

pH/ORP Controller Instruction Manual

MESTAR

Digital pH/ORP Controller

Instruction Manual

Instruction

Thank you very much for purchasing Cheonsei pH/ORP Controller. Before beginning operation, please read this instruction manual carefully. Correct handling, repair, & maintenance are described easily.

Please use this controller safely and, if the defect is found from products, please request it to local agent or CHEONSEI.

We will do our best to solve the problem as soon as possible.

Please keep this instruction manual at the place where you can see it easily.

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1 Notice for Safety

1-1 Introduction

- To use the products safely, the signs are showed on the manual like below.
- As it is a matter of safety, please be sure to keep the directions in manual.
- The signs and indication are as follows.

Warning

Person death or serious injury will be occurred, if warning is not kept by wrong handling.

Caution

Person injury or property damage will be occurred, if caution is not kept by wrong handling.

1-2 Cautions for Use Condition

Caution

- Controller and its components are intended to measure the concentration of hydrogen ionization concentration and the potential difference of oxidation-reduction of the liquid. Do not use it for other purposes Otherwise it may cause trouble..
- Please keep the followings, otherwise it may cause trouble.
Ambient temperature : -5~45°C
Relative humidity : below 90%
Install location : Indoor and inside of electrical panel
Temperature of the handling liquid : below the working temperature described in the electrode specification.
- Gas or moisture, which occur in jobsite, can lead to the internal corrosion of the controller and it may cause reduction of service life and trouble.

1-3 Cautions for Handling Condition

Warning

- Install this controller beyond the reach of children and/or unauthorized person.
- Turn off the power and stop the controller & other equipments when repairing or disassembling the controller. If power is on during work, it may cause electric shock
- Controller should be properly grounded and install ELCB(Earth Leakage Circuit Breaker) in order to prevent electric shock.
- In case of installation in the electric panel, install the controller after securing sufficient space in order not to contact with the components inside electric panel.
- Do not touch with wet hands. Electric shock may occur.

 Warning

- Use only designated parts. If undesignated parts are used to the controller, it may cause accident & trouble.
- Do not arbitrarily reconstruct the controller. If the controller is arbitrarily reconstructed, it may cause accident & trouble.
- Do not use the controller of which case was damaged. If the controller is used, it may cause trouble to equipment connected with the controller.
- Do not install controller in the heavy moist or dusty place. Electric shock and trouble may occur.
- Do not use power other than that specified in controller. Otherwise, it may cause malfunction or fire.
- Refrain from voltage withstand test in order to prevent damage of internal parts.
- Dispose of waste controller in accordance with related national law.

2 Confirmation of Product

2-1 Check Point When Unpacking

Please check following points immediately after receiving the controller.

If the defect is found from pump, please request it to local agent or CHEONSEI.

We will do our best to solve the problem as soon as possible.

- 1 Is specification correct as ordered?
- 2 Is there any missing parts ?
- 3 Is there any visible damage caused by vibration or shock during transport?
- 4 Is there any loosened bolt or nut?

2-2 Components

- 1 Controller
 - pH/ORP Digital Controller : 1 SET
 - Bracket (SPC-1 M4X110) : 2 EA
 - Instruction Manual : 1 COPY
- 2 SET Components
 - Refer to section 6.

3 General

This controller is a digital controller built-in micro processor.

It can be used by composing circuit with the external devices through dry contact of analog Input & output and, as option, it can be composed according to wanted using condition by installing Temperature Compensation Card & Communication Card.

This controller is designed only for a high insulation shielded cable.

If you need to extend the electrode cable, refrain from using the general cable in market and use our high insulation shielded cable

4 Model Code

Mestar **H** **S** **1**

Display

H : LED Display
P : LCD Display

Controller Option

S : Standard(No option)
C : Communication
T : Temperature Compensation
X : Communication + Temp. Compensation

Electrode Specification

0 : Without Electrode
1 : pH Electrode for normal temp.(GS-5)
2 : pH Electrode for high temp.(GSH-5)
3 : ORP Electrode(MS-5)
4 : pH Electrode of temp. compensation for normal temp.(GSTH-5)
5 : pH Electrode of temp. compensation for high temp.(GSTH-5)
6 : pH Electrode of supplement-free (GSA-5)
7 : pH Electrode of supplement-free & temp. compensation(GSTA-5)

5 Specification

5-1 Controller

Specification		Performance
Display Range	pH	-1.00~15.00pH
	ORP	-1999~1999 mV
Measuring Range	pH	0.00~14.00pH
	ORP	-1999~1999 mV
	TEMP	-10.0~100.0°C
Resolution/ Accuracy	pH	0.01pH/0.01pH
	ORP	1 mV/1 mV
	TEMP	0.1°C/0.5°C
Range of temp. compensation		AUTO/MANUAL 0~100°C
Element of temp. compensation		Pt 1000 (Option)
Calibration Method		2 Points (Zero:pH7, Span:pH4 or pH9) calibration
Display	MESTAR-H	3 ½ Digit LED Segment Display
	MESTAR-P	3 ½ Digit LCD Segment Display (LED Back Light)
Alarm	Setting Method	Upper limit(HIGH), Lower limit(LOW)
	Output spec.	Dry Contact 1a 1b, Contact capacity : 10A 125VAC / 6A 277VAC
	Dead band	Setting range : Full Scale 0.0~5.0%
Analog output	pH(ORP)	0~14pH(-1999~1999 mV) : 4~20 mA DC isolated output(Load resistance 500 Ω)
	TEMP	-10~100°C : 4~20 mA DC isolated output(Load resistance 500 Ω)
Memory		EEPROM
Communication		RS-422 Multi-Drop Full-Duplex (Option)
Power		AC110/220V 50/60Hz
Case		Anti-static ABS
Installation place		Indoor, inside electric panel

