Chapter 1 Overview

DDG-3080 industrial conductivity meter is a new-generation whole English PC-type instrument, characterized by display fully in English, high smartness, multiple functions, high measurement performance and strong environment adaptability. It can be widely used for continuous monitoring of solution conductivity in such industries as thermal power, chemical engineering, fertilizer, metallurgy, environmental protection, pharmacy, biochemical engineering, food and water supply.

When equipped with an electrode of constant 1.0 or 10, the secondary meter can measure the conductivity of common liquid; when equipped with an electrode of constant 0.1 or 0.01, it can accurately measure conductivity of pure water or hyperpure water, especially suitable for on-line continuous monitoring of conductivity of hyperpure water, such as boiler supply water and steam condensate in power plants.

Highly intelligent: industrial conductivity meter uses high precision AD conversion and singlechip micro-processing technology, and has such functions as conductivity measurement, temperature measurement, automatic temperature compensation, automatic switch of measurement range and self-check of the instrument.

High reliability: The components are integrated into a circuit board, without using any complex function switches, knobs or potential devices.

High resistance against interference: Photoelectric coupling separation technology is used for the current output, providing high resistance against interference and allowing for long transmission. It also has high electromagnetic compatibility.

Water and dust protection: The protection grade is IP65, and it is suitable for outdoor use.

25℃ translation: It provide 25℃ base temperature translation of the measured conductivity, so the conductivity value at 25℃ can be directly displayed. This is particularly suitable for measurement of water quality in power plants.

Automatic switch of measurement range: It can realize automatic switch of measurement range within the measurement range covered by the electrode.

RS485 communication interface: With this interface, it can be conveniently connected to PC for monitoring and communication.

Phase-sensitive detection: With such detection, the impact of wires on conductivity measurement can be eliminated.

Automatic switching of measurement frequency: With such switching, it can avoid polarization of electrode and thus enhance measurement precision.

Main features

Display fully in English and user-friendly interface: It uses high-resolution lattice graph-type LCD display module, and all data, status and operation prompts are displayed in Chinese, without any symbols or codes defined by the manufacturer.

Simple menu structure and text-type man-machine interaction: Compared with traditional instruments, is provided with many new functions. However, with sorted menu structure and the operation manner similar to PC, it can be conveniently and simply operated. Users need not remember the operation steps and sequences, and can operate it even without a user manual, just following the prompts on the screen.

Multi-parameter display in the same screen: It displays several parameters in the same screen, including conductivity, output current, temperature, time and status. The main display area displays conductivity in 10×10mm, very striking and readable even far away; The 6 auxiliary display areas display in 5×5mm the output current, temperature, status, week, date and time, designed to meet different habits of users and provide time base for the instrument.

Automatic temperature compensation for pure/hyperpure water: For hyperpure water, it has automatic temperature compensation and directly displays the conductivity at 25℃.

Notepad: The notepad faithfully records the operation conditions and alarming time of the instrument, providing convenience for management.

History curve and digital recorder: The secondary meter can save the measurement data automatically every 5 minutes, and can store the conductivity data of one consecutive month. It provides “history curve” display and “specified time/point” inquiry on the same screen. The “history curve” can generally reflects the changing tendency and course of the water quality, and can help identify and solve problems. “Specified point/time” is used to obtain the conductivity values at specified point/time.

Digital clock: It displays the current time, providing time base for the digital recording.

Backlight: With the backlight it can be used in dim and even completely dark environment. The contrast can be adjusted automatically according to temperature change, or adjusted manually to ensure clear display all along and meet the personal habits of users.

Crash prevention: The watchdog program ensures no system crash of the instrument, which is the basic requirement for an on-line instrument.

Output current setting and checking: It is provided with manual current source function, so output current can be checked and set freely, providing convenience for inspection of recorder and downstream instruments.

Software-set current output: The software selects 0～10mA or 4～20mA, and user need not touch any switch.

Chapter 2 Technical specifications

1. Applicable standards: JB/T 6855-93 Industrial Conductivity Meter
2. Conductivity meausrement range: 0.01～20μS/cm (with 0.01 electrode), actually up to 100.0μS/cm;

   0.1～200μS/cm (with 0.1 electrode), actually up to 1000.0μS/cm;

   1.0～2000μS/cm (with 1.0 electrode), actually up to 10000.0μS/cm;

   10～20000μS/cm (with 10.0 electrode), actually up to 10000.0μS/cm;

   30～600.0mS/cm (with 30.0 electrode).
3. Basic error of electronic unit: conductivity: ±0.5%FS; temperature: ±0.3℃;
4. Range of automatic temperature compensation: 0～99.9℃, 25℃ being the base;
5. Tested water: 0～99.9℃, 0.6MPa;
6. Basic error of the instrument: conductivity: ±1.0%FS; temperature: ±0.5℃;
7. Automatic temperature compensation error of electronic unit: ±0.5%FS;
8. Repetition error of electronic unit: ± 0.2%FS±1 word
9. Stability of electronic unit: ±0.2%FS±1 word/24h
10. Isolated current output: 0～10mA (load <1.5 kΩ), 4～20 mA (load <750 Ω);
11. Output current error: ≤±1%FS;
12. Error of electronic unit due to ambient temperature impact: ≤±0.5%FS;
13. Error of electronic unit due to power voltage impact: ≤±0.3%FS;
14. Alarming relay: AC220V, 3A;
15. RS485 communication interface;
16. Power supply: AC220V±22V, 50Hz±1Hz;
17. Protection grade: IP65;
18. Clock precision: ±1 minute/month;
19. Data storage quantity: data of 1 month (1 point per 5 minutes);
20. Data storage period without power: 10 years;

21. Outline dimension: 146mm x 146mm x 108mm;

Opening dimension: 138mm x 138mm;

22. Weight: 0.8kg

23. Working condition: Ambient temperature 0～60℃; Relative humidity <85%;

24. Conductivity electrodes with a constant of 0.01, 0.1, 1.0, 10.0 and 30.0 can be used.

Chapter 3 Selection and use of electrode

It is key for accurate measurement to select an electrode with suitable constant according to the conductivity range of the tested water. Especially, for accurate measurement of pure water (<3μS/cm) and hyperpure water (<1μS/cm), an electrode of 0.1 or 0.01 should be used, and closed measurement tank should be equipped when necessary.

