SINCE 1889

Yamato

GENERAL CATALOG

Laboratory Equipment

www.yamatorussia.ru

Yamato

SINCE 1889

Yamato

Future of Science

Innovations in Science & Technology
that create happiness for all humankind

Message from President

Yamato Scientific Co., Ltd. was founded in 1889 as “Sousuke Morikawa & Company”, which mainly focused on sales and production of medical glass in Nihonbashi, Tokyo, where the high commercial business district was originated in Japan during the Edo period.
Ever since, the company has grown from a provider solely of scientific glass to a distributor of newest and also advanced scientific instruments and laboratory equipment.
The factories perform totally from R&D to manufacturing are located in Japan and China which form Yamato’s production line including metal plate processing, coating, assembling and packing to provide authentic quality to all over the world.
With the cooperation of Yamato Group, we have successfully widened our new field of business to distribute food containers, electronic materials, medical equipment and its consumables.
As the rapid increase of globalization and the complexity of today’s competitive business environment, we have come to set up an infrastructure to adopt global standards and expand worldwide procurement. In addition, we have established 20 sales and service offices in Japan (as of March 2018) as well as subsidiaries over the world. With the support of approximately 300 distributors worldwide, we are well equipped to assist a diverse and global mix of customers.

Our Company’s Motto is to contribute to the development of scientific technologies by making the best use of our know-how and experience accumulated throughout the history of nearly 130 years.

Yamato Scientific always appreciates and welcomes your comments, opinions, and requests to help us provide the best for you.

Yamato Scientific Co., Ltd.
President and CEO
Satoshi Morikawa

Company's Motto

The company's established principles are firmly rooted in the philosophy and heritage of the founder since 1889.

Since 1889, we have embraced the philosophy and heritage of the founder Sosuke Morikawa to represent the spirit of "Challenge and Innovation" to build a relationship of "Faith and Trust" with our partners, which has helped us to create a company with "Sincerity and Consideration" to practice product development and business operation.

Management Principles

Yamato Scientific supports innovations in R&D and Production Technologies that contribute to the happiness of humankind.

Environmental Principles

Yamato Scientific stands by the company's environmental principles to be actively engaged in environmental conservation activities.

1. **Compliance with environmental regulations**
2. **Improvement of business processes to reduce the burdens of environment**
3. **Promotion of business activities to reduce environmental burdens.**
4. **Development of environmentally conscious products and systems**
5. **Enhancement of the environmental management system**
6. **Publication of our environmental policy**

ISO

We have always been trying to improve operational quality by acquiring ISO certification.

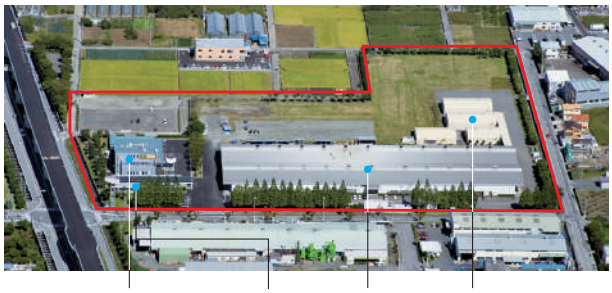
ISO14001

ISO9001

ISO13485

“An efficient R&D setup with fully integrated structures”

The Minami Alps Factory located in southern part of Yamanashi Prefecture develops and produces scientific instruments, laboratory equipment, analytical and measurement instruments, industrial inspection devices and medical equipment. The products from our facilities are offered to universities and public agencies, including domestic and foreign private companies, and thus contribute to further innovation of research, development and manufacturing technologies.



“Future Ideals”- R&D Center

R&D center enhances our manufacturing strength. Our avid researchers facilitate the development of new products in a highly effective environment. The center has a testing room equipped with the most advanced evaluation devices, which the researchers can obtain various test data to make a quantitative assessment of the product capabilities.
We can provide various technical training programs and product seminars for effective engineering skills and sales enhancement.

Lobby and Design Floor

Prototype Lab

Environmental testing, measurement experiment, evaluation testing, etc.

Plasma Laboratory

Spray Dry Laboratory

Fume Hood and Air Conditioner System

Yamato Scientific Chonqing Co., Ltd: Manufacturing Factory in China

We have started to manufacture scientific instruments and industrial equipment such as ovens, autoclaves and aging chambers in Chonqing, China since March 2006. There, we have developed an original, high-tech manufacturing system to provide the best quality to the world and build a strong brand image of Yamato Scientific in China.

Corporate Summary

Company Name	Yamato Scientific Co., Ltd.	
President	Satoshi Morikawa	
Headquarters	17F Muromachi Higashi Mitsui Bldg. (COREDO MUROMACHI Ⅰ), 2-2-1 Nihonbashi Muromachi, Chuo-ku, Tokyo 103-0022	
Foundation	March 4, 1889	
Incorporated	November 27, 1946	
Capital	100 million yen	
Accounting Period	September	
Gross Sales*	Non-consolidated Basis	27.7 billion yen
	Consolidated Basis	73.9 billion yen
	Yamato Group Total	86.8 billion yen
	*As of September 2017	
Employee**	Non-consolidated Basis	705
	Consolidated	1215
	Yamato Group Total	1314
	**As of October 2017	
Factories	Minami Alps Factory, R&D Center (Minami Alps・Atsugi), Advanced Technology Research Center	
Sales Bases	Sapporo, Sendai, Maebashi, Tsukuba, Kita-Kanto, Chiba, Tokyo, Tokyo-Kita, Tokyo-Nishi, Kawasaki, Yokohama, Atsugi, Nagano, Shizuoka, Nagoya, Hokuriku, Keiji, Kansai, Hiroshima, Fukuoka, Cologne (Germany)	
Overseas Branches	Yamato Scientific America Inc. (California, USA), Yamato Scientific Shanghai Corp. (Shanghai, China), Yamato Scientific Chongqing Co., Ltd. (Chongqing, China)	

Business Contents

1. Development, manufacture and domestic/overseas sales for scientific instruments, test & research facilities, analysis & measurement device, examinations & inspection device, and medical equipment.
2. Inspections & calibrations and preventive maintenance services for the above contents.
3. Design, construction, total relocation, reform and consultant services for research facilities in universities, institutes, etc.

ISO Certification

ISO14001 : Minami Alps Factory
ISO9001 : Field Engineering Department and Minami Alps Factory
ISO13485 : Minami Alps Factory

History

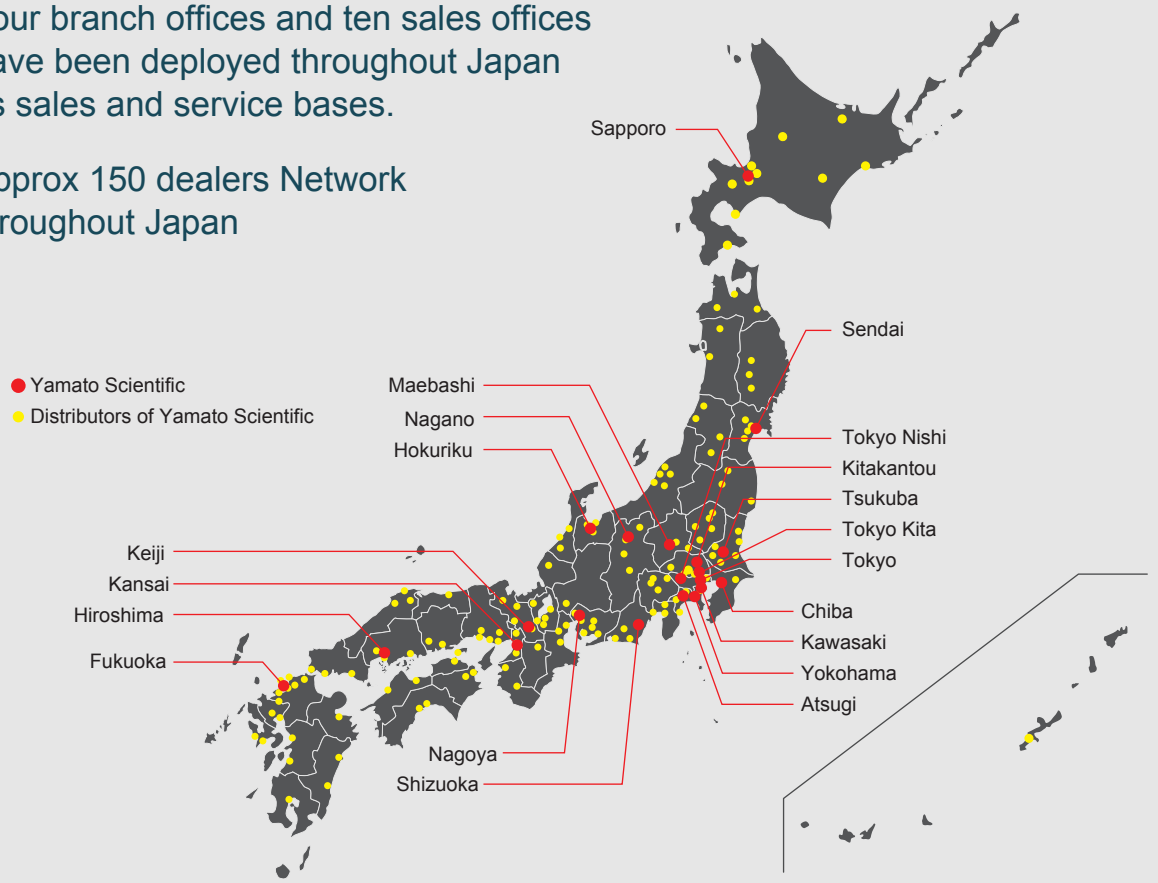
1889	Founded as"Yamato Sosuke Morikawa Company" by Sosuke Morikawa, First President
1913	Issued first Comprehensive Catalog
1915	First development and manufacture for X-ray tube in Japan
1941	Established “Yamato Scientific Instruments Ltd.”. Sosuke Morikawa Jr. became 2nd President.
1946	Yamato Scientific Instruments, Ltd. reorganized to Yamato Scientific Instruments Co, Ltd.
1948	Created distributor networks in Hokkaido, Tohoku, Kanto, Shinetsu, Hokuriku, Chubu, Kinki and Kyushu regions.
1966	Held the 1st domestic distributors meeting
1968	Completion of Atsugi Factory in Kanagawa Inland Industrial Park
1972	Yamato Scientific Instruments Co., Ltd. renamed to Yamato Scientific Co., Ltd. Tatsumi Morikawa became the 3rd president Established Yamato Express Co,. Ltd.
1976	Opened Atsugi Distribution Center within Atsugi Factory area
1977	Established Yamato Lab-Tech Co., Ltd. after incorpora - tion of Atsugi Factory and Research Facility Department.
1981	Completion of Yamanashi Factory in Kosai Industrial Park (current Minami Alps Factory)
1982	Established Yamato USA, Inc. in Illinois Established a medical device sales company, Yamato Medical Co. Ltd.
1989	Celebrated 100th anniversary establishment
1995	Established stock Yamato Environmental Technology Research Institute
1999	Satoshi Morikawa became the 4th president Yamato Glass Co., Ltd. listed on JASDAQ
2000	Established Morikawa Yamato Medical Co. Ltd. (Merging Yamato Medical Co. Ltd. and Morikawa Medical device Manufacture Co. Ltd.) Established SUNMEDIX Co., Ltd. (Merging Morikawa Yamato Medical Co. Ltd. and Ishii Medical Factory Co. Ltd.)
2003	Started “ Yamato Renaissance Campaign” promoting Yamato Brand Products
2004	Established Yamato Scientific Shanghai Corp.
2005	Established Yamato Scientific Chongqing Co., Ltd.
2006	New R&D Center opened at Minami Alps Factory Yamato Glass Co., Ltd. renamed to Yamato Material Co., Ltd.
2010	Opened Monzennaka-cho Annex
2012	Established Yamato Techno Engineering Co., Ltd.
2013	Relocation of headquarters (Nihonbashi Muromachi, Tokyo)
2014	Commemorated 125th Anniversary
2015	Established Lab Design Systems Co., Ltd.
2016	Completion of Yamato Scientific Chongqing Co., Ltd. new factory

Sales and Service Network

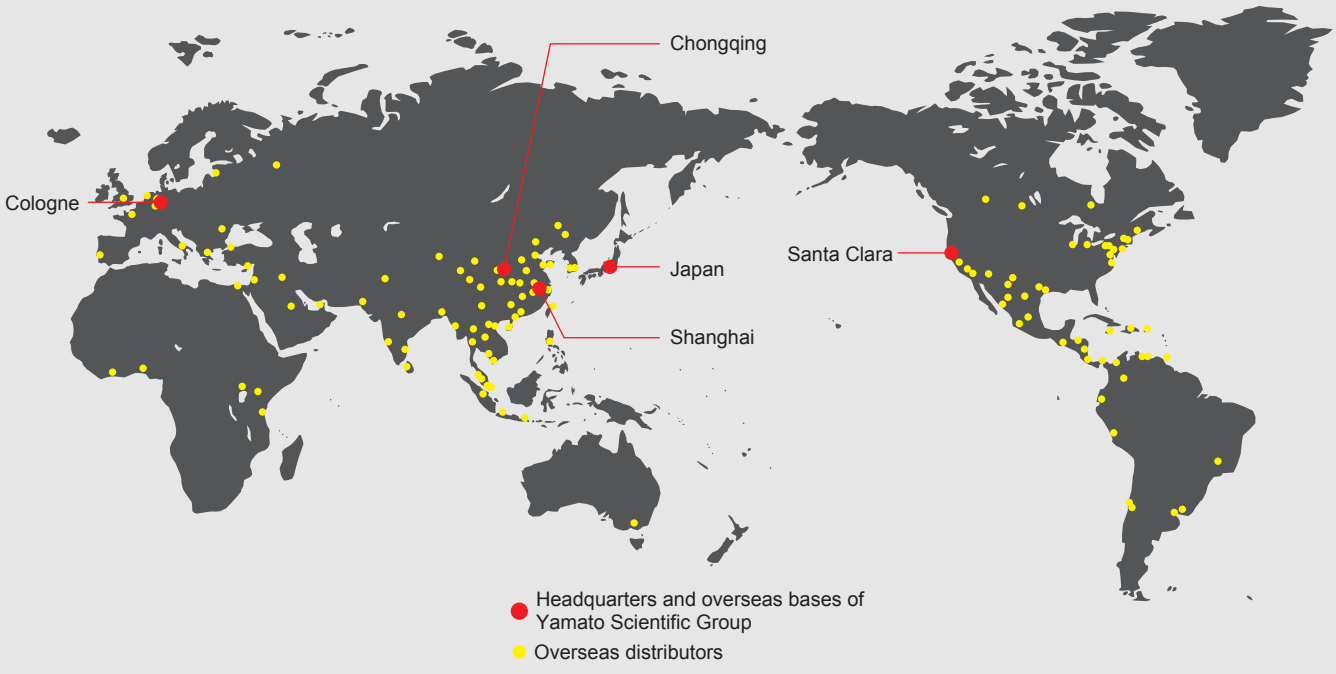
Location

Four branch offices and ten sales offices have been deployed throughout Japan as sales and service bases.

Approx 150 dealers Network throughout Japan

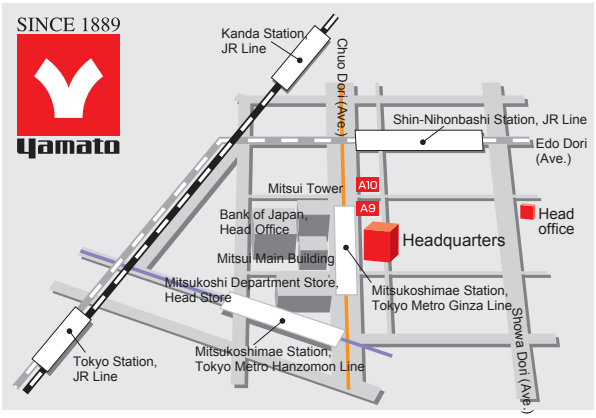


Overseas Sales Offices and Overseas Dealers Network



Yamato Group Introduction

Yamato Scientific Co., Ltd. Headquarters



(Transportation)

- Direct connection to Mitsukoshimae Station, Exit A6, Tokyo Metro Ginza Line
- Direct connection to Mitsukoshimae Station, Exit A6, Tokyo Metro Hanzomon Line
- Direct connection to Shin-Nihonbashi Station, Exit A6, JR Line

Yamato Scientific Co., Ltd. Head Office

SUNMEDIX Corporation

Establishment Date	August 21, 1950
Capital	83 million yen
Employee	371
Location	17F Muromachi Higashi Mitsui Bldg. (COREDO Muromachi 1), 2-2-1 Nihonbashi Muromachi, Chuo-ku, Tokyo 103-0022, JAPAN
Website	http://www.sunmedix.co.jp/

Business Contents

1. Sale of medical instruments, scientific instruments, medical X-ray devices, nursing care goods and various medical materials
2. Planning and consultation for medical facilities
3. Maintenance service

Yamato Scientific America Inc.

Establishment Date	January 23, 1989
Capital	US$2,000,000.00
Employee	7
Location	925 Walsh Ave.Santa Clara, CA 95050, U.S.A.
Website	http://www.yamato-usa.com

Business Contents

1. Sales and import/export of yamato brand products.
2. Turn-key project coordination for laboratory facilities.
3. Business incidental to the business listed in the preceding items.

Yamato Scientific Shanghai Corp.

Establishment Date	June 22, 2004
Capital	35 million yen
Employee	20
Location	Room 1001-1002, Block B, Xinyan Building, No.65 Guiqing Road, Xuhui District, Shanghai, China
Website	http://www.yamato-china.cn/

Business Contents

1. Sale and import/export of scientific instruments, medical instruments and laboratory facilities.
2. Export and domestic sales for OEM products and customized products manufactured in China.
3. Import and domestic sales for laboratory facilities.
4. Installation, repair and maintenance service.
5. Consultation for establishing new laboratories.

Yamato Scientific Chongqing Co., Ltd.

Establishment Date	September, 2005
Capital	130 million yen
Employee	104
Location	No.5-37, Yunhan Ave., Shuitu New & High-Tech, Industrial Park, Beibei Dist., Chongqing 400700, China

Business Contents

1. Investigation, R&D, design, production and sales of scientific instruments, medical instruments and laboratory facilities.
2. Medical Instruments Production Permission Number 20070012, ISO9001, ISO14001, GB/T28001

Yamato Material Co., Ltd.

Establishment Date	December 14, 1948
Capital	334 million yen
Employee	92
Location	24F 2-2-1 Kyobashi Edogrand, Kyobashi, Chuoku, Tokyo 104-8614, JAPAN
Major Branches	Osaka Branch, Kyushu Business Office, Akita Factory
Website	http://www.yamato-material.co.jp/

Business Contents

• Container Business

1. Plans, proposals, production and sales for packing materials to non-food industry such as cosmetics and toiletries, and for food industry such as beverages and seasonings.
2. Original Equipment Manufacturer (OEM) Sales of supplements, toiletry, etc.
3. Plans and sales of bottling system for food and medical industries
4. Plans and sales for environmental and energy saving products.
5. Cleaning and recycling for returnable beverage bottles, etc.

• Electronics Related Business

1. Plans, production, and sales for sockets, substrates, plastic products for electronic device, semiconductors, LCD, etc.
2. Plans and sales for testing devices for electronic device, semiconductors, LCD, etc
3. Plans and sales for image processing techniques and precision temperature control techniques.

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Sterilizer

Laboratory Use, Benchtop

SK101C/111C

Model	Temp. range	Internal capacity
SK101C/111C	50~126°C	18L

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Laboratory Use, Compact

SK200C/210C/300C/310C

Model	Temp. range	Internal capacity
SK200C/210C	50~126°C	24L
SK300C/310C		30L

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SN

Model	Temp. range	Internal capacity
SN200C/210C	45~135°C	20L
SN300C/310C		32L
SN500C/510C		47L

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Laboratory Use, Large Capacity

SQ500C/510C/810C

Model	Temp. range	Internal capacity
SQ500C/510C	45~135°C	50L
SQ810C		80L

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Laboratory Use, with Drying Process

SM520/530/820/830

Model	Temp. range	Internal capacity
SM520/530	45~60°C (retain temp.) 45~80°C (preheat temp.) 105~135°C (sterilize) 60~110°C (liquefy) 135~150°C (dry)	50L
SM820/830		80L

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SM201/211/301/311/501/511

Model	Temp. range	Internal capacity
SM201/211	Sterilization 105 to 123°C Drying 150 to 180°C	20L
SM301/311	Sterilization 105 to 128°C Drying 150 to 180°C	32L
SM501/511		47L

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Dry Sterilizer (Laboratory use)

SI411C/SI611C

Model	Temp. range	Internal capacity
SI411C	RT+5~260°C	77L
SI611C		159L

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SK401/601/801/811

Model	Temp. range	Internal capacity
SK401	RT+5~260°C	99L
SK601		162L
SK801/811	RT+10~210°C	300L

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Loop Cinerator

SL-21

Model	Internal sterilizing Temp.	Time to reach
SL-21	800~850°C	10min.

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Spray Dryer

Spray Dryer

ADL311SA

Model	Evaporated water	Temp. control range
ADL311SA	Max. 1300mL/h	40~220°C

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Spray Dryer Pulvis Mini Spray

GB210-A

Model	Evaporated water	Temp. control range
GB210A	Max. 1300mL/h	40~220°C

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GB210-B

Model	Granulation processing capacity	Temp. control range
GB210B	50~300g	40~220°C

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Spray Dryer (Large Capacity)

DL410

Model	Evaporated Water	Temp. control range
DL410	Max. 3000mL/h	40~300°C

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Solvent Recovery Unit

GAS410

Model	Circulation flow	Solvent recovery capacity
GAS410	0.12~0.65 m^3/min	1300ml/h or more

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Muffle Furnace

Standard Electric Furnace

FO□□□C

Model	Temp. range	Internal capacity
FO110C	100~1150°C	1.5L
FO210C		3.75L
FO310C		7.5L
FO410C		9L

Model	Temp. range	Internal capacity
FO510C	100~1150°C	11.3L
FO610C		17.5L
FO710C		23.6L
FO810C		30L

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FO□□□CR

Model	Temp. range	Internal capacity
FO100CR /110CR	100~1150°C	1.5L
FO200CR /210CR		3.75L
FO300CR /310CR		7.5L

Model	Temp. range	Internal capacity
FO410CR	100~1150°C	9L
FO510CR		11.3L
FO610CR		17.5L
FO710CR		23.6L
FO810CR		30L

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High Performance Muffle Furnace

FP110C/310C/510C

Model	Temp. range	Internal capacity
FP110C	100~1150°C	1.5L
FP310C		7.5L
FP510C		11.3L

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FP102/302/312/412

Model	Temp. range	Internal capacity
FP102	100~1150°C	1.5L
FP302		7.5L
FP312		
FP412		11.3L

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Nitrogen Gas Generator

NF300

Model	N_2 gas purity	N_2 gas Generating volume
NF300	99~99.99%	Max. 10 NL/min

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Oven

Forced Convection

DKN

Model	Temp. range	Internal capacity
DKN302C/312C	RT +10~260°C	27L
DKN402C/412C		90L
DKN602C/612C		150L
DKN812C		300L
DKN912C	RT +10~210°C	535L

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Economical Forced Convection Oven

DKM

Model	Temp. range	Internal capacity
DKM300C/310C	RT +10~260°C	27L
DKM400C/410C		90L
DKM600C/610C		150L

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DKL

Model	Temp. range	Internal capacity
DKL310C	RT +10~260°C	27L
DKL410C		90L
DKL610C		150L

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Forced Convection Oven (High Temp.)

DN410HC/610HC

Model	Temp. range	Internal capacity
DN410HC	RT +10~360°C	95L
DN610HC		223L

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DN411H/611H

Model	Temp. range	Internal capacity
DN411H	RT +15~360°C	95L
DN611H		223L

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Fine Oven

DF/DH□□□C

Model	Temp. range	Internal capacity
DF411C	RT +10~260°C	91L
DF611C		216L
DH411C	RT +10~360°C	91L
DH611C		216L

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DF/DH412,DF/DH612

Model	Temp. range	Internal capacity
DF412	RT +15~260°C	91L
DF612		216L
DH412	RT +15~360°C	61L
DH612		216L

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Fine Oven (Large Capacity)

DF/DH811C,DF/DH1011C

Model	Temp. range	Internal capacity
DF811C	RT +10~200°C	512L
DF1011C		1,000L
DH811C	RT +10~300°C	512L
DH1011C		1,000L

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DF832/1032,DH832/1032

Model	Temp. range	Internal capacity
DF832	RT +15~200°C	512L
DF1032		1,000L
DH832	RT +15~300°C	512L
DH1032		1,000L

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Fine Oven (Tall)

DFS710/810,DHS710/810

Model	Temp. range	Internal capacity
DFS710	RT +15~260°C	418L
DFS810		558L
DHS710	RT +15~360°C	418L
DHS810		558L

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Fine Oven (High Temp., 500℃)

DH650C

Model	Temp. range	Internal capacity
DH650C	RT +10~500°C	216L

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Forced Convection Oven (Energy Saving)

DNE650/650V/670/810/850/850V

Model	Temp. range	Internal capacity
DNE650/650V	RT +10~260°C	150L
DNE670/670V		
DNE850/850V		300L

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DNE□□□C

Model	Temp. range	Internal capacity
DNE410C	RT +20~210°C	90L
DNE610C		150L
DNE810C		300L
DNE910C		540L

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DNE401/410/601/610/810/910

Model	Temp. range	Internal capacity
DNE401/410	RT +20~210°C	90L
DNE601/610		150L
DNE811		300L
DNE911		540L

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Ovens

Forced Convection Oven (Airflow Control)

DNF□□□C

Model	Temp. range	Internal capacity
DNF410C	RT +10~260°C	90L
DNF610C		150L
DNF810C		300L
DNF910C		540L

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DNF

Model	Temp. range	Internal capacity
DNF301	RT +15~260°C	27L
DNF401/411		90L
DNF601/611		150L
DNF811		300L
DNF911		540L

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Industrial Forced Convection Oven (Silicorn/Fluoro-rubber Gasket)

DKG

Model	Temp. range	Internal capacity
DKG610/610V	RT +30~260°C	150L
DKG650/650V		
DKG810/810V		300L
DKG850/850V		

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Natural Convection Oven (Programmable)

DVS

Model	Temp. range	Internal capacity
DVS402C/412C	RT +5~260°C	99L
DVS602C/612C		162L

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Natural Convection Oven

DX

Model	Temp. range	Internal capacity
DX302C/312C	RT +5~300°C	28L
DX402C/412C		74L
DX602C/612C	RT +5~280°C	153L

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DY

Model	Temp. range	Internal capacity
DY310C	RT +5~300°C	28L
DY410C		74L
DY610C		153L

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Inert Oven

DN411I/611I

Model	Temp. range	Internal capacity
DN411I	RT +15~360°C	95L
DN611I		223L

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Fine Oven (with Explosion Vent)

DF/DH411SC, DF/DH611SC

Model	Temp. range	Internal capacity
DF411SC	RT +10~260°C	91L
DF611SC		216L
DH411SC	RT +10~360°C	91L
DH611SC		216L

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DF/DH412S, DF/DH612S

Model	Temp. range	Internal capacity
DF412S	RT +10~260°C	91L
DF612S		216L
DH412S	RT +10~360°C	91L
DH612S		216L

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Glassware Drying Oven

DG

Model	Temp. range	Internal capacity
DG410C	RT +5~70°C	92L
DG450C		
DG810C		445L
DG850C		

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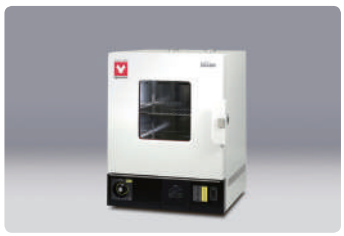
Fail-safe Drying Oven



DGS400

Model	Temp. range	Internal capacity
DGS400	RT +5~110°C	93L

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Clean Oven

DT300/300H

Model	Temp. range	Internal capacity
DT300	RT +20~300°C	27L
DT300T		

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DE/DT/DE U

Model	Temp. range	Internal capacity
DE430C/630C	RT +30~260°C	91/216L
DT430C/630C	RT +30~360°C	91/216L
DE430UC/630UC	RT +50~200°C	91/216L

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DE411/611, DT411/611

Model	Temp. range	Internal capacity
DE411/611	RT +30~260°C	91/216L
DT411/611	RT +30~360°C	91/216L

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DES830/DTS830

Model	Temp. range	Internal capacity
DES830	RT +30~260°C	327L
DTS830	RT +30~360°C	

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Ovens

Clean Oven (Large Capacity)

DEC812C/912C

Model	Temp. range	Internal capacity
DEC812C	RT +10~150°C	236L
DEC912C		472L

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Open Chamber

OTC-213A/OTC-2D

Model	Temp. range	Internal capacity
OTC-213A	-15~+60°C	134L
OTC-2D	-30~+80°C	300L

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IR Oven (Far-infrared Heating)

DIR631C

Model	Temp. range	Internal capacity
DIR631C	RT +10~360°C	216L

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Natural Convection Oven (High Temp., 700℃)

DR210C

Model	Temp. range	Internal capacity
DR210C	300~700°C	13.75L

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Vacuum Drying Oven

DP200/300/410/610

Model	Temp. range	Internal capacity
DP200	40~240°C	10L
DP300		27L
DP410	40~200°C	91L
DP610		216L

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DP43C/63C

Model	Temp. range	Internal capacity
DP43C	40~200°C	91L
DP63C		216L

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Vacuum Drying Oven (Large Capacity)

DP83C/103C

Model	Temp. range	Internal capacity
DP83C	40~200°C	512L
DP103C		1,000L

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DP810/1030

Model	Temp. range	Internal capacity
DP810	40~200°C	512L
DP1030		1,000L

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Vacuum Drying Oven (Compact)

DP23C/33C

Model	Temp. range	Internal capacity
DP23C	40~240°C	10L
DP33C		27L

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ADP

Model	Temp. range	Internal capacity
ADP200C/210C	40~240°C	10L
ADP300C/310C		27L

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Vacuum Drying Oven

DP43PC/63PC

Model	Temp. range	Internal capacity
DP43PC	40~200°C	91L
DP63PC		216L

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DP610P

Model	Temp. range	Internal capacity
DP610P	40~200°C	216L

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Incubator

Incubator (Natural Convection, Air Jacket)

IS□□□C

Model	Temp. range	Internal capacity
IS412C	RT +5~80°C	97L
IS612C		159L
IS812C		318L
IS912C		567L

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IS401/601/801/901

Model	Temp. range	Internal capacity
IS401	RT +5~80°C	97L
IS601		159L
IS801		318L
IS901		567L

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Economical Incubator (Natural Convection)

IC□□□C

Model	Temp. range	Internal capacity
IC412C	RT +5~80°C	97L
IC612C		159L
IC812C		318L
IC912C		567L

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Economical Incubator (Natural Convection)

IC□□□C

Model	Temp. range	Internal capacity
IC103C/113C	RT +5~80°C	37L
IC403C/413C		97L
IC603C/613C		159L
IC803C/813C		318L
IC903C/913C		567L

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Low Temperature Incubator (Programmable)

IN□□□C

Model	Temp. range	Internal capacity
IN602C	-10~+50°C	143L
IN612C		
IN802C		286L
IN812C		

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IN604/604W/804

Model	Temp. range	Internal capacity
IN604	-10~+50°C	143L
IN604W		
IN804		286L

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Low Temperature Incubator (Energy Saving & Programmable)

INE800

Model	Temp. range	Internal capacity
INE800	0~+60°C	286L

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Low Temperature Incubator (Programmable, Peltier Cooling)

IJ101/101W/201/300

Model	Temp. range	Internal capacity
IJ101/101W	+5~+60°C	15.6L
IJ201		27L
IJ300		43L

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Double Chamber Incubator (Natural Convection & Low Temp.)

INC821C

Model	Temp. range	Internal capacity
INC812C	(Upper) +4~+50°C	150L
	(Lower) +5~+80°C	143L

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Double Chamber Incubator (Low Temp.)

IQ822C

Model	Temp. range	Internal capacity
IQ822C	-10~+50°C	143L×2

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CO_2 Incubator

BNA600/IP600

Model	Temp. range	Internal capacity
BNA600	+5~+50°C	167L
IP600		

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Low Temperature Incubator (Programmable, Air Jacket)

IL603

Model	Temp. range	Internal capacity
IL603	0~+50°C	159L

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Low Temperature Incubator (Energy Saving, Programmable, Air Jacket)

ILE800

Model	Temp. range	Internal capacity
ILE800	0~+60°C	300L

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Low Temperature Incubator (Programmable, Air Jacket)

IL612C/812C

Model	Temp. range	Internal capacity
IL612C	0~+50°C	159L
IL812C		300L

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Plasma Cleaner

Plasma Reactor (Barrel Chamber)

PR200/300/301

Model	High frequency output	Reaction chamber
PR200	200W	ø100×160mm
PR300	100W×2	ø64×160mm×3
PR301	300W	ø118×160mm

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PR500/510

Model	High frequency output	Reaction chamber
PR500	500W	ø215×305mm
PR510		

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Plasma Cleaner (Parallel Electrode)

PDC200/210/510

Model	High frequency output	Reaction chamber (W×D×Hmm)
PDC200	300W	400×250×150
PDC210	500W	500×300×200
PDC510		

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PDC610

Model	High frequency output	Reaction chamber (W×D×Hmm)
PDC610	600W	350×270×300

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Plasma Cleaner (Parallel Electrode)

V1000/1000X/1000XS

Model	High frequency output	Reaction chamber (W×D×Hmm)
V1000	1,000W	400×400×380
V1000X	1,000 & 1,500W	
V1000XS		600×554×440

➡Page 181

Plasma Modifier (Barrel Chamber)

PM100

Model	Reaction chamber
PM100	I.D 100mm×L160mm

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Plasma Cleaner (Parallel Electrode, Compact)

PiPi

Model	High frequency output	Reaction chamber
PiPi	50~200W	230×130×130mm

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Water Purifier

Ion-exchange+Distillation

WG250/1000

Model	Purified water & Water quality
WG250	Deionized water: Type 1/A4
WG1000	Distilled water: Type 2/A4

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Ion-exchange+Distillation, Large Capacity

WG511/711

Model	Purified water & Water quality
WG511	Deionized water: A4
WG711	Distilled water: A4

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WA511/711/731

Model	Purified water & Water quality
WA511	Deionized water: A4 Distilled water: A1
WA711	
WA731	

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Ion-exchange+Distillation

WGH200

Model	Purified water & Water quality
WGH200	Deionized water: Type 1/A4 Distilled water: Type 2/A4

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Ion-exchange+Distillation

WG203

Model	Purified water & Water quality
WG203	Deionized water: Type 1/A4 Distilled water: Type 2/A4

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Distillation

WS200/220

Model	Purified water & Water quality
WS200	Distilled water: Type 4/A1
WS220	

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Ion-exchange

WL320A/320B

Model	Purified water & Water quality
WL320A	Deionized water: Type 2/A4
WL320B	

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WL200/220/220T

Model	Purified water & Water quality
WL200	Deionized water: Type 2/A3
WL220	
WL220T	

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RO+Ion-exchange

WE200

Model	Purified water & Water quality
WE200	Deionized water: Type 1/A4

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Ion-exchange

WL100

Model	Purified water
WL100	Deionized water

➡ Page 205

Constant Temperature Bath

Water Bath (Precision Constant Temp.)

BK

Model	Temp. range	Bath capacity
BK/BA310C	RT +5~80°C	27L
BK/BA410C		42L
BK/BA510C		70L
BK/BA610C		109L
BK/BA710C		144L

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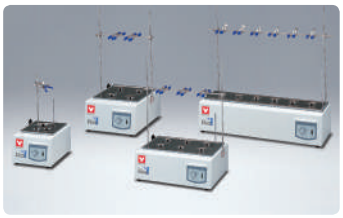
Water Bath (Constant Temp.)



BS

Model	Temp. range	Bath capacity
BS200	RT +5~ Water boiling point	27L
BS400		42L
BS600		70L
BS660		109L

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Economical Water Bath (Constant Temp.)

BM

Model	Temp. range	Bath capacity
BM100/110	RT +5~95°C	4L
BM200/210		7L
BM401		
BM500/510	RT +5~90°C	4L

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Immersion Constant Temperature Device

BF201/401/501/601

Model	Temp. range
BF201	RT +5~80°C
BF401	
BF501	
BS601	RT +5~180°C

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Water Bath (High Precision Constant Temp., Programmable)

BH401/501

Model	Temp. range	Bath capacity
BH401	RT +15~100°C	13L
BH501	RT +15~200°C	

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Oil Bath (Large Capacity)

BOA200/310

Model	Temp. range	Bath capacity
BOA200	RT +15~200°C	37L
BOA310	RT +15~270°C	

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Economical Oil Bath

BO400/410/500/601

Model	Temp. range	Bath capacity
BO400	RT +10~180°C	4L
BO410		
BO500	RT +10~199°C	5.2L
BO601	RT +10~180°C	7L

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Shaking Water Bath

BW101/201/400

Model	Shaking	Bath capacity
BW101	Shaking width: 10~40 mm Shaking speed: 20~160 time/min.	12L
BW201		20L
BW400		30L

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Shaking Water Bath Incubator

BT100/200/300

Model	Temp. range	Bath capacity
BT100	RT +5~80°C	19L
BT200		23L
BT300		34L

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Water Bath (Low Constant Temp.)

BBL111C/311C

Model	Temp. range	Bath capacity
BBL111C	RT -10~+80°C	8L
BBL311C		13L

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BB311C/411C/611C

Model	Temp. range	Bath capacity
BB311C	-30~+80°C	6L
BB411C		13L
BB611C		26L

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Water Bath (Low Constant Temp., Large Capacity)

BL410C/810C

Model	Temp. range	Bath capacity
BL410C	-15~+70°C	36L
BL810C		80L

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Low Temp. Bath

BLG100/200

Model	Temp. range	Bath capacity
BLG100	-80~0°C	300mL
BLG200	-40~0°C	1,000mL

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Low Temp. Water Bath (Programmable, Peltier Cooling)

BV100

Model	Temp. range	Bath capacity
BV100	0~+80°C	6L

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Heating Block

HF100/200

Model	Temp. range	Bath dimensions (W×D×Hmm)
HF100	RT +5~200°C	112×112×70
HF200		222×112×70

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Cooling Water Circulator

Externally Closed Circulation, Water Cooling

CHW710C, CHS710C

Model	Temp. range	Pump (50/60Hz)
CHW710C	10°C~RT	Max. flow rate: 22.1/21.7L/min Max. lift: 19.0/25.0m
CHS710C		

for Water (CHW710C)
for Pure Water (CHS710C)

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Externally Closed Circulation

CF311C/810C

Model	Temp. range	Bath capacity
CF311C	-20°C~RT	4L
CF810C		16L

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Externally Closed Circulation, Inverter Control

CFI

Model	Temp. range	Cooling capacity
CFI701	+5~30°C	1,000W
CFI911		1,600W
CFI1111		2,700W
CFI601	-10~30°C	1,000W
CFI811		1,800W
CFI1011		2,900W

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Externally Closed Circulation, Air Cooling

CFA311C/610C

Model	Temp. range	Pump (50/60Hz)
CFA311C	-30~+80°C	Max. flow rate: 8.9/10.3L/min Max. lift: 6.6/9.0m
CFA610C		Max. flow rate: 16.4/18.3L/min Max. lift: 9.7/13m

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Externally Opened Circulation

CLS312C/411C/610C

Model	Temp. range	Pump (50/60Hz)
CLS312C	-10°C~RT	Max. flow rate: 5.4/6.2L/min Max. lift: 3.5/5.0m
CLS411C		Max. flow rate: 5.4/6.3L/min Max. lift: 3.7/5.3m
CLS610C		Max. flow rate: 6.7/7.8L/min Max. lift: 6.2/8.7L/m

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CLH312C/411C/610C

Model	Temp. range	Pump (50/60Hz)
CLH312C	-10~+80°C	Max. flow rate: 5.4/6.2L/min Max. lift: 3.5/5.0m
CLH411C	-15~+80°C	Max. flow rate: 5.4/6.3L/min Max. lift: 3.7/5.3m
CLH610C		Max. flow rate: 6.7/7.8L/min Max. lift: 6.2/8.7L/m

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Externally Opened Circulation,Peltier Cooling

CTA402(S)/802(S)/412(S)/812(S)
CTW402(S)/802(S)/412(S)/812(S)

Model	Temp. range	Pump (50/60Hz)
CTA402/CTA412	0~+70°C	Max. flow rate: 8 L/min
CTA402S/CTA412S		
CTA802/CTA812		Max. flow rate: 11 L/min
CTA802S/CTA812S		
CTW402/CTW412	-10~+70°C	Max. flow rate: 8 L/min
CTW402S/CTW412S		
CTW802/CTW812		Max. flow rate: 11 L/min
CTW802S/CTW812S		

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Rotary Evaporator

Economical Rotary evaporator

RE201/RE211

Rotation speed	20~180 (rpm)
Lifting feature	Manual lifting
Temperature range	Water Bath: RT +5~95°C

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Rotary evaporator

RE301

Rotation speed	20~250 (rpm)
Lifting feature	Motorized lifting
Lift stroke	130mm
Temperature range	Water Bath: RT +5~90°C Oil Bath: RT +10~180°C

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High Performance Rotary evaporator

RE601/RE801

Rotation speed	20~250 (rpm)
Lifting feature	Motorized lifting
Lift stroke	130mm
Temperature range	Water Bath: RT +5~90°C Oil Bath: RT +10~180°C

➡Page 251/252/253

Cold Trap, Immersion Cooler, Freeze Dryer

Cold Trap

CA301/801

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

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Immersion Cooler

BE201/201F/301

Model	Temp. range	Cooling capacity
BE201	-20~+35°C	190W
BE201F		
BE301		350W

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Freeze Dryer

DC401/801

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

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Stirrer, Shaker & Hot Plate

Ultrasonic Homogenizer

LUH150/300

Model	Maximum output	Oscillation frequency
LUH150	50W	20 kHz ±0.5 kHz
LUH300	300W	

➡ Page 263/264

Laboratory Flask Mixer

LM100/110/200210

Model	Operating speed range	Max. torque
LM100/110	50~1000rpm	0.1N•m
LM200/210		

➡ Page 265/266

Magnetic Stirrer

MA300A/300B, M-21

Model	Revolution	Stirring capacity
MA300A	100~1,200rpm	50~3,000ml
MA300B		50~1,000ml
M-21	200~2,500rpm	

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MA100/300, MG120/600

Model	Revolution	Stirring capacity
MA100	100~1,500rpm	50~1,000ml
MA300	400~1,550rpm	50~3,000ml
MG120	100~1,500rpm	5~1,500ml ×12pcs.
MG600	200~1,500rpm	50~2,000ml ×6pcs.

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Magnetic Stirrer

MD200/300/500/800, MS500D

Model	Revolution	Stirring capacity
MD200	80~1,500rpm	50~2,000ml
MD300	100~1,500rpm	50~3,000ml
MD500	70~1,300rpm	50~5,000ml
MD800	50~1,400rpm	50~
MS500D	10~1,400rpm	10,000ml

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MC801, MF820, MB800

Model	Revolution	Stirring capacity
MC801	80~1,800rpm	100~10,000ml
MF820	80~1,500rpm	100~20,000ml
MB800	70~1,200rpm	100~10,000ml

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Magnetic Stirrer with Hot Plate

MH301/520/800, MG600H

Model	Revolution	Stirring capacity
MH301	400~1,500rpm	100~3,000ml
MH520	150~1,150rpm 150~1,300rpm	50~5,000ml
MH800	100~1,400rpm	200~10,000ml
MG600H	300~1,500rpm	100~2,000ml ×6pcs.

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Hot Plate, Touch Mixer

HK200/300, HM300/-11, MT-31/-51

Model	Temp. range
HK200	50~250°C
HK300	
HM300	RT.+5~80°C
HM-11	50~200°C

Model	Revolution
MT-31	2,800rpm(50Hz) 3,300rpm(50Hz)
MT-51	600~3,000rpm

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Laboratory Furniture

Sink (Steel)

LSE

Model	Feature
LSE-127	Top surface: Trespa One-compartment sink
LSE-157	
LSE-187	

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Balance Table (Steel)

LBA

Model	Feature
LBA-96	Top board: Stone (terrazzo) 50mm
LBA-126	
LBA-186	

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LBB

Model	Feature
LBB-96	Top board: Stone (terrazzo) 50mm
LBB-126	
LBB-186	

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LBC

Model	
LBC-96	Top board:Melamine Vibration proof
LBC-126	
LBC-186	

➡Page 351

Storage Cabinet (Steel)

LSE

Model	Dimensions
SU-1C	W450×D400×H600mm
SU-2C	
SU-3C	
SU-4C	
SU-5C	

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Chemical Storage Shelf/Cabinet (Steel)

LLA

Model	Feature
LLA-94	Upper unit: Glass door Lower unit: Hinge door
LLA-124	
LLA-154	
LLA-184	

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LLB

Model	Feature
LLB-94	Upper unit: Glass door Lower unit: Drawer and hinge door
LLB-124	
LLB-154	
LLB-184	

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Industrial Equipment

Chiller (Large Capacity)

C1-001

Temp. range	Circulating capacity
4~22℃	Max. flow: 24L/min Max. lift: 30m

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Chiller (Large Capacity, for Narrow Space)

C1-002

Temp. range	Circulating capacity
4~10℃	Max. flow: 24L/min Max. lift: 30m

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Multi-Chamber Oven

C1-003

Temp. range	Internal dimension
40~260℃	W450×D520×H300mm

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Clean Inert Oven

C1-004

Temp. range	Internal dimension
RT+30~360℃	W660×D660×H500mm

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Double Entry Oven

C1-005

Temp. range	Internal dimension
RT+20~180℃	W1,000×D1,850×H2,150mm

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Stackable Oven

C1-006

Temp. range	Internal dimension
RT+10~260℃	W700×D500×H500mm

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Conveyor Oven (Fully Automatic)

C1-007

Temp. range	Conveyor length	Inlet and outlet dimension
RT+20~80℃	600mm	W400×H65mm

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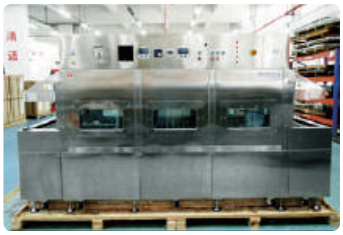

C1-008

Temp. range	Conveyor length	Inlet and outlet dimension
RT+20~120℃	3,000mm	W800×H215mm

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Industrial Equipment

Modular Vacuum Oven

C2-001

Temp. range	Internal dimension
RT+30~250℃	W600×D600×H600mm

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2-Chamber Vacuum Oven (Far-infrared Heating)

C2-002

Temp. range	Internal dimension
RT+10~200℃	W700×D1,250×H700mm

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2-Chamber Vacuum Oven (Automatic Control)

C2-003

Temp. range	Internal dimension
40~200℃	W450×D450×H450mm W600×D600×H600mm

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Vacuum Oven (Fully Automatic Programmable Control)

C2-004

Temp. range	Internal dimension
40~200℃ 40~200℃ 40~200℃	4 type: W450×D450×H450mm 6 type: W600×D600×H600mm

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Autoclave (Industrial Use, Large Capacity)

YYK

Model	Temp. range	Internal dimension
YKK500	RT+10~70℃	ϕ500×850Lmm
YKK750		ϕ750×1,100Lmm
YKK800		ϕ800×1,100Lmm
YKK900		ϕ900×1,300Lmm

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LCD Aging Chamber (Drawer)

C3-001

Temp. range	LCD size
50~60℃	Less than 45 inch

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LCD Aging Chamber (Insertion Slot)

C3-002

Temp. range	LCD size
50~60℃	32~50 inch

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Clean Oven (Class 1000)

C3-003

Temp. range	Internal dimension
RT+10~260℃	W600×D500×H1,000mm

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Clean Oven (Class 100)

C3-004

Temp. range	Internal dimension W×D×Hmm
RT+10~150℃	500×450×1,050

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Vacuum Inert Oven (with Humidity Monitoring System)

C4-001

Temp. range	Internal dimension W×D×Hmm
40~240℃	300×300×300

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Forced Convection Oven (with Oxygen & Humidity Monitor)

C4-002

Temp. range	Internal dimension W×D×Hmm
RT+10~150℃	800×600×1,265

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Forced Convection Oven (Cart)

C4-003

Temp. range	Internal dimension W×D×Hmm
RT+20~120℃	700×700×1,200

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C4-004

Temp. range	Internal dimension W×D×Hmm
RT+20~150℃	820×820×1,370

➡ Page 365

Burn-in Testing Chamber

C4-005

Temp. range	Internal dimension
RT+10~260℃	W600×D500×H1,000mm

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C4-006

Temp. range	Internal dimension
RT+10~100℃	Each temp. zone W710×D460×H140mm

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Coating Machine

C4-007

Temp. range	Conveyor
80~100℃	Stainless steel Speed: 300~600mm/min

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Walk-in Drying Chamber

C4-008

Temp. range	Internal dimension
RT+10~100℃	W3,500×D3,500×H3,000mm

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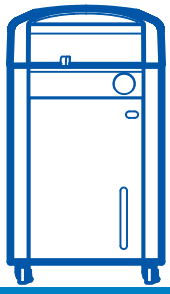


Sterilizer

Contents

Sterilizer

STEAM Sterilization DRY Sterilization

Benchtop

SK
Internal Capacity: 18L

Compact

SK
24, 30L

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

Standard without dryer

SN
Internal Capacity: 20, 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

- 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
- Economical

Large capacity dry sterilization

SK
Internal Capacity: 99, 162, 300L

- Dry heat sterilization through natural or forced convection
- Programmable
- Standard equipped with high precision controller

Steam Sterilizer (Laboratory Use, Benchtop)

SK101C/111C

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

Space-saving, low cost benchtop sterilizer, ideal for research facilities

Sterilizer with an 18 liter chamber for research processes and areas that are limited in space. High pressure steam is the most widely used method for sterilization due to its speed, reliability, and effectiveness. Newly designed small capacity sterilizers provide a safe, reliable high pressure steam sterilizing environment within a self-contained unit that is particularly easy to use. This sterilizer is ideal for a wide range of applications.

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

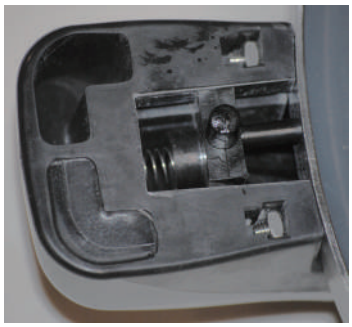
Model	SK101C	SK111C
System	Automatic high pressure steam sterilizer	
Temp. setting range	50 to 126°C	
Max. operational pressure	0.142MPa (at 126°C)	0.2MPa
Interior Material	Stainless steel SUS 304	
Heater	1500W stainless steel heating pipe	
Temp. controller	PID control by microprocessor	
Temp. setting 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×D275 mm	
External dimensions	Dia.343×D550 mm	
Internal capacity	18L	
Power source 50/60Hz	AC 115V, 15A	AC 220V, 9A
Weight	Approx. 17.5Kg	
Accessories	1 stainless steel mesh basket (254mm×240mm) and stainless steel bottom plate	

Control Panel

- New 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

Steam Sterilizer (Laboratory Use, Compact)

SK200C/210C/300C/310C

Operating temp. range	50°C to 126°C
Max. operational Pressure	0.142MPa
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×D360 mm		Dia.280×D440 mm	
External dimensions	W353×D386×H737 mm		W353×D386×H827 mm	
Internal capacity	24L		30L	
Power source 50/60Hz	AC 115V, 15A	AC 220V, 9A	AC 115V, 15A	AC 220V, 9A
Weight	Approx. 26.5Kg		Approx. 31.5Kg	
Accessories	1 stainless steel mesh basket (φ254 ×H331) and stainless steel bottom plate		1 stainless steel mesh basket (φ254 x H409) and stainless steel bottom plate	

Control Panel

- New 4 digit LED display

Key Features

- Three way Drain Valve Handle

- Lid clamp for added safety

- Casters (lockable front)

Steam Sterilizer (Laboratory Use, Compact) CE

SN200C/210C/300C/310C/500C/510C

Operating temp. range	45°C to 135°C

Max. operational Pressure	0.255MPa

Internal capacity	20L SN200C/210C	32L SN300C/310C	47L SN500C/510C

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

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

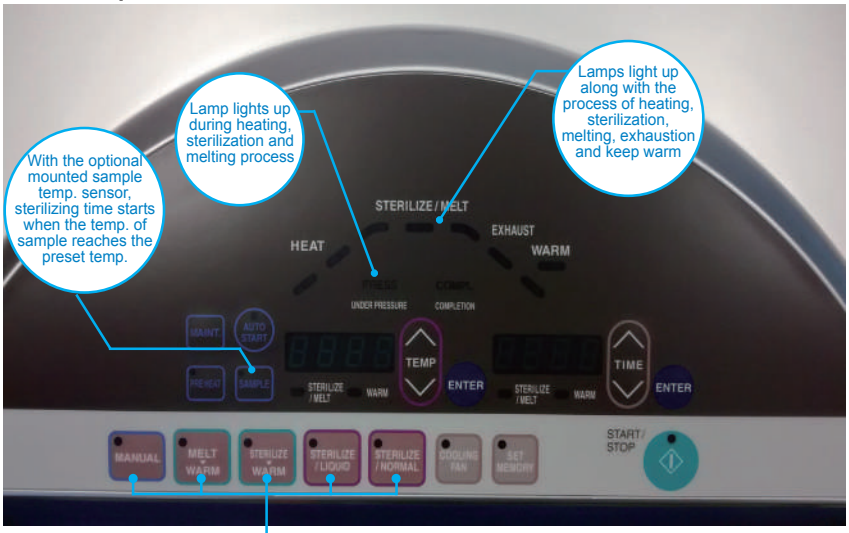
Enhanced safety device

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

Specifications

Model	SN200C	SN210C	SN300C	SN310C	SN500C	SN510C
System	Automatic high-pressure steam sterilization					
Operating temperature range	45~135°C					
Max. working pressure	0.255MPa					
Ambient temperature	5~35°C					
Lid	Manual upward opening with an interlock for safety					
Heater	100V, 800W×2 units				100V, 950W×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 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 (W×D×Hmm)	460×590×848				460×590×1068	
Internal dimensions of chamber	I.D.300×D305 mm		I.D.300×D445 mm		I.D.300×D665 mm	
Internal capacity	20L		32L		47L	
Weight	Approx. 65kg		Approx. 75kg		Approx. 85kg	
Power source	AC100~120V(15~12.5A)	AC200~240V(10~8.5A)	AC100~120V(15~12.5A)	AC200~240V(10~8.5A)	AC100~120V(23.5~19.5A)	AC200~240V(12~10A)
Accessories	2 pcs. stainless steel mesh basket (Dia.205×D204mm), OSM-60		2 pcs. stainless steel mesh basket (Dia.262 ×D204mm), OSM-70		3 pcs. stainless steel mesh basket (Dia.262×D204mm), OSM-70	
	Vapor cup×1, Drain bottle×1, Drain board×1, Chemical indicator 1 set (30 pieces), Filter×1					

Control panel



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

Standard Equipped with Cooling Fan & Slow Release Valve

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

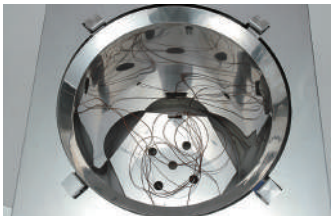
Features

Support GLP / GMP Inspection

Standard equipped with 2 sensor ports on the main unit

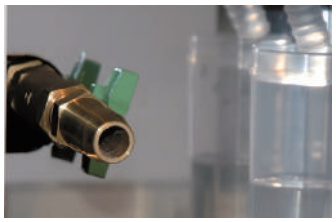
Optional recorder and high performance pressure gauge

Sterilization starts automatically by sample temperature sensor



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

Easy to drain out sterilizing water

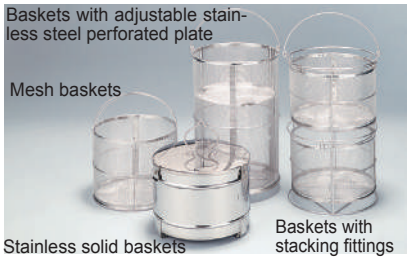


Easier maintenance with larger diameter drain pipe

Front Loading Drain Bottle

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

Optional items



- Stainless baskets

- Stainless buckets

Product code	Model	Description	Corresponding models
241087	OSM-60	Mesh basket	SN200C/210C
241088	OSM-70		SN300C/310C/500C/510C
241089	OSM-80		SN500C/510C
241093	OSQ-30	Mesh basket with stacking fittings	SN200C/210C, with two fittings
241092	OSQ-40		SN300C/310C, with two fittings
241091	OSQ-50		SN500C/510C, with three fittings
241096	OSQ-60	Mesh basket with adjustable stainless steel perforated plate	SN200C/210C, with 1 plate
241095	OSQ-70		SN300C/310C, with 1 plate
241094	OSQ-80		SN500C/510C, with 2 plates
241083	OSR-10	Stainless solid basket	SN200C/210C
241084	OSR-20		SN300C/310/500C/510C
241150	OSN10	Stainless bucket	SN200C/210C
241151	OSN12		SN300C/310/500C/510C
Please specify when ordering main unit.		Chamber temp. sensor	Type T thermocouple, 3 pcs./set
		Sample temp. sensor	Type T thermocouple, 1 pc.
		Pressure gauge	External installation
		External alarm output terminal	
		Temp. output terminal	4 - 20 mA
		Time-up output terminal	Relay, Contact output

Steam Sterilizer (Laboratory Use, Large Capacity)

SQ500C/510C/810C

CE

Operating temp. range	45°C to 135°C
Max. operational Pressure	0.255MPa
Internal capacity	50L SQ500C/510C / 80L SQ810C

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

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

Enhanced safety device

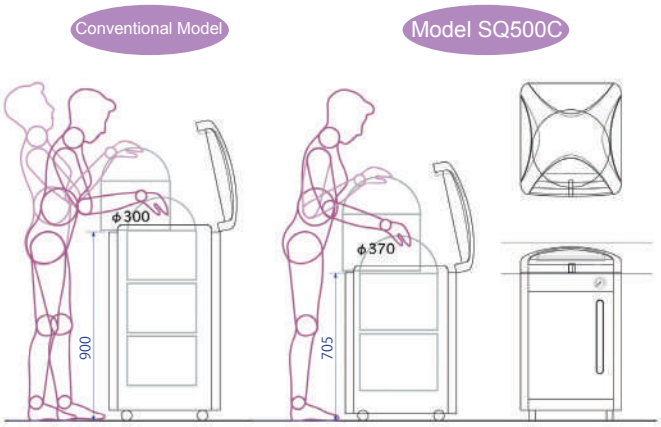
- Lid interlock mechanism
- Drain bottle unset alarm
- Memory malfunction
- Automatic shutdown when malfunction
- Self-diagnostic functions

Specifications

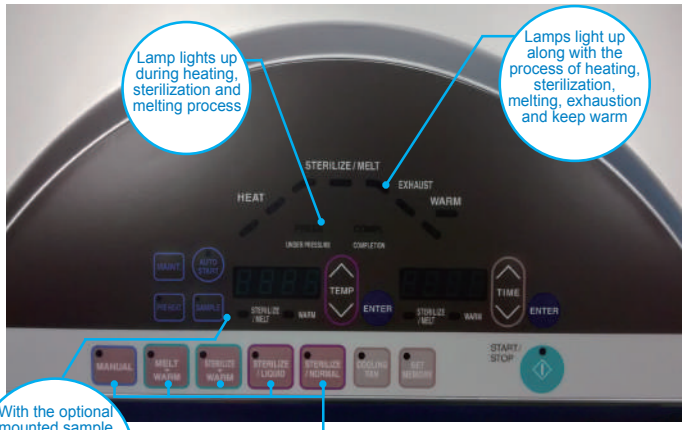
Model	SQ500C	SQ510C	SQ810C
System	Automatic high-pressure steam sterilization		
Operating temperature range	45~135°C		
Max. working pressure	0.255MPa		
Ambient temperature	5~35°C		
Lid	Manual upward opening with an interlock for safety		
Heater	100V, 1000W×2 units		
Exhaust valve	One exhaust valve and 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 (W×D×Hmm)	520×660×881		520×660×1161
Internal dimensions of chamber	I.D.370×D470 mm		I.D.370×D750 mm
Internal capacity	50L		80L
Weight	Approx. 95kg		Approx. 105kg
Power source	AC100~120V (24.5~20.5A)	AC200~240V (12.5~10.5A)	AC200~240V (12.5~10.5A)
Accessories	2 pcs. stainless steel mesh basket (Dia.332×D195.5mm), OSQ-90		3 pcs. stainless steel mesh basket (Dia.332×D195.5mm), OSQ-90
	Vapor cup×1, Drain bottle×1, Drain board×1, Chemical indicator 1 set (30 pieces), Filter×1		

Low Height Sterilizers

SQ500C(low height type)

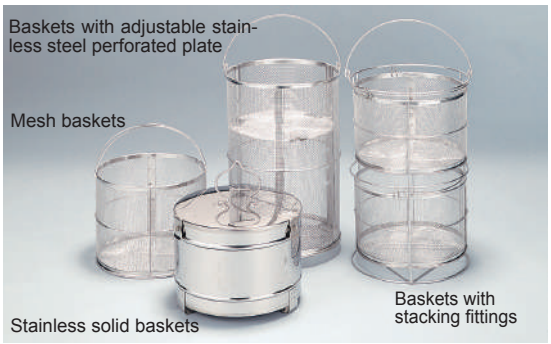


Control panel



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

Optional items



● Stainless baskets

● 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
241098	OSR-60	Stainless solid basket
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

Steam Sterilizer (Laboratory Use, with Drying Process)

SM520/530/820/830

Operating temp. range: 105~135°C

Max. operational pressure: 20°C (at 260°C)

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

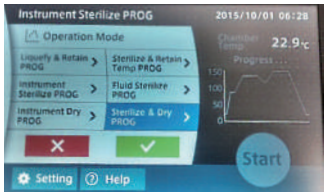
Specifications

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.×D)		370×470mm		370×750mm	
External dimensions (W×D×H)		520×660×881mm		520×660×1161mm	
Internal capacity		50L		80L	
Power source (50/60Hz)	Voltage	AC100~120V	AC200~240V	AC100~120V	AC200~240V
	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		Approx. 113kg		Approx. 137kg	
Included items		2 pcs. Stainless steel mesh basket (Dia.332×D195.5mm) OSQ-90		3 pcs. Stainless steel mesh basket (Dia.332×D195.5mm) OSQ-90	
		Drain board×1, Drain bottle×1, Chemical indicator 1 set, Filter×1, Droplet tray×1			

Control Panel

Instrument Sterilize Program

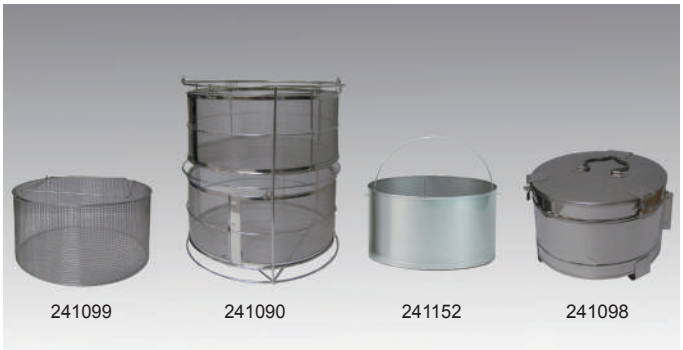
Instrument Sterilize operation



Sterilize & Dry Program

Sterilize & Dry operation

Optional items



Baskets and buckets

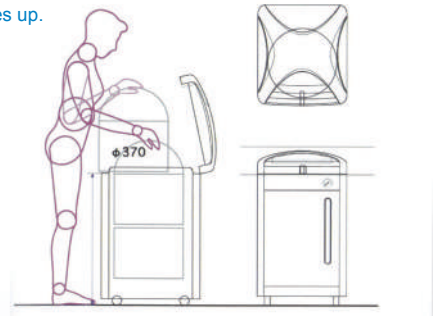
Product code	Model	Description
241099	OSQ-90	Mesh basket
241090	OSR-40	Mesh basket with 2 stacking fittings
241097	OSR-50	Mesh basket with 1 adjustable stainless steel perforated plate
241098	OSR-60	Stainless solid basket
241152	OSN14	Stainless bucket
Please specify when ordering main unit.		Chamber temperature sensor
		Sample temperature sensor
		Pressure gauge
		External alarm output terminal
		Temperature output terminal
		Time-up output terminal

Operation Mode

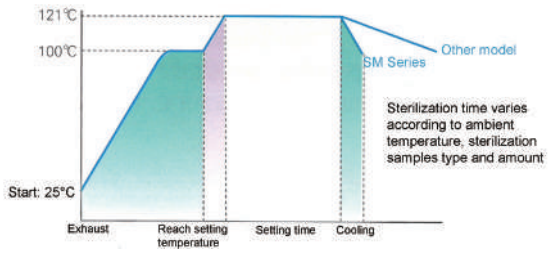
Mode	Name	Course
1	Instrument sterilize	Heat → sterilize → air purge
2	Fluid sterilize	Heat → sterilize → air purge
3	Sterilize & retain temp.	Heat → sterilize → air purge → retain temp.
4	Liquefy & retain temp.	Heat → liquefy → retain temp.
5	Instrument dry	Heat → air purge → cool
6	Sterilize & Dry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

Low Height Sterilizer

Easy to lift samples up.

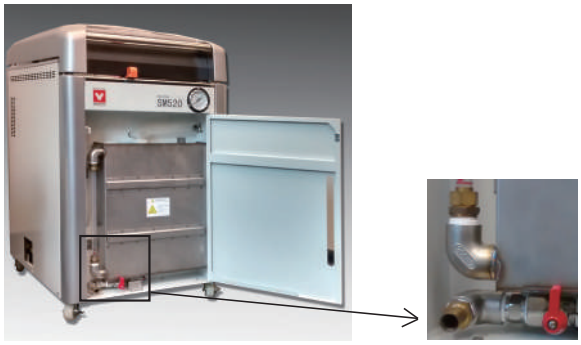


Standard Equipped with Cooling Fan



- 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

Steam Sterilizer (Laboratory Use, with Drying Process)

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

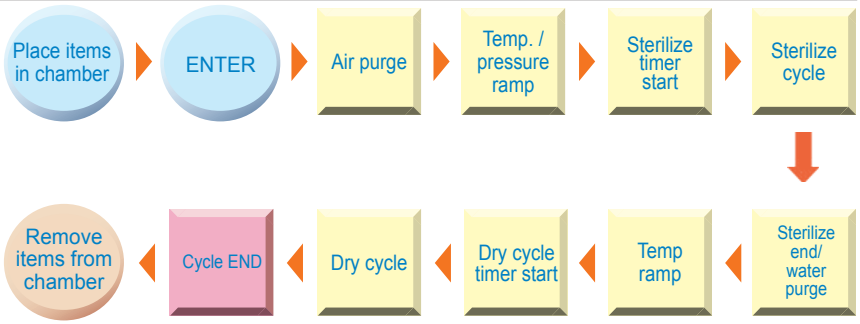
- Automatic operations from sterilization to drying carried out with an interactive key input system
- Quick sample drying capability makes samples ready to use right after sterilization
- Drying temperature can be set according to sample material, quantity, etc.
- Timer range from 1~999 hours
- Drain 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 material		Stainless steel					
Heater	Sterilization	1.3kW		1.7kW			2.0kW
	Drying	1.0kW		1.5kW			
Temp. controller		PID control by microprecessor					
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×Depth)		240×445 mm		300×445 mm		300×665 mm	
External dimensions (W×D×H)		410×470×957 mm		440×530×968 mm		440×530×1088 mm	
Internal capacity		20L		32L		47L	
Power source (50/60Hz single phase)		AC115V, 13A	AC220V, 7A	AC115V, 15A	AC220V, 9.5A	AC115V, 15A	AC220V, 9.5A
Weight		Approx. 65kg		Approx. 80kg		Approx. 85kg	
Accessories		2 pcs. stainless steel mesh basket (Dia.205×D204mm), OSM-60		2 pcs. stainless steel mesh basket (Dia.262×D204mm), OSM-70		2 pcs. stainless steel mesh basket (Dia.262×D315mm), OSM-80	
		Drain board×1, Chemical indicator strips (30 strips)×1, Drain bottle×1, Condensation collection container with magnetic bracket×1					

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

Sterilization & Drying Process



Control Panel

Front Door

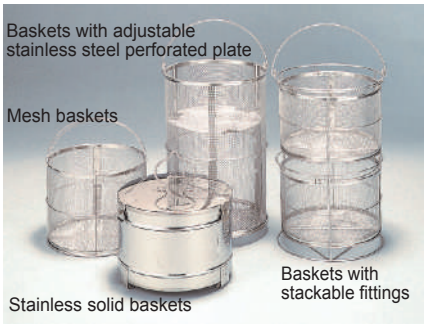
- Drain bottle placed in front for easy level monitoring and access
- Drain valve also located in front for quick access and operation

Included Items

Mesh baskets

Condensation collector

Optional Items



Output terminal

Product code	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 / 210
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.

Dry Sterilizer (Laboratory use)

Natural convection hot air sterilization

SI411C/611C

Operating temp. range	Room temp. +5~260°C
Temp. distribution accuracy	20°C(at 260°C)
Internal capacity	77L SI411C / 159L SI611C

Programmable natural convection hot air sterilizer

Features

- Quick, safe and reliable sterilization function.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock
- Program operation: 3 segments, 30 steps.

Safety

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

77L
SI411C

(Stand optional)

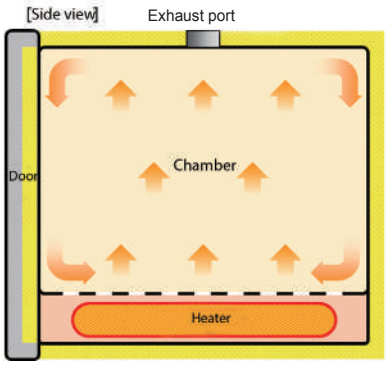
Specifications

Model		SI411C	SI611C
Circulation method		Natural convection	
Operating temp. range		Room temp. +5~260°C	
Temp. adjustment accuracy		2°C (at 260°C)	
Temp. distribution accuracy		20°C (at 260°C)	
Max. temp. reaching time		Approx. 70min.	
Interior/Exterior material		Stainless steel plate / Cold rolled steel plate with chemical proofing coating	
Insulating material		Glass fibre	
Heater		Nichrome heating wire	
		1.2kW	1.36kW
Air exhaust port		I.D. 30mm×2 (top)	
Temp. control		3 segments PID	
Temp. setting		Use special function menu key and up/down key to set	
Temp. display		Measured temp. display: Green 4-digit LED digital display	
		Setting temp. display: Red 4-digit LED digital displayy	
Timer		1min-99 hr 59 min and 100 hr-999 hr 50 min (Attached with timing wait function)	
Operation function		Fixed temp. operation, Auto start, Quick auto stop, Program operation	
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional functions		Deviation correction, Key lock, Power outage compensation	
Sensor		K thermocouple (Temp. controller and overheat protector)	
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, ELB to prevent overcurrent, Key lock, etc.	
Intenal dimensions (W×D×H)		450×430×400mm	600×530×500mm
External dimensions (W×D×H)		550×540×777mm	700×640×877mm
Internal capacity		77L	159L
Shelf plate with standard load		Approx. 15 kg/pc.	
Shelf rest step number / pitch		10 steps / 30mm	13 steps / 30mm
Power source (50/60Hz)		AC220V 6A	AC220V 6.5A
Weight		Approx. 42 kg	Approx. 59 kg
Shelf plate material		Stainless punching metal	
Shelf plate / bracket		2pcs./4pcs.	
Optional	Stand	ONS61C	
	Stacking clamp	ODK82C	ODK84C
	Others	Shelf plate (1 plate with 2 rests), Recorder, Indicator lamp (Stand-by/Running/Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal	

(Stand optional)

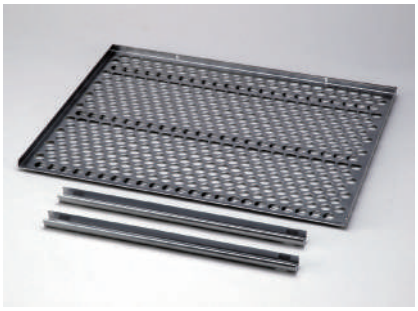
Control Panel

Method

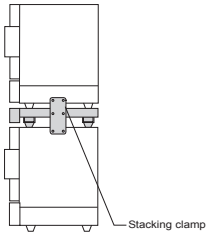


Interior

Shelf plate / bracket

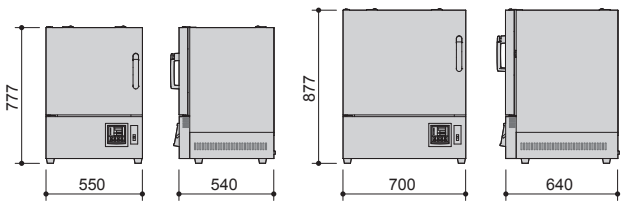


Optional items



ODK Stacking clamp

Dimensions (mm)



Dry Sterilizer (Laboratory use)

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

SK401/601/801/811

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

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

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

Dry heat sterilization with independent overheat prevention device

Operation and function

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

Safety features

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

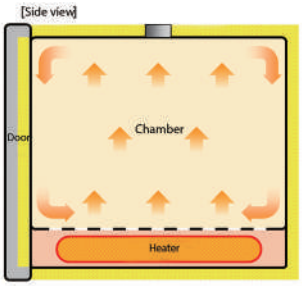
(Stand optional)

Specifications

Model	SK401	SK601	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	Approx. 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×2 (on top)		I.D. 33mm×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 function	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 (W×D×H)	450×490×450mm	600×540×500mm	600×500×1000mm	
External dimensions (W×D×H)	560×600×820mm	710×650×870mm	710×650×1640mm	
Internal capacity	99L	162L	300L	
Shelf plate with standard load	Approx. 15kg/pc			
Shelf rest step number / pitch	11 steps / 30mm	13 steps / 30mm	29 steps / 30mm	
Power source	115V 11.5A	115V 12.5A	115V 22A	Single phase 220V 11A
Weight	Approx. 50kg	Approx. 62kg	Approx. 108kg	
Shelf plate / bracket	Stainless steel punched metal			
	2 pcs. / 4 pcs.		4 pcs. / 8 pcs.	

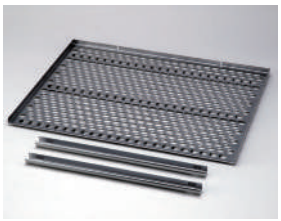
Control Panel

Method



Cable Port

Shelf and Bracket Set

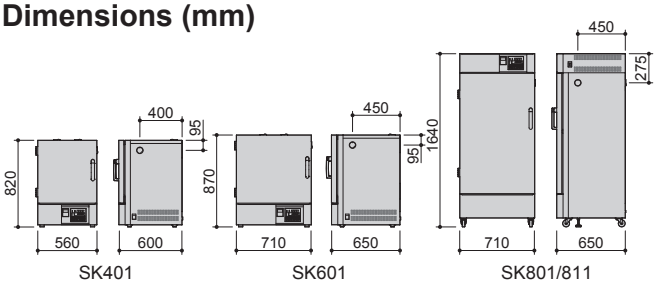


Optional items

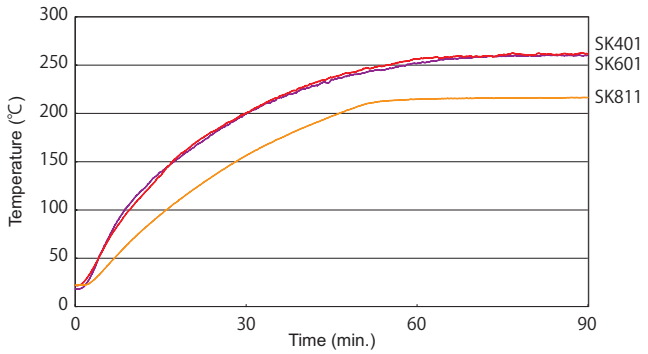
Description		Product code
Stand		
For SK401/601	ON61	211856
For SK401	OT42	212348
For SK601	OT62	212349
Stacking kit		
For SK401	OD40	212822
For SK601	OD60	212823
Shelf and bracket set		
For SK401	ODN20	212246
For SK601/801/811	ODN22	212266
*Cable port		
Ø25mm	ODK32	281121
Ø50mm	ODK34	281122
Seismic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

* Please specify when ordering main unit.

Dimensions (mm)



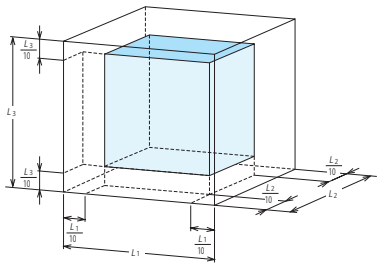
Temperature Rising Curve



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



Containers

Product code	Basket model	Description	Dimensions	Suitable models
H060303020	-	Mesh basket	ø254×H240mm	SK101C/111C
H060303038	-	Mesh basket	ø254×H331mm	SK200C/210C
H060303037	-	Mesh basket	ø254×H409mm	SK300C/310C
241085	OSQ-10	Mesh basket (pitch 2.5 mm)	ø190×H159mm	SM201/211
241086	OSQ-20	Mesh basket (pitch 2.5 mm)	ø250×H201mm	SM301/311/501/511
241087	OSM-60	Mesh basket (pitch 8.5 mm)	ø205×H204mm	SM201/211, SN200C/210C
241088	OSM-70	Mesh basket (pitch 8.5 mm)	ø262×H204mm	SM301/311/501/511, SN300C/310C/500C/510C
241089	OSM-80	Mesh basket (pitch 8.5 mm)	ø262×H315mm	SM501/511, SN500C/510C
241090	OSR-40	Mesh basket with 2 stacking fittings	ø326×H165mm	SQ500C/510C/810C, SM520/530/820/830
241091	OSQ-50	Mesh basket with 3 stacking fittings	ø246×H162mm	SM501/511, SN500C/510C
241092	OSQ-40	Mesh basket with 2 stacking fittings	ø246×H162mm	SM301/311, SN300C/310C
241093	OSQ-30	Mesh basket with 2 stacking fittings	ø168×H162mm	SN200C/210C, SM201/211
241094	OSQ-80	Mesh basket with 2 perforated plates	ø200×H590mm	SM501/511, SN500C/510C
241095	OSQ-70	Mesh basket with 1 perforated plate	ø260×H390mm	SM301/311, SN300C/310C
241096	OSQ-60	Mesh basket with 1 perforated plate	ø200×H390mm	SM201/211, SN200C/210C
241097	OSR-50	Mesh basket with 1 perforated plate	ø340×H430mm	SQ500C/510C/810C, SM520/530/820/830
241099	OSQ-90	Mesh basket	ø332×H196mm	SQ500C/510C/810C, SM520/530/820/830
241083	OSR-10	Stainless solid basket	ø210×H200mm	SM201/211, SN200C/210C
241084	OSR-20	Stainless solid basket	ø270×H200mm	SM301/311/501/511, SN300C/310C/500C/510C
241098	OSR-60	Stainless solid basket	ø330×H235mm	SQ500C/510C/810C, SM520/530/820/830
241150	OSN-10	Stainless bucket	ø210×H210mm	SM201/211, 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


241087 241088 241089


241090


241091


241092


241094

241095


241096


241099

Stainless solid basket

241083 / 241084 / 241098

Stainless bucket

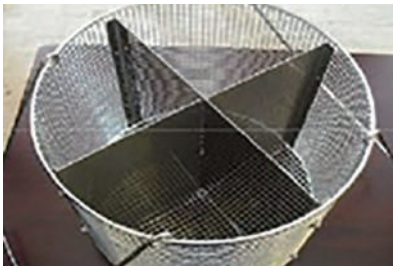

241150 241151 241152

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

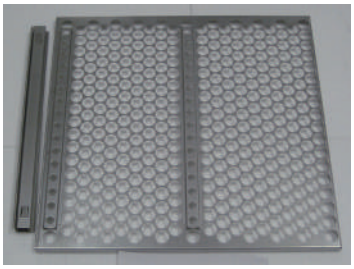


Stackable insert

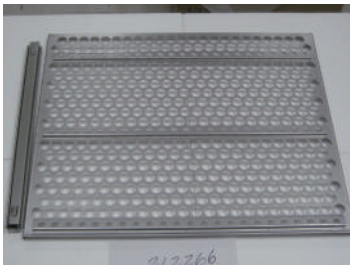
Shelves

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

212095



212246

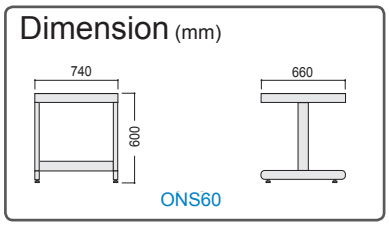


212266

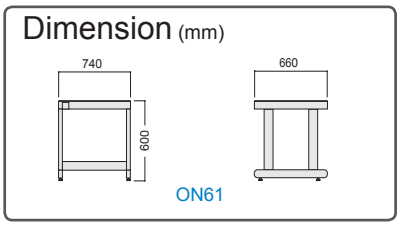
Stands

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

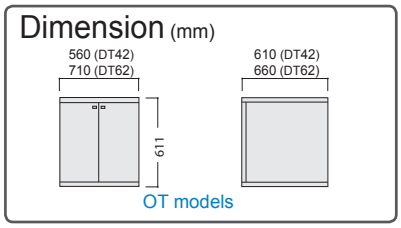
ONS60



ON61



OT42/62



Loop Cinerator

SL-21

Internal sterilizing temp. 800~850°C

Time to reach sterilizing temp. 10min

Features

- Pt. Ear, Needle is sterilized in combustion tube.
- Safe operation through heater sterilization.
- Good heat-resistance.
- Loaded with quartz glass which heats evenly.
- Efficient for big volume and for continuous sterilizing.

Specifications

Model	SL-21
Internal sterilizing temp.	800~850°C
Time to reach sterilizing temp.	10min.
Cinerating port diameter	15mm
Heater	130W
Power	AC100V, 50/60Hz, 1.5A
External dimensions	W95 x D170 x H200mm
Weight	1.5kg

Flexible angles

Pt Ear can be placed in holder holes

Consumable

Heater cartridge

SINCE 1889

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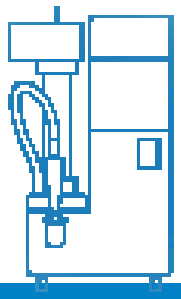


Spray Dryer

Contents

Spray Dryer

Spray Dryer
Suitable for water soluble samples

Inert N_2 Gas Sealed System
Required for organic solvent samples

Economical System

ADL311SA
With GF300 Glassware set

Versatile System

GB210A
For Spray Drying

GF300
For Spray Drying

GB210
Without glassware

Selectable Glassware

GF200
For Granulating

GB210B
For Granulating

GAS410

Safe N_2 gas sealed circulation system

Large Capacity System

DL410

Spray Dryer

Compact & Economical

ADL311SA

Water evaporation rate	Max.1,300mL/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 instal-lation 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

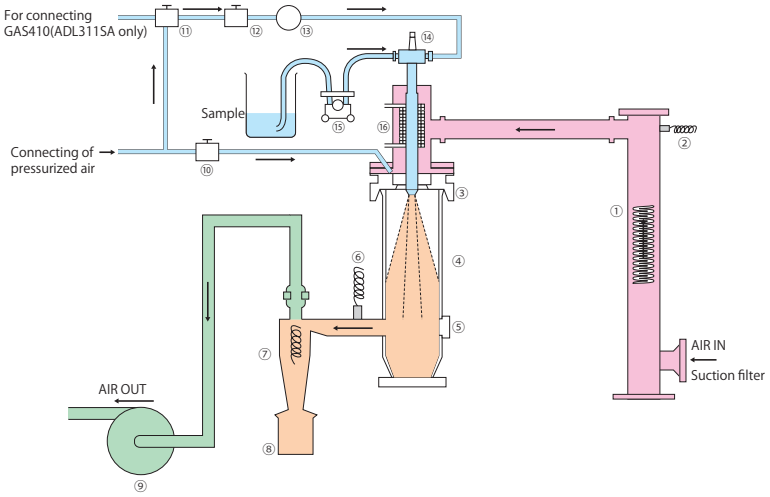
Specifications

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×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×D420×H1,125 mm
Weight	80kg
Power supply (50/60 Hz) rated current	AC220V 17A, AC240V 18A switching of terminals necessary
Accessories	Silicon tubes (with a stopper)×3, Exhaust duct (with one hose band)×1, Outlet temperature sensor, Spray air tube, Sample box, Static electricity removal earth, "Tetron" braided tube hose 5m (with two hose bands)

Example of installation: ADL311SA + GAS410

Control Panel

Diagram



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

Piping

ADL311SA+GAS410

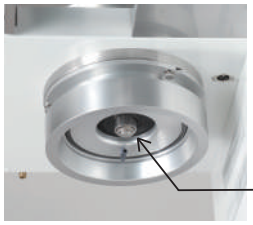
Applications

- 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

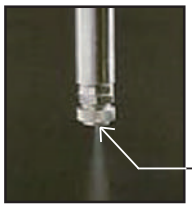
Product Name	Product Code
Fine powder recovery cyclone	212780
Safety cover	212784
Static removal brush set	212788
Viton packing for cyclone inlet/outlet (1 set of 2 types)	212781
Teflon packing for cyclone inlet/outlet (1 set of 2 types)	212782
Airfilter + Mist separator + Regulator set	212789
Supply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

Spraying Nozzle



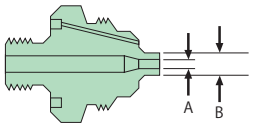
The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

Two-way nozzle system

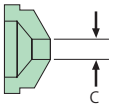


Easy to take apart for cleaning to prevent contamination

Nozzle for liquid(F)



Nozzle for gas(A)



Model	Nozzle No.	Size (μm)	Particle size
1A (Standard)	(F) 1650	A 406 B 1270	1~40μm
	(A) 64	C 1626	
1	(F) 2050	A 508 B 1270	5~40μm
	(A) 64	C 1626	
2A	(F) 2050	A 508 B 1270	5~50μm
	(A) 70	C 1778	
2	(F) 2850	A 711 B 1270	10~40μm
	(A) 70	C 1778	
3	(F) 2850	A 711 B 1270	10~50μm
	(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 (m^3/min)	Spray air pressure (MPa)	Sent amount of sample liquid (g/min)	Sample recovery rate (%)
Dextrin (solution)	10	150	80	0.4	0.1	6.1	66
Dextrin (emulsion)	40	150	80	0.4	0.1	5.1	63
Oxidized titanium (suspended liquid)	10	150	85	0.42	0.1	5.3	50
Soy sauce	50	130	75	0.36	0.1	5.1	60
Salt	10	145	85	0.38	0.1	5.3	52

Repeatability of spray drying test (spray dryer ADL311SA)

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

Spray Dryer Pulvis Mini Spray

Supports spray drying of fine powder of 1µm

GB-210A

Evaporated water	Max.1,300ml/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

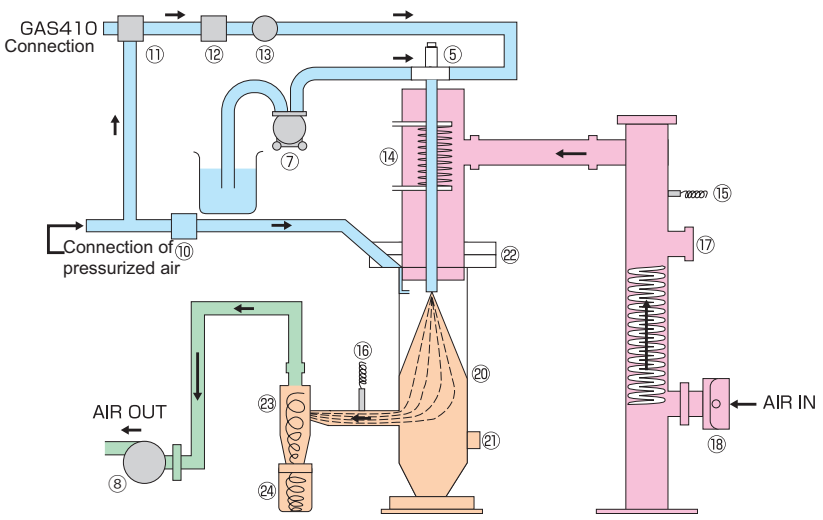
Model	GB-210A
Temp. adjusting unit setting range	40 to 220°C (inlet temperature), 0 to 60°C (Outlet temperature)
Temperature adjusting accuracy	Inlet temperature±1°C
Spraying system	Two-way nozzle, Nozzle No. 1A as standard
Drying air amount adjusting range	0 to 0.7m³/min
Spray air pressure adjusting 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×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×D420×H1,350 mm
Weight	110kg
Power supply (50/60Hz) rated current	AC220V 17A, AC240V 18A, Switching of terminals necessary
Accessories	Silicon tube (with a stopper)×3, Tiron tube (with a stopper)×2 Exhaust duct (with one hose band)×1, Outlet temperature sensor, Spray air tube, Sample box, Static electricity removal earth, Teflon braided hose 5m (with two hose bands), Container table

Control Panel

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

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

Diagram



No.	Part name
(1)	Heater
(5)	Spray nozzle
(7)	Liquid sending pump
(8)	Blower, exhaust filter
(10)	Solenoid valve
(11)	3-way solenoid valve
(12)	Needle valve
(13)	Pressure meter
(14)	Nozzle cooling port
(15)	Inlet temperature sensor

No.	Part name
(16)	Outlet temperature sensor
(17)	Blind
(18)	Suction port, suction filter
(19)	Nozzle cooling connection port
(20)	Drying chamber
(21)	Cap
(22)	Distributor
(23)	Cyclone
(24)	Product collecting container

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.

