



Digital inductive conductivity sensor

DDG-GY Series User Manual



SHANGHAI BOQU INSTRUMENT CO.,LTD

No. 118 Xiuyan Road,Pudong New Area,Shanghai,zip code:201315,China

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1. Introduction

This product is the latest digital inductive conductivity sensor independently researched, developed, and produced by our company. The sensor is light in weight, easy to install, and has high measurement accuracy, responsiveness, and can work stably for a long time. Built-in temperature probe, instant temperature compensation. Strong anti-interference ability, the longest output cable can reach 500 meters. It can be set and calibrated remotely, and the operation is simple. It can be widely used in monitoring the conductivity of solutions such as thermal power, chemical fertilizers, metallurgy, environmental protection, pharmaceuticals, biochemistry, food, and tap water.

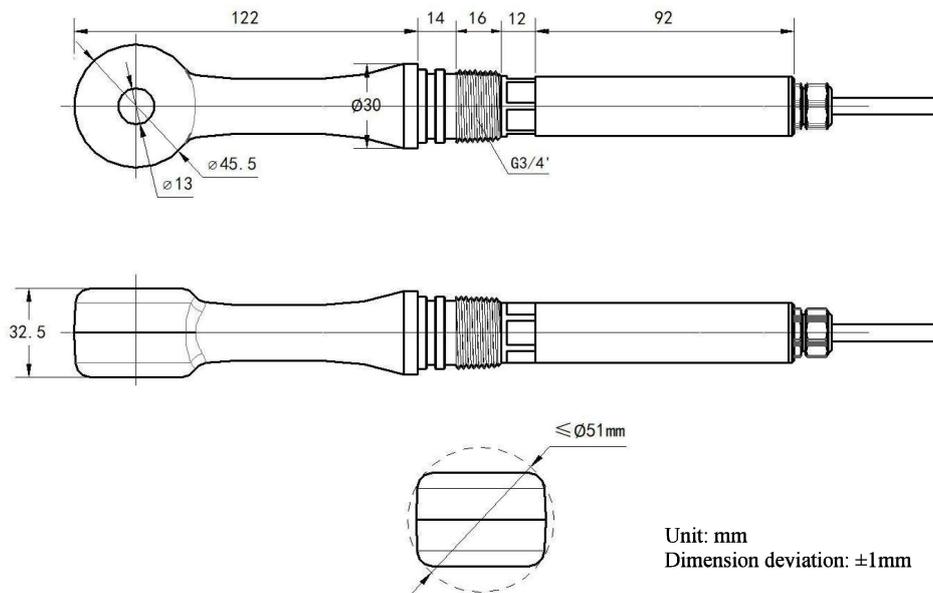


Figure 1 Sensor Drawing

* Units not specified in this manual are assumed to be mm

★ **notice:** If the contents of this manual differ from the actual situation due to functional upgrades and modifications, please contact us promptly to obtain the latest version.

2. Technical Parameters

Product Name	Digital inductive conductivity sensor	
Shell material	PEEK	PFA
Work Temperature	-20°C ~ 180°C	-20°C ~ 120°C
Working pressure	Max 21bar (2.1MPa)	Max 16bar (1.6MPa)
Waterproof Level	IP65	
Connector	G3/4" thread; cable: Overall cable connection	
Temperature compensation	Integrated Pt1000	
Measurement range	0.5mS/cm ~ 2000mS/cm -20°C ~ 80°C	
Accuracy	±2% of reading or ±1 mS/cm, whichever is greater; ±0.5°C	
Resolution	0.01mS/cm 0.01°C	
Power	12 VDC ~30VDC	
Protocol	-20°C ~ 50°C	
Output	RS485 Modbus RTU	

3. Special Statement on Safety Precautions

This manual includes safety information with the following designations and formats.

3.1 Definition of symbols and designations

Definition of equipment and documentation symbols and designations

 **WARNING:** POTENTIAL FOR PERSONAL INJURY.

 **CAUTION:** Possible instrument damage or malfunction.

 **Important operating information.**

 **WARNINGS:**

- It is forbidden to separate the shell of the instrument, only allow the company to appoint professional service personnel to repair the instrument!
- Do not work in an explosive environment! Because the instrument case is not airtight (May cause an explosion hazard due to corrosion caused by spark formation or immersion in gas).
- When using chemicals and solvents, follow the operator's operating instructions and laboratory safety procedures!
- The instrument should be installed and operated only by personnel familiar with the instrument and who are qualified for such work.
- The instrument must only be operated under the specified operating conditions (see “Technical Specifications”).
- Repair of the instrument must be performed by authorized, trained personnel only.
- With the exception of routine maintenance, cleaning procedures, as described in this manual, the instrument must not be tampered with or altered in any

manner.

- Our company accepts no responsibility for damage caused by unauthorized modifications to the instrument.
- Follow all warnings, cautions, and instructions indicated on and supplied with this product.
- Install instrument as specified in this instruction manual. Follow appropriate local and national codes.
- If this instrument is used in a manner not specified by the manufacturer, the protection provided by it against hazards may be void.



Please avoid the following environmental factors:

- Violent shaking
- Under sunshine for long time
- The presence of corrosive gases
- Strong electric field or magnetic field

3.2 Correct disposal of the unit

When the meter is finally removed from service, observe all local environmental regulations for proper disposal.

4. Interface and Operation

4.1 User Interface

The sensor is connected to the computer using RS485 to USB, and then use Modbus Poll to connect.

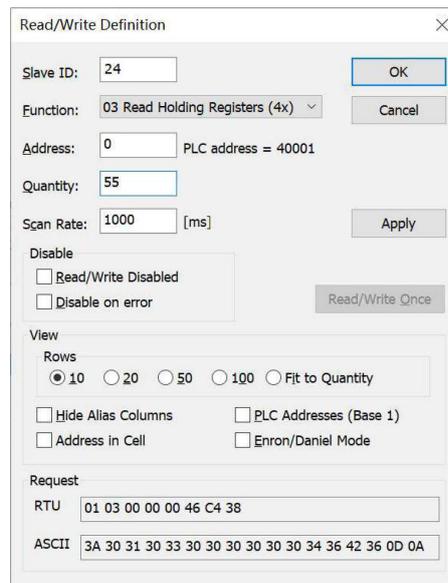
Note: Modbus Poll software is a general software that can be downloaded online. Next, we take Modbus Poll 9.2.2 version as an example.

4.2 Parameter Setting

1. Click “Setup” on the menu bar, select “Read / Write Definition” and then set the parameters (The slave address for the first time is the default address **24**), then enter “**55**” for Quantity in the dialog box, click “OK”.

