E-Duo Series
User Manual

mirae ST
Scientific Technology

E-Duo Series
User Manual

Contents

01/ INTRODUCTION

Configuration

E-Duo Series consists of Main System,M-POUs(dispensers) and ResTank
※ It can be vary depending on models.

M-POU Ⅰ
(Type Ⅰ)

M-POU Ⅱ
(Type Ⅱ, only for E-Duo12 series)

Dispensing button

POU Filter
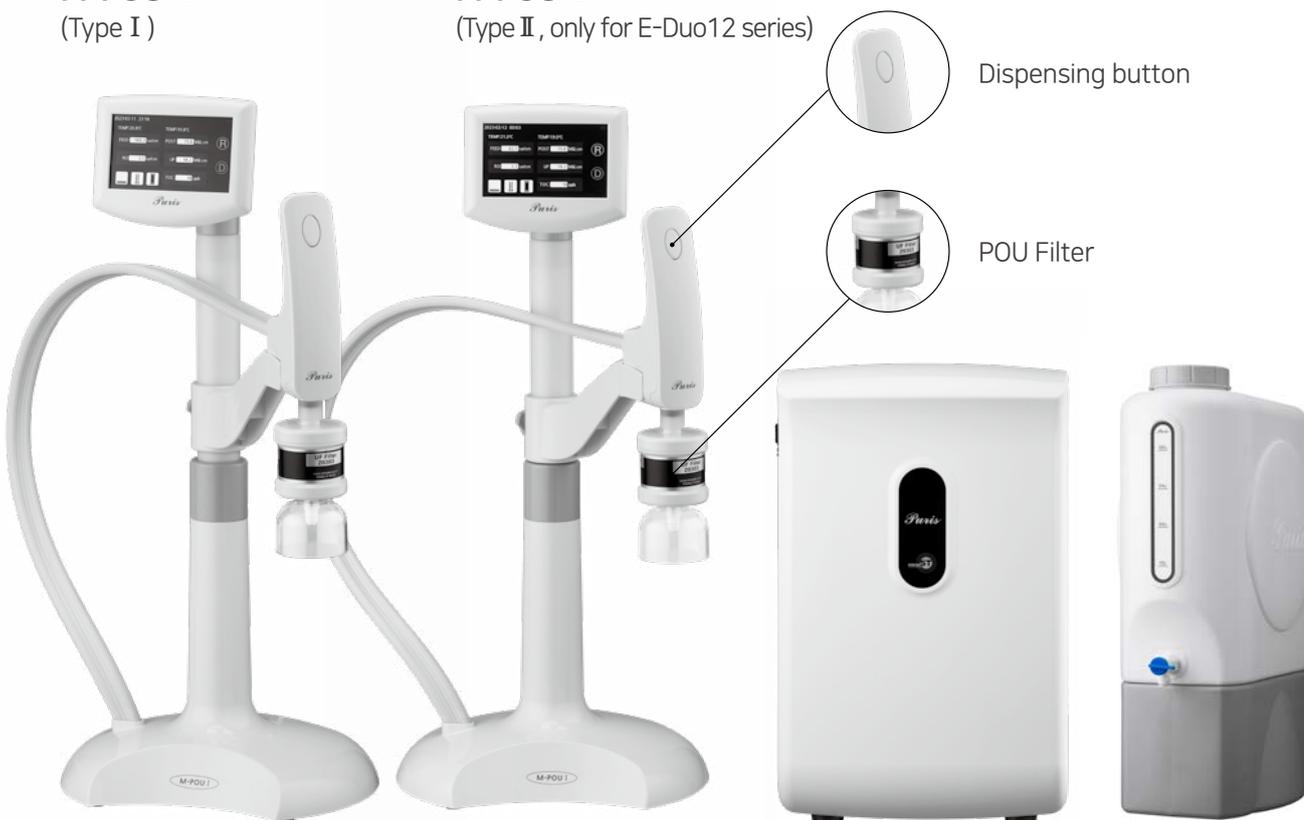
Model : E-Duo12 VFT

Main System

ResTank

01/ INTRODUCTION

Reservoirs

	Item No.	Dimension
ResTank 35L	30735	W270 x D500 x H730mm
ResTank 75L	30775	W315 x D580 x H810mm

Consumables

Filters	Item No.	사이즈
Duo-MA Pack	27101	Removes large particles and free chlorine from tap water.
Duo-RO Membrane	27102	Remove large contaminants.
Duo-MB Pack	27202	Remove trace levels of organics
Duo-PI Pack	27303	Removes trace levels of ions from ultrapure water.
Duo-UV Lamp(185+254nm)	27301	The UV 185 nm Lamp kills bacteria and reduces the level of organic molecules in the water.
POU Filters		It is attached to the Point of Delivery outlet. It provides additional quality and insurance that trace contaminants related to specific applications are removed just before ultrapure water is delivered.

※ E-Duo Series provides below POU Filters.

Duo-UF Filter	27304	Pyrogen-free water for removing of pyrogens(endotoxin), Rnase, Dnases.
Duo-Metal Filter	27305	Removes specific heavy metals and micro-particles.
Final filter I	20304	Filters for bacteria-free and particulate-free water
Final filter II (M-POU II)	27206	

01/ INTRODUCTION

Specifications

			E-Duo13 UV	E-Duo13 VF	E-Duo12 VF	E-Duo12 VFT
Flow Rate (up to)	Type I		2.0L/min	2.0L/min	2.0L/min	2.0L/min
	Type II		-	-	2.0L/min	2.0L/min
	Type III		22L/hr	22L/hr	22L/hr	22L/hr
Product Quality	Resistivity	Type I	18.2MΩ.cm	18.2MΩ.cm	18.2MΩ.cm	18.2MΩ.cm
		Type II	-	-	5-15MΩ.cm	5-15MΩ.cm
	Conductivity	Type III	1-20μs	1-20μs	1-20μs	1-20μs
	TOC	Type I	<2ppb	<2ppb	<2ppb	<2ppb
		Type II	-	-	<30ppb	<30ppb
	Particles (0.2μm)	Type I	<1EU/mL	<1EU/mL	<1EU/mL	<1EU/mL
		Type II	-	-	<1EU/mL	<1EU/mL
	Bacteria	Type I	<0.01CFU/mL	<0.01CFU/mL	<0.01CFU/mL	<0.01CFU/mL
		Type II		-	<0.01CFU/mL	<0.01CFU/mL
	*Endotoxin	Type I	-	<0.001EU/mL	<0.001EU/mL	<0.001EU/mL
		Type II	-	-	<0.001EU/mL	<0.001EU/mL
	*Rnase	Type I	-	<1pg/mL	<1pg/mL	<1pg/mL
		Type II	-	-	<1pg/mL	<1pg/mL
	*Dnase	Type I	-	<5pg/mL	<5pg/mL	<5pg/mL
		Type II	-	-	<5pg/mL	<5pg/mL

* With Duo-UF Filter

01/ INTRODUCTION

Requirements of feed water

Feed water resource	Potable tap water
Conductivity	High conductivity feedwaters may lower purification filter life and raise Type III water conductivity
Hardness	<350 ppm as $CaCO_3$
Free Chlorine	<0.05 ppm Cl_2
Silica	<30 ppm SiO_2
Carbon Dioxide(CO_2)	<30 ppm
Fouling Index	<10
TOC	<2 ppm
pH	5-8
Temperature	4 - 40 °C
Surrounding	Clean Laboratory environment

02/ INSTALLATION

Precautions before installation

▶ Power Supply
- Plug in the power cord correctly.
- Check if the power supply is correct.
- Careless opening or disconnection of the part connected to the main board may cause program errors or malfunctions.

▶ Location
- The device should be placed on a table in the laboratory or on a well-leveled surface.
- A floor without a table or a dirty place with dust/dirt may cause device operation error, so be sure to install it on a table.

▶ General Precautions
- Keep the device away from alcohol or flammable liquids.
- If flammable substances encounter any of internal electrical parts, it may result in electric shock or fire.
- Do not place any objects on top of the device. Main components such as the main board are on top of the device.
- Install the device and the water tank away from direct sunlight, as it can cause microbial growth.
- Cold winters or hot summers have an absolute effect on the filter and PCB, so it must be installed at a suitable room temperature.