5-2 Electrode

Code	Model	Use	Internal Liquid	Measuring Range	Cable Length	Using Temp.	Body Material
1	GS-5	pH	3.3Mol KCl	0~14pH	4m	0~40℃	Glass
2	GSH-5	pH	3.3Mol KCl	0~14pH	4m	0~80℃	Glass
3	MS-5	ORP	3.3Mol KCl	0~±1999 _{mV}	4m	0~40℃	Glass
4	GST-5	pH Temp. compensation	3.3Mol KCl	0~14pH	4m	0~40℃	Glass
5	GSTH-5	pH Temp. compensation	3.3Mol KCl	0~14pH	4m	0~80℃	Glass
6	GSA-5	pH Supplement-free	3.3Mol KCl	0~14pH	4m	0~80℃	PC
7	GSTA-5	pH Temp. compensation & Supplement-free	3.3Mol KCl	0~14pH	4m	0~80℃	PC

6 SET Components

6-1 Standard Components

SET Model	Components	Specification	Quantity
MESTAR-HS(P)1	Controller	MESTAR-HS(P)0	1Set
	Electrode	GS-5	1Set
	Connection Box	Coated with film for Anti-static induction	1Set
	Connection	CableHigh isolated special shield cable	20m
	Electrode Holder	Material : PP, Standard : $\phi 34*1m$	1Set
	Bracket for Holder	Material : PVC	1Set
	KCl Solution	3.3Mol/123g	1 bag
	KCl Bottle	Volume : 500cc, Material : PE	1EA
	Beaker	Volume : 500cc, Material : PE	1EA
	Standard Liquid Battle	Volume : 500cc, Material : PE	2EA
	Buffer Powder	pH7,pH4	each 2 bag
	Instruction Manual	20 Page	1 부

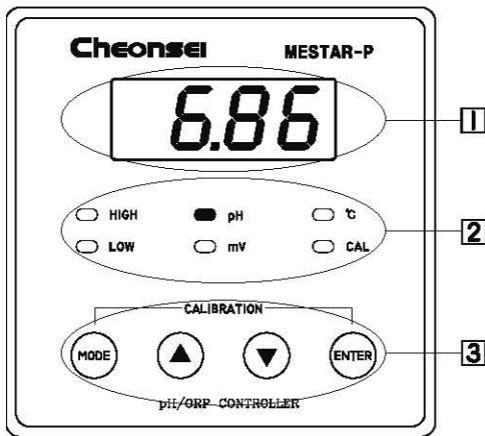
※Components of set are changed according to model codes.

6-2 Option Items

- ① Connection Cable (available upto 100 meters)
- ② Stand Panel (for outdoor)
- ③ Quinhydrone Powder (for ORP)
- ④ Flow Through Holder

7 Name & Function of Each Parts

7-1 Front of controller

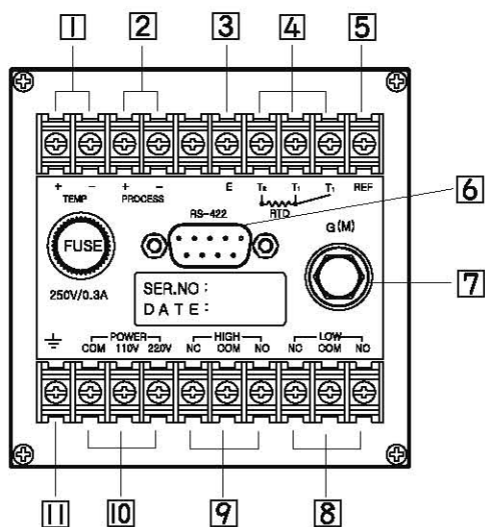


- ① Display
- MESTAR-H : 3 ½ Digit LED Segment
 - 3 ½ Digit LCD Segment(LED Back Light)
- ② LED sign lamp
- HIGH : Flickering when setting mode of HIGH alarm
Lighting when HIGH alarm
 - LOW : Flickering when setting mode of LOW alarm
Lighting when LOW alarm
 - pH : Lighting when operation as pH controller
 - mV : Lighting when operation as ORP controller
 - °C : Lighting when temp. display and manual setting
 - CAL : Lighting when Auto Calibration
Flickering when Manual Calibration

③ Button switch

- **MODE** : Mode is changed whenever pushing the button once.
Controller setting is changed from pH to ORP(pH↔ORP) when pressing the button continuously.
- **▲** : One measure of setting value is increased whenever pushing the button once.
Setting value is fast increased when pressing the button continuously.
- **▼** : One measure of setting value is decreased whenever pushing the button once.
Setting value is fast decreased when pressing the button continuously.
- **ENTER** : Save the setting value at the Setting Mode.
If you press the button at the measuring Mode continuously, all setting values will be initialized.
※When initialization, all setting values will be changed to the initial setting values before delivery from factory. Therefore, Calibration & Setting value should be set up.
- **MODE ENTER** : Calibration Mode
Press MODE button while pressing ENTER button
- **ENTER ▼** : Dead Band Setting Mode
Press ▲ button while pressing ENTER button
- **ENTER ▲** : Address Setting Mode(Communication, Option)
Press ▼ button while pressing ENTER button

7-2 Rear controller



- ① TEMP : analog output of -10~100°C by 4~20_mADC (Option)
- ② PROCESS : analog output of pH0~14 or -1999~1999 by 4~20_mADC
- ③ E : Earth to liquid to be tested
- ④ RTD : Temp. Compensation Electrode(Pt-1000 Ω)
- ⑤ R : R terminal of electrode
- ⑥ RS-422 : D-SUB Connector of 9 pins for communication(Option)
- ⑦ G(M) : G terminal for pH electrode, M terminal for ORP electrode
- ⑧ LOW : Output terminal of LOW alarm
- ⑨ HIGH : Output terminal of HIGH alarm
- ⑩ POWER : Power terminal
- ⑪ Earth : Earth terminal to panel

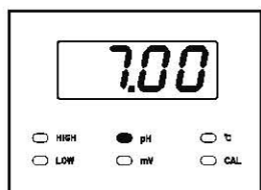
8 Calibration

8-1 Calibration

This controller is Two-Point Calibration type. Calibrate pH4 or pH9 after calibrating pH7(Zero). Operate calibration by using the standard liquids of pH4, pH7, & pH9 and other standard liquids are unavailable. Refer to below table for the standard liquids by which Auto Calibration is possible and the temperature properties.

