



SPECIFICATIONS

DISPLAY

Liquid crystal display with backlight
1 line with 4 digits and 2 line with 7 digits per line to Show electrical Parameters

LCD INDICATIONS

↔ - Communication in progress

LED INDICATIONS

INT - Integration of energy

WIRING INPUT

3 Ø - 4 wire, 1 Ø - 2 wire

RATED INPUT VOLTAGE

60 to 300V AC, 104 to 520V AC

FREQUENCY RANGE

45-65 Hz

NO. OF CHANNEL

4 Channel(3 Ø); 12 Channel(1 Ø)

CT PRIMARY (For All Channel)

1A to 10,000A (Programmable for any Value)

CT SECONDARY

330mV

PT PRIMARY

100V to 10kV (Programmable for any value)

PT SECONDARY

100 to 500V AC (L-L)(Programmable for any value)

DISPLAY UPDATE TIME

1sec for all parameters

DISPLAY SCROLLING

Automatic / Manual

POWER CONSUMPTION

Less than 8VA

ENVIRONMENTAL CONDITIONS

- Indoor use
- Altitude of up to 2000 meters
- Pollution degree II

Temperature : Operating : -10°C to 55°C

Storage : -20°C to 75°C

Humidity : Up to 85% non-condensing

MOUNTING

Din Rail mounting

WEIGHT

290gms

ORDER CODE INFORMATION

| Product | Supply | Certification |
|------------|------------------------|---------------|
| | Self Supplied(V1,N) | CE |
| MRJ4M-QUAD | 60 to 300V AC, 50/60Hz | ■ |

SERIAL COMMUNICATION

| | |
|---------------------------------|--|
| Interface standard and protocol | RS485 AND MODBUS RTU |
| Communication address | 1 to 255 |
| Transmission mode | Half duplex |
| Data types | Float and Integer |
| Transmission distance | 500 Metre maximum |
| Transmission speed | 300, 600,1200, 2400, 4800, 9600,19200,38400 (in bps) |
| Parity | None, Odd, Even |
| Stop bits | 1 or 2 |

RESOLUTION

| PT Ratio x CT Ratio | kWh | INT |
|---------------------|-------|--------|
| <15 | 0.01K | 0.001K |
| <150 | 0.1K | 0.01K |
| <1500 | 1K | 0.1K |
| <15000 | 0.01M | 1K |
| <150000 | 0.1M | 0.01M |
| ≤1000000 | 1M | 0.1M |

NOTE : 1) For Voltage, Power, resolution is automatically adjusted
2) For Power Factor, resolution is 0.01

ACCURACY

| Measurement | Accuracy |
|--|-----------------------|
| Voltage V_{L-N} | ± 0.5 % of full range |
| Voltage V_{L-L} | ± 0.5 % of full range |
| Current | ± 0.5 % of full range |
| Frequency For L-N Voltage >20V, For L-L Voltage >35V | ± 0.1 % of full range |
| Active Power | ± 1.0 % of full range |
| Reactive Power | ± 1.0 % of full range |
| Apparent Power | ± 1.0 % of full range |
| Power Factor | ± 0.01 of full range |
| Active Energy | ± 1.0 % of full range |
| Reactive Energy | ± 1.0 % of full range |
| Apparent Energy | ± 1.0 % of full range |
| MAX Active Power | ± 1% of full range |
| MAX Apparent Power | ± 1% of full range |

SAFETY PRECAUTIONS

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

- Do not use the equipment if there is any mechanical damage.
- Ensure that the equipment is supplied with correct voltage.

CAUTION :

1. Read complete instructions prior to installation and operation of the unit.
2. Risk of electric shock.
3. The equipment in its installed state must not come in close proximity to any heating sources, oils, steam, caustic vapors or other unwanted process by products.

WIRING GUIDELINES

WARNING :

1. To prevent the risk of electric shock, power supply to the equipment must be kept OFF while doing the wiring arrangement.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.
6. Copper cable should be used (Stranded or Single core cable).
7. Before attempting work on device, ensure absence of voltages using appropriate voltage detection device.

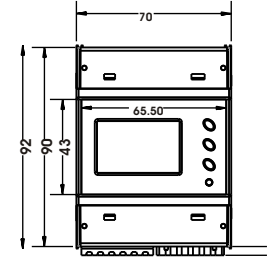
INSTALLATION GUIDELINES

CAUTION :

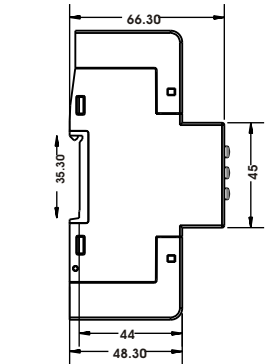
1. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
2. Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.
3. Before disconnecting the secondary of the external current transformer from the equipment, make sure that the current transformer is short circuited to avoid risk of electrical shock and injury.
4. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
5. The equipment does not have a built-in-type fuse. Installation of external fuse of rating 275V AC / 0.5Amp for electrical circuitry / battery is highly recommended.

DIMENSIONS (All dimensions in mm)

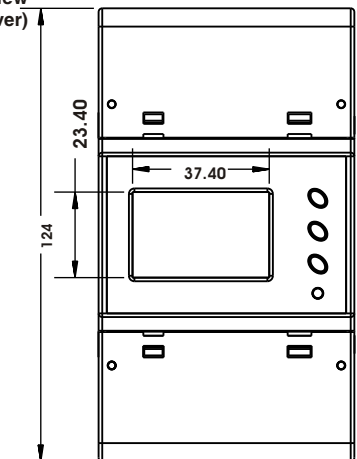
Front View



Side View



Front View (With Cover)

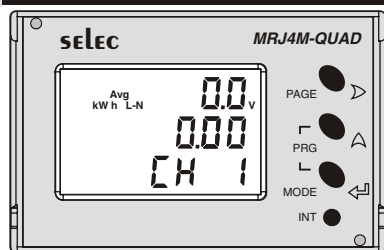


NOTE : Measuring current input should be connect with external CT only.

