INSTRUCTION MANUAL

FOR

pH Controller CRN-96PD

ORP Controller CRN-96OD

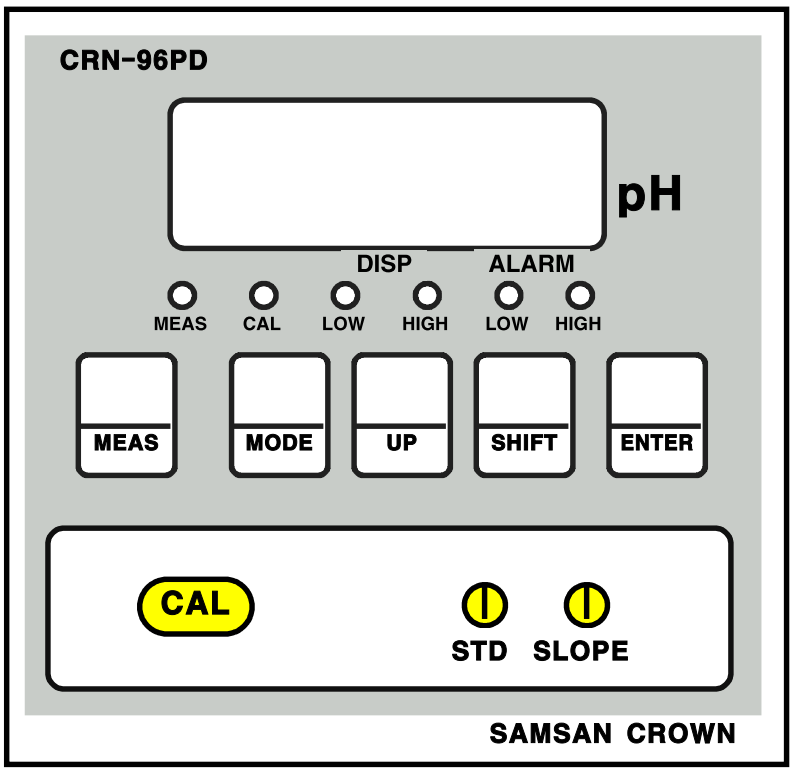
S A M S A N K O R E A , L T D .

TEL: +81-(0)31-423-7723 FAX: +81-(0)31-423-7727

h t t p : / / w w w . s a m s a n k o r e a . c o m

DIGITAL TYPE pH (ORP) Controller

Thank you very much for your purchasing of
Advanced SAMSAN CROWN CONTROLLER with microprocessor.



This controller has been checked and tested thoroughly to meet prescribed specifications and certain safety standards by our inspector before ex-factory, however, surely check the state of controller outside and accessaries when delivered. Also Read all instruction manuals and understand basic functions & operating methods for complete use.

1. FEATURES

Advanced SAMSAN CROWN CONTROLLER with microprocessor

Condensed in a compact DIN size (96×96m/m), versatile functions provide more simplicity in operation and more efficiency in performance, in addition to accurate monitoring results.
With the appropriate sensors and accessaries, SAMSAN CROWN CONTROLLER can serve as the most suitable and cost effective monitoring system to meet process, waste water and control applications.

1-1 With microprocessor controller functions and design of one touch button, you can get more effective, reliable data and very simple setting.

1-2 Designed for using out-put of signal and alarm
(DC 4～20㎃ or 1～5V and others)

1-3 With 3 Digit Digital Display, Reading & setting are very simple by appearance of each message.

1-4 Isolator is equipped for transmission of stable data with isolated DC 4～20㎃ or 1～5V output and you can connect with personal computer and data logger directly.

1-5 Designed to set high and low alarm for controlling of water quality in process, waste water and your applications.

1-6 Equipped with Automatic Temperature Compensation for more accurate monitoring results and appearance.

1-7 DIN (96×96m/m) size for simple installation and maintenance.

1-8 Equipped with power switch for protection of controller by ON/OFF of power supply while setting or A/S.

1-9 Equipped with EEPROM, SAMSAN CROWN CONTROLLER can hold all set values of preset parameters while power is OFF and when power become ON, they can continue to measure and monitor with all values set before.

2. SPECIFICATIONS

2-1 pH CONTROLLER

Model	CRN-96PD
Range	0.0 ～ 14.0 pH
SA(Sensitivity Adjustment)	0.1 ～ 4.0 pH (± 2 pH)
Shift	± 2.0 pH
Accuracy	± 0.1 pH ± 1 digit
Ambient Temperature	−5℃ ～ 45℃
Output	DC 4～20mA (Option: Isolation)
Alarm	High, Low Relay (1a1b)
Panel Cut	92 (W) × 92 (H) mm
Power Source	AC 100/220V ±10%, 50/60㎐

2-2 ORP CONTROLLER

Model	CRN-96OD
Range	± 700mV (Option ±999mV)
SA(Sensitivity Adjustment)	1 ~ 500mV (±250mV)
Shift	± 200mV
Accuracy	±10mV ± 1 digit
Ambient Temperature	−5℃ ~ 45℃
Output	DC 4~20mA (Option: Isolation)
Alarm	High, Low Relay (1a1b)
Panel Cut	92 (W) × 92 (H) mm
Power Source	AC 100/220V ±10%, 50/60㎐

2-3 Cable : This cable is special for pH controller and used to connect between the controller and connector box.

