Aluminum Shell UV Transmitter (485 Type)

SN-300AL-UV-N01

Ver 2.0

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Contents

1 Product Introduction

1.1 Product Overview

The SN-300AL-UV-N01 is a UV transmitter developed by our company. This product converts UV light into measurable electrical signals using photosensitive elements for online UV monitoring. It uses imported industrial-grade microprocessor chips from the United States and high-precision UV sensors, ensuring excellent reliability and accuracy. The product integrates comprehensive sensors for complete measurement data, outputs a 485 signal (standard ModBus-RTU protocol) with a maximum communication distance of 2000 m, and supports secondary development. The housing has a protection rating of IP67.

This product is widely applicable in environmental monitoring, meteorological monitoring, agriculture, forestry, and other environments, measuring UV in the atmosphere and from artificial light sources.

1.2 Features

- Uses UV measurement devices highly sensitive to 290-390 nm for accurate UV intensity measurement.
- Adopts standard ModBus-RTU communication protocol.
- High protection rating, suitable for long-term use in outdoor rain and snow environments.
- 10-30V DC wide voltage power supply.

1.3 Main Parameters

Parameter	**Value**
DC Power Supply (Default)	10-30VDC
Maximum Power Consumption	0.06W
Typical Accuracy	$\pm$10% FS (@365nm, 60% RH, 25°C)
UV Intensity Range	0 15 mW/cm^2
Resolution	0.01 mW/cm^2
UV Index Range	0-15
Measurement Wavelength Range	290-390 nm
Response Time (UV Intensity)	0.2s
Response Time (UV Index)	0.2s
Output Signal	485 (ModBus-RTU Protocol)

Note: The performance data was obtained under test conditions using our company's test system and software. Although highly reliable, we recommend checking functionality and parameters before use to ensure on-site performance.

1.4 System Framework Diagram

This product can be used with multiple sensors on one 485 bus, supporting up to 254 sensors theoretically. The bus can connect to a PLC with a 485 interface,

a microcontroller via a 485 interface chip, or a computer using USB to 485. Use the provided sensor configuration tool for configuration and testing (only one device can be connected during configuration).

1.5 Product Selection

Code	Description
SN- 300AL- UV- N01	Company Code Aluminum Housing UV Transmitter 485 Output (Standard ModBus-RTU)

2 Hardware Connection

2.1 Pre-Installation Equipment Check

Equipment List:

- Main Device
- Black Waterproof Plug-in Cable (70cm)
- Certificate of Conformity
- Installation Screw Pack

2.2 Interface Description

The power interface supports 10-30V wide voltage input. Ensure 485 signal lines (A/B) are not reversed, and addresses of multiple devices on the bus do not conflict.

2.2.1 Sensor Wiring

Type	Wire Color	Description
2*Power	Brown Black	Power Positive (10 30V DC) Power Negative
2*Communication	Yellow (Green) Blue	485-A 485-B

2.3 Installation Method

1. Use screws through the sensor's installation holes to fix it to the mounting bracket.
2. Ensure the device is parallel to the ground (adjust hand-tightened screws and check the level bubble).
3. Remove the protective cover after installation.

3 Configuration Software Installation and Use

Our company provides the “485 Parameter Configuration Software” for reading and modifying sensor parameters, including device ID and address.

Note: Ensure only one sensor is on the 485 bus during automatic acquisition.

3.1 Connecting Sensor to Computer

Connect the sensor to the computer via USB to 485 and provide power. Check the COM port in “My Computer - Properties - Device Manager - Ports.” Open the “485 Parameter Configuration Software” from the data package. If no COM port is found, install the USB to 485 driver (included in the data package) or contact technical support.

3.2 Using Sensor Monitoring Software

1. Obtain the serial port number (section 3.1) and select the correct serial port.
2. Click “Test Baud Rate” to detect the device’s baud rate and address (default: 4800 bit/s, 0x01).
3. Modify address and baud rate as needed and query the device’s functional status.
4. If the test fails, recheck wiring and 485 driver installation.

