AUTOCLAVES VERTICALES NAHITA BLUE, SERIE TS
NAHITA BLUE VERTICAL AUTOCLAVES, TS SERIES
AUTOCLAVES VERTICAUX NAHITA BLUE, SÉRIE TS

Ref.| Code | Réf. ZCK009, ZCK010, ZCK011

Este manual es parte integrante del aparato y debe estar a disposición de todos los usuarios. Le recomendamos que lea atentamente este manual y siga todos los procedimientos de funcionamiento, para obtener el mejor rendimiento y una mayor vida útil del aparato.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel fait partie intégrante de l'appareil, c'est pourquoi il doit être disponible pour tous les utilisateurs. Nous vous recommandons de lire attentivement ce manuel et de suivre toutes les procédures d'utilisation, afin d'obtenir les meilleures prestations et une plus grande durée de vie de l'appareil.

LANGUAGE INDEX

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1. Warning

■ Do not open/close the lid forcibly before energization.
■ Do not disassemble/reassemble the autoclave without authorization. If repair or service is needed, please contact your local distributor.
■ Never use the autoclave to sterilize corrosive products such as acids, bases, and phenols, volatile compounds, solutions of ethyl alcohol, methyl alcohol, chloroforms, and the like, or radioactive substances.
■ Never use the standard configuration of the autoclave to sterilize liquids contained in airtight glass bottles or other airtight glass vessels, as changes in temperature and pressure during the operation may cause the bottles to burst.
■ Do not use the equipment to cook food.
■ Do not use the autoclave for purposes other than sterilization and agar melting, or for sterilization of flammable, explosive, and oxidizable substances as well as strong acids, strong bases, saline water, and the like; otherwise, it may lead to corrosion of the sterilization chamber and pipeline, or even an explosion.
■ Do not block the steam exhaust port on the safety valve, as this may prevent the safety valve from discharging steam and relieving pressure in the event of an abnormality.
■ Make sure the pressure gauge reads “0 MPa” before opening the chamber lid.
When the pressure in the sterilization chamber is higher than “0 MPa”, do not open the chamber lid or the drain valve, otherwise it can lead to personal injuries due to high-pressure steam spraying.

■ When adding purified or demineralized water into the sterilization chamber, do not let any water leak into the control circuit, which may cause electric shock or other malfunctions.
■ When using cleaning bags, waste bags, or other bags, place them in the stainless steel basket first, and then put the basket into the sterilization chamber, otherwise it may affect the precision of temperature.
■ Keep an eye on the temperature inside the sterilization chamber, which is high at the end of an operation cycle. When opening the lid, keep your face and hands away from the sterilization chamber to avoid being scalded by the spraying steam. When taking items out of the sterilization chamber, be sure to wear heat-insulating gloves. Since it takes time for high-temperature liquids to cool down, when taking sterilized liquid substances out of the sterilization chamber, ensure that they are sufficiently cooled to avoid scalding.
■ Make sure to use purified or demineralized water as sterilization water to avoid affecting the service life of the autoclave. When the equipment continues to work, allow it to cool down for at least 15 minutes, otherwise, the autoclave will fail to produce enough saturated steam.
■ If an abnormal condition (such as abnormal sound, odor, and smoke) occurs, turn off the power immediately, pay attention to the equipment, and contact your local distributor.
■ Always place a chemical indicator for pressure steam sterilization (chemical indicator tape) that is suitable for the sterilization temperature on the items to be sterilized during each sterilization cycle. After the items have gone through a complete sterilization cycle, if the color change on the chemical indicator card matches the corresponding temperature and duration, it indicates that the required temperature and duration for sterilization have been met. Otherwise, if the color change does not match, it means the sterilization requirements have not been fulfilled.

Safety Information

■ Please follow the guidelines below and read this manual in its entirety to ensure safe operation of the unit. Failure to use the autoclave as instructed by the manufacturer may impair the protection provided by it.
■ Connect the equipment according to the power supply requirements indicated on the nameplate during installation; if the voltage fluctuation is too large, use a regulated power supply to ensure optimal performance; and if other types of voltage are used, be sure to use a transformer, otherwise, the autoclave will be damaged.
■ Always ensure that the equipment is reliably grounded. Do not connect the ground wire of the equipment to plastic pipelines, gas pipelines, telephone ground wires, lightning rods, etc.
■ The autoclave is provided without a built-in earth leakage circuit breaker. To ensure safety in use, please install an appropriate earth leakage circuit breaker before connecting the instrument.

This symbol is to remind the user to pay attention to safety signs during operation.

2. Unpacking

Once receiving the product, please check the appearance of the packing case immediately. If there is any damage, take a photo showing the damage, indicate the issue on the delivery note and contact your local distributor.
After the autoclave is unpacked, check whether there is any mechanical damage, take note of the packing method, and keep the packing material until the acceptance of the equipment. The mechanical inspection items include any traces of physical damage, such as scratches on the surface of the panel and deformation of sheet metal parts.
If any problems are found, please contact your local distributor immediately.

3. Installation

1) Placement of the autoclave

■ The autoclave is a precision apparatus. During installation, please place it on a flat floor and press down the locking switches on the four casters. Do not place the equipment in environments with high humidity, direct sunlight, and an indoor temperature below 5 ºC or above 40 ºC.

■ Keep a certain distance between the autoclave and the surrounding walls, preferably at least 10 cm for the back side, at least 20 cm for the left side, and at least 40 cm for the right side, to allow for better heat dissipation.

■ Do not place the autoclave under a fire alarm detector to prevent the alarm device from being triggered by the diffused steam when the instrument exhausts steam or the chamber lid is opened.

■ Keep the safety valve steam exhaust port away from the power socket and prevent it from being blocked.

2) Power connection

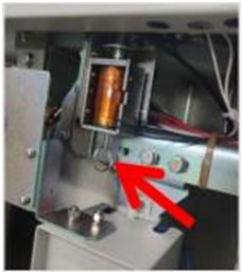
■ The device must be reliably grounded. If the socket doesn't have ground terminal, an independent ground wire must be used to ground the autoclave before energization.

■ Power requirements: single-phase AC 220 V ± 10%, 50/60 Hz.

■ Power socket requirements:
60L model - ≥15A (plug in and use)
85/110L models - ≥25A

■ When installing the 85L and 110L models, please connect the blue industrial plug into a 3-pin industrial socket or connect power cord to an air switch with an enclosure (requirements: ≥25A), and connect the red or brown wire to the live wire, the green or blue wire to the neutral wire, and the yellow or green wire to the ground wire.

■ Notes:



- Do not bind, twist, knot, or drag the power cord, and do not place heavy objects on it since a broken or exposed power cord may lead to fire or electric shock.
- Ensure that the load capacities of the power supply and the power cord are greater than the rated load of the autoclave and comply with local installation and safety rules and regulations.
- Do not extend or cut the power cord of the device, and do not use the zero or neutral wire as the ground wire.
- When the altitude exceeds 2000m, adjust the circuit breaker of the power supply according to the derating requirements for the brand being used.
- When there is no power, please open the left panel and pull the ring under the locking system to open the lid (pull the ring and move the lid handle at same time).

