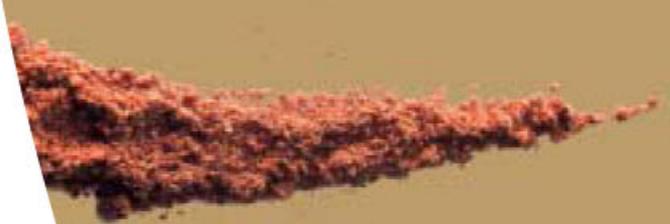


State of the  
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## Quality and efficiency

The cooling of the LL3000 and PL3000 is carried out by Heto's own unique twin-capillary tube system - the PowerDry® system. This new development features autoregulation for maximum cooling performance, thus providing the fastest possible drying time as well as evenly and fully distributed ice condensation. The full condenser surface is optimally used, ensuring extraordinarily high throughput.

You choose the model that's right for the job, based on your specific needs. Regardless of choice you get a freeze dryer with high quality in materials and design and access to a wide range of accessories covering all requirements e.g.:

- bulk drying in flasks or trays
- ampoule drying on manifold
- vial drying in chambers with stoppering arrangement

A unique feature is that all Heto accessories can be freely interchanged between any of our models.

Heto has been developing and manufacturing freeze dryers for over 30 years, equipping research and general laboratories around the world with reliable products of unsurpassed quality. LL3000 and PL3000 are part of an extensive family of freeze dryers.

Choosing a freeze dryer from Heto means you get access to a full line of freeze dryers covering capacities from 1 to 8 kg as well as industrial scale freeze dryers manufactured to individual needs.

## PowerDry LL3000 and PL3000 Freeze Dryers

### Strong tools for small scale freeze drying tasks

3000 stands for 3 kilograms per 24 hours of ice trapping capacity and both models are compatible with our extensive range of accessories, which are interchangeable between any of our freeze dryers. Both models employ Heto's PowerDry® technology for fast reliable and efficient drying. Your choice will be to decide what is needed to make your application optimal.

### LL3000 for general laboratory applications

The LL3000 has a standard controller, which is well suited for straightforward freeze drying applications.

### PL3000 for applications with high demands for documentation and control

The PL3000 has an advanced microprocessor designed for complicated and demanding tasks where full control, documentation and process data logging is required.



### Versatility in use

Both units are state-of-the-art freeze dryers designed to handle any kind of applications including: Pharmaceutical preparations, food and beverages, museum objects, micro-organisms such as bacteria and yeast, viruses, vaccines and antitoxins, blood fractions, enzymes, vitamins, biological reagents and standards.

### We make freeze drying easy

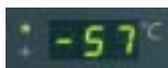
Success in freeze drying lies to a great extent in the simplicity of the unit and in the operator's comfort. A freeze dryer should perform the application in a safe, fast and reliable way. Some applications only need simple user interface controls whereas others will require more advanced controls. The idea behind the LL3000 and the PL3000 is to be able to select a unit for both requirements, without compromising quality and reliability.

# Reliability and flexibility

The LL3000 and the PL3000 are built around the same fundamental structure: a fully welded, one-piece, vertically constructed condenser with surrounding cooling coils and an integrated drainage system. Both units have an ice-trapping capacity of 3 kg/24 hours, an outer cabinet of powder-painted steel and an acid-proof stainless steel top. A lid of transparent acrylic offers

an NW 40-mm standard flange for the connection of manifolds, and additional chambers, which can therefore be placed directly on the condenser. All auxiliary connections are conveniently grouped at the rear of the machine. The units are extremely compact and can - if required - be placed out of the way on a specially designed mobile trolley.

## PowerDry LL3000



### Freeze drying using manifolds

The use of manifolds is particularly well suited for bulk drying where vacuum regulation is not required and we recommend LL3000 as the basic unit.



#### Flask drying using a 4-port flask manifold

This configuration is ideal for bulk drying in a few flasks. The manifold will accommodate the flasks mounted with cones on individual rubber valves. This manifold can be extended with a 4 port manifold thereby offering additional valves for connection.



#### High volume flask drying using a horizontal 14-port manifold

The horizontal manifold made of stainless steel will accommodate the flasks mounted with cones on individual rubber valves. On the top the manifold has a flange for connection of additional manifolds if required.



#### Multiple flask drying using a 12-port drum manifold

The drum manifold made of stainless steel will accommodate the flasks mounted with cones on individual rubber valves. The acrylic lid on top has a flange connection for additional manifolds if required. Can accommodate Ø 200 mm chambers as well.



### Mobile trolley

The mobile trolley, which can easily accommodate a freeze dryer with all its accessories, was conceived with a dual purpose: not only does it free up valuable space on a crowded laboratory tabletop, it also simplifies sharing equipment between labs. The LL3000 and PL3000 have been designed integrating all connections at the back, allowing easy set-up in any location.

## Optimisation

The need for applying heat is essential to any freeze drying process. This is normally done by using radiation from the surroundings or by applying electrically controlled heat to the shelves. The Heto Shelf Controller HSC 500 will work on any Heto freeze dryer and will *interface* with the PL3000 controller providing the ultimate temperature regulation and ensuring safest freeze drying cycle.

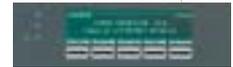


## Documentation

To keep track of various applications, the PL3000 is equipped with both a product sensor connection and an RS 232 C interface connection for a computer or a serial printer link. This allows for the data-logging of condenser and product temperatures, as well as vacuum parameters.



## PowerDry PL3000



### Freeze drying using chambers

The use of chambers is particular well suited where vacuum regulation is required and we recommend PL3000 as the basic unit. The controller can be set to a specific vacuum level and time, allowing for semi-automatic functioning.



