Quick Start Manual

ICON™ PROCESS CONTROLS Corrosion-Free Instrumentation Equipment

Read the user's manual carefully before starting to use the unit.
Producer reserves the right to implement changes without prior notice.

Safety Information

- **DO NOT** exceed maximum temperature or pressure specifications
- **ALWAYS** wear safety goggles or face-shield during installation and/or service
- **DO NOT** alter product construction

Warning | Caution | Danger

Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, or failure, injury, or death.

Note | Technical Notes

Highlights additional information or detailed procedure.

Intended Use

When receiving the instrument, please open the package carefully, check whether the instrument and accessories are damaged by transportation and whether the accessories are complete. If any abnormalities are found, please contact our after-sales service department or regional customer service center, and keep the package for return processing.

The technical data listed in the current data sheet are engaging and must be complied with. If the data sheet is not available, please order or download it from our homepage (www.iconprocon.com).

Personnel for Installation, Commissioning, and Operation

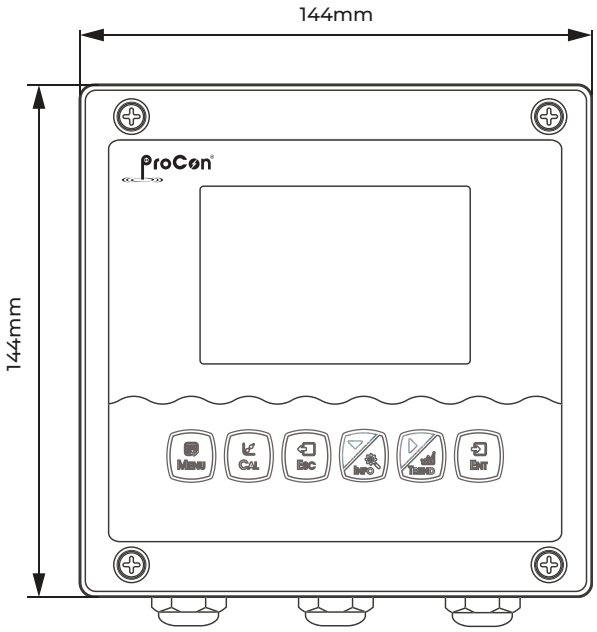
This controller is an analytical measurement and control instrument with highly precision. Only skilled,trained or authorized person should carry out installation, setup and operation of the instrument. Ensure that the power cable is physically separated from the power supply when connection or repair. Once the safety problem occurs, make sure that the power to the controller is off and disconnected.

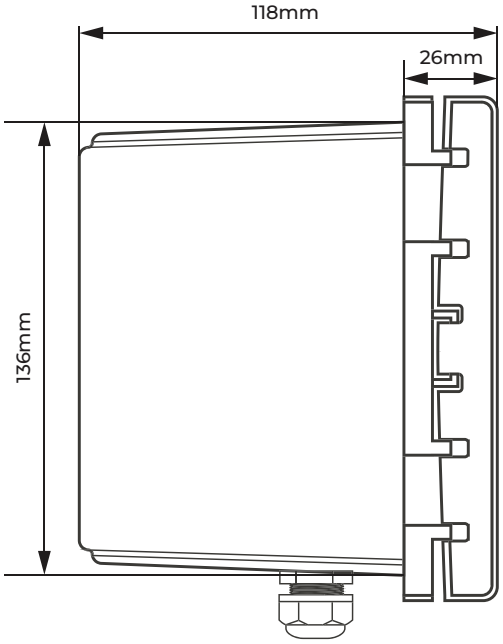
Technical Specifications

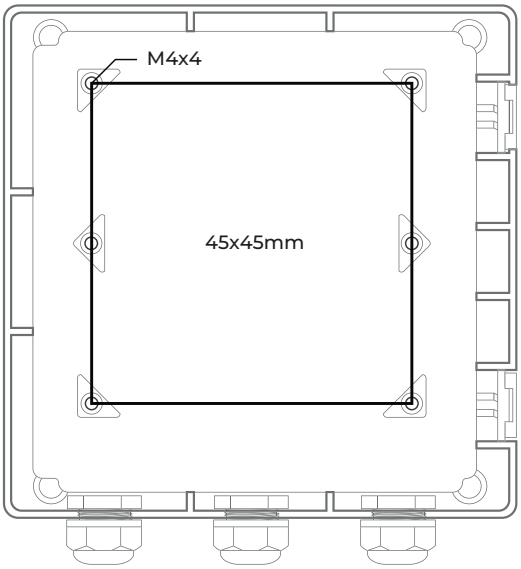
Measurement Range	0.005~20.00mg/L | 0.005~20.00ppm
Measurement Unit	mg/L | PPM
Resolution	0.001mg/L | 0.001ppm
Basic Error	±1% F.S
Temperature	14 ~ 302°F | -10 ~ 150.0°C (Depends on the Sensor)
Temperature Resolution	0.1°C
Temperature Basic Error	±0.3°C
Current Output	2 groups: 4-20mA
Communication Output	RS485 MODBUS RTU
Other Functions	Data Record & Curve Display
Three Relay Control Contacts	5A 250VAC, 5A 30VDC
Power Supply	9~36VDC (Standard) | 85~265VAC* | Power Consumption ≤ 3W
Working Conditions	No strong magnetic field interference around except the geomagnetic field
Working Temperature	14 ~ 140°F | -10~60°C
Relative Humidity	≤90%
Waterproof Rating	IP65
Weight	0.8kg
Dimensions	144 x 114 x 118mm
Installation Opening Size	138 x 138mm
Installation Methods	Panel | Wall Mount | Pipeline

