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SCIENTIFICI

*In our solutions
your safest samples*

Fridge-freezers at
 $+4^{\circ}\text{C}/-20^{\circ}\text{C}$

KRFDE series
and
KLAB series



BLUEline

Cold storage
equipment

www.kwkw.it - kw@kwkw.it





APPARECCHI
SCIENTIFICI

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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BlueLine



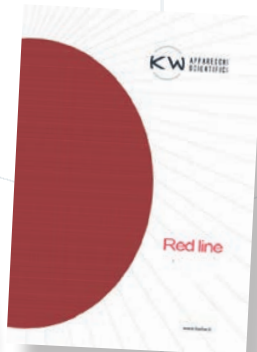
Cold storage
equipment

GreenLine



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microbiological
test equipment

RedLine



Ovens, drying
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management

BloodLine



Medical
devices for
transfusion centres

2019

Fridge-freezers +4/-20°C

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Fridge-Freezers +4°C/-20°C

Elite Line
KRFDE Series

Fridge-Freezers

KRFDE Series:

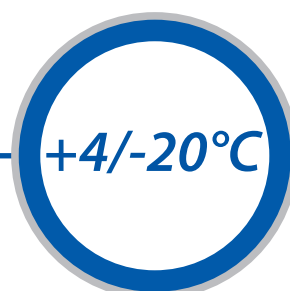
KRFDE Fridge-Freezers Series for biological material preservation up to $+4^{\circ}\text{C}$ / -20°C with an ideal capacity for scientific and hospital laboratories use.



This series is manufactured according to ISO 9001:2015 quality standards and in compliance with UNI EN 61010 (CEI 66/5) laboratory regulations; it comes with full instrumentation and a variety of technical solutions that make it an absolutely specific and safe line for the products, operators and environment.



KRFDE 2711 HPL



KRFDE Series

Fridge-Freezers KRFDE Series:

The KRFDE series is composed by refrigerator-freezer models **KRFDE2711** and **KRFDE2711 X**.

These models have a ventilated refrigerator compartment (positive t) with a structure that has removable drawers for a better use of the internal volume and a lower power consumption; the latter is also due to adequate insulation thickness

Both compartments (refrigerator and freezer) have their own refrigerating system, independent from each other. The fully sealed execution of the refrigerating systems and the use of airtight compressors make these refrigerator-freezers a very silent and reliable option, and aligned with the recommendations of the Kyoto Protocol. The materials and the fluids being used are all natural and environment-ally friendly, with a and particular attention to is paid to problems dealing.

Available with:

N.2 SLC Control



Display led

N.1 HPL Control



Display Touch Screen

Fridge-Freezers +4/-20°C

KRFDE Series

VERTICAL FRIDGE-FREEZERS +4/-20°C

MODELS	KRFDE 2711	KRFDE 2711X
CAPACITY (litri) Fridge-freezers	380 (270+110)	380 (270+110)
EXTERNAL DIM. (WDH)	60x62x215 cm	60x62x215 cm
WEIGHT (Kg)	100	100
SHELVES (fridge compartment)	4 adjustable	4 adjustable
DRAWERS (freezer compartment)	3	3
OPERATION TEMPERATURE	+4/-25°C	+4/-25°C
INTERNAL STANDARD SURFACES	ABS thermo moulded	ABS thermo moulded
EXTERNAL STANDARD SURFACES	Coated Steel White	AISI 304 stainless sheet
INSULATION	45mm/70mm	45mm/70mm
CONTROLLER	SLC or HPL	SLC or HPL

Fridge Comp.



Freezer Comp.



