

P260

pH / REDOX MONITOR



OPERATION GUIDE

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P260 Intelligent On-line PH / REDOX(ORP) Monitor

1. INTRODUCTION

The P260 is a microprocessor controlled pH and Redox measurement instrument. The unit utilizes a multifunction LCD to display readings and provide feedback to the user. It is available with different option to provide fully configurable control, alarm and feedback with up to two relays and 0/4-20mA current output sources. It can be used to detect the pH, ORP value of the solution in chemical, petroleum, rubber, paper, tobacco, alcohol, sugar, food, mining, smelting, iron and steel, power generation, pharmaceuticals, water treatment and other industries.

2. FEATURES AND TECHNICAL SPECIFICATIONS

2.1 Features

- (1) 3-1/2 LCD digital with back-lit display
- (2) Measured process pH, redox, temperature
- (3) Accepts pH glass or antimony and Redox sensors
- (4) 0 ~ 100°C automatic/manual temperature compensation
- (5) Manual or Automatic buffer adjustment
- (6) Restore factory setting function is available
- (7) Galvanic separation between inputs and outputs and supply voltage
- (8) Different input for excellent noise rejection
- (9) High and low programmable alarm, 250V/10A relay output

2.2 Technical Specifications

- (1) Ranges of measurement: 0.00~14.00PH / 0~±2000mV / 0~100°C
- (2) Accuracy: ±0.1 % PH / ±0.1 % mV / ±0.2°C
- (3) Linearity: ±0.1% of range
- (4) Repeatability: ±0.1% of range
- (5) Temperature compensation type: Auto / manual 0°C to 100°C

- (6) Alarm Output: Two relays outputs (250V/10A), full range with hysteresis adjustable
- (7) Current output: DC 4~20mA, Opto-isolated outputs, (750 Ω Max. load)
- (8) Ambient Operating temperature: -10~+55 $^{\circ}$ C
- (9) Humidity: \leq 95%
- (10) Power supply: AC110 ~220V, 50~60Hz

3. INSTALLATION

The panel-mounting version is designed to be flush mounted and sealed in a square cut-out in a panel, and is held in place with the two screw clamps provided.

