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**INTOIOT YN3731B LED Display Ultrasonic Liquid Level Indicator Module** 



# **Product Specifications**

• Product Name: YN3731 LED Display Ultrasonic Liquid Level Indicator Module

• File Version: V25.6.11

• Output Methods: RS485, 4-20mA, DC0-10V, and more

# **Product Usage Instructions**

#### **Product Selection**

The product comes in different models based on the output method:

• YN3731B: RS-485

• YN3731M: 4-20mA

• YN3731V10: DC0-10V

#### **Product Size and Installation**

Refer to the product manual for detailed instructions on wiring and installation.

#### **Communication Protocol**

The product uses the RS-485 MODBUS-RTU standard protocol format. The default device address is 1.

## **Reading Data**

- 1. Send the inquiry frame with Function code 0x03 to read data.
- 2. Example command to read data of device No. 1: 01 03 00 00 00 01 84 0A
- 3. The device will respond with data in hexadecimal format.

#### **Common Data Address Table**

This table provides information on register addresses, data types, and value ranges for configuration.

## **Read and Modify Device Address**

To query the device address if unknown, use the command FA 03 00 66 00 01 71 9E.

## **Technical Parameters**

Technical parameter	Parameter value
range	0~5.0m
accuracy	±5mm
Interface	RS485/4-20mA/DC0-10V
Power	DC6~24V 1A
Power	DC12~24V 1A
Running temperature	-30~80°C
Working humidity	5%RH~90%RH

## **Product Selection**

Product Design RS485, 4 20mA, DC0 10VMultiple output methods, the products are divided into the following models depending on the output method.

Product model	output method
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YN3731B	RS-485
YN3731M	4-20mA
YN3731V10	DC0-10V

## **Product Size**



In the case of broken wires, wire them as shown in the figure. If the product itself has no leads, the core color is for reference.

# **Using Instruction**

Ultrasonic liquid level sensors are mainly used in hydrological monitoring, urban pipe networks, and water level measurement in firewater tanks.



## **Product List**



## **Communication Protocol**

The product uses the RS485 MODBUS-RTU standard protocol format, and all operation or reply commands are in hexadecimal data. When the device leaves the factory, the default device address is 1, and the default baud rate is: for modules and non-recording instruments: 9600, 8, n, 1 (for the recorder series products, the default is: 115200, 8, n, 1).

## Read data (Function code 0x03)

The inquiry frame (in hexadecimal). Example of sending: To query 1 piece of data of device No. 1, the host computer sends the command: 01 03 00 00 00 01 84 0A.

Address	Function code	Starting address	Data length	Checksum
01	03	00 00	00 01	84 0A

For a correct inquiry frame, the device will respond with data: 01 03 02 02 18 B9 2E, and the response format is:

Address	Function code	Length	Data 1	Checksum
01	03	02	02 18	B9 2E

Data description: The data in the command is in hexadecimal. Taking Data 1 as an example, 02 18 converted to decimal value is 536. Assuming the data magnification factor is 100, then the true value is 536/100 = 5.36, and the others can be deduced by analogy.

#### **Common Data Address Table**

Configuration Address	Register Addre	Register Descr	Data Type	Value Range
40001	00 00		Read Only	0~65535
40101	00 64	Model Code	Read-only	0~59999
40102	00 65	Total Number o  f  Measuring Poi  nts	Read-only	1~1600

40103	00 66	Device Addres s	Read/Write	1~249
40104	00 67	Baud Rate	Read/Write	0~6
40105	00 68	Communicatio n Mode	Read/Write	1 Query
40106	00 69	Protocol Type	Read/Write	1 MODBUS-RT U

## Read and modify the device address

## 1. Read or query the device address

 If you don't know the current device address and there is only one device on the bus, you can query the device address through the command FA 03 00 66 00 01 71 9E.

Device addre	Function code	Starting addr	Data length	Checksum
FA	03	00 66	00 01	71 9E

- FA, which is 250, is the universal address. When you don't know the address, you can use 250 to obtain the real device address. 00 66 is the register of the device address.
- For a correct query command, the device will respond. For example, the response data is: 01 03 02 00 01 79 84. The format analysis is shown in the following table:

Device addre	Function code	Starting addr	Address ID	Checksum
01	03	02	00 01	79 84

 In the response data, the first byte 01 represents the real address of the current device.

