



2019-ENG-Vers. 1.5



APPARECCHI  
SCIENTIFICI

*In  
our  
solutions  
your  
safest  
samples*

Ultra Low Temperature  
Freezers (-40°C -86°C)

**PL** Series  
Premium Line

**HPL** Series  
High Performance Line

UltraLow Temperature Freezers  
-40°C -86°C  
Biological Banks®



Cold storage  
equipment

[www.kwkw.it](http://www.kwkw.it) - [kw@kwkw.it](mailto:kw@kwkw.it)





*Since 1953...  
Over 60 years dedicated to research in both  
the scientific pharmaceutical field and the  
diagnostics and hospital care field.*



Made in Italy

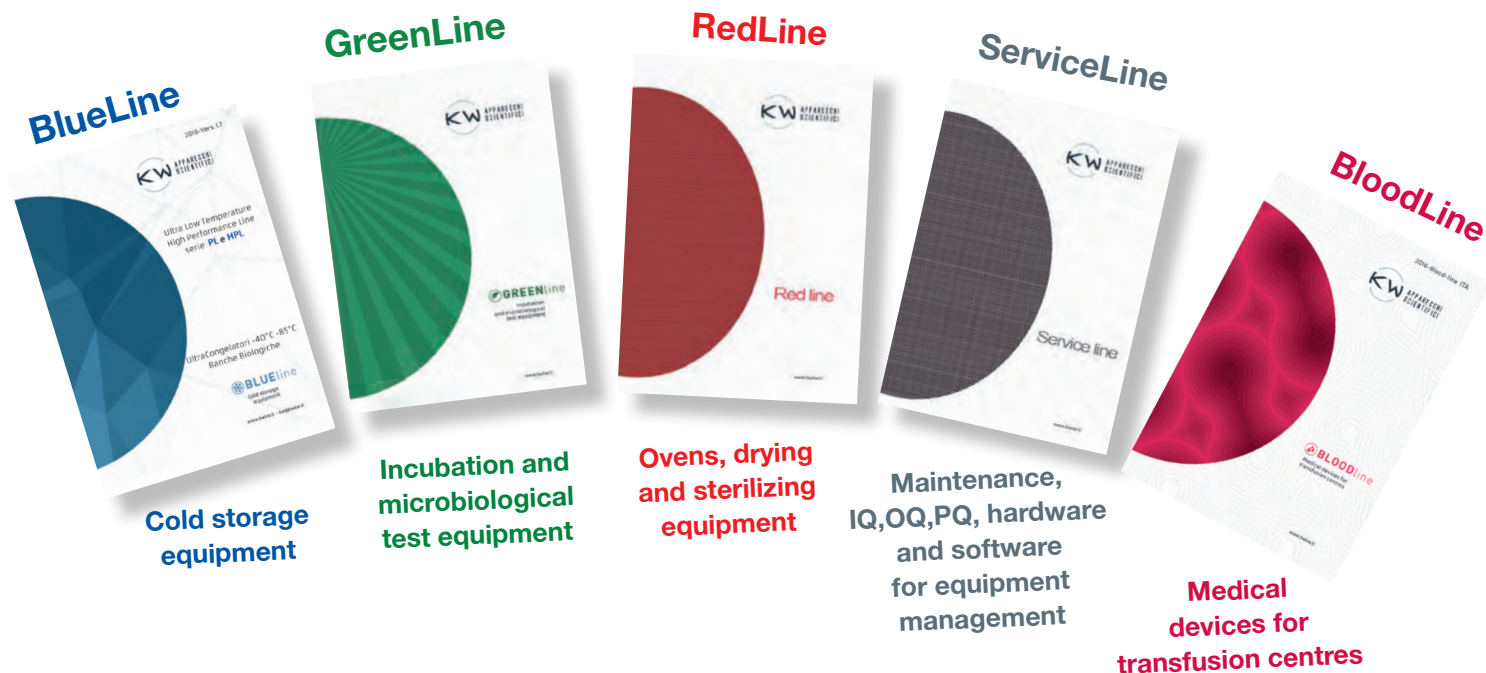
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**APPARECCHI SCIENTIFICI**



2019

# Introduction



*In our solutions  
your safest samples*

Kw is a leading company in the Italian market in designing and manufacturing cold storage and incubation equipment and also operates on various foreign markets.

Kw supplies equipment, services and devices for cold and thermal chains for the biomedical sector, scientific research and pharmaceutical industry.

Kw has two production plants and warehouses in Monteriggioni (Siena - Italy). The company is provided with the quality system (ISO 9001 - ISO 13485), health and security system (OHSAS 18001) and environmental respect system (ISO 14001).



ISO 9001:2015



ISO 13485:2016



ISO 14001:2015



OHSAS 18001 2007

# KW Freezers

The **PL (Premium Line)** series is KW standard -86°C freezers line. The **HPL (High Performance Line)** series represents the excellence in extremely low temperature freezers for lab use.

The **PLL (Premium Line Light)** series is KW standard -45°C Freezers line. **HPLL (High Performance Line Light)** series is the excellence in low temperature freezers for lab use.

The two lines differ from the control systems and from some components. In the HPL and PL lines the equipment is increasingly reliable thanks to exclusive and very innovative technical solutions. As a consequence also the safety of the stored products is much higher.

After a careful and complicated R&D plan KW, manufactured these brand new -86°C ultra-freezers series, which are a super solution, that is a superior quality compared to the market standards. KW Ultra Low Temperature Freezers's design and functions were renovated, such as the new **NEW ICE AGE KW CONTROL®** and **I-KW®** controllers.

The refrigeration and insulation systems are CFC and HCFC free, such gases are very harmful to the ozonosphere and are compliant with the new **F-GAS regulation no. 517/2014**.

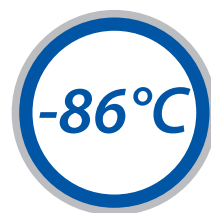
The technical innovations which KW design team inserted in all the models improves the quality of the products.

**PREMIUM LINE** and **HIGH PERFORMANCE LINE KW** have the CE certification; they comply with the UNI EN 61010 (CEI 66-5) standards as to lab equipment security; they are designed and built according to the procedures included in **the ISO 9001 and ISO 13485 quality system**.





# KW Very Low Temperature Freezers



## FLEXIBILITY (Structure and System)

**Wide range of -86°C Freezers: vertical and horizontal models with different capacity.**

**Possibly** – in the vertical models – two doors rather than one (2D versions); this solution allows:

- The separation of the samples with different handling characteristics.  
It is advisable to use the lower compartment for long term storage;
- The management of the two compartments autonomously and independently, as they are both equipped with a key lock;
- The use of the lower compartment as a horizontal freezer, as cold air stratifies in the lower part of the freezer and therefore the temperature in this part is stable while opening the higher door.
- **Possibility** of evaporation trays (ES) or mobile shelves (MS); in this case, there are 5 rather than 4 counter doors.
- **Possibility** of air or H<sub>2</sub>O as well as SPLIT motor condensing groups.
- **Possibility** of “embedded” solutions for classified environments such as pharmaceutical companies, biological banks...





## SECURITY

KW focuses on the quality of stored materials; this requires maximum safety. This is guaranteed by the **high degree of thermal insulation, efficient temperature recovery (recovery time) and high homogeneity and stability of the internal T**; all these characteristics allow the maximum preservation of stored products and materials.

- **Exceptional insulation** with polyurethane foamed on site (density 40 Kg/mc.): an average of about 140 mm and/or special insulated materials such as V.I.P. panels and/or Aerogel, thus less consumption, less startup time, slower T rise, greater product safety, greater internal temperature uniformity.
- **Insulated internal counter doors** (in foam polyurethane) minimize the discharge of hot air.

**T stability and uniformity** are guaranteed by special thermal fluid dynamics. This is proven by mappings performed with high standard instruments, compliant with GMP, GLP, FDA, etc.

KW's vertical models have an **exclusive tray evaporation system (ES)**: 5 trays with 4 storage compartments and very high temperature uniformity.

Tray evaporation allows a very fast pull down, a really fast recovery time and a very good T uniformity.

KW offers also **mobile shelves (RM)** models with comparable thermal performance.

Air- condensation occurs with two-circuit special condensers that are manufactured on KW specifics, with over 2600W of power and capable of enduring extreme environmental conditions.

Two-stage, cascade refrigeration system; two airtight compressors with 1.2 to 1.7 HP according to model and capacity. This allows faster cooling/freezing of the stored materials, also in reference to power consumption.

In addition, KW Freezers can be equipped (optional) with a **controlled access** system with electrical key and transponder/badge RFID or finger-pass.

Controllers can be connected to the network through Ethernet doors or WiFi (**Total Connectivity**).

They are equipped with a monitor card for the temperature recording, alarms etc. with USB port and SD CARD (**Total Traceability**).

GSM module for online remote assistance also available .



## RELIABILITY

KW freezers are designed for long term heavy duty use, given by its robust structure and high power cooling unit.

- Triple door gasket ensures maximum air sealing, with special resistance to wear and tear.
- Lifetime warranty on steel parts.
- The cooling unit is designed in order to ensure the maximum protection of the compressor (5 year warranty).
- **Special Functions** such as Safety control and disaster recovery allow a non-stop running of the equipment.



