Convert Modbus Analog I/O and RS485 Data to LoRaWAN Gateway

LR140 Series

LoRaWAN Modbus Analog Inputs/RS485 Converter

The LR140 series utilizes the latest Low Power Wide Area (LPWA) technology to build Modbus/RTU communication for long-distance, wide-coverage, and low power consumption wireless IoT applications.

Multiple analog inputs are supported in LR140 series, such as voltage, current and one RS-485 port for Modbus RTU Device connection. One LR140 can read more than 20 register entries from different field RTU devices in predefined time scheduling. The LoRaWAN wireless distance can reach up to 3-6KM distance depending on the environment.

The LR140 series offers great flexibilities in wireless IoT applications, such as environment sensors and meters reading for Smart City Applications such as Smart Farming, Smart Environment Monitor, etc.

LoRaWAN™ **Modbus** **-40~75°C**

Features & Benefits

Modbus/RTU to LoRaWAN

• Transmit RTU Data to LoRaWan Gateway
• Flexible RTU Device Address Settings
• Configurable Read Start Addresses
• Maximum 20 Entries for Time Schedule Report

Secured Radio Communication

• AES 128 Data Encryption
• Configurable Encryption Key – Modbus Register , WoMaster End-Node Utility

Windows© Configure Tools

• User-Friendly, Model Auto Detection
• Analog IO Parameter Read
• RTU Device Reading Parameter Setting
• Micro-USB Interface

Analog 4~20mA Input to LoRaWAN

• 2 Channels Current Sensing, 0.3%High Accuracy

Analog 0~10V Input to LoRaWan

• 2 Channels 0~10V High Impedance Input- Luminance Sensing or others

Industrial Application

• 10~30V DC wide power range input
• Low Power Consumption
• Wide Coverage up to 6KM (Max)
• -40 ~ 75°C / 90%H Operating Temperature / Humidity
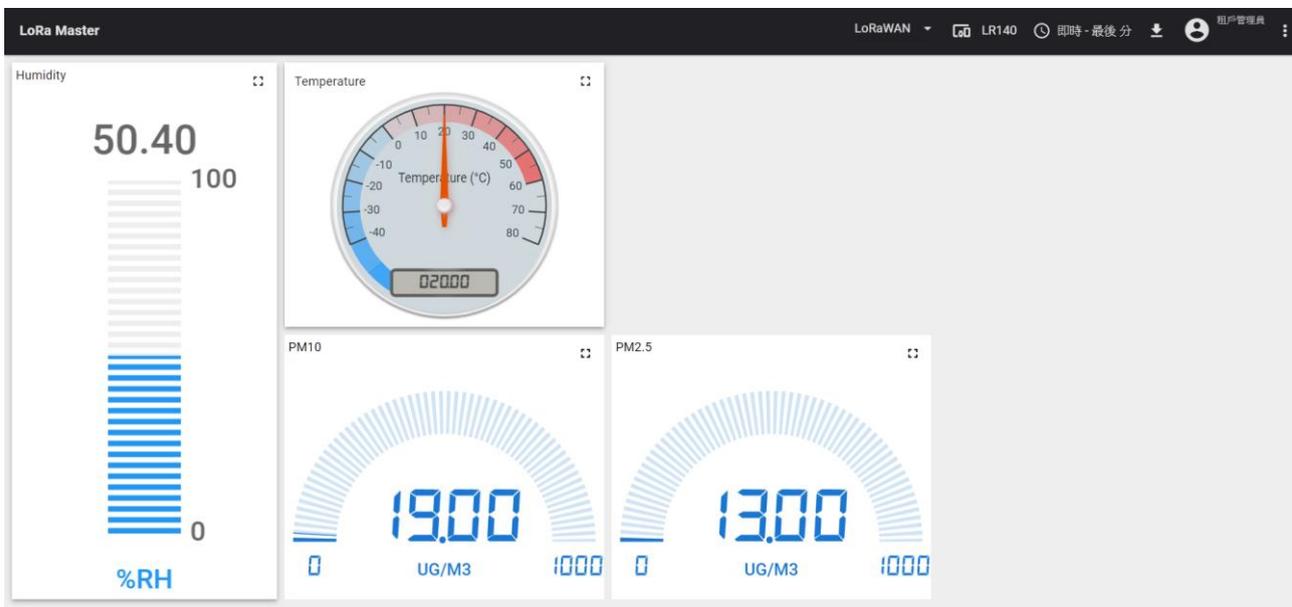• Compliance IEC 61000-6-2/-6-4 Heavy Industrial EMC

