Kalstein

Water Purification System

Model YR54

Instruction Manual

Thank you very much for purchasing our Kalstein´s Water Purification System Model YR54

Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a hand place for future reference.

Warning: Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

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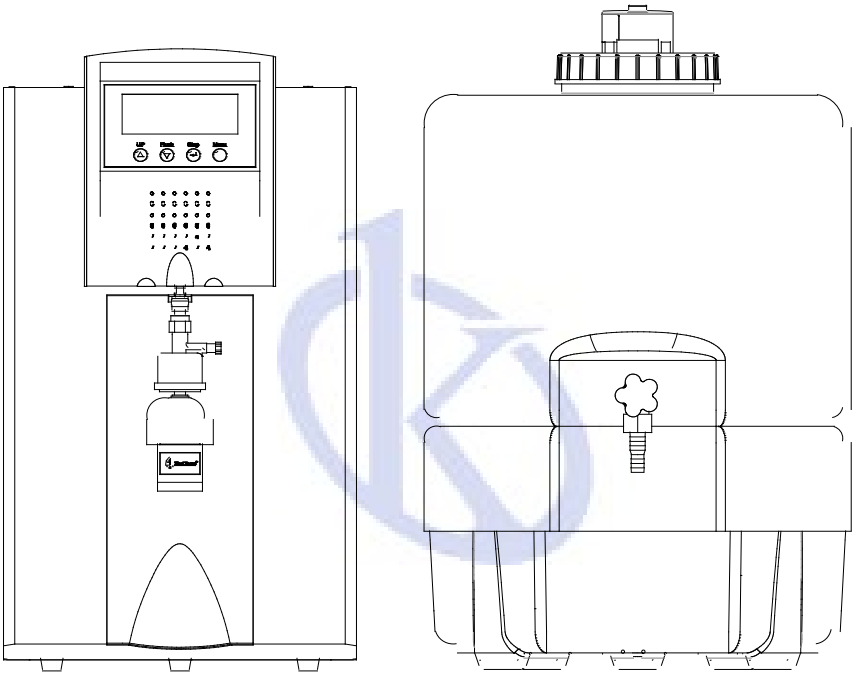
With more than 25 years growing with our customers, Kalstein's multiformat and modern content, is now present in more than 10 countries and increasing.



Notice

If it is the first time for you to use our product, please carefully read this operating and maintenance manual which will give you a lot of help. We take responsibility for regular maintenance and repair work instead of consequences caused by improper operation.

The content of the publication is subject to change and/or updating without notice. The content of this manual is only for reference use. The manufactory and the distributors shall not be responsible for losses caused by incorrect description or misuse of this manual. The graphics contained in the manual are as general representative which may have some errors compared to entity. But the description is definitely match the function.

Contents

Chapter 1 General

1.1 Confirm the ordering products

The manual is written for Smart-N series water purification system

The content of the manual can lead users to installation, operation and maintenance of the Smart-N series water purification system

We strongly recommend our users to read and understand the content of the manual before installation, operation and maintenance

You can easily find the model of the system in the nameplate at the back of the system.

1.2 Safety information

You must use the safety norms according to this manual before using the Smart-N system, especially water and power supply. It is necessary to refer to this manual when you install or operate the Smart-N system. Unqualified using environment will endanger the normal operation, or even damage the whole system.

The installation, commissioning and maintenance of the equipment can only be completed by Heal Force or its authorized agents. Heal Force did not responsible for duties and responsibilities if the equipment is disassembled by unauthorized dealer or service personnel.

1.3 System operating environment

- Indoor sue
- Avoid direct sunlight
- Between 0-2000 meters altitude
- Ambient temperature: 4-45°C
- Operating Voltage: 220-230V AC 50/60Hz
- Inlet pressure: 0.1-0.4MPA.
- The fluctuation range of the main power supply can be 10% of the normal voltage.
- Transient over-voltage power supply is grade 2.
- There is an drains around the equipment(1 meters)
- Adequate indoor ventilation
- Mounting surface must be fixed, level, and not burning
- Avoid direct sunlight
- No heat source next to the equipment.
- Be away from strong magnetic field.

1.4 warnings signal

Note alert you to pertinent facts and conditions, please read this operation and service manual carefully before you operate the main system

Caution: Caution alert you to the possibility of damage to the equipment, and water in pipe may spill out when the cartridge is installed OR replaced.

Danger: Danger alert to a possibility of personal injury.

Power supply must be firmly grounded

WARNING

The water tank is provided with a sterilizing ultraviolet lamp, and the radiation effect on the human body can be affected. The non-professional personnel are not allowed to open the lid of the water tank without permission, and the water tank cover can be opened after the power is cut off.

Chapter 2 System Introduction

2.1 System principle

Smart-N Series is an advanced essential laboratory equipment, widely used in trace analysis, diagnostics, toxicology, precision optics laboratories, as well as in hospital, research institute and other water quality monitor department. The device adopted advanced modular design, CPU auto-control technology, highly integrated water treatment equipment. It is the new generation of intelligent water purification system with intellectual property.

The feed water of Smart-N system is ordinary tap water. The feed water is passing through the multi-channel process of pretreatment cartridge, reverse osmosis cartridge, purification cartridge, Ultra-purification cartridge, UV sterilizer, Micro-filter cartridge. The quality of ultrapure water can reach the resistivity of 18 MΩ.cm and eliminating bacteria.

2.2 Technical features

- Product line is abundant, as many as a hundred variety, to meet individual needs.
- Disposable integrated cartridge simplifies operation. It takes less time to replace any component
- Modular design concept, including pretreatment cartridge, reverse osmosis, purification cartridge Self-diagnostic microprocessor control system monitors major parameters and alarm to ensuring the main system at optimize operation status.
- Advanced CPU self-controlled technology can determine the configuration. The system will shutdown automatically when the feed water is shortage and auto flush when the main system re-stared. Double channel design for pure water and ultrapure water.
- Special UV sterilizer control technology make the UV light work only when ultrapure water is produced, thus can extend life time of UV lamp.
- Interactive LCD display affords user optimum convenience, with indication on conductivity, resistivity, temperature, operate mode, water tank level, volume dispense products water.
- 3-channel resistivity sensors, equipped with temperature compensation function, comprehensively monitor system operation and water quality variation.
- Two hours standby mode with various types of loop disinfection. Using hydrogen peroxide as disinfectant to protect operator and filtration cartridge, and guarantee the quality of ultrapure water.
- Leakage protection unit. The main unit cut off the inlet water and send an alarm signal if water leakage occurs.
- A special connection process is applied for the Smart-N system, eliminating the risk of RO membranes seepage when the main unit is in standby mode, ensuring the qualified water into the water tank.
- 30Lor 60L storage tank with 5 level sensor, with optional air filter and UV sterilizer for water tank, which provides flexible solutions for different water usage.
- Adjustable level of water system start to making RO water, keep the RO water in the storage tank fresh according to the user demand.
- Volume dispense function (0.1-25L adjustable) or water producing amount according to your needs
- PIN-coded access to software set points prevent unauthorized changes to operation or system settings.
- Remote water producing function (optional)
- RS232 interface allows for data collection and permanent record of water quality and system parameters--essential for compliance with good laboratory practice guidelines.
- With remote monitor software (option), you can remote the water system on the computer.

2.3 Specifications for the system

YR Smart		15	30	2-15
Feed water requirement	Conductivity μS/cm@25℃	＜400		
	Pressure MPa	0.1～0.4		
	Temperature ℃	5～40		
Pure water	Ion rejection rate %@25℃	≥95		
	Bacteria remove %	＞99		
	Make rate* L/H@25℃	12-15	25-30	12-15
Ultra-Pure water	resistivity MΩ.cm	＞18		
	TOC** ppb	1-10		
	Endotoxin*** Eu/ml	<0.001Eu/ml		
	Particles（0.22μm） /ml	<1		
	Dispensing rate L/H	60-100		
	Power Consumption W	150	150	150
	Weight kg	34	36	38
	Storage tank	30L		
	Main System Dime. W*D*H	525*314*571		
	Storage Tank Dime.W*D*H	430*380*580		

Note:

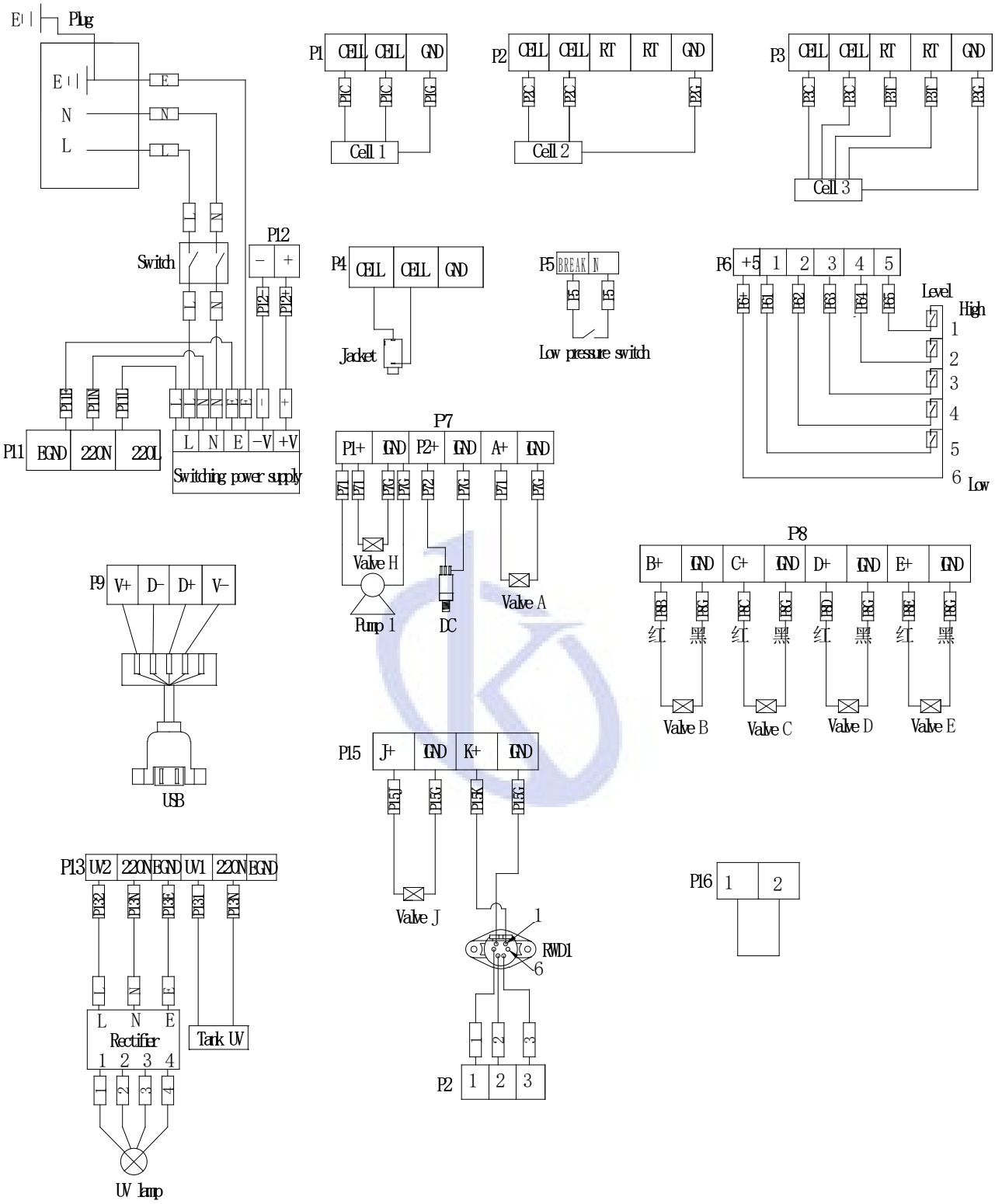
* The making rate will be changed with temperature variation. （3% per 1℃）

** The feed water TOC is less than 1000ppb.

*** with biofilter.

2.4 Diagram of the YR SMAR system

2.5 Electrical connections



Chapter 3 Instructions before installation

3.1 check before installation

Users please ensure whether the product you received is your purchase before installation.

