PC3030A/PC-3050

Microprocessor

pH/ORP

Controller

SUNTEX

ACT

WASH

MEAS REL1

7.00 pH

25.0 °C ATC

SETUP   CAL   MODE   ▶   ENTER

µP pH/ORP CONTROLLER PC-3030A

CONTENTS

1. Specifications:

Model	PC-3030A	PC-3050
Item	pH/ORP/Temp.	
Range	pH: -2~16pH mV: -1999~1999mV Temp.: -30.0~110.0°C	
Resolution	pH: 0.01pH mV: 1mV Temp.: 0.1°C	
Accuracy	pH: ±0.01pH(±1Digit) mV: ±0.1%(±1Digit) Temp: ±0.5℃	
Temperature compensation	PT1000 Automatic temperature probe compensation or Manual temperature setup compensation	
Input resistance	$> 10^{12}\Omega$	
Ambient temperature	0~50°C	
Display Screen	Large Graphic LCD	
Current output 1	Isolated 4~20mA output mapping to pH/ORP, max. load 500Ω	
Current output 2	—	Isolated 4~20mA output mapping to temp., max. load 500Ω
RS 485	—	Yes
H1/L1 Contact	N/O, 240VAC 2A max.	
H1/L1 Control	Programmable set point setting	
Wash Contact	N/O, 240VAC 2A max.	
Wash Time	ON：0～999 sec. OFF：0～999 hours	
Output Voltage	DC ±12V	
Input Power	115V or 230VAC±20%，50/60Hz	
Mounting	Panel mount	
Controller dimension	96×96×185mm（H×W×D）	
Cut out dimension	93×93×185mm（H×W×D）	
Weight	0.49Kg	

2. Assembly and installation:

2.1 Precautions for installation

Wrong wiring will lead to breakdown or electrical shock of the instrument, please read the operating manual clearly before installation.

Make sure to remove AC power to the controller before wiring input and output connections, and before opening the controller housing.

The installation site of the controller should be good in ventilation and avoid direct sun shining.
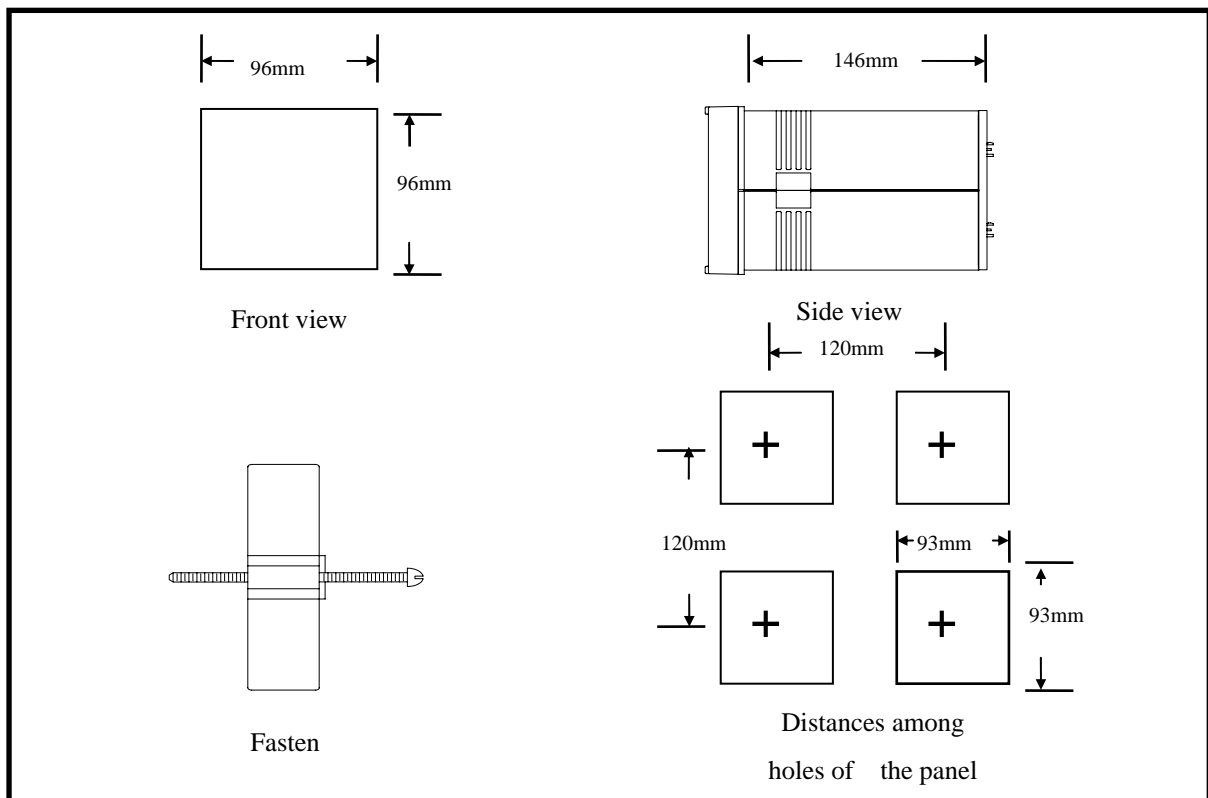
Relay contacts are subjected to electrical erosion. Don't connect relay contacts directly to heavy loads, connecting a magnetic switch instead.   Especially with inductive and capacitive loads, the service life of the contacts will be reduced.

For suppression of sparks and arcing, components such as RC combinations, nonlinear resistors, series resistors, diodes and varistors are used.

2.2 Install the controller on the wall mount chassis

Reserve a 93 x 93 mm hole on the front panel of the wall mount chassis and insert the controller from the rear of the chassis, fasten the two sides fixing metal boards with a screw driver.

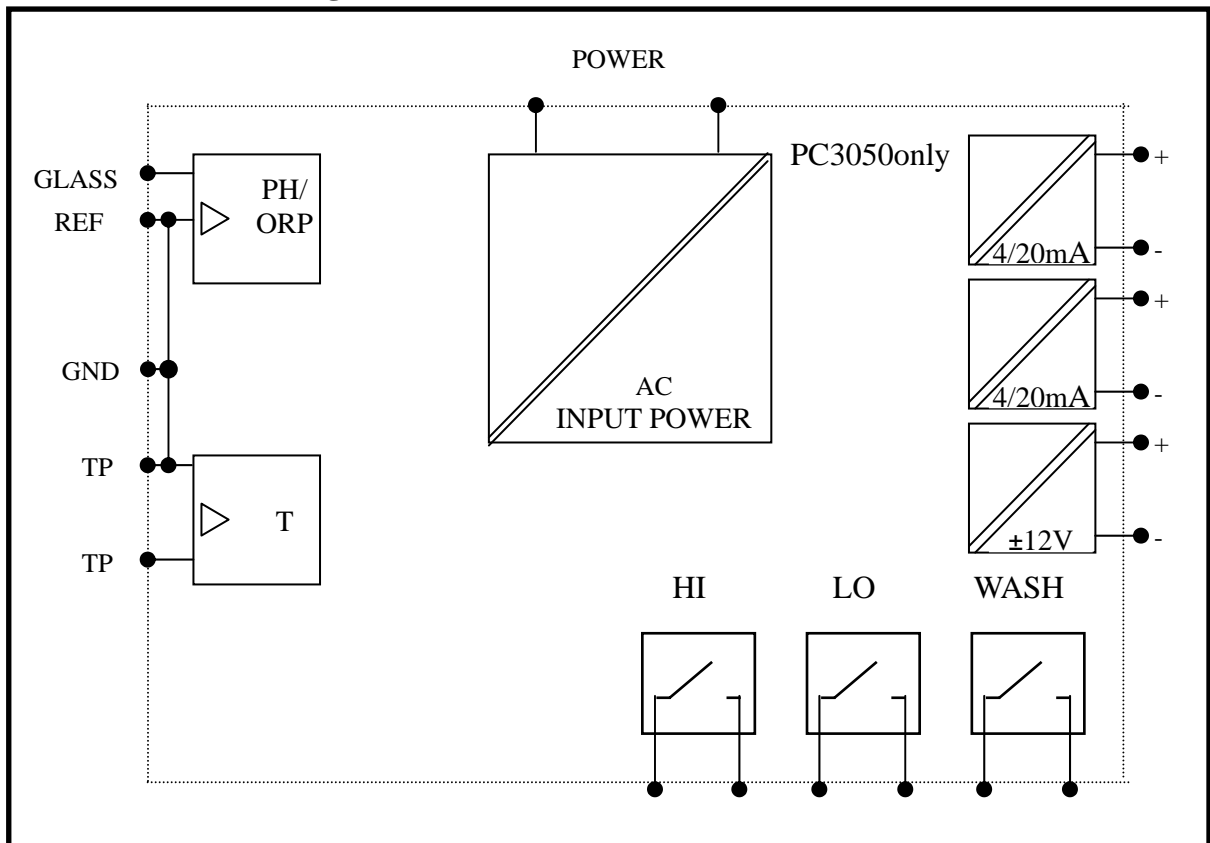### 2.3 Cut out dimension of the wall mount chassis

