

SINCE 1889



INSTRUCTION MANUAL FOR GRAVITY CONVECTION OVENS

Model

DX302
DX402
DX602

Second edition

- Thank you very much for purchasing this Yamato DX series constant temperature drying oven.
 - Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a handy place for future reference.
- ⚠ Warning!** Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

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Santa Clara, CA

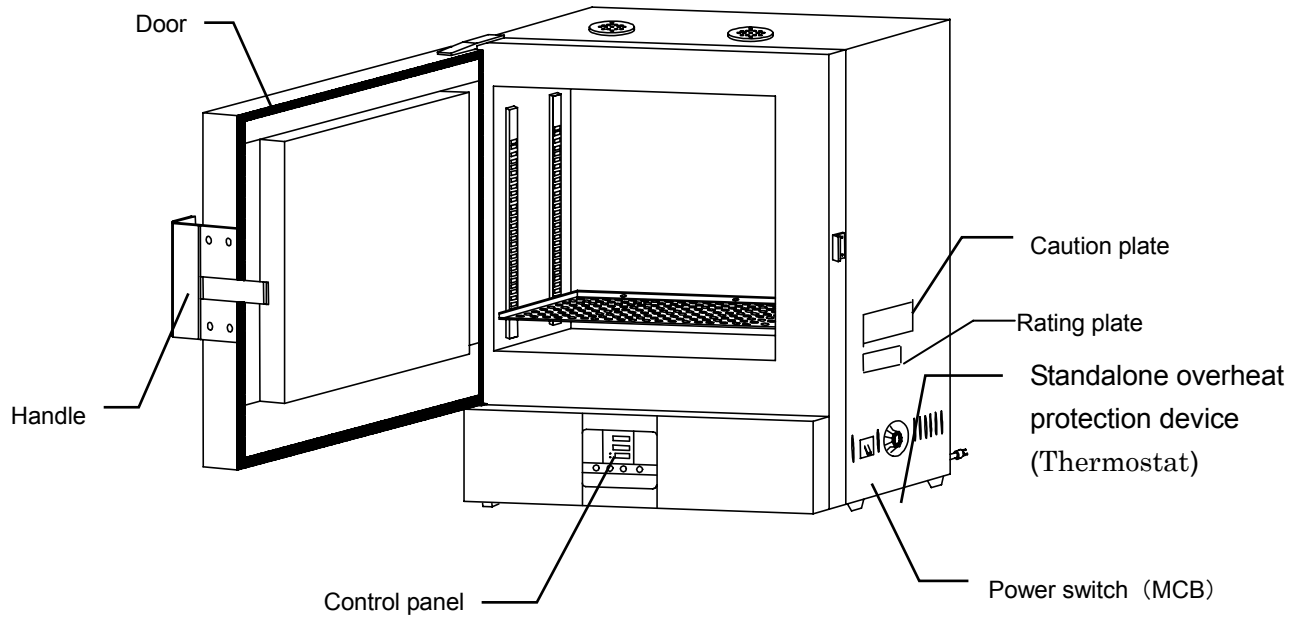
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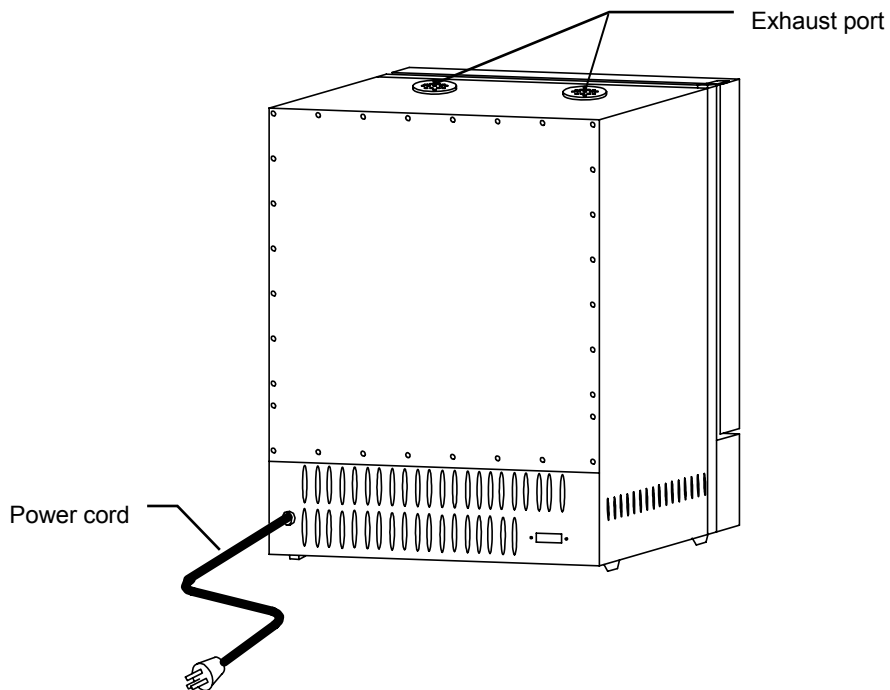
3. Names and functions of parts

