SCT-PH/ORP-MAXI-HR pH/ORP Controller

Warning!

1. Cut off the power supply when connecting the input and output terminals.
2. Read the following instructions carefully and take precautions to prevent any possible personal injury.

Contents

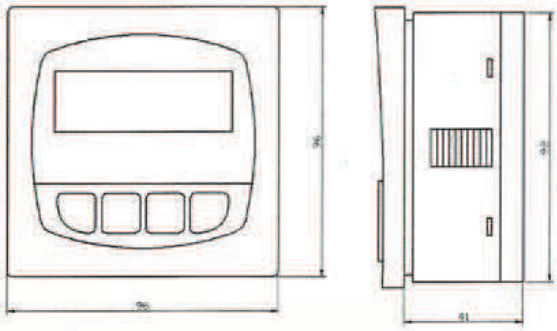
1. Installation
2. Product specifications
3. Electrical connection
4. The functions of the menu



1. Installation

1.1 Installation of the instrument panel.

1. This instrument needs a hole of **92 x 92mm**.
2. Press the back of the instrument with the mounting bracket until the quick-fixed card lock the grooves on the two sides of the instrument.
3. When removing the instrument, it is necessary to fix the instrument temporarily with adhesive tapes or hold the back of the instrument firmly in order to prevent the instrument from falling down. Pull the quick-fixed cards outwardly and draw out the instrument.



2. Product Specifications

General introduction

Compatible sensor: Standard type pH/ORP detector (BNC)

The housing box for packing

- Protection grade: IP65, front
- Material of the shell: ABS
- Screen: synthetic polyester
- Keys: 4 encapsulated silicone keys
- Weight: about 225g

Display:

- LCD display with backlight, LCD 2x16 bit
- Contrast: defined by users, 5 levels
- Refresh rate: 3s

Electrical performance

- Power: 18-36V DC

Input range of the sensor

- pH: 0.00～14.00pH
- ORP: -2000Mv～+2000mV
- Temperature: PT1000, -25-125℃

Current Output Signal

- Optically isolated 4-20mA, reversible, can migrate
- Maximum impedance of the loop: 600Ω max.@ 24V
- Refresh rate: 3S
- Accuracy: ±0.03mA@25℃,24V

Control output signals

- Operating mode: Hi/Lo/off (normally open contact)
- Capacity of the relay contact:
  2A/250V AC (resistive load)
  2A/28V DC (resistive load)

Pulse Output Signal

- Output signal of the open collector, optical isolation
- The maximum pull-down current is 50mA and the maximum pull-up voltage is 30VDC.
- Pulse modes (maximum pulse rate: 400p/m)

485 communication output signal

[Do not have this function]

Specifications and dimension

- Overall dimension: 96x96x46mm (height x width x depth)
- The dimension of the hole: 92x92mm (height x width)

Environmental conditions

- Working temperature: -10~70℃
- Storage temperature: -15~80℃
- Relative humidity: 0~95%, no dew point
- Insulation grade: II

3. Electrical connection

Caution: The instrument would be permanently damaged if the terminal sockets were not fully open before removal of wiring.

Wiring Procedures

1. Strip 13-16mm of insulating layer at one end of the conductive wire.
2. Press the orange terminal rod with a small screwdriver in order to open the terminal socket.
3. Insert the bare conductor (without insulating layer) into the terminal socket until the conductor reaches the bottom of the socket.



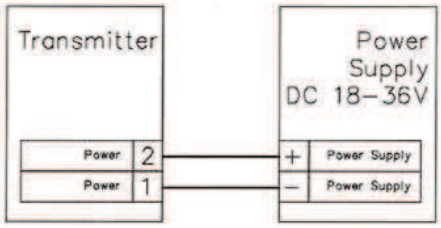
4. Release the orange terminal rod and then fix the conductor with clips. Draw the conductor gently so as to ensure that the conductor is well–connected.

Procedures for removal of wiring

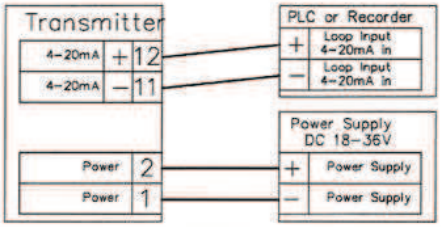
1. Press the orange terminal rod with a small screwdriver in order to open the terminal socket.
2. Pull out the conductor from the fully open terminal socket.