## HYGIENE

Hygiene is given by the entirely **AISI 304 stainless steel** inner chamber (on demand also AISI 316), with rounded edges; the complete absence of vertical junctions in the chamber prevents dirt deposits as well.

The external surfaces are made of prepainted and/or painted steel zinc sheet (also AISI 304 satinized stainless steel is available on request). Smooth surfaces are easier and safer to clean.



## INNOVATION

KW plant is equipped with a **chamber for environmental tests**, where it is possible to program T and UR%, both for research and development tests and for environmental simulations of product final tests.

KW is also developing an internal executive procedure for the consumption reduction. The procedure is based on a system that allows knowledge of the performances of the refrigerating circuit and the control of its process: COP, efficiency of the heat exchange to the condenser and evaporator, etc. taking into consideration the increase of problems concerning energy, environment and the latest European regulations. **Continuous research of new materials, new low GWP cooling systems and new systems.**



# Energy Saving



## Energy Saving- Echocompatibility/Echosustainability

**Very high thermal insulation with extremely low thermal conductivity** (between 140 and 175 mm.), also with **Vacuum Insulation Panels**, numerous inner counter doors (up to 5).

The VIP panels are optional; KW guarantees an **18%-20%** energy saving, while keeping constant average thickness or reducing the overall dimensions through a reduced thickness of the insulation (up to 90mm in the ULT SLIM Freezers).



**Environmental Impact:** the thermoplastic materials can be recyclable, as they are chlorinated and heavy metals free.

**Insulated internal counter doors** (in foam polyurethane), minimize hot air entry.  
**Triple silicone gasket**, minimize hot air entry.

**Double external door (2d)**, minimize hot air entry.

**Very wide range of inner furnishing** in order to minimize search time of samples and to minimally expose to heating samples which are not destined to sampling.

Attention to the environment:

- Use of **HFC refrigerants (or alternatively natural HC and HFO)** with ODP=0 and a **low GWP** (global warming potential), in the refrigerating circuits and the absence of CFC and HCFC polyurethane foams;
- F-gas maintenance procedures;
- COP (parameter of cooling efficiency) of the systems used;

These characteristics demonstrate the commitment to KW in protect the atmosphere ozone layer to limit its contribution to the greenhouse gas



**-40°C -86°C**  
**Ultra Freezers**

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**HPL Series**  
**High Performance Line**



# HPL Series:

-86°C Ultra Low Temperature Freezers

The KW **HPL (High Performance Line)** Series is CE certificated; it complies with UNI EN 61010 (CEI 66-5) standards concerning the lab equipment; it was designed and built according to **ISO 9001:2015, ISO 13485:2016** quality assurance system and boasts the **Medical Device certification**.

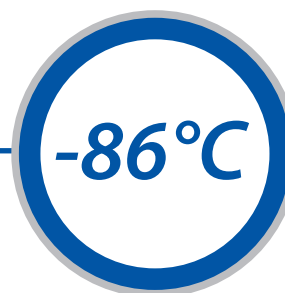


The new -86°C HPL Ultrafreezers



Touch Technology

**HPL High Performance Line** control system, **Touch technology** recording and supervision.



## HPL Controller

**Display Touch TFT 7".**

**Automatic Recording**  
of the temperatures and the alarms.

**Electronic key with password.**

**Standard setup for electronic locking system** (controlled access).

**Special Functions.**

**Ethernet and WiFi connection, USB port.**

## HPL (High Performance Line) Series:

- ✓ **Wide range of models** (horizontal, vertical and various capacities).
- ✓ **AISI 304 stainless steel internal chamber.**
- ✓ Pre-painted steel plate external surfaces.
- ✓ 140 and 175 mm insulation thickness.
- ✓ **Insulated internal counter doors.**
- ✓ Use of HFC and HFO, CFC free, HCFC free, non toxic, non explosive and non flammable refrigerants, in compliance with the F-GAS no.517/2014 regulation.
- ✓ Two-stage refrigeration system.



# Horizontal HPL Series Freezers

## FREEZERS HORIZONTAL -86°C HPL SERIES

MODELS	K52 HPL	K52E HPL	K54 HPL	K54E HPL	K55 HPL	K55E HPL	K5578 HPL
CAPACITY (litr.)	110	170	230	330	480	702	785
EXTERNAL DIM. (WDH)	90x100x124 cm	90x100x124 cm	150x86x124 cm	150x86x124 cm	195x88x112 cm	256x86x117 cm	249x97x112 cm
INTERNAL DIM. (WDH)	55x40x50 cm	63x48x55 cm	115x40x50 cm	123x48x55 cm	122x52x75 cm	180x50x78 cm	176x60x75 cm
WEIGHT	130	140	290	300	350	440	440
Insulation (mm)	175 mm	140 mm	175 mm	140 mm	140 mm	140 mm	140 mm

Power Supply : V230/Hz50

Work range : -40°C → -86°C

The minimum value is guaranteed with ambient T = +32°C. Above +35°C, an automatic condensation device running on water from the water supply system is recommended (see ACCESSORIES).

### Touch Technology



TFT 7" Display

- USB port
- Slot SD CARD
- Slot SIM GSM
- Controlled Access

### Standard equipment:

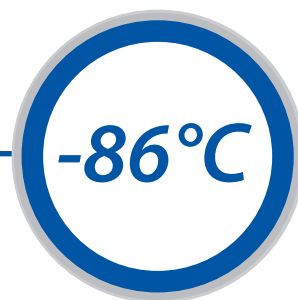
- = Min. /max temperature alarm
- = Open door alarm
- = Sensor failure alarm
- = Power failure alarm
- = Locking system
- = DATA LOG function
- = Wheels



K55/K55E HPL



# -40°C -86°C HPL Biological Banks®



*Biological Banks® is KW Registered Trademark exclusively made by KW*



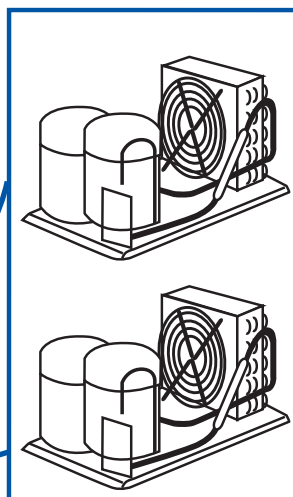
## Unique Touch Screen Controller

### Touch Technology



- USB port
- Slot SD CARD
- Slot SIM GSM
- Controlled Access

### TFT 7" Display



## Two independent refrigerating systems

## Standard equipment:

- = Min. /max temperature alarm
- = Open door alarm
- = Sensor failure alarm
- = Power failure alarm
- = Locking system
- = DATA LOG function
- = Wheels



- + Unique -86°C ultra low temperature freezers with two independent refrigerating systems that operate alternately (4 compressors + 2 evaporators).

**In case one of the two systems fails (either the fluidynamic thermal part or the electrical part), an internal control system reports an acoustical and visual warning (permanent) and excludes the failed system:** this allows easy and not necessarily immediate repairs, since the inner T is kept constant by the other system.

The Biological Bank® solution, albeit more expensive, is the most cheap one, since the individual motors and all the electro mechanic components last almost twice as much.

# Biological Banks® Serie HPL

## BIOLOGICAL BANKS VERTICAL -86°C HPL SERIES

MODELS	K56S	K58S	K60S	K62S	K64S	K66S
CAPACITY (litr.)	250	354	505	604	706	806
EXTERNAL DIM. (WDH)	115x79x188 cm	132x80x184 cm	132x97x184 cm	141x90x199 cm	141x100x199 cm	110x103x199 cm
INTERNAL DIM. (WDH)	50x45x110 cm	70x46x110 cm	70x65x110 cm	80x59x128 cm	80x69x128 cm	85x73x130 cm
WEIGHT	350	400	430	440	460	540
SHELVES/COUNTER DOORS	4/4	4/4	4/4	4/4	4/4	4/4
INSULATION THICKNESS	140 mm	140 mm	140 mm	140 mm	140 mm	140 mm

Power supply : V230/Hz50    **Work range : -40°C —> -86°C**    The minimum value is guaranteed with ambient T = +32°C.

## VERTICAL -86°C HPL SERIES (DOUBLE DOOR)

MODELS	K58S-2D	K60S-2D	K62S-2D	K66S-2D
CAPACITY (litr.)	354	505	604	806
EXTERNAL DIM. (WDH)	132x80x184 cm	132x97x184 cm	141x90x199 cm	110x103x199 cm
INTERNAL DIM. (WDH)	70x46x110 cm	70x65x110 cm	80x59x128 cm	85x73x130 cm
WEIGHT	400	320	440	540
SHELVES /COUNTER DOORS	4/4	4/4	4/4	4/4
INSULATION THICKNESS	140 mm	140 mm	140 mm	140 mm

Power supply : V230/Hz50    **Work range : -40°C —> -86°C**    The minimum value is guaranteed with ambient T = +32°C.

