

Digest Catalogue

Products to support scientific research

www.eyela.co.jp

Rotary Evaporator Vacuum System for the Chemical Laboratory
Vacuum Controller Diaphragm Vacuum Pump
Big Scale Rotary Evaporator Thin Film Evaporator
Centrifugal Evaporator Test Tube Evaporator
Pressured Gas Blowing Concentrator

Evaporator, Vacuum Unit

Organic Synthesizer "ChemiStation" Personal Organic Synthesizer
Process Controller Software for Reaction System
Liquid Phase Organic Synthesizer Solid Phase Organic Synthesizer
Synthesis and Recovery Module Disposable Reaction Tube
Compound Dissolving System Automatic Synthesis Work Station
Centrifugal Evaporator

Organic Synthesizer

Convection Oven Forced Air Flow Oven
Programmable Vacuum Oven
Programmable Electric Furnace Electric Furnace
Low Temp. Incubator Personal Incubator
Incubator Environmental Chamber Illuminated Incubator
Multi Thermo Incubator Light Stability Testing Device
Personal Freezer Freezer Explosion-Proof Freezer.Refrigerator

Oven, Electric Furnace Incubator, Freezer

Water Bath Shaker Programmable Precision Bath
Low Temp. Bath Circulator Program Freezer Low Temp. Bath
Programmable Low Temp. Precision Bath
Crystallized Constant Temp. Circulator Oil Bath with Magnetic Stirrer
Low Temp. Bath with Magnetic Stirrer Dry Block Bath
Immersion Cooler Cold Trap Condenser

Low-Temperature Bath Constant-Temperature Bath Condenser, Trap

Low Temp. Circulator Low Temp. Circulation Bath
Constant Temp. Circulator Water Circulator
Additional Pump

Low and Constant- Temperature Water circulator

Freeze Dryer
Spray Dryer

Freeze Dryer, Spray Dryer

Stirrer Homogenizer
Ultrasonic Processor Magnetic Stirrer
Magnetic Stirrer with Heater
Water Bath Shaker Mixer Shaker
Constant Temp. Chamber Forced Liquid Decay Testing Apparatus
Incubate Shaker Shaker/Incubate Shaker
Vortex Mixer Culture Tube Rotator

Stirrer, Shaker

Peristaltic Pump
Ceramic plunger pump

Peristaltic pump

Droplet Countercurrent Chromatograph
Rotation Locular Countercurrent Chromatograph
Low Pressure Gradient Low and High Pressure Gradient Pump
Delivery Pump Fixed UV Detector Variable Wavelength UV-VIS Detector
RI Detector, RI-UV Detector Fraction Collector Sample Injector
Automatic Rotary and Switching Valve Solvent Degassing Apparatus
Column Oven, Reactor Remote Timer, System Rack

Liquid Chromatograph

Fermentor for Microorganism Process Controller Process Controller
Electrode Aeration Unit, Compressor Gas Mixer, Oxygen Enricher,
Nitrogen Enricher Dry Heated Sterilizer Autoclave Sterilizer
Autoclave Sterilizer Culture Flask Slow Speed Magnetic Stirrer

Culture Microbe and related apparatus

Automatic Water Distillation Apparatus Cartridge Type Water Purifier
Water Purifier Solvent Recycler Cleaning Solvent Recycling Unit
Nitrogen Digestion Unit Mixer Settler Reciprocating Extractor
Ultrasonic Cleaner LED Light Source Cultivate Shelf with LED

Others

Digest Catalogue


Products to support scientific research

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8	Peristaltic pump	P.101
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11	Others Nitrogen digestion Unit for determining nitrogen, Countercurrent Multistage extraction Unit, Reciprocating extractor Unit, Solvent recycler, Deionizer, Ultrasonic Cleansing Unit	P.135

This Digest Catalogue provides only brief description of our major products.

General Catalogue, which includes detailed information of all EYELA products, is also available.

The contents of this catalogue are based on the criteria below unless otherwise specified:

- Specifications are under room temperature 20°C, AC100V, 50Hz, no load.
- Applicable operation temperature range is 5-35°C.
- Dimensions are shown in mm., width x depth x height. Dimensions in the parentheses include the protruded parts.
- Code with 3-tip plug and surface adaptor are equipped with the product (AC100V, under 15A). 3-tip code is attached only for the Single-phase products, which are AC100V, 15A and above, and AC200V. 4-tip cable code is attached only for the three-phase product such as AC200V. The products with  mark in this catalogue do not have any plug, but they are equipped only with code.

Evaporator, Vacuum Unit

1



Rotary Evaporator
N-1000S, V, T
P.2



Evaporator systems
for drainage control
P.12



Microprocessor
controlled Rotary
Evaporator
NE-1001, 1101
NE-2001
P.4



Medium/Large-
scale Rotary
Evaporator
N-11, 12, 12B
N-21, 51, 101
P.14



Aspirator
Cooling Aspirator
A-3S, CA-1111A
AS-2, 3, AT-1B
P.6



Thin Film
Evaporator
MF, F series
P.15



Diaphragm Vacuum Pump
DIVAC series
DTC, DAH, MD series
Oil Rotary Vacuum Pump
GLD, GCD series
P.8



Centrifugal
Evaporator
CVE series
P.16



Solvent Recovery
Unit for Evaporator
DPE series
P.10



Test Tube
Evaporator
TVE series
P.17



Vacuum Controller
for Evaporator
NVC-2000, 2000L
P.11



Pressured Gas
Blowing Concentrator
MGS series
P.18

Rotary Evaporator N-1000S, V, T

N-1000S series Standard
Double spiral type
N-1000S, S-W, S-WB



N-1000S-W

Model	N-1000S	N-1000S-W	N-1000S-WB
Cat. No.	188720	188730	188760
Condenser	Inclined double spiral, cooling area: 0.11m ²		
Sample flask	Pear shaped flask, 1L, ¥29/38		
Receiver flask	Round shaped flask, 1L, Ball joint (S35/20)		
Rotary joint	ID ø18 × 272L ¥29/38		
OD (highest)	670 × 320 × 530(790)	710 × 355 × 530(790)	

- ★ S series-Inclined double spiral type.
- ★ V series-Vertical space-saving type.
- ★ T series-Dewar vessel type suitable for substances with low boiling point.
- ★ Non-bath type which can use existing bath, W series with standard bath and WB series with energy-saving bath are available. Oil bath is an optional accessory.

■ Common specifications (S, V, T series)

Model	S, V, T	S-W, V-W, T-W	S-WB · V-WB · T-WB
	without bath	with bath	with energy-saving bath
Rotation speed	20~180rpm		
Evaporation capacity	Max.25mL/min (water)		
Ultimate vacuum	399.9Pa(3mmHg) or less		
Temp. range	RT+5~90°C		
Accuracy (flask rotating)	±1.5°C		±1.5°C(±3°C for oil)
Temp. control	Microprocessor ON/OFF		Liquid expansion
Temp. setting/display	Digital/min, fig.1°C		Analogue/dial
Heater	1kW(Drum heating) for Water		500W(Drum heating) for Water or Oil
Vacuum seal	Teflon+Teflon, Viton double seal		
Bath dimension	ID230 × bottom 160 × 100H		
Bath material/capacity	SUS304/approx.3L		
Stand base	T-base, 450 × 320		
Service AC outlet	connecting to driving part of main unit (1A)		
Nozzle dimension	OD10		
Jack stroke	110mm+150mm(slide jack+manual slide)		
Input power	35VA	1.035kVA	535VA
Rated power source	AC100V, 50/60Hz/AC115, 60Hz/AC230V, 50/60Hz		



SB-1000 for W series



OSB-1000 for WB series



▶ No heater element in the bath



▶ Smooth up and down by slide jack



Manual extension slide for trap bulb ▶



▶ Adapter to prevent reverse flow (V, T series)

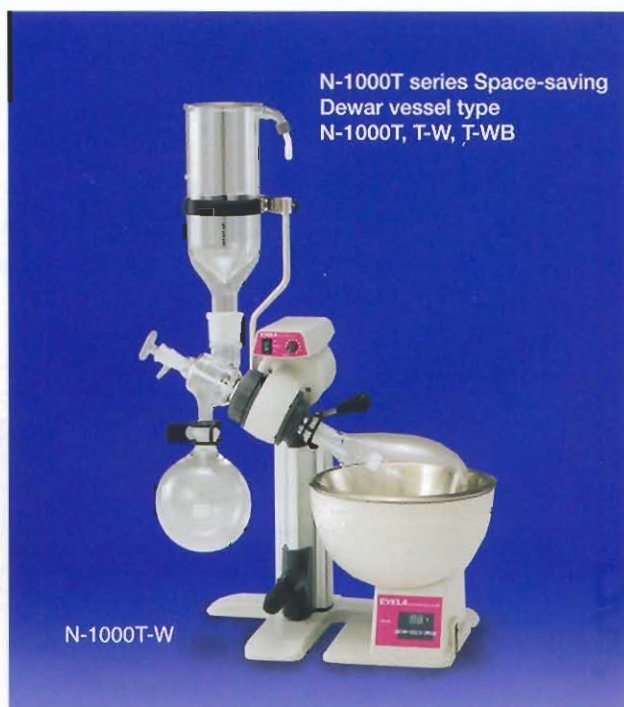
Please visit our website for further information of general catalogue





N-1000V series Space-saving Vertical Double spiral type
N-1000V, V-W, V-WB

N-1000V-W



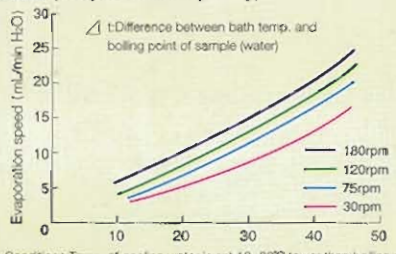
N-1000T series Space-saving Dewar vessel type
N-1000T, T-W, T-WB

N-1000T-W

Model	N-1000V	N-1000V-W	N-1000V-WB
Cat. No.	188740	188750	188770
Condenser	Inclined double spiral, cooling area 0.11m ²		
Sample flask	Pear shaped flask 1L \$29/38		
Receiver flask	Round shaped flask 1L Ball joint (S35/20)		
Rotary joint	ID ϕ 18 × 178mmL \$29/38		
OD (highest)	495 × 320 × 920(1180)	535 × 355 × 920(1180)	

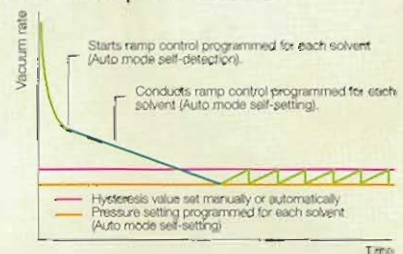
Model	N-1000T	N-1000T-W	N-1000T-WB
Cat. No.	194780	194790	194800
Condenser	Dewar vessel type OD110 × 340H(OD 91 × 230)		
Sample flask	Pear shaped flask 1L \$29/38		
Receiver flask	Round shaped flask 1L Ball joint (S35/20)		
Rotary joint	ID ϕ 18 × 178mmL \$29/38		
OD (highest)	495 × 320 × 920(1180)	535 × 355 × 920(1180)	

■ Data (evaporation capacity)



Conditions: Temp. of cooling water is set 10~20°C lower than boiling point of sample (water), RT 25~27°C, Sample flask is 1L (sample is 500mL)

■ Vacuum ramp program control function (Combined with optional Vacuum Controller NVC-2000)



■ Optional accessories/related products



- Glassware → P.6
- Teflon Seal → P.7
- Heater → P.62
- Vacuum Unit → P.7
- Jack → P.7
- Immersion cooler → P.65

- Low Temperature Circulator → P.68
- Aspirator → P.6 -
- Vacuum Controller → P.11
- Solvent Recovery Unit → P.10
- Examples of system configuration → P.5
- Examples of system recovery system → P.12

Evaporation, Vacuum Unit, Organic Synthesizer, Dean, Electric Furnace, Incubator, Freezer, Low Temperature Bath, Constant Temperature Bath, Condenser, Trap, Low and Constant Temperature Water Circulator, Freeze Dryer, Spray Dryer, Stirrer, Pump, Parasitic, Liquid Chromatograph, Culture Microbe and related apparatus, Others

Microprocessor controlled Rotary Evaporator NE-1001, 1101



★ Auto-vacuum control function controls the unit based on the automatically detected boiling point in response to the drainage regulation and enhances solvent recovery rate significantly.

★ Rotation speed, Bath temperature, Vapor temperature Vacuum rate are controlled by microprocessor. Two modes are available: Auto mode which starts and stops concentration operation automatically and Manual mode which operates under the preset conditions.

Model	NE-1001	NE-1101
Cat. No.	188910	188990
Bath temp. range	RT+5-90°C	RT+5-180°C
Bath temp. accuracy	±1°C (flask rotating, water)	±5°C (flask rotating, silicone oil)
Rotation speed	5-240rpm	5-160rpm
Vapor temp. set range	-20-150°C	
Pressure set range	0-933hPa(0-700Torr/mmHg, 0-933mbar)	
Timer set range	Concentration time 1min-9hr59min, Ramp time 1min-59min	
Auto mode	Auto 1: single solvent, Auto 2: mixed solvent Normal operation (flask rotating bath temp.)	
Manual mode	Fixed-point:	Continuous, Concentration time stop, Vapor temp. stop
	Ramp:	Continuous, Concentration time stop, Vapor temp. stop
Safety feature	Self-diagnosis (Watchdog, Overheat, Heater defect, Motor defect, Bath temp. sensor defect, Vapor temp. sensor defect, Pressure sensor defect, Power failure, Independent overheat protector, Breaker for leakage/excess current)	
Alarm function (warning display)	Overshoot, Bath temp., Pressure, Vapor temp, Motor, Input error	
Compensation function	Bath temp. (±10°C), Vapor temp. (±10°C), Pressure. (±10hPa)	
External output	Diaphragm pump control output (ON-OFF output)	
Overall dimension	565 × 465(530) × 535	
Power source	AC100V 50/60Hz, 1.4kVA	AC100V 50/60Hz, 1.4kVA
Glassware set	Option (SG, VG, CG, TG, RG, UG)	

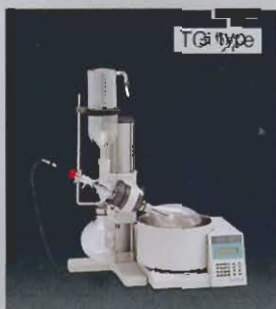
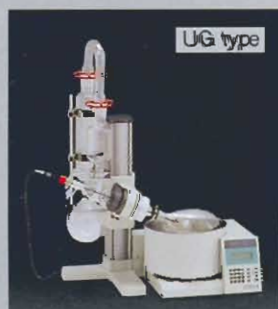
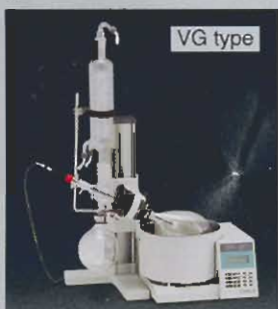
■ Control panel/Display



■ Glassware set for NE-1001, 1101 (optional accessories)

SG Standard inclined type	Cat. No.	182630
VG Vertical type for high boiling point substance	Cat. No.	182640
CG Vertical integrated type for high boiling point substance	Cat. No.	182650
TG Trap type for low boiling point substance	Cat. No.	182660
RF Reflux vertical type	Cat. No.	182670
UG Vertical downward cooling type	Cat. No.	182680

■ 6 types of glassware set options



■ Related products

Rotary Evaporator for measuring dioxin etc.

NE-SD, VD

Sample flask 5L
NE-2001



Rotary Evaporator

Examples of system configuration

Low cost system handling from water to solvents.

Standard System A System Code SYS09073



System requiring only minimum installing space.

Space-saving system System Code SYS09096



For high-boiling-point substance with Oil Bath

Concentration system for high-boiling-point substance System Code SYS09097



For purification and reaction by total reflux operation.

Total reflux purification system System Code SYS09078



For low-boiling-point substance by Cold Trap at -45°C.

Concentration system for low-boiling-point substance System Code SYS09098



2 units installed on both ends of the table

System of 2 units usable at the same time System Code SYS09099



Evaporator, Vacuum Unit
Organic Synthesizer
Over-Booze Furnace, Indicator, Freezer
Low-Temperature Bath, Constant-Temperature Bath, Circulator, Rig
Low and Constant-Temperature Water Circulator
Freeze Dryer, Spray Dryer
Stirrer, Shaker
Pneumatic Pump
Liquid Chromatograph
Culture Microbe and related apparatus
Others



Aspirator A-3S, CA-1112A



- ★ Displacement 19L/min × 2, Water bath type. A-3S
- ★ Double tank structure installing Aspirator tank in the cooling tank enables to reduce pressure and cool at the same time. CA-1111A

- Aspirator A-3S ◆ OD 380W × 260D × 396H
 - Option: Cooling coil CCU(copper) ◆ Cat. No. 119050
 - CCS(SUS) ◆ Cat. No. 119060
 - : Vacuum regulator with gauge Model VG-1 ◆ Cat. No. 119070
- Cooling Aspirator CA-1112A OD 354W × 384D × 1092H ◆
 - Option: Vacuum regulator with gauge Model VG-1 ◆ Cat. No. 119070
- Aspirator connected to faucet AS-2 ◆ Cat. No. 119100
- Metal Aspirator AS-3 ◆ Cat. No. 119110
- Teflon Aspirator AT-1B ◆ Cat. No. 119130

Evaporator, Vacuum Unit
 Organic Synthesizer
 Oven, Electric Furnace, Incubator, Freezer
 Low-temperature Bath, Constant-temperature Bath, Circulator, Temperature Bath, Circulator, Tip
 Low and Constant-temperature Water circulator
 Freeze Dryer, Spray Dryer
 Stirrer, Shaker
 Peristaltic pump
 Liquid Chromatograph
 Culture Microbe and related apparatus
 Others

EYELA's parts to support the efficiency of Evaporator

Parts

Rotary type



Thick type

Length(mm)	Spec.	Cat. No.
272	φ29/38	116580
272	φ24/40	116570
178	φ29/38	116580
178	φ24/40	116590

Standard type

Length(mm)	Spec.	Cat. No.
272	φ29/38	142500※
272	φ24/40	142510
178	φ29/38	142520※
178	φ24/40	142530

※Above-mentioned are standard equipments of Rotary Evaporator.

Transparent joint type

Length(mm)	Spec.	Cat. No.
272	φ29/38	116600
272	φ24/40	116610
178	φ29/38	116620
178	φ24/40	116630

Trap Bulb



Capacity	Spec.	Cat. No.
100mL	φ29 × 29	116700
	φ29 × 24	116710
	φ29 × 19	156700
	φ29 × 15	116720
	φ24 × 24	116730
	φ24 × 19	156710
200mL	φ24 × 15	116740
	φ29 × 29	116750
	φ29 × 24	116760
	φ29 × 19	156680
	φ29 × 15	116770
	φ24 × 24	116780
300mL	φ24 × 19	156690
	φ24 × 15	116790
	φ29 × 29	116800
	φ29 × 24	116810
	φ29 × 19	156650
	φ29 × 15	116820
500mL	φ24 × 24	116830
	φ24 × 19	156660
	φ24 × 15	116840
	φ29 × 29	116850
	φ29 × 24	116860
	φ29 × 19	156610
	φ24 × 24	156630
	φ24 × 19	156640

Sample flask (pear shaped)



Spec. φ29/38

Capacity	Cat. No.
50mL	116140
100mL	116150
200mL	116160
300mL	116170
500mL	116180
1L	116190※
2L	116200

Spec. φ24/40

Capacity	Cat. No.
50mL	116220
100mL	116230
200mL	116240
300mL	116250
500mL	116260
1L	116270
2L	116280

※Above-mentioned are standard equipments of Rotary Evaporator.

Standard type (Ball joint S35/20)

Capacity	Cat. No.
100mL	116300
200mL	116310
300mL	116320
500mL	116330
1L	116340※
2L	116350※

※Above-mentioned are standard equipments of Rotary Evaporator.

Receiver flask with drain cock (Ball joint S35/20)

Capacity	Cat. No.
500mL	116370
1L	116380

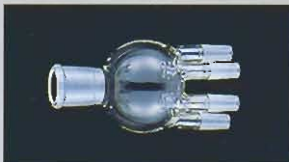
Jacket type receiver flask (Ball joint S35/20)

Capacity	Cat. No.
1L	116390

Receiver flask



Test Tube Adapter



Test tube joint	Joint	Cat. No.
φ15/25	φ29/38	116550
φ15/25	φ24/40	143870

	Spec.	Cat. No.
Test tube	φ15/25(6 pcs/set)	201450

Adapter for different diameter



	Spec.	Cat. No.
For Rotary Joint	φ29 × 24	116870
	φ29 × 19	116880
	φ29 × 15	116890
	φ24 × 29	116900
	φ24 × 19	116910
For Safety Cap	φ24 × 15	116920
	φ29 × 24	116930
	φ29 × 19	116940
	φ29 × 15	116950

Jack EJ model



EJ

EJ-A No.116120
Top panel 150 × 150, height 70 × 250(mm)
EJ-B No.116130
Top panel 200 × 200, height 90 × 320(mm)

Related products to ensure efficient concentration of Evaporator



Low Temperature Circulator P.68



Heater P.62



Vacuum Pump P.8



Vacuum Controller P.11



Solvent Recovery Unit P.10



Immersion Cooler P.64

■ Separable flask



■ Separable cover

Spec.	ID × H(mm)	Cat. No.
¥29/38	50 × 82	116460
¥24/40	50 × 82	116470
¥29/38	75 × 82	116480
¥24/40	75 × 82	116490

■ Separable sample flask

Spec.	ID × H(mm)	Cat. No.
50mL	50 × 60	116400
100mL	50 × 100	116410
200mL	50 × 110	116420
300mL	50 × 125	116430
500mL	75 × 152	116440
1L	75 × 185	116450

■ Separable clamp

Dia(mm)	Capacity(mL)	Cat. No.
50	500 - 300	116500
75	500, 1000	116510

■ Separable seal packing

Dia(mm)	Capacity(mL)	Cat. No.
50	500 - 300	116520
75	500, 1000	116530

■ Vacuum Hose



Spec.	Cat. No.	Q'ty
ID6 × OD15mm	119170	5m
ID12 × OD30mm	119210	5m

■ Cooling Hose set



Tube ID	Cat. No. (2m)	Cat. No. (5m)
9.0mm	112700	174420
15.0mm	143340	174460

■ Bumping free cap(safety cap PAT.)

As simple as to attach to Rotary Joint. Innovative bumping prevention is available by focusing on the principle of bumping. Teflon-made Caps can be used for all sorts of solvents. Please use the suitable adapter for different diameter. (This cap is only for Rotary Joint ¥29).

C-1 (Standard type)

The valve equipped to the top of Cap closes before bumping occurs as a result of a difference in pressure between cooler side and sample flask side, and opens when pressure difference is eliminated.

Cat.No.	116010
Rotary Joint applicable ID	20.2 ± 0.5mm
OD	OD23 × 36L

C-2 (Rocket type)

Applying the steam to the hemisphere part makes inside the flask well-convected and prevents the bumping as a handy way. Suitable for the substance with relatively weak bumping force.

Cat.No.	116020
Rotary Joint applicable ID	20.2 ± 0.5mm
OD	OD23 × 24L

C-3 (Filter type)

Glass filter (G3) mitigates the sudden change in pressure and prevents the bumping. This is also effective in preventing the spread of powder droplets when drying crystal samples etc.

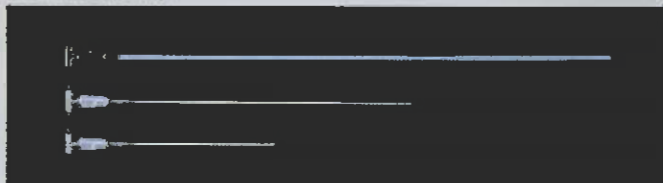
Cat.No.	116030
Rotary Joint applicable ID	20.2 ± 0.5mm
OD	OD23 × 27L

■ Teflon Seal



Product	Cat. No.	Q'ty
Teflon seal	143880	1

■ Glass Capillary



Applicable model	Cat. No.	Spec.
N-1000S, V, T	116540※	¥19/40 Teflon tube
N-1000S	142590	510mm ¥19/40
N-1000V, T	142600	297mm ¥19/40

※ is standard equipment of Rotary Evaporator

■ Three-way Cock



Cat. No.	Q'ty
116960	1

■ Glass stopper



Cat. No.	Q'ty
116970	1



Please read "Instruction Manual" carefully before using the product for your continued safety.

Evaporator
Vacuum Unit

Organic
Synthesizer

Open Electric Furnace,
Incubator, Freezer

Low Temperature Bath,
Constant Temperature Bath,
Condenser, Trap

Low and Constant
Temperature Water

Freezer Dryer,
Spray Dryer

Stirrer,
Shaker

Peristaltic
pump

Parabolic

Liquid
Chromatograph

Culture Microscope and
related apparatus

Others

Diaphragm Vacuum Pump

Excellent chemical-resistance feature offers effective measures for drainage control.

DIVAC series

★ Diaphragm coated with PTFE (Teflon) board, Kalrez® Valves for suction and outlet and Teflon-made Diaphragm Head are corrosion-proof.



DIVAC 0.6L

DIVAC 1.2L

Model	DIVAC 0.6L	DIVAC 1.2L	DIVAC 2.2L
Cat. No.	170650	170660	171550
Displacement (50Hz)	10L/min	20L/min	37L/min
Ultimate vacuum	800Pa(Approx. 6 Torr)		
Material of gas-contact part	Teflon, Kalrez®		
Power source	140VA	180VA	440VA



DTC-21

DTC-60

DAH, DTC series

★ Designed to comply with drainage regulations. Gas-contact part is made from Teflon. Suitable for discharging solvents and reducing pressure. (DTC series)

Model	DAH-60	DTC-21	DTC-41	DTC-60	DTC-120
Cat. No.	119030	188870	188880	188030	192610
Displacement (50/60Hz)	60/72L/min	20/24L/min	40/46L/min	60/70L/min	120/140L/min
Ultimate vacuum	1.2kPa	1.0kPa			
Rotation speed (50/60Hz)	1423/1707rpm	1255/1555rpm	1370/1620rpm	1400/1630rpm	1400/1630rpm
Material of gas-contact part	NRB, Aluminum diecast Teflon				
Power source	500VA	130VA	220/230VA	360/370VA	530/600VA



MD1C

MZ2C

MD, MZ series

★ Achieves 2hPa of ultimate vacuum (MD series). Suitable for pressure reduction and concentration of solvent with high boiling point.

★ Diaphragm vacuum pump with condenser-type motor and with gas-contact part made from Kalrez®, PTFE, PFA, and FFKM.

Model	MD1C	MZ2C	MD4C	MD52C
Cat. No.	198530	198500	198510	198520
Displacement (50/60Hz)	20/23L/min	28/33L/min	50/58L/min	138/148L/min
Ultimate vacuum	2hPa	9hPa	2hPa	
Gas-contact part material	PTFE, PFA, Kalrez®	Kalrez®, PTFE, PFA, FFKM		
Power source	80VA	180VA	200VA (including cooling fan)	370VA

Hybrid vacuum pump by combining oil rotary type and diaphragm type. Achieves $1 \times 10^{-2} \times 10^{-3}$ hPa Cat. No.198560

RC5 model

Small-sized Oil Rotary Vacuum Pump

High vacuum, suitable for Vacuum Oven and Freeze Dryer.

GLD · GCD series

★ Safety features are equipped such as Reflux prevention mechanism, Gas-ballast valve, Forced oiling system, Protection circuit against excess current, and Forced cooling system.

★ For GCD model, special treatment "Clean S" is made on individual parts.



Model	GLD-051	GLD-101N	GLD-136N	GLD-166N	GLD-201BN
Cat. No.	190840	189080	200540	189130	200560
Displacement (50/60Hz)	50/60L/min	100/120L/min	135/162L/min	165/200L/min	200/240L/min
Ultimate vacuum	6.7 × 10 ⁻² Pa				
Motor Output	200W	400W	400W	550W	550W
Safety function	Thermal protector, Reflux prevention valve, Oil filter				
Oil to be used (SMR type)	500 ~ 800mL	1100mL	1000mL	1200mL	1100mL
Suction tube dia.	Hose OD 18mm		Hose OD 22mm		
Ambient temp.	7 ~ 40°C				
OD (mm)	150(18.5) × 394(99) × 248.7	170 × 466(47.9) × 256.7	170 × 476(48.8) × 256.5	170 × 514.5(52.3.5) × 256.7	170 × 507(51.6) × 256.5
Net weight	13.9kg	24.7kg	26.0kg	28.3kg	28.0kg
Power source	5.6/4.8A	7.7/6.1A	7.5/6.5A	7.8/7.2A	9.0/8.4A



■ 200V three phase model

Model	GLD-166N	GLD-201AN
Cat. No.	189120	200550

■ Clean S treatment model

Model	GCD-051X	GCD-136XN	GCD-201XN
Cat. No.	190850	189160	189190

■ Clean S treatment 200V three phase

Model	GCD-136XN	GCD-201XN
Cat. No.	189170	189180

Oil filtration cassette makes it easy to change oil.

GCD-XF, XNF model

GCD-051XF	50/60L/min	Cat. No. 191080
GCD-136XNF	135/162L/min	Cat. No. 191090
GCD-201XNF	200/240L/min	Cat. No. 191100

※2 cassettes are equipped as standard. Spare cassette is available (Cat. No.192260)

Related products

■ Oil Mist Trap OMS, OMT, OMI, OMC type

■ Oil for pump

Applicable pump	Oil Model	Capacity	Cat. No.
GLD series	SMR-100	500mL × 2	118700
		4L	118710
		18L	118720
GLD series	SO-M	1L	118730
		4L	118740

■ Vacuum hose (ID 6, 9, 12, 18mm, 5m length)

■ Vacuum hose adapter

Type	Diameter	Cat. No.
Adapter A	OD 22 × OD 17mm	119240
Adapter B	OD 17 × OD 13mm	119250
Adapter C	OD 17 × OD 10mm	119260
Adapter D	OD 22 × OD 13mm	119270
Adapter E	OD 13 × OD 10mm	119280
Adapter F	OD 22 × OD 10mm	191660



Please read 'Instruction Manual' carefully before using the product for your continued safety.

Solvent Recovery Unit for Evaporator

DPE series

Evaporator,
Vacuum UnitOrganic
SynthesizerOven, Electric Furnace,
Incubator, FreezerLow-Temperature Bath,
Constant-Temperature Bath,
Condenser, TrapLow and Constant
Temperature Water
CirculatorFreeze Dryer,
Spray DryerStirrer,
ShakerPeristaltic
PumpLiquid
ChromatographCulture Media and
related apparatus

Others



Please visit our website for further information of general catalogue



DPE-1110 all-in-one unit to conduct self-control.
DPE-1210 selectable configuration and upgrade are available.
DPE-2110 controls 2 evaporators with large displacement capacity.

- ★ Vacuum Controller, Condenser, Waste liquid collecting trap (bottle), Recovery flask and Exhaust gas absorber cartridge are compactly gathered in one unit.
- ★ Complicated pressure setting is not necessary. Normal control allows to change the set pressure value anytime. Auto control starts the control corresponding with Vapor temperature (vapor sensor is an optional accessory). Program control memorizes the proper vacuum rate of 10 versions of typical regulated solvents.
- ★ Excellent corrosion resistance is achieved by using Solenoid valve of Teflon diaphragm and sensor which is anti-corrosive to organic solvents.

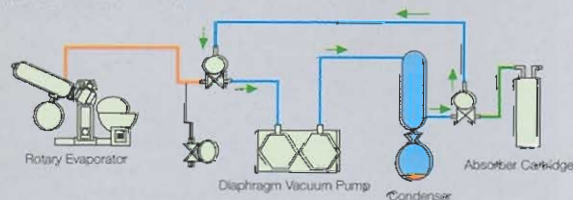
Model	DPE-1210B	DPE-1210C	DPE-1110	DPE-2110
Cat. No.	197010	197020	196970	196980
Vacuum Controller	●	●	●	●
Condenser	—	●	●	●
Waste liquid collecting bottle	●	●	●	●
Exhaust gas absorber cartridge	—	—	●	●
Collecting flask	—	●	●	●
Pressure measurement range	0-800mmHg, 0-1065hPa/mbar			
Control mode	Fixed-point, Ramp, Auto, Combination program			
Display (graphic)	Display the mode, Pressure setting, Vapor measured temp. (option) at the same time			
Pressure setting range	fixed-point control 1-760mmHg, 1-1013hPa/mbar			
	ramp control 1-700mmHg, 1-933hPa/mbar			
Hysteresis setting range	fixed-point control Auto or 1-30mmHg · hPa · mbar			
	ramp control Auto or 1-30%			
Overall dimension	160 × 350 × 618	160 × 350 × 691	198(200) × 80 × 485(555), 810 when pump base is set.	
Power source	AC100V, 50/60Hz, 100VA (pump is not included)			

★ Diaphragm vacuum pump is an optional accessory.

Trap type without vacuum control

DPE-1210A

■ Closed refresh system of Diaphragm Pump and Solenoid Valve (DPE-1110, 2110)



Closed System is introduced: a function of collecting vapor by circulating in Condenser when remained vapor in Diaphragm pump and tubing are automatically released. This improves the durability of pump, sensor, and solenoid valve as well as contributes to protection of tubing and longer life for absorber.

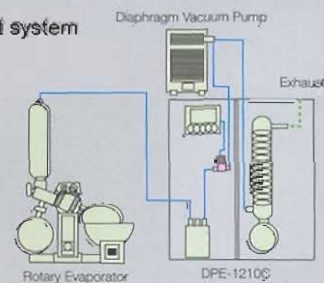
■ Related products

Diaphragm Vacuum Pump which elicits better performance of Solvent Recovery Unit

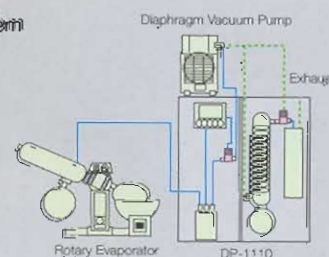
DIVAC series
DTC series
MD-1C series
→ P.8

■ Combination component system (for 1 or 2 Evaporators)

- Vacuum Line
- Exhaust Line
- DPE model
- Solenoid Valve (CV-1)



■ All-in-one unit, Full System (for one Evaporator)



Vacuum Controller for Evaporator

NVC-2000, 2000L



NVC-2000



Evaporator mounting plate

This is necessary to attach to Evaporator.

N-NVC3 (for N-1000 model) Cat. No. 189310



Provides excellent control functions.

Connecting this unit to Evaporator improves significantly the recovery rate of regulated solvents such as dichloromethane, benzene, or trihalomethane.

- ★ Proper vacuum rate of 10 typical regulated solvents are memorized. Selecting the type of solvent and pressing start key enable to automatically adjust to the proper vacuum rate.
- ★ 2 displays: numerical indication of pressure and graph indication to show the ongoing status of controlling.
- ★ Set pressure value can be changed anytime, regardless the operation status (run/stop) while checking the vacuum condition.
- ★ Adjusting the vapor temperature to the room temperature at start of operation enables to prevent the bumping of sample solvent automatically and to select the proper vacuum rate automatically.
- ★ NVC-2000L is suitable for large-sized Evaporator/Vacuum unit.

Model	NVC-2000	NVC-2000L
Cat. No.	195200	201630
Pressure measurement range	0-800mmHg, 0-1066hPa/mbar	
Pressure setting range	Normal control	1-760mmHg, 1-1013hPa/mbar(fixed-point)
	Auto control	Self-detect, self-set
	Program control	Programmed for each typical solvent
Hysteresis Setting range	Step program control	0-air pressure mmHg, 0-air pressure hPa/mbar(fixed-point/ramp control)
	Fixed-point control	Auto or 1-30mmHg/hPa/mbar
Time setting range	Ramp control	Auto or 1-30%
	Pressure control mode	Ramp: 1-999min, Step: 0-999min
Display	Fixed-point, Auto, Ramp, Step program	
Auto Leak function	Display of measured pressure value, set pressure value, temp.(option)at the same time	
Holding function	Automatic vacuum release at end of control (manual release at the end of control is selectable.)	
Tubing material	Able to hold at selected vacuum rate in ramp control excluding Auto mode	
Nozzle diameter	10mm	22mm
Teflon solenoid valve	Option	Included
Diaphragm pump output	PPS, PP, Teflon	
Power source	AC outlet	AC outlet
	AC100V, 50/60Hz, 100VA	AC100V, 50/60Hz, 300VA

■ NORMAL (fixed-point control) mode

Mode	Display
NORMAL	Standby
PU	1012 hPa
Set Press	85 hPa
mode	↑ ↓ disp

■ PROGRAM (ramp control) mode

Mode	Display
PROGRAM	Standby
PU	1012 hPa
Program Name	[06]
	& Hexane
mode	↑ ↓ disp

■ Option

Teflon solenoid valve, Vapor temp. sensor

Model	Cat. No.	Specifications
Solenoid valve	CV-1	for NVC-2000
	CV-2	
Temperature sensor	185170	for N-1000S series
	185180	for N-1000V, 1000T series
Capillary for vapor sensor	187830	for N-1000S series

■ Data

Recovery rate (program mode)

Solvent	Vacuum time	Recovery amount	Recovery rate
Diethyl ether	8min 28sec	493.5g	98.70%
Dichloromethane	8min 22sec	487.0g	97.40%
Acetone	13min 48sec	497.0g	99.40%
Dichloroethane	10min 34sec	497.5g	99.50%
Chloroform	8min 49sec	495.2g	98.98%
Hexane	9min 27sec	496.0g	99.20%
Trichloroethane	9min 5sec	495.2g	99.04%
Ethyl acetate	11min 50sec	493.0g	98.60%
Benzene	10min 43sec	497.3g	99.46%
Toluene	13min 42sec	496.9g	99.78%

※ Recovery rate is calculated by recovery amount(g) in the receiver flask when 500g of sample is placed in 1L sample flask



Please read "Instruction Manual" carefully before using the product for your continued safety.

Examples of system composition for drainage control measures

A wide variety of systems selectable depending on the solvents and equipment you will use and the experiment environment.



System 1 System Code SYS09066

Increases recovery rate by using Recirculating Chiller

Main Component Units

Rotary Evaporator N-1000S-W
 Recirculating Chiller CCA-1110
 Aspirator A-3S
 Vacuum Regulator with Gauge VG-1
 Cooling Coil for Tank CCS

Data	Cooling water temp		
	20°C	10°C	
Sample: Chloroform	Evaporation time	7min 25sec	6min 14sec
Q'ty: 250g	Vacuum adjustment	N/A	N/A
Bath temp: 40°C	Vacuum rate	Approx.180mmHg	Approx.120mmHg
	Recovery rate	79.9%	93.2%
	Unrecovered Q'ty	50.3g	17g

Recovery rate
 with tap water → with Cooling water
79.9% → 93.2%



System 2 System Code SYS09067

By using Diaphragm Vacuum Pump instead of Aspirator, drainage is not necessary

Main Component Units

Rotary Evaporator N-1000S-W
 Recirculating Chiller CCA-1110
 Diaphragm Vacuum Pump DTC-21

Data	Cooling water temp		
	10°C	0°C	
Sample: Chloroform	Evaporation time	5min 51sec	5min 14sec
Q'ty: 250g	Vacuum adjustment	N/A	N/A
Bath temp: 40°C	Vacuum rate	Approx.120mmHg	Approx.90mmHg
	Recovery rate	91.8%	95.0%
	Unrecovered Q'ty	20.5g	12.5g

Recovery rate
 Using Diaphragm pump instead of Aspirator decreases the electrical charge significantly.



System 3 System Code SYS09092

Further trapping of exhaust air from Diaphragm Vacuum Pump

Main Component Units

Rotary Evaporator N-1000S-W
 Recirculating Chiller CCA-1110
 Solvent Recovery Unit DPE-1210A
 Diaphragm Vacuum Pump DIVAC 1.2L
 Needle Valve with Vacuum Gauge VG-10

Data	Cooling water temp		
	10°C	0°C	
Sample: Chloroform	Evaporation time	5min 51sec	5min 8sec
Q'ty: 250g	Vacuum adjustment	N/A	N/A
Bath temp: 40°C	Vacuum rate	Approx.120mmHg	Approx.90mmHg
	Recovery rate of receiver flask	91.5%	94.6%
	Total recovery rate	97.5%	97.9%
	Unrecovered Q'ty	6.3g	5.9g

Recovery rate
 By using Solvent Recovery Unit DPE-1210A
93.2% → 97.5%



Circulating Chiller

P.68

P.7

Aspirator

Refrigerated Cold Trap

P.66

System 4 System Code SYS09093



Enhances recovery efficiency by controlling proper vacuum rate for each sample.

Main Component Units

Rotary Evaporator N-1000S-W
 Low Temperature Circulator CCA-1110
 Vacuum Controller NVC-2000
 Solenoid Valve CV-1
 Diaphragm Vacuum Pump DIVAC 1.2L

Data	Cooling water temp	
	10°C	0°C
Sample: Chloroform	Evaporation time 6min 31sec	5min 39sec
Q'ty: 250g	Vacuum adjustment Available	Available
Bath temp: 40°C	Vacuum rate 160mmHg	140mmHg
	Recovery rate of receiver flask 97.0%	97.9%
	Unrecovered Q'ty 7.5g	5.3g

Recovery rate
 No vacuum controlled 93.2% → Proper vacuum rate 97.0%

System 5 System Code SYS09094



Traps exhaust air and conducts vacuum control

Main Component Units

Rotary Evaporator N-1000S-W
 Low Temperature Circulator CCA-1110
 Solvent Recovery Unit DPE-1210C
 Diaphragm Vacuum Pump DTC-21

Data	Cooling water temp	
	10°C	0°C
Sample: Chloroform	Evaporation time 6min 35sec	5min 39sec
Q'ty: 250g	Vacuum adjustment Available	Available
Bath temp: 40°C	Vacuum rate 160mmHg	140mmHg
	Recovery rate of receiver flask 97.1%	97.8%
	Total recovery rate 98.0%	98.3%
	Unrecovered Q'ty 5.0g	4.5g

Recovery rate
 No trapping exhaust air 97.0% → Trapping exhaust air 98.0%

System 6 System Code SYS09095



Enhances recovery efficiency and traps the exhaust air. Also shuts out the smelled components.

Main Component Units

Rotary Evaporator N-1000S-W
 Low Temperature Circulator CCA-1110
 Solvent Recovery Unit DPE-1110
 Diaphragm Vacuum Pump DIVAC 1.2L

Data	Cooling water temp	
	10°C	0°C
Sample: Chloroform	Evaporation time 6min 34sec	5min 46sec
Q'ty: 250g	Vacuum adjustment Available	Available
Bath temp: 40°C	Vacuum rate 160mmHg	140mmHg
	Recovery rate of receiver flask 97.1%	97.7%
	Total recovery rate 98.7%	98.6%
	Unrecovered Q'ty 3.3g	3.5g

Exhaust gas amount in the air
 Closed refresh system achieves high recovery rate.
 without Absorber more than 400ppm → with Absorber less than 40ppm



Please read "Instruction Manual" carefully before using the product for your continued safety.

Middle and large sized Rotary Evaporator 10L, 20L



Control panel (separate type) N-21NS(standard type)

★10 ~ 100L series. Suitable for wide range of applications from mass processing in the laboratory to pilot plant and small-scale production

	Model	Cat. No.
10L	10L standard model	N-11 116980
	Drain Valve is equipped as standard	N-12 144440
	Equipped with Oil Bath	N-12B 117000
20L	20L standard model	N-21 117130
	Explosion-proof	N-21d 117220
	Equipped with Oil Bath	N-21B 117190
50L	50L standard model	N-51 117140
	Explosion-proof	N-51d 117230
	Equipped with Oil Bath	N-51B 117200
100L	100L standard model	N-101 117150
	Explosion-proof	N-101d 117240
	Equipped with Oil Bath	N-101B 117210

Newly designed 20L type. Control panel can be placed separately. Reasonable cost.

N-21NS

Model	N-21NS
Cat. No.	195580
Heater	6kW(for temp. control 1, 3, 4, 6kW)
Sample flask	20L (Joint dia 160mm)
Receiver flask	10L
Overall dimension	1300 × 500 × 2090
Power Source	AC200V, three phase, 50/60Hz, 6.5kVA

※N-21NS is equipped with Shower Pump.

Please visit our website for further information of general catalogue



■A wide variety of system compositions are available by combining various related products

10L Wide Cover System System Code SYS09101



20L Standard System System Code SYS09104



50L Explosion-proof system System Code SYS09022



Low Temperature Circulator

➔ P.08

Vacuum unit

➔ P.8

Vacuum Controller

➔ P.11

Refrigerated Cold Trap

➔ P.66

Thin Film Evaporator

MF, F series



MF-10A



F-150



Most suitable for concentration of bumping or foaming substance or heat denature substance.

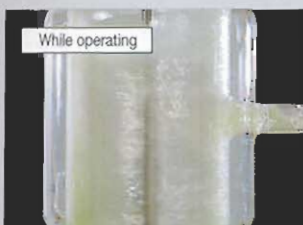
- ★ Suitable for sample subject to degradation by heat since heating time is short.
- ★ Heat source can be provided by existing steam or constant temp. circulator. (F-150, 200)

Model	MF-10A	F-70	F-150	F-200
Cat. No.	117440	117590	117700	117710
Rotation speed range(50/60Hz)	140~1200 rpm	140~1300 rpm	180~1800 rpm	
Evaporation capacity	1.14L/h(hot water)	1.5L/h(hot water)	5.28L/h(hot water) 20L/h(steam)	12L/h(hot water) 40L/h(steam)
Vacuum rate in operation	Vacuum pump capacity+133.3Pa	2.5×10^3 Pa (hot water)	3.3×10^3 Pa(hot water) 8×10^3 Pa(steam)	2.7×10^3 Pa(hot water) 6×10^3 Pa(steam)
Rotation axis seal	Vacuum seal	Magnet coupling	mechanical seal	
Evaporation tube	Glass jacket 0.04m ³	Glass jacket 0.05m ³	SUS jacket 0.125m ³	SUS jacket 0.25m ³
Condenser	Double spiral 0.3m ³	Triple spiral 0.5m ³	Triple spiral 1.33m ³	Multi-spiral 3.0m ³
Receiver flask	Concentrated liquid	3L	10L	20L
(w/drain cock)	Evaporated liquid	1L	10L	20L
Sample filling method	Solenoid valve ON-OFF by needle valve and timer set	Needle valve(Solenoid valve ON-OFF-option)	Needle valve with flow meter	
Overall dimension	550(625) × 400 × 1416	620 × 500 × 1970	1150 × 600 × 2760	1400 × 900 × 3050
Power source	AC100V, 50/60Hz, 150VA	AC100V, 50/60Hz, 200VA	AC200V, three phase, 50/60Hz, 3.2kVA	

1L filling type	MF-10B	117450
1L ~ 180°C high temp. type	MF-10C	117460
3L ~ 180°C high temp. type	F-70SJ	144380



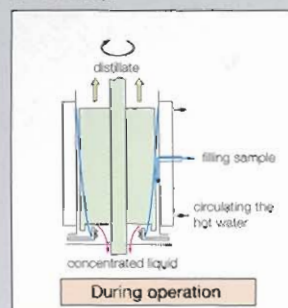
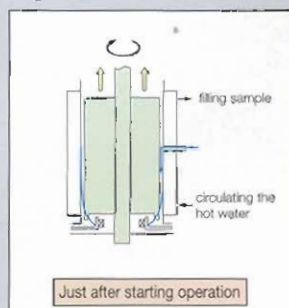
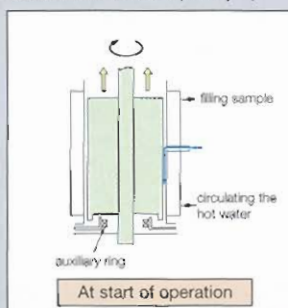
While not operating



While operating

■ Thin Film Evaporation

- Forms uniform thin film on the evaporation area by centrifugal action and stirring effect, enabling to concentrate the foaming solvents or high-viscous solvent.
- Needs short time for heating so that sample can be concentrated without being much degraded by heat.
- Can increase the rotation speed of propellers in order to raise the concentration ratio.
- Can remove the liquid by opening/closing cock and concentrate the sample continuously.



Centrifugal Evaporator CVE series



Please visit our website for further information of general catalogue



Ranging from Compact sized type to Acid and Organic solvent handling type.

Compact-type for 1.5mL microtube suitable for concentration and drying after ethanol precipitation.

CVE-1000

Cat. No.187430

Diaphragm Vacuum Pump built-in type suitable for solvent removal.

CVE-2000

Cat. No.188810

Can be used for low-temperature concentrating of biochemical substances.

CVE-200D

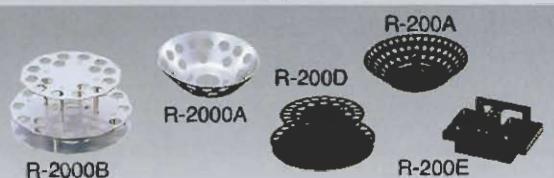
Cat. No.117740

Can be used for TFA, DMF, and DMSO suitable for concentrating synthetic sample of combinatorial chemistry and removing the solvents.

CVE-3100

Cat. No.188820

Optional accessories (Rotors)



- For CVE-2000 Rotor for 24 microtubes setting
Rotor for 16 test tubes setting (3 types)
- For CVE-200D Rotor for 96 microtubes setting
Rotor for 36/48 test tubes setting (3 types)
- For CVE-3100 Rotor for 2 Deep-well plates setting
Rotor for 96 microtubes setting
Rotor for 48 test tubes setting (3 types)
Rotor for 10 vials(50mL) setting
Rotor for 12 centrifuge tubes for combinatorial chemistry
Rotor for 2 Deep-well plates

※CVE-1000 includes the rotor for 1.5mL tube × 12 as a standard accessory.

Characteristics of CVE series

Model	Corrosion-resistance of chamber				Rotor material (surface treatment)	Vacuum pump	Lid material
	Water	Alcohol	Acid	Organic solvent			
CVE-1000	○	○	×	×	Aluminum(-)	Option	Acryl
CVE-2000	○	○	△	○	Aluminum (Alumite)	Built-in	PVC
CVE-200D	○	○	△	△	Aluminum(anticorrosion treatment)	Option	Acryl
CVE-3100	○	○	○	○	SUS (Teflon)	Option	Glass+PVC

Capacity and Temperature range of CVE series

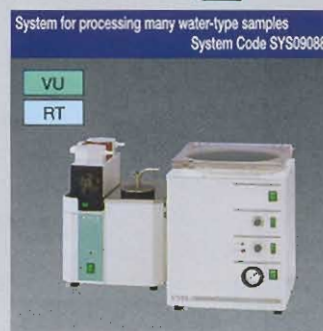
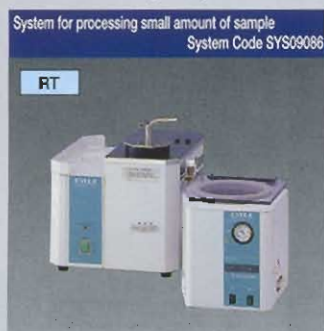
Model	No. of tubes to be handled		Temperature control range (°C)			
	Test tube (Max. dia)	Microtube	0	RT+5°C	50	100
CVE-1000	—	12				
CVE-2000	16	24				
CVE-200D	36	96	15°C			
CVE-3100	48	96				

※ — to set 15°C - RT requires Recirculating chiller.

Applicable pumps

Model	DIVAC			DTC		MD/C	GLD	GCD
	0.6L	1.2L	2.2L	-21	-41	○	-051	-051X
CVE-1000	○					○		
CVE-2000								
CVE-200D		○		○		○	○	○
CVE-3100		○	○	○		○	○	○

A wide variety of system configuration is available by combining various related products. (VU) shows main component unit.)



- VU** Vacuum unit
→ P.8
- VC** Vacuum Controller
→ P.11
- RT** Refrigerated Trap Unit
→ P.66

Test Tube Evaporator

TVE-1000, 2000



Vibration effect controls bumping.
Heating hood prevents concentration of vapor.
Contamination-conscious and detailed design.