You had batter check all items according the packing list.

- Whether the power site is close to the system.
- Whether the feed water meets the requirements.
- Whether the feed water pressure is normal.
- Whether the feed water supply is nonstop.
- Whether the feed water pipe has1/2″NPTF whorl connector.
- Whether it is needed another frame for wall installation.
- Whether the strength of the wall can bear the system (including tank full of water) weight.
- Whether the system's height can clearly observe both LCD screen and keypad operations on control panel.
- Whether there is adequate space to substitute supplies and connecting pipe as well around and behind the system.
- Whether you have installed more than 1/2″ drains, not more than one meter far away from the system, intended for discharging waste-water and water overflowing.
- Whether the installment circumstances are consistent with the regulations.
- Whether there is reserved space if you are going to install RS232 signal accessing your computer.
- Whether there is reserved space if you are looking forward to having moving handle and pedal switch installed.

3.2 Option spare parts

3.2.1 Pressure limiter CR-SP829

Please purchase this product additionally when the feed water pressure is too high（＞0.4MPa）. This component can reduce pressure to 0.4Mpa below.

3.2.2 Systematic data recording package CR-SP840

It includes systematic data recording software and RS232 connecting signal. Using it, you can easily have Smart-N system and your computer connected, on which you can install and record you using this recording system and water quality.

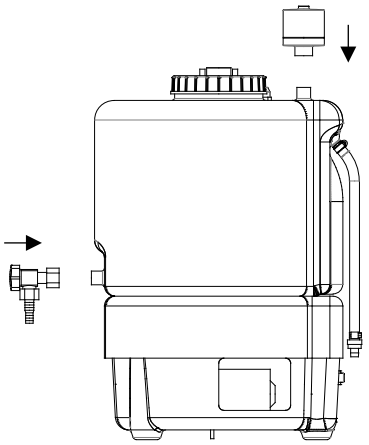
3.2.3 Enhanced pretreatment cartridge CR-SP102C

Enhanced pretreatment cartridge is a multi-stage pretreatment module to removes the impurities in tap water including suspended particulates, colloids, microorganisms, organics, chlorine and heavy metals to ensure the following purification modules work properly.

Chapter 4 Installation

It is important for the user to master installation and removal of quick connector. If user dose not operate properly will lead to water leakage, quick connector damage and pipeline broken.

4.1 Accessory installation of storage tank

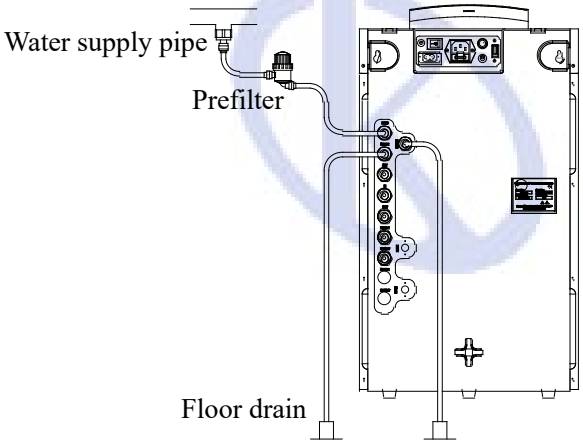


First to twine the 1/2' NPTF outlet in the front of the storage tank with Teflon tape ,then get the RO dispense valve connect to the outlet of storage, be sure the "O" ring and screw tight.

Get the air-filter and screw to the 1/2"NPTF outlet on the top of the storage tank according to the clockwise sense, be sure not to screw tight.

4.2 Pipeline connections

4.2.1 Feed pipeline and drain pipeline installations



Before connecting the inlet pipe, make sure that the external water supply has been shut down to prevent water supply pipe splashing around, resulting in unnecessary losses.

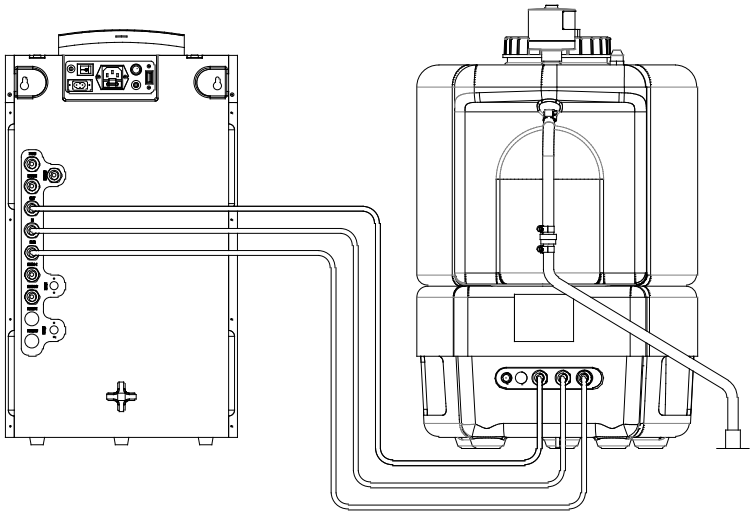
Get the quick connector and the tread sealing tape out. Wind the tread sealing tape around the 1 / 2 "NPTF connector (usually 3 to 4 laps) of pre-installed external water pipeline. And then screw on the connector.

Cut a blue tube and prefilter, one end of the blue tube connects to the tap water connector, the other end connects to the prefilter "in".

Cut a blue tube, one end connects to the prefilter "outlet", the other end connects into the "feed" at the back of main unit.

Cut two black tubes, one ends of the tubes connect to the "DRAIN1"and "DRAIN2" at the back of main unit, insert the other ends into the floor drain.

4.2.2 Pipeline connections between main unit and water tank



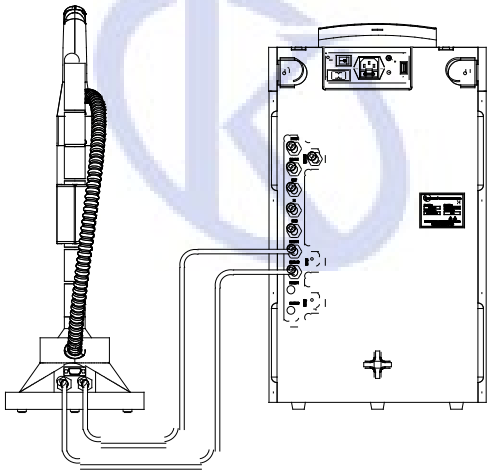
Cut a white tube, insert one end of the tube into the "OUT" on the back of main unit, and the other end into the "IN" on the back of storage tank.

Cut a white tube, insert one end of the tube into the "IN" on the back of main unit, and the other end into the "OUT" on the back of storage tank.

Cut a white tube, insert one end of the tube into the "REC" on the back of main unit, and the other end into the "REC" on the back of storage tank.

Get a transparent tube (DN12mm，2m), one end of the tube connect to the air check valve at the back of storage tank with clamp fitting, the other end into the external drainage pipes which have been pre-installed.

4.2.3 Pipeline connections between main unit and RWD

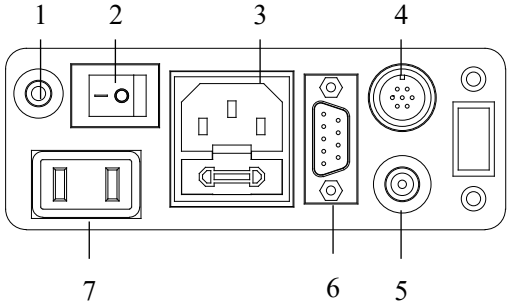


Get a white tube, insert one end of the tube into the "RWD1-1" on the back of main unit, and the other end into the one of the connectors on the back of RWD.

Get a white tube, insert one end of the tube into the "RWD1-2" on the back of main unit, and the other end into the one of the connectors on the back of RWD.

4.3 Signal cable connection

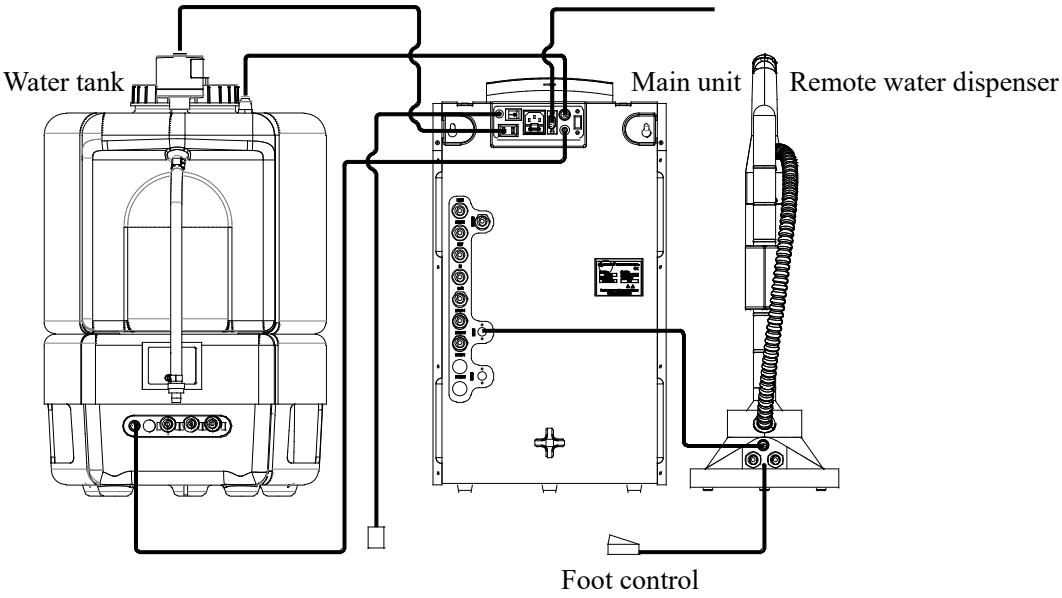
All the electrical interfaces are on the back of the system.



1 leakage sensor socket　　2 power switch　　3 power supply socket

4 level sensor socket 5 tank pump socket 6 RS232 Interface
7 tank UV socket

Sockets of different models are different.