*Optional

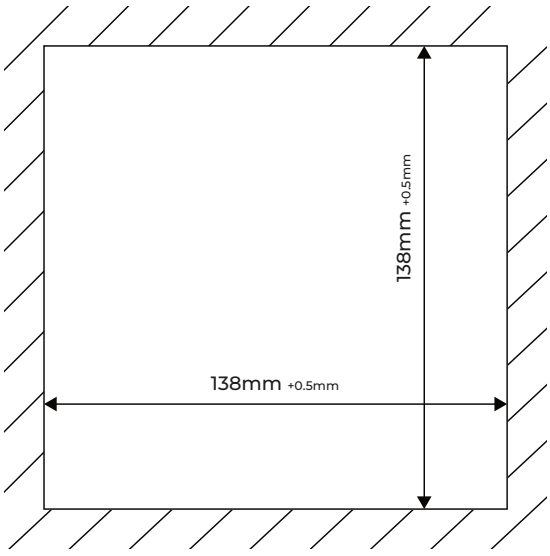
Dimensions





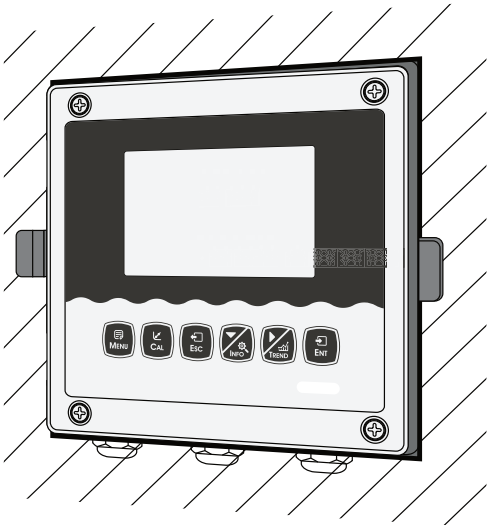


Back Fixed Hole Size



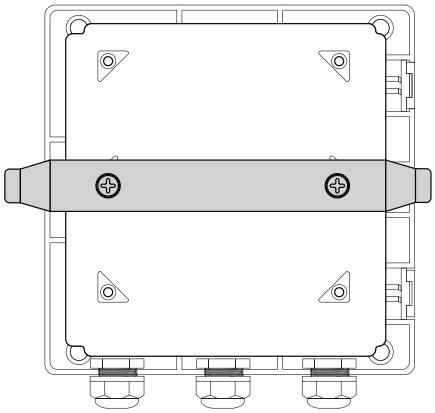
Embedded Mounting Cut-out Size

Cabinet Installation

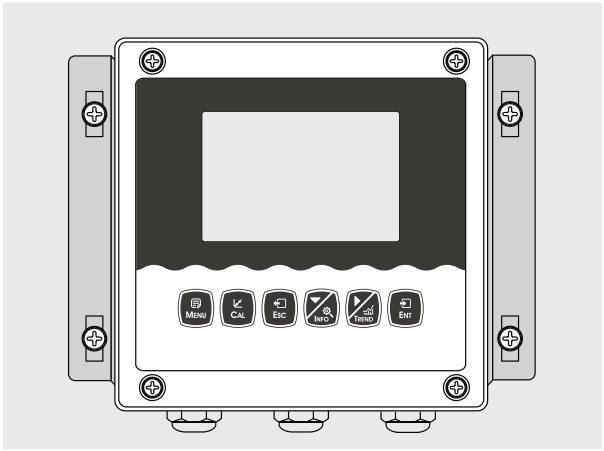


Schematic of Installation

a) Embedded in an open hole
b) Fix the instrument



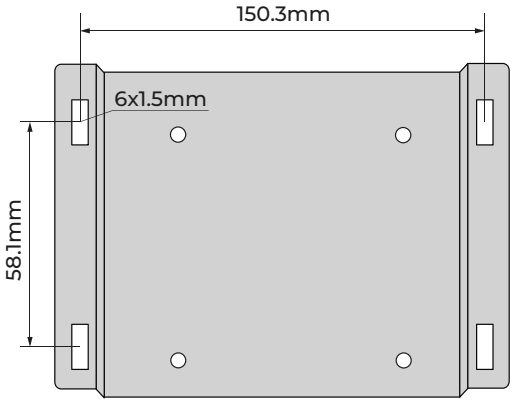
Wall Mount Installation

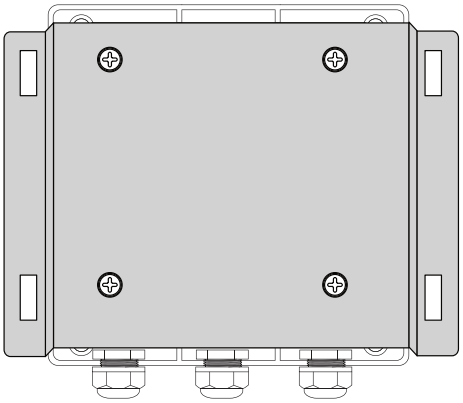


Schematic of Installation

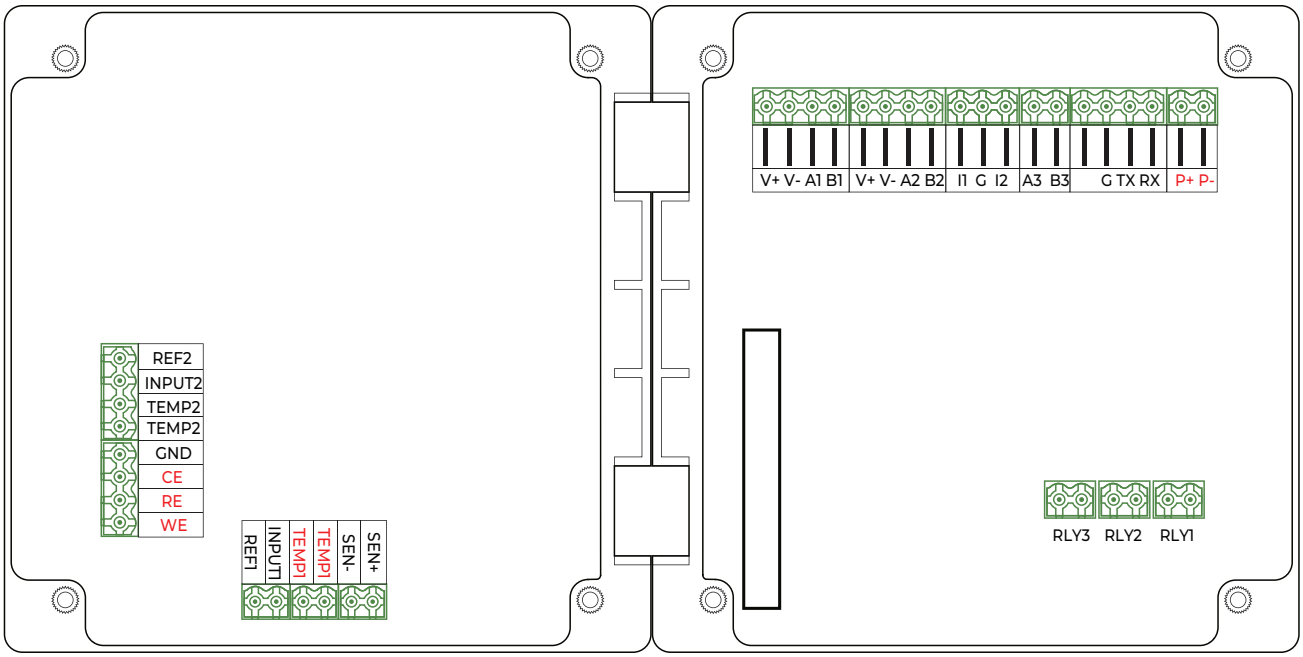
a) Install a mounting bracket for the instrument
b) Wall screw fixation

Top view of mounting bracket.
Pay attention to installation direction





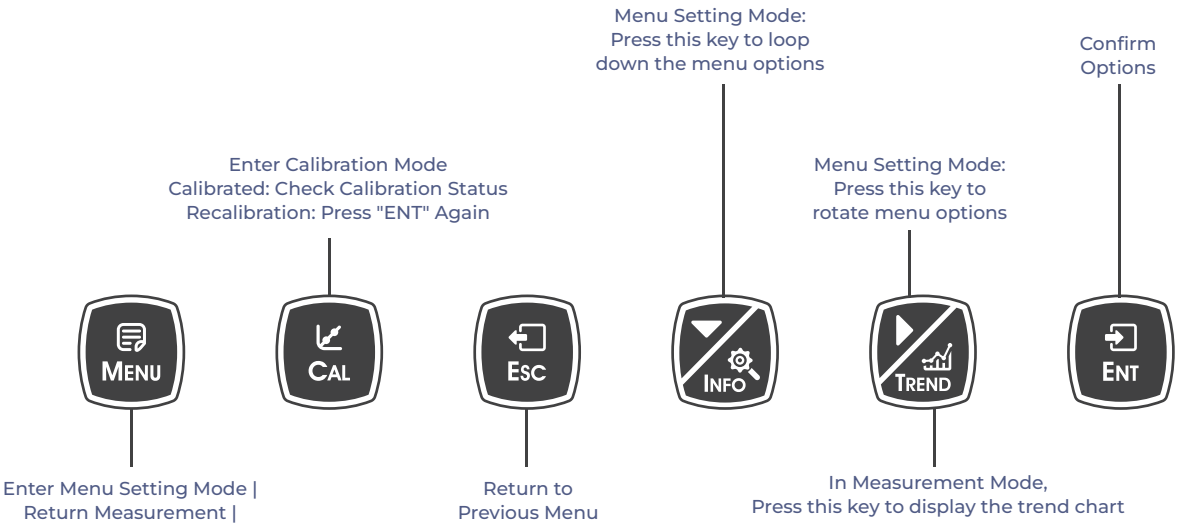
Wiring



Terminal	Description	Terminal	Description
P+, P-	VDC Power Supply	V+, V-, A1, B1	Digital Input Channel 1
TEMP1	Temperature Connections	V+, V-, A2, B2	Digital Input Channel 2
CE,RE,WE	Sensor Input Connections	A3, B3	RS485 Communication Output
I1, G, I2	4-20mA Output 1 & 2	RLY3,RLY2,RLY1	3 Relay Terminals

The connection between the instrument and the sensor: the power supply, output signal, relay alarm contact and the connection between the sensor and the controller are all inside the controller, and the wiring is as shown above. The length of the cable lead fixed by the electrode is usually 5-10 Meters, insert the line with corresponding label or color wire on the sensor into the corresponding terminal inside the instrument and tighten it.