3.1 System power supply / current circuit wiring

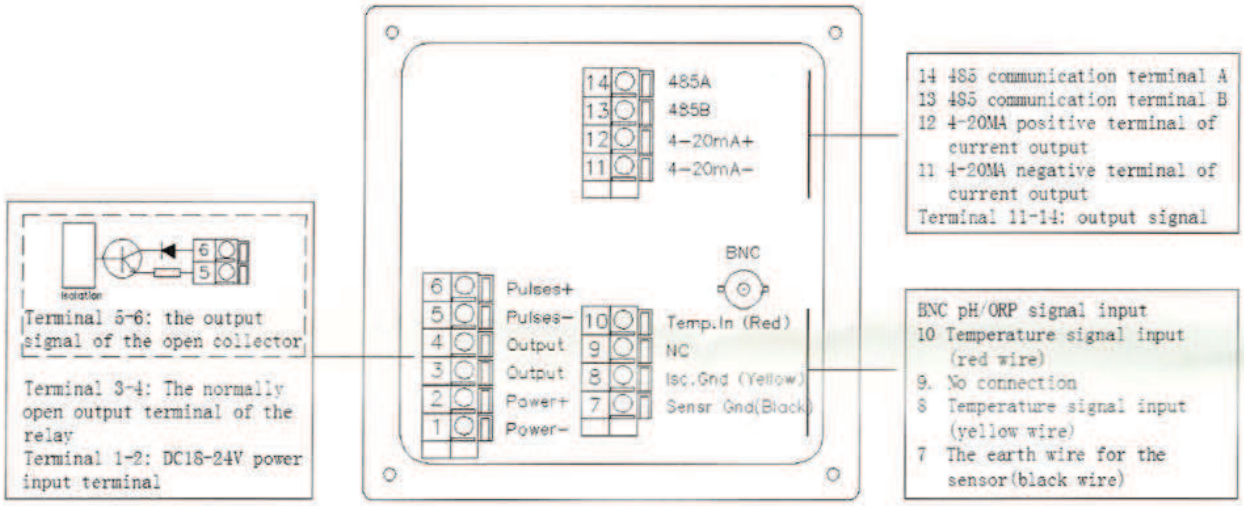
Application of a single standard function, without current signal output.



Connected with PLC/recorder with built-in power supply, independent power supply



3.2 Sensor input connection



Wiring instructions:

- The cables for the sensor and the AC cables cannot be laid in the same cable conduit as electronic noise can disturb the signals of the sensor.
- To lay the cables in the grounded metallic cable conduit is conductive to prevent electronic noise and mechanical damage.
- Seal the entrances of the cables in order to protect the cables from being damaged by humidity.
- Insert one conductor into each terminal socket. If two conductors need to be inserted in the same terminal socket, it is necessary to connect the two conductors and the terminal outside the terminal socket.

Choose a "Three-parameter Sensor" with temperature-measuring function or "Two-parameter Sensor" without temperature-measuring function according to the requirements of the technological process:

3.3 Relay output signal

Caution: The control of external equipments must be connected to intermediate relays.

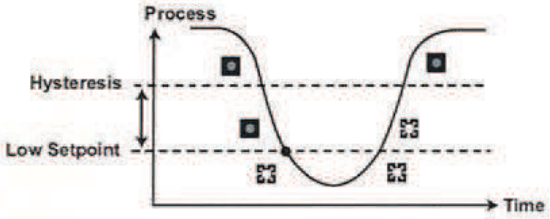
- Low

When the process variable is lower than the set value, the output switch of the relay should be closed. When the process variable is higher than the set value plus the return difference, the output switch of the relay should be open.

- High

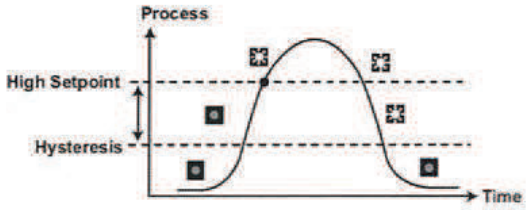
When the process variable is higher than the set value, the output switch of the relay should be closed. When the process

variable is lower than the set value plus the return difference, the output switch of the relay should be open.