✓ Read Analog and RS485 Data to LoRaWAN Gateway

The analog inputs such as 0~10V, 4~20mA and RS485 Modbus data can be forwarded by LR140 LoRaWAN converter to WR322GR-LoRaWAN gateway via LoRaWAN wireless network. The LoRaWAN gateway sends the data to cloud server such as AWS, Azure or ThingsMaster OTA via WAN or LTE cellular network.
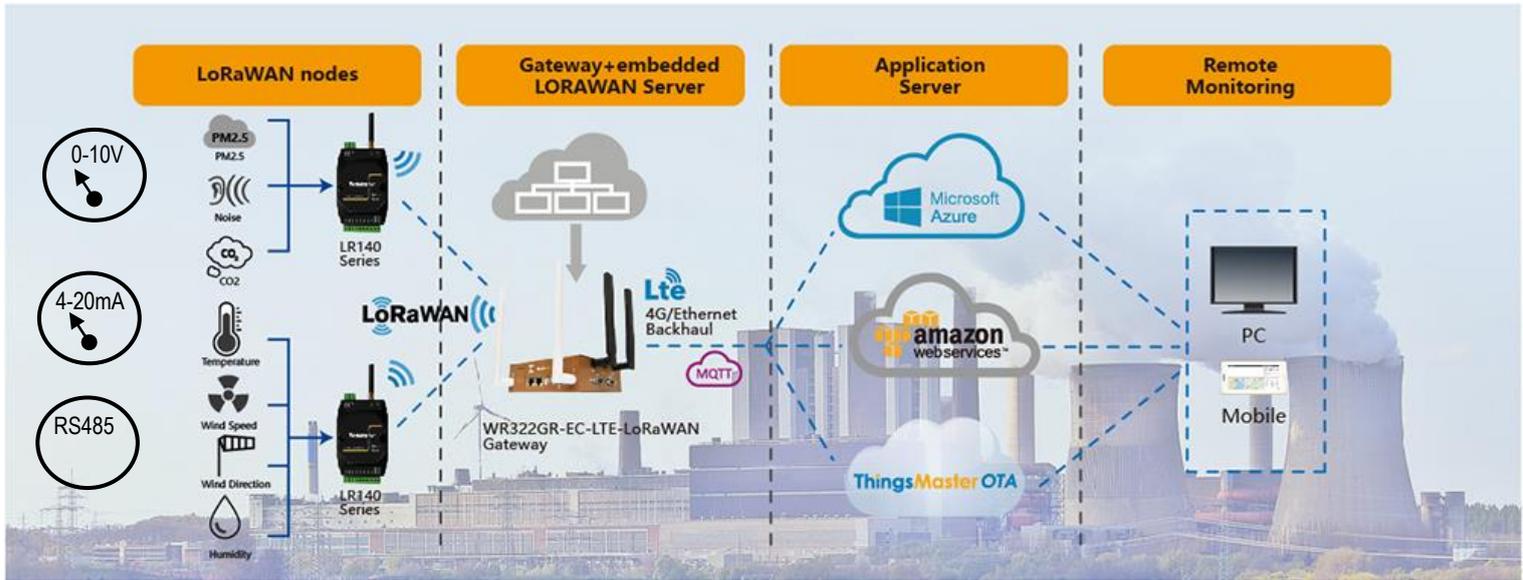
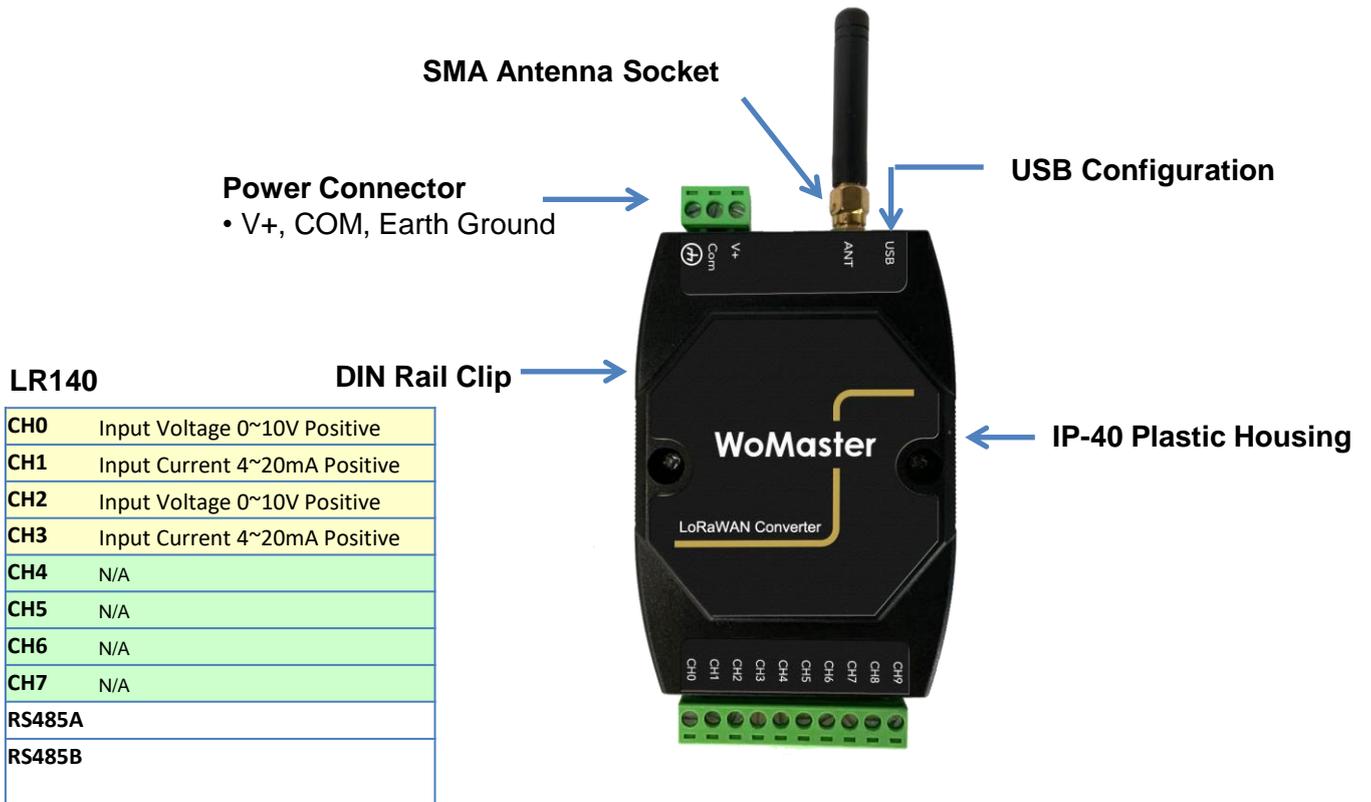### ✓ LoRaWAN Cloud Server on ThingsMaster OTA

