AI-RS485 converter 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

1. Anti-crash hardware watchdog
2. 9~36V Power supply with anti-reverse connection, over-voltage and over-current protection
3. 4 channels of 4～20mA current inputs
4. 12-bit resolution, 0.1% accuracy
5. Supporting Modbus-RTU protocol
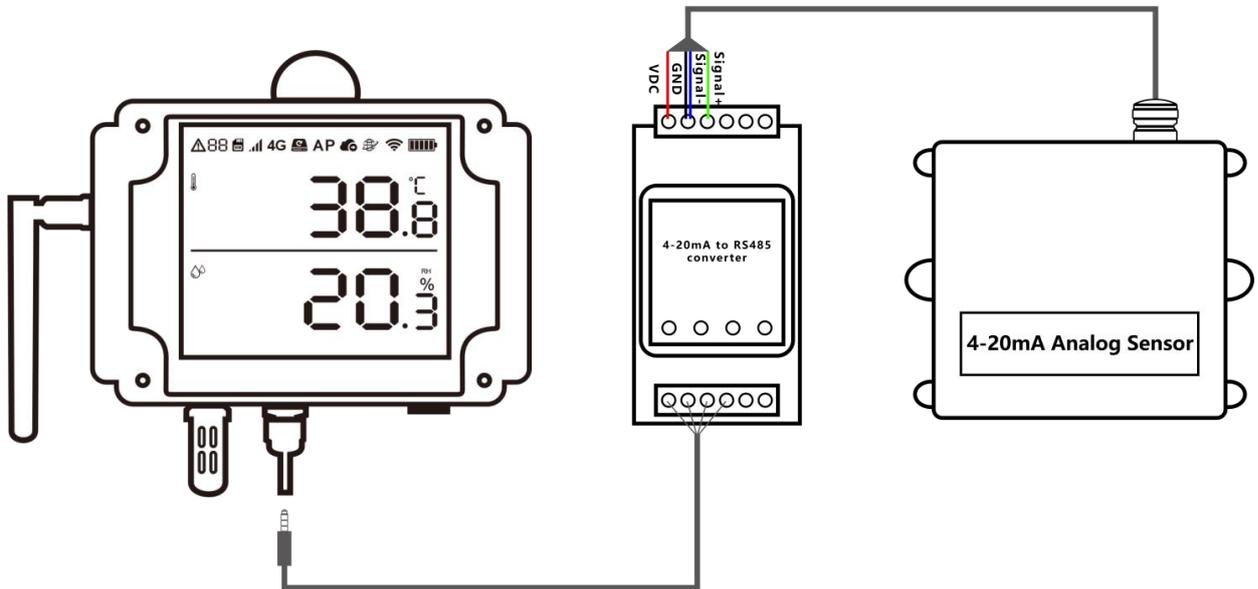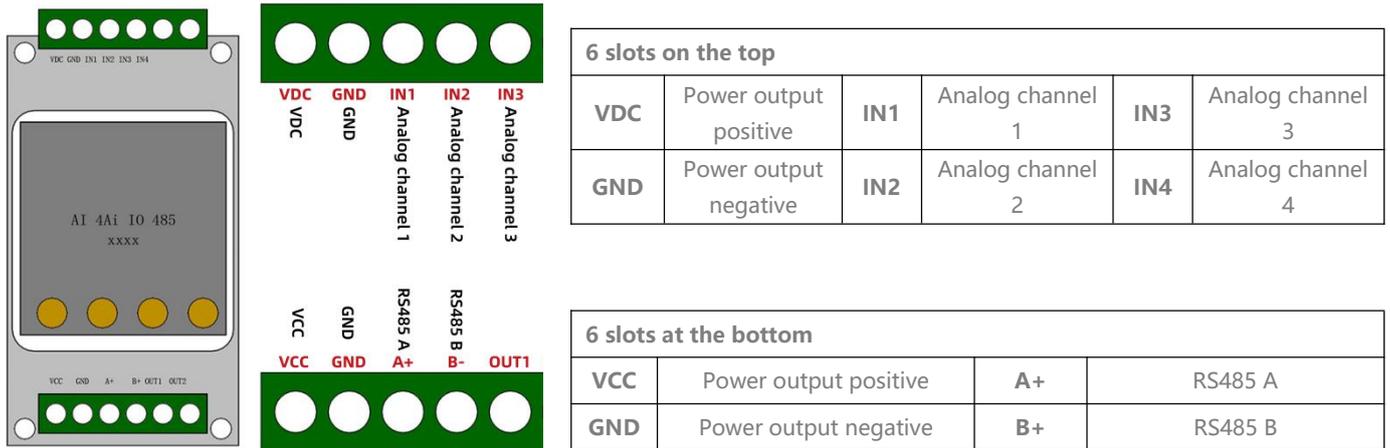6. RS485 communication interface with lightning protection and static protection

Specifications

Specification		
Model		UB-AI-N1
Rated input voltage		DC 9~36V
Analog interface	Collected signal	4-20mA
	Number of interfaces	4 channels single terminal
	AD conversion resolution	12 bit
	Accuracy	0.1%
Communication protocol		RS485　(Standard MODBUS-RTU Protocal)
Working environment		Temperature：-40℃~85℃　Humidity：0%RH~95%RH
Port		Audio
Size/Cable length		82*50*32mm/3m

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.

6 slots on the top

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

6 slots at the bottom

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.

Communication protocols

Register Address

Register Address	Name	Number of bytes	Description	Note
0000	AI1_H	2	Analog channel 1 high	Each analogchannel occupies 2 Modbus registers, 4 bytes, in floating point format, floating point format according to IEEE 754
0001	AI1_L	2	Analog channel 1 low	
0002	AI2_H	2	Analog channel 2 high	
0003	AI2_L	2	Analog channel 2 low	
0004	AI3_H	2	Analog channel 3 high	
0005	AI3_L	2	Analog channel 3 low	
0006	AI4_H	2	Analog channel 4 high	
0007	AI4_L	2	Analog channel 4 low	

Modbus RTU function code

Function code	Operation	Description
03/04	Read register value	Read register value

Example：

1. Read AI value：Input=4.96（40 9E E7 CF）	
Function code 03 Tx：**DA 03 00 00 00 02 D6 E0** Rx：**DA 03 04 40 9E E7 CF EE B4**	Function code 04 发送：**DA 04 00 00 00 02 63 20** 接收：**DA 04 04 40 9E E7 CF EF 03**
2. Function code of read	
Channel1：**DA 03 00 00 00 02 D6 E0** Channel2：**DA 03 00 02 00 02 D6 E0** Channel3：**DA 03 00 04 00 02 D6 E0** Channel4：**DA 03 00 06 00 02 D6 E0**	Channel1：**DA 04 00 00 00 02 63 20** Channel2：**DA 04 00 02 00 02 63 20** Channel3：**DA 04 00 04 00 02 63 20** Channel4：**DA 04 00 06 00 02 63 20**