

# 3

## Organic Synthesizer

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# Dry Aluminum Block Bath with stirrer **SynFlex™**

## BBS + RCH

No oil spill hazard, no smoke emission, no ignition.  
Contributes to safe and clean laboratory environment.  
Flexible aluminum block to be fit into the flask size.



### Features

- No clearance gap between flask and aluminum block even when flask is swollen or shrunk due to heat as aluminum block automatically adjusts its flask receptacle diameter to actual flask size.
- Flask breakage caused from deformation by heat can be prevented. This feature also contributes to stable heat transfer characteristic.
- Aluminum block provides two holes for temperature sensor insertion and is coated with chemical resistive anodized aluminum.

### ■Aluminum Block BBS

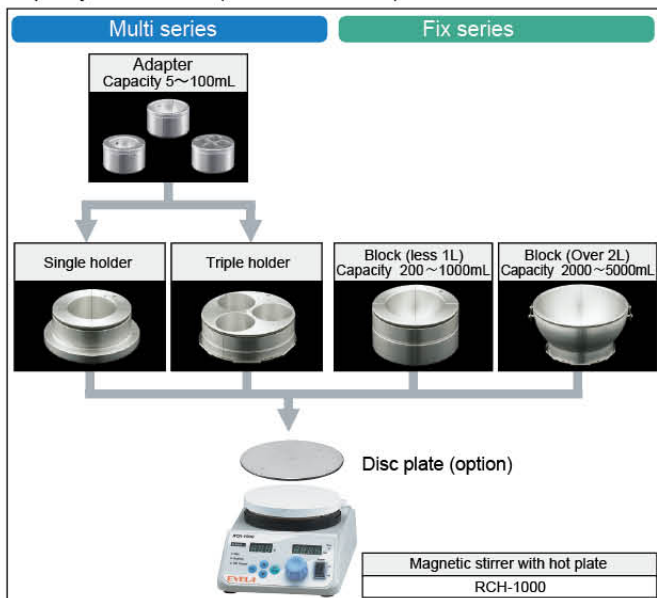
Temp. control accuracy	±1-3°C (Hot plate control)
	±1°C (Aluminum block control)
Max. temperature	250°C (Flask less 1L empty)
	200°C (Flask less 2L empty)
	180°C (Flask less 3L empty)

### Specifications

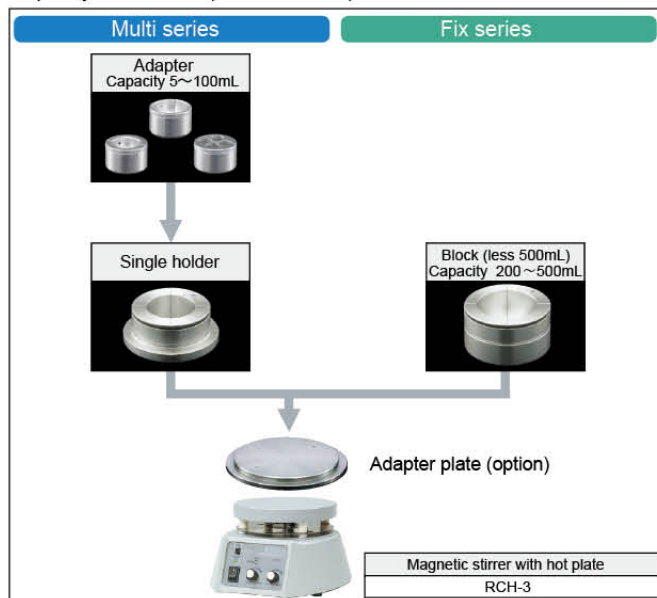
Product name	Magnetic Stirrer with hot plate	
Model	RCH-1000	RCH-3
Cat. No.	264280	123910
Rotation speed	50 ~ 1500rpm	100 ~ 1500rpm
Stirring capacity	10 ~ 20L (Water)	3L (Water)
Temp. control range	RT ~ 310°C (Hot plate temp.)	300°C (Plate surface)
Rotation speed setting & display	Volume setting • digital display (50 ~ 1500rpm)	Volume setting
Temp. setting & display	Volume setting • digital display (0 ~ 310°C)	Volume setting
Temp. control method	P.I control (hot plate or external temp. sensor)	Input adjustment (hot plate control)
Temp. adjustable accuracy	±1-3°C	-
Safety features	Independent variable overheat protector	-
Motor	Brushless motor 25W	Shaded-pole motor 1.8W
Heater	600W	250W
Hot plate	Aluminum alloy Φ135mm	Ceramic coating Φ150mm
Power source	630VA AC100V	300VA AC100V

### ■Combination guide

Capacity: 5 ~ 5000mL (BBS + RCH-1000)

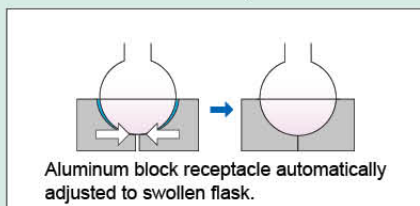


Capacity: 5 ~ 500mL (BBS + RCH-3)

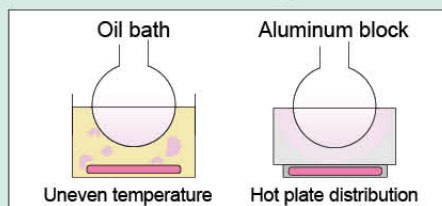


## Point!

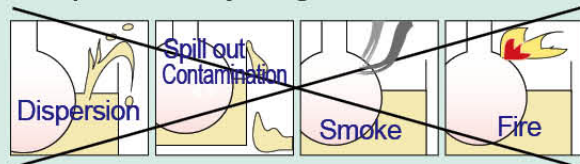
## Aluminum block to adjust to flask size



## Uniform and safe heating



## Exempt from risk by using oil bath



## ■ Aluminum block BBS selection guide

## Test tube, reaction vessel

Test tube & reaction vessel	Aluminum block Multi series adapter
φ12mm×8	BBS-12T8I
φ24mm×4	BBS-24T4I
φ38mm	BBS-38TI
φ50mm	BBS-50TI
φ60mm	BBS-60TI

## 5~10mL Flask

Flask capacity	Multi series adapter			
	Eggplant flask		Round bottom flask	
	ISO	JIS	ISO	JIS
5mL	—	—	BBS-30RI	—
10mL	—	BBS-32RI	BBS-35RI	BBS-32RI
20mL	—	BBS-35RI	—	—
25mL	—	—	BBS-41RI	BBS-45RI
30mL	—	BBS-41RI	—	—
50mL	BBS-56EI	BBS-51RI	BBS-51RI	BBS-53RI
100mL	BBS-60EI	BBS-64RI	BBS-64RI	BBS-65RI
150mL	—	—	—	BBS-75FI
+				
Single holder	BBS-1HLD			
Tripple holder	BBS-3HLD			

## 200~500mL Flask

Flask capacity	Fix series adapter			
	Eggplant flask		Round bottom flask	
	ISO	JIS	ISO	JIS
200mL	—	BBS-76EB	—	BBS-80RB
250mL	BBS-80RB	—	BBS-85RB	—
300mL	—	BBS-85RB	—	BBS-93RB
500mL	BBS-100EB	BBS-100EB	BBS-105RB	BBS-108RB
1000mL	—	BBS-133EB	BBS-131RB	BBS-135RB
2000mL	—	BBS-166RB	BBS-166RB	BBS-170RB
3000mL	—	—	BBS-185RB	BBS-200RB
4000mL	—	—	BBS-207RB	—
5000mL	—	—	BBS-223RB	BBS-230RB

## ■ Aluminum Block BBS

## Multi series

For small volume of 5~100mL.  
Single and tripple holder with adapter.



Product	Size	Model	Cat. No.
Tube adapter	φ12×8	BBS-12T8I	239940
	φ24×4	BBS-24T4I	239920
	φ38	BBS-38TI	248830
	φ50	BBS-50TI	248840
	φ60	BBS-60TI	239930
Flask adapter	φ30	BBS-30RI	239830
	φ32	BBS-32RI	239840
	φ35	BBS-35RI	239850
	φ41	BBS-41RI	239860
	φ45	BBS-45RI	239870
	φ51	BBS-51RI	239880
	φ53	BBS-53RI	239890
	φ56	BBS-56EI	240960
	φ60	BBS-60EI	240970
	φ64	BBS-64RI	239900
	φ65	BBS-65RI	239910
	φ75	BBS-75FI	245790
Single holder		BBS-1HLD	239810
Tripple holder		BBS-3HLD	239820

## Fix series

For large volume of 200~5000mL.  
Single holder with adapter.

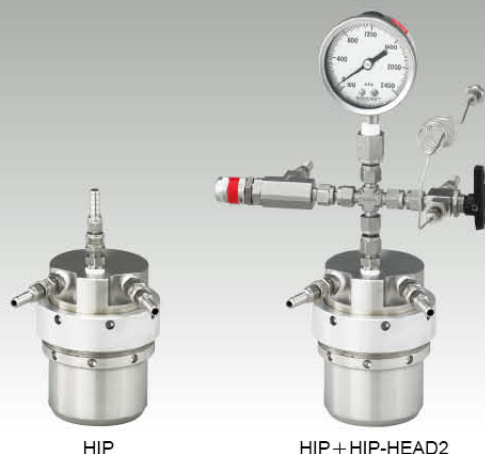


Product	Size	Model	Cat. No.
Aluminum block	φ76	BBS-76EB	239950
	φ80	BBS-80RB	240370
	φ85	BBS-85RB	240380
	φ93	BBS-93RB	240390
	φ100	BBS-100EB	239960
	φ105	BBS-105RB	240400
	φ108	BBS-108RB	240410
	φ131	BBS-131RB	240420
	φ133	BBS-133EB	239970
	φ135	BBS-135RB	240430
	φ166	BBS-166RB	239980
	φ170	BBS-170RB	239990
	φ185	BBS-185RB	240000
	φ200	BBS-200RB	240010
	φ207	BBS-207RB	240020
	φ223	BBS-223RB	240030
	φ230	BBS-230RB	240040



# Catalyst Screening Container HIP-7506•7518•7524

Quick and economical catalyst screening by the container contributes to cost reduction of combinatory chemistry synthesis.



## Features

- Three synthesis scales available for 6, 18 and 24 tubes. Screening under normal or high pressure is feasible.
- Pressure vessel is provided with insert hole for temperature sensor. Solvent loss is prevented by cold finger reflux.
- HIP-7518 is for 2mLHPLC x 18 vial container. It can be used with open top (for high temp. and high pressure) or with aluminum cap (septum set).

## Specifications

Product name	Catalyst Screening Container		
Model	HIP-7506	HIP-7518	HIP-7524
Cat. No.	248370	248380	248390
Scale	1.5~7.0mLx6	0.3~1.3mLx18	0.1~0.8mLx24
Max. pressure	5MPa (at 230°C)		
Container size (mm)	Dia. 75		

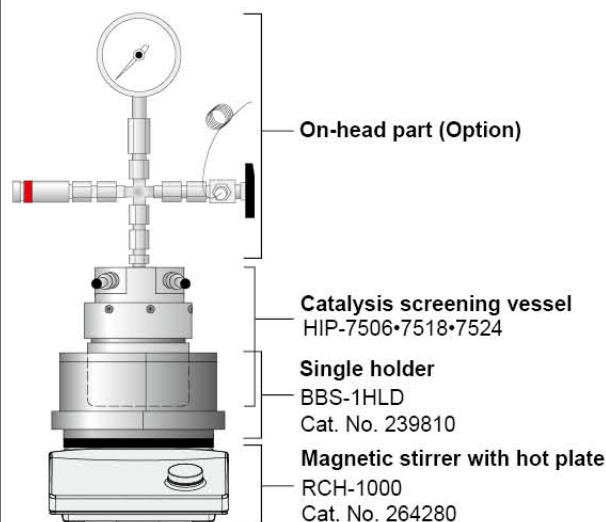
## System specifications

### HIP + BBS-1HLD + RCH-1000

Reaction vessel	HIP-7506	HIP-7518	HIP-7524
Max. pressure	5MPa (at 230°C)		
Temp. range	RT~230°C		
Stirring	Magnetic stirrer RCH-1000		
Reflux	Cold finger (Reflux by tap water or cooled water)		
Gas replacement	Ball valve (3 way cock) + pressure gauge		
Impeller size (mm)	Φ5 x 15	Φ3.0 x 6.4	

