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Operating and Service
INSTRUCTION MANUAL
FOR

**TABLETOP
HIGH SPEED
STEAM STERILIZER**
Model HS-1606



HS-1606

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SAFETY INSTRUCTIONS

The following instructions should be strictly observed to ensure the safety of life and property when operating, inspecting, and repairing this sterilizer. The manufacturer shall not be held liable for damages caused by failure to correctly follow these safety instructions, as well as the operating instructions detailed in this manual.

01. The operator should carefully read this manual, and should have a good working knowledge and experience in sterilization. This sterilizer should be used in accordance with the methods specified herein.
02. The area where the sterilizer would be installed should be ventilated at least ten times an hour.
03. Do not sterilize the loads that may deteriorate, discolor, and/or deform. Also, do not sterilize loads that are explosive or toxic, and that malfunction when exposed to high-pressure and high-temperature steam.
04. In sterilizing goods or materials whose physical and chemical properties have not been confirmed, please apply the sterilization methods specified in the literature provided by their respective manufacturers.
05. Observe the following pointers in loading the items to be sterilized:
 - ① Place the item to be sterilized in the tray supplied by the manufacturer, and put the tray on the rack.
 - ② Do not put the tray containing the item to be sterilized directly on the chamber floor or on the heater's cover, and avoid bringing the tray in contact with these parts.
 - ③ Do not bring the package of the item to be sterilized in contact with the chamber wall.
06. When sterilizing liquids, please observe the following:
 - ① Use only vented closures. Do not use a screw cap or rubber stopper.
 - ② Use only borosilicate glass bottles (type 1). Do not use ordinary glass bottles or containers that are not designed for sterilization purposes.
 - ③ Avoid opening the door immediately after completing the sterilization cycles. Instead, slightly open the door and let it cool for about ten minutes.
 - ④ Do not shake or move the hot bottle, as doing so may lead it to burst.
07. Do not sterilize saline solutions.
08. Use the sterilizer only when it is properly grounded to earth.
09. During sterilization, the operator should be near enough to be able to watch over it and hear any warning or unusual sounds that may indicate equipment failure. Also, make sure that sterilization has been completed and that the sterilizer has been turned off before leaving.
10. Only technically qualified and experienced personnel should inspect, adjust, and repair the sterilizer:
 - ① Always wear protective gloves when operating the sterilizer.
 - ② Disconnect the power plug and let the sterilizer cool down before conducting inspection and maintenance.
 - ③ Use only those spare parts designated by the manufacturer.
11. When cleaning the door or chamber, do not use a wire brush, steel wool, abrasives, or materials containing chlorides.

1. DESCRIPTION

This sterilizer uses saturated steam as a sterilant generated in its chamber and is fully automated in all processes by means of microprocessor. If a trouble takes place, it alarms with digital display and buzzer through the self-diagnosis function, and then stops the cycles. The door lock system is of eccentric latching type, which is an epochal structure closing the chamber airtight easily.

Table 1-1. Specifications	
MODEL	HS-1606
OVERALL SIZE	W350 × H315 × D485 mm
CABINET	W350 × H280 × D417 mm
CHAMBER	∅161 × D295 mm, Cylindrical Type Volume 6ℓ, SUS 316
RECEPTACLE	Volume 1.0ℓ
TRAY	W118 × H20 × D280 mm, Qty. 2 ea
PRESSURE GAUGE	Dial Type, 0~4 bar
TEMPERATURE SENSOR	Pt 100Ω (DIN)
NET WEIGHT	14 kg
POWER SOURCE	AC230 V, 50/60 Hz
POWER CONSUMPTION	1,400 W
STERILIZING AGENT	Saturated Steam max. 2,2 bar of Pressure
AIR REMOVAL	Gravity
CONTROLS	8 bits Microprocessor
EXPOSURE TEMPERATURE	121°C ~ 134°C
ENVIRONMENT CONDITIONS	<ul style="list-style-type: none"> * Altitudes up to 2,000 meters. * Temperature range of +5°C to +40°C. * Maximum relative humidity of 80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C. * Main supply voltage fluctuation of ±10% of nominal. * Installation Category (Overvoltage Category) II, Pollution Degree 2.

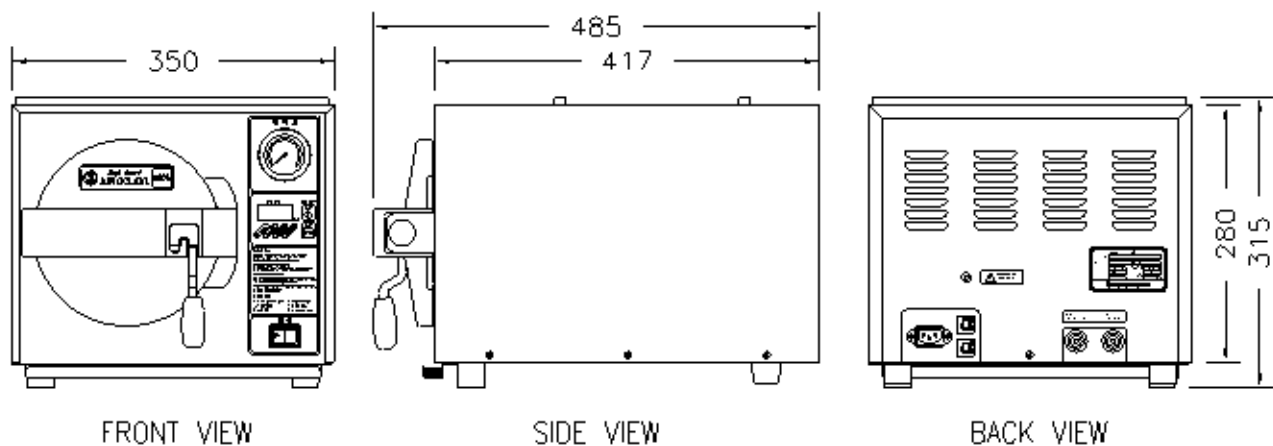


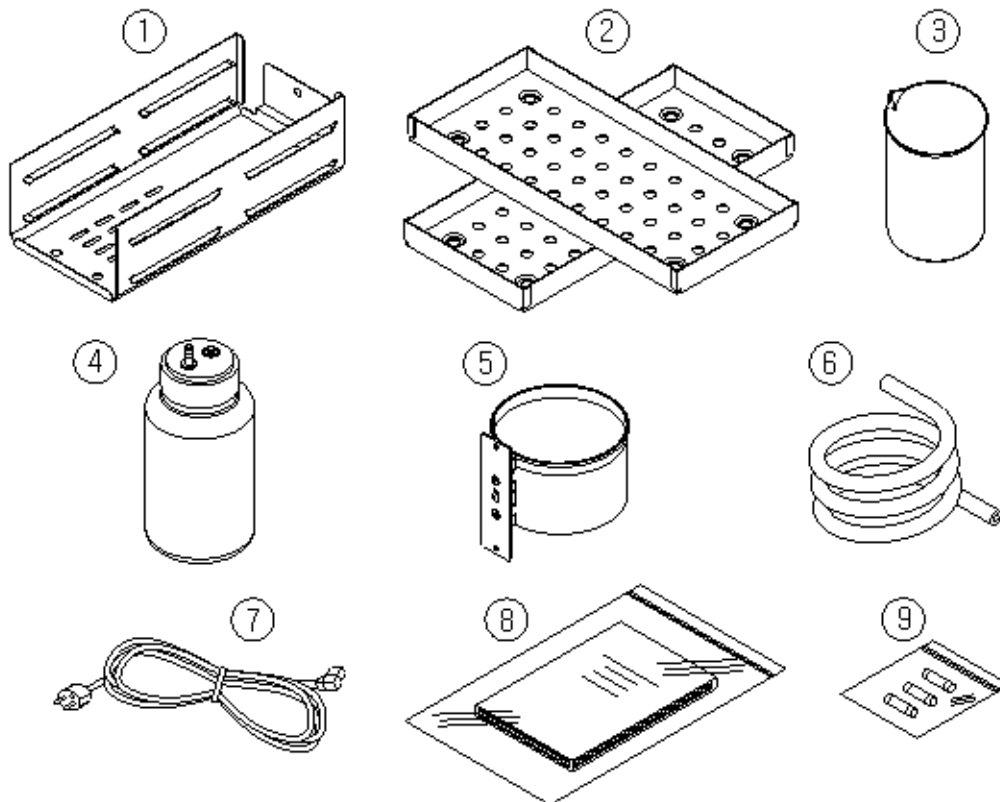
Figure 1-1. Dimensions of Unit

2. INSTALLATION

This sterilizer performed all test and inspection at the factory before shipping, so there is no problem in installing and using. And all necessary measures were taken to ensure safe arrival of the merchandise at its destination.

