SINCE 1889

Yamato

PRODUCT CATALOG

Yamato Scientific America

Innovating Science for over 130 Years

Innovating Science for over 130 Years

Yamato Scientific America Inc. (YSA) was formed in 1989, as a wholly owned subsidiary of Yamato Scientific Co., headquartered in Japan, to provide high-end general laboratory equipment to the US market including ovens, sterilizers, incubators, rotary evaporators, spray dryers, muffle furnaces, freeze dryers, fume hoods, clean benches, stirrers, shakers, plasma cleaners, water purifiers and custom made industrial equipment.

Located in the heart of Silicon Valley, Santa Clara, California, YSA houses its inventory on a 17,000 sq-ft. facility to ship directly from our warehouse. Our Silicon Valley location provides sales, marketing and technical support to a diverse pool of industries – life science, chemical, technology, automotive, energy, pharmaceutical, governmental, academic institutions and more.

Yamato is proud to collaborate with scientists to achieve breakthroughs to improve human life.

Yamato Scientific America Inc. Santa Clara, CA, USA

Industry Standards Compliance

ISO 9001   ISO 14001   ISO 13485 REGISTERED   CE

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Our customer service team is ready to assist you with sales estimates, product literature, product selection advice, replacement parts, accessories, customization and more.

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Yamato Scientific America

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Yamato Anaerobic Chambers

Contents

NOTES

Anaerobic Chambers

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

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

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Yamato Analyzer

Contents

Photo Absorbance Meter

Portable Design

PiCOEXPLORER (PAS-110-YU)

Minimum sample volume	30 μL
Dimension	70 x 150 x 30 mm
Weight	~200g (with batteries)

## A portable absorptiometer using white LED as light source

◼ Operation and features

- Palm-size absorptiometer made of silicon resin (PDMS)
- The highly sensitive yet extremely compact design of PiCOEXPLORER is a result of the breakthrough Silicone Optical Technology (SOT)
- Smarter data management
  Measurement results can be verified on a smart phone or tablet by downloading a special application that uses bluetooth communication. Raw data (absorbance, concentration, intensity) can be output to a PC in excel format for easy data processing.
- Measurements can be taken directly from unopened PCR tubes, preventing contamination risk and sample loss

◼ Applications

- Measurement of bacterial turbidity
- Quantification of protein (BCA method, Bradford method)
- Measurement of antioxidant activity
- Amino acid measurement (ninhydrin method)
- Quantification of glucose
- Environmental water analysis
- Analysis of heavy metals
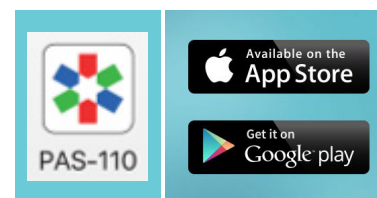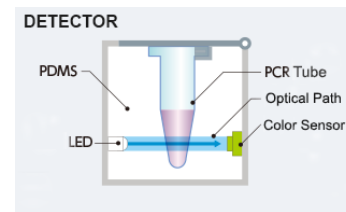
◼ Specifications

Model		PiCOEXPLORER			
Usage environment	Temperature humidity	5-35°C, 70% RH or less			
	Altitude	2000m or less			
	Installation condition	Indoor, pollution degree 2			
Measurement	Total samples	1 sample			
	Time	1 second or more			
	Absorbance range	0.02 or more (Gentian violet dilute solution)			
Sensor unit	Light source	White LED			
	Detector	Color sensor		Maximum absorption wavelength	Wavelength range
			Red	615 nm	575-660 nm
			Green	530 nm	455-630 nm
			Blue	460 nm	400-540 nm
Communication interface		Bluetooth low energy (Bluetooth smart)			
Frequency of operation		2402-2480 MHz			
Type of modulation		GFSK			
Channel spacing		2 MHz			
Channel number		40			
Peak output power		Less than 0 dBm			
Antenna gain		2.41 dBi			
Antenna type		PCB Antenna			
Compatible tablet		Nexus 7 (2013), Nexus 9, iPhone[2]			
Recommended PCR tube		WATSON brand 137-211C 0.2 mL			
Minimum sample volume		30 μL[3]			
Dimension		70 x 150 x 30 mm (excluding protrusions)			
Weight		about 200g (including batteries)			
Power		4.5V DC (3 AAA-type batteries) *(Note: Batteries not provided in the package)* 5V DC (micro-USB connector [1])			
Operating voltage		Battery 3.6~4.5 Vdc			

[1] Use the cable to connect to a computer or other appropriate power source to power the unit w/o batteries (device automatically senses power source; this connection cannot be used to transmit data.)
[2] Device may have disturbed images, may not start app, or may cause other malfunctions if used with unsupported smartphone ot tablet model.
[3] With a sample volume of 30μL, be sure to measure with the device tilted 10° or less horizontally

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Whenever, Wherever, Palm-sized Absorbance Meter

PiCOEXPLORER

Good for Turbidity Measurement!

On the lab table
Inside a clean bench
Out in the field
Wherever you need to measure

Use your smart phone or tablet

Measure in minutes

Compact! Handheld

Portable! Battery Powered

Quick! ~ 1 sec. scan

Minimal! 30μL sample

Easy! Measure by App

Affordable!

Food / Cosmetics / Chemical / University / Environment

Turbidity of Microbes
Bacteria   Algae

Field | Food / Cosmetics / University

Degradation of Oil (Turbidity)

Field | Food / Chemistry

Turbidity of Foods
日本酒

Field | Food

Quantitative Analysis of Glucose
Glucose   Fructose   Sucrose
ブドウ糖   果糖   ショ糖

Field | Food / University

Quantitative Analysis of Amino Acid, Protein

Field | Food / Cosmetics / University

Quantitative Analysis of Minerals
Mg
Ca   K

Field | Food / Cosmetics

Quantitative Analysis of Plating Solution
Copper（Cu）
Sexivalent Crome（Cr^{6+}）
Cyanide

Field | Chemistry

Quantitative Analysis of Nitrite Ion
Coupler Agent for Hams / Sausages)

Field | Food

Anti-Oxidation Activity

Field | Food

Useful for Hands on Experiments

1 unit per person makes a big difference in a study

Quantitative Analysis of Metal Ions
Fe   Mn   Pd   Cu
Cd   Cr SiO_3

Field | Chemistry / University

Water Quality Measurement
Digitalization of Pack Test

Field | Environment / Chemistry

Beverage Color

Field | Food

Easy Operation with your Smart Phone or Tablet

Put small amount of sample into a PCR tube then set it on the PiCOEXPLORER

Operate PiCOEXPLORER from your smart phone or tablet by downloading a special application that uses bluetooth communication

PAS-110

App Store からダウンロード

Google Play で手に入れよう
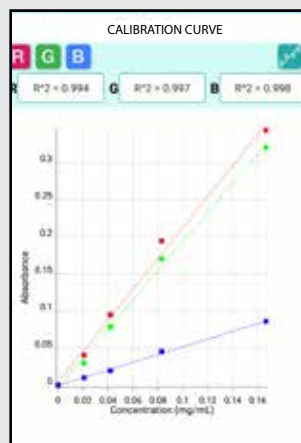
Application Guide

Menu
When PiCOEXPLORER is connected using bluetooth communication, tap desired measurement

Turbidity
Measure turbidity as Optical Density of R-sensor. No required calibration curve.

Calibration Curve
Calibration curve will be drawn for all of R.G.B sensors. Any curve can measure Quantitative Analysis.

Measurement
Set the sample in PCR tube then tap the "Measure" icon. Scanning takes approximately 1 second.

Specifications

Model	PiCOEXPLORER PAS-110-YU			
Light source	White LED			
Detector	Color sensor	Color	Max. Absorption Wavelength	Wavelength Range
		Red	615nm	575-660nm
		Green	530nm	455-630nm
		Blue	460nm	400-540nm
Compatible PCR tube	Cap: Flat type *1 Volume: 0.2mL			
Power source	AAA batteries x 3			
Dimension	D70 × W150 × H30（mm）			
Weight	200g			

＊1 Dome-shaped PCR tube will not fit.
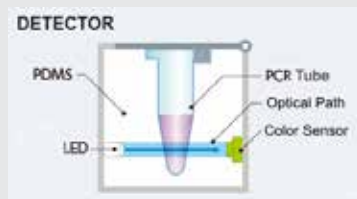
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Yamato Baths

Contents

■ Water Bath

BBL Series

BH Series

BK / BA Series

BM Series

BS Series

Water Bath Variation

General	Standard	Precision	Low Temperature
Max. operating temp. **100°C** Temp. adjustment accuracy **±1~±2°C**	Max. operating temp. **80°C** Temp. adjustment accuracy **±0.02~ ±0.07°C**	Max. operating temp. Including oil bath **~200°C** Temp. adjustment accuracy **±0.01~ ±0.1°C**	Lowest operating temp. **-10°C** Temp. adjustment accuracy **±0.1°C**

Type	Series	Model No.	Operating temp. range		Capacity (L)	Operation	Characteristics
General	BM	100/110	RT+5~95°C		4	Fixed	● Analog set up system ● Equipped with a drain (BM200/210) ● Thermometer included to verify actual temperature ● Protected water tank prevents burns caused by contact
		200/210			7	Fixed	
		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
		401/410	RT+5~95°C		7	Fixed	● Digital temperature setting and display ● Equipped with a drain ● Protected water tank prevents burns caused by contact
		500/510	RT+5~90°C		4	Fixed	● Digital temperature setting and display ● Heater situated outside water tank ● Removable water tank for convenient cleaning and changing of water ● Exclusive connection for bath operational setting function with RE601/801 rotary evaporator
	BS	200	RT+5~water boiling point		4.7	Fixed	● Accommodates several different sizes of containers ● Easy to change water level by adjusting overflow ● Sturdy die-cast clamps ● Removable lid
		401			9	Fixed	
		601			12	Fixed	
		660			14	Fixed	
Standard	BK	300	RT+5~80°C		27	Fixed	● Extremely high degree of temperature adjustment precision achieved by adopting high-precision thermostat and cirulation pump ● Fixed temperature operation ● Digital temperature setting and display ● Equipped with observation window
		400			42	Fixed	
		500			70	Fixed	
		610			109	Fixed	
		710			144	Fixed	
	BA	300			27	Program	● Extremely high degree of temperature adjustment precision achieved by adopting high-precision thermostat and circulation pump ● Program operation ● Digital temperature setting and display ● Equipped with observation window
		400			42	Program	
		500			70	Program	
		610			109	Program	
		710			144	Program	
Precision	BH	401	RT+15~100°C		13	Program	● High performance controller enables higher precision and wider temperature range ● Digital temperature setting and display ● Detachable control panel for remote control by using communication cable ● Can be used as water and oil bath (BH501)
		501	RT+15~200°C		13	Program	
Low Temperature	BBL	101	-10~80°C		8	Fixed	● Capable of more applications with large tank space but can accommodate small containers ● Digital temperature setting and display ● Two-stage adjustable shelf height for different flask sizes
		301			13	Fixed	

■ Immersion Temperature Device

BF Series

BE Series

Immersion Temp. Control Device

Thermomate
Max. operating temp.
200°C
Temp. adjustment accuracy
±0.02~±0.2°C

Neo Cool Dip
Lowest operating temp.
-20°C
Refrigerant
R134A, R404A

Type	Series	Model No.	Operating temp. range -50 0 50 100 150 200	Operation	Characteristics
Dipping	BF Thermomate	201	-20~90°C	Fixed	● Multi-function: can be used as constant temperature water bath, shaking incubator (when combined with bath with shaker) or oil bath ● Digital temperature setting and display ● Water jet strength can be adjusted in 10 patterns ● Comes with BY100 testing bath (made of polypropylene)
		401		Program	
		501		Program	
		601	0~200°C	Program	
	BE Neo Cool Dip	201	-20~+35°C	NA	● Unit comes with handles for easier manageability ● Different types of cooling coils made of materials with high corrosion resistance ● Improved safety by adopting overcurrent circuit breaker ● Bath not included
		201F			
		301			

■ Oil Bath

BO500+MB800

BOA Series

BO Series

Oil Bath Variation

Standard
Max. operating temperature
199°C
Temp. adjustment accuracy
±0.5~±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		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	RT+10~180°C	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 ● Equipped with a drain ● Protected oil tank prevents burns caused by contact
Large capacity	BOA	200	RT+10~200°C	37	Fixed	● High temperature distribution accuracy by jet stirring ● Digital temperature setting and display ● Equipped with six safety functions
		310	RT+10~270°C	37	Fixed	

NOTES

Economy Constant Temperature Water Bath

BM Series

Setting system	Analog (BM100/110/200/210)	Digital (BM401/410/500/510)	Operating temp. range	Room temp. +5~95°C (BM100/110/200/210/401/410)	Room temp. +5~90°C (BM500/510)	Bath capacity	4L (BM100/110/500/510)	7L (BM200/210/401/410)

Easy to use, compact design water bath

4L BM100
7L BM200
7L BM401
4L BM500

BM100/110/200/210
- Analog set up system
- Thermometer is included to verify actual temperature
- Protected water tank prevents burns caused by contact
- Equipped with a drain (BM200/210)

BM401/410
- 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 cleaning and changing of water
- Heater situated outside the water tank
- Exclusive connection for bath operational setting function with RE601/801 rotary evaporator

■ Specifications

Model	BM100	BM110	BM200	BM210	BM401	BM410	BM500	BM510
Operating temp. range *1	Room temp. +5~95°C *1						Room temp. +5~90°C	
Temp. adjustment accuracy*2	±2°C (at 60°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)				Digital setting by ▲/▼ keys		Digital 7 segment LED Digital setting by ▲/▼ keys	
Operation function	Operation at fixed point				Fixed temperature, quick auto stop, auto stop, auto start	Operation at fixed point	Fixed temperature, quick auto stop, auto stop, auto start	
Additional function	--				Calibration off-set, power failure recovery, keypad lock	Temp. preset function (preset / select one temp.)	Keypad lock, maintenance function (RE signal transmission and reception), calibration off-set, power failure recovery	
Heater	SUS316 pipe heater 500W		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 (ABS heat-resistant resin)	
	Overcurrent protection (fuse: 7A), thermal fuse		Overcurrent protection (fuse: 15A), thermal 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		~7L				~4L	
Water tank — Dimensions	I.D.200 x D120mm		I.D.250 x D150mm				Max. I.D.240 x bottom dia165 x D122mm	
External dimensions	W240 x D300 x H150mm		W310 x D360 x H230mm				W340 x D349 x H231mm	
Weight	~3.5kg		~6kg		~7kg		~5.5kg	
Power source (50/60 Hz)	AC115V 4.5A paddle switch	AC220V 2.3A paddle switch	AC115V 9A	AC220V 4.5A	AC115V 11A	AC220V 4.5A	AC100V~120V 12.5~10.5A	AC200~240V 6.5~5.5A
Accessories	Bar thermometer (10~110°C) with immersion line				--		--	

*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%

Economy Constant Temperature Water Bath

BM302-A/312-A

| Operating temp. range | Room temp. +10~90°C |
| Bath capacity | 5L |

Compatible with RE202-A/212-A

5L

- ● Large capacity 5L with internal diameter of φ240 mm
- ● 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)

■ Specifications

Model		BM302-A	BM312-A
Performance*¹	Operating ambient temp. range	5~35°C	
	Temperature control range	Room temp. +10~90°C	
	Temperature control accuracy	±1.0°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	Overshoot alert, Auto resume (selectable), 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 95-120V (BM302) / 90-241V (BM312) supplied power, 23 ±5°C room temperature, 65%RH ±20% humidity, and no process load.
   Operating temperature range for BM series 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.(BM302) / 190V (BM312).
*² Dimensions excludes protrusions.
*³ BM302 is compatible with voltage range of 100-115V and BM312 is compatible with voltage range of 200-230V, by choosing a suitable power plug.

Control Panel
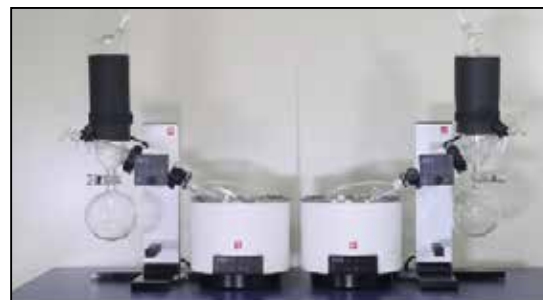
BM302-A shown with rotary evaporator RE202-A

■ Replacement parts

| Product name	Description	Product code	Compatible model
Main power fuse 15A (large)	250V 15A	LT00039643	BM302-A
Main power fuse 10A (large)	250V 10A	LT00039644	BM312-A
Service outlet fuse 2A (small)	250V 2A	LT00039642	BM302-A
Power cable	Comes with a plug, 3m	LT00039650	BM302-A
Power cable	With ring terminals, 3m	LT00039652	BM312-A

Constant Temperature Water Bath

BS Series

| Operating temperature range | RT+5°C~Water boiling point | Temperature distribution accuracy | ±5°C (at 70°C) | Bath capacity | 4.7L BS200 | 9L BS401 | 11L BS601 | 14L BS660 |

Standard equipped with overheat prevention device, electric leakage breaker.

9L
BS401

4.7L
BS200

14L
BS660

11L
BS601
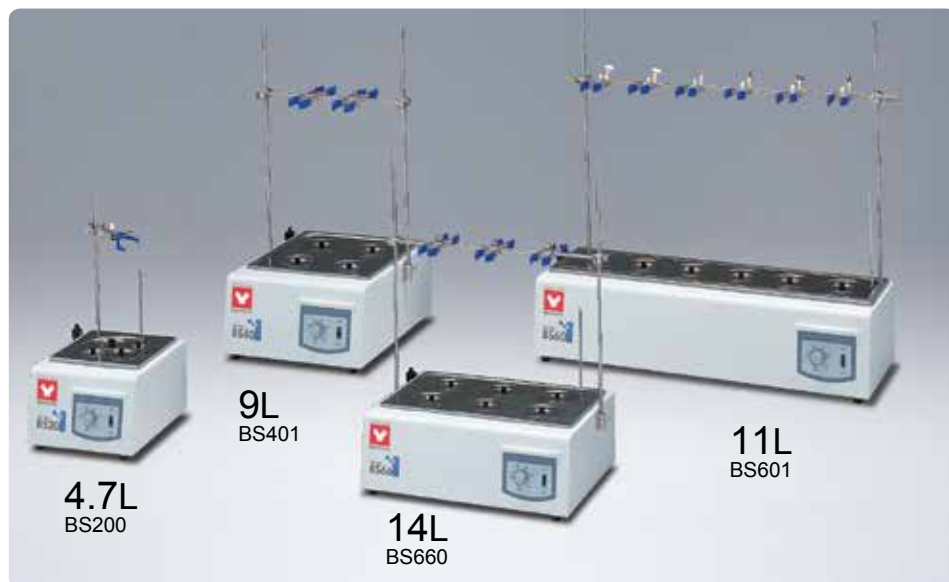
■ BS200-115V / BS200-220V
- 4 types of accessorial baskets. Maximum 5L beaker can be set after removing the lid

■ BS401-115V / BS401-220V
- Comes with 4 container mounting clamps and cooling water distributor (optional item)

■ BS601-115V / BS601-220V
- Up to 6pcs. of containers can be used simultaneously

■ BS660-115V / BS660-220V
- Fits small and large containers. Up to 6pcs. can be used simultaneously. Sink level can be adjusted

■ Control Panel

■ Features

For different flask size

Removable lid

Easy to change water level by adjusting over flow

Sturdy die-cast clamps

■ Specifications

Model	BS200-115V BS200-220V	BS401-115V BS401-220V	BS601-115V BS601-220V	BS660-115V BS660-220V
Operating temperature range	RT+5°C~Water boiling point *1			
Temperature adjustment accuracy	±3°C (at 70°C)			
Temperature distribution accuracy	±5°C (at 70°C)			
Max. temperature reaching time	~30min.	~40min.	~55min.	~60min.
Internal tank material	Stainless steel			
Heater	Copper Pipe Heater (Nickel Plated)			
	0.9kW	1.3kW		
Safety device	Overheat prevention system (Liquid expansion type, Self sustaining relay, Alarm lamp), Electric leakage breaker with overcurrent protection			
Internal dimension	ø200 x D149mm	L328 x W302 x D99mm	L790 x W150 x D102mm	L502 x W302 x D99mm
Effective internal dimension	ø186 x D115mm	L298 x W260 x D64mm	L776 x W140 x D73mm	L468 x W260 x D66mm
External dimension *2	L300 x W364 x H216mm	L390 x W438 x H214mm	L864 x W288 x H215mm	L565 x W437 x H214mm
Bath capacity	~4.7L	~9L	~12L	~14L
Power source (50/60Hz)	AC115V, 8A	AC115V, 11.5A		AC115V, 11.5A
	AC220V, 4.5A	AC220V, 6A		AC220V, 6A
Opening size (mm), quantity	ø101, ø77, ø62, ø45	ø115, 4pcs.	ø115, 6pcs.	
Weight	~5kg	~9.5kg	~16kg	~12kg
Accessories	Ring (excluding BS200), lid, clamp, stand, clamp bar (excluding BS200), connector (for stand), thermometer (0~+100°C alcohol type), bottom plate and basket (for BS200)			

*1. Ambient temperature might impact the boiling point. Conditions: RT23°C±5°C, humidity 65%±20% (no load).
*2. Protrusions not included. Power cord lenght 2m.

■ Optional items

Product code	Description	Suitable models
222081	Cooling water distributor (supply/drain tube ø12mm, caliber of spout ø8.5mm)	BS401
222086	Cooling water distributor (supply/drain tube ø16mm, caliber of spout ø8.5mm)	BS601

Includes distribution pipe 2pcs., connector 4pcs., 2pcs.=1set (supply/drain). One connected to water faucet will inject water to 4 cooling water distributors.

Cooling water distributor for BS401

www.yamato-usa.com

Precision Constant Temperature Water Bath

BK·BA Series

Operating temperature range	RT+5~80°C	Temperature control accuracy	±0.02°C~±0.07°C	Bath capacity	27L~144L

- BK series - Fixed temperature operation
  BA series - Program operation
- In addition to BK series function, BA series adopted controller with program operation function (1 pattern 30 steps or 2 pattern 15 steps)
- Tank capacity: 27L, 42L, 70L, 109L, 144L
- Extremely high degree of temperature adjustment precision achieved by adopting high-precision thermostat and circulation pump
- Digital display setting and indicated value of temperature and time
- Equipped with observation window
- Optional items include cooling coil, top cover, mounting rack, and viscosity meter support

Temperature Rising Curve
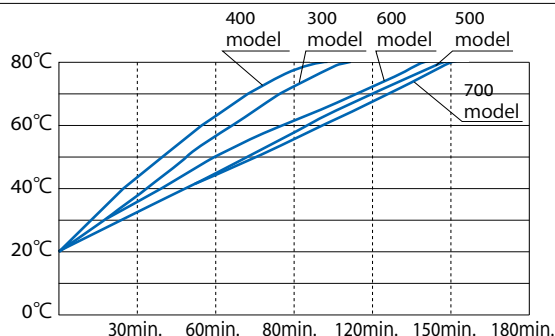
Control Panel

BK series control panel

BA series control panel

Specifications

Model	BK300-115V BK300-220V	BA300-115V BA300-220V	BK400-115V BK400-220V	BA400-115V BA400-220V	BK500-115V BK500-220V	BA500-115V BA500-220V	BK610	BA610	BK710	BA710
Stirring method	Stir by pump									
Operating temp. range	RT+5~80°C									
Temp. control accuracy	±0.02~±0.07°C									
Temp. distribution accuracy	±0.3°C									
Max. temp. reaching time	~120min.		~110min.		~165min.		~160min.		~200min.	~160min.
Interior material	Stainless steel and glass									
Temp. controller	PID control by microprocessor (BK: Fixed temperature operation, BA: Fixed temperature and program operation, 1 pattern 30 steps or 2 pattern 15 steps)									
Sensor	W sensor: Pt resistance thermometer, Pt 100Ω(temp. controller) + K thermocouple (overheat protector)									
Temp. setting / display method	Digital setting / display									
Overheat protector	ON / OFF by microprocessor									
Heater (SUS316)	1.3kW		2.2kW		2.4kW		3.5kW		4.5kW	
Stirring System (Magnet pump)	6W		30W				60W			
Timer	1min.~99Hrs. 59min. to 999Hrs. 50mins, Digital setting, Auto start, Auto stop, Quick auto stop									
Safety device	Self-diagnotic functions (Heater disconnection, SSR short circuit, Abnormal sensor, Over current), Electric leakage breaker, Over heat protector									
Internal dimensions (W x D x H mm)	300×300×300		400×350×300		500×400×350		548×500×400		640×500×450	
External dimensions (W x D x H mm)	490×360×367		590×410×367		690×460×417		738×560×467		830×560×517	
Window dimensions (W x H mm)	240×215		340×215		440×265		340×215		440×265mm	
Bath capacity	~27L		~42L		~70L		~109L		~144L	
Shelf pitch	30mm									
Number of plates	5				6		9		10	
Drain hose	ø15×20mm									
Power source 50/60Hz	AC115V 12.5A AC220V 6.5A		AC115V 20A AC220V 10.5A		AC115V 22A AC220V 11.5A		AC220V 17.5A Single phase		AC220V 23A Single phase	
Weight	~19kg		~25kg		~30kg		~36kg		~46kg	
Included accessories	Shelf plate 1pc., clamp 2pcs., stand 1pc., clamp holder 2pcs., tube connector 1pc., drainage cap 1pc.									

Optional Items

■ Shaking unit

Model	Shaking range	Shaking frequency
BN300	10~30 mm	20~160 rpm

BK400 + BN300

■ Mounting rack

Product code	Dimension (W x D x H)	Suitable models
221195	294 x 272 x 148.5mm	BK/BA300
221196	394 x 322 x 148.5mm	BK/BA400
221197	494 x 372 x 148.5mm	BK/BA500

Mounting rack

■ Viscosity meter support

Product code	Specification	Suitable models
221189	4 pcs. / bracket	BK/BA300
221183	4 pcs. / bracket	BK/BA400
221184	5 pcs. / bracket	BK/BA500

Able to hold Cannon-Fenske and Ubbelohde viscometer, easy to measure kinematic viscosity.
Base: Stainless steel 304
Holder: Brass nickel plated
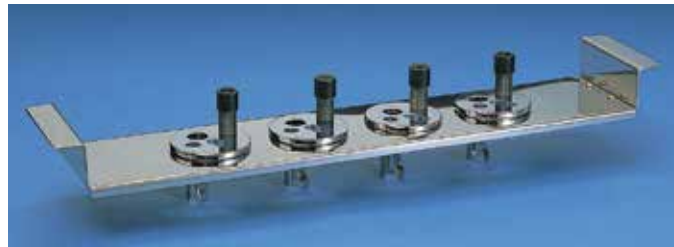
Viscosity meter support

■ Water pump

Model	Specification
PT-16	Operating temperature range RT~80°C
	Lift about 2m, water supply about 9L/min.
	Dimension: 17mm

Pump water in closed container, which includes distillation column, refractometer and other instruments inside, to continuously circulate and keep warm or warm up liquid.

Water pump

■ Cooling coil

Product code	Specification	Suitable models
221182	Copper pipe nickel plating I.D. 8mm x Length1.8m E.D. 12mm	BK/BA300, 400, 500

Use inside a tank. Cooling water pipe not included.

Cooling coil

■ Top cover of water tank (stainless steel)

Product code	Suitable models
221192	BK/BA300
221193	BK/BA400
221194	BK/BA500
221383	BK/BA610
221384	BK/BA710

Top cover for BK/BA300,400,500

Top cover for BK/BA610,710

■ Stand with caster

Product code	Suitable models
221385	BK/BA610
221386	BK/BA710

Programmable Precision Constant Temperature Water Bath

BH Series

Operating temp. range	RT+15~100°C (BH401) Water bath	RT+15~200°C (BH501) Water or oil bath	Temp. adjustment accuracy	±0.01°C	Bath capacity	~13L(liquid 10L)

Benchtop precision constant temperature bath equipped with high performance controller for higher precision and wider temperature range.

BH401-115V
BH401-220V
Water bath

BH501-115V
BH501-220V
Water or oil bath

■ Operation and functions

● Precision controller enables temperature adjustment accuracy of ±0.01°C (at 20°C)
● BH501 can be used as precision water or oil bath
● Maximum of 99 steps of programming operation, fixed temperature operation, Quick auto stop, Auto stop and Auto start functions
● RS485 communication function, Temperature output terminal (1~5V), Alarm output terminal, calibration offset function and key lock function
● Better external circulation with powerful circulation pump
● Circulation pump flow changeable up to 10 patterns
● Circulated water temperature (closed type) can be controlled precisely by external sensor
● Control panel can be removed for remote control by using communication cable (sold separately)

■ Safety features

● Self diagnostic functions, Earth leakage circuit breaker, Empty boiling prevention switch, Automatic overheating prevention, Independent overheating prevention

■ Specifications

Model		BH401-115V BH401-220V	BH501-115V BH501-220V
Circulation system		Water jet pump circulation (closed system circulation)	
Operating temperature range		RT+15~100°C	RT+15~200°C
Temperature adjustment accuracy		±0.01°C (water: RT+15°C~80°C), ± 0.1 (silicon oil: KF96/50cst 70°C~200°C)	
Temperature indication unit		0.1°C	
Circulation Pump		Water jet pump circulation	
(50/60Hz)	Pump max. flow	14/15L/min. (Circulation pressure loss when below 10kPa)	
	Pump max. lift	2.8/3.4m (water flow about 0.5L/min)	
Heater		1kW	1.2kW
Ambient temperature range		5~30°C	
Temperature control / system		PID control by microprocessor	
Temperature setting / display method		Digital setting / display	
Sensor		W sensor: Pt 100Ω A-class (for temperature control)+ K-thermocouple (for overheat prevention) double sensor	
Timer		1min.~99hrs.59min., 100~9999hrs Timer/Time switchable function	
Operation function		Fixed temp. operation, Quick auto stop, Auto stop / start at setting time, Program operation (max. 99 steps, repeating, gradient operation), Program auto start operation	
Safety device		Earth leakage circuit breaker, Key lock function, Breakout protection function, Automatic overheating prevention, Independent overheating prevention, Float switch	
Other functions		RS485 communication function, Temperature output terminal, Alarm output terminal, Calibration offset function	
Dimensions		W239 x D299 x H200mm	
Internal capacity		13L (liquid 10L)	
Effective water bath dimension		W227 x D150 x H200mm (front corner R34)	
External dimension		W310 x D396 x H607mm (water bath height)	
Power source		AC115V 10A AC220V 5A	AC115V 11.5A AC220V 6A
Weight		~20kg	
Accessories		Hose nipple (1/2 x ø14mm) 2pcs.	

*1. Performance value test condition: room temperature 20°C, no load, power source 50Hz
*2. Protrusions not included

Control Panel

Program controller CR5 model

Rear View (Circulation port)

Detachable control panel.
Remote control power source (optional item) needed in case remote control communication cable is longer than 5m.

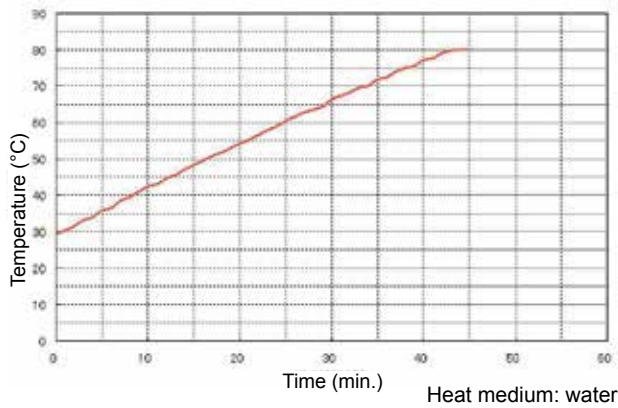## BH401 Heating Performance

Heat medium: water

BH501 Heating Performance

Heat medium: silicon oil
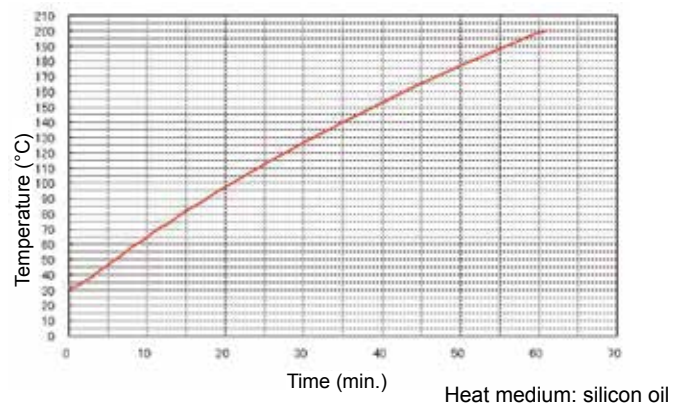
■Optional items

Product code	Description	Specifications
280094	Silicon hose for circulation	I.D. ø12mm, Length 2m, 1pc.
281388	External communication adapter	RS485－RS232C conversion
281350	External Pt sensor	Pt 100Ω, A level with protection tube, 3m
281397	Communication cable for remote control	4 holes, 5m
281398	Remote control panel stand	
281399	Remote control power	AC100V－DC5V (For 115V/220V compatibility verification)

Remote control panel stand

Remote control power

Low Constant Temperature Water Bath

BBL101-115V BBL101-220V / BBL301-115V BBL301-220V

Temperature control range	-10~+80°C	Temp. distribution accuracy	±0.3°C	Internal capacity	8L BBL101	13L BBL301

Benchtop water bath with wide operating temperature range and sufficient bath capacity.

8L
BBL101-115V
BBL101-220V

13L
BBL301-115V
BBL301-220V

Benchtop constant low temperature water bath, with capacity 8L/13L and operating temperature range -10~80°C

● Precision control with temperature adjustment accuracy of ±0.1°C
● More applications available with larger tank space
● Internal / External Circulation can be changed easily
● Shelf height is 2 stage adjustable for different flask sizes
● Standard equipped with auto stop, auto start, RS485 communication function, temperature output terminal (4~20mA)
● Enhanced safety features includes self diagnostic function, overcurrent circuit breaker, refrigerator overload relay, empty boiling prevention float switch, refrigerator protection delay timer function

Control Panel

Monitoring indicator for pump and refrigerator

Side View
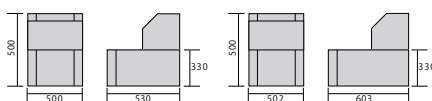
Equipped with water switch valve for easy switch ON/OFF the external circulation. Nozzle diameter 10.5mm.

Example of Application

■ Specifications

Model	BBL101-115V BBL101-220V	BBL301-115V BBL301-220V
System	Pump circulation cooling / external circulation system	
Temperature control range *1	-10~+80°C (at room temperature 20°C)	
Temperature adjustment accuracy *1	±0.1°C	
Temperature distribution accuracy *1	±0.3°C	
Cooling capacity *1	~370W (320Kcal/h) (at liquid temp. 15°C)	~410W (350Kcal/h) (at liquid temp. 15°C)
Ambient temperature *1	5~30°C	
Temperature control	PID control	
Operation function	Fix temperature, Auto stop, Auto start	
Temperature sensor	Double sensor: Pt100Ω (for temp. control) and K-thermocouple (for overheat prevention device)	
Refrigerator / coolant	160W Air-cooled fully closed compressor R134A	300W Air-cooling sealed rotary R404A
Circulation method	Magnet pump circulation	
Circulation system capacity (50/60 Hz)	Maximum flow rate (pump capacity): 3.7/4.7L/min. (11.0/12.0L/min.)	
	Maximum pump head (pump capacity): 1.0/1.5m (1.5/2.1m)	
Heater	700W	900W
Safety device	Earth leakage breaker, refrigerator overload relay protecting circuit, refrigerator pressure detection, empty boiling prevention float switch, delay timer for refrigerator protection, overheating prevention device, power failure protection function, key lock function	
Other function	Drain port, condenser filter, RS485 communication function, temperature output terminal, refrigerator pressure switch indicator, calibration offset	
Bath dimensions *2	W300 x D150 x H177.5 (Effective dimensions 238 x 100 x 85mm)	W300 x D240 x H177.5 (Effective dimensions 238 x 190 x 85mm)
Internal (effective) capacity	8 (6.95) L	13 (11.5) L
External dimensions *2	W500 x D530 x H500mm (water bath height 330mm)	W502 x D603 x H500mm (water bath height 330mm)
Power source (50/60Hz)	AC115V 8A AC220V 4A	AC115V 11A AC220V 6A
Weight	~50kg	~55kg
Accessories	Bottom shelf 1 pc., lid, drain hose 0.5m 1pc., over flow hose 0.5m 1pc.	

*1. Performance data tested at RT20°C, no load, rated power 50Hz, performance might vary in different conditions
*2. Projections not included
Note: Refrigerator turns OFF when setting temperature higher than 40.1°C.

■ Max. quantity of erlenmeyer flask

Model	300mL	500mL	1000mL
BBL101	3 pcs.	2 pcs.	--
BBL301	5 pcs.	3 pcs.	2 pcs.

■ Optional items

Product name	Description	Product code
External communication adapter	RS485-RS232C conversion	281387
Shelf for BBL101	Shelf support 4pcs.	221586
Shelf for BBL301	Shelf support 4pcs.	221587

Dimensions (mm)

BBL101

BBL301

BBL Series

NOTES

Immersion Constant Temperature Device

Thermomate BF Series

Operating temp. range	Room temp. +5~80°C BF201/401/501	Room temp. +5~180°C BF601

Multi-function immersion thermostatic device with improved performance, operability and safety

Basic	Multi-function	Multi-function	Oil / water compatible
BF201	BF401	BF501	BF601

■ Operation and functions
- Four models including basic model with only fixed temperature operation and multi-function models with segment programming function, external output and external communication function
- Water jet strength can be adjusted in 10 patterns
- Temperature preset function enables memory and read out of temperature
- BF601 can be used for water or oil
- No protrusions, easy to set-up

■ Safety features
- Self-diagnostic functions, circuit protector, water level detection sensor and buzzer alarm for errors

■ Specifications

Type	Basic	Multi-function		Oil / water compatible
Model	**BF201-115V** **BF201-220V**	**BF401-115V** **BF401-220V**	**BF501-115V** **BF501-220V**	**BF601-115V** **BF601-220V**
Temp. setting range	-20.0~90°C*¹			0~200°C
Temp. control range	RT+5~80°C*²			RT+5~180°C*³
Temp. control accuracy	±0.05 / 0.1°C*⁴	±0.02 / 0.05°C*⁴		±0.05 / 0.2°C*⁵
Stirrer	Propeller stirring	Water jet stirring		Propeller stirring
Heater	Stainless pipe heater			
	1.0kW			1.2kW
Temp. control system	PID control by microprocessor			
Temp. setting	Digital setting by ▲▼ keys			
Temp. display	Measured / target temperature display: green 4-digit LED digital display Digital 7 segment display (Resolution: 0.1°C)	Target temperature display: orange 4-digit LED digital display (Resolution: 0.1°C, 1°C for BF601) Measured temperature display: green 4-digit LED digital display (Resolution: 0.1°C, 1°C for BF601)		
Timer	--	1min. to 99hrs.59min. and 100hrs. to 999hrs.		
Timer resolution	--	1min. and 1hr.		
Operation functions	Fixed temperature	Fixed temperature, Quick auto stop, Auto start, Repeat function Program operation: 3 patterns 10 steps		
Additional functions	Temperature presetting (10 points)	Temperature presetting (10 points), Calibration offset, Keypad lock, Auto resume function		
	--	--	External output terminal*⁶: temperature output, External alarm output, Time-up output, External communication	--
Heater circuit control	Triac Zero-cross type			
Sensor	Platinum resistance temperature detector (Pt100)			
Safety device	Self-diagnostics function (power supply frequency error, controller failure detection, sensor failure detection, heater interruption detection, triac (SSR) short circuit detection, main relay contact failure, automatic overheat prevention, measured temperature error detection), Independent overheat prevention device (IOPD), Circuit protector, Float level detection			
External dimension*⁷	W140 x D138 x H312mm			
Weight	~7kg			
Clamp available thickness	Up to 35mm			
Power source 50/60Hz	AC115V 10A with step-down transformer AC220V 5A with step-down transformer			AC115V 11.5A with step-down transformer AC220V 6A with step-down transformer
Included accessory	Testing bath model BY100 (Polypropylene)			

*1. When using under room temperature +5°C, combine with low temperature water bath or neo cool dip BE series
*2. When using testing bath BY100
*3. When using testing bath BZ100D and silicon oil with viscosity 50cSt silicon oil. Water cannot be used at temperature above 80°C
*4. Setting temperature 37°C/80°C, using testing bath BY100
*5. Setting temperature 40°C/180°C, using testing bath BZ100D and silicon oil with viscosity 50cSt silicon oil
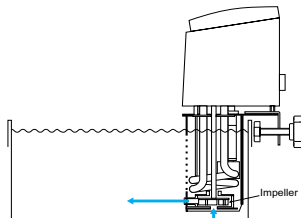*6. Output by one output terminal
*7. Protrusions excluded

Function Chart

Model	BF201	BF401	BF501	BF601
Digital setting / display	●	●	●	●
Temperature preset	●	●	●	●
Program function		●	●	●
Water jet strength changeable function		●	●	
Propeller stirring	●			●
External output, communication function			●	
Oil temperature control				●
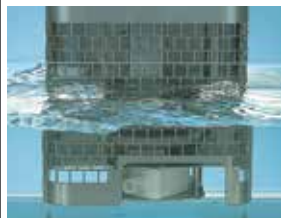
Water jet stirring (BF401/501)

Structure of water jet stirring

Impeller

■ Optional items

1-Level controller

2-Cooling Pipe

3-Bath cover

4-External circulation nozzle

No.	Product code	Model	Product Name	Specifications
1	221570	OBF10	Level controller (Automatic water supply unit)	Directly connected to tap water (electromagnetic valve open / close) Equipped with float type water level detection function Fixed to testing bath by clamp
2	221572	OBJ10	Cooling pipe	SUS304 O.D.ø10mm Neoprene hose 3m (ø13 x ø9)
3	221578	OBI11	Bath cover (additional process needed when combined with cooling pipe and external circulation nozzle)	Polycarbonate cover for testing bath BY100 (cover cannot be used together with automatic water supplier, external circulation nozzle, and cooling pipe)
4	221573	OBG10	External circulation nozzle	External closed circulation available by connecting to BF401/501 Neoprene hose I.D.9mm 3m Flow rate: ~8L/min Lift: ~1.8m
5	221871	OBF12	External communication adapter	USB-RS485 adapter, USB cable, RS485 connection cable. Compatible with BF501
6	221575	OBH10	Float for micro tubes	(For ø8mm) External dimension: 90×137mm Up to 24 pcs. can be attached
	221576	OBH20		(For ø11mm) External dimension: 90×137mm Up to 24 pcs. can be attached

Control Panel

BF201

BF401/501/601

Easy to Carry

OPD

Overheat Prevention Device

Testing Bath

BX

BZ

BY

Select according to purpose, sample amount and temperature

Material	Product code	Bath dimension	Capacity	Permissible operating temperature
Stainless steel plate	BZ100	230×390×150mm	12L	Room temperature to +200°C Use for high temperature and oil bath
	BZ100D	240×300×200mm	13L	
	BZ200	300×500×150mm	20L	
	BZ300	300×500×200mm	27L	
Polypropylene	BY100	327×185×156mm	8L	+5°C~+80°C
	BY200	455×300×160mm	18L	
Acrylic	BX100	230×390×150mm	12L	≤50°C Dedicated for water
	BX100D	240×300×200mm	13L	
	BX200	300×500×150mm	20L	

Immersion Constant Temp. Device Combination Examples

Constant temperature		
BF201	BF201	BF401
Constant temp. water bath	Low temp. water bath + Neo cool dip	Shaking bath BW series
Thermomate BF201 + Testing bath BZ100D	Thermomate BF201 + Testing bath BZ100D + Neo cool dip BE201F	Thermomate BF401 + Shaking bath BW400

Immersion Cooler (Neo Cool Dip)

BE Series

Operating temp. range	-20~+35°C

Easy to use compact benchtop immersion cooler in combination with water bath

NEW

BE201   BE201F   BE301

- Cools down water bath immediately by dipping cooling coil into fluid
- Improved safety by adopting overcurrent circuit breaker
- Spiral tube of BE201 changed from copper to chrome plated copper with high corrosion resistance
- Stainless steel flexible cooling coil of BE201F/301 is high corrosion resistant and can be easily bent to fit various bath capacities
- Comes with handles for better usability

■ Specifications

| Model	BE201-115V BE201-220V	BE201F-115V BE201F-220V	BE301-115V BE301-220V
Operating temp. range	-20~+35°C		
Ambient temperature	+5~+35°C		
Cooling capacity	190W at 0°C		350W at 0°C
	Naiburain 60% 5L Room temp. 20°C		Naiburain 60% 10L Room temp. 20°C
Refrigerator	Reciprocating type 160W		Reciprocating type 400W
Refrigerant / amount	R134a/110g	R134a/160g	R404A/170g
Cooling coil	Chrome plated copper	SUS 304	
	Spiral tube	Flexible Tube	
	ø30x170mm (Winding O.D.xLength)	ø15x500mm (O.D.xLength)	ø15×1,000mm (O.D.xLength)
Power source	AC115V 50/60Hz 3A/2A AC220V 50/60Hz 2A/1.5A		AC115V 50/60Hz 5A/4.5A AC220V 50/60Hz 2.5A/2.5A
External dimensions*	W410xD320xH303mm		
Weight	~24kg		~25kg

* Protrusions not included

Cooling Capacity
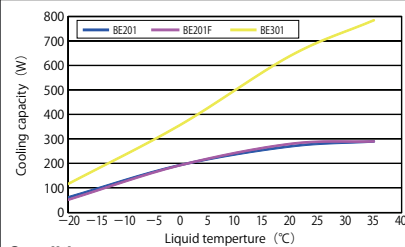
Conditions:
Room temperature: 20°C
Power source: AC115V/50Hz
Cooling liquid: Naiburain 60% dilution
With tank lid and stirring bar in the tank

Temperature Decreasing Curve
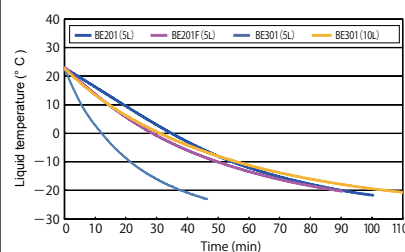
Conditions:
Room temperature: 23°C
Power source: AC115V/50Hz
Cooling liquid: Naiburain 60% dilution
With tank lid and stirring bar in the tank

Cooling Coil
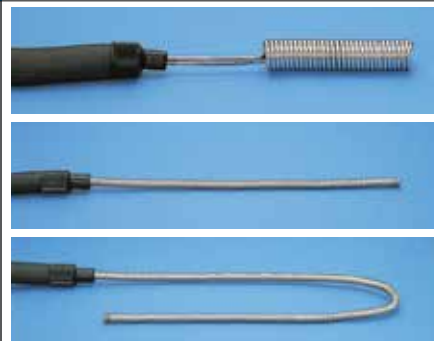
BE201
(Dia.30 x length170mm)

BE201F
(Dia.15 x length500mm)

BE301
(Dia.15 x length1000mm)

Cooling coils are made of different material and shape for different usage.

