

REFLECTIVITY

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OPERATOR'S MANUAL

VACUUM OVEN  
ADP-31

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**Yamato**

Yamato

## WARRANTY

Yamato Scientific America Inc. does hereby warranty for a period of 24 months from date of delivery, under normal and proper usage, this product against defects in workmanship and material, and will repair or replace any defective part(s) without charge.

This warranty becomes null and void where purchaser or user has made (1) unauthorized repairs, or (2) improper installation, or (3) improper use or neglect of the equipment.

Should repair or service of this product be necessary, it must be performed by repair and service personnel authorized by Yamato Scientific America Inc.

To obtain the benefits conferred by this warranty, user must return the warranty card to Yamato Scientific America Inc. within ten (10) business days after receipt of the product.

Yamato Scientific America Inc. makes no other warranty of any kind whatever, expressed or implied, including merchantability and fitness for a particular purpose.

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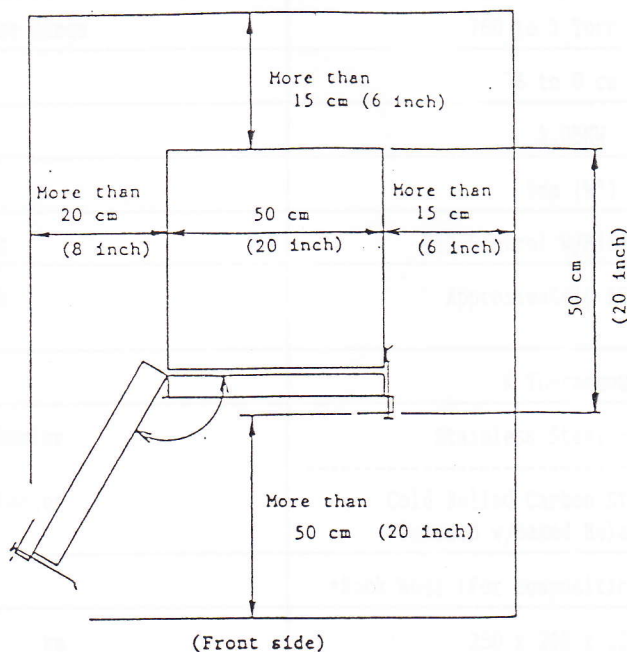
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## I. INSTALLATION

- (1) Install these ovens in a safe place positioned with adequate clearance on all sides as follows:



Installation in the following environments should be avoided.

