

Model HA-series Autoclave, CIRCUIT DIAGRAM (Export Standard)
Applicable to units for 220V, 230V or 240V AC. use

HA-24/HA-24D/HA-30D TUBINGS

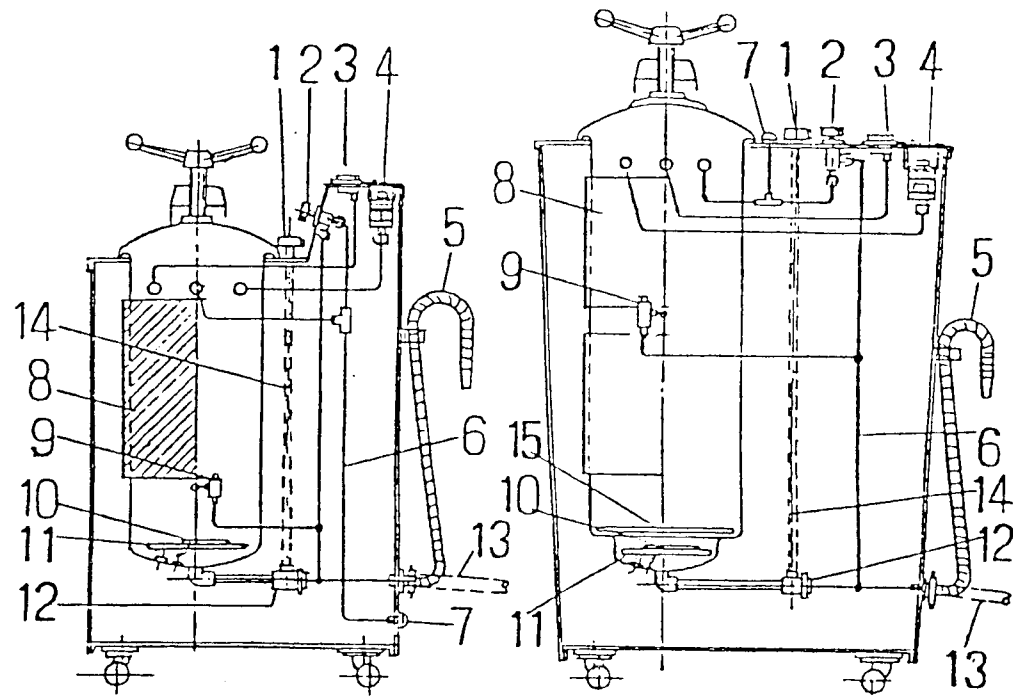
* For HA-24 : Omit 8 & 5

* For HA-24D/30D: Omit 13

HA-30/HA-3D TUBINGS

* For HA-30: Omit 8 & 5

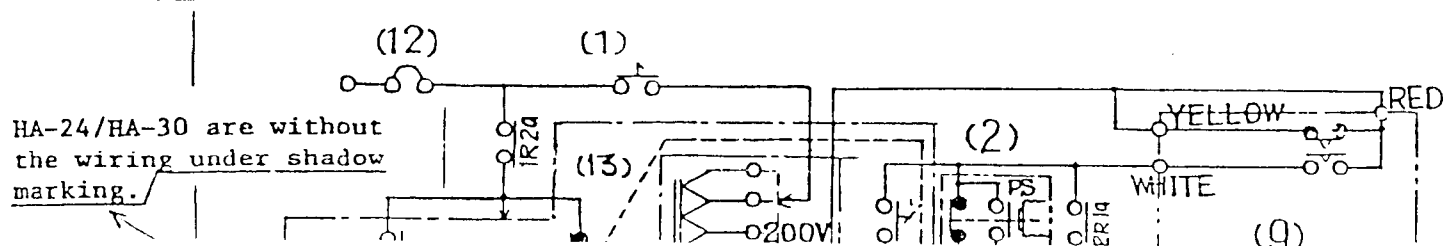
* For HA-3D: Omit 13.

