



## User Manual BPHT-109 pH/ORP Controller



# DESCRIPTION

The BASI BPHT-109 pH/ORP transmitter and controller is ideal for monitoring of pH, ORP and mV. Complete electrical isolation between measuring circuit supply and the 4-20mA output is provided. The BPHT-109 is compatible with most pH electrodes. The transmitter is housed in a compact IP65 DIN case enclosure suitable for panel mounting. The digital display provides a continuous display of the pH/mV Temperature level, alarm settings and provides a convenient 'on the spot' display during calibration and setting up. Easy to follow 'on display' messages assist the user to set up and calibrate the Controller/transmitter. Two point calibration provides a thorough calibration Using two accurate buffer solutions.

## Technical performance

1. Measuring range: pH 0.00~14.00 pH
  2. Resolution: 0.01pH; Class: 0.05
  3. Stability:  $\leq 0.03\text{pH}/24\text{h}$ ;
  4. Adjustable calibrate range: Zero  $\pm 1.45\text{pH}$  Slope 80% ~100%
  5. pH standard solution: 6.86/4.01/9.18 ; 4.00/7.00/10.01
- Control range: 0~14.00pH

## Function

Display, high and low points output ON/OFF, high and low points alarm, 30 days historical data logger (optional), 4~20mA output, RS485 output(optional).

## Temperature compensation

The BPHT109 has auto temperature compensation.

## Signal output

4~20mA current output, output load is less than 500 $\Omega$ . Output current  $I=4\text{mA}+\{(D-DL)/(DH-DL)\}\times 16\text{mA}$

Note: I—output current D—tested pH value; DH—pH value corresponding 20mA set by users, namely upper limit of output; DL—pH value corresponding 4mA set by users, namely lower limit of output. Error= $\pm 0.04\text{mA}$

# Installation steps

1. Cut a hole on any board that thickness is between 1.5mm and 9.5mm, hole size is 92x92mm. (Pic1, rear view)
2. Insert the instrument into the hole, then tighten.



Pic1

# Installation Instruction



Use this instrument stents to fix instrument on the panel.

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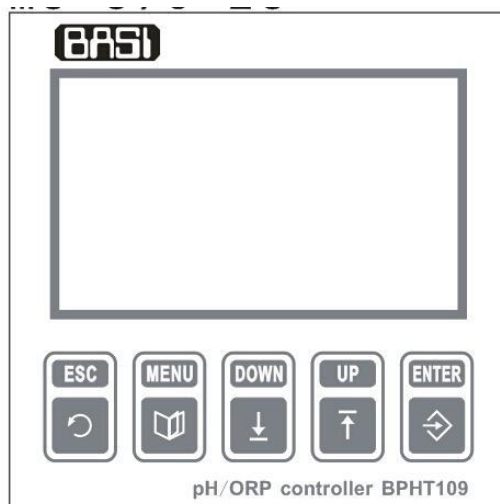
Pic2

# Back panel wiring diagram

- |                            |                                   |
|----------------------------|-----------------------------------|
| 1: High normal open (NOH)  | 9: Reference electrode (Ref)      |
| 2: High common (COMH)      | 10: Temp compensation1 (TEMP1)    |
| 3: High normal close (NCH) | 11: Temp compensation2 (TEMP2)    |
| 4: Low normal open (NOL)   | 12PH: Measuring electrode (INPUT) |
| 5: Low common (COML)       | 13: RS485 A                       |
| 6: Low normal close (NCL)  | 14: RS485 B                       |
| 7: 220V phase wire         | 15: 4~20mA(+)                     |
| 8: 220V null line          | 16: 4~20mA(-)                     |