Keypad Description



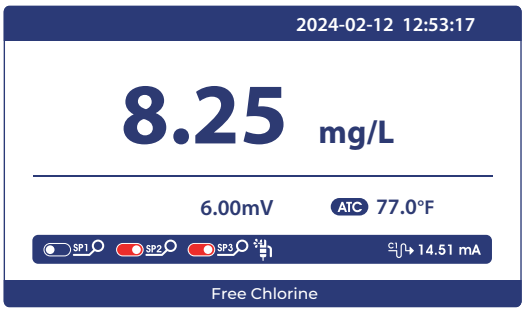
Keypad Operation

- **Short Press:** Release the key immediately after pressing (Default to short presses if not specified above).
- **Long Press:** Press the button for 3 seconds and then release it.

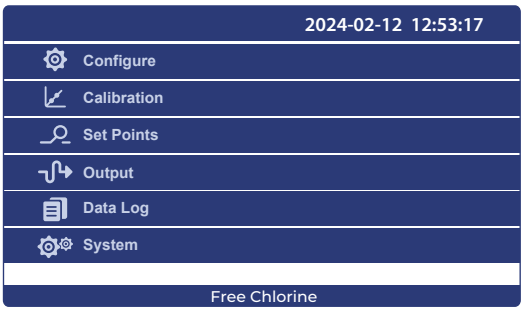
Display Descriptions

All electrical connections should be checked before use. After the power is switched on, the meter will display as follows.

Measurement Mode

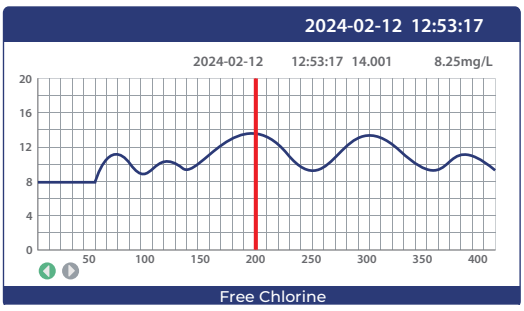


Setting Mode



Calibration Mode

Trend Chart Display



Menu Structure

The following is the menu structure of this instrument

Setting	Sensor	Type	FCL
		Unit	mg/L
	Temperature	Temperature Sensor	NTC2.252 KΩ
			NTC10 KΩ
			PT100
			PT1000 (Default)
		Temperature Offset	0.0000
		Temperature Input	Automatic (Default)
			Manual
		Temperature Unit	°C
			°F
Calibration	Standard Solution Calibration	Point 1	0.01 (Default, can be modified)
		Point 2	1 (Default, can be modified)
		Point 3	10 (Default, can be modified)
		Point 4	100 (Default, can be modified)
		Point 5	1000 (Default, can be modified)
		Calibration Adjustment	Voltage 1
			Voltage 2
			Voltage 3
			Voltage 4
			Voltage 5
	Field Calibration	Field Calibration	00.001 (Default)
		Offset Adjustment	00.000
		Slope Adjustment	01.000

Set Point	Relay 1	Status	ON
			OFF
		High/Low Set Point	High Alarm
			Low Alarm
			Clean
		Limit Value	020.00 mg/L
		Hysteresis	00.00 mg/L
	Relay 2	Status	ON
			OFF
		High/Low Set Point	High Alarm
			Low Alarm
			Clean
		Limit Value	020.00 mg/L
		Hysteresis	00.00 mg/L
	Relay 3	Status	ON
			OFF
		High/Low Set Point	High Alarm
			Low Alarm
			Clean
		Limit Value	020.00 mg/L
		Hysteresis	00.00 mg/L

Output	Current 1	Channel	Main
			Temperature
		Output Option	4-20mA
			0-20mA
			20-4mA
		Upper Limit	
		Lower Limit	
	Current 2	Channel	Main
			Temperature
		Output Option	4-20mA
			0-20mA
			20-4mA
		Upper Limit	
		Lower Limit	

Output	RS485	Baud Rate	4800BPS
			9600BPS
			19200BPS
		Parity Check	None Parity
			Odd Parity
			Even Parity
		Stop Bit	1 Bit
			2 Bit
		Network Node	
Data Log	Graphic Trend (Trend Chart)	Record Interval	Display according to interval settings 480 points/screen
		1h	
		12h	
		24h	
	Record Query	Query by number of data	
	Record Interval	7.5s	
		90s	
		180s	
	Data Output	101600 Point	
	Upload Data		
System	Language	English	
	Date/Time	Year-Month-Day	
		Hour-Minute-Second	
	Display	Display Speed	Low
			Standard
			Medium
			High
		LED	Energy Saving
			Long Bright
	Information	Software Version	22-8.0
		Password Settings	0000
		Serial number	

System	Factory Default	No	
		Yes	
	Terminal Current Tuning	Current 1 | 4mA	The positive and negative ends of the ammeter are connected to the current 1 or current 2 output terminals of the instrument respectively, press [▼] key to adjust the current to 4 mA or 20mA , press [ENT] key to confirm.
		Current 1 | 20mA	
		Current 2 | 4mA	
		Current 2 | 20mA	
	Relay Test	Relay 1-Testing	Select three groups of relays and hear the sound of two switches ,the relay is normal.
		Relay 2-Testing	
		Relay 3-Testing	

Calibration

Press [MENU] to enter the setting mode and select the calibration

Calibration	Standard Solution Calibration	Point 1	Enter given standard liquid value(Example:0.01)
		Point 2	Enter given standard liquid value(Example:1.0)
		Point 3	Enter given standard liquid value(Example:10.0)
		Point 4	Enter given standard liquid value(Example:100.0)
		Point 5	Enter given standard liquid value(Example:100.0)
		Field Calibration	
		Offset Adjustment	
		Slope Adjustment	

Standard Solution Calibration

This function is used to calibrate the five calibration points of the sensor. It has been calibrated before delivery and users can use it directly. If calibration is required, prepare 5 suitable standard liquids with known value, press **[MENU]** to enter the setting mode and select the calibration point. Modify or enter the corresponding calibration value.