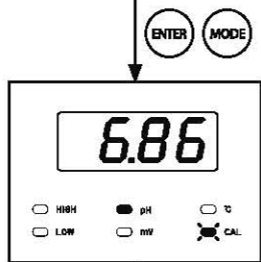
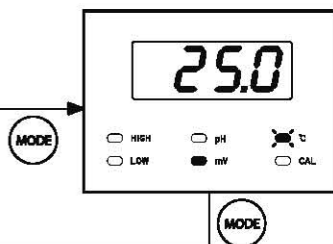
Standard liquid Temp.(°C)	pH4 Potassium Phthalate	pH7 Neutral Phosphate	pH9 borate
0	4.01	6.98	9.46
5	4.01	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.27
20	4.00	6.88	9.22
25	4.01	6.86	9.18
30	4.01	6.85	9.14
35	4.02	6.84	9.10
40	4.03	6.84	9.07
45	4.04	6.83	9.04
50	4.06	6.83	9.01
55	4.08	6.84	8.99
60	4.10	6.84	8.96
70	4.12	6.85	8.93
80	4.16	6.86	8.89
90	4.20	6.88	8.85
95	4.23	6.89	8.83

8-2 Zero Calibration (pH7)



- 1 Wash the electrode by distilled water.
Turn on the power switch for controller and immerse the electrode into the standard liquid(pH7) for a few minutes.
Then front LED sign lamp should be lighted at 'pH' .
If LED sign lamp is lighted at 'mV' , change it to pH measuring mode by pushing the Mode button (Refer to the section 9)

- 2 Temperature setting of standard liquid
 - Temp. Compensation Electrode : Additional setting is not necessary.
 - General Electrode : Change it again to Measuring Mode after change to Temperature Mode and revision to actual temperature



- 3 Press MODE button while pressing ENTER button

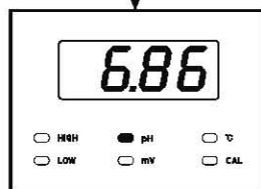
4 Calibration Mode

- If CAL of sign lamp is lighted, standard liquid' s pH value corresponded to temperature is set(Auto Calibration).
- The set value can be saved by pushing the ENTER button.
- CAL of sign lamp is flickering after CAL of sign lamp is lighted for a few seconds.

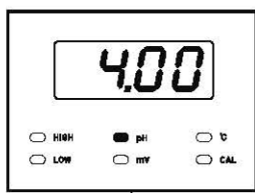
Then the set value can be changed by ▲/ ▼ button.

- If you use standard liquid other than Neutral Phosphate specified in the temperature properties table, change the setting value with the pH value of the standard liquid.
- If you use standard liquid in the temperature properties table(Neutral Phosphate), don' t need to change the setting value additionally.
- Changed setting value can be saved by pushing ENTER button.
- Controller can be changed to Measuring Mode by pushing MODE button after completing calibration or
- Setting value is saved and controller is changed to Measuring Mode automatically after a few seconds without pushing any button.
- If you don' t save the setting value, the setting value will be deleted when power is turned off.

Therefore, save the setting value certainly.

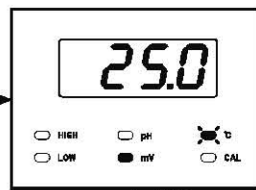


8-3 Span Calibration (pH4)



- 1 Wash the electrode by distilled water.
Turn on the power switch for controller and immerse the electrode into the standard liquid(pH4) for a few minutes.
Then front LED sign lamp should be lighted at 'pH' ..
If LED sign lamp is lighted at 'mV', change it to pH measuring mode by pushing the Mode button (Refer to the section 9)

- 2 Temperature setting of standard liquid
 - Temp. Compensation Electrode : Additional setting is not necessary.
 - General Electrode : Change it again to Measuring Mode after change to Temperature Mode and revision to actual temperature



- 3 Press MODE button while pressing ENTER button

- 4 Calibration Mode

- If CAL of sign lamp is lighted, standard liquid's pH value corresponded to temperature is set(Auto Calibration).
- The set value can be saved by pushing the ENTER button.
- CAL of sign lamp is flickering after CAL of sign lamp is lighted for a few seconds.

Then the set value can be changed by ▲/▼ button.

- If you use standard liquid other than Neutral Phosphate specified in the temperature properties table, change the setting value with the pH value of the standard liquid.

If you use standard liquid in the temperature properties table(Potassium Phthalate), don't need to change the setting value additionally.

- Changed setting value can be saved by pushing ENTER button.
- Controller can be changed to Measuring Mode by pushing MODE button after completing calibration or
- Setting value is saved and controller is changed to Measuring Mode automatically after a few seconds without pushing any button.
- If you don't save the setting value, the setting value will be deleted when power is turned off.

Therefore, save the setting value certainly.

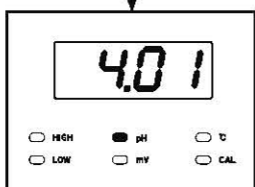
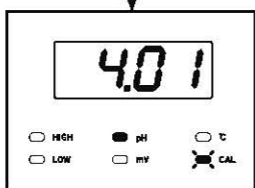
- 5 In case of Span calibration, use it after choosing one between pH7 or pH4.

Calibration method for pH9 is same with calibration method for pH7 or pH4.

Refer to the calibration method for pH7 or pH4, when operating calibration for pH9.

