INTEGRA INT-1422
Digital Multifunction Meter
Communications Guide

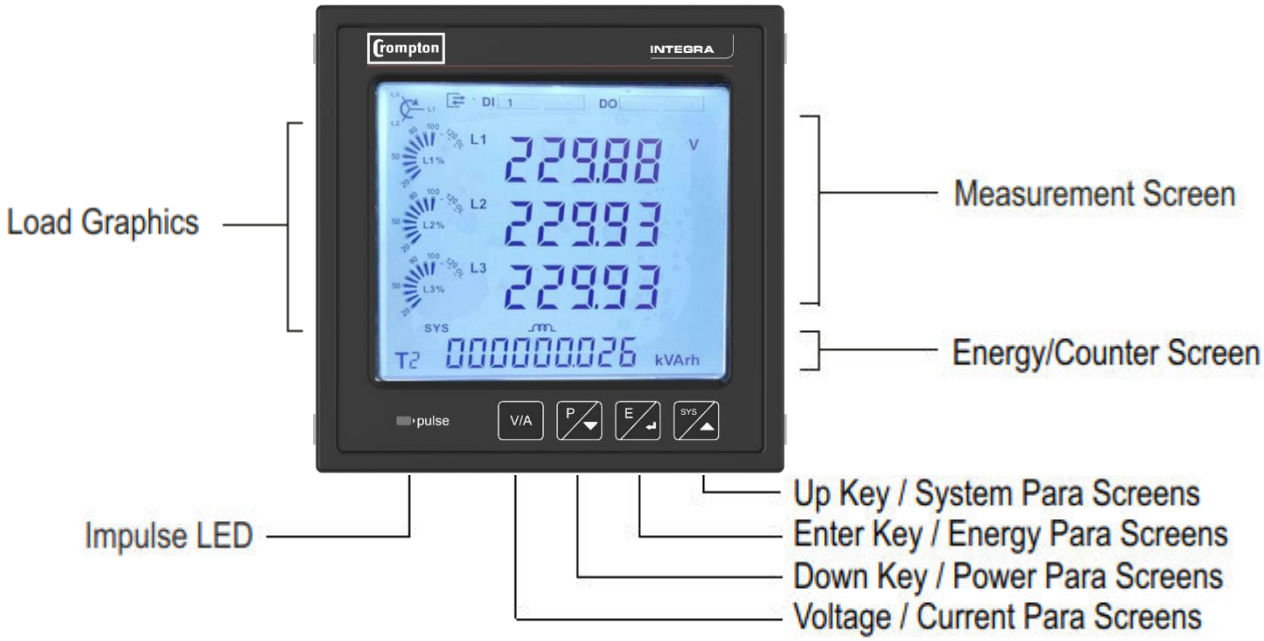
Section	Contents

1. Introduction

The Multifunction Instrument is a panel mounted 96 x 96mm DIN Quadratic Digital Panel Meter, which measures important electrical parameters in 3ph 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 Voltage & 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 four push buttons using which the user can scroll through different screens & configure the instrument. 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:

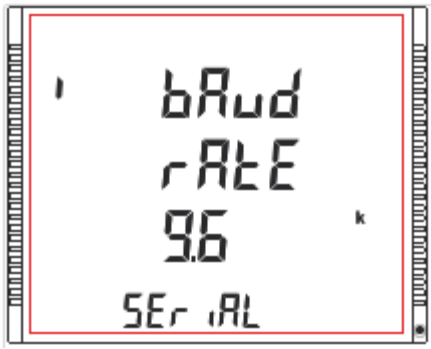
Device address: 001 Baud rate: 57600
Parity: None Stop bit: 1

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 2.1).

2.2 RS 485 Baud Rate

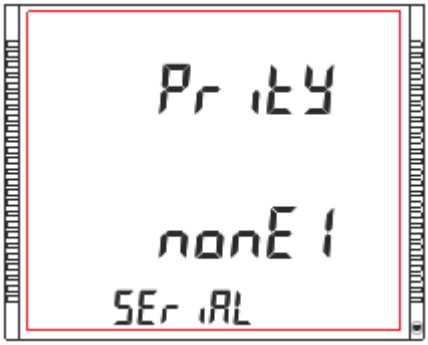


This screen allows the user to set Baud Rate of RS 485 port. The values displayed on screen are in kbaud.
Pressing "▲" key accepts the present value and advance to the "RS 485 Parity Selection" screen (see Section 2.3) and pressing the "▼" key accepts the present value and advance to the "Address Setting" 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.

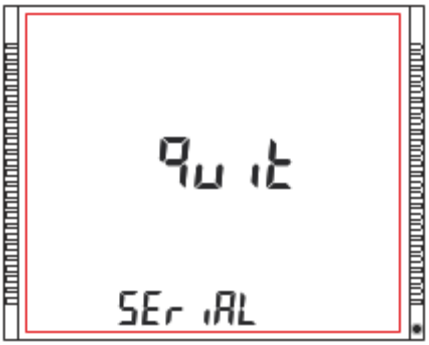


Pressing " ▲" key accepts the present value and advances to "Quit Communication Parameters" screen (see section 2.4).
Similarly, pressing " ▼key accepts the present value and advances to "RS 485 Baud Rate" screen (see section 2.2).

Pressing the "↵" key advances to the "Parity & Stop bit Edit" mode & k " ▲" and "▼" scrolls the value through:
nonE1: no parity with one stop bit **nonE2**: no parity with two stop bit
EVEn: even parity with one stop bit **odd**: odd parity with one stop bit

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 2 hexadecimal characters contained in each 8-bit field of the message
Format of Data Bytes	4 bytes (32 bits) per parameter. Floating point format (to IEEE 754) Most significant byte first (Alternative least significant byte first)
Error Checking Bytes	2 byte Cyclical Redundancy Check (CRC)
Byte format	1 start bit, 8 data bits, least significant bit sent first 1 bit for even/odd parity 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 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 consecutives16 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 query.
Start Address High: Most significant 8 bits of starting address of the parameter requested.
Start Address low: Least significant 8 bits of starting address of the parameter requested.
Number of register Hi: Most significant 8 bits of Number of registers requested.
Number of register Lo: Least significant 8 bits of Number of registers requested.
Data register 1 High Byte: Most significant 8 bits of Data register 1 of the parameter requested.
Data register 1 Low Byte: Least significant 8 bits of Data register 1 of the parameter requested.
Data register 2 High Byte: Most significant 8 bits of Data register 2 of the parameter requested.
Data register 2 Low Byte: Least significant 8 bits of Data register 2 of the parameter requested.
(Note: Two consecutive 16-bit register represent one parameter.)

TABLE 1: 3 X and 4 X register addresses for measured parameters
TABLE 1.1: 3 X and 4 X register addresses for Regular Parameters

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
30001	40001	1	Voltage L1 (Voltage L12 for 3P3W)	00	0	00	00
30003	40003	2	Voltage L2 (Voltage L23 for 3P3W)	00	02	00	02
30005	40005	3	Voltage L3 (Voltage L31 for 3P3W)	00	04	00	04
30007	40007	4	Current L1	00	06	00	06
30009	40009	5	Current L2	00	08	00	08
30011	40011	6	Current L3	00	0A	00	0A
30013	40013	7	Watt L1	00	0C	00	0C
30015	40015	8	Watt L2	00	0E	00	0E
30017	40017	9	Watt L3	00	10	00	10
30019	40019	10	VA L1	00	12	00	12
30021	40021	11	VA L2	00	14	00	14
30023	40023	12	VA L3	00	16	00	16
30025	40025	13	VAR L1	00	18	00	18
30027	40027	14	VAR L2	00	1A	00	1A
30029	40029	15	VAR L3	00	1C	00	1C
30031	40031	16	Power Factor L1	00	1E	00	1E
30033	40033	17	Power Factor L2	00	20	00	20
30035	40035	18	Power Factor L3	00	22	00	22
30037	40037	19	Phase Angle L1	00	24	00	24
30039	40039	20	Phase Angle L2	00	26	00	26
30041	40041	21	Phase Angle L3	00	28	00	28
30043	40043	22	Voltage Avg	00	2A	00	2A
30045	40045	23	Voltage 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
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	30121	61	VArh Ind. Overflow count	00	78	00	78
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	Re-Active Power Factor L1	00	A8	00	A8
30171	40171	86	Re-Active Power Factor L2	00	AA	00	AA
30173	40173	87	Re-Active Power Factor L3	00	AC	00	AC
30175	40175	88	Average Re-Active Power Factor	00	AE	00	AE
30177	40177	89	Sum Re-Active Power Factor	00	B0	00	B0
30179	40179	90	LF Factor SgnQ(1-(P/S)) L1	00	B2	00	B2
30181	40181	91	LF Factor SgnQ(1-(P/S)) L2	00	B4	00	B4
30183	40183	92	LF Factor SgnQ(1-(P/S)) L3	00	B6	00	B6
30185	40185	93	Average LF Factor SgnQ(1-(P/S))	00	B8	00	B8
30187	40187	94	Sum LF Factor SgnQ(1-(P/S))	00	BA	00	BA
30189	40189	95	Displacement Power Factor L1	00	BC	00	BC
30191	40191	96	Displacement Power Factor L2	00	BE	00	BE
30193	40193	97	Displacement Power Factor L3	00	C0	00	C0
30195	40195	98	Average Displacement Power Factor	00	C2	00	C2
30197	40197	99	Sum Displacement Power Factor	00	C4	00	C4
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	00	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 (3P4W only)	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
30243	40243	122	Phase indicate**	00	F2	00	F2
30249	40249	125	VLN Unbalance (3P4W only)	00	F8	00	F8
30251	40251	126	VLL Unbalance (3P4W and 3P3W only)	00	FA	00	FA
30253	40253	127	Curr. Unbalance (3P4W and 3P3W only)	00	FC	00	FC
30255	40255	128	Distortion VAr L1	00	FE	00	FE
30257	40257	129	Distortion VAr L2	01	00	01	00
30259	40259	130	Distortion VAr L3	01	02	01	02
30261	40261	131	Distortion VAr AVG	01	04	01	04
30263	40263	132	Distortion VAr SUM	01	06	01	06
30265	40265	133	Fundamental VAr L1	01	08	01	08
30267	40267	134	Fundamental VAr L2	01	0A	01	0A
30269	40269	135	Fundamental VAr L3	01	0C	01	0C
30271	40271	136	Fundamental VAr AVG	01	0E	01	0E
30273	40273	137	Fundamental VAr SUM	01	10	01	10

Note:

*1. The values are updated depending on "Energy 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 every 15 min.
**2. Phase Indicate - 0: Normal, 1: Reverse, 2: Absent, 3: Error
3. For 3P3W, phase-wise parameters (except Voltage, VTHD, Current, ITHD) are not available.
4. For 1P2W, Phase L2 and Phase L3 parameters, VLL are not available.

TABLE 1.2: 3 X and 4 X register addresses for Min & Max Values

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
31601	41601	1	Max Voltage L1 (L12 for 3P3W)	06	40	06	40
31603	41603	2	Max Voltage L2 (L23 for 3P3W)	06	42	06	42
31605	41605	3	Max Voltage L3 (L31 for 3P3W)	06	44	06	44
31607	41607	4	Min Voltage L1 (L12 for 3P3W)	06	46	06	46
31609	41609	5	Min Voltage L2 (L23 for 3P3W)	06	48	06	48
31611	41611	6	Min Voltage L3 (L31 for 3P3W)	06	4A	06	4A
31613	41613	7	Max Voltage L12	06	4C	06	4C
31615	41615	8	Max Voltage L23	06	4E	06	4E
31617	41617	9	Max Voltage L31	06	50	06	50
31619	41619	10	Min Voltage L12	06	52	06	52
31621	41621	11	Min Voltage L23	06	54	06	54
31623	41623	12	Min Voltage L31	06	56	06	56
31625	41625	13	System Max Voltage LN (VLL for 3P3W)	06	58	06	58
31627	41627	14	System Min Voltage LN (VLL for 3P3W)	06	5A	06	5A
31633	41633	17	Max Current L1	06	60	06	60
31635	41635	18	Max Current L2	06	62	06	62
31637	41637	19	Max Current L3	06	64	06	64
31639	41639	20	Min Current L1	06	66	06	66
31641	41641	21	Min Current L2	06	68	06	68
31643	41643	22	Min Current L3	06	6A	06	6A
31645	41645	23	System Max Current	06	6C	06	6C
31647	41647	24	System Min Current	06	6E	06	6E
31649	41649	25	Max W1	06	70	06	70
31651	41651	26	Max W2	06	72	06	72
31653	41653	27	Max W3	06	74	06	74
31655	41655	28	Min W1	06	76	06	76
31657	41657	29	Min W2	06	78	06	78
31659	41659	30	Min W3	06	7A	06	7A
31661	41661	31	Max Sys W	06	7C	06	7C
31663	41663	32	Min Sys W	06	7E	06	7E
31665	41665	33	Max VAr1	06	80	06	80
31667	41667	34	Max VAr2	06	82	06	82
31669	41669	35	Max VAr3	06	84	06	84
31671	41671	36	Min VAr1	06	86	06	86
31673	41673	37	Min VAr2	06	88	06	88
31675	41675	38	Min VAr3	06	8A	06	8A
31677	41677	39	Max SysVAr	06	8C	06	8C
31679	41679	40	Min Sys VAr	06	8E	06	8E
31681	41681	41	Max VA1	06	90	06	90
31683	41683	42	Max VA2	06	92	06	92
31685	41685	43	Max VA3	06	94	06	94
31687	41687	44	Min VA1	06	96	06	96
31689	41689	45	Min VA2	06	98	06	98
31691	41691	46	Min VA3	06	9A	06	9A

31693	41693	47	Max Sys VA	06	9C	06	9C
31695	41695	48	Min Sys VA	06	9E	06	9E
31697	41697	49	Max PF1	06	A0	06	A0
31699	41699	50	Max PF2	06	A2	06	A2
31701	41701	51	Max PF3	06	A4	06	A4
31703	41703	52	Min PF1	06	A6	06	A6
31705	41705	53	Min PF2	06	A8	06	A8
31707	41707	54	Min PF3	06	AA	06	AA
31709	41709	55	Max SysPF	06	AC	06	AC
31711	41711	56	Min Sys PF	06	AE	06	AE
31713	41713	57	Max Reactive PF L1	06	B0	06	B0
31715	41715	58	Max Reactive PF L2	06	B2	06	B2
31717	41717	59	Max Reactive PF L3	06	B4	06	B4
31719	41719	60	Min Reactive PF L1	06	B6	06	B6
31721	41721	61	Min Reactive PF L2	06	B8	06	B8
31723	41723	62	Min Reactive PF L3	06	BA	06	BA
31725	41725	63	Max Sys Reactive PF	06	BC	06	BC
31727	41727	64	Min Sys Reactive PF	06	BE	06	BE
31729	41729	65	Max PA1	06	C0	06	C0
31731	41731	66	Max PA2	06	C2	06	C2
31733	41733	67	Max PA3	06	C4	06	C4
31735	41735	68	Min PA1	06	C6	06	C6
31737	41737	69	Min PA2	06	C8	06	C8
31739	41739	70	Min PA3	06	CA	06	CA
31741	41741	71	Max SysPA	06	CC	06	CC
31743	41743	72	Min Sys PA	06	CE	06	CE
31745	41745	73	Max LF SgnQ L1	06	D0	06	D0
31747	41747	74	Max LF SgnQ L2	06	D2	06	D2
31749	41749	75	Max LF SgnQ L3	06	D4	06	D4
31751	41751	76	Min LF SgnQ L1	06	D6	06	D6
31753	41753	77	Min LF SgnQ L2	06	D8	06	D8
31755	41755	78	Min LF SgnQ L3	06	DA	06	DA
31757	41757	79	Max Sys LF SgnQ	06	DC	06	DC
31759	41759	80	Min Sys LF SgnQ	06	DE	06	DE
31761	41761	81	Max Sys Freq	06	E0	06	E0
31763	41763	82	Min Sys Freq	06	E2	06	E2

Note: 1. For 3P3W, phase-wise parameters (except Voltage, Current) are not available.
2. For 1P2W, phase-wise parameters are not available.

