Cheonsei

KEMPION DIGITAL CONTROLLER

MESTAR+

Digital DO Controller

Instruction Manual

www.cheonsei.co.kr

Thank you very much for purchasing Cheonsei digital DO controller.
Please read this instruction manual before beginning operation.
Handling and maintenance are explained in easy way. Read through this manual and use correctly the product. Correct handling, repair and maintenance are described easily.
※ The specification of products can be changed for improvement without prior notice.

CONTENTS

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.
- he 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 Operation Condition

⚠ Caution

- Do not use controller and its components 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 Warning 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.
- 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.

⚠ Caution

- 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 Product Confirmation

2-1 Check Point When Unpacking

Please check following points immediately after receiving the product.
If the defect is found from the product, please request it to local agent or CHEONSEI.

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
- Digital DO controller : 1Set
- Bracket(SPC-1 M4×52) : 2EA
- 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 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+ D □ □ – □

① ② ③ ④

① Type	② Controller Type	③ Output	④ Electrode Type
D : DO (Dissolved Oxygen)	B : Standard	0 : Standard 1 : Temperature (4~20mA)	1 : CPD11(Galvanic)

5 Specifications

5-1 Controller

Specification		Performance	
Display and Measuring Range	DO	0.00 ~ 20.00ppm(mg/L)	
	Temp	-10.0 ~ 100.0°C	
Resolution/ Accuracy	DO	0.01ppm(mg/L) / 0.01ppm(mg/L)	
	Temp	0.1°C / 0.5°C	
Ambient temp. & Humidity		-10°C ~ 40°C, Lower than relative humidity 80%RH (Dew and dew condensation must not be formed)	
Range of Temp. Compensation		Auto/Manual 0 ~ 50°C	
Calibration Method		2 points calibration(Zero : Zero solution, Span : Saturated water or Air)	
Display		3in LCD Segment Display (LED Back Light : White)	
Alarm Output	Setting	HIGH, LOW	
	Output	Dry Contact 1a 1b Contact Capacity : 0.5A, 125VAC / 1A, 24VDC	
	Dead Band	0.00 ~ 0.30ppm(mg/L)	
Analog Output	DO	0.00 ~ 20.00ppm(mg/L)	4~20mA Isolated Output (Load Resistance 500Ω)
	Temp	-10.0 ~ 100°C (Option)	
Memory		EEPROM	
Communication Method		RS-485 (Option)	
Power		AC85~245V, 50/60Hz (Power consumption : 3W)	
Case Material		Anti-static ABS	
Size		96mm × 96mm × 115mm	
Weight		Approx. 400g	
Installation Place		Indoor, Inside electric panel	

5-2 Electrode

	Specification	Remark
Model	CPD11	
Type	Dissolved Oxygen Measurement	
Electrode Type	Galvanic	
Measurement Range	0.00 ~ 20.00 ppm(mg/L)	
Velocity which measurement is available	0.35m/s	98±0.5%
Temp. Compensation Element	Pt 1000Ω	
Workable Temp.	0 ~ 60°C	
Workable Pressure	Max. 1 bar	
Reply Time	90% in 2 minutes	Based on 25°C
Cable Length	5m	
Material	ABS	

6 Set Components

6-1 Standard components

SET Model	Components	Specification	Quantity
MESTAR+ DB0-1	Controller	Digital DO Controller	1Set
	Panel Bracket	SPC-1 M4 x 52mm	2EA
	Instruction Manual	24Page	1Copy
	Electrode	CPD11	1Set
	Electrode Holder	Standard : Ø 34 * 1m, Material : PE	1Set
	Braket Holder	Material : PVC	1Set
	Connection Box	Prevention of Electrostatic Induction Special film coating	1Set
	Connection cable	High Insulation Special Shielded Cable	20m
	Buffer Powder	Sodium Sulfite(Na_2SO_3) 15g	1EA
	Power Container	500cc, Material : PE	1EA

※ Some components may vary depending on the SET model.

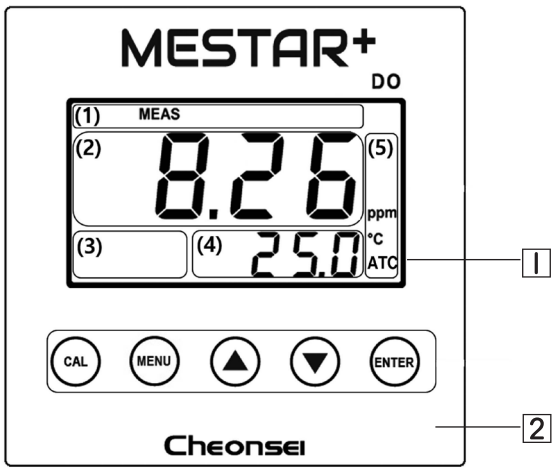
6-2 Optional item

1 Connection Cable(up to 100m)

2 Sampling Holder

7 Name & Function of Each Part

7-1 Front



1 Display : 3” LCD Segment
①Status
- SETUP : Display in setup mode
- MEAS : Display in measurement mode
- CAL : Display in calibration mode
- ZERO : Display in ZERO calibration
- SPAN : Display in SPAN calibration

② Main display : Measured valve or setting screen is displyed according to Mode

③ Alarm
- HOLD : Display in setting of measurement value fixed
- HIGH : Display in HIGH alarm
- LOW : Display in LOW alarm

④ Sub Display : Display temp. or display setting value when enter in setting mode or calibration mode

⑤ Unit : Display the unit which is set

2 Key

CAL : Enter Calibration Mode, if press the button for 5 seconds in Measuring Mode.
Exit the Calibration Mode, if press the button in Calibration Mode.
(Can not enter Calibration Mode when Setting Mode, displaying Error, & Setting to hold the measured value)

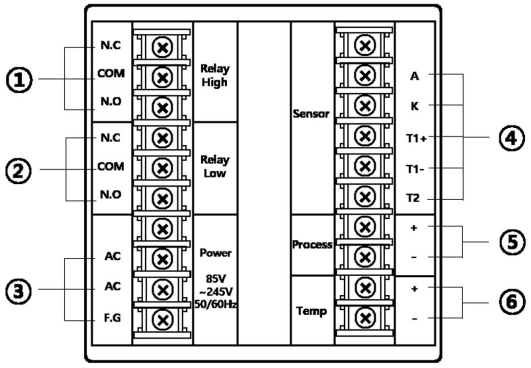
MENU : Enter the Setting Mode, if press the button in Measuring Mode.
Return to previous Mode, if press the button in Setting Mode.

▲ : Menu is changed or Setting Value is increased, if press the button in Setting Mode or Calibration Mode.
Setting value is fast increased, if press the button continuously.
High Alarm Setting Value is displayed for 3 seconds, if press the button for 3 seconds in Measuring Mode.

▼ : Menu is changed or Setting Value is decreased, if press the button in Setting Mode or Calibration Mode.
Setting value is fast decreased, if press the button continuously.
Low Alarm Setting Value is displayed for 3 seconds, if press the button for 3 seconds in Measuring Mode.

