

## Operation Manual



BAVT-300

## Vertical Autoclave

Thank you very much for Choosing Biolab products. Please read the "Operating Instructions" and "Warranty" before operating this unit to assure proper operation.

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## Precautions on Safe Operation

### Precaution:

- For your safety and to operate the instrument properly, please read this Operation Instruction carefully before using and operate following the requirements in this manual. Where you violate the instruction of manufacturer in this manual, it is possible to damage the protection of this instrument.
- This instrument shall not be used for purposes other than sterilization, drying and melting the agar, and it shall also not be used for sterilizing the flammable, explosive and readily oxidizable products or strong acid, alkali and saline solutions to avoid explosion, and corruption of sterilizer chamber or pipelines.
- The power supply of sterilizer should be properly connected according to nameplate on the instrument. In case of excessive voltage fluctuation, the regulated power supply shall be used to ensure optimum performance of the instrument. If you are using other types of voltage, a transformer must be used to prevent the instrument from being damaged.
- It is necessary to ground the instrument properly, and never connect the ground wire to plastic pipeline, gas pipe, telephone ground wire and lightning rod.
- Never block the steam exhaust hole on the safety valve with articles, so that the safety valve may work properly under abnormal conditions.
- Always ensure that the reading of pressure gauge is "0Mpa" before opening the chamber cover. Never attempt to open the chamber cover and drainage valve, or draw out the steam trapping bottle when the pressure inside the sterilizer chamber is over "0Mpa" to avoid injury from ejected pressurized steam.
- Avoid dripping water to the control circuit when adding distilled water to the sterilizer chamber to against electric shock or other faults.
- When using waste processing bags or other type of bags, please put the bags into the stainless steel basket before put into the sterilizer chamber to avoid affecting the precision of temperature.
- If the handle is turned by mistake during sterilization, it will not continue turning as it has been locked by the interlocking device, and there will be a little steam exhausted to release. In this case, press the "STOP" button to stop the instrument immediately. When opening the chamber cover, turn the handle slightly toward the opposition direction that it is wrongly operated, and then turn the handle counter-clockwise until the cover is released.
- Observe the temperature variation inside the sterilizer chamber. The temperature is relatively high when operation has been finished, keep the face and hands away from the sterilizer chamber when opening the cover to avoid injury from ejected pressurized steam. Gloves must be used when taking articles out of the sterilizer chamber.
- Liquid does take some time to get cooling, verify whether the temperature is low enough or not, when taking the liquid after sterilization out of the chamber to avoid scalding.
- Use only distilled water as sterilizing water to avoid affecting the service life of sterilizer.
- When using the instrument continuously, 15 minutes and above interval is required before next operation to allow the instrument to cool down, so that it will be able to produce adequate saturated steam.
- In case of abnormal conditions, such as noise, odor and smog, please turn off the power immediately, and observe until the abnormal condition stops, and then contact the local dealer or customer service department of our company.
- The user shall observe the local regulations related to the pressurized vessels.

# 01 Precautions on Safe Operation

## 1. Technical Specifications

Model	BAVT-301-A	BAVT-302-A	BAVT-303-A	BAVT-304-A
Capacity	36L	54L	80L	100L
External Dimension (L x W x H)	460mmx 542mm x 960mm	460mmx 542mm x 1070mm	620mmx 680mm x 1100mm	620mm x 680mm x 1200mm
Size of Sterilizer Chamber(D x H)	325mmx 460mm	325mmx 670mm	400mmx 709mm	400mmx 809mm
Net Weight	76kg	80kg	140kg	145kg
Power Supply	220V 50Hz/60Hz			
Power Consumption	2300W	2900W	4600W	4600W
Working Environment	5°C—40°C, relative humidity 10%—85%			
Material of Sterilizer Chamber	SUS304			
Sterilization Temperature	105°C: —135°C			
Sterilization Timer	1 —300 min			
Melting Temperature	60°C — 100°C			
Melting Timer	1 —300 min			
Warming Temperature	45°C —60°C			
Warming Timer	1 —9999 min			
Drying time	1 —300 min			
Exhaust temperature	73-104°C			
Steam trapping Bottle	Built-in			
Startup Timer	0 min—6 days delay			
Range of Pressure Gauge	0MPa—0.4MPa			
Rated working pressure	0.25MPa			

Operation Mode	Solid Mode: Heating » Sterilizing » Exhaust Liquid Mode 1: Heating » Sterilizing » Precooling » Exhaust » Warming Liquid Mode 2: Heating » Sterilizing » Precooling » Exhaust Agar Mode: Melting » Warming Solid ( With Drying) Mode: Heating » Sterilizing » Exhaust » Drainage » Opening the cover » Drying
Controller	"SMART-III" microcomputer intelligent control system
Safety Equipment	Chamber cover checking system, self-induction interlocking device, over temperature and temperature abnormal protection system, boil dry protection, relief valve, electric leakage protection equipment, over current and short circuit protection equipment, anti-scald chamber cover and bench.
Accessories	stainless steel baskets, water plate, waste water tank
Optional Accessories	Printer, Printer set

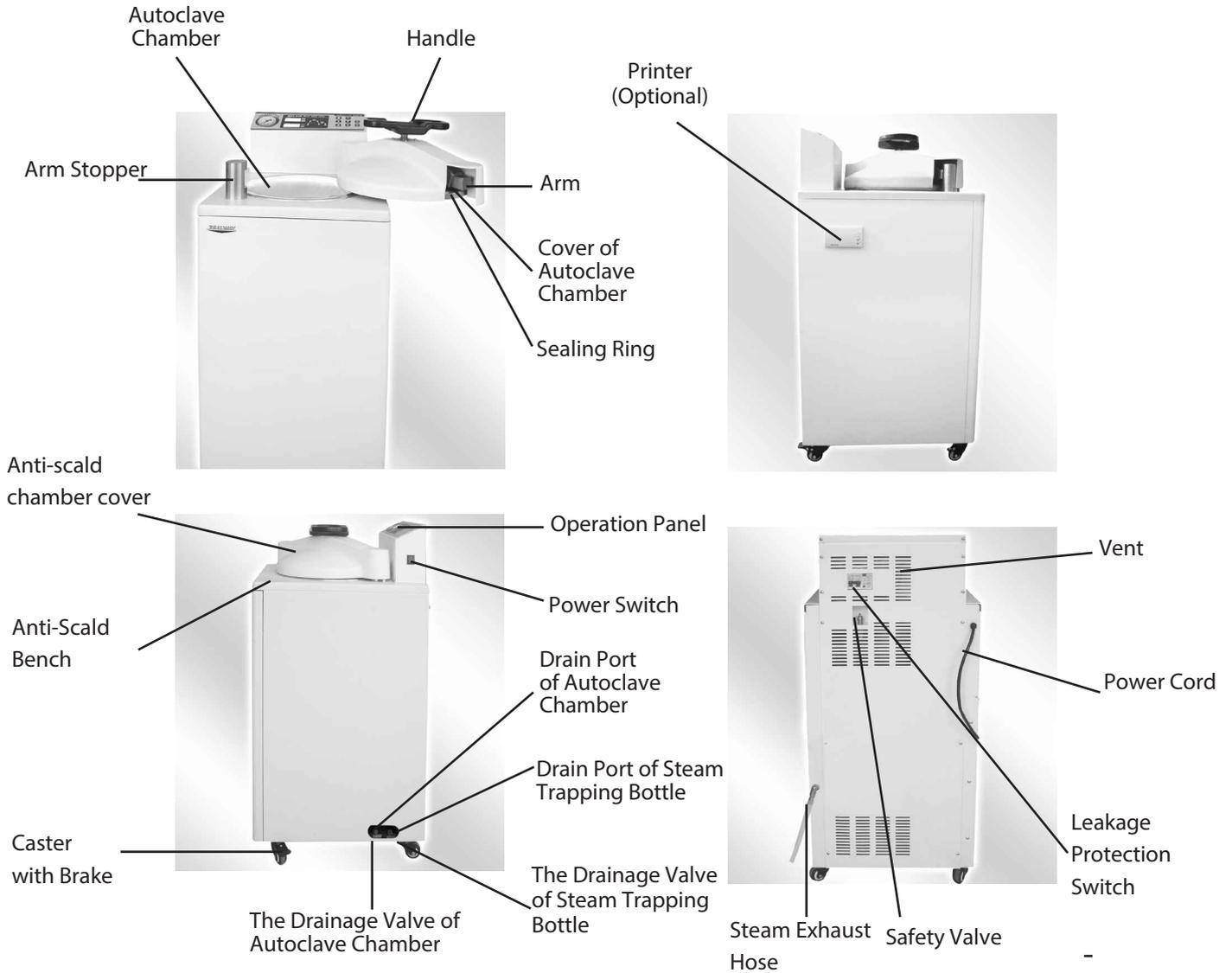
Model	BAVT-301-B	BAVT-302-B	BAVT-303-B	BAVT-304-B
Capacity	36L	54L	80L	100L
External Dimension (L x W x H)	460mmx 542mm x 960mm	460mmx 542mm x 1070mm	620mmx 680mm x 1100mm	620mm x 680mm x 1200mm
Size of Sterilizer Chamber(D x H)	325mmx 460mm	325mmx 670mm	400mmx 709mm	400mmx 809mm
Net Weight	76kg	80kg	140kg	145kg
Power Supply	220V 50Hz/60Hz			
Power Consumption	2300W	2900W	4600W	4600W
Working Environment	5°C—40°C, relative humidity 10%—85%			
Material of Sterilizer Chamber	SUS304			
Sterilization Temperature	105°C: —135°C			
Sterilization Timer	1 —300 min			
Melting Temperature	60°C — 100°C			
Melting Timer	1 —300 min			
Warming Temperature	45°C —60°C			
Warming Timer	1 —9999 min			
Drying time	1 —300 min			