Container size: 110Hmm, body cylinder ID75x44Hmm  
Vial: 10mL 2mLHPLC 1mL

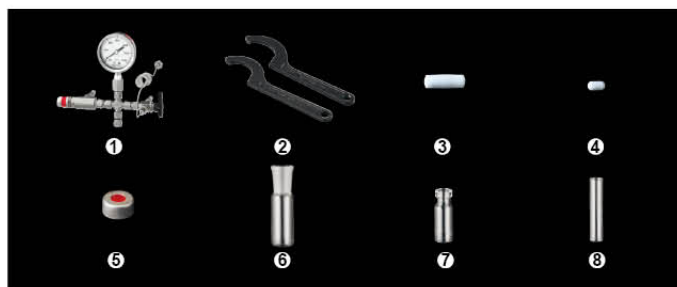
## System Consist



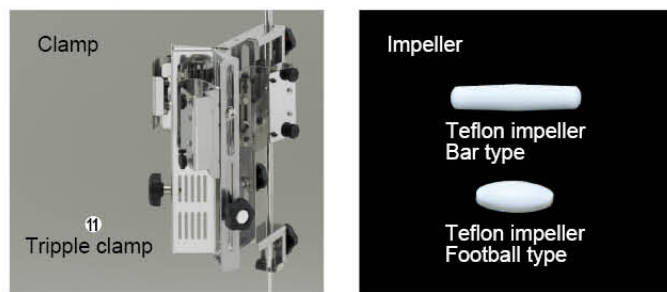
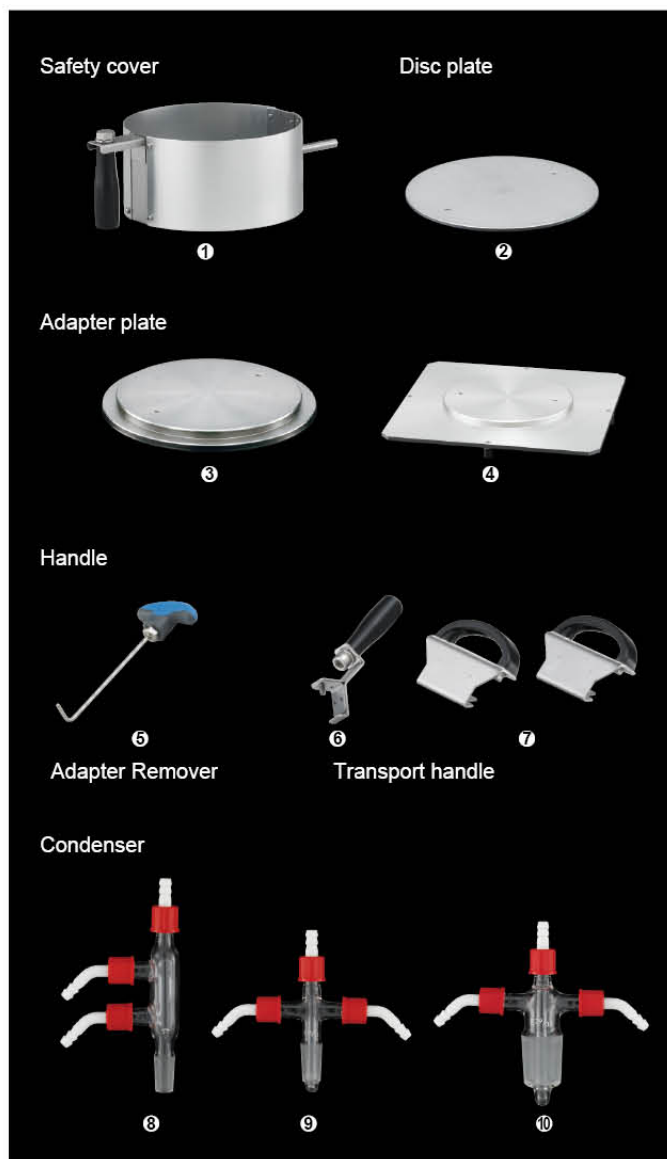
## Option

### ■ High pressure reaction vessel

Product name	Cat. No.
① On-head HIP-head 2	248400
② Pin spanner	248350
③ Teflon impeller	248440
④ Teflon micro impeller	248450
⑤ Aluminum cap	248460
⑥ Vial 10mL	248470
⑦ Vial 2mL	248480
⑧ Vial 1mL	248490







#### ■Teflon impeller

Product name	Model	ODxL(mm)	Q'ty	Cat. No.
Teflon impeller	TSB-30	8×30	5	123830
	TSB-40	8×40	5	123840
Teflon impeller (Football type)	TFS-15	6×15	5	200280
	TFS-20	10×20	5	200290
	TFS-25	10×25	5	200300
	TFS-30	15×30	5	200310
	TFS-35	15×35	5	200320
Teflon impeller (Strong football type)	TFX-15	6×15	1	200390
	TFX-21	10×20	1	240320
	TFX-25	10×25	1	200410
	TFX-30	15×30	1	200420
Teflon impeller(Disc type)	TFX-35	15×35	1	200430
	ST-10L	φ9×6H	10	182100

#### ■Safety cover

No.	Product name	Model	Cat. No.
①	Safety cover (~1L)	BBS-1LSC	240070
	Safety cover (2~5L)	BBS-5LSC	240100

#### ■Disc plate, adapter plate

No.	Product name	Model	Cat. No.
②	Disc plate (φ135x3mm)	BBS-135FDP	240900
③	Adapter plate (φ150mm)	BBS-150FAP	240050
④	Adapter plate (200x200mm)	BBS-200XAP	240980

#### ■Handle

No.	Product name	Model	Cat. No.
⑤	Adapter Remover	BBS-01LAR	240280
⑥	Transport handle (~1L)	BBS-1LTH	240060
⑦	Transport handle (2~5L)	BBS-5LTH	240090

#### ■Condenser

No.	Product name	Model	Cat. No.
⑧	Condenser NS14/23	—	240120
⑨	Small condenser (φ15/25)	—	240130
⑩	Small condenser (φ29/32)	—	240140

#### ■Pole, screw, much, clamp

No.	Product name	Model	Cat. No.
	Support rod	H16V	235000
	Bosshead	H44	216190
	Holding rod	H38	216200
	Extention	H16.1	234990
	Clamp	—	234970
	Much	—	234980
	ZC clamp	ZC	124560
	Stand base	—	240080
⑪	Tripple clamp	BBS-3CLP	245800
	Hexagonal bolt screw	—	240890

#### ■Impeller selection table

Holder	Impeller type				
	Bar	Football	Oval	Ellipsoidal	Octagon
Tripple	○	○	○	×	×
Single	×	○	○	○	○
Fix	×	○	○	○	○

# Personal Organic Synthesizer ChemiStation™ PPS-5511



PPS-5511

ChemiStation is a 5-lanes organic synthesizer which is designed to improve the efficiency of process development of new reactions and catalysis, examination of reaction condition and synthesis of intermediates. Individual setting of the temperature for each position enables examination by 5 types of temperature conditions simultaneously, allowing to achieve the most effective synthesis route. Synthesis scale can be changed by changing the reaction vessel.

## Features

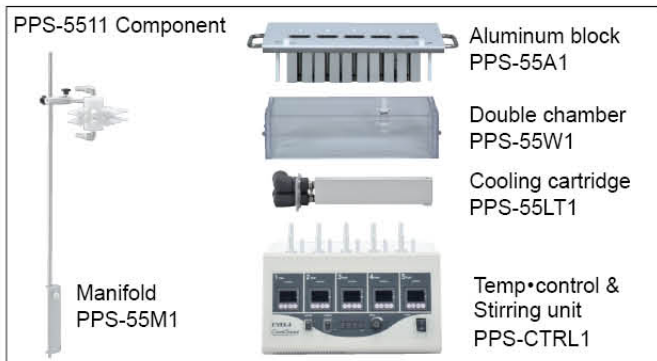
- PPS-5511 features wide synthetic scale from 0.5 to 60mL.
- Wide temperature control range from -23°C to 160°C. Each lanes of aluminum block temperature can be set independently.
- Variety of reaction vessels expands organic synthesis possibilities.
- By attaching cooling water manifold and dimroth condenser, effective reflux experiment is feasible.
- Cooling cartridge can be inserted from either side of main unit.
- Rising or falling gradient temperature control realizes moderate temperature rising until reaction starts.
- Reaction under inert gas is possible by using branched reaction vessel and 3 way cock injection port (Shrenk tube).
- Teflon shutter prevents dew condensation on aluminum block.
- By using sealed tubes, Schlenk tubes, pressure resistive vessels and Dean-Stark Traps, degassing, deoxidization or synthesis under high pressure provide new experimental conditions.

## Specifications

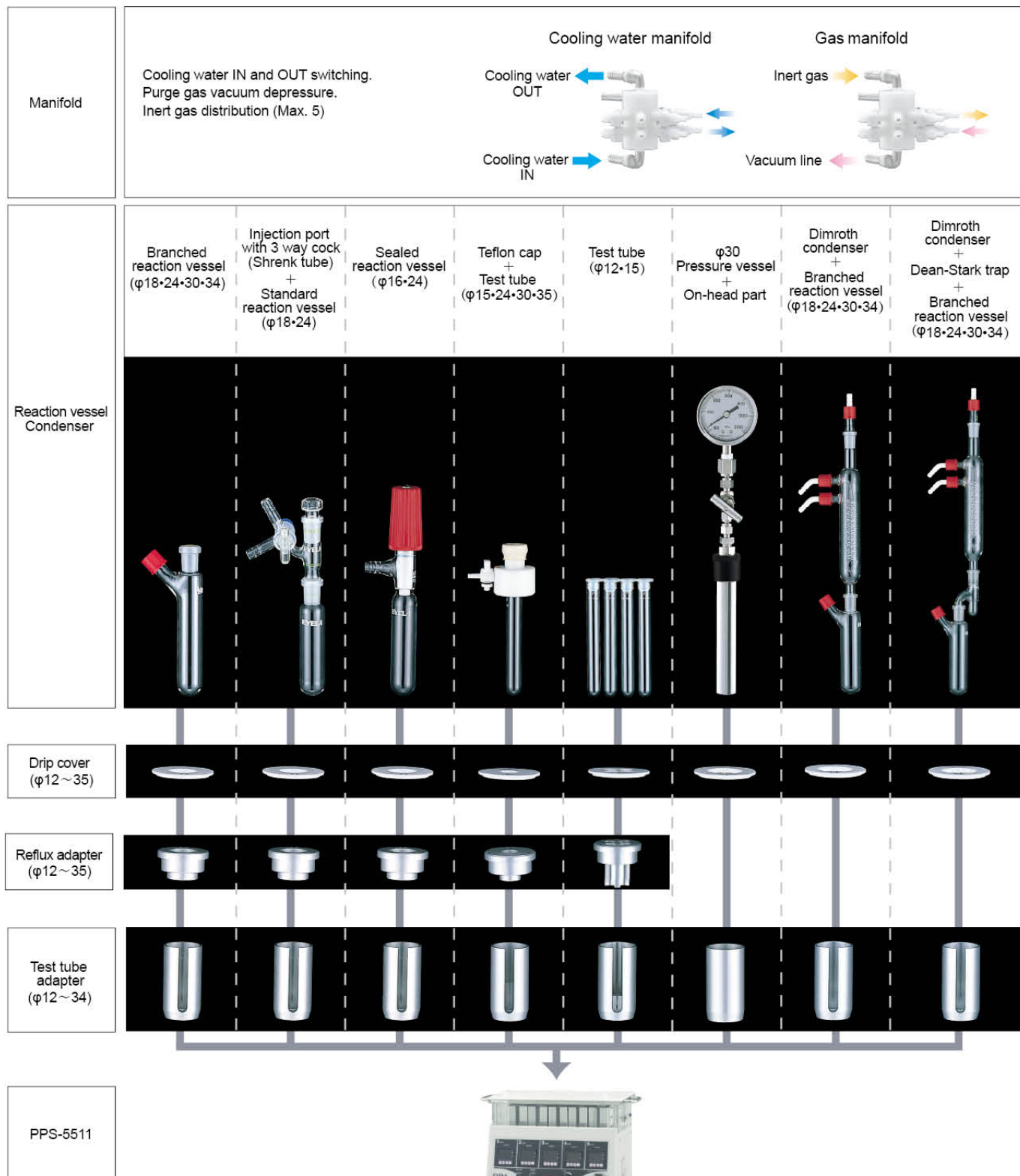
Product name	Personal Organic Synthesizer (ChemiStation)	
Model	PPS-5511	
Cat. No.	226499/226498	
Stirring	Strong magnetic stirrer	
Reaction vessel	Various reaction vessels 1~5 (max. 20)	
Synthesis scale	0.5~60mL (depends on reaction vessel)	
Temp. control range	-23~160°C (~130°C: 50~60mL) 5 x independent control	
Temp. control accuracy	±0.5°C	
Rotation speed	100~2000 rpm (water 1mL) 5 x fixed speed	
	100~1100 rpm (water 60mL) 5 x fixed speed	
Temp. setting & display	Sheet key input, digital display (-40~160°C)	
Gas replacement	Vacuuming + inert gas	
Reflux	NA/Reflux adapter/Cold water manifold	
Reagent injection	Pipet, syringe, dripping funnel under inert condition	
Observation window	Slit in front of aluminum block (with LED light)	
Safety features	Leakage•overcurrent braker, Fuse, Self diagnosis (Variable upper limit temp., Sensor error), Double chamber, Drip tray, Aluminum block mounted sensor, Motor overload protection	
Dimensions (mm)	465W x 335D x 295H	
Weight	23kg	
Power source	747VA AC115V/1.4kVA AC220V	

## ■ PPS-5511 Consist

Product name	Model	Cat. No.
Manifold	PPS-55M1	226510
Aluminum block	PPS-55A1	226390
Double chamber	PPS-55W1	226450
Cooling cartridge	PPS-55LT1	226420
Temp. control & stirring unit	PPS-CTRL1	226350



# Personal Organic Synthesizer Configuration



Rotary Evaporator

1

Vacuum Pump & Aspirator

2

Organic Synthesizer

3

Freeze Drier, Spray Drier

4

Shaker

5

Stirrer

6

Tube Pump

7

Low Temperature Circulator

8

Cold Trap

9

Constant Temperature Bath

10

Incubator

11

Oven

12

Fermentor

13



# Personal Organic Synthesizer ChemiStation™ PPM-5512



PPM-5512

## Features

- Independent rotation speed and temperature setting according to vessels.  
Set values can be memorized and applied to each experiment.
- Independent temperature control for five reaction vessels.
- Two step program function is incorporated.
- Temperature sensor for liquid (option) enables measurement and control of liquid temperature.
- Defrost and dew condensation preventive function is provided.

## Specifications

Product name	Personal Organic Synthesizer (ChemiStation)
Model	PPM-5512
Cat. No.	261690
Stirring	Powerfull magnetic stirrer
Reaction vessel	Various reaction vessels 1~5 (max. 20)
Synthesis scale	0.5~60mL (depends on reaction vessel)
Temp•control range	-23~160°C (~130°C: 50~60mL) 5 x independent control
Temp•control accuracy	±0.5°C
Rotation speed	300~2000 rpm (water 1mL) 5 x independent control
Temp•setting & display	Dial key input, digital display (-20~160°C)
Gas replacement	Vacuuming + inert gas
Reflux	NA/Reflux adapter/Cold water manifold
Dimensions (mm) & weight	370W x 261D x 323H 19kg
Power source	650VA AC100V

## Point!

### Independent rotation speed control



Independent rotation speed control for every reaction vessel. Set value is memorized and not needed to set every time.

### Two step program function



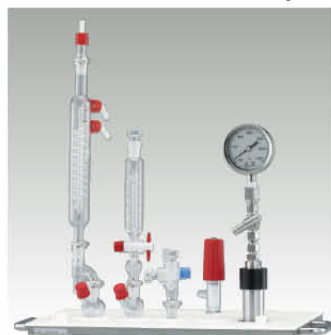
2 step temp. control is possible.