TABLE 1.3: 3 X and 4 X register addresses for Energies

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
31801	41801	1	Sys Active Energy Import	07	08	07	08
31803	41803	2	Sys Active Energy Export	07	0A	07	0A
31805	41805	3	Sys Reactive Energy Capacitive	07	0C	07	0C
31807	41807	4	Sys Reactive Energy Inductive	07	0E	07	0E
31809	41809	5	Sys Apparent Energy	07	10	07	10
31813	41813	7	Sys Active Energy Import OVF Count	07	14	07	14
31815	41815	8	Sys Active Energy Export OVF Count	07	16	07	16
31817	41817	9	Sys Reactive Energy Capacitive OVF Count	07	18	07	18
31819	41819	10	Sys Reactive Energy Inductive OVF Count	07	1A	07	1A
31821	41821	11	Sys Apparent Energy OVF Count	07	1C	07	1C
31825	41825	13	Sys Active Energy Import on time	07	20	07	20
31827	41827	14	Sys Active Energy Export on time	07	22	07	22
31829	41829	15	Sys Reactive Energy Capacitive on time	07	24	07	24
31831	41831	16	Sys Reactive Energy Inductive on time	07	26	07	26
31833	41833	17	Sys Apparent Energy on time	07	28	07	28
31837	41837	19	Sys Active Energy Imp OVF Count on update Rate*	07	2C	07	2C
31839	41839	20	Sys Active Energy Exp OVF Count on update Rate*	07	2E	07	2E
31841	41841	21	Sys Reactive Energy Cap OVF Count on update Rate*	07	30	07	30
31843	41843	22	Sys Reactive Energy Ind OVF Count on update Rate*	07	32	07	32
31845	41845	23	Sys Apparent Energy OVF Count on update Rate*	07	34	07	34
31849	41849	25	Sys Total Active Energy	07	38	07	38
31851	41851	26	Sys Total Reactive Energy	07	3A	07	3A
31853	41853	27	Sys Total Apparent Energy	07	3C	07	3C
31855	41855	28	Sys Total Active Energy OFL Count	07	3E	07	3E
31857	41857	29	Sys Total Reactive Energy OFL Count	07	40	07	40
31859	41859	30	Sys Total Apparent Energy OFL Count	07	42	07	42
31861	41861	31	Sys Total Active Energy on update Rate*	07	44	07	44
31863	41863	32	Sys Total Reactive Energy on update Rate*	07	46	07	46
31865	41865	33	Sys Total Apparent Energy on update Rate*	07	48	07	48
31867	41867	34	Sys Total Active Energy OFL Count on update Rate*	07	4A	07	4A
31869	41869	35	Sys Total Reactive Energy OFL Count on update Rate*	07	4C	07	4C
31871	41871	36	Sys Total Apparent Energy OFL Count on update Rate*	07	4E	07	4E
31873	41873	37	Active Energy Import L1	07	50	07	50
31875	41875	38	Active Energy Import L2	07	52	07	52
31877	41877	39	Active Energy Import L3	07	54	07	54
31879	41879	40	Active Energy Export L1	07	56	07	56
31881	41881	41	Active Energy Export L2	07	58	07	58
31883	41883	42	Active Energy Export L3	07	5A	07	5A
31885	41885	43	Reactive Energy Capacitive L1	07	5C	07	5C
31887	41887	44	Reactive Energy Capacitive L2	07	5E	07	5E

31889	41889	45	Reactive Energy Capacitive L3	07	60	07	60
31891	41891	46	Reactive Energy Inductive L1	07	62	07	62
31893	41893	47	Reactive Energy Inductive L2	07	64	07	64
31895	41895	48	Reactive Energy Inductive L3	07	66	07	66
31897	41897	49	Apparent Energy L1	07	68	07	68
31899	41899	50	Apparent Energy L2	07	6A	07	6A
31901	41901	51	Apparent Energy L3	07	6C	07	6C
31909	41909	55	Total Active Energy L1	07	74	07	74
31911	41911	56	Total Active Energy L2	07	76	07	76
31913	41913	57	Total Active Energy L3	07	78	07	78
31915	41915	58	Total Reactive Energy L1	07	7A	07	7A
31917	41917	59	Total Reactive Energy L2	07	7C	07	7C
31919	41919	60	Total Reactive Energy L3	07	7E	07	7E
31921	41921	61	Total Apparent Energy L1	07	80	07	80
31923	41923	62	Total Apparent Energy L2	07	82	07	82
31925	41925	63	Total Apparent Energy L3	07	84	07	84
31927	41927	64	OVF Count Active Energy Import L1	07	86	07	86
31929	41929	65	OVF Count Active Energy Import L2	07	88	07	88
31931	41931	66	OVF Count Active Energy Import L3	07	8A	07	8A
31933	41933	67	OVF Count Active Energy Export L1	07	8C	07	8C
31935	41935	68	OVF Count Active Energy Export L2	07	8E	07	8E
31937	41937	69	OVF Count Active Energy Export L3	07	90	07	90
31939	41939	70	OVF Count Reactive Energy Capacitive L1	07	92	07	92
31941	41941	71	OVF Count Reactive Energy Capacitive L2	07	94	07	94
31943	41943	72	OVF Count Reactive Energy Capacitive L3	07	96	07	96
31945	41945	73	OVF Count Reactive Energy Inductive L1	07	98	07	98
31947	41947	74	OVF Count Reactive Energy Inductive L2	07	9A	07	9A
31949	41949	75	OVF Count Reactive Energy Inductive L3	07	9C	07	9C
31951	41951	76	OVF Count Apparent Energy L1	07	9E	07	9E
31953	41953	77	OVF Count Apparent Energy L2	07	A0	07	A0
31955	41955	78	OVF Count Apparent Energy L3	07	A2	07	A2
31963	41963	82	Total Active Energy OVF Count L1	07	AA	07	AA
31965	41965	83	Total Active Energy OVF Count L2	07	AC	07	AC
31967	41967	84	Total Active Energy OVF Count L3	07	AE	07	AE
31969	41969	85	Total Reactive Energy OVF Count L1	07	B0	07	B0
31971	41971	86	Total Reactive Energy OVF Count L2	07	B2	07	B2
31973	41973	87	Total Reactive Energy OVF Count L3	07	B4	07	B4
31975	41975	88	Total Apparent Energy OVF Count L1	07	B6	07	B6
31977	41977	89	Total Apparent Energy OVF Count L2	07	B8	07	B8
31979	41979	90	Total Apparent Energy OVF Count L3	07	BA	07	BA
31981	41981	91	Active Energy Import L1 On Update Rate*	07	BC	07	BC
31983	41983	92	Active Energy Import L2 On Update Rate*	07	BE	07	BE
31985	41985	93	Active Energy Import L3 On Update Rate*	07	C0	07	C0
31987	41987	94	Active Energy Export L1 On Update Rate*	07	C2	07	C2
31989	41989	95	Active Energy Export L2 On Update Rate*	07	C4	07	C4
31991	41991	96	Active Energy Export L3 On Update Rate*	07	C6	07	C6
31993	41993	97	Reactive Energy Capacitive L1 On Update Rate*	07	C8	07	C8

31995	41995	98	Reactive Energy Capacitive L2 On Update Rate*	07	CA	07	CA
31997	41997	99	Reactive Energy Capacitive L3 On Update Rate*	07	CC	07	CC
31999	41999	100	Reactive Energy Inductive L1 On Update Rate*	07	CE	07	CE
32001	42001	101	Reactive Energy Inductive L2 On Update Rate*	07	D0	07	D0
32003	42003	102	Reactive Energy Inductive L3 On Update Rate*	07	D2	07	D2
32005	42005	103	Apparent Energy L1 On Update Rate*	07	D4	07	D4
32007	42007	104	Apparent Energy L2 On Update Rate*	07	D6	07	D6
32009	42009	105	Apparent Energy L3 On Update Rate*	07	D8	07	D8
32017	42017	109	Total Active Energy L1 On Update Rate*	07	E0	07	E0
32019	42019	110	Total Active Energy L2 On Update Rate*	07	E2	07	E2
32021	42021	111	Total Active Energy L3 On Update Rate*	07	E4	07	E4
32023	42023	112	Total Reactive Energy L1 On Update Rate*	07	E6	07	E6
32025	42025	113	Total Reactive Energy L2 On Update Rate*	07	E8	07	E8
32027	42027	114	Total Reactive Energy L3 On Update Rate*	07	EA	07	EA
32029	42029	115	Total Apparent Energy L1 On Update Rate*	07	EC	07	EC
32031	42031	116	Total Apparent Energy L2 On Update Rate*	07	EE	07	EE
32033	42033	117	Total Apparent Energy L3 On Update Rate*	07	F0	07	F0
32035	42035	118	OVF Active Energy Import L1 On Update Rate*	07	F2	07	F2
32037	42037	119	OVF Active Energy Import L2 On Update Rate*	07	F4	07	F4
32039	42039	120	OVF Active Energy Import L3 On Update Rate*	07	F6	07	F6
32041	42041	121	OVF Active Energy Export L1 On Update Rate*	07	F8	07	F8
32043	42043	122	OVF Active Energy Export L2 On Update Rate*	07	FA	07	FA
32045	42045	123	OVF Active Energy Export L3 On Update Rate*	07	FC	07	FC
32047	42047	124	OVF Reactive Energy Capacitive L1 On Update Rate*	07	FE	07	FE
32049	42049	125	OVF Reactive Energy Capacitive L2 On Update Rate*	08	0	08	0
32051	42051	126	OVF Reactive Energy Capacitive L3 On Update Rate*	08	02	08	02
32053	42053	127	OVF Reactive Energy Inductive L1 On Update Rate*	08	04	08	04
32055	42055	128	OVF Reactive Energy Inductive L2 On Update Rate*	08	06	08	06
32057	42057	129	OVF Reactive Energy Inductive L3 On Update Rate*	08	08	08	08
32059	42059	130	OVF Apparent Energy L1 On Update Rate*	08	0A	08	0A
32061	42061	131	OVF Apparent Energy L2 On Update Rate*	08	0C	08	0C
32063	42063	132	OVF Apparent Energy L3 On Update Rate*	08	0E	08	0E
32071	42071	136	Total Active Energy OVF Count L1 On Update Rate*	08	16	08	16
32073	42073	137	Total Active Energy OVF Count L2 On Update Rate*	08	18	08	18
32075	42075	138	Total Active Energy OVF Count L3 On Update Rate*	08	1A	08	1A
32077	42077	139	Total Reactive Energy OVF Count L1 On Update Rate*	08	1C	08	1C
32079	42079	140	Total Reactive Energy OVF Count L2 On Update Rate*	08	1E	08	1E

32081	42081	141	Total Reactive Energy OVF Count L3 On Update Rate*	08	20	08	20
32083	42083	142	Total Apparent Energy OVF Count L1 On Update Rate*	08	22	08	22
32085	42085	143	Total Apparent Energy OVF Count L2 On Update Rate*	08	24	08	24
32087	42087	144	Total Apparent Energy OVF Count L3 On Update Rate*	08	26	08	26
32089	42089	145	Digital Input Pulse Counter 1 Value	08	28	08	28
32091	42091	146	Digital Input Pulse Counter 2 Value	08	2A	08	2A
32097	42097	149	Digital Input Pulse Counter 1 Overflow	08	30	08	30
32099	42099	150	Digital Input Pulse Counter 2 Overflow	08	32	08	32
32105	42105	153	Run Hour Utility	08	38	08	38
32107	42107	154	On Hour Utility	08	3A	08	3A
32113	42113	157	No of Interruption	08	40	08	40

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 every 15 min.

2. OVF stands for Overflow Count.
3. For 3P3W and 1P2W, phase-wise parameters are not available.

TABLE 1.4: 3 X and 4 X register addresses for Individual Harmonics

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
32311	42311	1	VR Harmonic-1	09	06	09	06
32313	42313	2	IR Harmonic-1	09	08	09	08
32315	42315	3	VR Harmonic-2	09	0A	09	0A
32317	42317	4	IR Harmonic-2	09	0C	09	0C
32319	42319	5	VR Harmonic-3	09	0E	09	0E
32321	42321	6	IR Harmonic-3	09	10	09	10
32323	42323	7	VR Harmonic-4	09	12	09	12
32325	42325	8	IR Harmonic-4	09	14	09	14
32327	42327	9	VR Harmonic-5	09	16	09	16
32329	42329	10	IR Harmonic-5	09	18	09	18
32331	42331	11	VR Harmonic-6	09	1A	09	1A
32333	42333	12	IR Harmonic-6	09	1C	09	1C
32335	42335	13	VR Harmonic-7	09	1E	09	1E
32337	42337	14	IR Harmonic-7	09	20	09	20
32339	42339	15	VR Harmonic-8	09	22	09	22
32341	42341	16	IR Harmonic-8	09	24	09	24
32343	42343	17	VR Harmonic-9	09	26	09	26
32345	42345	18	IR Harmonic-9	09	28	09	28
32347	42347	19	VR Harmonic-10	09	2A	09	2A
32349	42349	20	IR Harmonic-10	09	2C	09	2C
32351	42351	21	VR Harmonic-11	09	2E	09	2E
32353	42353	22	IR Harmonic-11	09	30	09	30
32355	42355	23	VR Harmonic-12	09	32	09	32
32357	42357	24	IR Harmonic-12	09	34	09	34
32359	42359	25	VR Harmonic-13	09	36	09	36
32361	42361	26	IR Harmonic-13	09	38	09	38
32363	42363	27	VR Harmonic-14	09	3A	09	3A

32365	42365	28	IR Harmonic-14	09	3C	09	3C
32367	42367	29	VR Harmonic-15	09	3E	09	3E
32369	42369	30	IR Harmonic-15	09	40	09	40
32371	42371	31	VR Harmonic-16	09	42	09	42
32373	42373	32	IR Harmonic-16	09	44	09	44
32375	42375	33	VR Harmonic-17	09	46	09	46
32377	42377	34	IR Harmonic-17	09	48	09	48
32379	42379	35	VR Harmonic-18	09	4A	09	4A
32381	42381	36	IR Harmonic-18	09	4C	09	4C
32383	42383	37	VR Harmonic-19	09	4E	09	4E
32385	42385	38	IR Harmonic-19	09	50	09	50
32387	42387	39	VR Harmonic-20	09	52	09	52
32389	42389	40	IR Harmonic-20	09	54	09	54
32391	42391	41	VR Harmonic-21	09	56	09	56
32393	42393	42	IR Harmonic-21	09	58	09	58
32395	42395	43	VR Harmonic-22	09	5A	09	5A
32397	42397	44	IR Harmonic-22	09	5C	09	5C
32399	42399	45	VR Harmonic-23	09	5E	09	5E
32401	42401	46	IR Harmonic-23	09	60	09	60
32403	42403	47	VR Harmonic-24	09	62	09	62
32405	42405	48	IR Harmonic-24	09	64	09	64
32407	42407	49	VR Harmonic-25	09	66	09	66
32409	42409	50	IR Harmonic-25	09	68	09	68
32411	42411	51	VR Harmonic-26	09	6A	09	6A
32413	42413	52	IR Harmonic-26	09	6C	09	6C
32415	42415	53	VR Harmonic-27	09	6E	09	6E
32417	42417	54	IR Harmonic-27	09	70	09	70
32419	42419	55	VR Harmonic-28	09	72	09	72
32421	42421	56	IR Harmonic-28	09	74	09	74
32423	42423	57	VR Harmonic-29	09	76	09	76
32425	42425	58	IR Harmonic-29	09	78	09	78
32427	42427	59	VR Harmonic-30	09	7A	09	7A
32429	42429	60	IR Harmonic-30	09	7C	09	7C
32431	42431	61	VR Harmonic-31	09	7E	09	7E
32433	42433	62	IR Harmonic-31	09	80	09	80
32435	42435	63	VY Harmonic-1	09	82	09	82
32437	42437	64	IY Harmonic-1	09	84	09	84
32439	42439	65	VY Harmonic-2	09	86	09	86
32441	42441	66	IY Harmonic-2	09	88	09	88
32443	42443	67	VY Harmonic-3	09	8A	09	8A
32445	42445	68	IY Harmonic-3	09	8C	09	8C
32447	42447	69	VY Harmonic-4	09	8E	09	8E
32449	42449	70	IY Harmonic-4	09	90	09	90
32451	42451	71	VY Harmonic-5	09	92	09	92
32453	42453	72	IY Harmonic-5	09	94	09	94
32455	42455	73	VY Harmonic-6	09	96	09	96
32457	42457	74	IY Harmonic-6	09	98	09	98

