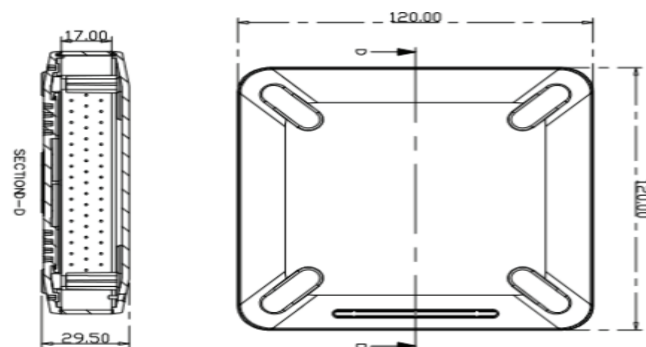




### TECHNICAL SPECIFICATION

Power Supply	100 - 240 VAC 50 - 60 Hz		
Power Consumption	< 3VA		
Display	4 LED (Power, LoRa, Tx, Rx)		
Lora Communication	Frequency	923 - 925 MHz	
	Transmit Power	+ 20 dBm (E.I.R.P.)	
	Spreading Factor	7 - 12	
	Sensitivity	Up to -137 dBm	
	Bit Rate	Up to 300 kbps	
RS-485	Antenna	SMA	
	Protocol	MODBUS RTU	
	Address	1 - 128	
	Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600	
	Parity	None, Even, Odd	
	Data Bit	8 Bit	
	Stop Bit	1, 2	
	Support Device Node	10	
	Ambient Operation	Temperature	-10 °C to 60 °C
		Humidity	<85% RH Non-Condensing
Ambient Storage	Temperature	-20 °C to 80 °C	
	Humidity	<85% RH Non-Condensing	
Material	ABS-V0		
Size	120 x 120 x 29.5 mm.		
Weight	170 g.		

### DIMENSION

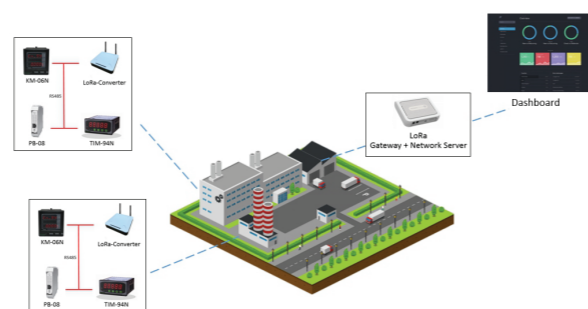


### DESCRIPTION

- Converter from RS485 to LoRawan.
- Able to handle the communicate devices via RS485. Modbus RTU as much to 10 devices and record data 12 Register.
- Able to set the MODBUS table record data via an software.
- LoRaWAN Class A Communication.
- Transmit Power +20dBm (E.I.R.P.).
- Radio frequency band AS923 : 923 - 925 MHz.
- Transmitter Distance 1 km in an open area.
- 4 LED indication (Power, LoRa, Tx, Rx ).
- Suitable for Smart Industries, Facilities Management, Smart Building Applicaton.

### OPERATION

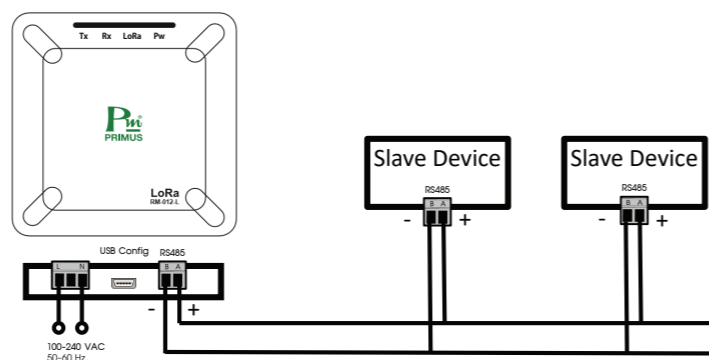
RM-012-L is a converter that converts from RS485 to LoRaWAN Range 923-925 MHz. It can communicate in distance 1 km from LoRaWAN Gateway to RM-012-L. And the LoRaWAN is popular standard communication so the device can use with LoRaWAN from other systems. RM-012-L will collect the data from the device which support MODBUS RS485 RTU then send data via LoRaWAN Gateway to Network Server every 36 seconds per 1 device to save and use for Applications such as Display temperature and humidity via Dashboard suit for Wireless Transmitter in long-distance works such as Smart industries, Facilities Management, Smart buildings etc