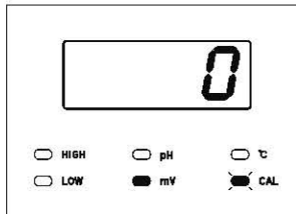
Temperature properties table of Auto Calibration for pH9 was applied by Borate of standard liquid.

If you use standard liquid other than Borate specified in the temperature properties table, change the setting value with the pH value of the standard liquid by manual.



8-4 ORP Calibration (pH4)

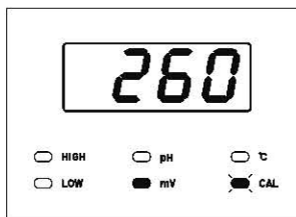
- 1 In case of ORP calibration, it will be not necessary to set any calibration because ORP calibration of the controller was already completed before delivery from factory
- 2 Calibration method when needed



- In cas of Zero calibration, separate the electrode cable from terminal located in rear controller first.

Short the G(M) terminal & the R terminal, and Press MODE button while pressing ENTER button in order to operate Calibration Mode, and complete calibration.

If the calibration is completed, connect electrode cable.



- Immerse the electrode into the liquid of Quinhydrone for a few minutes.

Press MODE button while pressing ENTER button in order to operate Calibration Mode and complete calibration.

- 3 Calibration method is same with calibration method for pH.
Refer to the calibration method for pH.

8-5 Cautions for calibration

- 1 the value of Calibration can be changed during the signal lamp flickers, after finish of Auto Calibration and, if a few seconds are passed without entering any value at this moment, controller will be changed to Measuring Mode.
- 2 If you don't save the setting value, the setting value will be deleted when power is turned off. Therefore, save the setting value certainly.
- 3 Wash the electrode by distilled water or clean water when electrode is moved for calibration to different standard liquids.
- 4 For exact calibration, use the standard liquid after sufficiently stirring the standard liquid.
- 5 If Err2 is displayed at the Calibration Mode, it indicates that calibration is not possible and, in this case, controller will be changed to Measuring Mode after a few seconds.

In case of followings, calibration is not possible.

- when the signal generated from electrode is not suitable for calibration(decrepit and damaged electrode).
- when controller can't correctly read the signal generated from electrode by damaged electronic circuit board

Warning

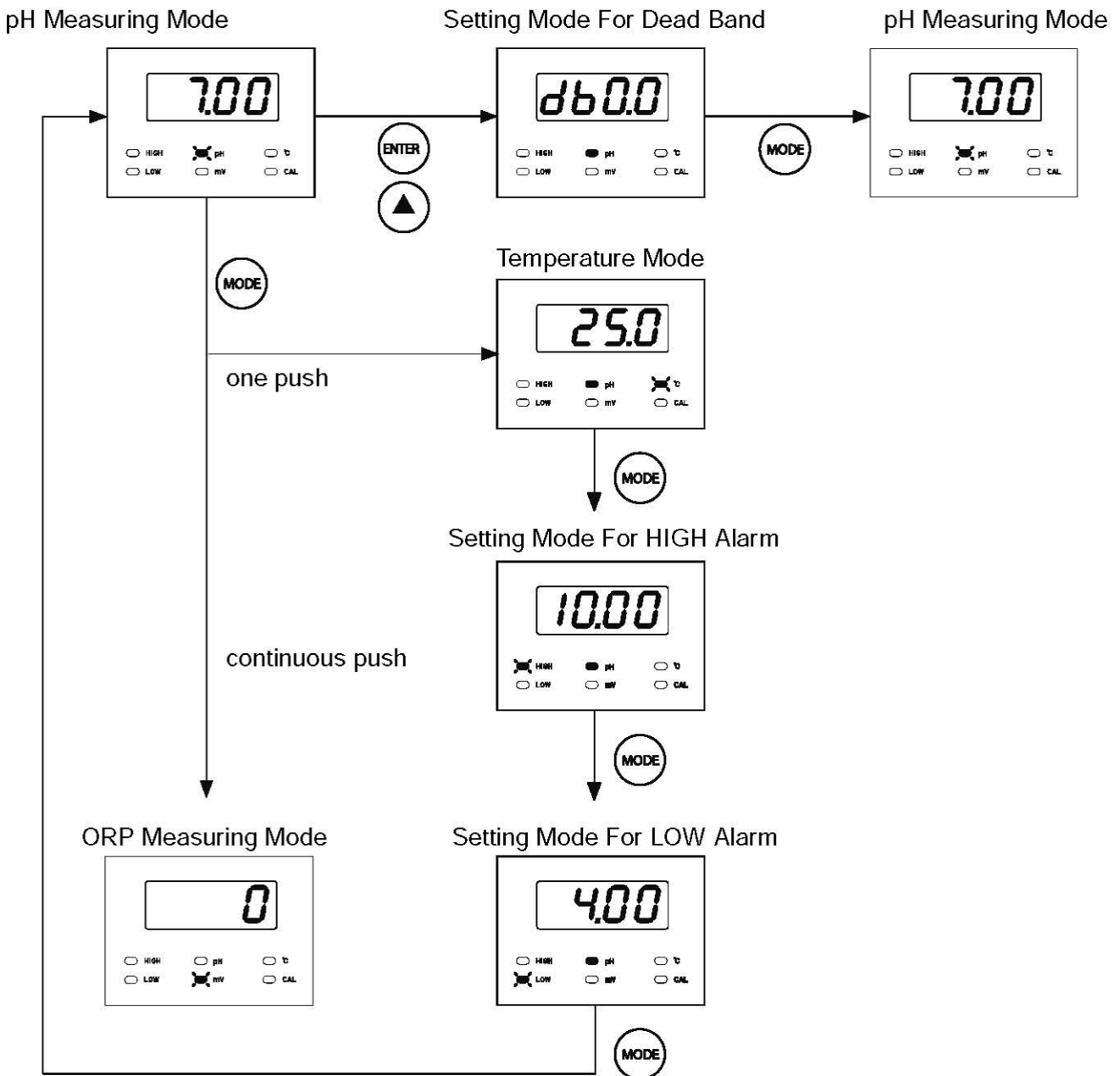
- Children and old & infirm person don't touch it because buffer powder & liquid for calibration may cause injury when drinking it.
Get checkup and prescription from doctor certainly when drinking it.
- When the electrode is broken, it may cause injury because electrode is made with glass.
Be careful in handling the electrode.
Check the surface of electrode by naked eye and, if the electrode has a crack and a trouble, don't use the damaged electrode.
- If measuring liquid is hazardous, wear suitable protective clothing certainly.