## 2. Change the device address.

• For example, if the current device address is 1 and you want to change it to 02, the command is: 01 06 00 66 00 02 E8 14.

Device addre	Function code	Register addr	Target addres	Checksum
01	06	00 66	00 02	E8 14

After the change is successful, the device will return the information: 02 06 00 66
 00 02 E8 27. The format analysis is shown in the following table:

Device addre	Function code	Register addr	Target addres	Checksum
02	06	00 66	00 02	E8 27

 In the response data, after the modification is successful, the first byte is the new device address. Generally, after the device address is changed, it takes effect immediately. At this time, users need to modify the query commands in their software accordingly.

# Read and modify the baud rate.

## 1. Read the baud rate

The default factory baud rate of the device is 9600. If you need to change it, you
can perform the change operation according to the following table and the
corresponding communication protocol. For example, to read the baud rate ID of
the current device, the command is: 01 03 00

67 00 01 35 D5. The format analysis is as follows.

Device addre	Function code	Starting addr	Data length	Checksum
01	03	00 67	00 01	35 D5

- Read the baud rate code of the current device. Baud rate codes: 1 for 2400; 2 for 4800; 3 for 9600; 4 for 19200; 5 for 38400; 6 for 115200.
- For a correct query command, the device will respond. For example, the response data is: 01 03 02 00 03 F8 45. The format analysis is shown in the following table:

Device addre	Function code	Data length	Baud rate code	Checksum
01	03	02	00 03	F8 45

 According to the baud rate code, 03 represents 9600, which means the current baud rate of the device is 9600.

## 2. Change the baud rate.

• For example, to change the baud rate from 9600 to 38400, that is, change the code from 3 to 5, the command is: 01 06 00 67 00 05 F8 16.

Device addre	Function code	Register addr	Target baud r	Checksum
01	06	00 67	00 05	F8 16

Change the baud rate from 9600 to 38400, that is, change the code from 3 to 5.
 The new baud rate will take effect immediately. At this time, the device will stop responding, and the query command for the device's baud rate needs to be modified accordingly.

## Read and modify the correction value (valid for some products)

#### 1. Read the correction value

• When there is an error between the data and the reference standard, we can reduce the display error by adjusting the "correction value". The adjustable range of the correction difference is plus or minus 1000, that is, the value range is 0 – 1000 or 64535 – 65535. For example, when the displayed value is 100 less than the actual value, we can correct it by adding 100. The command is: 01 03 00 6B 00 01 F5 D6. In the command, 100 is the hexadecimal value 0x64. If you need to decrease the value, you can set a negative value. For example, – 100 corresponds to the hexadecimal value FF 9C. The calculation method is 100 –

65535 = 65435, and then convert it to hexadecimal, which is 0x FF 9C. The device correction value starts from 00 6B. We take the first parameter as an example for illustration. When there are multiple parameters, the methods for reading and modifying the correction value are the same.

Device addre	Function code	Starting addr	Data length	Checksum
01	03	00 6B	00 01	F5 D6

 For a correct query command, the device will respond. For example, the response data is: 01 03 02 00 64 B9 AF. The format analysis is shown in the following table:

Device addre	Function code	Data length	Correction value	Checksum
01	03	02	00 64	B9 AF

 In the response data, the first byte 01 represents the real address of the current device, and 00 6B is the register for the correction value of the first state variable.
 If the device has multiple parameters, the operation methods for other parameters are the same. Generally, temperature and humidity sensors have this parameter, while light sensors usually do not.

## 2. Change the correction value.

 For example, if the current state variable value is too small and we want to increase its real value by 1, the command to correct the current value by adding 100 is: 01 06 00 6B 00 64 F9 FD.

Device addre	Function code	Register addr	Target addres	Checksum
01	06	00 6B	00 64	F9 FD