(1) Model : SC-10
(2) Size : 6 Ψ
(3) Length : 20m (standard), Max. extension : 100m (option)

2-4 Connector box

(1) Model : SCB-10
(2) In case of over than 3m between controller and electrode holder, install with connector box near electrode holder and connect with SAMSAN special cable surely in connection between connector box and controller.

2-5 pH (ORP) Electrode

(1) Model : GR-1K (pH), MR-1K (ORP)
(2) Measuring Temp. : 0 ~ 60℃
(3) Type : combination glass electrode (pH)
combination metal electrode (ORP)
(4) KCL filling type
(5) Option : automatic temperature compensation
KCL non-filling type

2-6 Holder

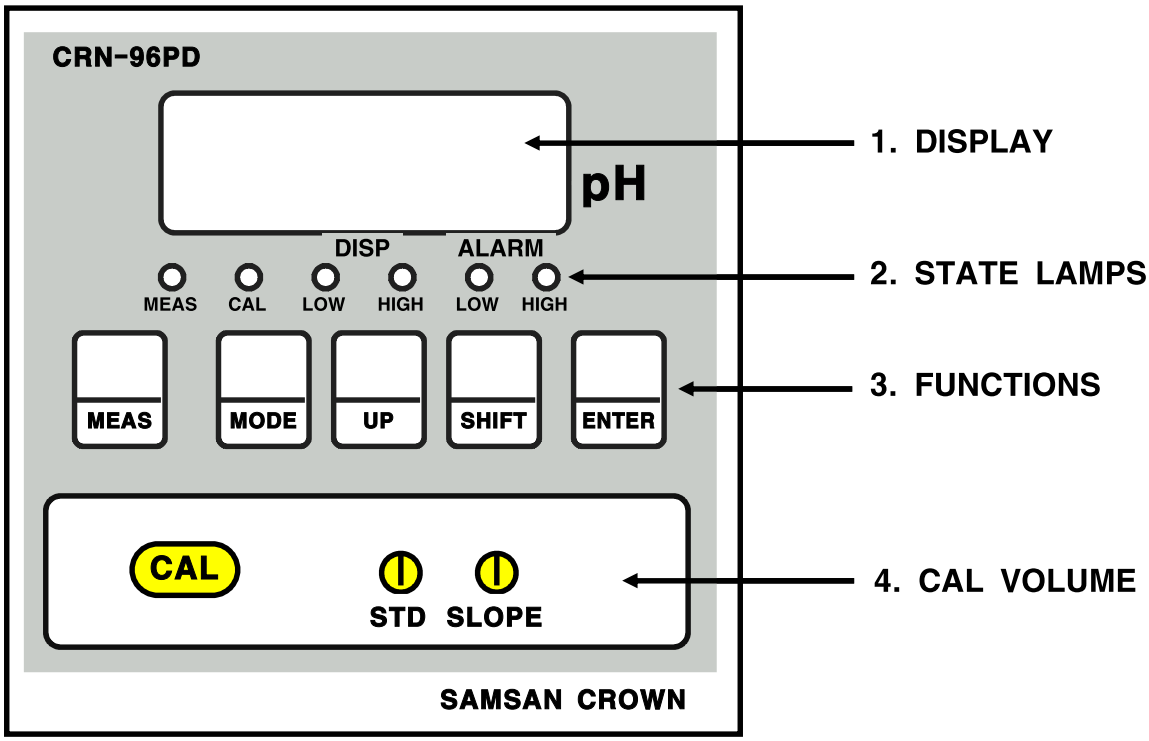
(1) Model : SH-10 (submersible type)
(2) Mat'l : polypropylene
(3) Liquid Temp. : - 10 ~ 80℃
(4) Length : 1m (standard)
option : 1.5m, 2m, 2.5m, 3m
(5) Flow-through type and special specifications should be asked to our technical sales dept.