Exhaust temperature	73-104°C
Steam trapping Bottle	Built-in
Startup Timer	0 min—6 days delay
Range of Pressure Gauge	0MPa—0.4MPa
Rated working pressure	0.25MPa
Operation Mode	Solid Mode: Heating » Sterilizing » Exhaust Liquid mode 1: Heating » Sterilizing » Precooling » Exhaust » Warming Liquid mode 2: Heating » Sterilizing » Precooling » Exhaust Agar mode: Melting » Warming
Controller	“SMART-III” microcomputer intelligent control system
Safety Equipment	Chamber cover checking system, self-induction interlocking device, over temperature and temperature abnormal protection system, boil dry protection, relief valve, electric leakage protection equipment, over current and short circuit protection equipment, anti-scald chamber cover and bench.
Accessories	stainless steel baskets, water plate, waste water tank
Optional Accessories	Printer, Printer set

Model	BAVT-301-C	BAVT-302-C	BAVT-303-C	BAVT-304-C
Capacity	36L	54L	80L	100L
External Dimension (L x W x H)	460mmx 542mm x 960mm	460mmx 542mm x 1070mm	620mmx 680mm x 1100mm	620mm x 680mm x 1200mm
Size of Sterilizer Chamber(D x H)	325mmx 460mm	325mmx 670mm	400mmx 709mm	400mmx 809mm
Net Weight	76kg	80kg	140kg	145kg
Power Supply	220V 50Hz/60Hz			
Power Consumption	2300W	2900W	4600W	4600W
Working Environment	5°C—40°C, relative humidity 10%—85%			
Material of Sterilizer Chamber	SUS304			
Sterilization Temperature	105°C: —135°C			

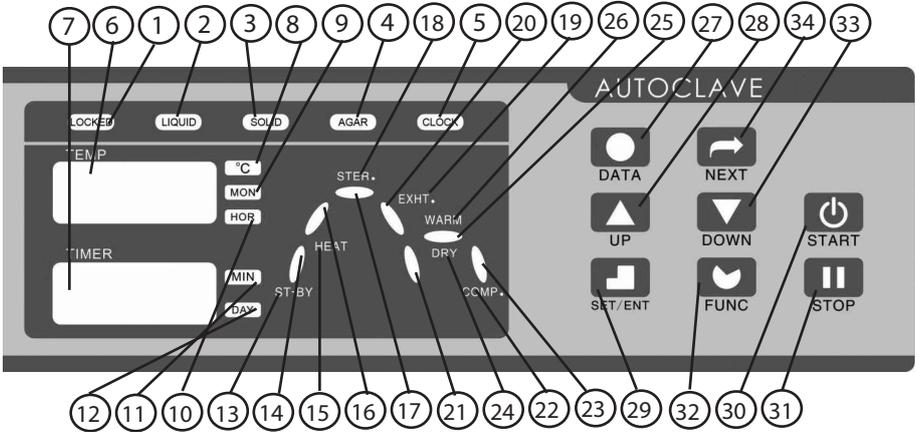
Sterilization Timer	1 — 300 min
Melting Temperature	60°C — 100°C
Melting Timer	1 — 300 min
Warming Temperature	45°C — 60°C
Warming Timer	1 — 9999 min
Drying time	1 — 300 min
Exhaust temperature	73-104°C
Steam trapping Bottle	Built-in
Startup Timer	0 min—6 days delay
Range of Pressure Gauge	0MPa—0.4MPa
Rated working pressure	0.25MPa
Operation Mode	Mode 1: Heating » Sterilizing Mode 2: Melting » Warming
Controller	“SMART-III” microcomputer intelligent control system
Safety Equipment	Chamber cover checking system, self-induction interlocking device, over temperature and temperature abnormal protection system; boil dry protection, relief valve, electric leakage protection equipment, over current and short circuit protection equipment, anti-scald chamber cover and bench.
Accessories	stainless steel baskets, water plate, waste water tank
Optional Accessories	Printer, Printer set

## 2. External Parts & Features

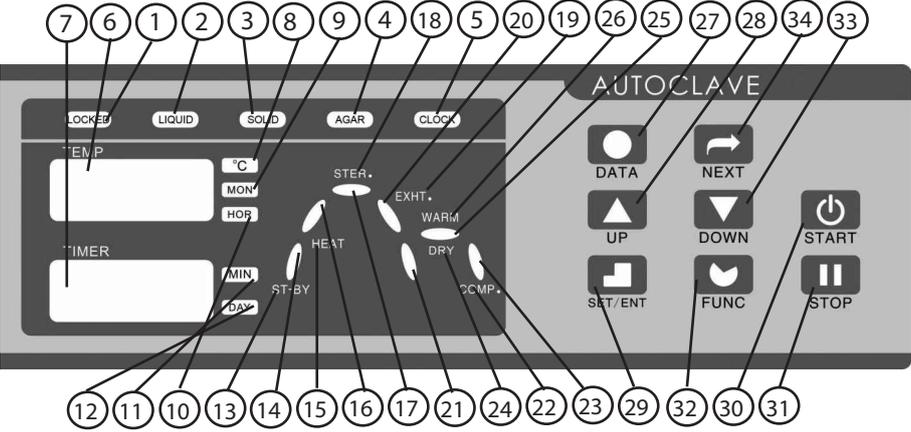


### 3. Functions of Parts

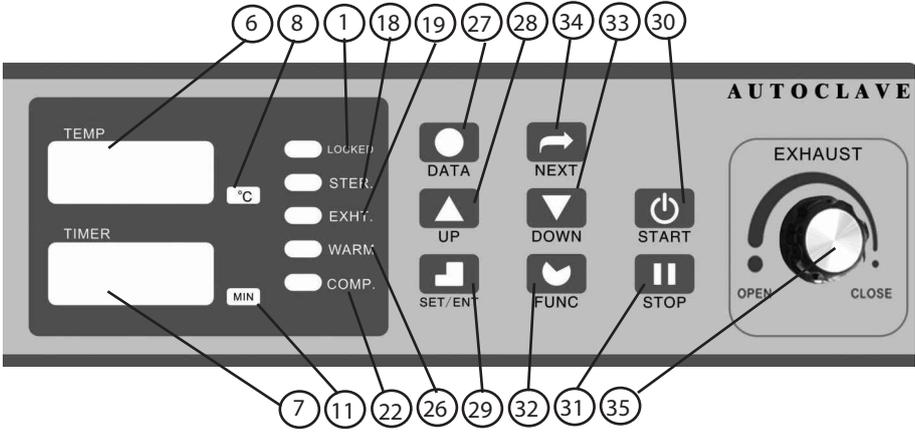
#### BAVT-300 Series A Panel



#### BAVT-300 Series B Panel



#### BAVT-300 Series C Panel



1. LOCKED: The cover closed indicator, which will be on during interlocking
2. LIQUID: The light indicates the current operation mode is liquid mode
3. SOLID: The light indicates the current operation mode is solid mode
4. AGAR: The light indicates the current operation mode is agar melting mode
5. CLOCK: The light indicates the current operation mode is auto startup mode
6. Digital display A: display the set temperature, actual temperature, month and hour
7. Digital display B: display the set time, remaining time, minute, date or user program
8. °C: The light indicates the current unit is °C
9. MON: The light indicates the current unit is month
10. HOR: The light indicates the current unit is hour
11. MIN: The light indicates the current unit is minute
12. DAY: The light indicates the current unit is day
13. ST-BY: The light blinking indicates the instrument is in standby status
14. Heating status indicator 1: The light blinks from initial sterilizing temperature until the local boiling point
15. HEAT: "HEAT" is light and heating status indicator is blinking to indicate that the instrument is in heating stage or melting stage; if "HEAT" and heating status indicator blink together, it indicates entering the melt parameters modification status
16. Heating status indicator 2: The light blinks from the local boiling point until the set sterilizing temperature
17. Sterilizing status indicator: The light blinks in course of sterilizing
18. STER.: "STER." is light and sterilizing status indicator is blinking to indicate that the instrument is in sterilizing stage, the temperature of this stage shall be the set sterilizing temperature. If "STER." and sterilizing status indicator blink together, it indicates entering the sterilizing parameters modification status
19. EXHT.: "EXHT." is light, and steam exhaust status indicator is blinking to indicate that the instrument is in steam exhaust stage. If "EXHT." and steam exhaust status indicator blink together, it indicates entering the steam exhaust temperature modification status. Under liquid & modes, the sterilization chamber and articles can be pre-cooled through setting exhaust temp to avoid liquid boiling over caused by great pressure drop when exhausting
20. Steam exhaust status indicator: The light blinks from the set sterilizing temperature to the boiling point
21. Cooling status indicator 1: The light blinks from the boiling point to 40°C in program without warming
22. COMR: The letter blinking indicates that the running of program is finished
23. Cooling status indicator 2: The light blinks from the completion of warming or drying to 40°C

24. DRY: "DRY" is light, and drying/warming status indicator is blinking to indicate that the instrument is in drying stage. If "DRY" and drying/warming status indicator blink together, it indicates entering the drying parameters modification status (only for TR)
25. Warming status indicator: The light blinks in course of warming
26. WARM: "WARM" is light, and warming status indicator is blinking to indicate that the instrument is in warming stage. If "WARM" and drying/warming status indicator blink together, it indicates entering the warming parameters modification status
27. DATA: Under standby status, you can press "DATA" button to inquire the detailed parameters of current program. When setting the parameters of program, press "DATA" button to cancel the modification and exit, unless the "SET / ENT" button has been pressed to save the modification before pressing the "DATA" button.
28. UP: Under standby status, you can press "UP" button to enter the immediate next program, i.e., the current program is U10, press "UP" button, it will enter U11, and display the detailed parameters of current program. When modifying the parameters of programs, you can press "UP" button to increase the set value, and press and hold the button to increase the display value by 10 units until the maximum value
29. SET/ENT: Setting and Entering button, press the "SET/ENT" button at the first time to enter the program parameters modification status, and press the button again to save the change
30. START: The button is used to start sterilization or melt. For the avoidance of disoperation, this button has delay response function so it could only work when pressed and held for over 2 seconds.
31. STOP: The button is used to stop sterilization or melt. For the avoidance of disoperation, this button has delay response function so it could only work when pressed and held for over 2 seconds.
32. FUNC: "FUNC" button must work with other buttons, press the "FUNC" button and "STOP" button together to delete the current program. Press the "FUNC" button and "NEXT" button together to enter the auto startup mode, press the "FUNC" button and "DATA" button together to enter the administrator menu.
33. DOWN: Under standby status, you can press "DOWN" button to enter the immediate previous program, i.e., the current program is U10, press "DOWN" button, it will enter U09, and display the detailed parameters of current program. When modifying the parameters of programs, you can press "DOWN" button to decrease the set value, and press and hold the button to decrease the display value by 10 units until the minimum value
34. NEXT: Enter the next option
35. Steam exhaust knob: After sterilization, turn the knob to exhaust the steam, otherwise, do not turn on the knob (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C)

