Opira GROUP

GYROZEN CONCENTRATORS

EXPERTS IN LABORATORY EQUIPMENT

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HyperCOOL™

HyperCOOL is a lab scale freeze dryer using the lyophilization phenomena. HyperCOOL is designed for safety, robustness and convenience for the successful freeze drying and cold trap. It is suitable for drying of aqueous products, various solvents and products with a low freezing point. HyperCOOL with stylish, modern and unique design will help you enjoy your daily laboratory work to the fullest!

HyperVAC™

HyperVAC is a centrifugal vacuum concentrator as general-purpose laboratory benchtop equipment. HyperVAC offers rapid, environmental friendly and efficient vacuum concentration or drying of samples like DNA/RNA, nucleotides, proteins and other liquid or wet samples with ease and reproducibility that maintain sample integrity. HyperVAC is ideal for routine work with your samples.

HyperVAP™

HyperVAP is a semi-automated evaporative concentrator that efficiently evaporates organic solvents by injecting inert gas into a sample under constant temperature condition. Inert gas is incorporated through the nozzles inside the lid and creates semi-helical gas flow into the sample tubes to maximize the surface area for efficient vaporization. It is efficiently used in the sample preparation for GC, GC/MS, and HPLC/MS analysis.

Freeze Dryer and Cooling Trap

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HyperCOOL is a lab scale freeze dryer using the lyophilization phenomena. HyperCOOL is designed for safety, robustness and convenience for the successful freeze drying and cold trapping. It is suitable for drying of aqueous products, various solvents and products with a low freezing point.

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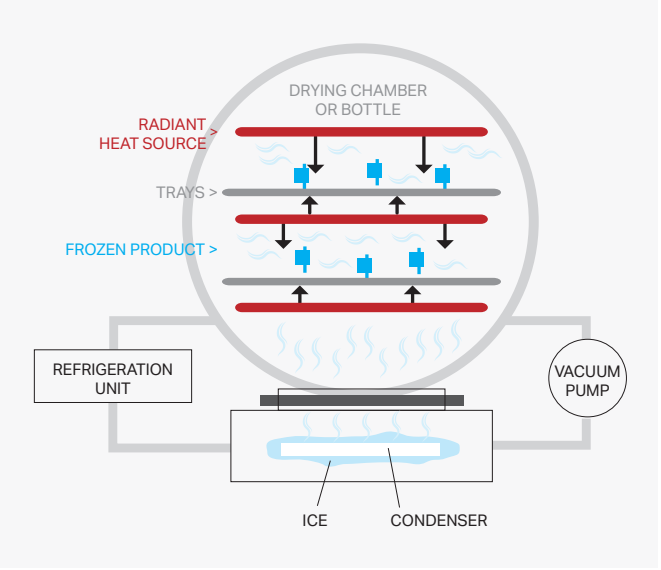


Features

- Provide wide solvent coverage by dropping temperature down to -110℃
- HyperCOOL by itself, when equipped with manifolds or chambers, becomes a versatile freeze dryer
- The compatible vacuum rotary vane pump generates vacuum down inside the chamber
- Automatic De-Vac and De-Ice functions installed
- Magnet embedded front cover of the condenser for very convenient cleaning
- Extended applications for concentrating wider range or larger volume of solvents

Applications

- Pharmaceutical study and production
- Research and production of vaccine and antidote
- Drying and preservation of plants, food and etc.
- Archaeological study

Freeze Drying

Freeze dryer is a system for physical drying of samples and it is used for long-term preservation, improve shelf life, sample pretreatment and product recovery from dissolved samples. Freeze drying method is also called lyopholization which has a three-step process.

The first is prefreezing which is a step to freeze moisture of samples or liquid into solid (ice). The second is primary drying step which occurs the phase transition of the sample of solid to gas phase without passing through the intermediate liquid phase, in other words, sublimation, using low temperature and low pressure. Strongly bound residual moisture is still present in the sample even after primary drying. The last step is secondary drying as a physical process step that the residual moisture (water) is removed from the sample, in other words, isothermal desorption.

