

Whether you're seeking small-capacity units for research, or high-end, programmable systems for pilot applications, Thermo Electron offers a complete line of high performance freeze dryers to meet your needs. The extensive family of Heto PowerDry freeze dryers are known for providing quality and innovation. Combined with Thermo Electron's global service and support network, the Heto PowerDry family of freeze dryers is designed to ensure years of reliable performance.



Product Features

- Exclusive PowerDry technology maintains temperature throughout the run for faster, more efficient drying
- Advanced refrigeration system features a dual-capillary design for maximum cooling performance, providing the fastest possible drying time as well as evenly and fully distributed ice condensation
- Condenser surface area is optimised on each unit to provide extraordinarily high throughput
- Optional HSC500 PLUS shelf controller can be connected for additional heat and control
- Wide range of accessories available for bulk drying in flasks or trays; ampule drying on manifolds; and vial drying in chambers with stoppers
- All Heto PowerDry accessories are fully interchangeable with our full range of Heto PowerDry freeze dryers
- Optional mobile trolley can easily accommodate a Heto PowerDry freeze dryer and accessories

Heto PowerDry LL1500

The Heto PowerDry LL1500 freeze dryer delivers 1.5 kg per 24 hours of ice trapping capacity – the highest capacity available for a condenser of its size. The unit employs PowerDry technology for fast, reliable and efficient drying using a condenser temperature as low as -110°C.

Product Features

- Ultra low temperature – down to -110°C, preserves sample activity and structural integrity and allows you to use lower-temperature solvents such as methanol, di-ethyl ether, ethanol and others
- High throughput – superior cooling capacity enables the Heto PowerDry LL1500 to reach the set temperature quickly, so you can process more samples in less time
- Offers the greatest total ice trapping capacity for its size – 3 kg
- Versatile – makes an excellent cold trap when used in conjunction with vacuum concentrators
- Serves as a secondary cold trap in conjunction with other freeze dryers



Specification Table

Heto PowerDry LL1500

Condenser	≤ -110°C
Ice Removal Capacity 24 hours	1.5kg (3.3 lbs)
Ice Capacity	2.6kg (5.7 lbs)
Condenser Chamber Capacity	3.8kg (8.4 lbs)
Condenser Diameter	160 mm 6.3"
Condenser Height	190 mm 7.5"
Interface Connections	RS232-C Interface (when used with HSC500 PLUS controller)
Temperature Display	Ambient to 120°C (-184°F)
Temperature	+5 to 32°C (+41 to 89.6°F)
Sound Level dBA	≤ 51
Ice Condenser Material	AISI 316 Stainless Steel
Display Parameters	Status Indicator (Alarm/ Wait / OK)
Refrigerants	R507/R1150
External Dimensions H x W x D	335 x 800 x 480 mm 13.2 x 31.5 x 18.9 in
Weight	53 kg, (116.3 lbs)

Ordering Information

Cat No.
88001500
88001551

Description
Heto PowerDry LL1500 Freeze Dryer
Heto PowerDry LL1500 Freeze Dryer

Power Requirements
230V / 50Hz
115V / 60Hz

Freeze Dryers

Heto PowerDry LL3000 and PL3000

The Heto PowerDry LL3000 and the PL3000 provide 3 kg per 24 hours of ice trapping capacity, making them well-suited for small-scale freeze drying tasks. Both units are built using a fully welded, one-piece, vertically constructed condenser with surrounding cooling coils and an integrated drainage system.

Product Features

- Outer cabinet of powder-painted steel and an acid-proof stainless steel top provides maximum durability
- Transparent acrylic lid offers an NW 40 mm standard flange for the connection of manifolds and additional chambers
- Auxiliary connections are conveniently grouped together at the rear of the machine for easy access
- Units are extremely compact and can, if required, be placed out of the way on a specially designed trolley
- LL3000 model offers a standard controller, which is ideal for straightforward freeze drying applications
- The PL3000 model has an advanced microprocessor designed for complicated and demanding tasks where full control, documentation and process datalogging is required
- Both units are designed for use with high-quality rotary vane pumps with a capacity of either 2 or 5 m³ per hour