### Temperature sensor



By using optional liquid temp. sensor, measurement and control of liquid temperature are possible.

## Selectable test tube adapters



### Reaction vessels



# Personal Organic Synthesizer

## ChemiStation™ PPS Series



PPS-5520



PPS-3511



PPS-5511

PPS series is designed to improve the efficiency of the synthesis process.

Developed as a system with 5 independent reactors, each with its own temperature control, the system is time saving and efficient. The relatively large vessel size is developed for users that work with

large amounts of sample volume and it is ideal for development, verification experiments, optimization and also for large volume intermediate synthesis. Five different temperatures can be set for five test tubes, saving time and performing efficient synthesis. Refluxing, gas purging, heating, cooling, and stirring functions are all equipped as standard.

### Features

- Max. 5 reaction vessels can be mounted.  
Five heating blocks enable to set 5 different temperature.
- Wide synthesis scale of 0.5~60mL.
- Highly viscous liquids can be stirred with strong ferromagnetic stirrer.
- Wide temperature control range of -28°C~160°C.
- By using sealed tubes, Schlenk tubes, pressure resistive vessels and Dean-Stark Traps, degassing, deoxidization or synthesis under high pressure provide new experimental conditions (PPS-5511).

### Point!

Variable synthesis scale, improved work efficiency

#### Reagent injection



#### Gas purging



#### Teflon shutter to prevent dew condensation



#### Independent temperature control



Five independent temperature control.

#### Reflux block

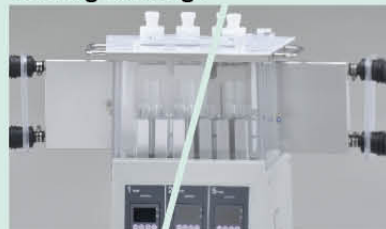


#### LED light



Reaction process can be confirmed clearly.

#### Cooling cartridge



Cooling cartridge can be inserted from either side.

Rokary Evaporator 1

Vacuum Pump &amp; Aspirator 2

Organic Synthesizer 3

Freeze Drier / Spray Drier 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

Incubator 11

Oven 12

Fermentor 13



## Specifications

Product name	Personal Organic Synthesizer ( <i>ChemStation</i> ®)			
Model	PPS-1520	PPS-2511	PPS-3511	PPS-5511
Cat. No.	231759/231758	226470	226489	226499/226498
Reaction vessel	1~5			1~5 (Max.20)
Synthesis scale	1~4mL	10~30mL	50~60mL	50~60mL
Stirring	Strong magnetic stirrer			
Temp. control range	-10~160℃	-27~160℃	-28~130℃	-23~160℃
Aluminum block temp.	5 x Independent control (cooling water circulator is necessary)			
Rotation speed	100~2000rpm	100~1300rpm	100~1100rpm	100~2000rpm(water 1mL) 100~1100rpm(water 60mL)
Temp. setting & display	Touch screen setting	Sheet key input, Digital display		
Gas replacement	—	Vacuuming & inert gas		
Reflux	NA	Available		NA (reflux adaptor, manifold)
Impeller stirring	125~1059rpm(option)	20~2000rpm		—
Observation window	Slit in front of aluminum block			
Test tube with lip	Φ10 x 150Hmm	Φ30 x 200Hmm	Φ35 x 200Hmm	Variety of options available
Impeller (Cross shaped)	Φ10 x 5Hmm	Φ20 x 7Hmm	Φ25 x 8Hmm	—
Dimensions (mm) & Weight	465W x 455D x 415H 36kg	465W x 455Dx440H 27kg	465W x 335Dx450H 28kg	465W x 335D x 390H 23kg
Power source	977VA AC115V/1.8kVA AC220V	650VA AC100V	747VA AC115V	977VA AC115V/1.4kVA AC220V

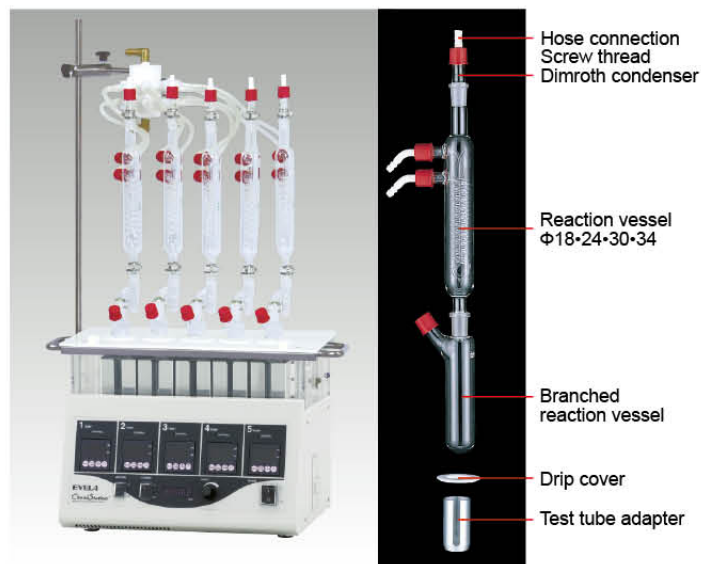
## Classified functions

Model	PPS-1511	PPS-1520	PPS-2511	PPS-2520	PPS-3511	PPS-3520	PPS-5511	PPS-5520
Synthesis scale (mL)	1~4		10~30		50~60	30~60	0.5~60	10~30
Temp. control range (°C)	-23~160	-10~160	-27~160	-10~160	-28~160	-10~130	-23~160	-10~160
Reaction vessel Φ12							20	
Φ13							5/15	
Φ15	5	5					5/15	
Φ16~35 (except Φ30, 35)							5	
Φ30			5	5			5	5
Φ35					5	5	5	
Bath	Aluminum block bath							
Independent temp. control	●	●	●	●	●	●	●	●
Digital temp/stirring display	●	●	●	●	●	●	●	●
Touch panel		●		●		●		●
Heating P.I.D control	●	●	●	●	●	●	●	●
Gradient control	●	●	●	●	●	●	●	●
Reactor control		●		●		●		●
Jacket control	●	●	●	●	●	●	●	●
Step program function		●		●		●		●
Observation window	●	●	●	●	●	●	●	●
Magnetic stirrer	●	●	●	●	●	●	●	●
Impeller (Option)	●	●	●	●	●	●	●	●
Drip control (Option)		●		●		●		●
Pressure measurement (Option)		●		●		●		●

## System Example (PPS-5511)

## Dimroth, Polymerization and Green Chemistry system

Product Name	Model	Cat. No.
Personal Organic Synthesizer	PPS-5511	226490
Reaction vessel with branch	Φ30x5	212760
Dimroth condenser	5 pcs	212780
Small condenser	5 pcs	240120
Screw sled	GL14, NS14	217220
Screw cap	GL14	217230
Drip cover	Φ30x5	217730
Impeller football type Φ10x20mm	TSF-20 (5 pcs)	200290
Test tube adapter	Φ30x5	212900
Cooling hose set 2mx2	CT-2S	201830
Silicone hose for manifold	5m	212790
Cooling water circulator	CA-1115A	249120





# Personal Organic Synthesizer ChemiStation™

## PPV Series



PPV-3461



PPV-4460

PPV series accommodates 4 reaction vessels, each with its own temperature control. It enables to study new reaction, to develop new catalyst, carry out sample and building block synthesis and also polymerization reaction experiments. It provides small reaction scale of 150mL suitable for small volume samples like medicine,

### Features

- Four reaction vessels can be mounted and independent temperature control is provided.
- Ferro-magnetic stirrer ensures stable and strong stirring even with highly viscous liquid samples.
- Synthesis study and experiment under different conditions are feasible:

catalyst and new material development. New functions like gradient temperature control and LED light for process observation are provided as standard.

PPV-4400 series offers experiment with pressure vessel as well as hydrogenation reactions. PPV-5460 accommodates multiple sizes and shapes of reaction vessels including Separable flask.

Low temp. experiment, Reflux, Distillation, Gas purge, Dripping Hydrogenation reaction, Pressurized liquid reaction, Temperature/pressure evaluation study (PPV-4400) Various system configurations using multiple size and shape reaction vessels (PPV-5460)

### Point!

Suitable for small volume sample (PPV-3400 series)

#### Low temp. experiment



Low temp. from -27°C  
With defrost heater.

#### Reflux/distillation



Stand for Deanstark synthesis  
(Option)

#### Gas purge/dripping



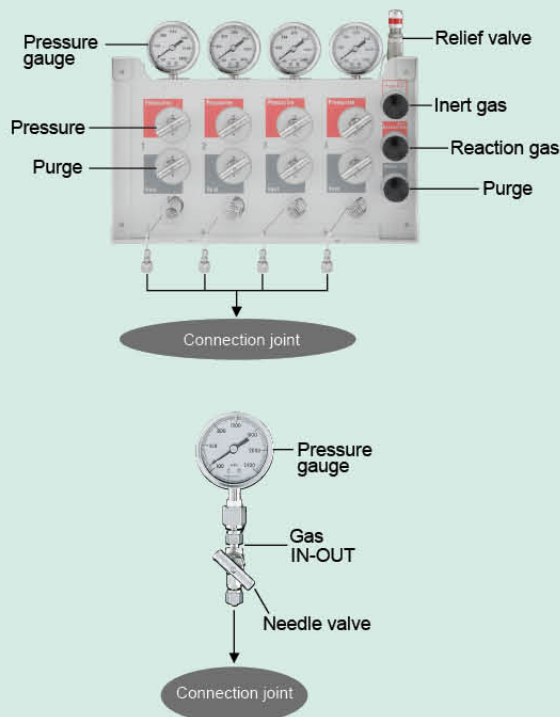
By three way glass cock  
or hose end connection.

#### LED light



### Point!

Hydrogenation reaction, Pressurized liquid reaction (PPV-4400 series)



Rotary Evaporator 1

Vacuum Pump &amp; Aspirator 2

Organic Synthesizer 3

Freeze Drier, Spray Drier 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

Incubator 11

Oven 12

Fermentor 13

## Specifications

Personal Organic Synthesizer (ChemiStation)		
Product name	Personal Organic Synthesizer (ChemiStation)	
Model	PPV-3430	PPV-4460
Cat. No.	229969/229968	230019/230018
Reaction vessel	1~4	
Maximum pressure	—	Max. 5MPa (Autoclave) Max. 1MPa (Inflamable gas)
Synthesis scale	10~30mL/1 vessel	Φ60.63mL (Vol. 190mL)
Stirring	Strong magnetic stirrer	
Temp. control range	-27~200°C	-10~200°C
Aluminum block temp.	4 x Independent control	
Rotation speed	50~900rpm	50~1000rpm
Temp. setting & display	Sheet key input, Digital display	
Gas replacement	Vacuuming & inert gas	Purge & inert gas Gas 2 lines, purge 1 line
Reflux	Dimroth condenser Cooling water manifold	—
Observation window	Slit in aluminum block	
Dimensions (mm) & Weight	475W x 383D x 290H 26kg	475W x 421D x 590H 40kg
Power source	1.49kVA AC115V/2.86kVA AC220V	

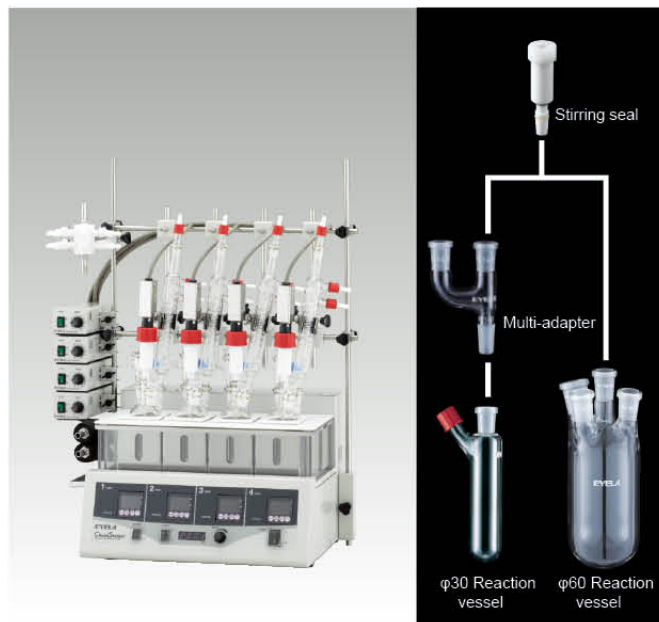
## Classified functions

Model	PPV-3430	PPV-4460
Synthesis scale (mL)	30	63
Temp. control range (°C)	-27-200	-10-200
Reaction vessel Φ30	4	
Φ60 (3 port)		
Φ60 (4 port)		
Pressure vessel Φ30		
Φ30 with protection tube		
Φ60 with protection tube		4
Bath	Aluminum block bath	
Independent temp. control	●	●
Digital temp/stirring display	●	●
Heating P.I.D control	●	●
Gradient control	●	●
Jacket control	●	●
Observation window	●	
Magnetic stirrer	●	●
Impeller (Option)	●	
Reaction under pressure		●

## System Example (PPV-3461)

Two synthesis scale with 30mL and 150mL vessels,  
Polymerization study and Impeller stirring

Product Name	Model	Cat. No.
Personal Organic Synthesizer	PPV-3430	229969
Stand unit	—	228150
Manifold	—	228110
Compact stirrer	CPS-1000x4	213290
Impeller	Φ60x4	228130
Test tube adapter	Φ30x4	227970
Reaction vessel	Φ30x4	212760
Stirring rod	Φ30x4	228140
Small condenser	x4	240120
Drip cover	Φ30x4	228020
Impeller football type Φ10x25mm	TFS-2S	201830
Cooling water circulator	CA-1115A	249120





# Personal Organic Synthesizer ChemiStation™

## PPV-5460

Suitable for low temperature, reflux & distillation experiments.

-27°C ~ 200°C, 4 independent temperature control reactors.

Development of new reaction process, new catalytic substances, sample synthesis, building block synthesis, polymerization reaction can be carried out effectively.