Cold Trap (optional item)

Cold trap made of Aluminum, easy cooling by Neocool dip.

■ Specifications

Product code	221481
External dimensions	ø210x290mm
Chamber dimensions	ø180x245mm
Cooling cylinder dimensions	ø45x220mm
Suction nozzle	ø18 (O.D.)
Chamber material	Aluminum (anodized finish)

■ Structure
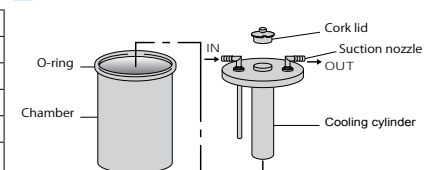
Hose sold separately

NOTES

Economy Constant Temperature Oil Bath

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

BO500 + MB800 (Magnetic Stirrer)

BO601

- ● 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

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

- ● 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 BO601-220V
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
Water tank — 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 AC220V 7A

*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

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

Bath capacity	5L

Compatible with RE202-A/212-A

5L

- Large capacity 5L with internal diameter of φ240 mm
- 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)

■ 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

888

■ Replacement parts

Product name	Description	Product code	Compatible model
Main power fuse 15A (large)	250V 15A	LT00039643	BO302-A
Main power fuse 10A (large)	250V 10A	LT00039644	BO312-A
Service outlet fuse 2A (small)	250V 2A	LT00039642	BO302-A
Power cable	Comes with a plug, 3m	LT00039650	BO302-A
Power cable	With ring terminals, 3m	LT00039652	BO312-A

BO302-A shown with rotary evaporator RE202-A

Economy Constant Temperature Oil Bath

Large capacity

BOA200-115V BOA200-220V / BOA310

| Temperature control range | RT+10°C~200°C BOA200 | RT+10°C~270°C BOA310 | Bath capacity | 37L |

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

Temperature Rising Curve

Time (min.)

Specifications

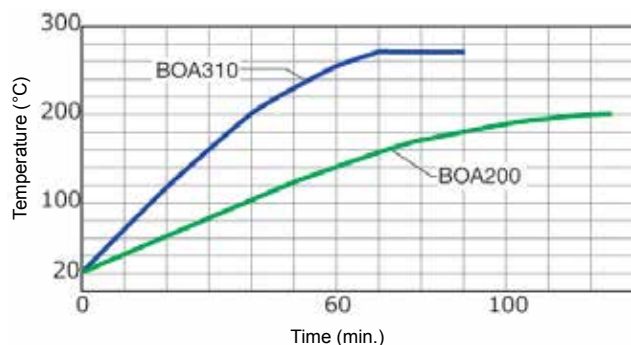| Model	BOA200-115V BOA200-220V	BOA310
Temp. control range	RT+10~200°C	RT+10~270°C
Temp. adjustment accuracy	±0.1°C	
Temp. distribution accuracy	±0.2°C	±0.3°C
Max. temp. reaching time	120 min.	70 min.
Temp. control	PID control	
Sensor	W sensor: Pt100Ω(Temp. adjuster) + K Thermocouple (Overheat prevention function)	
Operation function	Fixed Operation	
Stirring method	Water Jet Stirring	
Heater	SUS316 Pipe Heater 2kW	SUS316 Pipe Heater 4.5kW
Safety device	Electric leakage breaker for over current protection, Self diagnostic function,Temp. sensor error, Heater error, Automatic overheat prevention function, Overheat preventor, Independent overheat preventor (Fixed 230°C for BOA200, Fixed 300°C for BOA310), Float switch detector for overflow oil, Float switch detector, Emergency stop switch	
Other functions	Drain valve, Large operation lamp, External alarm output terminal, Temp. output terminal (1~5V, 4~20mA adjustable), RS485 communication function, Key lock function, Power failure Protection Function, Calibration Offset Function, External Communication Adapter (optional)	
Oil bath dimensions	W296 x D340 x H270mm	
Bath capacity	37L	
External dimensions	W531 x D520 x H578 (oil bath depth397) mm	
Power source	AC115V 18.5A AC220V 10A	AC220V 21A
Weight	~37kg	
Included accessories	Shelf 1pc., lid 1pc.	

■ Operation and functions
● High temperature distribution accuracy by adopting 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
● 3 overheating preventors (Heater cut off automatically when reaching setting temperature + 6°C, overheating preventor, Individual overheating preventor)
● Standard equipped with emergency stop switch. Forces cut off of the overcurrent circuit in case of emergency
● Float switch for empty boil prevention
● Float switch for oil overflow prevention
● Glass control panel protect from liquid dripping
● Large operation lamp lighting during operation for attention
● Self diagnostic function, overheat prevention device, over current leakage breaker, key lock function, power failure compensation function
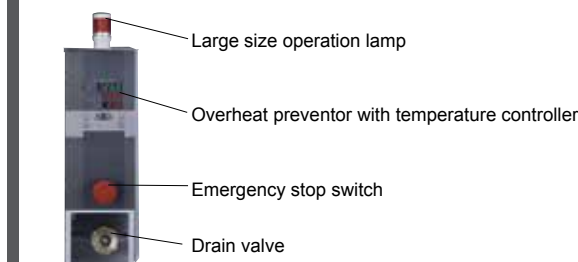

Operate with exhaust device such as fume hood

Control Panel

Large size operation lamp

Overheat preventor with temperature controller

Emergency stop switch

Drain valve

■ Recommended silicon 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)

Maker	Toshiba Silicon (or equivalent)	
Product name	TSF458-50	TSF458-100
Recommended temp.	200°C or less	200°C~270°C
Appearance	Pale yellow transparent	Pale 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 is different at different temperatures.
When using TSF485-100 over 200°C, viscosity barely changes, 1000 hours at 250°C and 100 hours at 270°C. Please inquire with silicon oil maker when purchasing.

NOTES

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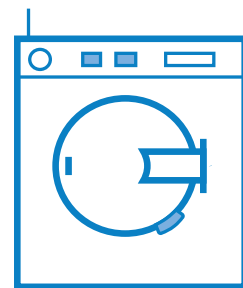
Yamato Customized Industrial Products

Large Walk-in Forced Convection Oven

Combination Forced Convection Oven

Large Autoclave

Large Vacuum Drying Oven

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

■ **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

Interior

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

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Yamato Data Loggers

Contents

NOTES

Wi-Fi Network Bridge

Industrial Wi-Fi Network Bridge with remote control and data logger

WBV4A/WBV4B/WBV4C

WiFi 802.11b/g/n   Compliance FCC/CE certified

Enables remote control, programming, and monitoring from any web browser on a PC or mobile device. It incorporates a customizable temperature data logger with storage and visualization, using an intuitive graphical user interface (GUI).

■ Features

- ● Adds Wi-Fi connectivity to select Yamato oven, muffle furnace, and incubator models
- ● Accessible from any PC or mobile device that is network connected
- ● Unique network name based on MAC address or user assigned name
- ● External high gain antenna (+8dB) for excellent WiFi coverage
- ● No software applications required on PC or mobile device
- ● Multi-color LED for Wi-Fi status and other adapter functions

■ Specifications

Model	WBV4A / WBV4B / WBV4C
Wi-Fi	802.11b/g/n, 2.4GHz compliant (FCC/CE certified)
Power	100V-240V AC, from Yamato equipment internal switched AC PDU
Dimensions	Power module: 55mm x 25mm x25mm Controller module: 40mm x 40mm x 18mm External Antenna: 145mm x 20mm x 15mm
Indicator light	Wi-Fi, Operation, Communication status
Firmware	Built-in TCP/IP & UDP, Web server, Websocket server, OTA updates
Included accesory	Six feet standard micro USB to USB type 'A' cable to interconnect power module to controller module

■ Bridge Functions

Model	WBV4A	WBV4B	WBV4C
Wi-Fi setup with access point discovery	●	●	●
Maintenance functions (firmware update, device name, file editor, etc.)	●	●	●
Data logger functions (log enable/disable, sample interval, log retrieval (charts), etc.)	●		
Remote control functions (Start/Stop Fixed temperature and Program cycles)	●	●	
Remote program functions (upload/download/edit Programs and Patterns)	●	●	
Status page with real-time temperature chart and equipment information	●	●	●
Direct access to VS4 control/status registers	●	●	●

■ Network Topology

Wi-Fi Bridge supports the following Yamato models:
- * ADP Vacuum Ovens
- * DP Vacuum Ovens
- * DKN Forced Convection Ovens
- * DVS Natural Convection Ovens
- * FO Muffle Furnaces
- * IC Incubators

■ Web Interface Screens*

Home Page

Wi-Fi Bridge Main Menu
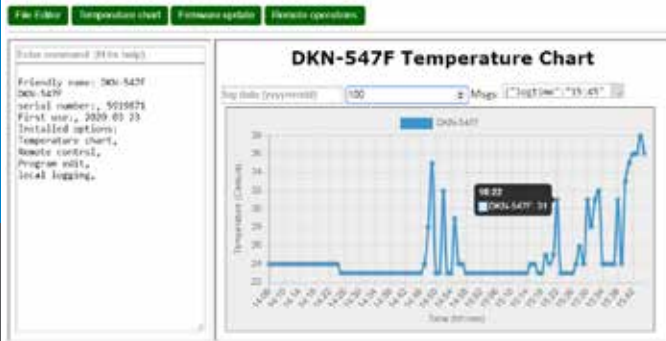
Monitor real time status with temperature chart

Remote Opps Root Page

Remote Control
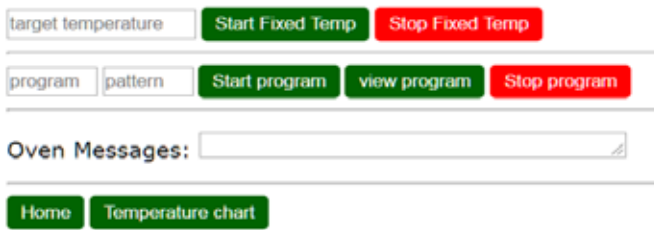
Select remote control function

Wi-Fi Manager

Configure Wi-Fi with simple easy steps

■ Remote Program Screens*

Program Editor

Design a program from any PC or mobile device

Program Temperature Profile Visualizer
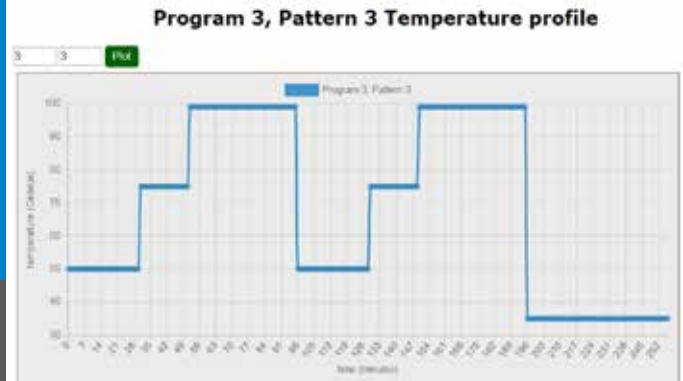
Visualize real time all steps of the program

Log File Sample
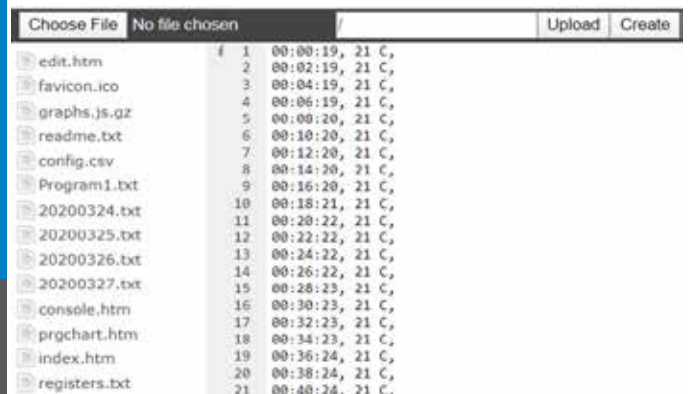
Generate a data log downloadable file

* Illustrations are subject to change and may not be present in all bridge models

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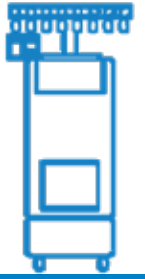
Yamato Freeze Dryers

Contents

NOTES

Freeze Dryer

DC401-115V DC401-220V / DC801-115V DC801-220V

| Trap cooling temp. | -45°C (DC401) | -85°C (DC801) | | Internal capacity | 4L | | Dehumidify amount | 0.6L (DC401) | 1.0L (DC801) |

DC401-115V
DC401-220V

DC801-115V
DC801-220V

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	DC801-115V DC801-220V
Trap cooling temperature	-45°C	-85°C
Time to reach minimum temperature	50 min. (20°C to -45°C)	80 min. (20°C to -80°C)
Dehumidify amount	0.6L	1.0L
Temperature sensor	N/A	Platinum resistance temperature detector Pt100Ω
Temperature display	N/A	7 segment LCD
Refrigerator	Air Cooling Type, 400W	Air Cooling Type, 350W
Refrigerator, coolant	R404A, Coolant amount: 300g ±5g	R600a and others, mixed coolant
Compound gauge	N/A	High pressure/Low pressure monitor
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	W405 x D500 x H1040mm
Internal capacity	~4L	
Power source 50/60 Hz	AC115V 12A AC220V 7A	AC115V 13A AC220V 7.3A
Weight	~60kg	~83kg
Included accessories	Vacuum silicone grease, vacuum hose	Vacuum silicone grease, vacuum hose, caster stop holder 4 pcs

Vacuum Pump

GLD136C115DCRKIT
GLD137CC220DCRKIT

■ Specifications

Model	Unit	GLD-136C/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	

Sublimation Data

DC401 Sublimation data

Sublimation amount (g) vs Time (h)
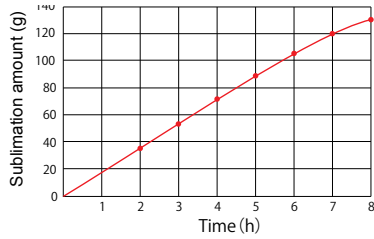
Room temp: 25℃ Power source: AC115V 50Hz

DC801 Sublimation data

Sublimation amount (g) vs Time (h)
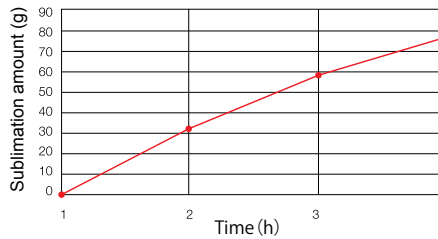
Cooling Curve

DC401 Cooling curve

Temperature (℃) vs Time (min)
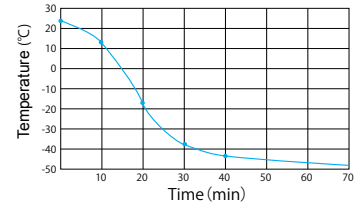
Room temp: 25℃ Power source: AC115V 50Hz

DC801 Cooling curve

Temperature (℃) vs Time (min)

■ Accessories

Flask mounting chamber

Closed dry chamber

Testing tube — φ21 φ18 φ16.5 φ15

Testing tube adapter (Straight)

Manifold B, 16pcs

Dry chamber

Testing tube — φ13 φ12 φ10

(45° Bending)

Testing tube

Manifold A, 8pcs

Valve

Petri dish

Serum bottle

Ampule adapter

Ampule

Dry flask cap (with glass joint) (Straight) (45° bent)

Serum bottle (vial bottle with rubber stopper) 50mL 30mL 10mL

Round bottom flask adapter (female) T/S 29

Round bottom flask adapter (male) T/S 29

Round bottom flask (female) T/S 29
200mL
300mL
500mL

Round bottom flask (male) T/S 29
200mL
300mL
500mL

Dry flask 250mL 120mL

Control Panel

Pirani Vacuum Gauge and Control Panel

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℃±2℃	
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℃ 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

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Freezers & Refrigerators

Contents

NOTES

Ultra Low Freezers

ULF Series

| 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 -85ºC / -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

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" 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)	-40°C to -85°C	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)	-40°C to -85°C	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)	-40°C to -85°C.	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)	-40°C to -85°C	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)	-40°C to -80°C	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)	-40°C to -80°C	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

| 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
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
LTF801U	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

877L
LTF801U

Low Temperature Freezers

LTF PLATINUM Series

Temperature range	0°C ~ -40°C

Style	Chest (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
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

Laboratory Freezers

SLF Series

Temperature range	-18°C to -25°C / 0°F to -13°F

Door type	Solid Door

SLF SERIES LABORATORY FREEZERS with SOLID DOOR

■ Common Specifications

Temperature range	-18°C to -25°C / 0°F to -13°F
Temperature control system	Digital display with Hi/Low alarm, Alarm relay dry contacts, Min/Max memory, Power failure relay, Battery back up
Access port	1/2" Diameter
Interior and exterior finish	White coated steel
Interior lighting	LED light
Insulation	Polyurethane foam
Refrigerant	R290 CFC free
Air circulation	Forced air
Evaporator	Adjustable
Defrost	Automatic
Compressor	1 hp (SLF1301DS)
Voltage	115V, 60 Hz, 1 phase
Running amps / breaker	10.3A / 15A
Supply plug	5-15P NEMA UL listed (SLF701SS) 5-20P NEMA UL listed (SLF1301DS)
Optional accessories	Extra shelf, Leg seismic restraints, wall seismic restraints

■ Unique Specifications

Model	Capacity		Door	Shelves	Internal Dimension		External Dimension		Weight	Casters
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter	Lbs.	
SLF701SS	708	25	Single solid, locking	3 adjustable	23.62" x 26.18" x 59.84"	60 x 66 x 152	28.35" x 31.5" x 79.25"	72 x 80 x 201	255	4 locking
SLF1301DS	1387	49	Two solid, locking	6 adjustable	51.97" x 26.18" x 59.84"	132 x 66 x 152	56.69" x 31.5" x 79.25"	144 x 80 x 201	450	6 locking

708L
SLF701SS

1387L
SLF1301DS

Undercounter and Countertop Freezers

Free Standing Freezers with Solid Door

UCF Series

Door type	Solid

Internal capacity	42L 1.5 cu.ft	708L 2.5 cu.ft	113L 4 cu.ft

■ Specifications

Model	UCF000	UCF001	UCF101A	UCF101B
Capacity	42L / 1.5 cu.ft.	70L / 2.5 cu.ft.	113L / 4 cu.ft.	113L / 4 cu.ft.
Door	Single solid, locking			
Temperature range	-20°C / -4°F	0°C to -20°C / +32°F ~ -4°F	0°C to -30°C / +32°F to -22°F	-30°C to -40°C / -22°F to -40°F
Temperature control	Mechanical thermostat	Digital display with Hi/Low alarm, Alarm relay dry contacts		
Alarm system	-	Emits an audible and visual signal when the temperature gets to hi or low. The alarm has an over and under temperature setting, alarm silencing switch, and dry contact relay. A relay for a remote alarm hook-up is also provided.		
Access port	Probe access port 3/8"	1/2"		1/2" rear
Shelves		2 full	2 adjustable, 1 full, 1 half	3 adjustable
Insulation	High density urethane foam	Polyurethane foam		
Refrigerant	R134a CFC-Free refrigerant	R600		R290
Compressor	-	-	1/3 hp	1/4 hp
Air circulation	-	Forced air		
Defrost	Manual			
Exterior construction	Painted white			
Internal dimensions (WxDxH)	14" x 13.25" x 14.5" 35 x 33 x 36 mm	17" x 15" x 17" 43 x 38 x 43 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	20" x 21.5" x 25" 50 x 54 x 63 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.	110 lbs.	150 lbs.	
Voltage	115V, 60 Hz, 1 phase	115V, 60 Hz, 1 phase		
Running amps / breaker	1.1A, 310 BTUs/hr	1.2A / 15A	2 / 15	5 / 15
Supply plug	-	5-15P NEMA		
Optional accessory	Chart recorder			

42L
UCF001

70L
UCF001

113L
UCF101A

113L
UCF101B

Laboratory Refrigerators

SLR Series

| Temperature range | 2°C~8°C / 36°F~46°F |

| Door type | Glass Door | Solid Door |

SLR SERIES LABORATORY REFRIGERATORS with GLASS DOOR

■ Common Specifications

Temperature range	2°C to 8°C / 36°F to 46°F
Temperature control system	Digital display with Hi/Low alarm, Alarm relay dry contacts, Min/Max memory, Power failure relay, Battery back up
Access port	1/2" Diameter
Interior and exterior finish	White coated steel
Interior lighting	LED light
Insulation	Polyurethane foam
Refrigerant	R290 CFC free
Air circulation	Forced air
Defrost	Cycle, Automatic
Compressor	1/5 hp (SLR1301DG, SLR1301DGSL) 2 x 1/3 hp (SLR2001TG)
Voltage	115V, 60 Hz, 1 phase
Running amps / breaker	5A / 15A (SLR301SG) 6A / 15A (SLR701SG to SLR1301DGSL) 12A /15A (SLR2001TG)
Supply plug	5-15P NEMA UL listed
Optional accessories	Extra shelf, Leg seismic restraints, wall seismic restraints

■ Unique Specifications

Model	Capacity		Door	Shelves	Internal Dimension		External Dimension		Weight	Casters
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter	Lbs.	
SLR301SG	340	12	Single glass, locking	4 adjustable	18.9" x 19.69" x 45.28"	48 x 50 x 115	23.62" x 25.27" x 71.75"	60 x 64 x 182	165	4 locking
SLR701SG	708	25	Single glass, locking	4 adjustable	23.62" x 26.18" x 59.84"	60 x 66 x 152	28.35" x 31.5" x 79.25"	72 x 80 x 201	253	4 locking
SLR801SG	850	30	Single glass, locking	4 adjustable	27.50" x 30.80" x 61.84"	70 x 78 x 157	33.85" x 37.80" x 81.12"	86 x 96 x 206	420	4 locking
SLR1301DG	1387	49	Two hinged glass, locking	8 adjustable	51.97" x 26.18" x 59.84"	132 x 66 x 152	56.69" x 31.5" x 79.25"	144 x 80 x 201	450	6 locking
SLR1301DGSL	1387	49	Two sliding glass	8 adjustable	51.97" x 26.18" x 59.84"	132 x 66 x 152	56.69" x 31.5" x 79.25"	144 x 80 x 201	450	6 locking
SLR2001TG	2039	72	Three hinged glass, locking	12 locking	80.31" x 26.18" x 59.84"	204 x 66 x 152	85.04" x 33.46" x 79.25"	216 x 85 x 201	700	12 adjustable

340L
SLR301SG

850L
SLR801SG

1387L
SLR1301DGSL

2039L
SLR2001TG

SLR SERIES LABORATORY REFRIGERATORS with SOLID DOOR

■ Common Specifications

Temperature range	2°C to 8°C / 36°F to 46°F
Temperature control system	Digital display with Hi/Low alarm, Alarm relay dry contacts, Min/Max memory, Power failure relay, Battery back up
Access port	1/2" Diameter
Interior and exterior finish	White coated steel
Interior lighting	LED light
Insulation	Polyurethane foam
Refrigerant	R290 CFC free
Air circulation	Forced air
Defrost	Cycle, Automatic
Compressor	1/5 hp (SLR1301DS)
Voltage	115V, 60 Hz, 1 phase
Running amps / breaker	6A / 15A
Supply plug	5-15P NEMA UL listed
Optional accessories	Extra shelf, Leg seismic restraints, wall seismic restraints

■ Unique Specifications

Model	Capacity		Door	Shelves	Internal Dimension		External Dimension		Weight	Casters
	Liters	Cu. ft.			Inch	Centimeter	Inch	Centimeter	Lbs.	
SLR701SS	708	25	Single solid, locking	4 adjustable	23.62" x 26.18" x 59.84"	60 x 66 x 152	28.35" x 31.5" x 79.25"	72 x 80 x 201	275	4 locking
SLR801SS	850	30	Single solid, locking	4 adjustable	27.50" x 30.80" x 61.84"	70 x 78 x 157	33.85" x 37.80" x 81.12"	86 x 96 x 206	420	4 locking
SLR1301DS	1387	49	Two hinged solid, locking	8 adjustable	51.97" x 26.18" x 59.84"	132 x 66 x 152	56.69" x 31.5" x 79.25"	144 x 80 x 201	450	6 locking

708L
SLR701SS

850L
SLR801SS

1387L
SLR1301DS

Undercounter and Countertop Refrigerators

UCR Series

| Temperature range | 2°C to 8°C / 36°F to 46°F | | Door type | Solid Door | Glass Door | | Internal capacity | 70L 2.5 cu.ft | 113L 4 cu.ft |

▪ Specifications

Model	UCR001	UCR001G	UCR101	UCR101G
Capacity	70L / 2.5 cu.ft.	70L / 2.5 cu.ft.	113L / 4 cu.ft.	113L / 4 cu.ft.
Door	Single solid, locking	Single glass, locking	Single solid, locking	Single glass, locking
Temperature range	2°C to 8°C / 36°F to 46°F			
Temperature control	Digital display with hi/low alarm, Alarm relay dry contacts			
Access port	1/2"			
Shelves	2 full	2 full	2 adjustable, 1 full, 1 half	2 full, 1 half
Insulation	Polyurethane foam			
Refrigerant	R600			
Compressor	-	-	1/3 hp	
Air circulation	Forced air			
Defrost	Cycle, Automatic			
Exterior construction	Painted white			
Internal dimensions (WxDxH)	17" x 15" x 17" 43 x 38 x 43 cm		20" x 15.25" x 22.75" 51 x 38 x 57 cm	20" x 17.75" x 24.5" 51 x 45 x 62 cm
External dimensions (WxDxH)	20" x 21.5" x 25" 50 x 54 x 63 cm		23.75" x 21.5" x 32" 60 x 64 x 84 cm	
Weight	110 lbs.		150 lbs.	
Voltage	115V, 60 Hz, 1/10 HP			
Running amps / breaker	1.2A / 15A			
Supply plug	5-15P NEMA			
Optional accessory	Chart recorder			

70L
UCR001

113L
UCR101

70L
UCR001G

113L
UCR101G

NOTES

Laboratory Freezer/Refrigerator Combination

RFC Series

Internal capacity	255L 9 cu.ft	283L 10 cu.ft	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	RFC201	RFC301	RFC501	RFC1301	RFC2001
Capacity	255L / 9 cu.ft.	283L / 10 cu.ft.	515L / 18.2 cu.ft.	1359L / 48 cu.ft.	1982L / 70 cu.ft.
Refrigerator capacity	4.6 cu.ft.	7 cu.ft.	9.1 cu.ft.	24 cu.ft.	46.6 cu.ft.
Freezer capacity	4.4 cu.ft.	3 cu.ft.	9.1 cu.ft.	24 cu.ft.	24 cu.ft.
Door	Two solid, locking	Solid, locking (F) Glass, locking (R)	Two Solid, locking		Three Solid, locking
Temperature range	(Refrigerator) 2°C to 8°C / 36°F to 46°F (Freezer) -10°C to -30°C / +14°F to -22°F	(Refrigerator) 2°C to 8°C / 36°F to 46°F (Freezer) -10°C to -25°C / +14°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) 2°C to 8°C / 36°F to 46°F (Freezer) 0°C to -25°C / +32°F to -13°F	(Refrigerator) 4°C / 39°F (Freezer) -20°C / -4°F
Temperature control	Two - Digital display				
Temperature alarm	Hi/Low temperature alarm with audible and visual alarm, Alarm relay dry contacts, Min/Max Memory (for RFC1301 and RFC2001)				
Probe port	3/8" access port hole, each chamber		-	-	-
Shelves	2 adjustable (R) 2 adjustable (F)	3 adjustable (R) 2 adjustable (F)	2 Per Compartment / Epoxy Coated	3 Per Compartment / Epoxy Coated	3 Per Compartment / Epoxy Coated
Legs	Four leveling feet		Four locking		
Stacking kit	Yes	-	-	-	-
Insulation	Urethane foam		Polyurethane		
Refrigerant	R600A CFC free	CFC free	-	-	
Compressor	2	2	1/4 hp (R), 1/3 hp (F)	1/4 hp (R), 1/2 hp (F)	1/3 hp (R), 1/2 hp (F)
Thermostat	Adjustable	-	-		
Evaporator	-	-	Fin and tube		
Refrigerator defrost	Cycle, Automatic		Automatic		
Freezer defrost	Manual		Automatic		
Interior / Exterior finish	White coated steel			Stainless steel	
Interior dimension of Refrigerator (WxDxH)	20" x 17.75" x 24.5"	20.25" x 18.5" x 28.75"	28 x 28 x 20"	22 x 28 x 60"	48 x 28 x 60"
Interior dimension of Freezer (WxDxH)	20" x 17.75" x 24.5"	18" x 17.5" x 14"	28 x 28 x 20"	22 x 28 x 60"	28 x 28 x 20"
External dimensions (WxDxH)	23.75" x 21.5" x 64" 60 x 54 x 162 cm	23.75" x 25.5" x 66.75" 60 x 65 x 170 cm	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	395 lbs.	395 lbs.	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				

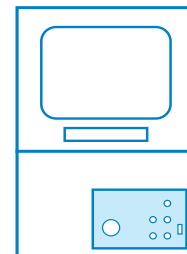## LABORATORY FREEZER / REFRIGERATOR COMBINATION

255L
RFC201

283L
RFC301

515L
RFC501

1359L
RFC1301

1982L
RFC2001

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Glassware Washers

Contents

NOTES

Semi-automatic Benchtop Glassware Washer

AW47-115V / AW47-220V

| 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)
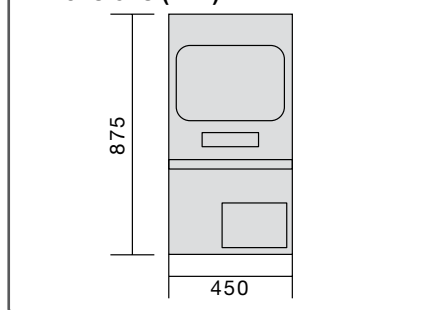
■ Optional items

(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

| 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
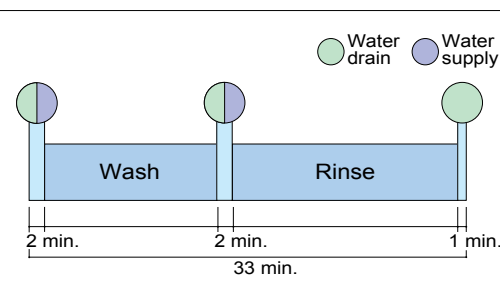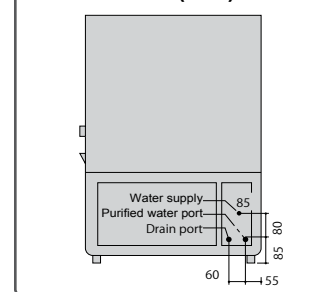
■ Optional items

(1)

Combination with water purifier

(2)

Jet rack (glasswares not included)

(3)

Beaker rack (glasswares not included)

(4)

Test tube rack (glasswares not included)

(5)

Flask rack (glasswares not included)

(6)

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

Water drain   Water supply

Wash   Rinse

2 min.   2 min.   1 min.

33 min.

Dimensions (mm)

Water supply
Purified water port   85
Drain port   80
85
60   55

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Incubators

Contents

Natural Convection ensures a homogeneous temperature throughout the chamber
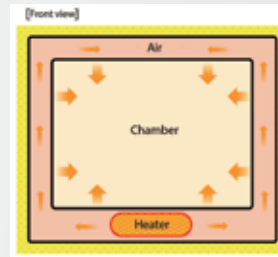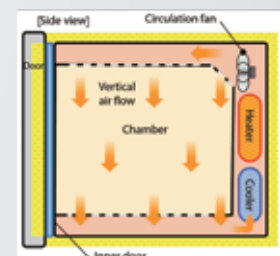
IC Series: General Purpose Incubator
Internal Capacity: 37, 97, 159, 318, 567L

- 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

Ecological Economical
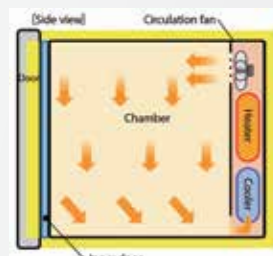
IN Series: Programmable Refrigerated Incubator
Internal Capacity: 143, 286L

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

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 off-set, overheat prevention and key lock
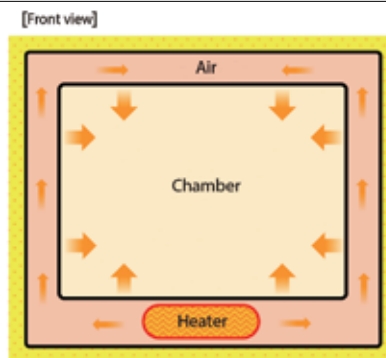- Models 400 to 900 have an option for communication port (R)

37L
IC103C

97L
IC403C

159L
IC603C

■ Specifications

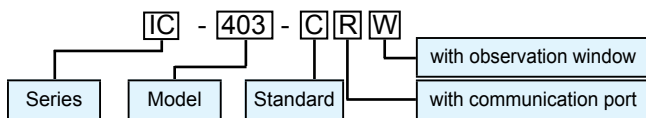| Model	IC103C IC113C	IC403C IC413C	IC603C IC613C	IC803C IC813C	IC903C IC913C
System	Natural convection				
Operating temperature range	Room temp. +5~80°C				
Temp. control accuracy	±0.5°C (at 37°C)				
Temperature distribution accuracy	±1.0°C				
Interior material	Stainless steel				
Exterior material	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 function	Fixed temperature, Auto start, Auto stop, Quick Auto stop				
Additional function	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 (WxDxHmm)	350 x 300 x 360	450 × 480 × 450	600 x 530 x 500	600 × 530 × 1000	1070 x 530 x 1000
External dimensions (WxDxHmm)	430 x 397 x 606	560 × 606 × 820	710 x 656 x 870	710 × 656 × 1619	1180 x 656 x 1619
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 AC220V 1A	AC115V 4.5A AC220V 2A	AC115V 6A AC220V 2.5A	AC115V 10A AC220V 4.5A	AC115V 13A AC220V 6.5A
Weight	~17 kg	~45 kg	~65 kg	~102 kg	~166kg
Shelf / shelf brackets	Stainless steel				
	2 pcs. / 4pcs.			4 pcs. / 8pcs.	8 pcs. / 16pcs.
Optional items	Stand, Stacking kit, Additional shelf, Cable hole (25/50mm or 30/50mm), External communication terminal (RS485), Temp. output terminal, Time-up output terminal for alarm device				

318L
IC803C

567L
IC903C

Method

[Front view]

Air

Chamber

Heater

Control Panel

Observation Window

IC103CW

Interior (IC613C)

Shelf & Bracket Set

Exhaust Ports

■ **Model Guide**

IC - 403 - C R W

Series | Model | Standard | with observation window
with communication port

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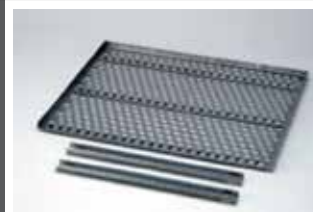IC-803CRW: Standard model with communication port and observation window

■ **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

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

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

Observation window dimension: W516 x H416mm

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)
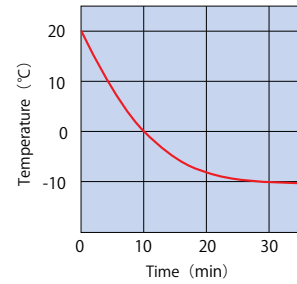
143L
IN604-115V
IN604-220V
(Stand optional)

143L
IN604W-115V
IN604W-220V

■ 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 AC220V 5.5A	AC115V 10.5A AC220V 7.5A	AC115V 10.5A AC220V 6A	AC115V AC220V
Weight	~89 kg		~ 120 kg	
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, external communication function (RS485), temperature output terminal (4-20mA), external alarm output terminal, time up output terminal			

286L
IN804

Control Panel

Method

[Side view]   Circulation fan

Door

Chamber

Heater
Cooler

Inner door

■ 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
External communication function (RS422)*	281166	--	All
External communication adapter (RS232C)*	281167	--	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.

