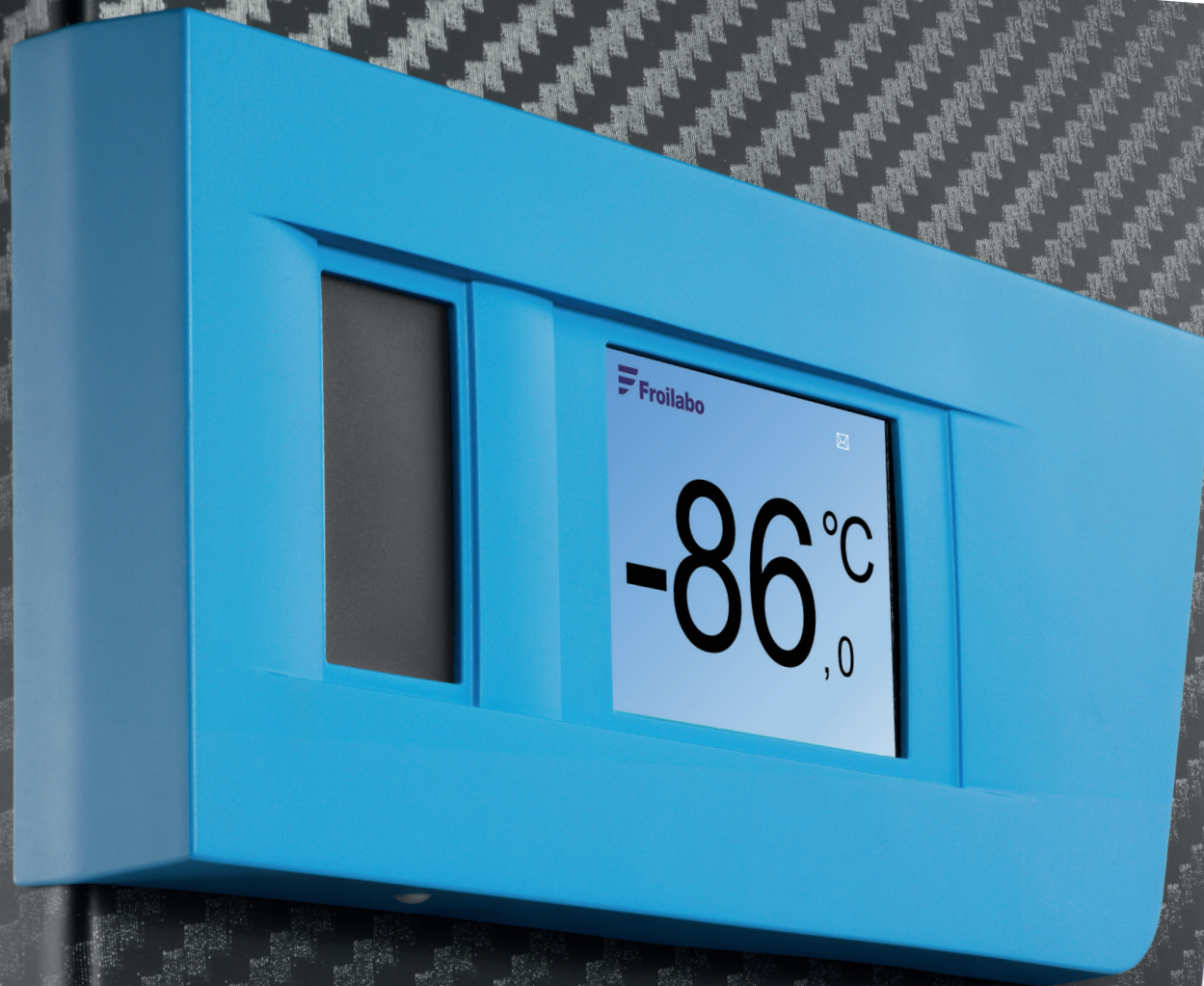


# ULT FREEZERS

## EVOLUTION -86°C

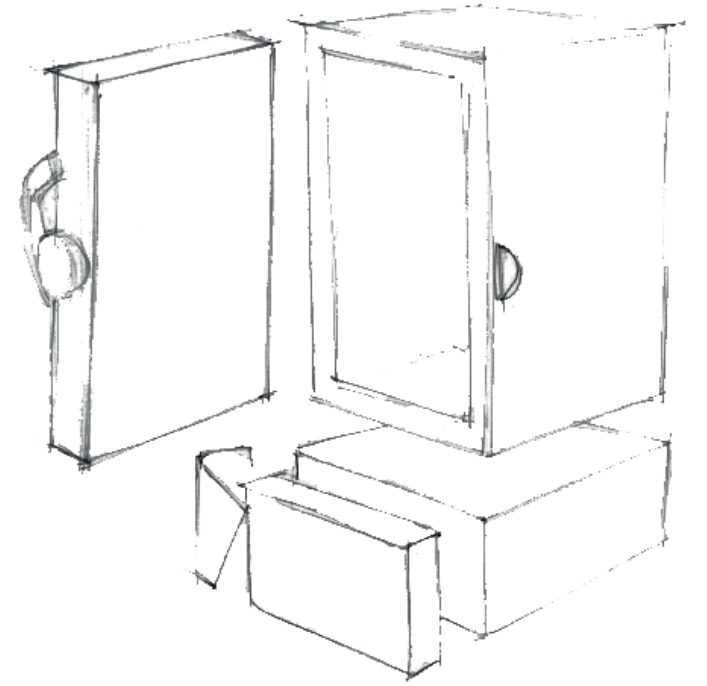




**Froilabo**  
EVOLUTION



# | Evolution



“ 100 years of experience and many months of R&D have led our team to offer you a range of ultra-performant ULT Freezers. Safety, innovation and performance have been at the heart of our strategy of development and design of our devices. ”

# A development guided by the user

Froilabo development of ULT Freezers has been based on 4 goals :



## Sample security

The preservation of the sample has been the key to any other consideration in our product development.



## Innovation in the use

Customer's comments and suggestions have led the development of those freezers. Several innovations have been patented.



## ULT freezer performance

Priority has been given to fast temperature recovery without compromising the power consumption.



## Simplicity of maintenance & diagnosis

12 LEDs are here to anticipate and simplify maintenance. It allows to limit freezer's downtime when intervention is necessary.

100 years  
of experience and know-how

# European manufacturing

Results of several months of research and development, Froilabo ULT Freezers are conceived and designed in France, manufactured in Europe.



CE marking



UL marking



ISO 9001 and ISO 13485  
