

PRESENTATION :

HP Series are capable of wrapped, solid, liquid and vacuum based tubal or hollow instrument sterilization. The control panel includes a printer and a USB flash drive port for recording sterilization data. HP Series uses a convenient touch panel to manage sterilization setup and configurations.



FEATURES :

- 7 Inch Touch Panel
- Fractioned Pre-Vacuum Air Removal
- User Login / Password Security
- Jacket Warm-Up Function
- Independent Steam Generator
- Digital Print and USB Port
- 5 Sterilization & 3 Diagnostics Programs
- PT-100 Temperature Sensor (Chamber & Jacket)
- Pressure Auto Door Lock
- Overheat Protection
- Overpressure Protection
- Emergency Button

STANDARDS & DIRECTIVES :

- * CE 93/42/EEC (MDD; European Directive for Medical Devices)
- * 2014/68/EU (PED; Pressure Equipment Directive)
- * EN/IEC 61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use)
- * EN/IEC 61010-2-040 (Safety requirements for sterilizers used to treat medical materials)
- * EN/IEC 61326-1 (EMC; Electrical equipment for measurement, control and laboratory use)
- * ISO 13485 (Quality Management/Certification)
- * RoHs (Restriction of Hazardous Substances Directive)

CHAMBER :

Chamber is designed and built of SUS304 stainless steel, manufactured and welded by the Automatic Robotic Arm for precision, perfection, and long-lasting durability. The overall design is pressure-resistant, temperature-resistant, and has the ability to maximize water, air and condensed steam. With exhaust hole and steam inlet holes, most of the air in the chamber can be exhausted through the cooperation of the vacuum pump, so that the steam can better flow to every corner to maximize the sterilization effect.

The outer layer(jacket) can store steam and has a thermal insulation effect, which can reduce heat loss and the influence of external ambient temperature.

Designed in accordance with ASME codes & standards and complies with the PED (Pressure Equipment Directive), with a service life of up to 7 years.

Chamber Volume -

- ☐ 143 Liter (SAT-450HP)
- ☐ 196 Liter (SAT-500HP)
- ☐ 350 Liter (SAT-600HP)

Chamber Material -

- ☐ SUS 304 / 304 Stainless Steel (Standard)
- ☐ SUS 316L / 316L Stainless Steel (Optional)

CHAMBER LOAD CAPACITY :

	SAT-450HP	SAT-500HP	SAT-600HP
Chamber Volume (L)	143	196	350
Chamber Size (Diameter x Depth) (mm)	450 x 900	500 x 1000	610 x 1200
STU Capacity *	2	3	5
Maximum Load (Wrapped)	22 kg	30 kg	53kg
Maximum Load (Unwrapped)	30 kg	41 kg	73kg

* STU Size : 600 x 300 x 300 mm (L x W x H)

HOUSING MATERIAL :

It is made of 304 stainless steel, with a polished design. The overall structure is simple and strong for easy installation and maintenance, equipped with a level adjustment screw set at the bottom.

SUS 316L can be selected for housing material.

Housing Material -

- ☐ SUS 304 / 304 Stainless Steel (Standard)
- ☐ SUS 316L / 316L Stainless Steel (Optional)

DOOR LOCK SYSTEM :

HP Series door locks use central steering wheel, this type of door opens and closes through manual activation, closing in a clockwise direction. The closing is carried out by means of concentric levers that move according to the turn of the steering wheel in a clockwise direction until the door is completely closed. When the chamber pressure is greater than 0.2 bar, the internal mechanism of the central steering wheel will lock it and cannot turn to prevent the door from being opened.

In addition, a positioning sensor is installed to verify the opening and closing of the door. When a program is selected, it will be displayed on the HMI panel to remind the current state of the door. When the door is not closed, the program will not be activated. In the double-door configuration, the unloading door panel displays the opening and closing of the door through light indicator.

Door is made of 304 stainless steel (SUS 316L is optional).

Door Configurations -

- ☐ Single Door (Standard)
- ☐ Double Door (Optional)

Door Material -

- ☐ SUS 304 / 304 Stainless Steel (Standard)
- ☐ SUS 316L / 316L Stainless Steel (Optional)

WATER FILLING SYSTEM :

The water flow into the steam generator is controlled by the switch of the PLC control solenoid valve. The pipe uses 304 stainless steel tube to avoid corrosion and prevent the pollution of the water from causing incomplete sterilization effect.

316L stainless steel tube can be selected to enhance the protection.

Piping Material -

- ☐ SUS 304 / 304 Stainless Steel (Standard)
- ☐ SUS 316L / 316L Stainless Steel (Optional)

VACUUM SYSTEM :

Using high-performance and high-flow water-sealed vacuum pump.

Pre Vacuum: Exhaust the air in the chamber before the sterilization starts, so that the chamber generates negative pressure and releases high-pressure and high-temperature air to allow the steam to flow better and fill the chamber and enter the slender pipe or porous instrument to ensure the sterilization effect reach the standard of complete sterilization.

Post Vacuum: To completely evaporate the steam and steam condensed water to keep the chamber and sterilized loads dry to achieve an ideal sterilization process.

Vacuum Pump Voltage-

- | | |
|------------------------------|------------------------------|
| 1.5 HP (AC 3Ø 230V, 50/60Hz) | 2.0 HP (AC 3Ø 415V, 50/60Hz) |
| 1.5 HP (AC 3Ø 380V, 50/60Hz) | 2.0 HP (AC 3Ø 440V, 50/60Hz) |

AIR FILTERING SYSTEM :

Air Filter : Ensure that the sterilized items are not affected by the external environment and remain sterilized during the drying process.

It can optional 0.3 μ m to compliance with EN285 standards.