4.3.1 Level cable

Connect the seven core signal cable on the top of the water storage tank to the level sensor socket on the back of the main unit.

4.3.2 Pump power cable

Get the three core signal cable, one end connect to three core socket at the back of main unit, the other end connect to the three core socket at the back of storage tank base.

4.3.3 Cable connect between main unit and RWD

Get the PS/2 signal cable, one end connects to the “RWD1” at the back of the main unit, the other end connects to the PS/2 socket at the back of the remote water dispenser.

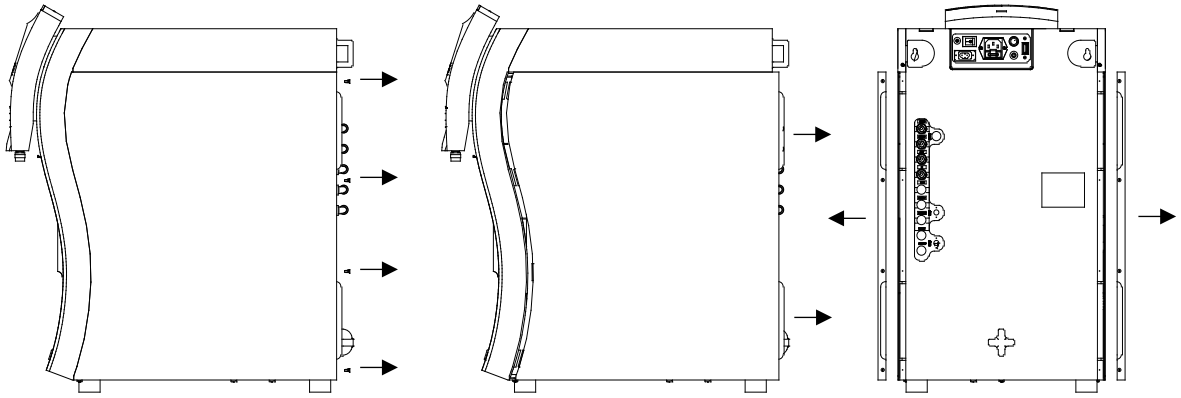
4.3.4 Main power supply cable

Make sure that the system switch status is "OFF" the switch should be in the "O"
Put the power cord plug into the power supply socket.
Insert the other end of the power cord into the external power supply outlet.

4.4 Cartridge installation

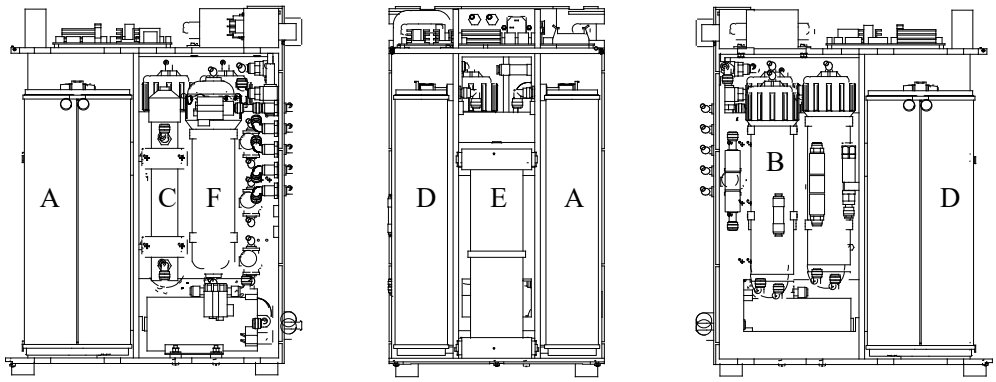
4.4.1 open the side door of the main unit

Opening method is showed below



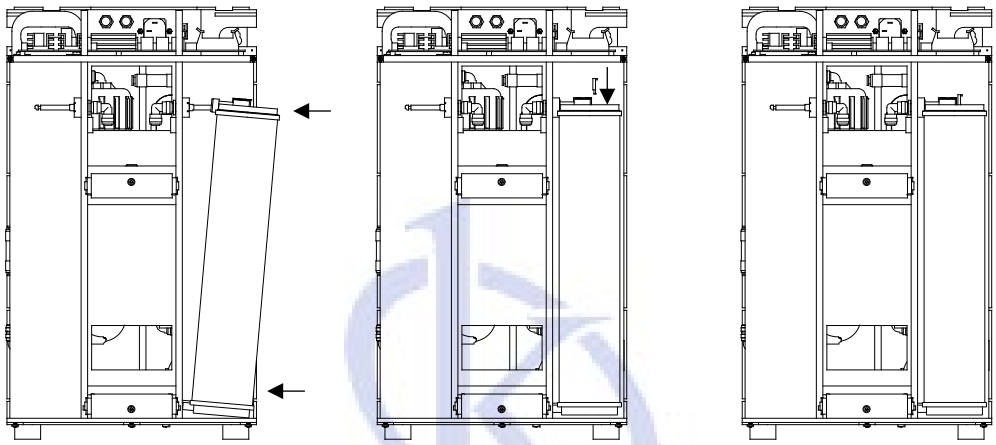
unscrew the screw of the side door with a screwdriver.
pull the handle of the side door with both hands, forced back to pull the a side door out of 10mm ~ 13mm.
carry out the side door.

4.4.2 The position of the main components



A Pretreatment cartridge
B RO cartridge
C UV light
D Purification cartridge
E Ultrapure cartridge
F MF/UF cartridge

4.4.3 Installation of pretreatment cartridge



Confirm the mart-N system is power off.

Pretreatment cartridge is installed in the right chamber of Smart-N system.

Get the pretreatment cartridge from the box (make sure number is correct for the CR-SP101M), open the vacuum bag, remove protection cover for the inlet and outlet of pretreatment cartridge. Make sure there is a black “O” ring in the inlet and outlet, which is in the bottom of the hole.

Use pure water to make the black "O" rings wet. Do not use lubricants for lubrication, such as glycerol or Vaseline or other lubricant.

Place the square tenon at the low of the pretreatment into the corresponding square hole on the main unit, shown as in the figure “A” above.

Push the joint at the up of the pretreatment cartridge to the main unit shown as in the figure “B” above. Make sure the "O"-rings of pretreatment cartridge can be completely sealed with the joints.

There is locking plate connected with nylon line on the joints of main unit. Insert the locking plate into the slot of metal bar, as shown in the figure C above.

Pretreatment cartridge installation is complete. As shown in Figure D.

4.4.4 Installation of purification cartridge (CR-SP302M)

Remove the left side door (front view), please refer to of this chapter.

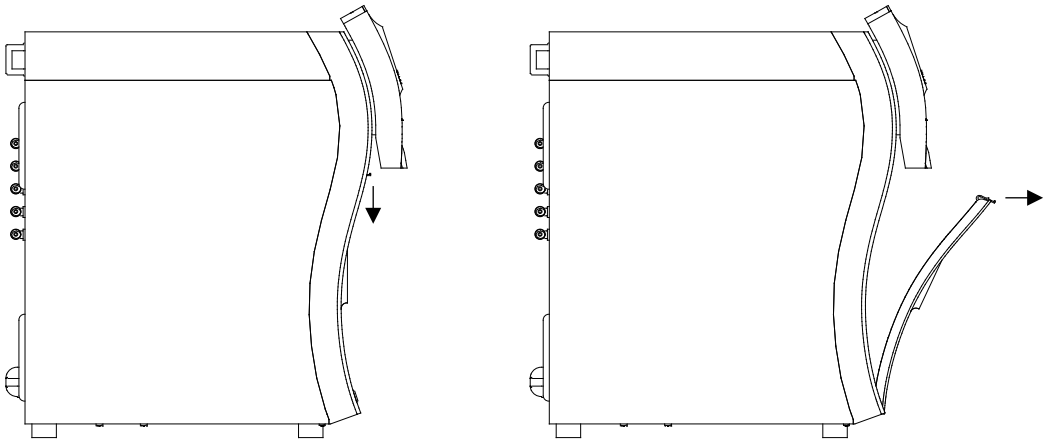
Purification cartridge is installed in the left chamber of Smart-N system.

Get the purification cartridge from the box (make sure number is correct for the CR-SP302M).

The operation method: please refer to section4.5.3 of this chapter.

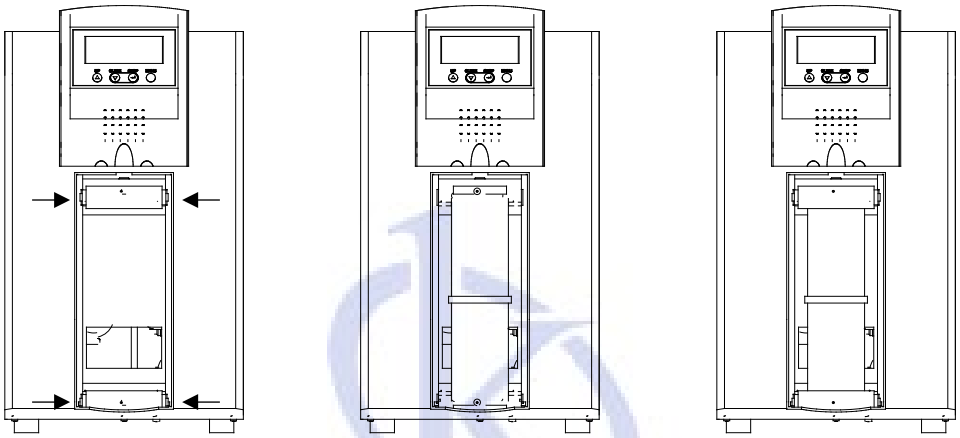
4.4.5 Installation of ultrapure cartridge(CR-SP303M)

Open the front door of the main unit



Press and pull the latch at the top of the front door, to remove the front door (press down about 3mm , do not press down hardly which may cause deformation or even fracture bayonet). As shown in figure “A””B”

Installation of purification cartridge(CR-SP303M)



Open the front door of the SMART system. Please refer to this chapter.

Open the front door , the cabinet of ultra-purification cartridges has upper and lower latch, As shown in Figure A

Take out the purification cartridge from the box (make sure number is correct for the CR-SP303M), open the vacuum bag, remove protection cover for the port of cartridge. Make sure there is a black “O” ring in the ports, which is in the right position.(should be close to the inlet and outlet inside the convex shoulder). If the position is not right, Please adjust it to the right position.

Wet the "O"-rings with ultra-pure water. Do not use lubricants for lubrication, such as glycerol or Vaseline or other lubricant.