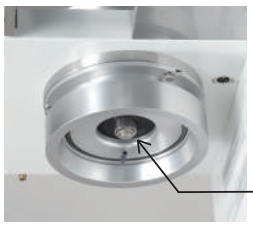
Optional items

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

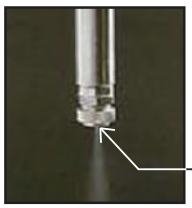
The one touch removal system has made the removal and cleaning of the drying chamber, the cyclone, and the product container much easier.

Spraying Nozzle

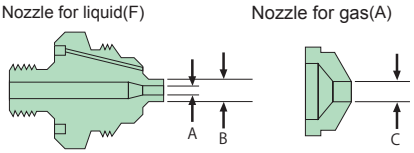


The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

Two-way nozzle system



Easy to take apart for cleaning to prevent contamination



Model	Nozzle No.	Size (µm)	Particle size
1A (Standard)	(F) 1650	A 406 B 1270	1~40µm
	(A) 64	C 1626	
1	(F) 2050	A 508 B 1270	5~40µm
	(A) 64	C 1626	
2A	(F) 2050	A 508 B 1270	5~50µm
	(A) 70	C 1778	
2	(F) 2850	A 711 B 1270	10~40µm
	(A) 70	C 1778	
3	(F) 2850	A 711 B 1270	10~50µm
	(A) 64	C 1626	

Particle sizes may vary on samples used and parameter settings.

Solvent Recovery Unit GAS410

Repeatability of spray drying test

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

Spray Dryer Pulvis Mini Spray

CE

Spray Dryer (For Granulating, Drying, Mixing)

GB-210B

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

Spray dryer capable of granulating and drying wet powder.

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

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

Specifications

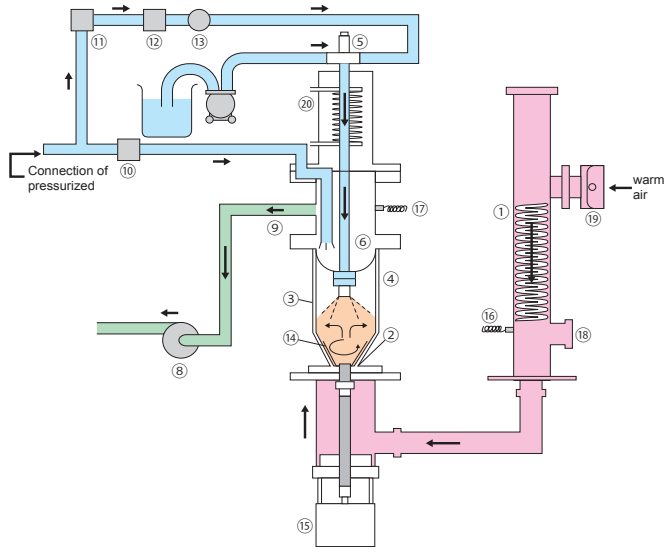
Model	GB-210B
Temp. adjusting unit setting range	40 to 220°C (inlet temperature), 0 to 98°C (Outlet temperature)
Temperature adjusting accuracy	Inlet temperature ± 1°C
Spraying system	Two-way nozzle, Nozzle No. 1A as standard
Drying air amount adjusting range	0 to 0.7m³/min
Spray air pressure adjusting 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×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×D420×H1,350 mm
Weight	Approx. 110 kg
Power supply (50/60Hz) rated current	AC220V 17A, AC240V 18A, Switching of terminals necessary
Accessories	Silicon tube (with a stopper)×3, Tiron tube (with a stopper)×2, Exhaust duct (with one hose band)×1, Outlet temperature sensor, Spray air tube, Sample box, Static electricity removal earth, Teflon braided hose 5m (with two hose bands), Container table

Control Panel

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

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

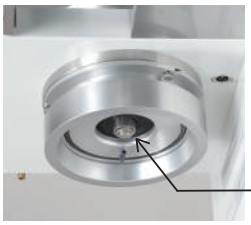
Diagram



No.	Part name
(1)	Heater
(2)	Micro porous plate
(3)	Flow layer chamber
(4)	Filter chamber
(5)	Nozzle
(6)	Filter
(7)	Liquid sending pump
(8)	Blower
(9)	Interim pipe
(10)	Solenoid valve

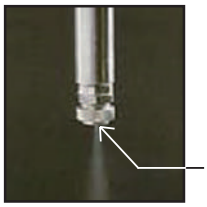
No.	Part name
(11)	3-way solenoid valve
(12)	Needle valve
(13)	Pressure meter
(14)	Stirring blades
(15)	Stirring motor
(16)	Inlet temperature sensor
(17)	Outlet temperature sensor
(18)	Blind
(19)	Suction port, suction filter
(20)	Nozzle cooling connection

Spraying Nozzle



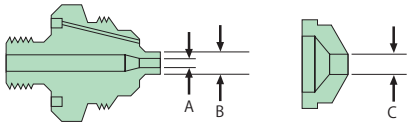
The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

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)	Particle size
1A (Standard)	(F) 1650	A 406 B 1270	1~40μm
	(A) 64	C 1626	
1	(F) 2050	A 508 B 1270	5~40μm
	(A) 64	C 1626	
2A	(F) 2050	A 508 B 1270	5~50μm
	(A) 70	C 1778	
2	(F) 2850	A 711 B 1270	10~40μm
	(A) 70	C 1778	
3	(F) 2850	A 711 B 1270	10~50μm
	(A) 64	C 1626	

Particle sizes may vary on samples used and parameter settings.

Applications

● Granulation, drying, mixing of powder
Applications:
Medicines, food, catalyst, die, detergent, ceramics, etc.

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

Handling

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

Optional items

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

Example of implementation

Sample		Binder			Test conditions					Results	
Name	Weight (min)	Name	Density (%)	Spray amount (min)	Inlet temp. (°C)	Liquid sending rate (g/min)	Spray pressure kPa (kg/cm^2)	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: 40 to 100μm with larger capacity

DL410

Evaporated water	Max. 3,000mL/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 100μm with a high recovery rate.

This spray dryer can produce fine particles from 40 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.

The 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

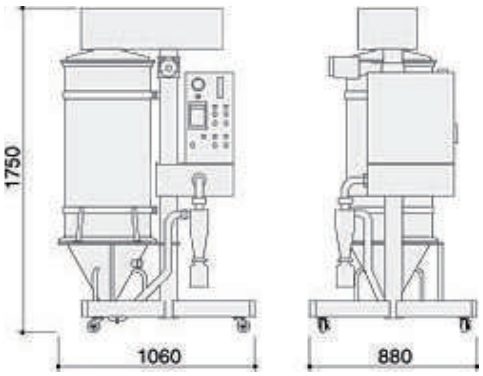
Easy operation and maintenance

- 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

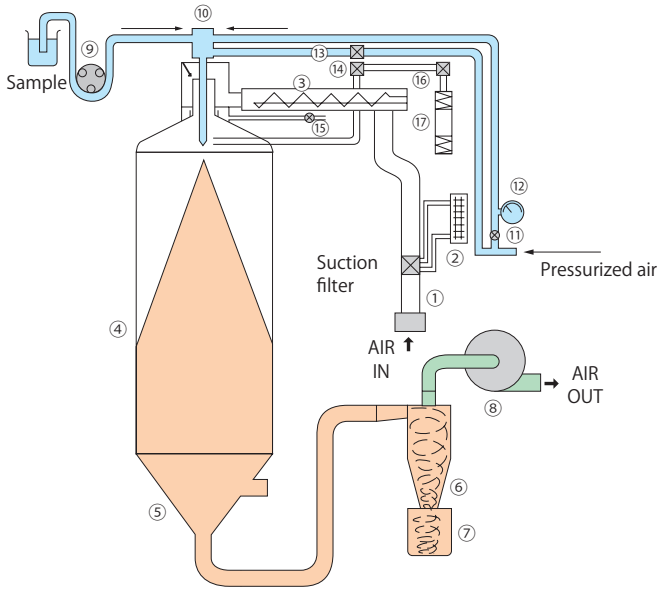
Specifications

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×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×D×H)	1750×1060×880 mm or 69×42×35 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
Optional Accessories	
Organic solvent recovery Unit	GAS410
Inlet/outlet temperature recorder	212792 - Factory installed
Viton/Tiron feeding tube	Please inquire
Nozzle	4, 5 (options), 3 standard
Compressed air	28 L/min air volume and 8 kgf/cm^2 compressed air is required
Type of gas	N_2 gas (99.99% purity, Medical grade) is required when using GAS410

Dimensions (Unit:mm)

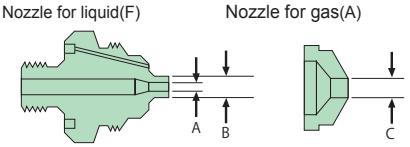


Diagram



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

Spraying Nozzle



Spraying Nozzle size (μm)

Model	Nozzle No.	Size (μm)	Particle size
3 (Standard)	(F) 2850	A 711 B 1270	up to 50μm
	(A) 64.5	C 1638	
4	(F) 60100	A 1530 B 2550	40~100μm
	(A) 120	C 3060	
5	(F) 100150	A 2550 B 3825	40~200μm
	(A) 130	C 4530	

Particle sizes may vary on samples used and parameter settings.

Control Panel

Multilingual touch screen controller

Application

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

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

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

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

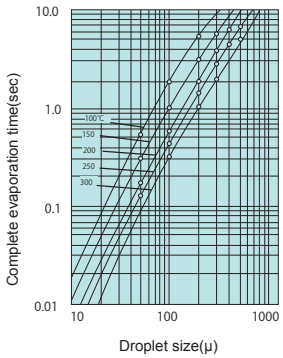
(4) Special applications
Spray concentrated, spray reaction, powder sizing, etc.

Powder generated by DL410

Equipment

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

Time



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

Solvent Recovery Unit

Highly safe N_2 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 N_2 Gas Sealed System used in conjunction with Spray Dryers

The Inert N_2 Gas Sealed System is used to prevent external discharge when combined with a spray dryer (ADL311SA or GB-210A) when using an organic solvent.

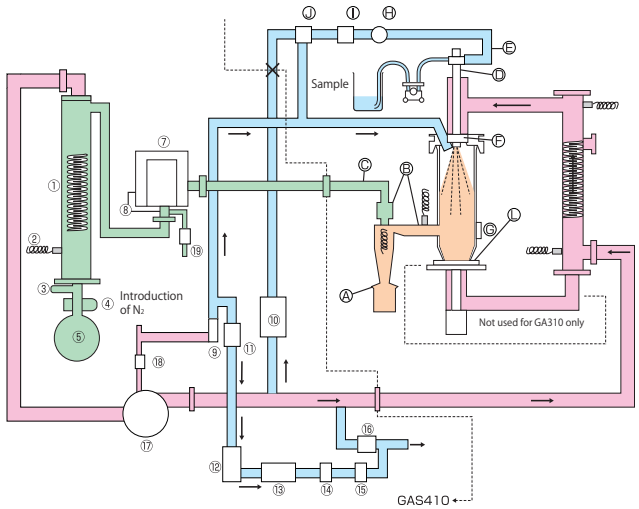
- Dehumidifier (Freezer) integrated in GAS410. No extra Freezer/ dehumidi-fier equipment needed
- Compressor included, no need for a separate compressor to operate the spray dryer ADL311SA when using organic solvent samples
- Flammable or toxic solvents can be processed by combining a N_2 gas sealed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

Example of installation: ADL311SA + GAS410

Specifications

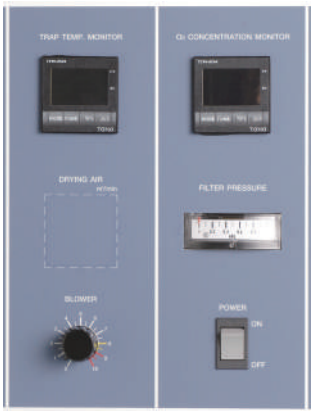
Model	GAS410
Solvent recovery system	Capacitor + freezer
Circulating gas	N_2 gas (sealed circulation when connected to ADL311SA or GB-210A)
Circulating volume flow	0.12 to 0.65m³/min
Compressor (for spraying)	Linear compressor integrated
Circulation blower	Roots blower
Solvent recovery container	2L flask
Freezer	Air-cooled condensation full-sealed type: 400W R404A
Solvent recovery mechanism	Capacitor cooling mechanism
Filter	Cartridge filter
Instruments	Cooling trap temperature display monitor Filter differential pressure meter (Monitor for clogging of filter) O_2 density display monitor Blower wind amount adjusting volume
O_2 sensor	Solid electrolyte (Zirconium) limit current type
Pump	For circulation to measure Oxygen
Safety device	O_2 density meter, Flammable gas alarm, Electric leakage breaker, N_2 gas forced introduction (when removing nozzles)
External dimensions	W700×D950×H1,500 mm
Weight	Approx. 130 kg
Power source (50/60 Hz) rated current	AC200 to 240V 5A (15A)
Required N_2 amount	15 L/h at 0.1 MPa
Accessories	Set of connection parts, anti-seismic clamps, interface cable, sample gas for gas alarm inspection, 2L flask

Diagram



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

Control Panel



Major control functions and detection function

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

Fields

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

Connection

Rear of GAS410

ADL311SA + GAS410 + stand with caster wheels

Optional items

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

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

Spray Dryer, Model Supporting Organic Solvent

Repeatability of granulation test

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

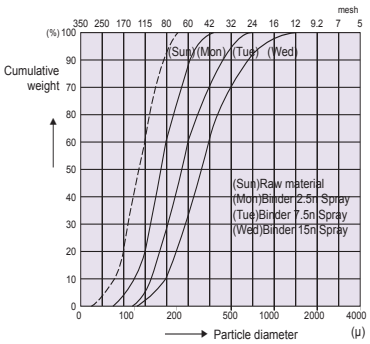
*Average particle diameter of the geometric mean

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

(Conditions)

Raw material	Sintered alumina (average particle size 40) 400g
Binder	5% PVA solution (#500) 25g
Inlet temperature	100°C
Binder liquid feed rate	12.4g/min
Binder spray times	6 times
Binder spray pressure	78kPa(0.8kg/cm^2)
Nozzle height	25cm from microporous plate

Change of particle diameter

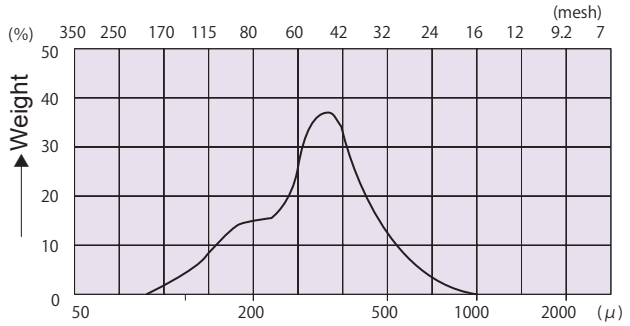


The factors that influence the particle diameter are the binder liquid feed rate and the spray pressure, the former being the most influential. A higher binder amount will result in larger diameter particles.

(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							Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure kPa(kg/cm^2)	Test sample amount (g/min)	Sent amount of sample liquid (g/min)	Test time (min)		
1	Coffee solution	5.00	150	75	0.45	147(1.5)	93.1	3.1	30	4.3	92.4
2	Coffee solution	5.00	150	75	0.45	147(1.5)	93	3.1	30	4	86
3	Coffee solution	5.00	150	75	0.45	147(1.5)	91.4	2.0	30	4	87.5
4	Coffee solution	5.00	150	75	0.45	147(1.5)	84.9	2.8	30	3.7	87.2
5	Coffee solution	5.00	150	75	0.45	147(1.5)	83.8	2.8	30	3.7	88.3

Example of implementation (Pulvis mini spray GB-210A)

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 GB-210B)

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/cm^2)	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 GB-210A)

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

Example of implementation Pulvis mini spray GB-210A, organic solvent recovery unit GAS410

Sample	Sample density (%)	Inlet temp. (°C)	Outlet temp. (°C)	Drying nitrogen (m^3/min)	Spray pressure (kg/cm^2)	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)

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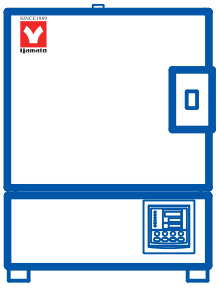


Muffle Furnace

Contents

Standard Electric Furnace

CE

FO110C/210C/310C/410C/510C/610C/710C/810C

Operating temp. range	Temp. distribution accuracy	Internal capcaity							
100~1150°C	±2°C (at 1150°C)	1.5L FO110C	3.75L FO210C	7.5L FO310C	9L FO410C	11.3L FO510C	17.5L FO610C	23.6L FO710C	30L FO810C

Programmable muffle furnace with varying internal capacity.

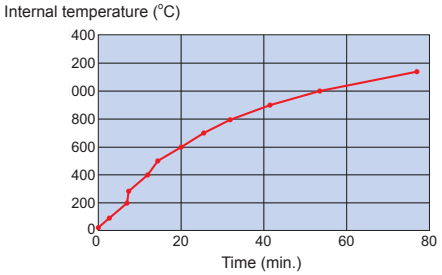
- High precision temperature control.
- Easy up/down key setting.
- Digital display of setting temperature and indicator value.
- Digital setting of overheat protection.
- R thermocouple temp. sensor for long service life.
- Equipped with exhaust port.
- Safety device includes self-diagnosis functions and over-current electric leakage breaker.
- Option for system upgrade such as air exhaust device, sample tray, N_2 introduction device with flow meter and temp. output terminal.

Specifications

Model	FO110C	FO210C	FO310C	FO410C	FO510C	FO610C	FO710C	FO810C
Operating temp. range	100~1150°C							
Temp. control accuracy	±2°C (at 1150°C)							
Max. temp. reaching time	Approx. 60min.		Approx. 70min.		Approx. 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	18 mm I.D. (upper part)							
Cooling Fan Type	Axial fan motor							
Temp. controller	PID controll by microprocessor							
Temp. setting/display method	Digital setting by▲/▼ keys / Digital display							
Overheat protection	Integrated controller							
Overheat protection set	Digital setting							
Operation function	Fixed temp., program (6 modes 30 seg.×1, 15 seg.×2, 10 seg.×3)							
Additional functions	Deviation correction, Power outage compensation, Key lock							
Timer	1min~99hr59min and 999hr 50min digital setting, Auto start, Quick auto stop							
Safety Device	Self diagnosis circuit (Abnormal temp. sensor, Auto overheat protection), Overheat protector, Overcurrent ELB, key lock							
Internal dimensions(WxDxHmm)	100×150×100	100×250×150	200×250×150	200×300×150	300×250×150	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)	AC220V							
	5A	7.5A	9.5A	10.5A	12A	15A	18A	20A
Weight	Approx. 24kg	Approx. 30kg	Approx. 37kg	Approx. 38kg	Approx. 44kg	Approx. 52kg	Approx. 58kg	Approx. 62kg
Accessories	Exhaust port cap 1 pc.							
Optional — Stand	ON30C			ON61C				
Optional — Others	Exhaust device (AC220V), Sample tray, N_2 introduction device (with flow meter), Recorder, Indicator lamp (Stand-by / running / Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal							

Control Panel

Temperature Rising Curve (FO310C)



Interior

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

■ **Optional items**

Sample tray

■ **Optional items**

Product code	Description
214097	Exhaust unit, 220V
281125*	Communication adapter (RS485 / RS232C conversion)
	Recorder
281301*	Time up output terminal
	Indicator lamp (stand-by/running/malfunction)
	Temp. output terminal (4-20mA)
	Output terminal for alarm device
281303*	N_2 gas inlet system with flow meter
281310	Sample tray

* Customized from factory. Please specify when ordering main unit

Exhaust unit

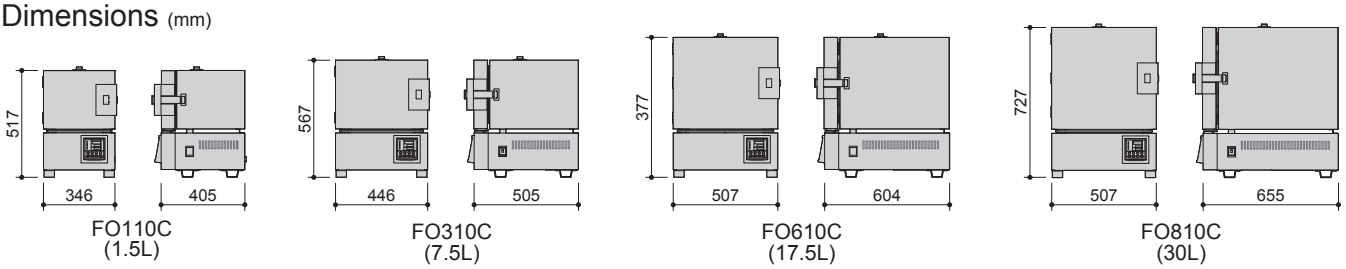
Gas generated due to the increase of temperature in the furnace will be quickly exhausted.

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

Temperature Output Terminal

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

Dimensions (mm)



Standard Electric Furnace

CE

FO100CR/110CR/200CR/210CR/300CR/310CR/410CR/510CR/610CR/710CR/810CR

Operating temp. range 100~1150°C

Temp. distribution accuracy ±2°C (at 1150°C)

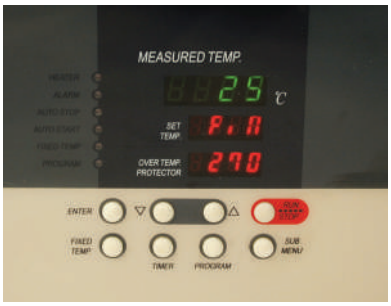
Internal capcaity 1.5L FO100CR/110CR | 3.75L FO200CR/210CR | 7.5L FO300CR/310CR | 9L FO410CR | 11.3L FO510CR | 17.5L FO610CR | 23.6L FO710CR | 30L FO810CR

- 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×1 pattern, 15 steps×2 patterns or 10 steps×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

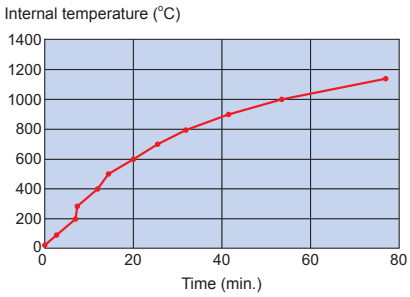
Specifications

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	Approx. 60min.		Approx. 70min.		Approx. 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×1 pattern, 15 steps×2 patterns or 10 steps×3 patterns)							
Additional functions	Calibration offset, Power failure compensation, Key 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	300×250×150	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	Approx. 24kg	Approx. 30kg	Approx. 37kg	Approx. 38kg	Approx. 44kg	Approx. 52kg	Approx. 58kg	Approx. 62kg
Accessories	Exhaust port cap 1 pc.							

Control Panel



Temperature Rising Curve (FO300CR)



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

* Customized from factory. Please specify when ordering main unit

Interior

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

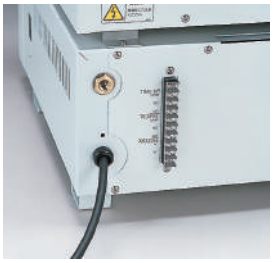
Sample tray

Exhaust unit

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

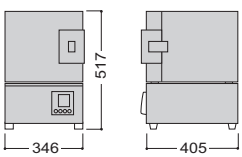
Power source of exhaust device :
AC115V 0.27A
Single phase AC220V 0.15A

Temperature Output Terminal

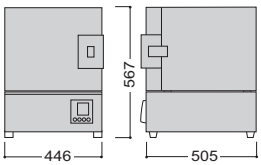


- Record and monitor internal temperature
- Temperature output: 4-20mA
- Time up output

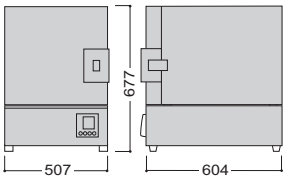
Dimensions (mm)



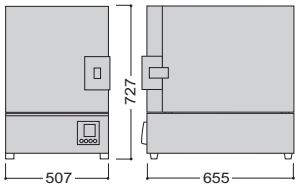
FO100CR/110CR
(1.5L)



FO300CR/310CR
(7.5L)



FO610CR
(17.5L)



FO810CR
(30L)

High Performance Muffle Furnace

FP110C/310C/510C

Operating temp. range	100~1150°C
Temp. control accuracy	±1.5°C
Internal capcaity	1.5L FP110C / 7.5L FP310C / 11.3L FP510C

Versatile muffle furnace with built-in heating wires

- High-quality ceramic furnace body with built-in heating wires preventing contamination.
- Programmable
- High accuracy controller enabling high temperature precision.
- Digital temperature setting and setting display.
- 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.
- Designed with R thermocouple temperature sensor with long service life.
- Equipped with exhaust port.
- Various optional items for system upgrade such as exhaust system, N_2 gas loading device (with flow meter), temperature output terminal, external communication terminal (RS232C) and external communication adapter.

Specifications

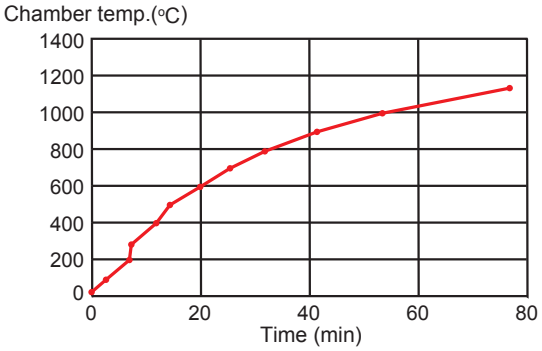
Model		FP110C	FP310C	FP510C
Operating temp. range		100~1150°C		
Temp. control accuracy		±1.5°C (at 1150°C)		
Temp. fluctuation		±1.0°C (at 1150°C)		
Temp. distribution accuracy		±4.0°C (at 1150°C)		
Temp. gradient		14°C (at 1150°C)		
Max. temp. reaching time		Approx. 80 min.		Approx. 80 min.
Exterior material		Cold rolled steel plate with baked-on melamine resin finish		
Interior material		Ceramic fiber		
Sensor		R-thermocouple		
Heater		Iron-chrome wire		
		1.1kW	2.4kW	3.25kW
Exhaust port		18 mm I.D. (upper part)		
Cooling fan		Axial flow fan		
Temp. controller		PID control by microprocessor		
Temp. setting/display method		Digital setting by ▲/▼ keys / Digital display		
Overheat protection		Integrated controller		
Overheat protection set		Digital setting		
Operation function		Fixed temp., Program (6 modes 30 seg.×1, 15 seg.×2, 10 seg.×3)		
Additional functions		Deviation correction, Power outage compensation, Key lock		
Timer		1min~99hr 59min and 999hr 50min digital setting, Auto start, quick auto stop		
Safety device		Self diagnosis circuit (Abnormal temp. Sensor, Auto overheat protection), Overheat protector, Overcurrent ELB, Key lock		
Internal dimensions (mm)		W100×D150×H100	W200×D250×H150	W300×D250×H150
External dimensions (mm)		W346×D405×517	W446×D504×H567	W507×D504×H627
Internal capacity		1.5L	7.5L	11.3L
Power source (50/60Hz)		AC220V 5A	AC220V 11.5A	AC220V 15A
Weight		Approx. 24kg	Approx. 42kg	Approx. 48kg
Accessories		Exhaust port cap, fuse, furnace floor plate		
Optional	Stand	ON30C		ON61C
	Others	Exhaust device (AC220V), sample tray, N_2 introduction device (with flow meter), Recorder, Indicator lamp (Stand-by / running / malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal		

11.3L
FP510C

Control Panel

Independent overheat protector (standard configuration)

Temperature Rising Curve (FP310C)



Interior

Built-in heater, optimal insulation structure improves heat insulation performance and temp. distribution accuracy.

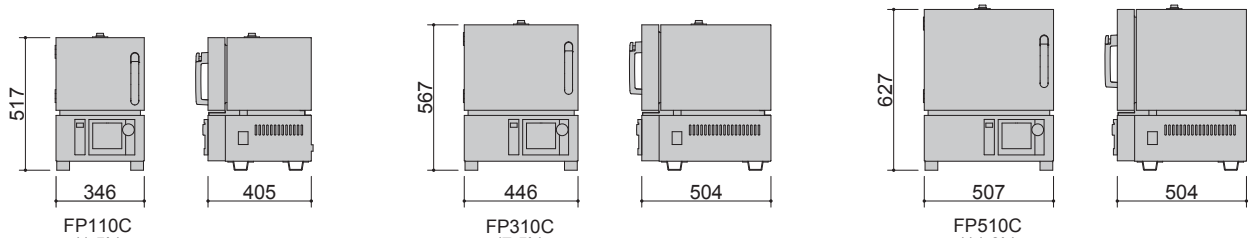
Optional item

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

Dimensions (mm)



High Performance Muffle Furnace

FP102/302/312/412

Operating temp. range	100~1150°C
Temp. control accuracy	±1.0°C
Internal capcaity	1.5L FP102 / 7.5L FP302/312 / 11.3L FP412

- 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

Specifications

Model	FP102	FP302	FP312	FP412
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	Approx. 90 min.			Approx. 80 min.
Exterior material	Cold rolled steel plate with baked-on melamine resin finish			
Interior material	Ceramic 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 functions	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×D150×H100	W200×D250×H150		W300×D250×H150
External dimensions (mm)	W376×D404×H515	W446×D504×H565		W506×D504×H625
Internal capacity	1.5L	7.5L		11.3L
Power source (50/60Hz)	AC115V 10A	AC115V 21.5A	AC220V 13A	AC220V 18A
Weight	Approx. 29kg	Approx. 43kg		Approx. 51kg
Accessories	Exhaust port cap, fuse, furnace floor plate			

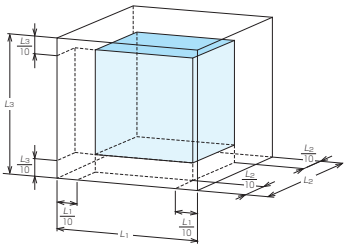
11.3L
FP412

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
FP312	1150.0	1150.4	1147.0	1147.6	1145.2	1146.2	1144.4	1145.7	1146.6

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



Optional items

Description	Product code
Exhaust unit, 115V	214096
Exhaust unit, 220V	214097
N_2 gas inlet system (with flow meter) for FP102	214196
for FP302/312	214197
for FP412	214198
Sample tray	281310
Seismic mat	296902
Alumina hearth plate for FP102, 90×145mm×5pcs.	214157
Alumina hearth plate for FP302/312, 190×245mm×5pcs.	214158
Alumina hearth plate for FP412, 290×245mm×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

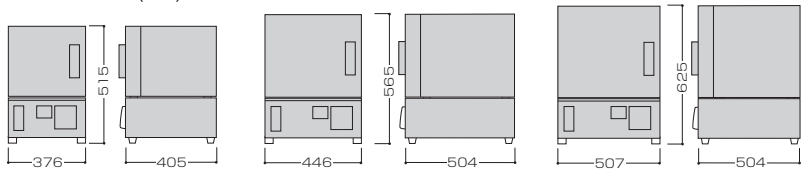
He
Adoption of optimal insulation structure increased heat insulation performance and temperature distribution accuracy.

Exhaust Unit

Gas generated with increasing temperature in the furnace can be efficiently exhausted.
Duct: Aluminum type fexible duct
Length 1.5m / Diameter 50mm
Power source of exhaust device :
AC115V 0.27A
Single phase AC220V 0.15A

Sample Tray

Dimensions (mm)



FP102 (1.5L) FP302/312 (7.5L) FP412 (11.3L)

Nitrogen Gas Generator

NF300

N_2 gas purity 99~99.99% | Generating volume Max. 10 NL/min

High purity N_2 gas (99~99.99%) can be generated by PSA method.

- All automatic easy operation by pressing the switches.
- Space-saving design.
- High-purity (99~99.99%) and Dry (–60℃ or less) N_2 gas can be obtained.
- Equipped with high reliability compressor.
- Standard equipped with casters for easy transport.
- Application samples: LC/MS FTIR ICP/MS, column drying, concentration of extraction liquid, storage cabinet humidity control etc.

Simple operation

Pressure / Flow rate adjustment and Flow meter

N_2 Gas Sampling Port (Rc 1/4)

Input output terminals

Operation output /
Error output / Remote input

Input / Output contact capacity
Output : AC125V 1A
Input : DC30V 20mA

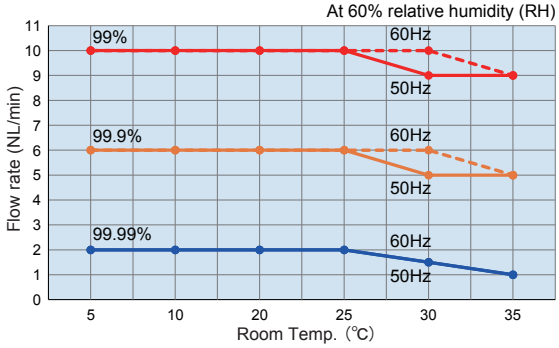
Specifications

Product code		301031
Model		**NF300**
Method		Adsorbent PSA method
Performance	N_2 gas purity	99~99.99% *
	N_2 gas generating volume	Max. 10 NL/min
	N_2 gas pressure	0.05~0.3 MPa
	N_2 gas dew point	-60℃
	Surrounding temp. / humidity	Temp. 5~35℃ / 10~80%RH (No Condensation)
Function	Flow meter	0.5 - 10.0 NL/min, Mass flow meter
	N_2 gas circulation port	O.D. 6mm, One-touch fitting
	N_2 gas sampling port	0.3MPa, 200mL/min (Rc 1/4)
	Maintenance announcement	4000 hrs. / 8000 hrs.
	Input / output	Operation output / Error output / Remote input
External dimension		W400×D400×H850mm
Weight		73kg
Compressor power consumption		50Hz:288W 60Hz:336W
Power source		AC115V / AC220V Single phase with step-down transformer

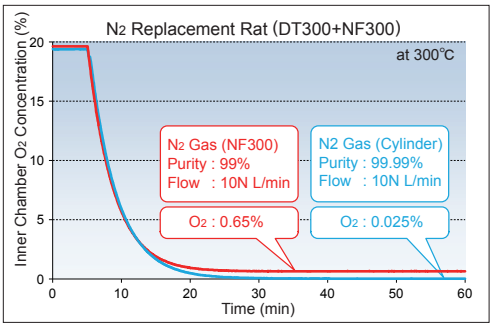
* N_2+Ar levels
* Amount of N_2 gas may decrease due to surrounding temperature and humidity.
* To reach specified N_2 gas purity, it may take 2 to 3 hours from start of operation to stabilization.

Relationship between Flow rate and N_2 Gas purity

N_2 Gas purity relationship (N_2 Flow rate – Humidity)
At 60% relative humidity (RH)

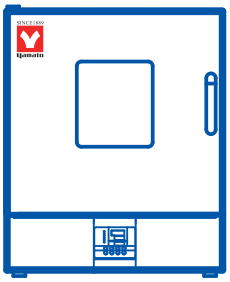


Sample installation with clean oven DT300



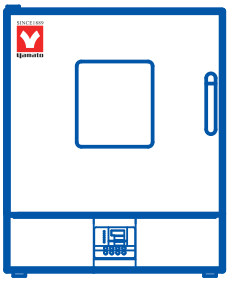
Reaching time of the specified N_2 Gas purity

N_2 Gas	Reaching time	When stable
99% → 99.9%	0.5 hour	1.0 hour
99.9% → 99.99%	1.0 hour	2.0 hour
99% → 99.99%	2.0 hour	4.0 hour
99% → Stop → 99%	-	0.5 hour
99.9% → Stop → 99.9%	-	0.5 hour
99.99% → Stop → 99.99%	-	1.0 hour



Oven

Contents

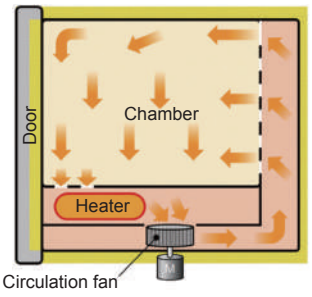


Oven

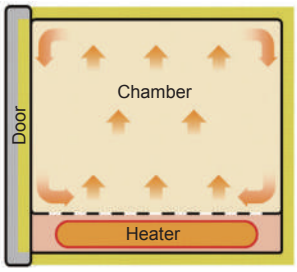
Contents

Method

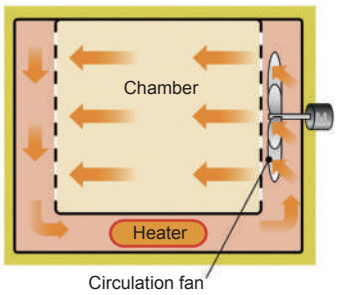
Forced Convection
[Side view]



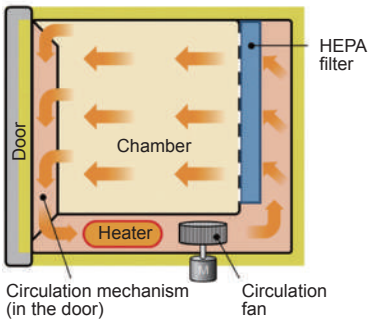
Natural Convection
[Side view]



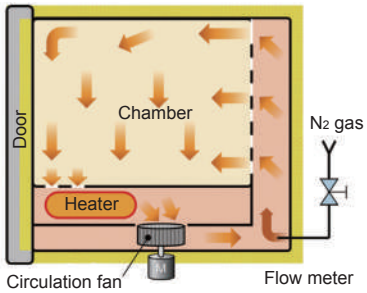
Forced Convection (Horizontal)
[Front view]



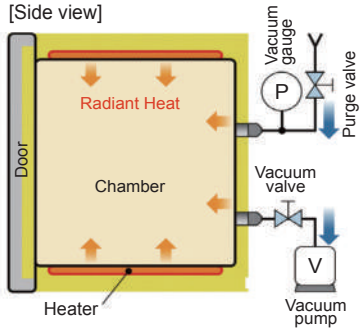
Clean Oven
[Side view]



Inert Oven
[Side view]



Vacuum Oven
[Side view]



Provide safe, environment-friendly and energy-saving products.

According to different purposes, may choose from various models, meet the requirements of temp. range and distribution accuracy, size, price, program operation, special usage, etc..

Function·Safety devices

Forced convection circulation
Through forced convection of high-performance centrifugal fan, stir the chamber to get uniform temp. distribution accuracy.

Free convection
Through chamber free convection of heater or air-jacket.

Auto overheat prevention
Overheat prevention with built-in controller, usually when ovens chamber temp. reaches set temp. +12℃, water bath chamber temp. reaches set temp. +6℃, the heater cuts off (auto recovery).

Overheat protector
Overheat protector with integrated controller, shares power suplly with controller, but other circuits are independent. In the event of abnormal temp. rising (manual recovery), cut off heater circuit.

Independent overheat protector
The circuit is different with controller, in the event of abnormal temp. rising (manual recovery), cut off heater circuit. According to different models, respectively configurate digital, hydraulic, thermometal types.

Self-diagnosis
Use the microcomputer, carried in the controller, to detect the abnormal circuit, alarm sounds in event of abnormality, control the device whitin safety range.

Key lock
Prevents the misoperation during operation.

Backup
Even in power outage or cutting off power, it also can memorize the set value.

Power outage compensation
When the power recovers, able to select to interrupt or continue operation.

Overcurrent breaker
When there is abnormal current, cut off power supply to protect the unit body.

Overcurrent ELB
This breaker has overcurrent cutting function and current leakage cutting function

Emergency stop button
If emergency stop needed, press this button to cut off.

Model List

Type	Max. Temp.	Temp. control accu-racy	Temp. distribution accuracy	Model	Characteristics	Program	Internal capacity (L)	Page
Forced Convection	260℃	±1℃	±2.5℃	DKN302C/312C/402C/412C/602C/612C	Observation Window	○	27/90/150	79
	210℃	±1℃	±2.5℃	DKN812C/912C		○	300/535	79
	260℃	±1℃	±2.5℃	DKM300C/310C/400C/410C/600C/610C	Economical		27/90/150	81
	260℃	±1℃	±2.5℃	DKL310C/410C/610C	Economical	○	27/90/150	83
	360℃	±0.2℃	±3.0℃	DN410HC/610HC	High Temp.	○	95/223	84
	360℃	±0.2℃	±3.0℃	DN411H/611H	High Temp.	○	95/223	85
	260℃	±0.1℃	±1.5℃	DF411C/611C	Fine	○	91/216	87
	360℃	±0.2℃	±2.5℃	DH411C/611C	Fine, High Temp.	○	91/216	87
	260℃	±0.1℃	±1.5℃	DF412/612	Fine	○	91/216	89
	360℃	±0.2℃	±2.5℃	DH412/612	Fine, High Temp.	○	91/216	89
	200℃	±0.2℃	±3.0℃	DF811C/DF1011C	Fine, Large Capacity	○	512/1000	91
	300℃	±0.3℃	±5.0℃	DH811C/DH1011C	Fine, High Temp., Large Capacity	○	512/1000	91
	200℃	±1.5℃	±12.0℃	DF832/DF1032	Fine, Large Capacity	○	512/1000	92
	300℃	±1.5℃	±18.0℃	DH832/DH1032	Fine, High Temp., Large Capacity	○	512/1000	92
	260℃	±0.2℃	±2.0℃	DFS710/DFS810	Fine	○	418/558	93
	360℃	±0.3℃	±3.0℃	DHS710/DHS810	Fine	○	418/558	93
	500℃	±0.2℃	±3.0℃	DH650C	High Temp.	○	216	95
	260℃	±0.2℃	±2.0℃	DNE650(V)/670(V)/850(V)	Energy Saving	○	150/300	97
	210℃	±0.5℃	±2.0℃	DNE410C/610C/810C/910C	Energy Saving	○	90/150/300/540	99
	210℃	±0.5℃	±2.0℃	DNE401/411/601/611/811/911	Energy Saving	○	90/150/300/540	101
	260℃	±0.5℃	±2.5℃	DNF410C/610C/810C/910C	Airflow Control	○	90/150/300/540	103
	260℃	±0.5℃	±2.5℃	DNF410/610/810/910	Airflow Control	○	90/150/300/540	105
	260℃	±0.5℃	±2.5℃	DKG610(V)/810(V)/850(V)	Industrial	○	150/300	107
	260℃	±0.1℃	±2.5℃	DF411SC/611SC	With Explosion Vent	○	91/216	117
	360℃	±0.2℃	±3.0℃	DH411SC/611SC	With Explosion Vent	○	91/216	117
	260℃		±10℃	DF412S/612S	With Explosion Vent	○	91/216	118
	360℃		±12℃	DH411S/611S	With Explosion Vent	○	91/216	118
	360℃	±0.2℃	±3.0℃	DN411I/611I	Inert	○	95/223	115
Forced Convection	260℃	±0.3℃	±2.5℃	DNF301/401/411/601/611/811/911	Airflow Control	○	27/90/150/300/540	105
Natural Convection	120℃	±0.5℃	±5.0℃	DNF301	Airflow Control	○	27	105
	120℃	±0.3℃	±3.0℃	DNF401/411/601/611	Airflow Control	○	90/150	105
Natural Convection	260℃	±1.0℃	±5.0℃	DVS402C/412C/602C/612C	Observation Window	○	99/162	109
	300℃	±1.0℃	±10℃	DX302C/312C/402C/412C			28/74	111
	280℃	±1.0℃	±10℃	DX602C/612C			153	111
	300℃	±1.0℃	±10℃	DY310C/410C			28/74	113
	280℃	±1.0℃	±10℃	DY610C			153	113
	70℃			DG410C/450C/810C/850C	Glassware Drying		92/445	119
	110℃			DGS400	Fail-safe		93	121
Clean	300℃	±0.3℃	±4.0/3.0℃	DT300/300H	Compact	○	27	123
	260℃	±0.3℃	±2.5℃	DE430C/DE630C		○	91/216	125
	360℃	±0.3℃	±4.0℃	DT430C/DT630C	High Temp.	○	91/216	125
	200℃	±0.3℃	±4.0℃	DE430UC/DE630UC	High Performance	○	91/216	125
	260℃	±0.5℃	±2.0℃	DES830	Large Capacity	○	327	129
	360℃	±0.5℃	±5.0℃	DTS830	Large Capacity	○	327	129
	150℃	±0.5℃	±3.0℃	DEC812C/DEC912C	Large Capacity	○	236/472	131
Vacuum	240℃	±1.5℃		DP23C/DP33C	Compact	○	10/27	141
	240℃	±1.0℃		DP200/300	Compact	○	10/27	135
	200℃	±1.0℃		DP43C/DP63C		○	91/216	137
	200℃	±1.5℃		DP410/610		○	91/216	135
	200℃	±1.0℃		DP83C/DP103C	Large Capacity	○	512/1000	139
	200℃	±1.0℃		DP810/DP1030	Large Capacity	○	512/1000	140
	240℃	±1.5℃		ADP200C/210C/300C/310C	Compact	○	10/27	142
	200℃	±1.0℃		DP43PC/63PC	Automatic Sequence	○	91/216	143
	200℃	±1.5℃		DP610P	Automatic Sequence	○	216	144
Others	360℃	±0.2℃	±3.0℃	DIR631C	Far-infrared Heating		72	133
	700℃	±5.0℃	±25℃	DR210C	High Temp.		13.75	134
	60℃	±1.0℃		OTC-213A/2D	Open Chamber		134/300	132

Forced Convection Oven

Programmable Forced Air Convection Ovens

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

Operating temp. range	Room temp. +10°C~210/250/260°C

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 "Best Seller" ovens - Fully programmable

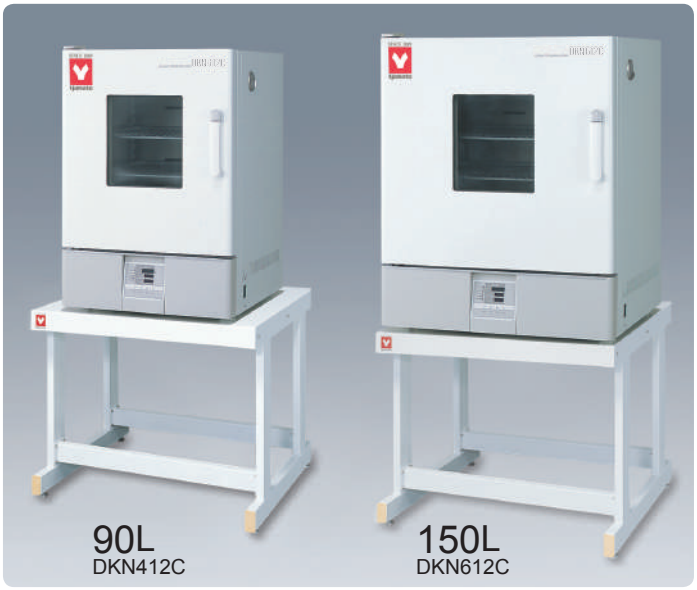
Standard forced air convection ovens are programmable and come with extended functions and safety features.

Operation and functions

- Best seller 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



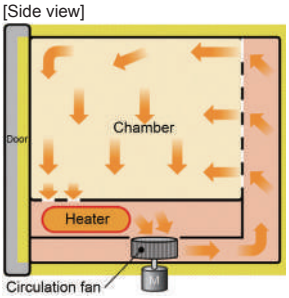
(Stands optional)

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	Approx. 90 min.						Approx. 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×2	1.8kW×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.×2 (on top)						30mm I.D.×2 (the back)	
Observation window	180×180mm Chemical strengthening glass×3		250×280mm Chemical strengthening glass×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	Approx. 15kg/piece							
Shelf rest step number/Shelf rest pitch	9 steps / 30mm		11 steps / 30mm		13 steps / 30mm		29 steps / 30mm	29 steps×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	Approx. 35kg		Approx. 50KG		Approx. 65kg		Approx. 110kg	Approx. 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.

Method

[Side view]



Interior

DKN612C

DKN912C

Cable Port (Standard)

Exhaust port (Standard)

Optional Items

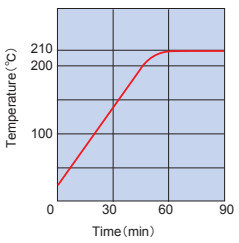
Product name		Product code
ON30 Stand for DKN302C/312C		211180
OT61 Stand for DKN402C/412C/602C/612C		211856
Stacking support OD40 for DKN402C/412C		212822
OD60 for DKN602C/612C		212823
Shelf (with support 2 pcs)	for DKN302C/312C	212094
	for DKN402C/412C	212246
	for DKN602C/612C/812C	212266
	for DKN912C	212490
*Cable port		
25mm dia		281121
50mm dia		281122
*Temperature output terminal (4-20 mA)		281123
*External alarm terminal/ time-up output terminal (to choose either)		281124
*External communication function (RS485)		281125
*External communication adapter (changeable to RS232C)		281126
Seismic mat for DKN302C/402C/602C series		296902

* Please specify when ordering main unit.

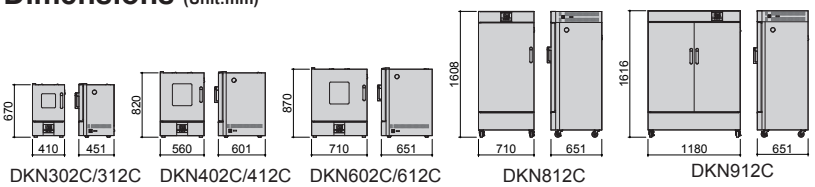
Control Panel

Temp. Rising Curve

DKN812C
DKN912C



Dimensions (Unit:mm)



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

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

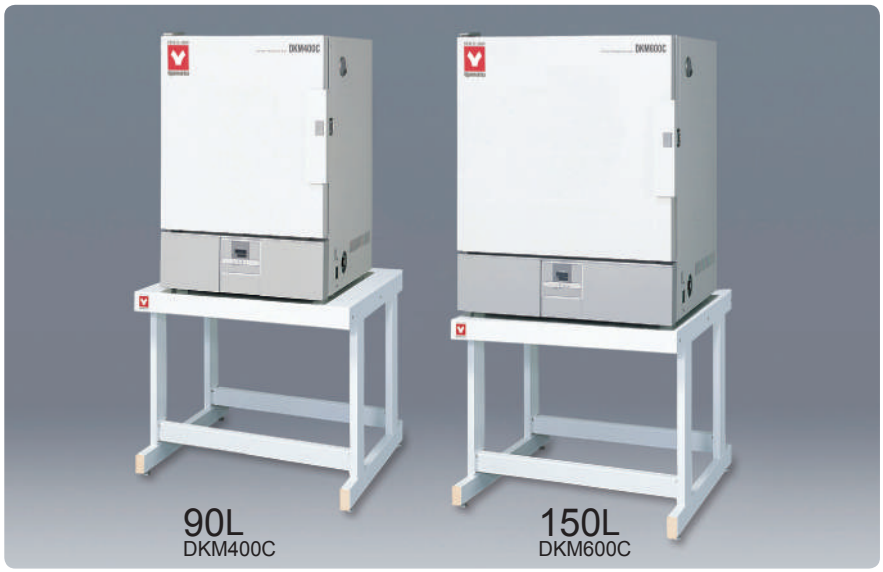
Forced convection, constant temperature oven with simple operation functions.

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



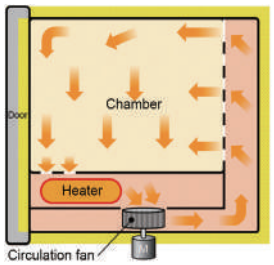
(Stands optional)

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	Approx. 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	Stainless 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	Approx. 35kg	Approx. 50kg	Approx. 65kg
Shelf plate	Stainless steel		
	2 pcs.		
Shelf bracket	4 pcs.		

Method

[Side view]



Control Panel

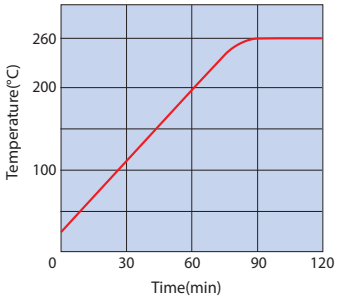
Exhaust Ports (Standard)

Cable Port (Standard)

Interior

DKM600C

Temperature Rising Curve



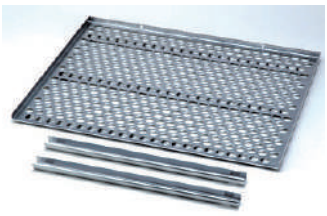
Optional items

Product name	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 pcs., shelf bracket 2pcs.)	
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.

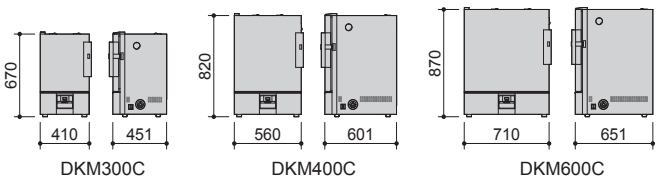
Optional Items

Stand



Shelf (with 2 brackets)

Dimensions (Unit:mm)



Economical Forced Convection Oven

CE

Basic function, Forced air circulation

DKL310C/410C/610C

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

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

Internal capacity	27L DKL310C	90L DK410C	150L DKL510C

Fixed temp. operation model, ensures basic functions.

Easy operation with various function settings, fixed temp. operation forced convection constant temp. oven.

Features

- Easy operation, available for fixed temp. and auto stop operations

Safety Protect

- Self-diagnosis circuit (abnormal temp. input, overheat prevention of upper temp. limit), overcurrent ELB, independent overheat protector.

Specifications

Model		DKL310C	DKL410C	DKL610C
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		Approx. 60min (at room temp. +10°C~210°C), Approx. 90min (at room temp. +10°C~260°C)		
Interior material		Stainless steel plate		
Exterior material		Cold rolled steel plate with chemical proofing coating		
Heat insulating material		Glass wool		
Heater		Stainless 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		Measured temp. display: Green 4-digit LED digital display Setting temp. display: Red 4-digit LED digital display		
Timer		1min-99 hr 59 min		
Operation functions		Fixed temp. operation, auto stop operation		
Additional functions		Deviation correction, parameter lock		
Sensor		Temp. controller: Pt100 thermal resistance, Overheat protection: Liquid-expansion temp. controller		
Safety device		Self-diagnosis (Abnormal temp. sensing, Overheat prevention of upper temp. limit), Parameter lock, Independent overheat protector, Overcurrent ELB		
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		AC220V 4.5A	AC220V 6.5A	AC220V 7A
Weight		Approx. 35kg	Approx. 50kg	Approx. 65kg
Shelf plate		Stainless steel		
		2 pcs.		
Shelf bracket		4 pcs.		
Optional	Stand	ON30C	ON61C	
	Stacking holder	–	OD40C	OD60C
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm)		

Forced Convection Oven (High Temp.)

High-temperature type

DN410HC/610HC

Operating temp. range	Room temp. +10°C to 360°C
Temp. distribution accuracy	±3.0°C (at 360°C)
Internal capacity	95L DN410HC / 223L DN610HC

Reliable constant temp. oven to support high-temp. thermal test.

Features

- Able to conduct 360°C high-temp. heat-resisting test and thermal treatment.
- Wide range applicable temp. with high accuracy of temp. control.
- Easy operation, available for fixed temp., program, quick auto stop, auto stop and auto start.
- Use specialized function menu key and up/down key to set. Program controller has 3 segments and 30 steps, repeatable.

Safety Protect

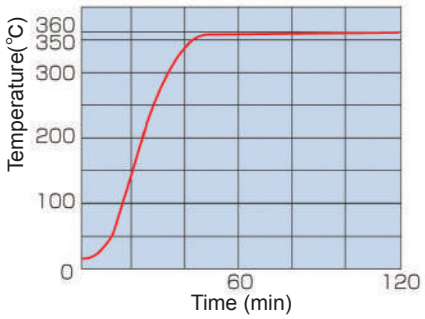
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, ELB to prevent overcurrent, key lock, etc.

Specifications

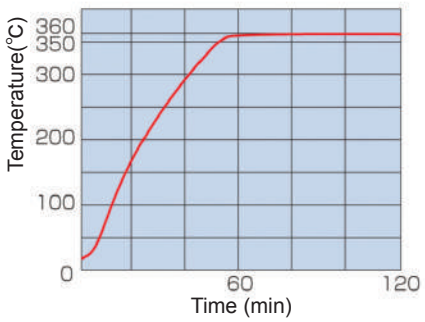
Model		DN410HC	DN610HC
Circulation method		Forced air circulation	
Operating temperature range		Room temp. +10~360°C	
Temp. control accuracy		±0.2°C (at 360°C)	
Temp. distribution accuracy		±3.0°C (at 360°C)	
Max. temp. reaching time		Approx. 60min	
Interior material		Stainless steel plate	
Exterior material		Cold rolled steel plate with chemical proofing coating	
Heat insulating material		Rock wool	
Heater		Stainless pipe heater 3.0KW	Stainless pipe heater 4.0KW
Fan type / Motor		Scirocco fan, High-temp. Self-cooling motor 30W	
Cable port		I.D. 30mm (1 on the right side)	
Exhaust port		I.D. 30mm×2, at back	
Temp. control		3 segments PID	
Temp. setting		Specialized function menu key and UP/DOWN key	
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 timing wait function)	
Operation functions		Fixed temp. operation, Auto start, Auto stop, Program operation	
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional functions		Deviation correction, Key lock, Power outage compensation	
Sensor		K thermocouple (Temp. controller and overheat protector)	
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), overheat protector, Overcurrent ELB, Key lock.	
Internal dimensions (W×D×H)		470×450×450mm	620×600×600mm
External dimensions (W×D×H)		640×695×915mm	790×846×1065mm
Internal capacity		95L	223L
Shelf plate with standard load		30kg / piece	
Shelf rest step number/Shelf rest pitch		12 steps / 30mm	17 steps / 30mm
Power source 50/60Hz		AC220V 14A	AC220V 19A
Weight		Approx. 80kg	Approx. 120kg
Shelf plate		Stainless steel wire screen plate	
		2 pcs.	
Shelf bracket		4 pcs.	
Optional	Stand	OH410C	OH61C
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by/Running/Malfunction), Observation window, External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal	

Temperature Rising Curve

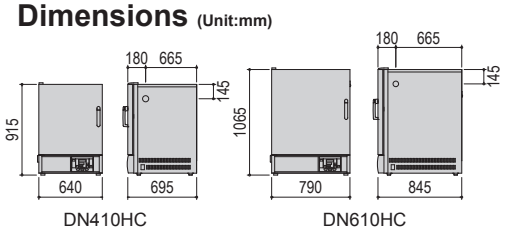
DN410HC



DN610HC



Dimensions (Unit:mm)



Forced Convection Oven (High Temp.)

Industrial & Laboratory Forced Convection

DN411H/611H

Operating temp. range	Room temp. +15°C~360°C

Temp. Distribution Accuracy	±3.0°C (at 360°C)

Internal capacity	95L DN411H	223L DN411H

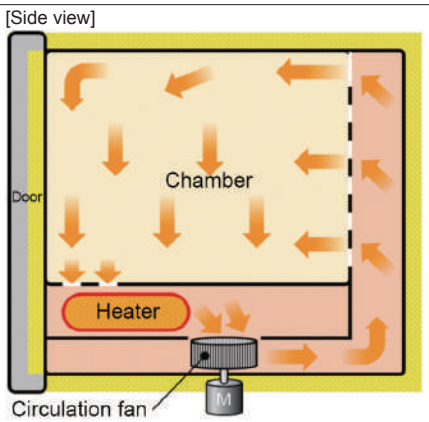
High precision constant temperature oven suitable for heat treatment and heat insulation tests. High performance control is possible due to its high precision control system. CO_2 and power discharge can be displayed on the monitor.

- Suitable for heat insulation test and curing process up to 360°C.
- Simple operation by interactive key input.
- Standard equipped with calibration offset function, power failure recovery mode, user configuration information and other functions.
- Maximum 99 steps, 99 patterns program controller with repeat function.
- Loaded with total operation hours timer.
- Designed with cable holes which allows data acquisition from internal test device.

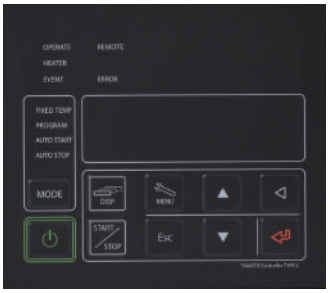
Specifications

Model	DN411H	DN611H
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. distribution accuracy	±3°C(at 360°C)	
Temp. gradient	12°C(at 360°C)	20°C(at 360°C)
Max. temp. reaching time	Approx. 60 min.	
Interior	Stainless steel plate	
Insulation material	Glass wool + Ceramic fiber	
Heater	Stainless pipe heater 3.0kW	Stainless pipe heater 4.0kW
Fan type / Motor	Sirocco fan, condenser type motor 30W	
Cable holes	33mm diameter (right side)	
Exhaust port	33mm diameter×2 (back side)	
Temp. controller	PID control by microcomputer	
Temp. setting Type	Digital setting by UP/DOWN key	
Temp. display	Digital indication by green LED	
Other display	Temp. pattern display for operating display by LED	
Timer / Timer Resolution	K thermocouple for temperature control and independent overload prevention device	
Flow meter, Gas carrier	Max. flow 30L/min, O.D. 9mm hose nipple	
Timer / Timer resolution	1min. to 99hrs. 59min. or 100hrs. to 999hrs. / 1min. or 1hrs.	
Operation functions	Fixed temp. operation, Auto start, Auto stop, Quick Auto stop	
Additional functions	Calendar time(24 hours), Calibration off set function, Electricity consumption, CO_2 discharge, Heater output operation display monitor, Power failure return mode, User configuration information saving / accessing	
Heater Circuit Control / Sensor	Triac zero-cross type / K-thermocouple (for temp. adjustment, Individual overheating prevention)	
Safety device	Self diagnosis function (Sensor, Heater, Fan, Triac, Main relay, Automatic overheat prevention), Key lock function, Independent overheating prevention, Door switch, Electric leakage breaker	
Internal dimensions	W470×D450×H450mm	W620×D600×H600mm
External dimensions	W640×D695×H915mm	W790×D845×H1065mm
Internal capacity	95L	223L
Withstand load of shelf board	Approx. 30kg / shelf	
No.of shelf stages/peg pitch	12pcs. / 30mm	17pcs. / 30mm
Power source	AC220V Single phase	
Weight	~90kg	~130kg
Shelf plate / bracket	Stainless wire, 2 pcs. / 4 pcs.	

Method



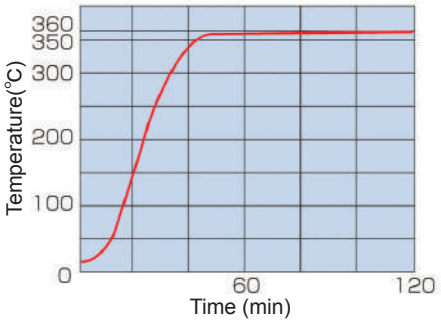
Control Panel



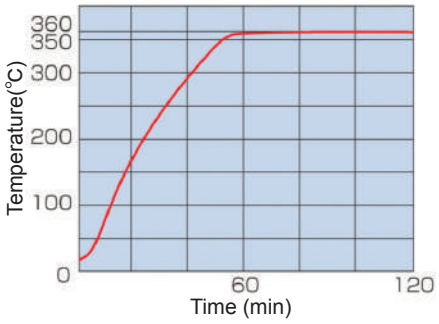
Overheat Prevention Device

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

DN411H



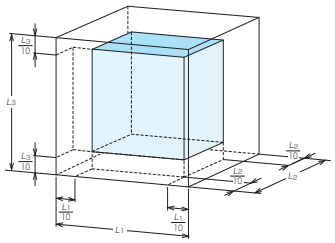
DN611H



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
DN411H	359	358	363	361	359	359	359	356	359
DN611H	361	357	362	357	359	355	350	350	357



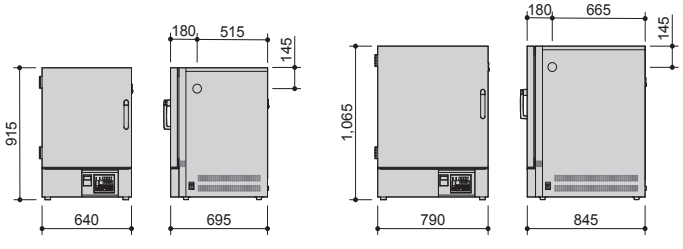
Conditions
1. Measured by 9 points including 1/10 distance to the the opposite wall and center measuring point according to internal dimensions.
2. Room temperature 23°C, AC220V, 50Hz, Setting at 360°C, Average temp. during stable state.
3. No load, 2 shelf plates installed.

Optional Items

Product name		Product code
Stand OH41(for DN411H)		212477
OH61(for DN611H)		212478
Shelf (with support 2 pcs.)	ODQ 10 for DN411H	211063
Stainless wire (loading up to 30 kg/shelf)	ODQ 20 for DN611H	211064
Shelf (with support 2 pcs.)	ODQ 30 for DN411H	211098
Stainless punching metal shelf (loading up to 15kg/shelf)	ODQ 40 for DN611H	211099
External Communication Adapter set OIN90		211880
*Additional cable port, 25mm dia.		281056
*Additional cable port, 50mm dia.		281057
*External Communication terminal		212975
*Temperature output terminal		212976
*External alarm output terminal		212977
*Time up output terminal		212978
*Operation signal output terminal		212979
*Event output terminal		212980

* Please specify when ordering main unit.

Dimensions (Unit:mm)



Interior

Stand (Optional Item)

DN611H+ Stand (Optional Item)

Fine Oven

CE

With high accuracy temperature control and exhaust damper

DF411C/611C・DH411C/611C

Operating temp. range	RT+10°C~260°C DF	RT+10°C~360°C DH

Temp. distribution accuracy	±1.5°C(at 260°C) DF	±2.5°C(at 360°C) DH

Internal capacity	91L Model 411C	216L Model 611C

High-precision thermal treatment constant temp. oven

(Stands Optional)

Features

- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock.
- Program operation: 3 segments, 30 steps
- Exhaust damper allows quick exhaust and cooling of inside chamber.

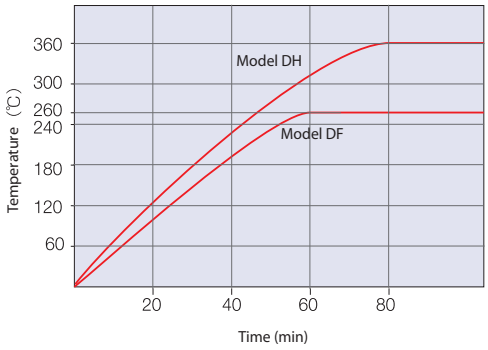
Safety

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

Specifications

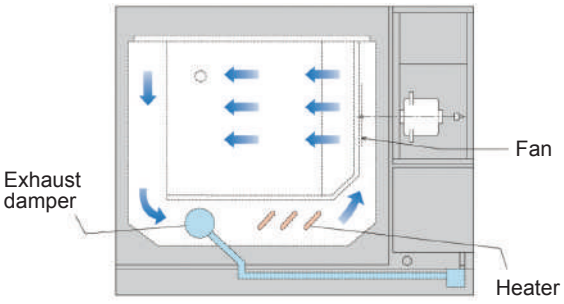
Model		DF411C	DF611C	DH411C	DH611C
System		Forced air circulation and ventilation			
Operating temp. range		Room temp.+10°C~260°C		Room temp.+10°C~360°C	
Temp. adjustment accuracy		±0.1deg.C (at 260°C)		±0.2deg.C (at 360°C)	
Temp. distribution accuracy		±1.5deg.C (at 260°C)		±2.5deg.C (at 360°C)	
Max temp. reaching time		Approx. 60 min. (to 260°C)		Approx. 80 min. (to 360°C)	
Interior		Stainless steel plate			
Exterior		Cold rolled steel plate with chemical proofing coating			
Insulating material		Glass fibre		Rock wool	
Heater		Stainless pipe heater with fin			
		2.1kW	3.0kW	2.7kW	3.75kW
Blower fan (motor)		Axial flow fan (Capacitor motor: 20W)			
Cable hole		I.D. 30mm (at back)			
Additional mechanism		Exhaust damper (Manual)			
Temp. control		3 segments PID			
Temp. setting		Use specialized function menu key and UP/DOWN 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 (Attached with timing wait function)			
Operation function		Fixed temp. operation, Auto start, Auto stop, Program operation			
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)			
Additional functions		Deviation correction, Key lock, Power outage compensation			
Heater circuit control		SSR driving			
Blower fan (motor)		Axial flow fan (Capacitor motor: 20W)			
Sensor		K thermocouple (Temp. controller and overheat protector)			
Internal dimensions (W×D×Hmm)		450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (W×D×Hmm)		1,050×630×850	1,200×780×1000	1,050×630×850	1,200×780×1000
Internal capacity		91L	216L	91L	216L
Shelf plate with standard load		Approx. 30kg / pc			
Shelf plate steps/Shelf rest pitch		9 steps / 45mm	9 steps / 60mm	9 steps / 45mm	9 steps / 60mm
Power source		AC 220V 10A	AC 220V 14A	AC 220V 13A	AC 220V 17.5A
Weight		Approx. 78kg	Approx. 109kg	Approx. 78kg	Approx. 109kg
Shelf / bracket		2 pcs. / 4 pcs.	3 pcs. / 6 pcs.	2 pcs. / 4 pcs.	3 pcs. / 6 pcs.
Optional	Stand	OP42C	OP62C	OP42C	OP62C
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30 / 50mm), Recorder, Indicator lamp (Stand-by / Running/Malfunction), Observation window, External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal			

Temperature Rising Curve



Control Panel

Structure diagram

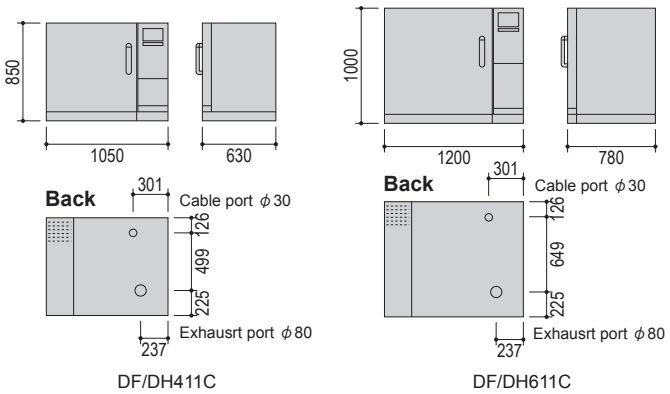


Interior

Optional items

(1)Exhaust duct
(2)Recorder
(3)Observation window

Dimensions (Unit:mm)



Fine Oven

With high accuracy temperature control and exhaust damper

DF412/612, DH412/612

Operating temp. range	RT +15°C~260°C DF412 / DF612	RT +15°C~360°C DH412 / DH612

Temp. distribution accuracy	±1.5°C (at 260°C) DF412 / DH412	±2.5°C (at 360°C) DF612 / DH612

Internal capacity	91L DF412 / DH412	216L DF612 / DH612

Highly reliable and accurate oven with simple settings for various temperature characteristics tests that require complicated programming.

91L
DF412

216L
DH612

(Stands Optional)

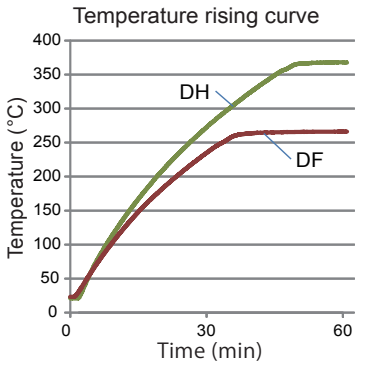
- Simple operation by interactive key input.
- Operation monitor visualizes controller status, temp and temp. changing.
- Incorporates with maximum 99 steps, 99 patterns program controller with repeat function.
- Loaded with total operation hours timer.
- Exhaust damper allows quick exhaust and cooling of inside.
- Accumulated timer function useful for maintenance and management is equipped as standard.
- Cable port useful for a monitor for temperature during testing is equipped as standard.

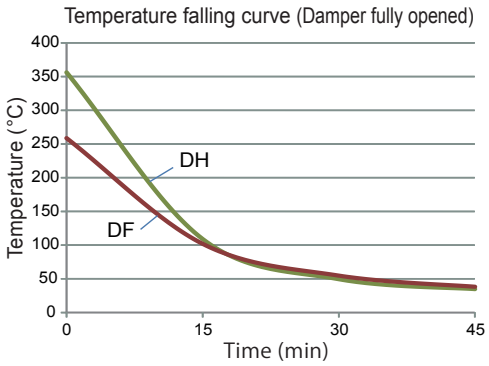
Interior

Specifications

Model	DF412	DF612	DH412	DH612
System	Forced convection and ventilation			
Operating temp. range	Room temp. +15~260°C		Room temp. +15~360°C	
Temp. control accuracy (JTM K05)	± 0.1°C (at 260°C)		± 0.2°C (at 360°C)	
Temp. fluctuation (JIS)	± 0.5°C (at 260°C)		± 1.0°C (at 260°C)	
Temp. distribution accuracy (JTM K05)	± 1.5°C (at 260°C)		± 2.5°C (at 360°C)	
Temp. gradient (JIS)	± 10°C (at 260°C)		± 12°C (at 360°C)	
Time to attain max. temp.	Approx. 50 min. (to 260°C)		Approx. 60 min. (to 360°C)	
Temp. control system	PID control with a micro computer			
Temp. and time setting system	Digital setting by UP/DOWN key			
Timer display range	Fixed value operation for 1 min. to 99 hr 59 min. and 24hr. setting			
Operation and manipulation functions	Fixed temp., auto-start, auto-stop, quick auto stop, program (max.99 steps, 99 patterns, repeat)			
Additional functions	Calendar timer (max. 24 Hrs.), Integration time (max. 65535Hrs.), Clock, Calibration off-set, Display the amount of power consumption / CO_2 discharge / Heater operation amount, Power failure recovery mode, User setting information save and recall, Wind velocity changeable function			
Sensor	Double K-thermocouple			
Heater	Stainless pipe heater with a fan			
Nominal heater capacity	2.1 kW	3.0 kW	2.7 kW	3.75 kW
Blower fan (motor)	Axial flow fan (Capacitor motor: 20W)			
Cable port	I.D. 33 mm×1 pc. (rear)			
Heat insulator	Glass wool			
Additional mechanism	Exhaust damper (manual)			
Safety device	Self diagnosis functions(Sensor, Fan, Heater, Relay, Triac, Automatic overheat prevention), Independent overheat prevention, Key lock function, Electric leakage breaker, Door switch			
Internal dimensions (W×D×H) (mm)	450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (W×D×H) (mm)	1,050×630×850	1200×780×1000	1,050×630×850	1200×780×1000
Internal capacity	91L	216L	91L	216L
Withstand load of shelf board	Approx. 30kg / pc			
No.of shelf stages/peg pitch	9 steps / 45mm	9 steps / 60mm	9 steps / 45mm	9 steps / 60mm
Power source 50 / 60 Hz	AC220V Single phase			
Weight	Approx. 112 kg	Approx. 156 kg	Approx. 112 kg	Approx. 156 kg
Shelf / bracket	3 pcs / 6 pcs			

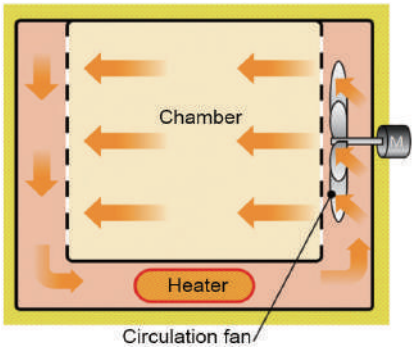
Performance





Method

[Front view]

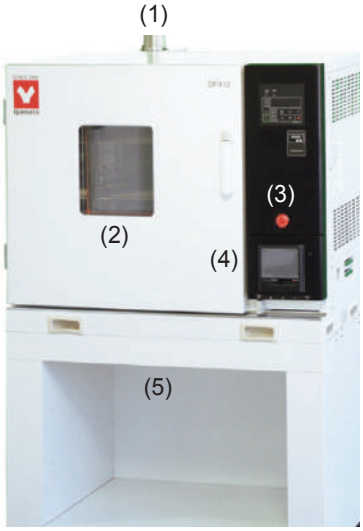


Optional Items

Description		Product code
Stand OP43 (without caster)	for DF/DH 412	415464
Stand OP63 (without caster)	for DF/DH 612	415465
Stand OP46 (with front side caster with stopper)	for DF/DH 412	415466
Stand OP66 (with front side caster with stopper)	for DF/DH 612	415467
Stacking support	for DF/DH Series	213700
Stainless wire shelf (loading up to 30 kg/shelf)	for DF/DH 412	211063
Stainless wire shelf (loading up to 30 kg/shelf)	for DF/DH 612	211064
Stainless punching metal shelf (loading up to 15kg/shelf)	for DF/DH 412	211098
Stainless punching metal shelf (loading up to 15kg/shelf)	for DF/DH 612	211099
Stainless mesh basket shelf (loading up to 15 kg/shelf)	for DF/DH 412	212924
Stainless mesh basket shelf (loading up to 15 kg/shelf)	for DF/DH 612	212925
*Wind velocity changeable function Fan revolution changeable range ; 50Hz: approx. 450-1,350rpm 60Hz: approx. 450-1,350rpm	for DF/DH Series	281060
*Observation window (for DF Type only)	for DF 412	213701
*Observation window (for DF Type only)	for DF 612	213702
*Automatic damper : 5 steps : 5%-25%-50%-75%-100%	for DF/DH Series	213706
*Exhaust duct (80mm dia)	for DF/DH 412	213703
*Exhaust duct (80mm dia)	for DF/DH 612	213704
*Flange for exhaust port	for DF/DH Series	281069
*Emergency stop switch	for DF/DH 412	213708
*Emergency stop switch	for DF/DH 612	213709
*Recorder (6 points type)	for DF/DH Series	213707
*Power cord, 8m.	for DF/DH 412	213710
*Power cord, 8m	for DF/DH 612	213711
*External communication terminal (RS485)	for DF/DH Series	213712
*External communication adapter set	for DF/DH Series	211880
*Temperature output terminal (4-20mA)	for DF/DH Series	213713
*Abnormal alarm display	for DF/DH Series	213714
*Time up output terminal	for DF/DH Series	213715
*Operation signal output terminal	for DF/DH Series	213716
*Event output terminal	for DF/DH Series	213717
Additional sensor (sheath sensor)	for DF/DH Series	212946
Silicon plug (with one hole, for DF type only)	for DF Series	212947
*Manual recovery function from blackout	for DF/DH Series	281066
*Wind velocity changeable function	for DF/DH Series	281071
*Power plug	for DF/DH Series	281071
*Cable port, 25mm dia. (Top)	for DF/DH Series	213718
*Cable port, 50mm dia. (Top)	for DF/DH Series	213719
*Cable port, 25mm dia (Rear)	for DF/DH Series	213720
*Cable port, 50mm dia (Rear)	for DF/DH Series	213721

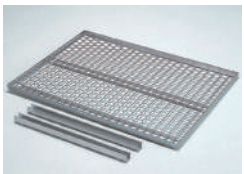
* Please specify when ordering main unit.

Control Panel

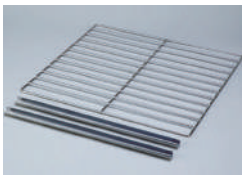


(1) Exhaust duct (213703)
(1) Observation window (213701)
(2) Emergency stop switch (213708)
(3) Paperless recorder (Built-in) (213707)
(4) Stand (with casters) (415466)

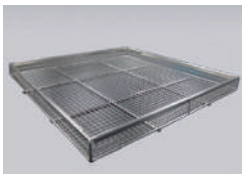
Shelf / Bracket



Stainless punching metal
(Weight tolerance 15kg/pc)

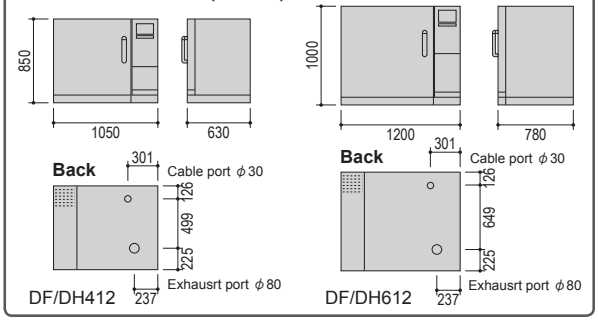


Stainless wire
(Weight tolerance 30kg/pc)



Stainless mesh basket shelf
(loading up to 15kg/shelf)
(Placed on top of the standard shelves)

Dimensions (Unit:mm)



Fine Oven (Large Capacity)

Large capacity

DF811C/1011C, DH811C/1011C

Operating temp. range	RT+10°C~200°C DF	RT+10°C~300°C DH

Temp. distribution accuracy	3°C(at 200°C) DF	5°C(at 300°C) DH

Internal capacity	512L Model 811C	1,000L Model 1011C

High precision constant temperature oven for heat treatment

1,000L
DH1011C

Features

- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock.
- Program operation: 3 segments, 30 steps
- Exhaust damper allows quick exhaust and cooling of inside chamber.

Safety

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

Specifications

Model	DF811C	DF1011C	DH811C	DH1011C
System	Forced air circulation and ventilation			
Operating temp. range	Room temp. +10°C~200°C		Room temp. +10°C~300°C	
Temp. control accuracy	±0.2°C (at 200°C)		±0.3°C (at 300°C)	
Temp. distribution accuracy	3°C (at 200°C)		5°C (at 300°C)	
Max. temp. reaching time	Approx. 60min (to 200°C)		Approx. 80min (to 200°C)	
Interior	Stainless steel plate			
Exterior	Cold rolled steel plate with chemical proofing coating			
Insulating material	Glass fiber		Rock wool	
Heater	Stainless pipe heater with fin			
	4.5KW	6KW	6.9KW	9KW
Blow fan / motor	Axial flow fan, Motor 20W×1	Axial flow fan, Motor 20W×2	Axial flow fan, Motor 20W×1	Axial flow fan, Motor 20W×2
Cable hole	I.D. 30mm (at back)			
Additional mechanism	Exhaust damper (manual)			
Temp. control	3 segments PID			
Temp. setting	Use specialized function menu key and up/down 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. operation, Auto start, Auto stop, Program operation			
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)			
Additional functions	Deviation correction, Key lock, Power outage compensation			
Heater circuit control	SSR driving			
Sensor	K thermocouple (Temp. controller and overheat protector)			
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock			
Internal dimensions (W×D×Hmm)	800×800×800mm	1,000×1,000×1,000mm	800×800×800mm	1,000×1,000×1,000mm
External dimensions (W×D×Hmm)	1,500×1,015×1,330mm	1,700×1,215×1,530mm	1,500×1,015×1,330mm	1,700×1,215×1,530mm
Internal capacity	512L	1,000L	512L	1,000L
Shelf plate with standard load	30kg / piece			
Shelf plate steps/Shelf rest pitch	12steps / 60mm	19steps / 60mm	12steps / 60mm	19steps / 60mm
Power supply (50/60Hz) rated current	3 phase AC380V 8A	3 phase AC380V 10.5A	3 phase AC380V 11.5A	3 phase AC380V 16A
Weight	Approx. 160kg	Approx. 230kg	Approx. 160kg	Approx. 230kg
Shelf plate	Stainless steel wire screen plate, 3 pcs			
Shelf bracket	6 pcs.			
Optional	Shelf plate (1 plate with 2 rests), Cable hole (30 / 50mm), Recorder, Indicator lamp (Stand-by / Running/Malfunction), Observation window, External communication (RS485), Temp. output terminal (40mA), Output terminal for alarm device, Time up output terminal			

Fine Oven (Large Capacity)

With high accuracy temperature control and exhaust damper

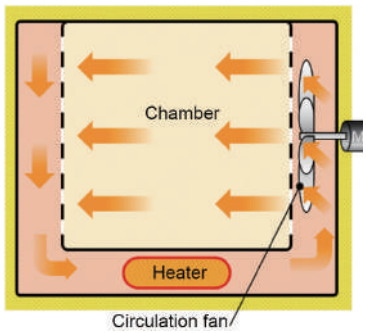
DF832/1032 DH832/1032

Operating temp. range	RT+15°C~200°C DF	RT+15°C~300°C DH
Temperature slope	15°C(at 200°C) DF	20°C(at 300°C) DH
Internal capacity	512L Model 832	1,000L Model 1032

Large fine oven designed to support high throughput

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

[Front view]



Specifications

Model	DF832	DF1032	DH832	DH1032
System	Forced air circulation and ventilation			
Operating temp. range	Room temp. +15°C~200°C		Room temp. +15°C~300°C	
Temperature fluctuation	±0.5°C (at 200°C)		±1.0°C (at 300°C)	
Temperature slope	15°C (at 200°C)		20°C (at 300°C)	
Temperature controller	PID Z control			
Temp setting method	Digital setting with ▲/▼ keys			
Timer	0 min~99 hrs 59 min (Resolution: 1 minute or 1 hour)			
Operation function	Fixed temperature operation, Program operation (Maximum 99 steps, Up to 99 patterns, Repeat operation function) Duration / time select timer operation function (Fixed temperature operation, Auto start/Auto stop / Quick auto stop, Program operation auto start)			
Additional functions	Accumulated power on and operation time (up to 65,535 hours); Calendar time (24 hours); Calibration offset; Monitor display of accumulated power consumption, Total CO2 emission, And heater operating output, Power recovery mode, User settings save and restore function, Fan speed setting function			
Sensor	K-thermocouple (Double sensor)			
Heater	Stainless steel pipe heater with a fan			
	4.5kW	6.0kW	6.9kW	9.0kW
Fan motor	Stainless steel axial flow fan (Capacitor motor: 20W), Two motors used for Model1032			
Cable port	I.D. ø30mm (rear)			
Heat insulator	Glass wool		Glass wool + Ceramic fiber	
Additional mechanism	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×D×H)	800×800×800mm	1,000×1,000×1,000mm	800×800×800mm	1,000×1,000×1,000mm
External dimensions (W×D×H)	1,500×1,015×1,330mm	1,700×1,215×1,530mm	1,500×1,015×1,330mm	1,700×1,215×1,530mm
Internal capacity	512L	1,000L	512L	1,000L
Weight	Approx. 350kg	Approx. 450kg	Approx. 350kg	Approx. 450kg
Shelf / bracket	3 pcs. / 6 pcs.			

