2024

Complete Catalog of Laboratory Equipment

SINCE 1889

PRODUCT CATALOG

Yamato Scientific America

Innovating Science for over 130 Years

Innovating Science for over 130 Years

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Yamato Baths

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SINCE 1889

BATH OVERVIEW

Water Bath

Water Bath Variation

Standard

Max. operating temperature
95°C
Temp. adjustment accuracy
±1~ ±2°C

Type	Series	Model No.	Operating temp. range (-50 0 50 100 150 200)	Capacity (L)	Operation	Characteristics
Standard	BM	100/110	RT+5~95°C	4	Fixed	● Analog set up system ● Thermometer included to verify actual temperature ● Protected water tank prevents burns caused by contact
		302A/312A	RT+10~90°C	5	Fixed	● White LED digital display, key entry ● Flat-shaped bath with no heater or sensor inside makes for ease in cleaning
		401	RT+5~95°C	7	Fixed	● Digital temperature setting and display ● Protected water tank prevents burns caused by contact ● Equipped with a drain
		500/510	RT+5~90°C	4	Fixed	● Digital temperature setting and display ● Removable water tank for convenient cleaning and changing of water ● Heated situated outside water tank

Oil Bath

Oil Bath Variation

Standard

Max. operating temperature
250°C
Temp. adjustment accuracy
±0.3~±2°C

Large capacity

Max. operating temperature
270°C
Temp. adjustment accuracy
±0.1°C

Type	Series	Model No.	Operating temp. range (0 100 200 300)	Capacity (L)	Operation	Characteristics
Standard	BO	302A/312A	RT+10~180°C	5	Fixed	● White LED digital display, key entry, minimum digit of 1°C ● Flat-shaped bath with no heater or sensor inside makes for ease in cleaning
		400		4	Fixed	● Digital temperature setting and display ● Removable oil tank for convenient cleaning and changing of oil ● Exclusive connection for bath operational setting function with RE601/801 rotavap
		410			Fixed	
		500	RT+5~199°C	5.2	Fixed	● Digital temperature setting / Glass thermometer ● Must be used with MB800 magnetic stirrer
		601	RT+5~180°C	7	Fixed	● Digital temperature setting and display ● Protected oil tank prevents burns caused by contact ● Equipped with a drain
	BOG	100/200	RT+5~240°C	0.8/1.7	Fixed	● Choice between glass for high visibility or solid for good temperature stability ● Remote use of controller ● Indent at the bottom of the bath allows integration of stirrer's hot plate.
	BOS	100/200	RT+5~250°C	0.8/1.7	Fixed	
Large capacity	BOA	201	RT+10~200°C	37	Fixed	● High temperature distribution accuracy by jet stirring ● Digital temperature setting and display ● Equipped with six safety functions
		311	RT+10~270°C	37	Fixed	

Economy Constant Temp. Water Bath

MADE IN JP

BM Series

Setting system	Analog (BM100/110)	Digital (BM302A/312A/401/500/510)

Operating temp. range	RT +5~95°C (BM100/110/401)	RT+10~90°C (BM302A/312A)	RT+5~90°C (BM500/510)

Bath capacity	4L (BM100/110/500/510)	5L (BM302A/312A)	7L (BM401)

Easy to use, compact design water bath

BM100/110

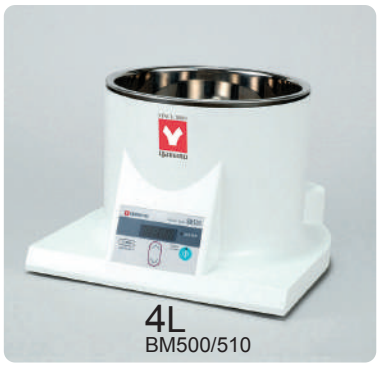
- Analog set up system
- Thermometer is included to verify actual temperature
- Protected water tank prevents burns caused by contact

BM302A/312A

- Digital temperature setting by ▲/▼ keys
- Flat-shaped bath with no heater or sensor inside for ease in cleaning
- Optional bath protection cover

BM401

- Digital temperature setting by ▲/▼ keys
- Protected water tank prevents
- burns caused by contact Equipped with a drain



BM500/510

- Digital temperature setting by ▲/▼ keys
- Removable water tank for convenient clean-ing and changing of water
- Heater situated outside the water tank

Specifications

Model	BM100	BM110	BM302-A	BM312-A	BM401	BM500	BM510
Operating temp. range *1	Room temp. +5~95°C		Room temp. +10~90°C		Room temp. +5~95°C	Room temp. +5~90°C	
Temp. adjustment accuracy*2	±2°C (at 60°C)		±1°C		±1°C (at 60°C)	±1.5°C (at agitation)	
Temp. control system	ON/OFF control		PID control by microprocessor				
Temp. setting / display method	Analog setting (Glass thermometer indication)		White LED digital display, key entry, min. digit of 1°C		Digital setting by ▲/▼ keys, LED display	Digital 7 segment LED Digital setting by ▲/▼ keys	
Operation function	Operation at fixed point				Fixed temperature, quick auto stop, auto stop, auto start	Fixed temperature, quick auto stop, auto stop, auto start	
Additional function	--		Overshoot alert, Auto-resume (selectable), calibration offset		Calibration offset, power failure recovery, keypad lock	Keypad lock, maintenance function (RE signal transmission and reception), calibration offset, power failure recovery	
Heater	SUS316 pipe heater 500W		1000W aluminum sheathed heater		SUS316 pipe heater 1kW	1kW (100V) 1.44kW (120V)	1kW (200V) 1.44kW (220V)
Sensor	Liquid expansion type		Pt100Ω			K thermocouple	
Safety device	Bath protection cover				Bath protection cover	Bath protection cover (ABS heat-resistant resin)	
	Overcurrent protection (fuse: 7A), thermal fuse		Automatic overheat prevention, independent overheat prevention (fixed temp.), temperature upper limit error, Overcurrent protection fuse		Self-diagnostic functions (Automatic overheat preven-tion, Sensor trouble, Triac short circuit, heater disconnection, main relay failure), circuit protector, thermal fuse	Self-diagnostic functions (Automatic overheat prevention, Sensor trouble, Triac short circuit, heater disconnecton, main relay failure), circuit protector, thermal fuse, micro switch to detect heating without water	
Water tank Capacity	~4L		~5L		~7L	~4L	
Water tank Dimensions	I.D.200 x D120mm					Max. I.D.240 x bottom dia165 x D122mm	
External dimensions*3	W240 x D300 x H150mm		φ262 (max. D286) x H240 mm		W310 x D360 x H230mm	W340 x D349 x H231mm	
Weight	~3.5kg		~4.5kg		~7kg	~5.5kg	
Power source (50/60 Hz)	AC115V 4.5A paddle switch	AC220V 2.3A paddle switch	100-115V, 10-12A	200-230V, 5-6A	AC115V 11A	AC100V~120V 12.5~10.5A	AC200~240V 6.5~5.5A
Accessories	Bar thermometer (10~110°C) with immersion line		Power cable (1), Spare fuse for main power (large)(1), Spare fuse for service outlet 2A for BM302A (small)(1), BC102 bath protection cover (optional)		Thermal fuse	--	
Country of Origin	Japan		China		Japan	Japan	

*1 No load operation of bath only. Maximum temperature varies based on different circumstances and operational conditions
*2 Measured under ambient temperature of 23°C±5°C, humidity of 65%RH±20%
*3 Dimensions excludes protrusions

NOTES

Economy Constant Temperature Oil Bath

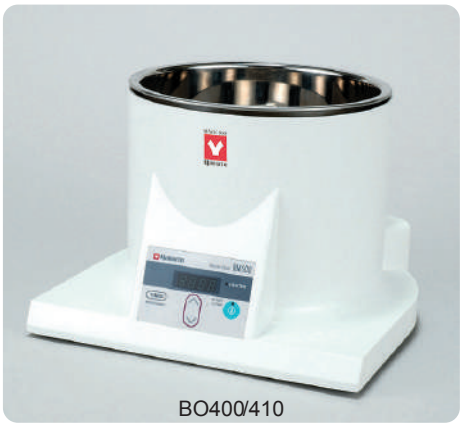
MADE IN JP

BO Series

Operating temp. range	Room temp.+10~180°C (BO400/410)	Room temp.+5~199°C (BO500)	Room temp.+5~180°C (BO601)

Bath capacity	4L (BO400/410)	5.2L (BO500)	7L (BO601)

Easy to use, digital setting, compact design oil bath



BO400/410

- Digital temperature setting by ▲/▼ keys
- Removable oil tank for convenient cleaning and changing of oil
- Heater situated outside the water tank
- Exclusive connection for bath operational setting function with RE601/801 rotary evaporator

BO500 + MB800 (Magnetic Stirrer)

- Stainless steel oil bath
- Bath protection sheet to prevent operator from burning
- Must be used with MB800 magnetic stirrer

BO601

- Digital temperature setting by ▲/▼ keys
- Protected oil tank prevents burns caused by contact
- Equipped with a drain

Specifications

Model		BO400	BO410	BO500-115V*3 BO500-220V*3	BO601-115V
Operating temp. range*1		Room temp. +10~180°C		Room temp. +5~199°C	Room temp. +5~180°C
Temp. control accuracy*2		±2°C (at agitation)		±0.5°C	±2°C (at 100°C)
Temp. control system		PID control by microprocessor		Proportional control	PID control by microprocessor
Temp. setting / display method		Digital setting by ▲/▼ keys		Digital / Glass thermometer	Digital setting by ▲/▼ keys
Operation function		Fixed temperature, quick auto-stop, auto stop, auto start		--	Fixed temperature, quick auto-stop, auto stop, auto start
Additional function		Keypad lock, RE signal transmission and reception, power failure recovery, calibration off-set		--	Keypad lock, power failure recovery, calibration off-set
Heater		1.44kW (120V)	1.44kW (240V)	Pipe heater 700W	SUS316 pipeheater 1kW
Sensor		K thermocouple		Pt100Ω	K thermocouple
Safety device		Bath protection cover (ABS heat-resistant resin)		Bath protection sheet	Bath protection cover
		Self-diagnostic function (automatic overheat prevention, temperature sensor error, triac short circuit, heater disconnection, main relay failure), circuit protector, thermal fuse, micro switch to detect heating without oil			Self-diagnostic function (automatic overheat prevention, temperature sensor error, triac short circuit, heater disconnection, main relay failure), circuit protector, thermal fuse
Interlocking control function		RE601/801 signal transmission and reception (constant operation, heat retention operation, stop), Error report to RE601/801		--	--
Water tank	Capacity	~4L		~5.2L	~7L
	Dimensions	Max. I.D.240 x bottom Dia165 x D122mm		ø240 x 130mm	I.D.250 x D150mm
External dimensions		W340 x D349 x H231mm		W250 x D290 x H130mm	W310 x D360 x H230mm
Weight		~5.5kg		~1.4kg	~8kg
Power source (50/60 Hz)		AC100~120V 12.5~10.5A	AC200~240V 6.5~5.5A	AC115V 7A AC220V 4A	AC115V 11A

*1. No load operation of bath only. Maximum temperature varies by different circumstances and operational conditions.
*2. Measured under ambient temperature at 23°C±5°C, humidity of 65%RH±20%.
*3. When combined with magnetic stirrer MB800, power source is from MB800 main unit outlet.

Model	MB800-115V / MB800-220V (in combination with BO500)
Stirring plate	Material: Aluminum, dimension: W250xD220mm
Stirring capacity	100ml~10L
Rotation speed	70~1200rpm
Motor	AC motor, Electronic control
Overheat prevention	70~200°C
Sensor	Thermistor
Safety device	Current leakage breaker, Oil bath power shutdown overheat prevention device
Power source (50/60Hz)	AC115V 10A / AC220V 5A (MB800+BO500 combined with oil bath)
External dimensions	W250xD270xH150mm
Weight	~4.2kg
Accessories	Stirrer 40mm 1pc.

BO500A-115V
BO500A-220V

Set of BO500 Oil Bath and MB800 Stirrer

Economy Constant Temperature Oil Bath

BO302-A/312-A

MADE IN CH

Operating temp. range: Room temp. +10~180°C

Bath capacity: 5L

Compatible with RE202-A/212-A REV-202M-A/212M-A

5L

- Large capacity 5L with φ240 mm ID
- Flat-shaped bath with no heater or sensor inside makes for ease in cleaning
- Full range of safety functions such as automatic overheat prevention, upper temperature limit abnormality, and independent overheat prevention (fixed temperature type)

BO302-A shown with rotary evaporator REV202MA

Specifications

Model		BO302-A	BO312-A
Performance*1	Operating ambient temp. range	5~35°C	
	Temperature control range	Room temp. +10~180°C	
	Temperature control accuracy	± 2.0°C	
Configuration	Temperature control system	PID control	
	Controller	White LED digital display, key entry, minimum digit of 1°C	
	Temperature sensor	Pt100Ω	
	Heater	1000W aluminum sheathed heater	
	Exterior	PBT (with fiber glass)	
	Bath reservoir	Stainless steel	
Safety functions		Automatic overheat prevention, independent overheat prevention (fixed temp.), temperature upper limit error, Overcurrent protection fuse	
Other functions		Overshoot alert, Auto resume (selectable), 2A service outlet, calibration offset	
Standard	External dimensions*2	φ262 (max. D286) x H240 mm	
	Reservoir capacity	~5L	
	Power supply (fuse capacity)	100-115V, 10-12A (Service outlet excluded) (15A)	200-230V, 5 6A (10 A)
	Power cable	3m long, with inlet plug *3	
	Weight	~4.5 kg	
Accessories		Power cable (1), Spare fuse for main power 15A (large)(1), Spare fuse for service outlet 2A (small)(1),	Power cable (1), Spare fuse for main power 10A (large)(1)

*1 Performance data above based on 95-120VAC (BO302)/ 90-241 VAC (BO312) supplied power, 23 ±5 °C room temperature, 65%RH ±20% humidity, and no process load. Operating temperature range for BM/BO series unit is between 5°C and 35°C. Be advised that maximum operating temperature may not be reached under low ambient temperatures, if source voltage is below.95V.(BO302)/190V (BO312)

*2 Dimensions do not include protrusions.

*3 BO302 is compatible with the voltage range of 100-115VAC and BO312 is compatible with the voltage range of 200-230VAC, by choosing a suitable power plug.

Control Panel

Optional accessory

BC102 Bath Protection Cover

Oil Bath for Synthetic Experiments

MADE IN JP

BOG100/110/200/210 BOS100/110/200/210

Operating temp. range	Room temp. +5~240°C BOG Series	Room temp. +5~250°C BOS Series

BOG100

BOS100

Operation and functions

- Safe and secure bath operation as controller can be safely operated from a distance
- Choice between glass oil bath for high visibility (BOG) or solid stainless oil bath for good temperature stability (BOS)
- Indent at the bottom of the bath allows integration of stirrer's hot plate. Also prevents bath from sliding or slipping off. Compatible with MFD800/MFH800 magnetic stirrers.
- Safety functions include independent overheat prevention device and heater guard
- Useless oil use and oil overflow are reduced as recommended amount of oil to use is indicated in the bath
- Highly accurate and rapid temperature control in the flask is possible with the use of the temperature sensor (optional) inserted into the flask and the in-tank sensor together
- Option for a triple system

Specifications

Model			BOG100/110	BOG200/210	BOS100/110	BOS200/210
Performance	Temperature setting range		0~260°C			
	Temperature control range		Room temp. +5~240°C		Room temp. +5~250°C	
	Temperature control accuracy		± 0.3°C (at 200°C, when stirring)			
Controller	Temperature control system		PID control			
	Temp. setting/display method		Digital setting using▲▼ keys (display in units of 1°C)			
	Operation function		Fixed temperature operation			
	Additional functions		Calibration offset function, auto resume, LED brightness setting			
	Heater circuit control		Triac zero cross method			
	Temperature sensor		Pt100Ω			
Configuration	Exterior		Chromium-free electrogalvanized steel plate baked finish			
	Bath		Hard transparent glass		Stainless steel	
	Heater material		Stainless steel tube heater			
	Heater capacity		310W	425W	310W	425W
Safety devices	Controller		Self-diagnostic functions (temperature sensor error detection, automatic overheat prevention)			
	Fuse		6.3 A, short-circuit protection, overcurrent protection			
	Others		Independent overheat prevention device			
Standards	Internal dimension (mm)		φ140×100	φ170×140	φ140×100	φ170×140
	External dimension (mm)		φ150×205×140	φ 180×235×180	φ 155×210×140	φ 185×240×180
	Bath capacity	Recommended (no load)	~0.8L	~1.7L	~0.8L	~1.7L
		Maximum (no load)	~1.0L	~2.2L	~1.0L	~2.2L
	Controller (W×D×H) mm		150×90×45mm			
	Power supply 50/60 Hz		115V 3.5A 220V 2.0A	115V 4.5A 220V 2.5A	115V 3.5A 220V 2.0A	115V 4.5A 220V 2.5A
	Weight	Bath and heater	~1.8 kg	~2.3 kg	~2.5 kg	~2.9 kg
		Single controller	~0.5 kg			
		Total weight	~2.3 kg	~2.8 kg	~3.0 kg	3.4 kg
Accessories			Heater guard (1 set), arbor (outer diameter φ12 x 90 mm: 1 pc.), PTFE stirrer (~ φ8 x 50 mm: 1 pc.), connector cap (1 pc.), tag attached cable ties (3)			

Remote use of controller

Controller

BOS200 triple system

Large Capacity Constant Temp. Oil Bath

MADE IN JP

BOA201-115V BOA201-220V / BOA311

Temperature control range	RT+10°C~200°C BOA201 / RT+10°C~270°C BOA311	Bath capacity	37L

Large capacity 37L oil bath with temperature control of up to 200°/270°C

Specifications

Model	BOA201-115V BOA201-220V	BOA311
Temp. control range*1	RT+10~200°C	RT+10~270°C
Temp. control accuracy*1	±0.1°C (at 200°C Silicone Oil)	
Temp. fluctuation*1	0.2°C (at 200°C Silicone Oil)	
Temp. distribution accuracy*1	±0.2°C (at 200°C Silicone Oil)	
Temp. gradient*1	0.5°C (at 200°C Silicone Oil)	
Temp. rise time*1	~120 min.	~70 min.
Temp. control system	PID control by microcomputer	
Temp. setting system	Digital setting with menu keys and the ▼▲ keys	
Temp. display system	Temp. reading display: Green 4-digit LED digital Temp. setting display: Red 4-digit LED digital	
Sensor	Platinum sensor Pt100Ω (for temperature control), Type-K thermocouple (for overheat prevention)	
Operation mode	Fixed operation (with operation indicator lamp)	
Stirring method	Jet agitation	
Heat insulator	Ceramic fiber	
Heater type / capacity	SUS316 Pipe Heater 2kW	SUS316 Pipe Heater 4.5kW
Agitator type / capacity	Vertical propeller agitation, induction motor 25W	
Safety device	Self-diagnostic functions (automatic overheat prevention, temperature sensor failure, heater disconnection, SSR short circuit, main relay failure, memory error, internal communication error, abnormal temperature reading, abnormal water level), overcurrent leakage breaker, overheating protector, independent overheating preventor, emergency stop button	
Other functions	Drain valve / operation indicator lamp / external alarm output terminal / temperature output terminal (with 1-5V, 4-20mA changeover switch) / external communication function (RS485) / calibration offset function / set value lock function / power failure recovery mode selection function	
External dimensions *2	531 x 520 x 578 mm (oil bath depth 397 mm)	
Inner bath dimensions *2	W296 x D340 x H270 mm (height when the lowest shelf board is installed from the upper edge in the bath)	
Bath capacity	~37L (when amount of oil is up to 50 mm from the upper edge of the bath)	
Effective bath capacity	~31.9L (when bottom shelf board is installed)	
Power source	AC115V 18.5A AC220V 10A	AC220V 21A *with external transformer*
Weight	~37kg	
Included accessories	Shelf 1pc., lid 1pc.	

**1 Performance data above based on 23 ±5 °C room temperature, 65%RH ±20% humidity, and no process load.*
Temperature control accuracy, temperature fluctuation, temperature distribution accuracy, and temperature gradient are the values measured using Toshiba Silicone TSF485-50.

Performance varies depending on the environmental temperature, type of medium (water, silicone oil) used, and operating temperature.

**2 Protrusions excluded*

Operation and functions

- High temperature distribution accuracy thru jet stirring
- Advanced supportive functions
  Standard equipped with external alarm output, temperature output terminal (4~20mA, 1~5V adjustable) RS485 communication function, key lock function, calibration offset function

Safety features

- Triple overheating preventiom function (heater shuts off automatically at set temperature + 6°C, overheating prevention device, independent overheating prevention device)
- Emergency stop switch. Forcibly cuts off the overcurrent leakage breaker in an emergency
- Float switch to prevent empty heating and oil overflow
- Operation panel is protected by glass from liquid dripping
- Large indicator lamp lights up during operation
- Self diagnostic function, overheat prevention device, overcurrent leakage breaker, key lock function, power failure compensation function

Oil smoke such as silicone oil is flammable, recommended to use in a place with an exhaust device such as a fumehood.

Recommended silicone oil

Silicone oil is one of the heat transfer media. Please select silicone oil (heat resistant dimethyl silicone oil, viscosity 100mm^2/ s [cSt] or less)

Manufacturer	Toshiba Silicone (or equivalent)	
Product name	TSF458-50	TSF458-100
Recommended temp.	Below 200°C	200°C~270°C
Appearance	Light yellow transparent	Light yellow transparent
Specific gravity (25°C)	0.961	0.963
Viscosity (25°C)	50mm^2/s (cSt)	100mm^2/s (cSt)
Volatilizatioin (150°C, 24h)	0.3%	0.3%
Viscosity temperature coefficient	0.59	0.59
Flash point	325°C	342°C
Pour point	-50°C or less	-50°C or less
Viscosity increase rate (300°C, 168h)	40%	35%

Degradation rate (change in viscosity) of silicone oil varies depending on temperature used. Especially in the case of TSF485-100 used at a temperature exceeding 200°C, as a guide, almost no change in viscosity is seen at 200°C, but it is about 1000 hours at 250°C and 100 hours at 270°C.

For further details, please inquire with silicone oil manufacturer when purchasing.

Lid (standard accessory)

SINCE 1889

Yamato Scientific America

Yamato Customized Industrial Products

Targeting Productivity Improvement

Yamato offers customization of products based on customer requirements

Contents

Forced Convection Oven

Combination type

C1-006

Usage: thermal treatment of products

- Use platform stands to combine one machine with several units to save space
- Equipped with set recorder (to record product temperature), timer and product running status indicator lamp
- Repositioned air exhaust ports (facing backwards) to accommodate overlapping set of product
- Each door is equipped with an electromagnetic lock
- Customized chamber dimensions
- Easy operation, available for fixed temperature, program, quick auto stop, auto stop and auto start operations
- Self-diagnostic circuit (abnormal temperature sensor, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, ELB to prevent overcurrent, key lock, etc.

Model	C1-006
Method	Forced convection
Operating temp. range	Room temp. +10°C ~260°C
Temp. adjustment accuracy	±1.0°C (at 210°C)
Temp. distribution accuracy	±2.5°C (at 210°C)
Operation function	Fixed temp., program, auto stop and auto start operations
Additional function	Deviation correction, key lock, power outage compensation
Internal dimension	W700×D500×H500mm (single)
Power source	Single phase AC220V

Forced Convection Oven

Large walk-in type

C4-008

Usage: drying treatment of special materials

- Large walk-in type
- Double door structure, anti lock mechanism
- Easy operation, available for fixed temperature, program, quick auto stop, auto stop and auto start operations
- Self-diagnostic circuit (abnormal temperature sensor, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, ELB to prevent overcurrent, key lock, etc.

Model	C4-008
Method	Forced convection circulation
Operating temp. range	Room temp. +10~100°C
Temp. adjustment accuracy	±1°C (at 100°C)
Temp. distribution accuracy	±5°C (at 100°C)
Operation function	Fixed temp., program, auto stop and auto start operations
Additional function	Deviation correction, key lock, power outage compensation
Internal dimension	W3500×D3500×H3000mm
Power source	3 phase AC380V

Conveyor Drying Oven

Fully automatic

C1-007

Operating temp. range: RT +20~80°C

Usage: thermal treatment during electronic component production process.

- Installed with a conveyor to improve efficiency of thermal treatment
- Adjustable conveyor speed with the ability to set multiple treatment processes
- Program operation function
- Equipped with a frequency converter, beacon, infrared switch, etc.
- Equipped with safety devices such as auto overheat protector, overheat protector, emergency stop switch, conveyor overload protection, over-current earth leakage circuit breaker, etc.

Model	C1-007
Temp. range	Room temp. +20~80°C
Temp. distribution accuracy	±10°C (at 80°C)
Temp. rising time	15min (Room temp.→80°C)
Operation function	Fixed temp., program operation
Conveyor speed	0.035-0.35m/min
Conveyor length	1100mm
Inlet and outlet dimension	W400×H65mm
Power source	3 phase AC380V

Low Temperature Chamber

Large Capacity

YY-711

Operating temp. range: -20~50°C

Internal capacity: 800L

Industry: Material and parts manufacturers

Application: Environmental test of various materials, parts

Features

- Low temperature: -20°C
- Large capacity of 800L compared to standard models IN and INE which are up to 286L
- High airtight panel structure (thermal insulation panel)
- Door switch and other safety devices can be added
- Size can be specified according to customer's needs
- Other optional specs can also be added

Interior

Specifications

Model	YY-711
Operating temp. range	-20~50°C
External dimensions (mm)	W1600 x D1200 x H2100
Internal dimensions (mm)	W1300 x D800 x H800
Power source	AC220

Large Autoclave

Standard type

YYK500/750/800/900

Operating temp. range	Room temp. +10~70°C

Max. operating pressure	0.9MPa

Internal dimension	YYK500 ø500×850mm	YYK750 ø750×1100mm	YYK800 ø800×1100mm	YYK900 ø900×1300mm

Used to remove residual air bubbles after affixing polarizer in LED production.

Operation and features

- No temperature overshoot, precision temperature uniformity available
- 4 step working procedures:
  (1) Preheat: temperature rising, no pressurizing
  (2) Pressurizing: holding temperature, pressurizing
  (3) Deaeration: holding temperature, deaerating
  (4) End: temperature cooling, pressure dropping
- Adjustable air suction and exhaust speed
- Customized chamber dimensions

Safety features

- Door open / close detection, door lock / unlock detection, higher pressure alarm, air inlet pressure detection, safety valve, independent overheat protector, ELB to prevent over-current

Specifications

Model	YYK500	YYK750	YYK800	YYK900
Method	Heating + pressurizing			
Specifications	Class-1 pressure container (AQSIQ pressure container verification)			
Operating temp. range	Room temp. 10~70°C			
Operating pressure range	0.101~0.9MPa			
Temp. distribution accuracy	±3°C (at 50°C)			
Max. temp. reaching time	Within 15min (adjustable)			
Max. pressure reaching time	Within 20min (adjustable)			
Internal dimension (effective)	ø500mm×850Lmm	ø750mm×1100Lmm	ø 800mm×1100Lmm	ø900mm×1300Lmm
Material	SUS304 stainless steel, internal polishing			
Max. operating pressure	0.9MPa			
Hydraulic test pressure	1.35MPa			
Medium	Dry air (pressure: working pressure +0.05MPa or higher)			
Opening / closing system	Manual clutch easy to operate			
Pressurizing system	Controlled by pressure controller			
Heating system	PID control			
Stirring system	Stirred by centrifugal fan (Water-Cooling is not required for shaft seal, free-maintenance)			
Control system	PLC control			
Pressure gauge	Pressure range: 0 to 1.0MPa, accuracy: ±1% (with upper limit alarm contact)			
Temp. controller	Digital setting and display, PID control			
Pressure controller	Digital setting and display, ON/OFF control			
Working timer	Time range: 99 hr 59min, Digital setting and display,			
Temp. sensor output	5 groups of K thermocouple output terminals			
Safety features	Door open / close detection, door lock / unlock detection, higher pressure alarm, air inlet pressure detection, safety valve, motor overheating protection, independent overheat protector, ELB to prevent over-current			
External dimensions (W×D×Hmm)	1000×1656×1546	1200×1957×1781	1250×2057×1806	1400×1950×2232
Air suction port	15A (internally equipped with air filter and oil mist separator)			
Air exhaust port	20A (manual and auto exhaust, equipped with silencer)			
Power source (50/60Hz) rated current	3 phase AC380V 7A	3 phase AC380V 8A	3 phase AC380V 9A	3 phase AC380V 12A
Weight	~700kg	~900kg	~1000kg	~1300kg

SINCE 1889

Yamato Scientific America

Yamato Freeze Dryer

Contents

NOTES

Freeze Dryer

DC401-115V DC401-220V

MADE IN JP

Trap cooling temp.	- 45°C
Internal capacity	4L
Dehumidify amount	0.6L

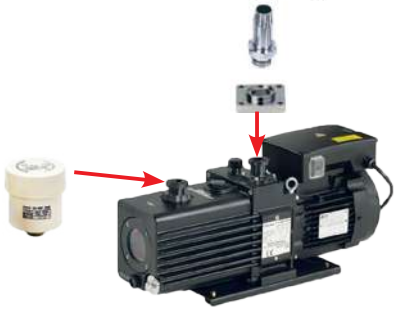
Chamber, manifold, mounting flask, flask cap and glass container sold separately

- Contaminant free system
- Designed with automatic safety vacuum venting system which prevents oil backflow when turn off power supply or power failure
- Ice can be refrozen and removed smoothly from the vessel by Hot Gas Bypass System
- Equipped with Pirani Vacuum Gauge
- Safety Valve is linked with Service Receptacle for Vacuum Pump
- Environment friendly coolant used for refrigeration
- Highly mobile on wheels

Specifications

Model	DC401-115V / DC401-220V
Trap cooling temperature	-45°C
Time to reach minimum temperature	50 min. (20°C to -45°C)
Dehumidify amount	0.6L
Temperature sensor	N/A
Temperature display	N/A
Refrigerator	Air Cooling Type, 400W
Refrigerator, coolant	R404A, Coolant amount: 300g ±5g
Compound gauge	N/A
Bath Shape, material	Cylinder, Stainless steel
Drain	Vacuum Hose with Stopper
Vacuum gauge	Pirani Vacuum Measure
Trap defrost	Defrosted by Hot Gas
Exhaust port (vacuum pump connection)	Dia.17mm
Ambient temperature range	5~30°C
Safety device	Electric Leakage Breaker with Over Current Protection,Refrigerator Overload Relay, Valve for Back Flow Prevention
Trap dimensions	Dia.153 x H235mm
External dimensions	W300 x D450 x H920mm
Internal capacity	~4L
Power source 50/60 Hz	AC115V 12A AC220V 7A
Weight	~60kg
Included accessories	Vacuum silicone grease, vacuum hose

Vacuum Pump



GLD137CC115DCRKIT
GLD137CC220DCRKIT

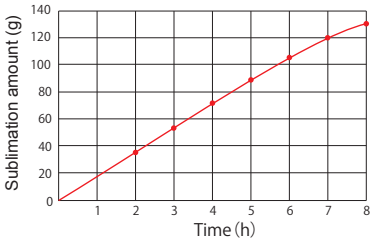
Specifications

Model	Unit	GLD-137CC	
		50Hz	60Hz
Actual pumping speed	L/min	135	162
Ultimate pressure	Pa	G.V. Closed: 0.67 G.V. Open: 6.7	
Power source 50/60 Hz		115V / 220V	
Weight	kg	27.0	
Overall dimensions	mm	W170 x L488 x H250	

Control Panel

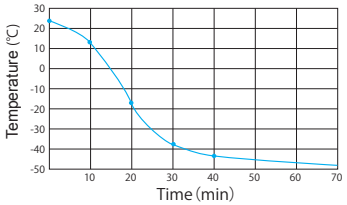
Pirani Vacuum Gauge and Control Panel

Sublimation Data



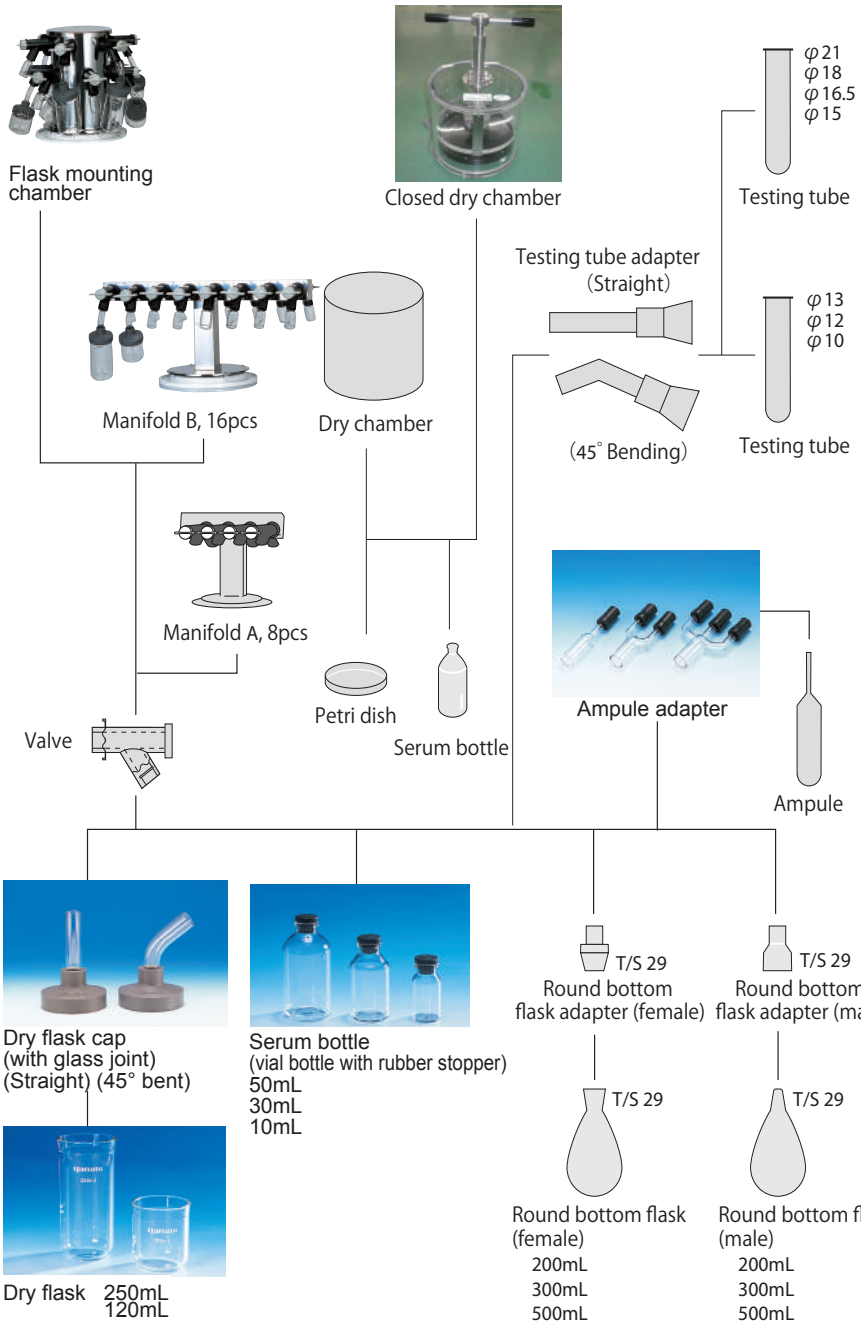
Room temp: 25℃ Power source: AC115V 50Hz

Cooling Curve



Room temp: 25℃ Power source: AC115V 50Hz

Accessories



Product code	212560	212561	212562	212563	212564
Product name	Flask mounting chamber	Manifold A	Manifold B	Dry chamber	Closed dry chamber
Shelf number	--			1	
Stopper	I.D.18.5mm				
Stopper Pitch	96mm	80mm		60mm Dish x 7	
Port number	12	8	16	Temp. adjustment 30°C±2°C	
Dimension	φ195xH303	W304x D60xH263	W624x D60xH263	φ252xH240	φ252xH425

Product name		Product code
Valve		212565
Dry Flask	120mL, 5pcs	212820
	250mL, 5pcs	212821
Dry Flask Cap (with glass joint)	5pcs. (Straight)	212570
	5pcs. (45°C Bent)	212571
Serum Bottle (vial bottle with rubber stopper)	50mL, 10pcs	212814
	30mL, 10pcs	212815
	10mL, 10pcs	212816
Ampule Adapter	Single, 5pcs	212572
	Double, 5pcs	212573
	Triple, 5pcs	212574
Testing Tube Adapter (with glass joint)	Straight	212590
	45° bend	212591
Round Bottom Flask (Male)	200mL T/S 29	212594
	300mL T/S 29	212595
	500mL T/S 29	212596
Round Bottom Flask Adapter (Male)	T/S 29	212597
Round Bottom Flask (Female)	200mL T/S29	212566
	300mL T/S29	212567
	500mL T/S29	212568
Round Bottom Flask Adapter (Female)	T/S 29	212569
Micro Tube Holder	1.5mL, 24pcs	212580
Glass Joint	Straight	212598
	45° bend	212599
Caster stop holder	4pcs set	281440

SINCE 1889

Yamato Scientific America

Yamato Freezers & Refrigerators

Contents

NOTES

Ultra Low Freezers

ULF Series

MADE IN THE USA

Temperature range	-40ºC to -85ºC / -40ºF to -121ºF -40ºC to -80ºC / -40ºF to -112ºF

Style	Chest (Horizontal)	Upright (Vertical)	Undercounter

1 ULF SERIES CHEST AND UPRIGHT ULTRA LOW FREEZERS

Features

- Digital temperature control with dual display and adjustable temperature range. Scan button for setting temperature and tamper proof lockout
- Quick pull-down to operating temperature with efficient and reliable cascade refrigeration. Two large hermetic compressors ensure rapid pull-down of product load. Because of the unique design of the freezers, the pressure in the refrigeration system is held very low, eliminating excessive heat build up. This low pressure allows the freezer to operate efficiently, extending compressor life.
- Compressor life is extended by an energy-saving low stage which operates only on demand.
- Compressors are protected with a constant flow of refrigerant
- Heat is efficiently and effectively dissipated by an air-cooled condenser with two heavy-duty fans. Condenser requires no liquid coolant
- Freezer has automatic timer system that restarts unit in case of power failure
- Frost and ice build-up along the gasket is minimized by a heater harness located beneath the channel
- CFC-Free R-508B and R-404A refrigerants

Primary Uses

- Clinics
- Research
- Small laboratories
- Hospital rooms
- Medical clinics

Common Specifications

Temperature control system	Digital control displays set point and chamber temperature
Digital alarm system with relay	Battery operated alarm system will emit an audible and visual signal when there is a mechanical or electrical failure. Alarm has over and under temperature setting, alarm silencing switch, and battery test switch. Also provided is a relay for remote alarm hook-up.
Refrigeration system	Cascade type - Two hermetic compressors. CFC & HCFC free refrigerants
Construction	Chamber is 14-ga. zinc coated galvanized steel. Exterior is 16-ga. steel. Powder coated cool gray finish.
Electrical requirements	115V, 60 Hz, 1 phase 208V, 60 Hz, 1 phase 230V, 60 Hz, 1 phase 220V, 50 Hz, 1 phase 220V, 60 Hz, 1 phase
Optional accessories	Chart recorder, CO^2 and LN^2 back-up system, Racks, Cold safety gloves

Unique Specifications for CHEST TYPE (HORIZONTAL) Ultra Low Freezers - Top Opening

Model	Capacity		Rack Capacity	Temp. Range	Internal Dimension		External Dimension	
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter
ULF001C	56	2	6	-40ºC to -85ºC / -40ºF to -121ºF	17” x 14” x 14”	43 x 35 x 35	25.25" x 25.75” x 40”	64 x 65 x 101
ULF101C	83	3	8	-40ºC to -85ºC / -40ºF to -121ºF	24” x 12” x 18”	60 x 30 x 45	34.5" x 25.25" x 48"	87 x 64 x 121
ULF201C	142	5	15	-40ºC to -85ºC / -40ºF to -121ºF	30” x 18” x 16”	76 x 45 x 40	40.5” x 31” x 47”	102 x 81 x 119
ULF301C	255	9	16	-40ºC to -85ºC / -40ºF to -121ºF	46” x 16” x 20”	116 x 40 x 50	57.5" x 29" x 46.5"	146 x 73 x 116
ULF401C	340	12	27	-40ºC to -85ºC / -40ºF to -121ºF	55” x 19” x 20”	139 x 48 x 50	65.5" x 32" x 47.5"	166 x 81 x 120
ULF501C	400	14	30	-40ºC to -85ºC / -40ºF to -121ºF	62” x 20” x 20”	157 x 50 x 50	72.5" x 33" x 47.5"	184 x 83 x 120
ULF601C	480	17	36	-40ºC to -85ºC./ -40ºF to -121ºF	69” x 20” x 21”	175 x 50 x 53	81.25" x 33.5" x 48.5"	206 x 85 x 123
ULF701C	594	21	36	-40ºC to -80ºC / -40ºF to -112ºF	81" x 21.5" x 21"	205 x 54 x 53	91" x 36" x 49"	231 x 91 x 124
ULF801C	626	22	36	-40ºC to -85ºC / -40ºF to -121ºF	67” x 19” x 30”	170 x 48 x 76	98” x 36” x 43.5”	248 x 91 x 110
ULF901C	766	27	48	-40ºC to -80ºC / -40ºF to -112ºF	67” x 23” x 31.25”	170 x 57 x 79	98” x 36” x 43.5”	248 x 91 x 110

CHEST TYPE (HORIZONTAL) Ultra Low Freezers - Top Opening

56L
ULF001C

83L
ULF101C

142L
ULF201C

340L
ULF401C

480L
ULF601C

766L
ULF901C

Unique Specifications for UPRIGHT TYPE (VERTICAL) Ultra Low Freezers

Model	Capacity		Rack Capacity	Shelving	Temp. Range	Internal Dimension		External Dimension	
	Liters	Cu. ft.				Inch	Centimeter	Inch	Centimeter
ULF401U	370	13	15	4 adjustable (5 compartments)	-40ºC to -85ºC / -40ºF to -121ºF	20” x 22” x 51.25	50 x 55 x 130	35" x 34.5" x 79.5"	88 x 87 x 201
ULF501U	505	18	20	4 adjustable (5 compartments)	-40ºC to -85ºC / -40ºF to -121ºF	23” x 26” x 51.25”	58 x 66 x 130	40" x 36" x 79.5"	101 x 91 x 201
ULF601U	626	22	25	4 adjustable (5 compartments)	-40ºC to -85ºC / -40ºF to -121ºF	28.5” x 26” x 51.25”	72 x 66 x 130	43" x 37" x 79.5"	109 x 93 x 201
ULF701U	710	25	30	4 adjustable (5 compartments)	-40ºC to -85ºC / -40ºF to -121ºF	34” x 25” x 51.25”	86 x 63 x 130	50" x 37" x 79.5"	127 x 93 x 201
ULF801U	792	28	30	4 adjustable (5 compartments)	-40ºC to -80ºC / -40ºF to -112ºF	38” x 25” x 51.25”	96 x 63 x 130	54" x 37" x 79.5"	137 x 93 x 201
ULF901U	877	31	35	4 fixed (5 compartments)	-40ºC to -80ºC / -40ºF to -112ºF	42” x 25” x 51.25”	106 x 63 x 130	60.5" x 37" x 79.5""	153 x 93 x 201

370L
ULF401U

505L
ULF501U

710L
ULF701U

877L
ULF901U

2 ULF SERIES UNDERCOUNTER MINI-CHEST ULTRA LOW FREEZERS

Common Specifications

Temperature range	-40ºC to -85ºC / -76ºF to -121ºF
Temperature control system	Digital data logging. Battery back-up, Hi/Low alarm.
Clearance	4" on sides and back.
Alarm system	Battery operated alarm system will emit an audible and visual signal when there is a mechanical or electrical failure. A relay for a remote alarm hook-up is also provided
Doors	Single solid, locking
Legs	Four, leveling
Evaporator	Cold wall
Defrost	Manual
Insulaton	Polyurethane CFC Free.
Electrical requirements	115V, 60 Hz, 1 phase
Supply plug	NEMA 5-15P ETL listed

Unique Specifications for UNDERCOUNTER Ultra Low Freezers

Model	Capacity		Internal Dimension		External Dimension	
	Liters	Cu. ft.	Inch	Centimeter	Inch	Centimeter
ULF001UN	7	.25	5.75" x 5.5" x 12"	15 x 14 x 31	15.75" x 25" x 26.25"	40 x 60 x 66
ULF101UN	54	2	14" x 18" x 12.5"	35 x 45 x 31	23" x 27" x 32"	58 x 68 x 81
ULF201UN	94	3	14" x 19.25" x 20.75"	36 x 49 x 53	37.5" x 28.5" x 32"	95.25 x 72 x 81

7L
ULF001UN

54L
ULF101UN

94L
ULF201UN

Ultra Low Freezers

ULF PLATINUM Series

MADE IN THE USA

Temperature range: -40ºC to -85ºC / -40ºC to -80ºC

Style: Chest (Horizontal) | Upright (Vertical)

ULF PLATINUM SERIES CHEST AND UPRIGHT ULTRA LOW FREEZERS

Features

- Digital temperature control with dual display and adjustable temperature range. Scan button for setting temperature and tamper proof lockout
- Quick pull-down to operating temperature with efficient and reliable cascade refrigeration. Two large hermetic compressors ensure rapid pull-down of product load. Because of the unique design of the freezers, the pressure in the refrigeration system is held very low, eliminating excessive heat build up. This low pressure allows the freezer to operate efficiently, extending compressor life.
- Compressor life is extended by an energy-saving low stage which operates only on demand.
- Compressors are protected with a constant flow of refrigerant
- Heat is efficiently and effectively dissipated by an air-cooled condenser with two heavy-duty fans. Condenser requires no liquid coolant
- Freezer has automatic timer system that restarts unit in case of power failure
- Frost and ice build-up along the gasket is minimized by a heater harness located beneath the channel
- CFC-Free R-508B and R-404A refrigerants

Primary Uses

- Clinics
- Research
- Small laboratories
- Hospital rooms
- Medical clinics

Common Specifications

Temperature control system	Touch Screen control Displays set point and chamber temperature Hi/Low Alarm W/ Email and SMS notification Alarm Relay Dry Contacts Power Failure Dry Contacts Battery Back-up Viewable Temperature graph Data logging downloadable via USB or FTP Multi-Level Security VNC Remote Access via PC / smart devices
Digital alarm system with relay	Battery operated alarm system will emit an audible and visual signal when there is a mechanical or electrical failure. The alarm has an over and under temperature setting, alarm silencing switch. A relay for a remote alarm hook-up is also provided.
Access port	Mounted in left hand side of the cabinet will be a 1/2" porthole leading into the chilling chamber, complete with plugs.
Refrigeration system	Cascade Type - Two hermetic motor compressors. CFC & HCFC free refrigerants
Construction	Chamber is 14-ga. Zinc coated galvanized steel. Exterior is 16-ga. steel. Powder coated cool gray finish.
Electrical requirements	115V, 60 Hz, 1 phase 208V, 60 Hz, 1 phase 230V, 60 Hz, 1 phase 220V, 50 Hz, 1 phase 220V, 60 Hz, 1 phase
Optional accessories	CO^2 and LN^2 back-up system, Racks, Cold safety gloves

Unique Specifications for PLATINUM CHEST TYPE (HORIZONTAL) Ultra Low Freezers - Top Opening

Model	Capacity		Rack Capacity	Temp. Range	Internal Dimension		External Dimension	
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter
ULF001CP	56	2	6	-40ºC to -85ºC	17” x 14” x 14”	43 x 35 x 35	25.25" x 25.75” x 40”	64 x 65 x 101
ULF101CP	83	3	8	-40ºC to -85ºC	24” x 12” x 18”	60 x 30 x 45	34.5" x 25.25" x 48"	87 x 64 x 121
ULF201CP	142	5	15	-40ºC to -85ºC	30” x 18” x 16”	76 x 45 x 40	40.5” x 31” x 47”	102 x 81 x 119
ULF301CP	255	9	16	-40ºC to -85ºC	46” x 16” x 20”	116 x 40 x 50	57.5" x 29" x 46.5"	146 x 73 x 116
ULF401CP	340	12	27	-40ºC to -85ºC	55” x 19” x 20”	139 x 48 x 50	65.5" x 32" x 47.5"	166 x 81 x 120
ULF501CP	400	14	30	-40ºC to -85ºC	62” x 20” x 20”	157 x 50 x 50	72.5" x 33" x 47.5"	184 x 83 x 120
ULF601CP	480	17	36	-40ºC to -85ºC.	69” x 20” x 21”	175 x 50 x 53	81.25" x 33.5" x 48.5"	206 x 85 x 123
ULF701CP	595	21	36	-40ºC to -80ºC	81" x 21.5" x 21"	205 x 54 x 53	91" x 36" x 49"	231 x 91 x 124
ULF801CP	626	22	36	-40ºC to -85ºC	67” x 19” x 30”	170 x 48 x 76	98” x 36” x 43.5”	248 x 91 x 110
ULF901CP	766	27	48	-40ºC to -80ºC	67” x 23” x 31.25”	170 x 57 x 79	98” x 36” x 43.5”	248 x 91 x 110

PLATINUM CHEST TYPE (HORIZONTAL) Ultra Low Freezers - Top Opening

56L
ULF001CP

142L
ULF201CP

340L
ULF401CP

480L
ULF601CP

766L
ULF901CP

Unique Specifications for PLATINUM UPRIGHT TYPE (VERTICAL) Ultra Low Freezers with Door Mounted Touch Screen Control

Model	Capacity		Rack Capacity	Shelving	Temp. Range	Internal Dimension		External Dimension	
	Liters	Cu. ft.				Inch	Centimeter	Inch	Centimeter
ULF401UP	370	13	15	4 adjustable (5 compartments)	-40ºC to -85ºC	20” x 22” x 51.25	50 x 55 x 130	35" x 34.5" x 79.5"	88 x 87 x 201
ULF501UP	505	18	20	4 adjustable (5 compartments)	-40ºC to -85ºC	23” x 26” x 51.25”	58 x 66 x 130	40" x 36" x 79.5"	101 x 91 x 201
ULF601UP	626	22	25	4 adjustable (5 compartments)	-40ºC to -85ºC.	28.5” x 26” x 51.25”	72 x 66 x 130	43" x 37" x 79.5"	109 x 93 x 201
ULF701UP	710	25	30	4 adjustable (5 compartments)	-40ºC to -85ºC	34” x 25” x 51.25”	86 x 63 x 130	50" x 37" x 79.5"	127 x 93 x 201
ULF801UP	792	28	30	4 adjustable (5 compartments)	-40ºC to -80ºC	38” x 25” x 51.25”	96 x 63 x 130	54" x 37" x 79.5"	137 x 93 x 201
ULF901UP	877	31	35	4 adjustable (5 compartments)	-40ºC to -80ºC	42” x 25” x 51.25”	106 x 63 x 130	60.5" x 37" x 79.5""	153 x 93 x 201

370L
ULF401UP

505L
ULF501UP

710L
ULF701UP

877L
ULF901UP

NOTES

Low Temperature Freezers

LTF Series

MADE IN THE USA

Temperature range: 0°C ~ -40°C / +32°F ~ -40°F

Style: Chest (Horizontal) | Upright (Vertical)

LTF SERIES CHEST AND UPRIGHT LOW TEMPERATURE FREEZERS

Every freezer is fully tested for 7 days under the most demanding conditions. The constant ultra low setpoint operating temperature is guaranteed in warm (+30°C) temp. environments.

Common Specifications

Temperature range	0°C ~ -40°C / +32°F ~ -40°F
Temperature control system	Digital Control with two temperature displays. One display shows the set temperature, the other shows the actual temperature in the freezer.
Digital alarm system with relay	Battery operated alarm system will emit an audible and visual signal when there is a mechanical or electrical failure. The alarm has an over and under temperature setting, alarm silencing switch, and battery test switch. Also provided is a relay for remote alarm hook-up.
Refrigeration system	Single stage system with one hermetic compressor. CFC & HCFC free refrigerants
Construction	Chamber is 14-ga. zinc coated galvanized steel. Exterior is 16-ga. steel. Powder coated cool gray finish.
Electrical requirements	115V, 60 Hz, 1 phase 208V, 60 Hz, 1 phase 230V, 60 Hz, 1 phase 220V, 50 Hz, 1 phase 220V, 60 Hz, 1 phase
Optional accessories	Chart recorder, CO^2 and LN^2 back-up system, Racks, Cold safety gloves

Primary Uses

- Clinics
- Research
- Small laboratories
- Hospital rooms
- Medical clinics

Unique Specifications for CHEST TYPE (HORIZONTAL) Low Temperature Freezers - Top Opening

Model	Capacity		Rack Capacity	Internal Dimension		External Dimension	
	Liters	Cu. ft.		Inch	Centimeter	Inch	Centimeter
LTF001C	56	2	6	17” x 14” x 14”	43 x 35 x 35	25.25” x 25.75” x 40”	64 x 65 x 101
LTF101C	83	3	8	24” x 12” x 18”	61 x 31 x 46	34.5” x 25.25” x 48”	87 x 64 x 121
LTF201C	142	5	15	30” x 18” x 16”	76 x 46 x 40.	40.5” x 31” x 47”	102 x 81.x 119
LTF301C	255	9	16	45.5” x 16” x 20”	115 x 40 x 50	57.5” x 29 x 46.5”	146 x 73 x 116
LTF401C	340	12	27	55” x 19” x 20”	139 x 48 x 50	65.5” x 32” x 47.5”	166 x 81 x 120
LTF501C	400	14	30	62” x 20” x 20”	157 x 50 x 50	72.5” x 33” x 47.5”	184 x 83 x 120
LTF601C	480	17	36	69” x 20” x 21”	175 x 50 x 53	81.25” x 33.5” x 48.5”	206 x 85 x 123
LTF701C	594	21	42	81" x 21.5" x 21"	205 x 54 x 53	91" x 36" x 49"	231 x 91 x 124
LTF801C	626	22	36	67” x 19” x 30”	170 x 48 x 76	98” x 36” x 43.5”	248 x 91 x 110
LTF901C	766	27	48	67” x 23” x 31.25”	170 x 57 x 79	98” x 36” x 43.5	248 x 91 x 110

56L
LTF001C

83L
LTF101C

340L
LTF401C

CHEST TYPE (HORIZONTAL) Low Temperature Freezers - Top Opening

480L
LTF601C

766L
LTF901C

Unique Specifications for UPRIGHT TYPE (VERTICAL) Low Temperature Freezers

Model	Capacity		Rack Capacity	Shelving	Internal Dimension		External Dimension	
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter
LTF401U	370	13	15	4 adjustable (5 compartments)	20” x 22” x 51.25	50 x 55 x 130	35” x 34.5” x 79.5”	88 x 87 x 201
LTF501U	505	18	20	4 adjustable (5 compartments)	23” x 26” x 51.25”	58 x 66 x 130	40" x 36" x 79.5"	101 x 91 x 201
LTF601U	626	22	25	4 adjustable (5 compartments)	28.5” x 26” x 51.25”	72 x 66 x 130	43" x 37" x 79.5"	109 x 93 x 201
LTF701U	710	25	30	4 adjustable (5 compartments)	34” x 25” x 51.25”	86 x 63 x 130	50" x 37" x 79.5"	127 x 93 x 201
LTF901U	792	28	30	4 adjustable (5 compartments)	38” x 25” x 51.25”	96 x 63 x 130	54" x 37" x 79.5"	137 x 93 x 201

370L
LTF401U

710L
LTF701U

792L
LTF901U

Low Temperature Freezers

LTF PLATINUM Series

MADE IN THE USA

Temperature range: 0°C ~ -40°C

Style: Chest (Horizontal) | Upright (Vertical)

LTF PLATINUM SERIES CHEST AND UPRIGHT LOW TEMPERATURE FREEZERS

Every freezer is fully tested for 7 days under the most demanding conditions. The constant ultra low setpoint operating temperature is guaranteed in warm (+30°C) temp. environments.

Common Specifications

Temperature control system	Touch Screen control Displays set point and chamber temperature Hi/Low Alarm W/ Email and SMS notification Alarm Relay Dry Contacts Power Failure Dry Contacts Battery Back-up Viewable Temperature graph Data logging downloadable via USB or FTP Multi-Level Security VNC Remote Access via PC / smart devices
Digital alarm system with relay	Battery operated alarm system will emit an audible and visual signal when there is a mechanical or electrical failure. The alarm has an over and under temperature setting, alarm silencing switch. A relay for a remote alarm hook-up is also provided.
Access port	Mounted in left hand side of the cabinet will be a 1/2" porthole leading into the chilling chamber, complete with plugs.
Refrigeration system	Single stage system with one hermetic compressors. CFC & HCFC free refrigerants
Construction	Chamber is 14-ga. Zinc coated galvanized steel. Exterior is 16-ga. steel. Powder coated cool gray finish.
Electrical requirements	115V, 60 Hz, 1 phase 208V, 60 Hz, 1 phase 230V, 60 Hz, 1 phase 220V, 50 Hz, 1 phase 220V, 60 Hz, 1 phase
Optional accessories	Chart recorder, CO^2 and LN^2 back-up system, Racks, Cold safety gloves

Primary Uses

- Clinics
- Research
- Small laboratories
- Hospital rooms
- Medical clinics

Unique Specifications for PLATINUM CHEST TYPE (HORIZONTAL) Low Temperature Freezers - Top Opening

Model	Capacity		Rack Capacity	Internal Dimension		External Dimension	
	Liters	Cu. ft.		Inch	Centimeter	Inch	Centimeter
LTF101CP	83	3	8	24" x 12" x 18"	61 x 31 x 46	34.5" x 25.25" x 48"	87 x 64 x 121
LTF201CP	142	5	15	30" x 18" x 16"	76 x 46 x 40.	40.5" x 31" x 47"	102 x 81.x 119
LTF301CP	255	9	16	45.5" x 16" x 20"	115 x 40 x 50	57.5" x 29 x 46.5"	146 x 73 x 116
LTF401CP	340	12	27	55" x 19" x 20"	139 x 48 x 50	65.5" x 32" x 47.5"	166 x 81 x 120
LTF501CP	400	14	30	62" x 20" x 20"	157 x 50 x 50	72.5" x 33" x 47.5"	184 x 83 x 120
LTF601CP	480	17	36	69" x 20" x 21"	175 x 50 x 53	81.25" x 33.5" x 48.5"	206 x 85 x 123
LTF701CP	594	21	42	81" x 21.5" x 21"	205 x 54 x 53	91" x 36" x 49"	231 x 91 x 124
LTF801CP	626	22	36	67" x 19" x 30"	170 x 48 x 76	98" x 36" x 43.5"	248 x 91 x 110
LTF901CP	766	27	48	67" x 23" x 31.25"	170 x 57 x 79	98" x 36" x 43.5	248 x 91 x 110

83L
LTF101CP

255L
LTF301CP

340L
LTF401CP

PLATINUM CHEST TYPE (HORIZONTAL) Low Temperature Freezers - Top Opening

480L
LTF601CP

766L
LTF901CP

Unique Specifications for PLATINUM UPRIGHT TYPE (VERTICAL) Low Temp. Freezers with Door Mounted Touch Screen Control

Model	Capacity		Rack Capacity	Shelving	Internal Dimension		External Dimension	
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter
LTF401UP	370	13	15	4 adjustable (5 compartments)	20” x 22” x 51.25	50 x 55 x 130	35” x 34.5” x 79.5”	88 x 87 x 201
LTF501UP	505	18	20	4 adjustable (5 compartments	23” x 26” x 51.25”	58 x 66 x 130	40" x 36" x 79.5"	101 x 91 x 201
LTF601UP	626	22	25	4 adjustable (5 compartments	28.5” x 26” x 51.25”	72 x 66 x 130	43" x 37" x 79.5"	109 x 93 x 201
LTF701UP	710	25	30	4 adjustable (5 compartments	34” x 25” x 51.25”	86 x 63 x 130	50" x 37" x 79.5"	127 x 93 x 201
LTF801UP	792	28	30	4 adjustable (5 compartments	38” x 25” x 51.25”	96 x 63 x 130	54" x 37" x 79.5"	137 x 93 x 201

370L
LTF401UP

710L
LTF701UP

792L
LTF801UP

Undercounter and Countertop Freezers

Lab and Pharmacy Freezers with Solid Door

UCF Series

MADE IN CH

Door type	Solid

Internal capacity	42L 1.5 cu.ft	48L 1.7 cu.ft	90L 3.2 cu.ft

Specifications

Model	UCF000	UCF001	UCF101A	UCF101B
Capacity	42L / 1.5 cu.ft.	48L / 1.7 cu.ft.	90L / 3.2 cu.ft.	90L / 3.2 cu.ft.
Temperature range	-20°C / -4°F	-15°C to -25°C / 5°F to -13°F	-10°C to -25°C / 14°F to -13°F	-20°C to -40°C / -4°F to -40°F
Temperature control	Mechanical dial thermostat	Digital display		
Alarm system	N/A	High / Low temperature, door ajar power failure, low battery sensor failure, USB failure		
Data logging	N/A	Yes, adjustable intervals		
Data download	N/A	N/A	Yes, via USB, PDF format	
Min / Max temperature	N/A	Yes, display and reset		
Alarm relay	N/A	Yes, dry contacts		
Back-up battery	N/A	N/A	Yes, only powers alarm	
Access port	3/8" diameter		1" diameter	
Shelves	1 fixed shelf	2 adjustable shelves, base shelf		
Insulation	Urethane foam	US EPA and SNAP approved		
Refrigerant	R600a			R290
Compressor	Hermetic compressor			
Air circulation	Gravity flow	Direct cooling		
Defrost	Manual			
Exterior construction	Painted steel			
Interior construction	Steel	Painted aluminum		
Lockable door	Yes, keyed			
Leveling legs	4		2 front	
Casters	N/A	N/A	2 rear	
Internal dimensions (WxDxH)	14" x 13.25" x 14.5" 35 x 33 x 36 mm	17.75" x 13.75" x 16" 45 x 34 x 40 cm	19.5" x 15.75" x 22" 50 x 40 x 56 cm	20" x 19.5" x 24.25" 50 x 49 x 61 cm
External dimensions (WxDxH)	18.5" x 19.5" x 19.5" 46 x 49 x 49 cm	28.75" x 24" x 20.5" 74 x 61 x 53 cm	23.75" x 21.5" x 32" 60 x 64 x 84 cm	24" x 24" x 33" 61 x 61 x 83 cm
Weight	~ 50 lbs.	115 lbs.	165 lbs.	
Voltage	115V, 60 Hz, 1 phase			
Amperage Line | Running	15 Amp Dedicated | 1.1A		15 Amp Dedicated | 1.66A	15 Amp Dedicated | 4.19A
Supply plug	NEMA 5-15			
Certification	N/A	UL listed, C-UL, Energy Star	UL listed	
Optional accessories	Chart recorder, cold safety gloves			

42L
UCF000

48L
UCF001

90L
UCF101A

90L
UCF101B

Undercounter and Countertop Refrigerators

Lab and Pharmacy Refrigerators

UCR Series

MADE IN CH

Temperature range	2°C to 8°C / 35°F to 46°F

Door type	Solid Door	Glass Door

Internal capacity	75L 2.64 cu.ft	130L 4.6 cu.ft

Specifications

Model	UCR001	UCR001G	UCR101	UCR101G
Capacity	75L / 2.64 cu.ft.	75L / 2.64 cu.ft.	130L / 4.6 cu.ft.	130L / 4.6 cu.ft.
Door	Single solid, lockable (keyed)	Single glass, lockable (keyed)	Single solid, lockable (keyed)	Single glass, lockable (keyed)
Temperature range	2°C to 8°C / 35°F to 46°F			
Digital type	Microprocessor, digital			
Alarms	Hi / Low temperature, door ajar power failure, low battery sensor failure, USB failure			
Porthole	1" diameter			
Storage	2 adjustable shelves, 1 basket			
Insulation	US EPA and SNAP approved			
Exterior	Steel			
Refrigerant	R600a			
Compressor	Hermetic compressor			
Air circulation	Forced air			
Defrost	Automatic			
Exterior construction	Painted white			
Casters	2 rear, with leveling feet			
Internal dimensions (WxDxH)	17.5" x 17.5" x 21.75" 44 x 44 x 54 cm		21.5" x 20" x 23.25" 55 x 51 x 59 cm	
External dimensions (WxDxH)	21.25" x 22" x 30" 54 x 56 x 76 cm		25.75" x 24.75" x 32" 65 x 63 x 81 cm	
Weight	150 lbs.		165 lbs.	
Voltage	115V, 60 Hz, 1 phase			
Amperage line / running	15amd dedicated / 2.28A			
NEMA configuration	NEMA 5-15, comes with plug			
Optional accessories	Chart recorder, cold safety gloves, extra shelves			

75L
UCR001

130L
UCR101

75L
UCR001G

130L
UCR101G

Laboratory Freezer/Refrigerator Combination

MADE IN THE USA

RFC Series

Internal capacity	515L 18.2 cu.ft	1359L 48 cu.ft	1982L 70 cu.ft

Features

- Digital temperature display
- High/Low alarm
- Two solid locking doors
- Auto or manual defrost available
- Locking casters
- Adjustable shelves
- CFC-free refrigerant and insulation
- UL listed
- Stainless exterior / interior available
- Optional chart recorder

Primary Uses

- Laboratories
- Pharmacies

Specifications

Model	RFC501	RFC1301	RFC2001
Capacity	515L / 18.2 cu.ft.	1359L / 48 cu.ft.	1982L / 70 cu.ft.
Refrigerator capacity	9.1 cu.ft.	24 cu.ft.	46.6 cu.ft.
Freezer capacity	9.1 cu.ft.	24 cu.ft.	24 cu.ft.
Door	Two Solid, locking		Three Solid, locking
Temperature range	(Refrigerator) 2°C to 8°C / 36°F to 46°F (Freezer) 0°C to -25°C / +32°F to -13°F	(Refrigerator) 2°C to 8°C / 36°F to 46°F (Freezer) 0°C to -25°C / +32°F to -13°F	(Refrigerator) 4ºC / 39ºF (Freezer) -20ºC / -4ºF
Temperature control	Two - Digital display		
Temperature alarm	Hi/Low temperature alarm with audible and visual alarm, Alarm relay dry contacts, Min/Max Memory (for RFC2001)		
Shelves	2 Per Compartment Epoxy Coated	3 Per Compartment Epoxy Coated	3 Per Compartment Epoxy Coated
Legs	Four locking		
Insulation	Polyurethane		
Compressor	1/4 hp (R), 1/3 hp (F)	1/4 hp (R), 1/2 hp (F)	1/3 hp (R), 1/2 hp (F)
Evaporator	Fin and tube		
Refrigerator defrost	Automatic		
Freezer defrost	Automatic		
Interior / Exterior finish	White coated steel	Stainless steel	
Interior dimension of Refrigerator (WxDxH)	28 x 28 x 20”	22 x 28 x 60”	48 x 28 x 60”
Interior dimension of Freezer (WxDxH)	28 x 28 x 20”	22 x 28 x 60”	28 x 28 x 20”
External dimensions (WxDxH)	27.5” x 34” x 81.5” 70 x 86 x 207 cm	52 x 34.75 x 81.5” 132 x 88 x 207” cm	78 x 34.75 x 81.5” 198 x 88 x 207 cm
Weight	550 lbs.	625 lbs.	950 lbs.
Voltage	115V, 60 Hz, 1 phase		
Running amps	4.5A (R), 7.5A (F)	5.7A (R), 6.0A (F)	9.4A (R), 10.6A (F)
Supply plug	5-15P NEMA (1 plug per chamber) UL listed		
Optional accessories	Chart recorder, Leg seismic restraints, Wall seismic restraints		

LABORATORY FREEZER / REFRIGERATOR COMBINATION

515L
RFC501

1359L
RFC1301

1982L
RFC2001

SINCE 1889

Yamato Scientific America

Yamato Glassware Washers

Contents

NOTES

Semi-automatic Benchtop Glassware Washer

AW47-115V / AW47-220V

MADE IN JP

Capacity	Test tube 450 pcs. (16.5ml) Volumetric flask 36 pcs. (100ml)
Washing water temp.	Room temp. ~60°C
Washing time	Setting range 0~60 min.