## HORIZONTAL -86°C HPL SERIES BIOLOGICAL BANKS

MODELS	K54S	K54ES	K55S	K55ES	K5578S
CAPACITY (litr.)	230	330	480	702	785
EXTERNAL DIM. (WDH)	167x86x124 cm	167x86x124 cm	237x88x112 cm	298x86x117 cm	290x96,5x112 cm
INTERNAL DIM. (WDH)	115x40x50 cm	123x48x55 cm	122x52x75 cm	180x50x78 cm	176x59,5x75 cm
WEIGHT	380	400	420	520	520
COUNTER DOORS	2	2	2	2	2
INSULATION THICKNESS	175 mm	140 mm	140 mm	140 mm	140 mm

Power supply : V230/Hz50    **Work range : -40°C —> -86°C**  
The minimum value is guaranteed with ambient T = +32°C.

**KW Biological Banks** series is the best solution for the conservation of the biological material at ultra low temperature.

KW has been exclusively manufacturing them since the end of the 80s.

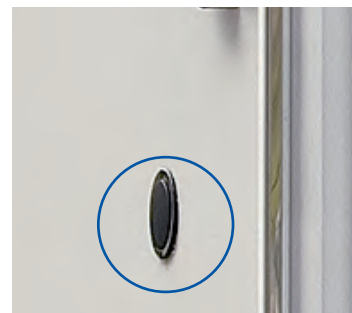
This cold storage solution, ensures a constant temperature also in case of failure, therefore the storage is safe and effective. This system could be compared to a jewel that is stored in a bank vault to avoid any risk.



# Accessories

## Freezers -86°C (HPL series)

- ✓ **S230 Volt  $\pm 15\%$ , Voltage stabilizer** to adjust the optimal power supply voltage (high or low) for the compressors.
- ✓  **$\varnothing 25$  mm in-out through holes** with external rubber or plastic plug.
- ✓ **Weekly disk recorder with battery power supply.**
- ✓ **Additional internal shelves** (for vertical freezers).
- ✓ **Remote-alarm devices GSM.**
- ✓ **Additional network water condensation device** with an automatic pressure regulator valve for the optimization of water consumption (water condenser kit ).
- ✓ **strip-chart electronic recorder** with one or more traces.
- ✓ **CO2 backup system with 24 VAC/50 Hz** power supply complete with connection and flexible hose.
- ✓ **LN2 backup system with 24 VAC/50Hz** power supply complete with connection, flexible hose and security valve (absolute value 2.7 bar).
- ✓ **CO2 backup system with 12 VDC** power supply complete with switching power supply, independent thermal sensor, independent T controller, 24 Ah battery, connection and flexible hose.



THROUGH HOLE



VOLTAGE STABILIZER



STRIP CHART  
RECORDER



CO2 SYSTEMS



DISK RECORDER



# Accessories

## Freezers -86°C (HPL series)

- ✓ **Additional sensors for T, RTD Pt 100**, for the connection to external T recording system.
- ✓ **Additional RTD Pt 100 sensor complete with 4-20 mA converter** mounted on a DIN bar for the connection an external recording system (BAS).
- ✓ **Containers, drawers and racks in AISI 304 stainless steel.**  
(see the page on KW CONTAINERS).



**CONTAINERS, RACKS,  
CHEST OF DRAWERS**

# Accessories

## Freezers -86°C (HPL series)



**RUOTER WiFi**



**BADGE OR TRANSPONDER**



**GSM MODULE**

On this equipment series it is possible to perform **I.Q. (Installation Qualification)** and **O.Q. (Operational Qualification)** activities; please contact KW's Commercial Office for an assessment of the costs entailed by such activities. KW is also available for ISO calibration certification services for the comparison of primary SIT samples.





# -86°C Freezers



**Double Door**



**Biological Banks**



**Touch Technology**



**HPL Control**

# Structure

## 01 INSIDE/OUTSIDE

Inner frame in AISI 304 stainless steel, with rounded edges for an easy cleaning. Pre-painted steel external sheet.

## 02 INSULATION

The insulation is made of CFC and HCFC free polyurethane resins, expanded on site, with 40 Kg./mc density and 140 mm average thickness or more. Also with V.I.P. panels.

## 03 SHELVES



ES



RM

**The internal evaporators are tray type in stainless steel** with direct expansion and form non extractable internal shelves which divide the internal space (**ES**). Also versions with evaporators placed on inner walls with height adjustable shelves (**RM**) are available.

## 04 WHEELS

The freezer is equipped with pivoting wheels with brake to facilitate transportation and movements.

## 05 THROUGH HOLE

Internal – external through hole, with rubber stopper.



The KUB75, K66 and SLIM style have a standard insulation made of foam polyurethane resins on site + embedded V.I.P. (Vacuum Insulation Panels).

## Green ICE



Environmental impact improvement and energy cost reduction.

## Antibacterial



Materials manufactured with modern processes and antibacterial technologies.



**COUNTER DOORS**

Vertical cabinets have metal and insulated doors, with hinges and locking devices. The horizontal cabinets have expanded polyurethane resins doors, so as to reduce the entrance of hot air.

**GASKETS**

The triple silicon rubber gasket has welded joints and is heated by the refrigerant. It is long-lasting so as to reduce the entrance of hot air

**HANDLE**

The handle has a very ergonomic design and is equipped with a key lock.

**ROUNDED EDGES**

The inner/outer smooth surfaces are safer and easier to clean. Very thick external door for a maximum thermal protection.

**DOOR HINGES**

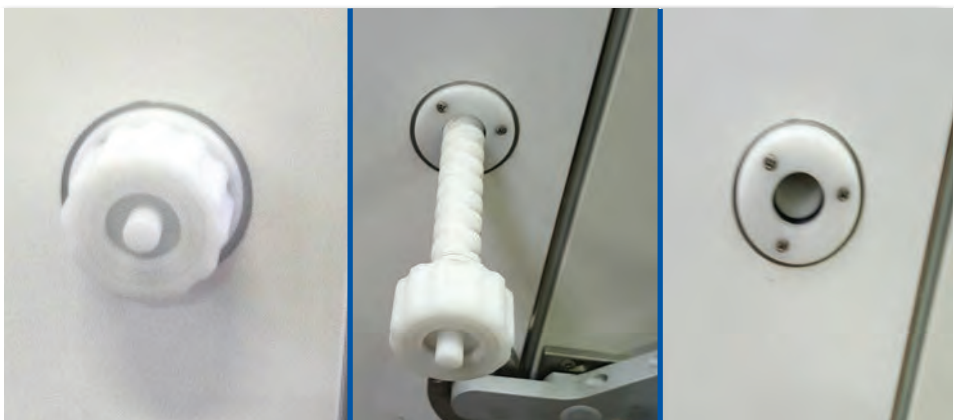
The horizontal freezers are equipped with self-balancing hinges and a ergonomic handle which allow to easily lock the door.

**RACK CABINETS**

They can be equipped with AISI 304 stainless steel cabinets with drawers and/or frontal and lateral racks.

**REMOTE ALARM**

Contacts for remotely controlled alarm signals.

**NEW COMPENSATION VALVE**

**New internal/external pressure compensation valve** to facilitate frequent opening and closing (which can be removed and easily cleaned).



# Refrigeration

*System compliant with the F-GAS Regulation no.517/2014*

**The refrigerating system is completely sealed; it is equipped with a cascade circuit,** composed of innovative fluids, that is very reliable guarantees a high cooling performance. It comes with **2 silent hermetic compressors** (Leq db(A)<55) having high cooling capacity, equipped with magneto thermal protections and maximum condensation pressure thermostat (MR-Manual Reset after 3 reset attempts). All these features assure total reliability and lack of 1st stage failures, moreover the system is easy to reset. The condensation surfaces (with air and thermal output higher than 2610 Watt, with ambient T+25°C) are very wide (with tubeless exchangers) in order to face severe environmental and working conditions and to reduce energy consumptions.

**The expansion of the refrigerants is obtained through capillary tubes;** the expansion occurs in fixed exchangers; the evaporating surfaces are composed of the following: a serpentine copper tube thermally connected to the entire external surface of the inner case in horizontal freezers and by AISI 304 stainless steel evaporation trays located inside the inner chamber, in vertical freezers.

What above described is also available even with coil serpentine on the wall and on the movable shelves; both solutions guarantee high refrigerant capacity, fast cooling (**low pull down and recovery time**), and high uniformity of inner temperature.

**-Max ambient T: +32°C/+35°C.**

**-Minor maintenance, max product protection, minor wear and tear of the compressors, minor thermal and acoustic pollution.**

**-Control system of the circuit inner pressures of the two stages of refrigeration.** the system constantly controls the T and pressure conditions of the two refrigerants, as well as the condition of the thermal exchange with the environment, so that to always have balanced flows between the 2 stages.

