

Convert Modbus RS485, Analog I/O to LoRaWAN Gateway

LR144

LoRa WAN Modbus RS485, Analog I/O Converter

The LR144 series utilizes the latest Low Power Wide Area (LPWA) technology to build long-distance, wide-coverage, and low-power wireless IoT applications.

Multiple analog inputs and outputs are supported in the LR144 series, such as 0-10V, 4-20mA current, 5V PWM, 0-10V PWM for traditional electromechanical control and sensing, and the RS-485 port supports Modbus Host mode for the field site automation controller- PLC, DCS or any device with Modbus communication interface. Its regular Modbus register data pulling function ensure the control center gets the latest data.

The LR144 series offers great flexibilities in wireless IoT applications, such as traditional analog sensors acquisition and Modbus/RTU devices remote control, integrated with LoRa WAN gateway that can achieved edge computing/control and enhanced your Industrial IoT process such WR322GR LoRaWAN series.



LORAWAN



-40~75°C



Features & Benefits

LoRa WAN End-Node Control

- LoRa WAN Class-C operating mode, Bi-directional end-devices with maximum receive time slots offers the ABP, OTAA Network Connection modes
- Lowest latency for server to end-device communication
- Supports Spreading Factor 5,6,7,8,9,10,11,12

Reliable Radio Communication

- LoRa WAN TX Confirmed Mode support
- Adjustable LoRa Data Upload Interval time

LoRa WAN to Modbus/RTU control

- Modbus RTU data Upload / Download with Gateway
- Remote Control with End-Node Acknowledge
- Maximum 20 RTU Entries, Scheduling polling
- Non-Limited RTU Entry for Downlink Control

RS485 Modbus Function Code

- Code 01: Read Coil-Read Output Control bit
- Code 02: Read Discreet-Read Input bit, Read Input bit
- Code 03: Read Holding Register – Read Output word
- Code 04: Read Input Registers – Read Input Word
- Code 05: Write Single Coils – Write one bit output
- Code 06: Write Single Coils – Write one word output
- Code 15: Write Multiple Coils – Write a number of output bits
- Code 16: Write Multiple Registers - Write a number of output words

Various RTU Data Format

- Integer, Unsigned Integer, Float, Short, Un-signed Short, ASC II

LoRa WAN Remote Control, Monitoring

- 2 Channels 0~10V Input, High Impedance, Accuracy 2 ‰
- 1 Channel 0~10V Output, Open Drain Output, Accuracy 2 ‰
- 2 Channels 4-20mA Current Sensing, 0.3%High Accuracy
- 1 Channel 4-20mA Current Output, 3 ‰ High Accuracy
- 1 Channel 5V PWM Output
- 1 Channel 10V Open Drain PWM Output