4. Specifications

Model	TS60	TS85	TS110
Code	ZCK009	ZCK010	ZCK011
Overall dimensions (LxWxH) mm	582 x 735 x 1060	582 x 735 x 1060	582 x 735 x 1260
Net weight	106 kg	111 kg	121 kg
Capacity	60 L	85 L	110 L
Sterilization chamber dim. (Ø x H) mm	Ø390x505	Ø390x700	Ø390x895
Power requirement	220 V ± 10 %, 50/60 Hz, 15 A	220 V ± 10 %, 50/60 Hz, 25 A	220 V ± 10 %, 50/60 Hz, 25 A
Rated power	2900 W	4600 W	4600 W
Basket size&quantity (Ø x H) mm	(Ø370 x 190) x 2 pcs	(Ø370 x 280) x 2 pcs	(Ø370 x 250) x 3 pcs
Sterilization chamber material	SUS304		
Working environment	5 ºC-40 ºC, relative humidity < 85%		
Working temperature during sterilization	105 ºC ~ 138 ºC		
Sterilization time	1 min ~ 6,000 min		
Melting temperature	60 ºC ~ 115 ºC		
Melting time	0 min ~ 6,000 min		
Warming temperature	45 ºC ~ 79 ºC		
Warming time	0 min ~ 9,999 min		
Cooling lock opening temperature	40 ºC ~ 99 ºC (Note: 40 ºC ~ 80 ºC under liquid mode)		
Steam exhaust level	Adjustable from level 0 to level 5		
Appointment timer	0 ~ 15 days delay		
Pressure	MAWP/Design pressure: 0.3MPa		
Water Supply Requirement	Distilled water with an electrical conductivity between 10-15 μS/cm		
Average Feed Water Consumption Per Cycle	2 L		

Working modes	Liquid mode Liquid with warming mode Solid mode Wrapped instrument mode Fabric mode Rubber mode Fast mode Waste mode Agar mode User-defined mode
Controller	"Inspiration II" new microcomputer smart control system
Safety devices	Lid inspection system, electric locking system (pressure interlocking device), boil-dry protection, water level monitoring, over-pressure protection, safety valve, over-temperature protection, over-current and short-circuit protection, earth leakage protection, cooling lock function, anti-scald chamber cover and countertop, automatic troubleshooting

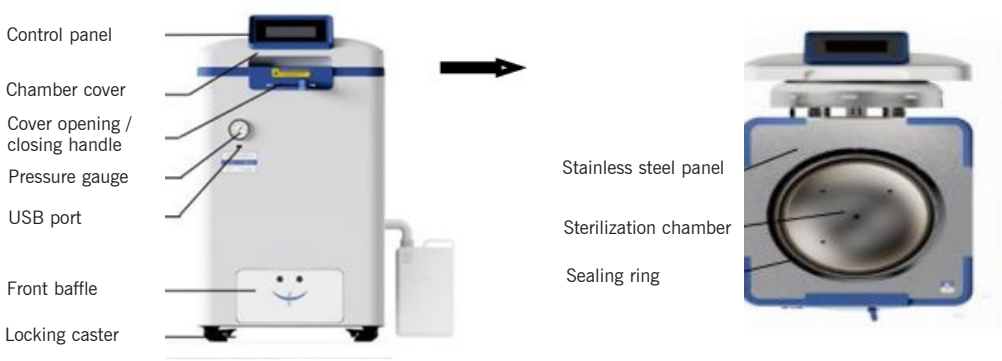
Loading capacity for Schott Duran bottles

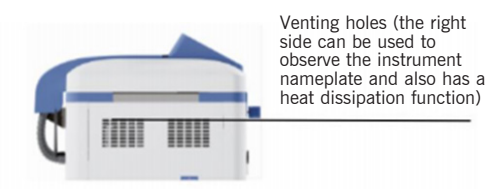
Model	250 mL	500 mL	1000 mL
TS60	32	24	8
TS85	32	24	16
TS110	51	36	24

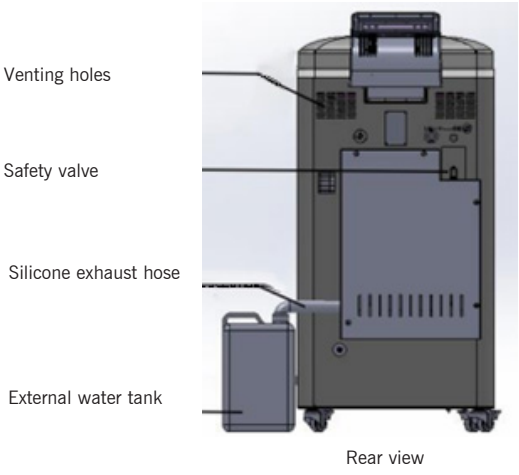
Loading capacity for Erlenmeyer flasks

Model	250 mL	500 mL	1000 mL
TS60	24	7	4
TS85	24	14	8
TS110	36	21	12

5. Autoclave structure



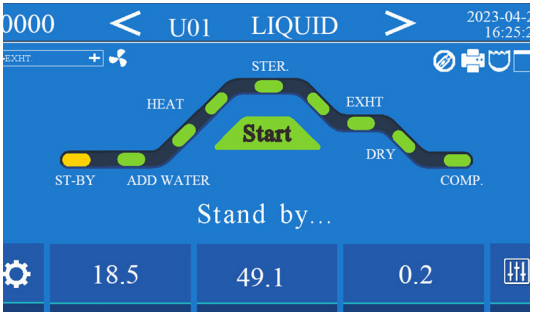




Note: The images shown above are for illustration only, and the actual product received may vary.
(External water tank and backwater tank are not present in TS Series. Front water tank is present in TS Series)

6. Screen / Water quality requirements / Options

6.1 Screen



No	Icon/Key	Name	Description
1	0000	Cycle number	This number will increase once each time you press START
2	<	Side arrow left	Click to switch the program number
3	>	Side arrow right	Click to switch the program number
4	U01	Program No.	U01-U10 are fixed programs, new programs created & saved will be up to U20
5	Liquid	Program name	Simple program description
6	EXHT +	Exhaust level	Click + and – to adjust the exhaust level at any stage of the sterilizing process
7		Cooling fan	The cooling fan is automatic on in the exhaust stage, click here to turn off
8		USB	Means USB is on, click to learn how to safely remove it.
9		Printer	It appears when printer is installed
10		Water level Low water level	Current water level is adequate Lack of water, please add water
11		Door locked Door open	Door is locked Door is open or not locked well
12	Smart clean	Smart cleaning	Only available when there is automatic water feeding+ auto drainage function
13		Setting	Click to set the programs
14		Parameter	Click to view the parameter
15	Load	Load temperature	Temperature detected by Floating PT100 sensor on the lid

16		Chamber temperature	Chamber temperature detected by temperature sensor on the chamber wall
17		Pressure	Pressure value, only displayed when you add digital pressure sensor on, you can change pressure unit in the admin menu by psi/bar/kPa
18		Start	Click here to start the cycle. Once the cycle begins, the button will change to STOP. Click STOP to end the cycle.
19		Stand by	It shows current stage is in Sandby state. Once cycle begins, it will change to Heating..., Water adding... etc.
20		Current stage light	It will blink and change color after entering into the corresponding stage
21		Add water	The indicator blinks during the automatic water filling process (not applicable to TS Series models)

6.2 Water quality requirements

Requirement of water used for sterilization	
Item	**Standard**
Evaporation Residue	≤10 mg/L
Silicate (SiO_2)	≤1 mg/L
Iron	≤0.2 mg/L
Cadmium	≤0.005 mg/L
Lead	≤0.05 mg/L
Other Heavy Metals (Excluding Iron, Cadmium and Lead)	<0.1 mg/L
Chloride Ion (Cl^-)	≤2 mg/L
Phosphate (P_2O_5)	≤0.5 mg/L
Conductivity (25 ºC)	10-15 μS/cm
pH Value	5~7.5
Appearance	Colorless, clean and free of precipitates
Hardness (Total Amount of Alkaline Metal Ions)	≤0.02 mmol/L

Note: The results of the consistency check shall comply with the provisions of the known analytical methods.