★ Note:

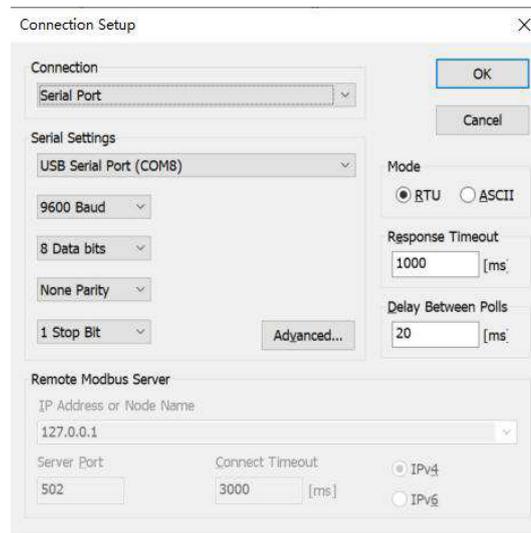
After the slave address is changed, the new address will be used for communication and the slave address for the next time connection is also the most recently changed address



The screenshot shows the 'Read/Write Definition' dialog box with the following settings:

- Slave ID: 24
- Function: 03 Read Holding Registers (4x)
- Address: 0 (PLC address = 40001)
- Quantity: 55
- Scan Rate: 1000 [ms]
- Disable: Read/Write Disabled, Disable on error
- View: Rows (radio buttons for 10, 20, 50, 100, Fit to Quantity; 10 is selected), Hide Alias Columns, PLC Addresses (Base 1), Address in Cell, Enron/Daniel Mode
- Request: RTU (01 03 00 00 00 46 C4 38), ASCII (3A 30 31 30 33 30 30 30 30 30 34 36 42 36 0D 0A)

2. Click " Connection" on the menu bar, select the first line in the drop-down menu "Connection setup" (The baud rate for the first time is the default **9600** and click "OK".



☆ Note: Port is set according to the Port number of the connection. If the sensor has been connected as described, and "Timeout Error" appears on the software "Display status", it means that the connection is failed; remove and replace the USB port or check the USB to RS485 converter, repeat the above procedure until the sensor connection is successful.

5. Modbus RTU Protocol

Communication parameters:

Baudrate:4800, 9600, 19200 (9600default)

Serial data format: 8N1 (8 data bits, no parity, 1 stop bit)

Function code: 03/06/10

Device Address: 1~247 ((default 24)

Data Format: Unsigned、Signed、Float ABCD/Big-endian (Unsigned default)

Register definition:

Addr.	Meaning	Range	Default	Magnification	R/W	Cmd	Remarks
4	Calibration result				R		=1: CC out of range =2: Input command error =3: The known concentration calibration standard value is out of range. =4: Temperature out of range =5: Installation factor out of range =8: Calibration success
5	Temperature status	0-2			R		=0: normal; =1: too high/low; =2: no sensor
8	Instrument address	1-247	24		R/W		Device ID
9	Baud rate	4800-19200	9600	1BPS	R/W		Only: 4800,9600,19200
10	Parameter recovery		0		W	1996	Reset to default
11	Reset the instrument	1524	0		W	1524	New start instrument
13	Calibration command	2、201、202、203、204、205	0		W		2: Standard solution calibration 201: The first point calibration of Five Points calibration 202: The second point calibration of Five Points calibration 203: The third point calibration of Five Points calibration

							204: The fourth point calibration of Five Points calibration 205: The fifth point calibration of Five Points calibration
14	Standard solution	1、2	2		R/W		1: 1413uS/cm 2: 12.88mS/cm
16	Temperature compensation coefficient	0-100	20	0.1%	R/W		Temperature compensation coefficient
18	Reference temperature	25、20	25		R/W		25°C / 20°C
21	Temperature offset adjustment	-50-50	0	0.1°C	R/W		Signed; Changing the temperature reference value
22	Measurement offset adjustment	-32000-32000 0	0	1uS/cm	R/W		Signed; Changing the conductivity reference value
24	Manual temperature	-400-2000	250	0.1°C	R/W		Signed; Default temperature value when the temperature resistor is not connected or exceeds the limit
25	Data format	0、1、2、3	1		R/W		0:8N2 1:8N1 2:8E1 3:8O1
26-27	Installation factor	>=0.001	1	1	R/W		Float ABCD
28-29	Known concentration solution	500-2000000	0	1uS/cm	R/W		Float ABCD
31	Filter Depth	0-100	5		R/W		The number of filter arrays. The larger the value, the deeper the filter.
41-42	Conductivity	0-2000		1mS/cm	R		Float ABCD
43-44	Resistivity	0-20000000		1Ω·cm	R		Float ABCD
45-46	Uncompensated conductivity	0-2000		1mS/cm	R		Float ABCD
47-48	Salinity	0-280		1ppt	R		Float ABCD
49-50	TDS	0-2000000		1mg/L	R		Float ABCD
51-52	Temperature	-40-200		1°C	R		Float ABCD

Communication Format Details:

- 16-bit data read instruction, taking the baud rate value as an example:

The command sending data format is as follows (only default address 24):

Send command: Address + function code + register start address + number

of registers read + CRC check code (hexadecimal)

TX: 18 03 00 09 00 01 56 01

Address	Function code	Register start address	Read the number of registers	CRC check code
18	03	0009	0001	5601

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 25 80 38 98

Address	Function code	Data length	baud rate value	CRC check code
18	03	02	2580	3898

Convert the hexadecimal number 2580 of the data bit to decimal and find that the current baud rate value is 9600.

- 32-bit float data reading instructions, taking conductivity value as an example:

The command sending data format is as follows (only default address 24):

Send command: Address + function code + register start address + number of registers read + CRC check code (hexadecimal)

TX: 18 03 00 29 00 02 17 CA

Address	Function code	Register start address	Read the number of registers	CRC check code
18	03	0029	0002	17CA

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 04 40 0E B8 52 F5 0C

Address	Function code	Data length	Conductivity value	CRC check code
18	03	04	400EB852	F50C

Convert the hexadecimal number 400EB852 to decimal 2.23, The conductivity value is 2.23 mS/cm.

6. Calibration

☆ Notice:

- All calibration procedures must be performed by trained personnel. Incorrectly set parameters may go unnoticed, but change the measuring properties.
- The sensor probe needs to be completely immersed in the solution, and the distance D from the sensor inner hole to the inner wall of the container and the water surface must not be less than 40mm (as shown figure 2), otherwise it may affect the measurement results.
- Since the conductivity value of the solution varies greatly with temperature, the solution temperature range must be between 0°C and 40°C during calibration to ensure that the solution calibration conditions meet the range.