Windows® Configuration Utility

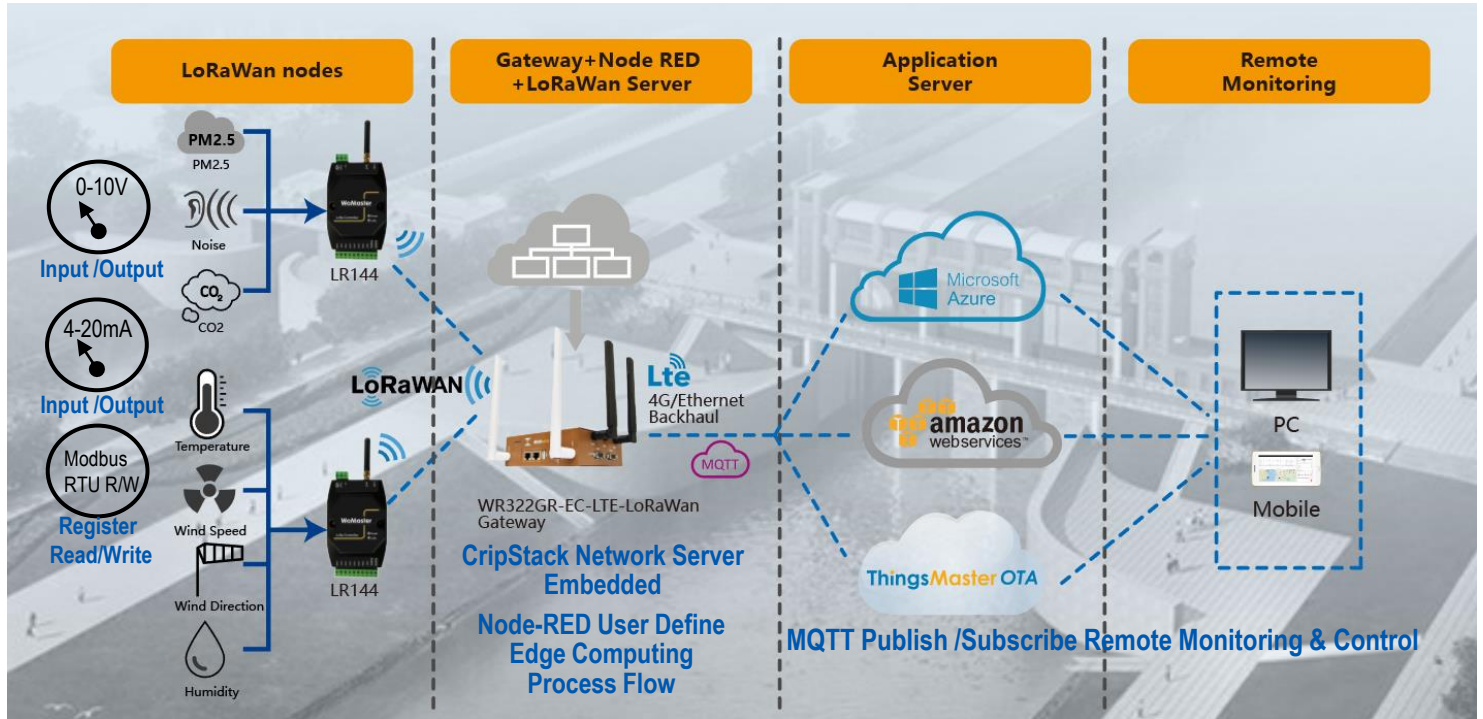
- User-Friendly, Model Auto Detection
- Radio Signal Check
- Analog IO Parameter Read and Write
- RTU Device Register Pulling Setting
- Micro-USB Interface

Industrial Application

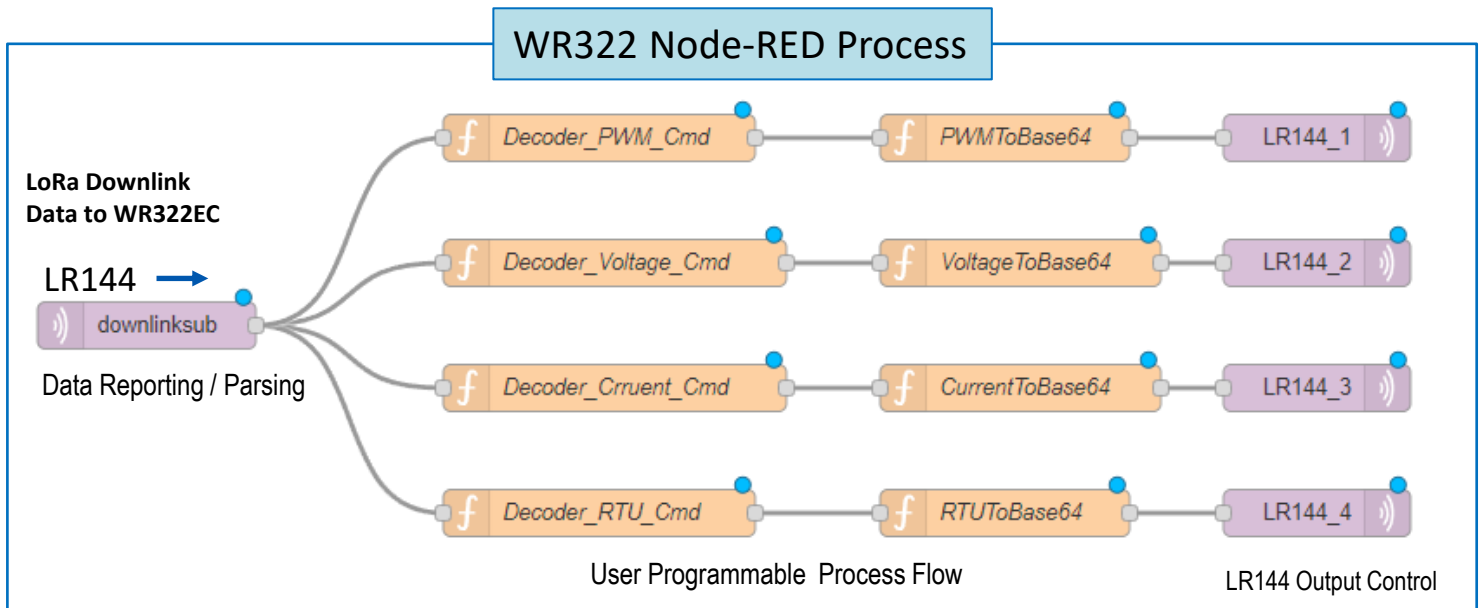
- 10~30V DC wide power range input
- Low Power Consumption
- Wide Coverage up to 6KM (Max)
- -40 ~ 75°C / 90%H Operating Temperature / Humidity
- Compliance IEC 61000-6-2/-6-4 Heavy Industrial EMC