The lower limit

Relay energized
Relay relaxed



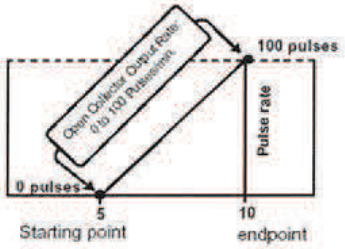
The higher limit

3.3 Proportional pulse output signal of the open collector.

- Proportional pulse

  The open collector will send out proportional pulse signals with a width of 100ms according to the pulse rate set in the CALIBRATE menu.

  See the following examples:



- When the measured value is below 5.0, the output signal is 0p/m.
- When the measured value is 7.5, the output signal is 50p/m.
- When the measured value reaches 10 or above, the output signal is 100p/m.

Set the maximum pulse rate and the starting and end points in the CALIBRATE menu.

The VIEW Menu



- During normal operation, the instrument displays VIEW menu.
- When using CALIBRATE menu or OPTIONS menu, if no key is pressed for over ten minutes, the instrument will automatically return to VIEW menu.
- Press the Up and Down arrow keys to have different contents displayed. The display options are continuous and can be repeatedly displayed.
- Changing the display options will not interrupt the normal operation of the system.
- No password is needed to change the display options.
- Output settings cannot be edited in the VIEW menu.

The VIEW menu（pH VIEW）

Displayed content	Description
7.00 pH 25.0 ℃	Display the pH values and the temperature values indicated in the sensor. This is a permanent display format.

The following items are displayed temporarily and the system will return to the permanent display items 10 minutes later.



Loop Output: 12.00 mA	Display a current output value of 4-20mA.
EASY CAL: >	Quick pH calibration

The VIEW menu (ORP VIEW)

Displayed content	Description
ORP 0 mV	Display the mV values indicated in the ORP sensor. This is a permanent display format.

The following items are displayed temporarily and the system will return to the permanent display items 10 minutes later.

Loop Output: 12.00 mA	Display a current output value of 4-20mA.

Procedures for editing the instrument

Step 1: keep pressing the **ENTER** key:

- Keep pressing the **ENTER** key for 2 seconds, and the system will enter into **CALIBRATE menu**.
- Keep pressing the **ENTER** key for 5 seconds, and the system will enter into **OPTIONS menu**.

Step 2: Press the Up-Up-Up-Down arrow keys according to the sequence of the password.

- After the password is typed in, the first item of the selected menu option will be displayed.



Step 3: Drag the menu by pressing the Up or Down key.

- Press the Up or Down arrow key to exit the menu and return to measurement status.

Step 4: Choose the menu option to be edited by pressing the Right arrow key.

- The first bit of the displayed content starts to flicker.

Step 5: Press the Up or Down arrow key to edit at the flicker bit.

- Press the Right arrow key to move the flicker bit forward.
- Press the Up or Down arrow key to return to the previous menu.

Step 6: Press the **ENTER** key to save the new settings and then return to Step **3**.

The CALIBRATE Menu I (pH CALIBRATE)

Displayed content (the content are the factory settings)	Description
Temp Input Model: MTC >	Temperature compensation input mode: MTC represents manual temperature compensation; ATC represents automatic temperature compensation.
Set: MTC 25.0 >	Adjust the measured temperature values of the system according to accurate external reference. (MTC/ ATC).
Set: pH >	For a sensor, completion of this single-point wet calibration will lead to the most accurate measurement result. When all the input values are "zero", the "TEMP" value and the "pH" value will be restored to the factory settings.
Loop Range: pH 0.00→14.00 >	Set the minimum and the maximum physical values (4mA and 20mA respectively) that are corresponding to the current output signal.
Output Mode: Off >	Choose either a "High", "Low" or "Off" working model for the relay. If the "High" and "Low" functions are not needed, the working model can be turned to "Off".
Output Setpnt: 7.00 pH >	Under "Low" or "High" model, if the process variable reaches the set value, the relay output signal will be excited.
Output Hys: 0.50 pH >	When the measured value reaches the set value ± the return difference value, the relay output signal will be reset. Choosing"+" or "-" depends on whether the relay is under "High" or "Low" working model. (See page 3 for more details.)
Pules Range: pH 0.00→14.00 >	Set the pulse rates at the starting and end points that are corresponding to the pulse signals.
Output PlsRate: 400 Pulses/Min >	Set the maximum pulse rate of the proportional pulse signal. PC-8750 can accept the values within the range of 0~400.
RS485 Source: pH >	Choose the source signal that is corresponding to the RS485 communication output signals: pH value or temperature value; pH value and temperature value.
RS485 BaudRate: 4800 >	Choose RS485 communication baud rate: 2400, 4800, or 9600.