ENTER : Save the setting value in Setting Mode or Calibration Mode.
The buzzer will sound and all setting values will be initialized, if press the button for 5 seconds in Measuring Mode.
(Unable to initialize when Setting Mode, Calibration Mode, & displaying Error)
※ When initialization, all calibration values and setting values will be changed to the initial setting values before delivery from factory.

7-2 Rear



① Relay High : HIGH Alarm Output Terminal
② Relay Low : LOW Alarm Output Terminal
③ Power : Power Supply Terminal
④ Sensor : Electrode Connection Terminal
⑤ Process : Analog Output Terminal for 4~20mA of 0 ~ 20ppm
⑥ Temp : Analog Output Terminal for 4~20mA of -10 ~ 100°C (Option)

8 Calibration

8-1 Calibration

This controller is Two-Point Calibration type and supports Air calibration and Solution calibration.
Air calibration makes Zero calibration set automatically.
Solution calibration is recommended to use 0.2mol Na_2SO_3(Na_2SO_3 12g + distilled water 500ml) as Zero standard solution. Refer to the below table for saturation dissolved oxygen according to temperature. (Under the condition of 1atm and salinity 0ppt)

Temperature(°C)	Dissolved oxygen(mg/L)	Temperature(°C)	Dissolved oxygen(mg/L)
0	14.62	25	8.26
5	12.77	30	7.56
10	11.29	35	6.59
15	10.08	40	6.41
20	9.09	45	5.93

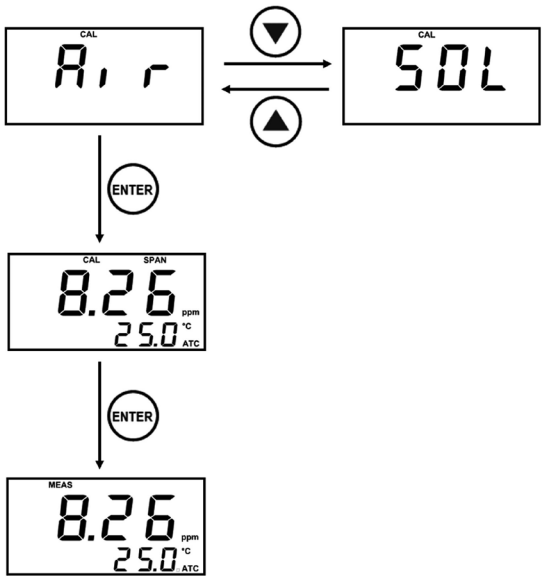
8-2 Cautions for calibration

1. In calibration mode, do not be changed to Measuring Mode even after several minutes.
   To exit the Calibration Mode, should stop calibration by pressing the CAL Key or complete calibration by pressing the ENTER Key.
2. During calibration, if press CAL key to exit Calibration Mode or the Calibration Mode is exited in an unusual manner, such as power off, Calibration Values are not stored.
3. Clean the electrodes with clean or distilled water before submerging it.
4. The dissolved oxygen is much influenced by the rate of liquid flow. Calibrate the rate with the same flow rate obtained at the time of measurement. The reliability of the measure value is reduced, if the flow rate at the time of calibration is different from that at the time of measurement.
5. Calibrate in the manner that the range to be measured falls within the Zero and Span range; otherwise, its accuracy drops.
   (Ex. Meas: 8ppm ➡ Zero: 0ppm, Span: 10ppm)
6. Solution calibration will be more accurate than air calibration.
7. It is recommended that the Span calibration should be at least in excess of 5ppm.
8. There can be a considerable difference between analysis by an instrument and analysis by a reagent. Analysis by a reagent is advised to adopt to have precise measurements.

⚠ Warning

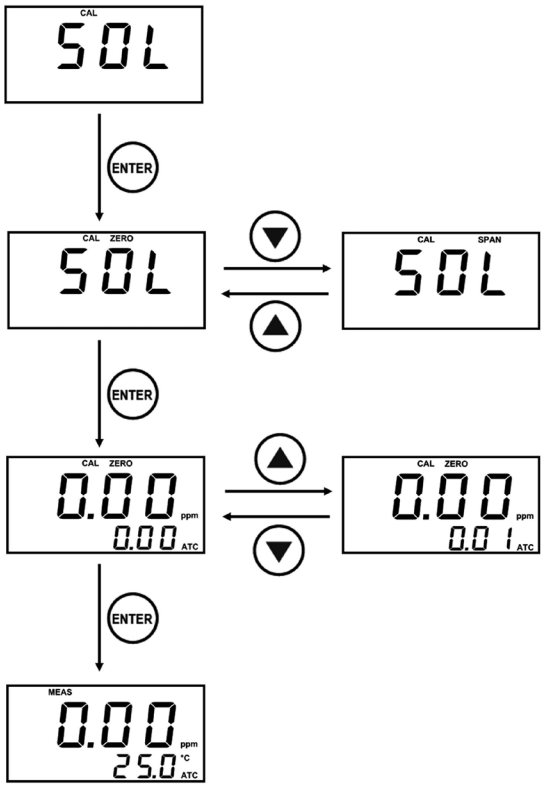
- Do not handle calibration powder or solution used for product calibration by children or the elderly & the infirm, since it may be harmful to the human body.
  Be sure to follow the doctor's prescription when drinking it.

8-3 Air Calibration



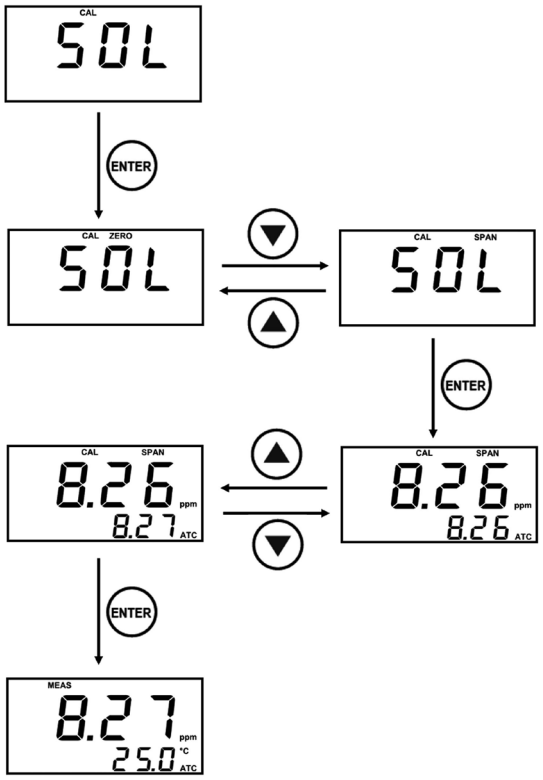
1. Clean the electrode with distilled water.
2. Wipe the electrode up carefully so it is free of moisture.
3. Expose the electrode to the air with its sensor facing to the bottom.
4. In the Measuring Mode, press the CAL key for 5 seconds to enter the Calibration Mode.
5. Currently, the Calibration mode appears on the main screen. (AIR: air, SOL: solution)
6. You can change settings in the Calibration mode by using the ▲ and ▼ keys.
7. Select Air (the Air calibration only supports Span calibration).
8. The main screen displays the current DO concentration.
9. The secondary screen displays the current temperature.
10. Press the Enter key to save the current value when the controller's concentration gets stabilized.
11. The screen returns to the Measurement mode automatically when the calibration is completed.