certified production site





# A scalable range

Research and comments from every user has helped Froilabo in designing the new ULT Freezers with 2 models according to your needs:

2 models

Up to  
48 000 cryotubes

## TRUST

Ideal for long term storage

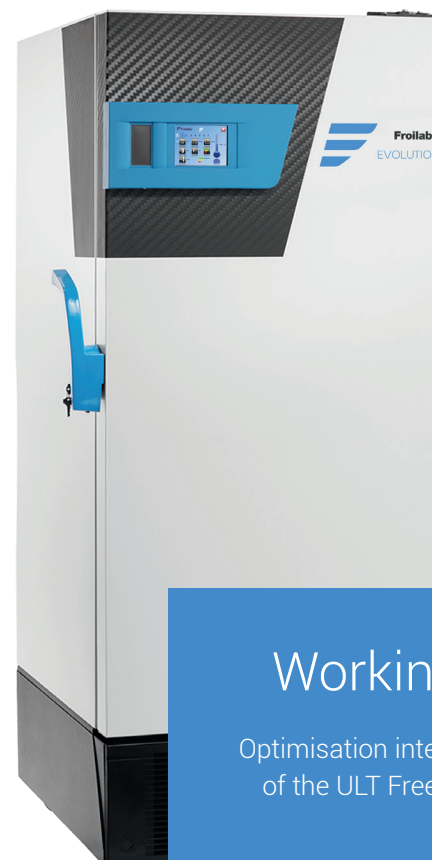


### Storage

Functionnal « OK »  
status

## EVOLUTION

Optimal for daily use with frequent  
door opening.



### Working

Optimisation interface  
of the ULT Freezer

# Samples

Protected & secure



 **Froilabo**



# Secure samples

Equipped with several safety devices, Froilabo ULT Freezers guarantee the long term preservation of your samples.



## BoSS system *(Board Substitution System)*

Froilabo's BoSS ensures the compressors remain operational in the case of losing the 24V regulation power supply. Up to 30 hours regulation on batteries.



## Access control

Froilabo ULT Freezers protect your samples on two levels. All freezer settings such as temperature are protected by a user password and the door can be locked to restrict access.



## Ergonomic intelligent handle

The ergonomically designed handle aligns the user force with the required action of unlocking or opening/closing the door. A sensor in the handle confirms door closure/locking.



## Powerful compressors

Essential for a quick return to the set temperature after opening door.



