



SPECIFICATIONS

DISPLAY

Liquid crystal display with backlight
1 line, 4 digits and 2 line, 7 digits per line to show electrical Parameters
5th line, 8 digits to show energy
Bar graph for current indication as a % of CT rating

LCD INDICATIONS

- Communication in progress
MAX DMD - Maximum & Minimum Demand of Power
INT - Integration of energy

WIRING INPUT

3.Ø - 4 wire, 1.Ø - 2 wire

RATED INPUT VOLTAGE

60 TO 300Vac (L-N); 104-520Vac (L-L)

FREQUENCY RANGE

45-65Hz

CT PRIMARY

5A to 10000A (Programmable for any value)

CT SECONDARY

330mV

PT PRIMARY

100 to 10KVac (Programmable for any value)

PT SECONDARY

100 to 500Vac (Programmable for any value)

DISPLAY UPDATE TIME

1 Second for parameters

AUXILIARY

Self supplied : Consumption > 8VA

TEMPERATURE

Operating : 0 to 50°C
Storage : -20 to 75°C

HUMIDITY

85% non-condensing

MOUNTING

DIN Rail mounting

WEIGHT

MRJ4M : 191gms MRJ4M-SL : 200gms

OUTPUT

Pulsed Output : Voltage range External 24VDC max
Current capacity : 100mA

INSTALLATION CATEGORY

Category III

SERIAL COMMUNICATION

Interface Standard and protocol	RS485 & Modbus RTU
Communication address	1 to 255
Transmission Mode	Half duplex
Data types	Float and Integer
Transmission distance	500 Meter maximum
Transmission speed	300, 600, 1200, 2400, 4800 9600, 19200 (bps)
Parity	None, Odd, Even
Stop bits	1 or 2
Response time	100mS

ACCURACY

Measurement	Accuracy
Voltage V _{L-N}	±0.5% of Full Scale
Voltage V _{L-L}	±0.5% of Full Scale
Current	±0.5% of Full Scale
Frequency	±0.1% of Full Scale For L-N Voltage >20V For L-L Voltage >35V
Active Power	1%
Reactive Power	1%
Apparent Power	1%
Power Factor	±0.1%
Active Energy	1%
Reactive Energy	1%
MAX / Min Active Power	1%
MAX / MIN Reactive Power	1%
MAX Apparent Power	1%

RESOLUTION

PT Ratio x CT Ratio	KWh / KVAh / KVArh	Pulse
<15	0.01K	0.01K
<150	0.1K	0.1K
<1500	1K	1K
<15000	0.01M	0.01M
<150000	0.1M	0.1M

NOTE: 1) For Voltage, Current, Power, resolution is automatically adjusted.
2) For Power Factor resolution is 0.001
3) For MRJ4M-SL : Total energy is highest resolution of loads

SAFETY PRECAUTIONS

All safety related codifications, symbols and instructions that appear in this operation 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 the manner specified by the manufacturer it might impair the protection provided by the equipment.



CAUTION

Read the instructions prior to installation and operation of the unit.



CAUTION

Risk of electrical shock

WIRING GUIDELINES



WARNING

- To prevent the risk of electric shock, power supply to the equipment must be kept OFF while installing the wiring.
- Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
- Use lugged terminals.
- To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
- Layout of connecting cables shall be away from any internal EMI source.
- Cable used for connection to power source, must have a cross section of 0.5mm² to 2.5mm². These wires shall have current capacity of 6A.
- Copper cable should be used (Stranded or single core cable).
- Before attempting work on the device ensure absence of voltages using appropriate voltage detection device.