Temperature Drop Curve (IN604)

Temperature (℃)

Time (min)

Interior

IN604W with MK161 shaker

IN604
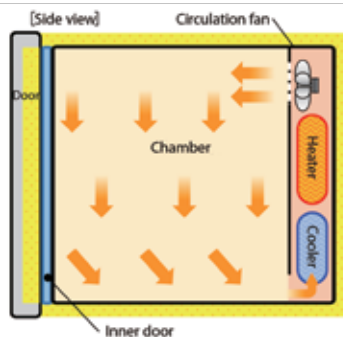
Shelf & Bracket Set

Stainless punched metal

Stainless wire

Interior Light

IN604W/804W
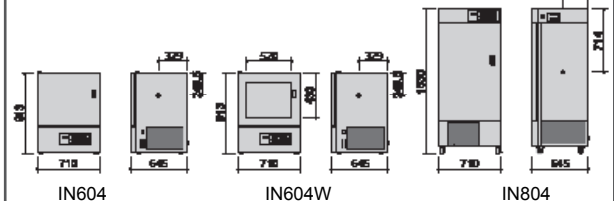
Dimensions (mm)

IN604   IN604W   IN804

Programmable Refrigerated Eco Incubator

Forced Air Convection

Ecological Economical

INE800-115V / INE800-220V

| 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
- Designed with Analog Output (4-20mA) and External Communication Port (RS485)

■ 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 prevention 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 prevention 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	AC220V 4.5A
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
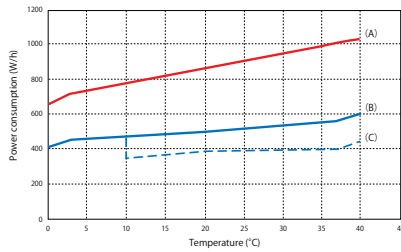
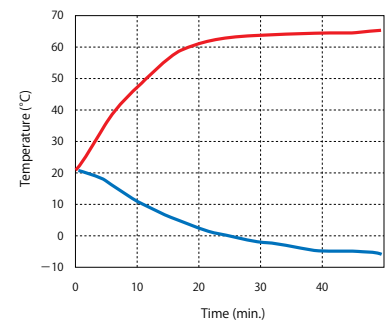|	0°C	3°C	20°C	37°C
IN804	648	712	864	1007
INE800	409	446	498	560
Reduction Rate	37%	37%	42%	44%

Unit: Wh

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 (°C)
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

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)
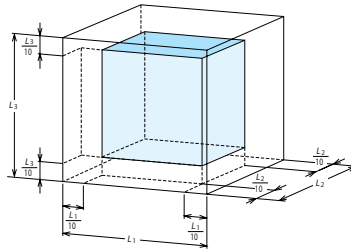
Method
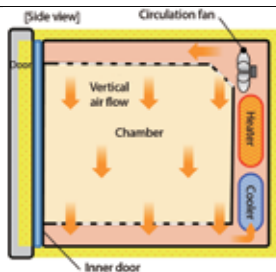
Control Panel

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 communication adapter	211880
(4) External alarm terminal	211881
(5) Time-up output terminal	211882
(6) Earthquake resistant fixture	211883

* (4) and (5) please specify when ordering main unit
External Communication Adapter is equipped with RS485-USB interchange adapter, 1m USB cable, 3m RS485 connection cable and utility software CD (accepts Windows XP, Vista, 7)

Dimensions (mm)

INE800

Yamato Scientific America

Innovating Science for over 130 Years
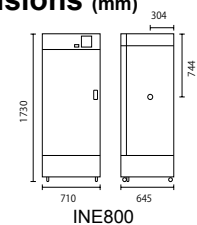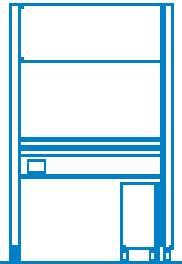
Yamato Laboratory Furniture

Contents

My Hood

MS / MV Series

Safe, Easy-operation, Space-saving Fume Hoods

● Selectable interior material: stainless steel (for organic solvents) or hard polyethylene (for acid)
● Easy installation with simple wiring and plumbing
● Air is efficiently exhausted through the air flow regulation device
● Standard equipped with water valve, lighting lamp, power sockets and waste liquid recycling tank
● Various options such as blower unit, exhaust chamber and decorative panel
● Benchtop type available which can be used on laboratory table

■ **Specifications**

Model		MS90C-115V MS90C-220V	MV90C-115V MV90C-220V
Exhaust pipe	Exhaust damper	Stainless steel, inner diameter ø150, outer diameter ø152, Fixed by flange	Hard polyethylene, inner diameter ø160, outer diameter ø165, Fixed by flange
	Matched Pipe	Hard polyethylene, inner diameter ø160, outer diameter ø165	
Fluorescent light		1 pc.	
Water exhaust pipe		Hard polyethylene / Single tube fixed (outer diameter ø40, Inner diameter ø31)	
Material	Exterior	Cold-rolled steel plate, chemical proofing powder coating, with adjusting casters	
	Interior	Stainless steel (SUS304)	Hard polyethylene
	Working face	Stainless steel (SUS304)	Hard polyethylene
	Glass door	Toughened glass 5mm. Close and open (up and down) with balance block	
Safety structure		Brake block to prevent door from falling down / Door opening extent sticker	Brake block to prevent door from falling down / Motor of exhaust fan
Air volume (m³ /min) *		7	
Internal static pressure Pa (mm H$_2$O)		40 (4)	
Power source (50/60Hz)		Single phase 115V 10A SIngle phase 220V 5A Length of power cord: about 2m	
Worktop		Stainless steel (SUS304)	Hard polyethylene
Worktop load bearing		Uniformly-distributed load 50kg	
Standard type	External dimensions	W900 x D750 x H1850 mm	
	Weight (kg)	~130	120
Benchtop type	External dimensions	W900 x D750 x H1000 mm	
	Weight (kg)	~90	80
Temperature and humidity condition of location		5~35°C, 20~80% (no frosting)	
Tap		Gooseneck tap, nominal value 1/2B flexible tube, external or internal thread fixing	
Device of waste liquid		Unit body (tray): cold-rolled steel plate (chemical proofing powder coating), with casters, 20L polyurethane bottle, connecting tools of draining water (nut, hose, steel wire hoop)	
Included accessories		Fixing bolts for upper and lower bodies fixing, fixing fittings of wall and ground, tools for adjusting foot, cover of water outlet, shock pads, front operation panel	Flange, bolts for flange fixing, fixing bolts for upper and lower bodies fixing, fixing fittings of wall and ground, tools for adjusting foot

* Recommended value (controlling air speed of opening part: 0.5m/s when the door is half open)
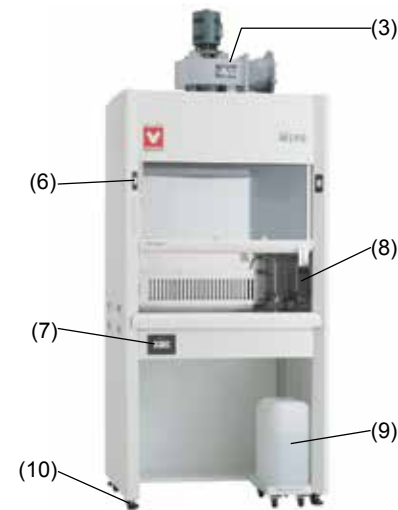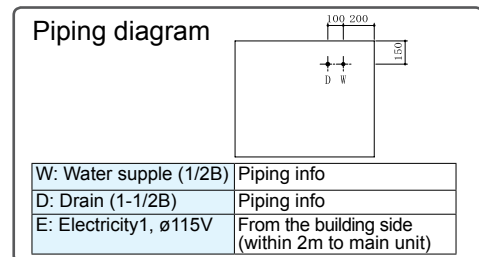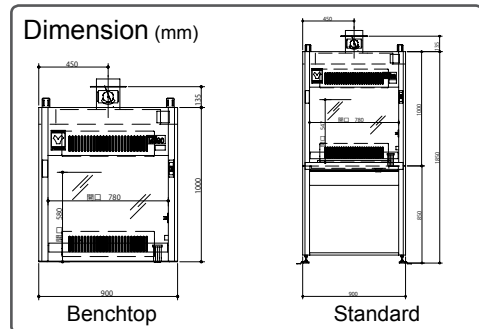
■ **Optional Items**

No	Product code	Description	Specifications	Functions	MS/MV	MS-T/ MV-T
(1)	OMS-D200	Exhaust damper SUSø200	Stainless steel	Use when more air flow is needed. Substitute for standard SUSø150damper.	●	●
(2)	OMV-D200	Exhaust damper PVCø200	Hard polyethylene		●	●
(3)	OMS-F150	Blower unit	Hard polyethylene, Motor, Single phase 115V/0.2kw, Exhaust fan operation switch	Used as exhaust fan. Can be installed on the upper part of main unit. Cannot mount with exhaust damper simultaneously.	●	●
(4)	OMS-PN	Blower decorative panel	Steel plate (with chemical resistant coating)	Used to cover the exhaust fan.	●	●
(5)	OMS-FD	Flexible duct unit	Hard polyethylene ø150x2m, with exhaust port	Resin made duct of exhaust bellows.	●	●
(6)	OMS-FS	Exhaust fan power switch	Tumbler switch (on/off), breaker, electromagnetic switch, single-phase 100V	Operation-Stop switch of exhaust fan	●	●
(7)	OMS-CN	Outlet unit	115V 15A with double earth	Supply of electrical appliances used in the hood.	●	–
(8)	OMS-FA	Faucet unit (additional)	Gooseneck faucet (T-41AS), water supply flexible hose	Light water work OK in the hood. Enables draining without drainage pipe when used in combination with liquid waste unit.	●	–
(9)	OMS-SC	Liquid waste unit	Main unit:Cold rolled steel plate, 25L plastic tank, with drain hose	Storage of waste liquid by connecting to the drain port of main unit.	●	–
(10)	OMS-CS	Caster set	Nylon caster ø50	Easy to move. For safety, suspend casters when installing and using hood. Total height 25mm	●	–

MV90C-115V
MV90C-220V

■ **Model list**

Model	Specifications	
	Interior	Worktop
MS-90C	Stainless steel	Stainless steel
MV-90C	Hard polyethylene	Hard polyethylene
MS-90TC	Stainless steel	N/A
MV-90TC	Hard polyethylene	N/A

Dimension (mm)

Benchtop   Standard

Piping diagram

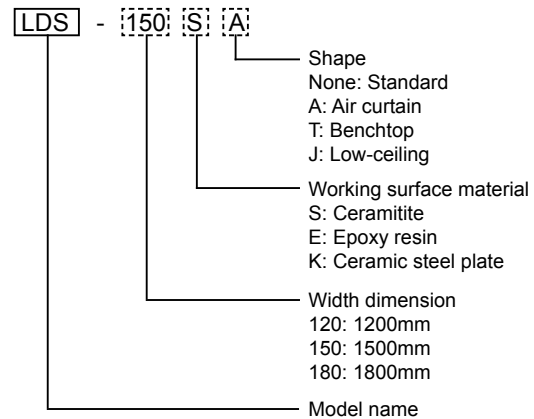| W: Water supple (1/2B)	Piping info
D: Drain (1-1/2B)	Piping info
E: Electricity1, ø115V	From the building side (within 2m to main unit)

Fume Hood

LDS Series

LDS150

Fume hood with fixed exhaust air volume

- Main unit is made of steel, chemical resistant powder coating applied; excellent fire resistance
- Non-asbestos, non-combustible veneer interior with excellent chemical and heat resistance
- Selectable work surface material
- Storage located in the lower base (not applicable to benchtop type)
- Equipped with multi-slit baffle to efficiently exhaust harmful gas in the fume hood
- Safety features include door drop prevention stopper, ventilator delay timer and exhaust blower activation monitor
- Outlets and switches are located at an easy operating height
- Selectable air speed meter, which digitally displays the front air speed and exhaust air volume (option)

■ Model Guide

LDS - 150 S A

Shape
None: Standard
A: Air curtain
T: Benchtop
J: Low-ceiling

Working surface material
S: Ceramitite
E: Epoxy resin
K: Ceramic steel plate

Width dimension
120: 1200mm
150: 1500mm
180: 1800mm

Model name

■ Common specifications

Exterior	Cool-milling steel, chemical-resistant baked paint finish
Interior	Non-asbestos, non-combustible decorative board (baffle plate: multi-slit type)
Glass window	Reinforced glass, 6mm thickness, balance weight type
Water faucet	Single goose neck type, 1pc.
Outlet	AC115V 15A with dual grounding wire (dropout prevention) 1pc.
Fluorescent lamp	120/150 model 32W, 180 model 40W, 1pc. each
Safety feature	Door drop prevention stopper, ventilator delay timer, exhaust blower activation monitor

■ Individual Specifications

Standard type	LDS-120	LDS-150	LDS-180
Standard discharge air quantity (m³/min)	12	16	19
Static pressure within the machine Pa (mmH₂O)	30 (3)	59 (6)	79 (8)
External dimensions (W x D x H mm)	1200 x 750 x 2400	1500 x 750 x 2400	1800 x 750 x 2400
Weight (kg)	~290	~330	~370

Air curtain type	LDS-120A	LDS-150A	LDS-180A
Standard discharge air quantity (m³/min)	12	16	19
Static pressure within the machine Pa (mmH₂O)	30 (3)	59 (6)	79 (8)
Air flow (m³/min)	8.4	11.2	13.3
Air flow pressure within the machine Pa (mmH₂O)	20 (2)	35 (3.6)	49 (5)
Air flow duct	Each duct PVC with I.D.400mm O.D.100mm, connected with a half flange		
Applicable air supply duct	PVC with I.D.211mm O.D.216mm		
External dimensions (W x D x H mm)	1200 x 750 / 1020 x 2600	1500 x 750 / 1020 x 2600	1800 x 750 / 1020 x 2600
Weight (kg)	~340	~380	~440

Benchtop type	LDS-120T	LDS-150T	LDS-180T
Standard discharge air quantity (m³/min)	12	16	19
Static pressure within the machine Pa (mmH₂O)	30 (3)	59 (6)	79 (8)
External dimensions (W x D x H mm)	1200 x 750 x 1550	1500 x 750 x 1550	1800 x 750 x 1550
Weight (kg)	~130	~150	~170

| Low-ceiling type	LDS-120J	LDS-150J	LDS-180J
Standard discharge air quantity (m³/min)	10	13	16
Static pressure within the machine Pa (mmH₂O)	25 (2.5)	39 (4)	59 (6)
External dimensions (W x D x H mm)	1200 x 750 x 2100	1500 x 750 x 2100	1800 x 750 x 2100
Weight (kg)	~280	~320	~360

Dimension drawing (mm)	Exhaust duct plan	Piping plan
Frontage : A 1200 : 960 1500:1260 1800:1560	Frontage : B 1200 : 600 1500:750 1800:900	W: Water supply (1/2B) D: Drainage (11/2B) E1: Electricity1ø 100V E2: Electricity3ø 200V

Standard type

Exhaust duct dia.: ø261~ø267 (PVC)

Air curtain type

Exhaust duct dia.: ø261~ø267 (PVC)
Intake duct: 400 x 100 (PVC)

Benchtop type

Exhaust duct dia.: ø261~ø267 (PVC)

Low-ceiling type

Exhaust duct dia.: ø261~ø267 (PVC)

Airflow

● **Window open:**
Efficient exhaust with constant air velocity at front opening
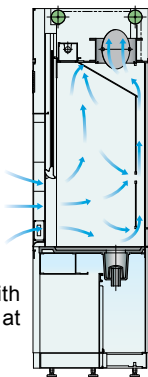
● **Window narrow open:**
Front air velocity is faster. Exhaust air volume is controlled by air bypass at top gallery
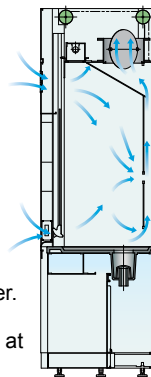
⚠ Attention
● Please select exhaust fan according to operating location and conditions.
● Not explosion-proof structure, please pay attention to conditons to be used.
● Interior material and chemical resistance of the working surface, please refer to selection table.
● Keep electric heating lower than 2kW.
● Avoid perchloric acid.
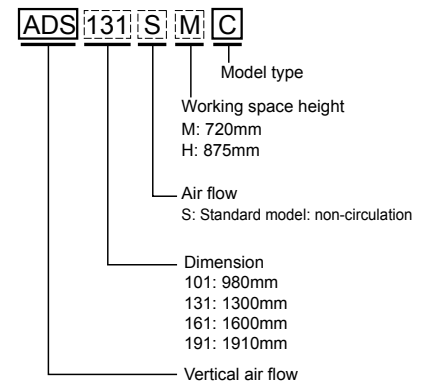
Industrial Clean Bench

Vertical Airflow

ADS Series

ADS131SMC

- Vertical airflow: air moves downward from filter positioned in the ceiling toward the work surface, non-circulation airflow
- Air does not blow directly at users face as sash acts as a barrier in front of user's face
- Wind velocity sensor can display discharged wind velocity digitally and keep track of the draft condition inside the bench accurately
- Wind velocity can be adjusted with optional wind velocity controller
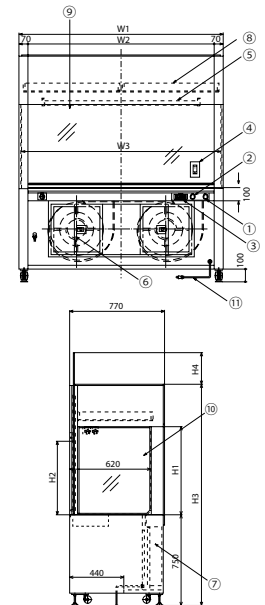
Model Guide

ADS 131 S M C

- Model type
- Working space height
  M: 720mm
  H: 875mm
- Air flow
  S: Standard model: non-circulation
- Dimension
  101: 980mm
  131: 1300mm
  161: 1600mm
  191: 1910mm
- Vertical air flow

Model		ADS101		ADS131		ADS161		ADS191	
		M	H	M	H	M	H	M	H
Height (mm)	H1: Working space	720	875	720	875	720	875	720	875
	H2: Front opening height	600	755	600	755	600	755	600	755
	H3: Main unit height	1820	1975	1820	1975	1820	1975	1820	1975
	H4: Front opening maximum height	260	415	260	415	260	415	260	415
Width (mm)	W1: Main unit width	980		1300		1600		1900	
	W2: Effective opening	840		1160		1460		1770	
	W3: Effective interior	940		1260		1560		1870	

Dimensions (mm)

■ Specifications

Model	ADS101S☐C		ADS131S☐C		ADS161S☐C		ADS191S☐C	
	M	H	M	H	M	H	M	H
Air flow direction	Vertical							
Cleanliness	Class 100							
Blow-off air speed (m/sec)	~0.40 at early stage, ~0.20 final							
Illuminance (lx)	1000 (in the center of working face)							
Load bearing of working face	50kg (static load)							
Air volume (m³/min)	~13		~17		~22		~26	
Exterior material	Cold roll steel sheet (chemical-resistant coating), white							
Interior material	Stainless steel sheet (SUS304)							
Working platform	Working face: stainless steel (SUS304), wire drawing processing							
Front doorframe	Toughened glass 5mm, open and close up and down, spare 5mm opening when fully closed							
HEPA Filter (mm)	915x610x65 1pc		610x610x65 2pcs		760x610x65 2pcs		915x610x65 2pcs	
	0.3µm DOP scan test 99.99 % or more							
Front filter (mm)	400x400x15 / 1pc.		400x400x15 / 2pcs.					
Socket	AC220V or AC115V 5A 2 outlets with grounding wire 2 (total capacity is 5A)							
Flourescent lamp	32W x 2 pcs.				40W x 2 pcs.			
Blower (Single phase)	150W x 1		120W x 2				150W x 2	
Working surface level adjustment	Use adjusting foot (-18~+40mm)							
Display of pressure difference	Differential pressure gauge							
Power source	Single phase AC220V/15A 1 circuit (can be changed to AC115V/15A 1 circuit)							
Working space height (mm)	720	875	720	875	720	875	720	875
External dimension (mm)	W980 x D770		W1300 x D770		W1600 x D770		W1910 x D770	
Height (mm) (Doors fully open) (mm)	1820 (2080)	1975 (2390)	1820 (2080)	1975 (2390)	1820 (2080)	1975 (2390)	1820 (2080)	1975 (2390)
Weight (kg)	~180	~200	~220	~240	~250	~270	~290	~320
Accessories	Fixing fittings of adjusting foot x 4							
Optional item	Wind velocity controller: displays wind velocity and with wind adjust device attachment							

*Ambient temperature and humidity conditions: temperature 5℃ ~35℃, humidity less than 85% RH.
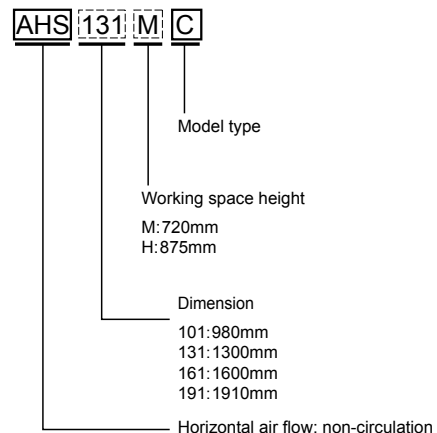
Industrial Clean Bench

Horizontal Airflow

AHS Series

AHS131MC

- Horizontal airflow: air enters the system from behind the filter and is forced in a back-to-front direction across the work surface
- No front sash ensuring a spacious work space
- Wind velocity can be adjusted with optional wind velocity controller

Model Guide

AHS 131 M C

Model type

Working space height
M: 720mm
H: 875mm

Dimension
101: 980mm
131: 1300mm
161: 1600mm
191: 1910mm

Horizontal air flow: non-circulation

■ Specifications

Model	AHS101□C		AHS131□C		AHS161□C		AHS191□C	
	M	H	M	H	M	H	M	H
Air flow direction	Horizontal							
Cleanliness	Class 100							
Blow-off air speed (m/sec)	~0.40 at early stage, ~0.20 final							
Illuminance (lx)	1000 (in the center of working face)							
Load bearing of working face	50kg (static load)							
Air volume (m³/min)	~16	~20	~22	~27	~27	~33	~32	~39
Exterior material	Cold roll steel sheet (chemical-resistant coating), white							
Interior material	Stainless steel (SUS304)							
Working surface	Stainless steel (SUS304), wire drawing processing							
HEPA Filter (mm)	915×760 ×65/1pc	915×915 ×65/1pc	610×760 ×65/2pcs	610×915 ×65/2pcs	760×760 ×65/2pcs	760×915 ×65/2pcs	915×760 ×65/2pcs	915×915 ×65/2pcs
	0.3µm DOP scan test 99.99 % or more							
Front filter (mm)	400×400×15 / 1pc.		400×400×15 / 2pcs.					
Socket	AC220V or AC115V 5A 2 outlets with grounding wire 2 (total capacity is 5A)							
Flourescent lamp	32W x 4pcs.				40W x 4pcs.			
Blower (single phase)	150W×1		120W×2				150W×2	
Working surface level adjustment	Using adjusting foot (-18~+40mm)							
Display of pressure difference	Differential pressure gauge							
Power source	Single phase AC220V/15A 1 circuit (can be changed to AC115V/15A 1 circuit)							
Working space height (mm)	720	875	720	875	720	875	720	875
External dimension (mm)	W980 x D770		W1,300 x D770		W1,600 x D770		W1,910 x D770	
Main unit height (mm)	1570	1725	1570	1725	1570	1725	1570	1725
Weight (kg)	~180	~190	~220	~230	~250	~260	~290	~310
Accessories	Fixing fittings of adjusting foot x 4							
Optional item	Air velocity controller: displays blow-off air speed and with variable air speed device							

*Ambient temperature and humidity conditions: temperature 5°C ~35°C, humidity less than 85% RH.

Model		AHS101		AHS131		AHS161		AHS191	
		M	H	M	H	M	H	M	H
Height (mm)	H1: Working space	720	875	720	875	720	875	720	875
	H2: Main unit height	1570	1725	1570	1725	1570	1725	1570	1725
Width (mm)	W1: Main unit width	980		1300		1600		1910	
	W2: Effective opening	920		1240		1540		1850	
	W3: Effective interior	940		1260		1560		1870	

Dimensions (mm)

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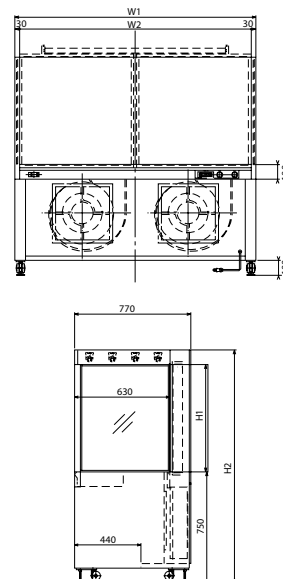
Yamato Muffle Furnaces

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

Operating temp. range	100~1150°C	Temp. control accuracy	±2°C (at 1150°C)

Internal capacity	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
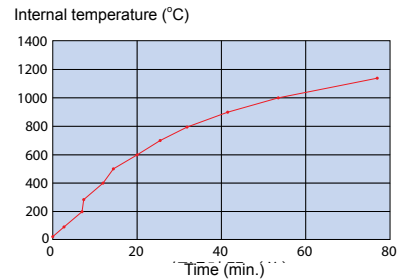- Designed with communication port

1.5L FO110CR **9L** FO410CR **11.3L** FO510CR **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, lock, RS485 communication interface							
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
Weight	~24kg	~30kg	~37kg	~38kg	~44kg	~52kg	~58kg	~62kg
Accessories	Exhaust port cap 1 pc.							

Control Panel

MEASURED TEMP.
25 °C
SET TEMP. F.N
OVER TEMP PROTECTOR 270

■ Optional items

Product code	Description
*214096	Exhaust unit, 115V
*214097	Exhaust unit, 220V
*281125	Communication adapter (RS485 / RS232C conversion)
*281301	Time up output terminal
*281303	N_2 gas inlet system with flow meter
281310	Sample tray

Please specify when ordering main unit.

Sample tray

Temperature Rising Curve (FO300CR)

Internal temperature (°C)

Time (min.)

Interior

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

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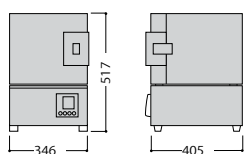
Aluminum flexible duct (*not included*)
Length 1.5m / Diameter 50mm

Temperature Output Terminal

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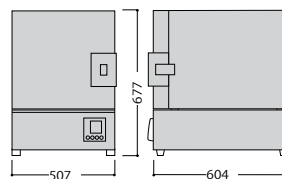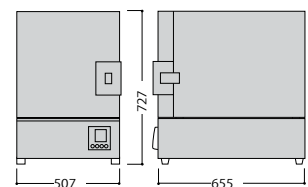● Temperature output: 4-20mA
● Time up output

Dimensions (mm)
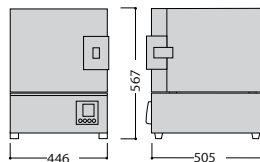
517	567	677	727
346 — 405	446 — 505	507 — 604	507 — 655
FO100CR/110CR (1.5L)	FO300CR/310CR (7.5L)	FO610CR (17.5L)	FO810CR (30L)

High Performance Muffle Furnace

FP Series

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, external communication terminal (RS232C), external communication adapter, 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	AC115V 21.5A	AC220V 13.5A	AC220V 18A
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, no load.
*- Measeurement conditions FP103 is at 3 points in the bath, FP303, 313 and 413 are compliant with JIS.*

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

11.3L
FP413
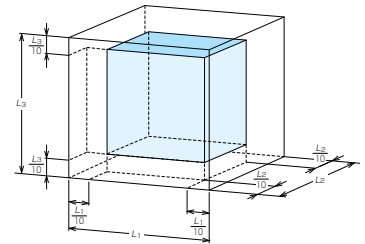
■ Optional items

Description	Product code
Exhaust unit, 115V	214096
Exhaust unit, 220V	214097
N$_2$ gas inlet system (with flow meter) for FP103	214196
for FP303/313	214197
for FP413	214198
Sample tray	281310
Seismic mat	296902
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
*Time up output terminal	214193
*Temp. output terminal (4-20mA)	214194
*External alarm terminal	214195
*External communication adapter (RC23)	281311

*** Please specify when ordering main unit**

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

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

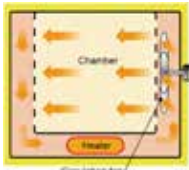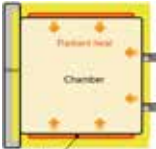## Sample Tray

Dimensions (mm)

515

405
376

FP103
(1.5L)

565

446   504

FP303/313
(7.5L)

625

507   504

FP413
(11.3L)

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Ovens

Contents

SINCE 1889 — YAMATO

Series	Model No.	Operating Temperature Range	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	RT+5~300°C	74	--	
	602C/612C	RT+5~280°C	153	--	
Natural Convection — DVS	402C/412C	RT+5~260°C	99	Yes	
	602C/612C	RT+5~260°C	162	Yes	
Natural Convection — DR	200	300~700°C	13.75	Yes	
Natural Convection — DG	400C/410C	RT+5~70°C	92	--	
	440C/450C	RT+5~70°C	92	--	
	800C/810C	RT+5~70°C	445	--	
	840C/850C*	RT+5~70°C	445	--	*DG840C/850C: Natural+Forced convection
Forced Convection — DKM	300C/310C	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
	400C/410C	RT+10~260°C	90	--	
	600C/610C	RT+10~260°C	150	--	
Forced Convection — DKN	302C/312C	RT+10~260°C	27	Yes	
	402C/412C	RT+10~260°C	90	Yes	
	602C/612C	RT+10~260°C	150	Yes	
	812C	RT+10~260°C	300	Yes	
	912C	RT+10~210°C	535	Yes	
Forced Convection — DNE (eco)	401/411	RT+20~210°C	90	Yes	
	601/611	RT+20~210°C	150	Yes	
	811	RT+15~210°C	300	Yes	
	911	RT+15~210°C	540	Yes	
Forced Convection — DNF (eco)	301	RT+15~260°C (Wind velocity: 1~10)	27	Yes	
	401/411		90	Yes	
	601/611		150	Yes	
	811		300	Yes	* DNF301/401/411/601/611 Two types of circulation: forced and natural convection
	911		540	Yes	
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	RT+15~260°C	216	Yes	
	832	RT+15~200°C	512	Yes	
	1032	RT+15~200°C	1000	Yes	
Fine — DH	412	RT+15~360°C	91	Yes	
	612	RT+15~360°C	216	Yes	
	832	RT+15~300°C	512	Yes	
	1032	RT+15~300°C	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	40~240°C	27	Yes	
Vacuum — DP	43C	40~200°C	91	Yes	
	63C	40~200°C	216	Yes	
	83C	40~200°C	512	Yes	
	104C	40~200°C	1000	Yes	
Inert — DN	411IE	RT+15~360°C	95	Yes	• Creates non-oxidative environment • Controllable nitrogen flow
	611IE	RT+15~360°C	223	Yes	

OVEN OVERVIEW

Series		Model No.	Operating Temperature Range		Internal Capacity (L)	Program	Characteristics
				0 100 200 300 400 500 600 700			
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	

NOTES

Natural Convection Oven

Economical, Constant Temperature Ovens

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

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

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

28L
DX302C

74L
DX402C

153L
DX602C

(Stands optional)

Standard type of 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 for easy constant operation with options of Fixed setting,
- Quick Auto Stop, Auto Start, Auto Stop operation
- 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]
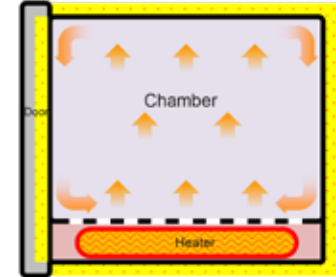
■ **Optional items**

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 dia.	281009
50mm dia.	281010
Seismic mat	296902

* Please specify when ordering main unit.

Temperature Rising Curve
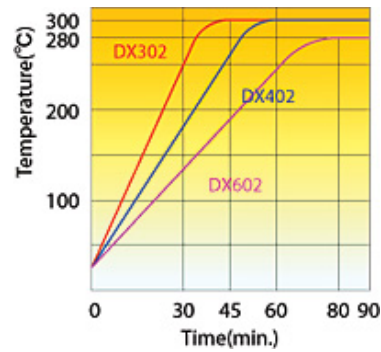
Optional Items

Stand

Shelf with 2 brackets

Seismic mat

Dimensional Drawing (mm)
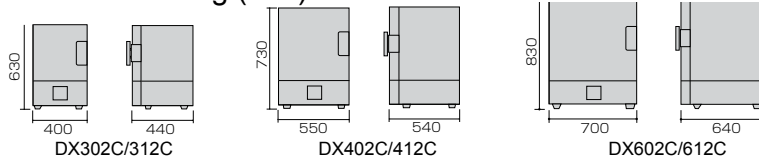
630	400	440	DX302C/312C
730	550	540	DX402C/412C
830	700	640	DX602C/612C

⚠ 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

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

Highly practical standard and programmable ovens

99L
DVS402C

162L
DVS602C

(Stands optional)

Programmable natural convection, constant temperature oven with quickly performed program settings

■ 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)
- Simultaneously display of set constant and measured temperature
- Quick Auto stop, Auto Start / Stop operation
- Increased safety and self-diagnostic function
- With calibration off-set 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 gravity 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 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, Program operation, 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×Hmm)	450×490×450		600×540×500	
External dimensions(W×D×Hmm)	560×601×820		710×651×870	
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 (15A)	AC220V 6.5A	AC115V 13.5A (20A)	AC220V 7.5A
Weight	~48kg		~63kg	
Shelf plate / Shelf bracket	Stainless steel, 2 pcs. / 4 pcs.			

Method

[Side view]

Chamber

Heater

DVS402C/412C/602C/612C
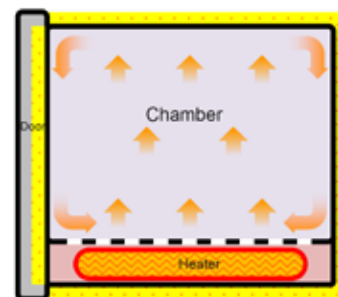
Interior (DVS402C)

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

Temp. Rising Curve
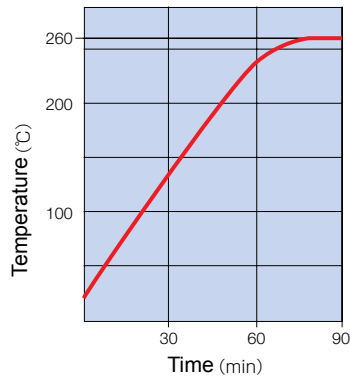
Control Panel

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 dia	281131
50mm dia	281132
*Temperature output terminal (4-20 mA)	281133
*External alarm terminal/ time-up output terminal (choose either)	281134
*External communication function (RS485)	281135
*External communication adapter (changeable to RS232C)	281136
Seismic mat	296902
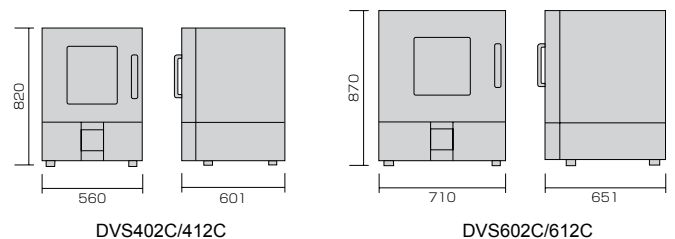
* Please specify when ordering main unit.

Dimensions (Unit:mm)

DVS402C/412C   DVS602C/612C

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

High Temperature Natural Convection Oven

DR200-115V / DR200-220V

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

Wide temperature range, maximum operation temperature up to 700°C

■ Operation and functions
- Programmable natural convection oven with high accuracy control at high temperature range
- Equipped with high operability temperature controller
- Can be used as constant temperature oven, drying oven, and electric furnace for ashing, sintering, etc. as unit is suitable for each of these three functions
- 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 and auto start
- Lock function, auto recovery after power failure, calibration offset

■ Safety Features
- Failure of sensor, heater, SSR, memory, internal communication, temperature inputting circuit, automatic overheating prevention device, overheating prevention device, measurement temperature

13.75L

■ Specifications

Model	DR200-115V	DR200-220V
System	Natural convection	
Temp. control range	300~700°C	
Temp. adjustment accuracy	±5°C (at 700°C)	
Temp. control accuracy	±25°C (at 700°C)	
Max. temp. reaching time	~70min. (Room temp. +5°C~700°C)	
Interior material	Stainless steel	
External material	Electro-galvanized steel sheet with epoxy and melamine resin baking finish	
Heat insulating material	Ceramic fiber	
Heater	Iron-chrome wire heater 1.3kW	
Temp. controller	PID control	
Temp. setting method	Digital setting by operation menu key and ▲/▼ keys	
Temp. display	Measured temp.: Green 4 digit LED digital display	
	Setting temp.: Red 4 digit LED digital display	
Timer	1min. to 99hrs 59min. and 100~999hrs 50min. (with timer wait function)	
Operation functions	Program operation, fixed temperature, quick auto stop, auto stop, auto start	
Additional functions	Calibration off-set, key lock, auto recovery after power failure	
Heater circuit control	SSR control	
Sensor	K thermocouple (W sensor)	
Safety device	Self diagnostic functions (temp. sensor abnormal, heater disconnection, SSR short, automatic overheat prevention function), key lock function, overheat prevention, electric leakage breaker with over current protection	
Internal dimension (WxDxH)	250 x 250 x 220mm	
External dimension* (WxDxH)	520 x 443 x 612mm	
Internal capacity	13.75L	
Shelf load capacity	15 kg / pc.	
Shelf rest step number	3 steps	
Shelf rest pitch	33mm	
Power source (50/60Hz)	AC115V 12A	AC220V 6.5A
Weight	~36 kg	
Shelf plate	Stainless punching metal	
Shelf plate	2 pcs. (1 pc. screwed at the bottom)	

* Protrusions excluded

■ Optional items

| No.	Description	Product code
1	Stand ONS60	212802
2	Shelf plate 1pc.	212808
3	Temp. output terminal (4-20mA)	281156
4	External alarm terminal / time-up output terminal*	281157
5	External communication terminal (RS485)	281158
6	External communication adaptor (changeable to RS232C)	281159
7	Seismic mat	296902

No. 3~6 please specify when ordering main unit.
*External alarm terminal and time-up output terminal cannot be installed at the same time
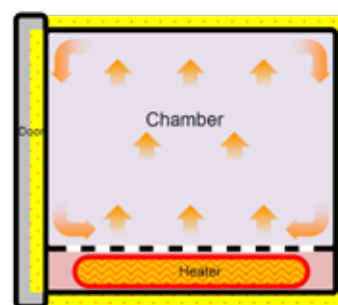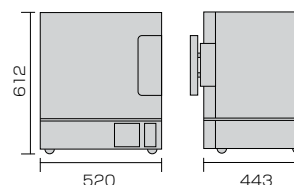
ONS Stand

Method

[Side view]

Chamber

Heater

Dimensions (mm)

612

520

443

⚠ 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

| 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

92L
DG400C

445L
DG800C

(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

445L
DG850C

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

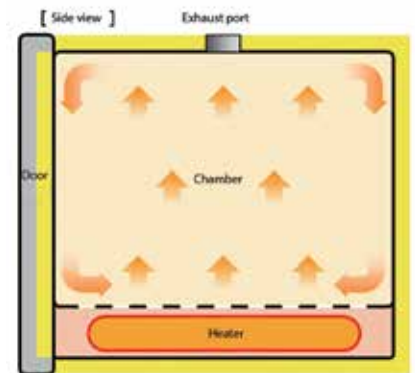

Shelf plate and brackets

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

Standard basic type, Forced air circulation

DKM300C/310C/400C/410C/600C/610C

| Operating temp. range | Room temp. +10°C to 260°C | | Temp. distribution accuracy | ±2.5°C(at 210°C) | | Operation | Simple & Economical |

Basic fixed setting forced air convection ovens

Forced convection, constant temperature oven with simple operation functions.

■ Performance and functions
- Fixed temperature, Quick Auto stop, Auto stop, and Auto start operating modes are possible, along with easy control capabilities
- Settings can be made digitally using the dedicated operation menu keys or the up and down keys
- Auto recovery after power failure, calibration offset and key-lock are possible through the auxiliary functions

■ Safety features
- Self-diagnostic functions, Auto overheat prevention, Independent overheat prevention

90L
DKM400C

150L
DKM600C

(Stands optional)

■ Specifications

Model	DKM300C/310C	DKM400C/410C	DKM600C/610C
Circulation method	Forced air circulation		
Operating temperature range	Room temp. +10~260°C		
Temp. control accuracy	±1°C (at 210°C)		
Temp. distribution accuracy	±2.5°C (at 210°C)		
Max. temp. reaching time	~90min (at room temp. +10°C~260°C)		
Interior material	Stainless Steel		
Exterior material	Cold rolled steel plate with melamine resin baking finish		
Heat insulating material	Glass wool		
Heater	SUS pipe heater		
	0.8kW	1.2kW	1.34kW
Fan type / Motor	Scirocco fan / Condenser type motor 10W		
Cable port	30 mm I.D.×1 pc. (right side)		
Exhaust port	30 mm I.D.×2 pcs.(the top)		
Temp. controller	PID control by microprocessor		
Temp. setting method	Operation menu key and 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. (with time wait function)		
Operation functions	Fixed temperature operation, Quick Auto-stop, Auto start, Auto stop		
Additional functions	Calibration off-set function, Key lock, Uninterruptible power for memory		
Heater circuit control	SSR control		
Sensor	K-thermocouple		
Safety device	Self diagnostic functions (Sensor trouble detection, Memory error, Measured temperature lower limit error, Measured temperature error), Auto overheat prevention, Independent overheat prevention.		
Internal dimensions (W×D×H)	300×300×300mm	450×450×450mm	600×500×500mm
External dimensions*(W×D×H)	410×451×670mm	560×601×820mm	710×651×870mm
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 4.5A	AC115V 11A / AC220V 6.5A	AC115V 12A / AC220V 7A
Weight	~35kg	~50kg	~65kg
Shelf plate	Stainless steel		
	2 pcs.		
Shelf bracket	4 pcs.		

27L
DKM300C

Interior

DKM600C

Method

[Side view]
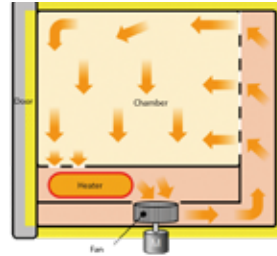
Exhaust Ports (Standard)

Cable Port (Standard)

Control Panel

Temperature Rising Curve
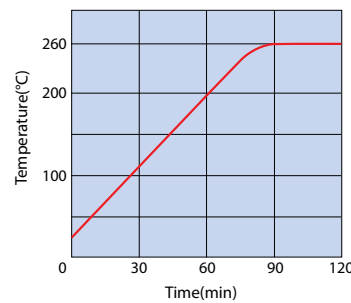
Optional Items

Description	Product Code
Stand	
For DKM300C/310C ON30	211180
For DKM400C/410C ON61	211856
For DKM600C/610C ON61	211856
Stacking Support	
For DKM400C/410C OD40	212822
For DKM600C/610C OD60	212823
Shelf (1 pc. shelf and 2 pcs. brackets)	
For DKM300C/310C	212068
For DKM400C/410C	212246
For DKM600C/610C	212266
*Cable port	
Dia 25mm	281121
Dia 50mm	281122
Seismic mat	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.

Optional Items

Stand   Seismic mat   Shelf (with 2 brackets)

Dimensions (Unit:mm)
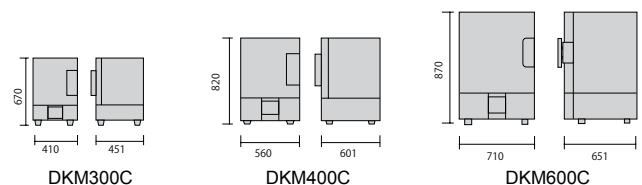
DKM300C   DKM400C   DKM600C

Forced Convection Oven

Programmable Forced Air Convection Ovens

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

BEST SELLER

| Operating temp. range | RT+10°C~260°C DKN300-600 Series | RT+10°C~260°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
- Over-heating 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

90L DKN402C **150L** DKN602C

(Stands 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×Hmm)	300×300×300		450×450×450		600×500×500		600×500×1000	1070×500×1000
External dimensions(W×D×Hmm)	410×451×670		560×601×820		710×651×870		710×651×1608	1180×651×1616
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	220V, 4.5A	115V, 11A	220V, 6.5A	115V, 12.5A	220V, 7A	220V, 15A	220V, 18A
Weight	~35kg		~50kg		~65kg		~110kg	~190kg
Shelf plate	Stainless steel, 1pc on the bottom screwed (DKN912C, 2 pcs)							
Shelf plate / bracket	2 pcs. / 4 pcs.						4 pcs. / 8 pcs.	8 pcs. / 16 pcs.

300L
DKN812C

535L
DKN912C

27L
DKN302C

Interior

DKN602C

DKN912C

Method

[Side view]
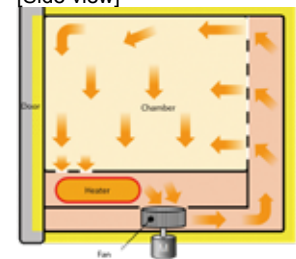
Cable Port (Standard)

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
	DN602C/612C/812C	212266
	DKN912C	212490
*Cable port		
25mm dia		281121
50mm dia		281122
*Temperature output terminal (4-20 mA)		281123
*External alarm terminal/ time-up output terminal (choose either)		281124
*External communication function (RS485)		281125
*External communication adapter (changeable to RS232C)		281126
Seismic mat for DKN 300 to 400 models		296902

* Please specify when ordering main unit.

Control Panel

Temp. Rising Curve
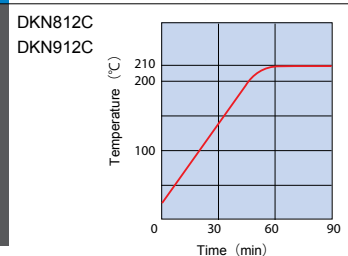
DKN812C
DKN912C
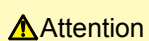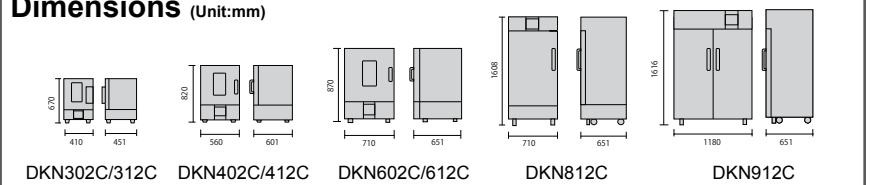
Dimensions (Unit:mm)

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

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

90L DNE401   150L DNE601

■ 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)	
Observation window	Optional				--	
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/Over-current Protection, Rated Current Sensitivity 30mA					
Independent overheat prevention	Set temperature range: 0~250°C					
Internal dimensions (W×D×H mm)*2	450×450×450		600×500×500		600×500×1000	1090×500×1000
External dimensions (W×D×H mm)*2	580×645×860		730×695×910		730×695×1660	1220 ×695×1660
Capacity	90L		150L		300L	540L
Weight	~63kg		~77kg		~92kg	~185kg
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	AC220V 5.5A	AC115V 11A	AC220V 6A	AC220V 11.5A	AC220V 14A

*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.

300L
DNE811

540L
DNE911

Control Panel

Method

[Side view]
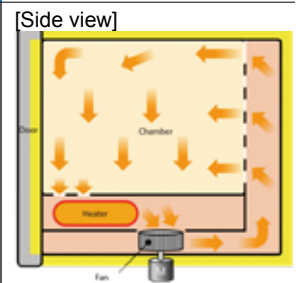
Interior

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 (with brackets 2 pcs.)	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 communication terminal (RS485)	281442	ODM12	DNE401/411/601/611/811
	281443	ODM14	DNE911
*External communication adapter set	281444	ODM16	DNE401/411/601/611/811
	281445	ODM18	DNE911
*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.
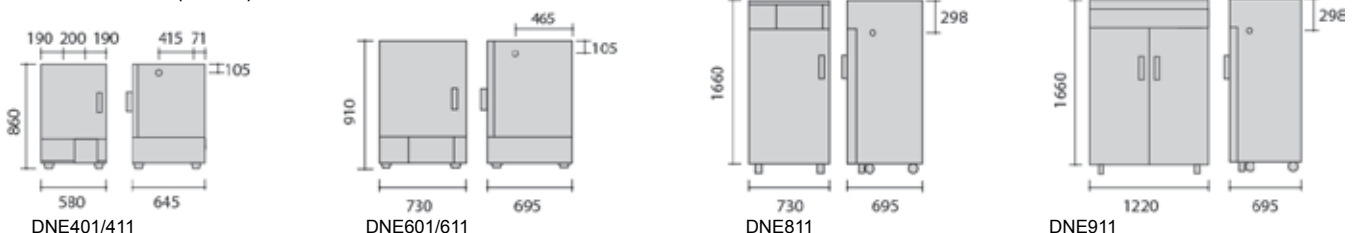
Dimensions (Unit:mm)

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 ECO

Energy Saving Programmable Forced Convection Ovens with Variable Flow Rate

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

27L DNF301   90L DNF401   150L DNF601

■ 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	
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.