# Front panel



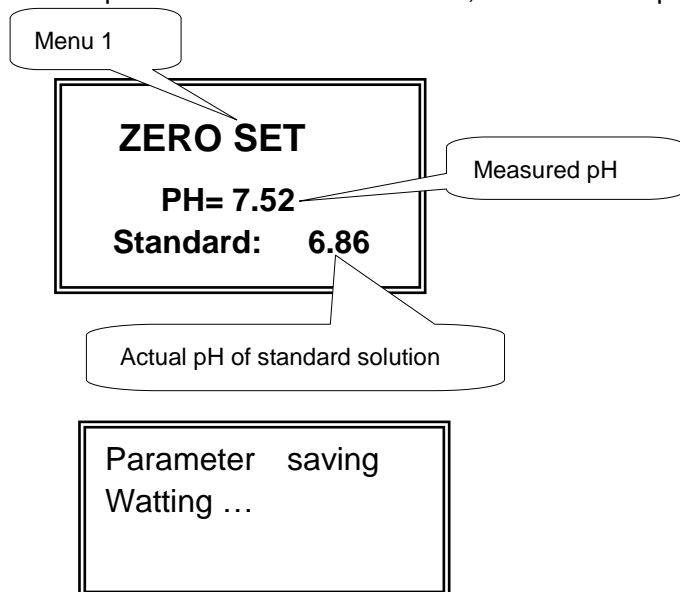
- 1: **MENU**: circulation mode
- 2: **DOWN**: numerical reduction
- 3: **UP**: numerical increment
- 4: **ENTER**: confirm
- 5: **ESC**: back to main interface

# Operation

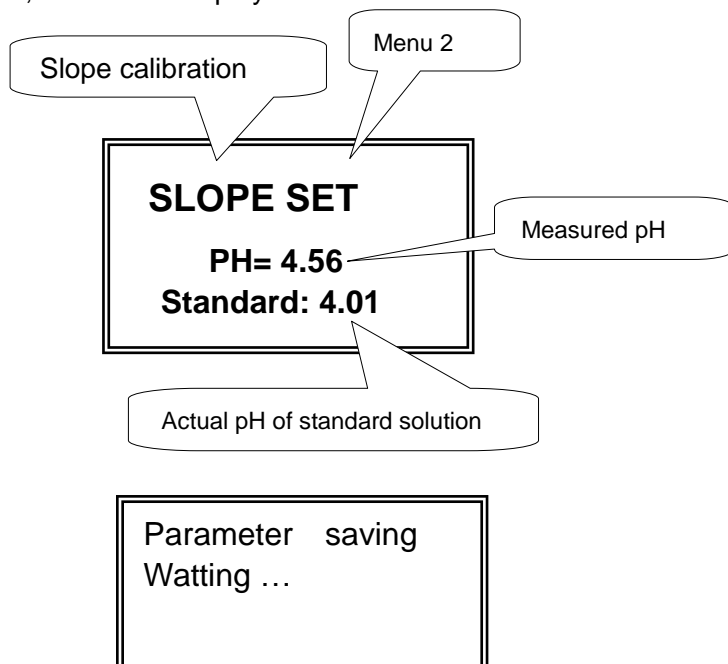
## Calibration steps

Clean the electrode using distilled water blot with filter paper, then put electrode into standard solution of pH6.86, stir slowly, until the number displayed stable.

**Zero calibration:** press **MENU** to enter menu 2, the screen display as follow:

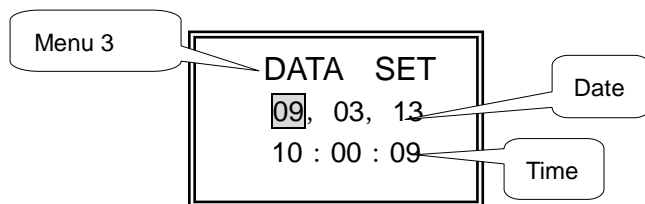


**Slope calibration:** press **MENU** to enter menu 2, take out the electrode form standard solution of pH6.86, clean and blot with filter paper, then put the electrode into standard solution of pH4.01 ( or pH9.18) , stir slowly, until the number displayed stable. Press **MENU**, the screen display as follow:

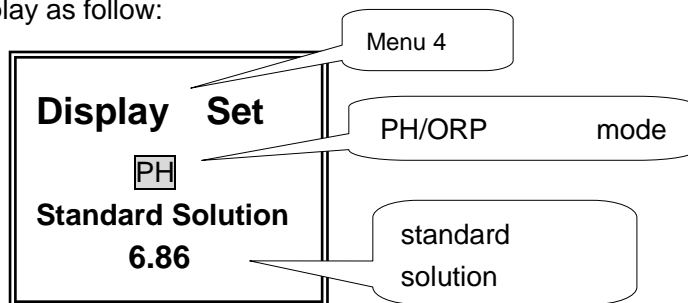


**Remark :** when changing the probe or probe is used for long time, the BPHT109 must be calibrated.

Time set: press **MENU** to enter menu 3, the screen display as follow:



PH/ORP mode swapping, standard solution selection: Press **MENU**, to enter menu 4, the screen display as follow:



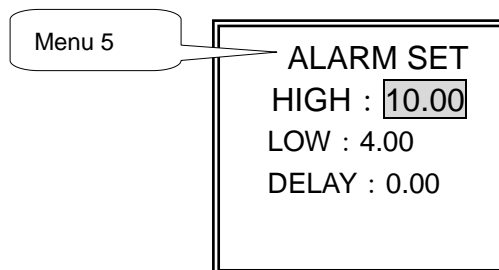
Press **ENTER** to move cursor, press **DOWN** or **UP** to change number. Standard solution selection:

6.86 means (6.86/4.01/9.18) standard solution.

7.00 means (4.00/7.00/10.01) standard solution.

Move the cursor to the last column, then press **ENTER** until display waiting, then confirm.

Alarm set : press **MENU** to enter menu 5, the screen display as follow:



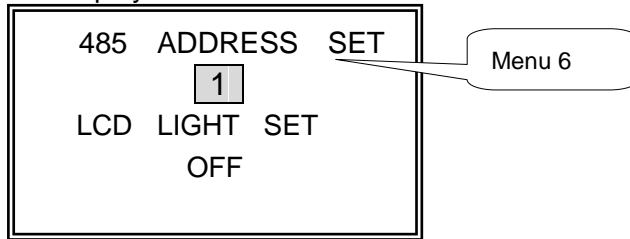
Press **ENTER** to move cursor, press **DOWN** and **UP** to change number , press **ENTER** not release to save. HIGH: high alarm settings, LOW: low alarm settings. DELAY: hysteresis volume settings.

Mark: 【DELAY value is between 0~ (HIGH- LOW)】

**High relay** Will act when actual measured value are higher than high alarm settings (high value); will release when actual measured value are lower than high alarm settings (high value).

**Low relay** Will act when actual measured value are lower than low alarm settings (low value); will release when actual measured value are higher than low alarm settings (low value). Are beneficial to extend the service life of relay or contactor. So the user must set high, low and hysteresis according to the actual conditions.

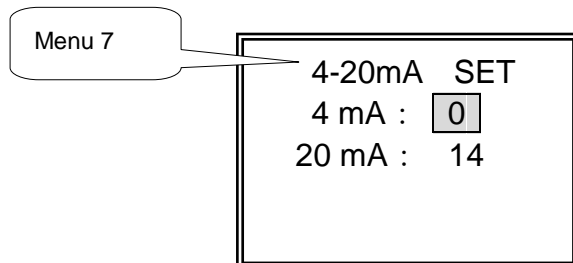
**RS485 communication address and backlight set:** press **MENU**, to enter menu 6, the screen display as below:



Press **ENTER** to move cursor, press **DOWN** and **UP** to change number , or **ON/OFF**

to switch , when LCD LIGHT SET are in ON status, backlight close when there is no operation of the buttons, then sort press **ENTER** to move cursor to the last column, then long press **ENTER** until screen display **Waiting** ...then confirm.

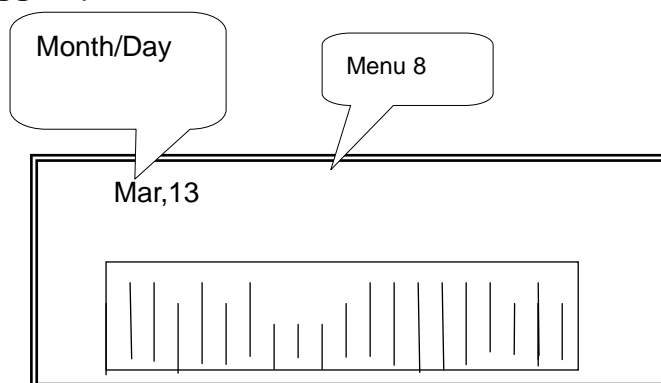
**Set of 4~20mA corresponding pH value:** press **MENU**, to enter menu 7, screen display as below:



4-20mA respectively corresponding 0-14 pH, but the user can set up freely to meet industrial needs.