 After the operation is successful, the device will return the information: 01 06 00 6B 00 64 F9 FD. After the change is successful, the parameter takes effect immediately. For example, the range is 0~5%RH, the analog output is 4~20mA current signal, humidity and current The calculation relationship is as shown in the formula: C = (A2-A1) \* (X-B1) / (B2-B1) + A1, where A2 is humidity range upper limit, A1 is the lower limit of the range, B2 is current output range upper limit, B1 is the lower limit, X is the currently read humidity value, and C is the calculated current value. The list of commonly used values is as follows:

current(mA)	humidityValue (%RH)	Calculation Process
4	0.0	(5-0)*(4-4)÷(20-4)+0
5	0.3	(5-0)*(5-4)÷(20-4)+0
6	0.6	(5-0)*(6-4)÷(20-4)+0
7	0.9	(5-0)*(7-4)÷(20-4)+0
8	1.3	(5-0)*(8-4)÷(20-4)+0
9	1.6	(5-0)*(9-4)÷(20-4)+0
10	1.9	(5-0)*(10-4)÷(20-4)+0
11	2.2	(5-0)*(11-4)÷(20-4)+0
12	2.5	(5-0)*(12-4)÷(20-4)+0
13	2.8	(5-0)*(13-4)÷(20-4)+0
14	3.1	(5-0)*(14-4)÷(20-4)+0
15	3.4	(5-0)*(15-4)÷(20-4)+0
16	3.8	(5-0)*(16-4)÷(20-4)+0
17	4.1	(5-0)*(17-4)÷(20-4)+0
18	4.4	(5-0)*(18-4)÷(20-4)+0
19	4.7	(5-0)*(19-4)÷(20-4)+0

20	5.0	(5-0)*(20-4)÷(20-4)+0
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- As shown in the above formula, when measuring 8mA, current current is 5.25%RH
- For example, the range is 0~5%RH, the analog output is 0~10V DC0-10Vvoltage signal, humidity and DC0-10Vvoltage The calculation relationship is as shown in the formula: C = (A2-A1) \* (X-B1) / (B2-B1) + A1, where A2 is humidity range upper limit, A1 is the lower limit of the range, B2 is DC0-10Vvoltage output range upper limit, B1 is the lower limit, X is the currently read humidity value, and C is the calculated DC0-10Vvoltage value. The list of commonly used values is as follows:

DC0-10Vvoltage(V)	humidityValue (%RH)	Calculation Process
0	0.0	(5-0)*(0-0)÷(10-0)+0
1	0.5	(5-0)*(1-0)÷(10-0)+0
2	1.0	(5-0)*(2-0)÷(10-0)+0
3	1.5	(5-0)*(3-0)÷(10-0)+0
4	2.0	(5-0)*(4-0)÷(10-0)+0
5	2.5	(5-0)*(5-0)÷(10-0)+0
6	3.0	(5-0)*(6-0)÷(10-0)+0
7	3.5	(5-0)*(7-0)÷(10-0)+0
8	4.0	(5-0)*(8-0)÷(10-0)+0
9	4.5	(5-0)*(9-0)÷(10-0)+0
10	5.0	(5-0)*(10-0)÷(10-0)+0

 As shown in the above formula, when measuring 5V, the current DC0-10V voltage is 2.5%RH

#### **Disclaimer**

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## **Contact Us**

• Company: Shanghai Sonbest Industrial Co., Ltd INTOIOT Brand Division Address: Building 8, No. 215 Northeast Road, Baoshan District, Shanghai, China

Web: <a href="http://www.intoiot.cn">http://www.intoiot.cn</a>

Web: <a href="http://www.intoiot.com">http://www.intoiot.com</a>

• SKYPE: soobuu

• Email: sale@sonbest.com

• Tel: 86-021-51083595 / 66862055 / 66862075 / 66861077

#### **FAQ**

How do I select the appropriate output method for my application?
 Refer to the product model specifications to choose the output method that best suits your requirements.

What is the default device address and baud rate?
 The default device address is 1, and the default baud rate varies based on the product series.

# **Documents / Resources**



## INTOIOT YN3731B LED Display Ultrasonic Liquid Level Indicator Module

[pdf] User Manual

YN3731B, YN3731M, YN3731V10, YN3731B LED Display Ultrasonic Liquid Level Indicator Module, YN3731B, LED Display Ultrasonic Liquid Level Indicator Module, Display Ultrasonic Liquid Level Indicator Module, Ultrasonic Liquid Level Indicator Module, Liquid Level Indicator Module, Level Indicator Module, Indicator Module

## References

- User Manual
- INTOIOT
- ◆ Display Ultrasonic Liquid Level Indicator Module, Indicator Module, INTOIOT, LED Display Ultrasonic Liquid Level Indicator Module, Level Indicator Module, Ultrasonic Liquid Level Indicator Module, YN3731B, YN3731B
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