▶ Preparing for installation
- After removing the main system body from the box, check the packaged contents.
- Place and use it in a safe place.

02/ INSTALLATION

Components for installation

|	E-Duo13 UV	E-Duo13 VF	E-Duo12 VF	E-Duo12 VFT
Duo-MA Pack	O	O	O	O
Duo-RO Membrane,2ea	Installed inside			
Duo-MB Pack	O	O	O	O
Duo-UV Lamp(185+254nm)	Installed inside			
Duo-PI Pack	O	O	O	O
Final filter I	O	-	-	-
Final filter II (M-POU II)	-	-	O	O
Duo-UF Filter	-	O	O	O
M-POU I	O	O	O	O
M-POU II	-	-	O	O
M-POU III	Option	Option	Option	Option
ResTank(35L, 75L)	35L or 75L with level sensor, tank cork			
Installation Kit	Power cable, Tubing, User manual			

02/ INSTALLATION

Installing the Main system

- Place the device where it will be installed and then install it in the following order
- The installation location must be a place where water intake and drainage are possible.
- For smooth supply of entering water, this system should be located next to or below a water tank.

  - To connect the tube to the side of the device, first remove the leak-proof plug before connecting
 - To remove the plug, press the collector with your hand and pull the plug out.

Main System


LEVEL SENSOR	M-POU Ⅰ M-POU Ⅱ

Power Supply   Spare fuse   Power Code

Connecting to the ResTank

Dispenser cable
(Connecting to each dispenser)

02/ INSTALLATION

M-POU

Cable
(Conneting to the main system)

USB Port

ResTank

Level sensor
(Connecting to the main system)
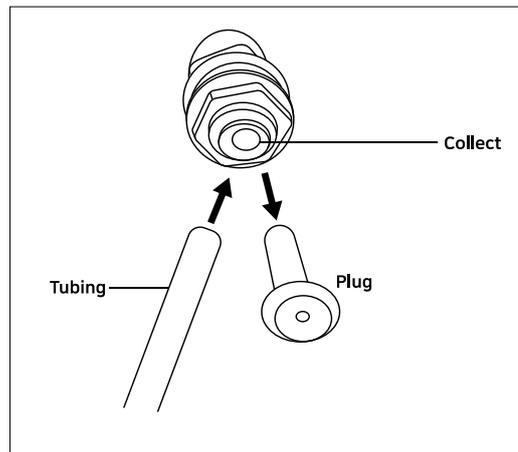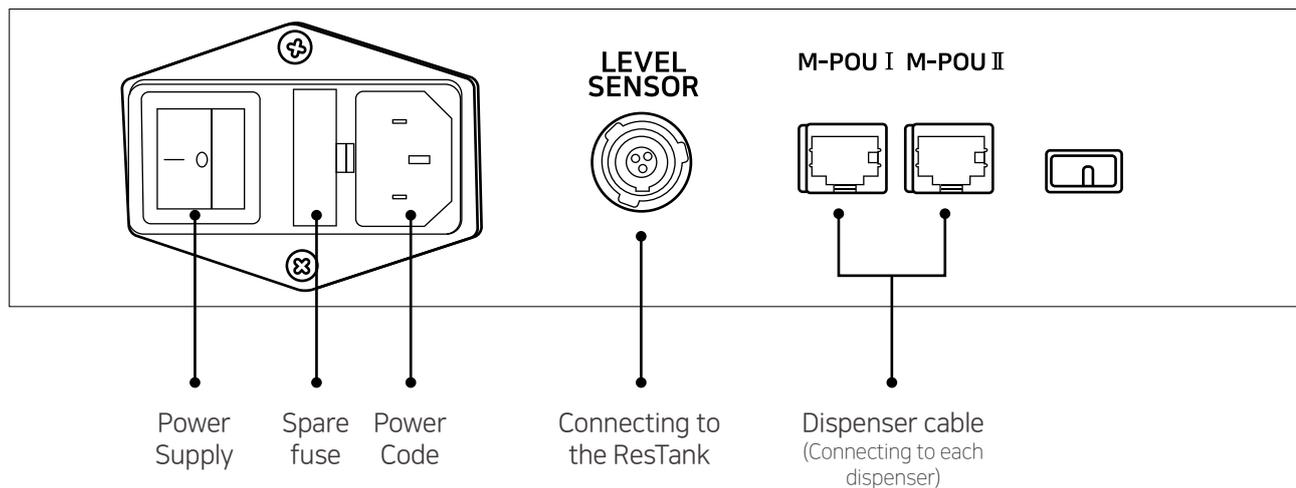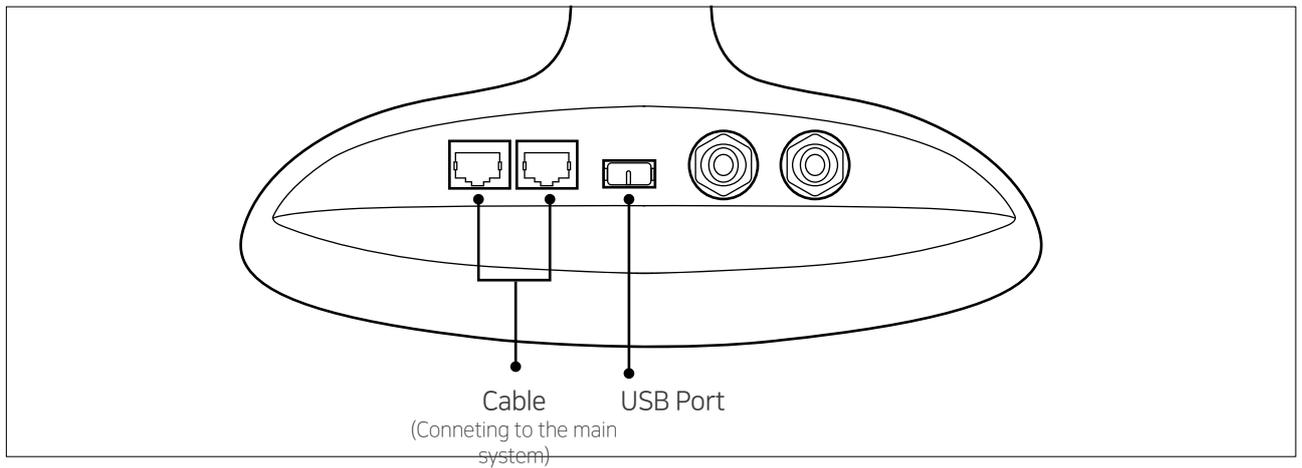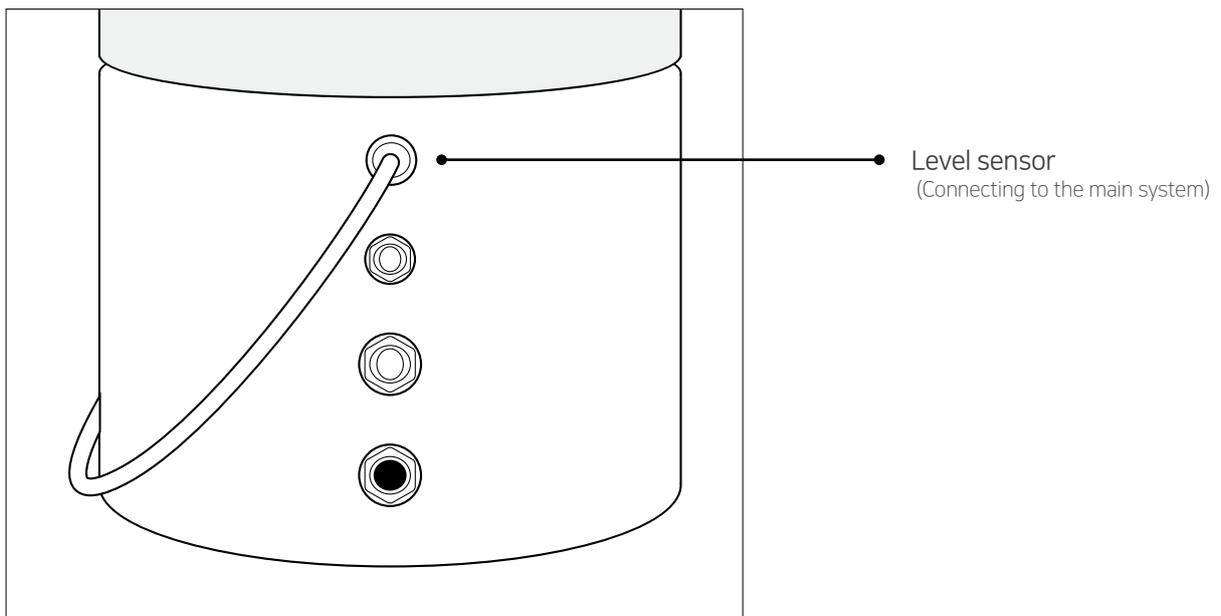
02/ INSTALLATION

