SELEC

MRJ4M-SL

Operating	Instructions



SPECIFICATIONS

DISPLAY

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

LCD INDICATIONS

MD - Maximum Demand of Power

- 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 (L-N) ;

104 to 520V AC (L-L)

FREQUENCY RANGE

45-65 Hz

NO OF CHANNEL

3 Ø - 2 Channel, 1 Ø - 6 Channel (Selectable)

CT PRIMARY L1 and CT PRIMARY L2 5A 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

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

MRJ4M-SL : 200gms. Pulse Output : Voltage range : 24V DC max.

Current capacity : 100mA max.

Pulse Duration : Selectable between 0.1 to 2.0sec. Pulse Weight : Selectable between 0.01 to 9.99kWh

ORDER CODE INFORMATION			
Product Supply Certification			
	Self Supplied(V1,N)	.€	
MRJ4M-SL	60 to 300V AC, 50 / 60Hz, (±5%)		
Installation Category III			

SERIAL COMMUNICATION

SLITIAL COMMONICATION		
RS485 AND MODBUS RTU		
1 to 255		
Half duplex		
Float and Integer		
500 Metre maximum		
300, 600,1200, 2400, 4800, 9600,19200 (in bps)		
None, Odd, Even		
1 or 2		
100ms (max and independent of baud rate)		

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

NOTE : 1) For Voltage, Current, Power, resolution is automatically adjusted

2) For power factor, resolution is 0.013) The total energy is highest resolution of loads

ACCURACY :

Measurement	Accuracy
Voltage V _{L-N}	±0.5% of full Range
Voltage V	±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% of full Range
Apparent power	±1% of full Range
Reactive Power	±1% of full Range
Power factor	±0.01 of full Range
Active energy	Class 1
Reactive energy	Class 1
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.

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 :

- 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.
- 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.
- Cable used for connection to power source, must have a cross section of 0.5mm² to 2.5mm² (20 to 14AWG; 75°C (min)).
- Copper cable should be used (Stranded or Single core cable).
- 8. Before attempting work on device, ensure absence of voltages using appropriate voltage detection device.

INSTALLATION GUIDELINES

CAUTION :

- 1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
- 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.
- 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.
- 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



TERMINAL CONNECTIONS



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

CHANNEL DESCRIPTION

•••••••			
	LOAD	2 CH	6 CH
	L1	1st, 2nd & 3rd phase of current 1	CH1, CH2, CH3
	L2	1st, 2nd & 3rd phase of current 2	CH4, CH5, CH6

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OP386-V0/

FRONT PANEL DESCRIPTION



ONLINE PAGE DESCRIPTION

There are 2 dedicated key labeled as PAGE and PRG with symbols marked as > and A to read meter parameters.

At power ON meter displays average phase to neutral voltage and active energy of three phases. If any key is not pressed for 60sec., unit resumes manual mode.

KEY PRESS	PARAMETER Key	DESCRIPTION
ONLINE PA	GE DESCRIPTI	ON FOR MRJ4M-SL (2CH)
Press page (⊅)	PressA	Displays line to neutral voltage of three phases Displays line to line voltage
key	key	of three phases
(1st time)	Press ⊅ key 3 sec.	Displays voltage sequence.
Press page (⊳)		Displays current of three phases of load 1.
key (2nd time)	Press A key	Displays current of three phases of load 2.
		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.
	PressA key 2nd time	Displays active power of three phases of load 1.
	PressA key 3rd time	Displays active power of three phases of load 2.
	PressA key 4th time	Displays reactive power of three phases of load 1.
	PressA key 5th time	Displays reactive power of three phases of load 2.
Press page (⊅)	PressA key 6th time	Displays apparent power of three phases of load 1.
key (3rd time)	PressA 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.
	PressA key 11th time	Displays max demand of active power of load 1 and load 2

KEY PRESS	PARAMETER Key	DESCRIPTION
ONLINE PAG	E DESCRIPTIO	N FOR MRJ4M-SL (2CH)
Press page (⊅) key (3rd time)	PressA key 12th time	Displays max demand of apparent power of load 1 and load 2
		Displays average phase to neutral voltage and active energy of three phases of load 1 and load 2
Press page ())	PressA key 1st time	Displays average phase to neutral voltage and reactive energy of three phases of load 1and load 2
key (4th time)	PressA key 2nd time	Displays total active energy of three phases of Load 1 and Load 2
	PressA key 3rd time	Displays total reactive energy of three phases of Load 1 and Load 2
		work, all page will be same as 3 ad phase parameter will display.

