

EYELA

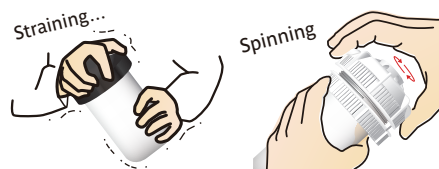
Versatile and flexible Freeze Dryer

For production of chemicals, pretreatment of sample, preservation and drying of food and living cells

Model FDM-1000, Model FDM-2000
Model FDL-1000, Model FDL-2000



Renewed genuine freeze drying bottle set (bottle and cap) are autoclavable and easy to handle



The previous cap was made of rubber. heavy, rigid, hard to open...

▶ The cap is now a screw-on type. Easy to open and close!

TOKYO RIKAKIKAI CO., LTD.

Model selection guide

Model FDM and Model FDL are unit-type freeze dryers.

Step 1: Select a model of the freeze dryer based on the dehumidification volume and cold trap temperature.

Step 2: Select a manifold or dry chamber from the options according to the type of vessels to be used.

Step 3: Finally, select a vacuum pump, hoses, and other piping.

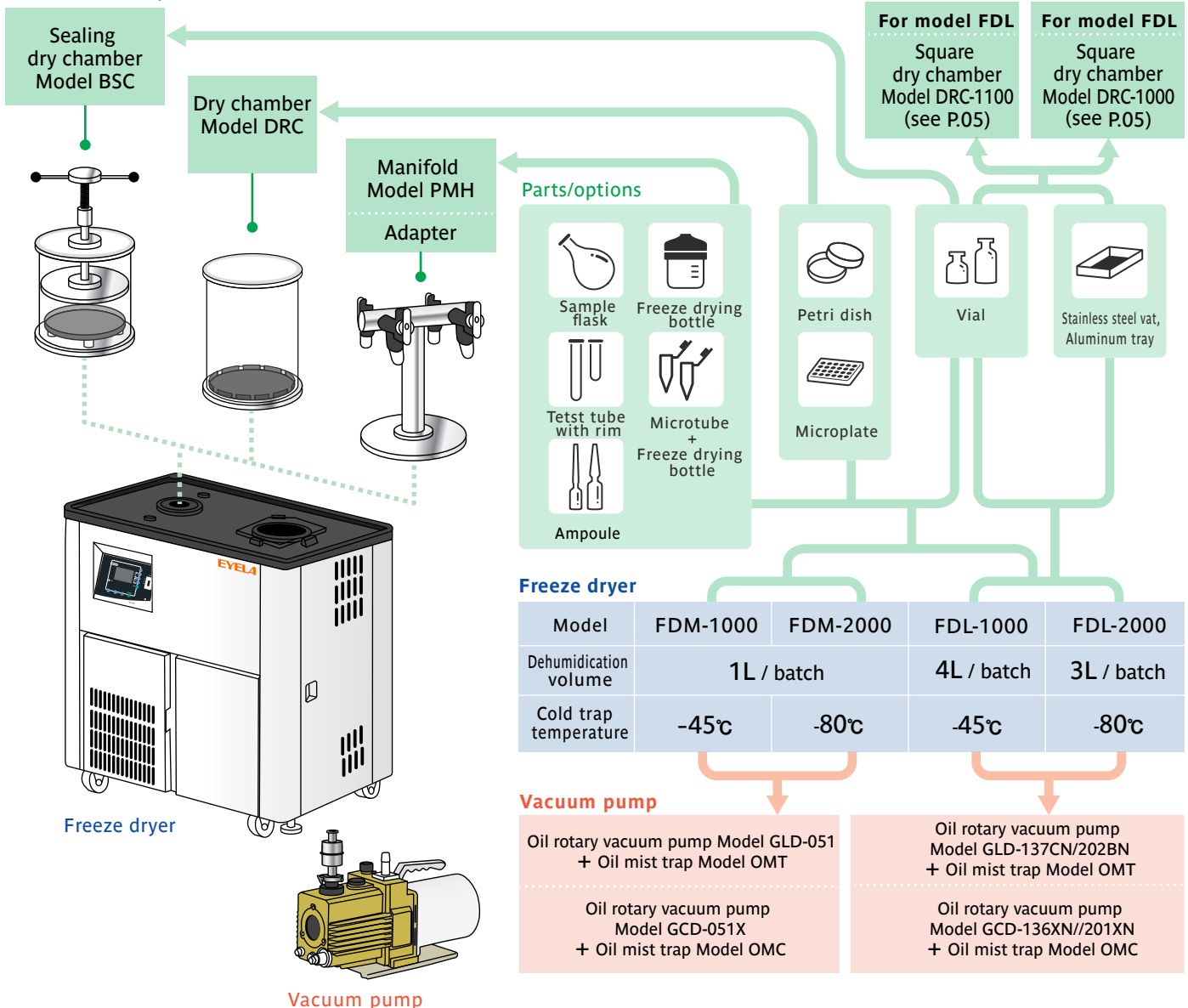


Model FDM and Model FDL can be combined with optional manifolds and dry chambers to configure a variety of freeze drying systems according to your needs.