300L
DNF811

540L
DNF911

Damper Switch

Damper open rate

■ 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 diameter	281454
50mm diameter	281455
*External communication terminal for DNF401/411/811 (RS485)	281464
*External communication terminal for DNF301/601/611/911 (RS485)	281465
*External communication adapter, connect RS485 to external device (eg: PC) USB port	211880
*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 dia with exhaust flange)	
for DNF301	281459
for DNF401/411	281460
for DNF601/611	281461
for DNF811	281462
for DNF910 (50mm dia with exhaust flange x 2 points)	281463
Seismic mat for DNF401/411/601/611	296902

* Please specify when ordering main unit.

Control Panel & Fan Setting

Method

[Side view]

Air speed control   Fan
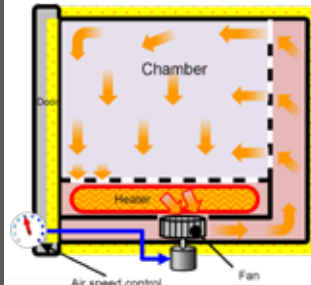
Diagram A: Forced convection

[Side view]
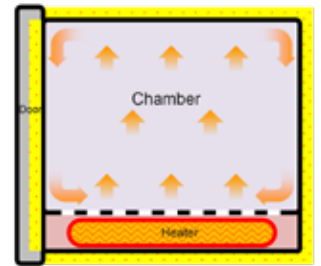
Diagram B: Natural convection

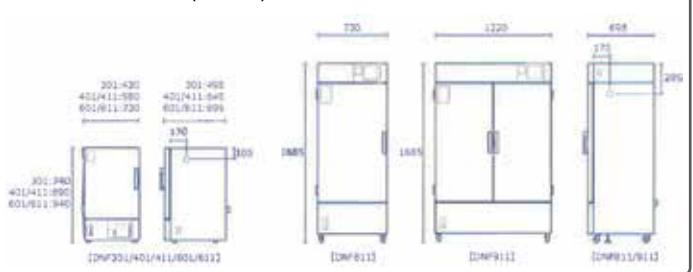| Model	Method
DNF301/401/411/601/611	Diagram A + B
DNF811/911	Diagram A

Exhaust Duct (optional)

Interior

Dimensions (Unit:mm)

⚠ 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

| 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

91L
DF412

216L
DF612

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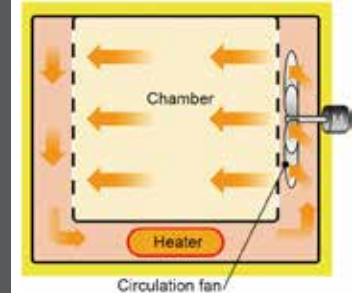
■ Safety features
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, earth leakage breaker, key lock, etc.

■ 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 atmospheric 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) |

Temperature(°C) vs Time (min.) — DH temp. rising time (DH, DF curves)

Temperature(°C) vs Time (min.) — DH temp. declining time (damper fully open) (DH, DF curves)

Dimensions (Unit:mm)

850 / 1050 / 630
Cable port 30φ Back 301 / 126 / 499 / 225 / 237
Exhaust port 80φ
DF/DH412

1000 / 1200 / 778
Back 301 / 126 / R49 / 225 / 237
DF/DH612
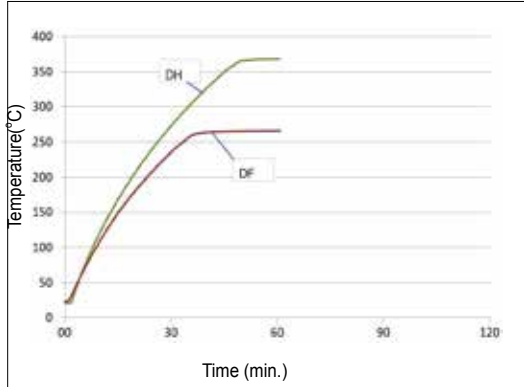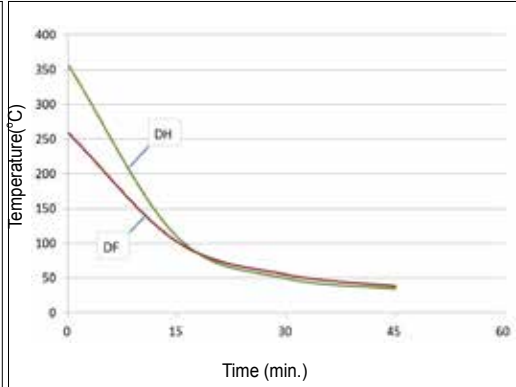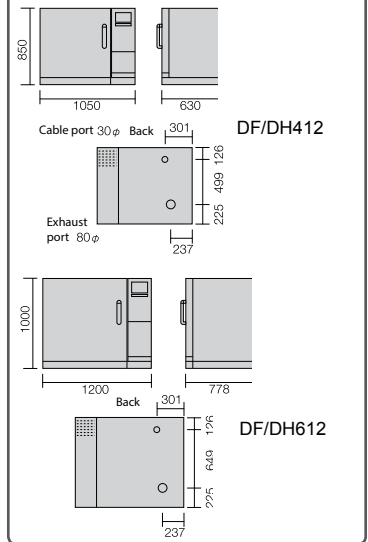
Optional Items

(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 dia)	213703	ODF54	DF/DH412
*Exhaust duct (80mm dia)	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 diameter (for top)	213718	ODF84	All models
50mm diameter (for top)	213719	ODF86	All models
25mm diameter (for rear)	213720	ODF88	All models
50mm diameter (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

With high accuracy temperature control and exhaust damper

DF832/1032   DH832/1032

Operating temp. range	Room temp. +15°C~200°C(DF) / Room temp. +15°C~300°C(DH)	Temperature slope	15°C(at 200°C)(DF) / 20°C(at 300°C)(DH)	Internal capacity	512L(Model832) / 1,000L(Model1032)

Large fine oven designed to support high throughput

1,000L
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]

Chamber

Heater

Circulation fan/
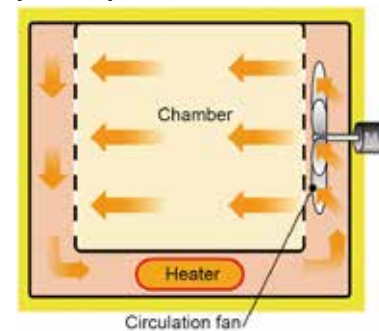
■ Specifications

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 800mm	1,000 x 1,000 x 1,000mm	800 x 800 x 800mm	1,000 x 1,000 x 1,000mm
External dimensions (W x D x H)	1,500 x 1,015 x 1,330mm	1,700 x 1,215 x 1,530mm	1,500 x 1,015 x 1,330mm	1,700 x 1,215 x 1,530mm
Internal capacity	512L	1,000L	512L	1,000L
Weight	~350kg	~450kg	~350kg	~450kg
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.

DF832/1032   DH832/1032

NOTES

Vacuum Drying Oven

Standard Small Size Benchtop Vacuum Drying Oven

ADP200C/210C/300C/310C

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

10L
ADP200C

27L
ADP310C

■ 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

ADP OVEN NW25 Flange

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)*

GLD-137CC for ADP Series

Dimensions (Unit:mm)

Upper part

ADP300C   ADP200C

⚠ 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

DP43C/63C

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

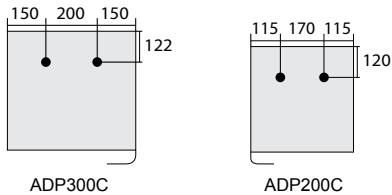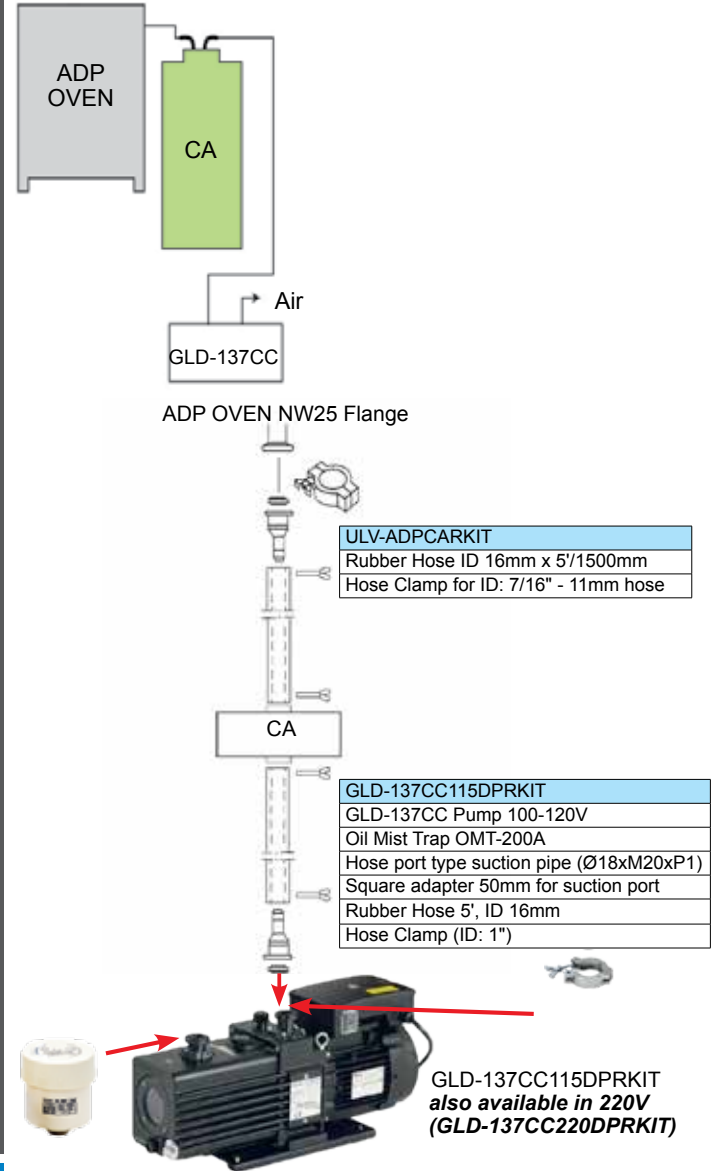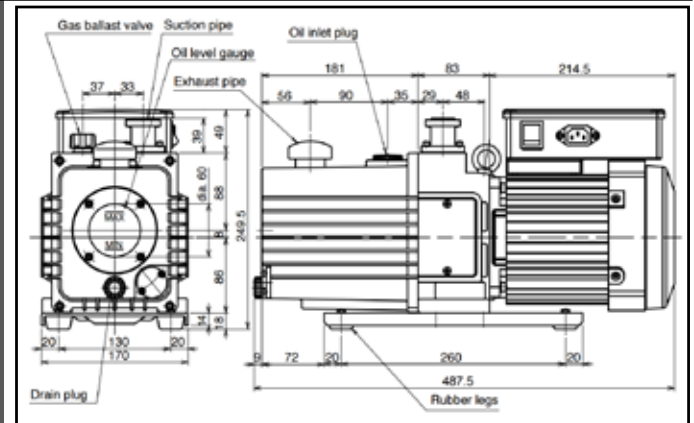| Model	DP43C	DP63C
System	Vacuum drying by decompressed chamber direct heating	
Operating temp. range	40°C to 200°C	
Operating pressure range	101 to 0.1 kPa (760 to 1 Torr)	
Temp. control accuracy	±1.0°C (at 200°C)	
Max. temp. reaching time	~80 min.	~120 min.
Interior material	Stainless steel	
Exterior 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

[Side view]

Radiant heat

Door

Chamber

Purge

Vacuum

Heater
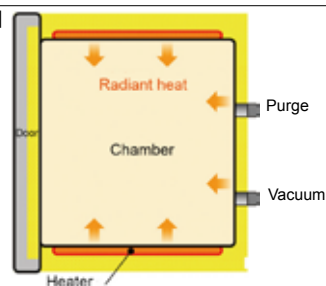
Control Panel

Pressure Falling Curve
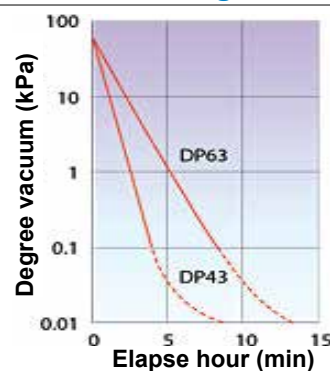
DP43C/63C

■ 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)

DP43C   DP63C

Sample Installation with CA801

216L
DP63C

Use with cooling trap CA801

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

CA801

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
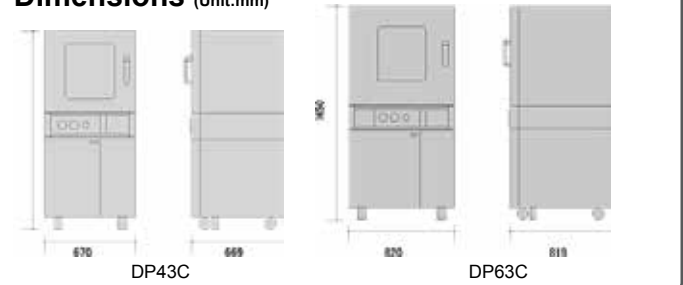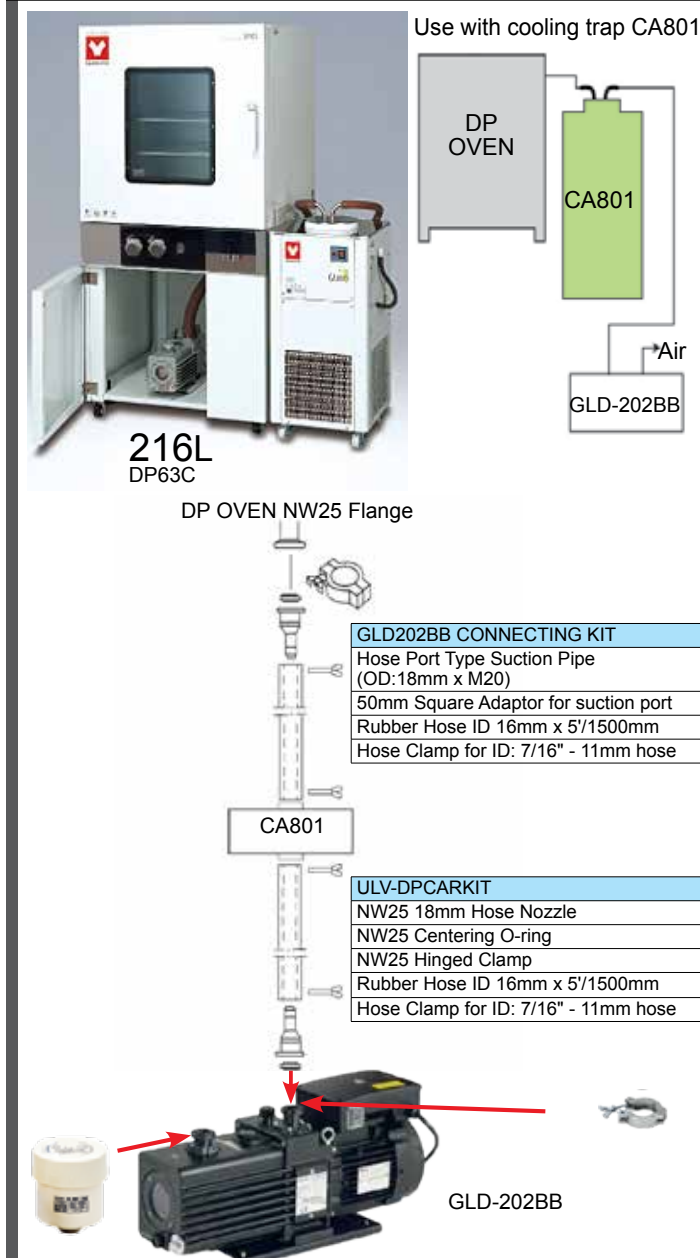
Rubber Hose or Stainless Steel Hose Connection for Vacuum Pump
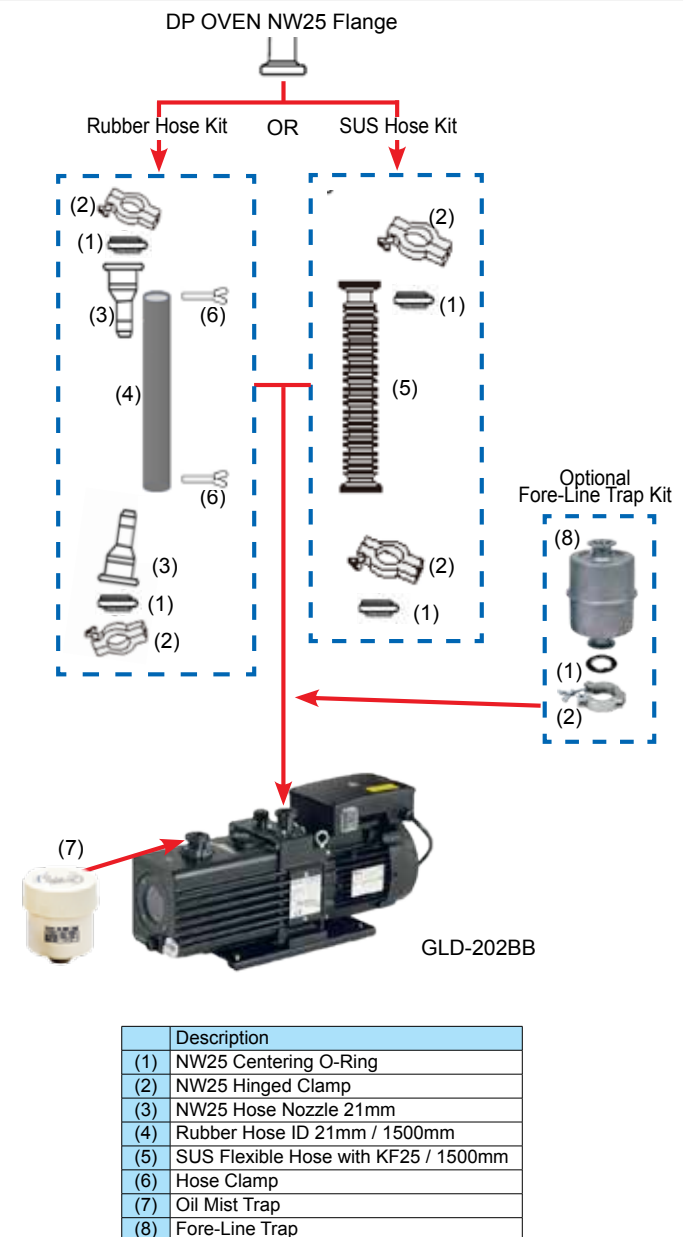
DP OVEN NW25 Flange

Rubber Hose Kit   OR   SUS Hose Kit

Optional
Fore-Line Trap Kit

GLD-202BB

	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

| 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

512L
DP83C

1000L
DP104C

■ Operation and function
● Vacuum pump can be installed inside the oven
● Quick connect / disconnect of vacuum pipes for easy vacuum pump maintenance
● Working efficiency is improved 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×Hmm)	800×800×800	1000×1000×1000
External dimensions (W×D×Hmm)	1020×1020×1850	1300×1280×2110
Internal capacity	512L	1000L
Air exhaust port	NW40 flange	
Air suction port	Rc 3/8	
Power source (50/60Hz) rated current	AC220V 31.5A	3 phase AC480V 18A
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), external communication (RS485), temp. output terminal (4~20mA), Output terminal for external alarm, time up output terminal	

■ Optional Items

Description	Product Code
DP83C shelf	Q110204006
DP103C shelf	Q110204007

NOTES

Oil-Sealed Rotary Vacuum Pump

GLD-137CC/201B

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 Series		GLD-201B for DP Series	
	Unit	50Hz	60Hz	50Hz	60Hz
Actual pumping speed	L/min	135	162	200	240
	m³/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-201B	Single phase, 100-120V	Standard	●	●	●
	Single phase, 200-240V	Standard	●	●	●

Pumping Speed Curves
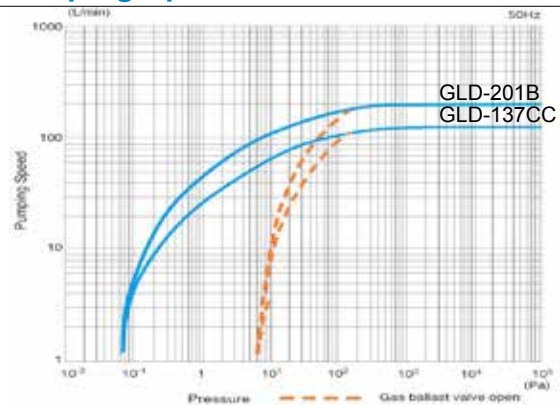
GLD-137CC for ADP Series
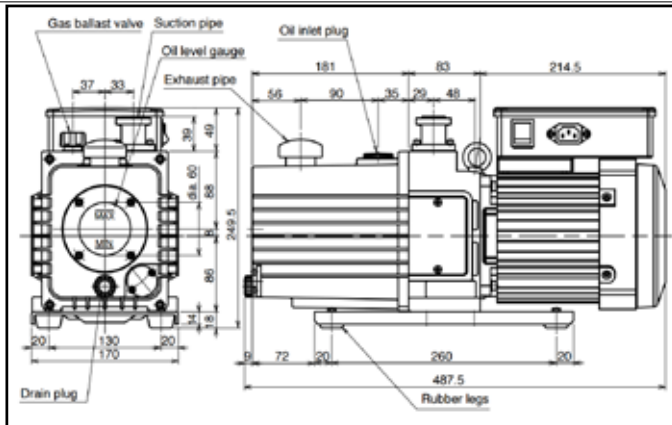
ADP Series Oven (Hose Connection)
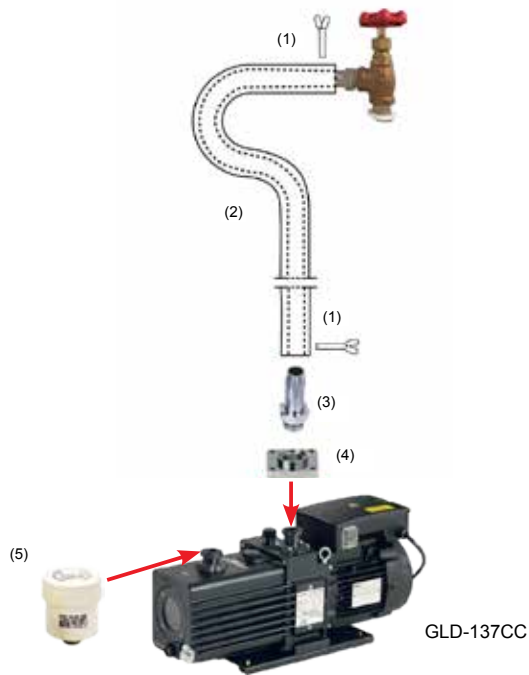
	Description
(1)	Hose Clamp
(2)	Rubber Hose ID:16mm/1500mm
(3)	Hose Port Type Suction Pipe OD: 18mm x M20
(4)	50mm Square Adapter for Suction Port
(5)	Oil Mist Trap

GLD-201B for DP Series
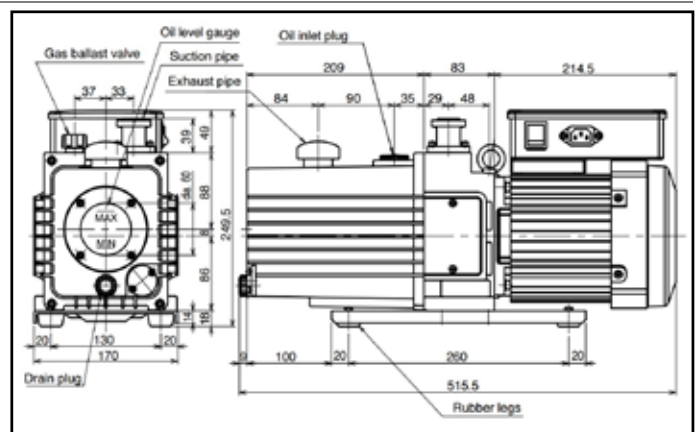
DP Series Oven (NW25 Flange Connection)
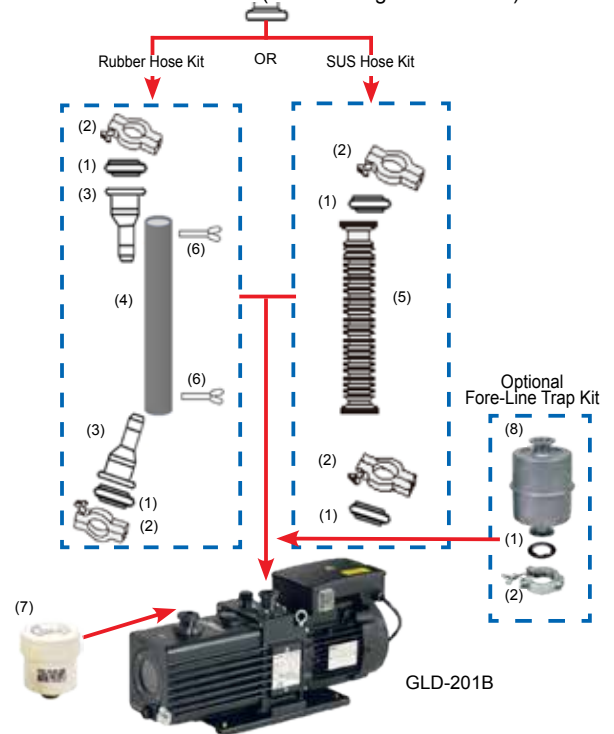
Rubber Hose Kit   OR   SUS Hose Kit

Optional Fore-Line Trap Kit

GLD-201B

	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 Vacuum Oven Series	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* *previously GLD201B115DPRKIT*	GLD202BB115DPRKIT *new model number*	DP43C/63C Vacuum Oven Series	Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, Rubber hose, Hose clamp
GLD201B with SUS Hose Kit 115V*	GLD201B115DPSKIT		Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, SUS flexible hose, Hose clamp
GLD201B with Rubber Hose Kit 220V*	GLD201B220DPRKIT		Vacuum pump, Oil mist trap, Centering o-ring, Hinged clamp, Hose nozzle, Rubber hose, Hose clamp
GLD201B with SUS Hose Kit 220V*	GLD201B220DPSKIT		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

| 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

95L
DN411IE

223L
DN611IE

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 H450mm	W620 x D600 x H600mm
External Dimensions	W640 x D695 x H915mm	W790 x D845 x H1065mm
Internal Capacity	95L	223L
Shelf max. load	~30kg / shelf	
Shelf support qty. / Pitch	12pcs. / 30mm	17pcs. / 30mm
Power source	Single phase 220V 13.5A	Single phase 220V 19A
Weight	~90kg	~130kg
Shelf plate / bracket	Stainless wire, 2 pcs. / 4 pcs.	

* N$_2$ introduction rate 20L/min.

Method

[Side view]
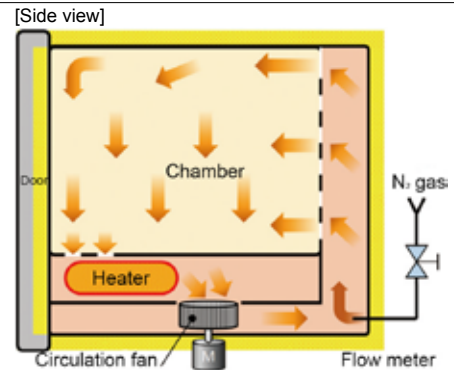
Control Panel

Overheat Prevention Device

N$_2$ Gas Entrance Port (ø9mm)

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

DN411IE

DN611IE
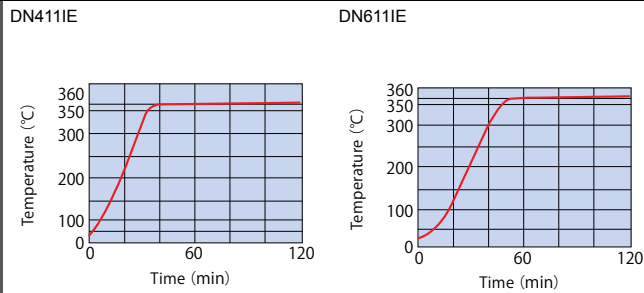
O₂ Gas Substitution Performance Curve
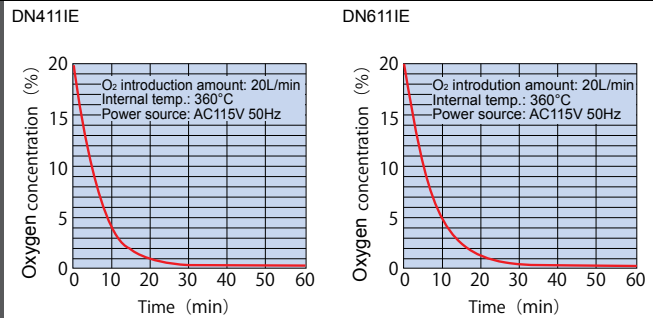
DN411IE

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.
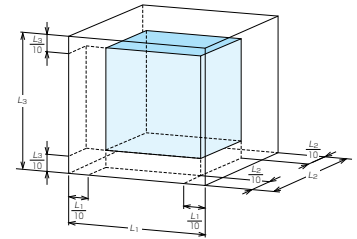
■ Optional Items

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
*External Communication terminal ODH16 *Does not include adapter. Must be purchased locally.*	212975
*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.

Dimensions (Unit:mm)

Back

N₂ gas entrance port O.D. 9φ

DN411IE

Back

N₂ gas entrance port O.D. 8φ

DN611IE

⚠Attention
● Never use in flammable or explosive gas atmosphere
● Never use explosive or flammable materials
● Caution: High temperature components

Interior

Stand (Optional Item)

DN611IE+ Stand (Optional Item)

Clean Oven

Suitable for temperature test in a dust-free environment

DE411/611 DT411/611

Operating temp. range	Room temp. +30~260°C (DE) / Room temp. +30~360°C (DT)
Temp. distribution accuracy	±2.5°C (at 260°C) (DE) / ±4.0°C (at 360°C) (DT)
Internal capcaity	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

91L DE411

216L DT611

■ 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 CO2 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	220V 3 phase 10A	220V 3 phase 10A	220V 3 phase 14A
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

www.yamato-usa.com

Interior

DE411

Method

Side view

- HEPA
- Chamber
- Door
- Heater
- Door side circulation mechanism
- Circulation fan

Components

- Exhaust Port
- Temp. Control Sensor
- HEPA Filter
- Sirocco Fan
- Fan Motor
- Rack Support
- Chamber Rack
- Support Post
- Heater
- Caster
- Leveling Foot

■ 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
212948	ODT54	Remote Communications Terminal (RS485)	All models
211880	OIN90	Remote Communications Adaptor Kit	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)
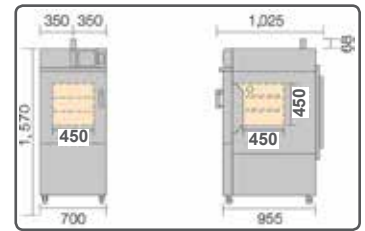
DE/DT411

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

| 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

NEW

327L
DES830

327L
DTS830

- 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

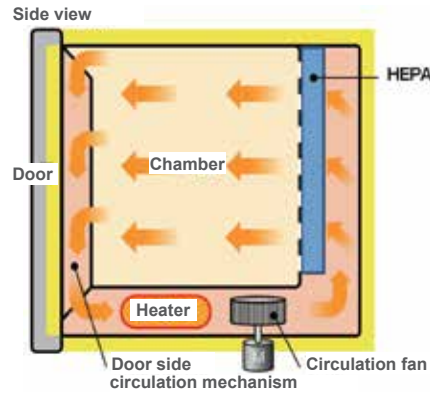| Model	DES830	DTS830
Circulation method	Forced convection	
Operating temperature range	Room temperature +30 to 260°C	Room temperature +30 to 360°C
Temp. control accuracy	±0.5°C at 260°C	±0.5°C at 360°C
Temp. fluctuation	±0.5°C at 260°C	±0.5°C at 360°C
Temp. distribution accuracy	±2.0°C at 260°C	±5.0°C 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, External Communication Terminal (RS485)	
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 mm)*²	620×480×1100	
External dimensions (W×D×H mm)*²	850×1080×1955	
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	AC220V, three phase, 24A
Shelf plate / bracket	3 pcs. / 6 pcs.	

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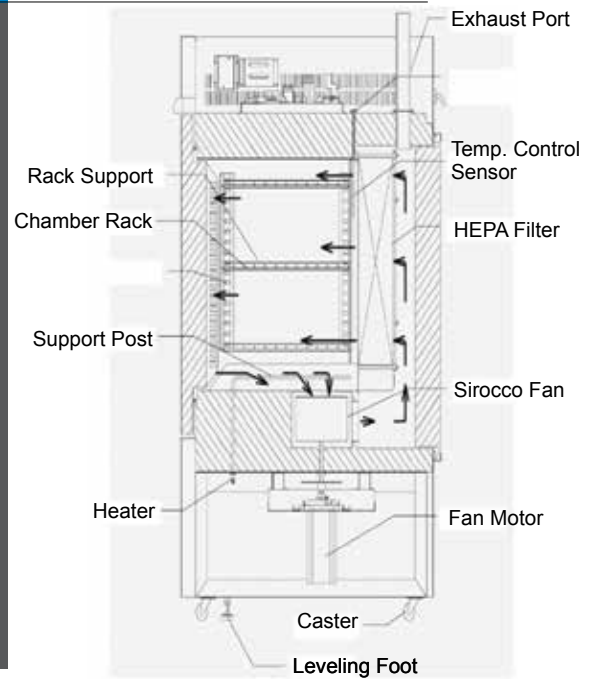*² Protrusions excluded

Interior

Performance Curve

High Performance Filter
（DES830 only）
(optional)

DES830

DTS830

Method

[Side view]

Circulation Fan

Heater

HEPA

Chamber

Door

Door side
circulation mechanism
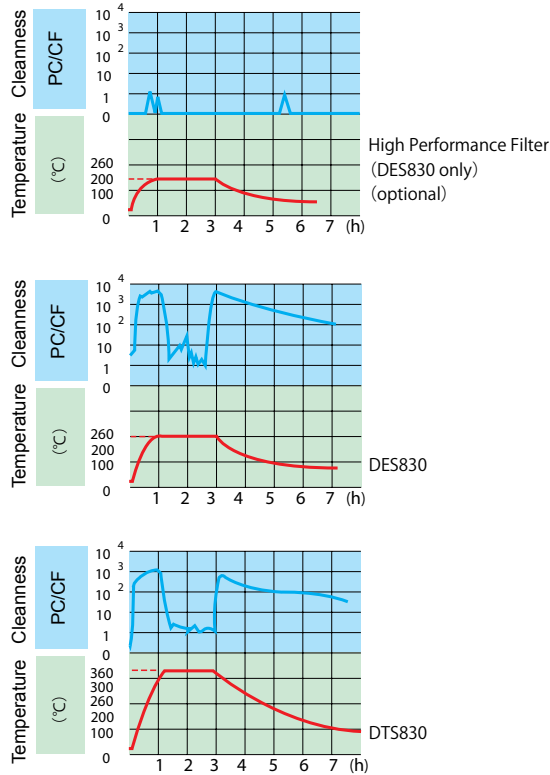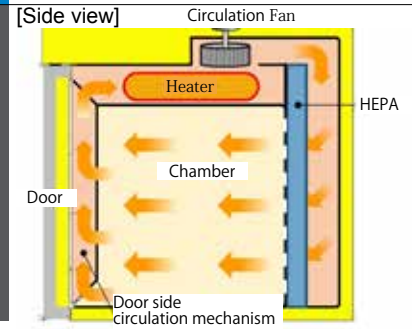
Cable Port
(φ33mm×1 right side)

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
211880	OIN90	External communication adapter set	DES830/DTS830
*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	N₂ 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)

655
1235
1955
850
1080

Stainless steel wire shelf
212678

Stainless steel punching shelf
212679

Basket-type shelf
(Placed on top of standard shelves)
212919
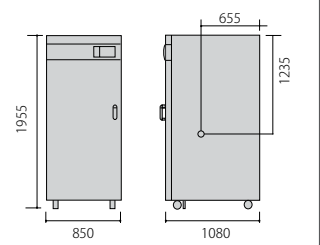
⚠ Attention
● Never use in flammable or
explosive gas atmosphere.
● Never use explosive or flammable
material.
● Caution: High temperature
components.

Stands

■ Stands and suitable oven models

Product code	Model	Suitable oven models
211180	ON30	DKM300C/310C, DKN302C/312C, DNF301
211856	ON61	DX400/600 Series, DVS400/600 Series, DG400 Series, DKM300/400/600 Series, DKN300/400/600 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
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)

550（30型）   550（30型）

600

ON30

■ OT42/62

Dimension (mm)

560 (model 42)
710 (model 62)
611

610 (model 42)
660 (model 62)

OT models

■ ON61

Dimension (mm)

740   660

600

ON61

■ OH41/61

Dimension (mm)

640 (model 41), 790 (model 61)

484 (model 41)
634 (model 61)

696 (model 41)
847 (model 61)

504

OH models

■ ONS60

Dimension (mm)

740   660

600
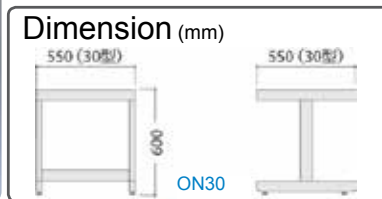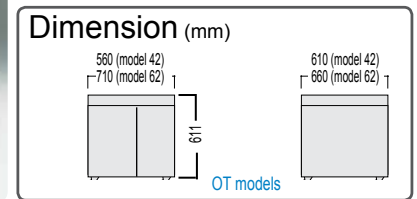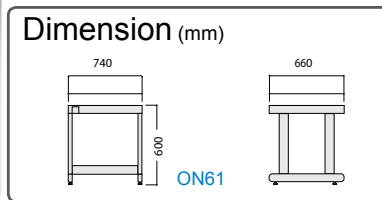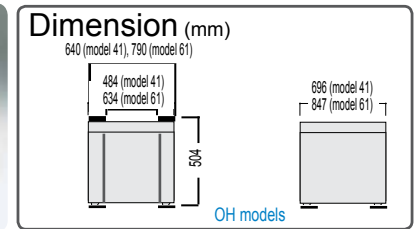
ONS60
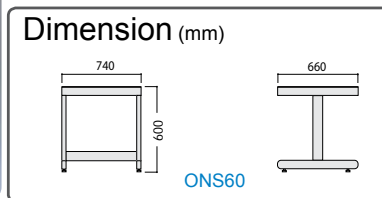
■ OP43/63, OP46/66 (casters front side with two stoppers)

Dimension (mm) (Casters optional)

1046 (model 43/46)
1196 (model 63/66)

775 (model 46)
625 (model66)

690 (model 46)
540 (model66)

632 (model 43/46)
782 (model 63/66)
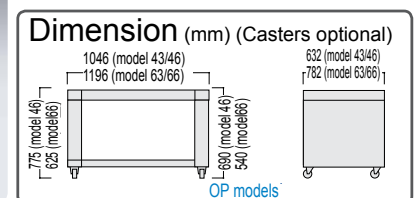
OP models

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, DKM, DKN
212823	OD60	600 Series of DVS, DKM, DKN
213700	ODF48	DF412/612, DH412/612
281458	ODM44	DNF301
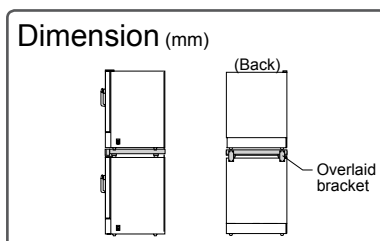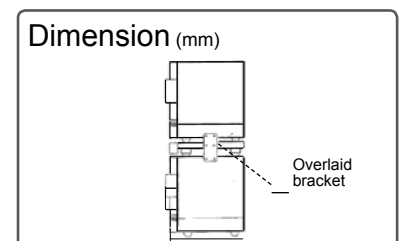
■ Important Notes:
- The stacking units must belong to the same series (among 400 series or among 600 series)
- Do not stack 400 series on 600 series. If the upper 400 series is not fixed well, it is easy to topple
- Stacking of old models is forbidden. Lower unit must be new model.