Fine Oven (Tall)

Large capacity

DFS710/810, DHS710/810

Operating temp. range	RT +15°C~260°C DFS710/810	RT +15°C~360°C DHS710/810

Temp. distribution accuracy	±2.0°C (at 360°C) DFS710/810	±3.0°C (at 360°C) DHS710/810

Internal capacity	418L DFS / DHS710	558L DFS / DHS810

Optimized for various temperature characteristic tests.

418L
DFS710

558L
DHS810

Accurate temperature control and wide temperature range allow various heat treatment and temperature characteristic tests.

- Improved visibility and operability of the control panel.
- A 16-segment program operation is possible.
- Forced hot air circulation and ventilation by a damper.
- Safety measures are enriched, including self-diagnosis function and an independent overheating prevention device.

Control Panel

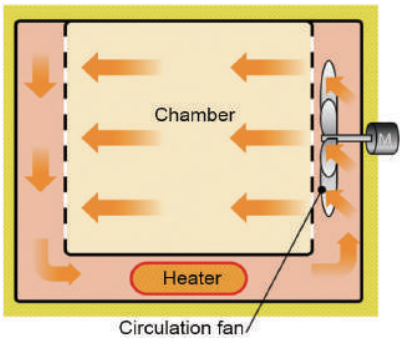
Specifications

Model		DFS710	DFS810	DHS710	DHS810
System		Forced convection and ventilation			
Operating temperature range		Room temp. +15~260°C		Room temp. +15~360°C	
Temperature adjustment accuracy		± 0.2°C (at 260°C)		± 0.3°C (at 360°C)	
Temperature distribution accuracy		± 2.0°C (at 260°C)		± 3.0°C (at 260°C)	
Max. temperature reaching time		Approx. 40 min.		Approx. 50 min.	
Interior material		Stainless steel			
Exterior material		Cold rolled steel plate with melamine resin baking finish			
Heat insulating material		Glass wool			
Heater		Stainless pipe heater with fan			
		4.5kW	5.4kW		6.0kW
Fan type		Scirocco fan			
Motor		Condenser type, 100 W			
Cable hole		50mm I.D. (left side)		33mm I.D. (left side)	
Temp. controller		PID control by microprocessor			
Temp. setting method		Digital setting with UP/DOWN key			
Temp display method		Digital display by green LED and orange LED			
Other display		Operation monitor (Operation condition graphic display by LED patterns)			
Min. division		1 min. to 99 hrs. 59 min			
Operation function		Fixed temperature operation, Auto-start operation, Auto-stop operation, Program operation			
Additional functions		Variable wind velocity function, Calendar timer (max. 24 hrs.), Integration time (max. 65535 hrs.), Time display, amount of electricity saved / Carbon dioxide emission / Heater operation amount display (Switching display), Power fail recovery mode selection, Store and recall user settings, External communication terminal (RS485)			
Heater circuit control		Triac zero-cross control			
Temp. sensor		K-thermocouple (double sensor)			
Safety countermeasures		Self diagnosis functions(Sensor, Fan, Heater, Triac, Automatic overheating prevention), Independent overheating prevention, Key lock function, Electric leakage breaker, Door switch, Switch for control box			
Internal dimensions (W×D×H) (mm)		620×750×900	620×750×1200	620×750×900	620×750×1200
External dimensions (W×D×H) (mm)		770×965×1580	770×965×1880	770×965×1580	770×965×1880
Internal capacity		418L	558L	418L	558L
Withstand load of shelf board		Approx. 30kg/piece			
Shelf rest step number		27 steps	37 steps	27 steps	37 steps
Shelf rest pitch		30 mm			
Power source 50 / 60 Hz		AC220V Single phase	AC220V / 380V Three phase		
Weight		Approx. 175kg	Approx. 190 kg	Approx. 175kg	Approx. 190 kg
Accessories	Shelf plate/Shelf bracket	Stainless steel wire, 2 pcs. / 4 pcs.			

Interior

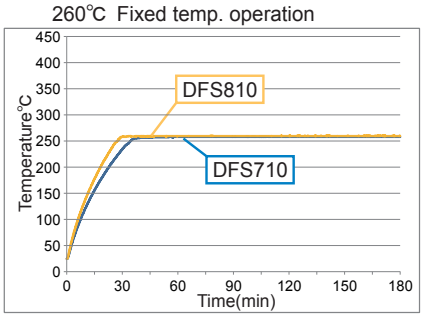
Method

[Side view]

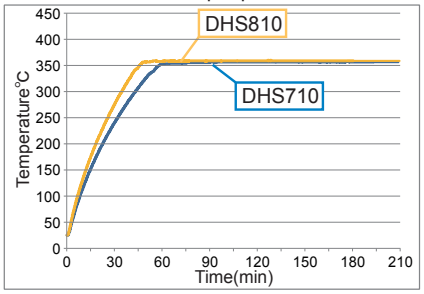


Performance

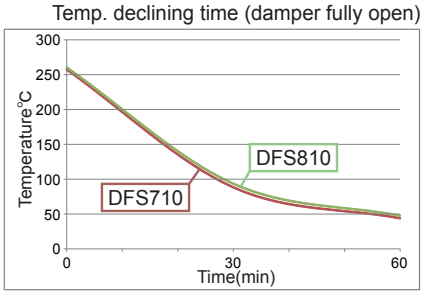
260℃ Fixed temp. operation



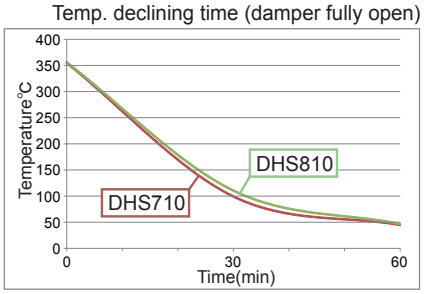
260℃ Fixed temp. operation



Temp. declining time (damper fully open)



Temp. declining time (damper fully open)

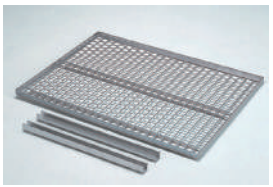


Optional Items

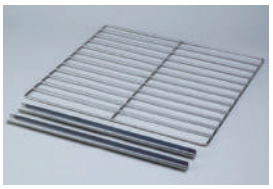
Description		Model No.	Product code
Stainless wire shelf (with support 2 pcs., loading up to 30 kg/shelf)	for DFS/DHS Series		211064
Stainless punching metal shelf (loading up to 15kg/shelf)	for DFS/DHS Series		211099
Stainless punching metal shelf (loading up to 15kg/shelf)	for DFS/DHS Series	ODT14	212925
*Automatic damper	for DFS/DHS Series	ODH32	212987
*Exhaust duct (80mm dia)	for DFS/DHS Series	ODH34	212988
*Emergency stop switch	for DFS710	ODH36	212989
*Emergency stop switch	for DFS810/ DHS710	ODH62	212970
*Digital recorder, 6 points, sensors are not included	for DFS/DHS Series	ODH38	212990
*Power cord (10m./pc)	for DFS810/ DHS710/DHS810	ODH42	212991
*Power cord (10m./pc)	for DFS710	ODH58	212992
*External communication terminal (RS485)	for DFS/DHS Series	ODH44	212993
External communication adapter (changeable to USB)	for DFS/DHS Series	OIN90	211880
*Temperature output terminal	for DFS/DHS Series	ODH46	212994
*External alarm terminal	for DFS/DHS Series	ODH48	212995
*Time up output terminal	for DFS/DHS Series	ODH52	212996
*Abnormal alarm display	for DFS/DHS Series	ODH54	212997
*Event output terminal	for DFS/DHS Series	ODH56	212998
Additional sensor (K thermocouple)	for DFS/DHS Series	ODT48	212946
Silicon plug (with one hole)	for DFS/DHS Series	ODT52	212947
Exhaust flange	for DFS/DHS Series	ODF46	281069
*Cable port, 25mm dia	for DFS/DHS Series	ODH66	212972
*Cable port, 50mm dia	for DFS/DHS Series	ODH68	212973
*Cable port, 100mm dia	for DFS/DHS Series	ODH72	212974

*Please specify when ordering main unit.

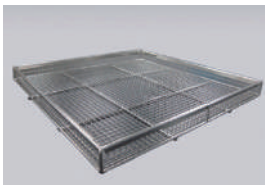
Shelf / Bracket



Stainless punching metal
(Weight tolerance 15kg/pc)

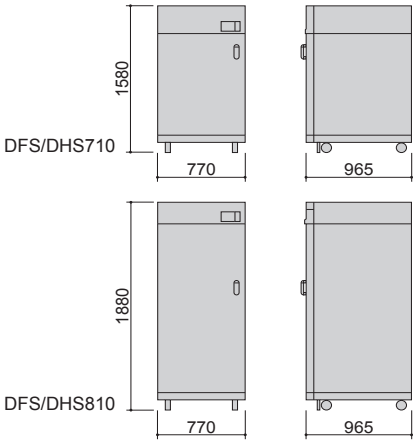


Stainless wire
(Weight tolerance 30kg/pc)



Stainless mesh basket shelf
(loading up to 15kg/shelf)
(Placed on top of the standard shelves)

Dimensions (Unit:mm)



Fine Oven (High Temp., 500℃)

Max. working temp. 500°C

DH650C

Operating temp. range	Room temp. +10°C to 500°C
Temp. distribution accuracy	±5.0°C (at 500°C)
Internal capacity	216L

Fine constant temp. oven with max. working temperature of 500°C.

Features

- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock
- Program operation: 3 segments, 30 steps
- Exhaust damper allows quick exhaust and cooling of inside chamber.

Safety Protect

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

Specifications

Model	DH650C
Circulation method	Forced convection circulation and ventilation
Operating temperature range	Room temp. +10~500°C
Temp. control accuracy	±0.2°C (at 360°C)
Temp. distribution accuracy	±3°C (at 300°C), ±5°C (at 500°C)
Max. temp. reaching time	Approx. 60min (to 500°C)
Interior material	Stainless steel plate
Exterior material	Cold rolled steel plate with chemical proofing coating
Insulating material	Aluminum silicate cotton, Ceramic fiber block, Heat insulation block
Heater	Alloy heating wire, 7.8KW
Blow fan / motor	Scirocco fan, High-temp. Self-cooling motor 30W
Exhaust port/Cable hole	I.D. 50mm (at back) / I.D. 30mm (at back)
Additional mechanism	Exhaust damper (manual)
Temp. control	3 segments PID
Temp. setting	Use specialized function menu key and UP/DOWN 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 (Attached with timing wait function)
Operation functions	Fixed temp. operation, Auto start, Auto stop, Program operation
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)
Additional functions	Deviation correction, Key lock, Power outage compensation
Heater circuit control	SSR driving
Sensor	K thermocouple (Temp. controller and overheat protector)
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock.
Internal dimensions (W×D×H)	600×600×600mm
External dimensions (W×D×H)	1,350×950×1,300mm
Internal capacity	216L
Shelf plate with standard load	30kg / piece
Shelf rest step number/Shelf rest pitch	9 steps / 60mm
Power source 50/60Hz	3 phase AC380V 12.5A
Weight	Approx. 250kg
Shelf plate	Stainless steel wire screen plate
	3 pcs.
Shelf bracket	6 pcs.
Optional	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by/Running/Malfunction), Observation window, External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal

Control Panel

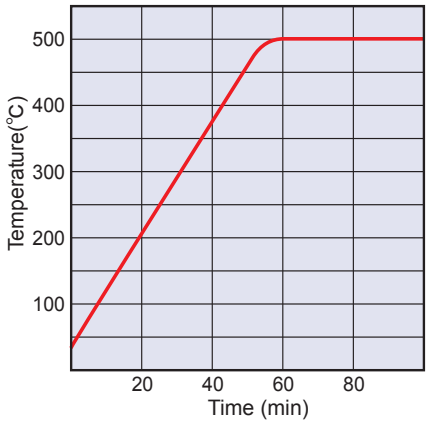
Operation modes

- Fixed operation
- Fixed auto stop operation
- Fixed quick auto stop operation
- Fixed auto start operation
- Program operation
- Program auto start operation

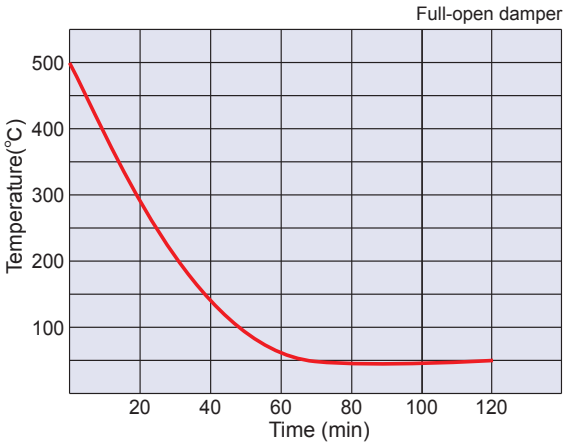
Useful functions

- Wind amount adjustment function (10 steps)
- Automatic open/close damper function
- Display switching during operation
- Heater output operation amount display
- Program name setting
- Operation guide function, etc.

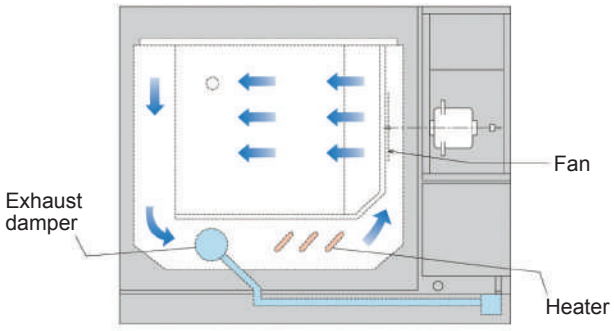
Temperature Rising Curve



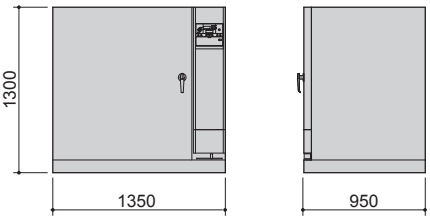
Temp. decline curve



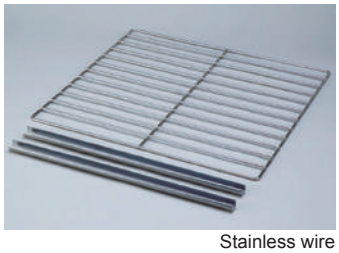
Structure diagram



Dimensions (Unit:mm)



Shelf / Bracket



Stainless wire

Forced Convection Oven (Energy Saving)

Energy-saving

DNE650/650V/670/670V/850/850V

Operating temp. range	RT +10°C~260°C
Temp. distribution accuracy	±2.0°C (at 260°C)
Internal capacity	150L DNE650/650V/670/670V / 300L DNE850/850V

Ultra low power consumption oven that supports multi-power sources.

- Ultra energy saving eco oven with power consumption cut by 50% compared to the conventional model (DN).
- Highly hermetic bath construction prevents dusts or foreign matters from entering chamber.
- Time required to attain the highest temperature has been shortened by up to 15 minutes (with no-load, our DN ratio). Shortened wait time and recovery time minimize down time and make work effective.
- Silicon-free eco oven with Viton(R) fluoroelastomer door packing. (DNE650V/670V/850V)
- Supports multi-power sources by simply connecting to either 100/120V (DNE650) or 200-240V (DNE670/850).
- Four-fold overheat preventive functions (automatic overheat prevention, heater room overheat prevention, overheat prevention in the bath, and temperature fuse) assure optimal safety.
- Equipped with various functions: self-diagnostic, alarm history monitoring, key lock and over current electric leakage breaker.
- Additional functions such as RS485 communication, temperature output, external alarm and time-up output allow system upgrade based on specific application.

Specifications

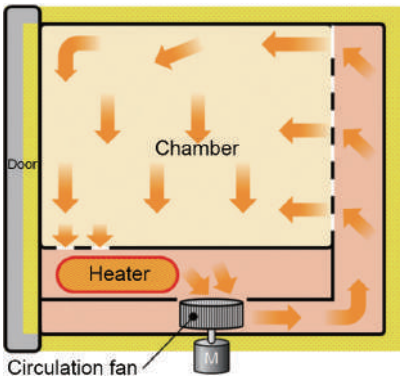
Model	DNE650	DNE650V	DNE670	DNE810	DNE850	DNE850V
System	Forced convection					
Operating temperature range*1	Room temp. +10°C to 260°C					
Temperature adjustment accuracy*1	± 0.2°C (at 260°C)					
Temperature distribution accuracy*1	± 2.0°C (at 260°C)					
Time to attain max. temp.*1	Approx. 65 min.				Approx. 55 min.	
Interior/external material	Stainless steel plate/electrogalvanized steel (Epoxy/melamine coated)					
Heater/heat insulator	SUS pipe heater, glass wool					
Heater capacity	100 to 120V / 1.56 to 2.16 kW		200 to 240V / 1.56 to 2.16 kW		200 to 240V / 2.7 to 3.88 kW	
Fan	Scirocco fan					
Fan motor	Condenser 10W				Condenser 30W	
Source voltage switching	With the multi power source selector switch on the rear panel 30W					
Cable port	One port at the right side: I.D.30 mm					
Door packing	Silicon rubber	Fluoroelastomer	Silicon rubber	Fluoroelastomer	Silicon rubber	Fluoroelastomer
Air supply port	One on the side (heater room side)					
Exhaust port	I.D. 30 mm (with damper) One on the top					
Controller	CR5 Multi functional program controller					
Heater control	SSR control					
Sensor	K-thermocouple (in the bath and heater kiln)					
Safety functions	Self diagnostic function (Temp. sensor error, Heater disconnection, SSR short-circuit, Automatic overheat prevention, And other functions of CR5), Key lock, Program lock, Independent overheat protection within the bath, Independent heater overheat prevention, Over-current electric leakage breaker, Temp. fuse					
Other functions	Standard functions: RS485 external communication (supports FORWARD), External alarm, Time-up, and output on the logger					
Power supply (50/60 Hz)	Single phase: AC100 to 120V, 14 to 16.5A		Single phase: AC200 to 240V, 7 to 8.5A		Single phase: AC200 to 240V, 12.5 to 15A	
Internal capacity	150L				300L	
External dimensions*2	770×696×1,760 mm (W×D×H)				770×696×995mm (W×D×H)	
Internal dimensions	600×500×500 mm (W×D×H)				600×500×1,000mm(W×D×H)	
Weight	Approx. 90 kg				Approx. 130 kg	
Shelf	Stainless steel punching metal×2				Stainless steel punching metal×4	
Shelf loading	Approx. 15 kg / each					
Shelf steps/shelf pitch	13 steps / 30 mm				29 steps / 30 mm	

*1 Conditions: temperature and humidity : 23°C±5°C, 65%RH±20% (no load)
*2 Do not include protrusions.

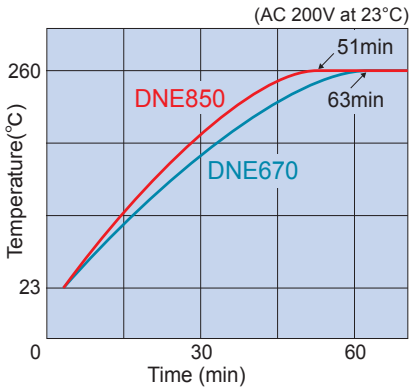
Interior

Method

[Side view]



Temperature Rising Curve



Control Panel

Major functions

Operation modes

1. Fixed operation
2. Fixed auto stop operation
3. Fixed quick auto stop operation
4. Fixed auto start operation
5. Program operation
6. Program auto start operation

Useful functions

- Display switching during operation
- Heater output operation amount display
- Program name setting
- Operation guide function, etc.

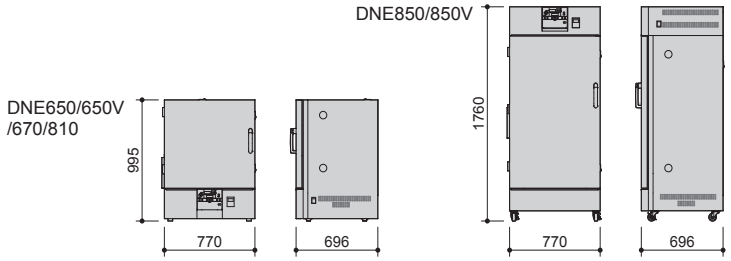
Multi power source selector switch

DNE650:
100 to 110V/115 to 120V

DNE670/850:
200 to 220V/230 to 240V

Cable Port

Dimensions (Unit:mm)



Optional Items

Description		Product code
ON62 Stand	for DNE650/650V/670/670V	281540
Stacking support for ODN12	for DNE650/670	281541
Stainless punching metal shelf (loading up to 15kg/shelf)	for DNE650/650V/670/670V/850/850V	212266
*Cable port of I.D. 25mm	for DNE650/650V/670/670V/850/850V	281502
*Cable port of I.D. 50mm	for DNE650/650V/670/670V/850/850V	281503
*RS485-232C conversion adapter	for DNE650/650V/670/670V/850/850V	281126

* Please specify when ordering main unit.

Stand

Stacking support

Stainless punching metal shelf

Forced Convection Oven (Energy Saving)

Economy Mechanical Convection Ovens

DNE410C/610C/810C/910C

Operating temp. range	RT +10°C~210°C

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

Internal capacity	90L DNE410C	150L DNE610C	300L DNE810C	540L DNE910C

Environment-friendly constant temp. oven with lower power consumption and CO_2 emission.

Features

- Airtight thermal insulation design in chamber, saves power consumption by 30% at constant temp. (compared with the previous product)
- Max. temp. reaching time shortened by 15 mins. compared to previous models. Operation efficiency improved as standby and recovery times are also shortened..
- High airtightness prevents dust and waste from entering chamber.
- Available for fixed temp., 32 steps program, auto stop and auto start operations.
- Temperature and time setting, deviation correction and more are displayed thru VFD fluorescent screen.
- Various optional functions enable system upgrade based on user requirement.

Safety

- Self-diagnosis circuit, independent overheat protector, overcurrent ELB, key lock, etc.

Specifications

Model		DNE410C	DNE610C	DNE810C	DNE910C
Circulation method		Forced air circulation			
Operating temp. range		RT+10°C to 210°C			
Temp. adjustment accuracy		±0.5°C (at 210°C)			
Temp. distribution accuracy		±2.0°C (at 210°C)			
Max. temp. reaching time		Approx. 60 min.		Approx. 45 min.	Approx. 60 min.
Interior/Exterior material		Stainless steel plate / Cold rolled steel plate with chemical proofing coating			
Heater / insulating material		Stainless pipe heater / Glass fibre			
		1.1kW	1.34kW	1.2kW×2	1.5kW×2
Blower motor		High-temp. self-cooling motor			
		10W		30W	30W×2
Cable hole		I.D. 30mm (1 on the right side)			
Air inlet		I.D. 30mm (1 on the right side)			
Exhaust port		I.D. 30mm×2, on top		I.D. 30mm×2, at back	
Temp. control		PID control			
Temp. setting		Use specialized function menu key and UP/DOWN key to set			
Temp. display		Measured temp. display: Orange 4-digit LED digital display+VFD fluorescent display screen			
		Setting temp. display: Red 4-digit LED digital display			
Timer/Timer resolution		1 min. to 999 hrs. 59 min. / 1 min.			
Operation function		Fixed temp., Program, Auto start, Auto stop operation			
Program mode		Program operation the max. 32 steps, Repeatability funciton			
Additional functions		Timer, cumulative time (till 49999hrs), Deviation correction, Clock display			
Sensor		K thermocouple (Temp. controller and overheat protector)			
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock, etc			
Internal dimensions (W×D×Hmm)		450×450×450	600×500×500	600×500×1000	1090×500×1000
External dimensions (W×D×Hmm)		580×646×860	730×696×910	730×696×1675	1220 ×696×1675
Internal capacity		90L	150L	300L	540L
Shelf plate with standard load		Approx. 15kg/pcs.			
Shelf rest step number / Shelf rest pitch		11 steps / 30mm	13 steps / 30mm	29 steps / 30mm	29 steps / 30mm x 2 lines
Power supply (50/60Hz) rated current		AC220V 5.5A	AC220V 7A	AC220V 12A	AC220V 15A
Weight		Approx. 60kg	Approx. 76kg	Approx. 112kg	Approx. 178kg
Shelf plate		Stainless punching metal			
Shelf plate / bracket		2 pcs. / 4 pcs.		4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Optional	Stand	ON61C		–	
	Stacking clamp	ODN26C	ODN28C	–	
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by / Running/Malfunction), Observation window, External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal			

Control Panel

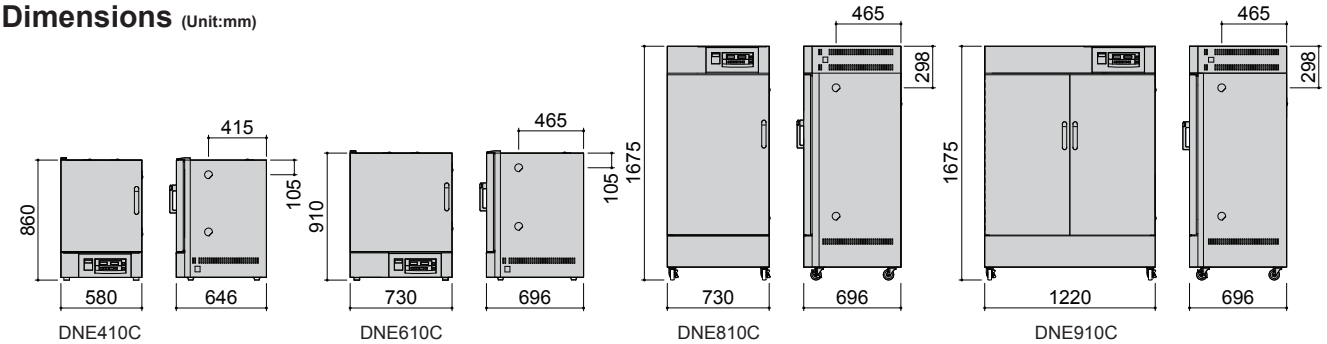
Cable Port (Standard)

Interior

DNE610C

DNE910C

Dimensions (Unit:mm)



Forced Convection Oven (Energy Saving)

Ecological Economical

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)

Internal capacity	90L DNE401/411	150L DNE601/611	300L DNE811	540L DNE911

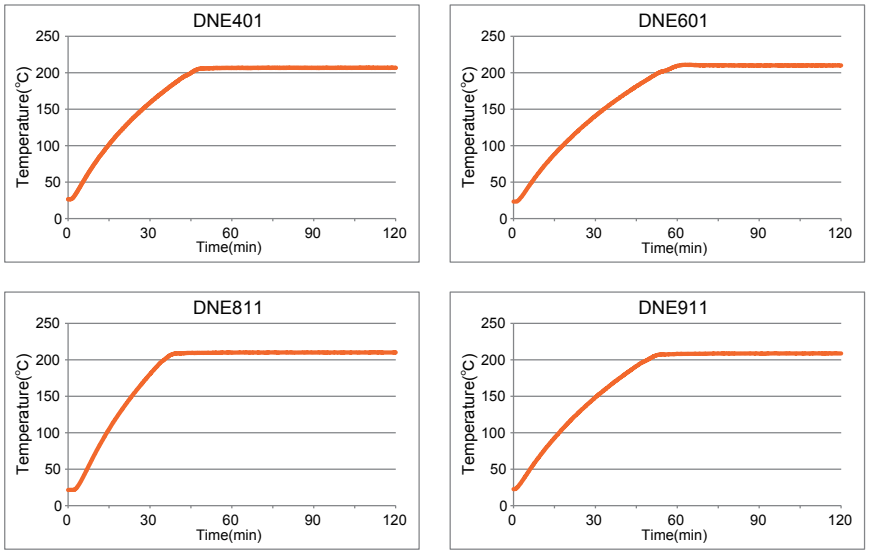
High performance, environment-friendly eco-oven that reduces power consumption significantly.

- High precision controller allows high performance temperature control and display of CO_2 and power discharge
- Heat tightness and insulation design of the chamber saves 30 to 40% of energy during constant temperature compared to previous models
- Program operation with a maximum of 99 steps, 99 patterns, with repeat function
- Standard equipped with various support functions such as calibration offset, operation time integration, power failure recovery mode, save & access of user setting information and other operation modes
- Data acquisition from internal test device possible because of cable holes
- Easy system upgrade with various option settings

Specifications

Model		DNE401/411	DNE601/611	DNE811	DNE911
Circulation method		Forced air circulation			
Operating temperature range		Room temp. +20 to 210°C		Room temp. +15 to 210°C	
Temp. adjustment accuracy		±0.5°C (at 210°C)			
Temp. distribution accuracy		±2.0°C (at 210°C)			
Max. temp. reaching time		Approx. 60 min.	Approx. 70 min.	Approx. 45 min.	Approx. 60 min.
Interior/Exterior material		Stainless steel /Electro-galvanized steel sheet with epoxy and melamine resin baking finish			
Heat insulating material		Glass wool			
Heater		Stainless pipe heater	Stainless pipe heater	Stainless pipe heater	Stainless pipe heater
		1.1 kW	1.2 kW	1.2 kW×2	1.5 kW×2
Fan Type		Scirocco fan			
Motor		Condenser type,10W		Condenser type,30W	Condenser type,30W×2
Cable hole/Air in-take hole		33mm I.D. (the right side) 1pc.			
Exhaust port		33mm I.D.×2 (the top)		33mm I.D.×2(the back)	
Temp. controller		PID Z control by microprocessor			
Temp. setting method		Digital setting by UP/DOWN key			
Temp display method		Digital Display by Green LED			
Timer/Min.division		0 min. to 99 Hrs. 59 min. /1 min.			
Operation function		Fixed temperature operation, Program operation, Auto start, Auto-stop, Quick automatic stop			
Program mode		Program operation; Maximum 32 steps, Repeat function			
Additional functions		Timer Function (Actual Timer within 24hrs.), Total operation hours timer (to 65535hrs.), Calendar time (24 hours), Calibration offset, Power discharge, CO_2 discharge, Power failure return mode, User configuration information			
Heater circuit control		Triac zero-cross control			
Sensor		K-thermocouple			
Safety device		Self diagnosis functions (Temp. sensor abnormal, Heater disconnection, SSR- short, Main relay abnormal, Automatic overheating prevention), Key lock function, Independent overheat prevention, Electric leakage breaker with over current protection			
Internal dimensions (W×D×Hmm)		450×450×450	600×500×500	600×500×1,000	1,090×500×1,000
External dimensions(W×D×Hmm)		580×645×860	730×695×910	730×695×1,660	1,220 ×695×1,660
Internal capacity		90L	150L	300L	540L
Shelf plate with standard load		Approx. 15kg/piece			
Shelf rest step number		11 steps	13 steps	29 steps	29 steps
Shelf rest pitch		30 mm			
Power source 50/60Hz		AC 100V/AC200V	AC 100V/AC200V	AC 200V/220V	AC 200V/220V
		single phase	single phase	single phase	single phase
		12A/6A	14.5A/7.5A	13A/11.8A	16A/14.5A
Weight		Approx. 63 kg	Approx. 77 kg	Approx. 92 kg	Approx. 185 kg
Accessories	Shelf plate	Stainless steel, 2 pcs.		Stainless steel, 4 pcs.	Stainless steel, 8 pcs.
	Shelf bracket	4 pcs. (1 pair - 2 pcs. is fixed)		8 pcs. (Same as left)	16 pcs. (2 pairs are fixed)

Temperature Rising Curve



Control Panel

Interior

DNE401

DNE911

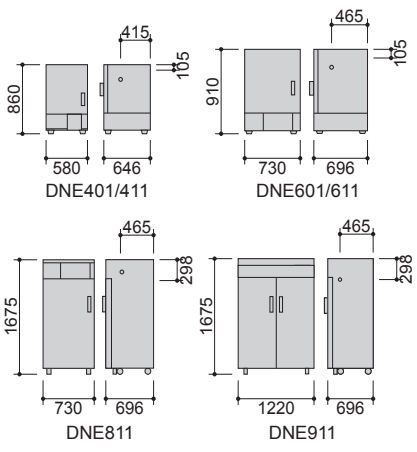
Cable Port (Standard)

Optional Items

Model No.	DNE401/411	DNE601/611	DNE811	DNE911
Stand	ON61(211856)		-	
	OT42 (212348)	OT62 (212349)	-	
Stacking support	ODN26 (212806)	ODN28 (212807)	-	
Shelf (with support 2 pcs.)	212246	212266	212266	212490
*Cable port, 25mm dia	ODM36(281454)			
*Cable port, 50mm dia	ODM38(281455)			
*Sheath sensor	ODT48 (212946)			
*Silicon Stopper	ODT52 (212947)			
Seismic isolation rubber	296902		-	
*Observation window	ODM40(281456)	ODM42(281457)	-	
*External communication function (RS485)	ODM12(281442)			ODM14(281443)
*External communication adapter	OIN90 (211880)			
*Temperature output terminal (4-20mA)	ODM16(281444)			ODM18(281445)
*External alarm terminal	ODM20(281446)			ODM22(281447)
*Time-up output terminal	ODM24(281448)			ODM26(281449)
*Working signal output terminal	ODM28(281450)			ODM30(281451)
*Event alarm output terminal (4 points output)	ODM32(281452)			ODM34(281453)

* Please specify when ordering main unit.

Dimensions (Unit:mm)



Forced Convection Oven (Airflow Control)

Programmable Energy Saving Mechanical Convection Ovens with Variable Flow Rate

DNF410C/610C/810C/910C

Operating temp. range	RT +10°C~260°C

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

Internal capacity	90L DNF410C	150L DNF610C	300L DNF810C	540L DNF910C

Variable air speed, environment-friendly constant temp. oven with lower power consumption and CO_2 emission.

Features

- Eco-oven with variable air speed and adjustable damper.
- Airtight thermal insulation design in chamber, saves power consumption by 30% at constant temp. (compared with the previous product)
- Max. temp. reaching time shortened by 15 mins. compared to previous models. Operation efficiency improved as standby and recovery times are also shortened..
- High airtightness prevents dust and waste from entering chamber.
- Available for fixed temp., 32 steps program, auto stop and auto start operations.
- Temperature and time setting, deviation correction and more are displayed thru VFD fluorescent screen.
- Various optional functions enable system upgrade based on user requirement.

Safety

- Self-diagnosis circuit, independent overheat protector, over-current ELB, key lock, etc.

Specifications

Model		DNF410C	DNF610C	DNF810C	DNF910C
Circulation method		Forced air circulation			
Operating temp. range		RT+10°C to 260°C			
Temp. adjustment accuracy		±0.5°C (at 260°C)			
Temp. distribution accuracy		±2.5°C ((set the max. air speed at 260°C)			
Max. temp. reaching time		Approx. 75 min.		Approx. 60 min.	Approx. 75 min.
Interior/Exterior material		Stainless steel plate / Cold rolled steel plate with chemical proofing coating			
Heater		Stainless pipe heater			
		1.25kW	1.5kW	1.35kW×2	1.65kW×2
Blower motor		DC24V brushless motor (800~1,500rpm) variable (set 10 segments)			
		30W			30W×2
Cable hole		I.D. 30mm (1 on the right side)			
Air inlet		I.D. 30mm (1 on the right side)			
Exhaust port		I.D.50mm (1 at back)			
Temp. control		PID control			
Temp. setting		Use specialized function menu key and up/down key to set			
Temp. display		Measured temp. display: Orange 4-digit LED digital display+VFD fluorescent display screen			
		Setting temp. display: Red 4-digit LED digital display			
Timer/Timer resolution		1 min. to 999 hrs. 59 min. / 1 min.			
Operation function		Fixed temp., Program, Auto start, Auto stop operation			
Program mode		Program operation the max. 32 steps, Repeatability funciton			
Additional functions		Timer, cumulative time (till 49999hrs), Deviation correction, Clock display			
Sensor		K thermocouple (Temp. controller and overheat protector)			
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock, etc			
Internal dimensions (W×D×Hmm)		450×450×450	600×500×500	600×500×1000	1090×500×1000
External dimensions (W×D×Hmm)		580×646×860	730×696×910	730×696×1675	1220 ×696×1675
Internal capacity		90L	150L	300L	540L
Shelf plate with standard load		Approx. 15kg/pcs.			
Shelf rest step number / Shelf rest pitch		11 steps / 30mm	13 steps / 30mm	29 steps / 30mm	29 steps / 30mm x 2 lines
Power supply (50/60Hz) rated current		AC220V 6A	AC220V 7.5A	AC220V 13A	AC220V 16A
Weight		Approx. 61kg	Approx. 77kg	Approx. 113kg	Approx. 180kg
Shelf plate		Stainless punching metal			
Shelf plate / bracket		2 pcs. / 4 pcs.		4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Optional	Stand	ON61C		—	
	Stacking clamp	ODN26C	ODN28C	—	
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30 / 50mm), Recorder, Indicator lamp (Stand-by / Running/Malfunction), Observation window, External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal			

Control Panel

Cable Port (Standard)

Exhaust Port & Damper Switch

Exhaust Port
(back of main unit)

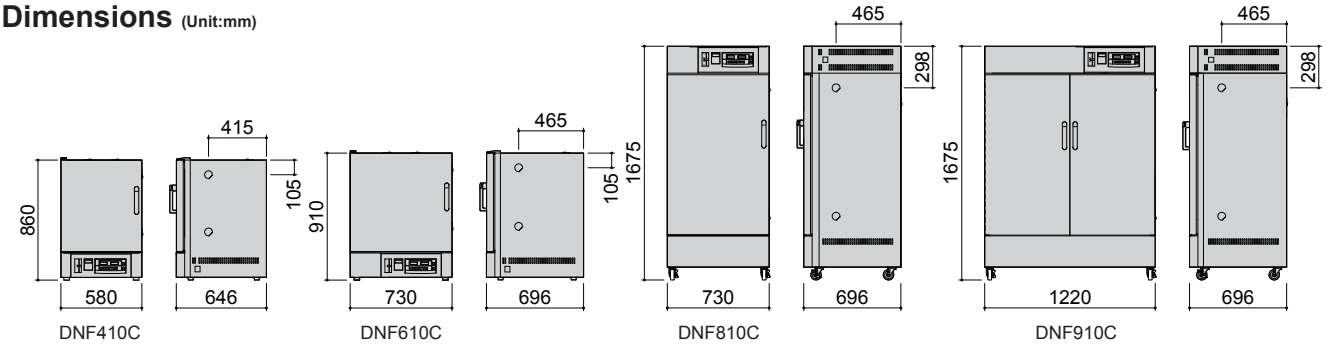
Damper Switch

Interior

DN6610C

DN6910C

Dimensions (Unit:mm)



Forced Convection Oven (Airflow Control)

Ecological Economical

Energy Saving Programmable Forced Convection Ovens with Variable Flow Rate

DNF301/401/411/601/611/811/911

Operating temp. range	RT +15°C~260°C (Forced convection)

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

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

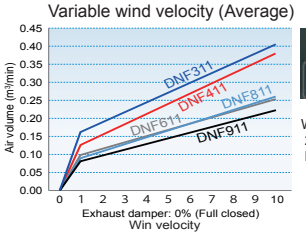
Forced and natural convection “2 in 1” ovens

- Two types of circulation, forced and natural convection, in one unit (compatible with model 300/400/600)
- Eco-oven with digital variable wind velocity from 0-10 steps and adjustable damper.
- Program featured to reduce power consumption significantly.
- Superior heat tightness and insulation of chamber.
- Excellent dust tightness, dust can hardly enter the chamber
- Air velocity changeable in 10 stages using digital setting of controller.
- Standard with 99 step program operation with repeat operation, auto start, auto stop and quick auto stop functions.
- Adjustable damper position at chamber front to optimize operation.
- Fluorescent display, interactive input method, calibration off-set function.

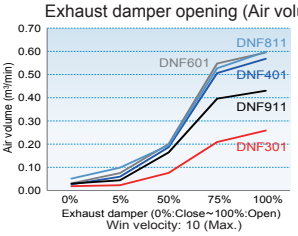
Specifications

Model		DNF301	DNF401	DNF411	DNF601	DNF611	DNF811	DNF911
Circulation method		2 in 1 type: Forced and Natural convection, with manual exhaust damper					Forced convection with manual exhaust damper	
Forced convection (Wind velocity setting:1-10)	Operating temp. range	Room temp. +15 to 260°C						
	Temp. control accuracy (JTM K05)	±0.3°C(at 260°C)						
	Temp. fluctuation (JIS)	±0.5°C(at 260°C)						
	Temp. distribution accuracy (JTM K05)	±2.5°C(at 260°C)						
	Temp. gradient (JIS)	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)
	Max. temp. reaching time	Approx. 70 min.	Approx. 105 min.		Approx. 100 min.		Approx. 60 min.	Approx. 100 min.
Natural convection (Wind velocity setting:0)	Operating temp. range	Room temp. +25 to 120°C					Not applicable	
	Temp. control accuracy (JTM K05)	±0.5°C (at 120°C)	±0.3°C(at 120°C)					
	Temp. fluctuation (JIS)	±1°C (at 120°C)	±0.8°C (at 120°C)		±0.6°C (at 120°C)			
	Temp. distribution accuracy (JTM K05)	±5°C (at 120°C)	±3°C(at 120°C)					
	Temp. gradient (JIS)	15°C (at 120°C)	13°C(at 120°C)					
	Max. temp. reaching time	Approx. 20 min.	Approx. 25 min.					
Interior / Exterior material		Stainless steel / Electro-galvanized steel sheet with epoxy and melamine resin baking finish						
Heat insulating material		Glass wool						
Heater		0.8 kW	0.6 kW×2		0.83 kW×2		1.35 kW×2	1.65 kW×2
Cable hole		33mm I.D. (Right)×1pc.						
Air in-take hole		33mm I.D. (Right)×1pc.						33mm I.D. (Right and Left) ×1pc. each
Exhaust port		50mm I.D. (Back)×1pc.						50mm I.D. (Back) x 2pc.
Temp. controller		PID control by microprocessor						
Temp. setting method		Digital setting by UP/DOWN key						
Timer display range		Fixed value operation for 1 min. to 99 hr 59 min. and 24hr. setting						
Operation function		Fixed temp., Auto-start, Auto-stop, Quick auto stop, Program (Max.99 steps, 99 patterns, repeat)						
Additional functions		Calendar timer (max. 24 Hrs.), Integration time (max. 65535Hrs.), Clock, Calibration off-set, Display the amount of Power consumption / CO_2 discharge / Heater operation amount, Power failure recovery mode, User setting information save and recall, Wind velocity changeable function						
Sensor		K-thermocouple ×2pcs.						
Safety device		Self diagnosis functions (Sensor, Fan, Heater, Relay, Triac, Automatic overheat prevention), Independent overheat prevention, Key lock function, Electric leakage breaker, Door switch						
Internal dimensions (W×D×Hmm)		300×300×300	450×450×450		600×500×500		600×500×1,000	1,090×500×1,000
External dimensions (W×D×Hmm)		430×495×740	580×645×890		730×695×940		730×695×1,685	1,220×695×1,685
Internal capacity		27 liters	90 liters		150 liters		300 liters	540 liters
Shelf plate with standard load		Approx. 15kg/piece						
Shelf rest step number		6 steps	11 steps		13 steps		29 steps	29 steps x2
Shelf rest pitch		30 mm						
Power source 50/60Hz		AC115V/AC220V single phase		AC220V single phase	AC115V/AC220V single phase	AC220V single phase		
Weight		Approx. 50 kg	Approx. 75 kg		Approx. 90 kg		Approx. 135 kg	Approx. 210 kg
Acces-sories	Shelf (Stainless punching metal)	2 pcs.					4 pcs.	8 pcs.
	Shelf support	4 pcs.					8 pcs.	16 pcs.

Wind velocity variable + Exhaust damper



Wind velocity setting
2in1 type 0~10
DNF811/911 : 1~10



Optional Items

Description	Option Model No.	Main Unit Model No.	Product code
Stand	ON30	DNF301	211180
Stand	ON61	DNF401/411/601/611	211856
Stand	OT42	DNF401/411	212348
Stand	OT62	DNF601/611	212349
Stacking support	ODM44	DNF301	281458
Stacking support	ODN26	DNF401/411	212806
Stacking support	ODN28	DNF601/611	212807
Stainless punching metal shelf (loading up to 15kg/shelf)	-	DNF301	212068
Stainless punching metal shelf (loading up to 15kg/shelf)	-	DNF401/411	212246
Stainless punching metal shelf (loading up to 15kg/shelf)	-	DNF601/611/811	212266
Stainless punching metal shelf (loading up to 15kg/shelf)	-	DNF911	212490
*Cable port 25mm dia	ODM36	DNF601/611/811/911	281454
*Cable port 50mm dia	ODM38	DNF601/611/811/911	281455
*External communication terminal (RS485)	ODM56	DNF401/411/811	281464
*External communication terminal (RS485)	ODM58	DNF301/601/611/911	281465
*External communication adapter set	OIN90	DNF Series	211880
*External Alarm Output Terminal	ODM60	DNF401/411/811	281466
*External Alarm Output Terminal	ODM62	DNF301/601/611/911	281467
*Timeup Output Terminal	ODM64	DNF401/411/811	281468
*Timeup Output Terminal	ODM66	DNF301/601/611/911	281469
*Operation Signal Output Terminal	ODM68	DNF401/411/811	281470
*Operation Signal Output Terminal	ODM70	DNF301/601/611/911	281471
*Event Output Terminal	ODM72	DNF401/411/811	281472
*Event Output Terminal	ODM74	DNF301/601/611/911	281473
Additional sensor (sheath sensor)	ODT48	All models	212946
Silicon plug (with one hole)	ODT52	All models	212947
*Digital recorder, 6 points, sensors are not included	YHR150	All models	281571
*Digital recorder, 6 points, sensors are not included	YHR250	All models	281570
Cable for Recorder (YHR150/250) and External communication function	ODM76	All models	281474
*Exhaust duct (50mm dia with exhaust flange)	ODM46	DNF301	281459
*Exhaust duct (50mm dia with exhaust flange)	ODM48	DNF401/411	281460
*Exhaust duct (50mm dia with exhaust flange)	ODM50	DNF601/611	281461
*Exhaust duct (50mm dia with exhaust flange)	ODM52	DNF811	281462
*Exhaust duct (50mm dia with exhaust flange)	ODM54	DNF911	281463

* Please specify when ordering main unit.

Control Panel

Interior

DNF601

DNF911

Industrial Forced Convection Oven (Silicorn/Fluoro-rubber Gasket)

Rapid heating and cooling

DKG610/610V/650/650V/810/810V/850/850V

Operating temp. range	RT +30°C~260°C
Temp. distribution accuracy	±2.0°C (at 200°C)
Internal capacity	150L DKG610/610V/650/650V / 300L DKG810/810V/850/850V

Improved heating and cooling time compared to conventional oven models.

- Standard oven with simple operation.
- Temperature increase and decrease time improved by up to 50% (at no load) compared to conventional company models resulting to extensive increase in work efficiency.
- Employment of a total exhaust system in which air supply and discharge are linked by operation of the manual damper at the front realizes extensive reduction in temperature decrease time.
- Horizontal air flow system ideal for batch processing and processing samples in a magazine rack achieves high precision temperature performance even at loaded condition.
- Silicon-free fluoro rubber door packing used for select models. (DKG610V/650V/810V/850V)
- Supports multiple power sources: 200-220V for models 610/610V/810/810V and 230-240V for 650/650V/850/850V.

Specifications

Model	DKG610	DKG610V	DKG650	DKG650V	DKG810	DKG810V	DKG850	DKG850V
System	Forced convection							
Operating temperature range*1	Room temp. +30°C to 260°C							
Temperature adjustment accuracy*1	± 0.5°C							
Temperature distribution accuracy*1	± 2.0°C (at 200°C), ± 2.5°C (at 260°C)							
Time to attain max. temp.*1	Within 45min. from 25°C→260°C				Within 50min. from 25°C→260°C			
Temp. decrease time	About 30min. from 260°C→50°C				About 40min. from 260°C→50°C			
Air supply/exhaust damper	Front operation/manual damper Air supply pipe/exhaust pipe at the rear NSSC180 With exhaust duct							
Interior/exterior	Stainless steel plate/chrome free electro galvanized steel plate Chemical proof baking finish							
Heater and heat insulator	SUS pipe heater & glass wool							
Heater capacity	200~220V 2.6~3.15kW		230~240V 2.6~2.83kW		200~220V 3.6~4.36kW		230~240V 3.6~3.92kW	
Blower fan	Sirocco fan×1				Sirocco fan×2			
Fan motor	Capacitor 30W×1				Capacitor 30W×2			
Cable port	I.D.: 30mm One at the right side of the main body							
Door packing	Silicon rubber	Fluororubber	Silicon rubber	Fluororubber	Silicon rubber	Fluororubber	Silicon rubber	Fluororubber
Air supply port	Bottom of heater room (Open/Close with a manual damper)							
Exhaust port	Upper part of rear of the main body: ϕ80 (Open / Close with a manual damper)							
Damper control	Linked air supply / Exhaust with manual knob on the front of the main body							
Heater control	SSR control							
Sensor	K-thermocouple (Both for inside the chamber and heater room)							
Safety unit	Self diagnostic function (Temperature sensor error, Heater disconnection, SSR short-circuit, Automatic overheat prevention function), Key lock, Program lock, Overheat preventive device, Over current electric leakage breaker, Door switch, Temperature fuse, External alarm terminal							
Internal dimension	W600×D500×H500mm				W600×D500×H1000mm			
External dimension	W770×D696 (846)×H985 mm * ( ) includes exhaust duct				W770×D696 (846)×H1674 mm * ( ) includes exhaust duct			
Internal capacity	150L				300L			
Withstand load of shelf	15 kg / unit							
No. of internal shelf stages	7 stages				15 stages			
Shelf support pitch	60mm pitch							
Power supply (50/60)Hz	200~220V 13~15A (20A)		230~240V 12~12.5A (15A)		200~220 18.5~20.5A (30A)		230~240V 16.5~17A (20A)	
Weight	100kg				145kg			
Accessories: Shelf	2 pcs.				4 pcs.			
Accessories: Shelf support	4 pcs.				8 pcs.			

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

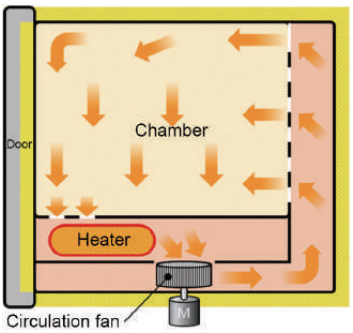
Interior

DKG610

DKG810

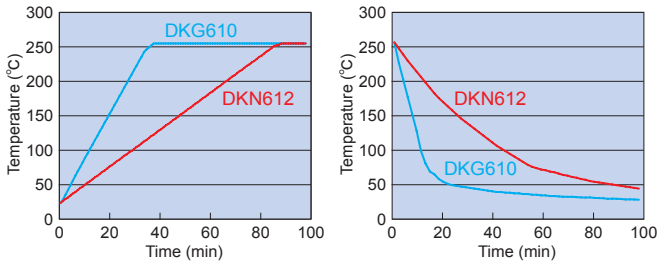
Method

[Side view]

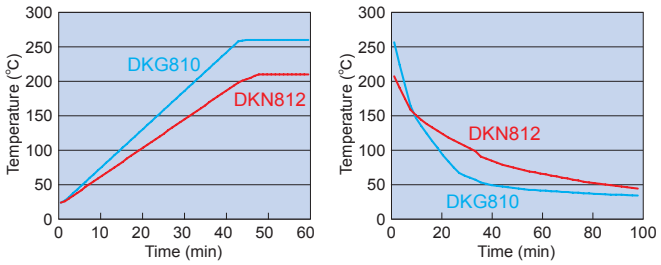


Cable Hole

DKG610 Comparison of temperature increase/ decrease time with conventional products



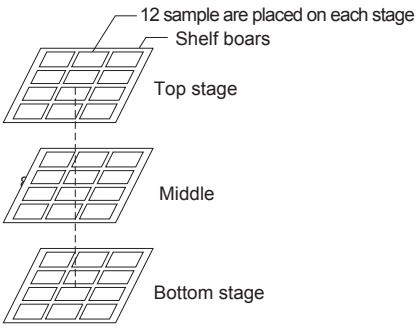
DKG810 Comparison of temperature increase/ decrease time with conventional products



Reference Data of Loaded Conditions

Model	Temp.	Avg. temp. increase time	Distribution width	Avg. temp. increase time
DKG610/650	100°C	23 min.	0.8 (±0.4)°C	21 min.
	150°C	38 min.	1.7 (±0.85)°C	30 min.
DKG810/850	100°C	28 min.	2.6 (±1.3)°C	40 min.
	150°C	51 min.	5.2 (±2.6)°C	55 min.

1. DKG610/650: Install shelves on all stages (7 stages) and place 12 samples on each stage.
   DKG810/850: Install shelves on all stages (15 stages) and place 12 samples on each stage. A sample is a 370g box of folded stainless steel plate (size 145×105×20 mm×thickness 2.0 mm).
2. Measuring points shall be the center and points 15 mm above the centers of the samples at four corners of the middle, top and bottom stages.
3. Increase time shall be the average of the shortest and longest times for the measured time to reach the target temperature +10°C for nine points.
4. Decrease time shall be the average time to cool down from 260°C to 50°C with the damper fully opened for all of nine measured points.
5. Temperature distribution width shall be a value for a stable range after the set temperature is reached and shall be the difference between the highest and the lowest temperatures (highest temperature–lowest temperature / 2) of measured temperatures at nine points.



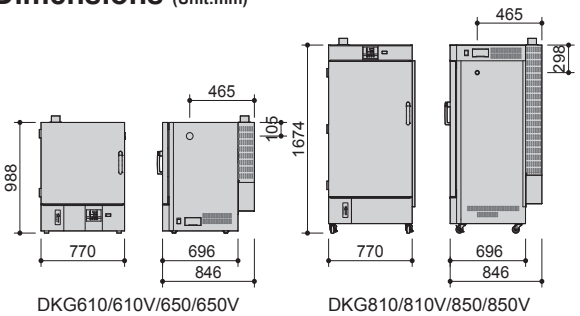
Measuring sensors shall be positioned at 15mm above the centers of the samples at four corners of the middle, top and bottom stages.

Optional Items

Description	Product code
*External alarm terminal/ time-up output terminal (to choose either) In case auto damper is chosen, external alarm terminal will become time-up output terminal. Signal tower is also available upon request.	281561
Stand: ON62 stand for DKG610/610V/650/650V	281540
*I.D.25mm cable port	281558
*I.D.50mm cable port	281559
*Temperature output terminal (4-20 mA)	281560
*External communication function (RS485)	281562
*External communication adapter (RS232C conversion)	281563
*Independent overheat preventive device	281564
*Automatic damper	281565

* Please specify when ordering main unit.

Dimensions (Unit:mm)



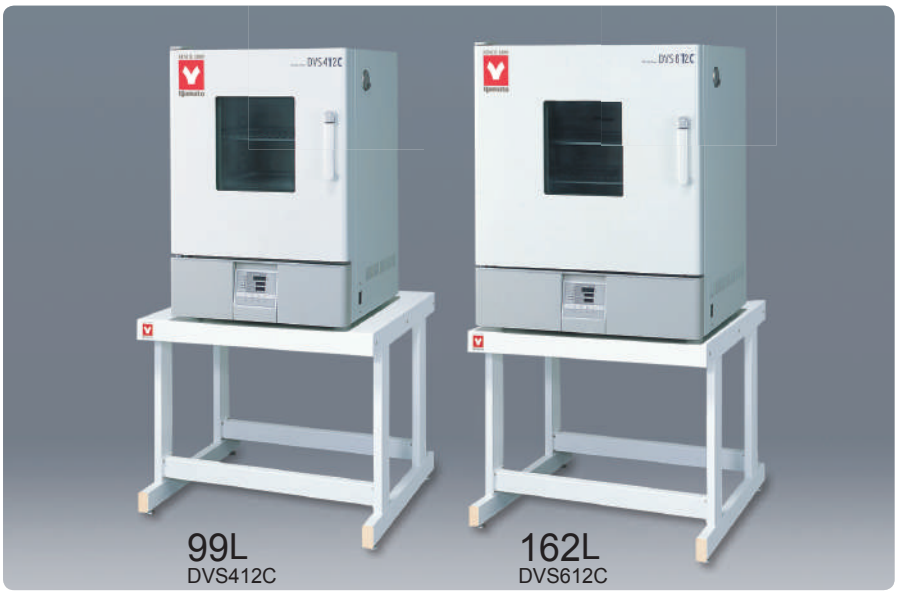
Natural Convection Oven (Programmable) CE

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 DVS402C/412C / 163L DVS602C/612C

Highly practical standard and programmable ovens



(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 con-troller 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

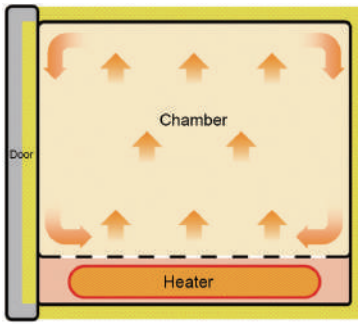
- Self diagnosis functions (Temp. sensor abnormal, Heater disconnection, Internal communication error, temperature input circuit abnormality, Automatic overheat prevention function, SSR-short), Overheat prevention, Electric leakage breaker with over current protection

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	Approx. 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×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	Approx. 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	Approx. 48kg		Approx. 63kg	
Shelf plate / Shelf bracket	Stainless steel, 2 pcs. / 4 pcs.			

Method

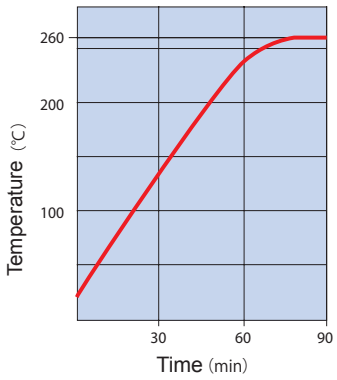
[Side view]



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.
- Punching metal shelves greatly improve the strength.

Temp. Rising Curve

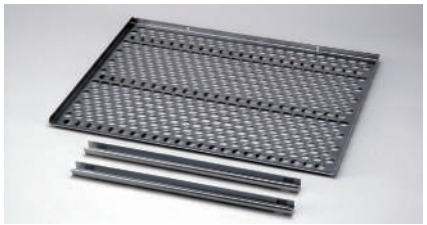


Control Panel

Cable Port (Standard)

Exhaust Port (Standard)

Shelf Plate / Shelf Bracket

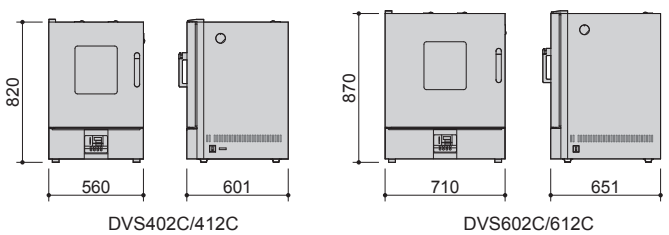


Optional Items

Product name	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
Anti-vibration material with support EPM-08	851352
without support EPM-05	851351
Seismic mat	296902

* Please specify when ordering main unit.

Dimensions (Unit:mm)



Natural Convection Oven

CE

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. distribution accuracy	±10°C	Operation	Economical, low cost

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

(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 / 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	Approx. 45 min (Room temp.~300°C)		Approx. 60 min (Room temp.~300°C)		Approx. 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. ×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 5A	AC115V 14A	AC220V 7A	AC115V 14A	AC220V 7A
Weight	Approx. 23kg		Approx. 38kg		Approx. 56kg	
Accessories	Stainless steel punching metal Shelf plate 2pcs. Shelf bracket 4pcs.					

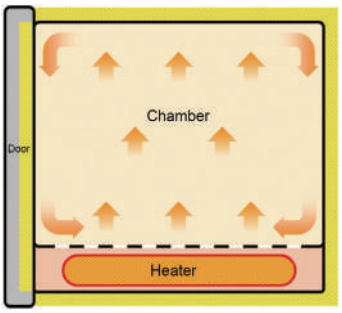
Interior

DX402C

Control Panel

Method

[Side view]

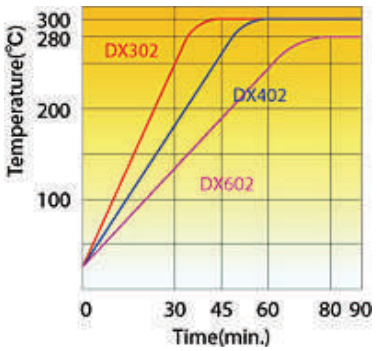


Optional items

Product name	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

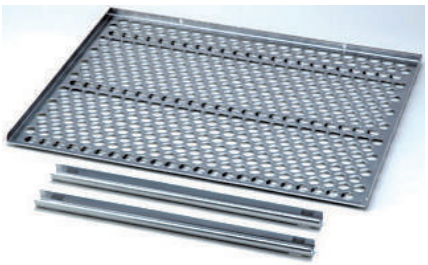
* Please specify with main unit ordering.

Temperature Rising Curve



Optional Items

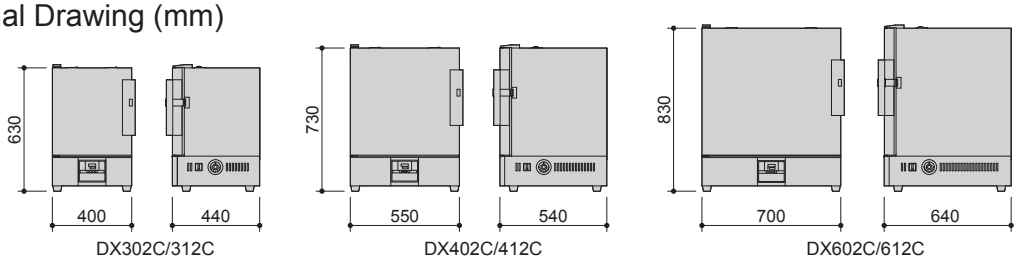
Stand



Shelf (with 2 brackets)

Stacking support

Dimensional Drawing (mm)



Natural Convection Oven

Economical, Basic functions

DY310C/410C/610C

Operating temp. range	RT +5°C~300°C DY310C/410C	RT +5°C~280°C DY610C

Temp. distribution accuracy	±10°C

Internal capacity	28L DY310C	74L DY410C	153L DY610C

Fixed temperature model ensures basic function.

Operation and functions

- Easy operation, available for fixed temp. and auto stop operation.

Safety features

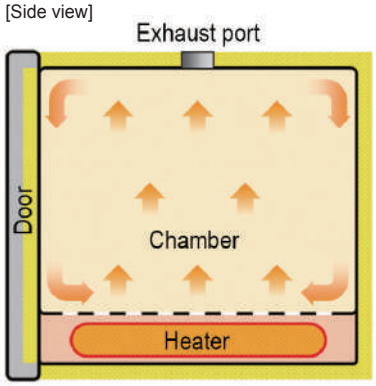
- Self-diagnosis circuit (abnormal temp. input, overheat prevention of upper temp. limit), overcurrent ELB, independent overheat protector.

Specifications

Model		DY310C	DY410C	DY610C
Circulation method		Natural gravity convection		
Operating temp. range		RT+5°C to 300°C		RT+5°C to 280°C
Temp. adjustment accuracy		±1.0 °C (at 300 °C)		±1.0 °C (at 280 °C)
Temp. distribution accuracy		±10 °C (at 300 °C)		±10 °C (at 280 °C)
Max. temp. reaching time		Approx. 45 min.	Approx. 60 min.	Approx. 90 min.
Interior/Exterior material		Stainless steel plate / Cold rolled steel plate with chemical proofing coating		
Insulating material		Rock wool		
Heater		Nichrome wire heater		
		0.9kW	1.36kW	
Exhaust port		I.D. 30mm×2, on top		
Temp. control		PID control		
Temp. setting		Use specialized function menu key and UP/DOWN 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		
Operation function		Fixed temp. operation, Auto stop operation		
Additional functions		Deviation correction, Parameter lock		
Heater circuit control		SSR driving		
Sensor		Temp. controller: Pt100 thermal resistance, Overheat protection: Liquid-expansion temp. controller		
Safety device		Self-diagnosis (Abnormal temp. sensing, Overheat prevention of upper temp. limit), Parameter lock, Independent overheat protector, Overcurrent ELB		
Internal dimensions (W×D×Hmm)		300×310×300	450×410×400	600×510×500
External dimensions (W×D×Hmm)		400×440×630	550×540×730	700×640×830
Internal capacity		28L	74L	153L
Shelf plate with standard load		Approx. 15kg/pcs.		
Shelf rest step number / Shelf rest pitch		6 steps / 35mm	9 steps / 35mm	12 steps / 35mm
Power supply (50/60Hz) rated current		AC220V 5A	AC220V 7A	AC220V 7A
Weight		Approx. 23kg	Approx. 38kg	Approx. 56kg
Shelf plate		Stainless punching metal		
Shelf plate / bracket		2 pcs. / 4 pcs.		
Optional	Stand	ONS30C	ONS60C	
	Stacking clamp	ODK80C	ODK82C	ODK84C
	Others	Shelf plate (1 plate with 2 rests), cable hole (30/50mm)		

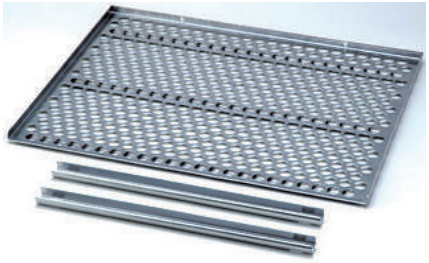
Method

[Side view]



Optional Items

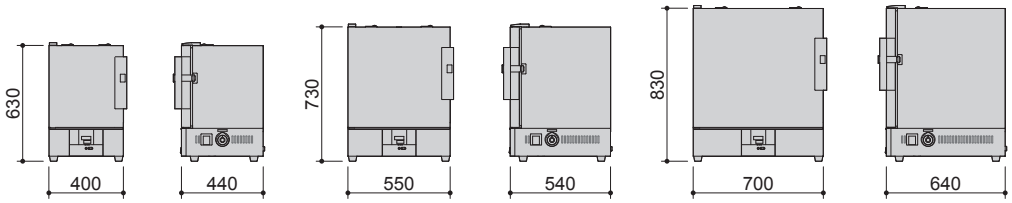
Stand



Shelf (with 2 brackets)

Stacking support

Dimensional Drawing (mm)



Inert Oven

Suitable for No Oxidation Environment

DN411I/611I

Operating temp. range	Room temp. +15°C~360°C

Temp. gradient	12°C(at 360°C) 411I	20°C(at 360°C) 611I

Internal capacity	95L DN411I	223L DN611I

Suitable for Curing Process in No Oxidation Environment

- Suitable for heat insulation test and curing process up to 360°C.
- Simple operation by interactive key input.
- Operation monitor visualizes controller status, temp and temp. changing.
- Incorporates with maximum 99 steps, 99 patterns program controller with repeat function.
- Loaded with total operation hours timer.
- N_2 gas flow amount controllable.

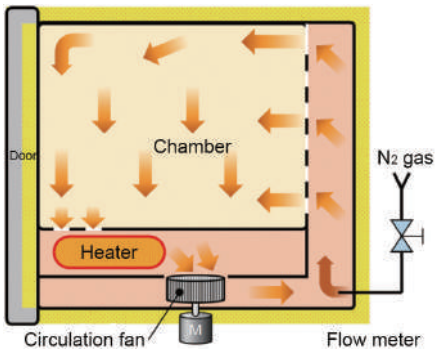
Specifications

Model	DN411I	DN611I
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	Approx. 60 min.	
Nitrogen substitution time required	Approx. 30 min. (ordinary temp with nitrogen concentration of 2%)	Approx. 70 min. (ordinary temp with nitrogen concentration of 2%)
Interior	Stainless steel plate	
Exterior	Cold rolled steel plate with baked melamine resin coating	
Heat insulator	Glass wool + Ceramic fiber	
Heater	Stainless pipe heater 3.0kW	Stainless 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×D450×H450mm	W620×D600×H600mm
External dimensions	W640×D695×H915mm	W790×D845×H1065mm
Internal capacity	95L	223L
Shelf max. load	Approx. 30kg / shelf	
Shelf support qty. / Pitch	12pcs. / 30mm	17pcs. / 30mm
Power source	Single phase 220V 13.5A	Single phase 220V 18A
Weight	Approx. 90kg	Approx. 130kg
Shelf plate / bracket	Stainless wire, 2 pcs. / 4 pcs.	

* N_2 introduction rate 20L/min.

Method

[Side view]



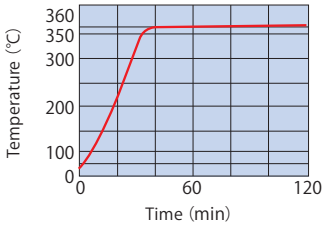
Control Panel

Overheat Prevention Device

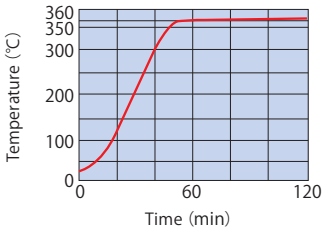
N_2 Gas Entrance Port (ø9mm)

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

DN411I

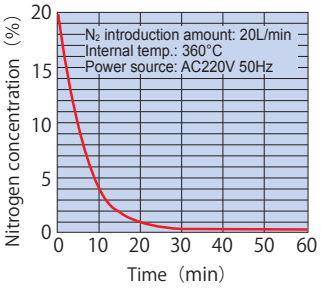


DN611I

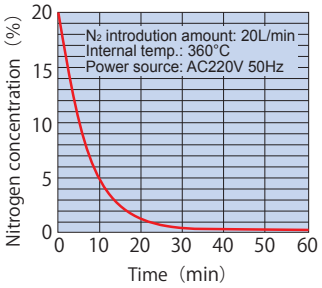


N_2 Gas Substitution Performance Curve

DN411I



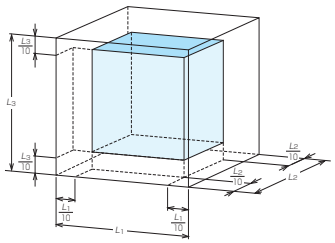
DN611I



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
DN411I	359	358	363	361	359	359	359	356	359
DN611I	361	357	362	357	359	355	350	350	357

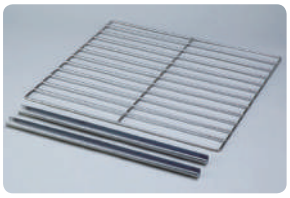


Conditions
1. Measured by 9 points including 1/10 distance to the the opposite wall and center measuring point according to internal dimensions.
2. Room temperature 23°C, AC220V, 50Hz, Setting at 360°C, Average temp. during stable state.
3. No load, 2 shelf plates installed.

Optional Items

Product name		Product code
Stand OH41(for DN411I)		212477
OH61(for DN611I)		212478
Shelf (with support 2 pcs.)		
Stainless wire (loading up to 30 kg/shelf)	ODQ 10 for DN411I	211063
	ODQ 20 for DN611I	211064
Stainless punching metal (loading up to 15kg/shelf)	ODQ 30 for DN411I	211098
	ODQ 40 for DN611I	211099
External communication adapter set OIN90		211880
Additional cable port, 25mm dia		281056
Additional cable port, 50mm dia		281057
External communication terminal ODH16		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

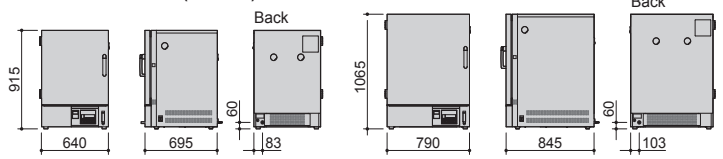
* Please specify when ordering main unit.



Stainless wire
(Weight tolerance 30kg/pc)

Stainless punching metal
(Weight tolerance 15kg/pc)

Dimensions (Unit:mm)



DN411I
N_2 Gas inlet : O.D. 9mm hose nipple
DN611I
N_2 Gas inlet : O.D. 9mm hose nipple

Interior

Stand (Optional Item)

DN611I+ Stand (Optional Item)

Fine Oven (with Explosion Vent)

Anti-explosion

DF411SC/611SC, DH411SC/611SC

Operating temp. range	RT +10°C~260°C DF411SC/611SC	RT +10°C~360°C DH411SC/611SC

Temp. distribution accuracy	±2.5°C(at 260°C) DF411SC/611SC	±3°C(at 360°C) DH411SC/611SC

Internal capacity	91L 411SC	216L 611SC

Special constant temp. oven conducting thermal treatment under oxygen-free environment.

Features

- Configured with pressure relief safety valve (explosion port) and firm interlock knob fixing unit body and door.
- Interlock functions:
  ①Through the door lock mechanism, device runs while door is locked.
  ②Through the explosion detector (set on top), operation stops when activated.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Exhaust damper allows quick exhaust and cooling of inside chamber.

Safety Features

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

216L
DH611SC

Specifications

Model		DF411SC	DF611SC	DH411SC	DH611SC
Circulation method		Forced convection and ventilation			
Operating temp. range		RT+10°C to 260°C		RT+10°C to 360°C	
Temp. adjustment accuracy		±0.1°C (at 260°C)		±0.2°C (at 360°C)	
Temp. distribution accuracy		±2.5 °C (at 260 °C)		±3°C (at 360°C)	
Max. temp. reaching time		Approx. 30 min. (to 260°C)		Approx. 80 min. (to 360°C)	
Interior/Exterior material		Stainless steel plate / Cold rolled steel plate with chemical proofing coating			
Insulating material		Glass fiber		Rock wool	
Heater		Stainless pipe heater with fin			
		2.1kW	3.0kW	2.7kW	3.75kW
Fan / motor		Axial flow fan, motor 20W×1			
Cable hole		I.D. 30mm (at back)			
Additional mechanism		Pressure relief safety valve (explosion port), Exhaust damper (manual)			
Temp. control		3 segments PID			
Temp. setting		Use specialized function menu key and UP/DOWN 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 (Awith time wait function)			
Operation function		Fixed temp. operation, Auto start, Auto stop, Program operation			
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)			
Additional functions		Deviation correction, Key lock, Power outage compensation			
Heater circuit control		SSR driving			
Sensor		K thermocouple (Temp. controller and overheat protector)			
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock			
Internal dimensions (W×D×Hmm)		450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (W×D×Hmm)		1,050×630×850	1,200×780×1,000	1,050×630×850	1,200×780×1,000
Internal capacity		91L	216L	91L	216L
Shelf plate with standard load		~30kg/pcs.			
Shelf rest step number / Shelf rest pitch		9 steps / 45mm	9 steps / 60mm	9 steps / 45mm	9 steps / 60mm
Power supply (50/60Hz) rated current		AC220V 10A	AC220V 14A	AC220V 13A	AC220V 17.5A
Weight		Approx. 78kg	Approx. 109kg	Approx. 78kg	Approx. 109kg
Shelf plate		Stainless steel wire screen plate			
Shelf plate / bracket		2 pcs. / 4 pcs.	3 pcs. / 6 pcs.	2 pcs. / 4 pcs.	3 pcs. / 6 pcs.
Optional	Stand	OP42C	OP62C	OP42C	OP62C
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30 / 50mm), Recorder, indicator lamp (Stand-by / Running / Malfunction), Observation window, External communication (RS485), Temp. output terminal (4~20mA), Output terminal for alarm device, Time up output terminal			

Fine Oven (with Explosion Vent)

Anti-explosion

DF412S/612S, DH412S/612S

Operating temp. range	RT +10°C~260°C DF412S/612S	RT +10°C~360°C DH412S/612S

Temp. gradient	10°C(at 260°C) DF412S/612S	12°C(at 360°C) DH412S/612S

Internal capacity	91L 412S	216L 612S

Fine oven with explosion preventive vent door.

- Equipped with safety door to relieve an explosion pressure (explosion preventive vent door) and an interlock door knob to reliably secure main unit and door.
- The product is integrated with the following interlock functions:
  ①Through the door lock mechanism, device runs while door is locked.
  ②Through the explosion detector (set on top), operation stops when activated.
- Standard functions include program operation and other high precision functions.
- Improved safety functions include self diagnostic, automatic overheat prevention and key lock.

Specifications

Model		DF412S	DF612S	DH412S	DH612S
Circulation method		Forced convection and ventilation			
Operating temp. range		RT+10°C to 260°C		RT+10°C to 360°C	
Temp. gradient (JIS)		10°C (at 260 °C)		±12°C (at 360 °C)	
Temperature control		PID control with a micro computer			
Operation & control		Fixed temp., Auto-start, Auto-stop, Quick auto stop, program (Max.99 steps, 99 patterns, repeat)			
Additional functions		Calendar timer (max. 24hrs.), Integration time (max. 65535hrs.), Clock, calibration off-set, Display the amount of power consumption/CO2 discharge / Heater operation amount, Power failure recovery mode, User setting information save and recall, Wind velocity changeable function			
Temp. sensor		K-thermocouple (double sensor)			
Heater		Stainless steel pipe heater with a fan			
Heater capacity		2.1kW	3.0kW	2.7kW	3.75kW
Fan		Axial fan (Condenser motor: 20W)			
Cable port		I.D. 30mm (rear panel)			
Heat insulator		Glass wool		Ceramic fiber	
Additional mechanism		Explosion preventive vent door			
Safety functions		Self diagnosis functions(Sensor, Fan, heater, Relay, Triac, Automatic overheat prevention), Independent overheat prevention, Key lock function, Electric leakage breaker, Door switch			
Internal dimensions (W×D×Hmm)		450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (W×D×Hmm)		1,050×620×1,240	1,200×780×1,400	1,050×620×1,240	1,200×780×1,400
Internal capacity		91L	216L	91L	216L
Weight		Approx. 130kg	Approx. 170kg	Approx. 130kg	Approx. 170kg
Power supply (50/60Hz)		AC220V Single phase			
Accessories	Shelf	Stainless wire			
		2pcs.	3pcs.	2pcs.	3pcs.
	Shelf peg	4pcs.	6pcs.	4pcs.	6pcs.

Optional Items

Product name	Product code
Shelf set for DF/DH412S	211063
Shelf set for DF/DH612S	211064

Glassware Drying Oven

Natural Convection Ovens for Glassware Drying / Forced Exhaust (DG450C/850C)

DG410C/450C/810C/850C

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

Internal capacity	92L DG410C/450C	445L DG810C/850C

Easy operation and highly acclaimed Glassware drying oven.

(Stand optional)

Features

- Large observation 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 (DG810C/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.
- DG850 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-diagnosis circuit (abnormal temp. input), power outage compensation, deviation correction, overcurrent ELB, independent overheat protector, etc.

Specifications

Model		DG410C	DG450C	DG810C	DG850C
System		Natural convection			
Operating temp. range		RT+5~70°C			
Interior material		Stainless steel			
Exterior		Cold rolled steel plate with chemical proofing coating			
Heater		Stainless steel pipe heater			
		1KW		1.34KW	
Observation window (W×Hmm)		250×300		250×700	
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	–	15W×1
Temp. control		PID control			
Temp. setting		Use specialized function menu key and UP/DOWN 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 (Attached with timing wait function)			
Operation function		Fixed temp., Quick auto stop, Auto start, Auto stop operation			
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			
Safety device		Self-diagnosis (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	
Shelf plate with standard load		15kg / piece			
Shelf plate steps/Shelf rest pitch		10 steps / 30mm		29 steps / 30mm	
Power supply (50/60Hz) rated current		AC220V 5A		AC220V 7A	
Weight		Approx. 45kg	Approx. 48kg	Approx. 78kg	Approx. 83kg
Shelf plate		Stainless punching metal			
Shelf rest		2 pcs		4 pcs	
Shelf bracket		4 pcs		8 pcs	
Water pan		1 pc			
Optional	Stand	ON61C		–	
	Others	Shelf plate (1 plate with 2 rests)			

Interior (DG850C)

Equipped with exhaust axial flow fan

Control Panel

DG410C/450C

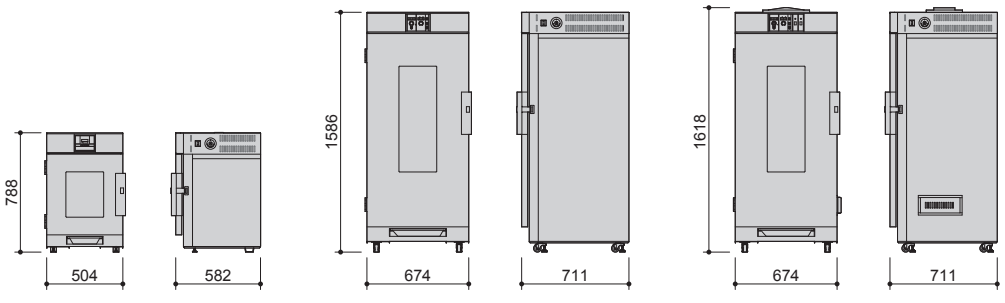
DG810C/850C

Water Pan (sliding type)

Germicidal lamp (DG850C)

Air In-take Filter (DG850C)

Dimensions (Unit:mm)



Fail-safe Drying Oven

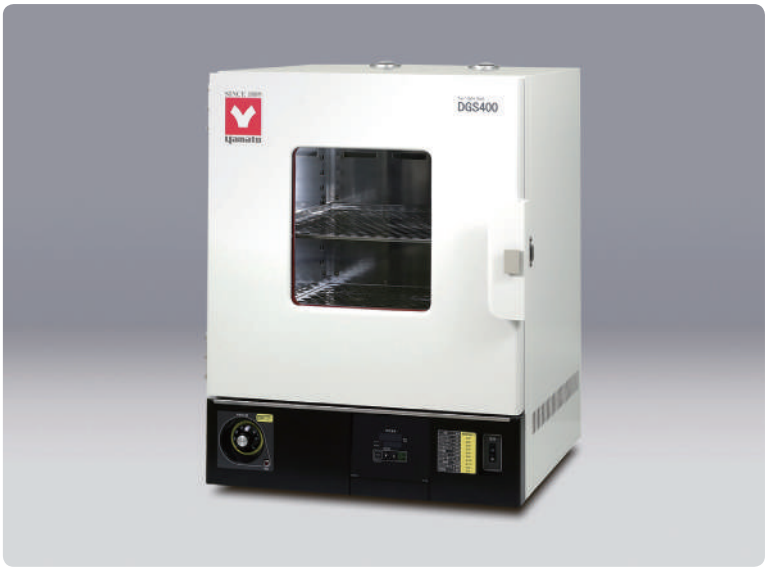
Natural Convection Oven for Glassware Drying

DGS400

Operating temp. range: Room temp. +5~110°C

Internal capacity: 93L

- By limiting the temperature control range to 110°C, which is sufficient for drying laboratory tools, it prevents inadvertent errors such as incorrect operation leading to high temperature.
- Large observation window makes it easy to confirm the condition inside the chamber.
- Independent overheating prevention device located in front of the oven for easy set up and condition confirmation.



Incorrect usage example

Overloaded sample

Sample placed directly on the bottom shelf

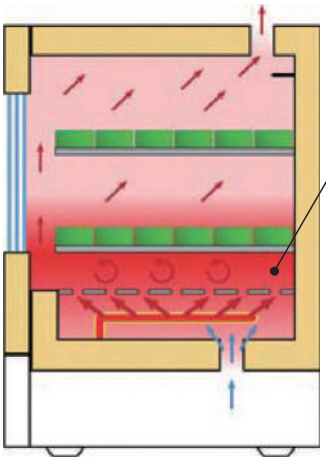
Specifications

Product code	211919
Model	**DGS400**
Method	Natural convection
Ambient temperature range	5 ～ 35°C
Operating temperature range	Room temp. +5～110°C
Exterior material	Cold rolled steel plate with melamine resin baked finish
Interior material	Stainless steel
Heat insulating material	Glass wool
Observation window	Tempered glass 250×280Hmm
Heater	SUS pipe heater 600W
Exhaust port	I.D φ30mm×2 with lid (top)
Temp. controller	PID control by microprocessor
Temp. setting method	Digital setting by UP/DOWN Key
Operation function	Fixed temperature, Auto start, Auto stop, Quick auto stop
Timer	1 min to 99 hrs. 59 min and 100 hrs. to 999 hrs. 50 min
Sensor	K-thermocouple
Additional functions	Key lock, Power failure return mode, Calibration offset function.
Safety Device	Self diagnosis functions (Temp. sensor abnormal, Memory abnormal, Automatic overheating prevention, Measured temp. abnormal)
	Maintenance functions (Overcurrent leakage breaker, Independent overheat prevention device (thermostat)
External dimensions (W×D×Hmm)	560×565×755
Internal dimensions (W×D×Hmm)	460×460×450
Effective dimensions (W×D×Hmm)	430×460×395
Internal capacity	Approx. 93L
Weight	Approx. 45kg
Power source (50/60Hz)	AC115V / 220V Single phase with step-down transformer
Accessories	Shelf plate×1pc / Shelf bracket×1set

Interior

Safety point 1:Prevent abnormal overheating by fail safe structure

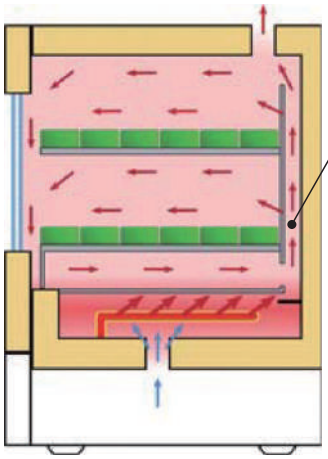
General Oven overloaded



If samples are overloaded on the column shelf, bottom part will overheat.

Resin equipment and relevant materials will melt. This is a major cause of ignition-related accidents.

Fail safe Oven



Air duct is equipped to produce upward airflow even if samples are overstuffed to prevent abnormal overheating.

Safety point 2:Fool proof design

The bottom shelf is firmly fixed and specially designed to protect the samples.

Removing it and placing samples directly at the bottom can cause burnout accidents.

Eliminating the ventilation hole on the bottom plate may prevent resin from melting and dropping directly to the heater.

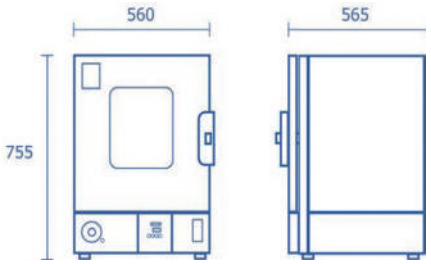
Optional Items

	Description	Model	Product code
①	Stand	ON61	211856
②	Stacking support	OD40	212822
③	Shelf (1pc・shelf bracket 2pcs)	–	212246

① Stand ON61

② Stacking support OD40

Dimensions (Unit:mm)



Clean Oven (with Heat-resistant HEPA)

Class 100, Compact

DT300/300H

Operating temp. range	RT +20°C~300°C

Temp. distribution accuracy	±4.0°C (at 200/300°C) DT300	±3.0°C (at 300°C) DT300H

Internal capacity	27L

Compact, high-performance clean ovens

DT300 with N_2 gas injection unit and Stand (with caster)

DT300H with N_2 gas injection unit and Exhaust valve (manual)

- DT300 maintains Class 100 cleanliness at a stable temperature of 300°C.
- DT300H maintains Class 100 cleanliness in all heating conditions (stable, increase, decrease).
- Program operation (Max.99 steps, 99 patterns, repeat operation) is available.
- Safety measures are enriched, including self-diagnosis function and an independent overheating prevention device.