- ★ By vibration action the sample is turned into the vortex condition, which increases the evaporation area and mixes the solvent hard. Efficient concentration is realized with controlling the bumping.
- ★ Glass trap has the structure which does not allow the concentrated solvent or sample at bumping to reflux into the test tube. Therefore contamination of the sample is controlled.
- ★ Simultaneous vacuum of test tubes is available simply by matching the joint of the tubes (transparent joint) of TVE-2000 series or pressing the manifold onto the test tubes of TVE-1000.

Model		TVE-1000	TVE-2000
Cat. No.		117910	117920
Rotation speed range		100-1200rpm(50/60Hz)Variable speed	
Ultimate vacuum		1.33 × 10 ³ Pa (10mmHg) (Aspirator used, water temp.8°C)	
Temperature range		RT + 5-60°C	
Temperature accuracy		± 0.1-0.2°C	
Temp. range in Hood		RT + 5-65°C	
Test tube	Attachable no.	8	Specific test tube 32(8 × 4)
	Standard equipment	OD 15mm × 150mm	Specific tube OD16.5mm × 10mm §12/12
	Option	OD 12, 16.5, 18(mm) OD 16.5mm §12/12	—
Material of solvent-contact part		Hard glass	
Overall dimension		220(322) × 320 × 450	440(524) × 390 × 345
Power source		AC100V 50/60Hz, 850VA	AC100V 50/60Hz, 1.1kVA

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TVE-1000

TVE-2000

■ Data

■ Water evaporation by combining TVE-1000 and Cooling Aspirator

Sample (b.p.100°C)	Evaporation conditions (5mL × 8tubes=40mL)			Performance	
	Bath temp. (°C)	Hot air temp. (°C)	Vacuum rate (mmHg)	Evaporating time (min)	Evaporating speed (mL/min)
Water	40	50	26	14.1	2.84
Water	35	45	20	17.7	2.26
Water	30	40	20	24.0	1.67
Water	25	35	16	35.7	1.12

※ Sample is put into ø15 × 150 test tubes and 5.0mL × 8 sample are used.
 ※ Cooling Aspirator is used for vacuum operation (4 - 6°C).
 ※ Degassing operation shall be conducted under 100mmHg for 3 to 5 minutes.

■ Water evaporation by combining TVE-2000 and Cooling Aspirator

Sample (b.p.100°C)	Evaporation conditions (2.5mL × 32tubes=80mL)			Performance	
	Bath temp. (°C)	Hot air temp. (°C)	Vacuum rate (mmHg)	Evaporating time (min)	Evaporating speed (mL/min)
Water	40	50	40	20	4.0
Water	35	45	34	25	3.2
Water	30	40	25	30	2.7
Water	25	35	20	52	1.5

※ Sample is put into ø16.5 test tubes and 2.5mL × 32 sample are used.
 ※ Cooling Aspirator is used for vacuum operation (4 - 6°C).
 ※ Degassing operation shall be conducted under 100mmHg for 3 - 5 minutes.

■ A wide variety of system configuration is available by combining various related products. (VU shows main component unit.)

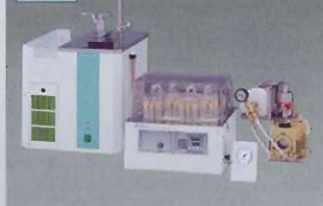
System for high-speed concentration of water-type samples
System Code SYS09105

VC AS



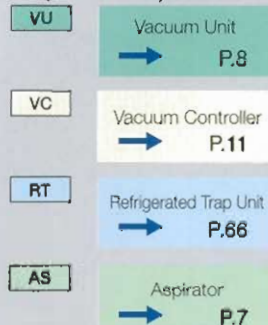
System for short-time processing of all kinds of samples
System Code SYS09083

VU VC
RT



System for recovering vapor
System Code SYS09106

VU RT



Please read "Instruction Manual" carefully before using the product for your continued safety.

Pressure Gas Blowing Concentrator

MGS series MGS-1000, 2000, 2100



Temperature range

MGS-1000
Peltier element
4.0 ~ 90.0°C

MGS-2000, 2100
Warming by heater
RT+5 ~ 200°C

- ★ Good-heat-conductance characteristic of Aluminum block allows to warm and control the temperature promptly as well as uniformly. Blowing the pressured inert gas prevents the oxidation of samples.
- ★ Inert gas is blown to individual tube without wasting (PAT.P)
- ★ Suitable for removing the low-boiling point solvent which is substituted for the extract of small amount of high-boiling point solvent.

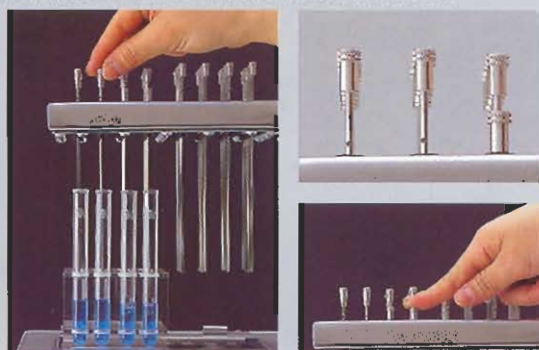
Model	MGS-1000	MGS-2000	MGS-2100
Temperature range	4.0~90.0°C	RT+5~200°C	
Temperature accuracy	± 0.1°C	± 0.1~0.4°C	
Applicable aluminum block	For microtube: dia.8mm, 11mm For test tube: dia.12mm	For microtube: dia. 8mm, 11mm For test tube: dia. 12, 15, 16.5, 18, 21, 24, 25, 30mm	
No. of block	1	1	2
Manifold	125 × 100 × 22, SUS304	180 × 125 × 22, SUS304	
Blowing nozzle	ID 1.69 × 160mmL, SUS304	ID 1.69 × 160mmL, SUS304	
Overall dimension	170(272) × 360(377) × 275(618)	170(272) × 293 × 124(495)	225(327) × 293 × 124(495)
Power source	AC100V, 50/60Hz, 120VA	AC100V, 50/60Hz, 190VA	AC100V, 50/60Hz, 330VA

Control panel

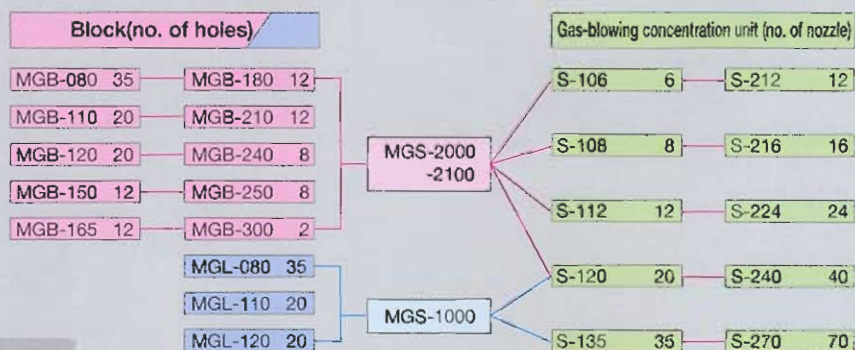


Gas blowing to individual tube

Picking up a needle stops the gas blowing from its needle.



Combination of the main unit and gas blowing concentration unit



Please visit our website for further information of general catalogue





**Personal Organic Synthesizer
ChemiStation overview
ChemiStation
PPS series**
P.20



**LabAuto Controller
LA-1**
P.31



**ChemiStation
PPW series**
P.22



**Personal Organic Synthesizer
24 Position Liquid Phase
Organic Synthesizer
CCL-2400
4 Station Liquid Phase
Organic Synthesizer
CCL-4S**
P.32



**ChemiStation
PPV series**
P.23



**Personal Organic Synthesizer
CCS-600, 1200
CCS-150M**
P.33



**Personal Organic Synthesizer
Zodiac
CCX**
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**Other Synthesizer
Systems**
P.34



**Process Controller
for synthesis
system
EPC-2000**
P.28



**Related products
for Synthesizer
system composition**
P.36



**Auto-synthesizer
software
LabWorld Soft**
P.30



**Concentration and
extraction units for
synthesis**
P.42

EYELA Combinatorial Technology

Development of new useful material

Reviews of optimum reaction conditions, Development of new reaction and new catalysts

Synthesis of sample for evaluation

Examining the conditions for plant production
Small-lot production
Reviews of the automation of the plant

Creates new compounds based on combinatorial chemistry technology, seeks useful compounds, and synthesizes various kinds of compounds.
In order to synthesize useful substance, develops new reactions and new catalysts and reviews the optimum conditions for reaction such as reagent, temperature or conditions.

For evaluation of purified compound, synthesizes the required amount of sample. Synthesizes raw material in order to develop new materials.

Develops the precision synthesis required for plant production, measures and controls individual conditions.
Starts small-lot production.
Reviews the system and process controller and software for automatic synthesis.

Development of new useful substance
Examining of optimum conditions for reaction

Synthesizer for small amount sample

Personal Organic Synthesizer
Zodiac **CGX-1000** → P.26

3~15mL

Temp. Reflux
Stirring Gas replacement



Personal Organic Synthesizer
ChemStation
PPS · PPW → P.21 · 22

1~30mL

Temp. Reflux
Stirring Gas replacement



PPS

PPW



Personal Organic Synthesizer
CCS → P.33

2~5mL

Temp. Gas replacement
Stirring

Sample synthesis for evaluation

Units for Scale-up

Personal Organic Synthesizer
ChemStation **PPV** → P.23

30~150mL

Temp. Reflux
Stirring Gas replacement



Low Temp. Bath with
Magnetic Stirrer
PSL-1400, 1800

1~180mL → P.34

Temp. Reflux
Stirring Gas replacement



Powerful Magnetic Stirrer
RCX → P.95

1~1800mL

Temp. Reflux
Stirring Gas replacement



Small-lot production
Examining of conditions of plant production

Synthesizer for large amount sample

Stirrer
MAZELA **NZ, Z series**
150mL~ → P.86 · 87

Stirring



Water Bath with Magnetic Stirrer
Water Bath **PS** → P.63

1~1200mL

Temp. Reflux
Stirring Gas replacement



Low Temp. Water Bath with
Magnetic Stirrer **PSL-1000** → P.63

100~1200mL

Temp. Reflux
Stirring Gas replacement



Examining for automation

Controllers for automated research

Process Controller
EPC-2000
→ P.28



Stirrer
MAZELA **Z series**
→ P.86



LabAuto
Controller
LA-1
→ P.31



LabWorldSoft
→ P.30



Personal Organic Synthesizer ChemiStation™

PPS-1510, 2510

PPS



PPS-2510



Examining 5 different temperature conditions individually.
-10 ~ 150°C

ChemiStation™ is 5 position organic synthesizer which is designed to improve the efficiency of process development experiments such as development of new reaction and new catalysts, examination of reaction conditions, and synthesis of intermediate.

Individual setting of temperature for each test tube enables examining 5 types of temperature condition simultaneously, allowing to achieve the effective synthesis route.

This unit is also equipped with reflux and gas replacement functions required for organic synthesis in addition to temperature control and stirring. Synthesis scale can be changed by changing the aluminum blocks.

There is such an option available for post-processing as a set of operations for liquid-liquid extraction and concentration without removing the containers.

Model	PPS-1510	PPS-2510
Cat. No.	198570	198580
Synthesis scale	1 ~ 4mL × 5	10 ~ 30mL × 5
Stirring	Ferromagnetic stirrer	
Temperature range	-10~150°C(5 × different temp. control)*	
Stirring speed	200 ~ 1600rpm(water:4mL)	250 ~ 1300rpm(water:30mL)
Reflux	Highly efficient reflux is possible.**	
Reagent adding	Pipette, syringe, drop funnel under inert condition	
Overall dimension	465 × 310 × 415	465 × 310 × 465
Input/Rated power source	AC100V, 50/60Hz, 900VA	

*For the temperature control and reflux at the temperature below room temperature, connecting with Low Temperature Circulator is necessary.

Reflux



Forced cooling system by refrigerant enables the strong reflux of reaction liquid at almost to 100% of recovery rate.

Refrigerated circulation



Troublesome attaching/detaching of cooling hose is not necessary. It is done in a second by attaching/detaching cooling cartridge.

Parts, consumables

Description	Model	Cat. No.
Cross stirring bar for ø15 (10 pcs)	ST-1X	191840
Cross stirring bar for ø30 (10 pcs)	ST-2X	191850
Three-way cock (10 pcs)	QK-3P	191920
Cooling hose set (silicon ø9 × 1m, 2 pcs)	CT-1S	194050
Cooling hose set (silicon ø9 × 2m, 2 pcs)	CT-2S	201830
Test tube ø15 (50 pcs)	—	195670
Test tube ø30 (25 pcs)	—	195690
Septum (silicon rubber 10 pcs)	—	195710

Adding of reagent



Adding by septum or pipette is available. Reagent can be added under inert condition. Adding the solid reagent under inert gas flow is also possible. Products with taper joint such as dropping funnels can be used. (Taper joint: 15/25)

Test tubes (1 ~ 5 tubes are attachable.)



Test tubes are individually detachable. Taking the reaction-completed tube off one by one ensures smooth shift to the next step.

Gas replacement



Reaction under inert condition is possible. Gas replacement is available by vacuumizing and applying pressure. Individual stop valve enables to select any test tube.

Individual temperature control



New designed block allows to set different temperature for 5 aluminum blocks ranging from -10°C to 150°C. For example an experiment can be conducted at 5 different temperatures, -10°C, 10°C, 30°C, 50°C, and 70°C simultaneously. An experiment of heating and cooling the aluminum block while connecting the cooling unit is possible.

Description	Model	Cat. No.
O-ring for replacement ø15(Perfluoro, 1pc)	—	195760
O-ring for replacement ø30(Perfluoro, 1pc)	—	195770
Hose coupler (double blocking type, 2 pcs)	—	198700
Screw ring ø15 (5 pcs)	—	195640
Screw ring ø30 (5 pcs)	—	195650
Teflon O-ring ø15 (10 pcs)	—	195780
Teflon O-ring ø30 (10 pcs)	—	195790



Please read Instruction Manual™ carefully before using the product for your continued safety.

Personal Organic Synthesizer ChemiStation™

PPW-1000, 2000

PPW



PPW-2000



Simultaneous examination on 12 synthesis conditions is available. Synthesis scale can be changed.

This is 12 position organic synthesizer designed to improve the efficiency in development of new reaction conditions and new catalysts.

12 different reagents can be examined simultaneously in one unit, suitable for the process screening experiment. The stirring bars in 12 reaction containers are maintained by individual magnet. This provides the strong vortex stirring required for suspension reaction or emulsion reaction of solid catalysts.

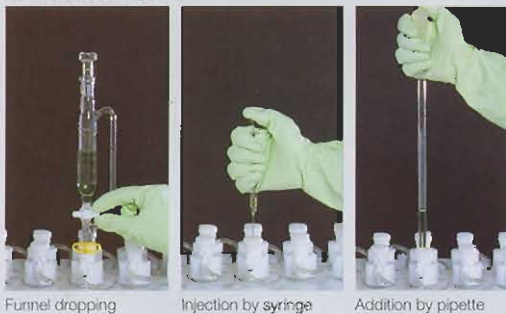
Reflux and gas replacement functions which are inevitable for organic synthesis are equipped. Synthesis scale can be changed by replacing the aluminum blocks.

For post-processing, such option is available as a set of operations for liquid-liquid extraction and concentration of liquid without removing the containers.

Model	PPW-1000	PPW-2000
Cat. No.	191700	191710
Synthesis scale	1 - 4mL × 12	10 - 30mL × 12
Stirring method	Ferromagnetic Stirring	
Temperature range	-10-150°C※	
Rotation speed	250 - 1800rpm(water 4mL)	250 - 1400rpm(water 30mL)
Reflux	High efficiency reflux is possible※	
Reagent adding	Pipette, syringe, dropping funnel under inert condition	
Overall dimension	510 × 326 × 405	510 × 326 × 455
Input/Rated power source	AC100V, 50/60Hz, 800VA	

※ In order for the temperature control and reflux at the temperature below room temperature, connecting with Recirculating chiller is necessary.

■ Addition of reagent



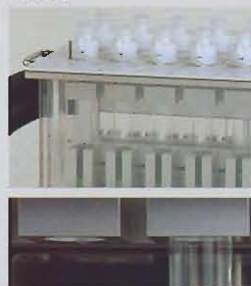
Funnel dropping

Injection by syringe

Addition by pipette

Addition or removal of reagent is easily available by pipette, syringe, or funnel dropping depending on the nature of experiments. Teflon cap has common joint taper of $\Phi 15/25$.

■ Reflux



Synthesis is easily available under reflux condition. It is also possible to achieve highly efficient reflux of low-boiling-point substances.

■ Gas replacement



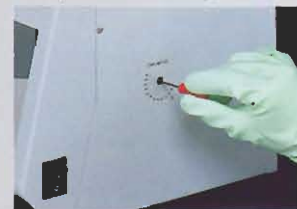
Gas replacement for each test tube is available. This allows deoxidation and dehydration in the test tube easily.

■ Heating/Cooling



Accurate temperature control from -10°C - 150°C allows synthesizing at wide range of temperature.

■ Temperature overheat protector



■ Cooling cartridge



■ Stirring



Strong magnetic stirrer for individual test tube assures stable stirring. Various operations are available including stirring of high-viscous solvents, suspension reaction of insoluble powder reagent or solid catalyst, and crystallization reaction.

■ Parts/Consumables

Description	Model	Cat. No.
Test tube $\phi 15$ (50 pcs)		195670
Test tube $\phi 30$ (25 pcs)		195690
Stirring bar for $\phi 15$ (10 pcs)	ST-1X	191840
Stirring bar for $\phi 30$ (10 pcs)	ST-2X	191850
Three-way cock (10 pcs)	QK-3P	191920
Cooling hose set (Silicon 1m × 2)	CT-1S	194050
O-ring (Nitrile rubber) for $\phi 15 \times 20$		195600
O-ring (Perfluoro) for $\phi 15 \times 1$		195760
O-ring (Nitrile rubber) for $\phi 30 \times 20$		195610
O-ring (Perfluoro) for $\phi 30 \times 1$		195770
Septum (Silicon rubber) 10 pcs		195710

Personal Organic Synthesizer

PPV-3000

ChemiStation™

PPV



30 ~ 150mL × 4

Temperature can be set for 2 types × 2 containers.

4 position organic synthesizer designed to enhance efficiency in development of new catalysts and materials, synthesis of building block and sample, and process development experiment. As two different temperatures can be set for every two containers, efficient synthesis experiment is available.

Individual stirring bars in four reaction containers are maintained by strong magnet, allowing the strong stirring necessary for suspension reaction, emulsion reaction and stirring of high-viscous solvents. Reflux and gas replacement functions required for organic solvents are equipped.

For post-processing, such option is available as a set of operation for liquid-liquid concentration without removing the containers.

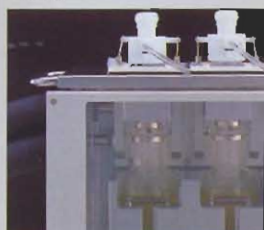
Model	PPV-3000
Cat. No.	201280
Synthesis scale	30 ~ 150mL × 4
Stirring method	Ferromagnetic stirring
Temperature range	-30 ~ 150°C*
Rotation speed	250 ~ 1300rpm(water 150mL)
Reflux	Highly efficient reflux **
Reagent dosing	Pipette, syringe, or funnel dropping under inert condition
Overall dimension	420 × 348 × 412
Power source	AC100V, 50/60Hz, 1.3kVA

*In order for the temperature control and reflux at the temperature below room temperature, connecting with Low Temperature Circulator is necessary.



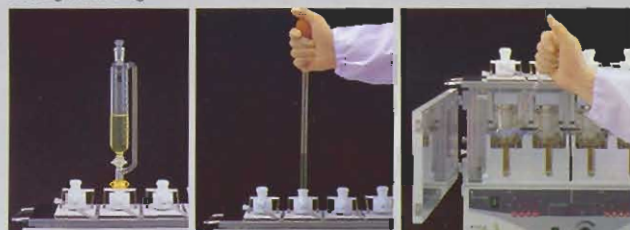
PPV-3000

■ Reflux



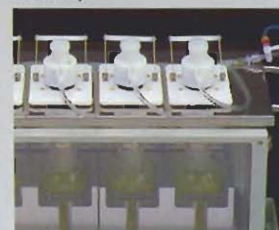
Solvents with low boiling point can be refluxed efficiently.

■ Reagent adding



Reagent adding by pipette, syringe, or funnel dropping is available.

■ Gas replacement



Gas replacement by each container

■ Safety functions



Overheat protector, double chambers to prevent dew.

■ Synthesis in the reaction container can be concentrated.



After synthesizing, connect to the evaporator for concentration

■ Removal of vessel.



Reaction vessels are removable one by one.

■ Parts/Consumables

Description	Cat. No.
Reaction container (1 pc)	203160
Reflux adapter (1 pc)	203180
Reaction container with 2 ports (1 pc)	203170
Stirring bar (football-shaped) 5 pcs	203320
Strong stirring bar (football-shaped) 1 pc	203660
Teflon cap	203150



Reaction container with two ports



Please read "Instruction Manual" carefully before using the product for your continued safety.

Optional accessories for Personal Organic Synthesizer ChemiStation™

Evaporator Vacuum Unit
Organic Synthesizer
Open Electric Furnace, Insulation Furnace
Low temperature bath, Constant temperature bath, Condenser Trap
Low and Constant Temperature Circulator
Flask, Pot, Stirrer, Dryer
Stirrer
Peristaltic pump
Liquid Chromatograph
Culture Microbe and related apparatus
Others

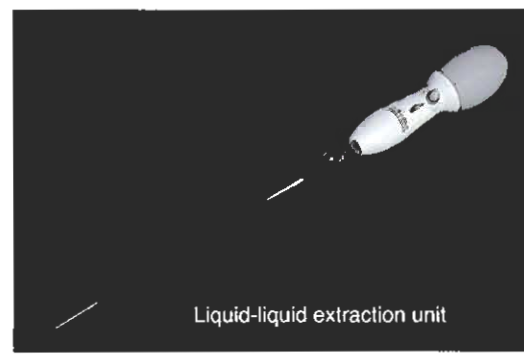


ChemiThermo monitoring unit Monitors the liquid temperature during reaction

This temperature interface enables to measure the solvent temperature during the synthesis reaction and to monitor it. This unit allows to display the real-time temperature of all reacting solvents on the monitor and save the data in the file.



Product	Chemi-thermo monitoring unit	
	Measurement channel	
Applicable OS	Windows98SP2/98/98SE/Me/NT4/XP	Windows98/Me/2000/Professional/XP Home Edition/XP Professional
Temperature interface	Soft-thermo E830 Cat. No. 194150	Temperature recorder NR-1000 Cat. No. 199800
Thermocouple	Chemical thermocouple (6 pcs) Cat. No. 194160	Chemical thermocouple for NR (6 pcs) Cat. No. 199810



Liquid-liquid extraction unit



Liquid-liquid extraction unit Without separating funnel, liquid-liquid extraction is easily available.

Troublesome liquid-liquid extraction (mixed or separated) required as post-processing after the synthesizing is easily available by using ChemiStation. There is no sample loss because synthesis and liquid-liquid extraction can be done in the same reaction tube. Liquid-liquid extraction of 1 to 5 test tubes in line reduces time and labor significantly.

Separatory tubes (6 pcs)

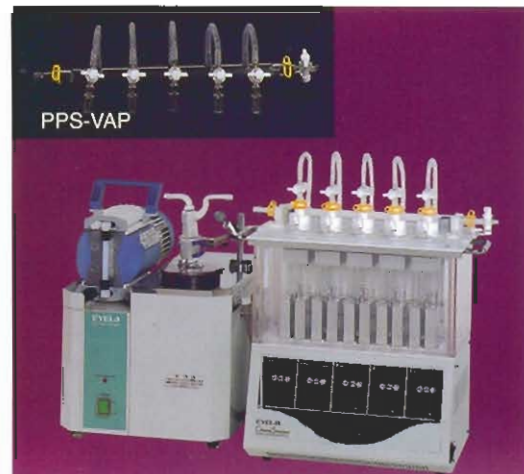
Cat. No. 198620

Pipette (manual)

Cat. No. 198610

Concentration unit, ChemiEvaporation unit For acid solvent and solvent with low to high boiling point.

Evaporation unit (vacuum/blowing gas piping required for performing parallel concentration) combined with vacuum unit and refrigerated trap unit serves as chemical resistance unit for concentration of acid solvents and solvents with low to high boiling point. Prompt concentration after synthesizing can be achieved. Selectable from 5 types: standard type, low boiling point type, vacuum control type, blowing type and all-in-one type.



PPS-VAP

Example of unit configuration (standard)

Component	Model	Cat. No.	Composition of ChemiEvaporation unit					
			Standard	Low boiling point	Vacuum control	Blowing	All-in-one	
Concentration unit	5 position for PPS	PPS-VAP	198600					
	6 position for PPW	PPW-VAP	201650					
	4 position for PPV	PPV-VAP	201660					
Refrigerated Trap Unit (-5°C)	UT-1000	189200						
Glass Trap set (300mL)	---	198630						
Glass Trap set for substance with low boiling point (150mL)	---	198640						
Vacuum Pump (2hPa)	MD1C	198530						
Vacuum Pump (2hPa, with vacuum control, exhaust trap)	PC2001	188590						
Teflon hose set (0.5&1m, ø13 x ø12mm)	---	188650						
Hose adapter (for MD1C, ODø12.5mm)	---	188670						
Hose adapter (for PC2001, ODø12.5mm)	---	188680						
Barrio type solvent recovery unit	PC2001IK/EK	203910						

Teflon Diaphragm Vacuum Pump Achieves ultimate vacuum rate 2hPa

Product	Diaphragm vacuum pump	Solvent recovery vacuum pump
Model	MD1C	PC2001
Cat. No.	188530	188590
Displacement (60/60Hz)	20/23L/min	26/26L/min
Ultimate vacuum	2hPa(1.5 Torr)	2hPa(1.5 Torr)
Material of gas contact part	PPFA, PFKM, PTFE	PPFA, PFKM, PTFE
Power source	80VAC/100/120V, 50/60Hz	200VAC/100/120V, 50/60Hz

Solvent Recovery Unit (Teflon diaphragm vacuum pump)

-20°C circulation, condenser equipped
Compact sized all-in-one unit provides accurate vacuum control.

Model	MD1C IK/EK	PC2001 IK/EK (ASPC Windows)
Cat. No.	203900	203910
Displacement (60/60Hz)	20/23L/min	26/26L/min
Ultimate vacuum	2hPa(1.5 Torr)	2hPa(1.5 Torr)
Cylinder	3 stage type	
Vacuum control	*point of set vacuum rate control by motor rotation	
Safety standard	IP20	IP20, IP54
Material of gas contact part	PPFA, PFKM (Kurex DoPoint), PTFE (ETFE, PBT)	
Serial interface	RS232C (Option: PC program operation)	
Power source	80VAC/100/120V	200VAC/100/120V, 50/60Hz



MD1C IK/EK

PC2001 IK/EK

ChemiStation™ Systems combined by PPS, PPW, PPV series

■ Individual temperature control synthesis system with 5 positions of liquid phase [concentration function equipped]

Synthesis at individually controlled temperature for 5 test tubes followed by individual concentration (synthesis capacity, 1 - 4mL, 10 - 30mL)



Example of system composition using PPS series

Setting temperature for each solvent contributes to efficiency in synthesis process such as development of new reaction and new catalysts, verification experiments, and optimization tests. Concentration while controlling vacuum after synthesis achieves speedy performance. As the system composition can be changed, changing the synthesis scale is available and alternating the system to low-boiling-point solvent concentration type or blowing type system is also possible. Teflon cap allows reagent adding and gas replacement. Adding the concentration function (ChemiEvaporation) system can be configured by using PPW-1000, 2000 or PPV-3000.

Temperature range: -10 - 150°C (individual control)

Rotation speed: 250 - 1600(1300)rpm

Reaction container: Dia 15mm × 5 or dia.30mm × 5

Synthesis scale: 1 - 4mL × 5 or 10 - 30mL × 5

Vacuum pump: Vacuum control function equipped 26L/min

Cooling trap unit: UT-1000, 300mL glass trap

Product	Model	Cat. No.
Personal Organic Synthesizer	PPS-2510	198580
Concentration unit	PPS-VAP	198600
Refrigerated Trap Unit	UT-1000	189200
Glass trap set	—	198630
Vacuum Pump	PC-2001	198590
Teflon hose set	—	198650
Hose Adapter	—	198600
Recirculating chiller	CA-1112	188310
Cooling hose set (dia.9mm × 1m × 2)	CT-1S	194050

■ Parallel synthesis system with 12 position liquid phase [Liquid temperature monitoring system equipped]

Real-time monitoring of reaction temperature (synthesis capacity, 1 - 4mL, 10 - 30mL)



Example of system composition using PPW series

Organic synthesizer system with 12 positions improves efficiency in organic synthesis experiments such as new reaction, catalysts development, and optimizing process. The temperature of 6 solvents can be monitored in real time, displayed on the PC monitor and saved in PC. Teflon cap allows reagent adding and gas replacement. Change in composition enables the change in synthesis scale. Composition of liquid temperature monitoring system (ChemiThermo monitoring system) is available by using PPS-1510, 2510 or PPV-3000.

Temperature range: -10 - 150 C

Rotation speed: 250 - 1800(1400)rpm

Reaction container: Dia 15mm × 12 or dia.30mm × 12

Synthesis scale: 1 - 4mL × 12 or 10 - 30mL × 12

Temperature measure: Chemical thermocouple × 6

Product	Model	Cat. No.
Personal Organic Synthesizer	PPW-2000	191710
Low Temperature Circulator	CCA-1110	188330
Cooling hose set (dia.9mm × 1m × 2)	CT-1S	194050
Soft Thermo	E830	194150
Chemical thermocouple (6 pcs)	—	194160

■ Individual 2 temp. control for sample synthesis system with 4 positions liquid phase

Suitable for efficient synthesis (Synthesis capacity 30 - 150mL)



Example of system composition using PPV series

This system allows highly efficient synthesis experiment of up to 150mL solvent at as low as -30°C. Suitable for sample synthesis in new reaction or catalysts development or synthesis of building block. Ferromagnetic stirrer enables stirring of suspension liquid or high viscous solvents. The function of controlling the temperature for each two containers individually is suitable for examination of temperature conditions.

Temperature range: -30 - 150 C individual control for each 2 containers

Rotation speed: 250 - 1300rpm

Reaction container: 600 × 140H 4 containers

Synthesis scale: 30 - 150mL × 4

Product	Model	Cat. No.
Personal Organic Synthesizer	PPV-3000	201280
Low Temperature Circulator	PFR-1000	197410
Pump for circulation	PFP-1000	197430
Cooling hose set (dia.9mm × 1m × 2)	CT-1S	194050



Please read "Instruction Manual" carefully before using the product for your continued safety.

Personal Organic Synthesizer **Zodiac**

CCX-1000



Light weight, compact size, and reasonable price.
Efficient lead optimization



CCX-1000

- ★ Reflux block without dew concentration.
Hose joint is attached/detached easily by one-touch.
- ★ \$15/25 reagent adding port can use the joint temper available on the market.
- ★ Suitable for inert gas replacement reaction.
Sealed up by W cap and gas introduction to individual tubes.
- ★ Teflon cock individually opened or closed.
- ★ Separable hot plate.
Heater with excellent temperature control and high wattage concentration around its peripheral part.
- ★ Vortex stirring by ferromagnetic power.
Strong stirring will not stop the operation with a little dislocation.
- ★ Independent overheat protector for safe operation.

Model	CCX-1000
Cat. No.	198730
Synthesis scale	3 ~ 15mL(Max. 25mL) × 12
Stirring method	Ferro-magnetic stirrer
Temperature range	RT+10~160°C
Rotation speed	Approx. 100 ~ 1200rpm(water 15mL)
Reflux	High-efficient reflux:s
Reagent adding	Pipette, syringe, dropping funnel under inert condition
Test tube dimension	ø24 × 150
Overall dimension/weight	192 × 210 × 315/approx. 9kg
Power source	AC100V, 50/60Hz, 500VA

Please ask for the production of aluminum block or Teflon cap to meet the size of the reaction containers you use.

ø13mm × 100Hmm	12 pcs	ø25mm × 150Hmm	12 pcs
ø15mm × 150Hmm	12 pcs	ø30mm × 200Hmm	12 pcs

Unit components



Teflon Cap



Aluminum block



Temperature control / stirring

Synthesizing 12 test tubes simultaneously (3 ~ 15mL)

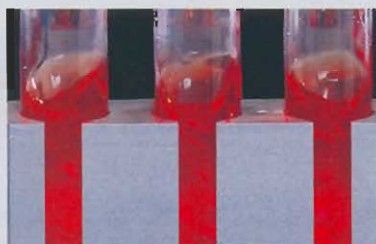
Basic system 12 position parallel synthesis system



12 position synthesizer designed for efficiency in development of pharmaceuticals, catalysts, functional organic / inorganic material. Efficient performance in lead optimization and synthesis process development experiment. Reflux, gas replacement, heating and stirring is available and Teflon cap enables reagent adding and gas replacement.

Temperature range: RT+10 ~ 160°C
 Rotation speed: Approx. 100 ~ 1200rpm
 Reaction containers: dia.24 × 150L(mm) × 12
 Synthesis scale: 3 ~ 15mL(Max. 25mL) × 12
 Stirring: Ferromagnetic stirrer

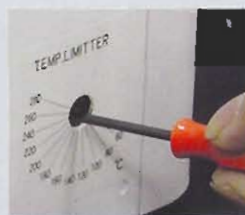
Product	Model	Cat. No.
Personal Organic Synthesizer	CCX-1000	198730
Low Temperature Circulator	CCA-1100	188330
Cooling hose set (dia.9mm × 1m × 2)	CT-1S	194050



Strong stirring



Sealed up by W cap (septum). Reaction under inert condition.



Variable overheat protector



Teflon cock enabling individual gas replacement.



Hose joint attached/detached by one-touch. Strong reflux.



Reagent adding by syringes, pipette, or funnel dropping.

Setting



Easy to attach



Individual attachment/detachment (excellent handling)



Convenient to carry (separable type)



Temperature probe (accurate temperature control)

Evaporator, Vacuum Unit

Organic Synthesizer

Oven, Electric Furnace, Incubator, Freezer

Low-Temperature Bath, Constant-Temperature Bath, Condenser, Trap

Low and Constant-Temperature Water

Freeze Dryer, Spray Dryer

Stirrer, Shaker

Peristaltic Pump

Liquid Chromatograph

Culture Microbe and related apparatus

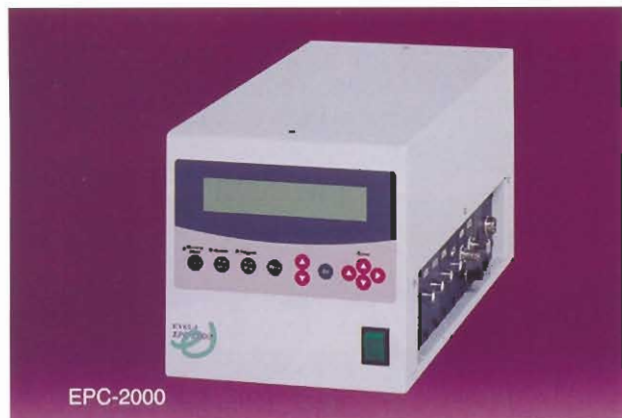
Others



Please read 'Instruction Manual' carefully before using the product for your continued safety.

Process Controller EPC-2000

Comprehensive automation control, detailed measurement and controlling

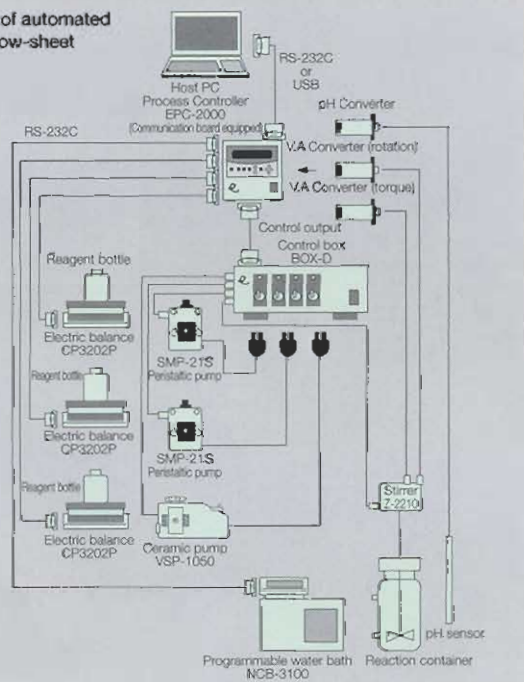


Automation of reaction system by Process Controller EPC model.

EPC-2000 automatic reaction system offers accurate controlling and various reactions monitoring to achieve the automated reaction. Free selection of unit component and controlling patterns enable to compose a system meeting your demand.

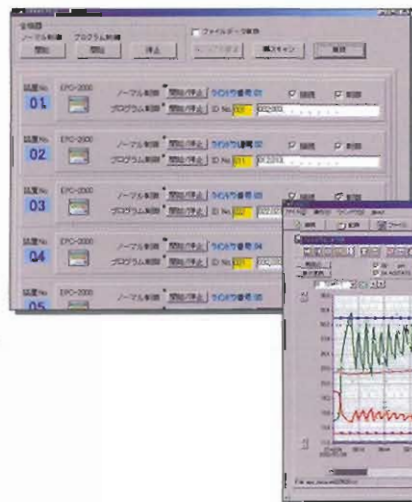
In addition to the examples shown on the right page, a variety of system compositions are available such as controlling more than one controllers by one PC etc.

Example of automated system flow-sheet

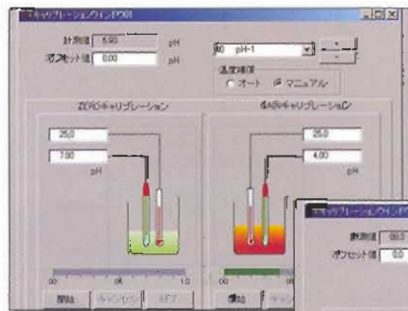


Model		EPC-2000 main unit
Cat. No.		199230
Control items		Max.16 items (when converter input, max. 8)
Converter input	Temperature	-50~250°C Temp. converter input (resolution: 0.1°C)
	pH	0~14pH, pH converter input (resolution: 0.01pH)
	V · A	Current, Voltage Converter input (Slir, Torque, Gas flow, UV, Turbidity, Conductivity, Pressure, etc.) Control range varies by equipment to be controlled (Selectable from 0(1)-5V, 0-10mv, 4-20mA for each item)
Communication input	Addition	Communication input (Control range varies by electronic balance to be used)
	Other	Connecting equipment (Process controllers, etc.)
Control method		P.I.D (2 types), H/L limit timer, Antifoam/level
Communication		RS-232C, EYELA TALK, USB
Voltage control output		Setting voltage output from 0-5V to 0-10V (4 points as standard, 8 points max.)
Digital output		Max. 16 points (Open collector)
Time		Progress time after starting control, Power failure-restart time, Total ON time of relay output
Safety feature	Power failure	Flash memory, backup by battery
	Others	Alarm, warning (independent setting of control) Watch-dog
Data process software		Windows98/98SE/ME/NT.ver.4/2000/XP
Overall dimensions		216 × 450 × 216(230)
Power source		AC100V, 50/60Hz, 100VA

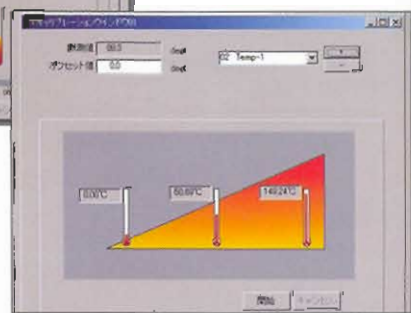
※The main unit does not include converters, equipment to be controlled, electrode, cable and etc.



Convenient functions are available such as confirmation of connecting status of Controller with PC, processing of Y scale for each item, and adjustable graph display.



Clear calibration is available depending on the each control item such as pH, stirring, and delivery. Display composition is easy to view and set.



For synthesis of pharmaceuticals and catalysts

Standard system for automation of reaction process



Standard system for automation of reaction process using EPC-2000. This system enables stirring, temperature and delivery control (2 points) and composition of the units can be changed depending on your need. Excellent scalability and operability by adding the controls of reaction measurement such as conductivity, turbidity, UV, etc.

Product	Model	Cat. No.
Process Controller	EPC-2000 main unit	199230
VA Converter	EPC2000VA	199300
Control Box	BOX-D-A	199330
Peristaltic pump × 2	SMP-21S	124760
Stirrer	Z-2210	120950
Stirring seal	TBO type ¥29	121100
Stirring shaft	T-11	203210
Torque rotation signal output code	ZO-EPC	200010
External signal input code	ZI-2000	120900
Electric balance × 2	CP-3202P	361740
RS-232C cable	RSC-1200	167370
RS-232C cable × 2	RSC-1300	200050
Tube stand × 2	CSD-1	199840
Jacket type reaction bath	BJ-10N	201480
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
O-ring		201620
Keck adapter × 2		185260
Condenser (spiral)	¥15/25	200490
Sealing stopper	¥15/25	200530
Programmable Low Temp. Precision Bath	NCB-3100	112450
External temp. sensor	STP-210	203250
Stand base	ZS	158710
ZC clamp	ZC	124560

※Host PC, heat medium for circulator, table, and tubing are not included.

For material synthesis reaction

System for automation of high-temperature reaction process



System for high-temperature reaction using Mantle Heater, EPC-2000 can control the equipment like Mantle Heater which is not equipped with communication or input/output function. Adding delivery control or increasing the controlling points enables the reaction control of 2 vessels.

Product	Model	Cat. No.
Process Controller	EPC-2000 main unit	199230
VA Converter	EPC2000VA	199300
Temperature Converter	EPC2000TEMP	199250
Temperature sensor	T-1	139040
Control box	BOX-E-A	199350
Peristaltic pump × 2	SMP-21S	124760
Stirrer	Z-2210	120950
Stirring seal	TBO type ¥29	121100
Stirring shaft	T-12	203220
Torque rotation signal output code	ZO-EPC	200010
External signal input code	ZI-2000	120900
Electric balance × 2	CP3202P	361740
RS-232C cable × 2	RSC-1300	200050
Tube stand × 2	CSD-1	199840
Separable round bottom flask	SFR-20	200470
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
O-ring		201620
Condenser (spiral type)	¥15/25	200490
Sealing stopper	¥15/25	200530
Stand base	ZS	158710
ZC clamp	ZC	124560

※Host PC, Mantle heater, heat medium for circulator, table, and tubing are not included.



Please read 'Instruction Manual' carefully before using the product for your continued safety.

Basic type Lab Worldsoft for research purpose

Easy control of reaction bath by PC

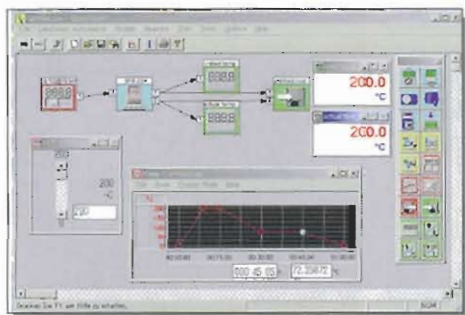


PCI card and input/output converter

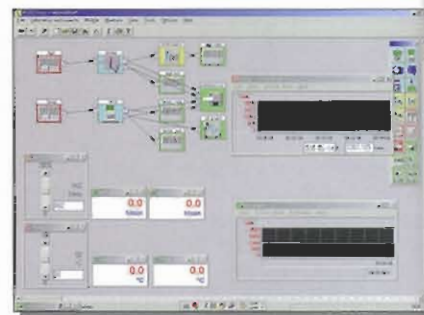
System for automation of synthesis by using LabWorldsoft

This automation system meets the request for simple system as 'Reaction container and bath+ Stirrer' by composition of basic type synthesis reaction system less costly. This versatile software enables controlling the RS232C-connected equipment by PC and connecting electric current/voltage input/output equipment through the converter.

For controlling more than one equipment, using PCI card enables to control up to 8 RS-232C-connected units. Operational display can be freely configured.



Example of display controlling the water bath



Example of display controlling the water bath, stirrer, and tube pump

Easy control of synthesis reaction

Basic type reaction system with manual reagent addition



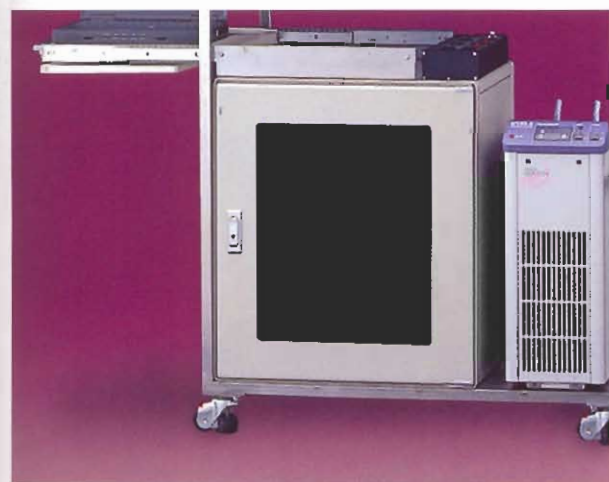
This system measures and controls the temperature and stirring and adds the chemicals manually. Depending on your need, various types of system are available from minimum composition. The system in the above picture has the automated adding by including the electronic balance. Depending on the connected equipment, more than one reaction vessel can be controlled.

Product	Model	Cat. No.
LaboWorldsoft		199860
PCI card	PCI8.2	199870
Data control (output converter)	DA2	199880
Data control (input converter)	DC2	199890
PC cable x 2	PC1.5	199900
Analogue cable	AK2.4	199910
Peristaltic pump x 2	SMP-21S	124760
Stirrer	Z-2210	120950
Stirring seal	TBO type ¥29	121100
Stirring shaft (all Teflon)	T-11	203210
Torque rotation signal output code	ZO-LWS	200020
External signal input code	ZI-LWSZ	200030
External signal input code	ZI-LWSS	200040
RS-232C cable	RSC-1500	203780
Convert adapter	PC1.2	203760
Jacket type reaction vessel	BJ-20N	201490
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
O-ring		201620
Keck adapter x 2		185260
Condenser (spiral type)	¥15/25	200490
Sealed stopper	¥15/25	200530
Programmable precision water bath	NCB-3100	112450
External temperature sensor	STP-210	203250
Stand base	ZS	158710
ZC clamp	ZC	124560

※Host PC, circulating refrigerant, table, and tubing are not included.

LabAuto Controller LA-1

Automatic control realizing production processes

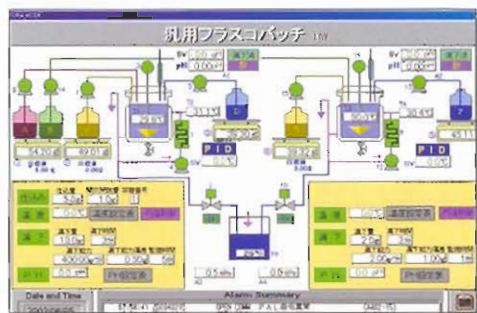


Control display of 2 vessels batch reaction system

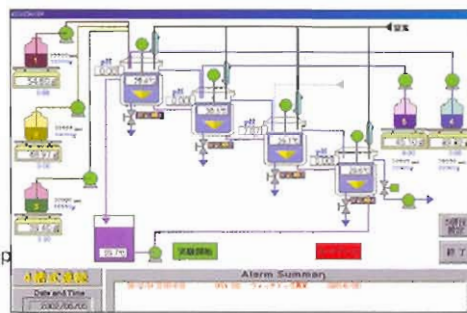
Automatic synthesis using LabAuto Controller LA-1

This is an automatic synthesis system equipped with functions to enable more than 50 controls, equivalent to DCS functions, to respond to the requirements of production system involving many measuring or controlling operations. Automatic system directly reflecting the production processes such as many reaction steps or complicated reaction control can be configured. The system configuration can be changed flexibly. Each unit is operated through database (operational software) on PC.

Below displays are examples of operational software. Other various model data base such as basic 6 reaction containers, dosing pH control, pressure oxidation, hydrogenated reaction are available.



Control display of 2 vessels batch reaction system



Control display of 4 step continuous reaction system

2 vessels batch reaction system

by hot water circulating and coating heater

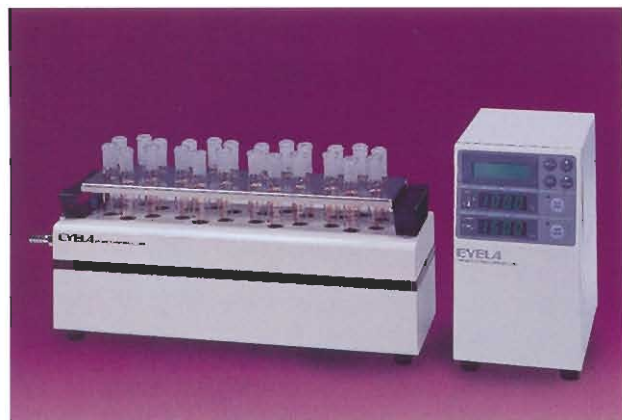


Automated system by utilizing the operational software of 2 vessels batch reaction system. Hot water circulation and heater coated reaction vessel enable batch reaction at $-10 \sim 150^{\circ}\text{C}$. Temperature, dosing, and pH are individually programmable.

Major components

LabAutoController	1 set
Reaction vessel(main reaction, preliminary reaction)	$\times 2$
adding reagent	1 ~ 6 types
Electronic balance	1 ~ 5
Stirrer	$\times 2$
Dosing pump	1 ~ 6
Circulating pump	$\times 2$
Water bath	1 set
Table	1 set

Personal Organic Synthesizer 24position Liquid Phase Organic Synthesizer CCL-2400



Option

Reflux unit

RU-24 model Cat. No. 182070

※Low Temperature Circulator is necessary.

Gas replacement unit

RG-24 Cat. No. 187170

Applicable model / CCL-2400, CCL-4S

Gas replacement/vacuum+pressure

Reagent dosing / Septum, pipette

★High-efficient parallel synthesis of low-molecular compound and etc. is available

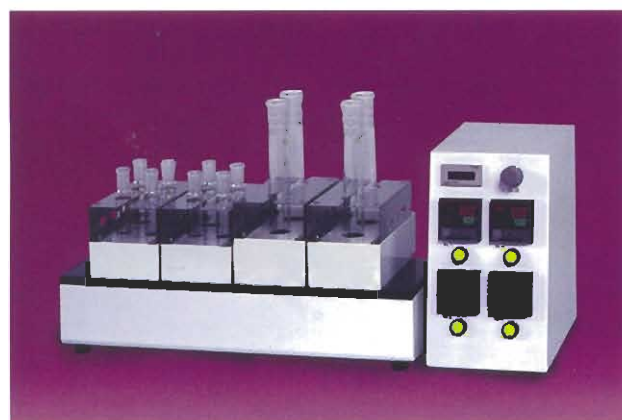
This unit is suitable for examining the reaction conditions or creating the library when developing the new synthesis method. Also suitable for the experiments of activity improvement, toxicity reduction, stability improvement by modifying the structure of lead compounds (Lead Optimization).

★Adopting cooling tube enables reflux reaction. Products with joint tapers can be used.

★Addition by syringe or pipette is available.

Model	CCL-2400
Cat. No.	182060
No. of reaction tube	24(glassware)
Synthesis scale	Solvent 2-7mL
Stirring	Magnetic stirrer
Temperature range	-30~150°C
Temperature uniformity	± 1.0°C at 50°C, ± 2.0°C at 100°C, ± 2.5°C at 150°C
Rotation speed	400-2000rpm
OFF timer setting	00: 01-99: 59 h:min
Stirring accumulated time	00: 01-99: 59 h:min
Gas replacement	Option: replacement by vacuuming and pressure applying
Reflux	Option: air cooling type, cold wind type
Safety feature	Overheat protector, Motor overload protector
Reaction test tube	OD 18 × ID 15 × 115, Joint taper \varnothing 15/25
Cooling nozzle	OD 10.5mm at hose mouth
Power source	AC100V, 50/60Hz, 900VA

Personal Organic Synthesizer 4 Station Liquid Phase Organic Synthesizer CCL-4S



Block (option)

Product	Block (for 4 tubes)		Block (for 2 tubes)	
	Model	Cat. No.	Model	Cat. No.
Temperature range	RT~150°C	-30°C-RT	RT~150°C	-30°C-RT
Reaction tube	OD18 × ID15 × 115(mm) Taper joint \varnothing 15/25		OD25 × ID21 × 200(mm) Taper joint \varnothing 24/40	
Stirring bar	Cross-type (OD 10 × 5H(mm))			
No. of tubes	1-4		1-2	
Synthesis scale	Solvent 2-7mL		Solvent 5-20mL	

★Simultaneous reaction experiment with 4 different temperatures is available. Not only the combi-chem synthesis condition but also the optimum reaction temperature can be examined.