#### 4. Optional accessories

1. **Printer:** The printer is optional for the need of recording sterilization process parameters. For enabling the printer, the operator shall enter into administrator menu to set printer to enabled and choose language of printing (English or Chinese) and display of date (DDMMYY or YYMMDD).
2. **Printing Set:** Where it is required to record the sterilization process parameters and check the accuracy of temp, the printing set is optional. This set is comprised of printer and pressure sensor. For enabling, in addition to printer setup, the display unit of the pressure sensor shall be set. (Kpa, PSI or bar)

# 02 Installation of Instrument

## 1. Placement of Instrument

- This is a precision instrument, and it must be placed on the level ground with the brakes of four casters pressed down before installation. Never place the instrument in an environment with high humidity and direct sunlight or a room with temperature lower than 5°C or over 40 °C.
- For better heat dispersion, it is recommended to keep some gaps between the instrument and the wall, normally 10cm from the back and 5cm from the side.
- During steam exhaust or when opening the chamber cover, some steam may come out, therefore, it is recommended not to install the instrument beneath the fire alarm sensor to avoid triggering the alarm.
- The steam exhaust hole of the safety valve must be kept away from the power socket and not blocked.

## 2. Connection

- The instrument must be grounded reliably, if the power socket does not have the ground terminal, it is required to ground the instrument with independent ground wire before powered on.
- Power supply: single-phase AC 220V± 10%, 50Hz/60Hz Requirement for current intensity:  
BAVT-301 A/B/C 16A  
BAVT-302 A/B/C 16A  
BAVT-303 A/B/C 32A  
BAVT-304 A/B/C 32 A
- Connect the power cord to air switch with power pack, of which, the red line connecting with live wire, green line with zero line and yellow/green line with earth wire.
- Check if the voltage and current conform to the requirement before installation.
- Hanging the steam exhaust hose above the surface of waste water tank, or connecting to waste water receiving pipeline directly, and take care to avoid soaking the steam exhaust pipe into the water.

**Note:**The specification of power cord connected switch or protective switch should comply with current requirements on nameplate of machine.

No heavy article is allowed to place on power cord and the damage or exposure of power cord or loosening of output lead may cause fire or electric shock.

### 3. Cleaning

- Switch on the leakage protection switch and turn on the power, and then open the cover of sterilizer chamber, and take out the protective foams from the container. Clean the container and put the water plate and stainless steel baskets in.

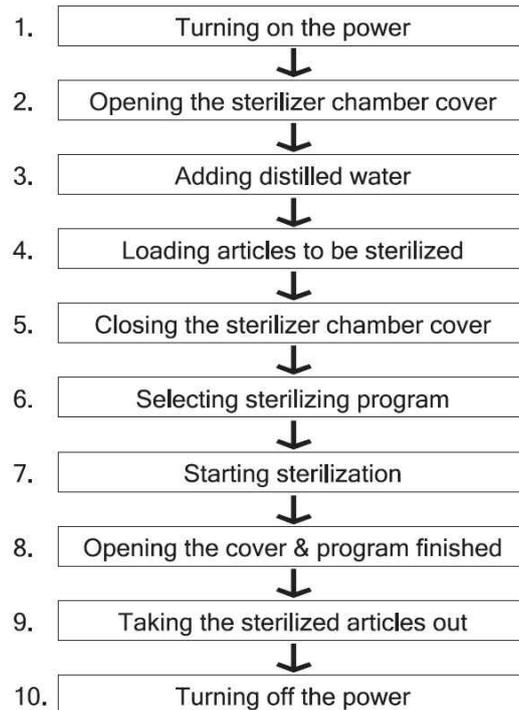
**Note:** Clean the foam scraps inside the sterilizer chamber completely to avoid blocking the pipeline.

### 4. Setting

When shipped from the factory, the unit is set for an elevation of between 0 and 300m. If the elevation of the installation location is higher than 300m, please ask your dealer to change the setting to avoid affecting normal work of sterilization.

# 03 Operation Instruction

## 1. Basic Sterilization Illustration & Operation Instruction



### A. Turning on the power

- Check if the leakage protection switch in the back of the instrument is switched on, and turn on the power switch on the right side of the control panel
- The system may start self-inspection automatically, and then enter the standby status when all the indicators on the panel blink three times: "ST-BY" blinks, the digital display A shows the current temperature, and the digital display B shows the newly saved sterilizing program number, BAVT-304 A/B/C, BAVT-303 A/B/C, BAVT-302 A/B/C, BAVT-301 A/B/C may display the corresponding flowchart of this sterilizing program at the same time.
- When the instrument is in standby status, if there is no operation within 30min, the instrument may enter the power down mode automatically, all the indicators except the cover closed indicator will be off, press any key to resume.

## B. Opening the sterilizer chamber cover

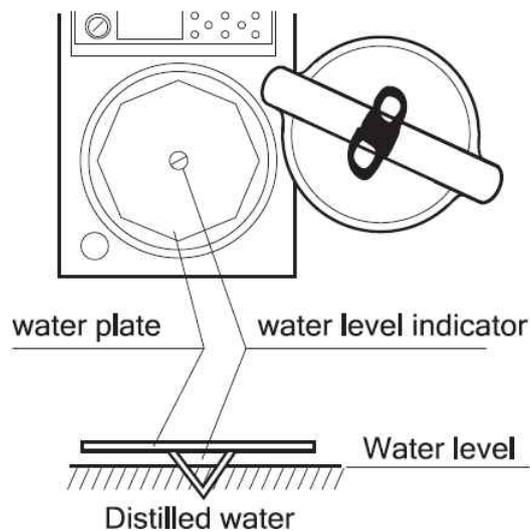
- 1) Turn the handle counter-clockwise until the chamber cover is loosened.
- 2) Push the handle rightward slightly to move the cover to one side.

### Note:

- The cover closed indicator is off at this time, and the sterilizer will not be able to work until the chamber cover is closed and secured.
- Do not open the chamber cover too fiercely, so that it will not be extruded and broken.

## C. Adding distilled water

- Check and confirm if the drainage valve is turned off;
- Add distilled water into the sterilizer chamber until the water flows into the observation hole in the middle of the water plate. The water level shall not exceed the water plate.



### Note:

- Do not open the drainage valve of sterilizer chamber or drainage valve of steam trapping bottle during sterilizing to avoid injury from the high temperature steam.
- The cooling water in the built-in steam trapping bottle may increase continuously when the instrument works continuously, the redundant cooling water will discharge automatically from the steam exhaust hose.
- The water level inside the sterilizer chamber may decrease after each sterilizing. Care must be taken to compensate distilled water on time.
- If it is in a constant water shortage status, the heater may always be easy to dry scorch and then get rusted.

- The distilled water must be used inside the sterilizer chamber, well water, brine or hard water must be avoided to prevent the sterilizer chamber from corrosion, fouling and shortening the life of heater.

#### D. Loading articles to be sterilized

- 1) Take the stainless steel baskets out, and put the articles to be sterilized into the baskets
- 2) Put the baskets back to the chamber of sterilizer

##### Note:

- Verify whether the water plate is in place or not before putting the baskets back into the sterilizer chamber, so that they will not be put on the heater directly.
- When plastic bag is used for sterilizing, please place the bag into the basket beforehand to avoid affecting the accuracy of temperature control of sterilizer.
- When sterilizing the waste processing bag, the bag must be opened to allow the steam to contact the articles to be sterilized adequately.
- When sterilizing the glassware like beaker, conical flask and test tube, the vessel must be put up side down or across. If the vessel can only be in vertical direction, put little water in the vessel before sterilizing.
- When sterilizing the liquids like chemical reagent or menstruum, care must be taken to the volume of liquid inside the container (3/4 of total volume of flask, and 1/2 of total volume of test tube), so that the liquid will not overflow from the container during sterilizing.
- The cover of container to be sterilized should be loosened for air exhaust to prevent container broken.
- During agar melting, the volume of container should be lower than 2L to prevent incomplete melting.
- The DURHAM TEST TUBE with over 6mm caliber should be used, otherwise air bubble may stay in the tube.

#### E. Closing the sterilizer chamber cover

- 1) Push the handle leftward slightly until the arm leans against the arm stopper.
- 2) turn the handle until it is secured and the cover closed indicator is on. The cover closed indicator may change repeatedly in course of tightening. When it is nearly secured, turn the handle slowly while observing whether the cover closed indicator is on or not.

##### Note:

- Before closing the cover, check if there are objects on the surface of sealing ring of the cover and its contact part to avoid damaging the sealing ring that may result in steam leakage.
- The sterilizer will only start working until the cover closed indicator is light. Otherwise, the sterilizer will not be functional.