The CALIBRATE Menu II (ORP CALIBRATE)

Displayed content (the content are the factory settings)	Description
Set: ORP >	For a sensor, completion of this single-point wet calibration will lead to the most accurate measurement result. When all the input values are "zero", the "ORP" value will be restored to the factory settings.
Loop Range: mV -2000→+2000 >	Set the minimum and the maximum physical values (4mA and 20mA respectively) that are corresponding to the current output signal.
Output Mode: ORP Off >	Choose either a "High", "Low" or "Off" working model for the relay. If the "High" and "Low" functions are not needed, the working model can be turned to "Off".
Output Setpnt: +0000 mV >	Under "Low" or "High" model, if the process variable reaches the set value, the relay output signal will be excited.
Output Hys: 50 mV >	When the measured value reaches the set value ± the return difference value, the output signal of the relay will be reset. Choosing"+" or "-" depends on whether the relay is under "High" or "Low" working models. (See page 3 for more details.)
Pules Range: mV -2000→+2000 >	Set the pulse rates at the starting and end points and the maximum pulse rate that are corresponding to the pulse signals.
Output PlsRate: 400 Pulses/Min >	Set the maximum pulse rate of the proportional pulse signal. PC-8750 can accept the values within the range of 0~400.
RS485 BaudRate: 4800 >	Choose RS485 communication baud rate: 2400, 4800, or 9600.

The OPTIONS Menu

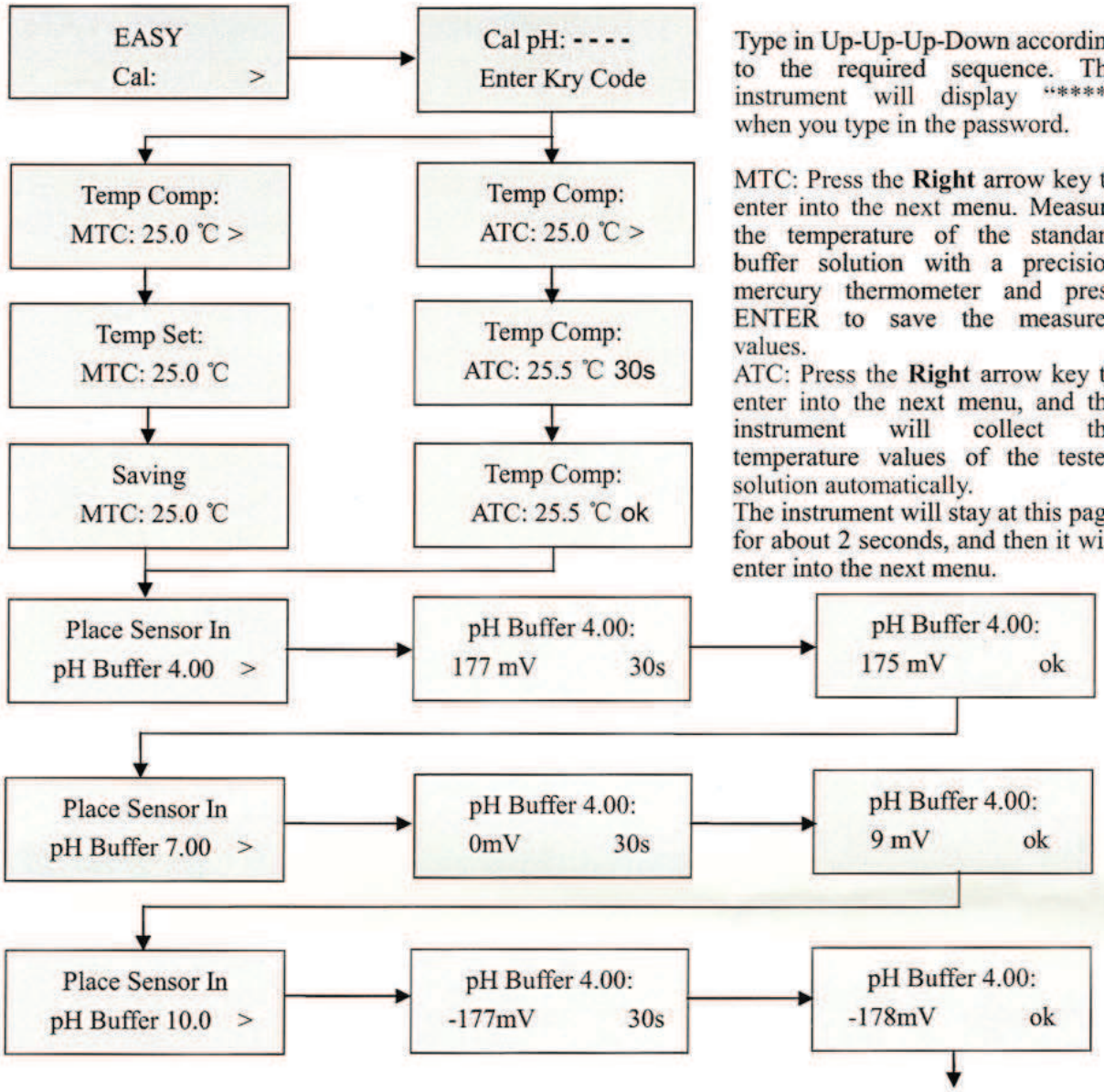
Displayed content (the content are the factory settings)	Description
Meas Units: pH >	Choose the measurement mode: pH/ ORP
Averaging: Off >	"OFF" is most responsive to the changes of the process variables. If there are frequent or large fluctuations, you may choose the deferred response time of 3s, 6s, 9s,…, 30s. The longest deferred response time is 30s.
Contrast: 3 >	Adjust the display contrast of the LCD in order to get the best visual effects. Level 1 is the relatively lower contrast while Level 5 is the relatively higher contrast. In relatively hot environment, it is better to choose the relatively lower contrast level.
Comeback data: Initialize data >	 Use this function with caution. If you choose "yes", the instrument will resume its initial data, so that you need to re-calibrate the instrument. Therefore, we do not recommend the users to use this function.