Filter Spec –

- ☐ Pore Size : 2 μ m (Standard) ☐ Pore Size : 0.3 μ m (Optional)

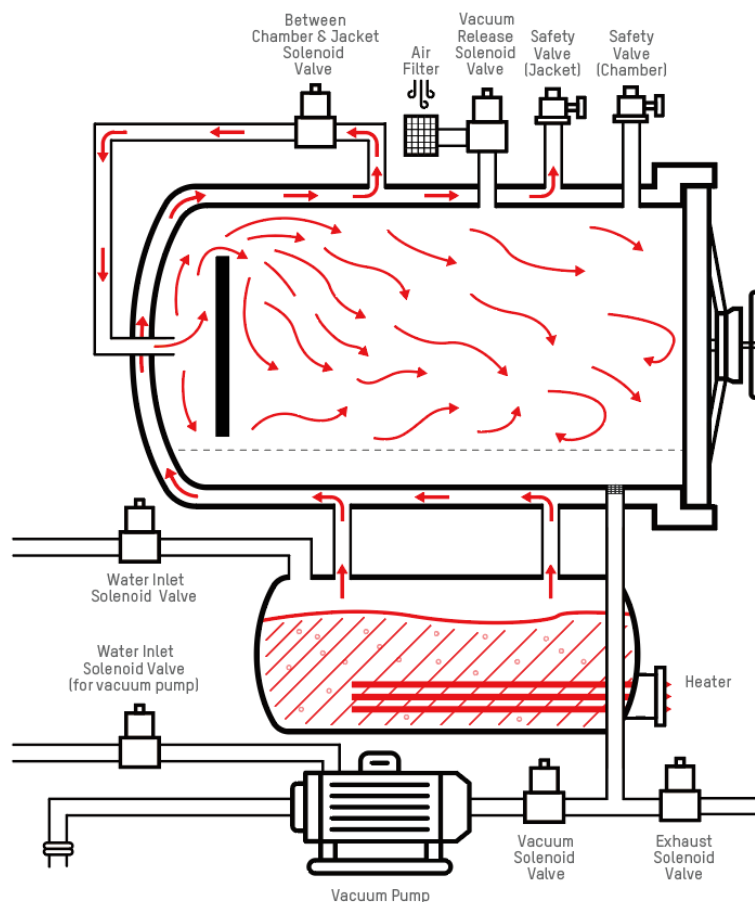
Exhaust Filter : Protecting the environment from potentially dangerous gasses released from the autoclave. Such as Virus, Bacterial and others. It is over biosafety levels 2 and levels 3 Laboratory.

Filter Spec –

- ☐ Pore Size : 0.3 μ m (Optional)

STEAM GENERATOR :

It is connected with the jacket. The steam is generated by heating water through an electric heating tube (made of SUS 316) and enters the jacket. A water level sensor is equipped to detect the highest and lowest water levels and an over temperature controller to overheating and extend the service life of the equipment.



Powers -

143 Liter : 9 KW

196 Liter : 9 KW

350 Liter : 12 KW

Steam Generator Material -

☐ SUS 304 / 304 Stainless Steel (Standard)

☐ SUS 316L / 316L Stainless Steel (Optional)

COMMAND AND CONTROL SYSTEM :

It is composed of a command panel fixed on the front of the equipment. Equipped with DELTA programmable logic controller (PLC) and two PT-100 temperature sensors to accurately detect the temperature of the chamber and jacket,, all operations on the system are executed through DELTA man-machine interface, 7-inch full-color touch screen and friendly and intuitive operation interface.

The login personnel management system is divided into two levels according to the authority :

Operator :

- Program selection and start;
- Date & Time setting;
- Screen brightness adjustment;
- Language change;
- View the counter and time of the sterilization program
- Printer on/off
- Selection of pressure unit (kgf/cm² & kPa)
- Change password
- Vacuum removal-release the pressure of the chamber
- Remove USB - data storage device
- Calibration-chamber temperature/pressure and jacket temperature

Administrator :

All "Operator" permissions also include :

- Counter setting for remind next service time.;
- Change of account and password of all operators;
- Change of account and password of all administrator;

Pre-configured with 8 sterilization programs, including 3 diagnostic programs such as Bowie & Dick, Helix and Leakage tests, and provide two sterilization program modules that can be adjusted according to the user's altitude. All sterilization programs can be easily selected through the touch panel, and the sterilization temperature, sterilization time, drying time and other parameters will be displayed when the program is selected. After the program is started, the system does not allow to change programs or modify parameters.

All controls including water injection, pressure, temperature, sterilization, exhaust, drying are automatically controlled by PLC, and are equipped with over-temperature and over-pressure protection devices. When the pressure and temperature exceed the allowable safety value, the system will stop the sterilization process or release the pressure to protect the safety of users and extend the life of the equipment.

Pre-established Programs –

Altitude \leq 2000M :

	Pre-Vacuum (step)	Temperature (°C)	Pressure (bar)	Sterilization Time (min/sec)	Dry Time (min/sec)
Universal 121°C	3	121	1.06	30 min	30 min
Universal 134°C	3	134	2.07	15 min	30 min
Liquid	-	121	1.06	40 min	-
Dry	-	-	-	-	1 ~ 60 min 59sec
Customization	0 ~ 5	105 ~ 135	2.07	0 ~ 60 min 59 sec	0 ~ 60 min 59sec
Leakage Test	-	-	-	-	-
B & D Test	-	134	-	3.5 min	-
Helix Test	-	134	-	3.5 min	-

Altitude > 2000M :

	Pre-Vacuum (step)	Temperature (°C)	Pressure (bar)	Sterilization Time (min/sec)	Dry Time (min/sec)
Universal 121°C	3	121	1.06	30 min	30 min
Universal 126°C	3	126	1.5	10 min	30 min
Liquid	-	121	1.06	40 min	-
Dry	-	-	-	-	1 ~ 60 min 59sec
Customization	0 ~ 5	105 ~ 132	-	0 ~ 60 min 59 sec	0 ~ 60 min 59 sec
Leakage Test	-	-	-	-	-
B & D Test	-	121	-	15 min	-
Helix Test	-	121	-	15 min	-