## F. Selecting sterilizing program

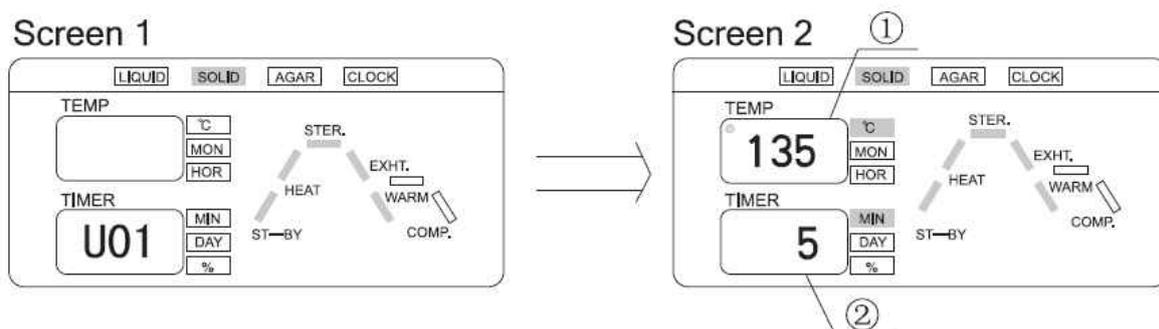
BAVT-304-A, BAVT-303-A, BAVT-302-A, BAVT-301-A are designed with five basic modes saved as U01, U02, U03, U04, and U05 before delivery.

BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B are designed with four basic modes saved as U01, U02, U03, and U04 before delivery.

These basic working modes cannot be modified or deleted as well as the parameters of basic program, while, it allows the user to create new programs by selecting the above working modes or basic programs and modifying the parameters with maximum 60 programs available including basic programs.

### (1) Solid Mode—U01

- Sterilizing flow: Heating » Sterilizing » Steam Exhaust
- Application: solid sterilizing
- Press “DATA” button, the digital display A and B will display the detailed parameters once by two screens:

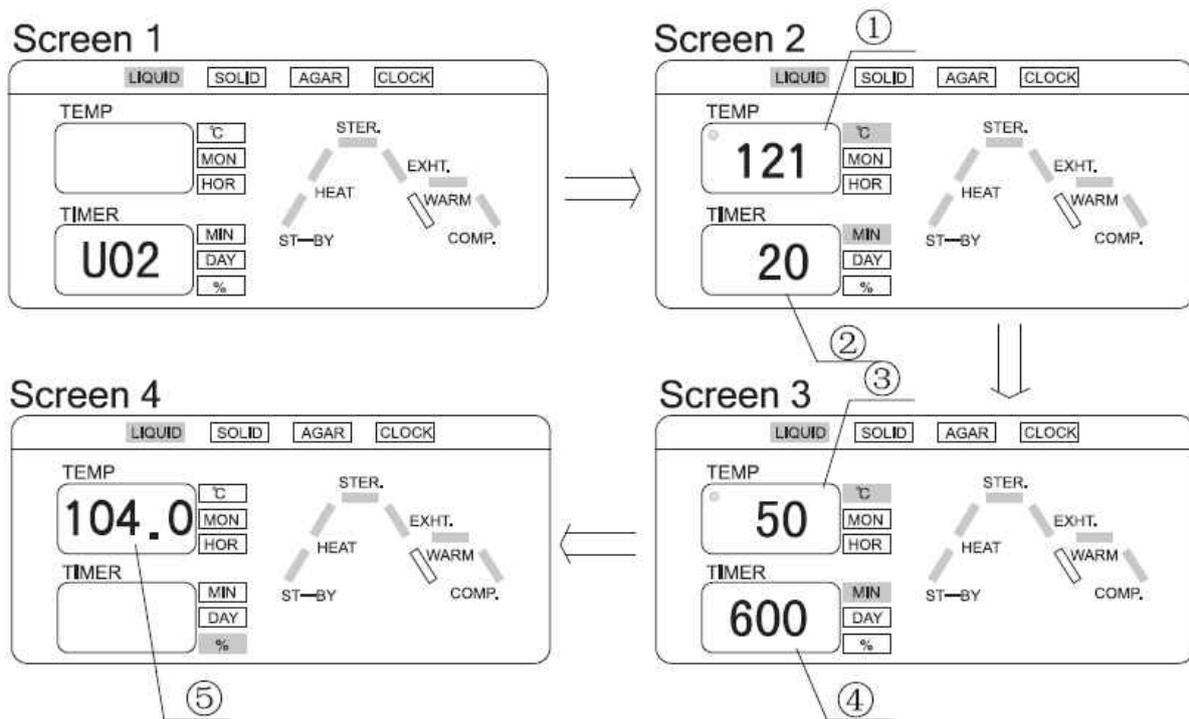


- U01 default parameters and the parameters scope of its newly generated program

Name	No.	Default Parameter	Parameters Range of New Program
Sterilizing Temperature	①	135°C	105°C — 135°C
Sterilizing Time	②	5min	1min — 300min
Warming Temperature		No warming	No warming

### (2) Liquid Mode 1 — U02

- Sterilizing flow: Heating » Sterilizing » Steam Exhaust » Warming
- Application: liquid sterilizing, it may enter automatic warming after sterilization to avoid concretion (e.g. sterilizing of agarose medium)
- Press “DATA” button, the digital display A and B will display the detailed parameters once by four screens:



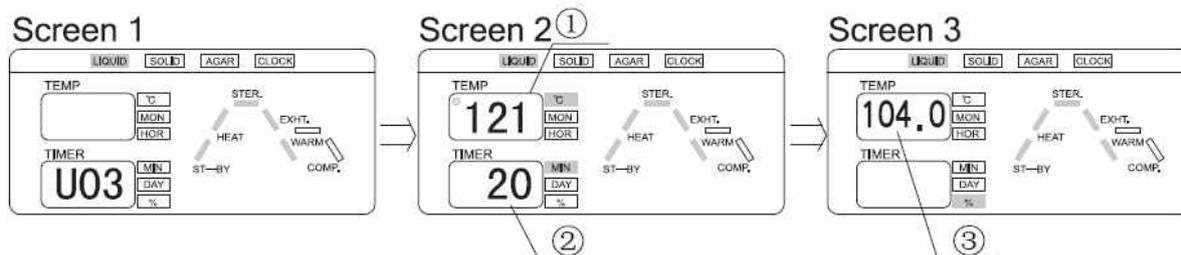
- U02 default parameters and the parameters scope of its newly generated program

Name	No.	Default Parameter	Parameters Range of New Program
Sterilizing Temperature	①	121°C	105°C – 135°C
Sterilizing Time	②	20min	1min – 300min
Warming Temperature	③	50°C	45°C – 60°C
Warming Time	④	600 min	1min – 9999 min
Exhaust Temperature	⑤	104°C	73°C-104°C

### (3) Liquid Mode 2—U03

- Sterilizing flow: Heating » Sterilizing » Steam Exhaust
- Application: liquid sterilizing, no warming after sterilization (such as water, menstruum, chemical reagent and liquid chemicals)
- Press "DATA" button, the digital display A and B will display the detailed parameters once by three screens:

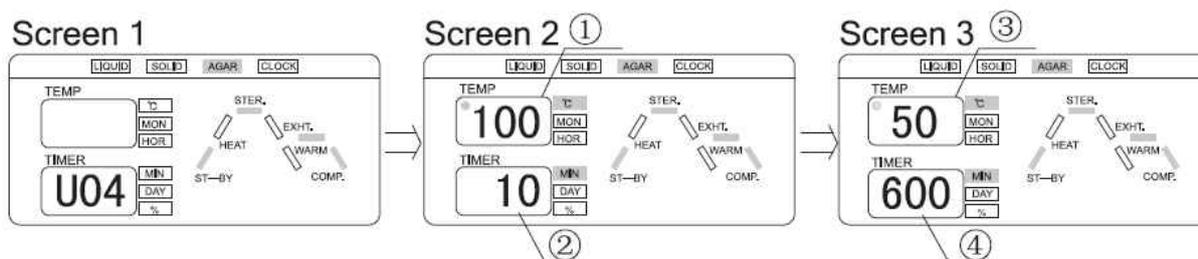
- U03 default parameters and the parameters scope of its newly generated program



Name	No.	Default Parameter	Parameters Range of New Program
Sterilizing Temperature	①	121°C	105°C – 135°C
Sterilizing Time	②	20min	1min – 300min
Warming Temperature		No warming	No warming
Exhaust Temperature	③	104°C	73°C-104°C

(4) Agar Mode—U04

- Sterilizing flow: Heating » Warming
- Application: agar melting
- Press “DATA” button, the digital display A and B will display the detailed parameters once by three screens:

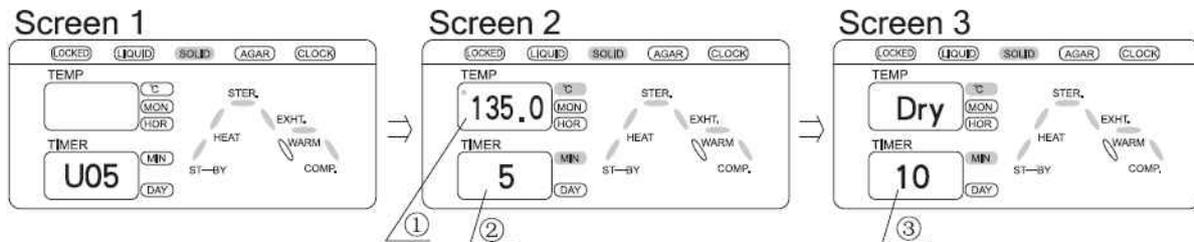


- U04 default parameters and the parameters scope of its newly generated program

Name	No.	Default Parameter	Parameters Range of New Program
Melting Temperature	①	100°C	60°C – 100°C
Melting Time	②	10min	1min – 300min
Warming Temperature	③	50°C	45°C – 60°C
Warming Time	④	600min	1min – 9999min

(5) Solid (With Drying) Mode-U05

- Sterilizing flow: Heating » Sterilizing » Exhaust » Drainage » Opening the cover » Drying
- Application: solid sterilization and then drying
- Press “DATA” button, the digital display A and B will display the detailed parameters once by three screens:

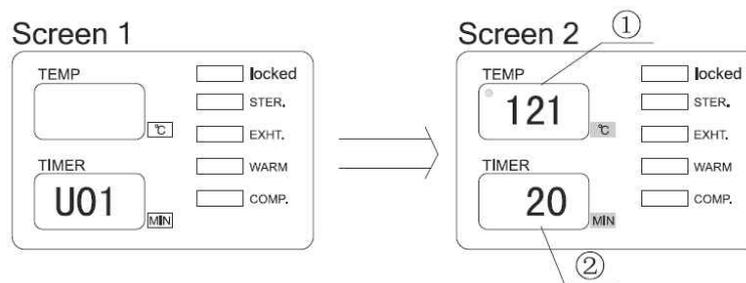


Name	No.	Default Parameter	Parameters Range of New Program
Sterilizing Temperature	①	135°C	105°C — 135°C
Sterilizing Time	②	5min	1min — 300min
Drying Time	③	10min	1min — 300min

2) BAVT-304-C, BAVT-303-C, BAVT-302-C, BAVT-301-C are designed with two basic working modes saved as U01 and U02 before delivery, which cannot be modified or deleted as well as the parameters of basic program, while, it allows the user to create new programs by selecting the above two working modes and modifying the parameters with maximum 20 programs available including U01 and U02.