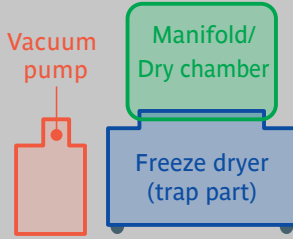


- Freeze drying can be performed in a variety of vessels, including freeze drying bottles, flasks, test tubes, ampoules, vials, petri dishes, microtubes, and microplates.
- Trap temperature, vacuum level, etc. are easily visible and operating status can be observed on 3.4-inch LCD display at a glance.
- The material of the vacuum piping inside the equipment has been changed. Compared to the conventional material, "ozone resistance," "climate resistance," and "oil resistance" have been improved, allowing the equipment to be used with peace of mind for a long time.

Manifold and dry chamber



Example of system configuration




Vacuum pump

Manifold/ Dry chamber

Freeze dryer (trap part)

A freeze dryer system consists of three parts as described below. You can select your desired configuration according to your needs.

- Freeze dryer (trap part)
- Minifold/dry chamber +parts/options (vessel/adapter)
- Vacuum pump



See video on freeze dryer

Lab tabletop system
System code: SYS10038

Dehumidication volume


1L/batch

Cold trap temperature

-45℃

A system can be used on lab tabletop

Manifold can be changed to Model PMH-4AB



Product name	Model	Cat.No.
Freeze dryer	FDM-1000	280898
Manifold for flask	PMH-4A	209560
Flask (pear shaped) Φ 29	1000mLx4 pcs	116190
Fixing clamp for Manifold	---	209580
Oil rotary vacuum pump ^{*1}	GCD-051X	190858
Oil mist trap	OMC-050	118680
Vacuum hose 5m	ID15xOD36mm	217910

^{*1} The picture shown is GCD-051XF.

Small-volume, low-temperature system
System code: SYS10039

Dehumidication volume


1L/batch

Cold trap temperature

-80℃

A system capable of freezing a large number of test tubes at once

Manifold can be changed to Model PMH-12B



Product name	Model	Cat. No.
Freeze dryer	FDM-2000	290900
Manifold for test tubes/ampoule	PMH-12	119840
Test tube adapter (for Valve B/C)	x12 pcs	120510
Test tubes w/ rim (50 pcs)	OD18x180Hmm	144110
Acryl base	---	213810
Oil rotary vacuum pump ^{*1}	GCD-051X	190850
Oil mist trap	OMC-050	118680
Vacuum hose 5m	ID15xOD36mm	217910

^{*1} The picture shown is GCD-051XF.

Freeze drying full system A
System code: SYS10040

Dehumidication volume

3L/batch

Cold trap temperature

-80℃

A full system from pre-freezing to freeze drying

Manifold can be changed to Model PMH-8B



Product name	Model	Cat. No.
Freeze dryer	FDL-2000	280928
Manifold for flask	PMH-8	119830
Flask (pear shaped) Φ 29	1000mLx8 pcs	116190
Oil rotary vacuum pump	GCD-136XN	189160
Oil mist trap	OMC-200	118690
Pre-freezing bath	PFR-1000	197418
Pre-freezer	PFM-1000	197420
Trap monitor	---	197480

Square dry chamber system
System code: SYS10041

Dehumidication volume

3L/batch

Cold trap temperature

-80℃

A system that allows simultaneous use of drying chamber and manifold

Manifold can be changed to Model PMH-8B



Product name	Model	Cat. No.
Freeze dryer	FDL-2000	280928
Manifold for flask	PMH-8	119830
Flask (pear shaped) Φ 29	1000mLx8 pcs	116190
Oil rotary vacuum pump	GCD-136XN	189160
Oil mist trap	OMC-200	118690
Square sealing dry chamber	DRC-1100	197460
Connection pipe B (shut-off valve)	---	203930

[※]Please prepare secondary refrigerant (ethanol and Nybrine[®] or ethylene glycol) for shelf circulation separately.

Combination guide

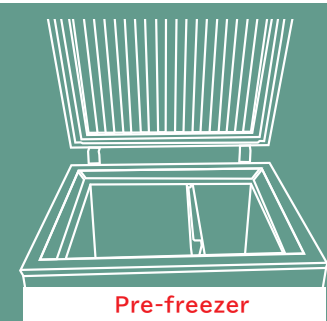
Shatterproof glass **EYELA COAT**[®] vessels are also available.