Easy to use benchtop semi-automatic glassware washer

- Semi-automatic washer, easy to operate by simply setting time then start
- Upward and downward two-way pressurized water jet method with rotating jet nozzles bring high level cleaning. Detergent washing is also available
- With built-in water heater, no boiler piping and water heating system are required
- Optional jet rack is available for hard to clean targets, such as glassware with narrow neck or body

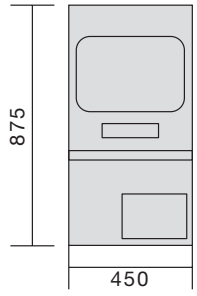
Control Panel

Specifications

Model	AW47-115V AW47-220V
Cleaning method	Upward and downward two-way pressurized water jet method Rotating jet nozzles (fixed when using jet rack)
Washing water temp.	Room temp. ~ 60°C
Water heater	Built-in heater 1kW, room temperature to 60°C
Supply water pressure	0.1~0.3MPa
Glassware stand	Table (Standard), racks (optional)
Water supply	Electromagnetic valve open/close
Water drain	Natural drainage by water level gap
Exterior material	Chrome-free electric galvanized steel plate, chemical-resistant paint
Interior material	Stainless steel
External dimensions	W450 x D490 x H875mm
Internal dimensions	W420 x D450 x H570mm
Pump	200W
Spin table	Dia. 420mm
Door	Drop down style
Weight	~43kg
Power source (50/60Hz)	AC115V 13A AC220V 7A
Included accessories	Water supply hose (with coupler) 2m 1pc.
	Drain hose (I.D.25.4mm) 1.5m 1pc.
	Vinyl cover 1pc.
	Phosphorus-free detergent 1kg (50ml measuring spoon 1pc.)
	Water supply unit 1set
Consumable	Phosphorus-free detergent

** Protrusions excluded*

Dimensions (mm)



Optional items

(1) Jet rack (glassware not included)

(2) Test tube rack (glassware not included)

(3) Phosphorus-free detergent

No.	Product name	Description	Product code
(1)	Jet rack	Hold up to 36 pcs. of 100ml flask	291090
(2)	Test tube rack	Hold up to 450 pcs. of ø18.5mm test tube	291091
(3)	Detergent	Phosphorus-free detergent 8kg	8190026001

Fully-automatic Benchtop Glassware Washer

AW62

MADE IN JP

Capacity	Test tube 600 pcs. (16.5ml) Volumetric flask 42 pcs. (100ml)	Washing water temp.	45~80°C	Washing time	Setting range 0~30 min.	Rinsing time	Setting range 0~30 min.

Compact and powerful automatic benchtop washer with spin table helps reduce laboratory glassware cleaning workload

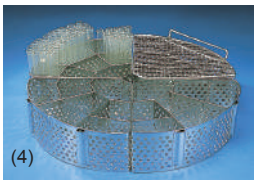
- All processes from wash to rinse are fully automatic. Each process is displayed on indicator
- Final rinse (option) with purified water available
- Water purifier connection is possible for pure water rinse process
- Wash process and time can be set according to glassware shape and contamination level
- Cleaning water temperature impacts the final cleaning results. With built-in water heater, no boiler piping and water heating system are required
- Powerful upward and downward two-way pressurized water jet method
- Optional jet rack is available for hard to clean targets, such as glassware with narrow neck or body

Optional items

Combination with water purifier

Jet rack (glasswares not included)

Beaker rack (glasswares not included)



Test tube rack (glasswares not included)

Flask rack (glasswares not included)

Phosphorus-free detergent

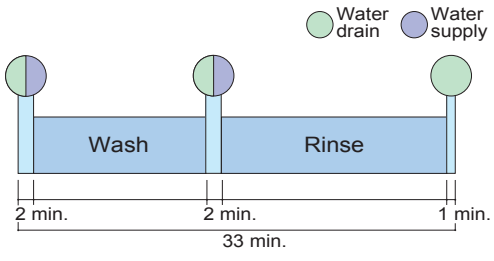
No.	Product name	Description	Product code
(1)	Pure water supply unit	With built-in 20L purified water tank	291017
(2)	Jet rack	Hold up to 42 pcs. of 100ml flask	291086
(3)	Beaker rack	Hold up to 85 pcs. of 50ml beaker	291081
(4)	Test tube rack	Hold up to 600 pcs. ø16.5mm test tube	291082
(5)	Flask rack	Hold up to 68 pcs. 60ml flask	291083
(6)	Detergent	Phosphorus-free detergent 8kg	8190026001
(7)	Ion-exchange resin cartridge	Ion-exchange resin 3L	CPCN30010

Specifications

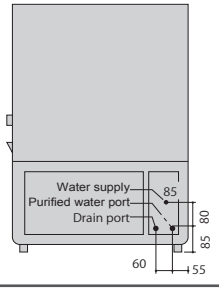
Model	AW62
Cleaning method	Two direction pressurized water jet method, fixed jet nozzle
Cleaning cycle	Wash (setting range: 0~30min.)
	Rinse (setting range: 0~30min.)
	Purified water rinse (optional) when connected with water purifier, Rinse clean with 20L purified water
Water supply	Room temp. ~ 60°C
Washing water temp.	45~80°C
Water heater	Built-in heater 6kW
Supply water pressure	0.1~0.3MPa
Glassware stand	Spin table (Standard), racks (optional)
Water supply	Controlled by electromagnetic valve open/close, water level adjustable by water level control switch
Water drain	Natural drainage by water level gap
Exterior material	Chrome-free electric galvanized steel plate, chemical-resistant paint
Interior material	Stainless steel
External dimensions	W600 x D620 x H940mm
Internal dimensions	W594 x D572 x H564mm, effective height: 345mm
Spin table	Dia.550mm (max. load bearing: 25kg)
Pump	Three phase AC220V 250W
Door	Drop down style (can stop at any position)
Weight	~90kg
Power source (50/60Hz)	Three phase AC220V 17A
Accessories	Water supply hose (with coupler) 2m 1pc., drain hose (I.D.25.4mm) 1.5m 1pc.
	Phosphorus-free detergent 1kg (50ml measuring spoon 1pc.)
	Vinyl cover, main jet nozzle cleaning needle 1pc.
	Water supply unit
Consumable	Phosphorus-free detergent

* Protrusions not included.

Process Time Schedule



Dimensions (mm)



SINCE 1889

Yamato Scientific America

Yamato Glove Boxes

Contents

Compact Glove Boxes

Compact design with transfer chamber and flat side access door

SG828/835/848/860

MADE IN THE USA

A completely sealed glove box for PRODUCT AND PERSONNEL PROTECTION

SG-828
28" W x 23" D x 29" H
710 x 580 x 740 mm

SG-860
60" W x 29" D x 32" H
1524 x 740 x 810 mm

All models feature high visibility interior, cleanliness, safety, complete containment, portability and a draft-free atmopshere

Installed purging valves are ideal for lowering oxygen and himidity levels

All models are completed systems, nothing needs to be added except gas of choice: nitrogen, argon or other inert gases

Very useful when working with toxic substances, asbestos, fibers, sewage residue and harmful liquid vapors

Features

- Constructed with an optically clear material, developed for isolation and/or containment
- Transfer chamber with purging valves and vacuum gauge
- Flat side access door for easy introduction of larger equipment
- Four (4) key cock valves for purging: 2 on the main body, 2 on the transfer chamber
- Hospital grade multiple electrical outlet strip
- Pressure relief valve with small HEPA filer
- White ambidextrous hypalon gloves

Specifications

Model	SG-828	SG-835	SG-848	SG-860
RECOMMENDED OPERATIONAL PRESSURE				
For containment purposes	-0.5 of water column (0.93 torr)			
For isolation purposes	0.5" of water column (0.93 torr)			
Main chamber				
Maximum pressure	+6" of water column (11.2 torr)			
Maximum vacuum	-6" of water column (11.2 torr)			
Transfer chamber				
Maximum pressure	Not engineered to support positive pressure			
Maximum vacuum	-26" of Hg (660 torr)			
Inside dimensions (W x D X H)	28" x 23" x 29" 710 x 580 x 740 mm	35" x 29"x 30" 890 x 740 x 760 mm	48" x 29" x 32" 1220 x 740 x 810 mm	60" x 29" x 32" 1524 x 740 x 810 mm
Outside dimensions (Includes transfer chamber 12" long)	43" x 24" x 31" 1100 x 610 x 790 mm	49" x 30" x 31" 1250 x 760 x 790 mm	63" x 31" x 35" 1600 x 790 x 860 mm	76" x 32" x 35" 1930 x 812 x 890 mm
Access door opening	15.5" x 22" h 400 x 560 mm	21.5" x 22" h 546 x 560 mm	21.5" x 24" h 546 x 610 mm	21.5" x 24" h 546 x 610 mm

Anaerobic Chambers

AC505/515/706/716/505A/515A

MADE IN THE USA

Designed to control atmosphere with O_2 sensitive materials. Any inert gas may be used.

Anaerobic Chamber for Single Operator

AC505
115-120V 60Hz 10 amps

AC515
220-240V 50Hz 5 amps

Anaerobic Chamber for Multiple Operators

AC706
115-120V 60Hz 10 amps

AC716
220-240V 50Hz 5 amps

Ideal for up to two (2) operators

Features

- Two vacuum diaphragm pumps, one each for the drying train and the transfer chamber (purging)
- All controls are illuminated
- "Bright Light" illumination system with a 40,000 hour lamp guarantee
- All clamps are adjustable to compensate for wear
- Adjustable vacuum gauge on transfer chamber
- Transfer chamber is 12' (305mm) long x 11' (280 mm) I.D.
- Four (4) ground key-cock valves for purging
- Electric outlet (socket) strip (UL, CSA, CE)
- Self-sealing quick disconnects allow changing of the drying train without disturbing the internal atmosphere

Applications

- Microbiology
- Biochemistry
- Plasma environment work
- Animal science studies
- Electronic sub-assembly work

Catalyst Heater

- Reduces trace amount of O_2
- Maintains correct incubation temperature

Drying Train

- Includes its own vacuum pressure pump and polycarbonate canisters filled with molecular sieve

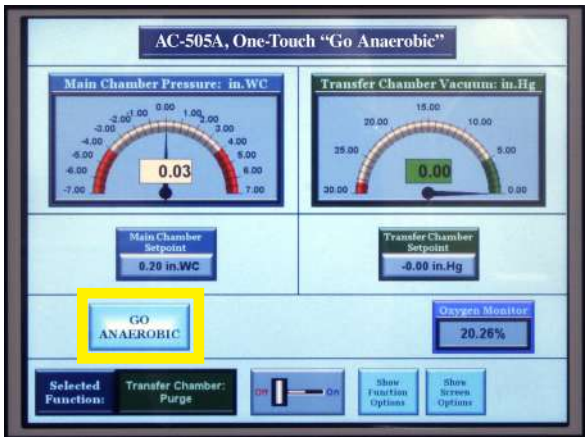
Molecular Sieve

- Absorbs moisture
- Easily rejuvenated in an oven

Specifications

Model	AC505/515	AC706/716
Top and bottom sections	Top: Formed one-piece clear plastic with "Easy Clean" corners Bottom: Matched die-molded whote thermoset with "Easy Clean" corners	Optically clear top and bottom sections with "Easy Clean" corners
Drying train	Includes three (3) clear plastic canisters filled with molecular sieve	Includes six (6) polycarbonate canisters filled with molecular sieve
White ambidextrous hypalon gloves	One (1) pair	Two (2) pairs
Inside dimension (WxDxH)	41" x 28" x 26" / 1040 x 710 x 660 mm	60" x 38" x 31" / 1520 x 960 x 790 mm
Outside dimension (WxDxH) (includes transfer chamber 12" long)	55" x 35" x 38" / 1400 x 890 x 970 mm	76" x 47" x 42" / 1930 x 1190 x 1070 mm
Approximate volume	17.3 cubic ft. / 489L	40.9 cubic ft. / 1157L
Approximate shipping weight (crated)	450 lbs. / 205 kilos	685 lbs. / 311 kilos

"Go Anaerobic" Control Panel



Automatic "One Touch" Anaerobic Chamber

AC505A
110-120V 50/60Hz 5 amps

AC515A
220 50/60Hz 3 amps

Simply press the "Go Anaerobic" button to automatically create an anaerobic atmosphere

Features

- One-Touch, “Go Anaerobic” button to initiate purging sequence
- One-Touch, on-screen data-logging with USB port for long term studies
- Larger, easy to use operator touch screen display, 24 hr. data logging
- Automatic pressure hold function. Pressure control maintains user selected pressure levels
- Automatic purging cycles for main chamber and transfer chamber
- Larger, easy to use operator touch screen
- Continual display of atmospheric oxygen conditions in percentage (%) and parts-per-million (ppm)
- Oxygen display automatically switches to ppm when O_2 levels is <0.5%
- User selectable gas: Nitrogen or Anaerobic gas mixture
- High and low level alarms with alarm history log
- Password protected administration window
- Optional Rh monitoring and control

Specifications

Model	AC505A/515A
Oxygen sensor accuracy (%)	0-100.0% ±1.0%
Oxygen sensor accuracy (ppm)	0-10,000 ±1.0% FS
Temperature range	Ambient to 41°C Accuracy: (±0.5°)
Gas consumption for anaerobic achievement	300L
Pressure range	-3" WC to +3" WC (-1500 Pa to +1500 Pa)
Optional Rh control	Rh range: 5-90% Rh Control accuracy: ±1.0%
Inside dimension ((WxDxH)	41" x 28" x 26" / 1041 x 711 x 660 mm
Outside dimension (WxDxH)	55" x 35" x 38" / 1397 x 889 x 965 mm
Approximate shipping weight (crated)	450 lbs. / 205 kilos

The units are shipped as complete systems. Nothing needs to be added except your gas of choice and work samples.

⚠Attention
- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
  Caution: High temperature components

SINCE 1889

Yamato Scientific America

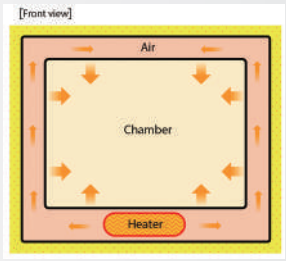
Yamato Incubators

Contents

SINCE 1889

Incubator Overview

Natural Convection ensures a homogeneous temperature throughout the chamber

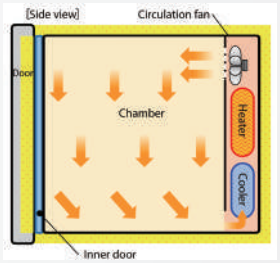


IC Series: General Purpose Incubator

Internal Capacity: 37, 97, 159, 318, 567L

- Non-programmable
- Easy to use digital display setting and timer
- Standard equipped with various functions like self-diagnostic, calibration off-set, overheat prevention and key lock
- Inner glass door for easy and safe sample viewing (except IC-100 models)
- Option to choose from several chamber capacities from small benchtop units to floor standing models
- All models are available with optional Window [W] for improved visibility
- Models 400 to 900 have an option for communication port

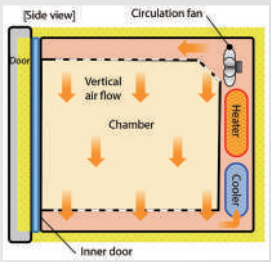
Forced Air Convection ensures both optimal heating of materials and a high precision temperature uniformity in the chamber with minimum energy consumption



IN Series: Programmable Refrigerated Incubator

Internal Capacity: 143, 286L

Ecological Economical



INE Programmable Refrigerated Eco Incubator

Internal Capacity: 286L

- Programmable
- Large Capacity
- Manual and programmed defrosting function
- Easy to use digital display setting and timer
- Standard equipped with various functions like self-diagnostic, calibration off-set, overheat prevention and key lock
- Inner glass door minimizes temperature changes and makes far easy and safe sample viewing
- Cooling system ensures that samples are not dried while cooling
- Option for RS485 interface
- Electrical hook up for shaker inside the chamber (IN series)
- Upgraded inverter control improved refrigeration efficiency and reduced frost significantly (INE series)

Economical General Purpose Incubator

Natural Convection

IC Series

MADE IN CH

Operating temp. range	Temp. distribution accuracy	Internal capacity				
Room temp. +5°C~80°C	±1.0°C (at 37°C)	37L (IC103C/113C)	97L (IC403C/413C)	159L (IC603C/613C)	318L (IC803C/813C)	567L (IC903C/913C)

Benchtop, compact design incubators (IC103C)
General purpose incubators (IC403C/603C/803C/903C)

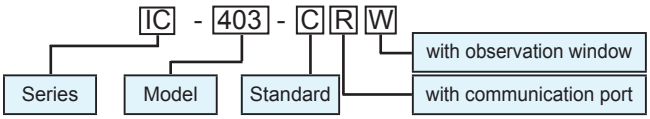
- Space saving
- All models come with either an observation window (W) for improved visibility or solid door
- Dual door system permits contents to be viewed easily without disrupting atmosphere of the incubator (except IC-100 series)
- Control panel of IC103C/113C located at a higher position for easy access
- Easy to use digital setting display and timer
- Air jacket technology ensures even and efficient heat distribution throughout the chamber
- Standard equipped with various functions such as self-diagnostic, calibration offset, overheat prevention and key lock
- Models 400 to 900 have an option for communication port (R)

37L IC103C | 97L IC403C | 159L IC603C

Specifications

Model	IC103C IC113C	IC403C IC413C	IC603C IC613C	IC803C IC813C	IC903C IC913C
System	Natural convection				
Operating temperature range	Room temp. +5~80°C				
Temp. control accuracy	±0.5°C (at 37°C)				
Temperature distribution accuracy	±1.0°C				
Interior material	Stainless steel				
Exterior material	Cold rolled steel plate with melamine resin baking finish				
Heat insulator	Glass fiber				
Heater	Stainless steel heating pipe	Iron-chrome wire heater			
	0.2kW	0.3kW	0.4kW	0.7kW	2.2kW
Temperature controller	PID control by microprocessor				
Temperature setting system	Operation menu key and digital setting by ▲/▼ keys, digital display				
Temperature display	Measurement temperature: Digital display by 4 digit green LED Setting temperature: Digital display by 4 digit red LED				
Timer	1 min. ~ 99 hrs 59 mins. and 100~999 hrs 50 mins (including timer waiting function)				
Operation functions	Fixed temperature, Auto start, Auto stop, Quick Auto stop				
Additional functions	Calibration off-set, Key-lock, Power outage compensation				
Safety device	Self diagnostic functions, temp. sensor error, display error, measurement temp. error, auto overheat prevention				
Heater control circuit	SSR drive system				
Sensor	K-thermocouple				
Internal dimensions (WxDxH)	350 x 300 x 360 mm	450 × 480 × 450 mm	600 x 530 x 500 mm	600 × 530 × 1000 mm	1070 x 530 x 1000 mm
External dimensions (WxDxH)	430 x 397 x 606 mm	560 × 606 × 820 mm	710 x 656 x 870 mm	710 × 656 × 1619 mm	1180 x 656 x 1619 mm
Internal capacity	37L	97L	159L	318L	567L
Inner door	None	Reinforced glass door x 1		Reinforced glass door x 2	
Shelf load capacity	~15 kg/pc.				
Shelf rest step number	8 steps	9 steps	12 steps	29 steps	29 steps x 2
Power supply (50/60 Hz)	AC115V 1.8A *with plug* AC220V 1A *no plug, round terminal*	AC115V 4.5A *with plug* AC220V 2A *no plug, round terminal*	AC115V 6A *with plug* AC220V 2.5A *no plug, round terminal*	AC115V 10A *with plug* AC220V 4.5A *no plug, round terminal*	AC115V 13A *with plug* AC220V 6.5A *no plug, round terminal*
Weight	~17 kg	~45 kg	~65 kg	~102 kg	~166kg
Included accessories: Shelf / shelf brackets	Stainless steel				
	2 pcs. / 4pcs.			4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Optional accessories	Stand, Stacking kit, Additional shelf, Cable hole (25/50mm or 30/50mm), Temp. output terminal, Time-up output terminal for alarm device				

Model Guide

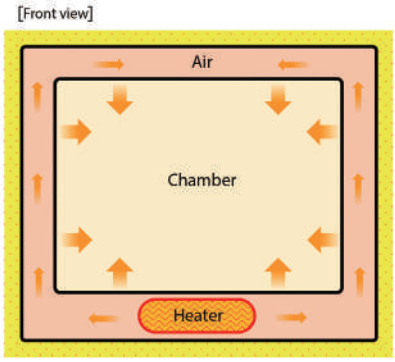


Examples:
IC-103C: Standard model
IC-403CR: Standard model with communication port
IC-603CW: Standard model with observation window
IC-803CRW: Standard model with communication port and observation window

Optional items

Description	Product code
Stand for up to 600 models (ON61)	211856
Shelf and bracket set for IC100 models	42110501001
Shelf and bracket set for IC400 models	212246
Shelf and bracket set for IC600 and 800 models	212266
Metal stacking kit for IC400 models (OD40)	212822
Metal stacking kit for IC600 models (OD60)	212823
Cable port ø25mm	281121
Cable port ø50mm	281122
Temperature output terminal (4~20mA) for ODK12	281123
Time-up output terminal for ODK14	281124

Method



Control Panel

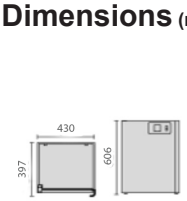
Observation Window

Interior (IC613C)

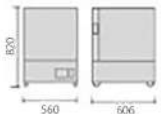
Shelf & Bracket Set

Exhaust Ports

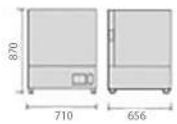
Dimensions (mm)



IC103C/113C

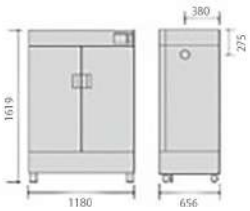


IC403C/413C



IC603C/613C

IC803C/813C



IC903C/913C

Programmable Refrigerated Incubator

Forced Air Convection

IN604-115V IN604-220V / IN604W-115V IN604W-220V
IN804-115V IN804-220V / IN804W-115V IN804W-220V

MADE IN JP

Operating temp. range	-10°C~+50°C
Temp. distribution accuracy	±1.0°C (at 37°C)
Internal capacity	143L (IN604/604W) / 286L (IN804/804W)

Applicable for low temperature tests and environmental tests

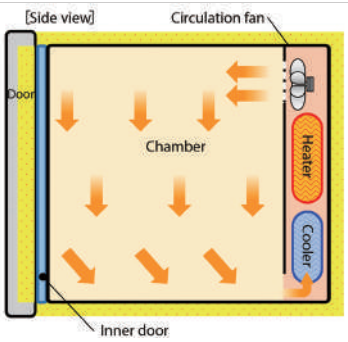
- High accuracy temperature control and temperature distribution
- Inner glass door keeps temperature stable during sample observation
- Designed with a large dual glass door and inner door that forms a triplex glass door for improved heat retention (IN604W/804W)
- Interior light for better sample visibility (IN604W/804W)
- Optional slide shaker table available to put in and take out sample easily (IN600 models)

Specifications

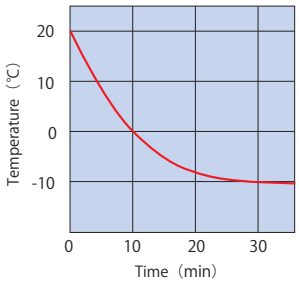
Model	IN604-115V IN604-220V	IN604W-115V IN604W-220V	IN804-115V IN804-220V	IN804W-115V IN804W-220V
System	Forced air convection			
Operating temperature range	-10°C~+50°C			
Temperature adjustment accuracy	±0.3°C (refrigerator in continuous operation)			
	±1.0°C (refrigerator in cycle operation)			
Temperature distribution accuracy	±1.0°C (refrigerator in continuous operation at 37°C)			
Maximum temperature reaching time	20~50°C ~20min		20~50°C ~30min	Data not available
Minimum temperature reaching time	20~-10°C ~ 45min	20~-10°C ~55min	20~-10°C ~65min	Data not available
Interior material	Stainless steel			
Exterior material	Chrome free electronic galvanized plated steel plate chemical proof baking finish			
Observation window	--	W516 x H416mm (with key)	--	Data not available
Heat insulation material	Styrene foam			
Refrigerator	Air-cooled fully closed compressor 250W		Air-cooled fully closed compressor 300W	
Refrigerator medium	R134A		R404A	
Defrosting mechanism	Manual ON / Auto OFF, Timer operation, Cycle operation			
Blower fan	Axial fan			
Heater	Iron-chrome wire heater: 550W		Iron-chrome wire heater: 750W	
Sensor	Platinum resistance temperature detector: Pt100Ω (temperature controller), K-thermocouple (overheat prevention device)			
Cable port (right side of main unit)	I.D. 32 mm	I.D. 50 mm	I.D. 32 mm	I.D. 32 mm
Room light / service outlet	--	Fluorescent lamp: 10W/5A with grounding terminal	–	Flourescent lamp: 10W/5A with grounding terminal
Temperature control	PID control			
Temperature setting	Digital setting with ▲/▼ keys			
Temperature display	Measured temperature: 4-digit orange LED digital display + VFD fluorescent display			
Timer / timer resolution	0 min.~999 hrs. 59 min. / 1min.			
Operation function	Fixed temperature, auto stop, auto start, program (up to 32 steps, repeat operation)			
Additional functions	Timer function (accumulated time to 49,999 hrs), calibration off-set function, clock display			
Safety device	Self diagnostic function (Temp. sensor error, Heater disconnection, SSR short-circuit, Main relay error, Automatic overheat prevention function), Key lock, Over current ELB, Overheat prevention device			
Internal dimensions (WxDxH mm)	600 x 477 x 500		600 x 477 x 1000	
External dimensions (WxDxH mm)	710 x 645 x 913		710 x 645 x 1630	
Internal capacity	143L		286L	
Shelf plate load	15 kg / pc.			
Shelf rest step number / pitch	13 steps / 30mm		23 steps / 30mm	
Power supply (50/60Hz)	AC115V 9A *with plug* AC220V 5.5A *no plug, round terminal*	AC115V 10.5A *with plug* AC220V 7.5A *no plug, round terminal*	AC115V 10.5A *with plug* AC220V 6A *no plug, round terminal*	AC115V *with plug* AC220V *no plug, round terminal*
Weight	~89 kg		~ 120 kg	
Included accessories: Shelf / shelf brackets	3 pcs. / 6 pcs. (stainless steel punched metal)		5 pcs. / 10 pcs. (stainless steel punched metal)	
Door keys	--	2 keys	--	2 keys
Optional items	Stand, additional shelf, cable port (ø30/50mm), recorder, warning light combination (stand-by/operation/error), observation window, temperature output terminal (4-20mA), external alarm output terminal, time up output terminal			

Control Panel

Method



Temperature Drop Curve (IN604)

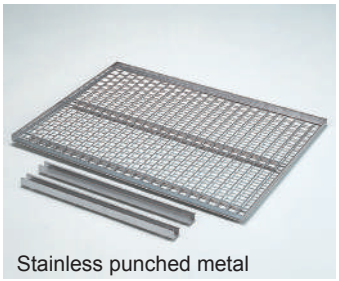


Interior

IN604W with MK161 shaker

IN604

Shelf & Bracket Set



Stainless punched metal

Stainless wire

Interior Light

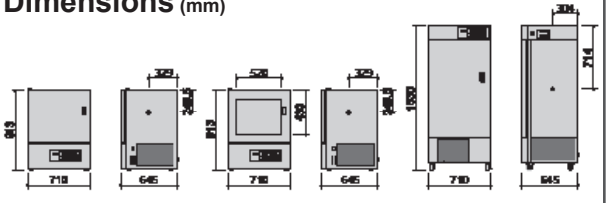
IN604W/804W

Optional items

Description	Product code	Model	Applicable units
Stand	211856	ON61	IN604/604W
Metal stacking kit with cooling fan for 600 models	212823	OD60	IN604/604W
Stainless steel punched metal shelf up to 15kg	211221	--	All
Stainless steel wire shelf up to 20kg	213464	--	All
Temperature output terminal*	281168	--	All
External alarm terminal*	281169	--	All
Time up output terminal*	281170	--	All
Seismic mat for 600 models	296902	--	IN604/604W
Shaker setting stage with slide rail	211318	--	IN604W

* Please specify when ordering main unit.

Dimensions (mm)



IN604 IN604W IN804

Programmable Refrigerated Eco Incubator

Forced Air Convection

INE800-115V / INE800-220V

Ecological Economical

MADE IN JP

Temperature range	0~+60°C
Temp. distribution accuracy	±0.5°C (at 37°C during continuous operation)
Internal capacity	286L
Inverter control	Energy savings

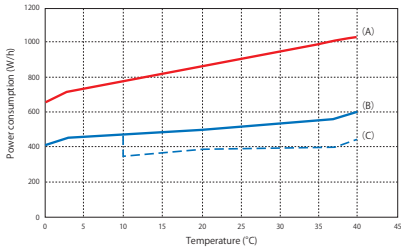
Upgraded inverter control improved refrigeration efficiency, reduced frost significantly and minimized wasted power during refrigeration.

- 44% power savings compared to previous models
- Controller upgraded for easier viewing and operability
- Temperature distribution accuracy improved for better incubation
- Standard equipped with program operation, auto-stop, auto-start, self-diagnostic, timer, calibration off-set, memory, and electricity & CO_2 emission monitor

Specifications

Model	INE800-115V	INE800-220V
System	Forced air convection	
Operating temperature range	0~+60°C	
Setting temperature range	-5~+65°C	
Temperature adjustment accuracy	±0.2°C (at 37°C during continuous operation), ±0.5°C (at 37°C cycle operation)	
Temperature fluctuation	±0.3°C (at 37°C during continuous operation), ±1.0°C (at 37°C cycle operation)	
Temperature distribution accuracy	±0.5°C (at 37°C during continuous operation)	
Temperature gradient	2.0°C (at 37°C during continuous operation)	
Max. temperature reaching time	20~60°C 35min.	
Min. temperature reaching time	20~0°C 50min.	
Cooling Mechanism	Continuous operation, Cycle operation, Cooling-stop operation	
Interior	Stainless steel	
Exterior	Chromate-free electrogalvanized steel plate Baked chemical resistant finish	
Heat insulator	Styrene foam (non-freon)	
Freezer	200W Rotary Unit	
Cooling Medium	R134a 350g	
Operation range of freezer	Below 40°C	
Defrosting mechanism	Hot Gas Bypass Method, Manual (random) Defrost / Auto (time) Defrost	
Blower fan	DC Axial flow fan 4-Step, Equipped with Error Signal when stopped	
Heater	Iron-chrome wire heater : 750W	
Sensor	Double sensor: Platinum resistance temperature detector: Pt100Ω (temperature controller), K-thermocouple (overheat preventation device)	
Cable port	I.D.: 50 mm (right side of main unit)	
Temperature controller	PID control by microprocesser	
Temperature Display	Setting Temp. Display : 5-digit orange LED digital display, Actual Temp. Display : 4-digit green LED digital display	
Timer / timer resolution	0~99hr. 59min. / 1min.	
Operation function	Fixed temperature, Auto start, Auto stop, Quick auto stop, Program (99 steps, 99 patterns)	
Additional function	Timer, Calibration off-set, Electricity & CO_2 Emission Monitor, Voltage Recovery Optional, User Setting saving/readout, Calendar timer (24 hours)	
Safety device	Self diagnostic function (temp. sensor error, heater disconnection, SSR short-circuit, main relay error, automatic overheat prevention), Key lock, Overcurrent electric leakage breaker, Overheat preventation device, Fan malfunction detector, Cooling high-pressure detector, Inverter malfunction detector	
External dimensions	W710 x D645 x H1730mm	
Internal dimensions	W600 x D477 x H1000 (effective 800) mm	
Internal capacity	286L	
Shelf load capacity	15 kg/pc.	
Shelf rest step number / pitch	23 steps / 30mm	
Power supply (50/60 Hz)	AC115V 8.7A *(with plug)*	AC220V 4.5A *(no plug, round terminal)*
Weight	~135kg	
Included accessories	Stainless steel punched metal 5 pcs. shelf / 10pcs. brackets, 2 keys, silicon stopper for cable hole 1 pc	

Power Consumption Comparison



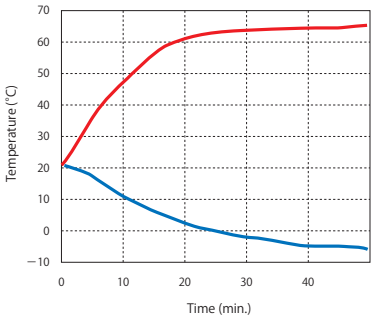
Unit: Wh

	0°C	3°C	20°C	37°C
IN804	648	712	864	1007
INE800	409	446	498	560
Reduction Rate	37%	37%	42%	44%

Comparison with IN804
1. Condition : AC115V/50Hz, Room Temp 23°C, 5 shelves, no load
2. Data was taken when each setting was stable

CO_2 emissions reduced by approx 1,269 kg
(Calculated for 1 year operation with 37°C setting)

Falling / Rising Temp. Curve

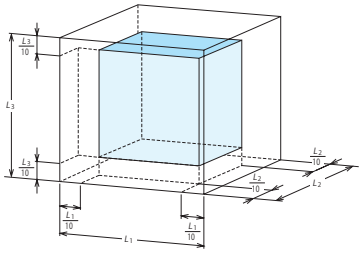


9 Point Temperature Distribution

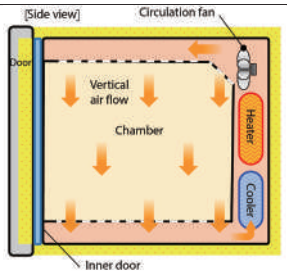
	Upper Front Left	Upper Back Left	Upper Front Right	Upper Back Right	Lower Front Left	Lower Back Left	Lower Front Right	Lower Back Right	Center Side
No load	37.1	36.2	37.2	36.9	36.8	36.8	37.1	36.9	37.0
Loaded	37.1	36.3	37.0	36.9	36.5	35.9	36.7	36.1	37.0

(°C)

Condition
1. Above 9 measurement points were taken from the effective internal capacity down-scale by 10% (as the image on the right)
2. Room Temp. 23°C, AC115V, 50Hz, Average temperature during stable setting temp. set at 37°C
3. No Load condition: 5 shelves
4. Loaded condition: each of the 12 shelves were loaded with 20 Petri Dishes (Total : 240 Petri Dishes)



Method



Control Panel

Overheat Prevention Device

External Output Terminal (Top: optional Bottom: standard)

Cable Port (I.D.Φ50mm standard)

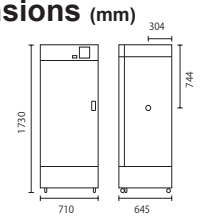
Shelf & Bracket Set

Optional items

Description	Product code
(1) Stainless steel punched metal shelf up to 15kg	211221
(2) Stainless steel wire shelf up to 20kg	212918
(3) External alarm terminal*	211881
(4) Time-up output terminal*	211882
(5) Earthquake resistant fixture	211883

* (3) and (4) please specify when ordering main unit

Dimensions (mm)



INE800

SINCE 1889

Yamato Scientific America

Yamato Muffle Furnaces

Contents

Muffle Furnace Overview

Common Features

- Operating Temp. Range 100~1150°C
- Excellent heat tightness with a firmly sealed chamber door
- Upgraded with long life R-thermocouple sensors
- Safety features include self-diagnostic functions, calibration off-set, key lock function, auto recovery after power failure, earth leakage breaker and automatic overheat prevention device

Unique Features

	FO Series **Standard Muffle Furnace** 	**FP Series** **High Performance Muffle Furnace** 
Controller	Easy to use controller	High accuracy controller for better operability and visibility
Temp. control accuracy	±2.0°C (at 1150°C)	±1.0°C (at 1150°C)
Max. temp. reaching time	60~80 mins (depending on the model)	80~90 mins (depending on the model)
Program operation	maximum of 6 patterns: 30 steps x 1 pattern, 15 steps x 2 patterns or 10 steps x 3 patterns	maximum 99 steps, 99 patterns, repeat operation
Capacity	Wider selection to choose from (11 models) with inner capacity of 1.5L to 30L	Four models to choose from with inner capacity of 1.5L to 11.3L
Chamber	High quality alumina porcelain hot plate where heater is exposed to the inner chamber (heater must not be exposed to halogen elements to avoid heater corrosion)	High quality alumina porcelain hot plate where heater is not exposed to the inner chamber (preventing contamination of samples)
Other features	Designed with communication port (for CR models)	Additional safety feature: independent overheat prevention device. Additional functions: power on and operation time integrating function (up to 65,535 hours); calendar timer (24 hrs.); power consumption, total CO_2 emission, and heater operating output; and save and access of operator's setting information.
Interior		
Control panel		

Standard Muffle Furnace

FO Series

MADE IN CH

Operating temp. range	Temp. control accuracy	Internal capacity
100~1150°C	±2°C (at 1150°C)	1.5L (FO100CR/110CR), 3.75L (FO200CR/210CR), 7.5L (FO300CR/310CR), 9L (FO410CR), 11.3L (FO510CR), 17.5L (FO610CR), 23.6L (FO710CR), 30L (FO810CR)

- Wide selection of space-saving compact units with maximum inner capacity
- Easy to use controller
- Excellent heat tightness with a firmly sealed chamber door
- High temperature accuracy at ±2.0°C
- Program operation of maximum of 6 patterns: 30 steps x 1 pattern, 15 steps x 2 patterns or 10 steps x 3 patterns
- Safety features include self-diagnostic functions, calibration off-set, lock function, auto-recovery after power failure, earth leakage breaker and automatic overheat prevention device
- Selectable options include exhaust system unit, N_2 gas loading device (with flow meter), temperature output terminal, time up / alarm output terminal and sample tray
- Upgraded with long life R-thermocouple sensors
- Designed with communication port

1.5L
FO100CR

7.5L
FO310CR

17.5L
FO610CR

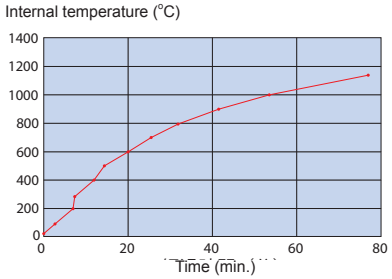
30L
FO810CR

Specifications

Model	FO100CR/110CR	FO200CR/210CR	FO300CR/310CR	FO410CR	FO510CR	FO610CR	FO710CR	FO810CR
Operating temp. range	100~1150°C							
Temp. control accuracy	±2°C (at 1150°C)							
Max. temp. reaching time	~60min.		~70min.		~80min.			
Exterior material	Cold rolled steel plate with baked-on melamine resin finish							
Interior material	Ceramic fiber							
Sensor	R-thermocouple							
Heater	Iron-chrome wire							
	1kW	1.5kW	2kW	2.2kW	2.5kW	3kW	3.5kW	4kW
Exhaust port	ø20mm (top)							
Cooling Fan Type	Axial fan motor							
Temp. controller	PID control by microprocessor							
Temp. setting/display method	Digital setting by▲/▼ keys / Digital display							
Operation function	Fixed temperature, quick auto stop, auto stop, auto start, program (maximum 6 patterns: 30 steps x 1 pattern, 15 steps x 2 patterns or 10 steps x 3 patterns)							
Additional function	Calibration offset, power failure compensation, key lock							
Timer	1 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs.							
Safety Device	Self diagnostic (memory error, heater disconnection, sensor error, SSR short curcuit), Electric leakage breaker, Overheat prevention device							
Internal dimensions(WxDxHmm)	100×150×100	100×250×150	200×250×150	200×300×150	250×300×150	250×350×200	270×350×250	300×400×250
External dimensions(WxDxHmm)	346×405×517	346×505×567	446×505×567	446×554×567	507×504×627	507×604×677	507×605×727	507×655×727
Internal capacity	1.5L	3.75L	7.5L	9L	11.3L	17.5L	23.6L	30L
Power source (50/60Hz)	AC115V / 220V			AC220V single phase				
	10A / 5A	14.5A / 7.5A	19A / 9.5A	10.5A	12A	15A	18A	20A
	no plug, round terminal	*no plug, round terminal*	*no plug, round terminal*	*no plug, round terminal*	*no plug, round terminal*	*no plug, round terminal*	*no plug, round terminal*	*no plug, round terminal*
Weight	~24kg	~30kg	~37kg	~38kg	~44kg	~52kg	~58kg	~62kg
Included accessory	Exhaust port cap 1 pc.							

Control Panel

Temperature Rising Curve (FO300CR)



Optional items

Product code	Description
*214096	Exhaust unit, 115V
*214097	Exhaust unit, 220V
*281301	Time up output terminal
*Contact Customer Service for part number	N_2 gas inlet system w/ flow meter
281310	Sample tray

** Please specify when ordering main unit.*

Interior

Adoption of reasonable insulation structure increased thermal insulation characteristics and temperature distribution accuracy

Sample tray

Exhaust unit

Gas generated due to the increase of temperature in the furnace will be quickly exhausted.

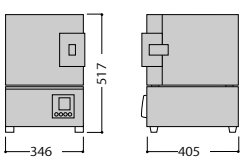
Power source of exhaust device :
AC115V 0.27A
Single phase AC220V 0.15A

Aluminum flexible duct (*not included*)
Length 1.5m / Diameter 50mm

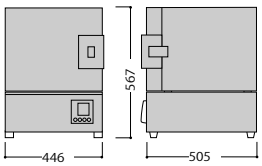
Temperature Output Terminal

- Record and monitor internal temperature
- Temperature output: 4-20mA
- Time up output

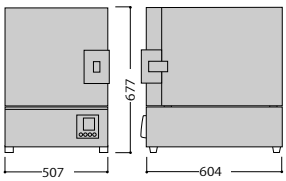
Dimensions (mm)



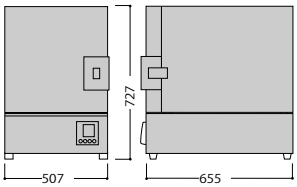
FO100CR/110CR
(1.5L)



FO300CR/310CR
(7.5L)



FO610CR
(17.5L)



FO810CR
(30L)

High Performance Muffle Furnace

FP Series

MADE IN JP

Operating temp. range	100~1150°C
Temp. control accuracy	±1.0°C
Internal capacity	1.5L (FP103) / 7.5L (FP303/313) / 11.3L (FP413)

- High accuracy controller for better operability and visibility
- Excellent heat tightness with a firmly sealed chamber door
- High temperature accuracy at ±1.0°C
- Upgraded with long life R-thermocouple sensors
- High quality alumina porcelain hot plate where heater is not exposed to the inner chamber preventing contamination of samples
- Program operation of maximum 99 steps, 99 patterns, with repeat operation function
- Safety features include self-diagnostic functions, calibration off-set, key lock function, auto recovery after power failure, earth leakage breaker, automatic overheat prevention device and independent overheat prevention device
- Optional items include exhaust system, N_2 gas loading device (with flow meter), temperature output terminal, time-up output terminal, sample tray, event output terminal, operation signal output terminal and furnace floor plate

1.5L
FP103

7.5L
FP313

Specifications

Model	FP103	FP303	FP313	FP413
Operating temp. range	100~1150°C			
Temp. control accuracy	±1.0°C (at 1150°C)			
Temp. fluctuation	±1.0°C (at 1150°C)			
Temp. distribution accuracy	±4.0°C (at 1150°C)			
Temp. gradient	14°C (at 1150°C)			
Max. temp. reaching time	~90 min.			~80 min.
Exterior material	Cold rolled steel plate with baked-on melamine resin finish			
Interior material	Alumina fiber			
Sensor	R-thermocouple			
Heater	Iron-chrome wire			
	1.1kW	2.4kW		3.25kW
Exhaust port	ø20mm (top)			
Cooling fan	19/16W (50/60Hz)			
Temp. controller	PID control by microprocessor			
Temp. and timer setting	Digital setting by ▲/▼ keys			
Temp. display	Setting temperature: Orange 5-digit LED digital display (resolution: 1°C) Temperature display: Green 4-digit LED digital display (resolution: 1°C)			
Timer	1 min. to 99 Hrs. 59 min., timer resolution 1 min. or 1 hr.			
Operation function	Fixed temperature, Quick auto stop, Auto start, Auto stop, Program (maximum 99 steps, 99 patterns, repeat operation)			
Additional function	Power on / operation time accumulation (up to 65535 hr.), calendar (timer 24 hr.), clock (24 hr. display), calibration off-set, display of power consumption, CO_2 emissions and heater operation, power failure recovery options, user setting storage and recall			
Heater circuit control	Triac with zero cross control			
Safety device	Self diagnostic functions (sensor error , heater disconnection, triac short circuit, main relay failure disconnection, automatic overheat prevention), Key lock function, Independent overheat prevention, Electric leakage breaker			
Internal dimensions (mm)	W100 x D150 x H100	W200 x D250 x H150		W300 x D250 x H150
External dimensions (mm)*	W376 x D404 x H515	W446 x D504 x H565		W506 x D504 x H625
Internal capacity	1.5L	7.5L		11.3L
Power source (50/60Hz)	AC115V 10A *with plug*	AC115V 21.5A *no plug, round terminal*	AC220V 13.5A *no plug, round terminal*	AC220V 18A *no plug, round terminal*
Weight	~32kg	~43kg		~51kg
Included accessories	Exhaust port cap, fuse, furnace floor plate			

** Protrusions excluded.*

- Length of power cord outside the unit is about 2m
- Performance have been measured at the rated source voltage, single phase 115V or 220V±5%, room temperature of 23°C±5°C, humidity of 65%RH±20°C, voltage of 86 kPa~106kPa,
- Measeurement conditions FP103 is at 3 points in the bath, FP303, 313 and 413 are compliant with JIS.

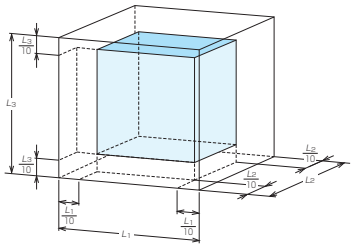
11.3L
FP413

Control Panel

9 Point Temperature Distribution (no load)

	Upper back right	Upper back left	Upper front right	Upper front left	Lower back right	Lower back left	Lower front right	Lower front right	Center
FP313	1150.0	1150.4	1147.0	1147.6	1145.2	1146.2	1144.4	1145.7	1146.6

1, Above 9 measurement points were taken from the effective internal capacity down-scale by 10% (as the image on the right)
2. Room Temp. 23°C, AC220V, 50Hz. Average temperature during stable setting temp. set at 1150°C
3. No load



Optional items

Description	Product code
Exhaust unit, 115V	214096
Exhaust unit, 220V	214097
N_2 gas inlet system (with flow meter) for FP103	214162
for FP303/313	214163
for FP413	214164
Sample tray	281310
Alumina hearth plate for FP103, 90 x 145mm x 5pcs.	214157
Alumina hearth plate for FP303/313, 190 x 245mm x 5pcs.	214158
Alumina hearth plate for FP413, 290 x 245mm x 5pcs.	214159
*Temp. output terminal (4-20mA)	214166
*External alarm output terminal	214167
*Time up output terminal	214168
*Operation signal output terminal	214169
*Event output terminal	214170

**** Please specify when ordering main unit. Installation not possible after delivery.***

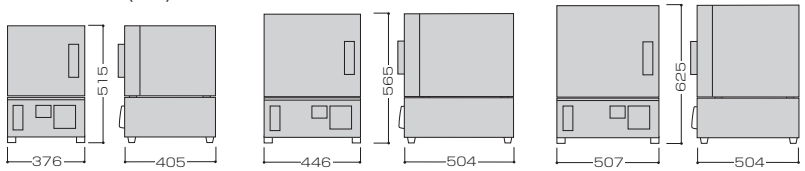
Exhaust Unit

Gas generated with increasing temperature in the furnace can be efficiently exhausted.

Power source of exhaust device :
AC115V 0.27A
Single phase AC220V 0.15A

Aluminum flexible duct (*not included*)
Length 1.5m / Diameter 50mm

Dimensions (mm)



FP103 (1.5L) FP303/313 (7.5L) FP413 (11.3L)

Interior

Heater is not exposed.
Adoption of optimal insulation structure increased heat insulation performance and temperature distribution accuracy.

Unit shown with optional front flow meter

Sample Tray

no load.

SINCE 1889

Yamato Scientific America

Yamato Ovens

Contents

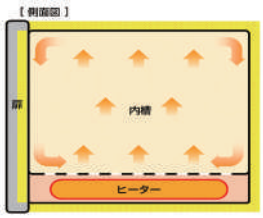
NOTES

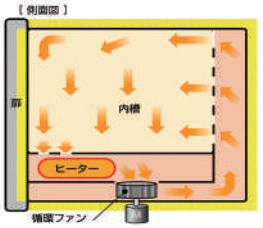
SINCE 1889

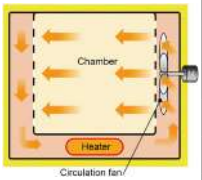
Yamato

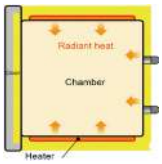
OVEN OVERVIEW

	Series	Model No.	Operating Temperature Range (0 100 200 300 400 500 600 700)	Internal Capacity (L)	Program	Characteristics
Natural Convection	DX	302C/312C	RT+5~300°C	28	--	• Economical • High temperature • Do not use fans. Heat rises by natural air convection for a slower heat flow
		402C/412C		74	--	
		602C/612C	RT+5~280°C	153	--	
	DVS	402C/412C	RT+5~260°C	99	Yes	
		602C/612C		162	Yes	
	DR	201	300~700°C	13.75	Yes	
	DG	400C/410C	RT+5~70°C	92	--	
		440C/450C		92	--	
		800C/810C		445	--	
		840C/850C*		445	--	*DG840C/850C: Natural+Forced convection
Forced Convection	DKL	301C/311C	RT+10~260°C	27	--	• High level of air circulation, accuracy and uniformity • Use fan motors for vertical air circulation providing a more uniform heat flow • Built-in exhaust port • Calibration offset function
		401C/411C		90	--	
		601C/611C		150	--	
	DKN	302C/312C	RT+10~260°C	27	Yes	
		402C/412C		90	Yes	
		602C/612C		150	Yes	
		812C		300	Yes	
		912C	RT+10~210°C	535	Yes	
	DNE	401/411	RT+20~210°C	90	Yes	
		601/611		150	Yes	
		811	RT+15~210°C	300	Yes	
		911		540	Yes	
	DNF	301	RT+15~260°C (Wind velocity: 1~10)	27	Yes	
		401/411		90	Yes	
		601/611		150	Yes	
		811		300	Yes	
		911		540	Yes	* DNF301/401/411/601/611 Two types of circulation: forced and natural convection
Fine	DF	412	RT+15~260°C	91	Yes	• Rapid & high volume of airflow • Use forced convection for a horizontal air flow as opposed to vertical • Very high uniformity, accuracy and performance • Quick exhaust and cooling
		612		216	Yes	
		832	RT+15~200°C	512	Yes	
		1032		1000	Yes	
	DH	412	RT+15~360°C	91	Yes	
		612		216	Yes	
		650	RT+10~500°C	216	Yes	
		832	RT+15~300°C	512	Yes	
		1032		1000	Yes	
Vacuum	ADP	200C/210C	40~240°C	10	Yes	• Handle sensitive samples at lower temperature • Heat is evenly distributed from arrangement of the heaters against outer chamber walls • Reduced oxidation
		300C/310C		27	Yes	
	SDP	300/310	RT+10~220°C	47.2	Yes	
		400/410		127.4	Yes	
		610	RT+15~220°C	264	Yes	
	DP	43C	40~200°C	91	Yes	
		63C		216	Yes	
		83C		512	Yes	
		104C		1000	Yes	





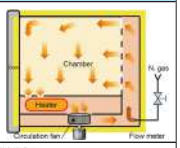
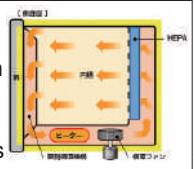
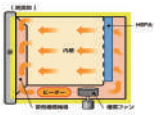




ADP and DP Series

SINCE 1889

Oven Overview

	Series	Model No.	Operating Temperature Range	Internal Capacity (L)	Program	Characteristics
Inert	DN	411IE	RT+15~260°C	95	Yes	• Creates non-oxidative environment • Controllable nitrogen flow 
		611IE		223	Yes	
Clean	DE	411	RT+30~260°C	91	Yes	• Class 100 • Adopts anti-fouling casters preventing wheel contamination during transportation • Improved optional accessories and more customization options 
	DE	611	RT+30~260°C	216	Yes	
	DT	411	RT+30~360°C	91	Yes	
	DT	611	RT+30~360°C	216	Yes	
	DES	830	RT+30~260°C	327	Yes	• Class 100 • Stable cleanliness through forced circulation with rear exhaust 
	DTS	830	RT+30~360°C	327	Yes	

Natural Convection Oven

Economical, Constant Temperature Ovens

DX302C/312C/402C/412C/602C/612C

MADE IN CH

Operating temp. range	Room temp. +5~300°C (DX302C/402C) / Room temp. +5~280°C (DX602C)
Temp. dstribution accuracy	±10°C
Operation	Economical, affordable

Highly practical standard ovens with maximum temperature up to 300°C

(Stand optional)

Standard natural convection constant temperature drying ovens, with extensive features and simple operation.

Performance and functions

- Economical and cost saving
- Easy to use and maintain
- Excellent temperature accuracy
- Digital PID controller
- Easy operation functions: Fixed setting, Quick Auto Stop, Auto Start, Auto Stop
- Increased safety and self-diagnostic function
- Calibration off-set function

Safety features

- Temp sensor error, Temp input circuit error, Auto overheat prevention, Measured temp error, Circuit breaker with over current protection

Specifications

Model	DX302C	DX312C	DX402C	DX412C	DX602C	DX612C
Circulation method	Natural gravity convection					
Operating temp. range	Room temp. +5°C~300°C				Room temp. +5°C~280°C	
Temp. control accuracy	±1°C (at 300°C)					
Temp. distribution accuracy	±10°C (at 300°C)				±10°C (at 280°C)	
Max. temp. reaching time	~45 min (Room temp.~300°C)		~60 min (Room temp.~300°C)		~80 min (Room temp.~280°C)	
Interior material	Stainless steel					
Exterior material	Electro-galvanized steel sheet with melamine resin baking finish					
Heat insulating material	Glass wool					
Heater	Iron-chrome wire heater, 0.9 kW		Iron-chrome wire heater, 1.36 kW			
Exhaust port	33 mm I.D. x 2 pcs. (on top)					
Temp. controller	PID control by microprocessor					
Temp. setting method	Digital setting by UP/DOWN key					
Temp. display method	Measurement temp. : Digital display by green LED Setting temp. : Digital display by red LED					
Timer	1 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs. 50 min.					
Operation function	Fixed temperature operation, Quick auto stop, Auto stop, Auto start					
Additional function	Calibration off-set, Power failure compensation function, Key lock function					
Heater circuit control	SSR control					
Sensor	K-thermocouple					
Safety device	Self diagnosis functions(Temp. Sensor abnormal, Abnormal memory, Input temp. abnormal, Measured temp. abnormal, Automatic overheat prevention), Key lock function, Hydraulic independent overheat prevention device, Electric leakage breaker with over current protection.					
Internal dimensions (W×D×H)	300*310*300mm		450*410*400mm		600*510*500mm	
External dimensions(W×D×H)	400*440*630mm		550*540*730mm		700*640*830mm	
Internal capacity	28L		74L		153L	
Shelf plate with standard load	15kg/piece					
Shelf rest step number / pitch	6 steps / 35mm		9steps / 35mm		12steps / 35mm	
Power source 50/60Hz	AC115V 9.5A	AC220V 4.3A	AC115V 14A	AC220V 6.4A	AC115V 14A	AC220V 6.4A
Weight	~23kg		~38kg		~56kg	
Accessories	Stainless steel, Punching metal shelf plate 2pcs. Shelf bracket 4pcs.					

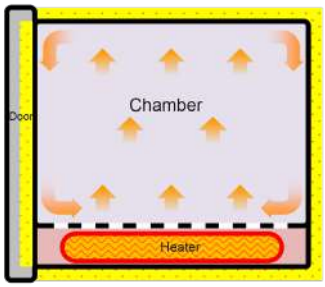
Interior

DX402C

Control Panel

Method

[Side view]

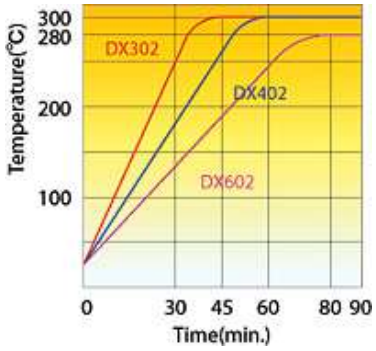


Optional items

Description	Product code
Stand	
ONS30 for DX302C/312C	212801
ONS60 for DX402C/412C/602C/612C	212802
Stacking support	
ODK80 For DX302C/312C	212803
ODK82 For DX402C/412C	212804
ODK84 For DX602C/612C	212805
Shelf	
For DX302C/312C	212068
For DX402C/412C	212095
For DX602C/612C	212266
*Cable port	
25mm Ø	281009
50mm Ø	281010
Seismic mat	296902

* Please specify when ordering main unit.

Temperature Rising Curve



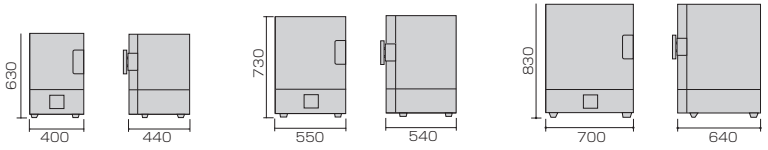
Optional Items

Stand

Shelf with 2 brackets

Seismic mat

Dimensional Drawing (mm)



DX302C/312C DX402C/412C DX602C/612C

⚠Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Programmable Natural Convection Oven

Constant Temperature Ovens

DVS402C/412C/602C/612C

MADE IN CH

Operating temp. range	Room temp. +5~260°C
Temp. distribution accuracy	±5°C (at 260°C)
Internal capacity	99L (402C/412C) 162L (602C/612C)

Programmable standard ovens with easy to perform program settings

(*Stand optional*)

Operation and functions

- Excellent temperature accuracy
- Easy to use and maintain
- Equipped with a 6 pattern PID program controller with easy program settings (30 steps x 1, 15 steps x 2, 10 steps x 3)
- Simultaneous display of set constant and measured temperature
- Quick Auto stop, Auto Start / Stop operation
- Increased safety and self-diagnostic function
- With calibration offset function

Safety features

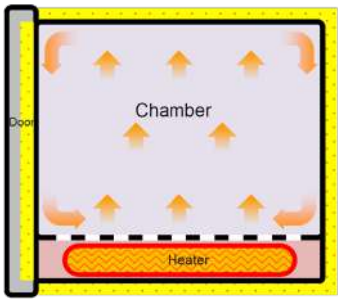
- Self diagnosis functions (Temp. sensor abnormal, Heater disconnection, Internal communication error, temperature input circuit abnormality, Automatic overheat prevention function, SSR-short), Overheat prevention, Electric leakage breaker with over current protection

Specifications

Model	DVS402C	DVS412C	DVS602C	DVS612C
Circulation method	Natural convection			
Operating temp. range	Room temp.+5 to 260°C			
Temp. control accuracy	±1.0°C (at 260°C)			
Temp. distribution accuracy	±5.0°C (at 260°C)			
Max. temp. reaching time	~90 min. (Room temp. +5°C~260°C)			
Interior material	Stainless steel			
Exterior material	Cold rolled steel plate with melamine resin baking finish			
Heat insulating material	Glass wool			
Heater	Stainless pipe heater			
	1.2kW		1.36kW	
Observation window	250×280 mm Chemically strengthened glass x 3			
Cable hole	30 mm I.D.×1 pcs.(right side)			
Exhaust port	30 mm I.D.×2 pcs.(on top)			
Temp. controller	3 patterns program controller, PID control by microprocessor			
Temp. setting method	Operation menu key and Digital setting by ▲/▼ key			
Temp display method	Measurement temp. : Digital display by green LED			
	Setting temp. : Digital display by red LED			
Timer	1 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs. 50 min.			
Operation function	Fixed temperature, Program, Auto start, Auto stop, Quick Auto-stop,			
Program mode	Program operation: 6 pattern, 30 steps (30 steps×1, 15 steps×2, 10 steps×3)			
Additional functions	Calibration off-set function, Key lock, Uninterruptible power for memory, Pattern repeat function			
Heater circuit control	SSR control			
Sensor	K-thermocouple			
Safety device	Self diagnosis functions (temp. sensor abnormal, Heater disconnection, SSR- short, Memory abnormal, Automatic overheating prevention), Overheat prevention, Electric leakage breaker with over current protection			
Internal dimensions (W×D×H)	450×490×450 mm		600×540×500 mm	
External dimensions (W×D×H)	560×601×820 mm		710×651×870 mm	
Internal capacity	99L		162L	
Shelf plate load	~15kg / pcs.			
Shelf rest step number / pitch	9 steps / 30mm		13 steps /30mm	
Power source 50/60Hz	AC115V 12A *with plug*	AC220V 6.5A *no plug, round terminal*	AC115V 13.5A *with plug*	AC220V 7.5A *no plug, round terminal*
Weight	~48kg		~63kg	
Included accessories	Stainless steel, 2 pcs. shelf plate / 4 pcs. brackets			

Method

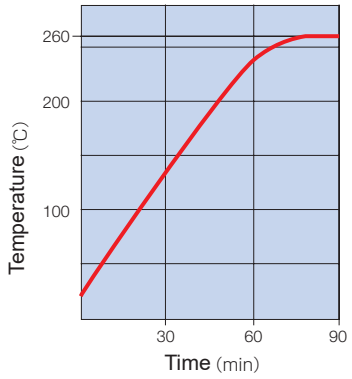
[Side view]



Interior (DVS402C)

- Enhanced sealing function with heat resistant silicon rubber packing, ensuring stable performance.
- Stainless steel interior material, high corrosion resistance for easy cleaning.

Temp. Rising Curve

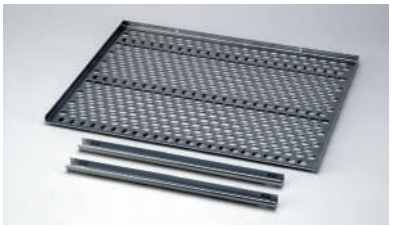


Control Panel

Cable Port (Standard)

Exhaust Port (Standard)

Shelf Plate / Shelf Bracket

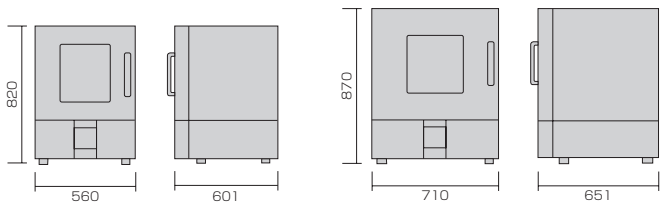


Optional Items

Description	Product code
Stand ON61	211856
Stacking support	
OD40 for DVS402C/412C	212822
OD60 for DVS602C/612C	212823
Shelf (with support 2 pcs)	
For DVS402C/412C	212246
For DVS602C/612C	212266
*Cable Port	
25mm Ø	281131
50mm Ø	281132
*Temperature output terminal (4-20 mA)	281133
*External alarm terminal/ time-up output terminal (choose either)	281134
Seismic mat	296902

* Please specify when ordering main unit.