(1) Mode 1 — U01

- Sterilizing flow: Heating » Sterilizing
- Press “DATA” button, the digital display A and B will display the detailed parameters once by two screens:

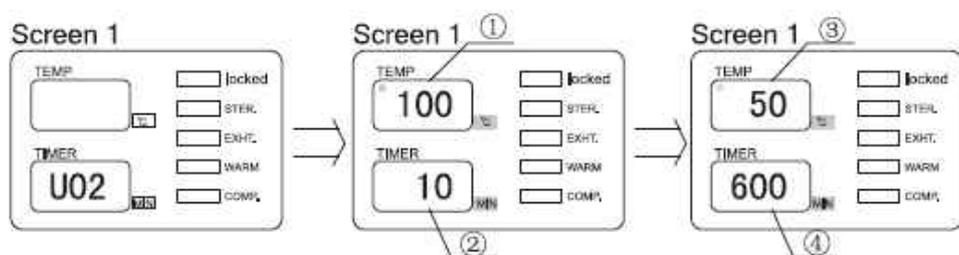


- U01 default parameters and the parameters scope of its newly generated program

Name	No.	Default Parameter	Parameters Range of New Program
Sterilizing Temperature	①	121℃	105℃—135℃
Sterilizing Time	②	20min	1min—300min
Steam Output		Adjust with knob 0—100%	Adjust with knob 0—100%

## (2) Mode—U02

- Sterilizing flow: Heating » Warming
- Application: agar melting
- Press “DATA” button, the digital display A and B will display the detailed parameters once by three screens:



- U02 default parameters and the parameters scope of its newly generated program

Name	No.	Default Parameter	Parameters Range of New Program
Melting Temperature	①	100℃	60℃—100℃
Melting Time	②	10min	1min—300min
Warming Temperature	③	50℃	45℃—60℃
Warming Time	④	600min	1min—9999min

## G. Starting sterilization

1) The newly saved program will be displayed automatically at the start, press “START” to use this program directly.

2) To use other saved programs: under standby status, press “UP” or “DOWN” button once, the program number will increase or decrease by 1 from the current number. If the current program number is U10, press “UP” button once, the program number will be U11, or press “DOWN” once, the program number will be U09; you can press and hold the “UP” or “DOWN” button to increase or decrease the number quickly by 10 units. When the button is released, it will display the detailed parameters of current program by two or four screens automatically. Select the proper program and press “START” to start working.

### 3) Modify or set new programs and start:

Press "UP" or "DOWN" to find the program of the desired mode, and then press "SET/ENT" button to enter the parameters modification screen (See Chapter 3 Operation Instruction Part II—Creating, Modifying and Deleting the Program for details) After modification, press "SET/ENT" again to save and press "START" to start working, or press "START" to start working directly after modification without saving.

### 4) Auto startup (See Chapter 3 Operation Instruction Part III—Clock Checking and Calibration and Part IV—Setting Auto Startup Timer for details)

**Note:** For BAVT-304-C, BAVT-303-C, BAVT-302-C, BAVT-301-C, it is necessary to verify if the steam exhaust knob has been turned off before sterilizing.

## H. Opening the cover & Program finished

### 1) Opening the cover for drying

- Under the mode of solid with drying, the system will send out a sound alarm and the screen A displaying "OPEN" at the same time indicates to open the cover when the set sterilizing time is up and the temperature is 3°C below the local boiling point.
- Loosen the cover, push the handle rightward slightly until the cover is widely opened or half opened. At this time, the drying time displayed on the screen B starts to countdown.

**Note:**

- It is recommended to half open the cover when drying.
- Care must be taken to avoid scald when opening the cover because there will be a little steam to release

### 2) Opening the cover after program finished

- When the set sterilizing time, drying time or melting time is up, the system will send out a sound alarm.
- When all the programs have been finished and the temperature is 3°C below local boiling point (under the solid modes) or 20°C below local boiling point (under the liquid modes), the "COMP." letter will blink. The system will send out 5 long sounds to indicate the accomplishment of sterilizing, care must be taken to avoid scald when opening the cover at this time.
- If the temperature is lower than 40°C, the system returns to the standby status, it is then safe to open the cover.

**Note:**

- If the handle is turned by mistake during sterilization, the handle will not continue turning as it has been locked by the interlocking device, and there will be a little steam exhausted to release. In this case, press the "STOP" button to stop the instrument immediately. When opening the chamber cover, turn the handle slightly toward the opposition direction that it is wrongly operated, and then turn the handle in counter-clockwise until the cover is released.

- Never press the “STOP” button casually to stop the running program during sterilizing of liquids to avoid the liquid overflowing into the sterilizer chamber and even blocking the valve and pipelines.

## I. Taking the sterilized articles out

- Always wear the heat insulation gloves when taking articles after sterilizing out of the sterilizer chamber, and wait until the steam disperses before reaching into the sterilizer chamber.
- When sterilizing the liquids, verify the temperature is low enough before taking it out to avoid scald due to low cooling speed of liquid.

## J. Turning off the power

- Power must be switched off after the completion of daily operations or the instrument will not be used for a long period of time.
- When sterilization is completed of a day, it is recommended to drain out all water in sterilization chamber.

## 2. Creating, Modifying, Deleting the Program

### A. Creating and modifying the program

Press the “UP” or “DOWN” button to find the program of the desired mode , and then press “SET/ENT” to enter the parameters modification screen. Press “ UP” or “ DOWN” to adjust the setting . It will increase or decrease by one unit at each time the button is pressed, once the button is pressed and held, the value will increase or decrease by ten units until it reaches the upper limit or the lower limit. Press the “ SET/ENT” button again, the setting or modification will be saved permanently even if power failure. If you do not want to save the modification, before pressing the “ SET/ENT” button the second time, press “ DATA” button to return to the standby status or press the “ START” button to start sterilizing without saving the modification.

1. When the sterilizing temperature on the digital display A, “STER.” letter and the sterilizing status indicator blink (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) or the sterilizing temperature on the digital display A blinks (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C) to indicate that it is ready to modify the sterilizing temperature.
2. Press the “Next” button, when the sterilizing time on the digital display B, “STER.” letter and the sterilizing status indicator blink (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) or the sterilizing time on the digital display B blinks (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C) to indicate that it is ready to modify the sterilizing time.
3. Press the “ NEXT” button, when “ Dry” letter on screen A, the drying time “ 10” on screen B blink, it

indicates that it is ready to modify the drying time.

4. Press the "Next" button, when the warming temperature on the digital display A, "WARM" letter and the warming status indicator blink (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) or the warming temperature on the digital display A blinks (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C) to indicate that it is ready to modify the warming temperature.
5. Press the "NEXT" button, when the warming time on the digital display B, "WARM" letter and the warming status indicator blink (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) or the warming time on the digital display B blinks (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C) to indicate that it is ready to modify the warming time.
6. Press "NEXT" button, when the steam exhaust temperature on digital display A, "EXHT." letter and steam exhaust status indicator (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) blink to indicate that it is ready to modify the steam exhaust temperature
7. Press "NEXT" button, when The melting temperature on the digital display A, "HEAT" letter and the heating status indicator blink (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) or the melting temperature on the digital display A blinks (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C) to indicate that it is ready to modify the melting temperature.
8. Press the "NEXT" button, when the melting time on the digital display B, "HEAT" letter and the heating status indicator blink (BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B) or the melting time on the digital display B blinks (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C) to indicate that it is ready to modify the melting time.

**Note:**

- The parameters of programs can only be modified under standby status, and the set parameters cannot be changed during sterilizing.
- Press the "NEXT" button at each time, the parameters of basic programs and the newly generated program from which will be modified by the following sequence:

Model	Program	SET/ENT	NEXT	NEXT	NEXT	NEXT	NEXT
BAVT-304- ABAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B	U01 & its generated programs	Display A: Sterilizing temperature	Display B: Sterilizing time	Repeat			
	U02 & its generated programs	Display A: Sterilizing temperature	Display B: Sterilizing time	Display A: Warming temperature	Display B: Warming time	Display A Exhaust-Temperature	Repeat
	U03 & its generated programs	Display A: Sterilizing temperature	Display B: Sterilizing time	Display B: Exhaust temperature	Repeat		
	U04 & its generated programs	Display A: Melting temperature	Display B: Melting time	Display A: Warming temperature	Display B: Warming time	Repeat	
	U05 & its generated programs	Display A: Sterilizing temperature	Display B: Sterilizing time	Display B: Drying time	Repeat		

Model	Program	SET/ENT	NEXT	NEXT	NEXT	NEXT	NEXT
BAVT-304-C, BAVT-303-C, BAVT-302-C, BAVT-301-C	U01 & its generated programs	Display A: Sterilizing temperature	Display B: Sterilizing time	Repeat			
	U02 & its generated programs	Display A: Melting temperature	Display B: Melting time	Display A: Warming temperature	Display B: Warming time	Repeat	

## B. Deleting the program

- Select the program to be deleted, and press the "FUNC" + "STOP" button at the same time to delete the current program.

