

## User Guide

### Introduction

4-20mA to RS485 converter is an industrial standard analog acquisition product, small and portable. It can collect up to four channels 4-20mA analog signals, and convert them to the standard ModBus-RTU communication protocol with RS485 port, so as to be monitored by GS1-S series devices. It can also be directly connected to a PLC, industrial control instrument, configuration screen or configuration software. Acquisition accuracy is 12-bit resolution, 0.1% accuracy. It can be widely used in industrial sites, distribution cabinets and other places requiring analog signal acquisition.



### Applications

Widely used in industrial sites, power distribution cabinets and other applications that need to collect analog signals.

### Features

- DC 9~36V Power supply with anti-reverse connection, over-voltage and over-current protection
- 4 channels of 4 ~ 20mA current inputs
- 12-bit resolution, 0.1% accuracy
- Supporting Modbus-RTU protocol
- RS485 communication interface with lightning protection and static protection

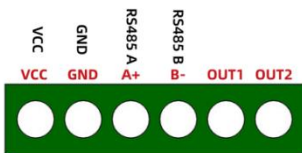
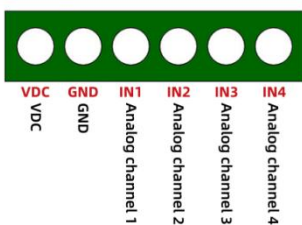
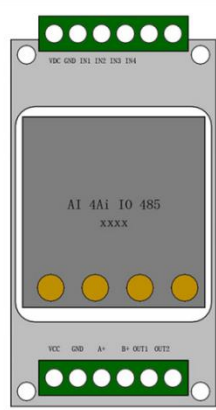
### Specifications

Specification		
Model		UB-AI-N1
Power Supply		DC 9~36V
Analog interface	Collected signal	4-20mA
	Number of interfaces	4 channels single terminal
	AD conversion resolution	12 bit
	Accuracy	0.1%
Max Current		269mA (@12V)
Working environment		-40~85°C, 0~95%RH
Connector		Audio
Size/Cable length		82*50*32mm /3m
Communication Protocol		RS485 Modbus RTU Protocol
RS485 Address		0xDA
Baud Rate		1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s (default), 19200 bit/s

Instruction

Users connect the 4-20mA analog sensor to the interface on the top according to the line sequence, and sets the acquisition frequency and sensor display settings through UbiBot console. At this time, the uploaded data is the current value. Input the upper limit and lower limit of the 4-20mA analog sensor range through the platform-level calibration function on the console, and the platform will automatically calculate and convert the current value to the actual value.

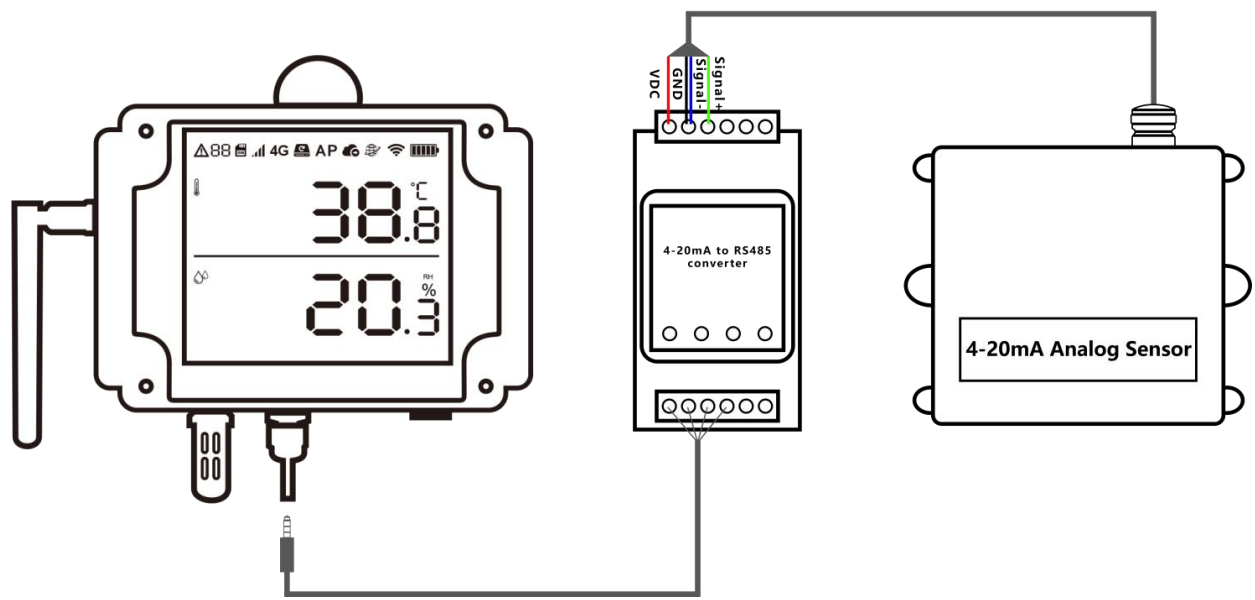
When this converter is used with our company's GS1-S series products, please connect GS1-S the device with DC12V power supply. At this time, the output voltage of the VDC interface is 12V, please pay attention to the voltage when connecting the analog sensor externally.