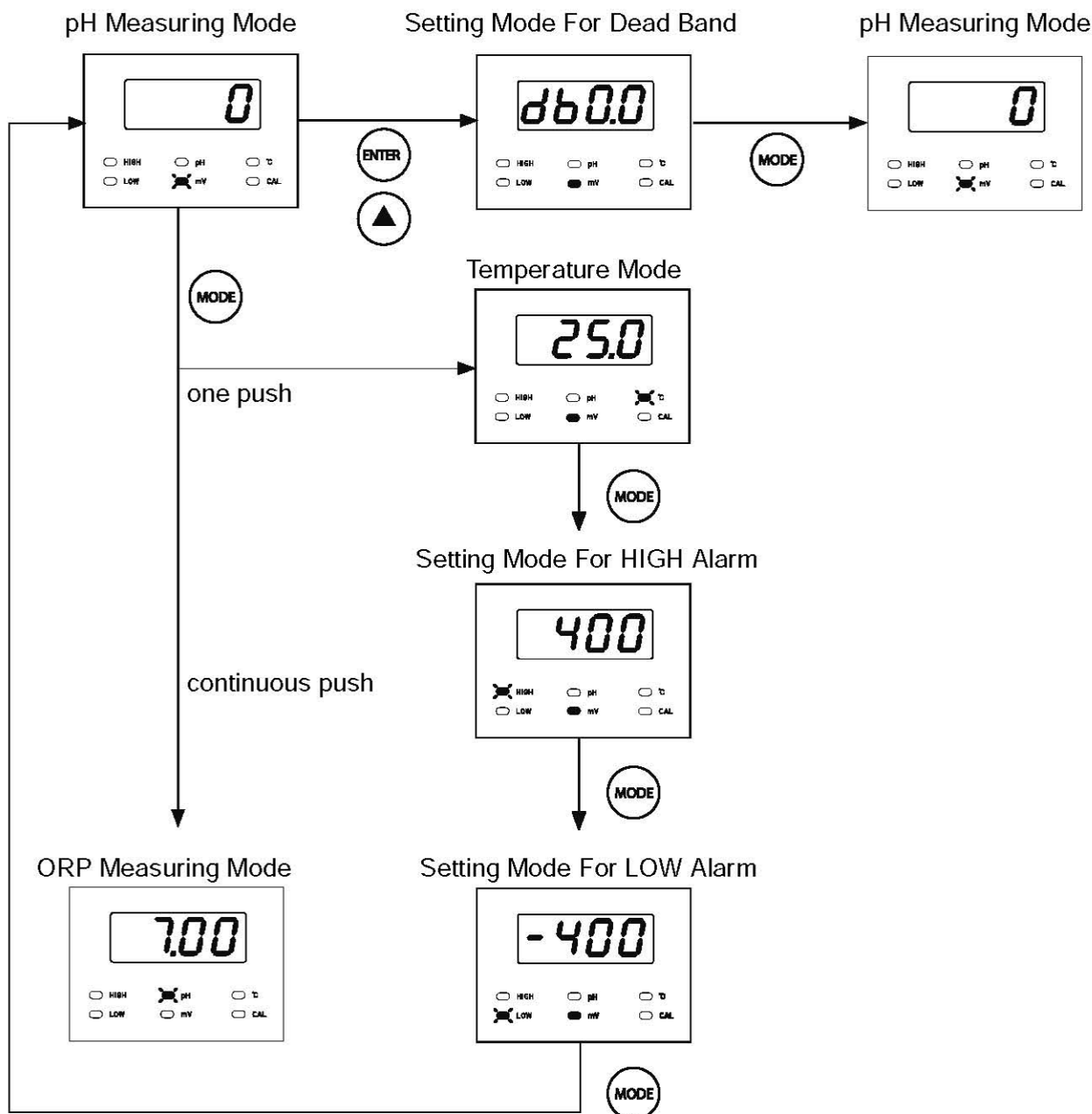
Caution

- Do not scoured G(M) & R terminal for connecting electrode with hand or glass fiber. It may cause a damage of electronic circuit board by static electricity.
- before turn on power, check if the wiring on the terminal is correct.

9 Settings & Functions

9-1 Change of mode





* In case of no Measuring Mode, controller is changed to Measuring Mode within a few seconds after last push of button.

9-2 Setting of HIGH Alarm and LOW Alarm

- ① Choose the Alarm Setting Mode you want after pushing the MODE button. Then HIGH lamp or LOW lamp will flicker.
- ② Set the desired value by pushing the ▲/▼ Button and save the value by pushing the ENTER button. Controller can be changed to Measuring Mode by pushing the MODE button, or setting value is saved & controller is changed to Measuring Mode automatically after a few seconds without pushing any button. The setting value for HIGH Alarm should be higher than that of LOW Alarm and the setting value for LOW Alarm should be lower than that of HIGH Alarm.
- ③ Generating condition of alarm
 - HIGH Alarm : The setting value for HIGH Alarm - Measured value ≤ 0
 - LOW Alarm : The setting value for LOW Alarm - Measured value ≥ 0
 - In case of using Dead Band function, refer to section 9-3.