✓ LoRaWan Remote Control Application & Architecture

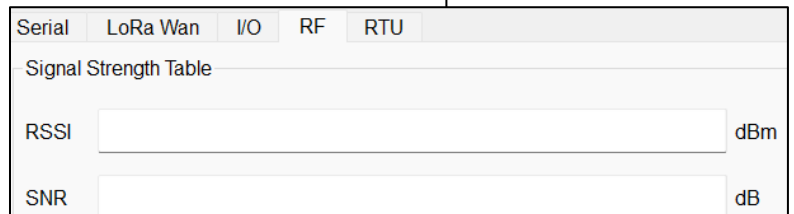
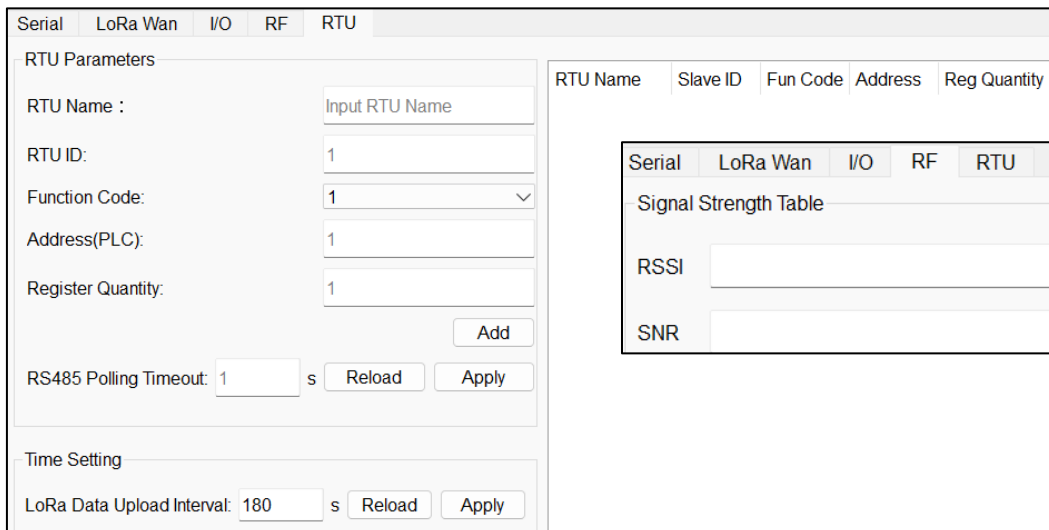