CHANNEL DESCRIPTION

| Group | 12 Channel Meter | 4 Channel Meter |
|-------|------------------|--|
| Gr 1 | CH1, CH2, CH3 | 1 st , 2 nd and 3 rd phase of CH1 |
| Gr 2 | CH4, CH5, CH6 | 1 st , 2 nd and 3 rd phase of CH2 |
| Gr 3 | CH7, CH8, CH9 | 1 st , 2 nd and 3 rd phase of CH3 |
| Gr 4 | CH10, CH11, CH12 | 1 st , 2 nd and 3 rd phase of CH4 |

FRONT PANEL DESCRIPTION



ONLINE PAGE DESCRIPTION

There are 2 dedicated key labeled as (PAGE) and PRG with symbols marked as \triangleright and \triangleleft to read meter parameters.

At power ON meter displays average line to neutral voltage at first line and energy at 2nd line in auto mode.

ONLINE PAGE DESCRIPTION FOR 4 CHANNEL 3P4W

| FIRST KEY \triangleright PRESS | SECOND KEY \triangleleft PRESS | DESCRIPTION |
|---------------------------------------|----------------------------------|--|
| Press \triangleright key (1st Time) | — | Displays average line to neutral voltage and CH 1 Active Energy. |
| | 1st time | Displays average line to neutral voltage and CH 2 Active Energy. |
| | 2nd time | Displays average line to neutral voltage and CH 3 Active Energy. |
| | 3rd time | Displays average line to neutral voltage and CH 4 Active Energy. |
| Press \triangleright key (2nd Time) | — | Displays line to neutral voltage of CH 1. |
| | 1st time | Displays line to neutral voltage of CH 2. |
| | 2nd time | Displays line to neutral voltage of CH 3. |
| | 3rd time | Displays line to neutral voltage of CH 4. |
| Press \triangleright key (3rd Time) | — | Displays line to line voltage of CH 1. |
| | 1st time | Displays line to line voltage of CH 2. |
| | 2nd time | Displays line to line voltage of CH 3. |
| Press \triangleright key (4th Time) | — | Displays current of CH 1. |
| | 1st time | Displays current of CH 2. |
| | 2nd time | Displays current of CH 3. |
| | 3rd time | Displays current of CH 4. |

| FIRST KEY \triangleright PRESS | SECOND KEY \triangleleft PRESS | DESCRIPTION |
|--|----------------------------------|--|
| Press \triangleright key (5th Time) | — | Displays CH 1 Power Factor and frequency. |
| | 1st time | Displays CH 2 Power Factor and frequency. |
| | 2nd time | Displays CH 3 Power Factor and frequency. |
| | 3rd time | Displays CH 4 Power Factor and frequency. |
| Press \triangleright key (6th Time) | — | Displays average line to neutral voltage and CH 1 Reactive Energy. |
| | 1st time | Displays average line to neutral voltage and CH 2 Reactive Energy. |
| | 2nd time | Displays average line to neutral voltage and CH 3 Reactive Energy. |
| | 3rd time | Displays average line to neutral voltage and CH 4 Reactive Energy. |
| Press \triangleright key (7th Time) | — | Displays average line to neutral voltage and total Reactive Energy of all channel. |
| | 1st time | Displays average line to neutral voltage and CH 1 Apparent Energy. |
| | 2nd time | Displays average line to neutral voltage and CH 2 Apparent Energy. |
| | 3rd time | Displays average line to neutral voltage and CH 3 Apparent Energy. |
| Press \triangleright key (8th Time) | — | Displays Active Power of CH 1. |
| | 1st time | Displays Active Power of CH 2. |
| | 2nd time | Displays Active Power of CH 3. |
| | 3rd time | Displays Active Power of CH 4. |
| Press \triangleright key (9th Time) | — | Displays Reactive Power of CH 1. |
| | 1st time | Displays Reactive Power of CH 2. |
| | 2nd time | Displays Reactive Power of CH 3. |
| Press \triangleright key (10th Time) | — | Displays Reactive Power of CH 4. |
| | 1st time | Displays Apparent Power of CH 1. |
| | 2nd time | Displays Apparent Power of CH 2. |
| Press \triangleright key (11th Time) | — | Displays Apparent Power of CH 3. |
| | 1st time | Displays Apparent Power of CH 4. |
| | 2nd time | Displays Apparent Power of CH 1. |
| | 3rd time | Displays Apparent Power of CH 2. |

| FIRST KEY \triangleright PRESS | SECOND KEY \triangleleft PRESS | DESCRIPTION |
|--|----------------------------------|--|
| Press \triangleright key (11th Time) | 2nd time | Displays max demand of active power of CH 3. |
| | 3rd time | Displays max demand of active power of CH 4. |
| Press \triangleright key (12th Time) | — | Displays max demand of apparent power of CH 1. |
| | 1st time | Displays max demand of apparent power of CH 2. |
| | 2nd time | Displays max demand of apparent power of CH 3. |
| | 3rd time | Displays max demand of apparent power of CH 4. |

ONLINE PAGE DESCRIPTION FOR 12 CHANNEL 1P2W

| FIRST KEY \triangleright PRESS | SECOND KEY \triangleleft PRESS | DESCRIPTION |
|---------------------------------------|--|---|
| Press \triangleright key (1st Time) | — | Displays line to neutral voltage and CH 1 Active Energy. |
| | 1st time | Displays line to neutral voltage and CH 2 Active Energy. |
| | 2nd time | Displays line to neutral voltage and CH 3 Active Energy. |
| | 3rd time | Displays line to neutral voltage and CH 4 Active Energy. |
| | 4th time | Displays line to neutral voltage and CH 5 Active Energy. |
| | 5th time | Displays line to neutral voltage and CH 6 Active Energy. |
| | 6th time | Displays line to neutral voltage and CH 7 Active Energy. |
| | 7th time | Displays line to neutral voltage and CH 8 Active Energy. |
| | 8th time | Displays line to neutral voltage and CH 9 Active Energy. |
| | 9th time | Displays line to neutral voltage and CH 10 Active Energy. |
| | 10th time | Displays line to neutral voltage and CH 11 Active Energy. |
| | 11th time | Displays line to neutral voltage and CH 12 Active Energy. |
| 12th time | Displays line to neutral voltage and Total Active Energy of all channel. | |