Freezing Point Depression

$\Delta T = i K_f m$

ΔT
Decrease in solution freezing point

K_f
Freezing point depression constant for the solvent

m
Molality

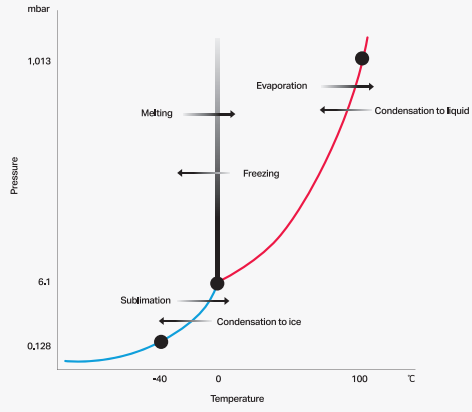


Figure 1-1. Typical Phase Diagram of Water

Temperature (℃)	Water Vapor Pressure (mBar)
+30	42.421
+20	23.374
+10	12.275
0	6.103
-20	2.599
-30	0.381
-40	0.128
-50	0.039
-80	0.0005

Figure 1-2. The table of vapor pressure by temperature

It is important to check the actual pressure status of the sample because the actual temperature of the frozen sample is determined by the actual pressure. The pressure should be at least 6.1 mbar for the freeze drying.

Vapor pressure is related to temperature. It is important to balance between the temperature to maintain the frozen state and the optimize temperature to maximize the vapor pressure.

Fully Teflon coated condenser chamber and top plate provides consistent resistance against aggressive solvents and acids.

Electrical de-ice function of chamber heating makes fast ice removal.

Diverse sample containers can be used both in the chamber plate and flasks through manifold tree with 3/4 inch rubber valves.