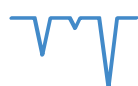
## Visual and audible alarms

A variety of alarms indicates various warnings, regarding door opening, power supply, pressure defaults, filter blockage and many other concerns. Alarm events are recorded and can be customised.



# Secure their environment

The equipment of Froilabo ULT Freezers ensures optimal operation for the safety of your samples in all circumstances.



## Micro-cuts power protection

The electronic board will accept power micro-cuts. It will minimise the number of compressor reboots and will reduce the potential maintenance.

1

## Adjustable delay

2

3

After a mains power outage, each ULT Freezer can adjust the time delay for re-start to avoid a simultaneous peak demand on the facility power supply.

CO<sub>2</sub> & LN<sub>2</sub>  
back up

available in option

# Equipment

Innovative & ergonomic



 **Froilabo**



# Equipment designed by the user

Research and comments from every type user has helped Froilabo in designing the new ULT Freezers.



## External dimensions

Froilabo is the only manufacturer of ULT freezers to offer a useful volume of 690L (24,3 cu.ft.) or 48000 2ml tubes with a device measuring less than 90cm (35.4") wide -standard doorway-.



## No frost built-up

The flatness of the door and the flat heated door seal help to minimize frost formation.



## Robust Construction

An interior tank and shelves fully designed in stainless steel for intensive use and maximum life.



## Removable accessories

Filter, internal doors and shelves are removable for easy maintenance and defrosting.



## Easy access to samples

Pull-out shelves are anti-tipping and ease the access to sample and specimen.  
(available in option, 2 shelves maximum for the 690l model)



## Easy tank cleaning

Round corners ease the cleaning and disinfection of the internal compartment.



## Heated pressure release valve

A bidirectional heated valve ensures balance between pressure and allows reopening of the door very quickly after closing.



5 sec

Filter replacement

0 outil

Internal door panels extraction

# Performances

Temperature & homogeneity



 **Froilabo**



# Cooling power and temperature homogeneity

Rapid cooling and temperature homogeneity inside the freezer are critical for sample preservation.



## Rapid temperature pull down

Unrivalled temperature pull down allows rapid temperature recovery after door openings and restarts.



## Delayed temperature rise

60 years of experience with designing insulation for ULT Freezers and the use of cryo-reservoir plates (option) retains the low temperature during door opening and power failures.



## Set temperature recovery speed

It is an essential setting for the optimal preservation of samples. Froilabo ULT Freezers always show the current temperature inside the bowl.



## Temperature homogeneity

The excellent temperature homogeneity inside the bowl allows to save energy for a same high temperature limit.

4 hours

Pull down to -86°C  
(empty 690L model - 22°C  
ambient temperature)

# Energy consumption

The energy consumption of an ULT Freezer is influenced by many factors, including the performance of the freezer and the way it is used.



## No one uses an empty freezer

Beware of manufacture performance and economy claims measured with empty freezers in low temperature environments. Froilabo ULT Freezers operate and are measured in the real world with large numbers of samples and realistic ambient temperatures.



## ULT Freezer in use

This is the only significant measure of the real power consumption of an ULT Freezer. It is greatly influenced by the set temperature, the frequency of door opening, the ambient temperature, the filter cleanliness, the power supply stability, and many more factors.

*Froilabo offers the user all the information allowing to really influence the consumption of its equipment.*





# Consumption

Optimized & controlled

 **Froilabo**



# Users Guide to Reduce Energy Consumption

The user can significantly reduce energy consumption by optimising operating conditions, environment and paying attention to the equipment and settings.



## "Eco" mode

Ability to minimise the power consumption of the freezer outside usual working hours



## Energy performances indicator

A colored indicator gives in real time the energetical comfort zone of the device. Green, yellow or red, the user is informed of the freezer's energy performance.



## Proximity sensor

Proximity sensor will only active the screen when a user is present to conserve power.  
NB: screen brightness is adjustable.



## Best practices tutorial

Recommendations and tips to guide users influencing power consumption: ambient T°, cleanliness of the filter, door opening frequency, etc.



# Optimal Thermodynamic Performance

Powerful and economic compressors combined with efficient insulation deliver the best performance/power consumption ratio.



## Optimized insulation

Vacuum Insulation Panel (VIP, VACUPOR™ type) combined with high density polyurethane foam offers optimal insulation. In case of power outage, the temperature rise is significantly slowed down.



## Homogeneity and stability of temperature

The use of rounded corners improved by 15% heat exchange. It also contributes to energy savings for the same high temperature limit.



## New generation of compressors

More compact and offering improved energy performance, our new generation of compressors allow significant energy savings.

