OHTS1091 Aluminum Shell Illuminance Transmitter (RS485 Type)

1 Product Overview

The OHTS1091 is a high-precision photoelectric effect illuminance detection transmitter with measurement units in Lux. The device features an aluminum alloy enclosure with IP65 protection rating, suitable for outdoor and harsh industrial environments. It integrates an RS485 communication interface supporting standard ModBus-RTU protocol, with configurable communication address and baud rate, and a maximum communication distance of 2000m. The transmitter operates on a 7-30V DC wide voltage power supply with dual selectable ranges (0-65535Lux or 0-200000Lux), applicable for illuminance acquisition in agriculture, industry, and environmental monitoring fields.

2 Applications

- Agricultural greenhouse illumination environment monitoring and regulation
- Photoperiod management in floriculture greenhouses
- Long-term illumination intensity monitoring in agricultural open fields
- Lighting quality inspection in electronic equipment production lines
- Environmental parameter acquisition in outdoor meteorological stations
- Intelligent building automated lighting control
- Illumination monitoring in livestock breeding environments
- Scientific research laboratory illumination condition recording
- Light intensity detection in harsh industrial site environments
- Illumination monitoring in warehousing and logistics environments

3 Features

- **Dual Range Configuration**: Selectable measurement ranges of 0-65535Lux or 0-200000Lux
- **Detection Accuracy**: Standard type ±7% (@25℃), High-precision type ±4% (@25℃)
- **Communication Protocol**: Standard ModBus-RTU protocol, supporting baud rate configuration from 1200-115200bit/s, default 4800bit/s
- **Mechanical Structure**: Aluminum alloy enclosure, IP65 protection rating, built-in spirit level
- **Electrical Interface**: 7-30V DC wide voltage power supply, maximum power consumption 0.4W
- **Long-term Stability**: ≤5%/year
- **Response Time**: <1s
- **Mounting Method**: Wall-mounted screw fixation, supporting horizontal adjustment