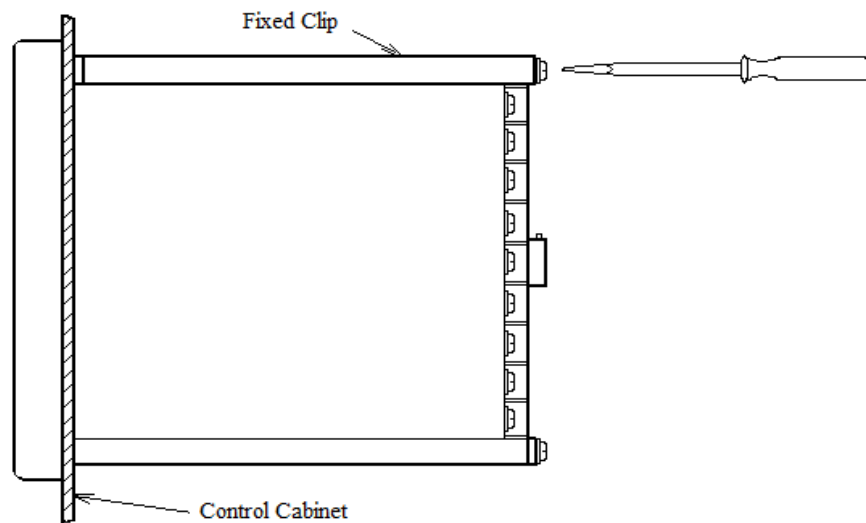


Figure 1 : installation diagram

3.1 Dimensions

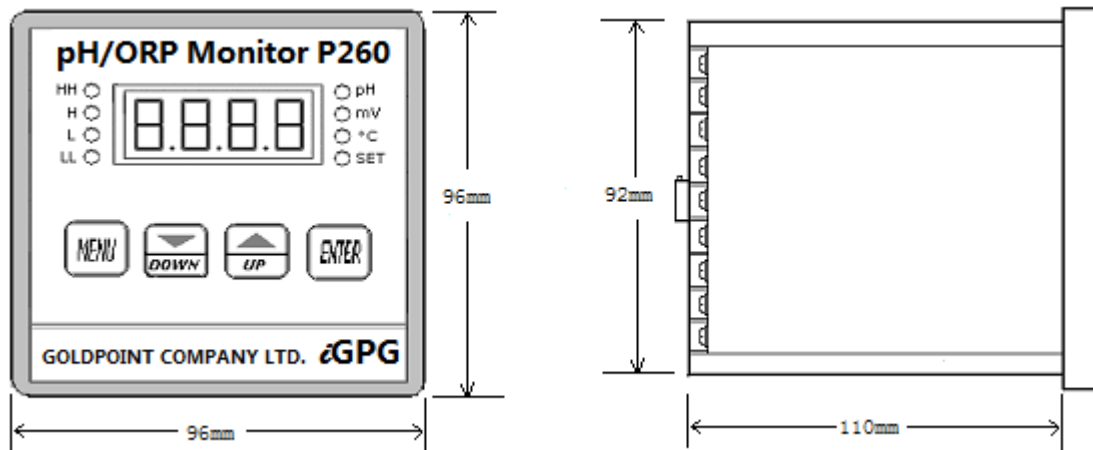


Figure 2 : overall dimensions panel-mounting

3.2 Panel Cut-out

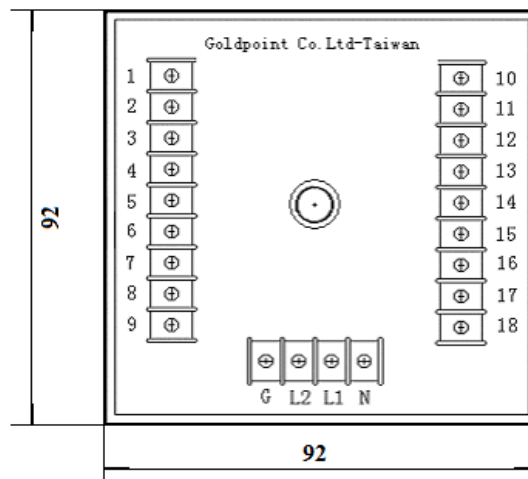


Figure 3: cut-out diagram

“ The panel cut-out for mounting the unit should be 92 mm x 92 mm (+1.0– 0.0).

“ Two screw clamps are supplied and are fitted from the back of the instrument

3.3 Connection

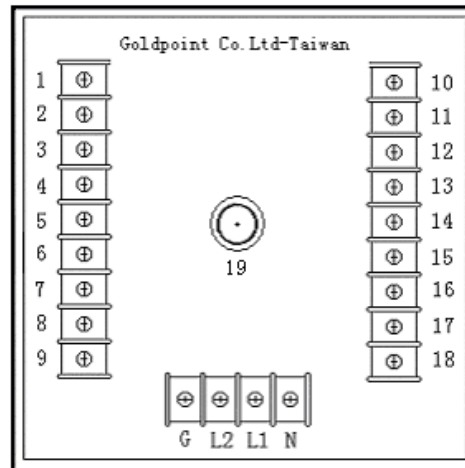


Figure 4: connection terminals diagram

Connection terminals wiring directions:

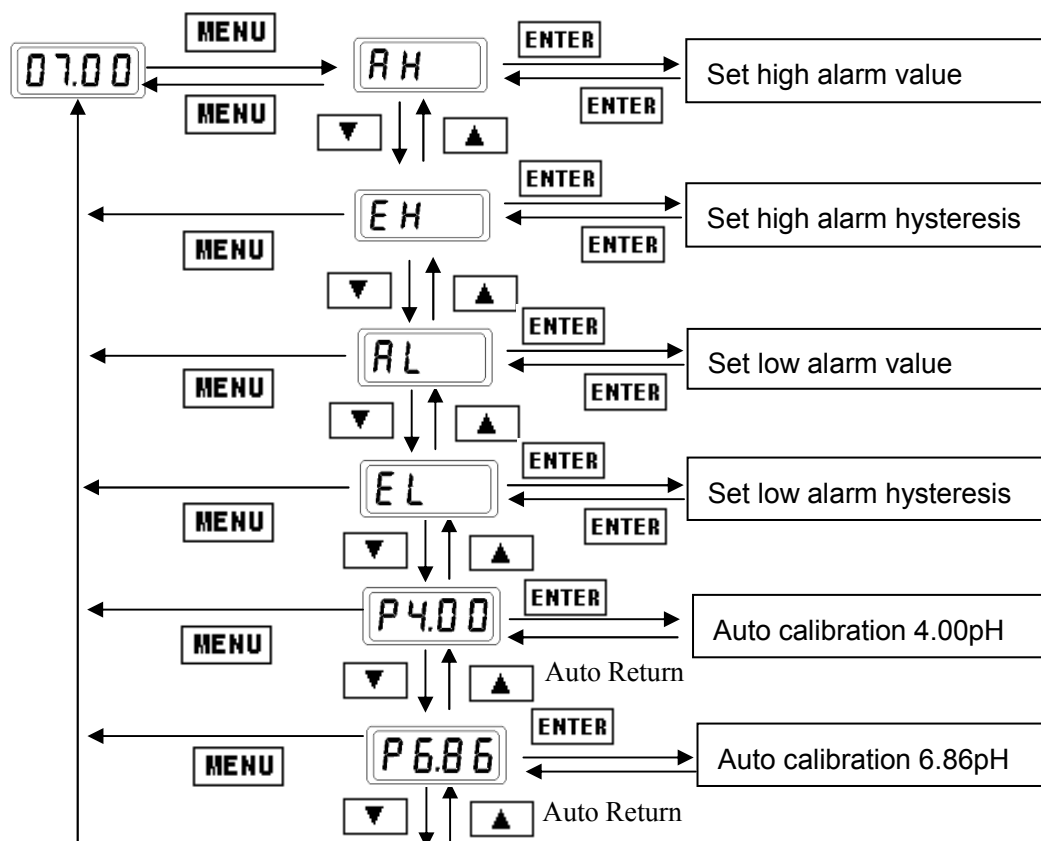
- (1) pH or redox sensor central line
- (2) Spare
- (3) Temperature sensor(1)
- (4) Temperature sensor(2)/ pH or redox sensor shield
- (5) 4~20mA Output (+)
- (6) 4~20mA Output (-)
- (7) Spare
- (8) Spare
- (9) Spare
- (10) High/Low alarm relay(Common)
- (11) Spare
- (12) High alarm relay(N/O, normally open)
- (13) Low alarm relay(N/O, normally open)
- (14) Spare
- (15) Spare
- (16) Spare
- (17) Spare