Vessels and optional products

Pre-freezing bath Model PFR-1000
 Pre-freezing temperature: -45°C,
 Power supply/input: 220VAC 50Hz 4.6A
 Cat. No. 197418

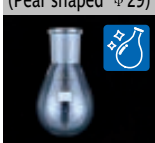
Pre-freezer (sample vessel rotation device) Model PFM-1000
 Applicable vessels: Sample flasks (¥ 29/38), freeze drying bottles
 Cat. No. 197420
 ※A special attachment is required when using the freeze drying bottle set.

① For 600, 900, 1200mL Cat. No. 282170
 For 150, 300 mL Cat. No. 282160
 ② For 40, 80mL Cat. No. 282150




Pre-freezer


Sample flasks
(Pear shaped ¥ 29)




Freeze drying bottle (set)
40/80mL




Freeze drying bottle (set)
150 to 1200mL




Test tubes with rim



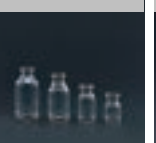
Ampoules
(OD 8mm)



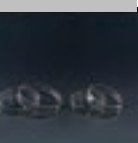
Microtubes
1.5mL



Vials



Petri dishes



Please refer to the genuine parts on page 6-7 for details.

Adapter D for freeze drying bottle
Standard ¥ 40/32
Cat. No. 281700

Adapter C for freeze drying bottle
Standard ¥ 40/32
Cat. No. 281690

Adapter C for flask
Standard ¥ 29
Cat. No. 191120

Test tube adapter
Cat. No. 120500

Sealing
Cat. No. 276830

Rubber material: silicone

Test tube adapter
Cat. No. 276820

Rubber material: silicone


Ampoule adapter (for OD 8mm)
Cat. No. 120520

Microtube holder

Standard	Cat. No.
1.5mLx12	191110
1.5mLx24	191150

※In case of using microtubes with integrated caps, 12-holder can hold up to 6 and 24-holder can hold 12 microtubes.


A Manifold (valve size ¥ 29/38)



Model	Number of ports	Applicable models	Cat. No.
PMH-4A	4	FDM/ FDL	209560
PMH-4AB			276060
PMH-4	119820		
PMH-4B	276050		
PMH-8	8		119830
PMH-8B		276070	
PMH-1000	9	FDL	197440
PMH-1000B			276100

※Model B type valves are autoclavable.
 ※For FDM-1000 and FDM-2000, purchase the optional clamp/ acrylic base support for fixing manifold together.


B Test tube/ampoule manifold



Model	Number of ports	Cat. No.
PMH-12	12	119840
PMH-12B		276080
PMH-24	24	119860
PMH-24B		276090

※Model B type valves are autoclavable.
 ※For FDM-1000 and FDM-2000, purchase the optional clamp/ acrylic base support for fixing manifold together.


C Sealing drying chamber



Model	BSC-2L	BSC-3L
Cat. No.	119790	119810
Shelf size(mm)	φ 220	φ 220
Number of shelves	1	2
Number of 10mL vials	58pcs×1	58pcs×2
Number of φ66 Petri dish	7pcs×1	7pcs×2
Control temp. range	Fixed at 30°C	Fixed at 30°C

※The sealing is possible only in the upper shelf of model 3L.

D Drying chamber



Model	DRC-1N	DRC-2L	DRC-3L
Cat. No.	119730	119750	119770
Shelf size(mm)	200W×230D	φ 220	φ 220
Number of shelves	2	1	3
Number of 10mL vials	72pcs×2	58pcs×1	58pcs×3
Number of φ66 Petri dish	8pcs×2	7pcs×1	7pcs×3
Control temp. range	RT+5 to 35°C	Fixed at 30°C	Fixed at 30°C

Freeze dryers



FDM-1000 FDM-2000 FDL-1000 / 2000

Drying chamber	Vacuum pump	Recorder
Square drying chamber Model DRC	Oil rotary vacuum pump	See the options on the last page

In case of using your vacuum pump with Model FDL-1000 or FDL-2000, please consult with us as it may not fit inside the product.

Related products



For Model FDL-1000 / 2000 Square drying chamber

Model DRC-1000 / 1000REC / 1100 / 1100REC

Automatic control of pre-freezing, primary drying, and secondary drying is possible in connection with model FDL. Shelves are cooled and heated by liquid circulation. Chamber capacity is 30L, shelf size is 24x24cm x 3 shelves, and drying processing of 10mL vial x270 pcs, 20mL vial x168 pcs, and 30mL vial x147 pcs is possible at a time. Model DRC-1100 and Model DRC-1100REC can seal 3 shelves at the same time.