KEY PRESS	PARAMETER Key	DESCRIPTION	
ONLINE PAG	ONLINE PAGE DESCRIPTION FOR MRJ4M-SL (6CH)		
Press page (▷) key (1st time) Displays line to neutral voltage of selected phase			
Press page (⊅)		Display current of CH 1 on 1st row, CH 2 on 2nd row and CH 3 on 3rd row as page one.	
key (2nd time)	Press A key 1st time	Display current of CH 4 on 1st row, CH 5 on 2nd row and CH 6 on 3rd row as page two.	
Press page (⊅) key (3rd time)		Display power factor of CH 1 on 1st row, CH 2 on 2nd row and CH 3 on 3rd row as page one & Frequency	
	Press A key 1st time	Two & Frequency	
	Press A key 2nd time	Display active power of CH 1 on 1st row, CH 2 on 2nd row and CH 3 on 3rd row as page one.	
	Press A key 3rd time	CH 5 on 2nd row and CH 6 on 3rd row as page two.	
	PressA key 4th time	CH 2 on 2nd row and CH 3 on 3rd row as page one.	
	PressA key 5th time	CH 5 on 2nd row and CH 6 on 3rd row as page two.	
	Press A key 6th time	Display apparent power of CH 1 on 1st row, CH 2 on 2nd row and CH 3 on 3rd row as page one.	

KEY PRESS	PARAMETER Key	DESCRIPTION
ONLINE PAG	E DESCRIPTIO	N FOR MRJ4M-SL (6CH)
Press page (⊅)	Press A key 7th time	Display apparent power of CH 4 on 1st row, CH 5 on 2nd row and CH 6 on 3rd row as page two.
key (3rd time)	Press A key 8th time	Displays total active power of load 1 (CH1,CH2,CH3) on 1st row and load 2 (CH4,CH5,CH6).
	Press A key 9th time	Displays total reactive power of load 1 (CH1,CH2,CH3) on 1st row and load 2 (CH4,CH5,CH6).
	PressA key 10th time	Displays total apparent power of load 1 (CH1,CH2,CH3) on 1st row and load 2 (CH4,CH5,CH6).
	PressA key 11th time	Displays max demand of active power of CH 1 on 1st row, CH 2 on 2nd row and CH 3 on 3rd row as page one.
	Press A key 12th time	Displays max demand of apparent power of CH 1 on 1st row, CH 2 on 2nd row and CH 3 on 3rd row as page one.
	Press A key 13th time	Displays max demand of active power of CH 4 on 1st row, CH 5 on 2nd row and CH 6 on 3rd row as page two.
	Press A key 14th time	Displays max demand of apparent power of CH 4 on 1st row, CH 5 on 2nd row and CH 6 on 3rd row as page two.
		Displays line to neutral voltage of selected phase on 1st row and CH1 active energy
Press page (⊅)	Press A key 1st time	Displays line to neutral voltage of selected phase on 1st row and CH1 reactive energy
key (4th time)	Press A key 2nd time	Displays line to neutral voltage of selected phase on 1st row and CH2 active energy
	Press A key 3rd time	Displays line to neutral voltage of selected phase on 1st row and CH2 reactive energy
	Press A key 4th time	Displays line to neutral voltage of selected phase on 1st row and CH3 active energy
	PressA key 5th time	Displays line to neutral voltage of selected phase on 1st row and CH3 reactive energy