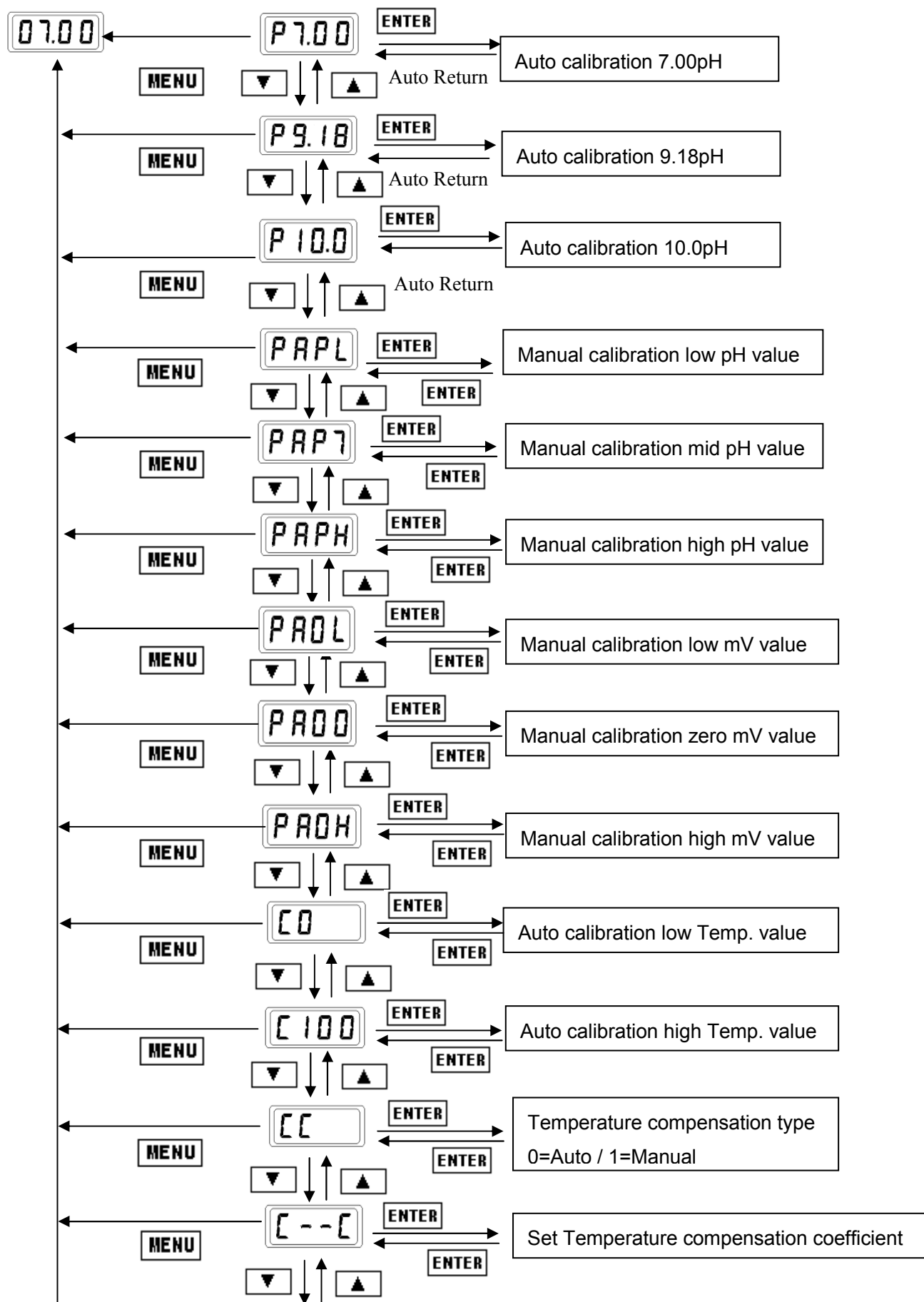
- (18) Spare
- (19) BNC connector for pH or redox sensor input
- (G) Ground
- (L2) Spare
- (L1) Power supply terminal: Connect AC110 ~ 220V
- (N) Power supply terminal: Connect the power supply phase