2-7 Bracket

(1) Model : SB-10

2-8 Buffer Solution : pH 4, pH 7

3. NAME OF PARTS



3-1 Display : display of measured value, set-value, parameter's set contents

3-2 State lamps

(1) MEAS : when measuring, LED lamp on

(2) CAL : when calibration, CAL switch-on and lamp on, HIGH/LOW Relay off

(3) DISPLAY

LOW : when set-value(related with LOW) is appeared, lamp on
LOW set / SA / SHIFT

HIGH : when set-value(related with HIGH) is appeared, lamp on
HIGH set / SA / SHIFT

(4) ALARM

LOW : when LOW ALARM, lamp on

HIGH : when HIGH ALARM, lamp on

3-3 Function buttons

(1) MEAS : set MODE → measuring MODE
CAL on → CAL off

(2) MODE : used when reading and changing of set-value

(3) UP : used when changing of set-value in set-MODE

(4) SHIFT : used when changing of figure's place

(5) ENTER: used when finishing of setting

3-4 CAL volume

: used when calibration with buffer solution

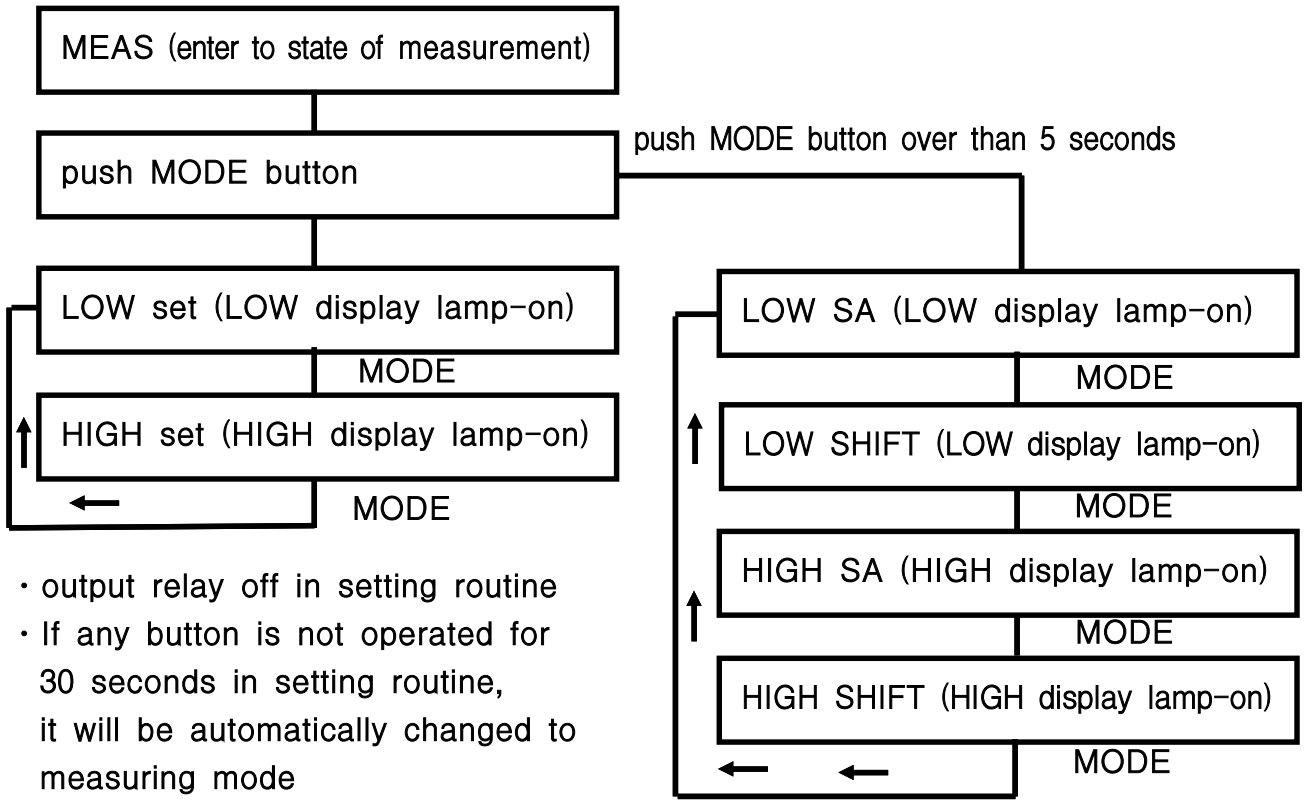
(1) CAL : when CAL button on, LOW/HIGH Relay off and stop of alarm & all kinds of controlling

(2) STD : used when calibration of pH 7

(3) SLOPE: used when calibration of pH 4 (pH 9)

4. OPERATION

4-1 Setting flow chart

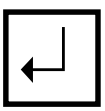


- output relay off in setting routine
- If any button is not operated for 30 seconds in setting routine, it will be automatically changed to measuring mode