Tubing Connection(E-Duo 13 UV,VF)

FEED, DRAIN

Main System

M-POU I (IN)
M-POU II (OUT)
M-POU II, III (IN)
M-POU II, III (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

M-POU I

Main System

M-POU I (IN)
M-POU II (OUT)
M-POU II, III (IN)
M-POU II, III (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

M-POU III

Main System

M-POU I (IN)
M-POU II (OUT)
M-POU II, III (IN)
M-POU II, III (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

ResTank

Main System

M-POU I (IN)
M-POU II (OUT)
M-POU II, III (IN)
M-POU II, III (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)
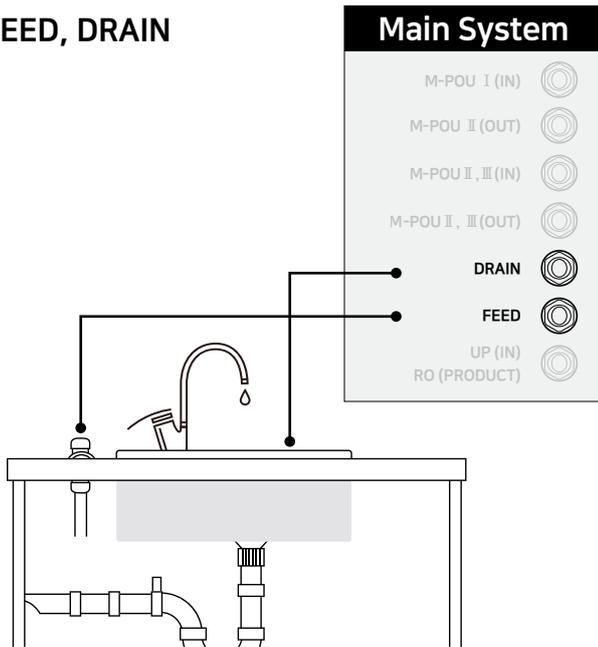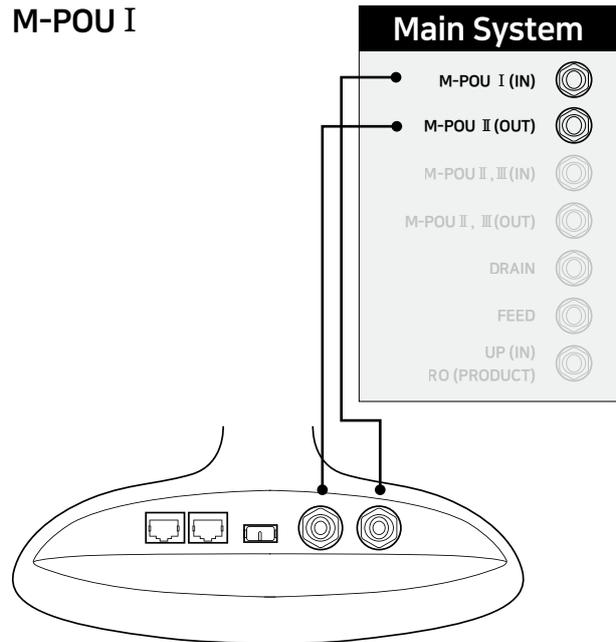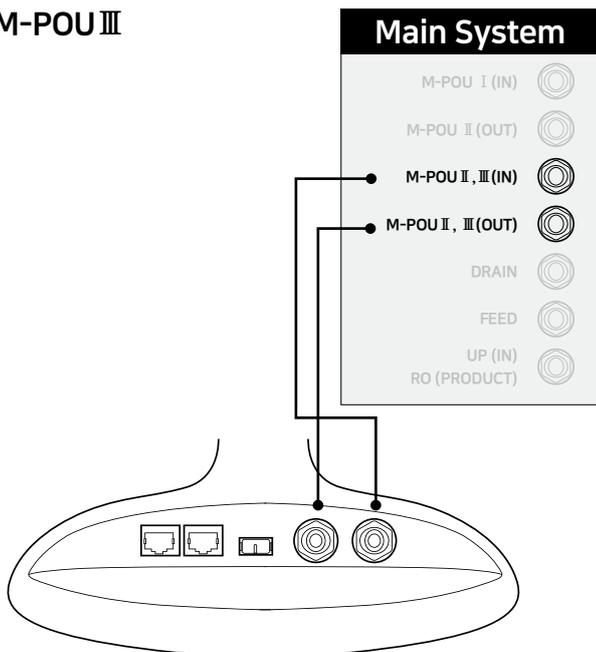
No Connection
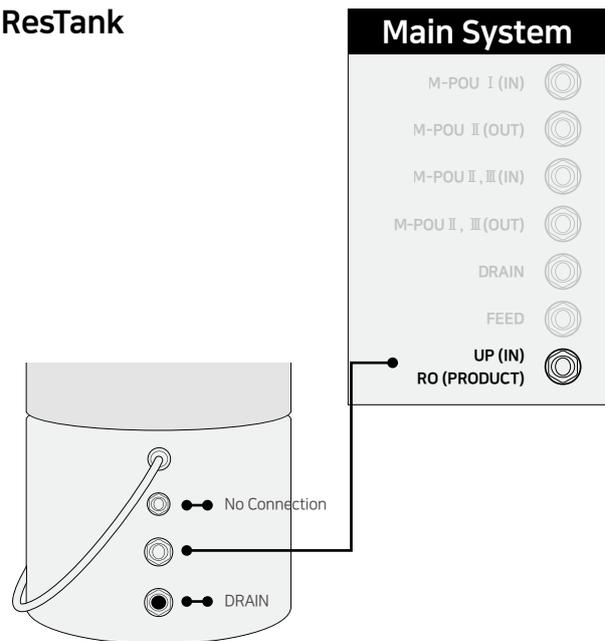
DRAIN

※ If you only use M-POU I , please connect tubing M-POU II ,III (IN) and M-POU II ,III (OUT) of Main system.