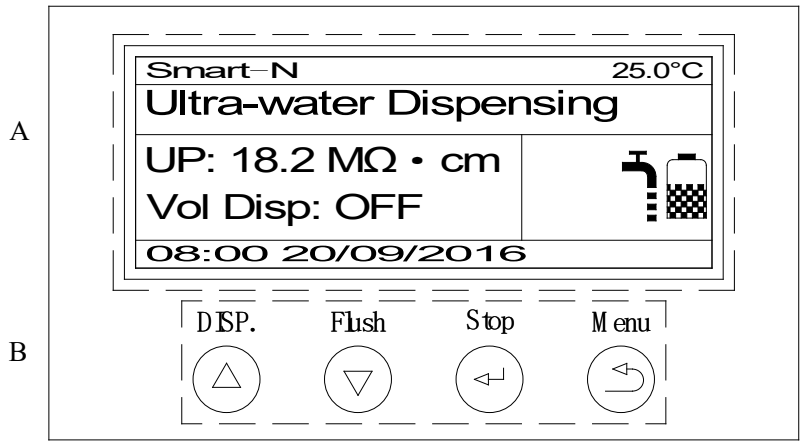
Push the purification cartridge firmly into place , Both the top and bottom ports of the cartridge have to be fully seated shown as figure ”B” above.

Place the latch as origin. Make sure that both the top latch and bottom latch are fully closed. Each latch should “click” when it is fully closed.

Install the front door as this chapter. The purification cartridge installation is completed.

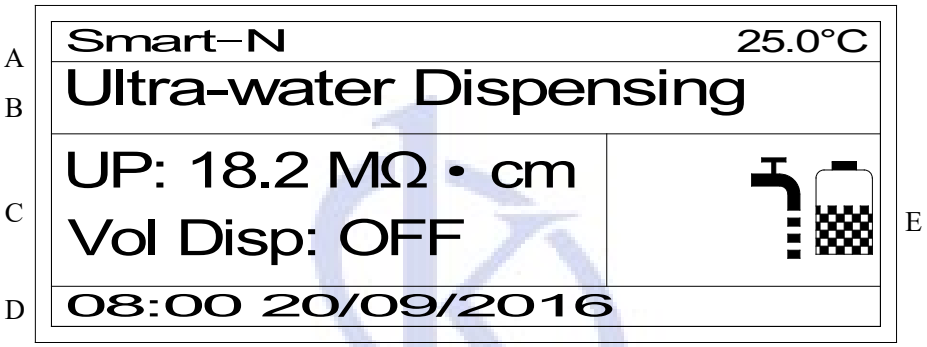
Chapter 5 Parameter setting and operation

5.1 Control panel area



A: dashed box for the LCD display area.
B: dashed box for the function keypad board.

5.2 LCD display area



A: system model and the current temperature display .
B: current status
C: product water quality and Volume dispense status.
D: date and feed water conductivity.
E: graphic for display status.

5.3 symbols and graphics for LCD display

symbols

FEED	Feed water conductivity	RO	Pure water conductivity	UP	Products resistivity	DS	deionization rate
PF	Pretreatment cartridge	UF	Ultra-filter	UV	UV lamp	Vol.Disp	Fixed Volume Dispensing

graphics

	Without feed water		System leakage	FE	Feed water low quality	PF	Pretreatment failure
RO	RO failure	UF	Ultra-filter failure	UV	UV light failure	DI	Purification cartridge failure
DS	RO failure		Ultrapure water producing		Ultrapure water recycle		Tank level

5.4 Function Keypad

There are 4 function keypads in the system: DISP./▲, Flush/▼, Stop/↵ and Menu/⮌.

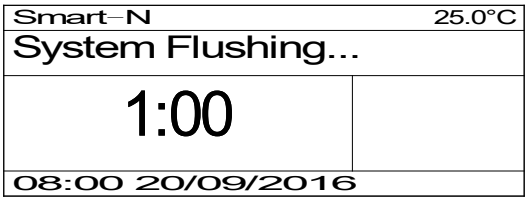
DISP./▲ Dispense product water, adjusting keypad at the menu mode.
Flush/▼ Flush cartridges, adjusting keypad at the menu mode.
Stop/↵ Stop current operation, confirmation keypad at the menu mode.

Menu/↩ Parameter setting.

5.5 Operation

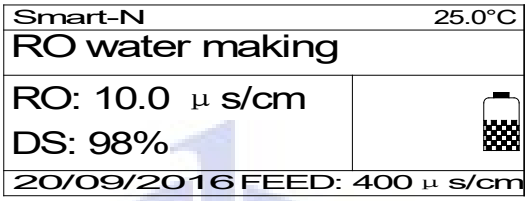
Turn on feed water supply. Ensure that all the pipe connecting parts have no leaking. Switch on the power supply at the back of the main unit.

After the main unit is powered on, LCD will display a welcome message, which is followed by the current state of the system. The system will remain in flushing status about 1 minute.

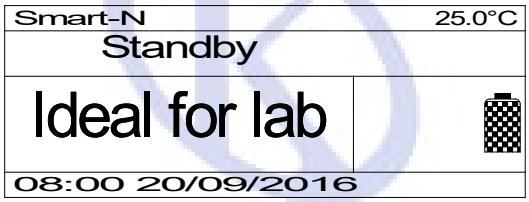


The lack of water warning will show in the right of display area when the pressure of feed water is too low or no feed water. The main unit will stop to standby status. The main unit will re-start to flush automatically when the water comes again.

When the flushing process of main unit is finished, the system will automatically enter the water producing state. The Smart-N will flush automatically RO membrane before and after producing RO water. The system also shows water conductivity and RO deionization rate.



When the storage tank of Smart-N system is full, the system will enter the standby mode automatically.



Press "Disp. / ▲" keypad you can take the pure water.

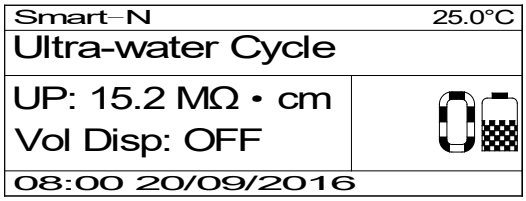
Ensure that the pure water at least 20% of the Smart-N water tank (water level 1).

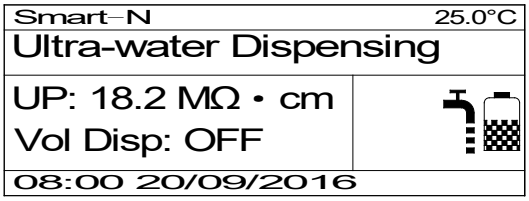
Press "Stop/↵" keypad to stopping take product water. The LCD displays the next system state.

Smart-N has manual flush function for RO membrane cartridge, press the "Flush / ▼" to flush RO membrane cartridge manually for 1 minute. At this time the LCD display of the main unit is the same as flushing mode from the beginning.

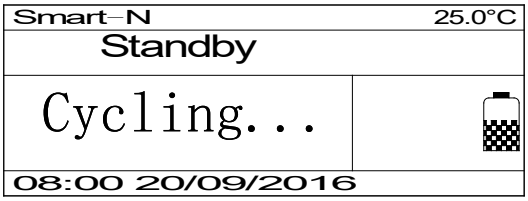
Press the "Stop / ↵"keypad to stop flushing operation. LCD will display the next current-status.

If the quality of current ultrapure water cannot meet the requirement of original setting (ie 16.0MΩ.cm), the system will automatically enter recycling mode to improve the water quality. And if the water quality reaches the set value, the main unit starts to produce ultra-pure water.





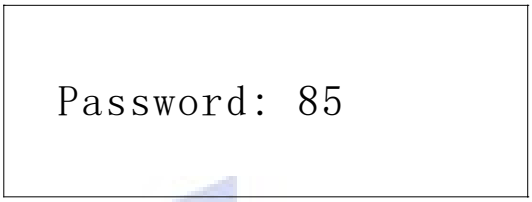
When the Smart-N system is in the standby state, the ultrapure water in the loop will automatically recycle for 5 minutes every 2 hours, which will guarantee the quality of ultrapure water to the setting requirement.



5.6 Parameters setting

Press "Menu" keypad to enter the menu, language selection, as shown below:

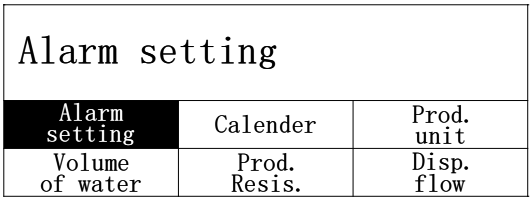
Press "Disp / ▲" or "Flush / ▼" keypad to select "ENGLISH". Press the "Stop /↵" keypad to confirm the setting and to the next level.



Press or hold down the "Disp. / ▲" or "Flush / ▼" keypad to enter the correct password. The default password is 85. Enter the password, press the "Stop / ↵" keypad to confirm the entry of next menu level. If the password input is error, the system will be directly reset.

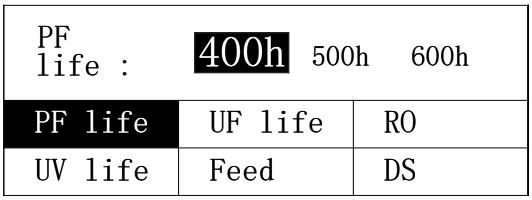
Press the "disp. / ▲" "Flush / ▼" keypad to select "Parameter setting". Press the "Stop / ↵" keypad to enter the parameter setting level

After entering the parameter setting menu, you can see the contents of the setting are: Alarm settings, Calendar, Product conductivity unit, Volume of water dispense.



5.6.1 Alarm Settings

After entering the parameter setting menu, press the "Disp. / ▲" or "Flush / ▼" keypad to select "Alarm setting". Press the "Stop / ↵" keypad to confirm the settings menu to enter the alarm category including various settings.



Alarm time setting for pretreatment failure

In this menu level the maintenance interval for the pre-treatment cartridge, it must be reset after exchanged, the manufacture setting is 400 hour, the user can press “Disp./▲， Flush/▼” keypad to select one of the 400,500,600hour according to the tap water quality. Press the “Stop/↵” keypad to confirms the setting and switches to the next menu level.

Select alarm time UV lamp failure

UV life : 4000h 6000h 8000h		
PF life	UF life	RO
UV life	Feed	DS

In this menu level the maintenance interval for the UV oxidator of main system must be reset after exchanging the UV lamp. the manufacture setting is 4000hour for UV lamp life time, the user can press "Disp./▲， Flush/▼" keypad to select one of the 4000,5000,6000,hour according to the user desire. Press the "Stop/↵" keypad to confirms the setting and switches to the next menu level.

Micro-filter failure time alarm options

UF life : 4000h 6000h 8000h		
PF life	UF life	RO
UV life	Feed	DS

In this menu level the maintenance interval for the Micro-filter Cartridge life time of main system must be reset after exchanging the cartridge. the manufacture setting is 4000hour for Micro-filter Cartridge life time, the user can press "Disp./▲， Flush/▼" keypad to select one of the 4000,5000,6000 hour according to the user de sire. Press the "Stop/↵" keypad to confirms the setting and switches to the next menu level.

Feed water quality alarm setting

Feed Water Alarm-H : 400 μs/cm		
PF life	UF life	RO
UV life	Feed	DS

The limit of the feed tap water conductivity can be adjusted by the user. If the adjusted limit will be overstepped it will decrease the life time of Pre-treatment cartridge, RO membrane and purification cartridge. the manufacture setting is 400us/cm, the user can press "Disp./▲， Flush/▼" keypad to adjusting according to the user desire. Press the "Stop/↵" keypad to confirms the setting and switches to the next menu level.