6.3 Options

1) Printer and digital pressure sensor:
To verify the accuracy of the temperature value, an optional printing set is required.
The printing set contains a printer and a pressure sensor. Before activation, in addition to setting up the printer, it is also necessary to enable the pressure sensor and set the corresponding measurement unit of pressure. The optional printing set can print temperature and pressure curves.

2) Floating PT100 sensor/Load thermometer

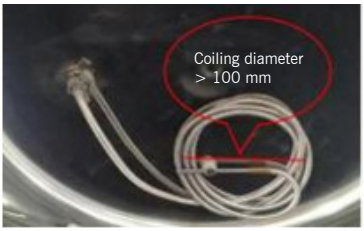
■ Application

- It is applicable to sterilize a load with high thermal inertia (such as liquids). When the chamber temperature reaches the preset sterilization temperature, the actual temperature of the load has not yet reached that level. To achieve the optimal sterilization effect, it is recommended to use a load thermometer to continuously monitor the actual temperature of the load. In this case, the sterilization timer will start counting only when the actual temperature of the load reaches the preset sterilization temperature.

Note: After installing the load thermometer, enter the “Administrator Settings” menu and enable the floating PT100 sensor (see “Administrator Settings”). After using it, place the floating PT100 sensor on the lid properly. If it will not be used for a long time, turn off this function in the Administrator Settings menu.

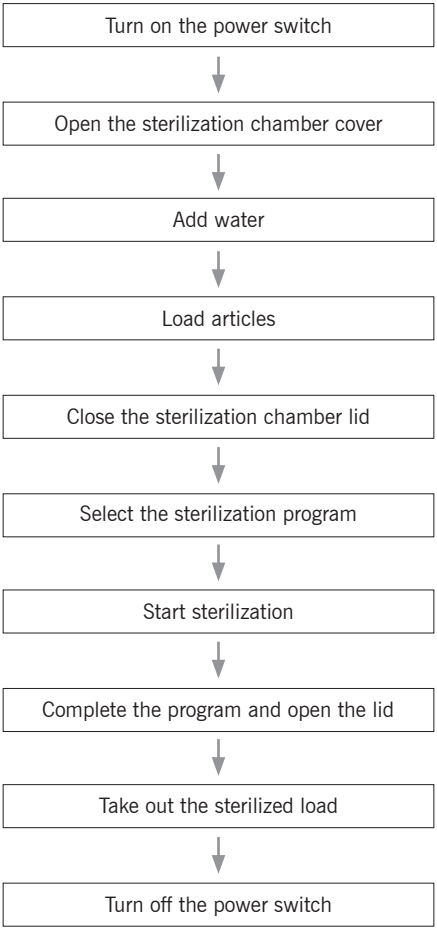
■ Requirements for use

- Please place the floating PT100 sensor as shown below:



- It is recommended to conduct a test once a month. The test method is as follows:
Use a fine iron wire to securely fasten the floating PT100 sensor near the chamber temperature sensor probe, set the sterilization temperature to 121 ºC and the sterilization time to 20 min, and when the sterilization time reaches 5 min, verify that the difference between the temperatures displayed by the floating PT100 sensor and by the temperature sensor falls within 0 ºC - +0.2 ºC. If not within the range, adjust the floating PT100 sensor compensation value (go to “Load Temperature Compensation” under “Parameter Settings” to change the value).

7. Operation Instruction

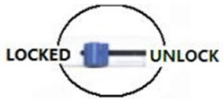


7.1. Turn on the power

■ The system automatically performs self-check upon startup. After the self-check is completed, it will emit a prompt tone saying “Hello! Welcome to use our autoclave!”.
Then, it will enter the last program screen saved by the user or display the last user login screen (when the level 5 permission is enabled).
■ When the autoclave is in the standby state, if there is no operation within 30 min, the equipment will automatically enter the energy-saving mode and the screen will be closed; pressing any key will restore the display.

7.2. Open the sterilization chamber lid

■ When opening the cover, gently press the middle frontend of the upper cover with one hand, turn the opening/closing handle to the “UNLOCK” position with the other hand. Then, the cover interlocking icon will flash in red.Grip the handle to open the chamber cover.



Notes: 1) Gently open the chamber cover to prevent damage to the sealing ring. When operating the opening/closing handle, make sure the instrument is powered on and the power switch is in the ON position.
2) Take out the load promptly after the sterilization is completed, otherwise, it may cause negative pressure, thereby resulting in the chamber cover cannot be opened.

7.3. Add water

■ **Front water tank:** Drain the front water tank. If the condensate water is not promptly drained, it may overflow from the water filling funnel onto the floor.

■ **Manual water adding:** Open the lid, add water to the sterilization chamber from the top and ensure the water level is not higher than the surface of the water plate.

■ Maintain the water level sensor regularly, and replace the water in the sterilization chamber and water inlet tank frequently to prevent dirt from adhering to the water level sensor and affecting its normal operation.

7.4. Load articles

■ Takeout the stainless steel basket and place the articles inside.
■ Ensure that the water level plate is properly placed and position the stainless steel basket on it.
Then, stack them in sequence to avoid direct contact with the electric heating element.

Recommendations for sterilization of various loads:
- Preparation for sterilization
Before sterilization, clean the adhesions on the instruments timely and preferably use detergents and purifiers together with purified and demineralized water. After cleaning, preferably rinse the instruments again with clean water to ensure its cleanliness.