4 Communication Protocol

4.1 Basic Communication Parameters

Parameter	Value
Encoding	8-bit Binary
Data Bits	8 Bits
Parity Bit	None
Stop Bit	1 Bit
Error Check	CRC (Cyclic Redundancy Check)
Baud Rate	2400, 4800, 9600 bit/s (configurable, default 4800 bit/s)

4.2 Data Frame Format Definition

Uses ModBus-RTU protocol:

- Initial Structure: $\geq$4 bytes time
- Address Code: 1 byte (default 0x01)
- Function Code: 1 byte (0x03: read, 0x06: write, 0x10: write multiple)
- Data Area: N bytes (16-bit data, high byte first)

- Error Check: 16-bit CRC Code
- End Structure: ≥4 bytes time

Host Inquiry Frame:

Address Code	1 Byte
Function Code	1 Byte
Register Start Address	2 Bytes
Register Length	2 Bytes
Check Code Low Byte	1 Byte
Check Code High Byte	1 Byte

Slave Response Frame:

Address Code	1 Byte
Function Code	1 Byte
Valid Byte Count	1 Byte
Data Area 1	2 Bytes
Data Area 2	2 Bytes
Data Area N	2 Bytes
Check Code	2 Bytes

4.3 Register Addresses

Register Address	PLC Address	Content	Operation
0000 H	40001	UV Intensity	Read Only
0001 H	40002	UV Index	Read Only
0052 H	40083	UV Intensity Offset Value	Read/Write
07D0 H	42001	Device Address	Read/Write (1 254, default 1)
07D1 H	42002	Device Baud Rate	Read/Write (00: 2400, 01: 48

4.4 Communication Protocol Examples and Explanations

4.4.1 Read UV Intensity Value from Device Address 0x01

Inquiry Frame:

Address	Function	Start Address	Data Length	Check Low	Check Hig
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Response Frame:

Address	Function	Valid Bytes	Data Area	Check Low	Check Hig
0x01	0x03	0x02	0x01 0x43	0xF8	0x25

UV Intensity: 0143 (hex) = 323 ⇒ 3.23 mW/cm^2

4.4.2 Read UV Index Value from Device Address 0x01

Inquiry Frame:

Address	Function	Start Address	Data Length	Check Low	Check Hig
0x01	0x03	0x00 0x01	0x00 0x01	0x74	0x0A

Response Frame:

Address	Function	Valid Bytes	Data Area	Check Low	Check Hig
0x01	0x03	0x02	0x00 0x03	0xF8	0x45

UV Index: 0003 (hex) = 3

4.4.3 Modify Current Address

Inquiry Frame (to 0x02):

Address	Function	Start Address	Modified Value	Check Low
0x01	0x06	0x07 0xD0	0x00 0x02	0x08

Response Frame:

Address	Function	Start Address	Modified Value	Check Low	Ch
0x02	0x06	0x07 0xD0	0x00 0x02	0x08	0x

4.4.4 Modify Current Baud Rate

Inquiry Frame (to 9600):

Address	Function	Start Address	Modified Value	Check Low
0x01	0x06	0x07 0xD1	0x00 0x02	0x59

Response Frame:

Address	Function	Start Address	Modified Value	Check Low	Ch
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x

4.4.5 Query Current Address and Baud Rate

Inquiry Frame:

Address	Function	Start Address	Data Length	Check Low	Check Hig
0xFF	0x03	0x07 0xD0	0x00 0x02	0xD1	0x58

Response Frame:

Address	Function	Valid Bytes	Address	Baud Rate	Check Low
0x01	0x03	0x04	0x00 0x01	0x00 0x01	0x6A

Result: Address = 0x01, Baud Rate = 0x01 (4800).

5 Common Problems and Solutions

Notes:

1. Confirm the product model upon receipt.
2. Do not wire with power on; verify wiring before powering.
3. The sensor is a precision device; do not disassemble to avoid damage.

Troubleshooting:

1. If the value reads 0, check for a light source and ensure the protective cover is removed.
2. Verify 485 wiring is correct and not reversed.
3. Check for incorrect or duplicate device addresses (default: 1).
4. Ensure the power supply matches the label.
5. Device damage.