Dimensions (Unit:mm)



DVS402C/412C DVS602C/612C

⚠Attention
- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

High Temperature Natural Convection Oven

MADE IN JP

DR201-115V / DR201-220V

Operating temp. range	300~700°C
Temp. distribution accuracy	±25°C (at 700°C)
Internal capacity	13.75L

Maximum operation temperature up to 700°C

Operation and functions

- Programmable natural convection oven with high accuracy control at high temperature range
- Can be used as an electric furnace for ashing and sintering, but also as an incubator and drying oven
- Temperature, measured temperature and overheat prevention temperature can be digitally set by operation menu and ▲/▼ keys
- Easy programmable operation, fixed temperature, quick auto stop, auto stop, program auto start, auto start
- Equipped with sub-functions such as overheating prevention temperature prevention temperature setting, key lock function, program repeat function, calibration offset

Safety features

- Self-diagnostic functions (automatic overheat prevention, temperature sensor failure, heater disconnection, SSR short circuit, main relay failure, memory error, internal communication error, abnormal temperature reading), Overcurrent ELB, Overheat prevention device

13.75L

Specifications

Model	DR201-115V	DR201-220V
System	Natural convection	
Temp. control range	300~700°C	
Temp. control accuracy	±5°C (at 700°C)	
Temp. fluctuation	10°C (at 700°C)	
Temp. distribution accuracy	±25°C (at 700°C)	
Temp. gradient	30°C (at 700°C)	
Temp. rise time	~70min. (Room temp. +5°C~700°C)	
Temp. fall time	~150min. (700°C to 300°C)	
Interior material	Stainless steel sheet metal	
Exterior material	Chromium-free electrogalvanized steel sheet, baked-on finish	
Heat insulating material	Ceramic fiber rock wool	
Heater type / capacity	Iron-chrome wire heater / 1.3kW	
Temp. controller	PID control by microcomputer	
Temp. setting method	Digital setting with menu keys and ▲/▼ keys	
Temp. display	Temp. reading display: Green 4 digit LED digital	
	Temp. setting display: Red 4 digit LED digital	
Timer function	0 to 99 hrs 59 mins. and 100 hrs. to 999 hrs 50min.	
Timer resolution	1 minute increments under 99 hours and 59 minutes, 10 minutes after 100 hours.	
Wait function	Timer wait function (ON/OFF setting)	
Operation modes	Fixed temperature, program, program auto start, auto start, quick auto stop, auto stop	
Program modes	6 patterns (PrG1: 30 steps, PrG2-3: 15 steps, PrG4-6: 10 steps) step weight function, repeat function, step hold function, step skip function	
Additional functions	Calibration offset, keypad lock, auto resume mode select	
Sensor	K thermocouple (W sensor)	
Safety devices	Self-diagnostic functions (automatic overheat prevention, temp. sensor failure, heater disconnection, SSR short circuit, main relay failure, memory error, internal comm. error, abnormal temp. reading), overcurrent ELB, overheat prevention device	
Internal dimension (WxDxH)	250 x 250 x 220 mm	
External dimension (WxDxH)	520 x 443 x 612 mm (*protrusions excluded*)	
Internal capacity	13.75L	
Shelf load capacity	15 kg / pc. Total load capacity 30 kg	
Shelf rest step number	3 steps	
Shelf rest pitch	33 mm	
Power source (50/60Hz)	AC115V 11.5A (with plug)	AC220V 6.0A (with plug)
Weight	~36 kg	
Shelf plate	Perforated stainless steel plate	
Included accessory	2 pcs. shelf plate	

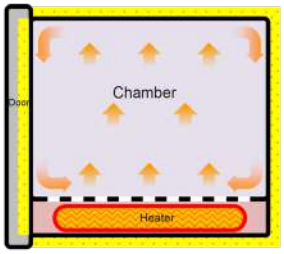
Optional items

No.	Description	Product code
1	Stand ONS60	212802
2	Shelf plate 1pc.	212808
3	Seismic mat (set of 4 pcs.)	296902
4	External alarm output terminal*	281283
5	Time-up output terminal*	281284
6	Temperature output terminal (4-20mA)	281285

Some options are required to be installed at the factory. Contact YSA for options 4-6.
** External alarm terminal and time-up output terminal cannot be installed at the same time*

Method

[Side view]

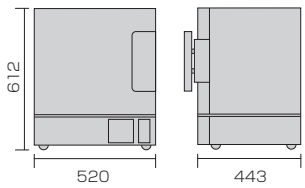


Accessories

Shelf plate

ONS stand

Dimensions (mm)



⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

NOTES

Glassware Drying Oven

Natural / Forced Convection Ovens for Glassware Drying

DG400C/410C/440C/450C/800C/810C/840C/850C

MADE IN CH

Operating temp. range	Room temp. +5~70°C

Internal capacity	92L DG400C/410C/440C/450C	445L DG800C/810C/840C/850C

Operation and functions

- Large window for easy observation
- Can be used to store instruments after drying
- Highly efficient heat insulation material for both internal and external structure
- Adjustable foot for stability on uneven floors
- Mobile on casters (DG800C/810C/840C/850C)
- Equipped with stainless steel pipe heater and water receiving plate at the bottom
- Stainless steel interior, easy to clean and highly resistant to corrosion
- DG440C/450C/840C/850C installed with filter at air in-take port, exhaust fan and germicidal lamp for fast drying
- Dial setting and digital display of temperature control and timer

Safety features

- Self-diagnostic functions, calibration offset, independent overheat prevention, over current leakage breaker, key lock and auto recovery after power failure

Note: Accurate temperature control may not be possible with heat generating samples in the chamber

(Stand optional)

Specifications

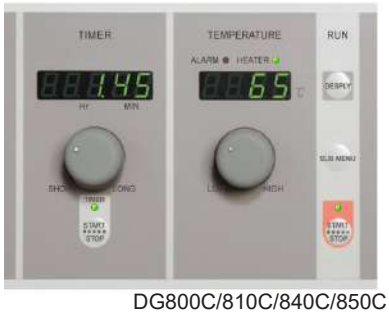
Model	DG400C/410C	DG440C/450C	DG800C/810C	DG840C/850C
System	Natural convection			Natural / Forced convection
Operating temp. range	RT+5~70°C			
Interior material	Stainless steel			
Exterior material	Cold rolled steel plate with chemical proofing coating			
Heater	SUS pipe heater 1.0kW		SUS pipe heater 1.34kW	
Temp. controller	PID control with microprocessor			
Temp. setting	Digital setting by ▲/▼ keys			
Temp. display	Measured temp. display: Green 4-digit LED digital display			
	Setting temp. display: Red 4-digit LED digital display			
Timer	1min-99 hr 59 min and 100 hr-999 hr 50 min (with time wait function)			
Operation functions	Fixed temperature, auto stop, auto start, quick auto stop			
Additional functions	Deviation correction, Key lock, Power outage compensation			
Heater circuit control	SSR driving			
Sensor	Temp. controller: K thermocouple, Overheat protection: Liquid-expansion temp. controller			
Exhaust port	I.D. 34mm×2	Axial flow fan forced exhaust	I.D. 34mm×2	Axial flow fan forced exhaust
Suction port	I.D. 30mm×2	Set air suction filter	I.D. 30mm×2	Set air suction filter
Germicidal lamp	—	15W×1	—	—
Safety device	Self-diagnostic (Abnormal temp. sensing, Auto overheat prevention, SSR short circuit), Key lock, Independent overheat protector, Overcurrent ELB			
Internal dimensions (W×D×Hmm)	450×450×450		620×600×1195	
External dimensions (W×D×Hmm)	504×562×788	504×562×820	674×711×1586	674×711×1618
Internal capacity	92L		445L	
Weight	~45kg	~48kg	~78kg	~83kg
Door	Single door, silicon rubber packing			
Observation window	Standard glass 3mm W250 x H300mm		Standard glass 3mm W250 x H700mm	
Shelf plate / bracket (stainless steel)	2pcs. / 4pcs.		4pcs. / 8pcs.	
Shelf plate load	15kg/pc.			
Shelf rest / pitch	10 steps / 30mm		29 steps / 30mm	
Water receiving plate	1 pc			
Power supply (50/60Hz) rated current	AC115V / AC220V	AC115V / AC220V	AC115V / AC220V	AC115V / AC220V

Interior (DG840C/850C)

Equipped with exhaust axial flow fan

Control Panel

DG400C/410C/440C/450C



DG800C/810C/840C/850C

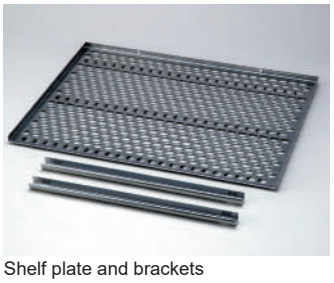
Germicidal lamp (DG440C/450C/840C/850C)

Air in-take filter (DG440C/450C/840C/850C)

Water Receiving Plate (sliding type)

Optional Items

Product code	Description	Suitable models
212246	Shelf & bracket set	DG400C/410C/440C/450C
211854	Shelf & bracket set	DG800C/810C/840C/850C
296902	Seismic mat	DG400C/410C/440C/450C
211856	Stand	DG400C/410C/440C/450C

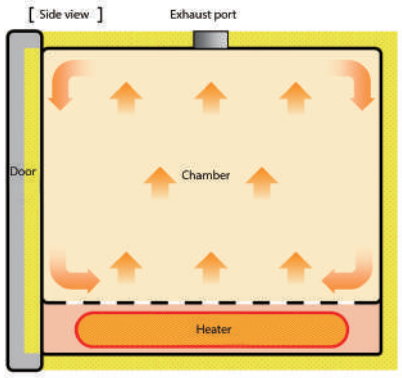


Shelf plate and brackets

Seismic mat

Stand

Method



⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

Economical Forced Convection Oven

Basic non-programmable forced convection oven

DKL301C/311C/401C/411C/601C/611C

MADE IN CH

Operating temp. range	Room temp. +10°C to 260°C

Temp. distribution accuracy	±2.5°C (at 260°C)

Internal capacity	27L DKL301C/311C	90L DKL401C/411C	150L DKL601C/611C

Fixed temperature operation

Performance and functions

- Fixed temperature, Quick auto stop, Auto stop, and Auto start operation modes with easy control capabilities
- Settings can be made digitally using the dedicated operation menu keys or the up and down keys
- Calibration offset function as an auxiliary function

Safety features

- Self-diagnostic functions, MCB with over current protector, hydraulic standalone overheat prevention device

27L
DKL301C/311C

90L
DKL401C/411C

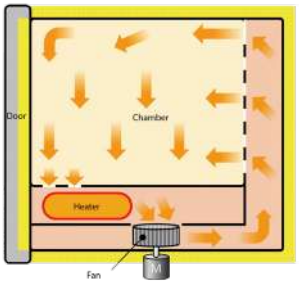
Specifications

Model	DKL301C/311C	DKL401C/411C	DKL601C/611C
Circulation method	Forced air circulation		
Operating temperature range	Room temp. +10~260°C		
Temp. control accuracy	±1°C (at 260°C)		
Temp. distribution accuracy	±2.5°C (at 260°C)		
Temperature rise time	~90 min (at room temp. ~260°C)		
Interior material	Stainless steel (SUS430)		
Exterior material	Steel plate SPCC (powder coating)		
Heat insulating material	Glass wool		
Heater	SUS304 pipe heater		
	0.8kW	1.2kW	1.5kW
Fan motor	Sirocco fan 10W		
Cable port	30 mm I.D.×1 pc. (right side)		
Exhaust port	30 mm I.D.×2 pcs. (top)		
Temp. controller	PID control by microprocessor		
Temp. setting method	Digital setting by ▲/▼ keys		
Operation functions	Fixed temperature, Quick auto-stop, Auto stop, Auto start		
Additional functions	Calibration offset function		
Heater circuit control	SSR control		
Sensor	K-thermocouple		
Safety device	Self diagnostic functions (temperature sensor error, memory error, auto overheat prevention, measured temperature error), MCB with an over current protector, hydraulic standalone overheat prevention device		
Internal dimensions (W×D×H)	310×310×310 mm	450×450×450 mm	610×500×500 mm
External dimensions (W×D×H)	410×450×680 mm	560×600×820 mm	710×650×880 mm
Internal capacity	27L	90L	150L
Shelf plate with standard load	15kg/piece		
Shelf rest step number	6 steps	9 steps	12 steps
Shelf rest pitch	35mm		
Power source 50/60Hz	AC115V 7.5A / AC220V 4A	AC115V 11A / AC220V 6A	AC115V 13.5A / AC220V 7.5A
Weight	~35kg	~50kg	~65kg
Shelf plate	Stainless steel		
	2 pcs.		
Shelf bracket	4 pcs.		

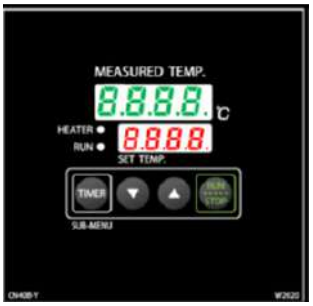
Performance under the power supply condition of AC 115V and 220V are shown here.
Operating environmental temperature range for this device is 5~35°C

Method

[Side view]



Control Panel



Exhaust Ports (Standard)

Cable Port (Standard)

Optional Items

Description	Product Code
Stand	
For DKL301C/311C ON30C	Q020101001
For DKL401C/411C/601C/611C ON61C	Q020101002
Stacking kit	
For DKL401C/411C OD40C	Q010101001
For DKL601C/611C OD60C	Q010101002
Shelf (1 pc. shelf and 2 pcs. brackets)	
For DKL301C/311C	Q110101001
For DKL401C/411C	Q110101002
For DKL601C/611C	Q110101003
*Cable port	
Ø 25mm	Q110101007
Ø 50mm	Q110101008
Seismic mat	296902

* Please specify when ordering main unit.

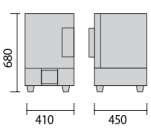
Optional Items

Stand

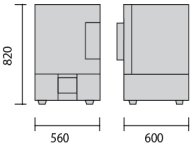
Seismic mat

Shelf (with 2 brackets)

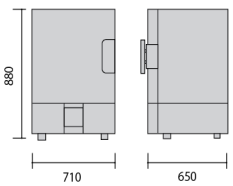
Dimensions (Unit:mm)



[DKL301C/311C]



[DKL401C/411C]



[DKL601C/611C]

⚠ Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Forced Convection Oven

BEST SELLER

MADE IN JP

MADE IN CH

Programmable Forced Air Convection Ovens

DKN302C/312C/402C/412C/602C/612C/812C/912C

Operating temp. range	RT+10°C~260°C DKN300-600 Series	RT+10°C~210°C DKN912C

Temp. distribution accuracy	±2.5°C (at 210°C)

Internal capacity	27L (DKN302C/312C)	90L (DKN402C/412C)	150L (DKN602C/612C)	300L (DKN812C)	535L (DKN912C)

Standard "Bestseller" ovens - Fully programmable

Standard forced air convection ovens are programmable and come with extended functions and safety features.

Operation and functions

- Bestseller based on excellent performance & affordability
- Superior temperature accuracy
- DKN302C/312C/402C/412C/602C/612C come with observation windows
- Programmable PID controller for easy program settings
  30-step, 3-pattern program controller with repeat functions
- Fixed setting, programmed, Quick Auto stop, Auto stop, and Auto start operating modes with easy control capabilities
- Increased safety and self-diagnostic function
- Overheating prevention and calibration off-set are possible with auxiliary functions
- Easy to use and maintain
- Built in exhaust ports

Safety features

- Self diagnosis functions (Temperature sensor abnormal, Heater disconnection, SSR-short) Automatic overheating prevention, Electric leakage breaker with over current protection, Key lock function

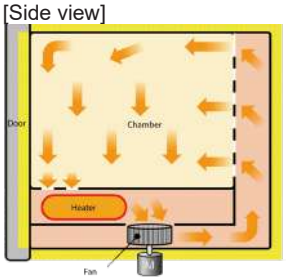
(Stand optional)

Specifications

Model	DKN302C	DKN312C	DKN402C	DKN412C	DKN602C	DKN612C	DKN812C	DKN912C
Circulation method	Forced air circulation							
Operating temp. range	Room temp. +10°C to 260°C							RT +10°C to 210°C
Temp. adjustment accuracy	±1°C (at 210°C)							
Temp. distribution accuracy	±2.5°C (at 210°C)							
Max. temp. reaching time	~90 min.						~60 min.	
Interior/Exterior material	Stainless steel / Cold rolled steel plate with melamine resin baking finish							
Heat insulating material	Glass wool							
Heater	Stainless pipe heater							
	0.8kW		1.2kW		1.5kW		1.5kW x 2	1.8kW x 2
Fan Type / Fan Motor	Scirocco fan, Condenser type motor 10W						1pc / 30W	2pc / 10W
Cable hole	30mm I.D. (on the right side) 1pc.							
Exhaust port	30mm I.D. x 2 (on top)						30mm I.D.×2 (the back)	
Observation window	180×180mm Chemical strengthening glass x 3		250 x 280mm Chemical strengthening glass x 3				None	
Temp. controller	3 patterns program controller, PID control by microprocessor							
Temp. setting method	Digital setting by UP/DOWN key							
Temp. display	Measurement temp. : Digital display by green LED							
	Setting temp. : Digital display by red LED							
Timer	1 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs. 50 min. with timer wait function							
Operation function	Fixed temperature operation, Program operation, Auto start, Quick Auto-stop							
Program mode	Program operation : 3 patterns, 30 steps(30 steps×1, 15 steps×2, 10 steps×3) Pattern repeat function							
Additional functions	Calibration off-set function, Key lock, Uninterruptible power for memory							
Heater circuit control	SSR control							
Sensor	K-thermocouple							
Safety device	Self diagnosis functions (temp. sensor abnormal, Heater disconnection, SSR- short, Automatic overheating prevention), Key lock function, Overheat prevention, Electric leakage breaker with over current protection							
Internal dimensions (W×D×H)	300×300×300 mm		450×450×450 mm		600×500×500 mm		600×500×1000mm	1070×500×1000 mm
External dimensions (W×D×H)	410×451×670 mm		560×601×820 mm		710×651×870 mm		710×651×1608mm	1180×651×1616 mm
Internal capacity	27L		90L		150L		300L	535L
Shelf plate with standard load	~15kg/piece							
Shelf rest step number / Shelf rest pitch	9 steps / 30mm		11 steps / 30mm		13 steps / 30mm		29 steps / 30mm	29 steps x 2 / 30mm
Power source 50/60Hz	115V, 7.5A *with plug*	220V, 4.5A *no plug, round terminal*	115V, 11A *with plug*	220V, 6.5A *no plug, round terminal*	115V, 12.5A *with plug*	220V, 7A *no plug, round terminal*	220V, 15A *no plug, round terminal*	220V, 18A *no plug, round terminal*
Weight	~35kg		~50kg		~65kg		~110kg	~190kg
Shelf plate	Stainless steel, 1pc. on the bottom screwed (DKN912C, 2 pcs)							
Included shelf plate / bracket	2 pcs. / 4 pcs.						4 pcs. / 8 pcs.	8 pcs. / 16 pcs.

Method

[Side view]



Interior

DKN602C

DKN912C

Cable Port (Standard)

Exhaust port (Standard)

Optional Items

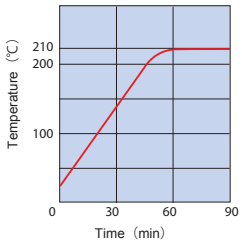
Description		Product code
ON30 Stand for DKN302C/312C		211180
ON61 Stand for DKN402C/412C/602C/612C		211856
Stacking support OD40 for DKN402C/412C		212822
OD60 for DKN602C/612C		212823
Shelf (with support 2 pcs)	DKN302C/312C	212068
	DKN402C/412C	212246
	DKN602C/612C/812C	212266
	DKN912C	212490
*Cable port		
25mm Ø		281121
50mm Ø		281122
*Temperature output terminal (4-20 mA)		281123
*External alarm terminal/ time-up output terminal (choose either)		281124
Seismic mat for DKN 300 to 400 models		296902

* Please specify when ordering main unit.

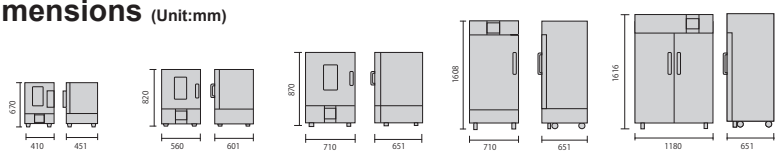
Control Panel

Temp. Rising Curve

DKN812C
DKN912C



Dimensions (Unit:mm)



DKN302C/312C DKN402C/412C DKN602C/612C DKN812C DKN912C

⚠Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Forced Convection Oven

Energy Saving Programmable Forced Convection Ovens

Ecological Economical

MADE IN JP

DNE401/411/601/611/811/911

Operating temp. range: RT +20°C~210°C (DNE401/411/601/611) RT +15°C~210°C (DNE811/911)

Temp. distribution accuracy: ±2.0°C (at 210°C)

Operation: Energy saving Environment friendly

High performance environment friendly eco-oven that reduces power consumption significantly

Operation and functions

- High precision controller allows high performance temperature control and display of CO_2 and power discharge
- Heat tightness and insulation design of the chamber achieves an energy saving rate of about 40% at constant temperature compared to previous models
- Maximum temperature reaching time reduced by 15 minutes (no-load) compared to previous models.
- Program operation with a maximum of 99 steps, 99 patterns repeatable
- Standard equipped with various support functions such as calibration offset, power failure recovery mode, save and access of user setting information, as well as other operation modes
- Data acquisition from internal test device possible because of cable holes
- Easy system upgrade with various option settings

Safety features

- Standard equipped with various self-diagnostic functions, independent overheat prevention device, overcurrent circuit breaker, and key lock function

Specifications

Model	DNE401	DNE411	DNE601	DNE611	DNE811	DNE911
Circulation method	Forced air circulation					
External temp. range	5~35°C					
Temperature control range	Room temperature +20~210°C				Room temperature +15~210°C	
Temp. control accuracy *1	±0.5°C (at 210°C)					
Temp. fluctuation *1	±0.6°C (at 210°C)					
Temp. distribution accuracy *1	±2.0°C (at 210°C)					
Temp. gradient*1	6°C (at 210°C)		8°C (at 210°C)		8°C (at 210°C)	10°C (at 210°C)
Temp. rise time *1	~60 min.		~70 min.		~45 min.	~60 min.
Chamber / Exterior / Insulation	Stainless steel / Chrome-free electro-galvanized steel plate, chemical-proof baked-on finish / Glass wool					
Door	Single swing (left side)					Double doors (from center)
Insulating material	Glass wool					
Heater (Stainless steel pipe)	1.1kW		1.2kW		1.2kW x 2	1.5kW x 2
Fan Type — Fan	Scirocco fan, capacitor motor					
Fan Type — Motor	10W				30W	30W x 2
Cable hole (lower right side)	33mm I.D. 1pc.					
Exhaust port	33mm I.D. 2pcs (top)				33mm I.D. 2pcs (rear)	
Caster wheels	--				Free swivel caster wheels (w/o stopper)	
Adjuster	--				Level adjusters (2 at the front)	
Controller	Model V type					
Temp. control / setting system	PID Z control / Digital setting with ▲/▼ keys					
Temp. display	Top screen (Chamber): Green 4 digit LED digital display (1°C resolution) / Bottom screen: Orange 5 digit LED digital display (1°C resolution)					
Other indications	LED indicates temperature patterns for heating/stable/cooling					
Timer	1 min. and 99 Hrs. 59 mins: duration operation, 24 hour setting: time operation					
Operation functions	Fixed temperature, Program operation (max.99 steps, up to 99 patterns repeat operationing function), Duration/time select timer operation function (fixed temperature operation, auto-start, auto-stop, quick auto stop, program operation auto start)					
Additional functions	Power on and Integration time function (up to 65,535 hours), Calibration offset, Time display, Display of power consumption, CO_2 discharge and heater operation, Power failure return mode, User configuration information					
Temperature sensor	K type Thermocouple double sensor (for temperature control and independent overheat prevention device)					
Heater control	Triac with Zero-cross Control					
Control board	Self diagnostic functions (temp. sensor failure detection, TRIAC short circuit, heater line disconnection, fan failure detection, main relay abnormal, automatic overheating prevention, key lock function					
Earth leakage breaker	Leak Current/Short Circuit/Overcurrent Protection, Rated Current Sensitivity 30mA					
Independent overheat prevention	Set temperature range: 0~250°C					
Internal dimensions (W×D×H)*2	450×450×450 mm		600×500×500 mm		600×500×1000 mm	1090×500×1000 mm
External dimensions (W×D×H)*2	580×645×860 mm		730×695×910 mm		730×695×1660 mm	1220 ×695×1660 mm
Capacity	90L		150L		300L	540L
Weight	~63kg		~77kg		~92kg	~185kg
Included accessories: shelf plate/bracket	2 pcs. / 4 pcs.				4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Shelf rest step number / Shelf rest pitch	11 steps / 30mm		13 steps / 30mm		29 steps / 30mm	29 steps / 30mm x 2
Withstand load of shelf	~15kg / shelf					
Power supply V±10% 50/60Hz single phase	AC115V 10A *with plug*	AC220V 5.5A *no plug, round terminal*	AC115V 11A *with plug*	AC220V 6A *no plug, round terminal*	AC220V 11.5A *no plug, round terminal*	AC220V 14A *no plug, round terminal*

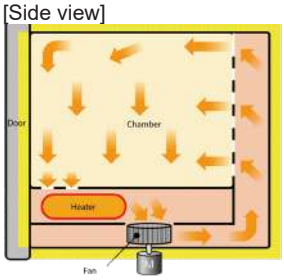
*1 Temperature Accuracy / Rise time Standard: Testing Machinery Association of Japan. Temperature Fluctuation/Gradient Standard: Japanese Industrial Standard
Performance data above based on 115V or 220V AC supplied power, 23°C±5°C (room temperature), 65%RH ±20% humidity, maximum air speed (FAN setting 10), damper closed, and no process load.

*2 Protrusions excluded

Control Panel

Method

[Side view]



Interior

DNE401

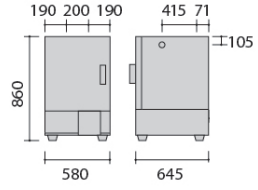
DNE911

Optional Items

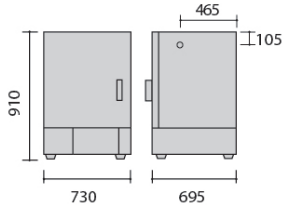
Description	Product code	Model	Applicable units
Stand	211856	ON61	DNE401/411/601/611
	212348	OT42	DNE401/411
	212349	OT62	DNE601/611
Stacking support	212806	ODN26	DNE401/411
	212807	ODN28	DNE601/611
Shelf and bracket set	212246	ODN20	DNE401/411
	212266	ODN22	DNE601/611/811
	212490	--	DNE911
Seath sensor (K type Thermocouple)	212946	ODT48	All models
Silicon plug (with one hole)	212947	ODT52	All models
*Cable port, 25mm diameter	281454	ODM36	All models
50mm diameter	281455	ODM38	All models
*Observation window for DNE401/411	281456	ODM40	DNE401/411
*Observation window for DNE601/611	281457	ODM42	DNE601/611
*External communication adapter set	211880	OIN90	All models
*External alarm output terminal	281446	ODM20	DNE401/411/601/611/811
	281447	ODM22	DNE911
*Time-up output terminal / Operation signal output terminal	281448	ODM24	DNE401/411/601/611/811
	281449	ODM26	DNE911
*Event ouput terminal / Time-up output terminal	281450	ODM28	DNE401/411/601/611/811
	281451	ODM30	DNE911
*Operation signal output terminal	281452	ODM32	DNE401/411/601/611/811
	281453	ODM34	DNE911

* Please specify when ordering main unit.

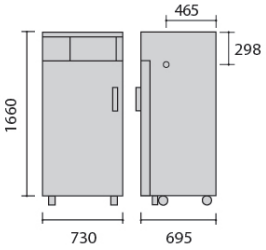
Dimensions (Unit:mm)



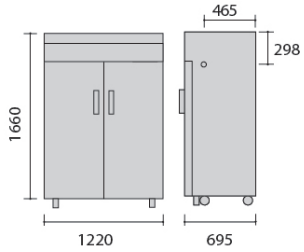
DNE401/411



DNE601/611



DNE811



DNE911

⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

Forced Convection Oven

Ecological Economical

Energy Saving Programmable Forced Convection Ovens with Variable Flow Rate

MADE IN JP

DNF301-115V/301-220V/401/411/601/611/811/911

Operating temp. range	Room temp. +15°C~260°C

Method	DNF301/401/411/601/611 Forced convection+Natural convection	DNF811/911 Forced convection

Capacity	27L DNF301	90L DNF401/411	150L DNF601/611	300L DNF811	540L DNF911

The first 2 in 1 system in the industry

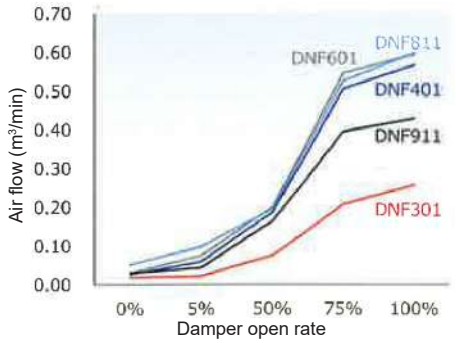
- Two types of circulation, forced and natural convection, in one unit (compatible with model 300/400/600)
- Eco-oven with improved air velocity control system and adjustable damper
- Program featured to reduce power consumption significantly
- Superior heat tightness and insulation of chamber
- Excellent dust tightness, dust can hardly enter the chamber
- Air velocity changeable in 10 stages using digital setting of controller
- Standard with 99 step program operation with repeat operation, auto start, auto stop and quick auto stop functions
- Adjustable damper position at chamber front to optimize operation
- Fluorescent display, interactive input method, calibration off-set function

Specifications

Model		DNF301-115V / DNF301-220V	DNF401/411	DNF601/611	DNF811	DNF911
Circulation method		Forced convection + Natural convection			Forced convection	
External temp. range		5~35°C				
Temperature set range		0~130°C (Wind velocity: 0), 0~270°C (Wind velocity: 1~10)			0~270°C (Wind velocity: 1~10)	
Temperature control range		RT +25~120°C (Wind velocity: 0), RT +15~260°C (Wind velocity: 1~10)			RT +15~260°C (Wind velocity: 1~10)	
Temp. control accuracy *1	Forced convection	±0.3°C (at 260°C)				
	Natural convection	±0.5°C (at 120°C)	±0.3°C (at 120°C)		Not applicable	
Temp. fluctuation *1	Forced convection	±0.5°C (at 260°C)				
	Natural convection	±1.0°C (at 120°C)	±0.8°C (at 120°C)	±0.6°C (at 120°C)	Not applicable	
Temp. distribution precision *1	Forced convection	±2.5°C (at 260°C)				
	Natural convection	±5°C (at 120°C)	±3°C (at 120°C)		Not applicable	
Temp. gradient *1	Forced convection	5°C (at 260°C)	7°C (at 260°C)	8°C (at 260°C)	12°C (at 260°C)	6°C (at 260°C)
	Natural convection	15°C (at 120°C)	13°C (at 120°C)		Not applicable	
Temp. rise time *1	Forced convection	~70min.	~105min.	~100min.	~60min.	~100min.
	Natural convection	~20min.	~25min.		Not applicable	
Chamber / Exterior / Insulation		Stainless steel / Cold rolled steel paneling, chemical-proof baked-on finish / Glass wool				
Door		Single swing (left side)				Double doors (opening from center)
Heater (stainless steel tube)		0.8kW	0.6kWx2	0.83kWx2	1.35kWx2	1.65kWx2
Wind velocity adjusting system		10 steps (600~1500rpm) + Wind velocity (0)			10 steps (600~1500rpm)	
Damper		Circulation-Ventilation Manual switching: Interlocked intake and exhaust system (Complete exhaust applicable / Unable to reach 260°C with damper fully open)				
Cable port		Inner diameter: 33mm×1 (right side)				
Exhaust port		Outer diameter: 50mm×1 (back side)				Outer dia.: 50mm×2 (back)
Inlet port		Inner diameter: 33mm×1 (right side)				Inner dia: 33mm×2 (both)
Controller		Model V type				
Temperature control / setting system		PID Z control / Digital setting with ▲/▼ keys				
Temperature display system		Temperature reading display: green 4-digit digital LED / Temperature setting display: orange 5-digit digital LED				
Other indications		LED indicates temperature patterns for heating/stabilizing/cooling				
Timer		1 minute and 99 hours 59 minutes: duration operation, 24 hour setting: time operation				
Operation functions		Fixed temperature operation, Program operation (maximum 99 steps or 99 patterns, with repeat operation function), Timer or clock operation function (Fixed temperature operation w/ auto start/auto stop/quick auto stop, program operation auto start)				
Additional functions		Variable Air Flow Function, Power-on Time and Operation Time Accumulation Monitor (up to 65,535 hours); Calibration Offset; Monitoring Display for Accumulated Power Consumption, Total CO_2 Emissions, and Heater Operation Output; Power Recovery Mode; Setting Data Backup and Recovery				
Temperature sensor		K type Thermocouple double sensor (for temperature control and independent overheat prevention device)				
Heater control		Triac with Zero-cross Control				
Control board		Self-diagnostic Functions (Detection for Temp. Sensor Failure, TRIAC Short Circuit, Automatic overheating prevention, Heater Line Disconnect, Main Relay Contact Damage), Earth leakage breaker, Fan Motor Failure, Key Lock Function, Independent overheating prevention device				
Earth leakage breaker		Leak Current/Short Circuit/Over-current Protection, Rated Current Sensitivity 30mA				
Door switch		Door open: fan motor and heater circuit OFF, Door close: fan motor and heater circuit ON				
Internal dimensions (W×D×H mm)*2		300×300×300	450×450×450	600×500×500	600×500×1000	1090×500×1000
External dimensions (W×D×H mm)*2		430×495×740	580×645×890	730×695×940	730×695×1685	1220×695×1685
Capacity		27L	90L	150L	300L	540L
Weight		~50kg	~75kg	~90kg	~135kg	~210kg
Number of shelf bracket step / pitch		6 steps/30mm	11 steps/30mm	13 steps/30mm	29 steps/30mm	
Included accessories: shelf plate/bracket		2 pcs. / 4 pcs.			4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Withstand load of shelf		15kg/shelf				
Power supply V±10% 50/60Hz Single phase		115V 7.5A (with plug) / 220V (no plug) *with external transformer*	115V 11A *(with plug)* 220V 6A *(no plug, round terminal)*	115V 15A / 220V 8A *(no plug, round terminal)*	220V 15.5A *(no plug, round terminal)*	220V 18.5A *(no plug, round terminal)*

*1. Temperature Accuracy / Rise time Standard: Testing Machinery Association of Japan. Temperature Fluctuation/Gradient Standard: Japanese Industrial Standard
Performance data above based on 115V or 220V AC supplied power, 23°C±5°C (room temperature), 65%RH ±20% humidity, maximum air speed (FAN setting 10), damper closed, and no process load.
*2. Protrusions excluded.

Damper Switch



Control Panel & Fan Setting

Method

[Side view]

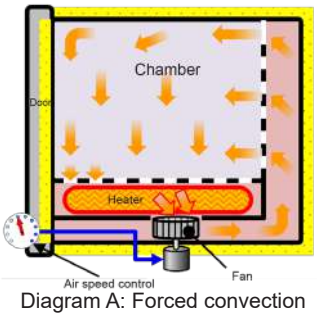


Diagram A: Forced convection

[Side view]

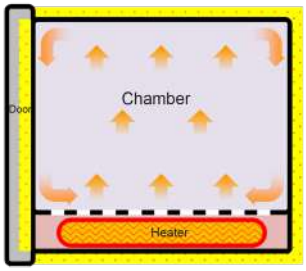


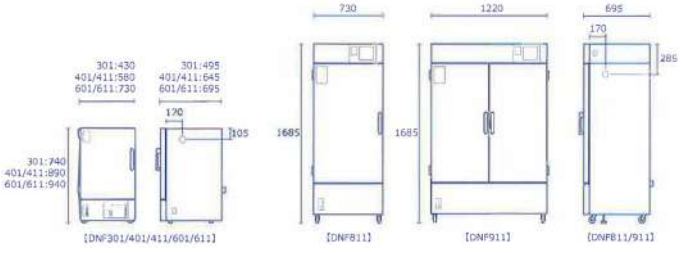
Diagram B: Natural convection

Model	Method
DNF301/401/411/601/611	Diagram A + B
DNF811/911	Diagram A

Exhaust Duct (optional)

Interior

Dimensions (Unit:mm)



Optional Items

Product name	Product code
ON30 Stand for DNF301	211180
ON61 Stand for DNF401/411/601/611	211856
OT42 Stand for DNF401/411	212348
OT62 Stand for DNF601/611	212349
Stacking support for DNF301 ODM44	281458
for DNF401/411 ODN26	212806
for DNF601/611 ODN28	212807
Shelf (with brackets 2 pcs.) for DNF301	212068
for DNF401/411	212246
for DNF601/611/811	212266
for DNF911	212490
*Cable port 25mm Ø	281454
50mm Ø	281455
*External alarm terminal for DNF401/411/811	281466
for DNF301/601/611/911	281467
*Time-up output terminal for DNF401/411/811	281468
for DNF301/601/611/911	281469
*Operation information output terminal for DNF401/411/811	281470
for DNF301/601/611/911	281471
*Event output terminal for DNF401/411/811	281472
for DNF301/601/611/911	281473
*Heat sensor for sample monitoring (K-thermocouple)	212946
*Exhaust duct (50mm Ø with exhaust flange)	
for DNF301	281459
for DNF401/411	281460
for DNF601/611	281461
for DNF811	281462
for DNF911 (50mm Ø with exhaust flange x 2 points)	281463
Seismic mat for DNF401/411/601/611	296902

* Please specify when ordering main unit.

⚠Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Fine Oven

High accuracy temperature control

DF412/612 DH412/612

MADE IN JP

Operating temp. range	Room temp. +15~260°C(DF) Room temp. +15~360°C(DH)
Temp. distribution accuracy	±1.5°C(at 260°C) (DF) / ±2.5°C (at 360°C) (DH)
Internal capacity	91L (412 model) 216L (612 model)

Circulates uniformed heated air in a horizontal air flow pattern

Highly reliable and accurate oven with improved visibility and operability of control panel

Operation and functions

- Precise temperature stability & uniformity
- Standard equipped with adjustable air speed function and displays of power consumption, CO_2 emission and heat timer
- Enhanced program operation function (maximum 99 steps, 99 patterns, repetitive operation function)
- Improved safety with fan motor error detection
- Exhaust damper allows quick exhaust and cooling of inside chamber
- Equipped with exhaust and cable ports

Safety features

- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, earth leakage breaker, key lock, etc.

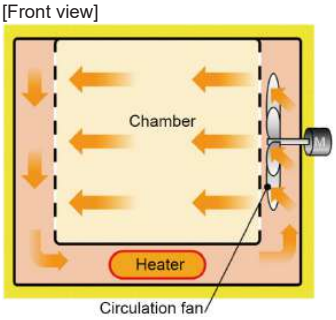
Specifications

Model	DF412	DF612	DH412	DH612
Circulation method	Forced air circulation and ventilation			
Operating temp. range *1	Room temp.+15°C~260°C		Room temp.+15°C~360°C	
Temp. adjustment accuracy *1	±0.1°C (at 260°C)		±0.2°C (at 360°C)	
Temp. distribution accuracy *1	±1.5°C (at 260°C)		±2.5°C (at 360°C)	
Max temp. reaching time *1	~40 min. (reaches 260°C when setting at 270°C)		~50 min. (reaches 360°C when setting at 370°C)	
Temp. control / setting	PID Z control / Digital setting with ▲/▼ keys			
Temp. display system	Temperature reading display: green 4-digit digital LED / Temperature setting display: orange 5-digit digital LED			
Other indications	LED indicates temperature patterns for heating/stabilizing/cooling			
Timer display range	Fixed value operation for 1 min. to 99 hrs. 59 mins. 24 hr time system: clock operation			
Operation functions	Fixed temperature, auto start, auto stop, program (max. 99 steps or 99 patterns with repeat operation)			
Additional functions	Variable air flow function, power on time and timer accumulation monitor (up to 65535 hrs), calibration offset, power consumption display, total CO_2 emissions and heat operation output, power failure recovery mode, setting data backup and recovery			
Sensor	Double K-thermocouple			
Heater / heater control	Stainless pipe heater with fan / Triac with zero-cross control			
Heater capacity	2.1kW	3.0kW	2.7kW	3.75 kW
Blower fan (motor)	Axial flow fan (capacitor motor: 20W)			
Cable port	I.D. 33 mm X 1 pc. (rear)			
Interior / Exterior / Insulation	Stainless steel / Chrome-free electro-galvanized steel sheet metal, chemical-proof baked-on finish / Glass wool			
Door	Single swing (left side)			
Exhaust port	Automatic exhaust damper I.D. 80 mm (rear panel)			
Safety device	Self-diagnostic functions (temp. sensor error, TRIAC short circuit, heater disconnection, SSR short-circuit, fan motor failure, main relay contact damage and overheating), key lock function, door switch (door open, fan motor and heater circuit OFF / door close: fan motor and heater circuit ON), independent overheat prevention (temp. setting range: 0~300°C for DF and 0~400°C for DH)			
Earth leakage breaker	15A	20A	20A	30A
	Leak current/short circuit / Over-current protection, rated current sensitivity 30mA			
Internal dimensions (mm)(WxDxH) *2	450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (mm)(WxDxH) *2	1050×630×850	1,200×780×1000	1050×630×850	1200×780×1000
Internal capacity	91L	216L	91L	216L
Shelf max. load	~30kg / pc			
Shelf support qty. / pitch	9 steps / 45mm	9 steps / 60mm	9 steps / 45mm	9 steps / 60mm
Power source (single phase)	AC 220V 12.5A	AC 220V 17.5A	AC 220V 15.5A	AC220V 17.5A
Weight	~112kg	~156kg	~112kg	~156kg
Shelf / bracket	2 pcs. / 4 pcs.	3 pcs. / 6 pcs.	2 pcs. / 4 pcs.	3 pcs / 6 pcs

*1. Performance data above based on rated source voltage, single phase 220V AC ±5%, supplied power, 23°C±5°C (room temperature), 65%RH ±20% humidity, 86kPa atomospheric pressure, exhaust damper closed, and no sample load.
*2. Protrusions excluded.

Method

[Front view]

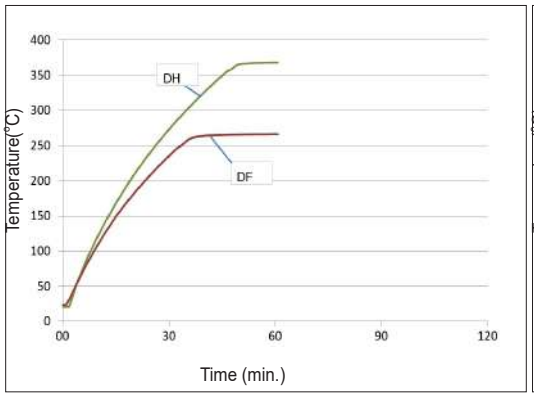


Control Panel

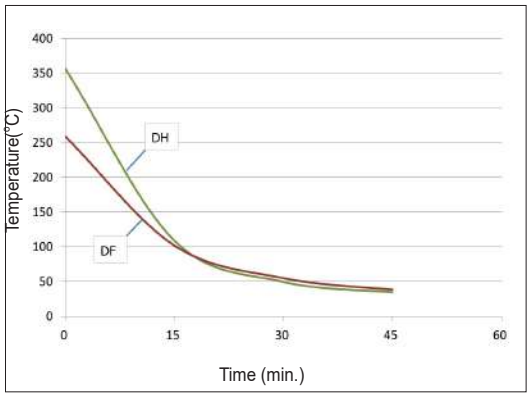
Interior

Performance

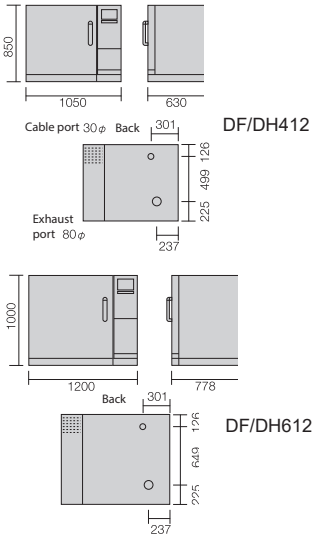
DH temp. rising time



DH temp. declining time (damper fully open)



Dimensions (Unit:mm)



Optional Items

(1) Exhaust duct (213704)
(2) Emergency stop switch (213709)
(3) Paperless recorder (Built-in) (213707)
(4) Stand (with casters) (415467)

Description	Product code	Model	Applicable units
Stand			
without caster	415464	OP43	DF/DH412
	415465	OP63	DF/DH612
with caster wheels and caster stopper in front	415466	OP46	DF/DH412
	415467	OP66	DF/DH612
Stacking support	213700	ODF48	All models
Shelf with brackets - Stainless steel wire (loading up to 30kg/shelf)	211063	ODQ10	DF/DH412
	211064	ODQ20	DF/DH612
Shelf with brackets - Stainless steel punching (loading up to 15 kg/shelf)	211098	ODQ30	DF/DH412
	211099	ODQ40	DF/DH612
Shelf with brackets - Stainless steel mesh (loading up to 15 kg/shelf, 30 mm deep / designed to be stacked on std stainless steel wire shelves)	212924	ODT12	DF/DH412
	212925	ODT14	DF/DH612
Sheath sensor (K thermocouple)	212946	ODT48	All models
Silicon stopper (for 1 opening)	212947	ODT52	DF models only
*External communication adapter	211880	OIN90	All models
*External communication terminal (RS485)	213712	ODF72	All models
*Temp. output terminal (4-20mA)	213713	ODF74	All models
*External alarm output terminal	213714	ODF76	All models
*Time-up output terminal	213715	ODF78	All models
*Operation signal output terminal	213716	ODF80	All models
*Event output terminal	213717	ODF82	All models
*Emergency stop switch	213708	ODF64	DF/DH412
*Emergency stop switch	213709	ODF66	DF/DH612
*Auto damper	213706	ODF60	All models
*Paperless recorder (built-in)	213707	ODF62	All models
*Exhaust duct (80mm Ø)	213703	ODF54	DF/DH412
*Exhaust duct (80mm Ø)	213704	ODF56	DF/DH612
*Exhaust port flange	281069	ODF46	All models
*Observation window	213701	ODF50	DF412
*Observation window	213702	ODF52	DF612
*Power cord ~8m.	213710	ODF68	DF/DH412
*Power cord ~8m.	213711	ODF70	DF/DH612
*Cable port			
25mm Ø (for top)	213718	ODF84	All models
50mm Ø (for top)	213719	ODF86	All models
25mm Ø (for rear)	213720	ODF88	All models
50mm Ø (for rear)	213721	ODF90	All models

* Customized from factory. Please specify when ordering main unit.

Shelf / Bracket

Stainless steel punching shelf

Stainless steel wire shelf

Stainless steel mesh shelf
(Placed on top of standard shelves)

⚠ Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Fine Oven

High temperature 500°C, with exhaust damper

DH650

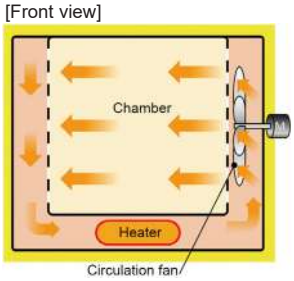
MADE IN JP

Operating temp. range	Room temp. +10°C~500°C
Temp. control precision	±0.3°C (at 360°C)
Internal capacity	216L

216L
DH650

- Maximum working temperature at 500°C
- Allows quick exhaust and cooling with the exhaust damper inside the chamber
- Equipped with a variety of operation functions such as an easy-to-use program operation function, power consumption, power charge display and history storage
- Operation function includes fixed temp., program, quick auto stop, auto stop and auto start operations
- Equipped with a four-fold overheating prevention device (automatic overheating, heater chamber overheating, tank overheating, and temp. fuse) to ensure complete safety

[Front view]



Specifications

Model	DH650
System	Forced convection circulation (with exhaust damper)
Operating temp. range	Room temp. +10°C~500°C
Temperature control precision*1	±0.3°C (at 360°C)
Temp. distribution precision*1	±3.0°C (at 360°C)
Max. temp. reaching time*1	~60 min.
Temperature controller	PID control / SSR control with a microcomputer
Temp setting / display system	Digital setting / digital display
Damper control	Manual circulation / ventilation operation
Sensor	K-thermocouple
Heater control	SSR-controlled
Safety functions	Over current ELB, overheat preventive device (in the bath, heater chamber), self diagnostic function (temperature sensor error, heater disconnection, SSR short-circuit) Automatic overheat prevention (internal controller), temperature fuse, door switch
Additional functions	Key lock function, calibration offset function, external alarm output, temperature output, time-up output
Heat insulator	Ceramic fiber, rock wool, heat insulating block
Heater	Wire heater: 200V 1.3 kW × 6
Fan motor	20W (capacitor)
Exhaust port	ø80mm (rear)
Number of shelf stages	9 stages
Shelf pitch	60 mm
Withhold load of shelf	30 kg/shelf
Power supply (50/60 Hz)	3 phase AC220V 20.5A
Internal dimensions (W x D x H)	600 x 600 x 600 mm
External dimensions (W x D x H) *2	1350 x 950 x 1300 mm
Internal capacity	216L
Weight	~250kg
Shelf / bracket	3 pcs. / 6 pcs.

*1 Values shall be at room temperature of 23°C, power voltage of 200V, and no sample load
*2 Protrusions excluded.

Optional Items

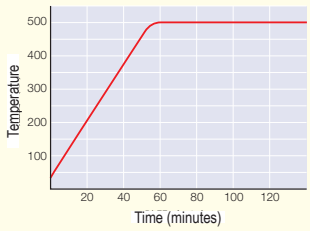
Description	Product code
Shelf and bracket set	211090
Cable port	
25 mm Ø	281508
50 mm Ø	281509

Stainless steel wire shelf

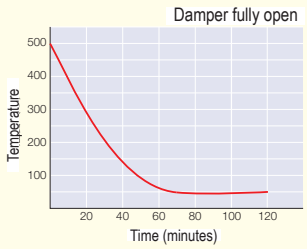
Forced Horizontal Air Circulation

It circulates air evenly throughout the chamber, making it ideal for constant temperature tests that require excellent temperature performance.

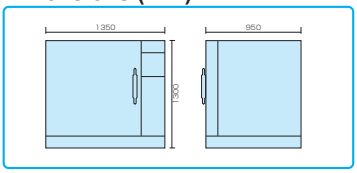
Temperature Rise Curve



Temperature Fall Curve



Dimensions (mm)



⚠Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Fine Oven

With high accuracy temperature control and exhaust damper

DF832/1032 DH832/1032

MADE IN JP

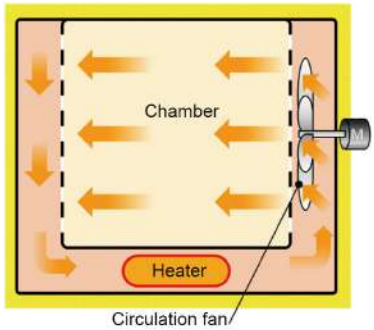
Operating temp. range	Temperature slope	Internal capacity
Room temp. +15°C~200°C(DF) Room temp. +15°C~300°C(DH)	15°C(at 200°C) (DF) / 20°C(at 300°C)(DH)	512L (Model832) / 1000L (Model1032)

Large fine oven designed to support high throughput

1000L
DH1032

- Allows precision maintenance of large parts at a constant temperature
- Quick exhaust and cooling in the unit with the exhaust damper
- Interactive key entry on the control panel with a green LED digital display for easy settings
- Features power consumption/ CO_2 emissions monitoring
- Increased safety and self diagnostic functions

[Front view]



Specifications

Model	DF832	DF1032	DH832	DH1032
System	Forced air circulation and ventilation			
Operating temp. range	Room temp. +15°C~200°C		Room temp. +15°C~300°C	
Temperature fluctuation	±0.5°C (at 200°C)		±1.0°C (at 300°C)	
Temperature slope	15°C (at 200°C)		20°C (at 300°C)	
Temperature controller	PID Z control			
Temp setting method	Digital setting with ▲/▼ keys			
Timer	0 min~99 hrs 59 min (Resolution: 1 minute or 1 hour)			
Operation function	Fixed temperature operation, Program operation (Maximum 99 steps, up to 99 patterns, repeat operation function) Duration/time select timer operation function (Fixed temperature operation, auto start/auto stop/quick auto stop, program operation auto start)			
Additional functions	Accumulated Power on and Operation Time (up to 65,535 hours); Calendar Time (24 hours); Calibration Offset; Monitor Display of Accumulated Power Consumption, Total CO2 Emission, and Heater operating Output; Power Recovery Mode; User Settings Save and Restore Function; Fan Speed Setting Function			
Sensor	K-thermocouple (double sensor)			
Heater	Stainless steel pipe heater with a fan			
	4.5kW	6.0kW	6.9kW	9.0kW
Fan motor	Stainless steel axial flow fan (capacitor motor: 20W), Two motors used for model1032			
Cable port	I.D. ø30mm (rear)			
Heat insulator	Glass wool		Glass wool + ceramic fiber	
Other additional structure	Exhaust damper (manual operation)			
Safety device	Self-diagnostic functions (temp. sensor error, heater disconnection, SSR short-circuit, automatic overheat prevention), Door switch, Fan Failure Detection, key lock, independent overheat protection, electric leakage breaker with over current protection			
Power supply (50/60 Hz)	3 phase AC220V 13.5A	3 phase AC220V 17A	3 phase AC220V 20A	3 phase AC220V 28A
Internal dimensions (W x D x H)	800 x 800 x 800 mm	1000 x 1000 x 1000 mm	800 x 800 x 800 mm	1000 x 1000 x 1000 mm
External dimensions (W x D x H)	1500 x 1015 x 1330 mm	1700 x 1215 x 1530 mm	1500 x 1015 x 1330 mm	1700 x 1215 x 1530 mm
Shelf support qty. / pitch	10 steps / 76mm	10 steps / 98mm	10 steps / 76mm	10 steps / 98mm
Internal capacity	512L	1,000L	512L	1,000L
Weight	~350kg	~450kg	~350kg	~450kg
Included shelf / bracket	3 pcs. / 6 pcs.			

⚠Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

Vacuum Drying Oven

Standard Small Size Benchtop Vacuum Drying Oven

ADP200C/210C/300C/310C

MADE IN CH

Operating temp. range	40~240°C
Operating pressure range	101~0.1kPa
Internal capacity	10L(ADP200C/210C) 27L(ADP300C/310C)

Standard vacuum drying oven with enhanced safety features

Operation and functions

- Easy input of parameters and settings
- Digital PID controller supports fixed temperature, quick auto-stop, auto stop, auto start and program operations
- Self-diagnostic and overheating prevention functions
- Silicon rubber door seal prevents air from leaking
- Independent over heating prevention device for each circuit
- Customizable with N_2 gas inlet and communication ports
- Calibration off-set function
- Easy maintenance

Safety features

- Sensor trouble detection, SSR, short circuit detection, heater disconnecting detection, memory error, over heating and measurement temperature error

Specifications

Model	ADP200C/210C	ADP300C/310C
System	Vacuum drying by decompressed chamber direct heating	
Operating temperature range	40~240°C	
Operating pressure range	101~0.1kPa (760~1 Torr)	
Temp. control accuracy	±1.5°C (at 240°C)	
Max. temp. reaching time	~70min.	~100min.
Interior Material	Stainless steel	
Temp. control method	PID control by microprocessor	
Sensor	K-thermocouple	
Temp. setting method	Digital setting by ▲/▼ keys	
Temp. display method	Measurement temp.: Digital display by green LED	
	Setting temp.: Digital display by red LED	
Timer	1 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs. and 50 min., Digital display	
Heater	Mica heater	
	0.68kW	1.05kW
Heat insulating material	Rock wool	
Observation window	Tempered glass (12 mm thickness) and polycarbonate resin plate	
Vacuum gauge	Bourdon tube type, 0~0.1 MPa (Gauge pressure)	
Safety device	Self diagnostic functions (Heater, Sensor, SSR short circuit, automatic overheat prevention function), over current electric leakage breaker, overheating prevention device	
Internal dimensions	W200 x D250 x H200mm	W300 x D300 x H300mm
External dimensions	W400 x D412 x H603mm	W500 x D465 x H705mm
Internal capacity	10L	27L
Shelf loading	~15kg / pcs	
Shelf rest step number	2 steps	3 steps
Shelf rest pitch	65mm	75mm
Vacuum port	O.D.18mm	
Power source	AC115V, 6A / AC220V 3.5A	AC115V, 9.5A / AC220V, 5A
Weight	~30kg	~55kg
Included accessories	Shelf plate (aluminum perforated metal) 2 pcs.	Shelf plate (aluminum perforated metal) 3 pcs.

Optional Items

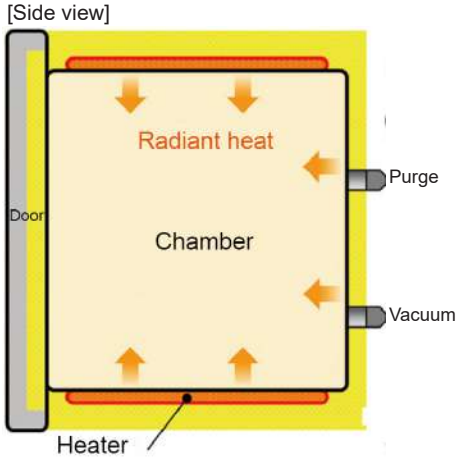
Description	Product code
Shelf	
ADP200C/210C	297071
ADP300C/310C	297072
Vacuum pump (Rotary vane pump)	
GLD137CC 115V 162L/min, 5.7CFM with Rubber Hose Kit	GLD137CC115DPRKIT
GLD137CC 220V 162L/min, 5.7CFM with Rubber Hose Kit	GLD137CC220DPRKIT
*N_2 gas introduction device 30L/min.(factory installed)	Contact Customer Service

* Please specify when ordering main unit.

Control Panel

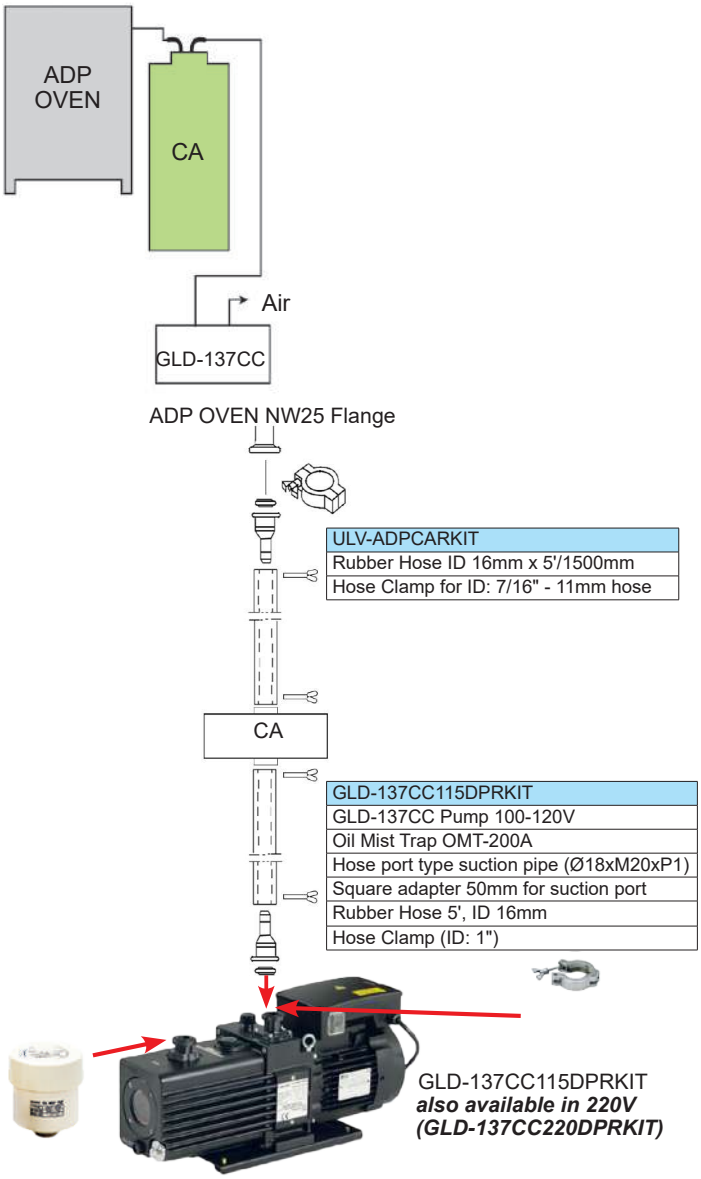
Method

[Side view]



Sample Installation with Cold Trap

Use with CA Series

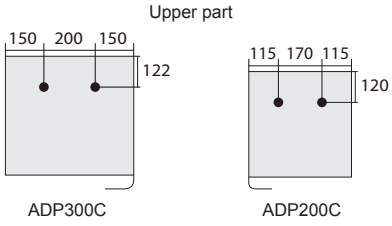


ULV-ADPCARKIT
Rubber Hose ID 16mm x 5'/1500mm
Hose Clamp for ID: 7/16" - 11mm hose

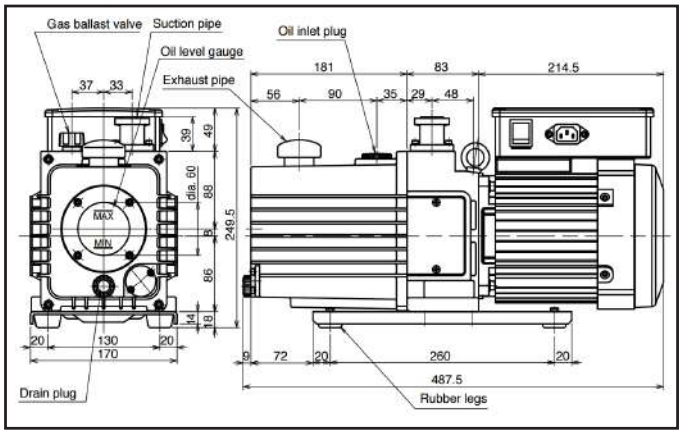
GLD-137CC115DPRKIT
GLD-137CC Pump 100-120V
Oil Mist Trap OMT-200A
Hose port type suction pipe (Ø18xM20xP1)
Square adapter 50mm for suction port
Rubber Hose 5', ID 16mm
Hose Clamp (ID: 1")

GLD-137CC115DPRKIT
also available in 220V
(GLD-137CC220DPRKIT)

Dimensions (Unit:mm)



GLD-137CC for ADP Series



⚠ Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

Vacuum Drying Oven

Benchtop to Floor Type Vacuum Drying Oven

SDP300/310/400/410/610

MADE IN THE USA

Operating temp. range	RT +10~220°C (SDP300/310/400/410)	RT +15~220°C (SDP610)

Operating vacuum range	-10 ~ 101 kPa

Capacity	47.2L (SDP300/310)	127.4L (SDP400/410)	264L (SDP610)

Provides exceptional capabilities for fast and gentle drying of heat-sensitive materials

Features

- Digital vacuum gauge shows chamber vacuum level
- Watlow controller that can be programmed to perform multiple ramp and soak profiles
- Doors with positive latch handles with spring-loaded glass to facilitate good vacuum seal
- Tempered glass viewing window allows for safe, continuous monitoring of samples
- Generous usable shelf area
- Achieve impressive vacuum levels
- Built-in overtemperature protection
- Meets TUV safety requirements

47L
SDP300/310

127L
SDP400/410

Specifications

Model		SDP300 SDP310	SDP400 SDP410	SDP610
Operating temperature range		Room temperature +10°C ~220°C		Room temperature +15°C ~220°C
Operating vacuum range		-3.0 ~ -29.9 inHg (-10 ~ 101 kPa)		
Vacuum display range		0.0 ~ -29.9 inHg (5 to -101 kPa)		760 Torr down to 0 mTorr
Controls		EZ-ZONE Watlow		
Access port		KF25		
Temperature uniformity - midrange		± 6.0% of setpoint		
Temperature stability	@ 80°C	± 0.1°C	± 0.2°C	± 0.2°C
	@ 150°C	± 0.20°C	± 0.25°C	± 0.2°C
	@ 220°C	± 0.3°C	± 0.3°C	± 0.3°C
Heat up times *(from RT of 20°C for SDP300/400) (from RT of 25°C for SDP610)*	@ 80°C	70 mins.	70 mins.	80 mins.
	@ 150°C	120 mins.	120 mins.	130 mins.
	@ 220°C	200 mins.	230 mins.	180 mins.
Cool down times *(time to cool down to 50°C)*	From 80°C	110 mins.	161 mins.	---
	From 150°C	188 mins.	318 mins.	---
	From 220°C	233 mins.	420 mins.	---
Controller		Digital		
Display resolution		0.1 °C		
Interior material		300 SST		
Exterior material		Painted cold roll steel		
Standard chamber gasket		Silicone		Viton
Internal dimensions		W304 x D508 x H304 mm 12 × 20 × 12 in.	W457 x D610 x H457 mm 18 × 24 × 18 in	W710 x D609 x H609 mm 28 × 24 × 24 in
External dimensions		W528 x D795 x H681 mm 20.8 × 31.3 × 26.8 in	W686 x D895 x H833 mm 27.0 × 35.2 × 32.8 in	W965 x D1189 x H1624 mm 38.1 × 46.8 × 63.9 in
Internal capacity		47.2L	127.4L	264L
Shelf dimensions (WxD)		287 x 483 mm (11.3" x 19")		
Shelf capacity by weight per shelf *1		15.8 kg		34 kg
Maximum total load *2		47.6 kg.		102 kg
Shelf rest step number		3 steps	6 steps	3 steps
Power source 50/60 Hz		AC110 - 120V 10A AC220 - 240 5.5A	AC110 - 120V 13A AC220 - 240V 7A	AC230V 20A (no plug)
Weight		~83kg	~144kg	~223kg
Included accessories		3 shelves (2 tall, 1 short bottom), 1 power cord, 4 leveling feet	3 shelves, 12 shelf clips, 1 power cord, 4 leveling feet	3 shelves, 12 shelf clips, 4 leveling feet, oil drain tray

*1 *With weight evenly distributed across the shelf*
*2 *Exceeding this limit risks damaging chamber liner*

SDP300/310 (47L)

Front view with open door

Back view with open door

SDP400/410 (127L)

Front view

Back view

⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

SDP610 (264L)

Front view

Features a fully programmable Watlow controller and a cool touch surface. A digital vacuum gauge shows chamber vacuum level in measurements of Torr and m/Torr. The display range is 760 Torr down to 0 mTorr (Maximum permitted end vacuum is 10 mTorr. Leak rate is 30 mTorr in 30 min).

A secondary independent high limit controller provides overtemperature safety protection.

Front view with open door

Equipped with a VITON gasket which provides an excellent combination of high temperature performance and chemical resistance.

Optional Items

Description	Applicable Models	Product code
Shelf		
Tall shelf	SDP300/310	SHE-5680588
Short shelf	SDP300/310	SHE-9751342
Shelf	SDP400/410	SHE-5680563
Shelf	SDP610	SHE-5680562
Shelf clip	SDP400/410/610	SHE-1250510
Adjustable leveling feet	All SDP models	SHE-2700506
Door gasket		
Silicone	SDP300/310	SHE-3450707
	SDP400/410	SHE-2450719
Buna-N	SDP300/310	SHE-3450708
	SDP400/410	SHE-3450724
Fluorosilicone	SDP300/310	SHE-3450611
	SDP400/410	SHE-3450612
Viton	SDP300/310	SHE-3450670
	SDP400/410	SHE-3450671
	SDP610	SHE-3450755
Window gasket		
Viton	SDP610	SHE-3450754
Vacuum pump		
GLD137 Rotary Vane Pump with Rubber Hose Kit 115V	SDP300	GLD137CC115DPRKIT
GLD137 Rotary Vane Pump with Rubber Hose Kit 220V	SDP310	GLD137CC220DPRKIT
GLD202 Rotary Vane Pump with Rubber Hose Kit 115V	SDP400	GLD202BB115DPRKIT
GLD202 Rotary Vane Pump with SUS Hose Kit 115V		GLD202BB115DPSKIT
GLD202 Rotary Vane Pump with Rubber Hose Kit 220V	SDP410 SDP610	GLD202BB220DPRKIT
GLD202 Rotary Vane Pump with SUS Hose Kit 220V		GLD202BB220DPSKIT

Floor Type Vacuum Drying Oven

Large Capacity Vacuum Drying Oven

DP43C/63C

MADE IN CH

Operating temp. range	40~200°C
Operating pressure range	101~0.1kPa
Internal capacity	91L (DP43C) 216L (DP63C)

Large capacity multi-purpose vacuum oven

91L
DP43C

216L
DP63C

Operation and functions

- Interactive key input of the control panel for easy operation
- Equipped with high precision functions such as fixed temperature, quick auto stop, auto stop, auto start and program operations for enhanced performance
- Vacuum reaching time significantly reduced by improvement of the exhaust system, resulting in more efficient operation
- Vacuum pump can be stored in the bottom cabinet, which is suitable for space limited laboratories
- Easy removal of piping and maintenance of vacuum pump
- Calibration off-set function

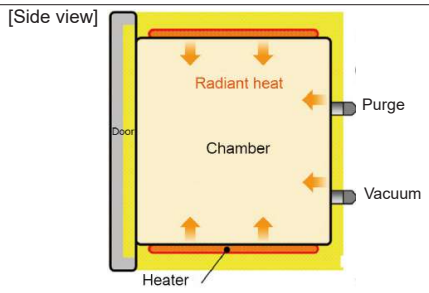
Safety features

- Enhanced safety features: sensor trouble detection, SSR short circuit detection, heater disconnection detector(sensor), memory error, internal communication error, overheating and measurement temperature error
- Large observation window with protective cover for increased safety

Specifications

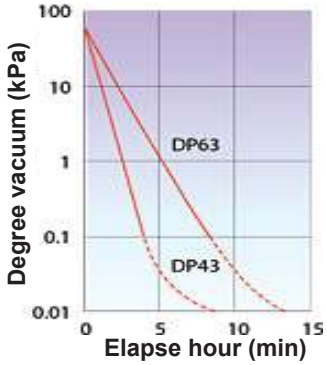
Model	DP43C	DP63C
System	Vacuum drying by decompressed chamber direct heating	
Operating temp. range	40°C to 200°C	
Operating pressure range	101 to 0.1 kPa (760 to 1 Torr)	
Temp. control accuracy	±1.0°C (at 200°C)	
Max. temp. reaching time	~80 min.	~120 min.
Interior material	Stainless steel	
Exterior material	Cold rolled steel plate with baked-on melamine resin finish	
Door	Single swing door	
Heat insulating material	Glass wool	
Heater	Mica heater, 2.25 kW	Mica heater, 3.15 kW
Vacuum gauge	Bourdon tube type, 0 ~ -0.1 MPa (Gauge pressure)	
Observation window	Tempered glass and polycarbonate resin plate	
Temp. control method	PID control by microprocessor	
Temp. setting method	Digital setting with ▲/▼ keys	
Temp. display method	Green LED digital display	
Timer	1 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs. and 50 min.	
Min. division	1 min. or 10 mins.	
Operation function	Fixed temperature operation, Quick auto stop, Auto-start operation, Auto-stop operation, Program operation (16 segments)	
Additional functions	Calendar timer (max. 24 Hrs.), Integration time (max. 49999 Hrs.), Time display	
Heater circuit control	Triac zero-cross control	
Temp. sensor	K-thermocouple (double sensor)	
Safety device	Self diagnostic functions (Sensor, Heater, Triac, Automatic overheating prevention), Independent overheating prevention, Key lock function, Electric leakage breaker	
Internal dimensions (WxDxH)	450×450×450 mm	600×600×600 mm
External dimensions (WxDxH)	670×669×1500 mm	820×819×1650 mm
Internal capacity	91L	216L
Shelf Support Qty. / Pitch	4 steps / 105mm	4 steps / 140mm
Exhaust port / Purge port	NW25 flange / Rc 1/4 (18mm O.D.)	
Power source	220V, single phase, 11A	220V, single phase, 15A
Weight	~190kg	~290kg
Shelf	2 perforated stainless steel shelves	

Method



Control Panel

Pressure Falling Curve

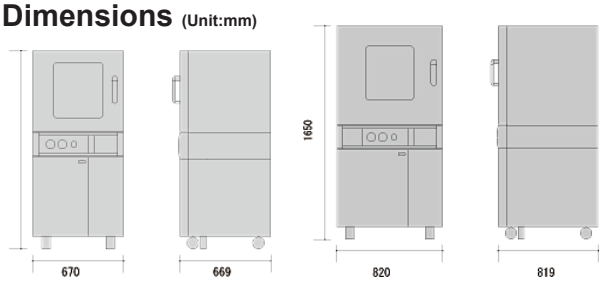


Optional Items

Description	Product Code
DP43C shelf	212192
DP63C shelf	212193
Temperature output terminal	281609
*N_2 Gas Introduction Device 30L/min. (Factory Installed)	281151
*Vacuum Pump Switch (For DP43C/63C) (Factory Installed)	281152
Oil-sealed rotary vacuum pump	
GLD202BB with rubber hose kit 115V	GLD202BB115DPRKIT
GLD202BB with SUS hose kit 115V	GLD202BB115DPSKIT
GLD202BB with rubber hose kit 220V	GLD202BB220DPRKIT
GLD202BB with SUS hose kit 220V	GLD202BB220DPSKIT

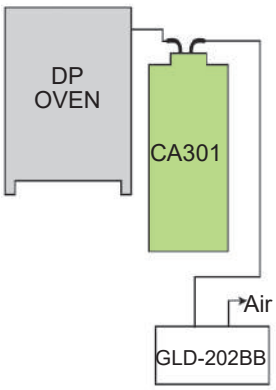
* Please specify when ordering main unit.