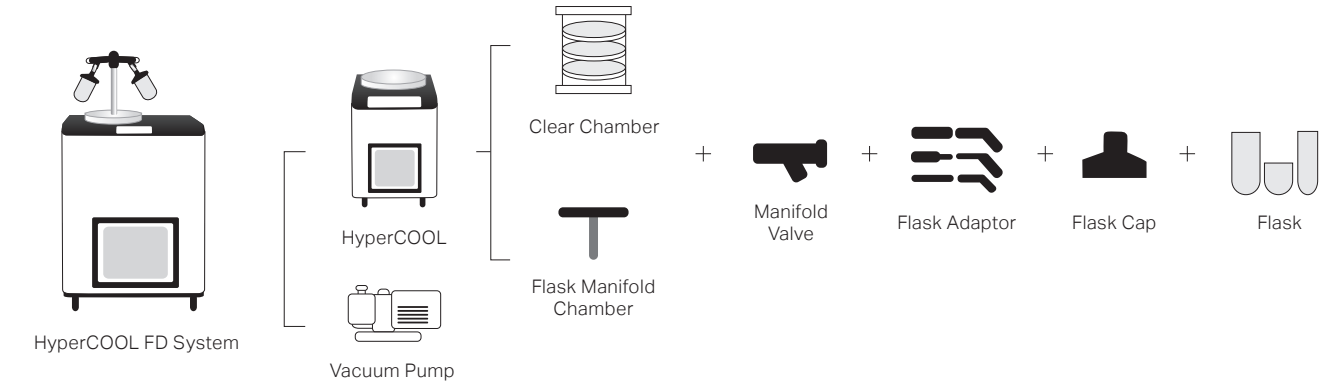
Technical Specifications

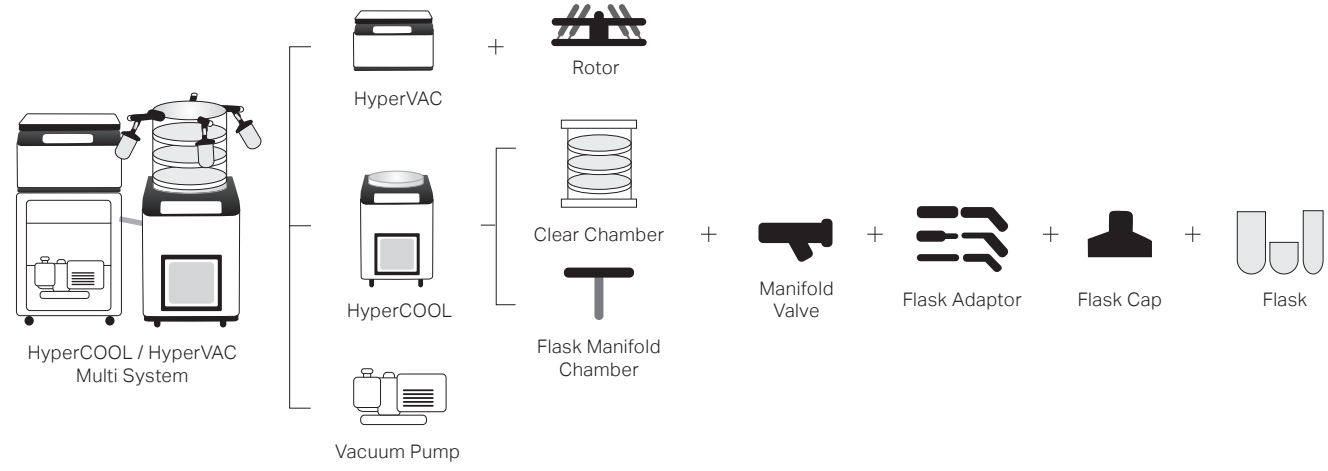
	HyperCOOL HC3055	HyperCOOL HC3110	HyperCOOL HC8080
Ultimate Chamber Temp (at RT) (°C)	-55	-110	-80
Chamber Volume (L)	4		25
Trap (Chamber) Size (Ø x L)	165 x 202		305 x 355
ICE Condensing Capacity (kg)	3		8
Digital Readout	Temperature, Time		Time, Program, Temperature, Vacuum Pressure
Function	KEYLOCK, DEFROST, VACUUM, TIME		COOLING, VACUUM
Power Requirement (Resting, VA)	642	819	1,500
Dimension (W x D x H, mm)	400 x 660 x 570		710 x 610 x 960
Weight (kg)	58	72	195
Power supply	230 V, 50 Hz (AC 220-230 V, 50/60 Hz; 110 V optional)		
Cat. No.	Hyper-HC3055	Hyper-HC3110	Hyper-HC8080
			

Front installed condenser pins are easily de-dusted by detaching a magnet door.

A screw capped drainage in the front body for easy and quick cleaning.

System Diagram





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Examples of System Configurations

	HyperCOOL 55-M4 / 110-M4 Basic	HyperCOOL 110-CH Rack	HyperCOOL 110-CH 4V Rack
Condenser Temperature	-55°C or -110°C	-110°C	-110°C
Drying Axillaries	4 Tree Manifold or 4 Flasks	Chamber	Chamber with 4 Valves for 4 Flasks
Pump	Rotary Vane Pump	Rotary Vane Pump	Rotary Vane Pump

	HyperCOOL 55-M4 / 110-M4 Basic	HyperCOOL 110-CH Rack	HyperCOOL 110-CH 4V Rack
Condenser Temperature	-110°C	-110°C	-110°C
Drying Axillaries	Chamber with 8 Valves	Centrifugal Vacuum Concentrator Two of 4 Tree Manifolds for 8 Flasks	Chamber with 4 Valves for 4 Flasks
Pump	Rotary Vane Pump	Rotary Vane Pump	Rotary Vane Pump
Others	-	B Type Table	B Type Table

	HyperCOOL 8080-M4 Basic	HyperCOOL 8080-M6 Basic	HyperCOOL 8080-M8 Basic
Condenser Temperature	-80°C	-80°C	-80°C
Drying Axillaries	4 Tree Manifold or 4 Flasks	6 Tree Manifolds for 6 Flasks	8 Tree Manifolds for 8 Flasks
Pump	Rotary Vane Pump Installed	Rotary Vane Pump Installed	Rotary Vane Pump Installed

	HyperCOOL 8080-CH Rack	HyperCOOL 8080-CH 4V Rack	HyperCOOL 8080-CH 8V Rack
Condenser Temperature	-80°C	-80°C	-80°C
Drying Axillaries	Chamber	Chamber with 4 Valves for 4 Flasks	Chamber with 8 Valves for 8 Flasks
Pump	Rotary Vane Pump Installed	Rotary Vane Pump Installed	Rotary Vane Pump Installed