96mm

96mm

Front view

146mm

Side view

120mm

120mm

93mm

93mm

Fasten

Distances among

holes of   the panel

3. Block diagram and rear panel:

3.1 Rear panel
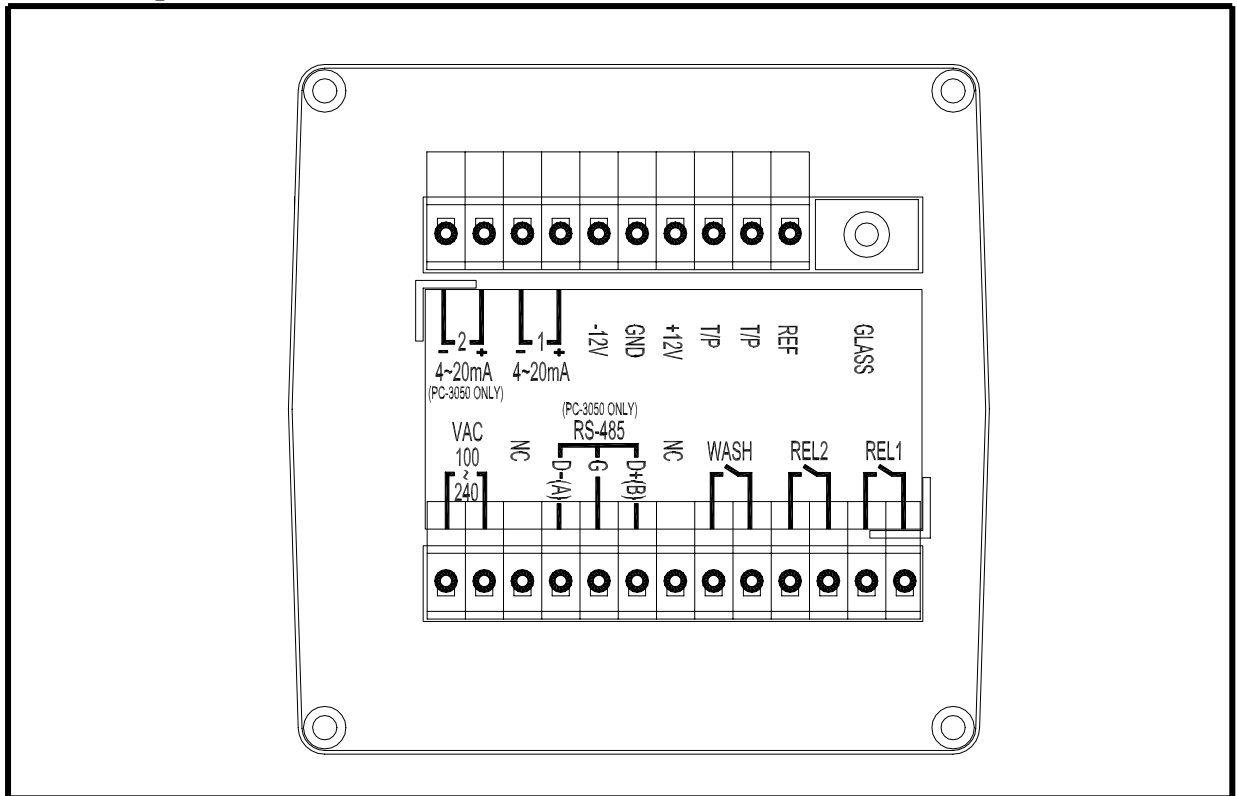
3.2 Function block diagram

3.3 Terminals of rear panel

GLASS	：	Connected to the central line cable.
REF	：	Connected to the net line cable.
T/P	：	Connected to the temperature probe.
4-20mA 1	：	Current output mapping to pH/ORP for recorder or remote connection.
4-20mA 2	：	Current output mapping to temp. for recorder or remote connection
REL 1	：	Hi relay contacts.
REL 2	：	Lo relay contacts.
WASH	：	Wash relay contact.
DC±12V	：	DC±12V output contacts.
GND	：	DC±12V ground contacts.
AC100～240V	：	AC power of the controller.　AC115V to 230V
NC	：	No connection.
T/R	：	End of terminal. (Refer to 8.1 description)
RS-485	：	Connected to the computer. (PC-3050 only)

3.4 Electrode connection diagram
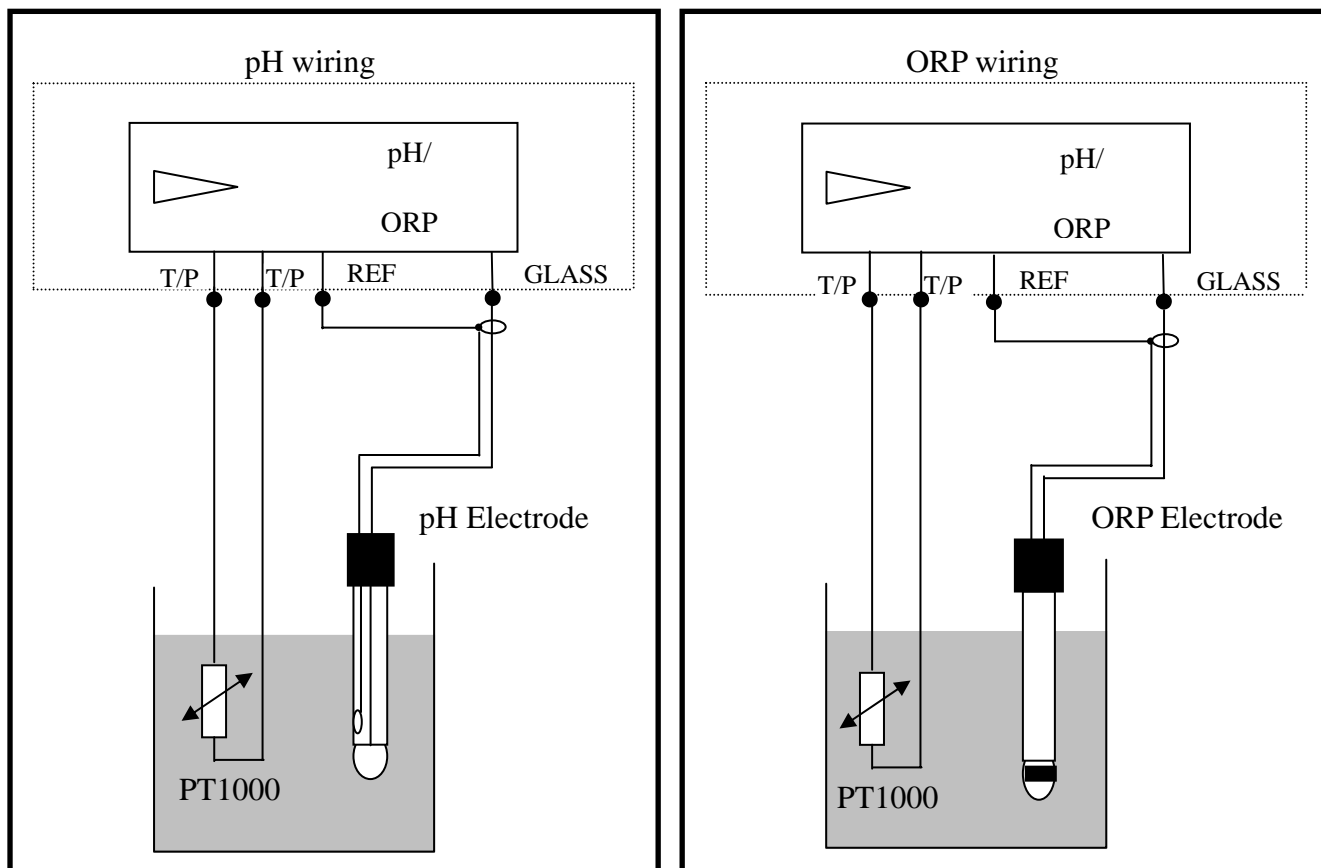
3.5 Electrical connection diagram
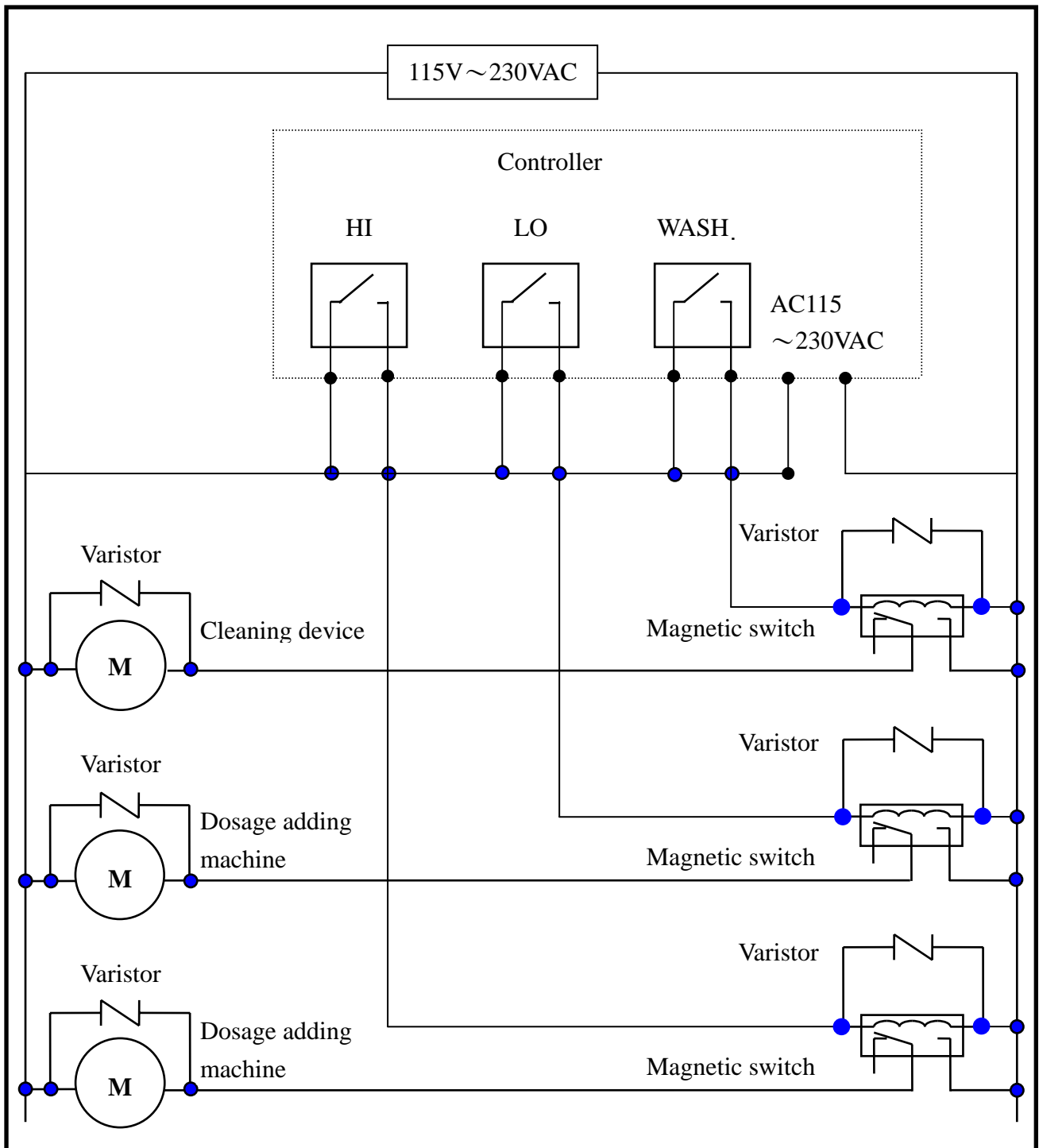
4. Panel introduction:
4.1 Front panel
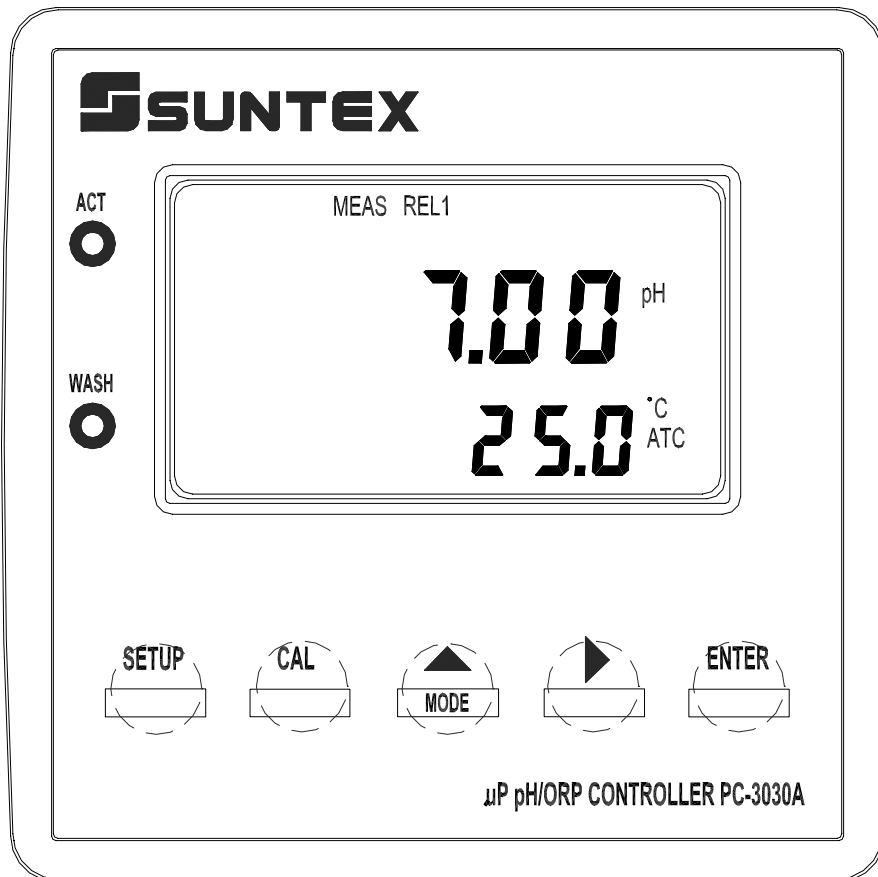
4.2 Display