32459	42459	75	VY Harmonic-7	09	9A	09	9A
32461	42461	76	IY Harmonic-7	09	9C	09	9C
32463	42463	77	VY Harmonic-8	09	9E	09	9E
32465	42465	78	IY Harmonic-8	09	A0	09	A0
32467	42467	79	VY Harmonic-9	09	A2	09	A2
32469	42469	80	IY Harmonic-9	09	A4	09	A4
32471	42471	81	VY Harmonic-10	09	A6	09	A6
32473	42473	82	IY Harmonic-10	09	A8	09	A8
32475	42475	83	VY Harmonic-11	09	AA	09	AA
32477	42477	84	IY Harmonic-11	09	AC	09	AC
32479	42479	85	VY Harmonic-12	09	AE	09	AE
32481	42481	86	IY Harmonic-12	09	B0	09	B0
32483	42483	87	VY Harmonic-13	09	B2	09	B2
32485	42485	88	IY Harmonic-13	09	B4	09	B4
32487	42487	89	VY Harmonic-14	09	B6	09	B6
32489	42489	90	IY Harmonic-14	09	B8	09	B8
32491	42491	91	VY Harmonic-15	09	BA	09	BA
32493	42493	92	IY Harmonic-15	09	BC	09	BC
32495	42495	93	VY Harmonic-16	09	BE	09	BE
32497	42497	94	IY Harmonic-16	09	C0	09	C0
32499	42499	95	VY Harmonic-17	09	C2	09	C2
32501	42501	96	IY Harmonic-17	09	C4	09	C4
32503	42503	97	VY Harmonic-18	09	C6	09	C6
32505	42505	98	IY Harmonic-18	09	C8	09	C8
32507	42507	99	VY Harmonic-19	09	CA	09	CA
32509	42509	100	IY Harmonic-19	09	CC	09	CC
32511	42511	101	VY Harmonic-20	09	CE	09	CE
32513	42513	102	IY Harmonic-20	09	D0	09	D0
32515	42515	103	VY Harmonic-21	09	D2	09	D2
32517	42517	104	IY Harmonic-21	09	D4	09	D4
32519	42519	105	VY Harmonic-22	09	D6	09	D6
32521	42521	106	IY Harmonic-22	09	D8	09	D8
32523	42523	107	VY Harmonic-23	09	DA	09	DA
32525	42525	108	IY Harmonic-23	09	DC	09	DC
32527	42527	109	VY Harmonic-24	09	DE	09	DE
32529	42529	110	IY Harmonic-24	09	E0	09	E0
32531	42531	111	VY Harmonic-25	09	E2	09	E2
32533	42533	112	IY Harmonic-25	09	E4	09	E4
32535	42535	113	VY Harmonic-26	09	E6	09	E6
32537	42537	114	IY Harmonic-26	09	E8	09	E8
32539	42539	115	VY Harmonic-27	09	EA	09	EA
32541	42541	116	IY Harmonic-27	09	EC	09	EC
32543	42543	117	VY Harmonic-28	09	EE	09	EE
32545	42545	118	IY Harmonic-28	09	F0	09	F0
32547	42547	119	VY Harmonic-29	09	F2	09	F2
32549	42549	120	IY Harmonic-29	09	F4	09	F4
32551	42551	121	VY Harmonic-30	09	F6	09	F6

32553	42553	122	IY Harmonic-30	09	F8	09	F8
32555	42555	123	VY Harmonic-31	09	FA	09	FA
32557	42557	124	IY Harmonic-31	09	FC	09	FC
32559	42559	125	VB Harmonic-1	09	FE	09	FE
32561	42561	126	IB Harmonic-1	0A	0	0A	0
32563	42563	127	VB Harmonic-2	0A	02	0A	02
32565	42565	128	IB Harmonic-2	0A	04	0A	04
32567	42567	129	VB Harmonic-3	0A	06	0A	06
32569	42569	130	IB Harmonic-3	0A	08	0A	08
32571	42571	131	VB Harmonic-4	0A	0A	0A	0A
32573	42573	132	IB Harmonic-4	0A	0C	0A	0C
32575	42575	133	VB Harmonic-5	0A	0E	0A	0E
32577	42577	134	IB Harmonic-5	0A	10	0A	10
32579	42579	135	VB Harmonic-6	0A	12	0A	12
32581	42581	136	IB Harmonic-6	0A	14	0A	14
32583	42583	137	VB Harmonic-7	0A	16	0A	16
32585	42585	138	IB Harmonic-7	0A	18	0A	18
32587	42587	139	VB Harmonic-8	0A	1A	0A	1A
32589	42589	140	IB Harmonic-8	0A	1C	0A	1C
32591	42591	141	VB Harmonic-9	0A	1E	0A	1E
32593	42593	142	IB Harmonic-9	0A	20	0A	20
32595	42595	143	VB Harmonic-10	0A	22	0A	22
32597	42597	144	IB Harmonic-10	0A	24	0A	24
32599	42599	145	VB Harmonic-11	0A	26	0A	26
32601	42601	146	IB Harmonic-11	0A	28	0A	28
32603	42603	147	VB Harmonic-12	0A	2A	0A	2A
32605	42605	148	IB Harmonic-12	0A	2C	0A	2C
32607	42607	149	VB Harmonic-13	0A	2E	0A	2E
32609	42609	150	IB Harmonic-13	0A	30	0A	30
32611	42611	151	VB Harmonic-14	0A	32	0A	32
32613	42613	152	IB Harmonic-14	0A	34	0A	34
32615	42615	153	VB Harmonic-15	0A	36	0A	36
32617	42617	154	IB Harmonic-15	0A	38	0A	38
32619	42619	155	VB Harmonic-16	0A	3A	0A	3A
32621	42621	156	IB Harmonic-16	0A	3C	0A	3C
32623	42623	157	VB Harmonic-17	0A	3E	0A	3E
32625	42625	158	IB Harmonic-17	0A	40	0A	40
32627	42627	159	VB Harmonic-18	0A	42	0A	42
32629	42629	160	IB Harmonic-18	0A	44	0A	44
32631	42631	161	VB Harmonic-19	0A	46	0A	46
32633	42633	162	IB Harmonic-19	0A	48	0A	48
32635	42635	163	VB Harmonic-20	0A	4A	0A	4A
32637	42637	164	IB Harmonic-20	0A	4C	0A	4C
32639	42639	165	VB Harmonic-21	0A	4E	0A	4E
32641	42641	166	IB Harmonic-21	0A	50	0A	50
32643	42643	167	VB Harmonic-22	0A	52	0A	52
32645	42645	168	IB Harmonic-22	0A	54	0A	54
32647	42647	169	VB Harmonic-23	0A	56	0A	56
32649	42649	170	IB Harmonic-23	0A	58	0A	58

32651	42651	171	VB Harmonic-24	0A	5A	0A	5A
32653	42653	172	IB Harmonic-24	0A	5C	0A	5C
32655	42655	173	VB Harmonic-25	0A	5E	0A	5E
32657	42657	174	IB Harmonic-25	0A	60	0A	60
32659	42659	175	VB Harmonic-26	0A	62	0A	62
32661	42661	176	IB Harmonic-26	0A	64	0A	64
32663	42663	177	VB Harmonic-27	0A	66	0A	66
32665	42665	178	IB Harmonic-27	0A	68	0A	68
32667	42667	179	VB Harmonic-28	0A	6A	0A	6A
32669	42669	180	IB Harmonic-28	0A	6C	0A	6C
32671	42671	181	VB Harmonic-29	0A	6E	0A	6E
32673	42673	182	IB Harmonic-29	0A	70	0A	70
32675	42675	183	VB Harmonic-30	0A	72	0A	72
32677	42677	184	IB Harmonic-30	0A	74	0A	74
32679	42679	185	VB Harmonic-31	0A	76	0A	76
32681	42681	186	IB Harmonic-31	0A	78	0A	78

TABLE 1.5: 3 X and 4 X register addresses for Historical Parameters

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
33301	43301	1	Historical Energy Unit	0C	E4	0C	E4
33303	43303	2	Historical Active Energy Import	0C	E6	0C	E6
33305	43305	3	Historical Active Energy Export	0C	E8	0C	E8
33307	43307	4	Historical Reactive Energy Capacitive	0C	EA	0C	EA
33309	43309	5	Historical Reactive Energy Inductive	0C	EC	0C	EC
33311	43311	6	Historical Apparent Energy	0C	EE	0C	EE
33315	43315	8	Historical Active Energy Import Overflow Count	0C	F2	0C	F2
33317	43317	9	Historical Active Energy Export Overflow Count	0C	F4	0C	F4
33319	43319	10	Historical Reactive Energy Capacitive Overflow Count	0C	F6	0C	F6
33321	43321	11	Historical Reactive Energy Inductive Overflow Count	0C	F8	0C	F8
33323	43323	12	Historical Apparent Energy Overflow Count	0C	FA	0C	FA
33327	43327	14	Historical Total Active Energy	0C	FE	0C	FE
33329	43329	15	Historical Total Reactive Energy	0D	0	0D	0
33331	43331	16	Historical Total Apparent Energy	0D	02	0D	02
33333	43333	17	Historical Total Active Energy Overflow Count	0D	04	0D	04
33335	43335	18	Historical Total Reactive Energy Overflow Count	0D	06	0D	06
33337	43337	19	Historical Total Apparent Energy Overflow Count	0D	08	0D	08
33339	43339	20	Historical Active Energy Import L1	0D	0A	0D	0A
33341	43341	21	Historical Active Energy Import L2	0D	0C	0D	0C
33343	43343	22	Historical Active Energy Import L3	0D	0E	0D	0E
33345	43345	23	Historical Active Energy Export L1	0D	10	0D	10
33347	43347	24	Historical Active Energy Export L2	0D	12	0D	12
33349	43349	25	Historical Active Energy Export L3	0D	14	0D	14
33351	43351	26	Historical Reactive Energy Capacitive L1	0D	16	0D	16
33353	43353	27	Historical Reactive Energy Capacitive L2	0D	18	0D	18
33355	43355	28	Historical Reactive Energy Capacitive L3	0D	1A	0D	1A
33357	43357	29	Historical Reactive Energy Inductive L1	0D	1C	0D	1C
33359	43359	30	Historical Reactive Energy Inductive L2	0D	1E	0D	1E
33361	43361	31	Historical Reactive Energy Inductive L3	0D	20	0D	20
33363	43363	32	Historical Apparent Energy L1	0D	22	0D	22
33365	43365	33	Historical Apparent Energy L2	0D	24	0D	24
33367	43367	34	Historical Apparent Energy L3	0D	26	0D	26
33375	43375	38	Historical Total Active Energy L1	0D	2E	0D	2E
33377	43377	39	Historical Total Active Energy L2	0D	30	0D	30
33379	43379	40	Historical Total Active Energy L3	0D	32	0D	32
33381	43381	41	Historical Total Reactive Energy L1	0D	34	0D	34
33383	43383	42	Historical Total Reactive Energy L2	0D	36	0D	36
33385	43385	43	Historical Total Reactive Energy L3	0D	38	0D	38
33387	43387	44	Historical Total Apparent Energy L1	0D	3A	0D	3A
33389	43389	45	Historical Total Apparent Energy L2	0D	3C	0D	3C
33391	43391	46	Historical Total Apparent Energy L3	0D	3E	0D	3E

33393	43393	47	Historical Overflow Active Energy Import L1	0D	40	0D	40
33395	43395	48	Historical Overflow Active Energy Import L2	0D	42	0D	42
33397	43397	49	Historical Overflow Active Energy Import L3	0D	44	0D	44
33399	43399	50	Historical Overflow Active Energy Export L1	0D	46	0D	46
33401	43401	51	Historical Overflow Active Energy Export L2	0D	48	0D	48
33403	43403	52	Historical Overflow Active Energy Export L3	0D	4A	0D	4A
33405	43405	53	Historical Overflow Reactive Energy Capacitive L1	0D	4C	0D	4C
33407	43407	54	Historical Overflow Reactive Energy Capacitive L2	0D	4E	0D	4E
33409	43409	55	Historical Overflow Reactive Energy Capacitive L3	0D	50	0D	50
33411	43411	56	Historical Overflow Reactive Energy Inductive L1	0D	52	0D	52
33413	43413	57	Historical Overflow Reactive Energy Inductive L2	0D	54	0D	54
33415	43415	58	Historical Overflow Reactive Energy Inductive L3	0D	56	0D	56
33417	43417	59	Historical Overflow Apparent Energy L1	0D	58	0D	58
33419	43419	60	Historical Overflow Apparent Energy L2	0D	5A	0D	5A
33421	43421	61	Historical Overflow Apparent Energy L3	0D	5C	0D	5C
33429	43429	65	Historical Total Active Energy Overflow Count L1	0D	64	0D	64
33431	43431	66	Historical Total Active Energy Overflow Count L2	0D	66	0D	66
33433	43433	67	Historical Total Active Energy Overflow Count L3	0D	68	0D	68
33435	43435	68	Historical Total Reactive Energy Overflow Count L1	0D	6A	0D	6A
33437	43437	69	Historical Total Reactive Energy Overflow Count L2	0D	6C	0D	6C
33439	43439	70	Historical Total Reactive Energy Overflow Count L3	0D	6E	0D	6E
33441	43441	71	Historical Total Apparent Energy Overflow Count L1	0D	70	0D	70
33443	43443	72	Historical Total Apparent Energy Overflow Count L2	0D	72	0D	72
33445	43445	73	Historical Total Apparent Energy Overflow Count L3	0D	74	0D	74
33447	43447	74	Historical Run hour	0D	76	0D	76
33449	43449	75	Historical On Hour	0D	78	0D	78
33455	43455	78	Historical No. of interrupts	0D	7E	0D	7E
33463	43463	82	Historical Sys kw imp Max Demand	0D	86	0D	86
33465	43465	83	Historical Sys kw exp Max Demand	0D	88	0D	88
33467	43467	84	Historical Sys kVAr Cap. Max Demand	0D	8A	0D	8A
33469	43469	85	Historical Sys kVAr Ind. Max Demand	0D	8C	0D	8C
33471	43471	86	Historical Sys kVA Max Demand	0D	8E	0D	8E
33475	43475	88	Historical Sys current Max demand	0D	92	0D	92

Note: For 3P3W and 1P2W, phase-wise parameters are not available.

TABLE 1.6: 3 X and 4 X register addresses for Digital Input & Output Parameters

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
33701	43701	1	Relay1 Output Status*	0E	74	0E	74
33703	43703	2	Relay2 Output Status*	0E	76	0E	76
33709	43709	5	Timer 1 On delay	0E	7C	0E	7C
33711	43711	6	Timer 2 On delay	0E	7E	0E	7E
33717	43717	9	Timer 1 Off delay	0E	84	0E	84
33719	43719	10	Timer 2 Off delay	0E	86	0E	86
33725	43725	13	Timer 1 No. of Cycles	0E	8C	0E	8C
33727	43727	14	Timer 2 No. of Cycles	0E	8E	0E	8E
33733	43733	17	Health Status of 3Ph Sys (Refer **Table 10**)	0E	94	0E	94
33735	43735	18	Prepaid Balance Energy for Relay 1	0E	96	0E	96
33737	43737	19	Prepaid Balance Energy for Relay 2	0E	98	0E	98
33743	43743	22	Prepaid Balance Cost for Relay 1	0E	9E	0E	9E
33745	43745	23	Prepaid Balance Cost for Relay 2	0E	A0	0E	A0
33759	43759	30	Digital Input 1 Status**	0E	AE	0E	AE
33761	43761	31	Digital Input 2 Status**	0E	B0	0E	B0

***Note:** 1. Relay Output 1/ 2 Status shows whether relay is Energized or De-energized.
1: - Relay Energized 0: - Relay De-energized
****Note:** 2. Digital Input status gets updated only when corresponding Digital Input is configured in Status Mode.