ONLINE PAGE DESCRIPTION FOR 12 CHANNEL 1P2W

| FIRST KEY \triangleright PRESS | SECOND KEY \triangleleft PRESS | DESCRIPTION |
|---------------------------------------|---|--|
| Press \triangleright key (2nd Time) | — | Displays line to neutral voltage of group 1. |
| | 1st time | Displays line to neutral voltage of group 2. |
| | 2nd time | Displays line to neutral voltage of group 3. |
| Press \triangleright key (3rd Time) | — | Displays line to neutral voltage of group 4. |
| | 1st time | Displays current of group 1. |
| | 2nd time | Displays current of group 2. |
| Press \triangleright key (4th Time) | — | Displays current of group 3. |
| | 1st time | Displays current of group 4. |
| | 2nd time | Displays current of group 1. |
| Press \triangleright key (5th Time) | — | Displays group 1 Power Factor and Frequency. |
| | 1st time | Displays group 2 Power Factor and Frequency. |
| | 2nd time | Displays group 3 Power Factor and Frequency. |
| Press \triangleright key (5th Time) | — | Displays group 4 Power Factor and Frequency. |
| | 3rd time | Displays line to neutral voltage and CH 1 Reactive Energy. |
| | 1st time | Displays line to neutral voltage and CH 2 Reactive Energy. |
| | 2nd time | Displays line to neutral voltage and CH 3 Reactive Energy. |
| | 3rd time | Displays line to neutral voltage and CH 4 Reactive Energy. |
| | 4th time | Displays line to neutral voltage and CH 5 Reactive Energy. |
| | 5th time | Displays line to neutral voltage and CH 6 Reactive Energy. |
| | 6th time | Displays line to neutral voltage and CH 7 Reactive Energy. |
| | 7th time | Displays line to neutral voltage and CH 8 Reactive Energy. |
| 8th time | Displays line to neutral voltage and CH 9 Reactive Energy. | |
| 9th time | Displays line to neutral voltage and CH 10 Reactive Energy. | |

| FIRST KEY (▷) PRESS | SECOND KEY (▲) PRESS | DESCRIPTION |
|--------------------------------|-------------------------|--|
| Press (▷) key (5th Time) | 10th time | Displays line to neutral voltage and CH 11 Reactive Energy |
| | 11th time | Displays line to neutral voltage and CH 12 Reactive Energy |
| | 12th time | Displays line to neutral voltage and Total Reactive Energy of all channel. |
| Press (▷) key (6th Time) | — | Displays line to neutral voltage and CH 1 Apparent Energy. |
| | 1st time | Displays line to neutral voltage and CH 2 Apparent Energy. |
| | 2nd time | Displays line to neutral voltage and CH 3 Apparent Energy. |
| | 3rd time | Displays line to neutral voltage and CH 4 Apparent Energy. |
| | 4th time | Displays line to neutral voltage and CH 5 Apparent Energy. |
| | 5th time | Displays line to neutral voltage and CH 6 Apparent Energy. |
| | 6th time | Displays line to neutral voltage and CH 7 Apparent Energy. |
| | 8th time | Displays line to neutral voltage and CH 8 Apparent Energy. |
| | 9th time | Displays line to neutral voltage and CH 9 Apparent Energy. |
| | 10th time | Displays line to neutral voltage and CH 10 Apparent Energy. |
| | 11th time | Displays line to neutral voltage and CH 11 Apparent Energy. |
| | 12th time | Displays line to neutral voltage and CH 12 Apparent Energy. |
| | 13th time | Displays line to neutral voltage and Total Apparent Energy of all channel. |
| Press (▷) key (7th Time) | — | Displays Active Power of group 1. |
| | 1st time | Displays Active Power of group 2. |
| | 2nd time | Displays Active Power of group 3. |
| Press (▷) key (8th Time) | — | Displays Reactive Power of group 1. |
| | 1st time | Displays Reactive Power of group 2. |
| | 2nd time | Displays Reactive Power of group 3. |
| | 3rd time | Displays Reactive Power of group 4. |

| FIRST KEY (▷) PRESS | SECOND KEY (▲) PRESS | DESCRIPTION |
|---------------------------------|-------------------------|---|
| Press (▷) key (9th Time) | — | Displays Apparent Power of group 1. |
| | 1st time | Displays Apparent Power of group 2. |
| | 2nd time | Displays Apparent Power of group 3. |
| | 3rd time | Displays Apparent Power of group 4. |
| | — | Displays max demand of active Power of group 1. |
| | 1st time | Displays max demand of active Power of group 2. |
| Press (▷) key (10th Time) | 2nd time | Displays max demand of active Power of group 3 |
| | 3rd time | Displays max demand of active Power of group 4 |
| | — | Displays max demand of apparent Power of group 1. |
| Press (▷) key (11th Time) | 1st time | Displays max demand of apparent Power of group 2. |
| | 2nd time | Displays max demand of apparent Power of group 3. |
| | 3rd time | Displays max demand of apparent Power of group 4. |

SERIAL NUMBER DESCRIPTION

Press ▲ key for 10sec. to display 8 digit serial number only for 10sec. at 2nd and 3rd line of display

AUTO / MANUAL PAGE MODE DESCRIPTION :

Press First key for 3sec. to toggle between Automatic and Manual mode.

Note : By default unit operates in automatic mode. In automatic mode online pages scroll automatically at the rate of 5 sec. per page. In automatic mode when any key is pressed, unit temporarily switches to manual mode and the appropriate page is displayed, also if any key is not pressed for 5sec., unit resumes automatic mode.

CONFIGURATION

There are 3 dedicated key with symbols marked as ▷, ▲ and ◀. Use these 3 key to enter into configuration / change setting.

Note : The settings should be done by a professional, after going through this users manual and after having understood the application situation.