2.1 Receipt and Handling

Upon delivery, the recipient should thoroughly check the device (both inside and outside), together with the delivery service. If anything is damaged or has been lost during delivery, please inform us, our representative immediately.



Standard Accessories	
① One (1) Tray Rack (Stainless Steel)	① One (1) Tray Rack (Stainless Steel)
② Two (2) Tray (Stainless Steel)	② Two (2) Tray (Stainless Steel)
③ One (1) Water Pail (500ml Vol.)	③ One (1) Water Pail (500ml Vol.)
④ One (1) Condensate Receptacle	④ One (1) Condensate Receptacle
⑤ One (1) Receptacle Underpinning	⑤ One (1) Receptacle Underpinning

Figure 2-1. Standard Accessories

2.2 Installation

Remove sterilizer from carton. Put the sterilizer on a table of height (about 800mm) convenient to use. The table shall be level and separated from both sides and the rear for a good ventilation by spacing some gap (about 100mm).

CAUTION : The sterilizer should not be installed where ventilation is limited or at the vicinity of water supply or sewerage system, inflammable or toxic gas unit and heat source.

CAUTION : In case the sterilizer is located in slanted posture, disorder such as overheating, etc. may occur.

2.3 Door Open/Close

Open the door of the chamber. Lift the handle up forwards (in 90° direction), and the tenseness of the door will be released. If you push the handle to the left along the breadthwise groove, the latch will be removed from the hook. If you insert the handle in the left perpendicular groove and lower it, the door will be fastened with the latch open.

2.4 Cleaning

Take out the contents (trays, rack etc.) of the chamber. Clean them up, replace them into the chamber and then close and lock the door. The closing and locking of the door shall be done in the reverse order of opening. Install the condensate receptacle and connect to the vent of unit with the hose (refer to Figure 2-1. ⑥).

2.5 Power Supply

Plug the power cord in the outlet of rated voltage (refer to Table 1-1).

CAUTION : The sterilizer should not be connected to power outlet together with other electrical appliances. The sterilizer should be grounded and extension power cord line should not be used.

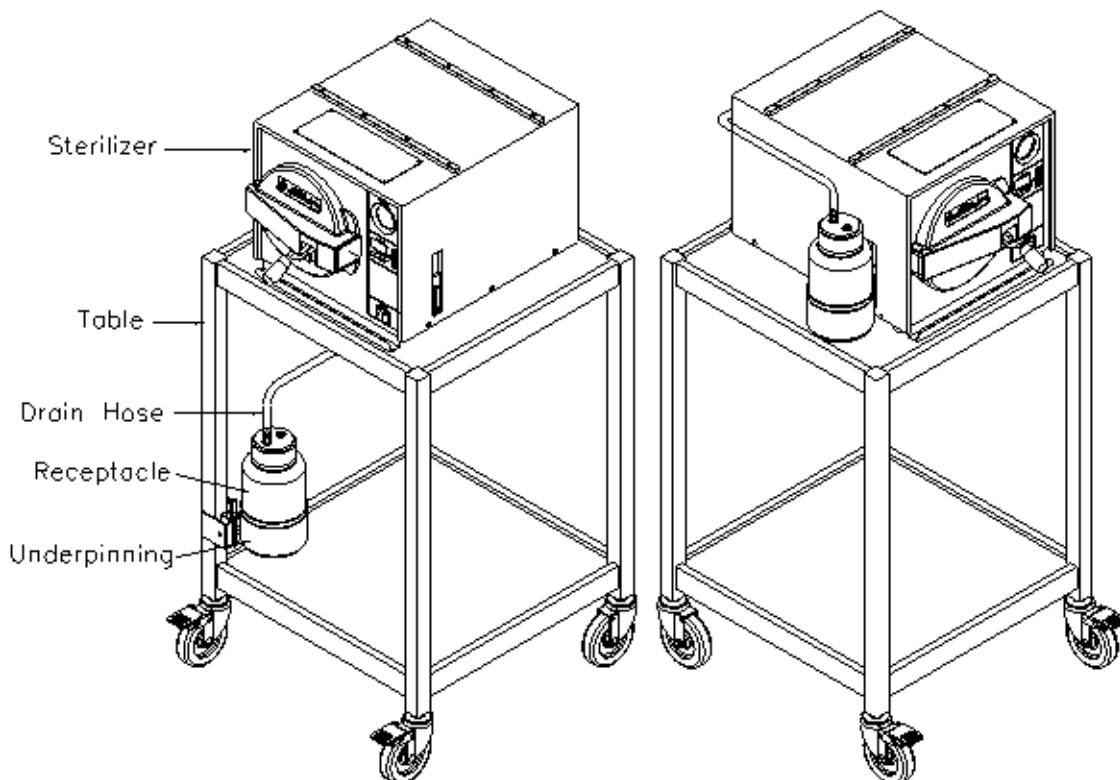


Figure 2-2. Installation

3. OPERATION

You can select an appropriate program according the type of material of which wrapped or unwrapped medical instruments and products are made such as metal, plastics, rubber, glass, fiber, liquids and so on. And then you can start to sterilize them.

CAUTION : In using this sterilizer, explosive or toxic material, and other substance which may cause deterioration, discoloration, transformation or malfunction in the heat and moisture should not be sterilized. Applying of the goods whose characteristic to heat and moisture is not identified should be made by contacting the manufacturer of that substance.

3.1 Cycle Program

(1) If you want to select one of the Cycle programs, press the <PROG.> key. Whenever pressing the <PROG.> key, one of the basic cycle programs will be set in turn. You can select an appropriate program by the type, material, packing of the loads and exposure time (see Table 3-1).

CYCLE NO.	#1	#2	#3
OPERATION TEMPERATURE	134℃	134℃	121℃
EXPOSURE TIME	3 min	12 min	30 min
LOADS	Unwrapped Metal Instruments, Glasswares	Wrapped Metal Instruments	Unwrapped Plastic, Rubber Goods

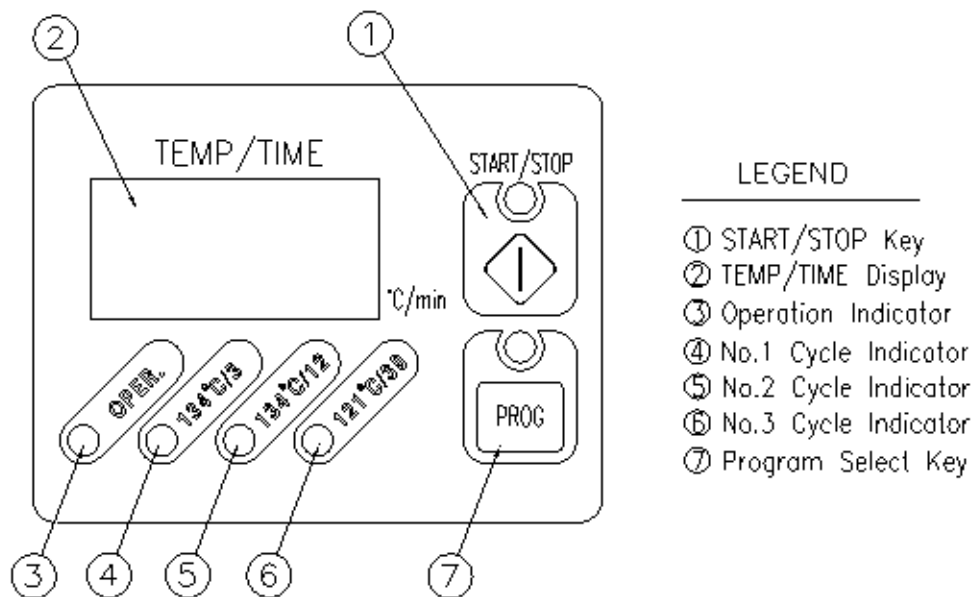


Figure 3-1. Control Panel

(2) Self-Diagnosis

The Self-Diagnosis Program detects the following 6 malfunctions, displays the error code on [TEMP./TIME] and gives an aural warning with a buzzer. And then the cycle will be aborted.

Error Code	Problem	Standard
Er 1	Malfunction of temperature sensor	Normal
Er 2	Overheating of heater	less than 330°C
Er 3	Door opens during cycle	should be locked
Er 4	Deviation of exposure temperature	within $\pm 4^{\circ}\text{C}$
Er 5	Heating speed too high	less than 50°C/min
Er 6	Excess of heating time	within 30min

3.2 Preparation of Sterilization

- (1) Check that the condensate receptacle connected to the vent (Figure 6-2. ㉑) with drain hose?
- (2) Turn the <POWER> switch on.
 - The #1 indicator out of three type cycle program indicators will be lit as a default.
 - The actual temperature will be displayed in the [TEMP./TIME].
- (3) Open the door, and pour the distilled water (300ml~500ml) into the chamber with the water pail (refer to Figure 2-1).