Dimensions (Unit:mm)



Sample Installation with CA301

Use with cooling trap CA301

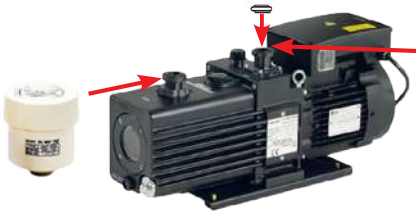


DP OVEN NW25 Flange

GLD202BB CONNECTING KIT
Hose Port Type Suction Pipe (OD:18mm x M20)
50mm Square Adaptor for suction port
Rubber Hose ID 16mm x 5'/1500mm
Hose Clamp for ID: 7/16" - 11mm hose

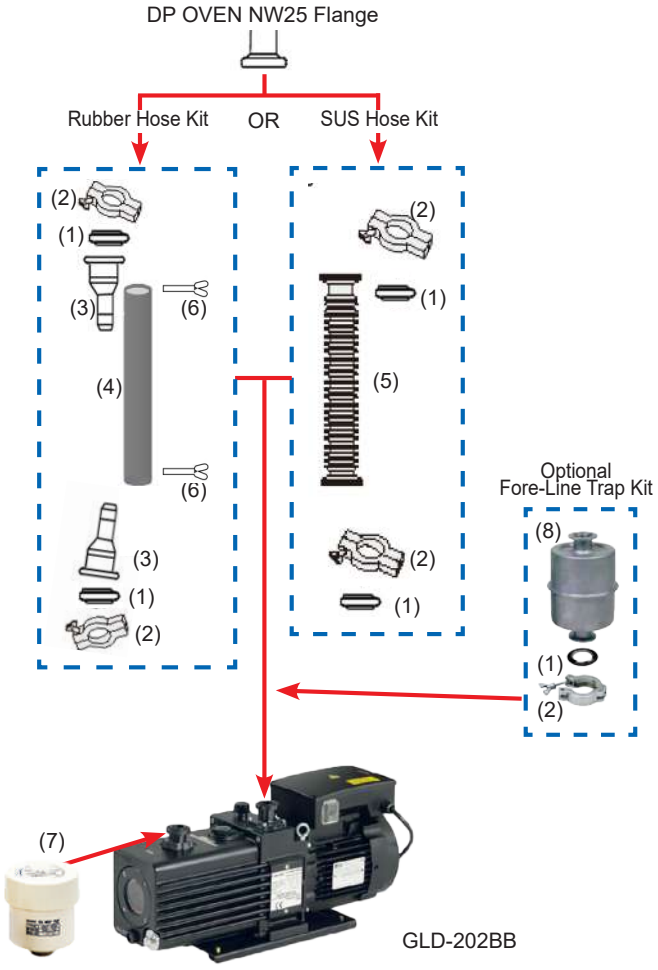
CA301

ULV-DPCARKIT
NW25 18mm Hose Nozzle
NW25 Centering O-ring
NW25 Hinged Clamp
Rubber Hose ID 16mm x 5'/1500mm
Hose Clamp for ID: 7/16" - 11mm hose



GLD-202BB

Rubber Hose or Stainless Steel Hose Connection for Vacuum Pump



	Description
(1)	NW25 Centering O-Ring
(2)	NW25 Hinged Clamp
(3)	NW25 Hose Nozzle 21mm
(4)	Rubber Hose ID 21mm / 1500mm
(5)	SUS Flexible Hose with KF25 / 1500mm
(6)	Hose Clamp
(7)	Oil Mist Trap
(8)	Fore-Line Trap

⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

Floor Type Vacuum Drying Oven

Large capacity Vacuum Drying Oven

DP83C/104C

MADE IN CH

Operating temp. range	40~200°C
Operating pressure range	101~0.1kPa
Internal capacity	512L (DP83C) 1000L (DP104C)

Large scale vacuum drying oven designed for treatment of large-sized parts

Operation and function

- Vacuum pump can be installed inside the oven
- Quick connect / disconnect of vacuum pipes for easy vacuum pump maintenance
- Improved working efficiency as exhaust system is improved to significantly shorten the time to reach vacuum
- Use specialized function menu key and up/down key to set. With program operation function, use submenu key to operate overheat protector, deviation correction, etc.

Safety features

- Self-diagnosis circuit (abnormal temperature sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, ELB to prevent overcurrent, key lock, etc.
- For safety, resin protection panel is installed at the observation window

Specifications

Model	DP83C	DP104C
Method	Decompressed chamber direct heating	
Operating temp. range	40~200°C	
Operating vacuum range	101~0.1kPa (760~1Torr)	
Temp. adjustment accuracy	±1.0°C (at 200°C)	
Interior material	Stainless steel plate	
Exterior material	Cold rolled steel plate with chemical proofing coating	
Insulating material	Glass fiber	
Heater power	6.5kW	14.4kW
Observation window	Toughened glass + resin protection panel	
Vacuum gauge	Pointer type, -100~0kPa	
Vacuum pump installation room	Yes	
Temp. control	3 segments PID	
Temp. setting	Use specialized function menu key and ▲/▼ key to set	
Temp. display	Measured temp. display: green 4-digit LED digital display	
	Setting temp. display: red 4-digit LED digital display	
Timer	1min-99 hr 59 min and 100 hr - 999 hr 50 min (with time wait function)	
Operation function	Fixed temp. auto start, auto stop, program operation	
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional function	Deviation correction, key lock, power outage compensation	
Heater circuit control	SSR driving	
Sensor	K thermocouple (temp. controller and overheat protector)	
Safety device	Self-diagnostic circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, EBL to prevent overcurrent, key lock, etc.	
Internal dimensions (W×D×H)	800×800×800 mm	1000×1000×1000 mm
External dimensions (W×D×H)	1020×1020×1850 mm	1300×1280×2110 mm
Internal capacity	512L	1000L
Air exhaust port	NW40 flange	
Air suction port	Rc 3/8	
Power source (50/60Hz) rated current	AC220V 31.5A *(no plug, round terminal)*	3 phase AC480V 18A *(no plug, round terminal)*
Weight	~450kg	~1000kg
Included accessories	Stainless steel punching plates, 2 pcs.	Stainless steel punching plates, 4 pcs.
Optional accessories	Shelf plate, vacuum pump, N_2 introduction device, recorder, alarm indicator lamp (stand-by/running/malfunction), temp. output terminal (4~20mA), Output terminal for external alarm, time up output terminal	

Optional Items

Product Code	Description
Q110204006	DP83C shelf
Q110204007	DP103C shelf

Recommended pump:

Product Code	Description
CR60BS200DPRKIT	Dry pump 200~240V with rubber hose and power cable kit

Dry Vacuum Pump

Air-cooled roots type dry vacuum pump

CR60B

MADE IN JP

Stable operation and extended lifetime as there is no oil inside the pump head and no contact between rotor and cylinder

Features

- Air cooled for low running costs
- No requiement for cooling water and nitrogen gas
- Low power consumption, air tight and light weight
- Possible to pump down water vapor by use of gas ballast
- Applicable standard: CE, cTUVus

Applications

- Clean gas vacuum pumping such as air, inert gas
- Water vapor pumping for vacuum dryer equipment (gas ballast is required)
- Vacuum equipment such as sputtering, evaporator, etc.

Vacuum Pump Guide

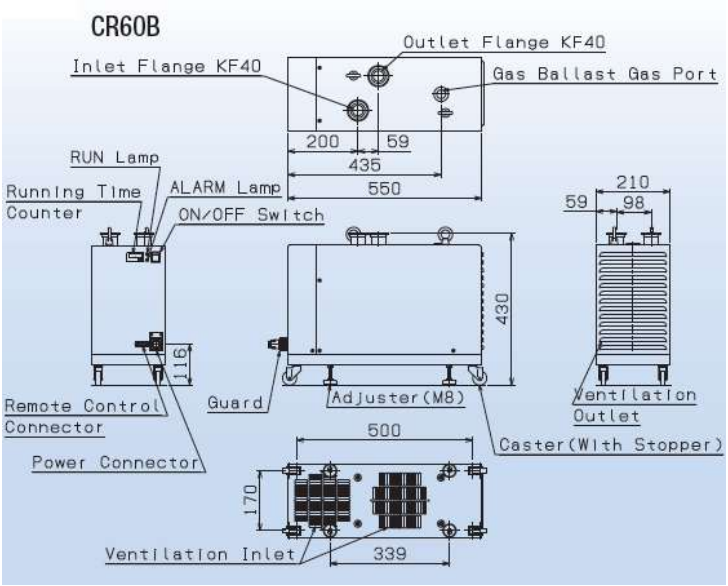
Assembly No.	Components	Applicable products
CR60BS200DPRKIT	CR60BS DRY PUMP 200V with Rubber Hose and Power Cable Kit	DP83C/104C

Specifications

Model	CR60B	
Maximum pumping speed	m^3/h	55
	L/min	920
	CFM	32.4
Ultimate pressure *1	Pa	≤ 3
	Torr	≤ 2 x 10^{-2}
	mbar	≤ 3 x 10^{-2}
Maximum inlet pressure	Atmospheric pressure	
Maximum outlet pressure	Atmospheric pressure	
Power	200V	
Motor rating	1.5	
Inlet	K40	
Outlet	K40	
Weight	48	
Cooling method	Air cooling	
Gas ballast mechanism *2	Equipped	
Maximum water vapor teolerance *3	<500	
Standard accessories	Power Connector, Remote Connector, Air filter, Guard	

*1 *Ultimate pressure is a value without gas ballast gas.*
*2 *The valve for gas ballasts is an option.*
*3 *Maximum water vapor tolerance is a value when gas ballast is used. Make sure to use a gas ballast mechanism.*

Dimensions (mm)



Options

	Specification
Gas ballast	Needle valve
	Solenoid valve + Needle valve
Rubber foot	---

Optional Accessories

	Specification
Silencer	RS-01 + Kit A
Simple silencer *1	EFS-19-NW40/1 *2
Soundproof cover	---
Power compatible box	Ver.A→Ver.B

*1 *Element inside need to be replaced in periodically.*
*2 *Impossible to connect to duct work in the facility (open type)*

Oil-Sealed Rotary Vacuum Pump

GLD-137CC/202BB

MADE IN JP

GLD Series, Direct Drive Oil-Sealed

Features

- GLD series features high performance, low vibration and noise and several functions such as gas ballast valve, oil-back-flow prevention mechanism, and large sized oil level gauge. This series equips multi-voltage motor and correspondent to international standard

Applications

- Chemical, science experiment, analyzer and laser system
- Backing pumps for electronic microscope
- Semiconductor equipment, sputtering equipment, vacuum evaporation equipment
- Vacuum dryer, freeze dryer
- Db noise level 57 db(A) or less

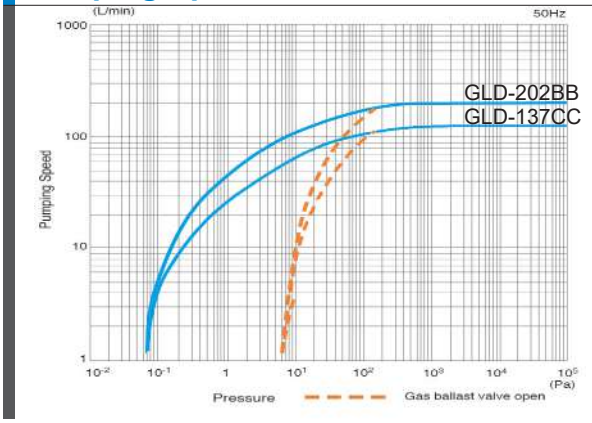
Specifications

Model		GLD-137CC for ADP and SDP300/310 Series		GLD-202BB for DP and SDP400/410/610 Series	
	Unit	50Hz	60Hz	50Hz	60Hz
Actual pumping speed	L/min	135	162	200	240
	m^3/h	8.1	9.72	12.00	14.40
	CFM	4.77	5.72	7.06	8.47
Ultimate pressure	Pa	G.V. Closed : 0.67 G.V. Open : 6.7		G.V. Closed : 0.67 G.V. Open : 6.7	
	Torr	G.V. Closed : 5.0×10^{-3} G.V. Open : 0.05		G.V. Closed : 5.0×10^{-3} G.V. Open : 0.05	
	mbar	G.V. Closed : 6.7×10^{-3} G.V. Open : 0.07		G.V. Closed : 6.7×10^{-3} G.V. Open : 0.07	
Motor		Single phase, 400W, 4P, Multiple-range motor Capacitor start & run, 100–120V/200–240V		Single phase, 550W, 4P, Multiple-range motor Capacitor start & run, 100–120V/200–240V	
Full load current	A	6.8 (100-120V) 3.5 (200-240V)	5.8 (100-120V) 2.9 (200-240V)	8.2 (100-120V) 4.1 (200-240V)	7.9 (100-120V) 3.9 (200-240V)
Oil capacity	mL	1000		1100	
Recommended oil		SMR-100		SMR-100	
Weight	kg	27.0		29.0	
Inlet port diameter	mm	KF-25		KF-25	
Ambient temperature	ºC	7-40		7-40	
	ºF	44.6 – 104		44.6 – 104	
Overall dimensions	mm	170(W) × 488(L) × 250(H)		170(W) × 516(L) × 250(H)	

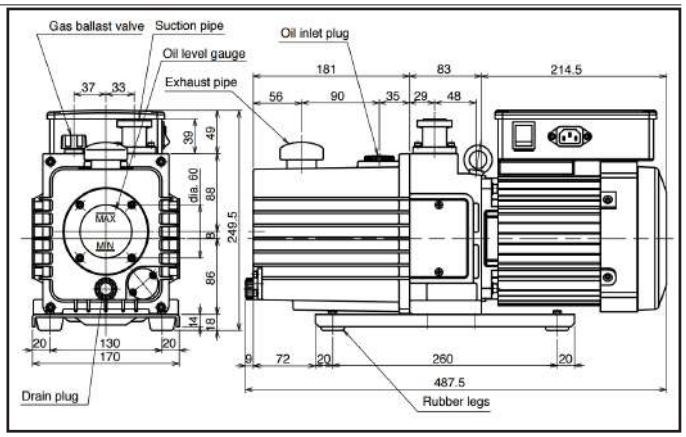
Corresponding Voltage and Certificate

Model	Voltage	Applicable Volt	CE Marked	TUV Marked	cTUVus Marked
GLD-137CC	Single phase, 100-120V	Standard	●	●	●
	Single phase, 200-240V	Standard	●	●	●
GLD-202BB	Single phase, 100-120V	Standard	●	●	●
	Single phase, 200-240V	Standard	●	●	●

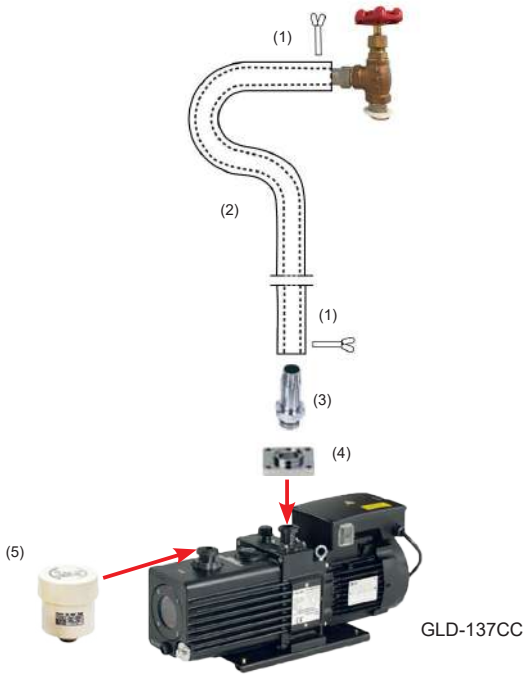
Pumping Speed Curves



GLD-137CC for ADP & SDP Series

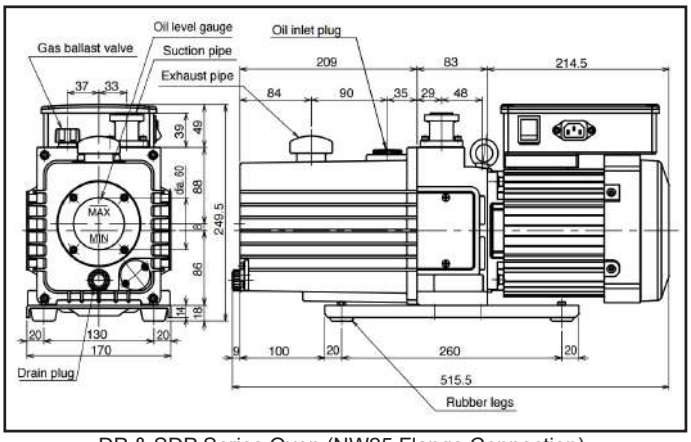


ADP & SDP Series Oven
(Hose Connection)

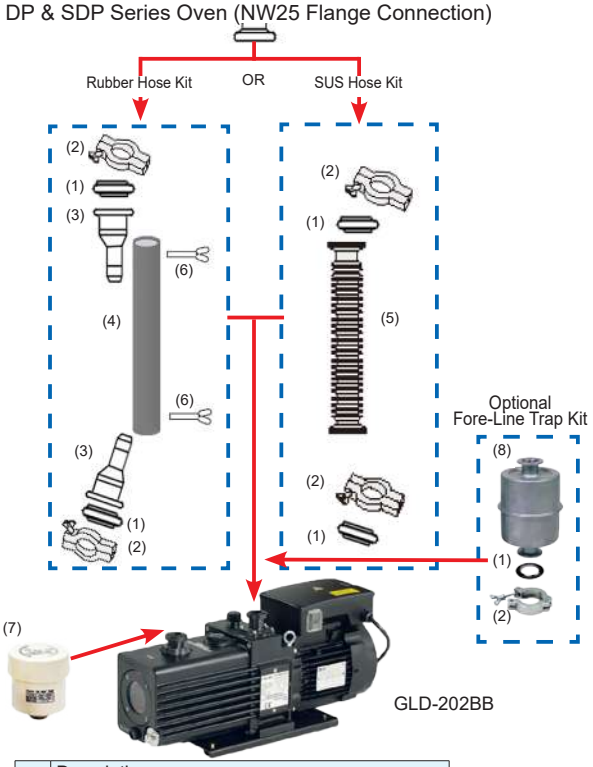


	Description
(1)	Hose Clamp
(2)	Rubber Hose ID:16mm/1500mm
(3)	Hose Port Type Suction Pipe OD: 18mm x M20
(4)	50mm Square Adapter for Suction Port
(5)	Oil Mist Trap

GLD-202BB for DP & SDP Series



DP & SDP Series Oven (NW25 Flange Connection)



	Description
(1)	NW25 Centering O-Ring
(2)	NW25 Hinged Clamp
(3)	NW25 Hose Nozzle 21mm
(4)	Rubber Hose ID 21mm / 1500mm
(5)	SUS Flexible Hose KF25 x 1500mm
(6)	Hose Clamp
(7)	Oil Mist Trap
(8)	Fore-Line Trap

Description	Product Code	Applicable products	Components
Rotary Vacuum Pump			
GLD137CC with Rubber Hose Kit 115V	GLD137CC115DPRKIT	ADP200C/210C/300C/310C SDP300/310	Vacuum pump, Oil mist trap, Hose clamp, Rubber hose, Suction pipe, Square adapter
GLD137CC with Rubber Hose Kit 220V	GLD137CC220DPRKIT		Vacuum pump, Oil mist trap, Hose clamp, Rubber hose, Suction pipe, Square adapter
GLD202BB with Rubber Hose Kit 115V*	GLD202BB115DPRKIT	DP43C/63C SDP400/410/610	Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, Rubber hose, Hose clamp
GLD202BB with SUS Hose Kit 115V*	GLD202BB115DPSKIT		Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, SUS flexible hose, Hose clamp
GLD202BB with Rubber Hose Kit 220V*	GLD202BB220DPRKIT		Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, Rubber hose, Hose clamp
GLD202BB with SUS Hose Kit 220V*	GLD202BB220DPSKIT		Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, SUS flexible hose, Hose clamp
* Optional Fore-Line Trap Kit not included in the kit above.			

Inert Oven

Suitable for No Oxidation Environment

DN411IE/611IE

MADE IN JP

Operating temp. range	Room temp. +15°C~360°C
Temp. gradient	12°C (at 360°C) (411IE) / 20°C (at 360°C) (611IE)
Internal capacity	95L (DN411IE) 223L (DN611IE)

Suitable for Curing Process in No Oxidation Environment

Inert oven suitable for temperature test and heat treatment in a non-oxidizing environment, by introducing N_2 gas into chamber.

Operation and functions

- Heat resistance test and heat treatment of up to 360°C
- Simple operation by interactive key input
- Standard equipped with various operation modes such as program operation and calibration offset function, power failure recovery mode selection, and user configuration information saving
- Repeatable operation function up to maximum 99 steps, 99 patterns controller with repeat function
- N_2 gas flow amount controllable

Safety features

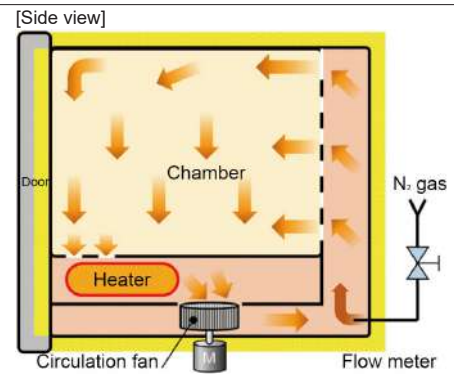
- Enhanced safety countermeasure, including self-diagnostic functions, digital setting independent overheat prevention device and electric leakage breaker
- In case of door opening during operation, fan and heater turn off by door switch

Specifications

Model	DN411IE	DN611IE
System	Forced Convection	
Operating temp. range	Room Temp. +15 to 360°C	
Temp. adjustment accuracy	±0.2°C (at 360°C)	
Temp. fluctuation	±0.6°C (at 360°C)	
Temp. uniformity	±3°C (at 360°C)	
Temp. gradient	12°C (at 360°C)	20°C (at 360°C)
Max. temp. reaching time	~60 min.	
Nitrogen substitution time required	~30 min. (ordinary temp with oxygen concentration of 2%)	~70 min. (ordinary temp with oxygen concentration of 2%)
Interior	Stainless steel plate	
Exterior	Cold rolled steel plate with baked melamine resin coating	
Heat insulator	Glass wool + Ceramic fiber	
Heater	SUS Pipe Heater 3.0kW	SUS Pipe Heater 4.0kW
Sensor	K thermocouple for temperature control and independent overload prevention device	
Fan type / Motor	Sirocco Fan / Condenser Type	
Flow meter, Gas carrier	Max. Flow 30L/min, O.D. 9mm Hose Nipple	
Temp. controller	PID Control by Microcomputer	
Temp. display type	Temp. display: Digital display by 4 digit green LED (resolution:1°C) Setting temp. display: Digital display by 5 digit orange LED (resolution:1°C)	
Timer / Timer resolution	1min. ~ 99hrs. 59mins. or 100hrs. ~ 999hrs. / 1min. or 1hr.	
Operation function	Fixed temp. operation, Auto-start, Auto-stop, Quick auto-stop, Program Operation	
Program mode	Repeatable operation function up to max 99 steps or 99 patterns.	
Additional functions	Power on and operation time integrating function (up to 65535 hours), calendar time (24 hours), calibration offset, Monitor display of integrated power consumption, total CO_2 emissions and heater operating output, power failure recovery mode, save and read out of user settings	
Heater circuit control	Triac with Zero-cross	
Safety device	Self diagnostic functions (Sensor failure, SSR short circuit, Heater line disconnection, Main Relay contact damaged, Automatic overheat prevention), Key lock function, Independent overheating prevention, Electric leakage breaker, Door switch	
Internal Dimensions	W470 x D450 x H450 mm	W620 x D600 x H600 mm
External Dimensions	W640 x D695 x H915 mm	W790 x D845 x H1065 mm
Internal Capacity	95L	223L
Shelf max. load	~30kg / shelf	
Shelf support qty. / Pitch	12pcs. / 30mm	17pcs. / 30mm
Power source	Single phase 220V 13.5A *(no plug, round terminal)*	Single phase 220V 19A *(no plug, round terminal)*
Weight	~90kg	~130kg
Included accessories	Stainless wire shelf plate / bracket: 2 pcs. / 4 pcs.	

* N_2 introduction rate 20L/min.

Method



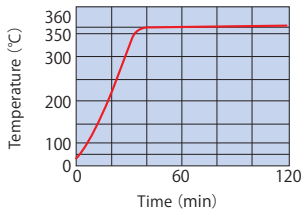
Control Panel

Overheat Prevention Device

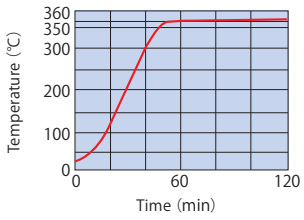
N_2 Gas Entrance Port (ø9mm)

Temp. Rising Curve (AC220V 50Hz Room temp.23°C)

DN411IE

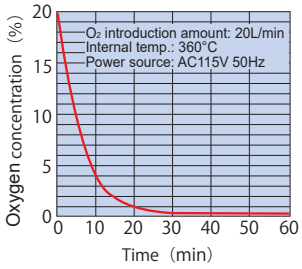


DN611IE

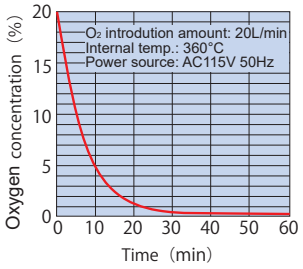


O_2 Gas Substitution Performance Curve

DN411IE



DN611IE

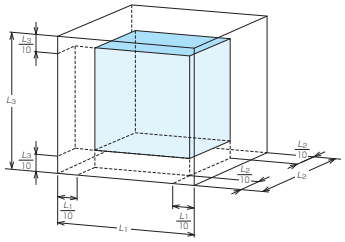


9 Points Distribution Reference Data

(°C)

	Top right back	Top left back	Top right front	Top left front	Bottom right back	Bottom left back	Bottom right front	Bottom left front	Center
DN411IE	359	358	363	361	359	359	359	356	359
DN611IE	361	357	362	357	359	355	350	350	357

Conditions:
1. Measured by 9 points including 1/10 distance to the the opposite wall and center measuring point according to internal dimensions.
2. Room temperature 23°C, AC220V, 50Hz, Setting at 360°C, Average temp. during stable state.
3. No load, 2 shelf plates installed.



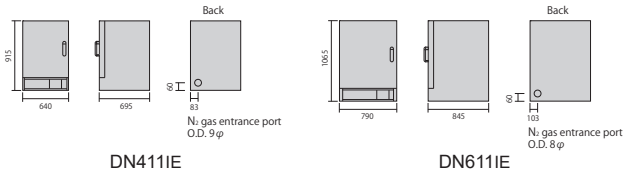
Optional Items

Description	Product code
Stand OH41(for DN411IE)	212477
OH61(for DN611IE)	212478
Shelf (with brackets 2 pcs.)	
Stainless wire (loading up to 30 kg/shelf)	
ODQ10 for DN411IE	211063
ODQ20 for DN611IE	211064
Stainless punching metal shelf (loading up to 15kg/shelf)	
ODQ30 for DN411IE	211098
ODQ40 for DN611IE	211099
*Temperature output terminal ODH18	212976
*External alarm output terminal ODH22	212977
*Time up output terminal ODH24	212978
*Operation signal output terminal ODH26	212979
*Event output terminal ODH28	212980

* Customized from factory. Please specify when ordering main unit.

Interior

Dimensions (Unit:mm)



DN411IE DN611IE

Stand (Optional Item)

DN611IE+ Stand (Optional Item)

⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable materials
- Caution: High temperature components

Clean Oven

Suitable for temperature test in a dust-free environment

DE411/611 DT411/611

MADE IN JP

Operating temp. range	Temp. distribution accuracy	Internal capcaity
Room temp. +30~260°C (DE) Room temp. +30~360°C (DT)	±2.5°C (at 260°C) (DE) ±4.0°C (at 360°C) (DT)	91L (411 model) 216L (611 model)

Operation and functions

- Improved visibility and operability with its V type controller
- Displays power consumption, CO_2 emissions and heater manipulated variables on the control panel
- Adopts anti-fouling casters which prevents wheel contamination during transportation
- Improved visibility of HEPA filter replacement timing by three color indication
- Enhanced safety with its phase-reversal relay detecting incorrect power source at installation
- Lower equipment height compared to previous models (DE/DT411 approximately ~200 mm shorter)
- Larger cable port from φ30mm to φ33mm
- Improved optional accessories and more customization options

Safety features

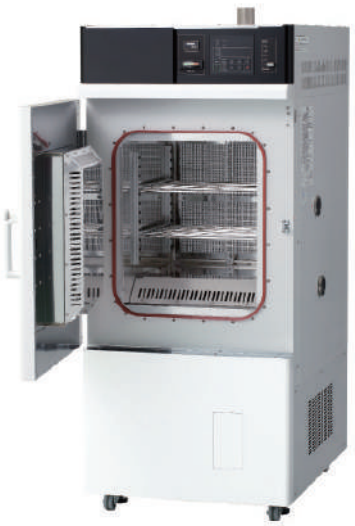
- Self-diagnostic functions, calibration offset, independent overheat prevention, over current leakage breaker, key lock and auto recovery after power failure

Specifications

Model	DE411	DE611	DT411	DT611
Circulation method	Forced convection			
Operating temperature range	Room Temp +30~260°C		Room Temp +30~360°C	
Temp. control accuracy	±0.3°C at 260°C		±0.3°C at 360°C	
Temp. fluctuation	±0.5°C at 260°C		±0.5°C at 360°C	
Temp. distribution accuracy	±2.5°C at 260°C		±4.0°C at 360°C	
Temp. gradient	±10.0°C at 260°C		±20.0°C at 360°C	
Maximum temp. reaching time	~70 min.		~80 min.	
Clean level	Class100 (when temperature is stable)			
Interior / Exterior material	Stainless steel / Cold rolled steel plate with melamine resin baking finish			
Heat insulating material	Glass wool			
Door	Single side left swing			
Heater	Stainless steel pipe heater			
Fan type	Sirocco fan, Condenser motor 400W			
Differential pressure meter	Analog type (0~300 Pa)			
Cable port / Exhaust port	Inner diameter: 33mm×1 (right side) / Outer diameter 61mm			
Filter	Heat resistant HEPA filter (dust-collection efficiency >99.97% up to 0.3μm particle filtering)			
Caster wheels / adjuster	Free swivel caster wheels without stopper / level adjuster (2 at front)			
Temperature control / setting system	PID V control / Digital setting with ▲/▼ keys			
Temperature display system	Top screen: green 4-digit digital LED (resolution 1°C), Bottom screen: orange 5-digit digital LED (resolution 1°C)			
Other indications	LED indicates temperature patterns for heating/stabilizing/cooling			
Operation functions	Constant temperature operation, Programmed operation (Maximum 99 steps, up to 99 patterns, repeat operation function), Duration/time select operation function (auto start/auto stop/quick auto stop, program operation)			
Additional functions	Variable fan speed, Accumulated on time, operation time function (up to 65,535 hours); calibration offset; accumulated power consumption monitoring, total CO_2 emission monitoring, heater output monitoring; power recovery; setting data save and restore			
Sensor	K type Thermocouple dual sensor (temperature control and independent overheat prevention device sensors)			
Heater control	Triac with Zero-cross control			
Safety device	Self-diagnostic functions (*Detection for Temp. Sensor Failure, Triac Short Circuit, Automatic overheating prevention, Fan motor failure detection, Heater Line Disconnect, Main Relay Contact Damage*), Earth leakage breaker, Key Lock Function, Independent overheating prevention device, Phase reversal relay, Door switch			
Earth leakage breaker	15A	15A	15A	20A
	Current leak /short circuit/surge protection, rated sensitivity 30mA			
Door switch	Door open: fan motor and heater circuit OFF / Door closed: fan motor and heater circuit ON			
Internal dimensions (W×D×H mm)	450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (W×D×H mm)	700×1025×1570	850×1175×1720	700×1025×1570	850×1175×1720
Internal capacity	91L / 3.21 cu. ft.	216L / 7.62 cu.ft.	91L / 3.21 cu.ft.	216L / 7.62 cu.ft.
Weight	~200 kg / ~441 lbs.	~270 kg / ~596 lbs.	~200 kg / ~441 lbs.	~270 kg / ~596 lbs.
Shelf rest / pitch	12 steps / 30mm	17 steps / 30mm	12 steps / 30mm	17 steps / 30mm
Withstand load of shelf	~30 kg / shelf			
Power supply 50/60Hz (V±10%)	220V 3 phase 7A *(no plug, round terminal)*	220V 3 phase 10A *(no plug, round terminal)*	220V 3 phase 10A *(no plug, round terminal)*	220V 3 phase 14A *(no plug, round terminal)*
Included accessories: shelf plate / bracket	2 pcs. / 4 pcs.	3 pcs. / 6 pcs.	2 pcs. / 4 pcs.	3 pcs. / 6 pcs.

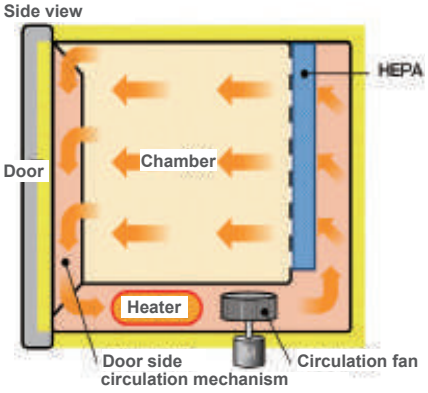
* Conditions: temperature and humidity: 23°C+, 65% RH ±20%, atmospheric pressure 86kPa ~106kPa (no load), exhaust damper and intake closed

Interior

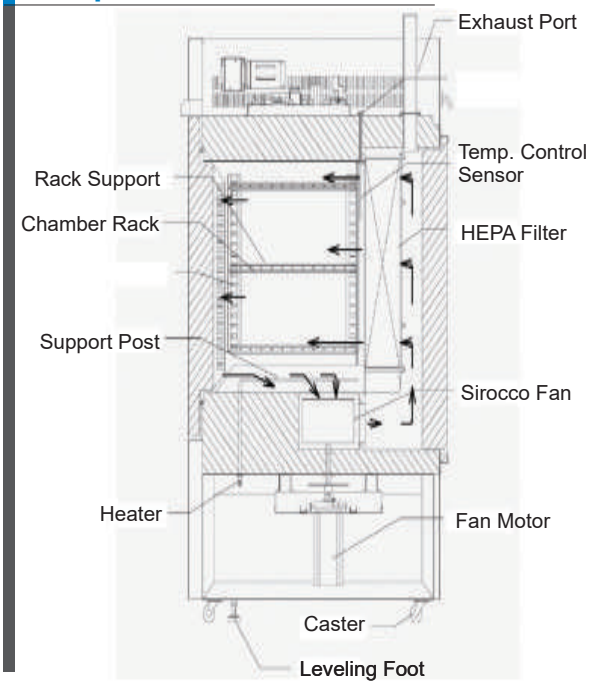


DE411

Method



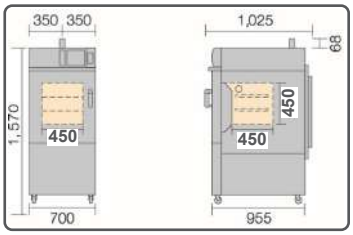
Components



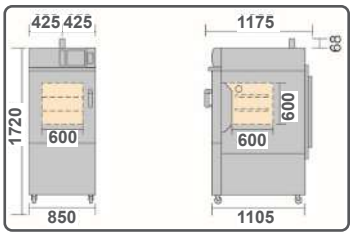
Optional Items

Product code	Model	Description	Suitable models
212686	---	Stainless steel wire shelf and bracket set. Withstand load up to 30 kg/shelf	DE/DT411
212687	---	Stainless steel wire shelf and bracket set. Withstand load up to 30 kg/shelf	DE/DT611
212688	---	Stainless steel punching shelf and bracket set. Withstand load up to 15 kg/shelf	DE/DT411
212689	---	Stainless steel punching shelf and bracket set. Withstand load up to 15 kg/shelf	DE/DT611
212924	ODT12	Basket-type shelf placed on top of standard shelves. Withstand load up to 15kg/shelf)	DE/DT411
212925	ODT14	Basket-type shelf placed on top of standard shelves. Withstand load up to 15kg/shelf)	DE/DT611
212946	ODT48	Sheath sensor (K thermocouple)	All models
212947	ODT52	Silicon plug (φ2mm opening in center)	DE models
212926	ODT16	Duct connection port for clean room application	DE/DT411
212927	ODT18	Duct connection port for clean room application	DE/DT611
212928	ODT22	Auto damper	DE/DT411
212929	ODT24	Auto damper	DE/DT611
212930	ODT26	N_2 gas introduction device (with flowmeter)	DE/DT411
212931	ODT28	N_2 gas introduction device (with flowmeter)	DE/DT611
212935	ODT32	Emergency stop switch	DE/DT411
212936	ODT34	Emergency stop switch	DE611
212937	ODT36	Emergency stop switch	DT611
212938	ODT38	Data logger	DE/DT411
212939	ODT42	Data logger	DE/DT611
212954	ODT68	High efficiency filter (Class 100) maximum resistance temperature 200°C	DE411
212955	ODT70	High efficiency filter (Class 100) maximum resistance temperature 200°C	DE611
212940	ODT44	Power cord 10m. No plug included.	All models
212949	ODT56	Temperature Output Terminal (4-20mA)	All models
212950	ODT58	External Alarm Output Terminal	All models
212951	ODT62	Time-up Output Terminal	All models
212952	ODT64	Operation Signal Output Terminal	All models
212953	ODT66	Event Output Terminal	All models

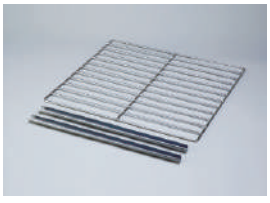
Dimensions (Unit:mm)



DE/DT411

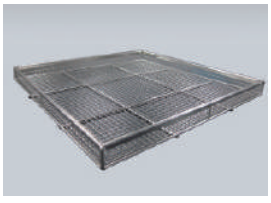


DE/DT611



Stainless steel wire shelf
212686 / 212687

Stainless steel punching shelf
252688 / 252689



Basket type shelf
212924 / 212925

⚠Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

Clean Oven

Large capacity, forced convection clean oven

DES830/DTS830

MADE IN JP

Operating temp. range	RT+30°~260°C (DES830) RT+30°~360°C (DTS830)

Temp. distribution accuracy	±2.0°C at 260°C DES830	±5.0°C at 360°C DTS830

Internal capacity	327L DES830 / DTS830

Space saving, large volume, Class 100 clean oven

- Improved visibility and operability of control panel
- Stable cleanliness through forced circulation with rear exhaust
- Displays power consumption, CO_2 emissions and heater manipulated variables on the control panel
- Incorporates a maximum of 99 steps, 99 patterns program controller with repeat function
- Offers several options such as recorder, manual/auto damper, N_2 gas introducer with flow meter and emergency switch
- DES830 convertible to high performance filter type maintaining Class 100 at stable and fluctuating temperature up to a maximum of 200°C

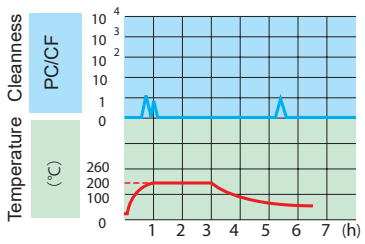
Specifications

Model	DES830	DTS830
Circulation method	Forced convection	
Operating temperature range	Room temperature +30 to 260°C	Room temperature +30 to 360°C
Temp. control accuracy	±0.5°C at 260°C	±0.5°C at 360°C
Temp. fluctuation	±0.5°C at 260°C	±0.5°C at 360°C
Temp. distribution accuracy	±2.0°C at 260°C	±5.0°C at 360°C
Temp. gradient	±6.0°C at 260°C	±10.0°C at 360°C
Maximum temp. reaching time	~70 min.	~80 min.
Clean level	Class100 (when temperature is stable)	
Interior material	Stainless steel	
Exterior material	Cold rolled steel plate with melamine resin baking finish	
Heat insulating material	Glass wool	
Heater	6.0kW (stainless steel pipe heater)	9.0kW (stainless steel pipe heater)
Fan type	Scirocco fan, condenser type motor 200W x 2	
Differential pressure meter	Analog type (0 ~ 300Pa)	
Cable port	Inner diameter: 33mm×1 (right side)	
Filter	Heat resistant HEPA filter (dust-collection efficiency >99.97% with a 0.3μm particle)	
Caster wheels / adjuster	Free swivel caster wheels without stopper / level adjuster (2 at front)	
Temperature control / setting system	PID V control / Digital setting with ▲/▼ keys	
Temperature display system	Top screen: green 4-digit digital LED (resolution 1°C), Bottom screen: orange 5-digit digital LED (resolution 1°C)	
Other indications	LED indicates temperature patterns for heating/stabilizing/cooling	
Operation functions	Fixed temperature operation, Program operation (maximum 99 steps up to 99 patterns, with repeat operation function), Timer or clock operation function (Fixed temperature operation w/ auto start/auto stop/quick auto stop, program operation auto start)	
Additional functions	Power-on Time and Operation Time Accumulation Monitor (up to 65,535 hours); Calibration Offset; Monitoring Display for Accumulated Power Consumption, Total CO_2 Emissions, and Heater Operation Output; Power Recovery Mode; Setting Data Backup and Recovery	
Sensor	K type thermocouple double sensor (for temperature control and independent overheat prevention device)	
Heater control	Triac with zero-cross control	
Safety device	Self-diagnostic functions (Detection for Temp. Sensor Failure, Triac Short Circuit, Automatic overheating prevention, Heater Line Disconnect, Main Relay Contact Damage), Earth leakage breaker, Fan Motor Failure, Key Lock Function, Independent overheating prevention device	
Earth leakage breaker	30A	40A
	Leak Current/Short Circuit/Over-current Protection, Rated Current Sensitivity 30mA	
Door switch	Door open: fan motor and heater circuit off, Door close: fan motor and heater circuit on	
Internal dimensions (W×D×H)*2	620×480×1100 mm	
External dimensions (W×D×H)*2	850×1080×1955 mm	
Internal capacity	327L	
Weight	~335 kg	
Number of shelf bracket step / pitch	35 steps / 30mm	
Withstand load of shelf	~30 kg / shelf	
Power supply 50/60Hz (V±10%)	AC220V, three phase, 16A *(no plug, round terminal)*	AC220V, three phase, 24A *(no plug, round terminal)*
Included accessories: shelf plate / bracket	3 pcs. / 6 pcs.	

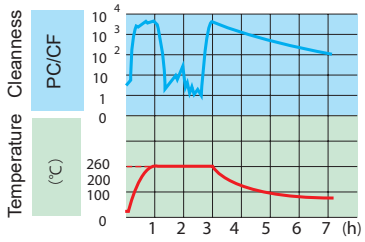
*1 Conditions: temperature and humidity: 23°C+, 65% RH ±20%, atmospheric pressure 86kPa ~106kPa (no load)
*2 Protrusions excluded

Interior

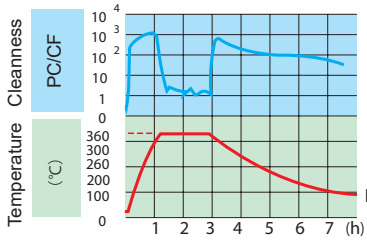
Performance Curve



High Performance Filter
(DES830 only)
(optional)



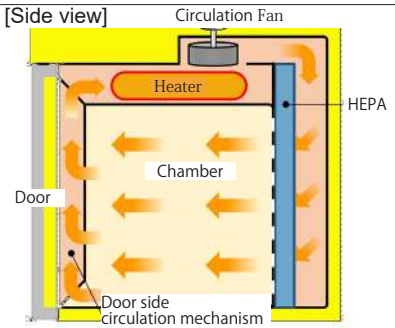
DES830



DTS830

Method

[Side view]



Cable Port (φ33mm×1 right side)

Paperless Recorder

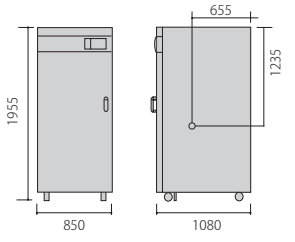
YHR150

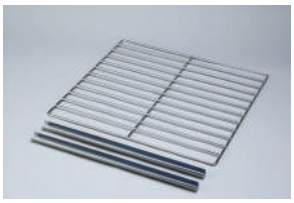
Optional Items

Product Code	Model	Description	Suitable models
212678	---	Stainless steel wire shelf and bracket set. Withstand load up to 30 kg/shelf	DES830/DTS830
212679	ODE50	Stainless steel punching shelf and bracket set. Withstand load up to 15 kg/shelf	DES830/DTS830
212919	ODE12	Basket-type shelf placed on top of standard shelves. Withstand load up to 15kg/shelf)	DES830/DTS830
212946	ODT48	Sheath sensor (K thermocouple)	DES830/DTS830
212947	ODT52	Silicon plug (One hole φ 2mm)	DES830
*212956	ODT72	Temperature output terminal (4-20 mA)	DES830/DTS830
*212957	ODT74	External alarm output terminal	DES830/DTS830
*212958	ODT76	Time-up output terminal	DES830/DTS830
*212959	ODT78	Operation signal output terminal	DES830/DTS830
*212960	ODT80	Event output terminal	DES830/DTS830
*212941	ODT82	Emergency stop switch	DES830
*212942	ODT84	Emergency stop switch	DTS830
*212943	ODT86	Recorder 6 pts. (sensors not included)	DES830/DTS830
*212945	ODT88	Power cord 10m.	DES830
*212999	ODT90	Power cord 10m.	DTS830
*212921	ODT92	Manual damper	DES830/DTS830
*212923	ODT94	Automatic damper: 5 steps: 5%-25%-50%-75%-100%	DES830/DTS830
*212932	ODT96	N_2 gas introduction device (with flowmeter)	DES830/DTS830
*212934	ODT98	Exhaust port for clean room O.D. φ 80mm (duct sold seprately)	DES830/DTS830
*212920	ODE14	High efficiency filter (Class 100) maximum temperature 200°C	DES830

* Customized at factory. Please specify when ordering main unit.

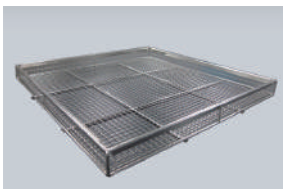
Dimensions (Unit:mm)





Stainless steel wire shelf
212678

Stainless steel punching shelf
212679



Basket-type shelf
(Placed on top of standard shelves)
212919

⚠ Attention

- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

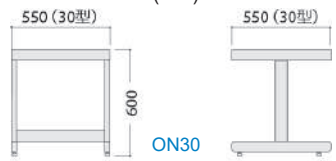
Stands

Stands and suitable oven models

Product code	Model	Suitable oven models
211180	ON30	DKL301C/311C, DKM300C/310C, DKN302C/312C, DNF301
211856	ON61	DX400/600 Series, DVS400/600 Series, DG400 Series, DKL400/600 Series, DKM400/600 Series, DKN400/600 Series, DNE400/600 Series, DNF400/600 Series
212348	OT42	DNE401/411, DNF401/411
212349	OT62	DNE601/611, DNF601/611
212477	OH41	DN411IE
212478	OH61	DN611IE
212801	ONS30	DX302C/312C
212802	ONS60	DX402C/412C/602C/612C, DR200/201
415464	OP43	DF411/412, DH411/412 (stand without caster)
415465	OP63	DF611/612, DH611/612 (stand without caster)
415466	OP46	DF411/412, DH411/412 (stand with caster wheels and stopper infront)
415467	OP66	DF611/612, DH611/612 (stand with caster wheels and stopper infront)

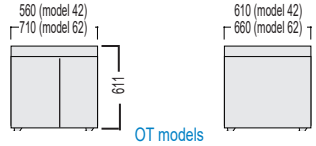
ON30

Dimension (mm)



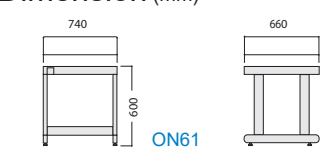
OT42/62

Dimension (mm)



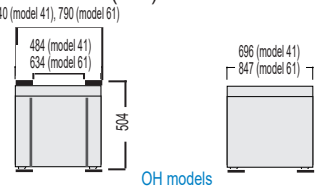
ON61

Dimension (mm)



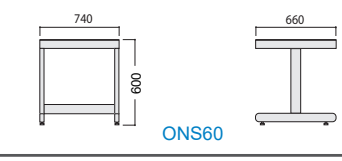
OH41/61

Dimension (mm)



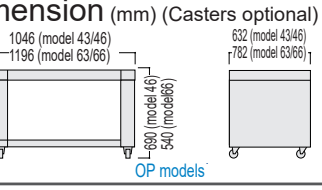
ONS60

Dimension (mm)



OP43/63, OP46/66 (casters front side with two stoppers)

Dimension (mm) (Casters optional)



Stacking Kit

Stacking kit and suitable models

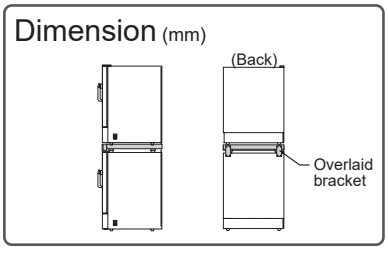
Product code	Model	Suitable oven models
212803	ODK80	DX302C/312C
212804	ODK82	DX402C/412C
212805	ODK84	DX602C/612C
212806	ODN26	400 Series of DNE, DNF (including models suitable for OD40)
212807	ODN28	600 Series of DNE, DNF (including models suitable for OD60)
212822	OD40	400 Series of DVS, DKL, DKM, DKN
212823	OD60	600 Series of DVS, DKL, DKM, DKN
213700	ODF48	DF412/612, DH412/612
281458	ODM44	DNF301

Important Notes:

- The stacking units must belong to the same series (among 400 series or among 600 series)
- Do not stack 400 series on 600 series. If the upper 400 series is not fixed well, it is easy to topple
- Stacking of old models is forbidden. Lower unit must be new model.

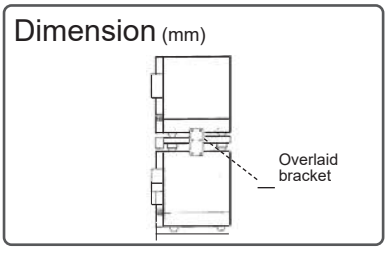
OD/ODN

Dimension (mm)



ODK

Dimension (mm)

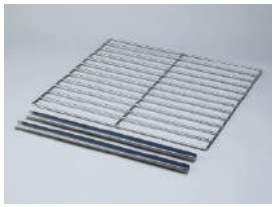


Shelves

Stainless steel shelf & bracket and suitable oven models

Product code	Description	Model	Suitable oven models
211063	Shelf and bracket set stainless wire (loading up to 30 kg/shelf)	ODQ10	DF/DH412, DN411IE
211064	Shelf and bracket set stainless wire (loading up to 30 kg/shelf)	ODQ20	DF/DH612, DN611IE
211090	Shelf and bracket set stainless wire		DH650
211098	Shelf and bracket set stainless punch (loading up to 15kg/shelf)	ODQ30	DF/DH412, DN411IE
211099	Shelf and bracket set stainless punch (loading up to 15 kg/shelf)	ODQ40	DF/DH612, DN611IE
211854	Shelf and bracket set		DG800 Series
212068	Shelf and bracket set stainless punch		DKN/DX300/302, DNF301, DKM/DY300, DKL301/311
212095	Shelf and bracket set stainless punch		400 Series of DX, DVS, DKN
212192	Shelf		DP41/43/43C
212193	Shelf		DP61/63/63C
Q110204006	Shelf		DP83C
Q110204007	Shelf		DP103C/104C
212246	Shelf & bracket set stainless punch		400 Series of DVS, DG, DKL, DKM, DKN, DNE, DNF
212266	Shelf & bracket set stainless punch		600 Series of DX, DVS, DKL, DKM & 600 to 800 of DKN, DNE, DNF
212490	Shelf & bracket set stainless punch		900 Series of DKN, DNE, DNF
212678	Stainless steel wire shelf and bracket set. Withstand load up to 30 kg/shelf		DES830/DTS830
212679	Stainless steel punching shelf and bracket set. Withstand load up to 15 kg/shelf	ODE50	DES830/DTS830
212686	Stainless steel wire shelf and bracket set. Withstand load up to 30 kg/shelf		DE/DT411
212687	Stainless steel wire shelf and bracket set. Withstand load up to 30 kg/shelf		DE/DT611
212688	Stainless steel punching shelf and bracket set. Withstand load up to 15 kg/shelf		DE/DT411
212689	Stainless steel punching shelf and bracket set. Withstand load up to 15 kg/shelf		DE/DT611
212808	Shelf		DR200/201
212919	Basket-type shelf placed on top of std shelves. Withstand load up to 15kg/shelf	ODE12	DES830/DTS830
212924	Basket-type shelf placed on top of std shelves. Withstand load up to 15kg/shelf	ODT12	DF/DH412, DE/DT411
212925	Basket-type shelf placed on top of std shelves. Withstand load up to 15kg/shelf	ODT14	DF/DH612 , DE/DT611
297071	Shelf		ADP21/200C/210C
297072	Shelf		ADP31/300C/310C
SHE-5680588	Tall shelf		SDP300/310
SHE-9751342	Short shelf		SDP300/310
SHE-5680563	Shelf		SDP400/410
SHE-5680562	Shelf		SDP610
YSA0000071	Shelf and bracket set		DF/DH832
YSA0000215	Shelf and bracket set		DF/DH1032


211063 / 211064


211090

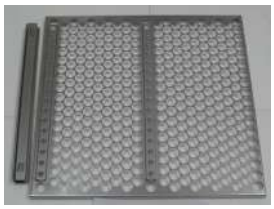

211098 / 211099
212688 / 212689 / 212679

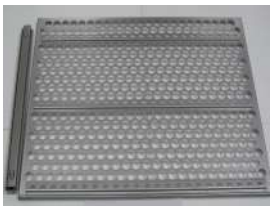

212068


212068

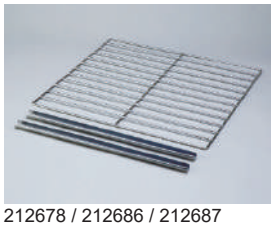

212192


212193

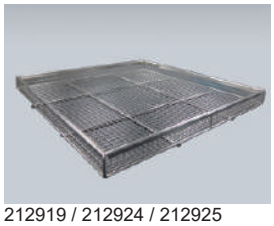

212246


212266


212490


212678 / 212686 / 212687


212808


212919 / 212924 / 212925


297071


297072

Earthquake Countermeasure

Seismic isolation rubber

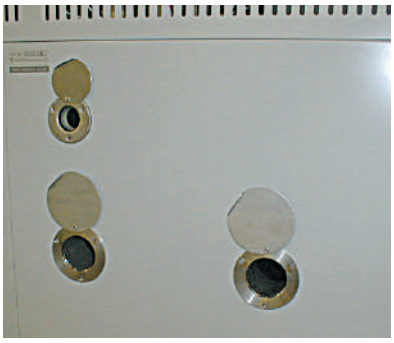
Product code	296902
Material	Urethane elastomer
Max. load	~100 kg (by 4 pcs.)
Size	W50 x D50 x H5mm 1set: 4pcs.

- Pasted at the bottom to prevent unit from falling
- Three layer structure made of urethane elastomer which absorbs 90% impact

Other Optional Accessories

Note: *Listed optional accessories ARE NOT applicable to all oven models. Contact Customer Service for more details.*

Cable port



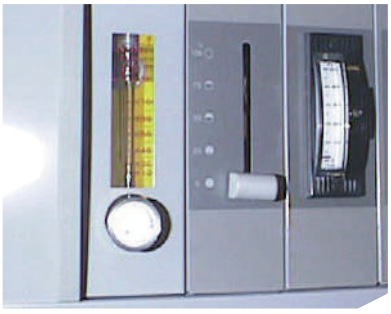
Exhaust duct

Butterfly flange
OD 100mm

Double flange to suck in more air
OD 95mm x H 105mm

Exhaust duct for DF and DH 213703 / 213704

N_2 gas inlet device



External output terminal

NOTES

SINCE 1889

Yamato Scientific America

Yamato PCR Workstations

Contents

PCR Workstations

PCR Workstation (UV) & PCR Workstation (UV + HEPA Filter)

PCR204/214/204H/214H

MADE IN THE USA

Designed to improve PCR accuracy and reduce airborne contamination

PCR Workstation (UV)

PCR204
115-120V 60Hz 12 amps

PCR214
220-240V 50Hz 6 amps

PCR Workstation (UV + HEPA Filter)

PCR204H
115-120V 60Hz 12 amps

PCR214H
220-240V 50Hz 6 amps

Includes factory installed HEPA filter system, rated at 99.9997% efficiency at 0.3µ (microns).

This is a positive pressure research chamber. The fan (blower) noise level is rated at less than 40 dBA.

Features

- "Bright Light" illumination system (40,000 hour lamp guarantee)
- U.V. germicidal system rated at 254 nm decontaminates all exposed surfaces in the interior
- Automatic timer to activate U.V. sterilization procedures
- Front panel is .500" thick (13 mm) for Beta Ray protection. **NOTE**: Not Gamma Rays
- Side and back walls are one piece formed optically clear acrylic .375" thick (9.5 mm)
- Two bright white plastic (adjustable) shelves. One is tooled to store pipettors
- Bottom tray has a formed in place "spill guard" for easy cleaning
- Removable side access doors with slip apart hinges
- Proximity sensors on doors for operator safety
- Main housing and top are removable for installation of large pieces of equipment

Specifications

Model	PCR204/214	PCR204H/214H
HEPA filter	---	"Mini HEPA" filter size 4" x 9.5" x 1" thick (101 x 240 x 25.4 mm thick) No tools required for HEPA filter change over
Inside dimension (WxDxH)	23.5" x 17" x 21" / 597 x 432 x 530 mm	23.5" x 17" x 21" / 597 x 432 x 530 mm
Outside dimension (WxDxH)	24" x 18" x 28" / 610 x 457 x 711 mm	26" x 23" x 28" / 610 x 457 x 711 mm
Approximate shipping weight	110 lbs. / 50 kilos	112 lbs. / 51 kilos

⚠ Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

SINCE 1889

Yamato Scientific America

Yamato Plasma Cleaners & Reactors

Contents

NOTES

Gas Plasma Dry Cleaner

Plasma Surface Treatment Device

PDC200/210/510

MADE IN JP

High frequency output	300W (PDC200)	500W (PDC210/510)

Stage size	250×170mm (PDC200/210)	410×210mm (PDC510)

Small and compact, suitable for R&D purposes

Features

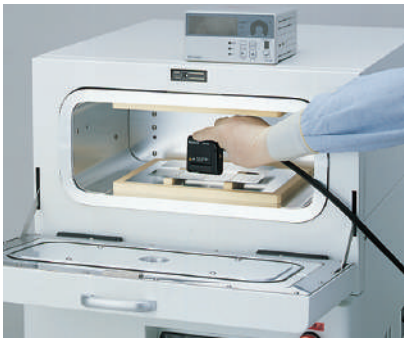
- Simple and compact plasma surface treatment device
- RIE (Reactive Ion Etching) Plasma mode, with DP (Direct Plasma) mode as option
- Excellent electrode structure for plasma uniformity
- Simple touch panel system

Applications

- Plasma processing of CSP, BGA, COB substratum
- Removal of organic films and metal oxidized films
- Dry cleaning of printed circuit board
- Surfactant process
- LED assembly
- For R&D

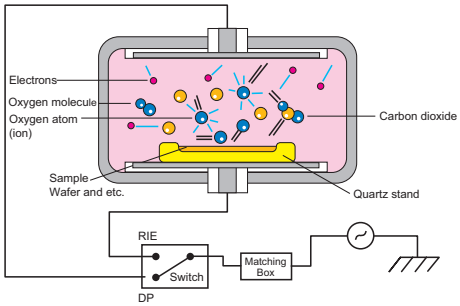
PDC210

Chamber

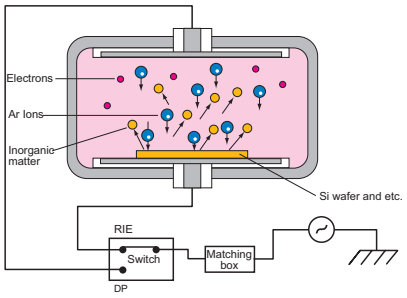


Diagram

DP(Direct Plasma) mode



RIE(Reactive Ion Etching) mode



Specifications

Model	PDC200	PDC210	PDC510
Plasma mode	RIE (DP mode option)		RIE/DP selectable
Electrode structure	Parallel flat stage plate		
Vacuum gauge	Capacitance manometer		
High frequency output	Max 300W	Max 500W	
Oscillation frequency	13.56MHz Quartz oscillator		
Output setting method	Manual setting on LCD touch panel		
Matching method	Auto tuning		
Controller	Programmable		
Display	LCD touch panel		
Chamber size	W400 × D250 × H150mm		W500 x D300 x H200mm
Stage size	W250 × D170mm		W410 x D210mm
Chamber material	Aluminum		
Reaction gas	2 systems (Argon, Oxygen)		
Purge gas	Nitrogen or dry air		
Reaction gas flow control	Flow meter	Mass flow controller	
Rotary vacuum pump (optional)	~345L/min.		~500L/min.
External dimensions	W540×D600×H600mm	W540×D600×H600mm	W700xD700xH700mm
Weight	~100kg	~105kg	180kg
Power source	Single phase AC115V 50/60Hz	3-phase AC200V~AC240V 50/60Hz	

Gas Plasma Dry Cleaner

Multi Stage Plasma Cleaner

PDC610

MADE IN JP

High-frequency Output	600W
Stage size	250 x 220 mm 1-stage, 2-stages, 3-stages selectable

Compact plasma cleaner with selectable RIE / DP modes and switchable electrodes (1 to 3 stages) covering a wide range of applications

Features

- Maximum power of 600W with compact package
- Electrodes can be switched among 1-stage, 2-stages, and 3-stages
- Supports processing of a vertical magazine
- RIE/DP modes selectable
- Supports integrated data logger (optional)
- Matching point memory function (optional)

Applications

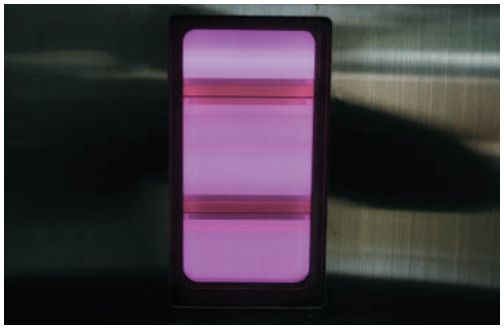
- Improvement of adhesiveness of various materials and surface reformation
- Light ashing and light etching process
- Pretreatment of implemented board bonding, plastic package and print board plating
- Processing of LED related commercial products
- Cleaning of electronic parts
- Resist peeling or residue removal after wetting process
- Cleaning of accuracy parts including optics and optical fibers, or machine parts
- Reformation of resin surface including fluoro resin

Specifications

Model	PDC610
Plasma mode	RIE/DP selectable
Electrode structure	3-stage independent parallel flat plates
Vacuum gauge	Capacitance manometer
High frequency output	Max 600W
Oscillation frequency	13.56MHz Quartz oscillator
Output setting method	Manual setting on LCD touch panel
Matching method	Auto tuning
Control device	Sequencer
Display	LCD touch panel
Chamber size	W350 x D270 x H300 mm
Stage size	W250 x D220mm Three stages
Chamber material	Aluminum
Reactive gas	2 systems (Argon and Oxygen)
Purge gas	Nitrogen or dry air
Vacuum pump	Rotary vacuum pump (Approx. 345 L/min)
External dimension	W600 x D722 x H700 mm
Exterior material	Stainless steel
Power source	3-phase AC200V~AC230V 50/60 Hz 15A (vacuum pump included)

Chamber

Plasma Discharge



Gas Plasma Reactor

Compact, Barrel Type, Low Temperature Ashing Device

PR200 / PR300-115V PR300-220V / PR301-115V PR301-220V

MADE IN JP

High-frequency output	200W (PR200)	300W (PR300/301)

Reaction chamber	ø100 x 160mm x 1 (PR200)	ø64 x 160mm x 3 (PR300)	ø118 x 160mm x 1 (PR301)

Wide range of application from ashing, etching, dry cleaning, etc.