8-4 Zero Solution Calibration



1. Clean the electrode with distilled water.
2. Immerse the electrode in a Zero solution.
3. In the Measuring Mode, press the CAL key for 5 seconds to enter the Calibration Mode.
4. the Calibration mode appears on the main screen (AIR: air, SOL: solution)
5. You can change settings in the Calibration mode by using the ▲ and ▼ keys.
6. Select SOL
7. The status window displays zero (0).
8. You can change the Zero and Span mode by using the ▲ and ▼ keys.
9. Check the zero on the status window and press the Enter key.
10. The main screen displays the current DO concentration.
11. The secondary screen displays the Zero concentration to be calibrated.
12. You can change settings in the Calibration concentration by using the ▲ and ▼ keys.
13. When the controller's concentration stays stabilized, align it with the Zero concentration to be calibrated and then press the Enter key to save the current value.
14. The screen returns to the Measurement mode automatically when the calibration is completed.

8-5 Saturated Water(Span) Calibration



1. Clean the electrode with distilled water.
2. Immerse the electrode in saturated water.
3. In the Measuring Mode, press the CAL key for 5 seconds to enter the Calibration Mode.
4. The Calibration mode appears on the main screen (AIR: air, SOL: solution)
5. You can change the Calibration menu by using the ▲ and ▼ keys.
6. Select SOL.
7. The status window displays zero (0).
8. You can change Zero, Span calibration mode by using the ▲ and ▼ keys.
9. After check SPAN in the status window, press Enter key.
10. The main screen displays the current DO concentration.
11. The secondary screen exhibits the Span concentration to be calibrated.
12. You can change calibration concentration by using the ▲ and ▼ keys.
13. When the controller's concentration stays stabilized, align it with the Span concentration to be calibrated and then press the Enter key to save the current value.
14. The screen returns to the Measurement mode automatically when the calibration is completed.

9 Setting and Operating

9-1 Menu setting

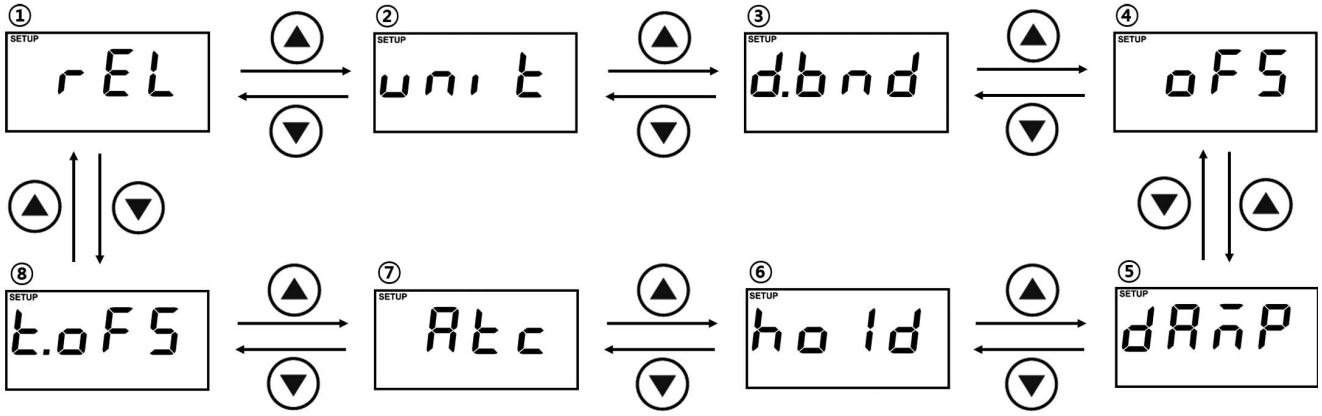
You can enter Menu mode by pressing the Menu key in Measuring mode, and can return to Measuring mode by pressing Menu key in Menu mode.
In Menu mode, if there is no any keystroke for 20 seconds, return to Measuring mode without any storage of the value that is being set.
Enter key must be pressed to save the setting value.

9-2 Standard setting value

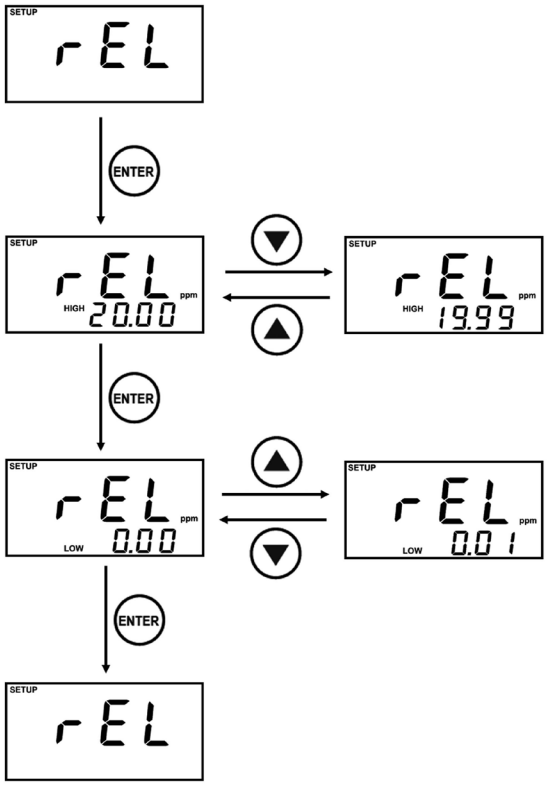
Menu		Standard setting value
Alarm setting(rEL)	High	8.00ppm
	Low	2.00ppm
Unit setting(unit)	Meas	ppm
	Temp	°C
Dead band (d.bnd)		0.00ppm
Offset(oFS)		0.00ppm
Damping(dAm̄p)		0.00ppm
Hold on measured value(hold)		OFF
Automatic Temp. Compensation(ATC)		ON
Temp. Offset(t.oFS)		0.0°C

9-3 Menu configurations

Menu configurations support 8 setup menus as shown below. Can change the menu by ▲ & ▼ key after entering the Menu mode and can enter the setting display by ENTER key.
In case of each setting method, refer to the setting page(9-4 ~ 9-11) of the corresponding menu.