4-2 Changing method

(1)  UP — used when increasing of twinkling figure

(2)  SHIFT — used when moving of twinkling figure to right side

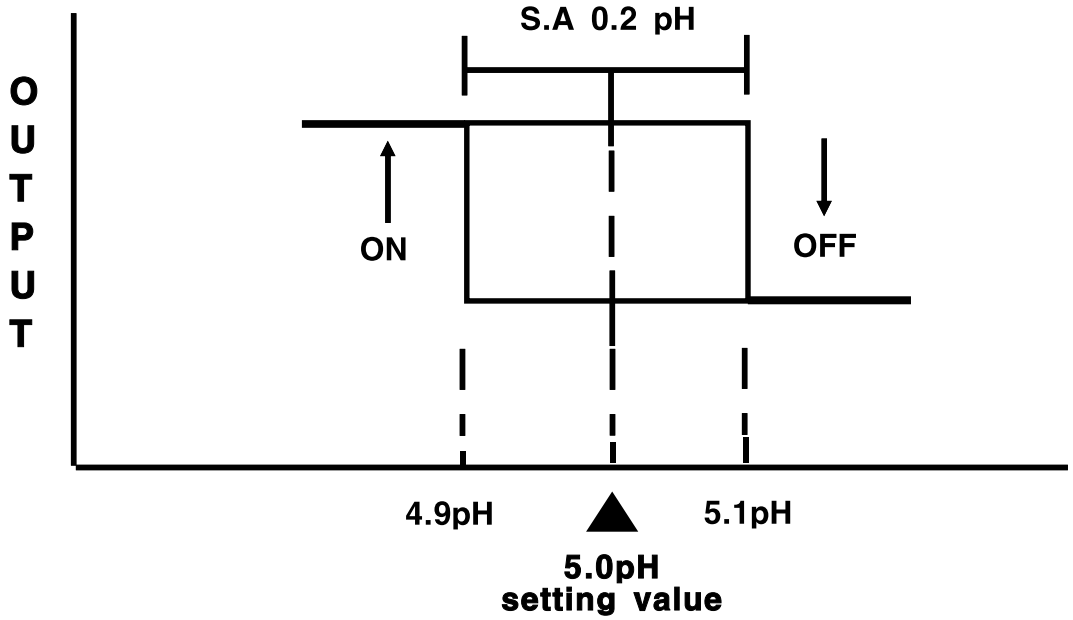
(3)  ENTER — used when saving of setting value

After changing of set-value, if ENTER button is not pushed, it will be returned to former set-value.

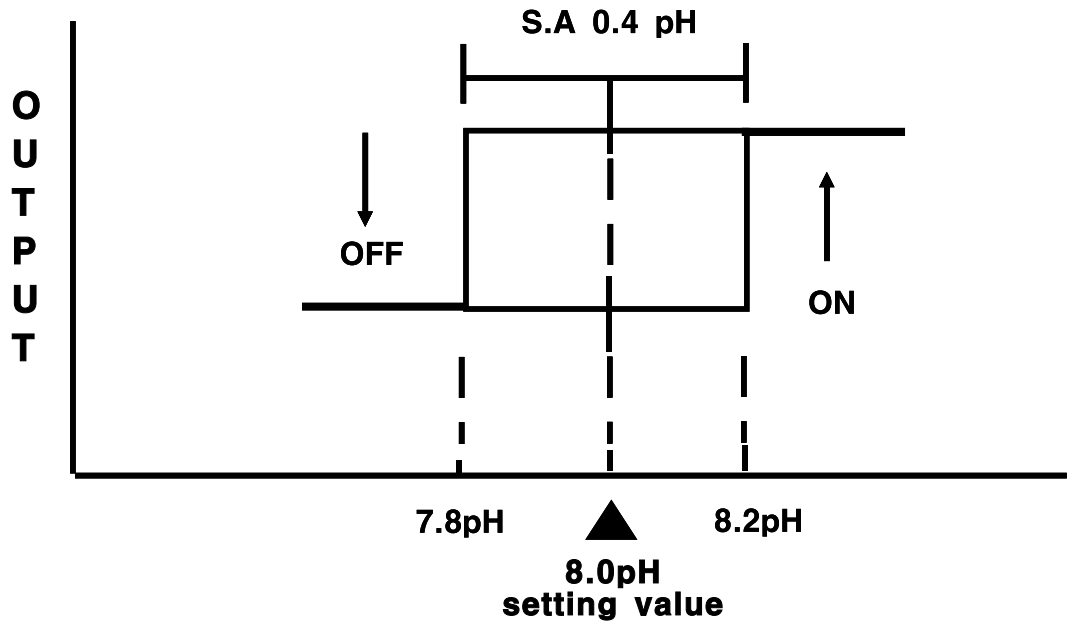
5. S.A.(Sensitivity Adjustment) & SHIFT

5-1 S.A.(sensitivity adjustment)

: When ON and OFF with 1 point, out-put is chattered and easy to receive influences of any noises, however, if you set the width of S.A. as following diagram, stable control is possible.
Setting is possible from 0.1pH to ±4.0pH(±2.0pH) and it was set as 0.1pH(±0.05pH).