For the configuration setting mode :

- Use ▲ and ◀ for 3 sec. to enter or exit from config mode
- Use ▷ shift key to move cursor left or right by one digit each time. After last digit of display cursor shift at 1st digit of display.
- Use ▲ increment key for increasing the parameter value.
- Use ◀ key to save the setting and move on to next page
- Use ▲ and ▷ keys to go back to previous page.

| Config. page. | FUNCTION | Range or Selection | Factory Setting |
|---------------|--------------------------|---|-----------------|
| | Password | 0000 to 9998 | 1000 |
| 1 | Change Password | No / Yes | No |
| 1.1 | New Password | 0000 to 9998 | 0000 |
| 2 | No of Channel | 4 CH / 12 CH | 4 CH |
| 3 | Network Selection | | 3P4W |
| | For 4 Channel | 3P4W, 1P2W-P1, 1P2W-P2, 1P2W-P3. | |
| | For 12 Channel | 1P2W | |
| 4 | CT Secondary | 1 | 1 |
| | For 4 Channel | | |
| 5 | CT Primary CH 1 | 1 to 10000 | 1 |
| 6 | CT Primary CH 2 | 1 to 10000 | 1 |
| 7 | CT Primary CH 3 | 1 to 10000 | 1 |
| 8 | CT Primary CH 4 | 1 to 10000 | 1 |
| | For 12 Channel | | |
| 5 | CT Primary Gr 1 | 1 to 10000 | 1 |
| 6 | CT Primary Gr 2 | 1 to 10000 | 1 |
| 7 | CT Primary Gr 3 | 1 to 10000 | 1 |
| 8 | CT Primary Gr 4 | 1 to 10000 | 1 |
| 9 | L1 CT mounting | RHS/LHS | RHS |
| 10 | L2 CT mounting | RHS/LHS | RHS |
| 11 | L3 CT mounting | RHS/LHS | RHS |
| 12 | L4 CT mounting | RHS/LHS | RHS |
| 13 | PT Secondary | 100 to 500 | 350 |
| 14 | PT primary | 100 to 10000 | 350 |
| 15 | Slave Id | 1 to 255 | 1 |
| 16 | Baud Rate | 300, 600, 1200, 2400, 4800, 9600, 19200 and 38400 | 9600 |
| 17 | Parity | None, Odd, Even | None |
| 18 | Stop Bit | 1 to 2 | 1 |
| 19 | Backlight | 0000 to 7200 | 0000 |
| 20 | Demand interval method | Sliding/ Fixed | Sliding |
| 21 | Demand interval duration | 1 to 20 | 15 |
| 22 | Demand interval length | 1 to 30 (min) | 1 |
| 23 | Factory Default | No / Yes | No |

| Config. page. | FUNCTION | Range or Selection | Factory Setting |
|---------------|----------------|--------------------------|-----------------|
| 21 | Reset Energy | No / Yes | No |
| 21.1 | Password | 0001 to 9999 | 1001 |
| 21.2 | Reset Kwh | | None |
| | For 4 Channel | CH1 to CH4 None and All | |
| | For 12 Channel | CH1 to CH12 None and All | |
| 21.3 | Reset Kvarh | | None |
| | For 4 Channel | CH1 to CH4 None and All | |
| | For 12 Channel | CH1 to CH12 None and All | |
| 21.4 | Reset Kvah | | None |
| | For 4 Channel | CH1 to CH4 None and All | |
| | For 12 Channel | CH1 to CH12 None and All | |
| 21.5 | Reset max | | None |
| | For 4 Channel | CH1 to CH4 None and All | |
| | For 12 Channel | CH1 to CH12 None and All | |

For resetting energy parameters user will be prompted the password. If correct password is entered, the user will be able to reset all energy parameters. This password will be value which will be greater than the configuration password by 1.

POWER FACTOR SIGN CONVENTION

Power Factor sign convention (PF sign) can be positive or negative, and is defined by the conventions used by the IEC standards.

PF sign correlates with the direction of real power (kW) flow.

- Quadrant 1 and 4: Positive real power (+kW). The PF sign is positive(+).
- Quadrant 2 and 3: Negative real power (-kW). The PF sign is negative(-).

EXAMPLE TO READ DATA FROM INPUT REGISTER

Data format: Mid Little Endian (Default)

If Total Active Energy = 1234.12kWh
Start Address : 30090, No. Of register : 02
Hexadecimal Equivalent of 1234.12 is 0x449A43D7

Data stored at 30090 is LSB : $\begin{matrix} C & D \\ 43 & D7 \end{matrix}$
Data Stored at 30091 is MSB : $\begin{matrix} A & B \\ 44 & 9A \end{matrix}$

Data Format to be followed is C-D-A-B

Data format: Big Endian

If Total Active Energy = 1234.12kWh
Start Address : 30090, No. Of register : 02
Hexadecimal Equivalent of 1234.12 is 0x449A43D7

Data stored at 30090 is LSB : $\begin{matrix} A & B \\ 44 & 9A \end{matrix}$
Data Stored at 30091 is MSB : $\begin{matrix} C & D \\ 43 & D7 \end{matrix}$

Data Format to be followed is A-B-C-D

MODBUS REGISTER ADDRESSES LIST

Readable parameters for 4 Channel Meter : [Length (Register) : 2 ; Data Structure : Float]

| ADDRESS | HEX ADDRESS | PARAMETER |
|---------|-------------|---|
| 30000 | 0x00 | 1st Phase line to neutral voltage of CH 1 |
| 30002 | 0x02 | 2nd Phase line to neutral voltage of CH 1 |
| 30004 | 0x04 | 3rd Phase line to neutral voltage of CH 1 |
| 30006 | 0x06 | Average line to neutral voltage of CH 1 |
| 30008 | 0x08 | 1st Phase line to line voltage of CH 1 |
| 30010 | 0x0A | 2nd Phase line to line voltage of CH 1 |
| 30012 | 0x0C | 3rd Phase line to line voltage of CH 1 |
| 30014 | 0x0E | Average line to line voltage of CH 1 |
| 30016 | 0x10 | 1st Phase current of CH 1 |
| 30018 | 0x12 | 2nd Phase current of CH 1 |
| 30020 | 0x14 | 3rd Phase current of CH 1 |
| 30022 | 0x16 | Average current of CH 1 |
| 30024 | 0x18 | Frequency |
| 30026 | 0x1A | 1st Phase Active Power of CH 1 |
| 30028 | 0x1C | 2nd Phase Active Power of CH 1 |
| 30030 | 0x1E | 3rd Phase Active Power of CH 1 |
| 30032 | 0x20 | Total Active Power of CH 1 |
| 30034 | 0x22 | 1st Phase Reactive Power of CH 1 |
| 30036 | 0x24 | 2nd Phase Reactive Power of CH 1 |
| 30038 | 0x26 | 3rd Phase Reactive Power of CH 1 |
| 30040 | 0x28 | Total Reactive Power of CH 1 |
| 30042 | 0x2A | 1st Phase Apparent Power of CH 1 |
| 30044 | 0x2C | 2nd Phase Apparent Power of CH 1 |
| 30046 | 0x2E | 3rd Phase Apparent Power of CH 1 |
| 30048 | 0x30 | Total Apparent Power of CH 1 |
| 30050 | 0x32 | 1st Phase Power Factor of CH 1 |
| 30052 | 0x34 | 2nd Phase Power Factor of CH 1 |
| 30054 | 0x36 | 3rd Phase Power Factor of CH 1 |
| 30056 | 0x38 | Average Power Factor of CH 1 |
| 30058 | 0x3A | 1st Phase Active Energy of CH 1 |
| 30060 | 0x3C | 2nd Phase Active Energy of CH 1 |
| 30062 | 0x3E | 3rd Phase Active Energy of CH 1 |
| 30064 | 0x40 | Total Active Energy of CH 1 |
| 30066 | 0x42 | 1st Phase Reactive Energy of CH 1 |
| 30068 | 0x44 | 2nd Phase Reactive Energy of CH 1 |
| 30070 | 0x46 | 3rd Phase Reactive Energy of CH 1 |
| 30072 | 0x48 | Total Reactive Energy of CH 1 |
| 30074 | 0x4A | 1st Phase Apparent Energy of CH 1 |