TABLE 1.7: 3 X and 4 X register addresses for Tariff Energies

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
34001	44001	1	Tariff1 Source1 Energy Count	0F	A0	0F	A0
34003	44003	2	Tariff1 Source2 Energy Count	0F	A2	0F	A2
34005	44005	3	Tariff1 Source3 Energy Count	0F	A4	0F	A4
34007	44007	4	Tariff1 Source4 Energy Count	0F	A6	0F	A6
34009	44009	5	Tariff1 Source5 Energy Count	0F	A8	0F	A8
34011	44011	6	Tariff1 Source6 Energy Count	0F	AA	0F	AA
34013	44013	7	Tariff1 Source1 Energy OVF Count	0F	AC	0F	AC
34015	44015	8	Tariff1 Source2 Energy OVF Count	0F	AE	0F	AE
34017	44017	9	Tariff1 Source3 Energy OVF Count	0F	B0	0F	B0
34019	44019	10	Tariff1 Source4 Energy OVF Count	0F	B2	0F	B2
34021	44021	11	Tariff1 Source5 Energy OVF Count	0F	B4	0F	B4
34023	44023	12	Tariff1 Source6 Energy OVF Count	0F	B6	0F	B6
34025	44025	13	Tariff2 Source1 Energy Count	0F	B8	0F	B8
34027	44027	14	Tariff2 Source2 Energy Count	0F	BA	0F	BA
34029	44029	15	Tariff2 Source3 Energy Count	0F	BC	0F	BC
34031	44031	16	Tariff2 Source4 Energy Count	0F	BE	0F	BE
34033	44033	17	Tariff2 Source5 Energy Count	0F	C0	0F	C0
34035	44035	18	Tariff2 Source6 Energy Count	0F	C2	0F	C2
34037	44037	19	Tariff2 Source1 Energy OVF Count	0F	C4	0F	C4
34039	44039	20	Tariff2 Source2 Energy OVF Count	0F	C6	0F	C6
34041	44041	21	Tariff2 Source3 Energy OVF Count	0F	C8	0F	C8
34043	44043	22	Tariff2 Source4 Energy OVF Count	0F	CA	0F	CA
34045	44045	23	Tariff2 Source5 Energy OVF Count	0F	CC	0F	CC
34047	44047	24	Tariff2 Source6 Energy OVF Count	0F	CE	0F	CE

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

Address (3X)	Address (4X)	Parameter Number	Parameter	Start Address Hex 3X		Start Address Hex 4X	
				High Byte	Lo Byte	High Byte	Lo Byte
30801	40801	1	Sys Active Energy Import	03	20	03	20
30803	40803	2	Sys Active Energy Export	03	22	03	22
30805	40805	3	Sys Reactive Energy Capacitive	03	24	03	24
30807	40807	4	Sys Reactive Energy Inductive	03	26	03	26
30809	40809	5	Sys Apparent Energy	03	28	03	28
30813	40813	7	Sys Active Energy Import OVF Count	03	2C	03	2C
30815	40815	8	Sys Active Energy Export OVF Count	03	2E	03	2E
30817	40817	9	Sys Reactive Energy Cap. OVF Count	03	30	03	30
30819	40819	10	Sys Reactive Energy Ind. OVF Count	03	32	03	32
30821	40821	11	Sys Apparent Energy OVF Count	03	34	03	34
30825	40825	13	Sys Active Energy OVF on update Rate*	03	38	03	38
30827	40827	14	Sys Active Energy Export on update Rate*	03	3A	03	3A
30829	40829	15	Sys Reactive Energy Cap. on update Rate*	03	3C	03	3C
30831	40831	16	Sys Reactive Energy Ind. on update Rate*	03	3E	03	3E
30833	40833	17	Sys Apparent Energy on update Rate*	03	40	03	40
30837	40837	19	Sys Active Energy Import OVF Count on update Rate*	03	44	03	44
30839	40839	20	Sys Active Energy Export OVF Count on update Rate*	03	46	03	46
30841	40841	21	Sys Reactive Energy Cap. OVF Count on update Rate*	03	48	03	48
30843	40843	22	Sys Reactive Energy Ind. OVF Count on update Rate*	03	4A	03	4A
30845	40845	23	Sys Apparent Energy OVF Count on update Rate*	03	4C	03	4C
30849	40849	25	Sys Total Active Energy	03	50	03	50
30851	40851	26	Sys Total Reactive Energy	03	52	03	52
30853	40853	27	Sys Total Apparent Energy	03	54	03	54
30855	40855	28	Sys Total Active Energy OVF Count	03	56	03	56
30857	40857	29	Sys Total Reactive Energy OVF Count	03	58	03	58
30859	40859	30	Sys Total Apparent Energy OVF Count	03	5A	03	5A
30861	40861	31	Sys Total Active Energy on update Rate*	03	5C	03	5C
30863	40863	32	Sys Total Reactive Energy on update Rate*	03	5E	03	5E
30865	40865	33	Sys Total Apparent Energy on update Rate*	03	60	03	60
30867	40867	34	Sys Total Active Energy OVF Count on update Rate*	03	62	03	62
30869	40869	35	Sys Total Reactive Energy OVF Count on update Rate*	03	64	03	64
30871	40871	36	Sys Total Apparent Energy OVF Count on update Rate*	03	66	03	66
30873	40873	37	Active Energy Import L1	03	68	03	68
30875	40875	38	Active Energy Import L2	03	6A	03	6A
30877	40877	39	Active Energy Import L3	03	6C	03	6C
30879	40879	40	Active Energy Export L1	03	6E	03	6E
30881	40881	41	Active Energy Export L2	03	70	03	70

30883	40883	42	Active Energy Export L3	03	72	03	72
30885	40885	43	Reactive Energy Capacitive L1	03	74	03	74
30887	40887	44	Reactive Energy Capacitive L2	03	76	03	76
30889	40889	45	Reactive Energy Capacitive L3	03	78	03	78
30891	40891	46	Reactive Energy Inductive L1	03	7A	03	7A
30893	40893	47	Reactive Energy Inductive L2	03	7C	03	7C
30895	40895	48	Reactive Energy Inductive L3	03	7E	03	7E
30897	40897	49	Apparent Energy L1	03	80	03	80
30899	40899	50	Apparent Energy L2	03	82	03	82
30901	40901	51	Apparent Energy L3	03	84	03	84
30909	40909	55	Total Active Energy L1	03	8C	03	8C
30911	40911	56	Total Active Energy L2	03	8E	03	8E
30913	40913	57	Total Active Energy L3	03	90	03	90
30915	40915	58	Total Reactive Energy L1	03	92	03	92
30917	40917	59	Total Reactive Energy L2	03	94	03	94
30919	40919	60	Total Reactive Energy L3	03	96	03	96
30921	40921	61	Total Apparent Energy L1	03	98	03	98
30923	40923	62	Total Apparent Energy L2	03	9A	03	9A
30925	40925	63	Total Apparent Energy L3	03	9C	03	9C
30927	40927	64	OVF Active Energy Import L1	03	9E	03	9E
30929	40929	65	OVF Active Energy Import L2	03	A0	03	A0
30931	40931	66	OVF Active Energy Import L3	03	A2	03	A2
30933	40933	67	OVF Active Energy Export L1	03	A4	03	A4
30935	40935	68	OVF Active Energy Export L2	03	A6	03	A6
30937	40937	69	OVF Active Energy Export L3	03	A8	03	A8
30939	40939	70	OVF Reactive Energy Capacitive L1	03	AA	03	AA
30941	40941	71	OVF Reactive Energy Capacitive L2	03	AC	03	AC
30943	40943	72	OVF Reactive Energy Capacitive L3	03	AE	03	AE
30945	40945	73	OVF Reactive Energy Inductive L1	03	B0	03	B0
30947	40947	74	OVF Reactive Energy Inductive L2	03	B2	03	B2
30949	40949	75	OVF Reactive Energy Inductive L3	03	B4	03	B4
30951	40951	76	OVF Apparent Energy L1	03	B6	03	B6
30953	40953	77	OVF Apparent Energy L2	03	B8	03	B8
30955	40955	78	OVF Apparent Energy L3	03	BA	03	BA
30963	40963	82	Total Active Energy OVF Count L1	03	C2	03	C2
30965	40965	83	Total Active Energy OVF Count L2	03	C4	03	C4
30967	40967	84	Total Active Energy OVF Count L3	03	C6	03	C6
30969	40969	85	Total Reactive Energy OVF Count L1	03	C8	03	C8
30971	40971	86	Total Reactive Energy OVF Count L2	03	CA	03	CA
30973	40973	87	Total Reactive Energy OVF Count L3	03	CC	03	CC
30975	40975	88	Total Apparent Energy OVF Count L1	03	CE	03	CE
30977	40977	89	Total Apparent Energy OVF Count L2	03	D0	03	D0
30979	40979	90	Total Apparent Energy OVF Count L3	03	D2	03	D2
30981	40981	91	Active Energy Import L1 on update Rate*	03	D4	03	D4
30983	40983	92	Active Energy Import L2 on update Rate*	03	D6	03	D6
30985	40985	93	Active Energy Import L3 on update Rate*	03	D8	03	D8
30987	40987	94	Active Energy Export L1 on update Rate*	03	DA	03	DA

30989	40989	95	Active Energy Export L2 on update Rate*	03	DC	03	DC
30991	40991	96	Active Energy Export L3 on update Rate*	03	DE	03	DE
30993	40993	97	Reactive Energy Capacitive L1 on update Rate*	03	E0	03	E0
30995	40995	98	Reactive Energy Capacitive L2 on update Rate*	03	E2	03	E2
30997	40997	99	Reactive Energy Capacitive L3 on update Rate*	03	E4	03	E4
30999	40999	100	Reactive Energy Inductive L1 on update Rate*	03	E6	03	E6
31001	41001	101	Reactive Energy Inductive L2 on update Rate*	03	E8	03	E8
31003	41003	102	Reactive Energy Inductive L3 on update Rate*	03	EA	03	EA
31005	41005	103	Apparent Energy L1 on update Rate*	03	EC	03	EC
31007	41007	104	Apparent Energy L2 on update Rate*	03	EE	03	EE
31009	41009	105	Apparent Energy L3 on update Rate*	03	F0	03	F0
31017	41017	109	Total Active Energy L1 on update Rate*	03	F8	03	F8
31019	41019	110	Total Active Energy L2 on update Rate*	03	FA	03	FA
31021	41021	111	Total Active Energy L3 on update Rate*	03	FC	03	FC
31023	41023	112	Total Reactive Energy L1 on update Rate*	03	FE	03	FE
31025	41025	113	Total Reactive Energy L2 on update Rate*	04	0	04	0
31027	41027	114	Total Reactive Energy L3 on update Rate*	04	02	04	02
31029	41029	115	Total Apparent Energy L1 on update Rate*	04	04	04	04
31031	41031	116	Total Apparent Energy L2 on update Rate*	04	06	04	06
31033	41033	117	Total Apparent Energy L3 on update Rate*	04	08	04	08
31035	41035	118	OVF Active Energy Import L1 on update Rate*	04	0A	04	0A
31037	41037	119	OVF Active Energy Import L2 on update Rate*	04	0C	04	0C
31039	41039	120	OVF Active Energy Import L3 on update Rate*	04	0E	04	0E
31041	41041	121	OVF Active Energy Export L1 on update Rate*	04	10	04	10
31043	41043	122	OVF Active Energy Export L2 on update Rate*	04	12	04	12
31045	41045	123	OVF Active Energy Export L3 on update Rate*	04	14	04	14
31047	41047	124	OVF Reactive Energy Cap. L1 on update Rate*	04	16	04	16
31049	41049	125	OVF Reactive Energy Cap. L2 on update Rate*	04	18	04	18
31051	41051	126	OVF Reactive Energy Cap. L3 on update Rate*	04	1A	04	1A
31053	41053	127	OVF Reactive Energy Ind. L1 on update Rate*	04	1C	04	1C
31055	41055	128	OVF Reactive Energy Ind. L2 on update Rate*	04	1E	04	1E
31057	41057	129	OVF Reactive Energy Ind. L3 on update Rate*	04	20	04	20
31059	41059	130	OVF Apparent Energy L1 on update Rate*	04	22	04	22
31061	41061	131	OVF Apparent Energy L2 on update Rate*	04	24	04	24
31063	41063	132	OVF Apparent Energy L3 on update Rate*	04	26	04	26
31071	41071	136	Total Active Energy OVF Count L1 on update Rate*	04	2E	04	2E
31073	41073	137	Total Active Energy OVF Count L2 on update Rate*	04	30	04	30

31075	41075	138	Total Active Energy OVF Count L3 on update Rate*	04	32	04	32
31077	41077	139	Total Reactive Energy OVF Count L1 on update Rate*	04	34	04	34
31079	41079	140	Total Reactive Energy OVF Count L2 on update Rate*	04	36	04	36
31081	41081	141	Total Reactive Energy OVF Count L3 on update Rate*	04	38	04	38
31083	41083	142	Total Apparent Energy OVF Count L1 on update Rate*	04	3A	04	3A
31085	41085	143	Total Apparent Energy OVF Count L2 on update Rate*	04	3C	04	3C
31087	41087	144	Total Apparent Energy OVF Count L3 on update Rate*	04	3E	04	3E
31089	41089	145	External Counter 1 Value**	04	40	04	40
31091	41091	146	External Counter 2 Value**	04	42	04	42
31097	41097	149	External Counter 1 OVF**	04	48	04	48
31099	41099	150	External Counter 2 OVF**	04	4A	04	4A
31105	41105	153	Run Hour	04	50	04	50
31107	41107	154	On Hour	04	52	04	52
31113	41113	157	No of Interruption	04	58	04	58
31301	41301	200	Tariff1 Source1 Energy Count	05	14	05	14
31303	41303	201	Tariff1 Source2 Energy Count	05	16	05	16
31305	41305	202	Tariff1 Source3 Energy Count	05	18	05	18
31307	41307	203	Tariff1 Source4 Energy Count	05	1A	05	1A
31309	41309	204	Tariff1 Source5 Energy Count	05	1C	05	1C
31311	41311	205	Tariff1 Source6 Energy Count	05	1E	05	1E
31313	41313	206	Tariff1 Source1 Energy OVF Count	05	20	05	20
31315	41315	207	Tariff1 Source2 Energy OVF Count	05	22	05	22
31317	41317	208	Tariff1 Source3 Energy OVF Count	05	24	05	24
31319	41319	209	Tariff1 Source4 Energy OVF Count	05	26	05	26
31321	41321	210	Tariff1 Source5 Energy OVF Count	05	28	05	28
31323	41323	211	Tariff1 Source6 Energy OVF Count	05	2A	05	2A
31325	41325	212	Tariff2 Source1 Energy Count	05	2C	05	2C
31327	41327	213	Tariff2 Source2 Energy Count	05	2E	05	2E
31329	41329	214	Tariff2 Source3 Energy Count	05	30	05	30
31331	41331	215	Tariff2 Source4 Energy Count	05	32	05	32
31333	41333	216	Tariff2 Source5 Energy Count	05	34	05	34
31335	41335	217	Tariff2 Source6 Energy Count	05	36	05	36
31337	41337	218	Tariff2 Source1 Energy OVF Count	05	38	05	38
31339	41339	219	Tariff2 Source2 Energy OVF Count	05	3A	05	3A
31341	41341	220	Tariff2 Source3 Energy OVF Count	05	3C	05	3C
31343	41343	221	Tariff2 Source4 Energy OVF Count	05	3E	05	3E
31345	41345	222	Tariff2 Source5 Energy OVF Count	05	40	05	40
31347	41347	223	Tariff2 Source6 Energy OVF Count	05	42	05	42

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.
**2. External Counter gets updated when Digital Input is configured in Pulse Mode.
3. OVF stands for OverFlow.
4. For 3P3W and 1P2W System, phase-wise parameters are not available.

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 = 1772 (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	72 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	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 High: Most significant 8 bits of Number of registers requested.
Number of register Low: Least significant 8 bits of Number of registers requested.
(Note: Two consecutive 16 bit register represent one parameter.)

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

Device Address	01 (Hex)
Function Code	03 (Hex)
Byte Count	04 (Hex)
Data Register- 1 High Byte	40 (Hex)
Data Register- 1 Low Byte	40 (Hex)
Data Register- 2 High Byte	00 (Hex)
Data Register- 2 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 = 1772 (Hex)
Number of registers = 02
Note: Number of registers = Number of Parameters x 2

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

Device Address	01 (Hex)
Function Code	10 (Hex)
Starting Address High	17 (Hex)
Starting Address Low	72 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	02 (Hex)
Byte Count	04 (Hex)
Data Register- 1 High Byte	40 (Hex)
Data Register- 1 Low Byte	00 (Hex)
Data Register- 2 High Byte	00 (Hex)
Data Register- 2 Low Byte	00 (Hex)
CRC Low	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	72 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	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 High: Most significant 8 bits of Number of registers requested.
Number of register Low: Least significant 8 bits of Number of registers requested.
(Note: Two consecutive 16 bit register represent one parameter)

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

For setting Energy start count in long energy format following query format should be used for writing energy start count. First, send query (at address 1790) to unlock the parameter.
Note: For parameter to be unlocked, refer TABLE 7 for energy parameter selection.

Query: (Query for Unlock to enter System Active Energy Import)

Device Address	01 (Hex)
Function Code	10 (Hex)
Starting Address High	17 (Hex)
Starting Address Low	90 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	02 (Hex)
Byte Count	04 (Hex)
Data Register- 1 High Byte	3F (Hex)
Data Register- 1 Low Byte	80 (Hex)
Data Register- 2 High Byte	00 (Hex)
Data Register- 2 Low Byte	00 (Hex)
CRC Low	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	17 (Hex)
Start Address Low	90 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	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 High: Most significant 8 bits of Number of registers requested.