INSTALLATION GUIDELINES

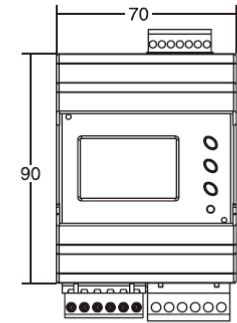


CAUTION

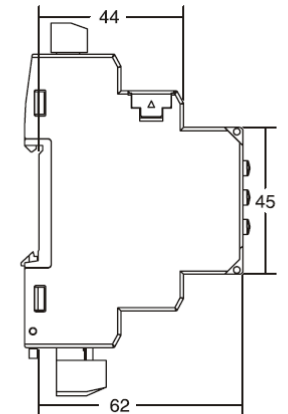
- This equipment, being of a built-in-type, normally becomes a part of a main control panel and in case the terminals do not remain accessible to the end user after installation and internal wire.
- Conductors must not come into contact with the internal circuitry of the equipment or it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
- Protection & disconnection means must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function & must be installed in a convenient position normally accessible to the operator.
- 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.
- The equipment shall not be installed in environmental conditions other than those mentioned in the manual.
The equipment does not have a built-in-type fuse. Installation of external fuse of rating 275Vac / 0.5Amp for electrical circuitry / battery is highly recommended.

DIMENSIONS (All dimensions in mm)

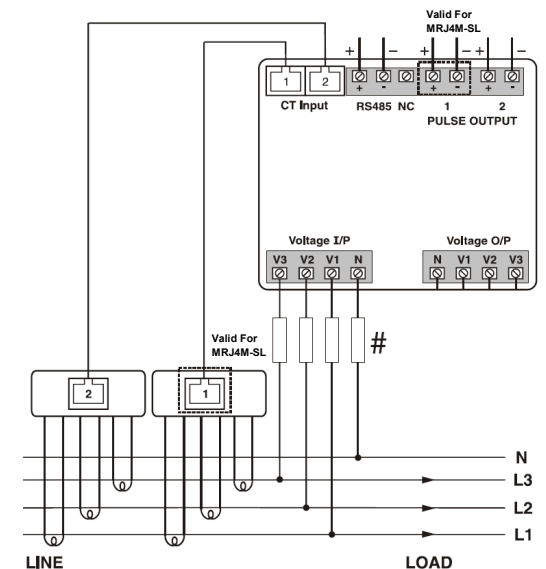
Front View



Side View



TERMINAL CONNECTIONS



ONLINE PAGE DESCRIPTION

There are 2 dedicated keys labelled as PAGE and PRG with symbols \triangleright and \triangleleft to read meter parameters.
At power on the meter displays average phase to neutral voltage and active energy of three phases. If any key is not pressed for 60 seconds the unit resumes manual mode.

KEY PRESS	PARAMETER KEY	DESCRIPTION
ONLINE PAGE DESCRIPTION FOR MRJ4M		
Press page (\triangleright) key (1st time)	—	Displays line to neutral voltage of three phases
	Press (A) key	Displays line to line voltage of three phases
	Press (A) key 3 seconds	Displays voltage sequence
Press page (\triangleright) key (2nd time)	—	Displays phase current of three phases
Press page (\triangleright) key (3rd time)	—	Displays average phase to neutral voltage, current and power factor of three phases and frequency
	Press (A) key	Displays average line to line voltage, current and power factor of three phases and frequency
Press page (\triangleright) key (4th time)	—	Displays power factor of three phases and frequency
	Press (A) key 1st time	Displays active power of three phases
	Press (A) key 2nd time	Displays reactive power of three phases
	Press (A) key 3rd time	Displays apparent power of three phases
	Press (A) key 4th time	Displays total active power of three phases
	Press (A) key 5th time	Displays total reactive power of three phases
	Press (A) key 6th time	Displays total apparent power of three phases
	Press (A) key 7th time	Displays Max demand of active power
	Press (A) key 8th time	Displays Max demand of apparent power
	Press page (\triangleright) key (4th time)	—
Press (A) key		Displays average phase to neutral voltage and reactive energy of three

SERIAL NUMBER DESCRIPTION

Press (A) key for 10 seconds to 8 digit serial number only for 10 seconds on the fifth line of the display