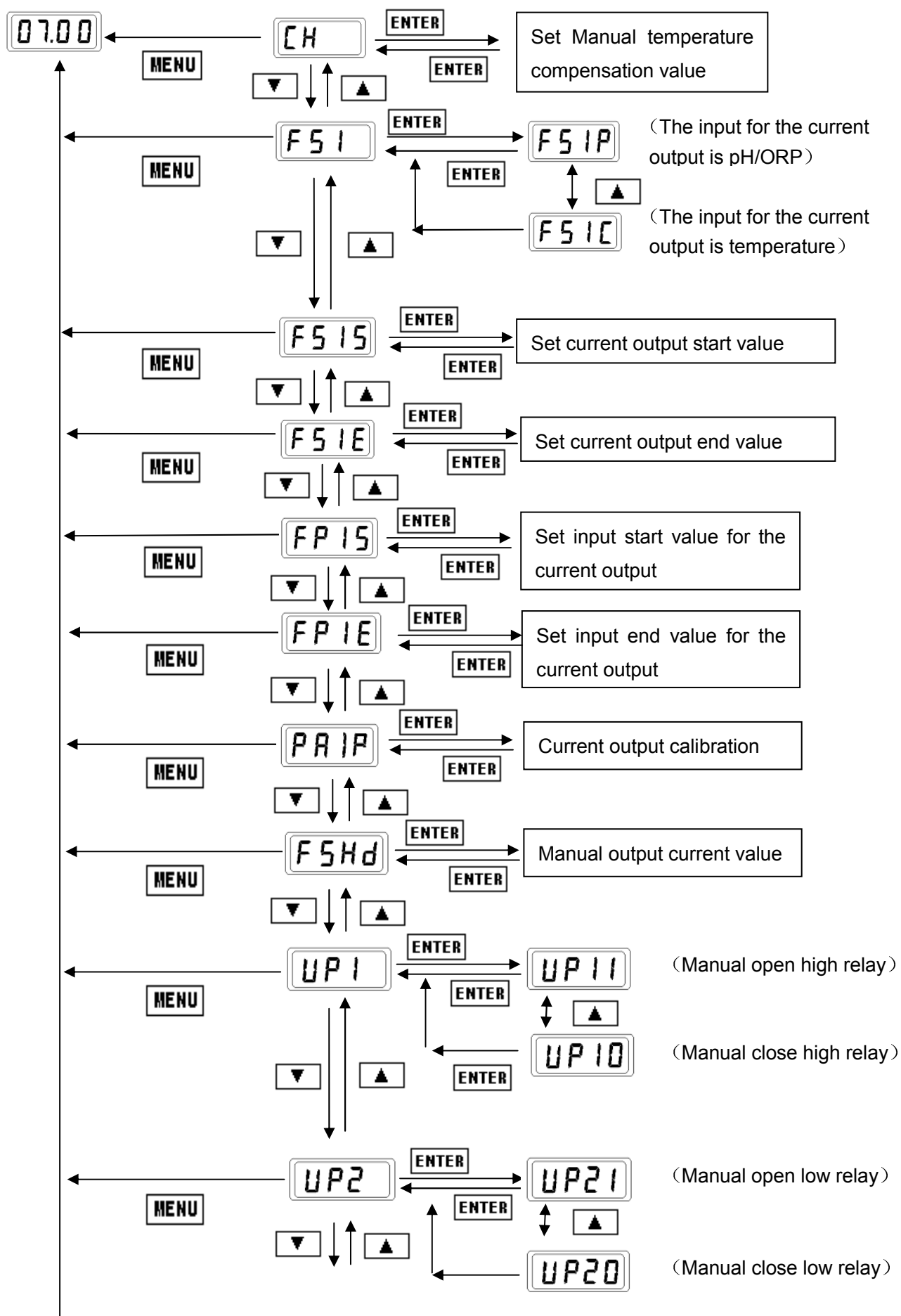
★ CAUTION ! :

The specified performance of the P260 is entirely dependent on correct installation. For this reason, the installer should thoroughly read the instructions before attempting to make any electrical connections to the unit.

4. MENU STRUCTURE







value of High alarm, furthermore lower than the hysteresis, the **H** alarm light will be turned off and the high relay (N/O) open.

- (3) **L** alarm light, Under the conditions of setting low alarm, when the measured pH value of the solution is lower than the value of low alarm, the **L** alarm light will be turned on and the low relay (N/O) close; When the measured pH value of the solution is higher than the value of low alarm, furthermore higher than the hysteresis, the **L** alarm light will be turned off and the low relay (N/O) open.
- (4) **LL** alarm light, (spare)
- (5) **LCD digital Monitor**, displayed the measured values (pH、mV、℃), and can also be displayed prompt function, parameter values and error codes in interactive.
- (6) **pH** indicator light. When the light is lit in the measuring state, means the measured value is pH; When the light is lit in the setting state, means the input parameter is pH.
- (7) **mV** indicator light. When the light is lit in the measuring state, means the measured value is mV; When the light is lit in the setting state, means the input parameter is mV.
- (8) **℃** indicator light. When the light is lit in the measuring state, means the measured value is Temperature; When the light is lit in the setting state, means the input parameter is Temperature.
- (9) **SET** indicator light, the light will be turned on when entering the setting state.
- (10) **MENU**, Press the **MENU** key to enter or exit the setting state.
- (11) **DOWN**, In the setting state, using the **DOWN** key the user can cycle through the next menu. To adjust a value, the **DOWN** key is used to select a digit.
- (12) **UP**, In setting state, using the **UP** key the user can cycle

through the front menu. To adjust a value, the **UP** key is used to increment the digit. In measurement state, the **UP** key is used to switch the display of temperature or pH/ORP.

- (13) **ENTER** key is the enter button to confirm enter the menu and store the setting parameters.

5.2 Parameter Setting and Operation

When the instrument is powered security, after a brief self-test program, **pH** indicator lights and display the pH value, example “7.00” as Figure 6. Indicates that the instrument is working in the measurement state.