Features

- Isotropy barrel type
- Compact, space saving design
- Capable of removing coated organic matter
- Adjustable RF suitable for various applications
- Outstanding operability and safety
- Can be set for a wide range of output conditions to handle a variety of testing samples

Applications

- Functionalization of the polymeric material surface improves adhesion
  Oxidation reaction generates functional groups -OH, >C=O, -COOH on the surface (very small amount of water and carbon dioxide will impact)
- In nitrogen plasma, a nitrogen atom is incorporated onto the surface, generates a functional group -NH_2
- Resist peeling
- Surface modification of materials (metals, polymers, films, ceramics, etc.)
- Asbestos pre-processing (ashing of membrane filter)
- Low-temperature ashing (polymer material, coal, food, etc.)
- PDMS chips bonding to glass and PDMS substrate
- Production of semiconductors and analysis work

PR200

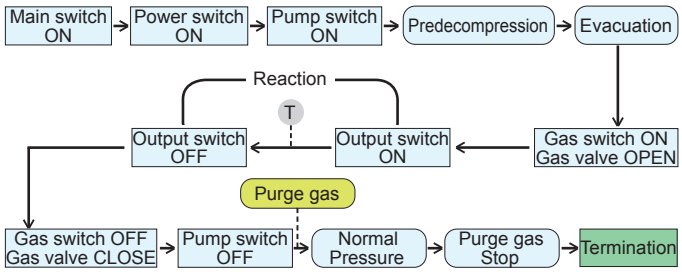
PR300-115V
PR300-220V

PR301-115V
PR301-220V

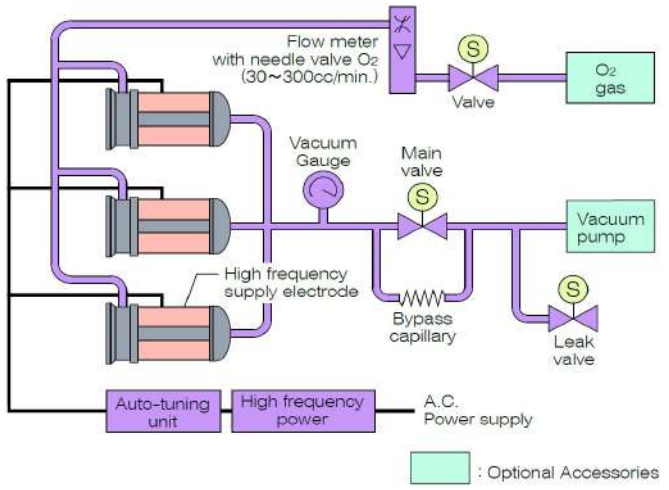
Specifications

Model	PR200	PR300-115V PR300-220V	PR301-115V PR301-220V
Plasma mode	Direct plasma (DP)		
High frequency output	Max. 200W	Max. 300W (100W x 3 chambers)	Max. 300W
Oscillation frequency	13.56MHz		
Tuning method	Auto matching	Manual biaxial	
Reaction chamber	Pyrex glass, ø100×160mm x 1 chamber	Pyrex glass, ø64×160mm×3 chambers	Pyrex glass, ø118×160mm x 1 chamber
Reaction gas	1 system (oxygen), flow meter control with dry air purge gas		
Control system	Manual leak valve	Auto pressure reduction, auto leak valve	
Piping material	Stainless steel, Teflon	Stainless steel, Teflon, Copper and Brass	Stainless steel, Teflon
External dimensions(W×D×H)	350 x 400 x 500mm	438 × 520 × 556mm	438 × 520 × 660mm
Weight	~25kg	~36kg	~34kg
Power source (50/60Hz)	AC115V 13A	AC115 6.1A with plug AC220V 3.2A no plug	AC115 6.1A with plug AC220V 3.2A no plug
Optional accessories	Sample dish, vacuum pump	Sample dish, stand, shelf, vacuum pump	

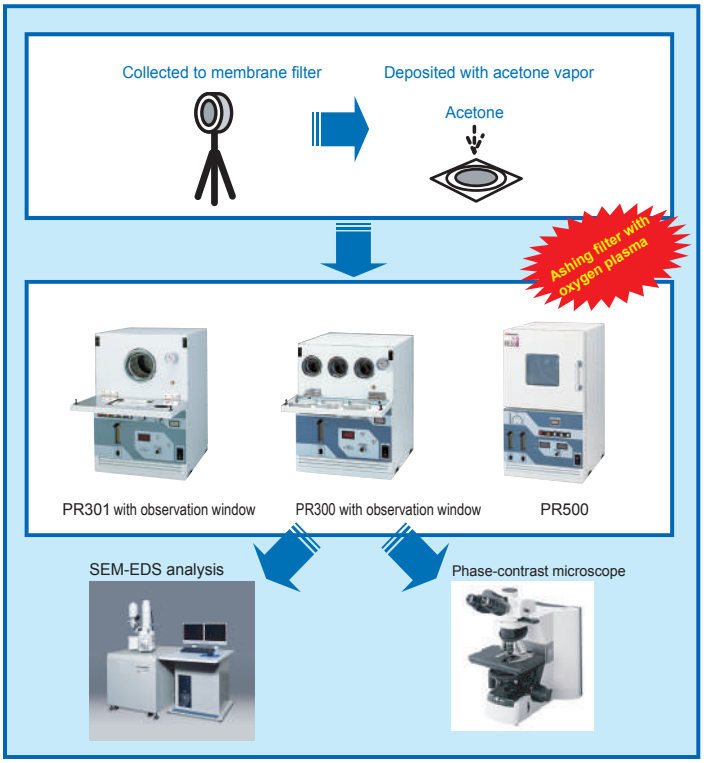
Operation Flowchart



Piping System (PR300)



Example application: asbestos analysis pre-processing



Control Panel

PR200

PR300, PR301

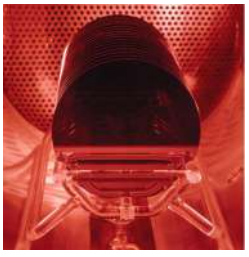
Chamber

PR200
1 chamber (ø100 x 160mm)

PR300
3 chambers (ø64 x 160mm)
Contamination free

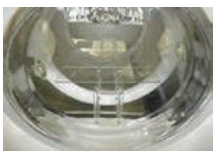
PR301
1 chamber (ø118 x 160mm)

Interior

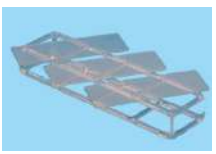


The gas plasma equipment has a wide range of applications from ashing, etching, dry cleaning, etc.

Accessories



Sample dish



Sample shelf for PR300

Sample shelf for PR301

Gas Plasma Reactor

Compact, Barrel Type, Low Temperature Ashing Device

PR500-115V PR500-220V / PR510

MADE IN JP

High-frequency output 500W

Reaction chamber ø215 x 305mm

Designed with large chamber size made of quartz considered almost completely resistant against most plasma processes

PR500-115V / PR500-220V (Manual version)

PR510 (Touch panel version) with **optional** Rainbow Signal Tower

Features

- Compact, space saving design with oscillation section integrated with a portion of the chamber
- Outstanding operability and safety with the automatic tuning system as standand component
- Equipped with a large quartz chamber (ø215mm) which can process big testing samples

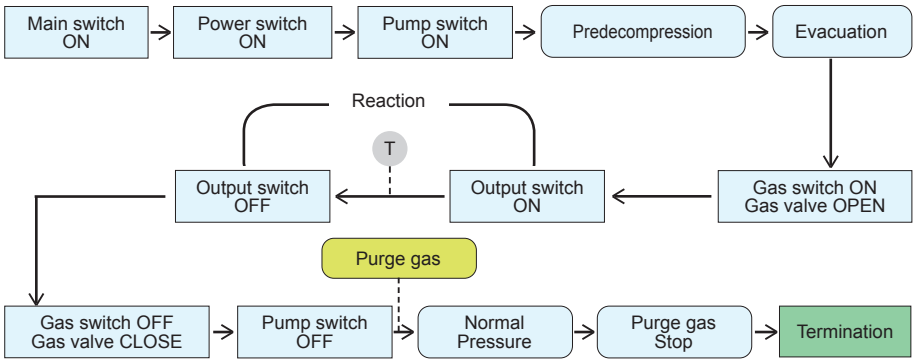
Applications

- Removal of photoresist
- Cleaning of parts
- Surfactant treatment
- Micro polishing
- Corresponds to wafer and glass substrate

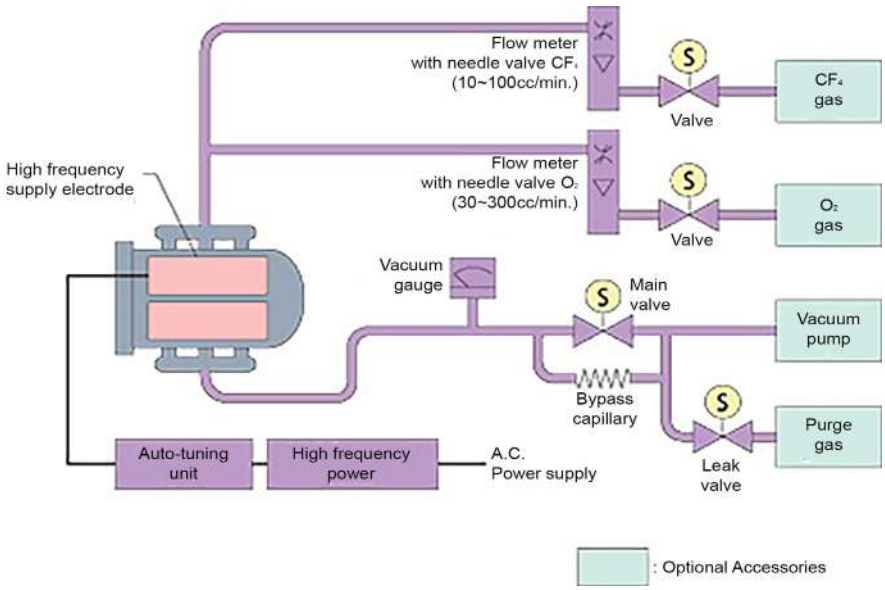
Specifications

Model	PR500-115V PR500-220V (Flow meter)	PR510 (Mass flow meter)
Method	Barrel type chamber direct plasma	
High frequency output	Max. 500W	
Oscillating frequency	13.56MHz	
Tuning method	Automatic tuning	
Reaction chamber	Made of quartz, ø215×305mm	
Reaction gas	Dual system (O_2 / CF_4)	
Control system	Manual	Automatic touch panel
Piping material	Stainless steel, Teflon	
External dimensions (W×D×Hmm)	438×520×760	520×630×760
Weight	~60kg	~60kg
Power source (50/60Hz)	AC115V 7.8A with plug AC220V 4.1A no plug	AC220V Three phase 7.3A no plug
Standard accessories	Connection cable: 1 complete set Vacuum grease: 1 pc. O-ring for reaction chamber: 1pc.	
Optional accessories	Frame for wafers (2, 3, 4, 5, 6 inches), multi-purpose angled frame, aluminum etching tunnel, stand	

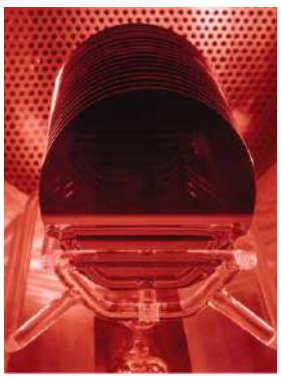
Operation Flowchart



Piping System (PR500/510)



Wafer Ashing



The gas plasma equipment has a wide range of applications from ashing, etching, dry cleaning, etc.

Control Panel

PR500

Chamber

ø215mm large caliber chamber

SINCE 1889

Yamato Scientific America

Yamato Rotary Evaporators

Contents

NOTES

Rotary Evaporator

Highly efficient standard rotary evaporator with manual lift

RE202-A/212-A *(basic)* REV202M-A/212M-A *(with vacuum controller)*

MADE IN CH

Evaporating / receiving flask	100 ml to 2L / 1L (Standard)
Rotation speed control range	5~315 rpm
Water bath / oil bath temp. range	RT +10~90°C / RT +10~180°C

Features

● *5 ~ 315 rpm rotation speed range*

Turning the encoder dial slowly increases or decreases the value by 1, turning it quickly changes the value by 10.
Selectable rotation mode (forward, reverse, auto reverse)
RPM display brightness can be adjusted in 8 levels.

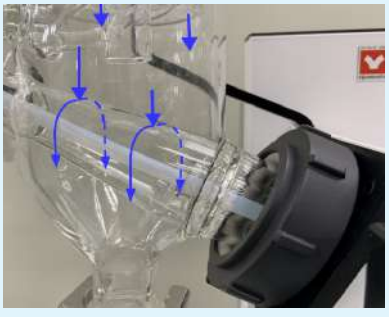
● *Set inversion function*

Glassware and bath can be set in either side, left or right, depending on user's dominant hand and installation location.
Three units of Glassware B (with vertical condenser) can be installed in a standard fume hood.

● *Uniquely designed glass condenser*

This prevents liquid stagnation and backflow improving durability of vacuum seal

When using ketone or ether solvents, standard vacuum seal swells. It is recommended to use PTFE vacuum seal.



● *Two types of baths*

Option for water and oil bath.
Large capacity 5L bath with 240mm I.D. and a full complement of safety functions such as automatic overheat prevention and temp. upper limit difference.

Specifications

Model		MODELS WITHOUT VACUUM CONTROLLER		
		RE202-AWA / 212-AWA *(Glassware A)*	RE202-BWA /2 12-BWA *(Glassware B)*	RE202-CWA / 212-CWA *(Glassware C)*
Performance *1	Operating ambient temp. range	5~35°C		
	Speed range	5~315 rpm *3		
	Evaporation capacity	Up to 23 ml/min		
Functions	RPM display	Digital display / Control knob		
	Rotation mode	Forward / Reverse / Auto inversion		
	Spring-loaded jack	Manual balance (maximum height 200 mm, stepless regulation, one-touch lock)		
Configuration	Rotary motor	DC brushless (simple servo)		
	Condenser retention	---	Condenser bracket	
Safety functions	Rotary evaporator	DC motor: Motor overload protection, overvoltage, low voltage, rotation speed sensor error AC adapter: Short circuit in internal circuit, overcurrent protection, overvoltage protection		
Standard	Cooling condenser	Double corrugated tube (cooling surface: 0.143 m^2)		
		Suction port: GL-14 (lower), Φ10 nozzle	Suction Port: GL-14 (upper), Φ10 nozzle	
		Cooling port: GL14 (two places in lower part), two φ10 nozzles		
	Compatible evaporation flask	50-2000 ml. *Use optional reducer to attach small flasks*		
	Compatible receiving flask	100-2000 ml		
	External dimensions *2	W719 × D24 × H534	W529 × D324 × H745	W529 × D324 × H745
	Overall dimensions *2 (including bath) (W x D x H)	744 × 365 × 534	554 × 365 × 745	
	Weight	~10.0 kg		
	Power rating 50/60Hz	RE202: 100-115V 1A ***with plug*** RE212M: 200-230V single phase 1A ***no plug, round terminal***		
Included accessories		Main unit: AC adapter (1), power cable (1), bath guide (1), rear cover (1), single-sided tape fastener roll (1), double-sided tape fastener roll (1)		
		Glass set: Cooling condenser (type A/B/C)(1), rotary joint (1), evaporation flask (1), receiving flask (1), ball joint clamp (1), flask clip (1), vacuum seal (1), condenser insulation kit (1), condenser bracket (1) (for type B/C), hex wrench (1) (for type B/C)		

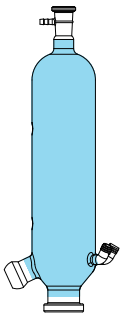
Model		MODELS WITH VACUUM CONTROLLER		
		REV202M-AWA / 212M-AWA *(Glassware A)*	REV202M-BWA / 212M-BWA *(Glassware B)*	REV202M-CWA / 212M-CWA *(Glassware C)*
Performance *1	Operating ambient temp. range	5~35°C		
	Speed range	5~315 rpm *3		
	Evaporation capacity	Up to 23 ml/min		
	Pressure setting range	0-1013 hPa		
Functions	RPM display	Digital display / Control knob		
	Rotation mode	Forward / Reverse / Auto inversion		
	Spring-loaded jack	Manual balance (maximum height 200 mm, stepless regulation, one-touch lock)		
Configuration	Vacuum controller	VR102S, installed above jack handle with attachment bracket		
	Vacuum control solenoid valve	OVR10, installed in the rear of stand base		
	Rotary motor	DC brushless (simple servo)		
	Condenser retention	---	Condenser bracket	---
Safety functions	Rotary evaporator	DC motor: Motor overload protection, overvoltage, low voltage, rotation speed sensor error AC adapter: Short circuit in internal circuit, overcurrent protection, overvoltage protection		
	Vacuum controller	Communication error, Pressure sensor error, Memory error, Leak error, High pressure error, Auto leak at error occurrence		
Standard	Cooling condenser	Double corrugated tube (cooling surface: 0.143 m^2)		
		Suction port: GL-14 (lower), Φ10 nozzle	Suction Port: GL-14 (upper), Φ10 nozzle	Suction Port: GL-14 (upper), Φ10 nozzle
		Cooling port: GL14 (two places in lower part), two φ10 nozzles		
	Compatible evaporation flask	50-2000ml. *Use optional reducer to attach small flasks*		
	Compatible receiving flask	100-2000 ml		
	External dimensions *2	W719 × D24 × H534	W529 × D324 × H745	W529 × D324 × H745
	Overall dimensions *2 (including bath) (W x D x H)	744 × 365 × 534	554 × 365 × 745	554 × 365 × 745
	Weight	~10.5 kg		
	Power rating 50/60Hz	RE202 and REV202M: 100-115V 1A ***with plug*** RE212 and REV212M: 200-230V single phase 1A ***no plug, round terminal***		
Included accessories		Main unit: AC adapter (1), power cable (1), bath guide (1), rear cover (1), single-sided tape fastener roll (1), double-sided tape fastener roll (1)		
		Glass set: Cooling condenser (type A/B/C)(1), rotary joint (1), evaporation flask (1), receiving flask (1), ball joint clamp (1), flask clip (1), vacuum seal (1), condenser insulation kit (1), condenser bracket (1) (for type B/C), hex wrench (1) (for type B/C)		

**1 Performance data above based on 23 ±5 °C room temperature, 65%RH ±20% humidity, and no process load.*
**2 Dimensions excludes protrusions.*
**3 Applicable rotation speed range and sample volume depend on the capacity of evaporation flask.*

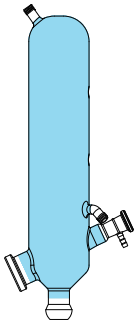
Operational Accessories

Glassware Set

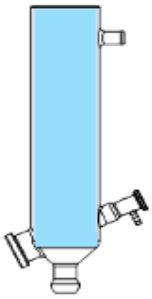
Product code	Set
RG202A	Set A (use with chiller) Traditional glass set where condenser is tilted diagonally
RG202B	Set B (use with chiller) Standard glass set where condenser is set vertically, suitable for limited space
RGB202C	Set C (cold finger) The cold finger glass condenser is set vertically, suitable for disitillation of volatile or low boiling point solvents.



Condenser A



Condenser B



Condenser C

Bath Specifications

Product name	Water bath		Oil bath	
Model	BM302-A	BM312-A	BO302-A	BO312-A
Temp. control range *1	RT +10°C~90°C		RT +10°C~180°C	
Temp. control accuracy *1	±1.0°C		±1.5°C (water), ±2°C (oil)	
Safety features	Automatic overheat prevention, independent overheat prevention (fixed temp.), temperature upper limit error, overcurrent protection fuse			
Other features	Calibration offset, overshoot alert, auto resume (selectable), 2A service outlet (for AC100~115V)			
Bath capacity	~5L			
Internal dimensions	Φ240 x H119 mm			
External dimensions *2	Φ262(max depth 286mm) x H240 mm			
Weight	~4.5kg			
Power supply (fuse capacity)	AC100~115V 10~12A (15A)	AC200~230V 5~6A (10A)	AC100~115V 10~12A (15A)	AC200~230V 5~6A (10A)

*1 Performance data above based on 220 VAC ±5% supplied power, 23 ±5 °C ambient, 65%RH. ±20% humidity, and no process load. Temp accuracy measured in JTM K05.
*2 Dimensions excludes protrusions.

Vacuum Controller

- Equipped with a color LCD that allows you to judge the operating status by color. Suppresses bumping with three operation modes that can be selected according to application.
- Evaporator body and vacuum pump work together with one button
- Wireless connection with specified vacuum pumps for control

REV-202M-CWA
Rotary Evaporator Set with Vacuum Controller and Condenser C

Model	VR102S
Setting range of the degree of vacuum*1	0 to 1013 hPa
Measurement range of the degree of vacuum	0 to 1100 hPa
Display	Color LCD (2.3")
Display items	Measurement/setting of vacuum degree, operation time, status
Operation mode	Manual (constant operation), Gradient (gradient decompression, constant operation) Auto (gradient decompression, target pressure automatic setting)
Hold function	Maintains current vacuum degree in the middle of decompression (controlled)
Pressure unit	mmHg/Torr/hPa/kPa/mbar
Automatic functions at end of operation	Auto leak, Auto cleaning
Vacuum control system*2	Based on ON/OFF of vacuum control solenoid valve, or pump rotation speed.
Safety functions	Communication error, pressure sensor error, memory error, leak error, high pressure error, auto leak at error occurrence
External dimension*3	86AW x 113D x 83H
Power supply	24V DC *1 (100-240VAC 1A or less)
Weight	0.5 kg
Included accessories	Vacuum line branch joint (O.D. φ4 x φ2 x 700 mm with PTFE tube)

*1 *A separate optional vacuum control solenoid valve is required. With the combination of vacuum pump N820G and vacuum pump control unit G, vacuum control can be performed by pump rotation speed without vacuum control solenoid valve, However, operation mode is limited.*
*2 *An optional connection cable (multi line of power supply/operation signal) for connecting RE unit is required. When using this unit without connecting to RE units, use optional AC adapter/power cable separately.*
*3 *Dimensions excludes protrusions.*

Optional Accessories

Glassware

Evaporating flask
Size: 24/40

Product code	Capacity
255713	2L
255712	**1L***
255711	500ml
255710	300ml
255709	200ml
255708	100ml

Receiving flask
Size 35/20

Product code	Capacity
255719	2L
255718	**1L***
255717	500ml
255716	300ml
255715	200ml
255714	100ml

Standard

Size: 29/38

Product code	Capacity
255706	2L
255705	1L
255704	500ml
255703	300ml
255702	200ml
255701	100ml

Three-way cock

Product code	Description
255738	Used for switching receiving flasks during operation S35/20 male/ female. Length 114 mm

Lab jack

Product code	Description
255745	150 x 150 mm Height 75 - 245 mm
255746	200 x 200 mm Height 75 - 245 mm

Rotary joint
RG202A

Product code	Size	Type
255720	29/38 L284mm	Standard
255722	**24/40 L286mm**	**Standard***
255724	29/38 L284mm	Transparent
255726	24/40 L286mm	Transparent

RG202B and RGB202C

Product code	Size	Type
255721	29/38 L208mm	Standard
255723	**24/40 L210mm**	**Standard***
255725	29/38 L208mm	Transparent
255727	24/40 L210mm	Transparent

Product code	Description
255738	Sample feed stopcock

Condenser insulation kit

Product code	Description
RG02AS0000	Condenser A and B only

Rotary joint **different diameter**

Product code	Description
255732	24/40 → 24/40 L105mm
255733	24/40 → 19/38 L103mm
255734	24/40 → 15/25 L90mm
255728	29/38 → 29/38 L106mm
255729	29/38 → 24/40 L108mm
255731	29/38 → 15/25 L105mm
255730	29/38 → 19/38 L105mm

Vacuum nozzle (gray)

Product code	Description
255512	GL14 K10 mm O.D. 2 pcs

Cooling nozzle (black)

Product code	Description
255742	GL14 K10 mm O.D. 2 pcs

Stop cock

Product code	Material
255735	PTFE, 19/38

Stop cock

Product code	Material
255736	Glass, 19/38

FKM vacuum seal

Product code	Description
255740	Standard

PTFE vacuum seal

Product code	Description
255741	Recommended for ketone and other solvents

Optional Accessories

Water Circulator (Chiller)

CF303Y/CF313Y

Model	CF303Y / CF313Y	CF802A
Operating temp. range	-20°C~30°C	
Temp. control accuracy	±1.0°C (≥ 0°C) ±1.5°C (< 0°C)	±1.0°C
Cooling capacity	~450W at liquid temp10°C ~330W at liquid temp-10°C	~1320W (at 10°C) ~700W (at -10°C)
Temp. control	Refrigerator On/Off	
Refrigerator, coolant	Air cooling 450W, R452A	Air cooling, 700W, R410A
External dimension WxDxH (including protrusions)	205 × 396 × 535 mm (225 × 434 × 564 mm)	340 × 370 × 838 mm (340 × 408 × 920 mm)
Water capacity	~3.9L (Liquid volume 3.5L)	~15.5L (liquid volume 14L)
Power source 60Hz	115V 6.8A / 220V 4A	Single phase 115V 15A
Weight	~30kg	~44kg

CF802A

Control panel

Filter mounting plate

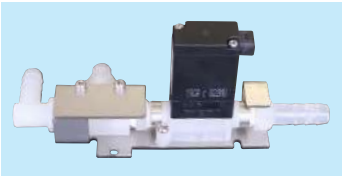
Circulation hose connection

Discharge and Return Ports

Vacuum Pump

Model	255161 (N820G)
Ultimate vacuum (mbar abs.)	
Minimum speed:	
Gas ballast closed	≤ 6
Gas ballast open	≤ 17
Maximum speed:	
Gas ballast closed	≤ 8
Gas ballast open	≤ 15
Flow rate at atm. pressure (l/min)	
Min. speed	9
Max. speed	20
Permissible ambient temperature	+10°C to + 40°C
Diaphragm material	PTFE-coated
Voltage (V)	100-240
Frequency (Hz)	50/60
Max. operating current (A)	0.66
Dimensions LxWxH (mm)	259 x 163 x 220
Weight (kg)	8.8

Vacuum Control Solenoid Valve



255762 (OVR10)

- Opens / closes to control the degree of vacuum
- Works with VR102S Vacuum Controller by wire
- Can be installed onto RT302 solvent recovery unit

Included accessories:

- PTFE tube φ4 × φ2 × 700 mm 1 pc
- Solenoid valve cable 1 pc

Vacuum Pump Control Unit G

255783 (OVR26)

- Regulates motor speed of vacuum pump to control the degree of vacuum
- Wireless interconnection with VR102S

Included accessories:

- N820G mounting bracket 1 pc.
- Hexagon wrench 1 pc.
- M4 hexagon socket head cap screw 3 pcs.

Compatible pump:
Yamato Scientific N820G

Stand

255770 (ORT10)

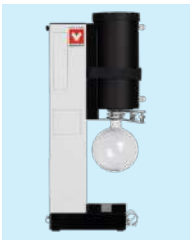
- Stand for VR102S and vacuum pump
- Power supply to this unit is either RE connection cable or AC adapter
- Includes waste liquid trap bottle (250 ml) 255772 (ORT14)

Exhaust Trap Kit

255771 (ORT12)

- Used as a solvent recovery unit by installing onto ORT10 stand.
- Comes with an exhaust trap, 500 ml flask, tray, connection hose on the OUT side, and a set of attachment brackets

Solvent Recovery Unit



RT302 (255378)

- Allows efficient solvent recovery by cooling water circulation
- Connected to the exhaust side of a diaphragm vacuum pump
- Combination of stand (255770) and exhaust trap kit (255771)

Set Guide

Set Combination

STANDARD SET
MAIN UNIT + BATH + GLASSWARE SET

RE- 202 - A W A

Main unit	
202	115V
212	220V

Glassware set	
A	Traditional (diagonal)
B	Standard (vertical)
C	Cold Finger (vertical)

Territory
USA

	Water / Oil bath		
Code	Model	Voltage	Capacity
W	BM302	115V	5L
W2	BM312	220V	5L
O	BO302	115V	5L
O2	BO312	220V	5L

SET WITH VACUUM CONTROLLER
MAIN UNIT + VACUUM CONTROLLER + BATH + GLASSWARE SET

REV - 212M - B W2 A

With Vacuum Controller
VS102S

Glassware set	
A	Traditional (diagonal)
B	Standard (vertical)
C	Cold Finger (vertical)

Territory
USA

Main unit	
202	115V
212	220V

	Water / Oil bath		
Code	Model	Voltage	Capacity
W	BM302	115V	5L
W2	BM312	220V	5L
O	BO302	115V	5L
O2	BO312	220V	5L

Basic Set Selection Chart

Model	Glassware			Water Bath		Oil Bath		Vacuum Controller
	A	B	C	BM302	BM312	BO302	BO312	
RE-202-AWA	●			●				
RE-202-BWA		●		●				
RE-202-CWA			●	●				
RE-202-AOA	●					●		
RE-202-BOA		●				●		
RE-202-COA			●			●		
RE-212-AW2A	●				●			
RE-212-BW2A		●			●			
RE-212-CW2A			●		●			
RE-212-AO2A	●						●	
RE-212-BO2A		●					●	
RE-212-CO2A			●				●	
REV-202M-AWA	●			●				●
REV-202M-BWA		●		●				●
REV-202M-CWA			●	●				●
REV-202M-AOA	●					●		●
REV-202M-BOA		●				●		●
REV-202M-COA			●			●		●
REV-212M-AW2A	●				●			●
REV-212M-BW2A		●			●			●
REV-212M-CW2A			●		●			●
REV-212M-AO2A	●						●	●
REV-212M-BO2A		●					●	●
REV-212M-CO2A			●				●	●

Set Variation

SET 1 FOUNDATIONAL SET
Includes a space-saving glassware set B (vertical condenser) and water bath. Also available in glassware set A (diagonal condenser) and glassware set C (cold finger diagonal condenser)

Product code	RE-202-BWA
RE202	*Rotary evaporator*
RG202B	*Glassware set B (vertical condenser)*
BM302A	*Water bath*

SET 2 BASIC SET
Includes a space-saving glassware set B (vertical condenser), water bath and vacuum pump.

Product code	RE-202-BWA-BSC
RE202	*Rotary evaporator*
RG202B	*Glassware set B (vertical condenser)*
BM302A	*Water bath*
N820GKIT	*Diaphragm vacuum pump & hose*

SET 3 STANDARD SET
Includes a space-saving glassware set A (diagonal condenser), water circulator (chiller), water bath and vacuum pump.

Product code	RE-202-AWA-STD
RE202	*Rotary evaporator*
RG202A	*Glassware set A (diagonal condenser)*
BM302A	*Water bath*
CF303Y	*Water circulator (chiller)*
221581	*Insulation hose 2 pcs.*
N820GKIT	*Diaphragm vacuum pump & hose*

SET VARIATION

SET 4 COMPLETE SET 1

*Similar to Set 3 (glassware set B, water circulator, water bath and vacuum pump) but with the addition of a **vacuum controller** and a **trap bottle**. User friendly and space saving.*

Product code	REV-202M-BWA-CMPT
REV202M	*Rotary evaporator with vacuum controller*
RG202B	*Glassware set B (vertical condenser)*
BM302A	*Water bath*
CF303Y	*Water circulator (chiller)*
221581	*Insulation hose 2 pcs.*
N820GKIT	*Diaphragm vacuum pump & hose*
255783	*Vacuum pump control unit G (OVR26)*
YS22Z0020	Water liquid trap bottle

SET 5 COMPLETE SET 2

*Similar to Set 4, this comes with a rotavap with vacuum controller, glassware B, chiller, water bath and vacuum pump. In addition, it considers environment protection and odor measures by improving collection efficiency through a **secondary trap.***

Product code	
REV202M	*Rotary evaporator with vacuum controller*
RG202B	*Glassware set B (vertical condenser)*
BM302A	*Water bath*
255770	*Stand (ORT10)*
255771	*Exhaust trap kit (ORT12)*
CF303Y	*Water circulator (chiller)*
221581	*Insulation hose 2 pcs.*
281330	*Insulation hose (OA094) 1 pc.*
N820GKIT	*Diaphragm vacuum pump & hose*
255783	*Vacuum pump control unit G (OVR26)*

SET 6 "USE YOUR OWN VACUUM PUMP" SET

*A complete set with a rotavap with vacuum controller, space-saving glassware set B (vertical condenser), water circulator (chiller) and water bath, combined with your **existing vacuum pump**. Vacuum pump is manually and continuously operated.*

Product code	
REV202M	*Rotary evaporator with vacuum controller*
RG202B	*Glassware set B (vertical condenser)*
BM302A	*Water bath*
CF303Y	*Water circulator (chiller)*
221581	*Insulation hose 2 pcs.*

SET 7 DOUBLE PERFORMANCE SET

A combination that connects two complete sets of rotary evaporator (glassware set B, water bath and vacuum pump) with one water circulator (CF802) that can be installed under the laboratory table or fume hood, and a secondary trap.

Product code	Qty	
REV202M	2	*Rotary evaporator with vacuum controller*
RG202B	2	*Glassware set B (vertical condenser)*
BM302A	2	*Water bath*
CF802A	1	*Water circulator (chiller)*
281478	1	*Secondary trap (OCF84)*
221581	2 sets	*Insulation hose 2 pcs.*
N820GKIT	2	*Diaphragm vacuum pump & hose*
255783	2	*Vacuum pump control unit G (OVR26)*

Diaphragm Vacuum Pump

255161 (N820G)

MADE IN DE

Chemically resistant, compact and oil-free diaphragm vacuum pump

Features

- Adjustable speed control
- Ideal for extremely aggressive/corrosive gases and vapors
- Clean, 100% oil-free operation

Applications

- Rotary evaporator
- Evaporating system
- Vacuum concentrator
- Vacuum filtration
- Vacuum drying systems
- Centrifuge
- Medical / Pharmaceutical equipment
- Analysis / scientific equipment

Specifications

Model	255161 (N820G)
Ultimate vacuum (mbar abs.) Minimum speed: *Gas ballast closed* *Gas ballast open* Maximum speed: *Gas ballast closed* *Gas ballast open*	 ≤ 6 ≤ 17 ≤ 8 ≤ 15
Flow rate at atm. pressure (l/min) *Min. speed* *Max. speed*	 9 20
Permissible ambient temperature	+10°C to + 40°C
Diaphragm material	PTFE-coated
Device protection	Overcurrent protection Overtemperature protection (drive) Blocking protection (drive)
Voltage (V)	100-240
Frequency (Hz)	50/60
Max. operating current (A)	0.66
Dimensions LxWxH (mm)	259 x 163 x 220
Weight (kg)	8.8

Vacuum Pump Guide

Assembly No.	Components	Applicable products
N820GKIT	N820G Diaphragm Vacuum Pump (255161) Vacuum hose (255297)	All RE Series Rotary Evaporators

Pump Materials

Assembly	Material
Pump head	Modified PTFE
Diaphragm	PTFE-coated
Valve	FFPM
Interconnection	PTFE / FFPM
Hose connector	PTFE / FFPM
Gas ballast	PTFE / FFPM

Design

1 Pneumatic pump inlet

2 Handle

3 Rotary / push knob

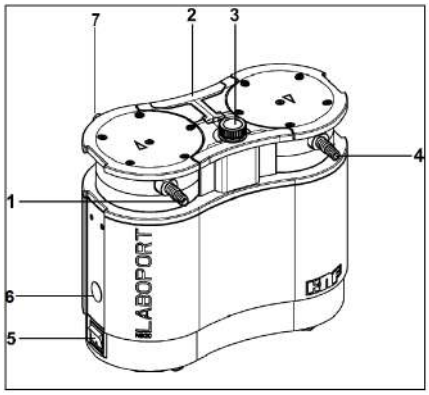
* Swtching pump on and off
* Adjusting pump speed

4 Pneumatic pump outlet

5 Power switch

6 Signal cable connection port with cap

7 Control knob for gas ballast



Function Diaphragm Pump

1 Outlet valve

2 Inlet valve

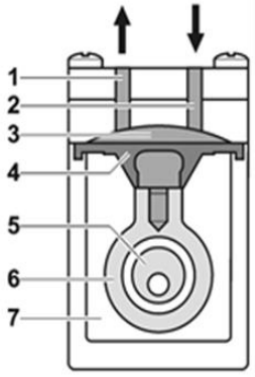
3 Transfer chamber

4 Diaphragm

5 Eccentric

6 Connection rod

7 Pump drive



SINCE 1889

Yamato Scientific America

Yamato Spray Dryer

Contents

SINCE 1889

Yamato

Spray Dryer

Suitable for water soluble samples

Organic Solvent Recovery Unit

Required for organic solvent samples

Economical System

ADL311SA

With GF300 Glassware set

Versatile System

GB210A

For Spray Drying

GF300

For Spray Drying

GB210

Without glassware

Selectable Glassware

GF200

For Granulating

GB210B

For Granulating

GAS410

Organic Solvent Recovery Unit

Large Capacity System

DL410

Spray Dryer

Compact & Economical

ADL311SA

MADE IN CH

Water evaporation rate	Max.1300mL/h	Temp. control range	40~220°C	Sample flow	Max. 26mL/min.	Spray nozzle (selectable)	Nozzle for liquid Nozzle for gas	Customer benefit	Compact Economical

Easily micronize liquid samples with a spray dryer

ADL311SA: For aqueous soluble samples

(When organic solvent is used, a GAS410 organic solvent recovery unit is required.)

- Easy setup, easy operation
- Suitable for heat sensitive samples. High heat is not directly applied to dry, fine powder
- Obtain contaminant free fine powder which is not oxidized and contains minimal moisture
- Direct drying of solution or solution liquid into fine powder. No pre- or post processes such as filtration, separation, or pulverization required
- Safe and explosion free working is guaranteed in combination with GAS410 due to oxygen & pressure control
- Organic solvents are recovered in a closed loop to protect the environment to enable minimized pollution
- Easy operation with one-touch detachable mechanism for drying chamber and cyclone
- An arm jack is equipped as standard for easy installation and removal of glassware attachments
- A service outlet (max.2A) and a sample stand are equipped as standard for connecting a magnetic mixer for stirring suspended liquid samples
- Unique peristaltic pump, nozzle cooling mechanism, pulse jet mechanism and a nozzle knocker for stable spray drying
- ADL311SA is highly mobile on wheels, or usable with shorter height as a bench top unit by removing the movable caster

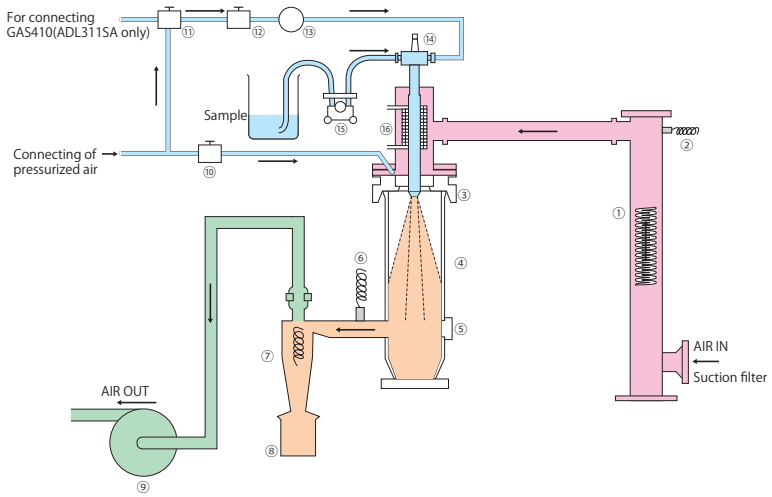
Example of installation: ADL311SA + GAS410

Specifications

Model	ADL311SA
Supported samples	Water soluble samples
Evaporated water amount	Max. 1300mL/h
Spraying system	Two-way nozzle, Nozzle No. 1A as standard (0.4mm)
Temp. adjusting unit setting range	40 to 220°C (inlet temperature), 0 to 98°C (outlet temperature)
Temperature adjusting accuracy	Inlet temperature±1°C
Drying air amount adjusting range	0 to 0.7m³/min
Spray air pressure adjusting range	0 to 0.3MPa
Liquid sending pump flow rate range	0 to 26 mL/min
Spray air line washing function	Spraying at the nozzle tip, manual pulse jet system
External output	Inlet temperature, outlet temperature, temperature outlet (4-20 mA)
Temperature adjusting device	PID digital temperature adjusting device
Touch panel	Blower, heater, liquid sending pump, pulse jet switch, error display
Control select switch	Inlet temperature, outlet temperature control switch (outlet temperature control is conditional)
Temperature sensor	K-thermocouple
Heater	2.0kW(at200V) to 2.88kW(at240V)
Liquid sending pump	Fixed amount peristaltic pump
Spraying air pump	For water soluble samples air compressor is used (sold separately). For organic solvent samples the integrated compressor in GAS410 is used (no separate air compressor required)
Service outlet	For stirrer: AC115V, Max 2A
Suction blower	Bypass blower
Filter	Suction filter, exhaust filter
Recovery of solvent	Solvent recovery unit GAS410 (sold separately) is used
Spray nozzle cooling mechanism	Connector: nipple x 2, O.D.: ø10.5mm
Spray air connection diameter	Nipple diameter: ø7mm
Spray air pressure	Bourdon tube: 0.3 MPa
Exhaust connecting diameter	ø50mm
Safety function	Inlet/outlet temperature overheat, sample feed reverse rotation mechanism, over current electric leakage breaker, nozzle connection error
External size	W580 x D420 x H1125 mm
Weight	80kg
Power supply (50/60 Hz)	Single Phase AC200V~240V 16~18A Switching of terminals necessary
Accessories	Silicon tubes (with a stopper) x 3, exhaust duct (with one hose band) x 1, outlet temperature sensor, spray air tube, sample box, static electricity removal earth, "Teflon" braided tube hose 5m (with two hose bands)

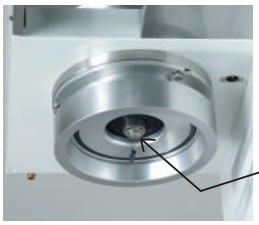
Control Panel

Diagram



No.	Part name	No.	Part name
(1)	Heater	(9)	Blower
(2)	Inlet temperature sensor	(10)	Solenoid valve
(3)	Distributor	(11)	3-way solenoid valve (ADL311SA only)
(4)	Drying chamber	(12)	Needle valve
(5)	Cap	(13)	Pressure meter
(6)	Outlet temperature sensor	(14)	Spray nozzle
(7)	Cyclone	(15)	Liquid sending pump
(8)	Product collecting container	(16)	Nozzle cooling mechanism connecting port

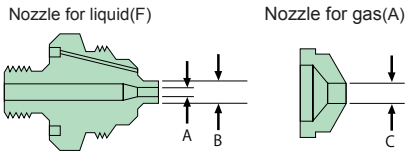
Spraying Nozzle



The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

Two-way nozzle system

Easy to take apart for cleaning to prevent contamination



Model	Nozzle No.	Size (μm)
1A (Standard)	(F)1650	A 406 B 1270
	(A)64	C 1626
1	(F)2050	A 508 B 1270
	(A)64	C 1626
2A	(F)2050	A 508 B 1270
	(A)70	C 1778
2	(F)2850	A 711 B 1270
	(A)70	C 1778
3	(F)2850	A 711 B 1270
	(A)64	C 1626

Particle sizes may vary on samples used and parameter settings.

Piping

ADL311SA+GAS410

Optional items

Product Name	Product Code
Fine powder recovery cyclone	212780
Safety cover	212784
Static removal brush set	212788
Viton packing for cyclone inlet/outlet (1 set of 2 types)	212781
Teflon packing for cyclone inlet/outlet (1 set of 2 types)	212782
Airfilter + Mist separator + Regulator set	212789
Supply air filter box (for 0.3 micro meter collection)	212790
Air compressor	SL100-8

Applications

- Food and medicinal products
  Powdered milk, egg yolks, soy sauce, coffee, starches, proteins, hormones, serums, antibiotics, enzymes, fragrances,essences, etc.
- Organic chemistry
  Waxes, dies, cleaning agents, surface acting agents, agricultural chemicals, antiseptic agents, synthesized resins, pigments, etc.
- Inorganic chemistry
  Ferrites, ceramics, photocopy toners, magnetic tapes materials, photosensitive materials, various industrial chemicals, waste fluid samples, etc.

Example of implementation (spray dryer ADL311SA)

Sample name	Composition (%)	Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure (MPa)	Sent amount of sample liquid (g/min)	Sample recovery rate (%)
Dextrin (solution)	10	150	80	0.4	0.1	6.1	66
Dextrin (emulsion)	40	150	80	0.4	0.1	5.1	63
Oxidized titanium (suspended liquid)	10	150	85	0.42	0.1	5.3	50
Soy sauce	50	130	75	0.36	0.1	5.1	60
Salt	10	145	85	0.38	0.1	5.3	52

Repeatability of spray drying test (spray dryer ADL311SA)

Test No.	Sample name	Sample density (%)	Drying conditions							Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure (MPa)	Test sample amount (g/min)	Sent amount of sample liquid (g/min)	Test time (min)		
1	Coffee solution	5.00	150	75	0.45	0.15	93.1	3.1	30	4.3	92.4
2	Coffee solution	5.00	150	75	0.45	0.15	93	3.1	30	4	86
3	Coffee solution	5.00	150	75	0.45	0.15	91.4	2	30	4	87.5
4	Coffee solution	5.00	150	75	0.45	0.15	84.9	2.8	30	3.7	87.2
5	Coffee solution	5.00	150	75	0.45	0.15	83.8	2.8	30	3.7	88.3

Spray Dryer Pulvis Mini Spray

Supports spray drying of fine powder of 1μm

GB210A

MADE IN CH

Evaporated water	Max.1300ml/h
Temp. control range	40 to 220°C
Sample flow	Variable up to 26ml/min
Spray nozzle (selectable)	Nozzle for liquid Nozzle for gas

Capable of drying ultra small samples as low as 0.5g of solid content
Can spray dry into fine powder 1μm in size when optional mini cyclone is used

Compact spray dryer that can produce powder easily on a laboratory scale. It is capable of variety of applications from preliminary experiments in a pilot plant to drying work in general laboratories.

- Samples unstable at high temperatures can be reliably processed into fine powder. The heat is applied instantly and indirectly to the powder itself
- Prepared fine powder will not be oxidized, contains minimal moisture and is contaminant-free
- Direct drying from solution/suspension liquid to fine powder with a reduced risk of contamination. No pre or post processes such as filtration, separation, or pulverization are required
- Processing of samples containing organic solvents is made possible by connecting the Solvent Recovery Unit GAS410
- This unit can also be used as a fluid bed drying granulator by installing a separate mini bed attachment GF200 instead of GF300 spray drying attachment
- An automatic lift is equipped as standard to enable easy installation or removal of glass drying chamber attachment
- A service outlet (max. 2A) and a sample stand are equipped as standard for connecting a magnetic mixer for stirring suspended liquid sample
- Stable spray drying using a unique peristaltic pump, nozzle cooling mechanism, pulse jet mechanism and a nozzle knocker enable stable spray drying

Specifications

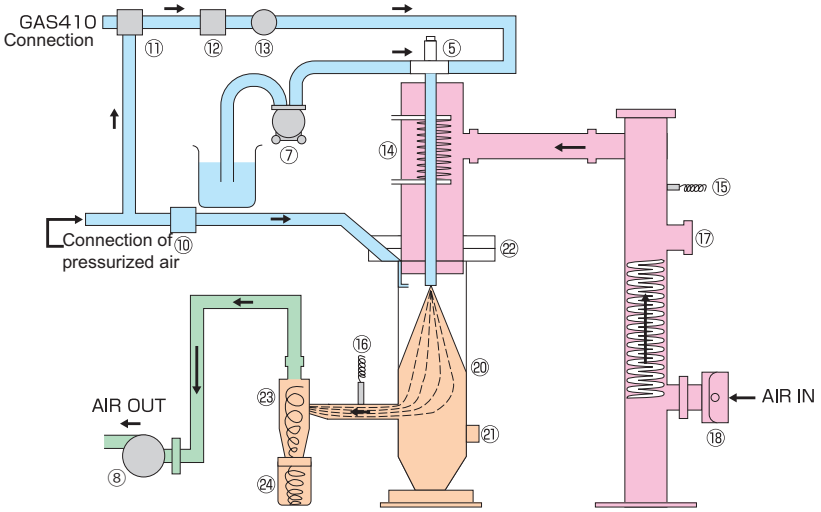
Model	GB210A
Temp. adjusting unit setting range	40 to 220°C (inlet temperature), 0 to 60°C (outlet temperature)
Temperature adjusting accuracy	Inlet temperature±1°C
Spraying system	Two-way nozzle, Nozzle No. 1A as standard
Drying air amount adjusting range	0 to 0.7m³/min
Spray air pressure adjusting range	0 to 0.3MPa
Liquid sending pump flow rate range	0 to 26 ml/min
Spray air line washing function	Spraying at the nozzle tip, manual pulse jet system
External output	Inlet temperature, outlet temperature, temperature outlet (4-20 mA)
Automatic lift	Moving up/down of glass chamber automatic lift
Temperature adjusting device	PID digital temperature adjusting device
Touch panel	Blower, heater, liquid sending pump, pulse jet switch, error display
Control select switch	Inlet temperature, output temperature control switch (outlet temp. control is conditional)
Temperature sensor	K-thermocouple
Heater	2.0 kW (at 200V) to 2.88 kW (at 240V)
Liquid sending pump	Fixed amount peristaltic pump
Spraying air pump	Spraying air compressor (sold separately) is used.
Service outlet	For stirrer: AC100V, Max. 2A
Suction blower	Bypass blower, brushless DC motor
Filter	Suction filter, exhaust filter
Recovery of solvent	Solvent recovery unit GAS410 (sold separately) is used.
Spray nozzle cooling mechanism	Connector: nipple x 2, O.D.:ø10.5 mm
Spray air connection diameter	Nipple diameter:ø7 mm
Exhaust connecting diameter	ø50mm
Safety function	Inlet/outlet temperature overheat, sample feed reverse rotation mechanism, over current electric leakage breaker, nozzle connection error
External size	W760 x D420 x H1350 mm
Weight	110kg
Power supply (50/60Hz)	Single Phase AC200V~240V 16~18A Switching of terminals necessary
Accessories	Silicon tube (with a stopper) x 3, tiron tube (with a stopper) x 2 exhaust duct (with one hose band) x 1, outlet temperature sensor, spray air tube, sample box, static electricity removal earth, Teflon braided hose 5m (with two hose bands), a container table

Control Panel

Inlet temperature, outlet temperature, and drying air amount are digitally displayed. Setting is made on the touch panel that allows operation settings, operation status display as well as error display, and settings of various operation conditions.

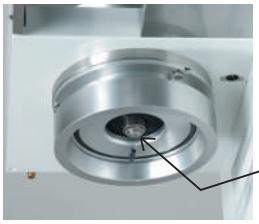
Mini spray attachment	GF300
Evaporated water amount	MAX1300mL/h
Sample for drying	Suspended solution, emulsion
Ultra hard glass	Cyclone, drying chamber, product container

Diagram



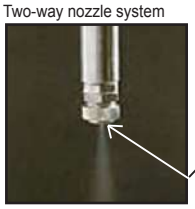
No.	Part name	No.	Part name
(1)	Heater	(16)	Outlet temperature sensor
(5)	Spray nozzle	(17)	Blind
(7)	Liquid sending pump	(18)	Suction port, suction filter
(8)	Blower, exhaust filter	(19)	Nozzle cooling connection port
(10)	Solenoid valve	(20)	Drying chamber
(11)	3-way solenoid valve	(21)	Cap
(12)	Needle valve	(22)	Distributor
(13)	Pressure meter	(23)	Cyclone
(14)	Nozzle cooling port	(24)	Product collecting container
(15)	Inlet temperature sensor		

Spraying Nozzle



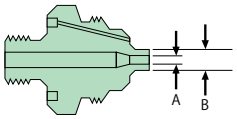
The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

Two-way nozzle system

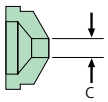


Easy to take apart for cleaning to prevent contamination

Nozzle for liquid(F)



Nozzle for gas(A)



Model	Nozzle No.	Size (μm)
1A (Standard)	(F)1650	A 406 B 1270
	(A)64	C 1626
1	(F)2050	A 508 B 1270
	(A)64	C 1626
2A	(F)2050	A 508 B 1270
	(A)70	C 1778
2	(F)2850	A 711 B 1270
	(A)70	C 1778
3	(F)2850	A 711 B 1270
	(A)64	C 1626

Particle sizes may vary on samples used and parameter settings.

Applications

- Food and medicinal products: Powdered milk, egg yolks, soy sauce, coffee, starches, proteins, hormones, serums,antibiotics, enzymes, fragrant materials, essences, etc.
- Organic chemistry: Waxes, dies, cleaning agents, surface acting agents, agricultural chemicals, antiseptic agents, synthesized resins, pigments, etc.
- Inorganic chemistry: Ferrites, ceramics, photocopy toners, magnetic tape materials, photosensitive materials, various industrial chemicals, waste fluid of samples, etc.

Optional items

Product name	Product code
Fine grain sample collecting cyclone	212780
Safety cover	212784
Static removal brush set	212788
Air filter + Mist separator + Regulator set	212789
Supply air filter box (for 0.3 μm collection)	212791

Handling

The one touch removal system has made the removal and cleaning of the drying chamber, the cyclone, and the product container much easier.

Organic Solvent Recovery Unit GAS410

Repeatability of spray drying test

Test No.	Sample name	Sample density (%)	Drying conditions							Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure kPa(kg/cm^2)	Test sample amount (g)	Sent amount of sample liquid (g/min)	Test time (min)		
1	Coffee solution	5	150	80	0.45	147(1.5)	198	6.6	30	8.1	81.8
2	Coffee solution	5	150	80	0.45	147(1.5)	198.7	6.6	30	8.1	81.5
3	Coffee solution	5	150	80	0.45	147(1.5)	200.6	6.7	30	8	79.8
4	Coffee solution	5	150	80	0.45	147(1.5)	198.1	6.6	30	8.2	82.8
5	Coffee solution	5	150	80	0.45	147(1.5)	199.3	6.6	30	8.4	84.3

Spray Dryer Pulvis Mini Bed

Spray Dryer (For Granulating, Drying, Mixing)

GB210B

MADE IN CH

Processing capacity: 50g to 300g | Temp. control range: 40 to 220°C | Sample flow: Variable up to 26ml/min | Spray nozzle (selectable): Nozzle for liquid, Nozzle for gas

Spray dryer capable of granulating and drying wet powder

Designed to granulate powder and dry wet powder using a fluid bed. This is a fluid bed drying granulator used in combination with the basic unit GB210 and Mini-bed attachment GF200.

- Conditions such as hot air temperature, air amount, binder liquid flow amount can be set easily with the setting dial on the front of the unit
- The chamber is made of ultra hard glass and the user can observe status of the fluid bed or spraying status. Also, the flowage meter, the spraying pressure meter, the chamber inlet/outlet temperature indicator are useful for evaluation of data
- The unit can also be used as a spraying dryer by installing the mini spray attachment GF300 (optional)
- The unit has an automatic lift as a standard to enable convenient installation or removal of the glass chamber attachment

Specifications

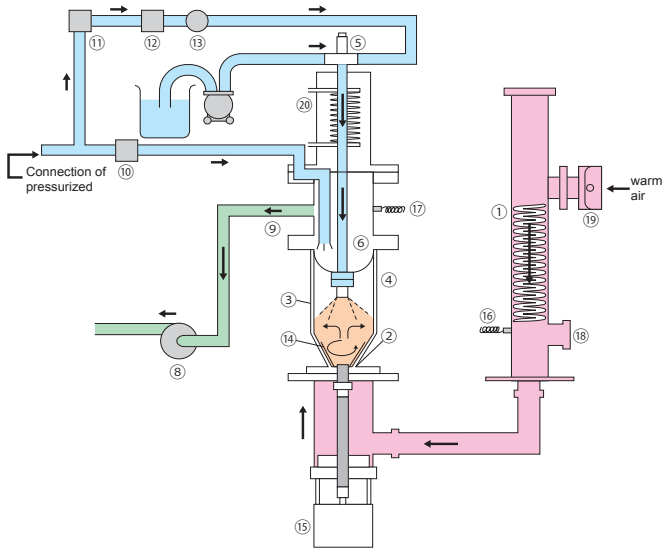
Model	GB210B
Temp. adjusting unit setting range	40 to 220°C (inlet temperature), 0 to 98°C (outlet temperature)
Temperature adjusting accuracy	Inlet temperature ± 1°C
Spraying system	Two-way nozzle, Nozzle No. 1A as standard
Drying air amount adjusting range	0 to 0.7m³/min
Spray air pressure adjusting range	0 to 0.3MPa
Liquid sending pump flow rate range	0 to 26mL/min
External output	Inlet temperature, outlet temperature, temperature outlet (4-20 mA)
Automatic lift	Moving up/down of glass chamber automatic lift
Temperature adjusting device	PID digital temperature adjusting device
Touch panel	Blower, heater, liquid sending pump, pulse jet switch, error display
Control select switch	Inlet temperature, output temperature control switch (outlet temp. control is conditional)
Temperature sensor	K-thermocouple
Heater	2.0 kW (at 200V) to 2.88 kW (at 240V)
Liquid sending pump	Fixed amount peristaltic pump
Spraying air pump	Spraying air compressor (sold separately) is used
Service outlet	For stirrer: AC100V, Max. 2A
Suction blower	Bypass blower, brushless DC motor
Filter	Suction filter, exhaust filter
Spray nozzle cooling mechanism	Connector: nipple x 2, O.D.: ø10.5mm
Spray air connection diameter	Nipple diameter: ø7mm
Exhaust connecting diameter	ø50mm
Safety device	Inlet/outlet temperature overheat, sample feed reverse rotation mechanism, over current electric leakage breaker, nozzle connection error
External dimensions	W760 x D420 x H1350 mm
Weight	~110 kg
Power supply (50/60Hz)	Single Phase AC200V~240V 16~18A Switching of terminals necessary
Accessories	Silicon tube (with a stopper) x 3, tiron tube (with a stopper) x 2, exhaust duct (with one hose band) x 1, outlet temperature sensor, spray air tube, sample box, static electricity removal earth, Teflon braided hose 5m (with two hose bands), container table

Control Panel

Inlet temperature, outlet temperature, and drying air amount are digitally displayed. Setting is made on the touch panel that allows operation settings, operation status display as well as error display, and settings of various operation conditions.

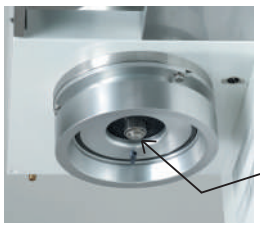
Mini bed attachment	GF200
Processing capacity	50 to 300g (It differs depending on whether the unit is of the batch type or specific samples used.)
Flow layer chamber capacity	3L
Spray nozzle	Dual fluid nozzle: 1A standard
Stirring blades	Integrated inside the flow layer chamber
Filter	Polyester (Carbon fiber mixed PTFE membrane laminate)
Filter cleaning mechanism	Pulse jet system
Glass parts	Ultra hard glass
Weight	~13 kg

Diagram



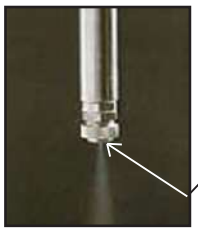
No.	Part name	No.	Part name
(1)	Heater	(11)	3-way solenoid valve
(2)	Micro porous plate	(12)	Needle valve
(3)	Flow layer chamber	(13)	Pressure meter
(4)	Filter chamber	(14)	Stirring blades
(5)	Nozzle	(15)	Stirring motor
(6)	Filter	(16)	Inlet temperature sensor
(7)	Liquid sending pump	(17)	Outlet temperature sensor
(8)	Blower	(18)	Blind
(9)	Interim pipe	(19)	Suction port, suction filter
(10)	Solenoid valve	(20)	Nozzle cooling connection port

Spraying Nozzle



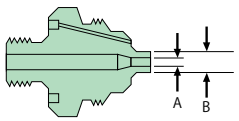
The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

Two-way nozzle system

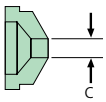


Easy to take apart for cleaning to prevent contamination

Nozzle for liquid(F)



Nozzle for gas(A)



Model	Nozzle No.	Size (μm)
1A (Standard)	(F)1650	A 406 B 1270
	(A)64	C 1626
1	(F)2050	A 508 B 1270
	(A)64	C 1626
2A	(F)2050	A 508 B 1270
	(A)70	C 1778
2	(F)2850	A 711 B 1270
	(A)70	C 1778
3	(F)2850	A 711 B 1270
	(A)64	C 1626

Particle sizes may vary on samples used and parameter settings.

Applications

- Granulation, drying, mixing of powder

Applications:
Medicines, food, catalyst, die, detergent, ceramics, etc.

The unit accepts sample weight as less as 50 to 300g and is suitable for experiments of expensive samples or those of a laboratory level.

Handling

Use of the one touch removal system has made removal or cleaning of the drying chamber, cyclone or the product container much easier.

Optional items

Product name	Product code
Safety cover	212784
Viton packing for cyclone inlet/outlet (1 set of 2 types)	212781
Teflon packing for cyclone inlet/outlet (1 set of 2 types)	212782
Air filter + Mist separator + Regulator set	212789
Supply air filter box (for 0.3 μm collection)	212791

Example of implementation

Sample		Binder			Test conditions					Results	
Name	Weight (min)	Name	Density (%)	Spray amount (min)	Inlet temp. (°C)	Liquid sending rate (g/min)	Spray pressure kPa (kg/cm²)	Spray times (times)	Nozzle height (cm)	Average dia. (μm)	12~115 mesh recovery rate(%)
Silicon	200	PVA	5.0	77	125	15	59 (0.6)	4	27	339	58
Oxidized iron	160	PVA	2.5	50	120	15	98 (1.0)	4	21	205	62
Ceramics	200	PVA	3.0	106	120	15	78 (0.8)	3	22	404	82
Alumina	160	PVA	3.0	60	110	15	59 (0.6)	4	22	311	88
Silica	150	CMC	1.0	100	120	15	78 (0.8)	4	22	306	60
Lactose	200	Sorbitol	70.0	10	100	14	98 (1.0)	4	25	390	80
Black tea essence	250	Guar gum	0.5	24	85	6	59 (0.6)	10	28	333	77
Grease containing powder	200	Glucose	30.0	11	85	4	59 (0.6)	7	22	236	82

*The average granule diameter is a geometric average.

Spray Dryer

Large Capacity / Fine powder: 1 to 100μm

DL410

MADE IN CH

Evaporated water	Max. 3000mL/h	Temp. control range	40 to 300°C	Sample flow	Variable up to 70ml/min.	Spray nozzle (selectable)	Two-way nozzle	Operation	Easy operation

Spray drying of fine powder as small as a single micrometer with high collection rate

This spray dryer can produce fine particles from 1 to 100μm which are considered to be extremely difficult to produce in laboratories. It is useful for preliminary tests for pilot plant or expensive samples, micro capture spray drying research, substitute for general laboratory drying method etc.

DL410 is a larger capacity spray dryer that also does not require the liquid sample or solution to undergo any pre or post-processes such as filtration, separation, or pulverization. The use of organic solvents is fully supported with the attachment of our GAS410 organic solvent recovery unit. Small, expensive and/or heat sensitive samples can be dried quickly and efficiently with this easy to operate system.

- Processes samples as small as 0.5 g of solid matter
- Safe for heat-sensitive samples, such as food or medical products
- No risk of contamination
- Digital display of inlet/outlet temperature and drying air volume
- Detachable drying chamber, cyclone and product vessel
- Fast and easy clean up
- Universal power supply and multilingual touch screen controller

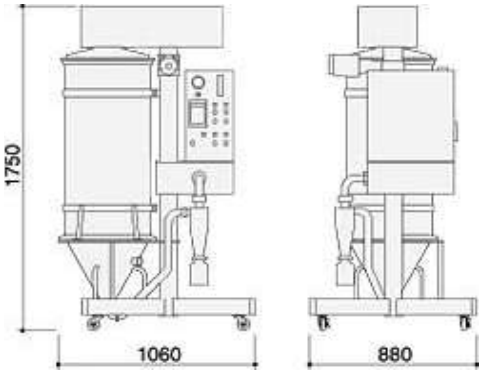
Easy operation and maintenance

- The hot air inlet and drying chamber cover automatically move up and down, and since the cyclone and product vessel can easily be removed, cleaning and maintenance after your experiment is easy
- Control functions are conveniently arranged on the control panel for various conditions
- The temperature recorder, air flow meter, pressure gauge and other measurements allow easy control of experiment conditions

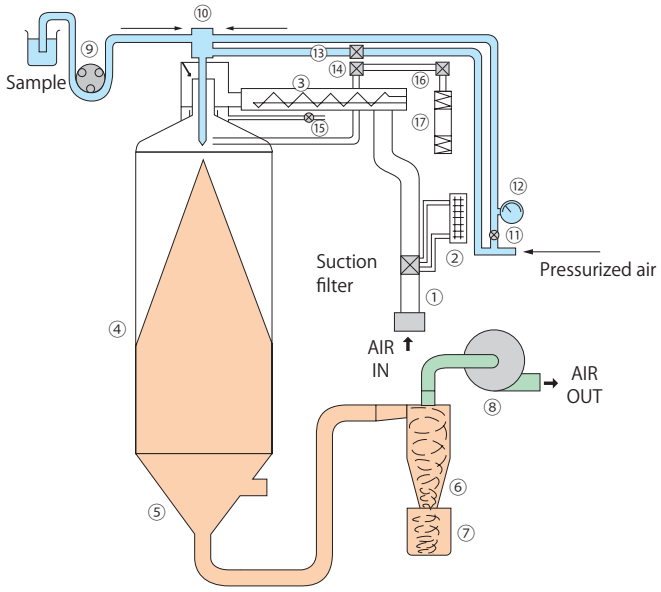
Specifications

Model	DL410
Water evaporation rate	Max. approx. 3,000 ml/h
Temperature control range	40°C - 300°C at inlet
Temperature control accuracy	± 1°C at inlet
Dry air flow rate	Max. 1.0 m³/min
Air spray pressure control range	0 - 600 k Pa (0-6 kg/cm²)
Spraying system	Two-way nozzle (Dia. of orifice: 0.7mm) Nozzle No.3 standard supply
Spray/hot air contact system	Downward spray parallel flow system
Temperature controller	PID digital temperature controller
Temperature sensor	K thermocouple
Stainless pipe heater	2kW x 2 at 240V
Sample liquid feeding pump	Quantitative peristaltic pump, flow rate variable up to 70ml/min.
Solvent recovering capability (optional)	Organic solvent recovery unit GAS410 must be used
Spray line cleaning	Needle inside the nozzle to clean the mesh automatically
Safety device	Self-diagnostic functions (e.g. temperature aberration); Sample feed reversal
Air spray pressure gauge	Bourdon tube: 600k Pa (6 kg/cm²)
External dimensions (W x D x H)	1060 x 880 x 1750 mm or 42 x 35 x 69 in
Weight	180 kg or 397 lbs
Power source	Single Phase AC220V 50/60Hz 24A
Included Accessories	
Sample liquid tube	Silicone tube - 2 pcs
Safety Cover	Yes
Static removal brush	1pc
Air hose	1 pc
Exhaust Duct	1 pc
Operational Accessories	
Compressed air	28 L/min air volume and 8 kgf/cm² compressed air is required
Type of gas	N_2 gas (99% or higher purity, medical grade) required when using GAS410
Optional Accessories	
Organic Solvent Recovery Unit	GAS410
Nozzle	4, 5 (options), 3 standard

Dimensions (Unit:mm)



Diagram



(1)Orifice tube
(2)Drying air flow meter
(3)Heater
(4)Drying chamber
(5)Drying chamber lower half
(6)Cyclone
(7)Product vessel
(8)Aspirator
(9)Sample feed pump
(10)Atomizing nozzle
(11)Atomizing pressure control valve
(12)Atomizing pressure gauge
(13)Needle knock Solenoid valve
(14)Nozzle blower Solenoid valve
(15)Cool air control valve
(16)Head elevation control valve
(17)Air cylinder for head elevation

Application

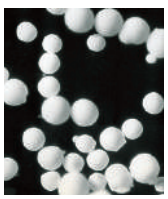
(1) Spray granulation
With the process of granulation and spheronization, powder liquidity is significantly improved and the pressure is uniform. Applications: aluminum, zirconia, ceramics, heavy metals, cemented carbide fields etc.

(2) Micro capture
In spray drying, the combination of core and coating material is a source solution to obtain encapsulated powder.

Applications:
- Ink for pressure-sensitive paper
- Adjustment of pharmaceutical products flavouring and lyolysis.
- Encapsulation of fragrances used in food and hygiene related products
- Encapsulation of dyes, fertilizers, oils, adhesives etc.

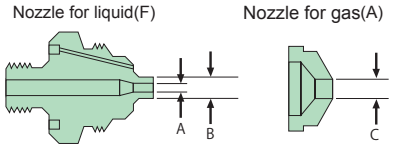
(3) Spray cooling granulation
Difficult to get dry powder, such as wax, oils and fats, fatty acids, etc.

(4) Special applications
Spray concentrated, spray reaction, powder sizing, etc.



Powder generated by DL410

Spraying Nozzle



Spraying Nozzle size (μm)

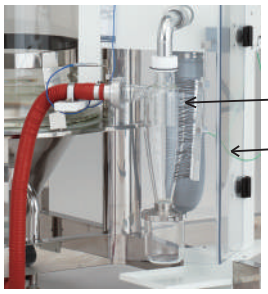
Model	Nozzle No.	Size (μm)
3 (Standard)	(F)2850	A 711 B 1270
	(A)64	C 1626
4	(F)60100	A 1530 B 2550
	(A)120	C 3060
5	(F)100150	A 2550 B 3825
	(A)180	C 4530

Particle sizes may vary on samples used and parameter settings.