When setting the value, please refer to the actual water quality. Only to eliminate the alarm for feed water. If the feed water quality is poor, the overall performance and lifetime of each module will be affected.

Pure water quality alarm settings

RO Alarm-H : 20.0 μs/c		
PF life	UF life	RO
UV life	Feed	DS

The limit of the RO water conductivity can be adjusted by the user. if the adjusted limit will be overstepped it will decrease the life time of purification cartridge. the manufacture setting is 20us/cm, the user can press "Disp./▲， Flush/▼" keypad to adjusting according to the user desire. Press the "Stop/↵" keypad to confirms the setting and switches to the next menu level

If this value is set too large, then the performance and lifetime of the ultrapure water purification cartridge will be affected.

Alarm settings for reverse osmosis desalting rate

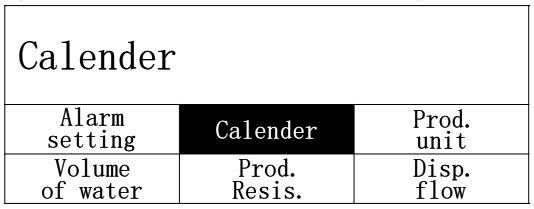
DS Alarm-L : 90 %		
PF life	UF life	RO
UV life	Feed	DS

The limit of the desalting rate of the RO membrane can be adjusted by the user. The display of the system shows the alarm message "Ds light" if the adjusted limit will be overstepped (manufacture's setting is 90%). press "Disp./▲， Flush/▼" keypad to increases or decreases the value, press the Stop/↵" keypad to confirm the setting and switches to the next menu level.

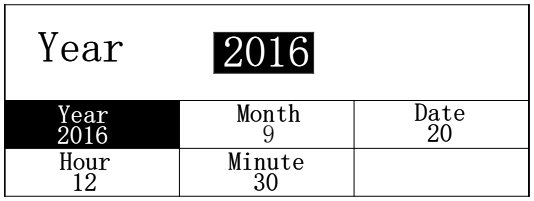
This value should not be set too low, otherwise the pure water quality will be affected. If the quality of inlet water is too poor, please set high value for higher pure water requirement. Value setting range: 50 to 99.

5.6.2 Calendar setting

After entering the parameter setting menu, press “Disp./▲”or “Flush/▼”keypad to select the "Calendar" function.

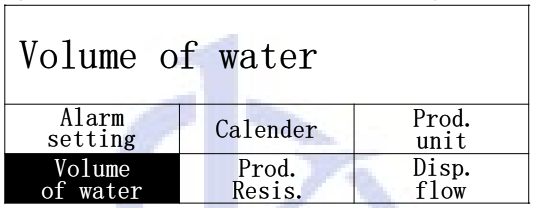


In this menu level the user wants to change the timer in maim system, you can be press the “Disp./▲， Flush/▼” keypad to set the correct date and time according to the mention of the display. Press the “Stop /↵” keypad to confirms the setting and switches to the next menu level.

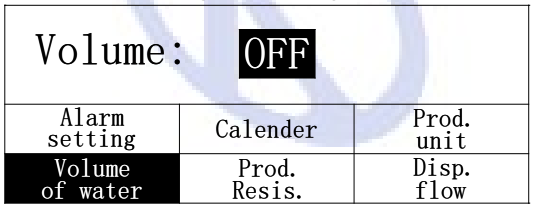


5.6.3 Volume of taking product water setting

After entering the parameter setting menu, press “Disp./▲” or “Flush/▼” keypad to select the "Volume of water" function.



Press "Stop / ↵" keypad to enter the volume of taking water setting interface.

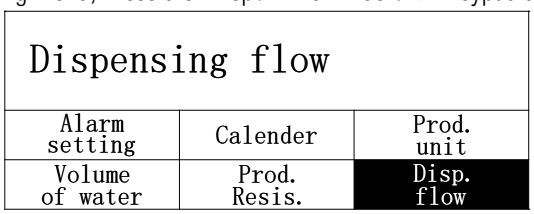


In this menu level the user can be adjusted fixed quantity of take water from 0.1L to 25L, or No limit(off) , the manufacture setting is No limit(OFF), the user can press “Disp./▲， Flush/▼” keypad to adjusting according to the user desire. Press the “Stop/↵” keypad to confirms the setting and switches to the next menu level

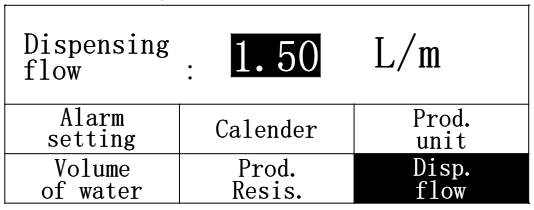
5.6.4 Dispensing flow setting

By setting this parameter, user can calibration the accuracy of fixed quantity of taking water such as 1L or 5L.

After entering the parameter setting menu, Press the “Disp./▲” or “Flush/▼” keypad to select the "Dispense flow” function.



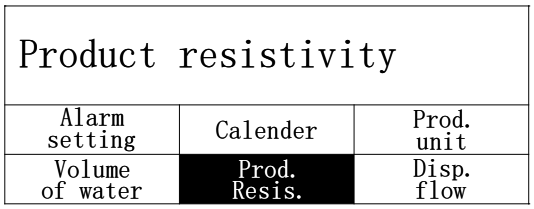
Press the “Stop/↵” keypad to confirms the setting and switches to the next menu level.



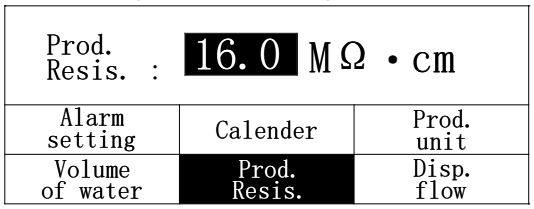
Note: Suggestion the user had batter to calibrating fixed quantity every half month.

5.6.5 Ultra-pure water quality setting

After entering the parameter setting menu according to this chapter, press “Disp./▲”or “Flush/▼”keypad to select the "Prod. Resis." function.



Press “Stop/↵”keypad to enter the water quality parameters setting interface.

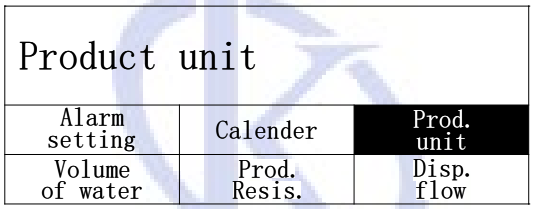


The limit of the resistivity of the ultra-pure water from purification cartridge can be adjusted by the user. the manufacture setting is 16.00MΩ.cm, if the resistivity of product water is lower than limit, the product water will be recycling in main system, the product water ‘s resistivity of user’ taken is higher than the limit. the user can press “Disp./▲， Flush/▼” keypad to adjusting according to the user desire. Press the “Stop/↵” keypad to confirms the setting and switches to the next menu level.

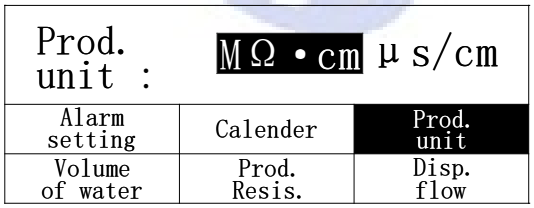
5.6.6 Unit selection

By setting this parameter, user can choose to the unit form of the ultrapure water, MΩ.cm or μS/cm.

After entering the parameter setting menu according to this chapter, press “Disp./▲” or “Flush/▼” keypad to select the "Prod. Unit." function.



Press "Stop / ↵" button to confirm the unit selection interface.



In this menu level the user can select the display unit of product water, the user can press “Disp./▲， Flush/▼” keypad to selecting one of “MΩ.cm” “or us/cm” according to the user desire. Press the “Stop/Enter” keypad to confirms the setting and switches to the next menu level.

Chapter 6 Maintenance

6.1 Routine maintenance

Maintenance of the ultra-pure water system is simple and convenient despite its integration of sophisticated equipment which combines water process, computer-control and precision instruments to monitor.

- ◆ Keep feed water going smoothly.
- ◆ Please stop main unit when feed water is cut off so that you can avoid large numbers of impurities in the water flowing into the apparatus, it will decrease the life time of pre-treatment cartridge.
- ◆ Constantly pay attention to water quality of the feed water. you had better stop the main unit immediately When feed water is of poor quality (yellow, high turbidity, conductivity than 400us/cm, with the smell). If necessary, you can purchase another enhanced pre-treatment. (Recommend that you can purchase TDS pen to measure water quality regularly)
- ◆ This main unit is controlled by computer and monitored by precision instruments, an equipment of high-precision, so if the local voltage is not very stable, please install one 500W manostat and with good ground connection.
- ◆ Keep both indoor environment and the instrument surface clean.
- ◆ If you need to stop main unit for a period, please keep in mind that firstly you should press “flush” keypad to flush the Smart-N system , then have the inlet valve closed and power off.
- ◆ Regularly disinfect and clean the water tank. If there are some special requirements, please install UV disinfector and air filter.

6.2 Periodic maintenance

Please refer to the following maintenance periodic table. Timely maintain this SMART-N system to enable it to keep in good condition.

Components	Operation	Time
Pre-filter	clean	Twice each year/ replace it if necessary when the amount of water is on the decline
Pre-treatment	replace	The amount of water is reduced or a mention of PF
reverse osmosis	replace	Pure-water conductivity dropped/make pure water rate decrease/ a mention of RO or DS
Purification cartridge	replace	Ultra-pure water index decreased or a mention of DI
MF/UF	replace	Product water dispense decrease，or a mention of UF
UV	replace	A mention of UV
Final filter	replace	Replaced at the same time with purification cartridge

6.3 Maintenance works and service works

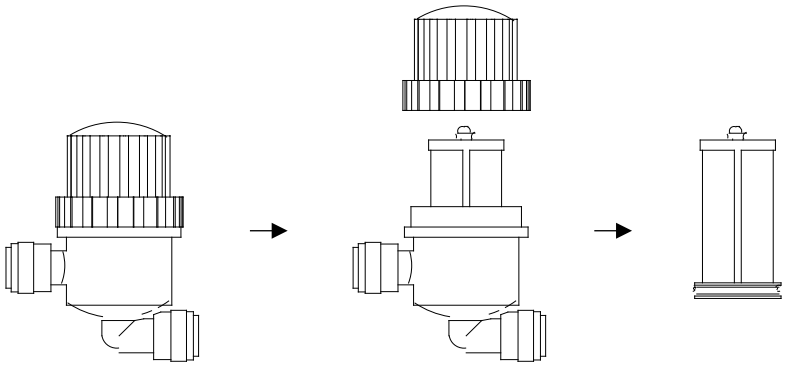
Be sure to enter the service setting by press” menu” to clear the consume time of cartridges used.

Pre-filter cleaning

Pre-filter cleaning period is about 180 days or clean it when the amount of feed water is obviously decreased.