Specification Table

	Heto PowerDry LL3000	Heto PowerDry PL3000
Condenser Temperature	-55°C	-55°C
Ice Removal Capacity 24 hours	3kg (6.6 lbs)	6.6 lbs (3) kg
Ice Capacity	6kg (13.2 lbs)	13.2 lbs (6) kg
Condenser Chamber Capacity	10.4kg (23.0 lbs)	23.0 lbs (10.4) kg
Condenser Diameter	230 mm (9.06")	9.06" (230 mm)
Condenser Height	210 mm (8.27")	8.27" (210 mm)
Cooling Capacity 20°C, 68°F	350kg (771 lbs)	771 lbs (350kg)
Cooling Capacity 0°C, 22°F	300kg (661 lbs)	661 lbs (300kg)
Cooling Capacity -30°C	150kg (330 lbs)	330 lbs (150kg)
RS232-C Interface	No	Yes
Microprocessor Controller	No	Yes
Pressure Read-Out / Regulation	No	Yes
Temperature Display	Ambient to ≤ -60°C	Ambient to ≤ -60°C
Temperature	+5 to 32°C	+5 to 32°C
Sound Level dBA	≤ 51	≤ 51
Ice Condenser Material	AISI Stainless Steel	AISI Stainless Steel
External Dimensions H x W x D	335 x 650 x 480 mm 13.19 x 13.78 x 18.9 in	335 x 650 x 480 mm 13.19 x 13.78 x 18.9 in
Weight	43.5 kg, (95.9 lbs)	43.5 kg, (95.9 lbs)

Ordering Information

Cat No.	Description	Power Requirements
88006000	Heto PowerDry LL3000	230V / 50 Hz
88006050	Heto PowerDry LL3000	115V / 60 Hz
88006100	Heto PowerDry PL3000	230V / 50 Hz
88006150	Heto PowerDry PL3000	115V / 60 Hz

Thermo's Heto PowerDry Freeze Dryers are unique in that any of the accessories can be freely interchanged among any of our other Heto PowerDry models. This provides you with added flexibility and reduced cost.



DM 12/ 3/4 Drum Manifold

Manifolds

Manifolds are particularly well suited for bulk drying samples in multiple round bottomed flasks that are heated by ambient radiation. All manifolds are placed directly on top of the condenser lid.

Ordering Information

Cat No.	Description	LL1500	LL3000 & PL3000
88008104	PM 14 /3/4 Port Manifold	*	*
88008108	AM 48/8 Ampule Manifold	*	*
88600011	Basic Manifold	*	*
88600012	Extension Manifold	*	*
88008164	DM 12 /3/4 Drum Manifold	*	*

Heated and Unheated Chamber Configurations

Chamber Configurations

Chambers are needed when samples are on trays or in vials. The chambers can be mounted either directly on the condenser or via the lid, and are available with or without heated shelves. Most chambers are made of versatile 200 mm or 300 mm diameter clear acrylic cylinders for maximum safety and performance.



AC 300-S/H Heated Chamber

Ordering Information

Cat No.	Description	LL1500	LL3000 & PL3000
88006111	MP3 Unheated Chamber	*	*
88006116	MP1 Unheated Chamber	*	*
88006117	UR Unheated Chamber	*	*
88006120	AC 300 Acrylic Chamber	*	*
88006110	AC 300-H Heated Chamber	*	*
88006112	AC 300-S/H Heated Chamber	*	*
88003099	HSC500 PLUS Shelf Controller (for heated chambers only)	*	*

Thermo Electron offers three different two-stage, oil-sealed, rotary vane vacuum pumps specifically designed for standard freeze drying applications. Each pump comes complete with a GBORK (Gas Ballast Oil Return Kit) and an Oil Mist Filter (EMF10). The GBORK allows the user to apply full gas ballast to keep the oil clean, without losing oil. The EMF10 filters the exhaust to keep the air clean.

For applications involving aggressive solvents that might damage ordinary pumps, Thermo Electron recommends the LyoPump, VLP195FD. In addition to the GBORK and oil mist filter, the two-stage, oil-sealed, rotary vane LyoPump™ includes an active oil filtration system (VPOF110) that dramatically extends the life of the pump.