▞▞▚	Activates wash relay state
mA▲	Current output above 20MA
mA▼	Current output below 4MA
MEAS	Measurement mode state
SETUP	Setup mode state
CALIB	Calibration mode state
SLOPE	Display electrode slope value
REL1	High point relay on
REL2	Low point relay on
HOLD	Control function lock state
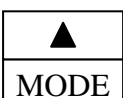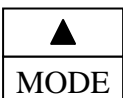
4.3 LCD display of measurement mode

Measurement State		REL1 High relay on
Setup State		REL2 Low relay on
Control function lock state		Wash relay on
Calibration State	HOLD SETUP MEAS REL1 REL2 mA	Output current higher 20MA
Display Electrode Slope value	CALIB SLOPE 7.0 0 pH 2 5.0 ATC	pH Mode
		Auto Temperature Compensation
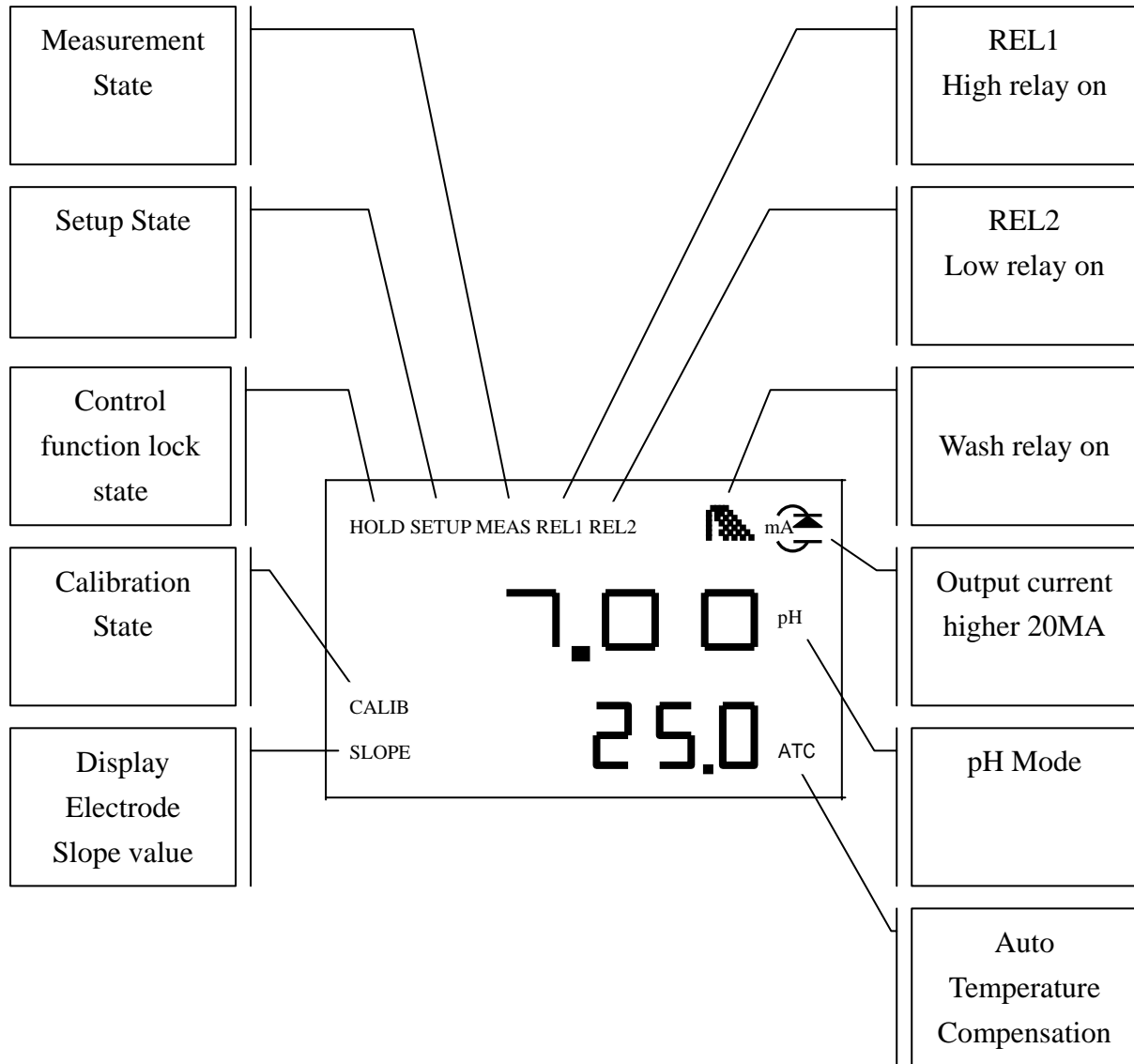
4.4 Keypad

The unit provides multi-key to prevent people from unauthorized access, as the following:

SETUP ▮	In setup mode, press **SETUP** to exit setup mode and return measurement mode.
CAL ▮	In calibration mode, press **CAL** to exit calibration mode and return measurement mode.
▲ / MODE	In setup and calibration mode, to increase numeric values.
▶	In setup and calibration mode, to move menu cursor down and shift numerical cursor to next right.
ENTER ▮	Enter key, press **ENTER** to select items within menu and store input data in the setup mode.

SETUP ▮   ▲ / MODE   In measurement mode, pressing **SETUP** and **MODE** simultaneously allows you to access setup mode.

CAL ▮   ▲ / MODE   In measurement mode, pressing **CAL** and **MODE** simultaneously allows you to access calibration mode.

SETUP ▮   ▲ / MODE   **ENTER** ▮   Restore default setup parameters.
In any mode, pressing **SETUP** and **MODE** simultaneously keep 5 seconds later, press **ENTER** simultaneously till a clock indicator shown up, then release all keys, allows you to restore default setup parameters.

CAL ▮   ▲ / MODE   **ENTER** ▮   Restore default calibration parameters.
In any mode, pressing **CAL** and **MODE** simultaneously keep 5 seconds later, press **ENTER** simultaneously till a clock indicator shown up, then release all keys, allows you to restore default calibration parameters.

4.5 LED indicators

    4.5.1 WASH   Indication wash relay activated or not, when wash relay on , screen display WASH symbol and WASH LED on.

    4.5.2 ACT   Indication high or low relay activated or not, when activated high or low, screen display REL1 or REL2 symbol and ACT LED on.

5.Operation

Make sure the input and output connections in controller are correct, power on the controller, it will enter measurement mode and start measures, you can change setup parameters and recalibration, as the following

```
                          ┌─────────────┐
                          │  POWER ON   │
                          └──────┬──────┘
                                 │
                          ┌──────▼──────┐
                          │    Enter    │
                          │ Measurement │
                          └──────┬──────┘
```