EASY CAL **calibration procedure** – PH

Electrical calibration for an instrument has been done in the factory.

- This calibration procedure needs only the 4.00, 6.86, and 9.18pH standard buffer solutions so as to simplify the calibration procedure.

■ Enter the EASY CAL calibration process from the "pH VIEW" menu.



Type in Up-Up-Up-Down according to the required sequence. The instrument will display "****" when you type in the password.

MTC: Press the **Right** arrow key to enter into the next menu. Measure the temperature of the standard buffer solution with a precision mercury thermometer and press ENTER to save the measured values.

ATC: Press the **Right** arrow key to enter into the next menu, and the instrument will collect the temperature values of the tested solution automatically.

The instrument will stay at this page for about 2 seconds, and then it will enter into the next menu.

The calibration is successful and the data are saved.------

GOOD Easy Cal
Press <ENTER>

The calibration fails and the data cannot be saved.--------
Press ENTER, and the instrument will return to the measuring status.

Not Easy Cal
Press <ENTER>

Note: Under the automatic temperature-measuring status, if the temperature falls out of the ranges of 0-60℃, the instrument cannot be calibrated. In this case, please check the sensor.

Technical instructions: The difference between the actual mV value and the displayed mV value can reflect the working conditions of a detector. If the above difference exceeds 50 mV, the detector should be repaired or replaced.

Theoretical mV value PH@25℃

mV value	+296	+237	+177	+118	59	0	-59	-188	-177	-237	-296
pH value	2	3	4	5	6	7	8	9	10	11	12

Troubleshooting

Displayed content	The possible causes	The recommended solutions
————	It displays the over range. When the process variation is close to or equal to the limit value of the sensor range, this shows that the instrument is in normal condition.	Check the sensor and re-calibrate the instrument.
Value must be 0 or more	The displayed or set values must be "0" or above.	Set values that are equal to or above "0".
Value must be 60 or less	The displayed or set values must be "60" or less.	Set values that are equal to or below "60".
Out of Range Use Manual CAL	1. The sensor has not detected the temperature signal or mV signal. 2. The sensor and the instrument are not well-connected.	1. Check all the connections. 2. Replace the sensor.
Value must be 400 or less	The pulse rate must be 400 or less.	Set a pulse rate that is equal to or below 400.

Technical instructions:

A: If the current output signal is locked at 0mA, please check the "Loop Range" option under the **CALIBRATE** menu so as to check whether the display value of the instrument exceeds the corresponding option.

B: If the pulse output signal is always locked at 0Pulse, please check the "Pulse Range" option under the **CALIBRATE** menu to see whether the display value of the instrument exceeds the corresponding option.

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