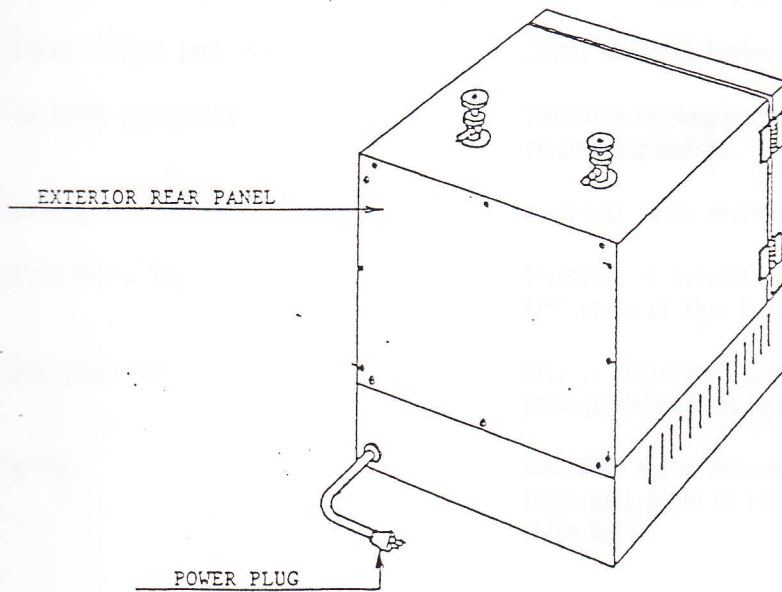
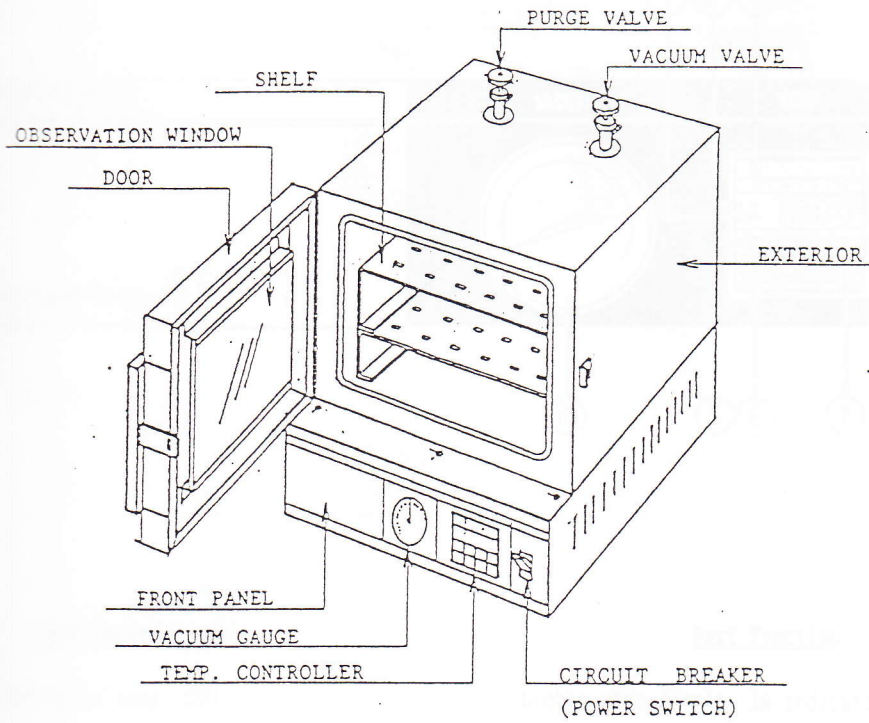
- ♦ Place where flammable gas or corrosive gas exists.
  - ♦ Place where high humidity exists.
  - ♦ Place where ambient temperature rises higher than 35°C or where dramatic temperature fluctuations occur.
  - ♦ Place where direct sun shines.
- (2) Do not place anything on the main unit.
- (3) Connect the power supply plug to the 3-wire grounded outlet which is suitable for necessary power supply capacity of this oven.
- (4) Recommended for use with a vacuum pump with 50ℓ/min. free air displacement. Connect the nipple O.D. 9mm(3/8") for vacuum hose on top of oven and suction port of vacuum pump with vacuum hose not to leak air. If nipple diameter differs from the diameter of suction port of vacuum pump, be sure to connect them by using a joint which has two different diameters at both ends.

## 2. SPECIFICATIONS

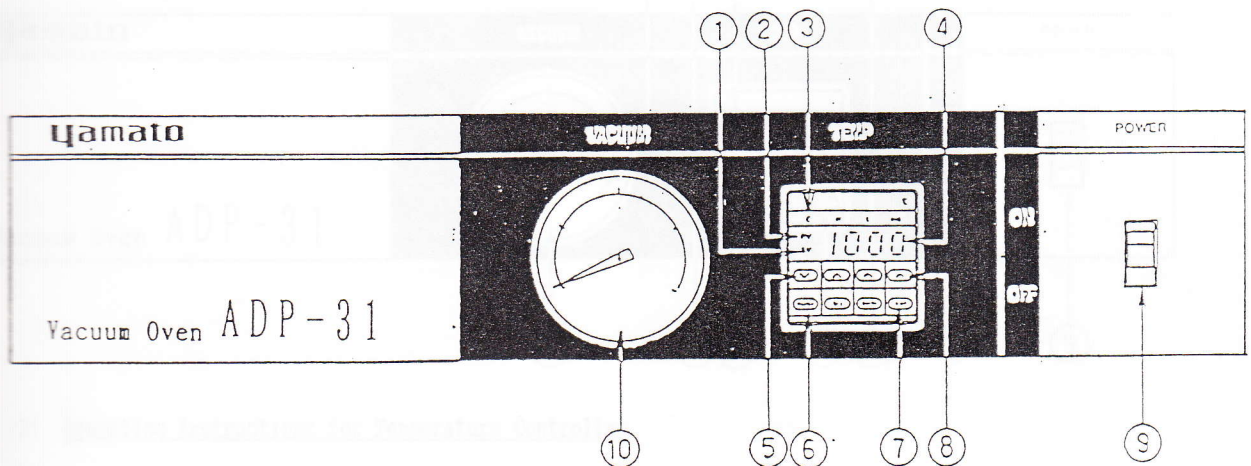
Model	ADP-31	
Operating Temperature Range	40°C to 240°C	
Temperature Control Accuracy	±1.5°C (at 150°C)	
Operating Vacuum Degree Range	760 to 1 Torr (mm Hg)	
Vacuum Gauge	76 to 0 cm Hg	
Heater Capacity	1.05KW	
Nipple for Vacuum	9mm (3/4")	
Temperature Controller	PID Control w/Microprocessor	
Time Required to Reach Maximum Temperature	Approximately 100 Minutes	
Sensor	K Thermocouple	
Material:	Interior	Stainless Steel - SST304
" :	Exterior	Cold Rolled Carbon Steel Sheets Finished w/Baked Melamine Resin
Insulating Material	*Rock Wool (For composition & weight %, see below)	
Observation Window:	mm	250 x 280 x 12
(W x H x T)	in.	9.8 x 11 x 0.5
Overall Dimension	mm	527 x 499 x 639
(W x D x H)	in.	20.7 x 19.6 x 25
Inside Dimension	mm	300 x 300 x 300
(W x D x H)	in.	11.8 x 11.8 x 11.8
Inside Capacity	ℓ(cu.ft.)	27 (1.0)
Net Weight	kg (lbs.)	Approximately 55 (121)
Power Supply	120 VAC, 10A, 60 HZ	
Maximum No. of Shelves	3	
Space Between Shelves	mm	75
	in.	3
Shelf Load Capacity	kg (lbs.)	Approximately 15 (33.1)/Shelf
Accessories (Included) Aluminum Shelf 3" High	3 Pieces	

