

User's Manual

Temperature and level transmitter

U-4M-062P-EN1



Preface

- Thank you for purchasing submersible pressure level transmitter.
- This manual is illustrating various functions, wiring methods, setting methods, operation methods, fault handling methods, etc. of the product.
- Please read this manual carefully before operating and using it to avoid unnecessary losses caused by the false operation.
- After reading, please keep it in a place convenient for reading at any time for reference during operation.

Note

- Modification of this manual's contents will not be notified due to function upgrading, etc.
- We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.
- It is strictly prohibited to reprint or copy the contents of this manual.
- This product is forbidden to use in explosion-proof occasions.

Version

U-4M-062P-EN1

Disclaimer

- The company does not make any guarantees for the terms outside the scope of this product warranty.
- This company is not responsible for damage to the instrument or loss of parts or unpredictable damage caused directly or indirectly by improper operation of the user.

Package contents

After opening the box, please confirm the package contents before starting the operation. If you find that the model and quantity are incorrect or there is any physical damage in appearance, please contact u

No.	Item Name	Quantity	Remarks
1	Temperature and level transmitter	1	
3	Manual	1	
4	Certificate	1	

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Chapter 1 Overview

The temperature and level transmitter is applied to fluid depth measurement at industrial areas, transfers measured depth value to standard signal such as (4~20)mA/ (0 ~ 5)V/ RS485. It matches various instruments, and is widely used in transportation,oil,chemical, metallurgical, light industry and other fields.

Chapter 2 Specifications

Range	Temperature : (0~50) °C Level: (0~100) m
Accuracy	Temperature :1.5% Level:0.5%
Stability	±0.25%FS/Year
Zero temperature drift	±0.05%FS/°C
Sensitivity temperature drift	±0.05%FS/°C
Compensation temperature	(0~50) °C
Medium temperature	(-20~65) °C
Supply	(12~30) VDC
Output	RS485
Load resistance	Current mode: $\leq (U-12)/0.02(\Omega)$
Ingress Protection	IP68

Chapter 3 Dimension and Structure

Integrated measurement of liquid level/temperature, removable protective cap, welded structure, RS485 output.

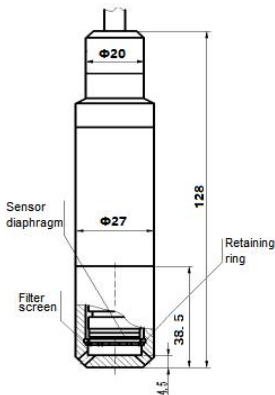


Figure 1

Chapter 4 Wiring

4.1 Electrical connection

- Red:Vcc+
- Green:Vcc-
- Yellow:TX(A)
- Blue:RX(B)
- Black:Shield Wire

4.2 Wiring diagram

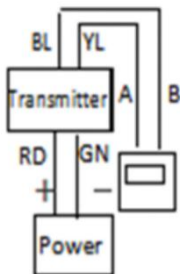


Figure 2 RS485 output

Chapter 5 Notes

- Read wiring diagram carefully before installation.
- Turn off the power and the valve of the tested medium during installing and disassembling, the pressure is reduced to atmosphere pressure to avoid accidents caused by medium ejection.
- Make sure the transmitter is firmly connected and properly grounded during installing, avoid vibration and strong EMI environment. Ensure the good grounding in outdoor installation, and lightning protection measures should be taken to prevent lightning from damaging the products.
- For the accuracy of measurement, the fluidity of the medium should be ensured.
- It prohibited to insert hard objects into the pressure hole to prevent damaging the sensor diaphragm.
- Prevent the cable damages so that fluid could not enter transmitter cavity through the damages and signal wire joint, which will damage the product.
- Explosion-proof products should be used in the working conditions requiring explosion protection.
- Avoid serious personal injury and heavy property loss caused by incorrect operation and selection.

Chapter 6 Warranty & After-sales Service

We promise to the customer that the hardware accessories provided during the supply of the instrument have no defects in material and manufacturing process.

From the date of the purchase, if the user's notice of such defects is received during the warranty period, the company will unconditionally maintain or replace the defective products without charge, and all non customized products are guaranteed to be returned and replaced within 7 days.

Disclaimers:

During the warranty period, product faults caused by the following reasons are not in the scope of Three Guarantees service

- Product faults caused by improper use by customers.
- Product faults caused by disassembling, repairing and refitting the product.

After-sales service commitment:

- We promise to deal with the customer's technical questions within 2 hours.
- For the instruments returned to the factory for maintenance, we promise to issue the test results within 3 working days and the maintenance results within 7 working days after receiving them.

Chapter 7 Communication Protocol

7.1 Overview

This protocol complies with the MODBUS communication protocol and adopts the RTU mode and RS485 half-duplex mode in the MODBUS protocol; Currently, the device supports the MODBUS-RTU function code 03 and 06.