+/- 20 %

Ability to optimise energy consumption by the user

# Management Interface

Intuitive & secure



 **Froilabo**

# Active monitoring to protect sample

All events and parameters are tracked and recorded. It allows diagnostics and trouble-shooting to prevent failures or unwanted temperature increases.



## Sample Location Software

Software integrated into the touch screen and bar-code reader can define the rack & shelf configuration and record the location of samples in the ULT Freezer (available on option).



## Input and output management

Entry of samples references to be stored or located on the touch screen with an alphanumeric keypad. Validation of the inputs and outputs .



## Transfer of data on a back-up

If necessary, immediate recovery of data storage on PC/tablet to transfer it to an equivalent back-up ULT Freezer.  
No re-entry of logins and locations.



# Traceability of events in any circumstances

Follow-up of the evolution of the temperature and all events that may potentially affect the samples.



## Collection of data with USB port

A USB port is available for data collection. Temperature evolution and alarm events are recorded and can be downloaded on Evolution and Expert models (CSV file).



## History of events

Display on touch screen of the temperature evolution on the last 10 hours, but also the last events and their acquittal (up to 10).

10 hours  
of temperature evolution

10 events  
and their acquittal





# Maintenance

Preventive & simplified



# Self-diagnosis and predictive maintenance

ULT Freezers provide a self-diagnosis that allows users to anticipate maintenance by reporting any reduction in performance.



## "Diagnosis" menu

It gives a preview in real time of the operation of the device. It identifies drifts of parameters (pressure, consumption, T ° of exchange, etc.) and the status of critical components (battery, power relay contacts, etc.).



## 12 LEDs state indicator

LED indicators give quick alarms identification (BoSS engaged, low battery, T° alarm, ...). It eases the diagnosis.



## "Statistics" menu

Key figures related to conditions of use: number of door openings and times, starts of compressors, power consumption, ambient T °, etc.



# Quick and simple service

The critical elements can be replaced very rapidly. It will minimise ULT Freezer's downtime and will significantly reduce maintenance and service cost.



## "Plug & Play" electronics

Electronics and display contained in the module are easily removable and can be rapidly switched without any specific tool.



## Removable cooling system

The cooling unit is mounted on a removable tray. Immediate cooling system substitution is possible and can avoid return of the unit back to the workshop.

## No oil separator

*Simple and efficient pipe architecture avoids oil clot and eliminates potential expensive maintenance.*

# | Specifications

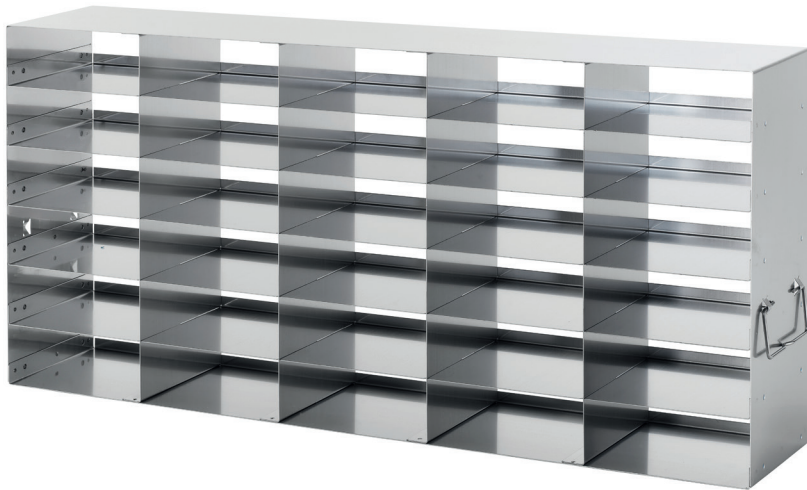


## Technical specifications

Volume	Compartments	Capacity (2mL cryo-tubes)	External dimensions (H x P x L in mm and in.)	Inner dimensions (H x P x L in mm and in.)	Net weight (kg and lb.)	Power supply
340L 12.0 cu.ft.	2	24 000	1280 x 970 x 875 50.4 x 38.2 x 34.5	716 x 752 x 630 28.2 x 29.6 x 24.8	223 kg 492 lb.	230V/50Hz  110V/50Hz  110V/60Hz
515L 18.1 cu.ft.	3	36 000	1640 x 970 x 875 64.6 x 38.2 x 34.5	1076 x 752 x 630 42.4 x 29.6 x 24.8	267 kg 589 lb.	
690L 24.3 cu.ft.	4	48 000	1990 x 970 x 875 78.4 x 38.2 x 34.5	1436 x 752 x 630 56.6 x 29.6 x 24.8	330 kg 728 lb.	