Control Panel

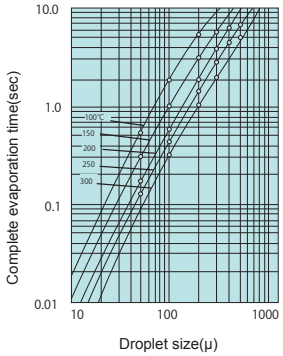
Multilingual touch screen controller

Equipment



Burn prevention safety cover and the static removal brush are standard equipment.

Time



Drying time until the liquid droplets are completely evaporated with hot air.

Organic Solvent Recovery Unit

Highly safe N_2 gas sealed circulation system

GAS410

MADE IN CH

Circulation flow 0.12 to 0.65m³/min | Recovery capacity 1,300ml/h or more | Cost savings With integrated freezer, With integrated compressor

Inert N_2 Gas Sealed System used in conjunction with Spray Dryers

The Organic Solvent Recovery Unit is used to prevent external discharge when using an organic solvent. Unit is used with a spray dryer (ADL311SA or GB-210A).

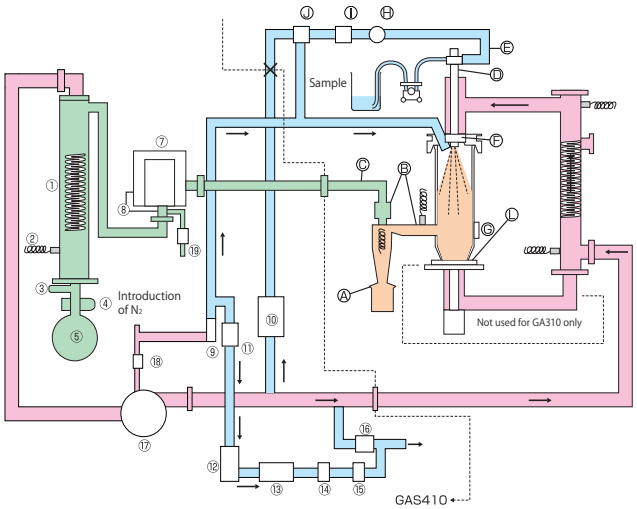
- Dehumidifier (Freezer) integrated in GAS410. No extra freezer/dehumidifier equipment needed
- Compressor included, no need for a separate compressor to operate the spray dryer ADL311SA when using organic solvent samples
- Flammable or toxic solvents can be processed by combining a N_2 gas sealed circulation system and a solvent recovery system (with freezer and capacitor)
- Explosion safety with closed loop N_2 inert gas system
- Recovery of solvent to protect the environment and enable minimized pollution.
- Drying of easily oxidized materials is possible
- Supports low temperature drying of materials that easily deform with heat
- No freezing risk due to organic solvent with aqueous solution mixtures which could cause damage to the closed loop GAS410 system
- Spray drying and recovery of products and solvents are performed with meticulously devised safety measures

Example of installation: ADL311SA + GAS410

Specifications

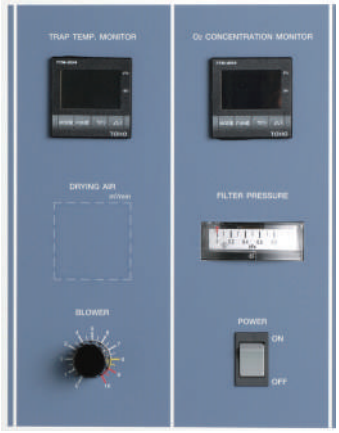
Model	GAS410
Solvent recovery system	Capacitor + freezer
Circulating gas	N_2 gas (sealed circulation when connected to ADL311SA or GB-210A)
Circulating volume flow	0.12 to 0.65m³/min
Compressor (for spraying)	Linear compressor integrated
Circulation blower	Roots blower
Solvent recovery container	2L flask
Freezer	Air-cooled condensation full-sealed type: 400W R404A
Solvent recovery mechanism	Capacitor cooling mechanism
Filter	Cartridge filter
Instruments	Cooling trap temperature display monitor Filter differential pressure meter (monitor for clogging of filter) O_2 density display monitor Blower wind amount adjusting volume
O_2 Sensor	Solid electrolyte (Zirconium) limit current type
Pump	For circulation to measure Oxygen
Safety device	O_2 density meter, flammable gas alarm, electric leakage breaker, N_2 gas forced introduction (when removing nozzles)
External dimensions	W700 x D950 x H1500 mm
Weight	~130 kg
Power source (50/60 Hz) rated current	AC200 to 240V 5A (15A)
Required N_2 amount	15 L/h at 0.1 MPa
Accessories	Set of connection parts, anti-seismic clamps, interface cable, sample gas for gas alarm inspection, 2L flask

Diagram



No.	Part name	No.	Part name
(1)	Capacitor	A	O ring
(2)	Sensor	B	Packing
(3)	Ball valve	C	Hose
(4)	Clamp	D	Spray nozzle
(5)	Recovery flask	E	Tube
(6)	Filter element	F	Aluminum honeycomb
(7)	Filter case	G	Cap
(8)	Differential pressure meter	H	Pressure meter
(9)	Flow meter (for introduction of N_2)	I	Needle valve
(10)	Compressor	J	3-way valve
(11)	Solenoid valve (for N2 control)	K	Solenoid valve
(12)	Flow meter (for measuring O2 density)	L	Packing
(13)	Filter		
(14)	Pump		
(15)	O_2 Sensor		
(16)	Solenoid valve (for exhaust)		
(17)	Blower		
(18)	Solenoid valve (for introduction of N_2)		
(19)	Solenoid valve (for air supply)		

Control Panel



Major control functions and detection function

- Closed system (N_2 gas sealed circulation type)
- O_2 density control function
- Flammable gas detection function
- Inlet temperature overheat detection function
- Outlet temperature overheat detection function
- In case of an abnormality, the alarm sounds and liquid flow stops
- Other self diagnostics functions
  - Detection of temp. sensor disconnection
  - Overheat prevention
  - Detection of absence of spray nozzle

Fields

- Non-oxide ceramics
- Polymer material
- Super conductivity materials
- Medicinal products
- Food products
- Material research

Connection

Rear of GAS410

ADL311SA + GAS410 + stand with caster wheels

Optional items

Product name	Product code
Filter element 0.1μ	212785
Viton packing for cyclone inlet/outlet (1 set of 2 types)	212781
Teflon packing for cyclone inlet/outlet (1 set of 2 types)	212782
Dry air flow meter (differential pressure type)*	212786

* The item marked "*" shall be ordered together with the main unit.

Organic Solvent Washing Unit

A unique vapor neutralizer using water or alkaline solution (Na_2CO_3, $NaHCO_3$)

GWS410

MADE IN CH

Max. flow 15L/min.

The world's first water-based solvent neutralizer designed primarily for spray dryers.

GWS410 traps contaminants in solvents by using tap water or alkaline solution at atmospheric pressure and room temperature.

GWS410 is designed with a washing tank --- when solvent vapor enters the tank, sprayed water adheres, cleans and neutralizes solvent particles, before returning to the bottom of the chamber.

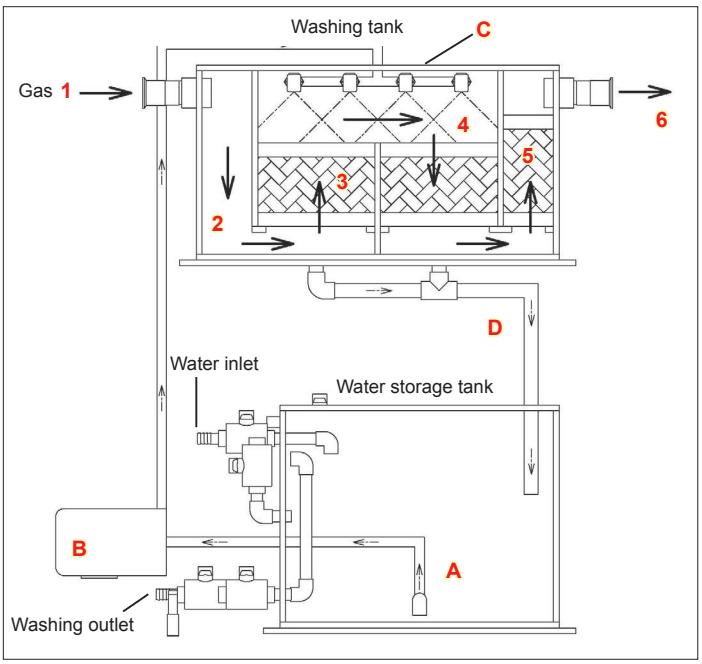
- Uses water or alkaline solution
- Eliminates harsh solvents
- Minimizes equipment rust and corrosion
- Simple operation
- Easy maintenance --- only requires monitoring of water's pH level in the storage tank and condition of molecular sieves

Specifications

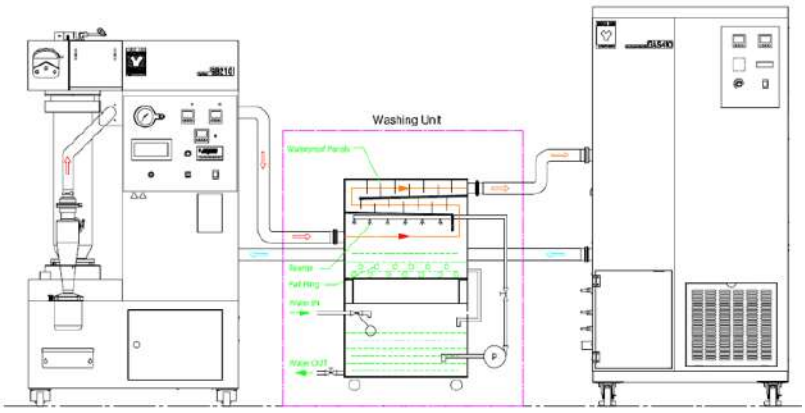
Model	GWS410
Method	Spraying circulation
Circulating liquid	Water
Circulating pump	Small magnetic force circulating pump
Max. flow	15L / min
Max. head	8m
Harmful gas washing way	Pall ring filling + water spray washing
Water storage tank capacity	35L
Safety device	Earth leakage breaker
Power source	AC200V 0.35A
Exterior dimension (WxDxH)*	800×500×1230 mm
Weight	Approx. 80kg

** Exterior dimension does not include protrusions.*

Flow Diagram



Sample Installation



Spray Dryer + GWS410 Solvent Vapor Neutralizer + GAS410 Organic Solvent Recovery Unit

(1) Harmful gas **1** from spray dryer enters into the washing tank unit.
(2) It goes through **2** inside the washing tank and the filling rooms **3** and comes in contact with the cleaning fluid **4** sprayed by the spray nozzle. The harmful substance is then absorbed by the cleaning fluid.
(3) Moving through multiple-stage filling rooms, the gas goes through the smog collector **5** to prevent cleaning fluid discharge.
(4) With the aid of the blower, the gas enters into **6** GAS410 as clean air.
(5) The cleaning fluid **A** from the water storage tank enters into the washing tank through the circulating pump **B**, it spreads to the filling rooms **3** by means of spray nozzle **C**, and then goes through the pipeline **D** to return to the circulating water in the water storage tank.

Spray Dryer Recommended Accessories

Air Compressor & Air Combination

Air Compressor SL100-8

For Spray Dryer ADL311SA, GB210A, GB210B, DL410

- Provides a stable source of oil free air
- Noiseless and oil free
- High flow, low noise, low vibration and low maintenance
- Automatic control and smooth operation

Specifications

Brand	SMTmax	
Model	SL100-8 (110V)	SL100-8 (220V)
Horsepower	2 x 3/4 HP	
Power	2X 550 W	
Starting Pressure (Mpa)	0.5	
Max Pressure (Mpa)	0.8	
Noise dB(A)	55	
Speed (r/min.)	1680	
Capacity (L/min)	220	
Cu. Ft. Delivered @ 115 PSI	7.8 CFM	
Tank	42 L (11 gal)	
Dimensions (L x W x H)	84 x 41 x 63 cm 33 x 16 x 25 in	
Voltage	110V, 50/60Hz, 10A	220V, 50/60Hz, 8A
Weight	47 kg (104 lbs)	

Air Combination 212789

For Spray Dryer ADL311SA, GB210A, GB210B

- To guarantee moisture-free, oil-free and clean air spray drying
- Element and bowl in one-piece for easy replacement (AF)
- Energy saving regulator (AR)
- Transparent bowl guard provides 360° visibility

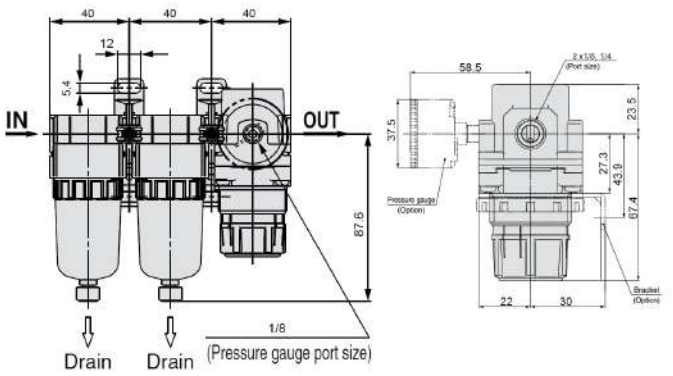
Specifications

Product name		Product code
Air combination		212789
Components	Air Filter [AF]	AF20
	Mist Separator [AFM]	AFM20
	Regulator [AR]	AR20

Model	AF20+AFM20+AR20
Ambient and fluid temperature	-5~60°C (with no freezing)
Max. operating pressure	145psi (1.0MPa)
Min. operating pressure	7.3psi (0.05MPa)
Set pressure range	7.3-102psi (0.05-0.7MPa)
Nominal filtration rating [AF/AFM]	AF: 5μm, AFM: 0.3μm (99.9 filtered particle size)
Outlet side oil mist concentration[AFM]	Max 1.0mg/m^3 (ANR) (≈0.8ppm)*
Bowl material [AF/AFM]	Polycarbonate
Bowl guard [AF/AFM]	Semi-standard (steel)
Weight	~0.39kg

*When the compressor oil mist discharge concentration is 30mg/m^3 (ANR).
Bowl seal and other o-rings are slightly lubricated.

Dimension (mm)



Reference Spray Dryer, Model Supporting Organic Solvent

Repeatability of granulation test

Mesh	#1	#2	#3	#4
12 and up	5.6	0.8	1.2	1.3
12~16	0.5	0.9	1	1.2
16~24	0.6	0.8	1.2	1.4
24~32	0.7	0.8	0.9	1.1
32~42	1.6	1.7	1.9	1.8
42~60	5.9	4.3	4.8	3.5
60~80	9.6	8.5	8.5	6.6
80~115	13.2	15.6	13.4	12.8
115 and under	66.8	66.6	67	70.6
Average particle size*	135.6	135.7	138.3	136.9

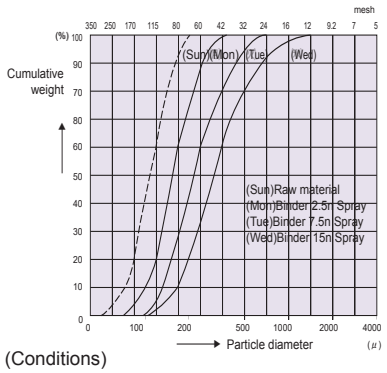
*Average particle diameter of the geometric mean

The granulation process has many operation factors, the reproducibility depends on the skill level of the operation. The flow state of the granules has a significant impact on the test results. By adjusting the amount of hot air consistent flow conditions are achievable.

(Conditions)

Raw material	Sintered alumina (average particle size 40) 400g
Binder	5% PVA solution (#500) 25g
Inlet temperature	100°C
Binder liquid feed rate	12.4g/min
Binder spray times	6 times
Binder spray pressure	78kPa(0.8kg/cm²)
Nozzle height	25cm from microporous plate

Change of particle diameter

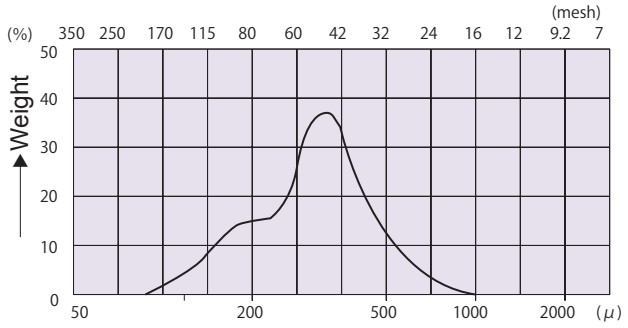


The factors that influence the particle diameter are the binder liquid feed rate and the spray pressure, the former being the most influential. A higher binder amount will result in larger diameter particles.

(Conditions)

Raw material	Lactose(100 mesh under) 200g
Binder	70% Sorbitol solution
Inlet temperature	90°C
Binder liquid feed rate	12g/min
Binder spray pressure	98kPa (1.0kg/cm²)
Nozzle height	25cm from microporous plate

Repeatability of granulation test



Particles generated by the pulvis mini bed are usually in the range of 0.1~1.5a, The particle size uniformity is lower than extrusion granulation and compression granulation methods.
The granularity consistency may be regulated by test conditions.

(Conditions)

Raw material	Lactose (100 mesh under) 200g
Binder	70% Sorbitol solution 7.3g
Inlet temperature	90°C
Binder liquid feed rate	12g/min
Binder spray times	7 times
Binder spray pressure	98kPa(1.0kg/cm²)
Nozzle height	22.5cm from microporous plate

Example of implementation (Spray dryer ADL311SA)

Sample name	Composition (%)	Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m³/min)	Spray air pressure kPa (kg/cm²)	Sent amount of sample liquid (g/min)	Sample recovery rate (%)
Dextrin (solution)	10	150	80	0.4	98 (1.0)	6.1	66
Dextrin (emulsion)	40	150	80	0.4	98 (1.0)	5.1	63
Oxidized titanium (suspended liquid)	10	150	85	0.42	98 (1.0)	5.3	50
Soy sauce	50	130	75	0.36	98 (1.0)	5.1	60
Salt	10	145	85	0.38	98 (1.0)	5.3	52

Repeatability of spray drying test (spray dryer ADL311SA)

Test No.	Sample name	Sample density (%)	Drying conditions							Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m³/min)	Spray air pressure kPa(kg/cm²)	Test sample amount (g/min)	Sent amount of sample liquid (g/min)	Test time (min)		
1	Coffee solution	5.00	150	75	0.45	147(1.5)	93.1	3.1	30	4.3	92.4
2	Coffee solution	5.00	150	75	0.45	147(1.5)	93	3.1	30	4	86
3	Coffee solution	5.00	150	75	0.45	147(1.5)	91.4	2.0	30	4	87.5
4	Coffee solution	5.00	150	75	0.45	147(1.5)	84.9	2.8	30	3.7	87.2
5	Coffee solution	5.00	150	75	0.45	147(1.5)	83.8	2.8	30	3.7	88.3

Example of implementation (Pulvis mini spray GB210A)

Sample name	Sample density	Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m³/min)	Spray air pressure kPa(kg/cm²)	Sent amount of sample liquid (g/min)	Recovery rate (%)
Dextrin (solution)	20% solution	140	85	0.48	147(1.5)	8.8	66
Drug suspension	10% suspension	145	80	0.42	196(2.0)	8.2	82
Black tea extract	20%solution	155	100	0.4	147(1.5)	7.8	72
Silica gel	20%solution	150	75	0.48	147(1.5)	12.6	70
Iron oxide	3%suspension	175	90	0.4	127(1.3)	9.5	75

Example of implementation (Pulvis mini bed GB210B)

Sample		Binder			Test conditions					Results	
Name	Weight (min)	Name	Concentration (%)	Spray amount (min)	Inlet temp. (°C)	Liquid sending rate (g/min)	Spray pressure kPa (kg/cm²)	Spray times (times)	Nozzle height (cm)	Average dia. (μm)	12~115 mesh recovery rate(%)
Silicon	200	PVA	5.0	77	125	15	59 (0.6)	4	27	339	58
Oxidized iron	160	PVA	2.5	50	120	15	98 (1.0)	4	21	205	62
Ceramics	200	PVA	3.0	106	120	15	78 (0.8)	3	22	404	82
Alumina	160	PVA	3.0	60	110	15	59 (0.6)	4	22	311	88
Silica	150	CMC	1.0	100	120	15	78 (0.8)	4	22	306	60
Lactose	200	Sorbitol	70.0	10	100	14	98 (1.0)	4	25	390	80
Black tea essence	250	Guar gum	0.5	24	85	6	59 (0.6)	10	28	333	77
Grease containing powder	200	Glucose	30.0	11	85	4	59 (0.6)	7	22	236	82

Binder category and features

Category	Features
Gelatin	Gelatin Low density and weak bonding strength. No need to heat.
Dextrin	While it has excellent disintegrating and formability, the binding strength is weak.
Potato starch	Good granulation properties and inexpensive. Used in the pharmaceutical and food sector.
Arsenic acid soda	Suitable as a binder for the high viscosity samples. Used primarily in the food sector.
Gum arabic	Warm and spray. Need large amount of binder.
CMC (Carboxymethyl cellulose)	High viscosity at low temperatures. High amount of powder remains.
HPC (hydroxypropyl cellulose)	Good cohesion and is suitable for hydrophilic material.
MC (methyl cellulose)	Strong binding strength, is suitable for rough particles.
PVA (Polyvinyl alcohol)	Excellent in granulation properties but somewhat difficult to disintegrate granulated products.
PVP (Polyvinylpyrrolidone)	High molecular weight and strong binding strength, is suitable for hydrophobic material.

Repeatability of spray drying test (Pulvis mini spray GB210A)

Test No.	Sample name	Sample density (%)	Drying conditions							Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m³/min)	Spray air pressure kPa(kg/cm²)	Test sample amount (g/min)	Sent amount of sample liquid (g/min)	Test time (min)		
1	Coffee solution	5.00	150	80	0.45	147(1.5)	198.0	6.6	30	8.1	81.8
2	Coffee solution	5.00	150	80	0.45	147(1.5)	198.7	6.6	30	8.1	81.5
3	Coffee solution	5.00	150	80	0.45	147(1.5)	200.6	6.7	30	8.0	79.8
4	Coffee solution	5.00	150	80	0.45	147(1.5)	198.1	6.6	30	8.2	82.8
5	Coffee solution	5.00	150	80	0.45	147(1.5)	199.3	6.6	30	8.4	84.3

Example of implementation Pulvis mini spray GB210A, organic solvent recovery unit GAS410

Sample	Sample density (%)	Inlet temp. (°C)	Outlet temp. (°C)	Drying nitrogen (m³/min)	Spray pressure (kg/cm²)	Sent rate of sample liquid (g/min)	Dispersion medium or solution	Results			
								Powdered	Recovery rate (%)	Solution recovery rate (%)	Others
Hydroxypropyl methylcellulose	10	90	55	0.5	1.0	9.9	*	G	65.3	92.5	*Chloroform1: Ethanol1
Cellulose polymer	5.0	70	47	0.5	1.0	8.3	Methylene chloride	G	72.3		
Polymer	2.0	100	64	0.5	1.0	8.4	*	G	77.8	80.7	*Ethanol95: Water5
Resin	23.5	80	55	0.5	1.0	4.2	*	G	81.9	96.7	*(Methanol4:Water1) Distributed
Carbon + resin	5.8	100	70	0.5	1.0	5.3	IPA	G	85.1	94.1	
Polymer + inorganic salt	10.2	140	98	0.5	1.0	3.8	*	G	97.6	97.4	*Dimethylacetamide
Polyvinylpyrrolidone (K30)	10.0	80	55	0.5	1.0	7.7	Ethanol	G	79.4	95.0	
Polyvinyl pyrrolidone + drug	10.0	80	55	0.5	1.0	7.7	Ethanol	G	75.9	95.4	
Botanical extract	3.0	130	71	0.5	1.0	9.1	*	G	96.5	91.9	*Ethanol6: Water4
Silicon carbide	38.5	150	84	0.5	1.0	12.1	Ethanol	G	89.9	99.9	*Use nozzle 3S
Aluminum nitride	13.2	150	99	0.5	1.0	12.9	Butyl acetate	G	92.2	86.7	*Use nozzle 3S
Nitride ceramic	60.5	120	83	0.5	1.0	11.3	MEK	G	74.7	88.7	
Superconducting material	33.3	80	60	0.5	1.0	15.7	Acetone	G	66.6	99.6	
Drug	3.61	100	68	0.6	1.0	10.0	*	Yes	73.6	87.2	*Ethanol+Methylene chloride
Drug	13.2	60	45	0.32	1.25	6.0	*	Yes	87.6	94.7	*Methylene chloride+Ethanol
W-Cu	50.0	100	62	0.5	0.5	20.7	Ethanol	Yes	60.3	91.9	
Metamorphic polystyrene	48.7	140	60	0.45	1.0	22.3	Water	Yes	67.6	91.7	
Polymer	0.5	150	88	0.5	1.0	8.5	*	Yes	83.1	97.6	*Methanol3+Water1
Organic matter	50.0	150	88	0.4	1.0	8.3	Methanol	Yes			
Silica dispersion	10.0	100	88	0.5	1.0	4.8	*	Yes	96.2	99.5	*Ethanol+Water(little)

SINCE 1889

Yamato Scientific America

Sterilizer Catalog

Contents

SINCE 1889

STERILIZER OVERVIEW

STEAM Sterilization DRY Sterilization

Compact

SK
Internal Capacity: 18, 24, 30L

- Economical, space saving
- Programmable
- Easy to read 4 digit LED display

Standard without dryer

SN
Internal Capacity: 32, 47L

- Ergonomically designed easy top loading
- Programmable / preset-programs for commonly used sample types
- Cooling fan to shorten cool down time

Large capacity without dryer

SQ
Internal Capacity: 50, 80L

SQL
Internal Capacity: 110L

- Ergonomically designed easy top loading
- Programmable / preset-programs for commonly used sample types
- Cooling fan to shorten cool down time

Standard with dryer

SM
Internal Capacity: 20, 32, 47L

- Programmable
- Pre-installed drying cycle
- Quick drying capability making samples ready to use right after sterilization

Large capacity with dryer

SM
Internal Capacity: 50, 80L

- Programmable with 7” interactive touch screen
- Fully automatic sterilization and drying
- 11L heat resistant stainless steel bottle

Large capacity dry sterilization

SK
Internal Capacity: 99, 162, 300L

- Dry heat sterilization through natural or forced convection
- Programmable: 99 patterns, 99 steps
- Temp. rising time to 260°C: ~60min.

Compact Laboratory Sterilizer

SK102C/112C/201C/211C/301C/311C

MADE IN CH

Operating temp. range	50°C to 126°C
Max. operational pressure	0.142 MPa
Internal capacity	18L (SK102C/112C) / 24L (SK201C/211C) / 30L (SK301C/311C)

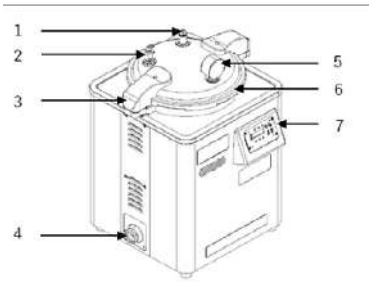
Space-saving, affordable compact sterilizer, ideal for research facilities

Easy to use

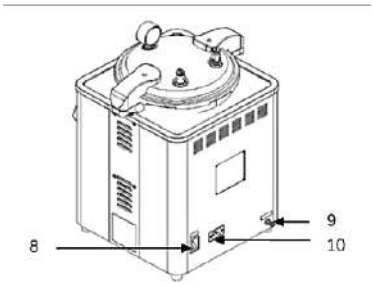
- Space-saving size - 18/24/30L
- Mobile on wheels
- Powerful 2000W pipe heater
- Easy to read 4 digit LED display
- Three Way Drain Valve eliminates air at the bottom of chamber during operation, and drains waste water after operation
- Programmable sterilizing and temperature functions
- Timer Setting Range 0 to 999 min.

Increased Safety Features

- Water level detection sensor with alarm
- Overheat protection sensor
- Lid closure sensor (interlock)
- Pressure lamp indicator



No.	Name
1	Safety valve
2	Vent valve
3	Handle (up/down)
4	Exhaust (drain) valve
5	Pressure gauge
6	Upper cover
7	Operation panel
8	Power switch
9	Exhaust (drain) port
10	Power interface



Specifications

Model	SK102C	SK112C	SK201C	SK211C	SK301C	SK311C
System	Automatic high pressure steam sterilizer					
Temp. setting range	50 to 126°C					
Max. operational pressure	0.142MPa (at 126°C)					
Interior Material	Stainless steel SUS 304					
Heater	2000W stainless steel heating pipe					
Drain valve	Glove valve					
Liquid level sensor	Float switch					
Temp. controller	PID control by microprocessor					
Temp. setting method	Digital setting by ▲/▼ keys					
Temp display method	Digital display by green LED					
Timer	0 min. to 999 min.					
Operation function	Fixed temperature operation procedure					
Safety Device	Water level detection (liquid expansion method), safety valve (0.165MPa), safety interlocking interactive device, spring full lift safety valve					
Internal dimensions	Φ280×H292		Φ280×H390		Φ280×H487	
External dimensions	W380×D380×H629 mm		W400×D410×H815 mm		W400×D410×H815 mm	
Internal capacity	18L		24L		30L	
Power source 50/60Hz *no plug, round terminal*	AC 115V 17A	AC 220V~230 9A~10A	AC 115V 17A	AC 220V~230 9A~10A	AC 115V 17A	AC 220V~230 9A~10A
Weight	~16.0 kg		~26.5 kg		~31.5 kg	
Included accessory	Rack 1 pc.					

** External dimension excludes protrusions.*

Key Features

● Drain valve

● Control panel

● Pressure gauge

Rack

Product code	Dimension	Suitable models
A990201305	277 x 260 mm	SK102C/112C
A990201304	277 x 330 mm	SK201C/211C
A990201303	277 x 420 mm	SK301C/311C

NOTES

Standard Laboratory Sterilizer

SN300C/310C/500C/510C

MADE IN CH

Operating temp. range	45°C to 135°C
Max. operating pressure	0.255MPa
Internal capacity	32L (SN300C/310C) / 47L (SN500C/510C)

High-performance, easy operation and ergonomically designed sterilizer featuring easy top loading and handling of samples

- Maximum sterilizing temperature goes up to 135°C suitable for protein modification
- By simple setting and operation, these sterilizers manage ordinary sterilization, sterilization of culture mediums and liquids, and melting of culture mediums
- Custom programs can be saved for repeated use
- Standard equipped with timer start and pre-heating features for efficient use of time and cooling fan to shorten cool down time
- Mobile on wheels

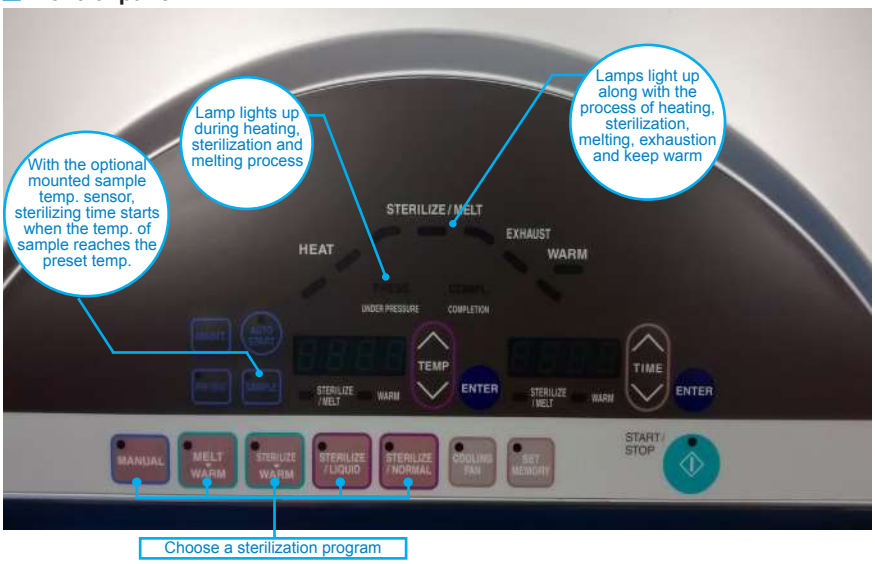
Enhanced safety device

- Lid interlock mechanism
- Drain bottle unset alarm
- Memory malfunction
- Automatic shutdown when malfunction
- Self-diagnostic functions

Specifications

Model	SN300C	SN310C	SN500C	SN510C
System	Automatic high-pressure steam sterilization			
Operating temperature range	45~135°C			
Max. working pressure	0.255MPa			
Ambient temperature	5~35°C			
Lid	Manual upward opening with an interlock for safety			
Heater	100V, 800W x 2 units		100V, 950W x 2 units	
Exhaust valve	One exhaust valve and one slow release valve			
Connection ports for optional accessories	Total 3 ports. Female thread for sample temp. sensor (1/4"), Female thread for chamber temp. sensor (1/4"), Female thread pressure sensor (branching from the solenoid valve tubing)			
Cooling fan	Axial fan motor			
Temp. controller	PID control by microprocessor			
Temp. display / setting	Digital display / digital setting by ▲/▼ keys			
Timer / Timer resolution	0 or 1 min. to 99 hrs 59 min. / 1 min.			
Operation mode	Instrument sterilization course, liquid sterilization course, sterilization and keep warm course, melting and keep warm course, customer-programmed course			
Other function	Key locking, presetting, saving, preheating, forced cooling, sample temperature sensor (option), pattern locking, up to 20 error log saving, display of accumulated working time / present time, ON-OFF beeping setting			
Safety device	Sensor failure detection, SSR short-circuit, broken heater wire, prevention of idle heating (liquid expansion type), alarm against the absence of a drain bottle, failure in locking the lid, memory error detection, pressure relief valve (0.255 MPa)			
External dimensions (WxDxHmm)	400 x 590 x 848		460 x 590 x 1058	
Internal dimensions of chamber	Φ300 x D445 mm		Φ300 x D665 mm	
Internal capacity	32L		47L	
Weight	~75kg		~85kg	
Power source	AC100~120V (15~12.5A) *no plug, round terminal*	AC200~240V (10~8.5A) *no plug, round terminal*	AC100~120V (23.5~19.5A) *no plug, round terminal*	AC200~240V (12~10A) *no plug, round terminal*
Accessories	2 pcs. stainless steel mesh basket (Φ274 x D200mm)		3 pcs. stainless steel mesh basket (Φ274 x D200mm)	
	Vapor cup x 1, Drain bottle x 1, Drain board x 1, Chemical indicator 1 set (30 pieces), Filter x 1			

Control panel



Sterilize/Normal Course	Sterilization of equipment such as flask, beaker, test tube, scissors
Sterilize/Liquid Course	Sterilization of culture and reagents and keep warm
Sterilize Warm Course	Dissolve and keep warm of the agar medium
Melt Warm Course	Sterilization of liquid, purified water and dilution water
Manual Course	Customized temperature and time settings

Standard Equipped with Cooling Fan & Slow Release Valve

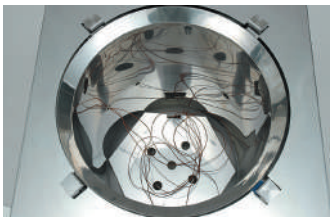
- For decompression and prevention of liquid samples from bumping
- Cooling fan cool to a safe temperature after sterilization completes
- Shortens time before samples are taken out
- Natural cooling by OFF setting

Features

Support GLP / GMP Inspection

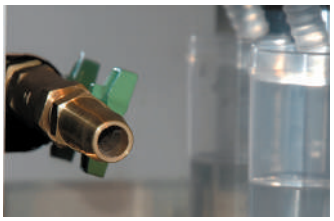
Standard equipped with 2 sensor ports on the main unit

Sterilization starts automatically by sample temperature sensor



With the optional mounted sample temperature sensor, desired sample temperature can be precisely maintained to ensure thorough sterilization

Easy to drain out sterilizing water

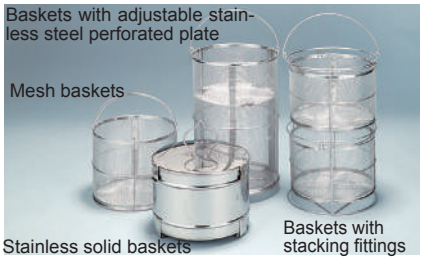


Easier maintenance with larger diameter drain pipe

Front Loading Drain Bottle

The drain bottle is located infront for easy access and drain water level can be monitored without opening the cabinet door

Optional items



- Stainless baskets

- Stainless buckets

Product code	Description	Corresponding models
H060101047	Mesh basket (Φ274 x D200mm)	SN300C/310C/500C/510C
241092	Mesh basket with stacking fittings	SN300C/310C, with two fittings
241091		SN500C/510C, with three fittings
241095	Mesh basket with adjustable stainless steel perforated plate	SN300C/310C, with 1 plate
241094		SN500C/510C, with 2 plates
241084	Stainless solid basket	SN300C/310C/500C/510C
241151	Stainless bucket	SN300C/310C/500C/510C
H060101110*	Chamber temp. sensor	Type T thermocouple, 3 pcs./set
H060101100*	Sample temp. sensor	Type T thermocouple, 1 pc.
Q110604013*	External output terminal	Temp. output, time-up output, alarm output

** Specify when ordering main unit*

Large Capacity Laboratory Sterilizer

SQ500C/510C/810C

MADE IN CH

Operating temp. range	45°C to 135°C
Max. operating pressure	0.255MPa
Internal capacity	50L (SQ500C/510C) / 80L (SQ810C)

High-performance, easy operation and ergonomically designed sterilizer featuring easy top loading and handling of samples

- Maximum sterilizing temperature goes up to 135°C suitable for protein modification
- By simple setting and operation, these sterilizers manage ordinary sterilization, sterilization of culture mediums and liquids, and melting of culture mediums
- Custom programs can be saved for repeated use
- Standard equipped with timer start and pre-heating features for efficient use of time and cooling fan to shorten cool down time
- Mobile on wheels

Enhanced safety device

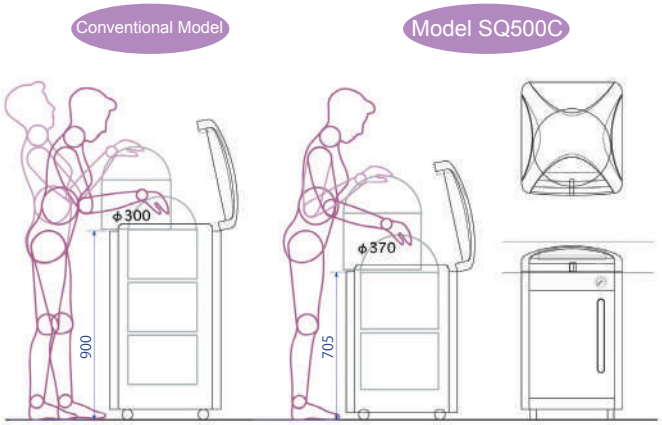
- Lid interlock mechanism
- Drain bottle unset alarm
- Memory malfunction
- Automatic shutdown when malfunction
- Self-diagnostic functions

Specifications

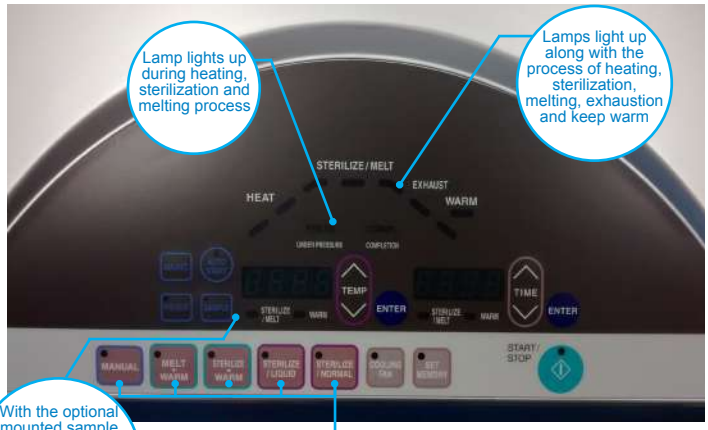
Model	SQ500C	SQ510C	SQ810C
System	Automatic high-pressure steam sterilization		
Operating temperature range	45~135°C		
Max. working pressure	0.255MPa		
Ambient temperature	5~35°C		
Lid	Manual upward opening with an interlock for safety		
Heater	1000W x 2 units		
Exhaust valve	One exhaust valve and one slow release valve		
Connection ports for optional accessories	Total 3 ports. Female thread for sample temp. sensor (1/4"), Female thread for chamber temp. sensor (1/4"), Female thread pressure sensor (branching from the solenoid valve tubing)		
Cooling fan	Axial fan motor		
Temp. controller	PID control by microprocessor		
Temp. display / setting	Digital display / digital setting by ▲/▼ keys		
Timer / Timer resolution	0 or 1 min. to 99 hrs 59 min. / 1 minute		
Operation mode	Instrument sterilization course, liquid sterilization course, sterilization and keep warm course, melting and keep warm course, customer-programmed course		
Other functions	Key locking, presetting, saving, preheating, forced cooling, sample temperature sensor (option), pattern locking, up to 20 error log saving, display of accumulated working time / present time, ON-OFF beeping setting		
Safety device	Sensor failure detection, SSR short-circuit, broken heater wire, prevention of idle heating (liquid expansion type), alarm against the absence of a drain bottle, failure in locking the lid, memory error detection, pressure relief valve (0.255 MPa)		
External dimensions (WxDxHmm)	520 x 660 x 881		520 x 660 x 1161
Internal dimensions of chamber	I.D.370 x D470 mm		I.D.370 x D750 mm
Internal capacity	50L		80L
Weight	~95kg		~105kg
Power source	AC100~120V (24.5~20.5A) *no plug, round terminal*	AC200~240V (12.5~10.5A) *no plug, round terminal*	AC200~240V (12.5~10.5A) *no plug, round terminal*
Accessories	2 pcs. stainless steel mesh basket (Φ344 x D200mm)		2 pcs. stainless steel mesh basket (Φ344 x D300mm)
	Vapor cup x 1, Drain bottle x 1, Drain board x 1, Chemical indicator 1 set (30 pieces), Filter x 1		

Low Height Sterilizers

SQ500C(low height type)



Control panel



Sterilize/Normal Course	Sterilization of equipment such as flask, beaker, test tube, scissors
Sterilize/Liquid Course	Sterilization of culture and reagents and keep warm
Sterilize Warm Course	Dissolve and keep warm of the agar medium
Melt Warm Course	Sterilization of liquid, purified water and dilution water
Manual Course	Customized temperature and time settings

Optional items

Stainless baskets

Mesh baskets

H060101048

H060103033

Baskets with stacking fittings

241090

Stainless buckets

Product code	Description
H060101048	Mesh basket for SQ500C/510C (Φ344 x D200mm)
H060103033	Mesh basket for SQ810C (Φ344 x D300mm)
241090	Mesh basket with 2 stacking fittings
241097	Mesh basket with 1 adjustable stainless steel perforated plate
241152	Stainless bucket
H060101110*	Chamber temp. sensor (Type T thermocouple, 3 pcs./set)
H060101100*	Sample temp. sensor (Type T thermocouple, 1 pc.)
Q110604013*	External output terminal (Temp. output, time-up output, alarm output)

** Specify when ordering main unit*

Large Capacity Laboratory Sterilizer

SQL1010C

MADE IN CH

Operating temp. range	45°C to 135°C
Max. operating pressure	0.26 MPa
Internal capacity	110L

High-performance, easy operation and ergonomically designed sterilizer featuring easy top loading and handling of samples

110L

- Maximum sterilizing temperature goes up to 135°C suitable for protein modification
- By simple setting and operation, these sterilizers manage ordinary sterilization, sterilization of culture mediums and liquids, and melting of culture mediums
- Custom programs can be saved for repeated use
- Standard equipped with timer start and preheating features for efficient use of time and cooling fan to shorten cool down time
- Mobile on wheels

Enhanced safety device

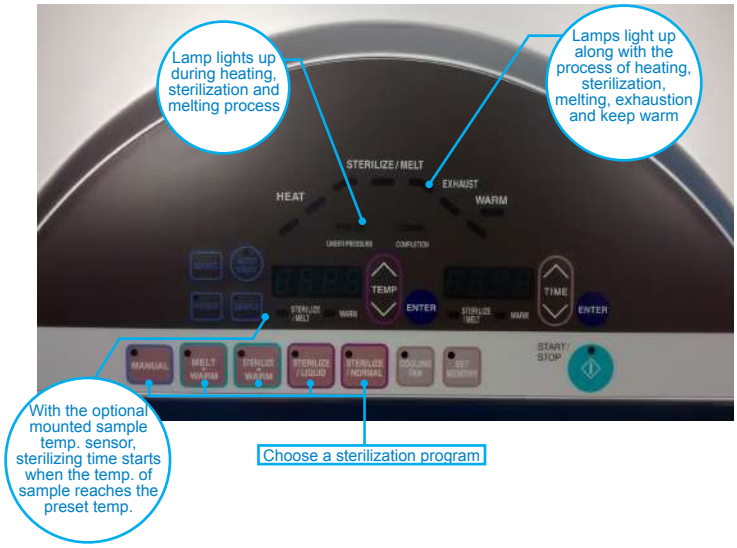
- Lid interlock mechanism
- Drain bottle unset alarm
- Memory malfunction
- Automatic shutdown when malfunction
- Self-diagnostic functions

Specifications

Model	SQL1010C
System	Automatic high-pressure steam sterilization
Operating temperature range	45 ~135°C 45 ~80°C (pre-heating) / 45 ~ 60°C (heat retention) / 65 ~100°C (melting) / 105 ~135°C (sterilization)
Max. working pressure	0.255 MPa
Lid (cover mechanism)	Manual upward opening with an interlock for safety
Heater	2000W x 2 pcs.
Exhaust valve	One exhaust valve and one slow release valve
Option port	For sample sensor (1/4), recorder (1/4) and connection to pressure gauge (branched from the electromagnetic exhaust duct)
Cooling fan	Axial fan motor
Temp. controller	PID control by microprocessor
Temp. display / setting	Digital display / digital setting by ▲/▼ keys
Timer / Timer resolution	0 or 1 min. to 99 hrs 59 min. / 1 minute
Operation mode	Instrument sterilization course, liquid sterilization course, sterilization and keep warm course, melting and keep warm course, customer-programmed course
Other functions	Key locking, presetting, saving, preheating, forced cooling, sample temperature sensor (option), pattern locking, up to 20 error log saving, display of accumulated working time / present time, ON-OFF beeping setting
Safety device	Sensor failure detection, SSR short-circuit, broken heater wire, prevention of idle heating (liquid expansion type), alarm against the absence of a drain bottle, failure in locking the lid, memory error detection, pressure relief valve (0.255 MPa)
External dimensions (WxDxH)*	680 x 760 x 1154 mm
Internal dimensions of chamber	I.D.450 x 692 mm
Internal capacity	110L
Weight	~170kg
Power source	AC220V 19A *no plug, round terminal*
Included accessories	2 pcs. stainless steel mesh basket (Φ424 x H300 mm)
	Vapor cup x 1, Drain bottle x 1, Drain board x 1, Filter x 1

** External dimensions exclude protrusions*

Control panel



Sterilize/Normal Course	Sterilization of equipment such as flask, beaker, test tube, scissors
Sterilize/Liquid Course	Sterilization of culture and reagents and keep warm
Sterilize Warm Course	Dissolve and keep warm of the agar medium
Melt Warm Course	Sterilization of liquid, purified water and dilution water
Manual Course	Customized temperature and time settings

Optional item

Mesh basket

Product code	Description
H060602006	Mesh basket Φ424×H300

Standard Laboratory Sterilizer with Dryer

SM201/211/301/311/501/511

MADE IN JP

Operating temp. range	105~123°C (SM201/211) 105~128°C (SM301/311/501/511)

Max. operation pressure	0.18MPa (SM201/211) 0.2MPa (SM301/311/501/511)

Internal capacity	20L (SM201/211)	32L (SM301/311)	47L (SM501/511)

High performance, fully automatic sterilization from start to finish with high pressure steam sterilization and drying steps

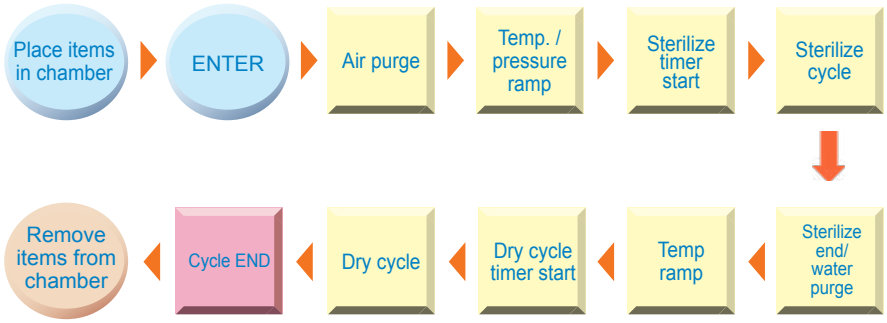
- Automatic operations from sterilization to drying carried out with an interactive key input system
- Quick sample drying capability makes samples ready to use right after sterilization
- Drying temperature can be set according to sample material, quantity, etc.
- Timer range from 1~999 hours
- Drain bottle water level can be quickly confirmed on the front panel level indicator
- Drain valve located in front for easy access
- Absence of protrusions in sterilization chamber makes insertion & removal of baskets, and other items quick and easy
- Self-diagnostic functions make operation safer and error recovery quicker
- Condensation collector neutralizes high temperature exhaust steam safely

Specifications

Model		SM201	SM211	SM301	SM311	SM501	SM511
System		Automatic high pressure steam sterilization					
Operating temperature	Sterilization	105 to 123°C		105 to 128°C			
	Drying	150 to 180°C					
Maximum pressure capacity		0.18MPa		0.2MPa			
Interior		Stainless steel					
Heater	Sterilization	1.3kW		1.7kW			2.0kW
	Drying	1.0kW		1.5kW			
Temp. controller		PID control by microprocessor					
Temp. display		Digital display by green LED and setting via ▲/▼ keys					
Timer / Timer resolution		1 min. ~ 99 hrs. and 59 min. 100~ 999 hrs. / 1 min. or 1 hr.					
Safety Device		Self-diagnostic functions (detection sensor error, SSR short circuit, heater disconnect, faulty main relay, dry operation), safety valve, electric leakage breaker, drain bottle set-fail switch					
Internal dimensions (Dia x Depth)		240 x 445 mm		300 x 445 mm		300 x 665 mm	
External dimensions (WxDxH)		410 x 470 x 957 mm		440 x 530 x 968 mm		440 x 530 x 1088 mm	
Internal capacity		20L		32L		47L	
Power source (50/60Hz single phase)		AC115V, 13A *with plug*	AC220V, 7A *no plug, round terminal*	AC115V, 15A *no plug, round terminal*	AC220V, 9.5A *no plug, round terminal*	AC115V, 15A *no plug, round terminal*	AC220V, 9.5A *no plug, round terminal*
Weight		~65kg		~80kg		~85kg	
Accessories		2 pcs. stainless steel mesh basket (Φ209 x D204mm)		2 pcs. stainless steel mesh basket (Φ266 x D204mm)		2 pcs. stainless steel mesh basket (Φ266 x D315mm)	
		Drain board x 1, drain bottle x 1, condensation collection container with magnetic bracket x 1					

Power cable is 3 meters.
Performance based on 23±5°C room temp, 65%RH±20% damper fully closed and no load. Overall dimensions do not include protrusions.

Sterilization & Drying Process



Control Panel

Front Door

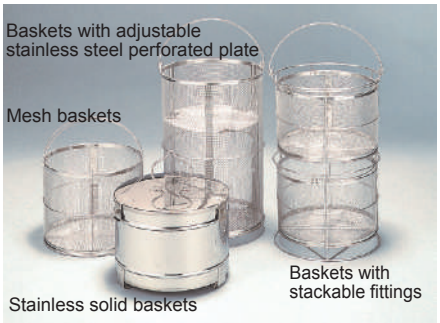
- Drain bottle placed in front for easy level monitoring and access
- Drain valve also located in front for quick access and operation

Included Items

Mesh baskets

Condensation collector

Optional Items



Output terminal

Product code	Description	Dimension	Corresponding models
241087	Mesh basket Pitch 8.5mm	209x204mm	SM201 / 211
241088		266x204mm	SM301 / 311
241089		266x315mm	SM501 / 511
241085	Mesh basket Pitch 10mm	190x159mm	SM201 / 211
241086		250x201mm*	SM301 / 311 / 501 / 511
241093	Mesh basket with stacking fittings	168x162mm with 2 fittings	SM201 / 211
241092		246x162mm with 2 fittings	SM301 / 311
241091		246x162mm with 3 fittings	SM501 / 511
241096	Mesh basket with adjustable stainless steel perforated plate	200x390 with 1 plate	SM201 / 211
241095		260x390with 1 plate	SM301 / 311
241094		200x590 with 2 plates	SM501 / 511
241083	Stainless solid basket	205x150	SM201 / 211
241084		265x180	SM301 / 311 / 501 / 511
241073	Temperature output terminal	Customized. Must be specified at time of order	
241074	Time-up output terminal		
241075	External alarm output terminal		
241076	Interior temp. gauging sensor		

*SM301/311 units accommodate 2 baskets. SM501/511 units accommodate up to 3 baskets.

Large Capacity Laboratory Sterilizer with Dryer

MADE IN CH

SM520/530/820/830

Operating temp. range	105~135°C
Max. operational pressure	0.255 MPa
Internal capacity	50L (SM520/530) / 80L (SM820/830)

Large Capacity, High Performance, Fully automatic sterilization from start to finish with high pressure steam sterilization and drying steps

50L
SM530

80L
SM830

- Interactive keypad input (touch panel) allows committing sterilization settings (time & temperature) to memory
- 7" interactive touch screen
- Suitable for protein modification at the maximum operating temperature of 135°C
- Easy settings and operation modes for a multitude of sterilization process
- Increased safety and function list including forced cooling and memory functions
- Equipped with multiple safety locking mechanism for the lid
- Comes with large capacity (11L) heat resistant stainless steel container
- Alarm buzzer sounds when high or low pressure error occurs

Specifications

Model		SM520	SM530	SM820	SM830
System		Automatic high pressure steam sterilization			
Operating temperature	Sterilize	105 to 135°C			
	Liquefy	60 to 110°C			
	Retain Temp.	45 to 60°C			
	Preheat temp.	45 to 80°C			
	Dry	135 to 150°C			
Operating Ambient Temp.		5 to 35°C			
Maximum pressure capacity		0.255MPa			
Heating	Sterilize Pipe	1000W ×2			
	Drying Pipe	110V/295W×2, 110V/455W×2	110V/295W×2, 110V/455W×2	110V/275W ×2, 110V/625W ×2	110V/275W ×2, 110V/625W ×2
Temp. controller		PID controlled by microprocessor			
Temp. setting / display		Touch panel			
Timer / Timer resolution		Range: 0 or 1min to 99h59min / 1 min.			
Safety Device		Sterilize sensor error, sterilize SSR short circuit, dry sensor error, dry SSR short circuit, sterilize heater disconnection, dry heater disconnection, water level detection (liquid expansion method), independent chamber overheat protection, cover unlock error, chamber over pressure protection, under pressure protection, warning about setting error in cooling water container, memory error, pressure switch (0.25MPa), pressure safety valve (0.255MPa)			
Internal dimensions (ID.xD)		370 x 470mm		370 x 750mm	
External dimensions (WxDxH)		520 x 660 x 881mm		520 x 660 x 1161mm	
Internal capacity		50L		80L	
Power source (50/60Hz)	Voltage	AC100~120V *no plug, round terminal*	AC200~240V *no plug, round terminal*	AC100~120V *no plug, round terminal*	AC200~240V *no plug, round terminal*
	Sterilize current	25~21A	12.5~10.5A	25~21A	12.5~10.5A
	Dry current	13.5A	8.0A	15.0A	9.0A
Weight		~113kg		~137kg	
Included items		2 pcs. stainless steel mesh basket (Φ344 x D200mm)		2 pcs. stainless steel mesh basket (Φ344 x D300mm)	
		Drain board x 1, drain bottle x 1, chemical indicator 1 set, filter x 1, droplet tray x 1			

Control Panel

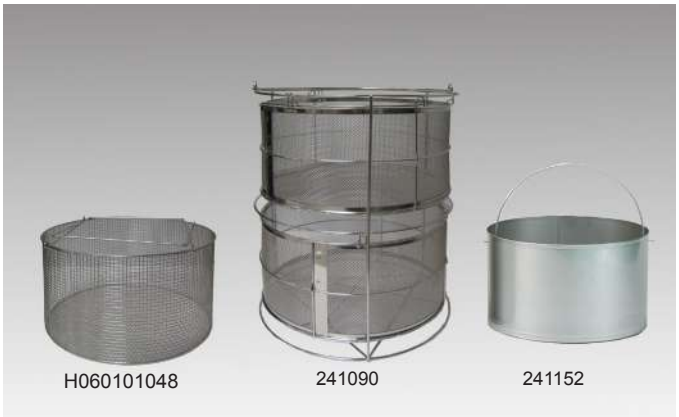
Instrument Sterilize Program

Instrument Sterilize operation

Sterilize & Dry Program

Sterilize & Dry operation

Optional items



Baskets and buckets

Product code	Description
H060101048	Mesh basket for SM520/530 (Φ344 x D200mm)
H060103033	Mesh basket for SM820/830 (Φ344 x D300mm)
241090	Mesh basket with 2 stacking fittings
241097	Mesh basket with 1 adjustable stainless steel perforated plate
241152	Stainless bucket
H060101110*	Chamber temp. sensor (Type T thermocouple, 3 pcs./set)
H060101100*	Sample temp. sensor (Type T thermocouple, 1 pc.)
Q110604013*	External output terminal (Temp. output, time-up output, alarm output)

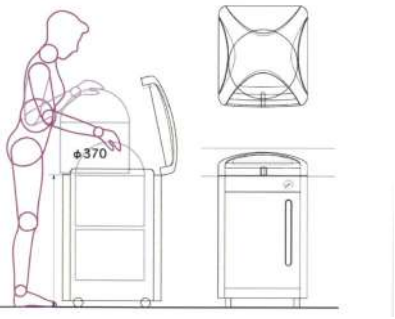
** Specify when ordering main unit*

Operation Mode

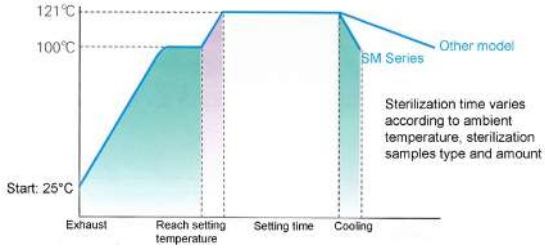
Mode	Name	Course
1	Instrument sterilize	Heat → sterilize → air purge
2	Fluid sterilize	Heat → sterilize → air purge
3	Sterilize & Retain temp.	Heat → sterilize → air purge → retain temp.
4	Liquefy & Retain temp.	Heat → liquefy → retain temp.
5	Instrument dry	Heat → air purge → cool
6	Sterilize & Dry	Heat → sterilize → air purge → drain → dry → cool

Low Height Sterilizer

Easy to lift samples up.



Standard Equipped with Cooling Fan



- Cooling fan starts after sterilization operation
- Cool down to safe temperature
- Time saving
- Optional between forced cooling and natural cooling

Front Door

- Front loading drain container
- Stainless steel drain container placed in front for easy access and drain water level can be monitored without opening door
- Drain valve located in front for quick access and operation

Laboratory Dry Sterilizer

Natural convection (SK401/601) / Forced air convection (SK801/811)

SK401-115V SK401-220V / SK601-115V SK601-220V / SK801 / SK811

MADE IN JP

Operating temp. range	Room temp. +5~260°C (SK401/601)	Room temp. +10~210°C (SK801/811)

Temp. control accuracy	±1°C (at 260°C) (SK401/601)	±1°C (at 210°C) (SK801/811)

Internal capacity	99L (SK401)	162L (SK601)	300L (SK801/811)

Dry heat sterilization with independent overheat prevention device

Operation and function

- Programmable
- High precision controller with improved display visibility and operability
- Standard equipped with calibration offset, lock function, power recovery mode, power on and operation time accumulation, calendar time, accumulation power consumption monitoring, total CO_2 emission, and heat output, save and access operator setting information
- Maximum 99 steps, 99 patterns, repeat operation
- Easy sample data collection with cable port

Safety features

- Standard equipped with self diagnostic functions, independent overheat prevention device and earth leakage breaker

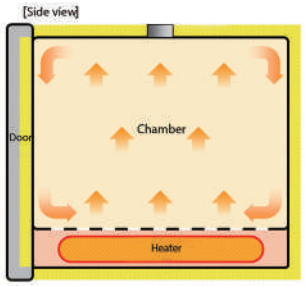
(Stand optional)

Specifications

Model	SK401-115V	SK401-220V	SK601-115V	SK601-220V	SK801	SK811
Circulation method	Natural convection				Forced convection	
Temp. setting range	Room temp. +5~260°C				Room temp. +10~210°C	
Temp. control accuracy	±1°C (at 260°C)				±1°C (at 210°C)	
Temp. fluctuation	±1.5°C (at 260°C)				±1°C (at 210°C)	
Temp. distribution accuracy	±5°C (at 260°C)				±3.5°C (at 210°C)	
Temp. rising time	~60min.					
Interior / Exterior material	Stainless Steel / Chrome free electrogalvanized carbon steel sheet coated with chemical-proof baked-on finish					
Insulation Material	Glass wool					
Heater	SUS 1.2kW		SUS 1.36kW		SUS 2.4kW	
Sensor	K type Thermocouple					
Fan type / Fan motor	–				Sirocco Fan / Condenser type motor 30W	
Cable port	I.D. 33mm (right side)					
Exhaust port	I.D. 33mm x 2 (on top)				I.D. 33mm x 2 (back)	
Temperature control	PID control by microprocessor					
Temperature display	Temp. display: Green 4-digit LED Digital Display (increment: 1°C) Setting temp. display: Orange 5-digit LED Digital Display (increment: 1°C)					
Timer	0 min~99 hrs 59 min (increment: 1 min. or 1 hr.)					
Heater control	Triac with Zero-cross control					
Operation function	Fixed temperature, Auto start, Auto stop, Quick auto stop, Program (99 steps, 99 patterns, repeat operation function)					
Additional functions	Power on and operation time accumulation function (up to 65535 hours), Calendar time (24 hours), Calibration offset, Accumulated power consumption monitoring, Total CO_2 emission and heater output, Power recovery mode, Save and access operator setting information, key lock					
Safety device	Self-diagnostic functions (Sensor failure, SSR short circuit, Heater failure, Main relay contact failure, Automatic overheat prevention), earth leakage breaker, Independent overheat prevention device					
Internal dimensions (WxDxH)	450 x 490 x 450mm		600 x 540 x 500mm		600 x 500 x 1000mm	
External dimensions (WxDxH)	560 x 600 x 820mm		710 x 650 x 870mm		710 x 650 x 1640mm	
Internal capacity	99L		162L		300L	
Shelf plate with standard load	~15kg/pc					
Shelf rest step number / pitch	11 steps / 30mm		13 steps / 30mm		29 steps / 30mm	
Power source	115V 11A *with plug*	220V 6A *no plug, round terminal*	115V 12.5A *with plug*	220V 6.5A *no plug, round terminal*	115V 21.5A *no plug, round terminal*	220V 11.5A *no plug, round terminal*
Weight	~50kg		~62kg		~108kg	
Shelf plate / bracket	Stainless steel punched metal					
	2 pcs. / 4 pcs.				4 pcs. / 8 pcs.	

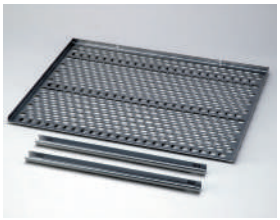
Control Panel

Method



Cable Port

Shelf and Bracket Set

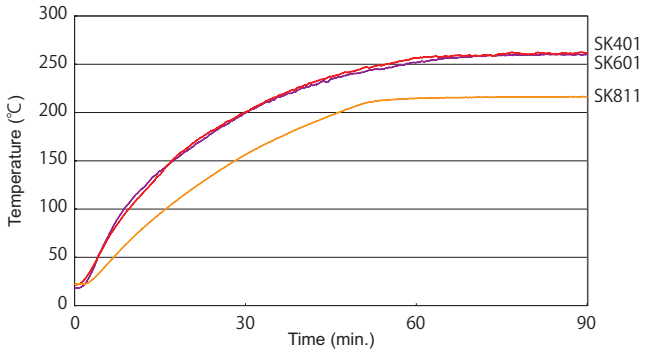


Optional items

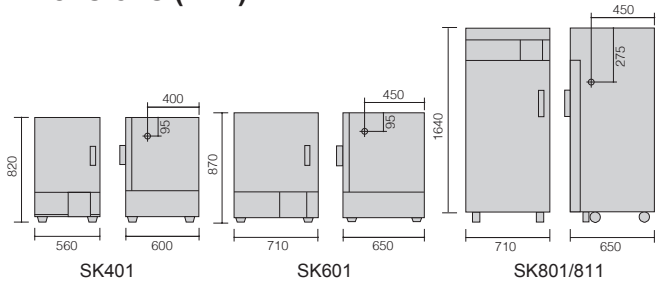
Description		Product code
Stand		
For SK401/601	ON61	211856
For SK401	OT42	212348
For SK601	OT62	212349
Stacking kit		
For SK401	OD40	212822
For SK601	OD60	212823
Shelf and bracket set		
For SK401	ODN20	212246
For SK601/801/811	ODN22	212266
*Cable port		
Ø25mm	ODK32	281121
Ø50mm	ODK34	281122
Seismic mat		296902
External communication adapter set	OIN90	211880
*External communication terminal	ODS16	212981
*Temperature output terminal	ODS18	212982
*External alarm output terminal	ODS22	212983
*Timeup output terminal	ODS24	212984
*Operation signal output terminal	ODS26	212985
*Event output terminal	ODS28	212986

* Please specify when ordering main unit.

Temperature Rising Curve



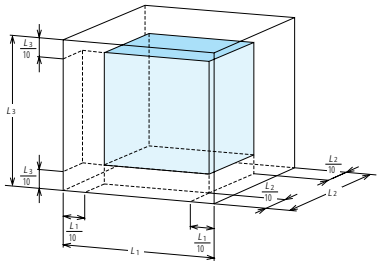
Dimensions (mm)



9 Points of Distribution Reference Data (SK811, no load, setting temp. 180°C)

	Top right back	Top left back	Top right front	Top left front	Bottom right back	Bottom left back	Bottom right front	Bottom left front	Center
SK811	186.6	189.2	186.2	188.8	184.9	186.3	183.0	183.5	186.9

Conditions
1. 9 measurement points are taken from the effective internal capacity down-scale by 10% (as the image on the right) and the center
2. Room Temp. 23°C, AC115V, 50Hz, stable temperature when temp. setting at 180°C
3. No load, with 2 pcs of shelves



⚠Attention
- Never use in flammable or explosive gas atmosphere.
- Never use explosive or flammable material.
- Caution: High temperature components.