KEY PRESS	PARAMETER KEY	DESCRIPTION
ONLINE PAGE DESCRIPTION FOR MRJ4M-SL		
Press page (\triangleright) key (1st time)	—	Displays line to neutral voltage of three phases
	Press (A) key	Displays line to line voltage of three phases
	Press (A) key 3 seconds	Displays voltage sequence
Press page (\triangleright) key (2nd time)	—	Displays phase current of three phases of load 1
	Press (A) key	Displays phase current of three phases of load 2
Press page (\triangleright) key (3rd time)	—	Displays power factor of three phases of load 1 and frequency
	Press (A) key 1st time	Displays power factor of three phases of load 2 and frequency
	Press (A) key 2nd time	Displays active power of three phases of load 1
	Press (A) key 3rd time	Displays active power of three phases of load 2
	Press (A) key 4th time	Displays reactive power of three phases of load 1
	Press (A) key 5th time	Displays active power of three phases of load 2
	Press (A) key 6th time	Displays apparent power of three phases of load 1
	Press (A) key 7th time	Displays apparent power of three phases of load 2
	Press (A) key 8th time	Displays total active power of three phases of load 1 and load 2
	Press (A) key 9th time	Displays total reactive power of three phases of load 1 and load 2
	Press (A) key 10th time	Displays total apparent power of three phases of load 1 and load 2
	Press (A) key 11th time	Displays max demand of active power of three phases of load 1 and load 2
Press (A) key 12th time	Displays max demand of apparent power of three phases of load 1 and load 2	

Config Page	Function	Range or Selection	Factory Setting
	Password	0000-9999	1000
1.0	Change Password	No/Yes	No
1.1	New Password	0000-9999	1000
2.0	Network Selection	3P4W 1P2W-P1 1P2W-P2 1P2W-P3	3P4W
3.0	CT Secondary	Pre-set	5A

CONFIGURATION

There are 3 dedicated keys with symbols marked as \triangleright , A and \triangleleft use these 3 keys to enter into configuration menu or to change the settings.

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

For the configuration setting mode:

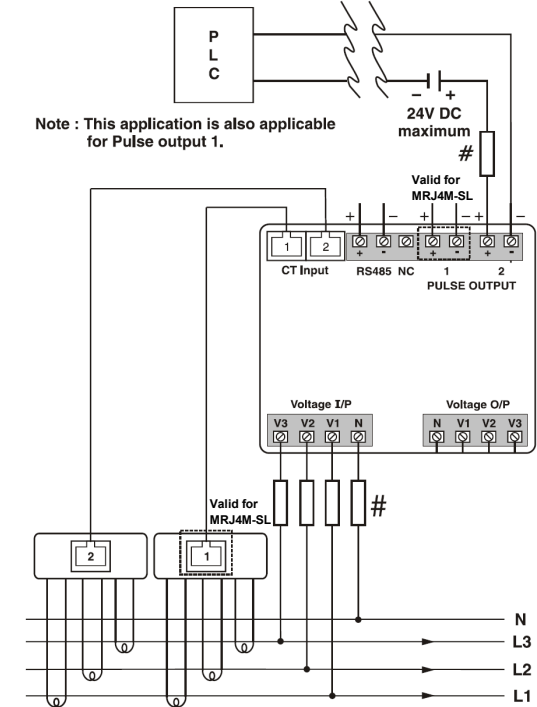
- Use A and \triangleleft keys for 3 seconds to enter or exit from the configuration menu.
- Use \triangleright shift key to move cursor left or right by one digit each time. After last digit of display cursor shifts to 1st digit of display.
- Use A increment key for increasing the parameter value.
- Use \triangleleft key to save the setting and move on to the next page.
- Use A and \triangleright keys to go back to the previous page.

Config Page	Function	Range or Selection	Factory Setting
4.0	CT Primary 1	5A to 10000A	160A
5.0	CT Primary 2 for MRJ4M-SL	5A to 10000A	160A
6.0	PT Secondary	173-415V	350V
7.0	PT Primary	100-500KV	350V
8.0	Slave ID (Address)	1-255	1
9.0	Baud Rate	300,600, 1200,4800, 9600 & 19200	9600
10.0	Parity	None, Even, Odd	None
11.0	Stop Bit	1 or 2	1
12.0	Back Light	0-7200S	0000
13.0	Demand Interval Method	Sliding/Fixed	Sliding
14.0	Demand Interval Duration	1-30	15
15.0	Demand Interval Length	1-30min	1
16.0	Pulse Weight (Load 1)	00.01-99.99	0.10
17.0	Pulse Weight (Load 2) for MRJ4M-SL	00.01-99.99	0.10
18.0	Pulse Duration	0.1 to 20	0.1
19.00	Factory Default	No/Yes	No
20.0	Reset Energy & Max Demand	No/Yes	No
*20.1	Password	0001-9999	1001
20.01	Reset Active Energy	No/Yes	No
20.02	Reset Reactive Energy	No/Yes	No
20.03	Reset Max Power	No/Yes	No
For MRJ4M-SL			
*20.1	Password	0001-9999	1001
20.01	Reset Active Energy (Load 1)	No/Yes	No
20.02	Reset Reactive Energy (Load 1)	No/Yes	No
20.03	Reset Max Power (Load 1)	No/Yes	No