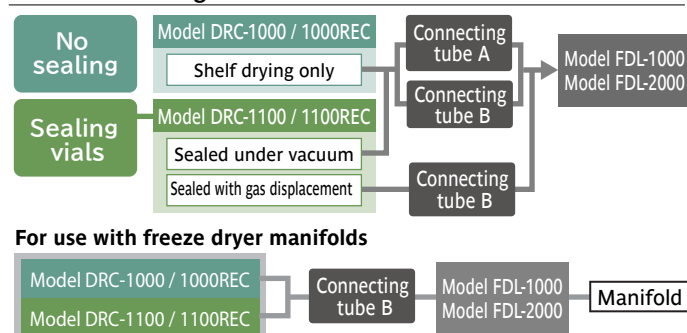
Model	DRC-1000	DRC-1000REC	DRC-1100	DRC-1100REC
Cat. No.	197450	204820	197460	204830
Pre-freezing temp.	-40°C (-35 to -30°C : sample temp.)			
Shelf temp. control range	-40 to 30°C (Shelf circulating fluid temp.)			
Shelf temp. control method	Secondary refrigerant circulation system			
Sealing	—		Manual handle system	
External output	—	Temp. sensor terminal	—	Temp. sensor terminal
Inner dimensions (mm), capacity	300W×300D×350H / approx. 30L			
Effective shelf size (mm)	240W×240D×3, Shelf-to-Shelf 80H		240W×240D×3, Shelf-to-Shelf 75H	
External dimensions (mm)	420W×550D×1300H		420W×550D×1465H	
Power input and supply voltage	13A 1.3kVA 100VAC 50/60Hz			

※Specifications are room temperature 20°C, rated power supply voltage, 50Hz, and no load. ※Shelf temperature is the temperature of secondary refrigerant circulating inside the shelf. -40°C is the specification at room temperature of 25°C or lower. ※Optional drying chambers (DRC-1N, 2L, 3L, BSC-2L, 3L) and square drying chamber (Model DRC-1000/1100 series) cannot be used simultaneously. ※Model DRC-1000REC and Model 1100REC are equipped with temperature sensor output terminals (shelf temperature and sample temperature) Pt100Ω direct output. ※Please prepare secondary refrigerant (ethanol and Nybrine® or ethylene glycol) for shelf circulation separately.

Option

Connecting tube A	Cat. No. 203920
Connecting tube B (w/ valve)	Cat. No. 203930
Aluminum tray (3 pcs)	Cat. No. 203950
Stainless steel vat (1pc)	Cat. No. 221140

Model selection guide



Recommended pump



GCD-051X



GLD-137CN



GCD-136XN

Oil rotary vacuum pump Model GLD/GCD series

Applicable model	FDM-1000/2000		FDL-1000/2000 (can be installed in freeze dryer)		FDL-1000/2000	
Model	GLD-051	GCD-051X	GLD-137CN	GCD-136XN	GLD-202BN	GCD-201XN
Cat. No.	190848	190858	270580	189160	270600	189190
Functions	—	Pump head corrosion resistant treatment	—	Pump head corrosion resistant treatment	—	Pump head corrosion resistant treatment
Displacement (50/60Hz)	50/60L/min		135/162L/min		200/240L/min	
Ultimate vacuum	0.67Pa (approx. 5x10 ⁻³ Torr)		0.67Pa (approx. 5x10 ⁻³ Torr)		0.67Pa (approx. 5x10 ⁻³ Torr)	
Suction port diameter	OD18mm (hose mouth)		OD22mm (hose mouth)		OD22mm (hose mouth)	

Option

Oil mist trap	Applicable vacuum pump	Cat. No.
OMT-050A	GLD-051	118630
OMT-200A	GLD-137CN/202BN	118650
OMI-200	GLD-137CN/202BN	118670

Oil mist trap	Applicable vacuum pump	Cat. No.
OMC-050 (clamp included)	GCD-051X	118680
OMC-200 (clamp included)	GCD-136XN/201XN	118690

Genuine parts

Genuine EYELA free dryer parts for obtaining superior freeze drying samples. Shatterproof sample flasks and freeze drying bottles are also available. Please contact us for more information.