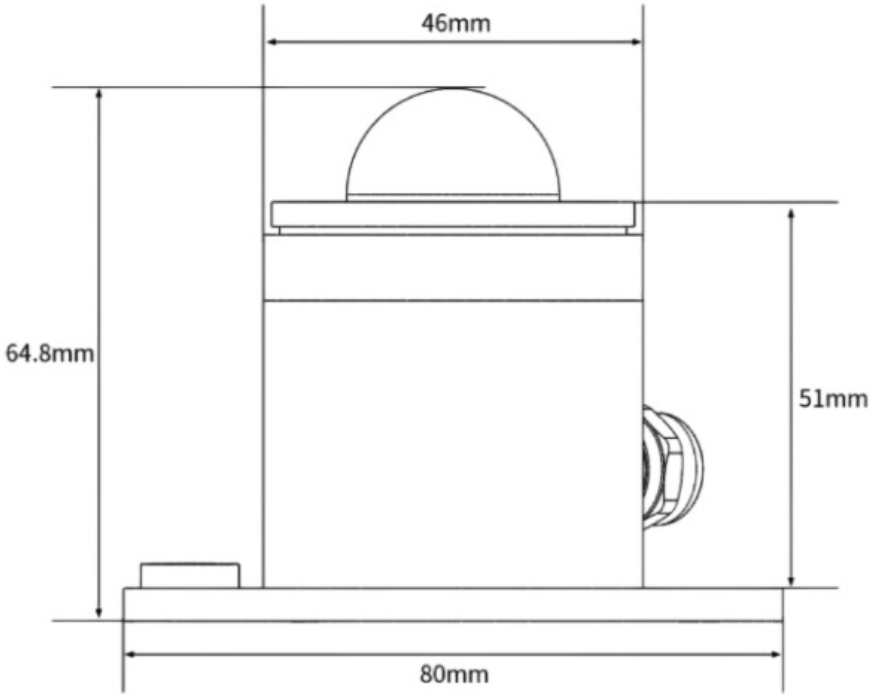
4 Technical Specifications

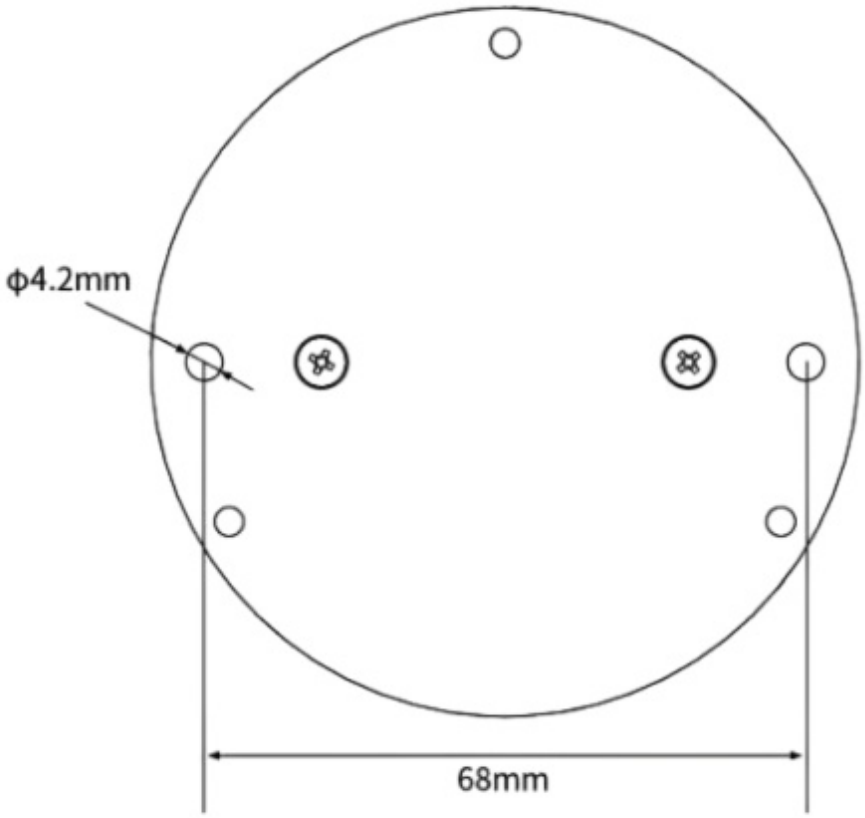
Parameter	Specification
Supply Voltage	7-30V DC
Maximum Power Consumption	0.4W
Measurement Range	0-65535Lux or 0-200000Lux
Accuracy (Standard Type)	±7% (@25℃)
Accuracy (High-Precision Type)	±4% (@25℃)
Long-term Stability	≤5%/y
Response Time	<1s
Output Signal	RS485 (ModBus-RTU)
Communication Distance	≤2000m
Baud Rate	1200/2400/4800/9600/19200/38400/57600/115200 bit/s
Data Format	8 data bits, no parity, 1 stop bit
Error Checking	CRC-16
Protection Rating	IP65
Operating Temperature	-
Storage Temperature	-

5 Physical Specifications

Parameter	Specification
Enclosure Material	Aluminum Alloy
Protection Rating	IP65
Mounting Method	Wall-mounted (screw fixation)
Leveling Adjustment	Built-in spirit level, supporting hand-tightened screw adjustment
Electrical Connection	4-wire system (Power +, Power -, 485-A, 485-B)

Enclosure Dimensions





6 Installation

Pre-installation Inspection

- Transmitter main unit: 1 unit
- Mounting screw kit
- Warranty card and certificate of conformity

Installation Steps

1. Use screws to secure the device through the mounting holes at the bottom of the transmitter to the installation position;
2. Adjust the hand-tightened screws and observe the spirit level to ensure the sensor surface is parallel to the ground;
3. After installation is complete, remove the protective cover on top of the sensor.

7 Wiring Definition

Terminal Definition

Wire Color	Marking	Function Description
Brown	VCC	Power Positive (7-30V DC)
Black	GND	Power Negative
Yellow	485-A	RS485 Communication Line A
Blue	485-B	RS485 Communication Line B

Wiring Precautions

- RS485 bus A/B wire sequence must not be reversed
- Multiple devices on the bus must have unique addresses (factory default address 0x01)
- For long-distance wiring (>100m), it is recommended to connect a 120Ω termination resistor in parallel at the bus end

8 Communication Protocol and Data Conversion

Communication Parameters

Parameter	Setting
Encoding	8-bit binary
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Error Checking	CRC-16 (Cyclic Redundancy Check)
Default Baud Rate	4800bit/s