Config Page	Function	Range or Selection	Factory Setting
20.04	Reset Active Energy (Load 2)	No/Yes	No
20.05	Reset Reactive Energy (Load 2)	No/Yes	No
20.06	Reset Max Power (Load 2)	No/Yes	No

* For resetting energy parameters user will be prompted for password. If correct password is entered, the user will be able to reset all energy parameters. The password will be 1 greater than the main password.

APPLICATION OF PULSE OUTPUT



Note : This application is also applicable for Pulse output 1.

Pulse output from MRJ4M-SL meter can be interfaced into a process through a PLC for the on-line control of energy content in the process. If the PLC has a self-exciting digital input, an external DC voltage supply is not needed. The kWh pulse is also used to derive average kWh information at the PLC.

**# All fuse are : 0.5A Class CC UL type
0.5A fast acting 600Vac**

LEFT HAND CT MOUNTING PHASE CORRECTION

The meter phases L1, L2 & L3 are setup as default for the CT to be mounted as an in-coming on the RH (Right Hand) side of the board. Meter display shows RH when "I" is pressed for 3 seconds.

When the CT is mounted on the LH (Left Hand) side of the board the phase sequence needs to be reversed.

- Press "I" for 3 seconds, then release and then press again for 3 seconds. Phase will be reversed and the display will show LH.
- Wait 5 seconds for the meter to resume online reading. Meter display shows LH when "I" is pressed for 3 seconds.

MODBUS REGISTER ADDRESSES LIST

Modbus Register Addresses List						
Readable / Writable Parameters For MRJ4M / MRJ4M-SL						
Address	Hex Address	Parameter	Range		Length (Register)	Data Structure
			Min Value	Max Value		
40000	0x00	Password	0	9998	1	Integer
			Value	Meaning		
40001	0x01	Network Selection	0x0000	3P4W	1	Integer
			0x0002	1P2W-P1	1	Integer
			0x0003	1P2W-P2	1	Integer
			0x0004	1P2W-P3	1	Integer
			Min Value	Max Value		
40002	0x02	CT Secondary (Readable Only)	5	5	1	Integer
40003	0x03	CT Primary 2	5	10000	1	Integer
40004	0x04	PT Secondary	100	500	1	Integer
40005	0x05	PT Primary	100	10000	2	Integer
40007	0x07	Slave ID	1	255	1	Integer
			Value	Meaning		
40008	0x08	Baud Rate	0x0000	300 bps	1	Integer
			0x0001	600 bps	1	Integer
			0x0002	1200 bps	1	Integer
			0x0003	2400 bps	1	Integer
			0x0004	4800 bps	1	Integer
			0x0005	9600 bps	1	Integer
			0x0006	19200 bps	1	Integer
40009	0x09	Parity	0x0000	None	1	Integer
			0x0001	Odd	1	Integer
			0x0002	Even	1	Integer
40010	0x0A	Stop Bit	0x0000	1	1	Integer
			0x0001	2	1	Integer
			Min Value	Max Value		
40011	0x0B	Backlight OFF	0	7200	1	Integer
40012	0x0C	Factory Default Reset	1	Set to factory setting range	1	Integer
40013	0x0D	Reset kWh (Load 2) for MRJ4M-SL	1	Reset Total Active Energy	1	Integer
40015	0x0F	Reset KVArh (Load 2) for MRJ4M-SL	1	Reset Total Reactive Energy	1	Integer
40034	0x22	Demand Interval Method	0x0000	Sliding	1	Integer
			0x0001	Fixed	1	Integer
40035	0x23	Demand Interval Duration	1	30	1	Integer
40036	0x24	Demand Interval Length (Min)	1	30	1	Integer
40037	0x25	Reset Max KW (Load 2) for MRJ4M-SL	1	Reset Max Active Power	1	Integer
40041	0x29	Reset Max KVA (Load 2) for MRJ4M-SL	1	Reset Max Apparent Power	1	Integer
40042	0x2A	Reset kWh (Load 1) for MRJ4M-SL	1	Reset Total Active Energy	1	Integer
40044	0x2B	Reset KVArh (Load 1) for MRJ4M-SL	1	Reset Total Active Energy	1	Integer
40045	0x2C	Reset Max KW (Load 1) for MRJ4M-SL	1	Reset Max Active Power	1	Integer
40049	0x31	Reset Max KVA (Load 1) for MRJ4M-SL	1	Reset Max Apparent Power	1	Integer
40050	0x32	CT Primary 1	5	10000	1	Integer
40057	0x39	Pulse Duration (Seconds)	0.1	2.0 Seconds	1	Integer
40058	0x3A	Pulse Weight (Load 1) for MRJ4M-SL				
40059	0x3B	Pulse Weight (Load 2) for MRJ4M-SL				