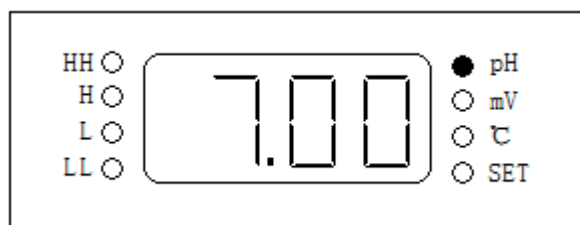


Figure 6 measurement state

5.2.1 Set Alarm

The P260 monitor has two alarm outputs designated high alarm(**H**) and low alarm(**L**). The alarm value and alarm hysteresis can be set within the currently selected measuring range.

table1 alarm value setting program content

Code	Content	Set range	Unit
<u>AH</u>	High alarm value	0~14.00/-2000~2000	pH/mV
<u>EH</u>	High alarm hysteresis	0~14.00/-2000~2000	pH/mV
<u>AL</u>	Low alarm value	0~14.00/-2000~2000	pH/mV
<u>EL</u>	Low alarm hysteresis	0~14.00/-2000~2000	pH/mV

***Note:** The setting should meet $AH-EH \geq AL+EL$

Alarm Relay

During normal operation when the alarm is not active, the alarm output will be in its NORMAL condition, the N/O (normal open) contact will be open. When the alarm is active, the alarm output will be in its ALARM condition and therefore the N/O contact will be closed.

Alarm Hysterisis

In a normal condition an alarm turns on and off at the same value. For example, if a high alarm turns on at 10.00pH the alarm occurs when the reading increases to 10.00pH. When it decreases through 10.00pH the alarm turns off.

Some applications may demand that the alarm turns off at a different value, for a high alarm this would be value lower than the alarm value, and for a low alarm this would be a value higher than the alarm value.

The hysteresis value determines the difference between the alarm switch on point and the alarm switch off point. In the case of a high alarm, hysteresis causes the alarm to turn off at a value that is less than the alarm value. For a low alarm, hysteresis causes the alarm to turn off at a value greater than the alarm value.

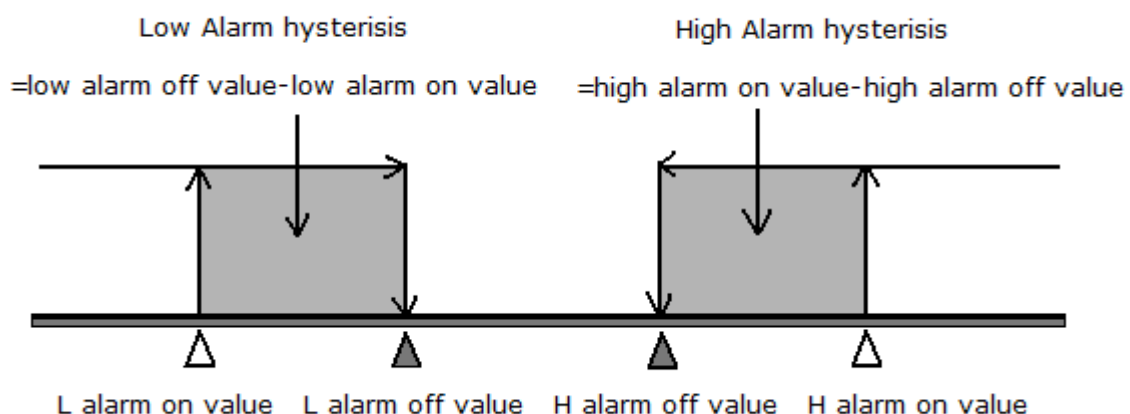


Figure 7 alarm with hysteresis

5.2.2 Calibration

Calibration Intervals

The P260 Monitor and Sensor combination once calibrated will require calibration checking/recalibration at 3-6 monthly intervals, however this does depend on the application. The calibration of the instrument can be effected by seasonal variations in the measured effluent, however only knowledge of the application can determine the re-calibration interval required.

5.2.2.1 P4.00、P6.86、P7.00、P9.18、P10.0—pH sensor auto calibration

Preparing For Calibration:

- ◆ pH buffer pH=4.00, 100ml (t=25℃);
- ◆ pH buffer pH=6.86 or pH=7.00, 100ml (t=25℃);
- ◆ pH buffer pH=9.18 or pH=10.0, 100ml (t=25℃);
- ◆ pure water 300~500ml;

Specific operations: first select P4.00 or P6.86 or P7.00 or P9.18 or P10.0 in the menu and put the dry and clean sensor into the corresponding standard buffer solution, press ENTER key to enter its settings program, then wait for the flashes display value is stable, each automatic calibration process automatically will return to setting mode when it completed. Press the MENU key to return to measurement mode.

Table2 sensor auto calibration program content

Code	Content	Direction
<u>P4.00</u>	Auto calibrate pH=4.00	Use pH=4.00 buffer to calibrate
<u>P6.86</u>	Auto calibrate pH=6.86	Use pH=6.86 buffer to calibrate

<u>P7.00</u>	Auto calibrate pH=7.00	Use pH=7.00 buffer to calibrate
<u>P9.18</u>	Auto calibrate pH=9.18	Use pH=9.18 buffer to calibrate
<u>P10.0</u>	Auto calibrate pH=10.0	Use pH=10.0 buffer to calibrate

***Note:** The above solution temperature is 25℃

General sensor calibration, two-point calibration method and three-point calibration method can be use as needed. In the use of two or three points calibration method should be the zero calibration first (pH = 7 or 6.86)

5.2.2.2 PAPL、PAP7、PAPH—pH sensor manual calibration

(PAOL、PAO0、PAOH—ORP sensor manual calibration)

Besides the previously mentioned standard buffer used for automatic calibration, also the other known pH solutions can be used for manual calibration.