* OTHER PACKAGES AVAILABLE

Centrifugal Vacuum Concentrator

HyperVAC™

HyperVAC is a centrifugal vacuum concentrator as general-purpose laboratory benchtop equipment.
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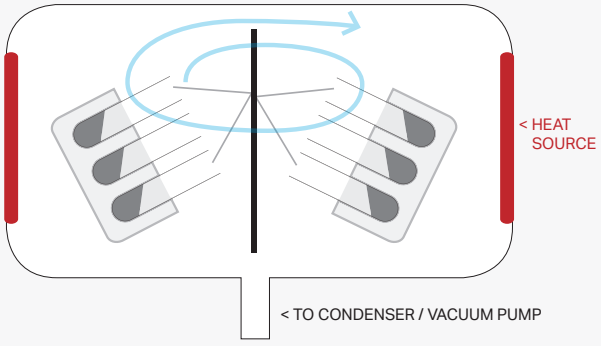


Features

- Modular configurations of centrifugal part, cold trapping, and vacuum pump for versatile applications
- Available for volatile chemical solvents by accomodating with water pump, diaphram pump or oil pump
- Accommodate a wide range of sample containers : 0.5, 2.0, 15, 50 mL tubes and microplates
- Automatic control and digital reading of TIME, TEMP and VAC
- Efficient concentration by equipped with an ice-cold trapping or a cooling trap, HyperCOOL (-55℃/-110℃)

Applications

- Nucleic acids (DNA/RNA) concentration
- HPLC, PCR, gel extraction, isolation, purification and concentration from solid phase extraction to solvent removal
- Combinatorial chemistry

Centrifugal Vacuum Concentration

Centrifugal vacuum concentrator evaporates the solvents for sample concentration or drying. Generally, liquid phase is evaporated to the gaseous phase at high temperature of above boiling point and atmospheric pressure. However, since it is not suitable for temperature sensitive samples, we need more comfortable way for evaporation. As the vapor pressure diagram [Figure 1], the boiling point can be decreased by lower pressure. The low pressure condition is possible by vacuum pump. HyperVAC is designed heating up to 80 degrees and working with vacuum pump. It can lead that the solvent has low boiling point by vacuum and the evaporation can be promoted by applying energy like heat. The samples are not under thermal stress and the experiment can proceed quickly. It is possible to collect without any pumping out and foaming due to the centrifugation and safe to collect the solvent vapor in drip catcher or cold trap.