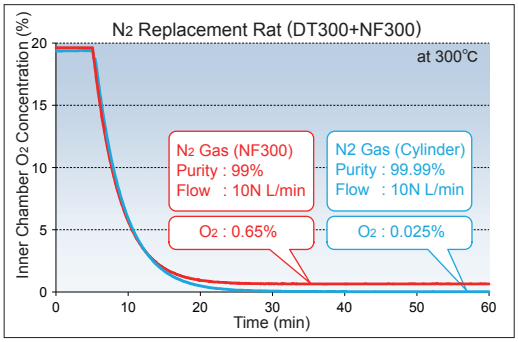
Control Panel

Specifications

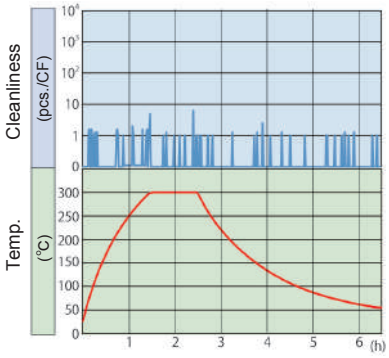
Model		DT300	DT300H
Circulation method		Forced air circulation	
Operating temp. range		Room temp. +20°C to 300°C	
Temp. control accuracy (JTM K05)		±0.3°C (at 300°C)	
Temp. fluctuation (JIS)		±0.5°C (at 100 / 200°C) , ±1.0°C (at 300°C)	
Temp. distribution accuracy (JTM K05)		±2.0°C (at 100°C) ±4.0°C (at 200 / 300°C)	±1.5°C (at 100°C) ±2.5°C(at 200°C) ±3.0°C (at 300°C)
Temp. gradient (JIS)		5°C (at 100°C) 10°C (at 200°C) 12°C (at 300°C)	3°C (at 100°C) 5°C(at 200°C) 7°C (at 300°C)
Max. temp. reaching time		Approx. 150 min.	
Clean level		Class 100 (when the temp. is stable)	Class 100 (constantly)
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	
Fan type		Sirocco fan, Condenser type motor 30W	
Differential pressure meter		Indicator type (tricolor)	
Cable port		33 mm I.D. (right side)	
Air in-take port		33 mm I.D. (right side)	
Exhaust port		16 mm I.D. (R1/2, top side)	
Filter		Heat resistant HEPA filter	High performance HEPA filter
		(dust collect : more than 99.97% at 0.3μm)	
Temp. controller		PID control by micro processor	
Temp. setting method		Digital setting with UP/DOWN key	
Temp display method		Digital display	
Other display		Operation monitor (operation condition graphic display by LED patterns)	
Timer		1 min. to 99 Hrs. 59 min	
Operation function		Fixed temp., Auto-start, Auto-stop, Quick auto stop, program (Max.99 steps, 99 patterns, repeat)	
Additional functions		Calendar timer (max. 24 hrs.), Integration time (max. 65535hrs.), Clock, Calibration off-set, Display the amount of Power consumption / CO_2 discharge / Heater operation amount, Power failure recovery mode, User setting information save and recall	
Heater circuit control		Triac zero-cross control	
Temp. sensor		K-thermocouple (double sensor)	
Safety device		Self diagnosis functions (Sensor, Fan, Heater, Relay, Triac, Automatic overheat prevention), Independent overheat prevention, Key lock function, Electric leakage breaker, Door switch	
Internal dimensions		W300×D300×H300mm	
External dimensions		W500×D720×H840mm	
Internal capacity		27 L	
Shelf loading		Approx. 15 kg / pc	
Shelf support Qty. / Pitch		6 steps / 30mm	
Power source (50/60Hz,)		Single-phase, AC100V, 13A (15A)	
Weight		Approx. 87 kg	Approx. 86 kg
Accessories	Shelf plate	Stainless wire shelf	
	Shelf / Shelf support	2 pcs / 4 pcs	

*1 Conditions: temperature and humidity: 23°C±5°C, 65%RH±20% (no load)
*2 Do not include protrusions.

Example of installing with N_2 Gas Generator, Model: NF300

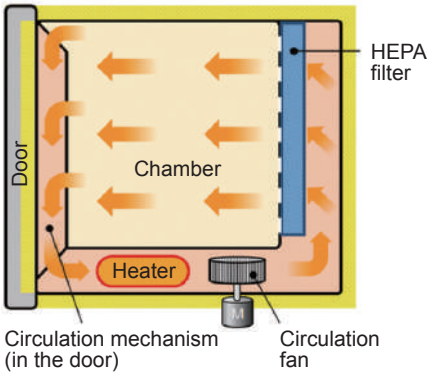


Performance Curve



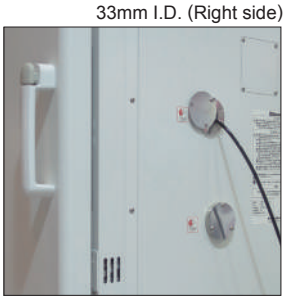
Method

[Side view]



Cable Port

33mm I.D. (Right side)



Interior

Optional Items

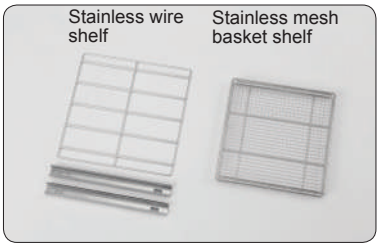
Description	Option Model	Product Code
Stand	ODE16	213430
Stand with caster	ODE18	213431
Stacking Support	ODE20	213432
Fixing Support	ODE22	213433
Stainless wire shelf (with support 2 pcs., loading up to 15 kg/shelf)	ODE24	213434
Stainless mesh basket shelf (loading up to 15kg/shelf)	ODE26	213435
*Exhaust valve (manual)	ODE28	213436
*N_2 Gas injection unit	ODE30	213437
*Exhaust port for clean room (O.D. 80mm, duct is not included)	ODE32	213438
Additional Sensor (sheath sensor)	ODT48	212946
Silicon Plug (with one hole)	ODT52	212947
*External Communication Terminal (RS485)	ODE34	213439
External Communication Adapter Set	OIN90	211880
*Temperature Output Terminal (0-20mA)	ODE36	213440
*External Alarm Output Terminal	ODE38	213441
*Time-up Output Terminal	ODE40	213442
*Operation Signal Output Terminal	ODE42	213443
*Event Output Terminal	ODE44	213444

*Please specify when ordering main unit.

Stacking support and Stand with caster

Stand

Shelf (with 2 support)



Clean Oven

Class 100

DE430C/630C, DT430C/630C, DE430UC/630UC

Operating temp. range	RT +30~260°C DE	RT +30~360°C DT	RT +50~200°C DE-U
Clean class	class 100 (constant temp.) DE/DT	class 100 (full course) DE-U	
Internal capacity	91L 430C/430UC	216L 630C/630UC	

Class 100 clean and fine constant temperature ovens that can suppress dust at constant and changing temperatures.

Suitable for the constant temp. test of semi-conductor, LCD, electronic products and precision instruments in a dustfree environment.

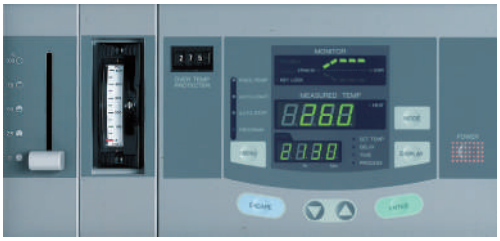
- Equipped with high temp. heat resistant HEPA filters and designed with horizontal circulation mode.
- Class 100 cleanliness is achieved for DE/DT models at constant temperature while DE-U models at full course.
- Suitable height for placing or taking samples, prevent the dust from blowing into the chamber during door opening and closing.
- N_2 flowmeter is used to introduce nitrogen and set the flow.
- Self-diagnosis function (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Specifications

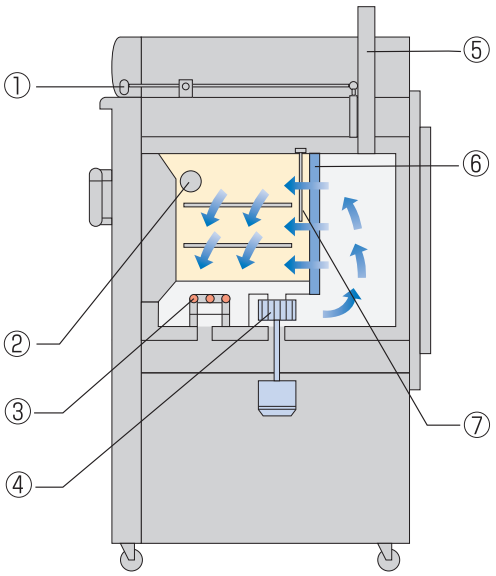
Model	DE430C	DE630C	DT430C	DT630C	DE430UC	DE630UC
System	Forced convection					
Operating temp. range	RT+30~260°C		RT+30~360°C		RT+50~200°C	
Temp. control accuracy	±0.3°C (at 260°C)		±0.3°C (at 360°C)		±0.3°C (at 200°C)	
Temp. distribution accuracy	±2.5°C (at 260°C)		±4°C (at 360°C)		±4°C (at 200°C)	
Max. temp. reaching time	Approx. 70min	Approx. 60min (to 260°C)	Approx. 80min		Approx. 60min	
Clean class	Keep class 100 at constant temp.				Keep class 100 at constant temp., temp. rising or cooling down	
Interior / Exterior	Stainless steel plate / Cold rolled steel plate with chemical proofing coating					
Insulating material	Glass fiber		Aluminume silicate wool		Glass fiber	
Heater	Stainless steel pipe heater					
	2.5KW	3.6KW		5.2KW	2.5KW	3.6KW
Blow fan / motor	Centrifugal fan, High-temp. self-cooling motor 370W					
Differential pressure gauge	Analog 0~500Pa					
Cable hole	I.D. 30mm (1 on the right side)					
Additional mechanism	Exhaust damper (manual) O.D.61mm					
HEPA filter	Dust collection efficiency: 0.3μm particle 99.97% or more				Dust collection efficiency: 0.1~0.2μm particle 99.999% or more	
N2 introduction port	O.D.8mm pagoda connector					
Temp. control	3 segments PID					
Temp. setting	Use specialized function menu key and UP/DOWN 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 (attached with timing wait function)					
Operation function	Fixed temp. operation, Auto start, Auto stop, Program operation					
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)					
Additional functions	Deviation correction, Key lock, Power outage compensation					
Sensor	K thermocouple (Temp. controller and overheat protector)					
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock					
Internal dimensions (W×D×Hmm)	450×450×450	600×600×600	450×450×450	600×600×600	450×450×450	600×600×600
External dimensions (W×D×Hmm)	700×1000×1765	850×1150×1765	700×1000×1765	850×1150×1765	700×1000×1765	850×1150×1765
Internal capacity	91L	216L	91L	216L	91L	216L
Shelf plate with standard load	30kg / piece					
Shelf plate steps/Shelf rest pitch	12 steps / 30mm	17 steps / 30mm	12 steps / 30mm	17 steps / 30mm	12 steps / 30mm	17 steps / 30mm
Power supply (50/60Hz) rated current	3 Phase AC380V 5A	3 Phase AC380V 6.5A		3 Phase AC380V 8.5A	3 Phase AC380V 5A	3 Phase AC380V 6.5A
Weight	Approx. 220kg	Approx. 270kg	Approx. 220kg	Approx. 270kg	Approx. 220kg	Approx. 270kg
Shelf plate	Stainless steel wire screen plate					
Shelf rest	2 pcs	3 pcs	2 pcs	3 pcs	2 pcs	3 pcs
Shelf bracket	4 pcs	6 pcs	4 pcs	6 pcs	4 pcs	6 pcs
Optional	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, indicator lamp (Stand-by/running/malfunction), Observation window, External communication (RS485), temp. Output terminal (4-20mA), Output terminal for alarm device, Time up output terminal					

Interior

Control panel

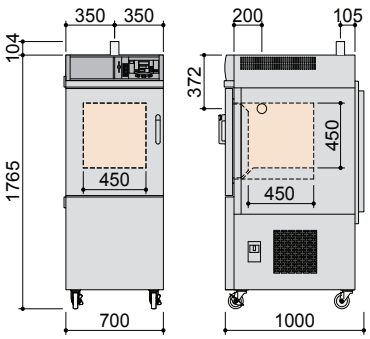


Structure diagram

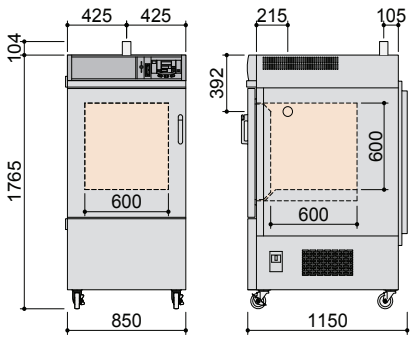


①Exhaust damper (manual), Auto damper (optional)
② Cable hole
③ Heater
④ Sirocco fan
⑤Air exhaust port
⑥ HEPA filter
⑦Sensor

Dimensions (Unit:mm)



DE430C/DT430C/DE430UC



DE630C/DT630C/DE630UC

Clean Oven

Class 100

DE411/611, DT411/611

Operating temp. range	RT +30~260°C DE411/611	RT +30~360°C DT411/611

Internal capacity	91L DE/DT411	216L DE/DT611

Clean oven suitable for temperature test in dust-free environment.

V-type controller improves the display visibility and operability of the operation panel, with Power consumption / CO_2 discharge monitor functioning as standard.

- Adoption of anti-fouling caster (preventing wheel contamination during transportation)
- Improvement of visibility of HEPA filter replacement timing by three color indication.
- Improvement of safety by phase-reversal relay, detecting of incorrectwiring of power supply when installing.
- Cable diameter changed from 30mm I.D to 33mm I.D when compare withconventional equipments.
- More options when compare with conventional equipments.

Specifications

Model		DE411	DE611	DT411	DT611
Circulation method		Forced air circulation			
Operating temperature range		Room temperature +30~260°C		Room temperature +30~360°C	
Max. temp. reaching time		Approx. 70 min.		Approx. 80 min.	
Temp. adjustment accuracy		±0.3°C (at 260°C) JTM K05		±0.3°C (at 360°C) JTM K05	
Temp. fluctuation		±0.5°C (at 260°C) JIS		±0.5°C (at 360°C) JIS	
Temp. distribution accuracy		±2.5°C (at 260°C) JTM K05		±4.0°C (at 360°C) JTM K05	
Temp. gradient		±10°C(at 260°C) JIS		±20°C (at 360°C) JIS	
Clean level		Class 100 (when the temperature is stable)			
Interior / Exterior material		Stainless steel / Cold rolled steel plate with melamine resin baking finish			
Heat insulating material		Glass wool			
Heater		Stainless pipe heater			
Fan type		Sirocco fan, Condenser type motor			
Differential pressure meter		Analog type (0~300 Pa)			
Cable hole / Exhaust port		33mm I.D. ×1 / 61mm O.D.×1			
Filter		Heat resistant HEPA filter (dust collect : more than 99.97% at 0.3μm)			
Caster		Wheel Dia. 50mm anti-fouling caster			
Temp. controller		PID control by micro processor			
Temp. setting method		Digital setting with UP/DOWN key			
Temp display method		Digital display			
Other display		Operation monitor (operation condition graphic display by LED patterns)			
Timer		1 min. to 99 Hrs. 59 min			
Operation function		Fixed temp., Auto-start, Auto-stop, Quick auto stop, program (Max.99 steps, 99 patterns, repeat)			
Additional functions		Calendar timer (max. 24 Hrs.), Calibration off-set function, Integration time (max. 65535Hrs.), Display the amount of power consumption/CO2 discharge/Heater operation amount, Power failure recovery mode, User setting information save and recall			
Heater circuit control		Triac zero-cross control			
Temp. sensor		K-thermocouple (double sensor)			
Safety countermeasures		Self diagnosis functions (Sensor, Fan, Heater, Relay, Triac, Automatic overheat prevention), Independent overheat prevention, Key lock function, Electric leakage breaker, Door switch, Reverse phase protection			
Internal dimensions		W450×D450×H450mm	W600×D600×H600mm	W450×D450×H450mm	W450×D450×H450mm
External dimensions		W700×D1,025×H1,570mm	W850×D1,175×H1,720mm	W700×D1,025×H1,570mm	W850×D1,175×H1,720mm
Internal capacity		91L	216L	91L	216L
Shelf rest step number		12 steps	17 steps	12 steps	17 steps
Power source (50/60Hz)		AC220 / 380V Three-phase			
Weight		Approx. 200 kg	Approx. 270 kg	Approx. 200 kg	Approx. 270 kg
Accessories	Shelf plate	Stainless steel, 2 pcs	Stainless steel, 3 pcs	Stainless steel, 2 pcs	Stainless steel, 3 pcs
	Shelf support	4 pcs	6 pcs	4 pcs	6 pcs

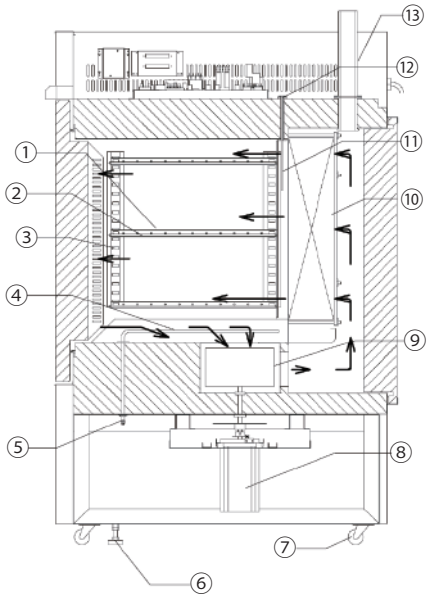
Control Panel

Digital Recorder (Optional)

Interior

DE411

Structure diagram



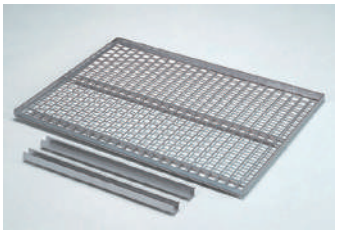
①Rsck support ②Chanber rack ③Suport post
④Heater ⑤Heater terminal ⑥Leveling foot
⑦Caster ⑧Fan motor ⑨Sirocco fan ⑩HEPA filter
⑪Temp. control sensor
⑫Flange for temp. control sensor ⑬Exhaust port

Optional Items

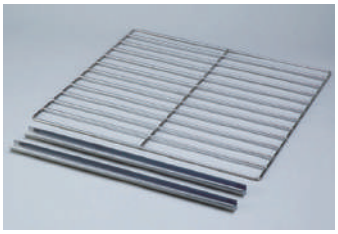
Description	Option Model No.	Main Unit Model No.	Product Code
Stainless wire shelf (with support 2 pcs., loading up to 30 kg/shelf)		DE/DT411	212686
Stainless wire shelf (with support 2 pcs., loading up to 30 kg/shelf)		DE/DT611	212687
Stainless punching metal shelf (loading up to 15kg/shelf)		DE/DT411	212688
Stainless punching metal shelf (loading up to 15kg/shelf)		DE/DT611	212689
Stainless mesh basket shelf (loading up to 15kg/shelf)	ODT12	DE/DT411	212924
Stainless mesh basket shelf (loading up to 15kg/shelf)	ODT14	DE/DT611	212925
Additional temp. sensor (K thermocouple)	ODT48	All models	212946
Silicone stopper (with 1 hole)	ODT52	All models	212947
*Exhaust port for clean room (O.D. 80mm, duct is not included)	ODT16	DE/DT411	212926
*Exhaust port for clean room (O.D. 80mm, duct is not included)	ODT18	DE/DT611	212927
*Automatic damper	ODT22	DE/DT411	212928
*Automatic damper	ODT24	DE/DT611	212929
*N_2 gas injection unit 50L/min	ODT26	DE/DT411	212930
*N_2 gas injection unit 50L/min	ODT28	DE/DT611	212931
*Emergency stop switch	ODT32	DE/DT411	212935
*Emergency stop switch	ODT34	DE611	212936
*Emergency stop switch	ODT36	DT611	212937
*Digital recorder, 6 points, sensors are not included	ODT38	DE/DT411	212938
*Digital recorder, 6 points, sensors are not included	ODT42	DE/DT611	212939
*High performance HEPA filter, class 100 in all heating conditions max temp: 200°C	ODT68	DE411	212954
*High performance HEPA filter, class 100 in all heating conditions max temp: 200°C	ODT70	DE611	212955
*Power cord change, 10m	ODT44	All models	212940
*External communication terminal (RS485)	ODT54	All models	212948
External communication adapter set	OIN90	All models	211880
*Temperature output terminal (4-20mA)	ODT56	All models	212949
*External alarm terminal	ODT58	All models	212950
*Time-up output terminal	ODT62	All models	212951
*Operation signal output terminal	ODT64	All models	212952
*Event output terminal	ODT66	All models	212953

* Please specify when ordering main unit.

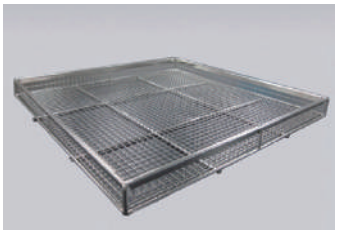
Shelf / Bracket



Stainless punching metal
(Weight tolerance 15kg/pc)



Stainless wire
(Weight tolerance 30kg/pc)



Stainless mesh basket shelf
(loading up to 15kg/shelf)
(Placed on top of the standard shelves)

Clean Oven (Large Capacity)

Class 100

DES830/DTS830

Operating temp. range	RT +30°C~260°C DES 830	RT +30°C~360°C DTS830	Temp. distribution accuracy	±2.0°C (at 360°C) DES830	±5.0°C (at 360°C) DTS830	Internal capacity	327L

Class 100, large capacity clean oven at constant temperature.

327L
DES830

327L
DTS830

- Maintain a purity degree of class 100 at stable temperature.
- Equipped with various functions, including program operations.
- Operation monitor visualizes controller status, temp and temp. change.
- Program operation: maximum of 99 steps, 99 patterns with repeat function.
- Safety measures are enriched, including self-diagnosis function and independent overheating prevention device.

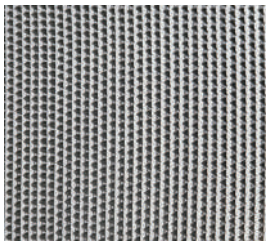
Specifications

Model		DES830	DTS830
Circulation method		Forced convection	
Operating temperature range		Room temp. +30~260°C	Room temp. +30~360°C
Temp. control accuracy (JTM K05)		± 0.5°C (at 260°C)	± 0.5°C (at 360°C)
Temp. fluctuation (JIS)		± 0.5°C (at 260°C)	± 0.5°C (at 360°C)
Temperature distribution accuracy (JTM K05)		± 2.0°C (at 260°C)	± 5.0°C (at 260°C)
Temp. gradient (JIS)		± 6.0°C (at 260°C)	± 10.0°C (at 260°C)
Max. temperature reaching time		Approx. 70 min.	Approx. 80 min.
Clean level		Class100 (when the temperature is stable)	
Interior Material/Exterior		Stainless steel/Cold rolled steel late with melamine resin baking finish	
Heat insulating material		Glass wool	
Heater		Stainless pipe heater, 6.0kW	
Fan type		Scirocco fan, Condenser type motor 200W×2	
Differential pressure meter		Analog type (0 to 300Pa)	
Cable hole		33 mm I.D. (right side)	
Filter		Heat resistance HEPA filter (Dust collect : more than 99.97% at 0.3μm)	
Temp. controller		PID control by microprocessor	
Temp. setting/display method		Digital setting/display with UP/DOWN key	
Timer		Fixed value operation for 1 min. to 99 hr. 59 min. and 24hr. setting	
Operation function		Fixed temp., Auto-start, Auto-stop, Quick auto stop, Program (max.99 steps, 99 patterns, repeat)	
Additional functions		Calendar timer (max. 24 Hrs.), Integration time (max. 65535hrs.), Clock, Calibration off-set, Display the amount of power consumption / CO_2 discharge/Heater operation amount, Power failure recovery mode, User setting information save and recall, External communication terminal (RS485)	
Heater circuit control/Temp. sensor		Triac zero-cross control/K-thermocouple (double sensor)	
Temp. sensor		K-thermocouple (Double sensor)	
Safety device		Self diagnosis functions (Sensor, Fan, Heater, Relay, Triac, Automatic overheat prevention), Independent overheat prevention, Key lock function, Electric leakage breaker, Door switch	
Internal dimensions (W×D×H) (mm)		620×480×1,100	
External dimensions (W×D×H) (mm)		850×1,080×1,955	
Internal capacity		327L	
Withstand load of shelf board		Approx. 30kg / piece	
Shelf rest step number / pitch		35 steps / 30mm	
Power source 50 / 60 Hz		AC220V/AC380V Three phase	
Weight		Approx. 335kg	
Accessories	Shelf plate/Shelf bracket	Stainless steel, 3 pcs / 6 pcs	

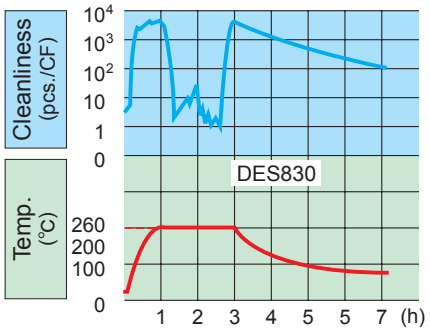
Control Panel

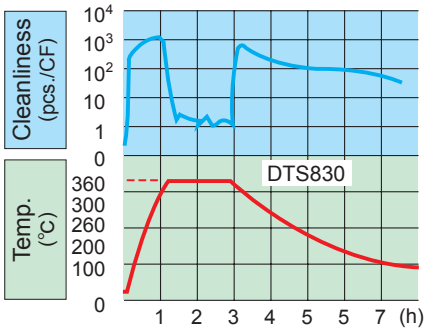
Cable Port

HEPA Filter



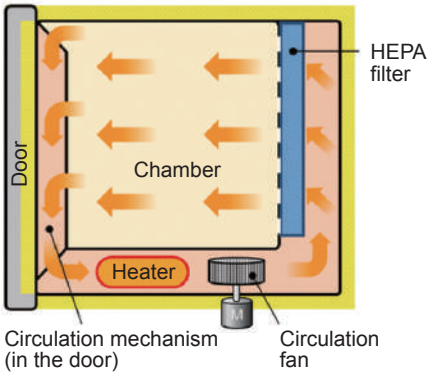
Performance Curve





Method

[Side view]



Interior

Digital Recorder

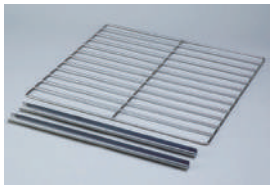
Optional Items

Description	Option Model No.	Main Unit Model No.	Product code
Stainless wire shelf (loading up to 30 kg/shelf)		DES830/DTS830	212678
Stainless punching metal shelf (loading up to 15kg/shelf)	ODE50	DES830/DTS830	212679
Stainless mesh basket shelf (loading up to 15 kg/shelf)	ODE12	DES830/DTS830	212919
Additional sensor (K thermocouple)	ODT48	DES830/DTS830	212946
Silicon plug (with one hole, ϕ2mm)	ODT52	DES830	212947
*External communication adapter set	OIN90	DES830/DTS830	211880
*Temperature output terminal (4-20mA)	ODT72	DES830/DTS830	212956
*Abnormal alarm display	ODT74	fDES830/DTS830	212957
*Time up output terminal	ODT76	DES830/DTS830	212958
*Operation signal output terminal	ODT78	DES830/DTS830	212959
*Event Output Terminal	ODT80	DES830/DTS830	212960
*Emergency stop switch	ODT82	DES830	212941
*Digital recorder, 6 points, sensors are not included	ODT86	DES830/DTS830	212943
*Power cord, 10m	ODT88	DES830	212945
*Exhaust ducting unit (manual damper)	ODT92	DES830/DTS830	212921
*Automatic damper : 5 steps	ODT94	DES830/DTS830	212923
*N_2 gas injection unit 100L/min	ODT96	DES830/DTS830	212932
*Exhaust port for clean room (O.D. 80mm, duct is not included)	ODT98	DES830/DTS830	212934
*High performance HEPA filter, class 100 in all heating conditions (stable, increase, decrease), max temp: 200°C	ODE14	DES830	212920

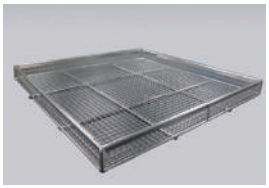
* Please specify when ordering main unit.

Shelf / Bracket

Stainless punching metal
(Weight tolerance 15kg/pc)

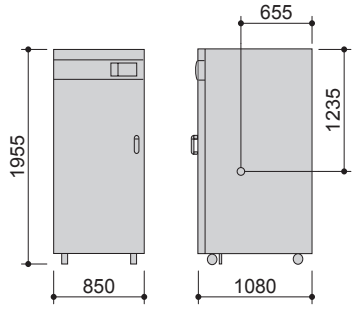


Stainless wire
(Weight tolerance 30kg/pc)



Stainless mesh basket shelf
(loading up to 15kg/shelf)
(Placed on top of the standard shelves)

Dimensions (Unit:mm)



Clean Oven (Large Capacity)

Class 100

DEC812C/912C

Operating temp. range	RT +10~150°C

Temp. distribution accuracy	±0.5°C (at150°C)

Internal capacity	236L DEC812C	472L DEC912C

Economical clean constant temp. oven of the max. temp. 150℃ and clean class 100

Suitable for drying or heat treatment of semiconductor, LCD, electronic products and precision instruments in a dust free environment.

- Equipped with high temp. heat resistant HEPA filters and designed with horizontal circulation mode.
- Class 100 cleanliness is achieved at constant temperature.
- Self-diagnosis functions (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Specifications

Model	DEC812C	DEC912C
Method	Forced convection circulation	
Operating temp. range	RT+10～150℃	
Temp. control accuracy	±0.5℃ (at150℃)	
Temp. distribution accuracy	±3.0℃ (a150℃)	
Max. temp. reaching time	Approx. 50min	
Clean class	Keep class 100 at constant temp.	
Interior	Stainless steel plate	
Exterior	Cold rolled steel plate with chemical proofing coating	
Insulating material	Glass fibre	
Heater	Stainless steel heating pipe	
	2.4KW	3.2KW
Blow fan / motor	Centrifugal fan, 30W×2	Centrifugal fan, 30W×4
Cable hole	I.D. 30mm (1 on the right side)	
HEPA filter	Dust collection efficiency: 0.3um particle 99.97% or more	
Temp. control	3 segments PID	
Temp. setting	Use specialized function menu key and up/down 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 (attached with timing wait function)	
Operation function	Fixed temp. operation, auto start, auto stop, program operation	
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional functions	Deviation correction, key lock, power outage compensation	
Sensor	K thermocouple (temp. controller and overheat protector)	
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock	
Internal dimensions (W×D×Hmm)	600×500×1000	1070×500×1000
External dimensions (W×D×Hmm)	710×720×1600	1170×720×1600
Internal capacity	236L	472L
Shelf plate with standard load	30kg / piece	
Shelf plate steps/Shelf rest pitch	29 steps/30mm	2×29 steps / 30mm
Power supply (50/60Hz) rated current	AC220V 12A 14A（30A）	AC220V 16A 14A（30A）
Weight	Approx. 110kg	Approx. 190kg
Shelf plate	Stainless steel wire screen plate	
	4 pcs	8 pcs
Shelf rest	8 pcs	16 pcs
Optional	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by/running / Malfunction), Observation window, External communication (RS485), Temp. output terminal (4～20mA), Output terminal for alarm device, Time up output terminal	

Open Chamber

OTC-213A/2D

Operating temp. range	-15°C~+60°C OTC-213A	-30°C~+80°C OTC-2D

Air curtain type	2 layers OTC-213A	3 layers OTC-2D

Internal capacity	134L OTC-213A	300L OTC-2D

- Spacious work space, hands can be directly placed inside the chamber.
- Can be remotely controlled by a personal computer with the RS232C interface.
- Designed with econo-cover to improve temp. distribution accuracy and temp. rising time.

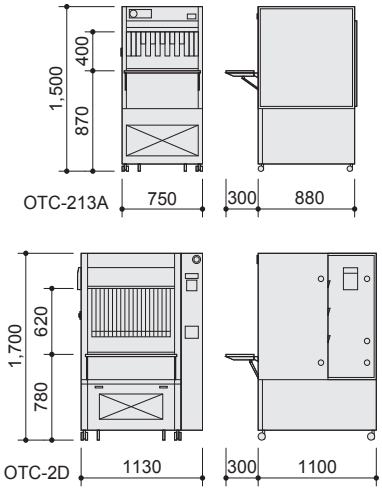
Specifications

Model	OTC-213A	OTC-2D
Type	Air curtain type (2 layers) (double stream)	Air curtain type (3 layers) (triple stream)
Setting temp. range	-15~+60°C (without econo-cover)	-30~+60°C (with econo-cover)
Temperature reaching time	Approx. within 30min. from +25~-15°C	Approx. within 60min. from +25~-25°C
	Approx. within 20min. from +25~+60°C	Approx. within 30min. from +25~+80°C
Temperature control	3-step changeable of cooling capability	5-step changeable of cooling capability by 2 freezers
	Below +10°C : Strong freezing and heater	Below +10°C : 2 freezers and heater
	+10~40°C : Soft freezing and heater	+10~40°C : 1 freezer and heater
	+41~60°C : Heater	+41~80°C : Heater
Temperature control	PID control by microcomputer	
Temperature sensor	Pt resistance thermometer	
Temperature setting	Digital setting	Touch panel input on LCD display
Temperature display	Digital display	7 segments display on LCD display
Operating functions	Fixed setting operation, Automatic defrost mode	Fixed operation, Automatic or manual defrost mode, Repeat function, 16 steps setting for temp. and time (1 to 990min.)
Additional functions	N/A	Total operation hours timer (to99,999.9hrs.)
External interface	RS232C (Communication function such as temp. setting, Run / Stop, Temp. monitor)	
Refrigerator/Coolant	Scroll compressor/R404A, 750kW	Rotary type/R404A, 1.1kW x 2
Heater capacity	1.4kW	3.0kW
Chamber lightning	15W (Incandescent light)	
Cable hole	I.D. 60mm	
Safety device	Abnormal overheat preventor, Abnormal high pressure preventor for compressor, Short-circuit breaker, Motor breaker, Emergency stop switch	
Internal dimensions	W670×D500×H400mm	W810×D600×H600mm
External dimensions	W750×D880×H1,500mm	W1,130×D1,100×H1,700mm
Internal capacity	134L	300L
Power (50/60Hz)	AC220V / AC380V Three phase with step down transformer	
Weight	Approx. 180kg	Approx. 470kg
Accessory	N/A	Econo-cover

Optional Items

Description		Product code
Dot type recorder	for OTC-2D	200000
Shelf with support 1pc	for OTC-213A	200000
Shelf with support 1pc	for OTC-2D	200000
Econo cover	for OTC-213A	200000
Working counter	for OTC-213A	200000
Working counter	for OTC-2D	200000
Operation display light pole	for OTC-2D	200000
Extension drain hose 2m	for OTC-213A / 2D	200000
Exhaust duct fan	for OTC-2D	200000

Dimensions (Unit:mm)



IR Oven (Far-infrared Heating)

Far infrared heating

DIR631C

Operating temp. range: Room temp. +10°C to 360°C

Temp. distribution accuracy: ±3.0°C (at 360°C) (when IR Heater is off)

Making use of features of far infrared ray heater (IR heater), used for heat treatment of polymer materials.

(Stand optional)

Specifications

Model		DIR631C
Circulation method		IR radiation+Forced convection circulation and ventilation
Operating temperature range		Room temp. +10~360°C
Temp. control accuracy		±0.2°C (at 360°C, when IR heater is off)
Temp. distribution accuracy		±3.0°C (at 360°C, when IR heater is off)
Max. temp. reaching time		100 min (to 360°C, when IR heater is off)
Heater		Stainless pipe heater with fin, 3.75kW
IR heater		0.2kW×16pcs×2 sides of the top and the bottom, 6.4kW in total
Fan type / Motor		Axial fan / Condenser motor 20W
Sensor		Double K thermocouples×1 (for unit body temp. controller and overheat protector)
		K thermocouple×2 (for IR heater which is built in the center)
Cable port		I.D. 30mm (at back)
Additional mechanism		Exhaust damper (manual)
Control method		PID control
Operation functions		Fixed temp., program, Quick auto stop, Auto stop and auto start operation
Additional functions		Deviation correction, Key lock, power outage compensation, Door open&close detection
ELB		Electric leakage, Short circuit, Overcurrent protection
Overheat protector		Auto cut off the heater circuit when overheating
Self-diagnosis functions		Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit
Internal dimensions (W×D×H)		600×600×600mm
Effective dimensions (W×D×H)		600×600×200mm
External dimensions (W×D×H)		1,200×780×1,000mm
Space between IR heaters		200mm
Weight		Approx. 230kg
Power source 50/60Hz		3 Phase AC380V 18A
Weight		Approx. 80kg
Shelf plate		Stainless steel wire screen plate
		1 pc.
Shelf bracket		2 pcs.
Optional	Stand	OP62C
	Others	Shelf plate (1 plate with 2 rests), Recorder, Indicator lamp (stand-by / Running/Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal

Features

- Max. working temp. is 500°C.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock.
- Program operation: 3 segments, 30 steps
- Exhaust damper allows quick exhaust and cooling of inside chamber.

feature

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

Control panel

Interior

Natural Convection Oven (High Temp., 700℃)

DR210C

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

High-temp. drying oven integrated with electric furnace, constant temp. oven and drying oven.

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

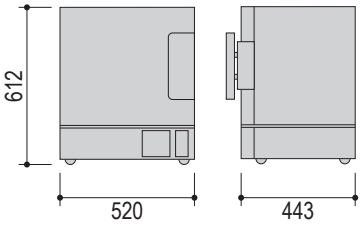
- Failure of sensor, heater, SSR, memory, internal communication, temperature inputting circuit, automatic overheating prevention device, overheating prevention device, measurement temperature

Specifications

Model		DR210C
Method		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		Approx. 60min. (Room temp. +5°C~700°C)
Interior		Stainless steel plate
External material		Cold rolled steel plate with chemical proofing coating
Insulating material		Ceramic fiber
Heater		Ferrochrome wire heater 1.3kW
Temp. controller		3 segments PID
Temp. setting		Use specialized function menu key and UP/DOWN 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 (attached with timing wait function)
Operation functions		Fixed temp., Program, Auto start, Auto stop operation
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)
Additional functions		Deviation correction, Key lock, Power outage compensation
Sensor		K thermocouple (Temp. controller and overheat protector)
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, ELB to prevent overcurrent, Key lock, etc.
Internal dimension (W×D×H)		250×250×220mm
External dimension (W×D×H)		520×443×612mm
Internal capacity		13.75L
Shelf load capacity		15kg / pc.
Shelf rest step number		3 steps
Shelf rest pitch		33mm
Power source (50/60Hz)		AC220V, 7A
Weight		Approx. 36kg
Shelf plate		Stainless punching metal
Shelf plate / bracket		2 pcs. / Integral structure with chamber (33mm pitch)
Optional	Stand	ON61C
	Others	Shelf plate, Recorder, Indicator lamp (Stand-by / Running / Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal

Control Panel

Dimensions (mm)



Vacuum Drying Oven

DP200/300/410/610

Operating temp. range	RT +40°C~240°C DP200/300	RT +40°C~200°C DP410/610

Operating pressure range	101~0.1kPa

Internal capacity	10L DP200	27L DP300	91L DP410	216L DP610

Wide variety of compact and large scale ovens.

Designed with high accuracy controller system with advanced functionality and safety, vacuum storage ability and various options for system upgrade. Ideal for curing, annealing, baking, defoaming, hardening and deaeration treatments.

Operation and functions

- Shorter drying time and heat-up process with the new Z controller system resulting to faster heat up process (by 37% compared to previous models) and improved stability when operating at low temperatures.
- User-friendly control panel and display.
- Standard equipped with various operation modes (fixed temp., auto-start, auto-stop, quick auto stop, program) and other support functions such as timer, calibration offset, power consumption / CO_2 emission monitor and power recovery mode.
- Option for input/output function (optional) 4-20mA analog output, external communication terminal (RS485), alarm output, operation signal, time-up signal, output port.

Safety Features

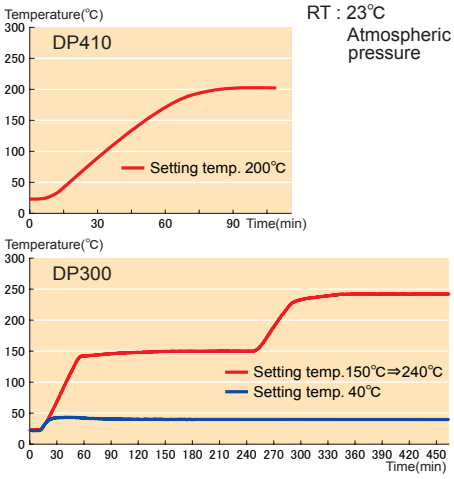
- Self diagnosis functions, independent overheating prevention & electric leakage breaker.

Specifications

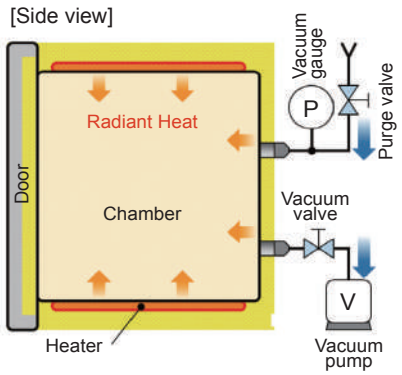
Model	DP200	DP300	DP410	DP610
System	Vacuum drying by decompressed chamber direct heating			
Operating temperature range	Room temp. +40~240°C		Room temp. +40~200°C	
Operatingpressure range	101~0.1 kPa (760~1 Torr) at absolute pressure			
Temp. Fluctuation	± 1.0°C (at 240°C)		± 1.5°C (at 200°C)	
Max. temp. reaching time	Approx. 60 min.	Approx. 120 min.	Approx. 80 min.	Approx. 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	Rock wool			
Heating method	Decompressed chamber direct heating			
Heater	Mica heater, 0.68 kW	Mica heater, 1.05 kW	Mica heater, 2.25 kW	Mica heater, 3.15 kW
Vacuum gauge	Bourdon tube type, 0 to 0.1 MPa (Gauge pressure)			
Observation window	Tempered glass and polycarbonate resin plate			
Pump connection port / Purge port	Exterior ?18(mm) / Rc 1/4		NW25 flange / Rc 1/4	
Temp. control method	PID control by microprocessor			
Temp. setting method	Digital setting with UP/DOWN key			
Temp display method	Digital display by green LED			
Timer	0 min. to 99 Hrs. 59 min. and 100 Hrs. to 999 Hrs.			
Min. division	1 min. or 1 Hrs.			
Operation function	Fixed temperature operation, Auto-start operation, Auto-stop operation, quick auto stop, program			
Additional functions	Calendar timer (max. 24 Hrs.), Integration time (max 65535 Hrs.), Time display, calibration offset, monitor display of total power consumption, total CO_2 emission and heater operating output, power recovery mode, storage and access of operator setting data			
Heater circuit control	Triac zero-cross control			
Temp. sensor	K-thermocouple (Double sensor)			
Safety device	Self diagnosis functions (Sensor, Heater, Triac, Automatic overheating prevention), Independent overheating prevention, Key lock function, Electric leakage breaker			
Leakage breaker	15A		20A	
Independent cut-out circuit	Set temperature range: 0~270°C		Set temperature range: 0~230°C	
Internal dimensions (W×D×Hmm)	200×250×200	300×300×300	450×450×450	0600×600×6000
External dimensions(W×D×Hmm)	400×410×682	510×460×782	670×669×1500	820×819×1650
Internal capacity	10L	27L	91L	216L
Shelf rest step number	3 steps		4 steps	
Shelf rest pitch	63mm	71mm	105mm	140mm
Exhaust port / Purge port	18mm O.D. (the right side) 1 pc. each		NW25 flange / Rc 1/4 (18mm O.D.)	
Power source (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	AC115V/AC220V Single phase with step-down transformer	AC220V Single phase	
Weight	Approx. 45 kg	Approx. 72 kg	Approx. 210 kg	Approx. 310 kg
Accessories / Shelf plate	Punched stainless steel, 2 pcs			

Control Panel

Temperature Characteristics



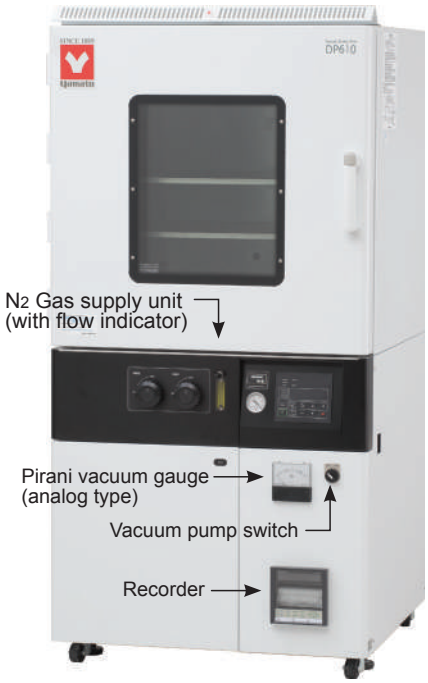
Method



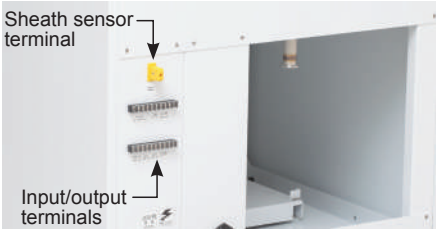
Optional Items

Description		Model No.	Product code
Stainless punching metal shelf	for DP200	-	212134
Stainless punching metal shelf	for DP300	-	212162
Stand	for DP200/DP300	ONS10	212079
External communication adapter set	for DP200/DP300	OIN90	211880
*Sheath sensor(500mm)	for DP200/DP300	ODP36	281601
*Sheath sensor(1500mm)	for DP200/DP300	ODP38	281602
*External communication terminal (RS485)	for DP200/DP300	ODP24	281603
*Analog output terminal (4-20 mA)	for DP200/DP300	ODP26	281604
*External alarm output terminal	for DP200/DP300	ODP28	281605
*Time-up output terminal	for DP200/DP300	ODP32	281606
*Digital vacuum indicator	for DP200/DP300	ODP34	281607
Stainless punching metal shelf	for DP410	-	212192
Stainless punching metal shelf	for DP610	-	212193
External communication adapter set	for DP410/DP610	OIN90	211880
*Sheath sensor (500mm)	for DP410/DP610	ODP36	281601
*Sheath sensor (1500mm)	for DP410/DP610	ODP38	281602
*External communication terminal (RS485)	for DP410/DP610	ODP42	281608
*Analog output terminal (4-20 mA)	for DP410/DP610	ODP44	281609
*External alarm output terminal	for DP410/DP610	ODP46	281610
*Time-up output terminal	for DP410/DP610	ODP48	281611
*Operating signal output terminal	for DP410/DP610	ODP52	281612
*Event output terminal	for DP410/DP610	ODP54	281613
*Vacuum pump switch (AC100V)	for DP410/DP610	ODP84	281625
*Vacuum pump switch (AC200V)	for DP410/DP610	ODP56	281614
*Pirani vacuum gauge with 0-10mV voltage output (analog type)	for DP410/DP610	ODP58	281615
*Pirani vacuum gauge with 0-10mV voltage output	for DP410/DP610	ODP62	281616
*Digital recorder	for DP410/DP610	ODP64	281617
*Digital vacuum indicator	for DP410/DP610	ODP82	281618
*N_2 gas supply unit (with flow Indicator)	for DP410	ODP66	281619
*Slide type vacuum pump Stand A	for DP410	ODP72	281620
*Slide type vacuum pump Stand B	for DP410	ODP76	281621
*N_2 Gas supply unit (with flow Indicator)	for DP610	ODP68	281622
*Slide type vacuum pump Stand C	for DP610	ODP74	281623
*Slide type vacuum pump Stand D	for DP610	ODP78	281624

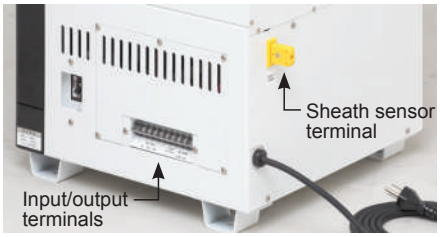
* Please specify when ordering main unit.



DP610

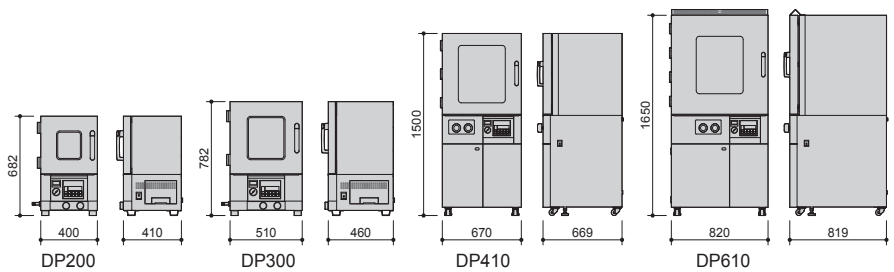


DP610



DP300

Dimensions (Unit:mm)



Vacuum Drying Oven

Large capacity, Floor type

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

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 the vacuum pump
- Calibration off-set function

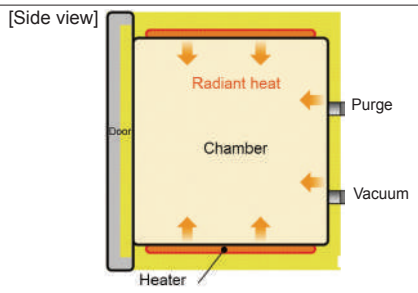
Safety features

- 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

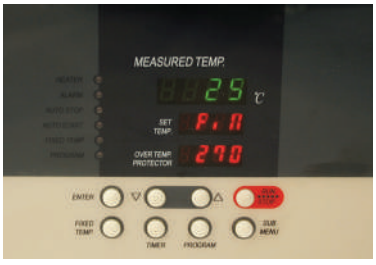
Specifications

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	Approx. 80 min.	Approx. 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 (W×D×H)	450×450×450 mm	600×600×600 mm
External dimensions (W×D×H)	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	Approx. 190kg	Approx. 290kg
Shelf	2 perforated stainless steel shelves	

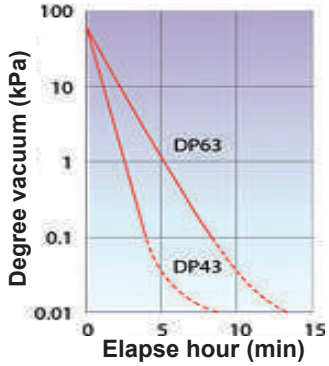
Method



Control Panel



Pressure Falling Curve

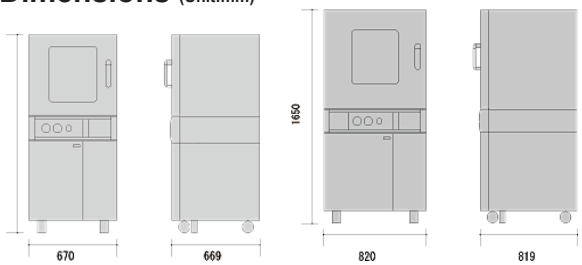


Optional Items

Product Name	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	
PD-204 with rubber hose kit 115V	GLD201B115DPRKIT
PD-204 with SUS hose kit 115V	GLD201B115DPSKIT
PD-204 with rubber hose kit 220V	GLD201B220DPRKIT
PD-204 with SUS hose kit 220V	GLD201B220DPSKIT

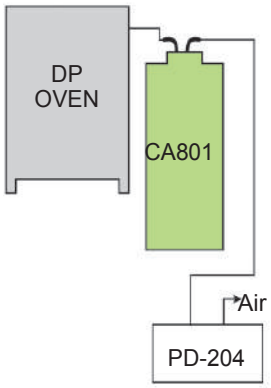
* Please specify when ordering main unit.

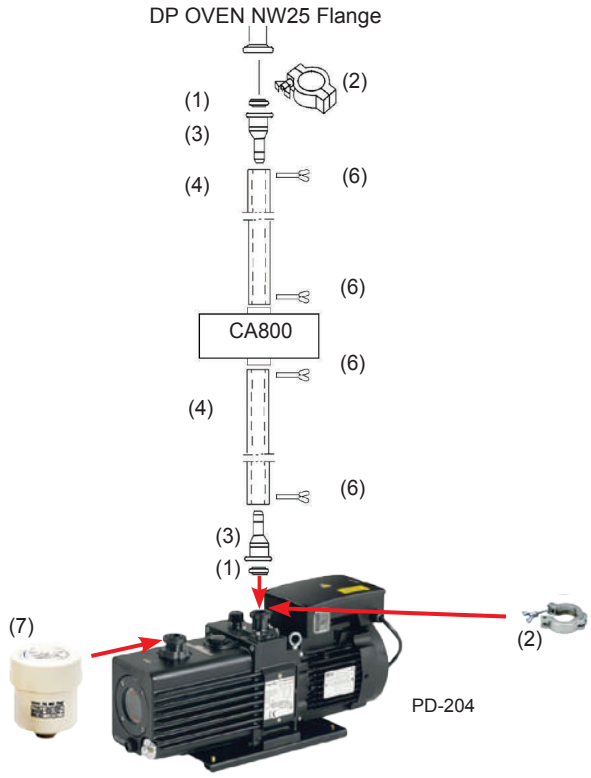
Dimensions (Unit:mm)



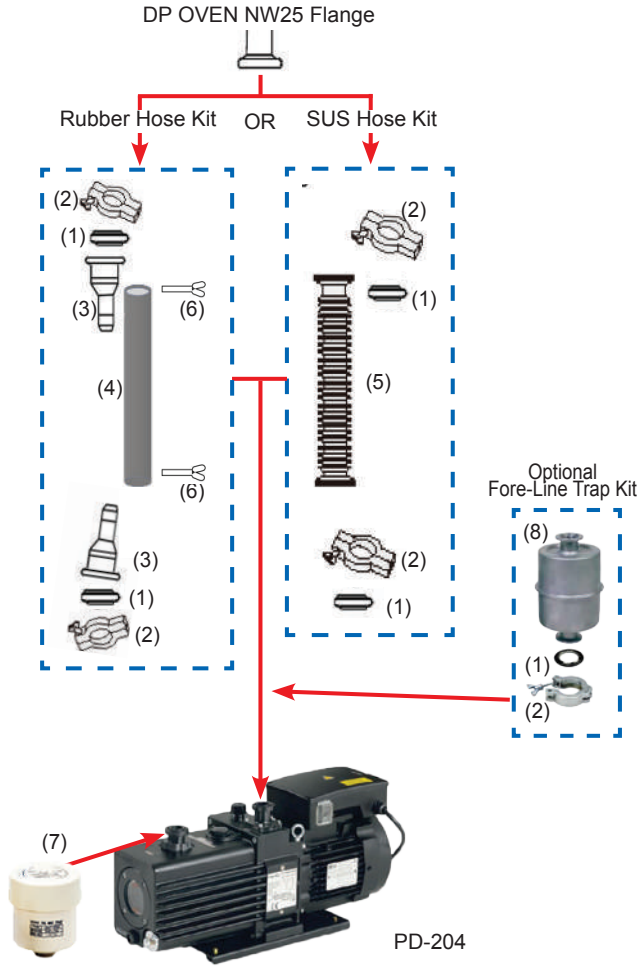
Sample Installation with CA801

Use with cooling trap CA801





Rubber Hose or Stainless Steel Hose Connection for Vacuum Pump



	Product Name	Product Code
(1)	NW25 Centering O-Ring	WEL-303102
(2)	NW25 Hinged Clamp	WEL-302202
(3)	NW25 Hose Nozzle 21mm	WEL-501262
(4)	Rubber Hose ID 21mm / 1500mm	WEL-3310605
(5)	SUS Flexible Hose with KF25 / 1500mm	ILM-710756
(6)	Hose Clamp	WEL-305360
(7)	Oil Mist Trap	ULV-OMT200A
(8)	Fore-Line Trap	ULV-OFI200C

Vacuum Drying Oven (Large Capacity)

Floor type

DP83C/103C

Operating temp. range	20~200°C
Operating pressure range	101~0.1kPa
Internal capacity	512L DP83C / 1,000L DP103C

Vacuum drying oven for treatment on a large scale and designed for large-size part.

Operation and functions

- Vacuum pump can be installed inside the oven.
- Quick connect / disconnect of vacuum pipes for easy pump maintenance.
- Enhanced working efficency as exhaust system is improved to significantly shorten time to reach vacuum.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock.

Safety features

- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.
- Resin protection panel is installed at the observation window.

Specifications

Model	DP83C	DP103C
Method	Decompression, chamber wall 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)	
Interior material	Stainless steel	
Exterior material	Cold rolled steel plate with chemical proofing coating	
Door	Single swing door	
Heat insulating material	Glass fibre	
Heating method	Decompressed chamber wall direct heating	
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 method	3 segments PID	
Temp. setting method	Use specialized function menu key and UP/DOWN 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 (attached with timing wait function)	
Operation functions	Fixed temp. operation, Auto start, Auto stop, Program operation	
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional functions	Deviation correction, Key lock, Power outage compensation	
Heater circuit control	SSR driving	
Temp. sensor	K thermocouple (Temp. controller and overheat protector)	
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock	
Internal dimensions (W×D×H)mm	800×800×800	1,000×1,000×1,000
External dimensions (W×D×H)mm	1,020×1,020×1,850	1,300×1,280×2,110
Internal capacity	512L	1,000L
Shelf support qty. / Pitch	4 steps / 105mm	4 steps / 140mm
Exhaust port	NW40 flange	
Vacuum port	Rc3/8	
Exhaust port / Purge port	NW25 flange / Rc 1/4 (18mm O.D.)	
Power source	Single phase AC220V 31.5A	3 phase AC380V 27A
Weight	Approx. 450kg	Approx. 1.000kg
Shelf	Stainless punching metal, 2 pcs	Stainless punching metal, 4 pcs
Optional	Shelf plate, Vacuum pump, N_2 introduction device, Recorder, Indicator lamp (Stand-by / Running / Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal	

Control Panel

Vacuum Drying Oven (Large Capacity)

Floor type

DP810/1030

Operating temp. range 40°C~200°C

Operating pressure range 100~0.1 kPa

Internal capacity 512L DP810 / 1,000L DP1030

- Decompression drying of large samples available
- Space saving, vacuum pump can be installed inside the oven.
- Interactive key input control panel, temperature display by LED.
- Highly accurate operation functions.

Control Panel

Specifications

Model		DP810	DP1030
System		Vacuum drying by decompressed chamber direct heating	
Operating temperature range		40~200°C	
Operating pressure range		100~0.1 kPa (760~1 Torr)	
Temp. adjustment accuracy		± 1.0°C (at 200°C)	
Interior material		Stainless steel	
Exterior material		Cold rolled steel plate with baked-on melamine resin finish	
Door		Single swing door	
Heat insulating material		Rock wool	
Heating method		Decompressed chamber direct heating	
Heater		Mica heater, 6.5kW	Mica heater, 14.4kW
Operation functions		Fixed temp., Auto-start, Auto-stop, Quick auto stop, Program (max.99 steps, 99 patterns, repeat)	
Heater circuit control		Triac zero-cross control	
Temp. sensor		K-thermocouple	
Exhaust port		NW40	
Inlet/Purge port		RC 1/4	RC 3/8
Temp. control method		PID control by microprocessor	
Temp. setting method		Digital setting with UP/DOWN key	
Temp display method		Digital display	
Other display		Temperature indicating the operation state displayed by LED	
Additional functions		Calendar timer (max. 24 Hrs.), Integration time (max. 65535 hrs.), Clock, Calibration off-set, Display the amount of power consumption / CO_2 discharge / Heater operation amount, Power failure recovery mode, User setting information save and recall	
Safety device		Self diagnosis functions(Sensor, Heater, Triac, Automatic overheating prevention), Independent overheating prevention, Key lock function, Electric leakage breaker	
Internal dimensions (W×D×Hmm)		800×800×800	1,000×1,000×1,000
External dimensions(W×D×Hmm)		1,020×1,019×1,850	1,300×1,280×2110
Internal capacity		512L	1,000L
Power source (50/60Hz)		AC220V Single phase	AC220V / AC380V Three phase
Weight		Approx. 600kg	Approx. 1000 kg
Accessories	Shelf plate	Punched stainless steel, 2 pcs	Punched stainless steel, 4 pcs

Vacuum Drying Oven (Compact)

Benchtop, Versatile

DP23C/33C

CE

Operating temp. range 40°C~240°C | Operating pressure range 101~0.1kPa | Internal capacity 10L DP23C 27L DP33C

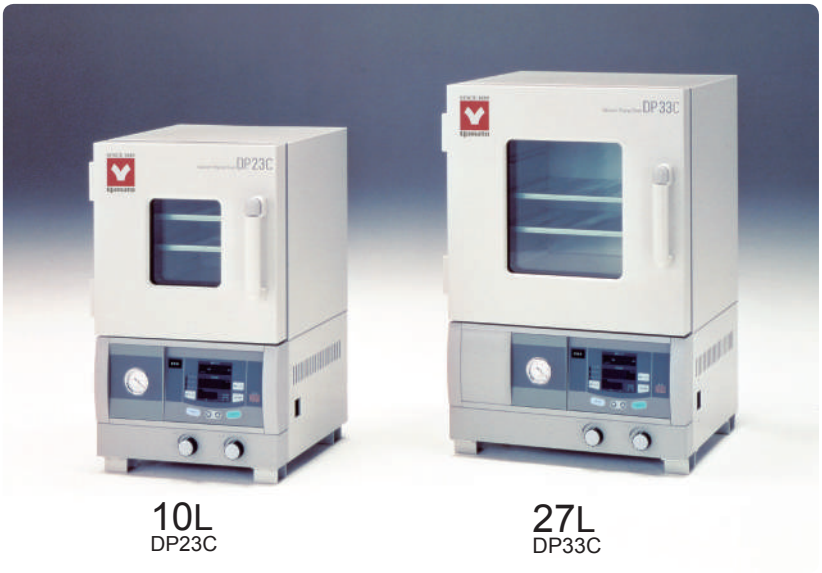
Small benchtop vacuum drying oven

Features

- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock.
- Program operation: 3 segments, 30 steps.

Safety Features

- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.
- Resin protection panel installed at the observation window.



10L DP23C　　27L DP33C

Specifications

Model		DP23C	DP33C
Method		Vacuum drying by decompressed chamber wall direct heating	
Operating temp. range		40°C to 240°C	
Operating pressure range		101~0.1KPa (760~1 Torr)	
Max. temp. reaching time		Approx. 60 min	Approx. 90 min
Temp. control accuracy		±1.5°C(at 240°C)	
Interior/Exterior material		Stainless steel plate / Cold rolled steel plate with chemical proofing coating	
Insulating material		Glass fiber	
Heating method		Decompressed chamber wall direct heating	
Heater power		0.68kW	1.05kW
Observation window		Toughened glass + Resin protection panel	
Vacuum gauge		Pointer type, -100~0KPa	
Temp. control		3 segments PID	
Temp. setting		Use specialized function menu key and UP/DOWN 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 (Attached with timing wait function)	
Operation function		Fixed temp. operation, Auto start, Auto stop, Program operation	
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional functions		Deviation correction, Key lock, Power outage compensation	
Heater circuit control		SSR driving	
Sensor		K thermocouple (Temp. controller and overheat protector)	
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, key lock	
Internal dimensions (W×D×Hmm)		200×250×200	300×300×300
External dimensions (W×D×Hmm)		400×410×672	510×460×774
Internal capacity		10L	27L
Shelf rest step number / Shelf rest pitch		3 steps (fixed) / 63mm	4 steps (fixed) / 71mm
exhaust port / Vacuum port		O.D.18mm / O.D.18mm	
Power supply (50/60Hz) rated current		AC220V 3.5A	AC220V 5A
Weight		Approx. 43kg	Approx. 69kg
Shelf plate		Stainless punching metal, 2 pcs	
Optional	Stand	ONS10C	ONS60C
	Others	Shelf plate, Vacuum pump, Recorder, Indicator lamp (Stand-by / Running / Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal	

Vacuum Drying Oven (Compact)

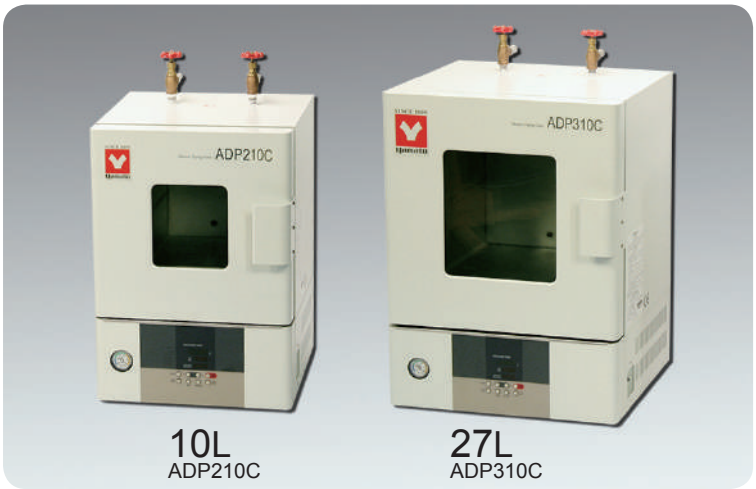
CE

Standard Small Size Benchtop Vacuum Drying Oven

ADP200C/210C/300C/310C

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

Standard vacuum drying oven with enhanced safety features



Operation and functions

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

Safety features

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

Specifications

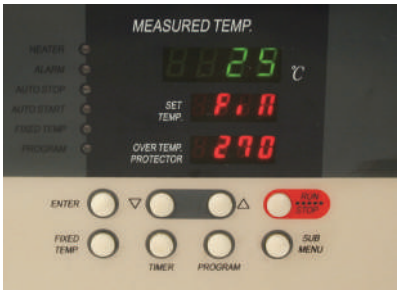
Model	ADP200C/210C	ADP300C/310C
System	Vacuum drying by decompressed chamber direct heating	
Operating temperature range	40~240°C	
Operating pressure range	101~0.1kPa (760~1 Torr)	
Temp. control accuracy	±1.5°C (at 240°C)	
Max. temp. reaching time	Approx. 70min.	Approx. 100min.
Interior material	Stainless 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×D250×H200mm	W300×D300×H300mm
External dimensions	W400×D412×H603mm	W500×D465×H705mm
Internal capacity	10L	27L
Shelf loading	Approx. 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
Accessories	Shelf plate (Aluminum perforated metal) 2 pcs.	Shelf plate (Aluminum perforated metal) 3 pcs.

Optional items

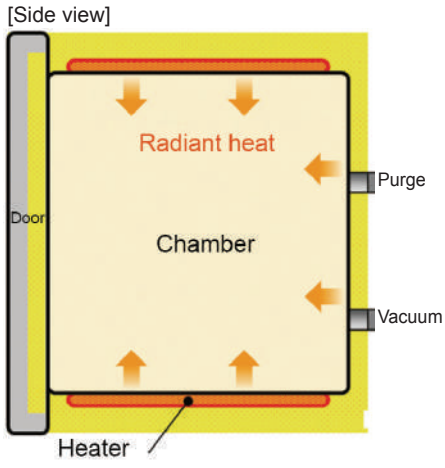
Product name	Product code
Vacuum pump (Rotary vane pump)	
GLD136C 115V 162L/min, 5.7CFM with rubber hose Kit	GLD136C115DPRKIT
GLD136C 220V 162L/min, 5.7CFM with rubber hose Kit	GLD136C220DCRKIT
*N_2 gas introduction device 30L/min.(factory installed)	281151

* Please specify when ordering main unit.

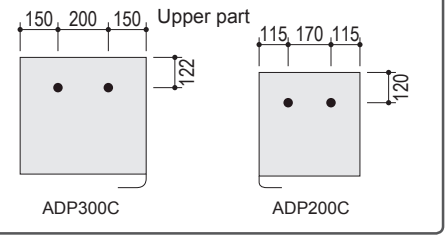
Control Panel



Method



Dimensions (Unit:mm)



Vacuum Drying Oven

Vacuum & temp. linkage

DP43PC/63PC

Operating temp. range	40°C~200°C
Operating pressure range	101~0.1kPa
Internal capacity	91L DP43PC / 216L DP63PC

〈Temp. program control〉+〈Vacuum pump ON/OFF〉+〈Inlet valve ON/OFF〉

Eliminates complex manual operation of vacuum pump and safety valve and worries on misoperation or vacuum pump oil backflow in case of power failure.

Operation and functions

- Simultaneous operation of oven program and auto program of vacuum pump linkage possible
- High quality controller, enhanced operability and safety features
- Vacuum pump can be installed inside the oven
- In case of power failure, unit maintains vacuum and instantaneous stop mode prevents vacuum pump oil backflow
- No exhaust losses as main valve adopts 1 inch large diameter vacuum electromagnetic valve
- Equipped with auto/manual selector switch enabling manual operation during emergency

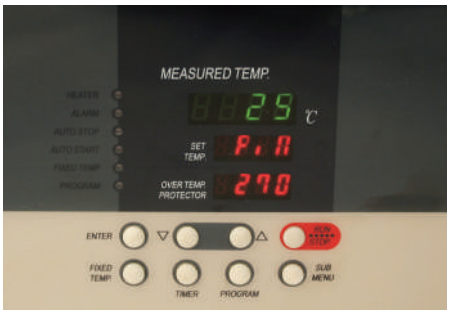
Safety features

- Self-diagnosis functions (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.
- Resin protection panel installed at the observation window

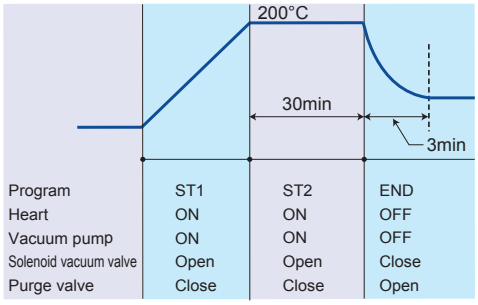
Specifications

Model	DP43PC	DP63PC
Method	Vacuum drying by decompressed chamber wall direct heating	
Operating temp. range	40°C to 200°C	
Operating pressure range	101~0.1KPa (760~1 Torr)	
Max. temp. reaching time	Approx. 80 min	Approx. 120 min
Temp. control accuracy	±1°C(at 200°C)	
Interior/Exterior material	Stainless steel plate / Cold rolled steel plate with chemical proofing coating	
Insulating material	Glass fiber	
Heating method	Decompressed chamber wall direct heating	
Heater power	2.25kW	3.15kW
Observation window	Toughened glass + Resin protection panel	
Vacuum gauge	Pointer type, -100~0KPa	
Vacuum pump storage room (W×D×Hmm)	320×600×540	470×750×540
Temp. control	3 segments PID	
Temp. setting	Use specialized function menu key and UP/DOWN 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 (attached with timing wait function)	
Operation function	Fixed temp. Operation, Auto start, Auto stop, Program operation	
Program mode	Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)	
Additional functions	Deviation correction, Key lock, Power outage compensation	
Heater circuit control	SSR driving	
Sensor	K thermocouple (Temp. controller and overheat protector)	
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock	
Internal dimensions (W×D×Hmm)	450×450×450	600×600×600
External dimensions (W×D×Hmm)	670×669×1500	820×819×1650
Internal capacity	91L	216L
Shelf rest step number / Shelf rest pitch	4 steps (fixed) / 105mm	4 steps (fixed) / 140mm
exhaust port / Vacuum port	25KF flange / Rc3/8	
Power supply (50/60Hz) rated current	AC220V 11A	AC220V 15A
Weight	Approx. 190kg	Approx. 290kg
Shelf plate	Stainless punching metal, 2 pcs	
Optional	Shelf plate, Vacuum pump, Recorder, indicator lamp (Stand-by/Running/Malfunction), External communication (RS485), Temp. output terminal (4-20mA), Output terminal for alarm device, Time up output terminal	

Control Panel



Auto program behavior example



Program	ST1	ST2	END
Heart	ON	ON	OFF
Vacuum pump	ON	ON	OFF
Solenoid vacuum valve	Open	Open	Close
Purge valve	Close	Close	Open

- Heater and vacuum pump activate, the temp. reaches 200°C. After keeping constant for 30min, heater and vacuum pump stop.
  Turn on the inlet valve for 3min, to recover atmospheric pressure in chamber.

※Program segment runs only when the program is running.

Vacuum Drying Oven

Automatic sequence

DP610P

Operating temp. range 40°C~200°C | Operating pressure range 100~0.1 kPa | Internal capacity 216L

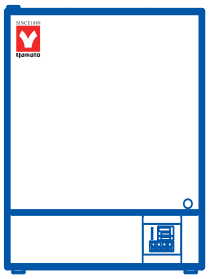
Vacuum pump linkage automatic sequence releases manual operation of a vacuum pump and a leak valve.
Eliminates worries on incorrect operation, reverse flow of vacuum pump oil when power off.

- Automatic sequence operation of vacuum pump linkage possible.
- High quality controller.
- Space saving, vacuum pump can be installed inside the oven.
- Prevents vacuum pump oil backflow when power is off.
- No exhaust losses because of 1 inch solenoid vacuum valve.
- Equipped with auto/manual selector switch.

Control Panel

Specifications

Model		DP610P
System		Vacuum drying by decompressed chamber direct heating
Operating temperature range		40~200°C
Operating pressure range		101~0.1 kPa (760~1 Torr) at absolute pressure
Temp. adjustment accuracy		± 1.5°C (at 200°C)
Max. temp. reaching time		Approx. 100 min.
Interior/Exterior material		Stainless steel/Cold rolled steel plate with baked-on melamine resin finish
Heating method		Decompressed chamber direct heating
Heater		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
Operation functions		Fixed temperature operation, auto-start operation, auto-stop operation, program operation (99 steps, 99 patterns repeat operation)
Additional functions		Calendar timer (max. 24 Hrs.), Integration time (max 65535 Hrs.), Time display, calibration offset, power discharge, CO2 discharge, heater consumption display, power failure stagnation mode, user configuration information
Heater circuit control		Triac zero-cross control
Temp. sensor		K-thermocouple (double sensor)
Safety device		Self diagnosis functions(Sensor, Heater, Triac, automatic overheating prevention), Independent overheating prevention, Key lock function, Electric leakage breaker
Internal dimensions (W×D×Hmm)		600×600×600
External dimensions(W×D×Hmm)		820×819×1,650
Internal capacity		216L
Shelf rest step number/pitch		4 steps/140mm
Exhaust port / Purge port		NW25 flange / Rc 1/4
Power source (50/60Hz)		AC220V Single phase
Weight		Approx. 310kg
Accessories	Shelf plate	Punched stainless steel, 2 pcs



Incubator

Contents

Provide safe, environment-friendly and energy-saving products.

According to different purposes, may choose from various models, meet the requirements of temp. range and distribution accuracy, size, price, program operation, special usage, etc.

Function·Safety devices

Forced convection circulation
Through forced convection of high-performance centrifugal fan, stir the chamber to get uniform temp. distribution accuracy.

Free convection
Through chamber free convection of heater or air-jacket.

Auto overheat prevention
Overheat prevention with built-in controller, usually when ovens chamber temp. reaches set temp. +12℃, water bath chamber temp. reaches set temp. +6℃, the heater cuts off (auto recovery).

Overheat protector
Overheat protector with integrated controller, shares power suplly with controller, but other circuits are independent. In the event of abnormal temp. rising (manual recovery), cut off heater circuit.

Independent overheat protector
The circuit is different with controller, in the event of abnormal temp. rising (manual recovery), cut off heater circuit. According to different models, respectively configurate digital, hydraulic, thermometal types.

Self-diagnosis
Use the microcomputer, carried in the controller, to detect the abnormal circuit, alarm sounds in event of abnormality, control the device whitin safety range.

Key lock
Prevents the misoperation during operation.

Backup
Even in power outage or cutting off power, it also can memorize the set value.

Power outage compensation
When the power recovers, able to select to interrupt or continue operation.

Overcurrent breaker
When there is abnormal current, cut off power supply to protect the unit body.

Overcurrent ELB
This breaker has overcurrent cutting function and current leakage cutting function

Emergency stop button
If emergency stop needed, press this button to cut off.

Model List

Type		Temp. range	Temp. control accuracy	Temp. distribution accuracy	Model	Characteristics	Convection		Internal capacity (L)	Page
							Natural	Forced		
High temp. incubator		Room temp. +5℃～80℃	±0.5℃	±1.0℃	IS412C/612C/812C/912C	Programmable	○		97/159/318/567	147
					IS401/601/801/901		○		97/159/318/567	149
					IC412C/612C/812C/912C	Economical	○		97/159/318/567	151
					IC103C/403C/603C/803C/903C		○		37/97/159/318/567	153
					IC113C/413C/613C/813C/913C		○		37/97/159/318/567	153
Low temp. incubator	Single	-10℃～50℃	±0.3℃		IN602C/612C/612CW//802C/812C	Programmable		○	143/286	155
					IN604/604W/804			○	143/286	157
		0℃～60℃	±0.2℃	±0.5℃	INE800	Energy saving		○	286	159
		0℃～50℃	±0.3℃	±1.0℃	IL612C/812C		○		159/300	171
					IL603		○		159	167
		0℃～60℃			ILE800	Energy saving	○		300	169
		5℃～60℃	±0.3℃ /±0.5℃		IJ101/101W/201/300	Peltier cooling	○		15.6/27/43	161
	Double	Upper : Room temp. +5℃～80℃	±0.3℃		INC821C	Double chamber High temp and Low temp.	○		143	163
		Lower :4℃～50℃	±0.5℃					○	150	
		Upper :-10℃～50℃	±0.3℃		IQ822C	Double chamber Low temp.	○		143	164
		Lower :-10℃～50℃					○		143	
CO_2		Room temp. +5℃～50℃	±0.1℃	±0.2℃	BNA600	Water Jacket	○		167	165
				±0.25℃	IP600	Air Jacket	○		167	

Incubator (Natural Convection, Air Jacket)

Programmable operation

IS412C/612C/812C/912C

Operating temp. range: RT+5°C~80°C

Temp. distribution accuracy: ±1.0°C (at 37°C)

Internal capacity: 97L IS412C | 159L IS612C | 318L IS812C | 567L IS912C

Highly functional constant temp. incubator with varying capacity.

Features

- Temperature is evenly distributed as it conducts heat by air jacket.
- Double-door structure reduces heat loss maintaining constant temp. state.
- Inner door for sample observation is made of toughened glass.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate overheat protector, deviation correction and key lock.
- Program operation: 3 segments, 30 steps, with repeat function.

Safety features

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

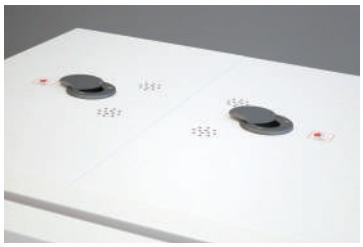
(Stand optional)

Specifications

Model		IS412C	IS612C	IS812C	IS912C
System		Natural convection by air jacket			
Operating temperature range		RT+5°C~+80°C			
Temperature adjustment accuracy		±0.5°C (at 37°C)			
Temperature distribution accuracy		±1.0°C (at 37°C)			
Interior material		Stainless steel plate			
Exterior material		Cold rolled steel plate with chemical proofing coating			
Heat insulation material		Glass fiber			
Heater		Nichrome wire heater			
		0.3KW	0.4KW	0.7KW	2.2KW
Exhaust port		I.D. 30mm×2, on top		I.D. 30mm×2, 1 for each side (left&right)	
Temperature control		PID control			
Temperature setting		Use specialized function menu key and UP/DOWN key to set			
Temperature 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			
Program mode		Program operation 3 segments 30 steps (30 steps×1, 15 steps×2, 10 steps×3)			
Heater circuit control		Deviation correction, Key lock, Power outage compensation			
Sensor		Temp. controller: Pt thermal resistance, Overheat protection: K thermocouple			
Safety device		Self-diagnosis circuit (Abnormal temp. Sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock			
Internal dimensions (W×D×Hmm)		450×480×450	600×530×500	600×530×1000	1070×530×1000
External dimensions (W×D×Hmm)		560×606×820	710×656×870	710×656×1619	1180×655×1619
Internal capacity		97L	159L	318L	567L
Shelf plate load		15kg / pc.			
Shelf rest step number / pitch		9 steps / 30mm	12 steps / 30mm	29 steps / 30mm	29 steps×2 / 30mm
Power supply (50/60Hz)		AC220 1.5A	AC220 2A	AC220 3.5A	AC220V 6.5A
Weight		Approx. 45kg	Approx. 65kg	Approx. 102kg	Approx. 166kg
Shelf plate		Stainless punching metal			
Shelf / Shelf brackets		2 pcs. / 4 pcs.		4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Optional	Stand	ON61C		—	
	Stacking bracket	OD40C	OD60C	—	
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by / running / malfunction), Observation window, External communication (RS485), Temp. output terminal (4~20mA), Output terminal for alarm device, Time up output terminal			

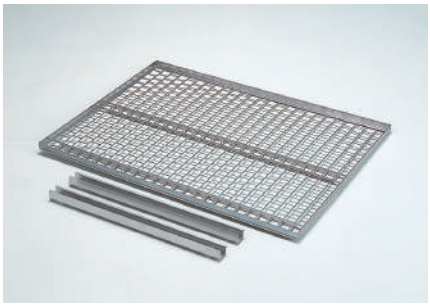
Control Panel

Exhaust port (IS412C/612C)

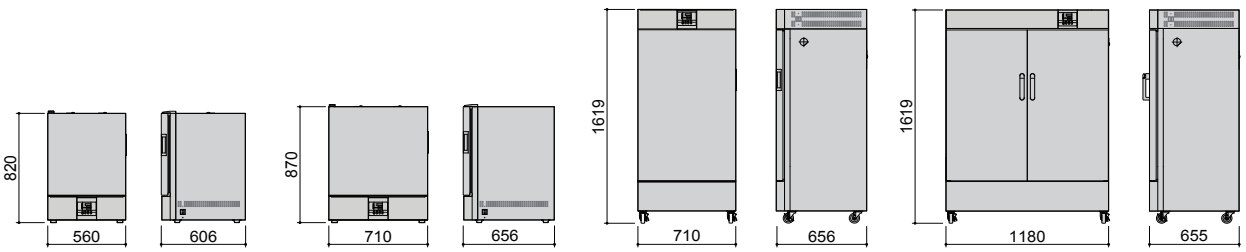


Interior (IS612C)

Shelf & Bracket Set



Dimensions (mm)



Incubator (Natural Convection, Air Jacket)

Programmable

IS401/601/801/901

Operating temp. range: RT+5°C~80°C

Temp. distribution accuracy: ±1.0°C (at 37°C)

Internal capacity: 97L IS401 | 159L IS601 | 318L IS801 | 567L IS901

Natural convection incubators equipped with various functions.

- Air-jacket method makes it possible to obtain uniform temperature distribution.
- Fixed temperature, Quick auto stop, Auto stop, Auto start, Program functions are available.
- Program function: 3 segments, 30 steps.
- Samples can be observed through the inner door.
- Safety device includes self-diagnosis, key lock and overcurrent breaker functions.
- Various optional system upgrade such as external communication terminal and time up output terminal.
- Models IS401/601 stackable.
- Operation before power failure can be resumed.

(Stand optional)

Specifications

Model	IS401	IS601	IS801	IS901
System	Natural convection by air jacket			
Operating temperature range	RT+5°C~+80°C			
Temp. control accuracy	±0.2°C (at 37°C)			
Temp. fluctuation	±0.4°C (at 37°C)			
Temp. distribution accuracy	±1.0°C (at 37°C)			
Temp. gradient	2.0°C (at 37°C)			
Time required to reach 60°C	Approx. 70min		Approx. 90min	
Interior material	Stainless steel			
Exterior material	Cold rolled steel plate with melamine resin baking finish			
Heat insulating material	Glass wool			
Heater	Iron-chrome wire heater			
	0.3kW	0.36kW	0.73kW	1.2kW
Exhaust port	30 mm I.D. ×2 pcs (on the top)		30 mm I.D. ×2 pcs (side)	
Inner door	5mm thickness reinforced glass			
Temp. controller	PID control by microprocessor			
Temp. setting method	Digital setting with key			
Temp display method	Digital display by LED			
Timer	1 min. to 99 hrs. 59 min. and 100 hrs. to 999 hrs.			
Min. division	1 min. or 10 min.			
Operation function	Fixed temperature operation, Quick auto-stop, Auto-stop, Auto-start operation			
	Program operation 3 patterns, 30 steps, Repeat function.			
Additional functions	Calibration offset, Key lock, Power failure compensation			
Heater circuit control	SSR drive			
Temp. sensor	Pt100 / K thermocouple			
Safety device	Self diagnosis functions (Temp. sensor abnormal, Heater disconnection, Triac short circuit, Automatic overheat prevention), Key lock function, Over current breaker, Resume function.			
Internal dimensions	450×480×450	600×530×500	600×530×1,000	600×530×1,000
External dimensions	560×606×820	710×656×870	710×655×1,611	1,180×655×1,619
Internal capacity	97L	159L	318L	567L
Shelf plate load	Approx. 15 kg/piece			
Shelf rest step number	11 steps	13 steps	29 steps	29 steps
Shelf rest pitch	30 mm			
Power source (50/60Hz)	AC115V / AC220V Single phase			
Weight	Approx. 55 kg	Approx. 65 kg	Approx. 65 kg	Approx. 166 kg
Accessories: Shelf plate/ bracket	Stainless steel, 2 pcs./ 4 pcs.	Stainless steel, 3 pcs./ 6 pcs.	Stainless steel, 5 pcs./10 pcs.	Stainless steel, 10 pcs./ 20 pcs.

Optional items

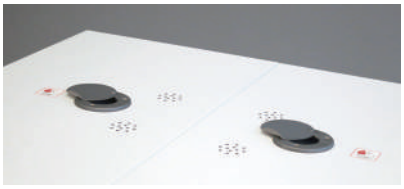
Description		Model	Product code
Stand	for IS401/IS601	ON61	211856
Stacking support	for IS401	OD40	212822
Stacking support	for IS601	OD60	212823
Stainless punching metal shelf (Loading up to 15kg/shelf)	for IS401	-	212246
Stainless punching metal shelf (Loading up to 15kg/shelf)	for IS601/IS801	-	212266
Stainless punching metal shelf (Loading up to 15kg/shelf)	for IS901	-	212371
*Cable port, 25mm dia	for IS401/IS601/ IS801/IS901	-	281121
*Cable port, 50mm dia	for IS401/IS601/ IS801/IS901	-	281122
*External communication terminal (RS485)	for IS401/IS601/ IS801/IS901	-	212575
*External Communication Adapter (Changeable to RS232C)	for IS401/IS601/ IS801/IS901	-	281388
*External alarm terminal	for IS401	-	212578
*External alarm terminal	for IS601	-	212961
*External alarm terminal	for IS801	-	212964
*External alarm terminal	for IS901	-	212967
*Time-up output terminal	for IS401	-	212579
*Time-up output terminal	for IS601	-	212962
*Time-up output terminal	for IS801	-	212965
*Time-up output terminal	for IS901	-	212968
*Temperature output terminal	for IS401	-	212588
*Temperature output terminal	for IS601	-	212963
*Temperature output terminal	for IS801	-	212966
*Temperature output terminal	for IS901	-	212969

* Please specify when ordering main unit.

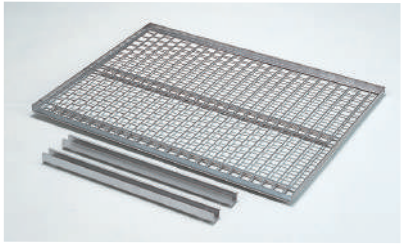
Control Panel

Interior (IS901)

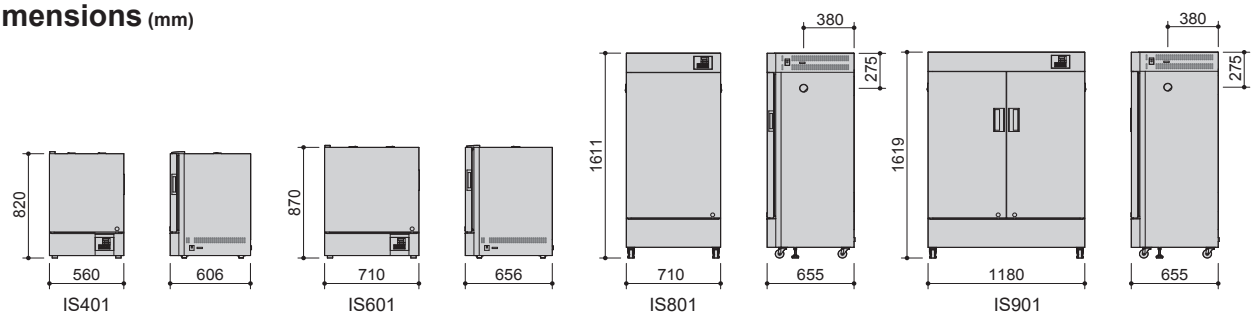
Exhaust port (IS401/601)



Shelf & Bracket Set



Dimensions (mm)



Economical Incubator (Natural Convection)

Fixed temp. operation, air jacket

IC412C/612C/812C/912C

Operating temp. range	RT+5°C~80°C

Temp. distribution accuracy	±1.0°C (at 37°C)

Internal capacity	97L IC412C	159L IC612C	318L IC812C	567L IC912C

Highly functional fixed temp. incubator with varying capacity.