| ADDRESS | HEX ADDRESS | PARAMETER |
|---------|-------------|---|
| 30076 | 0x4C | 2nd Phase Apparent Energy of CH 1 |
| 30078 | 0x4E | 3rd Phase Apparent Energy of CH 1 |
| 30080 | 0x50 | Total Apparent Energy of CH 1 |
| 30082 | 0x52 | 1st Phase line to neutral voltage of CH 2 |
| 30084 | 0x54 | 2nd Phase line to neutral voltage of CH 2 |
| 30086 | 0x56 | 3rd Phase line to neutral voltage of CH 2 |
| 30088 | 0x58 | Average line to neutral voltage of CH 2 |
| 30090 | 0x5A | 1st Phase line to line voltage of CH 2 |
| 30092 | 0x5C | 2nd Phase line to line voltage of CH 2 |
| 30094 | 0x5E | 3rd Phase line to line voltage of CH 2 |
| 30096 | 0x60 | Average line to line voltage of CH 2 |
| 30098 | 0x62 | 1st Phase current of CH 2 |
| 30100 | 0x64 | 2nd Phase current of CH 2 |
| 30102 | 0x66 | 3rd Phase current of CH 2 |
| 30104 | 0x68 | Average current of CH 2 |
| 30106 | 0x6A | Frequency |
| 30108 | 0x6C | 1st Phase Active Power of CH 2 |
| 30110 | 0x6E | 2nd Phase Active Power of CH 2 |
| 30112 | 0x70 | 3rd Phase Active Power of CH 2 |
| 30114 | 0x72 | Total Active Power of CH 2 |
| 30116 | 0x74 | 1st Phase Reactive Power of CH 2 |
| 30118 | 0x76 | 2nd Phase Reactive Power of CH 2 |
| 30120 | 0x78 | 3rd Phase Reactive Power of CH 2 |
| 30122 | 0x7A | Total Reactive Power of CH 2 |
| 30124 | 0x7C | 1st Phase Apparent Power of CH 2 |
| 30126 | 0x7E | 2nd Phase Apparent Power of CH 2 |
| 30128 | 0x80 | 3rd Phase Apparent Power of CH 2 |
| 30130 | 0x82 | Total Apparent Power of CH 2 |
| 30132 | 0x84 | 1st Phase Power Factor of CH 2 |
| 30134 | 0x86 | 2nd Phase Power Factor of CH 2 |
| 30136 | 0x88 | 3rd Phase Power Factor of CH 2 |
| 30138 | 0x8A | Average Power Factor of CH 2 |
| 30140 | 0x8C | 1st Phase Active Energy of CH 2 |
| 30142 | 0x8E | 2nd Phase Active Energy of CH 2 |
| 30144 | 0x90 | 3rd Phase Active Energy of CH 2 |
| 30146 | 0x92 | Total Active Energy of CH 2 |
| 30148 | 0x94 | 1st Phase Reactive Energy of CH 2 |
| 30150 | 0x96 | 2nd Phase Reactive Energy of CH 2 |

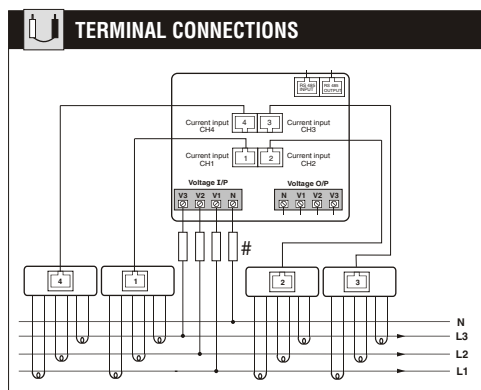
| ADDRESS | HEX ADDRESS | PARAMETER |
|---------|-------------|---|
| 30152 | 0x98 | 3rd Phase Reactive Energy of CH 2 |
| 30154 | 0x9A | Total Reactive Energy of CH 2 |
| 30156 | 0x9C | 1st Phase Apparent Energy of CH 2 |
| 30158 | 0x9E | 2nd Phase Apparent Energy of CH 2 |
| 30160 | 0xA0 | 3rd Phase Apparent Energy of CH 2 |
| 30162 | 0xA2 | Total Apparent Energy of CH 2 |
| 30164 | 0xA4 | 1st Phase line to neutral voltage of CH 3 |
| 30166 | 0xA6 | 2nd Phase line to neutral voltage of CH 3 |
| 30168 | 0xA8 | 3rd Phase line to neutral voltage of CH 3 |
| 30170 | 0xAA | Average line to neutral voltage of CH 3 |
| 30172 | 0xAC | 1st Phase line to line voltage of CH 3 |
| 30174 | 0xAE | 2nd Phase line to line voltage of CH 3 |
| 30176 | 0xB0 | 3rd Phase line to line voltage of CH 3 |
| 30178 | 0xB2 | Average line to line voltage of CH 3 |
| 30180 | 0xB4 | 1st Phase current of CH 3 |
| 30182 | 0xB6 | 2nd Phase current of CH 3 |
| 30184 | 0xB8 | 3rd Phase current of CH 3 |
| 30186 | 0xBA | Average current of CH 3 |
| 30188 | 0xBC | Frequency |
| 30190 | 0xBE | 1st Phase Active Power of CH 3 |
| 30192 | 0xC0 | 2nd Phase Active Power of CH 3 |
| 30194 | 0xC2 | 3rd Phase Active Power of CH 3 |
| 30196 | 0xC4 | Total Active Power of CH 3 |
| 30198 | 0xC6 | 1st Phase Reactive Power of CH 3 |
| 30200 | 0xC8 | 2nd Phase Reactive Power of CH 3 |
| 30202 | 0xCA | 3rd Phase Reactive Power of CH 3 |
| 30204 | 0xCC | Total Reactive Power of CH 3 |
| 30206 | 0xCE | 1st Phase Apparent Power of CH 3 |
| 30208 | 0xD0 | 2nd Phase Apparent Power of CH 3 |
| 30210 | 0xD2 | 3rd Phase Apparent Power of CH 3 |
| 30212 | 0xD4 | Total Apparent Power of CH 3 |
| 30214 | 0xD6 | 1st Phase Power Factor of CH 3 |
| 30216 | 0xD8 | 2nd Phase Power Factor of CH 3 |
| 30218 | 0xDA | 3rd Phase Power Factor of CH 3 |
| 30220 | 0xDC | Average Power Factor of CH 3 |
| 30222 | 0xDE | 1st Phase Active Energy of CH 3 |
| 30224 | 0xE0 | 2nd Phase Active Energy of CH 3 |
| 30226 | 0xE2 | 3rd Phase Active Energy of CH 3 |

