

LoRa I/O Controller

LM200 I/O Tracking Controller

Complete LoRa Controller for Analog IO Tracking

The LM200 and LC144 utilize Low Power Wide Area (LPWA) technology to establish Modbus/RTU communication, addressing the needs of wireless IoT applications with long-distance coverage and minimal power consumption.

In the LC144, various analog inputs and outputs are supported, encompassing voltage inputs and outputs, current inputs and outputs, PWM output, and a Modbus RTU slave RS-485 port. A single LM200 can connect up to 250 LC144 LoRa end nodes, facilitating two-way communications. LC144 nodes transmit field site analog signals to another LC144 through the LM200, achieving mirroring functionality. The LoRa wireless range can stretch up to 3-6KM, contingent on environmental conditions. LM100 and LC144 come with two variant models, LM100-900 / LC144-900 for adjustable EU868,AS923, KR920,US915 and LM100-400 / LC144-400 for EU433.

The LM200 and LC144 offer remarkable flexibility in wireless IoT applications, enabling tasks like cable-free LED light control and reproducing analog signals at remote sites as a substitute for traditional wiring.



Features & Benefits

Analog I/O Extension & Tracking by LoRa (LC144+LM200)

- Transparent /Reproduce Analog Signal by LoRa
- LM200 Polling Source LC100 specific Channel and Output to Target LC100 specific Channel
- Create /Edit Tracking Rule by Utility Tool
- Achieve 2-Sites Analog Tracking

V / V, V / A, A / A Auto I/O Tracking (LC144 + LM200)

- V / V Tracking – Local Input Voltage , Remote Output Voltage
- V / A Tracking – Local Input Voltage, Remote Output Current in V/A Ratio
- A / A Tracking – Local Input Current, Remote Output Current
- A / V Tracking – Local Input Current , Remote Output Voltage in A/V Ratio
- 20 I/O Rule Entries (Maximum)

Secured & Reliable Radio Communication

- ECHO & Re-Send Mechanism
- AES 128 Data Encryption

Windows® Configure Tools

- User-Friendly, Model Auto Detection
- Analog IO Parameter Read and Write
- On-Line Monitoring, Log File Download
- Micro-USB Interface

0~10V Input / Output (LC144)

- 2 Channels 0~10V High Impedance Input- Luminance Sensing
- 1 Channel 0~10V Open Drain Output, Dimmer Control

4~20mA Input / Output (LC144)

- 2 Channels Current Sensing, 0.3%High Accuracy
- 1 Channel Current Output, 0.3% High Accuracy

Communication Time-Out Output Control

- Over-Polling Time Setting for Voltage and Current
- Independent Voltage and Current Holding Output
- Available when T/O Tracking Output Activate

Event Log & Utility Monitoring (LM200)

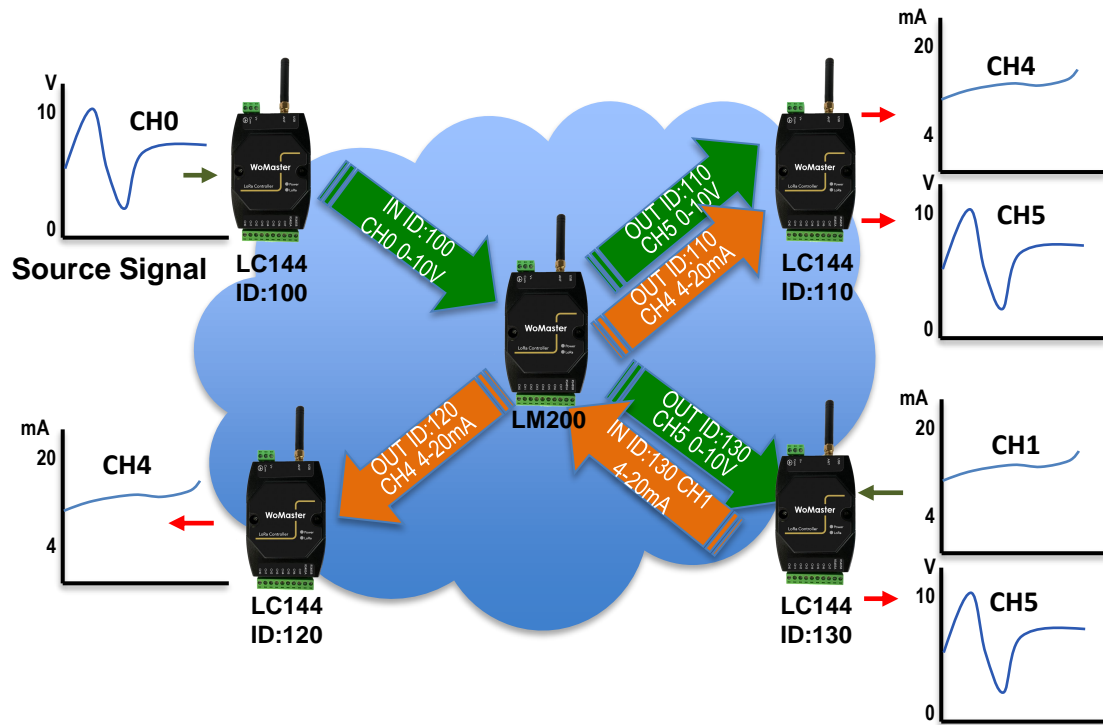
- 1K Event Log Entries – Polling Fail, Remote Control Fail
- On-Line Monitoring by LoRaMAC Utility