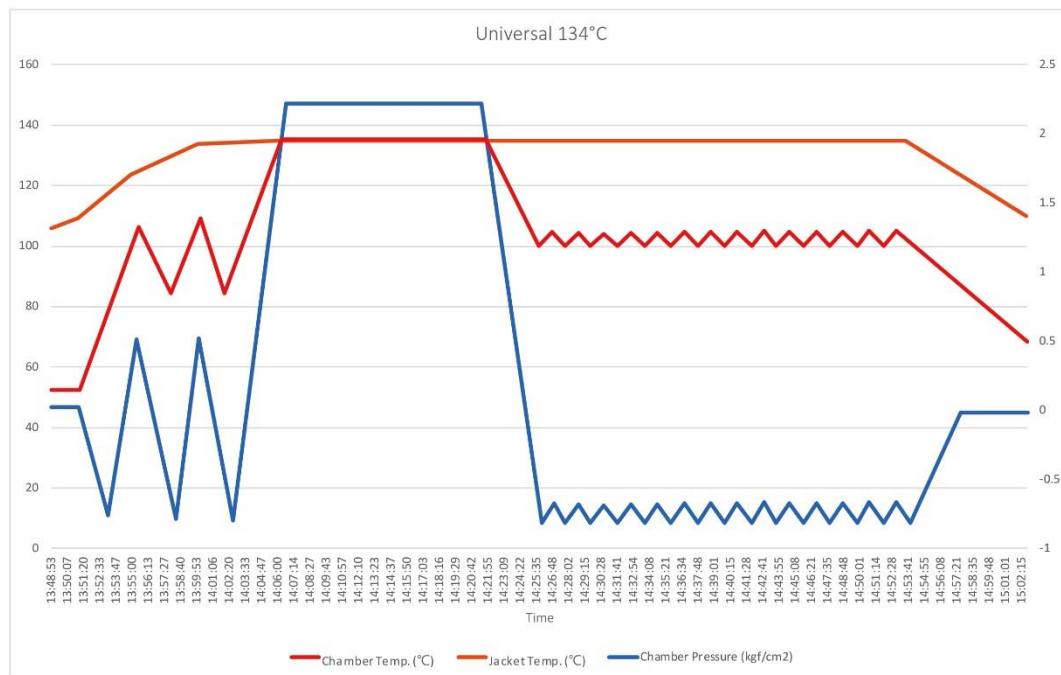
DATA RECORDER :

Access and record the data of the sterilization program via USB or SD. The stored data file is a CSV file, which can be easily opened by Microsoft Excel and converted into a line graph. It is easier for users to interpret and grasp the sterilization status.

Storage Device -

- ☐ USB Device (Standard) ☐ SD CARD (Optional)

When the dual storage device of USB + SD card is selected, the sterilization data will be automatically stored in the SD card, and then the specific data needed can be downloaded via USB to facilitate data transfer.



Universal 134°C program line graph example.

PRINTER :

The digital dot printer will automatically print the program data of each sterilization program, or you can turn off the automatic printing through the system settings.

The following data are included in the printout -


- Printout of Universal 134°C Program

Printout	Description
Model : SAT-450HP	Model number
Software version : V1.10	Software version
SN : 130505204-001	Series number
USER ID : OP2	User identification
Program : Universal 134 °C Pre-Vacuum : 3	Program parameter Pre-vacuum period

Ster. Temp : 134 °C Ster. Time : 15 m 0 s Dry Time : 30 m	Sterilization temperature Sterilization duration Dry duration	
Date : 2013/05/03 08 : 09 : 48	Date and Time of sterilization	
Cycle Counter : 000351	Cycles that had been started	
STEP Time Ts T°C P(kPa)	Step	action
Start 000:00 00:00 23.5 1.8	Time mmm:ss	mmm: minutes starting record, ss: seconds starting record
PHeat 019:09 19:09 24.3 2.7	Ts mm:ss	duration of each step, mm: minutes, ss: seconds
Vac1 020:25 01:16 38.3 -78.5	T(°C)	chamber temperature in °C
Heat1 023:07 02:42 105.0 53.7	P(kPa)	chamber pressure in kPa
Vac2 024:11 01:03 78.2 -78.5	Start	start time
Heat2 025:50 00:39 105.0 48.9	PHeat	pre-heating of jacket chamber
Vac3 025:30 00:40 94.4 -78.5	Vac1	1 st pre-vacuum pulse
Heat3 025:39 10:09 135.0 211.6	Heat1	1 st heating pulse
Sterl 035:40 00:00 135.0 211.7	Pac2	2nd pre-vacuum pulse
Sterl 036:40 01:00 135.6 216.4	Heat2	2nd heating pulse
	Vac3	3rd pre-vacuum pulse
	Heat3	3rd heating pulse
	Sterl	sterilization time recorded every 1 minute
	Exh	exhaust of water and steam
Sterl 049:40 14:00 135.2 207.6	Dry1	dry time
Sterl 050:40 15:00 135.2 207.5	VR	vacuum release
Exh 051:53 01:13 105.1 2.0		
Dry1 053:53 02:00 92.7 -90.7		
Dry1 056:13 02:00 87.2 -82.6		
Dry1 079:04 02:00 78.5 -82.8		
Dry1 081:21 02:00 78.4 -82.9		
VR 084:50 02:46 71.9 0.0		
Ster. Temp. : 135.0 ~ 136.4 °C	sterilization temperature	
Ster. Pres. : 2.06 ~ 2.88 kgf/cm²	sterilization pressure	
Ster. Time : 15:00	sterilization period	
Total Time : 86:01	total time of program	
Program : FINISH	end of recording	
Signature:	Signature office	

● Printout of Dry Program

Printout	Description
Model : SAT-450HP	Model number
Software version : V1.10	Software version
SN : 130505204-001	Series number
USER ID : OP2	User identification
Program : Dry No-Vacuum	Program parameter Pre-vacuum period