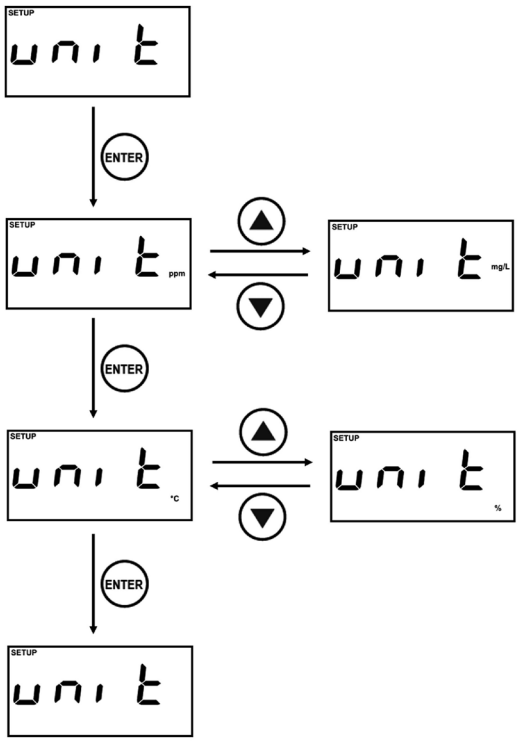
9-4 Alarm Setting



1. rEL is Alarm setting menu.
2. Present Alarm setting value is displayed, while you enter the Setting display.
3. Alarm setting value can be changed by ▲,▼ Keys (Unit : 0.01ppm, Max. : 20.00ppm)
4. Finish the setting by pressing the Enter key
5. Set the HIGH Alarm setting and then the LOW Alarm setting.
6. The HIGH Alarm value cannot be set lower than the LOW Alarm value, and the LOW Alarm value cannot be set higher than the HIGH Alarm value.
7. Dead band setting value is reflected to Alarm setting value. (Refer to “9-6: Dead Band Setting")
   Ex) When 0.30ppm of Dead band & 2.00ppm of HIGH Alarm are set, 1.70ppm or higher cannot be set as LOW Alarm.
8. Generating condition of alarm
   - HIGH Alarm : HIGH Alarm setting value – Measured value ≤ 0
   - LOW Alarm : LOW Alarm setting value – Measured value ≥ 0

※ In case of Dead band setting and its corresponding operation, refer to “9-6 Dead Band Setting”.

9-5 Unit Setting

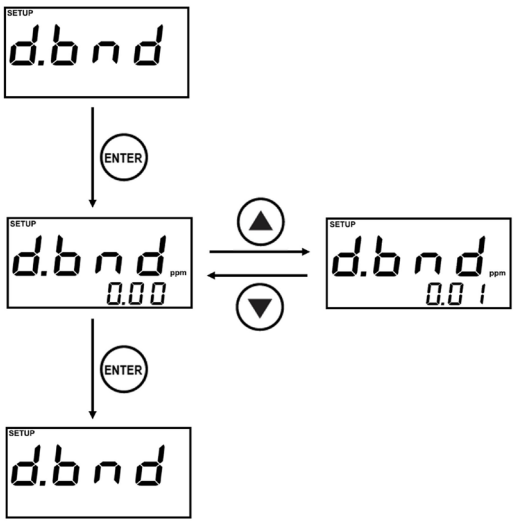


1 unit is Unit setting menu.
2 Present set unit is displayed, while you enter the Setting display.
3 You can change the unit by using the ▲ and ▼ keys.
4 Set the unit of the main screen and then that of the secondary screen.
5 Three types of unit(ppm, mg/L, and %) are provided on the main screen.
6 Three types of unit(°C, %, °F) are supported on the secondary screen.

※ When the main screen has the unit shown to be “%”, the secondary screen can't have the “%” unit (unable to set the same unit).

※ When the unit is changed, such settings as dead band, offset, damping value, and temperature offset will be initialized.

9-6 Dead band setting



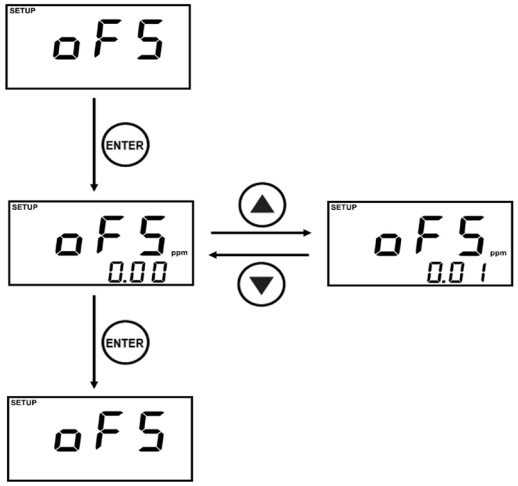
1 d.bnd is Dead band setting menu.
2 Present set value is displayed, while you enter the Setting display.
3 Dead band value can be changed by ▲,▼ Key.
4 Finish the setting by pressing the ENTER key.
5 The band can be set up to a maximum of 1.00ppm (0.30%). The alarm will occur as shown below example.

Ex) When setting of 0.10ppm
- When Setting value of HIGH Alarm is 10.00ppm.
  : If measured value is 10.10ppm or over, HIGH Alarm will occur, and, if measured value become less than 9.90ppm, HIGH Alarm will be off.
- When Setting value of LOW Alarm is 1.00ppm.
  : If measured value is less than 0.90ppm, LOW Alarm will occur, if measured value become 1.10ppm or over, LOW Alarm will be off.

※ Dead band setting value can not be set within the difference range of HIGH Alarm and LOW Alarm. (Refer to " 9-4 Alarm Setting")

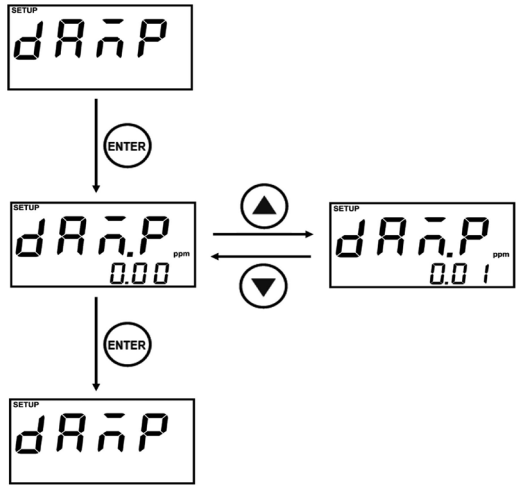
Ex) When 1.50ppm HIGH Alarm and 1.00ppm of LOW Alarm are set, 0.50ppm or higher can not be set as Dead band.