CAUTION : In case of the insufficient water in the chamber, because of the low water the heater may be overheated during the cycle.

NOTE : If the heater is overheated up to 330°C because of the low water in the chamber, the thermostat cut off the power and an alarm (Err 2) will occur. If there is pressure more than of the atmosphere in the chamber, the chamber will be vented automatically. When the heater has been cooled, press reset button to restore the power supply (refer to 5.2 Maintenance).

- (4) Put the prepared loads on the trays and load the chamber.
- (5) If you lock the door, the operation indicator [OPER.] will be lit.

3.3 OPERATION

CAUTION : Unless the door is locked, the sterilizer does not run.

CAUTION : If the only loads or loads on the trays are placed on the heater cover directly, it may be burned. The packages should not be contacted to the chamber wall.

- (1) If you want to select one of the cycle programs (134°C/3min, 134°C/12min, 121°C/30min), press the <PROG> key and then select one you want (see Table 3-1). Whenever pressing the <PROG> key, one of the cycle programs will be set in turn. The indicator of the selected cycle will be lit.

- (2) If you press the <START/STOP> key, and the sterilizer will begin the cycle simultaneously with heating.
- [TEMP/TIME] displays the actual temperature until the sterilizing temperature of the chamber has been reached. If the sterilizing phase starts with preset temperature, sterilizing temperature and remain time will be displayed alternately at an interval of 0.5 seconds.
 - The operation indicator [OPER.] blinks during running of the heater.
- (3) The cycle is full automatically proceeded in the order of HEATING, STERILIZING, VENTING and COMPLETE.
- (4) When the vent is finished, and the temperature of chamber drops below 107°C, the LED displays "End" and the completion signal buzzes for 30 seconds at an interval of 0.1 second. If you press the <START/STOP> key, the completion signal stops.
- (5) Check the chamber pressure is below than 0.3 kgf/cm², open the door and take out the loads.
- (6) If you open the door or press the <START/STOP> key, the last cycle program will be restored automatically.
- Generally, recommended exposure time is as follows.

Table 3-3. Recommended Exposure Time

Material to be Sterilized vs Minimum Time in Minutes	GRAVITY		VACUUM
	121°C	132°C	132°C
INSTRUMENTS, metal only, in perforated tray, unwrapped	15	3	4
INSTRUMENTS, metal, unwrapped, combined with sutures, tubing or other porous materials	20	10	4
INSTRUMENTS, metal only, in lightly covered or padded tray	20	10	4
INSTRUMENTS, metal, combined with other porous materials, in lightly covered or padded tray	30	15	4
INSTRUMENTS, wrapped in muslin -4 thicknesses- for storage	30	15	4
GLASSWARE, empty, inverted	15	3	4
DRESSINGS, wrapped in paper or muslin	30	15	4
DRESSINGS, loosely packed, in canisters (on sides)	30	15	4
LINEN, packs, maximal size (12"x12"x20") and weight (12 lbs)	30	-	4
SYRINGES and NEEDLES, disassembled, lumen moist, individually packaged in muslin or paper	30	15	4
RUBBER GLOVES, wrapped in muslin or paper	20	-	4
RUBBER CATHETERS, DRAINS, TUBING (lumen moist), unwrapped	20	10	4
RUBBER CATHETERS, DRAINS, TUBING (lumen moist), individually packaged in muslin or paper	30	15	4
TREATMENT TRAYS, wrapped in muslin or paper	30	-	4
SOLUTIONS (square-pak bottles)			
75 ml ~ 250 ml	20	-	-
500 ml ~ 1,000 ml	30	-	-
1,500 ml ~ 2,000 ml	40		
UTENSILS, on edge, unwrapped	15	3	4
UTENSILS, on edge, wrapped in muslin or paper	20	10	4

REFERENCE: Perkins, J. J. : Principles and Methods of Sterilization in Health Sciences, 2nd ed, Springfield, IL., Thomas, 1983, p. 165, 166.

3.4 Techniques of Sterilization

The information in this section is intended as a guide to steam sterilization techniques for the most common types of steam sterilizable articles and materials. Prior to sterilization, all materials and articles must be thoroughly cleaned. After sterilization, most goods should be stored for no longer than 30 days, depending on wrapping materials. For sterilization of articles or materials not covered in this section, contact the manufacturer of the article for the recommended procedure.

(1) Principles of Steam Sterilization

Steam under pressure is the simplest and most reliable method available for sterilizing medical items in health-care facilities. Steam can be inexpensively produced and rapidly penetrates and heats a wide range of items to provide effective sterilization. Typical steam sterilization temperatures are 121°C and 132°C.

Effective steam sterilization requires the following:

- Presence of saturated steam
- Achievement of proper temperature
- Exposure to steam for proper time

Steam sterilization relies on steam condensing on the item to be sterilized. When steam condenses, moisture and heat are transferred to the item. The presence of saturated steam assures that this transfer of heat and moisture occurs.

Removal of air from the sterilizer and items to be sterilized is absolutely essential for proper sterilization and achievement of saturated steam conditions. Air hinders the penetration of steam and protects microorganisms from the moisture in steam. Sterilizers are equipped with automatic air bleed valves. These valves remain open until air is removed from the sterilizer. Once air is removed, the valve closes to allow pressure to build up so that the set sterilization temperature can be reached.

The importance of moisture and saturated steam is illustrated by the fact that steam sterilization occurs within a few minutes at 132°C, while sterilization requires hours at that same temperature when little or no moisture is present (i.e., dry-heat sterilization).

The presence of saturated steam can be determined by monitoring the sterilizer temperature and pressure during the sterilization phase (i.e., once unit has reached set temperature). When saturated steam conditions exist, there is correlation between temperature and pressure.

Temperature and pressure should be monitored each cycle to assure proper sterilization conditions are present. The recommended amount of water must be placed in the sterilizer and the air vent properly functioning to assure adequate air removal and achievement of saturated steam.

Selection of proper sterilization time and temperature is critical to ensure that the entire

contents of the load are exposed to steam long enough to assure sterilization. The time/temperature combinations for particular loads have been thoroughly tested to give sufficient time for steam penetration. These are minimum recommendations and should be strictly followed.

Item to be wrapped should only be wrapped in appropriate sterilization wraps or pouches. Fabric and hard goods packs should be placed on edge to aid in air removal and facilitate proper drying. Do not overload sterilizer. Items should be placed in the tray so that steam can surround each pack.

As a check on the overall process (i.e., pack preparation, sterilizer loading and sterilizer operation), biological indicators containing *B. stearothermophilus* spores should be run at least weekly.

(2) Cleaning of Loads

Instruments: Cleaning the instruments immediately after use is most effective. Disassemble that assembled devices and unlock that locked devices and wash with water. At this time, every debris or dirt should be removed completely. Then, wash out cleanly with warm water and an appropriate detergent and apply water-soluble instrument lubricants, specifically designed for sterilization.

Lumens: Catheter, syringe needle, and tube should be washed cleanly and remove moisture, then soak with distilled water. Pack it with moisture remained in the tube and sterilize immediately (at least within 24 hours) for achieving effective sterilization and prevention of pyrogen generation.

Textiles: Wash out cleanly immediately after use and dry completely before sterilize.

(3) Wrapping Fabrics and Hard Goods

Wrapping of packs, instrument sets, and other porous materials provides protection against recontamination when the items are removed from the sterilizer.

The protective wrapping also serves as protection against contact contamination in handling, guards against the entry of insects, etc., and serves as a dust filter for normal storage of sterilized goods.

Use steam-sterilization wrappers for surgical supplies to provide protection after sterilization.

NOTE : Muslin of 140 thread count is the present standard for steam sterilization. The manufacturers of other materials should show data that indicates their product is equivalent to or better than the muslin profile in steam sterilization, drying and sterility maintenance.

Use of freshly laundered 140 thread count muslin (or equivalent) helps prevent superheating and provides longer life of the textiles. You may also use nonwoven wrap, self-seal and heat-seal pouches.

All fabric packs should be placed on edge, and arranged in chamber to allow for maximum exposure (i.e., minimal resistance for steam passage through the load.)

Also place utensils and treatment trays on edge so they will be sterilized and dried properly.

Instrument sets should be placed flat in tray having perforated bottom (or equivalent).

When processing mixed loads combining fabrics and hard goods, place the hard goods on the lower tray or rack. This prevents wetting of muslin packs from condensate dripping from hard goods load.

Remove any caps from and invert empty jars, canisters and all other nonporous containers to facilitate sterilization and drying.

CAUTION : DO NOT OVERLOAD STERILIZER. Allow for steam penetration between packs.

Avoid contact of load components with the walls of the chamber.

(4) Avoiding Wet Packs

A major factor governing the sterility of supplies is a "state of dryness." Wet materials may transmit bacteria, therefore a "state of wetness" could compromise the sterility of processed packs and instruments.