Basic principles for electrode selection: An electrode with suitable constant should be selected according to the conductivity range of the tested water with reference to the table below. When selecting an electrode, a common mistake is "using an electrode of relatively higher constant for measurement of low conductivity". For example, if electrode of 1.0 is used to measure the conductivity of <3μS/cm water, accurate measurement cannot be obtained. This is because that the low conductivity tested medium together with high constant electrode will lead to weak and unstable electric signal and thus greatly increase the measurement error.

Measurement Range of when Equipped with Different Electrodes

Measurement range	Electrode constant	Electrode type	Remarks
0.01～20μS/cm	0.01	DDJ-0.01	Closed measurement of flowing liquid
0.1～200μS/cm	0.1	DDJ -0.10	
1～2000μS/cm	1.0	DDJ -1.00	
10～20000μS/cm	10	DDJ -10.0	

Nonconformity to the table above will result in increased error.

When the conductivity is above100μS/cm, platinum black electrode with a constant of 1.0 or 10 is recommended to increase the effective area, remarkably decrease the current density on the surface of electrode and thus effectively reduce the impact of electrode polarization that generally occurs when the

medium is solution.

The electrode constant set in the instrument must be the same as the constant marked on the electrode. For example, it the electrode used indicates a constant of 0.102, then the parameter of electrode constant in the instrument must be set to 0.102.

Chapter 4 Installation

4.1 Unpacking

This instrument consists of two parts, i.e. the secondary meter and the sensor. Electrodes with a constant of 0.01, 0.1, 1.0, 10 are available for users. Meanwhile, an optional stainless steel protective covering can be supplied. At the time of unpacking, check the quantity, specs and accessories of the instrument against the packing list. If there is any damage or incorrect quantity or specs, please contact this Company or the dealers

1. One secondary meter
2. One set of measurement pool or equivalent device
3. One conductivity electrode (to be selected by user)
4. One operating manual
5. Accessories

4.2 Installation of electrode

Generally, the electrode can be installed in four manners: circulation type, immersion type, pipeline type and flange type.

I. Circulation type installation: The electrode uses circulation installation, suitable for water channel connected via soft-hard pipe. The water pipes have four outer diameters, that is, Φ6, Φ8, Φ10 and Φ12, to meet customers' different needs. Generally, Φ10 pipe is used.

II. Immersion type installation: Make the down-lead of electrode run out through the protective sleeve, and connect the top screw threads of the electrode with the sleeve.

III. Pipeline type installation: Just connect the threads of electrode with the pipe.

IV. Flange type installation: Flanges are provided according to customer request, such as DN 80 and DN100.

Note: Generally, the circulation type installation can be used.

The measurement pool uses the circulation structure, suitable for water channel connected via soft-hard pipes (see Figure 4.3.1). It is made of stainless steel, and when installing plate type installation and wall mounting type installation can be adopted using the attached clasp and cushion according to the field conditions. (see Figure 4.3.2)

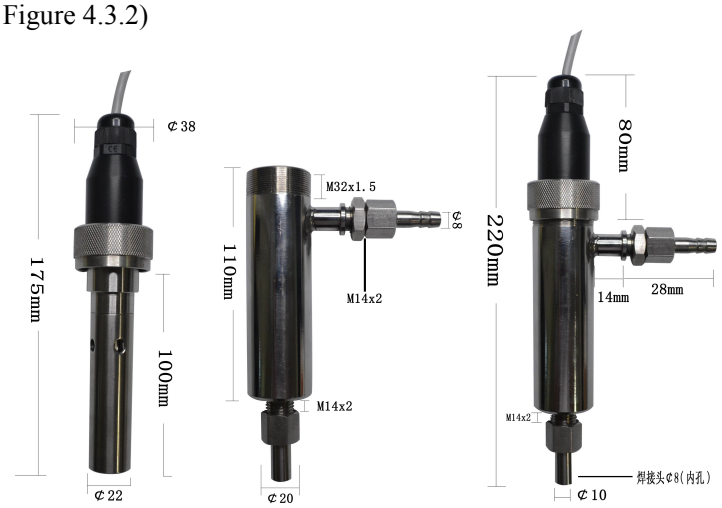


Figure 4.3.1 Outside view of measurement pool and electrode and assembly diagram of electrode

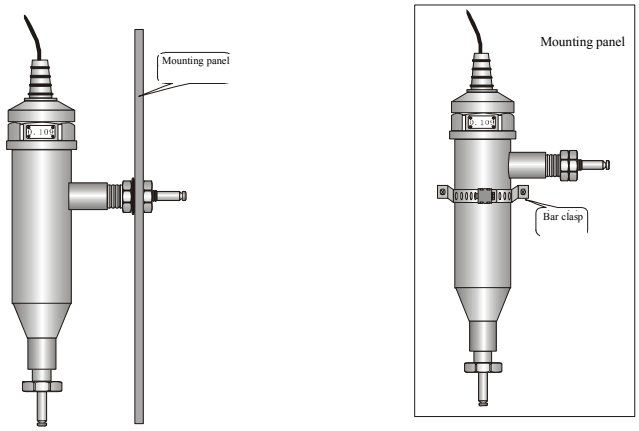
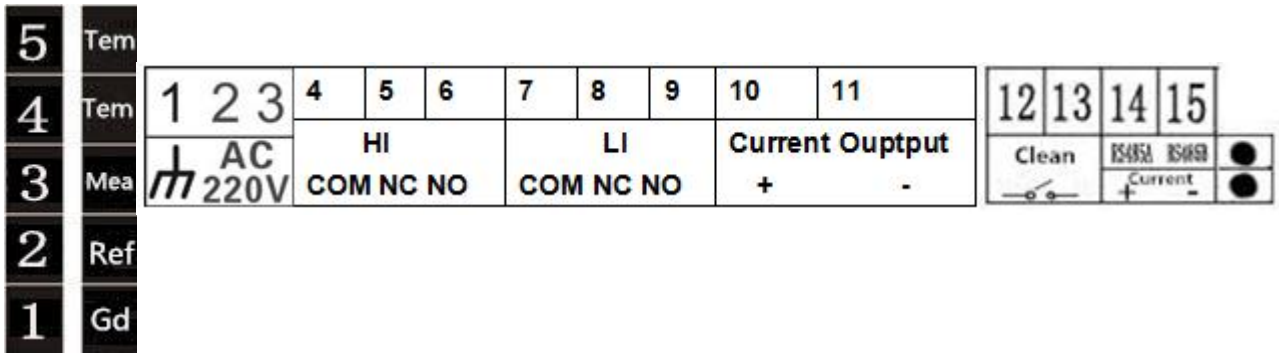