#### Bulk drying

Each shelf is rack-mounted and removable, and can be used with various other Heto trays etc. The chamber design allows heat radiation through the acrylic cylinder wall. As option a shelf controller HSC 500 can be connected for additional heat appliance and control.



#### Microtitre plate drying

The chamber can be easily filled, emptied and cleaned. The rack will accommodate 3 x 14 standard microtitre plates or 3 x 7 deepwell plates. The chamber design allows heat radiation through the acrylic cylinder wall.

#### Vial drying

This configuration is ideal where vacuum regulation and heating are required. The manual stoppering system will close the vials after the run is finished. The number of vials that can be processed depends on their diameter. (please ask for details).



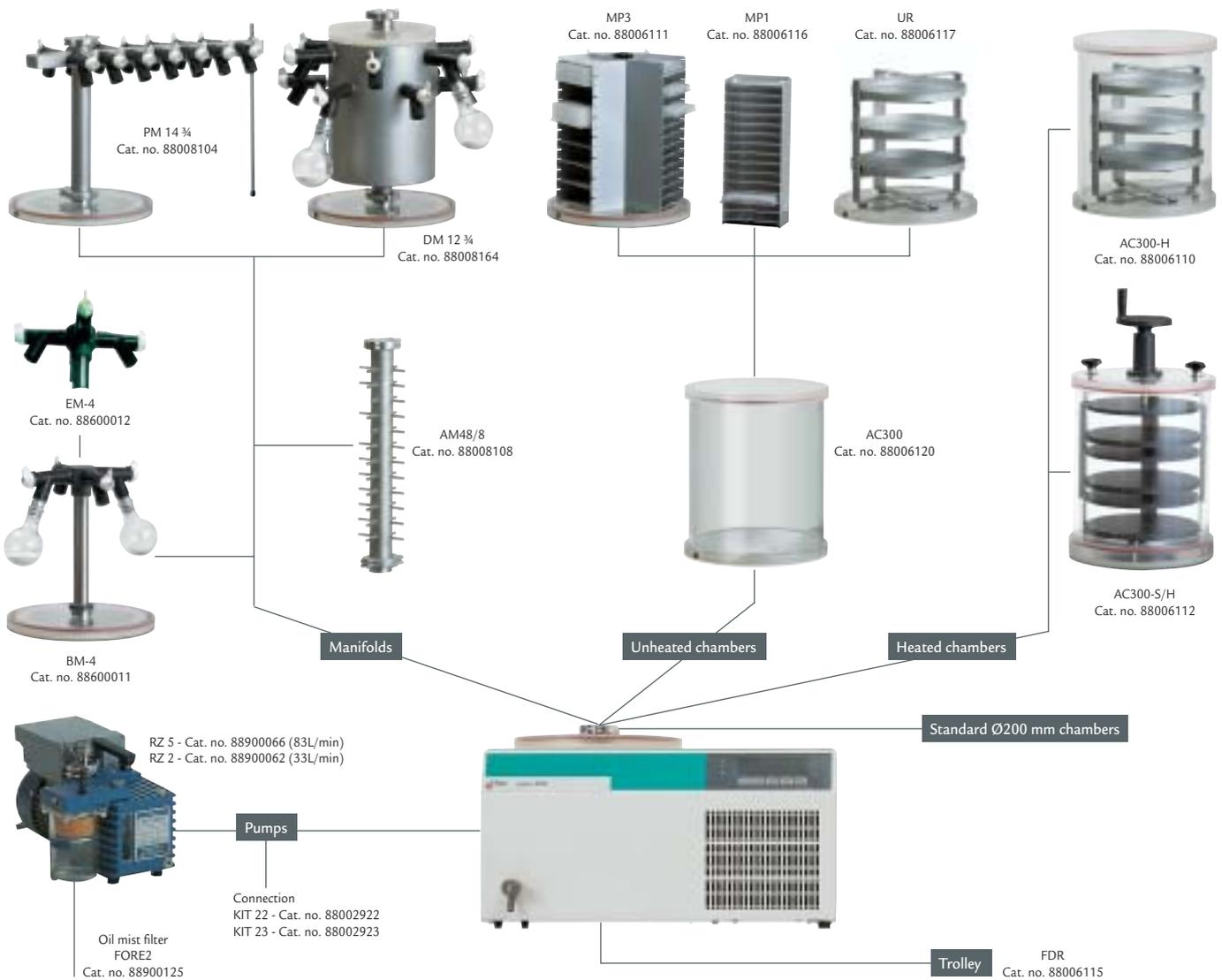
## Vacuum pump

LL3000 and PL3000 are designed for use with a high-quality rotary vane pumps with a capacity of either 2 or 5 m<sup>3</sup> per hour.

The chambers and shelf arrangements are mounted directly on top of the condenser or on the acrylic lid. A shelf heat regulator is available if additional heat is required to ensure optimal drying on the shelves. When operating vials a manual stoppering arrangement makes sure all samples are tightly closed. Most chambers are made of versatile Ø 300 mm or Ø 200 mm acrylic cylinders for maximum safety and performance.

Technical Specifications		LL3000	PL3000
Cat. No.	230V/115V	88006000/88006100	88610000/88006150
Required power supply	V/Hz	230/50 or 115/60	
Condenser capacity/24 hours	kg	3	
Total ice capacity	kg	6	
Condenser volume	L	10.4	
Condenser diameter x height	mm	Ø 230 x 210	
Microprocessor		No	Yes
RS232-C interface		No	Yes
Pressure readout & regulation		No	Yes
Digital temperature display		Ambient to <-60°C	
Ambient temperature	°C	+5 to +32	
Noise level	dBA	<51	
Ice condenser material		AISI 316	
External dimensions	D x W x H mm	480 x 650 x 335	
Weight	kg	43.5	

## Accessories



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