Specific operations: first select PAPL (low value) or PAP7 (median value) or PAPH (high-value) in the menu and put the dry and clean sensor into the corresponding solution, Press ENTER to enter its program, then the instrument displays the measured value of the solution, and in flashing mode which is different from the measurement states. After the measurement data is stable then Press ENTER again, now only the first digit flashing in the display data means it is modify bit. Press DOWN to choose the modification bit, press UP key to modify the data, make the display value as same as the pH value of the solution (Attention to maintaining the solution temperature 25 ℃) , press ENTER to store the calibration data(This value is stored even after power failure), and return to the setting state.

If the display state is set to the ORP measurement (i.e. mV), select PAOL (low value), PAO0 (median value), PAOH (high-value) in the menu can

set the ORP manual calibration. Method is similar to the pH, but the buffer should be replaced by the corresponding standard ORP buffer solution.

Table3 sensor manual calibration program content

Code	Content	Direction
<u>PAPL</u>	Manual calibrate pH low value	Use pH=2~6 buffer to calibrate
<u>PAP7</u>	Manual calibrate pH zero	Use pH=6~8 buffer to calibrate
<u>PAPH</u>	Manual calibrate pH high value	Use pH=8~12 buffer to calibrate
<u>PAOL</u>	Manual calibrate ORP low value	Use ORP<-100mV buffer to calibrate
<u>PAO0</u>	Manual calibrate ORP zero	Use ORP=-100~+100mV buffer to calibrate
<u>PAOH</u>	Manual calibrate ORP high value	Use ORP>+100mV buffer to calibrate

***Note:** The above solution temperature is 25℃

5.2.2.3 C0、C100—temperature calibration

P260 has temperature measurement function, for the automatic temperature compensation, and also can be displayed on the monitor. Temperature calibration requires a high and a low constant temperature environment. Such as ice water mixture (0℃) and boiling distilled water (100℃). C0 is used to calibrate 0℃. select C0 in the menu and put the sensor into 0℃ environment, press ENTER to store the calibration data , and return to the setting state. The Method of calibrate 100℃ is as same as calibrate 0℃.

Table4 temperature calibration program content

Code	Content	Direction
<u>C0</u>	Auto calibrate temperature=0℃	Use Ice water mixture (0℃) to calibrate
<u>C100</u>	Auto calibrate temperature=100℃	Use boiling water (100℃) to calibrate

5.2.3 Temperature Compensation

5.2.3.1 CC—auto/manual temperature compensation switch

P260 has Auto and manual temperature compensation function. The user can select between two modes of compensation by the CC in the menu. Press ENTER into CC and display CC0 or CC1. CC0 is Auto temperature compensation, CC1 is manual temperature compensation. Press UP to switch it, then press ENTER to store and return to the setting state.

5.2.3.2 C--C—set temperature compensation coefficient

The temperature compensation coefficient is different for each type of solution, so the temperature compensation coefficient is designed to be adjustable (25 °C as the reference), and the range is -2~+2%/°C. Select C--C in the menu, press ENTER into it and display the original value, use DOWN and UP to modify it, then press ENTER to store and return to the setting state. The temperature compensation coefficient works both in automatic and manual temperature compensation.

The Calculation Method of coefficient

$$\varepsilon = \frac{\text{pH}35 - \text{pH}25}{\text{pH}25 * (35 - 25)} \times 100\%$$

Remark: pH25=the pH value at t=25°C; pH35=the pH value at t=35°C

5.2.3.3 CH—set manual temperature

In this mode the instrument should be set with the “CC1” and the user can set the solution temperature (0~100°C) in the CH menu. Press ENTER into CH and display the original value, use UP and DOWN to modify it, then press ENTER to store and return to the setting state.

Table5 temperature compensation program content

Code	Content	Direction
<u>CC</u>	Auto/manual temp. compensation switch	0=Auto/1=manual
<u>C--C</u>	Temp. compensation coefficient setting	Range: -2~+2%/°C
<u>CH</u>	Manual temperature setting	Range: 0~100°C

5.2.4 Set Current Output

P260 has one 4~20mA current output. The user can select the input source: pH/ORP or temperature. And the current output can be set work over the whole range of the input source.