CAL MODE	SETUP MODE	CAL MODE ENTER	SETUP MODE ENTER	ENTER
ENTER CAL. MODE	ENTER SETUP MODE	RESTORE DEFAULT CALIBRATION PARAMETERS	RESTORE DEFAULT SETUP PARAMETERS	YEAR DATE TIME
PRESS **CAL** KEY BACK TO MEAS. MODE	PRESS **SETUP** KEY BACK TO MEAS. MODE			
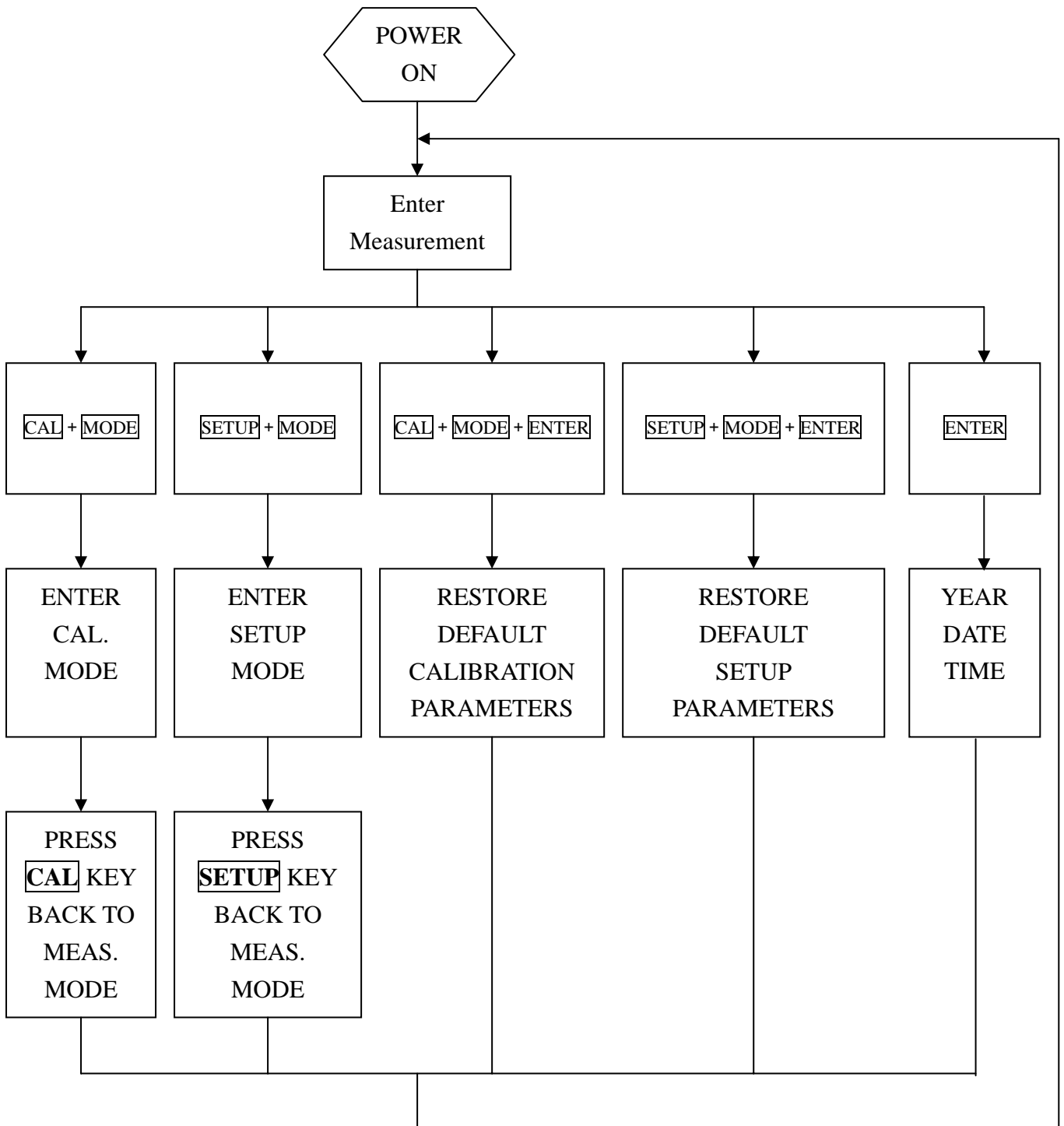
6.Setup mode

Overview of setup mode

```
┌─ Setup mode entry ─┐
                                                    PC-3050 only
```

Conf Set	℃ Set	Relay1 Set	Relay2 Set	Cln Set	Current1 Set (pH/ORP)	Current2 Set (TP)	RTC Set	SERL Set

ENTER / **ENTER** / **ENTE** / **ENTER** / **ENTER** / **ENTER** / **ENTER** / **ENTER** / **ENTER**

Set PH/ORP mode	Select ATC/MTC	Set REL1 Threshol	Set REL2 Threshold	Set Wash relay ON time	Set 0/4 mA mode	Set 0/4 mA mode	Set Year	Set ID

ENTER / **ENTE** / **ENTER** / **ENTER** / **ENTER** / **ENTER** / **ENTER** / **ENTER**

- OFF ATC
- ON ATC

	Set REL1 Dead	Set REL2 Dead band	Set Wash relay OFF time	Set 0/4mA Measuring Mapping	Set 0/4mA Measuring Mapping	Set Date	Set baud

- Adjust manual temp.
- PTC ATC
- NTC ATC

ENTER / **ENTER** / **ENTE** / **ENTER** / **ENTER** / **ENTER** / **ENTER** / **ENTER**

- Adjust temp.

	Set REL1 ON/OFF	Set REL2 ON/OFF	Wash relay TEST	Set 20mA Measuring Mapping	Set 20mA Measuring Mapping	Set Time

ENTER / **ENTE** / **ENTER** / **ENTER** / **ENTER** / **ENTER**

	Relay1 TEST	Relay2 TSET		0/20 mA Output TEST	0/20 mA Output TEST

ENTER

12

6.1 Access setup mode:

Pressing **SETUP** and **▲ MODE** simultaneously, allows you to access setup mode.

Ant time you can pressing **SETUP** to exit.

6.2 Select measuring mode:

Enter measurement mode select pH or ORP.

HOLD SETUP

$$ConF$$
$$SEt$$

Press ENTER

HOLD SETUP

$$PH$$
$$SEt$$

Press ▶ or ▶ to set pH or ORP

HOLD SETUP

$$orP$$
$$SEt$$

Press ENTER

Access "Temperature compensation mode"
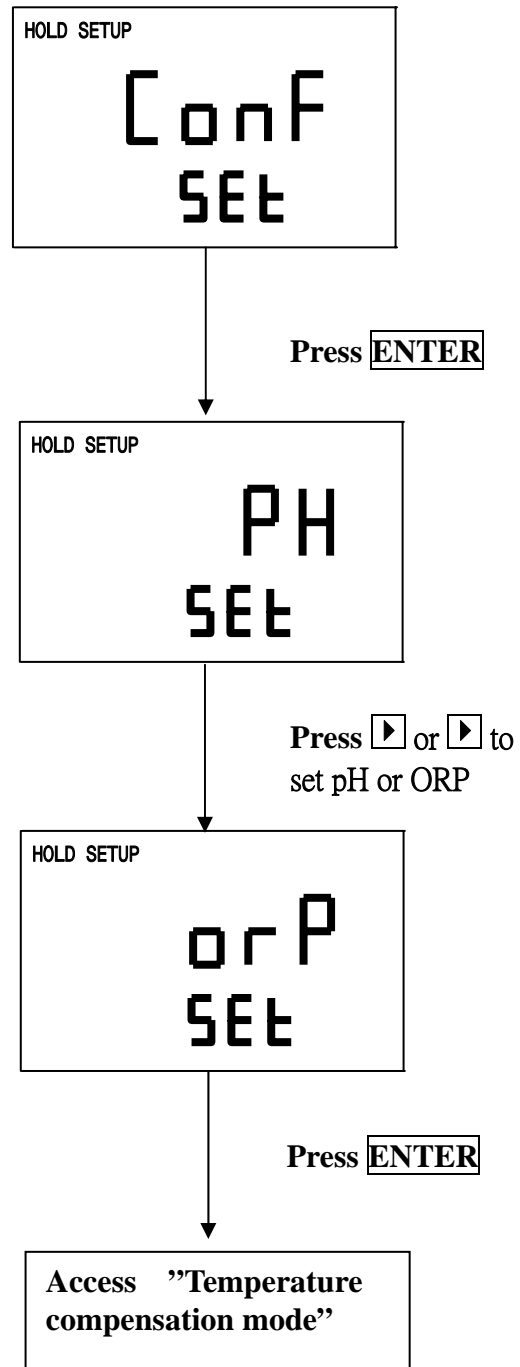
6.3 Temperature compensation mode:
Enter temperature compensation setup

HOLD SETUP

°C
SEt

Press ENTER

HOLD SETUP

oFF
AtC

Press ▶ or ▶
to set ATC or
MTC

Press ENTER
access Manual temperature
compensation (MTC)

HOLD SETUP

on
AtC

Press ENTER
access auto temperature
compensation (ATC)
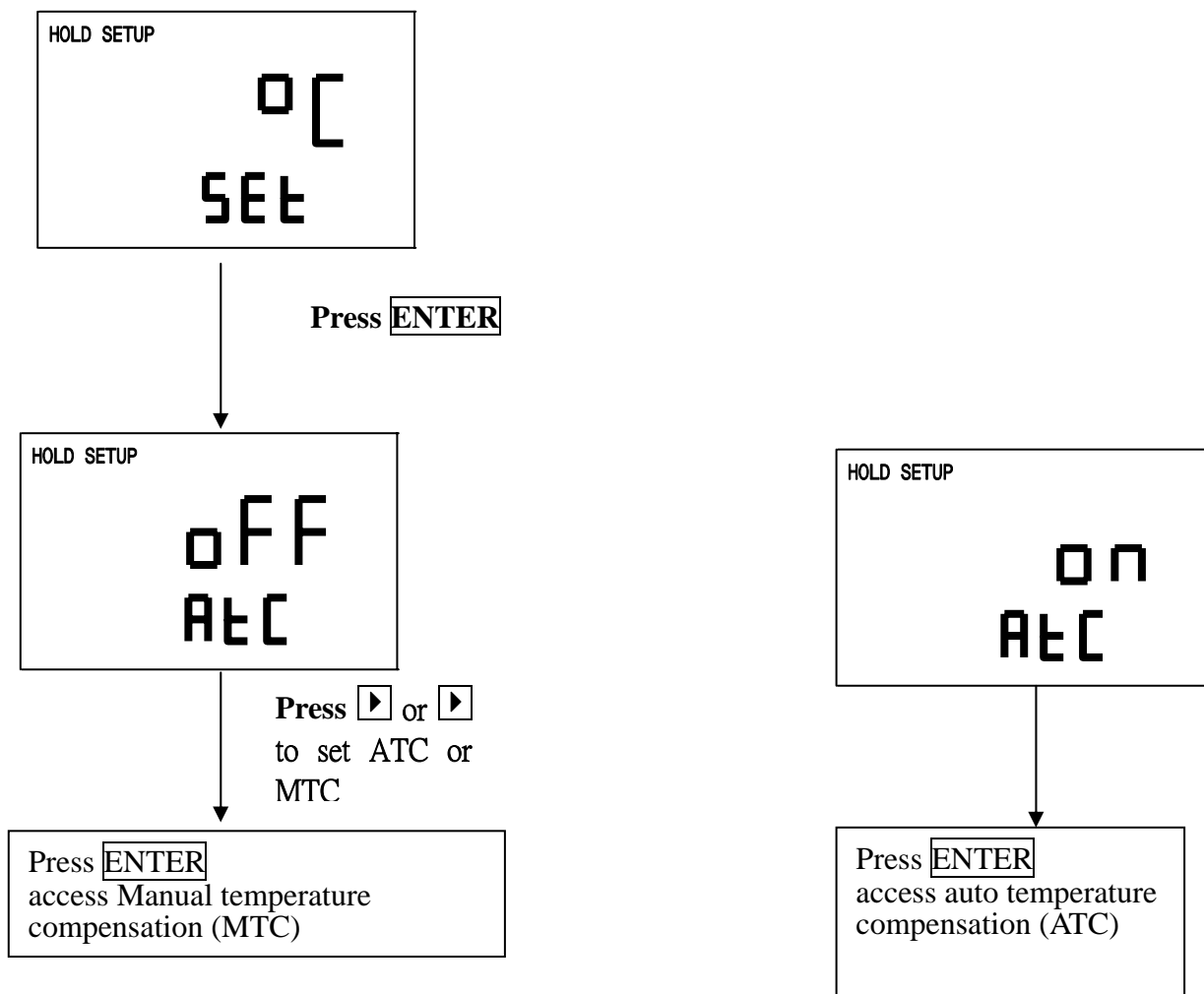
6.3.1 Auto temperature compensation (PT1000)

Auto temperature range：-30℃～110℃。

HOLD SETUP

ntC
AtC

Press ▲ ▶ key select
NTC 30K, press ENTER.