Industrial Application

- 10~30V DC wide power range input
- Low Power Consumption
- Wide Coverage up to 6KM
- Max.250 LC100 Nodes to one LM100
- -40 ~ 75°C / 90%H Operating Temperature / Humidity
- Compliance IEC 61000-6-2/-6-4 Heavy Industrial EMC



✓ Transparent LoRa Communication – Analog I/O Tracking



Tag Name (Rule Name)	Tracking Rule - Input	Tracking Rule -Output
Chain-1	ID:100-CH0	ID:130-CH5
Chain-2	ID:100-CH0	ID:110-CH5
Chain-3	ID:130-CH1	ID:110-CH4
Chain-4	ID:130-CH1	ID:120-CH4

✓ User Friendly LoRaMAC Utility to configure Analog IO parameters

Serial
Group Net
LoRa
LoRaWan
I/O
RF
RTU
Rule Chain
Chain Monitor

Rule Parameters

Tag :

In Device ID:

In Device_CH:

Type :

Out Device ID:

Out Device_CH:

Loop Time: s

Tag	IN Dev_ID	IN_CH	Type	OUT Dev_ID	OUT_CH
Chain-1	100	0	V-V	130	5
Chain-2	100	0	V-V	110	5
Chain-3	130	1	A-A	110	4
Chain-4	130	1	A-A	120	4

- Easy Created Rule Chain**
- V-V, V-A, A-A, A-V Ratio Control**
- Single Input chains to Multiple Outputs**
- Loop Delay Setting**
- Network Disconnection – Holding V / I output**



