High Pressure Steam Sterilizer

SM200 SM300
SM310 SM510

Second Edition

⚠ Read and apprehend the important warnings in this instruction manual prior to use.

Yamato Scientific America Inc.
Santa Clara, CA

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Specifications

SM200/300

Model	SM200	SM300
System	Automatic high pressure steam sterilizer	
Sterilization	105℃～123℃	105℃～128℃

Specifications

SM310/510

Model	SM310	SM510
System	Automatic High pressure steam sterilizer	
Sterilization	105℃～128℃	

Safety Information

Safety Information

Safety Precautions

Do not use this unit for any purpose other than its intended use, described in this manual.

This unit is not explosion proof. Never use in flammable or explosive gas environments.

Be sure to ground the unit. Electric leak could cause electrical shock or fire.

Be sure to use a power supply with more than the rated capacity specified in this manual. Use of a power supply without the correct rated voltage and current could cause fire or electric shock.

If smoke or any strange odor should disburse from this unit, turn the breaker off immediately and pull out the main power cord. Then contact Yamato Scientific. Neglecting this procedure can result in fire or electric shock. Never try repairing the unit yourself.

Forcibly bending, pulling, wrenching or extending the power cord can cause a fire or electric shock.

Overheat or fire can occur if the power cord is bundled or if an object is on the cord.

The use of explosive, flammable or such compounds can cause explosion or fire. (See Pg.7)

Disassembling this unit can cause fire, electric shock or other crisis's.

The exhaust is located on the right side of the unit. Possibility of personal injury if you come in contact with this area during operation or for a period of time after use.

In the event of electrical storm turn off the main circuit breaker. Neglecting this procedure can result in fire, electric shock or other troubles due to thunderbolts.

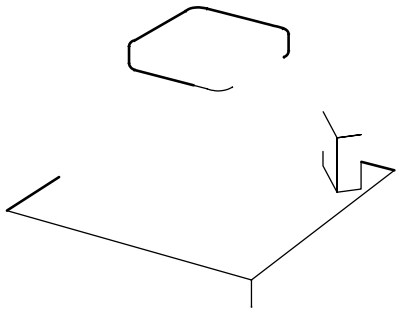
In the event of a power interruption or the main circuit breaker is switched off during operation the sterilizer solenoid exhaust valve will remain closed once power has been restored. The solenoid exhaust valve will not open until the chamber temperature reaches below boiling point.