Example picture of the RM-012-L with LoRa System application

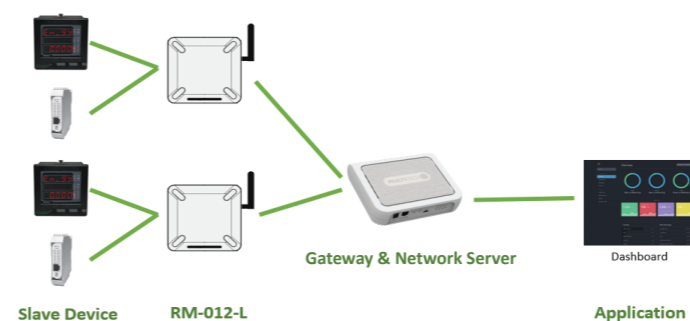
It made the device easy to install, and fast and saved cost on the wiring communication cable in long-distance between RM-012-L with LoRaWan Gateway can transmit to 1 km in an open area

### WIRING DIAGRAM



- Pw : show device status
- LoRa : show the data transfer via LoRa status
- Tx : show the data transfer via RS485 status
- Rx : show the data receive via RS485 status

### DATA FLOW ARCHITECTURE



Picture 1. Data Flow Architecture

This manual will show step by step method for setting the LoRa network will start from the left side of the picture by RM-012-L will browse value from Slave Device then send Multitech Gateway. It will add the device to Network Server before displaying the UI Application

### DEVICE DETAIL

**Model :** RM-012-L

**Input :** 100-240VAC 50-60Hz 50mA

**Dev EUI :** 64-C4-BB-25-12-34-56-78

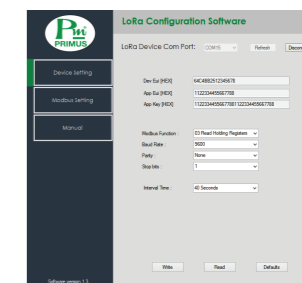
**App EUI :** 11-22-33-4-55-66-77-88

**App Key :** 1111222233334444  
4444555566667777

**Frequency :** 923MHz

### LoRa Configuration Software

Program for setting RM-012-L. This program will help to set a Modbus table of Slave Devices which connect with RM-012-L.



The program has 3 main menus as follows

1. Device Setting: For checking DevEUI, AppEUI, and AppKey of LoRa Converter and setting RS-485 communication.
2. Modbus Setting: For setting the Modbus table which user needs to browse the data and send to Gateway and read the value to test it.
3. Manual Setting: Open the Manual PDF file

### Device Setting

Item	Default Value	Description
Dev EUI	Setting from manufacturer	Device EUI use for Add at Network Server
App EUI	Setting from manufacturer	App EUI use for Add at Network Server
App Key	Setting from manufacturer	App Key for Add at Network Server
Baud Rate	9600	Communication speed RS-485 since 1200, 4800, 9600, 14400, 19200, 38400, 57600
Parity	None	There are None, Even, Odd
Stop Bits	1	1, 2
Interval Time	40 Seconds	Transmitter Time

### Modbus Setting

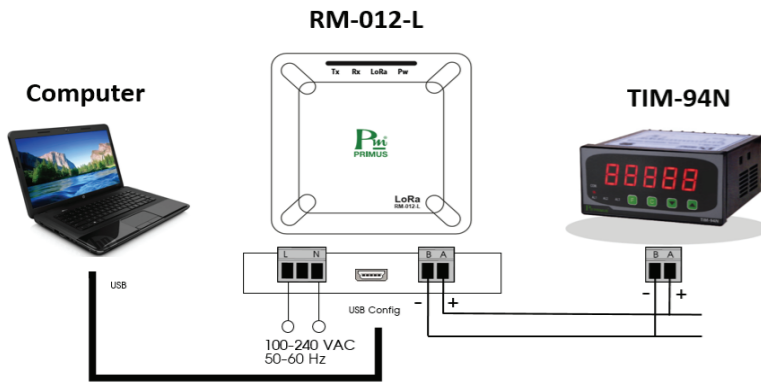
Item	Default Value	Description
Device	1	Setting Index
Start Address	0	Start Address for browse value
Quantity	0	Browse Maximum quantity 12 Register
Slave ID	1	Slave ID of other devices. Able to set since 1-256 or set 0 for turn off
Type	None	Type of Register data

### ORDERING CODE

RM-012-L

### Application Example

Example RM-012-L with TIM-94N Application. How to use and set program and setting.