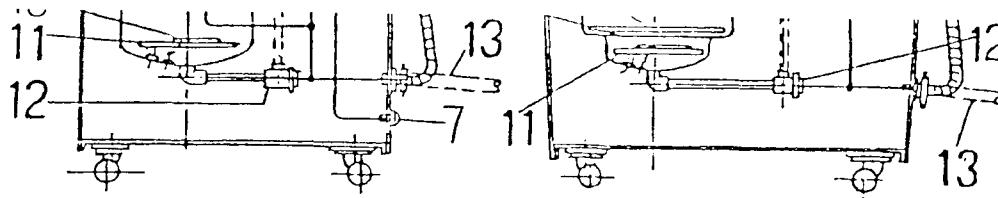


Part Name

1. Exhaust Valve Knob (Drain Knob)
2. Sensitive Exhaust Valve
3. Pressure Gauge
4. Automatic Press. Regulator
5. Flexible Exhaust Hose
6. Copper Tubing
7. Safety Press. Rubber Cap
8. Drying Heater
9. Auto. Air Evacuation Valve
10. Lack-of-Water Thermo.
11. Sterilizing Heater
12. Exhaust Valve (Drain)
13. Drain Rubber Hose.
14. Drain Valve Shaft
15. Bottom Perforated Plater

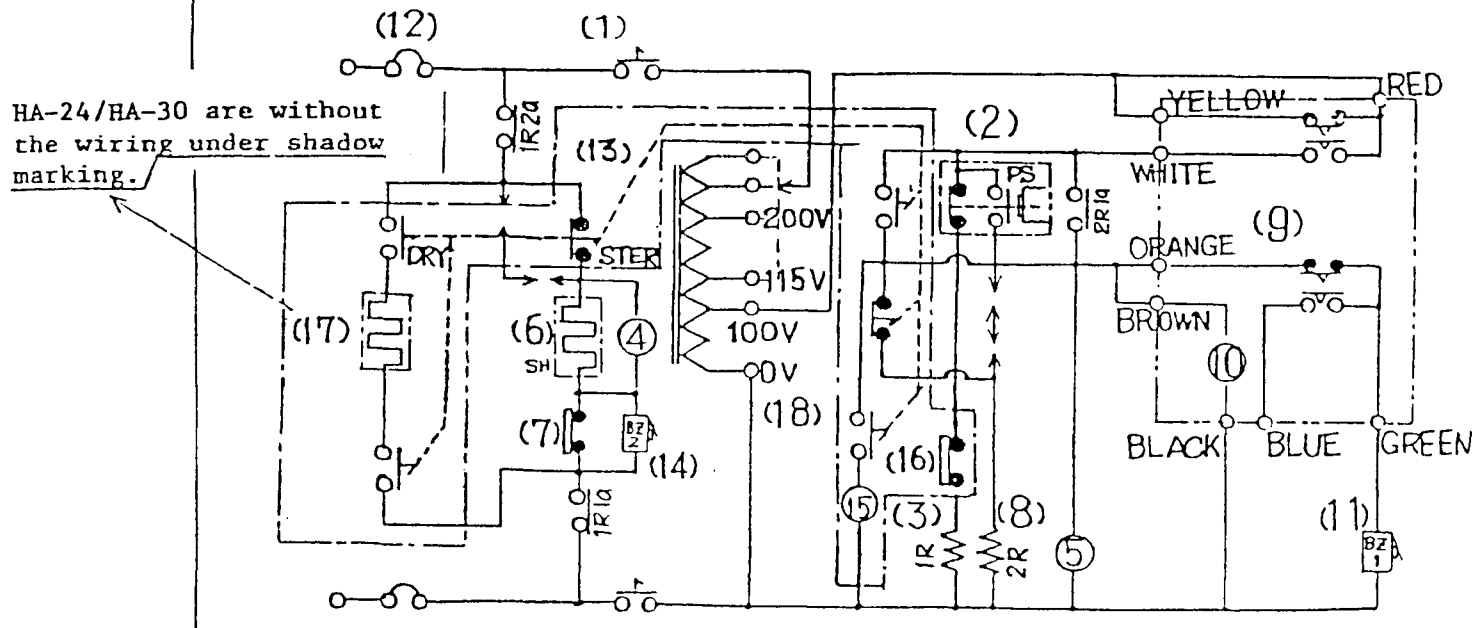
HA-24/HA-24D/HA-30D/HA-30/HA-3D CIRCUIT DIAGRAM
(Export Standard, 220/230/240V uses)