Flask manifold for Model FDM/FDL
Round manifold for flask for Model FDL

Flask manifold PMH-4A/4/8 PMH-4AB/4B/8B	Round manifold for flask PMH-1000 PMH-1000B
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PMH-4A	PMH-4AB	PMH-1000
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PMH-4A/4/8/1000 Standard valve	PMH-4AB/4B/8B/1000B Standard valve
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Valve D + Valve DB (autoclavable) + Flask adapter (¥ 29/38) ※standard accessory

1 2 3 Valve

	Product	QTY	Cat. No.
1	Valve D	1	209570
2	Valve DB	1	276110
3	Air filter	1	187450

4 5 6 7 8 9 Adapter

	Product	QTY	Cat. No.
4	Adapter for flask (¥ 29/38)	1	120470
5	Adapter for flask (¥ 24/40)	1	144500
6	Adapter for multi-connection	1	120490
7	Adapter D for freeze drying bottle (¥ 40/32)	1	281700
8	Adapter for test tube	1	120500
9	Sealing (Silicone)	1	276830

※Sample flasks (pear shaped) ¥29 with capacity of 50 to 300 mL can be mounted on the adaptor for multi-connections. Freeze drying bottles from 40 to 600 mL also can be attached.

10 Sample flask (pear shaped) (QTY 1 pc)

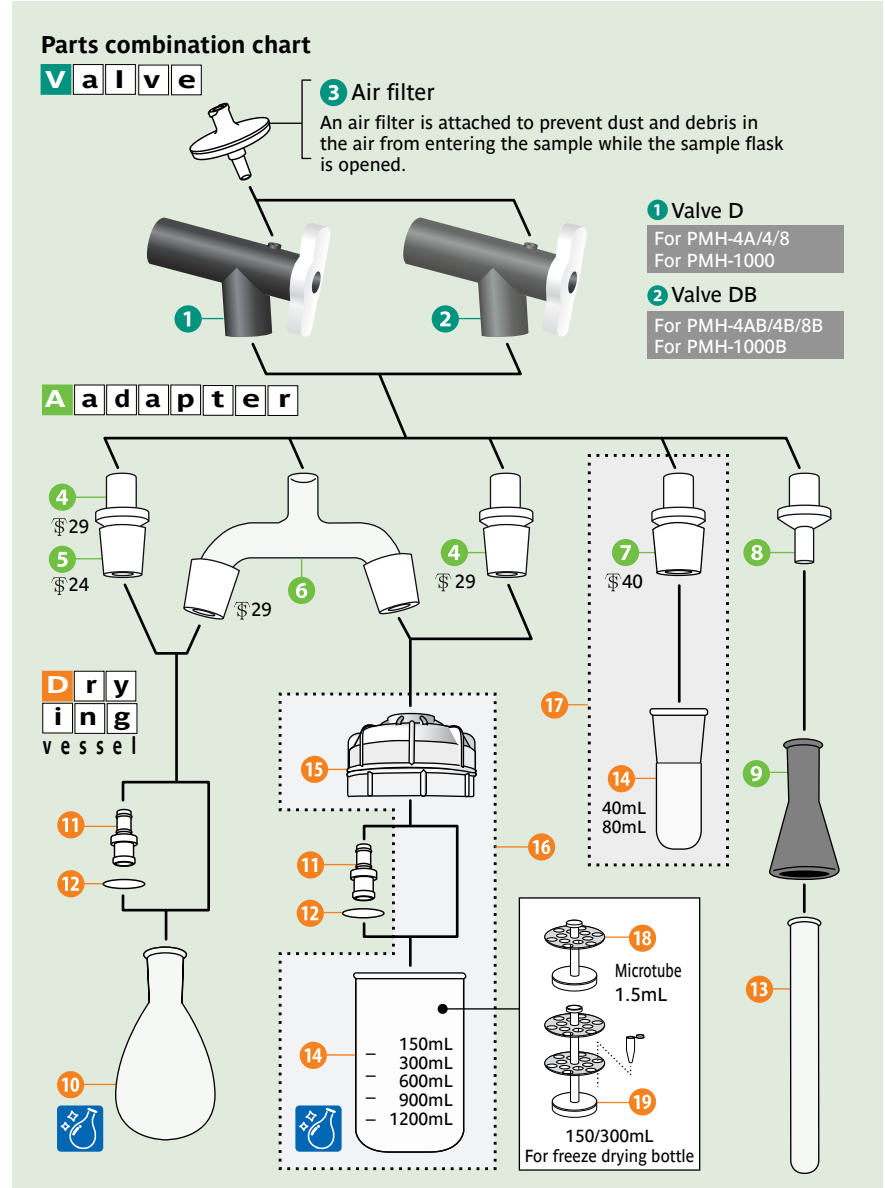
Taper joint	¥ 29/38	¥ 24/40
Standard	Cat. No.	Cat. No.
50mL	116140	116220
100mL	116150	116230
200mL	116160	116240
300mL	116170	116250
500mL	116180	116260
1000mL	116190	116270

11 12 Filter holder for pear shaped flask/filter

Product	Cat. No.
11 Filter holder for pear shaped flask	256160
12 Filters (100 pcs/box)	120110