9-7 Offset setting



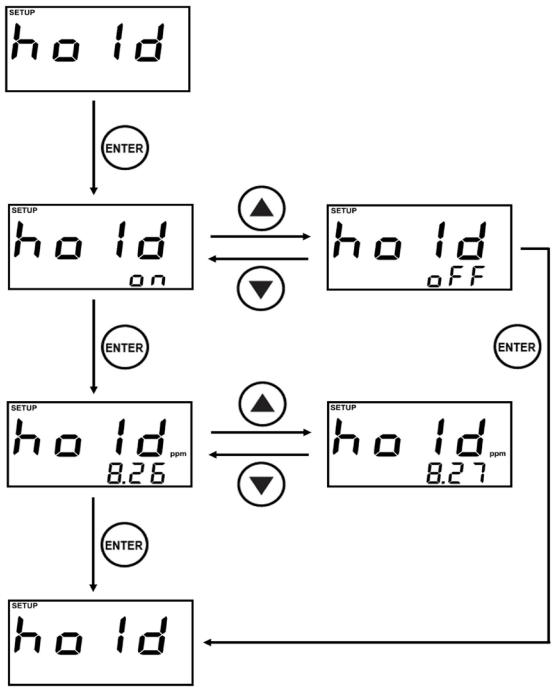
1 oFS is Offset setting menu.
2 Present set value is displayed, while you enter the Setting display.
3 Offsetting value can be changed by ▲,▼ Key.
4 Finish the setting by pressing ENTER Key.
5 The offset can be set within a range of –1.00 ~1.00ppm. (-0.30% ~ 0.30%)
The measured value is displayed after offsetting it as much as setting value.

9-8 Damping setting



1 dAñP is Damping setting menu.
2 Present setting value is displayed, while you enter the Setting display.
3 Damping value can be changed by ▲,▼ Key.
4 Finish the setting by pressing ENTER Key.
5 The damping value can be set within a range of 1.00ppm. (0.30%).
The measured value is displayed after damping it as much as setting value.

9-9 Hold Setting

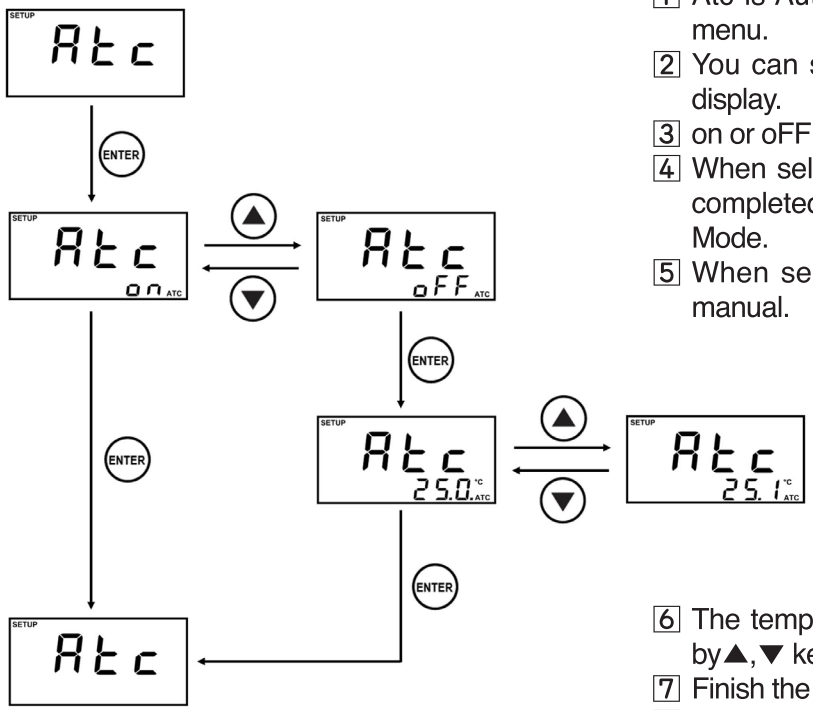


1 hold is menu for fixing the measured value.
2 You can select whether to hold the measured value or not, after entering the Setting display.
3 on or oFF can be changed by ▲,▼ key.
4 When selecting oFF, setting is immediately completed.
5 When selecting on, the value to set is displayed.
6 The setting value can be changed by ▲,▼ key.
(Unit : 0.01ppm, Range : 0.00~20.00ppm)
7 Finish the setting by pressing ENTER Key.
8 The setting value is displayed as the measured value and HOLD status is displayed.

※ If the hold setting value is higher than the setting value of HIGH Alarm and lower than the setting value of LOW Alarm, alarm will occur but it will be not effected by Dead band.

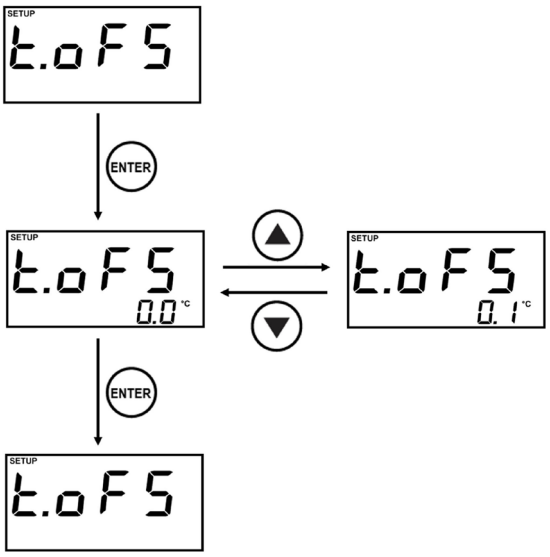
※ It is impossible to enter the calibration mode, when the measured value is hold state.

9-10 ATC Setting



1. Atc is Automatic Temp. Compensation setting menu.
2. You can select ATC after entering the Setting display.
3. on or oFF can be changed by ▲,▼ key.
4. When selecting on, ATC setting is immediately completed and ATC is displayed as Measuring Mode.
5. When selecting oFF, set the temperature by manual.
6. The temperature setting value can be changed by▲,▼ key. (Unit : 0.1℃, Range : 0.0~50.0℃)
7. Finish the setting by pressing ENTER Key.
8. The temperature setting value is displayed as the present temperature.

9-11 Temp. Offset Setting



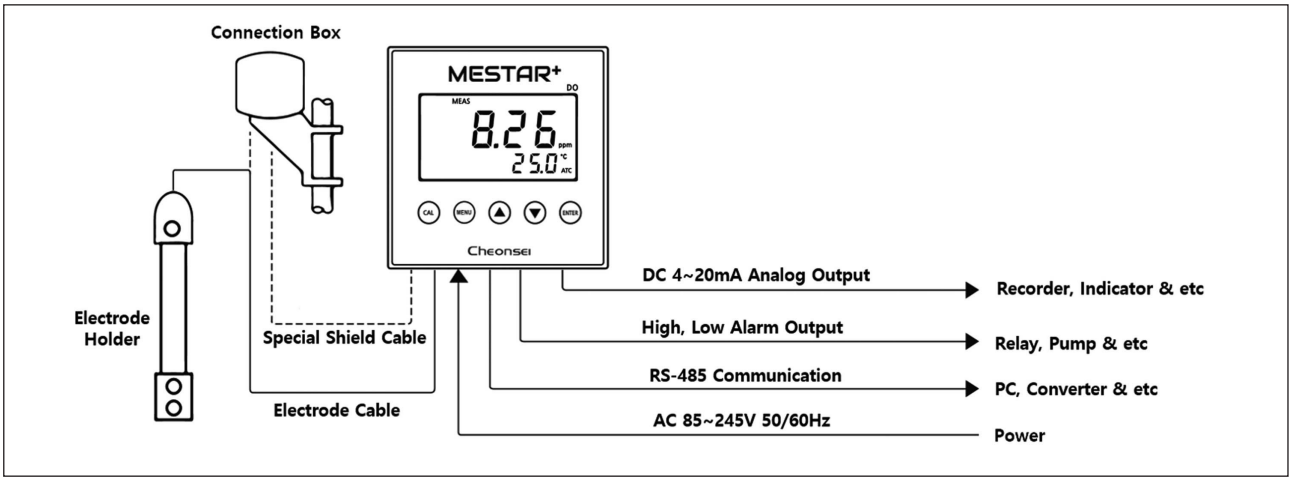
1. t.oFS is Temp. Offset setting menu.
2. Present setting value is displayed, while you enter the Setting display.
3. Temp. Offset value can be changed by ▲,▼ key. (Unit : 0.1℃/0.1℉, Range : -5.0~5.0℃/-9.0~9.0℉)
4. Finish the setting by pressing ENTER Key.
5. The present temperature is displayed after offsetting it as much as setting value.