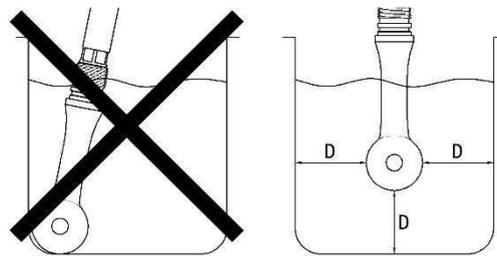


Figure 2 Sensor placement

There are two calibration modes: standard solution calibration, Five points calibration.

6.1 Standard Solution Calibration

- ☆ **Calibration step 1**: First, select a solution of standard concentration, place the sensor in the selected standard solution, and write the command

corresponding to the standard solution in **register 14** (if the reagent value is **1.413mS/cm**, enter **1**; if the reagent value is **12.88mS/cm**, enter **2**).

we will take the instrument default address **24** and the standard solution reagent **12.88mS/cm** (the standard solution instruction value is **2**) as an example.

➤ Standard solution calibration communication format details:

Send command: Address + Func. + register address + Write value + CRC
check code (Hex)

TX: 18 06 00 0E 00 02 6B C1

Address	Function code	Register address	Write value	CRC
18	06	000E	0002	6BC1

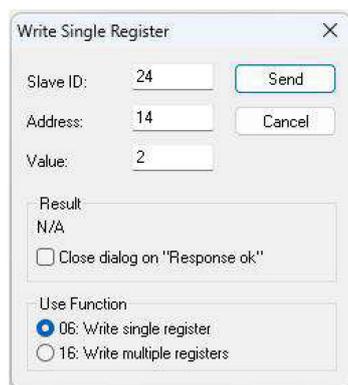
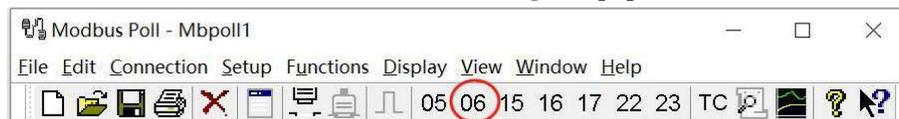
Receive command: address + function code + register address + value +
CRC check code(hexadecimal)

Rx: 18 06 00 0E 00 02 6B C1

Address	Function code	Register address	Value	CRC
18	06	000E	0002	6BC1

➤ **MODBUS POLL** Calibration Operation

double-click the "06" in toolbar, and a dialog box pops out.



In the dialog box, enter the standard solution register address "14", value "2", and click "Send".

- ★ **Calibration step 2:** Wait for about **10** seconds until the conductivity value in register **41** is basically stable, then write command **2** (the standard solution calibration command is **2**) into register **13** to complete the conductivity calibration.

We will take the instrument default address **24** and the standard solution reagent **12.88mS/cm** (the standard solution instruction value is **2**) as an example.

- Standard solution calibration communication format details:

Send command: Address + Func. + register address + Write value + CRC check code (Hex)

TX: 18 06 00 0D 00 02 9B C1

Address	Function code	Register address	Write value	CRC
18	06	000D	0002	9BC1

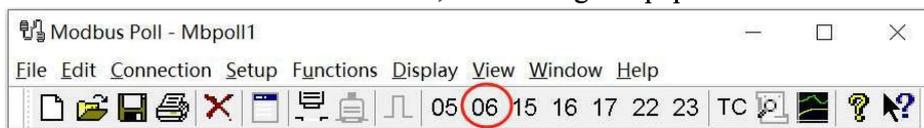
Receive command: address + function code + register address + value + CRC check code(hexadecimal)

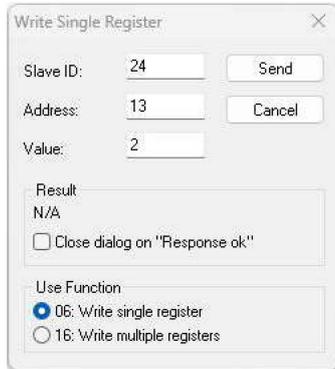
RX: 18 06 00 0D 00 02 9B C1

Address	Function code	Register address	Value	CRC
18	06	000D	0002	9BC1

- **MODBUS POLL Calibration Operation**

Double-click the "06" in toolbar, and a dialog box pops out.





In the dialog box, enter the calibration command register address "13", value "2", and click "Send".

6.2 Five Points Calibration

★ Notice:

- 1) Perform low concentration calibration first, then high concentration calibration. For example, perform the first point calibration first, then perform the second point calibration after completion, then perform the third point calibration after the second point calibration is completed, and so on, to complete the five-point calibration.
- 2) The concentration of the calibration solution is from low to high, and the instructions are also calibrated in sequence, starting from 201, 202, 203....205.
- 3) When selecting five-point calibration, you do not need to calibrate all five points, but at least two or more points must be calibrated. The calibration instructions are as follows:

Two-point calibration: 201, 202 instruction calibration

Three-point calibration: 201, 202, 203 instruction calibration

Four-point calibration: 201, 202, 203, 204 instruction calibration

Five-point calibration: 201, 202, 203, 204 instruction calibration

6.2.1 First Point Calibration

- 1) Select the first calibration solution with known concentration, place the sensor in the first calibration solution according to the placement requirements, and write the actual concentration value in registers **28**、**29**

(unit: 1uS/cm).

- 2) After the measured value stabilizes, enter the calibration command **201** in register **13**.
- 3) After the calibration is completed, register **4** returns the calibration result. When the return value is **8**, it means that the first point calibration is successful. When the return value is other values, it means that the calibration fails. For specific calibration results, see **6.3**.

6.2.2 Second Point Calibration

After completing the First Point Calibration in **6.2.1** and the calibration is successful, start the Second Point Calibration. The specific steps are as follows:

- 1) Select the second calibration solution with known concentration, place the sensor in the second calibration solution according to the placement requirements, and write the actual concentration value in registers **28**、**29** (unit: 1uS/cm).
- 2) After the measured value stabilizes, enter the calibration command **202** in register **13**.
- 3) After the calibration is completed, register **4** returns the calibration result. When the return value is **8**, it means that the second point calibration is successful. When the return value is other values, it means that the calibration fails. For specific calibration results, see **6.3**.

6.2.3 Third Point Calibration

After completing the Second Point Calibration in **6.2.2** and the calibration is successful, start the Third Point Calibration. The specific steps are as follows:

- 1) Select the third calibration solution with known concentration, place the sensor in the third calibration solution according to the placement requirements, and write the actual concentration value in registers **28**、**29** (unit: 1uS/cm).
- 2) After the measured value stabilizes, enter the calibration command **203** in register **13**.
- 3) After the calibration is completed, register **4** returns the calibration result.