After setting the calibration value, press **[ENT]** key to confirm and enter the calibration screen.

If the controller has been calibrated, the screen shows the calibration status. Press , press the [▶] key to switch the calibration state of the calibration point. If recalibration is required in this state, press **[ENT]** key to enter re-calibration.

Standard solution calibration has 5 calibration points. You can choose any one point to calibrate (at least choose one point for calibration)

In the standard solution calibration mode, press the [▶] key to switch the calibration points, press the [**ENT**] to start calibrating.

If the monitor prompts you to enter the calibration safety password, press [▼] or [▶] key to set the calibration safety password, then press **[ENT]** to confirm the calibration safety password.

Point 1 Calibration

After entering the calibration mode, the controller displays as shown in the above figure.

The main value of the controller displays the point 1 known standard solution value.

Place the electrode into the standard solution of the corresponding value, and the corresponding voltage mV value and calibration state will be displayed on the left side of the screen.

After completion of calibration, (**Done**) will be displayed on the right side of the screen.

If the next point needs to be calibrated, press [▶] to switch the calibration point.
If only one point calibration is needed, after the calibration is completed, press [**MENU**] to exit.

During the calibration process, if the calibration is failed, the screen will show (**Error**).

Field Calibration

Select field calibration methods: [Field calibration], [Offset adjustment], [Linear adjustment].

Field Calibration

When the data from the portable instrument is taken into this setting, the instrument will automatically correct the data.

Calibration Results

Confirm: When the "ENT" icon is green, press [**ENT**] to confirm
Cancel : Press the [▶] key to shift the green icon to ESC, and press [**ENT**] key to confirm

Offset Adjustment

Compare the data from portable instrument with the data measured by controller. If there are errors, the error data can be modified by this function.

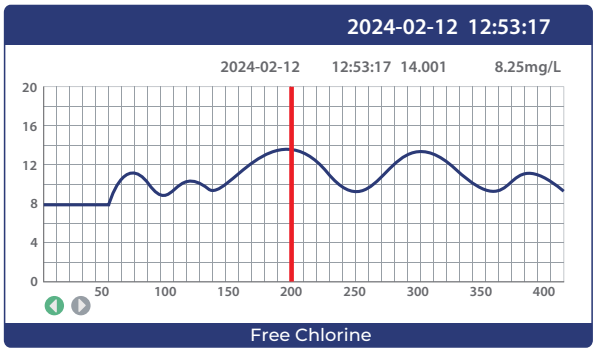
Linear adjustment

Linear values after "field calibration" will be saved in this setting and the factory data is 1.00.

Graphic Trend (Trend Chart)

Data Log	Graphic Trend (Trend Chart)	Record Interval	Display according to interval settings 480 points/screen
		1h	
		12h	
		24h	
	Record Query	Query by number of data	
	Record Interval	7.5s	
		90s	
		180s	
	Data Output	101600 Point	
	Upload Data		

Press the [▶/**TREND**] button in the measurement mode to view the trend chart of the saved data directly. Pressing the [**ESC**] button returns to the measurement screen. There are 480 sets of data record per page.



In the current screen, press the [**ENT**] key to move the data display line to the left and [▶/**TREND**] key to move towards right. Press [**INFO**] to change the chart display range.

Record Interval : Users can select the recording interval here. Once selected, the controller will save the data at the specified interval.

Record Query : Enter the number of records to query here, then press [ENT] to retrieve the historical data.

MODBUS RTU

The hardware version number of this document is V2.0; the software version number is V5.9 and above. This document describes the MODBUS RTU interface in details and the target object is a software programmer.

MODBUS Command Structure

Data format description in this document;
Binary display, suffix B, for example: 10001B - decimal display, without any prefix or suffix, for example: 256
Hexadecimal display, prefix 0x, for example: 0x2A
ASCII character or ASCII string display, for example: "YL0114010022"

Command Structure

The MODBUS application protocol defines the Simple Protocol Data Unit (PDU), which is independent of the underlying communication layer.

Fig.1 : MODBUS Protocol Data Unit

MODBUS protocol mapping on a specific bus or network introduces additional fields of protocol data units. The client that initiates the MODBUS exchange creates the MODBUS PDU, and then adds the domain to establish the correct communication PDU.

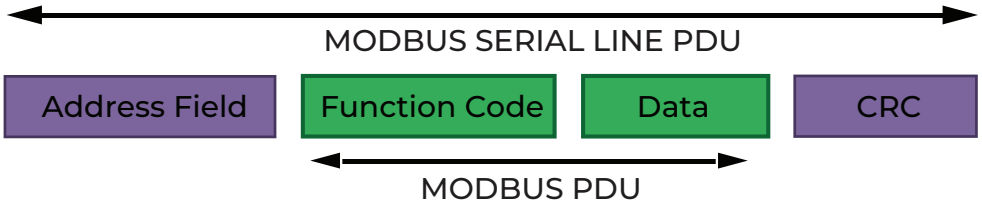


Fig.2 : MODBUS Architecture for Serial Communication

On the MODBUS serial line, the address domain contains only the slave instrument address. Tips: The device address range is 1...247
Set the device address of the slave in the address field of the request frame sent by the host. When the slave instrument responds, it places its instrument address in the address area of the response frame so that the master station knows which slave is responding.

Function codes indicate the type of operation performed by the server.
CRC domain is the result of the " redundancy check" calculation, which is executed according to the information content.