The **refrigerants are atoxic, non flammable, non explosive and ecologic** (maximum respect for the environment) as they are **HC FREE, CFC FREE, HCFC FREE (ODP=0 OZONE DEPLETION POTENTIAL).**

**CEI En 61326-1 CEI En 61010 -1 compliant.**

**2006/42/CE Machine Directive compliant.**

**2006/95 /CE Low Voltage Directive compliant**

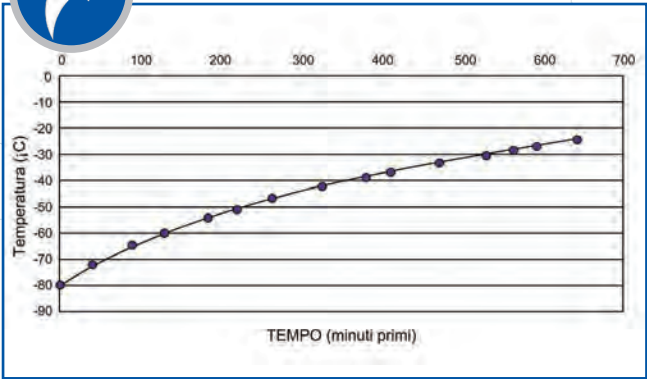
**2004/108/CE Electromagnetic Compatibility compliant**



# Performances



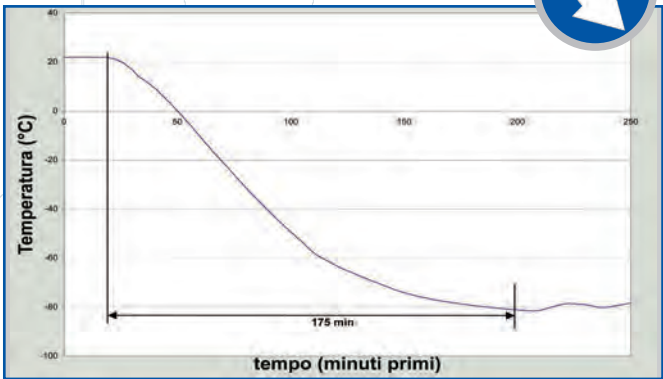
## PULL DOWN



Measurement of the temperature **increase** in an empty -80°C (500- 600 liters) vertical freezers with closed door.



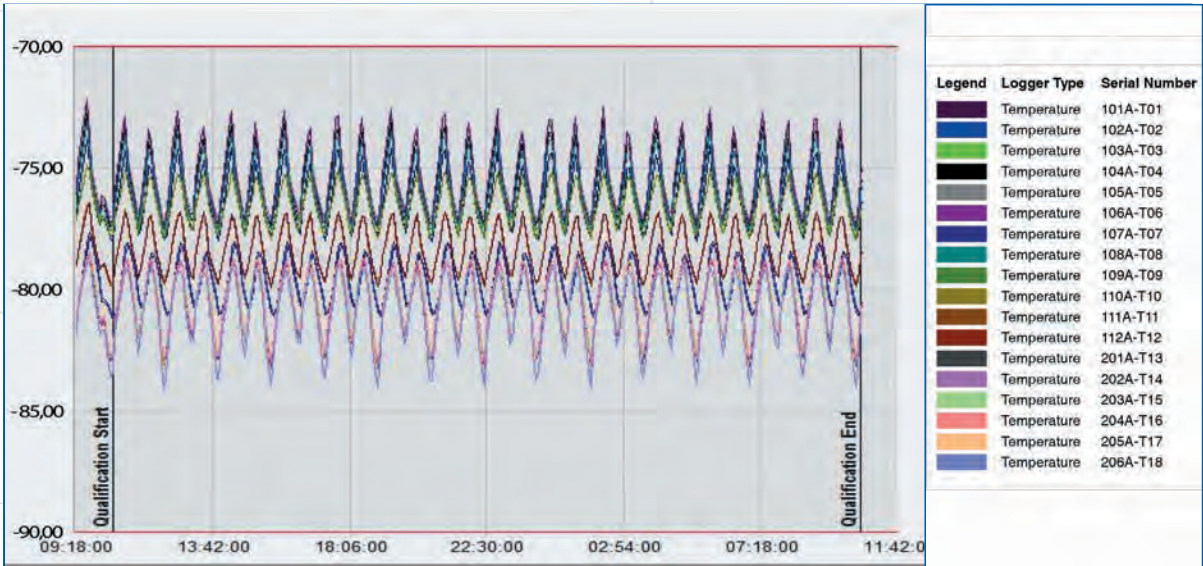
## START UP



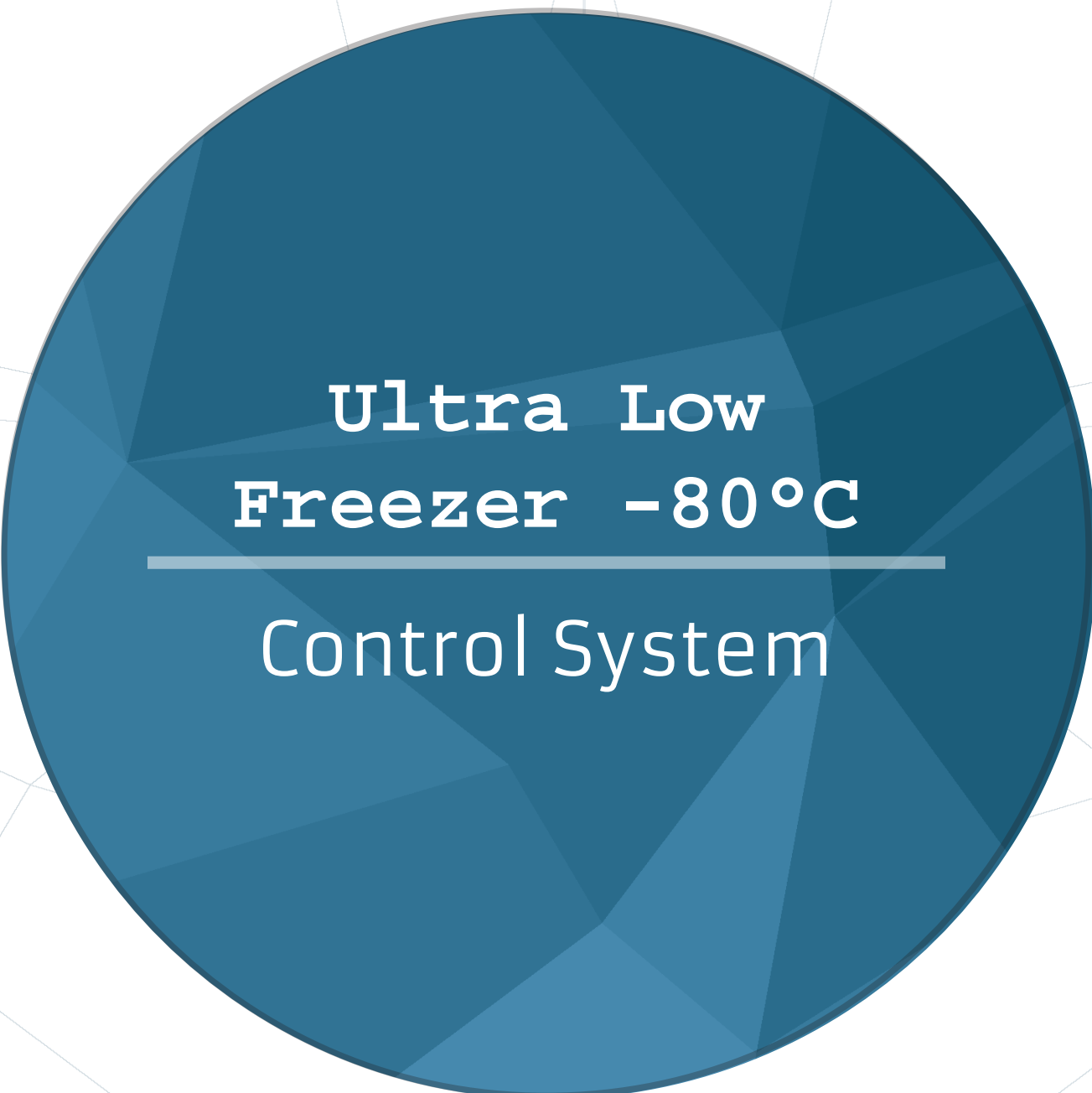
Measurement of the temperature **drop** from ambient temperature in an empty -80°C (500-600 liters) vertical freezer with the closed door.



## STABLE AND UNIFORM TEMPERATURE (-86°C)



Stable and uniform temperature in a -86°C (700 liters) vertical freezer at a set T of 80°C. (no. 18- temperature sensors in air)



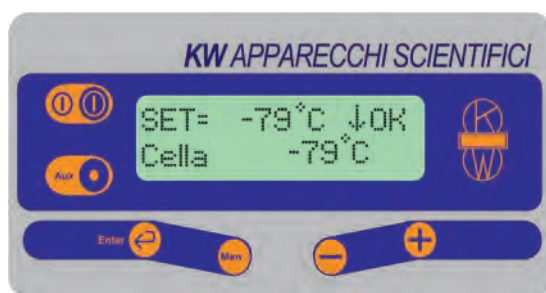
# Ultra Low Freezer -80°C

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## Control System



## NIA Control



LCD Display

## HPL Control



TFT 7" Touch Screen Display

# The NIA Controller

## New Ice Age

### Premium Line

The Premium models have standard control, registration and supervision **NEW ICE AGE KW CONTROL®** which is an innovative control in the cryobiology and ultra low temperatures sectors. This control, has an excellent machine-user interface, many advantages for users and for technical assistance and especially special functions which make it a Unique solution.