When the return value is **8**, it means that the third point calibration is successful. When the return value is other values, it means that the calibration fails. For specific calibration results, see **6.3**.

6.2.4 Fourth Point Calibration

After completing the Third Point Calibration in **6.2.3** and the calibration is successful, start the Fourth Point Calibration. The specific steps are as follows:

- 1) Select the fourth calibration solution with known concentration, place the sensor in the fourth calibration solution according to the placement requirements, and write the actual concentration value in registers **28**、**29** (unit: 1uS/cm).
- 2) After the measured value stabilizes, enter the calibration command **204** in register **13**.
- 3) After the calibration is completed, register **4** returns the calibration result. When the return value is **8**, it means that the fourth point calibration is successful. When the return value is other values, it means that the calibration fails. For specific calibration results, see **6.3**.

6.2.5 Fifth Point Calibration

After completing the Fourth Point Calibration in **6.2.4** and the calibration is successful, start the Fifth Point Calibration. The specific steps are as follows:

- 1) Select the fifth calibration solution with known concentration, place the sensor in the fifth calibration solution according to the placement requirements, and write the actual concentration value in registers **28**、**29** (unit: 1uS/cm).
- 2) After the measured value stabilizes, enter the calibration command **205** in register **13**.
- 3) After the calibration is completed, register **4** returns the calibration result. When the return value is **8**, it means that the fifth point calibration is successful. When the return value is other values, it means that the calibration fails. For specific calibration results, see **6.3**.

For the introduction of the communication format, sending instructions, and receiving instructions of Five Points Calibration, please refer to 6.1. no more description here. Next, the **MODBUS POLL** interface operation of the first point and second point calibration is introduced in detail. The third point, fourth point and fifth point calibration methods are similar and will not be repeated.

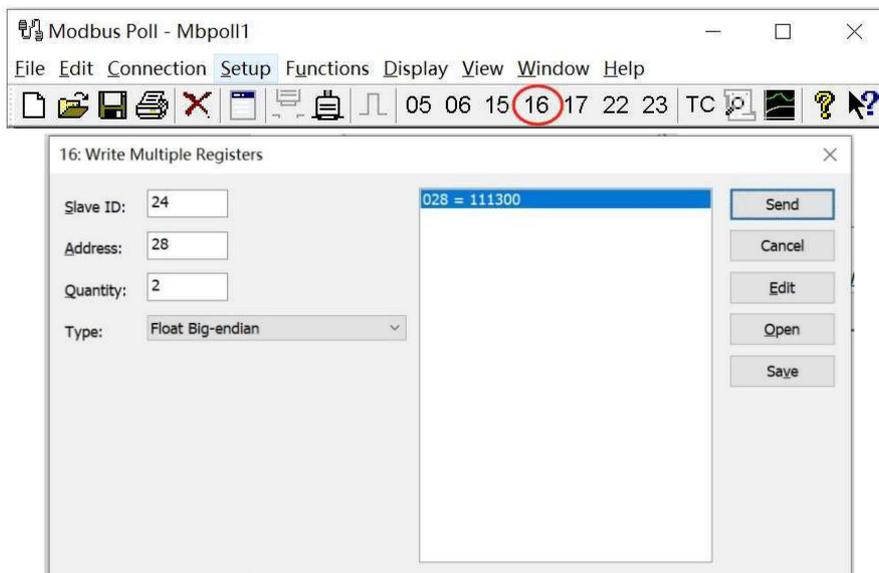
➤ We will take the instrument default address **24** and the first calibration solution reagent **111.3mS/cm**, second calibration solution reagent is **228.5** mS/cm as an example.

★ Note: Since the unit of the known concentration calibration solution registers is **uS/cm**, the value of the first point calibration solution reagent **111.3mS/cm** is **111300**, and the value of the second point calibration solution reagent **228.5** mS/cm is **228500**.

Modbus Poll Calibration Operation:

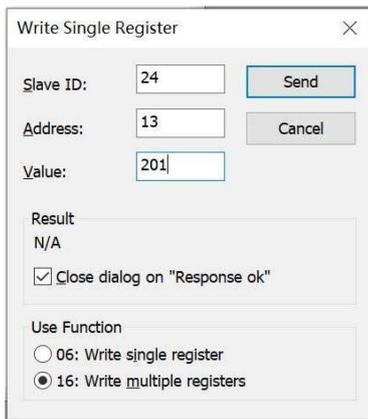
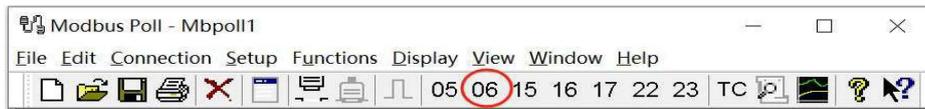
1) First Point Calibration

Place the sensor in the first calibration solution according to the placement requirements, double-click "16" in the toolbar, and a dialog box will pop up as shown:



In the dialog box, enter the known concentration solution register address "28" in the Address field on the left, enter "2" in the Quantity field, select "Float Big-endian" as the data type, click Edit on the right to enter the concentration value "111300", and then click " Send".

After the measured value stabilizes, input the calibration command 201. Double-click "06" in the toolbar and a dialog box will pop up as shown:

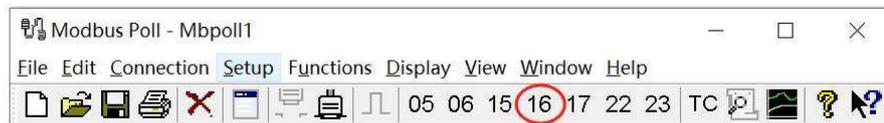


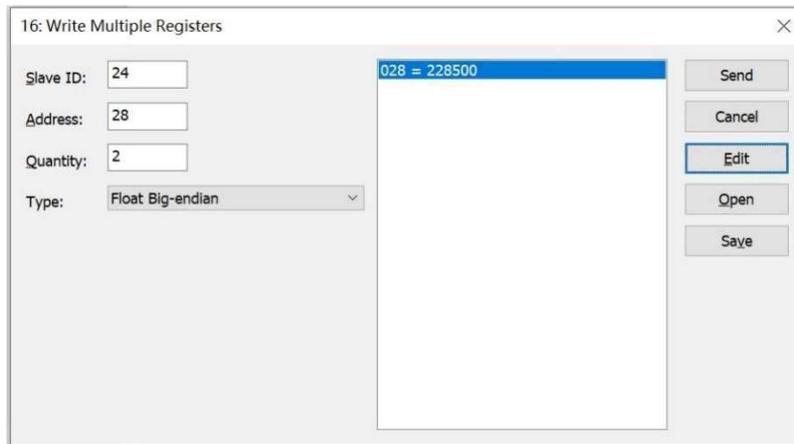
In the dialog box, enter the calibration command register address "13", value "201", and click "Send".