KEY PRESS	PARAMETER Key	DESCRIPTION
ONLINE PAGE DESCRIPTION FOR MRJ4M-SL (6CH)		
	PressA key 6th time	Displays line to neutral voltage of selected phase on 1st row and CH4 active energy
	Press A key 7th time	Displays line to neutral voltage of selected phase on 1st row and CH4 reactive energy
Press page (⊅) key (4th time)	Press A key 8th time	Displays line to neutral voltage of selected phase on 1st row and CH5 active energy
	Press A key 9th time	Displays line to neutral voltage of selected phase on 1st row and CH5 reactive energy
	Press A key 10th time	Displays line to neutral voltage of selected phase on 1st row and CH6 active energy
	PressA key 11th time	Displays line to neutral voltage of selected phase on 1st row and CH6 reactive energy.
	PressA key 12th time	Displays line to neutral voltage of selected phase on 1st row and total active energy of all channel.
	PressA key 13th time	Displays line to neutral voltage of selected phase on 1st row and total reactive energy of all channel.

Note : All pages will be same as above for P1/P2/P3 only phase wise voltage will be display (For MRJ4M-SL only)

SERIAL NUMBER DESCRIPTION

Press A key for 10sec. to display 8 digit serial number, the serial number will be displayed for 10 second

CONFIGURATION

There are 3 dedicated key with symbols marked as ▷, A 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 :
- UseA and refer 3sec. 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 A increment key for increasing the parameter value.
- Use key to save the setting and move on to next page.
- Use A and D keys to go back and 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	1000
2	Channel Selection	2CH / 6CH	2CH
3	Network Selection	3P4W, 1P2W-P1, 1P2W-P2, 1P2W-P3.	3P4W
#4	CT Secondary	Preset	5
[#] 5	CT Primary 1	5A to 10,000A	160
[#] 6	CT Primary 2	5A to 10,000A	160
7	Current Connection1	LHS/RHS	RHS
8	Current Connection2	LHS/RHS	RHS
[#] 9	PT Secondary	100V to 500V	350
[#] 10	PT primary	100V to 10kV	350
11	Slave Id	1 to 255	1
12	Baud Rate	300, 600, 1200, 2400, 4800, 9600 and 19200	9600
13	Parity	None, Even, Odd	None
14	Stop Bit	1 or 2	1
15	Back Light	0 to 7200 sec.	0000
16	Demand interval method	Sliding / Fixed	Sliding
17	Demand interval duration	1 to 30	15
18	Demand interval length	1 to 30min	1
* 19	Pulse Weight (load 1)	0.01 to 9.99kWh	0.10
*20	Pulse Weight (load 2)	0.01 to 9.99kWh	0.10
*21	Pulse Duration	0.1 to 2.0 sec.	0.1
22	Factory Default	No / Yes	No
23	Reset Energy and Max Demand	No / Yes	No
•23.1	Password	0001 to 9999	1001
23.01	Reset Active Energy -1	No / Yes	No
23.02	Reset Reactive Energy -1	No / Yes	No
23.03	Reset L1 Max Power	No / Yes	No
23.04	Reset Active Energy -2	No / Yes	No
23.05	Reset Reactive Energy -2	No / Yes	No

- 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.
- * Valid only for 2 channel selection.
- # In configuration set primary value first and then secondary value for both CT & PT.

A CT ROTATION - IMPORTANT NOTE

Please note: All **THREE PHASE** easywire current transformers as default are configured to monitor Incoming supplies(L1 is on the right-hand side when Viewed from the P2 face). If the transformer is to be used For load monitoring(Requiring L1 to be on the Left-hand Side when viewed from the P2 face), the operator must Perform the **"To change**" procedure described below: **To change**:

We can change LHS/RHS in configuration mode only. **To check:** Press ← key for 3 sec to check the CT mounting

Settings.



Pulse output from MRJ4M-SL meter can be interfaced into a process through a PLC for on line control of energy content in the process.

If the PLC has a self excited digital input, external DC supply is not needed.

The kWh pulse is also used to derive average kWh information at the PLC.