Figure 4.3.2 Assembly diagram of measurement pool

4.3 220V Power Supply

After the instrument is opened, the front cover board has five white PTFE high impedance terminals, terminal on the right label (such as black wiring diagramt), Put the electrode corresponding wire to the access terminal. After the instrument is opened, the bottom surface of the circuit board has the following terminals, when used first access to 220V AC terminals 2 and 3, regardless of the N and L, the ground access on the No.1 terminal. According to the need, will require the alarm contact terminal (terminal No. 4-9, passive contacts) and current output (terminal No. 10, 11) Terminal access control and other systems. Before the instrument is powered, please carefully check the wiring is correct!



Chapter 5 Use

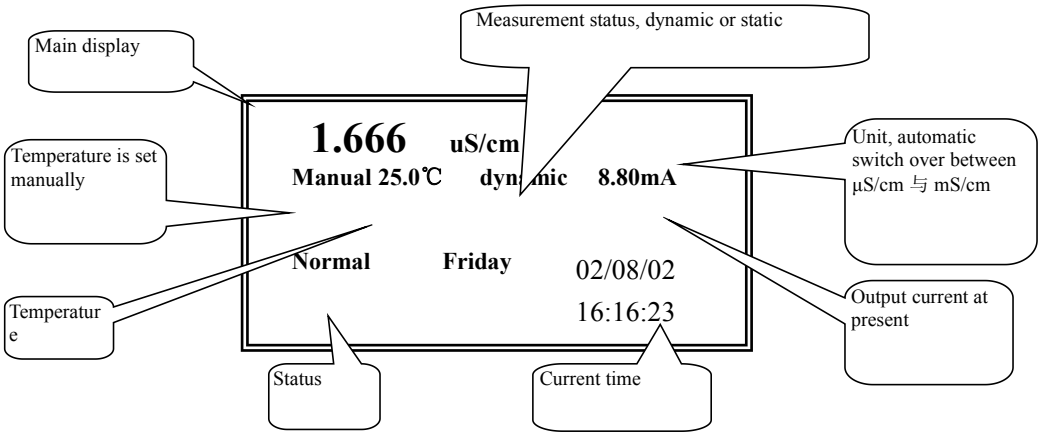
5.1 Function keys

industrial conductivity meter uses backlight 192x64 lattice graph-type LCD display for figures and Chinese words. There are 9 touch-type keys on the panel, as described below:

"ESC" key	In measurement state, press Menu key to enter the main menu and the operation screen. Press "ESC" key to return the previous operation status (screen). In any level of menu, press "ESC" key to return to the upper level, and press continuously to return till the measurement status. After modifying a parameter, the modified value can be saved automatically and then the screen returns to the upper level by directly pressing "ESC" key.
▲▼◀▶keys	① These four keys are direction keys, respectively used to go up, down, left and right to select intended item (menu) or parameter; ② In value modifying state, press ▲▼ key to increase/decrease the number, and hold the pressing to quicken the number changing; press ◀ or ▶ to initialize the value.
Enter" key	Press "Enter" key to confirm the selected item (menu) or parameter. ① When the cursor points at an item (menu), press "Enter" key to enter this item (menu) and then to modify the parameters there. ② When the cursor points at a parameter in an item, press "Enter" (or "ESC") key to confirm the value and complete the parameter setting, then the cursor will return to the upper level. ③ In the "history data" sub-menu, when history curve is displayed, press "Enter" key to enter the screen for modifying upper/lower limits and inquire the number of advance days.

5.2 Measurement status and display

After powering on and self-checking, the instrument automatically enter the measurement status and display the following:

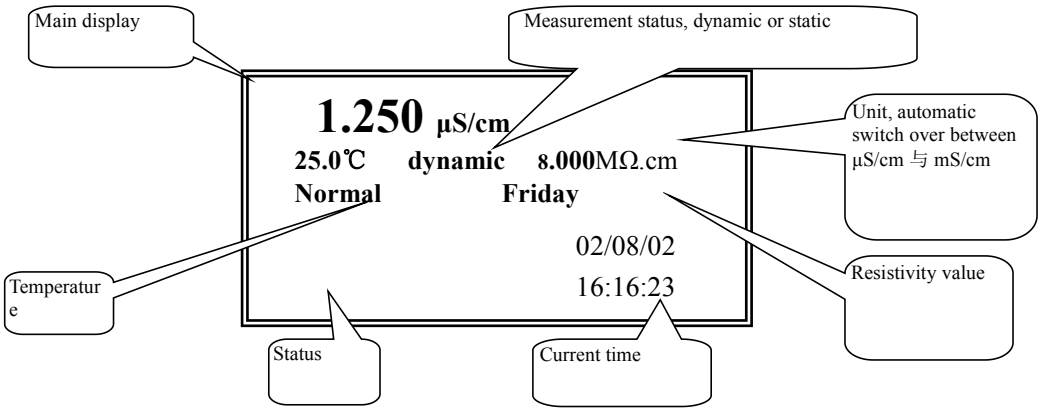


Conductivity value is in the main display area of 10×10mm, and output current, temperature, status, week, date and time are in the auxiliary display area of 5×5mm.