## C. Setting the sterilizing time

- For sterilization of liquids, set a sterilization time longer than desired, taking a delay time into account: For example, if the volume of water in the flask is 3L, when the internal temperature of the sterilizer

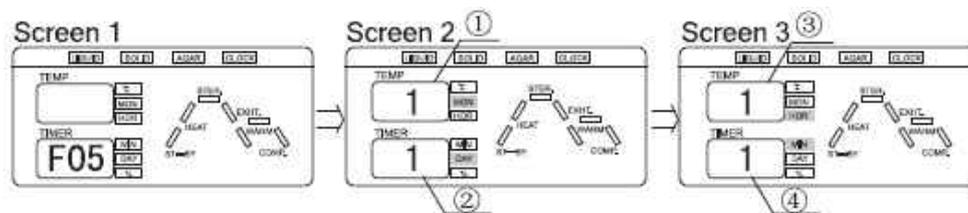
chamber reaches the set value, another 33 minutes shall be required for the water in the flask to reach this temperature, therefore, the sterilizing time must be set to 53 minutes. Actual required sterilizing time (53min) = Delay time (33min) + Normal sterilizing time (20min)

Sterilizing Delay Time Reference Value (Every Flask)	
Liquid Volume	Delay Time
3L	33 min
2L	24 min
1L	16 min

- When waste processing bag is used for sterilizing, 300—500ml water will be helpful to shorten the delay time of temperature-rise period.
- When sterilizing the plastic products, the sterilizing time shall be delayed adequately due to the slow heat conduction of plastic products.

### 3. Clock Checking and Calibration(BAVT-304-ABAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B)

- Under standby status, press “FUNC” and “NEXT” buttons together to enter the clock checking and calibration mode F05, with the digital display A and B showing the currently parameters automatically by sequence:



- F05 Default parameter & parameter adjustable range

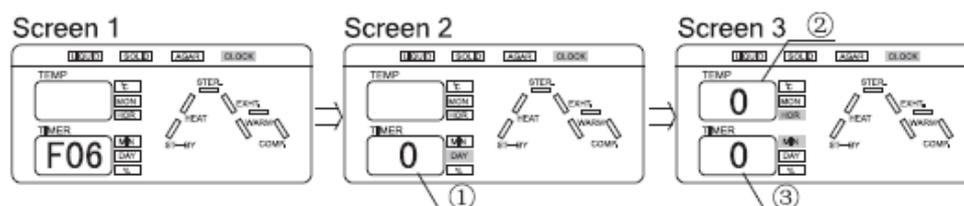
Name	No.	Default Parameter	Adjustable Range
Month	①	1	1—12
Day	②	1	1—31
Hour	③	1	0—23
Minute	④	1	0—59

- 1) After setting the time, press “DATA” button to exit.
- 2) If the time is not set properly, press “SET/ENT” button to enter the parameters modification status: the time on the digital display A and the month indicators blink to indicate that it is ready for modification. Press “UP” or “DOWN” button to increase or decrease the display value by 1 month at one press. Press and hold the button to increase or decrease the display value by 10 unit, and then it stops at 12 (or 1) once it exceeds the maximum value 12 (the minimum value 1).

- 3) Press "NEXT" button, the time on the digital display B and the day indicator blink to indicate that it is ready for modification. Press "UP" or "DOWN" to increase or decrease the display value by 1 day at one press. Press and hold the button to increase or decrease the display value by 10 unit, and then it stops at 31 (or 1) once it exceeds the maximum value 31 (the minimum value 1).
- 4) Press "NEXT" button again, the time on the digital display A and the hour indicator blink to indicate that it is ready for modification. Press "UP" or "DOWN" to increase or decrease the display value by 1 hour at one press. Press and hold the button to increase or decrease the display value by 10 unit, and then it stops at 23 (or 0) once exceeds the maximum value 23 (the minimum value 0).
- 5) Press "NEXT" button again, the time on the digital display B and the minute indicator blink to indicate that it is ready for modification. Press "UP" or "DOWN" to increase or decrease the display value by 1 minute at one press; press and hold the button to increase or decrease the display value by 10 unit, and then it stops at 59 (or 0) once exceeds the maximum value 59 (the minimum value 0).
- 6) Press "SET/ ENT" button to save the set or modified parameter permanently, which will not be lost even in case of power off. To exit without saving the modification, press the "DATA" button to return to the standby status before pressing the "SET/ ENT" button the second time.

#### 4. Setting Auto Startup Timer (BAVT-304-ABAVT-303-A, BAVT-302-A, BAVT-301-A BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B)

- 1) Under clock checking and calibration mode (F05), press "FUNC" and "NEXT" buttons together to enter the auto startup timer mode "F06", with the digital display A and B showing the currently parameters automatically by sequence:



- F05 Default parameter & parameter adjustable range

Name	No.	Default Parameter	Adjustable Range
Delay Day	①	0	0—6
Startup Time	②	0	0—23
Startup Time	③	0	0—59

- 2) After setting the delay time, press "DATA" button to exit.
- 3) If the time is not set properly, press "SET/ENT" button to enter the parameters modification status: The digital display B (delay day) blinks to indicate that it is ready for modification. Press "UP" or "DOWN" to increase or decrease the display value by 1 day at one press, with the maximum 6 days and minimum 0 day delay available.

4) Press "NEXT" button, the digital display A (hour) blinks to indicate that it is ready for modification. Press "UP" or "DOWN" to increase or decrease the display value by 1 hour at one press. Press and hold the button to increase or decrease

the display value by 10 units, and then it stops at 23 (or 0) once it exceeds the maximum value 23 (the minimum value 0).

5) Press "NEXT" button again, the digital display B (minute) blinks to indicate that it is ready for modification. Press "UP" or "DOWN" to increase or decrease the display value by 1 minute at one press. Press and hold the button to increase or decrease the display value by 10 units, and then it stops at 59 (or 0) once it exceeds the maximum value 59 (the minimum value 0).

6) For example:

1. If it is planned to start up the instrument at 6:30 pm, please set the time as follows: delay day=0, hour=18, minute=30.

2. If it is planned to start up the instrument at 6:00 am next morning, please set the time as follows: delay day=1, hour=6, minute=0.

7) Press "SET/ENT" button to save the modified data, and the "CLOCK" indicator is on. Press "DATA" button, it will display the specific parameters of current program.

8) Press "START" button, the timer starts working, and "CLOCK" and "ST-BY" indicators blink; otherwise, if "START" button is not pressed, the instrument will not start working automatically although the time has been preset.

9) Cancel the auto startup timer setting: Enter the timer setting mode F06 again to modify all delay time to 0 or turn off the power to disable the auto startup timer setting.

**Note:**

- The clock shall be calibrated before setting the auto startup timer. Incorrect clock or auto startup timer setting may not allow you to achieve the sterilized products at the desired time.
- Auto startup timer must be reset after each use.

# 04 Maintenance, Care & Management

## 1. Maintenance & care

### A. Drainage of built-in Steam Trapping Bottle

- The water in the steam trapping bottle should be changed every week.
- When changing the water, connect one end of the drainage hose with the drain port of steam trapping bottle, and put the other end into a water collector, release the drainage valve to drain, and turn off the valve counter-clockwise after the drainage.

**Note:** When the machine needs to be transported, the water in the steam trapping bottle should be emptied.

### B. Adding Water & Drainage of Sterilizer Chamber

- Before each sterilizing, it is required to observe if the water in the sterilizer chamber enters the observation hole in the middle of the water plate, otherwise, add water.
- The water in the sterilizer chamber must be changed every week, or change at any time within one week if the water is dirty.
- When changing the water, connect one end of the drainage hose with the drain port of sterilizer chamber, and put the other end into a water collector, release the drainage valve to drain, and turn off the valve counter-clockwise after the drainage.

**Note:**

- Make sure that the water in the sterilizer chamber is at room temperature before changing the water.
- If the sterilizer will not be used for a long period of time, the water in the sterilizer chamber must be emptied to avoid blocking the pipeline.

### C. Cleaning & Maintenance of Heater

- Take out the water plate and check whether the surface of heater is clean or not. Otherwise, wash with soft brush and rinse, and then empty the dirty water.
- Care must be taken to avoid moving or destroying the temperature control switch during cleaning.

## D. Cleaning the Instrument Surface

- The surface of instrument may be cleaned slightly using soft cloth with little neutral detergent solution, and then dried with cloth.

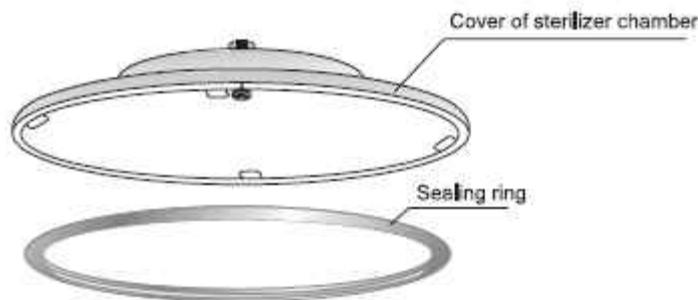
**Note:** Do not use any organic solution that may destroy the coating of instrument.

## E. Checking the Leakage Protection Switch

- Press the leakage protection switch to test the button, if the switch trips, it shall be normal, otherwise, turn off the power switch and contact the dealer.
- Press the reset switch, and turn the switch back to the upturned position.
- Check at least once a month.