Press ▲ ▶ key select
PT 1K

HOLD SETUP

PtC
AtC

Press ENTER.

HOLD SETUP

00.0
25.0 ℃ ATC

Press ▲ ▶ key fill in temperature value of standard thermometer detect the temperature value, press ENTER.

Access " High point setup mode"
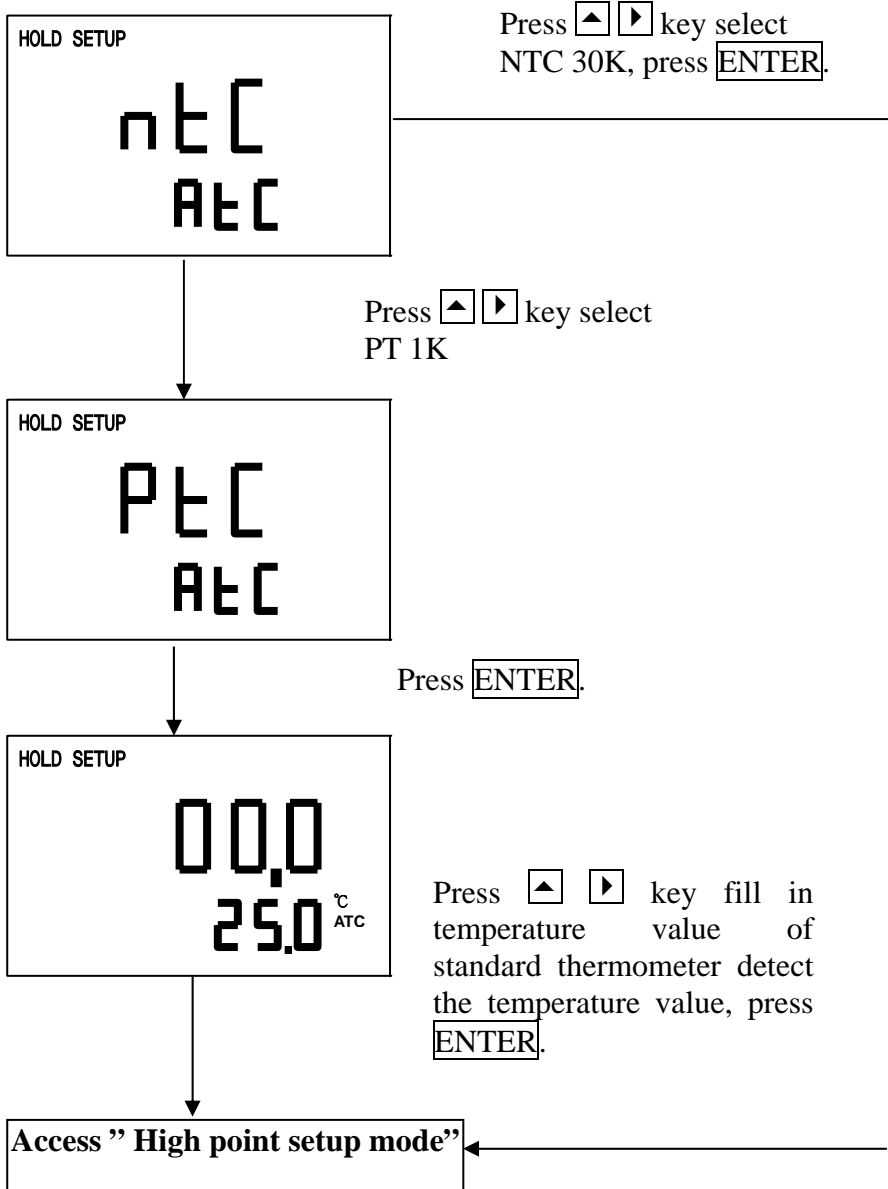
6.3.2 Manual temperature compensation (MTC)

Manual temperature range：-30℃～110℃。

HOLD SETUP

025.0
SEt ℃ MTC

Press ▲ ▶ key set temperature value of standard thermometer detect the solution temperature value, press ENTER.

Access" High point setup mode"
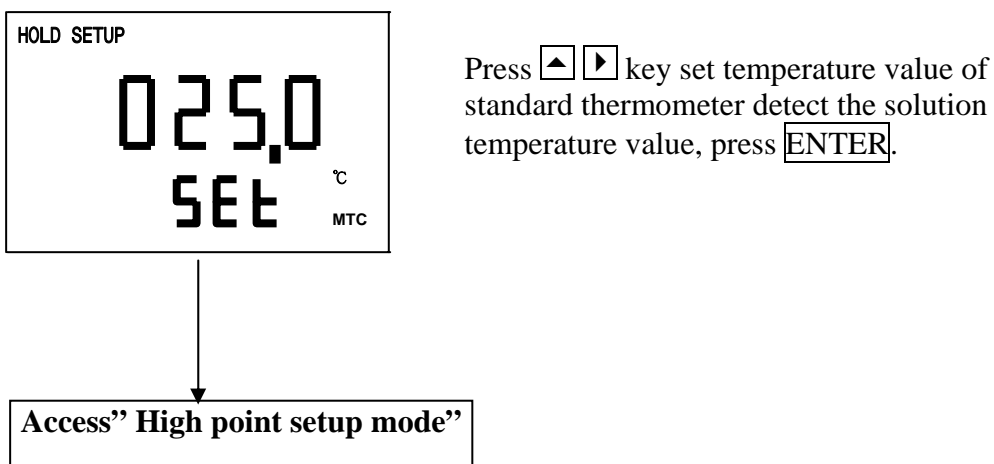
6.4 Set Hi point

Set Hi（REL1）threshold（**TH**）and dead band（**DB**）. The range of threshold is -2.00～16.00 pH/-1999～1999mV , dead band is 0.00～2.00pH/0～200mV.

```
HOLD SETUP    REL1

        rLY1
        SEt
```

Press ENTER .

```
HOLD SETUP    REL1

        10.00
        SP1
```

Press ▲ ▶ to set TH, and press ENTER .

```
HOLD SETUP    REL1

        0.10
        db1
```

Press ▲ ▶ to set DB, and press ENTER .

```
HOLD SETUP    REL1

        AUto
        rLY1
```

Press ▲ ▶ to set REL1 ON or OFF, and press ENTER .

```
HOLD SETUP    REL1

        oFF
        rLY1
```

Press ENTER .

```
HOLD SETUP    REL1

        oFF
        tESt
```

Press ▲ ▶ to set REL1 relay contact test ON or OFF, and press ENTER .

```
HOLD SETUP    REL1

        on
        tESt
```

Press ENTER .

Access " Low point setup mode"

16
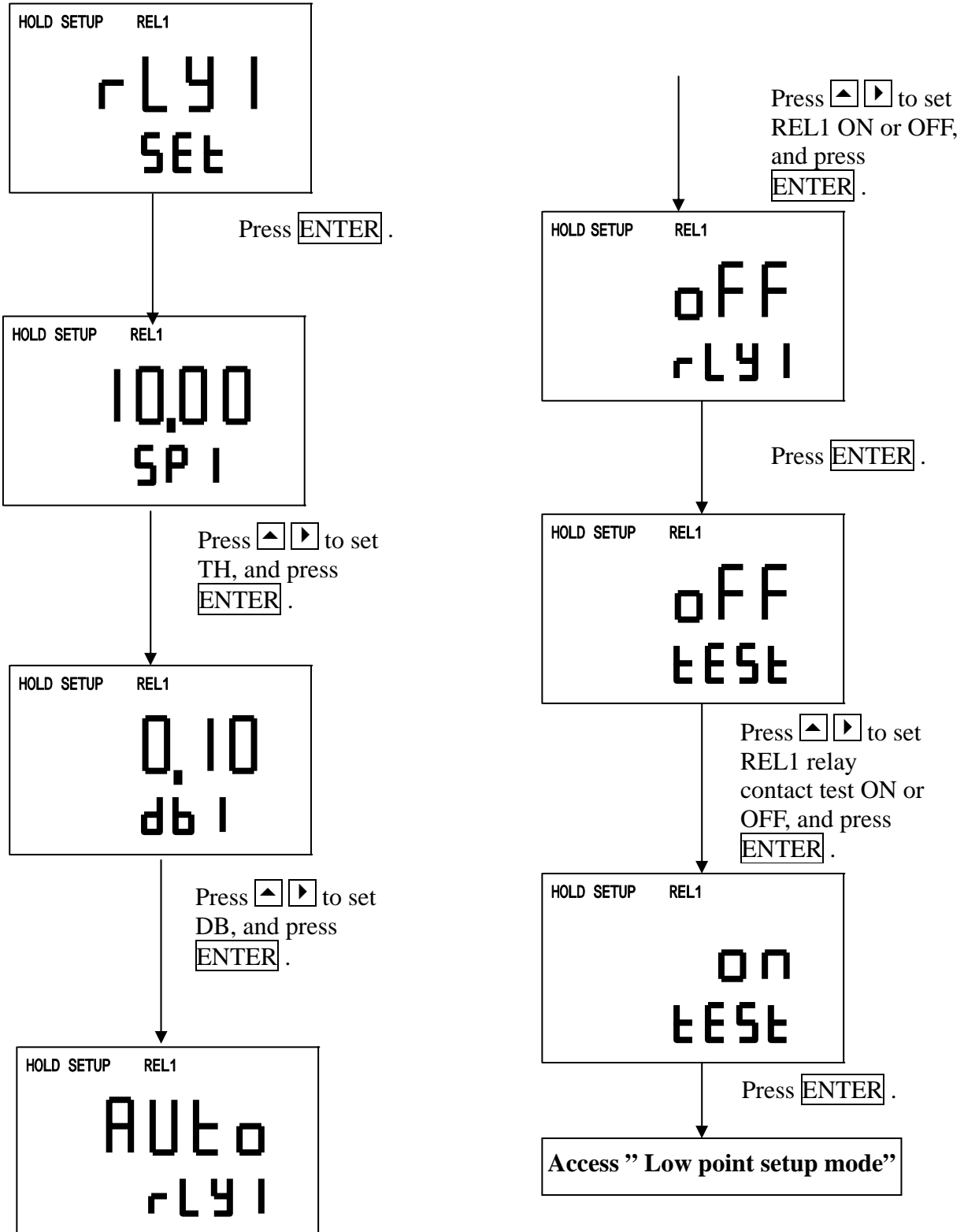
6.5 Set Lo point

Set Lo（REL2）threshold（**TH**）and dead band（**DB**）. The range of threshold is -2.00～16.00 pH/-1999～1999mV , dead band is 0.00～2.00pH/0～200mV.