Notes:
- When placing the stainless steel basket, ensure not to block the temperature sensor or the exhaust port; be careful not to overfill the basket during loading (it is recommended not to exceed 70% of the capacity of the basket) to ensure proper steam penetration.
- When placing loads into the stainless steel basket, be sure to:
Arrange the loads neatly at an interval between each other without overlapping, otherwise it may lead to insufficient sterilization; and place different types of loads, such as stainless steel and carbon steel, in separate stainless steel baskets.
- For carbon steel, pad the basket with several layers of sterilized paper or wooden cotton paper, and place similar types of loads together to avoid direct contact between carbon steel and stainless steel.
- Before sterilization, pack the articles with breathable packing materials such as sterilization pouches, sterilization paper, or thin gauze fabrics, and place with its opening facing downward or on its side.
- When the machine is installed with a floating PT100 sensor, when placing/removing it in/from the stainless steel basket before and after sterilization, take care to check for any scarches, as it could lead to breakage of the thermometers. When loading the basket, be careful not to hurt the floating PT100 sensor.
- When a sterilization pouch is used for loading, place the sterilization pouch in the basket first, and then put the basket in the sterilization chamber, otherwise it will affect temperature control.
- When a clean bag is used for loading, open the mouth of the clean bag and ensure that the bag is not in touch with the inner wall of the sterilization chamber. If the mouth of the bag is closed during sterilization, it will lead to insufficient sterilization. If the bag blocks the sterilization chamber, the steam cannot fill every corner of the chamber, resulting in incomplete sterilization.
- When the glassware such as beakers, conical flasks, and test tubes is sterilized, place such glassware upside down or horizontally. If the glassware can only be placed upright, add a small amount of purified or demineralized water to the glassware before sterilization.
- When liquids are sterilized, pay attention to loading a suitable amount of liquid in the loading container (not more than 3/4 of the volume for flasks, or 1/2 of the volume for test tubes), to avoid the liquid from overflowing from the loading container during the process of warming-up or cooling, loosen the cover of the loading container prior to sterilization to allow for air circulation; otherwise the loading container may burst.
- When melting agar, ensure that the volume of the loading container is less than 2 L to prevent incomplete melting (Note: If test tubes are used for loading, Durham tubes with a caliber of 6 mm or above should be used. If the caliber is less than 6 mm, there will be bubbles in the tubes, affecting the sterilization effect).
- When sterilizing waste, replace the water and clean the autoclave after each sterilization cycle, and for garbage bags, use a sterilization bucket or a stainless steel basket with a solid bottom for loading.

7.5. Close the sterilization chamber lid

■ Gently press the front middle part of the chamber cover and push the opening/closing handle towards the left to the LOCKED position. Then, the cover indicator icon on the screen turns white without flashing.

■ When the handle is locked in place, the cover indicator icon on the screen turns white and flashes. At this point, the cover should reach the preset closed position, and no operation can be started by clicking the START key unless the electromagnet pops up. If the handle is not locked in place, the cover indicator icon on the screen turns red, indicating that no operation can be started.

Note:

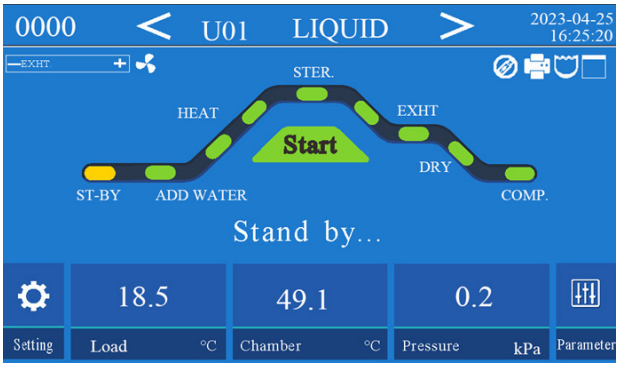
■ Before closing the chamber lid, make sure that the sealing ring and the area in contact with the sealing ring are free of foreign objects, otherwise the sealing ring may be damaged and air leakage may occur.

7.6. Select the sterilization program

1) Selection method

In the standby state as shown below, for symbols on both sides of <U01>, "<" indicates selecting the previous program, and ">" indicates selecting the next program.

2) Program introduction



■ There are ten basic modes available, and these working modes have been saved as nine basic programs (U01, U02, U03, U04, U05, U06, U07, U08, U09) and one user-defined program (U10).

■ The parameters of the basic programs cannot be deleted, but users can select any one as needed to modify parameters and it will become a new program after modified. A maximum of 20 programs (including the basic programs) can be created and saved.

■ The ADD WATER and DRY icons are only for the automatic water feeding and drying models, not for models of TS Series.

■ In basic working modes and parameters of corresponding basic programs, any settings related with drying data are only for models with drying, not for models of TS Series. It doesn't mean that the whole mode is only for models with drying, it just means the particular drying data in that mode is only for models with drying.

U01-Liquid mode
- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting - Complete
- Application: Sterilization of liquids
- Click the "PARAMETER" key to show parameters on the LCD display:
- Default parameters of U01 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC
Sterilization time	20 min	1 min ~ 6000 min
Steam exhaust level	0	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	80 ºC	40 ºC ~ 80 ºC

U02-Liquid with warming mode
- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting - Warming - Complete
- Application: Sterilization of liquids. In order to prevent solidification, automatic warming is enabled after sterilization (e.g. for agar medium sterilization)
- Default parameters of U02 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC
Sterilization time	20 min	1 min ~ 6000 min
Warming temperature	50 ºC	45 ºC ~ 79 ºC
Warming time	600 min	1 min ~ 9999 min
Steam exhaust level	0	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	80 ºC	40 ºC ~ 80 ºC

Note: During the warming stage, the lid can be opened at any time to take out the sterilized load. To continue warming, please close the chamber cover.

U03-Solid mode

- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting (water drainage) - Drying - Complete
- Application: Sterilization of solids
- Default parameters of U03 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC
Sterilization time	20 min	1 min ~ 6000 min
Drying system	124 ºC	80 ºC ~ 160 ºC
Drying time	40 min	0 min ~ 300 min
Steam exhaust level	3	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC

U04-Wrapped instruments mode

- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting (water drainage) - Drying - Complete
- Application: Sterilization of surgical instrument packs, paper bags, and paper-plastic packaged instruments
- Default parameters of U04 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC
Sterilization time	30 min	1 min ~ 6000 min
Drying system	124 ºC	80 ºC ~ 160 ºC
Drying time	40 min	0 min ~ 300 min
Steam exhaust level	3	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC

U05-Fabric mode

- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting (water drainage) - Drying - Complete
- Application: Sterilization of textiles and dressing packs
- Default parameters of U05 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC
Sterilization time	30 min	1 min ~ 6000 min
Drying system	124 ºC	80 ºC ~ 160 ºC
Drying time	80 min	0 min ~ 300 min
Steam exhaust level	3	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC

U06-Rubber mode

- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting (water drainage) - Drying - Complete
- Application: Sterilization of heat and moisture-resistant tubular rubber, porous rubber, and similar items
- Default parameters of U06 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC
Sterilization time	30 min	1 min ~ 6000 min
Drying system	124 ºC	80 ºC ~ 160 ºC
Drying time	40 min	0 min ~ 300 min
Steam exhaust level	3	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC

U07-Fast mode

■ Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting (water drainage) - Drying - Complete

■ Application: Only suitable for sterilization of exposed items. Use cartridge cases or specialized sterilization containers for loading. After sterilization, the items should be used promptly without further storage. There is no defined expiration date.