MODBUS RTU Transmission Mode

When the instrument uses RTU (Remote Terminal Unit) mode for MODBUS serial communication, each 8-bit byte of information contains two 4-bit hexadecimal characters. The main advantages of this mode are greater character density and better data throughput than the ASCII mode with the same baud rate. Each message must be transmitted as a continuous string.

The format of each byte in RTU mode (11 bits):

- Coding system: 8-bit binary
- Each 8-bit byte in a message contains two 4-bit hexadecimal characters (0-9, A-F)
- Bits in each byte: 1 starting bit
- 8 data bits, the first minimum valid bits without parity check bits
- 2 stop bits
- Baud rate: 9600 BPS

How characters are transmitted serially:

Each character or byte is sent in this order (from left to right) the least significant bit (LSB)... Maximum Significant Bit (MSB)

Start bit	1	2	3	4	5	6	7	8	Stop bit	Stop bit

Fig.3 : RTU Pattern Bit Sequence

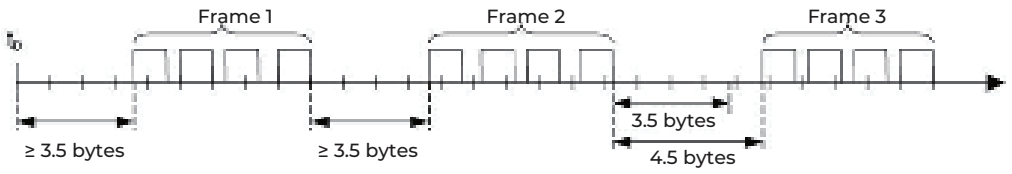
Check Domain Structure: Cyclic Redundancy Check (CRC16)

Structure description:

Slave Instrument	Function Code	Data	CRC
Address	1 byte	0...252 byte	2 byte
			CRC Low byte | CRC High byte

Fig.4 : RTU Information Structure

The maximum frame size of MODBUS is 256 bytes
MODBUS RTU Information Frame
In RTU mode, message frames are distinguished by idle intervals of at least 3.5 character times, which are called t3.5 in subsequent sections.



Starting	Address	Function code	Data	CRC	End
≥ 3.5 bytes	8	8	Nx8	16 bit	≥ 3.5 bytes

Fig.5 : RTU Message Frame

The entire message frame must be sent in a continuous character stream. When the pause time interval between two characters exceeds 1.5 characters, the information frame is considered incomplete and the receiver does not receive the information frame.

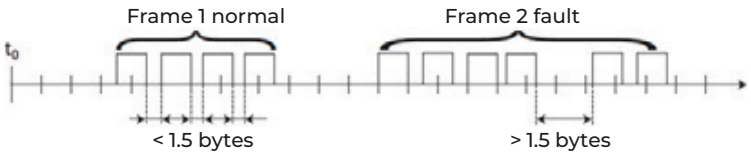


Fig.6 : MODBUS RTU CRC Check

The RTU mode contains an error-detection domain based on a cyclic redundancy check (CRC) algorithm that performs on all message contents. The CRC domain checks the contents of the entire message and performs this check regardless of whether the message has a random parity check. The CRC domain contains a 16-bit value consisting of two 8-bit bytes. CRC16 check is adopted. Low bytes precede, high bytes precede.

Implementation of MODBUS RTU in Instrument

According to the official MODBUS definition, the command starts with a 3.5 character interval triggering command, and the end of the command is also represented by a 3.5 character interval. The device address and MODBUS function code have 8 bits. The data string contains n*8 bits, and the data string contains the starting address of the register and the number of read/write registers. CRC check is 16 bits.

Value	Start	Device Address	Function	Data	Summary Check		End
	No Signal bytes during 3.5 Characters	1-247 1	Function Codes Confirming to MODBUS Specification	Data Confirming to MODBUS Specification	CRCL	CRCL	No Signal bytes during 3.5 characters
Byte	3.5		1	N	1	1	3.5

Fig.7 : MODBUS definition of Data Transmission

Instrument MODBUS RTU Function Code

The instrument only uses two MODBUS function codes:
0x03: Read-and-hold register
0x10: Write multiple registers

MODBUS Function Code 0x03: Read-and-hold Register
This function code is used to read the continuous block content of the holding register of the remote device. Request the PDU to specify the start register address and the number of registers. Address registers from zero. Therefore, the addressing register 1-16 is 0-15. The register data in the response information is packaged in two bytes per register. For each register, the first byte contains high bits and the second byte contains low bits.

Request:

Function Code	1 byte	0x03
Start Address	2 byte	0x0000....0xffffff
Read Register Number	2 byte	1...125

Fig.8 : Read and hold register request frame

Response:

Function Code	1 byte	0x03
Number of bytes	2 bytes	Nx2
Register Values	Nx2 byte	1...125

N = Register Number

Figure 9 : Read and hold register response frame

The following illustrates the request frame and response frame with the read and hold register 108-110 as an example. (The contents of register 108 are read-only, with two byte values of 0X022B, and the contents of register 109-110 are 0X0000 and 0X0064)

Request Frame		Response Frame	
Number Systems	(Hexadecimal)	Number Systems	(Hexadecimal)
Function Code	0x03	Function Code	0x03
Start Address (High byte)	0x00	Byte Count	0x06
Start Address (Low byte)	0x6B	Register Value (High Bytes) (108)	0x02
Number of Read Registers (High Bytes)	0x00	Register Value (Low Bytes) (108)	0x2B
Number of Read Registers (Low Bytes)	0x03	Register Value (High Bytes) (109)	0x00
		Register Value (Low Bytes) (109)	0x00
		Register Value (High Bytes) (110)	0x00
		Register Value (Low Bytes) (110)	0x64

Figure 10 : Examples of read and hold register request and response frames

MODBUS Function Code 0x10 : Write Multiple Registers

This function code is used to write continuous registers to remote devices (1... 123 registers) block that specifies the value of the registers written in the request data frame. Data is packaged in two bytes per register. Response frame return function code, start address and number of registers written.