* 0.1 Resolution [1 = 0.1 seconds] * 0.01 Resolution [1 = 0.01 kWh] * Applicable for MRJ4M also

Readable parameters : [Length (Register) : 2 ; Data Structure : Float]

Note: In 4 Byte data type, LSB will displayed on lower address and MSB will be displayed on higher address.

Address	Hex Address	Parameter	Address	Hex Address	Parameter [Load 1 MRJ4M-SL Only]
30000	0x00	Voltage V1-N	30074	0x4A	Current I1
30002	0x02	Voltage V2-N	30076	0x4C	Current I2
30004	0x04	Voltage V3-N	30078	0x4E	Current I3
30006	0x06	Average Voltage L-N	30080	0x50	Average Current
30008	0x08	Voltage V1-V2	30082	0x52	KW1
30010	0x0A	Voltage V2-V3	30084	0x54	KW2
30012	0x0C	Voltage V3-V1	30086	0x56	KW3
30014	0x0E	Average L-L	30088	0x58	KVA1
30132	0x84	Serial No (Data Structure : Hex)	30090	0x5A	KVA2
For MRJ4M and MRJ4M-SL (Load 2) Parameter					
30016	0x10	Current I1	30092	0x5C	KVA3
30018	0x12	Current I2	30094	0x5E	KVAr1
30020	0x14	Current I3	30096	0x60	KVAr2
30022	0x16	Average Current	30098	0x62	KVAr3
30024	0x18	KW1	30100	0x64	Total KW
30026	0x1A	KW2	30102	0x66	Total KVA
30028	0x1C	KW3	30104	0x68	Total KVAr
30030	0x1E	KVA1	30106	0x6A	PF1
30032	0x20	KVA2	30108	0x6C	PF2
30034	0x22	KVA3	30110	0x6E	PF3
30036	0x24	KVAr1	30112	0x70	Average PF
30038	0x26	KVAr2	30114	0x72	Frequency
30040	0x28	KVAr3	30116	0x74	KWh
30042	0x2a	Total KW	30120	0x78	KVArh
30044	0x2c	Total KVA	30122	0x7A	KW Max Active Power
30046	0x2e	Total KVAr	30130	0x82	KVA Max Apparent Power
30048	0x30	PF1	30142	0x8E	Total kWh (Load 1 and Load 2)
30050	0x32	PF2	30144	0x90	Total KVArh (Load 1 and Load 2)
30052	0x34	PF3	30146	0x92	Existing KW Max Active Power
30054	0x36	Average PF	30148	0x94	Existing KVA Max Apparent Power
30056	0x38	Frequency			
30058	0x3a	KWh			
30062	0x3e	KVArh			
30064	0x40	KW Max Active Power			
30072	0x48	KVA Max Apparent Power			
30134	0x86	Existing KW Max Active Power			
30138	0x8A	Existing KVA Max Apparent Power			
*30142	0x8E	Existing KVA Max Apparent Power			

* NOTE: These addresses are valid for MRJ4M



Specifications subject to change as development is a continuous process

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