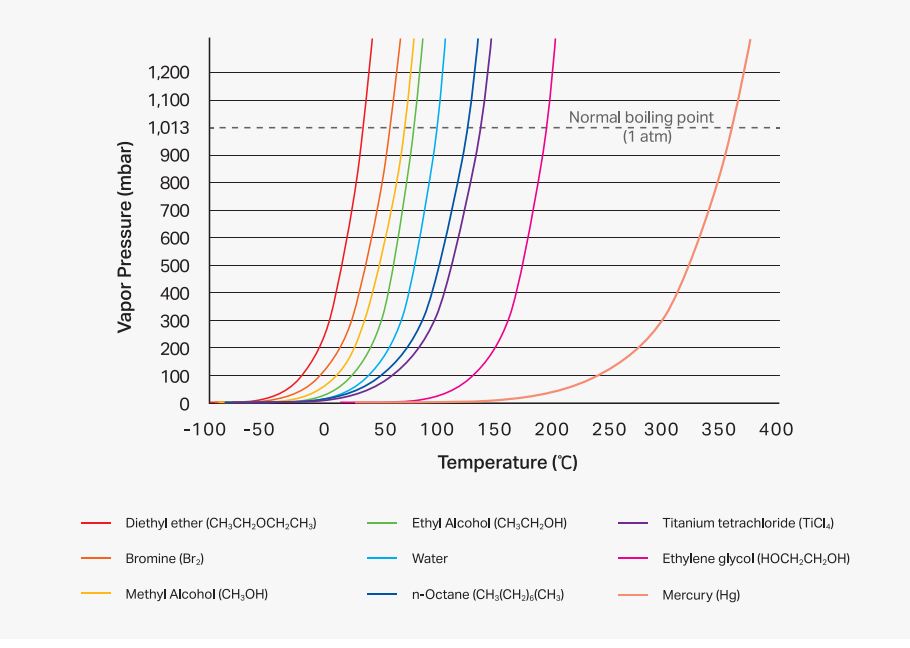


Figure 2-1. Vapor Pressure Diagram

Vapor Pressure Lowering

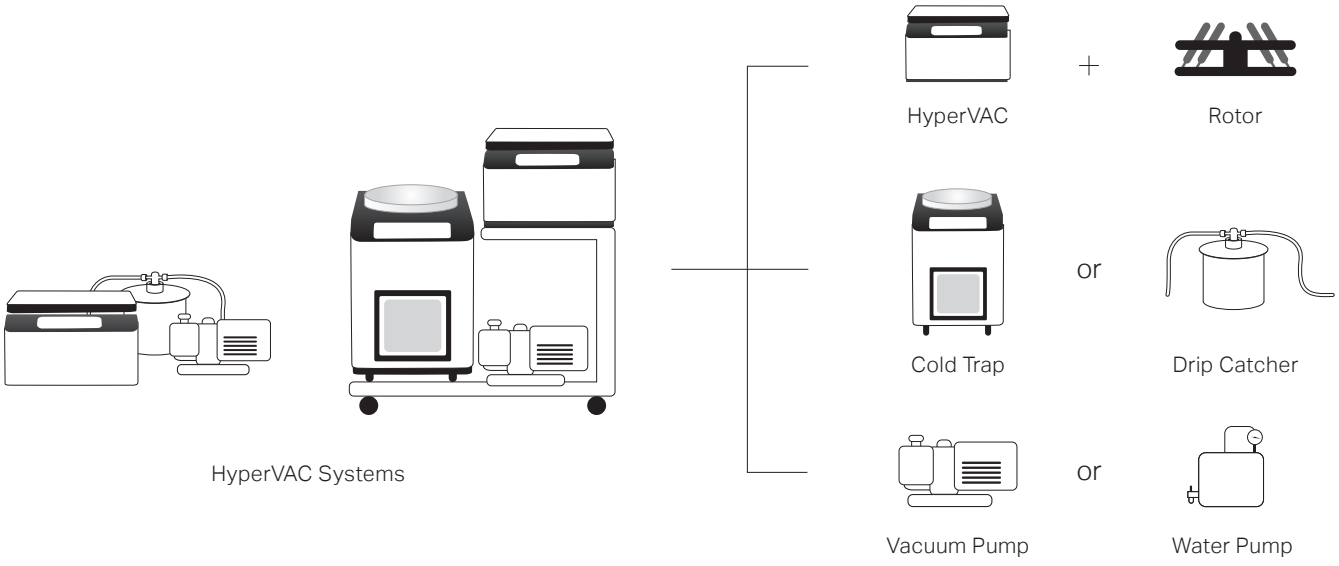
$P=XP^o$

P = Vapor pressure of the solution

X = Mole fraction of the solvent

P^o= Vapor pressure of the pure solvent

System Diagram



Technical Specifications

		HyperVAC-LITE	HyperVAC-MAX
Max. RPM		2,000	
Max. Capacity	**Fixed Angle**	120 x 1.5/2.0 mL microtubes or 48 x 1.5/2.0 mL + 76 x 0.5 mL microtubes 32 x 10 mL, 6 x 50 mL conical	200 x 1.5/2.0 mL microtubes 24 x 30 mL, 12 x 50 mL conical
	Swing-out	2 loadings of MTP	4 loadings of MTP or DWP
Auto Start / Stop of Vacuum		Yes	
Chamber Heating Temp. Range		R.T ~ 80°C	
Vacuum Pressure (mbar)		1 ~ 1,013	
Operating Time		< 23 hr 59 min or continuous, Default value: 0 h 0 m (continuous)	
Weight (kg)		22.5 (without rotor)	37 (without rotor)
Power Requirement (Centrifuge, VA)		350	700
Power supply (V/Hz)		230 V, 50 Hz (AC 220-230 V, 50/60 Hz; 110 V optional)	
Centrifuge Dimension (w x d x h, mm)		375 x 445 x 252	475 x 560 x 350
Cat. No.		Hyper-VC2124	Hyper-VC2200