Request:

Function Code	1 byte	0x10
Start Address	2 byte	2 byte
Number of input registers	2 byte	2 byte
Number of bytes	1 byte	1 byte
Register Values	N x 2 bytes	N x 2 bytes

Fig.11 : Write Multiple Register Request Frames

*N = Register Number

Response:

Function Code	1 byte	0x10
Start Address	2 byte	0x0000....0xffff
Register Number	2 byte	1...123(0x7B)

N = Register Number

Figure 12 : Write Multiple Register Response Frames

The request frame and response frame are illustrated below in two registers that write the values 0x000A and 0x0102 to the start address of 2.

Request Frame	(Hexadecimal)	Response Frame	(Hexadecimal)
Number Systems	0x10	Number Systems	0x10
Function Code	0x00	Function Code	0x00
Start Address (High byte)	0x01	Start Address (High byte)	0x01
Start Address (Low byte)	0x00	Start Address (Low byte)	0x00
Input Register Number (High bytes)	0x02	Input Register Number (High bytes)	0x02
Input Register Number (Low bytes)	0x04	Input Register Number (Low bytes)	
Number of bytes	0x00		
Register Value (High byte)	0x0A		
Register Value (Low byte)	0x01		
Register Value (High byte)	0x02		
Register Value (Low byte)			

Figure 13 : Examples of writing multiple register request and response frames

Data Format in Controller

Floating Point

Definition: Floating point, conforming to IEEE 754 (single precision)

Description	Symbol	Index	Mantissa	SUM
Bit	31	30...23	22...0	22...0
Index Deviation	127			

Figure 14 : Floating Point Single Precision Definition (4 bytes, 2 MODBUS Registers)

Example: Compile decimal 17.625 to binary

Step 1:

Converting 17.625 in decimal form to a floating-point number in binary form, first finding the binary representation of the integer part

17decimal= 16 + 1 = $1\times2^4 + 0\times2^3 + 0\times2^2 + 0\times2^1 + 1\times2^0$

The binary representation of integer part 17 is 10001B

Then the binary representation of decimal part is obtained

0.625= 0.5 + 0.125 = $1\times2^{-1} + 0\times2^{-2} + 1\times2^{-3}$

The binary representation of decimal part 0.625 is 0.101B.

So the binary floating point number of 17.625 in decimal form is 10001.101B

Step 2:

Shift to find the exponent.

Move 10001.101B to the left until there is only one decimal point, resulting in 1.0001101B, and

10001.101B = 1.0001101 B× 24 . So the exponential part is 4, plus 127, it becomes 131, and its binary representation is 10000011B.

Step 3:

Calculate the tail number

After removing 1 before the decimal point of 1.0001101B, the final number is 0001101B (because before the decimal point must be 1, so IEEE stipulates that only the decimal point behind can be recorded). For the important explanation of 23-bit mantissa, the first (i.e. hidden bit) is not compiled. Hidden bits are bits on the left side of the separator, which are usually set to 1 and suppressed.

Step 4:

Symbol bit definition

The sign bit of positive number is 0, and the sign bit of negative number is 1, so the sign bit of 17.625 is 0.

Step 5:

Convert to floating point number

1 bit symbol + 8 bit index + 23-bit mantissa

0 10000011 00011010000000000000000B (the hexadecimal system is shown as 0 x418d0000)

Reference code:

1. If the compiler used by the user has a library function that implements this function, the library function can be called directly, for example, using C language, then you can directly call the C library function memcpy to obtain an integer representation of the floating-point storage format in memory.

For example: float floatdata; // converted floating point number void* outdata; memcpy (outdata, & floatdata, 4);

Suppose floatdata = 17.625

If it is a small-end storage mode, after executing the above statement, the data stored in the address unit outdata is 0x00.

Outdata + 1 stores data as 0x00

address unit (outdata + 2) stores data as 0x8D

address unit (outdata + 3) stores data as 0x41

If it is large-end storage mode, after executing the above statement, the data stored in outdata of address unit is 0x41

address unit (outdata + 1) stores data as 0x8D

address unit (outdata + 2) stores data as 0x00

address unit (outdata + 3) stores data as 0x00

2. If the compiler used by the user does not implement the library function of this function, the following functions can be used to achieve this function:

```
void memcpy(void *dest,void *src,int n)
{
char *pd = (char *)dest; char *ps = (char *)src;
for(int i=0;i<n;i++) *pd++ = *ps++;
}
```

And then make a call to the above memcpy(outdata,&floatdata,4);

Example: Compile binary floating-point number 0100 0010 0111 1011 0110 0110 0110 10B to decimal number

Step 1: Divide the binary floating-point number 0100 0010 0111 1011 0110 0110 0110B into symbol bit, exponential bit and mantissa bit.