- 13. Drain Rubber Hose.
- 14. Drain Valve Shaft
- 15. Bottom Perforated Plater

HA-24/HA-24D/HA-30D/HA-30/HA-3D CIRCUIT DIAGRAM
(Export Standard, 220/230/240V uses)



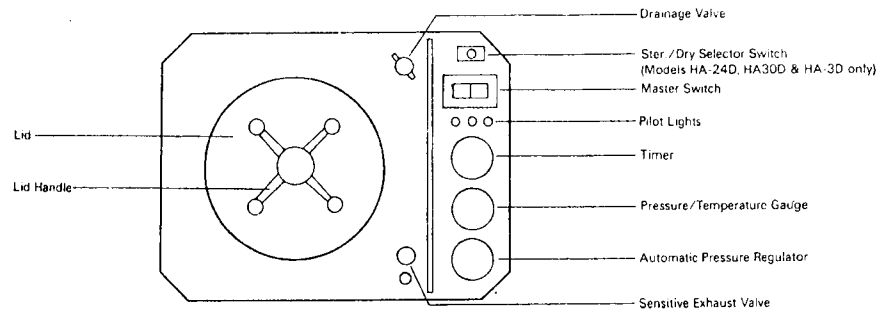
Part Name

- | | | |
|---------------------------------|----------------------------------|-------------------|
| 1. Power Switch (Master Switch) | 8. Supplementary Relay | 17. Drying Heater |
| 2. Automatic Press. Regulator | 9. Timer | For HA-24D 1000W |
| 3. Heater Relay | 10. Timer Motor | HA-30D 1000W |
| 4. Heater Pilot Lamp (Green) | 11. Buzzer | HA-3D 1500W |
| 5. Timer Pilot Lamp (Red) | 12. Breaker | |
| 6. Sterilizing Heater | 13. Ster./Dry Selector Switch | |
| HA-24/24D ——— 1.5 KW. | 14. Lack-of water warning buzzer | |
| HA-30/3D/30D ——— 2.0 KW. | 15. Drying Pilot Lamp (Orange) | |
| 7. Lack-of-water cut-off Switch | 16. Drying Heater Thermostat | |

This operating manual covers the following five models:

- Model HA-24** 240 ϕ × 440mm, 1.5KW max., for sterilizing only
- Model HA-24D** 240 ϕ × 440mm, 1.5KW max., for sterilizing & drying
- Model HA-30D** 300 ϕ × 450mm, 2.0KW max., for sterilizing & drying
- Model HA-30** 300 ϕ × 650mm, 2.0KW max., for sterilizing only
- Model HA-3D** 300 ϕ × 650mm, 2.0KW max., for sterilizing & drying

■ OPERATION



Preparation:

1. Plug in electric cord, for volts, 50 or 60Hz A.C.
2. Ground the attached ground wire.
3. Connect the attached flexible drainage hose to the drainage pipe nipple. As hot water/steam exhaust out, direct the hose to a safe drainage area, bucket or proper container.

Water Supply:

Pour water (1.2~2.0 liters) into the chamber bottom (if possible, distilled or demineralized water is preferable). Before using, be sure to check water amount. Add water before re-starting, if necessary.

Ster/Dry Selection:

Move the selector switch to STER. (for models HA-24D, HA-30D and HA-3D).