Examples of System Configurations

	HyperVAC-LITE a	HyperVAC-LITE b
Condenser Temperature	LITE Type / User's Choice	LITE Type / User's Choice
Drying Axillaries	0°C Ice Cooling / Chemical Trap Bottle	0°C Ice Cooling / Chemical Trap Bottle
Pump	Water Pump	Diaphram Pump

	HyperVAC-MAX a	HyperVAC-MAX b1	HyperVAC-MAX b2
Centrifuge	MAX Type / User's Choice	MAX Type / User's Choice	MAX Type / User's Choice
Cooling Trap	0°C Ice Cooling (Drip Catcher)	-55°C	-110°C
Pump	Diaphram Pump	Rotary Vane Pump	Rotary Vane Pump
Others		A Type Table	B Type Table

* OTHER PACKAGES AVAILABLE

Rotors for HyperVAC-LITE

GRV-m0.5/2.0-124
48 x 1.5/2.0 mL
+ 76 x 0.5 mL

GRV-m2.0-120
120 x 1.5/2.0 mL

GRV-50-6
Incl. 6 ea x HLV-50
6 x 50 mL (conical)

GRV-15-12
Incl. 12 ea x HLV-15
12 x 15 mL

GRV-mw-2
2 loadings of MTP

GRV-10-18
18 x 10 mL vial tube

GRV-10-32
32 x 10 mL

GRV-c15-12
12 x 15 mL conical

GRV-20-12
12 x 20 mL vial tube

GRV-c50-6
6 x 50 mL conical

Rotors for HyperVAC-MAX

GRV-m2.0-200
200 x 1.5/2.0 mL

GRV-15-48
Incl. 48 ea x HLV-15
48 x 15 mL

GRV-50-12
Incl. 12 ea x HLV-50
12 x 50 mL (conical)

GRV-mw-4
4 loadings of MTP/DWP

GRV-5-192
192 x 5 mL

GRV-8-60
60 x 8 mL vial tube

GRV-c15-24
24 x 15 mL conical

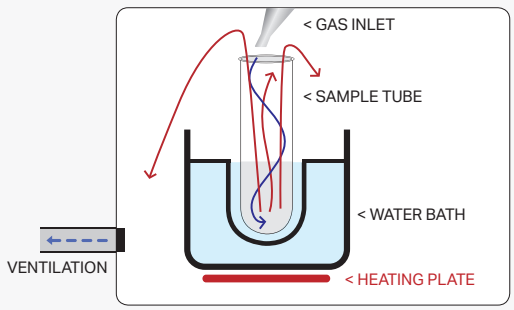
GRV-30-24
24 x 30 mL vial tube

GRV-c50-12
12 x 50 mL conical

Gas Purging Evaporation Concentrator

HyperVAP™

HyperVAP, HV300 is designed to semi-automatically remove vaporized solvent and concentrate samples. The inert gas such as Nitrogen is injected to the samples from the inner side of the lid in a way to generate semi-helical air flow through the sample tubes and produce much larger surface for efficient evaporation. The temperature control of water chamber to 90℃ escalates volatile vaporization and the back-located ventilation fan evacuate evaporated gas out of the instrument. When it is used inside a fume hood, much improved evaporation and concentration can be achieved under the safe environment. HV-300 provides some automatic control functions of time duration and purging pressure of gas inlet. Any type of sample containers from micro-tubes to large capacity glass tubes can be applied and enjoyably operated with minimum hands-on time.