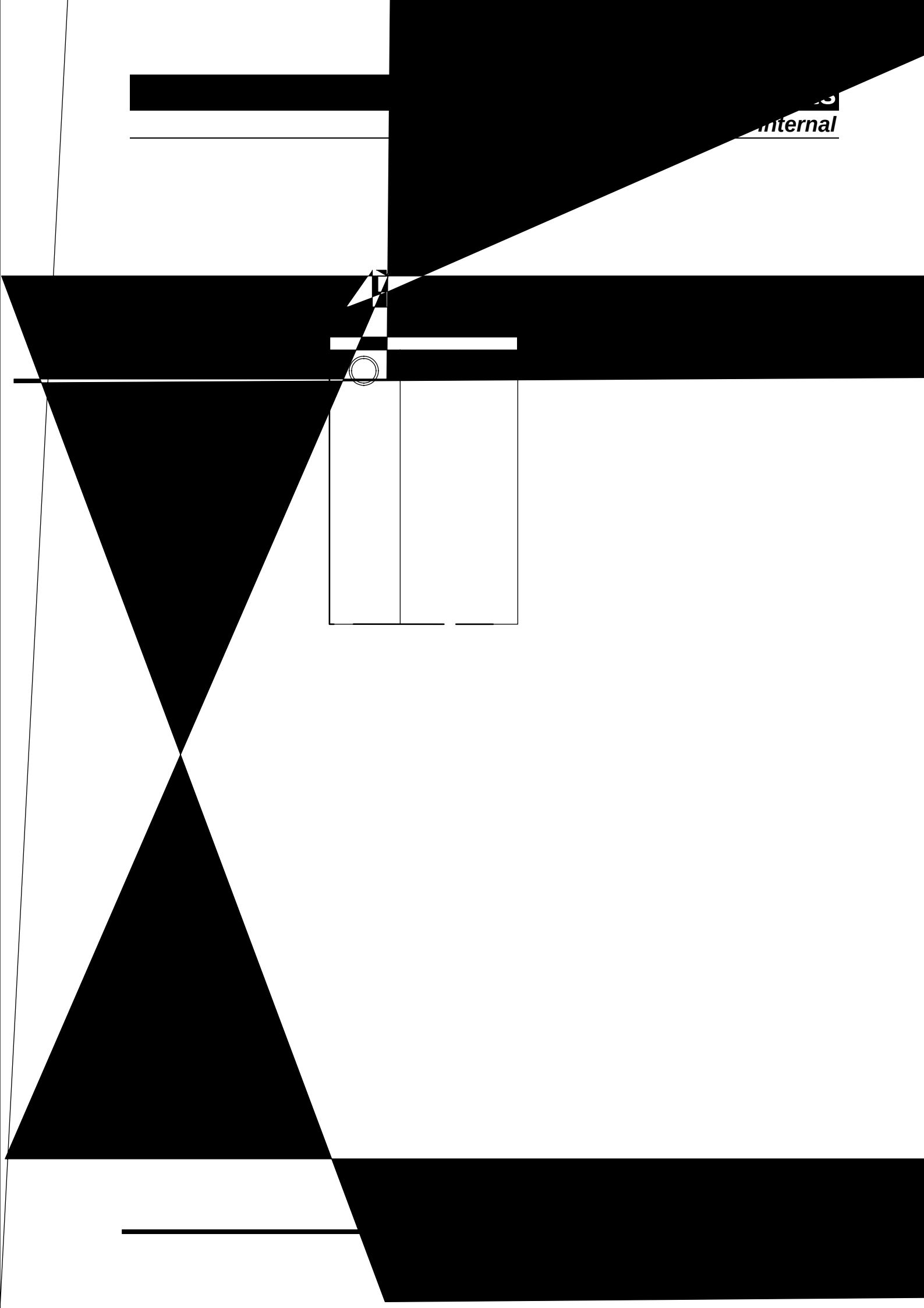
Do not attempt to open the sterilizer lid until the pressure is at 0psi.

Use the pressure relief switch to reduce the pressure inside the chamber to “0psi”. (refer to page 35 for instruction how to use the pressure relief switch)

The following material is not recommended for use on the sterilizer

Explosive	Explosive Substance	Nitroglycol, Nitroglycerin, Nitrocellulose and other explosive nitric esters.
		Trinitrobenzene, Trinitrotoluene, Picric acid, and other explosive nitro compounds.
		Peracetic acid, Methyl ethyl ketone peroxide, Benzoyl peroxide and other organic peroxides.
		Sodium azide and any other metallic azide compound.
Flammable	Combustible Substance	Metallic lithium, Metallic potassium, Metallic sodium, Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid, Calcium carbide(Carbide), Phosphide lime, Megnesium powder, Aluminum powder, other combustible metal powders and Sodium dithionite (Hydrosulfite).
	Oxidant	Potassium chlorate, Sodium chlorate, Ammonium chlorate and other perchlorate.
		Potassium perchlorate, Sodium perchlorate, Ammonia perchlorate, and other perchlorates.
		Potassium peroxide, Sodium peroxide, Barium peroxide and other inorganic peroxides.
		Potassium nitrate, Sodium nitrate, Ammonia nitrate and other nitrates.
		Sodium chlorite and other chlorites.
		Calcium hypochlorite and other hypochlorites.
	Ignitable Substance	Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide and other substance with the flash point below minus 30ºC.
		Normal hexane, Ethylene oxide, Acetone, Benzene, Methyl ethyl ketone and any other substance with the flash points not lower than minus 30ºC and below 0°C.
		Methanol, Ethanol, Xylene, Pentyl acetate (Amyl acetate) and other substance with the flash point not lower than 0ºC and below 30ºC.
		Kerosene oil, Light oil, Turpentine oil and Isopentyl alcohol(Isoamyl alcohol), Acetic acid and other substances with the flash point not lower than 30ºC and below 65ºC
	Combustible Gas	Hydrogen, Acetylene, Ethylene, Methane, Ethane, Propane, Butane and other flammable gas at 15ºC and under 1 atmosphere.