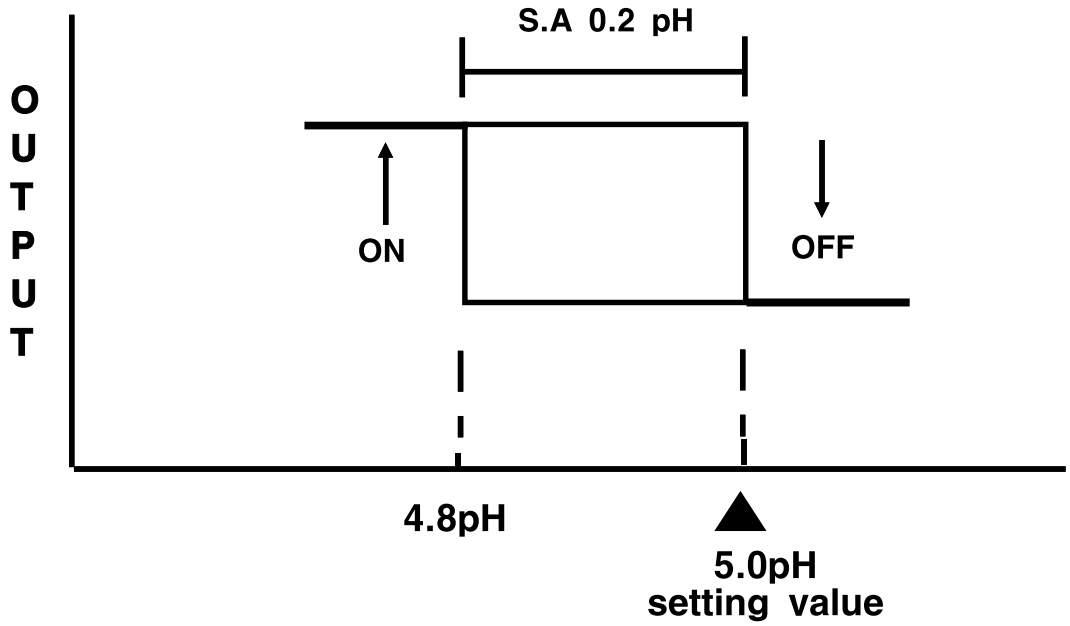
Set example) LOW set : occasion of lower limit 5.0pH
S.A : 0.2pH
SHIFT : 0.0pH



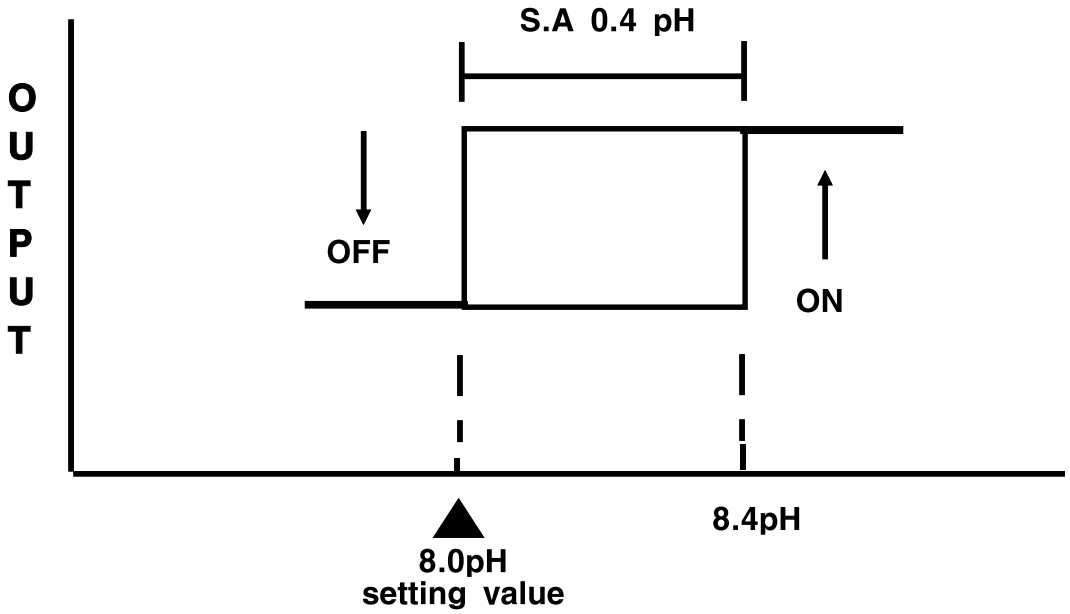
Set example) HIGH set : occasion of upper limit 8.0pH
S.A : 0.4pH
SHIFT : 0.0pH

5-2 SHIFT

: A constant error is occured against target value when ON and OFF. This error is called as off-set and this off-set can be controlled to target value without any errors, if you use this SHIFT function in SAMSAN CROWN controllers.
Setting is possible from 0.0pH to ±2.0pH and it was set as 0.0pH.