★This unit is equipped with 4 stations which can be installed by optional heating or cooling blocks. These blocks can control individual temperature.

★Using cooling tube enables the reflux reaction. Dosing funnel available on the market can be used.

★Addition by syringe or pipette is available.

Model	CCL-4S
Cat. No.	186810
No. of reaction tube	2-16(1-4 block)
Synthesis scale	1-7m(\varnothing 18), 5-20m(\varnothing 25)
Stirring method	Magnetic stirrer
Temperature range	-30-150°C
Temp. uniformity	± 1.0°C at 50°C, ± 1.5°C at 100°C, ± 2.5°C at 150°C
Rotating speed	\varnothing 18: 400-2000rpm, \varnothing 25: 800-1800rpm
Gas replacement	Option: replacement by vacuuming, pressurized gas
Reflux	Option: air cooling
Safety feature	Overheat alarm, temperature fuse, motor overload protector
Power source	AC100V, 50/60Hz, 900VA

Personal Organic Synthesizer CCS-600, 1200



CCS-600R

- ★ This unit enables high-efficient solid phase parallel synthesis of low-molecular compound and also collects compounds automatically. Suitable for examination of reaction conditions or lead optimization.
- ★ Scavenger resin can be used for liquid phase synthesis.
- ★ Addition by syringe or pipette is available.
- ★ Collecting the reaction solvent through filtration enables removal of overdosed reagent or cleavage collection.

Model	CCS-600R	CCS-600V	CCS-1200R	CCS-1200V
Cat. No.	181850	181860	181870	181880
No. of tubes	6 (glass)		12 (glass)	
Synthesis scale	Solvent 2-5mL			
Stirring method	Vortex mixing			
Temperature range	RT	-40-90°C	RT	-40-90°C
Rotation speed	200-600rpm			
OFF timer setting	00: 01-99: 59 h:min			
Stirring accumulated time	00: 01-99: 59 h:min			
Filtration	Waste: independent collection (individual/simultaneous selection of reaction tube), Vacuum filtration			
Gas replacement	Option: replacement / pressure by inert gas			
Automatic addition of washing solution	Option: automatic addition by gas pressure			
Reaction tube	OD 20 × 127, Taper joint ϕ 15 × 25			
Material of liquid contact part	Teflon, Dyflon, PPS, Perfluro			
Input/Rated power source	AC100V, 50/60Hz, 150VA(190VA)			

Personal Phase Organic Synthesizer CCS-150M



- ★ CCS-150M is a sister machine of CCS-600V. This unit enables the examination of combi chem solid phase synthesis condition and lead optimization. This is suitable when you begin combi chem synthesis first time or you need many units for personal use.
- ★ Addition by syringe or pipette is available.
- ★ Collecting the reaction solvent through filtration enables removal of overdosed reagent or cleavage collection.

Model	CCS-150M
Cat. No.	186930
No. of tubes	5 (glassware)
Synthesis scale	Solvent 2-5ml
Stirring method	Vortex mixing
Temperature range	-40-90°C
Rotation speed	200-1000rpm
Filtration	Waste: independent collection (individual/simultaneous selection of reaction tube), Vacuum filtration
Gas replacement	Option: replacement/pressure by inert gas
Automatic addition of washing solution	Option: automatic addition by gas pressure
Reaction tube	OD 20 × 127, Taper joint ϕ 15 × 25
Material of liquid contact part	Teflon, Dyflon, PEEK, Perfluro
Input / Rated power source	AC100V, 50/60Hz, 120VA

Basic system
(Main unit+Water Bath+Vacuum pump)

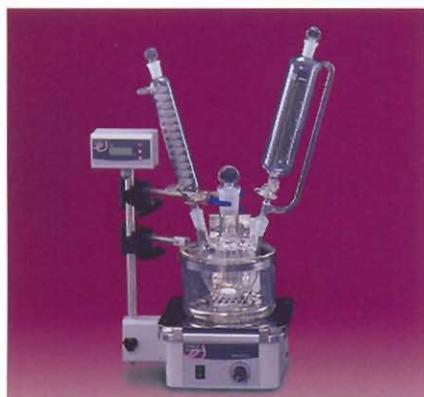


System compositions ranging from Scale-up synthesis to a small lot synthesis

For Scale-up synthesis from a small amount to 1200mL

(Synthesis volume 1~1200mL)

Basic type High temp. synthesis system



This unit can be used for various synthesis reactions from a small amount in the test tube at the initial stage to scale-up reaction.

This is suitable for synthesis which requires accurate temperature control for high viscous solvents such as pharmaceuticals, chemical products, materials and perfumes.

Temperature range: 30 ~ 250°C
 Rotation speed: 100 ~ 1300rpm
 Reaction tube: Test tube or container with diameter 200mm max.

Product	Model	Cat. No.
Powerful Magnetic stirrer	RCX-1000S	195540
Pole set		195570
Oil bath	OHB-1000G	200650
Powerful stirring bar (football type)	TFX-25	200410
Condenser (spiral cooling type)	¥15/25	200490
Droplet tube (with side tube)	¥15/25	200510
Sealing cap	¥29/38	200520
Sealing cap	¥15/25 × 2	200530

※Clamp and holder are not included.

For examination of reaction condition at -80~40°C

(Synthesis volume 1~180mL)

Low temp. synthesis system (-80°C type)



Experiments at low temperature from -80~-40°C are easily conducted. Low temperature synthesis at -78°C, not available by dry ice/acetone, is available under the long-term and stable conditions. Excellent temperature control provides the accurate control synthesis at low temperature. Using ferromagnetic stirrer enables stable stirring for the synthesis at the low temperature in which solvent tends to become high-viscous.

Temperature range: -80 ~ -40°C
 Rotation speed: 100 ~ 800rpm
 Reaction tube: Container with diameter 95mm max. or test tube

Product	Model	Cat. No.
Low temp. water bath with magnetic stirrer	PSL-1800	182220
Droplet tube (with side tube)	250mm	200510
Clamp set		164500
Powerful stirring bar (football type)	TFX-20	200400

※Round bottom reaction container is not included.

For synthesis reaction of crystallization and recrystallization

(Synthesis volume 100~1200mL)

Low temp. synthesis system (for large volume)



This system enables the accurate synthesis experiments at a broad range of temperature from 20 to -44°C. As the container of 2L max. can be attached and stirrer can be installed, this system is suitable for initial synthesis of intermediate and synthesis reaction of crystallization/recrystallization. With powerful magnetic stirrer equipped, stirring of reaction tube and accurate control of temperature inside the bath can be conducted simultaneously.

Temperature range: -44 ~ 20°C
 Rotation speed: 200 ~ 800rpm
 Reaction tube: Reaction container with diameter 135mm max. or flask

Product	Model	Cat. No.
Low temp. water bath with magnetic stirrer	PSL-1000	112681
Droplet tube (with side tube)	250mm	200510
Separable flask	SFR-20	200470
Flask cover	BC-3N	201570
O-ring		201620
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
Stirrer	NZ-1200	200610
Stirring shaft (All Teflon)	T-1	121590
Stirring seal	TBO ¥29	121100
ZC clamp	ZC	124560

※Thermometer and thermometer holder are not included.

For high temperature synthesis by Oil Bath with Magnetic Stirrer

(Synthesis volume 1~1200mL)

High temperature synthesis system



This system enables the experients at a broad range of temperature from 30°C to 150°C. Suitable for high molecular synthesis, polymerization, condensation reaction at individual temperature conditions. Adopting ferromagnetic stirrer enables stable stirring even for the synthesis which tends to be high-viscous during reaction.

Temperature range: 30 ~ 150°C
 Rotation speed: 100 ~ 800rpm
 Reaction container: Container with diameter of 165mm max. or test tube

Product	Model	Cat. No.
Oil bath with magnetic stirrer	PS-1000	182740
Droplet tube (with side tube)	250mm	200510
Condenser (Allihn type)	200mm	200480
Sealing cap	φ29/38	200520
Sealing cap	φ15/25 × 2	200530
Separable flask	SFR-20	200470
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
Clamp set		164500
Powerful stirring bar (football type)	TFX-40	200440

※Thermometer and thermometer holder are not included.

For synthesis of high-viscous substance

(Synthesis volume 150~1200mL)

High temperature and high visous synthesis system



This system enables dissolution and reaction of the substance with high fusing point.

Suitable for the examination of reaction condition, the synthesis reaction for the substance whose viscosity is too high to be stirred by magnetic stirrer or dissolution of solid sample.

Temperature range: RT +5 ~ 180°C
 Rotation speed: 5 ~ 300rpm
 Reaction container: Container with capacity of 2L max.

Product	Model	Cat. No.
Stirrer	NZ-1300	200630
Stirring seal	TBO type φ29	121100
Stirring shaft (All Teflon)	T-1	121590
Separable round bottom flask	SFR-20	200470
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
immersion thermo regulator	NTF-2400	195430
Stainless steel bath	SB-11	114650
Droplet tube (with side tube)	φ15/25	200510
Sealing cap	φ15/25 × 2	200530
Stand base	ZS	158710

※Clamp, holder, thermometer, and thermometer holder are not included.

For examining the conditions before plant production

(Synthesis volume 150~1800mL)

Jacket type reaction vessel synthesis system



This system can be used for the synthesis reaction scale-up.

A large volume of synthesis is available with dropping a small amount of samples.

Temperature range: -30 ~ 80°C
 Rotation speed: 5 ~ 300rpm
 Reaction container: Container with capacity of max. 3L.

Product	Model	Cat. No.
Stirrer	NZ-1300	200630
Stirring seal	TBO type φ29	121100
Stirring shaft (All Teflon)	T-11	203210
Jacket type reaction vessel with drainage	BD-10N	201520
Flask cover	BC-4N	201580
Low temp. bath	NCB-3100	112450
External temperature sensor	STP-210	203250
Droplet tube (with side tube)	φ15/25	200510
Condenser (spiral type)	φ15/25	200490
Sealing cap	φ15/25 × 2	200530
Stand base set	ZS-2	203190
Flange stopper	ST-1000	201600
Reaction container support	RH-1000	202670
O-ring		201620
Keck adapter		185260
Cooling hose set	φ9mm 1m × 2	112690

※Clamp, holder, thermometer holder are not included.

The system in the left picture uses 1 liter scale reaction container (maximum volum of synthesis is 600mL)



Please read "Instruction Manual" carefully before using the product for your continued safety.

Spare parts for synthesizers, Related products



■ Stirrer (NZ, Z series)

Type	Model	Cat. No.	
For low/middle viscosity	NZ-1000(S)	200570	
	NZ-1100(S)	200590	
	NZ-1200(S)	200610	
	NZ-1300(S)	200630	
For low viscosity	External input/output terminal equipped	Z-1110	120850
		Z-1210	120860
		Z-1310	120870
		Z-2100	120910
		Z-2200	120920
		Z-2300	120930
For high viscosity	External input/output terminal equipped	Z-2110	120940
		Z-2210	120950
		Z-2310	120960

※ NZ series do not include stirring shaft and stirring propeller as standard equipment.
S type is equipped with stirring shaft and propeller.

■ Stirring shaft (for NZ, Z series)

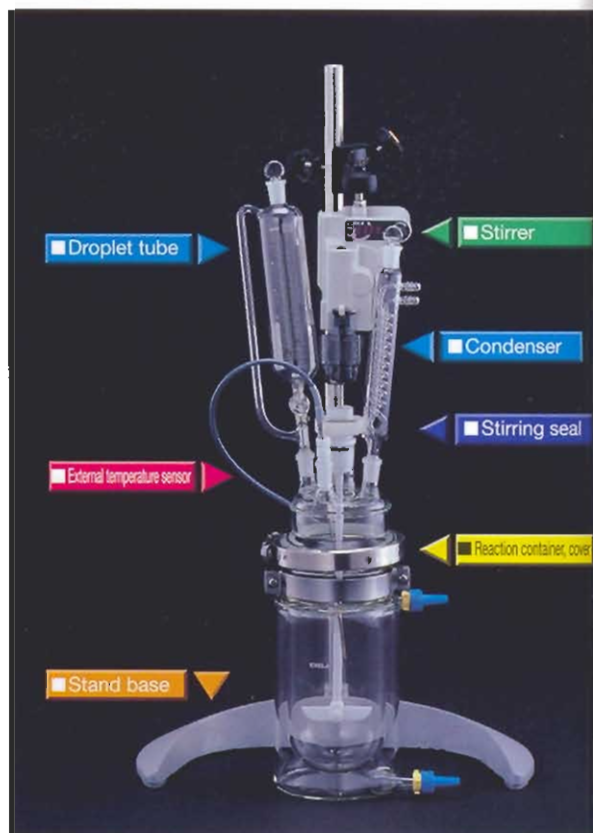
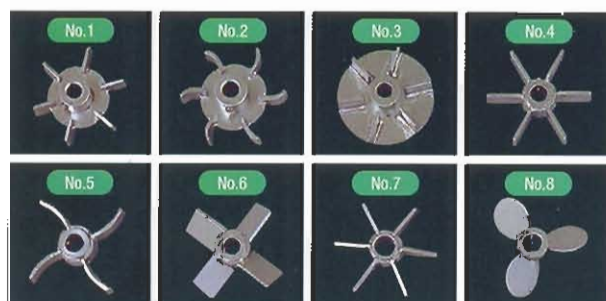
Material	OD × Length (mm)	Cat. No.
SUS	8 × 495	121720
	8 × 495 (screwed)	121730
	8 × 800	121760
	8 × 1000	121770
	10 × 500	121780
	10 × 800	121800
	10 × 1000	121810

※ Standard equipment for N, NZ series is screwed stirring shaft with 495mm length.
※ These shafts cannot be used for Stirring seal TBO type. Use the specific stirring shaft for stirring seal.

■ Stirring propeller (for NZ, Z series)

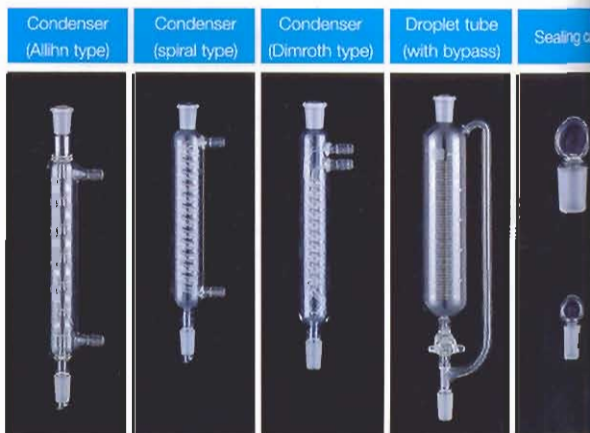
No.	Description	Shaft dia.	Propeller dia.	Cat. No.
NO. 1	Flat blade turbine	8mm	50mm	121840
NO. 2	Curved blade turbine			122020
NO. 3	Disc turbine			122200
NO. 4	Fan turbine			122380
NO. 5	Curved fan turbine			122560
NO. 6	Pitched blade turbine			122740
NO. 7	Modified fan turbine			122920
NO. 8	Marine propeller			123100

※ Shaft diameter 10mm is also available.
Standard equipment for N, NZ-series is marine type which is different from Marine propeller No. 8.



■ Condenser, Droplet tube, Sealing cap

Product	Taper joint	Cat. No.
Condenser (Allihn type)		200480
Condenser (spiral type)	15/25	200490
Condenser (Dimroth type)		200500
Droplet tube (with side tube)		200510
Sealing cap	29/38	200520
	15/25	200530



■ Stand base

Product	Model	Cat. No.
Stand base	ZS	158710
	ZS-2	203190



Stirring seal TBO type

Material	Taper joint	Cat. No.
Teflon	φ29	121100

Stirring propellers for stirring seal

Model	Material	Spec	Cat. No.
G-1	SUS	58 × 19	121450
G-2		71 × 19	121460
E-1	Glass	58 × 19	121430
E-2		71 × 19	121440
F-1	Teflon	58 × 19	121470
F-2		71 × 19	121480



Stirring shaft for stirring seal

	Material/Model	OD × L (propeller)mm	Cat. No.	
No stirring propeller	SUS	8 × 450 without split	121520	
		8 × 450 with split	121560	
		8 × 600 with split	121570	
	Glass	8 × 450	121490	
		8 × 600	121500	
		8 × 800	121510	
With stirring propeller	All Teflon	T-1	8 × 450 (80 × 17)	121590
		T-11	8 × 600 (80 × 17)	203210
		T-12	8 × 700 (100 × 23)	203220
		T-2	8 × 600 (120 × 23)	121600
	(Anchor type)	T-3	8 × 800 (150 × 25)	121610
		T-1A	8 × 450 (60 × 40)	200210
		T-2A	8 × 600 (80 × 60)	200220

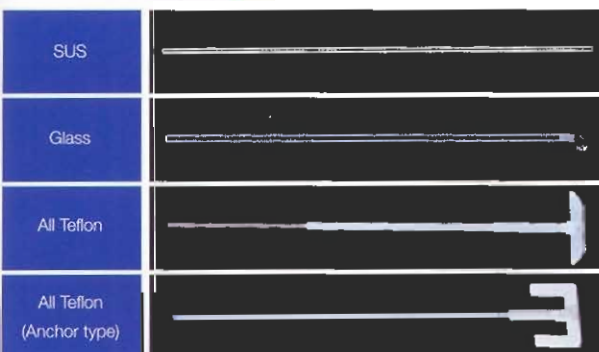


Table of All Teflon stirring shaft and reaction container

Product	Product Model	Jacket type reaction vessel*				Jacket reaction vessel with drainage				Separable round bottom flask		
		BJ-5N	BJ-10N	BJ-20N	BJ-30N	BD-5N	BD-10N	BD-20N	BD-30N	SFR-5	SFR-10	SFR-20
All Teflon stirring shaft	T-1	○				○				○	○	
	T-11	○	○	○		○	○	○		○	○	○
	T-12			○	○			○	○			○
	T-2				○							○
	T-3				○							○
	T-1A	○	○	○	○	○	○	○	○	○	○	○
	T-2A	○	○	○	○	○	○	○	○	○	○	○

External temperature sensor

Applicable Water Bath	Model	Sensor OD × L	Cat. No.
NCB-2300	STP-100	3.2 × 150mm	114220
NCB-2400	STP-110	3.2 × 270mm	203230
NTT-20G	STP-120	3.2 × 420mm	203240
NCB-3100	STP-200	3.2 × 150mm	113620
NCB-3200	STP-210	3.2 × 270mm	203250
PCC-7000	STP-220	3.2 × 420mm	203260
NTB-221			
NCB-1200	STP-300	3.2 × 150mm	198730
NCB-2600			
NCB-2600			

Reaction container, cover

Product	Model	Capacity mL	Cat. No.
Jacket type reaction vessel	BJ-5N	500	201470
	BJ-10N	1000	201480
	BJ-20N	2000	201490
	BJ-30N	3000	201500
Jacket reaction vessel with drainage	BD-5N	500	201510
	BD-10N	1000	201520
	BD-20N	2000	201530
	BD-30N	3000	201540
Separable round-bottom flask	SFR-5	500	200450
	SFR-10	1000	200460
	SFR-20	2000	200470

Product	Model	No. /Taper joint	Cat. No.
Flask Cover	BC-1N	1 × φ29/38	201550
	BC-2N	1 × φ29/38 1 × φ15/25	201560
	BC-3N	1 × φ29/38 2 × φ15/25	201570
	BC-4N	1 × φ29/38 3 × φ15/25	201580
	BC-5N	1 × φ29/38 4 × φ15/25	201590



Product	Model	Cat. No.
Flange stopper	ST-1000	201600
Reaction vessel support	RH-1000	202670
O-ring		201620
Neck adapter	(2 pcs/set)	185260



Please read "Instruction Manual" carefully before using the product for your continued safety.

Component parts to support the system functions



Low Temperature Circulator

GA-1112

Temperature setting range -20~30°C

Excellent cooling capacity
A wide range of temperature setting
(no heater)

Cooling capacity
1200W (liquid temperature 10°C)
Cat. No. 203970

→ P.69



Programmable low temp. precision bath

NCB-3100, 3200, 3300

Temperature setting range -30~80°C

Programmable control and computer communication are available.

Bath capacity 13L, 23L, 41L
3100 Cat. No. 112450
3200 Cat. No. 112460
3300 Cat. No. 112470

→ P.60



Low Temperature Circulator

CCA-1110

Temperature setting range -20~20°C

Compact size suitable for cooling the synthesis equipment
(no heater)

Cooling capacity
450W (liquid temperature 10°C)
Cat. No. 203980

→ P.69



Programmable constant temp. circulator

PCC-7000

Temperature setting range -30~80°C

Ramp control suitable for organic synthesis, crystallization, recrystallization and computer communication are available.

Bath capacity 13L
Cat. No. 127920

→ P.61



Low Temp. Water Bath

PFR-1000

Temp. control range -45~20°C

-45°C low temp. water bath for multi-purpose experiments
(no heater)

Cooling capacity
360W (liquid temperature -20°C)
Cat. No. 197410

→ P.69



Thermo regulating bath

NTT-2400

Temp. control range RT+5~180°C

A variety of containers can be used
Water and oil are available.

Heater capacity 1kW
Cat. No. 195430

→ P.56



Low Temp. Water Bath

NCB-1200

Temp. control range -30~95°C

A wide range of temperature setting
External circulating function is equipped

Cooling capacity
200W (liquid temperature 10°C)
Cat. No. 195590

→ P.58



Programmable Precision Bath

NTB-221

Temp. control range RT+10~200°C

Programmable control and communication control are available.

Heater capacity 1.2kW
Cat. No. 113610

→ P.57

Evaporator,
Vacuum Unit

Organic
Synthesizer

Oven, Electric Furnace,
Incubator, Freezer

Low Temperature Bath,
Constant Temperature Bath,
Condenser, Trap

Low and Constant
Temperature Water
Circulator

Freeze Dryer,
Spray Dryer

Stirrer,
Shaker

Purifier,
Pump

Liquid
Chromatograph

Culture Microbe and
related apparatus

Others



Oil bath
OHB-1000, 2000(G,S)

Temp. control range **RT+10~250°C**

Control panel is detachable
Easy-to-use glass/SUS bath

1000G Cat. No. 200650
2000G Cat. No. 200660
1000S Cat. No. 200670
2000S Cat. No. 200680

→ P.62



Peristaltic pump
SMP, MP series

For sending solvents such as reagent or pH adjustment solution.
S type can be used for external signal input.



SMP-21S
SMP-21
MP-1000S
MP-1000

→ P.102



Immersion cooler
Immersion heater **ECS**
HPC, HPS, HPT

Immersion cooler
-20°C type
-30°C type
-45°C type
-80°C type
Immersion heater
Material: Copper, SUS, Titanium

→ P.65



Electronic balance
CP model

This unit, combined with Process Controller, enables measurement of the solvent amount and automated dosing control.

Electronic balance
Electronic balance for analysis

Electronic balance for analysis

→ P.65



Temperature controller
THD, THS series

THD series for Heater control
THS series for refrigerator alternate control

THD-50 -50~50°C
THD-100 -99~0°C
THS-10 -10~50°C
THS-40 -40~20°C
THS-60 -60~-10°C



→ P.65



Vacuum pump
DIVAC, DTC, MD/MZ, GCD series

4 types of vacuum pump for concentration and vacuum reaction

DIVAC 1.2L DTC-21



MD1C GCD-051X

Diaphragm type
DIVAC series
DTC series
MD/MZ series
Oil rotary type
GCD series

→ P.8



Water Bath
SBC, SBC

SBC-11	10L	SUS
SBC-16	16L	Cold insulator
SBC-24	24L	
SB-6	5.5L	
SB-11	10L	SUS
SB-15	16L	
SB-24	24L	
SB-5	4.5L	Non-flammable material
SB-9L	9L	PP



→ P.65



Refrigerated trap Unit
Solvent Recover Unit **RT series**
DPE series

Trap unit protects vacuum pump and collects the solvents.
Solvent recovery unit operates by vacuum control and condenser.

UT-1000



DPE-2110 PC2001

Refrigerated Trap Unit
UT-1000 -50°C
UT-2000 -100°C
*Cover and accessories are optional accessories.
Solvent Recovery Unit
DPE series
Solvent Recovery Vacuum Pump
PC2001

→ P.10·66

System for compound separation and purification

Medium Pressure Preparative Standard System 1

Basic system for separation and purification can be conducted easily.
Available for separation/purification of compounds and distillates in various field including organic synthesis and biochemistry.



System Code SYS16025

Solvent degassing apparatus	721 (PEEK)
Plunger pump	VSP-3050
Fixed wavelength UV detector	UV-D2
Injector	SV-6010S
Glass column	ID20 x Length300mm
Recorder	SS-100F-MM
Fraction collector	DC-1200
(3 WAY valve, I/O connecting code equipped)	
System rack	STT-110
Column stand	CS-500
Tubing	

*Bottle and test tubes are not included.

Step Gradient System

Ramp step is available up to 8 types of solvents.
Use this system for separation/purification and examination of the conditions.



System Code SYS16032

Solvent degassing apparatus	DG-3310
Plunger pump	VSP-3050
Variable wavelength UV-VIS detector	UV-9000
Injector	SV-6010N
Glass column	ID20 x Length300mm
Recorder	SS-100F-MM
Solvent automatic switch unit	401-128
Fraction collector	DC-1200
(3 WAY valve, I/O connecting code equipped)	
System rack	STT-120
Column stand	CS-500
Tubing	

*Bottle and test tubes are not included.

Step Linear Gradient System

Ramp control combined with linear step is available.
Suitable for examination of conditions for separation/purification.



System Code SYS16027

Solvent degassing apparatus	703
Plunger pump	VSP-3050
Variable wavelength UV-VIS detector	UV-9000
Injector	SV-6010S
Glass column	ID20 x Length300mm
Recorder	SS-100F-MM
Low pressure gradient unit	LPG-1000
Fraction collector	DC-1500
(3 WAY valve, I/O connecting code equipped)	
System rack	STT-120
Column stand	CS-500
Tubing	

*Bottle and test tubes are not included.

Evaporator,
Vacuum UnitOrganic
SynthesizerOven, Basic Function,
Insulation, HeaterLow-temperature Bath,
Constant-temperature Bath,
Circulator, TrapLow and Constant-
temperature Water
circulatorFresh Dryer,
Spray DryerStirrer,
ShakerPeristaltic
pumpLiquid
ChromatographCulture Microbe and
related apparatus

Others

Open Column System

Separation and purification are easily conducted. Suitable for purification of organic compounds and natural products.



System Code SYS16014

Plunger pump	MP-1000
Fixed wavelength UV detector	UV-D2
Recorder	SS-100F-MM
Fraction collector (3 WAY valve, I/O connecting code equipped)	DC-1000
System rack	STT-120
Column stand	CS-500
Tubing	

*Bottle, test tubes and open columns are not included.

Flash Chromatography System

Suitable for shortening time for separation in the open columns or coarse purification.



System Code SYS16020

Plunger pump	WSP-3050
Fixed wavelength UV detector	UV-D2
Flash Column	ID20 x Length200mm
Recorder	SS-100F-MM
Fraction collector (3 WAY valve, I/O connecting code equipped)	DC-1200
System rack	STT-120
Column stand	CS-500
Tubing	

*Bottle and conical flask are not included.

Medium Pressure Preparative Standard System 2

Basic system using the variable wavelength detector. Available for separation/purification of compounds and distillates in various field including organic synthesis and biochemistry.



System Code SYS16039

Solvent degassing apparatus	721 (PEEK)
Plunger pump	WSP-3050
Variable wavelength UV-VIS detector	UV-9000
Injector	SW-6010S
Glass column	ID20 x Length300mm
Recorder	SS-100F-MM
Fraction collector (3 WAY valve, I/O connecting code equipped)	DC-1500
System rack	STT-120
Column stand	CS-500
Tubing	

*Bottles and test tubes are not included.



Concentration and extraction units for synthesis samples

Liquid-liquid extraction (exclusive use for ChemStation PPS, PPW, PPV, and Zodiac GCX)



Separatory funnel is not required.
Liquid-liquid extraction is easily available.

Pipette (manual)
Cat. No. 198610
Separation tube (6 tubes/set)
Cat. No. 198620

Complicated liquid-liquid extraction (mixing/separating) which is required after synthesis can be conducted in the same test tube. Conducting operations in one line reduces the time and labor significantly.



Mixing
Mixing the two phases with Magnetic Stirrer by one-touch.

Solvent removal
Remove all the lower phase solvent.

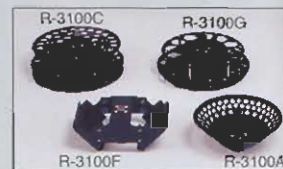
Separation
In order to take the upper phase, you can separate the solvent in the separatory tube and drop the lower phase.

Centrifugal Evaporator CVE-3100



No. of test tubes 12 ~ 48
Cat. No. 188820

Suitable for combichem synthesis samples, concentration of a small volume of multiple synthesis sample, removal of solvents, and pre-analysis processing.



Test Tube Evaporator TVE series

Suitable for combichem synthesis sample, speedy concentration of a small amount of synthesis sample, and solvent removal.



TVE-2000

TVE-1000
Cat. No. 117910
No. of attachable test tubes 8
TVE-2000
Cat. No. 117920
No. of attachable test tubes 32

Pressured Gas Blowing Concentrator MGS series

Suitable for concentration of a small amount of oxidizing/reducing synthesis sample and solvent removal.



MGS-2100

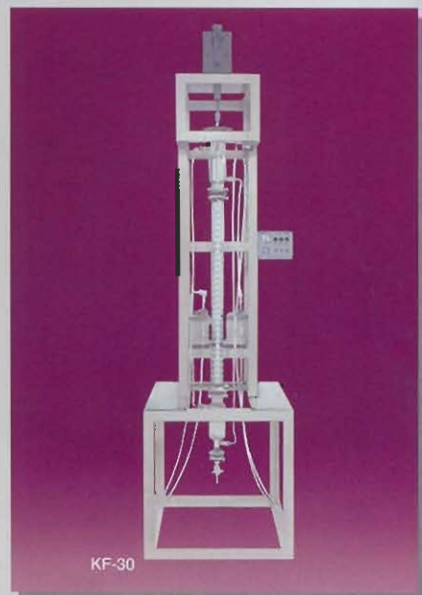
MGS-2000
No. of attachable containers 6 ~ 20
Block 1
MGS-2100
No. of attachable containers 12 ~ 40
Block 2



Reciprocating Liquid Liquid Counter Current Extractor KF-30

Suitable for separation/extraction of synthesis sample which tends to emulsify quickly and extraction of a minute amount of component.

KF-30
Cat. No. 184960
Column 6 tiers



KF-30

Rotary Vacuum Evaporator N-1000

Suitable for concentration of synthesis sample from a small amount to scale-up, solvent removal, concentration of intermediate synthesis and preprocessing for analysis.



N-1000V-W

N-1000T-W

N-1000S-W
Cat. No. 188730
Inclined condenser
N-1000T-W
Cat. No. 194790
Trap type condenser
N-1000V-W
Cat. No. 188750
Vertical condenser



Convection Oven
NDO series
P.44



Multi Thermo Incubator
MTI series
P.50



Forced Air Flow Oven
WFO series
P.45



Light Stability Testing Device
LST series
P.51



Vacuum Drying Oven
VOS series
P.46



Illuminated Incubator
FLI series
P.52



Electric Furnace (Muffle furnace)
TMF series
P.47



Environmental Chamber
KCL series
P.53



Low Temp. Incubator
LTI series
P.48



Personal Freezer
PF series
P.54



Incubator
SLI series
P.49



Programmable Freezer
MPF-1000
P.54

Convection Oven NDO series



Air flow: Gravity Convection
Temp. range: RT+10~250°C
40~250°C(for SD series)
Chamber capacity: 81~150L

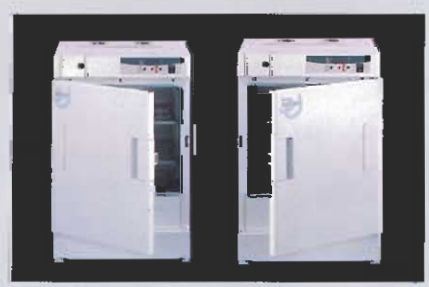


NDO-700

- ★ Two types are available. Reasonable and slim-sized 400, 700 models are equipped with standard timer function. SD model is equipped with a variety of programmable operations.
- W, SD models are equipped with the view window.
- ★ Opening side of the door for 400 and 700 models can be changed depending on the installing place.
- ★ SD series are equipped with a cable hole.

Model	400, 700	SD
Air flow	Gravity Convection	
Temperature range	RT+10~250°C	40~250°C
Temperature accuracy	±1°C	±1°C
Temperature control	PID control	PID control with Auto-tuning function
Program	AUTO-start, Auto-stop	
	Repeat, Step, Temp. ramp	
Safety feature (Alarm)	Door, Sensor, Upper-Lower temperature limit, Power failure	
	Temperature control fault	Heater fault, Temperature ramp
Safety function	Breaker for electrical leakage and excess current, Independent overheat protector	

Model	Cat. No.	Chamber capacity
NDO-400	194880	450 × 450 × 400, 81L
NDO-400W	194870	
NDO-700	194880	450 × 450 × 700, 142L
NDO-700W	194890	
NDO-451SD	181620	450 × 450 × 400, 81L
NDO-601SD	181630	600 × 500 × 500, 150L



For 400, 700 model, the open side of the door can be changed.

Optional accessories

For best use of installing space

- Table with casters
NDO-400, 400W, 451SD, 601SD
- Stackable table for
NDO-400, 400W, 451SD, 601SD

Gas can be exhausted to the draft chamber

Exhaust unit (for NDO-400, 400W, 700, 700W)
EU-300 Cat. No. 195350

Additional shelf board and shelf board support are available

Recorder output, communications (for SD series), right side open door for SD series, cable hole are available depending on your request.

Please visit our website for further information of general catalogue



Control panel (400, 700 series)



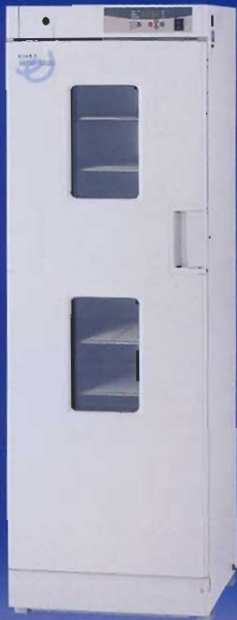
Control panel (SD series)

Forced Air Flow Oven

WFO series



Air flow: Forced Air Flow
 Temp. range: RT+10~210°C
 40~200°C(for SD series)
 Chamber capacity: 81~300L



WFO-1200W

- ★ Two types are available. Reasonable and slim-sized 400, 700, 1200 models are equipped with standard timer function. SD model is equipped with a variety of programmable operations. W-SD model is equipped with the view window.
- ★ Opening side of the door for 400, 700, and 1200 models can be changed depending on the installing place.
- ★ SD series are equipped with a cable hole.

Model	400, 700, 1200	SD
Air flow	Forced Air Flow	
Temperature range	RT+10~210°C	40~200°C
Temperature accuracy	±1°C	±1°C
Temperature control	PID control	PID control with Auto-tuning function
Program	Auto-start, Auto-stop	
		Repeat, Step, Temp. ramp
Safety function (Alarm)	Door, Sensor, Upper-Lower temperature limit, Power failure	
	Temperature control fault	Heater fault, Temperature ramp
Safety function	Breaker for electrical leakage and excess current, Independent overheat protector	

※ 1200, 1200W, and 1001SD models are AC200V single phase and mains plug is not attached.

Model	Cat. No.	Chamber capacity
WFO-400	194900	450 × 450 × 400, 81L
WFO-400W	194910	
WFO-700	194920	
WFO-700W	194930	450 × 450 × 700, 142L
WFO-1200	194940	450 × 450 × 1215, 246L
WFO-1200W	194950	
WFO-451SD	181490	450 × 450 × 400, 81L
WFO-601SD	181500	600 × 500 × 500, 150L
WFO-1001SD	181510	600 × 500 × 1000, 300L



For 400, 700, and 1200 model, the opening side of the door can be changed.

Please visit our website for further information of general catalogue



Optional accessories

For best use of installing space

Table with casters

WFO-400, 400W, 451SD, 601SD

Stackable table for

EFO-400, 400W, 451SD, 601SD

Gas can be exhausted to the draft chamber

Exhaust unit (for NDO-400, 400W, 700, 700W, 1200, 1200W)

EU-300 Cat. No. 195350

EU-400 Cat. No. 195360

Additional shelf board and shelf board support are available

※ Recorder output, communications (for SD series), right side open door for SD series, Air flow controller, and cable hole are available depending on your request.



Control panel (400, 700, 1200 model)



Control panel (SD series)



Please read "Instruction Manual" carefully before using the product for your continued safety.

Vacuum Drying Oven VOS series



Heating method: Chamber heating
 Temperature range: 40~200, 240°C
 Vacuum range: 667hPa~133Pa
 Temperature reaching time: 70~100min



VOS-451SD

- ★ Microprocessor-controlled program enables digital timer, Auto-start/stop and 2 step repeat operation.
- ★ Overheat protector, which is independent from temperature controller is equipped.
- ★ VD series provides the vacuum rate by digital setting/display and self-gas replacement control. Collective control by microprocessor allows stable chamber condition.

Model	VOS-201SD	VOS-301SD	VOS-451SD	VOS-601SD
Cat. No.	181680	181690	181700	181710
Heating method	Chamber heating			
Temp. range	40~240°C			40~200°C
Temp. accuracy	± 1.5°C(at 240°C setting)			± 1.5°C(at 200°C)
Temp. reaching time	Approx.70 min.		Approx.80 min.	Approx.100 min.
Ultimate vacuum	133Pa (1Torr)			
Temp. control	Microprocessor PID control (Auto-tuning)			
Program	Digital timer (1min - 99hr59min), Auto-start, Auto-stop, 2 step repeat, Step program (within 8 steps)			
Safety function	Self-diagnosis function (Sensor alarm, Overheat alarm, Power failure alarm, Door alarm, Input error alarm, Upper/Lower limit temp. alarm, Heater fault alarm), Breaker for excess current and leakage, Independent overheat protector (50-300°C)			
Vacuum gauge	Bourdon type, 0.1-0MPa			
Chamber dimension	192 × 270 × 192	300 × 300 × 300	450 × 450 × 450	600 × 600 × 600
Chamber capacity	10L	27L	91L	216L
Shelf pitch, No. of shelves	90mm, 2 (fixed)	71mm, 4 (fixed)	71mm, 6 (fixed)	95mm, 6 (fixed)
Overall dimension	355 × 400 × 580	505 × 540 × 760	655 × 595 × 905	860 × 780 × 1720(table included)
Power source	AC100V, 50/60Hz 0.77kVA	AC100V, 50/60Hz 1.25kVA	AC200V, 50/60Hz 2.15kVA	AC200V, 50/60Hz 2.55kVA

VOS-300VD, Cat. No. 164530 (40~240°C, 27L, 100V)
 VOS-450VD, Cat. No. 164540 (40~240°C, 91L, 200V)



Control panel (SD model)



Control panel (VD model)



Vacuum gauge (SD model)



Independent overheat protector

Vacuum Pump

← P.9

Vacuum Controller

→ P.11

Refrigerated Trap

→ P.65

Option

ON-OFF of vacuum pump can correspond to opening/closing of vacuum valve.

Vacuum Pump Controller

Model A Cat. No. 164560

Model B Cat. No. 164570

For best use of the installing space.

Table with casters

HSS-11C for VOS-201SD, 301SD, 300VD

Cat. No. 100290

Stackable table for

VOS-451SD, 450VD

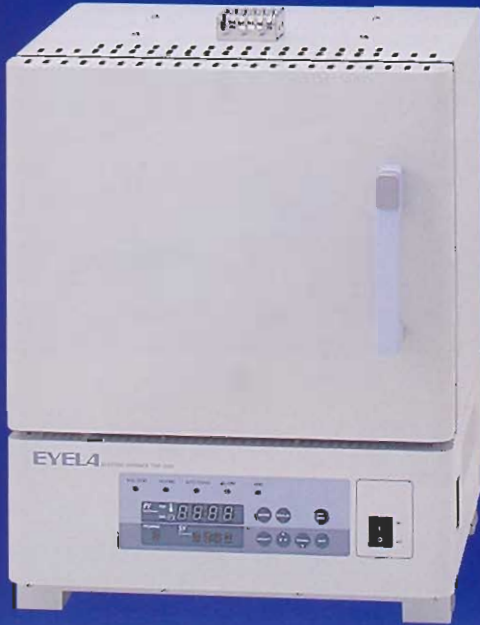
HSS-21C Cat. No. 100300

Please visit our website for further information of general catalogue



Programmable Electric Furnace

TMF-1200, 2200, 3200



TMF-2200



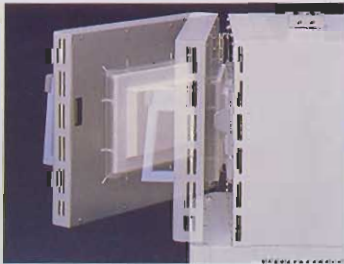
Temperature range: 200~1150°C
Temperature reaching time: 28~35min

- ★ Installed programs enables step-by-step rising of temperature from preliminary stage to final stage of burning. 5 patterns maximum.
- ★ Quick cooling system, which forcibly exhausts inside air by fan, enhances the operation rate.

Model	TMF-1200	TMF-2200	TMF-3200
Cat. No.	181720	181730	181740
Temp. range/accuracy	200~1150°C/±1.5°C		
Working temperature	1150°C		
Temp. reaching time	Approx. 35 min	Approx. 28 min	Approx. 32 min
Temperature control	Microprocessor P.I.D control (Auto-tuning)		
Program	5 patterns		
Safety function	Self-diagnosis function (Input error alarm, Heater fault alarm, Power failure alarm, Upper/Lower temp. limit alarm, Sensor alarm), Overheat alarm), Breaker for leakage/excess current, Independent overheat protector		
Ancillary function	2 step open/close mechanism door, Quick cooling system		
Fan	Exterior cooling, Chamber exhaust		
Chamber dimension	100 × 150 × 100	200 × 250 × 150	300 × 250 × 150
Chamber capacity	1.5L	7.5L	11.25L
Overall dimension	370 × 380(485) × 530(560)	470 × 480(585) × 580(610)	570 × 480(585) × 580(610)
Power source	AC100V, 1.15kVA	AC200V, 2.5kVA	AC200V, 3.3kVA



Control panel

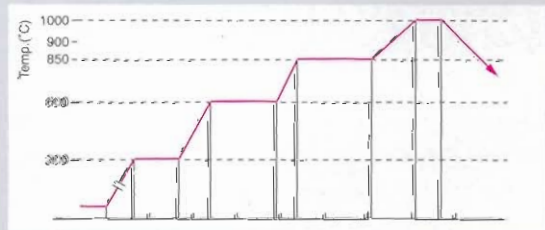


The door can be kept half-open, which prevents the heated air from blowing out front.

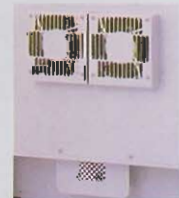
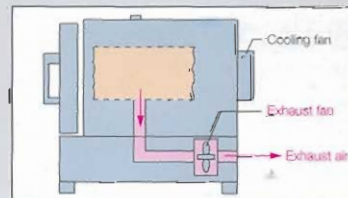
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■ Example of program



■ Quick Cooling System



■ Optional

Gas can be exhausted to a draft chamber.

Exhaust Unit

Model EU-100 Cat. No. 160870
Model EU-200 Cat. No. 160880



Please read "Instruction Manual" carefully before using the product for your continued safety.

Low Temp. Incubator

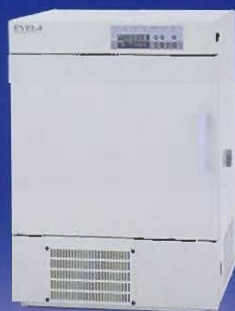
LTI series



Forced Convection: Air jacket gravity convection
 -10~60°C: 4~60°C
 140~300L: 150, 300L



LTI-700W



LTI-601SD

- ★ Slim-sized 700, 1200 model are at reasonable cost.
SD, ED-N, ED models provide various program operations.
ED-N, ED models are Air jacket convection type.
- ★ The opening side of the door for 700, 1200 models can be changed depending on the installation space. Anti-bacterial stainless steel inside the chamber.
- ★ W models are equipped with the view window.

Model	700, 1200	SD
Air flow	Forced convection	
Temp. range	-10~60°C	
Temp. accuracy	±0.1°C~	
Temp. uniformity	1~Max.7°C	2~Max.3°C
Temp. control	PID control	PID control (Auto-tuning)
Program	Auto-start, Auto-stop	
	Step	Repeat, Step

Model	ED-N/ED
Air flow	Air jacket gravity convection
Temp. range	4~60°C
Temp. accuracy	±0.2°C~
Temp. uniformity	2~Max. 5°C
Temp. control	PID control (Auto-tuning)
Program	Auto-start, Auto-stop
	Repeat, Step

Model	Cat. No.	Chamber capacity
LTI-700	197490	500 × 400 × 700 (140L)
LTI-700W	197500	(140L)
LTI-1200	197510	500 × 400 × 1200 (240L)
LTI-1200W	197520	(240L)
LTI-601SD	181470	600 × 500 × 500, 150L
LTI-1001SD	181480	600 × 500 × 1000, 300L
LTI-601ED-N	181790	600 × 500 × 500, 150L
LTI-601ED	181780	600 × 500 × 500, 150L
LTI-1001ED	181800	600 × 500 × 1000, 300L

Optional accessories

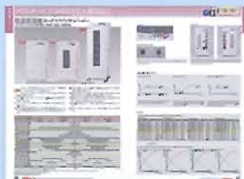
For best use of installing space

Table with casters
for LTI-700
for LTI-601

External communication and recording are available

RS-232C communication cable and Recorder output cable are available depending on your request (for SD, ED-N, ED series).

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general catalogue



Personal 11L type, electronic cooling by Peltier element



LTI-2000
Cat. No. 188280
Forced convection (with air flow adjustment function)
Temperature range: 3~40°C
Temperature accuracy: ±0.5°C
Chamber dimension: 280 × 190 × 200, 12L

Incubator SLI series



Air flow: Air jacket gravity convection
Temp. range: RT+5~60°C



SLI-700-C

★400, 700, 1200 models are slim-sized, equipped with standard timer function. The opening side of the door can be changed. C type is equipped with cable holes on right and left sides.

★Anti-bacterial stainless steel inside the chamber.

Model	SLI-400/400-C	SLI-700/700-C	SLI-1200/1200-C
Cat. No.	197180/197200	197190/197210	197960/197990
Air force	Air jacket gravity convection		
Temp. range	RT+5~60°C		
Temp. accuracy	±0.1°C(at 37°C setting)		±0.2°C(at 37°C)
Temp. uniformity	1.0°C(at 37°C setting)		1.5°C(at 37°C)
Timer set range	0~99hr 59min		
Safety function	Alarm function (Upper temp. limit, Door open, Sensor, Power failure, Temp. control fault, Watchdog), Independent overheat protector (variable 30~70°C), Breaker for leakage/excess current, Fuse (for service AC outlet)		
Chamber dimension	434 × 400 × 450	434 × 400 × 700	430 × 400 × 1200
Chamber capacity	Approx. 78L	Approx. 121L	Approx. 206L
Overall dimension	526(553) × 550 × 800	526(553) × 550 × 1050	550(577) × 590 × 1800
Net weight	Approx. 41kg	Approx. 47kg	Approx. 82kg
Power source	AC100V, 50/60Hz		

※Model C is equipped with cable holes (on right and left sides)

Personal type 16L



SLI-220 model
Cat. No. 197980
Air jacket gravity convection
Temp. range: RT+5~60°C
Temp. accuracy: ±0.5°C
Chamber dimension: 310 × 240 × 220, 16L

Control panel



The opening side of the door of 400, 700, 1200 models can be changed.

Option

Temperature inside the chamber can be recorded

Record output terminal (additional option type)
HRC-1 Cat. No. 197260

Shaker can be installed in the chamber

Shelf for shaker installation
HSI-1 Cat. No. 197270

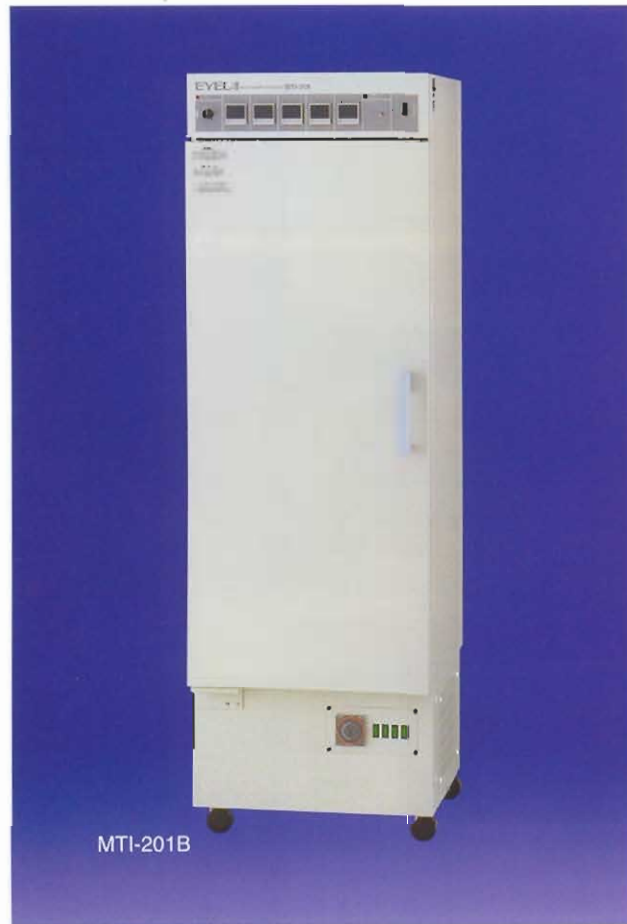
Best use of space, easy to move or install the unit

Fittings for piling two units
HSD-400(for SLI-400) Cat. No. 197230
HSD-220(for SLI-220) Cat. No. 198010
HSD-221(for SLI-220, LTI-2000) Cat. No. 198020
Adjuster Caster (4 pcs/set)
HAC-1(for SLI-400, 700) Cat. No. 197240

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Multi Thermo Incubator (Multi tiers temperature-controlled testing machine) MTI series



MTI-201B

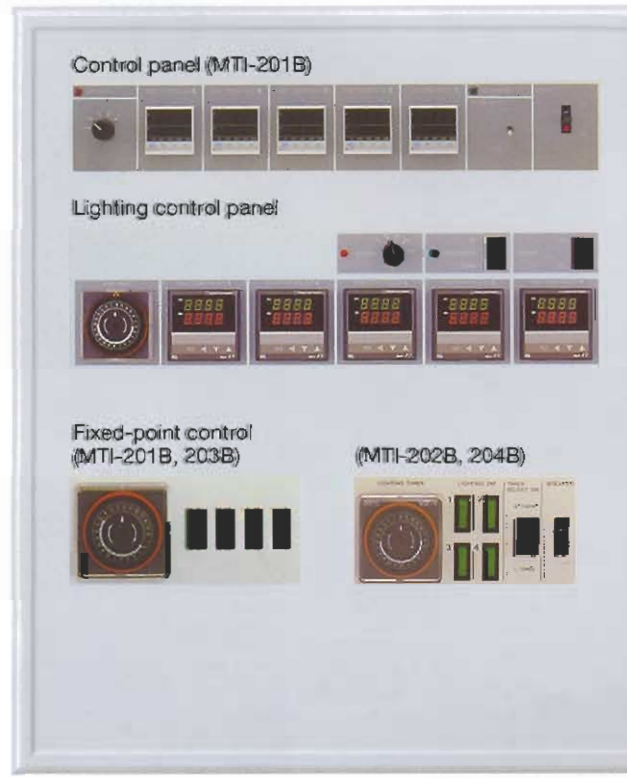


Air flow: Forced convection
Temp. range: 5~50°C
No. of tiers: 3~5
Lighting: 40W × 4

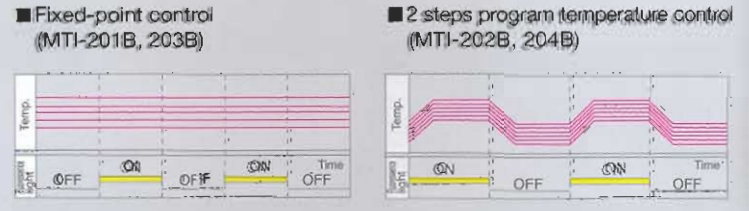
- ★ Multi tiers incubator for environmental change test of resin or pigment and the denaturation test of chemicals, food or grain, Each tiered incubator is equipped with AC outlet.
- ★ Temperature of each chamber can be controlled automatically by 2 steps program (MTI-202B, MTI-204B).
- ★ Each chamber is equipped with recorder output terminal (MTI-202B, 204B).