The status line displays the following information according to particular conditiosn: ①normal, ② high limit alarming, ③ low limit alarming and ④ beyond measurement range (conductivity value). Except "normal", the others are displayed in flashing manner to attract user attention.

Manual setting of temperature: In order to meet various applications, the temperature can be set manually from 0℃ to 80℃. Once the temperature is set to "manual", the instrument will no longer detect the actual temperature of the tested liquid, and the main screen will display a "manual" before the temperature. See the "parameter" sub-menu for detailed setting methods.

In the main display screen, Press ▲▼ key to switch between resistivity value and output current.

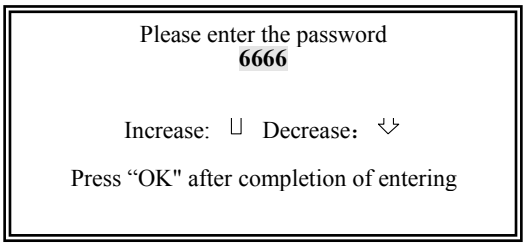


Automatically return to measurement status upon time-out: Press "menu" key to enter the main menu. After entering the main menu, the internal timer will start to function after each pressing, and the

instrument will automatically return to measurement status if there is no operation in 2 minutes for fear that the measurement cannot be performed for long because it is not in measurement status due to improper operation.

5.3 Password inputting and changing

To avoid access of unauthorized persons, some significant menu items, such as parameter setting, manual current source and system maintenance. require password for access. Other operations with no effect on the instrument are not protected by passwords. The password inputting screen is as follows:



This system has only one password, which is 8888 at default. In the password inputting screen, press ▲▼ to increase/decrease the password number, and press the other two direction keys to initialize the password to 8888. Press “ESC” key to return to upper level. Press “Enter” key, the system will automatically check the password. And if it is correct, the system will enter the next level, otherwise it will give a prompt and return to the upper level after 3 seconds.

To change password, select “change password” sub-menu under the “maintenance” menu. Firstly, input the original password, the system will check it and display the password changing screen only if the password is correct. Input a new password following the prompt on the screen, and press “Enter” to complete. If you forget your password, please contact us.

5.4 Basic Operating principles

To avoid polarization of electrode, the instrument generates highly stable square waves and apply them to the conductivity pool. The current running through the conductivity pool is directly proportional to the conductivity of the tested solution. The secondary meter translates the current to voltage using a high-impedance operational amplifier, and gets the potential signal reflecting the conductivity after programme controlled signal amplification, detection and filtration. The micro-processor samples temperature signal and conductivity signal in turn, and gets the temperature value the conductivity value at 25℃ (base temperature for power system in China) after calculation and temperature compensation.

5.5 Temperature, temperature coefficient and temperature compensation

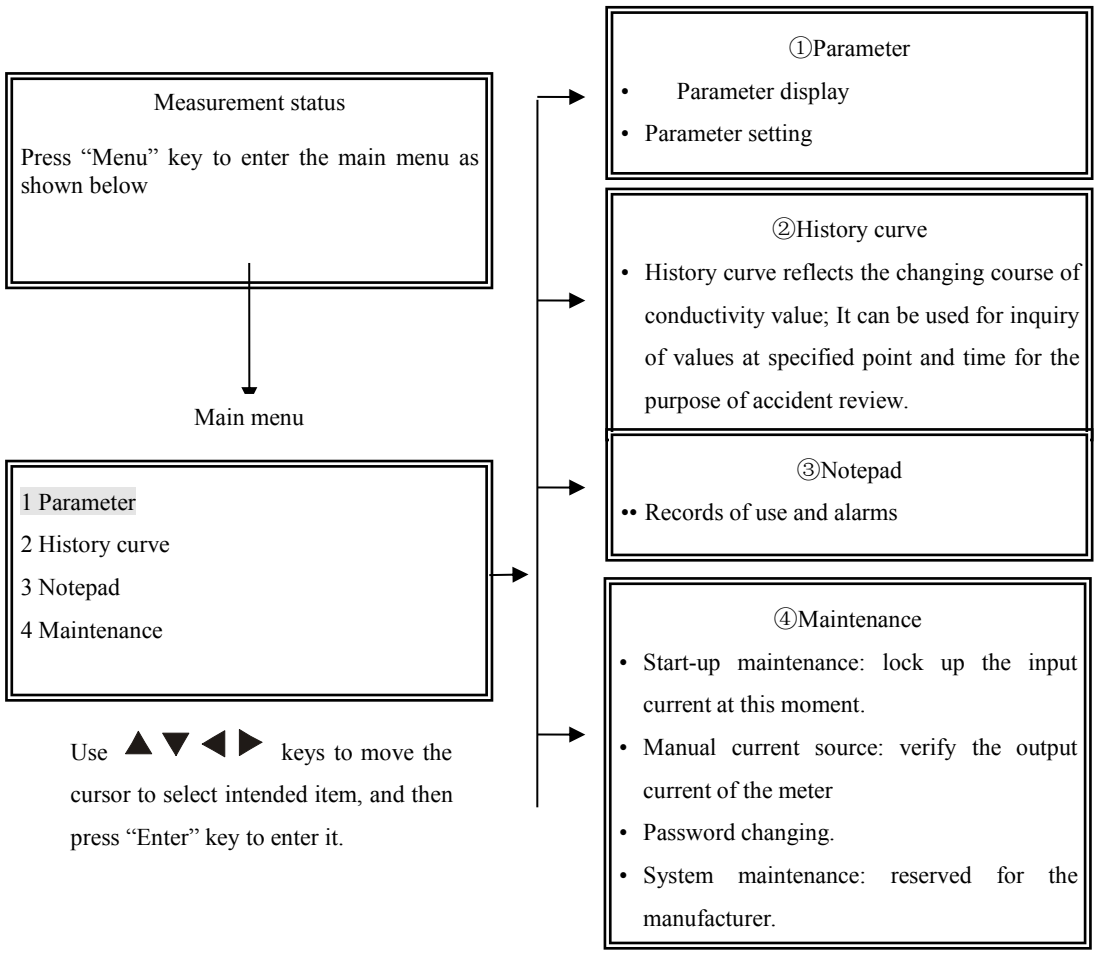
Conductivity of tested solution is greatly impacted by temperature change. So when analyzing the tested solution through conductivity, only the values under base temperature translated from the actually