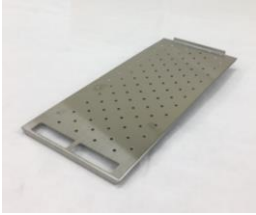

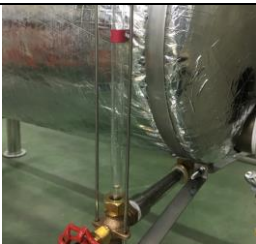



Ster. Temp : 0.0℃ Ster. Time : 0 m 0 s Dry Time : 30 m					Sterilization temperature Sterilization duration Dry duration	
Date : 2013/05/07 10 : 44 : 06					Date and Time of sterilization	
Cycle Counter : 000352					Cycles that had been started	
STEP	Time	Ts	T℃	P(kPa)	Step	action
Start	000:00	00:00	26.7	0.9	Time mmm:ss	mmm: minutes starting record, ss: seconds starting record
PHeat	019:49	19:49	28.4	1.9	Ts mm:ss	duration of each step, mm: minutes, ss: seconds
Dry1	021:49	02:00	37.0	-80.8		
Dry1	024:04	02:00	87.2	-82.6		
					T(℃)	chamber temperature in ℃
					P(kPa)	chamber pressure in kPa
					Start	start time
Dry1	048:01	02:00	78.5	-82.8	PHeat	pre-heating of jacket chamber
Dry1	050:38	02:00	78.4	-82.9	Dry1	dry time
VR	051:56	00:55	50.0	-0.3	VR	vacuum release
Ster. Temp. : 0.0 ~ 0.0℃					sterilization temperature	
Ster. Pres. : 0.0 ~ 0.0 kgf/cm²					sterilization pressure	
Ster. Time : 0:00					sterilization period	
Total Time : 51:56					total time of program	
Program : -----					end of recording	
Signature:_____					Signature office	

● Printout of Leakage Program

Printout	Description
Model : SAT-450HP	Model number
Software version : V1.10	Software version
SN : 130505204-001	Series number
USER ID : OP2	User identification
Program : Leakage Test	Program parameter
Date : 2013/05/16 08 : 04 : 06	Date and Time of sterilization
Cycle Counter : 000353	Cycles that had been started
Leakage Time_1: 300 sec Leakage Test_1: -80.0 kPa Leakage Time_2: 600 sec Leakage Test_2: -75.0 kPa Leakage Rate: 0.50 kPa/min Leakage Result: PASS	





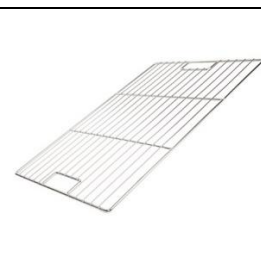


	Step	action
	Leakage Time_1	start of the leakage period
	Leakage Test_1	pressure after a period of 300 s
	Leakage Time_2	end of the test
	Leakage Test_2	pressure after a leakage time of 600 s
	Leakage Rate	leakage rate
	Leakage Result	test result
Signature: _____		Signature office






STANDARD ACCESSORIES :

	Name	Image	Description
<input type="checkbox"/>	Tray Base		Support the sterilizer accessories likes basket, plate set or sterilization loads. (1 pcs of standard)
<input type="checkbox"/>	Air Filter (Pore Size 2µm)		Replace the filter according to the ambient air quality. (1 pcs of standard)
<input type="checkbox"/>	Glass Tube		Helps to quickly check the water level during maintenance. (2 pcs of standard)
<input type="checkbox"/>	Printer Paper		Supplies, used to print sterilization data on digital dot printer. (5 pcs of standard)
<input type="checkbox"/>	Printer Ribbon		Supplies for printing sterilization data on paper. (1 pcs of standard)
<input type="checkbox"/>	USB Flash Drive		Device for storing sterilization data. (16GB x 1 pcs of standard)

OPTIONAL ACCESSORIES :

	Name	Image	Description
<input type="checkbox"/>	Basket (for 143 Liter)		Sterilization basket, made of 304 stainless steel. Include Rail x 1 and Basket x 2 Dimensions (W x H x D) : 290 x 195 x 400 mm

<input type="checkbox"/>	Basket (for 196 Liter)		<p>Sterilization basket, made of 304 stainless steel.</p> <p>Include Rail x 1 and Basket x 2</p> <p>Dimensions (W x H x D) : 345 x 230 x 450 mm</p>
<input type="checkbox"/>	Basket (for 350 Liter)		<p>Sterilization basket, made of 304 stainless steel.</p> <p>Include Plate Frame x 1 and Plate x 3</p> <p>Dimensions (W x H x D) : 395 x 265 x 365 mm</p>
<input type="checkbox"/>	Plate Set (for 143 Liter)		<p>Sterilization plate, made of 304 stainless steel.</p> <p>Include Plate Frame x 1 and Plate x 2</p> <p>Dimensions (W x D) : 413 x 850 mm (upper) 340 x 850 mm (lower)</p>
<input type="checkbox"/>	Plate Set (for 196 Liter)		<p>Sterilization plate, made of 304 stainless steel.</p> <p>Include Plate Frame x 1 and Plate x 2</p> <p>Dimensions (W x D) : 460 x 950 mm (upper) 376 x 950 mm (lower)</p>
<input type="checkbox"/>	Plate Set (for 350 Liter)		<p>Sterilization plate, made of 304 stainless steel.</p> <p>Include Plate Frame x 1 and Plate x 2</p> <p>Dimensions (W x D) : 550 x 1150 mm (upper) 500 x 1150 mm (lower)</p>
<input type="checkbox"/>	Loading Trolley		<p>Trolley w / Loading Plate</p> <p>Made of 304 stainless steel wire, with electro polished finish.</p>
<input type="checkbox"/>	Double-Layer Loading Trolley		<p>Trolley w / Loading Plate + Basket / Plate Combination x 2</p> <p>Made of 304 stainless steel wire, with electro polished finish.</p>

<input type="checkbox"/>	Water Filter		A fast, practical and functional water filter production system for high sterilization volumes.
<input type="checkbox"/>	Sterilization Pouch		Sterilization pouches are practical and easy to use, providing a fast and effective containment for equipment.
<input type="checkbox"/>	Cham-mate		Autoclave chamber & piping cleaner. (10 bags/ paper box)
<input type="checkbox"/>	Air Filter (Pore Size 0.3µm)		Replace the filter according to the ambient air quality.
<input type="checkbox"/>	Exhaust Filter (Pore Size 0.3µm)		Replace the filter according to the sterilization conditions.