When the value of address 4 is 8, it indicates that the first point calibration is successful, and the second point calibration can be performed.

2) Second Point Calibration

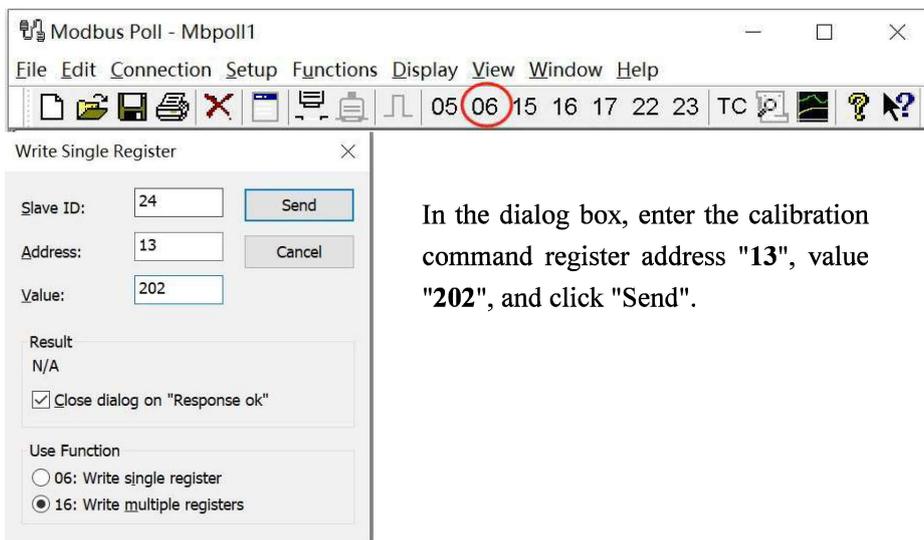
Place the sensor in the second calibration solution according to the placement requirements, double-click "16" in the toolbar, and a dialog box will pop up as shown:





In the dialog box, enter the known concentration solution register address "28" in the Address field on the left, enter "2" in the Quantity field, select "Float Big-endian" as the data type, click Edit on the right to enter the concentration value "228500", and then click " Send".

After the measured value stabilizes, input the calibration command 202. Double-click "06" in the toolbar and a dialog box will pop up as shown:



In the dialog box, enter the calibration command register address "13", value "202", and click "Send".

When the calibration status register 4 value returns 8, it means the calibration is successful, otherwise the calibration fails. For details, see 6.3 Calibration Result

Analysis.

6.3 Analysis of calibration results

After the sensor calibration is completed, register address 4 returns the calibration status value. When the calibration status value is 8, it means the calibration is successful, and when it is other values, it means the calibration fails. The specific analysis is as follows:

Calibration status	Meaning
1	Cell constant CC out of range
2	Calibration command input error
3	The known concentration calibration solution is out of range
4	Temperature out of range
5	Installation factor out of range
8	Calibration successful

- If the calibration status value is 1, the cell constant CC is out of range.

The command format is as follows (default address 24):

Send command: Address + Func. + register start address + number of registers read + CRC check code (Hex)

TX: 18 03 00 04 00 01 C7 C2

Address	Func.	Register start address	Number of registers read	CRC
18	03	0004	0001	C7C2

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 00 01 64 46

Address	Func.	Data length	Data	CRC
18	03	02	0001	6446

The hexadecimal value is 0x01 (decimal 1), indicating that the cell constant CC is

out of range.

- If the calibration status value is **2**, calibration command input error.

The command format is as follows (default address 24):

Send command: Address + Func. + register start address + number of registers read + CRC check code (Hex)

TX: 18 03 00 04 00 01 C7 C2

Address	Func.	Register start address	Number of registers read	CRC
18	03	0004	0001	C7C2

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 00 02 24 47

Address	Func.	Data length	Data	CRC
18	03	02	0002	2447

The hexadecimal value of the register is 0x02 (decimal 2), indicating that the input calibration command is wrong.

- If the calibration status value is **3**, the known concentration calibration input concentration value is out of range.

The command format is as follows (default address 24):

Send command: Address + Func. + register start address + number of registers read + CRC check code (Hex)

TX: 18 03 00 04 00 01 C7 C2

Address	Func.	Register start address	Number of registers read	CRC
18	03	0004	0001	C7C2

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 00 03 E5 87

Address	Func.	Data length	Data	CRC
18	03	02	0003	E587

The hexadecimal value of the register read is 0x03 (decimal 3), indicating that the

known concentration calibration input concentration value is out of range.

- If the calibration status value is **4**, the temperature out of range.

The command format is as follows (default address 24):

Send command: Address + Func. + register start address + number of registers read + CRC check code (Hex)

TX: 18 03 00 04 00 01 C7 C2

Address	Func.	Register start address	Number of registers read	CRC
18	03	0004	0001	C7C2

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 00 04 A4 45

Address	Func.	Data length	Data	CRC
18	03	02	0004	A445

The hexadecimal value read from the register is 0x**04** (decimal **4**), indicating that the temperature is out of range.

- If the calibration status value is **5**, the Installation factor out of range.

The command format is as follows (default address 24):

Send command: Address + Func. + register start address + number of registers read + CRC check code (Hex)

TX: 18 03 00 04 00 01 C7 C2

Address	Func.	Register start address	Number of registers read	CRC
18	03	0004	0001	C7C2

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 00 05 65 85

Address	Func.	Data length	Data	CRC
18	03	02	0005	6586

The hexadecimal value read from the register is 0x**05** (decimal **5**), indicating that the Installation factor out of range.

- If the calibration status value is **8**, the calibration is successful.

The command format is as follows (default address 24):

Send command: Address + Func. + register start address + number of registers read + CRC check code (Hex)

TX: 18 03 00 04 00 01 C7 C2

Address	Func.	Register start address	Number of registers read	CRC
18	03	0004	0001	C7C2

Receive command: Address + function code + data length + data + CRC check code (hexadecimal)

RX: 18 03 02 00 08 A4 40

Address	Func.	Data length	Data	CRC
18	03	02	0008	A440

The hexadecimal value of the register is 0x08 (decimal 8), indicating that the calibration is successful.