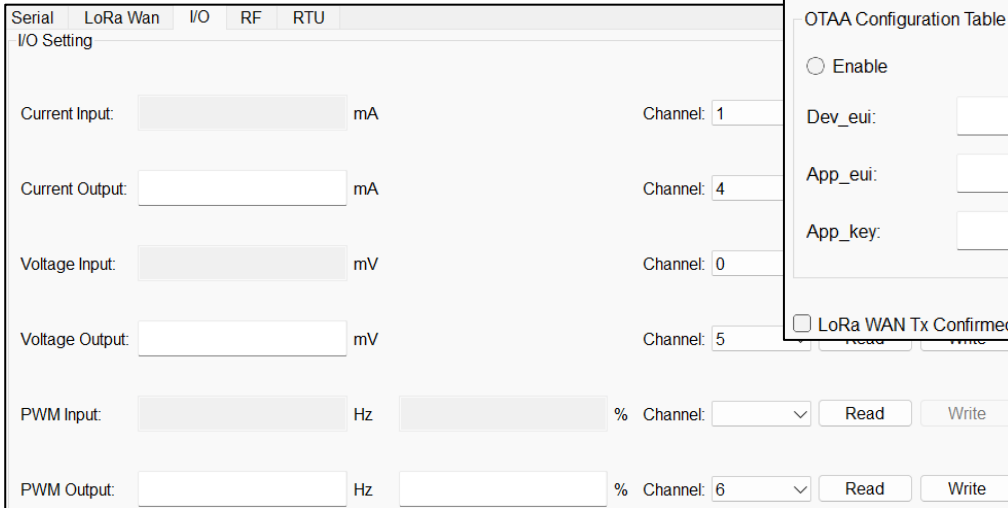
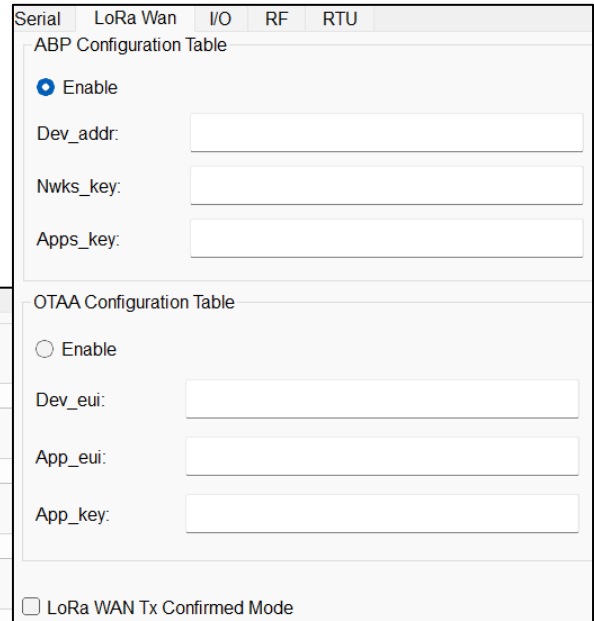
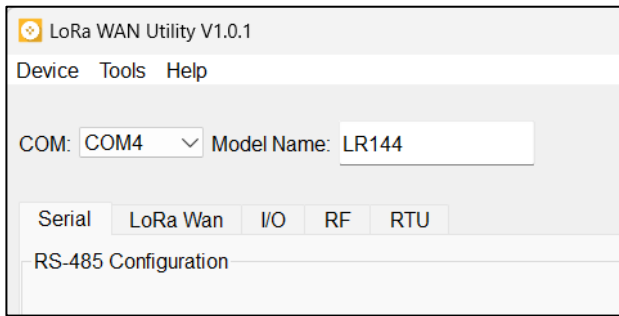
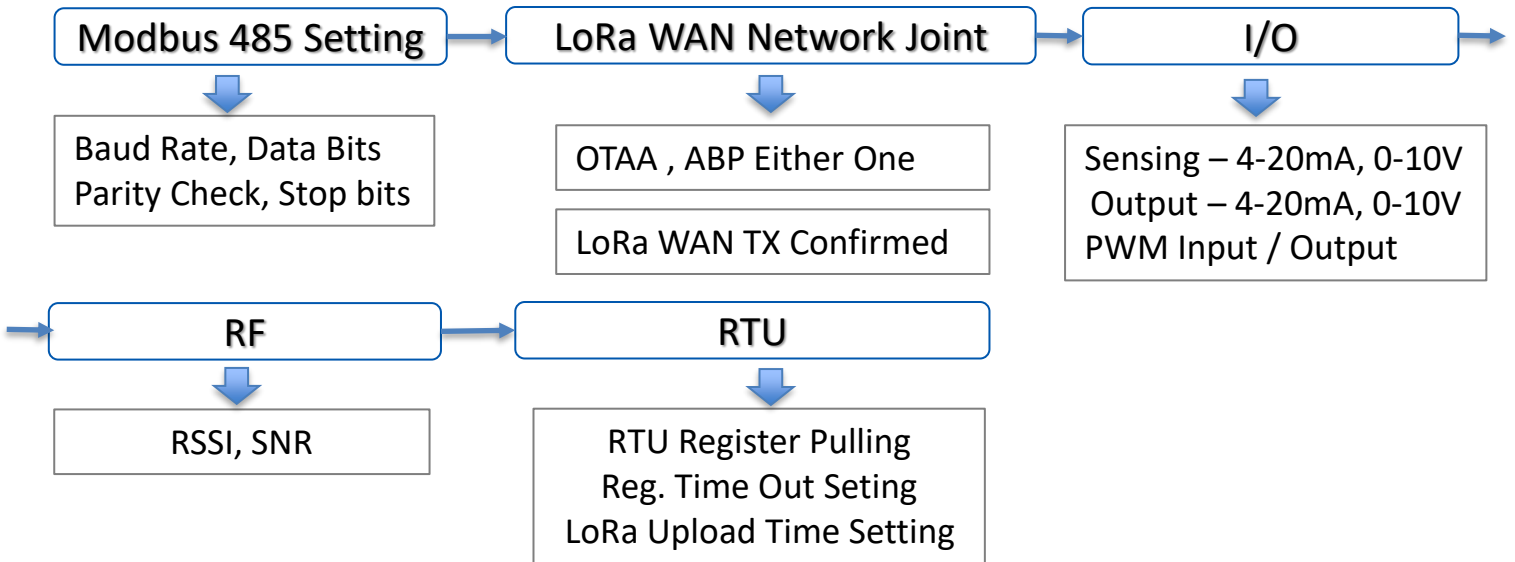