■ OD/ODN

Dimension (mm)

(Back)

Overlaid bracket

■ ODK

Dimension (mm)

Overlaid bracket

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
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
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, DKM, DKN, DNE, DNF
212266	Shelf & bracket set stainless punch		600 Series of DX, DVS, DKM and 600 to 800 Series 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
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
YSA0000071	Shelf and bracket set		DF/DH832
YSA0000215	Shelf and bracket set		DF/DH1032

211063 / 211064

211098 / 211099
212688 / 212689 / 212679
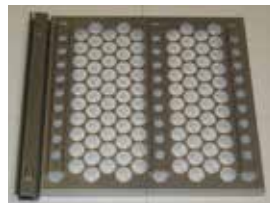
212068

212068

212192
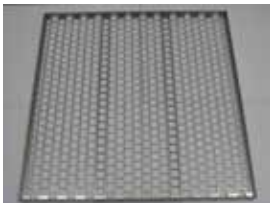
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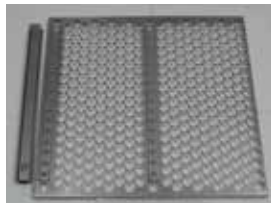
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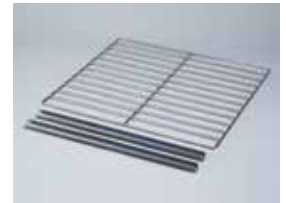
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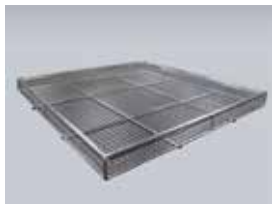
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NOTES

Yamato Scientific America

Innovating Science for over 130 Years

Yamato PCR Workstations

Contents

www.yamato-usa.com

PCR Workstations

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

PCR204/214/204H/214H

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

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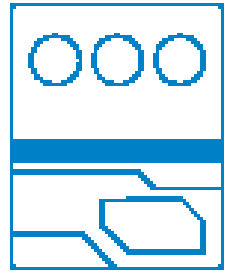
Yamato Plasma Cleaners & Reactors

Contents

Gas Plasma Dry Cleaner

Plasma Surface Treatment Device

PDC200/210/510

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

Electrons
Oxygen molecule
Oxygen atom (ion)
Carbon dioxide
Sample Wafer and etc.
Quartz stand
RIE
Switch
Matching Box
DP

RIE(Reactive Ion Etching) mode

Electrons
Ar Ions
Inorganic matter
Si wafer and etc.
RIE
Switch
Matching box
DP
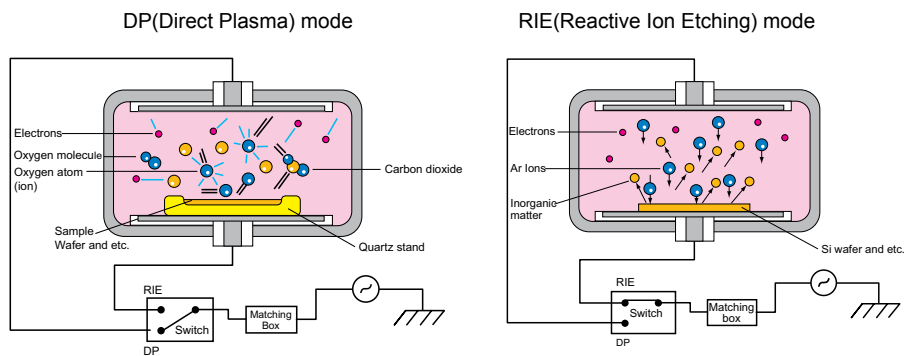
■ Specifications

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

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

FCC certified 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)
● Complies with FCC standards

■ 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)
Standards	FCC

Chamber

Plasma Discharge

NOTES
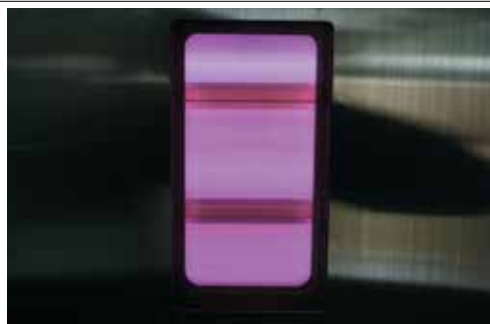
Gas Plasma Reactor

Compact, Barrel Type, Low Temperature Ashing Device

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

| 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

Main switch ON → Power switch ON → Pump switch ON → Predecompression → Evacuation

Reaction

Output switch OFF ← T ← Output switch ON ← Gas switch ON Gas valve OPEN

Purge gas

Gas switch OFF Gas valve CLOSE → Pump switch OFF → Normal Pressure → Purge gas Stop → Termination

Piping System (PR300)

Flow meter with needle valve O₂ (30~300cc/min.)
Valve
O₂ gas
Vacuum Gauge
Main valve
Vacuum pump
High frequency supply electrode
Bypass capillary
Leak valve
Auto-tuning unit
High frequency power
A.C. Power supply

: Optional Accessories

■ Example application: asbestos analysis pre-processing

Collected to membrane filter
Deposited with acetone vapor
Acetone

Ashing filter with oxygen plasma

PR301 with observation window
PR300 with observation window
PR500

SEM-EDS analysis
Phase-contrast microscope
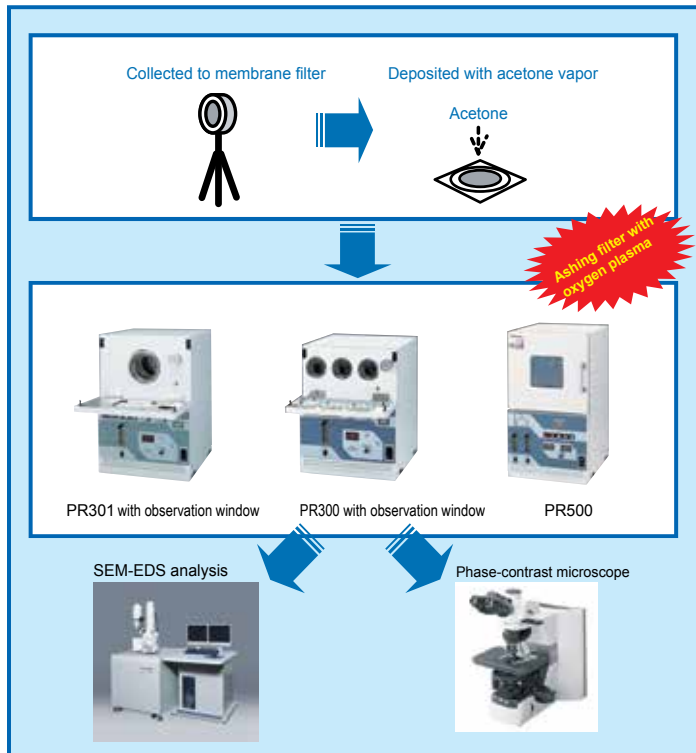
Control Panel

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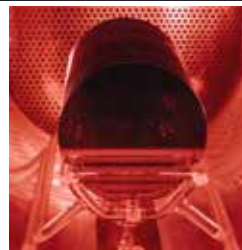
The gas plasma equipment has a wide range of applications from ashing, etching, dry cleaning, etc.

Accessories

Sample dish
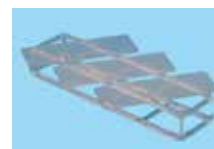
Sample shelf for PR300

Sample shelf for PR301

Gas Plasma Reactor

Compact, Barrel Type, Low Temperature Ashing Device

PR500-115V PR500-220V / PR510

| 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 standard 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

Main switch ON → Power switch ON → Pump switch ON → Predecompression → Evacuation

Reaction

Output switch OFF ← (T) ← Output switch ON ← Gas switch ON Gas valve OPEN

Purge gas

Gas switch OFF Gas valve CLOSE → Pump switch OFF → Normal Pressure → Purge gas Stop → Termination

Piping System (PR500/510)

High frequency supply electrode

Flow meter with needle valve CF₄ (10~100cc/min.)

Valve — CF₄ gas

Flow meter with needle valve O₂ (30~300cc/min.)

Valve — O₂ gas

Vacuum gauge

Main valve — Vacuum pump

Bypass capillary

Auto-tuning unit — High frequency power — A.C. Power supply

Leak valve — Purge gas

: Optional Accessories

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

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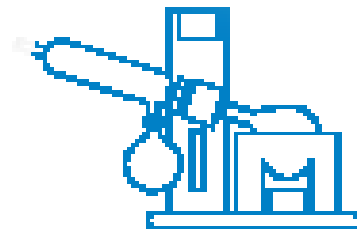
Yamato Rotary Evaporators

Contents

ROTARY EVAPORATOR OVERVIEW

RE201/211

- Manual lift with analog control
- Option for 3 different types of glassware
- Option for either a 4L or 7L capacity water bath
- Option for 7L capacity oil bath
- Optional arm jack permits setting flexibility

RE202-A/212-A

- Market leader in rotation speed range at 5~315 rpm
- Designed with set inversion function
- Standard equipped with condenser insulation kit
- Convenient height adjustment
- Integration of servo type motor with strong high torque
- Cables stored neatly, simply and smartly
- Option for 2 types of bath: water bath and oil bath

RE301

- Easy manual operation
- Digitally set and displayed motor speed (rpm)
- Equipped with motorized lift to easily raise or lower unit
- Option for 3 different types of glassware
- Universal power supply for main unit: works with 100~240VAC
- Option for 4L water or oil bath at 115~240VAC

RE601

- Programmable
- Digital setting and display for motor speed (rpm), vacuum control and vapor temperature
- Equipped with vacuum regulator and vapor temperature indicator
- Equipped with motorized lift to easily raise or lower unit
- Option for 3 different types of glassware
- Universal power supply for main unit: works with 100~240VAC
- Option for 4L water or oil bath at 115~240VAC

RE801

- Programmable
- Bath synchronized control
- Automatic distillation and 53 solvent presets
- Digital setting and display for motor speed (rpm), vacuum control and vapor temperature
- Equipped with vacuum regulator and vapor temperature indicator
- Equipped with motorized lift to easily raise or lower unit
- Option for 3 different types of glassware
- Universal power supply for main unit: works with 100~240VAC
- Option for 4L water or oil bath at 115~240VAC

Rotary Evaporator

Manual lift with analog control

RE201/211

| Evaporating / receiving flask | 1L (Standard) | | Rotation speed control range | 20~180rpm | | Water bath temp. range | Room Temperature+5 to 95°C |

RE-201-200A with optional arm jack (Glassware A)

RE-201-200B with optional arm jack (Glassware B)

RE-201-200C with optional arm jack (Glassware C)

■ Features

● Speed can be changed freely with the control knob

● Option for either a 4L or 7L capacity water bath

● Adjustable locking position of rotary joint (patent # 3220033)

● Evaporation flasks are easily removable with built in flask remover

● Optional arm jack permits setting flexibility

■ Specifications

Model	RE201	RE211
Rotational number control range	20~180rpm	
Drive system	Worm gear system	
Motor	Induction motor, 25W	
Ambient temperature range	5~35°C	
External dimensions(W×D×Hmm)	420×290×837	
Weight	~ 11 kg	
Power source 50/60Hz	AC 115V 50/60Hz 0.6A	AC 220V 50/60Hz 0.3A

■ Set Guide

RE - 201 - 100 A

Main unit	
201	115V
211	220V

Water bath			
Model	Voltage	Capacity	Controller
100	115V	4L	Analog
110	220V	4L	Analog
200	115V	7L	Analog
210	220V	7L	Analog
401	115V	7L	Digital
410	220V	7L	Digital

Glassware set	
A	For standard use (diagonal)
B	For high boiling point (vertical)
C	For low boiling point (vertical)

■ Set Selection Chart

Model	Glassware			Water Bath		
	A	B	C	BM100	BM200	BM401
RE-201-100A	●			●		
RE-201-100B		●		●		
RE-201-100C			●	●		
RE-201-200A	●				●	
RE-201-200B		●			●	
RE-201-200C			●		●	
RE-201-401A	●					●
RE-201-401B		●				●
RE-201-401C			●			●
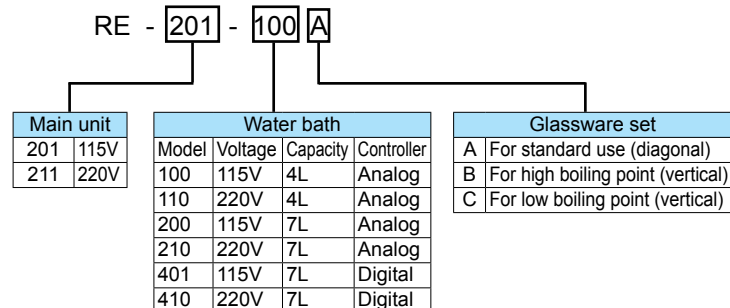
Model	Glassware			Water Bath		
	A	B	C	BM110	BM210	BM410
RE-211-110A	●			●		
RE-211-110B		●		●		
RE-211-110C			●	●		
RE-211-210A	●				●	
RE-211-210B		●			●	
RE-211-210C			●		●	
RE-211-410A	●					●
RE-211-410B		●				●
RE-211-410C			●			●

Operational Accessories

■ Glassware Set

Product code	Set
RE-200-183	Set A (use with cooling water) The Standard glass set where condenser is tilted diagonally, suitable for standard distillation
RE-200-184	Set B (use with cooling water) The condenser is set vertical, suitable for distillation of solvent with higher boiling points. When space is limited, the use of a vertical condenser set up is recommended
RE-200-185	Set C (use with dry ice) The cold finger glass condenser is set vertically, suitable for distillation of volatile or low boiling point solvents. When space is limited, the use of a vertical condenser set up is recommended

■ Bath Specifications

Model	BM100	BM110	BM200	BM210	BM401	BM410	BO601
Type	Water bath						Oil bath
Temp. control range during operation	RT +5°C~95°C						RT+5°C ~180°C
Temp. setting range	0°C~100°C						0°C~200°C
Temp. display method	Glass thermometer				Digital display shows measured / set temperature		
Set up system	Analog setting				Digital setting by ▲/▼ keys		
Bath capacity	4L		7L				
Bath dimension	ø200 x Depth120 mm		ø250 x Depth150 mm				
Weight	~3.5kg		~6.0kg		~7.0kg		~8.0kg
Power source 50/60Hz	115V 4.5A	220V 2.3A	115V 9A	220V 4.5A	115V 11A	220V 5.2A	115V/220V

Optional Accessories

■ Glassware

Evaporating flask

Product code	Size	Capacity
25527324	24/40	2L
25527334	24/40	500ml
25527344	24/40	300ml
25527354	24/40	200ml
25527364	24/40	100ml

Receiving flask

Product code	Size	Capacity
LT00016210	35/20	2L
LT00016180	35/20	500ml
LT00016209	35/20	300ml
LT00016208	35/20	200ml
LT00016207	35/20	100ml

Trap ball

Product code	Description
LG1910270055	TS 24/40-24/40
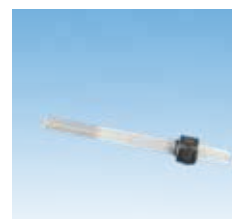
Steam duct / Rotary joint

Product code	Description
RE-200-401 (24/40)	With o-ring and nut

■ Armjack

Product code	Rod O.D.
255080	21.7mm

■ Water Circulator (Chiller)

Model	CF302L-A / CF312L-A
Operating temp. range	-20°C~30°C
Temp. control accuracy	±1.0°C (≥ 0°C) ±1.5°C (< 0°C)
Cooling capacity	~420W at liquid temp10°C ~280W at liquid temp-10°C
Temp. control	Refrigerator On/Off
Refrigerator, coolant	Air cooling 450W, R404A
External dimension (including protrusions)	205 x 396 x 535 mm (225 x 434 x 564 mm)
Water capacity	~3.9L (Liquid volume 3.5L)
Power source 60Hz	115V 7.5A / 220V 4A
Weight	~31kg

■ Organic Solvent Recovery Unit

Model	RT200
Condenser	Hard glass
Solvent collecting flask	500mL hard glass S35/20
Flask clamp	For 35mm
Outer covering	Print coating finish made from cold rolling steel sheet
Door	Acrylic door
IN/OUT nipple connected to a cooling water hose	Outer diameter: 9mm
IN/OUT nipple connected to a vacuum water hose	Outer diameter: 6mm
External diameter	W260*D400*H428mm

RT200 extracts organic solvent substances from gas generated by the rotary evaporator during concentration work, and prevents the discharge of dangerous substances

■ Vacuum Pump

Model		DTC-22A	DTC-22B
Discharge rate	50Hz	20L/min	
	60Hz	24L/min	
Ultimate pressure		1.0x10³Pa (7.5 Torr)	
Motor		AC115, Single phase	AC220, Single phase
		50W, 4P, with condenser-run thermal protection relay (automatic reset)	
Rated current		1.20/1.32A (50/60Hz)	0.60/0.72A (50/60Hz)
Speed		1260/1580rpm	1275/1570rpm
Inlet and outlet piping		O.D.ø10 x I.D.Φ6 (G1/4)	
Weight		7.1kg	
Air temperature		0~40°C	
Overall dimensions		W142 x L272 x H202 mm	
Product code		DTC22A115RERKIT	DTC22B220RERKIT
Components		DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp

■ Vacuum Regulator

Model	VR100
Setting range of vacuum	1~1,013hPa
Grading pressure setting range	66~600 hPa
Grading time setting range	1~99hrs.59mins.
Display	Digital setting by ▲/▼ keys
Control mode	Fixed value control, ramp control
Output	For vacuum, leak valve
Hose connecter	Nozzle O.D.ø9.5mm
Dimension, weight	W155*D190*H145mm, ~3.5kg
Power supply	AC100V 50/60Hz 1A External transformer required

Rotary Evaporator

Highly efficient standard rotary evaporator with manual lift

RE202-A/212-A

Evaporating / receiving flask	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.

● **Convenient height adjustment**
Slide panel employs a spring-loaded jack to lift up.
Easily twist the handle counterclockwise, adjust, lock and release.
Maximum height is 200mm.

Panel jumps up when releasing jack's lock without glassware mounted. Be sure to hold top of the slide panel by hand whenever releasing the lock.
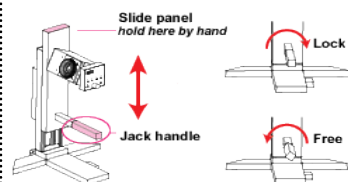
● **Set inversion function**
Glassware and bath can be set in either side, left or right, depending on user's dominant hand and installation location.
Three units of Glassware B (with vertical condenser) can be installed in a standard fume hood.

● **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.
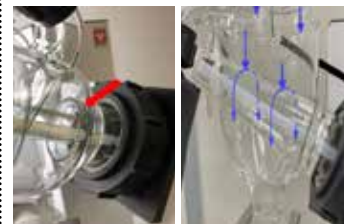
● **Condenser is fastened tightly**
Yamato adopts a condenser bracket screwed firmly to the motor box. It does not loosen or rattle even when jack moves up and down.

Vertical condenser (Glassware B) is used in conjunction with the condenser bracket.

● **Cables are stored neatly, simply and smartly**
The AC adapter holder at the back of the main unit helps to keep in place the AC adapter and excess cables. Rear cover keeps dust and liquid off the cables and organized wiring is achieved when unit is placed inside a laboratory bench and fume hood.

● **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.

● **Condenser insulation kit**
This insulating material is used to suppress condensation on the surface of the condenser.
Standard attached to Glassware A and B.

■ Specifications

Model		RE202-A/212-A *(Main Unit)*	RE202A-A/212A-A *(Glassware A)*	RE202B-A/212B-A *(Glassware B)*
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 / Encoder dial setting		
	Rotation mode	Forward/Reverse/Auto reverse		
	Spring-loaded jack	Manual balance (Max. height 200 mm, stepless regulation, one-touch lock)		
Configuration	Rotary motor	DC brushless (simple servo)		
	Condenser retention	Retaining bracket for vertical condenser (condenser type B)		
Safety functions		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 m²)	Double corrugated tube (cooling surface: 0.143 m²)
		---	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	0-2000ml for TS24. *Use optional reducer to attach small flasks.*		
	Compatible receiving flask	100-2000 ml		
	External dimensions *2 (W x D x H)	375 × 324 × 445	719 × 324 × 534	529 × 324 × 745
	Overall dimensions *2 (including bath) (W x D x H)	---	744 × 365 × 534	554 × 365 × 745
	Power rating	RE202: 100-115 VAC single phase 1A RE212: 200-230 VAC single phase 1A		
	Power cable	Approx. 2.0 m with inlet plug		
	Weight	Approx. 7.0 kg	Approx. 9.0 kg (including RE unit)	
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), condenser bracket (1), hex wrench (1), Instruction manual (1), warranty card (1)		
		Glass set: Cooling condenser (type A/B)(1), rotary joint (1), evaporation flask (1), receiving flask (1), ball joint clamp (1), flask clip (1), vacuum seal (1), condenser insulation kit (1), flask removal tool		

*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

■ 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.

■ Set Guide

RE - [212] - [A] [W2] [A]

Main unit	
202	115V
212	220V

Glassware set	
A	Traditional (diagonal)
B	Standard (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 Selection Chart

Model	Glassware		Water Bath		Oil Bath	
	A	B	BM302	BM312	BO302	BO312
RE-202-AWA	●		●			
RE-202-BWA		●	●			
RE-202-AOA	●				●	
RE-202-BOA		●			●	
RE-212-AW2A	●			●		
RE-212-BW2A		●		●		
RE-212-AO2A	●					●
RE-212-BO2A		●				●
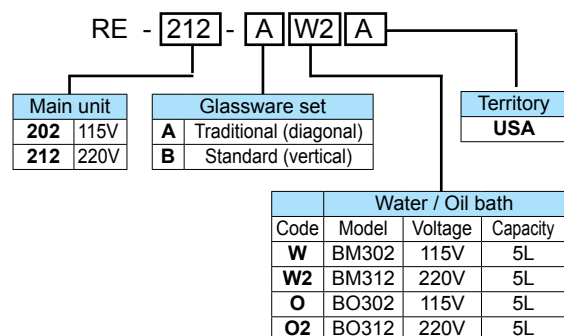
Optional Accessories

■ Glassware

Evaporating flask
Size: 24/40

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

Size: 29/38

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

Receiving flask
Size: 35/20

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

*****Standard**

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

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

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

FKM vacuum seal

Product code	Description
255740	**Standard**

PTFE vacuum seal

Product code	Description
255741	Recommended for ketone and other solvents

■ Water Circulator (Chiller)

Model	CF302L-A / CF312L-A
Operating temp. range	-20°C~30°C
Temp. control accuracy	±1.0°C (≥ 0°C) ±1.5°C (< 0°C)
Cooling capacity	~420W at liquid temp10°C ~280W at liquid temp-10°C
Temp. control	Refrigerator On/Off
Refrigerator, coolant	Air cooling 450W, R404A
External dimension (including protrusions)	205 x 396 x 535 mm (225 x 434 x 564 mm)
Water capacity	~3.9L (Liquid volume 3.5L)
Power source 60Hz	115V 7.5A / 220V 4A
Weight	~31kg

CF302L keeps water in the condenser at a stable low temp. which increases evaporation rate and maximizes solvent collection.

Easy maintenance of air intake filter
User-friendly controller
Convenient drainage of waste water
Compact

■ Vacuum Pump

Model	DTC-22A	DTC-22B
Discharge rate	50Hz: 20L/min, 60Hz: 24L/min	
Ultimate pressure	1.0x10³Pa	
Motor	AC115, Single phase	AC220, Single phase
	50W, 4P, with condenser-run thermal protection relay (automatic reset)	
Rated current	1.20/1.32A (50/60Hz)	0.60/0.72A (50/60Hz)
Speed	1260/1580rpm	1275/1570rpm
Inlet and outlet piping	O.D.Φ10 x I.D.Φ6 (G1/4)	
Weight	7.1kg	
Air temperature	0~40°C	
Dimensions	W142 x L272 x H202 mm	
Product code	DTC22A115RERKIT	DTC22B220RERKIT
Components	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp

■ Complete set with optional accessories

Rotary Evaporator RE-202-BWA
Vacuum pump DTC22A
Water circulator (chiller) CF302L-A

■ Space Saving Design

Compact rotary evaporator which can be neatly installed in a fume hood.
Vertical condenser (Glassware B) does not take up much space.

Rotary Evaporator

Basic with motorized lift and digital setting

RE301

| Evaporating/Receiving flask | 1L (Standard) | | Rotation speed | 20~250rpm | | Temperature range | Water Bath Room temperature +5~90°C | Oil Bath Room temperature +10~180°C |

RE-301-AW (Glassware A) RE-301-BW (Glassware B) RE-301-CW (Glassware C)
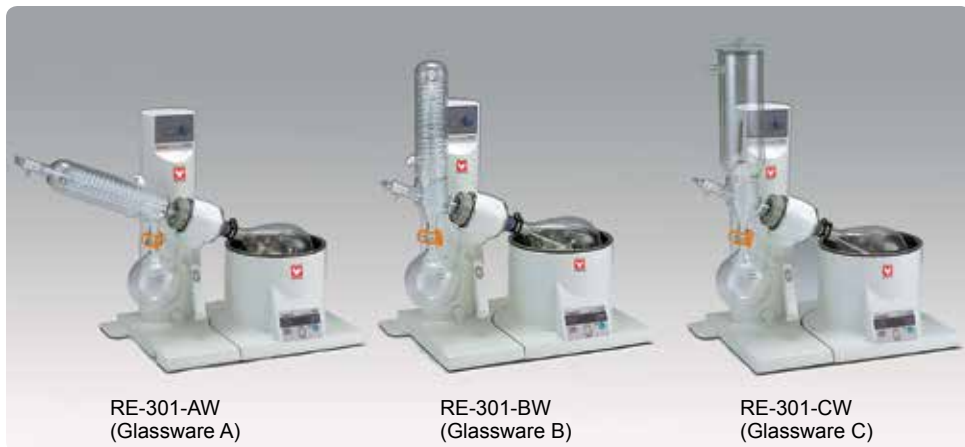
- One touch electric lift for easy up and down movement
- The evaporator's motor speed (rpm) is digitally set and displayed
- Unique durable vacuum seal suitable up to 2L flasks
- Stable rotation at low and high speeds
- Equipped with lift up switch in case of power outage
- Removable bath for easy cleaning and water replacement, with the option for water or oil bath
- Compact design fits into any fume hood
- Universal power supply: works with 100-240VAC

Features

● **Adjustable Rotary Joint**
The rotary joint's locking position feature is adjustable up to 80 mm. Useful when using evaporating flasks with varying capacities or when there is a need to shift the vacuum seal's contact position. (Patent No. 3220033)

● **Quick Release of Evaporating Flask**
The evaporating flask can be released easily and quickly by turning the flask release nut.

● **Motorized Lift**
Standard for all models and can be easily raised or lowered by a simple switch operation

● **Glass Condenser**
Unique designed glass condenser to prevent liquid stagnation and backflow and increase cooling capacity with a 20% larger surface area to enable faster distillation. (Patent No. 4597021)

● **Control Panel**
Rotation speed knob with digital display indication

Set Guide

RE - 301 - A W V 2

Main unit	100~240V
Bath	W Water bath / O Oil bath
Bath voltage	200-240V

Glassware set
A	For standard use (diagonal)
B	For high boiling point (vertical)
C	For low boiling point (vertical)

V Vacuum Regulator

Set Selection Chart

Model	Glassware			Bath (100-120V AC)		Bath (200-240V AC)		Vacuum regulator
				Water bath	Oil bath	Water bath	Oil bath	
	A	B	C	BM500	BO400	BM510	BO410	VR
RE-301-AW	●			●				
RE-301-AW2	●					●		
RE-301-AO	●				●			
RE-301-AO2	●						●	
RE-301-AWV	●			●				●
RE-301-AWV2	●					●		●
RE-301-AOV	●				●			●
RE-301-AOV2	●						●	●
RE-301-BW		●		●				
RE-301-BW2		●				●		
RE-301-BO		●			●			
RE-301-BO2		●					●	
RE-301-BWV		●		●				●
RE-301-BWV2		●				●		●
RE-301-BOV		●			●			●
RE-301-BOV2		●					●	●
RE-301-CW			●	●				
RE-301-CW2			●			●		
RE-301-CO			●		●			
RE-301-CO2			●				●	
RE-301-CWV			●	●				●
RE-301-CWV2			●			●		●
RE-301-COV			●		●			●
RE-301-COV2			●				●	●

Specifications

Model	RE301
Motor	DC brushless motor
Rotation speed	20~250 (rpm)
Lift stroke	130mm
Rotational speed setting	Control knob (digital indication)
Safety function (main unit)	Manual-setting lower limit, motor overload
Lifting feature	Motorized lifting system
External dimension	With Glassware A (mm)	828(W)× 400(D)×586(H) (716 when raised)
	With Glassware B/C (mm)	643(W)× 400(D)×727(H) (857 when raised)
Weight	~14.1kg (excluding glassware and water/oil bath)
Power supply Main unit(50/60Hz)	AC100~240V 1.5A(excluding water/oil bath)

Operational Accessories

■ Glassware Set

Product code	Set
255291	Set A (use with cooling water) Standard glass set where condenser is set diagonally, suitable for standard distillation.
255292	Set B (use with cooling water) The condenser is set vertically, suitable for distillation of solvent with higher boiling points. When space is limited, the use of a vertical condenser set up is recommended.
255293	Set C (use with dry ice) The cold finger glass condenser is set vertically, suitable for distillation of volatile or low boiling point solvents. When space is limited, the use of a vertical condenser set up is recommended.

■ Bath Specifications

BM500
The electric kettle style tank can be removed freely

Product name	Water bath		Oil bath	
Model	BM500	BM510	BO400	BO410
Temp. control range	RT +5°C~90°C		RT +10°C~180°C	
Temp. setting range	0~100°C		0~180°C	
Temp. adjustment accuracy	±1.5°C (at agitation)		±2°C (at agitation)	
Temp. control system	PID control with microprocessor			
Temp. setting / display system	Digital setting by ▲/▼ keys			
Bath capacity	~4L			
External dimensions	W340 x D349 x H231 mm			
Weight	~5.5kg			
Power supply	AC100~120V 12.5~10.5A	AC200~240V 6.5~5.5A	AC100~120V 12.5~10.5A	AC200~240V 6.5~5.5A

Optional Accessories

■ Glassware

Evaporating flask

Product code	Size	Capacity
LT00016206	29/42	2L
LT00016205	29/42	500ml
LT00016204	29/42	300ml
LT00016203	29/42	200ml
LT00016202	29/42	100ml

Receiving flask

Product code	Size	Capacity
LT00016210	35/20	2L
LT00016180	35/20	500ml
LT00016209	35/20	300ml
LT00016208	35/20	200ml
LT00016207	35/20	100ml

Joint

Product code	Description
RE200GT010	TS 29/42- 24/40
RE200GT012	TS 29/42- 29/42

Trap ball

Product code	Description
RE200GT002	TS 29/42- 29/42
RE200GT003	TS 29/42- 24/40

Steam Duct / Rotary Joint

Product code	Description
LT00016211ASSY (29/42)	with o-ring and nut

■ Water Circulator (Chiller)

Model	CF302L-A / CF312L-A
Operating temp. range	-20°C~30°C
Temp. control accuracy	±1.0°C (≥ 0°C) ±1.5°C (< 0°C)
Cooling capacity	~420W at liquid temp10°C ~280W at liquid temp-10°C
Temp. control	Refrigerator On/Off
Refrigerator, coolant	Air cooling 450W, R404A
External dimension (including protrusions)	205 x 396 x 535 mm (225 x 434 x 564 mm)
Water capacity	~3.9L (Liquid volume 3.5L)
Power source 60Hz	115V 7.5A / 220V 4A
Weight	~31kg

■ Organic Solvent Recovery Unit

Model	RT200
Condenser	Hard glass
Solvent collecting flask	500mL hard glass S35/20
Flask clamp	For 35mm
Outer covering	Print coating finish made from cold rolling steel sheet
Door	Acrylic door
IN/OUT nipple connected to a cooling water hose	Outer diameter: 9mm
IN/OUT nipple connected to a vacuum water hose	Outer diameter: 6mm
External diameter	W260*D400*H428mm

RT200 extracts organic solvent substances from gas generated by the rotary evaporator during concentration work, and prevents the discharge of dangerous substances

■ Vacuum Pump

Model	DTC-22A	DTC-22B
Discharge rate	50Hz: 20L/min, 60Hz: 24L/min	
Ultimate pressure	1.0x10³Pa	
Motor	AC115, Single phase	AC220, Single phase
	50W, 4P, with condenser-run thermal protection relay (automatic reset)	
Rated current	1.20/1.32A (50/60Hz)	0.60/0.72A (50/60Hz)
Speed	1260/1580rpm	1275/1570rpm
Inlet and outlet piping	O.D.Φ10 x I.D.Φ6 (G1/4)	
Weight	7.1kg	
Air temperature	0~40°C	
Overall dimensions	W142 x L272 x H202 mm	
Product code	DTC22A115RERKIT	DTC22B220RERKIT
Components	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp

■ Vacuum Regulator

Model	VR300	
Setting range of vacuum	0~981hPa	
Measurable range of vacuum	0~1033hPa	
Resolution of vacuum	1hPa	
Setting range of hysteresis	1~50hPa	
Operation modes	Free, fixed temperature, fixed temperature timer, descending and descending timer	
Setting range of timer	Fixed operation	1~999min
	Descending operation	1~99min
Safety features	Self-diagnosis, alarm	

Rotary Evaporator

Highly Functional & Programmable

RE601 / 801

Evaporating/ receiving flask	1L(Standard)	Rotation speed	20~250rpm	Water / Oil bath temp. range	Water Bath Room temperature +5~90°C	Oil Bath Room temperature +10~180°C

Highly functional type

Standard equipped with motorized lift, vacuum regulator, vapor temperature display functions

RE-601-AW (Glassware A)   RE-601-BW (Glassware B)   RE-601-CW (Glassware C)

Highly functional type with automatic distillation

Standard equipped with motorized lift, vacuum regulator, vapor temperature display and automatic distillation function

RE-801-AW (Glassware A)   RE-801-BW (Glassware B)   RE-801-CW (Glassware C)

■ Common features of RE601 and RE801

- One touch electric lift for easy up and down movement
- Digital setting and display for motor speed (rpm), vacuum and vapor temperature
- Stable rotation at low and high speeds
- Unique durable vacuum seal suitable up to 2L flasks
- One touch operation for displaying and saving operating conditions
- Equipped with lift-up switch in the event of power outage
- Compact, fits into any fume hood
- Universal power supply: works with 100-240VAC

■ Unique features of RE801

- Automatic distillation
- Continuous bath control
- Data on 53 solvents installed as default

■ Features

● Adjustable Rotary Joint

The rotary joint's locking position feature is adjustable up to 80 mm: useful when using evaporating flasks with varying capacities or when there is a need to shift the vacuum seal's contact position. (Patent No. 3220033)

● Quick Release of Evaporating Flask

The evaporating flask can be released easily and quickly by turning the flask release nut.

● Glass Condenser (prevents liquid stagnation)

The vertical condenser prevents liquid from stagnating. New condenser tubes (type A&B) are designed to increase cooling capacity with a 20% larger surface area. (Patent No. 4597021)
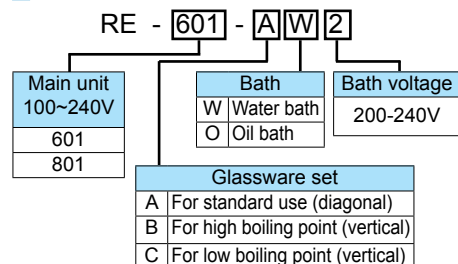
● Control Panel

Rotation speed knob with digital display and a programmable vacuum regulator.

Specifications

Model	RE-601	RE801
Motor	DC brushless motor (for rotation)	
Controller	Vacuum regulator VR600	Vacuum regulator VR800
Rotation speed	20~250 (rpm)	
Lift stroke	130mm	
Setting range of vacuum	0~981hPa	
Measurable range of vacuum	0~1033hPa	
Resolution of vacuum	1hPa	
Setting range of hysteresis	1~50hPa	
Resolution of vapor temperature indicator	Selectable (either 1°C or 0.1°C)	
Readout of cooling water temperature	Depending on indicator (option)	
Resolution of cooling water temperature indicator	1°C or 0.1°C	
Operation modes	Free, fixed temperature, fixed temperature timer, descending, and descending timer	Free, fixed temperature, fixed temperature timer, descending, and descending timer, auto I (auto operation with continuous drying), and auto II (auto operation for distillation of single solvent)
Setting range of timer	1-999 minutes in increments/decrements of 1 minute for preset operations, 1-99 minutes for descending timer operations	
Memory	10 programs for each operation	
Data operation	N/A	53 kinds of solvent data
Speed (rpm) setting	Rotation: Control knob Vacuum adjustment: Key pad	
Safety measures (drive unit)	Circuit breaker, rotor for overload protection, manual adjustment of lift's lower limit, lift-up switch during power outage	
Safety measures (vacuum regulator)	Self-diagnostic functions, main unit / bath synchronized stop at malfunction, error display	
Synchronized control feature	Selection of automatic bath stop or automatic insulation	
Lifting feature	One-touch motorized lift system	
External dimension* — With Glassware A (mm)	828(W)× 400(D)×727(H) (857(H)when raised)	
External dimension* — With Glassware B/C (mm)	643(W)× 400(D)×727(H) (857(H)when raised)	
Weight	~15.1kg (excluding the glassware and the water/oil bath)	
Power supply Main unit (50/60Hz)	AC100~240V 1.5A	

*External dimensions (excluding protrusions).

Set Guide

RE - 601 - A W 2

Main unit 100~240V		Bath	Bath voltage 200-240V
601	W	Water bath	
801	O	Oil bath	

Glassware set	
A	For standard use (diagonal)
B	For high boiling point (vertical)
C	For low boiling point (vertical)

Set Selection Chart

Model	Glass-ware A	B	C	Bath (100-120V) Water bath BM500	Oil bath BO400	Bath (200-240V) Water bath BM510	Oil bath BO410
RE-601-AW	●			●			
RE-601-AW2	●					●	
RE-601-AO	●				●		
RE-601-AO2	●						●
RE-601-BW		●		●			
RE-601-BW2		●				●	
RE-601-BO		●			●		
RE-601-BO2		●					●
RE-601-CW			●	●			
RE-601-CW2			●			●	
RE-601-CO			●		●		
RE-601-CO2			●				●
RE-801-AW	●			●			
RE-801-AW2	●					●	
RE-801-AO	●				●		
RE-801-AO2	●						●
RE-801-BW		●		●			
RE-801-BW2		●				●	
RE-801-BO		●			●		
RE-801-BO2		●					●
RE-801-CW			●	●			
RE-801-CW2			●			●	
RE-801-CO			●		●		
RE-801-CO2			●				●

Operational Accessories

Glassware Set

Product code	Set
255291	Set A (use with cooling water) The Standard glass set where condenser is tilted, suitable for standard distillation.
255292	Set B (use with cooling water) The condenser is set vertical, suitable for distillation of solvent with higher boiling points. When space is limited, the use of a vertical condenser set up is recommended
255293	Set C (use with dry ice) The cold finger glass condenser is set vertically, suitable for distillation of volatile or low boiling point solvents. When space is limited, the use of a vertical condenser set up is recommended

Bath Specifications

Product name	Water bath		Oil bath	
Model	BM500	BM510	BO400	BO410
Temp. control range	RT +5°C~90°C		RT +10°C~180°C	
Temp. setting range	0~100°C		0~180°C	
Temp. adjustment accuracy	±1.5°C (at agitation)		±2°C (at agitation)	
Temp. control system	PID control with microprocessor			
Temp. setting / display system	Digital setting by ▲/▼ keys			
Bath capacity	~4L			
External dimensions	W340 x D349 x H231 mm			
Weight	~5.5kg			
Power supply	AC100~120V 12.5~10.5A	AC200~240V 6.5~5.5A	AC100~120V 12.5~10.5A	AC200~240V 6.5~5.5A

BM500
The electric kettle style tank can be removed freely

Optional Accessories

■ Glassware

● Evaporating flask

Product code	Size	Capacity
LT00016206	29/42	2L
LT00016205	29/42	500ml
LT00016204	29/42	300ml
LT00016203	29/42	200ml
LT00016202	29/42	100ml

● Receiving flask

Product code	Size	Capacity
LT00016210	35/20	2L
LT00016180	35/20	500ml
LT00016209	35/20	300ml
LT00016208	35/20	200ml
LT00016207	35/20	100ml

● Joint

Product code	Description
RE200GT010	TS 29/42- 24/40
RE200GT012	TS 29/42- 29/42

● Trap ball

Product code	Description
RE200GT002	TS 29/42- 29/42
RE200GT003	TS 29/42- 24/40

● Steam Duct / Rotary Joint

Product code	Description
LT00016211ASSY (29/42)	with o-ring and nut

■ Connection method

● Vacuum seal

Product code	Description
RE50040090 (standard)	Silicone rubber vacuum seal
ORE7042000	Teflon vacuum seal ORE70

Teflon seal

● Hose connection parts and trap

Product code	Description
255284	Hose connection parts ORE30
255285	Trap with nozzle ORE40

■ Vacuum Pump

Model	DTC-22A	DTC-22B
Discharge rate	50Hz: 20L/min, 60Hz: 24L/min	
Ultimate pressure	1.0x10³Pa	
Motor	AC115V, Single phase	AC220V, Single phase
	50W, 4P, with condenser-run thermal protection relay (automatic reset)	
Rated current	1.20/1.32A (50/60Hz)	0.60/0.72A (50/60Hz)
Speed	1260 / 1580rpm	1275 / 1570rpm
Inlet and outlet piping	O.D.ø10 x I.D.ø6 (G1/4)	
Weight	7.1kg	
Air temperature	0~40°C	
Overall dimensions	W142 x L272 x H202 mm	
Product code	DTC22A115RERKIT	DTC22B220RERKIT
Components	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp	DTC-22A Dry Vacuum Pump, 5' of 8mm ID Rubber Hose, Hose Clamp

■ Organic Solvent Recovery Unit

Model	RT200
Condenser	Hard glass
Solvent collecting flask	500mL hard glass S35/20
Flask clamp	For 35mm
Outer covering	Print coating finish made from cold rolling steel sheet
Door	Acrylic door
IN/OUT nipple connected to a cooling water hose	Outer diameter: 9mm
IN/OUT nipple connected to a vacuum water hose	Outer diameter: 6mm
External diameter	W260 x D400 x H428mm

RT200 extracts organic solvent substances from gas generated by the rotary evaporator during concentration work, and prevents the discharge of dangerous substances

■ Water Circulator (Chiller)

Model	CF302L-A / CF312L-A
Operating temp. range	-20°C~30°C
Temp. control accuracy	±1.0°C (≥ 0°C) ±1.5°C (< 0°C)
Cooling capacity	~420W at liquid temp10°C ~280W at liquid temp-10°C
Temp. control	Refrigerator On/Off
Refrigerator, coolant	Air cooling 450W, R404A
External dimension (including protrusions)	205 x 396 x 535 mm (225 x 434 x 564 mm)
Water capacity	~3.9L (Liquid volume 3.5L)
Power source 60Hz	115V 7.5A / 220V 4A
Weight	~31kg

■ Complete set with optional accessories
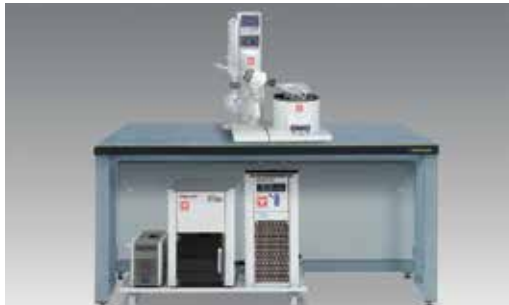
Rotary Evaporator RE601BW
Vacuum pump DTC22
Organic solvent recovery unit RT200
Cooling water circulator CF302L-A
Stand with caster wheel 255282

■ Space Saving Design

Compact Rotary Evaporator, which can be neatly installed in a Fume Hood. The vertical condenser does not take up much space

Diaphragm Type Dry Vacuum Pumps

DTC-22A/DTC-22B

Anti-Corrosion Type, DTC Series

■ **Features**
- All contacted parts of the gas are made of PTFE and FPM
- Suitable for pumping out corrosive gas or organic solvent
- High vacuum down to 1000Pa
- Compact

■ **Applications**
- Rotary evaporator
- Evaporating system
- Vacuum concentrator
- Vacuum filtration
- Exhaust of gas-transfer tube
- Vacuum drying systems
- Laser-gas circulation
- Centrifuge
- Medical/Pharmaceutical equipment
- Analysis/scientific equipment

■ **Specifications**

Model		DTC-22A		DTC-22B	
	Unit	50Hz	60Hz	50Hz	60Hz
Actual pumping speed	L/min	20		24	
	M³H	1.2		1.44	
	CFM	0.71		0.85	
Ultimate pressure	Pa (kPa)	1.0 × 10³ (-100.3)			
	Torr	7.50			
	mbar	10.0			
Motor	AC	115V		220V	
	Single phase, 50W, 4P, Capacitor run				
Noise value	dB(A)	54			
Full load current	A	1.2	1.32	0.6	0.72
Weight	kg	7.1			
Inlet port diameter	mm	O.D. dia.10 × I.D. dia.6 (G1/4)			
Ambient temperature	ºC	0-40			
	ºF	32-104			
Overall dimensions	mm	142(W) × 288.5(L) × 202(H)			

■ **Vacuum Pump Guide**

Assembly No.	Components	Applicable products
DTC22A115RERKIT (115V)	DTC-22A Dry Vacuum Pump 115V 5' of 8mm ID Rubber Hose Hose Clamp	RE-200/210/301/601/801 Rotary Evaporator
DTC22B220RERKIT (220V)	DTC-22B Dry Vacuum Pump 220V 5' of 8mm ID Rubber Hose Hose Clamp	

■ **Corresponding Voltage and Certificate**

Model	Voltage	CE Marked	TUV Marked	cTUVus Marked
DTC-22A	Single phase, 115V	●	●	●
DTC-22B	Single phase, 220V	●	●	●

Pumping Speed Curves
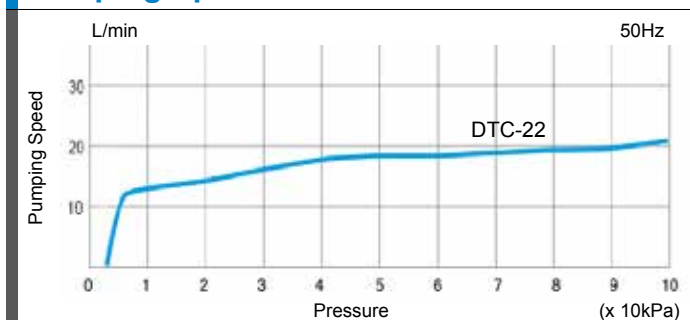
Outline Drawings

Yamato Scientific America

Innovating Science for over 130 Years
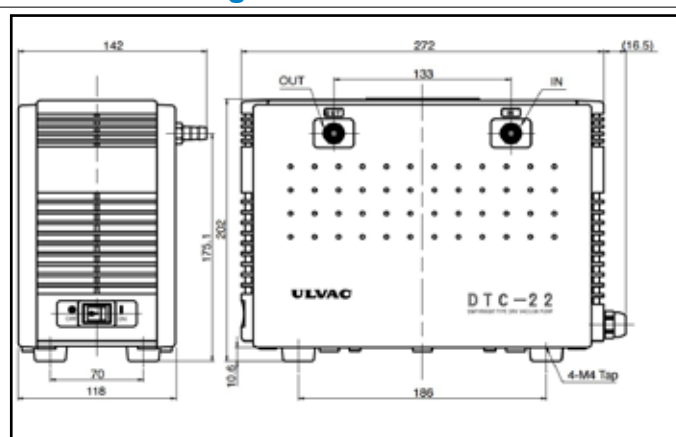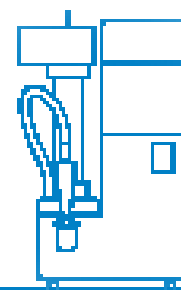
Yamato Spray Dryer

Contents

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

GB210
Without glassware

GF300
For Spray Drying

GB210A
For Spray Drying

Selectable Glassware

GF200
For Granulating

GB210B
For Granulating

GAS410

Organic Solvent Recovery Unit

Large Capacity System

DL410

Spray Dryer

Compact & Economical

ADL311SA

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	Low cost & 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

■ Specifications

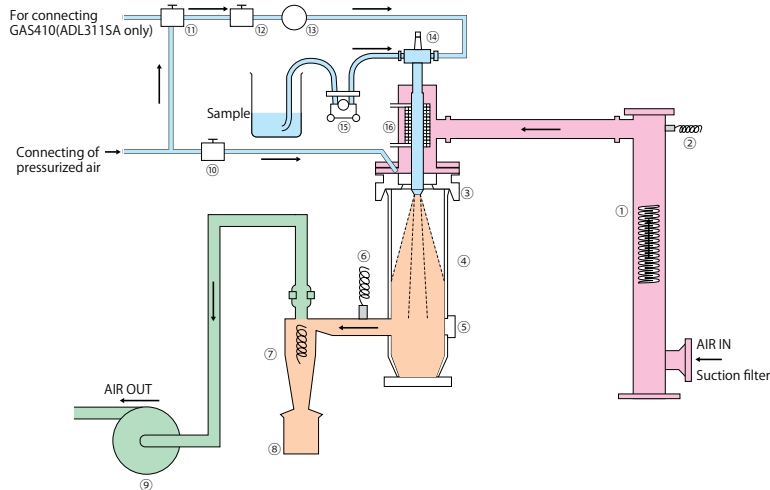| Model	ADL311SA
Supported samples	Water soluble samples
Evaporated water amount	Max. 1300mL/h
Spraying system	Two-way nozzle, Nozzle No. 1A as standard (0.4mm)
Temp. adjusting unit setting range	40 to 220°C (inlet temperature), 0 to 98°C (outlet temperature)
Temperature adjusting accuracy	Inlet temperature±1°C
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) rated current	AC220V 17A, AC240V 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)

Example of installation: ADL311SA + GAS410

Control Panel

ADL311SA

Diagram

For connecting GAS410(ADL311SA only)
Connecting of pressurized air
Sample
AIR OUT
AIR IN
Suction filter

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

Piping

ADL311SA+GAS410

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.