OVERALL DIMENSIONS :

SAT-450HP 143 Liter (Single Door) : 850mm x 1800mm x 1350mm (W x H x D)

SAT-500HP 196 Liter (Single Door) : 850mm x 1800mm x 1450mm (W x H x D)

SAT-600HP 350 Liter (Single Door) : 930mm x 1900mm x 1680mm (W x H x D)

SAT-450HPD 143 Liter (Double Door) : 850mm x 1800mm x 1300mm (W x H x D)

SAT-500HPD 196 Liter (Double Door) : 850mm x 1800mm x 1400mm (W x H x D)

SAT-600HPD 350 Liter (Double Door) : 930mm x 1900mm x 1638mm (W x H x D)

NET WEIGHT :

SAT-450HP 143 Liter (Single Door) : 325kg

SAT-500HP 196 Liter (Single Door) : 372kg

SAT-600HP 350 Liter (Single Door) : 490kg

SAT-450HPD 143 Liter (Double Door) : 325kg

SAT-500HPD 196 Liter (Double Door) : 436kg

SAT-600HPD 350 Liter (Double Door) : 510kg

VOLTAGE :

- ☐ AC 3Ø 230V, 50/60Hz
- ☐ AC 3Ø 380V, 50/60Hz
- ☐ AC 3Ø 415V, 50/60Hz
- ☐ AC 3Ø 440V, 50/60Hz

PACK :

- ☐ Add Water Pump
- ☐ Liquid Temperature Sensor
- ☐ UPS (Uninterruptable Power System)
for Control System

WATER AND ENERGY CONSUMPTION :

	SAT-450HP (HPD)	SAT-500HP (HPD)	SAT-600HP (HPD)
Chamber Volume	143 Liter	196 Liter	350 Liter
Total Power (KW)	13 KW	13 KW	16 KW
Max. Water (CC)	5,000	7,000	13,000

ENVIRONMENTAL CONDITIONS IN THE STERILE AREA :

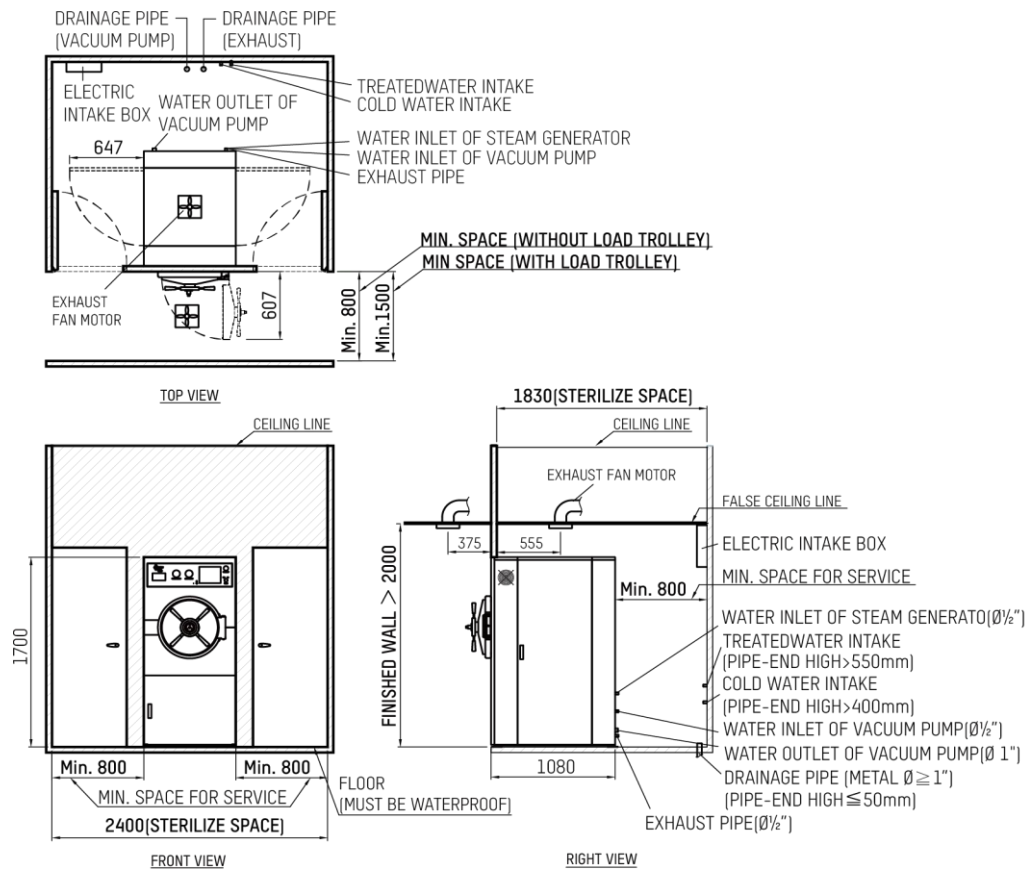
- Indoor use;
- Under 4,000m (altitude);
- Temperature 5°C to 40°C;
- Relative Humidity 80%RH@31°C to Relative Humidity 50%RH@40°C;
- Voltage fluctuation $\pm 10\%$;
- Transient overvoltages category II;
- Pollution degree 2

INSTALLATION INSTRUCTION :