0 10000100 11110110110011001100110B

1-bit sign + 8-bit index + 23-bit tail sign bit S: 0 denotes positive number

Index position E: $10000100B = 1\times2^7+0\times2^6+0\times2^5+0\times2^4 + 0\times2^3+1\times2^2+0\times2^1+0\times2^0$

$=128+0+0+0+0+4+0+0=132$

Mantissa bits M: 11110110110011001100110B =8087142

Step 2: Calculate the decimal number

$D = (-1)\times(1.0 + M/223)\times2E-127$

$= (-1)0\times(1.0 + 8087142/223)\times2132-127$

$= 1\times1.964062452316284\times32$

$= 62.85$

Reference Code:

```
float floatTOdecimal(long int byte0, long int byte1, long int byte2, long int byte3)
{
long int realbyte0,realbyte1,realbyte2,realbyte3; char S;
long int E,M;
float D; realbyte0 = byte3; realbyte1 = byte2; realbyte2 = byte1; realbyte3 = byte0;
if((realbyte0&0x80)==0)
{
S = 0;//positive number
}
else
{
 S = 1;//negative number
 }
E = ((realbyte0<<1)|(realbyte1&0x80)>>7)-127;
M = ((realbyte1&0x7f) << 16) | (realbyte2<< 8)| realbyte3;
D = pow(-1,S)*(1.0 + M/pow(2,23))* pow(2,E);
return D;
 }
```

Function description: parameters byte0, byte1, byte2, byte3 represent 4 bytes of binary floating point number.

The decimal number converted from the return value.

For example, the user sends the command to get the temperature value and dissolved oxygen value to the probe. The4 bytes representing the temperature value in the received response frame are 0x00, 0x00, 0x8d and 0x41. Then the user can get the decimal number of the corresponding temperature value through the following call statement.

That is temperature = 17.625.

Float temperature = floatTOdecimal(0x00, 0x00, 0x8d, 0x41)

Read Instruction Mode

The communication protocol adopts MODBUS (RTU) protocol. The content and address of the communication can be changed according to the needs of customers. The default configuration is network address 01, baud rate 9600, even check, one stop bit, users can set their own changes;

Function code 0x04: This function enables the host to obtain real-time measurements from slaves, which are specified as single-precision floating-point type (i.e. occupying two consecutive register addresses), and to mark the corresponding parameters with different register addresses. Communication address is as follows:

0000-0001: Main Measured Value | 0002-0003: Temperature Value | 0004-0005: Main Voltage Value |

0006-0007: Temperature & Voltage Value

Communication examples:

Examples of function code 04 instructions:

Communication address = 1, Main Value = 20.0, Temperature = 10.0, Main voltage = 100.0, Temperature voltage = 200.0

Host Send: 01 04 00 00 08 F1 CC | Slave Response: 01 04 10 00 41 A0 00 41 20 00 42 C8 00 43 48 81 E8

Note:

[01] Represents the instrument communication address;

[04] Represents function code 04;

[10] represents 10H (16) byte data;

[00 00 00 41 A0] = 20.0; / Main Measured value

[00 00 4120]= 10.0; // Temperature Value

[00 00 42 C8] = 100.0; / / Main measured voltage value

[00 00 43 48] = 200.0; / / Temperature & Voltage Values

[81 E8] represents CRC16 check code;

Maintenance

According to the requirements of use, the installation position and working condition of the controller are relatively complex. In order to ensure that the controller is working normally, maintenance personnel should carry out regular maintenance on the controller. Please pay attention to the following matters during maintenance:

- Check the working environment of the controller. If the temperature exceeds the rated range of the controller, please take appropriate measures; otherwise, the controller may be damaged or its service life may be reduced;
- When cleaning the plastic shell of the controller, please use a soft cloth and a soft cleaner to clean the shell.
- Check whether the wiring on the terminal of the controller is firm. Pay attention to disconnect the AC or DC power before removing the wiring cover.

Warranty, Returns and Limitations

Warranty

Icon Process Controls Ltd warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service in accordance with instructions furnished by Icon Process Controls Ltd for a period of one year from the date of sale of such products. Icon Process Controls Ltd obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd option, of the products or components, which Icon Process Controls Ltd examination determines to its satisfaction to be defective in material or workmanship within the warranty period. Icon Process Controls Ltd must be notified pursuant to the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for the one year from the date of replacement.

Returns

Products cannot be returned to Icon Process Controls Ltd without prior authorization. To return a product that is thought to be defective, go to www.iconprocon.com, and submit a customer return (MRA) request form and follow the instructions therein. All warranty and non-warranty product returns to Icon Process Controls Ltd must be shipped prepaid and insured. Icon Process Controls Ltd will not be responsible for any products lost or damaged in shipment.

Limitations

This warranty does not apply to products which:

1. are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above;
2. have been subjected to electrical, mechanical or chemical damage due to improper, accidental or negligent use;
3. have been modified or altered;
4. anyone other than service personnel authorized by Icon Process Controls Ltd have attempted to repair;
5. have been involved in accidents or natural disasters; or
6. are damaged during return shipment to Icon Process Controls Ltd

Icon Process Controls Ltd reserves the right to unilaterally waive this warranty and dispose of any product returned to Icon Process Controls Ltd where:

1. there is evidence of a potentially hazardous material present with the product;
2. or the product has remained unclaimed at Icon Process Controls Ltd for more than 30 days after Icon Process Controls Ltd has dutifully requested disposition.

This warranty contains the sole express warranty made by Icon Process Controls Ltd in connection with its products. ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED. The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. IN NO EVENT SHALL Icon Process Controls Ltd BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON. THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF Icon Process Controls Ltd. This warranty will be interpreted pursuant to the laws of the province of Ontario, Canada.

If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

For additional product documentation and technical support visit:

www.iconprocon.com | e-mail: sales@iconprocon.com or support@iconprocon.com | Ph: 905.469.9283

ICON PROCESS CONTROLS Corrosion-Free Instrumentation Equipment