※ It is only operated when Automatic Compensation is on.

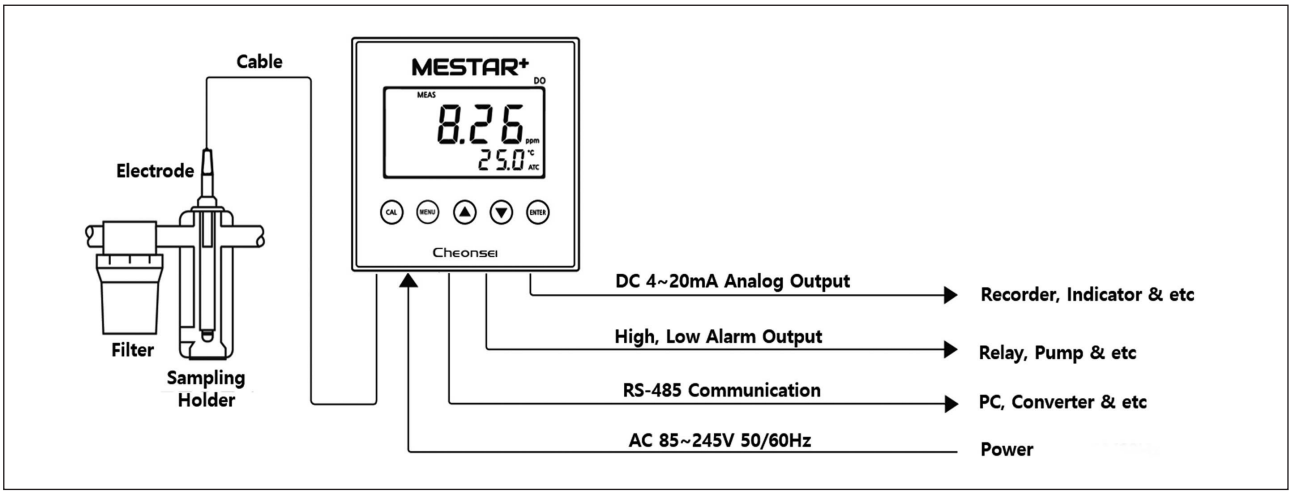
※ If temperature sensor is not connected, it will be not operated.

10 System Diagram

10-1 Electrode holder type



10-2 Sampling holder type

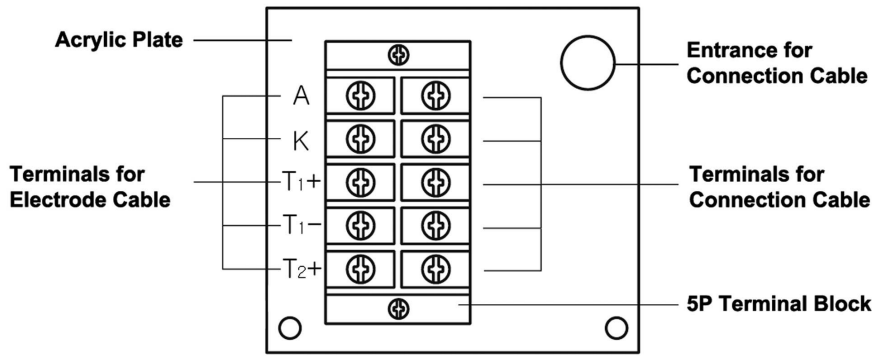


11 Handling of Components

※ This manual describes only the handling for the standard set components.

11-1 Wiring of Connection Box

Be careful not to change wiring, since the color of the electrode & the connection able should be matched with the terminals in the connection box each other.

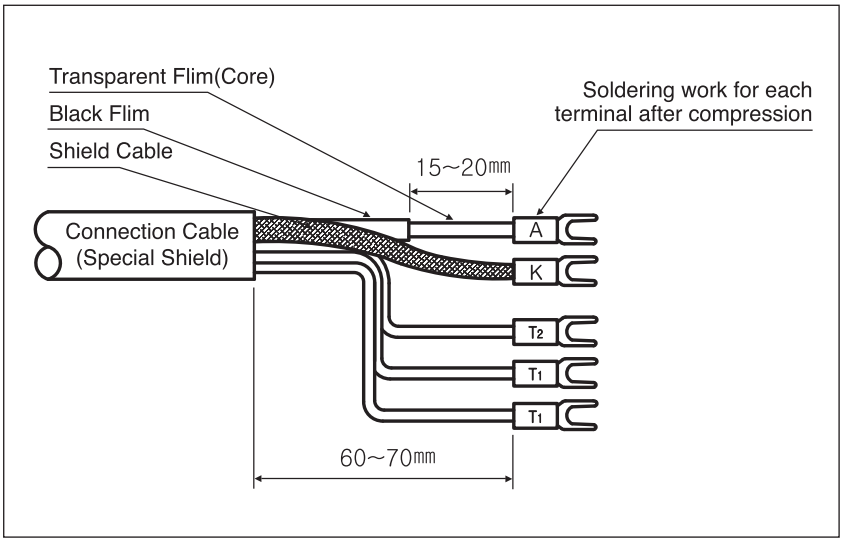


⚠ Caution

- Do not install controller 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 Temp. Compensation)

1 Remove the external film & the internal Black film as beside figure and solder the Y terminal after compressing the Y terminal(1.5-3Y) to the cable.
2 Wrap it with tube or tape after soldering. Specially, wrap Shield cable of R terminal with shrink tube(Φ2.0) or tape 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 cutting the damaged part.