14 Freeze drying bottle (QTY 1 pc)

Standard	Diameter	Cat. No.
40mL	43mm	281490
80mL	43mm	281500
150mL	71mm	281510
300mL	71mm	281520
600mL	102mm	281530
900mL	102mm	281540
1200mL	102mm	281550



13 Test tube with rim

OD x Length(mm)	Standard	QTY	Cat. No.
10×75	3mL	100	143970
12×75	4mL	100	143980
12×90	5mL	100	143990
12×105	6mL	100	144000
12×120	7mL	100	144010
13×75	5mL	100	144020
13×90	6mL	100	144030
13×100	7mL	100	144040
15×85	8mL	100	144050
15×105	10mL	100	144060
15×150	15mL	50	144070
16.5×105	12mL	100	144080
16.5×165	20mL	50	144090
18×165	24mL	50	144100
18×180	27mL	50	144110
21×200	42mL	50	144120

15 Cap for freeze drying bottle (QTY 1 pc)

Standard	Cat. No.
For 150 / 300mL	276880
For 600 / 900 / 1200mL	276870

16 Freeze drying bottle set (QTY 1 set)

Standard	Diameter	Cat. No.
150mL	¥ 29	276900
300mL		276910
600mL		276920
900mL		276930
1200mL		276940

※Set includes: freeze drying bottle, cap and O-ring

17 Freeze drying bottle set (QTY 1 set)

Standard	Diameter	Cat. No.
40mL	¥ 40/32	281710
80mL	¥ 40/32	281730

※Set consists of: freeze drying bottle and adapter D

18 19 Microtube holder

Standard	Freeze drying bottle	Cat. No.
18 1.5mL×12 pcs	For 150mL	191110
19 1.5mL×24 pcs	For 300mL	191150

※In case of using microtubes with integrated caps, 12-holder can hold up to 6 pcs and 24-holder can hold 12 pcs.



Shatterproof glass EYELA COAT®

Shatterproof flasks and freeze drying bottles are available. Highly transparent and environmentally friendly polyurethane resin is used. Heat resistance temperature is -80 to 120°C. Please inquire separately.



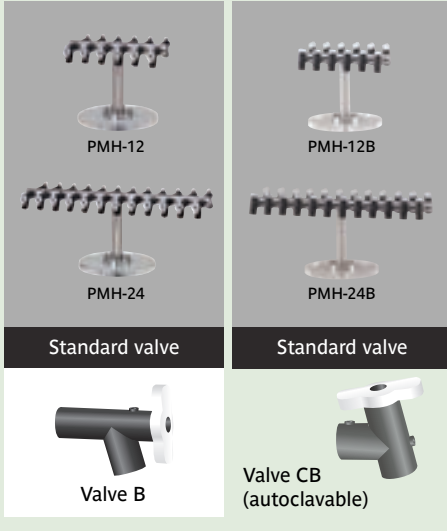
See video about special coating

Test tube/Ampoule manifold for all FDM / FDL models

Test tube / Ampoule manifold

PMH-12 / 24

PMH-12B / 24B



20 21 Valve

Product	QTY	Cat. No.
20 Valve B	1	119930
21 Valve CB	1	276120
3 Air filter	1	187450

22 23 24 25 26 Adapter (QTY 1 pc)

Product	Standard	Cat. No.
22 Adapter C	¥ 29	191120
23 for flask	¥ 24	216790
24 Adapter C for freeze drying bottle (¥ 40)		281690
25 Adapter for test tube	Chloroprene	120510
	Silicone	276820
26 Adapter for ampoule	For OD8mm	120520
	For OD6mm	120530

10 Sample flask (pear shaped) (QTY 1 pc)

Taper joint	¥ 29/38	¥ 24/40
Standard	Cat. No.	Cat. No.
50mL	116140	116220
100mL	116150	116230

32 12 Filter holder for pear shaped flask/filter

Product	Cat. No.
32 Filter holder for adapter C	276600
12 Filters (100 pcs/box)	120110