■ Default parameters of U07 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	134 ºC	105 ºC ~ 135 ºC
Sterilization time	12 min	1 min ~ 6000 min
Drying system	140 ºC	80 ºC ~ 160 ºC
Drying time	20 min	0 min ~ 300 min
Steam exhaust level	3	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC

U08-Waste mode

■ Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting (water drainage) - Complete

■ Application: Sterilization of waste, which can be solids, liquids, or a mixture of solids and liquids

■ Default parameters of U08 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Sterilization temperature	126 ºC	105 ºC ~ 138 ºC
Sterilization time	40 min	1 min ~ 6000 min
Steam exhaust level	0	0-5
Cooling fan	On	On/Off
Extended time for purging cold air	0 min	0 min ~ 10 min
Start time for purging cold air	0 min	0 min ~ 250 min
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC

U09-Agar mode

- Sterilization process: Standby - Water supply - Heating - Melting - Steam exhausting - Warming - Complete
- Application: Agar melting
- Default parameters of U09 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range
Melting temperature	100 ºC	60 ºC ~ 115 ºC
Melting time	10 min	1 min ~ 6000 min
Warming temperature	50 ºC	45 ºC ~ 79 ºC
Warming time	600 min	1 min ~ 9999 min
Cover opening temperature	80 ºC	40 ºC ~ 80 ºC

Note: During the warming stage, the cover can be opened at any time to take out the sterilized load. To continue warming, please close the chamber cover.

U10- User-defined mode

- Sterilization process: Standby - Water supply - Heating - Sterilization - Steam exhausting - Warming (Drying) - Complete
- Application: sterilization process according to user requirements
- Default parameters of U010 and new program parameter ranges generated therefrom

Name	Default Parameter	New Program Range	Remark
Sterilization temperature	121 ºC	105 ºC ~ 138 ºC	
Sterilization completion condition	By time	By time/By F0 value	
F0 value	10	1-300	
Sterilization time	20 min	1 min ~ 6000 min	
Warming temperature	50 ºC	45 ºC ~ 79 ºC	
Warming time	600 min	0,1 min ~ 9999 min	0 indicates the warming function is not activated
Steam exhaust level	Level 3	Level 0 to Level 5	
Cooling fan	On	On/Off	
Drying system	140 ºC	80 ºC ~ 160 ºC	
Drying time	20 min	0, 0 min ~ 300 min	0 indicates the drying function is not activated
Extended time for purging cold air	0 min	0 min ~ 15 min	
Cover opening temperature	97 ºC	40 ºC ~ 99 ºC	
Start time for purging cold air	0 min	0, 1 min ~ 250 min	0 indicates the function is not activated

Note: 1. During the warming stage, the cover can be opened at any time to take out the sterilized load. To continue warming, please close the chamber cover.
2. When "by time" is selected as the sterilization completion condition, only the sterilization time can be set. When "by F0 value" is selected, only the F0 value can be set.
3.When there is pulse purging function, the range is 0-9 times.

7.7. Start sterilization

1) In the standby state, if you click the symbol "<" or ">" once, the displayed program code will change at an increment or decrement of 1 relative to the current program code. For example, the current program code is U02. If you click the symbol ">" once, the program code U03 will be displayed, and if you click the symbol "<" once, the program code U01 will be displayed; and if you hold the symbol "<" or ">" to speedup changeover, the program code displayed will change at an increment or decrement of 10. Select the suitable program and hold the "START" key to start working.
2) Modify or set and start a new program (for details see "Create, Modify, and Delete Programs").
3) Timed startup (for details see "Timed Startup").

7.8. Complete the program and open the lid

1) After the set sterilization time or melting time countdown ends and the cover opening temperature is reached, the system will make a beeping sound.
2) When all the processes of the program are completed and the temperature is 3 ºC below the boiling point in the solid mode or 20 ºC below the boiling point in the liquid mode, the on-screen "COMP." text will flash and the system will make 5 long beeps and a voice prompt "Sterilization completed. Please be careful to prevent scalding when opening the cover!" to indicate that the sterilization has been completed. At this time, the interlocking electromagnet drops down, and the internal pressure is fully released. You can only open the cover by turning the handle, otherwise it cannot be opened.
3) When the temperature drops below 40 ºC, the system returns to the standby state, and it is safe to open the cover.

7.9. Take out the sterilized load

1) When taking out the sterilized load from the sterilization chamber, please wear heat-insulating gloves and wait for the steam to disperse before putting your hands into the sterilization chamber.
2) If the sterilized load is liquid, due to its slow cooling rate, ensure that it is sufficiently cooled to avoid scalding.
3) When taking out the stainless steel basket from the autoclave with a load thermometer, ensure the thermometer is not jammed before removing it.

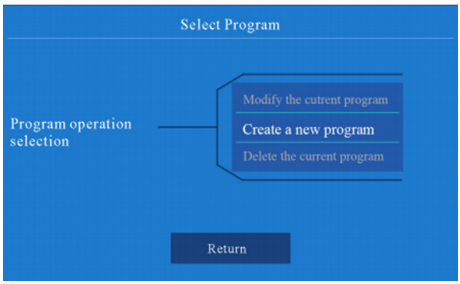
7.10. Turn off the power

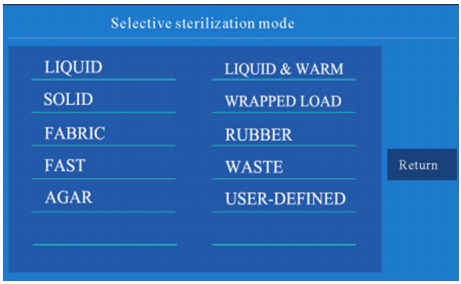
If the sterilization work of the day is over or the autoclave will not be used for a long time, turn off the power switch and drain the water in the chamber.

8. Create, Modify, and Delete Programs

8.1. Create, modify, and delete programs

In the standby state, click the “SET” key at the bottom left corner to go to the back-end operation screen. Select “Program Settings” to enter the screen as shown in Fig. 1, and then choose a modification mode (Modify, Create, or Delete) and a sterilization type as shown in Fig. 2. After selecting the corresponding parameters to be modified, you can modify their values. After completing all parameter settings, if you click the “Back” key to exit the “Program Settings” screen directly, the modified parameters will not be saved; if you click the “Save” key, the system will automatically return to the “Standby” screen and display the latest modified program.





Note: The default programs cannot be deleted.

8.2. Set sterilization time

- Some loads (such as liquids) have high thermal inertia. In order to obtain the desired sterilization effect, it is recommended to use a load thermometer.
- When a floating PT100 sensor is installed and enabled, the temperature of the sterilization chamber will initially reach the set sterilization temperature. However, the sterilization timer will not start counting down until the actual temperature of the load also reaches the set sterilization temperature
- If a clean bag is used for sterilization, fill the bag with 300 ml - 500 ml of water to greatly reduce the lag time in the warming-up process.
- When sterilizing plastic products, appropriately extend the sterilization time, since the heat conduction rate of plastic products is slow

8.3. Auto start timer

Note: This function can only be modified by the administrator

- Modify the current time

Click the “SET” key to enter the back-end operation screen. Then, click the “Auto startup timer” key to enter the screen as shown in Fig. 1. The time parameters are displayed in the following order: year, month, day, hour, minute, and second. After completing the modification, click the “Save instrument time” key to save the time. If no changes need to be saved, click the “Return” key.

Name	Adjustable Range
Year	2000 ~ 2099
Month	StaJanuary ~ December
Date	1st ~ 31st
Hour	0 ~ 23
Minute	0 ~ 59
Second	0 ~ 59

Please make sure that the date to be modified is valid. If an invalid date is set, the system will maintain the time as it was before the modification.