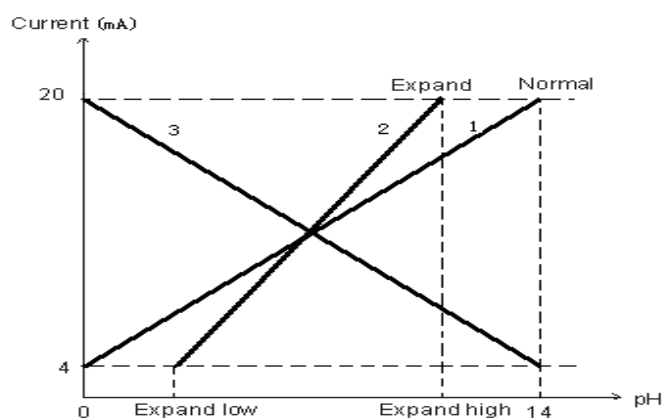


Figure 8 Current span curve

The output can be set work over the whole of selected measurement range (curve1) or a portion of it by setting of the output start and end values (curve2). It is also possible to configure the output to work reverse to normal, i.e. a 4 – 20 mA output where 20 mA corresponds to the zero display value and 4 mA corresponding to the full scale value. (curve3).

5.2.4.1 FSI—select the input for the current output

Select FSI in the menu, press ENTER into it and display FSIP or FSIC. FSIP is pH/OPR as the input, FSIC is temperature as the input.

Press **UP** to switch it, then Press **ENTER** to store and return to the setting state.

5.2.4.2 **FSIS、FSIE—set current output start and end value**

Select **FSIS** in the menu, press **ENTER** into it and display the original current output start value, use **DOWN** and **UP** to modify it, then press **ENTER** to store and return to the setting state.

The same method select **FSIE** to set the current output end value.

Table6 set current output

Code	Content	Direction
<u>FSI</u>	The input for the current output	P:pH/ORP C: temperature
<u>FSIS</u>	Current output start value	4.00~20.00 mA
<u>FSIE</u>	Current output end value	4.00~20.00 mA

5.2.4.3 **FPIS、FPIE—set input value range for the current output**

After selecting the input parameters, you can set its start value and end value. Select **FPIS** in the menu, press **ENTER** into it and display the original input start value, use **DOWN** and **UP** to modify it, then press **ENTER** to store and return to the setting state. The same method select **FPIE** to set the input end value. Please note that each parameter has a different range as below.

Table7 set input range for the current output

Code	Content	PH range	ORP range	Temp. range
<u>FPIS</u>	Input start value	0.00~14.00	-2000~2000	0~100℃
<u>FPIE</u>	Input end value	0.00~14.00	-2000~2000	0~100℃

5.2.5 SSPP—Measurement Mode

P260 has pH, ORP and temperature three modes of measurement and display functions, it can be selected in the SSPP program.

Select SSPP in the menu, Press ENTER into it and display SSP0 or SSP1 or SSP2. SSP0 is pH mode, SSP1 is ORP mode. SSP2 is temperature mode. Press UP to switch it, then Press ENTER to store and return to the setting state. The indicator light also changes to indicate that the display state changes. The corresponding parameters in the setting also will automatically change.

***NOTE:** The sensor should be changed when switch the measurement mode.

Table8 measurement Mode

Code	Content	Indicator light	Available sensor
<u>SSP0</u>	Display pH value	pH lights	pH sensor
<u>SSP1</u>	Display ORP value	mV lights	ORP sensor
<u>SSP2</u>	Display Temp. value	°C lights	Temp. sensor

In addition, when in measurement mode press UP it can display the temperature value, and the Temp. indicator will light. After a few seconds automatically return to the original measurement mode.

5.2.6 FAcT—Restore Factory Setting

Select FAcT in the menu, press ENTER into it and display HHHH. At this moment the instrument is being restored factory setting, about 10 seconds it will automatically returns to FAcT, restore factory setting is completed. After this process, all value the user set before becomes the factory calibration value. This function is generally used for replace with new sensor or data confusion. Generally after restored factory setting, it need recalibration before using.

6. ERROR CODES

When the instrument detects an error condition, an error code will be displayed. All the error codes are described below.

Table9 error codes

Code	Content	Solve methods
Er01	Measurement value out of range	Confirm the measuring solution within the measuring range of the instrument
Er02	Sensor signal failure	<ol style="list-style-type: none"> 1. Check whether the sensor connected with the monitor properly, (Reference 7.4 cable connection.) 2. Enter menu <u>FACt</u> to restore factory setting 3. Suggest check or replace the sensor
Er03	Temperature sensor failure	<ol style="list-style-type: none"> 1. Check whether the temperature sensor connected with the monitor properly 2. Check whether the temp. compensation (menu <u>CC</u>) setting correct
Er04	Alarm setting error	<ol style="list-style-type: none"> 1. Check whether the alarm setting correct, setting should meet $AH - EH \geq AL + EL$ 2. Enter menu <u>FACt</u> to restore factory setting
Er05	System error	Contact the supplier to repair
Er06	Calibration error	<ol style="list-style-type: none"> 1. Check whether the calibration setting correct 2. Enter menu <u>FACt</u> to restore factory setting

7. SENSOR

We use foreign advance technology to manufacture our pH/ORP combination sensor. The quality of the sensor is excellence and it can be used in industry province with all kind of pH/ORP monitor.

The following will introduce the pH sensor ph102 as an example to know about the features and use specifications of the sensor.