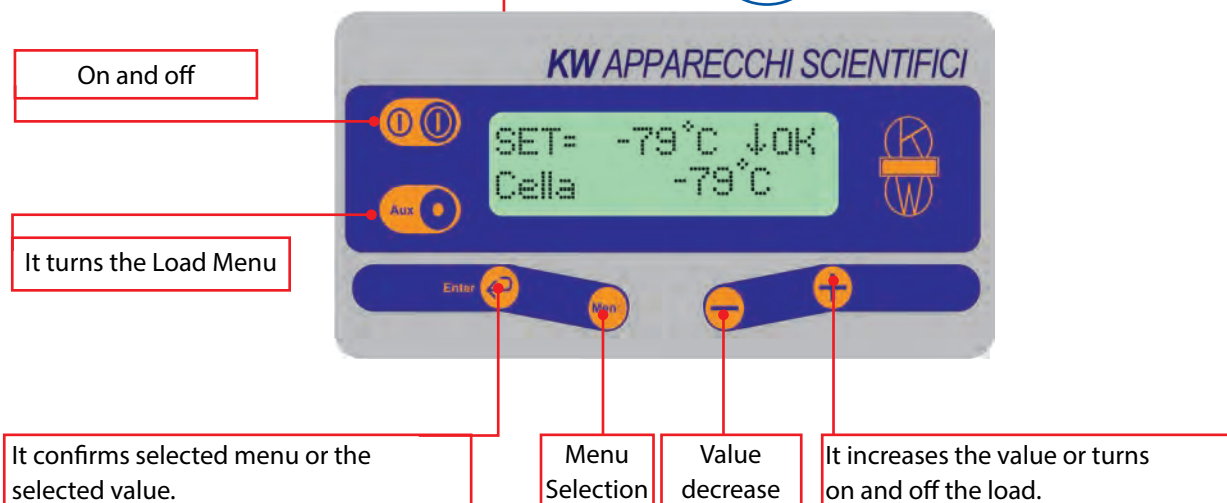


### Regulation, Supervision and Recording in one single Control

**Back lit LCD** display with 16 characters, with indication of T, at 0,1°C.



**NIA Control**  
New Ice Age

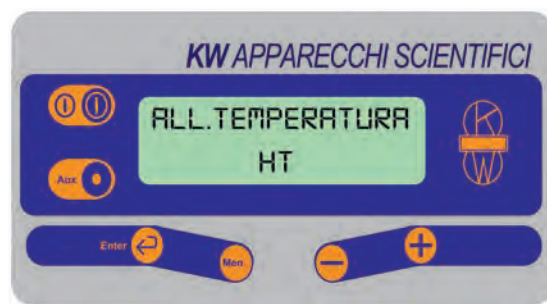






# Allarms Monitoring

The alarm display allows final users to know the state of preservation of the stored biological materials /medications etc. 24/7 etc. avoiding additional direct controls.



## Alarm List:

- ☒ Min/max audiovisual temperature alarm.
- ☒ Power shortage audiovisual alarm.
- ☒ Open door alarm.
- ☒ Condenser high pressure alarm.
- ☒ Battery alarm.
- ☒ Sensor failure alarm.
- ☒ Compressor alarm.
- ☒ Condensation high T and dirty condenser alarm.

Such alarms are always on even in case of power failure thanks to a 2.3 Ah buffer battery which feeds the control system.



## Data Logger Function:

The controller records both the temperatures and the alarms (up to two channels).

The storage capacity allows the registration every 20 m for about 4 months.



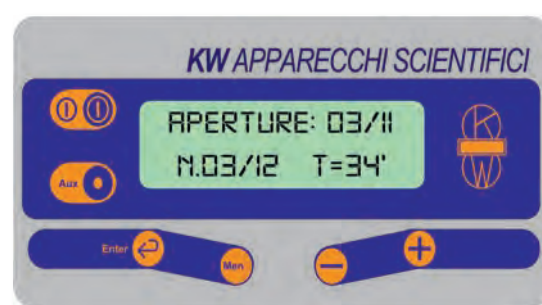
## Check Service:

The last **32 functional failures** are saved and can be read on the display through a password.

The controller, **for any temperature alarm**, records as follows (maximum traceability):

–**Type of alarm: high T, low T, black out...**

–**dd/mm/yy/h alarm beginning and duration**



**For every open door alarm** the control unit records the following:

–**number of critical openings/number of total openings/ total opening time in mins.**

–**dd/mm/yy**

Operation time of Motocompressors' are also recorded.

The **USB serial door** allows the recorded data download by the control unit to a USB pen drive. T values and alarm events can be displayed in a graphic chart or in a table with a software (reader USB software) that is included.

# Security

Security software for wrong and accidental handling and storage.

## User Security:

A password is requested for the following functions:

- + Freezer switching on and off**
- + Set point value variation**
- + Access to the service menu for all the functional parameters**



## Special Functions: stored sample maximum security.

### 2 CH MONITORING KIT (high flexibility):

There are two sample sensors (RTD Pt 100 ohm) that allow the regulation by calculating the average value. In addition, a control function determines if the difference, between the two sensors, exceeds a value defined by kW: in such a case, a non T uniform warning turns on inside the work chamber.

**The malfunction of one of the two sensors automatically transfers the regulation on the other one and, an alarm turns on.**

The two sensors can also be set up one for regulation and the other one for an alarm. In this case, the alarm sensor can be positioned in the hottest point detected in the mapped inner cabinet.

### KEY TEST:

The alarm test procedure can be activated by pressing a button. In particular:

- Blackout alarm,
- Remote alarm relay,
- High temperature alarm.

### SAFETY CONTROL:

The freezer does not stop working in case of regulation sensor failure. The temperature of the storage does not change significantly. The controller maintains the fixed temperature and the compressor turns on and off as detected before the failure (adjustment to the environmental conditions in use!). The failure is registered and the failure alarm signal activates.

### DISASTER RECOVERY:

The freezer does not stop working if a failure occurs. If the CPU is damaged it allows the cycle of the functions on the remote unit and excludes the data visualization. The correct conservation is performed with the recorded on/off times fixed by the previous controller.

### INFO TEST:

It allows the user to accomplish the same functional test performed in the factory. It performs a functional test of the biologic freezer with a printed report with no need of external devices. This function is very useful for the technical assistance.



# Energy Saving

**KW Apparecchi Scientifici** follows the **Green Ice project** and its product lines are in continuous development. KW follows some of the fundamental management principles of modern companies such as:

- lower environmental impact of its equipment;
- energy cost reduction of its equipment.



The automatic control and recording of all the functional parameters ensure very high operating efficiency by, allowing the energy consumption measurement and the parameter implementation for the COP increasing (coefficient of performance), namely promoting **Energy Saving**, in line with KW's **Green Ice Project**.

**The use of HFO with low GWP are compliant with the F-gas European regulation.**

## Night & DAY:

It allows to increase the pre-defined set temperature during night hours (set up by the user or by the manufacturer).

## Environmental Adaptability:

The condenser fans are independent; thus they can operate differently and still keep the condensation constant when the ambient T changes. This optimizes the condensation conditions and consequently maximizes the COP of the unit: **preventive and energy saving action.**

These two new functions are complement with NIA system functions and contribute to energy saving and global warming reduction, with a lower CO2 indirect emission in the atmosphere.

**The energy saving is up to 15% compared to a standard freezer.**



# The HPL Controller High Performance Line

## Touch Technology:

**KW** has always been very innovative for what regards the innovations in the information technology, the electronics world, and thermodynamics technologies. KW invented a controller with ARM microprocessor technology, which is the same used for smartphones, with embedded Linux operating system, and therefore a real on-board computer. The new control and monitoring system is characterized by a graphic video interface composed by a **TFT 7" display touch screen**.



HPL Control (High Performance Line)

### ONE TOUCH

Touch screen solutions to communicate in a simple and immediate manner.

### USER FRIENDLY

Interface facilitates interaction with the controller.



TRACEABILITY



CONNECTIVITY



ENERGY SAVING



SECURITY



EASY  
MAINTENANCE



# Connectivity, Traceability and Security

The new controller assures **maximum connectivity and traceability**, meets all the requirements of pharmaceutical industries and healthcare facilities. HPL freezers, with I-KW Smart controller have the following advantages:



## Total Connectivity:



- ✓ USB door
- ✓ SD Card Slot
- ✓ SIM Card Slot
- ✓ WiFi Connection
- ✓ Ethernet Door with Modbus protocol
- ✓ RS485 door with Modbus protocol
- ✓ Controlled access presetting



Total Connectivity

## Total Traceability:



the controller records the functional data at high frequency and also **stores bar codes or other coding forms** (some of them with expected hardware implementations) by associating the content to the freezing process, cryo preservation, etc. The user can easily transfer the data on Pc and/or network Windows only (no specific software is needed).



Network KW

## Data Management:

All HPL systems used by KW allow **a real-time and a backup data management**.

The characteristics of these two data technologies are the following:

**-Real-time Data:** allow a real time monitoring of the device.

**-Backup Data:** allow an off-line monitoring of the device through the use of recorded data.



# Security



HPL controller is the new interface and connectivity linked to the freezers' control. It is simple, intuitive with a high visual impact and is combined with a sophisticated management of the refrigerating unit.