■ Set timed startup

Click the “SET” key to enter the back-end operation screen. Then, click the “Timed Startup” key to enter the screen as shown in Fig. 1. Modify the time parameters including the year, month, day, hour, minute, and second sequentially. After completing the modification, click the “Confirm Timed Startup” key to enter the timed startup mode.

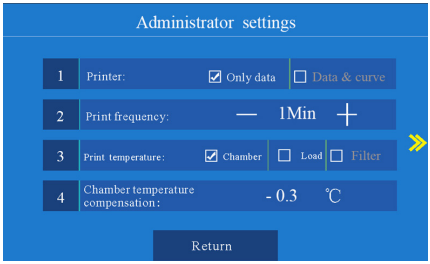
Note: O Please calibrate the clock before setting the startup timer. Incorrect clock settings or improper startup timer settings may lead to a failure in completing sterilization of the load in the set time.

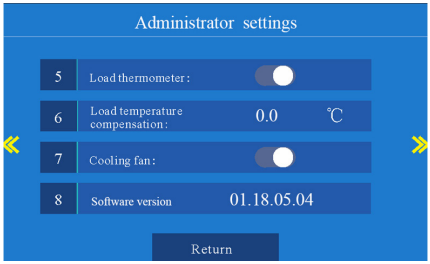
9. Administrator Settings

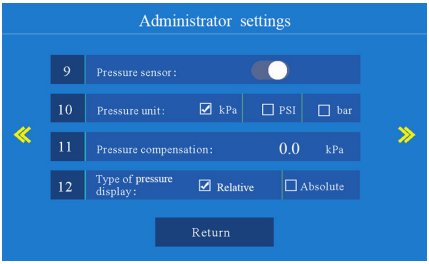
■ In the standby state, click the “SET” key to enter the back end operation screen, and click the “Parameter Settings” key to enter the “Enter Password” screen.

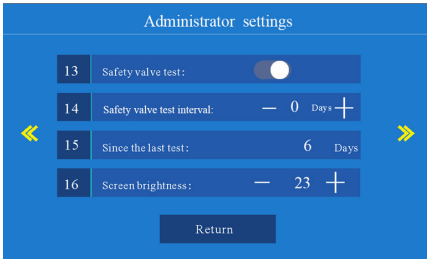
■ The default factory password is 667788; and when the level 5 permission is enabled, only administrators have this permission.

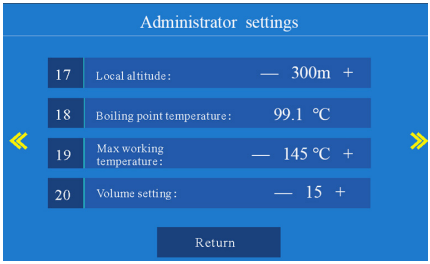
■ The screens that appear when you enter are shown below:

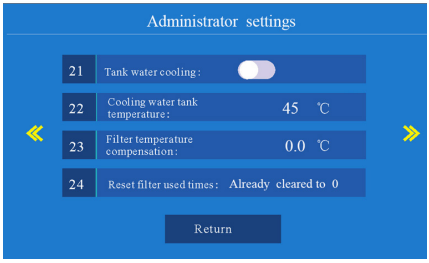


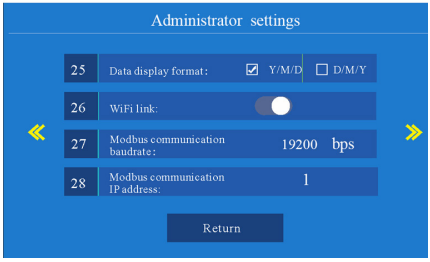

Administrator settings
5 Load thermometer:
6 Load temperature compensation: 0.0 ℃
7 Cooling fan:
8 Software version 01.18.05.04
Return

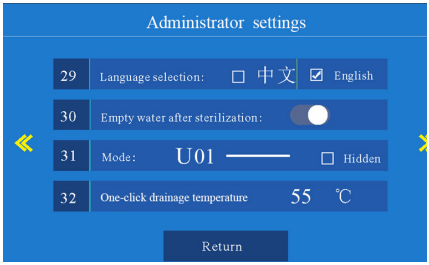

Administrator settings
9 Pressure sensor:
10 Pressure unit: kPa PSI bar
11 Pressure compensation: 0.0 kPa
12 Type of pressure display: Relative Absolute
Return

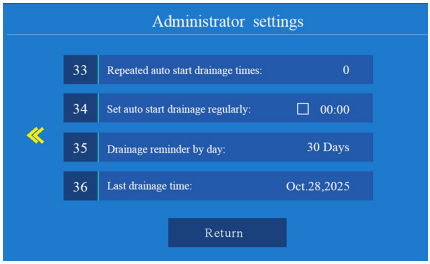

Administrator settings
13 Safety valve test:
14 Safety valve test interval: 0 Days
15 Since the last test: 6 Days
16 Screen brightness: 23
Return

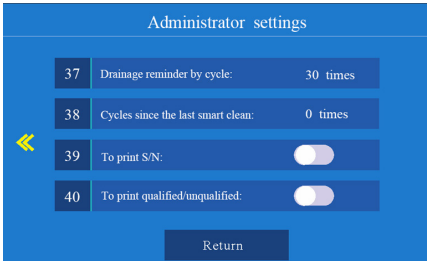

Administrator settings
17 Local altitude: 300m
18 Boiling point temperature: 99.1 ℃
19 Max working temperature: 145 ℃
20 Volume setting: 15
Return


Administrator settings
21 Tank water cooling:
22 Cooling water tank temperature: 45 ℃
23 Filter temperature compensation: 0.0 ℃
24 Reset filter used times: Already cleared to 0
Return


Administrator settings
25 Data display format: Y/M/D D/M/Y
26 WiFi link:
27 Modbus communication baudrate: 19200 bps
28 Modbus communication IP address: 1
Return


Administrator settings
29 Language selection: 中文 English
30 Empty water after sterilization:
31 Mode: U01 Hidden
32 One-click drainage temperature 55 ℃
Return


Administrator settings
33 Repeated auto start drainage times: 0
34 Set auto start drainage regularly: 00:00
35 Drainage reminder by day: 30 Days
36 Last drainage time: Oct.28,2025
Return


Administrator settings
37 Drainage reminder by cycle: 30 times
38 Cycles since the last smart clean: 0 times
39 To print S/N:
40 To print qualified/unqualified:
Return


Administrator settings
41 Smart cleaning:
42 Password change reminder:
43 Sterilization record encrypted export:
Return

■ Administrator menu description

Note: The menu may vary with the models. When the menu is grayed out, it indicates that this model does not have the function.