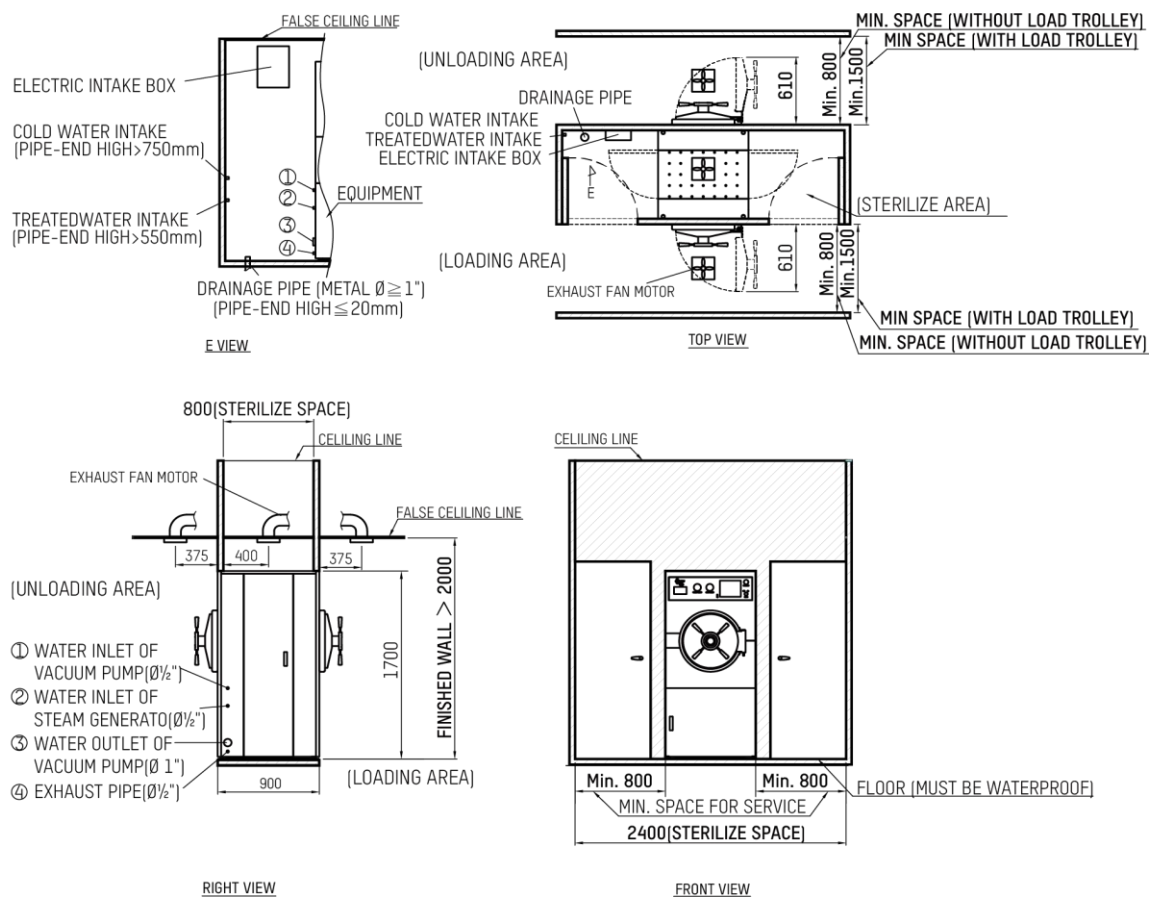
This equipment has been designed for use in accordance with the International EMC (Electromagnetic Compatibility) Standards. In view of different environments, please follow the instructions given below to eliminate interference, if necessary.

1. Install the autoclave as instructed in the "installation plan" onto a horizontal floor that can support it, and keep a minimum distance of 800mm from the walls for ventilation and maintenance.
2. Be sure to install the sterilizer on a flat surface, otherwise it may not detect the water level correctly.
3. Locate the autoclave and adjust its plane so that door site is slightly higher than the rear side about 1-2 degree.
4. Connect the pipes as following:
 - a. Water inlet for steam generator, diameter of $\phi 1/2"$
 - b. Water inlet for vacuum pump, diameter of $\phi 1/2"$
 - c. Exhaust outlet for chamber, diameter of $\phi 1/2"$
 - d. Exhaust outlet for vacuum pump and steam generator, diameter of $\phi 1"$
5. Do not install or operate the sterilizer in areas where flammable items or volatile substances are used or stored. An explosion could occur, causing personal injury. An installation site with good air circulation is required.

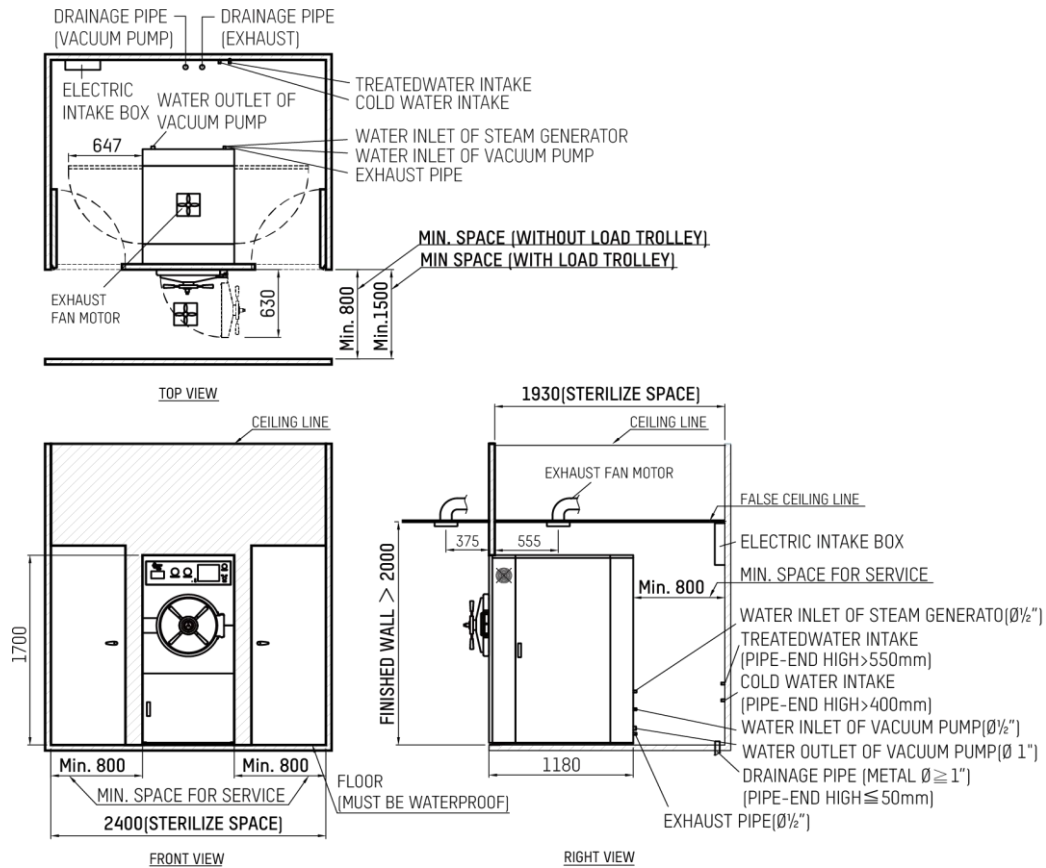
● SAT-450HP 143 Liter installation drawing – Single Door :