Setting Timer:

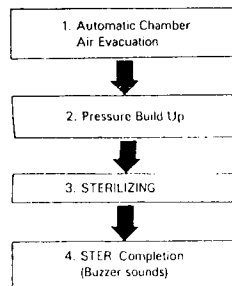
Set the desired sterilizing time by turning the timer knob clockwise. The timer can be used for either 50 or 60Hz.
 50Hz..... Outside black markings 0~72 minutes
 60Hz..... Inside green markings 0~60 minutes

Electricity ON:

Push the master switch ON. (The green pilot light glows indicating the heater is on). When the chamber pressure begins to rise, adjust the automatic pressure regulator knob (pressure regulator) while watching the pressure gauge so that the sterilizing pressure (temperature) remains in the red-pink color range...the actual chamber temperature is 121°C~123°C. Once set, it is not necessary to set again when using the next time. Upon delivery from our factory, the sterilizing pressure/temperature will be pre-set so there is no need to adjust the knob.

Placing Objects Inside:

Place the objects to be sterilized on the perforated plate. Close the lid by lightly turning the handle. Do not over-tighten.



Automatic Sterilizing Cycle:

After air evacuation is completed, pressure start to build-up. When the set sterilizing pressure and temperature (1.2kg/cm², 121°C) are reached, the timer begins to move. At this time, the RED (Timer) pilot light glows. The pressure and temperature are accurately kept throughout until completion. (During this time, the GREEN pilot light goes on and off indicating that the heater goes on and off).

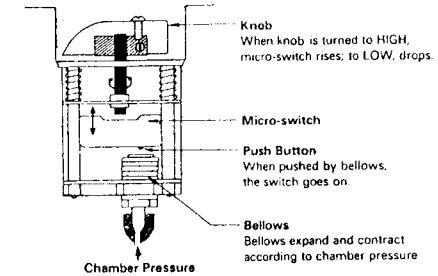
When sterilizing finishes, the buzzer sounds completion and the heater cuts off. The GREEN and RED pilot lights go off. (The buzzer volume can be regulated by opening the back wiring panel and adjusting the buzzer aperture.

Normal Sterilizing Time at 1Kg/cm² (121°C)

■ MAINTENANCE

Automatic Pressure Regulator (Pat.)

Automatic pressure regulator controls pressure which makes timer move. It is correctly pre-set upon delivery and usually no need to adjust. But, in case of failure, it can be adjusted as follows:



- (1) In case timer begins to move before set pressure builds up:

This is because gap between push button and bellows is too small.

(How to adjust): While watching pressure gauge, turn knob clockwise to HIGH. When pressure reaches between 1.10~1.15 kg/cm², green pilot light will glow. At this point, stop turning.

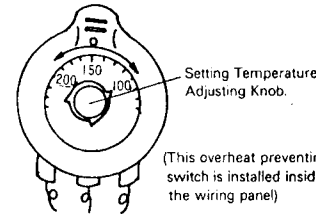
- (2) In case timer doesn't move even if set pressure is reached:

This is because, even though bellows expand, they cannot reach push button as gap between bellows and push button is too big.

(How to adjust): While watching pressure gauge, turn knob counter-clockwise to LOW. When pressure reaches between 1.10~1.15 kg/cm², green pilot light glows. At this point, stop turning.

NOTE: Knob can be turned many times.

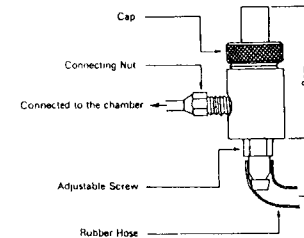
Overheat Preventing Switch (E.G.O.)



In case of lack of water, the buzzer will sound on and off continuously. Switch off the master switch and open the lid. Allow the heater to cool. Pour water (about 1200cc.) and start operation again. After sterilizing finishes, be sure to push the Master Switch (RED Button) off.

The switch is connected to the heater by series and is attached to the sterilizing heater. The normal sterilizing temperature is 121°C, but when there is a lack of water and the temperature rises unusually high, this switch cuts off the heater current. The switch is adjustable and is pre-set to operate at 140°C. This switch will cut off the heater current when the chamber temperature reaches 140°C and the buzzer sounds. The buzzer will continuously sound on and off.

Automatic Air Evacuation Valve (Pat.)



Automatic evacuation of chamber air begins after electricity goes on and lasts for approximately 13-18 minutes passing through this valve. When the air is evacuated, this valve closes and chamber pressure begins to rise (upon delivery of this autoclave, the valve will be pre-adjusted correctly).

