

NORHOF LN2 -85 Freezer backup system model 607

Universal applicable portable backup unit for mechanical freezers.

Suitable for mechanical freezers of –85 degrees Celsius (or similar)

Do you want only ONE backup system, suitable for all your mechanical freezers?

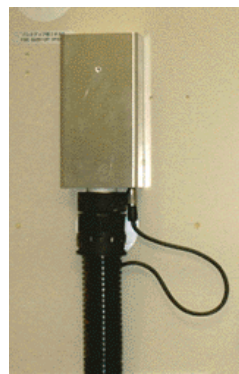
- Always ready to use
- Every freezer will be prepared with extra cold exchanger.
- One portable backup pumpsystem, for use with up to 20 freezers.
- Connection of pumpsystem to broken freezer in just two minutes.
- No opening of the freezer needed.
- Start of cooling after switched ON in just one minute.
- Cooling temperature to exact -85, also on the top shelf of the freezer.
- Pressure-less flow of LN2, without spilling, noise, vibrations etc.
- Reservoir dewar of 50 Liters sufficient for holding the freezer for 24 hours on -85 (depending on brand and model of the freezer)



picture shows pump mounted on a 35 Liter dewar, total system height 79 cm



Cold exchanger inside freezer, in the top



connecting box on rear side of the freezer

Norhof manufactures cooling systems in which Liquid Nitrogen (LN2) is used as the cooling medium. LN2 is supplied without any pressure and filling an application is like a teapot filling a teacup. You may compare our liquid nitrogen dispenser system with a water tap, but instead of giving water, it gives LN2, starting with some drops, up to 1 Liter/minute.

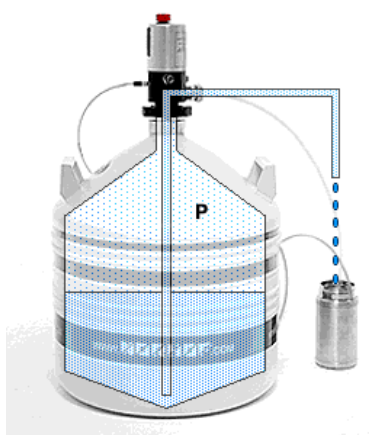
The reservoir dewar can safely stand next to your working place, ready for use. When a freezer needs extra cooling, connect the pump hose to the freezer. Switch the pump ON. The pump will gently fill the cold exchanger with LN2, depending of the temperature in the top of the freezer. The cold exchanger will become -196 degrees Celsius, creating a falling cold flow. The warmer gas from the top will be exhausted, thus cooling the interior of the freezer from the bottom to the top. The level in the cold exchanger is controlled, and the temperature in de top is controlled, so the pump stops automatically when the temperature of -85 is reached.

The majority of this system finds use in the field of laboratories, research centers etc. where a backup system should be stand-by in case of incidents with freezers, or during maintenance of a freezer.

Use of this system is for example for:

- Backup of freezers during maintenance
- Backup of freezers during failure
- Extra cooling when a lot of warm samples is placed in a freezer.

*For automatic filling of small applications we have the #900 serie of microdosing pumps, see the website



Working principle

The pressure above the liquid level inside the dewar is built by heating a small amount of liquid in the bottom of the dewar. With only 100 mBar of overpressure, the liquid will gently rise out of the rise pipe and fill the cold exchanger in the freezer. Because we evaporate some LN2 to build pressure, there is no adding of ice inside the dewar, such as with manual systems which use air from the environment.

In the Norhof LN2 cooling systems, Liquid Nitrogen is stored in pressure less Dewars. When LN2 is required, a small overpressure is generated by a small heater element in the LN2, and liquid flows out of the system like water from a tap, without spilling, noise, vibrations etc.

The advantages are numerous:

- **the system is extremely safe**, the operator comes not in contact with LN2.
- **the system is time saving, and thus sample saving**, any operator can install the system in just minutes.
- **the system can cool the freezer just with a press on the start button**
this means that the system is ready for use 24 hours a day, and starts cooling in 3 minutes.
- **the system delivers LN2 without any pressure**, this means without noise, vibration, excessive waste, etc.
- **there is no external LN2 valve used**, that implies no unnecessary heat input which spoils a lot of LN2
- **there is a very low thermal masse to cool down in the pump**
Filling efficiency is better than 90%, due to very less loss for cooling down pump parts.
- **there is a very low thermal connection to the ambient temperature**
This means that the system is extremely economic in stand-by. Typical usage less than 0,5 Liter / day
- **P.E.D. 99/36/EC (Pressure European Directive) for pressurized vessels does not apply for this system**
The maximum possible pressure is lower than 300mBar. Therefore this system is allowed to be used inside the lab, near your working place, without danger.

Technical Specifications

Static evaporation rate	< 0,5 liters per day		
Flow rate	Dripping up to 1 Liter/minute		
Maximum working pressure	< 300 mBar		
Reaction time	40-80 seconds (depending on level in dewar)		
Power connection	115V / 230V AC with supplied power supply or 12 Volt AC/DC		
Power consumption	average 10 Watts, during pumping 50 watts		
Storage container volume	25 Liter (on request)	35 Liter (on request)	50 Liter(standard)
Outside dimensions (round)	395	480	500 mm
Height dimensions	736	643	727 mm
Weight (empty,full)	10 / 31	13 / 41,5	17 / 51,5 kg
System includes	Dewar, pump, flexible fill hose 1.00 m, power supply		
per freezer, backup kit	Cold exchanger, including level sensor and temperature sensor. Connection box, including cryo connector for pump hose.		
Alarms/warning acoustical/ visual / mechanical	Dewar empty, 5 liters left, broken sensor, overpressure protection		
Options	Transport trolley 5 wheels (12 cm height)		