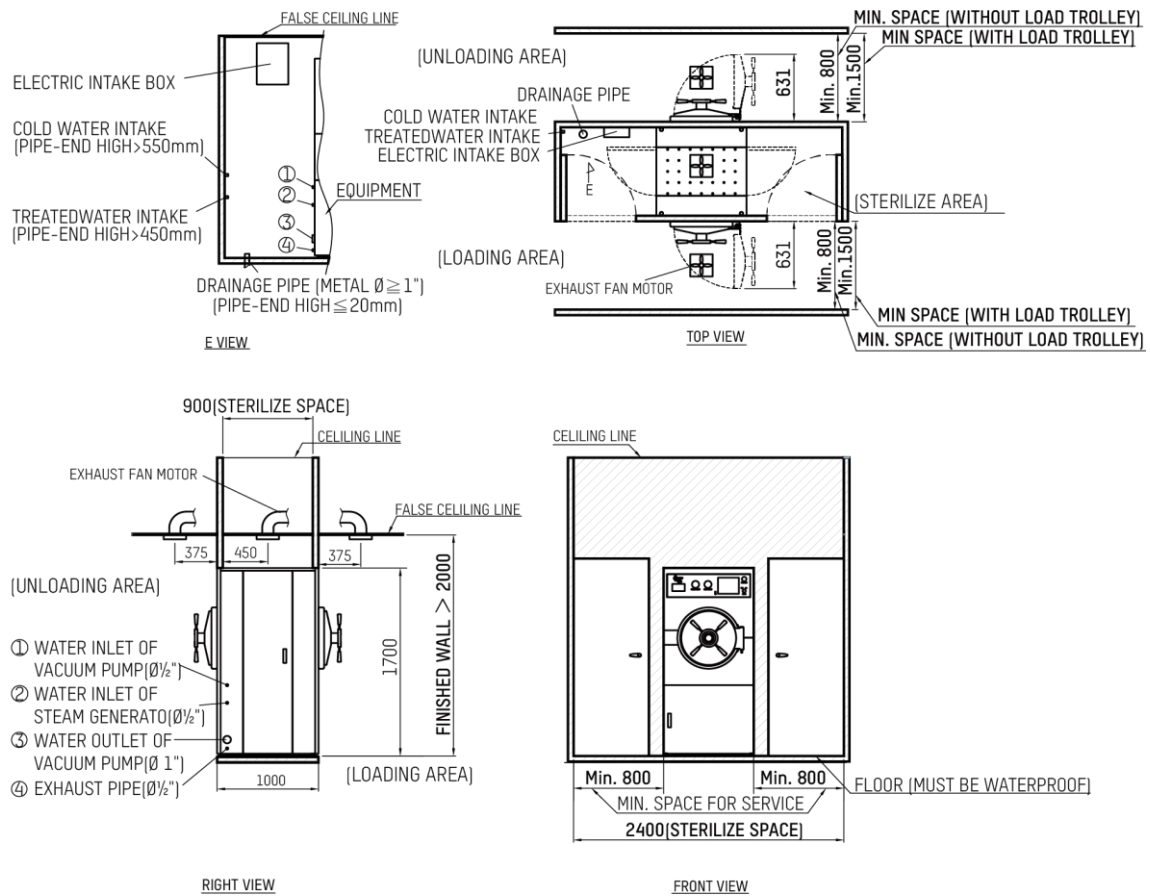
● SAT-450HPD 143 Liter installation drawing – Double Door :



