



AP200-LM

Datasheet

Aiming to create better and safer working environments and life experiences through the products we deliver.



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LoRa I/O Controller

AP200-LM

Complete LoRa Controller for Analog IO Tracking

The AP200-LM/AP144-LC 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 and outputs are supported in AP144-LC, such as voltage inputs and outputs, current inputs and outputs, PWM output and one RS-485 port for Modbus RTU slave. One AP200-LM can connect up to 250pcs AP144-LC LoRa end nodes for two-way communications where field site analog signals are sent from AP144-LC and mirrors to another AP144-LC by AP200-LM. The LoRa wireless distance can reach up to 3-6KM distance depending on the environment. The AP200-LM/AP144-LC offers great flexibility in wireless IoT applications, such as LED light control without cable, Analog signal reproduced at remote site to replace traditional wiring.



Analog I/O Extension & Tracking by LoRa (AP144-LC+AP200-LM)

- Transparent /Reproduce Analog Signal by LoRa
- AP200-LM Polling Source AP144-LC specific Channel and Output to Target AP144-LC specific Channel
- Create /Edit Tracking Rule by Utility Tool
- Achieve 2-Sites Analog Tracking

V / V, V / A, A / A Auto I/O Tracking (AP144-LC + AP200-LM)

- 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

4~20mA Input / Output (AP144-LC)

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

Event Log & Utility Monitoring (AP200-LM)

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

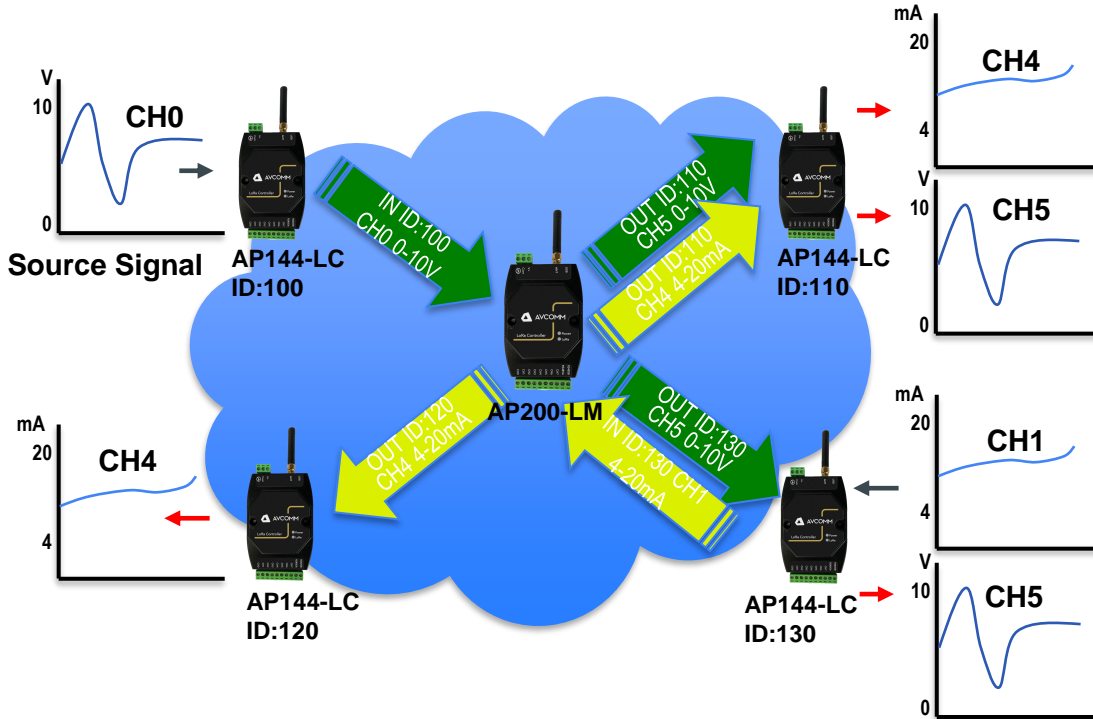
Industrial Application

- 10~30V DC wide power range input
- Low Power Consumption
- Wide Coverage up to 6KM
- Max.250 AP144-LC Nodes to one AP100-LM
- -40 ~ 75°C / 90%H Operating Temperature / Humidity
- Compliance IEC 61000-6-2/-6-4 Heavy Industrial EMC



Product Features

✓ 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 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