# | Options & storage



# Options list

CAT	REF	DESCRIPTION
SHELVES	BM/ES515	1 extractable shelf for BM515 and BM690
	BM/ES690	2 extractables shelves for BM690 only
	BM/ETA2	Stainless steel shelf for BM340/BM515/BM690 (597x743 mm) ( 23.5 x 29.3 in.)
SECURITY	BM/CO2T	Liquid CO <sub>2</sub> injection backup system. Autonomy 15 hours, flexible 3m included
	BM/FL1	Stainless steel connection flexible freezer / bottle or CO <sub>2</sub> ramp, length 2m
	BM/FL2	Stainless steel connection flexible freezer / bottle or CO <sub>2</sub> ramp, length 3m
	BM/FL3	Stainless steel connection flexible freezer / bottle or CO <sub>2</sub> ramp, length 4m
	BM/CRY02E	Cryo - accumulators for BM340, (Temperature up time doubled)
	BM/CRY03E	Cryo - accumulators for BM515, (Temperature up time doubled)
	BM/CRY04E	Cryo - accumulators for BM690, (Temperature up time doubled)
	BM/OPT20	Padlock closure bracket (padlock supply by costumer)

# Options list

CAT	REF	DESCRIPTION
TEMPERATURE CONTROL & COMMUNICATIONS	BM/OPT2E	Independant temperature probe PT100 ohms (-100°C to +50°C), connector at back
	BM/OPT3E	Independant K thermocouple (-100°C to +50°C), connector at back
	BM/OPT4E	Pt 100 ohms x3 (-100°C à +50 °C ) probes (DIN connector at the back)
	BM/OPT5E	Sensor with 3m cable length for external calibration
	BM/OPT6E	Certified temperature probe
	BM/OPT7E	Circular diagram temperature recorder 0°C to -100°C (1 revolution for 7 days)
	BM/OPT9E	RS 485 port
	BM/OPT13E	4-20mA output
	BM/OPT14E	Samples screen mapping
IQ/OQ/PQ	BM/QP	Performances qualification : 9 points temperature mapping, made in Froilabo factory by a certified independante organism
	BM/QIQO	Installation and qualification IQ/OQ (without travelling expenses)



# Storage elements

CAT	REF	DESCRIPTION	Number of shelves	Usable height (mm / in.)	Cryoboxes capacity (133 x 133 x 51 mm) (5.23 x 5.23 x 2 in.)	Freezer racks capacity (340L / 515L / 690L)
RACKS WITH DRAWERS (288x730x343mm) (11.34x28.74x13.5in.)	BM/EL2T690 BM/EL2T690A	Full stainless steel 2 drawers rack Stainless steel rack with 2 aluminium drawers	2	164 / 6.46	60	4 / 6 / 8
	BM/EL3T690 BM/EL3T690A	Full stainless steel 3 drawers rack Stainless steel rack with 3 aluminium drawers	3	109 / 4.29	60	
	BM/EL4T690 BM/EL4T690A	Full stainless steel 4 drawers rack Stainless steel rack with 4 aluminium drawers	4	80 / 3.15	40	
	BM/EL5T690 BM/EL5T690A	Full stainless steel 5 drawers rack Stainless steel rack with 5 aluminium drawers	5	63 / 2.48	50	
	BM/EL6T690 BM/EL6T690A	Full stainless steel 6 drawers rack Stainless steel rack with 6 aluminium drawers	6	53 / 2.08	60	
RACKS WITH FIXED SHELVES (140x730x343mm) (5.51x28.74x13.5in.)	BM/EL3E690AC	Aluminium rack, 15 compartments	3	109 / 4.29	30	8 / 12 / 16
	BM/EL4E690AC	Aluminium rack, 20 compartments	4	80 / 3.15	20	
	BM/EL5E690AC	Aluminium rack, 25 compartments	5	63 / 2.48	25	
	BM/EL6E690AC	Aluminium rack, 30 compartments	6	54 / 2.12	30	
OTHER STORAGE ELEMENTS	BM/ELE690	Stainless steel rack, 5 colums, up to 30 compartments, removables shelves.	Between 1 and 6	Between 54 and 109	160 micro-plates 96 wells 30 compartments	8 / 12 / 16
BASKETS	BM/TIR	Tiroir de stockage en acier inoxydable (142x740x330 mm) (5.6 x 29.2 x 13 in.)	1	330	/	8 / 12 / 16



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