Main body

Front panel



Rear panel



4. Operating procedures

List of operation modes and functions

Functions of the unit are as shown below:

No.	Name	Description	Page
1	Overheat prevention function	<p>Automatic overheat prevention function: This function is linked to the unit set temperature and has been set to so that it is automatically activated (returned automatically) at a temperature 12°C higher than the set temperature in the bath.</p> <p>Standalone overheat protection device (Thermostat) : When the temperature in the bath reaches the set temperature of the standalone overheat protection device (Thermostat), its heater circuit trips to shut off controller operation. The temperature can be set with the manual dial on the hydraulic overheat prevention device installed at the right side of the unit.</p>	P.15
2	Calibration Offset function	<p>Calibration offset function compensates any differences between the target temperature in the bath and the control temperature of the controller (sensor temperature.) The function can compensate to either plus or minus side for the whole temperature band of the unit. This compensation can be set with the SUB MENU keys.</p>	P.23
3	Setting lock function	<p>This function locks the set operation status. The lock can be set or released with the SUB MENU key.</p>	P.24
4	Power outage compensation function	<p>This function returns the main unit operation to the resume status after recovery from power outage, or keeps the current stop status. This compensation can be set with the SUB MENU keys.</p>	P.25

4. Operating procedures

Operating procedures (settings for Standalone overhear prevention device (Thermostat))

As a safety measure for preventing overhear, a standalone overhear prevention device (Thermostat) hydraulic overhear prevention device (manual return) is installed.

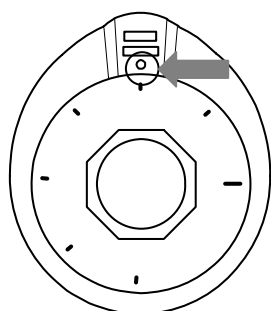
Temperature setting range and functions

The temperature setting range for the standalone overhear prevention device (Thermostat) is “50℃～350℃.”

When the temperature in the bath keeps rising beyond the controller set temperature and reaches the set temperature of the standalone overhear prevention device (Thermostat), the heater circuit trips and the controller operation is shut off.

When the standalone overhear prevention device (Thermostat) is activated, it will not be released until the ELB is turned on.

How to set temperature



Set the temperature scale
to the arrow

Setting the standalone overhear prevention device (Thermostat)

- Set the temperature scale on the standalone overhear prevention device (Thermostat) installed on the right side of the unit to the arrow in the diagram shown left.
- Turn the ELB to “OFF” and wait for a while without opening the door.
- After a while, turn the ELB “ON.” (Turn the ELB “ON”.)

Caution

- ① Set temperature as “set temperature +20℃” as a rough standard and add 5℃ to the setting if the device functions improperly.
- ② The temperature setting range for the standalone overhear prevention device is “50℃～320℃.” Be sure to set the overhear prevention activation temperature correctly otherwise the device may not start, the overhear prevention device is activated before temperature in the bath increases completely, or a fire or other unexpected accidents may result.
The temperature is set at 320℃ on shipping from the factory.
- ③ The standalone overhear prevention device (Thermostat) has been designed to prevent overheating of devices not to protect samples. The device does not prevent accidents caused from use of explosive or flammable materials.