No single factor stands out as the primary cause of wet packs, but rather several factors should be considered. Wet pack conditions occur in various:

- types of loads (i.e., instrument sets, utensil sets, textile packs, and steam-sterilized plastic, paper, or all-plastic peel pouches).
- types and sizes of wrappers (i.e., reusable textiles of all thread counts, disposable cellulose-based, and disposable polypropylene-based).
- pack preparation and sterilizer loading techniques.

Following are some guidelines for evaluating packs for acceptable drying.

- ① External droplets or visible moisture on the exterior of the pack, or on the tape, are unacceptable unless that wrap is completely impermeable to water (e.g., plastic film).
- ② Water droplets on the interior of a wrap (unless it is completely water impermeable), or on the items within the pack are unacceptable.
- ③ A pack is unacceptable if the pack is damp or wet when opened for use. A general guideline is that the pack be completely dry after cooling at room temperature (i.e., 21°C and 50% relative humidity) for a minimum of one hour following removal from the sterilizer. (If the room temperature and relative humidity vary from these recommendations, a longer drying time and increased cooling time may be necessary before the packs are handled or stored.)

These guidelines are not intended to be the final word in establishment of wet pack criteria, but serve as a basis for evaluating sterilized packs to assure an acceptable "state

of dryness."

(5) Sterilizing of Liquids

This sterilizer is designed to process liquids only when borosilicate flasks with vented closures are used. Sterilization of liquids in any other flask or with the use of non-vented closures requires a sterilizer specially designed for that purpose.

Borosilicate glass is recommended because it is a superior glass capable of containing higher pressure, of resisting thermal shock (such as cold air striking the hot glass), and of withstanding repeated handling.

Vented closures are required because, by design, they will relieve excess pressure by automatically venting a flask.

If other types of glass (such as flint glass) and non-venting (sealed) closures are used to sterilize liquids in the sterilizer, dangerous condition, capable of causing personal injury and property damage, is created. As the liquid and residual air in a sealed flask are heated, they expand and create an internal pressure greater than the external pressure of the steam. With the weaker glass, a greater potential for bursting exists. After the sterilization exposure, the chamber is exhausted slowly but it still exhausts more rapidly than the pressure within a sealed flask.

This pressure within the flask will exist until the residual air and the liquid have cooled (unlike a flask with a vented closure that relieves this excess pressure). Thus, potential exists for the flask to burst and cause personal injury or property damage.

3.5 Cycle Graph, Piping Schematic, Wiring Diagram

It can be applied as an useful data to check and understand the each cycle of the sterilizer.

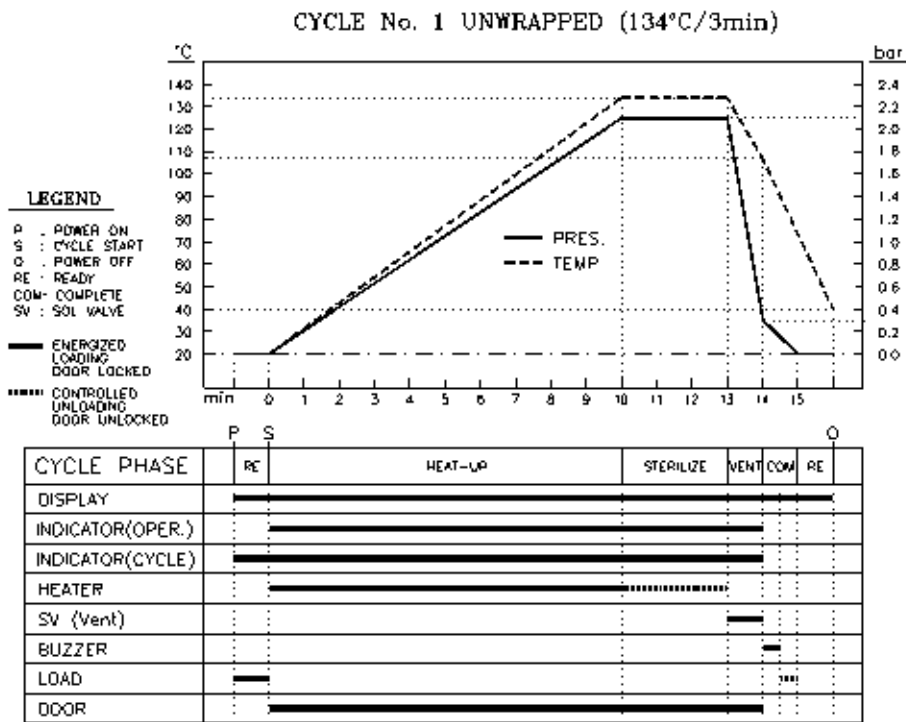


Figure 3-2, No. 1 Cycle Graph (134°C/3min)

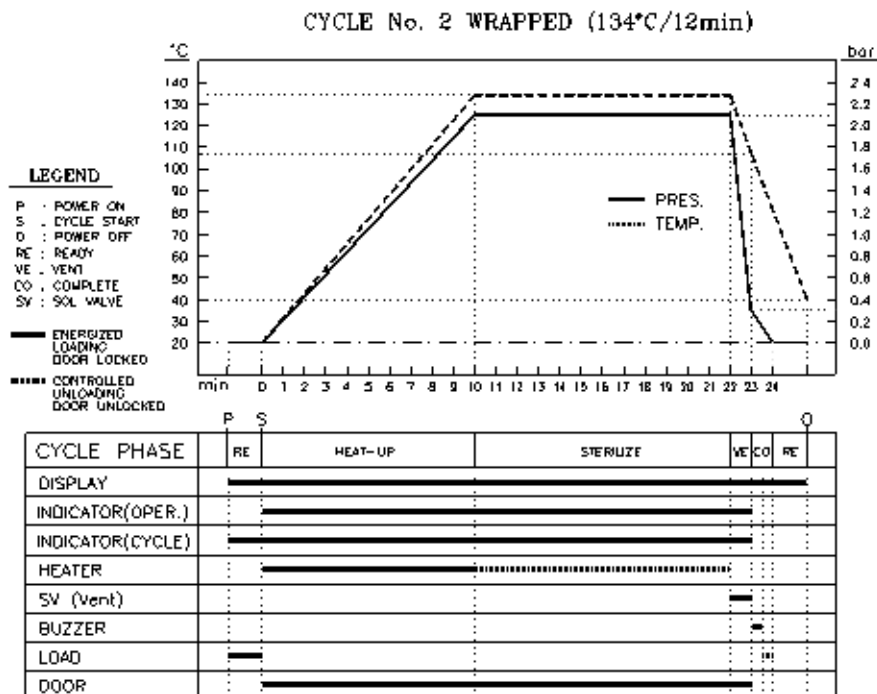


Figure 3-3, No. 2 Cycle Graph (134°C/12min)

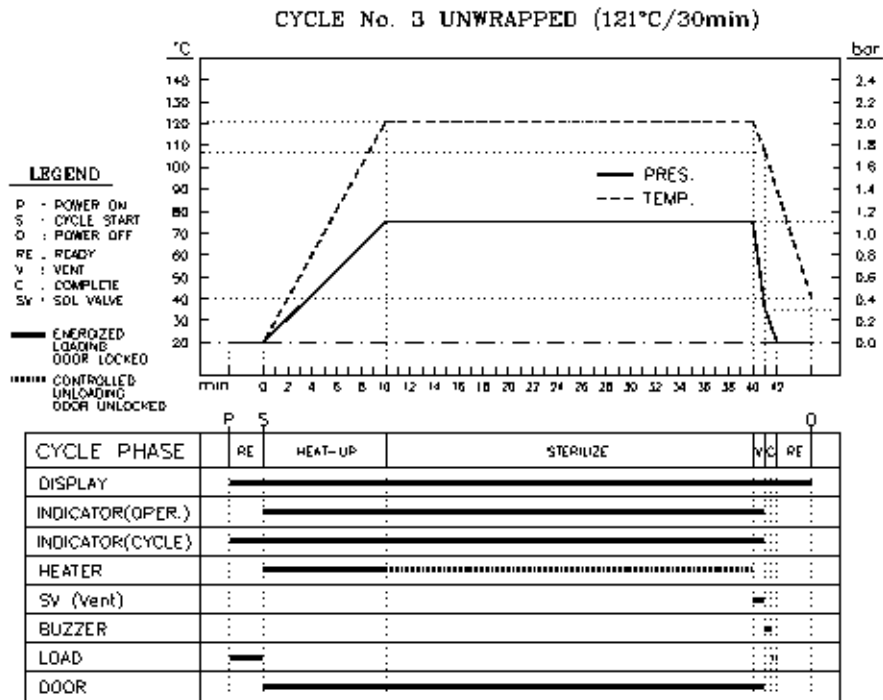


Figure 3-4, No. 3 Cycle Graph (121°C/30 min)