Operation and functions

- Temperature is evenly distributed as it conducts heat by air jacket.
- Double-door structure reduces heat loss maintaining constant temp. state.
- Inner door for sample observation is made of toughened glass
- Easy operation with fixed temp., quick auto stop, auto stop and auto start functions.
- Designed with specialized function menu key and up/down key to set and submenu key to operate deviation correction and key lock.

Safety

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

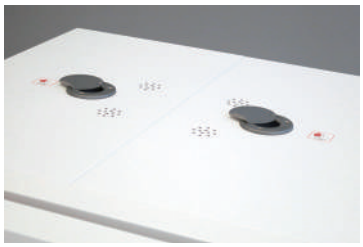
(Stand optional)

Specifications

Model		IC412C	IC612C	IC812C	IC912C
System		Natural convection by air jacket			
Operating temperature range		RT+5°C~+80°C			
Temperature adjustment accuracy		±0.5°C (at 37°C)			
Temperature distribution accuracy		±1.0°C (at 37°C)			
Interior material		Stainless steel plate			
Exterior material		Cold rolled steel plate with chemical proofing coating			
Heat insulation material		Glass fiber			
Heater		Nichrome wire heater			
		0.3KW	0.4KW	0.7KW	2.2KW
Exhaust port		I.D. 30mm×2, on top		I.D. 30mm×2, 1 for each side (left & right)	
Temperature control		PID control			
Temperature setting		Use specialized function menu key and UP/DOWN key to set			
Temperature 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., Quick auto stop, Auto start, Auto stop			
Additional functions		Deviation correction, Key lock, Power outage compensation			
Sensor		Temp. controller: Pt thermal resistance, Overheat protection: K thermocouple			
Safety device		Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Overheat protector, Overcurrent ELB, Key lock			
Internal dimensions (W×D×Hmm)		450×480×450	600×530×500	600×530×1000	1070×530×1000
External dimensions (W×D×Hmm)		560×606×820	710×656×870	710×656×1619	1180×655×1619
Internal capacity		97L	159L	1180×655×1619L	567L
Shelf plate load		15kg / pc.			
Shelf rest step number / pitch		9 steps / 30mm	12 steps / 30mm	29 steps / 30mm	29 steps×2 / 30mm
Power supply (50/60Hz)		AC220 1.5A	AC220 2A	AC220 3.5A	AC220V 6.5A
Weight		Approx. 45kg	Approx. 65kg	Approx. 102kg	Approx. 166kg
Shelf plate		Stainless punching metal			
Shelf / Shelf brackets		2 pcs. / 4 pcs.		4 pcs. / 8 pcs.	8 pcs. / 16 pcs.
Optional	Stand	ON61C		—	
	Stacking bracket	OD40C	OD60C	—	
	Others	Shelf plate (1 plate with 2 rests), cable hole (30/50mm), recorder, indicator lamp (stand-by/running/malfunction), observation window, external communication (RS485), temp. output terminal (4~20mA), output terminal for alarm device, time up output terminal			

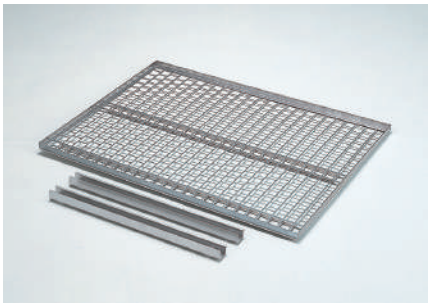
Control Panel

Exhaust port (IC412C/612C)

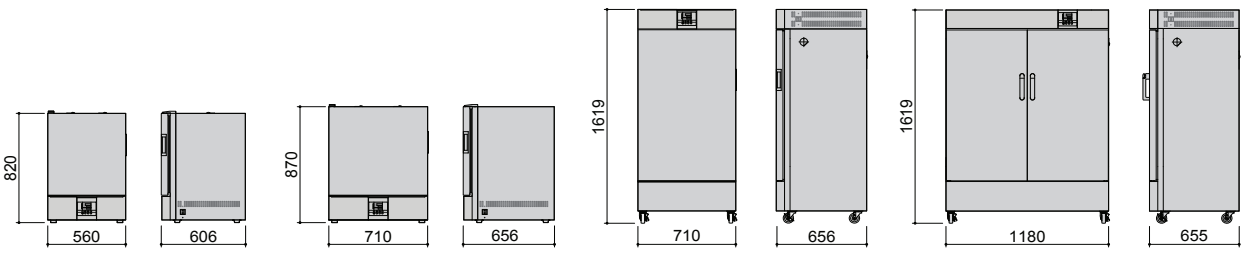


Interior (IC612C)

Shelf & Bracket Set



Dimensions (mm)



Economical Incubator (Natural Convection) CE

IC103C/113C/403C/413C/603C/613C/803C/813C/903C/913C

Operating temp. range	Room temp. +5°C~80°C

Temp. distribution accuracy	±1.0°C (at 37°C)

Internal capacity	37L IC103C/113C	97L IC403C/413C	159L IC603C/613C	318L IC803C/813C	567L IC903C/913C

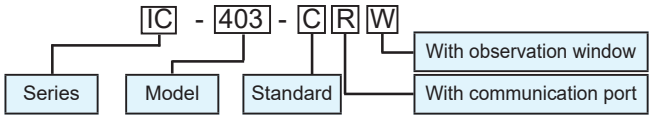
Benchtop, compact design incubators (IC103C)
General purpose incubators (IC403C/603C/803C/903C)

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

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 functions	Calibration off-set, Key-lock, Power outage compensation				
Safety device	Self diagnostic functions, Temp. sensor error, Display error, Measurement temp. error, Auto overheat prevention				
Heater control circuit	SSR drive system				
Sensor	K-thermocouple				
Internal dimensions (W×D×Hmm)	350×300×360	450×480×450	600×530×500	600×530×1000	1070×530×1000
External dimensions (W×D×Hmm)	430×397×606	560×606×820	710×656×870	710×656×1619	1180×656×1619
Internal capacity	37L	97L	159L	318L	567L
Inner door	None	Reinforced glass door x 1		Reinforced glass door x 2	
Shelf load capacity	Approx. 15 kg/pc.				
Shelf rest step number	8 steps	9 steps	12 steps	29 steps	29 steps×2
Power supply (50/60 Hz)	AC115V 1.8A AC220V 1A	AC115V 4.5A AC220V 2A	AC115V 6A AC220V 2.5A	AC115V 10A AC220V 3.5A	AC115V 13A AC220V 6.5A
Weight	Approx. 17 kg	Approx. 45 kg	Approx. 65 kg	Approx. 102 kg	Approx. 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				

Model Guide

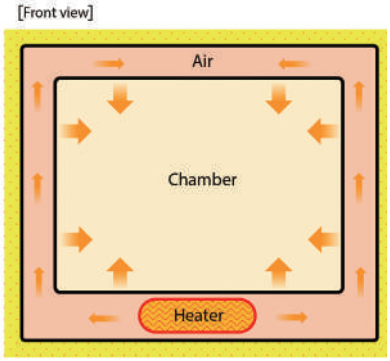


Examples:
IC-103C: Standard model
IC-403CR: Standard model with communication port
IC-603CW: Standard model with observation window
IC-803CRW: Standard model with communication port and observation window

Optional items

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

Method



Control Panel

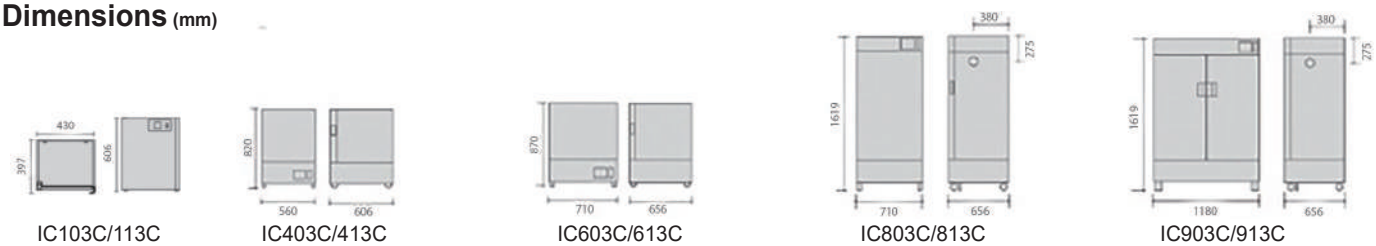
Observation Window

Interior (IC613C)

Shelf & Bracket Set

Exhaust Ports

Dimensions (mm)



Low Temperature Incubator (Programmable)

Forced Air Convection

IN602C/612C/802C/812C

Operating temp. range	-10°C~+50°C

Temp. distribution accuracy	±1.0°C (at 37°C)

Internal capacity	143L IN602C/612C	286L IN802C/812C

Standard low temperature incubator

- Large capacity
- Forced circulation with a fan enables high accuracy temperature control and even temperature distribution.
- All models come with either an observation window (W) for improved visibility or solid door.
- Inner glass door keeps temperature stable during sample observation.
- Employment of a large dual-glass door and inner door, forms a triplex glass doors for better heat insulation result (for models with observation window)
- Equipped with various functions such as self-diagnostic (tempera-ture sensor error, heater disconnection, SSR short-circuit, automatic overheat prevention), calibration off-set, clock, timer, overheat pre-vention device and key lock.
- Manual and program defrost operation are both available.
- After power failure, unit automatically restarts operation at setting before power failure.

(Stand optional)

Specifications

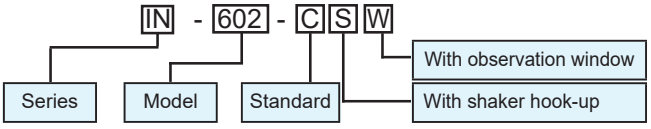
Model	IN602C	IN612C	IN802C	IN812C
System	Forced air convection			
Operating temperature range	-10°C~+50°C			
Temperature adjustment accuracy	±0.3°C (when refrigerator in continuous operation)			
	±1.0°C (when refrigerator in cycle operation)			
Temperature distribution accuracy	±1.0°C(when refrigerator in continuous operation at 37°C)			
Maximum temperature reaching time	20~50°C Approx. 20min		20~50°C Approx. 30min	
Minimum temperature reaching time	20~-10°C Approx. 45min (20~-10°C Approx. 55 min for IN602CW / 612CW)		20~-10°C Approx. 65min	
nterior material	Stainless steel			
Exterior material	Chrome free electronic galvanized plated steel plate chemical proof baking finish			
Heat insulation material	Styrene foam			
Refrigerator	Air-cooled fully closed compressor 275W		Air-cooled fully closed compressor 375W	
Refrigerator medium	R134A			
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	I.D.: 32 mm (right side)			
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	0min.~999hrs. 59min. / 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	Refrigerator overload relay, Independent overheat prevention device, Over current leakage breaker, Self diagnostic functions (Temperature sensor error, Heater disconnection, SSR short-circuit, Automatic overheat prevention), Abnormal buzzer alarm			
Internal dimensions (W×D×Hmm)	600×477×500		600×477×1,000	
External dimensions (W×D×Hmm)	710×645×915		710×645×1,630	
Internal capacity	143L		286L	
Shelf plate load	15kg / pc.			
Shelf rest step number / pitch	13 steps / 30mm		23 steps / 30mm	
Power supply (50/60Hz)	AC115 9A	AC220V 5A	AC115 10A	AC220V 6A
Weight	Approx. 89kg		Approx. 115kg	
Shelf / Shelf brackets	3 pcs. / 6 pcs.		5 pcs. / 10 pcs.	
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			

Observation window dimension: W516×H416mm

143L
IN602CW

(Stand optional)

Model Guide



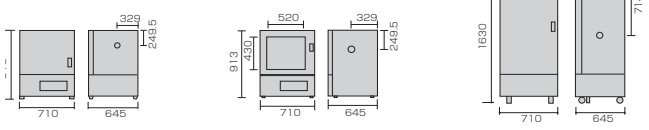
Examples:
IN-602C: Standard model
IN-602CW: Standard model with observation window
IN-602CSW: Standard model with shaker hook-up and observation window

Optional items

Description		Product code
Stand for 600 models (ON61)		211856
Metal stacking kit with cooling fan for 600 models (OD60)		212823
Stainless steel punched metal shelf up to 15kg		211221
Stainless steel wire shelf up to 20kg		213464
*External communication function (RS422)		281166
*External communication adapter (RS232C)		281167
*Temperature output terminal		281168
*External alarm terminal		281169
*Time up output terminal		281170
Seismic mat for 600 models		296902
Anti-vibration material	with support EPM-08	851352
	without support EPM-05	851351
Shaker table with slide rail for 600 models		211318

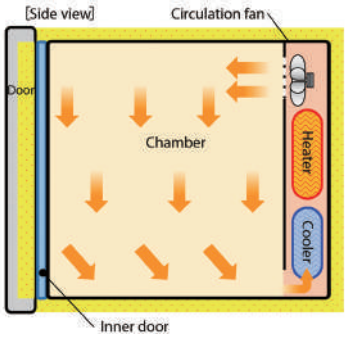
* Please specify when ordering main unit.

Dimensions (mm)



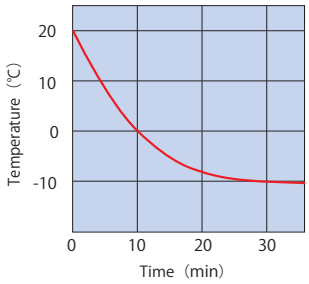
IN602C/612C IN602CW/612CW IN802C/812C

Method



Control Panel

Temperature Drop Curve (IN612C)



Interior

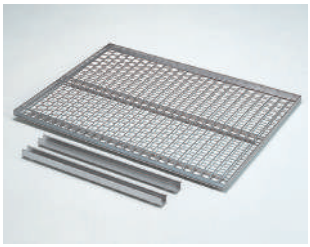
IN602CSW with MK161 shaker installed

IN612C

Interior Light

For models with observation window

Shelf & Bracket Set



Low Temperature Incubator (Programmable)

Forced Air Convection

IN604/604W/804

Operating temp. range	-10°C~+50°C

Temp. distribution accuracy	±1.0°C (at 37°C)

Internal capacity	143L IN604/604W	286L IN804

Best selling machines for low temperature tests and environmental tests.

- Applicable for a wide variety of applications from various constant temperature tests to environmental tests
- High accuracy temperature control and temperature distribution
- Designed with a large dual glass door and inner door that forms a triplex glass door for improved heat retention (IN604W)
- Optional slide shaker table available to put it and take out sample easily (IN604W)
- Interior light for better sample visibility (IN604W)
- Inner glass door keeps temperature stable during sample observation
- Employs R404A coolant that complies with Freon regulations

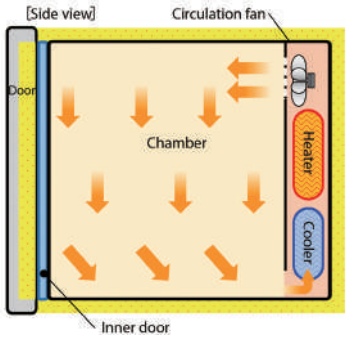
(Stand optional)

Specifications

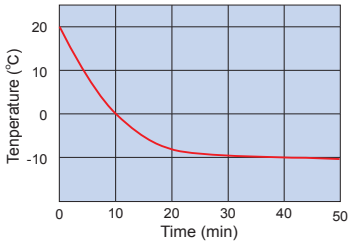
Model		IN604	IN604W	IN804
System		Forced air convection		
Operating temperature range		-10°C~+50°C		
Temperature adjustment range		±0.3°C (during continuous operation of freezer)		
		±1.0°C (during operation of freezing cycle)		
Temperature distribution accuracy		±1.0°C(continuous operation of freezer at 37°C)		
Time to attain the max. temperature		20~50°C Approx. 20min		20~50°C Approx. 30min
Time to attain the lowest temperature		20~-10°C Approx. 45min/20~4°C Approx. 55 min	20~-10°C Approx. 55min.	20~-10°C Approx. 65min
Interior material		Stainless steel plate		
Exterior material		Chrome free electronic galvanized plated steel plate Chemical proof baking finish		
Observation window		-	W516 x H416 mm	-
Heat insulator		Styrene foam (non-freon)		
Freezer		Air-cooled fully closed compressor 250W		Air-cooled fully closed compressor 300W
Freezer cooling medium		R134A		R404A
Defrosting mechanism		Manual ON/auto OFF, timer operation, cycle operation		
Blower fan		Axial flow fan		
Heater		Iron-chrome wire heater: 550W		Iron-chrome wire heater: 750W
Sensor		Double sensor: Platinum resistance temperature detector :Pt100Ω(temperature controller), K-thermocouple (Overheat preventive device)		
Cable port		I.D.: 32 mm (right side)	I.D.: 50 mm (right side)	I.D.: 32 mm (right side)
Room light / service outlet		-	Fluorescent lamp: 10W / 5A with a grounding terminal	-
Temperature control system		PID control		
Temperature setting system		Digital setting system with UP/DOWN keys		
Temp. display / information display		4-digit LED digital display / Fluorescent tube display		
Timer/timer resolution		0~999hrs 59min/1min		
Operation functions		Fixed temperature, Program operation, Auto stop, Auto start		
Program mode		Up to 32 steps, Repeat, Gradient operation		
Additional functions		Timer function (Accumulated time to 49,999 hrs, Calibration offset 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 preventive device		
Internal dimensions		W600×D477 x H500 mm		W600×D477×H1,000mm
External dimensions		W710×D645 x H913 mm		710×D645×H1,630 mm
Internal capacity		143L		286L
Shelf plate load		15 kg/pc.		
Shelf rest step number/pitch		13 steps/30 mm		23 steps/30 mm
Power supply (50/60Hz)		AC115V/AC220V Single phase with step-down transformer		
Weight		Approx. 89 kg		Approx.120 kg
Accessories	Shelf/shelf support	Stainless steel punched metal 3 stages/6		Stainless steel punched metal 5 stages/10
	Door keys	-	2 keys	-

Control Panel

Method



Temperature Drop Curve (IN604)



Interior

IN604W with MK161 shaker

IN604

Interior Light

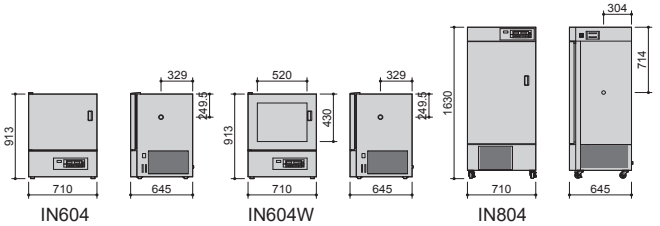
For models with observation window

Optional items

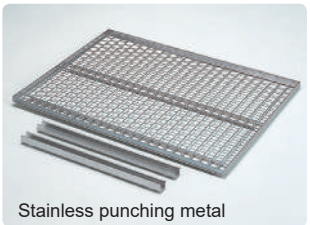
Description		Model	Product code
Stand	IN604/604W	ON61	211856
Stacking support	IN604/604W	OD60	212823
Stainless punching metal shelf (Loading up to 15kg/shelf)	All models	-	211221
Stainless wire shelf (with support 2 pcs., Loading up to 20 kg/shelf)	All models	-	213464
*External communication Function (RS422A)	All models	-	281166
*External communication Adapter (Changeable to RS232C)	All models	-	281167
*Temperature output terminal	All models	-	281168
*External alarm terminal	All models	-	281169
*Time-up output terminal	All models	-	281170
Shaker setting stage with slide rail	IN604W	-	211318
Drain water tray	All models	-	213466

* Please specify when ordering main unit.

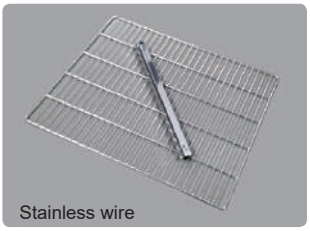
Dimensions (mm)



Shelf & Bracket Set



Stainless punching metal



Stainless wire

Low Temperature Incubator (Energy Saving & Programmable)

Forced Air Convection

Ecological Economical

INE800

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

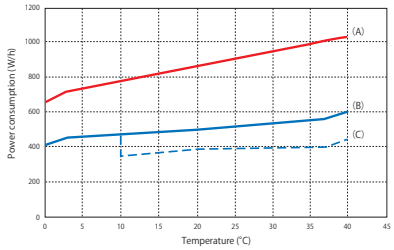
Upgraded inverter control improved refrigeration efficiency, reduced frost significantly and minimized wasted power during refrigeration.

- 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
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 material	Stainless steel
Exterior material	Chromate-free electrogalvanized steel plate Baked chemical resistant finish
Heat insulator	Styrene foam (non-freon)
Freezer	200W Rotary Unit
Cooling medium	R134a 350g
Operation range of freezer	Below 40°C
Defrosting mechanism	Hot gas bypass method, Manual (random) defrost / Auto (time) defrost
Blower fan	DC Axial flow fan 4-Step, Equipped with error signal when stopped
Heater	Iron-chrome wire heater : 750W
Sensor	Double sensor: Platinum resistance temperature detector: Pt100Ω (Temperature controller), K-thermocouple (Overheat preventation device)
Cable port	I.D.: 50 mm (Right side of main unit)
Temperature controller	PID control by microprocesser
Temperature display	Setting Temp. Display : 5-digit orange LED digital display, Actual Temp. Display : 4-digit green LED digital display
Timer / timer resolution	0~99hr. 59min. / 1min.
Operation function	Fixed temperature, Auto start, Auto stop, Quick auto stop, Program (99 steps, 99 patterns)
Additional functions	Timer, Calibration off-set, Electricity & CO_2 emission monitor, Voltage recovery optional, User setting saving/Readout, Calendar timer (24 hours)
Safety device	Self diagnostic function (Temp. sensor error, Heater disconnection, SSR short-circuit, Main relay error, Automatic overheat prevention), Key lock, Overcurrent electric leakage breaker, Overheat preventation device, Fan malfunction detector, Cooling high-pressure detector, Inverter malfunction detector
External dimensions	W710×D645×H1730mm
Internal dimensions	W600×D477×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)	AC100V~240V
Weight	Approx. 135kg
Included accessories	Stainless steel punched metal 5 pcs. shelf / 10pcs. Brackets, 2 keys, Silicon stopper for cable hole 1 pc

Power Consumption Comparison



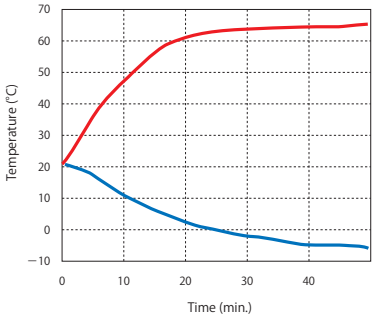
Unit : Wh

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

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

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

Falling / Rising Temp. Curve

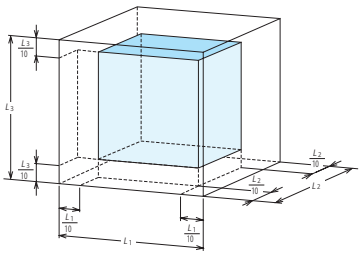


9 Point Temperature Distribution

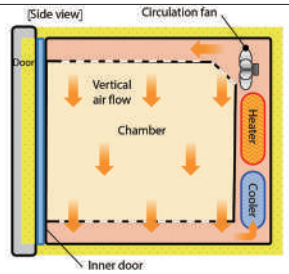
	Upper Front Left	Upper Back Left	Upper Front Right	Upper Back Right	Lower Front Left	Lower Back Left	Lower Front Right	Lower Back Right	Center Side
No load	37.1	36.2	37.2	36.9	36.8	36.8	37.1	36.9	37.0
Loaded	37.1	36.3	37.0	36.9	36.5	35.9	36.7	36.1	37.0

(°C)

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



Method

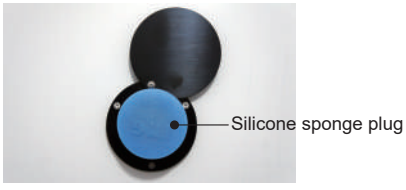


Control Panel

Overheat Prevention Device

External Output Terminal (Top: optional Bottom: standard)

Cable Port (I.D.Φ50mm standard)



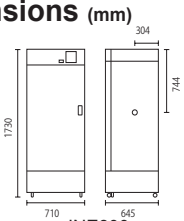
Shelf & Bracket Set

Optional items

Description	Product code
(1) Stainless steel punched metal shelf up to 15kg	211221
(2) Stainless steel wire shelf up to 20kg	212918
(3) External 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

Low Temperature Incubator (Programmable, Peltier Cooling)

Forced convection, economy

IJ101/101W/201/300

Operating temp. range	+5°C~ +60°C

Temp. distribution accuracy	±1.0°C (at 37°C)

Internal capacity	15.6L IJ101/101W	27L IJ201	43L IJ300

Highly functional fixed temp. incubator with varying capacity.

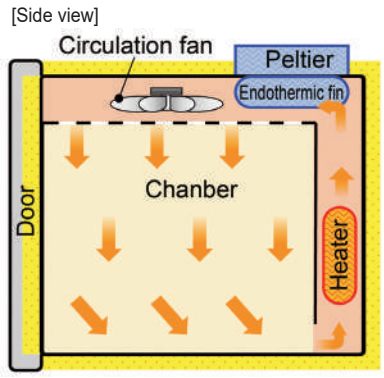
- Compact model ideal for sample preservation and constant temperature testing.
- CFC free, low vibration, with cooler equipped with peltier elements.
- Fixed temperature (IJ101/101W), Programmable (IJ201/300)
- Observation window made of environment-friendly glass (combination of energy-saving pair glass and half-tempered glass)
- Option to mount on an air jacket and stack units.
- Optional sliding mounting table for setting a micro-shaker and conveniently adding/removing samples (for IJ300, not applicable to IJ101W)
- Enhanced safety with the addition of self-diagnostic functions, auto overheat prevention, overheat prevention device and over current circuit breaker.

Specifications

Product Code	221164	221185	221158	221159
Model	**IJ101**	**IJ101W**	**IJ201**	**IJ300**
System	Forced convection			
Operating temp. range	+5°C~ +60°C (at room temp. ≦25°C)			
Temp. control accuracy	±0.3°C (at 37°C)		±0.5°C (at 37°C)	
Temp. distribution accuracy	±1.0°C (at 37°C)			
Time to max. temp (20~60°C)	Approx. 60min.		Approx. 50min.	Approx. 60min.
Time to the lowest temp. 20~0°C	Approx.100min.		Approx. 120min.	
Interior material	Stainless steel			
Exterior material	Chrome free electronic galvanized plated steel plate chemical proof baking finish			
Heat Insulator	Urethane foam			
Heater	Mica Heater 120W		Pipe Heater 150W	Pipe Heater 300W
Condenser	Peltiert element, Forced radiation type			
Temp. control method	PID Control			
Temp. setting method	Digital setting by UP/DOWN key		Dedicated operation menu key and digital setting by UP/DOWN key	
Operation function	Fixed temperature		Program (30 steps×1, 15 steps×2, 10 steps×3), Fixed temperature, Quick auto-stop, Auto-stop, Auto-start	
Additional functions	Temp. Preset (Memorize and reload 1 point temperature)		Calibration offset , Key-lock, Auto recovery at power failure	
Sensor	Thermistor		Double sensor: Platinum resistance Pt 100Ω (Temp. controller), K-thermocouple(Overheat preventer)	
Safety device	Self diagnostic function (Temperature sensor error, Heater disconnection, SSR short circuit, Automatic overheat) , Overheat preventive device(ij201/300), Liquid pressure type overheat preventive device, Over current electric leakage breaker, Main relay error			
Internal dimensions	W250×D250×H250mm		W300×D300×H300mm	W350×D350×H350mm
External dimensions	W350×D396×H530mm		W580×D417×H437mm	W470×D496×H665mm
Internal capacity	Approx. 15.6L		Approx. 27L	Approx. 43L
Shelf load capacity	15kg / shelf			
Shelf step	7 steps		8 steps	10 steps
Power supply (50/60Hz)	AC115V / AC220V single phase with step-down transformer			
Weight	Approx. 20kg		Approx. 25kg	Approx. 37kg
Accessories	Shelf (Stainless punching metal) 2pcs, Shelf support 4pcs. , Receiver for drain 1pc.			

Control Panel

Method



Interior

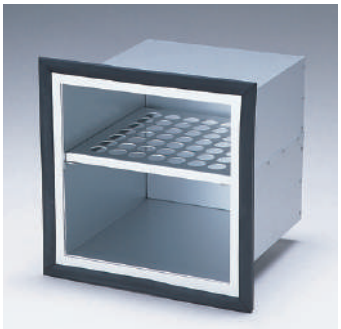

IJ300

Optional items

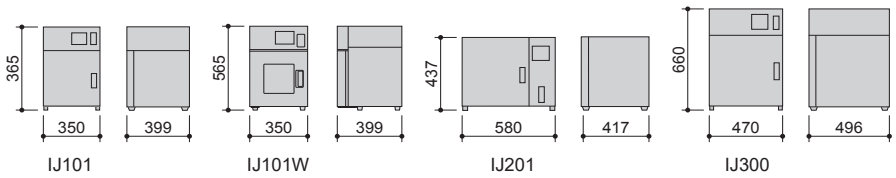
Description		Product Code
Stainless punching metal shelf (loading up to 15kg/shelf)	for IJ101/101W	221180
Stainless punching metal shelf (loading up to 15kg/shelf)	for IJ201	221186
Stainless punching metal shelf (loading up to 15kg/shelf)	for IJ300	221187
*Air jacket	for IJ101/101W	221179
*Air jacket	for IJ201	221165
*Air jacket	for IJ300	221166
*Stacking support	for IJ101/101W	281138
*Stacking support	for IJ201	221167
*Stacking support	for IJ300	221168
*External communication terminal (RS485)	for IJ series	281191
*External communication adapter	for IJ series	281202
*External alarm terminal	for IJ series	281203
*Temperature output terminal (4-20mA)	for IJ series	281204
*Time-up output terminal	for IJ series	281205
*Internal door	for IJ101/101W	281206
*Internal door	for IJ201	281207
*Internal door	for IJ300	281208
Internal door for air jacket	for IJ101/101W	281209
Internal door for air jacket	for IJ201	281210
Internal door for air jacket	for IJ300	281211

* Please specify when ordering main unit.


Stacking support


Internal door for air jacket

Dimensions (mm)



Double Chamber Incubator (Natural Convection & Low Temp.)

High temp. in upper chamber, low temp. in lower chamber

INC821C

Operating temp. range	4~50°C Lower	RT+5~80°C Upper

Temp. distribution accuracy	±1.0°C (at 37°C)

Internal capacity	150L Upper	143L Lower

High-temp. and low-temp. incubation conducted for 1 set of product simultaneously.

Operation and functions

- Upper chamber is fixed-temp. constant temp. oven with timing function and overheat protector while lower chamber is low constant temp. oven available to set 6 programs of 30~10 steps.
- Lower chamber has cycle/manual defrost function, easy to defrost.
- Door locks are set at both upper and lower chambers.

Safety features

- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), refrigerator heat overload protector, refrigerator delay start protection, overheat protector, electric leakage breaker, key lock, etc.

Specifications

Model	INC821C	
System	Forced convection circulation	
Basic constitution	Lower chamber: Low temp. incubator	Upper chamber: High temp. incubator
Operating temperature range	4~50°C	RT+5~80°C
Temp. control accuracy	±0.3°C(the refrigerator in continuous operation)	±0.5°C(at 37°C)
Temp. distribution accuracy	±1.0°C (at 37°C the refrigerator in continuous operation)	±1.0°C (at 37°C)
Interior material	Stainless steel (SUS304)	
Heater, insulating material	Ferrochrome heater, foaming polyethylene (Freon-free)	Ferrochrome heater, Glass wool
Heater power	550W	400W
Blow fan	Axial flow fan	--
Refrigerator, refrigerant	Air cooling 250W R134A	--
Defrost structure	Manual / cycle	--
Cable hole	I.D.50mm (right side)	I.D.30mm (right side)
Exhaust port	--	30mm on the top
Controller	VS4 program operation	VS3 fixes temp. operation
Sensor	Pt100 Ω	Pt100 Ω & K type
Heater control	SSR control	
Operation function	Program (30 steps×1, 15 steps×2, 10 steps×3), Fixed temp., Quick auto stop, Auto start, Auto stop	Fixed temp., Quick auto stop, Auto start, Auto stop
Safety device	Self-diagnosis circuit (Abnormal temp. sensing, Heater disconnection, Auto overheat prevention, SSR short circuit), Key lock, Overheat protector in chamber, Overcurrent ELB	
Internal dimensions (W×D×Hmm)	600×477×500	600×530×500
External dimensions (W×D×Hmm)	710×656×1792	
Internal capacity	143L	150L
Shelf plate load	15kg / pc.	
Shelf rest step number / pitch	13 steps / 30mm	24 steps / 30mm
Power supply (50/60Hz) rated current	AC220 10A	
Weight	Approx. 160kg	
Shelf plate	Stainless punching metal	
Shelf / Shelf brackets	3 pcs. / 6 pcs.	2 pcs. / 4 pcs.
Door key	2 pcs / each chamber	
Optional	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by / Running / Malfunction), External communication (RS485), Temp. output terminal (4~20mA), Output terminal for alarm device, Time up output terminal	

Control Panel

Interior

Double Chamber Incubator (Low Temp.)

IQ822C

Operating temp. range -10~50°C | Temp. distribution accuracy ±1.0°C (at 37°C) | Internal capacity 143L×2

Double chamber low temperature incubator with independent program.

- Control panel on the door makes operation easier.
- Six programs can be registered from 30 steps to 10 steps according to specific tests including incubation-storage process.
- Simply pressing the special button allows setting of manual defrosting operation in addition to cycle defrosting operation (fixed).
- Large cable ports of I.D.50 mm on each chamber.
- Comprehensive safety functions including self diagnostic, key lock, electric leakage breaker with over current protection, overheat preventive device.
- Door keys included.

Specifications

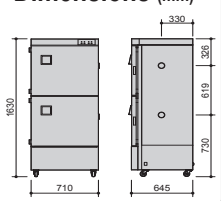
Model		IQ822C
System		Forced air convection
Operating temp. range		-10 to +50°C (for both upper and lower stage)
Temp. adjustment range		±0.3°C (During continuous operation of freezer, for both upper and lower stage)
Temp. distribution accuracy		±1.0°C (Continuous operation of freezer at 37°C, for both upper and lower stage)
Time to attain max. temp.		20 to 50°C Approx. 25 min
Time to attain min. temp.		20 to -10°C Approx. 45 min
Interior material		Stainless steel plate, 2-chamber system
Exterior material		Chrome free electronic galvanized plated steel plate, Chemical proof baking finish
Heat insulator		Styrene foam (non-Freon)
Freezer		Air cooled fully closed compressor: 250W×2
Freezer cooling medium		R404A
Defrosting mechanism		Manual defrosting (Manual ON / Auto OFF), Cycle defrost
Heater		Iron-chrome wire heater: 550W×2
Sensor		Platinum resistance temperature detector: Pt100Ω (Temperature controller), K-thermocouple (Overheat preventive device)
Cable port		I.D. 50 mm (right side, upper / lower stages)
Temp. control system		PID control with a micro computer
Temp. setting system		Digital setting system the dedicated select keys
Temperature display		Set temperature display: 4-digit green LED digital display Temperature display: 4-digit red LED digital display
Timer		1 to 99 hrs 59 min or 100 to 999 hrs 50 min (Timer wait function)
Operation functions		Fixed value, Program (up to 30 steps x 3 patterns), Auto start, Auto stop, Quick auto stop
Additional functions		Calibration offset, Power outage compensation
Heater control circuit		SSR drive system
Safety device		Self diagnostic (Memory error, Temp. Sensor error, Heater disconnection, SSR short-circuit, Automatic overheat prevention, etc.), Key lock, Over current ELB, Overheat preventive device
Internal dimensions		W600×D477×H500 mm 2 chambers
External dimensions/Internal capacity		W710×D645×H1,675 mm / 143L×2 chambers
Shelf load capacity		15 kg / unit
Shelf rest step number/pitch		13 stages×2 chambers / 30 mm
Power supply (50/60z)		AC220V Single phase
Weight		Approx.165 kg
Acces-sories	Shelf/shelf support	Stainless steel punched metal 3 stages×2 chambers = 6 / 6×2 chambers = 12
	Door keys	2 keys×2 sets

Optional items

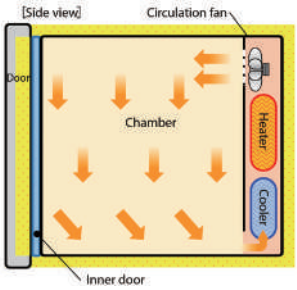
Description	Product Code
Stainless punching metal shelf (loading up to 15kg/shelf)	211221
Stainless wire shelf (with support 2 pcs., loading up to 20 kg/shelf)	212918
Drain water tray	213466
*Temperature output terminal (4-20mA)	281179
*Time-up output terminal	281180
*External communication terminal (RS485)	281181
External communication adapter, RS485-RS232C (conversion)	281182
*External alarm terminal	281183

* Please specify when ordering main unit.

Dimensions (mm)



Method



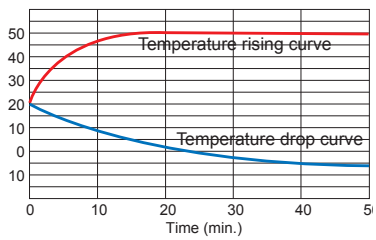
Control Panel

Defrost key and Door key

Cycle defrosting operation (fixed) and manual defrosting operation can be performed with the dedicated keys. The door is equipped with a key for security.

Interior

Temp. rise / drop characteristic curves



CO_2 Incubator

Water / Air Jackete

BNA600/IP600

Operating temp. range	RT +5~50°C

Temp. distribution accuracy	±0.2°C (at 37°C) BNA600	±0.25°C (at 37°C) IP600

Internal capacity	167L

167L
BNA600

167L
IP600

- Extremely stable incubation atmosphere inside the chamber by water jacket. (BNA600)
- Eliminates source of contaminants by stainless steel. (IP600: interior material, shelf, humidifying tray)
- Visualized operating condition, easy operation even with gloves on.
- History function ensures trouble-free management at night and on holidays.
- Simple and functional internal chamber.
- Eliminates source of contaminants with optional HEPA filter circulation.
- Designed with reduced power / CO_2 consumption.

Control Panel

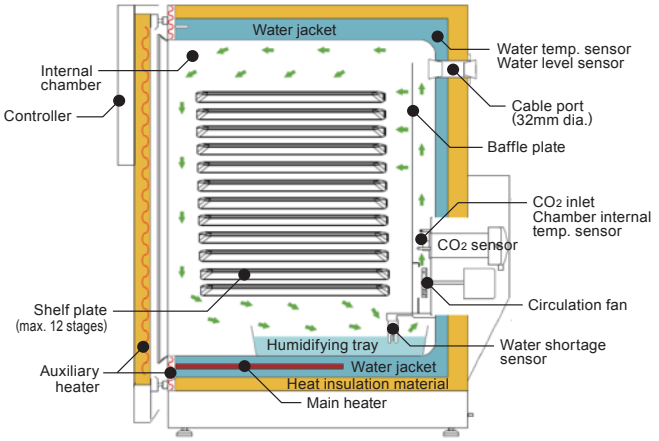
Specifications

Model	BNA600	IP600
System	Water jacket	Air jacket with drying sterilization
Operating temp. range	Room temp. +5~50°C	
Humidify system	Natural evaporation by water in tray	
Operating humidity range	More than 95%R.H.	More than 95%R.H.±5%R.H.
CO_2 density adjustable range	0 (at atmosphere) ~20.0%	
Temp. control accuracy (JTM K05)	±0.1°C (at 37°C)	
Temp. fluctuation (JIS)	±0.2°C (at 37°C)	
Temp. distribution accuracy (JTM K05)	±0.2°C (at 37°C)	±0.25°C (at 37°C)
Temp. gradient (JIS)	±1.0°C (at 37°C)	
CO_2 density control accuracy	±0.2% (at 37°C, set at 5.0%)	
CO_2 supplying pressure	0.03 ± 0.02MPa	
Exterior material	Cold rolled steel plate with baked-on melamine resin finish	
Inner door	Thick reinforced glass	
Interior material	Stainless steel (SUS304)	Antibacterial stainless steel
Internal dimensions (W×D×Hmm)	485×540×640, approx. 167L	
Shelf rest pitch/steps	40mm, 12steps	
Max. shelf load	5kg / pc.	7kg / pc.
Cable port	I.D. 32mm (back)	
Display	7-inch color LC touch panel (Japanese / English / Chinese)	
Temp. control sensor	Pt100Ω	
CO_2 sensor	Infrared ray absorption type	
Operation function	Temperature output terminal. CO_2 concentration output terminal, external alarm output terminal, External communication terminal (optional), Operation history display, output to the USB memory	
Safety device	Electric leakage breaker, Independent overheat prevent function, Temp. upper / lower limit abnormal, CO_2 concentration upper/Lower limit abnormal, Self diagnosis function (Sensor, Heater, SSR, Main relay, Automatic overheat prevention), Door open alarm, Water-level abnormal (BNA only), Humidifying water shortage alarm, Overturn prevention bracket	
External dimensions	W600×D664×H880mm	
Weight	Approx. 100kg	Approx. 110kg
Power source (50/60Hz)	AC115V/AC220V Single phase	
Accessories	Shelf plate (Aluminum)×4pcs., Humidifying tray (BNA: SUS304, IP: antibacterial stainless steel), CO_2 supply hose (I.D. 5mm×2m), Hose clamp×2pcs., Water supply/drain hose (BNA only, I.D.9mm×1.5m), Silicon plug for cable port×2pcs., Spanner, Antirust agent	

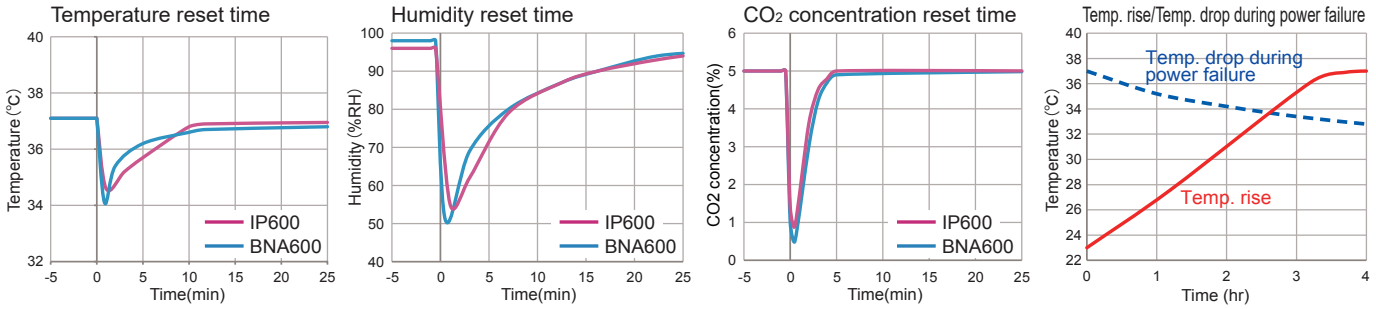
Interior

- Single-piece internal bath,with seamless shelf support.
- Highly-reliable CO_2 sensor.
- CO_2 gas consumption.
- Aluminum-made shelf plate.
- Antibacterial shelf plate (option).
- Cable hole (32mm dia.).
- Function: to announce the need for replenishment of humidifying water.

Interior Structure (BNA600)



Performance Curve



Reset performance after opening door for 30 seconds

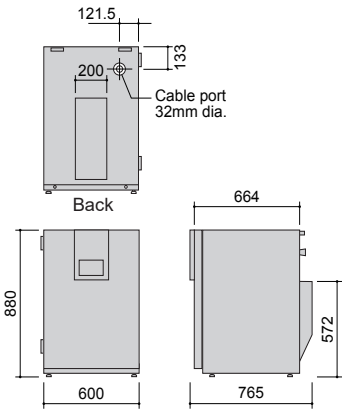
Optional items

Description	Item Code
Aluminum punching shelf (standard, loading up to 5kg/shelf)	213747
Antibacterial aluminum punching shelf (loading up to 5kg/shelf)	213748
Antibacterial stainless punching shelf (loading up to 5kg/shelf)	211253
Humidifying stainless tray (standard, 4L)	213749
Antibacterial humidifying stainless tray (4L)	213750
Stacking support kit	213751
Insulated stacking support kit	211254
Insulated stacking support kit for IP400	211255
Low-floor stand with casters	213752
Stand	213753
Anti-rust agent for water jacket, 50mL (10mL/time×5 times)	213758
Anti-rust agent for humidifying tray, 25g/1 pc. (Approx. 9g / time)	213759
*Clean circulation maintaining system, HEPA filter, FED standard Class 100	213755
CO_2 sample port (IN)	213760
*External communication terminal (RS485)	213756
External communication adapter set (USB-RS485 conversion)	213754
CO_2 gas regulator	213757
CO_2 cylinder automatic change	281233

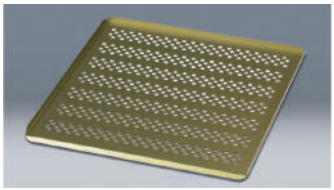
* Please specify when ordering main unit.

Two units can be installed, one unit on top of the other. The low-floor frame with casters makes it easy to move.

Dimensions (mm)



BNA600 / IP600



Antibacterial aluminum punching shelf

Clean circulation mechanism

Low-floor stand with casters

Stand

Low Temperature Incubator (Programmable, Air Jacket)

IL603

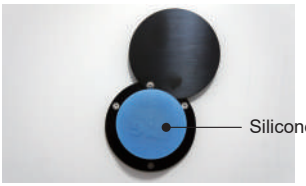
Operating temp. range 0~50°C | Temp. distribution accuracy ±1.0°C (at 37°C during continuous operation) | Internal capacity 159L

(Stand optional)

Low temperature incubator, ideal for testing incubation experiments.

- The amount of frost to the evaporator has been greatly improved due to our own refrigerator circuit.
- Air jacket structure and inner glass door is equipped.
- Analog output terminal (temperature output 4 to 20 mA, external communication (RS 485)) are equipped as standard.
- A ϕ50 mm cable hole and a silicone sponge stopper are equipped as standard.

Cable hole (left side)



Specifications

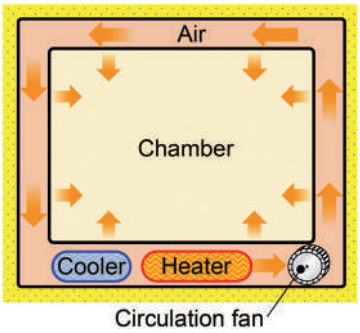
Method		IL603
Circulation method		Natural convection by air jacket
Operating temperature range		0~50°C
Temp. control accuracy / Temp. fluctuation		JTM K05 ±0.3°C / JIS ±1.0°C (at 37°C during continuous operation) JTM K05 ±1.0°C / JIS ±1.5°C (at 37°C cycle operation)
Temp. distribution accuracy / Temp. gradient		JTM K05 ±1.0°C / JIS ±2.2°C (at 37°C during continuous operation)
Refrigerator operating range		Setting temperature -5°C~44°C
Interior Material		Stainless steel SUS304
Frost observation window		Transparent acrylic board
Inner door		5mm thick reinforced glass
Temp. controller		PID control by micro processor
Sensor		Pt100Ω(Temperature controller), K-thermocouple (Overheat preventive device)
Temp. setting method		Digital setting with key
Temp display method		Digital display green LED
Heater		Iron-chrome wire heater, 800W
Refrigerator / Refrigerant		Air cooling enclose type, 300W / R-134a
Defrosting mechanism		Hot gas bypass method, System manual ON/OFF, Cycle operation
Cable hole		50mm I.D.
Operation function		Fixed temperature operation, Auto-start / Auto-stop operation, Refrigerator operation mode (continuous operation, cycle operation)
Safe Device		Earth leakage breaker, Independent overheat prevention, Delay timer for refrigerator protection, Refrigerator overload relay, Self-diagnosis function (Sensor abnormality, heater disconnection, SSR short circuit, main relay failure, auto overheat prevention)
Additional functions		Key lock function, Calibration offset function, Temperature output terminal, RS485 communication function, Alarm output terminal, Condenser filter
Internal dimensions (W×D×Hmm)		600×530×500
External dimensions(W×D×Hmm)		710×645×1,008
Internal capacity		159L
Shelf load capacity		Approx. 15 kg / piece
Shelf rest step number/pitch		12 steps / 35mm
Power source (50/60Hz)		AC115V / AC220V Single phase
Weight		Approx. 105kg
Accessories	Shelf plate/ Shelf bracket	Stainless steel, 3 pcs./ 6 pcs.

Interior

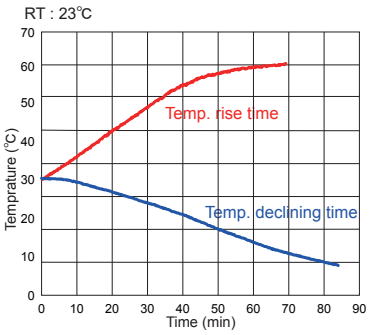
(Stand optional)

Method

[Front view]



Falling / Rising Temp. Curve



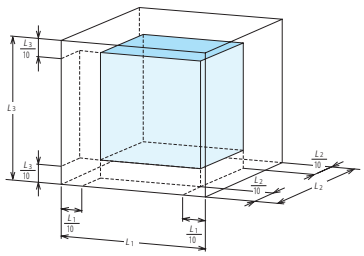
9 points distribution reference data (measured under the following conditions)

		Top right back	Upper left back	Upper right front	Upper left front	Bottom right back	Bottom left back	Bottom right front	Bottom left front	Center
No load	Continuous operation	37.3	37.0	37.5	36.9	36.8	36.5	36.4	35.9	36.9
	Cycle operation	38.4	37.8	38.0	37.8	37.6	37.6	37.6	37.3	37.6
Loaded	Continuous operation	37.6	37.4	37.3	37.4	36.7	35.8	36.7	36.6	36.3
	Cycle operation	37.2	36.9	36.8	36.9	36.3	35.6	36.7	36.3	36.1

(°C)

Condition

1. Above 9 measurement points were taken from the effective internal capacity down-scale by 10%
2. Room Temp. 23°C, AC100V, 50Hz, Average temperature during stable setting temp. set at 37°C
3. No Load condition : 3 shelves
4. Loaded condition : each of the 6 shelves were loaded with 21 Petri Dishes (Total : 126 Petri Dishes)



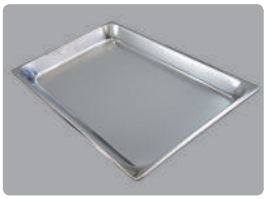
Optional items

Description	Product Code
Stand	211856
External communication adapter (Changeable to USB)	213465
External Communication Adapter, RS485-RS232C (Conversion)	281349
Stainless punching metal shelf (Loading up to 15kg/shelf)	212266
Stainless wire shelf (With support 2 pcs., loading up to 20 kg/shelf)	213464
Drain Water Tray (To be used together with Stand ON61), 4L	213466
Drain Water Bottle (To be fixed to the side of the main unit)	213467

Stand

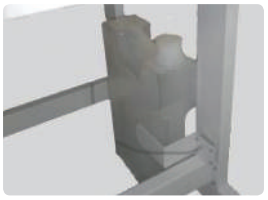
Stainless punching metal shelf

Stainless wire shelf



Drain water tray

Drain water bottle



Drain water bottle

Low Temperature Incubator (Energy Saving, Programmable, Air Jacket)

Natural convection by air jacket

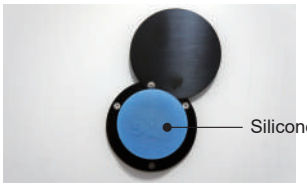
ILE800

Operating temp. range 0~60°C | Temp. distribution accuracy ±1.0°C (at 37°C during continuous operation) | Internal capacity 300L

Low temperature incubator, ideal for testing incubation experiments.

- The amount of frost to the evaporator and temperature falling time has been greatly improved due to our own refrigerator circuit and inverter system.
- Air jacket structure and inner glass door is equipped.
- Power consumption reduced about 34% compared with our previous model.
- A ϕ50 mm cable hole and a silicone sponge stopper are equipped as standard.

Cable hole (left side)



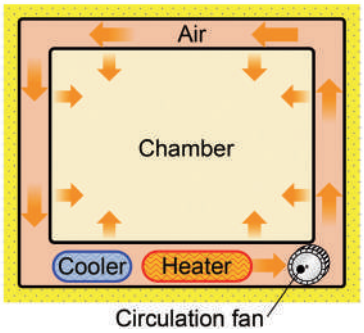
Specifications

Model		ILE800
Circulation method		Natural convection by air jacket
Operating temperature range		0~60°C
Temp. control accuracy / Temp. fluctuation		JTM K05 ±0.2°C / JIS ±0.3°C (at 37°C during continuous operation) JTM K05 ±0.3°C / JIS ±1.0°C (at 37°C cycle operation)
Temp. distribution accuracy / Temp. gradient		JTM K05 ±1.0°C / JIS ±3.0°C (at 37°C during continuous operation)
Refrigerator operating range		Setting temperature -5°C~44°C
Interior Material		Stainless steel SUS304
Frost observation window		Transparent acrylic board
Inner door		5mm thick reinforced glass
Temp. controller		PID control by micro processor
Sensor		Pt100Ω (Temperature controller), K-thermocouple (Overheat preventive device)
Temp. setting method		Digital setting with key
Temp display method		Digital display green LED
Heater		Iron-chrome wire heater, 680W
Refrigerator / Refrigerant		Inverter type compressor / HFC-R410A
Defrosting mechanism		Hot gas bypass method, System manual ON/OFF, Cycle operation
Cable hole		50mm I.D.
Operation function		Fixed temperature operation, Auto-start / Auto-stop operation, Program operation (Max. 99 patterns 99 steps repeat operation), Refrigerator operation mode, (continuous operation, cycle operation)
Safe Device		Earth leakage breaker, Independent overheat prevention, Delay timer for refrigerator protection, Refrigerator overload relay, Refrigerator pressure abnormality, Inverter abnormality, Self-diagnosis function (Sensor abnormality, heater disconnection, SSR short circuit, main relay failure, auto overheat prevention)
Additional functions		Key lock function, Calibration offset function, Condenser filter, Door switch
Internal dimensions (W×D×Hmm)		600×530×1,000
External dimensions(W×D×Hmm)		710×645×1,765
Internal capacity		300L
Shelf load capacity		Approx. 15 kg / piece
Shelf rest step number/pitch		29 steps / 30mm
Power source (50/60Hz)		AC115V / AC220V Single phase
Weight		Approx. 150kg
Accessories	Shelf plate/ Shelf bracket	Stainless steel, 5 pcs./ 10 pcs.

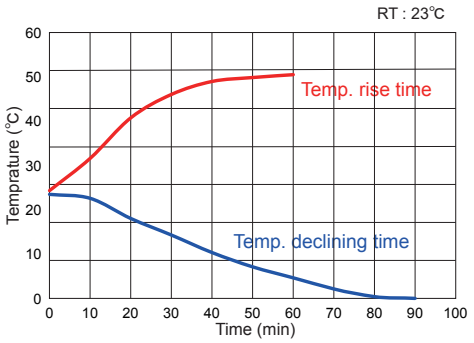
Interior

Method

[Front view]



Falling / Rising Temp. Curve

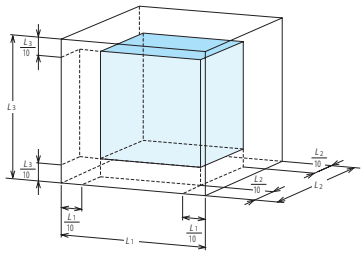


9 points distribution reference data (measured under the following conditions)

		Top right back	Upper left back	Upper right front	Upper left front	Bottom right back	Bottom left back	Bottom right front	Bottom left front	Center
No load	Continuous operation	37.9	37.6	38.3	37.7	36.9	36.7	36.6	36.4	37.3
	Cycle operation	37.9	37.7	38.4	37.8	37.0	36.8	36.7	36.5	37.4
Loaded	Continuous operation	38.4	38.3	38.6	38.7	35.9	35.8	36.0	36.1	37.5
	Cycle operation	38.3	38.4	38.8	38.9	36.1	35.9	36.2	36.2	37.6

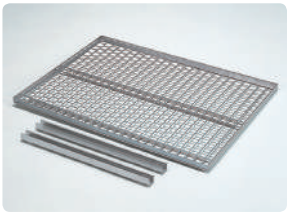
(°C)

Condition
1. Above 9 measurement points were taken from the effective internal capacity down-scale by 10%
2. Room Temp. 23°C, AC100V, 50Hz, Average temperature during stable setting temp. set at 37°C
3. No Load condition : 3 shelves
4. Loaded condition : each of the 6 shelves were loaded with 21 Petri Dishes (Total : 126 Petri Dishes)

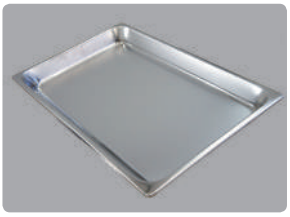


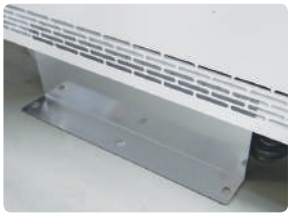
Optional items

Description	Product Code
Stainless punching metal shelf (Loading up to 15kg/shelf)	211839
Stainless wire shelf (With support 2 pcs., loading up to 20 kg/shelf)	213464
Temperature output terminal (4-20mA)	213460
External communication adapter (Changeable to USB)	213461
External communication terminal (RS485)	213462
External communication adapter (Changeable to USB)	211884
Fall Prevention Bracket (With Anchor Bolt Hole 11mm dia.)	213463
Drain Water Tray (To be used together with Stand ON61), 4L	213466


Stainless punching metal shelf


Stainless wire shelf


Drain water tray


Fall prevention bracket

Low Temperature Incubator (Programmable, Air Jacket)

Air jacket

IL612C/812C

Operating temp. range 0~50°C | Temp. distribution accuracy ±1.0°C (at 37°C) | Internal capacity 159L IL612C 300L IL812C

Multi-function refrigerant incubator by air jacket heat conduction.

Operation and functions

- Environmental friendly refrigerant R134a.
- High precision temp. control and uniform temp. distribution accuracy through air jacket heat conduction and PID control.
- Controller contains independent overheat protector circuit, based on fixed temp., auto start and auto stop operation, auxiliary with defrost, RS485 communication, temp. output terminal (4~20mA), output terminal for alarm (IL612C).
- Equipped with electronic independent overheat protector, configurated with CR5 controller (IL812C) based on the max. 99 steps program, fixed temp., auto start and auto stop operation, auxiliary with RS485 communication, temp. output terminal (1~5V), output terminal for alarm.
- Optional communication cable allows remote control of the control panel.

Safety features

- Self-diagnosis, refrigerator heat overload protector, refrigerator delay start protection, overheat protector, electric leakage breaker, key lock, etc.

(Stand optional)

Specifications

Model		IL612C	IL812C
System		Conduct, radiate	
Operating temperature range		0~50°C	
Temp. control accuracy		Refrigerator in continuous operation ±0.3°C Refrigerator ON/OFF operation ±1.0°C at 37°C	
Temp. distribution accuracy		±1.0°C (at 37°C the refrigerator in continuous operation)	
Internal door		Toughened glass 5mm	
Insulating material		Polyurethane foaming	
Refrigerator		300W R134a	
Defrost structure		Manual / cycle	
Heater		Nichrome wire heater, 800W	Nichrome wire hater, 850W
Sensor		Double sense line, platinum temp. resistance PT100 (for temp. control)+ K thermocouple (for overheat prevention)	
Overheat protector		Electronic integrated controlling	
Door lock		1 set	
Cable hole		I.D.50mm (On the right side of unit body)	
Temp. controller		VS3P PID control	CR5 PID control
Operation function		Fixed temp., Timing	Fixed temp., Timing, Max. 99 steps program
Safety device		Self-diagnosis, Overcurrent ELB, Refrigerator overload relay, Refrigerator delay timing protection, Overheat protector (IL612C), Independent overheat protector (IL812C)	
Internal dimensions (W×D×Hmm)		600×530×500	600×530×1000
External dimensions (W×D×Hmm)		710×645×1008	710×645×1600
Internal capacity		159L	300L
Shelf plate load		15kg / pc.	
Shelf rest step number / pitch		12 steps / 30mm	24 steps / 30mm
Power supply (50/60Hz)		AC220 7A	AC220 8A
Weight		Approx. 90kg	Approx. 150kg
Shelf plate		Stainless punching metal	
Shelf / Shelf brackets		3 pcs. / 6 pcs.	5 pcs. / 10 pcs.
Door key		2 sets	
Optional	Stand	ON61C	—
	Others	Shelf plate (1 plate with 2 rests), Cable hole (30/50mm), Recorder, Indicator lamp (Stand-by / Running / Malfunction), Observation window, External communication (RS485), Temp. output terminal (4~20mA), Output terminal for alarm device, Time up output terminal	

Control Panel

IL612C

IL812C

Interior (IL612C)

SINCE 1889

For the development of scientific technologies

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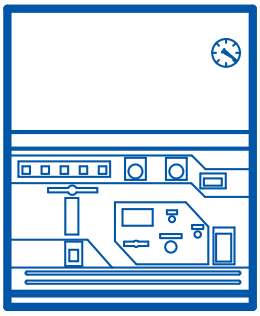


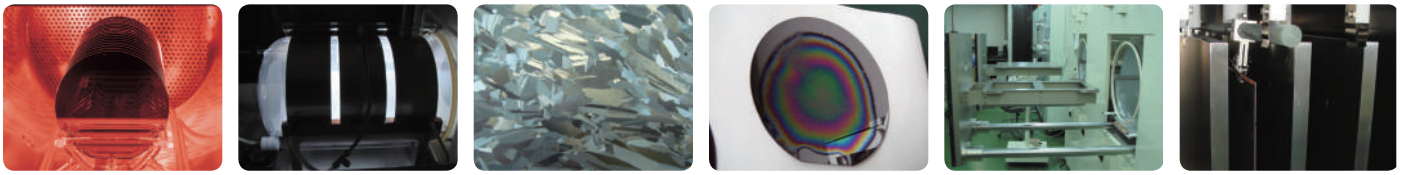
Plasma Cleaner

Contents

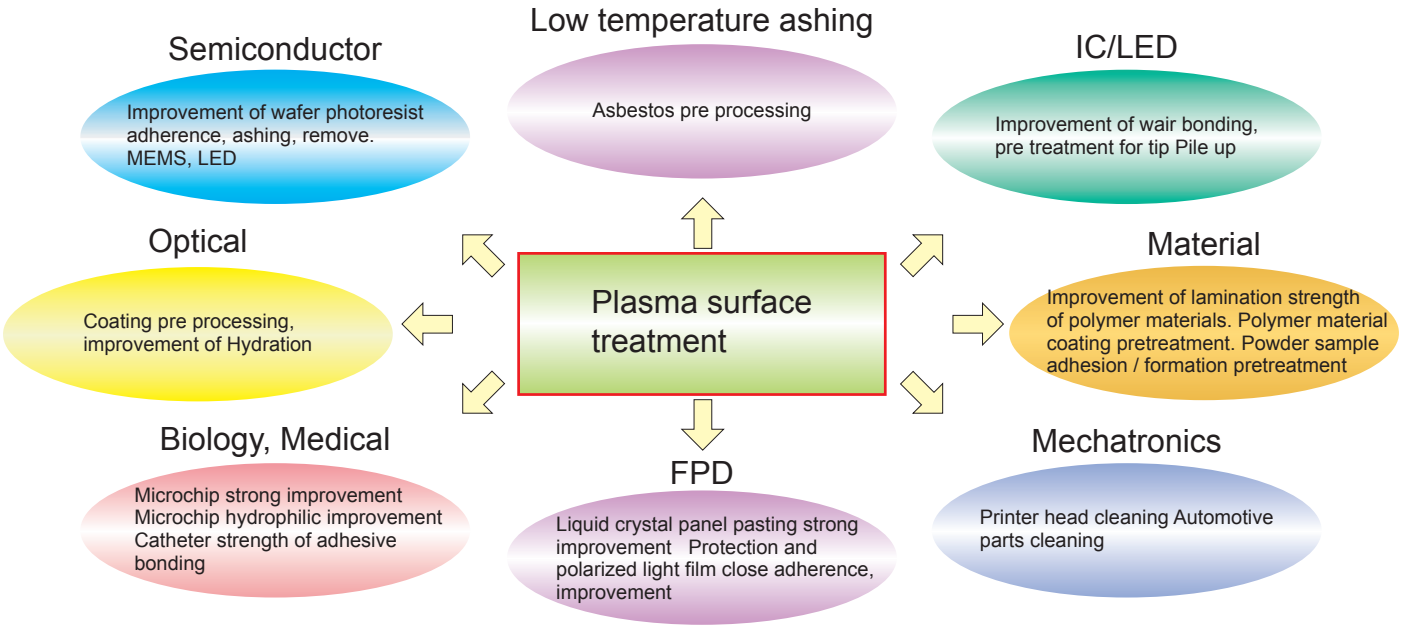
Overview Gas Plasma Reactor

According to the needs of super-fine fabrication surface treatment, reforming for research and development.

Plasma device is widely and increasingly using in the field of electronic material, dry washing and semiconductor.
Effected widely, for example, resist clearing of a silicon wafer, removal of organic film, surfactant, micro grind, removal of a carbon film.
Yamato Scientific's plasma device is according to the needs of the process as well as for research and development.



Yamato Scientific plasma surface treatment equipment has excellent performance in semiconductor.



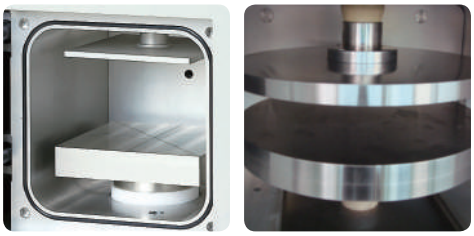
Plasma cleaner is effective in various gluing and coating plating.

DP mode Barrel type PR model

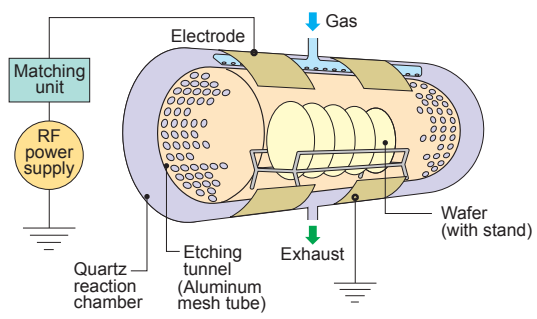
The effect is shown in register detaching of a silicon wafer, removal of organic film with oxygen or argon gas and house removal of the surfactant, micro grind and a carbon film.

RIE/DP mode Parallel flat board type PDC/V model

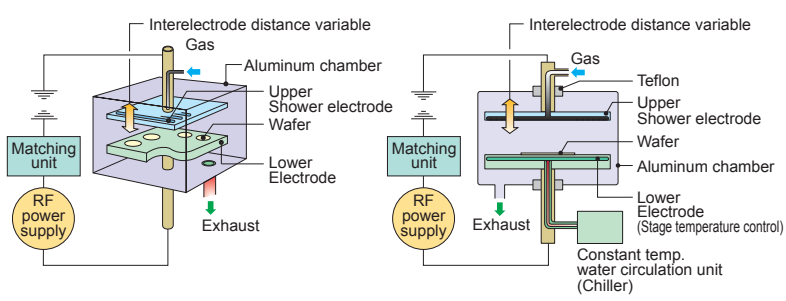
Plasma processing mode of RIE system and DP system and use for etching dry cleaning of a silicon wafer. The surface place washing and activation of a bonding pad of all kinds' sensor thermal COB are



Structure for Barrel type (DP mode)



Structure for Parallel flat board type (RIE mode)



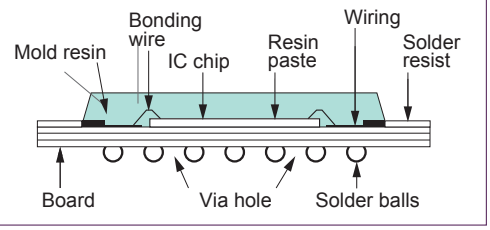
Plasma Super Cleaner

IC Package technology

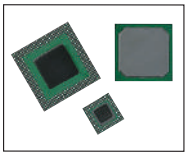
- BGA (Ball Grid Array)
- CSP (Chip Size Package)
- Picture device assembly

PLASAMA SUPER CLEANER → Die attach / Wire bonding / Molding

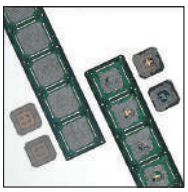
Section



BGA (Ball Grid Array Package)



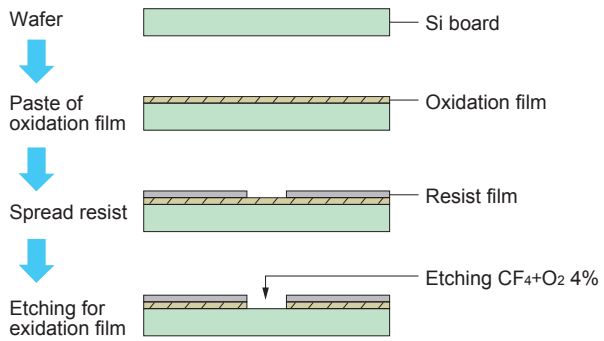
BGA type LSI



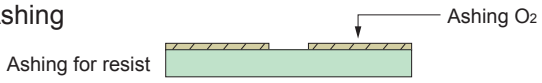
Plasma clearing for BGA package

Etching and Ashing process

Etching



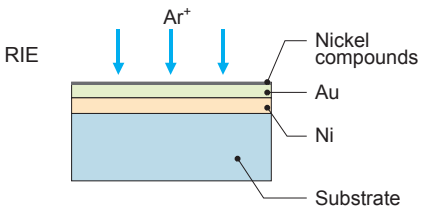
Ashing



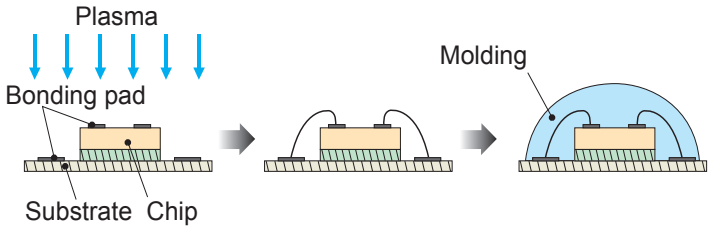
Removal of Metal oxide by Ar plasma(PDC/V series)

A lead leg material changes from Ni/Al into Cu, and mold resin from a ceramic for an IC package. It's etching cleaning process by plasma to take something more certain of these progress.

Removal of metal oxide by Ar plasma (PDC/V series)



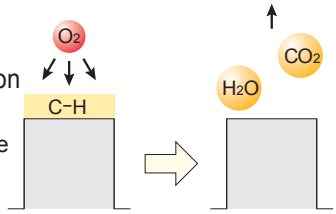
Cleaning of Circuit board (V series)



Etching and Ashing process by Plasma

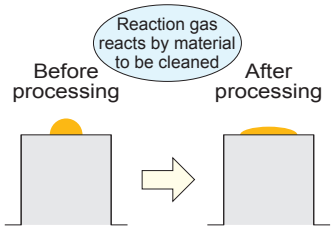
Remove oxidation material

- Solder flux residue
- Oil Grease
- Wax



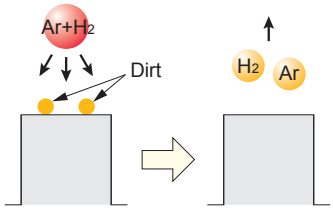
Surface modification

- Polyester
- Polypropylene
- Teflon
- Ceramic
- Polyimide



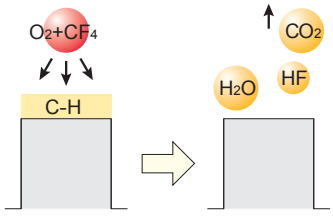
Surface cleaning

- material surface



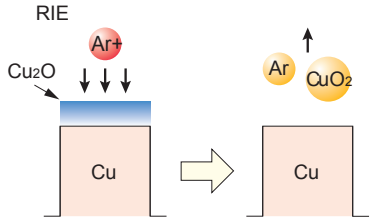
Surface etching

- Glass epoxy
- Polyimide



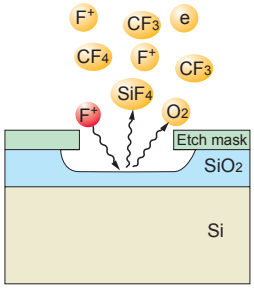
Metal oxide removal

- Cu_2O,CuO
- Al_2O_3



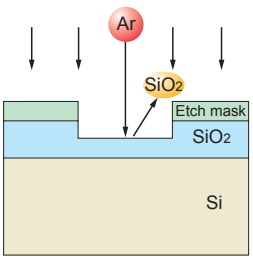
Mechanism of a Dry etching

- Barrel
- DP



Chemical dry etching (Isotropic etching)

- Parallel flat board
- Sputter



physical dry etching (Anisotropic etching)

Plasma Reactor (Barrel Chamber)

Compact, Barrel Type, Low Temperature Ashing Device

PR200/300/301

High frequency output	200W PR200	300W PR300/301

Reaction chamber	2ø100×160mm×1 PR200	ø64×160mm×3 PR300	ø118×160mm×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

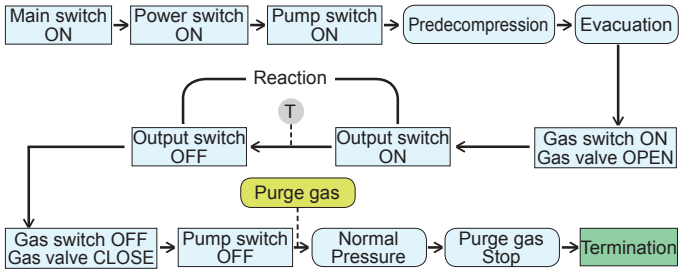
PR200

PR300 PR301

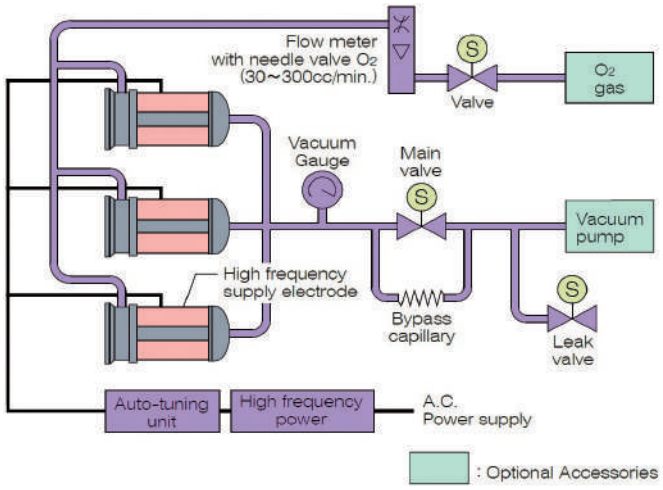
Specifications

Model	PR200	PR300	PR301
Plasma mode	Direct plasma (DP)		
High frequency output	Max. 200W	Max. 300W (100W×3 chambers)	Max. 300W
Oscillation frequency	13.56MHz		
Tuning method	Auto matching	Manual biaxial	
Reaction chamber	Pyrex glass, ø100×160mm×1 chamber	Pyrex glass, ø64×160mm×3 chambers	Pyrex glass, ø118×160mm×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)	350×400×500mm	438×520×556mm	438×520×660mm
Weight	Approx. 25kg	Approx. 36kg	Approx. 34kg
Power source (50/60Hz)	AC115V	AC115 / AC220V	
Optional accessories	Sample dish, Vacuum pump	Sample dish, stand, Shelf, Vacuum pump	

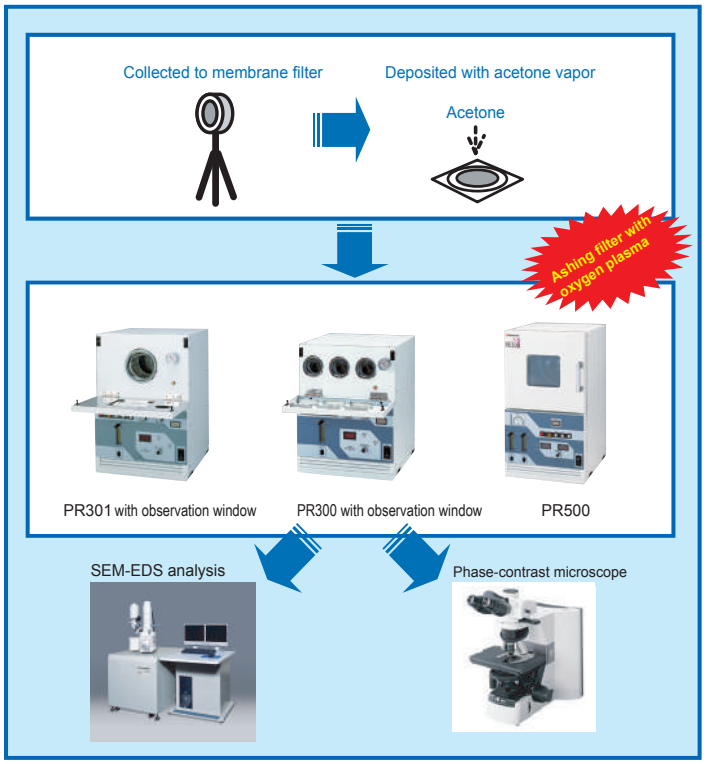
Operation Flowchart



Piping System (PR300)

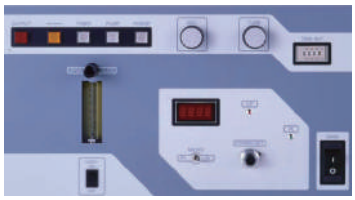


Example application: asbestos analysis pre-processing



Control Panel

PR200



PR300, PR301

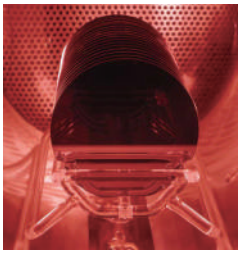
Chamber

PR200
1 chamber (ø100 x 160mm)

PR300
3 chambers (ø64 x 160mm)
Contamination free

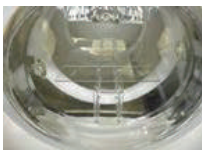
PR301
1 chamber (ø118 x 160mm)

Interior



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

Accessories



Sample dish

Sample shelf for PR300

Sample shelf for PR301

Plasma Reactor (Barrel Chamber)

Compact, Barrel Type, Low Temperature Ashing Device

PR500/510

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 (Manual version)

PR510 (Touch panel version)

Features

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

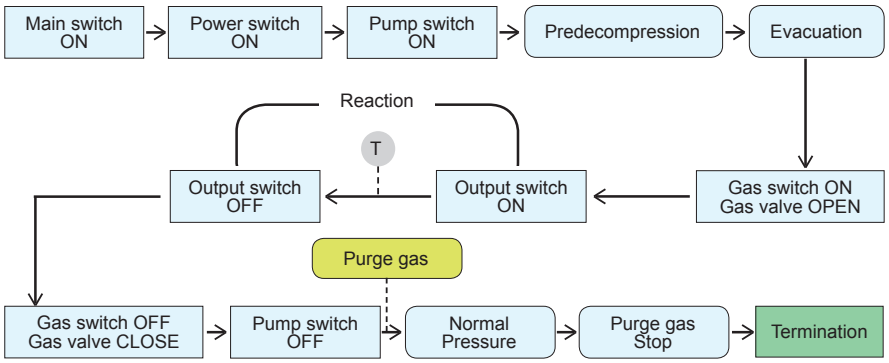
Applications

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

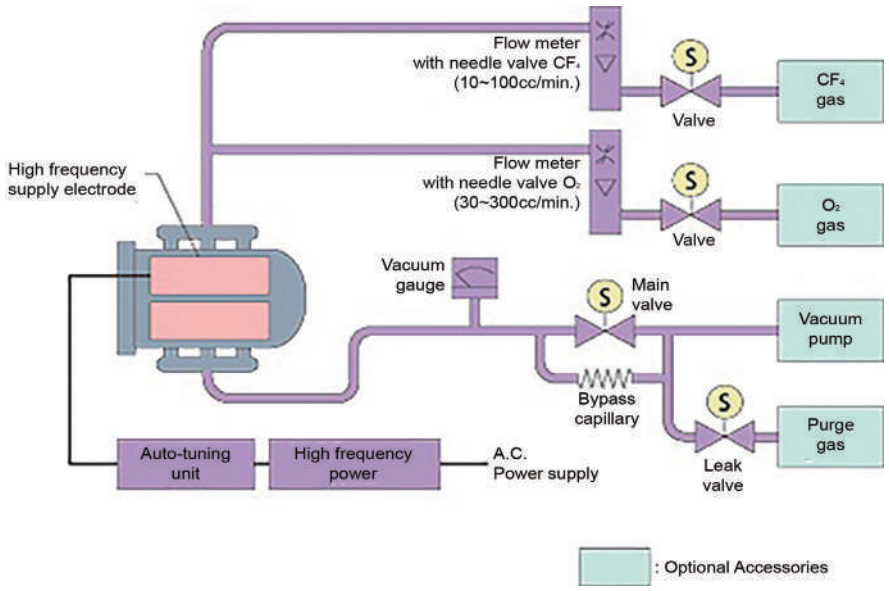
Specifications

Model	PR500 (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	Approx. 60kg	Approx. 60kg
Power source (50/60Hz)	AC115V / AC220V	
Standard accessories	Connection cable: 1 complete set Vacuum grease: 1 pc. O-ring for reaction chamber: 1pc.	
Optional accessories	Frame for wafers (2, 3, 4, 5, 6 inches) Multi-purpose angled frame Aluminum etching tunnel Stand	

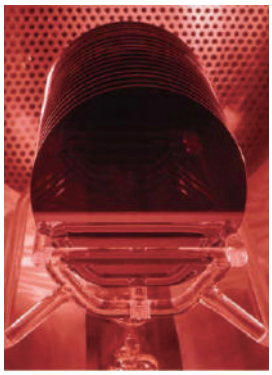
Operation Flowchart



Piping System (PR500/510)



Wafer Ashing



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

Control Panel

PR500

Chamber

ø215mm large caliber chamber

Plasma Cleaner (Parallel Electrode)

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

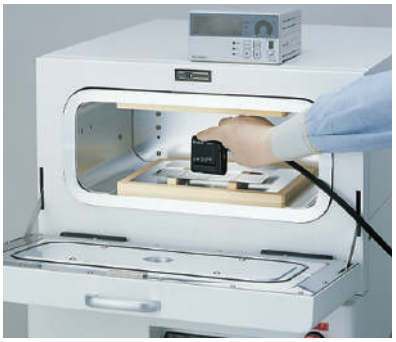
- Simple and compact plasma surface treatment device
- RIE (Reactive Ion Etching) Plasma mode, with DP (Direct Plasma) mode as option
- Excellent electrode structure for plasma uniformity
- Simple touch panel system

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

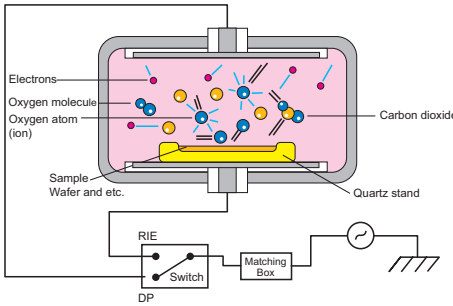
PDC210

Chamber

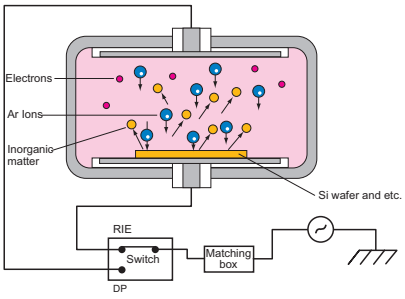


Diagram

DP(Direct Plasma) mode



RIE(Reactive Ion Etching) mode



Specifications

Model	PDC200	PDC210	PDC510
Plasma mode	RIE (DP mode option)		RIE/DP selectable
Electrode structure	Parallel flat stage plate		
Vacuum gauge	Capacitance manometer		
High frequency output	Max 300W	Max 500W	
Oscillation frequency	13.56MHz Quartz oscillator		
Output setting method	Manual setting on LCD touch panel		
Matching method	Auto tuning		
Controller	Programmable		
Display	LCD touch panel		
Chamber size	W400×D250×H150mm		W500×D300×H200mm
Stage size	W250×D170mm		W410×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)	Approx. 345L/min.		Approx. 500L/min.
External dimensions	W540×D600×H600mm	W540×D600×H600mm	W700×D700×H700mm
Weight	Approx. 100kg	Approx. 105kg	Approx. 180kg
Power source	Single phase AC115V 50/60Hz	3-phase AC200V~AC240V 50/60Hz	

Plasma Cleaner (Parallel Electrode)

Multi Stage Plasma Cleaner

PDC610

High-frequency Output	600W
Stage size	250×220 mm 1-stage, 2-stages, 3-stages selectable
Standards	FCC / CE compliant

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

Features

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

Applications

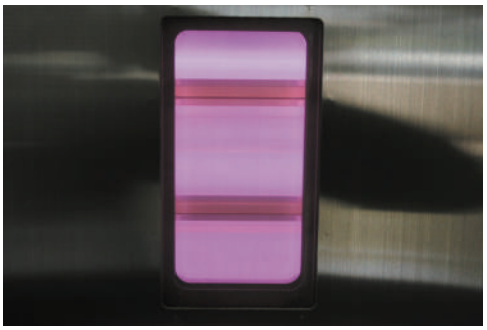
- Improvement of adhesiveness of various materials and surface reformation
- Light ashing and light etching process
- Pretreatment of implemented board bonding, plastic package and print board plating
- Processing of LED related commercial products
- Cleaning of electronic parts
- Resist peeling or residue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

Specifications

Model	PDC610
Plasma mode	RIE/DP selectable
Electrode structure	3-stage independent parallel flat plates
Vacuum gauge	Capacitance manometer
High frequency output	Max 600W
Oscillation frequency	13.56MHz Quartz oscillator
Output setting method	Manual setting on LCD touch panel
Matching method	Auto tuning
Control device	Sequencer
Display	LCD touch panel
Chamber size	W350×D270×H300 mm
Stage size	W250×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×D722×H700 mm
Exterior material	Stainless steel
Power source	3-phase AC200V~AC230V 50/60 Hz 15A (Vacuum pump included)

Chamber

Plasma Discharge



Plasma Cleaner (Parallel Electrode)

RIE and DP

V1000/V1000X/V1000XS

High frequency output	1,000W V1000	1,000 & 1500W V1000X/1000XS

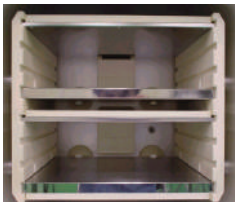
Stage size	280×280mm V1000	300×300mm(double) V1000X	400×375mm V1000XS

Purpose : Removal of Organic films, Surface cleaning, Surface reforming, Surface etching etc.