\*SiO<sub>2</sub> (35-45), Al<sub>2</sub>O<sub>3</sub> (10-20), CaO(20-40), MgO(3-10), Fe<sub>2</sub>O<sub>3</sub> (0-12), FeO

3. EXTERNAL VIEW

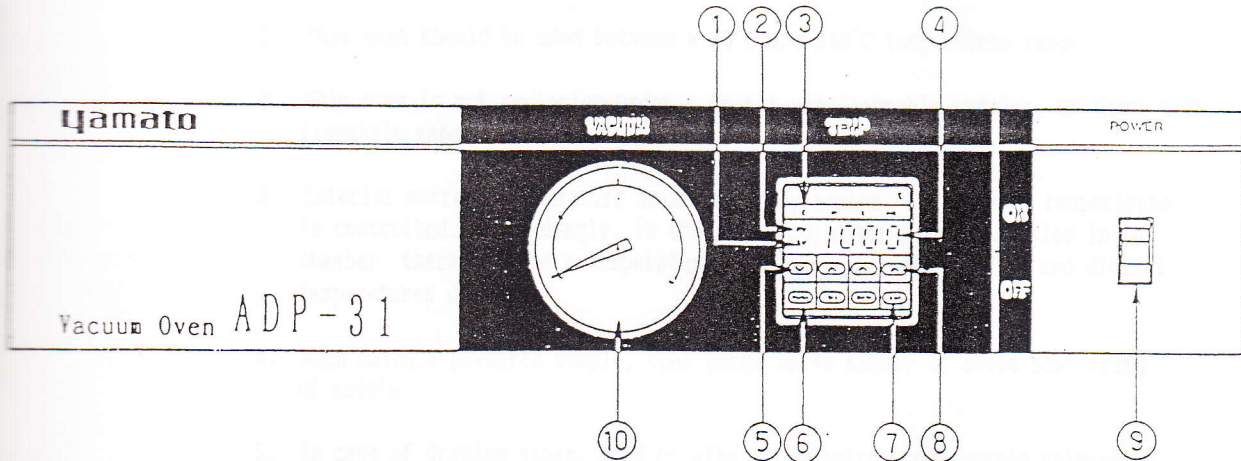


#### 4. TEMPERATURE CONTROLLER



<u>Part Description</u>	<u>Part Function</u>
(1) Set-Value Lamp (SV)	Lights when display is indicating set temperature (SV).
(2) Present-Value Lamp (PV)	Lights when display is indicating present temperature.
(3) Control Output Lamp (C)	Lights when the heater is activated.
(4) Parameter Indication	Indicates set temperature (SV), present temperature (PV), and various parameters.
(5) Down-Key	Numerical value decreases when key is pressed.
(6) PV/SV Select Key	Selection of present value (PV) or set temperature (SV) at each press of this key.
(7) Data Entry Key	Data is registered after it is changed. (Changed data cannot be registered unless this key is pressed)
(8) Up-Key	Numerical value increases when key is pressed. Indicator light will flash on first press; continue to depress key to raise value.
(9) Power Switch	Switch for starting operation of oven.
(10) Vacuum Gauge	Indicates vacuum level of the chamber.