Model	MTI-201B	MTI-202B	MTI-203B	MTI-204B
Cat. No.	139700	139720	139740	139760
Air force	Forced convection			
No. of tiers	5		3	
Temp. control	Fixed-point	2 step program	Fixed-point	2 step program
Temp. range and accuracy	5~50°C, ±1.0°C			
Temp. control	Lowest tier: Refrigerator ON-OFF control (NORM. mode) Refrigerator ON-OFF+Timer control (INT. mode) Other tiers: Heater PLD control			
Lighting time setting	24 hour timer (minimum setting: 15min)			
Safety function	Independent overheat protector (30~70°C setting), Breaker for leakage/excess current			
Lighting (white fluorescent)	400W × 4			
Chamber size/tier	400 (375) × 470 × 195	390 (365) × 470 × 330		
Ambient temp.	5~30°C			
Overall dimension	560 × 670 (735) × 1780	560 (580) × 710 (735) × 1780	560 × 670 (735) × 1780	560 (580) × 710 (735) × 1780
Power source	AC100V, 50/60Hz, 1.6kVA		AC100V, 50/60Hz, 1.6kVA	

※Please operate in INT. mode when set temperature of the lowest tier is below 15°C.
 ※During INT. mode (refrigerator stops operation), chamber temperature rises about 2~4°C.
 ※The figures in the parentheses in chamber size/tier exclude the protruded part (sensor part).



2 types of temperature control



Light intensity in chamber

Not. of 'ON' lamps	1 pcs	2 pcs	3 pcs	4 pcs
Light intensity (approx.)	2,500 lx	5,000 lx	7,500 lx	10,000 lx

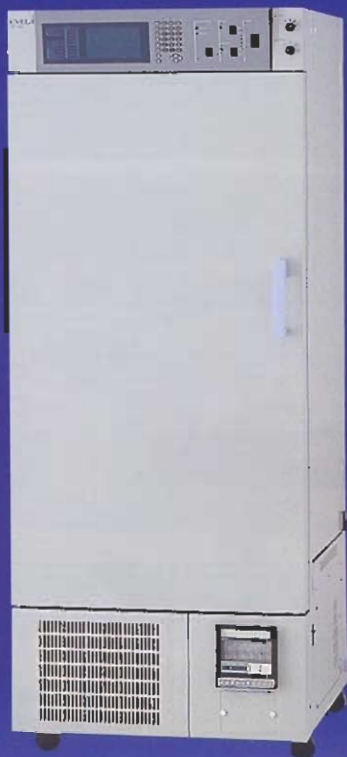
■ Option
Recorder REC-5 Cat. No. 171930

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Light Stability Testing Device

LST-300, 300D



LST-300D

Recorder is not included.



Air flow: Forced convection
 Temp. range: 5~60°C
 Light control range: 0 or 500~15000Lx (stepless)
 0 or 500~8500Lx (stepless)

- ★ For stability test of pharmaceuticals and light stability test of materials.
- ★ Chamber has a large capacity of 300L.
 Maximum lighting intensity 15000Lx (LST-300), 8500Lx (LST-300D).
- ★ Exposure to ultraviolet radiation is examined by Quinine Chemical Actinometry.

Model	LST-300	LST-300D
Cat. No.	110990	183150
Air flow	Forced convection	
Temp. range/accuracy	5~60°C (10~60°C 3000Lx min./Mode 1: ±0.5°C, Mode 2: ±1.0°C)	
Humidity range/accuracy	50~90%RH, Mode 1: ±5%RH, Mode 2: ±5%RH-	
Lighting range/accuracy	0 or 500~15000Lx stepless/±100Lx max.	0 or 500~8500Lx stepless/±100Lx max.
NUV intensity range	0 or approx. 0.3 (0~1.20)mW/cm ²	0 or approx. 0.01~0.32mW/cm ²
Defrost	1. Automatic control (during operation) 2. Manual (Manual start, Auto-stop) 3. Timer control (Auto-start, Auto-stop)	
Light, NUV lamp	40W × 12(fluorescent lamp), 40W × 3(360nm)	40W × 12(D-65 lamp), 40W × 3(360nm)
Chamber dimension	520 × 550 × 1050, 300L	
Overall dimension	720 × 750(880) × 1810, () includes dimension of handle	
Power source	AC100V 50/60Hz, 1.9kVA (Service AC outlet is not included)	

LST-300 (with recorder)

Cat. No. 110991

LST-300D (with recorder)

Cat. No. 183151

Control panel



Normal Mode (Fixed-point) display

NORMAL MODE			
NORMAL CONTROL ON			
PARAM	SET	MEAS	UNIT
TEMP	20.0	20.2	°C
HUMI	70.0	70.2	%RH
LIGHT	10000	10123.5	Lx
UV		0.4	mW/cm ²
L-INT	1000	0.1	mW/cm ²
UVINT	0.0	0.1	mW/cm ²
RT 15.5 °C			

Program Mode display



Program execution graph indication

Temperature

Lighting intensity

Optional accessories

To provide uniform testing environment for solvent

Turn table

Model LST-7 Cat. No. 111000

For acceleration test

NUV lamp (6 pcs)

Cat. No. 144400

For an extended operation

Pure water supply device for humidification

Cat. No. 139100

Rack for Polyethylene tank

Cat. No. 144210

Please visit our website for further information of general catalogue



Illuminated Incubator FLI series



Air flow: Forced convection, descending air
Lighting range: 0~approx. 15000Lx (1001 model)
0~approx. 25000Lx
Lighting: Fluorescent light

- ★ Controls the temperature, humidity and lighting in order to reproduce a natural environment as much as possible.
- ★ Stepless light control by light sensor (T, TH model).
- ★ Using an optional unit enables to control the concentration of carbon dioxide or to control at high illumination suited to the culturing conditions.



FLI-2000

FLI-160

Model	160	2000				1001
		A	H	T	HT	
Air flow	Forced convection	Descending air				Forced convection
Temp. control	range(°C)	4-50				5-45
	accuracy(°C)	±1.0-				±1.0-
	program	Ramp				Ramp
Humidity control	range(%)	—	5-90	—	5-90	50-90
	program	—	Ramp	—	Ramp	Ramp
Illumination control	range(Lx)	~25000(6 tiers)	~25000(6 tiers)	~25000(stepless)	~15000(7 tiers)	~55000(10 tiers)
	option(Lx)	—	~50000(7 tiers)	—	—	—
	Program	—	Step control	Stepless control	—	Ramp control
Refrigerant	R22	HFC (R134a)				R22

Model	Cat. No.	Chamber capacity
FLI-160	139530 (50Hz)	400 × 400 × 1000, 160L
	139540 (60Hz)	
FLI-2000A	204840	520 × 520 × 1050, 280L
FLI-2000H	204850	
FLI-2000T	204860	
FLI-2000HT	204870	
FLI-1001	139370	1000 × 970 × 1050, 1000L

Operation panel



FLI-2000



FLI-160

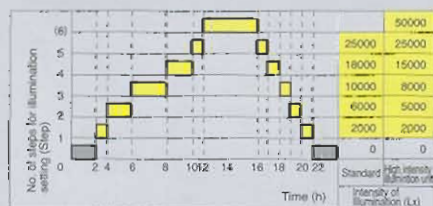


FLI-1001

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Example of program pattern



Program setting display



Graph indication display

Option

- Carbon dioxide concentration controller (factory option)
Control range: room concentration+3000ppm
- High illumination unit (factory option, field installation)
Maximum illumination intensity: approx. 50,000Lx (2000 model)
: approx. 55,000Lx (1001 model)
(Height after installation: 300mm)
- Pure water transfer device for humidification (2000H, HT, 1001 model)
- Rack for Polyethylene tank
Cat. No. 144210 (FLI-2000H, HT)
Cat. No. 144220 (FLI-1001)

Environmental Chamber *Enviros*

KCL-2000A, 2000W



Air flow: Forced convection
Temp. range: -15~85°C
Humidity range: 25~98%RH
Chamber capacity: 140L



KCL-2000W

- ★ Accurate program control of a wide range of temperature and humidity.
Temp:-15 ~ 85°C, Humidity: 25 ~ 98%RH.
- ★ Anti-bacterial tubing for inside tubing, anti-bacterial wick and anti-bacterial stainless steel for main internal parts.
- ★ Chamber capacity is 140L. Refrigerant is HFC.
- ★ Recorder output terminal, RC-232C communication terminal, and alarm output terminal are included standard equipment to support the validation.
- ★ Door can be opened either left or right side (A series). View window is equipped (W series).
- ★ Table with casters (H:410mm) is a standard accessory.

Model	KCL-2000A	KCL-2000W
Cat. No.	204580	204590
Air flow	Forced convection	
Temperature range/accuracy	-15~85°C, ±0.5°C	
Humidity control range/accuracy	25~98%RH, ±3%RH	
Control method (temp. humidity)	Microprocessor based P.I.D control	
View window	200 × 540 (Quadruple glass with heater)	
Program	Ramp program: 7 pattern (10 segments/1 pattern) Linked program: 6 patterns max. Repeat operation, Auto-start, Auto-stop	
Overall dimension	635 × 755 × 1695	
Chamber dimension, capacity	500 × 400 × 700, 140L	

■ Operation panel



■ Display (Setting display indication)

	SET	MEAS
Temp	41.0°C	40.1
Humi	75.0% RH	74.8% RH
Total Time	102/13:20	

■ Optional accessories

Useful when drainage equipment is not available near the unit.
 Drain tank capacity: approx. 10L, Cat. No. 204960 (with overflow alarm)
 Shelf Cat. No. 197540
 Shelf support Cat. No. 204980
 RS-232C communication cable Cat. No. 199920
 Recorder, alarm output lead wire Cat. No. 114230

■ Related products

Cartridge Type Water Purifier ERN model for humidification (See page 137.)

Vacuum valve connecting unit
Cat. No. 190860



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Personal Freezer PF-1000



PF-1000

- ★ Temperature setting is changeable -25°C or -40°C and digital display.
- ★ Door lock equipment enables individual control of the precious sample.
- ★ The upper door makes less temperature change.

Model	PF-1000
Cat. No.	187220
Cooling method	Drum cooling
Temperature setting/display	-25°C or -40°C, digital
Safety function	Leakage/excess current breaker, refrigeration unit overload relay, Temp. controller self-diagnosis function (High temp. alarm, Sensor fault alarm, Door alarm, FAIL check)
Equipped function	Defrost function, Frost prevent function
Refrigeration unit/Refrigerant	Air cooling, output 250W, R404A
Chamber dimension, capacity	239(upper part) × 299(upper part) × 200, approx. 10L
Chamber working dimension/working capacity	175 × 235 × 155, 6.4L
Overall dimension	550 × 428 × 382
Input/Rated Power source	AC100V, 50/60Hz, 300VA

Operation panel

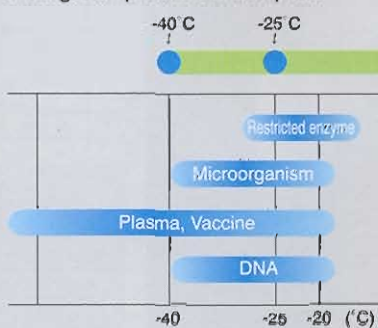


Door lock

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Storage temperature of samples



Optional accessory

Ensures freezing of the sample by securing the cooling air.

Shelf TB-1
Cat. No. 114210

Enables to place 1.5mL microtube × 192



Aluminum case PF-T
Cat. No. 167510

Programmable Freezer MPF-1000



MPF-1000

- ★ Temperature program avoids injuries to biogenic samples.
- ★ Suitable for freezing animal or plant cells and microorganism.

Model	MPF-1000
Cat. No.	168170
Temp. range/accuracy	-40~30°C, ±0.15°C max.
Temp. ramp (cooling)	less than 1.0°C/min (20→-30°C), less than 0.5°C/min (-30→-40°C)
Program	Fixed-point, Auto-start, Auto-stop, User program 7 patterns
External input/output	RS-232C communication terminal, External temperature sensor terminal
Chamber working dimension/capacity	153 × 116 × 140 3.5L
Overall dimension	454 × 650 (700) × 439
Input/Rated power source	AC100V, 50/60Hz, 1.5kVA

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Optional accessories

- External temperature sensor
STP-200 Cat. No. 113620
- RS-232C cable
RSC-1100 Cat. No. 167360



Compact Water Bath
NTT-2000 series
Immersion
Thermo-Regulator
NTT-2100 series

P.56



Programmable Freezer
MPF-1000

P.61



Water Circulation Bath
NTT-20S, 20G
Programmable Precision Bath
NTB-221
Water Bath with Window
HBS series

P.57



Water bath
SB-350, 1000
OSB-1000
OHB

P.62



Low Temp. Bath
UA-1000
UA-1100
NCB-1200

P.58



Oil Bath with Magnetic Stirrer
PS-1000
Low Temp. Bath with Magnetic Stirrer
PSL series

P.63



Low Temp. Bath
NCB-2300
NCB-2400
NCB-2500
NCB-2600

P.59



Dry Thermo Bath
MG-1000
Dry Thermo Bath
MG-2000, 2100

P.64



Programmable Low Temp. Precision Bath
NCB-3100
NCB-3200
NCB-3300

P.60



Immersion Cooler
ECS series
Bath
Immersion Heater
Thermo-Controller

P.65



Crystallized Constant Temp. Circulator
PCC-7000

P.61



Refrigerated Cold Trap
UT series

P.66

Compact Water Bath NTT-2000



NTT-2000

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- ★ Compact sized bath with 200W × 325D with low electrical consumption.
- Mild stirring enables incubation at low water level of 40mm. Anti-bacterial stainless steel.

Model	NTT-2000
Cat. No.	195400
Temperature range	RT+5~70°C
Temperature accuracy	±0.07°C
Temperature control	Microprocessor based P.I.D control
Heater	300W (SUS 316L, for water)
Chamber dimension (working)	165 × 290 × 97 (160 × 180 × 70)
Overall dimension	200 × 105 (325) × 207 (70)
Net weight	Approx. 2.5kg
Input/Rated power consumption	AC100V, 50/60Hz, 0.4kVA

- Optional accessory Bath cover (for equipped bath)
SBK-2 Cat. No. 196200

Placing this unit on the Shaker SS-1000 makes a compact-sized Shaker which is excellent in cleaning.

NTT-2000 SS-1000

Immersion Thermo-Regulator NTT-2100, 2200, 2400



NTT-2400

NTT-2100 · 2200

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general catalogue



- ★ 3 types available: energy saving type less than 80°C, external circulation type less than 80°C, and less than 180°C type.
- Anti-bacterial stainless steel is used.

Model	NTT-2100	NTT-2200	NTT-2400
Cat. No.	195410	195420	195430
Temp. range (when using bath)	RT+5~80°C (RT+5~70°C)		RT+5~180°C
Heater	500W(water)	1kW(water)	1kW(water/oil)
Stirring	Propeller	Water jet (circulation outside bath)	
Safety feature	Self-diagnosis, Empty heating protector, Overheat protector		
Standard accessory bath	Capacity:9L, Material:Non-flammable PP resin		
Overall dimension (bath equipped)	138 × 150 × 312 (220 × 424 × 335)		138 × 150 × 312
Input/Rated power source	AC100V, 50/60Hz, 600VA	AC100V, 50/60Hz, 1.1KVA	AC100V, 50/60Hz, 1.1KVA

- Optional accessories
 - Bath Cover (for standard accessory bath)
 - SBK-1 Cat. No. 196190
 - Cooling Coil
 - CC-1 Cat. No. 114250
 - Nozzle for external circulation
 - ON-1 (for 2200 model) Cat. No. 114260
 - ON-2 (for 2400 model) Cat. No. 114270



NTT-20S

Water Circulation Bath Thermopet NTT-20S, 20G

- ★ Compact-sized desk-top type for multi-purpose.
- ★ 2 types are available: RT+5 ~ 95°C and RT+5 ~ 180°C.

Model	NTT-20S	NTT-20G
Cat. No.	195440	195450
Temp. range/accuracy	RT+5~95°C, ±0.05°C~	RT+5~180°C, ±0.1°C~
Bath(working)dimension/capacity	150W × 260D × 150H(150W × 75D × 150H), 5.5L	
Overall dimension	194 × 306 × 359	
Input/Rated power source	AC100V, 50/60Hz, 1.1kVA	

■ Optional accessory External temperature sensor



NTB-221

Programmable Precision Bath Pro-Thermo Bath NTB-221

- ★ Accurate control of external equipment by program control and circulation function.
- Compute interface.

Model	NTB-221
Cat. No.	113610
Temp. range/accuracy	RT+10~200°C, ±0.03°C~
External input/output	RS-232C communication terminal, External temperature sensor terminal.
Bath(working)dimension/capacity	250W × 295D × 180H (250 × 150 × 180), 13L
Input/Rated power source	AC100V, 50/60Hz, 1.3kVA

■ Optional accessory RS-232C cable, External temperature sensor, Clamp set.



HBS-1100

Water Bath with Window UNI ACE HBS-1000, 1100, 1200

- ★ View window enables to check the condition of sample and viscometer.
- ★ Temperature sensor compensation function is equipped.

Model	HBS-1000	HBS-1100	HBS-1200
Cat. No.	182370	182380	182390
Temp. range/accuracy	RT+5~80°C(10~RT±5°C when refrigeration unit is used), ±0.03°C~		
Bath dimension/capacity	300 × 250 × 300, approx 22.5L	400 × 350 × 300, approx 42L	500 × 400 × 350, approx 70L
Overall dimension	490 (521) × 310 × 480	590 (621) × 410 × 480	690 (721) × 460 × 530
Input/Rated power source	AC100V, 50/60Hz, 1.5kVA	AC200V, 50/60Hz, 2.3kVA	AC200V, 50/60Hz, 3.5kVA

■ Optional accessory Rack, Cooling pipe, Automatic water supply unit, Stirring pump, External circulation nozzle.





UA-1000

Low Temperature Bath UNI ACE UA-1000

- ★ For reaction of a minute amount of bioengineering sample.
Uniform temperature control for enzyme reaction at 37°C.
- ★ Peltier cooling offers clean temperature control.

Model	UA-1000
Cat. No.	189220
Temperature range/accuracy	4–65°C, ±0.1°C
Temperature uniformity	Within 1°C (at liquid temp. 37.0°C)
Chamber dimension/capacity	185W × 105D × 74H, 1.3L
Overall dimension	300 (324) × 300 × 310
Input/Rated power source	AC100V, 50/60Hz, 350VA



UA-1100

Low Temperature Bath UNI ACE UA-1100

- ★ Switching valve enables external circulation. It can be used for cooling a column or an electrophoresis apparatus.

Model	UA-1100
Cat. No.	112590
Temperature range/accuracy	-10.0–60.0°C, ±0.1°C
External circulation capacity	Max. 6L/min, Max. head 3m (50Hz, water)
Chamber dimension/capacity	248W × 176D × 150, 7L
Overall dimension	333 (348) × 583 (633) × 440
Input/Rated power source	AC100V, 50/60Hz, 1kVA



NCB-1200

Low Temperature Bath UNI ACE NCB-1200

- ★ Compact-sized unit with a wide range of temperature control from -30 to 95°C. New refrigerant containing HFC Auto-start function.
Excellent cost performance and available for various applications.

Model	NCB-1200
Cat. No.	195590
Temperature range/accuracy	-30–95°C, Winthin ±0.1°C
Cooling capacity	200W (172kcal/h) at liquid temp. 10°C
External circulation capacity	Max. 5/6L/min, Max. head 1.2/1.5m (50/60Hz)
Chamber dimension/capacity	140W × 260D × 150H, Approx. 4L
Overall dimension	210 (238) × 380 (450) × 592
Input/Rated power source	AC100V, 50/60Hz, 800VA

Evaporator
Vacuum AirOrganic
SynthesizerOven
Incubator; Fermentor
Incubator; FreezerLow Temperature Bath
Condenser; TrapLow and Constant
Temperature Water
CirculatorFreezer; Dryer
Scary; DriveStirrer
ShakerPeristaltic
PumpLiquid
ChromatographCulture Media and
Inhibitor separator

Others

Low Temperature Bath UNI ACE Bath

NCB-2500, 2600



- ★ Two types are available: 13L and 23L Using new refrigerant containing HFC.
- ★ Auto-start function is equipped.

Model	NCB-2500	NCB-2600
Cat. No.	197120	197130
Temp. range/accuracy	-30~80°C, ±0.1°C	
External circulation capacity	Max. 5/6L/min, Max. head 1.2/1.5m (50/60Hz)	
Chamber dimension/capacity	245W × 315D × 180H, 13L	310W × 400D × 180H, 22L
Overall dimension	330 (358) × 410 (480) × 925	404 (432) × 515 (585) × 925
Input/Rated power source	AC100V, 50/60HZ, 1.45kVA	AC100V, 50/60HZ, 2.0kVA

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Optional accessories

Circulating pump		
Max. flow 8/10/min	Max. head 3/4m (50/60Hz)	
for NCB-2500	Cat. No. 199470	
for NCB-2600	Cat. No. 199480	
Clamp set	Cat. No. 164500	
External temperature sensor STP-300	Cat. No. 196730	
Bath shelf TB-2 for NCB-2500	Cat. No. 199450	
TB-3 for NCB-2600	Cat. No. 199460	

Low Temp. Bath UNI ACE Bath

NCB-2300, 2400



- ★ Large bath type with 41L capacity and Low temperature type at -40°C.
- ★ Setting value and measured value are displayed separately.

Model	NCB-2300	NCB-2400
Cat. No.	112510	112520
Temp. range/accuracy	-30~80°C, ±0.05°C~	-40~50°C, ±0.1°C~
External circulation capacity	Max. discharge rate: 7.2L/min (50Hz)	Max. head 2.2m (50Hz, water)
Chamber dimension/capacity	430W × 517D × 180H, 41L	250W × 295D × 180H, 13L
Overall dimension	513W × 632 (687)D × 898H	375W × 400 (455)D × 998H
Input/Rated power source	AC100V, 50/60Hz, 2kVA	

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Optional accessories

Clamp set	Cat. No. 164500
External temperature sensor STP-100	Cat. No. 114220
Output lead wire ROL-100	Cat. No. 114220



Programmable Low Temp. Precision Bath Pro-Cool Bath NCB-3100, 3200, 3300



NCB-3100



NCB-3200



Program

1. Fixed-point operation (Normal mode)
2. Auto-start
3. Auto-stop (1min~99hr59min)
4. User program 7 patterns
(1 pattern: Max. 10 segments 1min~99hr59min/1 segment)

★ A wide range of temperature control enables accurate temperature rising and descending program patterns.

★ RS-232C terminal is equipped. Computer interface.

★ Accurate temperature display by 0.03°C increment.

Model	NCB-3100	NCB-3200	NCB-3300
Cat. No.	112450	112460	112470
Temp. range/accuracy	-30~80°C, ±0.03°C		
Descending temp. ramp	Within 1.1°C/min(40~0°C)	Within 0.5°C/min	Within 0.3°C/min
	Within 0.5°C/min(5~-15°C) Within 0.4°C/min(-15~-30°C)		
External circulation capacity	Max. delivery 7.2L/min (50Hz), Max head 2.2m (50Hz, water)		
Program	1. Fixed-point control (Normal mode), 2. Auto-start, 3. Auto-stop (1min~99hr59min), 4. User program 7 patterns (1 pattern: Max. 10 segments, 1 min~99hr59min/1 segment)		
Safety function	Self-diagnosis function (water level, sensor default, SSR default, overheat, heater fault, cooling fault, power failure alarm, program ramp fault), leakage/excess current breaker, refrigeration unit overload relay.		
External output/input	RS-232C connector terminal, External temp. sensor terminal		
Chamber dimension/capacity	250 × 295 × 180, 13L	320 × 405 × 180, 23L	430 × 517 × 180, 41L
Overall dimension	620 (635) × 390 (440) × 464	378 (393) × 511 (561) × 793	498 (513) × 632 (682) × 898
Input/Rated power source	AC100V, 50/60HZ, 1.95kVA		AC100V, 50/60Hz, 2kVA

Control panel



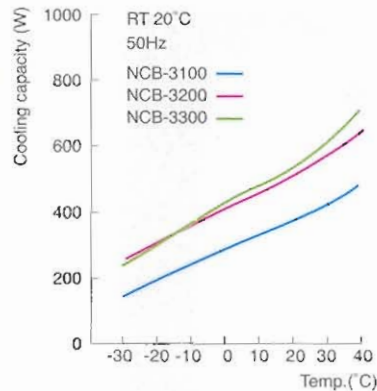
Optional accessories

- Clamp set
Cat. No. 164500
- External temperature sensor
STP-200 Cat. No. 113620
- RS-232C cable
RSC-1100 Cat. No. 167360

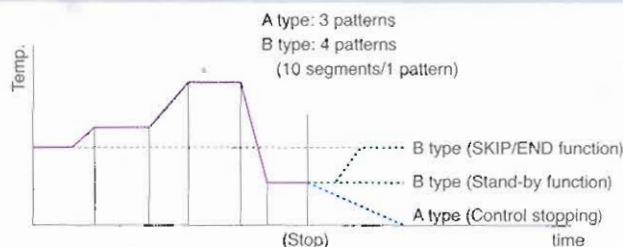
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Cooling capacity



User Program



Crystallized Constant Temp. Circulator

PCC-7000



PCC-7000

- ★ Accurate ramp control for crystallization, recrystallization and synthesis reaction.
- ★ Three types of Max. 10 steps program patterns can be programmed.
- ★ RS-232C terminal is equipped. Computer interface.

Model	PCC-7000
Cat. No.	127920
Temp. range/accuracy	-30~80°C, ±0.03°C
Temp. ramp (cooling)	1.0~0.1°C/min(80→10°C), 0.4~0.1°C/min(20→-30°C)
External circulation capacity	Max. 7.2L/min (50Hz), Max. head 2.2 m (50Hz) (water)
Program	Fixed-point control, Auto-start, Auto-stop, User program 7 patterns
External input/output	RS-232C connector terminal, External temp. sensor terminal
Bath dimension/capacity	250 × 295 × 180, 13L
Overall dimension	360 (375) × 470 (540) × 790
Input/Rated power source	AC100V, 50/60HZ, 2kVA

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Optional accessories

External temperature sensor	
STP-200	Cat. No. 113620
RS-232 cable	
RSC-1100	Cat. No. 167360

Programmable Freezer

MPF-1000



MPF-1000

- ★ Temperature programmed freezing avoids injuries to biogenic samples.
- ★ Suitable for freezing of animal and plant cells and microorganism.

Model	MPF-1000
Cat. No.	168170
Temp. range/accuracy	-40~30°C, within ±0.15°C
Temp. ramp (cooling)	Within 1.0°C/min(20→-30°C), within 0.5°C/min(-30→-40°C)
Program	Fixed-point control, Auto-start, Auto-stop, User program 7 patterns
External input/output	RS-232C connector terminal, External temp. sensor terminal
Bath working dimension/capacity	153 × 116 × 140, 3.5L
Overall dimension	454 × 650 (700) × 439
Input/Rated power source	AC100V, 50/60HZ, 1.5kVA

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Optional accessories

External temperature sensor	
STP-200	Cat. No. 113620
RS-232 cable	
RSC-1100	Cat. No. 167360



Please read "Instruction Manual" carefully before using the product for your continued safety.

Water Bath

SB-350, 1000, OSB-1000



★ Usable as Water Bath for Rotary Evaporator or basic system of Water Bath.

★ Built-in overheat protector stops supplying power in case of temperature controller failure.

Model	SB-350	SB-1000	OSB-1000
Cat. No.	180180	188780	188790
Temp. range	RT+5~80°C	RT+5~90°C	
Temp. accuracy	±1.5°C (when stirring)		±1.5°C / ±3°C (when stirring water)
Temp. control	ON-OFF control	Microprocessor ON-OFF control	ON-OFF control
Temp. setting/display	Analogue setting	Digital setting by 1°C	Analogue setting
Safety feature	Independent overheat protector, Fuse		
Capacity	Approx. 3.5L	Approx. 3L	
Bath working dimension	ø180 × 94H	ø230(bottom ø160) × 100H	
Power source	AC100V 50/60Hz		

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Example of installation



Oil Bath

OHB series



★ Independent overheat protector is equipped as standard.

★ Two types of baths are available: glass bath by which reaction condition can be confirmed or SUS bath with thermal insulation cover.

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Model	OHB-1000G	OHB-2000G	OHB-1000S	OHB-2000S
Cat. No.	200650	200660	200670	200680
Temp. range	RT+10~250°C	RT+10~200°C	RT+10~250°C	
Temp. accuracy	Within ±0.5°C (set at 200°C, when stirring)			
Temp. control	P.I.D control, auto-tuning			
Temp. setting/display	Membrane keypad, digital display, minimum display 0.1°C			
Safety function	Independent overheat protector, Fuse, Sensor fault over display (output suspended)			
Bath material	Glass		SUS304	
Capacity (approx.)	1.5L	4.2L	1.8L	4.7L
Bath working dimension	ø142 × 86H	ø192 × 136H	ø153 × 90H	ø200 × 140H
Power source	AC100V 50/60Hz			

Oil Bath with Magnetic Stirrer

PS-1000



PSL-1000

★ This can be used with water or oil. Synthesis reaction by water bath, synthesis at high temperature by oil bath, and polymerization reaction available by dual stirring function of this water/oil bath.

Model	PS-1000
Cat. No.	182740
Temp. range	Water: 30°C (RT+5°C)–80°C Oil: 30°C (RT+10°C)–150°C
Temp. accuracy	Within ± 0.5 (water)
Rotation speed	100–800rpm
Bath dimension	Dia. 250 × depth 130mm
Max. container size	Dia. 165mm
Overall dimension	230 (270) × 280 (292) × 260
Input/Rated power source	AC100V, 50/60Hz, 750VA

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■ Optional accessories

Clamp set
Cat. No. 184500
Stirring bar (Teflon Mold)
Cobalt magnet (for samples) Cat. No. 123870
TSB-30 (for sample 30mm length) Cat. No. 123830
TSB-40 (for sample 40mm length) Cat. No. 123840

Low Temp. Bath with Magnetic Stirrer

PSL series



PSL-1800

PSL-1000

★ Dual stirring function for process chemistry.
★ 3 types are available: -40 ~ 0°C, -80 ~ -40°C, and -44 ~ 20°C.

Model	PSL-1400	PSL-1800	PSL-1000
Cat. No.	182210	182220	112681
Temp. range	-40–0°C	-80–-40°C	-44–20°C
Temp. accuracy	Within ± 0.5°C	Within ± 1.0°C	± 0.1°C
Rotation speed	100–800rpm		200–800rpm
Bath dimension	Dia. 140 × depth 135mm		Dia. 250 × depth 180mm
Max. container size/dia.	300mL/Max.dia.95mm		2L/Max.dia. 135mm
Overall dimension	350 (380) × 450 × 380 (480)	400 (458) × 550 × 450 (480)	357 × 417 × 780 (1070)
Input/Rated Power source	AC100V, 50/60Hz, 530VA	AC100V, 50/60Hz, 1.03kVA	AC100V, 50/60Hz, 1.1kVA

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■ Optional accessories

Clamp for containers with small capacity. (for PSL-1400, 1800)
Cat. No. 182760
Clamp set Cat. No. 164500
Stirring bar (Teflon mode)
(for sample) Cobalt stirring bar Cat. No. 123870
TSB-30 (Stirring bar for sample 30mL) Cat. No. 123830
TSB-40 (Stirring bar for sample 40mL) Cat. No. 123840
Lid with shutter (for PSL-1400) Cat. No. 182750



Please read "Instruction Manual" carefully before using the product for your continued safety.

Dry Thermo Bath

MG series



Temp. range: 4.0~90.0°C (MG-1000)
: RT+5~200°C (MG-2000, 2100)

Temp. accuracy: $\pm 0.1^\circ\text{C}$ ~

- ★ Temperature sensor inserted directly into block bath enables the accurate temperature control of the block.
- ★ MG-1000 is suitable for applications from enzyme reaction to low-temperature storage in the field of medicines and biochemistry. MG-2000, 2100 are suitable for enzyme reaction and hydrolysis in the field of chemistry and biochemistry.

Model	MG-1000	MG-2000	MG-2100
Cat. No.	164430	160750	160760
Temperature range	4.0~90.0°C	RT+5~200°C	
Temperature accuracy	$\pm 0.1^\circ\text{C}$ ~	$\pm 0.1\text{--}0.4^\circ\text{C}$	
No. of block	1	1	2
Working aluminum block dimension	105 × 80 × 40	105 × 80 × 70	
Aluminum block	Optional accessories		
Overall dimension	170 × 360 (403) × 274	170 × 293 (336) × 124	225 × 293 (336) × 124
Input/Rated power source	AC100V, 50/60Hz, 120VA	AC100V, 50/60Hz, 190VA	AC100V, 50/60Hz, 330VA

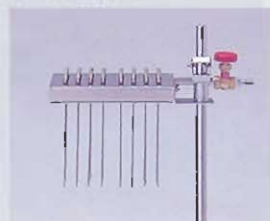
Control panel



Aluminum block



Pressured gas blowing concentrator



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■ Optional accessories

Aluminum block
for MG-1000 (MGL-00 ~ -120)
for MG-2000, 2100 (MGB-080 ~ -300)

Model	OD of applicable test tube	No. of hole	Hole depth	Cat. No.
MGL-00	for 96 holes micro plate	—	—	164480
MGL-080	8mm (for 0.5mL micro tube)	35	29	164470
MGL-110	11mm (for 1.5mL micro tube)	20	36	164460
MGL-120	12mm	20	35	164450
MGB-080	8mm (for 0.5mL micro tube)	35	29	160770
MGB-110	11mm (for 1.5mL micro tube)	20	37	160780
MGB-120	12mm	20	60	160790
MGB-150	15mm	12	60	160800
MGB-165	16.5mm	12	60	160810
MGB-180	18mm	12	67	160820
MGB-210	21mm	12	67	160830
MGB-240	24mm	8	67	160840
MGB-250	25mm	8	67	160850
MGB-300	30mm	6	67	160860

Pressured Gas Blowing Concentrator for a small amount of sample

Pressured Gas Blowing Concentrator
for MG-1000 (S-120, 135)
for MG-2000 (S-106 ~ -135)
for MG-2100 (S-212 ~ -270)

Model	Applicable block	No. of needle	Cat. No.
S-106	MGB-300	6	161140
S-108	MGB-240, 250	8	161150
S-112	MGB-150, 165, 180, 210	12	161160
S-120	MGB-110, 120	20	161170
S-135	MGB-080	35	161180
S-212	MGB-300	12	161190
S-216	MGB-240, 250	16	161200
S-224	MGB-150, 165, 180, 210	24	161210
S-240	MGB-110, 120	40	161220
S-270	MGB-080	70	161230

Immersion Cooler ECS series



Temperature reaching

-20°C (ECS-0 series) -45°C (ECS-50 series)
-30°C (ECS-30 series) -80°C (ECS-80 series)

- ★ Effective for various types of cooling below the room temperature.
- ★ ECS-80, 80SS can be used instead of dry ice. Ideal for synthesis/reaction at low temperature or using Cooling trap.

Model	ECS-0	ECS-0SS	ECS-30	ECS-30SS
Cat. No.	113350	113360	113390	113410
Temp. reaching	-20°C		-30°C	
Cooling capacity	140/160W at 10°C		570/600W at 10°C	600/640W at 10°C
Max. temp. of solvent to be used	30°C			
Material of cooling part	SUS flexible	SUS spiral	SUS flexible	SUS spiral
Dimension of condenser (mm)	OD 15 × 500L	OD40 × 140L	OD 15 × 1100L	OD 115 × 140L
Overall dimension	325(455) × 194 × 265		358(443) × 420 × 370	
Input/Rated power source	AC100V, 50/60Hz, 300VA		AC100V, 50/60Hz, 850VA	

Model	ECS-50	ECS-50SS	ECS-80	ECS-80SS
Cat. No.	113420	113440	113450	113470
Temp. reaching	-45°C		-80°C	
Cooling capacity	170W at -30°C		110/150W at -50°C	130/150W at -50°C
Max. temp. of solvent to be used	0°C			
Material of cooling part	SUS flexible	SUS spiral	SUS flexible	SUS spiral
Dimension of condenser (mm)	OD 15 × 700L	OD75 × 200L	OD 15 × 800L	OD 78 × 200L
Overall dimension	358(443) × 420(470) × 370		408(493) × 500(600) × 717	
Input/Rated power source	AC100V, 50/60Hz, 850VA		AC100V, 50/60Hz, 1.4kVA	

Bath, Immersion Heater, Thermo-Controller



■ Bath

Model	SB-24	SB-15	SB-11	SB-6	SBC-24	SBC-16	SBC-11	SB-9
Cat. No.	114630	164520	114650	164510	114660	114670	114680	114700
Bath material	SUS 304				SUS 304 & Insulation mat. <small>Nonflammable resin PP</small>			
Capacity (L)	24	16	10	5.5	24	16	10	9
Working dimension	507 × 302 × 160	298 × 274 × 150	281 × 222 × 150	260 × 150 × 150	507 × 302 × 150	298 × 274 × 150	281 × 222 × 150	327 × 165 × 145

■ Immersion Heater

Model	HPC-300	HPC-500	HPC-1000	HPS-300	HPS-500	HPS-1000	HPT-300	HPT-500	HPT-1000
Cat. No.	114740	114750	114760	114770	114780	114790	114800	114810	114820
Mat. of heating part	Chrome plated copper			SUS 316L			Titanium		
Capacity (W)	300	500	1000	300	500	1000	300	500	1000

■ Thermo-controller

Model	THS-10	THS-40	THS-60	THD-50	THD-100
Cat. No.	114570	114580	114590	114600	114610
Temp. range	-10~50°C	-40~20°C	-60~-10°C	-50~50°C	-99~0°C
Temp. accuracy	±1.0~2.5°C			±0.1~5°C(adjustable)	
Temp. for operation	Heater/refrigerator alternate control			Heater control	
Temp. for operation	5~40°C			5~40°C	



Please read "Instruction Manual" carefully before using the product for your continued safety.

Refrigerated Cold Trap



UT-1000, 2000

- ★ Efficient trap of harmful vapors from vacuum unit and evaporator.
- ★ Two types are available: -50°C and -100°C. HFC as refrigerant.
- ★ The unit can be placed on the table, under the table and within the dry chamber.

Model	UT-1000	UT-2000
Cat. No.	189200	189210
Trap method	Direct trap, glass trap (option)	
Condensing capacity	Max.0.5kg(water)	Max.0.4kg(water)
Lowest temperature	-50°C	-100°C
Trap dimension	Drum cooling, ID 90 × 225 depth	
Overall dimension	333 (373) × 370 × 317	421 (461) × 510 × 473
Input/Rated power source	AC100V, 50/60Hz, 6A, 600VA	AC100V, 50/60Hz, 10A, 1kVA

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Optional accessories

- Glass condenser set B Cat. No. 199740
- Glass condenser set B for solvents with low boiling point Cat. No. 199750
- Table with casters for UT-1000 Cat. No. 192420
- Table with casters for UT-2000 Cat. No. 192430
- Lid with nozzle B (for UT-1000) Cat. No. 192410
- Lid with nozzle B2 (for UT-2000) Cat. No. 193800



UT-50, 80

- ★ 4 models of two types: -45°C and -80°C. Refrigeration unit is built-in and casters are equipped.

Model	UT-50	UT-50L	UT-80	UT-80S
Cat. No.	113500	113510	113520	113530
Trap method	Direct trap, glass trap (option)		Direct trap, glass trap (option)	
Condensing capacity	Max.0.9kg(water)	Max.4kg(water)	Max.0.5kg(water)	
Lowest temperature	-45°C		-80°C	
Trap dimension	Coil cooling, ID90 × 225 depth	Drum cooling, ID200 × 300 depth	Coil cooling, ID90 × 225 depth	
Overall dimension(with lid)	300 (415) × 320 (330) × 700	400 (453) × 455 × 852	400 (415) × 450 (460) × 850	405 (455) × 695 × 550
Input/Rated power source	AC100V, 50/60Hz, 5A, 600VA	AC100V, 50/60Hz, 7A, 700VA	AC100V, 50/60Hz, 10A, 1kVA	AC100V, 50/60Hz, 10A, 1kVA

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Optional accessories

- Glass Condenser Set A Cat. No. 199720 (for UT-50, 80, 80S)
- Glass Condenser Set A for solvents with low boiling point Cat. No. 181830 (for UT-50L)
- Lid A with nozzle Cat. No. 148940 (for UT-50, 80, 80S)
- Lid A with nozzle B Cat. No. 185890 (for UT-50L)



Table Top Low Temperature Circulator
CCA-1110
P.68



Large size Low Temperature Calculator
CA-L · H · WL · WH
P.71



Low Temperature Circulator
CA-1112
P.69



Constant Temp. Circulator
NCC series
P.72



Low Temperature Circulator (Refrigerated Bath + Circulation Pump)
(PFR-1000+PFP-1000)
P.69



Constant Temp. Circulator for Open System
CTP, CAP series
P.72



Low Temperature Calculator
CA-1120, 1130
P.70



Water Circulator
HS series
P.72



Low Temperature Calculator
CA-2600, 2600S
P.70



High Pressure Pump for Circulator
HPP series
P.72



Low Temperature Calculator
CA-3000 series
CA-4000 series
P.70

Table Top Low Temperature Circulator Cool Ace CCA-1110



Refrigerating unit: Air cooling
Temp. range: -20~20°C
Cooling capacity: 450W at liquid temp. 10°C
Max. flow, head (50/60Hz): 9/10L/min, 4.2/5.6m

- ★ Compact size for cooling the heat exchanger of the equipment.
- ★ Uses HFC (R407C) as refrigerant.
- ★ Greater safety functions are available such as self-diagnosis function, refrigeration unit protection timer, refrigeration high pressure switch, overload relay, thermal protector, etc.

Model	CCA-1110
Catalogue Code	203988
Circulation method	Closed loop
Temperature range	-20°C~20°C(no heater)
Temperature accuracy	±2°C
Cooling capacity	450W(at liquid temp. 10°C) 350W(at liquid temp. 0°C) 260W(at liquid temp. -10°C)
Refrigeration unit	Air cooling Output 350W, R407C
Overall dimension	206 (221) × 401 × 540
Net weight	Approx. 25kg
Input/Rated power source	AC220V, 50/60Hz, 1.1kVA

Control panel



Recirculating Chiller system

System Code SYS09093



Optional accessories

Circulating flow can be controlled.

Flow stop valve Cat. No. 182460

Please visit our website for further information of general catalogue



Low Temperature Circulator Cool Ace

CA-1112



Refrigeation unit: Air cooling
 Temperature range: -20~30°C
 Cooling capacity: 1200W at liquid temp. 10°C
 Max. flow, head (50/60Hz): 9/10L/min, 4.2/5.6m



CA-1112

- ★ Provides cooling water with research equipment and industrial equipment and controls the temperature of heat source and heat load.
- ★ Uses HFC (R407C) as refrigerant.
- ★ Greater safety functions are available such as self-diagnosis function, refrigeration unit protection timer, refrigeration high pressure switch, overload relay, thermal protector, etc.

Model	CA-1112
Cat. No.	188318
Circulation method	Closed loop
Temperature range	-20°C-30°C(no heater)
Temperature accuracy	±2°C
Cooling capacity	1200W(at liquid temp. 10°C)
	950W(at liquid temp. 0°C)
	650W(at liquid temp. -10°C)
Refrigeration unit	Air cooled, Output 675W, R407C
Overall dimension	340 (354) × 384 × 851 (901)
Net weight	Approx. 41kg
Input/Rated power source	AC220V, 50/60Hz, 1.1kVA

Control panel



■ Related products

Combination of Refrigerated Bath and Circulation Pump enables stable supply of cooling water at -45 ~ -20°C.

Refrigerated Bath PFR-1000
Circulation Pump PFP-1000

■ Optional accessories

When standard pump lacks in capability

High Pressure Pump
 HPP-1100(AC100V) Cat. No. 158750
 HPP-2100(AC200V) Cat. No. 158770
 Base for High Pressure Pump
 CA-10 Cat. No. 180520

Aspirator function can be added.

Aspirator
 CA-1A Cat. No. 180510

Circulation to open external equipment is also available.

Seal Lid
 Cat. No. 112780



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CA-1120 · 1130

Low Temperature Circulation Bath COOL ACE CA-1120, 1130

- ★ Cooling Capacity 960W. Uses HFC as refrigerant. Greater safety functions.
- ★ Equipped with pump with high head Model handling purified water is available.
- ★ For cooling the heat source of industrial equipment or analysis/measurement equipment.

Model	CA-1120(City water)	CA-1130(Purified water)
Cat. No.	188290	188400
Circulated water	Closed loop	
Circulation method	10°C~30°C(no heater)/within ±1°C	
Cooling capacity	960W at liquid temp. 20°C(RT 20°C) 700W at liquid temp. 20°C(RT 35°C)	
Ambient temp. for use	5~40°C	
Overall dimension	354 (374) × 462 × 1016	
Net weight	Approx. 64kg	
Input/Rated power source	AC100V, 50/60HZ, 13A, 1.3kVA	



CA-2600

Low Temperature Circulator Bath COOL ACE CA-2600, 2600S

- ★ Cooling Capacity: 3000W. Use HFC for refrigerant. Greater safety functions.
- ★ Equipped with pump with high head.
- ★ For cooling the heat source of industrial equipment or analysis/measurement equipment.

Model	CA-2600	CA-2600S
Cat. No.	197110	199410
Circulation method	Closed loop	
Temp. range/accuracy	-10°C~35°C(no heater)/within ±2°C	
Cooling capacity	3000W(2580kcal/h) at liquid temp. 20°C	
Emergency stop switch	Equipped	
Overall dimension	450 (465) × 515 (600) × 1010 (1025)	
Net weight	Approx. 84kg	
power resource	AC200V, Single Phase, 10A	



CA-3110S · 4110S

CA-3110 · 4310

Low Temperature Circulator Bath COOL ACE CA-3000, 4000

- ★ Cooling Capacity: 7800W. Use HFC for refrigerant. Greater safety functions.
- ★ High power type enabling stable function even for the built-in equipment.
- ★ For cooling the heat source of industrial equipment or analysis/measurement equipment.

	Model	Cooling capacity (at liquid temp. 20°C)
Air cooling	CA-3110, 3110S	4500W(3870kcal/h)
	CA-4110, 4110S	6000W(5160kcal/h)
	CA-3310, 3310S	5600W(4815kcal/h)
Water cooling	CA-3310, 3310S	5600W(4815kcal/h)
	CA-4310, 4310S	7800W(6700kcal/h)

Ambient temperature for operation: 5~40°C,
Overall dimension: 600 (680) × 750 (825) × 1400. Power source: AC200V, three phase

Large size Low Temperature Circulation Bath

CA-L · H (Air cooling)

CA-WL · WH (Water cooling)

★Cooling capacity: up to 30,000W. Suitable for cooling of large size equipment.

CAL-L · H (Air cooling)

Model	CA-352L	CA-351H	CA-501H	CA-1001H
Cat. No.	112930	112850	112860	112870
Circulation method	Closed loop			
Temp. range, Temp. accuracy	-15°C~10°C(no heater), ±2°C		5°C~25°C(no heater), ±2°C	
Refrigeration unit, Refrigerant	1.5kW, R22	1.5kW, R22	2.2kW, R22	3.75kW, R22
Circulation pump	Output 400W			Output 750W
Overall dimension	820 (950) × 750 × 1285 (1360)			1005 (1135) × 850 × 1385 (1470)
Power source	AC200V, three phase, 20A		AC200V, 3 phase, 30A	AC200V, 3 phase, 50A

■Cooling capacity (50/60Hz)

CA-352L	1740/2090W 1500/1800kcal/h	at liquid temp.0°C	1050/1280W 900/1100kcal/h	at liquid temp.-10°C
CA-351H	4880/5350W 4200/4600kcal/h	at liquid temp.20°C	3490/3840W 3000/3300kcal/h	at liquid temp.10°C
CA-501H	6400/7090W 5500/6100kcal/h	at liquid temp.20°C	4650/5120W 4000/4400kcal/h	at liquid temp.10°C
CA-1001H	11000/12200W 9500/10500kcal/h	at liquid temp.20°C	8140/8950W 7000/7700kcal/h	at liquid temp.10°C

CAL-WL · WH (Water cooling)

Model	CA-352WL	CA-351WH	CA-501WH	CA-1001WH	CA-3001WH	CA-4001WH
Cat. No.	112960	112880	112890	112900	112910	112920
Circulation method	Closed loop					
Temp. range	-15°C~10°C(no heater)		5~25°C(no heater)			
Refrigeration unit, Refrigerant	1.5kW, R22	2.2kW, R22	3.75kW, R22	5.5kW, R22	7.5kW, R22	7.5kW, R22
Circulation pump	Output 400W			Output 750W		0.77/1.28kW
Overall dimension	820 (950) × 750 × 1285 (1360)			1005 (1135) × 850 × 1385 (1470)		1005 (1135) × 915 × 1385 (1475)
Power source	AC200V, 3 phase, 20A		AC200V, 3 phase, 30A	AC200V, 3 phase, 50A		AC200V, 3 phase, 75A

■Cooling capacity

CA-352WL	1860/2200W 1600/1900kcal/h	at liquid temp.0°C	1040/1280W 900/1100kcal/h	at liquid temp.-10°C
CA-351WH	6040/6500W 5200/5600kcal/h	at liquid temp.20°C	3480/4180W 3000/3600kcal/h	at liquid temp.10°C
CA-501WH	8950/9880W 7700/8500kcal/h	at liquid temp.20°C	6270/6860W 5400/5900kcal/h	at liquid temp.10°C
CA-1001WH	12700/13900W 11000/12000kcal/h	at liquid temp.20°C	9880/10700W 8500/9200kcal/h	at liquid temp.10°C
CA-3001WH	22000/23200W 19000/20000kcal/h	at liquid temp.20°C	15100/16600W 13000/14300kcal/h	at liquid temp.10°C
CA-4001WH	27900/30200W 24000/26000kcal/h	at liquid temp.20°C	19700/21500W 17000/18500kcal/h	at liquid temp.10°C



CA-351H

Nozzle is not included.

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Low Temperature Circulator COOL ACE series

Various applications are available by system composition with equipment and equipment built-in.

Examples

■Cooling the heated part of the semiconductor manufacturing machine.

Wafer cleaning machine, Printing machine, Automatic soldering machine, Sputtering machine, Ion plating machine, Etching machine, Wafer processing machine, Dicing machine, Packaging machine, Temperature control of Developer, Photolithography machine, Heated part of Magnetizing equipment, and etc.

■Cooling the heated part of the Laser equipment.

Heated part of the laser processor or welding machine, Laser marking equipment, Generator, CO₂ laser processor, and etc.

■Cooling the heated part of other industrial equipment.

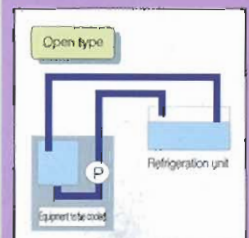
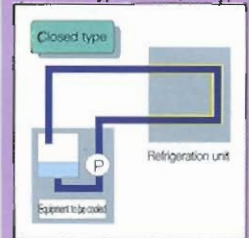
Plasma welding machine, Resistance welding machine, Auto-packaging machine, Cooling the molding machine, Cleaning machine, Printing machine, Cooling of plating tank, Electric discharge machine, High-precision processing machine, Precision polishing, Grinding machine, Injection molding machine, Kneader, Molding part of resin molding machine, Withdrawing part of film/tubing withdrawer, Liquefaction unit of solvent (Freon) recovery unit, automatic welding equipment, and etc.