Provide ample space surrounding the sterilizer

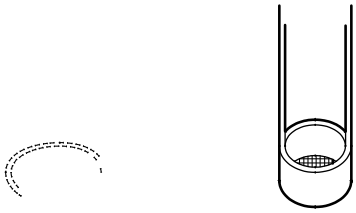
Ground

To prevent shock from electric current leak, be sure to connect the ground lead.
Contact Yamato Scientific or an electrician if a power source with a ground terminal is needed.
Never connect ground to with gas pipe, water pipe, telephone line, or lighting conductor.

SM200/300 **SM310/510**

Filter Installation

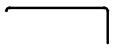
Be sure to install the filter prior to operation.



Install the bottle

The sterilizer drains water forcibly during the “STERILIZE & DRY” process. Hot and high pressure water will spout out to the bottle. To prevent the user from operating the sterilizer without the drain bottle a micro switch will not allow the sterilizer to operate without the bottle.

①Open the front door of the sterilizer and remove the bottle. The display will flash bot L indicating the bottle is not in place.

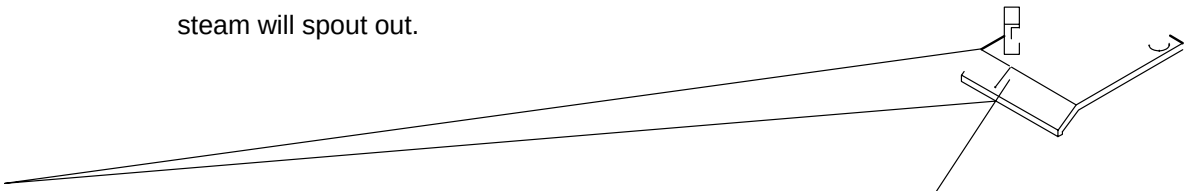


Pour water into the chamber

Pour water into the chamber according to the gauge on the bottom plate.
Failing to pour adequate water will result in a interruption of operation. Confirm the water level after each sample run.

Opening lid

⚠ When opening the lid, be sure that the pressure gauge reads “0psi". Proceed to open slowly. If the lid is opened at high pressure, hot steam will spout out.

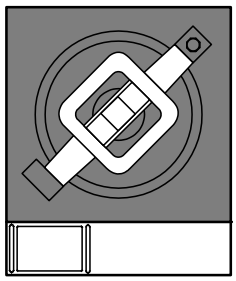


Operational Precautions

Certain areas become very hot

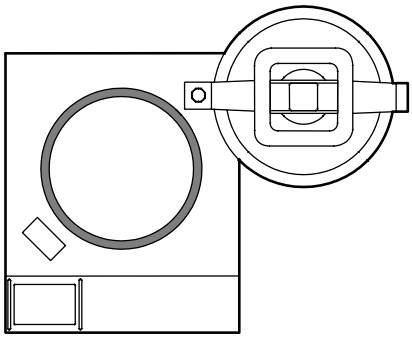
During and following operation, the areas around the lid become very hot. Be careful not to touch these areas.

◆**Gray areas in the illustration on the right become especially hot.**



Lid gasket

Any damage or dust on the lid gasket/flange of the chamber (gray area in illustration on right) will allow steam to escape. Be sure to keep this area clean and avoid contacting with baskets, etc. when installing or removing materials from the chamber.