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

Spraying Nozzle

Two-way nozzle system

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

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.

Example of implementation (spray dryer ADL311SA)

Sample name	Composition (%)	Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m³/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						Test time (min)	Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m³/min)	Spray air pressure (MPa)	Test sample amount (g/min)	Sent amount of sample liquid (g/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

| 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) rated current	AC220V 17A, AC240V 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

GAS410 Connection

Connection of pressurized air

AIR OUT

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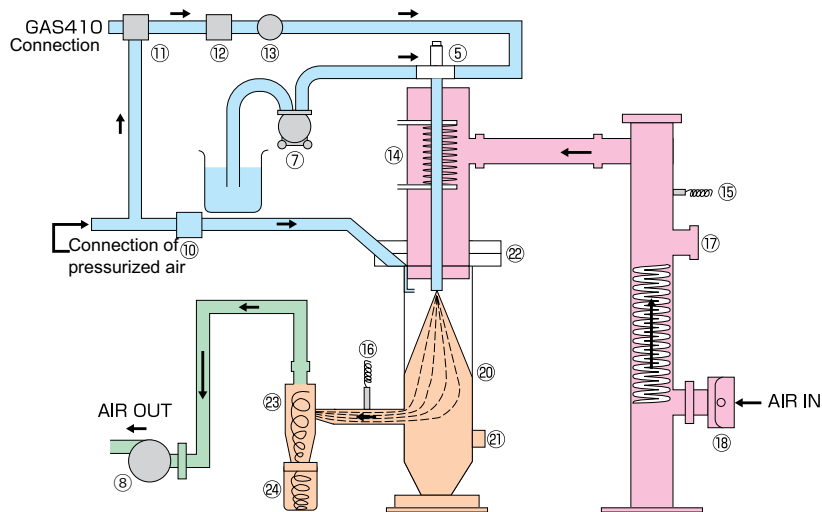
No.	Part name	No.	Part name
(1)	Heater	(16)	Outlet temperature sensor
(5)	Spray nozzle	(17)	Blind
(7)	Liquid sending pump	(18)	Suction port, suction filter
(8)	Blower, exhaust filter	(19)	Nozzle cooling connection port
(10)	Solenoid valve	(20)	Drying chamber
(11)	3-way solenoid valve	(21)	Cap
(12)	Needle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

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.

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.

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 (m³/min)	Spray air pressure kPa(kg/cm²)	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

| 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

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.

■ 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) rated current	AC220V 17A, AC240V 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

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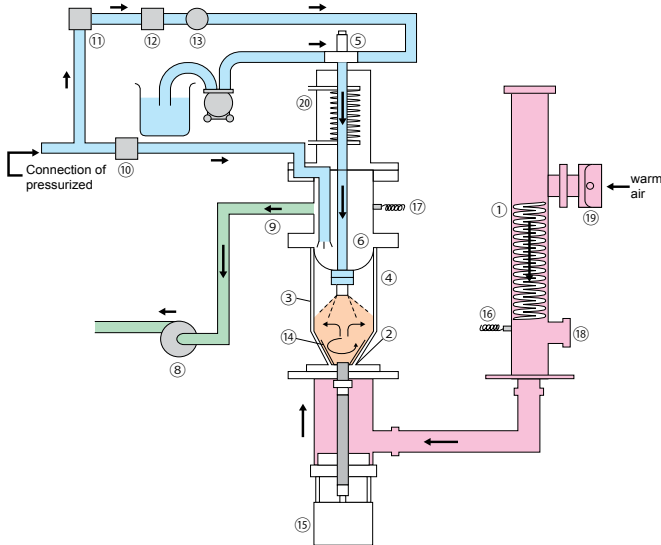
No.	Part name	No.	Part name
(1)	Heater	(11)	3-way solenoid valve
(2)	Micro porous plate	(12)	Needle valve
(3)	Flow layer chamber	(13)	Pressure meter
(4)	Filter chamber	(14)	Stirring blades
(5)	Nozzle	(15)	Stirring motor
(6)	Filter	(16)	Inlet temperature sensor
(7)	Liquid sending pump	(17)	Outlet temperature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

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.

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.

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

| 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. 1.2 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	AC 200V - 240V, single-phase 24 A
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	N₂ 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

Sample

Suction filter

Pressurized air

AIR IN

AIR OUT
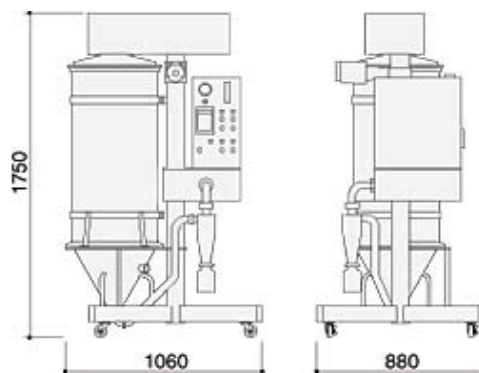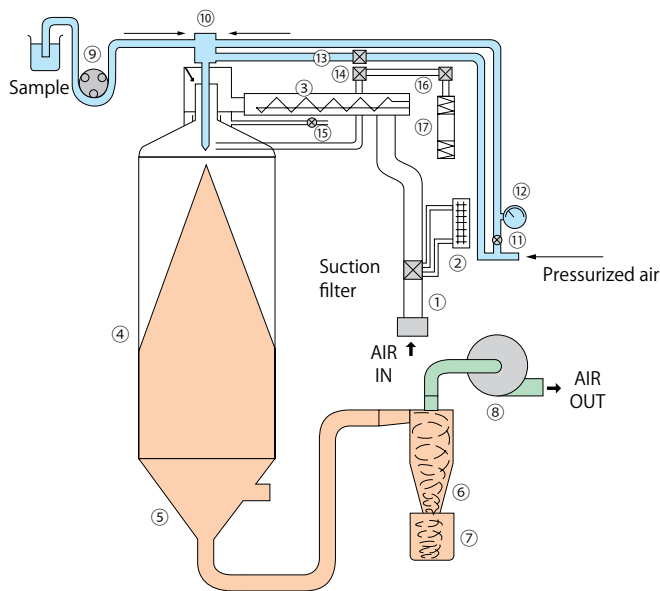
(1)Orifice tube
(2)Drying air flow meter
(3)Heater
(4)Drying chamber
(5)Drying chamber lower half
(6)Cyclone
(7)Product vessel
(8)Aspirator
(9)Sample feed pump
(10)Atomizing nozzle
(11)Atomizing pressure control valve
(12)Atomizing pressure gauge
(13)Needle knock Solenoid valve
(14)Nozzle blower Solenoid 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.

0   50   100µm

Powder generated by DL410

Spraying Nozzle

Nozzle for liquid(F)   Nozzle for gas(A)

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

Static removal brush

Burn prevention safety cover

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

Time

Complete evaporation time(sec)

100℃
150
200
250
300

Droplet size(µ)
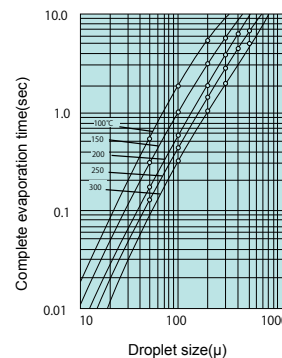
Drying time until the liquid droplets are completely evaporated with hot air.

Organic Solvent Recovery Unit

Highly safe N₂ gas sealed circulation system

GAS410

Circulation flow	0.12 to 0.65m³/min

Recovery capacity	1,300ml/h or more

Cost savings	With integrated freezer With integrated compressor

Inert N₂ 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 N₂ gas sealed circulation system and a solvent recovery system (with freezer and capacitor)
● Explosion safety with closed loop N₂ 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

ADL311SA

GAS410

with movable casters

Example of installation: ADL311SA + GAS410

■ Specifications

Model	GAS410
Solvent recovery system	Capacitor + freezer
Circulating gas	N₂ 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) O₂ density display monitor Blower wind amount adjusting volume
O₂ Sensor	Solid electrolyte (Zirconium) limit current type
Pump	For circulation to measure Oxygen
Safety device	O₂ density meter, flammable gas alarm, electric leakage breaker, N₂ 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 N₂ 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
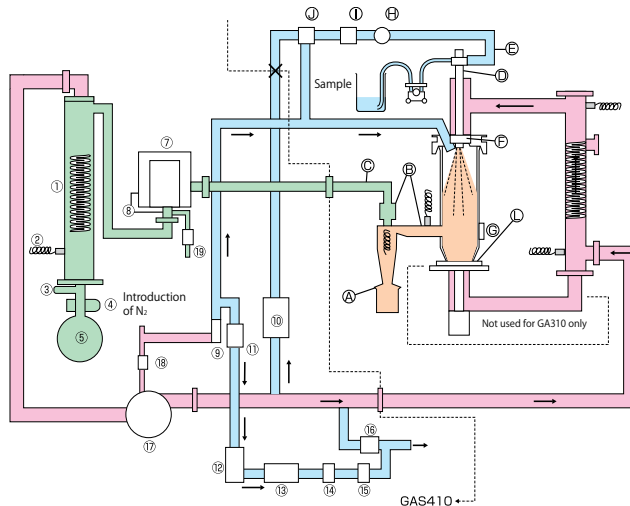
No.	Part name	No.	Part name
(1)	Capacitor	A	O ring
(2)	Sensor	B	Packing
(3)	Ball valve	C	Hose
(4)	Clamp	D	Spray nozzle
(5)	Recovery flask	E	Tube
(6)	Filter element	F	Aluminum honeycomb
(7)	Filter case	G	Cap
(8)	Differential pressure meter	H	Pressure meter
(9)	Flow meter (for introduction of N₂)	I	Needle 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)	O₂ Sensor		
(16)	Solenoid valve (for exhaust)		
(17)	Blower		
(18)	Solenoid valve (for introduction of N₂)		
(19)	Solenoid valve (for air supply)		

Control Panel

■ Major control functions and detection function

● Closed system (N₂ gas sealed circulation type)
● O₂ 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$_2$CO$_3$, NaHCO$_3$)

GWS410

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

■ Flow Diagram
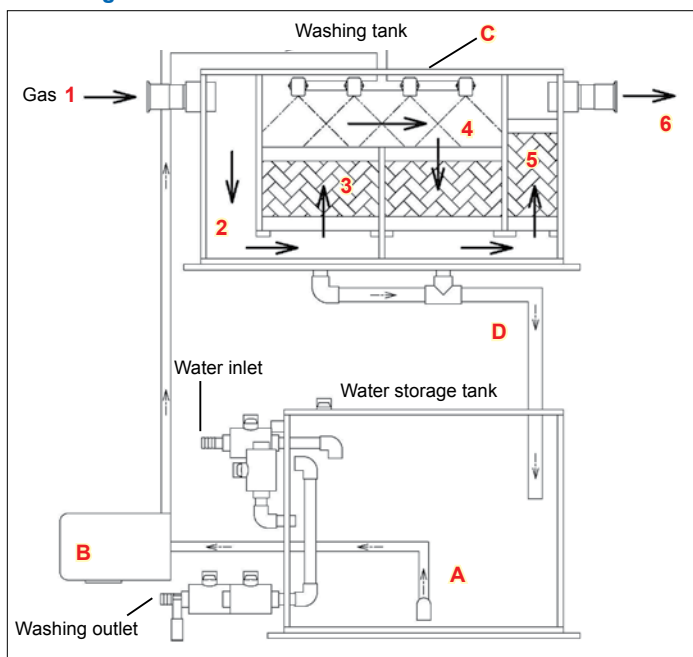
■ Specifications

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.

(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.

■ Sample Installation

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

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/m³ (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/m³ (ANR).
 Bowl seal and other o-rings are slightly lubricated.

■ Dimension (mm)
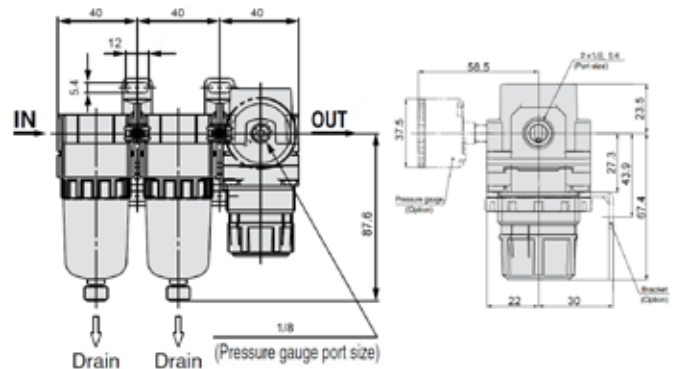
Repeatability of granulation test

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/cm^2)
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.
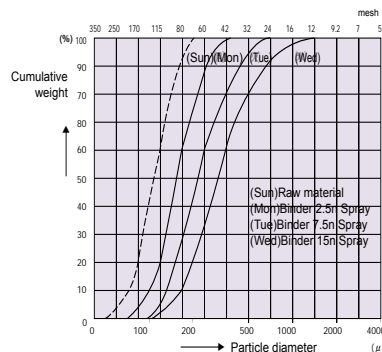
(Conditions)

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/cm^2)
Nozzle height	25cm from microporous plate

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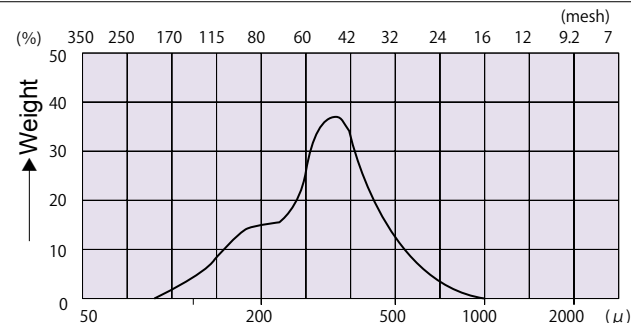
Particles generated by the pulvis mini bed are usually in the range of 0.1~1.5a, The particle size uniformity is lower than extrusion granulation and compression granulation methods.
The granularity consistency may be regulated by test conditions.

(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/cm^2)
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 (m^3/min)	Spray air pressure kPa (kg/cm^2)	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				Test sample amount (g/min)	Sent amount of sample liquid (g/min)	Test time (min)	Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure kPa(kg/cm^2)					
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 (m^3/min)	Spray air pressure kPa(kg/cm^2)	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

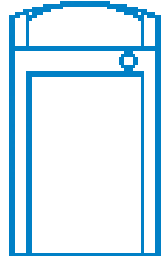| Category	Features
Gelatin	Gelatin Low density and weak bonding strength. No need to heat.
Dextrin	While it has excellent disintegrating and formability, the binding strength is weak.
Potato starch	Good granulation properties and inexpensive. Used in the pharmaceutical and food sector.
Arsinic acid 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						Test time (min)	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)			
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)

Yamato Scientific America

Innovating Science for over 130 Years

Sterilizer Catalog

Contents

STERILIZER OVERVIEW

☐ STEAM Sterilization   ☐ DRY Sterilization

Benchtop   Compact

SK
Internal Capacity: 18L

SK
24, 30L

- Low cost, 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: 85, 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

Standard dry sterilization

SI
Internal Capacity: 77, 159L

- Dry heat sterilization through natural convection
- Programmable: 6 patterns, 30 steps
- Temp. rising time to 260°C: ~70min.

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.

Benchtop Sterilizer

SK101C/111C

Operating temp. range	50°C to 126°C		Max. operational Pressure	0.142MPa		Internal capacity	18L

Space-saving, economical benchtop sterilizer, ideal for research facilities

■ Easy to use
- Benchtop size - 18 Liter
- Powerful 1500W pipe heater
- Easy to read 4 digit LED display
- Built in Drain Valve for easy cleaning
- Programmable sterilizing and temperature functions
- Timer Setting Range 0 to 999 min.
- Space-saving

■ Increased Safety Features
- Water level detection sensor with alarm
- Overheat Protection Sensor
- Lid closure sensor (Inter lock)
- Pressure Lamp Indicator
- Increased chamber wall thickness (2mm)
- New improved silicon lid gasket

■ Specifications

Model	SK101C	SK111C
System	Automatic high pressure steam sterilizer	
Temp. setting range	50 to 126°C	
Max. operational pressure	0.142MPa (at 126°C)	0.2MPa
Interior Material	Stainless steel SUS 304	
Heater	1500 W Stainless Steel Heating Pipe	
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.	
Safety Device	Pressure safety valve, Low water sensor, Dual exterior walls, built in Inter-lock sensor	
Internal dimensions	Dia.280 x D275 mm	
External dimensions	Dia.343 x D550 mm	
Internal capacity	18L	
Power source 50/60Hz	AC 115V, 15A *with plug*	AC 220V, 9A *no plug, round terminal*
Weight	~17.5Kg	
Included accessories	1 stainless steel mesh basket (254mm x 240mm) and stainless steel bottom plate	

Control Panel

- 4 digit LED display

Key Features

- Drain valve for easy clean up

- New lid closure sensor (Inter-Lock)

- Low water sensor prevents damage by sounding an alarm and stopping all operations until water is refilled

Compact Sterilizer

SK200C/210C/300C/310C

Operating temp. range	50°C to 126°C	Max. operational pressure	0.142 MPa	Internal capacity	24L (SK200C/210C) 30L (SK300C/310C)

SK300C

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

■ **Easy to use**
● Space-saving size - 24 / 30 Liter
● Mobile on wheels
● Powerful 1500W 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 (Inter lock)
● Pressure Lamp Indicator
● New improved silicon lid gasket

■ **Specifications**

Model	SK200C	SK210C	SK300C	SK310C
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	1500W Stainless Steel Heating Pipe			
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.			
Safety Device	Pressure safety valve, Low water sensor, Dual exterior walls, Built in inter-lock sensor			
Internal dimensions	Dia.280 x D360 mm		Dia.280 x D440 mm	
External dimensions	W353 x D386 x H737 mm		W353 x D386 x H827 mm	
Internal capacity	24L		30L	
Power source 50/60Hz	AC 115V, 15A *with plug*	AC 220V, 9A *no plug, round terminal*	AC 115V, 15A *with plug*	AC 220V, 9A *no plug, round terminal*
Weight	~26.5Kg		~31.5Kg	
Included accessories	1 stainless steel mesh basket (Dia. 254mm x H 331mm), 1 pc, stackable plate and stainless steel bottom plate		1 stainless steel mesh basket (Dia. 254mm x H 409mm), 1 pc, stackable plate and stainless steel bottom plate	

Control Panel

● 4 digit LED display

Key Features

●Three way Drain Valve Handle

● Casters (lockable front)

Standard Laboratory Sterilizer

SN300C/310C/500C/510C

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
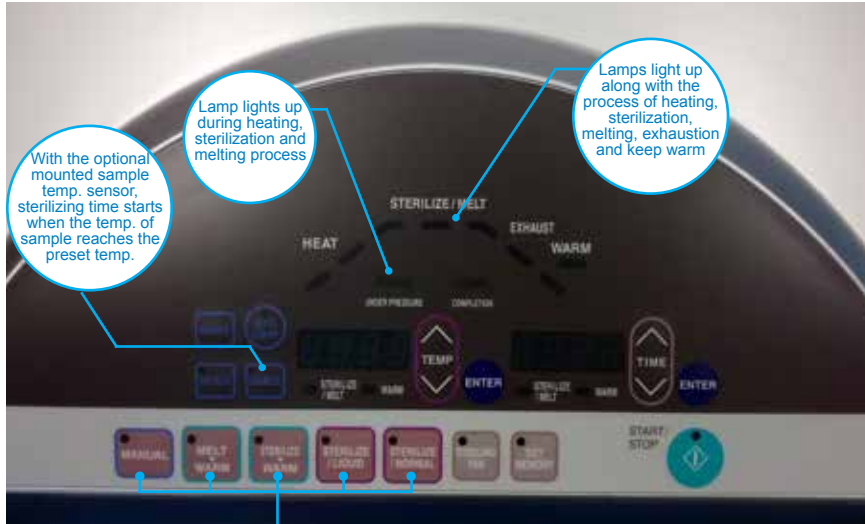
32L
SN300C

47L
SN500C

- 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	SN300C	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 1068	
Internal dimensions of chamber	I.D.300 x D445 mm		I.D.300 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 (Dia.262 x D204mm), OSM-70		3 pcs. stainless steel mesh basket (Dia.262 x D204mm), OSM-70	
	Vapor cup x 1, Drain bottle x 1, Drain board x 1, Chemical indicator 1 set (30 pieces), Filter x 1			

■ Control panel

With the optional mounted sample temp. sensor, sterilizing time starts when the temp. of sample reaches the preset temp.

Lamp lights up during heating, sterilization and melting process

Lamps light up along with the process of heating, sterilization, melting, exhaustion and keep warm

HEAT   STERILIZE / MELT   EXHAUST   WARM

Choose a sterilization program

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

Optional chart recorder

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

Baskets with adjustable stainless steel perforated plate

Mesh baskets

Stainless solid baskets

Baskets with stacking fittings

● Stainless baskets

● Stainless buckets

Product code	Model	Description	Corresponding models
241088	OSM-70	Mesh basket	SN300C/310C/500C/510C
241089	OSM-80		SN500C/510C
241092	OSQ-40	Mesh basket with stacking fittings	SN300C/310C, with two fittings
241091	OSQ-50		SN500C/510C, with three fittings
241095	OSQ-70	Mesh basket with adjustable stainless steel perforated plate	SN300C/310C, with 1 plate
241094	OSQ-80		SN500C/510C, with 2 plates
241084	OSR-20	Stainless solid basket	SN300C/310C/500C/510C
241151	OSN12	Stainless bucket	SN300C/310C/500C/510C
Please specify when ordering main unit		Chamber temp. sensor	Type T thermocouple, 3 pcs./set
		Sample temp. sensor	Type T thermocouple, 1 pc.
		External alarm output terminal	
		Temp. output terminal	4 - 20 mA
		Time-up output terminal	Relay, contact output

Large Capacity Laboratory Sterilizer

SQ500C/510C/810C

| 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
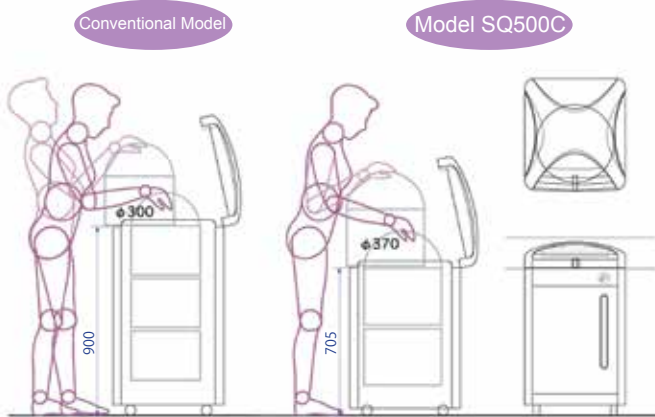

50L
SQ510C

80L
SQ810C

- 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
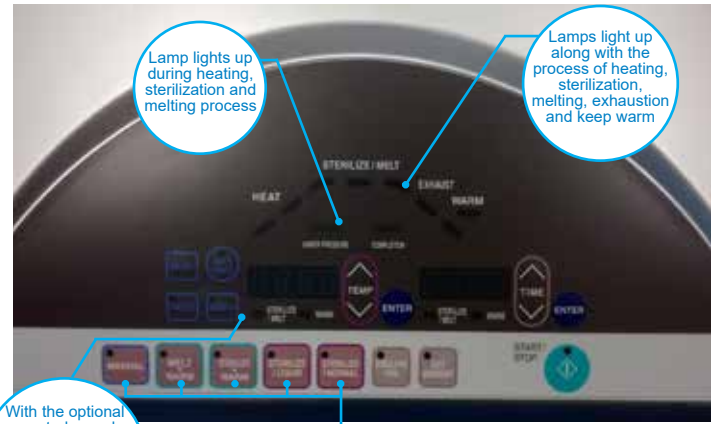- Self-diagnostic functions

■ 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 (Dia.332 x D195.5mm), OSQ-90		3 pcs. stainless steel mesh basket (Dia.332 x D195.5mm), OSQ-90
	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)

Conventional Model

Model SQ500C

■ Control panel

Lamp lights up during heating, sterilization and melting process

Lamps light up along with the process of heating, sterilization, melting, exhaustion and keep warm

With the optional mounted sample temp. sensor, sterilizing time starts when the temp. of sample reaches the preset temp.

Choose a sterilization program

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

Baskets with stacking fittings

241090

● Stainless baskets

Mesh baskets

241099

● Stainless buckets

Product code	Model	Description
241099	OSQ-90	Mesh basket
241090	OSR-40	Mesh basket with 2 stacking fittings
241097	OSR-50	Mesh basket with 1 adjustable stainless steel perforated plate
241152	OSN14	Stainless bucket
Please specify when ordering main unit.		Chamber temperature sensor
		Sample temperature sensor
		Pressure gauge
		External alarm output terminal
		Temperature output terminal
		Time-up output terminal

Large Capacity Laboratory Use Sterilizer

SQL810C/1010C

| Operating temp. range | 45°C to 135°C | Max. operating pressure | 0.26 MPa | Internal capacity | 85L (SQL810C) / 110L (SQ1010C) |

High-performance, easy operation and ergonomically designed sterilizer featuring easy top loading and handling of samples
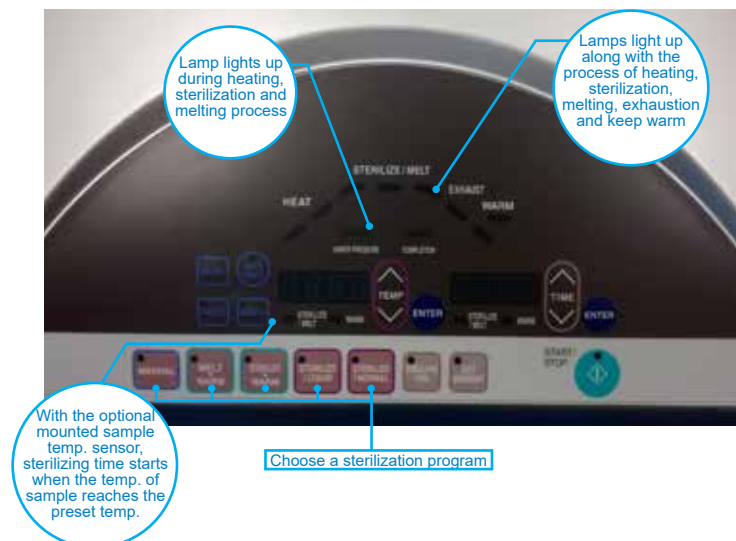
85L
SQL810C

110L
SQL1010C

- 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	SQL810C	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 997 mm	680 x 760 x 1154 mm
Internal dimensions of chamber	I.D.450 x D535 mm	I.D.450 x 692 mm
Internal capacity	85L	110L
Weight	~145kg	~170kg
Power source	AC220V 19A *no plug, round terminal*	
Included accessories	2 pcs. stainless steel mesh basket (Dia.424 x H200 mm)	3 pcs. stainless steel mesh basket (Dia.424 x H200 mm)
	Vapor cup x 1, Drain bottle x 1, Drain board x 1, Filter x 1	

* External dimensions exclude protrusions

SQL810C/1010C

■ Control panel

Lamp lights up during heating, sterilization and melting process

Lamps light up along with the process of heating, sterilization, melting, exhaustion and keep warm

With the optional mounted sample temp. sensor, sterilizing time starts when the temp. of sample reaches the preset temp.

Choose a sterilization program

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
H060601028	Mesh basket Φ424×H200

Standard Laboratory Sterilizer With Dryer

SM201/211/301/311/501/511

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

20L
SM201

32L
SM301

47L
SM511

- 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
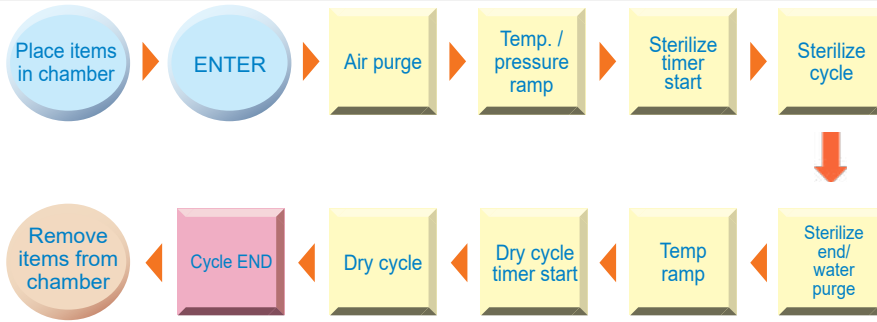- Condensation collector neutralizes high temperature exhaust steam safely

■ 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 (Dia.205 x D204mm), OSM-60		2 pcs. stainless steel mesh basket (Dia.262 x D204mm), OSM-70		2 pcs. stainless steel mesh basket (Dia.262 x D315mm), OSM-80	
		Drain board x 1, chemical indicator strips (30 strips) 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

Place items in chamber → ENTER → Air purge → Temp. / pressure ramp → Sterilize timer start → Sterilize cycle

Sterilize end/ water purge → Temp ramp → Dry cycle timer start → Dry cycle → Cycle END → Remove items from chamber

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

Baskets with adjustable stainless steel perforated plate

Mesh baskets

Stainless solid baskets

Baskets with stackable fittings

Output terminal

Product code	Model	Description	Dimension	Corresponding models
241087	OSM-60	Mesh basket Pitch 8.5mm	205x204mm	SM201 / 211
241088	OSM-70		262x204mm	SM301 / 311
241089	OSM-80		262x315mm	SM501 / 511
241085	OSQ-10	Mesh basket Pitch 2.5mm	189x161mm	SM201 / 211
241086	OSQ-20		249x203mm*	SM301 / 311 / 501 / 511
241093	OSQ-30	Mesh basket with stacking fittings	168x162mm with 2 fittings	SM201 / 211
241092	OSQ-40		246x162mm with 2 fittings	SM301 / 311
241091	OSQ-50		246x162mm with 3 fittings	SM501 / 511
241096	OSQ-60	Mesh basket with adjustable stainless steel perforated plate	200x390 with 1 plate	SM201 / 211
241095	OSQ-70		260x391 with 1 plate	SM301 / 311
241094	OSQ-80		200x590 with 2 plates	SM501 / 511
241083	OSR-10	Stainless solid basket	210x200	SM201 / 211
241084	OSR-20		270x200	SM301 / 311 / 501 / 511
241073	OSM-40	Temperature output terminal	Customized. Must be specified at time of order	
241074	OSM-30	Time-up output terminal		
241075	OSM-20	External alarm output terminal		
241076	OSM-50	Interior temp. gauging sensor		

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

Large Capacity Laboratory Sterilizer With Dryer

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

- 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

50L SM530

80L SM830

■ **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 (Dia.332 x D195.5mm) OSQ-90		3 pcs. stainless steel mesh basket (Dia.332 x D195.5mm) OSQ-90	
		Drain board x 1, drain bottle x 1, chemical indicator 1 set, filter x 1, droplet tray x 1			

Control Panel

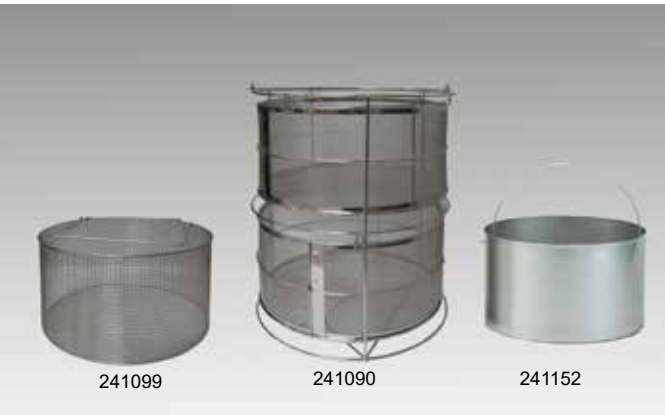Instrument Sterilize Program

Instrument Sterilize operation

Sterilize & Dry Program
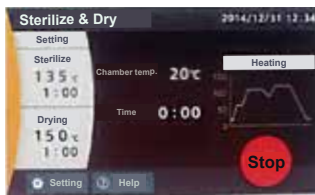
Sterilize & Dry operation

Optional items

241099   241090   241152

Baskets and buckets

Product code	Model	Description
241099	OSQ-90	Mesh basket
241090	OSR-40	Mesh basket with 2 stacking fittings
241097	OSR-50	Mesh basket with 1 adjustable stainless steel perforated plate
241152	OSN14	Stainless bucket
Please specify when ordering main unit		Chamber temperature sensor
		Sample temperature sensor
		Pressure gauge
		External alarm output terminal
		Temperature output terminal
		Time-up output terminal

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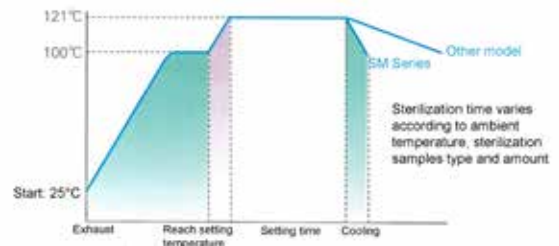
- Cooling fan starts after sterilization operation
- Cool down to safe temperature
- Time saving
- Optional between forced cooling and natural cooling

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

SI402-115V SI402-220V / SI602-115V SI602-220V

Operating temp. range	Room temp. +5~260°C	Temp. distribution accuracy	±6°C (at 260°C)	Internal capacity	77L (SI402)	159L (SI602)

Natural convection hot air sterilizer with program function

■ **Operation and function**
- Programmable
- Improved temperature controller with better operability
- Digital setting by main menu and ▲/▼ keys for fixed temperature, program, quick auto stop, auto stop and auto start operations
- Standard equipped with calibration offset, lock function, power failure recovery mode
- Maximum 30 steps, 6 patterns, repeat operation

■ **Safety features**
- Standard equipped with self diagnostic functions, earth leakage breaker and overheat prevention device

77L
SI402-115V
SI402-220V

■ **Specifications**

Model	SI402-115V	SI402-220V	SI602-115V	SI602-220V
Circulation method	Natural convection			
Temp. setting range	Room temp. +5~260°C			
Temp. control accuracy	±1°C (at 260°C)			
Temp. fluctuation	3°C (at 260°C)			
Temp. distribution accuracy	±6°C (at 260°C)			
Temperature gradient	20 °C (at 260 °C)			
Temp. rising time	~70 min. (RT to 260°C)			
Interior / Exterior material	Stainless Steel / Chrome free electrogalvanized carbon steel sheet coated with chemical-proof baked-on finish			
Insulation Material	Glass wool			
Heater type / capacity	Iron chromium wire heater 1.2kW		Iron chromium wire heater 1.36kW	
Sensor	K type thermocouple for temperature control and overheat prevention			
Exhaust port	I.D. 30mm x 2 (on top)			
Temperature control	PID control by microprocessor			
Temperature setting system	Digital setting with menu keys and the ▼▲ keys			
Temperature display system	Temp. display: Green 4-digit LED Digital Display (increment: 1°C) Setting temp. display: Red 5-digit LED Digital Display (increment: 1°C)			
Timer	0 to 99 hours 59 minutes, 100 hours to 999 hours 50 minutes			
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 function	Fixed temperature, Program, Program auto start, Auto stop, Auto start, Quick auto stop operations			
Program modes	6 patterns (PrG1: 30 steps, PrG2-3: 15 steps, PrG4-6: 10 steps), Step wait, Repeat, Step hold, Step skip functions			
Additional functions	Calibration offset, Keypad lock, Auto resume mode select			
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), Overcurrent ELB, Overheat prevention device			
Internal dimensions (WxDxH)	450 x 430 x 400mm		600 x 530 x 500mm	
External dimensions (WxDxH)	550 x 540 x 777mm		700 x 640 x 877mm	
Internal capacity	77L		159L	
Shelf plate with standard load	~15kg/pc			
Shelf rest step number / pitch	10 steps / 30mm		13 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*
Weight	~42kg		~59kg	
Included accesories	Shelf plate / bracket: Perforated stainless steel plate			
	2 pcs. / 4 pcs. Bottom most plate is secured by screws.			

* Conditions: temperature 23°C±5°C, humidity 65%rh±20% (no load)

Method

[Side view]

Exhaust port

Door

Chamber

Heater
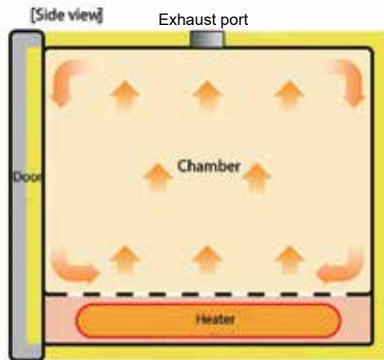
Control Panel

Interior

■ Optional items

| Description	Product code
Stand ONS60	212802
Stacking hardware with insulation ODK82 (for SI401/402)	212804
Stacking hardware with insulation ODK84 (for SI601/602)	212805
Shelf and bracket set for SI401/402	212095
Shelf and bracket set for SI601/602	212266
Seismic mat (set of 4 pcs.)	296902
*External communications adaptor kit (RS485-USB conversion)	281146
*External communication terminal (RS485) for SI402 for SI602	281190 281249
*External alarm output terminal for SI402 for SI602	281196 281250
*Time-up output terminal for SI402 for SI602	281246 281251
*Temperature output terminal for SI402 for SI602	281247 281252
*Independent overheat prevention device for SI402 for SI602	281248 281253

* Please specify when ordering main unit.

Shelf and bracket set

Seismic mat

Stacking clamp
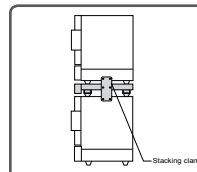
ODK Stacking hardware

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

Laboratory Dry Sterilizer

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

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

| 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 off-set, 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
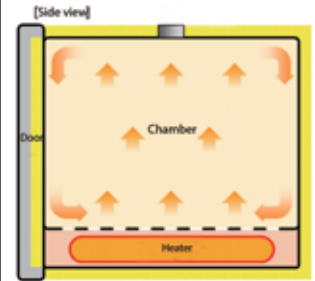
99L
SK401-115V
SK401-220V

162L
SK601-115V
SK601-220V

(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.	

300L
SK811

Control Panel

Method

[Side view]

Door | Chamber | Heater

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.

Dimensions (mm)

400
95
820
560
SK401

450
95
870
600
710
650
SK601

450
275
1640
710
650
SK801/811

Temperature Rising Curve

Temperature (°C) vs Time (min.)
SK401
SK601
SK811
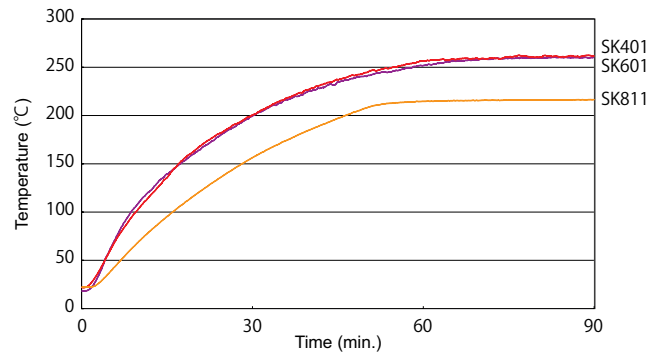
9 Points of Distribution Reference Data (SK811, no load, setting temp. 180°C)

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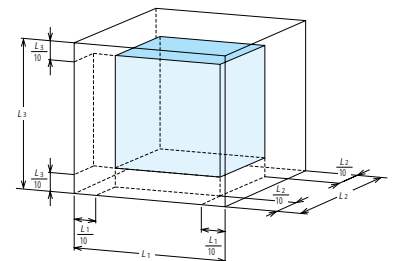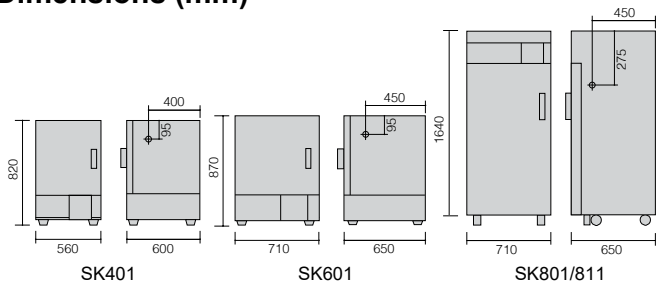
⚠ Attention
● Never use in flammable or explosive gas atmosphere.
● Never use explosive or flammable material.
● Caution: High temperature components.