Control Display

Programmable control (touch panel)

Chamber V1000X



Specifications

	Model	V1000	V1000X	V1000XS
	Plasma Mode	RIE and DP		
Main Unit	Electrode structure	Parallel flat stage plate		
	Stage size	280mmW×280mmD	300mmW×300mmD(Double stage)	400mmW×375mmD
	Chamber size	400mmW×400mmD×380mmH	400mmW×400mmD×380mmH	600mmW×554mmD×440mmH
	Vacuum gauge	Capacitance manometer		
	Reaction gas system	Two systems		
	Controller	Programmable		
	Display	Programmable terminal (touch panel)		
Radio-Frequency Power Supply	Input	AC 220/380V,Three phase,		
	Radio-frequency output power	1,000W	1,000 & 1,500W	
	Reference oscillator	Quartz oscillator		
	Oscillating frequency	13.56 MHz		
	Matching adjustment	Automatic tuning		
Discharge System (Vacuum Pump)	Displacement	670 & 1,000L/min.	670 & 1,500L/min.	1,000 & 1,500L/min.
	Inlet configuration	NW40 with a flexible stainless steel hose (1 meter long)		
	Outlet configuration	NW40		
Gas Systems	Purge gas	Nitrogen (N_2) and a regulator (3 kgf/cm^2) with a manometer		
	Driving gas	Air or nitrogen (N_2) and a regulator (alarm contact at 10 kgf/cm^2) with a manometer		
	Reaction gas G1	Oxygen (O_2) and a mass flow controller (1000 secm)		
	Reaction gas G2	Argon (Ar) and a mass flow controller (100 secm)		
Safety Mechanisms	System Protections	Oscillator protection circuit, Front-door interlock switch (interlocked with the startup), Safety switches (interlock switch on the side panels), Vacuum leak test function, Air-purge end buzzer, Alarm buzzer, Emergency stop push-button switch		
	Actions against vacuum pump trouble	Plasma scrubber takes the counteractions listed and show an alarm message on its display when something wrong happens to the vacuum pump. ●main valve closes ●gas feed valve closes ●isolation valve closes ●oscillator stops outputting ●treatment process is suspended ●alarm buzzer starts sounding ●alarm indicator lamp lights up ●treatment process timer stops		
Required Utilities	Power (50/60Hz)	Main unit with vacuum pump	AC220V/AC380V Three phase with step-down transformer (with an accessory power cable of 3 meters long, and exposed crimp-style terminals of 8 millimeters long)	
	Gases	Driving gas	Air or nitrogen (N_2) (Feed pressure: 5 to 7 kgf/cm^2)	
		Purge gas	Nitrogen (N_2) (Feed pressure: 2 to 7 kgf/cm^2)	
		Reaction gas G1	Oxygen (O_2) (Feed pressure: 1.5 kgf/cm^2)	
		Reaction gas G2	Argon (Ar) (Feed pressure: 1.5 kgf/cm^2)	
		Connection port	1/4" swagelok joint bulkhead union (SS-400-61)	
			Note: Pressure regulators, filters and other protective devices shall be prepared by others.	
Connection Diameter of the Discharge Duct (and Inlet Port)	Vacuum pump's inlet port	NW40 (with a flexible stainless steel hose of 1 meter long)		
	Vacuum pump's outlet port	NW40		
	Main unit's ozone outlet port	163mm diameter		
	Oscillator's ventilation port	163mm diameter		
		Note: Every port has a connector designed for a flexible hose. Connect a duct to these inlet and outlet ports.		

Plasma Modifier (Barrel Chamber)

Low Frequency Plasma Device

PM100

Overview

- Barrel type and isotropic, plasma is generated throughout the chamber.
- Soft plasma as system uses low frequency wavelength.
- Suitable for biochemical systems.
- Uses oxygen as reaction gas.

Application

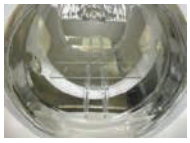
- Biochemistry (organic membrane treatment on glass substrate).
- Cleaning of glassware (sterilization).
- Cleaning of sample holder TEM, SEM, FIB etc. system.
- Treatment of sensor probe of analysis equipment.
- Acceleration test of coated film.
- Bonding of PDMS chip, glass, PDMS board.
- Degradation and acceleration test of coated film etc.

Specifications

Product code		215015
Model		**PM100**
Plasma source		Low frequency high voltage power supply
Gas Flowmeter		Oxygen gas, flow rate 30 - 300 mL / min
Interior dimensions		I.D 100mm×L160mm
Exterior dimensions		310mm×300mm×448Hmm / Approx. 16kg
Utility	Power (50/60Hz)	AC115V / 220V Single phase with step-down transformer
	Vacuum pump connection port	O.D 15mm with hose fitting (Recommended pump exhaust speed 30L/ min)
	Gas connection port	O.D 6.35mm with hose fitting

Chamber

Observation window



Sample shelf

Oil-sealed vacuum pump

PQ30

- Integrated check valve below the inlet port and pump internal atmospheric release mechanism for backflow prevention.
- Magnet coupling produces low noise and results to longer lifetime of shaft seal.

Specifications

Product code	242284
Model	**PQ30**
Effective pumping speed	30/36 L / min (50/60 Hz)
Reaching pressure	0.67Pa
Intake pipe diameter	I.D 15mm
Safety function	Back flow prevention, Atmospheric release mechanism
Coupling	Magnet coupling
Exterior dimensions	120mm×288.5mm×190Hmm
Power (50/60Hz)	AC115V / 220V Single phase with step-down transformer
Weight	9.3kg

Plasma Cleaner (Parallel Electrode, Compact)

Reactive Ion Etching

PiPi

High frequency output 50~300W | Electrode dimensions 130×130mm

Plasma

Among the plasmatized gases, in addition to ions and electrons, there are electrically neutral atoms and molecules that electrons have moved to the electrical excitation.

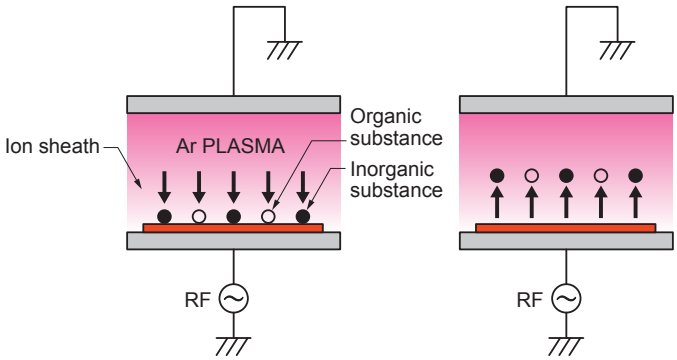
- Economical plasma cleaning machine
- Simple plasma processing operation

Plasma mode: RIE (Reactive Ion Etching)

Sputtering effect of ions makes it possible to remove not only organic matter on the surface of the object but also inorganic matter.

- Removes organic matter
- Reforms resin / film surface
- Improves bonding effect
- Improves hydrophilic
- Removes metal oxides

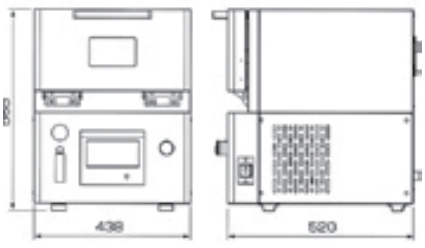
Chamber



Specifications

Model	PiPi
Performance	
Plasma :mode	RIE (reactive ion etching)
Electrode structure	Parallel flat panel type
Electrode dimensions	W130×D130mm
Internal dimensions	W230×D130×H100mm
External dimensions	W438×D520×H565mm
Power source (50/60Hz,)	AC115V/AC220V Single phase with step-down transformer
Vacuum meter	Bourdon gauge
Controller	Sequencer
Operation / display unit	4.5-inch monochrome STN touch panel
High-frequency power supply	
High-frequency out-put power	50～200W
Reference oscillator	Quartz oscillator
Oscillation frequency	13.56 MHz
Output setting	Manual setting knob
Matching method	Auto tuning
Gas system	
Purge gas	N_2 1/4-inch bite type tube fitting
Reaction gas	Ar mass flow meter 1/4-inch bite type tube fitting

Dimensions (Unit:mm)



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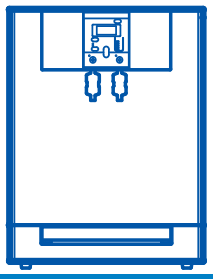


Water Purifier

Contents

Overview Water Purifier

High purity water purifiers with various water treatment processes and production volume for different laboratory needs

Pure water and ultra pure water

Besides H_2O, tap water contains various impurities which need to be removed to prevent interfering with research and experiment operations. Water in which impurities such as inorganic ions and organic substances remain are expressed in mg / L (ppm) or less, and is referred to as pure water. Water which is further purified is expressed in units of ppb, ppt and is referred to as ultra pure water.

High purity water purifier can meet wide range of laboratory needs

For example, Type1 / A4 level pure water can cover all applications from Type1 to Type4 (ASTM D 1193) / A1 to A4 (JIS K 0557) levels.
Yamato Scientific's water purifier is designed to produce Type1 / A4 level of both distilled water and deionized water. Meanwhile, models which can produce higher-level ultra pure water such as TOC reduction water and pyrogen-reduced water are also available. Customers can choose based on their specific needs.

Auto Still® water purifier

Auto Still water purifiers are a combination of ion exchange through filters and distillation to produce the desired type of water quality. Deionized water is produced through various types of filters from raw water while distilled water is produced by heating up and cooling down process.

Series	Models
Auto Still®	WG250B / WG1000 WA570 / WA730 WS200 / WS220 WGH200 WG203 WS200/220

Labo Cube® water purifier

Space-saving water purifier that can be installed under a fume hood or sink, or on a table; either as a benchtop unit or on movable casters for easy mobility.

Series	Models
Labo Cube®	WL320A / WL320B

Pure Line® water purifier

Non-heating ultra pure water purifiers in combination with reverse osmosis membrane, ion exchange resin, activated carbon and filters.

Series	Models
Pure Line®	WE200 WL200 / WL220 / WL220T WL100

Labo Cube® WL320 installation example

JIS K 0557 (Japanese Industrial Standards)

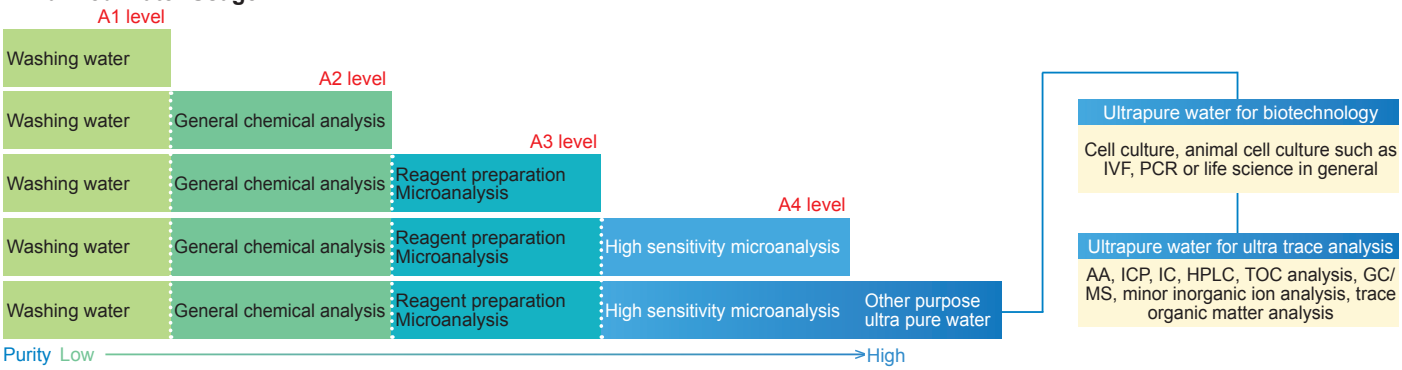
Item[*1]	A1	A2	A3	A4
Electrical conductivity μS/cm (25°C)	<5	<1[*2*3]	<1[*2]	<1[*2]
Total organic carbon (TOC) μgC/L	<1000	<500	<200	<50
Zinc μgZn/L	<0.5	<0.5	<0.1	<0.1
Total silica μgSi_2/L	-	<50	<5.0	<2.5
Chloride ion μgCl^-/L	<10	<2	<1	<1
Sulfate ion μgSO_4^{2-}/L	<10	<2	<1	<1

*1. Select water type according to test method or individual water provision
*2. Measured by directly introducing water delivery port into electrical conductivity
*3. When connected directly to final ion-exchange device and introducing water delivery port into electrical conductivity, electrical conductivity is 0.01mS/m (or 0.1μS/cm) (at 25°C)

ASTM D1193 (American Society for Testing and Materials)

	Type I	Type II	Type III	Type IV
Electrical conductivity μS/cm at 25°C	<0.056	<1.0	<0.25	<5.0
Electrical resistivity MΩ•cm at 25°C	>18	>1.0	>4.0	>0.2
pH at 25°C	-	-	-	5.0 to 8.0
Total organic carbon (TOC) μg/L	<50	<50	<200	no limit
Sodium μg/L	<1	<5	<10	<50
Chlorides μg/L	<1	<5	<10	<50
Total silica μg/L	<3	<3	<500	no limit

Purified Water Usage



Water purifier portfolio and usage

Type	Series	Model	Water purifying method	Purified water		Level (ASTM D1193 JIS K 0557)		Usage (based on JIS K 0557)			
								A1	A2	A3	A4
				Distilled water	Deionized water	Distilled water	Deionized water	Washing water	General chemical analysis	Reagent preparation / Microanalysis	High sensitivity Microanalysis
	Auto Still®	WGH200	Ion-exchange→Distillation →High purity cartridge→Filtration	○	○	T2 A4	T1 A4	■ ●	■ ●	■ ●	■ ●
High class	Auto Still®	WG250B/ WG1000	Ion-exchange→Distillation →Filtration	○	○	T2 A4	T1 A4	■ ●	■ ●	■ ●	■ ●
Standard	Auto Still®	WG203	Ion-exchange→Distillation	○	○	T2 A4	T1 A4	■ ●	■ ●	■ ●	●
Large capacity High class	Auto Still®	WG511/WG711	Ion-exchange→Distillation →Filtration	○	○	T2 A4	T1 A4	■ ●	■ ●	■ ●	■ ●
Large capacity Low running cost	Auto Still®	WA511/WA711 WA731	Distillation→Ion-exchange →Filtration	○	○	T4 A1	T1 A4	■ ●	●	●	●
Compact	Auto Still®	WS200/WS220	Distillation	○	–	T4 A1	–	■			
Standard	Pure Line®	WE200	RO membrane →Ion-exchange→Filtration	–	○	–	T1 A4	●	●	●	●
Economical	Pure Line®	WL200/WL220/ WL220T	Ion-exchange→Filtration	–	○	–	T2 A3	●	●	●	
Economical Simple	Pure Line®	WL100	Ion-exchange	–	○	–	–				
Long life	Labo Cube®	WL320A/WL320B	Ion-exchange→Filtration	–	○	–	T2 A4	●	●	●	●

■:Distilled water ●:Deionized water

⚠ Attention

- Do not bend the drain hose
- Drain hose should be lower than the unit's drain port. It is recommended to attach water supply hose to tap water with sink.
- May pose high risk if feeding water hose is connected to tap water without sink as water leakage or hose damage may occur
- When sink is separate from the faucet, please use optional water supply port unit.
- Compared to standard water hose, water supply port unit is designed to prevent loosening from faucet when water pressure changes. Raw water pressure is kept the same with the use of the water supply port unit.
- Raw water pressure should be within specified pressure range.
- Avoid flammable or explosive gas atmosphere. Unit is not explosion-proof

Water purifier Overview

Model	Distilled water production (L/hr.) Water quality	Deionized water collection (L/min.) Water quality	Tank / Storage space (L)	Power supply	Series / Water Purification Process
 WGH200	1.8 Type2 / A4	0.5~1.0 Type1 / A4	Polyethylene tank 30	AC115V AC220V	Auto Still® Raw water → Membrane filter → Ion exchange → Membrane filter → Deionized water Distillation → High purity cartridge → Membrane filter → Distilled water
 WG250B/1000	1.8 (WG250B) 5.0 (WG1000) Type2 / A4	0.5~1.0 Type1 / A4	Polyethylene tank 30 (WG250B) 100 (WG1000)	AC115V/ AC220V (WG250B) AC220V (WG1000)	Auto Still® Raw water → Membrane filter → Ion exchange → Membrane filter → Deionized water Distillation → Membrane filter → Distilled water
 WG203	1.8 Type2 / A4	1.0 Type1 / A4	Polyethylene tank 20	AC115V AC220V	Auto Still® Raw water → Membrane filter → Ion exchange → Deionized water Distillation → Distilled water
 WG511/711	5 (WA570) 10 (WA730) Type 2 / A4	1.4~1.5 Type1 / A4	Polyethylene tank 60	AC220V	Auto Still® Raw water → Membrane filter → Ion exchange → Membrane filter → Deionized water Distillation → Membrane filter → Distilled water
 WA511/711/731	5 (WA570) 10 (WA730) Type 4 / A1	1.4~1.5 Type1 / A4	Polyethylene tank 60	AC220V	Auto Still® Raw water → Membrane filter → Distillation → Ion exchange → Membrane filter → Deionized water Membrane filter → Distilled water
 WS200/220	1.8 Type 4 / A1	-	Polyethylene tank 20	AC115V AC220V	Auto Still® Raw water → Distillation → Distilled water
 WE200	-	0.5~1.0 Type1 / A4	-	AC100V~240V	Pure Line® Raw water → Membrane filter → RO → Ion exchange → Membrane filter → Deionized water
 WL200/220/220T	-	1.0 Type2 / A3	Polyethylene tank 3 (WL220T)	AC100V~240V	Pure Line® Raw water → Ion exchange → Membrane filter → Deionized water
 WL100	-	2.5	-	No AC power supply needed	Pure Line® Raw water → (Optional) Membrane filter → Ion exchange → (Optional) Membrane filter → Deionized water
 WL320A/320B	-	1.0 Type2 / A4	-	AC100V~240V	Labo Cube® Raw water → Membrane filter → Ion exchange → Membrane filter → Deionized water

Features

Auto Still®	Water quality monitor	Water quality abnormal alarm	Empty boiling prevention device	Heater overheat detection	Leakage detection	Water outage detection	Water pump idling prevention	Purity water volume setting	Cartridge exchange reminder
WGH200	●	●	●	●	●	●	●	●	●
WG250B/1000	●	●	●	●	●	●	●	●	●
WG203	●		●	●	●	●	●		●
WG511/711	●	●	●	●	●	●	●	●	●
WA570/730	●	●	●	●	●	●	●	●	●
WS200/220	●		●						

Pure Line® Labo Cube®	Water quality display	RO membrane self clean	Water temp. display	Validation correspondence	Cartridge exchange reminder
WE200	●	●	●	●	●
WL200/220/220T	●			●	●
WL100	●				
WL320A/320B	●			●	●

Water Purifier (Ion-exchange+Distillation)

WG250B/1000

Distilled water production	1.8L/h (WG250B)	5L/h (WG1000)
Treatment process	Ion exchange→ Distillation→Filtration	
Purified Water	Deionized water / Distilled water	
Water quality	Type 1 / A4 Deionized water	Type 2 / A4 Distilled water

Low TOC standard models

WG250B

WG1000

- 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 (WG250B) and 100L (WG1000)
- Easy to use slide out type water sampling tray with drainage eliminates concerns about overflowing water discharge

Specifications

Model	WG250B	WG1000
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	Approx. 1.8L/h	Approx. 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 1.4kW	Ceramic heater 1.9kW×2
Pre-treatment cartridge	0.1μm hollow fiber + Activated carbon (PWF-1)	
Ion-exchange resin cartridge	CPC-S 4L×1pc. (Activated carbon high-purity cartridge)	CPC-S 4L×2pcs.(Activated carbon high-purity cartridge)
Final filtration	0.1μm membrane filter×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	0.5~5×100kPa (0.5~5kgf/cm^2)	
Power source (50/60 Hz)	AC115V 13A / AC220V 6.8A	Single phase AC220V 18A
External dimension*1	W600×D660×H980mm	W600×D660×1850mm
Weight	Approx. 60kg	Approx. 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

Control Panel

Membrane Filter (Standard)

Maintenance

WG1000 interior

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

Easy to use tray for product water intake

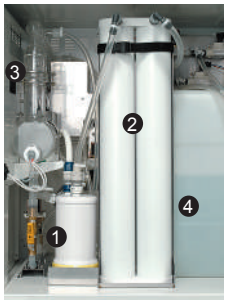
Water Quality Analysis

Item	ASTM D 1193 Type1	JIS K 0557 A4	WG250B						WG1000					
			Deionized water			Distilled water			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**

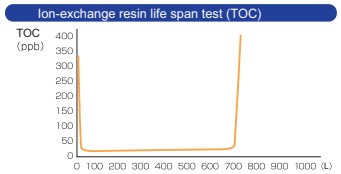
*Quality of raw water may cause different results.
*For water quality comparison JIS K 0057 ↔ ASTM D 1193 refer to page 115 of the general catalog.

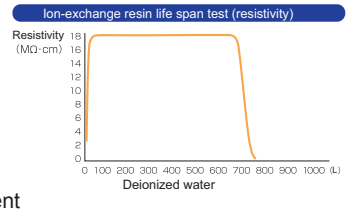
High Quality Ion-exchange Resin Cartridge (CPC-S)

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



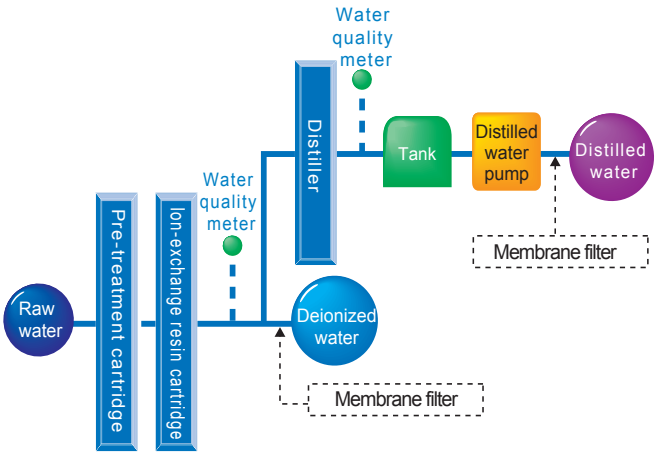
Automatic drainage function of the boiler water prevents scale adhesion and achieves higher water quality.





(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×D683×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)

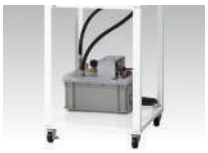
* Please specify when ordering main unit.

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


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

Water Purifier (Ion-exchange+Distillation, Large Capacity)

WG511/711

Production capacity	5 / 10L/h
Treatment process	Ion exchange→Distillation →Filtration
Purified Water	Ion-exchanged water / Distilled water
Water quality	A4 Ion-exchanged water / A4 Distilled water

Large capacity water purifier producing highly pure water in a single motion.

WG511 WG711

Supplied water, Ion exchange water and Distilled water to the storage tank are automatically controlled.

- For production of large amounts of distilled water and deionized water.
- Digital display of water quality, touch button water collection.
- Easy to replace ion-exchange resin cartridge.
- Optional UV lamp for sterilization.

Specifications

Model	WG511	WG711
Water purification method	Pretreatment → Ion-exchange → Distillation → Filtration	
Purified water	Distilled water, Deionized water	
Distilled water production	Approx. 5 L/hr.	Approx. 10 L/hr.
Collection of distilled water	Approx. 1.0 to 2.0 L/min. (50Hz) 1.5 to 2.5 L/min. (60Hz)	
Collection of Ion exchange water	Approx. 1.4 L/min.	Approx. 2.8 L/min
Condenser	Hard glass	
Heater	Ceramic heater, 2 pcs.	Ceramic heater, 4 pcs.
Distilled water Storage tank	Polyethylene made, 100 L	
Raw water filter	Pre-treatment cartridge (Activated carbon + hollow fiber membrane, 0.1μm)	
Pure water filter	Membrane filter (Hollow fiber membrane, 0.1μm)	
Ion-exchanger	One-touch connecting type large cartridge (mixed floor type, 10 L)	
Distilled water tank level display	Display on LED in 5 steps	
Range of collection capacity	0.1 to 85 L (0.1 L/step)	
Water pump	Magnet pump 20W	
Raw water pressure range	0.10MPa ~ 0.50MPa	0.15MPa ~ 0.50MPa
Power source (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	
External dimensions (W×D×Hmm)	W800×D685×H1510	W870×D685×H1510
Weight	Approx. 130kg	Approx. 140kg
Accessories	Water supply hose -- 2m×1 pc. (with connecting unit),	
	Drain hose -- 3m×1 pc. (with hose clamp)	
	Pre-treatment cartridge -- 1 pc. Ion-exchange resin -- 1 pc. Membrane filter-- 2 pcs.	

Structure

Water sampling tray
Large stainless steel sink with a splashing preventive mechanism

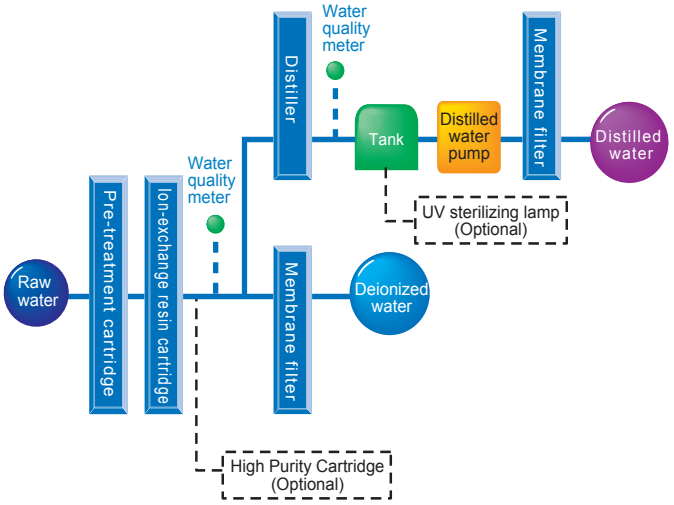
(1) Membrane filter MFRL730

Inner View

Arrangement of consumables

(2) Ion-exchange resin cartridge SPC-10
(3) Pre-treatment cartridge PWF-1
(4) High purity cartridge CPC-H (Optional)

Treatment Process



Japan Industrial standard JIS K0557 (at water temp. : 20℃)

Item	WG511/711	WG511	WG711
	Exchanged water	Distilled water	
	Measured value	Measured value	
Electric conductivity(mS/m)	0.006	0.084	0.066
Organic carbon (TOC) (mg/L)	0.02	0.015	0.014
Zinc (μ Zn/L)	<0.1	<0.1	<0.1
Silica (μ SiO2/L)	<1.0	1.2	2
Chloride Ion (μCL-/L)	<0.5	<0.2	<0.5
Sulfuric acid Ion (μ SO4-/L)	<0.5	<0.2	<0.5
Water Level	JIS A4		

Optional & Consumable items

Description	Option Model	Main Unit Model No.	Product Code
Product water intake hose unit with a 0.1 μm membrane filter	OWF10	WG511/WG711	253208
Water Supply Unit	OWH10	WG511/WG711	253686
Raw water pressure reduction valve	OWG42	WG511/WG711	253769
Connection unit G (WL100+WG Series)	G	WG511/WG711	253668
Drain water trap	OWI41	WG711	253223
UV sterilizing lamp	OWG66	WG511/WG711	253226
High Purity Cartridge (CPC-H) Connection Unit	OWG62	WG511/WG711	253781
External Alarm Output	OWG64	WG511/WG711	253225
Membrane filter	MFRL730	WG511/WG711	9020010006
UV lamp for sterilization	OWG28	WG511/WG711	253773
Ion exchanger	SPC-10	WG511/WG711	9110010004
High purity cartridge	CPC-H	WG511/WG711	CPCNS30011
Pretreatment cartridge	PWF-1	WG511/WG711	253099

Water Supply Unit (OWH10)

High Purity Cartridge (CPC-H)

Pretreatment cartridge (PWF-1)

Water Purifier (Ion-exchange+Distillation, Large Capacity)

WA511/711/731

Production capacity	Treatment process	Purified Water	Water quality
5 / 10L/h	Distillation→Ion exchange →Filtration	Ion-exchanged water / Distilled water	A4 Ion-exchanged water / A1 Distilled water

High-capacity type to supply highly pure water with a single motion.

WA511　　WA711

Ion-exchanged water and Distilled water supplying to the storage tank are automatically controlled.

- Large amounts of Distilled water and Ion-exchanged water can be obtained.
- Distillation to Ion-exchange is low running cost method. Selecting Ion-exchange resin cartridge Model: CPC-N (option, A3 water level) can be much lower running cost.
- Operation status are digitally displayed and the language can be chosen either Japanese or English.
- Easy to replace the Ion-exchange resin cartridge.
- Safety function: Power leakage breaker, Water leakage sensor, Water pressure reduction valve are equipped.
- Water softener cartridge, UV lamp for sterilization is available as the optional.

Specifications

	WA511	WA711	WA731
Water purification method	Pretreatment → Distillation → Ion-exchange → Filtration		
Purified water / Quality level	Distilled water / A1, Ion-exchanged water / A4		
Production of distilled water	Approx. 5 L/h	Approx. 10 L/h	
Collection of distilled water	Approx. 1. 4 L/ min.		
Collection of Ion exchange water	Approx. 1. 4 L/ min.		
Range of collection capacity	0.1 to 85 L		
Waste water discharging	Drain water connecting on both / back sides for the drain hose		
Boiler	Stainless steel		
Condenser	Stainless steel		
Heater	Pipe heater, 1.9kW×2 pcs.	Pipe heater, 2.55kW×3 pcs.	
Pre-treatment cartridge	Activated carbon + Hollow fiber membrane, 0.1μm		
Membrane filter	Hollow fiber membrane, 0.1μm		
High purity cartridge	One-touch connecting type cartridge (Model: CPC-H, 3L)		
Distilled water storage tank	Polyethylene made, 100 L		
Water sampling table	Large stainless steel sink (With a splashing preventive mechanism)		
Feeding pump	Electromagnetic pump		
Raw water pressure range	15 to 5×100kPa (15 to 5kg /cm^2)		
Safety function	Power leakage breaker, Water leakage sensor, Water pressure reduction valve, Water quality error alarm		
Power source (50/60Hz)	AC220V Single phase		AC220V / AC380V Three phase with step-down transformer
External dimensions(W×D×Hmm)	800×685×1510	870×685×1510	
Weight	Approx. 130 kg	Approx. 140 kg	
Water quality monitor	Digital indication (Conductivity or Resistivity)		
Distilled water tank level display	Display on LED in 5 steps		
Other indications	Replacement consumable parts (Pretreatment cartridge, High purity cartridge, Membrane filter), Error message, History of error messages, History of consumable part replacements (up to 20 times for each consumable part), Default Language in Japanese or English, Requirement of maintenance		
Accessories	Water supply hose 2m×1 pc. (with connecting unit), Drain hose 3m×1 pc. (with hose clamp)		
	Pre-treatment cartridge, High purity cartridge (CPC-H), Membrane filter×2 pcs.		

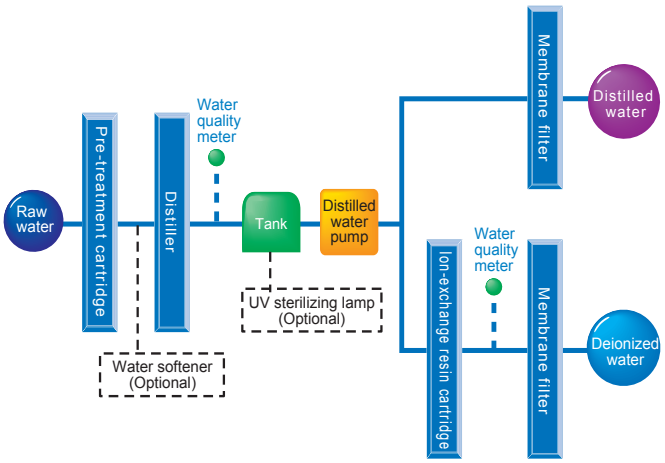
Structure

Water sampling tray
Large stainless steel sink with a splashing preventive mechanism

Range of collection capacity:
0.1～85 L (Continuous sampling)

Control Panel

Treatment Process



Japan Industrial standard JIS K0557 (at water temp. : 20℃)

Item	Ion-exchanged water		Distilled water	
	Measured value		Measured value	
	WA511	WA731	WA511	WA731
Electric conductivity(mS/m)	0.006	0.006	0.2	0.2
Organic carbon (TOC) (mg/L)	0.014	0.015	0.09	0.066
Zinc（μg Zn/L)	<0.1	<1.0	<0.1	<0.1
Silica (μg SiO2/L)	<0.1	<0.1	0.8	<0.1
Chloride Ion (μg CL-/L)	<0.5	<0.5	0.5	<0.5
Sulfuric acid Ion (μg SO4-/L)	<1.0	<1.0	<1.0	<1.0
Water Level	A4		A1	

Raw water: Tap water of Kanagawa Prefecture Japan. Above measurements vary, depending on the quality of raw water.

Optional items & Consumable items

Description	Model No.	Main Unit Model No.	Product Code
Sampling hose connection unit	OWF10	WA series	253208
Water supply unit	OWH10	WA series	253686
Raw water pressure reduction valve	OWG42	WA series	253769
*Connection unit G (WL100+WA Series)	G	WA series	253668
* water trap	OWI21	WA511	253222
*Drain water trap	OWI41	WA711	253223
*Drain water trap	OWI51	WA731	253224
*UV sterilizing lamp	OWG22	WA series	253203
Water supply L shape socket	OWE18	WA series	253281
Raw water pressure meter	OWA48	WA series	253209
*Water softener cartridge (with OWA30)	OWA50	WA series	253210
*External alarm output terminal	OWG52	WA series	253219
High purity cartridge	CPC-H	WA series	CPCNS30011
Pretreatment cartridge	PWF-1	WA series	253099
Membrane filter	MFRL730	WA series	9020010006
Ion exchange resin cartridge (A3 water level)	CPC-N	WA series	CPCN30010
Water softener cartridge	-	OWA50	OWA30

* Please specify when ordering main unit.

Water Supply Unit (OWH10)

Water supply L shape socket (OWE18)

Ion exchange resin cartridge (CPC-N)

Pretreatment cartridge (PWF-1)

High Purity Cartridge (CPC-H)

Water Purifier (Ion-exchange+Distillation)

WGH200

Production capacity	1.8L/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

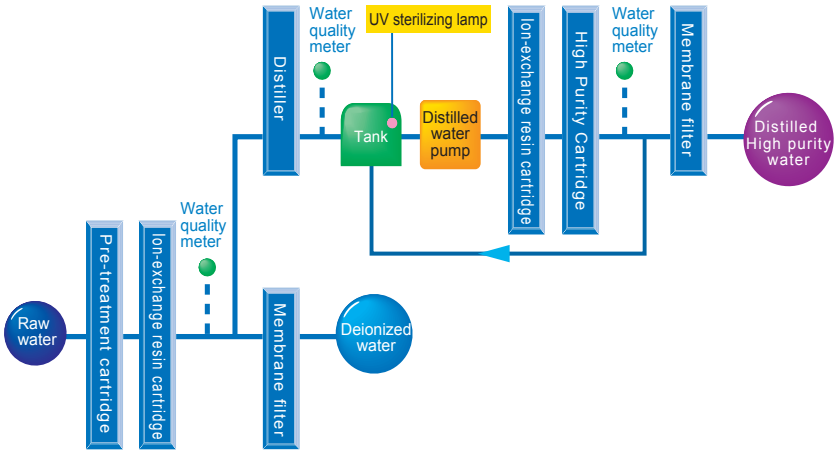
Continuous production of high purity deionized and distilled water (Resistivity 18Ω or more, Level JIS A4/ ASTM D1193 Type1) kept in a 30L storage tank.

- High purity water integrated system with Sterilizing UV lamp, Pretreatment cartridge, Ion exchange resin cartridge, High purity cartridge.
- Membrane filter and distilled water circulation system.
- Easy-to-use tray for product water intake (with drainage).
- Multi-functional control and display panel.
- Feed and drain can be connected on both sides and installed anywhere.
- Easy maintenance as most consumables can be easily attached and detached.

Specifications

Product code		253136
Model		**WGH200**
Treatment process	Distillation	Pretreatment → Ion exchange → Distillation → Tank → UV sterilizing → Ion exchange → High purity Filtration
	Deionized	Pretreatment → Ion exchange → Filtration
Raw water feeding		Connection to a tap water faucet with a one-touch coupler (with a sluice valve)
Waste water discharge		Drain water connector on both sides for the connection of a drain hose
Product water		Deionized water, High purity distilled water and Distilled water
Production of distilled water		Approx. 1.8L/hr.
Collection of distilled water		Approx. 0.9L/min.
Collection of deionized water		Approx. 1L/min.
Range of production		0.1 - 26L/continuous production
Condenser		Hard glass
Heater		Ceramic heater 1.4 kW
Pretreatment cartridge		0.1μm diameter hollow fiber + Activated carbon
Ion-exchange resin cartridge		Ion-exchange (CPC-S) 4L×1, High purity (CPC-H) 3L×1
Final filter of distilled/ deionized water		0.1 μm membrane filter×2
Leakage detection		Water leakage activates a leak sensor, Which forcefully shuts down the feed water solenoid valve.
Distilled water storage tank		30L polyethylene tank
TOC reducing		UV sterilizing lamp for distilled water
Product water intake tray		Drawer type, Load capacity 10 kg
Level sensor		Five-step reed switch
Raw water feed pressure		0.5-5×100 kPa (0.5-5 kgf/cm^2)
Power source (50/60Hz)		AC115V/AC220V Single phase with step-down transformer
External dimension/weight		600 mmW×660 mmD×775 mmH, Approx. 75 kg
Level indications		LED
Quality indication		Digital indication (Conductivity or Resistivity)
Other indications		Replacement consumable parts (Pretreatment cartridge, Ion exchange resin cartridge, High purity cartridge, Membrane filter, UV lamp), Error message, Alarm message, History of consumable part replacements (up to 20 times for each consumable part), History of error messages, Default Language in Japanese or English, Requirement of maintenance
Accessories		Feed/Drain water hose, Pretreatment cartridge, Ion exchange resin cartridge, High purity cartridge , Membrane filter, TOC reducing UV sterilizing lamp

Treatment Process



Water quality standard

Description	Measurements			
	JIS K0557 A4	ASTM D1193 Type1	WGH200	
			Deionized water	Distilled water
Conductivity (mS/m) at 25℃	0.1 or less	0.00555 or less	0.006	< 0.00555
Total organic carbon (TOC) (mg/L)	0.05 or less	0.05 or less	4	0.02
Zinc (µg Zn/L)	0.1 or less	-	< 0.01	< 0.1
Silica (µg SiO2/L)	2.5 or less	-	< 1.0	< 0.1
Total silica (µg SiO2/L)	-	3 or less	-	0.21
Chloride ion (µg Cl-/L)	1 or less	1 or less	< 0.1	< 0.1
Sulfate ion (µg H2SO4/L)	1 or less	-	< 0.1	< 0.1
Natrium (µg Na/L)	-	1 or less	-	< 0.1
Total level			A4	A4

Raw water: Tap water of Kanagawa Prefecture Japan. Above measurements vary, depending on the quality of raw water.

Structure

Easy maintenance

Most consumable parts, including the Ion exchange resin cartridge, High purity cartridge, Pretreatment cartridge can be easily attached and detached, facilitating easy maintenance work.

Easy installation

Feed/drain water connectors can be selected from both sides, ready to be installed anywhere. With a rear, flat casing panel the system can be positioned against the wall, leaving no dead space.

Optional items & Consumable items

Description	Option Model	Item Code
Cart	AS250	253174
Product water intake hose unit with a 0.1 µm membrane filter	OWG24	253204
Water supply unit	OWH10	253686
Raw water pressure reduction valve	OWG42	253769
Connection unit (WL100+WG Series)	G	253668
Drain water trap	OWI10	253211
Water sampling stand	OWL40	253266
External alarm output terminal	OWG60	262780
Membrane filter (2pcs/set)	MFRL727	9020010004
Ion exchange resin cartridge	CPC-S	253080
High purity cartridge	CPC-H	CPCNS30011
Pretreatment cartridge	PWF-1	253099
Air vent filter for storage tank	AVF-1	9020020001
TOC measurement UV lamp	OWG28	253773

Ion exchange resin cartridge (CPC-S)

High Purity Cartridge (CPC-H)

Ion exchange resin cartridge (CPC-N)

Water Supply Unit (OWH10)

Membrane filter (MFRL727)

Pretreatment cartridge (PWF-1)

Water Purifier (Ion-exchange+Distillation)

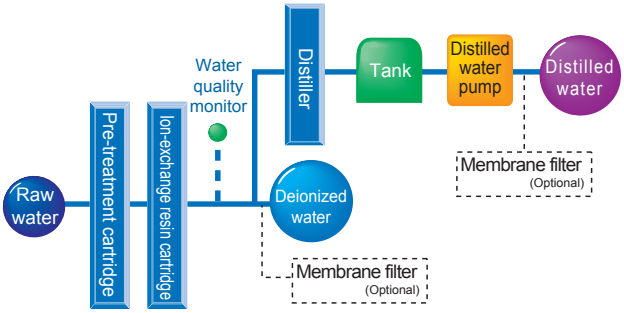
WG203

Production capacity	1.8L/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



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	WG203
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	Approx. 1.8L/h
Distilled water delivery rate	Approx. 1L/min
Deionized water delivery rate	Approx. 1L/min
Range of production	Continuous production
Condenser	Hard glass
Heater	Ceramic heater 1.4kW
Pre-treatment cartridge	0.1μm diameter hollow fiber + Activated carbon
Ion-exchange resin cartridge	CPC-S 4L×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	0.5~5×100kPa (0.5~5kgf/cm^2)
Power source (50/60 Hz)	AC115V 12A, AC220V 6.5A
External dimension*	W600×D575×H780mm
Weight	Approx. 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×D683×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

Water Purifier (Distillation)

WS200/220

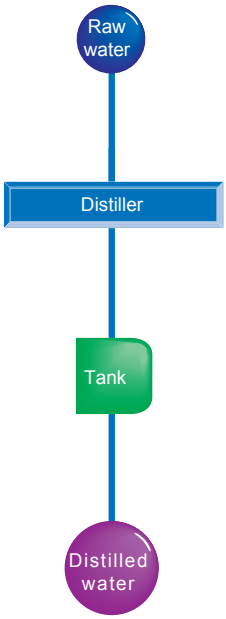
Production capacity 1.8L/h | Treatment process Distillation | Purified Water Distilled water | Water quality Type 4 / A1

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.

WS200 WS220

Treatment Process



Specifications

Model		WS200	WS220
Water purifying method		Distillation	
Purified water		Distilled water	
Distilled water production		Approx. 1.8L/h	
Distilled water delivery rate		Approx. 2.2L/min.	
Raw water pressure range		1~3×100kPa (1~3kg/cm²)	
Safety device		Auto adjustment of cooling water volume	
		Empty boiling / overheat / splash prevention	
Distiller	Boiler	Stainless steel	Hard glass
	Condenser	Hard glass	Hard glass
	Heater	Pipe heater	Built-in quartz glass outer cover
Distilled water storage tank		20L polyethylene tank	
Power source		AC115V 13A / AC220V 6.8A	
External dimensions*		W500×D400×H974mm	
Weight		Approx. 40kg	

*Protrusions not included

Optional items

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

Water Purifier (Ion-exchange)

WL320A/320B

Treatment process: Ion-exchange | Purified Water: Deionized water | Water quality: Type 2 / A4

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

WL320B

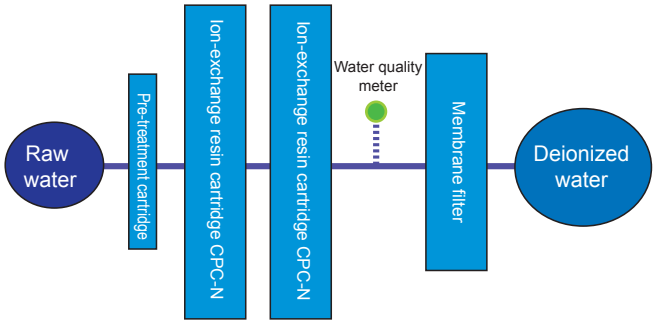
- Deionized water compliant with ASTM D1193 Type2 / JIS K 0557 A4 level, suitable for high sensitivity trace analysis
- Easy operating digital display
- Standard equipped with membrane filter at water feeding port
- Equipped with water leak detection function that stops water supply in case water leak 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	Approx. 1L/min (Continuously)	
Pre-treatment cartridge	0.1μm hollow fiber+Activated carbon (PWF-1)	
Ion-exchange resin cartridge	Ion-exchange cartridge (CPC-N) 3L×2	
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	0.5~5×100kPa (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

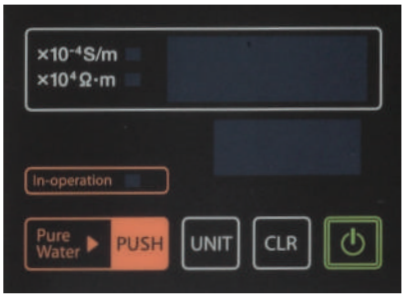
* Protrusions not included

Treatment Process

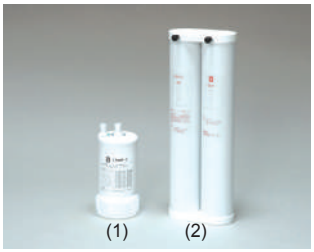


Installation Example

Control Panel



Pre-treatment Cartridge Ion-exchange Resin Cartridge



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

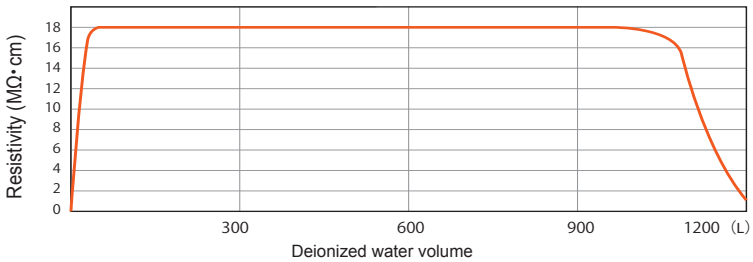
Water Quality Analysis

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.

Structure

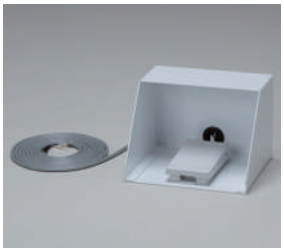
Ion-exchange Resin Life Span Test (resistivity)



Optional items / consumables

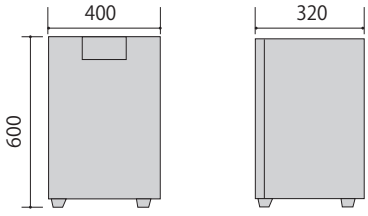
Product code	Description
253277	Fume hood / Sink installation kit OWL60
253686	Water supply port unit OWH10
253099	Pre-treatment cartridge PWF-1
CPCN30010	Ion-exchange resin cartridge CPC-N
9020010004	Membrane filter (2 pcs. set) MFRL727
253276	Remote water sampling function (with foot switch) OWL58
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

Water Purifier (Ion-exchange)

WL200/220/220T

Treatment process: Ion-exchange | Purified Water: Deionized water | Water quality: Type 2 / A3

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

- 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

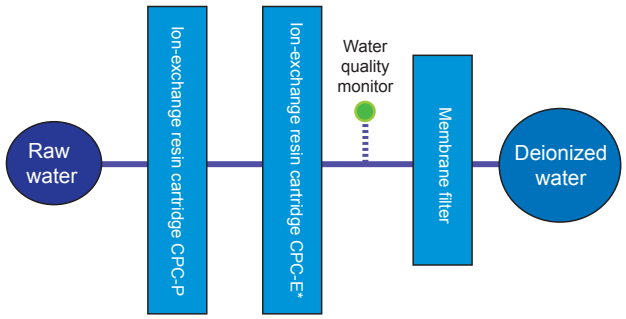
Specifications

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	Approx. 1L/min. (Continuously produced)		Approx. 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*	W350×D350×H450mm		
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.

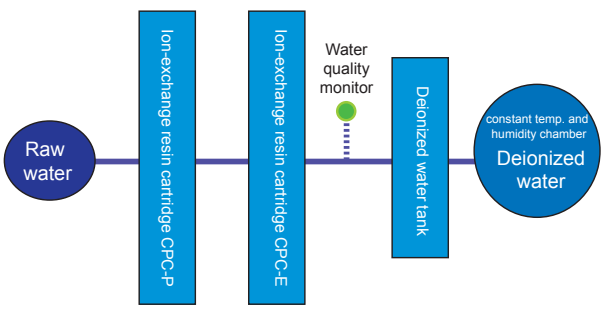
Treatment Process

WL200/220



*CPC-E only for WL220

WL220T



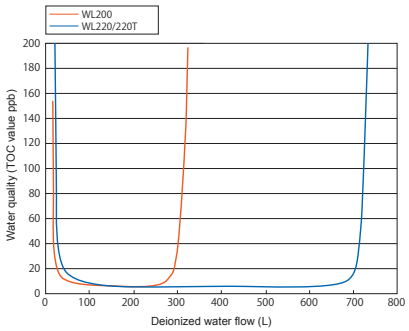
WL220T used only for constant temperature and pure water tank, no water sampling port in the front.

Water Quality Analysis

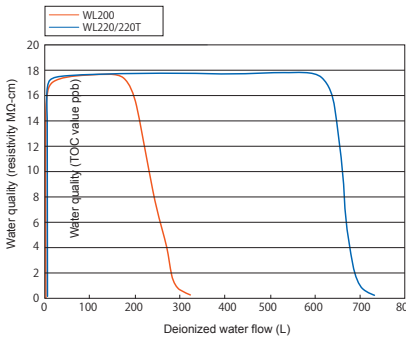
Item	ASTM D 1193 Standard Type 2	JIS K 0557 A3 level	WL200			WL220		
			Measured value	Level		Measured value	Level	
				ASTM D 1193	JIS K 0557		ASTM D 1193	JIS K 0557
Electrical conductivity (μS/cm)	<1	<1	0.055	Type1	A4	0.055	Type1	A4
Organic carbon (μg /l)	<50	<200	19.6	Type1	A4	19.0	Type1	A4
Zinc (μg 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 SO^{4}-/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

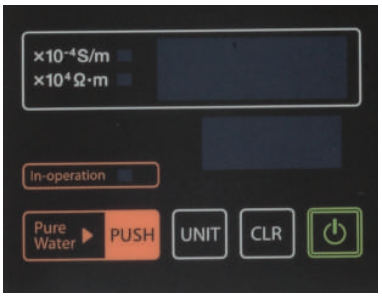
Membrane filter

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×2pcs.

Control Panel



WL220T has no PUSH key and POWER key

Structure

WL220

WL220T

Water Purifier (RO+Ion-exchange)

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

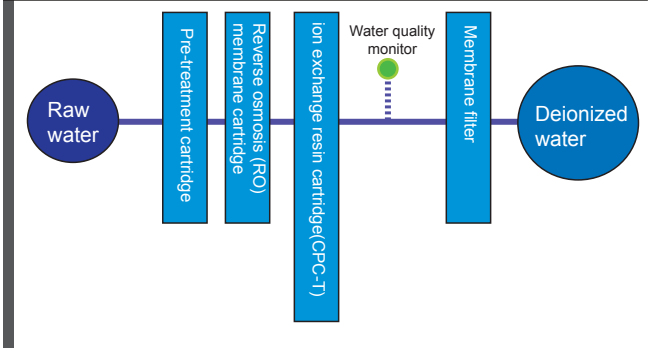
- Suitable for high sensitivity trace analysis
- Lower running cost
- By adopting reverse osmosis (RO) membrane cartridge set, life span of consumables has been expanded significantly
- Benchtop type, space saving
- Easy water sampling by attaching to water faucet
- Easy to operate digital display
- 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×D430×H 470
Weight	Approx. 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



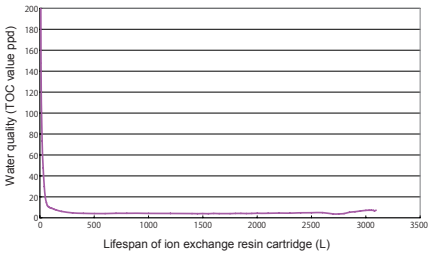
Structure

Water Quality Analysis

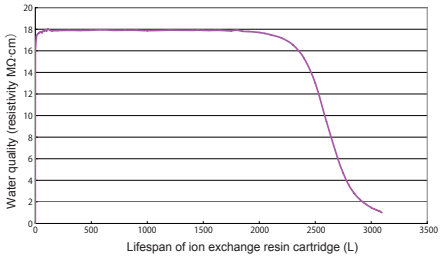
Item	ASTM D 1193 Standard Type 1	JIS K 0057 Standard A4	Measured value	ASTM D 1193 level	JIS K 0057 level
Electrical conductivity (μS/cm)	<0.056	<1	0.055	Type 1	A4
Organic carbon (μg /l)	<50	<50	5	Type 1	A4
Zinc (μg Zn/l)	-	<0.1	<0.1	-	A4
Silica (μg SiO_2/l)	<3	<2.5	0.5	Type 1	A4
Chloride ion (μ Cl^-/l)	<1	<1	<0.5	Type 1	A4
Sulfate ion (μg SO_4^{2-}/l)	-	<1	<1.0	-	A4
Total level				**Type 1**	**A4**

*Quality of raw water may cause different results.
*For water quality comparison JIS K 0057 ↔ ASTM D 1193 refer to page 115 of the general catalog.

Ion exchange resin lifespan test (TOC value)

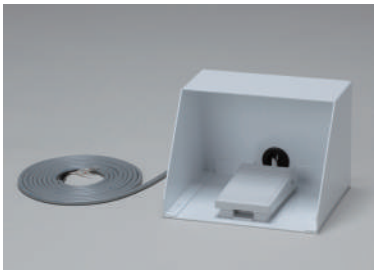


Ion exchange resin lifespan test (resistivity value)



Optional items

Water sampling stand



Foot switch

Product code	Product name
253266	Water sampling stand (supplied in connection kit)　OWL40
253278	External alarm output terminal　OWE10
253279	Remote water sampling terminal　OWE12
253280	Foot switch　OWE14
253686	Water supply port unit　OWH10

Consumable parts

Pre-treatment cartridge

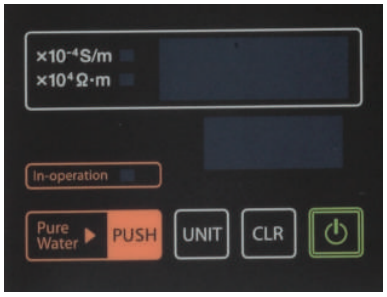
Reverse osmosis (RO) membrane cartridge set

Ion-exchange resin cartridge　CPC-T

Membrane filter

Product code	Product name
253099	Pre-treatment cartridge
253257	Reverse osmosis (RO) membrane cartridge set
253256	Ion-exchange resin cartridge　CPC-T
9020010004	Membrane filter

Control Panel



Supply / Drain Port (Back of main unit)

Water Purifier (Ion-exchange)

WL100

Production amount: Below 2~5L/min | Collection type: Ion exchange type | Collection pure water: Deionized water

This sets is WL100 + Filter stand (1) + Filter housing unit (2) + Active carbon filter + Membrane

- Simply collectable large amount of ion exchange water only by connecting to tap water.
- Built-in voltage circuit in water quality meter can check water quality immediately.
- Polyethylene made cartridge for lesser contamination.
- No AC power is required, and economical price.
- Easy maintenance.

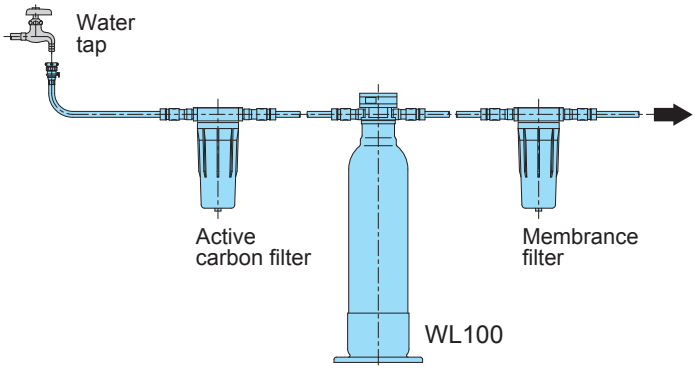
Specifications

Model	WL100
Collection type	Ion exchange type
Collection pure water	Ion exchange water
Production amount	Below 2 to 5L/min.
Ion exchanger	Cartridge type (Mixed bed type, Resin amount 10L)
Water quality meter	0 to 10 x 10-4S/m (0 to 10μs/cm) (Analogue display)
Power (for water quality meter)	Dry cell battery, DC9V
External dimensions	Φ180 x H820mm (Not including coupler and stand)
Weight (at operating)	Approx. 18kg

Connection Unit

Connection Unit G (WL100+WG250)

Sample Installation



Possible to eliminate the other particles of inorfanic ion

Optional items & Consumable items

Description	Model No.	Product Code
Connection unit B	WL100+Filter housing unit	253678
Connection unit G	WL100+Filter housing unit	253668
Filter stand	WL100	253676
Filter housing unit	WL100	253675
Activated carbon filter	WL100	9020026002
Ion exchanger, IE bomb	WL100	821
Ion exchange resin only (without cylinder)	WL100	9110010001
Membrane filter PSECG20SSIAW1	WL100	9020010007

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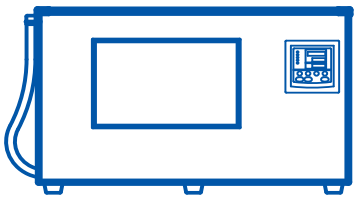


Constant Temperature Bath

Contents

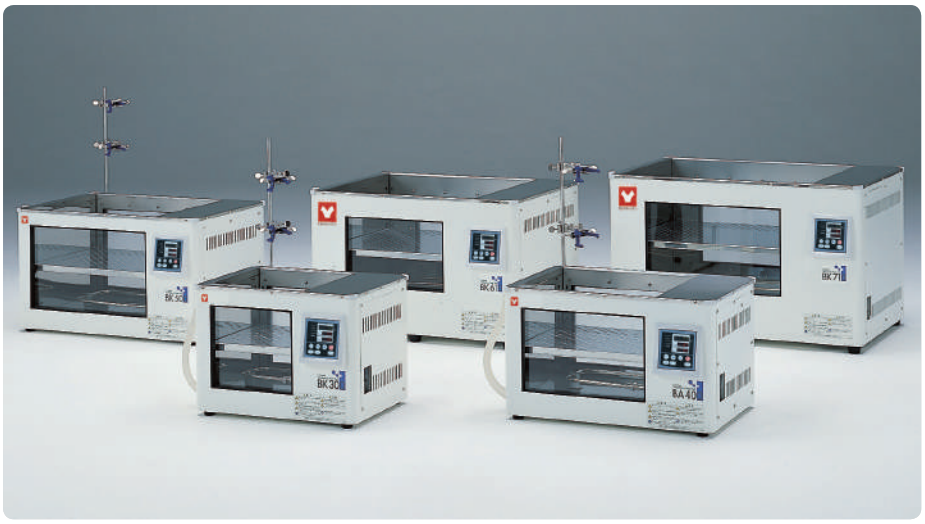
Water Bath (Precision Constant Temp.)

BK · BA Series

Operating temp. range	RT+5~80°C

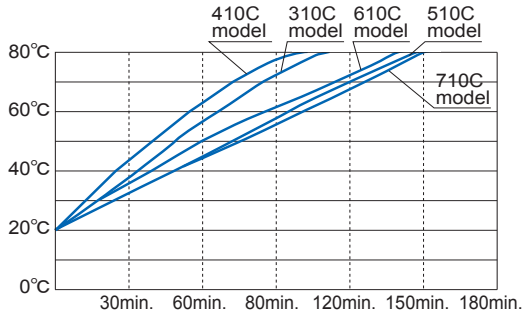
Temperature control accuracy	±0.02°C~±0.07°C

Bath capacity	27L	42L	70L	109L	144L
	BK/BA310C	BK/BA410C	BK/BA510C	BK/BA610C	BK/BA710C

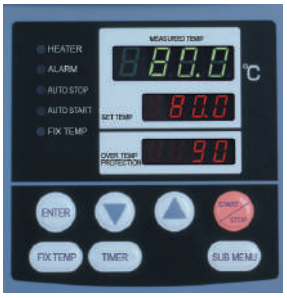


- BK series - Fixed temperature operation
  BA series - Program operation.
- In addition to BK series function, BA series adopted controller with program operation function (1 pattern 30 steps or 2 pattern 15 steps).
- Tank capacity: 27L, 42L, 70L, 109L, 144L
- Extremely high degree of temperature adjustment 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	BK310C	BA310C	BK410C	BA410C	BK510C	BA510C	BK610C	BA610C	BK710C	BA710C
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	Approx. 120min.		Approx. 110min.		Approx. 165min.		Approx. 160min.		Approx. 200min.	Approx. 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×D×H mm)	300×300×300		400×350×300		500×400×350		548×500×400		640×500×450	
External dimensions (W×D×H mm)	490×360×367		590×410×367		690×460×417		738×560×467		830×560×517	
Window dimensions (W×H mm)	240×215		340×215		440×265		340×215		440×265mm	
Bath capacity	Approx. 27L		Approx. 42L		Approx. 70L		Approx. 109L		Approx. 144L	
Shelf pitch	30mm									
Number of plates	5pcs.				6pcs.		9pcs.		10pcs.	
Drain hose	ø15×20mm									
Power source 50/60Hz	AC100V / AC220V						Single phase AC220V			
	14 / 7A		23A / 11A		25A / 12A		17A		22A	
Weight	Approx. 19kg		Approx. 25kg		Approx. 30kg		Approx. 36kg		Approx. 46kg	
Included accessories	Shelf plate 1pc., clamp 2pcs., stand 1pc., clamp holder 2pcs., tube connector 1pc., drainage cap 1pc.									
optional	Vessel installing holder, viscometer holder, external circulating pump, cooling coil, top cover of water bath									

Water Bath (Constant Temp.)

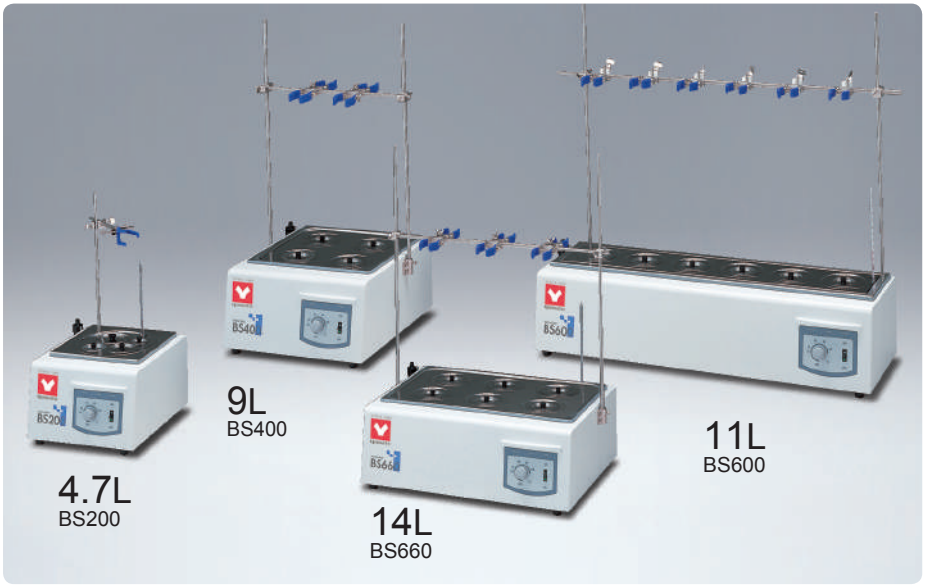
BS200/400/600/660

Operating temp. range	RT+5°C~Water boiling point

Temp. distribution accuracy	±5°C (at 70°C)

Bath capacity	4.7L BS200	9L BS400	11L BS600	14L BS660

Standard equipped with overheat prevention device, electric leakage breaker.



BS200
- 4 types of accessorial baskets. Maximum 5L beaker can be set after removing the lid

BS400
- Comes with 4 container mounting clamps and cooling water distributor (optional item)

BS600
- Up to 6pcs. of containers can be used simultaneously

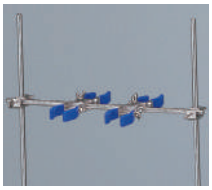
BS660
- Fits small and large containers. Up to 6pcs. can be used simultaneously. Sink level can be adjusted

Features


For different flask size


Removable lid


Easy to change water level by adjusting over flow


Sturdy die-cast clamps

Control Panel

Specifications

Model	BS200	BS400	BS600	BS660
Operating temperature range	RT+5°C~Water boiling point *1			
Temp. adjustment accuracy	±3°C (at 70°C)			
Temp. distribution accuracy	±5°C (at 70°C)			
Max. temp. reaching time	Approx. 35min.		Approx. 60min.	Approx. 50min.
Internal tank material	Stainless steel			
Heater	Copper Pipe Heater (Nickel Plated)			
	0.9kW	1.4kW		1.3kW
Safety device	Overheat prevention system (Liquid expansion type, Self sustaining relay, Alarm lamp), Electric leakage breaker with overcurrent protection			
Internal dimension	ø200×D149mm	L328×W302×D99mm	L790×W150 x D102mm	L502×W302×D99mm
Effective internal dimension	ø186×D115mm	L298×W260×D64mm	L776×W140 x D73mm	L468×W260×D66mm
External dimension *3	L300×W364×H216mm	L390×W438×H214mm	L864×W288 x H215mm	L565×W437×H214mm
Bath capacity	Approx. 4.7L	Approx. 9L	Approx. 11L	Approx. 14L
Power source (50/60Hz)	AC115V, 8A	AC115V, 12.5A		AC115V, 11.5A
	AC220V, 4.5A	AC220V, 6.5A		AC220V, 6A
Opening size, quantity	—*2	ø115mm, 4pcs.	ø115mm, 6pcs.	
Weight	Approx. 5kg	Approx. 9.5kg	Approx. 16kg	Approx. 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. 4 lids. Suitable for erlenmeyer flask up to ø96 x D50mm 300ml, ø56 x D40mm 50ml, ø40 x 30mm.
*3. 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)	BS400
222086	Cooling water distributor (supply/drain tube ø16mm, caliber of spout ø8.5mm)	BS600

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 BS400

Economical Water Bath (Constant Temp.)

BM100/110/200/210/401/500/510

Setting system	Analog	Digital
	BM100/110/200/210	BM401/500/510

Operating temp. range	Room temp. +5~95°C	Room temp. +5~90°C
	BM100/110/200/210/401	BM500/510

Bath capacity	4L	7L
	BM100/110/500/510	BM200/210/401

Easy to use, compact design water bath

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

- 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

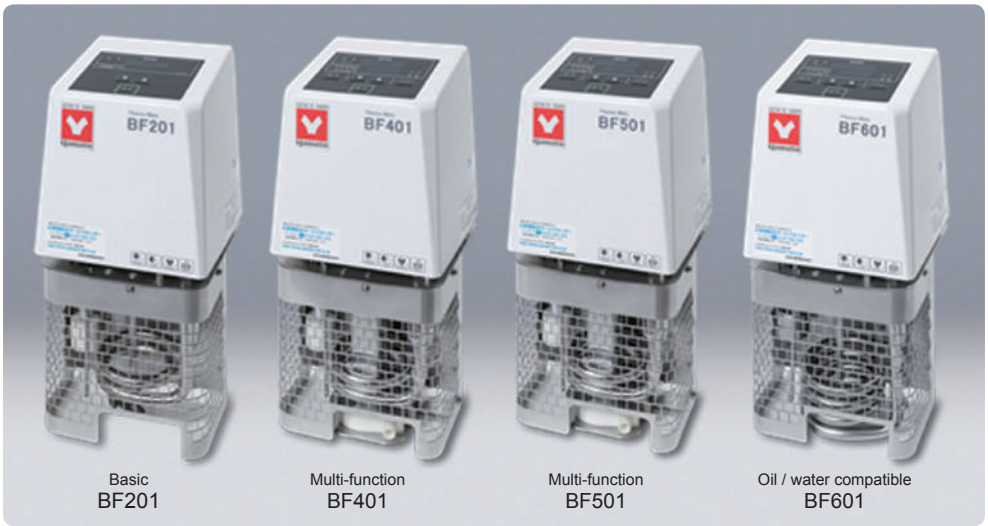
Model		BM100	BM110	BM200	BM210	BM401	BM500	BM510
Operating temp. range *1		Room temp. +5~95°C *1					Room temp. +5~90°C	
Temp. adjustment accuracy*2		±2°C (at 60°C)				±1°C (at 60°C)	±1.5°C (at agitation)	
Temp. control		ON/OFF control				PID control by microprocessor		
Temp. setting / display		Analog 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	Fixed temperature, quick auto stop, auto stop, auto start	
Additional functions		--				Calibration off-set, power failure recovery, keypad lock	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	Approx. 4L		Approx. 7L			Approx. 4L	
	Dimensions	I.D.200×D120mm		I.D.250×D150mm			Max. I.D.240×bottom dia165×D122mm	
External dimensions		W240×D300×H150mm		W310×D360×H230mm			W340×D349×H231mm	
Weight		Approx. 3.5kg		Approx. 6kg		Approx. 7kg	Approx. 5.5kg	
Power source (50/60 Hz)		AC115V 4.5A paddle switch	AC220V 2.3A paddle switch	AC115V 9A	AC220V 4.5A	AC115V 11A	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%

Immersion Constant Temperature Device

Thermomate® BF201/401/501/601

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



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

- Multi-function immersion thermostatic device for various usage
- Operation functions from "fixed temperature operation" to "programmable operation"
- Water jet can be adjusted in 10 patterns (excluding BF200)
- Various options available such as data output, external communication and level controller
- BY100 testing bath comes standard with the unit

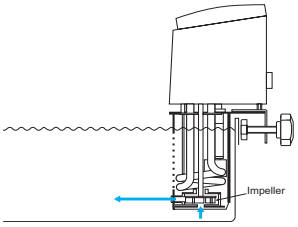
Specifications

Type	Basic	Multi function		Oil/Water compatible
Model	**BF201**	**BF401**	**BF501**	**BF601**
Temp. setting range	-20.0 to 90°C			0 to 200°C
Operating temp. range	Room temp. +5 to 80°C			Room temp. +5 to 180°C*4
Temp. control accuracy	±0.05/0.1°C (at37/80°C)*3	±0.02 to 0.05°C (at37/80°C)*3		±0.05 to 0.2°C (at40/180°C)*4
Stirrer	Propeller stirring	Water jet stirring		Propeller stirring
Heater	Stainless pipe heater			
	1.0kW			1.2kW
Temp. control	PID control by micro computer			
Temp. setting	Digital setting by up/down key			
Temp. display	Digital display by green LED			
	Min. digit indication: 0.1°C			Min. digit indication: 1°C
	Setting / Measured temp. changeable	Displayed on main indicator (sub-indicator displays setting temp.)		
Timer	--	1min. to 99h.59min. or 100h. to 999h.		
Timer resolution	--	1min. or 1h.		
Operation function	Fixed operation	Fixed operation: Setting temp., Quick auto stop Program operation: 1 to 3 Pattern, (Max. 10 Segment Pattern) Repeat Operation: Auto Start		
Additional functions	Temp. pre-setting (Memory / Recall 10 temp.)	Temp. Pre-setting (Memory / Recall 10 Temp.), Timer (to 49,999h.), Key lock, Calibration offset, Power failure recovery mode		
	--	--	Temp. output, External alarm output, Time–up output, External communication function (RS422A)	--
Heater circuit control	Triac Zero-cross type			
Sensor	Platinum resistance temperature detector (Pt100Ω)			
Safety device	Self diagnosis function (Automatic overheat prevention, Abnormal temp. sensor, Heater, Triac, Relay), Circuit protector, Float type empty boiling preventor, Independent overheat prevention device			
Accessories	Testing bath BY100 (Polypropylene)			
External dimension	W140×D138×H312mm			
Clamp available thickness	Max. 35mm			
Power source (50/60Hz)	AC115V/AC220V Single phase with step-down transformer			AC115V/AC220V Single phase with step-down transformer
Weight	Approx. 4kg			

*1 Conditions: Temp. and Humidity 23°C ±5°C, 65%RH ±20% (no load)
*2 To control at Room Temp. +5 or lower, please use with cooling unit (Example: BE201F)
*3 Condition: Testing Bath BY100, Water
*4 Condition: Testing Bath BZ100D, Silicon Oil Stickiness 50cst (Set over 81°C, Silicon Oil is necessary)

Function Chart

Model	BF201	BF401	BF501	BF601
Digital setting / display	●	●	●	●
Temperature pre-setting	●	●	●	●
Program function		●	●	●
Water jet strength changeable function		●	●	
Propeller stirring	●			●
External output, communication function etc.			●	
Oil temperature control				●



Structure of water jet stirring

Control Panel


BF201


BF401/501/601

Easy to Carry

Overheat Prevention Device

Optional items

Product name	Specification	Option model	Main unit model no.	Item code
Level controller (Automatic water supplier)	Water supply directly connected to tap water (Electromagnetic valve open/close type), Fixed to testing bath by clamp	OBF10	BF series	221570
Cooling pipe	SUS304, O.D. ϕ 10mm with Neo plane hose 3m (ϕ 13× ϕ 9)	OBJ10	BF series	221572
Bath cover	Stainless cover for testing bath BY100 (This cover cannot be operated with automatic water supplier, External circulation nozzle and cooling pile.)	OBI11	BF series	221578
External circulation nozzle	Neo plane hose I.D. 9mm 3m, Flow rate: Approx. 8L/min., Lift: approx. 1.8m	OBG10	BF401/BF501	221573
External communication adapter set	USB-RS485 adapter, USB cable, RS485 connection cable	OBF12	BF series	221871

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


Level Controller


Cooling Pipe


External Circulation Nozzle


Bath Cover

Testing Baths

Material	Model	Product code	Bath internal size (W×D×H)	Capacity	Operating temp. range
Stainless steel plate	BZ100	221820	230×390×150mm	12L	Up to +200°C
	BZ100D	221821	240×300×200mm	13L	
	BZ200	221822	300×500×150mm	20L	
	BZ300	221823	300×500×200mm	27L	
Polypropylene	BY100	221824	327×185×156mm	8L	−5 to +80°C
	BY200	221825	300×455×160mm	18L	
Acrylic	BX100	221826	230×390×150mm	12L	Up to 50°C (For water only)
	BX100D	221827	240×300×200mm	13L	
	BX200	221828	300×500×150mm	20L	

Water Bath (High Precision Constant Temp., Programmable)

Thermo-Elite® BH401/501

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
Water bath

BH501
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	BH501
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		PID control by microprocessor	
Temperature setting / display		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×D299×H200mm	
Internal capacity		13L (liquid 10L)	
Effective water bath dimension		W227×D150×H200mm (front corner R34)	
External dimension		W310×D396×H607mm (water bath height)	
Power source		AC115V 10A / AC220V 5A	AC115V 11.5A / AC220V 6A
Weight		Approx. 20kg	
Accessories		Hose nipple (1/2×ø14mm) 2pcs.	

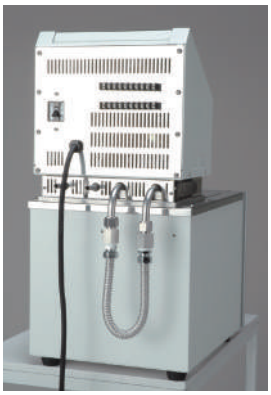
*1. Performance value test condition: room temperature 20°C, no load, power source 50Hz
*2. Protrusions not included

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

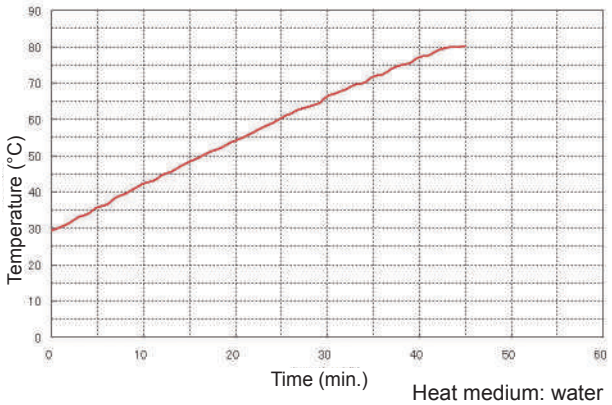
Control Panel

Program controller CR5 model

Rear View (Circulation port)

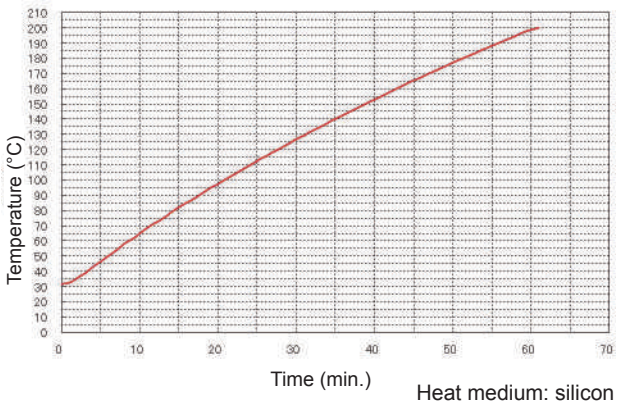


BH401 Heating Performance



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

Oil Bath (Large Capacity)

BOA200/310

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

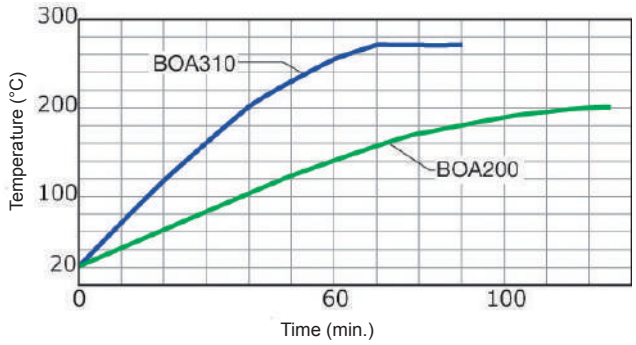
Operation and functions

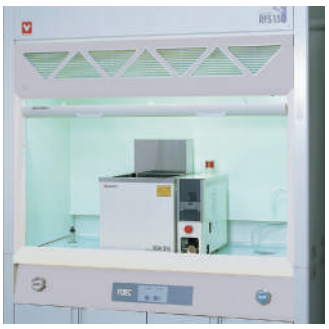
- High temperature distribution accuracy by adopting jet stirring
- Advanced supportive functions
  Standard equipped with external alarm output, temperature output terminal (4~20mA, 1~5V adjustable) RS485 communication function, key lock function, calibration offset function

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

Temperature Rising Curve





Operate with exhaust device such as fume hood

Control Panel

Specifications

Model	BOA200	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×D340×H270mm	
Bath capacity	37L	
External dimensions	W531×D520×H578 (oil bath depth397) mm	
Power source	AC115V 18.5A / AC220V 10A	AC220V 21A
Weight	Approx. 37kg	
Accessories	Shelf 1pc., lid 1pc.	

Recommended silicon oil

Silicone oil is one of the heat transfer media. Please select silicone oil (heat resistant dimethyl silicone oil, viscosity 100mm²/ 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)	50mm²/s (cSt)	100mm²/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.

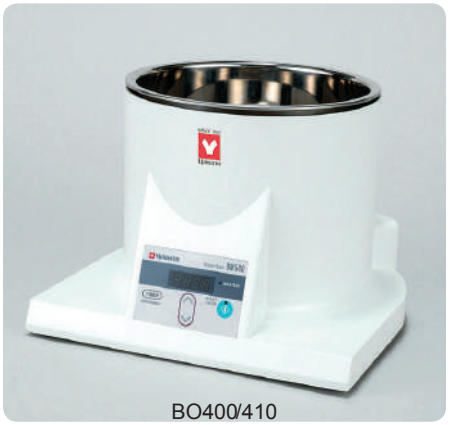
Economical Oil Bath

BO400/410/500/601

Operating temp. range	2Room temp.+10~180°C BO400/410	Room temp.+5~199°C BO500	Room temp.+5~180°C BO601

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

Easy to use, digital setting, compact design oil bath



BO400/410

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

BO500 + MB800 (Magnetic Stirrer)

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

BO601

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

Specifications

Model		BO400	BO410	BO500	BO601
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		PID control by microprocessor		Proportional control	PID control by microprocessor
Temp. setting / display		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 functions		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	Approx. 4L		Approx. 5.2L	Approx. 7L
	Dimensions	Max. I.D.240×bottom Dia165×D122mm		ø240×130mm	I.D.250×D150mm
External dimensions		W340×D349×H231mm		W250×D290×H130mm	W310×D360×H230mm
Weight		Approx. 5.5kg		Approx. 1.4kg	Approx. 8kg
Power source (50/60 Hz)		AC100~120V 12.5~10.5A	AC200~240V 6.5~5.5A	AC115V 7A / AC220V 4A, no breaker*3	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 (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.

Shaking Water Bath

BW101/201/400

Shaking width 10~40 mm

Shaking speed 20~160 times / min

Note: Immersion Type Constant Temperature Devices BF201/401/501 are sold separately.
Above picture is an example of BF and BW combination use.

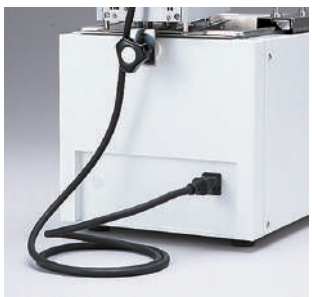
- Adjustable shaking width from 10 to 40 mm.
- Digital display of shaking frequency.
- Double spring shaking rack for stability.
- Drain pump is attached to BW201 and BW400.
- Fitted with service receptacle for "Thermomate".

Control Panel

Specifications

Model		BW101	BW201	BW400
Shaking type		Reciprocate shaking		
Shaking width		10 to 40 mm adjustable		
Shaking speed		20 to 160 times / min. (No step speed change)		
Water bath material		Stainless steel		
Shaking speed control system		Feedback phase control		
Shaking speed display system		Digital		
Additional function		Service receptacle AC100V, 12A for BF201/401/501		
Usable fluid		Water only		
Drain type		Natural drain	Drain pump	
Safety device		Electric leakage breaker, Motor overheat prevention (Automatic recovery type thermal protector)		
Water bath internal dimension		W230×D390×H150mm	W300×D500×H150mm	W380×D535×H150mm
External dimensions		W295×D445×H285mm	W370×D560×H285mm	W445×D585×H295mm
Water bath capacity		Approx. 12L	Approx. 20L	Approx. 30L
Weight		Approx. 28kg	Approx. 35kg	Approx. 42kg
Power (50/60Hz)		AC115V/AC220V Single phase with step-down transformer		
Accessory		Shaking Rack		
Shaking rack capacity	Test tube (ϕ 15mm)	60pcs.	126pcs.	190pcs.
	Erlenmeyer flask	10pcs.	21pcs.	30pcs.

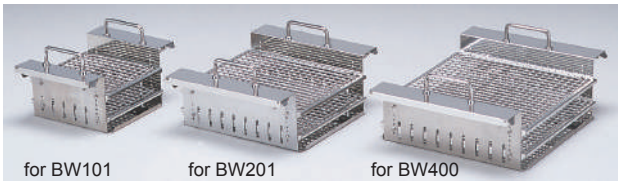
Service Receptacle



Shaking Rack

Number of containers stored

	BW101	BW201	BW400
Test tube (dia. 15mm)	60	126	190
Erlenmeyer flask (50mL)	10	21	30



Shaking Water Bath Incubator

BT100/200/300

Operating temp. range RT+5~80°C | Temp. distribution accuracy ±0.1°C | Bath capacity 17L BT100 | 23L BT200 | 34L BT400

Constant temp. shaking water bath with integrated vibrating design and easy to use, flexible inner tank.

- Changeable vibration range that varies from 10 to 44mm.
- Oscillation frequency ranges from 20 to 160 times per minute allowing for non-incremental speed transition.
- Thermostat enables fixed operation.
- Digital setting and display.
- Comprehensive safety features.

Specifications

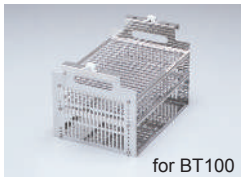
Model	BT100	BT200	BT300
Shaking type	Reciprocate shaking, Stirring by pump		
Operating temp. range	Room temp. +5°C to 80°C		
Temperature control accuracy	±0.02°C to 0.08°C		
Temperature distribution accuracy	±0.1°C		
Temperature rising time	Approx. 95 min.	Approx. 70 min.	Approx. 120 min.
Shaking frequency	20 to 160 times/min.		
Shaking width	10 to 40mm (adjustable)		
Temp. controller	PID control by microprocessor		
Temp. sensor	Pt resistance thermometer (double sensor)		
Temp setting/display	Digital setting		
Overheat protector	ON/OFF control by microprocessor		
Overheat protect setting	Digital setting		
Heater	Copper pipe heater (nickel plated)		
	1.2kW	1.9kW	2.5kW
Stirring system	Magnet pump		
	6W	10W	10W
Shaker	Gear motor		
	25W	40W	40W
Shaking speed setting system	Analog setting		
Shaking speed display system	Digital display		
Timer	1 min. to 999 hr. 50 min. Digital display, Quick automatic start/stop		
Safety device	Self-diagnosis function(Heater defective, Sensor defective, Set value abnormal, SSR short circuit and Overheat protector) Warning buzzer and alarm lump, Over current, short circuit breaker, Heater no-load operation prevention device and overheat protector.		
Container flame number, Test tube	Dia : 16.5mm, Length : 150 to 200mm(JIS)		
	130 pcs.	169 pcs.	260 pcs.
Flask	Round, Erlenmeyer flask 100/300/500ml		
	12/5/3pcs.	16/9/6pcs.	24/10/6pcs.
Interior material	Stainless steel		
Internal dimensions(W×D×Hmm)	302×350×250	372×350×250	532×350×250
External dimensions(W×D×Hmm)	579×414×325	649×414×325	809×414×325
Tank capacity	19L	23L	34L
Power source (50/60Hz)	AC115V/ AC220V Single phase with step-down transformer		AC220V Single phase with step-down transformer
Weight	Approx. 27kg	Approx. 40kg	Approx. 48kg
Accessories: Shaking rack (Dimensions W×D×Hmm)	1 pc. 290×220×170	1 pc. 290×290×170	2 pc. 290×220×170
Accessories: Spring pitch	20mm (both length and width)		

Control Panel

Lid (Optional)

Description	Model No.	Product Code
Lid for BT100	BT Series	221380
Lid for BT200	BT Series	221381
Lid for BT300	BT Series	221382

Rack for Test Tube (Optional)

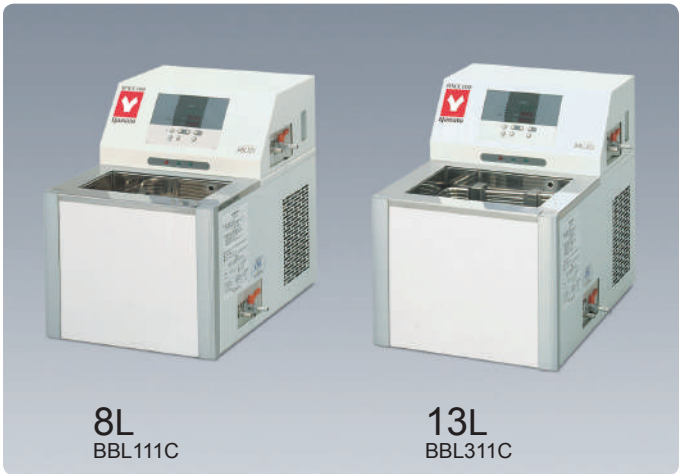


Water Bath (Low Constant Temp.)

BBL111C/311C

Operating temp. range	-10~+80°C
Temp. distribution accuracy	±0.3°C
Internal capacity	8L BBL111C / 13L BBL311C

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



Operation and functions

- Precise temperature control accuracy of ±0.1°C.
- Can easily operate the water valve to switch internal and external circulations.
- Adjustable shelf plate height up to 2 sections.
- Fixed temperature, auto stop and auto start operation functions with auxiliary functions such as RS485 communication function and temp. output terminal (4~20mA).