Interfaces

SMA Antenna Socket

Power Connector
• V+, COM, Earth Ground

USB Configuration

IP-40 Plastic Housing

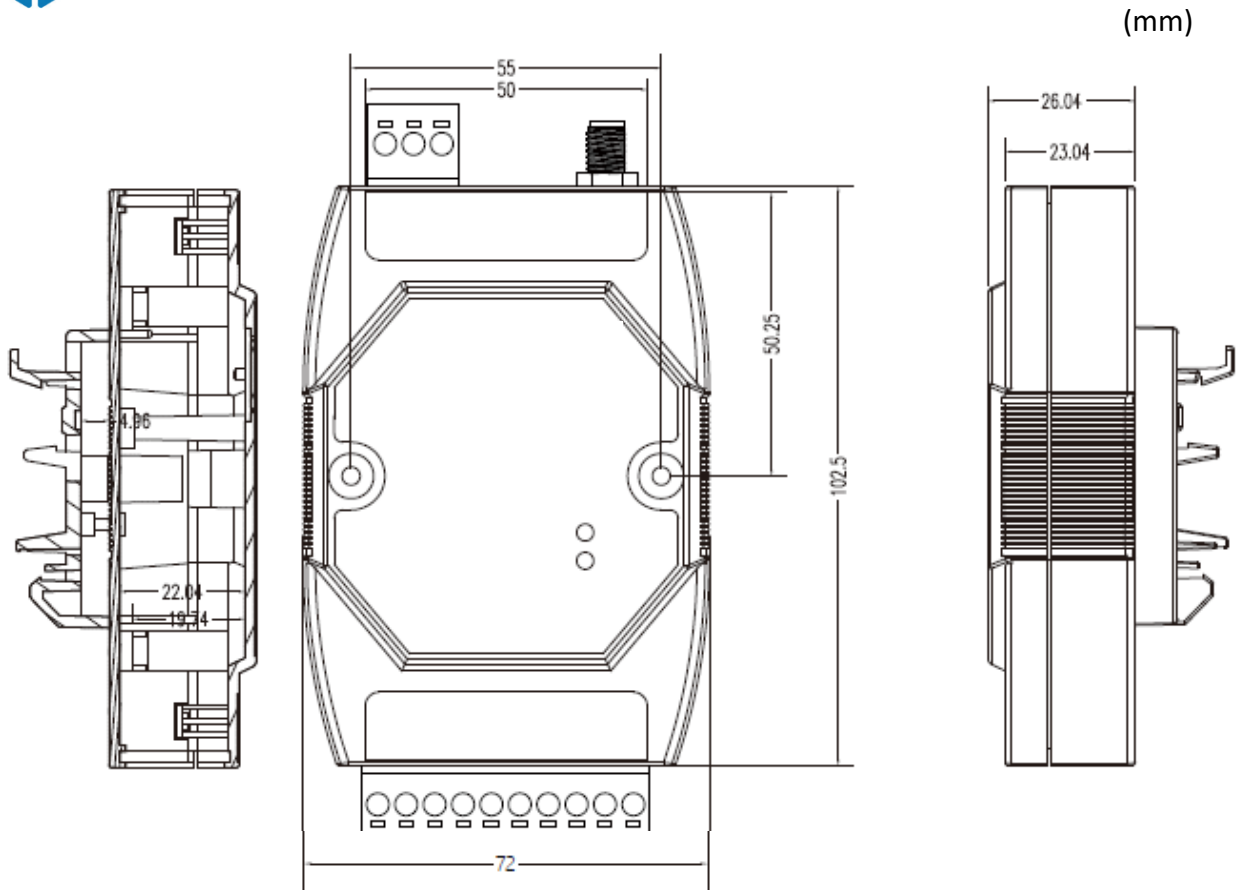
DIN Rail Clip

LC144

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	
RS485B	



Dimensions



Wireless Specification	
Frequency	-900 model : Frequency Support EU 868Mhz, US915Mhz, AS 923Mhz, KR 920Mhz -400 model : Frequency Support EU 433Mhz Frequency adjust by Utility
Wireless Technology	Low Power Wide Area – LoRa MAC 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	Modbus protocol over the Air (LoRa MAC Transparent Transmission) with configurable Echo time and retransmission technology LM200 supports Group I/O Tracking function, perform I/O Tracking between one pair of LC144
Forwarding Data Buffer	256Bytes FIFO Data Buffer for LoRa signal transmission
Data Encryption	128bits AES key , Utility configurable

Management	
System Management	1 x Micro USB 2.0 port for system configuration
Software Utility	Windows [®] Based Utility for parameters configuration, monitoring, log file download
Monitoring	On-Line Utility Monitoring
Event Log	1K Event Log Entries
Firmware Update	Firmware upgrade by upgrade tool or Utility (To Be Available Soon)

I/O Interface (LC144)	
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: LC-144(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%
Current Output	1 Channel Output Range: 4-20mA @ Typical 24V Power Input Accuracy Level: 0.3%
Voltage Output	1 Channel Output Range: 0.03~10V Output Type: Open Collect (O.C.) Accuracy Level: 0.2%, Full Scale (F.S.)

PWM Output	Frequency: 100Hz~1KHz with 0.2% Duty-Cycle Accuracy Output Type-1: 5V, 200mA (Max) Output Type-2: Open Collect (O.C.), 10V /200mA (Max)
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 Earth Ground
Reverse Protection	Yes
Power Consumption	LM200: 1 Watt @ DC 24V power input LC144: 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
Standards	
Radio Equipment Directive	RED 2014/53/EU EMC: EN 301489-1 V2.2.3 (2019-11)/ EN 301489-3 V2.1.1 (2019-03) Radio: EN 300 220-1 v3.1.1 (2017-02)/ EN 300 220-2 v3.2.1 (2018-06) Health: EN 50663:2017 / EN 62479:2010 Safety: EN62368-1: 2014+ A11:2017
EMC	Compliance with EN 55032:2015/A11:2020, EN 55035:2017 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



Model	Description
LM200-900	LoRa /Modbus RTU Client Agent 1 x RS-485 Slave 2-wire, 1 x SMA Antenna Connector LM200-900: adjustable EU868,AS923, KR920,US915 frequency
LM200-400	LoRa /Modbus RTU Client Agent 1 x RS-485 Slave 2-wire, 1 x SMA Antenna Connector LM200-400: EU433
LC144-900	LoRa End-Node, 8CH AIO, 1 Modbus RTU 485 Host 2 x 0~10V input, 0.2% accuracy 2 x 4~20mA input, 0.3% accuracy 1 x 0~10V Output, Open Collect (O.C.) Type, 0.2% accuracy 1 x 4~20mA Output, 0.3% accuracy 1 x PWM Output (0~5V), 200mA (max), 0.2%Duty_Cycle Accuracy @1khz 1 x PWM (0~10V), Open Collect (O.C.) Type, 200mA, 0.2% Duty Cycle accuracy @1Khz, 10V(Max) 1 x RS485 Host, 2-wire 1 x SMA /LoRa Antenna Connector LC144-900: adjustable EU868,AS923, KR920,US915 frequency
LC144-400	LoRa End-Node, 8CH AIO, 1 Modbus RTU 485 Host 2 x 0~10V input, 0.2% accuracy 2 x 4~20mA input, 0.3% accuracy 1 x 0~10V Output, Open Collect (O.C.) Type, 0.2% accuracy 1 x 4~20mA Output, 0.3% accuracy 1 x PWM Output (0~5V), 200mA (max), 0.2%Duty_Cycle Accuracy @1khz 1 x PWM (0~10V), Open Collect (O.C.) Type, 200mA, 0.2% Duty Cycle accuracy @1Khz, 10V(Max) 1 x RS485 Host, 2-wire 1 x SMA /LoRa Antenna Connector LC144-400: EU433

Packing & Accessories

	LoRa Device x 1
	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
A-LORA868-7dBi-SM-3M	Out-Door LoRa Antenna, Magnetic Sucker, SMA Male, 850-925MHZ, 7dBi, RG174 Cable, 3M Length, -40°C~65°C
A-LORA433-7dBi-SM-3M	Out-Door LoRa Antenna, Magnetic Sucker, SMA Male, 433MHZ, 7dBi, RG174 Cable, 3M Length, -40°C~65°C