Containers

Product code	Basket model	Description	Dimensions	Suitable models
H060303020	-	Mesh basket	ø254 x H240mm	SK101C/111C
H060303038	-	Mesh basket	ø254 x H331mm	SK200C/210C
H060303037	-	Mesh basket	ø254 x H409mm	SK300C/310C
H060601028	-	Mesh basket	ø424 x H200mm	SQL810C/1010C
241085	OSQ-10	Mesh basket (pitch 2.5 mm)	ø190 x H159mm	SM201/210
241086	OSQ-20	Mesh basket (pitch 2.5 mm)	ø250 x H201mm	SM301/311/501/511
241087	OSM-60	Mesh basket (pitch 8.5 mm)	ø205 x H204mm	SM201/210, SN200C/210C
241088	OSM-70	Mesh basket (pitch 8.5 mm)	ø262 x H204mm	SM301/311/501/511, SN300C/310C/500C/510C
241089	OSM-80	Mesh basket (pitch 8.5 mm)	ø262 x H315mm	SM501/511, SN500C/510C
241090	OSR-40	Mesh basket with 2 stacking fittings	ø326 x H165mm	SQ500C/510C/810C, SM520/530/820/830
241091	OSQ-50	Mesh basket with 3 stacking fittings	ø246 x H162mm	SM501/511, SN500C/510C
241092	OSQ-40	Mesh basket with 2 stacking fittings	ø246 x H162mm	SM301/311, SN300C/310C
241093	OSQ-30	Mesh basket with 2 stacking fittings	ø168 x H162mm	SN200C/210C, SM201/210
241094	OSQ-80	Mesh basket with 2 perforated plates	ø200 x H590mm	SM501/511, SN500C/510C
241095	OSQ-70	Mesh basket with 1 perforated plate	ø260 x H390mm	SM301/311, SN300C/310C
241096	OSQ-60	Mesh basket with 1 perforated plate	ø200 x H390mm	SM201/210, SN200C/210C
241097	OSR-50	Mesh basket with 1 perforated plate	ø340 x H430mm	SQ500C/510C/810C, SM520/530/820/830
241099	OSQ-90	Mesh basket	ø332 x H196mm	SQ500C/510C/810C, SM520/530/820/830
241083	OSR-10	Stainless solid basket	ø210 x H200mm	SM201/210, SN200C/210C
241084	OSR-20	Stainless solid basket	ø270 x H200mm	SM301/311/501/511, SN300C/310C/500C/510C
241150	OSN-10	Stainless bucket	ø210 x H210mm	SM201/210, SN200C/210C
241151	OSN-12	Stainless bucket	ø270 x H210mm	SM301/311/501/511, SN300C/310C/500C/510C
241152	OSN-14	Stainless bucket	ø340 x H210mm	SQ500C/510C/810C, SM520/530/820/830

■ Mesh basket

H060303020   H060303037   H060601028   241087   241088   241089   241090

241091   241092   241094   241095   241096

■ Stainless bucket

241099   241150   241151   241152

■ Stainless solid basket

241083 / 241084

Plates and Inserts

Product code	Description	Suitable models
Q110603004	Stackable plate	SK200C/210C
Q110603005	Stackable plate	SK300C/310C
Q110603008	Stackable insert	SK200C/210C
Q110603009	Stackable insert	SK300C/310C

Stackable plate

Stackable insert

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
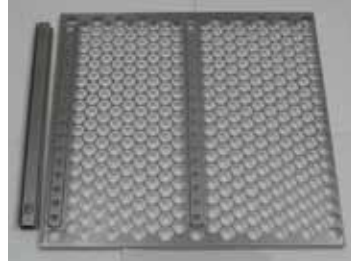
212246
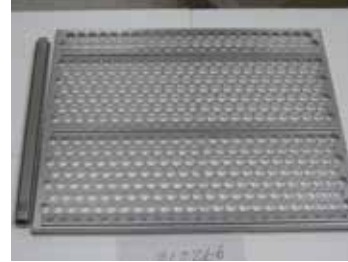
212266

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

Dimension (mm)

740   660

600

ONS60

ON61

Dimension (mm)

740   660

600

ON61

OT42/62

Dimension (mm)

560 (DT42)   610 (DT42)
710 (DT62)   660 (DT62)

611

OT models

Yamato Scientific America

Innovating Science for over 130 Years
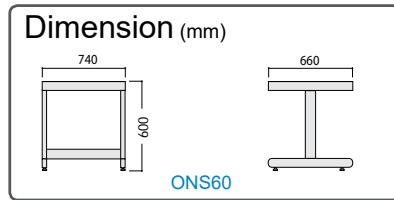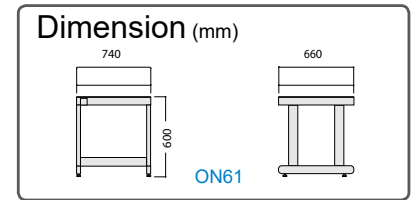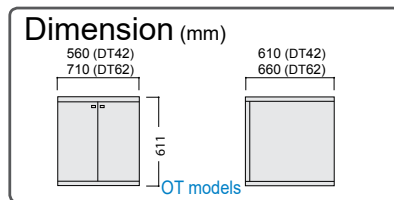
Yamato Stirrers and Shakers

Contents

Magnetic Stirrer with Hot Plate

MH301-115V MH301-220V / MH520-115V MH520-220V
MH800-115V MH800-220V / MG600H-115V MG600H-220V

| Stirring rate (rpm) | 400~1500 MH301 | 150~1150(50Hz)/150~1300(60Hz) MH520 | 100~1400 MH800 | 300~1500 MG600H | | Stirring capacity(ml) | 100~3000 MH301 | 50~5000 MH520 | 200~10000 MH800 | 100~2000 x 6 MG600H | | Plate max. temp. | 300°C MH301 | 325°C MH520 | 250°C MH800/MG600H |

MH301-115V
MH301-220V

MH520-115V
MH520-220V

MH800-115V
MH800-220V

Strong stirrer with ceramic coating material

MH301/800
- Hot plate is made of chemical resistant, heat conductive aluminum with ceramic coating
- Stirrable for high viscosity sample
- Volume knob type temperature control

High temperature / boiling type magnetic stirrer with hot plate

MH520
- Stable rotation brings better results
- Excellent temperature stability and temperature rising speed with the adoption of round plate with good thermal efficiency
- Chemical resistant ceramic coating hot plate
- Equipped with circuit protector
- Strong stirring capacity up to 5L
- 20~60mm stirrer bar available

■ Specifications

Model	MH301-115V MH301-220V	MH520-115V MH520-220V	MH800-115V MH800-220V
Plate material	Aluminum with ceramic coating		
Plate dimensions	W176xD151mm	ø168mm	W299xD285mm
Stirring capacity	100~3000ml	50~5000ml	200~10000ml
Stirring rate	400~1500rpm	150~1150rpm (50Hz) 150~1300rpm (60Hz)	100~1400rpm
Heater	400W	470W	1000W
Temp. control	Triac input control type		
Hot plate temp.	Max.300°C (set by volume with OFF)	Max.325°C	Max.250°C (set by volume with OFF)
Motor	AC motor, condenser motor	Induction motor, Phase control / electromagnetic brake combination	AC motor, condenser electronic control 3W
Power source (50/60Hz)	AC115V 4A AC220V 2.5A	AC115V 5.5A AC220V 3.5A	AC115V 10A AC220V 6A
External dimensions*	W184 x D202 x H114 mm	W190 x D223 x H123 mm	W309 x D315 x H151 mm
Weight	~2.6kg	~3.1kg	~6.7kg
Accessory	Stirrer bar 30mm 1pc.	Stirrer bar 30mm 1pc.	Stirrer bar 40mm 1pc.

* Protrusions excluded

■ MH520 optional item

Product code	Product name
231397	Tipping preventor

MH520+Tipping preventor (optional)

6 Points 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

MG600H-115V
MG600H-220V

■ Specifications

Model	MG600H-115V MG600H-220V
Plate material	Aluminum with ceramic coating
Plate dimensions	ø126mm x 6pcs.
Stirring capacity	100~2000ml x 6pcs.
Stirring rate	300~1500rpm
Hot plate	W230mm x 6pcs. Individual temp. control (set by volume with OFF)
Cooling	--
Heater	230W x 6pcs.
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	~14kg
Accessory	Stirrer bar 30mm 6 pcs.

* Protrusions excluded

Laboratory Flask Mixer

LM100/110/200/210 Series

Max. Speed Range	50 ~1000rpm

Max. Torque	0.1N•m

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

LM100

LM200
with Digital Display

■ 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

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)
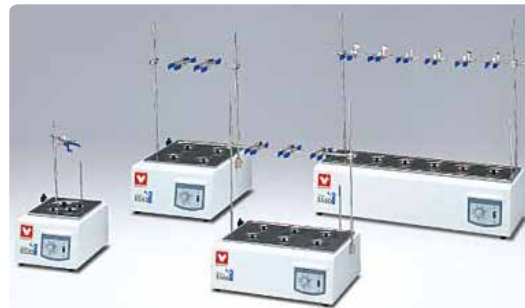
BS200/401/601/660

BM100/200/401

CF302L-A

BO601

BO500 + MB800

Laboratory Stirrer

LT400/500 Series

| Max. Speed Range | 3,000rpm (400 model) | 1,200rpm (500 model) | | Operation | Wide speed range / Wide torque range |

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

LT400B

*Operational accessories purchased separately

■ 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

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

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

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

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 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

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

AREC-F20500011 / AREC-F20510011

| Speed range | 50 ~1500 rpm | | Stirring capacity | 15L | | Overall power | 800W |

For general laboratory use and for all applications requiring precise regulation of stirring speed and heating plate temperature.

Ceramic heating plate obtains higher temperature compared to traditional aluminium heating plate and takes less time to heat the sample. Ceramic is an inert and very hard material resistant to almost any type of chemical or mechanical aggression. Its surface characteristics remain unaltered over time.

This magnetic stirrer is used to mix liquids using a magnetically driven stir bar placed inside the vessel. The size and shape of the magnetic stir bar determines the stirring efficiency at any given speed.

The instrument is turned on using the ON/OFF button. Stirring speed and temperature of the heating plate are adjusted using relative knobs on the front panel. Values are indicated on the digital display.

■ Specifications

Programmable temp. range	5°C~550°C
Type of temperature control	Digital
Overtemperature protection	Yes
Stirring capacity	15L of H_2O
Programmable speed range	50-1500 rpm
Type of motor control	Electronic
Noise level	<< 80 dBa
Temperature range	+5 ...+40°C
Storage temperature range	-10 ... +60°C
Maximum humidity	80%
Maximum altitude	4000m
Power supply	115V 60Hz (F20500011) 230V 50-60Hz (F20510011)
Dimensions WxHxD	203 x 94 x 344 mm
Weight	3.5 kg
Overall power	800W
Dimensions of the heating plate	180 x180 mm

	Magnetic stir bar ø6x35mm	A00001056
	Magnetic stir bar ø10x40mm	A00001060
	Magnetic stir bar ø9.5x60mm	A00001061
	Hemispheric bowl for 250ml flasks	A00001071
	Hemispheric bowl for 500ml flasks	A00001072
Optional accessories	Hemispheric bowl for 1000ml flasks	A00001073
	Support rod	A00001069
	Knob	10002097
	Foot	10000239

Magnetic Stirrer

Suitable for stirring heating baths

MB800-115V / MB800-220V

| 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

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

■ 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

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

Incubator IN604W with optional slide shaker stage and MK161 shaker

*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

Shaking rack for erlenmeyer flask holder clamp, inclination type

Shaking rack for test tube, inclination type

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.

Compact Shaker

MK201D-115V MK201D-220V

Rotary and reciprocate shaking motion

- Compact, space-saving design
- Changeable rotary and reciprocate motion for mixing, extracting and stirring of samples
- Digital display of shaking frequency
- Equipped with shaking timer
- Easy to assemble and remove accessories
- Various shaking modes when used with different shaking stages and racks
- Can be placed inside IN604W incubator for shaking incubation

■ Specifications

Model	MK201D-115V MK201D-220V
Shaking mode	Rotary and Reciprocate (manual operation)
Shaking range	Rotary: 30mm Reciprocate: 30mm
Shaking frequency	20~200rpm, Random adjustment
Display type	Digital
Timer	0.5sec.~100hrs.
External dimensions	W442 x D415 x H130mm
Weight	19kg
Power source (50/60Hz)	AC115V ~2A AC220V ~1.3A

■ Operational accessories

Shaking rack for erlenmeyer flask clamp, fixed type

Product code	Capacity	No. of clamps
232170	100ml	20pcs.
232171	200ml	10pcs.
232172	300ml	6pcs.
232173	500ml	4pcs.
232174	1,000ml	2pcs.

Shaking rack for erlenmeyer flask clamp, inclined type

2 sets example (inclination stage sold seperately)

For 1 set		
Product code	Capacity	No. of clamps
232175	100ml	8pcs.
232176	200ml	4pcs.
232177	500ml	2pcs.

Shaking rack for spitz tube

2 sets example (inclination stage sold separately)

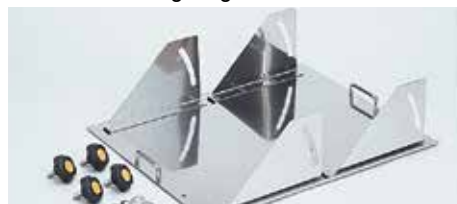| For 1 set |
|---|
| Size 15ml   12pcs. |
| E.D.ø16.5 x L110mm or less |
| Product code: 232178 |

Shaking rack for centrifugal tube

2 sets example (inclination stage sold seperately)

For 1 set
Size 50mL   8pcs.
E.D. ø30 x L110mm or less
Product code: 232179

Inclination setting stage

Necessary in tilt cases, up to 2 sets
Product code: 232078

Shaking rack with sticky non-skid sheet

W400 x D330mm   Material: silicon rubber
Product code: 232182

(For flat bottom flask use only)

Shaking rack for SUS spring almighty type A

A type: for polyethylene bottle
Size 250ml   up to 9pcs.
Product code: 232180

Shaking rack for SUS spring almighty type B

B type: for erlenmeyer flask and test tube
17 x 15 = 255 grids
Product code: 232181

Two layer shaking rack for SUS spring almighty type C

C type: for erlenmeyer flask and test tube
For erlenmeyer flask
100ml x 16pcs, 200ml x 10pcs,
500ml x 4pcs, 1,000ml x 2pcs.
For test tube ø16mm x 105pcs. when 45°inclination
Product code: 231398

*Glassware and polyethylene bottles not included.

Laboratory Shaker

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

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

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

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Vented Balance Enclosures

Contents

NOTES

Vented Balance Enclosures

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

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 Work Surface	Outside Dimension
VBE204/214	23.5" wide x 21" deep 597mm x 533mm	24" wide x 28" deep x 41" high 609 x 711 x 1041 mm
VBE306/316	35.5" wide x 21" deep 901mm x 533mm	36" wide x 28" deep x 41" high 914 x 711 x 1041 mm
VBE408/418	47.5" wide x 21" deep 1206mm x 533mm	48" wide x 28" deep x 41" high 1219 x 711 x 1041 mm
VBE600/610	59.5" wide x 21" deep 1511mm x 533mm	60" wide x 28" deep x 41" high 1524 x 711 x 10414 mm
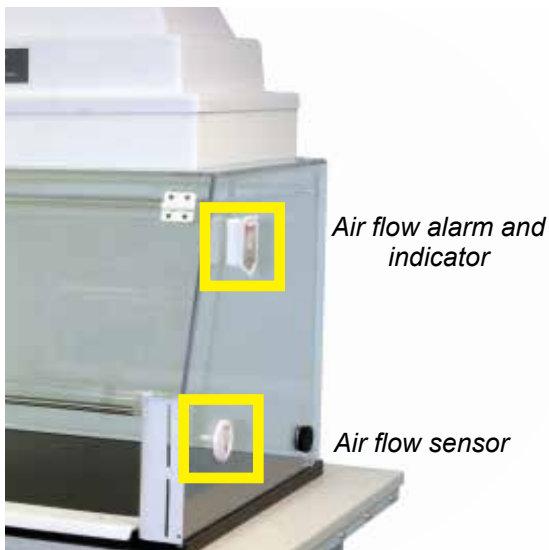
Air flow alarm and indicator

Air flow sensor

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

■ 800-BIBO/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.

■ 800-BIBO/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	Model
900-CARTLIFT/24	VBE204/214
900-CARTLIFT/36	VBE306/316
900-CARTLIFT/48	VBE408/418
900-CARTLIFT/60	VBE600/610

■ Extraction Units

900-EXTRACT

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
900-LVFH/HEPA	HEPA filter
900-LVFH/Carbon	Impregnated carbon filter
900-LVFH/HEPA/CARB	Combination. HEPA / Non-Impregnated Carbon Filter
900-LVFH / CARBN(A)	Alkaline type fumes
900-LVFH / CARBN(B)	Ammonia or amines
900-LVFH / 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

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Water Circulators & Cold Traps

Contents

CF-302LA / CF-312LA   CF800   CA301   CA801

Water Circulator (Chiller)   **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

Combination Example

In combination with a rotary evaporator

CF302LA + RE Rotary Evaporator + RT200 + Vacuum Pump

In combination with a vacuum oven

Exhaust

DP63C Vacuum Oven + CA801 + Vacuum Pump

Specifications

Type	Series	Max. lowest temperature	Dehumidifying capacity	Capacity (L)	Features	Application	Recommended in combination with
Water Circulator (Chiller)*	CF302LA CF312LA	-20°C to 30°C *no heating function*	N/A	3.9L	● 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 CF800	● Used for many cooling applications	Rotary evaporator
	CF800	-20°C~Room temperature	N/A	16L			
Cold Trap	CA301	-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 ● CA801 designed with defrosting mechanism (hot gas bypass) ● 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
	CA801	-85°C	Max 1.0 kg (water type liquid)	4L			

Water Circulator (Chiller)

Powerful closed circulation system with excellent cooling capacity

CF-302LA CF-312LA / CF800-115V CF800-220V

Operating temp. range	-20°C~30°C (CF302LA/CF312LA)	-20°C~RT (CF800)

Capacity	~3.9L (Liquid vol. 3.5L) (CF302LA/CF312LA)	-~16L (Liquid vol. 14L) (CF800)

CF-302LA
CF-312LA

CF800-115V
CF800-220V

Common to all models
- Environment friendly coolant used for refrigeration
- Compact and space-saving to fit on laboratory tables and limited space

CF302LA / CF312L-A
- User-friendly controller
- Easy maintenance of air intake filter
- Rotatable connector which can freely be moved and be set in the desired orientation
- Convenient drainage of waste water
- Environment friendly coolant used for refrigeration
- Features calibration offset function which compesates discrepancy between actual liquid temperature and display temperature
- Auto resume function allows user to select whether to resume operation or to remain at standby at the time of recovery from power failures

CF800-115V / CF800-220V
- Waterproof touch panel with big LED display and sheet key for easier setting
- Less energy use and less cooling capacity loss by fixing the heat-resistant lid
- Powerful cooling and big energy saver in combination with rotary evaporator distillation
- Up to 4 rotary evaporators can be connected saving investment and operation cost

■ Specifications

Model	CF-302LA CF-312LA	CF800-115V CF800-220V
System/circulating water	Closed circulation/tap water, anti-freeze solution (below 10°C)	
Operating ambient temperature	5 to 35°C	
Temp. setting range	-20°C ~ 30°C (no heating function) [*1]	-20°C ~ Room temperature
Temperature control accuracy (JTM K05)[*2]	±1.0 °C (≥ 0°C) ±1.5 °C (≥ 0°C)	±1.5°C at 10°C
Temperature fluctuation (JIS)[*2]	3.0 °C (≥ 0°C) 4.0 °C (≥ 0°C)	-
Cooling capacity (liquid temp) [*2]	~420W at liquid temp. 10°C ~280W at liquid temp. -10°C	~1050W (830Kcal/h) at Liquid Temp. 10°C ~910W (780Kcal/h) at Liquid Temp. 0°C ~670W (570Kcal/h) at Liquid Temp. -10°C
Max. flow rate [*3]	~ 10L/min.	50Hz: ~16.9L/min 60Hz: ~19.6L/min
Max. head [*3]	~ 5.7m	10.3m / 14.3m
Temperature control system	Refrigeration ON-OFF	
Temperature sensor	Pt100Ω	T-Thermocouple (with SUS Protection Tube)
Controller	White LED digital display, key entry, minimum digit of 1°C	Digital setting / LED display
Refrigeraton system/rated performance	Air cooling/450W	Air cooling, 600W
Refrigerant	R404A	
Cooling Coil	Copper/Nickel plating	
External circulation connection port	One touch connector (swivel type, L type) / Flow rate valve (optional)	Outer diameter: 10.5mm (both discharge and return) with hose nipple
Circulation pump	15W 20W	Magnet pump 65W 65W
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	Electric leakage breaker, refrigerator over load relay, pump thermal protector, refrigerator-protection delay timer
Other functions	Drain hose, condensate drain hose, Intake dust filter, cooling operation key, circulating pump key, calibration offset, Auto resume function	Overflow, Drainage cook Service power outlet (Aspirator unit power supply use)
Water bath material	Stainless steel	
Water bath capacity	~3.9L (Liquid volume 3.5L)	~16L (Liquid Amount 14L)
Power source	AC115V 7.5A with plug AC220V 4A no plug, round terminal	AC115V 13.5A with plug AC220V 7A no plug, round terminal
External dimension (WxDxH) mm (including protrusions)	205 x 396 x 535 (225 x 434 x 564)	355 x 480 x 1060
Weight	~31kg	~80kg
Included accessories	Condensate drain hose(1m)(1), Hose clamp (2), Hose nozzle (for flexible hose connection)(2)	Top cover, 0.5m long drain hose, 3m long circulation hose, wire clampx2

*[*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 (CF302/312) and 23°C (CF800).*

Features of CF-302LA / CF-312LA

■ **Control Panel**

■ **Discharge port, Return port (top view)**

■ **Drain plug (right side)**

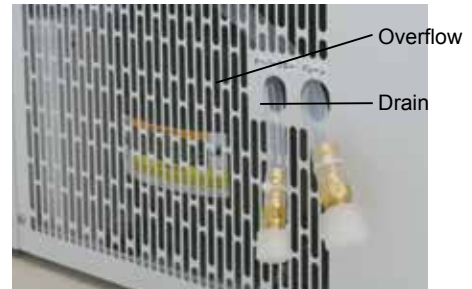# Features of CF800

■ **Control Panel**

■ **External Circulation Nozzle (back view)**

■ **Drain, Overflow (left side)**

■ **Installation of one touch rotation L-shaped nozzle**

■ **Optional items**

CF-302LA/312LA

Product code	Product name	Standard
LT00039314	One touch connector (L-type)	R3/8
LT00039316	Hose nozzle	10 mm OD connectors for flexible hose with 9 mm I.D.
CF30243000	Intake dust filter	Front air intake
CF30241060	Drain plug	For 12mm ID hose
LT00007489	Silicon hose	φ12 × φ16 mm 1.0 m Condensate drain hose (included)
LT00036771	Strainer	20 mesh
LT00039454	Inner collar	Applicable hose: φ6.5 × φ10 mm

CF800

Product code	Product name	Specifications
221581	Circulation insulation hose	ø9 2m×2pcs
221596	Straight circulation nozzle	ø8 Rc3/8
221394		ø10.5 Rc3/8
221399		ø13 Rc3/8
221395		ø16 Rc/8
221681	One touch fixing holder	ø10.5 Straight 2pcs/set
221682		ø13.7 Straight 2pcs/set
221683		ø10.5 L shape 2pcs/set
221684		ø13.7 L shape 2pcs/set
281440	Cast fixing holder	4pcs/set

Cold Trap

CA301-115V CA301-220V /CA801-115V CA801-220V

Maximum low temperature	-45°C (CA301)	-85°C (CA801)	Dehumidifying capacity	0.9kg (Water type liquid) (CA301)	1.0kg (Water type liquid) (CA801)

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 (CA301) and R600a and mixed coolants (CA801)
- Space saving and highly mobile on wheels

CA301-115V
CA301-220V

CA801-115V
CA801-220V

■ Specifications

Model	CA301-115V CA301-220V	CA801-115V CA801-220V
Method	Direct trap or Glass trap (optional)	
Dehumidifying capacity	Max. 0.9kg (water type liquid)	Max. 1.0kg (water type liquid)
Max. low temperature	-45°C	-85°C
Refrigerator	Air cooling, 400W	Air cooling, 350W x 2
Refrigerant	R404A	R600a, Mixed coolant
Cooling coil	ID ø90mm SUS304	Installed at tank periphery
Lid	OD ø17.6mm with nozzle, SUS304	
Bath shape / material	Cylindrical / SUS304	
Ambient temp. range	5~35°C	5~30°C
Temperature display	7 segment LED	
Temperature sensor	Platinum resistance temperature detector Pt100Ω	
Defrosting mechanism	N/A	Hot gas bypass
Safety device	Electric leakage breaker with over current protection, refrigeration overload relay	Electric leakage breaker with over current protection, refrigeration overload relay, refrigerator delay timer, refrigerator high voltage error, sensor disconnection error
Sink dimensions	I.D.153 x H235mm	
Internal capacity	~4L (Liquid 3L)	
Power source 50/60Hz	AC115V 4.3A AC220V 2.3A	AC115V 8.5A AC220V 4.5A
External dimension (mm) WxDxH	345x475x726	405x500x1040
Weight	~50kg	~65kg
Included accessories	-	Casters fixing holder x 4

■ Optional items

Product description	Product code
Glass condenser set OCA10	221487
Reducer for rubber tube	
brass ø30×ø18	242185
brass ø30×ø12	242186
SUS ø30×ø18	221496
SUS ø30×ø12	241497
SUS lid	281296
Caster fixing holder x 4	281440

Glass condenser set

Glass condenser

Stainless cover

Cooling Curve

No-load

Condition: 115V 50Hz Room temp. 20 ℃

CA301

No-load

Condition:115V 50Hz Room temp20℃
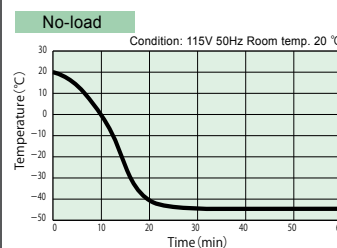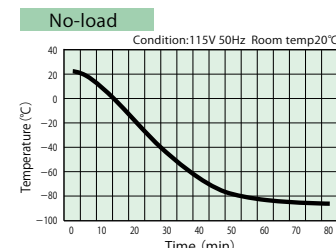
CA801

Application Examples

Combination with vacuum oven
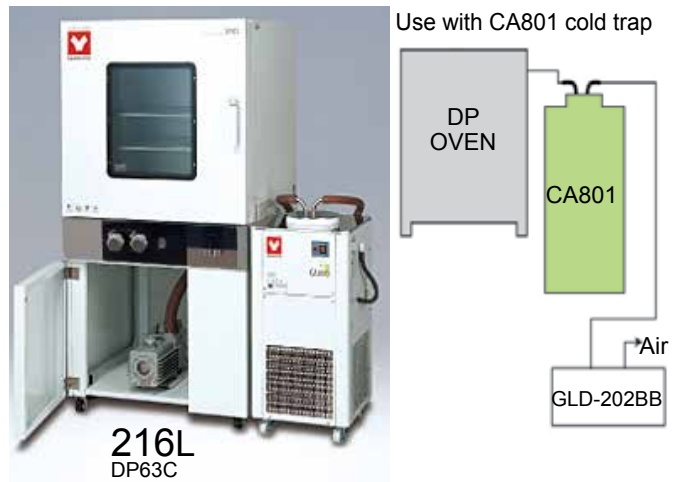
DP63C+CA801+Vacuum pump

Combination with rotary evaporator

CF302L-A+RE601+CA301+Vacuum pump

Sample Installation with CA801

216L
DP63C

Use with CA801 cold trap
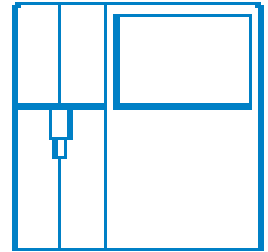

DP OVEN NW25 Flange

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

CA801

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

Yamato Scientific America

Innovating Science for over 130 Years

Yamato Water Purifiers

Contents

NOTES

Water Purifier - Auto Pure   Type 1 Water

For General Chemistry, Buffer Solutions, Academia

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

| 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

■ Specifications

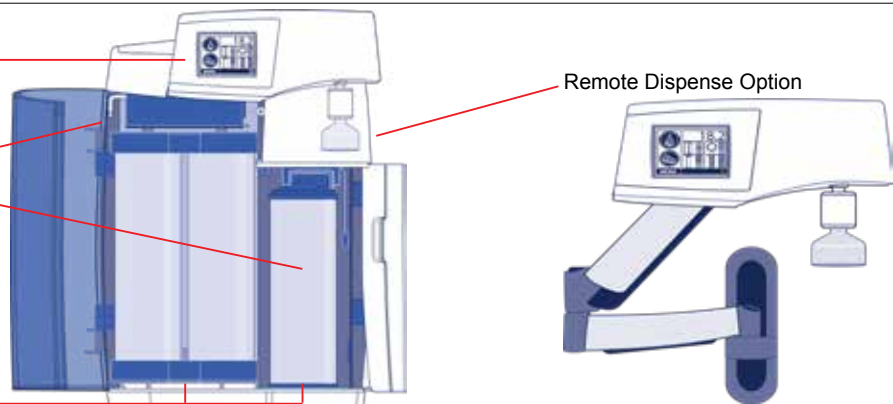| Model	WA301B/WA311B	WA301R/WA311R
Type	Benchtop	Remote dispense
Resistivity*	18.2 MΩ-cm	
Bacteria*	< 1 cfu/ml	
Particulates*	< 0.2 μm filtration	
TOC*	< 15 ppb	
Temperature	100˚F / 30˚C	
Pressure	90 PSIG Max. / 20 PSIG Min.	
Flow rate (typical)	0.67 Gallons Per Minute / 2.5 Liters Per Minute < 2.0 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

Intuitive Touch Screen Controls
Programmable Volume Dispense
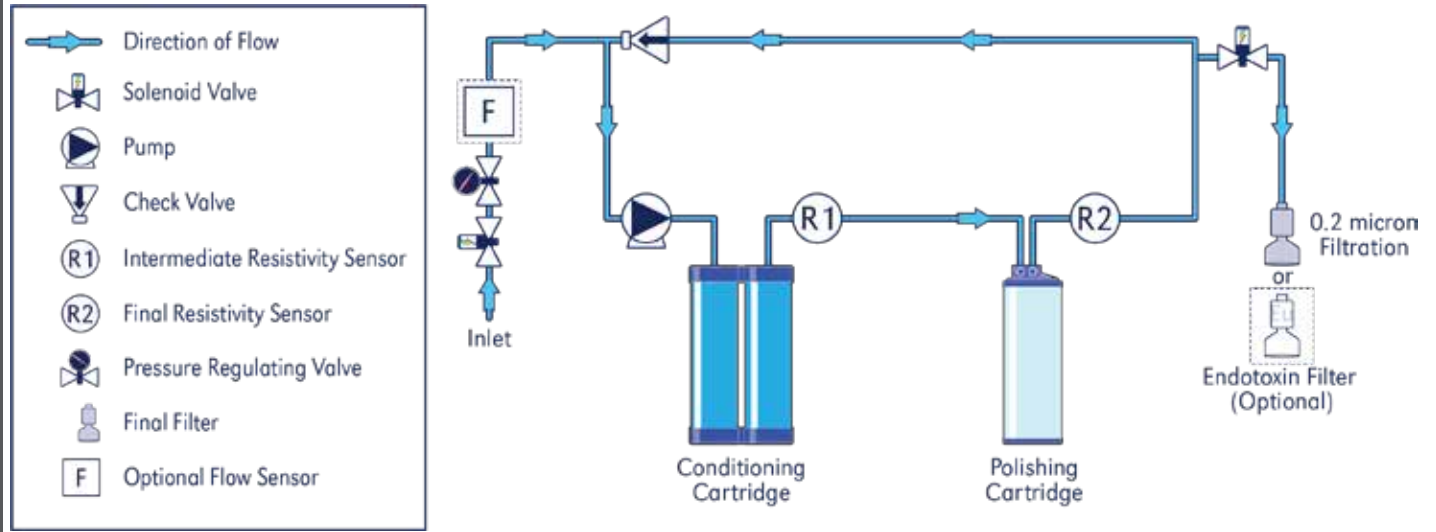Real-time Quality Monitoring & Alerts

Remote Dispense Option

Quick Change Cartridge Design

Large Capacity Cartridges filled
with Premium ResinTech Media

Flow Diagram

Legend:
- Direction of Flow
- Solenoid Valve
- Pump
- Check Valve
- (R1) Intermediate Resistivity Sensor
- (R2) Final Resistivity Sensor
- Pressure Regulating Valve
- Final Filter
- F Optional Flow Sensor

Inlet · F · Conditioning Cartridge · R1 · Polishing Cartridge · R2 · 0.2 micron Filtration or Endotoxin Filter (Optional)

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

Water Purifier - Auto Pure Type 1 Water

For HPLC, GC/MS, ICP-MS, Analytic Chemistry / Trace Organics

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

■ 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)
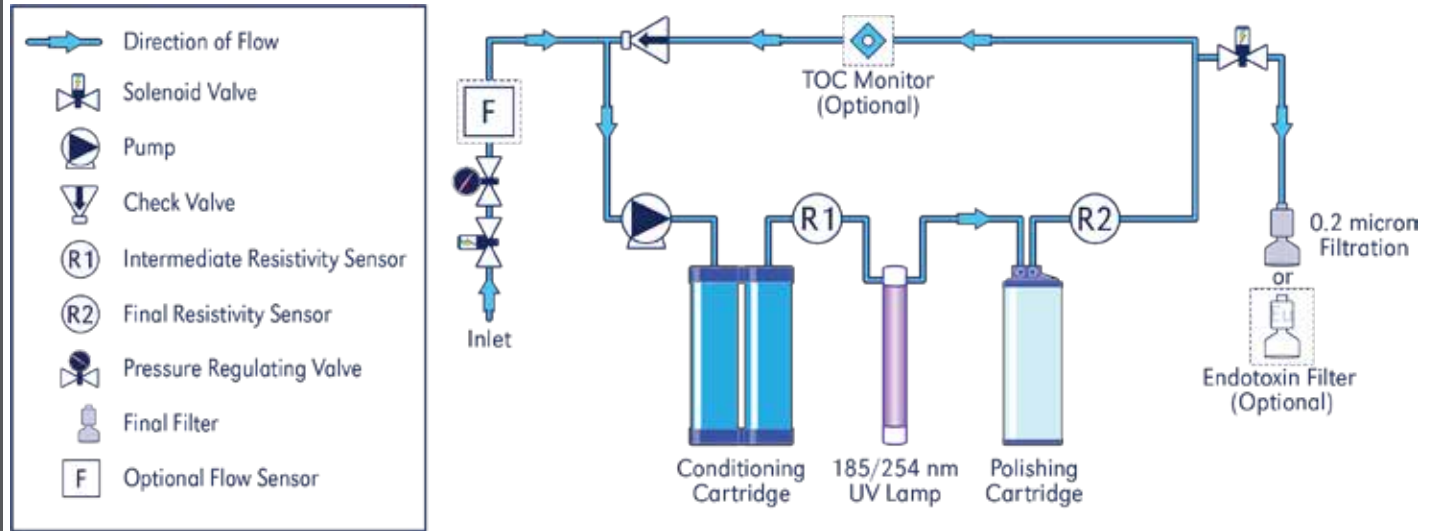
System Highlights

Intuitive Touch Screen Controls
Programmable Volume Dispense
Real-time Quality Monitoring & Alerts

Quick Change Cartridge Design

Large Capacity Cartridges filled
with Premium ResinTech Media

Remote Dispense Option

Flow Diagram

Legend:
- Direction of Flow
- Solenoid Valve
- Pump
- Check Valve
- (R1) Intermediate Resistivity Sensor
- (R2) Final Resistivity Sensor
- Pressure Regulating Valve
- Final Filter
- (F) Optional Flow Sensor

Components: Inlet, F, Conditioning Cartridge, 185/254 nm UV Lamp, Polishing Cartridge, TOC Monitor (Optional), 0.2 micron Filtration or Endotoxin Filter (Optional)

■ 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

■ Other WC Series Configuration (includes TOC Monitor)

Product code and Description
WC301UVTB
Benchtop - with UV Oxidation Lamp and TOC Monitor 120V/60Hz
WC311UVTB
Benchtop - with UV Oxidation Lamp and TOC Monitor 220V/50Hz
WC301UVTR
Remote Dispense Configuration - with UV Oxidation Lamp and TOC Monitor 120V/60Hz
WC311UVTR
Remote Dispense Configuration - UV Oxidation Lamp and TOC Monitor 220V/50Hz

Best Value in Replacement Consumables

Water Purifier - Auto Pure Type 1 Water

For Life Science, Cell Culture, Microbiology

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

■ Specifications

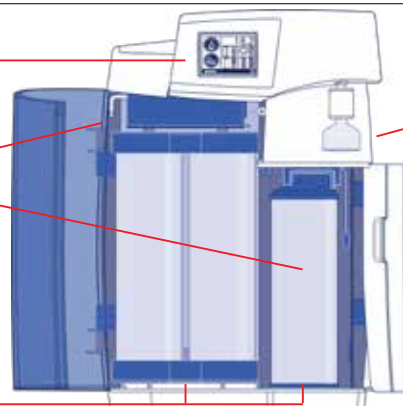| Model	WB301UFB/WB311UFB	WB301UFR/WB311UFR
Type	Benchtop	Remote dispense
Resistivity*	18.2 MΩ-cm	
Bacteria*	< 1 cfu/ml	
Endotoxin**	< 0.005 EU/m	
Particulates*	< 0.05 µm filtration	
TOC*	< 15 ppb	
RNase*	< 0.01 ng/ml	
Dnase*	< 4 pg/µl	
Temperature	100˚F / 30˚C	
Pressure	90 PSIG Max. / 20 PSIG Min.	
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
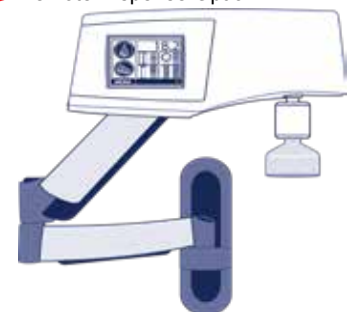
System Highlights

Intuitive Touch Screen Controls
Programmable Volume Dispense
Real-time Quality Monitoring & Alerts

Remote Dispense Option
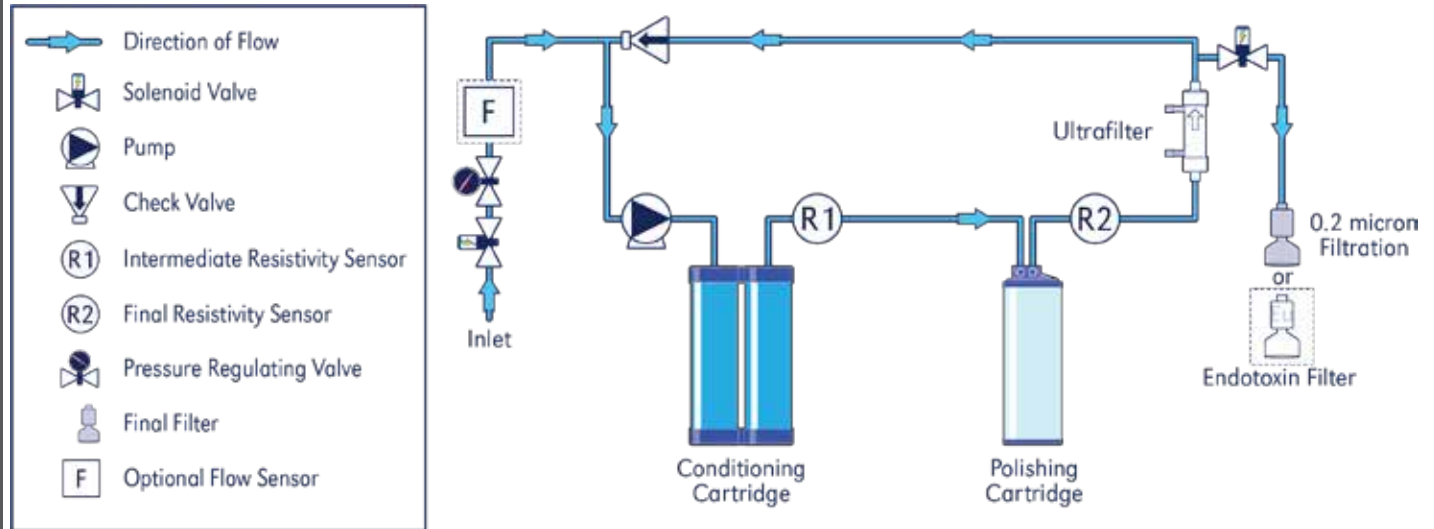
Quick Change Cartridge Design

Large Capacity Cartridges filled
with Premium ResinTech Media

Flow Diagram

Symbol	Description
→	Direction of Flow
	Solenoid Valve
	Pump
	Check Valve
R1	Intermediate Resistivity Sensor
R2	Final Resistivity Sensor
	Pressure Regulating Valve
	Final Filter
F	Optional Flow Sensor

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

Water Purifier - Auto Pure Type 1 Water

For Genetics, DNA Sequencing, Polymerase Chain Reaction (PCR)

Benchtop WG301UVUFB: 120V / WG311UVUFB: 220V
Remote Dispense WG301UVUFR: 120V / WG311UVUFR: 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, 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

■ 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	

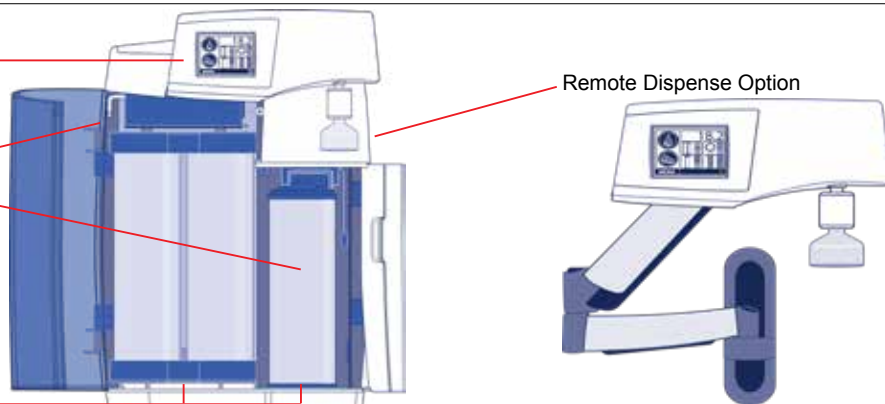** Performance based upon RO / DI or Distillation Feed (< 20 uS/cm, < 50 ppb of TOC, 0.2 micron filtration) ** Includes Endotoxin Removal Capsule Filter*
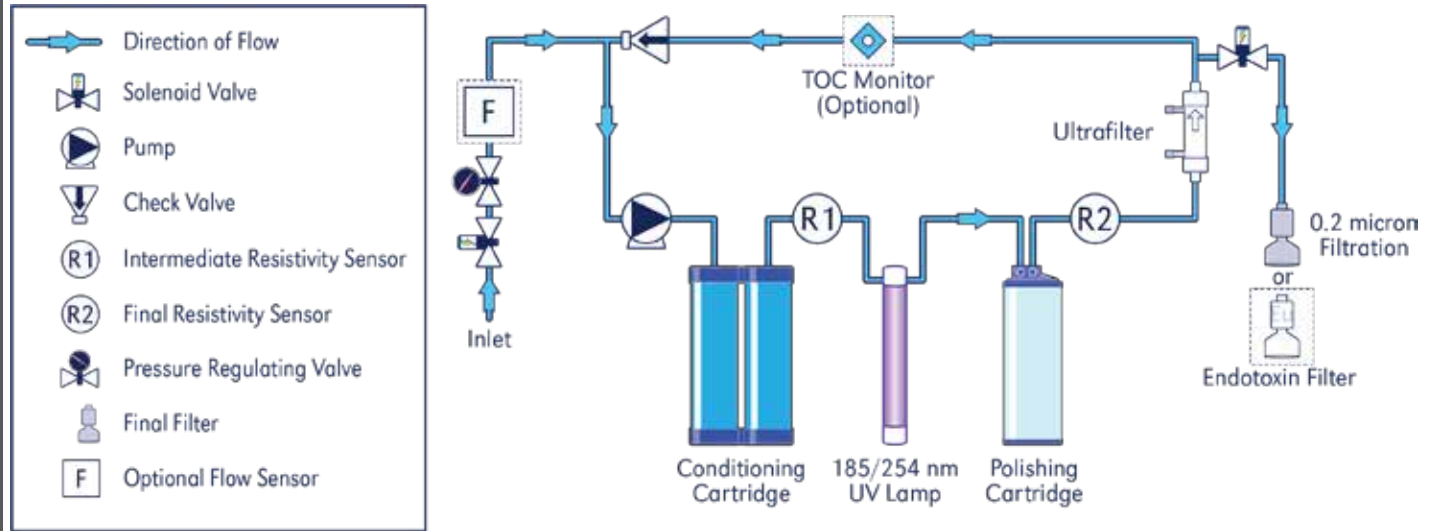
System Highlights

Intuitive Touch Screen Controls
Programmable Volume Dispense
Real-time Quality Monitoring & Alerts

Remote Dispense Option

Quick Change Cartridge Design

Large Capacity Cartridges filled with Premium ResinTech Media

Flow Diagram

Legend:
- Direction of Flow
- Solenoid Valve
- Pump
- Check Valve
- (R1) Intermediate Resistivity Sensor
- (R2) Final Resistivity Sensor
- Pressure Regulating Valve
- Final Filter
- F Optional Flow Sensor

Diagram components: F, Inlet, Conditioning Cartridge, 185/254 nm UV Lamp, Polishing Cartridge, R1, R2, TOC Monitor (Optional), Ultrafilter, 0.2 micron Filtration or Endotoxin Filter

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

Other WG Series Configuration (includes TOC Monitor)

Product code and Description
WG301UVUFTB
Benchtop - with UV, UF and TOC Monitor installed, 120V/60Hz
WG311UVUFTB
Benchtop - with UV, UF and TOC Monitor installed, 220V/50Hz
WG301UVUFTR
Remote Dispense Configuration - with UV, UF and TOC Monitor installed, 120V/60Hz
WG311UVUFTR
Remote Dispense Configuration - with UV, UF and TOC Monitor installed, 220V/50Hz

Best Value in Replacement Consumables

Auto Pure Water Purifier   Type 1 Water

Free standing or wall mounted water system

WA401/WA401UV/WA201UF/WA201UVUF

| 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
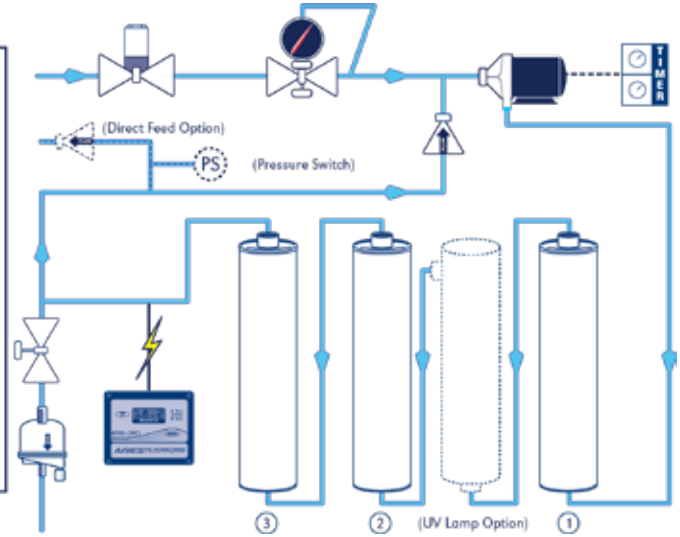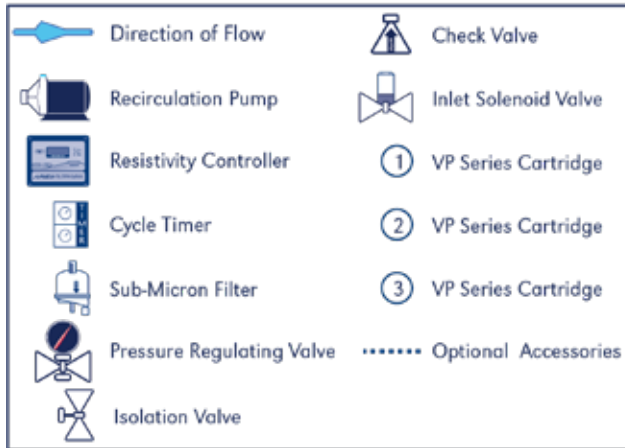● Built-in pressure regulator
● 0.2 micron filter

■ 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 operating 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

Legend:
- Direction of Flow
- Recirculation Pump
- Resistivity Controller
- Cycle Timer
- Sub-Micron Filter
- Pressure Regulating Valve
- Isolation Valve
- Check Valve
- Inlet Solenoid Valve
- ① VP Series Cartridge
- ② VP Series Cartridge
- ③ VP Series Cartridge
- ···· Optional Accessories

(Direct Feed Option)
PS (Pressure Switch)
(UV Lamp Option)

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*

Auto Pure Water Purifier   Type 2 and Type 3 Water

Economical Deionized Water System

WH201P/WH501P/WH201C/WH501C

| 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 CaCO₃)*	**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 CaCO₃	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 Pretreatment
Perfect addition to any lab water system!