measured values with temperature compensation are of practical significance. This instrument automatically translates the conductivity values to values at 25℃ (base temperature for power system in China) and displays the translated values. If the “water quality” item in parameter setting is set to “hyperpure water”, the instrument will perform temperature compensation according to the preset conductivity-temperature coefficient; If “common water” is selected, user needs to set the in “temperature coefficient for common water” item, then the instrument will use this value. Generally, within 0～50℃ mean conductivity-temperature coefficient of salt solution is 2.3%℃$^{-1}$, that of acid solution 1.6%℃$^{-1}$, and that of alkaline solution 1.9%℃$^{-1}$. As default setting of this instrument, the water quality is common water, and the conductivity-temperature coefficient for common water is 2.00% (setting range: 0～10％℃$^{-1}$). If user sets the “conductivity-temperature coefficient for common water” to 0.00%, the instrument performs no temperature compensation and the conductivity value displayed is the value under the present temperature.

When “automatic” is selected in “temperature measurement”, and the temperature compensation electrode is well connected, this instrument will display the temperature measured by the temperature compensation electrode, and it will automatically perform temperature compensation. When “manual” in “temperature measurement” is selected, the instrument in under manual temperature setting mode, which means it does not detect the actual temperature of the tested liquid but uses and displays the temperature value set by the user. In this case, the word “manual” will be displayed and the instrument performs manual temperature compensation.

Chapter 6 Detailed explanation of menus and functions

List of menus and functions

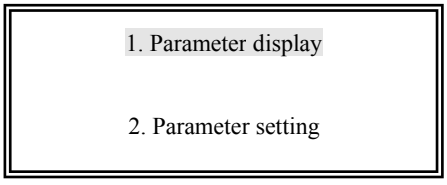


6.1 "Parameter" sub-menu

In the main menu, when the cursor points at "parameter" sub-menu, press "Enter" key to enter this sub-menu.

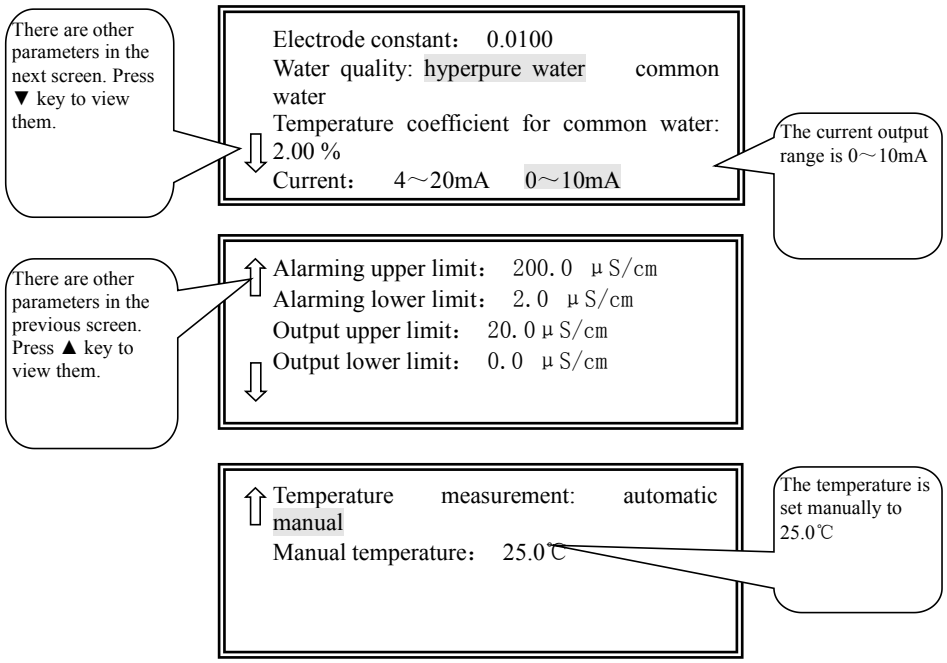
This sub-menu is used for parameter display and setting. If "parameter display" is selected, parameters can be viewed only there but not modified. To avoid access of unauthorized persons, password is required to enter the "parameter setting" item.

Before measurement, parameters should be set according to the site conditions. If not, the default settings (for new instrument) or previous settings (for instrument used before) will apply.

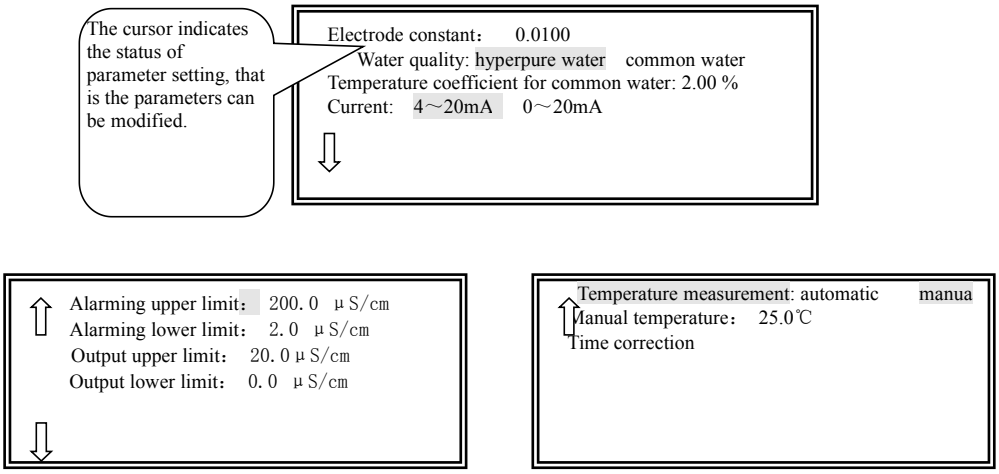


Press "▲▼" keys to select, "Enter" key to enter, and "ESC" key to return the main menu.