VDC	Power output positive	IN1	Analog channel 1	IN3	Analog channel 3
GND	Power output negative	IN2	Analog channel 2	IN4	Analog channel 4

VCC	Power output positive	A+	RS485 A
GND	Power output negative	B+	RS485 B



Example:

4-20mA to RS485 converter is connected to an atmospheric pressure sensor to obtain atmospheric pressure and temperature values. Atmospheric pressure range: 0~120kPa; temperature range: -40~80°C.

- ① Connect the atmospheric pressure sensor to the top , using analog channel 1 and channel 2, with

the following sequence

4-20mA to RS485 converter	atmospheric pressure sensor
VDC	Power supply positive
GND	Negative power supply, negative temperature signal, negative air pressure signal
IN1	Positive temperature signal
IN2	Positive power supply

② Set the acquisition frequency via the console, [Settings] - [Data Management]. Set the corresponding channel in the field of [Sensor Display Settings].

field9 :

External current to RS485 converter 1

1

(-)

Edit

field10 :

External current to RS485 converter 2

2

(-)

Edit

③ Choose[Calibration Sensors] - [Platform-level Calibration], and click edit. According to the range, input the upper and lower range limits, and the platform will automatically calculate.

Wiring Instruction



Communication protocols

1. Communication basic parameters

Communication Basic Parameter	
Coding System	8-bit binary
Data Bit	8 bits
Parity Checking Bit	none
Stop Bit	1 bit
Error Checking	CRC Check
Baud Rate	1200 bit/s,2400 bit/s, 4800 bit/s, 9600 bit/s (default), 19200 bit/s

2. Data Frame Format

The Modbus-RTU communication protocol is used in the following format:

- Initial structure  $\geq 4$  bytes in time.
- Address code: 1 byte, default 0xDA.
- Function code: 1 byte, support function code 0x03 (read only) and 0x06 (read/write).
- Data area: N bytes, 16-bit data, high byte comes first.

- Error check: 16-bit CRC code.
- End structure  $\geq 4$  bytes of time.

Request							
Slave Address	Function Code	Register Address	No. of Registers	CRC LSB		CRC MSB	
1 byte	1 byte	2 bytes	2 bytes	1 byte		1 byte	
Response							
Slave Address	Function Code	No. of Bytes	Content 1	Content 1	...	Content n	CRC
1 byte	1 byte	1 byte	2 bytes	2 bytes	...	2 bytes	2 bytes

### 3. Register Address

Register Address				
Address	Content	Register Length	Function Code	Description of definitions
0x0000	Channel 1 current value	2	03	Floating (IEEE 754 standard)
0x0002	Channel 2 current value	2	03	Floating (IEEE 754 standard)
0x0004	Channel 3 current value	2	03	Floating (IEEE 754 standard)
0x0006	Channel 4 current value	2	03	Floating (IEEE 754 standard)