7. Installation and wiring

7.1 Wiring diagram

V+	V-	A	B
12V~30V positive pole	12V~30V negative pole	RS485_A	RS485_B

The quick wiring diagram is as follows:

When the matching instrument is SJG-2083CS digital instrument, the wiring diagram is as follows

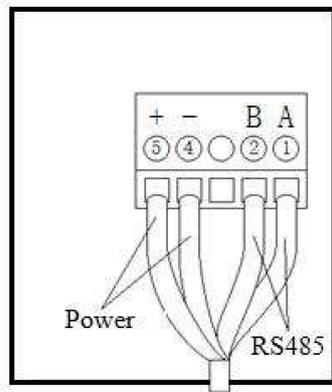


Figure 3 quick wiring

7.2 Sensor Installation

7.2.1 Flange installation

Liquid contact flange: Flange installation is used with flanges. Flanges are used for permanent installation in pipelines and tanks. In pipelines or storage tank systems using DN65 or 2 inches and larger process piping, flanges are used with inductive conductivity sensors. The flanges are equipped with locknut and are sealed with sensors through O-rings and gaskets.

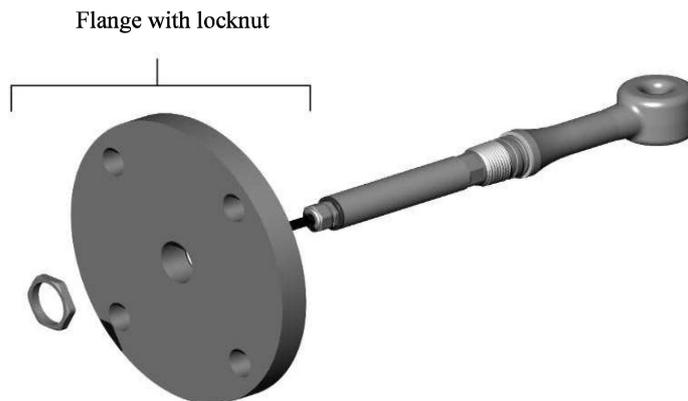


Figure 4 Flange installation (Liquid contact flange)

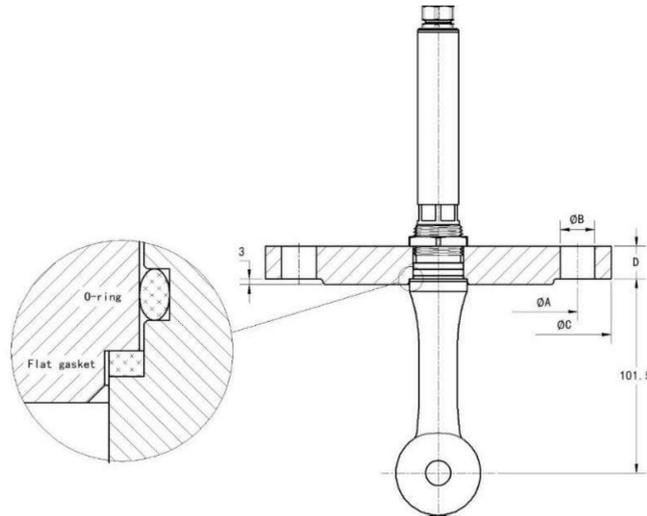


Figure 5 optional flange installation dimensions (unit: mm) (Liquid contact flange)

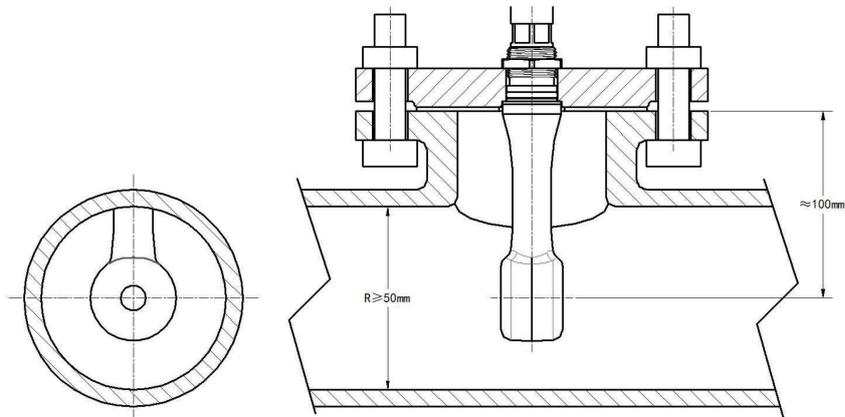


Figure 6 Flange pipeline installation diagram (Liquid contact flange)

- ★ Note: If flange installation is used on the pipeline, the sensor hole must be parallel to the pipeline flow direction, as shown in the flange pipeline installation diagram above, and the pipeline must be filled with liquid, otherwise the sensor cannot measure normally.

Non-liquid contact flange: Flange type installation matching flange and loose flange are used. In the hot melt pipe or storage tank system using $\phi 110$ and above

process, the loose flange is used in conjunction with the inductive conductivity sensor. The flange is equipped with a locking nut and a sealing effect is achieved with the sensor through an O-ring and a gasket.

Flanges, loose flanges and lock nuts

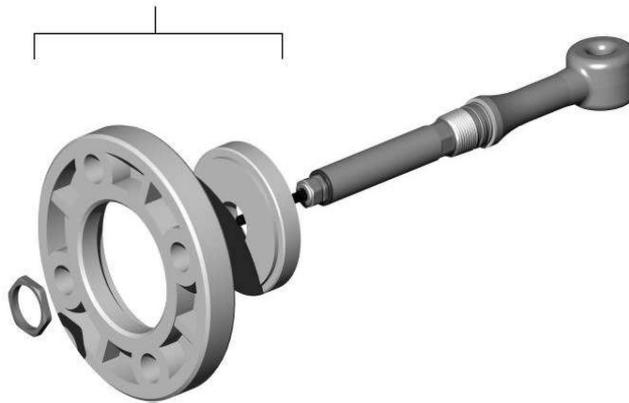


Figure 7 Schematic diagram of flange-type mounting accessories (non-liquid contact flange)

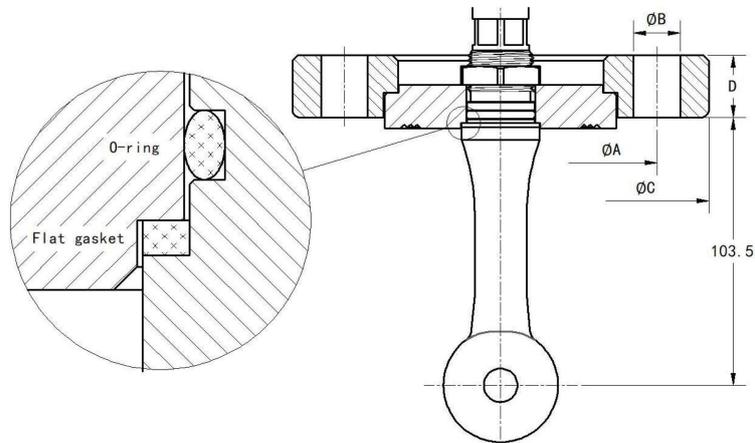


Figure 8 Flange installation dimensions (non-liquid contact flange)

★ Note: If flange installation is used on the pipeline, the sensor hole must be parallel to the pipeline flow direction, as shown in the flange pipeline installation

diagram above, and the pipeline must be filled with liquid, otherwise the sensor cannot measure normally.