 # All fuse types : 0.5A class CC UL type 0.5A fast acting 600V
In MRJ4M-SL valid only for 2 channel selection

Address	Hex Address	rameters from MRJ4M-SL : Parameter		Range	Length	Data
Autross	HEA Address		Min value	Max value	(Reğister)	Structure
40000	0x00	Password	0	9998	1	Integ
40000	0000		Value	Meaning		meg
40001	0x01	N/W selection	0x0000	3P-4W	1	Integ
40001	0.01		0x0000	1P2W-P1	1	Integ
			0x0002	1P2W-P2	1	Integ
			0x0003	1P2W-P2	1	Integ
				-		niteț
40000	0.00	CT Secondary (A)	Min value	Max value		Integ
40002	0x02	, , ,	5	5	1	
40003	0x03	CT primary L1 (A) [0f load 2]		10000	1	Integ Integ
40004	0x04	PT Secondary (V)	100	500		
40005	0x05	PT primary (V)	100	10000	2	Integ
40007	0x07	Slave id	1	255	1	Integ
			Value	Meaning		
40008	0x08	Baud rate (bps)	0x0000	300	1	Integ
			0x0001	600		
			0x0002	1200		
			0x0003	2400		
			0x0004	4800		
			0x0005	9600		
			0x0006	19200		
40009	0x09	Parity	0X0000	None	1	Integ
			0X0001	Odd		
			0x0002	Even		
40010	0x0A	Stop bit	0x0000	1	1	Integ
	0,0,1		0x0001	2		
			Min value	- Max value		
40011	0x0B	Backlight OFF (sec.)	0	7200	1	Integ
	0.0D	gg()	Value	Meaning	· ·	
40012	0x0C	Factory Default	1	Set to factory setting range	1	Integ
40012	0x0D	Reset kWh [of load 2]	1	Reset Total Active Energy	1	Integ
		Reset kVArh [of load 2]	1	Reset Total Reactive Energy	1	Integ
40015 40034	0x0F	. ,		0,	1	Integ
40034	0x22	Demand Interval Method	0x0000	Sliding		nite
		Development in the second seco	0x0001	Fixed	<u> </u>	Inter
40035	0x23	Demand Interval Duration	MIN Value : 1		1	Integ
40036	0x24	Demand Interval Length(min)	MIN Value : 1		1	Integ
40037	0x25	Reset max kW [of load 2]	1	Reset max Active power	1	Integ
40041	0x29	Reset max kVA [of load 2]	1	Reset max Apparent power	1	Integ
40042	0x2A	Reset kWh [of load 1]	1	Reset Total Active energy	1	Integ
40044	0x2B	Reset kVArh [of load 1]	1	Reset Total Reactive energy	1	Integ
40045	0x2C	Reset max kW [of load 1]	1	Reset max Active power	1	Integ
40049	0x31	Reset max kVA [of load 1]	1	Reset max Apparent power	1	Integ
			Min value	Max value		
40050	0x32	CT primary L2 (A) [of load 1]	5	10000	1	Integ
40057	0x39	Pulse Duration (sec.)	0.1	2.0 (sec.)	1	Integ
40058	0x3A	Pulse Weight of load 1 (kWh)	0.01	9.99 (kWh)	1	Integ
40059	0x3B	Pulse Weight (kWh)[of load 2]	0.01	9.99 (kWh)	1	Integ
			Value	Meaning		
40060	0x3C	No of Channel	0	2 CH	1	Integ
			1	6 CH	1	Integ
40061	0x3D	Current connection-L1	0X0000	RHS	1	Integ
			0X0001	LHS	<u> </u>	
40000		Current connection-L2	0X0000	RHS	1	Integ
40062	0x3E					1
40062	0x3E		0X0001	LHS		