## F. Cleaning & Replacement of Sealing Ring of Chamber Cover

- Wipe the surface of the sealing ring and its contact parts with soft and clean cloth at least once a week to avoid steam leakage resulted from damage of sealing ring with foreign matters.
- If the edge of sealing ring of cover becomes white or hardened, it may lead to steam leakage, and must be changed.



**Note:**

- After replacing the sealing ring, it is necessary to check the air-tightness of the new sealing ring, and if there is any leakage, stop the instrument and check immediately.

## 2. SETTING OF ADMINISTRATOR

- Under standby condition, press and hold FUNC and DATA buttons, then screen A will show " 0000". Among these, the first " 0" flashing means it is changeable. And press of UP or DOWN button may adjust the first digit to " 6" , and then press NEXT button. At this time, the second " 0" flashing means it is changeable. By analogy, you could input password and press SET/ENT button for confirmation to enter into parameter modification menu.
- In this menu, screen A will show P001 and screen B will display corresponding parameters so that you could press UP or DOWN button to change. After change, press SET/ENT button to save and exit, or press DATA button to quit. Choosing the NEXT button, screen A will show the next setting menu or press and hold the NEXT button until the desired menu to be changed appears.
- Administrator menu
- P001 Printer enabled or not: Yes refers to printer enabled that could print various status data automatically during operation, and no means printer disabled.
- P002 Button sound switch: yes means enabled and no for disabled.
- P003 Setting of pressure unit: 1: Kpa; 2: bar; 3: psi; 4: no means no this optional accessory or pressure sensor disabled.
- P004 Display of printing date: 0: DDMMYY; 1: YYMMDD
- POOS Printing language: 0: English; 1: Chinese
- P006 Safety valve test: yes for enabled; no for disabled
- P007 Chamber temp sensor' s temp compensation: the temp compensation scope is -5--+5; screen B will show temp compensation value and press of UP or DOWN button may adjust the value.
- P008 Setting of max working temp: The temp range is 135-145°C and press of UP or DOWN button may adjust the max temp for safety valve test.
- P009 Setting of local altitude: the UP or DOWN button may be used for adjusting the altitude and every press of this button will increase or decrease one unit and pressing and holding it will be 50 units increase or decrease until the upper limit of 3000m or lower limit of 0.
- P010 Boiling point temp corresponding to altitude: after setting of altitude, press NEXT button and local boiling point will be shown, and the value of 99.8 on the screen represents the boiling point 99.8°C.
- P011 Display of software version: no change available

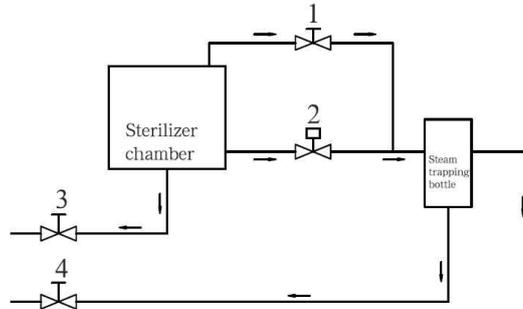
## 05 Troubleshooting

- The automatic control system of the sterilizer monitors the real time operation of the instrument. Whenever any failure occurs, the system may send out alarm and display the error code, then, please press the STOP button to return to standby status, and turn off the power, check the error code and handle on time.

Error Code/ Symptom of Failure	Possible Causes	Troubleshooting Method
E01	The cover of sterilizer chamber is not secured	Turn the handle until the cover closed indicator is on and the cover is secured
E02	Heater is burnt	Contact the local dealer
E03	Heater dry scorch	Add water to the chamber until the water flows into the observation hole
	The steam exhaust knob is not turned off (BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C)	Turn off the steam exhaust knob
	Safety valve or pressure switch is not functional and lead to pressure builds up excessively	Replace the safety valve or pressure switch
	Out of control of temp leading to overpressure in chamber	main board or temp sensor failed
E04	Abnormal fluctuation of power results in abnormal change of temp	Whether the power supply is between 198V and 242V
E05	Solenoid valve jammed by contaminants leads to abnormal work of exhaust valve	Contact the local dealer to change the automatic steam exhaust valve
E06	Temperature sensor comes off the circuit board	Plug the temperature sensor in place
	Temperature sensor is not functional	Replace the temperature sensor
E07	Plug or joint of temperature sensor is short-circuited	Contact the local deal to replace the temperature sensor
E08	Temperature in the chamber when start working is higher than 100°C	Wait until the temperature falls down before restart
E09	Improper setting of the startup timer	Reset the timer
E10	Power failure in the course of sterilization	Re-sterilize
E13	Failure of drying temp controller	Contact the local dealer
E14	Failure of heating system or temperature control system	Contact the local dealer
E18	Over high pressure in sterilization chamber	Stop working and contact the local dealer
E20	Safety valve test circuit failed.	Contact the local dealer
Unable to rise to the set sterilizing temperature	If the steam exhaust knob is turned Off	Turn off the steam exhaust knob
Leakage protection switch trips	Reset switch is not pressed	Press the reset switch
	Electric leakage, short-circuit or over-current with the instrument	Contact the local dealer

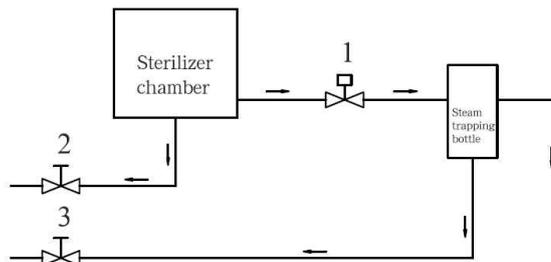
# 06 Diagram of pipeline & interface

## 1. Pipeline for BAVT-304-C BAVT-303-C, BAVT-302-C, BAVT-301-C



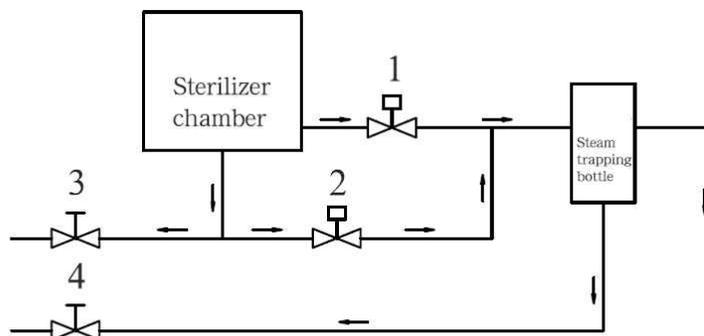
1. Needle valve      2. Exhaust solenoid valve      3. Drain valve of sterilizer chamber      4. Drain valve of steam trapping bottle

## 2. Pipeline for BAVT-304-B, BAVT-303-B, BAVT-302-B, BAVT-301-B



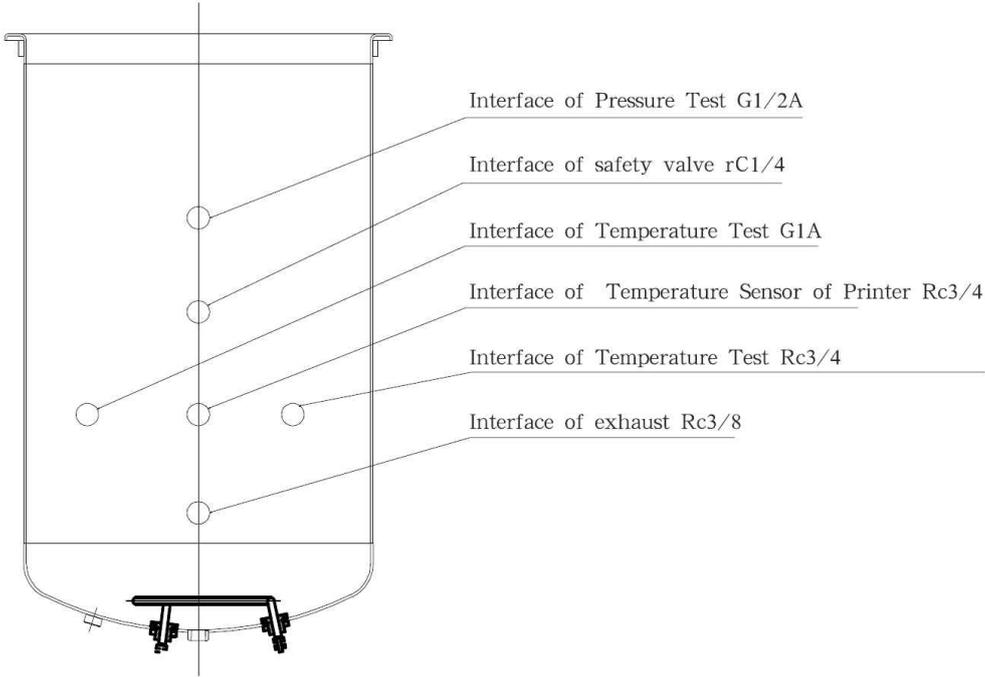
1. Exhaust solenoid valve      2. Drain valve of sterilizer chamber      3. Drain valve of steam trapping bottle