Optional flange size table

Installation method	Model	A	B	C	D	Material	Material Number
Fluid contact flange	DN75	165	8x18	210	18	316L	5740100036
Non-Fluid contact flange	Φ75	165	8x18	210	24	PP-R	5740100037

7.2.2 Bushing installation

The Bushing installation is used with bushings. The bushing is used for installations in pipelines and tanks and are provided complete with locknut. In pipes or storage tank systems using G2" and above thread technology, the bushing is used in conjunction with the inductive conductivity sensor. The bushing is equipped with a locking nut and is sealed with the sensor through an O-ring and a gasket.

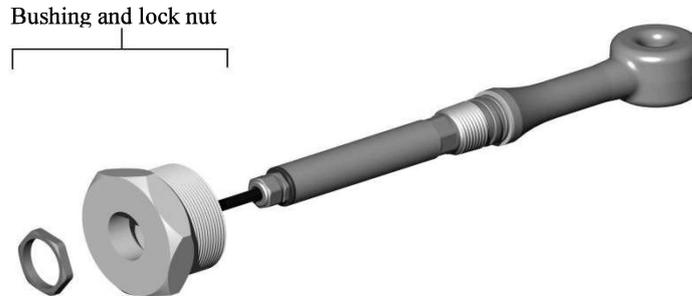


Figure 9 Casing installation accessories

Bushing Size Table (Optional)

Bushing Model	A	B	C	Material Number
CT-NPT2-316L	NPT2"	SW65	22(0.87")	5740100038

CT-NPT2-PVDF	NPT2"	SW65	22(0.87")	5740100039
Thread NPT2" PP	NPT2"	SW65	22(0.87")	5740100040

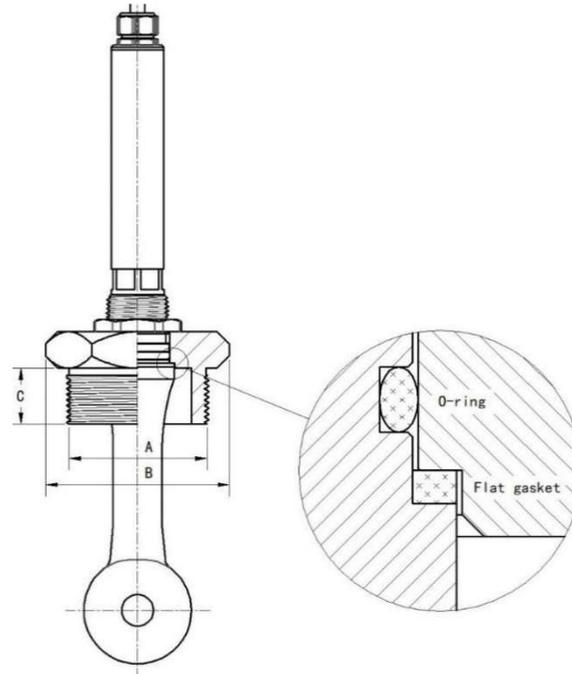


Figure 10 bushing installation dimensions (unit: mm)

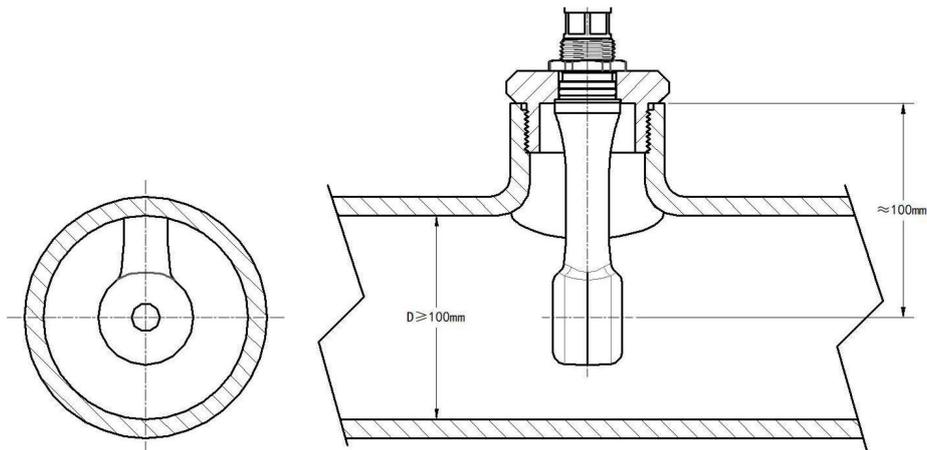


Figure 11 Casing installation dimensions

★ Note: If flange installation is used on the pipeline, the sensor hole must be parallel to the pipeline flow direction, as shown in the flange pipeline installation diagram above, and the pipeline must be filled with liquid, otherwise the sensor cannot measure normally.

7.2.3 Clamp installation

The clamp installation requires the use of matching clamps and quick-connect flanges. Quick-connect flanges are used for quick installation of pipelines and storage tanks. They are fast to install and remove, but have weak pressure resistance. In pipelines or storage tank systems using DN50 or 2 inches and above, quick-connect flanges are used in conjunction with inductive conductivity sensors. Quick-connect flanges are equipped with locking nuts and are sealed with sensors through O-rings and gaskets.