1. **Parameter display:** Current values of all parameters are displayed here in three screens.



2. **Parameter setting:** This screen can be accessed only after entering a correct password. Here the cursor stays at a parameter, indicating this parameter can be modified. There are three screens, shown as follows:



Setting of electrode constant

When the cursor points at “electrode constant”, press “enter” key, the cursor will points at the value of this parameter. Press ▲▼ keys to increase/decrease the value till the electrode constant displayed is the same as that marked on the electrode. When the cursor points at “electrode constant”, press ◀▶ to switch the value among 0.0100, 0.1000, 1.0000 and10.000, so that the value can be set quickly.

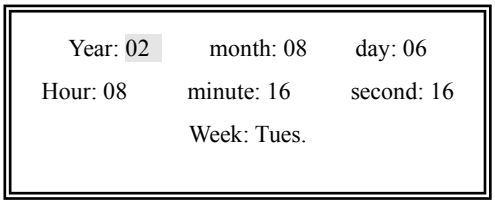
Special note: Do keep the electrode constant displayed in the instrument the same as that marked on the electrode.

Setting of output upper/lower limit

When the cursor points at “output upper limit”, press “Enter” key, the cursor will point at the upper limit value. Press ▲ key to increase the value, and ▼ to decrease. When the displayed value is the desired value, press “Enter” (or “ESC”) key to complete such setting. Then the cursor will go back to the “output upper limit”. Setting of output lower limit is similar.

Time correction

The secondary meter stores data with time. If the time is incorrect, the records will be wrong and the “history curve” will not give correct data. The screen of “time correction” is as follows:



Use directions keys to select an item to be modified, and press “Enter”. Then use “▲▼” key to modify the value and then “Enter” key or “ESC” key to exit modification of this item.

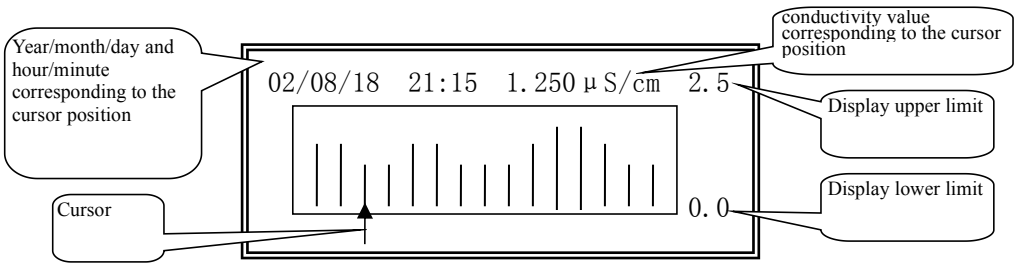
6.2 “History Curve” sub-menu

This sub-menu is functioned as a digital recorder of the instrument, and can realize the following at the same time on the same screen: history curve display and inquiry of conductivity value at specified point or time.

“History curve” generally reflects the changing tendency and course of the water quality, and can help identify and solve problems. “Specified point/time” is used to obtain the conductivity value at specified point/time.
This sub-menu cannot be blocked out by PC.

The secondary meter can store the data of the last 30 days, one point every 5 minutes. Data beyond this period will be automatically replaced.

After entering this sub-menu, the curve the last half day is shown as follows:



Press “Enter” key to enter the screen for modifying the display upper limit and lower limit and inquiring the days. Points without data are displayed as 0.000.

Note: There is a cursor below the graph, and press ◀ ▶ key to move it to select specific point. Above the

graph there displays time and conductivity value corresponding to the cursor position, which is very useful for positioning. For example:

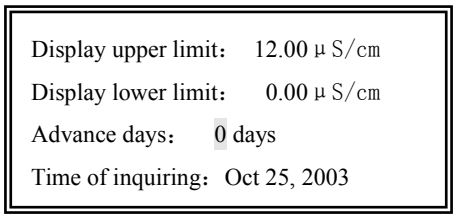
1. Example 1. Inquiring conductivity value at specified time point

Backward inquiring: press ▶ key, the cursor will move to the right and the time displayed above the graph will become closer to the current time. When the cursor has moved to the rightest position, press ▶ key to display the curve of the next half day.

Forward inquiring: press ◀ key, the cursor will move to the left and the time displayed above the graph will become farther from the current time. When the cursor has moved to the leftest position, press ◀ key to display the curve of the previous half day.

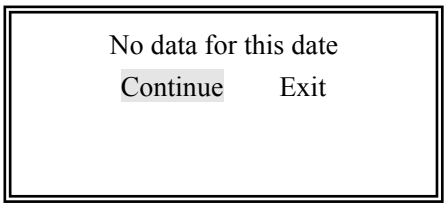
2. Example 2. Quick inquiry of conductivity curve of a specified period or conductivity value of specified point or time

After entering "history curve" sub-menu, press "Enter" key to enter the screen for modifying the upper/lower limit and the advance days. The screen is shown as follows:



Use the direction keys to select the item to be changed, press "Enter" key to enter the modifying screen, and press ▲▼ keys to modify the values. Items that can be modified include display upper/lower limit and advance days. The time of inquiring is automatically displayed on the bottom line.

Press "ESC", the second half day curve of the selected date will be displayed. If the time specified is beyond the effective range, the following will be displayed:



At this time, select "continue" to go back to date entering screen. If "exit" button is pressed, the display date will remain unchanged while the modified display upper/lower limit will be effective. Then direction keys can be used for specified-point inquiring.