## 5. OPERATION



### (1) Operating Instructions for Temperature Controller

- A. When turning power switch ON, oven will be in operation.
- B. Light Set-Value Lamp (SV) by pressing PV/SV select key.
- C. Set the numerical value on display at desired temperature by pressing Up Key ⑧ or Down Key ⑤. When correct value is reached, press Entry Key ⑦.
- D. Present temperature is displayed by repressing PV/SV Select Key ⑥.
- E. When Control Output Lamp ③ flickers and fluctuation of temperature value on display becomes less frequent, it shows that present temperature (PV) is stabilizing.
- F. When raising Set Temperature (SV) during operation, press PV/SV Select Key ⑥, then perform the operations of B, C, and D mentioned above.

### (2) Vacuum Operation

- A. When evacuating the chamber, close purge valve and open vacuum valve, then turn power switch of vacuum pump ON.
- B. When restoring chamber pressure to atmospheric pressure, close vacuum valve and open purge valve.
- C. Turn power switch of vacuum pump OFF after restoring suction port side of vacuum pump to atmospheric pressure.

**CAUTION:** Failure to turn off vacuum pump may result in oil flowing into the chamber from the pump.

If "SEL" or "DATA" keys are accidentally pressed, please depress PV/SV ⑥ for reset or wait approximately 30 seconds for automatic reset.



## 6. PRECAUTIONS OF OPERATION

1. This oven should be used between a 40°C and 240°C temperature range.
2. This oven is not explosion-proof. Do not use flammable samples, or those with flammable vapor.
3. Interior surface temperature is detected by sensor, and chamber temperature is controlled. Accordingly, in the beginning after placing samples in the chamber, there will be a temperature difference between samples and digital temperatures display.
4. When using a powdered sample, open purge valve slowly to avoid scattering of sample.
5. In case of drawing steam, acid or alkali corrosive gas, organic solvent or mercury vapor, remove them by means of dehydrating agent (calcium chloride, silica gel, etc.), or cold trap in order to ensure long life of vacuum oil and vacuum pump.
6. Specified shelf load of 15 Kg (33.1 Lbs.) assumes equally distributed loads. Always distribute samples evenly over shelf area. Always keep 30% or more open space over shelf area for uniform distribution of temperature.
7. The protecting plate of temperature glass for observation window is made of polycarbonate resin, and if cleaned with organic solvent, may become cloudy. Therefore, use neutral detergent when cleaning.
8. Although temperature can be set to a higher degree than maximum operating temperature, the controller does not accept temperature above 240 C.

## 7. TROUBLESHOOTING

### (1) Trouble Diagnosis Method

Trouble	Cause	Measure
Power switch (breaker) is turned on, oven does not operate at all.	<ol style="list-style-type: none"> <li>1. Defective power supply.</li> <li>2. Defective power switch (breaker).</li> <li>3. Defective temperature controller.</li> <li>4. Power supply cord is not connected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair power supply.</li> <li>2. Replace power switch (breaker).</li> <li>3. Replace temperature controller.</li> <li>4. Turn breaker on.</li> <li>5. Be sure to connect the power cord.</li> </ol>
It is not possible to set the temperature.	<ol style="list-style-type: none"> <li>1. Defective temperature controller.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace temperature controller.</li> </ol>
Temperature does not rise.	<ol style="list-style-type: none"> <li>1. Defective heater.</li> <li>2. Defective wiring.</li> <li>3. Thermal fuse is blown.</li> <li>4. Defective temperature controller.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace heater.</li> <li>2. Re-wire.</li> <li>3. Replace thermal fuse.</li> <li>4. Replace temperature controller.</li> </ol>
It is not possible to evacuate.	<ol style="list-style-type: none"> <li>1. Defective valve.</li> <li>2. Defective door gasket.</li> <li>3. Defective vacuum hose.</li> <li>4. Defective vacuum pump.</li> <li>5. Piping or hose is clogged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace valve.</li> <li>2. Replace door gasket.</li> <li>3. Replace vacuum hose.</li> <li>4. Repair vacuum pump.</li> <li>5. Repair pipe or hose.</li> </ol>
OVEN appears	<ol style="list-style-type: none"> <li>1. Defective temperature sensor.</li> <li>2. Temperature sensor disconnected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace temperature sensor.</li> <li>2. Connect temperature sensor.</li> </ol>

NOTE : For replacement parts and service, contact Yamato Service Department at 1-800-292-6286.