9-3 Dead Band

- 1 Push the ▲ button while pressing ENTER button
- 2 Random value from db0.0(0.0%) to db5.0(5.0%) is displayed.
The initial value set by us before delivery is db0.0.
- 3 Set the desired value by pushing the ▲/▼ Button and save value by pushing the ENTER button.
Controller can be changed to Measuring Mode by pushing the MODE button, or setting value is saved & controller is changed to Measuring Mode automatically after a few seconds without pushing any button.

4 The setting of Dead Band is possible from 0.0% to 5.0% and Alarm is issued as follows.

Ex.) Setting of pH 5.0%

In case the setting value of pH HIGH Alarm is pH10.00, if measured value is more than pH10.70, HIGH Alarm will be issued, and, if measured value is less than pH9.30, HIGH Alarm will be cleared.

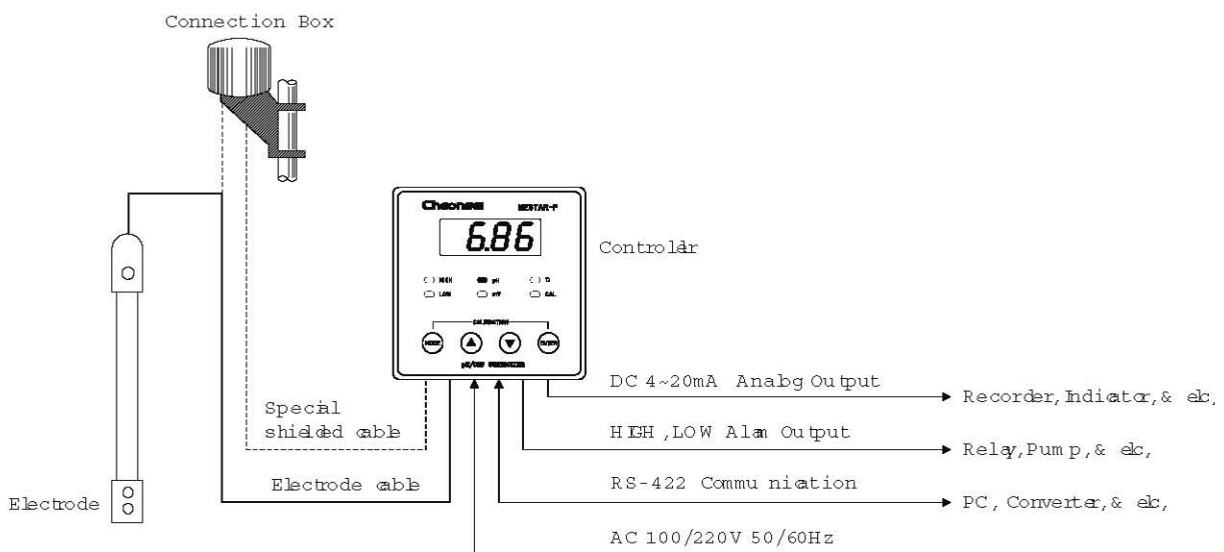
In case the setting value of pH LOW Alarm is pH4.00, if measured value is below pH3.30, LOW Alarm will be issued, and, if measured value is over pH4.70, LOW Alarm will be cleared.

Ex.) Setting of ORP 5.0%

In case the setting value of ORP HIGH Alarm is 400mV, if measured value is more than 600mV, HIGH Alarm will be issued, and, if measured value is less than 200mV, HIGH Alarm will be cleared.

In case the setting value of pH LOW Alarm is -400mV, if measured value is below -600mV, LOW Alarm will be issued, and, if measured value is over -200mV, LOW Alarm will be cleared.

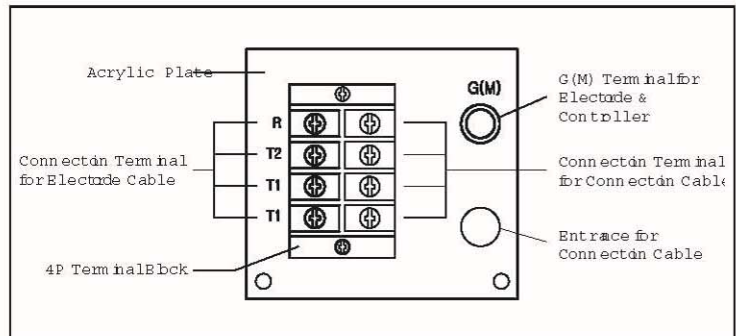
10 System Diagram



11 Handling Method For Components

11-1 Wiring of connection box (for Temperature Compensation)

- 1 colors of Electrode & connection cable should be same with the terminals of connection box each other.
Be careful of that wiring is not changed.
- 2 In case of connection box for general standard type, it have G(M) terminal & R terminal only.
When wiring, connect G(M) & R terminal on the acrylic plate to same poles each other.