■Cooling the heated part of analysis/measurement equipment.

Light source of electronic microscope, Light source of ICP emission/dispersion analysis equipment, Heated part of spectrophotometer, Diffusion pump of mass spectrometer, Heat source of X-ray analysis unit, Constant temperature part of automatic sampler, Heat source of GC/LC MASS, Heat source of FT-IR, Light source of atomic absorption photometry, and etc.



■Closed type and Open type



Please read "Instruction Manual" carefully before using the product for your continued safety.

Constant Temp. Circulator UNI THERMO ACE NCC series

★ Circulates the accurately controlled liquid at $-10.0 \sim 80.0^{\circ}\text{C}$.

★ 1750W cooling capacity for NCC-2100.

Model	NCC-1100	NCC-1400	NCC-2100
Cat. No.	112990	113000	113010
Circulation method	Closed loop		
Temp. range/accuracy	$-10.0 \sim 80^{\circ}\text{C} / \pm 0.1^{\circ}\text{C}$		
Cooling capacity	1000W(860kcal/h) at liquid temp. 30°C	1350W(1160kcal/h) at liquid temp. 30°C	1750W(1500kcal/h) at liquid temp. 30°C
External circulating capacity	Max. flow 22L/min., Max. head 10m(50Hz)		
Power source	AC200V, single phase 50/60Hz(Capacity:20A)		

NCC-2100



Constant Temp. Circulator for Open System COOLING THERMO PUMP CTP series

★ A wide range of temperature controlled. Accurate temperature control by heater and refrigeration unit.

★ 2 Step program installed. Use HFC as refrigerant.

Model	CTP-1000	CTP-3000	CTP-6000
Cat. No.	204880	204890	204900
Temp. range	$-10.0 \sim 80^{\circ}\text{C}$	$-20.0 \sim 80.0^{\circ}\text{C}$	
Temp. accuracy	$\pm 0.1^{\circ}\text{C}$		
Heater	550W	850W	2.2kW
Cooling capacity	220W at liquid temp. 10°C	500W at liquid temp. 10°C	900W at liquid temp. 10°C
Max. flow (L/min), Head (m)	8/9.5, 5.5/7.5	15/18, 5.8/8	25/30, 15/21
Overall dimension	290 × 375 × 460	250 × 480 × 775	450 × 510 × 967

CTP-3000



Low Temperature Circulator for Open System COOLING ACE PUMP CAP series

★ Circulates the cooling water at $-10 \sim 30^{\circ}\text{C}$.

★ Uses HFC as refrigerant.

Model	CAP-1000	CAP-3000	CAP-6000
Cat. No.	204910	204920	204930
Temp. range	$-10 \sim 30^{\circ}\text{C}$ (no heater)	$-20 \sim 30^{\circ}\text{C}$ (no heater)	
Temp. accuracy	$\pm 1.0^{\circ}\text{C}$		
Cooling capacity	220W at liquid temp. 10°C	500W at liquid temp. 10°C	900W at liquid temp. 10°C
Max. flow (L/min), Head (m)	8/9.5, 5.5/7.5	15/18, 5.8/8	25/30, 15/21
Overall dimension	290 × 375 × 460	250 × 480 × 775	450 × 510 × 967

CAP-1000

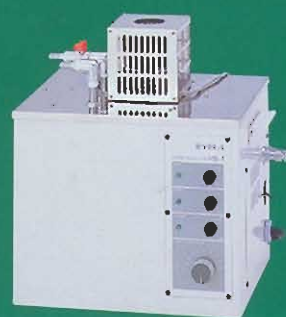


Water Circulator HS series

★ Circulates the constant temperature water at $\text{RT}+15 \sim 90^{\circ}\text{C}$ to the closed system.

Max. flow	22.5L/min.	Head 9.5m	HS-1
Max. flow	60L/min.	Head 6m	HS-6
Max. flow	60L/min.	Head 6m	HS-8
Max. flow	60L/min.	Head 6m	HS-12

HS-1

Evaporator,
Vacuum UnitOrganic
SynthesizerOven, Electric Furnace,
Infrared FreezerLow-temperature Bath,
Constant temperature Bath,
Coolerbox, TapLow and Constant-
temperature Water
CirculatorFreeze Dryer,
Spray DryerStirrer,
ShakerPeristaltic
pumpLiquid
ChromatographyCulture Microbe and
related apparatus

Others



**Freeze Dryer
FD-1000**
P.74



**Related products,
Parts
for Freeze Dryer**
P.76



**Freeze Dryer
5N**
P.74



**Freeze Dryer
System**
P.80



**Freeze Dryer
FDU-1000,
2000, 810**
P.74



**Spray Dryer
SD-1000**
P.82



**Freeze Dryer
FD-550**
P.75



**Experiment
request
of Spray Dryer**
P.84

Freeze Dryer FD-1000



FD-1000

- ★ Suitable for small volume sample. Cooling temperature is -45°C and ice holding capacity is 500mL/batch.
- ★ Digital display of vacuum rate, trap temperature and time at the same time.
- ★ Various containers can be used depending on the purpose.

Model	FD-1000	FD-1000REC
Cat. No.	188800	191160
Cold trap temperature	-45°C	
Ice holding capacity	500ml/batch	
Display/setting function	Digital display, membrane key pad	
No. of ports	8 vials	
Trap dimension (mm), Capacity	$\phi 83.1 \times 277\text{H}$, Approx. 1.5L	
Input/Rated power source	AC100V, 50/60Hz, 4.5A, 450VA	

※ 1000REC is equipped with recorder output of vacuum rate and trap temperature.

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Recommended Vacuum Pump

- GLD-051 (Standard type)
Cat. No. 190840
- GLD-051X (Corrosion resistant type)
Cat. No. 190850
- GLD-051XF (Oil filtration type)
Cat. No. 191080

Related products and parts → P.76

Freeze Dryer FD-5N



FD-5N

- ★ Cooling temperature: -45°C , Ice holding capacity: 1L/batch.
- ★ 4 ports for flasks are equipped as standard.

Model	FD-5N
Cat. No.	119480
Cold Trap Temperature	-45°C
Ice holding capacity	1L/batch
No. of ports	4 flasks, $\phi 29/38$
Trap dimension/capacity	$\phi 153 \times 225\text{H}$ (mm) Approx. 4L
Input/Rated Power source	AC100V, 50/60Hz, 5A, 500VA

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Optional accessories

- T-shape manifold for test tube, ampoule or vial
PMH-12 model
Cat. No. 119840
- PMH-24 model
Cat. No. 119860

Recommended Vacuum Pump

- GLD-051 (Standard type)
Cat. No. 190840
- GLD-051X (Anti-corrosion type)
Cat. No. 190850
- GLD-051XF (Oil filtration type)
Cat. No. 191080

Related products/parts → P.76

Freeze Dryer

FDU-1000, 2000 series



FDU-2100

- ★ 4 models from 2 types are available: -45°C with ice holding capacity 4L and -80°C with ice holding capacity 3L.
- ★ Various containers and pre-freezers are selectable depending on your purpose.
- ★ Square-type Drying Chamber enables sealing a vial.

Model	FDU-1000	FDU-2000	FDU-1100	FDU-2100
Cat. No.	197390	197370	197400	197380
Cold trap temp.	-45°C	-80°C	-45°C	-80°C
Ice holding capacity	4L/batch	3L/batch	4L/batch	3L/batch
Display/setting	Digital display, membrane key pad			
Vacuum release	Automatic vacuum release valve			
Refrigeration unit, Refrigerant	600W, HFC	500Wx2, HFC	600W, HFC	500Wx2, HFC
Input/Rated power source	AC100V, 50/60Hz, 1.7kVA	AC200V, 50/60Hz, 2.4kVA	AC100V, 50/60Hz, 1.7kVA	AC200V, 50/60Hz, 2.4kVA

FDU-810 model -80°C 1L/batch Cat. No.119310

Please visit our website for further information of general catalogue



■ Square type Dry Chamber

Model	DRC-1000	DRC-1100
Cat. No.	197450	197460
Pre-freezing temp.	-40°C	
Shelf temp. range	-40 ~ $+30^{\circ}\text{C}$	
Vial sealing	Manual handle	
Chamber dimension, Chamber capacity	300 x 300 x 350, Approx. 30L	
Shelf dimension	240 x 240 x 3 tiers	
Connecting tubing	Option (see P.77)	
Input/Rated power source	AC100V, 50/60Hz, 12kVA	

■ Recommended Vacuum Pump

GLD-136CN (Standard type)
Cat. No. 200540
GCD-136XN (Corrosion-resistance type)
Cat. No. 189160
GCD-136XNF (Oil filtration type)
Cat. No. 191090

Related products, parts → P.76

Freeze Dryer

FD-550 series



FD-550R

- ★ Cooling trap: -45°C , Ice holding capacity: 10L
- ★ Shelf dry method suitable for drying the food, medicines and cell tissues.

Standard type FD-550 model

Recorder equipped type FD-550R model

Recorder equipped, temp. program type FD-550P

Model	FD-550	FD-550R	FD-550P
Cat. No.	120540	144130	181580
Shelf cooling (heating) method	Refrigerant circulating method		
Cold trap method	-45°C		
Ice holding capacity	10L/batch		
Pre-freezer temp.	-35 ~ -30°C		
Drying shelf temp. range	10 ~ 40°C		
Input/Rated power source	AC200V, 3 phase, 50/60Hz, 17.5/18.8A, 5.0/5.5kVA		

Please visit our website for further information of general catalogue



■ Optional accessories

For uniform temperature distribution

Aluminum tray
Cat. No. 120610 (1 pcs)
Cat. No. 120630 (3 pcs)

Related products, parts → P.76





Vacuum Pump GLD, GCD series

- ★ Reflux prevention mechanism, Gas ballast valve, Forced oiling method.
- ★ Individual parts of GCD models are provided with Clean S treatment.

Significantly reduces the frequency of the oil change and makes it easy to change. Vacuum Pump with oil filtration and cassette.

GCD-051XF, 136XNF

※ 2 cassettes are equipped as the standard accessories. Spare cassette is available as an optional accessory (Cat. No. 192260)

Detailed information of Vacuum Pump → P.9

Model	GLD-051	GCD-051X	GCD-051XF	GLD-101N	GLD-136CN	GCD-136XN	GCD-136XNF
Cat. No.	190840	190850	191080	189080	200540	189160	191090
Applicable model	FD-1000, FD-5N, FDU-810			FDU-1000, FDU-1100, FDU-2000, FDU-2100			
Displacement	50/60L/min			100/120L/min		135/162L/min	



Pre-Freezer PFR-1000, UT-80, PF-1000

Use this unit as Pre-Freezer of FD-1000, 5N and FDU model.

Model	PFR-1000	UT-80
Cat. No.	197410	113520
Temp. of pre-freeze	-45°C	-80°C
Applicable container	Sample flask Max.2L, Freeze drying bottle Max.1.2L	Sample flask Max.300mL, Freeze drying bottle Max.300mL

Use this unit as Pre-Freezer by air cooling (see P.54).

Model	PF-1000
Cat. No.	187220
Temp. of pre-freeze	-25/-40°C
Applicable container	Petri dish, Ampoule, Vial, Test tube, Microtube

T-shape manifold for sample flask



Model	PMH-4	PMH-8
Cat. No.	119820	119830
Applicable model	FDU-810, 1000, 1100, 2000, 2100	FDU-1000, 1100, 2000, 2100
Dia. /Max. dia of attached part	240/230	
Cock, pitch	φ29/38, Taper joint 150	
No. of port	4	8
Overall dimension	250 × 300 × 317	550 × 300 × 317

※ When using the containers other than φ29/38 flask, it is necessary to prepare adapter for the container.

Cylindrical manifold for sample flask



Model	PMH-1000
Cat. No.	197440
Applicable model	FDU-1000, 1100, 2000, 2100
No. of port, Dia. of attached part	8, Dia. 240

※ When using the containers other than φ29/38 flask, it is necessary to prepare adapter for the container.

T-shape manifold for test tube or ampoule



Model	PMH-12	PMH-24
Cat. No.	119840	119860
Applicable model	FD-5N, FDU-810, 1000, 1100, 2000, 2100	
Dia. /Max. dia of attached part	275/270	
Cock, pitch	φ15 (for Vial), 50	
No. of port	12	24
Overall dimension	300 × 214 × 234	600 × 214 × 234

※ When using the test tubes or ampoules, it is necessary to prepare the proper adapter.

Square-type Drying Chamber DRC-1000, 1100



DRC-1100+Connecting pipe+FDU-2100

- ★ Applicable for FDU-1000, 2000 series. Enhances the function of FDU series.
- ★ Programmed control from the pre-freezing to the end.
- ★ DRC-1000 is a sealing lid type. Processing the multiple vials at a time is available.
- ★ Temperature output to the Recorder is available (factory option).

Model	DRC-1000	DRC-1100
Cat. No.	197450	197460
Temp. of pre-freeze	-40°C	
Shelf temp. range	-40 ~ +30°C	
Sealing the vial		Manual
Chamber dimension, Chamber capacity	300 × 300 × 350, Approx. 30L	
Shelf dimension	240 × 240 × 3 tiers	
Aluminum tray	Option (240 × 240, 3 pcs)	
Input/Rated power source	AC100V, 50/60Hz, 12kVA	

Connecting tubing A

Connecting tubing B

Temperature sensor output terminal

※ Connecting tubing is necessary to connect with Dry Freezer.

Pre-Freezer PFM-1000



Revolver for sample container. Freezing the sample in film-like condition against the container wall shortens the time for drying.

Cat. No.	197420
Applicable model	PFR-1000, UT-50, 50L, 80, 80S
Rotating speed	92/110 rpm, fixed
Applicable container	Sample flask (φ29/38), Freeze dry bottle
Rated power source	AC100V, 50/60Hz

※ Freeze dry bottle is not equipped.

Moisture Trap CMW-1



This unit recovers a minute amount of moisture which cannot be recovered by Refrigerated Cold Trap, resulting in stable vacuum rate and longer life of Vacuum Pump Oil.

Cat. No.	119900
Applicable model	Molecular Sieve, 500g
No. of port, Dia	OD 22, Vacuum hose
of attached part	ID 18 × OD 42

※ Consumable product: Molecular Sieve (panned) 500g
Cat. No.178330



Round-shape tray dryer

Round-shape tray dryer

Model	DRC-1N	DRC-2	DRC-2L	DRC-3	DRC-3L
Cat. No.	119730	119740	119750	119760	119770
Applicable model	FD-5N, FDU series	FD-5N, FDU-810	FDU-1000, 1100, 2000, 2100	FD-5N, FDU-810	FDU-1000, 1100, 2000, 2100
Max. dia. for attachment	270	185	270	185	270
No. of shelf, Shelf dimension	2, 200W × 230D	1, Dia. 220		3, Dia. 220	
No. of 10mL vial × shelf	72 × 2	58 × 1		58 × 3	
No. of Petri dish × shelf	8(OD 66) × 2	7(OD 66) × 1		7(OD 66) × 3	
Temp. range, control	5 - 35°C		Fixed at 30°C		



Sealing tray dryer

Sealing tray dryer

Model	BSC-2	BSC-2L	BSC-3	BSC-3L
Cat. No.	119780	119790	119800	119810
Applicable model	FD-5N, FDU-810	FDU-1000, 1100, 2000, 2100	FD-5N, FDU-810	FDU-1000, 1100, 2000, 2100
Max. dia. for attachment	185	270	185	270
No. of shelf, Shelf dimension	1, Dia. 220		2, Dia. 220	
No. of 10mL vial × shelf	58		58 × 2(58 for sealing)	
No. of Petri dish × shelf	7(OD 66) × 1		7(OD 66) × 2	
Temp. range, control	Fixed at 30°C			

※ Sealing is only available for the upper shelf. Other shelves can be used as dryer.



Please read "Instruction Manual" carefully before using the product for your continued safety.

Chamber, Manifold



Cylindrical manifold for sample flask



T-shape manifold for sample flask

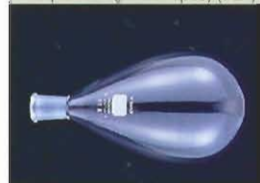
Cock Standard accessory for Freeze Dryer FD-5N, Port for round-bottom flask and T-shape manifold for flask (PMH-4, 8)

Cock A		Vacuum Cock Body A		Vacuum Cock A		Liner A	
Q'ty	Cat. No.	Q'ty	Cat. No.	Q'ty	Cat. No.	Q'ty	Cat. No.
1	119920	1	144460	1	144470	10	143950

Adapter for Cock A

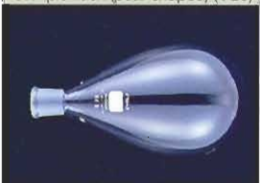
Adapter for flask (¥24)			Adapter for flask (¥29) (Standard accessory)			Adapter for dual flasks**		Adapter for freeze bottle			Adapter for test tube	
Q'ty	Spec.	Cat. No.	Q'ty	Spec.	Cat. No.	Q'ty	Cat. No.	No.	Q'ty	Cat. No.	Q'ty	Cat. No.
1	¥24	144500	1	¥29	120470	1	120490	① 3	1	120450	1	120500
								② 2	1	120460		

Sample flask (pear shaped) (¥24)



Spec.	Q'ty	Cat. No.
50mL	1	116220
100mL	1	116230
200mL	1	116240
300mL	1	116250
500mL	1	116260
1000mL	1	116270

Sample flask (pear shaped) (¥29)



Spec.	Q'ty	Cat. No.
50mL	1	116140
100mL	1	116150
200mL	1	116160
300mL	1	116170
500mL	1	116180
1000mL	1	116190

Freeze dry bottle (set)



Spec.	Q'ty	Cat. No.
40mL	1	119940
80mL	1	119950
120mL	1	119960
150mL	1	119970
300mL	1	119980
600mL	1	119990
900mL	1	120000
1200mL	1	120010

Freeze dry bottle



Spec.	Q'ty	Cat. No.
40mL da 45mL	1	120050
80mL da 45mL	1	120060
120mL da 70mL	1	120120
150mL da 70mL	1	120130
300mL da 70mL	1	120140
600mL da 105mL	1	120070
900mL da 105mL	1	120080
1200mL da 105mL	1	120090

Cap (for Freeze dry bottle)



Spec.	Q'ty	Cat. No.
Da. 45mm 40, 80mL	1	120520
Da. 70mm 120, 250, 300mL	1	120030
Da. 105mm 600, 900, 1200mL	1	120040

Sealing



Q'ty	Cat. No.
1	145610

Filter holder



Q'ty	Cat. No.
1	120100

Filter (100 pcs/box)



Q'ty	Cat. No.
1	120110

**Adapter for dual flasks: attachable sample flask is the pear shaped flask with ¥29 joint taper and 50 - 300mL capacity only. The capacity of attachable freeze dry bottle is 400 - 600mL.

Evaporator, Vacuum Unit

Organic Synthesizer

Oven, Electric Furnace, Incubator, Freezer

Low-temperature Bath, Constant-temperature Bath, Circulator, Tap

Low and Constant-temperature Water, Spray Dryer

Freeze Dryer, Spray Dryer

Sterile, Shaker

Peristaltic pump

Liquid Chromatograph

Culture Microbe and related apparatus

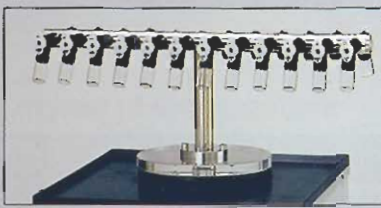
Others



Cock for FD-1000



T-shape manifold for vials, test tubes and ampoules.



Sealing tray dryer



Round-shape tray dryer

Standard accessory for FD-1000

Standard accessory for T-shape manifold PMH models.



Q'ty	Cat. No.
1	191140



Q'ty	Cat. No.
1	119930

Adapters for Cock B, C



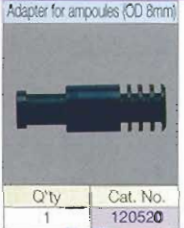
Spec.	Cat. No.
Di: 70mm	191130



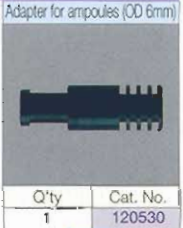
Spec.	Cat. No.
∅ 29	191120



Q'ty	Cat. No.
1	120510



Q'ty	Cat. No.
1	120520



Q'ty	Cat. No.
1	120530



Spec.	Cat. No.
150mL	119970
300mL	119980



Spec.	Cat. No.
50mL ∅ 29	116140
100mL ∅ 29	116150

Description	
OD10 × 75L(mm)	3mL
143970	100
OD12 × 75L(mm)	4mL
143980	100
OD12 × 90L(mm)	5mL
143990	100
OD12 × 105L(mm)	6mL
144000	100
OD12 × 120L(mm)	7mL
144010	100
OD13 × 75L(mm)	5mL
144020	100
OD13 × 90L(mm)	6mL
144030	100
OD13 × 100L(mm)	7mL
144040	100
OD15 × 85L(mm)	8mL
144050	100
OD15 × 105L(mm)	10mL
144060	100
OD15 × 155L(mm)	15mL
144070	50
OD16.5 × 105L(mm)	12mL
144080	100
OD16.5 × 165L(mm)	20mL
144090	50
OD18 × 165L(mm)	24mL
144100	50
OD18 × 190L(mm)	27mL
144110	50
OD21 × 200L(mm)	42mL
144120	50

Ampoules (OD 8mm)	
Description	
Cat. No.	Q'ty
120210	20
120220	20
120221	20
120222	20
120230	20
120240	20
120250	10
120260	20
120270	20
120280	10

OD 6mm ampoule is produced upon request.



Spec.	Cat. No.
1.5mL × 12	191110
1.5mL × 24	191150

Vials		
Description	Q'ty	Cat. No.
Vials (5mL)	132	120290
Vials (10mL)	125	120300
Vials (20mL)	138	120310
Vials (30mL)	110	120320
Vials (50mL)	75	120330

Petri dish		
Description	Q'ty	Cat. No.
Description ∅66 × 19	60	120420
Description ∅96 × 22	60	120430
Description ∅160 × 33	30	120440

Aluminum cap		Rubber cock	
Description	Q'ty	Description	Q'ty
Arrow aluminum cap	100	Arrow flip cap	100
OFF aluminum cap	100	OFF flip cap	100
Arrow flip cap	100	Rubber cock	100
OFF flip cap	100		
Rubber cap	100		

Freeze Dryer

FD, FDU model system

For small volume sample

Freeze Dryer system for small volume container

System Code SYS10019



Product	Model	Cat. No.
Freeze Dryer	FD-1000	188807
Vacuum pump with filtration cassette		191080
Oil mist trap		118880
Adapter for test tubes		120510
Test tube		144110
Adapter for ampoules		120520
Flat ampoule		120280
Vacuum hose		119210

Sample flask and vial can be processed simultaneously

Laboratory samll volume system

System Code SYS10015



Product	Model	Cat. No.
Freeze Dryer	FD-5N	119480
Sealing tray dryer	BSC-3	119800
Oil rotary vacuum pump	GLD-051	190840
Oil mist trap	OMT-050A	118830
Sample flask (pear shaped) \$29	1000mL x 4	116190
Vial	10mL 125pcs x 2	120300
Rubber cock	100pcs x 2	120380
Arrow flip cap	100pcs x 2	120400
Vacuum hose	ID12 x OD30(mm) x 5m	119210

*Pre-freezer is not included. Recommended pre-freezers are UT-50(-45°C, P.66), UT-80(-80°C, P.66), PFR-1000(-45°C, P.76), PF-1000(-25/-40°C, P.76), PFM-1000(P.77) recommended for Pre-freezer.

Shelf type Chamber system for small volumes such as microplates and vials.

Chamber Freeze Dry system, shelf type for small volumes

System Code SYS10021



Product	Model	Cat. No.
Freeze Dryer	FDU-1100	191400
Vacuum pump w/filtration cassette	OCV-1360VF	191080
Drying Chamber	DRC-1N	119730
Trap monitor		197480

Full system from pre-freezing to freeze drying of sample flask

Freeze dry full system A

System Code SYS10020



Freeze drying bottle is not included.

Product	Model	Cat. No.
Freeze Dryer	FDU-2100	197380
Vacuum pump with filtration cassette	GCD-136XNF	191090
T-shape manifold for flask	PMH-8	119830
Sample flask (pear shaped) 29	1000mL × 8	116190
Pre-freezing bath	PFR-1000	197410
Pre-freezer	PFM-1000	197420
Trap monitor		197480

Freeze drying multiple test tubes simultaneously at low temperature.

Freeze drying system at low temp. for small volume

System Code SYS10012



Product	Model	Cat. No.
Freeze Dryer	FDU-810	119310
T-shape manifold for test tubes, ampoules	PMH-24	119860
Oil rotary vacuum pump	GCD-051X	190850
Test tube $\varnothing 18 \times 180\text{H}(\text{mm}) \times 50$		144110
Adapter for test tube B	24pcs	120510
Vacuum hose $\text{ID}12 \times \text{OD}30(\text{mm})$	5m	119210

※ It is recommended to attach Oil Mist Trap OMC-050 (see P.105) to the upper part of exhaust part of vacuum pump.

Shelf type system for large volume, 10L at a time.

Large volume system

System Code SYS10011



Product	Model	Cat. No.
Freeze Dryer	FD-550R	144130
Tray (aluminum)		120630
Petri dish		120420

Spray Dryer

SD-1000

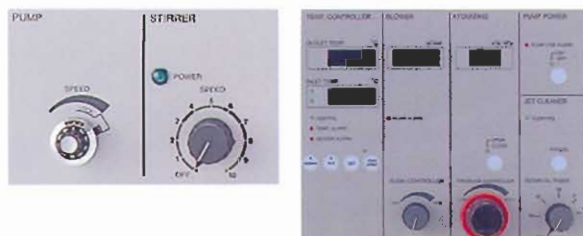


Type: 2 way type nozzle spray nozzle
 Drying capacity: Max. approx. 1500mL/h
 Temp. range: 40~200°C(at inlet)
 Capacity: 50mL~2L

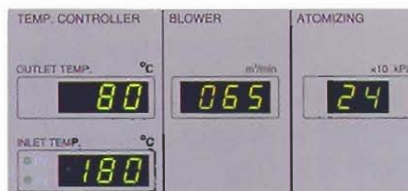
- ★ Sample solution can be collected in the form of dried uniform powder. Pre-process of filtering or concentrating or post-process of grinding are not required.
- ★ Drying by gram order is possible.
- ★ Equipped recorder output enables setting, checking and recording the experiment data.

Model	SD-1000
Cat. No.	174970
Type	2 way type nozzle spray nozzle
Drying capacity	Max. approx. 1500mL/h
Temp. range/accuracy	40 ~ 200°C(at inlet) / ± 1°C
Heated air volume	0.2 ~ 0.75cm ³ /min
Spray air pressure	0.2 ~ 245kPa(0.2 ~ 2.5kg/cm ²)
Sample stirrer rpm	100 ~ 1000rpm(50mL ~ 2L water)
Collection container	Hard glass (600mL)
Input/Rated power source	AC200V, 50/60Hz, 4.2kVA

Control panel



Indicator



Optional accessories, Consumable parts

Cap	Nominal diameter	Spray air		Sample	Cat. No.
		Flow at P pressure [kPa(kg/cm ²)]	(L/min)		
For solution PF-1650-SS dia. 0.41mm	1A	68.67(0.7) ~ 1.3 to	147.15(1.5) ~ 17.0	Uniform solution	120710
For gas PA-64-SS dia. 1.6mm					120740
For solution PF-2050-SS dia. 0.51mm	1	68.67(0.7) ~ 13.3 to	147.15(1.5) ~ 20.0	Slurry concentration approx.5%	120720
For gas PA-64-SS dia. 1.6mm					120740
For solution PF-2050-SS dia. 0.51mm	2A	68.67(0.7) ~ 23.0 to	147.15(1.5) ~ 36.0	Slurry concentration approx.5%	120720
For gas PA-70-SS dia. 1.75mm					120750
For solution PF-2850-SS dia. 0.71mm	2 (standard)	68.67(0.7) ~ 19.3 to	147.15(1.5) ~ 31.0	Slurry concentration approx.5 ~ 20%	120730
For gas PA-70-SS dia. 1.75mm					120750

Needle

Needle	For 0.41mm	For 0.51mm	For 0.71mm
Cat. No.	180250	180260	180270

Suction filter at inlet



(Standard accessory)
Cat. No. 179950

Air filter at outlet



(Standard accessory)
Cat. No. 179960

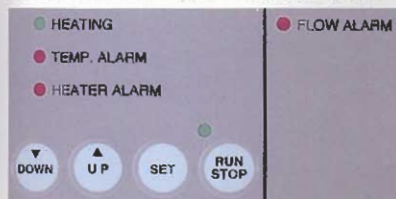


■ Separator, Collecting flask (600mL)
(Standard accessory)
Cat. No. 146760

■ Collecting flask (1.2L)
Cat. No. 147940

Shaker

Designed pursuing safety and easy-to-use



■ Safety design

Various safety functions are available such as Temperature error, Air flow error, Heater default, Flow pressure error by microprocessor-based self diagnosis, Breaker for leakage and excess current, overheat protector and manual recovery in case of power failure. Tubing parts are equipped with rubber tray to ensure the safety design.



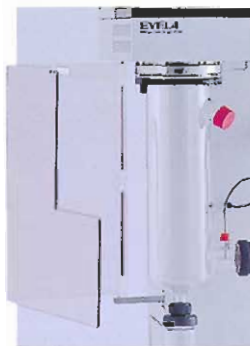
■ Efficient layout of plumbing line

Shortest plumbing line at the efficient position. Enables to prevent the solvent collection or deposition of sample as much as possible.



■ Pressure error detect function

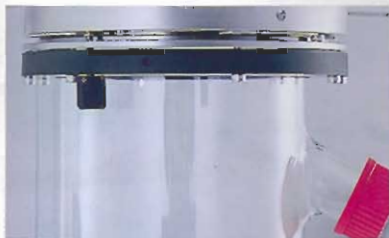
Pressure error alarm is set in flow line and pressure line in order to prevent the removal or breakage of tubing due to nozzle clogging.



■ Protection cover

Protection cover is attached in order to prevent inadvertent touch on the evaporating tubing, part of which reaches to a high temperature by heated air.

Attention is paid to maintenance.



■ Easy to disassemble, clean and reassemble.

Newly designed to enable smooth disassembly, cleaning and reassembly.



■ Inlet (suction filter)



Prevents the pollution from outside.

■ Outlet (air filter)



Prevents the suction blower side.

■ Recorder

Model	μRS-1000
Cat. No.	190970
No. of measured point	6, 6 color ribbon
Measurement cycle	6/10sec (Max)
Input	DCV: 5 types, TC: 1 types, RTD: 2 types
Chart speed	10 ~ 1500mm/h (28 lines)
Record display	Digital
Chart paper	Folding type (100mm)
OD/net weight	144 × 220 × 144, 3.4kg
Input power	18VA
Rated power source	AC100-240V(automatic change) 50/60Hz

■ Consumable products

Chart paper Cat. No. 163980 (16m × 10 rolls)
6 colored ribbon Cat. No. 172320

■ Hose for exhaust

2.5m: Cat. No. 179980
10m: Cat. No. 179990

■ Air Compressor



Model	0.20P-5SA	0.20P-56A	0.40P-7S	0.40P-7S
Cat. No.	180140	180141	180150	180151
Tank capacity	30L			
Control pressure (kg/cm ²)	3.5 ~ 5.0		5.0 ~ 7.5	
Input power	410VA		770VA	
Rated power source	AC100V 50Hz	AC100V 60Hz	AC100V 50Hz	AC100V 60Hz

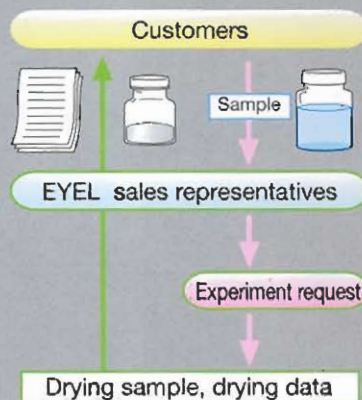


Please read "Instruction Manual" carefully before using the product for your continued safety.

We accept your experiment request

Experiment request

Upon purchasing the Spray SD-1000, we are accepting the drying test to confirm the drying result.



Applicable field	Fine ceramic
	New metal
	Polymeric material
	Engineering plastics
	Food, Nutrients
	Detergent, Grease, Fertilizer
	Medicine, Agricultural chemical
	Dye, Pigment
	Inorganic compounds
	Perfumes, Biology
	Pulp, Paper

Examples of experiment requests

Users' industry, Dept	Sample
Chemical Superconductivity R	Ceramics
Chemical products, Material D	Alumina
Chemical, Synthesis	Polymer
Food New product development	Extract of plant leaves
Food, New product development	Extract of plant root
Crude drug, Development	Starchy plastic material
Container producer, Development	Container for sake cake
University, Reaction chemistry	Oxide silicon
Chemical, ED	Inorganic material
Home building, ED	Resin extract
Rubber, Functional materials D	Inorganic materials
Health food, D	Mushroom extract
Crude drug, factory	Salt solution with impurities
Individual	White of raw egg
Electronics, ED	Polyvinyl alcohol
Chemical, R	Surface-active agent
Parts producer, D	Inorganic materials
Food, D	Egg yolk
Automotive, Material R	Ceramics
Chemical products, R&D	Silk protein
Cosmetics, Reserach Institute	Mushroom extract
Office supplies, R&D	Carbon black
Chemical, Functional material	Malic acid solution
Automotive, Material R	Ceramic powder
Chemical, E	Inorganic substance
Electric appliances R&D	Inorganic materials
Chemical (non-Japanese co.)	Ink jet

Users' industry, Dept	Sample
Food, Research Institute	Starch syrup
Government RL, Material R	Alumina
Metal, Engineering	Polyvinyl alcohol
Additive, D	Natural products
Metal, R&D	PZT solution
Crude drug	Natural products extract
Chemical, Research Institute	Enzyme
Engineering	Sea water
Chemical products, factory	Protamine hydrochloride
Chemical, Material R	Acrylic resin
Optics, Engineering	Titanium dioxide
Chemical, Research Institute	Grease solution
Pharmaceutical, R&D	Lactic acid bacteria
Chemical, R&D	Surface-active agent
University, Material R	Tannin solution
Food, Food D	Food colors
Food, D	Bonito broth
Health food, Research Institute	Lactic acid polymer
Food, Research Institute	Protein/saccharin solution
Electronics, D	Ceramic oxide
Food, R	Grease solvent
University (non-Japanese)	Inorganic materials
Health food, D	Mushroom extract
Retrochemistry, Prod. engineer.	Printing liquid
University, textile	Polyvinyl alcohol
Government RL, Material R	Sodium terephthalate
University, Material chemistry	Bark of coniferous trees

R: Research, D: Development, ED: Engineering Development, RL: Research Laboratory.

Stirrer, Shaker



Stirrer Mazera
NZ-1000 series
Z-1110, 1210, 1310
NZ-2000 series
P.86



Water Bath Shaker
NTS model
Water Bath Shaker
NTC model
P.96



Stirrer
Parts
System
composition parts
P.88



Shaker
MMS model
Constant Temp.
Chamber FMS model
Shaker
S-102, 103D
P.97



Stirrer system
P.92



Incubate Shaker
MMS-1
Incubate Shaker
OSI model
P.98



Homogenizer
GTR-1000
Ultrasonic Processor
VC, VCX series
P.94



Hybridization Oven
MHS-2000
Forcing Test Apparatus
NCS-6100A
P.98



Magnetic Stirrer
RCN, RC-2
Magnetic Stirrer
with Heater
RCH model
P.94



Mixer
CM-1000
Vortex Mixer
IMS-1000
P.99



Magnetic Stirrer with Heater ERC model
Magnetic Stirrer for multiple samples ERC model
Magnetic Stirrer for large capacity RCL model
Powerful Magnetic Stirrer RCX model
P.95



Culture Tube Rotator
MBS model
P.100

Stirrer MAZELA

NZ-1000 Series



Rotation Speed: 5 ~ 3000rpm
 Rotation control: Speed feedback control
 Maximum torque: 0.98/300 ~ 0.098/3000
 (N · m/rpm)

- ★ Reasonable price.
- ★ New design: compact size and less weight.
- ★ Unique speed feedback control is equipped to maintain the set rotation.
- ★ Accurate rotation display by pulse counter.
- ★ Air purge port prevents the invasion of solvent or acid from outside.



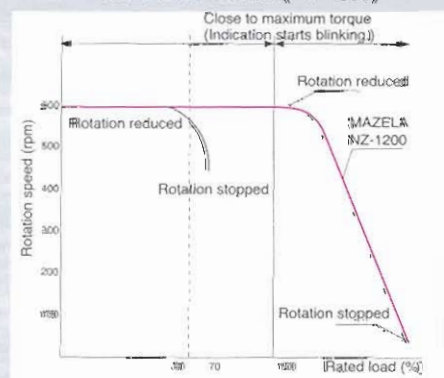
Model	NZ-1000	NZ-1100	NZ-1200	NZ-1300
Cat. No.	200570	200590	200610	200630
Rotation speed(no load)	50-3000rpm	20-1200rpm	10-600rpm	5-300rpm
Max. torque (N · m/rpm)	0.098/3000	0.245/1200	0.49/600	0.98/300
Rotation control	Speed feedback control			
Rotation speed setting/display	Analog setting, Digital readout 4 digits			
Safety function	Thermal protector, Current limit circuit, Chuck cover			
Motor	DC brushless motor, 30W			
Rated torque	0.098N · m(1kgf · cm)/3000rpm			
Input/Rated power source	AC100V, 50/60Hz, 200VA			

※ NZ-1000S, NZ-1100S, NZ-1200S and NZ-1300S are equipped with a stirring shaft and a stirring propeller.

Control panel



Rated load characteristics (NZ-1200)



Optional accessory

Stand base
 ZS model Cat. No. 158710

Excellent performance in synthesis and reaction experiments

Stirring seal
 TBO type
 ¥24 Cat. No. 121090
 ¥29 Cat. No. 121100
 ¥34 Cat. No. 121110
 ¥40 Cat. No. 121120

Please visit our website for further information of general catalogue



Stirrer MAZELA

Z-1110, 1210, 1310



Z

- ★ DC brushless motor with 30W output.
- ★ External output of signal allows remote control of rotation speed.
- ★ Unique speed feedback control is equipped to maintain the set rotation.

Model	Z-1110	Z-1210	Z-1310
Cat. No.	120850	120860	120870
Rotation speed(no load)	20~1200rpm	10~600rpm	5~300rpm
Max. torque (N · m/rpm)	0.245/1200	0.49/600	0.98/300
Rotation control	Speed feedback control		
Rotation speed setting/display	Analogue setting, Digital readout 4 digit		
Torque display	% against max. torque (20, 40, 60, 80, OVER)		
Motor	DC brushless motor, output 60W		
Rated torque	0.098N · m(1kgf · cm)/3000rpm		
Overall dimension	118 × 205 × 240 (383.5 when free clamp attached)		
Input/Rated power source	AC100V, 50/60Hz, 200VA		

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External input/output terminal



Electrical signal input (DC0 - 5V) such as a computer or a process controller etc. enables the remote control of rotation speed and electrical signal output (DC0 - 5V) of rotation speed and loaded torque is available. Therefore data processing is possible.

Stirrer

Z-2000 series



Z

- ★ DC brushless motor with 60W output.
- ★ Unique speed feedback control is equipped to maintain the set rotation.
- ★ External signal input enables remote control of rotation speed. (2110, 2210, 2310 model).

Model	Z-2100/Z-2110	Z-2200/Z-2210	Z-2300/Z-2310
Cat. No.	120910/120940	120920/120950	120930/120960
Rotation speed(no load)	20~1200rpm	10~600rpm	5~300rpm
Max. torque (N · m/rpm)	0.392/1200	0.784/600	1.57/300
Rotation control	Speed feedback control		
Rotation speed setting/display	Analogue setting, Digital readout 4 digit		
Torque display	% against max. torque (20, 40, 60, 80, OVER)		
Motor	DC brushless motor, output 60W		
Rated torque	0.196N · m(2kgf · cm)/3000rpm		
Overall dimension	120 × 254 × 240 (393.5 when free clamp attached)		
Input/Rated power source	AC100V, 50/60Hz, 300VA		

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Optional accessories

Stand Base ZS model

Cat. No. 158710

Torque, rotation signal output code ZO-2000 model

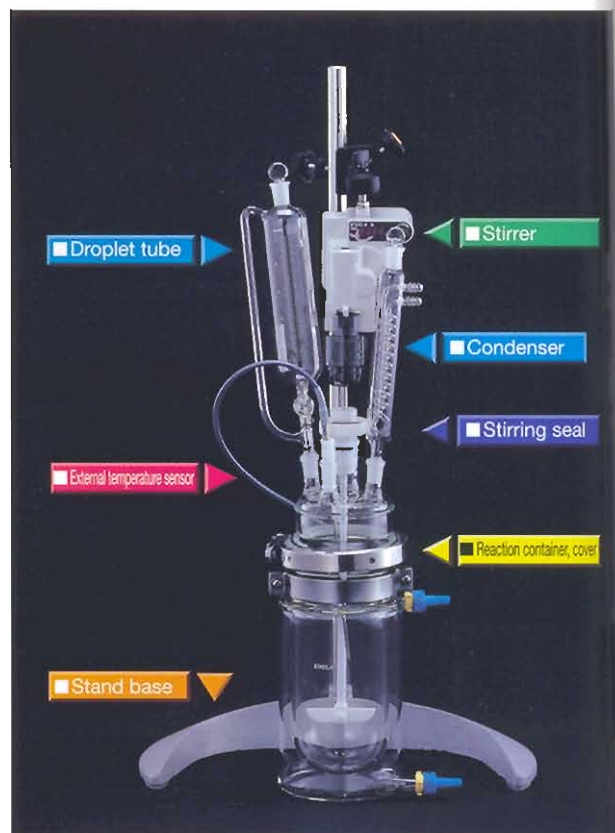
Cat. No. 120890

External signal input code ZI-2000

Cat. No. 120900



Parts for Stirrer, Related products



■ Stirring shaft (for NZ, Z series)

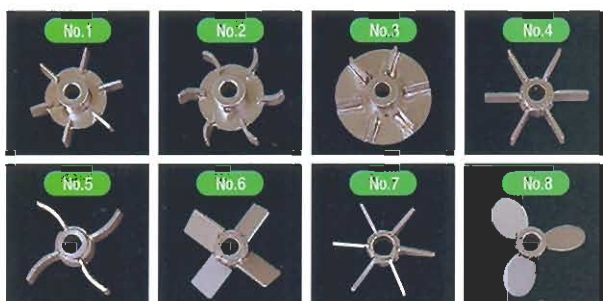
Material	OD × Length (mm)	Cat. No.
SUS	8 × 495	121720
	8 × 495 (screwed)	121730
	8 × 800	121760
	8 × 1000	121770
	10 × 500	121780
	10 × 800	121800
	10 × 1000	121810

※ Standard equipment for N, NZ series is screwed stirring shaft with 495mm length.
 ※ These shafts cannot be used for Stirring seal TBO type. Use the specific stirring shaft for stirring seal.

■ Stirring propeller (for NZ, Z series)

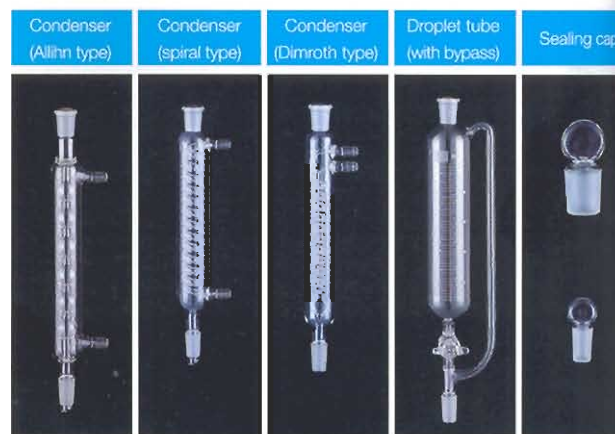
No.	Description	Shaft dia.	Propeller dia.	Cat. No.
NO. 1	Flat blade turbine	8mm	50mm	121840
NO. 2	Curved blade turbine			122020
NO. 3	Disc turbine			122200
NO. 4	Fan turbine			122380
NO. 5	Curved fan turbine			122560
NO. 6	Pitched blade turbine			122740
NO. 7	Modified fan turbine			122920
NO. 8	Marine propeller			123100

※ Shaft diameter 10mm is also available.
 Standard equipment for N, NZ-series is marine type which is different from Marine propeller No.8.



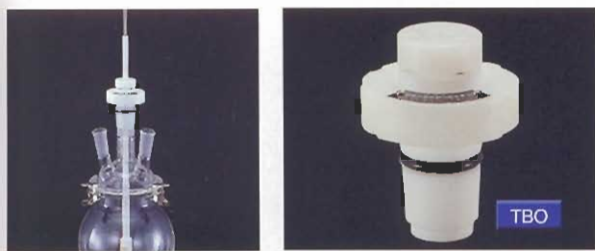
■ Condenser, Droplet tube, Sealing cap

Product	Taper joint	Cat. No.
Condenser(Allihn type)		200480
Condenser(spiral type)	Φ 15/25	200490
Condenser(Dimroth type)		200500
Droplet tube(with side tube)		200510
Sealing cap	Φ 29/38	200520
	Φ 15/25	200530



■ Stand base

Product	Model	Cat. No.
Stand base	ZS	158710
	ZS-2	203190



■ Stirring seal TBO type

Material	Taper joint	Cat. No.
Teflon	φ29	121100

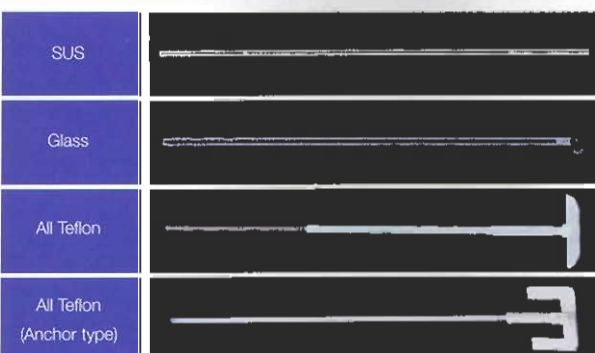
■ Stirring propellers for stirring seal

Model	Material	Spec	Cat. No.
G-1	SUS	58 × 19	121450
G-2		71 × 19	121460
E-1	Glass	58 × 19	121430
E-2		71 × 19	121440
F-1	Teflon	58 × 19	121470
F-2		71 × 19	121480



■ Stirring shaft for stirring seal

	Material/Model	OD × L (propeller)mm	Cat. No.	
No stirring propeller	SUS	8 × 450 without split	121520	
		8 × 450 with split	121560	
		8 × 600 with split	121570	
	Glass	8 × 450	121490	
		8 × 600	121500	
		8 × 800	121510	
With stirring propeller	All Teflon	T-1	8 × 450 (80 × 17)	121590
		T-11	8 × 600 (80 × 17)	203210
		T-12	8 × 700 (100 × 23)	203220
		T-2	8 × 600 (120 × 23)	121600
		T-3	8 × 800 (150 × 25)	121610
	(Anchor type)	T-1A	8 × 450 (60 × 40)	200210
T-2A	8 × 600 (80 × 60)	200220		



■ Table of All Teflon stirring shaft and reaction container

Product	Product Model	Jacket type reaction vessel				Jacket reaction vessel with drainage				Separable round bottom flask		
		BJ-5N	BJ-10N	BJ-20N	BJ-30N	BD-5N	BD-10N	BD-20N	BD-30N	SFR-5	SFR-10	SFR-20
All Teflon stirring shaft	T-1	○				○				○	○	
	T-11	○	○				○				○	○
	T-12			○				○				○
	T-2				○				○			○
	T-3											○
	T-1A	○	○			○	○			○	○	○
T-2A	○	○	○		○	○	○	○	○	○	○	

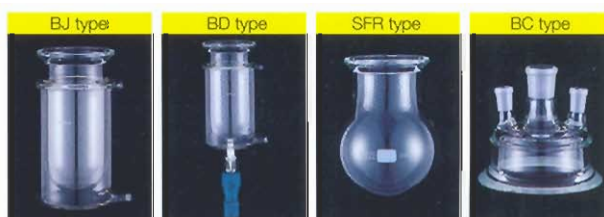
■ External temperature sensor

Applicable Water Bath	Model	Sensor OD × L	Cat. No.
NCB-2300	STP-100	3.2 × 150mm	114220
NCB-2400	STP-110	3.2 × 270mm	203230
NTT-20G	STP-120	3.2 × 420mm	203240
NCB-3100	STP-200	3.2 × 150mm	113620
NCB-3200	STP-210	3.2 × 270mm	203250
NCB-3300			
PCC-7000	STP-220	3.2 × 420mm	203260
NTB-221			
NCB-1200			
NCB-2500	STP-300	3.2 × 150mm	196730
NCB-2600			

■ Reaction container, cover

Product	Model	Capacity mL	Cat. No.
Jacket type reaction vessel	BJ-5N	500	201470
	BJ-10N	1000	201480
	BJ-20N	2000	201490
	BJ-30N	3000	201500
Jacket reaction vessel with drainage	BD-5N	500	201510
	BD-10N	1000	201520
	BD-20N	2000	201530
	BD-30N	3000	201540
Separable round-bottom flask	SFR-5	500	200450
	SFR-10	1000	200460
	SFR-20	2000	200470

Product	Model	No. /Taper joint	Cat. No.
Flask Cover	BC-1N	1 × φ29/38	201550
	BC-2N	1 × φ29/38	201560
		1 × φ15/25	
	BC-3N	1 × φ29/38	201570
		2 × φ15/25	
	BC-4N	1 × φ29/38	201580
3 × φ15/25			
BC-5N	1 × φ29/38	201590	
	4 × φ15/25		



Product	Model	Cat. No.
Flange stopper	ST-1000	201600
Reaction vessel support	RH-1000	202670
O-ring		201620
Neck adapter	(2 pcs/set)	185260



Related products to support the system composition



ZC Clamp **ZC model**
ZS model

ZC Clamp
Clamp dia. Max. dia 22
Cat. No. 124560
OD Base 450 × 314
Pole OD 22 × 780

ZS Stand base
Cat. No. 158710

Evaporator, Vacuum Unit
Organic Synthesizer



Recirculating Chiller **CA-1112**

Temp. setting range -20~30°C

Excellent cooling capacity
A wide range of temperature setting (no heater)

Cooling capacity 1200W (liquid temp. 10°C)
Cat. No. 203970

→ P.69



One-touch Coupling **CW-1**
CF-1

Flexible Coupling

Stirrer is easily detachable while stirring shaft is set to reaction container.

CW-1
Cat. No. 123480

Only for glassware shaft. Glass shaft is firmly chucked by turning the glass shaft.

CF-1
Cat. No. 123490

Open, Electric Furnace, Reaction Heater
Low-Temperature Bath, Corrosive Temperature Bath, Corrosive Tap
Low and Corrosive Temperature Water Circulator




Recirculating Chiller **CCA-1110**

Temp. setting range -20~20°C

Compact size suitable for cooling of synthesizer (no heater)

Cooling capacity 450W (liquid temp. 10°C)
Cat. No. 203980

→ P.68



Flexible Stirrer **FS-1**

Without moving the stirrer, stirring place can be shifted. Stirring the dangerous solvent in the draft is possible.

Max. torque 1.47N · m(15kgf · cm)
Min. flexible radius 150mm
Cat. No. 123570

Freeze Dryer, Spray Dryer
Stirrer, Shaker
Peristaltic Pump



Low Temp. Water Bath **PFR-1000**


Temp. control range -40~20°C

-45°C low temp. water bath for multi-purpose experiments (no heater)

Cooling capacity 360W (liquid temp. -20°C)
Cat. No. 197410

Optional circulating pump is equipped.