02/ INSTALLATION

Tubing Connection(E-Duo 12 VF,VFT)

FEED, DRAIN

Main System

M-POU Ⅰ (IN)
M-POU Ⅱ (OUT)
M-POU Ⅱ , Ⅲ (IN)
M-POU Ⅱ , Ⅲ (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

M-POU Ⅰ

Main System

M-POU Ⅰ (IN)
M-POU Ⅱ (OUT)
M-POU Ⅱ , Ⅲ (IN)
M-POU Ⅱ , Ⅲ (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

M-POU Ⅱ

Main System

M-POU Ⅰ (IN)
M-POU Ⅱ (OUT)
M-POU Ⅱ , Ⅲ (IN)
M-POU Ⅱ , Ⅲ (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

ResTank

Main System

M-POU Ⅰ (IN)
M-POU Ⅱ (OUT)
M-POU Ⅱ , Ⅲ (IN)
M-POU Ⅱ , Ⅲ (OUT)
DRAIN
FEED
UP (IN)
RO (PRODUCT)

DRAIN
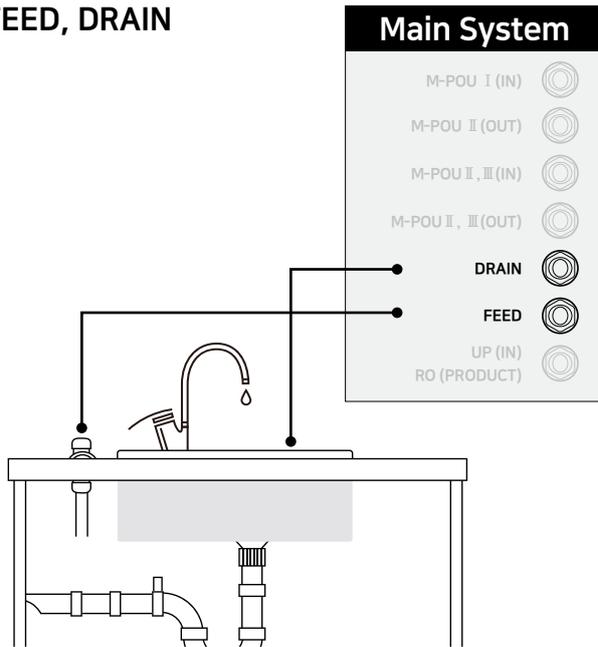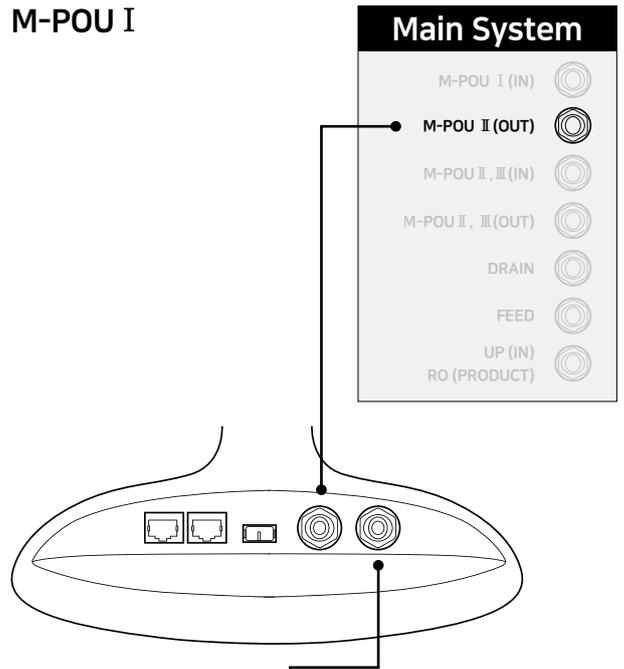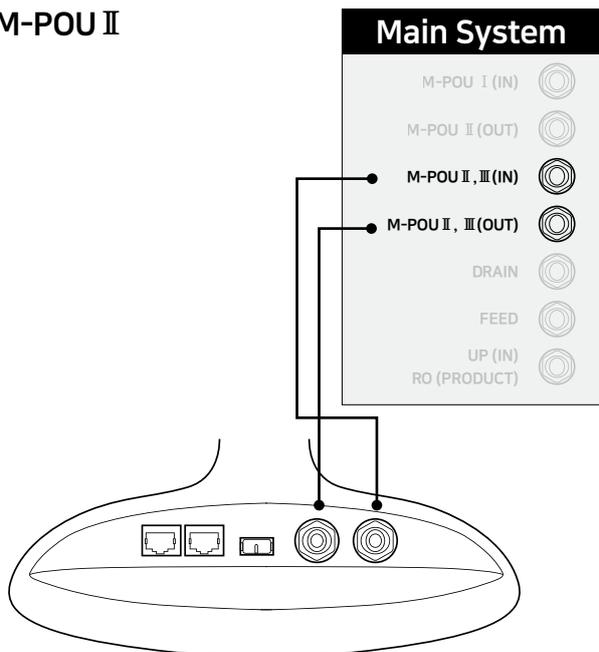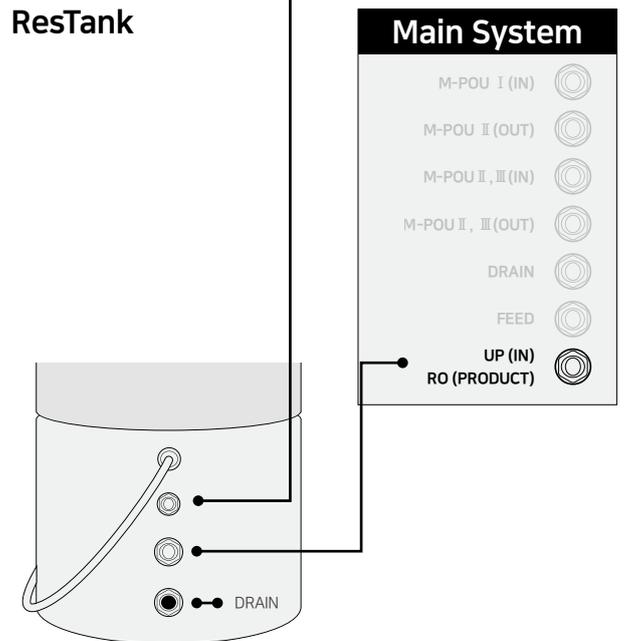
03 / SOFTWARE

1. **Main Screen** (Standby mode)

2023-01-04 PM03:00

Quality   Setting   Filter   ®

Calibration   USB Print   Administrator   Ⓓ
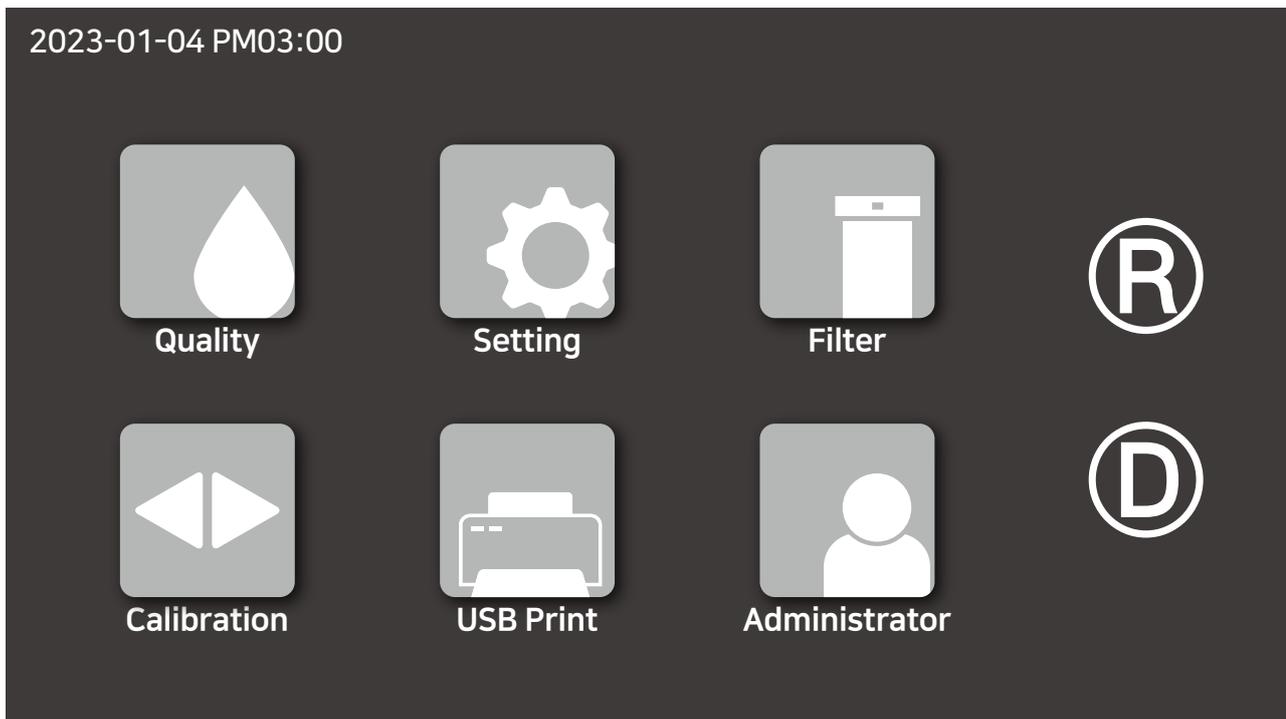
2. **Icons**

® Press the button to produce Type3(RO) water.