The LoRaWAN data can be sent to the ThingsMaster OTA server, located in the public domain or your corporate server. The device can be easily added and monitored on ThingsMasterOTA through the LoRaWAN gateway. WoMaster provides free demo account on ThingsMaster OTA for WR322GR-EC-LoRaWAN gateway. License for more nodes can be requested and supported.

Interfaces

SMA Antenna Socket

Power Connector
• V+, COM, Earth Ground

USB Configuration

DIN Rail Clip

IP-40 Plastic Housing

WoMaster
LoRaWAN Converter

LR140

CH0	Input Voltage 0~10V Positive
CH1	Input Current 4~20mA Positive
CH2	Input Voltage 0~10V Positive
CH3	Input Current 4~20mA Positive
CH4	N/A
CH5	N/A
CH6	N/A
CH7	N/A
RS485A	
RS485B	

Dimensions

(mm)

55
50
50.25
102.5
72
26.04
23.04
22.04
19.74
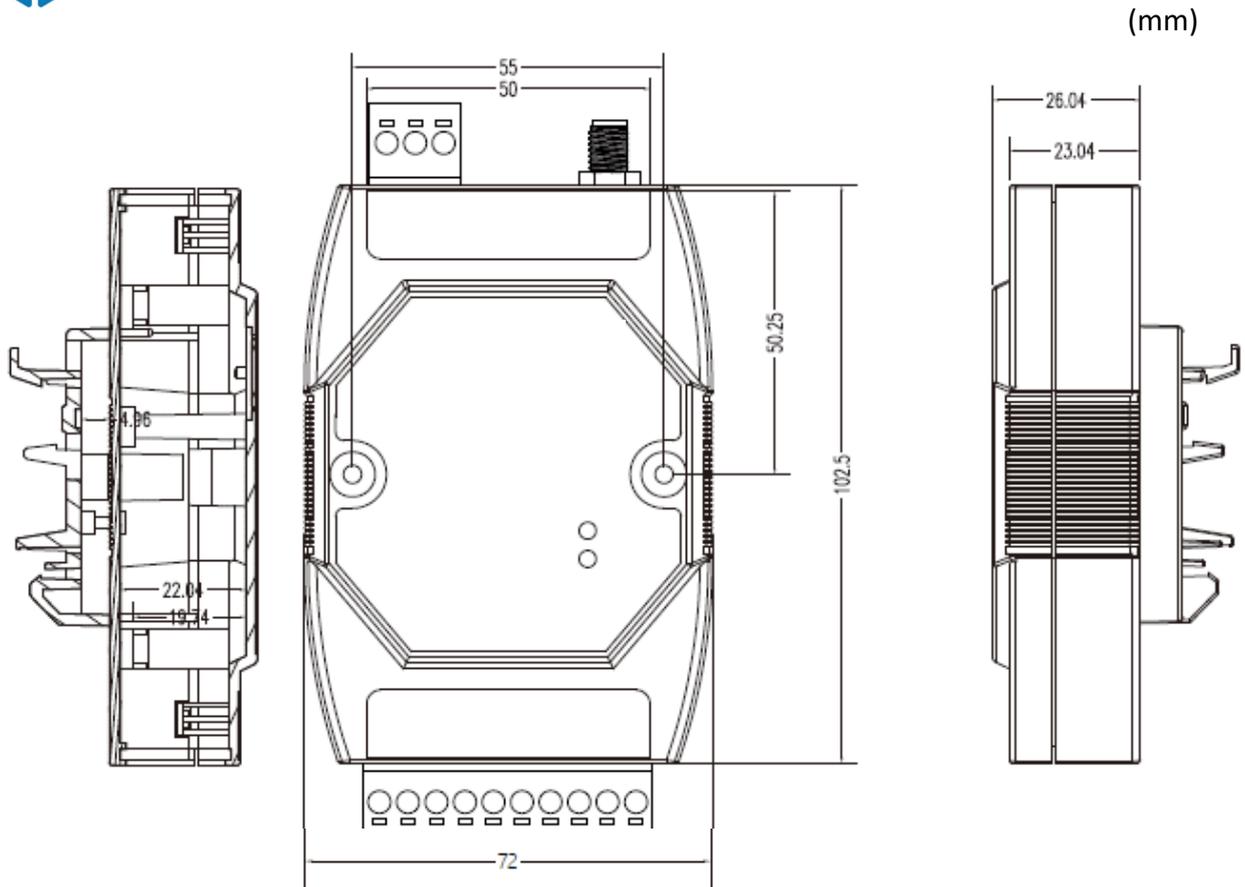
Specifications