Data Frame Format (ModBus-RTU)

Structure	Length	Description
Start Structure	≥4 character times	Silent interval
Address Code	1 byte	Device address (default 0x01)
Function Code	1 byte	Command function identifier
Data Area	N bytes	Communication data (16-bit data high byte first)
CRC Check	2 bytes	16-bit CRC check code (low byte first)
End Structure	≥4 character times	Silent interval

Register Address Mapping

Register Address	PLC Address	Content Description	Function Code
0002H	40003	Illuminance High Word (0-200000Lux, unit 1Lux)	0x03/0x04
0003H	40004	Illuminance Low Word (0-200000Lux, unit 1Lux)	0x03/0x04
0006H	40007	Illuminance (0-65535Lux unit 1Lux; 0-200000Lux unit hecto-Lux)	0x03/0x04
0052H	40083	Illuminance Calibration Value	0x03/0x04/0x06/0x10
07D0H	42001	Device Address (range 1-254, default 1)	0x03/0x04/0x06/0x10
07D1H	42002	Baud Rate Configuration (0:2400, 1:4800, 2:9600, 3:19200, 4:38400, 5:57600, 6:115200, 7:1200)	0x03/0x04/0x06/0x10

Data Conversion Formula

For register 0006H (single register, 16-bit unsigned integer):

- Range 0-65535Lux:

$$Lux = \text{Register Value} \times 1$$

- Range 0-200000Lux (hecto-Lux unit):

$$Lux = \text{Register Value} \times 100$$

For registers 0002H-0003H (dual registers, 32-bit unsigned integer, high byte first):

$$Lux = (\text{Register 0002H Value} \times 65536) + \text{Register 0003H Value}$$

Or expressed as:

$$Lux = \frac{\text{Data}_{32}}{1}$$

Where Data_{32} represents the 32-bit unsigned integer value.

Communication Example

Reading illuminance value from device address 0x01 (0-200000Lux, 1Lux unit):

- Inquiry frame: Address code 0x01, Function code 0x03, Starting address 0x0002, Register quantity 0x0002
- Response data parsing: If returned data area is 0x00 0x03 0xD0 0x40 (high word 0x0003, low word 0xD040), then:

$$Lux = (3 \times 65536) + 53312 = 200000$$

9 Precautions

Safety Warnings

- Strictly prohibited from using this device as a safety device or emergency stop device, nor for any other purpose that may cause personal injury due to equipment failure. Failure to comply with the operation manual may result in serious injury.

Electrical Safety

- Device power supply is 7-30V DC; strictly prohibited from connecting to AC power or DC voltage beyond the specified range
- Please confirm power is disconnected before wiring to avoid live operation
- RS485 bus A/B wire sequence must not be reversed, otherwise communication failure will occur

Installation Environment

- After installation, the protective cover on top of the sensor must be removed, otherwise measurement accuracy will be affected
- Ensure the sensor surface is parallel to the ground, calibrated through the spirit level
- For outdoor installation, ensure the enclosure is properly sealed to maintain IP65 protection rating

Communication Configuration

- Multiple devices on the bus must have unique addresses; factory default address is 0x01
- Host polling interval and waiting response time should be set above 200ms
- When bus length exceeds 200m or there are many devices, local power supply should be used and RS485 signal repeaters should be added, with 120Ω termination resistors connected in parallel at the bus end

10 After-Sales Guarantee & Support

Warranty Terms

- Warranty Period: 12 months from date of purchase (valid purchase proof required)
- Warranty Scope: Under normal use and maintenance conditions, free repair and replacement parts service for failures due to mechanical component materials or manufacturing defects
- Post-warranty Service: Lifetime maintenance service provided after warranty expiration (material and labor costs charged)

Non-warranty Scope

- Equipment damage caused by incorrect installation, use, or operation

- Disassembly, repair, modification, alteration, or replacement of internal components by unauthorized technical personnel
- Damage caused by negligent use or liquid ingress
- Failures caused by natural disasters or accidents
- Damage caused by use beyond the product's rated operating parameters

11 Manufacturer Information

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12 Revision History

Version	Date	Revision Content
V1.0	-	Initial version release