PPV-5460

### Features

- Reaction vessels of different diameter can be mounted by changing test tube adapter.  
The unit provides possibility of synthesis experiment with wide scale of 11 ~ 150mL.  
Combination of glass or stainless reaction vessels is feasible.
- Temperature sensor and temperature controller are equipped with 4 heating blocks; each block operation independently controlled.
- Constant flow of cooling water prevents excessive synthesis reaction.
- Strong ferro-magnetic stirrer provides strong and stable stirring.  
One motor, four shafts system ensures stable rotation from low to high speed.

### Specifications

Product name	Personal Organic Synthesizer
Model	PPV-5460
Cat. No.	254870
Stirring	Strong magnetic stirrer
Reaction vessel	1 ~ 4
Synthesis scale	11 ~ 150mL
Temp. control range	-27 ~ 200°C
Temp. control accuracy	±0.5°C
Rotation speed	50 ~ 900 rpm (water)
Temp. setting & display	Sheet key input, digital display (-40 ~ 200°C)
Gas replacement	Vacuuming + inert gas
Reflux	Dimroth condenser
Reagent injection	Pipett, syringe, dripping funnel
Observation window	Slit in front of aluminum block (with light)
Safety features	Leakage·overcurrent braker, Fuse, Self diagnosis, Double chamber, Drip tray Defrost heater, Motor overload protector
Dimensions (mm) & weight	475W x 383D x 290H 26kg
Power source	1.3kVA AC100V

### Point!

By changing size and kind of reaction vessels, diversified systems will be available



Standard  
φ60  
reaction vessel

Branched test tube
Separable flask
3·4 port reaction vessel
Pressure vessel

+

Drip preventive cover
Test tube adapter

By adding optional test tube adapter, different size and kind of reaction vessels can be mounted. 10 selections available for combination of glass reaction vessel and stainless pressure vessel.

Rotary Evaporator 1

Vacuum Pump & Aspirator 2

Organic Synthesizer 3

Freeze Drier · Spray Drier 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

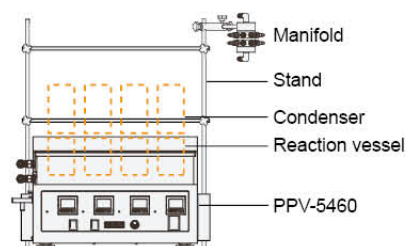
Incubator 11

Oven 12

Fermentor 13



## System composition



● **Manifold**  
Used for cold water circulation, vacuuming and inert gas distribution.

● **Stand**  
Support manifold and provides clamp function for max. 4 condenser.

● **Condenser**  
Used for reflux of evaporated vapor when using glass reaction vessel.

● **On-head parts:**  
Used with pressure vessel to confirm reaction gas injection, purging and inner pressure. Relief valve is provided to avoid over pressure.

	Condenser On-head	On-head for pressure vessel	Ultra small condenser	Small condenser	Dimroth condenser	On-head for pressure vessel
	<b>Reaction vessel</b> • Test tube with branch • Separable flask • Reaction vessel • Pressure vessel	11 • 14 mL pressure vessel	30 • 50 mL Test tube with branch	50 mL • 100 mL Separable flask 50mL   100mL	150 mL Separable flask	150 mL Reaction vessel 63 mL Reaction vessel
	<b>Drip cover</b>	φ30	φ34	φ38   φ50	Standard φ60	
	<b>Test tube adapter</b>	φ30	φ34	φ38   φ50		



Parts related to reaction vessels

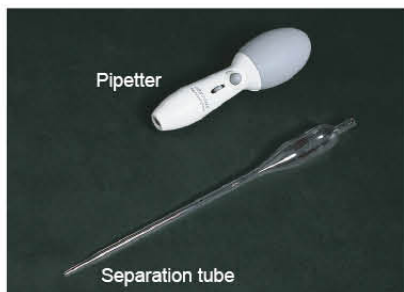
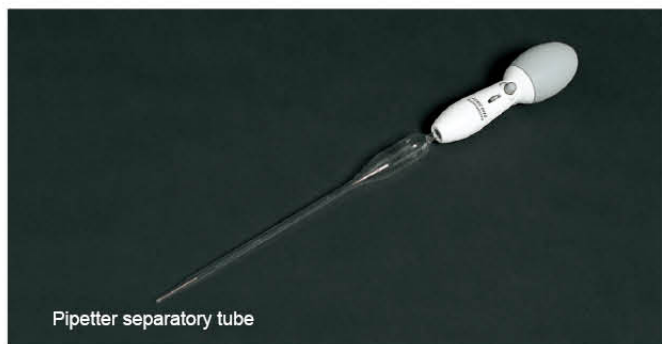
No.	Product name	Specifications	Model	Cat. No.
①	Branched reaction vessel	30mL φ30	—	212760
②		50mL φ34	—	217160
③	Small separable flask set	50mL (6 port) φ38	—	248810
④		100mL (6 port) φ50	—	248820
⑤		150mL (3 port) φ60	—	251070
⑥		150mL (4 port) φ60	—	251080
⑦	Reaction vessel (3 port)	150mL φ60	—	228040
⑧	Reaction vessel (4 port)	150mL φ60	—	228050
⑨	Pressure vessel (with impeller)	14mL φ30	HIP-30	218290
⑩		11mL φ30	HIP-30L	228190
⑪		63mL φ60	HIP-60	218310
⑫	Small condenser	NS14 / 23	—	240120
⑬	Multi-adapter	NS14 / 23 2 port	—	228080
⑭	On-head part (-100/0/2400kPa)		HIP-HEAD2	248400
⑮	Teflon impeller (Football type)	30 • 50mL	TFS-20	200290
⑯		30 • 50 • 100mL	TFS-25	200300
⑰		150mL	TFS-35	200320
⑱	Flask cover (150mL)	3 port	—	251040
⑲		4 port	—	251050
⑳	Vessel part (150mL)	—	—	251060
㉑	Separable clamp	—	Y-SK-13	116500
	Separable seal packing	—	—	262430

Options

No.	Product name	Model	Cat. No.
⑮	Test tube adapter	φ30	—
		φ34	—
		φ38	—
		φ50	—
⑰	Drip cover	φ30	—
		φ34	—
		φ38	—
		φ50	—
⑱	Stand unit	—	228150
	Manifold	PPV-34M	228110

# Personal Organic Synthesizer ChemiStation™

## Optional Accessories



### ■ Liquid-liquid extraction unit No need of Separating funnel

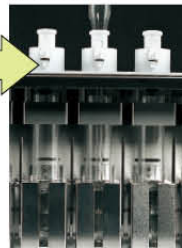
Complicated process of mixing and separating after synthesis can be carried out by ChemiStation. Minimizes sample loss as synthesis and separation can be done in one test tube.

#### Mixing



One touch mixing by magnetic stirrer

#### Suction



Bottom phase can be completely drained.

#### Separation



When sucking upper phase, separate in Separation tube and drain bottom phase.

Separation tube (6 pcs)  
Pipetter (manual)

Cat. No. 198620  
Cat. No. 198610



IGR-030 • 035

back (IGR-030)

back (IGR-035)

### ■ Inert gas controller

Protects reaction vessel by precise pressure control.

#### Specifications

Product name	Inert gas controller	
Model	IGR-030	IGR-035
Cat. No.	186870	186880
Control method	Manual	—
Pressure control range	0~0.06MPa	0.03MPa (fixed)
Input pressure	less than 0.56PA	
Display and safety function	Analog display, safety valve	
Gas contact parts material	PEEK, Teflon, PP, SUS	PP, Aluminum, Brass
Dimensions (mm) & weight	80W x 235D x 131H 2kg	



PC3001 VARIO pro

### ■ Diaphragm vacuum pump

Small size cooling tube (exhaust condenser), pressure sensor and vacuum controller are integrated.

#### Specifications

Product name	Diaphragm Vacuum Pump
Model	PC3001 VARIO pro
Cat. No.	229360
Displacement	33L/min
Ultimate vacuum	2hPa
Cylinder	3 step cylinder
Vacuum controller	By motor rotation speed control
Receiver at suction side	500mL round bottom flask
Condenser at exhaust side	Glass condenser with heat insulation cover
Receiver at exhaust side	500mL round bottom flask
Pressure sensor	Capacitance sensor
Dimensions (mm) & weight	328W x 294D x 480H 7.7kg
Power source	160VA AC100-120V



# Personal Organic Synthesizer ChemiStation™

## Parts List

### Parts for PPS-5511

#### ■Drip cover

Part Name	Type	Cat. No.
Drip cover (Φ12x4)	-	217610
Drip cover (Φ13)	-	217620
Drip cover (Φ13x3)	-	217630
Drip cover (Φ15)	-	217640
Drip cover (Φ15x3)	-	217650
Drip cover (Φ16)	-	217660
Drip cover (Φ16.5)	-	217670
Drip cover (Φ18)	-	217680
Drip cover (Φ20)	-	216890
Drip cover (Φ12)	-	217700
Drip cover (Φ21)	-	217710
Drip cover (Φ24)	-	217720
Drip cover (Φ25)	-	217730
Drip cover (Φ30)	-	217740
Drip cover (Φ34)	-	217750
Drip cover (Φ35)	-	217760
Drip cover (Φ30 for reflux adaptor) for PPS	-	245880
Drip cover (Φ35 for reflux adaptor) for PPS	-	245890

#### ■Reflux adaptor

Part Name	Type	Cat. No.
Reflux adaptor (Φ12x4)	-	217320
Reflux adaptor (Φ13)	-	217330
Reflux adaptor (Φ13x3)	-	217340
Reflux adaptor (Φ15)	-	217350
Reflux adaptor (Φ15x3)	-	217360
Reflux adaptor (Φ16)	-	217370
Reflux adaptor (Φ16.5)	-	217380
Reflux adaptor (Φ18)	-	217390
Reflux adaptor (Φ20)	-	217400
Reflux adaptor (Φ21)	-	217410
Reflux adaptor (Φ24)	-	217420
Reflux adaptor (Φ25)	-	217430
Reflux adaptor (Φ30) for PPS	-	245900
Reflux adaptor (Φ35) for PPS	-	245910

#### ■Test tube adaptor

Part Name	Type	Cat. No.
Test tube (Φ12x4)	-	217080
Test tube adaptor (Φ13)	-	212810
Test tube adaptor (Φ13x3)	-	217090
Test tube adaptor (Φ15)	-	212820
Test tube adaptor (Φ15x3)	-	217100
Test tube adaptor (Φ16)	-	212830
Test tube adaptor (Φ16.5)	-	212840
Test tube adaptor (Φ18)	-	212850
Test tube adaptor (Φ20)	-	212860
Test tube adaptor (Φ21)	-	212870
Test tube adaptor (Φ24)	-	212880
Test tube adaptor (Φ25)	-	212890
Test tube adaptor (Φ30)	-	212900
Test tube adaptor (Φ30) for pressure vessel	-	218550
Test tube adaptor (Φ34)	-	217110

#### ■Reaction Vessel

Part Name	Type	Cat. No.
① Standard reaction vessel (Φ18 NS14/23)	-	217120
② Standard reaction vessel (Φ24 NS14/23)	-	217130
③ Branched reaction vessel (Φ18 NS14/23 GL14)	-	217140
④ Branched reaction vessel (Φ24 NS14/23 GL14)	-	217150
⑤ Branched reaction vessel (Φ30 NS14/23 GL14)	-	212760
⑥ Branched reaction vessel (Φ34 NS14/23 GL14)	-	217160
⑦ Sealed reaction vessel (Φ16)	-	217170
⑧ Sealed reaction vessel (Φ24)	-	217180
⑨ Φ30 Pressure vessel	HIP-30	218290
⑩ On-head part	HIP-HEAD	218320
Φ30 Test tube	-	245920
Φ35 Test tube	-	245930
Φ12 Test tube	P-12	225720
Φ15 Test tube with lip	P-15S	225740
Φ15 Test tube with screw port	ST-15S	254320

#### ■Condenser, Hose

Part Name	Type	Cat. No.
⑪ Dimroth condenser NS14/23, GL 14	-	212780
⑫ Liebig condenser L100 NS14/23, GL 14	-	212700
Silicone hose for manifold 5m	-	212790
Cooling hose set (Φ9x1m, 2pcs)	CT-1S	194050
Cooling hose set (Φ9x2m, 2pcs)	CT-2S	201830
⑬ Small size condenser (NS 14/23)	-	240120
⑭ Ultra small size condenser (Ts 15/25)	-	240130
⑮ Ultra small size condenser (Ts 29/32)	-	240140

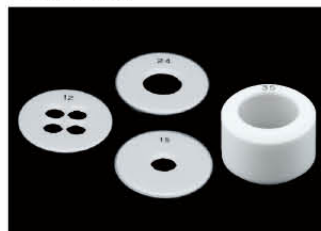
#### ■NS 14/23 parts

Part Name	Type	Cat. No.
⑯ Injection port with 3 way cock	-	217190
⑰ Dan-Stark trap for PPS-CCX	-	212770
⑱ Stopper NS 14/23 (10pcs)	-	217290
⑲ Screwthread GL14 NS 14/23 (10pcs)	-	217220
⑳ Adapter top: Ts 15/25 bottom: NS 14/23	-	217310
㉑ Dripping funnel 25mL NS 14/23	-	217210
㉒ KECK clip NS 14 Ts 15	-	217300

#### ■GL 14 parts

Part Name	Type	Cat. No.
㉓ Screw cap GL 14 (open type 10pcs)	-	217230
㉔ Screw cap GL 14 (blank type 10pcs)	-	217240
㉕ Hose connection straight (10pcs)	-	217250
㉖ Hose connection bent (10pcs)	-	217260
㉗ Silicone rubber sealing septa (25pcs)	-	217280
㉘ Silicone rubber sealing open (10pcs)	-	217270

#### ■Drip cover



Cover to prevent dew condensation in the aluminum block. To be used when using cooling cartridge.