Be sure to have turned off the feed water.

Uncover the lid of pre-filter. Take careful the seal O-ring.



Take the filter core out and washed with flowing pure water or brush. Pay attention to the seal o-ring which should be attached to the filter.

After cleaning, put the filter core to the original place and tighten the lid. Ensure that the core and seal o-ring in the lid.

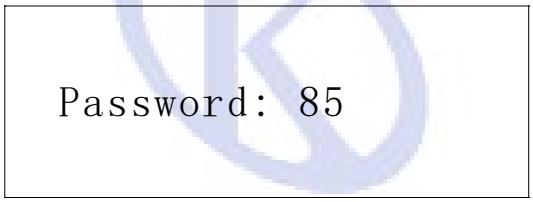
Once the filter core is corroded, please replace the pre-filter.

6.3.1 Into the maintenance settings

Make sure that the system is in standby or automatic making water state. If it is in flushing or dispense state, please press "Stop/↵"to stop it.

Press "Menu" keypad to enter the menu model, first of which is the language option.

Press "Disp./▲" or "Flush/▼" keypad to choose "ENGLISH", then press "Stop/↵" keypad to confirm and into the code input interface.

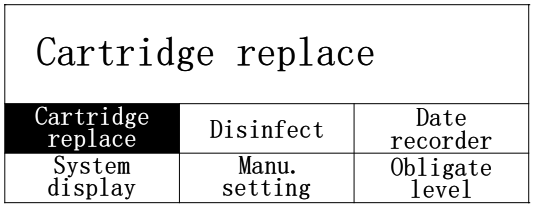


Press or hold down "Disp./▲" or "Flush/▼" keypad, and then input the correct password. The default password is 85, press "Stop/↵" to confirm to enter the next level of menu.

If the password is error, the system will restart.

Press "Disp./▲" or "Flush/▼" keypad to choose "Service setting". Then press "Stop/↵" keypad to confirm to enter the parameter setting menu.

When you enter the service setting menu, you can find the contents for each setting, which include cartridge replace, disinfection settings, data logging, machine condition and the factory setting.



6.3.2 Pre-treatment replacement

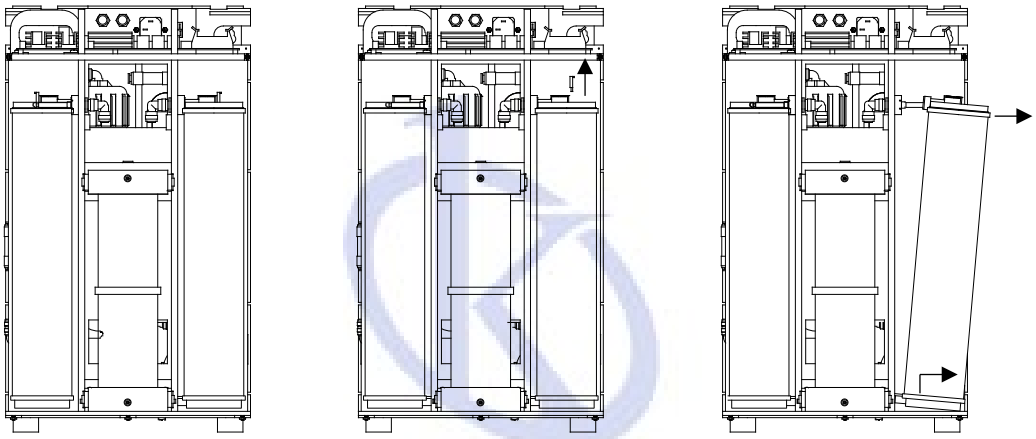
After entering maintenance settings, press “Disp./▲” or “Flush/▼” button to choose “Cartridge replace”, then press “Stop/↵” keypad to confirm to enter each setting in replacement of supplies.

Replace PF?		
PF	UF	DI
UV	RO	

Press “Disp./▲”or “Flush/▼” keypad to choose “PF”. Then press “Stop/↵” button to confirm, and LCD will display the confirmation screen.

PF Replaced?		
PF	UF	DI
UV	RO	

Remove the exhausted pre-treatment cartridge from the SMART-N.



We have completely removed the main unit shell so that it is easy for you to see clearly. In fact, during the installment you just need to remove the main unit side door and after that you can finish the replacement

Remove the right side door （front view）of the main unit. As for the operation procedure,

Pre-treatment cartridge is installed right in front of the host cavity and mounted on the connector of the water.

Pull out the lock which is on the stainless steel.

Gently pull out the upper part of the pre-treatment cartridge along the stainless steel rod of the port.

Get the dovetail at the bottom of the pre-treatment out from square hole.

Get the new pre-treatment cartridge and make sure the ordering No. is CR-SP101M.

Install the new pretreatment cartridge into the main unit.

Install side door.

Press the “Stop/↵”keypad to confirm it to been replaced.

Now since you have finished all the operation of pre-treatment replacement, you can press “Menu” keypad to return to the previous menu or continuously press “Menu” keypad to exit the maintenance settings so that the system will restart.

6.3.3 RO membrane replacement

After you enter the maintenance settings, press “Disp./▲” or “Flush/▼” keypad to choose “Cartridge replace”, then press “Stop/↵” button to confirm you have entered each settings of replacement of supplies menu.

Press “Disp./▲” or “Flush/▼” keypad to choose “RO”.

Replace RO?		
PF	UF	DI
UV	RO	

Press “Stop/↵”keypad to confirm, LCD will display the confirmation interface of consumable replacement.

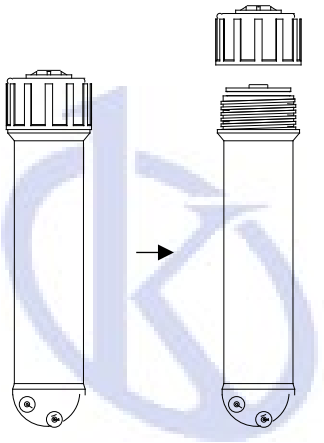
RO Replaced?		
PF	UF	DI
UV	RO	

Remove the left side door of the main unit (front view).

RO cartridge is installed at the back of the left chamber, which the ordering No is CR-SP201 or202.

Remove the connecting pipe from the RO cartridge. The upper single pipe is inlet pipe; the middle pipe at the bottom is for pure water, while the side one in lower position is for waste water discharge. We suggest you mark the pipe connector after RO cartridge to avoid confusing when you re-installed next time.

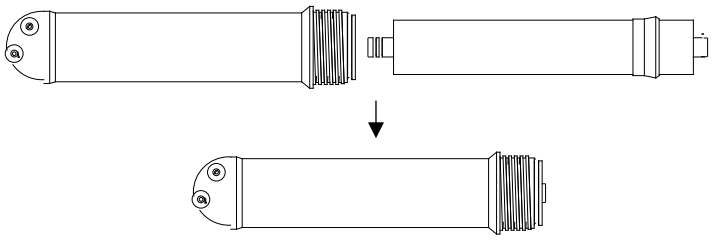
Take out the RO cartridge. unscrew the housing cover. A special wrench can be used to unscrew the lid. There is an o-ring in the upper crust. Please take care of the ring after unscrewing the RO cartridge.



A plier can be used to pull out the reverse osmosis which is exhausted. Grip the center of reverse osmosis and pull out with force.

Remove the new reverse osmosis membranes, please check the model, and unpack the package.

Push the RO membrane end with double rings into the membrane shell.



Screw lid and tighten. Confirm the seal ring is on the upper the upper shell.

Insert the tube into the corresponding connectors of the RO cartridge.

Install the RO module back on the rack of chamber.

Install the side door of the main unit.

Back to the control panel operation, press the "Stop / ↵" keypad to confirm the replacement.

Now you have completed the replacement of RO membrane. Press "Disp. / ▲" or "Flush / ▼" button to select the replacement of other cartridges. You can also press the "Menu" keypad to return to upper level of menu, or continuously click "Menu" Keypad to exit the maintenance setting, the system will restart.

The new reverse osmosis membrane will contain a protective solution, which will make the conductivity of pure water high. After the replacement is done, press the "Flush / ▼" button of the control panel to flush the reverse osmosis membrane. Repeat 10 to 15 times of flush.

6.3.4 purification cartridge replacement

Enter the maintenance setting interface, press the "Disp. / ▲" or "Flush / ▼" keypad to select "cartridge replacement". Press the "Stop / ↵" keypad to set.

Press "Disp. / ▲" or "Flush / ▼" button to select the "DI".

Replace DI?		
PF	UF	DI
UV	RO	

Press "Stop / ↵" button to confirm, LCD displays the replacement complete.

DI Replaced?		
PF	UF	DI
UV	RO	

Purification cartridge replacement

Remove the left side door of the main unit (front view). Please refer to replacement pretreatment cartridge to operate.

Purification cartridge is installed in the left chamber of the main unit.

Remove exhausted purification cartridge.

Take out the new purification cartridge, and make sure the order No. is CR-SP302M.

Install the purification cartridge into the main unit, Install the side door.

purification cartridge replacement(CR-SP303M)

Open the front door of the Smart-N system.

Open the front door, then you can see upper and lower latches inside the main unit. Take out of the latches.

Remove the exhausted ultra-purification cartridge from the main unit.

Get the new purification cartridge, and make sure the order number is CR-SP303M.

Install the new purification cartridge into the main unit.

Install the front door.

GO back to the control panel, press the "Stop / ↵" keypad to confirm the replacement process is done.

After finishing the purification cartridges replacement, you can press "Disp. / ▲" or "Flush / ▼" button the selection other components replacement, or press "Menu" button to return to the upper level of menu. or you can continuously press "Menu" keypad to exit the maintenance setting, the system will reboot.

Newly installed ultra-pure purification cartridges and cartridges need to be washed for 2 to 4hours to reach the best condition. When the new cartridge is installed, the ultra-pure water resistivity will gradually be increased. Once you reach the setting value (manufacture setting is 16.0MΩ.cm), the ultra-pure water can be produced. Then you can press the "Stop / ↵" keypad to stop the resin flushing cycle and the system is into the standby mode.

When the new cartridge is in the flushing cycle, Place a water container under the ultra pure water outlets, you should be to view the system LCD displays. When the quality of water is going to meet the pre-setting value hold the container in right position to avoid damage to other equipments.

6.3.5 UV lamp replacement

Enter the maintenance setting, press the "disp. / ▲" or "Flush / ▼" keypad to select consumable replacement. Press the "Stop / ↵" keypad to set.

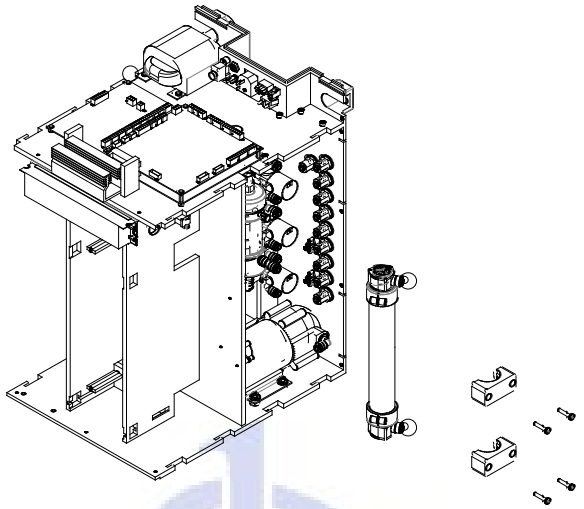
Press "Disp. / ▲" or "Flush / ▼" keypad to select "UV".