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

Once the Unlock query is sent, next send query for writing Energy start count.
For Example: Query for writing energy start count of 999999999 for System Active Import Energy
Note: Refer **TABLE 2** for register address of the selected parameter.

Query: (Query enter System Active Energy Import)

Device Address	01 (Hex)
Function Code	10 (Hex)
Starting Address High	03 (Hex)
Starting Address Low	20 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	02 (Hex)
Byte Count	04 (Hex)
Data Register- 1 High 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) represents 999999999.

Response:

Device Address	01 (Hex)
Function Code	10 (Hex)
Start Address High	03 (Hex)
Start Address Low	20 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	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 High: Most significant 8 bits of Number of registers requested.
Number of register Low: Least significant 8 bits of Number of registers requested.

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

TABLE 3: 4 X register addresses

Address (Register)	Parameter Number	Parameter	Read/ Write	Modbus Start Address Hex		Default Value
				High Byte	Low Byte	
46003	1	System Type	R/Wp	17	72	3
46005	2	PT Primary	R/Wp	17	74	500
46007	3	CT Primary	R/Wp	17	76	5
46009	4	PT Secondary	R/Wp	17	78	500
46011	5	CT Secondary	R/Wp	17	7A	5
46013	6	System Frequency Selection	R/Wp	17	7C	50
46019	9	Demand Integration Time	R/Wp	17	82	8
46021	10	Energy Unit	R/Wp	17	84	2
46023	11	Energy Digit Reset Count	R/Wp	17	86	8
46027	13	Energy Update rate on MODBUS	R/Wp	17	8A	15
46029	14	Impulse on Energy Selection	R/Wp	17	8C	1
46031	15	Impulse Rate	R	17	8E	-
46033	16	Energy Para Select for Start Count	R/Wp	17	90	0
46035	17	Enter Energy Start Count	R/Wp	17	92	0
46037	18	Reset Parameters	R/Wp	17	94	0
46039	19	Password	R/Wp	17	96	0
46041	20	Factory Reset Mode	R/Wp	17	98	0
46045	22	Number of Poles	R/Wp	17	9C	2
46047	23	Auto Scroll	R/Wp	17	9E	0
46049	24	Current Noise Cut off (mA)	R/Wp	17	A0	0
46051	25	Node Address	R/Wp	17	A2	1
46053	26	RS485 Setup Code	R/Wp	17	A4	4
46055	27	Register Order/Word Order	R/Wp	17	A6	0
46057	28	Pulse Width	R/Wp	17	A8	100
46059	29	Pulse Divisor	R/Wp	17	AA	1
46061	30	Relay1 Output Select	R/Wp	17	AC	0
46063	31	Relay1 Parameter Select	R/Wp	17	AE	0
46065	32	Relay1 Limit1 Alarm Setting (Hi/Lo)	R/Wp	17	B0	0
46067	33	Relay1 Limit1 Trip point	R/Wp	17	B2	10
46069	34	Relay1 Limit1 Hysteresis	R/Wp	17	B4	0.5
46071	35	Relay1 Limit 2 Para select	R/Wp	17	B6	0
46073	36	Relay1 Limit 2 Alarm Setting (High/Low)	R/Wp	17	B8	0
46075	37	Relay1 Limit 2 Trip point	R/Wp	17	BA	10
46077	38	Relay1 Limit 2 Hysteresis	R/Wp	17	BC	0.5
46079	39	Relay1 Limit 3 Para select	R/Wp	17	BE	0
46081	40	Relay1 Limit 3 Alarm Setting (High/Low)	R/Wp	17	C0	0
46083	41	Relay1 Limit 3 Trip point	R/Wp	17	C2	10
46085	42	Relay1 Limit 3 Hysteresis	R/Wp	17	C4	0.5
46087	43	Relay1 Logic Operation Setting	R/Wp	17	C6	0
46089	44	Relay1 Configuration (Energize/De-Energize)	R/Wp	17	C8	1
46091	45	Relay1 Delay (On)	R/Wp	17	CA	1
46093	46	Relay1 Delay (Off)	R/Wp	17	CC	1
46095	47	Relay1 Energy Selection for Prepaid	R/Wp	17	CE	0
46097	48	Relay1 Rate per energy unit for Prepaid	R/Wp	17	D0	1
46099	49	Relay1 Top up Recharge for Prepaid	R/Wp	17	D2	100
46101	50	Relay1 New Recharge for Prepaid	R/Wp	17	D4	100
46103	51	Relay2 Output Select	R/Wp	17	D6	0
46105	52	Relay2 Limit1 Para Select	R/Wp	17	D8	0
46107	53	Relay2 Limit1 Alarm Setting (High/Low)	R/Wp	17	DA	0
46109	54	Relay2 Limit1 Trip point	R/Wp	17	DC	10
46111	55	Relay2 Limit1 Hysteresis	R/Wp	17	DE	0.5
46113	56	Relay2 Limit 2 Para select	R/Wp	17	E0	0
46115	57	Relay2 Limit 2 Alarm Setting (High/Low)	R/Wp	17	E2	0

46117	58	Relay2 Limit 2 Trip point	R/Wp	17	E4	10
46119	59	Relay2 Limit 2 Hysteresis	R/Wp	17	E6	0.5
46121	60	Relay2 Limit 3 Para select	R/Wp	17	E8	0
46123	61	Relay2 Limit 3 Alarm Setting (High/Low)	R/Wp	17	EA	0
46125	62	Relay2 Limit 3 Trip point	R/Wp	17	EC	10
46127	63	Relay2 Limit 3 Hysteresis	R/Wp	17	EE	0.5
46129	64	Relay2 Logic Operation Setting	R/Wp	17	F0	0
46131	65	Relay2 Configuration (Energize/DeEnergize)	R/Wp	17	F2	1
46133	66	Relay2 Delay (On)	R/Wp	117	F4	1
46135	67	Relay2 Delay (Off)	R/Wp	7	F6	1
46137	68	Relay2 Energy Selection for Prepaid	R/Wp	17	F8	0
46139	69	Relay2 Rate per energy unit for Prepaid	R/Wp	17	FA	1
46141	70	Relay2 Top up Recharge for Prepaid	R/Wp	17	FC	100
46143	71	Relay2 New Recharge for Prepaid	R/Wp	18	FE	100
46229	114	Health Monitor Voltage Unbalance limit	R/Wp	1178	54	20
46231	115	Health Monitor Current Unbalance limit	R/Wp	18	56	20
46233	116	Health Monitor Under Freq Limit	R/Wp	18	58	95
46235	117	Health Monitor Under Voltage Limit	R/Wp	18	5A	70
46237	118	Health Monitor Over Voltage Limit	R/Wp	18	5C	120
46239	119	Health Monitor Over Current Limit	R/Wp	18	5E	120
46241	120	Timer 1 Start Stop	R/Wp	18	60	0
46243	121	Timer 2 Start Stop	R/Wp	18	62	0
46337	168	Digital Input Debounce Time	R/Wp	18	C0	100
46339	169	Digital Input 1 Mode	R/Wp	18	C2	0
46341	170	Digital Input 2 Mode	R/Wp	18	C4	0
46347	173	Digital Input 1 Pulse Multiplier	R/Wp	18	CA	1
46349	174	Digital Input 2 Pulse Multiplier	R/Wp	18	CC	1
46357	178	Firmware Version Number	R	18	D4	-
46365	182	Backlight ON/OFF	R/Wp	18	DC	1
46367	183	Contrast for both LCD/ Touch	R/Wp	18	DE	3
46369	184	User screen enable	R/Wp	18	E0	0
46371	185	User screen 1	R/Wp	18	E2	1
46373	186	User screen 2	R/Wp	18	E4	2
46375	187	User screen 3	R/Wp	18	E6	3
46377	188	User screen 4	R/Wp	18	E8	4
46379	189	User screen 5	R/Wp	18	EA	5
46381	190	User screen 6	R/W	17	EC	6
46383	191	User screen 7	R/Wp	18	EE	7
46385	192	User screen 8	R/Wp	18	F0	8
46387	193	User screen 9	R/Wp	18	F2	9
46389	194	User screen 10	R/Wp	18	F4	10
46391	195	Tariff Selection Mode	R/Wp	18	F6	1
46393	196	No of Tariff	R/Wp	18	F8	2
46395	197	Tariff Energy Source 1	R/Wp	18	FA	0
46397	198	Tariff Energy Source 2	R/Wp	18	FC	1
46399	199	Tariff Energy Source 3	R/Wp	18	FE	2
46401	200	Tariff Energy Source 4	R/Wp	19	00	3
46403	201	Tariff Energy Source 5	R/Wp	19	02	4
46405	202	Tariff Energy Source 6	R/Wp	19	04	24
46407	203	Active Tariff	R/Wp	19	06	1
46701	205	IP Address 1	R	1A	2C	192.168
46703	206	IP Address 2	R	1A	2E	11.11
46705	207	Subnet Mask 1	R	1A	30	255.255
46707	208	Subnet Mask 2	R	1A	32	255.0
46709	209	Default Gateway 1	R	1A	34	192.168
46711	210	Default Gateway 2	R	1A	36	1.1
46713	211	Server Port	R	1A	38	502

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	System Type	This address is used to set the System type. Write one of the following value to this address. **1:** 1 Phase 2 Wire **3:** 3 Phase 3 Wire **3:** 3 Phase 4 Wire.
46005	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.
46007	CT Primary	This address allows the user to set CT Primary value. The settable range is **1** to **9999**. It also depends on the per phase 1800 MVA Restriction of power combined with PT primary.
46009	PT Secondary	This address is used to read and write the PT secondary value. The settable range is **100-600VLL**
46011	CT Secondary	This address is used to read and write the CT secondary value. Write one of the following values to this address. **1:** 1A CT secondary **5:** 5A CT secondary
46013	System Frequency Selection	This address is used to set the frequency of the input. Write **50:** For 50 Hz input **60:** For 60Hz input
46019	Demand Integration Time	Demand period represents demand time in minutes. The applicable values are ranging from **5** to **60**.
46021	Energy Unit	This address is used to set energy output in Wh, kWh & MWh. Write one of the following value to this address. **1**: Energy in Wh. **2**: Energy in KWh. **3**: Energy in MWh.
46023	Energy Digit Reset Count	This address is used to set maximum energy count after which energy on Modbus will roll over to zero. Valid values are **7**, **8** and **9**.
46027	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.
46029	Impulse on Energy Selection	This address is used to select the energy to which impulse is to be assigned. Writing any other value will return an error. To assign the value refer **TABLE 5.**
46031	Impulse Rate	This address allows the user to read the impulse rate which is calculated depending on the nominal system power.
46033	Energy Para Select for Start Count	This address is used to select the parameter whose start count (initial value) is to be set. Refer **TABLE 7**
46035	Enter Energy Start Count	This address is used to set the start count of the parameter selected in address 46033. The start count of the parameter should be in the range specified in **TABLE 7**.
46037	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. **1:** Energy Reset **2:** Demand Reset **3:** System Min Values Reset **4:** System Max Values Reset **5:** Run hour & On hour Reset **6:** No of Interruptions Reset **7:** Reset All data **8**: Tariff log Reset **9**: DI External Energy Reset
46039	Password	This address is used to set & reset the password. Valid Range of Password can be set is **0000 - 9999**. 1) If password lock is present & if this location is read it will return **zero**. 2) If password lock is absent & if this location is read it will return **one**. 3) If password lock is present & to disable this lock first send valid password to this location then write "**0000**" to this location 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. 5) If for in any of the above case invalid password is send then meter will return exceptional error 2.
46041	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
46045	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.

46047	Auto scroll	This address is used to activate or de-activate the auto scrolling. Write **0:** Deactivate **1:** Activate
46049	Current Noise Cut-off (mA)	This address is used to set the noise current cut off. The valid values ranges from **0 to 30** (mA).
46051	Node Address	This register address is used to set Device address between **1 to 247**.
46053	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.
46055	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 floating-point numbers are sent most significant bytes first. In reversed register mode, the two registers that make up 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.
46057	Pulse Width of Relay	This address is used to set pulse width of the Pulse output. Write one of the following values to this address: **60:** 60 ms **100:** 100 ms **200:** 200 ms
46059	Pulse Divisor	This address is used to set pulse divisor of the Pulse output. Write one of the following values to this address for energy unit **Wh**: **1:** Divisor 1 **10**: Divisor 10 **100**: Divisor 100 **1000**: Divisor 1000 In energy unit **kWh** or **MWh**, divisor will be **1** by default.
46061	Relay 1 Output Select	This address is used to select the Relay operation as None / Pulse / Limit / Timer / Health Monitor / Pre-Paid Energy. Write one of the following values to this address. **0**: None **1**: Pulse **2**: Limit **3** :Timer **4**: Health Monitor **5**: Pre Paid Energy
46063	Relay 1 Parameter Select	This address is used to assign the Parameter to Relay. Pulse relay: Refer **TABLE 8.** Limit - 1 relay: Refer **TABLE 9.** Timer relay: Refer **TABLE 6.**
46065	Relay 1 Limit – 1 Alarm Setting	This address is used to set the alarm for the selected Limit -1 parameter **0**: High Alarm **1**: Low Alarm
46067	Relay 1 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 is **10-9999999**. (refer **TABLE 9**).
46069	Relay 1 Limit - 1 Hysteresis	This address is used to set the hysteresis between **0.5% to 50.0%**.
46071	Relay 1 Limit - 2 Para Select	This address is used to assign the parameter for Limit 2 (refer **TABLE 9**) to Relay 1.
46073	Relay 1 Limit - 2 Alarm Setting	Same as Relay 1 Limit - 1
46075	Relay 1 Limit - 2 Trip Point	
46077	Relay 1 Limit - 2 Hysteresis	
46079	Relay 1 Limit - 3 Para Select	Same as Relay 1 Limit - 2 Para Select.
46081	Relay 1 Limit - 3 Alarm Setting	Same as Relay 1 Limit - 1
46083	Relay 1 Limit - 3 Trip Point	
46085	Relay 1 Limit - 3 Hysteresis	
46087	Relay 1 Logic Operation Setting	This address is used to set the logic operation between the Limit (1-2-3) output parameters. Valid values are: **0**: None **1**: AND **2**: OR
46089	Relay 1 Configuration Select	This address is used to set the Configuration for Relay 1. Valid values are: **0**: Energize **1**: De-Energize

46091	Relay 1 Delay (On)	This address is used to set the On delay in seconds in range of **1 to 9999** for Limit and Timer Relay
46093	Relay 1 Delay (Off)	This address is used to set the Off delay in seconds in range of 1 to 9999 for Limit and Timer Relay
46095	Relay 1 Energy Selection for Pre-Paid	This register address is used to assign the Parameter to Pre-Paid Energy Relay. Refer **TABLE 8** for details.
46097	Relay 1 Rate per Energy Unit for Prepaid	This register address is used to assign unit (1 kilo) cost for the energy parameter in the range of **1 to 999**.
46099	Relay 1 Top up Recharge for Prepaid	This register address is used to assign top up recharge for the energy parameter in the range of **1 to 999999** when energy unit is set as “2” or “3” and **1 to 9999** when energy unit is set as “1”.
46101	Relay 1 New Recharge for Prepaid	This register address is used to assign new recharge for the energy parameter in the range of **1 to 999999** when energy unit is set as “2” or “3” and **1 to 9999** when energy unit is set as “1”.
46103	Relay 2 Output Select	Same as Relay - 1
46105	Relay 2 Parameter Select	
46107	Relay 2 Limit - 1 Alarm Setting	
46109	Relay 2 Limit - 1 Trip Point	
46111	Relay 2 Limit - 1 Hysteresis	
46113	Relay 2 Limit - 2 Para Select	
46115	Relay 2 Limit - 2 Alarm Setting	
46117	Relay 2 Limit - 2 Trip Point	
46119	Relay 2 Limit - 2Hysteresis	
46121	Relay 2 Limit - 3Para Select	
46123	Relay 2 Limit - 3Alarm Setting	
46125	Relay 2 Limit - 3Trip Point	
46127	Relay 2 Limit - 3Hysteresis	
46129	Relay 2 Logic Operation Setting	
46131	Relay 2 Configuration Select	
46133	Relay 2 Delay (On)	
46135	Relay 2 Delay (Off)	
46137	Relay 2 Energy Selection for Pre-Paid	
46139	Relay 2 Rate per Energy Unit for Pre-paid	
46141	Relay 2 Top up	
46143	Relay 2 New Recharge for Pre-paid	
46229	Health Monitor Voltage Unbalance limit	This address i+C1:C24s used to set the limit of voltage unbalance. Valid range is **5% to 20%.**
46231	Health Monitor Current Unbalance limit	This address is used to set the limit of current unbalance. Valid range is **5% to 20%** and to disable it, set **0**.
46233	Health Monitor Under Frequency Limit	This address is used to set the under frequency limit. Valid range is **95% to 99%** of system frequency and to disable it, set **0**.
46235	Health Monitor Under Voltage Limit	This address is used to set the under voltage limit. Valid range is **70% to 90%** of nominal and to disable it, set **0**.
46237	Health Monitor Over Voltage Limit	This address is used to set the over voltage limit. Valid range is **105% to 120%** of nominal and to disable it, set **0**.
46239	Health Monitor Over Current Limit	This address is used to set the over current limit. Valid range is **50% to 120%** of nominal and to disable it, set **0**.
46341	Digital Input 2 Mode	This address is used to select mode of Digital Input 2. Write one of the following values to this address. **0**: Status **2**: Pulse
46243	Relay 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