The set T for the refrigerator compartment is between **0°C and +15°C**

The set T for the freezer compartment is between **-10°C and -30°C**

Power Supply: V230/Hz50/1

Features:

- ☒ Single body structure
- ☒ Removable shelves (for refrigerator compartment)
- ☒ Removable drawers (for fridge compartment)
- ☒ Automatic closing with key lock and magnetic gaskets
- ☒ Support feet on the front and wheels on the back
- ☒ Contact for remote alarm signaling

Dry Contact



Refrigeration:

- ☒ Ventilated refrigeration (refrigerator compartment)
- ☒ Static refrigeration (freezer compartment)
- ☒ n.2 independent airtight compressors
- ☒ Very low noise and consumption
- ☒ Use of HC Green GMP=0

Standard equipment for each compartment:



= Visual and sound
T min/max alarm



= Key lock



= Sensor failure alarm



= Ethernet port
(only for HPL control)



= USB port and DATA
LOG function (only for
HPL control)



= RS485 port interface
(only for HPL control)



= Disaster Recovery Safety
Control (only for HPL control)

Available with:

N.2 SLC Controller



N.1 HPL Controller



Optional:



= Visual and sound
door open alarm (1 per
compartment)



= Visual and sound
power failure alarm (1 per
compartment)



= Pivoting wheel kit



= Double-trace disk
recorder with weekly
cycle

Structure

01 STRUCTURE

All models have a single-body structure with external steel sheets pre-enameled or plasticized in white, or AISI 304 stainless steel; the internal compartments are in white plastic material: non-abrasive ABS with completely rounded edges to facilitate the cleaning. Support feet on the front and wheels on the back

02 INSULATION

Thermal insulation is with high-density (40 Kg/mc.) polyurethane foamed on site, **with an average thickness of 45 mm.** (refrigerator compartment) **and of 70 mm.** (freezer compartment) **for energy saving.**

03 DOORS AND GASKETS

All doors are reversible, with **magnetic gaskets** and automatic closing. Each door comes with **key lock.**

04 SHELVES (N.4)

Refrigerator compartment with **internal grilled shelves and adjustable height.**

05 DRAWERS (N.3)

Freezer compartment with **removable ABS plastic drawers on sliding rails** (transparent front).

06 CONTROL PANEL

All models are available with control: **SLC** (leds display) or **HPL** (Touch Screen display).



KRFDE 2711 HPL

Refrigeration



2 airtight independent compressors with air condensation for both compartments; guaranteed silence.

UPPER CABINET (refrigerator):

- Ventilated evaporator** positioned on the back side;
- Automatic defrost** with automatic evaporation of the condensation water.

LOWER CABINET (freezer):

- Static evaporator** on the external side of the inner chamber;
- Manual defrost** of the freezer (only rarely necessary).

Both compartments (refrigerator and freezer) have their own refrigerating system, independent from each other. The execution of the refrigerating systems is fully sealed and there are 2 use of airtight compressors.

The refrigerants used are non-atoxic, nonflammable, non-explosive and ecologic (maximum respect for the environment) as they are HC free, CFC free, HCFC free (ODP=0 OZONE DEPLETION POTENTIAL) and with a low GWP.

- CEI EN 61326-1 CEI EN 61010 -1 compliant.**
- 2006/42/CE Machine Directive compliant.**
- 2014/35/UE Low Voltage Directive compliant.**
- 2004/30/UE Electromagnetic Compatibility compliant.**

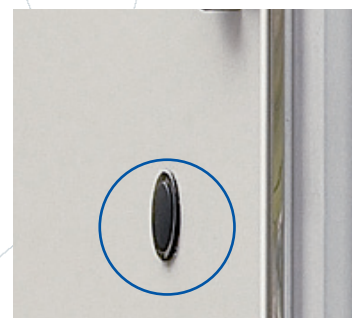
Accessories

KRFDE Series:

- ✓ **Pivoting wheel kit.**
- ✓ **Supplementary grilled shelves (refrigerator compartment)**
- ✓ **Internal-external through-hole with rubber stopper** (1 for a compartment).
- ✓ **Visual-Sound power failure alarm, 12-VDC power supply with 2.3 Ah battery backup** (estimated duration, 3 years) 1 per compartment.
- ✓ **Visual-Sound open door alarm** (1 for a compartment).
- ✓ **Remote GSM alarm device.**
- ✓ **Double-trace disk recorder with weekly cycle** and 1.5 VDC battery power supply.
- ✓ **Additional RTD Pt 100 Ohm sensor** to connect to an external system for the acquisition and recording of T values, (1 per compartment).
- ✓ **Additional RTD Pt 100 sensor with 4-20 mA converter** mounted on a DIN bar to connect to an external recording system (1 per compartment).
- ✓ **ACCESSORIES FOR HPL CONTROLLER:**
 - LAN port,
 - WiFi module,
 - GSM module,
 - electronic key for controlled opening (see HPL release).