#### ■Reflux adaptor



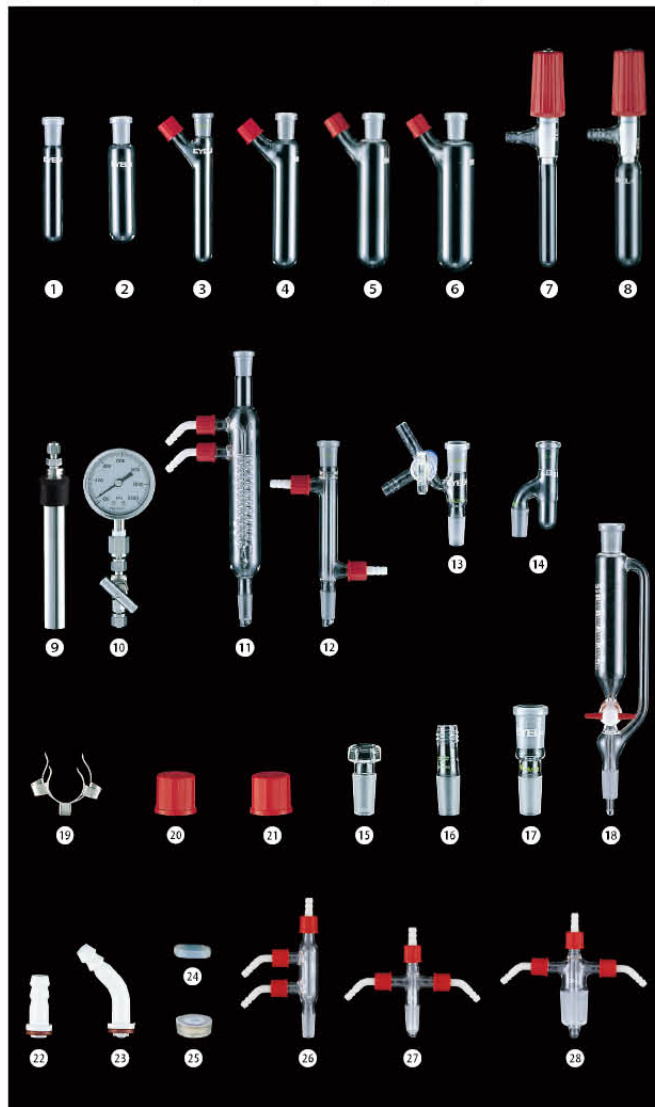
Built-in type condenser attached to aluminum block. It cools down top of reaction vessel.

#### ■Test tube adaptor



Select proper adaptor according to reaction vessel to be used. Adapter for one, three and four tubes available.

#### ■Reaction Vessel, Condenser, Hose, NS 14/23, GL-14





## ■ Septum

Part Name	Type	Cat. No.
① Suba seal (Silicone rubber for GL 14 10pcs)	-	212700
② Septum (Synthetic rubber for NS 14 10pcs)	-	218420
③ Septum (Silicone rubber for NS 14 10pcs)	-	218410
Septum (Synthetic rubber for Ts 15 10pcs)	-	218430
Septum (Silicone rubber for Ts 15 10pcs)	-	195710

## ■ Stirring impeller

Part Name	Type	Cat. No.
④ Teflon stirring impeller (disk shape)	ST-10L	217120
⑤ Teflon stirring impeller (cross shape)	ST-1X	191840
⑥ Teflon stirring impeller (football shape Φ6x15L)	TFS-15	200280
⑦ Teflon stirring impeller (football shape Φ10x20L)	TFS-20	200290
⑧ Teflon stirring impeller (football shape Φ10x25L)	TFS-25	200300
⑨ Strong magnetic stirring impeller (oval shape)	ST-2F	213110
⑩ Strong magnetic stirring impeller (bar shape)	ST-2L	213220
⑪ Glass stirring impeller (thin cylinder shape)	ST-1G	218330
⑫ Glass stirring impeller (thick cylinder shape)	ST-2G	218340
⑬ Shaft holder (for floating stirring bar)	-	240930
⑭ Floating stirring impeller	PR-10	240150

## ■ PPS parts

Part Name	Type	Cat. No.
Cross shape impeller Φ15 10pcs	ST-1X	191840
Cross shape impeller Φ30 10pcs	ST-2X	191850
Cross shape impeller Φ35 10pcs	ST-3X	212680
3 way cock 10pcs	QK-3P	191920
Cooling hose set (1mx2pcs)	CT-1S	194050
Cooling hose set (2mx2pcs)	CT-2S	201830
Φ15 Test tube 50pcs	-	195670
Φ30 Test tube 50pcs	-	195690
Φ35 Test tube 50pcs	-	212690
Perfluoro O-ring for PPS-15TC	-	195760
Perfluoro O-ring for PPS-25TC	-	195770
Perfluoro O-ring for PPS-35TC	-	213070
Screw ring for teflon cap Φ15 5pcs	-	195640
Screw ring for teflon cap Φ30 5pcs	-	195650
Screw ring for teflon cap Φ35 5pcs	-	213100
Teflon O-ring for PPS-15TC 10pcs	-	195780
Teflon O-ring for PPS-25TC 10pcs	-	195790
Teflon O-ring for PPS-35TC 10pcs	-	213080
2 way cock for teflon cap 5pcs	-	195700
Gas piping (for PPS teflon cap)	-	213090
Cap for PPS Φ15	-	195620
Cap for PPS Φ30	-	195630

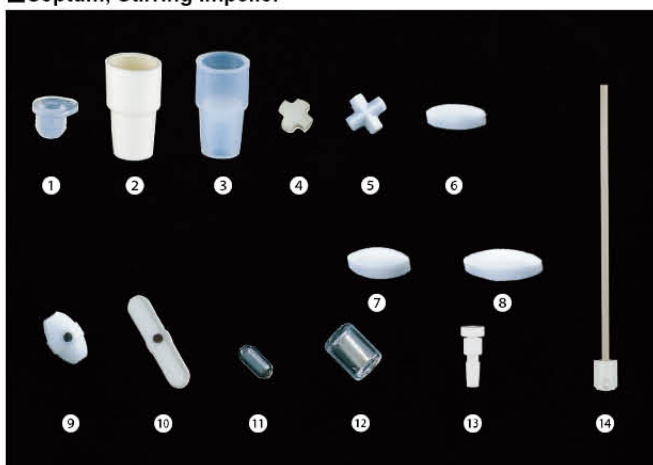
## ■ PPV parts

Part Name	Type	Cat. No.
① 3 port reaction vessel	-	228040
② 4 port reaction vessel	-	228050
③ Dean-Stark trap	-	228060
④ Separable flask 50mL	-	228810
⑤ Separable flask 100mL	-	228820
Separable flask 150mL 3 port	-	251070
Separable flask 150mL 4 port	-	251080
Multi-adapter	-	228080
Impeller (football shape) 5pcs	TFS-35	200320
Strong magnetic impeller (football shape)	-	203660
Stopper 10pcs	-	228100
Keck clip 10pcs	-	228090
Stirring seal	-	228120
Impeller Φ30	-	228140
Impeller Φ60	-	228130

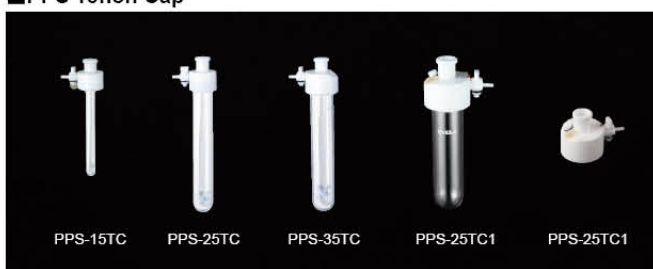
## ■ PPV-4430-4431-4460 parts

Part Name	Type	Cat. No.
① Pressure vessel Φ30 with inner vessel & impeller	HIP-30	218290
② Pressure vessel Φ30 with inner vessel, impeller, protection tube	HIP-30L	228190
③ Pressure vessel Φ60 with inner vessel & impeller	HIP-60	218310
④ Inner vessel glass Φ20 (for HIP-30)	-	218560
⑤ Inner vessel glass Φ20 (for HIP-30L)	-	231890
⑥ Inner vessel glass Φ45 (for HIP-60)	-	212340
⑦ Inner vessel teflon Φ20 (for HIP-30)	-	218570
⑧ Inner vessel teflon Φ45 (for HIP-60)	-	218580
⑨ Strong magnetic impeller (teflon Φ10)	ST-2F	213110
⑩ Strong magnetic impeller (teflon Φ14)	ST-3F	206430
⑪ On-head part	HIP-HEAD	218320
⑫ Pressure gauge (-100/2400kPa)	-	218480
⑬ Pressure gauge (0/6000kPa)	-	218490
⑭ Test tube adapter (for Φ30 vessel)	-	227970
⑮ Drip cover Φ30	-	228020
⑯ Drip cover Φ60	-	228010
⑰ Temp. sensor protection tube (HIP-30L)	-	231920
⑱ Temp. sensor protection tube (HIP-60L)	-	238500
Stopper	-	245830
⑲ Pressure connection	-	216470
⑳ Spiral hose for vessel connection	-	218400
Gas inlet spiral hose	-	218390
㉑ Flexible hose for exhaust port	-	218460
㉒ Independent relief valve	-	218510
Seal kit (fluoro carbon)	-	218380
Seal kit (rubber)	-	218370
Spring kit (2.41-5.16MPa)	-	215040
Spring kit (0.34-2.41MPa)	-	215050
O-ring Φ30	-	245810
O-ring Φ60	-	245820
Backup ring Φ30	-	218440
Backup ring Φ60	-	218450

## ■ Septum, Stirring impeller



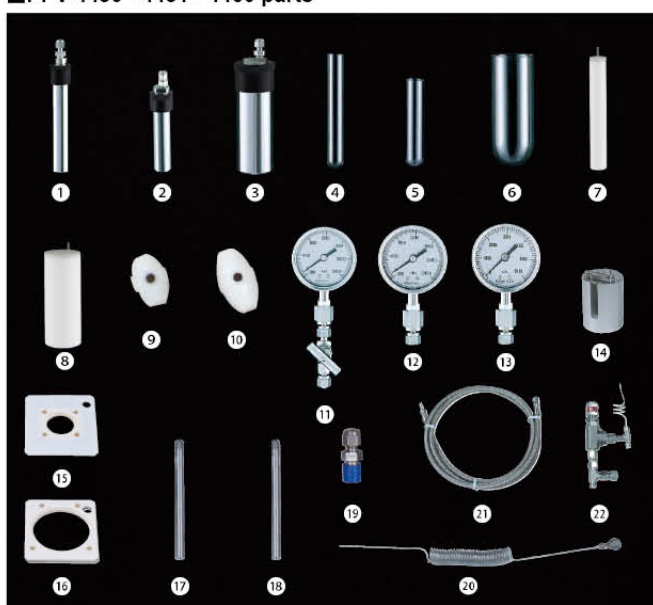
## ■ PPS Teflon Cap



## ■ PPV parts



## ■ PPV-4430-4431-4460 parts



Rotary Evaporator

1

Vacuum Pump &amp; Aspirator

2

Organic Synthesizer

3

Freeze Dryer, Spray Dryer

4

Shaker

5

Stirrer

6

Tube Pump

7

Low Temperature Circulator

8

Cold Trap

9

Constant Temperature Bath

10

Incubator

11

Oven

12

Fermentor

13

# Continuous Flow Hydrogenation Reactor *FlowMaster™* CCR-1100G



CCR-1100

The system provides safe and efficient hydrogenation reaction. Wide application by simple operation; efficient catalyst screening & condition setting, solvent-free reaction and scale-up production.

Contact hydrogenation experiment can be carried out by using continuous flow hydrogenation reactor.

Arbitrary selected volume of substrate (compounds) and hydrogen are independently injected into SUS column packed with metallic catalyst such as palladium.

Various parameters can be automatically controlled by PC software; Flow rate of substrate and hydrogen gas, temperature control of aluminum block bath, line cleaning and leak check.

## Specifications

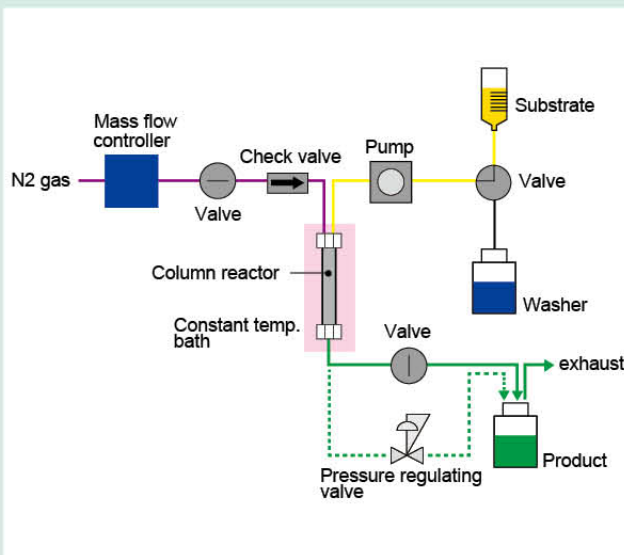
Product Name	Continuous Flow Hydrogenation Reactor
Model	CCR-1100G
Cat. No.	264290
Reaction method	Flow system
Reaction vessel	Catalyst packed column
Max. pressure	0~0.5Hpa
Liquid • Gas flow	1x (substrate & cleaning) • 1x (Hydrogen gas)
Reaction vessel size	ID5mm x 50mm
Temp. control range	RT+15~150°C
Temperature control	Aluminum block jacket control Step program
Dimensions (mm)	240W x 418D x 304H
Power source	210VA AC100V

## Features

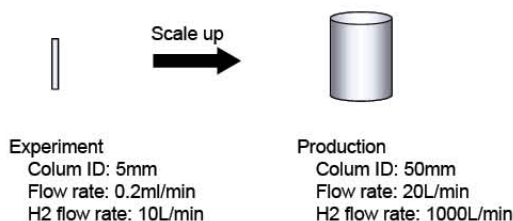
- There is no need of separating catalyst from product and column (catalyst) can be used repeatedly. There is no space to allow air (oxygen) in reaction vessel; eliminating reaction gas explosion risk.
- Treatment capacity is over 10 mmol per hour by 5mm diameter column. Compared to batch system, larger catalyst volume provides shorter reaction time and reaction at lower temperature.
- Unlike the system using hydrogen gas dissolved in solvents, the unit accepts direct injection of hydrogen gas into column and provides sufficient hydrogen gas supply. Air or carbon dioxide can also be used in place of hydrogen.
- Liquid substrate can be used undiluted; eliminating needs of solvent condensation process.

