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INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

pHimetro

BL-BGD286

Instruction Manual

BGD 285

EXACT pH METER

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Ⅰ. General

Read this manual thoroughly before use please.

The Model **BGD 285 pH meter** is a $3\frac{1}{2}$ digit decimal pH meter with ATC (auto temperature compensat -ion) or MTC (manual temperature compensation). It can measure the temperature of the medium to be measured and display the values of temperature, pH and mili-voltage It is suitable to measure the pH value of aqueous solution and the potentials of electrodes in laboratories of research institutes, factories and mines. If it is equipped with an appropriate ion selective electrode, it can be used as a terminus display device for potential titration.

Ⅱ. Main Specification

1. After having been powered on and warmed up for thirty minutes, the instrument can be used continuously under the following conditions:

(1) Ambient temperature：0～+40℃；

(2) Relative humidity：less than 85%

(3) Power supply：110V AC±11V AC，60Hz±1Hz

or 220V AC±11V AC，50Hz±1Hz

2. **Main parameters:**

(1) Measuring range：pH：0～14.00pH

mV：0～±1999mV（automatic polarity display）

T：0～100℃

(2) Error of electro-unit：pH：0.01pH

mV：±0.1%F.S

(3) Meter accuracy： pH：±0.01pH±1 digit

mV：±0.1%F.S

T：±0.5℃±1 digit

(4) Input impedance：$\geq 10^{12}\Omega$

(5) Zero drift：≤0.01pH±1 digit/3h

(6) Error of electro-unit after temperature compensation：±0.01pH

(7) Overall dimension： 280×200×95 mm

(8) Weight：1 kg

(9) Power consumption：1.5 W

Ⅲ. Principle of Operation

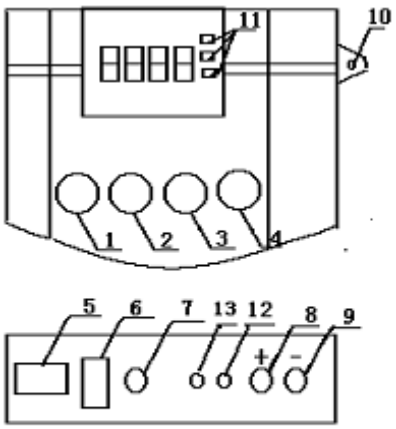
The Model BGD 285 pH meter is based on a D.C. potential generated by a pH electrode and a

reference electrode against different acidity of solution to be measured. The D.C. potential is fed to an analog-to digital converter via a preamplifier for digital display of pH value. Similarly, in an application that it is equipped with an appropriate ion selective electrode for a potential titration, it is need for display of terminus potentials.

1. Measuring theory

Ⅳ. Structure

The meter make up of electro-unit, compound electrode and temperature sensor as Fig 2.



1. Temperature adjusting knob
2. Slope adjusting knob
3. Setting knob
4. Selection knob
5. Power outlet
6. Power switch
7. Fuse seat
8. Connection terminal for reference electrode
9. Measuring electrode outlet
10. Hole for electrode rod
11. Indicator light
12. Selection switch
13. Temperature sensor

Fig. 2 The structure of pHS-3B

Ⅴ. Operation and Maintenance

1. Setting the meter

The meter must be set on no vibration table and have good earthing.

2. Preparation before using

2.1 Warm up the meter

a) Take out the compound electrode and temperature sensor. Preparing buffer solution, distilled water, beaker and filter paper etc. The Q9 short circuit plug must be inserted into the input terminal of the instrument before inserting the electrode into the instrument, to make the input terminal in the short circuit and to protect the electric element.

b) Put the power key on “OFF”. Insert the three-pin power plug into the AC power outlet.

c) Put on the power supply. Warm up the meter for 10 minutes before using it.

2.2 How to use the ATC and MTC function.

To link the temperature sensor, put the selection knob on auto position and the meter can work in ATC mode. Now the MTC function will be invalidation.

a) ATC mode: Put the selection knob on "℃". The value displayed means the temperature of the medium to be measured. At the same time the temperature signal be sent to the pH-t mixture circuit to compensate the pH value.

b) MTC mode: Remove the temperature sensor, Put the selection knob on MTC and "℃" position. Adjust the temperature regulation knob until the value of temperature displayed is same as the indication value of thermometer pluged in the medium to be measured. At the same time the temperature signal be sent to the pH-t mixture circuit to compensate the pH value manualy.

2.3 Calibration

Before operating, i.e. before measuring the solution to be measured, the instrument should be calibrated. However, it does not mean that it must be calibrated before operating each time. For successive operating, in general, it will be calibrated once a day.

There are two methods of calibration, one is one point calibration for normal use and the other is two points calibration for exact measuring.

2.3.1 One point calibration procedure (taking ATC for example):

a) Remove the Q9 short circuit plug, Link the compound electrode and the temperature sensor, clean the electrode with distilled water and blot it with filter paper, then plug the electrode into the buffer solution (pH=4 or pH=9.18).To measure the temperature first, put the selection knob on "℃" and ATC position, The value displayed means the temperature of the medium to be measured.

b) Put the selection knob on "pH", turn the slope knob to the end clockwise, adjust setting regulator until the value displayed equals to the standard pH (pH=4 or pH=9.18).