Safety features

- Overcurrent ELB, self-diagnosis, refrigerator pressure detection, float switch preventing pump idling, refrigerator overload protector relay, refrigerator delay timer of protection, etc..

Specifications

Model		BBL111C	BBL311C
System		Pump circulation cooling / external circulation	
Operating temperature range		-10~+80°C (at room temperature 20°C)	
Temperature control accuracy		±0.1°C	
Temp. distribution accuracy		±0.3°C	
Temp. indicating unit		0.1°C	
Cooling capacity		Approx. 300W (260Kcal/h), at fluid temp.15°C	Approx. 410W (350Kcal/h), at fluid temp. 15°C
Temperature control		PID control	
Operation function		Fixed temp., auto stop , auto start	
Temperature sensor		Temp. controller: Pt thermal resistance, Overheat protection: K thermocouple	
Temp. setting, display		Digital setting and display	
Refrigerator, refrigerant		Air cooling	
		160W, R134A	350W, R134A
Strring method		Magnetic drive pump	
Unit circulation ability (50/60 Hz)	Max. flow	3.7 / 4.7L/min	
	pump capacity	11 / 12L/min	
	Max. lift	1 / 1.5m	
	pump capacity	1.5 / 2.1m	
Heater		700W	900W
Cooling coil		Nickel-clad copper	
External circulation nozzle		O.D.11mm of water outlet and return port	
Operating environmental temp. range		5~30°C	
Safety device		Overcurrent ELB, Self-diagnosis, Refrigerator overload protector, Refrigerator delay timer of protection, Refrigerator pressure detection, Float switch preventing pump idling, Auto overheat protection, Overheat protector, Key lock, etc..	
Other functions		Water valve, Condenser filter screen, Deviation correction, External communication (RS485), Refrigerator pressure indicator, Power outage compensation, Temp. output terminal	
Bath dimensions (W×D×Hmm)		300×150×177.5	300×240×177.5
Bath effective dimensions (W×D×Hmm)		300×150×155	300×240×155
Bath capacity (effective)		8L (6.75L)	13L (11.5L)
External dimensions (W×D×Hmm)		500×530×500	500×600×500
Power source (50/60Hz)		AC220V 5A	AC220V 6A
Weight		Approx. 50kg	Approx. 55kg
Accessories		Bottom shelf plate, Top cover, Drain pipe, Overflow pipe	

Max. quantity of erlenmeyer flask

Model	300mL	500mL	1000mL
BBL111C	3 pcs.	2 pcs.	--
BBL311C	5 pcs.	3 pcs.	2 pcs.

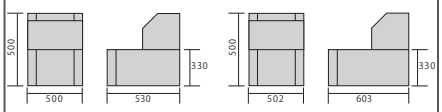
Control Panel

Side View

Equipped with water switch valve to easily switch ON/OFF the external circulation. Nozzle diameter 10.5mm.

Sample Application

Dimensions (mm)



Water Bath (Low Constant Temp., Large Capacity)

BL410C/810C

Operating temp. range	-15~+70°C
Temp. distribution accuracy	±0.3°C
Internal capacity	36L BL410C / 80L BL810C

Large capacity low constant temperature water bath with observation window.

Operation and functions

- Wide temp. range: -15°C+70°C.
- Fixed temperature, auto stop and auto start operations with auxiliary functions such as RS485 communication function and temp. output terminal (4~20mA).
- Designed large observation window.
  BL410C: W250×H135mm
  BL810C: W450×H135mm
- Adjustable shelf plate height up to 2 sections.

Safety features

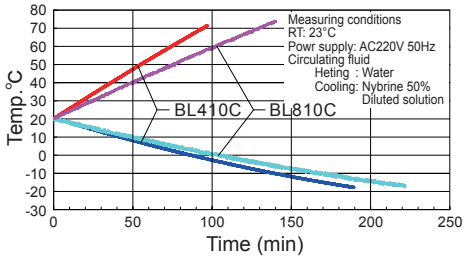
- Overcurrent ELB, self-diagnosis, refrigerator pressure detection, float switch preventing pump idling, refrigerator overload protector relay, refrigerator delay timer of protection, etc..

Specifications

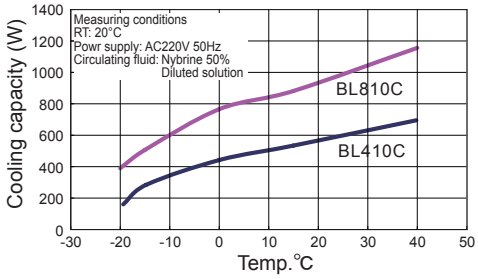
Model	BL410C	BL810C
System	Pump circulating cooling	
Operating temperature range	-15~+70°C	
Temperature control accuracy	±0.1°C	
Temperature distribution accuracy	±0.3°C	
Temperature indicating unit	0.1°C	
Cooling capacity	Approx. 540W (464Kcal/h), at fluid temp.15°C	Approx. 920W (791Kcal/h), at fluid temp.15°C
Temperature control	PID control	
Operation function	Fixed temp., Auto stop, Auto start	
Temperature sensor	Temp. controller: Pt thermal resistance, Overheat protection: K thermocouple	
Temp. setting, display	Digital setting and display	
Refrigerator, refrigerant	Air cooling	
	340W, R134A	600W, R134A
Strring method	Magnetic drive pump to jet flow and stir	
Heater	1.3KW	2KW
Operating environmental temp. range	5~30°C	
Safety device	Overcurrent ELB, Self-diagnosis, Refrigerator overload protector, Refrigerator delay timer of protection, Refrigerator pressure detection, Float switch preventing pump idling, Auto overheat protection, Overheat protector, Key lock, etc..	
Other functions	Water valve, condenser filter screen, Deviation correction, External communication (RS485), Refrigerator pressure indicator, Power outage compensation, Temp. output terminal	
Bath dimensions (W×D×Hmm)	400×300×300	600×400×350
Bath capacity	36L	80L
Shelf plate steps/pitch	2 steps, 30mm adjustable pitch	
External dimensions (W×D×Hmm)	680×390×800	880×490×850
Power source (50/60Hz)	AC220V 8A	AC220V 14A
Weight	Approx. 57kg	Approx. 85kg
Accessories	Bottom shelf plate, changeable middle shelf plate	

Control Panel

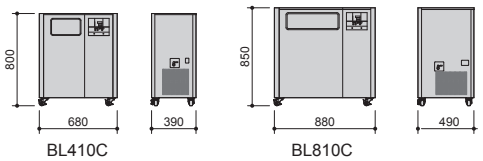
Heating / cooling·cooling capacity curve



Cooling capacity curve



Dimensions (mm)



Water Bath (Low Constant Temp.)

BB311C/411C/611C

Operating temp. range	-30~+80°C

Temp. distribution accuracy	±0.3°C

Bath capacity	6L BB311C	13L BB411C	26L BB611C

Low constant temp. water bath with precision accuracy of ±0.1°C under -30°C+80°C.

Operation and functions

- Precise temperature control accuracy of ±0.1°C.
- Can easily operate the water valve to switch internal and external circulations.
- Adjustable shelf plate height up to 3 sections.
- Fixed temperature, auto stop and auto start operations with auxiliary functions such as RS485 communication function and temp. output terminal (4~20mA).

Safety features

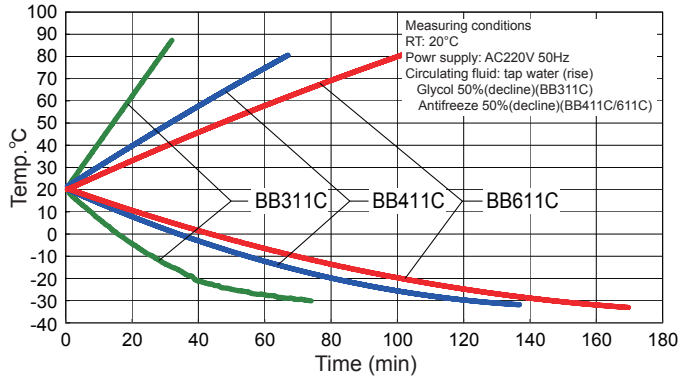
- Overcurrent ELB, self-diagnosis, refrigerator pressure detection, float switch preventing pump idling, refrigerator overload protector relay, refrigerator delay timer of protection, etc..

Specifications

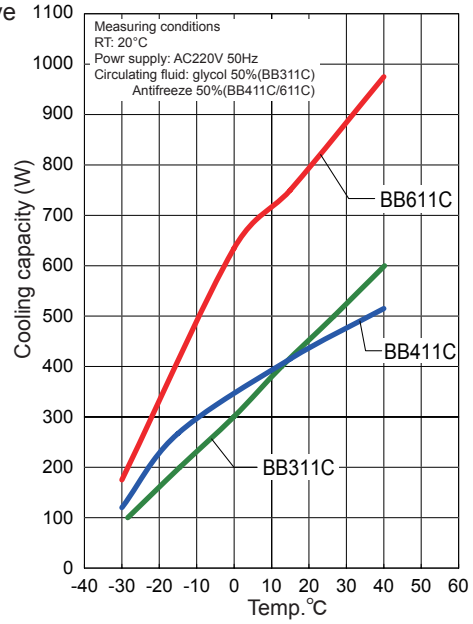
Model		BB311C	BB411C	BB611C
Operating temperature range		-30~+80°C		
Temperature control accuracy		±0.1°C		
Temperature distribution accuracy		±0.3°C		
Temperature indicating unit		0.1°C		
Cooling capacity		Approx. 420W (361Kcal/h), at fluid temp.15°C	Approx. 510W (439 Kcal/h), at fluid temp.15°C	Approx. 730W (628Kcal/h), at fluid temp.15°C
Temperature control		PID control		
Operation function		Fixed temp., Auto stop , Auto start operations		
Temperature sensor		Temp. controller: Pt thermal resistance, Overheat protection: K thermocouple		
Temperature setting, display		Digital setting and display		
Refrigerator, refrigerant		Air cooling		
		300W, R404A	350W, R404A	600W, R404A
Unit circulation ability(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		Stainless steel pipe heater		
		850W		1.2KW
Cooling coil		Nickel-clad copper		
External circulation nozzle		O.D.11mm of water outlet and return port		
Operating environmental temp. range		5~30°C		
Safety device		Overcurrent ELB, Self-diagnosis, Refrigerator overload protector, Refrigerator delay timer of protection, Refrigerator pressure detection, Float switch preventing pump idling, Auto overheat protection, Overheat protector, Key lock, etc..		
Other functions		Water valve, Condenser filter screen, Deviation correction, External communication (RS485), Refrigerator pressure indicator, Power outage compensation, Temp. output terminal		
Bath dimension (W×D×Hmm)		150×300×170	250×315×190	330×435×200
Bath effective dimension (W×D×Hmm)		120×140×140	220×150×160	300×285×170
Bath capacity		6L	13L	26L
External dimensions (W×D×Hmm)		380×460×880	420×550×880	440×650×880
Power supply (50/60Hz)		AC220V 5A	AC220V 6A	AC220V 9A
Weight		Approx. 46kg	Approx. 53kg	Approx. 70kg
Accessories		Top cover, Drain pipe, Overflow pipe		

Heating/cooling·cooling capacity curve·flow/lift curve

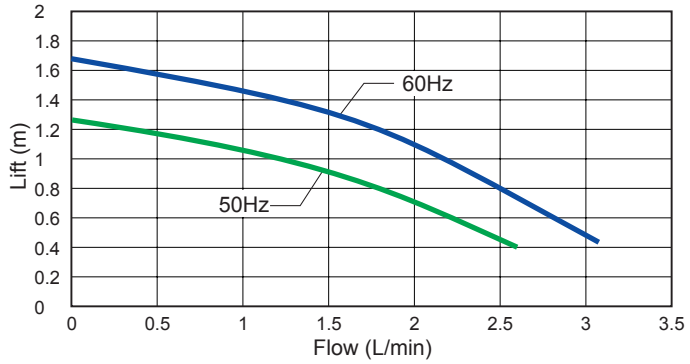
Heating/cooling curve



Cooling capacity curve



Flow / lift curve



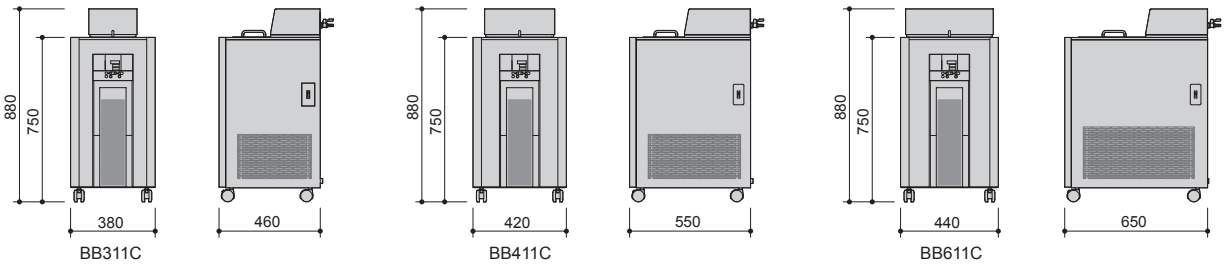
Control Panel

Back view

- I'm not sure what the highlighted statement means so please validate my re-phrased statement: Water stop valve at the back of the unit allows easy switch of external circulation. Nozzle dia.10.5Φ.
- RS485 external communication
- Temp. output terminal

Sample case

Dimensions (mm)



Low Temperature Bath

BLG100/200

Temp. control range	-80°C to 0°C	-40°C to 0°C

Bath capacity	300mL	1,000mL

An all-in-one liquid cooling bath with stirrer that eliminates constant monitoring and replenishment of dry ice and liquid nitrogen.

BLG100　　BLG200

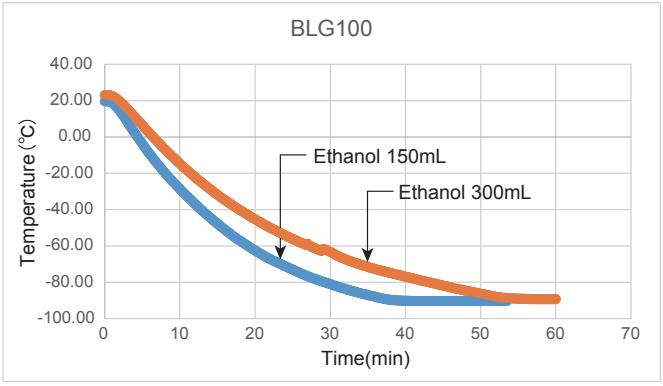
- Lowest temp. reach time is approximately one hour after commencing operation (or within 30 minutes in a no-load state).
- Powerful neodymium magnet is used, which enables simultaneous stirring of multiple reactors.
- Equipped with ON-timer function (which facilitates preparation for the next day's experiments).
- Temp. of 80℃ below zero (BLG100) is optimum for small-scale experiments (up to 100 ml).
- The type for 40℃ below zero (BLG200) is optimum for raw material synthesizing scale (up to 400 ml). Aluminum beads are used in the bath.

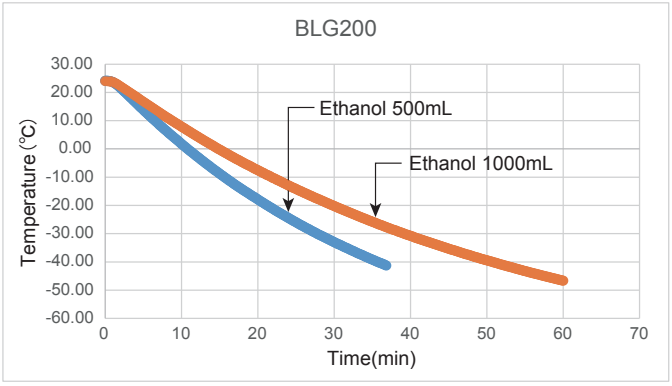
Control Panel

Specifications

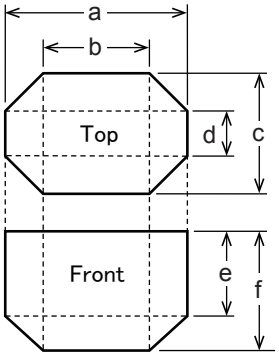
Product code	221704	221705
Model	**BLG100**	**BLG200**
System	Stirring cooler 80W, with helium refrigerant (not Freon)	
Temp. control range	-80°C to 0°C (at ambient temp. of 23°C ± 5°C)	-40°C to 0°C (at ambient temp. of 23°C ± 5°C)
Temp. control accuracy	±0.3°C (the cooling bath temp. in the stable state)	
Temp. fluctuation	±0.3°C	
Lowest temp. reaching time	Approx. 55min (20°C → -80°C)	Approx. 60min (20°C → -40°C)
Bath capacity	Aluminum made/ approx. 300ml	Aluminum made/ approx. 1000ml
Temperature control	PID control + Inverter control	
Temperature display and setting	Digital	
Maximum applicable container size	100 mL three-neck flask	500 mL three-neck flask
Stirring function	Neodymium magnet type. 100 – 1200 rpm, with the rotation speed displayed digitally	
Timer	ON timer only (maximum 99 hours 50 minutes)	
Overall dimensions	W210×D425×H295mm	W210×D450×H295mm
Weight	Approx. 15kg	
Power supply (50/60Hz)	AC115V / 220V Single phase with step-down transformer	
Accessories	Adiabatic cover, Stainless steel support×2 pieces, Operation manual, Warranty card	

Data (Temperature drop curve)



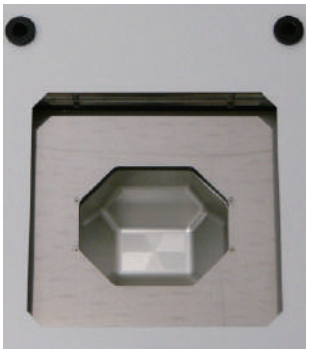


Dimensional drawing

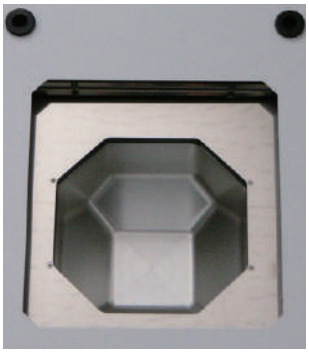


	BLG100	BLG200
a	98	124
b	48	58
c	80	124
d	30	58
e	34	66
f	58	101

Bath size comparison



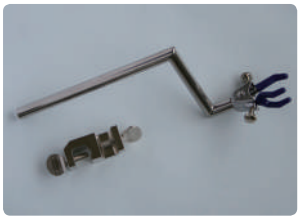
BLG100



BLG200

Related components (recommended)

● Crank type clamp and square holder (with flat head screw) set



Name of Product	Product code
Clamp with crank handle opened on both sides, and square holder (5 to 13 mm-dia,) with flat head screw set	221774

● Side-arm eggplant flask (arm size: ϕ8×30 mm)

Capacity	Main tube	Product code
5ml	15/25	221763
10ml	15/25	221764
20ml	15/25	221765
30ml	15/25	221766
50ml	15/25	221767

● Teflon-made stirrer, FO type (10-piece set)

Length	Diameter	Product code
10mm	5mm	221775
20mm	10mm	221776
30mm	15mm	221777

● Three-neck round-bottom flask (side tube 15/25)

Capacity	Main tube	Product code
50ml	15/25	221768
100ml	15/25	221769
100ml	29/42	221770
200ml*	29/42	221771
300ml*	29/42	221772
500ml*	29/42	221773

*For BLG200 only

Low Temperature Water Bath (Programmable, Peltier Cooling)

BV100

Operating temp. range 0~80°C | Temp. distribution accuracy ±0.1°C | Bath capacity 6L

Space saving low temperature water bath with program operation function, high precision temp. control and low vibration type with Peltier device equipped.

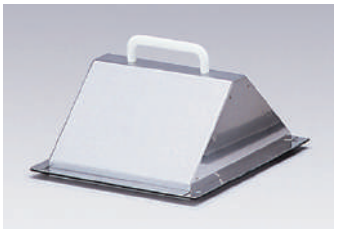
- Precise temp. control by digital temp. setting.
- Enhanced temp. distribution by pump stirring.
- Improved lid closure by its simple flat design.

Specifications

Model	BV100
Stirring system	Peltier device with heater, stirring by pump
Operating temp. range	0 to 80°C (periphery temperature 20°C)
Temp. adjustment accuracy	±0.1°C (Water temp. 20°C, Room temp. 20°C)
Temp. distribution accuracy	±0.1°C (Water temp. 20°C, Room temp. 20°C)
Time to reach to max. temp.	Approx. 90min.
Time to reach to min. temp.	Approx. 180min.
Internal bath	Stainless steel
Temp. adjuster	PID control by microcomputer
Program function	8 steps×2 patterns, or 16 steps×1 pattern
Sensor	Pt sensor, Pt100Ω (Temp. controller), K-thermocouple (for overheat preventor) (Double sensor)
Temp. setting	Digital
Temp. display	Digital
Overheat preventor	On/Off control by microcomputer
Overheat preventor setting	Digital
Overheat preventor sensor	K-thermocouple
Heater	Copper pipe heater (Nickel plated)
	0.5kW
Cooler	Peltier device
Cooling fan	Direct flow fan
Stirrer	Magnet pump 3W
Timer	1min. to 99hrs.59min. to 999hrs.50min.
	Digital display, Automatic stop, Automatic start
Safety device	Self diagnosis function (Heater wire broken, SSR short circuit, Automatic overheat prevention), Empty boiling prevent system, Overheat preventor, Over-current / Electric leakage breaker
Internal dimensions	W188×D220×H180mm
External dimensions	W340×D538×H415mm
Bath internal capacity	Approx. 6L
Drain hose dimensions	ϕ15 x ϕ20
Power	AC100V, 50/60Hz, 10A (15A)
Weight	Approx. 35kg
Accessories	Drain pump, Water bath lid

Control Panel

Stainless Lid



Optional items

Description	Product Code
Clamp set	221387
Lid (made of stainless steel)	221388
Rack (stainless steel)	221391

Heating Block

HF100/200

Operating temp. range RT+5~200℃

Temp. adjustment accuracy ±0.2℃

HF100

HF200

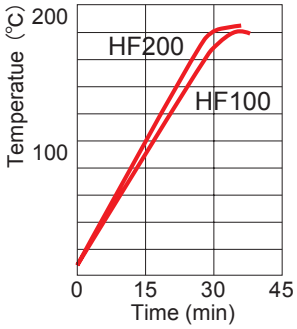
- Quick heat up
- Enhanced temp. adjustment accuracy (±0.2℃) with calibration off-set function.
- 10 types of aluminium block

Specifications

Model	HF100	HF200
Operating temp. range	Room temp. +5 to 200℃	
Temp. adjustment accuracy	±0.2℃ (at 200℃ , at using ϕ16.5 testing tube)	
Time to reach to max. temp.	Approx. 30min. (Room temp. 23℃)	Approx. 35min. (Room temp. 23℃)
Loadable block	Aluminium block 1pc.	Aluminium block 2pcs.
Temp. control	PID Control by digital controller	
Temp. sensor	Pt Sensor, Pt100Ω	
Temp. setting/display	Digital setting, Min. indication unit 0.1℃	
Operation function	Fixed. temp. operation, Quick automatic stop timer operation, Automatic stop timer operation, Automatic start timer operation	
Heater	Mica heater 370W	Mica heater 600W
Safety device	Over current / electric leakage breaker, Automatic overheat prevention (Main relay shut down at setting temp. +12deg.C, Manual recovery), Independent overheat preventor (Manual recovery type bimetal, Reaction temp. Approx. 230deg.C)	
Other functions	Key lock function, Calibration Off -Set function, Breakout protection function	
Bath dimensions	W112×D112×H70mm	W222×D112×H70mm
External dimensions	W230×D310×H139mm	W340×D310×H139mm
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	AC115V/AC220V Single phase with step-down transformer
Weight	Approx. 5kg	Approx. 6.5kg
Accessory	Handle for aluminium block loading /Unloading	

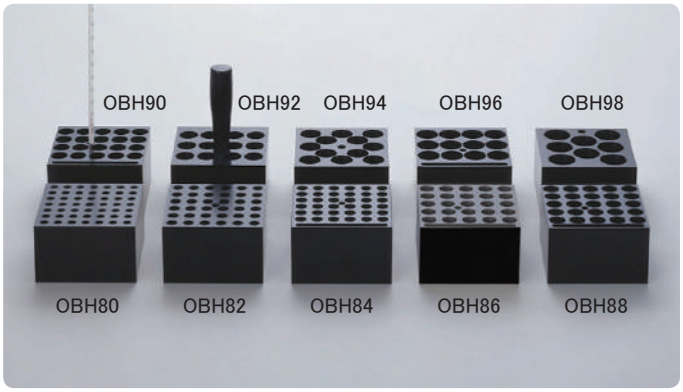
Control panel

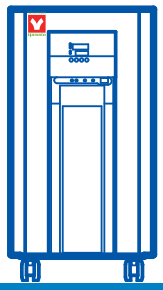
Temperature Rising Curve



Operational Items

Description	Option Model	Product Code
Aluminum block, 0.5ml Micro tube, 48 tubes	OBH80	213173
Aluminum block, 1.5ml Micro tube, 36 tubes	OBH82	213174
Aluminum block, 12mm Test tube, 36 tubes	OBH84	213181
Aluminum block, 15mm Test tube, 25 tubes	OBH86	213182
Aluminum block, 16.5mm Test tube, 25 tubes	OBH88	213183
Aluminum block, 18mm Test tube, 20 tubes	OBH90	213184
Aluminum block, 21mm Test tube, 12 tubes	OBH92	213175
Aluminum block, 24mm Test tube, 12 tubes	OBH94	213176
Aluminum block, 25mm Test tube, 12 tubes	OBH96	213185
Aluminum block, 30mm Test tube, 8 tubes	OBH98	213177





Cooling Water Circulator

Contents

Overview Cooling Water Circulator

Provide safe, environment-friendly and energy-saving products.

According to different purposes, may choose from various models, meet the requirements of temp. range and distribution accuracy, size, price, program operation, special usage, etc.

Function·Safety devices

Forced convection circulation
Through forced convection of high-performance centrifugal fan, stir the chamber to get uniform temp. distribution accuracy.

Free convection
Through chamber free convection of heater or air-jacket.

Auto overheat prevention
Overheat prevention with built-in controller, usually when ovens chamber temp. reaches set temp. +12℃, water bath chamber temp. reaches set temp. +6℃, the heater cuts off (auto recovery).

Overheat protector
Overheat protector with integrated controller, shares power suplly with controller, but other circuits are independent. In the event of abnormal temp. rising (manual recovery), cut off heater circuit.

Independent overheat protector
The circuit is different with controller, in the event of abnormal temp. rising (manual recovery), cut off heater circuit. According to different models, respectively configurate digital, hydraulic, thermometal types.

Self-diagnosis
Use the microcomputer, carried in the controller, to detect the abnormal circuit, alarm sounds in event of abnormality, control the device whitin safety range.

Key lock
Prevents the misoperation during operation.

Backup
Even in power outage or cutting off power, it also can memorize the set value.

Power outage compensation
When the power recovers, able to select to interrupt or continue operation.

Overcurrent breaker
When there is abnormal current, cut off power supply to protect the unit body.

Overcurrent ELB
This breaker has overcurrent cutting function and current leakage cutting function

Emergency stop button
If emergency stop needed, press this button to cut off.

Type		Feature	Operating temp. range	Max. Flow rate (L/min.)	Head of fluid (m)	Model	Cooling capacity (W) (Liquid temp.)	Internal capacity (L)	Page
External Closed Circulation	Neocool Circulator	Refrigerator ON-OFF control	-20℃～Room temp.	6.3/7.2	4.0/5.6	CF311C	450 (at 10℃)	4	231
				10.0/11.8	10.3/14.3	CF810C	1050 (at 10℃)	16	
		High flow rate & lift	10℃～Room temp.	20.1/21.7	19.0/25.0	CHW710C/CHS710C	1050 (at 20℃)	16	230
		Temp. control accuracy ±0.1℃	30℃～+80℃	8.9/10.3	6.6/9.0	CFA311C	330 (at 10℃)	13	235
				16.4/18.3	9.7/13	CFA610C	900 (at 10℃)	16	
		High power and lower power consumption type with inverter	5℃～+30℃	15/18	35/48	CFI701	1000 (at 20℃)	5	233
				22/26	52/65	CFI911/1111	1600/2700 (at 20℃)		
			-10℃～+30℃	15/17	10/14	CFI601/811/1011	1000/1800/2900 (at 20℃)		
External Opened Circulation	Cool Line	Refrigerator ON-OFF control	-10℃～Room temp.	5.4/6.2	3.5/5.0	CLS312C	450 (at 15℃)	1.5	237
			-15℃～Room temp.	5.4/6.3	3.7/5.3	CLS411C	570 (at 15℃)	3	
				6.7/7.8	6.2/8.7	CLS610C	820 (at 15℃)		
		Temp. adjustment accuracy ±0.1℃	-10℃～+80℃	5.4/6.2	3.5/5.0	CLH312C	450 (at 15℃)	1.5	239
			-15℃～+80℃	5.4/6.3	3.7/5.3	CLH411C	570 (at 15℃)	3	
				6.7/7.8	6.2/8.7	CLH610C	820 (at 15℃)		
	Coolnics Circulator	Peltier device	-10℃～+70℃	8	-	CTW402/412	97	-	241
				11		CTW802/812	189		
			0℃～+70℃	8		CTA402/412	97		
				11		CTA802/812	189		
			-10℃～+70℃	8		CTW402S/412S	147		
				11		CTW802S/812S	291		
			0℃～+70℃	8		CTA402S/412S	147		
				11		CTA802S/812S	291		

Cooling Water Circulator (Externally Closed Circulation)

For water circulation (CHW710C) / For pure water circulation (CHS710C)

CHW710C/CHS710C

Operating temp. range: 10~Room temp.

Pump capacity (50Hz): Max. Flow rate 22.0/25.0L/min, Max. Lift 20.0/27.0m

Suitable for high flow amount and high lift.

- Cooling capacity: 1,000W/860kcal at water temp. 20℃, at room temp. 20℃.
- Continuous monitoring for water level, abnormal refrigerating pressure, cooling water pressure level, circulation pump, etc.

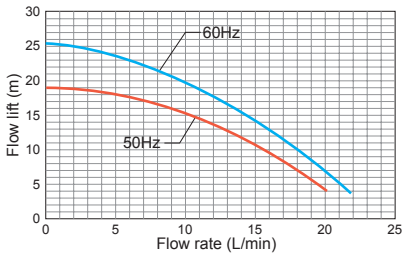
Specifications

Model	CHW710C	CHS710C
Operating water	For city water circulation	For pure water circulation
Circulation type	Closed system circulation by pump	
Operating temperature range	10℃ to Room temp.	
Temp. adjustment accuracy	±1.5 to 2.5℃	
Cooling capacity	Approx. 1,050W (900kcal) at Liquid temp. 20℃ , at Room temp. 20℃	
Temp. control system	Refrigerator On/Off control	
Temp. sensor	T-thermocouple	
Temp. setting, display	Digital	
Refrigerator / Coolant	Air cooling 675W / R407C	
Circulation pump	Magnet pump 65W×2pcs.	
Pump max. flow rate	22.1/21.7L/min. (50/60Hz)	
Pump max. lift	19.0/25.0m (50/60Hz)	
Surrounding operation temp. range	5 to 35℃	
Circulation nozzle	Rc3/8 Female screw	
Safety countermeasures	Self diagnosis functions, Electric leakage breaker with over current protection, Refrigerator over load relay, Refrigerator pressure detector, Refrigerator protection's delay timer function, Float switch, Circulation pump protection by-pass	
Other function	Drain cock, Dust prevention filter, Refrigerator pressure indicator, Automatic stop operation, Automatic start operation, Key lock function, Calibration off set function, Breakout protection function, Temp. output terminal (4-20mA).	
Accessories	Drain hose 0.5m×1pc, Overflow hose 0.5m×1pc	
Water bath dimension	ID300×H235mm	
Water bath capacity	Approx. 16L (liquid volume 14L)	
Cooling coil	Copper-nickel plated	
External dimension	W380×D460×H1,050 mm	
Power source (50/60Hz)	AC220V Single phase	
Weight	Approx. 55kg	

Optional Items

Description	Model No.	Product Code
Straight circulation nozzle 10.5m dia Rc3/8	CHW710C/CHS710C	221394
Straight circulation nozzle 13.0m dia Rc3/8	CHW710C/CHS710C	221399
Straight circulation nozzle 16.0m dia Rc3/8	CHW710C/CHS710C	221395
L shape circulation nozzle 10.5m dia Rc3/8	CHW710C/CHS710C	221396
L shape circulation nozzle 13.0m dia Rc3/8	CHW710C/CHS710C	221397
L shape circulation nozzle 16.0m dia Rc3/8	CHW710C/CHS710C	221398
External communication adapter RS485-RS232C changeable	CHW710C/CHS710C	281388

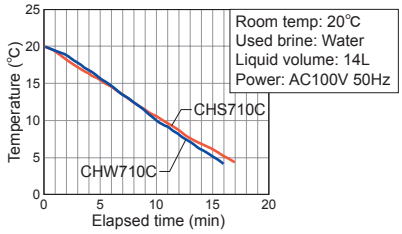
Flow / lift curve



Back Side

- RS485 external communication terminal
- Temp. output terminal
- Circulation port

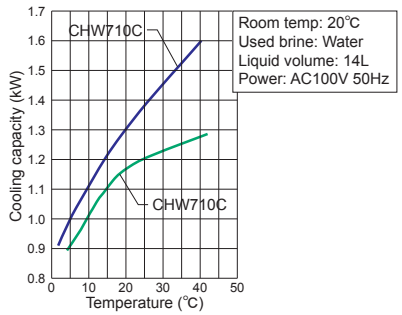
Cooling curve



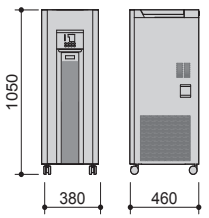
Control Panel

Water level monitor, Refrigerator monitor, Refrigerator operation indicator

Cooling capacity curve



Dimensions (mm)



Optional Items

Circulation nozzle

Cooling Water Circulator (Externally Closed Circulation)

Powerful closed cooling system

CF/311C/810C

Operating temp. range: -20°C~Room temp.

Capacity: 4L CF311C | 16L CF810C

Closed system and water saving with excellent cooling capacity and water-saving

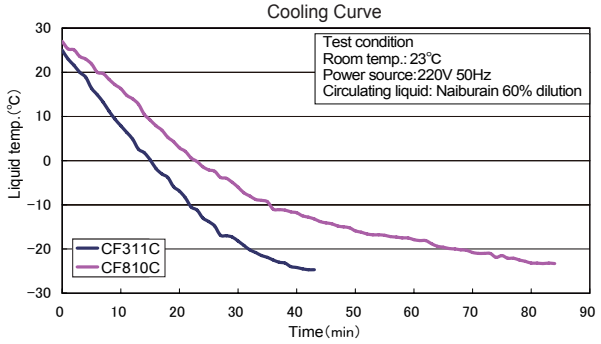
Through the refrigerator and circulating pump steadily provide cooling water for closed cooling parts of research instrument, analysis and measuring instruments, industrial machine etc.

- Environment friendly coolant used for refrigeration.
- Waterproof control panel with big LED display and sheet key for easier setting.
- Equipped with overcurrent ELB, refrigerator overload relay, pump overheat protector, refrigerator delay timer of protection.

Specifications

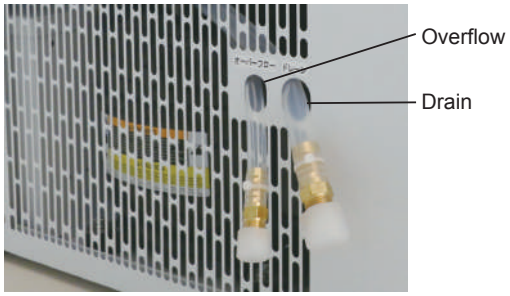
Model		CF311C	CF810C
Circulation type		Closed circulation	
Operational ambient temperature		5~35°C	
Operating temp. range		-20°C ~ Room temperature	
Cooling capacity		Approx. 450W (385Kcal/h) at liquid temp. 10°C Approx. 360W (300Kcal/h) at liquid temp. 0°C Approx. 270W (220Kcal/h) at liquid temp. -10°C	Approx. 1050W (770Kcal/h) at liquid temp. 10°C Approx. 910W (600Kcal/h) at liquid temp. 0°C Approx. 670W (410Kcal/h) at liquid temp. -10°C
Temp. control		Refrigerator ON/OFF control	
Temp. sensor		T-Thermocouple	
Temp. setting / Display		Digital setting / LED display	
Refrigerator		Air cooling, 450W	Air cooling, 600W
Coolant		R404A	
Circulation pump		Magnet pump 10/15W	Magnet pump 65/65W
Circulation capacity (50/60Hz)	Max. flow rate	6.3 / 7.2L/min	10.0 / 11.8L/min
	Pump max. flow rate	12.8 / 14.3L/min	22.0 / 25.0L/min
	Max. lift	4.0 / 5.6m	10.3 / 14.3m
	Pump max. lift	4.1 / 5.7m	10.0 / 13.5m
Cooling Coil		Nickel plated copper	
External circulation nozzle		O.D. 10.5mm for in and out with hose nipple	
Safety device		Electric leakage breaker, Refrigerator over load relay, Pump thermal protector, Refrigerator-protection delay timer	
Other functions		Drain, over flow	
External linkage terminal		-	-
Socket		-	5A socket
Water bath dimension		ø151×177mm	ø300×H235mm
Water bath material		SUS304	
Water bath capacity		Approx. 4L (Liquid amount 3L)	Approx. 16L (Liquid amount 14L)
Power source (50/60Hz)		AC220V 3A	AC220V 7A
External dimension (W×D×H mm)		228×508×546	350×480×840
Weight		Approx. 32kg	Approx. 54kg
Accessories		Circulation hose (1.5m) ×2, Wire clamp×2, Cover	

Cooling Curve



Control Panel

Drain, Overflow (Left Side)



External Circulation Nozzle (rear of CF810C)

Optional items

Circulation insulation hose

Straight circulation nozzle

One touch rotation L-shaped nozzle

Optional Items

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

Installation of one touch rotation L shape nozzle

Cooling Water Circulator (Externally Closed Circulation, Inverter Control)

Inverter Type

CFI 701/911/1111/601/811/1011

Operating temp. range	5~30°C CFI 701/911/1111	-10~30°C CFI 601/811/1011

Cooling capacity	1,000W CFI 601/701	1,600W CFI 911	1,800W CFI 811	2,700W CFI 1111	2,900W CFI 1011

Cooling water circulation system of high output, saving energy consumption by inverter control.

- High lift models equipped with high powered pump (CFI701/911/1111) suitable for cooling analyzing equipment such as ICP, ICP-MAS, X-ray analyzer device, Electron microscope etc.
- Various optional accessories available.

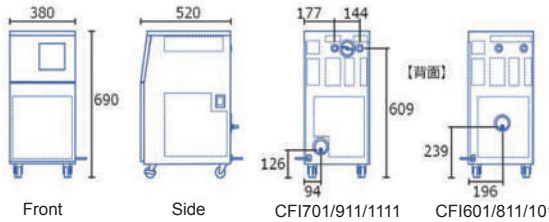
Specifications

Model	CFI 701	CFI 911	CFI 1111	CFI 601	CFI 811	CFI 1011
Type	High-lift			General		
Circulation type	Closed System / Tap Water or Anti-freezing liquid					
Operating temp. range	5~30℃			-10~30℃		
Temp. fluctuation (JIS)	±0.1°C					
Cooling capacity (at Liquid Temp. 20°C)	Approx. 1,000W	Approx. 1,600W	Approx. 2,700W	Approx. 1000W	Approx. 1,800W	Approx. 2,900W
External circulation flow rate (50/60Hz)	Approx. 15 / 18L/min	Approx. 22 / 26L/min		Approx. 15 / 17L/min		
Pump max. lift (50/60Hz)	Approx. 35 / 48m	Approx. 52 / 65m		Approx. 10 / 14m		
Tank	Polyethylene					
Temp. control	Refrigerator inverter control					
Temp. sensor	Pt100Ω, T thermocouple					
Temp. setting / display	Digital setting/display					
Refrigerator / coolant	Air-cooling inverter type / R410A					
Heat exchanger	Plate type, SUS316					
External circulation nozzle	Nozzle is option, Rc1/2					
Circulation pump	Turbine Pump 370W	Turbine Pump 550W		Magnet Pump 65W		
Safety countermeasures	Over current electrical leakage breaker, Temp. sensor error, Float switch, Refrigerator over load relay, Refrigerator high pressure relay, Ambient temp. upper limit error, Refrigerator overload reducing operation, Pump thermal protector, Delay timer for protecting refrigerator, Bypass valve for protecting pump, Condenser refrigerating protecting, Inverter error			Over current electrical leakage breaker, Temp. sensor error, Float switch, Refrigerator over load relay, Refrigerator high pressure relay, Ambient temp. upper limit error, Refrigerator overload reducing operation, Pump thermal protector, Delay timer for protecting refrigerator, Inverter error		
Other functions	Water bath filter, Drain cock, Air intake filter, Calibration off-set, Auto start, Auto stop, Display the amount of Power consumption, Integration time					
Water bath capacity	Approx. 5L					
Power source (50/60Hz)	AC115V / AC220V Single phase with step-down transformer					
External dimensions (WxDxHmm)	W380 x D520 x H690mm					
Weight	Approx. 56kg	Approx. 50kg	Approx. 53kg	Approx. 47kg	Approx. 40kg	Approx. 44kg
Accessories	Lid, Drain hose (I.D. 9mm x 500mm), Drain hose nozzle (O.D. 10mm)					

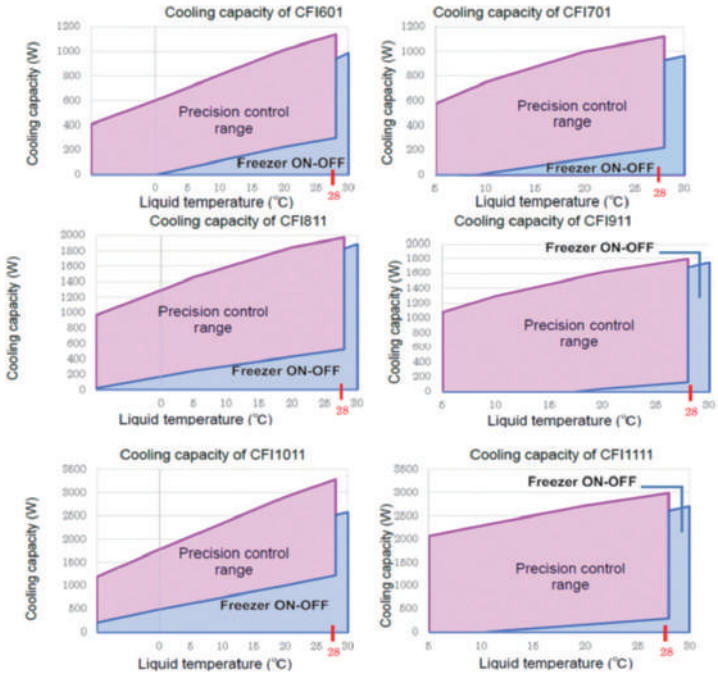
*1 Conditions: Ambient temperature and humidity: 23℃±5℃, 65%RH±20% (no load). Liquid temperature 20℃.
*2 Protrusions not included.

Control Panel

Dimensions (mm)



Cooling curve



Optional Items

Description	Product code
Straight circulation nozzle 9mm dia Rc1/2	221650
Straight circulation nozzle 10.5mm dia Rc1/2	221651
Straight circulation nozzle 12.7mm dia Rc1/2	221652
Straight circulation nozzle 16.0mm dia Rc1/2	221653
Straight circulation nozzle 19.0mm dia Rc1/2	221654
Male/female elbow	221655
Coupling for Brade hose 9.0mm dia, R1/2	221677
Coupling for Brade hose 15.0mm dia, R1/2	221678
Coupling for Nylon rigid hose 8.0/9.0mm dia, R1/2	221679
Brade hose, PVC, 9mm dia, 5mX1pc.	221673
Brade hose, PVC, 15mm dia, 5mX1pc.	221674
Nylon rigid hose, 9mm dia, 5mX1pc.	221672
Heat-resistant circulation hose (2m. X 2pcs., 9mm dia)	221581
Flow adjusting valve, Rc1/2 × R1/2	221656
Flow meter, Rc1/2 × R1/2	221691
Pressure meter, R1/2 × Rc1/2	221657
Filter set 50μm, should be connect with Nylon rigid hose	221692
Strainer set, R1/2 × Rc1/2	221671
*External communication terminal (RS485)	221690
*Operation signal output terminal	221688
*External combination terminal	221687
*External alarm output terminal	221686
*Temperature output terminal (4-20mA)	221689
External Communication Adapter set (USB-RS485 adapter, USB cable 1m, RS485 connection cable 3m, utility software for Windows XP/Vista/7)	211884
*Leak detection system	221685
Noise reduction panel	221693
Connecting set for analyzing equipment	221694

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

Leak detection system

Noise reduction panel

Straight circulation nozzle

Male / Female elbow

Strainer set

Coupling for Brade hose

Coupling for Nylon rigid hose

Flow adjusting valve

Brade hose, PVC

Nylon rigid hose

Pressure meter

Cooling Water Circulator (Externally Closed Circulation, Air Cooling)

High-precision temp.control

CFA311C/610C

Operating temp. range	-30~+80°C
Temp. control accuracy	±0.1°C
Bath capacity	13L CFA311C / 16L CFA610C

Precision external closed cooling water circulator with a temp. control accuracy of ±0.1°C.

Operation and functions

- High-precision circulation water with temp. range of -10°C~+80°C and temp. control accuracy of ±0.1°C.
- Powerful cooling capacity.
- Continuous monitoring for water level, abnormal refrigerator pressure, refrigerator operation, circulation pump operation, etc..
- Configurated with auto stop, auto start operations, temp. output terminal, deviation correction, external communication (RS485), etc..

Safety features

- Overcurrent ELB, self-diagnosis, key lock, refrigerator overload protector, refrigerator delay timer of protection, refrigerator pressure detection, float switch preventing pump idling, bypass for protecting circulating pump, auto overheat protection, overheat protector, etc..

Specifications

Model		CFA311C	CFA610C
Method		External closed circulation	
Operating temperature range		-30~+80°C	
Temperature control accuracy		±0.1°C	
Temperature indicating unit		0.1°C	
Cooling capacity		~330W (284Kcal/h), at fluid temp.10°C	~900W (770 Kcal/h), at fluid temp.10°C
Temperature control		PID control	
Temperature sensor		Temp. controller: Pt thermal resistance, overheat protection: K thermocouple	
Temperature setting, display		Digital setting and display	
Refrigerator, refrigerant		Air cooling	
		300W, R407A	675W, R407A
Circulating pump		Magnetic drive pump	
		45W	65W
Unit circulation ability (50/60Hz)	Max. flow	8.9 / 10.3L/min	16.4 / 18.3L/min
	Pump capacity	(15 / 17L/min)	(22.0 / 25.0L/min)
	Max. lift	6.6 / 9.0m	9.7 / 13m
	Pump capacity	(8.0 / 11.0m)	(10.0 / 13.5m)
Heater		Stainless steel pipe heater 1.0KW	Stainless steel pipe heater 2.5KW
Cooling coil		Nickel-clad copper	
External circulation nozzle		Rc3/8 (CFA311C standard configuration pagoda connector)	
Operating environmental temp. range		5~35°C	
Safety device		Overcurrent ELB, Self-diagnosis, Refrigerator overload protector, Refrigerator delay timer of protection, Refrigerator pressure detection, Float switch preventing pump idling, Bypass for protecting circulating pump, Auto overheat protection, Overheat protector, etc..	
Other functions		Drain valve, Condenser filter screen, Deviation correction, External communication (RS485), Refrigerator pressure indicator, Key lock, Temp. output terminal	
Bath dimension		W250×D315×H180mm	I.D.300×H236mm
Bath materials		Stainless steel	
Bath capacity		13L	16L
External dimensions (W×D×Hmm)		380×565×720	420×565×1050
Power supply (50/60Hz)		AC220V 8A	AC220V 15A
Weight		~60kg	~77kg
Accessories		Drain pipe, Overflow pipe	

Chamber (CFA610C)

Control Panel

Water level monitor,
Refrigerator monitor,
Refrigerator operation indicator

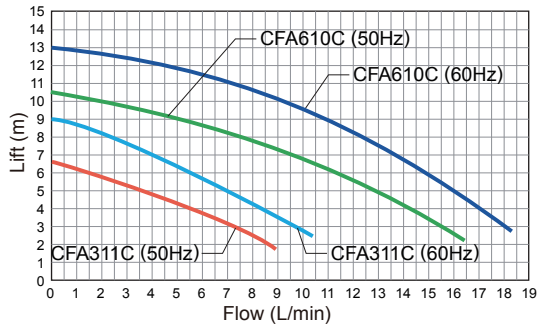
Rear (CFA311C)

- RS485 external communication terminal
- Temp. output terminal
- Circulation port

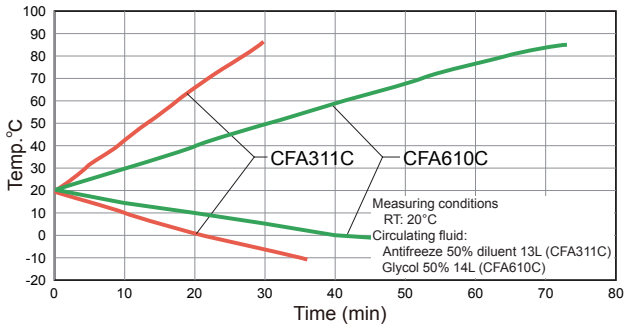
Rear (CFA610C)

- RS485 external communication terminal
- Temp. output terminal
- Circulation port

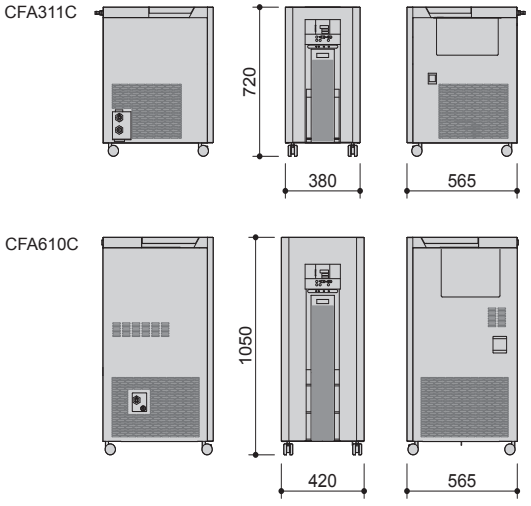
Flow / lift curve



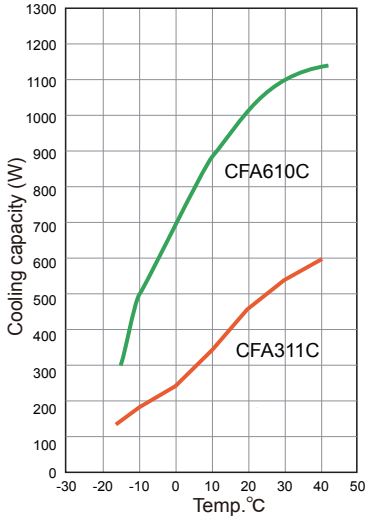
Heating cooling curve



Dimensions (mm)



Cooling capacity curve



Measuring conditions
RT: 20°C
Circulating fluid:
Antifreeze 50% diluent 13L (CFA311C)
Glycol 50% 14L (CFA610C)

Cooling Water Circulator (Externally Opened Circulation)

Standard

CLS312C/411C/610C

Operating temp. range	-10°C~RT CLS312C	-15°C~RT CLS411C/610C

Temp. control accuracy	±1.5~2°C

Bath capacity	1.5L CLS312C	3L CLS411C/610C

External open cooling water circulator with refrigerator ON-OFF control and powerful cooling capacity.

Operation and functions

- External open cooling water circulator with temp. range of -10°C and -15°C.
- Use the flow control valve to freely adjust the circulating pump's flow according to bath size.
- Use the flow sensor to monitor the pipeline flow, in case of pipe clogging, the red lamp lights up, with auto stop protection device.
- Configurated with quick auto stop, auto stop, auto start operations, temp. output terminal, deviation correction, power outage compensation.

Safety features

- Overcurrent ELB, self-diagnosis, key lock, power outage compensation, flow monitor, refrigerator monitor, refrigerator delay timer of protection, abnormal flow or high pressure, etc..

Specifications

Model		CLS312C	CLS411C	CLS610C
Method		External opened circulation		
Operating temperature range		-10°C~RT	-15°C~RT	
Temperature control accuracy		±1.5~2°C		
Cooling capacity		~450W (387Kcal/h), at fluid temp.15°C	~570W (490 Kcal/h), at fluid temp.15°C	~820W (705 Kcal/h), at fluid temp.15°C
Temperature control		Refrigerator ON-OFF control		
Temperature sensor		T thermocouple		
Temperature setting, display		Digital setting and display		
Refrigerator, refrigerant		Air cooling		
		200W, R404A	350W, R404A	600W, R404A
Circulating pump		Magnetic drive pump		
Unit circulation ability (50/60Hz)	Max. flow	5.4 / 6.2L/min	5.4 / 6.3L/min	6.7 / 7.8L/min
	Pump capacity	(10.0 / 11.0L/min)	(10.0 / 11.0L/min)	(15.0 / 17.0L/min)
	Max. lift	3.5 / 5.0m	3.7 / 5.3m	6.2 / 8.7L/m
	Pump capacity	(4.9 / 6.9m)	(4.9 / 6.9m)	(8.0 / 11.0L/min)
Cooling coil		Nickel-clad copper		
External circulation nozzle		O.D.13mm of water outlet and return port		
Operating environmental temp. range		5~30°C		
Safety device		Overcurrent ELB, Self-diagnosis, Key lock, Power outage compensation, Flow monitor, Refrigerator monitor, Refrigerator delay timer of protection, Abnormal flow or high pressure, etc..		
Other functions		Flow control valve, Drain valve, Condenser filter screen, Deviation correction, Key lock, Temp. output terminal, Power outage compensation		
Bath dimension		I.D.120×D200mm	I.D.150×D200mm	
Bath materials		Stainless steel		
Bath capacity		1.5L	3L	
External dimensions (W×D×Hmm)		410×460×550	380×460×720	380×565×720
Power supply (50/60Hz)		AC220V 2A	AC220V 3A	AC220V 5A
Weight		~40kg	~45kg	~60kg
Accessories		Circulating heat preservation pipe-1, Pump circulating tube-1, Hoop-4, Drain pipe-1		

Control Panel

Water level monitor,
Refrigerator monitor,
Refrigerator operation
indicator

Rear

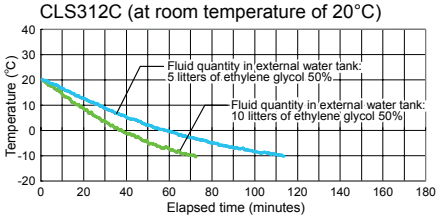
- Water stop valve at the back of the unit allows easy switch of external circulation.
- RS485 external communication
- Temp. output terminal

Sample case

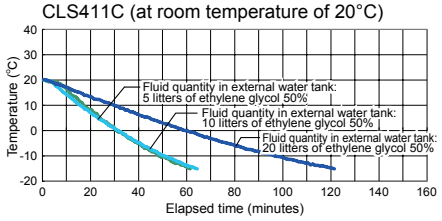
Optional test bath

Cooling curve

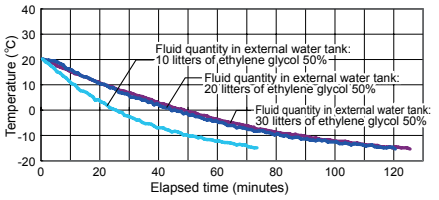
CLS312C (at room temperature of 20°C)



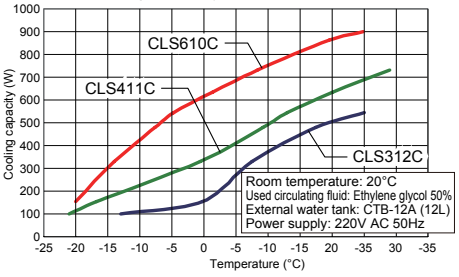
CLS411C (at room temperature of 20°C)



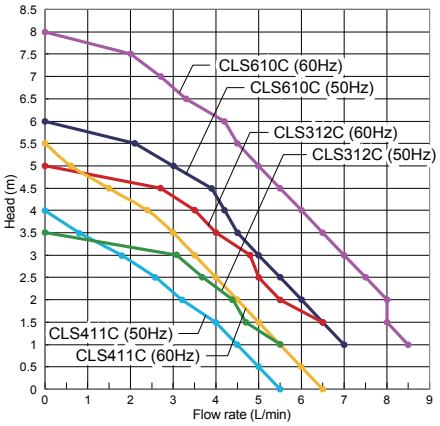
CLS610C (at room temperature of 20°C)



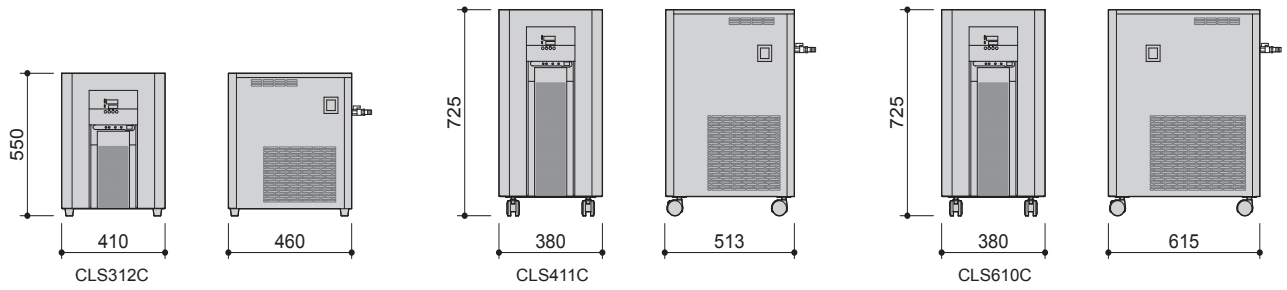
CLH cooling capacity curves



Flow / lift curve



Dimensions (mm)



Cooling Water Circulator (Externally Opened Circulation)

High-precision temp.control

CLH312C/411C/610C

Operating temp. range	-10~+80°C CLH312C	-15~+80°C CLH411C/610C

Temp. control accuracy	±0.1°C

Bath capacity	1.5L CLH312C	3L CLH411C/610C

Precision external open cooling water circulator with temp. control accuracy of ±0.1°C.

Operation and functions

- Precision external open cooling water circulator with temp. range of -10~+80°C and -15~+80°C.
- Use the flow control valve to freely adjust the circulating pump's flow according to bath size.
- Use the flow sensor to monitor the pipeline flow, in case of pipe clogging, the red lamp lights up, with auto stop protection device.
- Configurated with quick auto stop, auto stop, auto start operations, temp. output terminal, deviation correction, power outage compensation.

Safety features

- Overcurrent ELB, self-diagnosis, key lock, power outage compensation, flow monitor, refrigerator monitor, refrigerator delay timer of protection, abnormal flow or high pressure, etc..

Specifications

Model		CLH312C	CLH411C	CLH610C
Method		External opened circulation		
Operating temperature range		-10~+80°C	-15~+80°C	
Temperature control accuracy		±0.1°C		
Cooling capacity		~450W (387Kcal/h), at fluid temp.15°C	~570W (490 Kcal/h), at fluid temp.15°C	~820W (705 Kcal/h), at fluid temp.15°C
Temperature control		PID control		
Temperature sensor		Temp. controller: Pt thermal resistance, overheat protection: K thermocouple		
Heater		Stainless steel pipe heater		
		750W	900W	1.5kW
Temperature setting, display		Digital setting and display		
Refrigerator, refrigerant		Air cooling		
		200W, R404A	350W, R404A	600W, R404A
Circulating pump		Magnetic drive pump		
Unit circulation ability (50/60Hz)	Max. flow	5.4 / 6.2L/min	5.4 / 6.3L/min	6.7 / 7.8L/min
	Pump capacity	(10.0 / 11.0L/min)	(10.0 / 11.0L/min)	(15.0 /17.0L/min)
	Max. lift	3.5 / 5.0m	3.7 / 5.3m	6.2 / 8.7L/m
	Pump capacity	(4.9 / 6.9m)	(4.9 / 6.9m)	(8.0 / 11.0L/min)
Cooling coil		Nickel-clad copper		
External circulation nozzle		O.D.13mm of water outlet and return port		
Operating environmental temp. range		5~30°C		
Safety device		Overcurrent ELB, Self-diagnosis, Key lock, Power outage compensation, flow monitor, Refrigerator monitor, Refrigerator delay timer of protection, Abnormal flow or high pressure, etc..		
Other functions		Flow control valve, Drain valve, Condenser filter screen, Deviation correction, Key lock, Temp. output terminal, Power outage compensation		
Bath dimension		I.D.120×D200mm	I.D.150×D200mm	
Bath materials		Stainless steel		
Bath capacity		1.5L	3L	
External dimensions (W×D×Hmm)		410×460×550	380×460×720	380×565×720
Power supply (50/60Hz)		AC220V 6A	AC220V 8A	AC220V 12A
Weight		~40kg	~45kg	~60kg
Accessories		Circulating heat preservation pipe-1, Pump circulating tube-1, Hoop-4, Drain pipe-1		

Control Panel

Water level monitor,
Refrigerator monitor,
Refrigerator operation
indicator

Rear

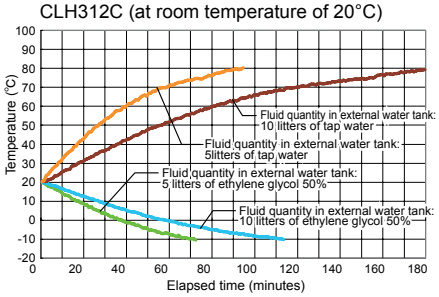
- Water stop valve at the back of the unit allows easy switch of external circulation.
- RS485 external communication
- Temp. output terminal

Sample case

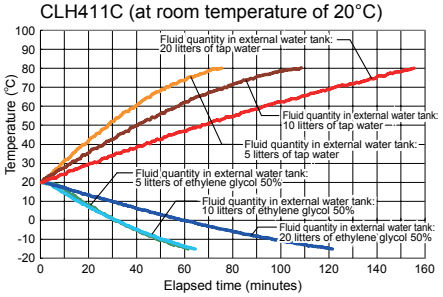
Optional test bath

Cooling curve

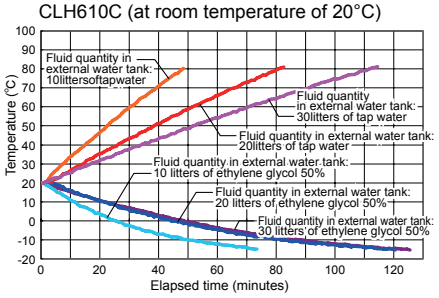
CLH312C (at room temperature of 20°C)



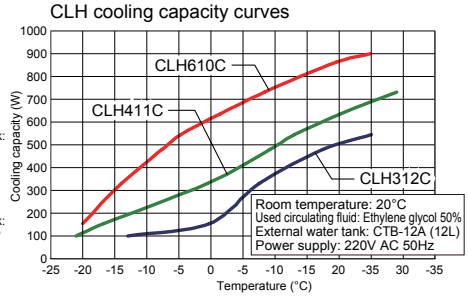
CLH411C (at room temperature of 20°C)



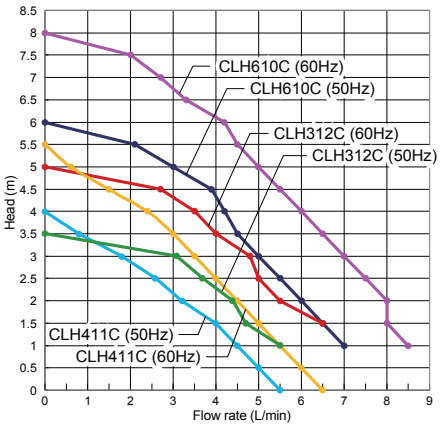
CLH610C (at room temperature of 20°C)



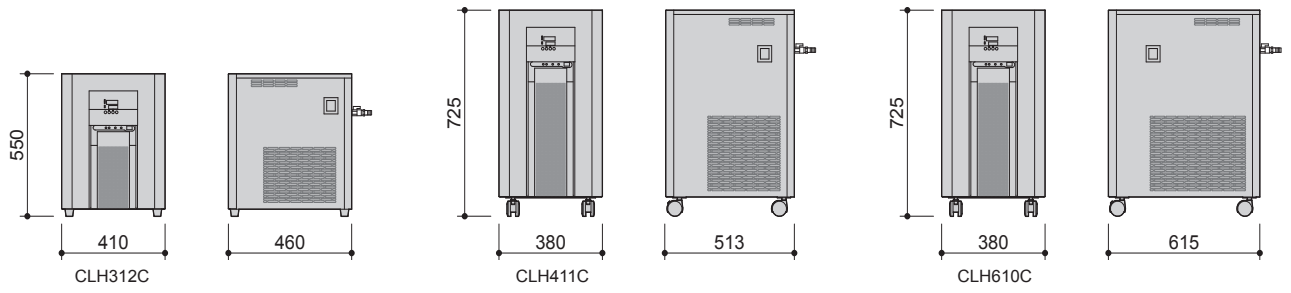
CLH cooling capacity curves



Flow / lift curve



Dimensions (mm)



Cooling Water Circulator (Externally Opened Circulation, Peltier Cooling)

Freon-free Cooling Type

CTA402(S)/802(S)/412(S)/812(S), CTW402(S)/802(S)/412(S)/812(S)

Operating temp. range	0~+70°C CTA	-10~+70°C CTW

Temp. adjustment accuracy	±0.1°C

Max. Pump flow	8L/min 402(S) / 412(S)	11L/min 802(S) / 812(S)

- Water cooling (CTW) and air cooling (CTA) heat dissipation systems available.
- Integrated (CTW402/802, CTA402/802) and separated (CTW402S/802S, CTA402S/802S) types selectable.
- External open constant temperature water circulator with separate cooling/heating assembly and power control assembly enabling precise control of constant temperature water. It uses a Freon-free cooling system.
- RS485 communication function provided as standard and can be centrally managed from a PC.

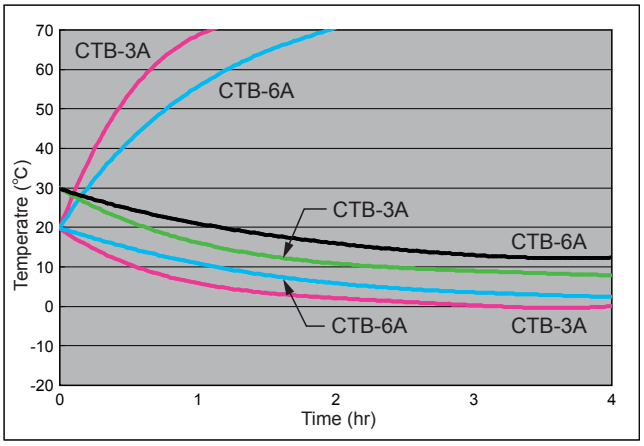
Specifications

Product code	AC100V/AC200V	221635/221636	221637/221638	221631/221632	221633/221634
Model		**CTA402/CTA412**	**CTA802/CTA812**	**CTW402/CTW412**	**CTW802/CTW812**
System		Integrated type, Air cooled electronic system, External open circulation		Integrated type, Water cooled electronic system, External open circulation	
Product code	AC100V/AC200V	221643/221644	221645/221646	221639/221640	221641/221642
Model		**CTA402S/CTA412S**	**CTA802S/CTA812S**	**CTW402S/CTW412S**	**CTW802S/CTW812S**
System		Separated type, Air cooled electronic system, External open circulation		Separated type, Water cooled electronic system, External open circulation	
Operating temperature range		0°C to +70°C		-10°C to +70°C	
Temp. adjustment accuracy		±0.1°C *2			
Cooling capacity		83 kcal/h (97W)	163 kcal/h (189W)	126 kcal/h (147W)	250 kcal/h (291W)
Pump	Maximum flow	8 L/min	11 L/min	8 L/min	11 L/min
Timer function		1 min to 99 hrs 50 min, 100 to 9999 hrs (with time/clock switching function)			
Operation function		Fixed temp., Auto-start, Auto-stop, Quick auto stop, Program (Max.99 steps, step separate,repeat, gradient), Program auto start			
Other functions		Self diagnostics, Calibration offset, External temperature sensor switching, Power failure recovery mode, RS485 external communication, Alarm output terminal, Key lock, Display the amount of Power consumption, Operation guidance			
Safety device		Over current electric leakage breaker, Abnormality detection (Temp. sensor, Overheat, Peltier, Temp. upper / lower limit, Power supply, Internal communication, Memory)			
Material of cooling/heating unit liquid contact part		Stainless steel (SUS304)			
External size(mm)	Integrated type	W291×D380×H360	W371×D440×H380	W291×D380×H360	W331×D480×H380
	Separated type (-S)	W291×D380×H190	W361×D410×H265	W291×D360×H175	W311×D480×H202
		W291×D342×H195			
Weight	Integrated type	23 kg (total)	35 kg (total)	19 kg (total)	27 kg (total)
	Separated type (-S)	16 kg	27kg	12kg	19kg
		10 kg			
Circulation port nipple diameter		O.D.: 12.7mm			
Number of thermo module		4	8	4	8
Power supply	AC100V/AC200V	3.4A / 1.7A	6.5A / 3.3A	3.3A / 1.7A	6A / 3A
Accessories		Circulation heat insulation hose (ID 11.5mm 1m×2pcs.), Heat radiation water hose (ID12mm 3m×1pc., CTW only), Stacking support (Separated type only)			

*1 Conditions: Temp. and humidity 23 °C ±5°C, 65%RH±20% (no load)
*2 Condition: Testing bath CTB-3A/6A (Optional)

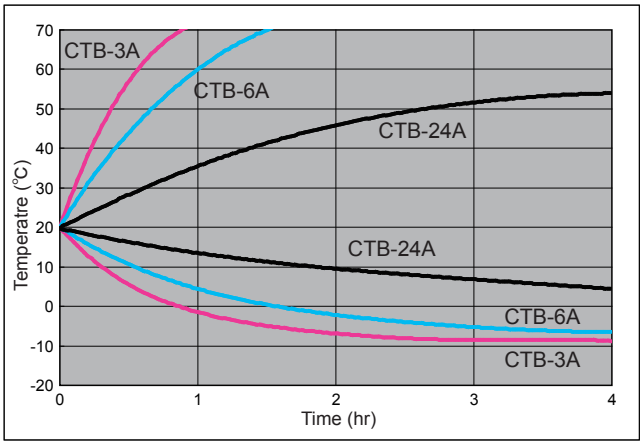
Heating-cooling Characteristics

CTA402 / CTA402S / CTA412 / CTA412S



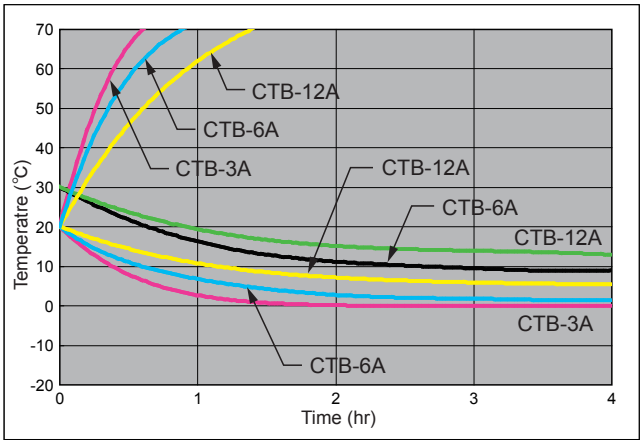
Testing bath	CTB-3A	CTB-6A	CTB-3A	CTB-6A
Liquid	Ethylene glycol + water (1:1)			
Liquid amount	3L	6L	3L	6L
Environmental temperature	20°C		30°C	

CTW402 / CTW402S / CTW412 / CTW412S



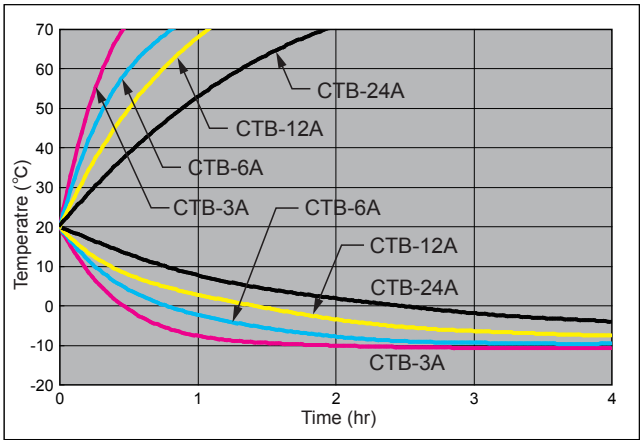
Testing bath	CTB-3A	CTB-6A	CTB-24A
Liquid	Ethylene glycol + water (1:1)		
Liquid amount	3L	6L	20L
Environmental temperature	20°C		30°C
Temp. of the primary side of radiation water	20°C		
Radiation water amount	5L/min		

CTA802 / CTA802S / CTA812 / CTA812S



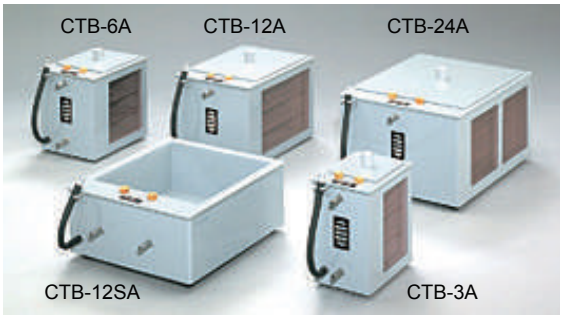
Testing bath	CTB-3A	CTB-6A	CTB-12A	CTB-6A	CTB-12A
Liquid	Ethylene glycol + water (1:1)				
Liquid amount	3L	6L	12L	6L	12L
Environmental temperature	20°C			30°C	

CTW802 / CTW802S / CTW812 / CTW812S



Testing bath	CTB-3A	CTB-6A	CTB-12A	CTB-24A
Liquid	Ethylene glycol + water (1:1)			
Liquid amount	3L	6L	12L	20L
Environmental temperature	20°C			
Temp. of the primary side of radiation water	20°C			
Radiation water amount	5L/min			

Optional Items



Description	Option Model	Product Code
Sensor	-	221295
Testing bath, capacity : 3L	CTB-3A	221801
Testing bath, capacity : 6L	CTB-6A	221802
Testing bath, capacity : 12L	CTB-12A	221803
Testing bath, capacity : 12L	CTB-12S	221804
Testing bath, capacity : 24L	CTB-24A	221805

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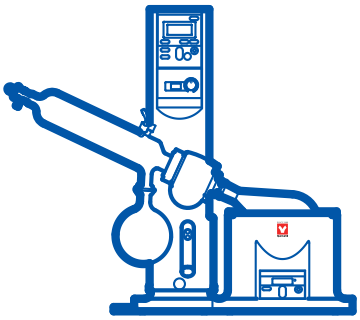


Rotary Evaporator

Contents

Rotary Evaporator

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

RE301

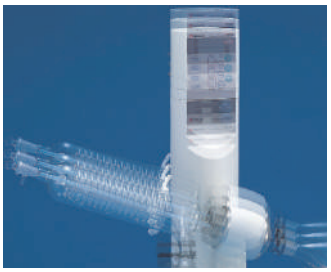
- Easy manual operation
- Digitally set and displayed motor speed (rpm)
- Equipped with motorized lift to easily raise or lower unit
- Option for 3 different types of glassware
- Universal power supply for main unit: works with 100~240VAC
- Option for 4L water or oil bath at 115~240VAC

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



Motorized lift standard for all models

All models of Yamato rotary evaporators are easily raised or lowered by simple switch operation.

Digital settings and display in Japanese or English

The evaporator's motor speed (rpm), vacuum and vapor temperature can be digitally set and displayed. Experimental conditions and steps during a reaction can be saved and repeated in future. Display language can be either Japanese or English. (Only the rpm of the motor can be digitally displayed in model RE311, vacuum regulator and vapor temperature indicator are optional.)

Movable rotary joint

The rotary joint's locking position feature is adjustable within 80mm which is especially useful when using varying capacity evaporating flasks 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 just turning the flask release nut.

Glass components

Vertical condenser (Glassware B&C) function to prevent liquid from stagnating. (patent pending)
New condenser tubes (type A&B) designed to increase rapidity of cooling capacity.
(Surface area is 20% larger than previous model.)

Hose joints

Resin-made hose joints are used for easy connection of cooling water and vacuum hoses to their corresponding glass ports.

Water bath (oil bath)

Original removable bath enables easy cleaning and replacing of the water (oil). The digital temperature indicator is designed for easy setting and reading. The most suitable bath is selectable from model BM Water Bath or Model BO Oil Bath in accordance with working temperatures of the experiment.

Voltage-sensing power pack

The rotary evaporator (including the water bath, oil bath and some optional accessories) works with a power supply of 100-240V AC.

Vacuum

The fluoro-rubber vacuum seal with its multistage configuration is designed to maintain the stability of reduced pressures.
Pure Teflon vacuum seal is also available as an option for evaporation of ether-based and ketone-based liquids.

Carefully designed safety measures

The evaporator can detect any malfunctions in the driving mechanisms in the rotary section and the lifting device, and will automatically stop to ensure safety. It can also automatically detect abnormal temperatures in the water bath and oil bath and will stop the operation .

Stable rotation at low and high speeds

Together with the digital setting and display, the rotary evaporator maintains a stable rotation by using the feedback control feature. This ensures precise reproducibility of experiments.

Economical 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

- Economical
- Improved operability with variable type rotary joint, distillation flask pull-out structure, Hose joint, large capacity water bath etc.
- Arm jack permits setting flexibility.

RE201A-WJ
+ Glassware A + Arm jack
+ Water bath BM200

RE201B-WJ
+ Glassware B + Arm jack
+ Water bath BM200

Arm jack

Specifications

Model	RE201 / RE211 (Rotary Evaporator)
Rotational number control range	20 to 180rpm
Drive system	Worm gear system
Motor	Induction motor, 25W
Ambient temperature range	5°C to 35°C
Other supplemental system	Movable rotary joint / Distilling flask removal system
External dimensions(W×D×Hmm)	Approx. 420×290×839
Weight	Approx. 11 kg
Power source (50/60Hz)	AC115V / AC220V Single phase
Water bath model	BM200
Temperature range	Ambient 5°C to 95°C
Temperature setting	Analog setting
Bath capacity	7.0L, 250 (Dia.)×150 (D)mm

Features

Adjustable locking position of the rotary joint.

Evaporation flasks are easily removable with built in flask remover.

Plastic removable hose connection for water cooling hose (O.D.9.8mm).

Speed can be changed freely with the control knob.

Glass Parts

Condenser A

Condenser B

Condenser C

RE201C-WJ
+ Glassware C + Arm jack
+ Water bath BM200

Solvent Recovery Unit

Model: RT200

Extracts organic solvents from gas generated by a rotary evaporator during concentration work, and prevents discharge of dangerous matter.

Cooling Circulator

Model: CF320P

Labocube closed cooling circulator with built-in solvent collection device can be installed under the draft chamber or sink.

Custom Selection Chart

Model	Glassware			Water Bath	Stand
	A	B	C	BM200	Arm Jack JK200
RE201A	●				
RE201A-J	●				●
RE201A-W	●			●	
RE201A-WJ	●			●	●
RE201B		●			
RE201B-J		●			●
RE201B-W		●		●	
RE201B-WJ		●		●	●
RE201C			●		
RE201C-J			●		●
RE201C-W			●	●	
RE201C-WJ			●	●	●

Water Bath BM200

Oil Bath BO601

Optional Items

Description	Product Code
Cooling hose, 9mm dia, 2m×1pc.	255296
Vacuum hose, 6mm dia, 5m×1pc.	255297
Distillation flask 100ml, translucent ORG20	RE20000100
Distillation flask 200ml, translucent ORG22	RE20000200
Distillation flask 300ml, translucent ORG24	RE20000300
Distillation flask 500ml, translucent ORG26	RE20000500
Distillation flask 1L ORG16	RG00A30040
Distillation flask 2L, translucent ORG28	RE20002000
Receiving flask, 300ml ORG34	RE47002
Receiving flask, 500ml ORG36	RE47001
Receiving flask 1L ORG18	2551730413
Receiving flask, 2L ORG38	2127410575
Coating distillation flask 1L ORG58	255505
Coating receiving flask 1L ORG56	255511

Evaporating flask
2000ml,1000ml, 500ml, 300ml, 200ml, 100ml

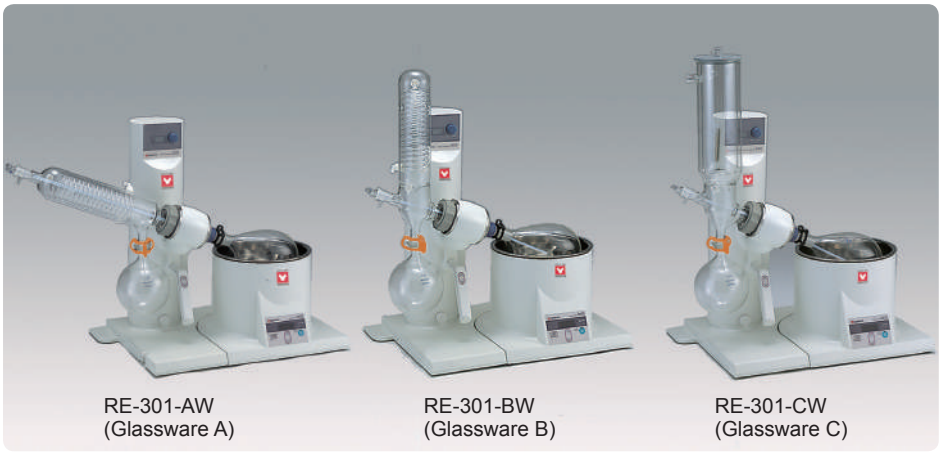
Receiving flask
2000ml, 1000ml, 500ml, 300ml

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

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		Approx. 14.1kg (excluding glassware and water/oil bath)
Power supply Main unit(50/60Hz)		AC100~240V 1.5A(excluding water/oil bath)

Set Guide

RE 301 - A W V 2

Main unit	
100~240V	

Bath	
W	Water bath
O	Oil bath

Bath voltage	
2	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			●				●	●

Operational Accessories

Glassware Set

Product code	Set
255291	Set A (use with cooling water) The Standard glass set where condenser is diagonally, 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



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	Approx. 4L			
External dimensions	W340×D349×H231 mm			
Weight	Approx. 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

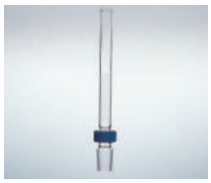
Product code	Size	Capacity
LT00016210	35/20	2L
LT00016180	35/20	500ml
LT00016209	35/20	300ml
LT00016208	35/20	200ml
LT00016207	35/20	100ml

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

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

Cooling Water Circulator (Chiller)

Model	CF301
Operating temp. range	-20°C~Room temp.
Temp. control accuracy	±2°C
Cooling capacity	~450W(387Kcal/h)at Liquid temp. 10°C ~360W(309Kcal/h)at Liquid temp. 0°C ~270W(232Kcal/h)at Liquid temp. -10°C
Temp. control	Refrigerator On/Off Control
Refrigerator, coolant	Air cooling 450W, R404A
Water bath dimension	151×151×177
Water capacity	Approx. 4L (Liquid amount 3L)
Power source	AC115V ~ AC220V
Weight	Approx. 50kg

CF301 keeps water in the condenser at a stable low temperture which increases evaporation rate and maximizes solvent collection. Use with glassware A or B

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×I.D.Φ6 (G1/4)	
Weight		7.1kg	
Air temperature		0~40°C	
Overall dimensions		W142×L272×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	

High Performance Rotary Evaporator

Highly Functional & Programmable

RE601 / 801

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

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)

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)

Quick Release of Evaporating Flask

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

Control Panel

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

Specifications

Model	RE601	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	Approx. 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
601
801

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)

Set Selection Chart

Model	Glass-ware			Bath (100-120V)		Bath (200-240V)	
				Water bath	Oil bath	Water bath	Oil bath
	A	B	C	BM500	BO400	BM510	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×D349×H231 mm			
Weight	Approx. 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

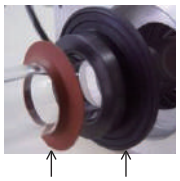
● Trap ball

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



Optional Standard

● Vacuum seal

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

● 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	1.0x10^{3}Pa	
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×L272×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

Cooling Water Circulator (Chiller)

Model	CF301
Operating temp. range	-20°C~Room temp.
Temp. control accuracy	±2°C
Cooling capacity	Approx. 450W(387Kcal/h)at Liquid temp. 10°C Approx. 360W(309Kcal/h)at Liquid temp. 0°C Approx. 270W(232Kcal/h)at Liquid temp. -10°C
Temp. control	Refrigerator On/Off Control
Refrigerator, coolant	Air cooling 450W, R404A
Water bath dimension	151×151×177mm
Water capacity	~4L (Liquid amount 3L)
Power source	AC100 ~ AC240
Weight	Approx. 50kg

CF301 keeps water in the condenser at a stable low temperture which increases evaporation rate and maximizes solvent collection. Use with glassware A or B

Complete set with optional accessories

Rotary evaporator RE601BW
Vacuum pump DTC22
Organic solvent recovery unit RT200
Cooling water circulator CF301
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 Vacuum Pump

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	
	M^3H	1.2		1.44	
	CFM	0.71		0.85	
Ultimate pressure	Pa (kPa)	1.0×10^3 (-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)			

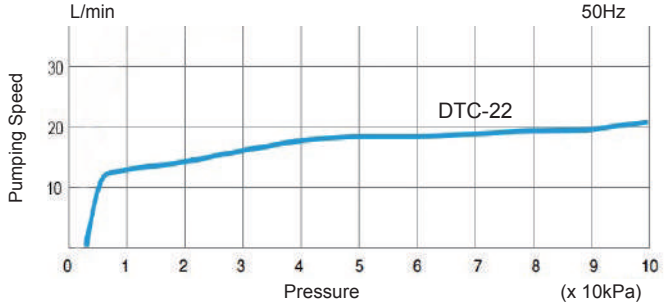
Vacuum Pump Guide

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	

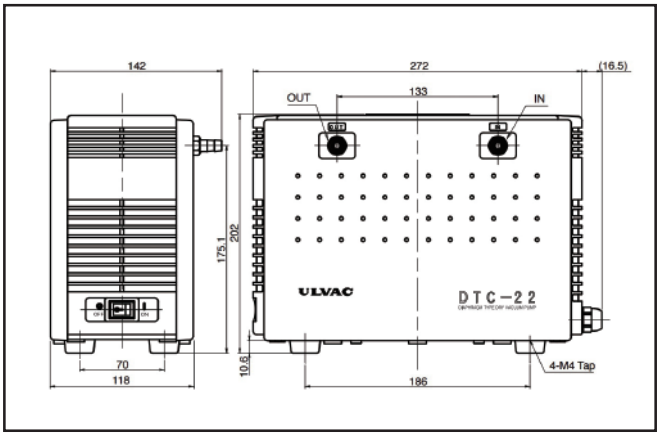
Corresponding Voltage and Certificate

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

Pumping Speed Curves



Outline Drawings



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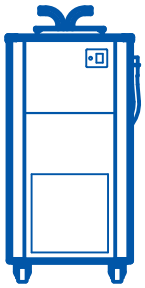


Cold Trap, Immersion Cooler & Freeze Dryer

Contents

Cold Trap

CA301/801

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

CA301 CA801

Efficiently traps water vapor and toxic substances discharged from vacuum oven and rotary evaporator 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

Specifications

Model	CA301	CA801
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×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×H235mm	
Internal capacity	~4L (Liquid 3L)	
Power source	AC115V, 50/60Hz, 5A	AC115V, 50/60Hz, 8.5A AC220V, 50/60Hz, 4.5A
External dimension(mm)	W345×D475×H726	W405×D500×H850
Weight	~47kg	~65kg
Accessories		Casters fixing holder×4

Optional items

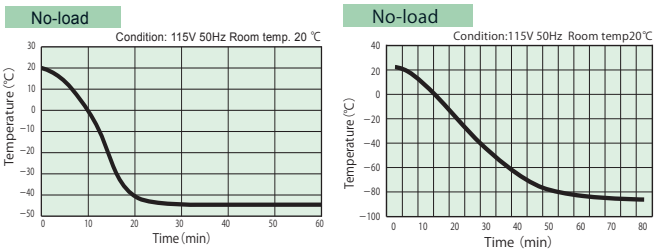
Product description	Product code
Glass condenser set OCA10	221487
Reducer for rubber tube brass ø30×ø18 brass ø30×ø12 SUS ø30×ø18 SUS ø30×ø12	 242185 242186 221496 241497
SUS lid	281296
Caster fixing holder x 4	281440

Glass condenser set

Glass condenser

Stainless cover

Cooling Curve



CA301 CA801

Application Examples

Combination with vacuum oven

DP63C+CA801+Vacuum pump

Combination with rotary evaporator

CF301+RE601+CA301+Vacuum pump

Immersion Cooler

BE201/201F/301

Operating temp. range -20~+35°C

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

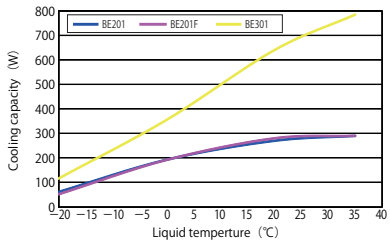
- Cools down water bath immediately by dipping cooling coil into fluid
- Improved safety by adopting overcurrent circuit breaker
- Spiral tube of BE201 changed from copper to chrome plated copper with high corrosion resistance
- Stainless steel flexible cooling coil of BE201F/301 is high corrosion resistant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

Specifications

Model	BE201	BE201F	BE301
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	
	ø30×170mm (Winding O.D.×Length)	ø15×500mm (O.D.×Length)	ø15×1,000mm (O.D.×Length)
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	Approx. 24kg		Approx. 25kg

* Protrusions not included

Cooling Capacity

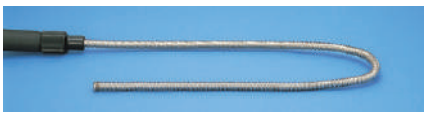


Conditions:
Room temperature: 20°C
Power source: AC115V/50Hz
Cooling liquid: Naiburain 60% dilution
With tank lid and stirring bar in the tank

Cooling Coil

BE201
(Dia.30×length170mm)

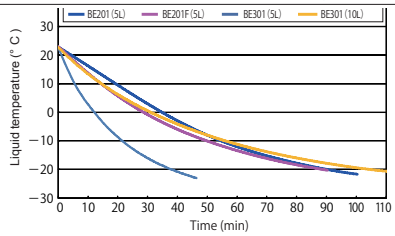
BE201F
(Dia.15×length500mm)



BE301
(Dia.15×length1000mm)

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

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

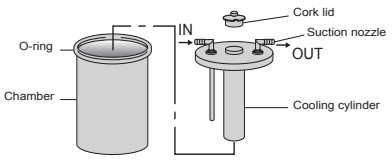
Cold Trap (optional item)

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

Specifications

Product code	221481
External dimensions	ø210×290mm
Chamber dimensions	ø180×245mm
Cooling cylinder dimensions	ø45×220mm
Suction nozzle	ø18 (O.D.)
Chamber material	Aluminum (anodized finish)

Structure



Hose sold separately

Freeze Dryer

DC401/801

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

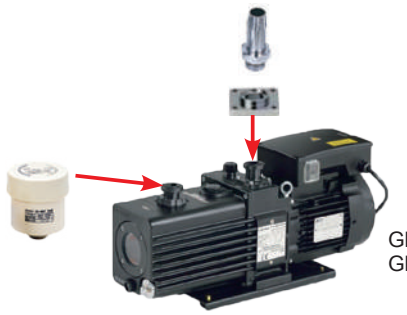
For both DC401 / 801, chamber, manifold, mounting flask, flask cap and glass container are sold separately.