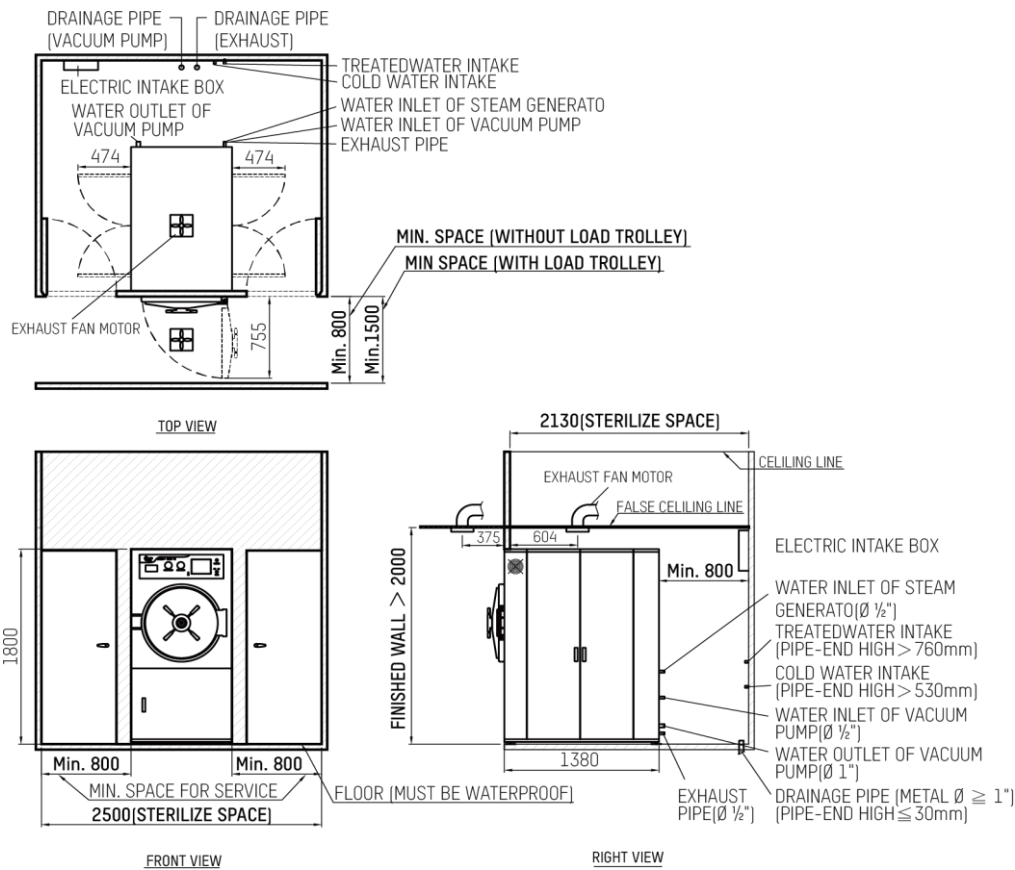
- SAT-500HP 196 Liter installation drawing – Single Door :



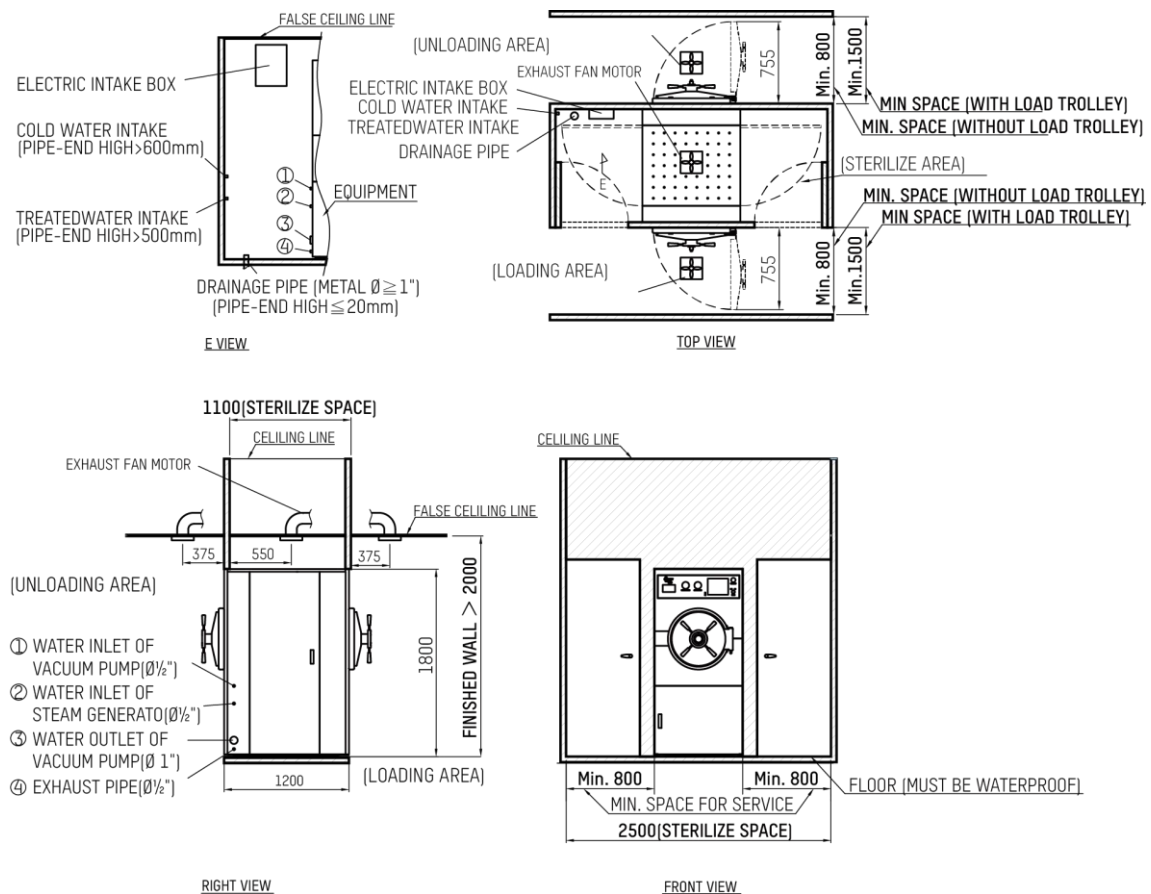
- SAT-500HPD 196 Liter installation drawing – Double Door :



● SAT-600HP 350 Liter installation drawing – Single Door :



● SAT-600HPD 350 Liter installation drawing – Double Door :



RECOMMENDED SUPPLY WATER QUALITY :

It is recommended to purchase RO water filtration equipment locally. The recommended water quality requirements are as follows :

Determinant	Feed water
Residue on evaporation	≤ 10 mg/l
Silicate (SiO ₂)	≤ 1 mg/l
Iron	≤ 0.2 mg/l
Cadmium	≤ 0.005 mg/l
Lead	≤ 0.05 mg/l
Rest of heavy metals except iron, cadmium, lead	≤ 0.1 mg/l
Chloride	≤ 2 mg/l
Phosphate	≤ 0.5 mg/l
Conductivity (at 25°C)	≤ 15 μ S/cm
pH value ((degree of acidity))	5 to 7.5
Hardness (Σ ions of alkaline earth)	≤ 0.02 mmol/l

Compliance should be tested in accordance with acknowledged analytical methods.

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For more information, contact



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