HOLD SETUP   REL2

rLY2
SEt

Press ENTER .

HOLD SETUP   REL2

10.00
SP2

Press ▲ ▶ to set TH, and press ENTER .

HOLD SETUP   REL2

0.10
db2

Press ▲ ▶ to set DB, and press ENTER .

HOLD SETUP   REL2

AUto
rLY2

Press ▲ ▶ to set REL2 ON or OFF, and press ENTER .

HOLD SETUP   REL2

oFF
rLY2

Press ENTER .

HOLD SETUP   REL2

oFF
tESt

Press ▲ ▶ to set REL2 relay contact test ON or OFF, and press ENTER .

HOLD SETUP   REL2

on
tESt

Press ENTER .

Access " Wash time"

17
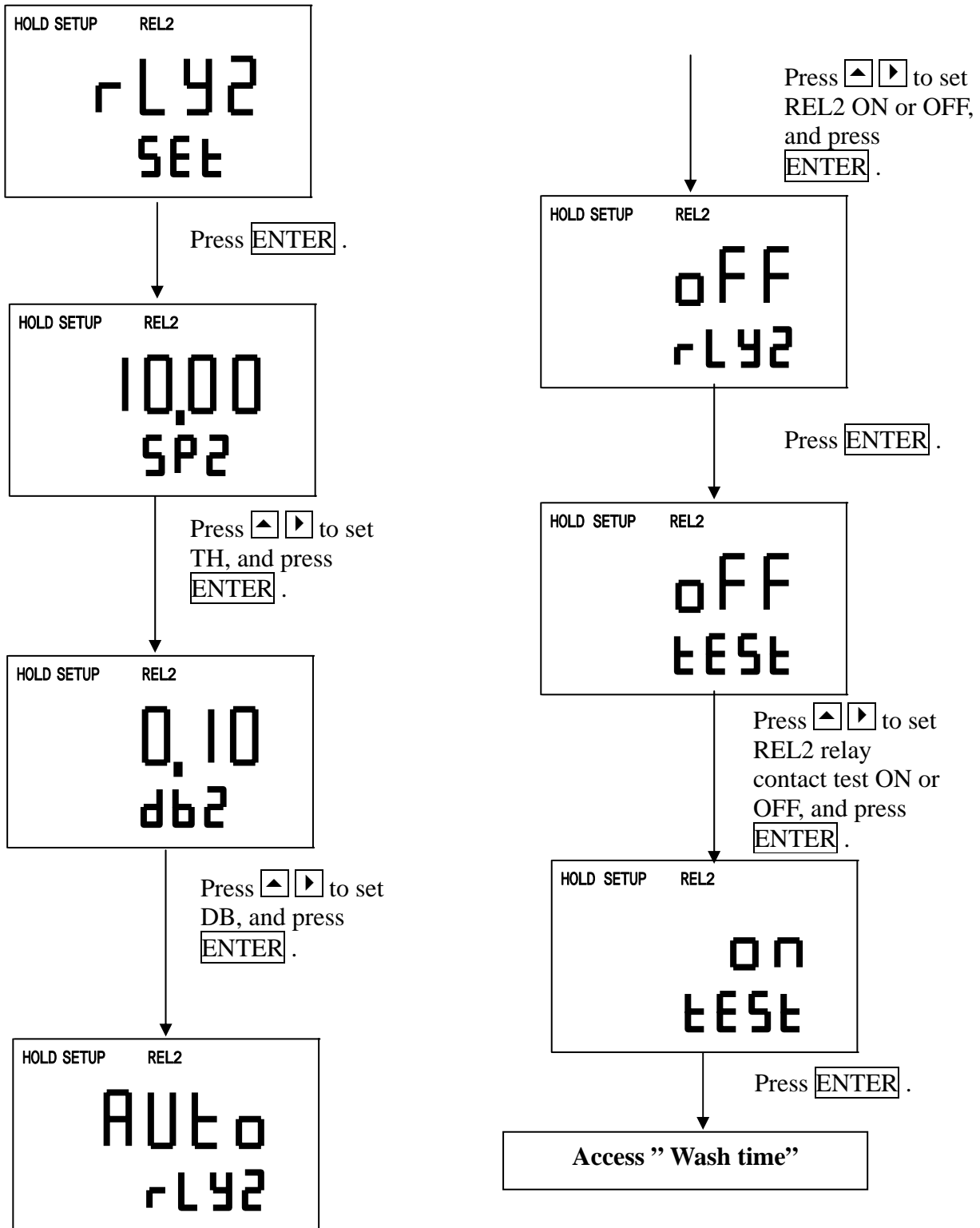
6.6 Wash time:

Set ON and OFF time of wash relay. The function will stop when WASH either ON or OFF time is set to 0.

```
HOLD SETUP
    [Ln
    SEE
```

Press ENTER.

```
HOLD SETUP
    0000
    on. S
```
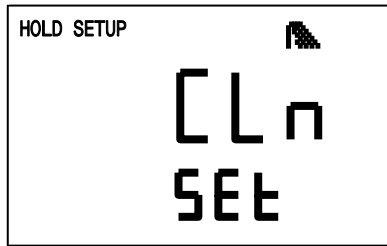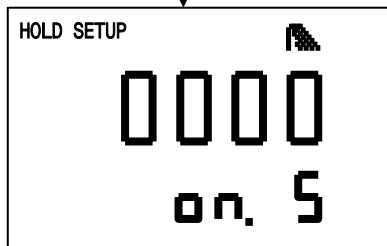
Press ▲ ▶ to set wash relay on time. Use unit in second. And press ENTER

```
HOLD SETUP
    0000
    oFF.H
```
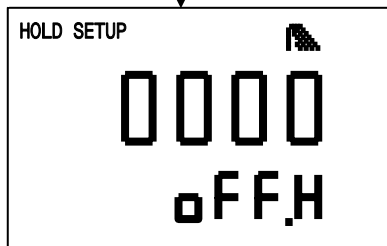
Press ▲ ▶ to set wash relay off time. Use unit in hour. And press ENTER

```
HOLD SETUP
    oFF
    EESE
```

Press ▲ ▶ to set wash relay contact test ON or OFF.
And press ENTER

Access "Select buffer solution mod"

6.7 Current mapping to pH/ORP:

Let you to adjust a proper mapping between pH/ORP measuring value and current output to enhance the resolution of current output.

```
HOLD SETUP          mA
        PH
     SEt
```

Press ENTER

```
HOLD SETUP          mA
     4-20
     SEt
```

Press ▲ ▶ select
0-20mA or 4-20mA

```
HOLD SETUP          mA
     0-20
     SEt
```

Press ENTER

```
HOLD SETUP          mA
     02.00  pH
          4.0
```

Press ▲ ▶ change
value to 4mA mapping,
press ENTER

```
HOLD SETUP          mA
     12.00  pH
          20.0
```

Press ▲ ▶ change value to
20mA mapping, press ENTER

```
HOLD SETUP          mA
     00.00
     tESt
```

Press ▲ ▶ change value 0mA or
20mA output test, press ENTER

```
HOLD SETUP          mA
     20.00
     tESt
```

Press ENTER

Access "Current mapping to Temp."
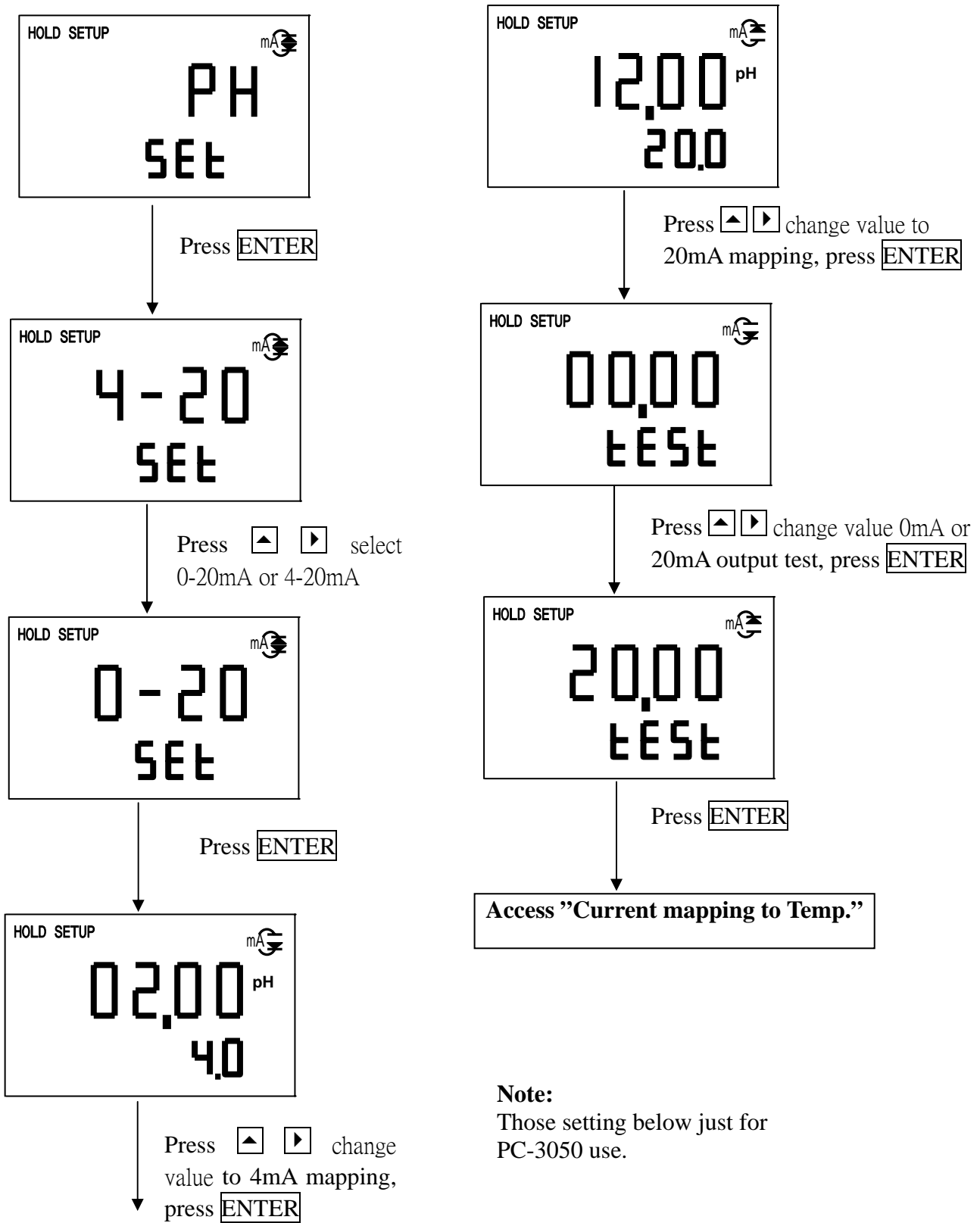
Note:
Those setting below just for
PC-3050 use.