### RETURN TO RIGHT-HAND OPENING DOOR

1. Unscrew and remove six (6) screws on the right side of oven.
2. Unscrew and remove two (2) screws between the door hinges; then unscrew door hook on left side of oven body. Screw door hook into right side of body.
3. Open the door and support it. Unscrew hinges (3 screws per hinge) on the left side of the oven body. Remove door assembly.
4. Turn door assembly around so door handle is now on left side; screw six screws into right side of body. Ensure that door and gasket create a tight seal.

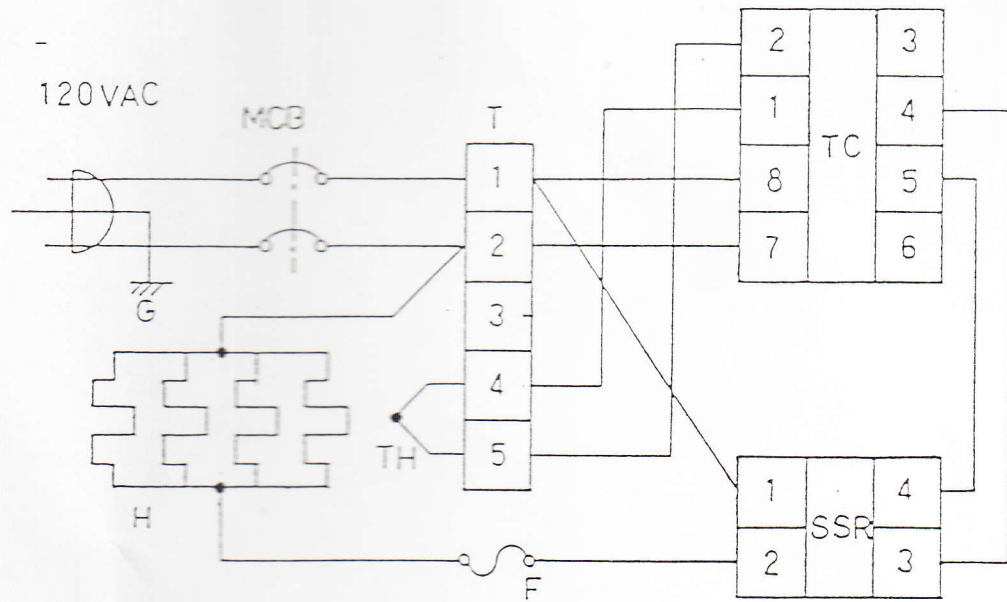
9. ACCESSORY LISTING

Cat. No.	Mfg. Part No.	Description	Unit
	ADP-31-4023	Shelf, 3.0" High	1 Ea.

10. REPLACEMENT PARTS LISTING FOR MODEL ADP-31

PART NAME	PART NUMBER	SPECIFICATIONS
Circuit Breaker	ADP-21-A007	Matsushita BS20214
SSR (Solid State Relay)	ADP-21-A004	Omron G3NE-220T (24V)
Wiring Socket	ADP-21-A006	Fuji ATX2PSB (UL)
Temp. Controller	ADP-21-A005	Fuji PY24
Heater (A)	ADP-31-4007	120 VAC, 150W x 1
Heater (B)	ADP-31-4008	120 VAC, 300W x 3
Temp. Sensor	ADP-21-4015	K Thermocouple
Vacuum Gauge	ADP-21-D001	Toyo Keiki DU-1/4 Flange Type
Door Gasket	ADP-31-4006	Silicon Rubber
Terminal Strip (B)	ADP-21-A003	Fasten 5P
Valve	ADP-21-E001	Fujikin DC-42B

11. WIRING DIAGRAM



SYMBOL	PART NAME
MCB	Circuit Breaker
H	Heater
TH	Temperature Sensor (K Thermocouple)
TC	Temperature Controller
T	Terminal Strip
SSR	Solid-State Relay
F	Thermo-Fuse
G	Ground