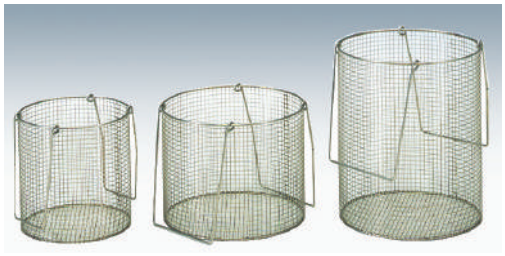
Containers

Product code	Description	Dimensions	Suitable models
A990201305	Stainless rack	ø277 x H260mm	SK102C/112C
A990201304	Stainless rack	ø277 x H330mm	SK201C/211C
A990201303	Stainless rack	ø277 x H420mm	SK301C/311C
H060101047	Mesh basket	ø274 x H200mm	SN300C/310C/500C/510C
H060101048	Mesh basket	ø344 x H200mm	SQ500C/510C, SM520/530
H060103033	Mesh basket	ø344 x H300mm	SQ810C, SM820/830
H060601028	Mesh basket	ø424 x H200mm	SQL810C
H060602006	Mesh basket	ø424 x H300mm	SQL1010C
241085	Mesh basket (pitch 10 mm)	ø190 x H159mm	SM201/211
241086	Mesh basket (pitch 10 mm)	ø250 x H201mm	SM301/311/501/511
241087	Mesh basket (pitch 8.5 mm)	ø209 x H204mm	SM201/211, SN200C/210C
241088	Mesh basket (pitch 8.5 mm)	ø266 x H204mm	SM301/311/501/511
241089	Mesh basket (pitch 8.5 mm)	ø266 x H315mm	SM501/511
241090	Mesh basket with 2 stacking fittings	ø320 x H162mm	SQ500C/510C/810C, SM520/530/820/830
241091	Mesh basket with 3 stacking fittings	ø246 x H162mm	SM501/511, SN500C/510C
241092	Mesh basket with 2 stacking fittings	ø246 x H162mm	SM301/311, SN300C/310C
241093	Mesh basket with 2 stacking fittings	ø168 x H162mm	SN200C/210C, SM201/211
241094	Mesh basket with 2 perforated plates	ø270 x H590mm	SM501/511, SN500C/510C
241095	Mesh basket with 1 perforated plate	ø260 x H390mm	SM301/311, SN300C/310C
241096	Mesh basket with 1 perforated plate	ø200 x H390mm	SM201/211, SN200C/210C
241097	Mesh basket with 1 perforated plate	ø330 x H380mm	SQ500C/510C/810C, SM520/530/820/830
241083	Stainless solid basket	ø205 x H150mm	SM201/211, SN200C/210C
241084	Stainless solid basket	ø265 x H180mm	SM301/311/501/511, SN300C/310C/500C/510C
241150	Stainless bucket	ø208 x H203mm	SM201/211, SN200C/210C
241151	Stainless bucket	ø268x H203mm	SM301/311/501/511, SN300C/310C/500C/510C
241152	Stainless bucket	ø338 x H203mm	SQ500C/510C/810C, SM520/530/820/830

Mesh basket


H060103033


H060601028


241087 241088 241089


241090


241091


241092


241094

241095


241096


241099

Stainless bucket


241150 241151 241152

Stainless rack


A990201303 / A990201304 / A990201305

Stainless solid basket

241083 / 241084

Shelves

Product code	Punching shape	Suitable sterilizer models
212095	Round punch shelf & bracket set	SI401/402
212246	Round punch shelf & bracket set	SK401
212266	Round punch shelf & bracket set	SI601/602, SK601/801/811


212095

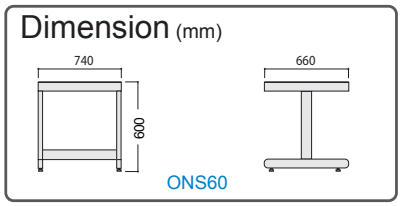

212246


212266

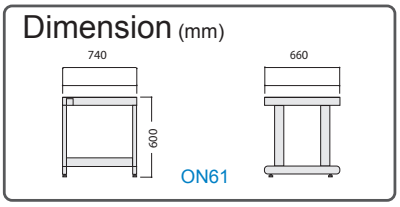
Stands

Product code	Stand models	Suitable sterilizer models
212802	ONS60	SI401/402/601/602
211856	ON61	SK401/601
212348	OT42	SK401
212349	OT62	SK601

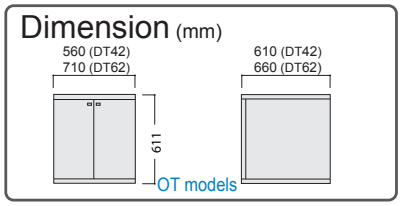

ONS60




ON61




OT42/62



SINCE 1889

Yamato Scientific America

Yamato Stirrers and Shakers

Contents

Magnetic Stirrer with Hot Plate

MG600H-115V MG600H-220V

MADE IN JP

Stirring rate (rpm)	300~1500 MG600H
Stirring capacity(ml)	100~2000 x 6 MG600H
Plate max. temp.	250°C MG600H

6 Point Controllable Type (individual stirring heating)

MG600H-115V / MG600H-220V

- Rotation and heating can be adjusted individually
- Equipped with circuit protector
- Chemical resistant ceramic coating hot plate

Specifications

Model	MG600H-115V MG600H-220V
Plate material	Aluminum with ceramic coating
Plate dimensions	ø126mm x 6 pcs.
Stirring capacity	100~2000ml x 6 pcs.
Stirring rate	300~1500rpm
Hot plate	W230mm x 6 pcs. Individual temp. control (set by volume with OFF)
Cooling	--
Heater	230W x 6 pcs.
Temp. control	Triac input control type
Hot plate temp.	Max.250°C
Motor	AC shading motor
Power source (50/60Hz)	AC115V 13.5A AC220V 7A
External dimensions*	W606 x D420 x H122 mm
Weight	~14 kg
Accessory	Stirrer bar 30mm 6 pcs.

* Protrusions excluded

Magnetic Stirrer

MFD800 / MFD810

MADE IN JP

Max. Speed Range 50 ~1600 rpm

Strong magnetic stirrer for chemical synthesis experiments

Operation and functions

- Simple operation
- Variable and convenient rotation functions
- Corrosion and chemical resistant ceramic coating stirring plate
- Strong magnetic force allows continuous stirring even when flask is removed
- Stirrer detachment detection function
- Recommended to work together with oil bath BOG and BOS Series

Specifications

Model	MFD800	MFD810
Plate material	Aluminum die casting	
Plate dimensions	Ø135 diameter	
Speed range	50 to 1600 rpm (set in 10 rpm increments)	
Operating temperature range	4°C to 40°C (set in 1°C increments)	
Motor	DC brushless motor (31W)	
Magnet	Neodymium magnet	
Display	White LED digital display	
Exterior parts material	Aluminum die cast (ceramic coating)	
Rotation mode	Constant speed, step out detection, intermittent, auto reverse, slow-up	
Safety functions	Overcurrent fuse	
Standard load capacity	30 kg or less	
External dimensions WxDxH	165 × 275 × 90 mm	
Power supply (50/60 Hz)	115V 0.25A	230V 0.15A
Weight	2.8 kg	
Included accessories	1 heat plate, 1 protective cover, 2 screw caps, 1 power cord, 1 spare fuse (internal circuit, service outlet)	

Control Panel

Rotation Mode Display
When mode number LED is off, unit rotates at a constant speed.

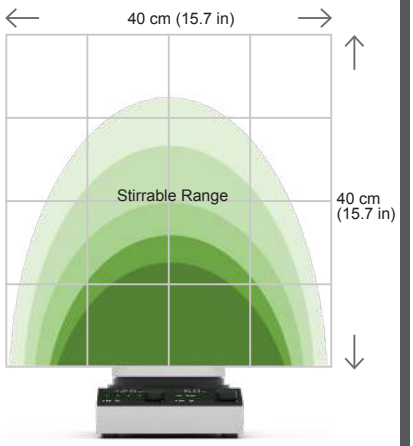
No. 1: Step out detection
No. 2: Intermittent
No. 3: Auto reverse
No. 4: Slow-up

BOG/BOS Series Bath

These oil baths fit perfectly with MFD800/810 as plate can be inserted at the bottom of the oil bath preventing risk of moving or slipping due to vibration.

Magnetic Force

Strong magnetic force allows stirring to continue even when flask is removed from the stirring table.
Range that can be stirred varies depending on the shape of the stirrer and the viscosity of the sample, but the figure shows an image of the range that can be stirred when the load is small.



Optional items

Product code	Model	Description
281395	OA154	Protective cover
281394	OA153	External temperature sensor
281381	OA143	Pole set
281384	OA146	Container fall prevention frame
281385	OA147	Stage for lab jacks
281587	OA183	Power cord (round terminal 2m)
281382	OA144	Aluminum block handle
281383	OA145	Dual-handed aluminum block handle

MFD combination

MFD800 + BOG oil bath

MFD800 + BOG oil bath + LM200 flask mixer

BOG Oil Bath

BOS Oil Bath

Magnetic Stirrer with Hot Plate

MFH800 / MFH810

MADE IN JP

Speed Range 50 ~1600 rpm

Temp. control range RT +25°C to 310°C

Strong magnetic stirrer with hot plate for chemical synthesis experiments

Operation and functions

- Simple and intuitive operation
- Variable and convenient rotation functions
- Corrosion and chemical resistant ceramic coating stirring plate
- Equipped with circuit protector
- Strong magnetic force allows continuous stirring even when flask is removed
- Stirrer detachment detection function
- Recommended to work together with oil bath BOG and BOS Series
- Multiple options for aluminum block systems for oil-less synthesis experiments

281568 281424 281421 / 281422 281430 281577

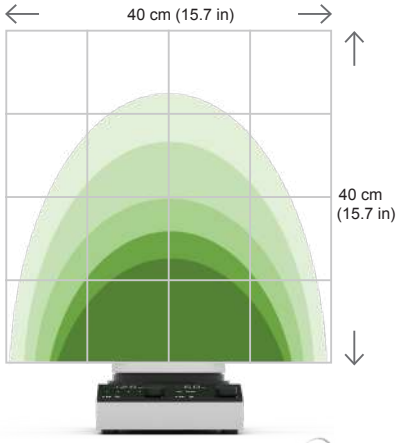
Specifications

Model	MFH800	MFH810
Plate material	Aluminum die casting (ceramic coating)	
Plate dimensions	Ø135 diameter	
Speed range	50 to 1600 rpm (set in 10 rpm increments)	
Temperature control range	RT +25°C to 310°C (set in 1°C increments)	
Temperature control accuracy	±1.5°C @ 100°C (internal temperature sensor) ±1.0°C @ 50°C (external temperature sensor)	
Motor	DC brushless motor (31W)	
Magnet	Neodymium magnet	
Display	White LED digital display	
Temperature control method	PID control	
Temperature sensor	PT100	
Heater	600W mica heater	
Exterior parts material	Aluminum die cast	
Rotation mode	Constant speed, step-out detection, intermittent, auto reverse, slow-up	
Safety functions	Overcurrent fuse, temperature upper limit error, overheating prevention (fixed temperature), high temperature warning	
Additional features	Service outlet, temperature high limit function, power failure recovery mode selection, calibration offset function	
Standard load capacity	30 kg or less	
Overcurrnet fuse capacity	For internal circuit: 7A	For internal circuit: 5A
	For service outlet: 5A	
External dimensions WxDxH	165 × 275 × 90 mm	
Power supply (50/60 Hz)	115V 6A	220V 3A
Weight	3 kg	
Included accessories	1 heat plate, 1 protective cover, 2 screw caps, 1 power cord, 1 spare fuse (internal circuit, service outlet), 1 external temperature sensor	

Magnetic Force

Strong magnetic force allows stirring to continue even when flask is removed from the stirring table.

Range that can be stirred varies depending on the shape of the stirrer and the viscosity of the sample, but the figure shows an image of the range that can be stirred when the load is small.



Control Panel

Rotation Mode Display
When mode number LED is off, unit rotates at a constant speed.
No. 1: Step out detection
No. 2: Intermittent
No. 3: Auto reverse
No. 4: Slow-up

MFH800 with aluminum block samples

MFH800 + 281422

Optional items

Product code	Model number	Description
281396	OA155	Protective cover
281394	OA153	External temperature sensor
281381	OA143	Pole set
281384	OA146	Container fall prevention frame
281385	OA147	Stage for lab jack
281587	OA183	Power cord (round terminal 2m)
281382	OA144	Aluminum block handle
281383	OA145	Dual-handed aluminum block handle

Magnetic Stirrer MFH800/810

Part Number	Code	Description	Weight	Compatible Containers
281432	OA167	Aluminum block	1.7 kg	Eggplant flask 200 mL
281436	OA171	Aluminum block	1.6 kg	Eggplant flask 300 mL
281566	OA172	Aluminum block	1.8 kg	Eggplant flask 500 mL
281567	OA173	Aluminum block	2.4 kg	Eggplant flask 1000 mL
281568	OA174	Aluminum block	2.4 kg	Eggplant flask 2000 mL
281572	OA175	Aluminum block	1.7 kg	Round flask 200 mL
281573	OA176	Aluminum block	1.7 kg	Round flask 300 mL
281574	OA177	Aluminum block	1.7 kg	Round flask 500 mL
281575	OA178	Aluminum block	2.4 kg	Round flask 1000 mL
281576	OA179	Aluminum block	2.4 kg	Round flask 2000 mL
281423	OA158	Aluminum plate	1.6 kg	Vial bottle Φ12 mm 40 frame
281424	OA159	Aluminum plate	1.4 kg	Vial bottle Φ15 mm 38 frame
281425	OA160	Aluminum plate	1.3 kg	Vial bottle Φ17 mm 38 frame
281426	OA161	Aluminum plate	1.3 kg	Vial bottle Φ18 mm 34 frame
281427	OA162	Aluminum plate	1.2 kg	Vial bottle Φ21 mm 30 frame
281428	OA163	Aluminum plate	1.7 kg	Vial bottle Φ30 mm 12 frame
281429	OA164	Aluminum plate	1.4 kg	Vial bottle Φ35 mm 12 frame
281421	OA156	Base holder	0.4 kg	Adapter block 1 dress up
281422	OA157	Base holder	0.6 kg	Adapter block 3 dress up
281434	OA169	Adapter block	0.6 kg	Eggplant flask 10 mL
281433	OA168	Adapter block	0.6 kg	Eggplant flask 20 mL
281430	OA165	Adapter block	0.6 kg	Eggplant flask 30 mL
281431	OA166	Adapter block	0.6 kg	Eggplant flask 50 mL
281435	OA170	Adapter block	0.5 kg	Eggplant flask 100 mL
281577	OA180	Adapter plate	0.6 kg	Vial bottle Φ12 mm 8 frame
281578	OA181	Adapter plate	0.6 kg	Vial bottle Φ16 mm 6 frame
281579	OA182	Adapter plate	0.5 kg	Vial bottle Φ24 mm 4 frame

Aluminum block
281568

Aluminum plate
281424

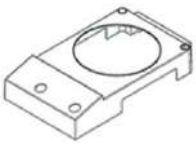
Base holder
281421 / 281422

Adapter block
281430

Adapter plate
281577

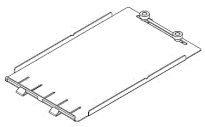
Magnetic Stirrer MFD800/810 MFH800/810

Part Number	Description	Code	Remarks
281395	Protective cover for MFD	OA154	Silicon protective cover protects the main unit from dirt and scattering of samples
281396	Protective cover for MFH	OA155	
281394	External temperature sensor	OA153	Sensor used when external temperature control is performed with MFH
281381	Pole set	OA143	Pole for fixing baths and mixers Φ10×480mm
281384	Container fall prevention frame	OA146	Variable frame to prevent containers such as beakers from falling when placed on the stirring table
281385	Stage for lab jack	OA147	Allows main unit to be placed on a lab jack
281587	Power cord (round terminal 2m)	OA183	Round terminal power cable
281382	Aluminum block handle	OA144	Handle to carry hot aluminum block with one hand
281383	Dual-handed aluminum block handle	OA145	Handles to carry hot aluminum blocks with both hands
231632	Muff	OLM44	Φ5~Φ13mm
231633	Muff	OLM46	Φ6~Φ17mm
231634	Muff	OLM48	Φ9.5~Φ29mm
231635	Double opening clamp	OLM50	Tightening adjustment range 3~55 mm, shaft Φ10 mm
231636	Double opening clamp	OLM52	Tightening adjustment range 3~80 mm, shaft Φ20 mm
222193	Glass tank for BOG100	OBO14	Mounted on MFH and used as an oil bath Φ150mm 1.0L
222194	Glass tank for BOG200	OBO16	Mounted on MFH and used as an oil bath Φ180mm 2.2L
281386	High magnetic agitator	OA148	Oval Φ6×15
281390	High magnetic agitator	OA149	Octagon Φ3×13
281391	High magnetic agitator	OA150	Octagon Φ8×13
281392	High magnetic agitator	OA151	Octagon Φ8×38
281393	Magnetic agitator	OA152	Micro Φ2×5, set of 5
F-4028-02	Magnetic agitator	TB-20	Φ7×20 12 pcs.
F-4028-03	Magnetic agitator	TB-30	Φ8×30 12 pcs.
F-4028-04	Magnetic agitator	TB-40	Φ8×40 12 pcs.
F-4025-04	Magnetic agitator	A-43	Φ13×43 6 pcs.



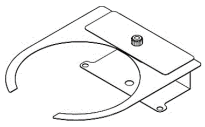
Protective cover (MFH)

281396



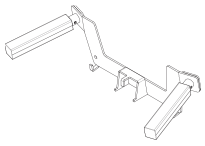
Stage for lab jack

281385



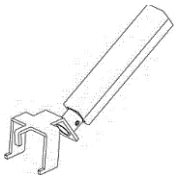
Container fall prevention frame

281384



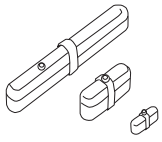
Dual-handed aluminum block handle

281383



Aluminum block handle

281382



High magnetic agitator

281390 / 281391 / 281392

Laboratory Flask Mixer

LM100/110/200/210 Series

MADE IN JP

Max. Speed Range	50 ~1000rpm

Max. Torque	0.1N•m

LM100 LM200 with Digital Display

LM Series compact design flask mixer features integrated drive and stirring seal allowing direct installation of flask and stirring in a vacuum and sealed state. No time-consuming shaft alignment required. Its strong stirring power is perfect for samples of high volume and high viscosity.

LM100/110 is designed with manual type rotation speed while LM200/210 is equipped with digital indicator.

- **Wide range rotation speed of 50-1000 rpm**
- **Capable of vacuuming up to 399.9Pa without impairing rotation efficiency**
- **Directly attachable to a three-neck flask 24/40, 29/42 optional**

- Maintenance free and superior DC brushless motor
- Belt drive transmission minimizes noise and vibration
- Variety of stirring shafts and blades available to handle small to large volume samples
- Fluorine rubber seal as standard for shaft seal, superior chemical resistant Teflon® rubber seal available as option
- At the flask joint, FKM o-ring is used as standard, superior chemical resistant Kalrez® o-ring available as option
- Equipped with 24/40 rotary joint, 29/42 optional
- Capable of AC100-240 by changing power cord

Specifications

Model	LM100	LM110	LM200	LM210
Operating temp. range	5°C~35°C			
Operating speed range*1	50~1000rpm			
Max. torque	0.1N•m			
Max. ultimate vacuum	≤399.9Pa			
Exterior	PBT /ADC12 (Surface treatment: Baking finish)			
Motor	DC brushless motor 30 W			
Power switch	Speed control dial with switch (stepless adjustment)			
Rotation speed indication	None		3 digits ×10 rpm (Digital display)	
Operation indicator lamp	LED (Green)		None (Confirm operation with speed indicator)	
Adaptable flask size	50~5000ml			
Joint size	TS24/40			
Chuck	ø8mm (ø7.9~7.95)			
Sealing material	PTFE (rotary joint) / FKM (oil seal,o ring)			
Safety device	Overload protection function*2, coupling cover (hair entanglement prevention structure), slow start function			
External dimensions	W69 × D108 × H222 mm			
Power source	Single phase AC100V~AC120V 50/60Hz 1A	Single phase AC200V~AC220V 50/60Hz 1A	Single phase AC100V~AC120V 50/60Hz 1A	Single phase AC200V~AC220V 50/60Hz 1A
Power cord	A type 3P (AC115V 50/60Hz)	O type 3P (AC220V 50/60Hz)	A type 3P (AC115V 50/60Hz)	O type 3P (AC220V 50/60Hz)
Weight	700 g (main body only)			
Included accessories	Hexagon socket head cap screw & wrench, AC adapter, 3m power cord, Coupling cover, handle(arbor), flask clip			
Operational accessories*3	Stirring shaft (PTFE, stainless steel, glass), propellers (different types and sizes), stand			

*1 Max. revolutions differ depending on the combination of oil seal + stirring shaft
50~1000rpm: FKM oil seal + PTFE stirring shaft / PTFE oil seal + glass or SUS stirring shaft
50~300rpm: FKM oil seal + glass or SUS stirring shaft / PTFE oil seal + PTFE stirring shaft
*2 When load exceeding maximum torque is applied, current limit circuit automatically controls the current to protect the motor
*3 Sold separately

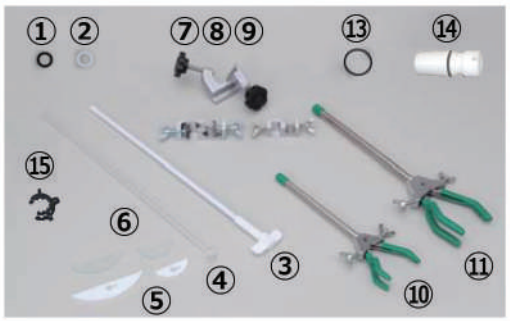
LM Set Guide

LM-100A	LM-100 SET MAIN BODY, STAND, PTFE STIRRING BAR W/ PROPELLER L450mm×φ50mm, BURETTE CLAMP φ9.5~φ29mm and Double Opening Clamp 3~55mm.
LM-110A	LM-110 SET MAIN BODY, STAND, PTFE STIRRING BAR W/ PROPELLER L450mm×φ50mm, BURETTE CLAMP φ9.5~φ29mm and Double Opening Clamp 3~55mm
LM-200A	LM-200 SET MAIN BODY, STAND, PTFE STIRRING BAR W/ PROPELLER L450mm×φ50mm, BURETTE CLAMP φ9.5~φ29mm and Double Opening Clamp 3~55mm
LM-210A	LM-210 SET MAIN BODY, STAND, PTFE STIRRING BAR W/ PROPELLER L450mm×φ50mm, BURETTE CLAMP φ9.5~φ29mm and Double Opening Clamp 3~55mm

LM200 with BM100 Water Bath

Accessories

Product code	Model	Product name	No.	Specification
231640	OLM60	FKM oil seal	①	FKM Black, 2pcs/set (standard)
231641	OLM62	PTFE oil seal	②	Teflon®, 2pcs/set
231615	OLM10	PTFE stirring shaft with blade	③	L350×ø30mm, 100 ~ 300mL
231616	OLM12			L450×ø30mm, 100 ~ 500mL
231617	OLM14			L450×ø50mm, 200 ~ 1000mL
231618	OLM16			L450×ø80mm, 300 ~ 1000mL
231619	OLM18			L600×ø80mm, 1000 ~ 1500mL
231620	OLM20			L600×ø100mm, 1000 ~ 5000mL
231621	OLM22			L600×ø120mm, 3000 ~ 5000mL
231622	OLM24	Glass stirring shaft	④	L350mm
231623	OLM26			L400mm
231624	OLM28			L530mm
231625	OLM30	PTFE half-moon blade	⑤	ø40×16×t3mm
231626	OLM32			ø50×17×t3mm, 100 ~ 500mL
231627	OLM34			ø60×17×t4mm, 500 ~ 5000mL
231628	OLM36			ø100×17×t4mm, 1000 ~ 5000mL
231629	OLM38			ø125×30×t5mm, separable flask
231630	OLM40	Glass half-moon blade	⑥	ø50×17×t3.3mm, 100 ~ 5000mL
231631	OLM42			ø80×17×t3.8mm, 500 ~ 5000mL
231632	OLM44	Burette clamp (muff)	⑦	ø5 ~ ø13mm
231633	OLM46	Burette clamp (muff)	⑧	ø6 ~ ø17mm
231634	OLM48	Burette clamp (muff)	⑨	ø9.5 ~ ø29mm
231635	OLM50	Double opening clamp	⑩	Range 3~55 mm, ø10mm, 50mL~3000mL
231636	OLM52	Double opening clamp	⑪	Range 3~80 mm, ø12mm, 50mL~5000mL
231086	--	Y stand	⑫	H725×ø25, Leg W400 (Internal 310mm) × 420mm
231640	OLM64	FFKM o ring	⑬	Kalrez® 29/42
231640	OLM66			Kalrez® 24/40
LT00038897	--	FKM o ring		29/42
LT00038898	--			24/40 (standard)
231639	OLM58	24/40 rotary joint seal set	⑭	Set of oil seal, o ring etc.
231644	OLM68	29/42 rotary joint seal set		Set of oil seal, o ring etc.
231637	OLM54	Flask clip	⑮	2 pcs set for 29/42
231638	OLM56	Flask clip		2 pcs set for 24/40



CF302L-A

O ring and Oil seal Comparison Table of Chemical Resistance

Chemical	FKM O ring + FKM oil seal (Standard)	FFKM O ring + PTFE oil seal (Option)
Acetone	D	A
Acetone 60°C	D	A
Hydrochloric acid (10%)	A	A
Hydrochloric acid (10%) 70°C	A	A
Hydrochloric acid (20%)	A	A
Hydrochloric acid (20%) 80°C	A	A
Hydrochloric acid (36%)	A	A
Hydrochloric acid (36%) 70°C	A	A
Xylene	A	A
Chloroform	B	A
Acetic acid (10%)	D	A
Acetic acid (100%)	D	A
Acetic acid (25%)	D	A
Acetic acid (50%)	D	A
Acetic acid (50%) 70°C	D	A
Acetic acid (anhydrous)	D	A
Tetrahydrofuran	D	A
Toluene	C	A
Pyridine	D	A
Hexane	A	A
Benzene	C	A
Benzene 70°C	C	A

A: Good B: Usable based on a condition C/D: Unusable

Related Products (Baths and Chiller)

BS200/401/601/660

BM100/200/401

BO601

BO500 + MB800

Laboratory Stirrer

LT400/500 Series

MADE IN JP

Max. Speed Range: 3,000rpm (400 model) | 1,200rpm (500 model)

Operation: Wide speed range / Wide torque range

LT400B

*Operational accessories purchased separately

LT series stirrers include LT400A and LT500A with higher torque, LT400B and LT500B with well-balanced speed and torque, and LT400C with high speed to support different applications.

- Highly sensitive feedback system keeps the set speed even with changing viscosity during stir
- Maintenance free DC brushless motor
- Digital speed indicator for accurate speed setting and confirmation
- Noise prevention measures for optimal work environment
- More safety-oriented design

Specifications

Model	LT400A	LT400B	LT400C	LT500A	LT500B
Viscosity of sample	High	Medium	Medium-low	High	Medium
Speed range	10~300rpm	15~600rpm	25~1,200rpm	15~600rpm	25~1,200rpm
Torque	0.9N•m (9.0kgf•cm)	0.5N•m (5.0kgf•cm)	0.3N•m (3.0kgf•cm)	1.0N•m (10.0kgf•cm)	0.6N•m (6.0kgf•cm)
Motor	DC brushless motor 30W				
Speed control	Feedback control				
Panel display	Digital speed display, Overload display*1, Torque indicator (20% gradation)*2				
Chuck	ø8mm drill chuck				
Safety device	Current limit circuit *3, Thermal protector*4, Drill chuck cover				
External dimensions	W146 x D154 x H165mm				
Power source	AC100V~AC125V 50/60Hz				
Power cord	Power supply cord with bipolar grounding type plug 2m				
Weight	2.4kg				
Included accessories	Clamp, Safety cover, Chuck handle				
Operational accessories*	Stirring shaft (stainless steel or glass), propellers (different types and sizes), stand and rod				

*1, When load exceeding the maximum torque is applied, tachometer display flashes.
*2, Torque indicator LED displays the loading status by 5 gradation.
*3, When load exceeding the maximum torque is applied, current limit circuit automatically controls the current to protect the motor.
*4, When temperature of the motor exceeds the upper limit temperature, thermal protector shuts off the current flowing to the motor and prevents it from burnout.

Digital Laboratory Stirrer

LR500A/B Series

Max. Speed Range: 1,000rpm

Operation: Low noise / Maintenance free

- DC brushless motor considered superior in safety as there are no brushes to cause sparks and no brush replacement required
- Direct-drive system reduces noise and require low maintenance
- Achieves high torque enabling stirring of high viscosity solution
- Digital tachometer for easy speed setting and confirmation
- Load on the stirring shaft can be monitored by LED2 display. An overload lamp turns on when exceeding the maximum load, stopping the motor automatically
- Revolution feedback control function can maintain the setting rate despite change of load (especially suitable for high viscosity samples)

Specifications

Model	LR500A	LR500B
Speed range *1	34~340rpm	100~1,000rpm
Max. torque	1.96N•m (20kgf•cm)	0.98N•m (10kgf•cm)
Display of speed / torque	Digital, 3-digit / Green LED, 2 Steps + Overload Display	
Motor (brushless DC)	70W	100W
Speed control	Speed Feedback Control	
Safety device	Stops when overloaded	
Stirring function / shaft dia.	Gearless Direct Drive Type / ø10mm	
Power source	AC100 -125V, 50/60Hz, 3A	AC100 -125V, 50/60Hz, 3.5A
Included accessories	Stirring shaft (Ø10*500mm), 75mm 4-blade propeller, clamp	
Operational accessories*	Stand and rod	
Optional accessories	Propellers (different types and sizes), vacuum adapter, extra long stirring shaft (Ø10*800mm), glass stirring shaft	

*1, No load

LR500A

*Operational accessories purchased separately

Laboratory Stirrer LT400/500 LR500A/B

Adapter for depressurizing stirrer (for LT400/500)

Material	Fluoride resin & Nitrile rubber		
Stirrer shaft	ø8mm		
Vacuum level	6.7Pa (5×10^{-2}Torr)		
Accessories	Oil Seal (Nitrile rubber) 2pcs.		
Joint type	T24/40	Product code	231380
	T29/42		231381

Additional stirrer support (for LT400/500)

Product code	231382
Size	Max. 3L beaker 2pcs.
Stirrer shaft	ø8mm
Stirrer shaft interval	135mm
Belt	O-ring (VitonP120)
Accessories	Hexagon wrench (2pcs.) Belt (1pc.) Chuck handle (1pc.) Clamp (1pc.) Puller (1pc.)

Adapter for depressurizing stirrer (for LR500)

Material	Fluoride resin & Nitrile rubber		
Stirrer shaft	ø10mm		
Vacuum level	6.7Pa (5×10^{-2}Torr)		
Accessories	Oil Seal (Nitrile rubber) 2pcs. Stirring propeller for small mouth		
Joint type	T24/40	Product code	231097
	T29/42		231098

Additional stirrer support (for LR500)

Product code	231096
Size	Max. 3L beaker 2pcs.
Stirrer shaft	ø10mm
Stirrer shaft interval	135mm
Belt	O-ring (VitonP120)
Accessories	Hexagon wrench (2pcs.) Belt (1pc.) Chuck handle (1pc.) Clamp (1pc.) Puller (1pc.)

*Use with propeller less than 60mm

PTFE Stirring shaft and propeller

Product code	Product name	Model	Rod diameter	Length	Propeller	Material
F-4011-01	PTFE coated stirring shaft (with propeller)	LT400/500	ø8mm	450mm	Length 80mm	PTFE upper stainless
F-4012-04	PTFE coated stirring shaft (with propeller)	LT400/500	ø8mm	500mm	Length 100mm	PTFE internal iron core
F-4013-01	PTFE large stirring shaft	LT400/500	ø8mm	600mm	Width 16 x length 80mm	PTFE internal stainless bar
F-4013-02		LR500	ø10mm	800mm	Width 20 x length 120mm	PTFE internal stainless bar
F-4014-04	PTFE propeller type coated stirring shaft	LT400/500	ø8mm	450mm	Dia. ø52mm	PTFE upper stainless

Product code	Product name	Rod diameter	Length
F-4053-01	PTFE coated stirring shaft for LT400/500	ø8mm	350mm
F-4053-02		ø8mm	450mm
F-4053-03		ø8mm	500mm
F-4053-04		ø8mm	600mm

● F-4022 and F-4053 must be purchased together

Product code	Product name	Propeller diameter
F-4022-01	PTFE coated half-moon blade propeller	40×16mm×3t
F-4022-02		50×19mm×3t
F-4022-03		60×19mm×4t
F-4022-04		75×20mm×4t
F-4022-05		90×24mm×4t
F-4022-06		100×24mm×4t
F-4022-07		125×30mm×5t
F-4022-08		150×30mm×5t

Propellers

4-blade propeller
Standard
Material: Stainless steel SUS 304

Product code	Propeller diameter	Mounting screw
280078	75mm	M5
280079	60mm	M5
LR41AY0003	40mm	M5

Folding propeller
For narrow mouth bottle (up to I.D.18mm)
Material: Stainless steel SUS 304

Product code	Propeller diameter	Mounting screw
LR41AY0006	45mm	M5

2-blade glass propeller
Use for corrosive or strong acid samples
Material: Hard glass

Product code	Model	Propeller Ø	Shaft Diameter
231385	LT400/500	60mm	ø8
231066101B	LR500	60mm	ø10

2 blade propeller
For wide mouth bottle. Use for high viscosity samples.
Material: Stainless steel SUS 304

Product code	Propeller diameter	Mounting screw
LR41AY0009	100mm	M5
LR41AY0008	28mm	M5

Round plate turbine
Use for deep container for less air intake during stirring
Material: Stainless steel SUS 304

Product code	Propeller diameter	Mounting screw
LR41AY0022	100mm	M5
LR41AY0010	60mm	M5

2 stage round plate turbine
Material: Stainless steel SUS 304

Product code	Model	Propeller Ø	Mounting screw
2310630101	LR500	60mm	ø10
231386	LT400/500	60mm	ø8

Stirring shaft

Product code	Model	Diameter	Material
231384	LT400/500	500mm ø8mm	SUS316
LR41231169	LR500	500mm ø10mm	
LR41AY0002	LR500	800mm ø10mm	

Fixing Support for Water Bath (for LT400/500, LR500)

Max. thickness of container's edge	Max. 35mm
Stirring shaft's changeable angle	Up to 60°
Product code	231032

Stand & Rod Set

Product code	Product name	Dimension
LR-41-124	Stand & rod set	~7kg
2310030209	Rod	Length 725mm E.D. 25mm
YSA000194	U-stand	Width 400mm Depth 420mm

Heating Magnetic Stirrer

MB800-115V / MB800-220V

MADE IN JP

Stirring rate 70 ~ 1200 rpm

Stirring capacity 100 ml to 10L

Equipped with optimum heat prevention function for oil bath

- Chemical-proof, anodized aluminum finish top plate
- Employs a magnetic stirrer bar to agitate solutions
- High-powered electronic controlled AC motor which provides stable rotation
- Power supply to the outlet for oil bath can be cut off and stopped when the temperature of the bottom of the oil bath reaches the specified value
- Suitable for BO500 oil bath

Specifications

Model	MB800-115V	MB800-220V
Top plate material	Aluminum	
Top plate dimensions	W250×D270 mm	
Stirring capacity	100 ~ 10000 ml	
Stirring rate	70 ~ 1200 rpm	
Temp. control	Triac input control type	
Motor	AC motor, condenser motor	
Overheat prevention function	70 to 200°C	
Sensor	Thermistor type	
Safety device	Overheat prevention device for oil bath, earth leakage breaker	
Power source (50/60Hz)	AC115V 8.7A *with external transformer*	AC220V 4.5A *with external transformer*
External dimensions*	W250 × D270 × H150 mm	
Weight	~4.2kg	
Included accessory	Magnetic stirrer bar 40mm 1pc.	

** Protrusions excluded*

Compact Shaker

MK161-115V MK161-220V

MADE IN JP

Shaking frequency	20 ~ 200 rpm

Shaking range	30 mm

Rotary, elliptical and reciprocate motion

- Compact, space saving design
- Changeable rotary, elliptical and reciprocate motion for mixing, extracting and stirring of samples
- Stable and high torque shaking power and speed with the DC brushless motor
- Shaking frequency and timer are dial setting and digital display
- Shake pause function, timer function and constant operation by one switch
- Selectable mixing, extracting and stirring patterns when used with different shaking stage and racks (optional item)
- Can be placed inside IN604W incubator for shaking incubation

Example of using mounting stage and erlenmeyer flask holder clamps (optional)

Incubator IN604W with optional slide shaker stage and MK161 shaker

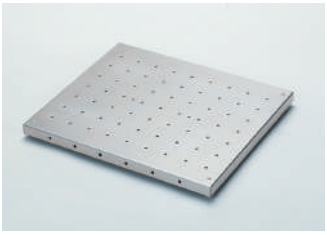
Specifications

Model	MK161-115V MK161-220V
Shaking mode	Rotary, Elliptical and Reciprocate (manual operation)
Shaking range	Rotary:30mm Reciprocate: 30mm
Shaking frequency	20~200rpm
Frequency controller	Dial Setting, Digital Display
Timer	Dial Setting, Digital Display / Digital 0.1min. (6 sec.) to 99.9hr.
Shaking stage dimensions	Main Unit : W300 x D254mm, Stage : W290 x D250mm
External dimensions	W350 x D300 x H150mm
Weight	~15kg
Power source 50/60Hz	AC115V 0.5A AC220V 0.3A

*Glassware not included.

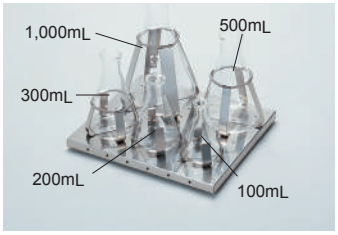
Operational accessories

Mounting stage



Capacity	Number of erlenmeyer flask clamp
100ml	10pcs
200ml	9pcs
300ml	5pcs
500ml	4pcs
1,000ml	2pcs
Product code	232061

Erlenmeyer flask holder clamp



Product code	Capacity	No. of clamps
232062	100ml	10 pcs.
232063	200ml	9 pcs.
232064	300ml	5 pcs.
232065	500ml	4 pcs.
232066	1,000ml	2 pcs.

*Mounting stage sold seperately

Diagonal rack holder

Diagonal erlenmeyer flask holder		
Product code	Capacity	No. of unit
232067	100ml	3 pcs
232068	200ml	2 pcs
232069	300ml	2 pcs

*Mounting stage sold seperately

Diagonal test tube holder		
Product code	Diameter	No. of unit
232080	ø12mm	50 pcs
232081	ø16.5	20 pcs
232082	ø18	20 pcs

*Mounting stage sold seperately

Diagonal centrifugal tube holder

For spitz tube

Prouct code	Size	No. of units
232070	15ml	12 pcs.

For 50ml centrifugal tube

Product code	Diameter
232083	ø29mm

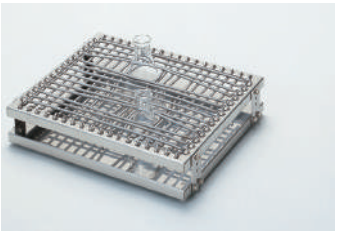
*Mounting stage sold seperately

Non-skid sheet

Product code	Dimension (W x D x H)
232084	290 × 250 × 30

*Mounting stage sold seperately

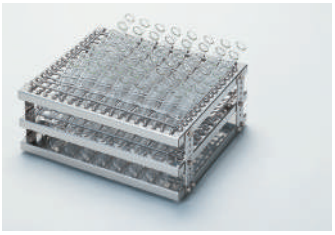
Single spring shaking rack



Dimension (W x D x H)
290 × 250 × 66mm
Number of test tube: ø16mm test tube x 64 (45°inclination)
Number of erlenmeyer flask 50mlx20pcs, 100mlx10pcs, 200mlx9pcs, 300mlx5pcs, 500mlx4pcs. 1000mlx2pcs
Product code 232050

*Mounting stage not necessary
This can be set directly to the main unit.

Two layer spring shaking rack



Dimension (W x D x H)
290 × 250 × 110mm
Number of test tube: ø16mm test tube x 64 (45°inclination)
Number of erlenmeyer flask 50mlx20pcs, 100mlx10pcs, 200mlx9pcs, 300mlx5pcs, 500mlx4pcs. 1000mlx2pcs
Product code 232056

*Mounting stage not necessary
This can be set directly to the main unit.

*Glassware not included.

Laboratory Shaker

Vertical / Horizontal / Rotary / Double-sided vertical shaking motion

SA300-115V SA300-220V / SA320-115V SA320-220V SA400-115V SA400-220V

MADE IN JP

SA300/400	20~300rpm	SA320	20~210rpm	Shaking width	40mm

SA320 with test tube holder

Test tube and funnel holders sold separately

SA300 with separating funnel holder

Glassware not included

SA320 with separating funnel holder

Funnel holders sold separately

SA400 with separating funnel holder

Glassware not included

The SA300 achieves two dimensional shaking (horizontal and vertical), while the SA320 enables rotary shaking and SA400 is double-sided vertical shaking. All models are efficient in extraction, culture and mixture stirring of samples.

- Stable turns from low to high speed can be obtained
- Compact and equipped with a powerful shaking load
- Easy-to-use dial settings for shaking frequency and digital displays.
- Possible to switch between timer operation and continuous operation
- Various holders can be easily attached and removed and are extremely durable

SA300/320

- The main unit shakes vertically, but it can be laid on the side to shake horizontally

SA400

- 6 pieces of 1 liter liquid sample holder and 4 pieces of 2 liter liquid sample holder can shake simultaneously
- Double sided shaking possibility

Specifications

Model	SA300-115V SA300-220V	SA320-115V SA320-220V	SA400-115V SA400-220V
Shaking method	Horizontal / Vertical shaking	Horizontal / Vertical rotary shaking	Double sided vertical shaking
Max. number of sample holder	100ml x 5, 300ml x 4, 1000ml x 3 200ml x 4, 500ml x 4, 2000ml x 2		100ml x 10, 300ml x 8, 1000ml x 6 200ml x 8, 500ml x 8, 2000ml x 4
Shaking speed: horizontal	20~300 rpm	20~210 rpm	None
Shaking speed: vertical	20~300 rpm	20~210 rpm	20~300 rpm
Speed setting display	Dial setting		Dial setting / Digital display
Timer	Dial setting 0~60 min. (minimum scale 5 min.). Continuous switching function		
Motor	DC motor 90W		
External dimensions	W460 x D460 x H423		W520 x D460 x H483
Weight	~40kg		~39kg
Power source (50/60Hz)	Single phase AC115V 2A Single phase AC220V 1A		
Included accessories	Fuse x 1, carbon brush x 1		

Horizontal Shaking

Rotary + Horizontal Shaking

Vertical Shaking

Rotary + Vertical Shaking

Operational Accessories

Centrifugal tube holder

For all models
Horizontal / vertical shaking

Dia. 16~35mm Length 110~130mm 18 pcs.	
Product code	232087

Test tube holder

For SA300/320
Horizontal shaking

Dia. 16.5~18mm Length 160~190mm 18 pcs.	
Product code	232086

Separating funnel holder

For all models
Vertical shaking

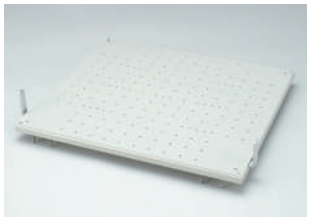
50ml 100~1000ml 2000ml	
Product code	232089

Separating funnel holder

For all models
Vertical shaking

100~1000ml	
Product code	232096

Mounting stage



For SA300/320
Horizontal shaking

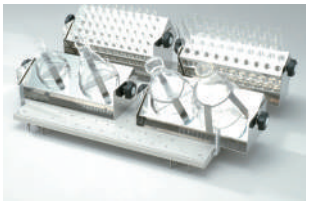
Capacity	No. of pcs.
100ml	28
200ml	19
500ml	14
1L	9
Product code	232095

Erlenmeyer flask holder clamp

For SA300/320
Horizontal shaking

Product code	Capacity	No. of pcs.
232062	100ml	10
232063	200ml	9
232064	300ml	5
232065	500ml	4
232066	1L	2

Diagonal rack



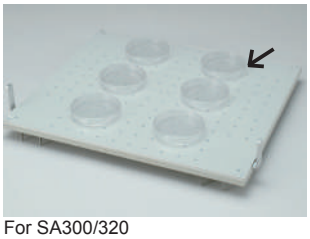
For SA300/320
Horizontal shaking

Diagonal erlenmeyer flask holder	
Product code	Capacity
232067	100ml
232068	200ml
232069	300ml

Diagonal test tube holder		
Product code	Size	No. of pcs
232080	ø12mm	50
232081	ø16.5mm	20
232082	ø18mm	20

Mounting stage sold separately

Non-skid sheet

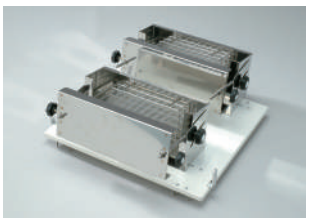


For SA300/320
Horizontal shaking

Thickness 1mm W450 x D396mm	
Product code	232071

Mounting stage sold separately

Test tube rack holder



For SA300/320
Vertical horizontal shaking

Max. test tube rack W238 x D121 x H105mm 2 lines	
Product code	232088

Mounting stage sold separately

Erlenmeyer flask holder

For SA300/320
Horizontal shaking

Adjustable 100~1000ml	
Product code	232097

Two layer spring shaking rack

For SA300/320
Horizontal shaking

320 pcs. of ø16 test tube (Pitch 20mm)	
Product code	232079

SINCE 1889

Yamato Scientific America

Thermal Analyzer

Contents

NOTES

Thermal Analyzer

Thermal Evaluation of Metallized Ceramic Substrates

TE100

MADE IN JP

Specimen load	10 kg
Sampling rate	100 sampling/sec (max)
Temperature characteristics	Resolution ≥ 0.01°C
Electrical resistance measurement error	±0.1mΩ (range 70-130Ω)

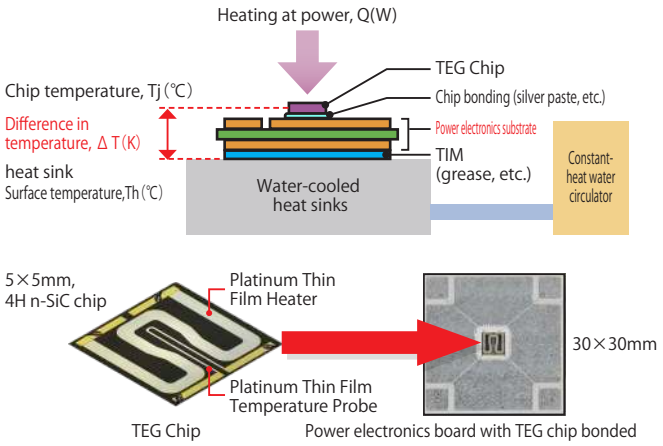
- Evaluates thermal characteristics (thermal resistance) of power device substrates
- Capable of evaluating heat dissipation characteristics due to module structure
- Capable of measuring and evaluating heat dissipation characteristics of individual substarte materials
- Evaluated according to "Internatonal Organization for Standardization ISO 4825-1:2023

Effective thermal resistance of power electronics board, Rth(K/W)

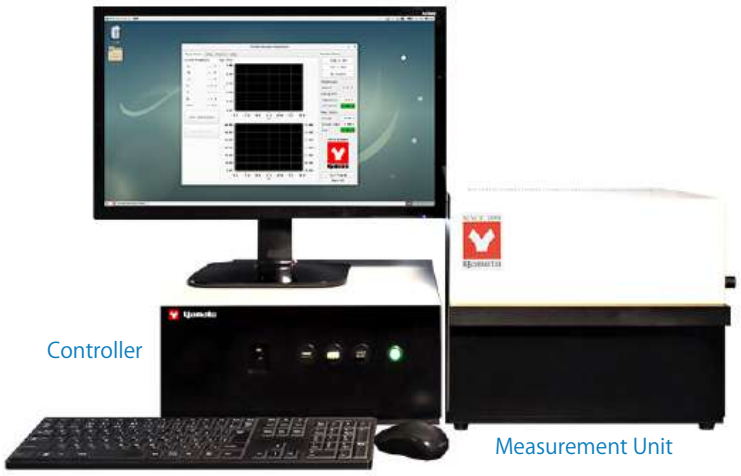
Can be calculated from chip temperature, heatsink surface temperature, and applied power

Thermal Resistance Calculation Method

Formula: $R_{th} = \Delta T / Q$



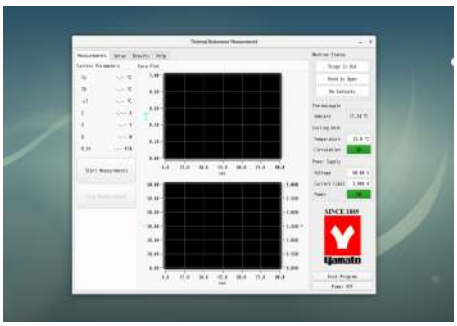
Equipment Configuration



** Monitor, keyboard and mouse to be provided by the user*

ANALYSIS SYSTEM (SOFTWARE) AS STANDARD

- Simple operation screen with "Setting", "Measurement", "Result", and "Help"
- Centralized Heating of TEG Chips and cooling by CFA302 Water Circulator



SPECIFICATION OF TE100

Compatible specimen size (ISO4825-1:2023)		30 x 30 mm
Specimen load		10 kg
Temperature characteristics		Resolution ≥ 0.01°C
Electrical resistance measurement error		±0.1mΩ (70 ~ 130Ω)
Sampling rate		100 sampling/sec (max)
Supply voltage		AC100V 50/60Hz
Size	Controller	W380 × D470 × H180mm
	Measurement unit	W380 × D400 × H320mm

ISO 4825-1:2023

Fine ceramics (advanced ceramics, advanced technical ceramics) --
Test method for thermal property
measurements of metalized ceramic substrates
Part 1: Evaluation of thermal resistance for use in power modules.

TEG CHIP (CONSUMABLE)

The TEG Chip is Attached to a Sample for Evaluation, such as a Metallized Substrate.

SPECIFICATION OF TEG CHIP

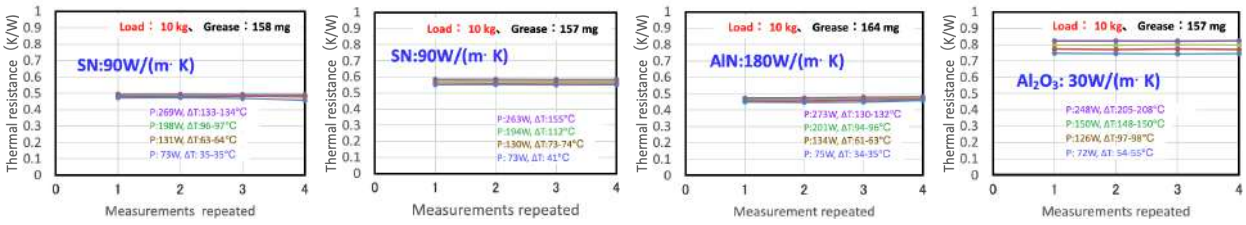
Heat generation intensity	1KW / cm²
Maximum input power	about 250W.
Temperature increase rate	1.4×10⁴K/sec
Size	W5×D5×H0.35mm

SPECIFICATION OF CIRCULATOR CFA302

Circulation Method	External Closed System Circulation
Cooling Method	Air cooling
Temperature control range	- 10 ~ 60°C
Power supply	AC100V 13.8A
Size	W380×D565×H725mm

Thermal property measurements with good reproducibility

Determine slight differences in thermal resistance due to ceramic materials and thicknesses



(a-1) 0.3mmCu/0.32mmSi_3N_4/0.3mmCu (a-2) 0.3mmCu/0.64mmSi_3N_4/0.3mmCu (b) 0.3mmCu/0.64mmAlN/0.3mmCu (d) 0.3mmCu/0.64mmAl_2O_3/0.3mmCu

What are the target markets for TE100?

- Power semiconductors, such as for automotive, electrical, and railroad applications. It contributes to high thermal conductivity design of semiconductors.
- Ceramic substrate manufacturer
- Heat transfer material manufacturer (grease, heat transfer sheets)
- Diamond attach bonding material manufacturer
- Heat sink manufacturer

Is TE100 only applicable to metallized ceramic substrates?

It can be applied to ceramic substrates, heat transfer materials, heat sinks, and other power semiconductor components.

SINCE 1889

Yamato Scientific America

Yamato Vented Balance Enclosures

Contents

NOTES

Vented Balance Enclosures

VBE204/214/306/316/408/418/600/610

MADE IN THE USA

Self-contained units ideal for fine powders, chemicals and biological products

VBE306 115-120V

VBE316 220-240V

VBE408 115-120V

VBE418 220-240V

Features

- Includes top mounted HEPA/Blower filtration which are set-up to circulate the internal chamber atmosphere, through the HEPA filter and into the lab.
- The smooth curved, or rounded ABS™ airfoils provide gentle, unobstructed air flow through rear, and side, baffles and through top mounted HEPA filter.
- Constructed with optically clear 3/8" jeweled acrylic plastic
- Front viewing sash with multiple air foils for higher containment and draft deflection
- Includes phenolic base with superior chemical resistance and provides higher analytical balance stabilization
- Low vibrations. The black base allows for easy powder detection.
- Electrical cord outlet port
- Air flow alarm system
- Adjustable front draft protection
- Side blank plate for optional Bag-In / Bag-Out port
- Includes face velocity alarm

HEPA Filters
Aluminum frame with upstream/downstream polyurethane gasket. 100mm thick pleat requires fewer filter change outs and increased longevity. Rate 99.9997% @ 0.3 microns (H14). Easy HEPA filter replacement.

Blowers
High efficiency backward curved impeller. Variable speed controller. IP44 protection as per EN60034-5. Ecodesign Directive 2009/125/EC.

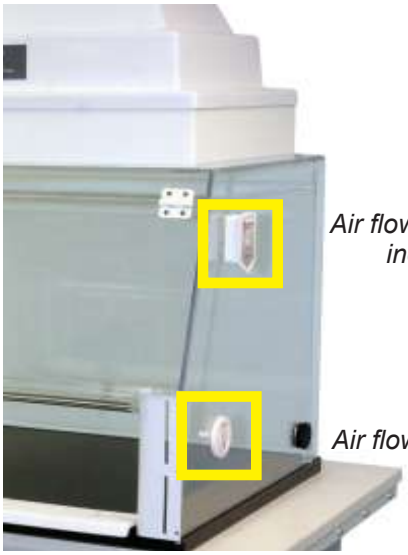
Exhaust Duct
6" OD port can be hard-ducted, thimble conneted, exhausted back into the room, or exhausted out of a mobile laboratory.

Energy and Sound
Blower current 0.53 amps. <55 dBA @ 80 FPM

Airflow
Target face velocity: 80 FPM. Non-turbulent, gentle airflow sweeps particulates into the rear baffle.

Specifications

Model	Inner Dimensions *width x depth x height*	Outside Dimensions *width x depth x height*
VBE204/214	24" x 23" x 21.50" 609 x 584 x 546 mm	26" x 26.75" x 41" 660 x 679 x 1041 mm
VBE306/316	35.25" x 23" x 21.50" 895 x 584 x 546 mm	36.50" x 26.75" x 41" 927 x 679 x 1041 mm
VBE408/418	47.25" x 23" x 21.50" 1200 x 584 x 546 mm	48.50" x 26.75" x 41" 1232 x 679 x 1041 mm
VBE600/610	59.25" x 23" x 21.50" 1505 x 584 x 546 mm	60.50" x 26.75" x 41" 1537 x 679 x 1041 mm



AIR FLOW ALARM

- Adds additional security needed for laboratory researchers
- Continuous tracking of air velocities within the balance enclosure
- Includes next generation airflow alarm technology
- Audible and visual alarm functions
- Includes 110V adapter

Specifications	Details
Airflow velocity range	40 -2000 fpm
Response time	< 1 second
Alarm indicators	LED light & audible Piezo
Turbulence warning	Flashing yellow LED rest switch
System failure	Red flashing LED
System Healthy	Green solid LED

Recommended Accessories

PLA-800BIBO/PORT

Bag-In / Bag-Out port includes a long ArmorFlex™ polypropylene bag (48" long) for safe removal of trash and unwanted debris.

Unwanted debris and trash are always contained and are never exposed outside of the containment isolator.

Bag port is 6" OD clear acrylic with two machined grooves for bag placement.

PLA-800BIBO/CRIMPER

Allows safe and secure removal of unwanted debris from inside the balance enclosure.

Trash is removed from the inside of the balance enclosure, through the 6" waste port, and into the bag.

Adjustable Lift Tables

Adjustable height lift tables with locking casters.

Height range: 25" to 45"
635mm x 1143 mm

Maximum weight: 330 lbs.
149 kilos

Product code	VBE
PLA-900CARTLIFT/24	204/214
PLA-900CARTLIFT/36	306/316
PLA-900CARTLIFT/48	408/418
PLA-900-CARTLIFT/60	600/610

Extraction Units

PLA-900EXTRACT

Extraction unit is a variable speed suction housing that includes your choice of filters such as HEPA or Impregnated Carbon. Suction speeds can be adjusted from "0" up to 250 CFM face velocity.

Filter options:

Product code	Model
PLA-900LVFH/HEPA	HEPA filter
PLA-900LVFH/Carbon	Impregnated carbon filter
PLA-900LVFH/HEPA/CARB	Combination. HEPA / Non-Impregnated Carbon Filter
PLA-900LVFH/CARBN(A)	Alkaline type fumes
PLA-900-LVFH/CARBN(B)	Ammonia or amines
PLA-900LVFH/CARBN(C)	Aromatic hydrocarbons, organic vapors, keytones, alcohols, organic acids, and odors

⚠ Attention

- Never use in flammable or explosive gas atmosphere
- Never use explosive or flammable material
- Caution: High temperature components

SINCE 1889

Yamato Scientific America

Water Circulators & Cold Trap

Contents

Overview Water Circulator (Chiller) & Cold Trap

CB100

CFA302

CF303Y
CF313Y

CF802A

Water Circulator (Chiller)

CA301

Cold Trap

Water Circulator (Chiller)

Purpose

Supplies a source of temperature controlled fluid, typically water, which removes heat from a process

Benefits

Keeps water in the condenser at a stable low temperature thereby creating ideal conditions for collecting the maximum amount of solvent

Cold Trap

Purpose

Efficiently collects moisture and harmful vapors by trapping them in the container and keeping them from reaching the vacuum pump

Benefits

Protects vacuum pumps
For oil-sealed pumps, collection of vapors is critical to prevent them from getting into the vacuum pump where they would condense and contaminate the pump's oil which will eventually cause loss of efficiency or irreparably damage pump

Protects the environment
For dry pumps, collection of vapors makes the evaporation system a closed system, preventing vapors from passing through the vacuum pump and into the environment

Increases evaporation rate
Vapors are collected as a frozen solid and are therefore not condensed inside the vacuum tubing, which would slow evaporation

Specifications

Type	Series	Temperature range	Dehumidifying capacity	Capacity (L)	Features	Application	Recommended in combination with
Water Circulator (Chiller)	CB100	-10°C to 80°C	N/A	3.4L	● Closed circulation system ● Environment friendly coolant used for refrigeration ● Less energy use and less cooling capacity loss by fixing the heat resistant lead ● Can connect four (4) Rotary Evaporators when using CF802A	● Used for many cooling applications	Viscometer Spectrofluorometer
	CFA302	-10°C to 60°C	N/A	13L			TE100 Thermal Analyzer
	CF303Y CF313Y	-20°C to 30°C *no heating function*	N/A	3.9L			Rotary evaporator
	CF802A		N/A	15.5L			
Cold Trap	CA301	*Max lowest temperature* -45°C	Max 0.9 kg (water type liquid)	4L	● A worry-free system which can be operated without adding dry ice or liquid nitrogen ● Uses environment friendly and CFC-free refrigerant ● Standard equipped with stainless steel condenser / option for glass trap for corrosives ● Space saving and highly mobile on wheels, equipped with stoppers in the front caster wheels	● Large amount of outgassing or contaminants that may be present ● Large amount of liquid that must be removed from the vacuum environment (e.g. freeze drying)	Vacuum oven Freeze dryer

Benchtop Water Circulator (Chiller)

Precision low temperature, compact water circulator

CB-100

MADE IN JP

Operating temp. range: -10°C ~ 80°C

Capacity: ~3.4L (Liquid volume 2.3L)

Operation and functions

- **Wide temperature range of -10 ~ 80°C**
  Can be used for various applications such as as maintaining temperature for cell samples in a spectrofluorometer and a viscometer
- **High head and flow rate**
  Lift is ~3.3/4.7m (50/60 Hz), which is very high in this class, so even piping with pressure loss can be circulated sufficiently. In addition, the maximum flow rate is as large as ~6.8/8.0L/min (50/60 Hz).The lift and flow rates allow stable circulation even when installed under a desk.
- **Easy to clean cooling air intake filter**
  Filter mounting plate located on the front of the unit can be easily removed when cleaning
- **Standard equipped with drain**
  Maintenance work such as replacement of liquid can be easily performed. After use, it can be stored in the space inside the main unit.
- **Nozzle can be used in any orientation**
  Since the nozzle is freely rotatable, it can be installed in any direction
- **Compact**
  With a width of 180mm and a depth of 360mm, it is ideal for limited spaces
- **Low GWP value that is friendly to the global environment**
  Since the alternative CFC refrigerant R-134a is used, the global warming potential is as low as 1430, good for the global environment.

Specifications

Model		CB-100
System/circulating water		Closed circulation / tap water, anti-freeze solution (for 10°C or lower)
Temperature control system		Refrigerator control + heater PID control
		-10 to 50°C: Refrigerator ON, control by heater PID 50.1 to 80°C: Refrigerator OFF, control by heater PID only
Operating ambient temperature range		5 to 30°C
Performance	Temperature setting range	-10°C to 80°C
	Temperature setting range for refrigerator continuous use	-10°C to 50°C
	Max. flow rate *1	8 L/min.
	Max. head *1	4.7m
	Temperature control accuracy *2	±0.1°C
	Cooling capacity (liquid temp) *3	~230W (liquid temp. at 10°C)
Function / Configuration	Controller	7-segment 3-digit white LED digital display, key input, resolution: 0.1°C
	Control heater	115V 650W stainless steel
	Refrigerator / Refrigerant	Air cooling / 100W / R134a
	Temperature sensor	Pt100Ω
	Circulation pump motor	Induction motor 40W
	Cooling pipe	Stainless steel 304
	External input	External temperature sensor input connector
	User function	Calibration offset, auto-resume mode select
	Circulation system	Control unit front side, one system / One touch connector (swivel type, L type) / Flow rate valve
Safety devices		Overcurrent ELCB, temp. sensor failure, temp. rise/fall alarm (operation continues), temp. upper/lower limit error (operation stops), float switch for dry heating prevention, refrigeration overload relay, refrigeraotr high pressure cut-off switch, fan motor protection, circulation pump thermal protector, delay timer for refrigerator protection, overheat prevention device
Standard	Water bath material	Stainless steel
	Water bath capacity	~3.4L (Liquid volume 2.3L)
	Power source	Single phase AC115V 13A, with plug
	External dimension (WxDxH) (including protrusions)	180 x 360 (440) x 553 (600) mm (including protrusions)
	Weight	~22kg
	Included accessories	Hose nozzle 10mm O.D. connection (for flexible hose connection (2), knurled screw (2)

1 Pump performance based on tap water at 20°C
2 Circulating water -10 to 10°C: Nybrine/10.1 to 80°C water. Performance based on 115V 60Hz supplied power, being short circuited, no load applied.
3 Performance based on 115V 60Hz supplied power and 23°C ambient temperature.