HPL-RO

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 operating 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-HPLRO500	500 Gallon Per Day Reverse Osmosis Pretreatmen
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®

WG251-115V WG251-220V / WG1001

| Distilled water production | 1.8L/h (WG251) | 5L/h (WG1001) | Treatment process | Ion exchange→Distillation →Filtration | Purified water | Deionized water Distilled water | Water quality | Type1 / A4 Deionized water | Type2 / A4 Distilled water |

Low TOC standard models

WG251

WG1001

- Pre-treatment cartridge removes bacteria, trihalomethane, residual chlorine, organic and dust
- High performance ion-exchange resin cartridge (CPC-S, 4L) achieves high purity water with low electric conductivity and TOC
- Multi-functional control and display panel
- Standard equipped with membrane filter at water feeding port
- Large distilled water tank with capacity of 30L (WG251) and 100L (WG1001)
- Easy to use slide out type water sampling tray with drainage eliminates concerns about overflowing water discharge

Control Panel

Membrane Filter (Standard)

Maintenance

WG1001 interior

Pre-process cartridge and ion-exchange resin cartridge can be easily attached and detached

Easy to use tray for product water intake

■ Specifications

Model	WG251-115V WG251-220V	WG1001
Water purifying method	Ion exchange→Distillation→Filtration	
Water feeding	One-touch coupler connecting resin hose / free hose connecting	
Water drain method	Left / right selection connecting / hose connecting	
Purified water	Deionized water and distilled water	
Distilled water production	~1.5L/h	~5L/h
Distilled water delivery rate	0.5~1L/min	
Deionized water delivery rate	0.5~1L/min	
Range of production	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 + activated carbon (PWF-1)	
Ion-exchange resin cartridge	CPC-S 4L x 1pc. (activated carbon high-purity cartridge)	CPC-S 4L x 2pcs.(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	Slide out type, load-bearing capacity 20kg, for 10L tank
Multi-purpose distilled water sampling port	Right side of main unit	
Water level sensor	Lead switch, five level detection	
Raw water pressure range	0.5~5 x 100kPa (0.5~5kgf/cm^2)	
Power source (50/60 Hz)	AC115V 11A / AC220V 6A	AC220V 18A
External dimension*1	W600 x D660 x H980mm	W600 x D660 x 1850mm
Weight	~60kg	~120kg
Water level display	LED display	
Water quality display	Digital (conductivity or resistivity)	
Other display	Replacement of consumable parts (ion-exchange resin cartridge, pre-treatment cartridge, UV sterilizing lamp*2, membrane filter), error message, log of consumables replacement (20 logs each), error log, Japanese or English display, maintenance requirement display	
Included accessories	Feed/drain water hose, connecting hose assembly, cleaning agent, preprocess cartridge, ion-exchange resin cartridge, membrane filter, hose clamp, seal tape	

*1. Protrusions not included
*2. Optional

Water Quality Analysis

Item	ASTM D 1193 Type1	JIS K 0557 A4	WG251 Deionized water			Distilled water			WG1001 Deionized water			Distilled water		
			Measured value	ASTM D 1193	JIS K 0557	Measured value	ASTM D 1193	JIS K 0557	Measured value	ASTM D 1193	JIS K 0557	Measured value	ASTM D 1193	JIS K 0557
Electrical conductivity (µS/cm)	<0.056	<1	0.055	Type1	A4	0.81	Type2	A4	0.056	Type1	A4	0.7	Type2	A4
Total organic carbon (µg/l)	<50	<50	4	Type1	A4	33	Type1	A4	10	Type1	A4	20	Type1	A4
Zinc (µgZn/l)	-	<0.1	<0.01	-	A4	<0.01	-	A4	<0.01	-	A4	<0.01	-	A4
Silica (µgSiO$_2$/l)	<3	<2.5	<0.1	Type1	A4	<1.0	Type1	A4	<1.0	Type1	A4	<1.0	Type1	A4
Chloride ion (µ Cl$^-$/l)	<1	<1	<0.1	Type1	A4	<0.1	Type1	A4	<0.1	Type1	A4	<0.1	Type1	A4
Sulfate ion (µgSO$_4^-$/l)	-	<1	<0.1	-	A4	<0.1	-	A4	<0.1	-	A4	<0.1	-	A4
Total level				**Type1**	**A4**		**Type2**	**A4**		**Type1**	**A4**		**Type2**	**A4**

*Quality of raw water may cause different results.
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High Quality Ion-exchange Resin Cartridge (CPC-S)

25% more resin than previous products. Activated carbon added to high-quality ion-exchange resin achieves lower TOC.


Ion-exchange resin life span test (TOC)
TOC (ppb)
Deionized water

Ion-exchange resin life span test (resistivity)
Resistivity (MΩ·cm)
Deionized water

Automatic drainage function of the boiler water prevents scale adhesion and achieves higher water quality.

(1) High performance pre-treatment cartridge (PWF-1) removes trihalomethane and achieves higher water quality
(2) Ion-exchange resin cartridge (CPC-S)
(3) Distilling boiler
(4) Distilled water tank
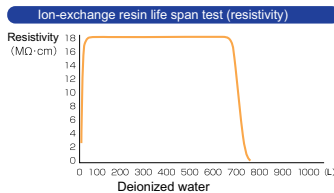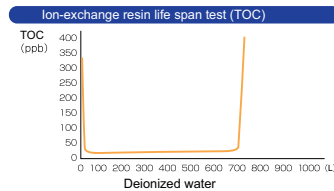
Treatment Process
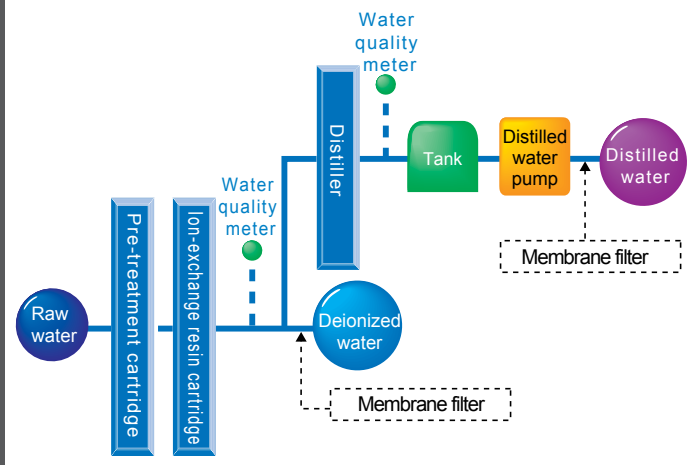
■ Optional items

Product code	Description
253174	Stand AS250 (External dimension: W603 x D683 x H870mm)
253204	Product water hose OWG24 hose length 2m
253686	Feed water connection unit OWH10
253769	Raw water pressure reducing valve OWG42
253202	UV sterilizing lamp OWG20 (for WG250B) *
253203	UV sterilizing lamp OWG22 (for WG1000) *
253211	Drain trap OWI10 (for WG250B) *
253212	Drain trap OWI20 (for WG1000) *

* Please specify when ordering main unit.

■ 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	UV sterilizing lamp	OWG28 (Must have 253202 or 253203)

Product water hose (OWG24)

Feed water connection (OWH10)

Drain trap OWI10+stand AS250

Pre-process cartridge PWF-1

Membrane filter MFRL727

Ion-exchange resin cartridge CPC-S

Air vent filter for tank   AVF-1

⚠ 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.

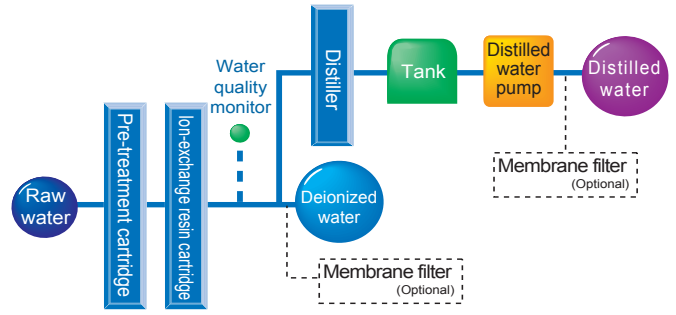# Small Capacity Water Purifier - Auto Still

WG204-115V WG204-220V

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
- High performance ion-exchange resin cartridge (CPC-S, 4L) brings high purity water with low electric conductivity and TOC
- Optional membrane filter at water sampling port
- Displays replacement of consumables
- Feed / Drain water connectors on both sides

Treatment Process

Raw water → Pre-treatment cartridge → Ion-exchange resin cartridge → Water quality monitor → Distiller → Tank → Distilled water pump → Distilled water
Membrane filter (Optional)
Deionized water → Membrane filter (Optional)

Water Quality Analysis

Item	ASTM D 1193 Standard Type 1	JIS K 0057 Standard A4	Deionized water				Distilled water			
			Measured value	Level			Measured value	Level		
				ASTM D1193	JIS K 0557			ASTM D1193	JIS K 0557	
Electrical conductivity (µS/cm)	<0.056	<1	0.055	Type 1	A4		0.81	Type 2	A4	
Total organic carbon (TOC) (µgC/L)	<50	<50	4	Type 1	A4		33	Type 1	A4	
Zinc (µgZn/l)	-	<0.1	<0.01	-	A4		<0.01	-	A4	
Silica (µgSiO$_2$/L)	<3	<2.5	<1.0	Type 1	A4		<1.0	Type 1	A4	
Chloride ion (µgCl$^-$/L)	<1	<1	<0.1	Type 1	A4		<0.1	Type 1	A4	
Sulfate ion (µgSO$_4^-$/L)	-	<1	<0.1	-	A4		<0.1	-	A4	
Total level				Type 1	A4			Type 2	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.

Specifications

Model	WG204-115V / WG204-220V
Water purifying method	Ion-exchange→Distillation
Water feeding	One-touch coupler water connection, with water stop valve
Water discharging	Left / right selection for connecting hose
Distilled water production	~1.5L/h
Distilled water delivery rate	~1L/min
Deionized water delivery rate	~1L/min
Range of production	Continuous production
Condenser	Hard glass
Heater	Ceramic heater 1.2kW
Pre-treatment cartridge	0.1µm diameter hollow fiber + activated carbon
Ion-exchange resin cartridge	CPC-S 4L x 1pc. (activated carbon high-purity cartridge)
Distilled / deionized water filter	Optional
Leakage indication	Water supply solenoid valve forcibly shut off when water leakage detected
Distilled water tank capacity	20L polyethylene tank
Distilled water UV sterilization	--
Water sampling tray	--
Multi-purpose distilled water sampling port	Right side of main unit, 1pc.
Water level sensor	2 steps reed switch
Raw water pressure range	0.5~5 x 100kPa (0.5~5kgf/cm^2)
Power source (50/60 Hz)	AC115V 11A / AC220V 6A
External dimension*	W600 x D575 x H780mm
Weight	~48kg
Water level display	Communication pipe water level indication
Water quality display	5 steps conductivity LED indication
Other display	Replacement of consumable parts (ion-exchange resin cartridge)
Accessories	Feed /drain water hose, connecting hose assembly, pre-treatment cartridge, ion-exchange resin cartridge, hose clamp

* Protrusions not included.

Optional items

Product code	Product name	
253174	Stand	AS250 (W603 x D683 x H870mm)
253204	Water sampling hose	OWG24 hose length 2m
253686	Water supply port unit	OWH10
253769	Raw water pressure reducing valve	OWG42
253211	*Drain trap	OWI10

* Please specify when ordering main unit.

Stand   Water supply port unit   Drain trap + Stand

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

Large Capacity Water Purifier - Auto Still

WA511/711/731

Production capacity	5~10L/h	Treatment process	Distillation→Ion exchange→Filtration	Purified Water	Deionized water / Distilled water	Water quality	Type1 / A4 Deionized water	Type 4 / A1 Distilled water

Large capacity water purifier

WA511

WA711

- Large volume of distilled and deionized water can be obtained
- Equipped with high performance pre-treatment cartridge (activated charcoal + 0.1μm hollow fiber membrane) for high quality water
- Standard equipped with 0.1μm hollow fiber membrane filter at water sampling ports which protects pure water delivery from contamination
- Low cost method from distillation to ion-exchange by selecting optional CPC-N ion-exchange resin cartridge (A3 / Type 3 water level)
- Digitally displayed operation status
- Easy to replace ion-exchange resin cartridge
- Safety device includes power leakage breaker, water leakage sensor, water pressure reduction valve
- Optional water softener cartridge and UV lamp for sterilization available

■ Specifications

Model		WA511	WA711	WA731
Water purifying method		Pre-treatment → Distillation → Ion-exchange → Filtration		
Purified water		Distilled water (Type 4 / A1), Deionized water (Type 1 / A4)		
Distilled water production		~5L/h	~10L/h	
Pure water delivery rate		Distilled water: ~1.4 L/min.		
		Deionized water: ~1.4 L/min.		
Range of collection capacity		0.1 to 85L		
Waste water discharge		Drain water connected on both / back sides for the drain hose		
Distiller	Boiler	Stainless steel (SUS304)		
	Condenser	Stainless steel (SUS304)		
	Pipe heater	1.9kW x 2	2.55kW x 3	
Raw water filter		Pre-treatment cartridge (activated carbon + 0.1μm hollow fiber membrane)		
Pure water filter		Membrane filter (MFRL730) (0.1μm hollow fiber membrane)		
High purity cartridge		One-touch fitting cartridge (CPC-H) (Mixed bed, resin 3L)		
Distilled water storage tank		100L polyethylene made		
Water sampling table		Large stainless steel sink with splashing preventive mechanism		
Water feeding pump		Electromagnetic pump		
Raw water pressure range		15 to 5x100kPa (15 to 5kg/cm²)		
Safety function		Power leakage breaker, water leakage sensor, water pressure reduction valve, water quality error alarm		
Distilled water level indication		5 levels by LED display		
Water quality monitor		Digital indication (conductivity or resistivity)		
Power source (50/60Hz)		Single phase AC220V		Three phase AC220V / AC380V, with step down transformer
External dimensions*		W800 x D685 x H1510mm		W870 x 685 x 1510
Weight		~130kg		~140kg
Other indications		Replacement consumable parts (pre-treatment cartridge, high purity cartridge, membrane filter), Error message, History of error messages, History of consumable part replacements (up to 20x for each consumable part), default language in English or Japanese, Maintenance requirement		
Accessories		Water supply hose 2m x 1 pc. (with connecting unit), drain hose 3m x 1 pc. (with hose clamp), pre-treatment cartridge, high purity cartridge (CPC-H), membrane filter x 2 pcs.		

* Protrusions not included.

Structure

Water sampling tray
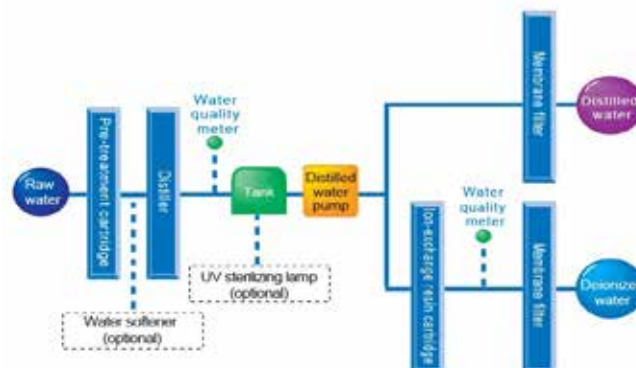Large stainless steel sink with splashing preventive mechanism

Range of collection capacity 0.1 to 85L (continuous sampling)

Control Panel

Digital water quality monitor displays quality of deionized water and distilled water

Treatment Process

Water Quality Analysis

Item	ASTM D1193				Deionized water						Distilled water					
	Type 1	Type 2	Type 3	Type 4	Measured value WA511	Level ASTM D1193	JIS K 0557	Measured value WA731	Level ASTM D1193	JIS K 0557	Measured value WA511	Level ASTM D1193	JIS K 0557	Measured value WA731	Level ASTM D1193	JIS K 0557
Electrical conductivity(µS/cm)	<0.056	<1.0	<0.25	<5.0	0.06	Type 1	A4	0.06	Type 1	A4	2	Type 4	A1	2	Type 4	A1
Organic carbon (µg /l)	<50	<50	<200	no limit	14	Type 1	A4	15	Type 1	A4	90	Type 3	A3	66	Type 3	A3
Zinc (µg Zn/l)	-	-	-	-	<0.1	-	A4	<1.0	-	A4	<0.1	-	A4	<0.1	-	A4
Silica (µg SiO$_2$/l)	<3	<3	<500	no limit	<0.1	Type 1	A4	<0.1	Type 1	A4	0.8	Type 1	A4	<0.1	Type 1	A4
Chloride ion (µ Cl$^-$/l)	<1	<5	<10	<50	<0.5	Type 1	A4	<0.5	Type 1	A4	0.5	Type 1	A4	<0.5	Type 1	A4
Sulfate ion (µg SO^{+-}/l)	-	-	-	-	<1.0	-	A4	<1.0	-	A4	<1.0	-	A4	<1.0	-	A4
Total level						**Type 1**	**A4**		**Type 1**	**A4**		**Type 4**	**A1**		**Type 4**	**A1**

*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.

■ Optional items

Product code	Product name	Model no.	Unit Model
253208	Sampling hose connection unit	OWF10	WA Series
253686	Water supply unit	OWH10	WA Series
253769	Raw water pressure reduction valve	OWG42	WA Series
253668*	Connection unit G (WL100 + WA Series)	G	WA Series
253222*	Water trap	OWI21	WA511
253223*	Drain water trap	OWI41	WA711
253224*	Drain warer trap	OWI51	WA731
253203*	UV sterilizing lamp	OWG22	WA Series
253281	Water supply L shape socket	OWE18	WA Series
253209	Raw water pressure meter	OWA48	WA Series
253219*	External alarm output terminal	OWG52	WA Series

■ Consumable parts

Product code	Product name	Model no.	Unit Model
253099	Pre-treatment cartridge	PWF-1	WA Series
CPCNS30011	High purity cartridge	CPC-H	WA Series
9020010006	Membrane filter	MFRL730	WA Series
253210*	Water softener cartridge (with OWA30)	OWA50	WA Series
CPCN30010	Ion-exhange resin cartridge (A3 water level)	CPC-N	WA Series

Water supply unit (OWH10)

Water supply L shape socket (OWE 18)

Pre-treatment cartridge (PWF-1)

High purity cartridge CPC-H

Ion-exchange resin cartridge CPC-N

⚠ Attention
- Avoid tangling the drain hose
- Attach water supply hoses to the faucet with sink
- When sink is separate from the faucet, use optional water supply port unit
- Raw water pressure should be within specified pressure range
- Avoid flammable or explosive gas atmosphere

Compact Water Purifier - Auto Still®

WS201-115V WS201-220V / WS221-115V WS221-220V

| Production capacity | 1.8L/h | Treatment process | Distillation | Purified water | Distilled water | Water quality | Type4 / A1 |

### Simple and economical water purifier designed for distilled water production

- Space saving and compact
- By adopting splash prevention design, impurities are prevented from mixing with the distilled water, resulting to a stable water quality
- Designed with empty boiling prevention and overheat prevention functions
- Suitable as washing water for cleaning tools, glassware, etc.

WS201   WS221

Treatment Process

Raw water

Distiller

Tank
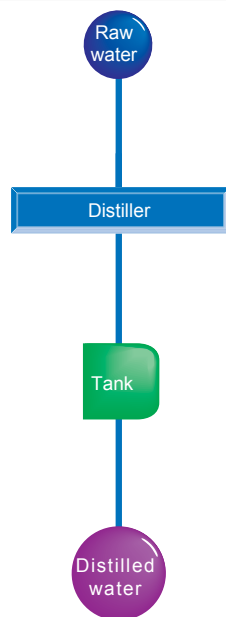
Distilled water

Specifications

Model	WS201-115V/WS201-220V	WS221-115V/WS221-220V
Water purifying method	Distillation	
Purified water	Distilled water	
Distilled water production	~1.6L/h	
Distilled water delivery rate	~2.2L/min.	
Raw water pressure range	1~3 x 100kPa (1~3kg/cm²)	
Safety device	Auto adjustment of cooling water volume	
	Empty boiling / overheat / splash prevention	
Distiller — Boiler	Stainless steel	Hard glass
Distiller — Condenser	Hard glass	Hard glass
Distiller — Heater	Pipe heater	Built-in quartz glass outer cover
Distilled water storage tank	20L polyethylene tank	
Power source	AC115V 11.5A / AC220V 6.5A	
External dimensions*	W500 x D400 x H974mm	
Weight	~40kg	

*Protrusions not included

Optional items

Product code	Description	
253176	Stand	AS22
253686	Water feeding unit	OWH10
253211	Drain trap	OWI10

⚠ **Attention**
- Handle carefully the drain hose.
- Attach the water supply hose to a faucet with a sink.
- When the sink is remote from the faucet, use the optional water supply port unit.
- Keep the original water pressure within the specified pressure range.
- Never use in flammable or explosive gas atmosphere.

NOTES

Benchtop Water Purifier - Pure Line®

WE200

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
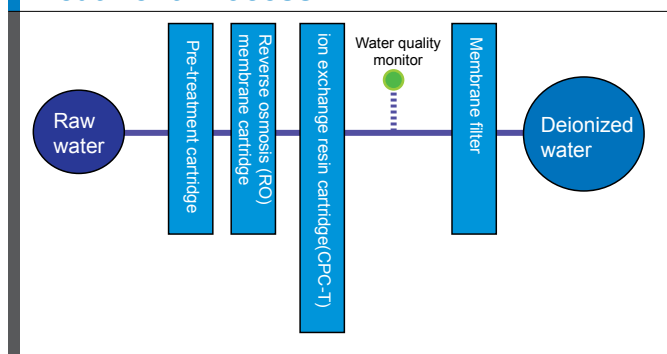
- Suitable for high sensitivity trace analysis
- Lower running cost
- By adopting reverse osmosis (RO) membrane cartridge set, life span of consumables has been expanded significantly
- Benchtop type, space saving
- Easy water sampling by attaching to water faucet
- Easy to operate digital display
- 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 circuit breaker
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
Accessories	Supply / drain water hoses, pre-treatment cartridge, reverse osmosis (RO) membrane cartridge set, ion-exchange cartridge CPC-T, membrane filter, power cord, seal tape

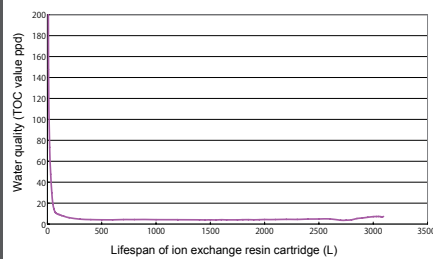*This unit must be connected to drainage facility.

Treatment Process

Raw water → Pre-treatment cartridge → Reverse osmosis (RO) membrane cartridge → ion exchange resin cartridge(CPC-T) → Water quality monitor → Membrane filter → Deionized water

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)

Water quality (TOC value ppd) — Lifespan of ion exchange resin cartridge (L)

■ Ion exchange resin lifespan test (resistivity value)

Water quality (resistivity MΩ·cm) — Lifespan of ion exchange resin cartridge (L)
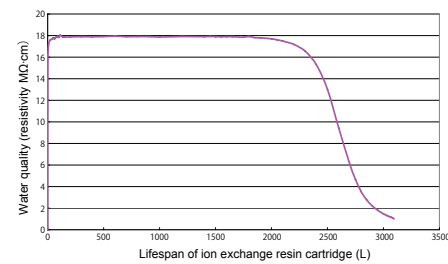
■ Optional items

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)

Water Purifier - Pure Line®

WL200/220/220T

| Treatment process | Ion-exchange | Purified water | Deionized water | Water quality | Type2 / A3 |

Economical, space saving benchtop water purifier which connects directly to tap water.
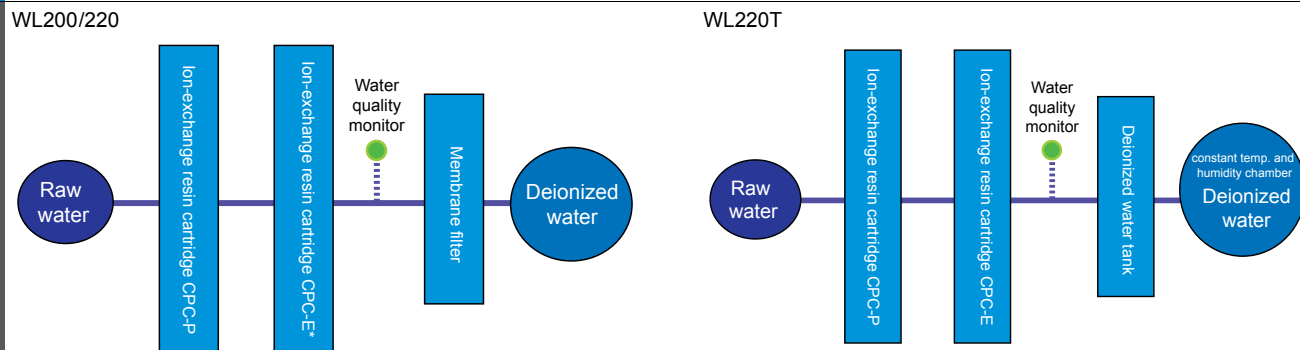

WL200   WL220   WL220T

- Collecting deionized water is as simple as connecting to a faucet
- Benchtop, space-saving design
- Digital display for easy operation
- Deionized water compliant with ASTM D1193 Type 2 / JIS K 0557 A3 level, suitable for trace analysis
- Displays replacement of consumables
- Standard equipped with membrane filter (WL200/220)
- A solenoid valve at the water sampling port prevents water leakage from final membrane filter
- WL220T is equipped with constant temperature control and pure water tank. Constant temperature and deionized water delivery to pure water tank controlled by electromagnetic valve

■ Specifications

Model	WL200	WL220	WL220T
Water purifying method	Ion-exchange (controlled by key)		Ion-exchange (manual)
Raw water supply	One touch coupler water connection resin hose		
Deionized water production	~1L/min. (continuously produced)		~1L/min. (by natural fall)
Ion-exchange resin cartridge	2L ion-exchange resin with activated carbon (CPC-P) x 1pc.	2L ion-exchange resin with activated carbon (CPC-P) x 1pc. 2L ion-exchange resin (CPC-E) x 1pc.	
Final filtration	0.1μm (membrane filter)		N/A
Pure water tank	N/A		3L polyethylene tank
Water leakage detection	Solenoid valve forced shutdown of water supply by detecting water leakage		
Raw water pressure range	0.5~5x100kPa (0.5~5 kgf/cm²)		
Sampling port	250mm above floor RC1/4 (membrane filter connection)		ø9 nipple (hose connection)
Safety device	Circuit breaker, water leakage indicator, pressure reducing valve, water quality abnormal alarm		
Power source (50/60Hz)	AC100~240V <0.2A		
External dimensions*	W350xD350xH450mm		
Weight	14kg	16kg	17kg
Water quality display	7 segments LED display (conductivity / resistivity)		
Other display	Display of consumables replacement (CPC-P and CPC-E: should be replaced simultaneously to prevent degradation of water quality, membrane filter), alarm display (water leakage alarm)		
Accessories	Raw water supply hose, power cord (2m), Ion-exchange resin CPC-P (WL200 only), Ion-exchange resin CPC-P+CPC-E (WL220/WL220T), membrane filter (WL200/220), Y-shaped water supply hose with strainer 4m (WL220T), constant temperature and humidity chamber hose ø9xø13 3m (WL220T), hook (WL220T), seal tape		

*Protrusions not included.

Treatment Process

WL200/220

*CPC-E only for WL220

WL220T

WL220T used only for constant temperature and pure water tank, no water sampling port in the front.

Water Quality Analysis

| Item	ASTM D 1193 Standard Type 2	JIS K 0557 A3 level	WL200 Measured value	WL200 Level ASTM D 1193	WL200 Level JIS K 0557	WL220 Measured value	WL220 Level ASTM D 1193	WL220 Level JIS K 0557
Electrical conductivity (μS/cm)	<1	<1	0.055	Type1	A4	0.055	Type1	A4
Organic carbon (μg /l)	<50	<200	19.6	Type1	A4	19.0	Type1	A4
Zinc (μg Zn/l)	-	<0.1	<0.1	-	A4	<0.1	-	A4
Silica (μg SiO2/l)	<3	<5	<3	Type2	A3	<3	Type2	A3
Chloride ion (μg Cl⁻/l)	<5	<1	<0.5	Type1	A4	<0.5	Type1	A4
Sulfate ion (μg SO⁴⁻/l)	-	<1	<1.0	-	A4	<1.0	-	A4
Total level				**Type2**	**A3**		**Type2**	**A3**

*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)
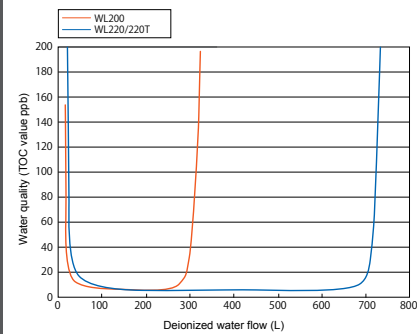
■ Ion exchange resin lifespan test (resistivity value)
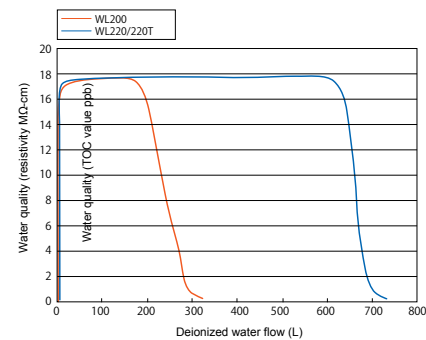
■ Optional items

Product code	Description	Applicable model
253686	Water supply port unit OWH10	WL200/220/220T
253769	Pressure reducing valve for raw water OWG42	WL200/220/220T
253261	CPC-E connection set (CPC-E included) OWL36	WL200
253267	*Pre-process cartridge connection set OWL38	WL200/220
253266	*Water sampling stand with connection set OWL40	WL200/220
253268	*External alarm output terminal OWL42	WL200/220/220T
253269	*Remote water sampling function OWL44	WL200/220
253270	Remote water sampling function with sampling switch OWL46	WL200/220
253272	Input terminal for remote water sampling with solenoid valve OWL48	WL220T
253271	Shelf plate OWL50	WL220T
253273	Power cord (4m) OWL52	WL200/220

* Please specify when ordering main unit.

Shelf plate (OWL50): used when WL220T is placed on top of the constant temperature control plate

Water supply port unit   OWH10

■ Consumables

Membrane filter

CPC-P   Ion exchange resin cartridge

CPC-E   Ion exchange resin cartridge

Product code	Description
253254	Ion exchange resin cartridge CPC-P
253262	Ion exchange resin cartridge CPC-P+CPC-E
9020010004	Membrane filter x 2pcs.

Control Panel

WL220T has no PUSH key and POWER key

Structure

WL220

WL220T

Water Purifier - Pure Line

WL100

Simple and economical water purifier

- Stand alone cartridge type water purifier which can easily collect large amount of deionized water by simply connecting to a faucet
- Built-in voltage circuit in water quality meter can check water quality immediately
- Polyethylene cartridge generates least impurity elution
- No AC power supply needed
- Easy maintenance

■ Specifications

Model	WL100
Water purifying method	Ion-exchange
Purified water	Deionized water
Deionized water production	2~5L/min
Ion-exchange method	By cartridge (mixed bed type, resin quantity 10L)
Raw water pressure range	98~294kPa (1~3kg/cm^2)
Water quality meter	0~10x10^{-4}S/m (0~10μs/cm) (analog display)
Power supply for water quality meter	Battery DC 9V
External dimensions *	Dia.180xH820mm (coupler and stand excluded)
Weight	~18kg

*Protrusions not included
Make sure to open water outlet of WL100 when turning on raw water supply.

Water purification set:
WL100+filter stand(1)+Filter housing unit(2)+activated carbon+membrane

Product code	Description
253676	Filter stand
253675	Filter housing unit
9020026002	Activated carbon filter
9020010007	Membrane filter
253678	Connection unit B
253668	Connection unit G

Connection unit G (WL100+WG250)

Filter stand + Filter housing unit

System Diagram

Activated carbon filter

Membrane filter

WL100
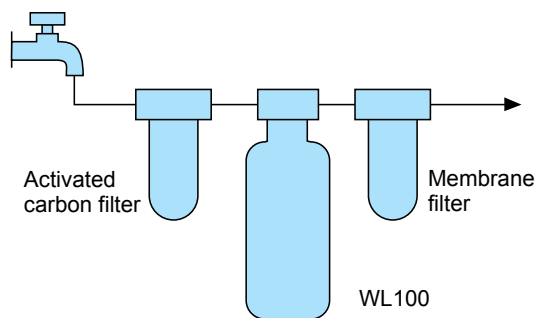
Capable of removing inorganic ions and other particles.

⚠Attention

- System unit must be used at or near room temperature. Cylinder cartridge may become deformed, compromising performance, if used in extreme temperatures
- Direct contact with concrete surfaces may damage cartridge
- Clean unit with a soft, damp cloth and if necessary, a neutral detergent. Do not use solvents, harsh chemicals or abrasive substances
- Observe flow direction by connecting hoses in accordance with "IN" and "OUT" markings

NOTES

Labo-Cube Water Purifier

WL320A/320B

Treatment process	Ion-exchange	Purified water	Deionized water	Water quality	Type2 / A4

Space-saving water purifier ideal for washing; can be installed under a fume hood or sink, or on a table

WL320B

- Deionized water compliant with ASTM D1193 Type2 / JIS K 0557 A4 level, suitable for high sensitivity trace analysis
- Easy operating digital display
- Standard equipped with membrane filter at water feeding port
- Equipped with water leak detection function that stops water supply in case water leak occurs, by activating the electric leakage breaker
- Displays replacement of consumables

Specifications

Model	WL320A	WL320B
Type	Benchtop	Built-in caster
Purified water	Deionized water ASTM D 1193 Type2 / JIS K 0557 A4	
Water purifying method	Ion-exchange	
Water feeding	One touch coupler connecting resin hose	
Deionized water delivery rate	~1L/min (continuously)	
Pre-treatment cartridge	0.1μm hollow fiber + activated carbon (PWF-1)	
Ion-exchange resin cartridge	Ion-exchange cartridge (CPC-N) 3Lx2	
Leakage detection	Water leakage detector forcefully shuts off feed water solenoid valve when water leakage detected	
Ion-exchange water delivery port	Water sampling stand	
Raw water pressure range	0.5~5x100kPa (0.5~5kgf / cm²)	
Power source	AC100~240V <0.2A	
External dimensions*	W400xD320xH600mm	
Weight	Main unit: ~30kg, water sampling stand: 5kg	
Water quality display	LED digital display (conductivity / resistivity)	
Other display	Replacement of consumables (pre-treatment cartridge, ion-exchange resin, membrane filter), alarm indication (water leakage)	
Accessories	Water supply hose, pre-treatment cartridge, ion-exchange cartridge CPC-N, membrane filter, water sampling stand, purified water sampling hose	
Legs	Rubber legs	Movable caster

* Protrusions not included

Treatment Process

Raw water → Pre-treatment cartridge → Ion-exchange resin cartridge CPC-N → Ion-exchange resin cartridge CPC-N → Water quality meter → Membrane filter → Deionized water
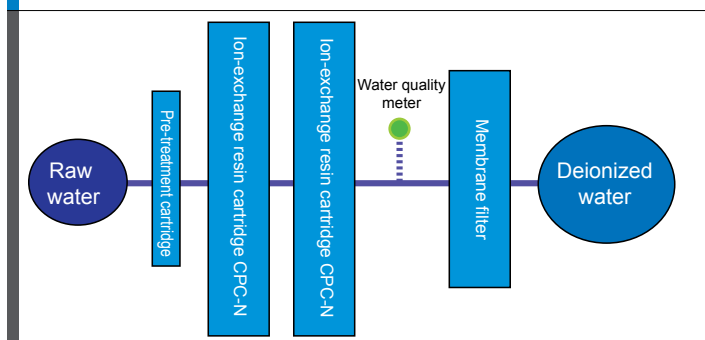
Installation Example

Control Panel

Pre-treatment Cartridge
Ion-exchange Resin Cartridge

(1)   (2)

(1) Pre-treatment cartridge PWF-1
(2) Ion-exchange resin cartridge CPC-N

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	<1	Type 2	A4
Organic carbon (μg /l)	<50	<50	46	Type 1	A4
Zinc (μg Zn/l)	-	<0.1	<0.01	-	A4
Silica (μg SiO_2/l)	<3	<2.5	0.1	Type 1	A4
Chloride ion (μ Cl^-/l)	<1	<1	<0.1	Type 1	A4
Sulfate ion (μg SO_4^{2-}/l)	-	<1	<0.1	-	A4
Total level				**Type 2**	**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 Life Span Test (resistivity)

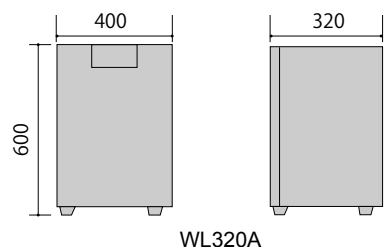## Structure
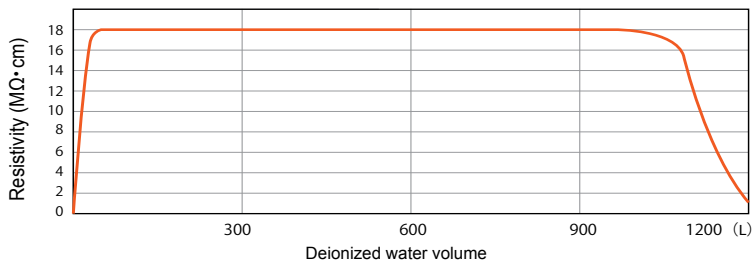
Optional items / consumables

Product code	Description
253277	Fume hood / sink installation kit OWL60
253686	Water supply port unit OWH10
253099	Pre-treatment cartridge PWF-1
CPCN30010	Ion-exchange resin cartridge CPC-N
9020010004	Membrane filter (2 pcs. set) MFRL727
253276	Remote water sampling function (with foot switch) OWL58
253275	Remote water sampling function (without foot switch) OWL58

Note: When combined with fume hood or installed under the sink, the following are required: WL320 + 253277 + 253276 (with foot switch)
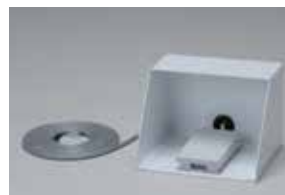
Foot switch (optional)

Dimensions (mm)

WL320A