Sealing dry chamber Model BSC

Dry chamber Model DRC

Applicable: All FDM / FDL models

Sealing dry chamber
Model BSC-2L / 3L



BSC-2L

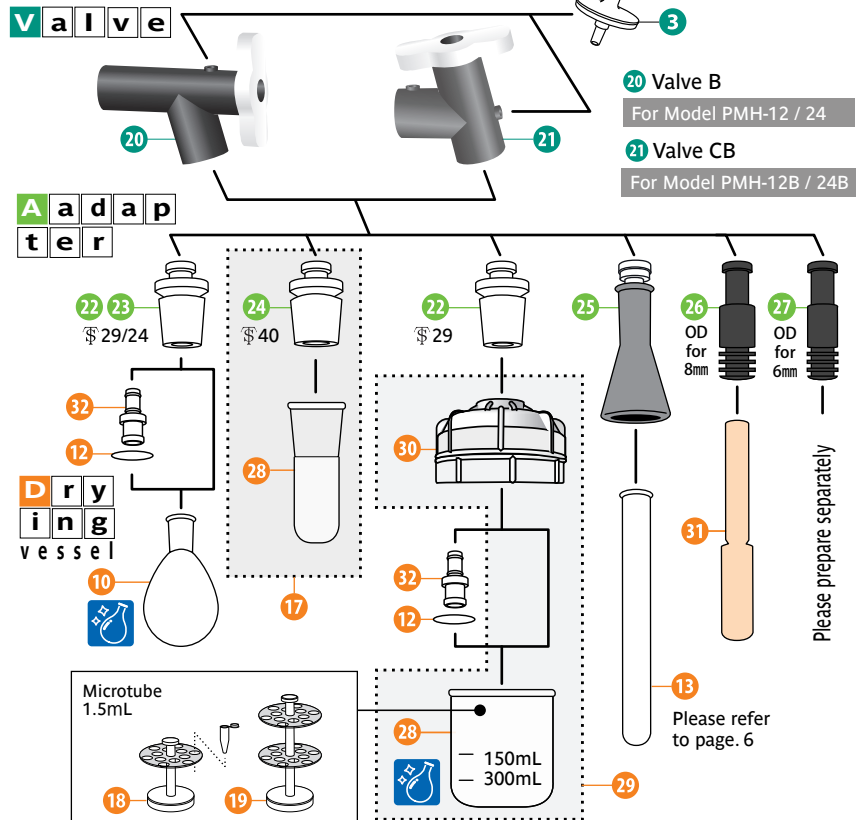
Dry chamber
Model DRC-1N / 2L / 3L



DRC-1N

DRC-2L

Parts combination chart



17 29 Freeze dryig bottle set (QTY 1 set)

Standard	Diameter	Cat. No.
40mL	¥ 40/32	281720
80mL	¥ 40/32	281740
150mL	¥ 29	276900
300mL	¥ 29	276910

※ 17 Set includes: freeze drying bottle and adapter C
※ 29 Set includes: freeze drying bottle, cap and O-ring

28 Freeze drying bottle (QTY 1 set)

Standard	Cat. No.
40mL (¥ 40/32)	281490
80mL (¥ 40/32)	281500
150mL	281510
300mL	281520

30 Cap for freeze drying bottle (QTY 1 pc)

Standard	Cat. No.
For 150 / 300mL	276880

18 19 Microtube holder

Standard	Freeze drying bottle	Cat. No.
18 1.5mL×12 pcs	For 150mL	191110
19 1.5mL×24 pcs	For 300mL	191150

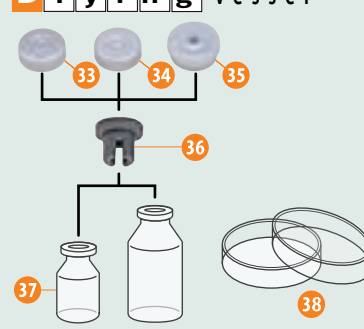
※In case of using microtubes with integrated caps, 12-holder can hold up to 6 pcs and 24-holder can hold 12 pcs.

31 Ampoule (OD8mm)

Standard	Volume	QTY	Cat. No.
Pear shaped	1mL	20	120210
Pencil shaped (flat bottom)	1mL	20	120221
Pencil shaped (round bottom)	1mL	20	120220
Flat bottom	2mL	20	120230
	10mL	10	120250
Round bottom	2mL	20	120260
	10mL	10	120280

Parts combination chart

D r y i n g v e s s e l



33 34 35 Aluminum cap (QTY 100 pcs)

36 Rubber cap (QTY 100 pcs)

Product	Cat. No.
33 φ20 MT cap	120402
34 OFF aluminum cap	120403
35 Arrow flip cap	120400
36 Rubber stopper	120390

37 Vial

Standard	QTY	Cat. No.
10mL	125	120300
20mL	138	120310
30mL	110	120320
50mL	75	120330