Replace UV?		
PF	UF	DI
UV	RO	

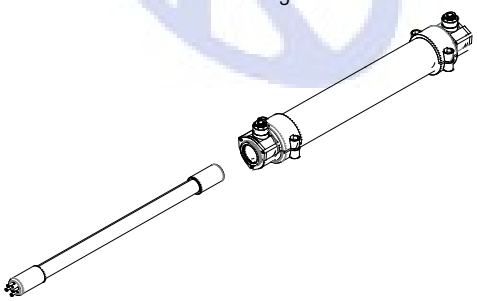
Press "Stop / ↵" button to confirm, LCD displays the replacement complete.

UV Replaced?		
PF	UF	DI
UV	RO	

Remove the right side door of the main unit (front view).
UV lamps are installed in the right chamber of the Smart-N system, mounted on the UV lamp holder.
Unplug the power cord of the UV lamp.
Remove the exhausted UV lamp.



Pull out the inlet/outlet water tube of the UV lamp, mark the connector to avoid mistakes in the next installation process.
Unscrew the fixer of the UV lamp.
Remove the UV lamp hoop.
Remove the UV light from UV lamp holder out..
Spin out the exhausted UV lamp from the stainless steel housing.



Prepare the new UV light. Make sure that the new UV lamp in good condition without damage.
Insert the new UV light into the stainless-steel shell and tighten.
Install the UV lamp on the holder and install and tighten the fixer.
Insert the inlet/outlet water pipe into the corresponding connector.
Installed side door.
GO back to the control panel, press the "Stop / ↵" keypad to confirm the replacement process is done.
After finishing the UV lamp replacement, you can press "Disp. / ▲" or "Flush / ▼" keypad the selection other components replacement, or press "Menu" button to return to the upper level of menu. Or you can continuously press "Menu" keypad to exit the maintenance setting, the system will restart.

6.3.6 Micro/Ultra-filter replacement

Enter the maintenance setting, press the "Disp. / ▲" or "Flush / ▼" keypad to select consumable replacement. Press the "Stop / ↵" keypad to set.
Press "Disp. / ▲" or "Flush / ▼" keypad to select "MF/UF".

Replace UF?		
PF	UF	DI
UV	RO	

Press "Stop / ↵" keypad to confirm, LCD displays the replacement complete.

UF Replaced?		
PF	UF	DI
UV	RO	

Remove the right-side door of the main unit (front view).

Micro-filter installed in the right chamber of the Smart-N system. The MF/UF is bolted to the rack of the main unit.

Remove the connection pipe from the Micro/Ultra-filter. You can mark the tube to prevent confusion in the next installation.

Take the new Micro/Ultra-filter cartridge, insert the tube into the corresponding connector.

Install the Micro/ultra-filter back to rack of the main unit.

Install the side door.

GO back to the control panel, press the "Stop / ↵" keypad to confirm the replacement process is done.

After finishing the Micro/Ultra-filter cartridges replacement, you can press "Disp. / ▲" or "Flush / ▼" keypad the selection other components replacement, or press "Menu" button to return to the upper level of menu. Or you can continuously press "Menu" keypad to exit the maintenance setting, the system will restart.

Newly installed membrane surface has protective liquid, press "Disp. / ▲" keypad, the system is in water producing state, drainage the pure water. After half an hour, press "Stop / ↵" keypad to stop flushing of Micro/Ultra-filter, the system is in standby mode.

6.3.7 How to re-installation the cartridges

The system will leak water when the cartridge installation has some mistakes. The cartridges re-installation is needed. Refer to the following content.

Enter the maintenance setting, press the "Disp. / ▲" or "Flush / ▼" keypad to select "consumable replacement". Press the "Stop / ↵" keypad to set.

Now you can remove the cartridge which has leak water and re-install them according to the instructions in previous chapter.

Press "Menu" keypad continuously to exit the maintenance setting, the system will restart.

In the consumable reset process, you do not need to choose any type of the cartridges after entering the consumable replacement interface. Do not press “Stop/↵” keypad, otherwise it will cause the cartridge replace data recording errors.

6.4 System status check

There is an item for system status check in maintenance setting, which allows you to understand the current system status.

Enter the maintenance settings, press the "Disp. / ▲" or "Flush / ▼" button to select the "machine state".

System display		
Cartridge replace	Disinfect	Date recorder
System display	Manu. setting	Obligate level

Press "Stop / ↵" keypad to confirm, LCD displays current working state.

FEED: 420 μs/cm	T: 25.4℃
RO: 15 μs/cm	PF: 036h
DS: 96.5%	UV: 0130h
UP: 18.2MΩ.cm	UF: 0130h

Description:

FEED: the current feed water conductivity.

RO: pure water conductivity.

DS: Desalination rate for reverse osmosis cartridge.

T: the current system temperature.

PF: used time for pretreatment cartridge.

UV: used time for ultraviolet lamps.

UF: used time for Ultra-filter cartridge.

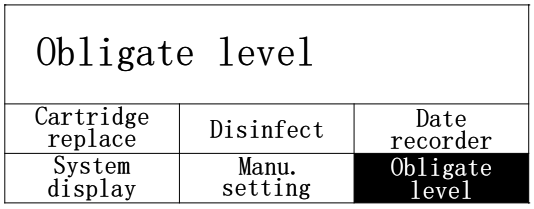
UP: resistivity of ultra-pure water

Press "Menu" keypad to return to the previous menu, or press "Menu" keypad continuously to exit the maintenance setting, the system reboots.

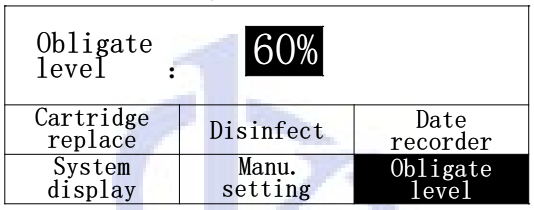
6.5 Obligate level setting

User can adjust the level of main unit to restart making RO water, according to the demand.

After entering maintenance settings, press “Disp./▲” or “Flush/▼” button to choose “Obligate level”.



Press “Stop/↵” keypad to confirm to enter each setting parameter.

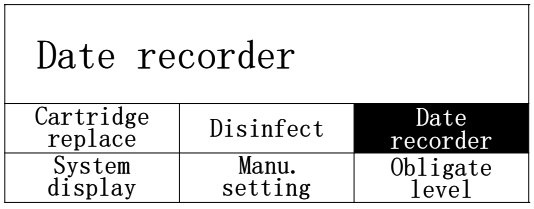


Press "Menu" keypad to return to the previous menu, or press "Menu" keypad continuously to exit the maintenance setting, the system reboots.

6.6 Data record of system

SMART-N system is equipped with a large capacity data storage unit, it will record time, temperature, quality, each water producing volume, the total water producing volume, the time, the type and the replacement frequency of cartridges.

Enter the maintenance settings. Press the "Disp. / ▲" or "Flush / ▼" keypad to select "Data Recorder".



Press "Stop / ↵" keypad to confirm, select the record type.

Water data Record

Enter data record menu, press "Disp. / ▲" or "Flush / ▼" keypad to select water records.

Press "Stop / ↵" button to confirm, LCD displays each record for water producing.

<00001>	11:00	20/09/2016
25.2℃	390μS/cm	15.0μS/cm
18.2MΩ.cm	12.4L	00012.4L
<00002>	12:00	21/09/2016
25.0℃	400μS/cm	15.2μS/cm
18.2MΩ.cm	15.6L	00028.0L

Data Description:

The first line from left to right: product water dispenses times, time and date.

Second line from left to right: water temperature, feed water conductivity and pure water conductivity.

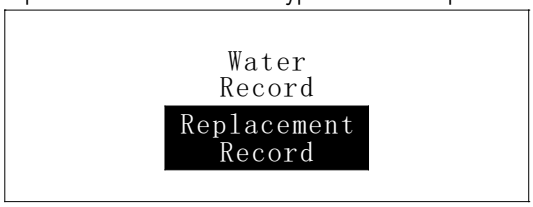
The third line from left to right: resistivity of ultra-pure water, volume of dispensed and total volume of dispensed.

Press "Disp. / ▲" or "Flush / ▼" keypad to scroll the screen to check other time of the water data record.

Press "Menu" keypad to return to the previous menu, or press "Menu" keypad continuously to exit the maintenance setting, the system restart.

Cartridges replacement records

Enter data record menu, press "Disp. / ▲" or "Flush / ▼" keypad to select replacement records.



Press "Stop / ↵" button to confirm, LCD displays each record for water producing.

10:20 20/09/2016	PF	02
11:00 20/09/2016	RO	01
11:20 20/09/2016	DI	04
11:50 20/09/2016	UF	01

Data Description:

From left to right: replacement time, cartridge type, cumulative number of replacement times.

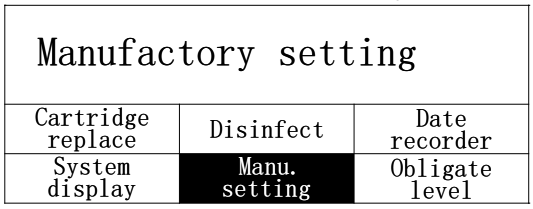
Press "Disp. / ▲" or "Flush / ▼" keypad to scroll to see other time for the consumables replacement records.

Press "Menu" keypad to return to the previous menu, or press "Menu" keypad continuously to exit the maintenance setting, the system restart.

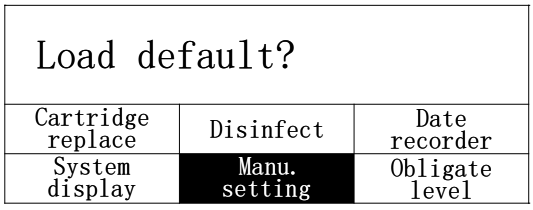
6.7 Restore factory settings

Various parameter settings has been changed by users. When you need to return to the default settings, you can choose this item.

Enter the maintenance settings. Press the "Disp. / ▲" or "Flush / ▼" keypad to select "Manu. setting".



Press “Stop / ↵” keypad to confirm.



Press the "Stop / ↵" keypad to confirm, the system restore the manufactory settings of the parameter values.

Press "Menu" keypad to return to the previous menu, or press "Menu" keypad continuously to exit the maintenance setting, the system reboots.

When the restart of system is complete, each parameter value is automatically set back to manufactory setting. Manufactory settings for all parameters are as follows:

Pretreatment cartridge alarm time: 400h
UV lamp alarm time: 4000h
Micro-filter cartridge alarm time: 6000h
Feed water alarm conductivity: 400μS/cm
Conductivity of pure water alarm: 20.0μS/cm
Reverse osmosis desalination rate alarm: 90%
Resistivity 0f ultrapure-water is 16.0 MΩ.cm
The display unit of is MΩ.cm
Volume of dispense setting: OFF
Obligate level setting: 60%

6.8 Main unit disinfection

Because bacteria are everywhere, there are a mount of bacteria in the pipeline, although UV sterilizer and micro-filtration are installed. It is necessary to disinfect water purification system.