PIVOT WHEEL KIT



THROUGH HOLE



DISK RECORDER

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



Fridge-Freezers +4°C/-20°C

KLAB Series

Fridge-freezers KLAB Series:

KW offers one of the broadest selections of fridge-freezers for medical applications, scientific research and the pharmaceutical and agro alimentary industries.

KLAB equipment is used in the preservation of pharmaceutical products, diagnostic products, vaccines and sera, biological materials in general and the conservation of industrial products.



RF700C NIA

+4/-20°C

KLAB Series:

- ✓ Operation temperature (refrigerator): from 0°C to +15°C.
Operation temperature (freezer): from -10°C to -22°C.
- ✓ **Wide range of models** (blind doors, glass doors with different capacity).
- ✓ Pre-painted steel plate external surfaces.
- ✓ **60 and 75 mm** insulation thickness.
- ✓ Power supply V230/1/Hz50.
- ✓ **N.2 independent airtight compressors** (1 per compartment).
- ✓ 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.

KLAB series:

KLAB products are the result of KW's continuous technological innovation, quality in manufacturing and continuous focus on the customer, all part of KW tradition perfected over half a century of activity. All models are designed and manufactured according to the ISO 9001:2015 International Quality System and built according to European CE trademark safety regulations and **UNI-EN-61010** for laboratory equipment; in addition, it complies with the **GMP regarding** the requirements of the pharmaceutical and biotechnology sectors.

KLAB fridge-freezers are built using refrigerants with an ODP = 0 and a low GWP to protect the environment.

KLAB LIGHT Series

Fridge-freezers at +4 °C / -20 °C



FRIDGE-FREEZERS +4/-20°C WITH BLIND DOORS

MODELS	RF360C	RF700C	RF800C	RF1500C	RF2300C
CAPACITY (ltr.)	180+180	350+350	400+400	700+700	1500+700
EXTERNAL DIM. (WDH)	64x60x184 cm	71x80x203 cm	120x60x203 cm	142x80x203 cm	216x80x203 cm
COMPARTMENT DIM. (WDH)	53x41x63 cm	59x68x60 cm	50x50x135 cm	59x68x140 cm	117/57x65x140 cm
DOOR	N.2 Blind	N.2 Blind	N.2 Blind	N.3 Blind	N.3 Blind
WEIGHT (Kg)	100	160	170	270	340
SHELVES	3+3 adjustable	2+2 adjustable	3+3 adjustable	3+3 adjustable	6+3 radjustable
INSULATION (mm)	50	60	60	60	60
DEFROST	Electric	Electric	Electric	Electric	Electric
CONTROLLER	n.2 SLC or n.2 NIA	n.2 SLC or n.2 NIA	n.2 SLC or n.2 NIA	n.2 SLC or n.2 NIA	n.2 SLC or n.2 NIA

Operation temperature (refrigerator compartment): **+4°C**

Operation temperature (freezer compartment): **-20°C**

Power Supply: V230/Hz50/1

The set T for the refrigerator compartment is between **0°C and +15°C**.

The set T for the freezer compartment is between **-10°C and -22°C**.

Models with glass doors are available upon request: RF360V, RF700V, RF800V and RF1500V

Available with:

n.2 SLC Controller (1 for compartment)



Led Display

n.2 NIA Controller (1 for compartment)



LCD Display

Green ICE



Environmental impact improvement and energy cost reduction.

Antibacterial



Materials manufactured with modern processes and antibacterial technologies.