- 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	DC801
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×D450×H920mm	W405×D500×H1040mm
Internal capacity	Approx. 4L	
Power source 50/60 Hz	AC115V 12A / AC220V 7A	AC115V 13A / AC220V 7.3A
Weight	Approx. 60kg	Approx. 83kg
Accessories	Vacuum silicone grease	Vacuum silicone grease, caster stop holder 4 pcs

Vacuum Pump



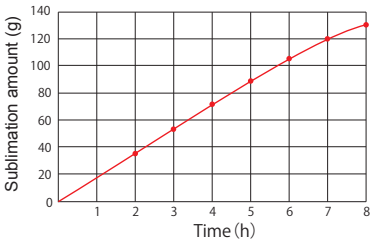
GLD136C115DCRKIT
GLD136C220DCRKIT

Specifications

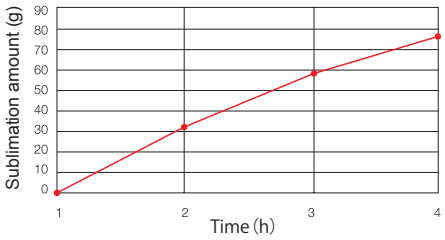
Model	Unit	GLD-136C	
		50Hz	60Hz
Actual pumping speed	L/min	135	162
Ultimate pressure	Pa	G.V. Closed: 0.67 G.V. Open: 6.7	
Power source 50/60 Hz		115V / 220V	
Weight	kg	27.0	
Overall dimensions	mm	W170×L488×H250	

Sublimation Data

DC401 Sublimation data



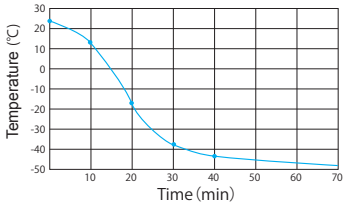
DC801 Sublimation data



Room temp: 25℃ Power source: AC115V 50Hz

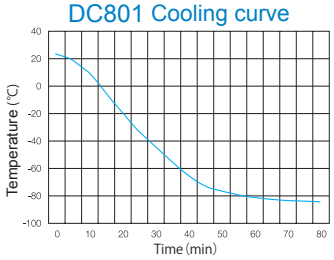
Cooling Curve

DC401 Cooling curve



Room temp: 25℃ Power source: AC115V 50Hz

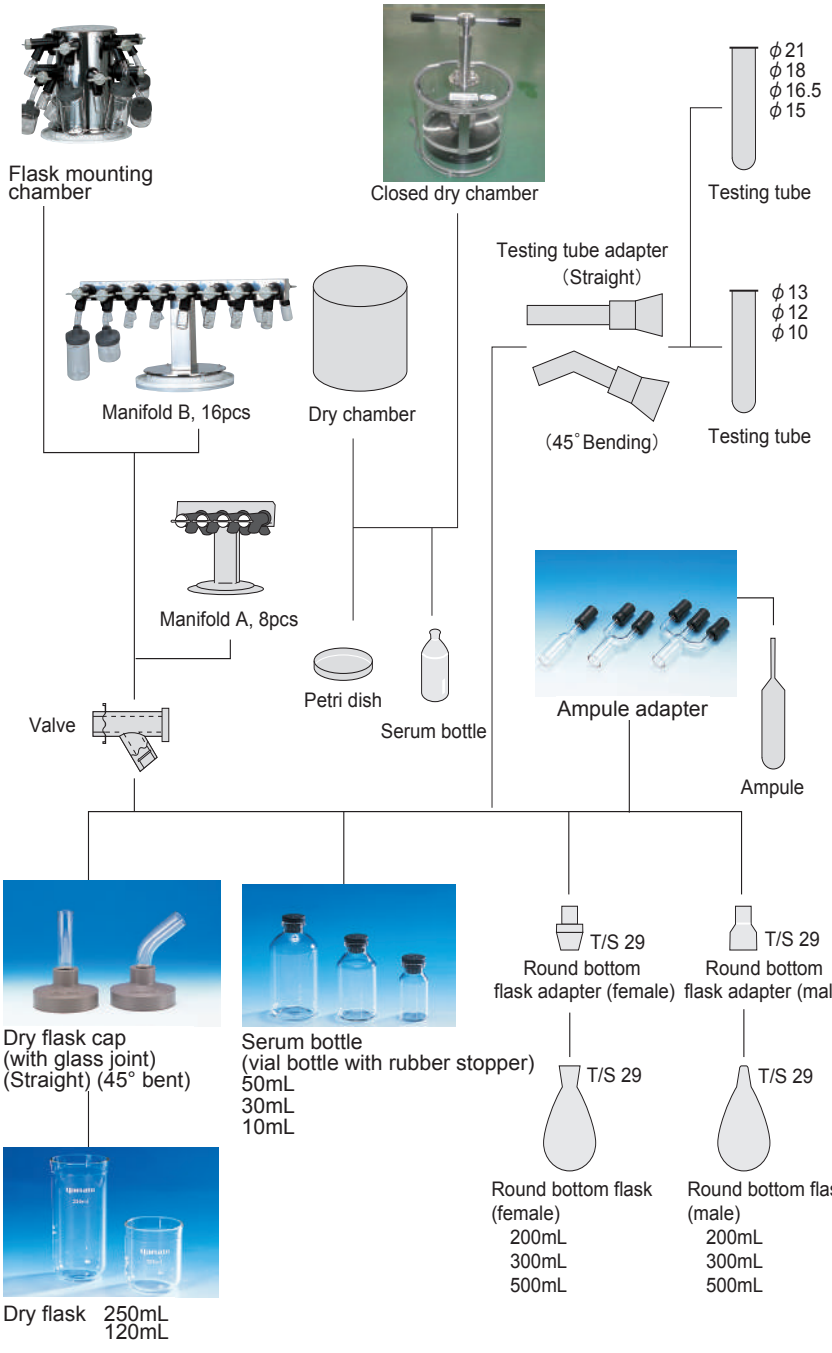
DC801 Cooling curve



Control Panel

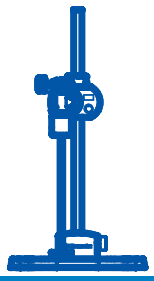
Pirani Vacuum Gauge and Control Panel

Accessories



Product code	212560	212561	212562	212563	212564
Product name	Flask mounting chamber	Manifold A	Manifold B	Dry chamber	Closed dry chamber
Shelf number	--			1	
Stopper	I.D.18.5mm				
Stopper Pitch	96mm	80mm		60mm Dish×7	
Port number	12	8	16	Temp. adjustment 30°C±2°C	
Dimension	ϕ195×H303	W304×D60×H263	W624×D60×H263	ϕ252×H240	ϕ252×H425

Product name		Product code
Valve		212565
Dry Flask	120mL, 5pcs	212820
	250mL, 5pcs	212821
Dry Flask Cap (with glass joint)	5pcs. (Straight)	212570
	5pcs. (45°C Bent)	212571
Serum Bottle (vial bottle with rubber stopper)	50mL, 10pcs	212814
	30mL, 10pcs	212815
	10mL, 10pcs	212816
Ample 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 TT/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 TT/S29	212567
	500mL TT/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



Stirrer, Shaker & Hot Plate

Contents

Ultrasonic Homogenizer

LUH150/300

Maximum output	20 kHz 50W LUH150	20 kHz 300W LUH300

Operational functions	Continuous / Timer-controlled / Interval

This homogenizer, using ultrasonic oscillation, does not add any unreasonable stress on the sample because only a few of its elements apply mechanical impact on particles.

Principle

The homogenizer generates oscillation of 20,000 times/sec (20 kHz) in the liquid.
Ultrasonic oscillation produces bubbling called cavitation in the liquid. When broken, these bubbles cause impact to crush and shred surrounding particles. Maintenance can be minimized because of limited contamination and fewer eroding parts as compared with a mechanical homogenizer.

Applications

Emulsification, Dissipation, Shredding, Crushing, Homogenizing, Reaction acceleration, Extraction, Defoaming, Cleaning, Filtering

LUH150 (50W small handy type)

- Easy-to-handle,user-friendly small ultrasonic homogenizer
- Used mainly in receptacles (test tubes, tubes, etc.)
- ON/OFF possible with an oscillator hand switch
- AC 100 – 240V power supply (AC 100V cable attached)
- Compatible with 2,3,6 mm-dia. step-type microchips (3 mm-dia. step type microchip provided as standard)

LUH300 (300W medium type)

- Medium ultrasonic homogenizer
- Used mainly in test tubes, tubes, and beakers
- Amplitude direct control mode with an oscillation sensor
- Compatible with various separately-available microchips and extenders in addition to 12 and 20 mm-dia. standard horns (12 mm-dia. horn provided as standard)
- Appropriate dispersion and crushing conditions ensured for the sample by varying the output over a wide range

Specifications

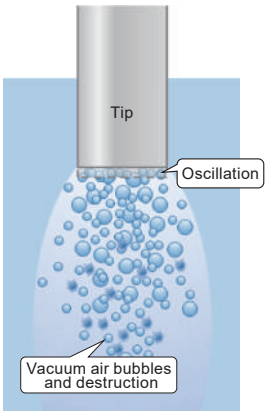
Product code		231507	231506
Model		**LUH150**	**LUH300**
Type		Externally-excited oscillation	Self-excited+externally-excited oscillation
Performance	Maximum output	50W	300W
	Oscillation frequency	20 kHz ±0.5 kHz	
	Operating ambient temperature range	5 to 45℃	
Functions	Auto-tuning mode	●	●
	Constant-power mode	●	●
	Constant-amplitude mode	●	●
	Oscillation sensor mode	–	●
	Timer-controlled operation	●1 sec to 120 minutes	●1 sec to 120 minutes
	Interval operation	●ON/OFF, each 1.0 to 60.0 sec	●ON/OFF, each 1.0 to 60.0 sec
	Operation with hand switch	●	–
Attached horn or chip		3 mm-dia. step type microchips made from titanium alloy	12 mm-dia. standard horn made from titanium alloy
Oscillator outside dimensions		W122×D270×H283mm	W142×D360×H303mm
Oscillator weight		4.1kg	7.2kg
Converter overall dimensions		Φ40×L171mm (not including chip)	Φ40×L170mm (not including chip)
Converter weight		530g	1.1kg
Power supply (50/60 Hz)		AC115V / AC220V Single phase	AC115V / AC220V Single phase with step-down transformer
Accessories		Power cable, Horn / Chip replacing tool, Attached horn / Chip	

*For the oscillation period during timer-controlled and interval operations, minimum three seconds will be recommended to ensure stability.
*The power cable attached to LUH150 is for AC 100V. A separate power cable is necessary for use at the different voltages.

Principle

The converter generates oscillation of approx.20 kHz (20,000times/sec).
This oscillation is converted to oscillation energy by the shape of horn and tip as an amplitude to be generated at the tip.
Cavitation which generates numerous air bubbles and oscillation is transmitted in the form of compressional waves based on the pressure difference in the liquid.
When these bubbles are collapsed, they create impact in the liquid, applying force from all sides to crush or fracture particles.

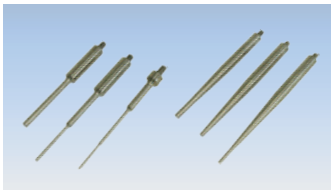
Compared to a mechanical homogenizer, the ultrasonic homogenizer has only a limited number of elements that apply mechanical impact on particles. Particles are not flattened readily in this condition, so that the particle size distribution appears characteristically sharp.

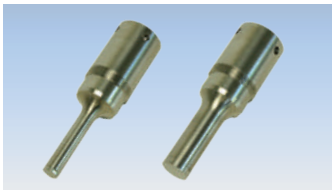


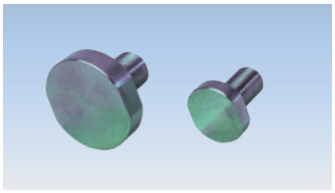
Operation and functions

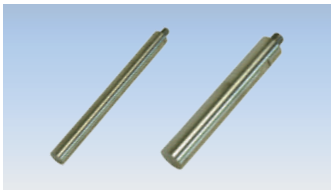
- Auto tuning
  Initial adjustment before operation can be done by a single touch of TUNE button. Frequency sweep method enables automatic adjustment.
- Output adjustment
  Selectable either POW mode which keeps the constant of the power or PWM mode which uniformly control the oscillation amplitude.
  Furthermore, LUH300 comes with SEN mode which enables feedback control of amplitude by the vibration sensor. The most applicable mode enables the safety operation corresponding to the viscosity or alteration characteristic of the sample.
- Timer operation
  In this mode, the oscillation is performed only within the set period, and it will be stopped automatically.
- Interval operation
  This is an intermittent mode which repeats on and off oscillation.
  Compared to continuous operation, this mode can prevent heat generated from the oscillator while having a long time oscillation.
  Interval setting range : ON/OFF period 1.0 to 60.0s

Optional Items

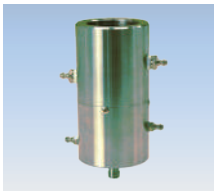

Microtip Step type/Taper type


Standard horn (12mm-dia./20mm-dia.)

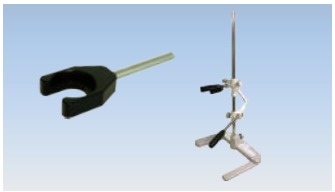

Flat tip of standard horn


Horn extender


Coupler


Continuous holder


Foot switch


Converter holder/stand + arm jack


Silencer box

Applicable model	Description	Application	Model	Throughput	Dimension (mm)	Product code
LUH150/LUH300	Microtip, step type	Microtubes, test tubes, centrifuge tubes	OLU10 (2.2mm-dia.)	0.1 to 10ml	12.8mm-dia.×118.6	231560
			OLU12 (3mm-dia.)	0.25 to 25ml	12mm-dia.×134.6	231561
			OLU14 (6mm-dia.)	2 to 50ml	12mm-dia.×111	231562
LUH300	Standard horn	Beakers/Centrifuge tubes	OLU16 (12mm-dia.)	25 to 250ml	38mm-dia.×133	231563
			OLU18 (20mm-dia.)	50 to 250ml	38mm-dia.×119.5	231564
LUH300 12mm-dia. standard horn	Microtip, taper type	Microtubes, test tubes, centrifuge tubes	OLU20 (3.5mm-dia.)	1 to 10ml	12mm-dia.×164.6	231565
			OLU22 (5mm-dia.)	3 to 20ml	12.8mm-dia.×150.6	231566
			OLU24 (6.6mm-dia.)	5 to 50ml	12mm-dia.×145.3	231567
	Flat tip of standard horn	Replacement tip for standard horn	OLU26 (12mm-dia.)	—	12mm-dia.	231568
	Horn extender	Flasks/ filtration bottle/Measuring cylinder	OLU28 (12mm-dia.)	25 to 250ml	12mm-dia.×124	231569
	Continuous holder	External circulation for continuous sample treatment	OLU30 (12mm-dia.)	For continuous processing	52mm-dia.×115	231570
LUH300 20mm-dia. standard horn	Coupler	Used to connect the taper type micro tip to the 12mm-dia. standard horn	OLU32	—	28mm-dia.×87.6	231571
	Flat tip of standard horn	Replacement tip for standard horn	OLU34 (20mm-dia.)	—	20mm-dia.	231572
	Horn extender	Flasks/ filtration bottle/Measuring cylinder	OLU36 (20mm-dia.)	50 to 250ml	20mm-dia.×127	231573
	Continuous holder	External circulation for continuous sample treatment	OLU38 (20mm-dia.)	For continuous processing	52mm-dia.×115	231574
LUH150/LUH300	Footswitch	Ultrasonic wave generating while stepping	OLU40	—	76mm-dia.×H23	231575
	Stand	For holding the converter	OLU42	—	W420×D290×H837	231576
	Arm jack	For holding the converter	JK200	—	—	255080
LUH150	Converter clamp	For holding the converter	OLU44	—	—	231577
LUH300	Converter holder	For holding the converter	OLU46	—	W90×D270×H30	231578
LUH300	Silencer box	For insulating the insulation sound	OLU48	—	W350×D350×H500	231579
LUH150/300	Laboratory jack	For U/D of the sample container (beaker)	OLU50	—	Stage W148×D148	231580

Laboratory Flask Mixer

LM100/110/200/210

Operating speed range 50~1000rpm | Max. Torque 0.1N•m

LM100/110 LM200/210 with Digital Display

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

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

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

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

Specifications

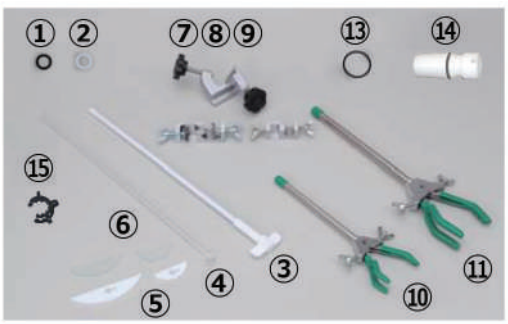
Model	LM100	LM110	LM200	LM210
Operating temp. range	5°C~35°C			
Operating speed range *1	50~1000rpm			
Max. torque	0.1N•m			
Max. ultimate vacuum	≤399.9Pa			
Exterior	PBT /ADC12 (Surface treatment: Baking finish)			
Motor	DC brushless motor 30W			
Power switch	Speed control dial with switch (Stepless 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), Fask 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

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

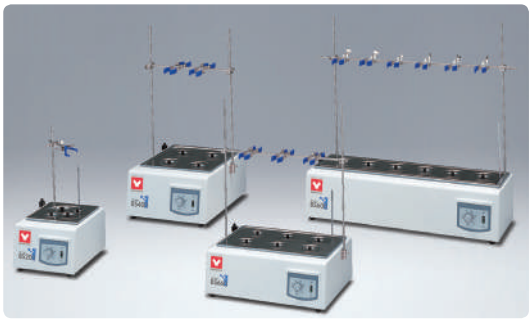


O ring and Oil seal Comparison Table of Chemical Resistance

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)



BS200/400/600/660

BM100/200/401

CF301

BO601

BO500 + MB800

Magnetic Stirrer

MA300A/300B

Revolution(50/60Hz)	100~1,200rpm

Stirring capacity	50~3,000ml MA300A	50~1,000ml MA300B

MA300A MA300B

MA300A

- Basic digital indication magnetic stirrer.

MA300B

- Thin digital indication magnetic stirrer.

Specifications

Model	MA300A	MA300B
Stage size	W172×D156mm	
Stirring capacity	50 to 3,000ml	50 to 1,000ml
Revolution	100 to 1,200rpm	
Motor	DC Motor	
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	
External dimensions	W172×D156×H53.7mm	W172×D156×H37.7mm
Accessory	Stirrer bar, 30mm, 1pc.	

Magnetic Stirrer

M-21

Revolution(50/60Hz)	200~2,500rpm

Stirring stage size	W92×D120mm

- Suitable for titration and small amount stirring.
- Super light and compact.
- Aluminum (chemical proof) stirring stage.

Specifications

Model	M-21
Revolution	Approx. 200 to 2,500rpm
Motor type	Shaded pole motor
Stirring stage size	W92×D120mm
External dimensions	W96×D129×H73mm
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer
Weight	Approx. 0.6kg
Accessory	Stirrer bar, 2pcs.

Optional item

Product name	Product code
Stirrer fixing support , for M-21	231198

Magnetic Stirrer

MA100/300

Revolution(50/60Hz)	100~1,500rpm MA100	400~1,550rpm MA300

Stirring capacity	50~1,000ml MA100	100~3,000ml MA300

MA100
- Small size
- Loaded with DC motor electronic control

MA300
- Long life
- Max. 3L stirring

Specifications

Model	MA100	MA300
Stirring stage size*	W77×D135mm *excludes liquid drop protection part	W178×D165mm *excludes liquid drop protection part
Stirring capacity	50 to 1,000ml	100 to 3,000ml
Revolution	Approx. 100 to 1,500rpm	Approx. 400 to 1,550rpm
Motor	DC motor, electronic control, 0.3W	AC motor, shaded pole type, 0.7W
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	AC115V/AC220V Single phase with step-down transformer
External dimensions	W84×D150×H60mm	W181×D197×H83mm
Weight	Approx. 1.1kg	Approx. 1.6kg
Accessory	Stirring Bar 30mm, 1pc.	

Magnetic Stirrer

MG120/600

Revolution(50/60Hz)	100~1,500rpm MG120	200~1,500rpm MG600

Stirring capacity	5~1,500ml×12 pcs. MG120	50~2,000ml×6pcs. MG600

MG120
- Simultaneous Stirring up to 12 samples

MG600
- Individual Revolution Control for 6 points
- Chemical-resistant plate with ceramic coating

Specifications

Model	MG120	MG600
Stirrer	12 pcs. Interlock type	With individual revolution control for 6 points
Plate material	Ceramic coating	
Plate size	W295×D198 mm	W449×D300 mm
Stirring capacity	5 to 1,500ml×12 pcs. (Max.)	50 to 2,000ml×6pcs.
Revolution	Approx. 100 to 1,500rpm.	Approx. 200 to 1,500 rpm
Motor	DC motor×12pcs. Interlock electronic control	DC motor 0.7W×6pcs.
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	AC115V/AC220V Single phase with step-down transformer
External size	W303×D234×H55 mm	W456×D335×H90 mm
Weight	Approx. 4kg	Approx. 7.5kg
Accessory	Stirrer bar 25mm 12 pcs	Stirrer bar 30mm 6 pcs

Magnetic Stirrer

MD200/300/500/800, MS500D

Revolution	80~1,500rpm MD200	100~1,500rpm MD300	70~1,300rpm MD500	10~1,400rpm MS500D	50~1,400rpm MD800

Stirring Capacity	50~2,000ml MD200	50~3,000ml MD300	50~5,000ml MD500	50~10,000ml MS500D / MS800

MD200
- Compact ultra thin.
- Efficient stirring by stronger magnet.

MD300
- Stable stirring by DC motor electronic control.

MD500
- Stable stirring from low to high speed.

MS500D
- Stable stirring at ultra-slow stirring.
- Stable stirring against load of sample from low to high speed by feedback control loaded with digital stirring gauge.

MD800
- Loaded with 2,500G strong magnet.
- Suitable for big capacity (max. 10L) and high viscosity liquid.

Specifications

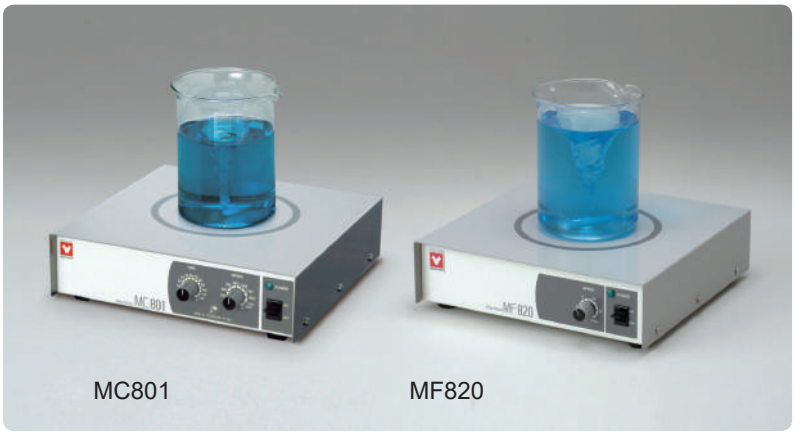
Model	MD200	MD300	MD500	MS500D	MD800
Stirring stage material	Ceramic coating				
Stirring stage size	W164×D145mm	W167×D147mm	W191×D177mm	W190×D180mm	W217×D214mm
Stirring capacity	50 to 2,000ml	50 to 3,000ml	50 to 5,000ml	50 to 10,000ml	
Revolution	Approx.80 to 1,500rpm	Approx.100 to 1,500rpm	Approx.70 to 1,300rpm	Approx.10 to 1,400rpm	Approx.50 to 1,400rpm
Motor	DC motor	DC motor electronic control, 0.3W	AC motor condenser type, 2W	Optical pulse control feed back type	AC motor condenser type electronic control, 3W
Power source (50/60Hz)	AC115V / AC220V Single phase with step-down transformer				
External dimensions	W172×D163×H37mm	W174×D180×H59mm	W199×D225×H89mm	W196×D200×H81mm	W224×D263×H142mm
Weight	Approx. 0.9kg	Approx. 1.4kg	Approx. 2.2kg		Approx. 2.2kg
Accessory	Stirring bar 30mm, 1pc.				Stirring bar 40mm, 1pc.

Magnetic Stirrer

MC801/MF820

Revolution(50/60Hz)	80~1,800rpm MC801	80~1,500rpm MF820

Stirring capacity	100~10,000ml MC801	100~20,000ml MF820



MC801

- With three rotative direction (counterclockwise, reverse, clockwise)
- Strong stirring with ture increaseminimal tempera.

MF820

- Thin type digital indication magnetic stirrer.

Specifications

Model	MC801	MF820
Stirring stage material	Stainless Steel	
Stirring stage size	W272×D270mm	
Stirring capacity	100 to 10,000ml	100 to 20,000ml
Revolution	Approx. 80~1,800 rpm	Approx. 80~1,500 rpm
Motor	DC motor electronic control	
Rotative direction of motor	(CCW-counterclockwise direction), Reverse stirring, (CW-clockwise direction).	
Timer	Adjustable reverse stirring time in between 10 to 120sec.	N/A
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	
External dimensions	W278×D286×H81mm	W276×D295×H80mm
Weight	Approx. 3.6kg	Approx. 3.8kg
Accessories	Stirring bar 30mm and 40mm, 1pc. each	Stirring bar 40mm 1pc.

Irritable even on a thick catalogue

Operational items

Product name	Product code
Spring Shaking Rack	231394

Magnetic Stirrer

MB800

Revolution(50/60Hz)	70~1,200rpm

Stirring capacity	100~10,000ml

MB800+BO500

- Chemical-proof, anodized aluminum finish top plate.
- Automatic power shut down function upon detection of abnormal water bath temperature.

Specifications

Model	MB800
Stirring plate material	Aluminum
Stirring plate dimensions	W250×D220mm
Stirring capacity	100 to 10,000ml
Revolution	70 to 1,200rpm
Motor	AC motor, electronic control
Overheat preventor	70 to 200℃
Sensor	Themista
Service receptacle (for Oil bath)	AC100V, 50/60Hz, 10A
Safety device	Preventor for oil bath power shut down
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer
External dimensions	W250×D270×H150mm
Weight	Approx. 4.2kg
Accessory	Stirrer bar 40mm, 1pc.

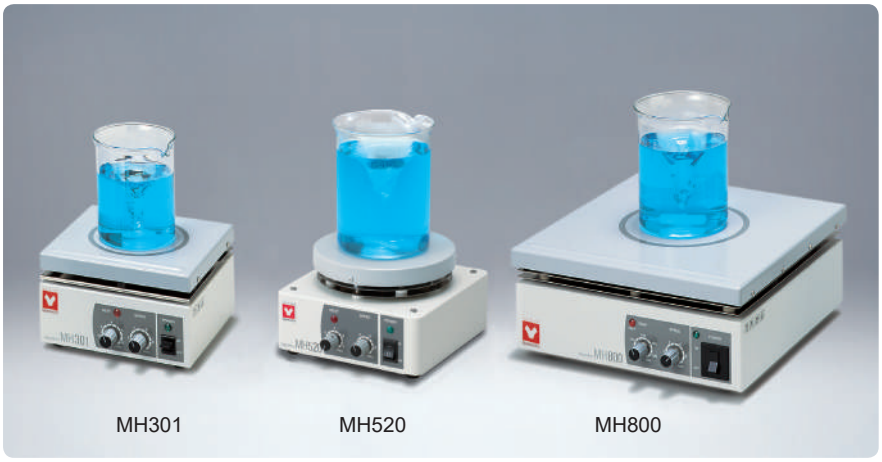
Magnetic Stirrer with Hot Plate

MH301/520/800·MG600H

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 MG600H

Plate max. temp.	300°C MH301	325°C MH520	250°C MH800/MG600H



MH301 MH520 MH800

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	MH520	MH800
Plate material	Aluminum with ceramic coating		
Plate dimensions	W176×D151mm	ø168mm	W299×D285mm
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×D202×H114mm	W190×D223×H123mm	W309×D315×H151mm
Weight	Approx. 2.6kg	Approx. 3.1kg	Approx. 6.7kg
Accessory	Stirrer bar 30mm 1pc.	Stirrer bar 30mm 1pc.	Stirrer bar 40mm 1pc.

* Protrusions not included

MH520 optional item

Product code	Product name
231397	Tipping preventor

MH520+Tipping preventor (optional)

Magnetic Stirrer with Hot Plate

6 Points Controllable Type (Individual stirring heating)

MG600H

Revolution(50/60Hz)	300~1,500rpm

Stirring capacity	100~2,000ml×6pcs.

MG600H

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

MG600H

Specifications

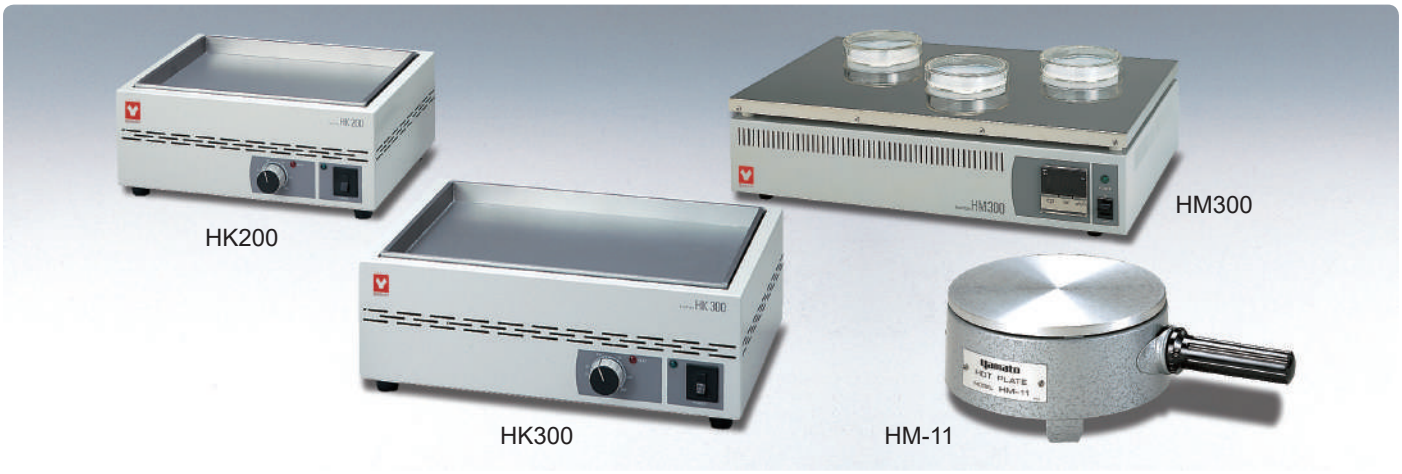
Model	MG600H
Plate material	Aluminum with ceramic coating
Plate dimensions	ø126mm×6pcs.
Stirring capacity	100~2,000ml×6pcs.
Revolution	300~1,500rpm
Hot plate	W230mm×6pcs. Individual temp. control (Set by volume with OFF)
Cooling	--
Heater	230W×6pcs.
Temp. control	Triac input control type
Hot plate temp.	Max.250°C
Motor	AC shading motor
Power source (50/60Hz)	AC115V 13.5A / AC220V 7A
External dimensions*	W606×D420×H122mm
Weight	Approx. 14kg
Accessory	Stirrer bar 30mm 6 pcs.

* Protrusions not included

Hot Plate

HK200/300, HM300, HM-11

Operating temperature range	50~250℃ HK200, HK300	R.T.+5~80℃ HM300	50~200℃ HM-11



■HK200/300 sand bath type
- Stable temperature accuracy even at high temperature.

■HM300 with digital setting and display
- Thermoregulation accuracy is maintained at less than ±0.5℃

■HM-11 standard type
- Compact and simple to use.

■Specifications

Model	HK200	HK300	HM300	HM-11
Operating temperature range	50 to 250℃		R.T.+5 to 80℃	50 to 200℃
Temp. control accuracy (with no load)	±5.0℃ at 250℃ (at the center point of top plate)		±0.5℃ (at 40℃)	±15℃
Max. temp reaching time	Approx. 40 min. at the center point of hot plate (with no load)		–	
Thermoregulator	Liquid expansion type		Time proportion control type	Bimetal type
Hot plate material	Aluminum		Stainless steel	Aluminum alloy cast
Power source (50/60Hz)	AC115V / AC220V Single phase with step-down transformer			
Heater	750 W	900 W	160W (80W×2 pcs)	400W
Hot plate dimensions	338×238×25mm	388×288×25mm	450×300mm	126 (Dia.)mm
External dimensions	392×330×160mm	442×380×160mm	450×305×90mm	132(Dia.)×66(H)mm (Handle:80mm)
Weight	6.2 kg	7.8 kg	5.0 kg	1.1 kg
Safety device	Circuit protector		–	

Touch Mixer

MT-31/51

Revolution(50/60Hz)	2,800/3,300rpm MT-31	600~3,000rpm MT-51

Stirring surface size	ϕ70mm

- Compact type touch mixer for continuous operation.
- Designed with stirring stage.
- MT-51 is loaded with revolution adjustment dial.

■Specifications

Model	MT-31	MT-51
Revolution	2,800/3,300rpm (50/60Hz)	600 to 3,000rpm
Motor	Shaded pole motor, 2W	Direct current motor, 10W
External dimensions	W104×D155×H123mm	W128×D165×H125mm
Weight	1.6kg	1.8kg
Switch	ON1: Touch switch, ON2: Continuous switch	
Stirring ware	Testing tube, Centrifugal tube, Colour comparison tube, Erlenmeyer flask (Max. 100mL)	
Stirring surface size	ϕ70mm	
Stirring surface material	Polyurethane	
Power (50/60Hz)	AC115V/AC220V Single phase with step-down transformer	

Laboratory Stirrer

LT400/500 Series

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

LT400A

*Operational accessories purchased separately

LT series stirrers include LT400A and LT500A with higher torque, LT400B and LT500B with well-balanced speed and torque, and LT400C and LT400D with high speed to support different applications.

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

Specifications

Model	LT400A	LT400B	LT400C	LT400D	LT500A	LT500B
Viscosity of sample	High	Medium	Medium-low	Low	High	Medium
Speed range	10~300rpm	15~600rpm	25~1,200rpm	60~3,000rpm	60~3,000rpm	25~1,200rpm
Torque	0.9N•m (9.0kgf•cm)	0.5N•m (5.0kgf•cm)	0.3N•m (3.0kgf•cm)	0.1N•m (1.0kgf•cm)	1.0N•m (10.0kgf•cm)	0.6N•m (6.0kgf•cm)
Motor	DC brushless motor 30W			DC brushless motor 70W		
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 Stirrers

LR500A/B

Max. Speed Range: 1,000rpm
Operation: Low noise / Maintenance free

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

Specifications

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

*1, No load

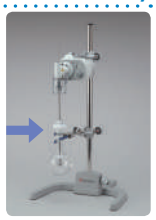
LR500A

*Operational accessories purchased separately

Laboratory Stirrer LT400/500 LR500A/B

Adapter for depressurizing stirrer (for LT400/500)

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



Additional stirrer support (for LT400/500)

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

Adapter for depressurizing stirrer (for LR500)

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

Additional stirrer support (for LR500)

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

*Use with propeller less than 60mm

PTFE Stirring shaft and propeller

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

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

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

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

Propellers

4-blade propeller
Standard
Material: Stainless steel SUS 304

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

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

Product code	Propeller diameter	Mounting screw
LR41AY0006	45mm	M5

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

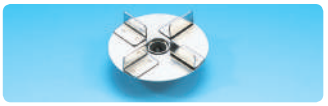
Product code	Model	Propeller Ø	Shaft Diameter
231385	LT400/500	60mm	ø8
2310661018	LR500	60mm	ø10

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

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

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

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



2 stage round plate turbine
Material: Stainless steel SUS 304

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

Stirring shaft

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

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

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

Stand & Rod Set

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

Laboratory Shaker (Horizontal Shaking)

MK161

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 IN602CSW incubator for shaking incubation

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

Incubator IN602CW slide shaker stage (optional) and MK161 installation example

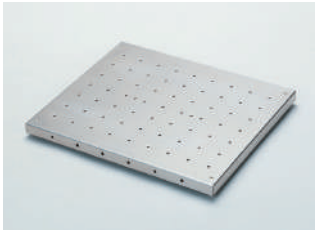
Specifications

Model	MK161
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. (6sec.) to 99.9hr.
Shaking stage dimensions	Main unit : W300 x D254mm, Stage : W290 x D250mm
External dimensions	W350 x D300 x H150mm
Weight	~15kg
Power source 50/60Hz	AC115V 0.5A / AC220V 0.3A

*Glassware not included.

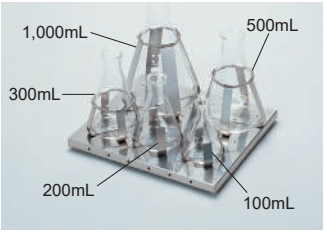
Operational accessories

Mounting stage



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

Erlenmeyer flask holder clamp



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

*Mounting stage sold seperately

Diagonal rack holder

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

*Mounting stage sold seperately

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

*Mounting stage sold seperately

Diagonal centrifugal tube holder

For spitz tube

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

For 50ml centrifugal tube

Product code	Diameter
232083	ø29mm

*Mounting stage sold seperately

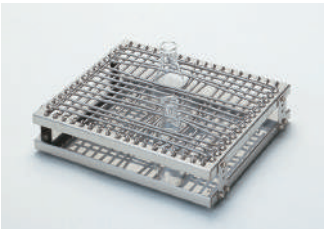
*Glassware not included.

Non-skid sheet

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

*Mounting stage sold seperately

Single spring shaking rack



Dimension (W×D×H)
290×250×66mm
Number of test tube: ø16mm test tube×64 (45°inclination)
Number of erlenmeyer flask 50ml×20pcs, 100ml×10pcs, 200ml×9pcs, 300ml×5pcs, 500ml×4pcs. 1000ml×2pcs
Product code 232050

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

Two layer spring shaking rack

Dimension (W×D×H)
290×250×110mm
Number of test tube: ø16mm test tube×64 (45°inclination)
Number of erlenmeyer flask 50ml×20pcs, 100ml×10pcs, 200ml×9pcs, 300ml×5pcs, 500ml×4pcs. 1000ml×2pcs
Product code 232056

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

Laboratory Shaker (Horizontal Shaking)

MK201D

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 IN-602CSW incubator for shaking incubation

Specifications

Model	MK201D
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×D415×H130mm
Weight	19kg
Power source (50/60Hz)	AC115V Approx. 2A / AC220V Approx. 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)

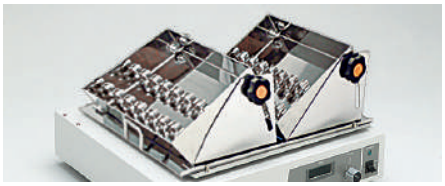
For 1 set		
Product code	Capacity	No. of clamps
232175	100ml	8pcs.
232176	200ml	4pcs.
232177	500ml	2pcs.

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×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

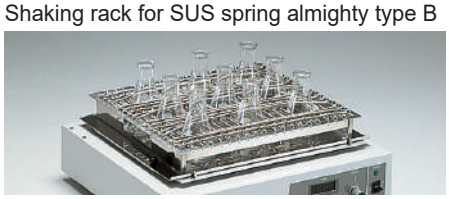
W400×D330mm Material: silicon rubber
Product code: 232182

(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×16pcs, 200ml×10pcs, 500ml×4pcs, 1,000ml×2pcs. For test tube ø16mm×105pcs. when 45°inclination
Product code: 231398

*Glassware and polyethylene bottles not included.

Laboratory Shaker (Vertical & Horizontal Shaking)

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

SA300/320/400

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

SA320 with test tube holder

SA300 with separating funnel holder

Glassware not included

SA320 with separating funnel holder

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	SA320	SA400
Shaking method	Horizontal / Vertical shaking	Horizontal / Vertical rotary shaking	Double sided vertical shaking
Max. number of sample holder	100ml×5, 300ml×4, 1000ml×3 200ml×4, 500ml×4, 2000ml×2		100ml×10, 300ml×8, 1000ml×6 200ml×8, 500ml×8, 2000ml×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×D460×H423		W520×D460×H483
Weight	~40kg		~39kg
Power source (50/60Hz)	Single phase, AC115V 2A / AC220V 1A		
Included accessories	Fuse×1, Carbon brush×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

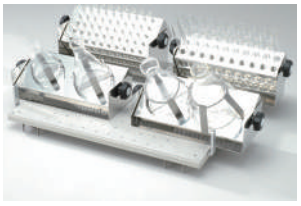
Capacity	No. of pcs.
100ml	28
200ml	19
500ml	14
1L	9
Product code	232095

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



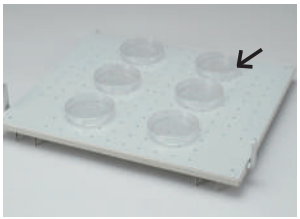
For SA300/320
Horizontal shaking

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

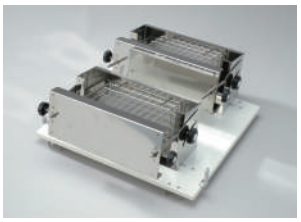


For SA300/320
Horizontal shaking

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

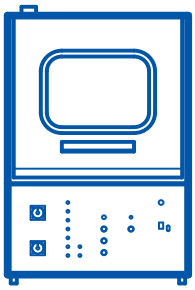
For SA300/320
Horizontal shaking

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



Laboratory Washer

Contents

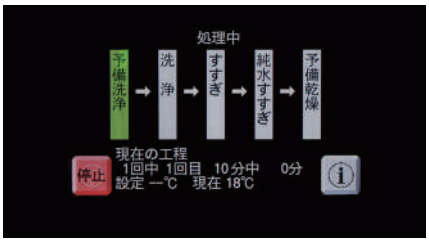
Laboratory Washer (Process Monitorable)

AWD510/AWD510DRY

Washing Water Temp. Set Off to Max. 80℃

- Color lighting to make it easy to determine stage of the washing process.
- Large double glass window for easy observation.
- Powerful alkaline as standard liquid detergent.
- Feed-water connection established between the rack and main body by simply closing the door.

Control panel



Specifications

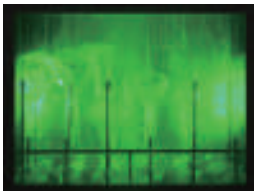
Model		AWD510	AWD510DRY (With pre-drying unit)
Washing system		Upper / Middle / Lower-stage rotating jet nozzles	
Washing process		Pre-washing, Washing, Rinsing, Rinsing with pure water (optional)	Pre-washing, Washing, Rinsing, Rinsing with pure water (optional), Pre-drying (optional)
Water temp.		Set Off to Max. 80℃ (pre-washing / washing), Max. 93℃ (rinsing)	
Hot-water supply		2kW Pipe heater	
Detergent supply		Automatic weighing and loading (liquid detergent)	
Drain method		Hot water cooling and forced draining with pump	
Drying method (optional)		–	Hot-air drying (HEPA filter, fixed at approx. 60℃)
Water supply	Tap water (necessary)	Temp. 5 to 25℃ , Raw water feed pressure 0.1 ～ 0.5MPa, G3/4 (main unit), G1/2 (primary)	
	Hot water (Discretionally)	Temp. 5 to 60℃ , Raw water feed pressure 0.1 ～ 0.5MPa, G3/4 (main unit), G1/2 (primary)	
Detergent		Dedicated detergent (optional)	
Pure water connection (discretionally)		Raw water feed pressure 0.02 ～ 0.1MPa, Hose nipple I.D. 10.5mm	
Exterior material		Stainless steel plate（SUS304）	
Interior material		Stainless steel plate（SUS304）	
Leg		Level adjuster	
Display		4.3-inch LC touch panel / LED lamp (process) / Interior lighting color by process	
Safety Device		Over current/Electric leakage breaker, Overheat prevention, Door lock, Water leakage	
Internal dimensions (W×D×Hmm)		500×480×480	
External dimensions (W×D×Hmm)		580×600×845	
Weight		Approx. 87kg	
Power source (50/60Hz)		AC115V/AC220V Single phase with step-down transformer	
Accessories		Raw water supply hose (for tap water and hot water), Drain hose, Lid for removing upper-stage rack, Stainless steel rack for detergent, Drain hose clamp, Overflow water hose, Detergent tube	

*1 Power cord: 3M (power plug is not included)
*2 External dimensions do not include protrusions.

Front LED lamp / Internal color lighting

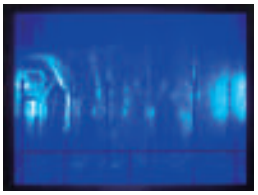
Five-color lighting to differentiate each process enables quick confirmation of the current progress even from a distance.

① Pre-washing

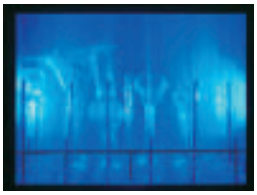


② Washing

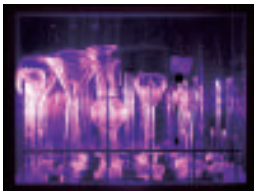
③ Rinsing



④ Rinsing by pure water (OP)



⑤ Pre-drying (AWD510DRY)



Rack combination examples

Example		Applicable stage	Major target glassware	Rack used
Single stage (lower-stage) only	(1)	Lower-stage only	Test tube:Inside dia. 9mm or more, length 200mm or less	Slide-type lower-stage rack base ② + test tube rack ④ *Note) Lid (accessory) attached for removal of the upper-stage rack
	(2)	Lower-stage only	Beaker:50 to 3000mL	Slide-type lower-stage rack base ② + beaker rack A5 ⑤ *Note) Lid (accessory) attached for removal of the upper-stage rack
	(3)	Lower-stage only	Measuring flask:50 to 1000mL Erlenmeyer flask:50 to 500mL	Slide-type jet rack A5 ③ *Note) To be used independently (the upper-stage not to be used)
Double stage (lower and upper-stage)	(4)	Lower-stage	Test tube:Inside dia. 9mm or more, length 165mm or less	Slide-type lower-stage rack base ② + test tube rack ④
		Upper-stage	Test tube:Inside dia. 9mm or more, length 150mm or less	Slide-type upper-stage rack base ① + test tube rack ④ *Note) For the upper-stage, three of the four sections of test tube rack are used
	(5)	Lower-stage	Test tube:Inside dia. 9mm or more, length 165mm or less	Slide-type lower-stage rack base ② + test tube rack ④
		Upper-stage	Beaker:1000mL or less	Slide-type upper-stage rack base ① + beaker rack A5 ⑤
	(6)	Lower-stage	Beaker:1000mL or less	Slide-type lower-stage rack base ② + beaker rack A5 ⑤
		Upper-stage	Test tube:Inside dia. 9mm or more, length 150mm or less	Slide-type upper-stage rack base ① + test tube rack ④ *Note) For the upper-stage, three of the four sections of test tube rack are used
	(7)	Lower-stage	Beaker:1000mL or less	Slide-type lower-stage rack base ② + beaker rack A5 ⑤
		Upper-stage	Beaker:1000mL or less	Slide-type lower-stage rack base ① + beaker rack A5 ⑤

Optional Items and Consumables

	Description	Option Model	Item Code
①	Rack base, Slide-type upper-stage	-	291061
②	Rack base, Slide-type lower-stage	-	291062
③	Jet rack, Slide-type A5, Nozzle 36pcs.	-	291063
④	Test tube rack, Rack base is necessary, Approx. 212pcs.×4 racks settable in case of Φ10mm test tube	-	291068
⑤	Beaker rack A5, Rack base is necessary, Approx. 8pcs. settable in case of 1L beaker	-	291064
⑥	Stand	-	291067
⑦	*Drying unit	-	291060
⑧	Drain-water junction pipe, for combination of overflow drain and normal drain	-	291065
⑨	Water supply connection unit, valve R1/2 with 60-mesh strainer and joint for G1/2	-	291066
⑩	Water purifier	WL220T	253629
⑪	Water supply unit for WL220T	OWH10	253686
⑫	Drain pan for WL220T	OWL50	253271
⑬	Power cord 4m for WL220T	OWL52	253273
⑭	Ion exchange cartridge set for WL220T	CPC-P+CPC-E	253262
⑮	Amorphous phosphorus detergent, General use. Alkaline powder detergent 8kg	-	8190026001
⑯	Detergent, General use. Alkaline liquid detergent, 2L×4	AWL100	291077
⑰	Detergent, Grease-cutting. Alkaline liquid detergent, 2L×4	AWL200	291078
⑱	Detergent, General use. Weak alkaline liquid detergent, 2L×4	AWL300	291079
⑲	Detergent for Inner chamber, Strong acid, 500g×4	AWP500	291080

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

Sequence/Time Chart

⑫ Water purifier WL220T (optional item)

The use of a pure waterfeed system or the water purifier WL220T enables rinsing with pure water.

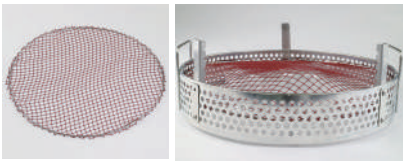
⑥ Stand (optional item)

With casters/adjuster. Capable of housing thewashing bottles and test tube racks.

Slide-type upper-stage rack base ①

Test tube rack ④

Beaker rack net



Slide-type lower-stage rack base ②

Beaker rack A5 ⑤

Band to hold a small number of glassware items

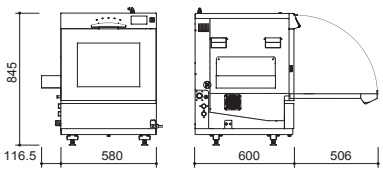
Slide-type jet rack A5 ③

Mesh basket

Drainage junction pipe ⑧

Feed-water connection unit ⑨

Dimensions (mm)



Laboratory Washer (Fully-automatic, Large Capacity)

AW83

Washing Time (Each Process) 1~99min. Setting

Washing Water Temp. Supplied Temp. ~80℃

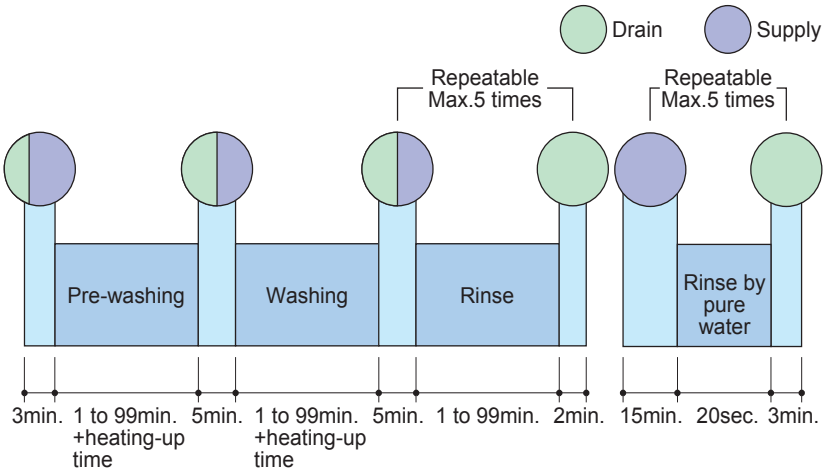
Pure water supply unit optional

- Two washing chambers
- Selectable three washing patterns
- Optional jet rack can easily remove dirt in the containers.
- Fixing rack and spinning jet nozzle can avoid container breakage.
- Washing with hot water is available through its built-in heater.
- Liquid detergent is automatically supplied from detergent container (powder detergent also available by adding powder in each time)

Specifications

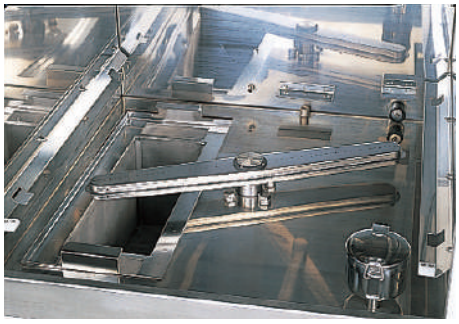
Model		AW83
Washing compartment		Two washing chambers
		Pressure water jet from two directions: Top and bottom, Jet nozzle spinning
		Fixed rack (Changeable to batch type jet rack)
Washing pattern		Selectable three washing patterns *Final rinse is option
		1. Pre-washing → Washing → Rinse → Final rinse*
		2. Washing → Rinse → Final rinse*
		3. Rinse → Final rinse*
Washing time		Pre-washing, Washing, Rinse: settable 1 to 99min
		Rinse: settable up to 5 times by batch system
		Final rinse (to connect with pure water supplying system): Rinse by pure water 50L, settable up to 5 times, start to wash after reaching to the set water level, Timer count starts after reaching to the setting temp.
Water supply temp.		Room temp. to 80℃
Washing water temp.		Supplied temp. to 80℃
		Same water temp. for pre-washing and washing, no water heat-up for rinse and final rinse
Liquid detergent supplying type		Automatic supply by pump (Adjustable supply amount)
Liquid detergent tank capacity		2L
Required water amount		Approx. 28L for each pre-wash, wash and rinse
Hot water supply system		Heater (Built-in: 6kW) heat-up or connection to primary hot water supply
Container stand		Shelf board 2pcs. (Standard)
Water supplying system		Electromagnetic valve Open/Close, water flow amount is fixed by flow switch
Water drain system		Forced drain by pump
Power (50/60Hz)		AC230V / AC380V three phase with step-down transformer
Exterior material		Cold rolled steel plate with melamine resin baking finish
Interior material		Stainless steel
External dimensions		W860×D770×H1,795mm
Inner bath dimensions		W600×D630×H1,080mm
Pump		Washing pump: 355W/560W
		Drain Pump: 45W
Shelf board		550×550mm, max. load 245N (25kg)
Weight		Approx. 220kg
Accessories	Supply hose	I.D.18mm, 2m×1pc
	Drain hose (with coupler)	2m×1pc
	Detergent	(Amorphous phosphorus) 1kg
	Measuring spoon (for 50ml)	1pc
	Test tube rack support	1pc
	Hose clamp	1pc

Sequence/Time Chart

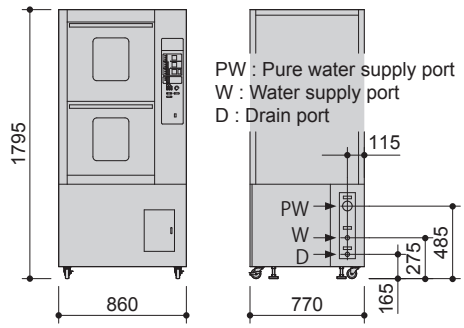


*Starting supply to pure water tank when rinse starte.

Jet Nozzle



Dimensions (mm)

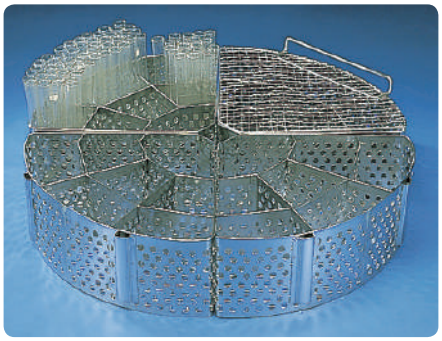


Jet rack

Optional Items

Product name	Description	Product code
Pure water supplier	O.D. W420×D600×H1,065mm	291092
	Electric power for pump: 355W/560W (50/60Hz)	
	Pure water tank capacity: 50L	
	Ion exchange: mixed bed type, resin amount 10L	
	Cartridge: collectable water amount 1,500L, warning Lamp on after 30times final rinse	
Jet rack	44pcs. settable in case of 100mL volumetric flask	291093
Beaker rack	Approx. 85pcs. settable in case of 50ml beaker	291081
Test tube rack	Approx. 600ps. settable in case of ϕ16.5mm test tube	291082
Test tube rack support	Approx. 68pcs. settable in case of 50ml flask	281255
Flask rack	Approx. 68pcs. settable in case of 50ml flask	291083
Port position change	Supply and drain from right to left side	281256
Detergent	Phosphorus-free detergent 8kg	8190026001
IE bomb	For pure water supplier	000821

Beaker rack



Test tube rack

Flask rack

Laboratory Washer (Fully-automatic, Compact)

AW62

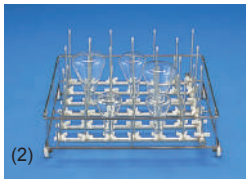
Capacity	Test tube 600 pcs. (16.5ml) Volumetric flask 42 pcs. (100ml)	Washing water temp.	45~80°C	Washing time	Setting range 0~30 min.	Rinsing time	Setting range 0~30 min.

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

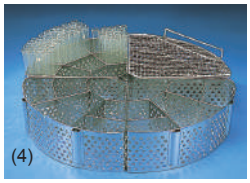
Optional item

Combination with water purifier



Jet rack (glasswares not included)

Beaker rack (glasswares not included)



Test tube rack (glasswares not included)

Flask rack (glasswares not included)

Phosphorus-free detergent

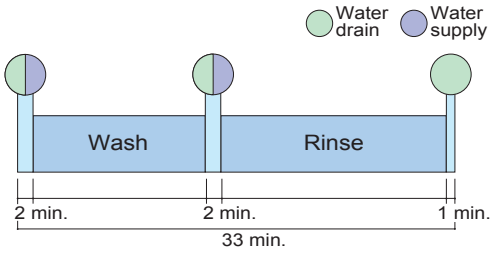
No.	Product name	Description	Product code
(1)	Water purifier	With built-in 20L purified water tank	291017
(2)	Jet rack	Hold up to 42 pcs. of 100ml flask	291086
(3)	Beaker rack	Hold up to 85 pcs. of 50ml beaker	291081
(4)	Test tube rack	Hold up to 600 pcs. ø16.5mm test tube	291082
(5)	Flask rack	Hold 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

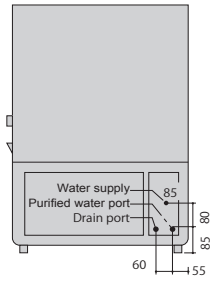
Model	AW62
Cleaning method	Two direction pressurized water jet method, fixed jet nozzle
Cleaning cycle	Wash (setting range: 0~30min.)
	Rinse (setting range: 0~30min.)
	Purified water rinse (optional) when connected with water purifier, Rinse clean with 20L purified water
Water supply	Room temp. ~ 80°C
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×D620×H940mm
Internal dimensions	W594×D572×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	Approx. 90kg
Power source (50/60Hz)	Three phase AC220V 17A
Accessories	Water supply hose (with coupler) 2m 1pc., Drain hose (I.D.25.4mm) 1.5m 1pc.
	Phosphorus-free detergent 1kg (50mL measuring spoon 1pc.)
	Vinyl cover, Main jet nozzle cleaning needle 1pc.
	Water supply unit
Consumable	Phosphorus-free detergent

* Protrusions not included.

Process Time Schedule



Dimensions (mm)



Laboratory Washer (Semi-automatic, Compact)

AW47

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 glass-ware 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

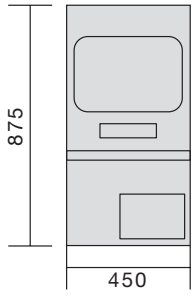
Control Panel

Specifications

Model	AW47
Cleaning method	Upward and downward two-way pressurized water jet method Rotating jet nozzles (fixed when using jet rack)
Washing water temp.	Room temp. ~ 80°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×D490×H875mm
Internal dimensions	W420×D450×H570mm
Pump	200W
Spin table	Dia. 420mm
Door	Drop down style
Weight	Approx. 43kg
Power source (50/60Hz)	AC115V 13A / 220V 7A
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 not included.

Dimensions (mm)



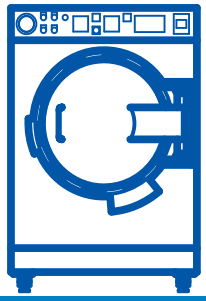
Optional items

Jet rack (glassware not included)

Test tube rack (glassware not included)

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



Industrial Equipment

Contents

Chiller (Large Capacity)

C1-001

Usage: cutting blade cooling of semiconductor packaging.

- Significantly prolongs life span of expensive cutting blade.
- Effective capacity of main water tank is 375L.
- Auto control of water inflow, supply, circulation and drainage.
- Easy operation
- Equipped with exhaust fan, beacon, emergency stop switch, etc.
- Equipped with safety devices such as water level detection, overheating protection of chiller, delayed start for chiller protection, over-current earth leakage circuit breaker, etc.

Product	C1-001
Temp. range	4~22℃ (internal recycling)
Temp. adjustment accuracy	±1℃ (at fluid temp. 7℃)
Temp. expression unit	0.1℃
Chiller•refrigerant	Air cooling 2.2KW R407C
Circulating pump	Submerged multistage centrifugal pump
Circulating capacity	Max. flow (pump capacity): 24L/min (40L/min)
	Max. lift (pump capacity): 30m (50m)
Water tank material	PVC
Water tank effective capacity	375L
External dimension	W900×D1,400×H1,700mm
Power source	3 phase AC380V 6A

Chiller (Large Capacity, for Narrow Space)

C1-002

Usage: semiconductor packaging program segment, for resin curing.

- Max. working temp. 360℃, clean class 100, oxygen concentration less than 50ppm.
- Program operation function, auto / manual mode.
- Fast temp. rising and cooling, and air cooling or air cooling+water cooling are available for cooling method.
- Equipped with auto lock, digital pressure gauge, digital flowmeter, etc.
- Equipped with safety devices such as auto overheat protector, overheat protector, abnormal N_2 pressure, abnormal N_2 flow, over-current earth leakage circuit breaker, etc.

Product	C1-002
Temp. range	4~10℃ (internal recycling)
Temp. adjustment accuracy	±1℃ (at fluid temp. 7℃)
Temp. expression unit	0.1℃
Chiller•refrigerant	Air cooling 2.2KW R407C
Circulating pump	Submerged multistage centrifugal pump
Circulating capacity	Max. flow (pump capacity): 24L/min (40L/min)
	Max. lift (pump capacity): 30m (50m)
Water tank material	PVC
Water tank effective capacity	200L
External dimension	W650×D1,200×H1,750mm
Power source	3 phase AC380V 6A

Multi-Chamber Oven

2-chamber•4-chamber•6-chamber

C1-003

Usage: semiconductor packaging program segment, for resin curing.

- Available in 2/4/6-chamber combination (independent control for each chamber), saving installation space.
- Horizontal convection.
- Fast temp. rising and cooling, with program operation function.
- Equipped with auto lock, N_2 flowmeter, temp. recorder, emergency stop switch, etc.
- Equipped with safety devices such as auto overheat protector, overheat protector, abnormal N_2 pressure, abnormal N_2 flow, over-current earth leakage circuit breaker, etc.

Product	C1-003
Temp. range	40~260℃
Temp. distribution accuracy	±5.0℃ (at 175℃)
Temp. rising time	15min (50℃→175℃)
Temp. cooling time	30min (175℃→50℃)
Operation function	Fixed temp., Program
Configuration	Air exhaust actuator, N_2 introduction device, Recorder, etc.
Internal dimension	W450×D520×H300mm (single chamber)
Power source	3 phase AC380V

Clean Inert Oven

Clean class 100, oxygen concentration 50ppm

C1-004

Usage: semiconductor packaging program segment, for resin curing.

- Max. working temp. 360℃, clean class 100, oxygen concentration less than 50ppm.
- Program operation function, auto / manual mode.
- Fast temp. rising and cooling, and air cooling or air cooling+water cooling are available for cooling method.
- Equipped with auto lock, digital pressure gauge, digital flowmeter, etc..
- Equipped with safety devices such as auto overheat protector, overheat protector, abnormal N_2 pressure, abnormal N_2 flow, over-current earth leakage circuit breaker, etc..

Product	C1-004
Temp. range	RT+30~360℃
Temp. distribution accuracy	±4.0℃ (at 360℃)
Temp. rising time	15min (RT→360℃)
Temp. cooling time	60min (360℃→50℃)
Clean class	100 (at constant temp.)
HEPA filter	Dust collection efficiency: 0.3um particle more than 99.97%
Operation function	Fixed temp., program
Configuration	N_2 introduction device, Water cooling device, Differential pressure gauge, etc.
Internal dimension	W660×D660×H500mm
Power source	3 phase AC380V

Double Entry Oven

Front and rear doors

C1-005

Usage: ageing treatment of electronic products.

- Front and rear doors, embedded in the wall to install, ensures cleanliness of room.
- Cart moving in integrally, improves production efficiency.
- Interlock function of two doors, prevents misoperation.
- Front and rear sides synchronously display all operation status.
- Auto stop function.
- Equipped with safety devices such as auto overheat protector, overheat protector, over-current earth leakage circuit breaker, etc.

Product	C1-005
Temp. range	RT+20~180℃
Temp. distribution accuracy	±5.0℃ (at 180℃)
Temp. rising time	100min (RT→180℃)
Operation function	Fxed temp., Auto stop
Configuration	Independent overheat protector, Electromagnetic lock, etc.
Internal dimension	W1,000×D1,850×H2,150mm
Power source	Single phase AC220V

Stackable Oven

Combination type

C1-006

Usage: thermal treatment of products.

- Uses overlapping stands to combine one machine with several units to save installation space.
- Door is equipped with electromagnetic lock.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C1-006
Method	Forced convection
Operating temp. range	RT+10~260℃
Temp. adjustment accuracy	±1℃ (at 210℃)
Temp. distribution accuracy	±2.5℃ (at 210℃)
Operation function	Fixed temp., Program, Auto stop and auto start
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	W700×D500×H500mm (single)
Power source	Single phase AC220V

Conveyor Oven (Fully Automatic)

C1-007

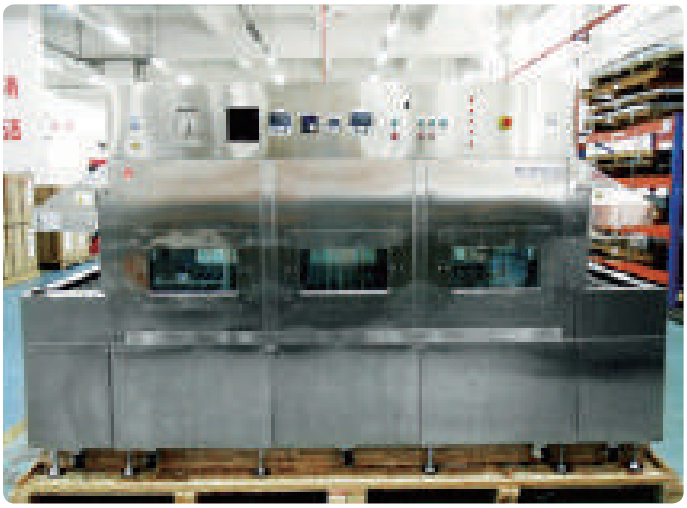
Usage: thermal treatment during electronic components production process.

- Installed at conveyor thereby saving space and improving thermal treatment efficiency.
- Adjustable conveyor speed, multiple treatment processes can be set.
- Program operation function.
- Equipped with 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.

Product	Conveyor Drying Oven, C1-007
Temp. range	RT+20~80℃
Temp. distribution accuracy	±10℃ (at 80℃)
Temp. rising time	15min (RT→80℃)
Operation function	Fixed temp., program operation
Conveyor speed	0.035~0.35m/min
Conveyor length	1,100mm
Inlet and outlet dimension	W400×H65mm
Power source	3 phase AC380V

Conveyor Oven (Fully Automatic)

C1-008



Usage: thermal treatment of products.

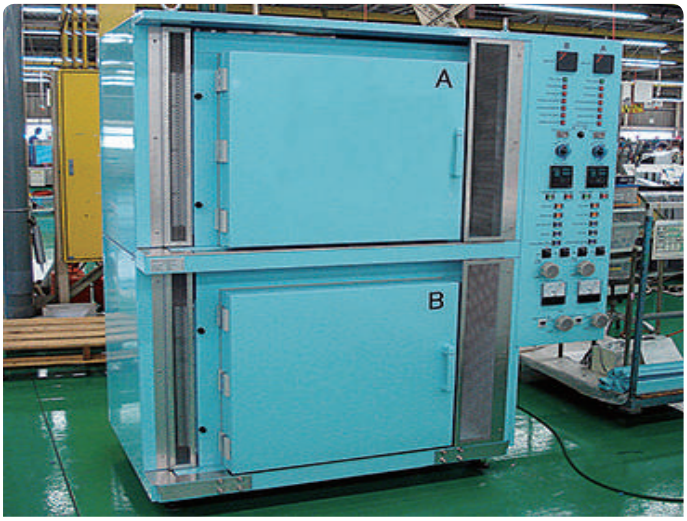
- Set at production line which significantly improves production efficiency.
- Fully-automatic control.
- Adjustable conveyor speed, multiple treatment processes can be set.
- Program operation function.
- Equipped with frequency converter, beacon, cylinder, etc.
- Equipped with safety devices such as auto overheat protector, overheat protector, emergency stop switch, conveyor overload protection, over-current earth leakage circuit breaker, etc.

Product	C1-008
Temp. range	RT+20~120℃
Temp. distribution accuracy	±10℃ (at 120℃)
Temp. rising time	50min (RT→120℃)
Operation function	Fixed temp., Program
Door open & close control	Cylinder
Conveyor length	3,000mm
Inlet and outlet dimension	W800×H215mm
Power source	3 phase AC380V

Modular Vacuum Oven

Fast temp. rising and cooling

C2-001



Usage: in battery manufacturing engineering, vacuum drying to remove moisture and solvent in the electrode material.

- Fast temp. rising and cooling improving production efficiency.
- Auto / manual mode: at auto mode, the air exhaust, temp. rising, treatment, cooling, deflation are controlled automatically, one key operation.
- Chamber wall and shelf plate heating, shortens temp. rising time and improves temp. distribution accuracy.
- Option to select “air cooling (air jacket) + air cooling (cooling pipe)” or “air cooling (air jacket) + water cooling (cooling pipe)” to significantly shorten cooling time.
- Equipped with safety devices such as auto overheat protector, overheat protector, abnormal N_2 pressure, abnormal N_2 flow, abnormal cylinder action, instant power outage protection, over-current earth leakage circuit breaker, etc.

Product	C2-001
Method	Decompression • Chamber wall and shelf plate heating
Operating temp. range	RT+30 ~ 250℃
Operating vacuum range	101 ~ 0.1KPa
Temp. rising time	Approx. 75min (RT→185℃)
Temp. cooling time	Approx. 90min (185→50℃)
Temp. adjustment accuracy	±1℃ (at 185℃)
Temp. distribution accuracy	±10℃ (at 185℃)
Internal dimension	W600×D600×H600mm (single chamber)
Power source	3 phase AC380V

2-Chamber Vacuum Oven (Far-infrared Heating)

C2-002

Usage: in battery manufacturing engineering, vacuum drying to remove moisture and solvent in the electrode material.

- Fast temp. rising and cooling improving production efficiency.
- Auto/manual mode: at auto mode, the convection, air exhaust, temp. rising, treatment (repeatedly air suction and exhaust in process), cooling, deflation are controlled automatically, able to edit various production programs, realize one key operation.
- Adopt far-infrared heating tube to heat, condenser with fin (cooling water) to cool, uses forced convection structure, very short temp. rising and cooling time.
- Equipped with door detection switch, automatic door locks, door leak detection oxygen concentration meter, chamber oxygen concentration meter, pirani vacuum gauge, etc.
- Equipped with safety devices such as auto overheat protector, overheat protector, abnormal N_2 pressure, abnormal oxygen concentration, abnormal cooling water, instant power outage protection, over-current earth leakage circuit breaker, etc.

Product	C2-002
Method	Decompression •far-infrared tube heating
Operating temp. range	RT+10 ~ 200℃
Operating vacuum range	101kPa ~ 1Pa
Temp. rising time	Approx. 90min (RT→185℃)
Temp. cooling time	Approx. 90min (185→50℃)
Temp. adjustment accuracy	±1℃ (at 185℃)
Temp. distribution accuracy	±5℃ (at 185℃)
Internal dimension	W700×D1,250×H700mm (single chamber)
Power source	3 phase AC380V

2-Chamber Vacuum Oven (Automatic Control)

C2-003

Usage: vacuum drying of electrode materials.

- Adopt upper and lower chambers layout, independent control for each, saves installation space.
- Auto / manual modes available.
- When program is running, automatic program running of vacuum pump linkage can be carried out.
- Easy operation, with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Submenu key to operate overheat protector, deviation correction and key lock.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C2-003
Method	Decompression • chamber wall heating
Operating temp. range	40 ~ 200℃
Operating vacuum range	101 ~ 0.1KPa
Max. temp. reaching time	Approx. 120min (RT→200℃)
Temp. adjustment accuracy	±1℃ (at 200℃)
Internal dimension	W450×D450×H450mm (single chamber)
	W600×D600×H600mm (single chamber)
Power source	Single phase AC220V

Vacuum Oven (Fully Automatic Programmable Control)

C2-004

Usage: vacuum drying of electrode materials.

- Max. temperature 200℃/300℃/400℃ optional.
- According to technical requirements, capable of running complicated programs. Equipped with pirani vacuum gauge.
- N_2 or air is available to be selected for air suction, adjustable air speed.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, etc.

Product	C2-004		
Method	Decompression • chamber wall heating		Decompression • internal heating
Operating temp. range	40~200℃	40~300℃	40~400℃
Operating vacuum range	101 ~ 0.1KPa		
Temp. rising time	Approx. 80min (RT→200℃)	Approx. 120min (RT→300℃)	Approx. 60min (RT→400℃)
Temp. adjustment accuracy	±1℃		
Configuration	Pirani vacuum gauge		
Internal dimension	4 type: W450×D450×H450mm 6 type: W600×D600×H600mm		
Power source	Single phase AC220V		

Autoclave (Industrial Use, Large Capacity)

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 functions

- 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, electric leakage breaker

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, electric leakage breaker			
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	Approx. 700kg	Approx. 900kg	Approx. 1000kg	Approx. 1300kg

LCD Aging Chamber (Drawer)

C3-001

Usage: power-on ageing test after assembling LCD panel.

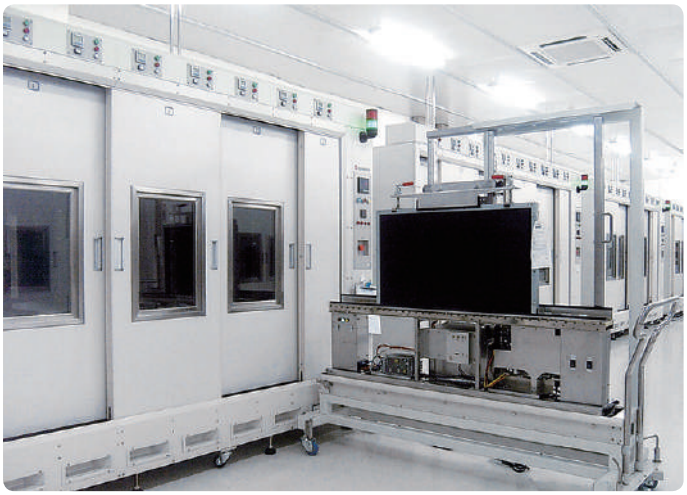
- Drawer design saves installation space, easy operation.
- Less than 45 in. LCD panel.
- Each drawer adopts independent enclosed design, able to pull it out at any time to observe LCD panel ageing state or replace, and will not lead to temperature fluctuation of other drawers.
- Adjustable ventilation speed.
- Customizable drawer quantity based on customer requirements.
- Equipped with safety devices such as auto overheat protector, overheat protector, blower overheating protection, over-current earth leakage circuit breaker, etc.

Product	C3-001
Operating temp. range	50~60℃
Temp. adjustment accuracy	±0.5℃ (at 60℃)
Temp. distribution accuracy	±5℃ (at 60℃)
Max. temp. reaching time	Within 30min (RT→60℃)
Operation function	Fixed temp., Instant power outage operation recovery
LCD size	Less than 45 inch
Drawer qty.	Customizable
Power source	3 phase AC380V

LCD Aging Chamber (Insertion Slot)

Cart push-in type

C3-002



Usage: power-on ageing test after assembling large-size LCD panel.

- Tracks are installed inside chamber, easy for the ageing cart to be pushed in integrally.
- 32-50 inch LCD panel.
- Cart and unit body adopt collector electrode for power supply, easy and reliable.
- Sliding door design, cart could move in or out fast. Adjustable ventilation speed.
- Customizable cart holding quantity based on customer requirements.
- Equipped with safety devices such as auto overheat protector, overheat protector, blower overheating protection, cart arrival detector switch, over-current earth leakage circuit breaker, etc.

Product	C3-002
Operating temp. range	40~60℃
Temp. adjustment accuracy	±0.5℃ (at 60℃)
Temp. distribution accuracy	±5℃ (at 60℃)
Max. temp. reaching time	Within 30min (RT→60℃)
Operation function	Fixed temp., Instant power outage operation recovery function
LCD size	32~50 inch
Drawer qty.	Customizable
Power source	3 phase AC380V

Clean Oven (Class 1000)

C3-003

Usage: thermal treatment of special materials.

- Clean class 1000.
- Equipped with running alarm lamp.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C3-003
Method	Forced convection
Operating temp. range	RT+10 ~ 260℃
Temp. adjustment accuracy	±1℃ (at 210℃)
Temp. distribution accuracy	±2.5℃ (at 210℃)
Operation function	Fixed temp., program, Auto stop and auto start
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	W600×D500×H1,000mm
Power source	Single phase AC220V

Clean Oven (Class 100)

C3-004

Usage: drying and storage of special materials.

- Clean class 100.
- Adjustable air speed, capable of drying and storing materials containing water.
- Easy operation with fixed temp., quick auto stop, auto stop and auto start functions.
- Able to set overheat protection, deviation correction and key lock.
- Self-diagnosis circuit (abnormal temp. input), power outage compensation, deviation correction, independent overheat protector, electric leakage breaker, etc.

Product	C3-004
Operating temp. range	RT+10 ~ 150℃
Temp. adjustment accuracy	±0.5℃ (at 150℃)
Temp. distribution accuracy	±5℃ (at 150℃)
Max. temp. reaching time	Within 50min (RT→150℃)
Clean class	100 (at constant temp.)
HEPA filter	Dust collection efficiency: 0.3um particle more than 99.97%
Operation function	Fixed temp., Quick auto stop, Auto stop and auto start
Internal dimension	W500×D450×H1,050mm
Power source	Single phase AC220V

Vacuum Inert Oven (with Humidity Monitoring System)

C4-001

Usage: vacuum storage of special materials.

- Equipped with oxygen concentration meter and humidity sensor, real-time measure of oxygen concentration and humidity in chamber.
- Lock is installed at the door.
- Equipped with safety devices such as auto overheat protector, abnormal N_2 pressure, abnormal oxygen concentration meter, over-current earth leakage circuit breaker, etc.

Product	C4-001
Method	Decompression • Chamber wall heating
Operating temp. range	40 ~ 240℃
Operating vacuum range	101 ~ 0.1KPa
Temp. rising time	Approx. 60min (RT→240℃)
Temp. adjustment accuracy	±1.5℃ (at 185℃)
Configuration	Oxygen concentration meter, humidity sensor
Internal dimension	W300×D300×H300mm

Forced Convection Oven (with Oxygen & Humidity Monitor)

C4-002

Usage: mould preheating.

- Equipped with air speed adjusting knob to change air speed.
- Double door with large observation windows.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start operations.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C4-002
Method	Forced convection circulation
Operating temp. range	RT+10 ~ 150℃
Temp. adjustment accuracy	±1℃ (at 150℃)
Temp. distribution accuracy	±5℃ (at 150℃)
Operation function	Fixed temp., Program, Auto stop and auto start
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	W800×D600×H1,265mm
Power source	Single phase AC220V

Forced Convection Oven (Cart)

Cart move-in type

C4-003

Usage: thermal treatment of materials.

- Cart is moved in or out integrally improving production efficiency. Program operation function.
- Manually adjust exhaust port to reach required ventilation volume (max. 100 times/hr).
- Fluoro rubber sealing strip.
- Equipped with safety devices such as auto overheat protector, overheat protector, over-current earth leakage circuit breaker, etc.

Product	C4-003
Temp. range	RT+20~120℃
Temp. distribution accuracy	±2.0℃ (at 120℃)
Temp. rising time	50min (RT→120℃)
Ventilation volume	Max. 100 times/hr
Operation function	Fixed temp., Program
Configuration	Independent overheat protector, Beacon, Manual air exhausting device
Internal dimension	W700×D700×H1,200mm
Power source	Single phase AC220V

Forced Convection Oven (Cart)

Cart push-in type

C4-004

Usage: conduct drying treatment after surface coating of parts.

- Cart is pushed in integrally to conduct drying treatment improving production efficiency.
- Equipped with running alarm lamp, and manually adjustable exhaust port.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C4-004
Method	Forced convection circulation
Operating temp. range	RT+20～150℃
Temp. adjustment accuracy	±1℃ (at150℃)
Temp. distribution accuracy	±2.5℃ (at150℃)
Operation function	Fixed temp., Program, Auto stop and Auto start
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	W820×D820×H1,370mm
Power source	Single phase AC220V

Burn-in Testing Chamber

Single temperature zone

C4-005

Usage: parts power-on ageing test.

- Combine with customer's parts to form an integrated test system.
- Single temperature zone control.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C4-005
Method	Forced convection circulation
Operating temp. range	RT+10 ~ 260℃
Temp. adjustment accuracy	±1℃ (at 210℃)
Temp. distribution accuracy	±2.5℃ (at 210℃)
Operation function	Fixed temp., Program, Auto stop and auto start operations
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	W600×D500×H1,000mm
Power source	Single phase AC220V

Burn-in Testing Chamber

Single temperature zone

C4-006

Usage: parts power-on environment test.

- Combine with customer's parts to form an integrated test system.
- Multiple temperature zone control.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	C4-006
Method	Forced convection circulation
Operating temp. range	RT+10 ~ 100℃
Temp. adjustment accuracy	±1℃ (at 100℃)
Temp. distribution accuracy	±2.5℃ (at 100℃)
Operation function	Fixed temp., Program, Auto stop and auto start
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	Each temp. zone W710×D460×H140mm
Power source	Single phase AC220V

Coating Machine

Automatic control

C4-007

Usage: assembly line equipment of small parts from coating to drying.

- Coating room + conveyor drying oven + air exhaust system.
- Anti-explosion structure and fire proof door.
- Speed adjusting range 300-600mm/min.
- Equipped with safety devices such as abnormal temp. sensing, heater disconnection, overheat protector, abnormal air blowing and exhausting, abnormal conveyor, fire proof door, electric leakage breaker, etc.

Product	C4-007
Method	Forced convection circulation
Operating temp. range	80 ~ 100℃
Temp. adjustment accuracy	±1℃ (at 100℃)
Conveyor	Stainless steel
	Speed 300 ~ 600mm/min
Exhausting method	Forced exhaust of centrifugal fan
Coating room	Auto-manual system
Power source	3 phase A380V

Walk-in Drying Chamber

Large walk-in type

C4-008

Usage: drying treatment of special materials.

- Large walk-in type.
- Double door structure, anti lock mechanism.
- Easy operation with fixed temp., program, quick auto stop, auto stop and auto start functions.
- Self-diagnosis circuit (abnormal temp. sensing, heater disconnection, auto overheat prevention, SSR short circuit), overheat protector, electric leakage breaker, key lock, etc.

Product	Forced Convection Constant Temp. Drying Oven, C4-008
Method	Forced convection circulation
Operating temp. range	RT+10 ~ 100℃
Temp. adjustment accuracy	±1℃ (at 100℃)
Temp. distribution accuracy	±5℃ (at 100℃)
Operation function	Fixed temp., Program, Auto stop and auto start
Additional functions	Deviation correction, Key lock, Power outage compensation
Internal dimension	W3,500×D3,500×H3,000mm
Power source	3 phase AC380V

Yamato

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