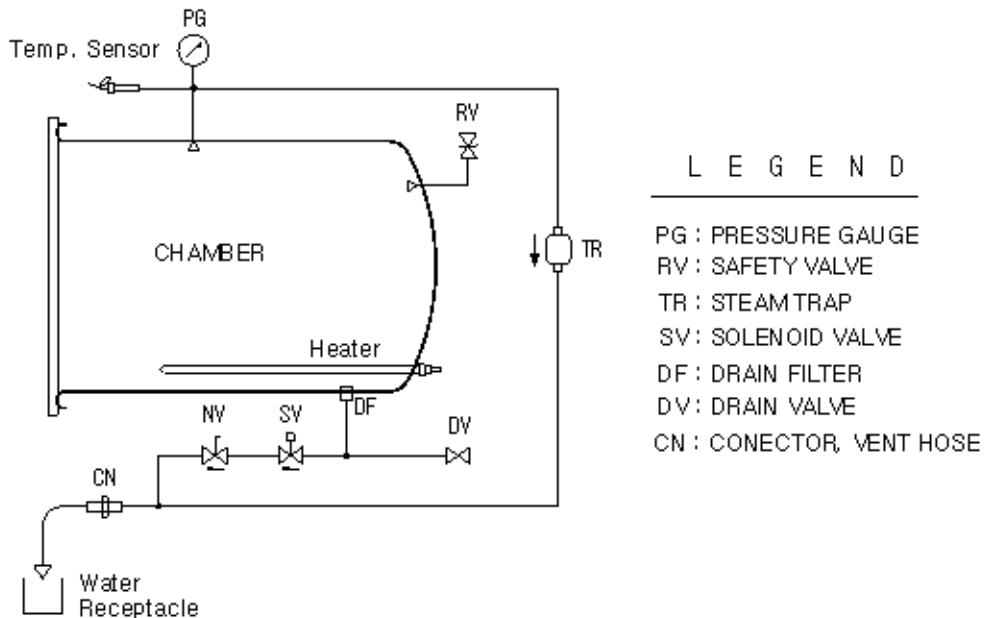


Figure 3-5, Piping Schematic

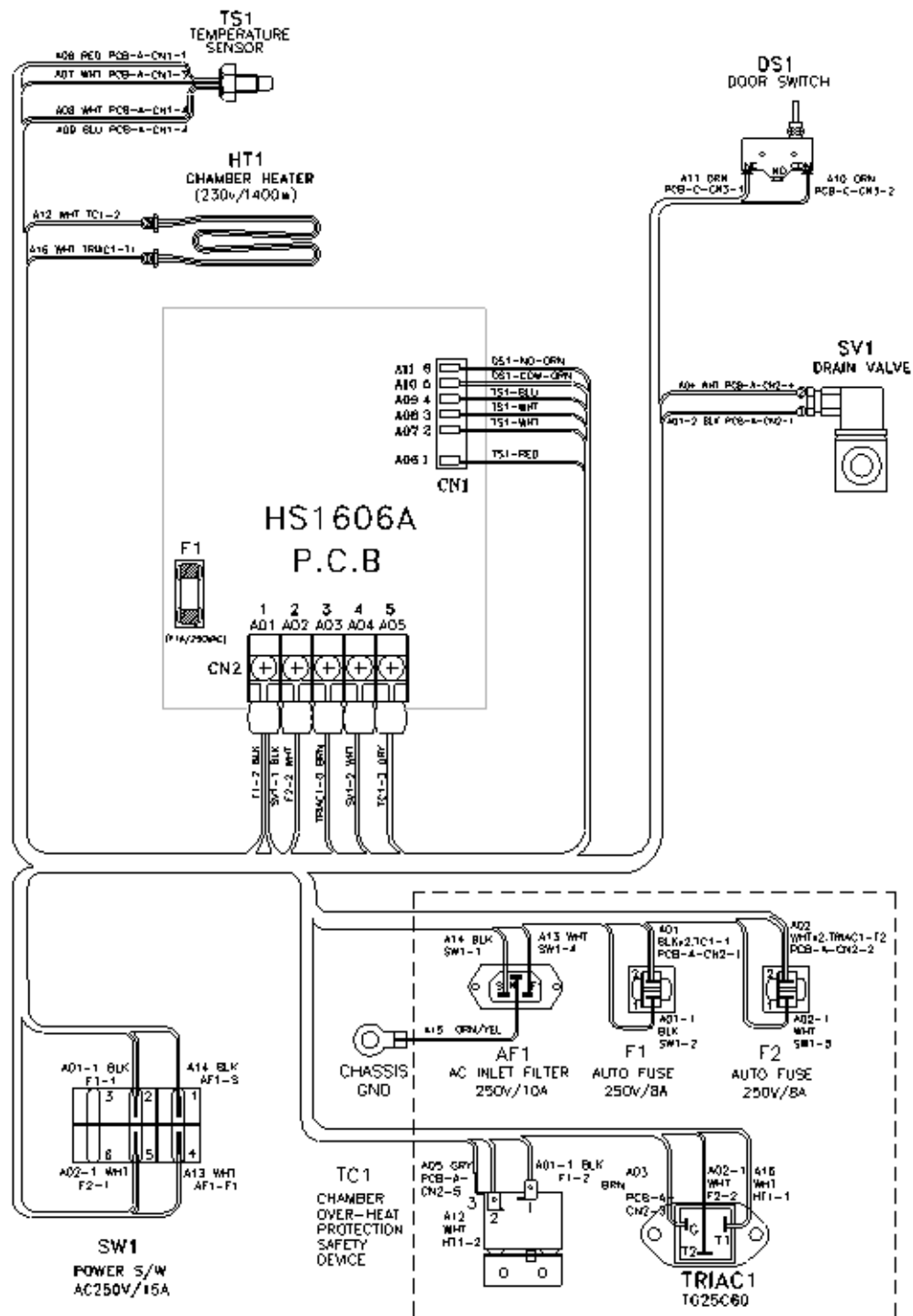


Figure 3-6. Wiring Diagram

4. TROUBLESHOOTING

During operation of the sterilizer, there may take place the following abnormalities, which can be treated as follows.

Table 4-1. Errors Detected by Self-Diagnosis			
CODE	CONDITION	AUTOMATICALLY	MANUALLY
Err 1	Malfunction of Temperature Sensor.	ALARM: Err code display and audible signal sound.	Press START/STOP key and fill in reservoir.
Err 2	Overheating of Heater. Standard: within 300°C	Aborts cycle and vents chamber. ALARM: Err code display and audible signal sound.	Press START/STOP key. Press reset button after cooling and then remedy.
Err 3	Latch unlocked during cycle.	Aborts cycle and vents chamber. ALARM: Err code display and audible signal sound.	Press START/STOP key and adjust the door switch. Resume cycle.
Err 4	Deviation of chamber temperature. Standard: Set Temp. $\pm 4^{\circ}\text{C}$	Aborts cycle and vents chamber. ALARM: Err code display and audible signal sound.	Press START/STOP key and remedy after cooling.
Err 5	Heating speed too high. Standard: within 50°C/min	Aborts cycle and vents chamber. ALARM: Err code display and audible signal sound.	Press START/STOP key and remedy after cooling.
Err 6	Heating time has exceeded. Standard: within 20 min	Aborts cycle and vents chamber. ALARM: Err code display and audible signal sound.	Press START/STOP key and remedy after cooling.

DEFICIENCY	POSSIBLE CAUSE	CORRECTION
1. Control panel does not display, when POWER switch is pressed.	① No power to unit, ② Defective circuit breaker, ③ Defective power switch, ④ Defective PCB, ⑤ Loosen PCB connector.	① Check plugging cord, ② Replace circuit breaker, ③ Check POWER switch, ④ Request after sale service, ⑤ Correct connection PCB cable.
2. Unit does not respond to Program key.	① Defective key, ② Defective control PCB.	① Replace key, ② Request after sale service.
3. [OPER] indicator does not light, when door has locked.	① Defective door lock, ② Defective door switch, ③ Defective [OPER] indicator.	① Check and repair lock, ② Check and adjust switch, ③ Check and repair indicator.
4. Unit does not run, when START/STOP key is pressed.	① Defective START/STOP key, ② Door is not locked, ③ Defective door switch, ④ Defective control PCB.	① Check and repair key, ② Lock door correctly, ③ Check and adjust switch, ④ Request after sale service.
5. Unit is not heated.	① Defective heater, ② Defective control PCB, ③ Defective temperature sensor, ④ Low voltage.	① Replace heater, ② Request after sale service, ③ Request after sale service, ④ Adjust line voltage.
6. Chamber temperature discrepancy exceeds the allowable ($\pm 4^{\circ}\text{C}$). -Alarm [Err 4]-	① Defective steam trap, ② Defective heater, ③ Defective control PCB, ④ Defective temperature sensor, ⑤ Tubing leaks.	① Clean and repair, ② Check and replace, ③ Request after sale service, ④ Request after sale service, ⑤ Repair tubing.
7. Heater is overheated. -Alarm [Err 2]-	① Insufficient filling, ② Defective temperature sensor, ③ Defective control PCB, ④ Defective overheat protector (sensor).	① Fill chamber w/proper water, ② Request after sale service, ③ Request after sale service, ④ Request after sale service.
8. Chamber pressure does not rise during cycle.	① Defective vent valve, ② Defective steam trap, ③ Defective door gasket, ④ Tubing leaks.	① Check and clean valve, ② Check and clean trap, ③ Replace gasket, ④ Repair tubing.
9. Unit does not exhaust.	① Defective exhaust valve, ② Defective control PCB, ③ Tubing clogged.	① Check and clean valve, ② Request after sale service, ③ Clean tubing.