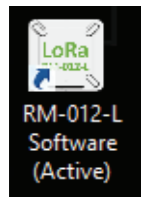


Picture show RM-012-L with TIM-94N application

The method is as follows

1. Wiring RS485 between RM-012-L with TIM-94N by the terminal (+) connect to (+) and terminal (-) with (-) follow picture and wiring USB between RM-012-L with Computer which install the M-012-L Software program already

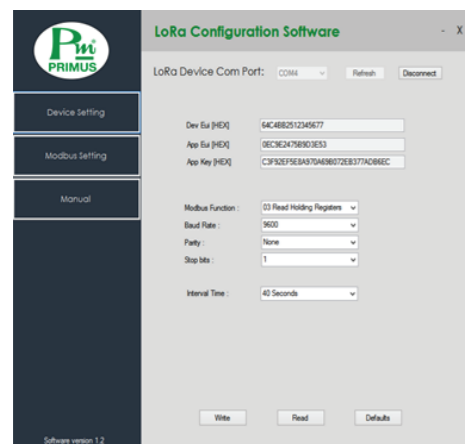
2. Open RM-012-L Software



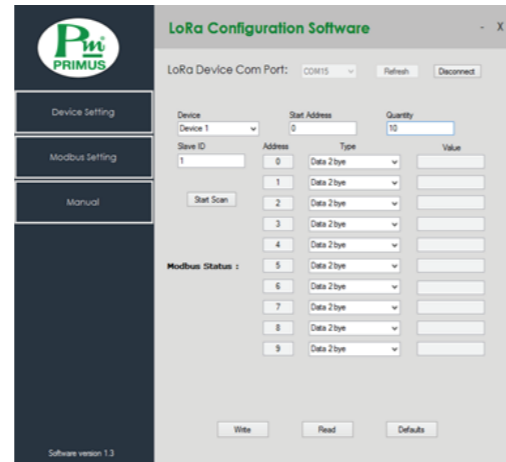
3. After the open program choose Port of RM-012-L and press Connect

If Connect successful Message Box show "Connection Successful" if it is not the successful user may check the USB cable or COM Port. It should be correct.

4. Setting Modbus RS485 RTU match with Device Setting table and press Write for saving

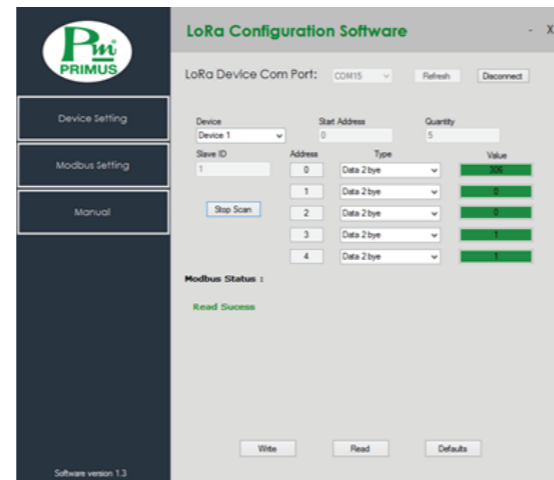


5. Choose menu Modbus Setting and choose Device to "Device 1" there are Message Box show "Read Setting Success" and sets Modbus table as required. Example User needs to read Register at 0-10 of TIM-94N and Slave ID of TIM-94N are 1 (if set to 0 is turned off) as picture



6. Press Write to save if it success the Message Box will show "Write Success" In case the user needs to check the record value press Read it will show the value from RM-012-L

7. After Setting then do the reading parameter test the TIM-94N via RM-012-L by pressing Start Scan after press the keypad program will show parameter as picture



In case which can not read the data, the user has to check as following

- LED status of Tx if Tx is flashed it means RM-012-L transfer data If it is not flashing please recheck the setting.
- LED status of Rx if Rx flashed it means there reply data from Slave Device if it is not that means there are no reply data. the user should check the wiring between RM-012-L with Slave Device

### LoRa Payload

LoRa Payload is data transferred by LoRa on LoRaWAN Network and is designed easy to use and understand. it made the device receive full information by Sensor data byte which specific is 2 byte

- Data Channel: Specific position Register such as Device 1 Address 0 it will get Chanel 0
- Data Type: Specific type of data such as temperature or Data 2 byte

#### LoRa Payload Structure

1 Byte	1 Byte	2 Byte	1 Byte	1 Byte	2 Byte	...
Data1 Ch	Data1 Type	Data1	Data2 Ch	Data2 Type	Data2	...

#### Example

- Device 1. Start Address = 0, quantity = 2

Payload (Hex)	00 67 01 10 01 67 00 FF	
Data Channel	Data Type	Data
00 -> 0	67 -> Temperature	0110 = 272 -> 27.2
01 -> 1	67 -> Temperature	00FF = 255 -> 25.5



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