

## Water level sensor RS485 type Modbus communication protocol

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

Default device address is 1

Modbus register map:

| Parameters registers, read function code: 0x03, write function code: 0x06 |                       |                            |                |                 |                                                                                                   |            |
|---------------------------------------------------------------------------|-----------------------|----------------------------|----------------|-----------------|---------------------------------------------------------------------------------------------------|------------|
| Register address (Hex)                                                    | PLC Address (decimal) | Meaning                    | Data type      | Number of bytes | Content                                                                                           | remark     |
| 0000 H                                                                    | 40001                 | Slave ID                   | Unsigned int16 | 2               | 1-254                                                                                             | Read/Write |
| 0001 H                                                                    | 40002                 | baud rate                  | Unsigned int16 | 2               | 0-1200; 1-2400<br>2-4800; 3-9600<br>4-19200; 5-38400<br>6-5760; 7-115200                          | Read/Write |
| 0002 H                                                                    | 40003                 | Unit                       | Unsigned int16 | 2               | range: (0~8)<br>0-Mpa (°C); 1-Kpa<br>2-Pa; 3-Bar<br>4-mbar; 5-kg/cm2<br>6-Psi; 7-mh2o<br>8-mmh2o; | Read/Write |
| 0003 H                                                                    | 40004                 | Decimal places             | Unsigned int16 | 2               | 0-####; 1-###.#<br>2-##.###; 3-#.###                                                              | Read       |
| 0004 H                                                                    | 40005                 | Measuring value In Int16   | Signed int16   | 2               | (-1999~9999)                                                                                      | Read       |
| 0005 H                                                                    | 40006                 | Range zero                 | Signed int16   | 2               | (-1999~9999)                                                                                      | Read       |
| 0006 H                                                                    | 40007                 | Full range                 | Signed int16   | 2               | (-1999~9999)                                                                                      | Read       |
| 0016 H                                                                    | 40023                 | Measuring value In Float32 | Float32        | 4               | Single-precision floating point number                                                            | Read       |
| 0017 H                                                                    | 40024                 |                            |                |                 |                                                                                                   |            |
| 0009 H                                                                    | 40010                 | Status of sensor           | Unsigned int16 | 2               | 0: pressure<br>1: temperature                                                                     | Read       |
| 000A H                                                                    | 40011                 | Parity                     | Unsigned int16 | 2               | 0: none<br>1: even<br>2: odd                                                                      | Read/Write |
| 000B H                                                                    | 40012                 | Data mode                  | Unsigned int16 | 2               | 0: big-endian<br>1: little-endian                                                                 | Read/Write |
| 000C H                                                                    | 40013                 | Offset                     | Signed int16   | 2               | Range:<br>-1999~9999                                                                              | Read/Write |

|        |       |               |                |   |                                                                     |            |
|--------|-------|---------------|----------------|---|---------------------------------------------------------------------|------------|
| 000D H | 40014 | Filter factor | Unsigned int16 | 2 | Range: 0~4                                                          | Read/Write |
| 000E H | 40015 | Gain factor   | Signed int16   | 2 | Range: -1999~9999                                                   | Read/Write |
| 000F H | 40016 | User function | Unsigned int16 | 2 | 0000H: save settings<br>0055H: zero clearing<br>00AAH: load default | Write      |

**Master read measuring value in int16:**

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x03          | 0x00               | 0x04               | 0x00                  | 0x01                  | 0xC5             | 0xCB             |

Sensor responds:

| Address | Function Code | Number of byte | Measuring value | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|----------------|-----------------|------------------|------------------|
| 0x01    | 0x03          | 0x02           | 0x01 0x65       | 0x79             | 0xFF             |

Measuring output value: 165 H=>357 D=357

**Master read measuring value in float32:**

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x03          | 0x00               | 0x16               | 0x00                  | 0x02                  | 0x25             | 0xCF             |

Sensor responds:

| Address | Function Code | Number of byte | Measuring value     | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|----------------|---------------------|------------------|------------------|
| 0x01    | 0x03          | 0x04           | 0x41 0xB4 0x0A 0xA6 | 0x28             | 0xF3             |

Measuring output value: 0x41 0xB4 0x0A 0xA6 (IEEE) =>22.5052(DEC)

**Master read decimal places:**

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x03          | 0x00               | 0x03               | 0x00                  | 0x01                  | 0x74             | 0x0A             |

Sensor responds:

| Address | Function Code | Number of byte | Decimal places | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|----------------|----------------|------------------|------------------|
| 0x01    | 0x03          | 0x02           | 0x00 0x03      | 0xF8             | 0x45             |

**Master read Slave ID:**

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x03          | 0x00               | 0x00               | 0x00                  | 0x01                  | 0x84             | 0x0A             |

Sensor responds:

| Address | Function Code | Number of byte | ID        | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|----------------|-----------|------------------|------------------|
| 0x01    | 0x03          | 0x02           | 0x00 0x01 | 0x79             | 0x84             |

**Set slave ID**

E.g., set slave ID=2, Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x06          | 0x00               | 0x00               | 0x00                  | 0x02                  | 0x08             | 0x0B             |

Sensor responds:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | ID        | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------|------------------|------------------|
| 0x01    | 0x06          | 0x00               | 0x00               | 0x00 0x02 | 0x08             | 0x0B             |

**Master read baud rate**

Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x03          | 0x00               | 0x01               | 0x00                  | 0x01                  | 0xD5             | 0xCA             |

Sensor responds:

| Address | Function Code | Number of Points | baud      | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|------------------|-----------|------------------|------------------|
| 0x01    | 0x03          | 0x02             | 0x00 0x01 | 0x79             | 0x84             |

### Set baud rate

E.g., set baud rate to 4800, Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x06          | 0x00               | 0x01               | 0x00                  | 0x02                  | 0x59             | 0xCB             |

Sensor responds:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x06          | 0x00               | 0x01               | 0x00                  | 0x02                  | 0x59             | 0xCB             |

Master read parity:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x03          | 0x00               | 0x0A               | 0x00                  | 0x01                  | 0xA4             | 0x08             |

Sensor responds:

| Address | Function Code | Number of byte | parity    | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|----------------|-----------|------------------|------------------|
| 0x01    | 0x03          | 0x02           | 0x00 0x02 | 0x39             | 0x85             |

### Set parity

E.g., set parity to even, master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01    | 0x06          | 0x00               | 0x0A               | 0x00                  | 0x01                  | 0x68             | 0x08             |

Sensor responds:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | parity    | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------|------------------|------------------|
| 0x01    | 0x06          | 0x00               | 0x0A               | 0x00 0x01 | 0x68             | 0x08             |

**Note: after setup parameter, like ID, baud rate, parity, must write 0 to register 40016 to save settings**

| Register address (Hex) | PLC Address (decimal) | Meaning       | Data type      | Number of bytes | Content                                                             | remark |
|------------------------|-----------------------|---------------|----------------|-----------------|---------------------------------------------------------------------|--------|
| 000F H                 | 40016                 | User function | Unsigned int16 | 2               | 0000H: save settings<br>0055H: zero clearing<br>00AAH: load default | Write  |