| ADDRESS | HEX ADDRESS | PARAMETER |
|---------|-------------|---|
| 30228 | 0xE4 | Total Active Energy of CH 3 |
| 30230 | 0xE6 | 1st Phase Reactive Energy of CH 3 |
| 30232 | 0xE8 | 2nd Phase Reactive Energy of CH 3 |
| 30234 | 0xEA | 3rd Phase Reactive Energy of CH 3 |
| 30236 | 0xEC | Total Reactive Energy of CH 3 |
| 30238 | 0xEE | 1st Phase Apparent Energy of CH 3 |
| 30240 | 0xF0 | 2nd Phase Apparent Energy of CH 3 |
| 30242 | 0xF2 | 3rd Phase Apparent Energy of CH 3 |
| 30244 | 0xF4 | Total Apparent Energy of CH 3 |
| 30246 | 0xF6 | 1st Phase line to neutral voltage of CH 4 |
| 30248 | 0xF8 | 2nd Phase line to neutral voltage of CH 4 |
| 30250 | 0xFA | 3rd Phase line to neutral voltage of CH 4 |
| 30252 | 0xFC | Average line to neutral voltage of CH 4 |
| 30254 | 0xFE | 1st Phase line to line voltage of CH 4 |
| 30256 | 0x100 | 2nd Phase line to line voltage of CH 4 |
| 30258 | 0x102 | 3rd Phase line to line voltage of CH 4 |
| 30260 | 0x104 | Average line to line voltage of CH 4 |
| 30262 | 0x106 | 1st Phase current of CH 4 |
| 30264 | 0x108 | 2nd Phase current of CH 4 |
| 30266 | 0x10A | 3rd Phase current of CH 4 |
| 30268 | 0x10C | Average current of CH 4 |
| 30270 | 0x10E | Frequency |
| 30272 | 0x110 | 1st Phase Active Power of CH 4 |
| 30274 | 0x112 | 2nd Phase Active Power of CH 4 |
| 30276 | 0x114 | 3rd Phase Active Power of CH 4 |
| 30278 | 0x116 | Total Active Power of CH 4 |
| 30280 | 0x118 | 1st Phase Reactive Power of CH 4 |
| 30282 | 0x11A | 2nd Phase Reactive Power of CH 4 |
| 30284 | 0x11C | 3rd Phase Reactive Power of CH 4 |
| 30286 | 0x11E | Total Reactive Power of CH 4 |
| 30288 | 0x120 | 1st Phase Apparent Power of CH 4 |
| 30290 | 0x122 | 2nd Phase Apparent Power of CH 4 |
| 30292 | 0x124 | 3rd Phase Apparent Power of CH 4 |
| 30294 | 0x126 | Total Apparent Power of CH 4 |
| 30296 | 0x128 | 1st Phase Power Factor of CH 4 |
| 30298 | 0x12A | 2nd Phase Power Factor of CH 4 |
| 30300 | 0x12C | 3rd Phase Power Factor of CH 4 |
| 30302 | 0x12E | Average Power Factor of CH 4 |

| MODBUS REGISTER ADDRESSES LIST | | |
|---|-------------|---------------------------------------|
| Readable parameters for 4 Channel Meter : [Length (Register) : 2 ; Data Structure : Float] | | |
| ADDRESS | HEX ADDRESS | PARAMETER |
| 30304 | 0x130 | 1st Phase Active Energy of CH 4 |
| 30306 | 0x132 | 2nd Phase Active Energy of CH 4 |
| 30308 | 0x134 | 3rd Phase Active Energy of CH 4 |
| 30310 | 0x136 | Total Active Energy of CH 4 |
| 30312 | 0x138 | 1st Phase Reactive Energy of CH 4 |
| 30314 | 0x13A | 2nd Phase Reactive Energy of CH 4 |
| 30316 | 0x13C | 3rd Phase Reactive Energy of CH 4 |
| 30318 | 0x13E | Total Reactive Energy of CH 4 |
| 30320 | 0x140 | 1st Phase Apparent Energy of CH 4 |
| 30322 | 0x142 | 2nd Phase Apparent Energy of CH 4 |
| 30324 | 0x144 | 3rd Phase Apparent Energy of CH 4 |
| 30326 | 0x146 | Total Apparent Energy of CH 4 |
| 30328 | 0x148 | Serial No. (Data Structure : Hex) |
| 30330 | 0x14A | Total Active Energy of all channel. |
| 30332 | 0x14C | Total Reactive Energy of all channel. |
| 30334 | 0x14E | Total Apparent Energy of all channel. |
| 30336 | 0x150 | kW MAX Active power of CH 1 |
| 30338 | 0x152 | kW MAX Active power of CH 2 |
| 30340 | 0x154 | kW MAX Active power of CH 3 |
| 30342 | 0x156 | kW MAX Active power of CH 4 |
| 30344 | 0x158 | kVA MAX Apparent power of CH 1 |
| 30346 | 0x15A | kVA MAX Apparent power of CH 2 |
| 30348 | 0x15C | kVA MAX Apparent power of CH 3 |
| 30350 | 0x15E | kVA MAX Apparent power of CH 4 |