5. MAINTENANCE

5.1 Preventive Maintenance

(1) Before every use, check and maintain as follows:

- ① Check if it's clean, damaged and well-arranged in appearance.
- ② Turn the POWER switch on, and check if all keys and lamps are in normal operation.
- ③ Check if the door locking system is in perfect operation and any part has become loose.
- ④ Take out the chamber contents such as tray, tray cover, tray rack assembly, and clean the inside of the chamber, the heater, the door and gasket with dustcloth dipped in detergent water, rinse them with clean water and remove moisture with dry cloth. The chamber contents shall also be cleaned in the same manner.
- ⑤ The waste water in the chamber should be discharged through the drain valve (refer to Figure 6-2. #). Put a container under the unit, connect a hose to the drain valve. Turn the knurled knob of the valve clockwise to open, and turn it counterclockwise to close.

CAUTION : ① Do not use wire brush, steel wool, abrasives or products containing chlorides.

② Be sure that there is not left any debris in the chamber after cleaning.

③ Whenever some liquid with chlorides has been sterilized, clean it immediately in the foregoing manner.

(2) Check and maintain in the following manner weekly

- ① Check the deformity, damage or elasticity of the door gasket closely, and if defects found, replace immediately.
- ② To prevent the door gasket from being stuck, clean the edge ring of the chamber with dustcloth dipped in mild detergent.
- ③ Try pulling the ring of the safety valve. Check repeatedly if it is freely moved and returned to the original position. Check if there is some indication of leakage or cracks, and remove dust or debris cleanly.
- ④ Drain filter of the chamber should be overhauled and cleaned.

5.2 Repair and Maintenance

(1) Door Gasket

If there is any defect in the gasket, replace it immediately. Even though there is no particular defect, it should be replaced at least once a year. Method of replacement is as follows.

- ① Remove the defective gasket, and clean the gasket groove.
- ② Insert new gasket into the groove. Thrust the gasket in the groove at four points first

in the same distance, and then thrust the rest in turn. Applying a bit of lubricant such as olive oil, etc. will make the work easy. Be careful so that the gasket may not be partially extended or compressed.

(2) Door Locking System

The locking system allows the door to get open by turning the eccentric latch 90° with the handle. Therefore, it is a device of high safety and reliability easy to door operation. Consequently, there is little possibility that troubles take place. If necessary, disassemble in the following manner for checking, cleaning and repairing:

- ① Open the door. Lift the handle, and a set screw will appear on the latch.
- ② Unscrew the set screw by the key wrench, and the handle will be removed.
- ③ Remove the latch, and the spring will be removed together.
- ④ Replace the damaged parts, clean out and oiling.
- ⑤ Assembling shall be done in the reverse order of disassembling.

(3) Over Heat Protector

In case of the insufficient water in the chamber, the heater may be overheated during the cycle. If the heater is overheated up to 330°C in the chamber, the thermostat cut off the power and an alarm (Err 2) will occur by self diagnosis. If you press the <START/STOP> key, the alarm will stop. When the heater has been cooled to the ambient temperature, press the red reset button on the back panel through the access hole with a rod. The power supply will restored (refer to Figure 5-1).

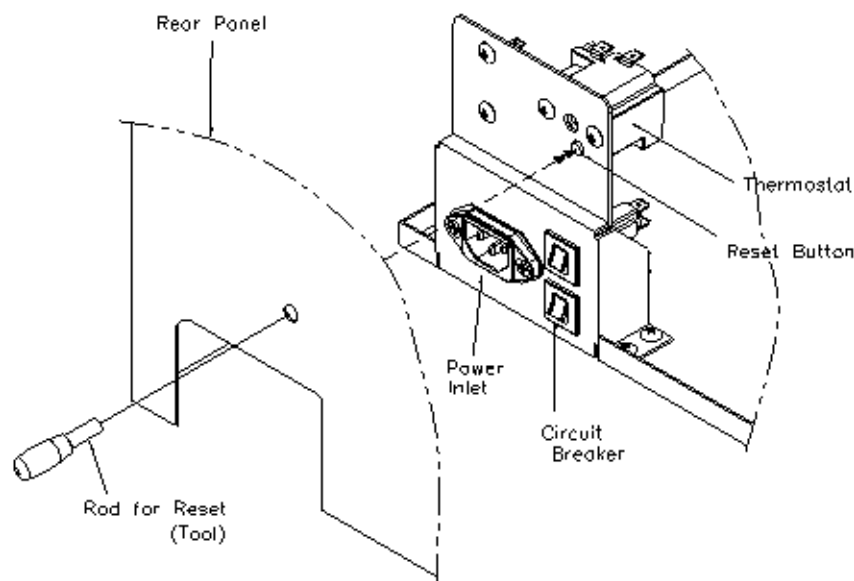


Figure 5-1. Overheat Protector and Circuit Breaker

(4) Thermal Circuit Breaker

The manual reset type thermal circuit breaker is installed beside the power inlet at the back panel. In case of overload to the sterilizer, the knob will be sprang up to disconnect current. Pushing the knob to the original position, the function will be recovered (reset). In this case, you should check cause of the overload (refer to Figure 5-1).

(5) Steam Trap

In case the chamber temperature does not go up 100°C or above, or it takes much time to reach to the set temperature, it may be suspected that there are some defects in the steam trap. In such case, replace the steam trap or clean in the following manner:

- ① Cool down the sterilizer and then remove the cabinet.
- ② Remove the steam trap.
- ③ Replace the steam trap with a new one in the right direction.
- ④ Make a test run and confirm the result.

(6) Safety Valve

If some trouble is suspected in the safety valve, check it under steam pressure. If the chamber pressure does not blow up at 2.8 bar (40 psig), replace it by a new one.

(7) Solenoid Valve

If the valve operation is slow or there are disorders such as leakage or noise, disassemble the valve, and remove debris completely by cleaning the body and parts. Disassembling will be done in the following order:

- ① If you unscrew the top nut and lift up the coil, the core tube will appear.
- ② Unscrew the four screws from valve body, the core (plunger) and spring will be removed.
- ③ Check and clean the body, disc and seat. Defective parts should be replaced.
- ④ Assemble again in the reverse order of disassembling and perform test operations for clicking or leaking.
- ⑤ If the result of test operation is not satisfactory, replace the solenoid valve.

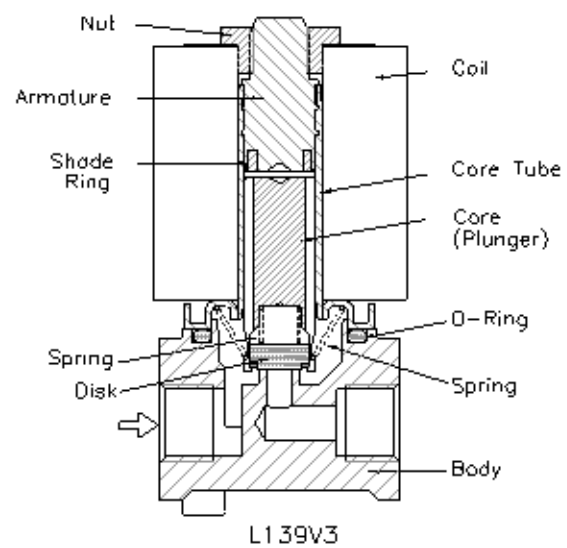
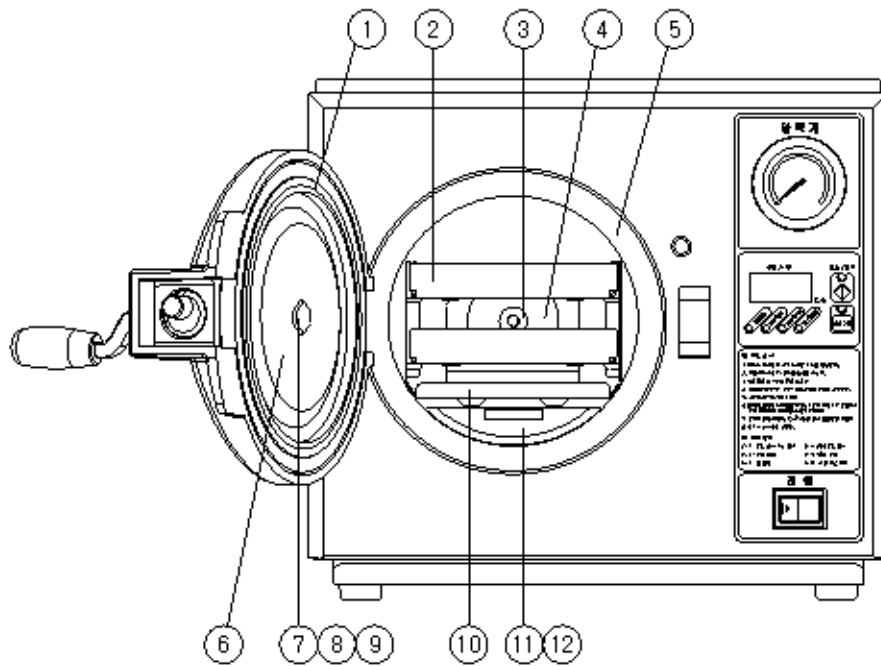