✓ LR144 with WR322 Node-RED Process Flow





✓ Friendly Configure Tool – LoRa WAN Utility





Interfaces

Power Connector

- V+, COM (Power & Analog I/O)
- Earth Ground

5dBi SMA Antenna

USB Configuration

DIN Rail Installation

IP-40 Plastic Housing

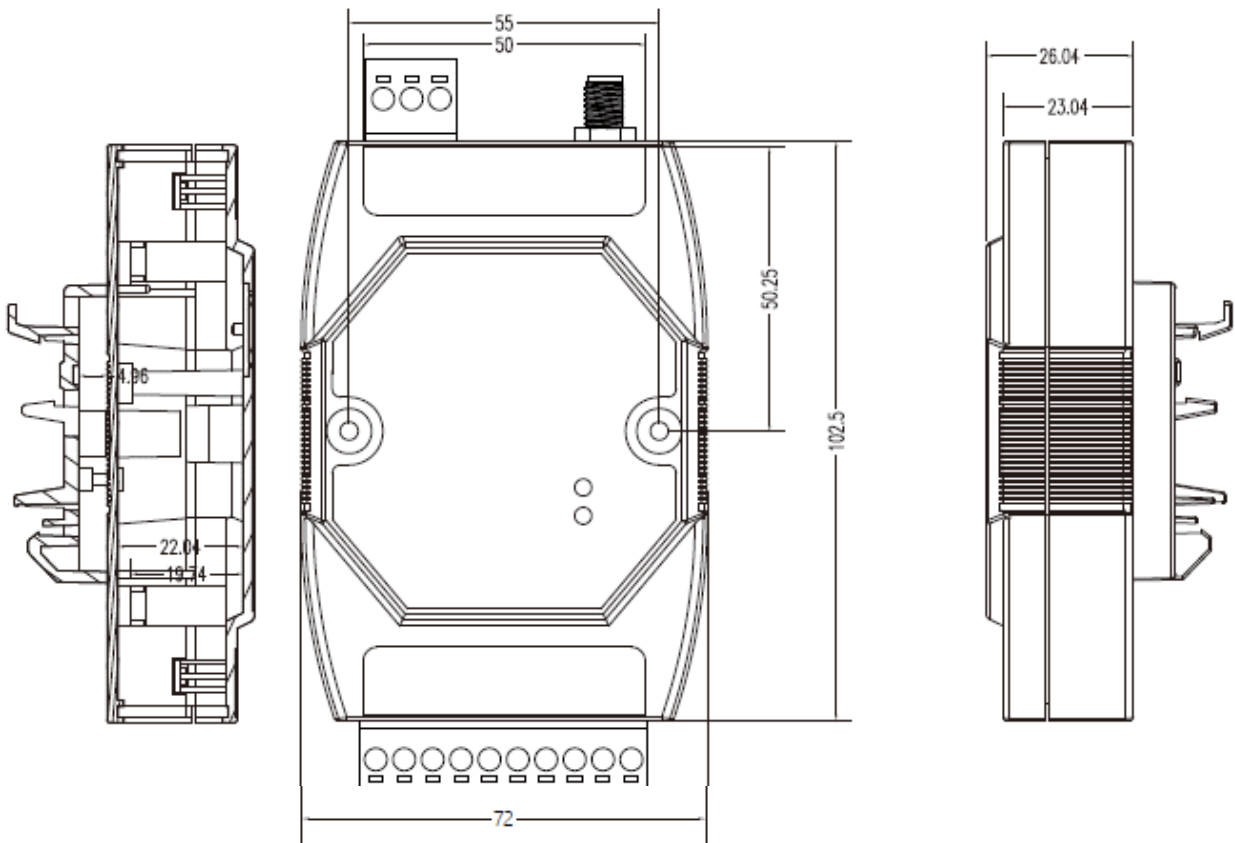
System Power , LoRa Status LEDs

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	Output Current 4~20mA Positive
CH5	Output Voltage(OC) 0~10V Positive
CH6	Output PWM Voltage 0~5V Positive
CH7	Output PWM(OC) 0~10V Positive
RS485A	RS485-A
RS485B	RS485-B



Dimensions

26(D) x 102.5 (H) x 72 mm (W) / with wall mounting clip



Wireless Specification	
Frequency	LR144-EU433 (Region Code): 433~434Mhz LR144-EU868 (Region Code): 863~870Mhz LR144-US915 (Region Code): 902~928Mhz LR144-AS923 (Region Code): 920~923.5Mhz, Group AS923-1 LR144-KR920 (Region Code): 920~923Mhz LR144-CN470 (Region Code): 470~510MHz
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/SF11/SF12, Default SF7; the Class-C RX2 Spreading Factor regarding the LoRa WAN standard 1.0.2 , please refers to User Manual.
Demodulator SNR	LoRa Demodulator Signal to Noise Ratio: -2.5dB ~ -20dB
Operating Mode	System operating in LoRa WAN Class-C Mode, OTAA and ABP joint modes Supports TX Confirmed function, configured through the LoRa WAN Utility Adjustable Regular LoRa Data Uploading interval time – 5 minutes (Min.)
Forwarding Data Buffer	256Bytes FIFO Data Buffer for LoRa signal transmission
Data Encryption	128bits AES with configurable key (LoRa WAN protocol)
Management	
System Management	1 x Micro USB 2.0 port for system configuration
Software Utility	Windows [®] Based LoRa WAN Utility, Free installation.
Analog 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-144(Modbus Host)