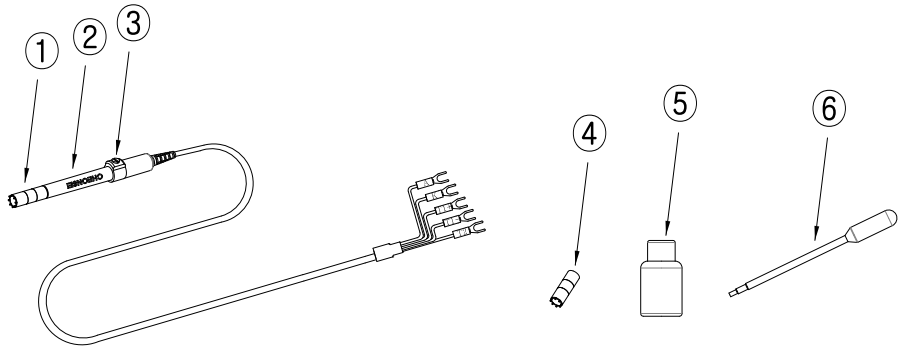


Terminal name	A	K	T2+	T1+	T1-
Cable color	Transparent film(core wire)	Shield wire	White	Green	Black

⚠ Caution

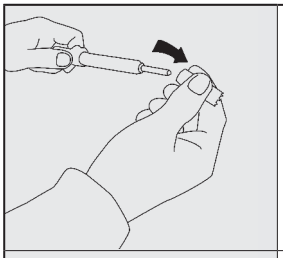
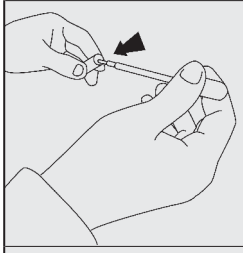
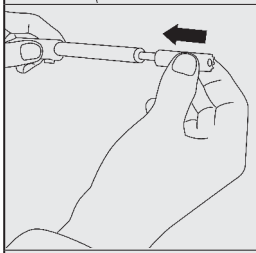
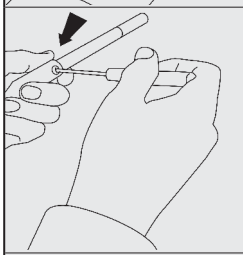
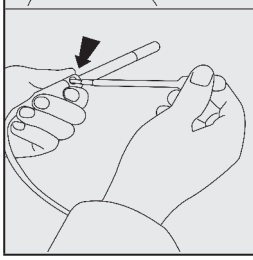
- Remove the black film as shown in the picture. If not removed, terminals A and K are short state. Measurement is impossible.

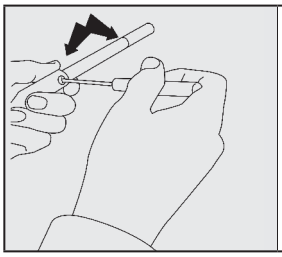
11-3 Electrode Components



① Membrane
② Dissolved oxygen electrode(Cable length Approx. 5m)
③ Internal fluid inlet
④ Membrane(Replacement)
⑤ Internal fluid 30mL(0.5M NaOH)
⑥ Dropping pipet 1mL(Internal fluid for injection)

11-4 How to Inject Solution

	• Separate the membrane from the electrode.
	• Fill the membrane with 1mL of 0.5M NaOH using a dropping pipette.
	• Assemble the membrane onto the electrode. • Be sure not to tighten the membrane firmly but let it be a little loose so that the solution may leak.
	• Loosen the solution opening using a flat-head driver.
	• Inject the solution through the opening. • Do the injection until the solution oozes between the sensor and the membrane.

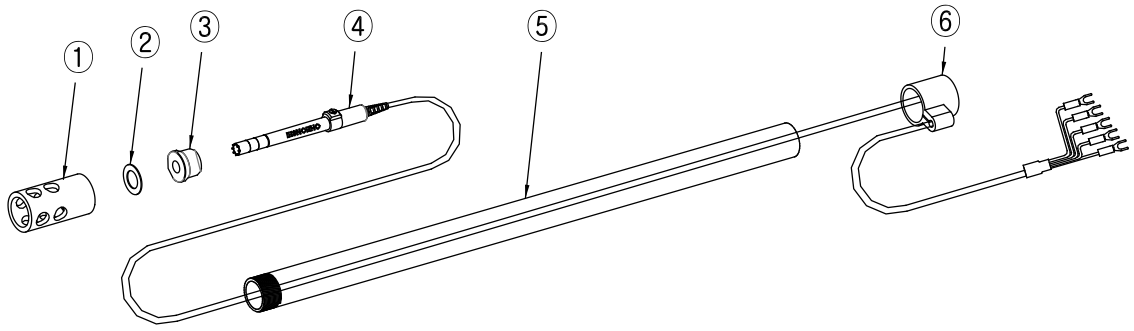


• Wipe leaked solution after closing the membrane and the solution openings.
※ The solution may leak; please follow the precautions described below.

⚠ Caution

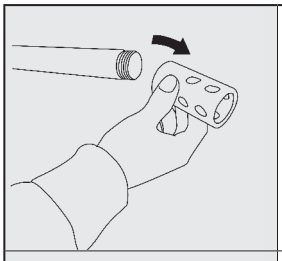
- Do not drink the solution. It may cause harm to the body. Be careful not to let the old and weak or children handle it. Get a medical help from a doctor when one drinks it.
- For anyone who has wounds on the hand, be sure to put on medical gloves.
- Wash the area with clean water immediately when a red spot, swelling, itching, or pain develops on that area.

11-5 Electrode Holder SET Components

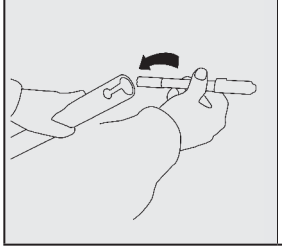


① Electrode protection tube ② Washer(P.E) ③ Packing
④ Dissolved oxygen electrode(Cable length Approx. 5m) ⑤ Electrode Holder ⑥ Rubber stopper

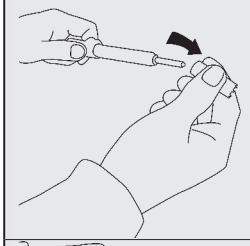
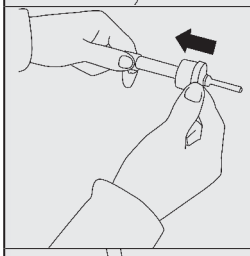
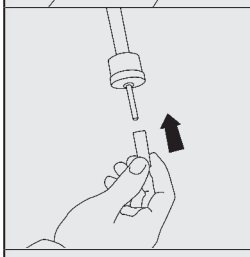
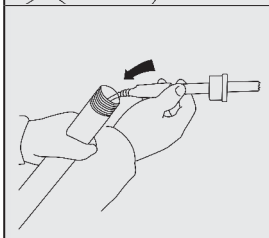
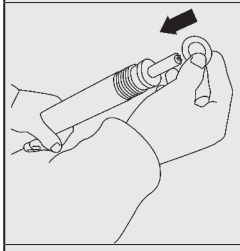
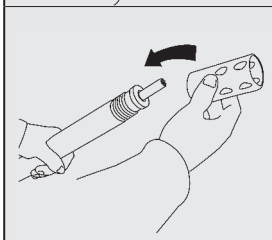
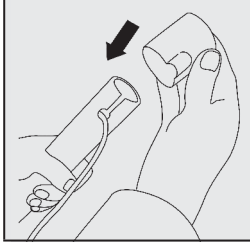
11-6 How to Fix the Electrode-Electrode Holder



• Separate the electrode holder from the electrode protection tube



• Insert the electrode from the top of the electrode holder and pull it out from the bottom.