If valve constantly remains open, steam exhausts out preventing chamber pressure from rising....at this time.... probably, dirt is clogging the valve or the valve seat is scratched. If so.....

1. Open the back wiring panel.
2. With a wrench, unscrew Connecting Nut, take off hose, and take out valve.
3. Unscrew and take off Adjustable Screw.
4. Clean inside parts of valve.

NOTE: If only a little steam exhausts out from drainage hose during sterilizing, there is no need to worry nor is there need to take apart and clean this valve. Never remove the Cap when cleaning this valve.

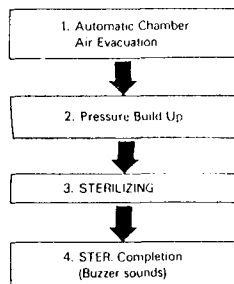
Replacement of Heating Element

Heater replacement can be accomplished in the follow-

Push the master switch ON (The green pilot light glows indicating the heater is on). When the chamber pressure begins to rise, adjust the automatic pressure regulator knob (pressure regulator) while watching the pressure gauge so that the sterilizing pressure (temperature) remains in the red-pink color range...the actual chamber temperature is 121°C~123°C. Once set, it is not necessary to set again when using the next time. Upon delivery from our factory, the sterilizing pressure/temperature will be pre-set so there is no need to adjust the knob.

Placing Objects Inside:

Place the objects to be sterilized on the perforated plate. Close the lid by lightly turning the handle. Do not over-tighten.



Automatic Sterilizing Cycle:

After air evacuation is completed, pressure start to build-up. When the set sterilizing pressure and temperature (1.2 kg/cm², 121°C) are reached, the timer begins to move. At this time, the RED (Timer) pilot light glows. The pressure and temperature are accurately kept throughout until completion. (During this time, the GREEN pilot light goes on and off indicating that the heater goes on and off).

When sterilizing finishes, the buzzer sounds completion and the heater cuts off. The GREEN and RED pilot lights go off. (The buzzer volume can be regulated by opening the back wiring panel and adjusting the buzzer aperture.

Normal Sterilizing Time at 1 Kg/cm² (121°C)

(1) Glassware	15 min.
(2) Instruments in tray covered with linen	15 min.
(3) Surgical rubber gloves	15~20 min.
(4) Hypodermic syringes (wrapped in linen or sterilizing paper bag)	30 min.
(5) Gauze, linens, and other dressing materials	40 min.
(6) Liquid in flask	30 min.

Steam Exhaust:

Turn the exhaust knob counter-clockwise to exhaust out steam from chamber.

When sterilizing liquid medicines, culture fluids, other liquids and objects sealed in packages, it is necessary to turn the exhaust knob counter-clockwise slowly, a little at a time to prevent liquids from spilling over and packages from bursting open due to a sudden decrease in pressure. When quick exhaust is desired, turn the drainage knob 90° to forcefully exhaust out hot water and steam.

Taking Out Objects:

Be sure the pressure gauge reads "0" before opening the lid and taking out the objects.

DRYING.....for Models HA-24D, HA-30D & HA-3D only

If drying is desired, omit the operation after Steam Exhaust and continue from sterilizing completion directly to the next operation.

Hot Water Exhaust:

Immediately after the buzzer indicates end of sterilizing, turn the drainage knob counter-clockwise to exhaust out hot water and steam forcefully.

Moisture Exhaust:

After the pressure gauge indicated "0", loosen the handle fully and allow it to stand as it is.

Ster/Dry Selecting:

Move the selector switch to DRY.

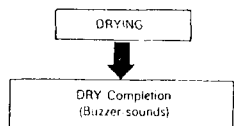
Setting Timer:

Set the timer for drying (15~30 minutes). At this time, the RED (Timer) pilot light glows.