Features

- Accelerated evaporation by semi-helical gas purging and heating
- Four lines of separated independent control of gas purging
- Diverse dimensions of gas inlet nozzles and tube racks
- Dual step control of pressure and time of gas purging
- Easy monitoring through transparent windows from front and left sides.
- Selectable light on and off function

Applications

- Evaporation of solvents for compound analysis
- Evaporation of extraction solvent for GC, GC.MS, and HPLC/MS analysis
- Concentration of solvents for the preparation of drug samples or pesticide extracts
- Widely used in environmental, forensic, clinical chemistry, food and pharmaceutical laboratories

Technical Specifications

	HyperVAP HV-300
Number of Samples	6 ~ 32
Sample Volume (ml)	5 ~ 300 mL
Gas	Compressed air, Nitrogen, etc.
Operating Gas Pressure (psi)	Max 50 psi
Pressure Control	Automated dual-step control (initial & running pressure)
Max. Time for Initial Pressure	~ 99 min
Max. Time Control	~ 999 min (4 independent channels)
Individual Time Setting for Each Channel	Yes
Light On/Off	Yes
Water Bath Temperature	Ambient ~ 90°C
Forced Vapor Evacuation	Yes (by fan)
Power supply	230 V, 50 Hz (AC 220-230 V, 50/60 Hz; 110 V optional)
Power requirement (VA)	800
Dimension	590 x 340 x 320 (W x D x H, mm)
Weight	26.5 kg
Cat. No.	Hyper-HV300 (Hyper-HV300-110)

Time for Complete Evaporation

	40 psi	30 psi	20 psi
Hexane	1:50	2:10	3:20
Methanol	5:50	6:30	9:50
Acetonitrile	5:45	7:10	11:40
Ethanol	6:10	8:30	15:30

(min:sec)

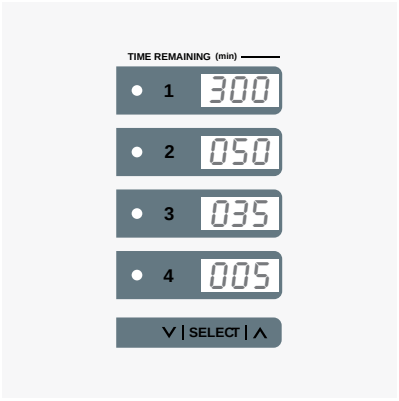
* Experimental Conditions

- Sample volume : 5 mL in 20 mL tube
- Temperature : 40°C
- Gas Purging : Nitrogen

Quick Operational Guide for Efficient Evaporation and Concentration

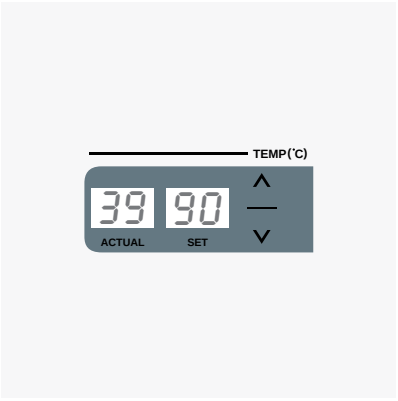
1. Two Stage Pressure Setting

The gas pursing pressures can be controlled both for initial stage and operating period. The management of gas pressure and duration time for initial stage supports minimization of sample's bumping out and automatic switch to operational stage.



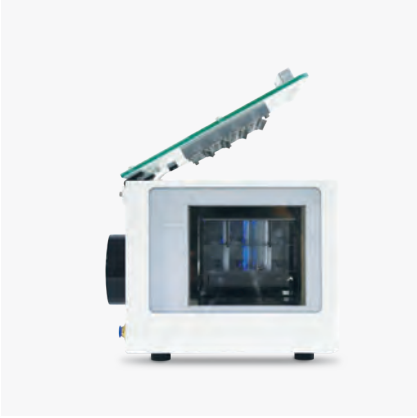
2. Four Individual Setting of Working Time

The independent control of time for four gas purging channels allows simultaneous running of different samples and prevents unnecessary consumption of gas.



3. Temperature setting

Water bath with whole floor heating precise temperature control up to 95℃.



Transparent front and side window for easy monitoring of sample processing.

Good visibility of processed status of samples with blue-light background

The rubber grip inside every upper circle of tube rack is designed for anti-vibration of inserted tubes during gas pursing to result consistent result of concentration.





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CENTRIFUGES

CONCENTRATORS

FREEZE DRYERS

DEEP FREEZERS

CO_2 INCUBATOR

MIXERS & SHAKERS

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