6.8 Current mapping to Temp.:

Let you to adjust a proper mapping between Temp. measuring value and current output to enhance the resolution of current output.

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│         ᵗP          │
│        SEᵗ          │
└─────────────────────┘
```

Press ENTER

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│       4-20          │
│        SEᵗ          │
└─────────────────────┘
```

Press ▲ ▶ select 0-20mA or 4-20mA

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│       0-20          │
│        SEᵗ          │
└─────────────────────┘
```
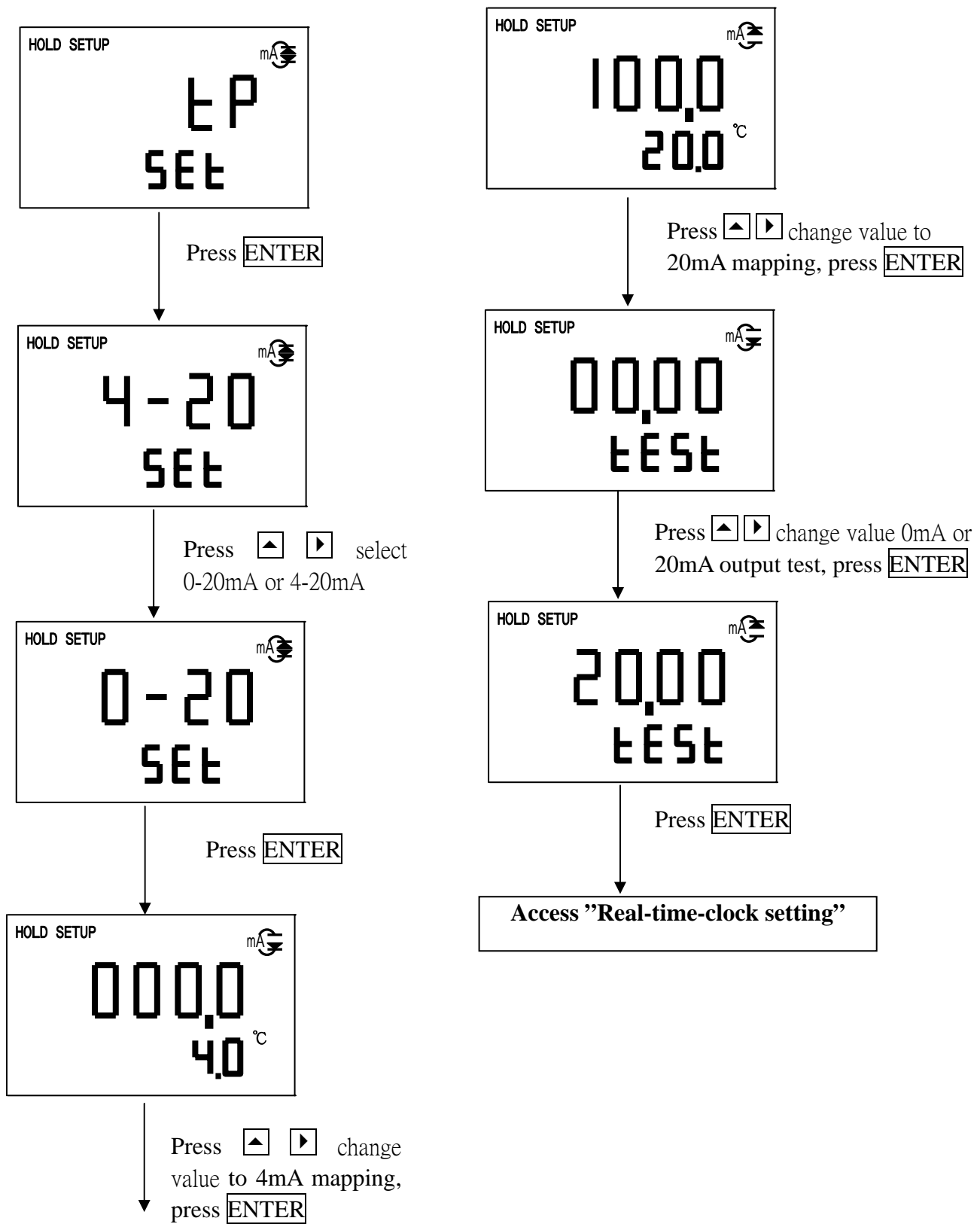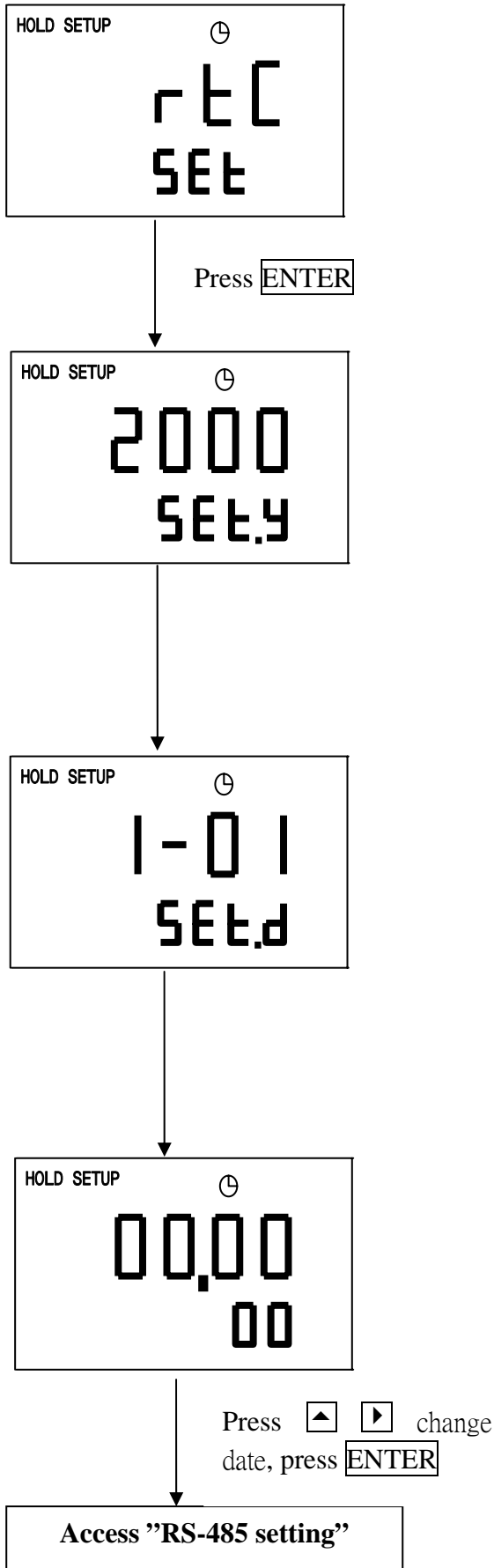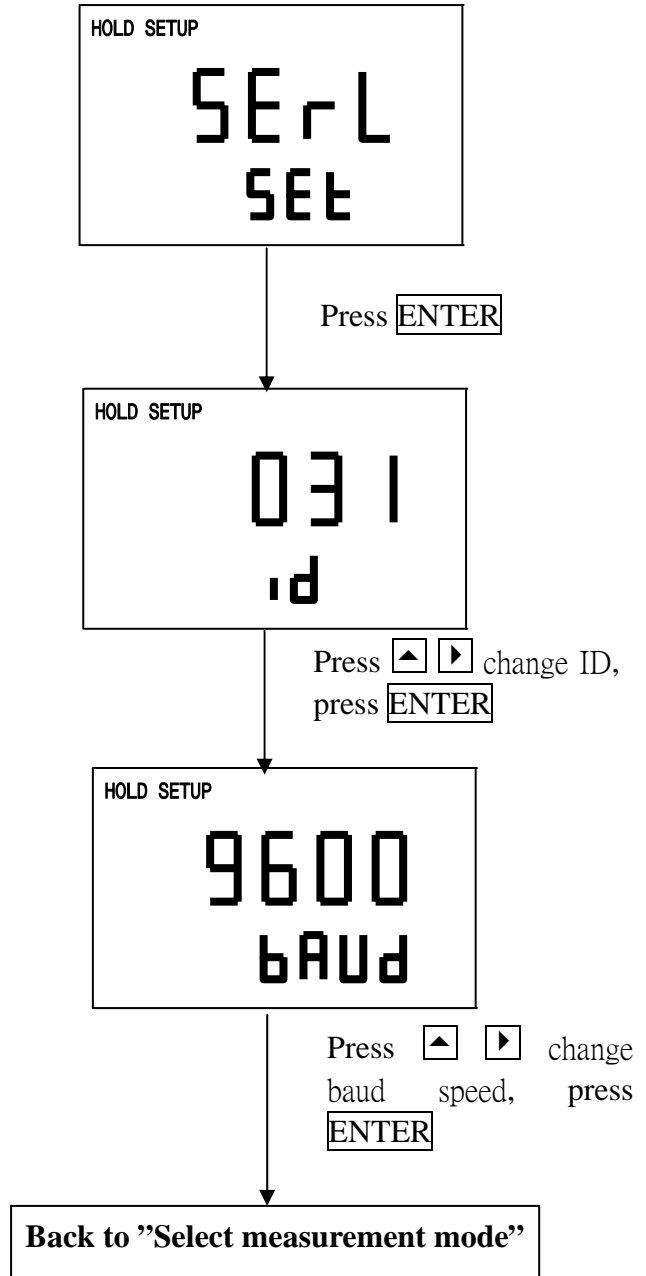
Press ENTER

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│       000.0         │
│        4.0    ℃     │
└─────────────────────┘
```

Press ▲ ▶ change value to 4mA mapping, press ENTER

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│       100.0         │
│       20.0    ℃     │
└─────────────────────┘
```

Press ▲ ▶ change value to 20mA mapping, press ENTER

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│       00.00         │
│        ᵗESᵗ         │
└─────────────────────┘
```

Press ▲ ▶ change value 0mA or 20mA output test, press ENTER

```
┌─────────────────────┐
│ HOLD SETUP      mA   │
│                     │
│       20.00         │
│        ᵗESᵗ         │
└─────────────────────┘
```

Press ENTER

┌─────────────────────────────────┐
│ **Access "Real-time-clock setting"** │
└─────────────────────────────────┘

6.9 Real-time-clock setting:

HOLD SETUP ⏱

rtC
SEt

Press ENTER

HOLD SETUP ⏱

2000
SEt.y

HOLD SETUP ⏱

1-01
SEt.d

HOLD SETUP ⏱

00.00
00

Press ▲ ▶ change date, press ENTER

Access "RS-485 setting"

6.10 RS-485 setting:
User can set ID and baud speed for RS-485.

HOLD SETUP

SErL
SEt

Press ENTER

HOLD SETUP

031
id

Press ▲ ▶ change ID, press ENTER

HOLD SETUP

9600
bAUd

Press ▲ ▶ change baud speed, press ENTER

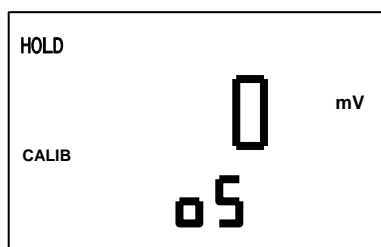**Back to "Select measurement mode"**

7.Calibration mode

7.1 Access calibration mode

1. Pressing **CAL** and $\boxed{\text{▲ MODE}}$ simultaneously, allows you to access calibration mode, and press **CAL** to exit calibration mode and return measurement mode.