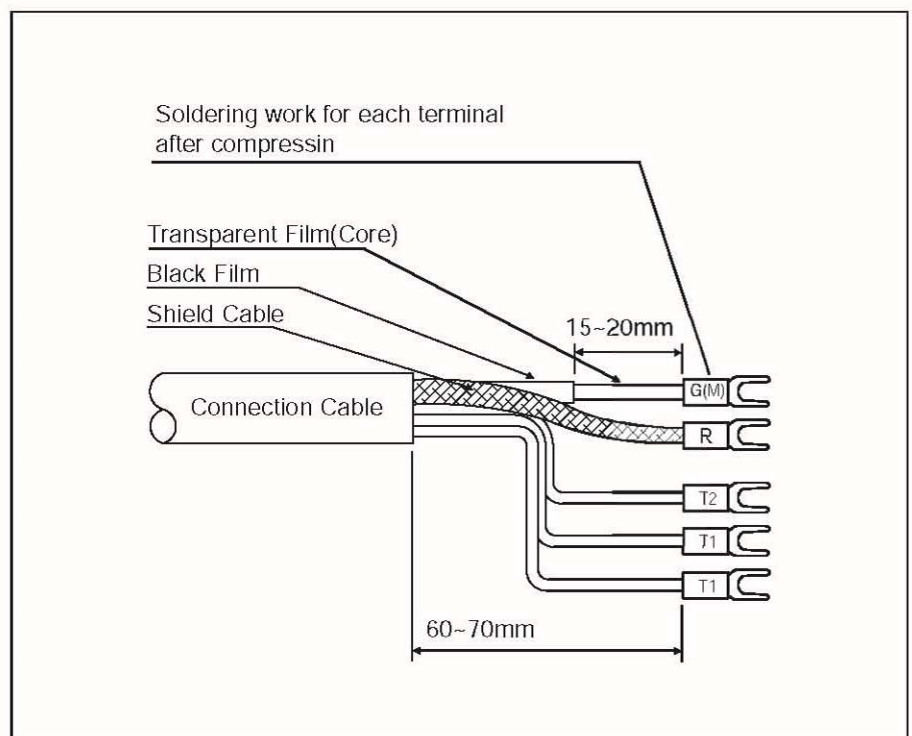


⚠ Caution

- Do not install this connection box in the heavy moist, dusty, or vibration place.
Bad connection at the terminal may occur.
- Do not install this connection box at the place where corrosive gas is generated.
- Turn off power before repair & maintenance.
It may cause a damage of controller by static electricity.

11-2 Termination Method of connection cable (for Temperature Compensation)

- 1 Remove the external film & the internal Black film as beside figure and solder the terminal(1.5-3Y) after compressing the terminal to the cable.
- 2 wrap it with tube or tape after soldering. Specially, wrap Shield cable of R terminal with shrink tube(ϕ 2.0) in order to prevent its exposure.
- 3 when moving external film & internal black film, be careful that transparent film (G(M)) don't be damaged and, if the transparent film is damaged, rework after cuttin the damaged part.



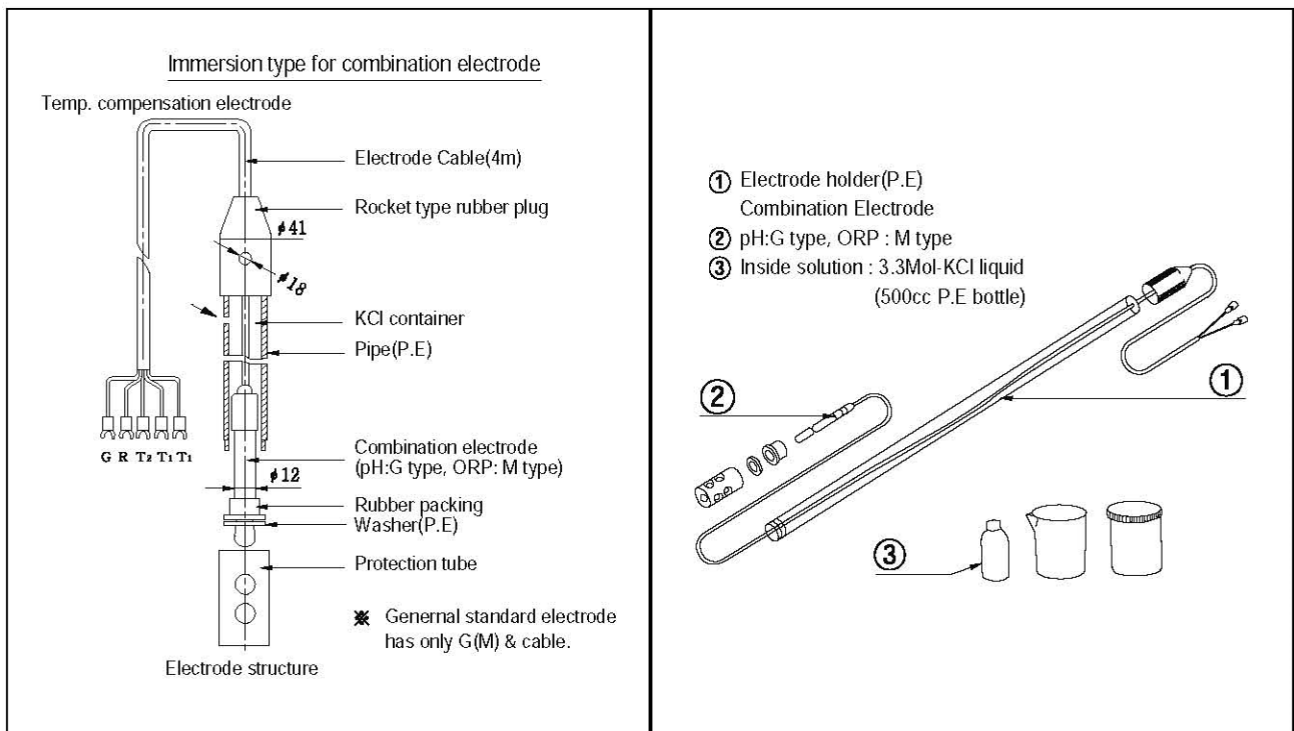
Terminal	G(M)	R	T2	T1	T1
Cable Color	Transparent Film(Core)	Shield Cable	White	Red	Yellow

⚠ Caution

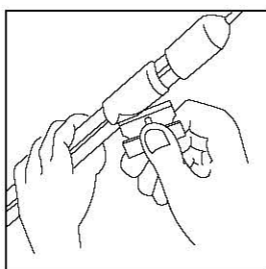
- Remove black film as above figure certainly.
If black film don't be removed, G(M) terminal will be short state, in case of pH measuring, measured value will be fixed around pH7, and in case of ORP measuring, measured value will be fixed around 0mV. Therefore measuring will be impossible.