Set example) LOW set : 5.0pH
S.A : 0.2pH
SHIFT : -0.1pH



Set example) HIGH set : 8.0pH
S.A : 0.4pH
SHIFT : +0.2pH

6. INSTALLATION & WIRING

6-1 Installation environment

: Install at good conditioned place as follows.

(1) Airy place (ambient temperature : -5℃～40℃)

(2) Adequate protection should be provided to keep the controller from being exposed to direct sunlight or rain.

(3) Moistureless place that ambient humidity is less than 85%.

(4) A place without the mechanical vibration

(5) A place with sufficient space for easy maintenance and wiring

(6) A place without dust, corrosive gas and any influences of electronic power

6-2 Installation method

(1) Panel mounting type

※ Refer to out-drawing for panel cutting.

(2) Insert 2 eas of mount bracket in the upper and lower holes and fasten the bolts with ⊕ driver.

6-3 Connection of sensor cable

: Cable connector should be kept in dry and clean to get a stable value.

(1) Standard cable length is 5m

In case of extension over than 5m, use the connector box and SAMSAN CROWN cable for pH and ORP.

(2) Install at the place without any influences due to motors of machinery.

(3) Lead cable of sensor should be fully left for calibration of pH 4, pH 7, pH 9 and checking of sensor.

(4) Contact to our technical sales dept. in case of using Temperature Compensation electrode.

6.8 kΩ at 25℃ or 500Ω at 25℃

G (M) : Glass terminal

R : Ref (Reference electrode terminal)

T. T : Temp. compensation electrode terminal

E : Shield cable

※ Refer to following drawing for wiring to terminal.

6-4 Connection of output cable

(1) Output signal of DC 4～20mA against measuring range come out.

※ Max. load resistance : 500Ω

0.0 pH → 4 mA

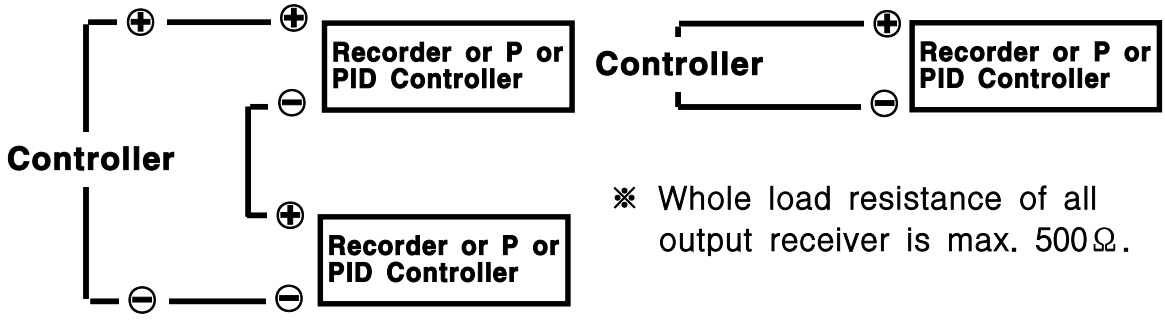
3.5 pH → 8 mA

7.0 pH → 12 mA

10.5 pH → 16 mA

14.0 pH → 20 mA

(2) Output



※ Whole load resistance of all output receiver is max. 500Ω.

6-5 Connection of power cable

: Connect with correct voltage

(1) Power switch is attached to terminal board in the back of the controller

(2) Surely ground for your safety

7. CALIBRATION & OPERATION

Adjust controller & using sensor with standard solution prior to operating. Regular calibration is surely needed because character of sensor changes when used for long time.

7-1 Calibration of pH controller

(1) Clean the end of sensor holder with distilled water (or pure water)

(2) Calibrate pH 7

Measure the liquid temperature and set pH value according to it with STD volume

Temp. ℃	pH 4	pH 7	pH 9
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

(3) Calibrate pH 4 or pH 9
Measure the liquid temperature and set pH value according to it with SLOPE volume and Don't touch STD & SLOPE volume after setting.
(4) Repeat items (1)～(3) at 2～3 times to check reappearance.

7-2 Calibration of ORP Controller

(1) Make a short G terminal (glass electrode input) and Ref board (Reference electrode input) behind of controller with jumping cable.
(2) Adjust till appearance of "0" value with ZERO volume on display.
(3) Remove a jumping cable of item (1) and connect the lead cable of ORP sensor.
(4) Clean the end of sensor holder with distilled water (or puve water).
(5) Checking of ORP standard solution

※ Check the following electromotive force and adjust with SLOPE volume.