	• Separate the membrane of the electrode.
	• Insert a rubber packing up to the membrane connection of the electrode. ※ Make sure that the rubber packing should be in the right direction.
	• Fill 1mL of 0.5M NaOH into the membrane and assemble it into the electrode inserted with the rubber packing. ※ Refer to 11-4 How to inject solution.
	• Assemble the electrode to the electrode holder. Insert a rubber packing into the electrode holder.
	• Put a washer (P.E) on top of the rubber packing.
	• Assemble the electrode protection tube.
	• The electrode assembly is completed by inserting the vents of the electrode holder and the rubber stopper aligned each other.

⚠ Caution

- Be careful not to apply excessive force when handling the electrode. If the glass electrode is broken by excessive force, it may cause injury.

12 Cause & Solution of Problem

	Problem	Number of Cause & Solution
A	E.01 on screen (Circuit board is not connected)	1, 2
B	E.02 on screen (Electrode is not calibrated)	3, 4, 9
C	Reading on screen is not changed	3, 4, 5, 6, 7, 9
D	Measuring is difficult because reading is not steady	3, 5, 6, 7, 9
E	The displayed temp. is far different from the actual temperature. (over ±5°C)	8

NO	Cause	Solution
1	Faulty circuit board connection	Repair the controller
2	Damaged circuit board	Repair the controller
3	Damaged electrodes & Electrode's aging	Exchange electrode
4	Shortage of Electrode solution	Supplement of internal liquid
5	Faulty connection of controller's terminal	Connecting terminal after removing obstacle
6	Fault of liquid to be measured	Exchange the measuring liquid
7	The fluid velocity of liquid to be measured is not steady	Makes the fluid velocity steady
8	Fault of temp. compensation circuit	Exchange temp. compensation PCB
9	Damaged electrode membrane & electrode membrane's aging	Exchange electrode membrane

13 Warranty

⚠ Caution

- If the product is reconstructed arbitrarily or the undesignated parts are used into the product, CHEONSEI will not warrant and CHEONSEI 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)

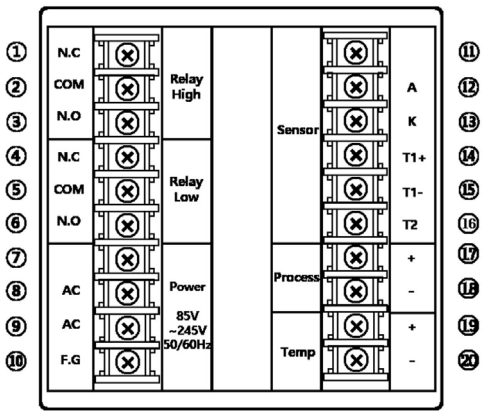
3 Repair or change product due to following reasons will be charged regardless the warranty period.
① Trouble or damage of pump expired warranty period.
② Trouble of using by careless handling.
③ Trouble or damage due to using non-designated part & reconstructing the products arbitrarily.
④ Trouble or damage due to reconstructing the products by other than CHEONSEI and our authorized company.
⑤ Trouble by fire or natural disaster

14 Repair Service

> ⚠ Caution
> • When the product is sent to factory for repair service, do not damage during transport.
> Also, please make sure that bolts and other components are securely fastened in order not to loss it.

1 Contact to CHEONSEI or local agent as shown on back of the manual, if you have any problem or questions.
2 If you want to repair, please inform the following.
① Model Name & manufacture number written in name plate
② Used period, using condition, & state
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 Controller Wiring

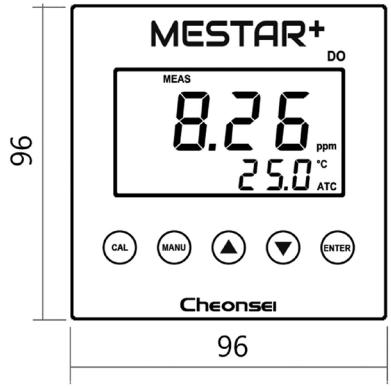


① HIGH Alarm N.C(Normal Close)
② HIGH Alarm COM(Common)
③ HIGH Alarm N.O(Normal Open)
④ LOW Alarm N.C(Normal Close)
⑤ LOW Alarm COM(Common)
⑥ LOW Alarm N.O(Normal Open)
⑦ None
⑧ AC input power
⑨ AC input power
⑩ F.G(Frame Ground)
⑪ None
⑫ Electrode A
⑬ Electrode K
⑭ Electrode T1+
⑮ Electrode T1-
⑯ Electrode T2
⑰ DO analog output +
⑱ DO analog output -
⑲ Temp analog output +
⑳ Temp analog output -

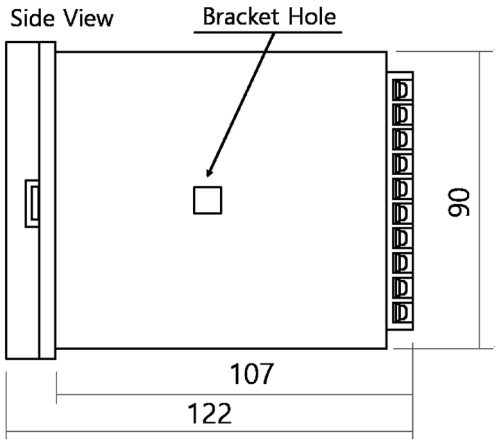
16 Controller Dimension

unit : mm

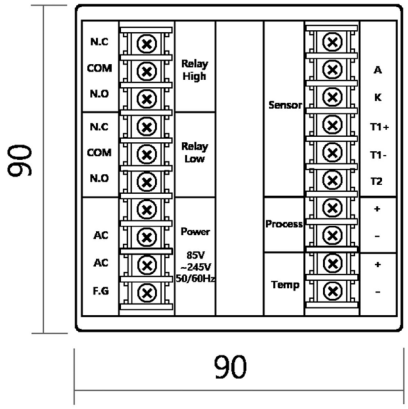
Front View



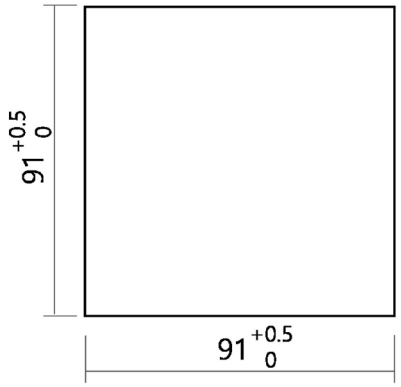
Side View



Rear View



Section View



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