



# Reye-200

## Radar Sensor

Vers. 1.2 – Oct 2025

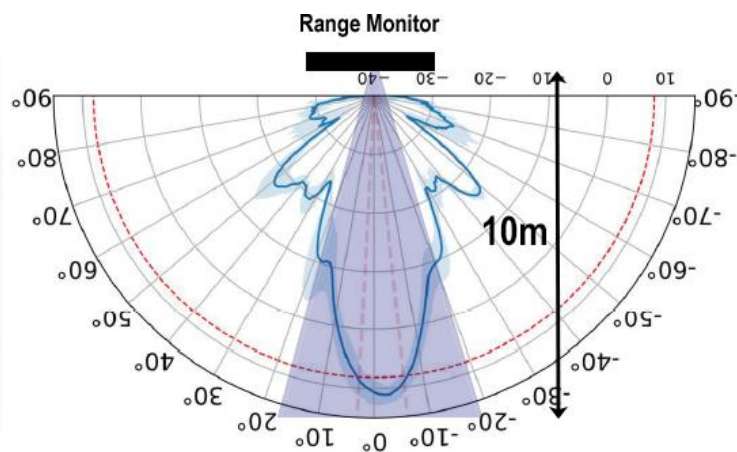
### Introduction

The Reye 200 is a radar water level sensor using 60GHz Pulsed coherent radar technology.

It can be used to monitor the level of sea, lakes, rivers and creeks. The sensor has a narrow field of view and fast measurement response time.

The sensor incorporates an ultra-low power microcontroller for data sampling, subsystem activation and overall system control.

It is a low power, RS485 Modbus Radar sensor measuring distance to target.



### Features

|                |                                             |
|----------------|---------------------------------------------|
| Battery:       | 12VDC                                       |
| Consumption:   | 0.1W, 80 mA max                             |
| Transmit Freq: | 60 Ghz                                      |
| Range:         | 1-10 m (configurable in steps 1,2,4,6,8,10) |
| Accuracy:      | +/-2mm @ 4m, +/-4mm @ 10m                   |
| Connectivity:  | Modbus ASCII, 1.5m 4 wire cable             |
| Antenna:       | Internal                                    |
| Temperature    | -40°C...+85°C operating                     |
| Protection     | IP67/68                                     |
| Dimensions     | 50 x 50 x 70 mm (gland included)            |
| Weight         | 0.05 kg                                     |

## Instructions

| <u>Wiring</u> | <u>Description</u> |
|---------------|--------------------|
| 1 – Green     | RS485 A+           |
| 2 – White     | RS485 B-           |
| 3 – Brown     | Power + (DC12V)    |
| 4 - Yellow    | Ground             |

RS485 communication default parameters: 9600,n,8,1

Default device address is 1

Default protocol is Modbus ASCII

Minus offset is 1

Read status registers, read function code: 0x30

| Register address                                                                 | Measurement             | Number of registers | Unit                                                |
|----------------------------------------------------------------------------------|-------------------------|---------------------|-----------------------------------------------------|
| 2                                                                                | Distance                | 1                   | mm                                                  |
| Parameters registers, read function code: 0x30 (0x40), write function code: 0x60 |                         |                     |                                                     |
| 5                                                                                | Maximum Range in meters | 1                   | 1,2,4,6,8,10                                        |
| 4                                                                                | Baud Rate               | 1                   | 1: 9600<br>2: 19200<br>3: 115200<br>Default is 9600 |
| 3                                                                                | Slave ID                | 1                   | 1-254                                               |

E.g. Master read distance:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | LRC  |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------|
| 0x01    | 0x03          | 0x00               | 0x01               | 0x00                  | 0x01                  | 0xFA |

Sensor response:

| Address | Function Code | Number of bytes | Distance value (Hi) | Distance Value (Lo) | LRC |
|---------|---------------|-----------------|---------------------|---------------------|-----|
|---------|---------------|-----------------|---------------------|---------------------|-----|

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| 0x01 | 0x03 | 0x02 | 0x07 | 0xAF | 0x44 |
|------|------|------|------|------|------|

Distance is given in HEX:

Distance: 07AF= 1967 => distance = 1967 mm

### Notes

The sensor supports Modbus command 3 to "Read Holding Registers"

The sensor supports Modbus command 6 to "Write Single Register"

## How to use the Reye-200 with an ADS-300, ADS-410 RTU

You can read and configure the Reye-200 sensor with an ADS-300 NBloT/LTEM or ADS-410 Itron RTU using a terminal and command 9220.

All commands follow this format:

9220,ADR,FC,CMD,LEN

Where:

- 9220 – ADS-300 command
- ADR – Device address
- FC – Function code
- CMD – Command type
- LEN – Length of data

The function code FC = 3 corresponds to "Read Holding Registers."

The function code FC = 6 corresponds to "Write Single Register."

### Examples

Ensure the device is properly connected via Modbus ASCII, 9600, no parity, 8 bits, no stop bits

Give command 0207,1 to switch ON excitation to power the sensor. If external power is used you still have to give this command.