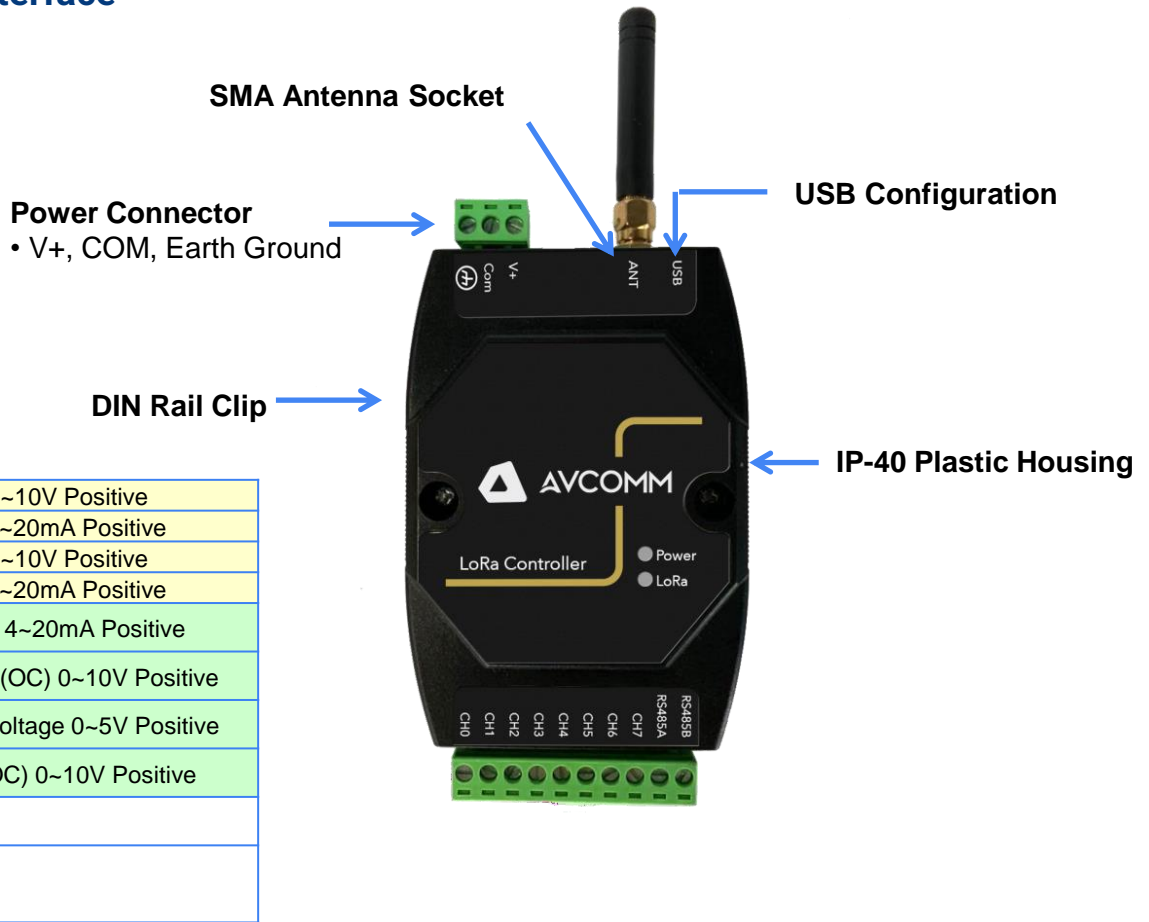
Ordering Information

Model Name	Description
AP200-LM-400	LoRa Master /Modbus RTU Client Agent, Group IO Mapping, Logic Rule, 410~493 Mhz by software configuration (Must work with AP144-LC) (with LoRa antennas)
AP200-LM-900	LoRa Master /Modbus RTU Client Agent, Group IO Mapping, Logic Rule, 850~930 Mhz by software configuration (Must work with AP144-LC) (with LoRa antennas)
AP144-LC-900	LoRa End-Node, 8CH AIO, 1 Modbus RTU 485 2-wire, 2 x 0~10V input, 2 x 4~20mA input, 1 x 0~10V Output, Open Collect (O.C.), 1 x 4~20mA Output, 1 x PWM Output (0~5V), 1 x PWM (0~10V), Open Collect (O.C.) Type, 1 x SMA /LoRa Antenna, 850~930 Mhz by software configuration, (Must work with AP100-LM or AP200-LM)

Wireless Specification	
Frequency	AP200-LM-900 model (Thailand Region) : Frequency Support 920~925Mhz
Wireless Technology	Low Power Wide Area – LoRa MAC Technology
Radio TX Power	17dBm(50mW) (Maximum)
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 AP200-LM supports Group I/O Tracking function, perform I/O Tracking between one pair of AP144-LC
Forwarding Data Buffer	256Bytes FIFO Data Buffer for LoRa signal transmission
Data Encryption	128bits AES key
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
I/O Interface (AP144-LC)	
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: AP144-LC(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	AP200-LM: 1 Watt @ DC 24V power input AP144-LC: 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	5 Years
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

Function interface

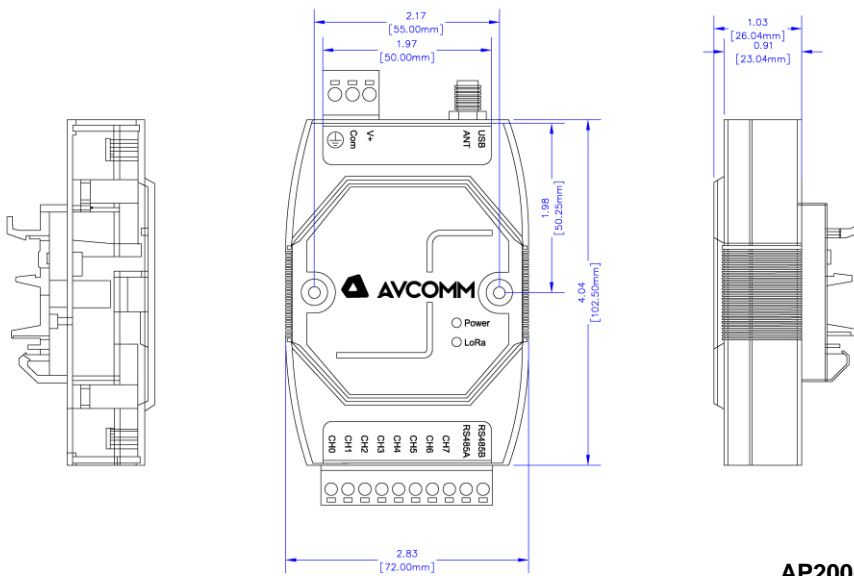


AP144-LC

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	

Installation dimensions

Unit: $\frac{\text{inch} \pm 0.040}{[\text{mm}] \pm 1.00}$



AP200-LM

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