2. After into calibration mode, the screen will show OS value of last calibration, press **ENTER**.

```
HOLD
                    0    mV
CALIB
              o5
```

3. The screen will show slope value of last calibration, press **ENTER**.

```
HOLD
              100.0
CALIB
              SLP
```

4. Select single or two point calibration by press ▲ and ▶ , press **ENTER**.

```
HOLD
              CA1  pH
CALIB
              rEdy
```
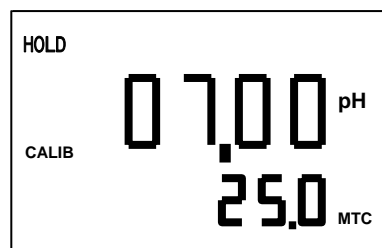
Note: CA1 is single point calibration,
          Ct1 is two point calibration.

7.2 Calibration pH single point

1. Enter single point calibration mode,
The last measuring value will be showed
on screen, rinse electrode with distill water,
and put it on the buffer solution, use ▲
and ▶ adjust the value correction to buffer
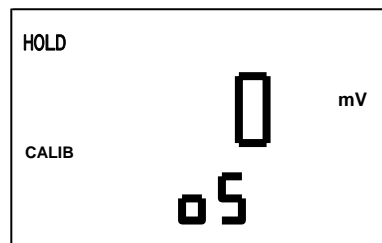solution, press **ENTER**.

2. Start to calibration, the measuring mV value
will be showed on the screen, and CALIB symbol
will flashing, after calibrate finish, the "CAL
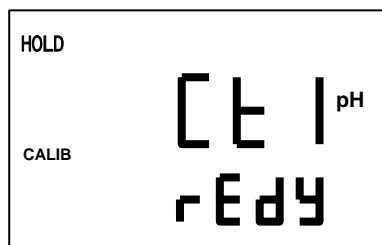pass" will be showed, and OS value will be
showing.

3. Pressing **CAL** back to measurement mode,

or repeat section 7.1 calibration procedure by
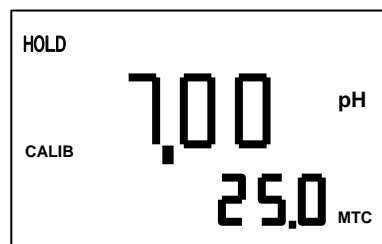press **ENTER** .

7.3 Calibration pH two point

1. Enter calimode, select two point calibration by
press ▲ and ▶ , press **ENTER**.

2. Rinse electrode with distill water, put it into
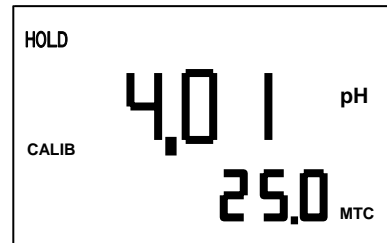the first buffer solution, press **ENTER** ,
begin 1st buffer calibration.

3. The measuring mV value showing on screen,
it has auto-read function, after calibration the
first buffer value will be showed on screen,
and automatic into 2st point calibration
on 3 second.

4.Rinse electrode with distill water, and put
   it into 2st buffer solution, press **ENTER** ,
   begin 2st buffer calibration.

```
┌─────────────────────┐
│ HOLD                │
│         [ t 2   pH  │
│                     │
│ CALIB               │
│         r E d Y     │
└─────────────────────┘
```
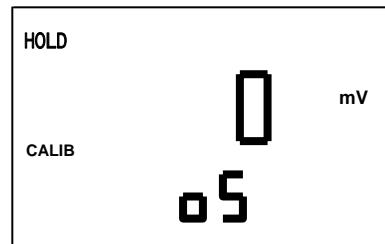
5.The measuring mV value showing on screen,
   it has auto-read function, after calibration the
   2st buffer value will be showed on screen,
   and automatic into electrode determine screen
   on 3 second.

```
┌─────────────────────┐
│ HOLD                │
│   4.0 1       pH    │
│                     │
│ CALIB               │
│          25.0 MTC   │
└─────────────────────┘
```

6.If calibrate successful, the "CAL pass" will be
   showed on screen, otherwise "CAL Err" will
   be showed.

```
┌─────────────────────┐
│ HOLD                │
│       PASS          │
│                     │
│ CALIB               │
│        CAL          │
└─────────────────────┘
```

7.The OS value of calibration will be showed
   on screen automatic, press **ENTER** screen
   will be showed slope value of calibration,
   pressing **CAL** back to measurement mode,

   or repeat section 7.1 calibration procedure by
   press **ENTER** .

```
┌─────────────────────┐
│ HOLD                │
│          0     mV   │
│                     │
│ CALIB               │
│       o S           │
└─────────────────────┘
```

```
┌─────────────────────┐
│ HOLD                │
│       100.0         │
│                     │
│ CALIB               │
│        SLP          │
└─────────────────────┘
```
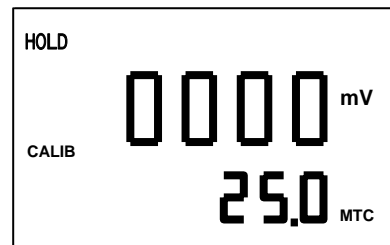
7.4 ORP calibration

The ORP electrode has to calibration in every time, because the electrode offset is out of square, and ambient environment is dissidence, so we have calibration by apposite ORP standard solution, so that get a better ORP potential value.

1. In the measurement mode, rinse electrode with distill water, and put it into ORP buffer solution, check readout value is same as solution value, record the value difference between both.

2. Into calibration mode, change the offset value by press ▲ and ▶ , and press **ENTER** confirm, and return measurement mode by press **CAL** .

8、Error message:

Questions	Diagnosis	Actions
HOLD CALIB Err9	Meter out of order.	Please call service engineer.
HOLD CALIB Err4 pH CAL	1. During calibration, the standard solution temperature exceeds a range of 5 ～50℃ 2. Couldn't recognize buffer solution.	1. Please adjust standard solution temperature, then re-calibration again. 2. Please replace buffer solution or do the maintenance for electrode or replace new electrode, and re-calibration again.
HOLD CALIB Err3 pH CHC	Read-out value couldn't stable.	Please do the maintenance for electrode or replace new electrode, and re-calibration again.
HOLD CALIB Err2 pH CAL	SLOPE value over	Please do the maintenance for electrode or replace new electrode, and re-calibration again.
HOLD CALIB Err1 pH CAL	OFFSET value over +/-60mv.	Please do the maintenance for electrode or replace new electrode, and re-calibration again.

9、Maintenance:

The electrode should be cleaned when the junction or the glass membrane is contaminated.
Depending on the type of contamination, different cleaning methods are recommended.

Type of Contamination	Cleaning Method
Measuring solutions containing proteins： （Contamination of the junction）	The electrode is soaked in Pepsin/HCl for several hours. METTLER-TOLEDO 9891 Electrode Cleaner is recommended.
Measuring solution thiocontaining sulfides （Black junction）	The junction is soaked in Thiourea/HCl solution until bleached. METTLER-TOLEDO 9892 Electrode Cleaner is recommended.
Lipid and other organic measuring solutions	Short rinsing of the electrode with acetone and ethanol.
Acid and alkaline soluble contaminations	Rinsing the electrode with 0.1mol/l NaOH or 0.1mol/l HCl for a few minutes.
Apply clean water to flash the electrode after above cleaning steps and immerse the electrode in 3M KCl solution for 15 minutes at least, and then calibrate the electrode.	
The electrode should only be rinsed and never rubbed or otherwise mechanically cleaned, since this would lead to electrostatic charges. This could cause an increase in the response time.	
In cleaning the platinum electrode, the platinum ring of the electrode can be rubbed gently with a wet soft piece of cloth.	

※The frequency of electrode cleaning depends on the type and degree of contamination. However it is recommended that the electrode be cleaned once a week.

10.Appendix

10.1 Junction box
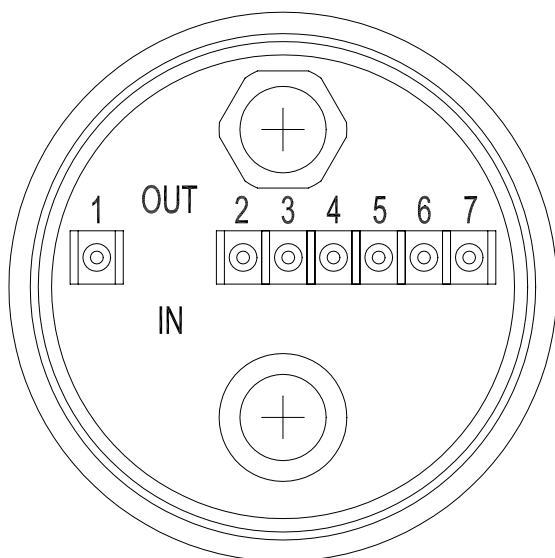
10.2 Description of junction box

IN side terminals:

1　　　　Connected to the central line of pH/ORP electrode cable.

2　　　　Connected to the net of pH/ORP electrode cable.

3　　　　Connected to the line of temperature probe.

4　　　　Connected to the other line of temperature probe.

OUT side terminals:

1　　　　Connected to the central line of electrode extended cable that will be
　　　　　conducted to the GLASS terminal of rear panel.

2　　　　Connected to the net of electrode extended cable that will be conducted to
　　　　　the REF terminal of rear panel.

3　　　Connected to the red line of electrode extended cable that will be conducted
　　　　　to the TP terminal of rear panel.

4　　　　Connected to the green line of electrode extended cable that will be
　　　　　conducted to the TP terminal of rear panel.