→ P.69



Sub Stirrer **SS-1**

One stirrer enables 2 or 3 stirring simultaneously under the same condition. Container stirring and bath stirring in the same bath is possible.

Shaft dia. : 1 ~ 8mm
SS-1A Z-1000
SS-1B Z-1000series (except for Z-1000)
SS-1C Z-2000

Liquid Chromatograph
Culture Microbe and Insecto apparatus
Others



Low Temp. Water Bath **NCB-1200**

Temp. setting range -30~95°C

A wide range of temperature setting
External circulating function is equipped

Cooling capacity 200W (liquid temp. 10°C)
Cat. No. 195590

→ P.58

Programmable low temp. precision bath
NCB-3100, 3200, 3300

Temp. control range: -30~80°C

Programmable control and computer communication are available.

Bath capacity	13L, 23L, 41L
3100	No. 112450
3200	No. 112460
3300	No. 112470

→ P.60

Oil bath
OHB-1000, 2000(G, S)

Temp. control range: 10~250°C

Control panel is detachable.
Easy-to-use glass/SUS bath.

1000G	Cat. No.200650
2000G	Cat. No.200660
1000S	Cat. No.200670
2000S	Cat. No.200680

G type

S type

→ P.62

Programmable constant temp. circulator
PCC-7000

Temp. control range: -30~80°C

Ramp control suitable for organic synthesis, crystallization, recrystallization and computer communication are available.

Bath capacity	13L
Cat. No.	127920

→ P.61

Immersion cooler
Immersion heater

ECS
HPC, HPS, HPT

Immersion cooler
-20°C type
-30°C type
-45°C type
-80°C type

Immersion heater
Material: Copper, SUS, Titanium

→ P.65

Thermo regulating bath
NTT-2400

Temp. control range: +5~180°C

A variety of containers can be used.
Water and oil are available.

Heater capacity	1kW
Cat. No.	195430

→ P.56

Temperature controller
THD, THS series

THD series for Heater control
THS series for refrigerator alternate control

THD-50	-50~50°C
THD-100	-99~0°C
THS-10	-10~50°C
THS-40	-40~20°C
THS-60	-60~-10°C

→ P.65

Programmable Precision Bath
NTB-221

Temp. control range: +10~200°C

Programmable control and communication control are available.

Heater capacity	1.2kW
Cat. No.	113610

→ P.57

Water Bath
SB, SBC series

SBC-11	10L	
SBC-16	16L	SUS
SBC-24	24L	Cold insulator
SB-6	5.5L	
SB-11	10L	
SB15	16L	SUS
SB-24	24L	
SB-5	4.5L	Non-flammable material
SB-9	9L	PP

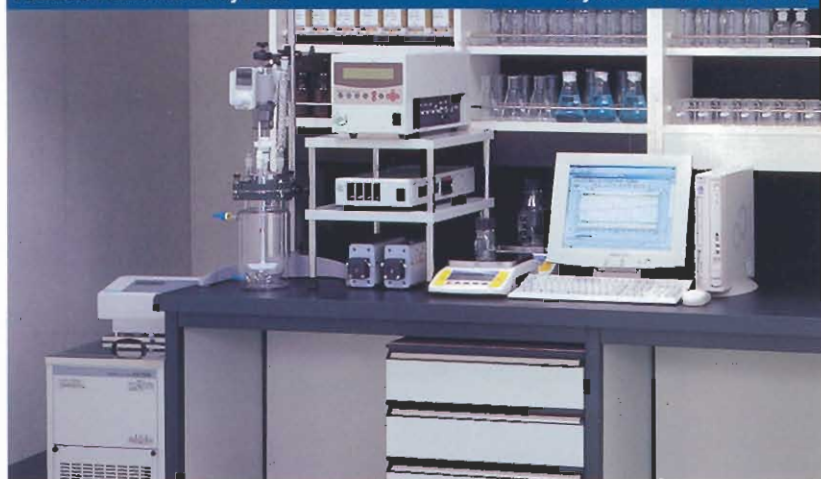
→ P.65

System Compositions for synthesis reaction

Control of reaction processes

Reaction automated system

System Code SYS13016



Description	Model	Cat. No.
Process Controller	EPC-2000 main unit	199230
VA converter × 2		199300
Control box	BOX-D-A	199330
Peristaltic pump × 2	SMP-21S	124760
Stirrer	Z-2210	120850
Stirring seal	TBO type ¥29	121100
Stirring shaft (All Teflon)	T-1	121590
Torque rotation signal output code	ZO-EPC	200010
External signal input code	ZI-2000	120900
Electronic balance × 2	CP3202P	361740
RS-232C cable	RSC-1200	167370
RS-232C cable × 2	RSC-1300	200050
Tube stand × 2	CSD-1	199840
Jacket type reaction vessel	BJ-20N	201490
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
O-ring		201620
Reaction container support	RH-1000	202670
Keck adapter × 2		185260
Condenser (spiral type)	¥15/25	200490
Sealing cap	¥15/25	200530
Programmable constant temp. circulator for recrystallization	PCC-7000	127920
Stand base	ZS	158710

※Host PC, heat medium for circulation, table, tubing and thermometer are not included.

Control of basic system by using PC

Labworld SOFT reaction system

System Code SYS13017



Description	Model	Cat. No.
Labworld Soft		199860
PC card	PC18.2	199870
Data Control	DA2	199880
Data Control	DC2	199890
PC cable × 2	PC1.5	199900
Analogue cable	AK2.4	199910
Peristaltic pump	SMP-21S	124760
Stirrer	Z-2210	120850
Stirring seal	TBO type ¥29	121100
Stirring shaft (All Teflon)	T-1	121590
Torque rotation signal output code	ZO-LWS	200020
External signal input code	ZI-LWSZ	200030
External signal input code	ZI-LWSS	200040
RS-232C cable	RSC-1400	199920
Jacket type reaction vessel	BJ-20N	201490
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
O-ring		201620
Reaction container support	RH-1000	202670
Keck adapter × 2		185260
Condenser (spiral type)	¥15/25	200490
Sealing cap	¥15/25	200530
Programmable constant temp. circulator for recrystallization	PCC-7000	127920
Stand base	ZS	158710

※Host PC, heat medium for circulation, table, tubing and thermometer are not included.

Reaction experiment at low temperature

Low temp. program reaction system

System Code SYS13010



Description	Model	Cat. No.
Stirrer	Z-1110	120850
Stirring seal	TBO type ¥29	121100
Stirring shaft (All Teflon)	T-11	203210
Jacket type reaction vessel	BJ-20N	201490
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
O-ring		201620
Reaction container support	RH-1000	202670
Keck adapter × 2		185260
Condenser (spiral type)	¥15/25	200490
Sealing cap	¥15/25	200530
programmable constant temp. circulator	NCB-3100	112450
Stand base	ZS	158710

※Thermometer and clamp are not included.

Programmable basic system

Temperature program basic reaction system

System Code SYS13007



Description	Model	Cat. No.
Stirrer	Z-1210	120860
Stirring seal	TBO type ¥29	121010
Stirring shaft (All Teflon)	T-1	121590
Separable round bottom flask	SFR-10	200460
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Droplet tube (250mm)	¥15/25	200510
Sealing cap	¥15/25	200530
Programmable constant temp. circulator	NTB-221	113610
Stand base	ZS	158710

*Clamp, holder, and thermometer are not included.

Polymerization reaction at low temperature

Low temperature reaction system

System Code SYS13022



Description	Model	Cat. No.
Stirrer	NZ-1300	200630
Stirring seal	TBO type ¥29	121100
Stirring shaft (All Teflon)	T-1	121590
Separable round bottom flask	SFR-10	200460
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Immersion cooler	ECS-50	113420
Cooler clamp	CHC-2	181840
Temperature controller	THD-50	114600
Water bath	SB-11	114670
Immersion heater	HPT-500	114810
Stirring pump	STR-1	114240
Droplet tube (250mm)	¥15/25	200510
Stand base	ZS	158710

*Clamp, holder, and thermometer are not included.

Reaction of solvent with high fusing point

High temperature stirring reaction system 2 (Basic system) System Code SYS13023



Description	Model	Cat. No.
Stirrer	NZ-1100	200590
Stirring seal	TBO type ¥29	121100
Stirring shaft (All Teflon)	T-1	121590
Separable round bottom flask	SFR-10	200460
Flask cover	BC-4N	201580
Flange stopper	ST-1000	201600
Immersion Thermo-Regulator	NTT-2400	195430
Stainless steel Bath	SB-11	114650
Droplet tube (250mm)	¥15/25	200510
Stand base	ZS	158710

*Clamp, holder, and thermometer are not included.



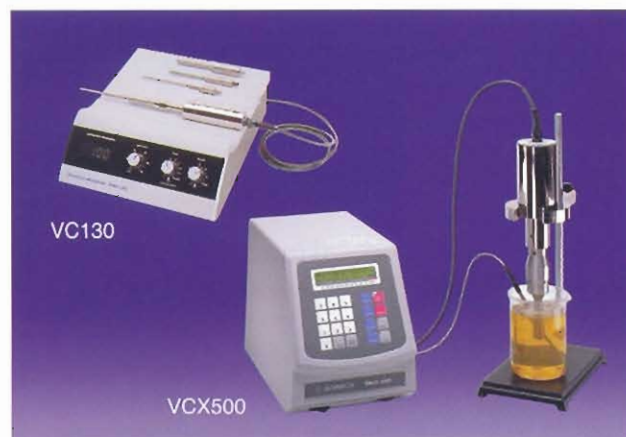
Please read "Instruction Manual" carefully before using the product for your continued safety.



Homogenizer GTR-1000

★ For crashing the cell tissue, coarse fraction or purification of protein

Model	GTR-1000
Cat. No.	124230
Rotation speed	100 ~ 1000rpm (Max. 1200rpm) no load
Max. torque	0.245N.m (2.5kgf · cm)
Rotation control	Speed feedback control
Power source	AC100V, 50/60Hz



Ultrasonic Processor VC, VCX series

★ Timer is equipped to enable to set the fraction time.

★ Pulsar process prevents the rise in temperature of sample.

VC130 Cat. No. 185650
Output: 100W, Frequency: 20kHz, Timer: 0 - 10min, AC100V

VCX500 Cat. No. 190820
Output: 500W, Frequency: 20kHz, Timer: 1s - 10h, AC100V



Magnetic Stirrer RC, RCN

★ Stirring the low to high viscous solvent. 6 types to handle 50mL ~ 7L

Model	RCN-3	RCN-3D	RC-2	RCN-7	RCN-7D	RCN-7R
Cat. No.	123800	123810	123820	123880	123890	123900
Rotation speed (no load)	100 ~ 1500rpm	20 ~ 1200rpm	200 ~ 2000rpm (50Hz)	20 ~ 1200rpm		
Capacity	50mL ~ 3L (water)	100mL ~ 1L (water)	50mL ~ 7L (water)			
Power source	AC100V, 50/60Hz 2VA	AC100V, 50/60Hz 15VA	AC100V, 50/60Hz 10VA	AC100V, 50/60Hz, 15VA		



Magnetic Stirrer with Heater RCH model

★ Controllable up to 300°C.

★ Cobalt magnetic prevents lowering the magnetic intensity caused by high temperature.

RCH-3 Cat. No. 123910
RCH-3L Cat. No. 123920
Rotation speed 100 ~ 1500rpm, Capacity: 50mL ~ 3L (water)



ERC-1000H

Magnetic Stirrer with Heater ERC model

- ★ Possible to operate at as low as 15rpm.
- ★ Electromagnetic induction enables non-shaking safe rotation.

ERC-1000H Cat. No. 198950
 Rotation speed: 15 ~ 1250rpm, Stirring capacity: 15L, Temp. range: RT ~ 310°C
 Power source: AC100V, 50/60Hz



ERC-2000

Magnetic Stirrer for multiple samples ERC model

- ★ Simultaneous stirring of multiple samples is available.
- ★ Rotation speed range is 100 ~ 1250rpm.

ERC-2000 Cat. No. 198960
 Rotation speed: 100 ~ 1250rpm, Stirring capacity: Max. 0.4/1 stirring (water)
 Power source: AC100V, 50/60Hz



RCL-1000

Magnetic Stirrer for large capacity RCL model

- ★ For large capacity container of up to 30L or 60L.
- ★ Rotation speed range is 100 ~ 1300rpm.

Model	RCL-1000	RCL-2000
Cat. No.	200190	200200
Rotation speed (no load)	100 ~ 1300rpm	
Stirring capacity	Max. 30L (water)	Max. 60L (water)
Power source	AC100V, 50/60Hz	



RCX-1000S

Powerful Magnetic Stirrer RCX

- ★ This mechanism enhances the upward magnetic force.
- ★ New material magnet improves the magnetic force significantly.

Model	RCX-1000S	RCX-1000D	RCX-1000H
Cat. No.	195540	195550	195560
Rotation speed (no load)	100 ~ 1300rpm		
Max. temperature	—		Max. 300°C (plate side)
Stirring capacity	10mL ~ 3L		
Input/Rated Power source	AC100V, 50/60Hz, 200VA		AC100V, 50/60Hz, 500VA



Evaporator,
Incubator UnitOrganic
SynthesizerOpen Electric Furnace,
Incubator, FreezerLow Temperature Bath,
Constant Temperature Bath,
Condenser, TapLow and Constant
Temperature Water
GeneratorFume Drier,
Spray DrierStirrer,
ShakerPeristaltic
pumpLiquid
ChromatographCulture Media and
related apparatus

Others



NTS-1000

Compact size Water Bath Shaker NTS-1000

★ Compact size, Electromagnetic induction type.

Model	NTS-1000
Cat. No.	197650
Shaking mode	Reciprocation (Electromagnetic induction)
Temperature range	RT+5 - 70°C
Shaking speed/width	0 - 200/min, 25mm
Power source	AC100V, 50/60Hz, 4.4kVA

※H



NTS-1300D

Water Bath Shaker NTS-1300D

★ Controllable at 20 ~ 160/min up to 80°C.

★ 100 test tubes with OD 16 ~ 18mm can be set.

Model	NTS-1300D
Cat. No.	196960
Shaking mode	Reciprocation
Temperature range	RT+5 - 80°C
Temperature accuracy	±0.05°C
Shaking speed/width	20 - 160/min, 30mm
Power source	AC100V, 50/60Hz, 1.4kVA



NTS-3100

NTS-2000

Water Bath Shaker NTS-2000, 2100, 3000, 3100

★ NTS-2100, 3100 are program controlled.

★ Shaking speed is 20 ~ 160/min. Shaking width is switchable.

Model	NTS-2000	NTS-2100	NTS-3000	NTS-3100
Cat. No.	114950	114920	114960	114930
Shaking mode	Reciprocation			
Temperature control	RT+5 - 80°C			
Temperature accuracy	±0.03°C			
Shaking speed/width	20 - 160/min, 25 - 40mm		20 - 140/min, 25 - 40mm	
Input/Rated power source	AC100V, 50/60Hz, 1.33kVA		AC100V, 50/60Hz, 2.2kVA	



NCS-3000

NCS-1300

Water Bath Shaker NCS-1300, 3000, 6100

★ Stirring at a wide range of temperature below room temperature.

★ NCS-6100 is equipped with 7 patterns program function.

Model	NCS-1300	NCS-3000	NCS-6100
Cat. No.	114860	114870	198930
Stirring mode	Reciprocation		
Temperature range	10 - 70°C	10 - 50°C	0 - 60°C
Temperature accuracy	±0.1°C	±0.1°C	Within ±0.1°C
Shaking speed	20 - 160/min	20 - 140/min	
Shaking width	30mm	25/40mm variable	25mm
Power rate	AC100V, 50/60Hz, 1.5kVA		AC100V, 50/60Hz, 3.4kVA



MMS-5010



MMS-210

Shaking Table is not included

Shaker MMS model

- ★ 20 ~ 250/min shaking speed for various applications.
- ★ 20 ~ 450/min powerful shaking speed enables emulsion.

Model	MMS-110	MMS-210	MMS-310	MMS-3010	MMS-510	MMS-5010
Cat. No.	192780	192790	190980	190990	194480	194530
Shaking method	Reciprocation	Orbital motion	Reciprocation/Orbital motion		Orbital motion	
Shaking speed	20 ~ 250/min				20 ~ 450/min (by Shaking table, holder)	
Shaking width	25mm					
Ambient temp.	4 ~ 50°C					
Power source	AC100V, 50/60Hz, 30kVA					

Constant Temp. Chamber FMS model

- ★ Installing Shaker MMS model inside this unit serves as Incubate Shaker.
- ★ Using this unit alone serves as an Incubator.

Model	FMS-100	FMS-1000
Cat. No.	191060	191070
Air force	Forced air flow	
Temperature range	RT+5 ~ 50°C	
OD of installable shaker	Within 400 × 340	Within 500 × 390
Power source	AC100V, 50/60Hz, 620VA	AC100V, 50/60Hz, 690VA

Constant Temp. Chamber FMC model

- ★ Installing Shaker MMS model this unit serves as Low Temp. Shaker.
- ★ Using this unit alone serves as Low Temp. Incubator.

Model	FMC-100	FMC-1000
Cat. No.	195240	195250
Air force	Forced air flow	
Temperature range	4 ~ 50°C	
OD of installable shaker	Within 400 × 340	Within 500 × 390
Power source	AC100V, 50/60Hz, 930VA	AC100V, 50/60Hz, 940VA



FMC-100(放入振荡器)



FMC-1000

Shaker S model

- ★ 9 types of shaking table are available from 50mL ~ 5L for large volume of culturing.

Model	S-102D	S-103D
Cat. No.	174540	174550
Shaking mode	Orbital motion	
Shaking speed	20 ~ 300/min	
Shaking width	25mm	38mm
No. of attachable containers (500mL flask)	20	40



S-102D





MMS-1

Incubate Shaker MMS model

- ★ Desk top, personal type.
- ★ Suitable for shaking for short time and a small volume of sample.

Model	MMS-1
Cat. No.	140460
Shaking mode	Reciprocation
Temp. range/accuracy	RT+5 - 60°C, ±1°C (set at 37°C)
Shaking speed/width	20 - 160/min, 25mm
Shaking table	280W × 215D
Power source	AC100V, 50/60Hz, 90VA



OSI-502LD

Incubate Shaker OSI model

- ★ Mass process at a wide range of temperature.
- ★ Shaking speed is 20 ~ 250rpm. 2 types of temperature range are available.

Model	OSI-501D	OSI-502D	OSI-503D	OSI-501LD	OSI-502LD	OSI-503LD
Cat. No.	174480	174490	174500	174510	174520	174530
Shaking method	Reciprocation					
Temp. range	RT+10 - 60°C			5 - 60°C		
Shaking speed/width	20 - 250/min, 70mm					

※ No. of attachable containers (100mL Erlenmeyer flask) 501 model: 30, 502 model: 60, 503 model: 94.



MHS-2000

Hybridization Oven MHS model

- ★ From DNA extraction to hybridization.
- ★ Stable temperature uniformity by forced air flow.

Model	MHS-2000
Cat. No.	190050
Air flow	Forced air flow
Shaking method	Rotation/Seesaw motion
Temp. range/accuracy	RT+5 - 80°C, ±0.2°C (set at 37°C)
Rotation (shaking) speed	5 - 28rpm
Shaking table shaking width	±13mm
Standard unit	Bottle, Hybridization bag



NCS-6100A

Forcing Test Apparatus NCS model

- ★ For taste deterioration test of drinking water, etc.
- ★ Programmed control of shaking speed, temperature and time.

Model	NCS-6100A
Cat. No.	198940
Temperature range	0 - 60°C
Shaking method	Reciprocation
Shaking speed	20 - 140/min
Shaking width	25mm

Evaporator,
Vacuum UnitOrganic
SynthesizerOven, Electric Furnace,
Inoculation FreezerLow-temperature Bath,
Constant-temperature Bath,
Condenser, TrapLow and Constant-
temperature Water
circulatorFreeze Dryer,
Spray DryerStirrer,
ShakerPeristaltic
pumpLiquid
ChromatographCulture Microbe and
related apparatus

Others

Mixer

CM-1000



CM-1000 Rack and container units are not included.

★7 types of rack are available to deal with various containers. Shaking speed is 300 ~ 2500rpm.

★Available for a variety of uses such as DNA/RNA extraction, dissolution of reagent and etc.

Model	CM-1000
Cat. No.	188140
Shaking method	Orbital motion
Shaking speed (the type of rack attached)	300 ~ 1500rpm(50mL centrifuge tube rack) 300 ~ 1800rpm(15mL centrifuge tube rack) 300 ~ 1800rpm(Microtube rack) 300 ~ 1200rpm(Microplate rack) 300 ~ 2500rpm(Vortex rack) 300 ~ 1800rpm(Deepwell rack)
Shaking width	Approx. 3mm
Ambient temperature	5 ~ 37°C
Overall dimension	160 × 170 × 155(main unit)

Please visit our website for further information of general catalogue



■ Optional accessory (Rack)

Description	No. of unit attached	Model	Cat. No.
0.5mL tube rack	24	CM-R0.5	188150
1.5mL tube rack	24	CM-R1.5	188160
15mL centrifuge tube rack	12	CM-R15	188180
50mL centrifuge tube rack	6	CM-R50	188170
Microplate rack	2	CM-RP	188190
Vortex rack		CM-RV	199200
Deepwell rack	1	CM-RD	192310

Vortex Mixer

IMS-1000



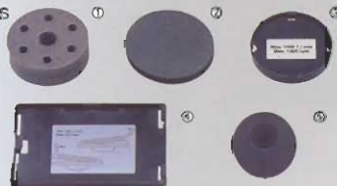
IMS-1000

★Compact size, high performance, and reasonable price.

★Vortex mixing enables handling various containers.

Model	IMS-1000
Cat. No.	198970
Shaking method	Orbital motion
Shaking speed/width	200 ~ 2500/min 4.5mm
Ambient temperature	5 ~ 40°C
Power source	AC100V, 50/60Hz

■ Accessories



NO	Description	Applicable container	Model	Cat. No.
①	Sponge	Microtube	IMS-4	199020
②	Sponge	Erlenmeyer flask, Centrifuge tube	IMS-3	199040
③	Tray for sponge	—	IMS-2	199010
④	Microplate tray	Microplate	IMS-5	199030
⑤	Rubber base	Test tube	IMS-1	199000



Please read 'Instruction Manual' carefully before using the product for your continued safety.

Culture Tube Rotator

MBS model



Rotation speed: 0.5 ~ 5.0rpm
5.0 ~ 50rpm
Angle range: 0 ~ 90° (horizontal ~ vertical)
Angle indicator attached

- ★ Suitable for clinical inspection and shoot apex culture.
- ★ MGS-10 can hold 214 test tubes or 30 Erlenmeyer flasks with 100mL at a time.
- ★ Discs for various containers are available as options. The angle is adjustable from vertical to horizontal.

Model	MBS-1A	MBS-1B	MBS-10
Cat. No.	141520	141530	141640
Rotation speed	0.5~5.0rpm	5.0~50rpm	0.5~5.0rpm
Angle range	0 ~ 90° Angle indicator is attached		0 ~ 90°
Timer	Max. 1 hr or continuous		
Holder	Optional accessory		
Ambient temp.	5 - 40°C		10 - 35°C
Overall dimension	330(414) × 212(249) × 300		510(570) × 400 × 495(540)
Net weight	Approx. 8kg		Approx. 30kg
Power source	AC100V, 50/60Hz, 35VA		AC100V, 50/60Hz, 80VA

■ Rotation Discs

Description	For test tube		For Erlenmeyer flask			For vial	Laid mixing			Test tube	Erlenmeyer flask		
Cat. No.	141540	141550	141560	141570	141580	141590	141600	141610	141620	141630	141650	141660	141670
Applicable unit	MBS-1A, 1B										MBS-10		
Attachable units	Test tube	ø18 × 110	ø25 × 110								ø25 × 110		
	Erlenmeyer flask			50mL	100mL	200mL						100mL	200mL
	Vial					ø25 × 50							
	Eppendorf tube						ø10.8						
	Test tube w/stopper							ø13 × 15	ø18				
	Centrifuge tube									ø35			
Attachable no.	54	42	6	5	4	42	30 × 2 stage	30 × 2 stage	18 × 2 stage	10	214	30	25
Discs dia.	260		240			260	240				560		

For test tube



For Erlenmeyer flasks



For vials



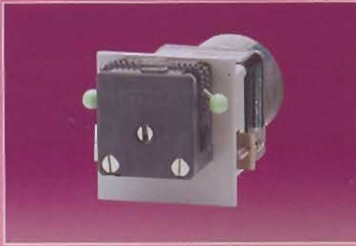
For Laid mixing



For Erlenmeyer flasks



✦ Containers are not included.



**Peristaltic Pump
Panel mount
Pump
SMP-11**
P.102



**Peristaltic Pump
Roller Pump
RP-2000, 2100**
P.103



**Peristaltic Pump
Cassette tube
pump
SMP-21, 21S, 23, 23S**
P.102



**Peristaltic Pump
Roller Pump
RP-1000**
P.103



**Peristaltic Pump
Micro tube pump
MP-1000, 1100**
P.102



**Peristaltic Pump
Ceramic plunger
pump
VSP**
P.104



**Peristaltic Pump
Micro tube pump
MP-101, 201, 1011**
P.103



**Tubings for
Peristaltic Pumps**
A list of Chemical
resistance of tubing
P.105, 106



SMP-11

Peristaltic Pump Panel Mount Pump SMP-11

- ★ Compact pump for mounting on operation panel.
- ★ Cassette type tubing head for easy attachment.
- ★ Flow pressure: Approximately 196kPa (or, 2.0kg/cm²)

Model	SMP-11
Cat. No.	124820
Flow rate	9-160mL/h (ID 1.15 × OD 3.2mm tubing), 30-507mL/h (ID 2.15 × OD 4.2mm tubing), 51-900mL/h (ID 3.15 × OD 5.2mm tubing)
Flow pressure	Approx. 196kPa (2.0kg/cm ²)
Power source	AC100V, 50/60Hz, 10VA



SMP-21

SMP-23S

Peristaltic Pump Cassette tube pump SMP

- ★ Cassette type tube case. Readily changeable to normal/reverse direction.
- External signals input available with S-type device.
- ★ Flow pressure: Approximately 196kPa (or, 2.0kg/cm²)

Model	SMP-21	SMP-21S	SMP-23	SMP-23S
Cat. No.	124740	124760	124750	124770
Flow rate	9-160mL/h (ID 1.15 × OD 3.2mm tubing), 30-507mL/h (ID 2.15 × OD 4.2mm tubing), 51-900mL/h (ID 3.15 × OD 5.2mm tubing)		9-160mL/h × 3 (ID 1.15 × OD 3.2mm tubing), 30-507mL/h × 3 (ID 2.15 × OD 4.2mm tubing), 51-900mL/h × 3 (ID 3.15 × OD 5.2mm tubing)	
Flow pressure	Max. 196kPa (2.0kg/cm ²)			
Power source	AC100V, 50/60Hz, 10VA		AC100V, 50/60Hz, 25VA	



MP-1000 · 1000S

MP-1100A · 1100B

Peristaltic Pump Micro tube pump MP

Model	MP-1000	MP-1000A	MP-1000B
Cat. No.	195870	195900	195910
Flow rate	10-1450mL/h × 2	10-180mL/h	100-1450mL/h
Flow pressure	196kPa (2.0kg/cm ²)	147kPa (1.5kg/cm ²)	
the No. of tubing	2 pcs.	1 pcs.	
Power source	AC100V, 50/60Hz, 40VA		

Model	MP-1100	MP-1100A	MP-1100B
Cat. No.	195920	195930	195940
Flow rate	10-1450mL/h × 4	10-180mL/h × 2	100-1450mL/h × 2
Flow pressure	196kPa (2.0kg/cm ²)	147kPa (1.5kg/cm ²)	
the No. of tubing	2pcs. × 2 channels	1pcs. × 2 channels	
Power source	AC100V, 50/60Hz, 40VA		



MP-101

Peristaltic Pump Micro tube Pump MP

- ★ Range of discharge flow rate is adjustable by 1/1000. High re-productivity provided.
- ★ Excellent performance with high flow accuracy and long-life tubing.

Model	MP-101	MP-201	MP-1011
Cat. No.	125190	125220	125250
Flow rate	40~270mL/h	40~270mL/h × 2	250~1900mL/h × 2
Flow pressure	Max. 196kPa(2.0kg/cm ²)		
the No. of tubing	1	2	1
Power source	AC100V, 50/60Hz		



RP-2000

RP-2100

Peristaltic Pump Roller Pump RP

- ★ RP-2000: Low flow rate with 0.7 ~ 31L/h,
RP-2100: High flow rate with 3 ~ 88L/h.
- ★ Flow pressure: 137.3kPa (1.4kg/cm²).

Model	RP-2000 as low flow rate type	RP-2100 as high flow rate type
Cat. No.	160200	160201
Flow rate	0.7~12L/h(ID 4.76 × OD 7.94mm tubing), 1.1~22L/h(ID 6.35 × OD 9.53mm tubing), 1.5~31L/h(ID 7.94 × OD 11.11mm tubing)	3~35L/h(ID 4.76 × OD 7.94mm tubing), 5~68L/h(ID 6.35 × OD 9.53mm tubing), 6~88L/h(ID 7.94 × OD 11.11mm tubing)
Flow pressure	Max. 137.3kPa(1.4kg/cm ²)	
Power source	AC100V, 50/60Hz, 200VA	



RP-1000

Peristaltic Pump Roller Pump RP

- ★ Max. 138L/h of flow rate.
- ★ Readily accurately controllable rotation speed, or flow rate, with multi-analog settings.

Model	RP-1000
Cat. No.	124710
Flow rate	0.7~64L/h(ID 4.76 × OD 7.94mm tubing), 1.2~104L/h(ID 6.35 × OD 9.53mm tubing), 1.5~138L/h(ID 7.94 × OD 11.11mm tubing)
Flow pressure	Max. 137.3kPa(1.4kg/cm ²)
Power source	AC100V, 50/60Hz, 200VA



Peristaltic Pump Ceramic plunger pump VSP



Flow rate: 0.5 ~ 48mL/min,
2 ~ 192mL/min,
Flow pressure: Max. 686kPa,
Rotation speed: 0 ~ 280rpm



VSP-1050



VSP-3050

- ★ Corrosion-resistant material applied with no valve.
- ★ Flow pressure: Max. 686kPa (7kg/cm²).
- ★ On VSP-1050, VSP-1200: Controllable flow rate with external signal input.
On VSP-2050, VSP-2200: Contact available through external signal input, controllable normal/reverse flow direction, selectable 2 kinds of flow rate.
- ★ VSP-3050, VSP-3200: With necessary functions for medium pressure preparative liquid chromatograph.

Model	Ceramic plunger pump				Medium pressure ceramic plunger pump	
	VSP-1050	VSP-1200	VSP-2050	VSP-2200	VSP-3050	VSP-3200
Cat. No.	164330	164340	164350	164360	164370	164380
Flow rate (mL/min.)	0.5-48mL/min	2-192mL/min	0.5-48mL/min	2-192mL/min	0.5-48mL/min	1-192mL/min
Flow pressure, Applied liquid temp.	Max. 686kPa (7kg/cm ²); 0 ~ 65°C (Unavailable under freezing)					
Rotation speed	0 ~ 280rpm					
Flow direction	Controllable in both directions (normal, reverse)				Only in normal direction	
Applicable diameters on tubing & plunger	T's OD3, P's OD5		T's OD5, P's OD10		T's OD3, P's OD5	
Power source	AC100V, 50/60Hz, 50VA			AC100V, 50/60Hz, 400VA		

Optional accessories

Cleaning port-equipped pump head

For VSP-1050, VSP-2050:	VSP-5WP type,	Cat. No. 170640
For VSP-1200, VSP-2200:	VSP-10WP type,	Cat. No. 181160
For VSP-3050:	VSP-5W type,	Cat. No. 180740
For VSP-3200:	VSP-10W type,	Cat. No. 180750

Pump head

For VSP-1050, VSP-2050:	VSP-3050, CSP-5P type,	Cat. No. 165150
For VSP-1200, VSP-2200:	VSP-3200, CSP-10P type,	Cat. No. 165160

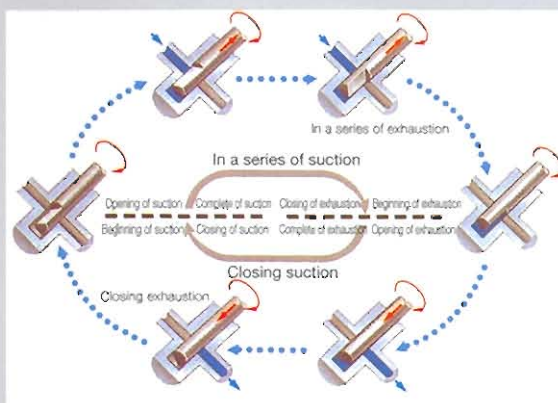
Please visit our website for further information of general catalogue



VPS-3050 & VPS-3200-exclusive additional functions

- Timer settings
- Purge key
- Upper/Lower pressure limit
- Power failure detection and display

Operation principle



Evaporator: MRC-1000, MRC-1000-1
 Organic Synthesizer
 Open Electric Furnace: MRC-1000, MRC-1000-1
 Low-Temperature Bath: MRC-1000, MRC-1000-1
 Constant-Temperature Bath: MRC-1000, MRC-1000-1
 Low and Constant-Temperature Water Circulator
 Farada Drive: MRC-1000, MRC-1000-1
 Stirrer: MRC-1000, MRC-1000-1

Peristaltic pump
 Liquid Chromatograph
 Culture Monitor and related apparatus
 Others

Tubing for peristaltic pump

Long-life, and 1/60 of gas permeability



PharMed Tubing

With cooperation from Norton of U.S., this series of tubing is originally designed and developed in accordance with our specifications.

In usage with the tube pumps, their life span is 5 to 10 times longer than that of the silicon tubings/tubes, so, there is no liquid leakage caused by crack, leading to saving a time to replace tubings. The tubings are tough enough even under high to low temperature environment such as -51 to 135°C, therefore, still durable under autoclaving.

Comparing to the silicon tubings, the applicable tubings have approximately 1/60 of permeability of various types of gaseous body such as oxygen, nitrogen, and carbon dioxide. Hence, this element protects any samples from gas, leading to give less impact to analysis results at last.

Also, degradation in quality of the tubings can be rarely seen against any corrosive materials such as ozone, hypochlorite, and hydrogen peroxide. Besides, the products are highly durable against any corrosive materials like acid, alkaline and such.

The tubings are useful in the wide range from prescription, biotechnology, to analysis.

Applicable model	Dimensions (in mm)	Length (in m)	Cat. No.
SMP, MP-1000, 1000S, 1000A MP-1100, 1100A	ID 1.15 × OD 3.2	7.5	125320
		1.5	125330
SMP, MP-1000, 1000S MP-1100	ID 2.15 × OD 4.2	7.5	125340
		1.5	125360
SMP, MP-1000, 1000S MP-1100	ID 3.15 × OD 5.2	7.5	125350
		1.5	125370
MP-1000, 1000S, 1000B MP-1100, 1100B	ID 3.7 × OD 6.1	7.5	125380
		1.5	125390
RP-1000, 2000 series	ID 4.76 × OD 7.94	7.5	125400
		7.5	125420
		7.5	125440

The tubings are designed for pursuing the safety for lessening the degree of cytotoxicity and hemolysis regulated in the Standard Methods of Analysis for Hygienic Chemists in compliance with USP Class VI, NSF, FDA (21CFR 177.2600), and the public notice No.20 issued by the Ministry of Health and Welfare of Japan.

Highly stable flow rate



Silicon tubing

This series of tubing is made of chemical materials dedicatedly arranged to ensure its high durability.

The used materials are strictly selected in compliance with the specifications, and the dimensions are also strictly controlled with every lot No.

Not only autoclaving inspections, but the products also pass chemical elution examinations.

With the tubing, heat-resistance temperature is up to 200°C.

Applicable model	Dimensions (in mm)	Length (in m)	Cat. No.
SMP, MP-1000, 1000S, 1000A MP-1100, 1100A	ID 1.15 × OD 3.2	15	125460
		5	125470
SMP, MP-1000, 1000S MP-1100	ID 2.15 × OD 4.2	15	125480
		5	125490
SMP, MP-1000, 1000S MP-1100	ID 3.15 × OD 5.2	15	125500
		5	125510
MP-1000, 1000S, 1000B MP-1100, 1100B	ID 3.7 × OD 6.1	15	125520
		5	125530
RP-1000, 2000 series	ID 4.76 × OD 7.94	7.5	125540
		7.5	125560
		7.5	125580

High resistivity against inorganic solution



Tygon tubing

With cooperation from Norton of the U.S., this series of tubing is originally designed and developed in accordance with our specifications. It is superior in resistivity against inorganic solution as described in page 106, and of all 4 kinds of tubing, this is the most applicable item.

It is hard to be given any effectiveness from corrosive materials with less degradation in quality.

Due to its transparency and high flexibility, it is visible and easy to be equipped with piping, and also highly durable and chemical-resistance with heat-resistance up to 74°C.

Applicable model	Dimensions (in mm)	Length (in m)	Cat. No.
SMP, MP-1000, 1000S, 1000A MP-1100, 1100A	ID 1.15 × OD 3.2	15	125600
		5	125610
SMP, MP-1000, 1000S MP-1100	ID 2.15 × OD 4.2	15	125620
		5	125630
SMP, MP-1000, 1000S MP-1100	ID 3.15 × OD 5.2	15	125640
		5	125650
MP-1000, 1000S, 1000B MP-1100, 1100B	ID 3.7 × OD 6.1	15	125660
		5	125670
RP-1000, 2000 series	ID 4.76 × OD 7.94	15	125680
		15	125700
		15	125720

Highly chemical-resistance



Fluran tubing

With cooperation from Norton of the U.S., this series of tubing is originally designed and developed in accordance with our specifications. It is highly chemical-resistance, and of all 4 kinds of tubing, this has the highest corrosion-resistance.

Made of fluorocarbon rubber, it is quality, and is able to cope with highly corrosive solution/liquid.

Comparing to domestic Viton tubings, it has higher physical intensity, ozone-resistance, weather-proof with heat-proof up to 204°C.

Applicable model	Dimensions (in mm)	Length (in m)	Cat. No.
SMP, MP-1000, 1000S, 1000A MP-1100, 1100A	ID 1.15 × OD 3.2	7.5	125740
		1.5	125750
SMP, MP-1000, 1000S MP-1100	ID 2.15 × OD 4.2	7.5	125760
		1.5	125770
SMP, MP-1000, 1000S MP-1100	ID 3.15 × OD 5.2	7.5	125780
		1.5	125790
MP-1000, 1000S, 1000B MP-1100, 1100B	ID 3.7 × OD 6.1	7.5	125800
		1.5	125810
RP-1000, 2000 series	ID 4.76 × OD 7.94	7.5	125830
		7.5	125850
		7.5	125870

For usage of any of the tubing herewith introduced, please make sure to comply with specified each temperature for the peristaltic pump-applied liquid, with the upper limit of heat-resistance for the tubing



Please read "Instruction Manual" carefully before using the product for your continued safety. 10

Chemical resistance of Tubing

- : Recommended
- △: Depending on test results
- ×: Not recommended
- Blank: No data available

- S: Silicone tubing
- T: Tygon® tubing (vinyl chloride)
- F: PharMed® tubing
- A: Fluon tubing (fluorocarbon)

※Chemical resistance is the data which is taken by soaking tubes in the 25°C, pure solvent at room temperature under atmospheric pressure. Results may differ depending on the conditions. Data is based on the results using the tube we specify, otherwise results may differ.

Registered trademark of norton Performance Plastics Corp.

Fluid	S	T	F	A	Fluid	S	T	F	A	Fluid	S	T	F	A
Acrylonitrile	×	×	×	×	Mineral oil	×	×	×	○	Triethanol amine	×	×	×	
Adipic acid (alc) (100%)	×	×	△	×	Zinc acetate	×	△	×	×	Tricresyl phosphate	×	×	×	
Acetamide (67%)	△	×	△	×	Amyl acetate	×	△	○	×	Trichlene (Trichloroethylene)	×	×		
Acetaldehyde	×	×	×	×	Ammonium acetate (45%)	○	○	○	×	Trichloroethane	×	×	×	
Acetonitrile	×	×	×	△	Isopropyl acetate	×	×	△	×	Trichloroethylene	×	×	×	
Acetone	×	×	×	×	Trichyl acetate	×	×	△	×	Trichloroacetic acid (90%)	○	○	△	
Aniline	×	×	×	×	Cellosolve acetate	×	×	×	×	Toluene	×	×	×	
Linseed oil	○	×	×	○	Vinyl acetate	×	×	△	×	Naptha	×	×	×	
Amyl alcohol	×	△	△	△	N-butyl acetate	×	×	△	×	Naphthalene	×	×	×	
Amine acid	×	×	×	×	Methyl acetate	×	×	△	×	Ethylene dichloride	×	×		
Sulfurous acid	○	○	○	○	Acetic acid (10%)	△	△	△	×	Methylene dichloride	×	×		
Sulfurous acid (10%)	△	△	△	○	Acetic acid (50-60%)	△	△	△	×	Nitroethane	×	×	○	
Sodium sulfite (10%)	○	○	○	○	Salicylic acid (1%)	○	○	○	×	Nitropropane	×	×		
Benzoic acid	×	○	△	×	Potassium oxide (50%)	○	○	○	○	Nitrobenzene	×	×	×	
Ethyl benzoate	×	○	×	×	Calcium oxide (3%)	○	○	○	○	Nitromethane	×	×	×	
Sodium benzoate (22%)	○	○	○	○	Diphenyl oxide	△	×	○	○	Lactic acid (35%)	○	○	○	
Ammonia gas	×	○	○	×	Hypochlorous acid (25%)	△	○	○	○	Lactic acid (86%)	×	×	△	
Ammonium water (30%)	×	○	○	×	Potassium hypochlorite (70%)	○	○	○	○	Uric acid	○	○	○	
Ammonium water (5-10%)	×	△	○	×	Calcium hypochlorite (20%)	×	○	○	○	Urea (20%)	○	○	○	
Isooctane	×	×	×	×	Sodium hypochlorite (12.2%)	×	○	○	○	Carbon disulfide	×	×	×	
Isobutyl alcohol	×	×	×	○	Sodium hypochlorite (8.5%)	×	○	○	○	Fuming nitric acid	×	×	×	
Isopropyl alcohol	×	×	×	△	Sodium cyanide (30%)	○	○	○	○	Fuming sulfuric acid (25%)	△	△	○	
Isopropyl ether	×	×	×	×	Diethylamine	×	○	○	×	Paraffin	×	×	×	
ASTM oil No.1	△	△	△	○	Diethyl ether	×	×	×	×	Palmitic acid	×	×		
ASTM oil No.2	×	×		○	Diethylene glycol	○	△	△	△	Picric acid (1%)	×	○	×	○
ASTM oil No.3	×	×		○	Jet fuel	×	×	×	×	Castor oil	○	×	×	×
ASTM reference fuel A	×	×		○	Carbon tetrachloride	×	×	×	×	Pyridine	×	×	×	×
Ether	×	×	×	×	Dioxane	×	×	×	×	Phenol (5-10%)	○	△	○	○
Ethanolamine	△	△		×	Diethyl phthalate (DOP)	○	×		○	Phenol (91%)	△	×	○	○
Ethyl alcohol	△	○	×	×	Cyclohexanol	○	△		○	Butadiene	○	○	○	○
Ethyl ether	×	×	×	×	Cyclohexane	×	×	×	○	Diethyl phthalate	○	×	○	○
Ethyl benzene	×	△	△	△	Dichlorobenzene	×	×	×	×	Butane	△	△	△	△
Ethylene oxide	△	△	△	△	Dibutyl phthalate (DBP)	△	×	×	△	Butyl alcohol	×	×	×	×
Ethylene glycol	○	○	○	○	Fatty acid	△	×	×	×	Cellosolve, Butyl	△	△	△	△
Ethylene diamine	×	×	×	×	Aliphatic hydrocarbon	×	×	×	△	Aluminum fluoride (0.1%)	△	○	○	○
Zinc chloride (80%)	×	×	×	○	Dimethylsulfoxide (DMSO)	×	×	×	×	Hydrofluoric acid (10%)	×	×	×	×
Acetylene chloride	×	×	×	×	Dimethyl formamide	○	×	×	×	Hydrofluoric acid (25%)	×	○	×	○
Aluminum chloride (53%)	△	△	△	△	Dimethyl formaldehyde	○	×	△	×	Hydrofluoric acid (40-48%)	×	△	×	×
Ethyl chloride	×	×	×	×	Calcium bisulfite (1%)	○	×	○	○	Propanol	×	×	×	×
Potassium chloride (20%)	○	○	○	○	Ethylene bromide	○	×	×	○	Propane	△	△		
Calcium chloride (30%)	○	○	○	○	Hydrobromic acid (100%)	×	○	×	○	Propyl alcohol	△	○	△	○
Mercuric chloride (6%)	○	○	○	○	Oxalic Acid (12%)	×	△	△	×	Propylene glycol	○	○	○	○
Stannic chloride (50%)	△	△	△	△	Bromine	×	△	△	△	Freon 12	×	△	×	△
Ferric chloride (43%)	△	△	△	△	Tartaric acid (56%)	△	×	×	○	Freon 22	△	△	△	△
Copper chloride (40%)	○	○	○	○	Lubricating oil (petroleum)	△	×	×	○	Hexane	×	×	×	×
Thionyl chloride	○	○	○	△	Aluminum nitrate (39%)	△	○	○	○	Hexyl alcohol	△	△		
Nickel chloride (40%)	○	○	○	○	Ammonium nitrate (54%)	△	○	○	○	Benzyl alcohol	○	×	○	○
Barium chloride (27%)	○	△	△	○	Calcium nitrate (55%)	△	○	○	○	Benzaldehyde	△	×	×	×
Magnesium chloride (35%)	○	○	○	○	Silver nitrate (55%)	○	○	○	○	Benzene	×	×	×	×
Methyl chloride	×	×	×	×	Ferric nitrate (60%)	△	△	△	△	Benzensulfonic acid	×	×	×	×
Methylene chloride	×	×	×	×	Cupric nitrate (70%)	○	○	○	○	Boric acid (4%)	△	○	○	○
Hydrochloric acid (10%)	△	△	△	○	Sodium nitrate (3.6%)	△	○	○	○	Formaldehyde (37%)	×	×	×	×
Hydrochloric acid (37%)	×	△	△	○	Lead nitrate (27%)	○	○	○	○	Maleic acid (30%)	△	×	×	×
Salt water	○	○	○	○	Nitric acid (10%)	×	○	○	○	Acetic anhydride	△	×	○	×
Oil (vegetable oil)	△	×	×	○	Nitric acid (10%, 70°C)	○	△		○	Methyl methacrylate	×	×	×	×
Oil (hydrocarbon oil)	△	×	×	○	Nitric acid (30%)	○	○	○	○	Methyl alcohol	△	×	○	×
Oil (animal oil)	○	×	×	○	Nitric acid (68-71%)	×	×	×	×	Methyl isobutyl ketone	×	×	×	×
Oil (phosphoric ester)	×	×	×	○	Silicone oils	×	△	×	○	Methyl ethyl ketone (MEK)	×	×	×	×
Aqua regia	×	×	×	×	Vinegar	○	○	○	×	Cottonseed oil	△	×	×	×
Octyl alcohol	△	○		○	Ammonium hydroxide	○	△	△	△	Monoethanolamine	×	×	×	×
Oleic acid	×	×	×	○	Potassium hydroxide (10%)	△	○	○	○	Monochlorobenzen	×	×	×	△
Seawater	○	○	○	○	Calcium hydroxide	△	○	○	○	Potassium iodide (56%)	○	○	○	○
Hydrogen peroxide (30%)	○	△	△	△	Sodium hydroxide (10-15%)	○	○	○	○	Butyric acid	×	×	△	×
Hydrogen peroxide (90%)	×	×	△	○	Sodium hydroxide (30-40%)	○	×	×	○	Zinc sulfate	○	○	○	○
Gasoline	×	×	×	○	Styrene monomer	×	×	×	△	Potassium sulfide (20%)	○	○	○	○
Caustic soda (30%)	×	○	×	×	Stearic acid (alc) (5%)	×	×	×	○	Sodium sulfide (45%)	○	○	○	○
Sodium perborate (25%)	△	△	○	○	Lead sulfamate	△	○		○	Sulfuric acid (10%)	○	○	○	○
Formic acid (25%)	△	△	△	△	Essential oil	×	×	×	○	Sulfuric acid (30%)	△	△	△	△
Formic acid (40-50%)	△	○	△	×	Petroleum	△	△		○	Sulfuric acid (95-98%)	×	×	×	×
Formic acid (98%)	△	△	△	△	Soap solutions	○	○	△	○	Aluminum sulfate (50%)	○	○	○	○
Xylene	×	×	×	×	Detergent solutions	○	○	△	○	Potassium sulfate (10%)	○	○	○	○
Citric acid (10-20%)	○	○	×	×	Ammonium carbonate (50%)	△	△	△	△	Ferric sulfate (5%)	△	△	△	△
Glycerin	○	○	○	○	Potassium carbonate (55%)	○	○	○	○	Cupric sulfate (13%)	○	○	○	○
Creosote oil	×	×	○	○	Calcium carbonate dilute acid solution (25%)	○	○	○	○	Sodium sulfate (25%)	○	○	○	○
Cresol (o, m, p)	△	×	×	△	Sodium carbonate (7%)	○	○	○	○	Magnesium sulfate (25%)	○	○	○	○
Chromic acid (10-20%)	×	△	△	△	Barium carbonate (1%)	○	○	○	○	Malic acid (36%)	△	△	△	×
Chloroacetic acid	○	○	△	×	Magnesium carbonate (1%)	○	○	○	○	Phosphoric acid (50%)	△	○	○	○
Chlorosulfonic acid	×	×	×	×	Tetrahydrofuran	×	×	×	×	Ammonium phosphate (21%)	○	○	○	○
Chloroform	×	×	×	×	Turpentine oil	×	×	×	○	Sodium phosphate (30%)	△	○	○	○
Xetone series	×	×	×	×	Kerosene	×	×	×	○	Phosphoric acid (85%)	×	○	○	○



Liquid chromatograph systems for

- Organic synthesis
- Coarse extraction
- Natural product
- Chemical general purpose
- Protein&Biological polymer
- Micro refinement
- Micro&HPLC

P.108



Fraction collector
DC-1000, 1200,
1500 series

P.118



Sample injector
Automatic rotary
and valve
switching device

P.119



Droplet countercurrent chromatograph
DCC model
Rotation ocular countercurrent chromatograph

RLCC model
P.114



Solvent degassing apparatus
Column oven
Reactor
P.120



Low pressure gradient pump
LPG-1000
Low and high pressure gradient pump

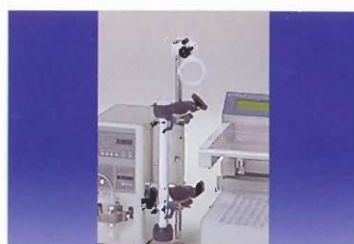
6:11, 601+602
P.115



Remote timer
Recorder
System rack
P.120



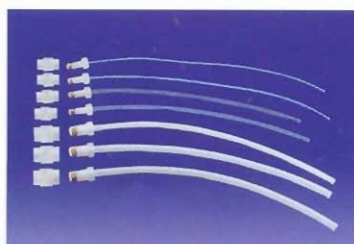
Medium and high pressure delivery pump
Medium pressure delivery pump
Low pressure delivery pump
P.116



Column
P.122



Detector
P.117



Tubing
P.124

- | | | | | | | |
|-------------------------------------|---------------------------------------|-------|-----------------------------|-------|------------------------------|------|
| System for natural product | System for Protein&Biological Polymer | P.110 | System for Micro Refinement | P.112 | System for Organic Synthesis | P.40 |
| System for chemical general purpose | | | System for Micro&HPLC | P.113 | System for Coarse Extraction | P.41 |

System for Natural Product

DCC, Droplet Countercurrent Chromatograph, -applied system. Suitable for natural samples.