Note: The "setting" knob will not be changed after calibration finished.

2.3.2 Two points calibration procedure:

a) Taking ATC for example. Remove the Q9 short circuit plug, Link the compound electrode and the temperature sensor, clean the electrode with distilled water and blot it with filter paper, then plug the electrode into the buffer solution (pH=6.86).To measure the temperature first, put the selection knob on "pH", The value displayed means the pH of the standard buffer solution (pH=7).

b) If the solution to be measured is acidic, take out the electrode from the solution of known pH value (pH value =6.86), clean the electrode with distilled water and blot it with filter paper, then plug it into the buffer solution of known pH value (pH value = 4). Adjust the slope regulator until the value displayed means the pH of the standard buffer solution (pH=4).

c) If the solution to be measured is alkalescent, we can calibrate the meter secondly with the solution of known pH value (pH value =9.18). Adjust the slope regulator until the value displayed means the pH of the standard buffer solution (pH=9.18).

The calibration of the instrument is completed. Once the instrument has been calibrated, its SETTING potentiometer should not be changed any more .

2.3.3 Calibration with MTC to reference 2.2 (b).

3. pH value measurement

a) In case that the temperature of the solution to be measured the same as the temperature of the setting solution.

Rinse the end of the electrode with distilled water, and suck it dry with clean filtering paper.Put the

electrode into the solution to be measured, stir the breaker till the solution becomes uniform, and read out the pH value of the solution.

b) In case that the temperature of the solution to be measured different from the temperature of the setting solution.

To uniform the temperature of the solution to be measured with buffer solution. The instrument can be used after re-calibration. Or it can be used directly after the temperature of the solution to be measured is same as buffer solution.

4. Electrode potential (mV value) measurement

a) Remove the Q9 short circuit plug and temperature sensor. Connect in an appropriate ion selective electrode and reference electrode.

b). Rinse the electrode with distilled water, then ,suck it dry with clean filtering paper.Put the electrode into the solution to be measured.

c) Put the selection knob on “mV”, now the setting, temperature and slope knobs are invalid.Stir the beaker till the solution becomes uniform. Then, the potential (mV value) of the ion selective electrode can be read out, and its polarity displayed automatically.

5. Operation and Maintenance

a) The input terminal of this instrument, (i.e. the socket of the glass electrode) should be kept clean. When it is idle, insert the short circuit plug in it, to avoid any invention of dust or heavy humidity.

b) The compound electrode can be used for one year. After taking off the cap, be careful to avoid the sensitive glass bulb inside the plastic protection grid being contacted with hard stuff. Any damage or rubbing will cause the electrode invalid. After the measurement completed, the electrode should be covered with the protection cap. A few amount of supplementary solution should be contained in the cap to keep the electrode bulb in a wet state. A 3N potassium chloride solution is served as an external reference supplementary solution for the combination electrode, which can be injected into the electrode via the small hole on the top of it.

c) Keep the lead of the compound electrode immobile to prevent from disturb.

d) The buffer solution should be assured of high reliability. It can be prepared by user it self. For the method of preparing the buffer solution, please see Appendix Ⅱ.

e) The temperature sensor has a long life. But it can not be knock.

Ⅵ. Composing

The complete set of the instrument are as table 1.

(1) BGD 285 basic unit	1 unit
(2) Compound electrode	1 pc
(3) Temperature sensor	1 pc
(4) Electrode supporting rod and extension rod	1 pc
(5) Electrode clamp	1 pc
(6) Power supply lead	1 pc
(7) Buffer powder (pH = 4, 7 and 9)	1 bags for each
(8) Electrode short circuit plug (to be inserted in the input terminal of the instrument)	1 pc
(9) Fuse (0.1A)	2 pcs
(10) Instruction manual	1 copy
(11) Product quality certificate	1 copy

Appendix Ⅰ Relationship between pH value of a buffer solution and temperature

Table 2

pH Solution / Temp.（℃）	GR O-potassium bithalate	GR potassium phosphate monobasic	borax
5	4.01	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.27
20	4.01	6.88	9.22
25	4.01	6.86	9.18
30	4.02	6.85	9.14
35	4.03	6.84	9.10
40	4.04	6.84	9.07
45	4.05	6.83	9.04
50	4.06	6.83	9.01
55	4.08	6.84	8.99
60	4.10	6.84	8.96

Appendix Ⅱ Preparation of buffer solution

1. pH 4 buffer solution

Weight 10.21 grams of GR O-potassium bithalate, dilute it into 1000 ml of twice-distilled water.

2. pH 6.86 buffer solution

Weight 3.4 grams of GR potassium phosphate monobasic and 3.55 grams of GR sodium phosphate oibasic, dilute them into 1000 ml of twice-distilled water.

3. pH 9.20 buffer solution

Weight 3.81 grams of borax, dilute it into 1000 ml of twice-distilled water.

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