The gasket may deteriorate according to use. If steam escapes frequently, you may need to change the gasket.

Panel guard

The panel guard was designed to protect the display/keypad. Do not hold the panel guard to move the sterilizer.

Sample Run Examples

How to operate the "STERILIZE" process

Sterilize operation using a waste bag.

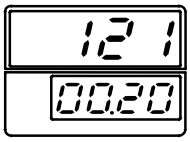
① Be sure to open the mouth of the bag to let steam.

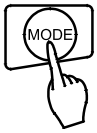
② Keep the bag approximately 2/3" height of the total depth of the chamber (Example: SM200 is 17.5" deep, so the bag should be placed 11.5" from the bottom). If the bag is placed higher than this point, steam will not disperse easily and may result in incomplete sterilization, in addition, the bag can easily cover the exhaust in the upper part of the container.

③ Set the temperature lower than the heat resisting point of the bag.

④ Set time depends on quality and quantity of the material being sterilized. (See chart below) Set the temperao

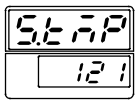
How to use the “MODE” key

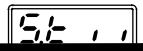




Program “MODE”

Flowchart





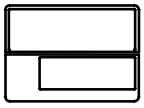
Setting sterilization temp/time

◆Used to set the sterilization temp/time.

◆Simply push the ”MODE” key to cancel the set up at any point.

◆The sterilizer automatically sets in stand-by mode if it is untouched for more than a minute during set up.