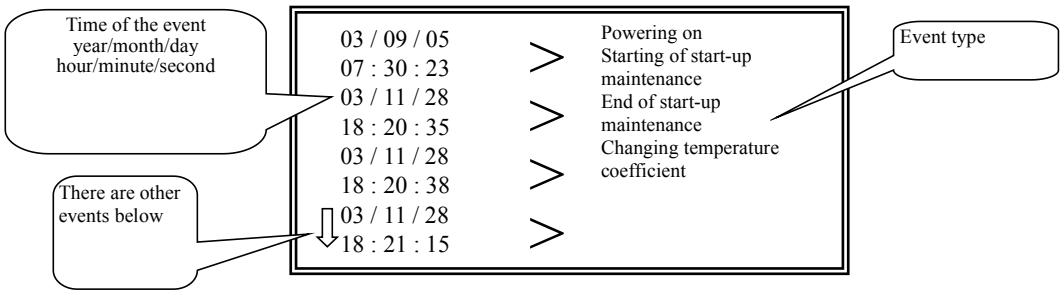
Improving curve display effect

Different measurement points have different values, and the "display upper limit" and "display lower limit" of the "history curve" should be appropriate. If the upper limit is too low, all lines will take up the whole screen, without showing the change tendency. If the lower limit is too high, there will be no line in the

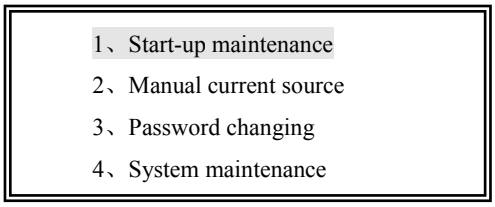
screen. So appropriate upper limit and lower limit should be set according to the range of the measured values. See the previous section for the steps of setting. After modification is completed, press “ESC” key to apply the new display upper limit and lower limit.

6.3 “Notepad” sub-menu

The instrument can record 200 latest events, including powering on, powering off, starting of high alarming, end of high alarming, starting of start-up maintenance, end of start-up maintenance, starting of manual current source, end of manual current source, changing system password, changing output upper limit, changing output lower limit, changing alarming upper limit, changing alarming lower limit, changing current output manner, changing system time, changing water quality, changing electrode constant, reset or instant power failure, changing temperature coefficient, changing temperature measurement manner, changing manual temperature, and so on. See the example below:



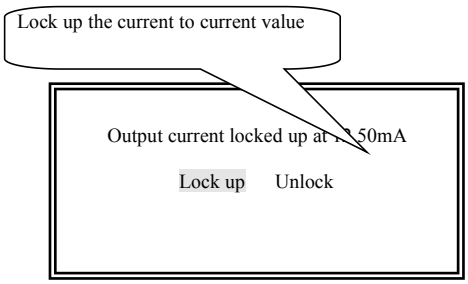
6.4 “Maintenance” sub-menu



Press “▲▼” keys to select, “Enter” key to enter, and “ESC” key to return the main menu.

1. Start-up maintenance

During operation of the instrument, when the electrode or measurement pool is being maintained, the sample supply is interrupted or the electrode has been taken out, the data collected, the output current and the data saved are false data. To avoid such condition, this instrument is provided with the function of start-up maintenance to lock up the output current. When it is used on-line, computer will detect that this instrument is under maintenance and thus stop recording data and automatically follow up the duration of the maintenance.



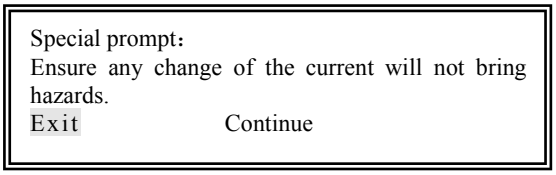
After entering the "start-up maintenance" item, the screen on the left is displayed.

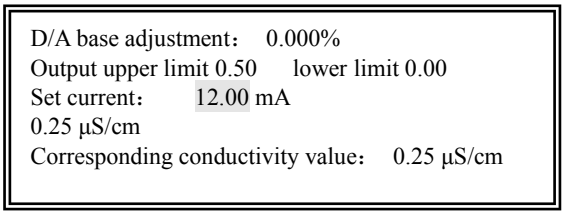
The current is locked up at current value, and a signal indicating start-up maintenance is sent to the computer. After completion of the start-up maintenance, press ▶ to select "unlock" button and then press "Enter" (or "Exit") key.

2. Manual current source

Correct password is required for entering this item. In this item the output current can be set freely by users via the ▲▼ keys within the range specified in "parameter setting" item. This function has two purposes: first, allowing user to check the accuracy of output current of the instrument within full output range; second, if connected with recorder or traditional downstream machines, allowing users to check whether the sampling of the recorder and downstream machines is correct and thus determine the responsibility for problems. The downstream adjuster connected can be even controlled manually. The following will be displayed after entering this item:

Special prompt: When using this function, the output current is set by user and can vary in full range, so one must verify that the adjustment controller or PC at the output will not bring any control output with adverse effect.





If the displayed current is not equal to the output current, press "Enter" key, the cursor will point at the value of the "D/A base adjustment" parameter, then press ▲▼ to change it.

Such change can make the displayed current equal to the output current. If the cursor does not go to that value after pressing "Enter" key, change the "D/A off" to "D/A on" in the "system maintenance" sub-menu.

For the correspondence between current and conductivity, see the next section. There are at least three checking methods:

I. Connect load resistances and a universal meter to the output end, and check the output current;

II. Connect a recorder for comparison checking;

III. Connect the output to a computer sampling system for comparison checking.

Calculation of output current

The instrument provides two grades of current output, that is 0～10mA or 4～20mA, but the corresponding conductivity value range can be defined by user. The correspondence between the measured conductivity value and the output current is as follows:

0～10mA output: I={（D-DL）/（DH-DL）}×10mA

4～20mA output: I=4mA+{（D-DL）/（DH-DL）}×16 mA

Wherein: I – output current;

D – currently measured conductivity value;

DH – conductivity value corresponding to 20mA or10mA output current defined by user, that is the output upper limit;

DL -- conductivity value corresponding to 4mA or 0mA output current defined by user, that is the output lower limit.