38 Petri dish ※Please prepare separately.

Model	FDM-1000	FDM-2000	FDL-1000	FDL-2000
Cat. No.	280898	280900	280918	280928
Cold trap temperature	-45 °C	-80 °C	-45°C	-80°C
Dehumidifying volume	1 L / batch	1 L / batch	4L / batch	3L / batch
Cooling method	Cooling coil	Cold trap chamber cooling	Cold trap chamber cooling	
Safety functions	Leakage/earth leakage breker, Control board self-diagnostic function, Refrigerator overload relay, Automatic vacuum release, Fuse for service outlet, High-pressure switches for refrigerator only for Model FDL-1000/2000			
Trap defrosting function	Defrosting by hot gas		Defrosting by hot gas	
Vacuum release function	Automatic vacuum leak valve		Automatic vacuum leak valve	
Other functions	Vacuum pump control, Vacuum pump operation time display, Stopwatch function, power failure recovery time selection function, Vacuum abnormality monitoring function, Refrigerator protection timer, trap volume monitor (option only available for Model FDL-1000/2000)			
Refrigerator	Air-cooled Power output 450W	Air-cooled Power output 500W×2	Air-cooled Power output 600W	Air-cooled Power output 500W×2
Refrigerant	R507A	R404A/R23	R404A	R404A/R23
Vacuum pump required displacement	Option: 50/60 L/min (50/60Hz) or more		Option: 100/120L/min (50/60Hz) or more	
Vacuum gauge	Pirani vacuum gauge (digital display) 0.0 to 533Pa		Pirani vacuum gauge (digital display) 0.0 to 533Pa	
Cold trap size, material	ID200×175H, SUS	ID153×225H, SUS	ID200×300H, SUS	
Suction port diameter	OD17.3mm		OD22mm	
Recorder output	Temperature: 1°C/mV vacuum: 1Pa/mV		Temperature: 1°C/mV vacuum: 1Pa/mV	
Service outlet	For vacuum pump max. 6A, for dry chamber max. 2A		For dry chamber Max.3A	
Ambient temperature range	5 to 35°C		5 to 35°C	
Outer dimensions (mm)	450W×420D×460H	450W×550D×945H	700W×550D×955H	
Weight	Approx. 38kg	Approx. 81kg	Approx. 116kg	Approx. 144kg
Power supply input	3A, 500VA	12A 1.2KVA	7.7A 1.7kVA	11A 2.4kVA
Power supply voltage	220VAC 50Hz	100VAC 50/60Hz	220VAC 50Hz	220VAC 50Hz
Electrical requirement	220VAC 10A	100VAC 20A	220VAC 10A	220VAC 7A

※Specifications are based on room temperature at 20°C, rated power supply voltage, 50Hz. ※Power input does not include the capacity of the service outlet.
 ※Teflon® coated corrosion resistant trap for Model FDM-2000 is available upon special order. Please contact us. ※Power plug is not included.
 ※Dimensions in parentheses () include protrusions. ※Freight and other charges are required. Please contact us for a separate estimate (Model FDM-2000 and FDL-1000/2000).

Option

For FDM-1000 **Dedicated rack**

Outer dimensions (mm): 550W×470D×600H
 Cat. No. 209530

For FDM-1000 **Cover with nozzle**

The cover with a nozzle can be used as a cold trap equipment.
 (Suction port diameter: OD17.3mm)
 Cat. No. 209520

For FDM-2000 **Vacuum pump mounting base**

The vacuum pump can be moved together with the main unit of FDM-2000. Cat. No. 209540

For FDM-1000 **Clamps for fixing manifold**

For FDM-2000 **Acrylic base support**

Flask manifold Model PMH-4/4B/4A/4AB/8/8B/1000/1000B,
 Test tube/Ampoule manifold Model PMH-12·24·12B·24B,
 Cover with nozzle and main body can be fixed with a single touch. (2 pcs)

Clamps for fixing manifold Cat. No. 209580

Acrylic base support Cat. No. 213810

For FDM/FDL **Recorder connection cord**

Cat. No. 240170



For FDL **Trap monitor**

The monitor lamp on the control panel blinks when the amount of dehumidifying moisture in the cold trap is sensed.

Cat. No. 197480



Recorder Model μR-10000

Number of measurement points: 6
 Input: DCV, TC, RTD, DCA
 Display of measured values: Digital
 Recording: Recording paper
 For FDM-1000 Cat. No. 219290
 For FDM-2000 Cat. No. 219300
 For FDL series Cat. No. 219270

※Please purchase the recorder connection cord when using a recorder.



Vacuum hose

ID×OD	Length	Cat. No.
15×36mm	1m	263450
	2m	263440
	3m	263430
	5m	217910
18×42mm	1m	263480
	2m	263470
	3m	263460
	5m	119230



Vacuum hose adapter

Adapter A (OD22×OD17mm)
 Cat. No. 119240

※Vacuum hoses (200 mm long) are included at both ends of the adapter.



For GLD/GCD **Rack for oil rotary vacuum pump**

Oil replacement can be done without worrying about the weight of the pump by using this rack.

External dimension(mm): 246W×378(533)D×361H
 Cat. No. 278230

TOKYO RIKAKIKAI CO., LTD.

EYELA

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※The appearance and specifications of the products are subject to change without notice.