## Point!

### Flow line



### Scale up





# Column Flow Reactor *FlowMaster™* FFX-1000G

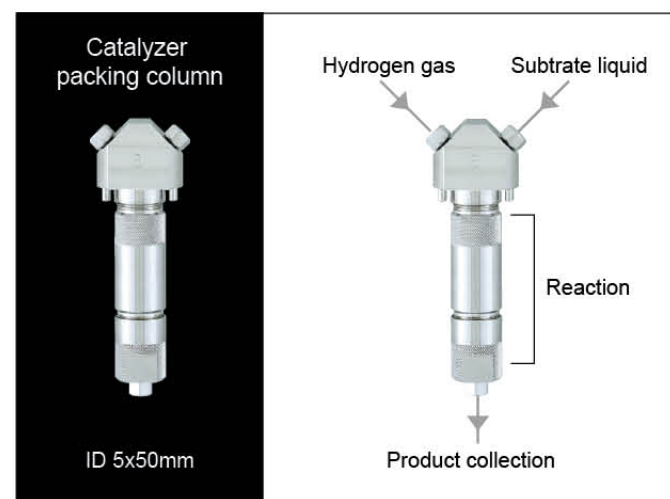
Effective middle pressure range flow-type hydrogenation reaction by high performance catalyst.



FFX-1000G

## Features

- Small, compact flow type reactor. Arbitrary selected volume of substrate (compounds) and hydrogen are independently injected into SUS column packed with metallic catalyzer such as palladium.
- Flow reaction study and scale up synthesis process are feasible.
- Pressure regulation valve precisely controls pressure on liquid and gas from 0~0.8MPa.
- Even during operation, condition setting can be done on pressure, temperature, flow volume.



## Specifications

Product Name	Column Flow Reactor FlowFactory
Model	FFX-1000G
Cat. No.	262770
Reaction method	Flow system
Reaction vessel	Catalyzer packed column
Max. pressure	1MPa
Temp. control range	50~200°C
Flow volume	0.01~1.00mL/min (liquid) 2~100mL/min (Hydrogen gas)
Temp. & flow setting	Sheet key input, digital display
Temp. control method	Heating P.I.D.
Dimensions (mm)	300W x 420D x 377H
Power source	500VA AC100V

# Column Flow Reactor *FlowFactory™* FFX-2000L

A hydrogenation reaction under high pressure and temperature in the catalyst column.



FFX-2000L

## Features

- Flow type reactor with wide temperature control range of 50~300°C.
- High pressure control range of Max. 10MPa.
- Pressure, temperature and flow volume (liquid and gas) can be changed even during operation.

## Specifications

Product Name	Column Flow Reactor <i>FlowFactory™</i>
Model	FFX-2000L
Cat. No.	262810
Reaction method	Flow system
Reaction vessel	Catalyzer packed column
Max. pressure	10MPa
Temp. control range	50~300°C
Flow volume	0.01~1.00mL/min (liquid) x 2
Dimensions (mm)	400W x 420D x 377H
Power source	500VA AC100V



# Process Reactor *React Master MAX*<sup>®</sup>

## DDS-1410 • DDS-2000A



DDS-1410



DDS-2000A

### React Master MAX DDS-1410

The React Master MAX is a 4-position automatic chemical synthesizer designed to perform process optimization experiment as

#### Features

- Highly precise and sensitive calorimetry analysis is realized by heat flow and cascade control. Actual reaction heat can be measured from low temp. to high temp. by taking mass balance.

applied to search optimum production method of API as well as organic chemistry study like calorimetry.

- Unique structure aluminum block features high thermal conductivity and ensures quick, uniform heating. 4 reaction vessels are independently controlled by P.I.D.

### React Master DDS-2000A

React master DDS-2000 is equipped with reaction calorimetry function and suitable for risk evaluation during scale up process. Jacket type reaction bath, inner temp.

#### Features

- Reaction vessel is jacket type bath. Reaction liquid temperature is controlled by mixing heated warm water and cold water from cool water tank.

sensor, impeller stirrer are incorporated in the unit and scale up experiment is feasible under same condition with actual production site.

- 4 reaction vessels from 250mL to 2L available. Highly heat conductive aluminum block with heating or cooling function.

#### Specifications

Product name	Process Reactor React Master	
Model	DDS-1410	DDS-2000A
Cat. No.	254030	254120
Synthesis scale	50mL/100mL/250mL (independent control)	250mL, 500mL, 1L, 2L
Temp. control range	-50°C ~ 250°C*	10 ~ 80°C (Jacket temp.)*
Temp. control accuracy	Aluminum block temp. $\pm 0.5K$ (-20 ~ 100°C) $\pm 1.0K$ (100 ~ 180°C)	
Rotation speed	100 ~ 1000rpm	
Max. heating speed	Tr < 5.3K/min Tj < 19.3K/min	Tr < 2.72K/min Tj < 12.9K/min
Drip control	Drip volume x 8	Drip volume or weight
Calorimetry	Heat flow system, Calibration	
Dimensions (mm)	650W x 490D x 380H	419W x 470D x 999H (Reactor) 309W x 362D x 167H (Control box)
Weight	59kg	75kg
Power source	2000VA AC100V	2900VA AC200V

# Process Reactor *React Mate*<sup>TM</sup>

## DDL-1000 • 2000 • 3000



DDL-1000

DDL-2000

DDL-3000

The React Mate DDL series is provided with jacket type reaction vessel, inner temperature sensor and impeller. It is suitable for organic experiment under reaction conditions required in actual production.

### Features

- Reaction vessel is jacket type bath. Reaction liquid temperature is controlled by mixing heated warm water and cold water from cool water tank.
- Two types of vessel are prepared; Standard 1L vessel for sample synthesis and 250mL suitable for reaction condition study.
- Two temperature control methods are available; Reaction liquid control and Jacket temperature control.

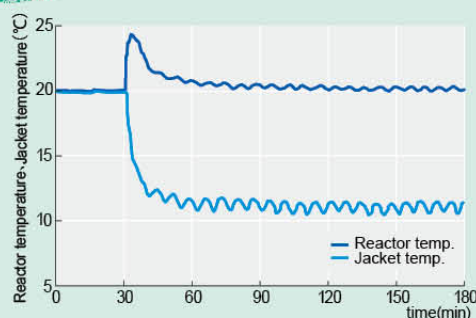
Emergency cooling function ensures safety even during strong heating reaction study.

Two types of reaction vessels are prepared; 250mL (DDL-1000) and 1L (DDL-2000•3000) with drain cock.

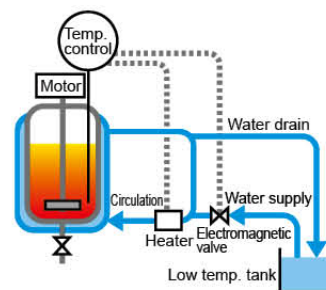
- Gradient temperature control makes it possible to keep temperature constant or rise/down temperature at programmed ratio.
- Three different shape impellers are available as standard (DDL-3000).
- LED light is installed at backside of reaction vessel. Reaction process status can be confirmed through slit of aluminum block.

### Point!

Reaction condition study for scale up



Flow chart



### Specifications

Product name	Process Reactor React Mate		
Model	DDL-1000	DDL-2000	DDL-3000
Cat. No.	226630	226640	DDL-2000 226640 ST-3000 Stirrer 231940
Reaction vessel	Jacket type (w/o drain) 250mL	Jacket type (with drain cock) 1L	
Synthesis scale	100 ~ 250mL	300 ~ 1000mL	
Stirring method	Impeller (2 straight blades, PTFE)	Impeller (4 blades, SUS316)	Impeller (SUS304)
Rotation speed	125 ~ 1059rpm	10 ~ 600rpm	0 ~ ±1500rpm (CW/CCW)
Temp. setting & display	Sheetkey input, digital display		
Control	Reactor control, Jacket control, Gradient temp. control, Constant temp. control		
Safety features	Leak/overload braker, Independent temp. control, Empty heating protection, Self diagnosis		
Dimensions (mm)	290W x 380D x 790H	330W x 420D x 1030H	290W x 380D x 790H
Power source	700VA AC100V	1200VA AC100V	1500VA AC100V

\* Cooling water circulator is necessary

Rotary Evaporator 1

Vacuum Pump &amp; Aspirator 2

Organic Synthesizer 3

Freeze Drier, Spray Drier 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

Incubator 11

Oven 12

Fermentor 13

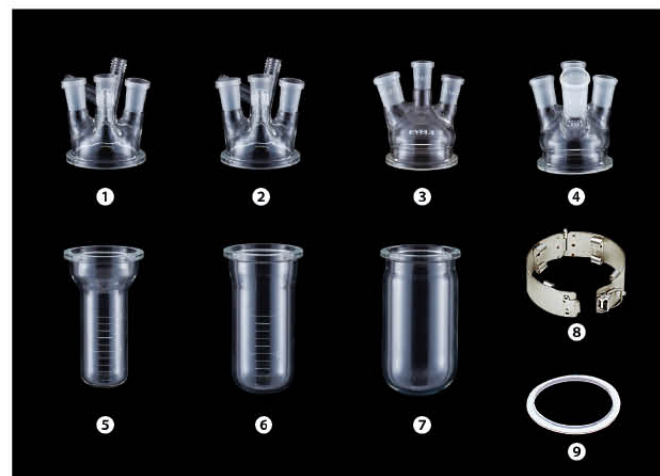


# Separable Flask

Separable flask suitable for small volum synthesis using stirrer or impeller.



## Option



## Related parts for seperable flask



## Features

- Wide port aperture makes it easy to collect products and to clean inside vessel.
- Various applications are available depending on vessel capacity of 50, 100, and 150mL. Stirring by stirrer or impeller is possible. Reflux by small condenser is also possible.
- With separable cover (option), evaporation by rotary evaporator is possible.
- Mountable on following units.
  - SynFlex BBS
  - ChemiStation PPV-5460
  - React Master MAX DDS-1410

## Specifications

Product name	Separable Flask Set			
Cat. No.	248810	248820	251070	251080
Volume	50mL	100mL	150mL	150mL
OD (mm)	38	50	60	60
Port	6	6	3	4
Scale	5mL	10mL	—	
Flask cover	254840	258870	251040	251050
Vessel	248880	248890	251060	
Separable clamp	116500			
Seal packing	262430			

No.	Product name	Specifications	Cat. No.
①	Flask cover	50mL	254840
②		100mL	248870
③		150mL (3 port)	251040
④		150mL (4 port)	251050
⑤	Vessel	50mL	248880
⑥		100mL	248890
⑦		150mL	251060
⑧	Separable clamp	50•100•150mL	116500
⑨	Separable seal packing	50•100•150mL	262430

## ■ For separable flask 50mL

Product name	Specifications	Model	Cat. No.
Test tube adapter	φ38 for DDS	—	254440
Drip cover		—	254460
Test tube adapter	φ38 for PPV	—	251100
Drip cover		—	251130
Tube adapter	φ38 BBS multi	BBS-38TI	248830
Teflon impeller	Football type x 5	TFS-20	200290
Strong teflon impeller	Football type	TFX-21	240320
Cross impeller	10	ST-3X	212680
Stirring propeller	Teflon	—	248900
Stirring seal	NS14/23	—	228120
Small condenser	NS14/23	—	240120



# Microwave Synthesizer Wave Magic

## MWS-1000A•1000B



MWS-1000A

MWS-1000A: For solid phase peptide synthesizing with microwave.

MWS-1000B: Single mode liquid phase synthesis is possible by using exclusive parts. Stirring, reflux, gas replacement and sampling can be done by single mode.

### Features

- Volume of microwave absorbed by reagent can be measured.
- Optical fiber temperature sensor realizes accurate temperature control of microwave.
- Temperature control range:  $RT + 10 \sim 70^{\circ}\text{C}$   
Output power adjustment range:  $50 \sim 500\text{W}$
- Synthesis of inactive solvents can be carried out thanks to strong microwave energy and solvent volume required is decreased; realizing synthesis cost reduction.