46337	Digital Input De-bounce Time	This address is used to set the De-bounce time of Digital Input. Valid range is **1 to 9999**.
46339	Digital Input 1 Mode	This address is used to select mode of Digital Input 1. Write one of the following values to this address. **0**: Status **1**: Tariff* **2**: Pulse ***Note**: When DI is selected in Tariff mode, then no input present on DI1 indicates Tariff 1 and an input present on DI1 indicates Tariff 2.
46341	Digital Input 2 Mode	This address is used to select mode of Digital Input 2. Write one of the following values to this address. **0**: Status **2**: Pulse
46347	Digital Input 1 Pulse Multiplier	This address is used to set the pulse multiplier of Digital Input 1 between **1 to 9999**. This parameter is useful when DI is configured in Pulse Mode. The Pulse count is available as "External Counter" on Modbus (refer **TABLE2**).
46349	Digital Input 2 Pulse Multiplier	This address is used to set the pulse multiplier of Digital Input 2 between **1 to 9999**. This parameter is useful when DI is configured in Pulse Mode. The Pulse count is available as "External Counter" on Modbus (refer **TABLE2**).
46357	Firmware Version	This address is read only and displays the firmware version of the meter.
46365	Backlite ON/OFF	This address is used to Turn ON or Turn OFF the backlit. Valid values are: **1**: Backlit On **0**: Backlit Off
46367	Contrast	This address is used to change the contrast of the display. The options available are **1 to 4**, in increasing order of contrast.
46369	User Assignable Screen Enable	This address is used to activate or deactivate the User Assignable Screen feature which enables the user to select the screens to be displayed over the screen. **0**: Disable **1 to 10**: Corresponding number of user assignable screens.
46371 to 46389	User Screens 1 to 10	These addresses are used to assign maximum 10 selectable screen numbers in corresponding sequence. User needs to put the combination of key number and screen number to this address. Refer **TABLE 11** for screen numbers. For example, to select the screen number 3 of **V**/**A** key (key number 1), assign 103 to the corresponding user screen. Similarly, **P key** and **Sys key** have key numbers 2 and 3, respectively.
46391	Tariff Selection Mode	This address is used to select the mode of Tariff. Valid values are: **0**: Digital Input (This value is valid only when Digital Input 1 Mode is set as Tariff) **1**: Modbus Command When Di1 is selected in Tariff Mode, then no input present on DI1 indicates Tariff 1 and an input present on DI1 indicates Tariff 2.
46393	Number of Tariff	This address is used to select the number of Tariff. Valid values are: **1**: Single Tariff **2**: Dual Tariff **Note:** Only Digital Input 1 can be used for Tariff Selection.
46395 to 46405	Tariff Energy Source 1 to 6	These addresses are used to assign the energy parameters to six tariff sources. Refer **TABLE 8** for the energy parameters numbers.
46407	Active Tariff	This address is used to select active tariff, only when Tariff selection mode is set as "Modbus Command". Write one of the following values to this address. **1**: 1st Tariff **2**: 2nd Tariff
46701	IP Address 1	This address is read only and represents the high 16 bits of IP address.
46703	IP Address 2	This address is read only and represents the low 16 bits of IP address.
46705	Subnet Mask 1	This address is read only and represents high 16 bits of subnet mask address.
46707	Subnet Mask 2	This address is read only and represents low 16 bits of subnet mask address
46709	Default gateway 1	This address is read only and represents high 16 bits of default gateway address.
46711	Default gateway 2	This address is read only and represents low16 bits of default gateway address.
46713	Server Port	This address is read only and represents 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	1	0
4800	NONE	2	1
4800	EVEN	1	2
4800	ODD	1	3
9600	NONE	1	4
9600	NONE	2	5
9600	EVEN	1	6
9600	ODD	1	7
19200	NONE	1	8
19200	NONE	2	9
19200	EVEN	1	10
19200	ODD	1	11
38400	NONE	1	12
38400	NONE	2	13
38400	EVEN	1	14
38400	ODD	1	15
57600	NONE	1	16
57600	NONE	2	17
57600	EVEN	1	18
57600	ODD	1	19

NOTE: Codes not listed in the **TABLE 4** may **give rise to** unpredictable results including loss of **communication.** Exercise caution when attempting to **change mode via** direct Modbus writes.

TABLE 5: Impulse Energy Selection

Parameter Number	Parameter	3P4W	3P3W	1P2W
0	None	✓	✓	✓
1	System Active Energy	✓	✓	✓
2	System Reactive Energy	✓	✓	✓
3	System Apparent Energy	✓	✓	✓
4	Active Energy L1	✓	✗	✗
5	Active Energy L2	✓	✗	✗
6	Active Energy L3	✓	✗	✗
7	Apparent Energy L1	✓	✗	✗
8	Apparent Energy L2	✓	✗	✗
9	Apparent Energy L3	✓	✗	✗
10	Reactive Energy L1	✓	✗	✗
11	Reactive Energy L2	✓	✗	✗
12	Reactive Energy L3	✓	✗	✗

TABLE 6: Number of Cycles for Timer Relay

Code	Description
0	Unlimited
1 to 9999	Fixed Cycles

TABLE 7: Energy Parameter Selection and Start Count

Parameter Number	Parameter	Range
1	Sys Active Energy Import	1 to 999999999
2	Sys Active Energy Export	1 to 999999999
3	Sys Reactive Energy Cap.	1 to 999999999
4	Sys Reactive Energy Ind.	1 to 999999999
5	Sys Apparent Energy	1 to 999999999
7	Sys Active Energy Import Overflow Count	1 to 999999
8	Sys Active Energy Export Overflow Count	1 to 999999
9	Sys Reactive Energy Capacitive Overflow Count	1 to 999999
10	Sys Reactive Energy Inductive Overflow Count	1 to 999999
11	Sys Apparent Energy Overflow Count	1 to 999999
25	Sys Total Active Energy	1 to 999999999
26	Sys Total Reactive Energy	1 to 999999999
27	Sys Total Apparent Energy	1 to 999999999
28	Sys Total Active Energy Overflow Count	1 to 999999
29	Sys Total Reactive Energy Overflow Count	1 to 999999
30	Sys Total Apparent Energy Overflow Count	1 to 999999
37	Active Energy Import L1	1 to 999999999
38	Active Energy Import L2	1 to 999999999
39	Active Energy Import L3	1 to 999999999
40	Active Energy Export L1	1 to 999999999
41	Active Energy Export L2	1 to 999999999
42	Active Energy Export L3	1 to 999999999
43	Reactive Energy Capacitive L1	1 to 999999999
44	Reactive Energy Capacitive L2	1 to 999999999
45	Reactive Energy Capacitive L3	1 to 999999999
46	Reactive Energy Inductive L1	1 to 999999999
47	Reactive Energy Inductive L2	1 to 999999999
48	Reactive Energy Inductive L3	1 to 999999999
49	Apparent Energy L1	1 to 999999999
50	Apparent Energy L2	1 to 999999999
51	Apparent Energy L3	1 to 999999999
55	Total Active Energy L1	1 to 999999999
44	Reactive Energy Capacitive L2	1 to 999999999
45	Reactive Energy Capacitive L3	1 to 999999999
46	Reactive Energy Inductive L1	1 to 999999999
47	Reactive Energy Inductive L2	1 to 999999999
48	Reactive Energy Inductive L3	1 to 999999999
49	Apparent Energy L1	1 to 999999999
50	Apparent Energy L2	1 to 999999999
51	Apparent Energy L3	1 to 999999999
55	Total Active Energy L1	1 to 999999999
56	Total Active Energy L2	1 to 999999999
57	Total Active Energy L3	1 to 999999999
58	Total Reactive Energy L1	1 to 999999999
59	Total Reactive Energy L2	1 to 999999999
60	Total Reactive Energy L3	1 to 999999999
61	Total Apparent Energy L1	1 to 999999999
62	Total Apparent Energy L2	1 to 999999999
63	Total Apparent Energy L3	1 to 999999999
64	Overflow Active Energy Import L1	1 to 999999
65	Overflow Active Energy Import L2	1 to 999999
66	Overflow Active Energy Import L3	1 to 999999
67	Overflow Active Energy Export L1	1 to 999999
68	Overflow Active Energy Export L2	1 to 999999
69	Overflow Active Energy Export L3	1 to 999999
70	Overflow Reactive Energy Capacitive L1	1 to 999999
71	Overflow Reactive Energy Capacitive L2	1 to 999999

72	Overflow Reactive Energy Capacitive L3	1 to 999999
73	Overflow Reactive Energy Inductive L1	1 to 999999
74	Overflow Reactive Energy Inductive L2	1 to 999999
75	Overflow Reactive Energy Inductive L3	1 to 999999
76	Overflow Apparent Energy L1	1 to 999999
77	Overflow Apparent Energy L2	1 to 999999
78	Overflow Apparent Energy L3	1 to 999999
82	Total Active Energy Overflow Count L1	1 to 999999
83	Total Active Energy Overflow Count L2	1 to 999999
84	Total Active Energy Overflow Count L3	1 to 999999
85	Total Reactive Energy Overflow Count L1	1 to 999999
86	Total Reactive Energy Overflow Count L2	1 to 999999
87	Total Reactive Energy Overflow Count L3	1 to 999999
88	Total Apparent Energy Overflow Count L1	1 to 999999
89	Total Apparent Energy Overflow Count L2	1 to 999999
90	Total Apparent Energy Overflow Count L3	1 to 999999
200	Tariff1 Source 1 Energy Count	1 to 999999999
201	Tariff1 Source 2 Energy Count	1 to 999999999
202	Tariff1 Source 3 Energy Count	1 to 999999999
203	Tariff1 Source 4 Energy Count	1 to 999999999
204	Tariff1 Source 5 Energy Count	1 to 999999999
205	Tariff1 Source 6 Energy Count	1 to 999999999
206	Tariff1 Source 1 Energy Overflow Count	1 to 999999
207	Tariff1 Source 2 Energy Overflow Count	1 to 999999
208	Tariff1 Source 3 Energy Overflow Count	1 to 999999
209	Tariff1 Source 4 Energy Overflow Count	1 to 999999
210	Tariff1 Source 5 Energy Overflow Count	1 to 999999
211	Tariff1 Source 6 Energy Overflow Count	1 to 999999
212	Tariff2 Source 1 Energy Count	1 to 999999999
213	Tariff2 Source 2 Energy Count	1 to 999999999
214	Tariff2 Source 3 Energy Count	1 to 999999999
215	Tariff2 Source 4 Energy Count	1 to 999999999
216	Tariff2 Source 5 Energy Count	1 to 999999999
217	Tariff2 Source 6 Energy Count	1 to 999999999
218	Tariff2 Source 1 Energy Overflow Count	1 to 999999
219	Tariff2 Source 2 Energy Overflow Count	1 to 999999
220	Tariff2 Source 3 Energy Overflow Count	1 to 999999
221	Tariff2 Source 4 Energy Overflow Count	1 to 999999
222	Tariff2 Source 5 Energy Overflow Count	1 to 999999
223	Tariff2 Source 6 Energy Overflow Count	1 to 999999
200	Tariff1 Source 1 Energy Count	1 to 999999999
201	Tariff1 Source 2 Energy Count	1 to 999999999
202	Tariff1 Source 3 Energy Count	1 to 999999999
203	Tariff1 Source 4 Energy Count	1 to 999999999
204	Tariff1 Source 5 Energy Count	1 to 999999999
205	Tariff1 Source 6 Energy Count	1 to 999999999
206	Tariff1 Source 1 Energy Overflow Count	1 to 999999
207	Tariff1 Source 1 Energy Count	1 to 999999
208	Tariff1 Source 2 Energy Count	1 to 999999
209	Tariff1 Source 3 Energy Count	1 to 999999
210	Tariff1 Source 4 Energy Count	1 to 999999
211	Tariff1 Source 5 Energy Count	1 to 999999
212	Tariff1 Source 6 Energy Count	1 to 999999999
213	Tariff1 Source 1 Energy Overflow Count	1 to 999999999
214	Tariff1 Source 2 Energy Overflow Count	1 to 999999999
215	Tariff1 Source 3 Energy Overflow Count	1 to 999999999
216	Tariff1 Source 4 Energy Overflow Count	1 to 999999999
217	Tariff1 Source 5 Energy Overflow Count	1 to 999999999
218	Tariff1 Source 6 Energy Overflow Count	1 to 999999

219	Tariff2 Source 2 Energy Count	1 to 999999
220	Tariff2 Source 3 Energy Count	1 to 999999
221	Tariff2 Source 4 Energy Count	1 to 999999
222	Tariff2 Source 5 Energy Count	1 to 999999
223	Tariff2 Source 6 Energy Count	1 to 999999

NOTE: For 3P3W and 1P2W, phase-wise parameters are not available.

TABLE 8: Parameters for Pulse Output / Pre Paid Energy / Tariff Energy

Parameter Number	Parameter	3P4W	3P 3W	1P 2W
0	Sys Wh import	✓	✓	✓
1	Sys Wh export	✓	✓	✓
2	Sys VArh import	✓	✓	✓
3	Sys VArh export	✓	✓	✓
4	Sys VAh	✓	✓	✓
6	Active Energy Import L1	✓	✗	✗
7	Active Energy Import L2	✓	✗	✗
8	Active Energy Import L3	✓	✗	✗
9	Active Energy Export L1	✓	✗	✗
10	Active Energy Export L2	✓	✗	✗
11	Active Energy Export L3	✓	✗	✗
12	Reactive Energy Capacitive L1	✓	✗	✗
13	Reactive Energy Capacitive L2	✓	✗	✗
14	Reactive Energy Capacitive L3	✓	✗	✗
15	Reactive Energy Inductive L1	✓	✗	✗
16	Reactive Energy Inductive L2	✓	✗	✗
17	Reactive Energy Inductive L3	✓	✗	✗
18	Apparent Energy L1	✓	✗	✗
19	Apparent Energy L2	✓	✗	✗
20	Apparent Energy L3	✓	✗	✗
24	Total Sys Active Energy	✓	✓	✓
25	Total Sys Reactive Energy	✓	✓	✓
26	Total Sys Apparent Energy	✓	✓	✓
27	Total Active Energy L1	✓	✗	✗
28	Total Active Energy L2	✓	✗	✗
29	Total Active Energy L3	✓	✗	✗
30	Total Reactive Energy L1	✓	✗	✗
31	Total Reactive Energy L2	✓	✗	✗
32	Total Reactive Energy L3	✓	✗	✗