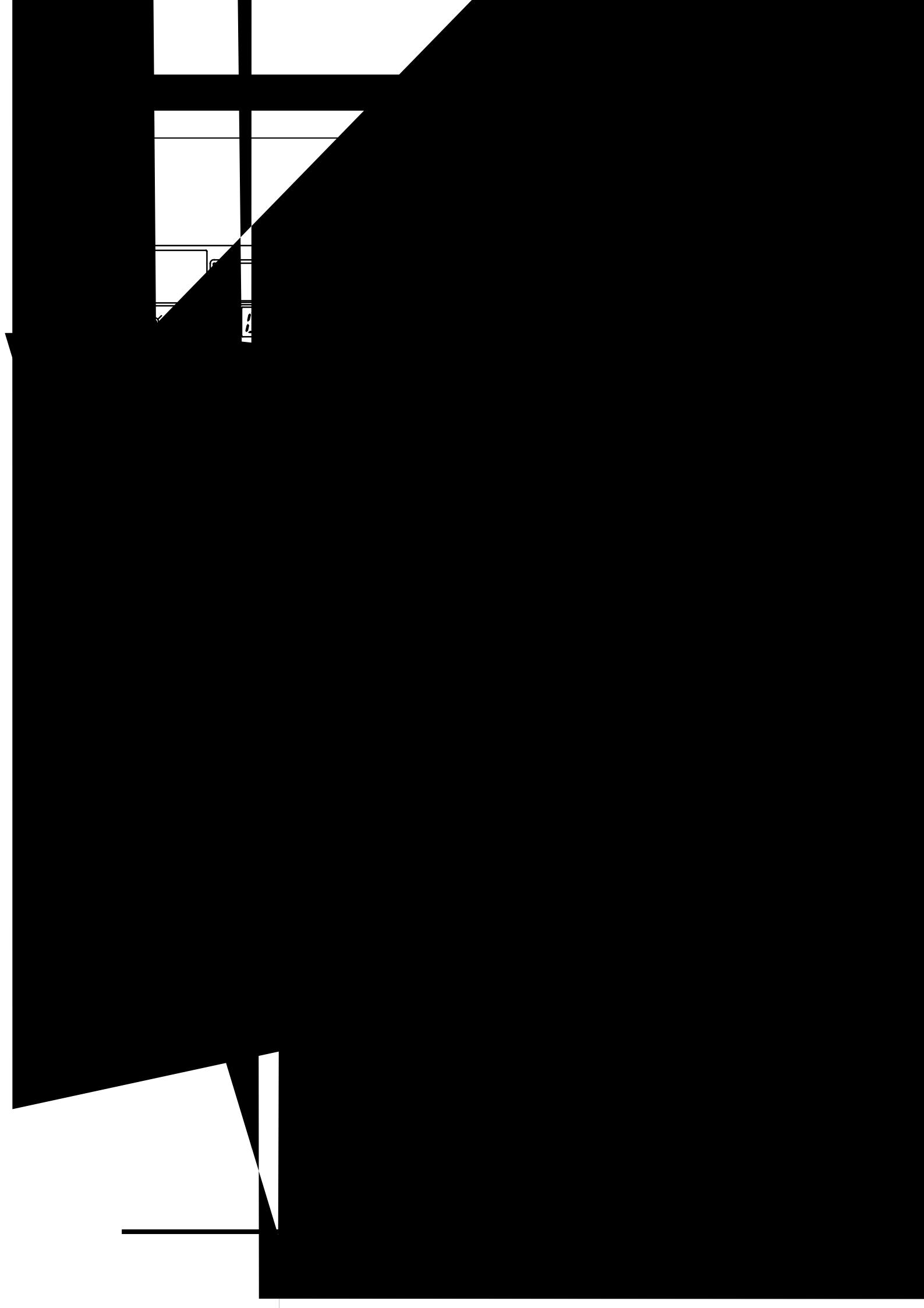
Stand-by

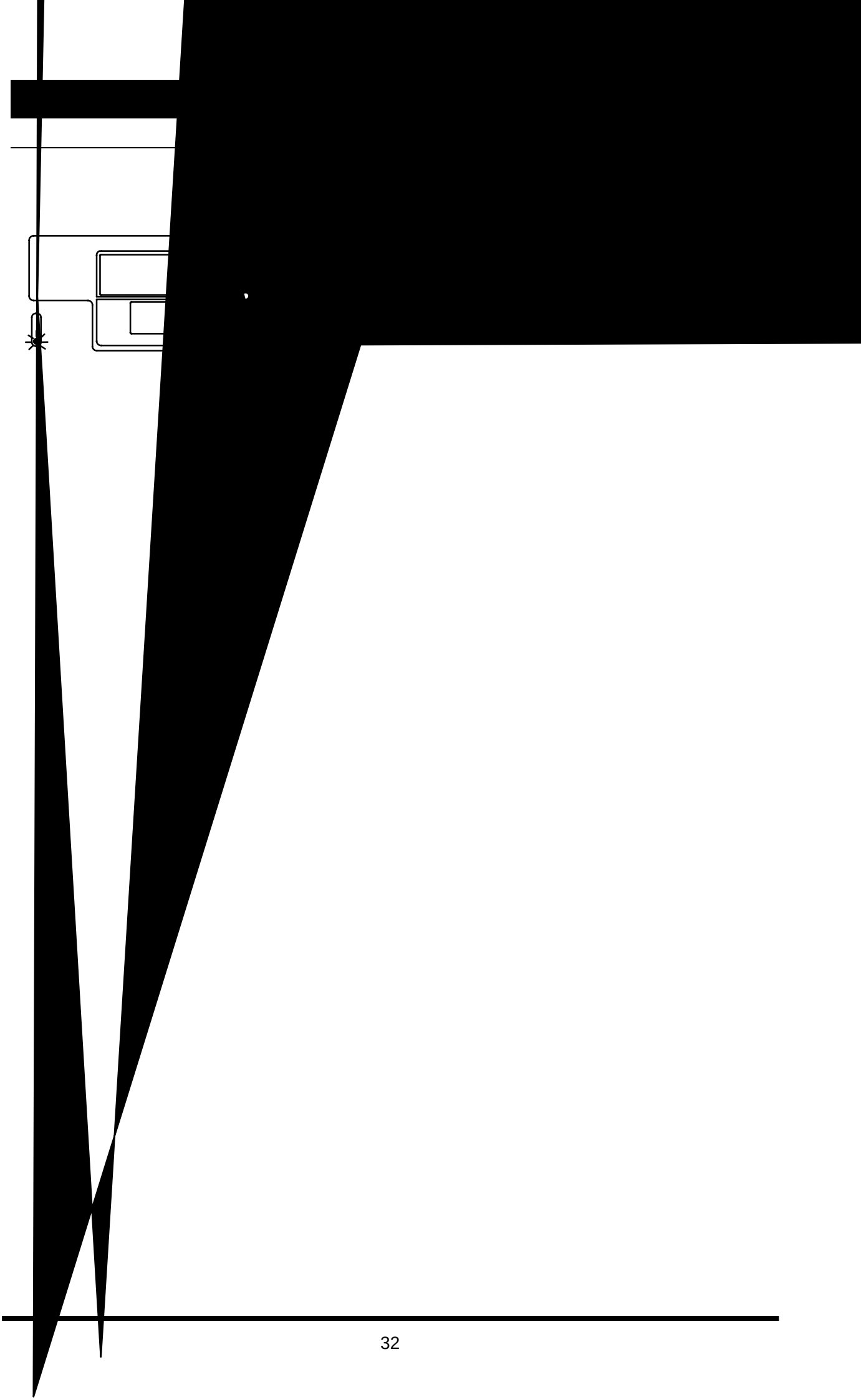


Dry Mode Temperature and Time

Selecting operation

The following procedure allows the user to select the desired operation.





View Parameter during Operation

To check set temperature and time during the operation, push the “MODE” key.
Set points can only be viewed, not changed.

Self-diagnostic Circuitry

The Yamato sterilizer was designed with self-diagnostic circuitry capable of monitoring operation of the sterilizer. If a malfunction occurs, the display panel blinks the error code and an alarm is sounded. The microprocessor disables power to the heater element. If this occurs, check the error code and immediately shut off the main breaker.

The safety valve is activated if pressure inside the chamber is abnormal. No special alarm is given

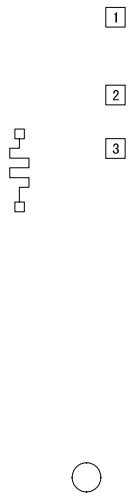
Troubleshooting Guide

Problem Solving Chart

Fault Indication	Check Points
Display does not come up when the breaker is turned on	・Is the power supply cord connected? ・Is there any power failure? ・Is the voltage of the power source adequate?
Air is not exhausted. The safety valve is activated.	・Is the hose to the bottle bent or clogged? ・Is the exhaust clogged by material etc.,?
Water is not drained. Water is not drained in drying process.	・Is the filter clogged?
Sterilization temperature does not go up. The pressure does not increase.	・Is the lid securely closed? ・Is the packing or flange damaged?
The pressure increases when the solenoid valve is not closed.	・Is the exhaust vent clogged?
The temperature changes during operation.	・Is there considerable changes of the outside temperature?
Steam spouts rapidly.	・Is there water in the bottle? ・Is the exhaust hose out of place or damaged?
Water leaks.	・Is the drain valve securely closed? ・Is there too much water in the bottle?
The operation does not start from stand-by.	・Is bottle installed?
Noise during air purge is loud.	・Is the silencer out of place?

◆If you require further technical assistance, please call Yamato Scientific at (800) 292-6286 Ext. 235

SM200



SM310/510

For maintenance

For maintenance, turn the breaker and power supply off for safety. If the chamber is hot, wait for it to cool. Wipe off any dirt on the exterior with a damp cloth. Do not use benzene, thinner or cleanser to wipe, nor scrub with a brush.