### Specifications

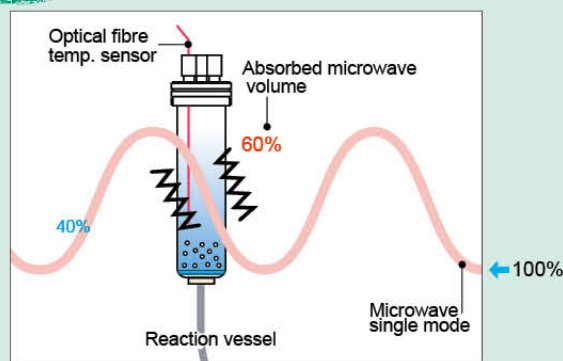
Product name	Microwave Synthesizer	
Model	MMS-1000A	MWS-1000B
Cat. No.	246360 (main unit)	246360 (main unit)
	246370 (exclusive parts)	246380 (exclusive parts)
Microwave radiation	Single mode (continuous wave, pulse wave)	
Reaction method	Solid phase synthesis	Liquid phase synthesis
Synthesis scale	0.5~10mL (0.5~5mL, 0.5~10mL)	1~20mL
Reaction vessel	PP reaction tube	3 port test tube
Stirring	Vortex mixer	Magnetic stirrer
Temp. control range	$RT + 10 \sim 70^{\circ}\text{C}$	$RT + 10 \sim 200^{\circ}\text{C}$
Rotation speed	0~1300rpm	100~1300rpm
Program	Constant value, Auto stop, Gradient, Step program	
Frequency & output power	2450 $\pm$ 30MHz 0.50~500W	
Dimensions(mm) & weight	565W x 430D x 536H 39kg	
Power source	1500VA AC100V	

### Point

#### Control panel



### Point! Microwave absorption measuring



### Neatly arranged operation valve & lever selector



Rokery Evaporator 1

Vacuum Pump &amp; Aspirator 2

Organic Synthesizer 3

Freeze Dryer, Spray Dryer 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

Incubator 11

Oven 12

Fermentor 13

# Compact Stirrer CPS-1000



CPS-1000

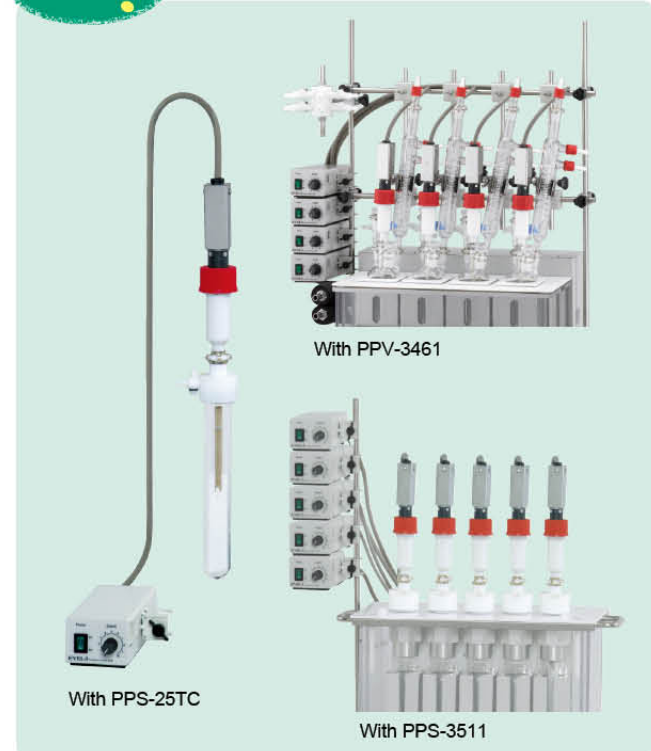
The unit is designed for use with personal organic synthesizers (PPS, PPV series) and features compact size, overhanging stirrer. Plural units can be used in parallel and it is suitable for the polymerization reaction study, the stirring of crystal and fits for small volume samples.

## Features

- Interchangeable joint (Ts 15/25 or NS 14/23) can be mounted.
- Motor overload protection function is incorporated.
- Different shapes of impeller available depending on the synthesizers to be used with the stirrer.
- Newly developed brushless motor realizes smooth and strong rotation.  
Rotation speed range 31~266rpm, Max. torque 68N·m, and up to 10000mPa·s stirring is possible.
- The stirring blade (impeller) is made of PTFE and the stirring shaft is made of PEEK or PPS. Both are inert specification and experiment can be conducted without influence of solvent chemical characteristics.

**Point!**

Suitable for routine experimental process



With PPV-3461

With PPS-25TC

With PPS-3511

## Specifications

Product Name	Compact Stirrer
Model	CPS-1000
Cat. No.	213290
Rotation speed	31~266rpm
Maximum torque	68.6mN·m
Max. stirring velocity	10000mPa·s
Setting & display	With power switch, volume setting
Safety function	Motor overload protection (Auto stop), Fuse

## Parts

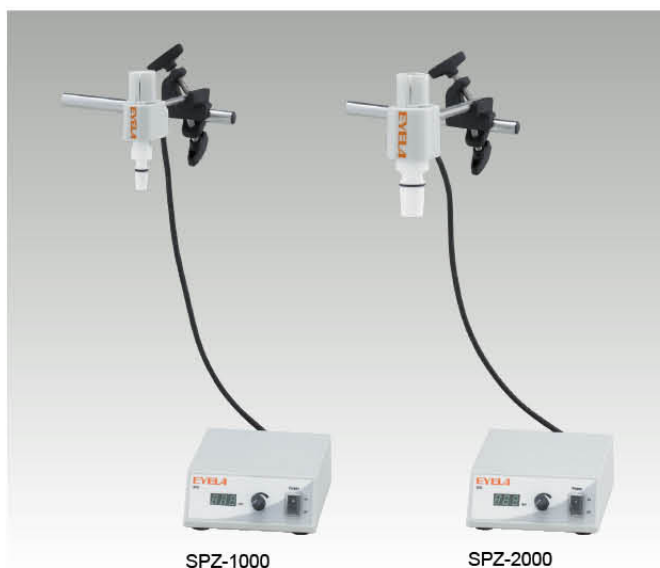
Product name	Cat. No.
Shaft (bar) PPS-1511·2511·3511 (PPS)	218810
Shaft (bar) PPS-5511 (PPS)	222730
Shaft (bar) PPS-5520 (PTFE with impeller) Φ30	231840
Shaft (bar) PPS-5520 (PTFE with impeller) Φ35	245860
Shaft (bar) PPS-2520·3520 (PTFE with impeller)	245870
Shaft (bar) PPV-3430 (PPS with impeller)	228140
Shaft (bar) PPV-3460·3461 (PPS with impeller)	228130
Impeller PPS-1511 (PTFE)	218830
Impeller PPS-2511 (PTFE)	218840
Impeller PPS-3511 (PTFE)	218850
Impeller PPS-5511 (PTFE)	218860
Stirring seal (NS14)	228120
Stirring seal (Ts14)	218800
Motor joint	221320
Coupling screw	221330
Motor joint with height adjustment screw	222740
Screw fixing	221340
Screw and nut for impeller (PEEK each 10pcs)	224550

Stirring impeller & shaft





# Small Stirrer SPZ-1000•1100•2000



SPZ-1000

SPZ-2000

The unit is designed for use with personal organic synthesizers (PPS, PPV series) and features compact size, overhanging stirrer. Stirring unit can be directly inserted into vessel; eliminating needs of centering.

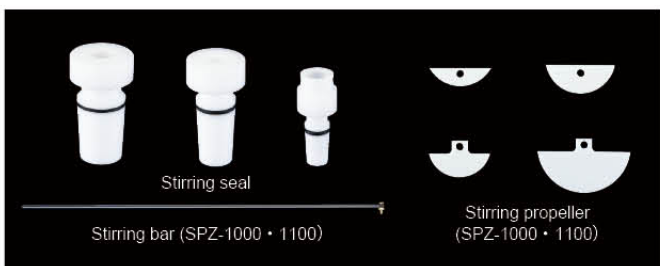
## Features

- Interchangeable joint (Ts 15/25 or TS 29/38) can be mounted.
- Operation controller and driving part are separated to provide control operation from outside of fume hood.
- Stirring seal can be inserted directly into vessel. No need of stirring rod centering.
- Stirring rod can be fixed manually. No need of fixing tool like chuck handle.
- Coupling cover is provided as standard.

## Specifications

Product name	Small Stirrer		Small Stirrer
Model	SPZ-1000		SPZ-1100
Cat. No.	260510		260520
Rotation speed	10~350rpm		
Maximum torque	0.015/350N•m/rpm		0.12/350N•m/rpm
Ultimate vacuum	Less 399.9 Pa		
Vessel volume	50~300mL		300~1000mL
Joint	TS 15/25		TS 29/38
Dimensions (mm)	Driving part: 38Wx67Dx132H		Driving part: 38Wx67Dx140H
Power source	Controller: 145Wx190Dx58H 50VA AC100V		

## Option



## Stirring seal

Applicable model	Joint	Cat. No.
SPZ-1000 SPZ-1100	Φ29	260710
	Φ24	260720
	Φ15	260730
SPZ-2000	Φ29	260740
	Φ24	260750

## Stirring bar & propeller

Product name	Vessel	Cat. No.
Stirring bar	—	260760
	Φ15	260770
	Φ24•29	260780
Propeller	Separable flask 50•100mL	260790
	Separable flask 300mL	260800



## Reaction vessel

Product name	Capacity (mL)	Cat. No.
Separable flask	50	261860
	100	261870
	300	261880

## Flask cove Φ100

Main tube	Side tube	Cat. No.
Φ15/25x1	—	261890
Φ29/38x1	—	261900
Φ15/25x1	Φ15/25x2	261910
Φ29/38x1	Φ15/25x2	260920
Φ15/25x1	Φ15/25x3	261930
Φ29/38x1	Φ15/25x3	261940

Rokery Evaporator 1

Vacuum Pump &amp; Aspirator 2

Organic Synthesizer 3

Freeze Dryer, Spray Dryer 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

Incubator 11

Oven 12

Fermentor 13



# Constant Temp. Bath with Magnetic Stirrer PS-1000•PSL-1400•1810•2000

For examination of reaction conditions with wide temperature range from -80 ~ 150°C.



## Features

- Equipped with strong magnetic stirrer for bath and vessel to keep sample temperature accurate and stable.
- PSL-1000 is for water and oil.
- PSL-1000•1400•1810 are compact, desktop type and can be installed in fume hood.
- PSL-1810•2000 provide long time, stable temperature control as low as -80°C which cannot be obtained by dry-ice/aceton mixture or ice.
- PSL-1810 bath adopts vacuum heat isolation system and realizes max. 7 days continuous operation at -78°C.
- PSL-1810•2000 are equipped with shuttered lid which can be adjusted to vessel diameter to minimize coolant evaporation.

## Specifications

Product Name	Constant Temperature Bath with magnetic stirrer			
Model	PS-1000	PSL-1400	PSL-1810	PSL-2000
Cat. No.	182740	182210	226340	220940
Temperature control range	Water: 30(RT+5°C)~80°C Oil: 30(RT+10°C)~150°C	-40~0°C	-80~0°C	-80~20°C
Temperature control accuracy	±0.5°C		±1°C	
Rotation speed	100~800rpm			
Temp. control	Heater P control	Heater P.I.D control, Refrigerator continuous operation		
Sensor	Thermistor	T Thermocouple	Pt100Ω	
Temp. setting & display	Analog volume, Temp. scale	Sheetkey input & digital display		
Safety functions	Independent overheat protector Sensor brake, Fuse	Independent overheat protector Leak/overcurrent braker, Sensor brake Refrigerator high pressure switch Overload relay hold circuit	Independent overheat protector Leak/overcurrent braker, Float switch Refrigerator high pressure switch Overload relay hold circuit Self diagnosis (Heater, Sensor, Temp. limit)	Independent overheat protector Leak/overcurrent braker Refrigerator high pressure switch Overload relay hold circuit Self diagnosis (Heater, Sensor, Temp. limit)
Heater	700W (Water & oil)	250W	450W	750W
Refrigerator•coolant	—	Air cooling 450W R404A	Air cooling 450Wx2•R507A•R23	Air cooling 500Wx2•R404A•R23
Bath Dimensions (mm)	Φ250 x 130D 6L	Φ140 x 135D 2.1L	Φ190 x 154D 3.5L	Φ250 x 180D 8L
Max. vessel capacity	2L Φ165mm	300mL Φ95mm		2L Φ165mm
Dimensions (mm) & Weight	230W x 280D x 260H 8kg	350W x 490D x 380H 29kg	530W x 450D x 522H 70kg	450W x 515D x 945H 100kg
Power source	750VA AC100V	650VA AC100V	1500VA AC100V	1900VA AC100V

## ■ Operation panel

### PS-1000



### PSL-1400



### PSL-1810



### PSL-2000



## ■ Installed in fume hood

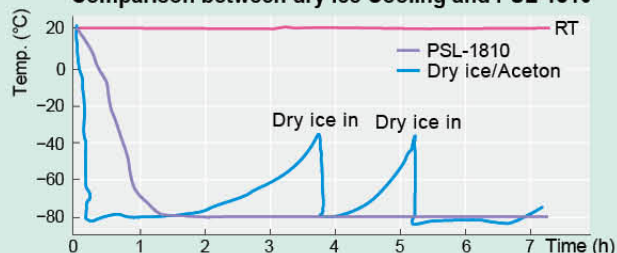


## ■ PSL-2000 + pole



## Point!

### Comparison between dry ice Cooling and PSL-1810

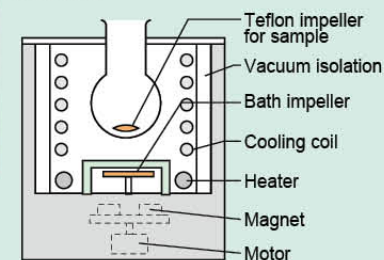


Dry ice and acetone can cool quickly but lacks stable temperature holding. PSL-1810 realizes stable temperature thanks to vacuum isolation effect.

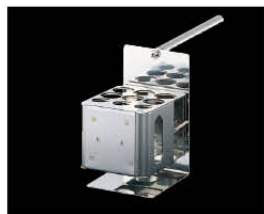
### Stable rotation from low to high speed



#### PSL-1810



## Option



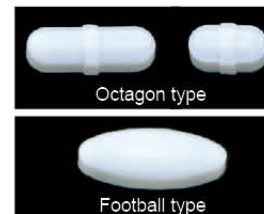
Test tube holder



2 port reaction vessel



Isolation lid



Teflon impeller

## ■ Option compatibility

Product name	Cat. No.	PS-1000	PSL-1400	PSL-1810	PSL-2000
Test tube holder	212300	●	●	●	
	224100				●
2 port reaction vessel	203170	●	●	●	●
Isolation lid	227220		●	●	
	164500	●	●		
	224090				●
Clamp set	229320			●	
	229310			●	
Stirring pole	229310			●	
Clamp for small vessel	182760		●	●	
Lid with shutter	182750		●		

## ■ Impeller

Product name	Model	OD x L (mm)	Cat. No.
Teflon impeller (Octagon type)	TOX-15	6.5×15	200340
	TOX-20	6.5×20	200350
	TOX-25	7.5×25	200360
	TOX-30	7.5×30	200370
	TOX-35	7.5×35	200380
Teflon impeller (Football type)	TFX-15	6×15	200390
	TFX-21	10×20	240320
	TFX-25	10×25	200410
	TFX-30	15×30	200420
	TFX-35	15×35	200430
	TFX-40	20×40	200440



# Aluminium Block Cryostat with Magnetic Stirrer PSL-2500A·2500B

Aluminum block cooling system provides safe and stable temperature control as low as  $-100^{\circ}\text{C}$  which cannot be obtained by dry-ice/aceton mixture or ice.