## 3. Pipeline for BAVT-304-A BAVT-303-A, BAVT-302-A, BAVT-301-A

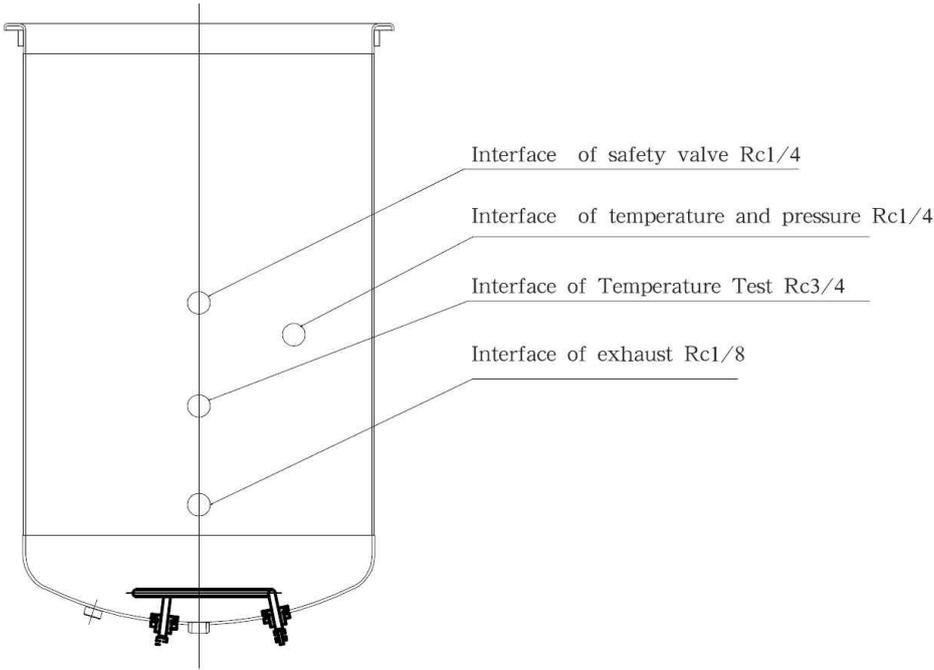


1. Exhaust solenoid valve      2. Exhaust solenoid valve  
3. Drain valve of sterilizer chamber      4. Drain valve of steam trapping bottle

4. Interface diagram of BAVT-303-A /BAVT-303-B / BAVT-303-C / BAVT-304-A / BAVT-304-B / BAVT-304-C

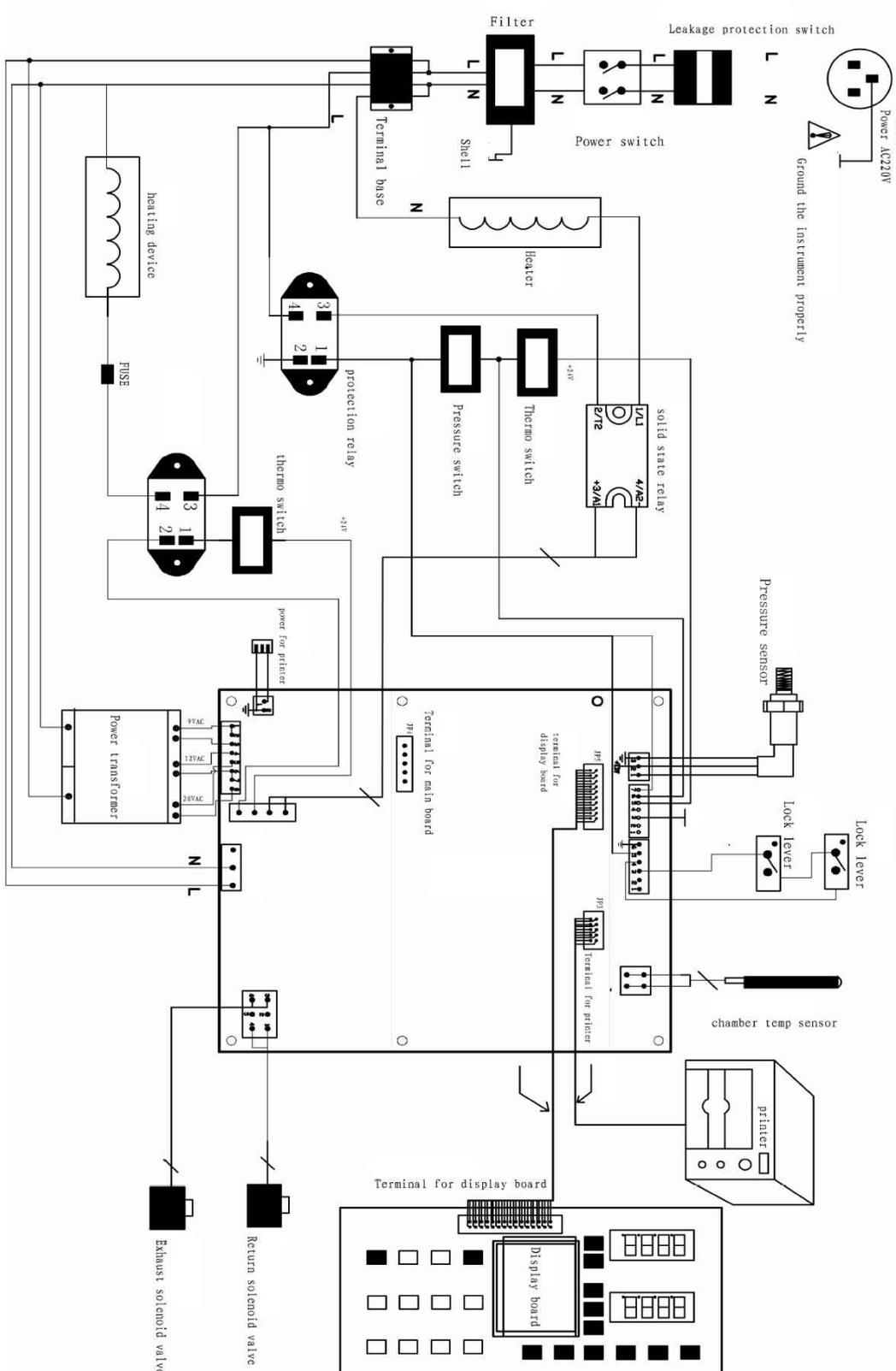


5. Interface diagram of BAVT-301-A / BAVT-301-B / BAVT-301-C / BAVT-302-A / BAVT-302-B / BAVT-302-C

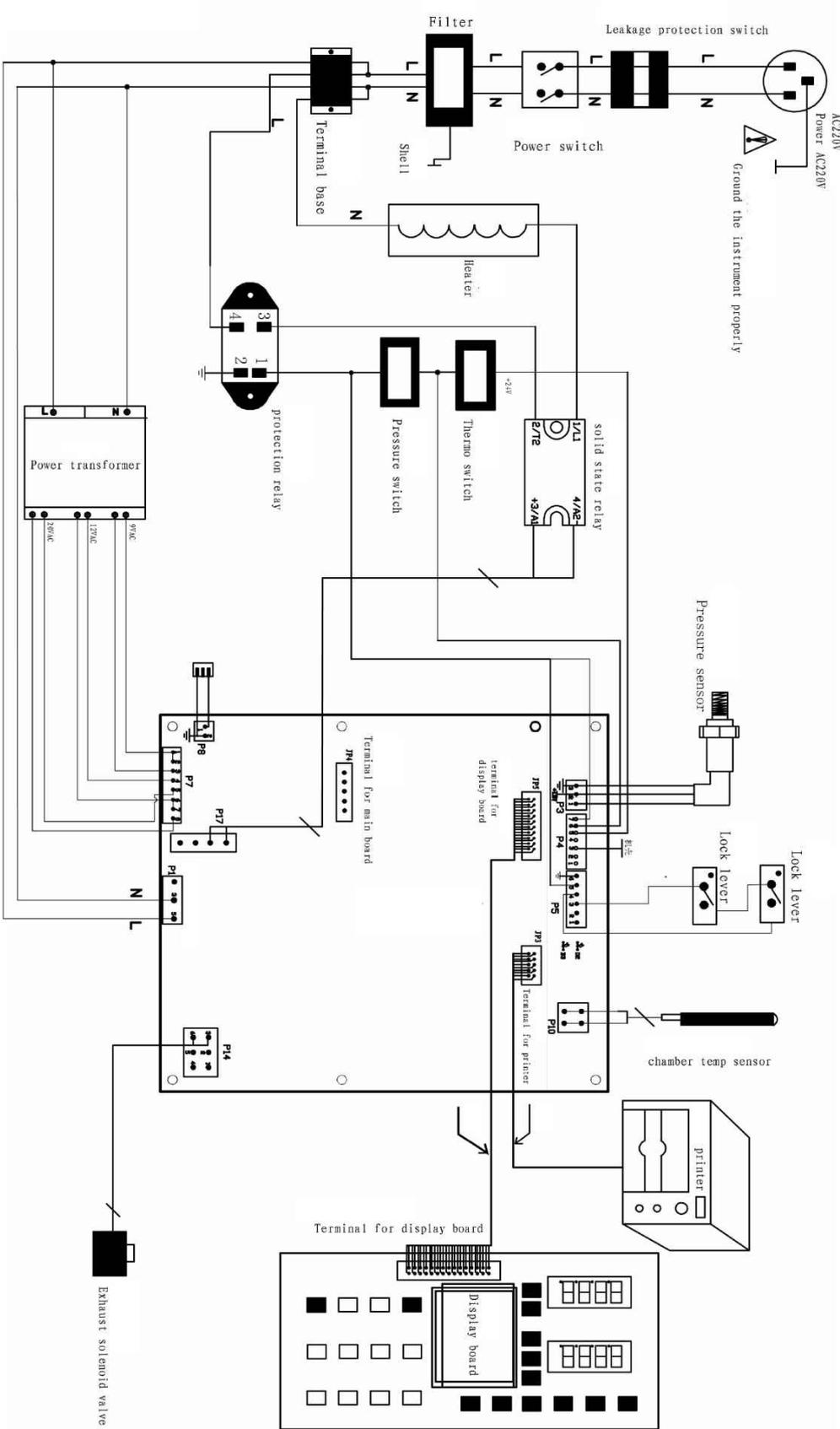


# 07 Wiring Diagram

## 1. Wiring Diagram for BAVT-301-A / BAVT-302-A / BAVT-303-A / BAVT-304-A



## 2. Wiring Diagram for BAVT-301-B / BAVT-301-C/ BAVT-302-B / BAVT-302-C / BAVT-303-B / BAVT-303-C / BAVT-304-B / BAVT-304-C





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