DCC System

System Code SYS16036



- | | |
|---------------------------------------|--|
| ① Solvent degassing apparatus | 701 |
| ② Plunger pump | 301(PEEK) |
| ③ Variable wavelength UV-VIS detector | UV-9000 |
| ④ DCC | DCC-3000-G2 |
| ⑤ Recorder | SS-100F-MM |
| ⑥ Fraction collector | DC-1200 |
| | (3-WAY valve, I/O connector cord equipped) |
| ⑦ System rack | STT-110 |
| ⑧ Optional parts for piping | |

RLCC, Rotation locular countercurrent chromatograph, -applied system for separation and purification of nature products using a wide range of solvents.

RLCC System

System Code SYS16006



- | | |
|---------------------------------------|--|
| ① Solvent degassing apparatus | 701 |
| ② Plunger pump | VSP-3050 |
| ③ Variable wavelength UV-VIS detector | UV-9000 |
| ④ RLCC | RLCC-1000 |
| ⑤ Recorder | SS-100F-MM |
| ⑥ Fraction collector | DC-1200 |
| | (3-WAY valve, I/O connector cord equipped) |
| ⑦ System rack | STT-120 |
| ⑧ Optional parts for piping | |

System with 8 types of solvent-switchable function and useful for sequential solvent delivery.

Step gradient System

System Code SYS16038



- | | |
|---|--|
| ① Solvent degassing apparatus | 703 |
| ② Plunger pump | MP-1000 |
| ③ Fixed wavelength UV detector | UV-2000 |
| ④ Injector | SV-6010N |
| ⑤ Resin column | ID 22 * Length 300mm |
| ⑥ Recorder | SS-100F-MM |
| ⑦ Automatic rotary and valve switching device | 401-128 |
| ⑧ Fraction collector | DC-1200 |
| | (3-WAY valve, I/O connector cord equipped) |
| ⑨ System rack | STT-120 |
| ⑩ Column stand | CS-500 |
| ⑪ Optional parts for piping | |

System for Chemical General Purpose

Fundamental system that is capable of separating and purifying synthetic substances and extracts in the various fields from organics to biochemical using interference filters with variable wavelength function.

Medium Pressure Preparative Standard System 3

System Code SYS16040



① Solvent degassing apparatus	721(PEEK)
② Plunger pump	VSP-3050
③ Fixed wavelength UV detector	UV-2000
④ Injector	SV-6010S
⑤ Glass column	ID 22 × Length 300mm
⑥ Recorder	SS-100F-MM
⑦ Fraction collector	DC-1200 (3-WAY valve, I/O connector cord equipped)
⑧ System rack	STT-110
⑨ Column stand	CS-500
⑩ Optional parts for piping	

System that is capable of conducting simultaneous measurement for UV absorbance and flexibility. Posses the capacity to monitor materials in wide range.

RI-UV preparative system

System Code SYS16026



① Solvent degassing apparatus	721(PEEK)
② Plunger pump	VSP-3050
③ RI-UV detector	YRU-883
④ Injector	SV-6010S
⑤ Glass column	ID 22 × Length 300mm
⑥ Recorder	MDL-102
⑦ Fraction collector	DC-1500 (3-WAY valve, I/O connector cord equipped)
⑧ System rack	STT-110
⑨ Column stand	CS-500
⑩ Optional parts for piping	

System that is capable of conducting various gradients in combination with linear and step gradient by using 4 kinds of liquid. Useful system for conditioning separation and purification.

Step gradient system

System Code SYS16041



① Low pressure gradient delivery pump	611(PEEK)
② Variable wavelength UV-VIS detector	UV-9000
③ Injector	V-50R
④ Recorder	SS-100F-MM
⑤ Fraction collector	DC-1500 (3-WAY valve, I/O connector cord equipped)
⑥ System rack	STT-110
⑦ Optional parts for piping	



Please read "Instruction Manual" carefully before using the product for your continued safety. 10

System for Protein &
Biological Polymer

for Natural product
for Chemical general purpose

P.108
P.109

for Micro refinement
for Micro & HPLC

P.112
P.113

for Organic synthesis
for Coarse extraction

P.40
P.41

Protein & Biological Polymer's System

Combining linear/step gradient with low pressure gradienter enables the system to perform on various chromatographies such as affinity, ion exchange and etc., which are used as method for separation and refinement of protein substance.

Protein refinement system 1

System Code SYS16018



① Solvent degassing apparatus	703
② Plunger pump	MP-1000
③ Variable wavelength UV-VIS detector	UV-9000
④ Injector	SV-6010N
⑤ Resin column	ID 22 × Length 300mm
⑥ Recorder	SS-100F-MM
⑦ Low pressure gradienter	LPG-1000
⑧ Fraction collector	DC-1200
(3-WAY valve, I/O connector cord equipped)	
⑨ System rack	STT-120
⑩ Column stand	CS-500
⑪ Optional parts for piping	

System corresponding to accelerative refinement of protein and peptide. With cleaning port-equipped pump, it enables performing stable transfer of buffer containing highly concentrated salt.

Protein refinement system 2

System Code SYS16030



① Solvent degassing apparatus	703
② Plunger pump	VSP-3050W
③ Fixed wavelength UV detector	UV-2000
④ Injector	SV-6010S
⑤ Recorder	SS-100F-MM
⑥ Glass column	ID 22 × Length 300mm
⑦ Low pressure gradienter	LPG-1000
⑧ Fraction collector	DC-1500
(3-WAY valve, I/O connector cord equipped)	
⑨ System rack	STT-110
⑩ Column stand	CS-500
⑪ Cleaning pump	SMP-21
⑫ Optional parts for piping	

System used for separating and purifying protein and peptide in sizes of nanogram to μ , μ g, gram. Since the system is high-separation, it can be used for sophisticated refinement of protein after coarse refinement.

Sophisticated protein separation and purification system

System Code SYS16037



① Solvent degassing apparatus	703
② Plunger pump	301(PEEK)
③ Variable wavelength UV-VIS detector	UV-9000
④ Injector	V-50R
⑤ Recorder	SS-100F-MM
⑥ Low pressure gradienter	LPG-1000
⑦ Fraction collector	DC-1500
(3-WAY valve, I/O connector cord equipped)	
⑧ System rack	STT-110
⑨ Optional parts for piping	

System applicable to gel percolation chromatography widely used for protein refinement, desalting and etc.

Gel percolation system

System Code SYS16029



- ① Solvent degassing apparatus 701
- ② Plunger pump MP-1000
- ③ Fixed wavelength UV detector UV-2000
- ④ Injector SV-6010S
- ⑤ Resin column ID 22 × Length 300mm
- ⑥ Recorder SS-100F-MM
- ⑦ Fraction collector DC-1500
(3-WAY valve, I/O connector cord equipped)
- ⑧ System rack STT-110
- ⑨ Column stand CS-500
- ⑩ Optional parts for piping

System used exclusively for gel percolation and affinity. Available for refinement of various kinds of antibodies and proteins.

Affinity system

System Code SYS16042



- ① Solvent degassing apparatus 703
- ② Plunger pump MP-1000
- ③ Fixed wavelength UV detector UV-2000
- ④ Injector SV-6010S
- ⑤ Resin column ID 22 × Length 300mm
- ⑥ Recorder SS-100F-MM
- ⑦ Automatic rotary and valve switching device 401-128
- ⑧ Fraction collector DC-1200
(3-WAY valve, I/O connector cord equipped)
- ⑨ System rack STT-120
- ⑩ Column stand CS-500
- ⑪ Remote timer RT-730A
- ⑫ Optional parts for piping

System used exclusively for antibody refinement. Available for huge volume of refinement such as 1gG, monoclonal antibody, enzyme and etc. With connecting store-bought perfusion column, it enables to avoid denaturation of protein by purifying great quantity of substances under low pressure.

Clamps, universal clamps, bottles, and columns are not included

System Code SYS16024



- ① Plunger pump VSP-3200W
- ② Fixed wavelength UV detector UV-2000
- ③ Large amount-preparative flow cell
- ④ Recorder SS-100F-MM
- ⑤ Automatic rotary and valve switching device 401-59
- ⑥ Fraction collector DC-1200
(3-WAY valve, I/O connector cord equipped)
- ⑦ Large amount-preparative unit 2120-LV-D
- ⑧ System rack STT-110
- ⑨ Cleaning pump SMP-21
- ⑩ Optional parts for piping

*Please contact us if you have any questions about perfusion column.



Please read "Instruction Manual" carefully before using the product for your continued safety.

Micro refinement system	for Natural product	P.108	for Protein & biological polymer	P.110	for Organic synthesis	P.40
Micro & HPLC system	for Chemical general purpose	P.109			for Coarse extraction	P.41

Micro refinement system

With adopting a pump which has 50ml/min. of maximum flow and 100kg/cm² of withstand pressure, this system is applicable to perform high separation and refinement which requires relatively high pressure such as reverse phase chromatography with using ODS.

High and medium pressure preparative system

System Code SYS16034



① Solvent degassing apparatus	722(SUS)
② Plunger pump	214
③ Variable wavelength UV-VIS detector	UV-9000
④ Injector	V-50
⑤ Glass column	ID 8 × Length 100mm
⑥ Recorder	SS-100F-MM
⑦ Fraction collector	DC-1500
(3-WAY valve, I/O connector cord equipped)	
⑧ System rack	STT-120
⑨ Optional parts for piping	

System using both of saccharide-specified RI detector and sugar-separatory column.

High pressure semi-preparative system

System Code SYS16035



① Solvent degassing apparatus	701
② Plunger pump	301(PEEK)
③ RI detector	RI-101
④ Injector	7725
⑤ Recorder	SS-100F-MM
⑥ Fraction collector	DC-1200
(3-WAY valve, I/O connector cord equipped)	
⑦ System rack	STT-110
⑧ Optional parts for piping	

More high-end system performing separation and refinement by high-pressure gradienter with using 2 types of liquid.

High pressure gradient preparative system

System Code SYS16043



① High pressure gradient plunger pump	⑥01+⑥02(PEEK)
② Variable wavelength UV-VIS detector	UV-9000
③ Injector	V-50R
④ Recorder	SS-100F-MM
⑤ Fraction collector	DC-1500
(3-WAY valve, I/O connector cord equipped)	
⑥ System rack	STT-110
⑦ Optional parts for piping	

Micro & HPLC system

Standard system applicable to micro liquid chromatography

Micro system System Code SYS16044



① Solvent degassing apparatus	715M
② Plunger pump	301M (SUS)
③ Variable wavelength UV-VIS detector	UV-8000V
④ Semi-micro flow cell	
⑤ Injector	7725
⑥ Integrator	
⑦ System rack	STT-120
⑧ Optional parts for piping	

The simplest analysis-dedicated system

Standard analysis system System Code SYS16045



① Solvent degassing apparatus	701
② Plunger pump	203(SUS)
③ Fixed wavelength UV detector	UV-2000
④ Analytical flow cell	
⑤ Injector	7725
⑥ Integrator	
⑦ System rack	STT-110
⑧ Optional parts for piping	

Low pressure gradient-combined analysis system

Low pressure gradient analysis system System Code SYS16046



① Solvent degassing apparatus	703
② Plunger pump	301(SUS)
③ Variable wavelength UV-VIS detector	UV-8000V
④ Injector	7725
⑤ Integrator	
⑥ Low pressure gradienter	LPG-1000
⑦ System rack	STT-110
⑧ Optional parts for piping	

Evaporator
Vacuum Line

Organic
Synthesizer

Oven, Electric Furnace,
Incubator, Freezer

Low Temperature Bath,
Constant Temperature Bath,
Cryocooler, Trap

Low and Constant
Temperature Water
circulator

Fluorescence
Sensitizer,
Sensitizer Dryer

Shifter,
Shaker

Peristaltic
Pump

Liquid
Chromatograph

Culture Microbe and
related apparatus

Others

Droplet countercurrent chromatograph DCC-3000

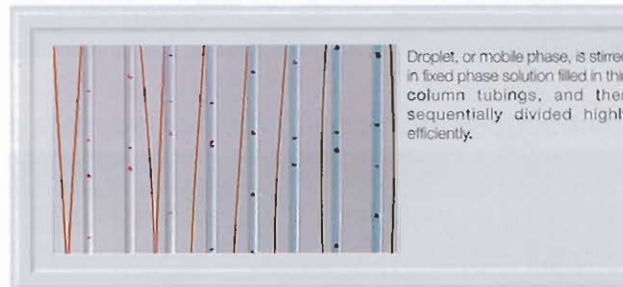


★ Liquid-liquid distribution chromatograph displaying its greatest force in separating compounds in the fields of natural products, organic synthesis, and biological chemistry.

★ No pretreatment required at sample injection.

★ Loading required gram order sample because of large capacity for stationary phase.

Model	DCC-3000			
Cat. No.	164970	164980	164990	165000
Temp. control range	Room temp. +5~40°C			
Applicable pressure	490kPa(5kg/cm ²)			
Column	G3(Glass)	G2(Glass)	T4(Teflon)	T3(Teflon)
	ID 3.4 × L 400	ID 2.0 × L 400	ID 4.0 × L 400	ID 3.0 × L 400
	25 pcs. per cassette / a dozen of cassette as standard (300 pcs.)			
Column capacity (300 pcs.)	1250mL	420mL	1650mL	1000mL
injector	Loop method (sample syringe filled)			
Duct switching valve	4-WAY valve			
Material at liquid contact	Teflon, Dflon, Glass			
External dimensions	562 × 470(527) × 638			
Power source	AC100V, 50/60Hz, 300VA			



Droplet, or mobile phase, is stirred in fixed phase solution filled in thin column tubings, and then sequentially divided highly efficiently.

■ 4 kinds of column stretching the applicable scope

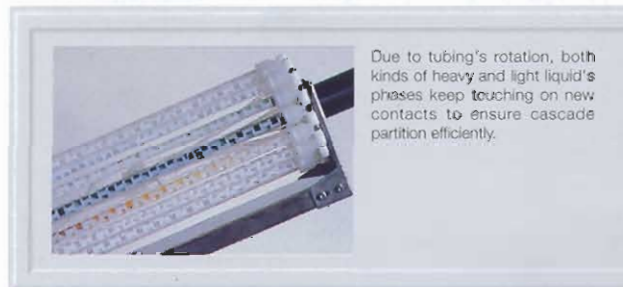
Model	Usage
DC-G3	All-purpose type applicable for readily generating droplet with a wide range of solution
DC-G2	Conventionally specified type with higher performance of separation than that of DC-G3
DC-T4	Applicable with a variety of solution for reversed phase chromatography
DC-T3	With higher performance of separation than DC-T4's for reversed phase chromatography

Rotation locular countercurrent chromatograph RLCC-1000



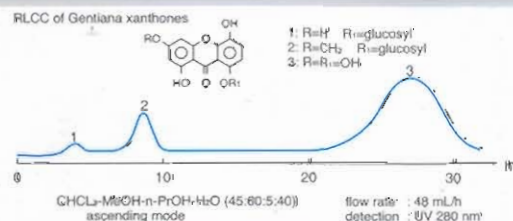
★ Capable of separating and refining natural products and compounds with a wide range of solution. Liquid-liquid rotation locular countercurrent chromatograph separating substances while rotating multi-barrier-applied column.

Model	RLCC-1000
Cat. No.	165010
Rotation speed	30~95rpm
Applicable withstand pressure	392kPa(less than 4kg/cm ²)
Column	(Glass) ID 12 × 450mm; standard 16 series-connected
Column capacity	670mL (16 pcs.)
Injector	Loop system (syringe-filled)
Materials for liquid contact	Teflon, Dflon, Glass
Connection/Piping	Both int. & ext. ID 0.5 × OD 1.5mm (Teflon tubing)
Dimensions	836 × 216 × 858
Power source	AC100V, 50/60Hz, 200VA



Due to tubing's rotation, both kinds of heavy and light liquid's phases keep touching on new contacts to ensure cascade partition efficiently.

■ Example of separation



Low pressure gradientor LPG-1000



LPG-1000

- ★ Capable of generating a concentration gradient of eluent for refining protein substance. Gradient control is available with using 2 or 3 types of liquid.
- ★ 30 steps of linear/step gradient are available.
- ★ Non-metallic duct suitable for bio-inert preparative.

Model	LPG-1000
Cat. No.	165050
Operation mode	Ramp in linear/step with 3 kinds of liquid
Flow rate	0.1 to 0.3, 0.5 to 5.0mL/min. (Up to applicable pump)
Controllable mixture range	0 to 100%
Program file	1 to 9 files
1 program file	30 steps max. 999.9min(accumulated period of time)
1 step	Setup of time span and ratio
Repeatability	1 to 99 times
Link & Loop file	1 to 9 files
Consolidated program	1 to 9 programs
Repeatability	1 to 99 times
External input/output	Input: each 1 start & stop contact signal; output: each 4 start & end contact signals
Chamber capacity	0.5 to 5mL (variable)
Materials for liquid contact	Teflon, Dيفون, Glass, Perfluoro
power source	AC100V, 50/60Hz, 1.12A

※ This set of device is designed suitable for our plunger pump MP-1000/MP-301, VSP-3050/VSP-3050W.
 ※ In order to avoid any impact given from bubbles when blending multiple solvents, it is recommended to use this system in combination with solvent-degasifier unit.

Example of system configuration for protein refinement



Optional accessories for high/low flow rate mixer

Model	LPG-01M	LPG-50M
Cat. No.	180800	180790
Applicable pump	MP-1000/MP-301	VSP-3050/VSP-3050W
Flow rate	Less than 1mL/min	10 to 48mL/min
Chamber capacity	Fixed 130μL	Fixed 10mL

High and low pressure gradient pump 611, 601+602



611

601+602

- ★ 611: Low pressure gradient pump as a combined unit of a solvent degassing apparatus and a double plunger pump.
- ★ 601+602: High pressure gradient pump as a combined unit of a solvent degassing apparatus and two double plunger pumps.

Model	611(Spec.: PEEK, SUS)	601+602(Spec.: PEEK, SUS)
Cat. No.	200840/200850	200860/200870
Operation mode	Linear/step ramp with 4 kinds of liquid	Linear/step ramp with 2 kinds of liquid
Flow rate	0.01 to 9.99mL/min (When in ramp: 0.1 - 5.0mL/min)	0.01 to 9.99mL/min (When in ramp: 0.01 - 5.0mL/min)
Flow pressure	0 to 19.6MPa(0 to 200kg/cm ²)	0 to 34.3MPa(0 to 350kg/cm ²)
Controllable mixture range	0 to 100%	0 to 100%
Program file	1 to 9 files	1 to 20 files
1 program file	99 steps max.	30 steps max.
Time span to set up	Max.999.9min/file	Max.99.99min/file
Chain file	1 file	1 file
1 chain file	99 steps max.	30 steps max.
External input/output	Input (contact signal, or, open collector signal): pump start, program start, Output (contact signal): program start, program end, error	
Materials for liquid contact	For both of PEEK and SUS: Teflon, Dيفون	

※ Please make sure to get another mixing chamber prepared when using with more than 2mL/min. of flow rate.





High and medium pressure delivery pump

PEEK/SUS selectable, a variety of product series

- ★ 3 types in 300 series containing non-pulsating flow upon self-learning function.
- ★ 5 types in 200 series as fundamental functions-focused general-purpose devices.
- ★ 6 types in 011/022 series with single pump at reasonable prices.



Ceramic-made medium pressure delivery pump

Almost every kind of solvent of liquid chromatography, preparative purification is available.

- ★ Containing useful functions such as program timer, purge key, upper and lower pressure limit.

0.5 to 48.0 mL/min	VSP-3050
2 to 192mL/min	VSP-3200
Cleaning port-equipped	VSP-3050W
Cleaning port-equipped	VSP-3200W

※Function-simplified VSP-1000/VSP-2000 types also available. Please refer to page 104.



Low pressure delivery pump

3 types of product suitable for chromatography for solutions under low pressure.

- ★ For 9 to 160mL/h, 30 to 507 mL/h, 50 to 900mL/h.
SMP-21, SMP-21S with external signal input terminal.
- ★ For 10 to 1450mL/h.
MP-1000, MP-1000S with external signal input terminal.
- ★ For 0.7 to 64.0mL/h, 1.2 to 104.0mL/h, 1.5 to 138mL/h.
RP-1000.

→ Please refer to page 102 and 103.

Evaporator,
Vacuum UnitOrganic
SynthesizerOven, Exhaust Function,
Inchubator, FreezerLow-Temperature Bath,
Constant-Temperature Bath,
Condenser, TrapLow and Constant-
temperature Water
circulatorFreeze Drier,
Spray DrierStirrer,
ShakerPeristaltic
pumpLiquid
ChromatographCulture Microbe and
related apparatus

Others



Fixed UV detector

Fixed UV Detector capable of detecting 254nm and 254/280(200 ~ 380)nm.

	UV-D2	UV-2000
Wavelength (nm)	254	254/280
Drift (AU)	0.001	5×10^{-4}
Noise level (AU)	0.0001	1×10^{-4}
Response (sec.)	0.5	0.05/0.5/1.5

UV-D2 Cat. No. 128990

UV-2000 Cat. No. 172000



Variable wavelength UV-VIS detector

Range of wavelength: 190/195 to 600/900nm

	UV-9000	UV-8000V	UV-8800V
Wavelength (nm)	195 to 600	190 to 600	190 to 900
Drift (AU)	5×10^{-4}	3×10^{-4}	3×10^{-4}
Noise level (AU)	5×10^{-4}	$\pm 5 \times 10^{-5}$	$\pm 5 \times 10^{-5}$
Response (sec.)	0.05/0.5/1.5	0.05 to 10.0	0.05 to 10.0

UV-9000 Cat. No. 128950

UV-8000V Cat. No. 185560

UV-8800V Cat. No. 195570



RI detector, RI-UV detector

Capable of detecting RI and RI+UV

	YRD-883	YRU-883	YRU-880
Reflection index (RIU)	1 to 1.75	1 to 1.75	1 to 1.75
Wavelength (nm)	254	254	254
Noise RI (RIU)	1×10^{-6}	2.5×10^{-5}	2.5×10^{-5}
Noise UV (AU)	---	5×10^{-5}	5×10^{-5}

※YRU-880: for analysis with high sensitivity and integrator output.

YRD-883 Cat. No. 200885

YRU-883 Cat. No. 200890

YRU-880 Cat. No. 200900



Fraction collector

DC-1000 DC-1200 DC-1500



DC-1000: Compact, general-purpose type with certain chromatographic fraction function.
DC-1200: Sophisticated type enabling various and accurate chromatographic fraction.
DC-1500: Hi-end type containing sampling sampling mode.
Both DC-1200/DC-1500 available to communicate with RS-232C.

DC-1000

DC-1200

DC-1500

- ★ DC-1000: Less No. of operation keys. 8 characters in 2 columns available on display to facilitate parameter check.
- ★ DC-1200: 4 kinds of chromatographic fraction, and various motions available.
- ★ DC-1500: With manual mode, available to manually operate, separate, and fractionate preparative sample while observing chromatogram on an applicable device or a recorder. A function to save 1 series of manually operated program.

Reproduction of preparative made possible with programmed timing.

■ Fraction container, operation mode

		DC-1000	DC-1200	DC-1500
Fraction container	Test tube(mm)	OD12 - 15 × 120 Max. Height	OD12 - 18 × 90 - 180 Max. Height	OD12 - 18 × 105 - 180 Max. Height
	Bottle	—	OP.	OP.
	Eppendorf tubing	—	OP.	OP.
	Micro plate (Eppendorf) bottle	—	—	OP.
Operation mode	Simple	○	○	○
	Peak	—	○	○
	Wind	—	○	○
	Manual	—	○	○
	Sampling	—	—	○

	DC-1000	DC-1200	DC-1500
Model	DC-1000	DC-1200	DC-1500
Cat. No.	165260	130730	180810
Fraction mode	Time: 99min59sec max. Signal: 999 count max. Drop: 999drop max. Volume: 99.9ml max.	Time: 99min59sec max., Signal: 9999 count max., Drop: 9999drop max., Volume: 999.9ml max.	
Wait setting	Time: 99min, 59sec. max		
Chromatogram display	—		
Fraction outcome display	—		
External input	Ext. start (on start), Ext. count (on count)	Chromatograph signal 10ml(FS) Ext. and (on end); Ext. start (on start); Ext. count (on count)	Chromatograph signal 10ml or 7(FS) Ext. and (on end); Ext. start (on start); Ext. count (on count)
External output	Event marker Solenoid valve (3-WAY)	ON-OFF contact output, Event marker, Solenoid valve (3-WAY)	Event marker (1), (2) Solenoid valve (3-WAY)
Applicable test tube	OD12 - 15mm × 120mm Max. Height	OD 12 - 18mm × 90 - 180mm Max. Height	OD 12 - 18mm × 105 - 180mm Max. Height
Applicable ambient temp. range	2 - 40°C with non condensing		
External dimensions	268 × 30(319) × 170(200)	355(375) × 340 × 310	286(310) × 359 × 335
Power source	AC100V, 115V, 240V, 50/60Hz		

■ Options

For DC-1200, DC-1500;
Large amount preparative unit for water type solvents,
organic solvents.
desktop type, cart type.
Eppendorf tubing & adaptor for DC-1200, DC-1500

For DC-1500;
96-hole micro plate rack,
Vial bottle rack for 27.5mm,
Vial bottle rack for 16.5mm,
Rack for test tubes which are more than ϕ 15mm in diameter,
Rack for test tubes which are ϕ 12mm in diameter,



Large amount preparative
unit desktop type

Evaporator,
Vacuum UnitOrganic
SynthesizerOven, Electric Furnace,
Incubator, FreezerLow-Temperature Bath,
Condenser, Temperature Bath,
Circulator, TapLow and Constant
Temperature Water
circulatorFreeze Dryer,
Spray DryerStirrer,
ShakerPeristaltic
pumpLiquid
ChromatographCulture Microbe and
related apparatus

Others

Sample injector

7725 V series SV series

- ★ 7725 V series: Successive model of general-purpose 7125 series.
- ★ SV series: Applicable to liquid chromatography, preparative purification under medium and low pressure separation and purification of liquid for chromatography.

■ 7725 V series (Equipped standard loop: 20 μ L)

Model	SUS316	Ceramics	Inert PEEK	Polymer	Pressure in MPa	Inject. signal
7725	○	○	—	○	34.3	○
7725i	○	○	—	○	34.3	○
V-50	○	○	○	—	29.4	○
V-50M	○	○	○	—	29.4	○
V-50R	—	○	○	—	24.5	○
V-50RM	—	○	○	—	24.5	○

■ SV series

Model	Material at liquid contact	Pressure MPa	ID of loop	Stop function
SV-6020N	Teflon, Diflon	1.47	2.0mm	—
SV-6010N			1.0mm	—
SV-6005N			0.5mm	—
SV-6020S			2.0mm	○
SV-6010S			1.0mm	○
SV-6005S			0.5mm	○

■ Optional loops for 7725 V series

5/10/20/50/200/500 μ L, 1/2/5mL



Automatic rotary and value switching device

401 series

- ★ Automatically switchable with external signal; Combining medium pressure liquid chromatography pump VSP-3050 with remote timer RT-730A enables building up automatic system and upgrade.

■ External signal

Input	Rotary	Rotary change, home position, assigned position, CPU reset
	Switching	Swing, home position, CPU reset
Output	Position, error	

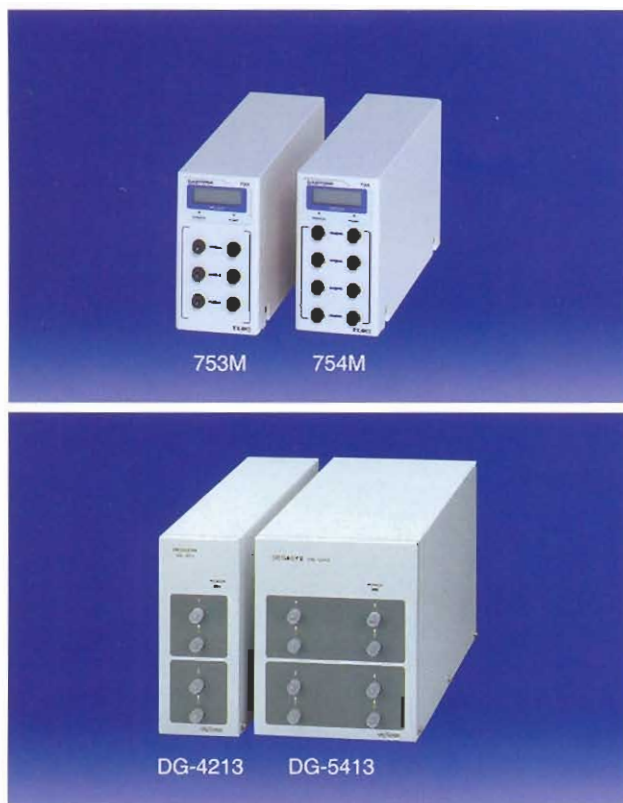
Model	Type	Stator material	Pressure MPa
401-59	1-40-WAY	PEEK, Ceramics	1.47
401-10		SUS316	19.6
401-20	1-6-WAY	PEEK, Ceramics	4.90
401-51		PEEK	
401-128	1-8-WAY	SUS316	29.4
401-127		PEEK	
401-01	Switching valve	SUS316	29.4
401-03		PEEK, Ceramics	19.6
401-19		SUS316	4.90
401-52		PEEK, Ceramics	

For medium pressure liquid chromatography pump VSP-3050: Please refer to page 116.

For remote timer: Please refer to page 121.



Solvent degassing apparatus



700 series DG series

Sensing any dissolved gas.

700 series

Type	Max. flow rate	Deaeration capacity	Pressure loss	No. of duct	Duct amount
Analysis	10mL	0.75ppm	4.9kPa	1 to 4	10mL
Low volume analysis	10mL	1.2ppm	0.1kPa	1 to 4	500 μ L
Micro volume analysis	200 μ L	1.0ppm	0.01kPa	1 to 4	50 μ L

※ Applicable materials at liquid contact for these three types of device above: Teflon, Tefzel, PPA.

Preparative	50mL	1.0ppm	2.45kPa	1/2	62mL
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※ Applicable materials at liquid contact for the device above: SUS/PEEK

DG series

※ Applicable materials at liquid contact for the device above: PEEK

Type	Max. flow rate	Deaeration capacity	Pressure loss	No. of duct	Duct amount
Analysis	7mL	0.8ppm	0.6kPa	1 - 6	10mL
Analysis/Semi-preparative	15mL	1ppm	6kPa	1 - 3	18mL
Preparative	50mL	1ppm	3kPa	1 - 2 - 4	55mL

※ Applicable materials at liquid contact for these three types of device above: PTFE, PPS, ETFE.

Column oven, reactor



Highly accurate, controllable cooling and heating conditions with this applicable column oven.

Reactor applicable for reaction chromatography and FIA.

Column oven

Model	502	505
Cat. No.	183340	183350
Temp. control	Electronic element-applied temp. control for cooling & heating, constant temp. bath under circulatory air conditioning	
In-bath temp. control & accuracy	Room temp. -10 to +60°C; $\pm 0.3^\circ\text{C}$	
External input/output	Temp. monitor output Φ to 1.5V; 1 to 60°C, error signal	
In-bath dimensions	42 x 320 x 20	90 x 340 x 70

Reactor

Model	521
Cat. No.	201070
Temp. control	air conditioning-applied heating
Temp. control range	40 to 180°C (ambient temp. 25°C)
Temp. control accuracy	$\pm 0.5^\circ\text{C}$
Applicable tubing	1/16" Tefzel tubing, $\phi 0.5\text{mm} \times 10\text{m}$

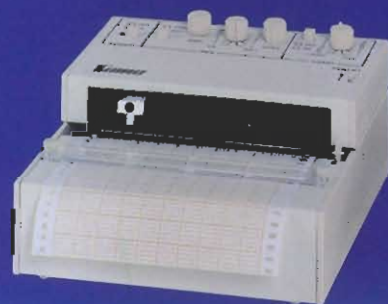


RT-730

Remote timer

For automation and system upgrade of chromatography.

Model	RT-730A
Cat. No.	201080
Timer program	999min. 59 sec. max.
No. of steps	20 steps on each output
Repeatability	1 to 8 times on the same program, or infinite repeating
External input	AC100V, 4 outlets (Max. 4 outlets for 3A, 1 outlet for 1A)
External input	Contact output: 12 channels (4 channels/1 lineage=3 lineages)



MDL-101

Recorder

MDL-101	1 pen	100mm	Cat. No.201290
- Measurable range: 1,2,5,10,20,50mV 0.1,0.2,0.5,1,2,5V			
- Chart speed: 1,2,5,10,20,30cm/h,cm/min			
SS-100F-MM	1 pen	100mm	Cat. No.130950
SS-250F-12102	1 pen	250mm	Cat. No.187270
U-228-1P-500	1 pen	250mm	Cat. No.187250
MDL-102	2 pen	100mm	Cat. No.181040
SS-250F-22102	2 pen	250mm	Cat. No.187280
U-228-2P-500	2 pen	250mm	Cat. No.187260
SS-250F-32102	3 pen	250mm	Cat. No.187290



STT-110



STT-120

System rack

STT-120 has a carry table, on which recorder can be placed. The table can be pulled towards to use the recorder and the height of lower table is adjustable.

Model	STT-110	STT-120
Cat. No.	165020	165030
Dimensions	374 × 430 × 210	374 × 430 × 360 to 400



Glass column for medium and low pressure liquid chromatography



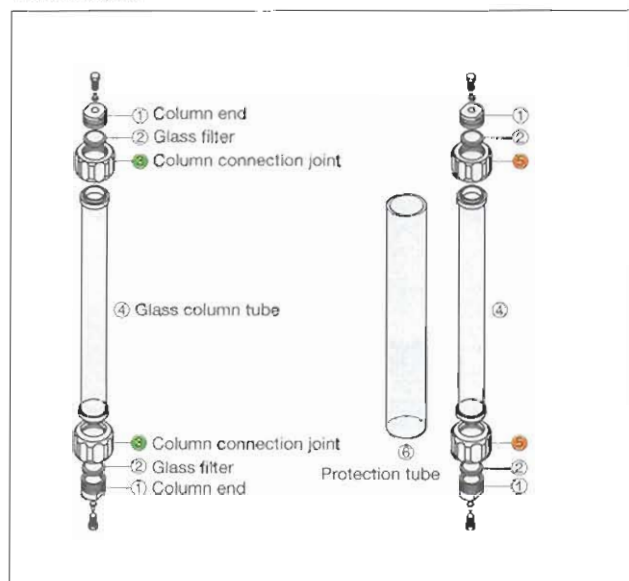
ID in mm	Pressure in MPa(kg/cm ²)	Glass filter's pore size	Length in mm				
			50L	100L	300L	500L	1000L
3	11.8(120)	10μm	165820	129290	129300	129310	129320
5	11.8(120)		165830	129330	129340	129350	129360
8	9.81(100)		165840	129370	129380	129390	129400
10	9.81(100)		165850	129410	129420	129430	129440
15	7.84(80)		165860	129450	129460	129470	129480
20	4.90(50)		178040	129490	129500	129510	129520
30	2.94(30)		178050	129530	129540	129550	129560
50	1.96(20)		—	129570	129580	129590	129600
100	0.98(10)		—	—	129610	129620	129630

Protection tube-surrounded glass column for medium and low pressure liquid chromatography



ID in mm	Pressure in MPa(kg/cm ²)	Glass filter's pore size	Length in mm				
			50L	100L	300L	500L	1000L
3	14.7(150)	5μm	176410	176420	176430	176440	176450
5	14.7(150)		176460	176470	176480	176490	176500
8	9.81(100)		176510	176520	176530	176540	176550
10	9.81(100)	10μm	176560	176570	176580	176590	176600
15	7.85(80)		176610	176620	176630	176640	176650
20	4.90(50)		—	176660	176670	176680	176690
30	2.94(30)		—	176700	176710	176720	176730
50	1.96(20)		—	176740	176750	176760	176770

Standard parts



④ Glass column tube

ID in mm	Length in mm
3	50 to 1000L
5	50 to 1000L
8	50 to 1000L
10	50 to 1000L
15	50 to 1000L
20	100 to 1000L
30	100 to 1000L
50	100 to 1000L
100	300 to 1000L

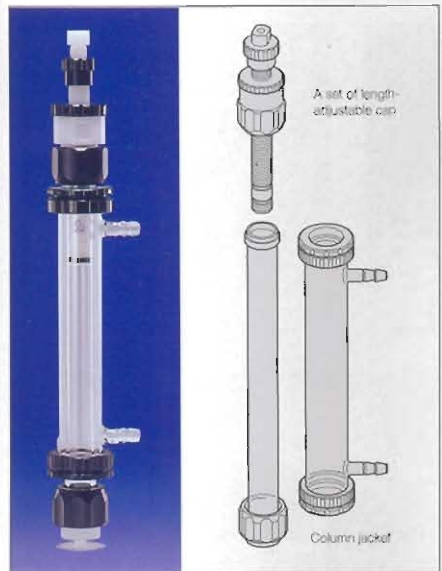
⑤ Protection tube (material: polycarbonate)

ID in mm	Length in mm
3 to 50	50 to 1000L

① Column end Material: Diflon	② Glass filter Pore: 0.3-8.5μm, ID 10-100:10μm	③ Column connection joint Material: Polyacetar	④ Column connection joint Material: Polyacetar
ID in mm	ID in mm	ID in mm	ID in mm
3	3	3	3
5	5	5	5
8	8	8	8
10	10	10	10
15	15	15	15
20	20	20	20
30	30	30	30
50	50	50	50
100	100	100	—

Optional parts for glass column

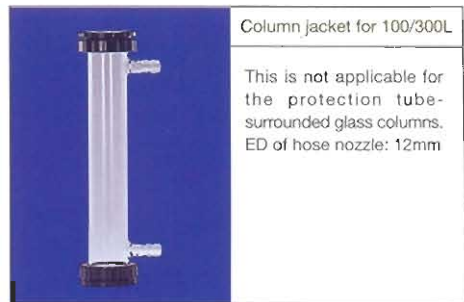
Length-adjustable cap-equipped column jacket for water



A set of length-adjustable stopper

Adjustable length: ID 3.5-sized column : 50mm, ID 8 to 100-sized column: 100mm

For Glass column		For Protection tube-surrounded glass column	
ID in mm	Cat. No.	ID in mm	Cat. No.
3	130340	—	—
5	130350	5	177120
8	130360	8	177130
10	130370	10	177140
15	130380	15	177150
20	130390	20	177160
30	130400	30	177170
50	130410	50	177180
100	130420	—	—



Column jacket for 100/300L

This is not applicable for the protection tube-surrounded glass columns. ED of hose nozzle: 12mm

For 100L: ID 3 to 50mm, For 300L: ID 3 to 100mm

Optional tools

These tools are used to fully tighten the column end's and the glass tube's seal contacts. Especially, they are useful for the ID sizes more than 30mm as it is difficult to reach with human's fingers or a hand.



Square wrench
Circle wrench

Length-adjustable cap-equipped filter set

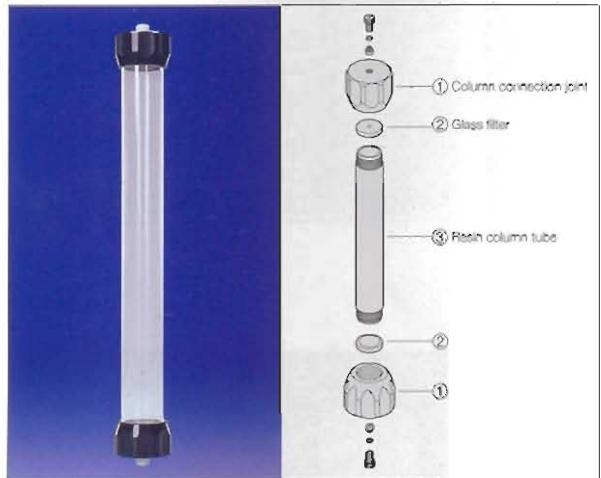


ID 3 to 50mm

※Materialistic strength is uncertain when any highly acidic solvent or high alkalinity solution is applied. Please contact us if you require further information.

Resin column for low pressure liquid chromatograph

Polycarbonate-made resin column for low pressure liquid chromatograph



Resin column for low pressure liquid chromatograph (material: polycarbonate)							
ID in mm	Pressure kPa(kg/cm ²)	Glass filter's pore size	Length in mm				
			100L	200L	300L	500L	1000L
9	2940(30)	10μm	166010	166020	166030	166040	166050
14			166060	166070	166080	166090	166100
18			166110	166120	166130	166140	166150
22	1960(20)		166160	166170	166180	166190	166200
29	1470(15)		166210	166220	166230	166240	166250
36	686(7)		166260	166270	166280	166290	166300
44	490(5)		166310	166320	166330	166340	166350
55	294(3)		166360	166370	166380	166390	166400
65	196(2)		166410	166420	166430	166440	166450

①Column connection joint		②Glass filter	
ID in mm	Quantity	ID in mm	Quantity
9	1	9	2
14	1	14	2
18	1	18	2
22	1	22	2
29	1	29	2
36	1	36	2
44	1	44	2
55	1	55	2
65	1	65	2

③Resin column tube	
ID in mm	Length in mm
9	100 to 1000L
14	100 to 1000L
18	100 to 1000L
22	100 to 1000L
29	100 to 1000L
36	100 to 1000L
44	100 to 1000L
55	100 to 1000L
65	100 to 1000L

Optimal parts for piping for liquid chromatography

Manual valve VF type tubing



VF-5210
VF-5410

2-WAY valve (Durable pressure: 0.98, 2.94 MPa),
3-WAY valve (Durable pressure: 0.98, 2.94 MPa),
4-WAY valve (Durable pressure: 0.98, 2.94 MPa).



Teflon tubing (PTFE)
Polytetrafluoroethylene-made resin tubing

ID × OD in mm	Length in m
0.25 × 1.58	10/30/50
0.5 × 1.58	
0.25 × 2.0	
0.5 × 2.0	
1.0 × 2.0	
2.0 × 3.0	
3.0 × 5.0	



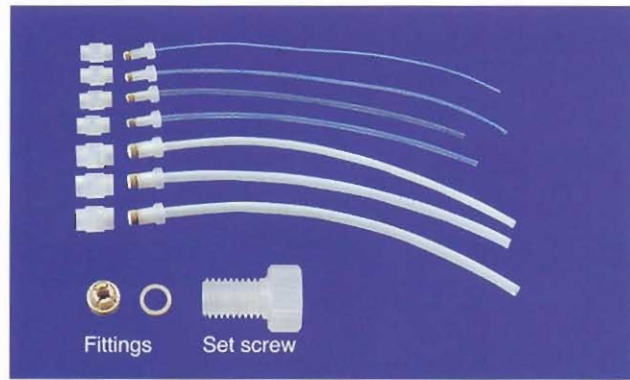
Tefzel tubing (ETFE)

ID × OD in mm	Length in m
0.2 × 1.58(1/16")	10
0.5 × 1.58(1/16")	
0.8 × 1.58(1/16")	



Peek tubing (PEEK)

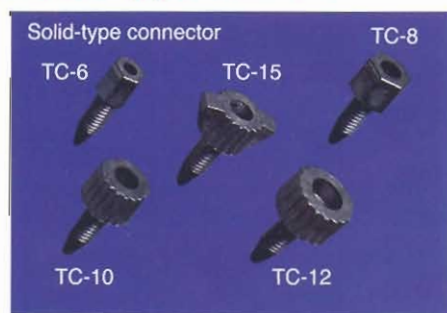
ID × OD in mm	Length in m
0.13 × 1.58(1/16")	10
0.25 × 1.58(1/16")	
0.5 × 1.58(1/16")	
0.75 × 1.58(1/16")	
1.0 × 1.58(1/16")	



Set screw, fitting

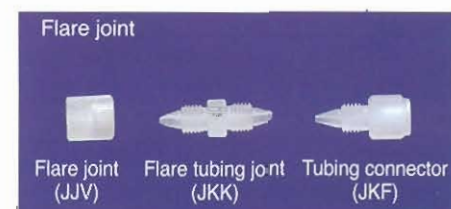
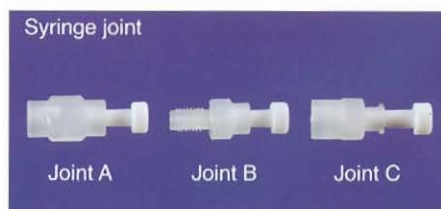
Applicable piping	Screw diameter	Set screw		Fitting	
		Model	Quantity	Model	Quantity
OD 1.50mm	1/4-28UNF	F-15	10	F-15	10
OD 1.58mm(1/16")	1/4-28UNF	F-16	10	F-16	10
OD 1.58mm for Lobar column	1/4-28UNF	F-16R	10	F-16A	10
OD 1.58mm(1/16")	NO.10-32UNF	F-16A	10	F-20	10
OD 2mm	1/4-28UNF	F-20	10		10
	M8 × P1.0	F-20B	10	10	
OD 3mm	1/4-28UNF	F-30	10	F-30	10
OD 3.2mm(1/8")	1/4-28UNF	F-32	10	F-32	10
OD 5mm	M10 × P1.0	F-50	10	F-50	10
OD 6mm	M10 × P1.0	F-60	10	F-60	10
OD 6.3mm(1/4")	M10 × P1.0	F-63	10	F-63	10
Blank cap (Solid type)	1/4-28UNF	JE-0000T	10		

Solid-type connector



Model	Max. diameter in mm	Quantity
TC-6	6mm	10
TC-8	8mm	10
TC-10	10mm	10
TC-12	12mm	10
TC-15	15mm	10
9004	10mm	10
9711	9.5mm	10
9721	9.5mm	10
9701	5mm	10
9703	5mm	10

Union. Joint





**Fermentor
MBF**

P.126



**Dry heated
sterilizer
NDS**

P.132



**Process controller
for incubation
controller
EPC-2000**

P.128



**Autoclave
sterilizer
MAC**

P.133



**Process controller
unit for incubation
controller**

P.130



Culture flask

P.134



**Measuring sensors,
Aeration unit, Gas
mixer, Oxygen
enricher, Nitrogen
gas generator for
Incubation controller**

P.131



**Low speed
magnetic stirrer
MCS**

P.134

Fermentor for microorganism

MBF-ME



MBF-300ME

- ★ Its stirring unit is designed as magnet coupling style to prevent from bacteria contamination.
- ★ Microorganism-friendly water jacket style.
- ★ Combined with its process controller EPC-2000 or with measuring/control unit, incubation process control is made possible.

Model	MBF-300ME	MBF-250ME	MBF-500ME	MBF-800ME	MBF-1000ME
Cat. No.	181180	135820	135830	135840	135850
Heating method	Double-walled water jacket system				In-piping water heating system
Rotary/Aeration method	Non-sealed magnet coupling/Ring Spurger				
Temp. range	Water coolant +5 to 60°C (When applying external coolant)				
Agitation speed	80 to 1000rpm		80 to 800rpm		
Impeller	Turbine+Deformed turbine				
Incubation bath ID x depth, capacity	143 x 195, 3L	114 x 262, 2.5L	143 x 332, 5L	168 x 370, 8L	168 x 382, 10L
External dimensions	300 x 470 x 715		300 x 470 x 865		400 x 560 x 850
Power source	AC100V, 50/60Hz, 500VA		AC100V, 50/60Hz, 440VA		AC100V, 50/60Hz, 550VA

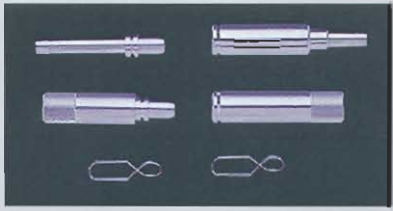
■ Optional devices and related products
 Process controller: EPC-2000
 Control box: BOX-D, BOX-E, BOX-F
 For measurement control unit, please refer to page 128.



For aeration unit: MAU, please refer to page 131.



For low constant temperature bath: NCB, please refer to page 59.



Aseptic joints:
 OD 2 mm: code No.143290
 OD 3 mm: code No.143300
 OD 6 mm: code No.143310
 OD 8 mm: code No.143320



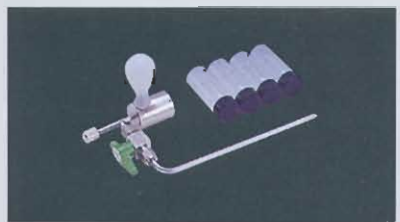
For various sensors, please refer to page 131.



Sampling tubing: MST



For oxygen enricher, nitrogen gas generator, please refer to page 131.



Sampler: MSP

Example of systemized fermentor lineups for microorganism under control by its process controller



Name of system		Cat. No.
2.5L system	13	SYS19053
	14	SYS19054
5L system	13	SYS19057
	14	SYS19058
8L system	13	SYS19061
	14	SYS19062
10L system	13	SYS19065
	14	SYS19066

*System 13 means mass flow system, and 14 means valve flow system with no PCs on either case.

Another example of systemized fermentor lineups for microorganism under control by its process control unit



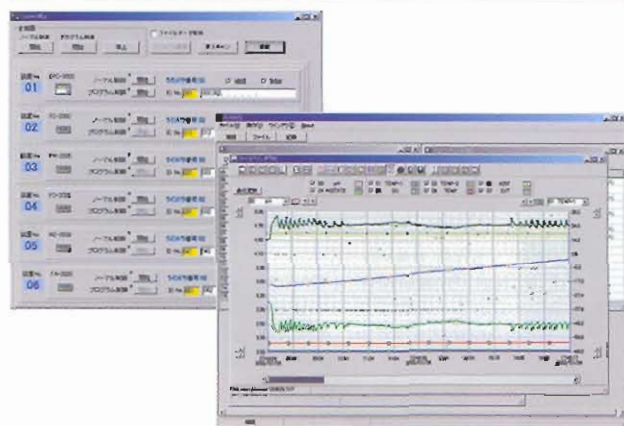
Name of system		Cat. No.
2.5L system	11	SYS19051
	12	SYS19052
5L system	11	SYS19055
	12	SYS19056
8L system	11	SYS19059
	12	SYS19060
10L system	11	SYS19063
	12	SYS19064

*System 11 means mass flow system, and 12 means valve flow system.



Process controller for incubation control

EPC-2000

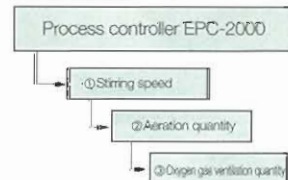


- ★ Process controller that is capable of determining optimal conditions and automating culture.
- ★ Cascade control operating with other multiple functions in order to minimize a burden over cells under incubation.
- ★ Gas mixture element control functioning to control DO value while quantity of gas flow remains unchanged.
- ★ Addition quantity control working to add culture media and specified elements.

Model	EPC-2000
Cat. No.	199240
Measurable/controllable operation items	Converter with applicable 5 items for pH, DO, Temp., Stirring in Pulse, Antifoam, Concurrently connectable to defined another communication device while communicating, Operational up to 16 items (Maximum 8 items can be input into converter.)
Control functions	PID control in 2 kinds, Control timer, Antifoam / Level control
Communication I/O	RS-232C/EYELA TALK/USB ver.1.1, As options, additional PCB, RS-232C 5CH additional
Converter input	8 points max.
Voltage control output	Controllable from 0-5V to 0-10V (4 points in average, 8 points as max.)
Digital output	16 points Max. (open collector output)
Recorder output	Optional 8 points per piece (0-10mV), additional up to 2 pieces
Setup	Keyboard input, shown on LCD (40 characters × 4 rows, with backlight)
Timer function	Operating time period accumulation upon elapsed time from control start, time span from blackout until recovery, relay output period of time
Applicable OS on PC	Windows 98/99/SE/Me/NT ver.4/2000/XP
External dimensions	218 × 450 × 216 (230)

● Cascade control

Ex. DO control



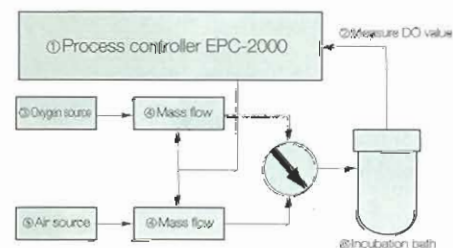
Up to 3 items on each lineage

On EPC-2000, the cascade function is fully enhanced. In addition to its conventionally organized DO value cascade control, the cascade control is able to function upon multiple items. It is also able to work in conjunction with the gas mixture element control function.

● Additional quantity control

In some necessary cases of adding some culture solution in accordance with cultivated condition, or of adding a certain amount of one certain element in order to observe cells' changing condition, such some conditions require incubation baths to receive these solutions constantly and accurately. EPC-2000 is able to perform such additional quantity control. Since this function controls additional pump while measuring additional solution with electronic balance, quantity of additional solution can be controlled even in minutes amounts. With some system combinations, voltage output control, ON-OFF control, 2-element addition control and such are also made possible.