Figure 5-2. Solenoid Valve

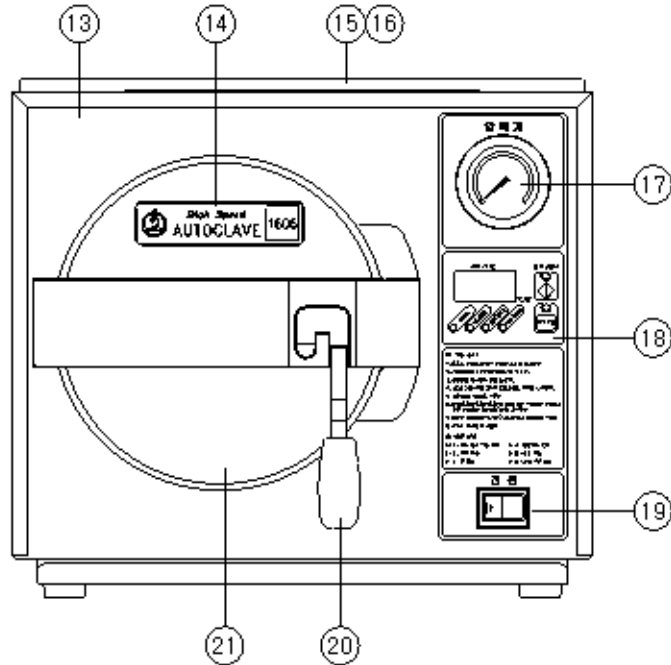
6. PARTS LIST

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	Gasket, Door	1606-300-0001	1
2	Tray	1606-100-0009	2
3	Nut	1321-200-0015	1
4	Washer	1321-100-0018	1
5	Chamber Assembly	1606-010-0001	1
6	Plate, Door	1606-200-0002	1
7	Screw, HH, M10x25L	1606-600-0002	1
8	Washer, Flat, M10	1606-600-0007	1
9	Washer, Brass, M10	1606-600-0004	3
10	Rack w/Heater Cover, Tray	1606-100-0008	1
11	Mount, Rack	1606-100-0010	1
12	Screw, BH., M6x15L	1606-600-0016	1
13	Panel, Front	1606-100-0003	1
14	Label, Model No.	1606-400-0002	1
15	Rail, Tray	1321-300-0002	2
16	Screw, TH., M4x12L	1606-600-0029	10
17	Gauge, Pressure	1606-700-0004	1
18	Control Panel	1606-400-0001	1
19	Switch, Power	1606-500-0056	1
20	Handle, Door	1212-300-0002	1
21	Cover, Door	1606-200-0001	1
22	Foot	1606-300-0002	4
23	Screw, TRH., M4x20L	1606-600-0012	4
24	PCB, Keyboard (HS1606A)	1606-500-0001	1
25	Screw, BH., M4x8L	1606-600-0015	6
26	Socket, Locking Arm	1212-200-0001	6
27	Arm, Door Locking	1606-200-0003	1
28	Spring, Locking Arm	1321-400-0005	1
29	Hinge, Door	1212-200-0002	1
30	Pin, Door Hinge	1212-200-0008	1
31	Retainer, E-Type, #6	1606-600-0019	1
32	Shim (1t, 1.2t)	1212-100-0012	2
33	Clamp, Heat Conductor	1321-100-0027	1
34	Heat Conductor, Thermostat Sensor	1321-100-0028	1
35	Nut, M5	1606-600-0026	3
36	Washer, Lock, M5	1606-600-0020	3
37	Thermostat, Overheat	1606-500-0052	1
38	Heater Assembly	1605-500-0059	1
39	Gasket, Copper Asbestos	1212-100-0021	2
40	Washer, Lock, M14	1606-600-0011	2

ITEM NO.	DESCRIPTION	PART NO.	QTY.
41	Plate, Bottom	1606-100-0002	1
42	Filter, Chamber Drain	1321-020-0010	1
43	Circuit Breaker, Thermal	1606-500-0053	2
44	Power Inlet w/Filter	1606-500-0061	1
45	Screw, FH., M3x8L	1606-600-0016	2
46	Triac	1606-500-0054	1
47	Screw, TRH., M4x8L	1606-600-0014	12
48	Washer, Lock, M4	1606-600-0008	6
49	Support, Front Panel	1606-100-0012	2
50	Nut, M4	1606-600-0027	2
51	Piping Assembly (refer to Figure 6-2)	1606-050-0001	1
52	Cover, Control Box	1606-100-0007	1
53	Control Box	1606-100-0005	1
54	Instruction Plate, Operating	1606-400-0003	1
55	Rivet, #2,3	1606-600-0023	8
56	Insulation, t25	1606-600-0024	1
57	Case, Top	1606-100-0004	1
58	Screw, TRH., M4x6L	1606-600-0013	6
59	Label, Thermostat	4030-400-0012	1
60	Bracket, Power Inlet	1606-100-0006	1
61	Cover, Bottom Access Hole	1212-100-0017	1
62	Nut, M12	1606-600-0031	2
63	Support, Chamber, Rear	1212-200-0016	2
64	Screw, HH., M8x15L	1606-600-0028	2
65	Washer, Flat, M8	1606-600-0006	4
66	Washer, Lock, M8	1606-600-0009	4
67	Lever, Handle	1212-200-0011	1
68	Screw, Socket Head Cap, M4x12L	1606-600-0022	1
69	Switch, door	1606-500-0057	1
70	Bracket, Door Switch	1606-100-0013	1
71	Screw, Socket Head Cap, M10x25L	1606-600-0017	4
72	Washer, Lock, M10	1606-600-0010	4
73	Rim, Pressure Gauge	1212-200-0006	1
74	Bracket, Gauge	1212-100-0009	1
75	Bracket, Water Receive	1606-100-0016	1
76	Sponge	1606-300-0006	1
77	Label, Drain	1606-400-0004	1
78	Name Plate	1321-400-0005	1
79	Label, Overheat Reset Button	1321-400-0015	1