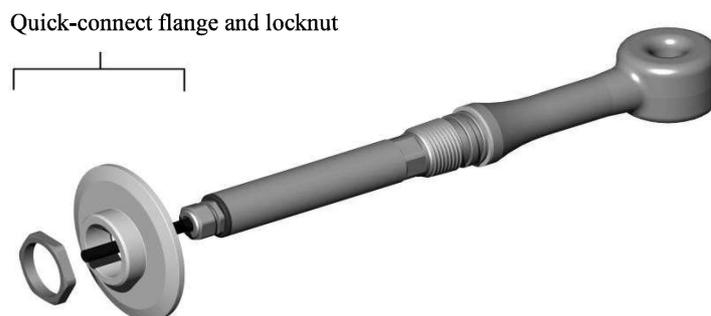


Figure 12 Clamp installation

Model	A	B	Material Number
DN75(2.5'')	91	17	5740100041

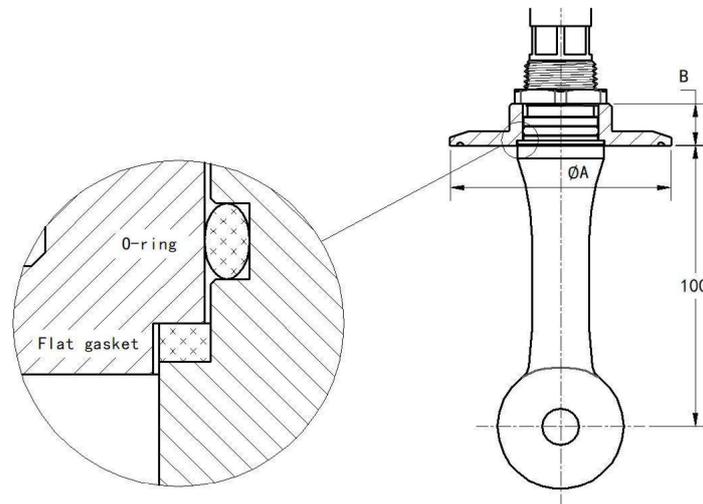


Figure 13 Clamp installation dimensions (unit: mm)

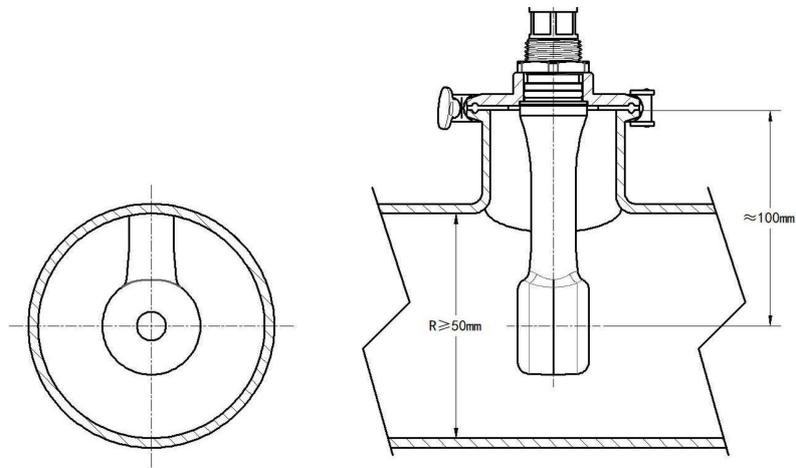


Figure 14 Quick connect flange pipeline installation

- ★ Note: If the clamp installation is used on the pipeline, the sensor hole must be parallel to the pipeline flow direction, as shown in the flange pipeline installation diagram above, and the pipeline must be filled with liquid, otherwise the sensor cannot measure normally.

8. Maintenance and precautions

There are several issues that need to be paid attention to in the application of inductive conductivity sensors:

- 1) When disassembly is required for sensor maintenance, use a standard wrench to tighten and loosen as shown in the figure. The wrench of size SW32 is clamped on the locknut and rotated clockwise or counterclockwise to tighten or loosen the locknut. The wrench of size SW20 is clamped on the hexagonal end of the inductive conductivity sensor to fix it and prevent the sensor from rotating when disassembling.

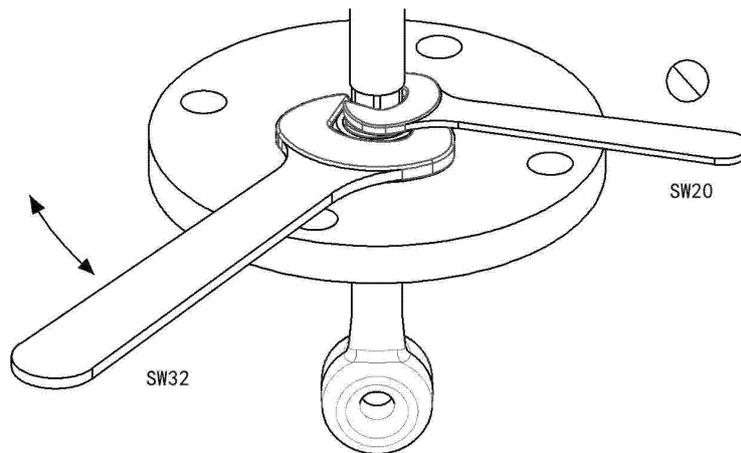


Figure 12 Sensor disassembly and assembly

- ★ Notice: when tightening the lock nut, the maximum torque of the wrench should not exceed 20N·m to prevent irreversible damage to the lock nut or the sensor itself.
- 2) Do not use external force to drop or bump the sensor, do not use blunt or sharp objects to hit the sensor, and do not use the measuring hole at the front end of the sensor as a fastening position. Our company does not assume any responsibility for cracks or damage to the sensor caused by violent operation.



- 3) Although the sensor is completely sealed with waterproof glue, the part above the G3/4 threaded port (including the cable) must be completely isolated from the measured solution. There is still a risk of damaging the sensor after long-term immersion (dripping) in liquid.
- 4) When wiring, do not pass the sensor cable through any conduit with AC or DC current. The electrical signal may interfere with the sensor signal.
- 5) Before wiring, please confirm the corresponding position of each cable to avoid wiring errors. Although there are measures to prevent wrong connection inside the sensor, it will cause the sensor to not work properly.
- 6) If the power is turned on again after a long period of power outage, the conductivity value will drift slightly within 5 to 15 minutes. This is normal and does not affect the actual measurement.

9. Appendix

Temperature tolerance of the sensor medium:

medium		concentration	PEEK	PFA
hydrochloric acid	HCL	0-20%	20°C-95°C	20°C-80°C
		25-40%	20°C-95°C	20°C-95°C
Nitric acid	HNO3	0-25%	20°C-95°C	20°C-80°C
		36-96%	20°C	20°C-60°C
Phosphoric acid	H3PO4	0-40%	20°C-95°C	20°C-60°C
Sulfuric acid	H2SO4	0-30%	20°C-80°C	20°C-95°C
		35-85%	20°C-60°C	20°C-95°C
		85-92%	20°C	20°C-80°C
		92-100%	20°C	20°C-80°C
Hydrofluoric acid	HF	0-35%	20°C-95°C	20°C-95°C
Sodium hydroxide	NaOH	0-18%	20°C-95°C	20°C-50°C
		20-40%	20°C-95°C	20°C-50°C
Calcium chloride	CaCl2	0-30%	20°C-95°C	20°C-95°C
Sodium chloride	NaCl	0-30%	20°C-95°C	20°C-95°C