The period of disinfection of main unit is about 3-6 months. You had to disinfection the main unit when the main unit has suspended for more than 6 months.

The system has a function to remind users to do disinfection each month intervals. you can press the Stop/↵"keypad to enter disinfection process, or press Menu" to cancel when the disinfection reminders display on the screen after the system is power on.

Chlorine disinfectant tablet is used as disinfectant. And main unit at standby status, the storage tank is full of pure water. Put one Chlorine disinfectant tablet in to the storage.

Please enter the disinfection settings. the specific operation is as follows:

Enter the maintenance of the settings. Press the "Displays / ▲" or "Flush / ▼" keypad to select "Disin. setting".

Disinfect		
Cartridge replace	Disinfect	Date recorder
System display	Manu. setting	Obligate level

Press "Stop / ↵" keypad to confirm and enter the next step for sterilization confirmation.

Disinfector Add?		
Cartridge replace	Disinfect	Date recorder
System display	Manu. setting	Obligate level

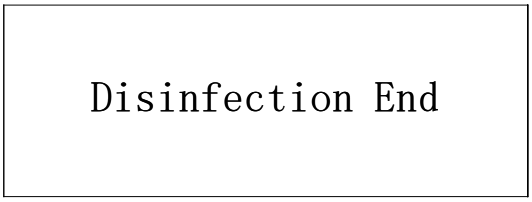
Press "Stop / ↵" keypad to confirm and enter the next step.

Disinfection?

As the disinfection go on, the main system will first make pure water to fill up the water tank, then carry on disinfection cycling, soaking, draining water, making water and so on.

Disinfecting 1/10 20% SAN.CYCLE: 405 min

Press "Stop / ↵" keypad, when the main system disinfection end, the main system will to standby. The disinfection cannot be stopped even if turn off the power supply.



Press "Stop / ↵" keypad to confirm, the system restart.
After the system restarts, press the "Disp. / ▲" keypad to flush the remaining disinfectant in the end tube for 10-15 minutes.

Chapter 7 Troubleshooting

7.1 No display

Description	Solution
No power supply for power outlet	Confirm power outlet is normal
Electrical outlet loose	Change electrical outlet
System power cord is not properly installed	Make sure the power cord is plugged into the electrical outlet of main unit
system power is turned off	Turn on the power switch on the back of the main unit
Power cord is damaged	Change the power cord
Fuse burned	Change fuse
Internal component failure	Contact Technical service

7.2 Making RO water is too low

Description	Solution
No feed water supply, warning for water shut off	confirm the patency of external water supply
Pre-filter blocked, warning for no water	Rinse the filter and replace it when necessary
Feed water pressure is too low, indicating no water warning	Needs another pressure pump
water supply connection error, indicating no water warning	Make sure that feed water pipe connecting to the FEED connector of the main unit.
Pretreatment blocked	Replace the pretreatment module
There are impurities on the RO surface	Press “Flush/▼” button to flush RO
RO blocked	Replace the RO module
Pure water outlet connection error	Verify that the RO OUT of main unit connected with RO IN of water tank
Water temperature is too low	Add the preheat system
Internal component failure	Contact Technical service

7.3 The pure water conductivity of SMART-N is too high

Description	solution
Feed water conductivity is high	Choose RO-2 module
RO exhausted, showing RO or DS alarm	Replace the RO membrane
New reverse osmosis membrane with remaining protection liquid.	Press “Flush/▼” button to rinse the membrane
Internal component failure	Contact Technical service

7.4 Ultra-pure water resistivity is too low

Description	Solution
Purification cartridge is exhausted	Replace the Purification cartridge
The unit display conductivity value	Switch the unit mode to resistivity
Purification cartridge installation error	Make sure the purification cartridge installation OK.
Disinfectant is not fully discharged after disinfection	Discharge amount of the ultra-pure water
Internal component failure	Contact Technical service

7.5 The flow rate of ultra-pure water is too low

Description	Solution
System is in recycling mode	Wait for the producing water reaching preset quality
Water tank level is less than 20%	Wait for pure water level increase in water tank
Ultra-pure water resistivity is too low	Adjust the ultra-pure water quality to the requirement
Ultra-pure water resistivity value is setting too high	Adjust the ultra-pure water quality to the requirement
Supply pipe connection error	Confirm the RO OUT of water tank connecting to the RO IN of main unit
Internal component failure	Contact Technical service

Chapter 8 Order information

8.1 Consumable

Description	specification	Order No.	Remark
Pre-filter	2'tube connector	CR-SP109	
Pretreatment cartridge	10um/5um PP and active carbon	CR-SP101M	
RO membrane	100G	CR-SP202	
Purification cartridge		CR-SP302M	
Purification cartridge		CR-SP303M	
Air filter		CR-SP412	
Micro-filter		CR-SP502B	
biofilter		CR-SP503C	
UV sterilizer lamp	254/185nm	CR-SP431	
Final filter		CR-SP504C	
Disinfectant tablet		CR-SP854	

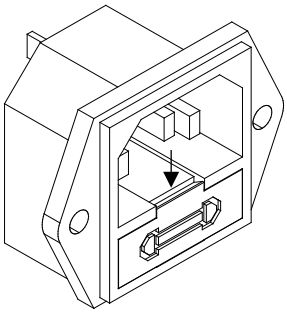
8.2 Option parts

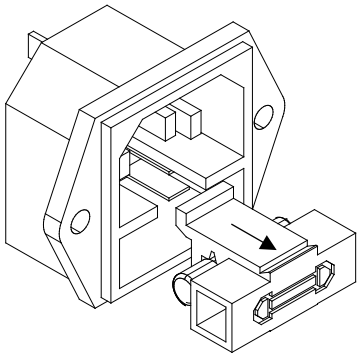
Description	specification	Order No.	Remark
Enhanced pretreatment device	Pretreatment cartridges	CR-SP102C	
Pretreatment filter	2sets 20"PP，AC,SR	CR-SP107C	
Pressure reductor	5KG	CR-SP829	
Inlet valve subassembly	4" T-way with 2 "ball valve	CR-SP831	
Data transfer software	Smart-N	CR-SP840	
Sterilizer for water tank	254nm	CR-SP426	For water tank
Storage tank	60L	CR–SP410C	

Chapter 9 Appendix

Appendix 1 Fuse replacement

The fuse used by the system is 1A/250V, which is installed in the power outlet at the back of the main unit.
Pull the power cord from the external power outlet.
Unplug the power cord from the main unit. You can see a fuse holder below the power socket.
Use a screwdriver to pull the fuse holder from socket.

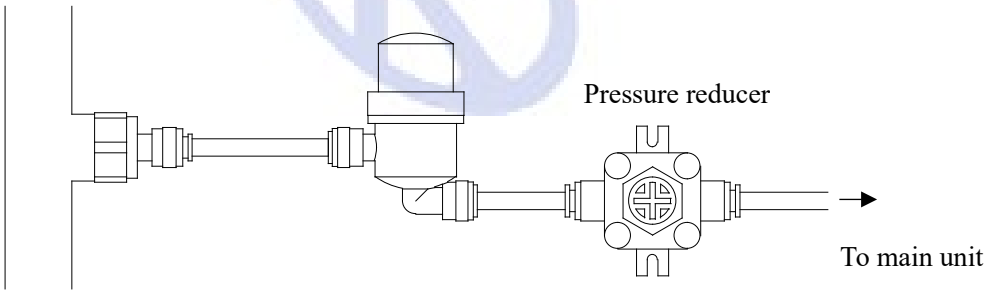




Take out the used fuse from the fuse holder, install new one into holder and push to the end.
Push the fuse holder to the square hole which lies in the lower part of power socket.
Fuse replacement is complete, plug the power cord and connect to an external power supply.

Appendix 2 pressure reductor installation

The feed water pressure for the system is normally 0.4MPA. If the pressure exceeds this value, a pressure reductor needs to be installed after the pre-filter.



Please install the pressure reductor according to the water flow direction, do not install it in the wrong direction, otherwise it will not work normally.

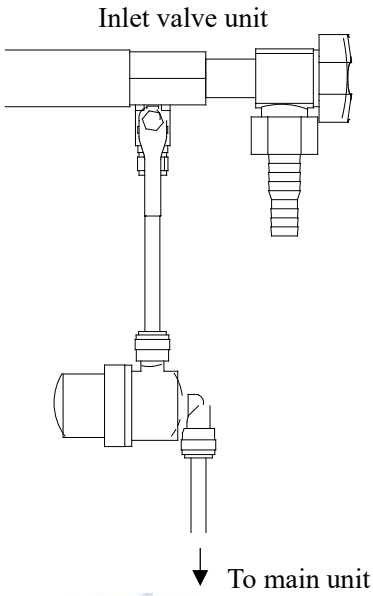
The pressure reductor is adjustable, you can use tools to rotate the cross slots to change the feed water pressure relief. Please connect a pressure gauge to the outlet and block the following pipe when you adjust the pressure. Then you need to regulate slowly in accordance with the pressure gauge.

Do not rotate the regulator when you do not have any water pressure test instrument.

Appendix 3 inlet valve unit installation

Some of the laboratories have no threaded tap. The fast connection can not be used to connect to an external water supply pipe. The inlet valve components can be optional alternative, which is installed in the middle of external pipe.

Inlet valve subassembly is usually installed on the outside of the tap.



Inlet valve subassembly includes a T-way and a ball valve.

Turn off the external tap water supply valve.

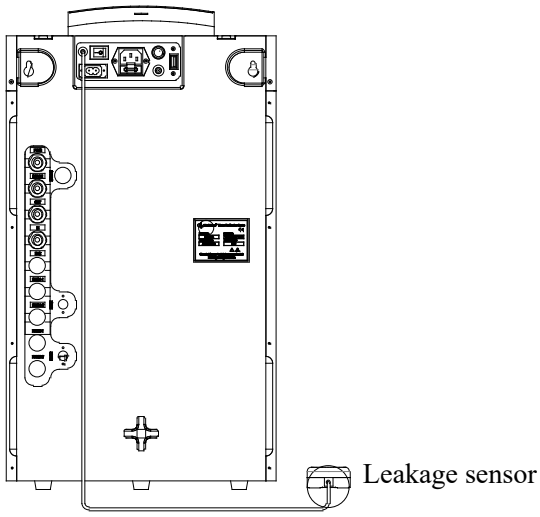
Remove the tap from water supply pipe.

Take T-way which with teflon seal one end links to external water supply pipes, the second end to the tap and the third end to the ball valve with teflon seal.

Take the pre-filter connect to the ball valve.

Install other components in accordance with the manual.

Appendix 4 Leakage protection sensor installation



Get the cable one end connect to hole at the back of main unit, the other end to the Leakage protection sensor, Put the leakage protection sensor on the table near the main unit.