10. Specifications

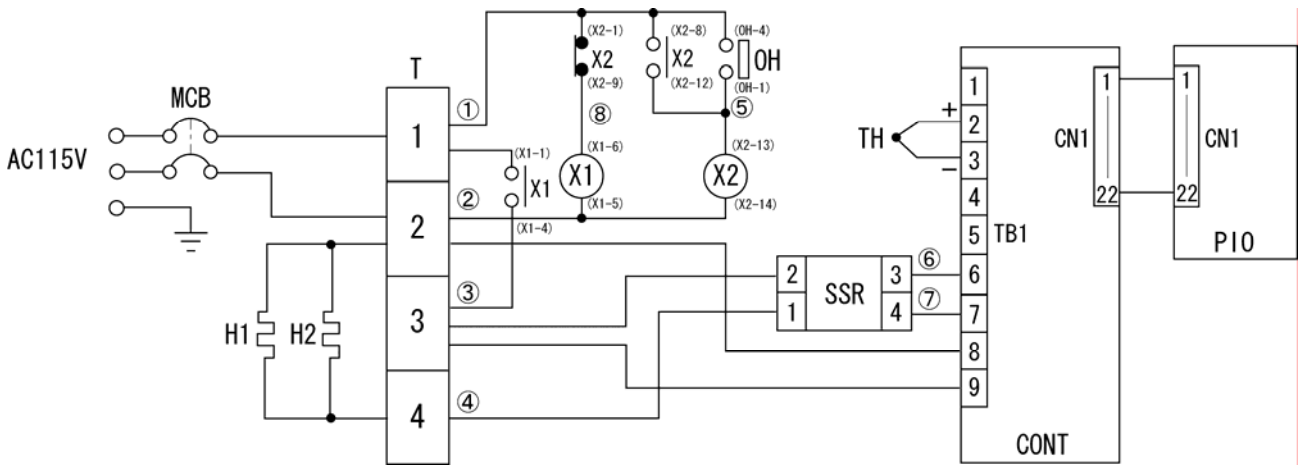
Model		DX302	DX402	DX602
Performance	Temperature control range	40°C~300°C		40°C~280°C
		At no load and at an ambient temperature of 23°C		
	Temperature control precision	±1°C setting: 300°C(DX302/402),280°C(DX602)		exhaust port closed
	Temperature distribution precision	±10°C (setting: 300, exhaust port closed)		±10°C (setting: 280, exhaust port closed)
	Temperature rise time	Approx. 45 minutes (Room temperature~300°C)	Approx. 60 minutes (Room temperature~300°C)	Approx. 80 minutes (Room temperature~280°C)
Mechanism	Exhaust port	Rotation damper with opening rate of 20% when closed		
	Heater	Iron-chrome heater		
		0.9 kW	1.5 kW	
Control assembly	Control system	PID control of heater output with a micro computer		
	Setting system	Digital setting using up/down keys		
	Operation mode	Fixed temperature operation, quick auto stop operation Auto stop operation, auto start operation		
	Sensor	K thermocouple		
	Auxiliary functions	Lock function, power outage compensation function, calibration offset function		
Safety device	Controller Self diagnostic function	Temperature sensor error, memory error, auto overheat prevention, measured temperature error		
	Protection device	MCB with an over current protector, Standalone overheat prevention device (Thermostat)		
Standard	Outer dimensions (mm) (w x d x h)	400 × 440 × 630	550 × 540 × 730	700 × 640 × 830
	Inner dimensions (mm) (w x d x h)	300 × 310 × 300	450 × 410 × 400	600 × 510 × 500
	Internal volume	28ℓ	74ℓ	153ℓ
	Weight	Approx. 23kg	Approx. 38kg	Approx. 56kg
	Power supply (i50/60Hz)	115V 8.5A	115V 13.5A	115V 13.5A
Included items	Shelf board x 2 (withstand load approx. 15kg /each), operating instructions, warranty card			

*Performance values are for the VAC115 power supply.

*Operating environmental temperature range for this device is 5°C~35°C.

11. Wiring diagram

DX302/402/602



Symbol	Part name	Symbol	Part name
MCB	Circuit breaker	OH	Standalone overheat prevention device (Thermostat)
H1, H2	Heater	TH	Temperature sensor (K-thermocouple)
T	Terminal block	CONT	Planar board
SSR	SSR	PIO	Display circuit board
X1, X2	Relay		

12. List of replacement parts

Common parts

Symbol	Part name	Code No.	Specifications	Manufacturer
TH1	Temperature sensor	1-16-003-0049	LCK-M1-2000Y K single	Yamato
CONT	Planar board	LT00007640	CN40B-Y	Yamato
PIO	Display circuit board	LT00007639	CN40B-Y	Yamato
-	Tough card	1-13-000-0009	50 mm	Yamato
X1	Relay	2-05-000-0019	AHE1254 @100V/120V	Matsushita
X2	Relay	LT00020609	RU2S-A110	IDEC
SSR	SSR	2-16-000-0035	TRS5255	Toho
-	Power cord	LT00008924	2.0sq 3P	Yamato
OH	Standalone overheat prevention device (Thermostat)	LT00033261	55.13265.900	E.G.O

Replacement parts for DX302

Symbol	Part name	Code No.	Specifications	Manufacturer
MCB	Circuit breaker	2060000007	BS2021 15A	Matsushita
H1 · 2	Heater	LT00020604	sus pipe heater 115V450W	Yamato

Replacement parts for DX402

Symbol	Part name	Code No.	Specifications	Manufacturer
MCB	Circuit breaker	2060000014	BS2022 20A	Matsushita
H1 · 2	Heater	LT00020605	sus pipe heater115V 750W	Yamato

Replacement parts for DX602

Symbol	Part name	Code No.	Specifications	Manufacturer
MCB	Circuit breaker	2060000014	BS2022 20A	Matsushita
H1 · 2	Heater	LT00020605	sus pipe heater115V 750W	Yamato

Limited liability

Be sure to use the unit strictly following the handling and operating instructions in this operating instruction.

Yamato Scientific Co., Ltd. assumes no responsibility for an accident or a malfunction caused by use of this product in any way not specified in this operating instruction.

Never attempt to perform matters prohibited in this operation instruction.

Otherwise, an unexpected accident may result.

Notice

- **Descriptions in this operating instruction are subject to change without notice.**
- **We will replace a manual with a missing page or paging disorder.**

Operating instruction
Constant Temperature Drying Oven
DX302/402/602
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