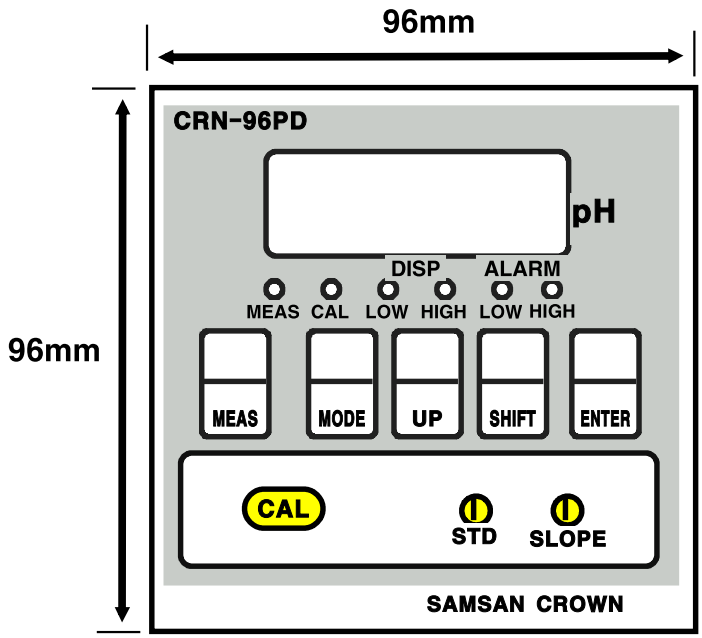
ORP electrode	Reference electrode	eletromotive force
Gold or Pt	AgCl	260mV ±20mV
Gold or Pt	Hg_2Cl_2	220mV ±20mV

8. TROUBLESHOOTING

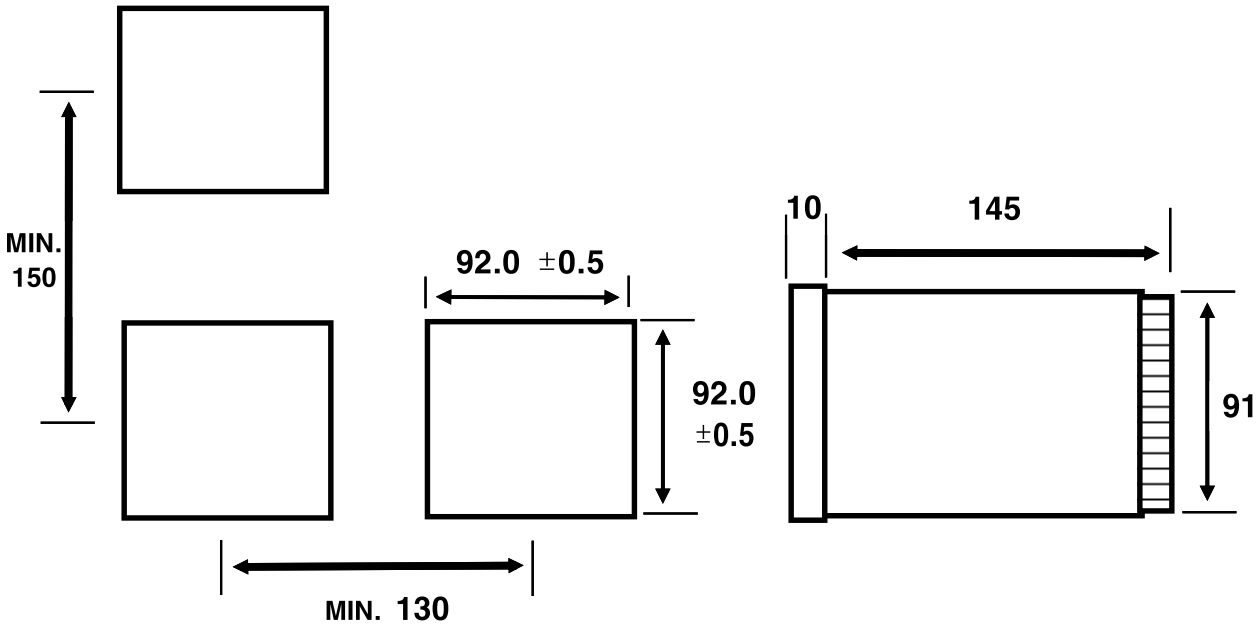
trouble	cause	remedy
Controller swings fully to the end of 0pH or 14pH and -700mV or +700mV (when electrode is dipped into standard solution).	Faulty insulation of glass electrode terminal in connector box, electrode lead cable or connector.	Clean with carbon tetrachloride. Do not allow contact of glass electrode to other wires.
	Faulty contact at electrode cable connection.	The controller is forced to swing to the end when the input becomes open due to faulty contact between G and R terminal. Check continuity with circuit tester and correct faulty contact.
Controller is unstable.	Faulty contact of ZERO or SPAN	Replace.
	Imperfect grounding.	Ground surely.
	Coated on the sensing part of glass electrode or increased resistance.	Thoroughly rinse the sensing part of glass (metal) electrode or replace.
	Coated on the sensing part of metal electrode	
	Measuring liquid is grounded.	This occurs when pH controller or ORP controller is grounded. Sufficiently insulate the measuring liquid.
	Faulty connection of electrode lead cable	Connect correctly.
Not adjustable to pH of standard solution with ZERO or SPAN volume	Increase of unbalanced potential difference of glass electrode or crack of inner electrode.	Replace.
	The pH value of standard solution was changed.	Use correct standard solution.