| MODBUS REGISTER ADDRESSES LIST | | |
|--|-------------|-----------------------------|
| Readable parameters for 12 Channel Meter : [Length (Register) : 2 ; Data Structure : Float] | | |
| ADDRESS | HEX ADDRESS | PARAMETER |
| 30352 | 0x160 | kW MAX Active power of CH 1 |
| 30354 | 0x162 | kW MAX Active power of CH 2 |
| 30356 | 0x164 | kW MAX Active power of CH 3 |
| 30358 | 0x166 | kW MAX Active power of CH 4 |
| 30360 | 0x168 | kW MAX Active power of CH 5 |
| 30362 | 0x16A | kW MAX Active power of CH 6 |
| 30364 | 0x16C | kW MAX Active power of CH 7 |
| 30366 | 0x16E | kW MAX Active power of CH 8 |

| MODBUS REGISTER ADDRESSES LIST | | |
|--|-------------|---------------------------------|
| Readable parameters for 12 Channel Meter : [Length (Register) : 2 ; Data Structure : Float] | | |
| ADDRESS | HEX ADDRESS | PARAMETER |
| 30368 | 0x170 | kW MAX Active power of CH 9 |
| 30370 | 0x172 | kW MAX Active power of CH 10 |
| 30372 | 0x174 | kW MAX Active power of CH 11 |
| 30374 | 0x176 | kW MAX Active power of CH 12 |
| 30376 | 0x178 | kVA MAX Apparent power of CH 1 |
| 30378 | 0x17A | kVA MAX Apparent power of CH 2 |
| 30380 | 0x17C | kVA MAX Apparent power of CH 3 |
| 30382 | 0x17E | kVA MAX Apparent power of CH 4 |
| 30384 | 0x180 | kVA MAX Apparent power of CH 5 |
| 30386 | 0x182 | kVA MAX Apparent power of CH 6 |
| 30388 | 0x184 | kVA MAX Apparent power of CH 7 |
| 30390 | 0x186 | kVA MAX Apparent power of CH 8 |
| 30392 | 0x188 | kVA MAX Apparent power of CH 9 |
| 30394 | 0x18A | kVA MAX Apparent power of CH 10 |
| 30396 | 0x18C | kVA MAX Apparent power of CH 11 |
| 30398 | 0x18E | kVA MAX Apparent power of CH 12 |



CT MOUNTING DESCRIPTION

- 1) For CT mounting first go to the current page as per the requirement CH1, CH2, CH3, CH4.
- 2) Press enter key for 3 sec to display CT mounting method: RHS/LHS/ is ok /not ok/ invalid .
- 3) Range for ok : if PF is in between of 0.8L to 0.8C
Range for not ok : if PF is not between of 0.8L to 0.8C
Range for invalid : if current is zero

NOTE : In 1P2W for 4 Channel meter all pages will be same as 3P4W only selected phase parameter will display.

| MODBUS REGISTER ADDRESSES LIST | | | | | | |
|--|-------------|---------------------------------------|------------------|------------------------------|-------------------|----------------|
| Readable / Writable parameters from MRJ4M-QUAD | | | | | | |
| Address | Hex Address | Parameter | Range | | Length (Register) | Data Structure |
| | | | Min value | Max value | | |
| 40000 | 0x00 | Password | 0 | 9998 | 1 | Integer |
| | | | Value | Meaning | | |
| 40001 | 0x01 | N/W selection | 0x0000 | 3P-4W | 1 | Integer |
| | | | 0x0001 | | 1 | Integer |
| | | | 0x0002 | 1P2W-P1 | 1 | Integer |
| | | | 0x0003 | 1P2W-P2 | 1 | Integer |
| | | | 0x0004 | 1P2W-P3 | 1 | Integer |
| | | (Valid only for 12 Channel meter) | 0x0005 | 1P2W | 1 | Integer |
| | | | Min value | Max value | | |
| 40002 | 0x02 | CT Secondary | 1 | 1 | 1 | Integer |
| 40003 | 0x03 | CT Primary CH1 (Gr 1 for 12 CH Meter) | 1 | 10000 | 1 | Integer |
| 40004 | 0x04 | CT Primary CH2 (Gr 2 for 12 CH Meter) | 1 | 10000 | 1 | Integer |
| 40005 | 0x05 | CT Primary CH3 (Gr 3 for 12 CH Meter) | 1 | 10000 | 1 | Integer |
| 40006 | 0x06 | CT Primary CH4 (Gr 4 for 12 CH Meter) | 1 | 10000 | 1 | Integer |
| 40007 | 0x07 | PT Secondary | 100 | 500 | 1 | Integer |
| 40008 | 0x08 | PT Primary | 100 | 10000 | 2 | Integer |
| 40010 | 0x0A | Slave ID | 1 | 255 | | |
| | | | Value | Meaning | | |
| 40011 | 0x0B | Baud Rate | 0x0000 | 300 | 1 | Integer |
| | | | 0x0001 | 600 | 1 | Integer |
| | | | 0x0002 | 1200 | 1 | Integer |
| | | | 0x0003 | 2400 | 1 | Integer |
| | | | 0x0004 | 4800 | 1 | Integer |
| | | | 0x0005 | 9600 | 1 | Integer |
| | | | 0x0006 | 19200 | 1 | Integer |
| | | | 0x0007 | 38400 | 1 | Integer |
| 40012 | 0x0C | Parity | 0x0000 | None | 1 | Integer |
| | | | 0x0001 | Odd | 1 | Integer |
| | | | 0x0002 | Even | 1 | Integer |
| 40013 | 0x0D | Stop Bit | 0x0000 | 1 | 1 | Integer |
| | | | 0x0001 | 2 | 1 | Integer |
| | | | Min value | Max value | | |
| 40014 | 0x0E | Backlight | 0000 | 7200 | 1 | Integer |
| | | | Value | Meaning | | |
| 40015 | 0x0F | No of channel | 0x0000 | 4 channel | 1 | Integer |
| | | | 0x0001 | 12 channel | 1 | Integer |
| 40016 | 0x10 | Factory Default | 1 | To set factory setting range | 1 | Integer |

MODBUS REGISTER ADDRESSES LIST

NOTE : CHANNEL 5 to CHANNEL 12 are valid only for 12 CHANNEL Meter.