7.2 Wiring diagram

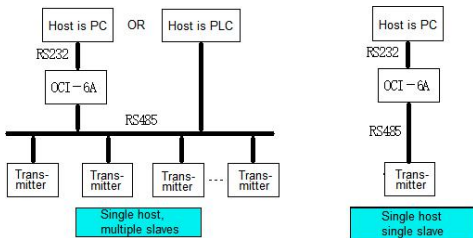


Figure 3

7.3 Data frame structure:

- Frame header: Starting byte, slave address.
- End of frame: Check data (XOR check).
- Parameter data: Function code operation command/response, function code number, function code setting/actual value.
- Process data: Host control command/ slave state response, master setting of host operation/actual value of slave operation.

7.4 Format:

- Serial port settings: 8-bit data, 1-bit stop.
- Example: 9600,N,8,1
- Meaning : 9600bps, No check, 8-bit data, 1-bit stop, serial port baud rate supported by this transmitter: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- The polynomial of CRC check : 0xA001.

7.5 Communication format

- Examples of reading command format
A. Send the reading command format:

Address	Function code	Data starting (H)	Data starting (L)	Data number (H)	Data number (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

B. Return the read data format: Example

Address	Function code	Byte number	Data (H)	Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X02	0X00	0X01	0X79	0X84

● Write command format (06 Function Code) example

Address	Function code	Data starting (H)	Data starting (L)	Data (H)	Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

B. Return the read data format: Example

Address	Function code	Data starting (H)	Data starting (L)	Data (H)	Data (L)	CRC16 (L)	CRC16 (H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

7.6 Supported commands and meanings of the commands and data:

Function Code	Data starting address	Data type	Data byte	Data range	Directive significance
0x03 Function code read data					
0X03	0X0300	Unsigned int	2	1~247	Address
0X03	0X0301	Unsigned long int	4	1200	Baud rate
				2400	
				4800	
				9600	
	0X0302			19200	
				38400	
				57600	

				115200	
0X03	0X0303	Unsigned int	2	0-None	Check bit
				1-ODD	
				2-EVEN	
0X03	0X0304	Unsigned int	2	0~7	Pressured decimal point
0X03	0X0305	Unsigned int	2	0~7	Emperature decimal point
0X03	0X0306	Float	4	0.5~1.5	Pressure gain coefficient
	0X0307				
0X03	0X0308	Float	4		Pressure base value
	0X0309				

0X03	0X030A	Float	4		Temperature base value
	0X030B				
0X03	0X030C	Unsigned int	2	0001-kPa	Pressure unit
				0002-MPa	
				0003-mmH2O	
				0004-mH2O	
				0005-mmOIL	
				0006-mOIL	
				0007-Bar	
				0008-psi	

				0009-atm	
0X03	0X030D	Unsigned int	2	0080-℃	Temperature unit
				0081-℉	
0X03	0X0404	Float	4		Pressure output value
	0X0405				
0X03	0X0408	Float	4		Temperature output value
	0X0409				
0x06 Function code read data					
0X06	0X0300	Unsigned int	2	1~247	Address
0X06	0X0301	Unsigned long int	4	1200	Baud rate
				2400	
				4800	

	0X0302			9600	
				19200	
				38400	
				57600	
				115200	
0X06	0X0303	Unsigned int	2	0-None	Check bit
				1-ODD	
				2-EVEN	
0X06	0X0304	Unsigned int	2	0~7	Pressured decimal point
0X06	0X0305	Unsigned int	2	0~7	Emperature decimal point
0X06	0X0306	Float	4	0.5~1.5	Pressure gain coefficien
	0X0307				

0X06	0X0308	Float	4		Pressure base value
	0X0309				
0X06	0X030A	Float	4		Temperature base value
	0X030B				
0X06	0X030C	Unsigned int	2	0001-kPa	Pressure unit
				0002-MPa	
				0003-mmH ₂ O	
				0004-mH ₂ O	
				0005-mmOIL	
				0006-mOIL	
				0007-Bar	
				0008-psi	

				0009-atm	
0X06	0X0501	Unsigned int	2	0001-Save to user data area	Save operation
				0004-Restore factory settings	
				0007-Pressure reset	

Description:

- If the device receives a function code other than 03H, 06H, or 10H, the abnormal response code 01H will be returned.
- In order to protect the important parameters of the device from being damaged, some registers only support users' reading operation (03H function code). If these registers are written (06H, 10H function code), the abnormal response code 02H will be returned.
- The operation data section only supports writing operations (06H, 10H function code). If these registers are read (03H power code), the abnormal response code 02H will be returned.
- Read/write operations on addresses beyond the range of the offset address allocation table will return the abnormal response code 02H.
- In order to prevent some registers from writing illegal parameters, when the registers in the user data area are written (06H, 10H function code), the device will verify the

data. If the wrong data is written, the abnormal response code 04H will be returned, and the data in the register will not be changed.