Wireless Specification	
Frequency	EU 433Mhz, EU 868Mhz, US915Mhz, AS 923Mhz, KR 920Mhz
Wireless Technology	Low Power Wide Area – LoRa WAN Technology
Radio TX Power	22dBm
Radio RX Sensitivity	- 148dBm, SF=12 @ 250bps
Spreading Factor	SF5/SF6/SF7/SF8/SF9/SF10/SF12, Default SF7
Demodulator SNR	LoRa Demodulator Signal to Noise Ratio: -2.5dB ~ -20dB
Operating Mode	RTU 485: Modbus protocol over the Air (LoRa WANTransmission) with configurable RTU Device / Register Address Analog Input: Pre-defined Current / Voltage interface
Forwarding Data Buffer	256Bytes FIFO Data Buffer for LoRa signal transmission
Data Encryption	128bits AES with configurable key
Management	
System Management	1 x Micro USB 2.0 port for system configuration
Software Utility	Windows© Based Utility
I/O Interface	
Antenna Connector	1x 50 ohm, Female SMA
Serial Interface	2-wires RS-485 Terminal Connector with 1kv isolation Connector Type: Removable Terminal Connector Supported Model: LR-140(Host)
Serial Parameters	Baud Rate: 1200bps,2400bps, 4800bps, 9600bps Data Bits: 8 Parity Check: None, Even, Odd Stop Bit: 1,2
Current Input	2 Channels Detection Range: 4-20mA Accuracy Level: 0.3%
Voltage Input	2 Channels Detection Range: 0~10 V Accuracy Level: 0.2%
System Indication	
LED	Power (On): System Power applied LoRa (Blinking): LoRa RF Signal on Communication
Power Requirement	
Input Rating	Typical DC 24V, Rating: 10~30V 3-Pins Removable Terminal Connector for V+ ,Com and Chassis Earth Ground
Reverse Protection	Yes
Power Consumption	LR-140: 3 Watts @ DC 24V power input

Mechanical	
Installation	DIN Rail Mount
Enclosure Material	UL94v0, ABS , Anti- U/V
Ingress Protection	IP 40
Dimension	26(D) x 102.5 (H) x 72 mm (W) / with wall mounting clip
Weight	115g

Environmental	
Operating Temperature	-40°C~75°C, 0% ~ 90%, Non-Condensing
Storage Temperature	-40°C~80°C, 0% ~ 90%, Non-Condensing

Reliability & Warranty	
MTBF	20000> Hours
Warranty	3 Years, No-Natural damaged

Standards	
EMC	Compliance with IEC / EN61000-6-2, IEC/ EN61000-6-4
EMI	Electromagnetic Immunity: CISPR 22, FCC part 15B Class A
EMS	Electromagnetic Suspension: IEC 61000-4-2 ESD IEC 61000-4-3 RS IEC 61000-4-4 EFT IEC 61000-4-5 Surge IEC 61000-4-6 CS IEC 61000-4-8 Pulse Magnetic Field

Ordering Information

Model	Description
LR140-EU868 **LR140-AS923** **LR140-US915** **LR140-EU433** **LR140-CN470**	LoRa WAN End-Node, 4CH AI, 1 Modbus RTU 485 Host 1 x RS485 Host, 2-wire 1 x SMA /LoRa Antenna Connector EU868: 863-870MHz US915: 902-928MHz AS923: 923-923.5MHz EU433: 433.05~434.79MHz CN470: 470~510MHz

Packing & Accessories
LoRa Device x 1
Antenna x 1, 6dBm , SMA
User's QIG x1

Optional Order	
MDR-40-24	Din Rail Power Supply, INPUT:85-264VAC, 120-370VDC, OUTPUT: 24VDC/1.7A, -20 ~ +70℃
ThingsMaster OTA-Annual Fee-100	ThingsMaster OTA Online OTA annual fee for 100 nodes
WR322GR-EC-LTE-LORAWAN-EU868 **WR322GR-EC-LTE-LORAWAN-EU433** **WR322GR-EC-LTE-LORAWAN-US915** **WR322GR-EC-LTE-LORAWAN-AS923** **WR322GR-EC-LTE-LORAWAN-CN470**	Industrial LoRaWAN Gateway, 2GbE+2COM, LTE 2SIM, FDD B1/3/7/8/20/28A EU868: 863-870MHz US915: 902-928MHz AS923: 923-923.5MHz EU433: 433.05~434.79MHz CN470: 470~510MHz