Ⓓ Press the button to produce Type1(UP) and Type2(Post) water.

◀ ▼ ▶ Move the cursor

OK Save your changes

▶| Go to the next page

03/ SOFTWARE

3. Menu

① Quality

When the water fails to reach the set water quality over the set time, a filter replacement notification is displayed. When you arbitrarily change the set water quality, it will affect the production water, so please consult with the engineer.

2023-01-04 PM03:00

RO Quality	POST Quality	UP Quality
25 us/cm	**5** MΩ.cm	**10** MΩ.cm
15 min	**15** min	**15** min

▲ ▼ ▶ OK
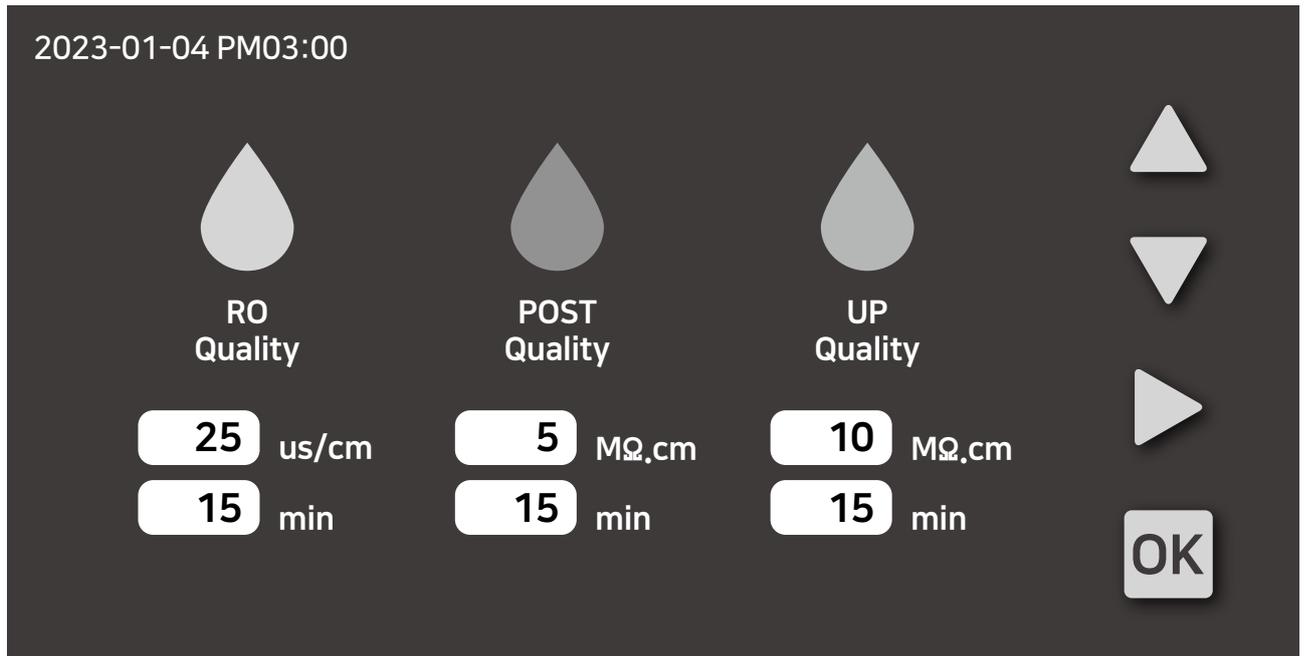
② Setting

You can change the settings.

2023 - 00 - 00 PM 00:00

UP Auto Standby	UP Circulation	RO Standby Wash
5 min	**60** min	**60** min
ON	**5** min	**5** min

2023 - 00 - 00 PM 00:00

Level Sensor	Key Tone
80 %	ON
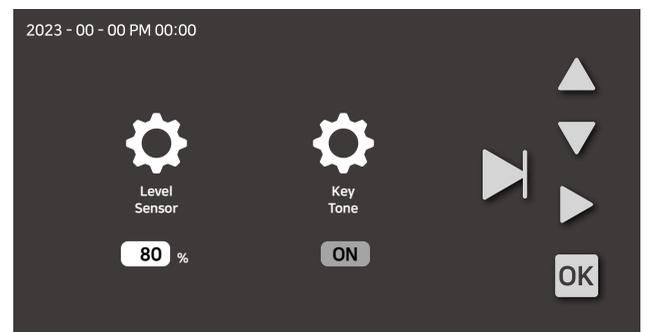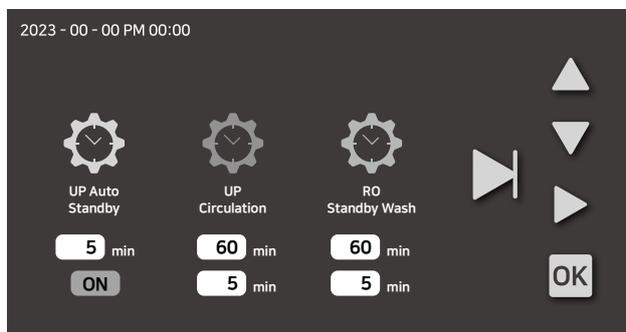
▶ When ultrapure water is not used for more than the entered time, it automatically switches to standby mode. This prevents idle run, reducing damage to the pump. Press the ON button to deactivate the function.

▶ It automatically circulates ultrapure water.(5-minute activation every 60 minutes)

▶ Clean the RO membrane. (5-minute activation every 60 minutes)

▶ While the system is in standby mode, when the water tank is under 80% full, the system will restart.

▶ You can turn on/off the touch sound.

03/ SOFTWARE

③ Filter

You can check the replacement cycle and number of days of use of each filter. After replacing the filter, press the Zero button to reset the number of days of use.(For items without a Zero button, the number of days of use is automatically reset after the replacement of the filter.)
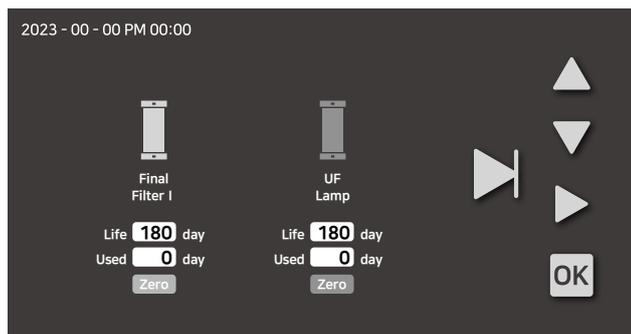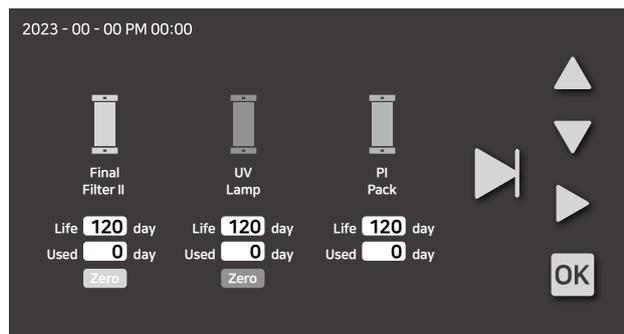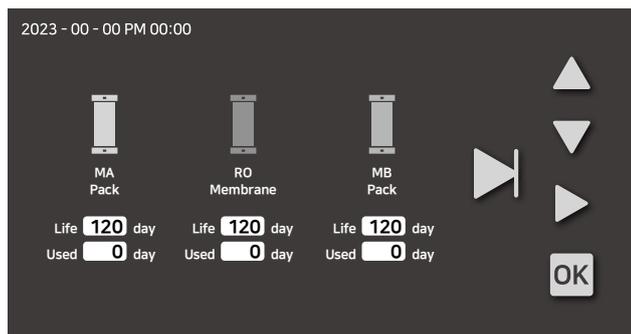

④ Calibration

The E-Duo Series is capable of automatic calibration.