#### **Get Distance**

9220,1,3,2,1

Response

2000

**Get Device Address (default is 1)**

9220,1,3,3,1

Response

1

**Read Baud Rate (default is 9600)**

9220,1,3,4,1

Response

9600

**Get Distance Configuration (default is 4m)**

9220,1,3,5,1

Response

4

Set Baud Rate

9220,1,6,4,1

Sets baud rate to 9600

9220,1,6,4,2

Sets baud rate to 19200

9220,1,6,4,3

Set Device Address 1 to 2

9220,1,6,3,2

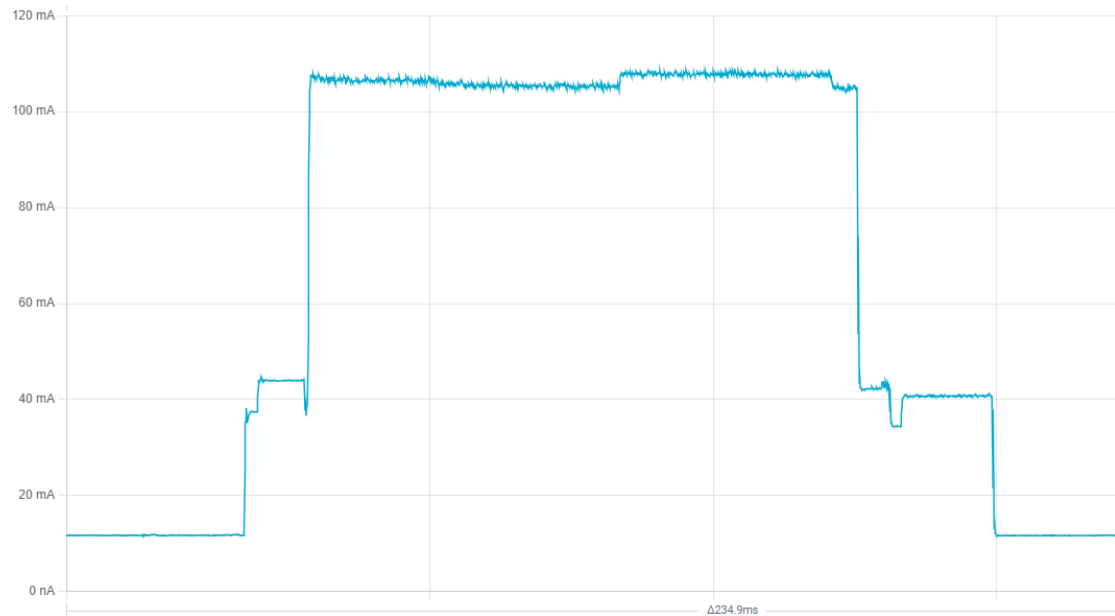
Set Maximum sensor Range

9220,1,6,5,4

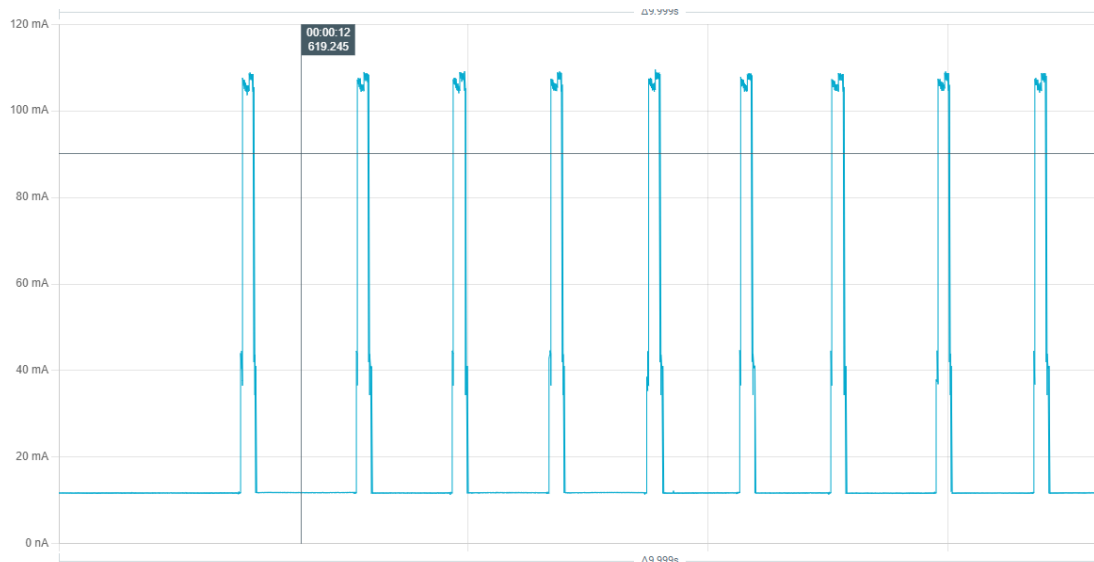
Sets the device's max range to the maximum range in meters (1, 2, 4, 6, 8, 10)

## Power consumption

The consumption of the Reye-200 while measuring is 105mA@5VDC for 100ms.



The consumption of the Reye-200 while powered (power up delay) is 11.7mA @5VDC.



If the sensor is configured with a 1 second delay in total the total sample cycle will be 1100ms and the total consumption will be,

$(11.7\text{mA} \times 1000\text{ms}) + (105\text{mA} \times 100\text{ms}) = 11.7 \times 1000 / 3600000 + 105 \times 100 / 3600000 = 0.00617 \text{ mAh}$   
per sample.

The mean current is,

$(11.7\text{mA} \times 1000\text{ms}) + (105\text{mA} \times 100\text{ms}) = 11700 + 10500 = 22200\text{mA} \backslash \text{coulombs per ms}$

$I_{\text{mean}} = 22200\text{mA} / 1100\text{ms} = \mathbf{20.18\text{mA}}$