TABLE 9: Parameters for Limit output

Parameter Number	Parameter	3P4W	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	Current 1	✓	✓	✓	10 - 120 %	Inom
5	Current 2	✓	✓	✗	10 - 120 -%	Inom
6	Current 3	✓	✓	✗	10 - 120 %	Inom
7	Watt 1	✓	✗	✓	10 - 120 %	Nom (3)
8	Watt 2	✓	✗	✗	10 - 120 %	Nom (3)
9	Watt 3	✓	✗	✗	10 - 120 %	Nom (3)
10	VA 1	✓	✗	✓	10 - 120 %	Nom (3)
11	VA 2	✓	✗	✗	10 - 120 %	Nom (3)
12	VA 3	✓	✗	✗	10 - 120 %	Nom (3)
13	VAr 1	✓	✗	✓	10 - 120 %	Nom (3)
14	VAr 2	✓	✗	✗	10 - 120 %	Nom (3)
15	VAr 3	✓	✗	✗	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 Average	✓	✓	✗	10 - 120 %	Vnom (2)
24	Current Average	✓	✓	✗	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 Average	✓	✓	✗	10 - 90 %	90°
34	PA Average	✓	✓	✗	10 - 90 %	360°
36	Frequency	✓	✓	✓	10 - 90 %	66 Hz (1)
37	Sys Wh Import	✓	✓	✓	10 - 9999999	Nom (3)
38	Sys Wh Export	✓	✓	✓	10 - 9999999	Nom (3)
39	Sys VArh Capacitive	✓	✓	✓	10 - 9999999	Nom (3)
40	Sys VArh Inductive	✓	✓	✓	10 - 9999999	Nom (3)
41	Sys VArh	✓	✓	✓	10 - 9999999	Nom (3)
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
85	Re-Active PF L1	✓	✗	✓	10 - 90 %	90°
86	Re-Active PF L2	✓	✗	✗	10 - 90 %	90°
87	Re-Active PF L3	✓	✗	✗	10 - 90 %	90°
88	Avg Re-Active PF	✓	✓	✗	10 - 90 %	90°
90	LF SgnQ(1-(P/S)) L1	✓	✗	✓	10 - 90 %	90°
91	LF SgnQ(1-(P/S)) L2	✓	✗	✗	10 - 90 %	90°
92	LF SgnQ(1-(P/S)) L3	✓	✗	✗	10 - 90 %	90°
93	Avg LF SgnQ(1-(P/S))	✓	✓	✗	10 - 90 %	90°
95	Displacement PF L1	✓	✗	✓	10 - 90 %	90°
96	Displacement PF L2	✓	✗	✗	10 - 90 %	90°
97	Displacement PF L3	✓	✗	✗	10 - 90 %	90°
98	Avg Displacement PF	✓	✓	✗	10 - 90 %	90°
101	V12	✓	✗	✗	10 - 120 %	Vnom (L-L)
102	V23	✓	✗	✗	10 - 120 %	Vnom (L-L)
103	V31	✓	✗	✗	10 - 120 %	Vnom (L-L)
128	Distortion VAr L1	✓	✗	✓	10 - 120 %	Nom (3)
129	Distortion VAr L2	✓	✗	✗	10 - 120 %	Nom (3)
130	Distortion VAr L3	✓	✗	✗	10 - 120 %	Nom (3)
132	SUM Distortion VAr	✓	✓	✗	10 - 120 %	Nom (3)
133	Fundamental VAr L1	✓	✗	✓	10 - 120 %	Nom (3)
134	Fundamental VAr L2	✓	✗	✗	10 - 120 %	Nom (3)
135	Fundamental VAr L3	✓	✗	✗	10 - 120 %	Nom (3)
137	SUM Fundamental VAr	✓	✓	✗	10 - 120 %	Nom (3)
198	Relay manually off	✓	✓	✓	1	-
199	Relay manually on	✓	✓	✓	1	-
200	Sys Wh import	✓	✓	✓	10-9999999	Nom (3)
201	Sys Wh export	✓	✓	✓	10-9999999	Nom (3)
202	Sys VArh Capacitive	✓	✓	✓	10-9999999	Nom (3)
203	Sys VArh Inductive	✓	✓	✓	10-9999999	Nom (3)
204	Sys VAh	✓	✓	✓	10-9999999	Nom (3)
206	Active Energy Import L1	✓	✗	✗	10-9999999	Nom (3)

207	Active Energy Import L2	✓	✗	✗	10-9999999	Nom (3)
208	Active Energy Import L3	✓	✗	✗	10-9999999	Nom (3)
209	Active Energy Export L1	✓	✗	✗	10-9999999	Nom (3)
210	Active Energy Export L2	✓	✗	✗	10-9999999	Nom (3)
211	Active Energy Export L3	✓	✗	✗	10-9999999	Nom (3)
212	Reactive Energy Capacitive L1	✓	✗	✗	10-9999999	Nom (3)
213	Reactive Energy Capacitive L2	✓	✗	✗	10-9999999	Nom (3)
214	Reactive Energy Capacitive L3	✓	✗	✗	10-9999999	Nom (3)
215	Reactive Energy Inductive L1	✓	✗	✗	10-9999999	Nom (3)
216	Reactive Energy Inductive L2	✓	✗	✗	10-9999999	Nom (3)
217	Reactive Energy Inductive L3	✓	✗	✗	10-9999999	Nom (3)
218	Apparent Energy L1	✓	✗	✗	10-9999999	Nom (3)
219	Apparent Energy L2	✓	✗	✗	10-9999999	Nom (3)
220	Apparent Energy L3	✓	✗	✗	10-9999999	Nom (3)
224	Total Sys Active Energy	✓	✗	✗	10-9999999	Nom (3)
225	Total Sys Reactive Energy	✓	✓	✓	10-9999999	Nom (3)
226	Total Sys Apparent Energy	✓	✓	✓	10-9999999	Nom (3)
227	Total Active Energy L1	✓	✗	✗	10-9999999	Nom (3)
228	Total Active Energy L2	✓	✗	✗	10-9999999	Nom (3)
229	Total Active Energy L3	✓	✗	✗	10-9999999	Nom (3)
230	Total Reactive Energy L1	✓	✗	✗	10-9999999	Nom (3)
231	Total Reactive Energy L2	✓	✗	✗	10-9999999	Nom (3)
232	Total Reactive Energy L3	✓	✗	✗	10-9999999	Nom (3)

Note: (1) Parameters 1,2,3 are L-N Voltage for 3P 4W & L-L Voltage for 3P 3W.
(2) For Frequency 0% corresponds to 45 Hz and 100% corresponds to 66 Hz.
(3) For 3P 4W and 1P2W the nominal value is VLN and that for 3P 3W is VLL.
(4) Nominal Value for power is calculated from Nominal Voltage and Current values.

Nominal Value is to be considered with set CT/ PT Primary values.
For 1P2W, L1 Phase values are to be considered as System values.
Trip Point for Energy Parameters is a whole (non-decimal) number.

TABLE 10: Health Monitor Status for 3 Phase System

bit15	bit14	bit13	bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
XX	XX	XX	XX	XX	XX	XX	XX	OC	OV	UV	UF	PF	PH-R	IUNB	VUNB
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

For e.g.:
1) Health Status is valid for Three Phase system only
2) bit15, bit14, bit13, bit12, bit11, bit10, bit9 and bit8 will always be 00000000.
3) The fault parameter bit will be 1.
4) If only over current fault is present, then OC bit will 1.
5) Binary value of OC is 0000000010000000 and decimal value is 128.
6) This value will be shown in health status indication buffer (refer **TABLE 1.6**) at corresponding address.

OC: Over current **OV:** Over voltage **UV:** Under voltage
UF: Under frequency **PF:** Phase failure **PH-R:** Phase reversal
IUNB: Current Unbalance **VUNB:** Voltage Unbalance

TABLE 11: Measurement & Energy/Counter Screens Table 11.1 System Parameters Screens:

Parameter No.	Parameters	On Display			On Modbus		
		3P 4W	3P 3W	1P 2W	3P 4W	3P 2W	1P 2W
1	System Voltage/ Current/ Active Power	✓	✓	✓	✓	✓	✓
2	System VA-VAr-Watt	✓	✓	✓	✓	✓	✓
3	System VA-VAr-Power Factor	✓	✓	✓	✓	✓	✓
4	System VA-VAr-Degree	✓	✓	✓	✓	✓	✓
5	System RPM - Frequency	✓	✓	✓	✓	✓	✓
6	System %THD Voltage-Current	✓	✓	✓	✓	✓	✓
7	System VA-A Demand	✓	✓	✓	✓	✓	✓
8	System Capacitive-Inductive VAr Demand	✓	✓	✓	✓	✓	✓
9	System Import-Export Watt Demand	✓	✓	✓	✓	✓	✓
10	System Max VA-A Demand	✓	✓	✓	✓	✓	✓
11	System Max Capacitive-Inductive VAr Demand	✓	✓	✓	✓	✓	✓
12	System Max Import-Export Watt Demand	✓	✓	✓	✓	✓	✓
13	System Max Voltage-Current-Power	✓	✓	✓	✓	✓	✓
14	System Min Voltage-Current-Power	✓	✓	✓	✓	✓	✓
15	System Max VA-VAr-Watt Power	✓	✓	✓	✓	✓	✓
16	System Min VA-VAr-Watt Power	✓	✓	✓	✓	✓	✓
17	System Max VA-VAr-Power Factor	✓	✓	✓	✓	✓	✓
18	System Min VA-VAr-Power Factor	✓	✓	✓	✓	✓	✓
19	System Max VA-VAr-Degree	✓	✓	✓	✓	✓	✓
20	System Min VA-VAr-Degree	✓	✓	✓	✓	✓	✓
21	System Max Voltage-Current-Frequency	✓	✓	✓	✓	✓	✓
22	System Min Voltage-Current-Frequency	✓	✓	✓	✓	✓	✓
23	Timer 1 No. of Cycles-ON Delay-OFF Delay	✓	✓	✓	✓	✓	✓
24	Timer 2 No. of Cycles-ON Delay-OFF Delay	✓	✓	✓	✓	✓	✓
25	Health Monitor Menu	✓	✓	✓	✓	✓	✓
26	Pre Paid Energy Menu	✓	✓	✓	✓	✓	✓
27	System Displacement Power Factor	✗	✗	✗	✓	✓	✓
28	System Reactive Power Factor	✗	✗	✗	✓	✓	✓
29	System LF Factor SgnQ(1-(P/S))	✗	✗	✗	✓	✓	✓
30	Historical Sys Max Import-Export Watt Demand	✗	✗	✗	✓	✓	✓
31	Historical Sys Max Capacitive-Inductive VAr Demand	✗	✗	✗	✓	✓	✓
32	Historical Sys Max VA-A Demand	✗	✗	✗	✓	✓	✓
33	System Voltage Unbalance	✗	✗	✗	✓	✓	✗
34	System Current Unbalance	✗	✗	✗	✓	✓	✗
35	System Distortion VAr	✗	✗	✗	✓	✓	✓
36	System Fundamental Var	✗	✗	✗	✓	✓	✓
37	System Max Reactive PF	✗	✗	✗	✓	✓	✓
38	System Min Reactive PF	✗	✗	✗	✓	✓	✓
39	System Max LF Factor SgnQ(1-(P/S))	✗	✗	✗	✓	✓	✓
40	System Min LF Factor SgnQ(1-(P/S))	✗	✗	✗	✓	✓	✓

NOTE: The Display screens of Table 11.1 can be scrolled through **sys** / **UP Key**.

Table 11.2 Energy Parameters Screens:

Parameter No.	Parameters	On Display			On Modbus		
		3P 4W	3P 3W	1P 2W	3P 4W	3P 2W	1P 2W
1	System Active Energy Import (Overflow)	✗	✗	✗	✓	✓	✓
2	System Active Energy Import	✓	✓	✓	✓	✓	✓
3	System Active Energy Export (Overflow)	✗	✗	✗	✓	✓	✓
4	System Active Energy Export	✓	✓	✓	✓	✓	✓
5	System Reactive Capacitive energy (Overflow)	✗	✗	✗	✓	✓	✓
6	System Reactive Capacitive energy	✓	✓	✓	✓	✓	✓
7	System Reactive Inductive energy (Overflow)	✗	✗	✗	✓	✓	✓
8	System Reactive Inductive energy	✓	✓	✓	✓	✓	✓
9	System Apparent energy (Overflow)	✗	✗	✗	✓	✓	✓
10	System Apparent energy	✓	✓	✓	✓	✓	✓
11	L1-L2-L3 Active Energy Import (Overflow)	✗	✗	✗	✓	✓	✓
12	L1-L2-L3 Active Energy Import	✓	✗	✗	✓	✓	✓
13	L1-L2-L3 Active Energy Export (Overflow)	✗	✗	✗	✓	✓	✓
14	L1-L2-L3 Active Energy Export	✓	✗	✗	✓	✓	✓
15	L1-L2-L3 Reactive Capacitive energy (Overflow)	✗	✗	✗	✓	✓	✓
16	L1-L2-L3 Reactive Capacitive energy	✓	✗	✗	✓	✓	✓
17	L1-L2-L3 Reactive Inductive energy (Overflow)	✗	✗	✗	✓	✓	✓
18	L1-L2-L3 Reactive Inductive energy	✓	✗	✗	✓	✓	✓
19	L1-L2-L3 Apparent energy (Overflow)	✗	✗	✗	✓	✓	✓
20	L1-L2-L3 Apparent energy	✓	✗	✗	✓	✓	✓
21	Run hour	✓	✓	✓	✓	✓	✓
22	On hour	✓	✓	✓	✓	✓	✓
23	No. of interrupts	✓	✓	✓	✓	✓	✓
24	Sys Total Active Energy Overflow Count	✗	✗	✗	✓	✓	✓
25	Sys Total Active Energy	✓	✓	✓	✓	✓	✓
26	Sys Total Reactive Energy Overflow Count	✗	✗	✗	✓	✓	✓
27	Sys Total Reactive Energy	✓	✓	✓	✓	✓	✓
28	L1-L2-L3 Total Active Energy Overflow Count	✗	✗	✗	✓	✗	✗
29	L1-L2-L3 Total Active Energy	✓	✗	✗	✓	✗	✗
30	L1-L2-L3 Total Reactive Energy Overflow Count	✗	✗	✗	✓	✗	✗
31	L1-L2-L3 Total Reactive Energy	✓	✗	✗	✓	✗	✗
32	Tariff 1 Energy 1	✓	✓	✓	✓	✓	✓
33	Tariff 1 Energy 2	✓	✓	✓	✓	✓	✓
34	Tariff 1 Energy 3	✓	✓	✓	✓	✓	✓
35	Tariff 1 Energy 4	✓	✓	✓	✓	✓	✓

36	Tariff 1 Energy 5	✓	✓	✓	✓	✓	✓
37	Tariff 1 Energy 6	✓	✓	✓	✓	✓	✓
38	Tariff 2 Energy 1	✓	✓	✓	✓	✓	✓
39	Tariff 2 Energy 2	✓	✓	✓	✓	✓	✓
40	Tariff 2 Energy 3	✓	✓	✓	✓	✓	✓
41	Tariff 2 Energy 4	✓	✓	✓	✓	✓	✓
42	Tariff 2 Energy 5	✓	✓	✓	✓	✓	✓
43	Tariff 2 Energy 6	✓	✓	✓	✓	✓	✓
44	Historical Energy Unit	✗	✗	✗	✓	✓	✓
45	Historical System Active Energy Import(Overflow)	✗	✗	✗	✓	✓	✓
46	Historical System Active Energy Import	✗	✗	✗	✓	✓	✓
47	Historical System Active Energy Export(Overflow)	✗	✗	✗	✓	✓	✓
48	Historical System Active Energy Export	✗	✗	✗	✓	✓	✓
49	Historical System Reactive Capacitive energy (Overflow)	✗	✗	✗	✓	✓	✓
50	Historical System Reactive Capacitive energy	✗	✗	✗	✓	✓	✓
51	Historical System Reactive Inductive energy (Overflow)	✗	✗	✗	✓	✓	✓
52	Historical System Reactive Inductive energy	✗	✗	✗	✓	✓	✓
53	Historical System Apparent energy(Overflow)	✗	✗	✗	✓	✓	✓
54	Historical System Apparent energy	✗	✗	✗	✓	✓	✓
55	Historical L1-L2-L3 Active Energy Import(Overflow)	✗	✗	✗	✓	✗	✗
56	Historical L1-L2-L3 Active Energy Import	✗	✗	✗	✓	✗	✗
57	Historical L1-L2-L3 Active Energy Export(Overflow)	✗	✗	✗	✓	✗	✗
58	Historical L1-L2-L3 Active Energy Export	✗	✗	✗	✓	✗	✗
59	Historical L1-L2-L3 Reactive Capacitive energy (Overflow)	✗	✗	✗	✓	✗	✗
60	Historical L1-L2-L3 Reactive Capacitive energy	✗	✗	✗	✓	✗	✗
61	Historical L1-L2-L3 Reactive Inductive energy (Overflow)	✗	✗	✗	✓	✗	✗
62	Historical L1-L2-L3 Reactive Inductive energy	✗	✗	✗	✓	✗	✗
63	Historical L1-L2-L3 Apparent energy (Overflow)	✗	✗	✗	✓	✗	✗
64	Historical L1-L2-L3 Apparent energy	✗	✗	✗	✓	✗	✗
65	Historical Sys Total Active Energy Overflow Count	✗	✗	✗	✓	✓	✓
66	Historical Sys Total Active Energy	✗	✗	✗	✓	✓	✓
67	Historical Sys Total Reactive Energy Overflow Count	✗	✗	✗	✓	✓	✓
68	Historical Sys Total Reactive Energy	✗	✗	✗	✓	✓	✓
69	Historical L1-L2-L3 Total Active Energy Overflow Count	✗	✗	✗	✓	✗	✗