Press **DOWN**, **UP** to change number, then short press **ENTER** to move cursor to the last bar, then long press **ENTER** until screen display **Waiting** ...then confirm.

**Data logger:** press **MENU**, to enter menu 8, screen display as below:



This instrument can record a data every 12 minutes, store the data for 30 days, press the **DOWN** key, the **UP** button the historical data of one day, when you need to check for one day some time, you can press the **ENTER** key to **ENTER**, then press the **DOWN** button and the **UP** move the cursor around the query. Then press the **ENTER** key to **ENTER** back is the highest level of interface, press the **MENU** key back is the highest level of the **MENU**.

## pH electrode use and maintenance

The PH electrode, should be in cleaned in distilled water (or) in deionized water, 1/3 of the electrode should be inserted in the solution when measure.

Electrode should be washed when not in use, insert with 3.5 mol, the cases of the potassium chloride solution, or electrode will be inserted with 3.5 mol, potassium chloride solution in the container. Check whether terminals is dry, such as contamination, please use anhydrous alcohol to wipe, blow dry after use. Should avoid long-term immersion in distilled water or protein solution, and to prevent contact with silicone grease. Using electrode for a longer time, it may become translucent glass membrane or with sediments, this time can dilute hydrochloric acid washing, and rinse with water. Electrode used for a long time, and if measurement error, must perform calibration for instrument. For correction. When using the above way of electrode maintenance and maintenance is still not during calibration and measurement, the electrode has failed, please replace the electrodes.



## Standard buffer pH value reference table

| TEMP °C | 4.00 | 4.01 | 6.86 | 7.00 | 9.18 | 10.01 |
|---------|------|------|------|------|------|-------|
| 0       | 4.00 | 4.00 | 6.98 | 7.12 | 9.46 | 10.32 |
| 5       | 4.00 | 4.00 | 6.95 | 7.09 | 9.39 | 10.25 |
| 10      | 4.00 | 4.00 | 6.92 | 7.06 | 9.33 | 10.18 |
| 15      | 4.00 | 4.00 | 6.90 | 7.04 | 9.28 | 10.12 |
| 20      | 4.00 | 4.00 | 6.88 | 7.02 | 9.23 | 10.06 |
| 25      | 4.00 | 4.01 | 6.86 | 7.00 | 9.18 | 10.01 |
| 30      | 4.01 | 4.02 | 6.85 | 6.99 | 9.14 | 9.97  |
| 35      | 4.02 | 4.02 | 6.84 | 6.98 | 9.17 | 9.93  |
| 40      | 4.03 | 4.04 | 6.84 | 6.97 | 9.07 | 9.89  |
| 45      | 4.04 | 4.05 | 6.83 | 6.97 | 9.04 | 9.86  |
| 50      | 4.06 | 4.06 | 6.83 | 6.97 | 9.02 | 9.83  |

## User instructions

- Please follow the operation procedures in this manual.
- if found work abnormal or damaged, please contact the dealer.
- In order to make more accurate measurement, instrument must be calibrated. If electrodes have been working nearly a year or there is quality problems, please pay attention to change electrode.
- Please warm up the instrument 30 minutes before calibrate the instrument.

## Warranty

BASI Instrument AB warrants this product to be free from defects in materials and workmanship for 12 months. If your unit is found to be defective within that time, we will promptly repair or replace it. This warranty does not cover accidental damage, wear or tear, or consequential or incidental loss. This warranty does not cover any defects caused by wrong transportation, storage, installation, or operating (see '**Specifications**').

# Technical support

In the unlikely event that you encounter a problem with your BASI device, please call your local dealer or contact directly our support team.

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