11-3 Handling of electrode holder

- The electrode holder is used for measuring pH value of liquid in the open tank. Electrode holder is plastic pipe and functions as container which can fill in KCl liquid.
KCl liquid can be easily filled from top of electrode holder and sufficient KCl liquid can be stored inside because whole pipe functions as container.
- In case of supplement free electrode, there is no need to refill KCl liqui



2 Installation method of electrode



- Remove the tube(tape) which wrapped the refill hole of KCl.
In case of supplement free electrode, it has no tube.

12 Cause of Trouble and Troubleshooting

12-1 Trouble

item	Description	No.
A	Err1 on the display (out of display range)	2, 3, 4, 5, 6, 12
B	Err2 on the display(electrode calibration is impossible)	4, 5, 6, 7, 8, 12
C	Err3 on the display (communication trouble between Main PCB & Front PCB)	13, 14
D	When immersing electrode into the standard liquid, the measured value on the display is not changed.	1,4, 5
E	When immersing electrode into the standard liquid, the measured value on the display is fluctuated and it needs long time until stabilization	2, 3, 4, 6, 7, 8, 12, 13
F	When immersing electrode into the standard liquid, it is difficult for measuring because the measured value on the display is very fluctuated.	2, 3, 4, 6, 7, 9, 12, 13
G	The temperature on the display of the standard liquid or measured liquid is far different from the actual temperature.	11, 12, 14

12-2 Cause of trouble and troubleshooting

No.	Cause	Troubleshooting
1	Bad terminal work of connection cable	Remove black film in the connection cable
2	Short of connection cable	Solder and isolate connection part after re-connecting the shorted part
3	Loose contact between connection cable & connection box	Check the contact point & remove cause of trouble
4	Old electrode	Replace electrode
5	Damaged electrode	Replace electrode
6	Forming films on glass layer of electrode & the end of ORP electrode	Replace electrode
7	Poor quality of standard liquid	Replace standard liquid
8	Insufficient agitation of standard liquid	Sufficient agitation
9	Insufficient agitation of measured liquid	measuring after sufficient agitation
10	Bad manual temperature setting	Adjust manual temperature setting
11	Bad temperature compensation circuit	Replace temperature compensation PCB
12	Loose contact of controller terminal	Reconnect after removing cause of trouble
13	Loose contact of connecter for circuit board	Repair the controller
14	broken circuit board	Repair the controller

13 Warranty

⚠ Caution

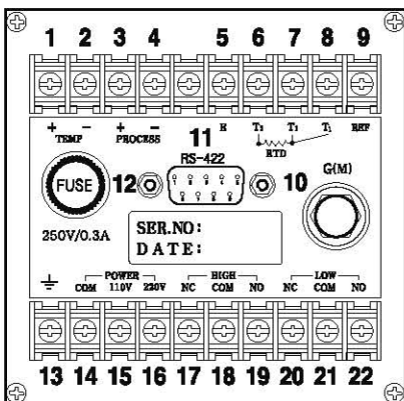
- If the product is reconstructed arbitrarily or the undesignated parts are used into the product, Cheonsei will not warrant and Chensei is not responsible for any expense caused by accident or trouble.

- 1 Warranty period is one year from purchase date.
- 2 During warranty period, repair or change of pump is free of charge, if trouble or damage of pump due to design or manufacturing of CHEONSEI. (※ Consumable parts are excluded)
- 3 Repair or change product due to following reasons will be charged regardless the warranty period.
 - Trouble or damage of pump expired warranty period.
 - Trouble of using by careless handling.
 - Trouble or damage due to using non-designated part & reconstructing the pump arbitrarily.
 - Trouble by fire or natural disaster

14 Repair Service

- 1 Contact to CHEONSEI or local distributor as shown on back of the manual, if you have any problem or questions.
- 2 If you want to repair, please inform the following.
 - Model name & Serial number
 - Using period & state of product
- 3 If warranty period is over, it may charge according to repair part. Please contact with sales agent for more information.
- 4 Minimum retention period of parts for repair is 5 years from the date of production.

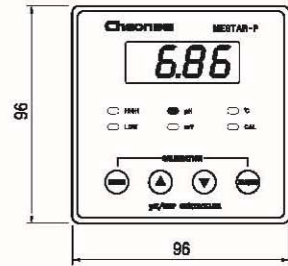
15 Wiring for Controller



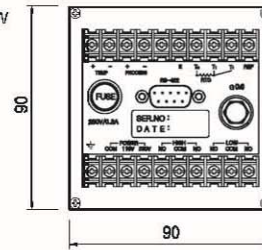
1	TEMP. analog output +	12	Fuse Holder
2	TEMP analog output -	13	Panel earth
3	pH/ORP analog output +	14	AC power input (COM)
4	pH/ORP analog output -	15	AC power input (110V)
5	Earth to measured liquid	16	AC power input (220V)
6	Temp. compensation electrode T2	17	HIGH alarm NC (Normal Close)
7	Temp. compensation electrode T1	18	HIGH alarm COM (common)
8	Temp. compensation electrode T1	19	HIGH alarm NO (Normal Open)
9	Electrode R	20	LOW alarm NC (Normal Close)
10	Electrode G(M)	21	LOW alarm COM (common)
11	RS-422 for communication D-SUB Connector	22	LOW alarm NO (Normal Open)

16 Dimension

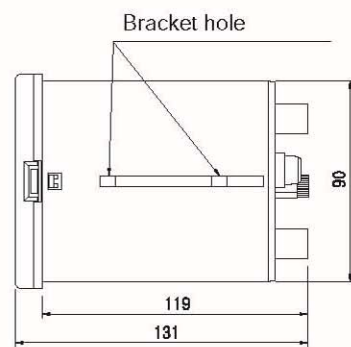
Front View



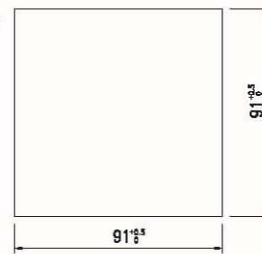
Side View



Rear View



Sectional View





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