Dry Contact







Contacts for remote alarm signalling.







KLAB LIGHT Series

Fridge-freezers at +4 °C / -20 °C







Standard equipment:

-  = Min. /max temperature alarm (1 per compartment)
-  = Open door alarm (1 per compartment)
-  = Sensor failure alarm (1 per compartment)
-  = DATA LOG function (only for NIA control)

Standard equipment:

-  = Locking system (1 per compartment)
-  = Internal light
-  = Disaster Recovery Safety Control (only for NIA control)
-  = RS485 port interface (only for NIA control)

Optional:

-  = Power failure alarm (1 per compartment)
-  = Wheels
-  = Internal-external through-hole (1 per compartment)
-  = USB Port (only for NIA), (1 per compartment)
-  = Double-trace disk recorder with weekly cycle
-  = Internal-External Stainless Steel



RF700C SLC



RF1500C NIA



RF700C NIA

KLAB SMART Series

Fridge-freezers at +4 °C / -20 °C



FRIDGE-FREEZERS +4/-20°C WITH BLIND DOORS

MODELS	RF360C ADV	RF700C ADV	RF1500C ADV	RF2300C ADV
CAPACITY (ltr.)	180+180	350+350	700+700	1500+700
EXTERNAL DIM. (WDH)	64x60x184 cm	75x82x210 cm	150x82x210 cm	225x82x210 cm
INTERNAL COMPARTMENT DIM. (WDH)	53x41x63 cm	59x68x60 cm	59x68x140 cm	117/57x65x140 cm
DOOR	N.2 Blind	N.2 Blind	N.2 Blind	N.3 Blind
WEIGHT (Kg)	100	160	270	340
SHELVES	3+3 adjustable	2+2 adjustable	3+3 adjustable	6+3 adjustable
INSULATION (mm)	50	75	75	75
DEFROST	Hot gas	Hot gas	Hot gas	Hot gas
CONTROLLER	n.2 NIA or n.1 HPL	n.2 NIA or n.1 HPL	n.2 NIA or n.1 HPL	n.2 NIA or n.1 HPL

Operation temperature (refrigerator compartment): **+4°C**
 Operation temperature (freezer compartment): **-20°C**
 Power Supply: V230/Hz50/1

The set T for the refrigerator compartment is between **0°C and +15°C**.
 The set T for the freezer compartment is between **-10°C and -22°C**.

Models with glass doors are available upon request: RF360V ADV, RF700V ADV and RF1500V ADV.

Available with:

n.2 NIA Controller (1 for compartment)



LCD Display

Unique HPL Controller



Touch Screen Display

Green ICE



Environmental impact improvement and energy cost reduction.

Antibacterial



Materials manufactured with modern processes and antibacterial technologies.

Dry Contact








Contacts for remote alarm signalling.



KLAB SMART Series

Fridge-freezers at +4 °C / -20 °C





Standard equipment:

-  = Min. /max temperature alarm (1 per compartment)
-  = Open door alarm (1 per compartment)
-  = Sensor failure alarm (1 per compartment)
-  = Power failure alarm (1 per compartment)
-  = USB Port and DATA LOG function

Standard equipment:

-  = Locking system (1 per compartment)
-  = Presa Ethernet (only for HPL control)
-  = Internal light
-  = Disaster Recovery Safety Control
-  = RS485 port interface

Optional:

-  = Wheels
-  = Internal-external through-hole (1 per compartment)
-  = Double-trace disk recorder with weekly cycle
-  = Internal-External Stainless Steel



RF2300CX ADV HPL



RF1500V ADV HPL



RF700C ADV HPL



Structure

01 STRUCTURE

All models have a single-body structure with internal and external steel sheets pre-enameled or plasticized in white, or AISI 304 stainless steel; the internal and external angles are rounded (**for easy cleaning and maximum hygiene**).