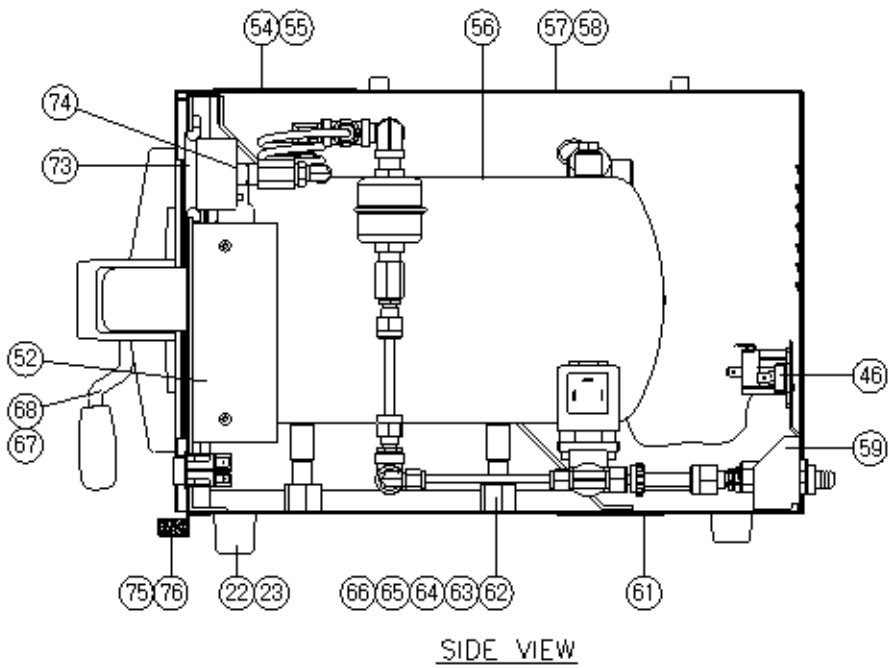
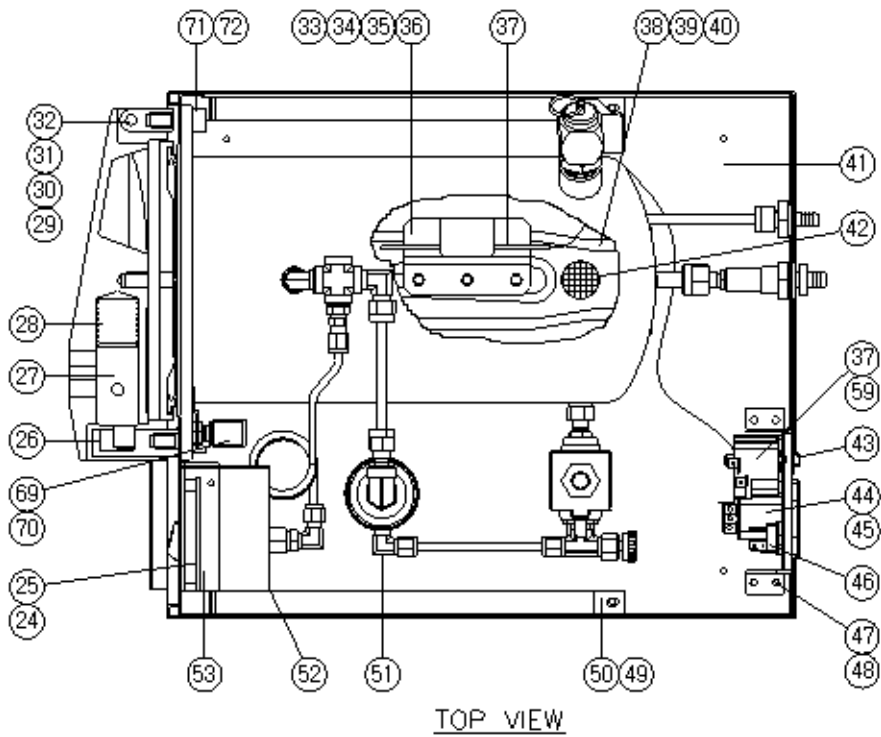


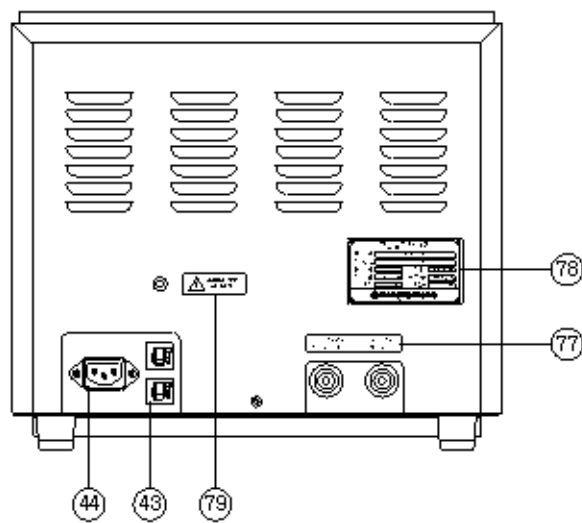
DOOR/CHAMBER



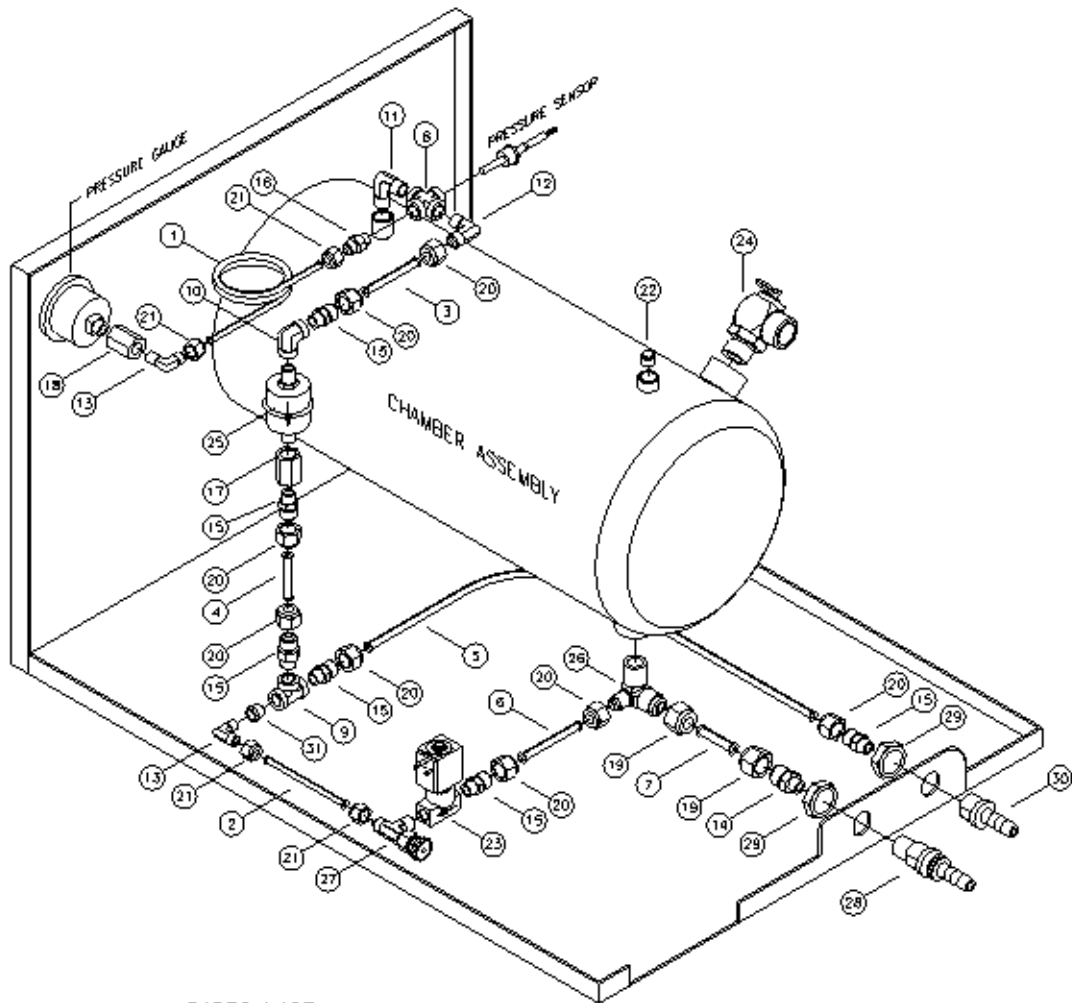
FRONT VIEW

Figure 6-1. Sterilizer Assembly (HS-1606)





BACK VIEW



PARTS LIST

No.	DESCRIPTION	QTY.	REMARKS	No.	DESCRIPTION	QTY.	REMARKS
1	Tube, Copper, 3/16	A/R		17	Socket, 1/4FPT	1	
2	Tube, Copper, 3/16	A/R		18	Socket, 1/4FPTx1/8FPT	1	
3	Tube, Copper, 1/4	A/R		19	Nut, Flare, 3/8	2	
4	Tube, Copper, 1/4	A/R		20	Nut, Flare, 1/4	8	
5	Tube, Copper, 1/4	A/R		21	Nut, Flare, 3/16	4	
6	Tube, Copper, 1/4	A/R		22	Plug, 1/4FPT	1	
7	Tube, Copper, 3/8	A/R		23	Solenoid Valve, 1/4	1	
8	Cross, 1/4FPT	1		24	Safety Valve, 1/2	1	
9	Tee, 1/4FPT	1		25	Trap, 1/4FPT	1	
10	Elbow, 1/4FPT	1		26	Nipple, Chamber Drain	1	1321-200-0044
11	Elbow, 1/4FPT	1		27	Needle Valve	1	1606-010-0002
12	Elbow, Flare, 1/4FPTx1/400T	1		28	Drain Valve, Chamber	1	1321-010-0003
13	Elbow, Flare, 1/8FPTx3/1600T	2		29	Hex. Nut #20	2	1321-200-0041
14	Nipple, Flare, 1/4FPTx3/800T	1		30	Connector, Vent Hose	1	1606-200-0008
15	Nipple, Flare, 1/4FPTx1/400T	6		31	Bushing, 1/4FPTx1/8FPT	1	
16	Nipple, Flare, 1/4FPTx3/160PT	1					

Figure 6-2. Piping Assembly (HS-1606)

M-SS-S14-E

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