Product Features

- Three models to choose from
- Low noise level, 48 dBA
- High quality cast iron shafts & rotors
- Thermal overload switches with automatic reset
- Complete with gas ballast oil return & mist filter

Technical Specifications

Model	FDP80	FDP120	FDP200 or VLP195FD
Displacement	76 l/min @ 60Hz	116 l/min @ 60Hz	195 l/min @ 60Hz
Maximum Vacuum	1.5 mtorr / 1.95 x 10 ³ mbar	1.5 mtorr / 1.95 x 10 ³ mbar	1.5 mtorr / 1.95 x 10 ³ mbar
Oil Capacity	0.7 litres	0.7 litres	0.75 litres, 1.75 litres for VLP195FD
Dimensions H x W x D	230 x 160 x 420 (mm) 9 x 6 x 17 (in)	230 x 160 x 420 (mm) 9 x 6 x 17 (in)	230 x 160 x 470 (mm) 9 x 6 x 19 (in)
Weight kg (lbs)	22 (48)	22 (48)	26 (57), 35 (77) for VLP195FD
Power Requirements	120V 60Hz, 5A 230V 50Hz, 3A	120V 60Hz, 5A 230V 50Hz, 3A	120V 60Hz, 8A, 12A for VLP195FD 230V 50Hz, 4A
Vacuum Inlet Fitting (mm)	12.7 O.D.	12.7 O.D.	12.7 O.D.

Note :- VLP195FD includes VPOF110 oil filtration system.

Ordering Information and Specifications

Cat No.

FDP80-115
FDP80-230
FDP120-115
FDP120-230
FDP200-115
FDP200-230
FDP195FD-115
FDP195FD-230

Description

Vacuum Pump with GBORK & EMF10 filter
Vacuum Pump with GBORK & EMF10 filter
Vacuum Pump with GBORK & EMF10 filter
Vacuum Pump with GBORK & EMF10 filter
Vacuum Pump with GBORK & EMF10 filter
Vacuum Pump with GBORK & EMF10 filter
Vacuum Pump with GBORK, EMF10 filter and VPOF filter
Vacuum Pump with GBORK, EMF10 filter and VPOF filter

Accessories

Cat No.

SPO1
SPO1-B
SFF1
SFF1-B
MF10
PF10
AO310
M30-0007-02
M30-0007-03
BV130
M60-0044-11
M60-0044-14
CC120/DX
203-1009-00

Description

Case of 12 one litre bottles of vacuum pump oil
One litre of vacuum pump oil
Case of 12 one litre bottles of vacuum pump flushing fluid
One litre of vacuum pump flushing fluid
Odor filter element for EMF10
Oil mist filter for EMF10, 5/pk
Replacement oil filter cartridge for VPOF110
4 foot length of 1/2" I.D. vacuum tubing
8 foot length of 1/2" I.D. vacuum tubing
1/2" O.D. bleeder valve
1/2" O.D. polypropylene 90° elbow fitting
1/2" O.D. polypropylene straight fitting
Deluxe convenience cart - 61 x 91.4 x 96.5 mm
Additional vacuum connection kit for non-Thermo Electron pumps

All Heto PowerDry freeze dryers are designed for use with our high-quality rotary vane pumps, which offer a capacity of either 2, 5 or 8 m³ per hour.



RZ 5 Pump

Ordering Information

Cat No.	Description	LL1500	LL3000 & PL3000
88900065	RZ 2, Rotary Vane Pump, 115V / 60 Hz	*	*
88900062	RZ 2, Rotary Vane Pump, 230 V	*	*
88900067	RZ 5, Rotary Vane Pump, 115V / 60 Hz	*	*
88900066	RZ 5, Rotary Vane Pump, 230 V	*	*

Connection Kits for Accessories

Cat No.	Description	LL1500	LL3000 & PL3000
88902922	Kit number 22	*	*
88902933	Kit number 23	*	*
88900125	FORE2 oil mist eliminator for RZ 5	*	*