● Gas mixture element control



EPC-2000 is designed to keep a certain amount of gas while controlling flow rate of components in order to serve better incubation conditions. For example, flow ratio between oxygen and air changes in accordance with DO value's fluctuation, however, the combined total quantity of oxygen and air does not change. This is the control function for gas mixture. Due to employment of this control, constant amount of gas can be flowed from the start to the end of one incubation process.

■ Process control configuration devices

■ Control box BOX-F-B

Combination of EPC-2000 and mass flow box, valve flow box, and etc. enables controlling injection of chemicals and ventilation volume.



Connection with a tubing pump and etc. enables injecting chemical up to 4 lineages. Also, combination with mass flow box, valve flow box and etc. enables controlling culture apparatus fundamentally by controlling the quantity of air flow. Control boxes (BOX-D/BOX-E) using external plunger pumps are also available.

Model	BOX-F-B
Cat. No.	199380
Applicable piup	1.5A, 2 outlets
No. of tubing pump	2
Voltage output contact terminal	0 to +5VDC, 4CH
Stirring output (MBF)	0 to +5VDC, 1CH

■ Mass flow box, Valve flow box



Mass flow box FF-2500



Valve flow box FF-3500

These adjusters are designed to control air during aerobic incubation time. Air can be controlled with the change of DO value. Two types of the devices are available. One is "Mass Flow Type", which controls a quantity of airflow, and the other is "Bulb flow type", which opens and closes the bulb.

Mass flow box series

Model	Flow rate	Cat. No.
FF-2500-A	0.5L/min. in 20°C	199120
FF-2500-B	2L/min. in 20°C	199130
FF-2500-C	10L/min. in 20°C	199140

Valve flow box series

Model	Flow rate	Cat. No.
FF-3500-A	0.5L/min.	199150
FF-3500-B	2L/min.	199160
FF-3500-C	10L/min.	199170

■ Converter

Converter	pH/ORP	DO	Temp.	Pulse	Antifoam	V · A
Cat. No.	199270	199280	199250	199260	199290	199300
Measurable range	0.00-14.00(pH) ±1000mV(ORP)	0.0-20.0ppm, or 0.0-100.0%	-50-250°C	0-1kHz	0-5MΩ	Selectable either from 0-5V, 0-10mv, 4-20mA

*Controllable range varies depending on electrode to connect with, or sensor or operating machine/device.

■ Optional devices for incubation measurement



Electric conductivity metering unit

Enables measurement / metering of electrical conductivity with applicable ø12 sensor.



Turbidity metering unit

Laser-applied turbidity metering unit with thin ø6 sensor.



UV absorption detector

Fiber-applied UV detector using a liquid immersion probe. With this probe, it is attachable to an incubation bath.



pH, ORP measuring unit

Connecting to pH or ORP electrode enables measuring and to controlling pH and ORP scale or value. There are two connecting methods such as connection to a converter and to a measuring unit.



FTIP measurement unit

Since this unit is capable of measuring in Mid infra-red light(900 ~ 5000nm) and its probe is liquid immersion type, it is possible to measure during incubation period. Connectable with commercially available FTIPs.



Please read "Instruction Manual" carefully before using the product for your continued safety.

Process controller



- ★ By unifying the size of each instrumentation, only necessary units can be piled up in use.
- ★ Each controller is equipped with RS-232C and EYELA TALK connector. Transmission between controllers is available through attached EYELA TALK cable, and transmission between host computers and controller in network is also available through RS-232C with 1 channel.
- ★ With connecting to Model EPC-2000 (EYE TALK), it is possible to operate even 1 task item from some items programmed in the process controller EPC-2000.

Evaporator, Vacuum Unit
 Organic Synthesizer
 Oven, Electric Furnace, Incubator, Freezer
 Low-Temperature Bath, Constant-Temperature Bath, Condenser, Trap
 Low and Constant-Temperature Water circulator
 Freeze Dryer, Spray Dryer
 Stirrer, Shaker
 Peristaltic pump
 Liquid Chromatograph
 Culture Microbe and related apparatus
 Others



pH controller FC-2000
 Measurable up to 0.01, and available as a stand-alone pH meter unit. This controller is equipped with control output with interval timer setting, temperature compensation function, and alarm output.



DO controller FM-2000
 Units of ppm and % can be switched. Equipped with a variety of functions such as temperature compensating and controlling output function attached with interval timer and etc.



ORP controller FO-2000
 Since the range of control is -1000 to +1000mV, it can be controlled both from oxidizing side and reduction side. Easy-to-use with a variety of functions such as interval timer, alarm output and etc.



Antifoam/Fluid level controller MZ-2000
 Equipped with controlling output attached with interval timer. Detects blister and fluid level, and injects antifoam and gets culture media out.



Flow rate/Stirring controller FA-2000
 Controls quantity of air flow from mass flow box and stirring of culture apparatus upon receiving signal (DO value) from DO controller. Cascade control is also available in conjunction with aeration amount and stirring.



Mass flow box FF-2500
 Controls with using controller and flow volume/stirring controller. Quantity of air flow corresponding to DO value is supplied to culture apparatus. Three types of flow volume are available to meet the requirement of culture apparatus.

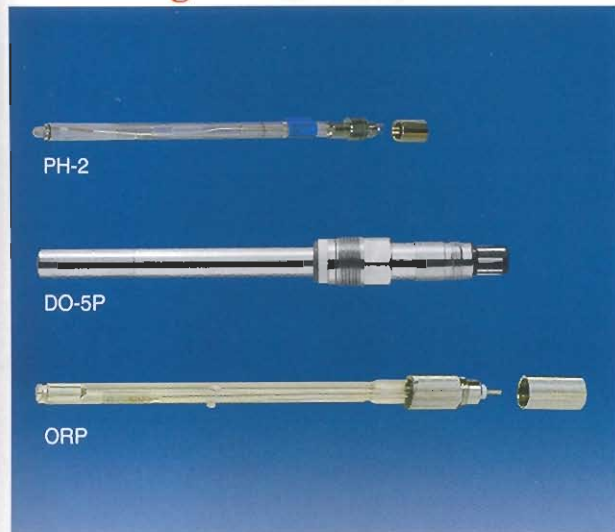


Valve flow box FF-3500
 Controls with using DO controller. Volume adjuster of valve-flow type. Three types of flow volume are available to meet the requirements of each culture apparatus.



Pump box FB-2000
 Pump box used for injecting acidum, alkalies and antifoam. This product works upon receiving any signals from a pH controller, a defoaming/fluid level controller or such reaches. With served four plug outlets.

Electrode/pH, DO, ORP, Defoaming measuring sensor for MBF



PH sensor			
Model	Cat. No.	OD in mm	Glass length in mm
Mettler-Toledo	PH-2P	188440	12
	PH-3P	188450	
	PH-4P	189700	
	PH-2	136630	12.3
	PH-5	138650	

※Optional connector cord is available.

DO sensor				Connector cord	
Model	Cat. No.	OD in mm	Flange length in mm	Model	Cat. No.
Mettler-Toledo	DO-3P	199180	12	DO-C1p	199850
	DO-5P	199200			
	DO-6P	199210			
	DO-2	138810	15.8	DO-C1	138860
	DO-5	138830			
	DO-6	138840	10	DO-C2	138870

※Optional connector cord is available.

ORP sensor				Connector cord	
Model	Cat. No.	OD in mm	Glass length in mm	Model	Cat. No.
	ORP-2	12.1	250	ORP-C	138990
	ORP-5		320		

※Optional connector cord is available.

Defoaming sensor			
Model	Cat. No.	OD in mm	Probe length in mm
	AF-3	7	195

Aeration unit, Compressor



Air supply unit for incubation devices in fermentors and bio-reactors.

■Aeration unit

Model	MAU-1C	MAU-1D	MAU-2C	MAU-2D
Cat. No.	138360	138370	138380	138390
Rated flow pressure	68.6kPa(0.7kgf/cm ²)		98.1kPa(1.0kgf/cm ²)	
Rated flow rate	3.5L/min.		8L/min.	
Max. flow pressure	98.1kPa(1.0kgf/cm ²)(when closing)		147kPa(1.5kgf/cm ²)(when closing)	
Flow rate controller	Fixed flow rate valve for variable secondary pressure			
Flow rate meter	50-500NmL/min.	0.2-2.5NL/min.	0.5-5NL/min.	1.0-10NL/min.

※Optional dry module set MDM-1.

■Compressor

Model	AC-0207	AC-0610
Cat. No.	138400	138410
Rated flow pressure	68.6kPa(0.7kgf/cm ²)	98.1kPa(1.0kgf/cm ²)
Rated flow rate	3.5L/min.	8L/min.

Gas mixer, Oxygen enricher, Nitrogen gas generator



■Gas mixer

Functions to blend 2 types of gas and then to supply the mixture to an incubation device, and to control the gas amount even just in case the secondary pressure changes.

Model	GMU-1
Cat. No.	138420
Applicable type of gas	Either 2 types from air, O ₂ , CO ₂ , N ₂
Flow rate	Selectable from 8-8000NmL/min. per 1 type of gas
Applicable range of secondary pressure	49.0k(0.5)-196kPa(2.0kg/cm ² gauge)

■Oxygen enricher SOM/SC

Available to generate oxygen gas and then get it to highly concentrated in to 90%.

■Nitrogen gas generator SLN

With a connection to a compressor, nitrogen gas in the concentration of more than 95% is supplied.



Dry heated sterilizer

NDS-400, NSD-700

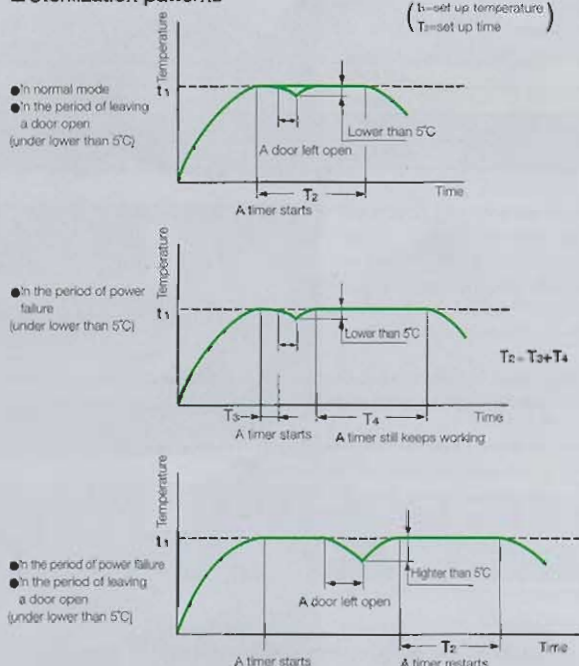


NDS-700

- ★ Slim figure. Door can be opened both from right and left side.
- ★ Fully provided timer functions such as auto start and stop in order to raise operational efficiency.
- ★ Built-in temperature compensation function to comply with an appropriate temperature measured by an external standard thermometer.
- ★ Warning function as alarm display with alert buzzer in case of trouble/accident.

Model	NDS-400	NDS-700
Cat. No.	194960	194970
Convective method	Natural convection	
Temp. control range&accuracy	Room temp. +10 to 250°C, ±1°C	
Applicable temp. range	40 to 250°C	
Temp. distribution range	10/20°C(at100/200°C)	
Temp. arrival time	45 min.	75min.
Safety functions	Door open alarm, Caution alarm, Sensor alarm, Temp. failure alarm, Power failure alarm, Electric leakage/Surge breaker, Variable stand-alone overheat stopper, Panel overheat prevention	
Interior dimensions, capacity	450 × 450 × 400, 81L	450 × 450 × 700, 142L
No. of shelves	Equally distributed load 15kg per shelf, 2 pcs. provided	Equally distributed load 15kg per shelf, 3 pcs. provided
Shelf pitch, No. of steps	30mm, 8 steps	40mm, 12 steps
No. of exhaust openings	2 on top	
External dimensions	526 × 550 × 795	526 × 550 × 1095
Power source	AC100V, 50/60Hz, 1.25kVA	AC100V, 50/60Hz, 1.4kVA

■ Sterilization patterns



■ Optional devices

■ Dedicated rack for NDS-400

Coming with fixing bracket and adjustor HSS-40CA with its code No. 197220
Sizes in mm (Width × Depth × Height): 600 × 600 × 767

■ Buildup structure rack for NDS-400

Coming with a cooling fan and a served plug. HSD-10 with its code No. 195340
Sizes in mm (Width × Depth × Height): 530 × 567 × 135

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Autoclave sterilizer MAC-5100, MAC-6100



MAC-6100

- ★ Selectable functions as follows: "Equipment Sterilization Course" to sterilize relevant equipment, "Culture Sterilization Course" coming with heating function to prevent from immobilization of culture after sterilization, and "Culture dissolution Course" to dissolve once hardened culture and to sustain it.
- ★ To open and close its door, the proven 'One handle sliding method' is adopted. To check whether the door is fully sealed, employment of that new structural door ensures not only opening and closing of the door but also full sealing.
- ★ In case its internal temperature falls 1°C or less than its preset value, internal timing device automatically stops. Then, once the temperature comes back to the preset value, its safety mechanism to check incomplete sterilization restarts to work.

Model	MAC-5100	MAC-6100
Cat. No.	182990	183000
Temp. control range	Sterilization: 105~126°C; Heat. temp. for dissolution: 60~100°C; Thermal insulation: 45~60°C	
Controllable pressure, temp. range	147kPa(1.5kg/cm ²), 126°C	
Timer function	Sterilization: 1~130min.; Heat. temp. for dissolution: 1~480min.; Thermal insulation: 0~480min.	
Safety function	Surge prevention, In-sterilization room overpressure prevention, Empty heating prevention, Full sealing check	
Applicable material for body	Stainless steel-made compact pressure container	
Sizes in mm	Internal diameter 240 × Depth 500	Internal diameter 316 × Depth 670
Medical device license No.	20BZ0016	
Applicable ambient temp.	10~40°C	
External dimensions	490 × 440 × 929	570 × 440 × 1133
Power source	AC100V, 50/60Hz, 1.3kVA	AC100V, 50/60Hz, 1.8kVA



■ Membrane key pad



■ Optional items



■ Culture sterilization container

Double-tiered style
For MAC-5100 (ø220 × 240mm in height)
Cat. No. 141700
For MAC-6100 (ø300 × 240mm in height)
Cat. No. 141710

Autoclave sterilizer SGC-220



SGC-220

- ★ Fully automatic sterilizer with drying function.
- ★ Selectable sterile temperature either from 121°C and 132°C.

Model	SGC-220
Cat. No.	199220
Sterile. temp.	Selectable from 121°C or 132°C
Sterilization timer	20 to 60 min. for 121°C/5 to 60 min. for 132°C
Drying method	Air pump applied, timer for 1 to 60min.
Interior dimensions&capacity	ø220 × 360, 13L
External dimensions	440 × 540 × 370
Power source	AC100V, 50/60Hz, 1.3kVA



Culture flask



Standard type

Jacket type

Magna flex type

- ★ Convex-designed bottoms of flask to avoid precipitation of cells.
- ★ Two-side arms equipped on a flask enable filling up culture solution, obtain cell and control vapor phase. With the flask of 500mL or higher, attachment of the pH sensor is also available.
- ★ Magna flex type enables the stirring with a spherical glass rod, and also performs evenly calm stirring throughout inside a flask while sustaining beads in suspension.

■ Magna flex type

Model	Cat. No.	Capacity in mL	Body diameter in mm	Height in mm	Cap diameter in mm	Arm diameter in mm
NO.356830	164710	125	65	155	51	33
NO.356831	164720	250	85	175	51	33
NO.356832	164730	500	110	190	100	45
NO.356834	164740	1000	130	250	100	45

■ Standard type

Model	Cat. No.	Capacity in mL	Body diameter in mm	Height in mm	Cap diameter in mm	Arm diameter in mm
NO.356873	164590	25	38	122	38	15
NO.356875	164600	50	38	141	38	15
NO.356876	164610	125	65	155	51	33
NO.356879	164620	250	85	175	51	33
NO.356882	164630	500	110	190	100	45
NO.356884	164640	1000	130	250	100	45

■ Jacket type

Model	Cat. No.	Capacity in mL	Body diameter in mm	Height in mm	Cap diameter in mm	Arm diameter in mm
NO.356943	164650	25	54	134	38	15
NO.356945	164660	50	54	147	38	15
NO.356946	164670	125	78	162	51	33
NO.356949	164680	250	100	182	51	33
NO.356952	164690	500	130	195	100	45
NO.356954	164700	1000	150	260	100	45

■ Spinner flask-dedicated parts

Low speed magnetic stirrer MCS



MCS-201

- ★ Performs stable stirring at low speed with using a spinner flask.
- ★ Since it is thin model, it is capable of being used in a unit such as thermostatic incubator and etc.
- ★ Employment of 'slow start/stop' mode. (Excluding MCS-100).



Model	MCS-100	MCS-101	MCS-201	MCS-401
Cat. No.	137360	137370	137380	137390
Rotation speed	10-100rpm		5-100rpm	
No. of flask positions	1		2	4
Rotation accuracy	100-5000mL		50-2000mL	
Additional function	Slow up (Approx. 10 sec. Max.), Slow down			
Applicable ambient temp. range	4-40°C with non condensing			
External dimensions	250 × 270 × 80	400 × 270 × 80	400 × 450 × 80	
Power source	AC100V, 50/60Hz, 25kVA			



Automatic water
distillation apparatus
SA-2100A series
P.136



Nitrogen
digestion unit
KR-1000
P.140



Automatic water
distillation apparatus
SA-2100E series
P.136



Mixer settler
MX-4G
P.141



Cartridge type
water purifier
ERN
P.137



Reciprocating
extractor
KF
P.141



Water purifier
ERN-W
P.137



Ultrasonic
cleaner
MUS, W, AU
P.142



Solvent recycler
SR-2000
P.138



LED light source
Panel LED
Stick LED
P.143



Cleaning solvent
recycling unit
KFE
P.139



Culture shelf
with LED
LED-MPS
P.143

Automatic water distillation apparatus

SA-2100 series



SA-2100A



SA-2100E

■ Various functions

2100A, 2100An	2100E, 2100E-UV, 2100E1, 2100E1-UV
Water supply cut-off detection, overheat detection, empty heating prevention, water leakage detection, electric leakage & surge breaker, metal fixture, entraining prevention, automatic boiler drainage, automatic coolant water control	
Display of cartridge replacement period, display of total quantity of sample water	

- ★SA-2100A&SA-2100An: Compact, and sampling distilled water.
- ★SA-2100W: Sampling two-stage distilled water.
- ★SA-2100E&SA-2100E1: Sampling distilled water and ion-exchanged water.

■ SA-2100A



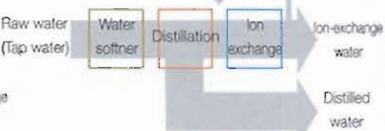
■ SA-2100A+SA-2100W



■ SA-2100E



■ SA-2100E1



Model	SA-2100A	SA-2100An	SA-2100W
Cat. No.	182230	185010	185020
Water sampling method	Distillation		Two-stage distillation
Applicable purified water	Distilled water		Two-stage distilled water
Distillation performance	Approx. 1.8L/h		
Sample q'ty of distilled water	2.0L/min. at full water level (10L/sampling Max.)		
Water quality meter	Digital display at automatic temp. compensation 25°C, Specific resistance/Electric conductivity (Switchable)		
Pre-treatment filter	Resin cartridge for soft water		
Storage tank for distilled water	Polyethylene resin-made, 10L, cock-equipped, 150 × 330 × 480		
Applicable raw water	Tap water	Ion-exchanged water	SA-2100A/SA-2100An-distilled water
Applicable tap water pressure	49.0~490kPa(0.5~5.0kg/cm ²)		
External dimensions	300 × 410 × 700(or, tank-equipped sizes:460 × 410 × 700)		
Power source	AC100V, 50/60Hz, 1.5kVA		

Model	SA-2100E	SA-2100E-UV	SA-2100E1	SA-2100E1-UV
Cat. No.	182240	182241	182250	182251
Water sampling method	Ion exchange - Distillation		Distillation - Ion exchange	
Applicable purified water	Ion-exchanged water, Distilled water		Distilled water, Ion-exchanged water	
Distillation performance	Approx. 1.8L/h			
Sample q'ty of distilled water	2.0L/min. (20L/sampling Max.)			
Sample q'ty of ion-exchanged water/Set up q'ty	1.3L/min, 1~99L		1.5L/min, 1~20L	
Applicable raw water pressure	49.0~490kPa(0.5~5.0kg/cm ²)			
Water quality meter	Digital display at automatic temp. compensation 25°C, Specific resistance/Electric conductivity (Switchable)			
Pre-treatment filter	Active charcoal cartridge		Soft water resin cartridge	
Ion exchange resin	Mixed bed ion exchange cartridge; Resin amount: 3L			
UV lamp	---	UV cartridge	---	UV cartridge
Storage tank for distilled water	Polyethylene resin-made, 20L			
External dimensions	550 × 430 × 750			
Power source	AC100V, 50/60Hz, 1.5kVA			

Water softener	MS-5	185050
RO Unit	RiOs5	182350
Cooling water recycler for SA-2100E&SA-2100E1	SA-RS	182260

■ Optional items, consumables

Name of item	Model	Cat. No.	Main spec.	Applicable model					
				A	An	E	E-UV	E1	E-UV
Filter element/Active charcoal cartridge	ACC-1	182290	Disposable cartridge, 1pc.			●	●		
Hollow fiber membrane filter	---	185460	Percolation accuracy in 0.1µm, 1pc.			●	●	●	●
Ion exchange cartridge	IE-3	182270	Disposable mixed bed 3.0L, 1pc.			●	●	●	●
High purity ion exchange cartridge	IE-30	182280	Mixed bed 3.0L(TOC-specified), 1pc.			●	●	●	●
Resin cartridge for soft water	SF-3	182300	Disposable 3.0L, 1pc.	●				●	●
UV lamp	---	186530	---				●		●
Water supply hose	---	182360	Simple attachment to a tap, 3m	●	●	●	●	●	●
Rack	HSS-221	185030	Width 520 × Depth 520	●	●				
	HSS-222	185040	Width 560 × Depth 560(or, 760)			●	●	●	●

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Cartridge type water purifier

ERN



ERN-7

ERN-15

ERN-25

- ★ Filled up by the cartridge (steel bottle), which contains ion exchange resin.
- ★ Ion exchange resin to be reproduced by Tokyo Rikakikai Co., Ltd.

Model	ERN-7	ERN-15	ERN-25	
Cat. No.	111850	111860	111870	
Water sampling method/Applicable purified water	Ion exchange method/Ion-exchanged water			
Sample q'ty of purified water	Approx. 1400L/Cycle	Approx. 3000L/Cycle	Approx. 5000L/Cycle	
Criteria for treated water	Less than 1 μ S/cm			
Applicable raw water pressure	29.4~392kPa(0.3~4.0kg/cm ²)			
Ion exchange resin	Cartridge type 7L	Cartridge type 15L	Cartridge type 25L	
Flow rate in average	70~210L/h	150~450L/h	250~750L/h	
External dimensions	ϕ 152(220) × 540	ϕ 152(220) × 969	ϕ 203(270) × 969	
Power source	Battery 006P × 2 pcs.			
Resin reproduction	Style	Cartridge replacement at cylinder		
	Cat. No.	111970	111980	111990
Spare cartridge	Style	ERN-7K	ERN-15K	ERN-25K
	Cat. No.	111940	111950	111960
Unused resin	Style	IE-7	IE-15	IE-25
	Cat. No.	112030	112040	112050

Optional items, consumables

Name of item	Model	Cat. No.	Main spec.	
Filter element	Pre-filter	TCW-5	112271	Percolation accuracy in 5 μ m 2 pcs.
	Active charcoal filter	TCC-1	112281	Approx. 200g 1 pcs.
	Membrane	TCR-045	112300	Percolation accuracy in 0.45 μ m 1 pcs.
	Filter	TCR-020	112290	Percolation accuracy in 0.2 μ m 1 pcs.
Filter housing	ERNF-1	112310	Material: Polypropylene	
	ERNF-2	112320	Applicable max. pressure 392kPa(4kg/cm ²)	
Filter fixture	Single-filter	ERNJ-1	112330	---
	Single-filter, installation type	ERNJ-10	187580	---
	Double-filter	ERNJ-2	112350	---
	Double-filter, installation type	ERNJ-20	187590	---
Water supply hose	---	182360	Simple attachment to a tap, 3m	

Water purifier

ERN-W



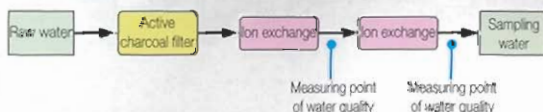
ERN-W

- ★ Obtains required quantity of water instantly after turning the faucet ON.
- ★ In the initial step, active charcoal filter removes residual chlorine, organic matter and etc. in the initial step, which affect to shorten the life span of ion exchange cartridge.
- ★ Both active charcoal filter (1pc) and ion exchange resin (2pcs) are cartridge style, which is easy to replace.

Model	ERN-W
Cat. No.	111840
Water sampling method	Active charcoal filter ~ ion exchange
Applicable purified water	Ion-exchanged water
Sample q'ty of ion-exchanged water	Approx. 1L/min.
Applicable raw water pressure	49~245kPa(0.5~3.0kg/cm ²)
Active charcoal filter	Diameter 69 × Length 250mm, Active charcoal 40~60mesh, Approx 200g
Ion exchange resin	Cartridge type, Mixed bed, Resin amount 1.8L × 2 pcs.
External dimensions	600 × 250(260) × 720
Power source	AC100V, 50/60Hz, 30VA

Optional items, consumables

Name of item	Model	Cat. No.	Main Spec.	
Filter element	Pre-filter	TCW-5	112271	Percolation accuracy in 5 μ m 2 pcs.
	Active charcoal filter	TCC-1	112281	Approx. 200g 1 pcs.
Ion exchange cartridge	IE-2	112370	Mixed bed, 1.8L 2 pcs.	
High purity ion exchange cartridge	IE-10	112400	Mixed bed, 1.8L, TOC-specified 1 pcs.	
Recycled ion exchange cartridge	IES-20	112410	1.8L 2 pcs.	
Water supply hose	---	182360	Simple attachment to a tap, 3m	



Solvent recycler

SR-2100



★ A device used for recycling solvents such as liquid chromatography and upgrading purity of samples. Reproduces used solvent to reduce environment load and generate economic effect, which means the contribution to resource usage.

★ Fills up glass Rasching Ring as a standard column to raise fractionation efficiency.

★ Simple structure for easy disassembly and cleaning.

Model	SR-2000
Cat. No.	200120
Separative range	5 steps (against 0.5m)
Controllable heating range	Room temp. +5~250°C (with overheat prevention)
Sample temp./vapour temp.	200°C Max., Room temp. +5~200°C
Operative pressure	Atmospheric pressure
Sample flask capacity, Stirring	5L (1~3L options), Magnetic stirrer
Vapour column	ID 30 × 500mm, Vacuum jacket type
Filling	Glass Rasching Ring
Distribution area of recycled liquid	Magnetic valve, ON-OFF time control
Heating device	Mantle heater, 600W
External dimensions	670 × 440 × 1720
Power source	AC100V, 50/60Hz, 600VA

Applications

- Collection and recycle of used solvent/solution once applied to liquid chromatography.
- Improving refinement mode for marketed solvents/solutions.
- Recycle of solvents/solutions once used for extraction.
- Collection and recycle of solvents/solutions once used for cleaning equipment.
- Recycle of organic solvent once used at a pathology laboratory.

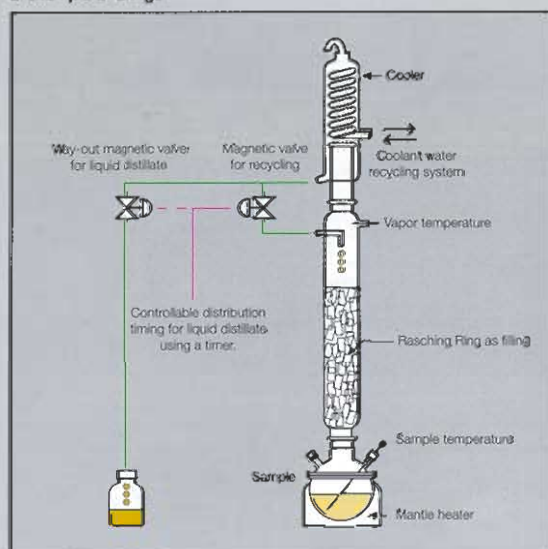
Optional devices

Coolant water recycler
CA-1112 (Refer to page 69)
code No. 203970
CA-1110 (Refer to page 68)
code No. 203980

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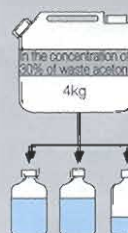
Example of usage



Working principles

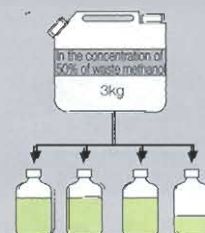
Concentrate solution: Water type/Aceton
30wt% of Aceton's concentration in 4kg is distilled.

Outcome: Aceton's concentration in a flask is distilled until concentrated in to 3wt%, and then almost 100wt% of Aceton in 1100g is collected from the top of this solvent recycler.



Concentrate solution: Water type/Methanol
50wt% of Methanol's concentration in 3kg is distilled.

Outcome: Methanol's concentration in a flask is distilled until concentrated in to 3wt%, and then 98wt% of methanol in approximately 1300g is collected from the top of this solvent recycler.



Cleaning solvent recycling unit

KFE-3100, KFE-3050A



KFE-3100

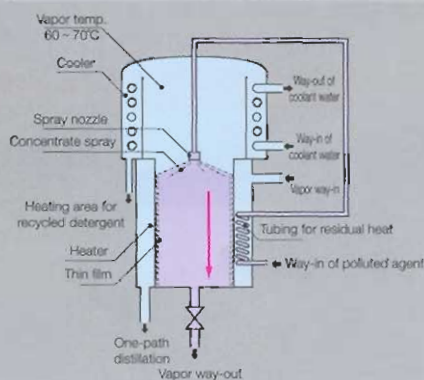
This is a device for collecting and recycling used detergents extracted from distilling and separating oil and pollution from hydrocarbon-contained cleaning agent once applied in a cleaning unit.

Combined to a body of cleaning system, high quality of cleaning performance is sustainable.

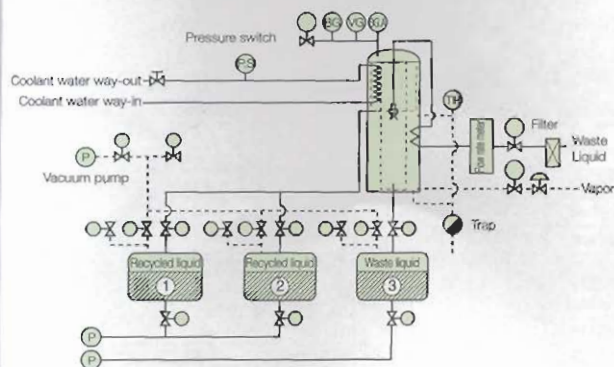
- ★ Distills, reproduces and recycles cleaning fluid without any change in quality through thin film distillation method.
- ★ By performing vacuum pressure distillation method, which combines distillation part and concentration part, this unit is able to collect solvent while preventing from being heat denaturation.
- ★ Maintains appropriate concentration of contamination of rinse bath in combination with cleansing unit.

Model	KFE-3100	KFE-3050A
Cat. No.	170520	178850
The Fire Defense Law-specified	Applicable flammable/burnable substances/liquids specified in the Fire Defense Law	
Performance	100L/h	50L/h
Distiller/Condenser	Falling film evaporator/SUS 304, Highly efficient coil thermal exchanger	
Detergent receptor	30L × 2pcs.(SUS 304)	30L × 1 pcs.(SUS 304)
Waste liquid receptor	30L × 1pcs.(SUS 304)	17L × 1pcs.(SUS 304)
Control platform	Air purging-applied graphic display	
Vacuum pump	Oil-applied rotary vacuum pump safety type, 300L/min.	
External dimensions	700 × 1290 × 2100	

Thin film one-path distillation to prevent from thermal alteration

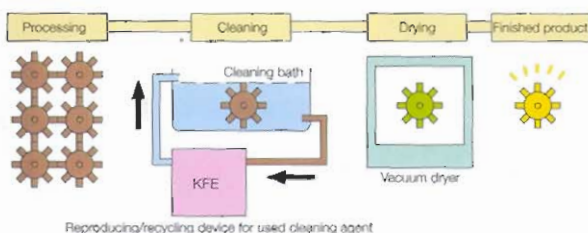


Flow chart for KFE-3100



Cleaning process

Sample parts on one client's site
 Precise parts: Clock/watch-applied part, lens, bearing
 Electronic parts: PCB, lead frame, end terminal
 Electric parts: Magnetic head, press part
 Machinery parts: Motor, thermally treated part, hydraulic machine-applied part.



Nitrogen digestion unit Nitro Ace

KR-1000

Nitro Ace nitrogen digestion system



Capable of performing high throughput (high efficiency) by replacing the conventional Kjeldahl method-specified titer to the colorimetric determination one's after analyzing a sample with a high speed heat shaking device.

- ★ Measures the ingredients of 25 samples at the same time, Capable of measuring 100 samples/day.
- ★ Shortens the measuring time by performing colorimetric determination method and skipping some process of distillation.
- ★ Since the unit performs high-sensitivity colorimetric determination method, amount of sample is minute amount ranging from 10 to 20mg. while.
- ★ Resolved person-by-person measurement error.
- ★ Compact-designed device to fit even a small area for its installation.



KR-1000

Decomposition-applied lower temperature to 200°C and minute amounts of sample enables drastic reduction of gas generation and desktop operability.

Nitro Ace nitrogen digestion system System Code SYS10500



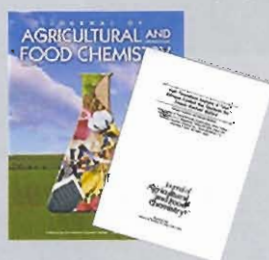
Name of product	Model	Cat. No.
Nitrogen digestion unit	KR-1000	191960
Coolant water recycler	CCA-1110	203980
Micro plate reader	NJ-2300	195470
A pair set of refrigerated hose	Internal diameter 9mm * 2m	112700

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Model	KR-1000
Cat. No.	191960
No. of applicable test tubes	25
Applicable qty of analytical chemical	0.5~3mL
Stirring method	Vortex mixing
Controllable temp. range	Room temp. +10~200°C
Temp. distribution accuracy	Within 4°C when setting up 200°C
Rotary speed range	600 1000rpm
Recycling method	Cooling with coolant water or low temp. heat medium
Applicable chemical	With pipet or septum
Applicable sizes of test tube	Outer diameter 16 * Height 125
External dimensions	298 * 424 * 344
Power source	AC100V, 50/60Hz, 350VA

We accept your request for analysis.



The Nitro Ace method, which is for the quantitative determination of nitrogen, is also certified by American Chemical Society.

We accept your request for analysis.

■ For detailed information and your request for analysis:

For the Nitro Ace method, its detailed information/data can be provided upon your requests. Besides, your requests of analysis using this new method are also acceptable. Please feel free to contact us.

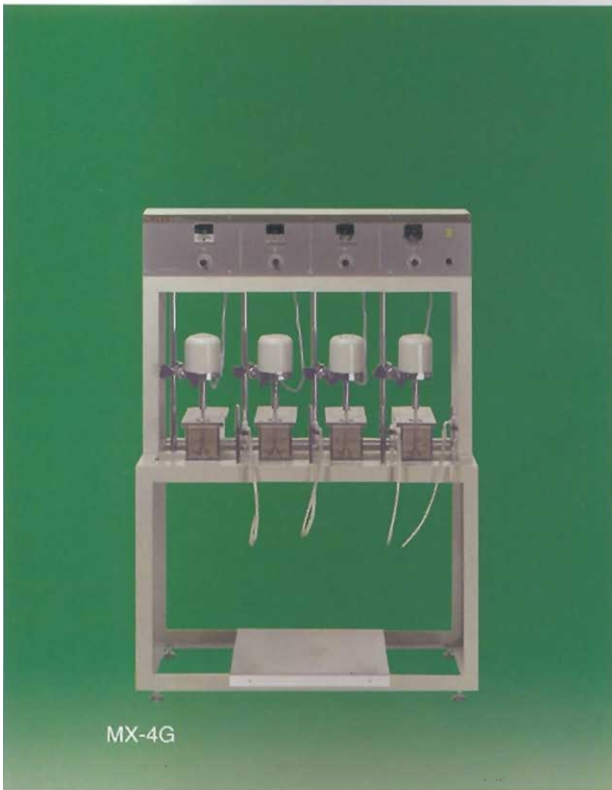
■ Data

With marketed soy flour	1	2	3	4	5	Average in %	
Nitro Ace method	35.1	35.5	34.9	35.8		35.5	
Kjeldahl method	36.4	35.3	35.3	35.7	35.7	35.5	
With marketed medium wheat flour	1	2	3	4	5	Average in %	
Nitro Ace method	9.0	9.0	9.0	9.0	9.1	9.0	
Kjeldahl method	8.8	9.0	9.1	9.0	9.1	9.0	
1548a(3.03% of nitrogen contained)	1	2	3	4	5	6	Average in %
Nitro Ace method	3.04	2.98	3.04	3.04	2.93	3.04	3.02

1548a is a standard substance designated by National Institute of Standards and Technology of the U.S. for the purpose of analysis of food ingredients.

Mixer settler

MX-4G



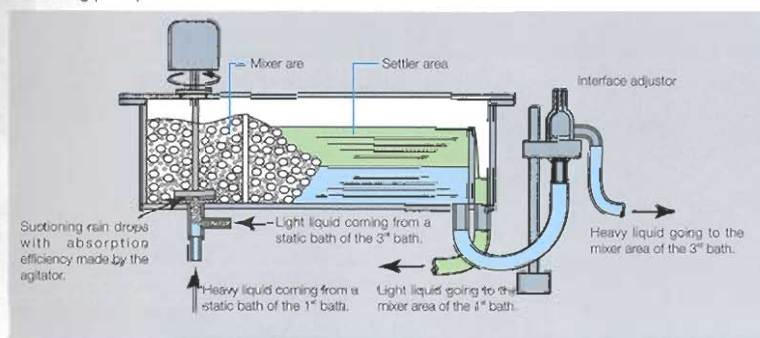
MX-4G

This unique extractor displays its greatest force for the following cases, which are performed with solvent extraction method.

- Collecting waste acid mixture from the industrial-waste disposal business, and collecting jewelries and metals.
- Handling a large amount of extracted samples from analysis on dioxin and its lineage chemicals.
- Extracting thermal-sensitive substances in the fields of pharmaceuticals, biotechnology, and biochemistry.

Model	MX-4G
Cat. No.	184930
Extraction method	By rotary agitator-applied stirring method
Step efficiency/Bath	80-90%
All 4 baths	Separating funnel, shake-out efficiency between 3.2 and 3.6 times
Shaft	SUS 304-defined core axis, Teflon mold-applied external
Agitator	Teflon-made circular disc
Mixer area	69 × 68 × 60 × 4, hard glass
Setter area	131 × 68 × 60 × 4, hard glass
Plunger pump	Ceramic pump
External dimensions	850 × 400 × 1160
Power source	AC100V, 50/60Hz, 200VA

■ Working principles in the 2nd bath



Reciprocating extractor

KF-30, KF-50



KF-50

When applying the solvent extraction method, this device demonstrates its full power to the following tasks with its multi-step extraction functions.

- Extracting solvents from easy-to-emulsified liquids/chemicals, and also from metals and jewelries.
- Extracting active ingredients from herbal medicine.
- Extracting active ingredients from biotechnology products.
- Purifying and collecting metals, and collecting organic and inorganic acids.

Model	KF-30	KF-50
Cat. No.	184969	184970
Extraction method	Vertical amplitude motion with a perforated plate	
Height equivalent to theoretical plate	12.5cm/step	30cm/step
Column	6 steps (750mm)	3.3 step (Length 1000mm)
Upper and lower motion limits	5-50mm	5-50mm
Static area for light liquid	ID 50 × L 300mm	ID 75 × L 300mm
Extraction column	ID 25 × L 750mm	ID 50 × L 1000mm
Static area for heavy liquid	ID 50 × L 300mm	ID 75 × L 300mm
Plunger pump	6-23mL/min.	10-50mL/min. × 2 units
External dimensions	580 × 450 × 2000	700 × 700 × 2580
Power source	AC100V, 50/60Hz, 200VA	AC100V, 50/60Hz, 250VA



Ultrasonic cleaner

MUS, W, AU



Operation platforms



MUS



AU



W

For MUS models:

In-bath dimensions	Model	Cat. No.
185 × 105 × 75	MUS-6D	185370
298 × 148 × 150	MUS-10D	185380
298 × 238 × 200	MUS-20D	185390
498 × 298 × 200	MUS-40D	185400
515 × 405 × 300	MUS-60D	185410

For W models:

In-bath dimensions	Model	Cat. No.
∅99 × 52	W-103T	172210
240 × 140 × 100	W-113	168190
240 × 140 × 150	W-211H	168200
298 × 149 × 150	W-212H	168210
298 × 149 × 150	W-221H	168220
298 × 238 × 150	W-222H	168230
298 × 238 × 150	W-231H	168240
500 × 298 × 200	W-232H	168250

For AU models:

In-bath dimensions	Model	Cat. No.
152 × 140 × 65	AU-10C	134290
220 × 150 × 120	AU-30C	134300
297 × 149 × 150	AU-50C	197660
300 × 180 × 160	AU-70C	161690
300 × 180 × 165	AU-70CO	161700
297 × 236 × 150	AU-80C	197670
380 × 180 × 160	AU-90C	161710
501 × 298 × 150	AU-180C	197680
501 × 298 × 200	AU-260C	197690
450 × 310 × 300	AU-301C	172220
500 × 400 × 300	AU-501CO	182170
700 × 400 × 300	AU-710CO	197700

For Ultrasonic pipet cleaners:

In-bath dimensions	Model	Cat. No.
∅155 × 605	AU-100CR	134340
∅155 × 605	AU-105CR	180330
∅180 × 660	AU-150CR	161720
∅180 × 660	AU-155CR	180340
∅180 × 697	MUS-337	172240



LED light source Panel LED, Stick LED



Since LED is different from fluorescent lamps and does not contain any heat ray, it is able to perform contact irradiation against samples. Hence, it is capable of giving effective light intensity on plant and increasing photosynthetically active light photon flux density.

- ★ Controllable brightness level in a simple color light with a narrow range of emitted spectrum.
- ★ No harmful UV energy contained.
- ★ No leaf scorch even with close-up irradiation.
- ★ Long-life, and no drastic degradation in illumination unlike that of fluorescent lamps.

■ Panel LED

Name of product	Panel LED		Mini panel LED		
	Model	LED-R	LED-B	LED-mR	LED-mB
Cat. No.	181290	181760	181300	181770	
Light source color of LED/Peak pulse	Red/660nm	Blue/470nm	Red/660nm	Blue/470nm	
Light source color of LED (Half-range)	20nm	30nm	20nm	30nm	
Typical value in LED chip brightness	1500mcd	2000mcd	1500mcd	2000mcd	
Photosynthetic effective light quantum energy flux density(under light source in 100mm)	100 μ mol/m ² /s	130 μ mol/m ² /s	100 μ mol/m ² /s	110 μ mol/m ² /s	
No. of sticks/No. of LED chips	25/800		23/368		
Panel dimensions	350 × 400 × 52		314 × 258 × 60		
Rated power source	DC18V, 2A	DC18V, 4A	DC18V, 0.9A	DC18V, 1.8A	

■ Stick LED

Model	STICK-R(-mR)	STICK-B16	STICK-B32(-mB)	STICK-FR(-mFR)
Cat. No.	181360(181400)	181370	181380(181410)	181390(181420)
Light source color of LED/Peak pulse	Red/660nm	Blue/470nm		Near-infrared/740nm
Light source color of LED (Half-range)	20nm	30nm		25nm
Typical value in LED chip brightness	1500mcd	2000mcd		—
No. of applied LED chips per stick	32(16)	16	32(16)	32(16)

※ Descriptions in () are applicable for mini panel LED sticks.

■ Optional DC power source devices:

The followings are converters from AC to DC for LED brightness control.

PR18-5AYF with 5 A max. code No. 181430

PR18-3AYF with 3 A max. code No. 181440

- ★ With using efficient wavelength characteristic of LED, various cultivation experiments, which can not be conducted with using fluorescent lamp, become possible.
- ★ Maximum 4 panel LEDs are available. They can be set either horizontal or vertical direction.
- ★ Lays out your desired unlimited illuminant color by changing stick LED.

Model	LED-MPS
Cat. No.	181350
Type and No. of panel LED	LED-R (Red, 660nm), 1 pc.
No. of steps	1 (Movable)
External dimensions	905 × 555 × 1250

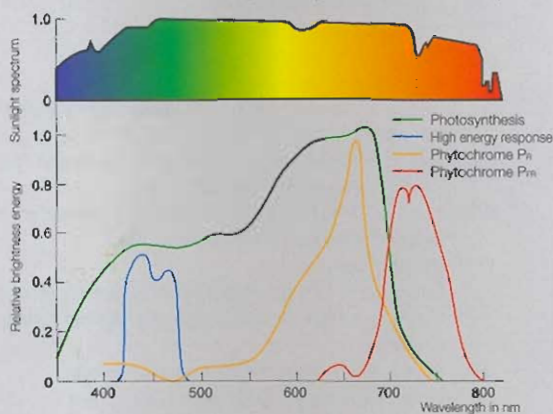


Please read "Instruction Manual" carefully before using the product for your continued safety. 1

Panel LED

Stick LED

■ Plant-required light spectrum for 20 kinds of crop's growth in a chamber
(Referring to a portion from K. J. McCree-released abstract in the name of 'Photosynthetically Active Radiation' in 1972)



Culture shelf with LED

LED-MPS

LED-MPS



Company Profile

1. Company name Tokyo Rikakikai Co., Ltd.
2. Head Office 3-3-4 Hon-cho Nihonbashi, Chuo-ku, Tokyo.
103-0023, Japan
Tel: 81/3-5201-6421
Fax: 81/3-3241-0177
3. Establishment July 12, 1955
4. Capital 383 million and 2 hundred thousand Yen
116 million and 8 hundred thousand Yen
(Tokyo Rikakikai Co., Ltd, Miyagi)
5. President Hidekata Chino
Inspector Mitsuo Iwagami
6. Products
 1. Bio technology and life science appliances
Genetical and Proteinic Engineering instruments.
Bioengineering instruments, Pharmaceutical and electronic controlling instruments.
 2. Analyzer and controller
Chromatograph, Photo analyzing apparatus, Environmental analyzing apparatus, Food analyzing apparatus
 3. Instruments for New materials and Electronics
 4. Instruments for environment
 5. General scientific instruments
Temperature regulation path and circulator, Oven, Freeze dryer, Electric furnace, Low temperature regulation bath and circulator, Vacuum pump, Sterilizer, Synthesizer, Reactor, Peactor, Peristaltic pump, Water purifier, Evaporator, Water distiller, Extractor, Stirrer, Shaker, Growth chamber, Laboratory furniture, etc.
7. Membership of Association

Japan Federation of Scientific Instrument Association
Hokkaido Scientific Instruments Association
Tohoku Scientific Instruments Association
Tokyo Scientific Instruments Association
Tokai Scientific Instruments Association
Kyoto Scientific Instruments Association
Osaka Scientific Instruments Association
Ohu-Shikoku Scientific Instruments Association
Kyushu Scientific Instruments Association
Japan External Trade Organization
Japan Analytical Instruments Manufacturers Association
Japan Pharmaceutical Equipment & Machinery Association
The Japan Society of Analytical Chemistry
The Society for Bioscience and Bioengineering, Japan
The Pharmaceutical Society of Japan
The Chemical Society of Japan
Japan Society of Bioscience, Bioengineering, and Agrochemistry
The Japanese Bioscience Society
The Society of Synthetic Organic Chemistry, Japan
Robotic Synthetic Organic Chemistry, Japan
Robotic Synthesis Research Group,
Division of Synthetic Chemistry, Kinki Chemical Society
Japan Combinatorial Chemistry Focus Group
8. Head Office 3-3-4 Honcho Nihonbashi, Chuo-ku Tokyo 103-0023, Japan
Tel: 81/3-5201-6421
Sapporo, Sendai, Tsukuba, Nasu, Saitama, Chiba, Nishi-Tokyo, Yokonama, Kanagawa, Shizuoka, Nagoya, Kyoto, Osaka, Kobe, Hiroshima, Fukuoka
- Saitama Workshop 223 Obari, Ina-machi, Kitaadachi-gun, Saitama 362-0803, Japan
Tel: 81/48-721-2277
- Miyagi Factory 48-21 Obogi, Motoyoshi-cho, Motoyoshi-gun, Miyagi 988-0267, Japan
Tel: 81/226-44-2131
- Proteomics Research Institute 1-16-1 Amakubo, Tsukuba-shi, Ibaraki
Tel: 81/29-851-1601
9. History
 - 1955 Tokyo Rikakikai Co., Ltd. was established.
 - 1962 Release PTFE Vacuum Seal.
 - 1985 Release Rotary Vacuum Evaporator Model N-1.
 - 1967 Shiki workshop and Osaka branch office opened.
 - 1970 Saitama workshop and Research & Development Laboratory opened.
 - 1973 Release Mini Fermentor.
 - 1975 Hiroshima branch office opened.
 - 1976 Training center and Engineering section in Saitama workshop opened.
 - 1977 Fukuoka, Nagoya and Saitama branch office opened. Tsukuba, Shizuoka branch office opened.
 - 1979 Exhibition at Japan-U.S. Joint Chemical Conference in Hawaii.
Exhibition atACHEMA in Frankfurt, Germany (1979)
 - 1980 Engineering Institute Opened. Kanagawa branch office opened.
Exhibition at Pittsburgh conference (1980-1988).
 - 1981 Sapporo branch office opened.
 - 1982 Delivery center opened at Ina-machi, Saitama.
 - 1983 Release personal HPLC.
 - 1984 Miyagi Factory opened at Motoyoshi-cho, Miyagi. Kyoto branch office opened.
 - 1985 Sendai branch office opened.
 - 1986 Chiba branch office opened.
 - 1987 Kawasaki branch office opened.
 - 1989 Bio research institute opened.
 - 1990 Miyagi factory expanded.
Sharing a capital of Institute of Functional Peptide.
 - 1991 Yokohama, Kobe branch office opened.
 - 1992 Nasu Office opened (Nasu distribution center and Plant Research Laboratory opened).
 - 1993 Awarded 'TAKUGIN Frontier Fund' by development of Detergent Solvent Recycling Apparatus.
 - 1994 ISO9001 Certified
 - 1995 Established the PL committee for safety use of products.
 - 1996 Started the information service of products through Internet.
 - 1997 Internal training for validation support finished.
 - 1998 Tokyo Rikakikai Co., Ltd. merged Tokyo Rika Co., Ltd.
 - 1999 Distribution center opened in Miyagi Factory. Nasu branch office opened.
 - 2000 Proteomics Research Institute opened in Tsukuba. Nishi-Tokyo branch office opened
 - 2001 The initial instrument was manufacture in the Proteomics research institute as a commission development. Beijing liaison office opened. The capital was expanded to 383 million and 2 hundred thousand Yen.
 - 2002 Shanghai factory opened.
 - 2003 Sales company opened at Shanghai China.
 - 2004 Singapore representative office opened.

Every member of Tokyo Rikakikai Co. Ltd. endeavors to supply the products according to our quality policy 'Devoting our whole energies to the quality, we provide the stable quality on which customers relies and satisfies greatly.' EYELA is the registered trademark of Tokyo Rikakikai Co., Ltd. which is a coined word from "EYE" and "LA" from laboratory and signifies our commitment to the future of science.

TOKYO RIKAKIKAI CO., LTD.

Nihonbashi Hon-cho Bldg.,
3-3-4, Hon-cho Nihonbashi, Chuo-ku.
Tokyo. 103-0023 Japan

※Exterior and specification of the products are subject to change without notice due to continual improvements.

※Please note that actual products may differ slightly in coloration from the pictures shown on this catalogue.