3. Password changing

See Section 5.3.

4. System maintenance

“System maintenance” is a function reserved for the manufacturer. Generally user should not access this item, otherwise it may influence the normal operation of the instrument. The detailed operations are as follows: When the cursor points at a serial number, press up/down key to move, and press “Enter” key to enter the corresponding sub-menu. For "password restoring, emptying notepad, and emptying curves, the cursor will automatically return after pressing down key. For “display on/off” and “D/A on/off” functions, press down key to set “on” and up key “off”. If there is any mistake in “History curve” or “Notepad”, they can be restored by emptying them correspondingly.

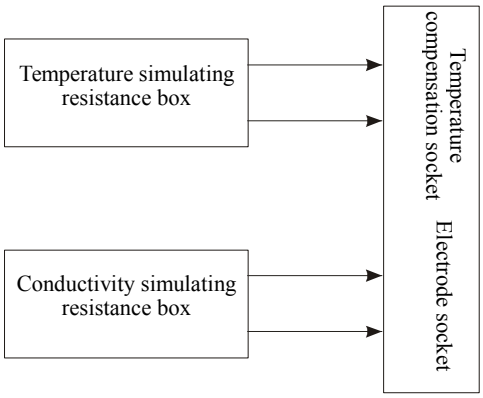
Chapter 7 Delayed cancellation of alarm

The contacts of the alarming relay of the instrument are designed to form a control system by connecting relevant controlling devices (such as electromagnetic valve). To avoid shaking of relay contacts near alarming points, the secondary meter adopts delayed cancellation of alarm.

When the conductivity reaches the preset alarming upper/lower limit, the relay closes immediately and the screen displays “high/low limit alarming” in flashing. However, when the conductivity value falls/rises below/above the upper/lower limit, the alarm will not stop immediately until it continues to fall/rise by Δ (generally 0.05μS/cm).

Chapter 8 Simulative testing

When there is inaccurate measurement or any question about the instrument, user can perform simulative testing of the instrument using resistance box to judge whether the problem rests with the electrode or the secondary meter. First dismount the connection wires between the temperature compensation electrode & conductivity electrode and the secondary meter, and then respectively connect the temperature terminal and conductivity electrode terminal of the secondary meter to a resistance box for simulative testing.



Set the “water quality” in the secondary meter to common water, and “manual temperature” to 25.0℃ or “temperature coefficient for common water” to 0.00% (canceling temperature compensation). At this time, the reading R of the resistance box should have the following relation with the displayed conductivity:

$$S=1{,}000{,}000 \times K/R$$

Wherein: R — resistance of the resistance box, in Ω; S — conductivity value; K — electrode constant.

Table 1. Correspondence between resistance and conductivity

(common water, temperature coefficient =0.00% or manual temperature =25℃)

Resistance（kΩ）	Conductivity（μS/cm）(electrode constant =0.01)	Conductivity（μS/cm）(electrode constant =0.10)	Conductivity（μS/cm）(electrode constant =1.00)	Conductivity（μS/cm）(electrode constant =10.00)
50.00	0.200	2.000	20.00	200.0
40.00	0.250	2.500	25.00	250
30.00	0.333	3.333	33.33	333.3
20.00	0.500	5.000	50.00	500
10.00	1.000	10.00	100.0	1000
5.000	2.000	20.00	200.0	2000
2.000	5.000	50.00	500.0	5000
1.000	10.00	100.0	1000	10000
0.500	20.00	200.0	2000	20000

This instrument uses NTC (negative temperature coefficient) thermal resistor to measure temperature in two-line system. To carry out simulating testing of temperature using resistance box, please set the “temperature measurement” in “parameter setting” to “automatic”, and respectively connect the leading wires from the temperature compensation electrode holes to the two sides of the resistance box.

Table 2. Correspondence between Resistance And Temperature

Resistance（Ω）	7352	4481	2813	2252	1814	1199	811.4	560.3	394.17	282.64
Temperature（℃）	0.00	10.0	20.0	25.0	30.0	40.0	50.0	60.0	70.0	80.0

If you find after a simulative testing there is great difference between the displayed values and the theoretical values from the tables above, please contact the manufacturer. If there is no problem in precision of secondary meter, please re-calibrate the electrode constant or change another electrode.

Chapter 9 Considerations and maintenance

1. The secondary meter generally needs no daily maintenance. When there is an obvious fault, please do not open and repair it by yourself but contact us as soon as possible.
2. The conductivity pool needs to be timely cleaned to remove any feculence. Clean it with 50% warm abluent (or 2% hydrochloric acid or 5% nitric acid solution if the feculence is strongly adhesive), brush it with a nylon brush, and then wash the internal and external surface of the electrode for several times using distilled water. Remember never touch the electrode with your hand.
3. After powered on, the instrument should display related information. So if there is no display or the display is abnormal, immediately turn off the power and check whether the power source and fuse function normally.
4. Keep the leading wire of the electrode and the connection plug on the back of the secondary meter away from water, otherwise the measurement will be inaccurate.
5. Highly pure water should be measured as soon as possible after it is put into a container, as CO_2 in the air may continuously dissolve into the water to form CO_3^{2-} ion that has strong conductivity, resulting in continuously increased conductivity and thus inaccurate measurement results.
6. The container of the tested solution must be clean, free of any ion.
7. Incorrect use of electrode often causes failure or fault of the instrument. When installing an electrode, completely soak it into the solution.

Chapter 10 Notice of ordering

1. When ordering products, please specify the conductivity pool constant, the outer diameter of water pipe pipes (Ø 8, Ø 10 and Ø 12 available), whether soft or hard pipe will be required, and the distance between the conductivity electrode and the secondary meter (length of electrode wire). If not specified, 0.01 conductivity pool, 5m wire and Ø 10 soft pipe connector will be attached to the instrument.
2. Please inform the installation manner of the electrode and the secondary meter.
3. Please specify other special requirements (if any).