Time-temperature chart



Electronic Key



KW Badge

the I-KW smart controller was conceived for an integrated security of all functions through the regulation and management of all refrigeration powers.

Data recording and filing is in compliance with the most developed standards, such as GMP, JACIE, FACT, etc.

**The time-temperature chart can be displayed on the screen with no need of a dedicated instrument.**

## Access Control:



Ultrafreezers equipped with the new controller have controlled access:

- + (standard) **electronic key** (alphanumeric customized code) to be associated with an electric locking system for controlled opening.
- + (optional) **badge or transponder**, or finger-pass, with finger print filing.

## "Door Opening" Event Traceability:

Through the **Log Function**, it is possible to trace the "door opening" event.

The following info are stored and displayed:

- **The Operator who opened the door** (identified by the User Code entered with the key-board or by using the badge).
- **Door opening timing (day/month/year/hour/minute/second).**
- **Number of times the door was opened.**



## Easy use and Maintenance



### Easy Maintenance:

The manufacturer or maintenance specialist can connect to the device through an **IP address** and with a password sequence (for security and traceability reasons) to question the equipment status. It is possible to manage the equipment remotely, at reduced costs and work time. This system is very advantageous for, failure prevention.



### User Friendly:

Many tools will facilitate the equipment use.

The user's guide is displayed on the screen and can be skimmed just like on a cell phone. The panel displays a real time user's manual, as well as the start up sequence or video files needed for maintenance and so on

**A remote assistance service is possible. There is a designated slot for a SIM with a GSM function that sends instructions and recommendations to the display.**

## Energy saving



Automatic control and registration of all functional parameters guarantee a very high operating efficiency, by allowing the measurement of energy consumption and the implementation of the COP parameters (coefficient of performance). Increase, namely greater energy saving, as to the **Green Ice Project** promoted by kW

### Environmental Adaptability:

The condenser fans are independent; thus they can operate differently and still keep the condensation constant when the ambient T changes. This optimizes the condensation conditions and consequently maximizes the COP of the unit: **preventive and energy saving action.**

### Energy Saving:

When the use percentage of the compressor reaches a predefined value, the Energy Saving function allows to increase temporarily and automatically the set point of the user pre-defined value and automatically activates the established conditions.

### Eco mode:

It allows to increase the pre-defined set temperature during night hours (set up by the user or by the manufacturer).

These new functions are complement with NIA system functions and contribute to energy saving and global warming reduction, with a lower CO2 indirect emission in the atmosphere.

**The energy saving is up to 15% compared to a standard freezer.**

The controller is provided for future updates at low costs, of new technological developments and meets the growing requests of standards and directives in the healthcare and pharmaceutical area.

**The I-KW smart controller is the most innovative control system for freezers and ultra-freezers.**

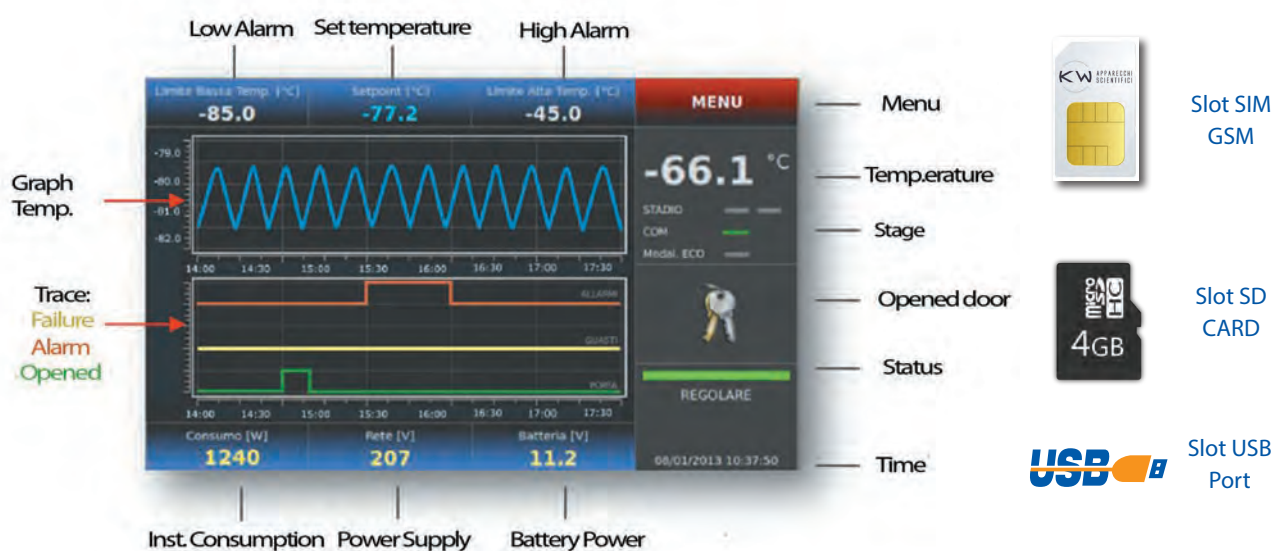


## Display Touch Screen

- ✓ TFT 7" color Display Touch Screen.
- ✓ ARM9 microprocessor technology.
- ✓ Menu with multiple windows and temperature chart.
- ✓ Available in 5 languages.
- ✓ On/Off > controlled access through the use of an electronic key with password.

<b>Display</b>	<b>TFT Touch screen 7.0" wide</b>
<b>Supply</b>	<b>from Power Board</b>
<b>Dimension</b>	<b>197x122x50 mm</b>
<b>Front ports</b>	<b>USB - Slot per SIM Card e SD Card</b>
<b>Ports</b>	<b>Ethernet, RS485</b>
<b>Slot</b>	<b>for modem GSM</b>
<b>CPU</b>	<b>Atmel® at91 sam9261 256 Mb flash</b>
	<b>Operating System Linux 2.6.33</b>

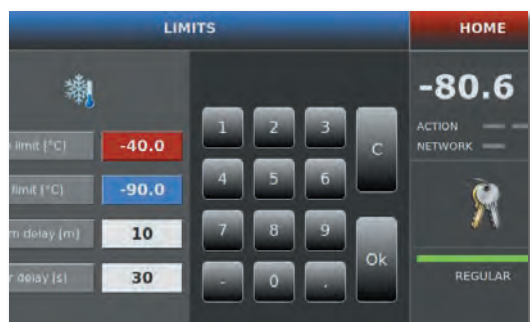
## HPL Control High Performance Line



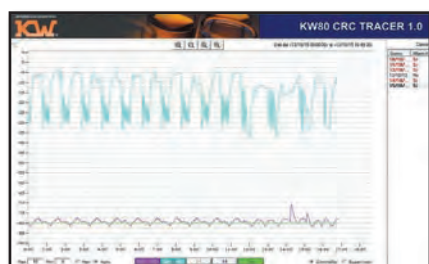


# Control System

Control, recording, supervision and complete traceability of all parameters and events, complete connectivity with the environment, very high operating and access security.



Set point modification and alarm threshold



Software Tracer

- + **Two RTD Pt 100 Ohm independent sensors;** one for the adjustment and the other one for the t alarm. automatic recording of temperature and alarm.
- + USB interface on the front panel for the download of thermorecording data and updates.
- + **Lead buffer battery, supply backup and charge circuit (autonomy 48h).**
- + **Setpoint modification and alarm threshold:** modification controlled through an electronic key provided with password in order to avoid intrusions, accidental handling and for the best traceability.
- + **Access to the menu including sensitive data and parameters:** controlled access to the software parameters through an electronic key with password, for maximum security and compliance with lab regulations and procedures;
- + **All the data are constantly recorded and can be downloaded** on a SD card and through the USB door. The "Tracer" software allows to display and analyze the recorded data on a PC.

## Alarms

The temperature alarm system is independent from the regulation and control system; the alarm sensor reading is allowed by a second microprocessor on the card edge.

### Alarms List:

- ☒ High/low temperature audiovisual alarm.
- ☒ Power failure audiovisual alarm.
- ☒ Open door alarm.
- ☒ Condenser high pressure alarm.
- ☒ Battery alarm.
- ☒ Sensor/sensors failure alarm.
- ☒ Compressor alarm (use time).
- ☒ High condensation T and dirty condenser alarm.

#### Automatic recording for each alarm:

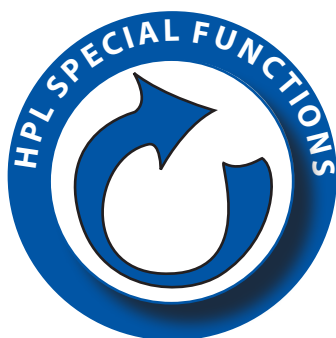
HT (high T), LT (low T), black out, critical temperature alarm; day/month/ year/ hour (minutes alarm start); alarm duration (for ht and Lt) day/month/ year/hour (black out start minutes);

- **Door opening:** records: number of daily openings; number of critical openings; total opening times.

- **Monitored failures list:** T sensor failure, compressor time, blocked condenser, high condensation temperature, network failure, thermal protection, system sensor failure...



## HPL Special Function



Control panel

### Info Test function

It allows the customer to repeat the functional test performed in the factory. It performs a functional test of the biologic freezer with a printed report without the use of external devices.