Press the Calibration button on the main screen to calibrate.
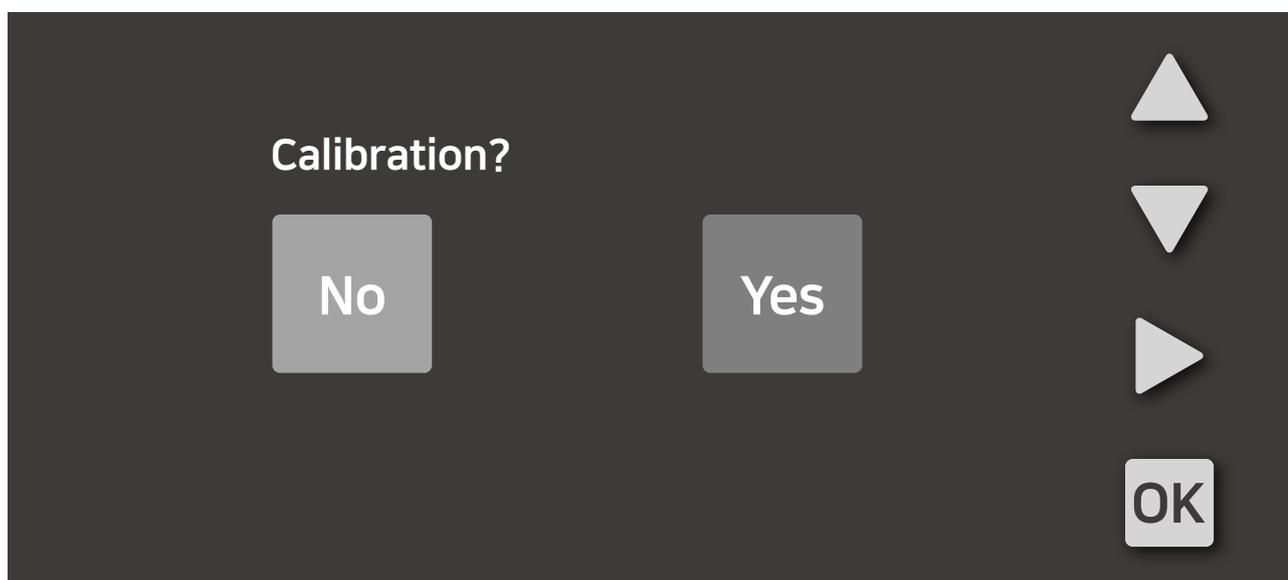
03 / SOFTWARE

⑤ USB Print

Water quality data that is saved in USB. After connecting the USB port, press the Yes button to save.

USB Print ?

| No | Yes |

▲
▼
▶
OK
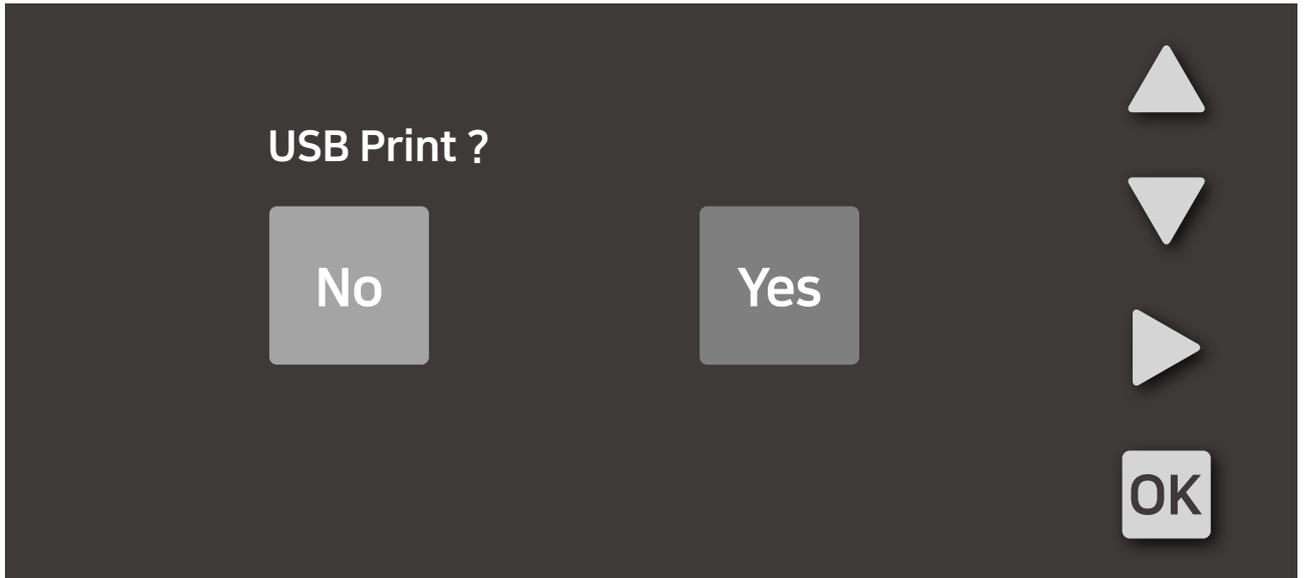
⑥ Administrator

In administrator, you can change the date and time and system settings. The password is "0000".

2023 - 00 - 00 PM 00:00

0 * * *

▲
▼
▶
OK

2023 - 00 - 00 PM 00:00

2023-01-01

12 : 00 : 00

▲
▼
▶
OK
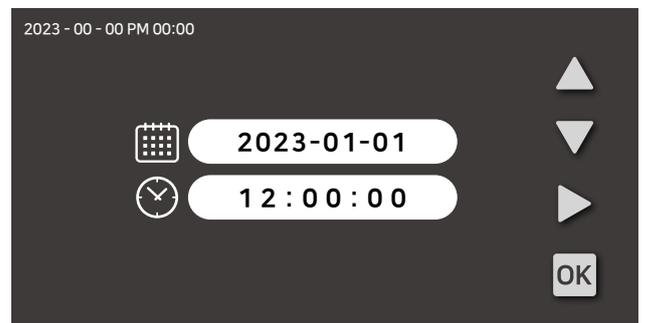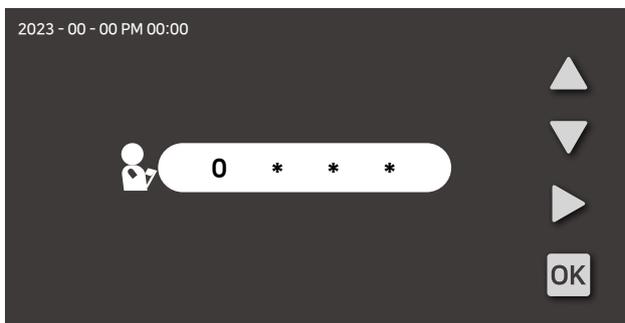
04 /OPERATION

① Initial screen

1. Displayed MIRAE ST and model.

2. When the device is operated for the first time, the screen to set the date and time will appear. Touch the desired location to make the number pad shown on the right display. Press the 1/E button to change to the English keyboard.
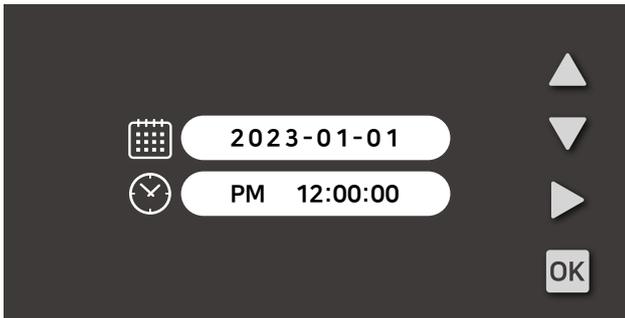
3. Put wifi ID and password. (only lower case letters and numbers)
   ※ Press the OK button to move to the next screen.