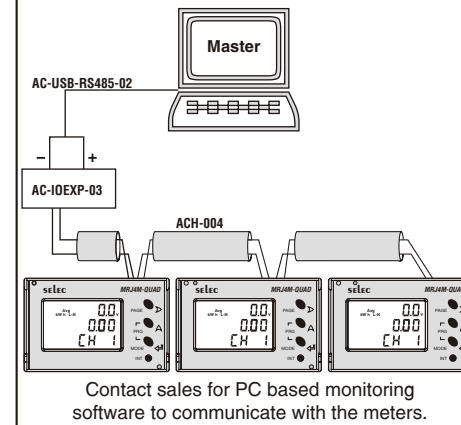
| Address | Hex Address | Parameter | Range | | Length (Register) | Data Structure |
|---------|-------------|-----------------------|-------|-----------------------|-------------------|----------------|
| 40017 | 0x11 | Reset Active Energy | 1 | CH 1 | 1 | Integer |
| | | | 2 | CH 2 | 1 | Integer |
| | | | 3 | CH 3 | 1 | Integer |
| | | | 4 | CH 4 | 1 | Integer |
| | | | 5 | CH 5 | 1 | Integer |
| | | | 6 | CH 6 | 1 | Integer |
| | | | 7 | CH 7 | 1 | Integer |
| | | | 8 | CH 8 | 1 | Integer |
| | | | 9 | CH 9 | 1 | Integer |
| | | | 10 | CH 10 | 1 | Integer |
| | | | 11 | CH 11 | 1 | Integer |
| | | | 12 | CH 12 | 1 | Integer |
| | | | 13 | Total Active Energy | 1 | Integer |
| 40018 | 0x12 | Reset Apparent Energy | 1 | CH 1 | 1 | Integer |
| | | | 2 | CH 2 | 1 | Integer |
| | | | 3 | CH 3 | 1 | Integer |
| | | | 4 | CH 4 | 1 | Integer |
| | | | 5 | CH 5 | 1 | Integer |
| | | | 6 | CH 6 | 1 | Integer |
| | | | 7 | CH 7 | 1 | Integer |
| | | | 8 | CH 8 | 1 | Integer |
| | | | 9 | CH 9 | 1 | Integer |
| | | | 10 | CH 10 | 1 | Integer |
| | | | 11 | CH 11 | 1 | Integer |
| | | | 12 | CH 12 | 1 | Integer |
| | | | 13 | Total Apparent Energy | 1 | Integer |
| 40019 | 0x13 | Reset Reactive Energy | 1 | CH 1 | 1 | Integer |
| | | | 2 | CH 2 | 1 | Integer |
| | | | 3 | CH 3 | 1 | Integer |
| | | | 4 | CH 4 | 1 | Integer |
| | | | 5 | CH 5 | 1 | Integer |
| | | | 6 | CH 6 | 1 | Integer |
| | | | 7 | CH 7 | 1 | Integer |
| | | | 8 | CH 8 | 1 | Integer |
| | | | 9 | CH 9 | 1 | Integer |
| | | | 10 | CH 10 | 1 | Integer |
| | | | 11 | CH 11 | 1 | Integer |
| | | | 12 | CH 12 | 1 | Integer |
| | | | 13 | Total Reactive Energy | 1 | Integer |

MODBUS REGISTER ADDRESSES LIST

NOTE : CHANNEL 5 to CHANNEL 12 are valid only for 12 CHANNEL Meter.

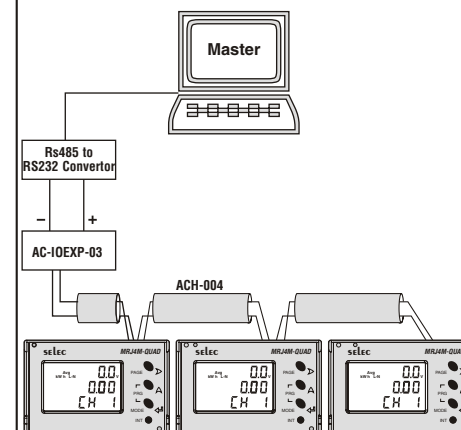
| Address | Hex Address | Parameter | Range | | Length (Register) | Data Structure |
|---------|-------------|------------------------------|---------------|--|-------------------|----------------|
| 40021 | 0x15 | Demand interval method | 0x0000 | Sliding | 1 | Integer |
| | | | 0x0001 | Fixed | | |
| 40022 | 0x16 | Demand interval Duration | Min Value : 1 | MAX Value : 20 | 1 | Integer |
| 40023 | 0x17 | Demand interval Length (min) | Min Value : 1 | MAX Value : 30 | 1 | Integer |
| 40024 | 0x18 | Reset MAX | 1 | Reset all MAX Demand | 1 | Integer |
| 40070 | 0x46 | Change Endianness | Value :0 or 1 | Meaning : 0: Mid Little Endian (CDAB) 1: Big Endian (ABCD) Default setting: Mid Little Endian | 1 | Integer |

CONNECTION DIAGRAM FOR COMMUNICATION



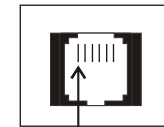
All fuse types : 0.5A class CC UL type
0.5A fast acting 600V

CONNECTION DIAGRAM FOR COMMUNICATION



All fuse types : 0.5A class CC UL type
0.5A fast acting 600V

INTERNAL PINOUT FOR COMMUNICATION RS485 PORT



PIN 1

| PIN | DESCRIPTION |
|-----|----------------|
| 1 | RS485+ (Slave) |
| 2 | --- |
| 3 | --- |
| 4 | --- |
| 5 | --- |
| 6 | RS485- (Slave) |

ACCESSORIES (To be ordered separately)

| ORDER CODE | DESCRIPTION |
|-------------------|---|
| AC-USB-RS485-03 | USB to RS485 cable (6 pin jack for downloading) |
| AC-USB-RS485-02 * | USB to RS485 cable (2 pin open wire) |
| ACH-004 | RJ25 (6-pin) cable |
| AC-IOEXP-03 | Port Expansion adapter |

Note: * Along with ACH-004 & AC-IOEXP-03 for networking

(Specifications subject to change as development is a continuous process.)

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