Daily Maintenance

Cleaning the silencer

The unit is set up with a silencer at the end of the exhaust hose to reduce noise occurring from air purge. Remove the silencer and clean with water once a month.

◆**A ball is set in the silencer to prevent back flow of water. Do not misplace the ball when removing the silencer.**

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When you request repair

If any troubles should occur, stop the operation immediately, turn the breaker off, pull the power cord out and contact Yamato Sciectific

Replacement Parts List

Common for all SM series

Part Name	Part No.	Specifications
Planar Board	1-24-000-0059	**IV**$_{CR}$
PIO Board	1-24-000-0028	**IV**$_{FR}$
Power Board	1-24-000-0026	**IV**$_{CR}$
SSR1 (SM300)	2-16-000-0020	YLT-SSR-01A
SSR2 (SM300)	2-16-000-0021	YLT-SSR-01B
SSR (SM200/310/510)	2-16-000-0010	YLT-SSR-01
CPU	1-18-001-0006	
Transformer(Tr1; SM200/300)	2-18-000-0035	AD21-100A 115V
Transformer(Tr2; SM200/300)	2-18-000-0022	AC100V
Transformer(Tr1; SM310/510)	2-18-000-0035	AD21-100A 220V
Transformer(Tr2; SM310/510)	2-18-000-0023	AC200V
Relay (SM200/310/510)	2-05-000-0031	LY2F-DC12V
Relay (SM300)	2-05-000-0019	HEla-DC12V
Relay	2-05-012-0001	JRlaF-TM-DC12V
Stick Keypad	SM51A-30490	W467
Current Transformer	2-17-001-0002	URP CTL-6-5-400
Pressure Relief Switch	2-01-001-0014	A2A-4W
Circuit Breaker (SM200/310/510)	2-06-001-0003	BS2021
Circuit Breaker (SM300)	2-06-001-0004	BS2022
Heater 1 (SM200)	2-24-000-0057	AC115V 1.3kw
Heater 1 (SM300)	2-24-000-0058	AC115V 1.7kw
Heater 1 (SM310/510)	2-24-000-0059	AC220V 2.0kw
Heater 2 (SM200)	2-26-000-0003	AC115V 500W
Heater 2 (SM300/310/510)	2-26-000-0004	AC115V 750W
Sensor 1	1-16-003-0035	Pt100 Resistance Thermometer Sensor
Sensor 2	1-16-003-0034	T type Thermometer
Solenoid Exhaust Valve (SM200/300)	3-02-001-0016	AB41-02-7-C4A PT1/4 AC100V CKD
Solenoid Exhaust Valve (SM310/510)	3-02-001-0017	AB41-02-7-C4A PT1/4 AC200V CKD
Solenoid Drain Valve (SM200/300)	3-02-001-0016	AB41-02-7-C4A PT1/4 AC100V CKD
Solenoid Drain Valve (SM310/510)	3-02-001-0017	AB41-02-7-C4A PT1/4 AC200V CKD
Micro Switch	2-02-001-0005	ABV163661
Safety Valve (SM200)	3-18-001-6003	M3D-B1.6±0.2Kgf/cm^2
Safety Valve (SM300/310/510)	3-18-001-6002	M3D-B2.0±0.2Kgf/cm^2
Plug	SM500-30280	
Silencer	SM500-30340	
Lid Gasket (SM200)	241022-180	SH75UN
Lid Gasket (SM300/310/510)	241024-180	SH75UN
Bottom Plate (SM200)	SM200-30750	
Bottom Plate (SM 300/310/510)	SM500-30750	
Filter	SM500-30700	
Drain Valve	3-15-0003-6002	Type BSB PT3/8
Mesh	(WG)253003-172-2	
Bottle	7-26-000-0006	5000cc
Pressure Gauge	5-05-000-0002	GS58-201

●The solenoid valve is usable for exhaust band drain.

Responsibility

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply.
Never conduct what this document forbids. Unexpected accidents or breakdown may result in.