PSL-2500A

PSL-2500B

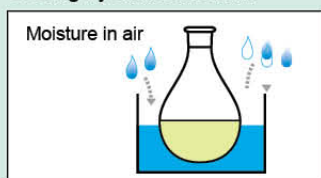
## Features

- Equipped with strong magnetic stirrer for bath and vessel to keep sample temperature accurate and stable.
- Minimum temperature is as low as  $-100^{\circ}\text{C}$ .
- Flask (PSL-2500B), test tube or centrifugal tube can be mounted.
- Compact desktop design of 220Wx445Dmm (PSL-2500A), 220Wx600Dmm (PSL-2500B).
- Time required to reach minimum temperature is only 40 minutes by use of highly thermal conductive aluminum block.
- Various reaction vessels can be mounted by using different size aluminum blocks and adapters.

## Point!

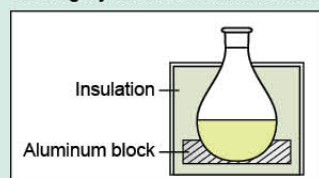
Safe and uniform cooling by aluminum block.

Cooling by chilled medium



Cooling capacity fluctuates by alcohol evaporation and use of inflammable alcohol contains flash accident risk.


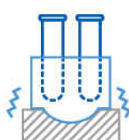
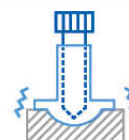

Cooling by chilled aluminum block



Volatilization and consequent composition change can be avoided thanks to dry cooling system by aluminum block. Stable and quick cooling is also feasible.

## Point!

Wide variety of vessels can be mounted.

Vessel	Flask	Test tube	Centrifugal tube	Aluminum bath
Model				
PSL-2500A	10~500mL	$\phi 24 \times 4$ 、 $\phi 34 \times 2$	50mL	—
PSL-2500B	10mL~1L	Vessel size changeable		Vessel smaller than bath size

## Point!

Flexible aluminum bath



Aluminum beads

Aluminum beads + PP ball

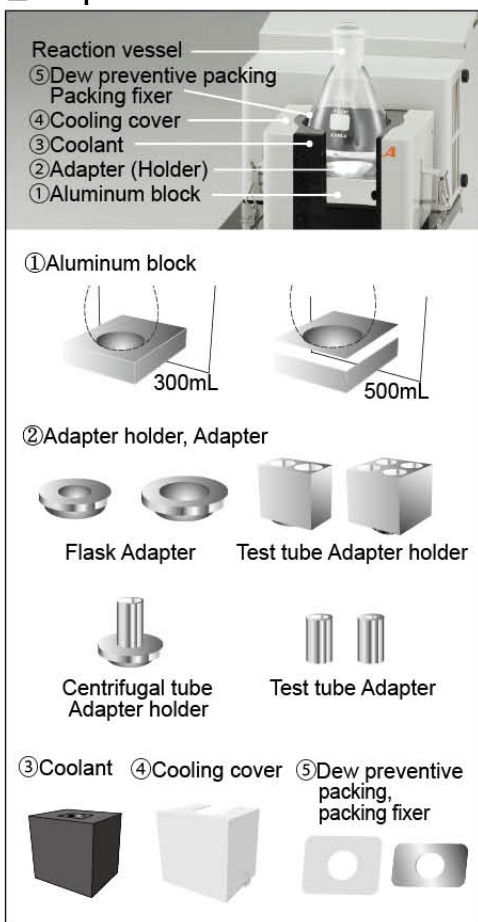
Various size vessels can be mounted.  
Prevents dew condensation.  
Can be used as liquid bath by filling low temp. heat medium.

## Specifications

Product name	Constant Temperature Bath with magnetic stirrer	
Model	PSL-2500A	PSL-2500B
Cat. No.	263158/263159	263160
Cooling system	By aluminum block	
Temperature control range	$-80^{\circ}\text{C} \sim \text{R/T} - 20^{\circ}\text{C}$	$100^{\circ}\text{C} \sim \text{R/T}$
Temp. control accuracy	$\pm 2^{\circ}\text{C}$	
Cooling speed	$20^{\circ}\text{C} \rightarrow -80^{\circ}\text{C}$ (30min.)	$20^{\circ}\text{C} \rightarrow -100^{\circ}\text{C}$ (40min.)
Rotation speed	100~800rpm	
Temp. control	Micro processor P.I.D control	
Motor	DC brushless motor 15W	
Cooler & refrigerant	Refrigerator 80W Helium gas	Refrigerator 150W Helium gas
Aluminum block	Option	
Dimensions (mm) & Weight	220W x 445D x 315H 15kg	220W x 630D x 350H 24kg
Power source	230VA AC115V	250VA AC100V



## ■ Composition



## ■ Aluminum block

Vessel size	2500A	2500B (w/o heater)	2500B (with heater)
	Cat. No.		
10mL	262510	262590	262730
20mL	262500	262580	262720
30mL	262490	262570	262710
50mL	262480	262560	262700
100mL	262470	262550	262690
200mL	262460	262540	262680
300mL	262450	262530	262670
500mL	259630	262520	262660
1L	—	258800	upon order

## ■ Test tube adapter

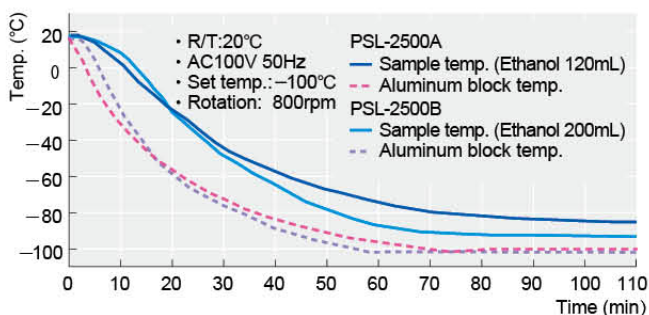
Vessel size	2500A	2500B (w/o heater)	2500B (with heater)
	Cat. No.		
φ24×4	262600	262630	262740
φ34×2	262610	262640	262750

## ■ 50mL Centrifugal tube

2500A	2500B (w/o heater)	2500B (with heater)
Cat. No.		
262620	262650	262760

## Data

## ■ Cooling capacity and time



Aluminum bath (PSL-2500B)  
Cat. No. 262210

Beads for aluminum bath  
2L Cat. No. 262250

PP ball for aluminum bath  
φ10x500pcs Cat. No. 262260  
φ10x1000pcs Cat. No. 262270

Sample temp. monitor (A)  
Cat. No. 260500

External temp. sensor  
Cat. No. 260500

Teflon temp. sensor  
Cat. No. 260110

Rotary Evaporator 1

Vacuum Pump &amp; Aspirator 2

Organic Synthesizer 3

Freeze Drier, Spray Drier 4

Shaker 5

Stirrer 6

Tube Pump 7

Low Temperature Circulator 8

Cold Trap 9

Constant Temperature Bath 10

Incubator 11

Oven 12

Fermentor 13

## Organic synthesizers & Reactors System Examples

Reaction solvent vapor can be effectively evaporated and refluxed.

- Suitable for heating reaction above boiling point.
- Strong reflux experiment is possible by Dimroth condenser.
- Reflux by water realizes polymerization and green chemistry.

### ■ Main functions

Strong reflux, cooling and stirring by heating and condenser.  
Gas purge & depressure.  
Sampling

Synthesis scale: 7mL, 12.5mL, 30mL, 60mL x 8pcs  
Temp. control: RT+10~280°C (~200°C: 50~60mL)

### Reaction without water/oxygen is possible.

- By applying vacuum grease to joint part, it can be used as Schrenck tube.
- Suitable for reaction that requires gas replacement, for reaction of compounds which are unstable to small volume of oxygen and water.
- Fill reaction vessel with inert gas by connecting vacuum pump and inert gas supply pipe to 3 way cock.

### ■ Main functions

Gas purge (vacuum pump + inert gas)  
Heating, reflux, cooling and stirring  
Sampling

Synthesis scale: 7mL, 12.5mL x 5pcs  
Temp. control: -23~160°C

- With 4 compact stirrers fixed to reaction vessels.
- Suitable for solvents of high viscosity and observation of crystallization process.
- Stirring up to 10000mPa · s(cP) is possible.
- Independent rotation speed setting is possible for 4 stirrers.

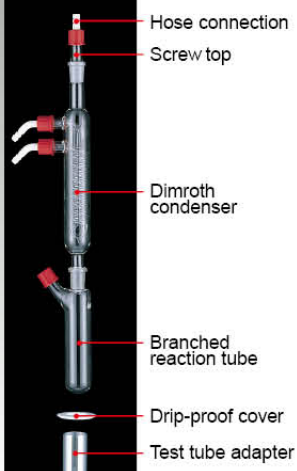
### ■ Main functions

Gas purge  
Heating, reflux, cooling and stirring  
Sampling

Synthesis scale: 50~150mL x 4  
Temp. control: -27~200°C

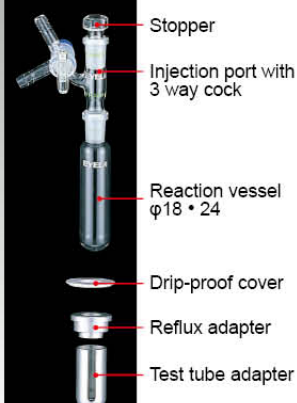
### PPS-5511 System

#### Dimroth, Polymerization & Green chemistry



### PPS-5511

#### Schrenck system



### PPV-3461 System

#### Impeller stirring, flexible system





# SynFlex BBS System

## SynFlex™ BBS system

### 1L Round flask system with ultra small condense

Specifications 29×32



Product Name	Cat. No.
Magnetic stirrer RCH-1000	264280
Aluminum block BBS-135RB	240430
Teflon impeller TFX-35	200430

## SynFlex™ BBS system

### Small volume synthesis with separable flask

BBS-150FAP



Product Name	Cat. No.
Magnetic stirrer RCH-3	123910
Aluminum block BBS-150FAP	240050
Single holder BBS-1HLD	239810
Tube adapter BBS-38TI	248830
Separable flask set	
Small condenser NS14/23	240120
Teflon impeller TFX-21	240320

## CCR-1100G System

### Flow type hydrogen reaction system



Product Name	Cat. No.
Flow reactor CRG-1100G	264290
Column reaction vessel Φ5x100mm	250390
Column reaction vessel Φ10x50mm	250400
Column reaction vessel Φ10x100mm	250410
Nitrogen generator RHG-200	250420

## DDS-1410 System

### For reaction condition study and screening



Product Name	Cat. No.
Process reactor DDS-1410	254030
Impeller unit DDS-14RV	254040
Syringe pump unit DDS-14SS	256950
AC relay unit DDS-14AC	254060
Separable flask set 250mL	254070
Small condenser NS14/23	240120
Cooling water circulator CA-1115A	249120

# Pharmaceutical Process



PPM-5512



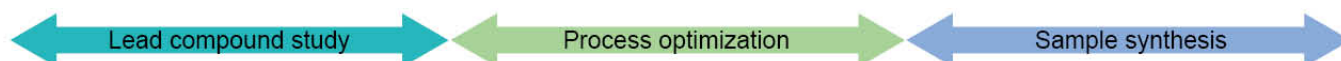
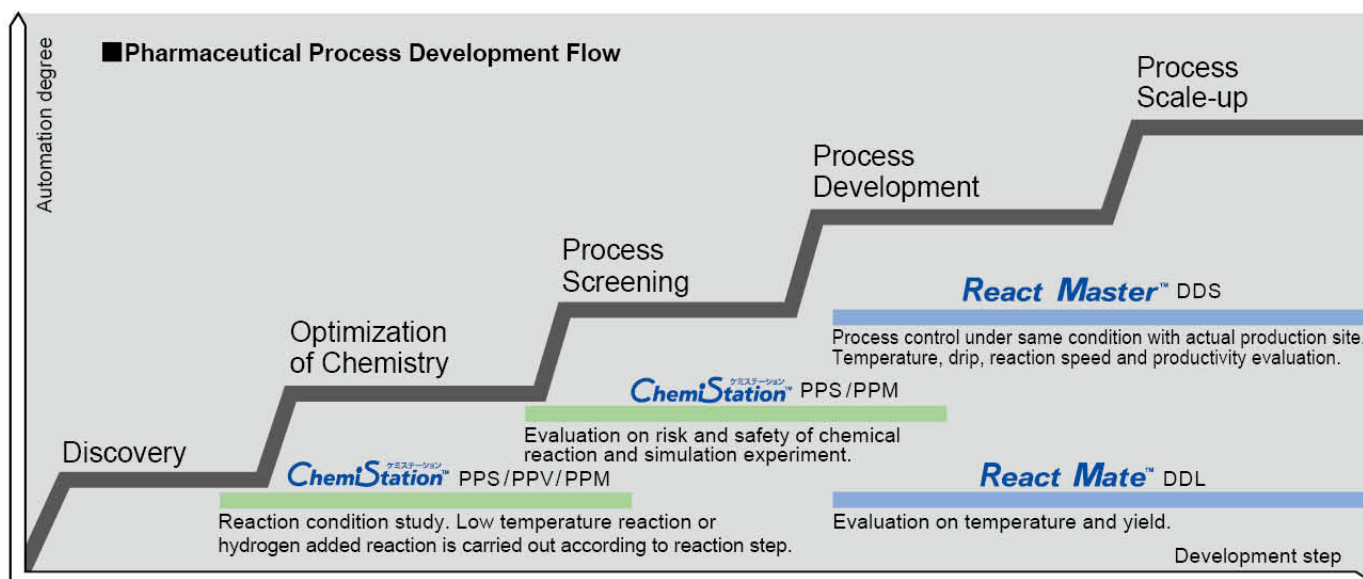
PPS-5520



DDS-1410



DDS-2000A



Combinatory chemical synthesis and evaluation with 1~15mL sample. Make more active chemical compounds from active compounds and evaluate them. (Lead optimization)

Establish synthesis route with small volume samples of 1~50mL. Simulation experiment is repeated by 10~250mL samples (reaction screening) to establish production process; safe, low cost, high yield and environmentally friendly.

Reaction at 100~1000mL synthesis scale. Approximately 1g active compounds (API-Active pharmaceutical ingredients) can be produced with high reproducibility.