7.1 Sensor Features

- ✧ Easy to use , without added electrolyte
- ✧ pH measurement rang is 0~14pH, temperature is 0~80℃
- ✧ Quickly response(within two seconds) and stability
- ✧ Unique structure preventing the sensor from pollution and blockage
- ✧ To apply all low –conductivity water($\geq 0.1\mu\text{S}/\text{cm}$)

7.2 Maintenance and measurement

- ✧ The sensor should be cleaned and inserted into mixture solution of 3.5mol KCL and pH 4.00 buffer (1:1 ratio) when not in use.
- ✧ Storage dry conditions, 10~30℃. If temperature is below -5℃, the sensor may fracture due to freezing of buffer and electrolyte.
- ✧ Insert the sensor into distilled water or protein solution for long time should be avoided, and prevent from contact with organic silica grease.
- ✧ Dry stored pH sensors must be immersed in water for 12 hours prior to use.
- ✧ Each new sensor must be calibrated with monitor. For pH sensors, 2 or 3 points calibration is necessary.
- ✧ The frequency of calibration or checking the measuring sensor depends on the application conditions.

7.3 Cleaning

- ✧ If the sensor bead or membrane is contaminated by substances containing grease, surface active agent can be used to rinse it.
- ✧ If the sensor bead or membrane is contaminated by protein content (food industry applications), a mixture of dilute hydrochloric acid(10%) and pepsin(saturated) can be used to rinse it.
- ✧ If the sensor bead or membrane is contaminated calcium deposal and metal hydroxide coating, dilute hydrochloric acid(10%) can be used to rinse it.

7.4 Connections

- ✧ Terminal connection or BNC connection
- ✧ Ensure the black semiconductor layer between the copper wire and the polyethylene insulation is completely insulated.

7.5 Sensor Installation

7.5.1 Dimension (Unit: mm)

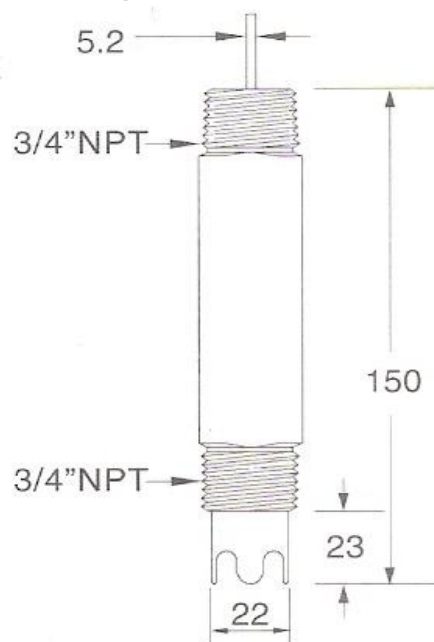


Figure 9 sensor dimension

7.5.2 Installation Diagram

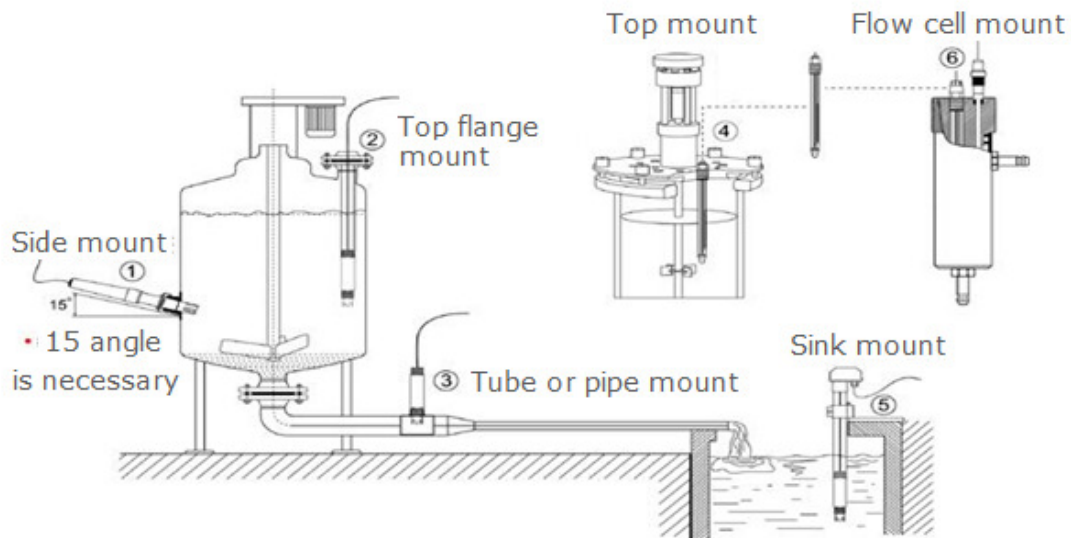


Figure 10 installation diagram

8. WARRANTY

Products manufactured by GOLDPOINT company Ltd. are guaranteed for a period of one year from the date of delivery. Goods for attention under guarantee must be returned to the factory carriage paid and, if accepted for free repair, will be returned to the customer's address free of charge.

All sensors made by GOLDPOINT company Ltd. are thoroughly tested to their published specification before delivery. As we have no control over the conditions in which their sensors are used, no further guarantee is given.

9. STANDARD CONFIGURATION

- P260 monitor
- Mounting fixing of monitor
- Operation guide
- Inspection report

10. OPTIONAL CONFIGURATION

- Combination pH sensor (cable length 10 meters)
- Combination ORP sensor (cable length 10 meters)
- Combination pH with temperature sensor (cable length 10 meters)
- Sink sensor stand
- Flow cell
- pH buffer
- Cable for extend