trouble	cause	remedy
Not adjustable to pH of standard solution with ZERO or SPAN volume	Faulty insulation	Clean terminal connector of input circuit connecting part sufficiently with carbon tetrachloride.
	Increase of current leakage from initial stage FET of amplifier	Replace.
	Sensing parts and measuring liquid is not balanced.	Dip the electrode sufficiently into measuring liquid water.

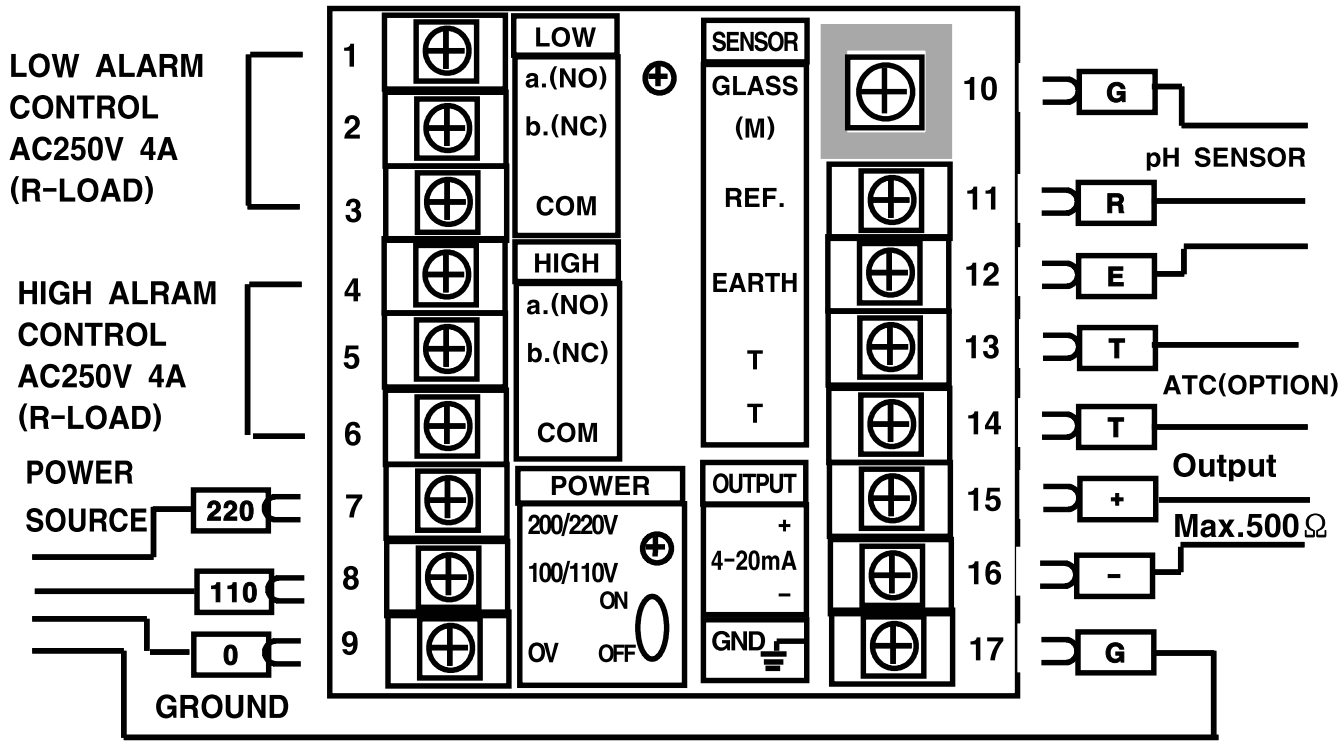
9. DIMENSIONS



PANEL-CUT SIZE (UNIT: mm)



10. TERMINAL BOARD



11. INNER STRUCTURE