MODBUS REGISTER ADDRESSES LIST

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

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

NOTE : In 4 byte data type, LSB will be displayed on lower address				
Address	Hex Address	Parameter		
30000	0x00	Voltage V1N		
30002	0x02	Voltage V2N		
30004	0x04	Voltage V3N		
30006	0x06	Average Voltage LN		
30008	0x08	Voltage V12		
30010	0x0A	Voltage V23		
30012	0x0C	Voltage V31		
30014	0x0E	Average Voltage LL		
30132	0x84	Serial No (Data Structure : Hex)		
	FC	R 2 CHANNEL		
[Load :	2] parameters			
30016	0x10	Current I1		
30018	0x12	Current I2		
30020	0x14	Current I3		
30022	0x16	Average Current		
30024	0x18	kW1		
30026	0x1A	kW2		
30028	0x1C	kW3		
30030	0x1E	kVA1		
30032	0x20	kVA2		
30034	0x22	kVA3		
30036	0x24	kVAr1		
30038	0x26	kVAr2		
30040	0x28	kVAr3		
30042	0x2A	Total kW		
30044	0x2C	Total kVA		
30046	0x2E	Total kVAr		
30048	0x30	PF1		
30050	0x32	PF2		
30052	0x34	PF3		
30054	0x36	Average PF		
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		
	-			

M	MSB will be displayed on higher address.					
	Address	Hex Address	[Load 1] Parameter			
	30074	0x4A	Current I1			
	30076	0x4C	Current I2			
	30078	0x4E	Current I3			
	30080	0x50	Average Current			
	30082	0x52	kW1			
	30084	0x54	kW2			
	30086	0x56	kW3			
	30088	0x58	kVA1			
	30090	0x5A	kVA2			
	30092	0x5C	kVA3			
	30094	0x5E	kVAr1			
	30096	0x60	kVAr2			
	30098	0x62	kVAr3			
	30100	0x64	Total kW			
	30102	0x66	Total kVA			
	30104	0x68	Total kVAr			
	30106	0x6A	PF1			
	30108	0x6C	PF2			
	30110	0x6E	PF3			
	30112	0x70	Average PF			
	30114	0x72	Frequency			
	30116	0x74	kWh			
	30120	0x78	kVArh			
	30122	0x7A	kW MAX Active Power			
	30130	0x82	kVA MAX Apparent Power			
	30142	0x8E	Total kWh (Load 1 and Load 2)			
	30144	0x90	Total kVArh (Load 1 and Load 2)			
	30146	0x92	Existing kW MAX Active Power			
	30148	0x94	Existing kVA MAX Apperant Power			
		I	OR 6 CHANNEL			
	30150	0x96	kWh of CH1			
	30152	0x98	kWh of CH2			
	30154	0x9A	kWh of CH3			
	30156	0x9C	kWh of CH4			
	30158	0x9E	kWh of CH5			
	30160	0xA0	kWh of CH6			
	30162	0xA2	kVArh of CH1			

Address	Hex Address	Parameter
30164	0xA4	kVArh of CH2
30166	0xA6	kVArh of CH3
30168	0xA8	kVArh of CH4
30170	0xAA	kVArh of CH5
30172	0xAC	kVArh of CH6
30174	0xAE	kW Max active power of CH1
30176	0xB0	kW Max active power of CH2
30178	0xB2	kW Max active power of CH3
30180	0xB4	kW Max active power of CH4
30182	0xB6	kW Max active power of CH5
30184	0xB8	kW Max active power of CH6
30186	0xBA	kVA Max apparent power of CH1
30188	0xBC	kVA Max apparent power of CH2
30190	0xBE	kVA Max apparent power of CH3
30192	0xC0	kVA Max apparent power of CH4
30194	0xC2	kVA Max apparent power of CH5
30196	0xC4	kVA Max apparent power of CH6
30198	0xC6	Existing kW Max active power of CH1
30200	0xC8	Existing kW Max active power of CH2
30202	0xCA	Existing kW Max active power of CH3
30204	0xCC	Existing kW Max active power of CH4
30206	0xCE	Existing kW Max active power of CH5
30208	0xD0	Existing kW Max active power of CH6
30210	0xD2	Existing kVA Max apparent power of CH1
30212	0xD4	Existing kVA Max apparent power of CH2
30214	0xD6	Existing kVA Max apparent power of CH3
30216	0xD8	Existing kVA Max apparent power of CH4
30218	0xDA	Existing kVA Max apparent power of CH5
30220	0xDC	Existing kVA Max apparent power of CH6

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

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