Item	Name displayed	Notes
1	Printer	“Only data” means printer is “On” to print numerical values; “Data & Curve” means printer is “On” to print numerical values and curves together; and if both not seen, means printer is “Off”. For sterilizers with additional printer.
2	Print frequency	The printing interval during the sterilization stage can be adjustable: 10 s, 20 s, 30 s, or 1 min to 10 min.
3	Print temperature	The temperature selected marked with √. For sterilizers with additional printer.
4	Chamber temperature compensation	Adjustable from -5 ºC to 5 ºC.
5	Load thermometer	Optional. Do not turn it on when your autoclave is not equipped with floating PT100 sensor.
6	Load temperature compensation	Adjustable from -5 ºC to 5 ºC (for floating PT100 sensor compensation).
7	Cooling fan	 indicates “On”, while  indicates “Off”, default is on. When cooling fan is on, it will switch on automatically in the exhausting stage.
8	Software version	Unchangeable, used for after-sale service.
9	Pressure sensor	Optional. Do not turn it on when your autoclave is not equipped with a pressure sensor.
10	Pressure unit	kPa, PSI, or bar
11	Pressure compensation	Adjustment from -5 kPa to 5 kPa
12	Type of pressure display	Gauge/Relative pressure or Absolute pressure
13	Safety valve test	 indicates “On”, allowing for the safety valve test, while  indicates “Off”.
14	Safety valve test interval	Choose reminder frequency for safety valve test: 30, 60, 90, 120, 150, 180, 210, 240, 270, 300 330, 360 days or off.
15	Since the last test	Show how many days have passed since the last safety valve test.
16	Screen brightness	Adjustable from 10 to 25.
17	Local altitude	You can set the local altitude (0 to 3000 m), default is 300, need to change if over 300.
18	Boiling point temperature	Follow the setting in item 17: local altitude, not changeable.

19	Max. working temperature	Adjustable from 141 ºC to 148 ºC for the safety valve test.
20	Volume setting	Adjustable from 0 to 15.
21	Tank water cooling	For sterilizers with additional counter pressure &spraying function.
22	Cooling water tank temperature	Adjustable from 45 ºC to 60 ºC. For sterilizers with additional counter pressure &spraying function.
23	Filter temperature compensation	Adjustable from -5 ºC to 5 ºC. For sterilizers with additional HEPA filter.
24	Reset filter used times	If On, the filter element usage count will be reset; if Off, the count will be accumulated. For sterilizers with additional HEPA filter.
25	Date display format	Two options: Year/Month/Day or Day/Month/Year.
26	Wi-Fi link	If On, you can use Wi-FI to transfer data; and if it is Off, no Wi-Fi connection is required. For sterilizers with additional WiFi function.
27	Modbus communication baud rate	Setting for the MODBUS baud rate. For sterilizers with additional Modbus connection function.
28	Modbus communication IP address	Local IP of MODBUS, adjustable from 1 to 127. For sterilizers with additional Modbus connection function
29	Language selection	Chinese and English
30	Empty water after Sterilization	Select "No" to reject or "Yes" to accept automatic water drainage after sterilization. This function is only available for solid program in models with drying. For sterilizers with additional one key drainage function.
31	Mode	"Hidden": the corresponding mode will be hidden. If you hide all default modes and there are no new programs added, the U01 mode will be displayed by default.
32	One click drainage temperature	55 ºC by default and adjustable from 45 ºC to 80 ºC. For sterilizers with additional one click drain temperature only.
33	Repeated auto-start drainage times	0 by default for low-temperature cleaning and adjustable from 0 to 10. Only for models with the automatic water supply function+one click drain.
34	Set auto-start drainage regularly	Set timed start of low-temperature washing, it will start automatically later.
35	Drainage reminder by day	30 by default (no repetition) and adjustable from 0 to 30. 0 means off.
36	Last drain/clean time	This value is read-only.
37	Drainage reminder by cycle	30 by default and adjustable from 1 day to 60 days. 0 means off.

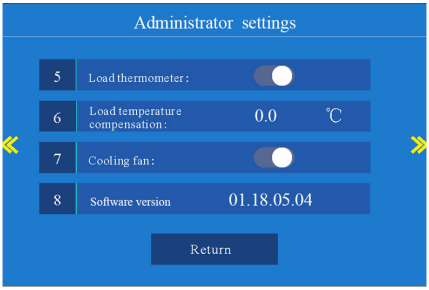
38	Cycles since the last smart cleaning	Cycles that have passed since the last smart cleaning/drainage. Unchangable.
39	To print S/N	 indicates “On”,  indicates “Off”, printer will print if ON. For sterilizers with additional printer.
40	To print qualified/unqualified	 indicates “On”, while  indicates “Off”, printer will print if ON. Only for sterilizers with additional printer.
41	Smart cleaning	Smart cleaning function, default off, do not turn on when there is no automatic water feeding and one click drain function together.
42	Password change reminder	 indicates “On”. It means there will be a reminder if the password of administrator, technician, operator is not changed for 90 days.
43	Sterilization records encrypted export	This function is an optional feature and is disabled by default. When enabled, sterilization records will be exported in an encrypted format, together with dedicated software to generate tamper-proof sterilization record files, ensuring the authenticity and compliance of data traceability.

10. Account Management

For some customers who want to manage the account permission, there are 5 levels authorities for you to manage the use of this sterilizer. The default setting for this function is off. If you want to turn it on, follow the following steps.
Note: After you set up the account, it will always ask for a password each time you turn on the autoclave.

In the standby state, click the  key on the home screen, then click 

in the next page to enter into below page:

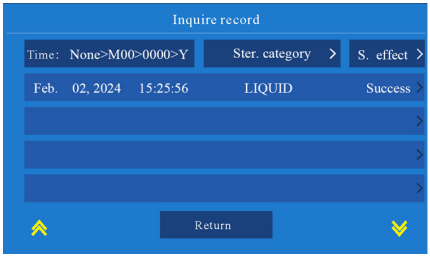


Select the account name by click , and set the password by click . Then, the standby screen will appear.
Note: The autoclave will remember the last account used. For example, if the last used account is "Operator 2", the "Operator 2" account will be displayed after you turn on the machine next time.

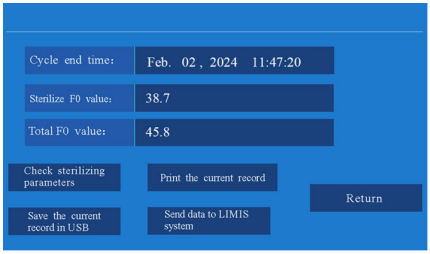
1. Operator account
After selecting the operator account, and entering the password (initial password: 000000), click Confirm key to enter below page:

Operators have a total of 3 permissions: record query, account selection, and password management, as shown in the figure above (where the white text indicates available functions and the gray text indicates a lack of permission). Operators do not have access to set programs, auto start timer and parameter setting.

1.1 Inquire record
In Operator 1 account, click the 4 Inquire record , screen is shown below:

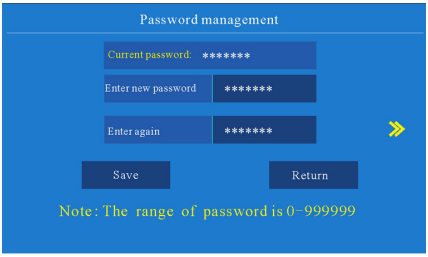


- The most recent records will be automatically displayed at the top.
- Each page will display 4 records. When there are additional records on the next page, a downward triangle at the bottom indicates that there are earlier records. Conversely, an upward triangle at the bottom indicates that there are more recent records on the previous page.
- Each record shows the time when the sterilization was started and whether the sterilization succeeded or not.
- After selecting a record, click the icon > to view detailed sterilization information and to take more actions (some actions require more option functions installed):



1.2 Password management

In Operator 1 account, click 6 Password management > , screen is shown below:



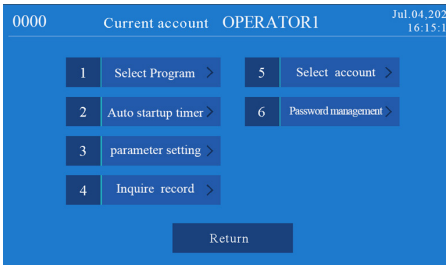
2. Technician account

After selecting the “Technician” account and entering the password (initial password: 000000), click the “Confirm” key to enter Technician account page:

Note: Technicians do not have access to parameters setting.