70	Historical L1-L2-L3 Total Active Energy	✗	✗	✗	✓	✗	✗
71	Historical L1-L2-L3 Total Reactive Energy Overflow Count	✗	✗	✗	✓	✗	✗
72	Historical L1-L2-L3 Total Reactive Energy	✗	✗	✗	✓	✗	✗
73	Historical Run Hour	✗	✗	✗	✓	✓	✓
74	Historical On Hour	✗	✗	✗	✓	✓	✓
75	Historical no. of interrupts	✗	✗	✗	✓	✓	✓
76	Digital Input 1 Pulse Counter	✗	✗	✗	✓	✓	✓
77	Digital Input 2 Pulse Counter	✗	✗	✗	✓	✓	✓
78	Digital Input 1 Pulse Counter Overflow Count	✗	✗	✗	✓	✓	✓
79	Digital Input 2 Pulse Counter Overflow Count	✗	✗	✗	✓	✓	✓

NOTE: The Display screens of Table 11.2 can be scrolled through **E** / **Enter Key.**

Table 11.3 Power Parameters Screens:

Parameter No.	Parameters	On Display			On Modbus		
		3P 4W	3P 3W	1P 2W	3P 4W	3P 2W	1P 2W
1	L1 VA-VAr-Watt	✓	✗	✗	✓	✗	✗
2	L2 VA-VAr-Watt	✓	✗	✗	✓	✗	✗
3	L3 VA-VAr-Watt	✓	✗	✗	✓	✗	✗
4	L1-L2-L3 Power Factor	✓	✗	✗	✓	✗	✗
5	L1-L2-L3 Degree	✓	✗	✗	✓	✗	✗
6	System VA-VAr-Watt	✓	✓	✓	✓	✓	✓
7	System VA-VAr-PF	✓	✓	✓	✓	✓	✓
8	L1 Max VA-VAr-Watt	✓	✗	✗	✓	✗	✗
9	L1 Min VA-VAr-Watt	✓	✗	✗	✓	✗	✗
10	L2 Max VA-VAr-Watt	✓	✗	✗	✓	✗	✗
11	L2 Min VA-VAr-Watt	✓	✗	✗	✓	✗	✗
12	L3 Max VA-VAr-Watt	✓	✗	✗	✓	✗	✗
13	L3 Min VA-VAr-Watt	✓	✗	✗	✓	✗	✗
14	L1-L2-L3 Max Power Factor	✓	✗	✗	✓	✗	✗
15	L1-L2-L3 Min Power Factor	✓	✗	✗	✓	✗	✗
16	L1-L2-L3 Max Degree	✓	✗	✗	✓	✗	✗
17	L1-L2-L3 Min Degree	✓	✗	✗	✓	✗	✗
18	L1-L2-L3 Displacement Power Factor	✗	✗	✗	✓	✗	✗
19	L1-L2-L3 Reactive Power Factor	✗	✗	✗	✓	✗	✗
20	L1-L2-L3 LF Factor SgnQ(1-(P/S))	✗	✗	✗	✓	✗	✗
21	L1-L2-L3 Distortion Var	✗	✗	✗	✓	✗	✗
22	L1-L2-L3 Fundamental VAr	✗	✗	✗	✓	✗	✗
23	L1-L2-L3 Max Reactive Power Factor	✗	✗	✗	✓	✗	✗
24	L1-L2-L3 Min Reactive Power Factor	✗	✗	✗	✓	✗	✗
25	L1-L2-L3 Max LF Factor SgnQ(1-(P/S))	✗	✗	✗	✓	✗	✗
26	L1-L2-L3 Min LF Factor SgnQ(1-(P/S))	✗	✗	✗	✓	✗	✗

NOTE: The Display screens of Table 11.3 can be scrolled through **P** / **Down Key.**

Table 11.4 Voltage/Current Parameters Screens:

Parameter No.	Parameters	On Display			On Modbus		
		3P 4W	3P 3W	1P 2W	3P 4W	3P 2W	1P 2W
1	L1-L2-L3 Voltage	✓	✗	✗	✓	✗	✗
2	L12-L23-L31 Voltage	✓	✓	✗	✓	✓	✗
3	L1-L2-L3 Current	✓	✓	✗	✓	✓	✗
4	Neutral Current	✓	✗	✗	✓	✗	✗
5	L1-L2-L3 Voltage %THD	✓	✓	✗	✓	✓	✗
6	L1-L2-L3 Current %THD	✓	✓	✗	✓	✓	✗
7	Current Reversal	✓	✗	✓	✓	✗	✓
8	Phase Rotation Error	✓	✓	✗	✓	✓	✗
9	Phase Absent Indication	✓	✓	✗	✓	✓	✗
10	System Voltage-Current-Frequency	✓	✓	✓	✓	✓	✓
11	L1-L2-L3 Max Voltage	✓	✗	✗	✓	✗	✗
12	L1-L2-L3 Min Voltage	✓	✗	✗	✓	✗	✗
13	L12-L23-L31 Max Voltage	✓	✓	✗	✓	✓	✗
14	L12-L23-L31 Min Voltage	✓	✓	✗	✓	✓	✗
15	L1-L2-L3 Max Current	✓	✓	✗	✓	✓	✗
16	L1-L2-L3 Min Current	✓	✓	✗	✓	✓	✗
17	Individual Harmonics V (upto 31st)	✓	✓	✓	✓	✓	✓
18	Individual Harmonics A (upto 31st)	✓	✓	✓	✓	✓	✓

NOTE: The Display screens of Table 11.4 can be scrolled through **V/A Key**

3.4 User Assignable Modbus Registers:

The Multifunction Instrument contains 20 user assignable registers in the address range of 0x1450 (35201) to 0x1476 (35239) for 3X registers **(see TABLE 12)** and address range of 0x1450 (45201) to 0x1476 (45239) for 4X registers **(see TABLE 12).**
Any of the parameter addresses (3X register addresses and 4X register addresses of **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 0x1450 to 0x1476 are specified in 4X Register 0x2710 to 0x2723 **(see TABLE 13).**

TABLE 12: User Assignable 3X Data Registers

Address (3X)	Address (4X)	Assignable Register	Modbus Start Address (Hex)	
			High Byte	Low Byte
35201	45201	Assignable Register 1	14	50
35203	45203	Assignable Register 2	14	52
35205	45205	Assignable Register 3	14	54
35207	45207	Assignable Register 4	14	56
35209	45209	Assignable Register 5	14	58
35211	45211	Assignable Register 6	14	5A
35213	45213	Assignable Register 7	14	5C
35215	45215	Assignable Register 8	14	5E
35217	45217	Assignable Register 9	14	60
35219	45219	Assignable Register 10	14	62
35221	45221	Assignable Register 11	14	64
35223	45223	Assignable Register 12	14	66
35225	45225	Assignable Register 13	14	68
35227	45227	Assignable Register 14	14	6A
35229	45229	Assignable Register 15	14	6C
35231	45231	Assignable Register 16	14	6E
35233	45233	Assignable Register 17	14	70
35235	45235	Assignable Register 18	14	72
35237	45237	Assignable Register 19	14	74
35239	45239	Assignable Register 20	14	76

TABLE 13: User Assignable mapping register (4X registers)

Address (4X)	Assignable Register	Modbus Start Address (Hex)	
		High Byte	Low Byte
410001	Map Address for Assignable Register 1	27	10
410002	Map Address for Assignable Register 2	27	11
410003	Map Address for Assignable Register 3	27	12
410004	Map Address for Assignable Register 4	27	13
410005	Map Address for Assignable Register 5	27	14
410006	Map Address for Assignable Register 6	27	15
410007	Map Address for Assignable Register 7	27	16
410008	Map Address for Assignable Register 8	27	17
410009	Map Address for Assignable Register 9	27	18
410010	Map Address for Assignable Register 10	27	19
410011	Map Address for Assignable Register 11	27	1A
410012	Map Address for Assignable Register 12	27	1B
410013	Map Address for Assignable Register 13	27	1C
410014	Map Address for Assignable Register 14	27	1D
410015	Map Address for Assignable Register 15	27	1E
410016	Map Address for Assignable Register 16	27	1F
410017	Map Address for Assignable Register 17	27	20
410018	Map Address for Assignable Register 18	27	21
410019	Map Address for Assignable Register 19	27	22
410020	Map Address for Assignable Register 20	27	23

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 13**) 0x2710 and 0x2711 respectively.

Assigning Query:

Device Address	01 (Hex)	
Function Code	10 (Hex)	
Start Address High	27 (Hex)	
Start Address Low	10 (Hex)	
Number of Registers High	00 (Hex)	
Number of Registers Low	02 (Hex)	
Byte Count	04 (Hex)	
Data Register- 1 High Byte	00 (Hex)	Voltage 2 * (3X Address 0x0002)
Data Register- 1 Low Byte	02 (Hex)	
Data Register- 2 High Byte	00 (Hex)	Power Factor 1 * (3X Address 0x001E)
Data Register- 2 Low Byte	1E (Hex)	
CRC Low	01 (Hex)	
CRC High	EC (Hex)	

Response:

Device Address	01 (Hex)
Function Code	10 (Hex)
Start Address High	27 (Hex)
Start Address Low	10 (Hex)
Number of Registers High	00 (Hex)
Number of Registers Low	02 (Hex)
CRC Low	4A (Hex)
CRC High	B9 (Hex

* **Note:** Up to 6 parameters can be assigned at a time but these parameters should be assigned in Multiple of two i.e. 2, 4 or 6.

Reading Parameter Data through User Assignable Registers:
In assigning query, Voltage 2 & Power Factor 1 parameters were assigned to 0x2710 & 0x2711 (**TABLE 13**) which will point to user assignable 3x registers 0x1450 and 0x1452 (**TABLE 12**). So, to read Voltage2 and Power Factor1 data reading query should be as below.

Query:

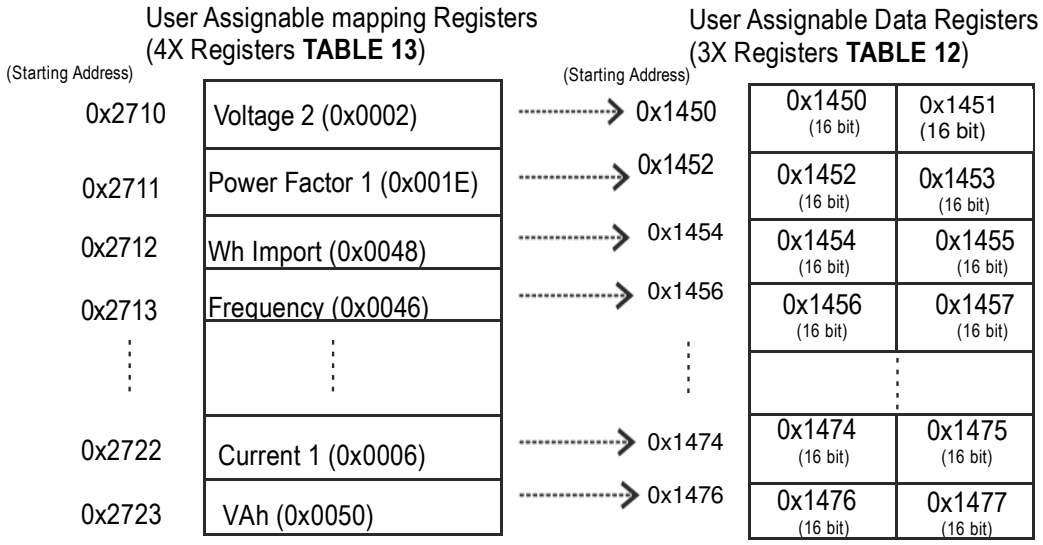
Device Address	01 (Hex)
Function Code	04 (Hex)
Start Address High	14 (Hex)
Start Address Low	50 (Hex)
Number of Registers Hi	00 (Hex)
Number of Registers Lo	04 (Hex)
CRC Low	F0 (Hex)
CRC High	71 (Hex)

Response: (Volt2 = 219.30 / Power Factor1 = 1.0)

Device Address	01 (Hex)	
Function Code	04 (Hex)	
Byte Count	08 (Hex)	
Data Register- 1 High 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)	

Start Address High: Most significant 8 bits of starting address of User assignable register.
Start Address low: Least significant 8 bits of starting address of User assignable register.
Number of register Hi: Most significant 8 bits of Number of registers requested.
Number of register Lo: Least significant 8 bits of Number of registers requested.

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

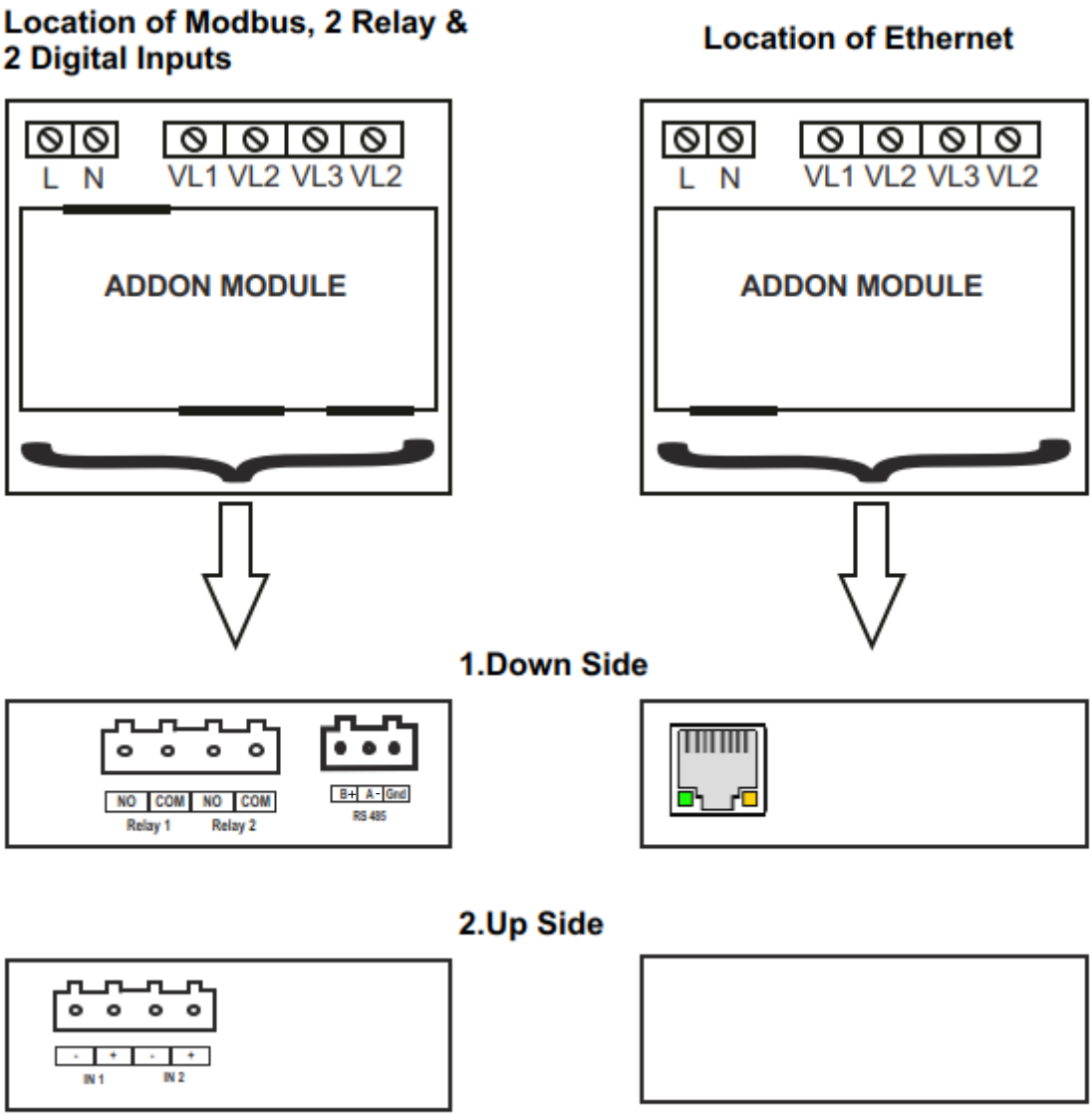


To get the data through User Assignable Register go through the following steps:

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 3.4).

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 0x1450 with number of register 8 or individually parameters can be accessed. For example, if current1 is to be accessed use starting address 0x01474. (see Section **Reading Parameter data through User Assignable Registers** of Section 3.4).

4. Connection for Optional Pulse Output / Digital Input / RS 485 /Ethernet Module (rear view of Multifunction Meter):



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