Serial Parameters	Baud Rate: 1200bps,2400bps, 4800bps, 9600bps Data Bits: 8 Parity Check: None, Even, Odd Stop Bit: 1, 2
Current I/O	4~20mA Input: 2 Channels Accuracy Level: 0.3% 4~20mA Output: 1 Channel Accuracy Level: 0.3%
Voltage I/O	0~10V Input: 2 Channels Accuracy Level: 0.2% 0~10V Output (Open Drain): 1 Channel Accuracy: 0.2% 5V PWM Output: 1 Channel Voltage Accuracy: 0.2% Adjustable Duty Cycle, 100Hz ~1KHz 10V PWM Output (Open Drain): 1 Channel Voltage Accuracy: 0.2% Adjustable Duty Cycle, 100Hz ~1KHz
Modbus RTU	
Function Code	Support RS-485 Modbus Host with Function Code: Code 01: Read Coil - Read Output Control bit Code 02: Read Discreet - Read Input bit Code 03: Read Holding Register - Read Output word Code 04: Read Input Registers - Read Input Word Code 05: Write Single Coils – Write one bit output Code 06: Write Single Coils – Write one word output Code 15: Write Multiple Coils – Write a number of output bits Code 16: Write Multiple Registers - Write a number of output words

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
Power Consumption	LR144: 3 Watts @ DC 24V power input
Reverse Protection	Yes
Mechanical	
Installation	DIN Rail Mount
Enclosure Material	UL94v0 level plastic, 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	> 20000Hours
Warranty	3 Years, No-Natural & Human 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
LR144-EU433 LR144-EU868 LR144-AS923 LR144-KR920 LR144-US915 LR144-CN470	LR144-(Region Code), 2 CHs 4-20mA Input, 2 CHs 0-10V Input, 1CH 20mA Output, 1CH 10V Output, 1CH 5V PWM, 1CH10V O.D. PWM, 1 Modbus RTU 485 Host 1 x 2-Wire RS485 1 x SMA Connector
Packing & Accessories	
	LR144 Device x 1
	Rod Antenna x 1, 6dBm , SMA
	User's QIG x1
Optional Accessories	
MDR-40-24	Din Rail Power Supply, INPUT:85-264VAC, 120-370VDC, OUTPUT: 24VDC/1.7A, -20 ~ +70°C