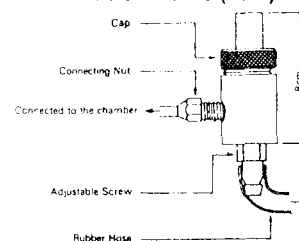
Then, the Drying pilot light (ORANGE) glows and the Drying Heater (exclusive drying heater surrounding the chamber) goes ON. When setting the timer for drying, check to see if the ORANGE drying pilot light is on or not. If the GREEN pilot light is on, move the selector switch to DRY immediately.

When drying finishes, the buzzer announces completion, and the red pilot light and the orange pilot light go off. The drying heater cuts off. When the master switch is turned OFF, the operation is completed. Slide the lid open and take out the objects.

Be sure to close both the drainage and exhaust knobs.



Automatic Air Evacuation Valve (Pat.)



Automatic evacuation of chamber air begins after electricity goes on and lasts for approximately 13-18 minutes passing through this valve. When the air is evacuated, this valve closes and chamber pressure begins to rise (upon delivery of this autoclave, the valve will be pre-adjusted correctly).

If valve constantly remains open, steam exhausts out preventing chamber pressure from rising.....at this time.....probably, dirt is clogging the valve or the valve seat is scratched. If so.....

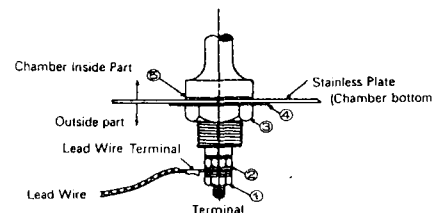
1. Open the back wiring panel.
2. With a wrench, unscrew Connecting Nut, take off hose, and take out valve.
3. Unscrew and take off Adjustable Screw.
4. Clean inside parts of valve.

NOTE: If only a little steam exhausts out from drainage hose during sterilizing, there is no need to worry nor is there need to take apart and clean this valve. Never remove the Cap when cleaning this valve.

Replacement of Heating Element

Heater replacement can be accomplished in the following manner:

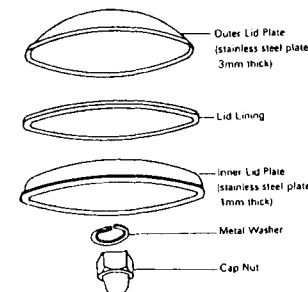
1. Loosen nut (1) and take off the wire.
 2. Take off nut (3).
 3. Remove the heater by pushing the heater terminal out from inside the chamber.
 4. After the heater has been removed, clean the area around the attachment hole. (As there will be scale, dirt, etc.)
 5. When putting in a new heater, remove parts (3) and (4), then insert the heater terminal into the hole. At this time, check to see if washer (5) is there or not and whether or not it is damaged.
 6. Put on metal washer (4) and tighten nut (3) well.
 7. Take off nut (1) and attach the lead wire terminal. Then put nut (1) back and tighten.
- Caution: If nut (3) is not tightened perfectly, water will leak out and cause a short circuit.
If the lead wire terminal is dirty, clean it with sandpaper.
Do not forget to replace washer parts (5) and (4).



Lid Lining

The lid lining expands and contracts according to the pressure thus perfectly sealing itself onto the lid and chamber rim (Pat.). Therefore, there is no need to over tighten the lid handles. When the pressure rises, the lid lining contracts and is sealed tightly onto the chamber rim. Remember, overtightening damages the lining and shortens its life-span. The lid lining can be changed in the following manner:

1. Loosen the Cap Nut; take off metal washer and Inner Lid.
2. Insert the new lid lining inside the Outer Lid.
3. Fit the Inner Lid properly into the lid lining from the bottom by pushing up.
4. Attach the metal washer; screw on the Cap Nut securely.



Maintenance

1. Keep inside of chamber clean.
2. Keep outside of autoclave clean. This autoclave can be used for a long time under proper care.
3. Parts, which are subject to damage or wear after 3 to 5 years use, are lid lining, sheathed heating element. They are easily replaceable. All identical parts for renewal or replacement are available at reasonable cost upon request. Place parts order with your dealer from whom unit was supplied, or write directly to us giving serial number of unit.

* For further details, see the circuit diagram and parts list supplied with the unit.



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