### Disaster Recovery

**The freezer does not stop working if a failure occurs.** If the CPU is damaged it allows the cycle of the functions on the remote unit and excludes the data visualization. The correct conservation is performed with the recorded on/off times fixed by the previous controller.

### Key Test

The alarm test procedure can be activated by pressing a button. In particular:

- Blackout alarm
- Remote alarm relay
- High temperature alarm

### Enviromental Adaptability

**The condenser fans are independent; thus they can operate differently and still keep the condensation constant when the ambient T changes.** This optimizes the condensation conditions and consequently maximizes the COP of the unit: preventive and energy saving action.

### Safety Control

**The freezer does not stop working in case of regulation sensor failure.** The temperature of the storage does not change significantly. The controller maintains the fixed temperature and the compressor turns on and off as detected before the failure (adjustment to the environmental conditions in use!). The failure is registered and the failure alarm signal activates.

## KW Network



**The Wi-Fi and/or LAN connection enables** the HPL freezer visibility in the LAN of the hospital, of the research center or of the industrial lab.

The controller is able to provide information on the status of the equipment or show critical events occurred by **simply entering the IP address** through a browser, worldwide. **The device can be controlled with the same procedure.**





# HPL Controller Connectivity



Real time monitoring of the freezer's operation at any time on smart-phone or tablet.



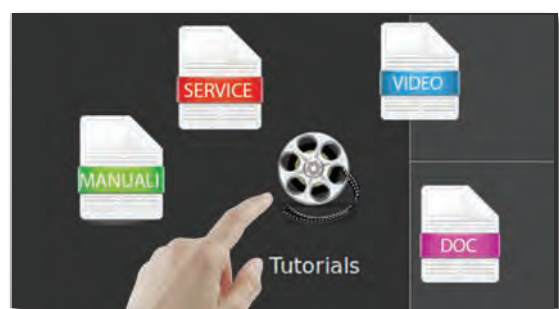
HPL connectivity

## Wireless:

**(Optional)** – KW units can be provided with optional Wi-Fi module, in order to connect to a wireless network with a (Wi-Fi) router.

## Wired:

KW devices are equipped with Ethernet connection and Web server function that allows to display the devices with a browser.



Human Interface

## GSM Modul:

**(Optional)** - every i-KW, can have a GSM plug-in modem, which sends an SMS to the contacts saved in the SIM card (not included) in case an alarm or failure occurs.

## Human Interface:

User's guide on display; File (also video) with maintenance procedure; kW maintenance program: it reminds periodical operations, recommended for freezer's maximum reliability and minor energy consumption.

## USB Port:

The USB port allows a quick and easy data download and the software/firmware update to the system with automatic procedures.

## SD Card:

Standard slot for SD CARD is used to download data.



Slot HPL control

## Free Contacts:

In the rear side of the freezer there is a slot for the alarm signal remoting.

## RS485/Ethernet Modbus:

Standard production RS485 and/or Ethernet door with ModBus protocol.

# -86°C Freezer Accessories and Containers

Wide range of containers for a better optimization of the internal space in KW freezers. Both horizontal and vertical freezers can be provided with containers, drawer chests, drawers, boxes and racks of different types and sizes.

## **DRAWERS FOR VERTICAL FREEZERS** in AISI 304 stainless steel (1 drawer each shelf)

Modd. K58-60-62 (and modd. S):

For K58:

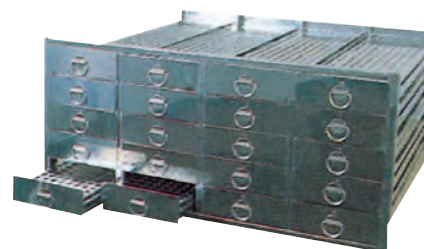
- CA220200 for 2 ml. vials. 16 drawers 200 places each. Ø 14 mm.  
h = c.a. 48 mm. (3200 vials)

For K60:

- CA220240 for 2 ml. vials 16 drawers 240 places each. Ø 14 mm.  
h = c.a. 48 mm. (3840 vials)

For K62:

- CA220280 for 2 ml. vials 20 drawers 240 places each. Ø 14 mm.  
h = c.a. 48 mm. (4800 vials)



CA 220280

## **DRAWERS FOR VERTICAL FREEZERS** in AISI 304 stainless steel (test-tubes)

Modd. K56-57-58-60-62 (and modd. S):

- CAK56 4 drawers 154 places each. Ø 14 mm.  
n. 3 CAK56 for each shelf in K56-57  
n. 4 CAK56 for each shelf in K58-K568

- CAK60 4 drawers 210 places each. Ø 14 mm.  
n. 4 CAK60 for each shelf in K60-62-64



Cak

## **SUPERIMPOSABLE CONTAINERS**, in AISI 304 stainless steel, with handles **FOR HORIZONTAL FREEZERS:**

Modd. K52-54 K52E-54E-55-55E (and modd. S):

- Cod. COS52 (dimensions cm.25x18x15/h)  
n. 12 COS52 in K52-52E; n. 24 COS52 nel K54-54E  
n. 48 COS52 in K55; n. 70 COS52 nel K55E

## **SUPERIMPOSABLE CONTAINERS**, in AISI 304 stainless steel, with handle **FOR VERTICAL FREEZERS:**

Modd. K56-57 K568-58-60-62-64 (and modd. S):

- Cod. COS56 (dimensions cm.16x43x11/h)  
n. 6 COS56 for each shelf in K56-57  
n. 8 COS56 for each shelf in K568-K58

- Cod. COS60 (dimensions cm.16x58x11/h)  
n. 8 COS60 for each shelf in K60-64  
n. 8 COS62 for each shelf in K62  
n. 8 COS64 for each shelf in K64



COS 52



COS 60

## **DRAWERS**, in AISI 304 stainless steel, **which can be pulled out on telescopic guides, FOR VERTICAL FREEZERS:**

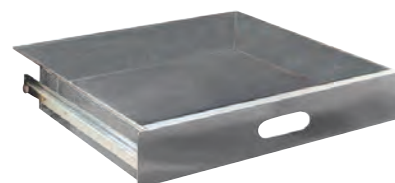
Modd. K56-57 K568-58-60-62-64 (and modd. S):

- Cod. DRA56/1-DRA57/1-DRA568/1-DRA58/1-DRA60/1-DRA62/1-DRA64/1-DRA66/1 (drawer' height cm.25)  
n. 1 for each shelf in K56-57-568-58-60-62-64-66

- Cod. DRA56/2-DRA57/2-DRA568/2-DRA58/2-DRA60/2-DRA62/2-DRA64/2-DRA66/2 (drawer' height cm.12)  
n. 2 for each shelf in K56-57-568-58-60-62-64-66



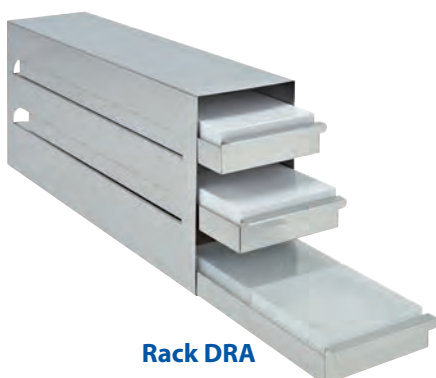
DRA 60/1



DRA 62/2

# Containers Racks and Vial

## Frontal Extraction Rack for Vertical Freezers



Rack DRA

Frontal extraction rack in AISI 304 Stainless steel for box storage in vertical freezers (divided in several small drawers):

With frontal racks the contact of the samples with warm air when opening the door and internal door. In this way the samples involved only are exposed to ambient T. **These racks optimize the storage by saving time when seeking for a sample.**

### FRONTAL EXTRACTION DRA RACK FOR VERTICAL FREEZERS

FREEZER MODEL	Rack Model	No. of racks per freezer	Racks per shelf	Carton dimension (mm)	Boxes per rack	Polypropylene Dim. (mm)	Boxes per rack	Box Total no. in the Freezer	KW Internal Code
KUB75	Rack DRA KUB75 8/5	2	3	133x133x50	8	133x133x50	8	48	8001033A
K57	Rack DRA K57 12/5	2	3	133x133x50	12	133x133x50	12	72	8001032A
K56	Rack DRA K56 12/5	4	3	133x133x50	12	133x133x50	12	144	8001032A
K568	Rack DRA K568 12/5	4	4	133x133x50	12	133x133x50	12	192	8001032A
K58	Rack DRA K58 12/5	4	5	133x133x50	12	133x133x50	12	240	8001032A
K58US	Rack DRA K62 20/5	4	3	133x133x50	20	133x133x50	20	240	8001007A
K60	Rack DRA K60 12/7,5	4	4	133x133x70	12	133x133x75	12	192	8001037A
K60	Rack DRA K60 16/5	4	5	133x133x50	16	133x133x50	16	320	8001002A
K62	Rack DRA K62 12/7,5	4	5	133x133x70	12	133x133x75	12	240	8001006A
K62	Rack DRA K62 20/5	4	5	133x133x50	20	133x133x50	20	400	8001007A
K62US	Rack DRA K64 25/5	4	4	133x133x50	25	133x133x50	25	400	8001001A
K64	Rack DRA K64 15/7,5	4	5	133x133x70	15	133x133x75	15	300	8001038A
K64	Rack DRA K64 25/5	4	5	133x133x50	25	133x133x50	25	500	8001001A
K66	Rack DRA K66 15/7,5	4	6	133x133x70	15	133x133x75	15	360	8001036A
K66	Rack DRA K66 25/5	4	6	133x133x50	25	133x133x50	25	600	8001029A
K66US	Rack DRA K66 30/5	4	5	133x133x50	30	133x133x50	30	600	8001000A

Example: Rack DRA K64 (25/5)  
 drawer' height  
 no. of boxes per rack



Polypropylene box



Cardboard box

# Containers Racks and Vial

## Lateral Extraction Rack for Vertical Freezers



Rack RK

Lateral extraction RACK in AISI 304 Stainless steel, for box storage in vertical freezers.