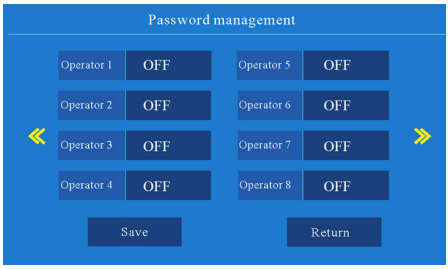
3. Administrator account

After selecting the “Administrator” account and entering the password (initial password: 667788), click the “Confirm” key, screen is shown below:

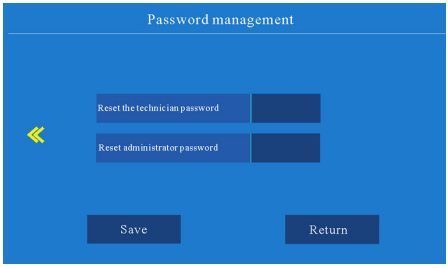


- For “Parameter Settings”, see section 9 “Administrator settings”.
- The “Password Management” function in “Administrator” account can be used to enable/disable “Operator” permissions and reset the passwords of the “Technician” and “Operator” accounts.

A. Enable/disable “Operator” permissions



B. Reset passwords of “Technician” and “Operator” accounts



4. Engineer account from service

This function is only available for engineers from the authorized technical service.

5. Engineer account from manufacturer

This function is not displayed.

11.Troubleshooting

11.1 Error messages

Error	Error message	Recommended solution
E-01	Chamber cover interlock failure	Check if the cover opening/closing handle is set in place. If the handle is in place but the error still exists, contact your distributor.
E-02	Altitude not set	Reset the altitude
	Temperature sensor obstructed by the load	Carefully read the instructions for loading
	Heating system failure	Check the heating tube and wiring or contact your distributor
E-03	Water level sensor contaminated	Clean the water level sensor
	Mismatch between the pressure gauge reading and the temperature	1. Check for blockage in the solenoid valve and pipeline. 2. Check the temperature sensor and its wiring. 3. Check the pressure switch and its wiring.
	Temperature control switch error	Replace the temperature control switch
E-04	Abnormal temperature fluctuation due to abnormal power supply fluctuation	Check whether the power supply voltage is between 198 V - 242 V
	Cold air not fully exhausted	Check the pipeline for blockage, and ensure the load is placed correctly
E-06	Chamber temperature sensor plug disconnected from or in poor contact with the circuit board	Re-connect the temperature sensor plug
	Chamber temperature sensor failure	Replace the temperature sensor
E-07	Master controller temperature sensor plug or wiring short-circuited	Replace the temperature sensor
E-10	Exceptions such as power failure during sterilization	Re-sterilization
E-11	Low external water supply pressure	Adjust the water supply pressure
E-12	Mismatch between temperature sensor and pressure gauge readings	Calibrate or replace the temperature sensor
	Micro pressure switch failure	Replace the micro pressure switch or contact your distributor
E-14	Drying heating system or thermostat failure	Contact your distributor
E-15	Low water level in the sterilization chamber	Add water to the sterilization chamber
	Water conductivity is less than 10 μS/cm	Add an appropriate amount of salt to increase the conductivity to 10-15 μS/cm
	Steam exhaust solenoid valve contaminated	Clean the steam exhaust solenoid valve

E-16	Load temperature sensor plug disconnected from or in poor contact with the circuit board	Re-connect the temperature sensor plug
	Load temperature sensor failure	Replace the temperature sensor
E-18	Solenoid valve and pipeline blocked	Clean the solenoid valve and pipeline
	Error in the temperature sensor/pressure sensor or its wiring	Disconnect and re-connect the temperature sensor/pressure sensor plug. If the issue persists, contact your distributor.
E-19	Container water level sensor contaminated	Wipe the water level sensor inside the container with a clean cloth
E-20	Safety valve test circuit failure	Contact your distributor
E-24	Safety valve pipeline blocked	Clean the safety valve pipeline
	Safety valve failure	Replace the safety valve
E-25	Drying temperature sensor plug disconnected from or in poor contact with the circuit board	Re-connect the temperature sensor plug
	Drying temperature sensor failure	Replace the temperature sensor
E-26	Pressure sensor plug disconnected from or in poor contact with the circuit board	Re-connect the pressure sensor plug
	Chamber pressure sensor failure	Replace the pressure sensor
E-27	Chamber pressure sensor plug or wiring short-circuited	Contact your distributor or replace the pressure sensor
E-31	Low external water supply pressure	Adjust the water supply pressure
	Water inlet filter clogged	Clean the water inlet filter
	Water tank level sensor error	Replace the water tank level sensor
E-32	Water tank level sensor contaminated	Wipe the water level sensor inside the water tank with a clean cloth
E-35	Filter element exhaust pipeline blocked	Clean the filter element exhaust pipeline
	Filter element sensor location with accumulated water	Adjust the instrument's level to make the end close to the sterilization chamber filter element slightly lower than the far end
E-35	Filter element temperature sensor in poor contact, uncalibrated, or failed	Properly re-connect, recalibrate, or, when the error cannot be eliminated, replace the temperature sensor
E-36	Overheat protection sensor open-circuited or short-circuited	Re-connect the temperature sensor plug
E-37	Low water level in the sterilization chamber	Add water to the chamber
	Water level sensor contaminated	Clean the water level sensor
	Water level sensor failure	Contact your distributor

E-38	Chamber cover interlock failure in the standby state	Check if the cover opening/closing electromagnet pops up or is jammed, or contact your distributor
E-50	Boil-dry protection failure	Contact your distributor
Grounding malfunction	Instrument electric leakage or short-circuited	Contact maintenance personnel

11.2 Note messages

Below are note messages. You can click the “Back” key to return to the standby state.

Note Message	Suggestion
Over temperature in the chamber!	Wait for the temperature to decrease before proceeding with work
Clean the chamber, drain the water then remove this note while no water in the chamber!	Please clean the water level sensor, heating tube, and sterilization chamber, and then drain the water from the chamber to clear this message.
Unreasonable setting of auto start time!	Reset the time
The safety valve test hasn’t been done for too long!	Test the safety valve
Water shortage in water tank	Manually add water or enable automatic water filling
Please wait for the micro pressure to release	There is still pressure in the chamber. Please wait for it to be released.

The above table lists some simple errors, causes, and suggestions for solution. If you are unable to deal with these problems, please contact your distributor and provide the following information:

1) Autoclave model and serial number
2) Damaged part and fault phenomenon and sterilized load (error code, if any)
3) Operation details before the error appears
4) Date of purchase of the autoclave
5) Software version