04 / OPERATION

② Main Screen

2023 - 00 - 00 PM 00:00

Quality   Setting   Filter

Calibration   USB Print   Administrator

Ⓡ

Ⓓ
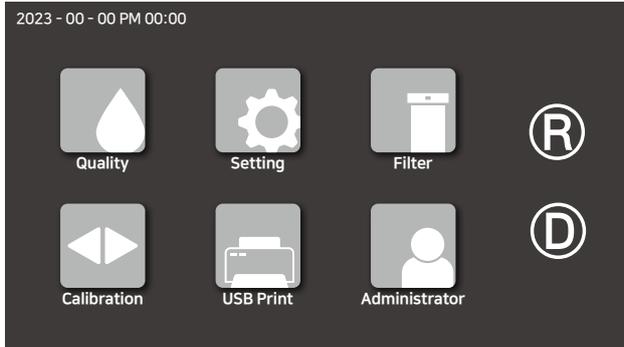
Date and time are displayed at the top.
(It takes about 5 seconds to boot. When the device is operated during boot, errors may occur. In this case, reboot the system.)

③ Operation

2023 - 00 - 00 PM 00:00
TEMP : 21.0℃

FEED   **120**   us/cm

RO   **2**   us/cm

Vol   **200**   ml

OK
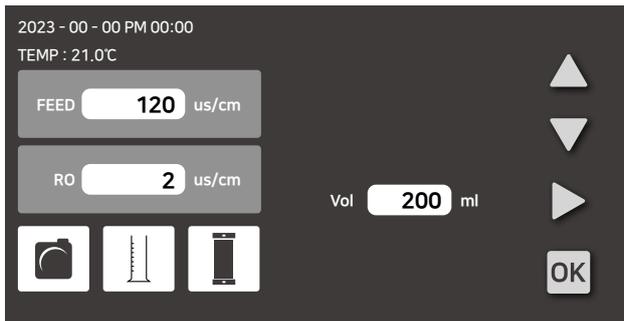
Dispensing

Press the R button on the main screen to produce Type Ⅲ water, and press the D button to produce Type Ⅰ and Ⅱ water. Temperature, Feed water quality, and production water quality are displayed. Press the button on the dispenser to start dispensing water

※ **Volumetric dispensing**
During ultrapure water production, touch the icon above to dispense the desired volume of water.

2023 - 00 - 00 PM 00:00

MA Pack   RO Membrane   MB Pack   Final Filter II   UV Lamp   PI Pack   Final Filter I
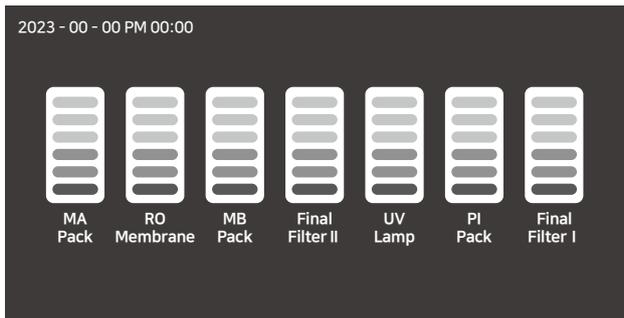
Filter Status

During operation, touch the button above to check the used amount and remaining amount of the installed filter. It will automatically disappear after 10 seconds.

2023 - 00 - 00 PM 00:00

USB Print ?

No   Yes

OK

Saving to USB drive

This function saves water quality information stored in the device to a USB drive. After connecting to the USB port of M-POU Ⅰ, Ⅱ, and Ⅲ, press USB PRINT on the menu screen and touch the YES button on the next screen to save to the USB drive.

05/ MAINTENANCE

① Filter lifetime

|	
Duo-MA Pack	120 days
Duo-RO Membrane(2ea)	365 days
Duo-MB Pack	180 days
Duo-PI Pack	180 days
Duo-UV Lamp	365 days
Final filter I	180 days
Final filter II (M-POU II)	180 days
Duo-UF Filter	180 days

※ The above replacement cycle may vary depending on the water quality and used amount.

## ② Filters Installation

1. Installation of MA Pack, MB Pack, PI Pack
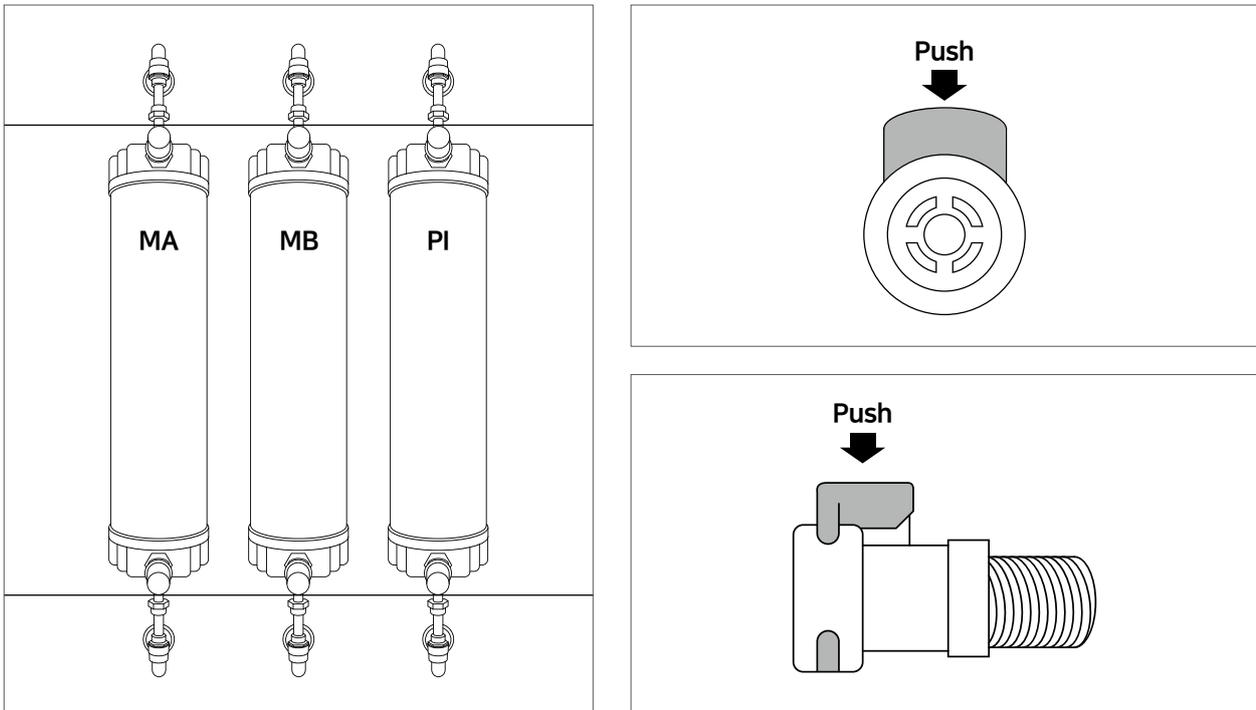
1. Open the front door. There are magnetic attached so, you don't need tools to open the door.
2. When you press the upper part of the connector connected to the top and bottom of the filter, the tubing is separated.
3. After replacement, the number of days of use is automatically reset.