Control Panel

Filter Mounting Plate

Compact

Water Circulator (Chiller)

Externally-sealed precision circulation system

CFA-302

MADE IN JP

Operating temp. range -10°C ~ +60°C

Capacity ~ 13L

Operation and functions

- Provides highly accurate circulating water with an operating temperature range of -10 to 60°C and a temperature control accuracy of ±0.1°C
- Demonstrates powerful cooling ability of 370W as a cooling device. (at liquid temperature 10°C, room temperature at 20°C)
- Air-cooled, which generates less heat from the device
- Standard equipped with a variety of support functions such as auto-stop operation, auto-start operation, temperature output terminal, and calibration offset function

Specifications

Model	CFA-302
PERFORMANCE[*1]	
Circulation method	External closed system circulation
Temperature control range	-10~+60°C
Setting temperature range	-15 ~ +65°C
Temperature control accuracy	±0.1°C at 20°C JTM
Temperature fluctuation	±0.3°C at 20°C JIS
Temperature display unit	0.1°C
Cooling capacity	~ 370W (318Kcal/h) at liquid temperature 10°C
Ambient temp. range	5 ~ 35°C
Circulation capacity (50/60Hz) Maximum flow rate (pump capacity)	8.9/10.3L/min (15.0/17.0L/min)
Circulation capacity (50/60Hz) Maximum head (pump capacity)	6.6/9.0m (8.0/11.0m)
CONFIGURATION	
Bath	Stainless steel SUS304
Temperature control system	PID control
Temperature sensor	Double sensor: Pt100Ω (for temperature control) K-thermocouple (for overheating prevention)
Temperature setting / display method	Digital setting
Refrigeration system/rated performance	Air cooling / 300W
Refrigerant	R404A 300g
Circulation pump	Magnet pump 45W
Heater	850W (SUS316)
Cooling coil	Copper nickel plating treatment
External circulation nozzle	Rc3/8 with discharge port and return ports outer diameter Φ14 mm hose nipple
Safety device	Earth leakage breaker, overheating prevention device, refrigerator overload relay protecting circuit, delay timer for refrigerator protection, refrigerator pressure detection, float switch, bypass for circulating pump protection, self-diagnostic functions (sensor failure, heater disconnection, SSR short circuit, main relay contact short circuit, automatic overheating prevention)
Other functions	Operation monitor, drain cock, key lock, calibration offset, temperature output terminal, refrigerator pressure indicator, condenser filter
STANDARD	
Tank dimension (WxDxH)	245 x 315 x 180 mm
External dimension (WxDxH) [*2]	380 x 565 x 725 mm
Water tank capacity	~13L
Power source	AC100V single phase 13.8A
Weight	~60kg
Included accessories	Drain hose 0.5m 1 piece overflow hose 0.5m 1 piece

[*1] *Performance at the environmental temperature of -20°C ±5*

[*2] *Outer dimensions excludes protrusions.*

Water Circulator (Chiller)

Powerful closed circulation system with excellent cooling capacity

CF-303Y CF-313Y / CF802A

MADE IN CH

Operating temp. range: -20°C~30°C *no heating function*

Capacity: ~3.9L (Liquid vol. 3.5L) (CF303Y/CF313Y) | ~15.5L (Liquid vol.14L) (CF802A)

CF-303Y
CF-313Y

CF802A

Operation and functions

- User-friendly controller
  Controller with high visibility and improved operability. Possible to switch between measured temperature and set temperature.
- Convenient circulation pathway connection
  Connection is completed by inserting a hard tube with 10 mm OD or flexible hose with 9mm ID. Connector can be freely moved and be set in the desired direction
- Easy drainage of condensate water
  A condensation drain port is designed near the connector on the upper rear of the unit
- Easy to clean intake filter
  Filter mounting plate located on the front of the unit can be easily removed when cleaning
- Compact size for easy installation (for CF303Y/313Y)
  Requires minimal installation space. Can be installed on or below a laboratory table
- Space-saving solvent recovery device stored in the main body as secondary trap (option for CF802A)
  Used to recover solvent gases remaining in the concentration recovery process

Specifications

Model	CF-303Y CF-313Y	CF-802A
PERFORMANCE		
System/circulating water	Closed circulation / tap water, anti-freeze solution (below 10°C)	Closed circulation / tap water, anti-freeze solution (over 10°C)
Operating ambient temperature range	5 to 35°C	
Temperature setting range *1	-20°C ~ 30°C (no heating function)	
Temperature control accuracy *2	±1.0 °C (≥ 0°C) ±1.5 °C (< 0°C)	±1.0°C
Temperature fluctuation *2	2.0 °C (≥ 0°C) 3.0 °C (< 0°C)	3.0°C
Cooling capacity (liquid temp) *2	~450W at 10°C ~330W at -10°C	~1320W at 10°C ~700W at -10°C
Max. flow rate *3	~ 10L/min.	~ 14L/min.
Max. head *3	~ 5.7m	~ 14.3m
CONFIGURATION		
Temperature control system	Refrigeration ON-OFF	
Temperature sensor	Pt100Ω	
Controller	White LED digital display, key entry, minimum digit of 1°C	
Refrigeration system/rated performance	Air cooling / 450W	Air cooling / 700W
Refrigerant	R452A	R410A
Cooling coil	Stainless steel	304 Stainless steel
External circulation connection port	Rear top panel, single line One touch connector (swivel type, L type) Flow rate valve (optional)	Rear top panel, single line One touch connector (swivel type, L type) Flow rate valve
Safety device	Overcurrent ELCB, temp. sensor failure, temp. upper/lower limit alert, temp. upper/lower limit error, refrigerator high pressure cut off switch fan motor protection, circulation pump protection, delay timer for refrigerator protection, overcurrent protection fuse (service outlet) for CF802, refrigerator overload relay (CF802)	
Other functions	Drain hose, condensate drain hose, Intake dust filter, cooling operation key, circulating pump key, calibration offset, auto resume function, service outlet (2A) for CF802A	
STANDARD		
Water bath material	Stainless steel	
Water bath capacity	~3.9L (Liquid volume 3.5L)	~15.5L (Liquid volume 14L)
Power source	Single phase AC115V 6.8A with plug SIngle phase AC220V 4A no plug	AC115V 15A with plug
External dimension (WxDxH) mm (including protrusions)	205 x 396 x 535 (225 x 434 x 564)	340 × 370 × 838 (340 × 408 × 920)
Weight	~30kg	~44kg
Included accessories	Condensation drain hose(1m)(1), Hose clamp (2), Hose nozzle (for flexible hose connection)(2), spare fuse for service outlet 2A (1) for CF802A	

1 Unit does not feature heating function. Depending on ambient temperature or connection conditions, temperature may not reach -20°C.
2 Performance based on 115V/220V supplied power and 20°C ambient temp. Temp.control accuracy and temp fluctuation are standards calculated accdg. to JTM K05 and JIS respectively.
3 Pump performance based on tap water at 20°C

Features

Control Panel

Discharge and Return Ports

Filter mounting plate

Circulation Hose Connection

Easy installation

CF303Y / 313Y installed under the table

CF303Y / 313Y installed on the table

Optional items

Product name	Product code	Applicable models
Circulation Connection (fittings)	*Check manual for fitting components*	All models
Circulation Connection (hoses)	*Check manual for fitting components*	All models
Strainer set	281482	All models
External interlock input terminal	281588 281589 281485	CF303Y CF313Y CF802A
Flow rate valve	281477	All models
Glass container (secondary trap)	281487	CF802A
Seal lid for external open connection	281479	CF802A

Cold Trap

CA301-115V CA301-220V

MADE IN JP

Maximum low temperature	- 45°C

Dehumidifying capacity	0.9 kg (Water type liquid)

Efficiently traps water vapor and toxic substances discharged from rotary evaporator and vacuum oven to protect the vacuum pump

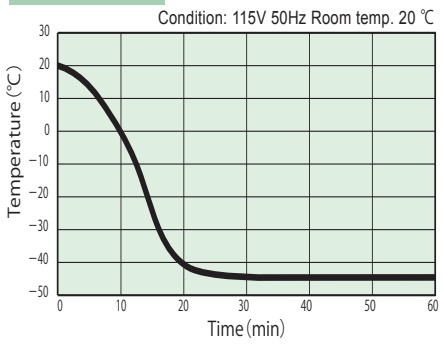
- Excellent choice to extract acid and organic solvents with the optional glass condenser
- Efficiently reduces vapor inhalation amount to the vacuum pump
- Can be used as a low temperature tank as well as pre-cooling tank
- Utilizes R404A
- Space saving and highly mobile on wheels

Specifications

Model	CA301-115V / CA301-220V
Method	Direct trap or Glass trap (optional)
Dehumidifying capacity	Max. 0.9kg (aqueous system)
Max. low temperature	- 45°C
Time to achieve the maximum lowest temperature	20 minutes or less
Refrigerator	Air cooling, 400W
Refrigerant	R404A
Cooling coil	ID ø90mm SUS304
Lid	OD ø17.6mm with nozzle, SUS304
Bath shape / material	Cylindrical / SUS304
Ambient temp. range	5~35°C
Temperature display	7 segment LED
Temperature sensor	Platinum resistance temperature detector Pt100Ω
Safety devices	Electric leakage breaker with over current protection, refrigeration overload relay
Defrosting mechanism	None
Tank dimensions	I.D. ø153 x H 235 mm
Internal capacity	~4L (Liquid 3L)
Power source 50/60 Hz	AC115V 5.1A / AC220V 2.3A
External dimension WxDxH	345 x 475 x 726 mm
Weight	~50kg

Cooling Curve

No-load



Optional items

Product description	Product code	Function / Feature
Glass condenser set OCA10	221487	To trap acidic and organic solvents
Reducer for rubber tube brass ø30×ø18 brass ø30×ø12 SUS ø30×ø18 SUS ø30×ø12	 242185 242186 221496 241497	Used when connection size is different
SUS lid	281296	Lid of trap tank

Glass condenser set

Glass condenser

Stainless cover

NOTES

SINCE 1889

Yamato Scientific America

Yamato Water Purification System

Contents

NOTES

Water Purifier - Auto Pure Type 1 Water

For General Lab Work: Ultrapure, Analytical

Benchtop WA301B: 120V / WA311B: 220V
Remote Dispense WA301R: 120V / WA311R: 220V

MADE IN THE USA

Water quality	Type 1, 18.2 MΩ
Feed requirement	< 20 uS
Flow	0.67 gpm 2.5 lpm

Water is purified using a stage purification process which includes high-purity ion exchange resins to remove dissolved minerals and internal recirculation to maintain purity. As water exits the system, a final filter removes particulates and bacteria to reach Type I water specifications.

WA Series Configuration
- Conditioning cartridge
- Polishing cartridge
- 0.2 micron filter

Features
- 2.5 LPM* of 18 MΩ Type 1 reagent water on demand
- Intuitive, user-friendly touch screen interface
- Real time quality monitoring with leak detection
- **Compact design with remote dispense option**
- **Quick change, no tools cartridge design**
- Large capacity, low cost consumable cartridges
- Premium quality ion exchange resin
- **Low ownership cost**

** Reported flow rate is typical but can vary depending on supply pressure and system options*

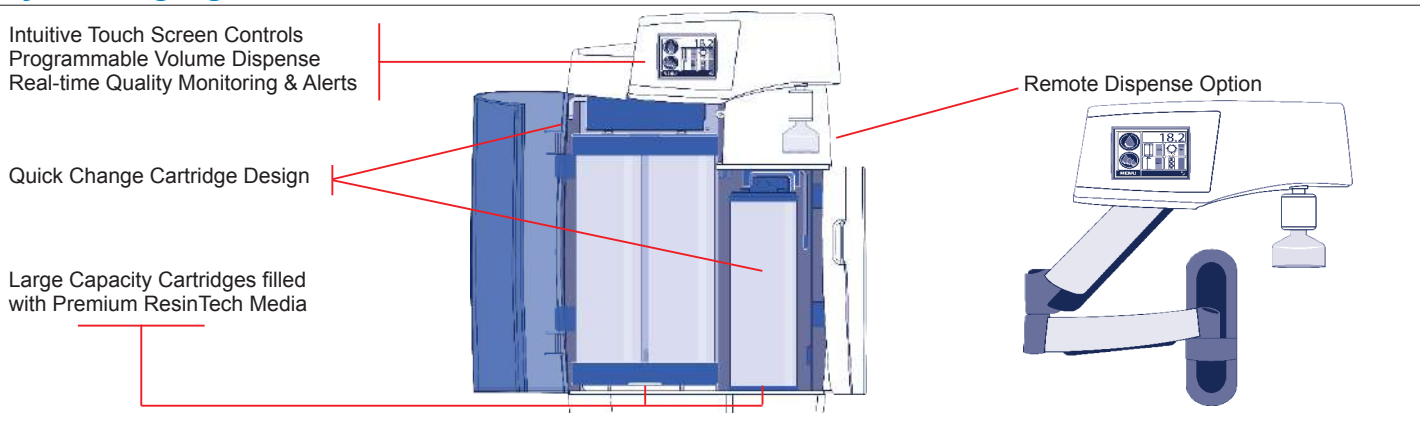
Applications
- General Chemistry
- Buffer Solutions
- Academia

Specifications

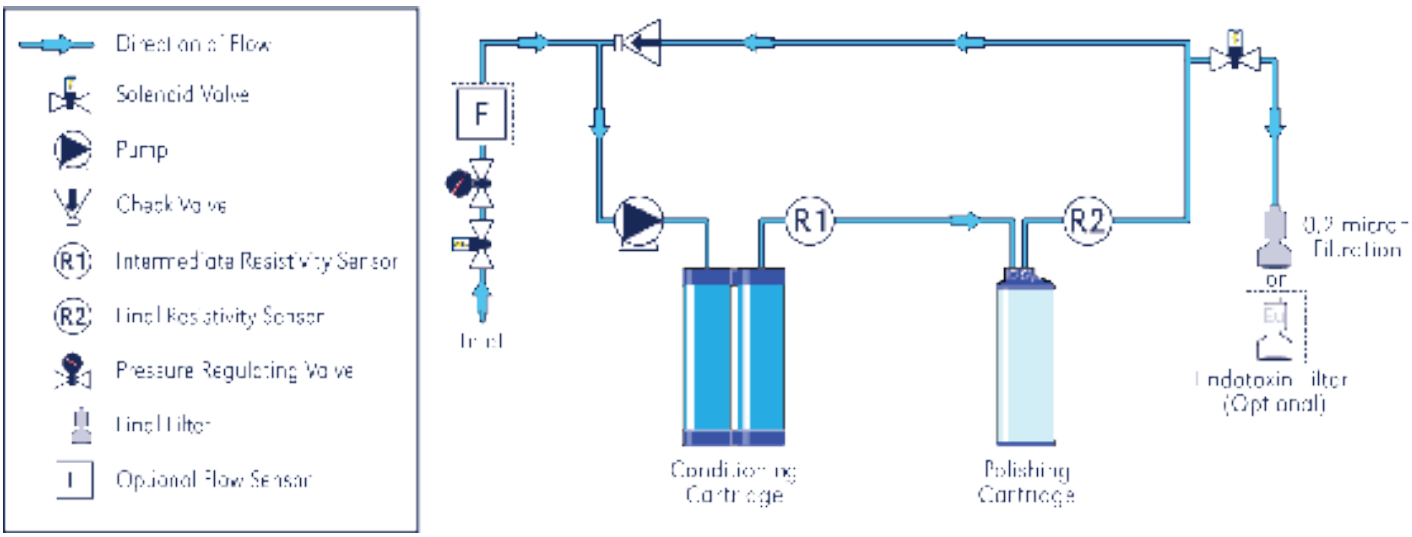
Model	WA301B/WA311B	WA301R/WA311R
Type	Benchtop	Remote dispense
Resistivity*	18.2 MΩ-cm	
Bacteria*	< 1 cfu/ml	
Particulates*	< 0.2 µm filtration	
TOC*	< 15 ppb	
Temperature	100˚F / 30˚C	
Pressure	90 PSIG Max. / 20 PSIG Min.	
Flow rate (typical)	0.67 Gallons Per Minute / 2.5 Liters Per Minute < 2.0 LPM with Ultrafilter & Endotoxin filter installed	
Inlet connection	3/8" O.D. Tubing / 9.53 mm O.D. Tubing	
Dimensions (H x W x D)	21.6 in. x 14.7 in. x 14.4 in. (54.8 cm x 37 cm x 36.5 cm)	
Weight	42 lbs. dry / 47 lbs. operating (22.7 **kg** dry / 25 **kg** operating)	
Power requirements	120V, 60 Hz @ 1.0 amp / 220V, 50 Hz @ 0.5 amp	

** Performance based upon RO / DI or Distillation Feed (< 20 uS/cm, < 50 ppb of TOC, 0.2 micron filtration)*

System Highlights



Flow Diagram



Additional System Components

Product code	Description
Installed Options and Accessories*	
ARI-PHADF	Direct Feed Port
ARI-PHADG	Recirculating Dispensing Gun
ARI-PHAWB	Wall Mount Bracket
Cartridges and Filters*	
ARI-PX135001	Dual Conditioning Cartridge (RO Feed)
ARI-PX135002	Dual Conditioning Cartridge (SDI / TAP Feed)
ARI-PX115103	Polishing Ultrapure Cartridge
ARI-PX115104	Polishing Ultrapure Low Organics Cartridge
ARI-PF006402	0.2 Micron Capsule Final Filter - 1/4" MNPT x 1/4" hose barb
ARI-PF007101	0.2 Micron Capsule Final Endotoxin Filter - 1/4" MNPT x 1/4" hose barb
Consumables	
ARI-PF007105	Ultrafilter - 3/8" Quick Disconnect Fitting
ARI-HPA016	UV Bulb 254/185nm TOC Destruct
ARI-HPA017	Sanitization Kit (includes cartridges, test strips, and gloves)

* *Must be pre-ordered for factory installation*
** *Not included in a system and orderered separately*

Best Value in Replacement Consumables

Model Configuration (aside from Benchtop)

Remote configuration

Wall mount with dispensing gun

Wall mount bracket and dispensing gun are options, sold separately

Water Purifier - Auto Pure Type 1 Water

For Organic and Analytical Chemistry: Ultrapure, Analytical, Low TOC

MADE IN THE USA

Benchtop WC301UVB: 120V / WC311UVB: 220V
Remote Dispense WC301UVR: 120V / WC311UVR: 220V

Water quality	Type 1, 18.2 MΩ
Feed requirement	< 20 uS
Flow	0.67 gpm 2.5 lpm

Water is purified using a staged purification process which includes high-purity ion exchange resins to remove dissolved minerals, and ultraviolet light for bacteria sterilization and TOC reduction. As water exits the system, a final filter removes particulates and bacteria to reach Type I water specifications.

WC Series Configuration
- Conditioning cartridge
- Polishing cartridge
- UV oxidation
- 0.2 micron filter

Features
- 2.5 LPM* of 18 MΩ Type 1 reagent water on demand
- Intuitive, user-friendly touch screen interface
- Real time quality monitoring with leak detection
- **Compact design with remote dispense option**
- **Quick change, no tools cartridge design**
- Large capacity, low cost consumable cartridges
- Premium quality ion exchange resin
- **Low ownership cost**

** Reported flow rate is typical but can vary depending on supply pressure and system options*

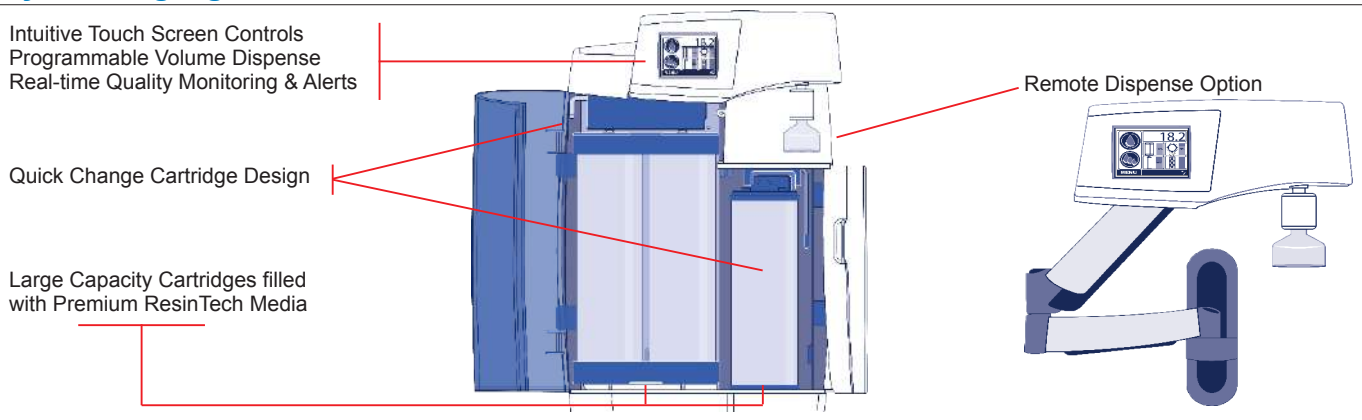
Applications
- High Performance Liquid Chromatography (HPLC)
- Gas Chromatography Mass Spectrometry (GC/MS)
- Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
- Analytic Chemistry / Trace Organics

Specifications

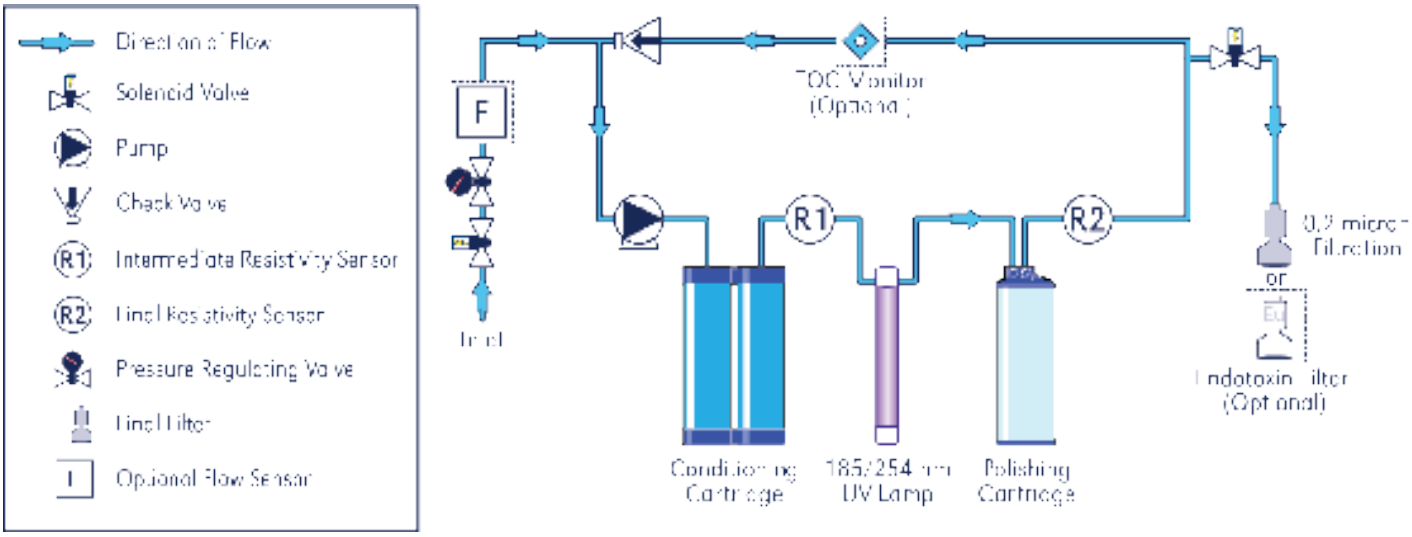
Model	WC301UVB/WC311UVB	WC301UVR/WC311UVR
Type	Benchtop	Remote dispense
Resistivity*	18.2 MΩ-cm	
Bacteria*	< 1 cfu/ml	
Particulates*	< 0.2 µm filtration	
TOC*	< 5 ppb	
Temperature	100˚F / 30˚C	
Pressure	90 PSIG Max. / 20 PSIG Min.	
Flow rate (typical)	0.67 Gallons Per Minute / 2.5 Liters Per Minute < 2.0 LPM with Ultrafilter & Endotoxin filter installed	
Inlet connection	3/8" O.D. Tubing / 9.53 mm O.D. Tubing	
Dimensions (H x W x D)	21.6 in. x 14.7 in. x 14.4 in. (54.8 cm x 37 cm x 36.5 cm)	
Weight	42 lbs. dry / 47 lbs. operating (22.7 **kg** dry / 25 **kg** operating)	
Power requirements	120V, 60 Hz @ 1.0 amp / 220V, 50 Hz @ 0.5 amp	

** Performance based upon RO / DI or Distillation Feed (< 20 uS/cm, < 50 ppb of TOC, 0.2 micron filtration)*

System Highlights



Flow Diagram

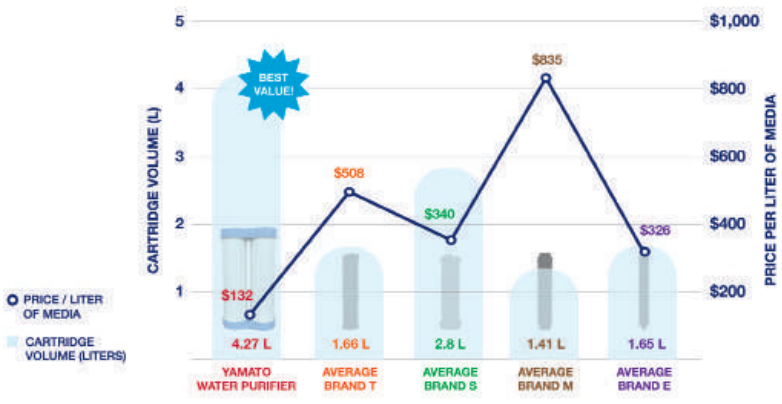


Additional System Components

Product code	Description
Installed Options and Accessories*	
ARI-PHADF	Direct Feed Port
ARI-PHADG	Recirculating Dispensing Gun
ARI-PHAWB	Wall Mount Bracket
Cartridges and Filters*	
ARI-PX135001	Dual Conditioning Cartridge (RO Feed)
ARI-PX135002	Dual Conditioning Cartridge (SDI / TAP Feed)
ARI-PX115103	Polishing Ultrapure Cartridge
ARI-PX115104	Polishing Ultrapure Low Organics Cartridge
ARI-PF006402	0.2 Micron Capsule Final Filter - 1/4" MNPT x 1/4" hose barb
ARI-PF007101	0.2 Micron Capsule Final Endotoxin Filter - 1/4" MNPT x 1/4" hose barb
Consumables	
ARI-PF007105	Ultrafilter - 3/8" Quick Disconnect Fitting
ARI-HPA016	UV Bulb 254/185nm TOC Destruct
ARI-HPA017	Sanitization Kit (includes cartridges, test strips, and gloves)

** Must be pre-ordered for factory installation*
*** Not included in a system and orderered separately*

Best Value in Replacement Consumables



Model Configuration (aside from Benchtop)

Remote configuration

Wall mount with dispensing gun

Wall mount bracket and dispensing gun are options, sold separately

Water Purifier - Auto Pure Type 1 Water

For most Life Sciences: Ultrapure, Biological

Benchtop WB301UFB: 120V / WB311UFB: 220V
Remote Dispense WB301UFR: 120V / WB311UFR: 220V

MADE IN THE USA

Water quality	Type 1, 18.2 MΩ
Feed requirement	< 20 uS
Flow	0.67 gpm 2.5 lpm

Water is purified using a staged purification process which includes high-purity ion exchange resins to remove dissolved minerals and pyrogen removal ultrafiltration. As water exits the system, a final filter removes particulates and bacteria to reach Type I water specifications.

WB Series Configuration
- Conditioning cartridge
- Polishing cartridge
- Ultrafiltration
- 0.2 micron filter

Features
- 2.5 LPM* of 18 MΩ Type 1 reagent water on demand
- Intuitive, user-friendly touch screen interface
- Real time quality monitoring with leak detection
- **Compact design with remote dispense option**
- **Quick change, no tools cartridge design**
- Large capacity, low cost consumable cartridges
- Premium quality ion exchange resin
- **Low ownership cost**

** Reported flow rate is typical but can vary depending on supply pressure and system options*

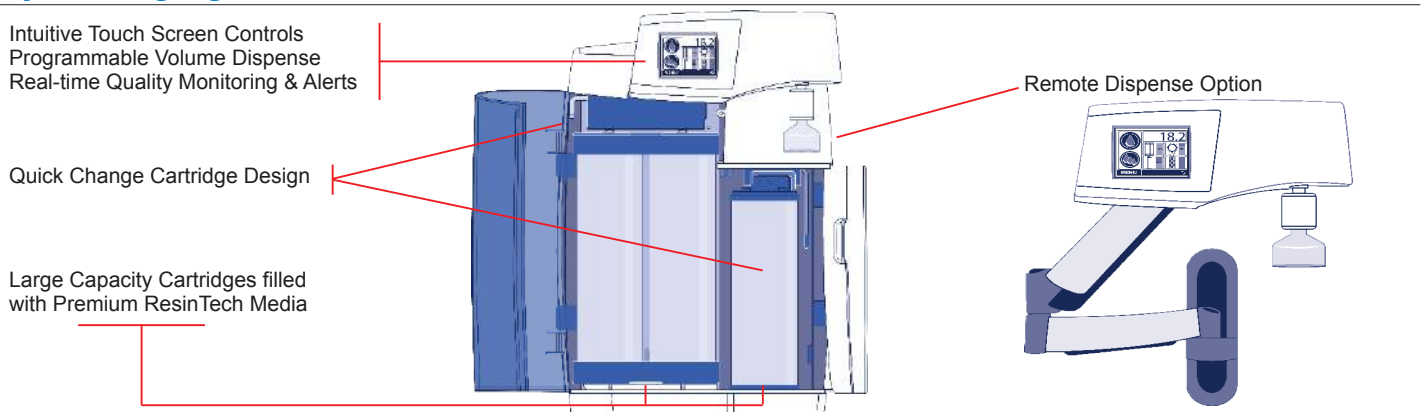
Applications
- Life Science
- Cell Culture
- Microbiology

Specifications

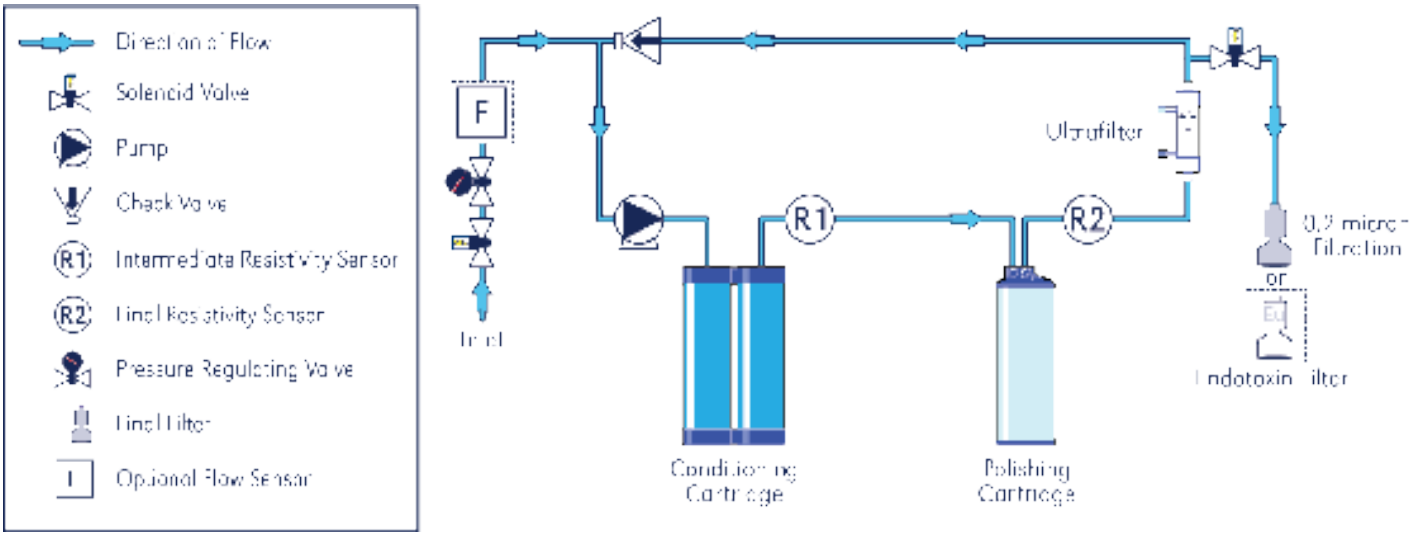
Model	WB301UFB/WB311UFB	WB301UFR/WB311UFR
Type	Benchtop	Remote dispense
Resistivity*	18.2 MΩ-cm	
Bacteria*	< 1 cfu/ml	
Endotoxin**	< 0.005 EU/m	
Particulates*	< 0.05 µm filtration	
TOC*	< 15 ppb	
RNase*	< 0.01 ng/ml	
Dnase*	< 4 pg/µl	
Temperature	100˚F / 30˚C	
Pressure	90 PSIG Max. / 20 PSIG Min.	
Flow rate (typical)	0.67 Gallons Per Minute / 2.5 Liters Per Minute < 2.0 LPM with Ultrafilter & Endotoxin filter installed	
Inlet connection	3/8" O.D. Tubing / 9.53 mm O.D. Tubing	
Dimensions (H x W x D)	21.6 in. x 14.7 in. x 14.4 in. (54.8 cm x 37 cm x 36.5 cm)	
Weight	42 lbs. dry / 47 lbs. operating (22.7 **kg** dry / 25 **kg** operating)	
Power requirements	120V, 60 Hz @ 1.0 amp / 220V, 50 Hz @ 0.5 amp	

** Performance based upon RO / DI or Distillation Feed (< 20 uS/cm, < 50 ppb of TOC, 0.2 micron filtration) ** Includes Endotoxin Removal Capsule Filter*

System Highlights



Flow Diagram

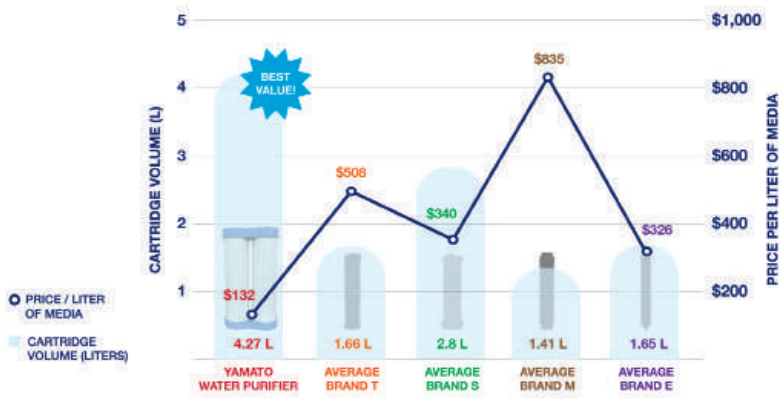


Additional System Components

Product code	Description
Installed Options and Accessories*	
ARI-PHADF	Direct Feed Port
ARI-PHADG	Recirculating Dispensing Gun
ARI-PHAWB	Wall Mount Bracket
Cartridges and Filters**	
ARI-PX135001	Dual Conditioning Cartridge (RO Feed)
ARI-PX135002	Dual Conditioning Cartridge (SDI / TAP Feed)
ARI-PX115103	Polishing Ultrapure Cartridge
ARI-PX115104	Polishing Ultrapure Low Organics Cartridge
ARI-PF006402	0.2 Micron Capsule Final Filter - 1/4" MNPT x 1/4" hose barb
ARI-PF007101	0.2 Micron Capsule Final Endotoxin Filter - 1/4" MNPT x 1/4" hose barb
Consumables	
ARI-PF007105	Ultrafilter - 3/8" Quick Disconnect Fitting
ARI-HPA016	UV Bulb 254/185nm TOC Destruct
ARI-HPA017	Sanitization Kit (includes cartridges, test strips, and gloves)

** Must be pre-ordered for factory installation*
*** Not included in a system and orderered separately*

Best Value in Replacement Consumables



Model Configuration (aside from Benchtop)

Remote configuration

Wall mount with dispensing gun

Wall mount bracket and dispensing gun are options, sold separately

Water Purifier - Auto Pure Type 1 Water

For Genetics Testing and more: Ultrapure, Biological, Low TOC

Benchtop WG301UVUFB: 120V / WG311UVUFB: 220V

Remote Dispense WG301UVUFR: 120V / WG311UVUFR: 220V

MADE IN THE USA

Water quality	Type 1, 18.2 MΩ
Feed Requirement	< 20 uS
Flow	0.67 gpm 2.5 lpm

Water is purified using a staged purification process which includes high-purity ion exchange resins to remove dissolved minerals, ultraviolet light for bacteria sterilization and TOC reduction, and ultrafiltration for pyrogen removal and nuclease free water. As water exits the system, a final filter removes particulates and bacteria to reach Type I water specifications.

WG Series Configuration

- Conditioning cartridge
- Polishing cartridge
- UV oxidation
- Ultrafiltration
- 0.2 micron filter

Features

- 2.5 LPM* of 18 MΩ Type 1 reagent water on demand
- Intuitive, user-friendly touch screen interface
- Real time quality monitoring with leak detection
- **Compact design with remote dispense option**
- **Quick change, no tools cartridge design**
- Large capacity, low cost consumable cartridges
- Premium quality ion exchange resin
- **Low ownership cost**

** Reported flow rate is typical but can vary depending on supply pressure and system options*

Applications

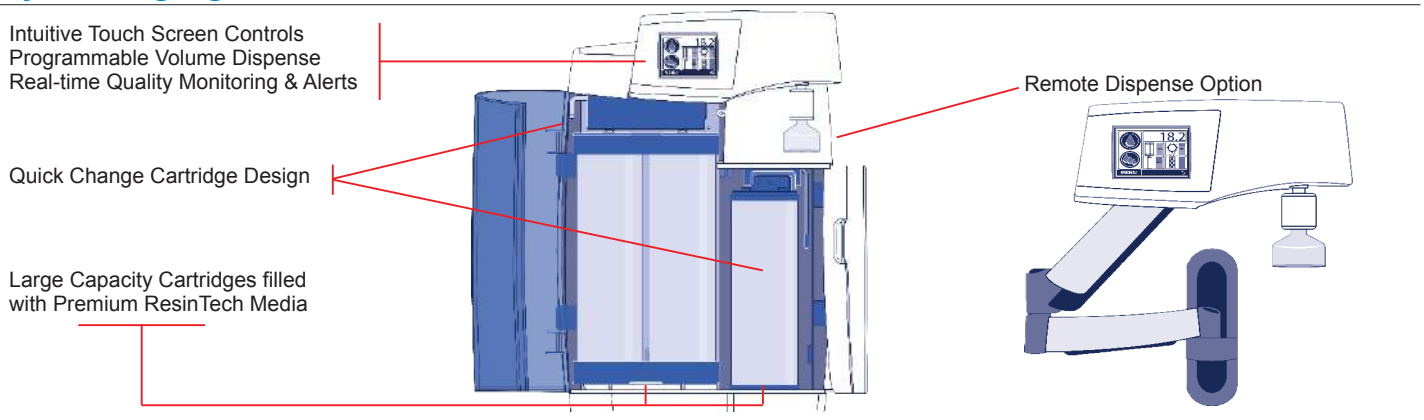
- Genetics
- DNE Sequencing
- Polymerase Chain Reaction (PCR)

Specifications

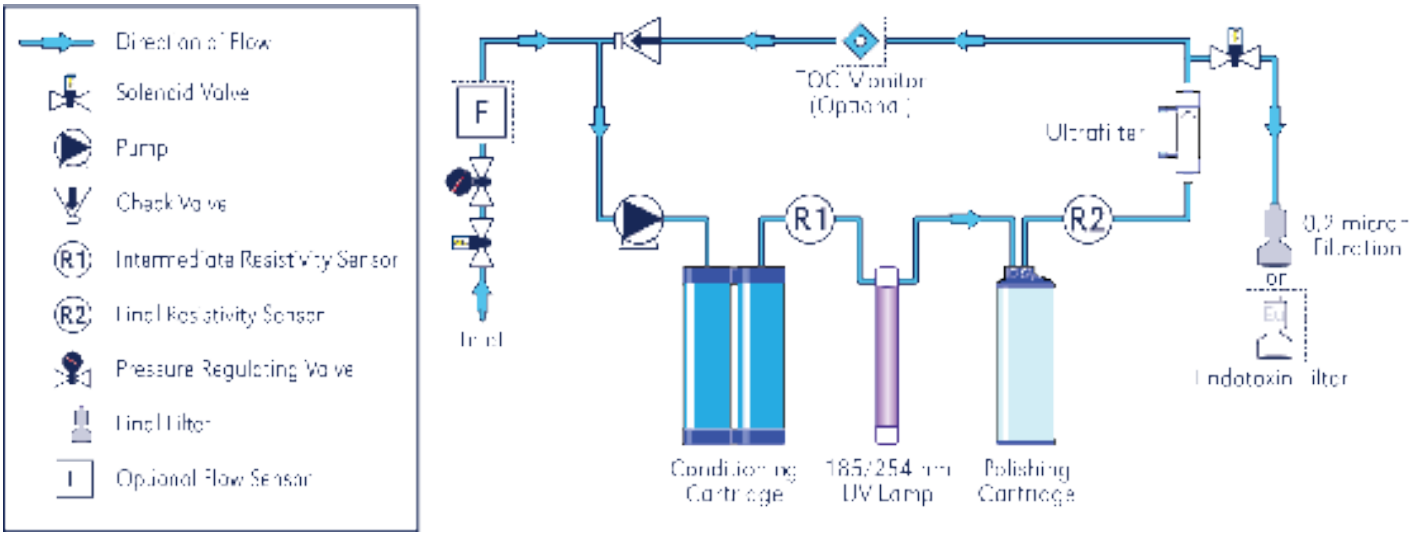
Model	WG301UVUFB/WG311UVUFB	WG301UVUFR/WG311UVUFR
Type	Benchtop	Remote dispense
Resistivity*	18.2 MΩ-cm	
Bacteria*	< 1 cfu/ml	
Endotoxin**	<0.005 EU/m	
Particulates*	< 0.05 µm filtration	
TOC*	< 5 ppb	
RNase*	< 0.01 ng/ml	
Dnase*	< 4 pg/µl	
Temperature	100˚F / 30˚C	
Pressure	90 PSIG Max. / 20 PSIG Min.	
Flow rate (typical)	0.67 Gallons Per Minute / 2.5 Liters Per Minute , < 2.0 LPM with Ultrafilter & Endotoxin filter installed	
Inlet connection	3/8" O.D. Tubing / 9.53 mm O.D. Tubing	
Dimensions (H x W x D)	21.6 in. x 14.7 in. x 14.4 in. (54.8 cm x 37 cm x 36.5 cm)	
Weight	42 lbs. dry / 47 lbs. operating (22.7 **kg** dry / 25 **kg** operating)	
Power requirements	120V, 60 Hz @ 1.0 amp / 220V, 50 Hz @ 0.5 amp	

** Performance based upon RO / DI or Distillation Feed (< 20 uS/cm, < 50 ppb of TOC, 0.2 micron filtration) ** Includes Endotoxin Removal Capsule Filter*

System Highlights



Flow Diagram

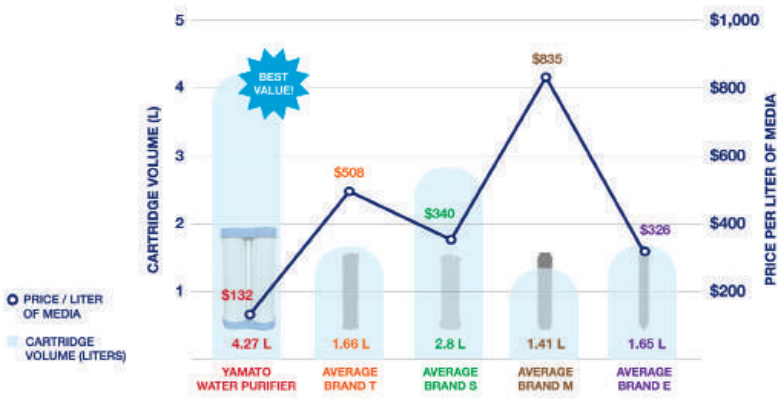


Additional System Components

Product code	Description
Installed Options and Accessories*	
ARI-PHADF	Direct Feed Port
ARI-PHADG	Recirculating Dispensing Gun
ARI-PHAWB	Wall Mount Bracket
Cartridges and Filters*	
ARI-PX135001	Dual Conditioning Cartridge (RO Feed)
ARI-PX135002	Dual Conditioning Cartridge (SDI / TAP Feed)
ARI-PX115103	Polishing Ultrapure Cartridge
ARI-PX115104	Polishing Ultrapure Low Organics Cartridge
ARI-PF006402	0.2 Micron Capsule Final Filter - 1/4" MNPT x 1/4" hose barb
ARI-PF007101	0.2 Micron Capsule Final Endotoxin Filter - 1/4" MNPT x 1/4" hose barb
Consumables	
ARI-PF007105	Ultrafilter - 3/8" Quick Disconnect Fitting
ARI-HPA016	UV Bulb 254/185nm TOC Destruct
ARI-HPA017	Sanitization Kit (includes cartridges, test strips, and gloves)

** Must be pre-ordered for factory installation*
*** Not included in a system and orderered separately*

Best Value in Replacement Consumables



Model Configuration (aside from Benchtop)

Remote configuration

Wall mount with dispensing gun

Wall mount bracket and dispensing gun are options, sold separately

Water Purifier - Auto Pure Type 1 Water

For cost control: Ultrapure, Economical

WA401/WA401UV/WA201UF/WA201UVUF

MADE IN THE USA

Water quality	Type 1 18.2 MΩ	Purity	< 20 uS/cm	Flow	1.1 gpm 4.0 lpm

This system provides 4L per minute of 18.2 megohm water. A quiet recirculation pump ensures constant water purity. Water quality meets or exceeds ASTM Type I water specifications.

WA Series Configuration

- Built-in pressure regulator
- 0.2 micron filter

Features

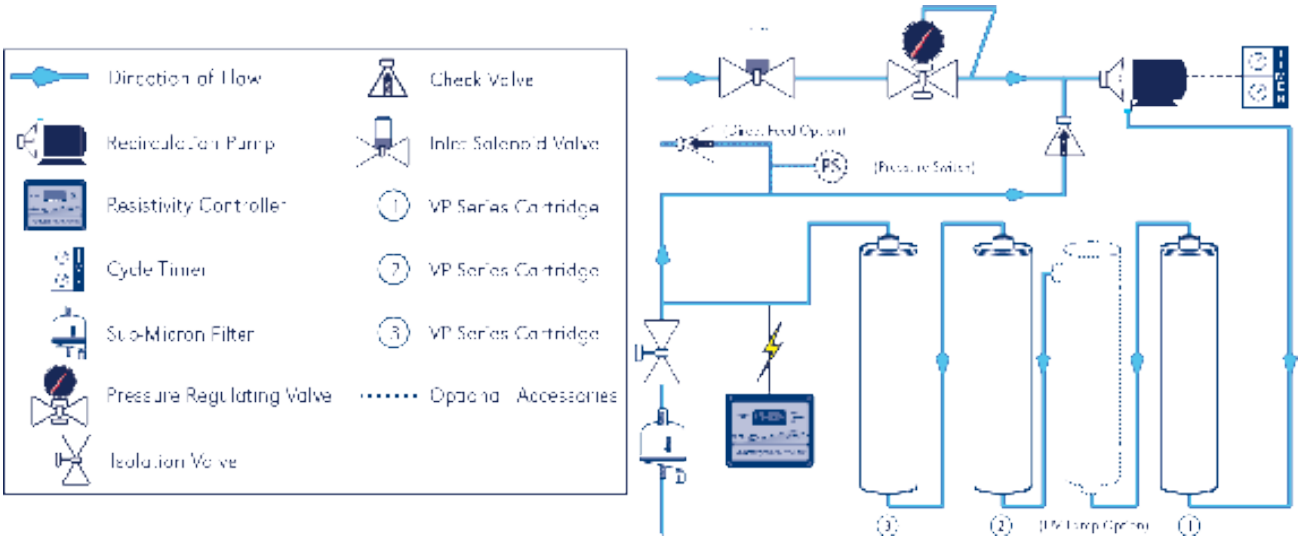
- 4.0 LPM* of 18 MΩ water
- Intuitive, touch screen for programmable water dispensing
- Fully recirculating flow of water ensures quality water upon dispensing
- **Compact design, can be wall mounted or free standing**
- **Easy cartridge replacement, no tools needed**
- **Low ownership cost**
- Variety of options available

** Reported flow rate is typical but can vary depending on supply pressure and system options*

Specifications

Model	**WA401** Water system with 0.2 micron capsule filter **WA401UV** Water system with 0.2 micron capsule filter and combination UV for bacteria and TOC distruct **WA201UF** Water system with 0.05 micron capsule ultrafilter **WA201UVUF** Water system with 0.05 micron capsule ultrafilter and combination UV for bacteria and TOC distruct
Influent Quality	
Source	Reverse Osmosis, DI or Distillation
Purity	< 20 uS/cm
Filtration	0.2 micron
Free Chlorine	< 0.05 ppm
SIlica	< 2 ppm
TOC	< 50 ppb
Effluent Quality (Standard System)	
Purity	> 18 Megohm- cm
Microorganisms	< 10 CFU / mL
Chlorides	< 1 ppb
Sodium	< 1 ppb
With 0.05 micron UF Endotoxin	< 0.03 EU
Technical Data	
Pressure	90 PSIG Maximum 20 PSIG Minimum
Temperature	100˚F / 30˚C
Flow Rate	4.0 lpm (1.1 GPM) 2.0 lpm (0.53 GPM) with capsule filter
Connections	Inlet 3/8” Tube Outlet 1/4” FNPT
Dimensions (H x W x D)	25 in. x 23 in. x 8.5 in. (64 cm x 59 cm x 22 cm)
Weight	32 lbs dry / 38 lbs operating (14.5 kg dry / 17.3 kg operating)
Outer shell	Powder coated steel
Power requirements	120V, 60 Hz @ 1.0 amp
Options	Remote dispensing gun, 0.05 micron hollow fiber UF filter, combination high-purity/sub-micron cartridge, Reverse osmosis, direct feed option for auxiliary equipment

Flow Diagram



Optional items

Product code	Description
ARI-ARADG	Dispensing Gun and tubing kit
ARI-ARAUV	UV Combination for Bacteria and TOC
ARI-ARADF	Direct Feed
ARI-ARAWB	Wall Mount Bracket
ARI-VPK3805	Tap Feed Cartridge Kit
ARI-VPK4010	RO/DI Feed Cartridge Kit
ARI-PF006402	0.2 micron capsule filter
ARI-PF006505HN	0.05 micron hollow fiber UF filter
ARI-HPA008	220 VAC External Power Converter
ARI-HPA010	Sanitization Kit
ARI-HPLRO	Reverse Osmosis Pretreatment

** VP Series cartridge sold separately*

Water Purifier - Auto Pure Type 2 and Type 3 Water

For media preparation

WH201P/WH501P/WH201C/WH501C

MADE IN THE USA

Media fill	High purity High capacity	Flow rate	0.5 gpm (1.9 lpm) / 1.25 gpm (4.7 lpm)

A pre-assembled cartridge system that provides deionized water using a staged filtration process. Water purification is provided using a 3-stage process.

WH201P

Stage 1

Removes particles greater than 5 micron, chlorine, and organics

Stages 2 & 3

Deionizers designed to remove dissolved minerals

Features

- Turn-key system for low cost - on demand service
- Resistivity light included for visual indication of cartridge replacement
- Available in high purity and high capacity configurations
- Available in 2-1/2" and 4/1/2" diameter configurations
- Outlet isolation valve, spanner wrench and associated tubing provided
- **Economically produces DI water**

Applications

- *High purity models: WH201P and WH501P: use low odor mixed bed cartridges for applications requiring better than 10 MΩ water quality*
  General deionization, battery water filling, humidification, hydrogen generator, glassware rinse, glassware washer, sterilizers
- *High capacity models WH201C and WH501C: provide water quality better than 50 kΩ, for less corrosive applications, ideal for scale reduction and non-stainless steel piping systems*
  Environmental chambers, sterilizers, ultrasonic cleaners, chiller loops

Specifications

Model	WH201P	WH501P	WH201C	WH501C
Distilled water capacity in gallons				
FEEDWATER ***Total Dissolved Solids (TDS as $CaCO_3$)***	**High Purity DI Water** ***Better than 10 Megohm***		**High Capacity DI Water** ***Better than 50 Kohm***	
10 ppm*	2650	6800	3000	8000
100 ppm	265	680	300	800
300 ppm	90	225	100	265
500 ppm	50	135	60	160
Filter technology	(1) 10” Carbon Block (2) 20” High Purity	(1) 10” Carbon GAC (2) 20” High Purity	(1) 10” Carbon Block (2) 20” High Capacity	(1) 10” Carbon GAC (2) 20” High Capacity
Bowl diameter	2.5”	4.5”	2.5”	4.5”
Resistivity light	200 KΩ	200 KΩ	20 KΩ	20 KΩ
Flow rate	0.5 gpm / 1.9 lpm	1.25 gpm / 4.7 lpm	0.5 gpm / 1.9 lpm	1.25 gpm / 4.7 lpm
Total capacity grains as $CaCO_3$	1800	4760	2160	5710
Typical effluent	10 MΩ-cm	10 MΩ-cm	50 KΩ-cm	50 KΩ-cm
Connection	Inlet - 3/8" O.D. tubing Outlet - 1/2' hose barb			
Pressure	10 PSIG minimum 100 PSIG maximum			
Temperature (max)	100°F			
Filter housing	Polypropylene			
Bracket	Painted steel			
Dimensions (H x W x D)	24”x 20”x 6	26”x 36”x 9	24”x 20”x 6	26”x 36”x 9
Shipping weight	24 lbs.	55 lbs.	24 lbs.	55 lbs.
Voltage	120V			

** Typical water quality with reverse osmosis pre-treatment*

WH501P

Catridge Replacement Kits

Product code	Description	Contents	Suitable Model
ARI-HYK001	High Purity Cartridge Replacement Kit	(1) 2.5” x 10” Carbon Block (2) 2.5” x 20” Mixed Bed	WH201P
ARI-HYK002	High Purity Cartridge Replacement Kit	(1) 4.5” x 10” Carbon GAC (2) 4.5” x 20” Mixed Bed	WH501P
ARI-HYK009	High Capacity Cartridge Replacement Kit	(1) 2.5” x 10” Carbon Block (2) 2.5” x 20” High Capacity	WH201C
ARI-HYK010	High Capacity Cartridge Replacement Kit	(1) 4.5” x 10” Carbon GAC (2) 4.5” x 20” High Capacity	WH501C

2.5" Cartridge Replacement Kit

4.5" Cartridge Replacement Kit

Replacement Resistivity Lights

Product code	Description
ARI-CL20K50	20 Kohm Resistivity Light
ARI-CL200K50	200 Kohm Resistivity Light
ARI-CL2MG50	2 Megohm Resistivity Light

Reverse Osmosis Pre-treatment

Perfect addition to any lab water system!

HPL-RO

MADE IN THE USA

Syetem output	100g/day

Rejection rate	>93 % total dissolved solids

HPL-RO system uses feed water pressure to purify the water through a reverse osmosis membrane. The 4-stage filtration process reduces dissolved salts and organics from the water. The permeate water is conveniently stored in storage tank while the concentrated salts are sent to drain.

The HPL-RO system can increase the DI cartridge capacity by 10 times. For low Total Organic Carbon (TOC) applications, reverse osmosis can significantly reduce levels to allow the polishing system to remove the final trace amounts.

Features

- Wall mounted design
- Four stage filtration
- Fourteen (14) gallon bladder tank
- Easy filter changes
- Variety of option including booster pump and high capacity membranes
- **Low ownership cost**

Specifications

Model	HPL
System output	100 gallons / day
Rejection rate	>93 % total dissolved solids
Sediment filter	5.0 micron
Carbon filter	GAC media
Post filter	1.0 micron
R.O. System dimensions	18” x 16” x 5”
Bladder tank dimensions	26.5” x 16” (14 gallon)
Overall weight	38 lbs. (17.3 kg)

Options

Product code	Description
ARI-HPLRO	75 Gallon Per Day Reverse Osmosis Pretreatment with 14-Gallon Bladder Tank
ARI-HPLRO200	200 Gallon Per Day Reverse Osmosis Pretreatment
ARI-HPLRO300	300 Gallon Per Day Reverse Osmosis Pretreatment
ARI-ROBladder40	40-Gallon Bladder Storage Tank
ARI-ROBladder80	80-Gallon Bladder Storage Tank
ARI-AFK005	HPL-RO Pretreatment Kit for 75,, 200, and 300 GPD Systems
ARI-AM127010	HPL-RO Membrane, 100 GPD, TFC
ARI-AM147020	HPL-RO Membrane, 200 GPD, TFC
ARI-AM217030	HPL-RO Membrane, 300 GPD, TFC

NOTES

Water Purifier - Auto Still®

WG252-115V WG252-220V / WG1012

MADE IN JP

Distilled water production	1.5L/h (WG252)	5L/h (WG1012)
Treatment process	Ion exchange→Distillation →Filtration	
Purified water	Deionized water Distilled water	
Water quality	Type1 / A4 Deionized water	Type2 / A4 Distilled water

WG252

WG1012

Specifications

Model	WG252-115V WG252-220V	WG1012
Water purifying method	Ion exchange→Distillation→Filtration	
Purified water	Deionized water and distilled water	
Distilled water production*1	~1.5L/h	~5L/h
Distilled water delivery rate*1	~2.5L/min (with variable flow rate function)	
Deionized water delivery rate*2	~1.0L/min (with variable flow rate function)	
Range of production*3	0.1~30L / continuous water collection	0.1~100L / continuous water collection
Condenser	Hard glass	
Heater	Ceramic heater 1.2kW	Ceramic heater 1.9kW x 2
Pre-treatment cartridge	0.1µm hollow fiber membrane + activated carbon (PWF-1)	
Ion-exchange resin cartridge *(must be purchased separately)*	CPC-S 4L x **1 pc.** (activated carbon high-purity cartridge)	CPC-S 4L x **2 pcs.** (activated carbon high-purity cartridge)
Final filtration	0.1µm membrane filter x 2	
Leakage detection	Water leakage detector forcefully shuts off feed water solenoid valve when water leakage detected	
Distilled water tank capacity	30L polyethylene tank	100L polyethylene tank
Distilled water UV sterilization	Optional	
Water sampling tray	Slide out type, load-bearing capacity 10kg, for 5L beaker	
Multipurpose distilled water outlet	For connecting Φ8 hard tube (right side of main body)	
Standard raw water requirement	~2.0L/min	~2.6L/min
Raw water pressure range	0.05-0.5 MPa	0.1-0.5 MPa
Distilled water tank full water setting	2, 10, 20, 30L	10, 30, 60, 90L
Power source (50/60 Hz)	AC115V 11A / AC220V 6A *with external transformer*	AC220V 18A *with external transformer*
External dimension*4	W540 x D570 x H775 mm	W550 x D570 x 1715 mm
Weight	~63kg	~113kg
Water level display	LED display	
Water quality display	Digital (conductivity or resistivity)	
Other displays	Notification: Consumables replacement / Periodic maintenance, Alarm: Water outage / Trend data recording impossible / Power failure / Distilled water quality deterioration, Abnormality: Controller / Water leakage / Heater overheating / disconnection / Tank water level gauge / Boiler water level, Water level gauge / Boiler drainage route / Cooling water / Water quality meter / Water sampling pump, / Ion exchange water flow reduction / Water sampling route	
Included accessories	1 water supply hose (2m), 1 water supply hose filter, 1 connection hose assembly, 1 can stone cleaner, 1 pretreatment cartridge, 1 air vent filter, 2 membrane filters, 2 filter covers, 2 magnet hooks, adjuster fixing bracket (WG1012 only)	
Operational accessory	Ion exchange resin cartridge **(must be purchased separately)**	

*1 Performance data above is based on 23°C ±5°C room temperature, and 65% RH ±20% humidity.

Operating ambient temperature range for this unit is between 5°C and 35°C.Keep temperature range of raw water between 5°C-30°C. When raw water temperature is high, the drainage temperarture may also be high. If temperature exceeds 60°C, a drain pipe is required.

*2 The guaranteed performance range is raw water pressure 0.2 -0.5 MPa. Water dispensing volume varies dpending on water temperature.

*3 Accuracy of quantitative water ssampling is approximately 10%..

*4 Dimensions excludes protrusions.

Features

- Two independent dispensers for water sampling
  Handy dispenser for easy collection of water. Dispenser is divided into 2 parts: deionized water and distilled water.
- 7-inch LCD touch panel system
  Improved visibility and operability
- Consumable management functions
  Displays replacement history of comsumables such as ion resin, and the replacement method with figures and explanations. In addition, it provides a consumables advance notice (replace soon) and replacement notice (replace).
- Trend graph
  Displays trend graph of water quality and temperature. Can also graph consumable replacement notifications and error occurence information.
- Easy replacement of ion-exchange resin
  Easy replacement through a one-touch joint. Possible to add 2 cartridges to reduce frequency of cartridge replacement.
- Large water tank
  Large distilled water tank with capacity of 30L (WG252) and 100L (WL1012)
- Improved design
  More compact width and depth. Unit can be easily installed in small spaces.

Easy to use slide out type water sampling tray with drainage eliminating concerns about overflowing water discharge

Control Panel

Independent Dispensers

WG252

Two independent dispensers for water sampling

WG1012

Water sampling tray

with drainage function

WG252 step

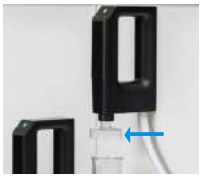
Optional items

Product code	Product name
281333	Stand (W540 x D660 x H800mm). Caster with adjuster. **For WG252.**
281334*	Sterilization light for WG252. Cannot be installed after delivery.
281335*	Sterilization light for WG1012. Cannot be installed after delivery.
281337	Water supply joint
281339	Tap water pressure reducing valve
281340*	Drain trap
281344	Water outlet cover

* Please specify when ordering main unit.
For complete list of optional items, please refer to WG252/1012 Instruction Manual.

Stand

Tap water pressure reducing valve



Water outlet cover

Consumable parts

Product code	Description	
253099	Pre-treatment cartridge	PWF-1
253080	Ion-exchange resin cartridge	CPC-S
9020010004	Membrane filter (2 pcs. / set)	MFRL727
9020020001	Air vent filter for tank	AVF-1(4210)
253773	Replacement sterilization light for WG252/1012	OWG28

Pre-process cartridge

Membrane filter

Ion-exchange resin cartridge

Air vent filter for tank

⚠ Attention

- Handle drain hose carefully.
- Attach water supply hose to a faucet with a sink.
- When the sink is remote from the faucet, use optional water supply port unit.
- Keep original water pressure within the specified pressure range.
- Never use in flammable or explosive gas atmosphere.

Small Capacity Water Purifier - Auto Still®

MADE IN JP

WG205-115V WG205-220V

Production capacity	1.5L/h
Treatment process	Ion-exchange→Distillation
Purified water	Deionized water Distilled water
Water quality	Type 1 / A4 level Deionized water Type 2 / A4 level Distilled water

Low cost high purity water purifier

- Pre-treatment cartridge removes bacteria, trihalomethane, residual chlorine, organic and dust
- Easy replacement of ion exchange resin
- Optional membrane filter at water sampling port
- Displays replacement of consumables
- Equipped with automatic boiler drainage function
- Compact. Can be installed in areas with limited space.

Control Panel

Specifications

Model	WG205-115V / WG205-220V
Water purifying method	Ion-exchange→Distillation
Purified water	Deionized water and distilled water
Distilled water production *1	~1.5L/h
Distilled water delivery rate *1	~1.5L/min
Deionized water delivery rate*2	~1.0L/min
Range of production *1	Continuous production
Condenser	Hard glass
Heater	Ceramic heater 1.2kW
Pre-treatment cartridge	0.1µm diameter hollow fiber membrane + activated carbon (PWF-1)
Ion-exchange resin cartridge *(must be purchased separately)*	CPC-S 4L x **1 pc.** (activated carbon high-purity cartridge)
Final filtration	Optional membrane fliter
Leakage indication	Water supply solenoid valve forcibly shuts off when water leakage detected
Distilled water tank capacity	20L polyethylene tank
Multi-purpose distilled water sampling port	For Φ8 rigid tube connection (right side of main unit)
Water level sensor	Float switch 2-stage detection
Raw water pressure range	0.5~5 MPa
Standard raw water requirement	~2.0L/min
Water level display	Communication pipe water level indication
Water quality display	5 stage conductivity LED indication
Other display	Consumable replacement time indication (ion-exchange resin cartridge)
Power source (50/60 Hz)	AC115V 11A / AC220V 6A *with external transformer*
External dimension*3	W540 x D575 x H775mm
Weight	~55kg
Included accessories	1 water supply hose (2m) 1 water supply hose filter 1 connection hose assembly 1 can scale cleaner 1 pretreatment cartridge
Operational accessory	1 ion exchange resin cartridge *(must be purchased separately)*

*1 Performance data above is based on 23°C ±5°C room temperature, and 65% RH ±20% humidity.
Operating ambient temperature range for this unit is between 5°C and 35°C.Keep temperature range of raw water between 5°C-30°C. When raw water temperature is high, the drainage temperarture may also be high.

*2 The guaranteed performance range is raw water pressure 0.2 -0.5 MPa. Water dispensing volume varies dpending on water temperature.

*3 Dimensions excludes protrusions.

Optional items

Product code	Product name
281333	Stand (W540 x D660 x H800mm). Caster with adjuster.
281336	Water dispensing hose unit. Length 2m.
281337	Water supply joint
281339	Tap water pressure reducing valve
281340*	Drain trap
281344	Water outlet cover

* Please specify when ordering main unit.
For complete list of optional items, please refer to WG205 Instruction Manual.


Stand


Tap water pressure reducing valve


Water outlet cover

Consumable parts

Product code	Product name	
253099	Pre-treatment cartridge	PWF-1
253080	Ion-exchange resin cartridge	CPC-S
9020010004	Membrane filter (2 pcs. / set)	MFRL727
9020020001	Tank air vent filter	AVF-1 (4210)


Pre-treatment cartridge


Ion-exchange cartridge


Membrane filter


Tank air vent filter

⚠ Attention

- Avoid tangling the drain hose
- Attach water supply hoses to the faucet with sink
- When sink is separate from the faucet, please use optional Water Supply Port Unit
- Raw water pressure should be within specified pressure range
- Avoid flammable or explosive gas atmosphere

NOTES

Benchtop Water Purifier - Pure Line®

WE200

MADE IN JP

Treatment process	Ion-exchange	Purified water	Deionized water	Water quality	Type 1 / A4

Type 1 (ASTM D 1193) / A4 (JIS K 0057) level purity benchtop water purifier

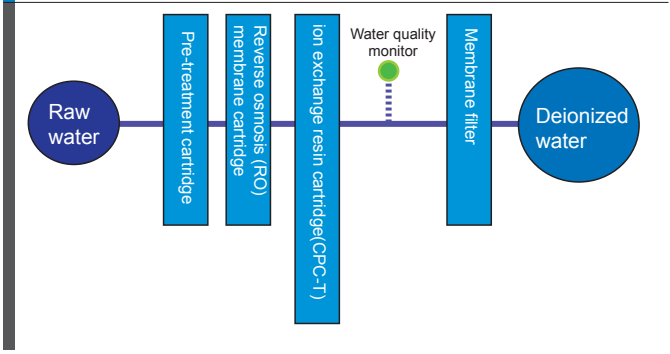
- Suitable for high sensitivity trace analysis
- Lower running cost
- By adopting reverse osmosis (RO) membrane cartridge set, life span of consumables has been expanded significantly
- Benchtop type, space saving
- Easy water sampling by attaching to water faucet
- Easy to operate digital display
- Displays replacement of consumables and its exchange history
- Standard equipped with membrane filter to protect pure water production from contamination
- Electromagnetic valve equipped at sampling water port for leakage prevention
- Universal power supply: works with 100-240VAC

Specifications

Model	WE200
Purified water	Deionized water: compliant with ASTM D 1193 Type1 / JIS K0557 A4
Water purifying method	RO membrane→ion exchange→filtration
Pure water delivery rate	0.5~1.0L/min continuous production
Raw water filter	Pre-treatment cartridge (activated charcoal + 0.1μm hollow fiber membrane)
Filtration	Reverse osmosis membrane RO
Ion-exchange resin cartridge	2L ion exchange resin containing activated charcoal (CPC-T)
Final filtration	0.1μm membrane filter
Leakage detection	Water supply solenoid valve forcibly shut off when leak is detected
Raw water press range	0.13~0.5MPa (1.3~5.0kgf/cm²)
Raw water temperature range	10~30°C
Water sampling port	250mm above floor, RC1/4 (connected with membrane filter)
Drainage port	ø10 rigid tube
Drainage rate	Maximum 2L/min.
Safety device	Water cut-off error, water quality sensor error, controller error, pressure limit error, leak error, flow alarm/error, earth leakage
Power source (50/60Hz)	Single phase AC100~240V 1.3A or less
External dimensions (mm)	W350 x D430 x H 470
Weight	~30kg
Water quality display	7-segment LED display (conductivity / resistivity / water temperature)
Other display	Consumables replacement display (ion exchange resin, pre-treatment cartridge, reverse osmosis (RO) membrane, membrane filter), warning / error display
Included accessories	Supply / drain water hoses, pre-treatment cartridge, reverse osmosis (RO) membrane cartridge set, membrane filter, power cord, seal tape
Operational accessory	Ion-exchange cartridge CPC-T *(must be purchased separately)*

*This unit must be connected to drainage facility.

Treatment Process

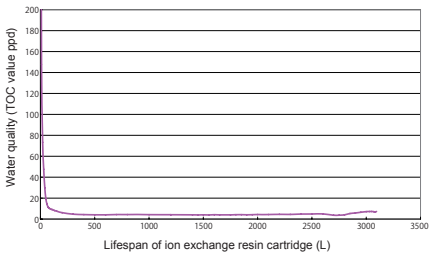


Water Quality Analysis

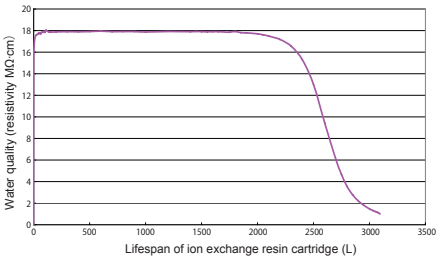
Item	ASTM D 1193 Standard Type 1	JIS K 0057 Standard A4	Measured value	ASTM D 1193 level	JIS K 0057 level
Electrical conductivity (µS/cm)	<0.056	<1	0.055	Type 1	A4
Organic carbon (µg /l)	<50	<50	5	Type 1	A4
Zinc (µg Zn/l)	-	<0.1	<0.1	-	A4
Silica (µg SiO_2/l)	<3	<2.5	0.5	Type 1	A4
Chloride ion (µ Cl^-/l)	<1	<1	<0.5	Type 1	A4
Sulfate ion (µg SO_4^{2-}/l)	-	<1	<1.0	-	A4
Total level				**Type 1**	**A4**

*Quality of raw water may cause different results.
*For water quality comparison JIS K 0057 ↔ ASTM D 1193 refer to page 115 of the general catalog.

Ion exchange resin lifespan test (TOC value)

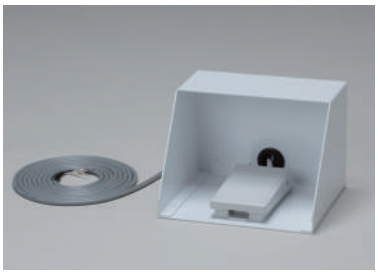


Ion exchange resin lifespan test (resistivity value)



Optional items


Water sampling stand


Foot switch

Product code	Product name
253266	Water sampling stand (supplied in connection kit) OWL40
253278	External alarm output terminal OWE10
253279	Remote water sampling terminal OWE12
253280	Foot switch OWE14
253686	Water supply port unit OWH10

Consumable parts


Pre-treatment cartridge

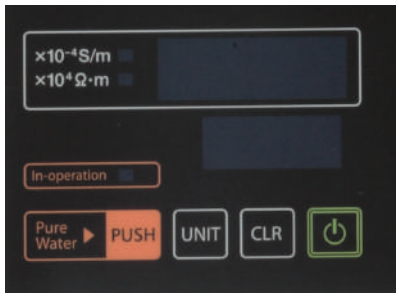

Reverse osmosis (RO) membrane cartridge set


Ion-exchange resin cartridge CPC-T


Membrane filter

Product code	Product name
253099	Pre-treatment cartridge
253257	Reverse osmosis (RO) membrane cartridge set
253256	Ion-exchange resin cartridge CPC-T
9020010004	Membrane filter

Control Panel



Supply / Drain Port (Back of main unit)

SINCE 1889

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