LATERAL PULL OUT RACK FOR VERTICAL FREEZERS									KW Internal Code
FREEZER MODEL	Rack Model	No. of racks per freezer	Racks per shelf	Carton dimension (mm)	Boxes per rack	Polypropylene Dim. (mm)	Boxes per rack	Box Total no. in the Freezer	
K57	Rack RK K57 12/5	2	3	133x133x50	12	133x133x50	12	72	8001012A
K57	Rack RK K57 9/7,5	2	3	133x133x70	9	133x133x75	9	54	8001013A
K57	Rack RK K57 6/10	2	3	133x133x100	6	133x133x95	6	36	8001014A
K56	Rack RK K56 12/5	4	3	133x133x50	12	133x133x50	12	144	8001012A
K56	Rack RK K56 9/7,5	4	3	133x133x70	9	133x133x75	9	108	8001013A
K56	Rack RK K56 6/10	4	3	133x133x100	6	133x133x95	6	72	8001014A
K568	Rack RK K568 15/5	4	4	133x133x50	15	133x133x50	15	240	8001023A
K58	Rack RK K58 12/5	4	4	133x133x50	12	133x133x50	12	192	8001012A
K58	Rack RK K58 9/7,5	4	4	133x133x70	9	133x133x75	9	144	8001013A
K58	Rack RK K58 6/10	4	4	133x133x100	6	133x133x95	6	96	8001014A
K60	Rack RK K60 16/5	4	5	133x133x50	16	133x133x50	16	320	8001015A
K60	Rack RK K60 12/7,5	4	5	133x133x70	12	133x133x75	12	240	8001016A
K60	Rack RK K60 8/10	4	5	133x133x100	8	133x133x95	8	160	8001017A
K62	Rack RK K62 20/5	4	5	133x133x50	20	133x133x50	20	400	8001004A
K62	Rack RK K62 12/7,5	4	5	133x133x70	12	133x133x75	12	240	8001018A
K62	Rack RK K62 8/12,5	4	5	133x133x100	8	133x133x125	8	160	8001019A
K64	Rack RK K64 25/5	4	5	133x133x50	25	133x133x50	25	500	8001020A
K64	Rack RK K64 15/7,5	4	5	133x133x70	15	133x133x75	15	300	8001021A

Example: Rack RK K64 25/5

drawer' height

no. of boxes per rack



Polypropylene box



Cardboard box

# Containers Racks and Vial

## Column Rack for Horizontal Freezers

Stainless steel AISI 304 Column RACK, for horizontal Freezers.



Rack

COLUMN RACK FOR HORIZONTAL FREEZERS

FREEZER MODEL	Rack Model	No. of racks per freezer	Carton dimension (mm)	Boxes per rack	Polypropylene Dim. (mm)	Boxes per rack	Box Total no. in the Freezer	KW Internal Code
K52/K52E	Rack K52 8/5	In K52= 7 rack In K52E= 8 rack	133x133x50	8	133x133x50	8	56/64	8001005A
K52/K52E	Rack K52 6/7	In K52= 7 rack In K52E= 8 rack	133x133x70	6	133x133x75	6	42/48	8001024A
K52/K52E	Rack K52 4/10	In K52= 7 rack In K52E= 8 rack	133x133x100	4	133x133x95	4	28/32	8001025A
K54/K54E	Rack K54 8/5	In K54= 16 rack In K54E= 24 rack	133x133x50	8	133x133x50	8	128/192	8001005A
K54/K54E	Rack K54 6/7	In K54= 16 rack In K54E= 24 rack	133x133x70	6	133x133x70	6	96/144	8001024A
K54/K54E	Rack K54 4/100	In K54= 16 rack In K54E= 24 rack	133x133x100	4	133x133x100	4	64/96	8001025A
K55/K55E	Rack K55 12/5	In K55= 24 rack In K55E= 39 rack	133x133x50	12	133x133x50	12	288/468	8001026A
K55/K55E	Rack K55 9/7	In K55= 24 rack In K55E= 39 rack	133x133x70	9	133x133x70	9	216/351	8001027A
K55/K55E	Rack K55 6/10	In K55= 24 rack In K55E= 39 rack	133x133x100	6	133x133x95	6	144/234	8001028A
K5578	Rack K5578 12/5	48 rack	133x133x50	12	133x133x50	12	576	8001026A
K5578	Rack K5578 9/7	48 rack	133x133x70	9	133x133x70	9	432	8001027A
K5578	Rack K5578 6/10	48 rack	133x133x70	6	133x133x70	6	288	8001028A

drawer' height

Example: Rack RK K64 25/5

no. of boxes per rack



Polypropylene box



Cardboard box



# Innovation

## SPLIT Freezers

KW develops both for the PL and HPL series **Special Customized Solutions** to set the freezers on sterile chambers walls; the environment where the samples are stored at  $-86^{\circ}\text{C}$  is **Contamination Free Solutions**. **SUCH SOLUTIONS ARE IDEAL FOR CELL FACTORIES, TRANSPLANT LABORATORIES, etc.**



- the front part of the freezer is fully sealed, along the entire perimeter and is equipped with an appropriate frame that is placed between the device and the sterile chamber;

- the air (or water or else mixed) motor condensing system is entirely positioned outside the sterile chamber;

- all external walls and doors are in AISI 304 or AISI 316.

### -86°C Refrigerating Units with Split Group

(for the minimum impact in the lab, to eliminate thermal and acoustic noise)



# Innovation

## 2T Dual-Zone Freezers

-40/-86°C

**K(M)(58-60-62) 2d- 2t** is a new line, similar to the Biological Banks line, and particularly suitable for environments with the following requirements:

- Physical separation of samples
- Storage at different T (-30/-40°C ; -50/-86°C) (2T)
- Different storage timing
- Use by different users
- 2 separate doors (2D)
- 2 separate casings/cabinets
- 4 internal counter doors
- **Two different NIA controllers for the PL series**
- **Unique controller for the HPL series**
- Two different and fully independent refrigerating systems



PL Controller

CO2 Back up

### VERTICAL BIOLOGICAL BANKS KM 2D-2T -40°C/-86°C

MODELS	K58-2D-2T	K60-2D-2T	K62-2D-2T
CAPACITY (litr)	350	500	600
EXTERNAL DIM. (WDH)	1337x760x1990 mm	1337x955x1990 mm	1337x990x1990 mm
CABI	2	2	2
(2) REFRIGERATING SYST.	2 at double stage	2 at double stage	2 at double stage
CABINET TEMP.	-80°C	-80°C	-80°C

Power supply : V230/Hz50    **Work range Double stage: -40°C —> -86°C**

2  
Cabi

-80°C

-80°C

### VERTICAL BIOLOGICAL BANKS M 2D-2T -40°C/-86°C

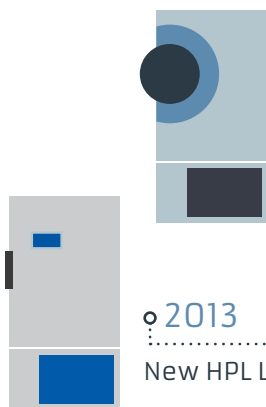
MODELLI	KM58-2D-2T	KM60-2D-2T	KM62-2D-2T
CAPACITY (litr)	350	500	600
EXTERNAL DIM. (WDH)	1337x760x1990 mm	1337x955x1990 mm	1337x990x1990 mm
CABI	2	2	2
(2) REFRIGERATING SYST.	1 at double stage 1 at single stage	1 at double stage 1 at single stage	1 at double stage 1 at single stage
CABINET TEMP.	-40°C/-80°C	-40°C/-80°C	-40°C/-80°C

Power supply : V230/Hz50  
**Work range single stage: -30°C —> -45°C**  
**Work range Double stage: -40°C —> -86°C**

2  
Cabi

-80°C

-40°C



2016  
Smart Blood Bank

2014  
New KW image

2013  
New HPL Line

2006  
Rapid freezer for plasma -86°C

2002  
Control **NEW ICE AGE KW CONTROL®**

2001  
**Medical Project®** series

1990  
Biological Bank -86°C®

1985  
**KW Apparecchi Scientifici S.r.l.**

In the '70s  
First **vertical** freezer -86°

1961  
First **horizontal** freezer -86°

1953  
**KW (kalt/warm) Officine Meccaniche**



ISO 13485:2012



ISO 9001:2008



ISO 14001:2015



Made in Italy



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