05 / MAINTENANCE

2. Installation of RO Membrane
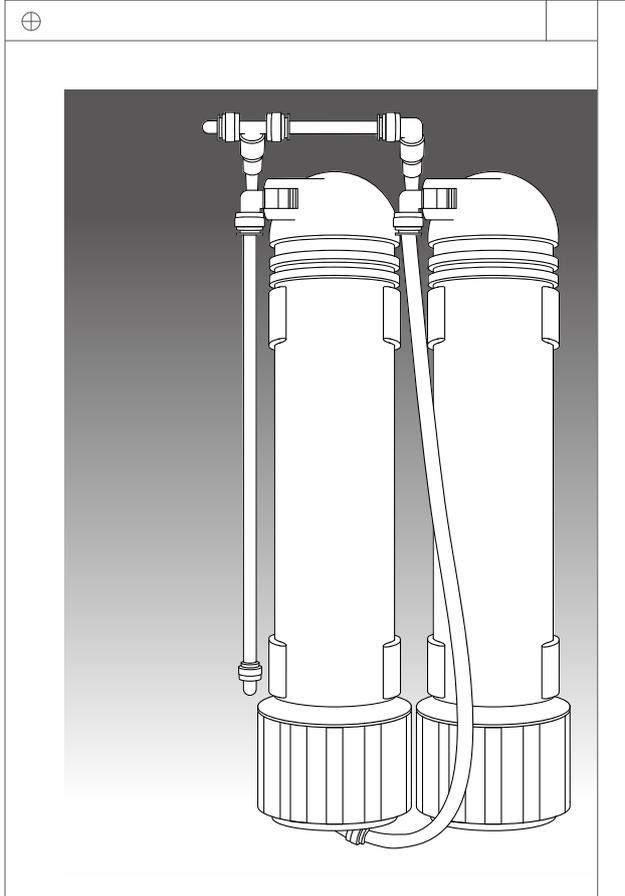
1. Open the hand screws of the left door of the system.
2. Remove the connected tubing, install the new product, and connect the tubing to the original one.
3. The E-Duo Series is equipped with two membranes.
4. After replacement, the number of days of use is automatically reset.

* When the tubing is connected in the wrong direction, the water does not come out.

3.Installation of POU Filters

M-POU
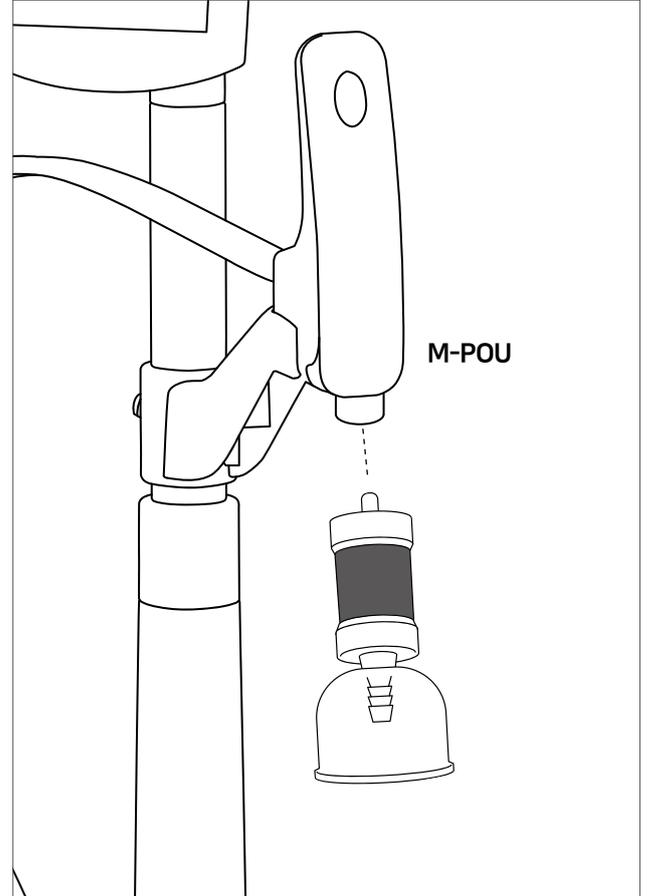
1. Turn the filter clockwise to remove it from the dispenser.
2. Turn the POU counterclockwise to install the new filter.

*If you turn it too hard, the dispenser part may be damaged.

05/ MAINTENANCE

4. Installation of UV Lamp


Connector ▶

Lamp head ▶

Lamp Housing ▶

UV Lamp
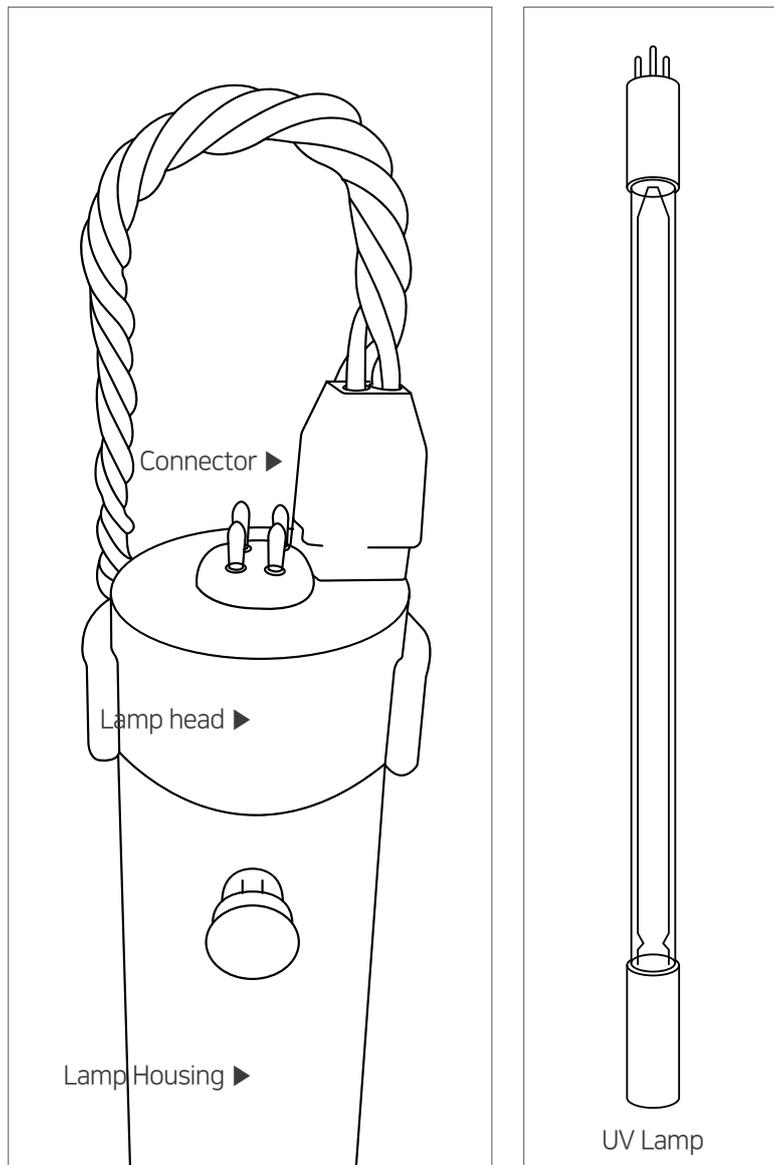
1. Open the hand screws of the left door of the system.

2. Remove the lamp head from the cradle and separate the connector from the lamp.

3. Lift up the separated lamp to remove it from the housing, insert a new lamp, and connect the connector.

06 / TROUBLE SHOOTING

If a "Replace" message is displayed, replace the applicable filter.
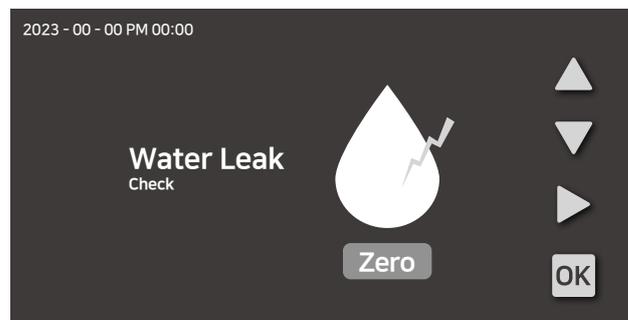
A leak has been detected inside the device. Turn off the power of the device and check the inside.

You have connected a filter that has already been used or there is an error in the reader. Contact the place of purchase or the manufacturer.

07 / ORDER INFORMATION

E-Duo13 UV	17401	Duo-MA Pack	27101
E-Duo13 VF	17402	Duo-RO Membrane	27102
E-Duo12 VF	37301	Duo-MB Pack	27202
E-Duo12 VFT	37101	Duo-PI Pack	27303
M-POU I	37301	Duo-UV Lamp	27301
M-POU II	37201	Final filter Ⅰ	20304
M-POU III	37101	Final filter Ⅱ	27206
ResTank 35L	30735	Duo-UF Filter	27304
ResTank 75L	30775	Duo-Metal Filter	27305