02 INSULATION

Thermal insulation is with high-density (40 Kg/mc.) polyurethane foamed on site, **with an average thickness of 60 mm. or of 75 mm. (SMART) for energy saving.**

03 DOORS AND GASKETS

C models include doors with blind-closed panels. **V** models include doors in double or triple glass chambers, with anti-clouding noble gas loads. All doors are reversible, with **magnetic gaskets** and automatic closing.

04 KEY LOCK

Each door comes with **key lock**.

05 INTERNAL LIGHTING (LED)

Internal lighting (led) is activated when the door is opened in models with blind doors; in models with glass doors this is performed with an external switch.

06 CONTROL PANEL

All models are available with controller: **SLC** (leds display), **NIA** (LCD display) and **HPL** (Touch Screen display).



07 SHELVES

The internal grilled shelves are height adjustable by means of racks on the lateral and back walls. These are made of plasticized steel sheets or stainless steel. The racks can be used for sliding drawers on removable tracks.

Single-body group:

• Advantages of the single-body group:

the evaporator is not visible, better cleaning of the internal preservation compartment, less probability of air flow block or damage due to accidental events, etc. More conservation space compared to traditional solutions with visible evaporators.

More compact refrigerating group: less refrigerant load, minimal load loss in aspiration, **lower power consumption** with similar operation parameters to evaporation T and condensation T.

Easier maintenance: everything is concentrated in a single area.



The cabinet has adjustable support feet in stainless steel; upon request pivoting wheels (with brakes) can be mounted to facilitate the equipment handling in the laboratory.

C models include doors with blind-closed panels.

V models include doors in double or triple glass chambers, with anti-clouding noble gas loads.

The models with a final **X** have both the internal and external walls in AISI 304 stainless steel.

The models with a final **II** have internal walls in stainless steel and white external walls.

Door micro switch:

Each door comes with a micro switch to block, upon opening, the operation of the internal ventilation; this allows a better functionality and less consumption by minimizing any alterations in the internal microclimate and preventing the operator from being exposed to cold air; **it also activates the door open alarm when the opening time is longer than the predefined critical value -which can also be set by -kw or by the user directly.**

A prolonged time door opening is signaled by a sound and visual alarm that flashes on the temperature control display.



Refrigeration



Ventilated refrigeration for optimum temperature uniformity in the entire compartment; **2 airtight independent compressors with air condensation**; guaranteed silence; hermetically sealed circuit to avoid any refrigerant dispersion, in conformity with recent provisions and recommendations on gases; **ecological refrigerant**.

Automatic and/or manual defrost with automatic evaporation of the condensation water.

- execution with **electric defrost (LIGHT line)** or **hot gas defrost (SMART line)**, for a more constant temperature, even during the defrosting stage and with a low power consumption.
- tropicalized execution of the refrigerating system (up to +43 °C).
- execution backup of the evaporator group, in order to maximize the internal space and facilitate internal cleaning.

KW is researching alternative solutions with lower environmental impact; and is always updated with new gases at very low or no greenhouse effect impact, in order to develop new models.

For this purpose, we suggest the reading of our SMART line with a 75mm insulation and an integral application of NIA and HPL control system.

The used refrigerants are non-toxic, 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) and with a low GWP.

- **CEI EN 61326-1 CEI EN 61010 -1 compliant.**
- **2006/42/CE Machine Directive compliant.**
- **2014/35/UE Low Voltage Directive compliant.**
- **2004/30/UE Electromagnetic Compatibility compliant.**

Accessories KLAB Series:

- ✓ **Pivoting wheel kit.**
- ✓ **Supplementary gridded shelves (in plasticized steel or inox).**
- ✓ **Removable (drilled) drawer in AISI 304 stainless steel, mounted on anti-rollover sliding rails.**
- ✓ **Internal divisions (for drawers) in plastic material.**
- ✓ **Internal-external through-hole with rubber stopper (1 for a compartment).**
- ✓ **Internal electric outlet + external magnetothermal switch.**
- ✓ **Visual-Sound power failure alarm, 12-VDC power supply with 2.3 Ah battery backup (estimated duration, 3 years) 1 per compartment (only for Light Series).**
- ✓ **Remote alarm device GSM.**
- ✓ **USB Port** for a quick and easy transfer of all information (1 per compartment, only for NIA control Light Series).
- ✓ **Double-trace disk recorder with weekly cycle and 1.5 VDC battery power supply.**
- ✓ **Additional RTD Pt 100 Ohm sensor** to connect to an external system for the acquisition and recording of T values, (1 per compartment).
- ✓ **Additional RTD Pt 100 sensor complete with 4-20 mA converter** mounted on a DIN bar to connect to an external recording system (1 per compartment).
- ✓ **2 ch monitoring kit** (1 per compartment, only for NIA control Light Series) allows to perform the regulation by means of average values from two sensors (ntc standard or Rtd pt 100 upon request).

ACCESSORIES FOR HPL CONTROLLER:

- ✓ **LAN port, WiFi module, GSM module, electronic key for controlled opening.** (see HPL release).

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



THROUGH HOLE



DISK RECORDER



USB PORT



Fridge-Freezers +4/-20°C

Control System

SLC Control



Refrigerator compartment



Freezer compartment

Silver Line Control

NIA Control



Refrigerator compartment



Freezer compartment

New Ice Age

HPL Control



Unique control for
refrigerator and freezer
compartment

High Performance Line

SLC Control (Silver Line Control)

Control System "Silver Line Control"

Electronic digital thermoregulator specific for industrial and laboratory refrigeration:
IP65 protection level.

Keyboard and display:

We want to make using a controller both simple and intuitive. We selected a keyboard with 4-keys, a menu structure and LED display, 2+1/2 digits with automatic digital point (between -19.9 °C +19.9 °C), marked; perfectly visible with natural or artificial light from any angle.



SLC Control:

N.2 DISPLAY
(1 for compartment)



ON button, internal lights in version V (glass door)

PRG/mute button
Increase/aux button



SET button

Decrease/def button

Main switch

Display

Parameters:

Parameters are organized into two levels:

- **First level:** frequent parameters that can be accessed without the need of a Password (set point).
- **Second level:** configuration parameters that can only be accessed with a Password and allows the configuration.



Input:

- 2 analogs for ntc sensors (thermo- stabilization sensor, evaporator sensor for defrosting).
- 2 multi-function digitals (power failure and open door alarms).

Output:

- 4 SPDT 230VAC/ 8 A relays

Configuration:

- keyboard, remote command, or PC

Refrigeration:

The control operates on the REFRIGERATION SYSTEM in order to maintain the set temperature.

The user can check the functioning with the Icons on the control panel.

Defrosting:

It is performed in different ways depending on the model: **hot gas models, or electric**, can be performed in a scheduled and/or manual mode. It is very safe as there is a thermo-probe in the ventilation system with a max and min timer.



Alarm visualization:

PROBE ALARM (1 per compartment)

In case of temperature alarm breakdown or failure.

TEMPERATURE ALARM (1 per compartment)

If, for any reason, the temperature starts increasing or decreasing until it falls outside the allowed range (configured with respect to the defined set point), the internal timer is activated (configurable alarm delay, 30 minutes by default but the value can be modified upon customer request); after this period the TEMPERATURE ALARM activates both visual (HI or LO) and sound (BUZZER) alerts.

DOOR OPEN ALARM (1 per compartment)

2 minutes (standard time, but configurable upon request) after the door is opened, the display shows the word "door" and the Buzzer sounds.

POWER FAILURE ALARM (optional)

When the equipment is furnished with a backup battery, **is it possible to display the temperature reading, even if there is no power supply to the laboratory, for several hours.** The internal buzzer and remote alarm signalling also remain active. The BUZZER starts sounding. Please bear in mind that the backup battery, 12V 2.3 Ah, has a life of 2-3 years.

Standard equipment includes a connector for remote alarm towards the user.

NIA Control (New Ice Age)

The Fridge-freezer models (**KLAB** and **KRFDE**) can be provided with a **NEW ICE AGE KW CONTROL®** controller, registration and supervision system.

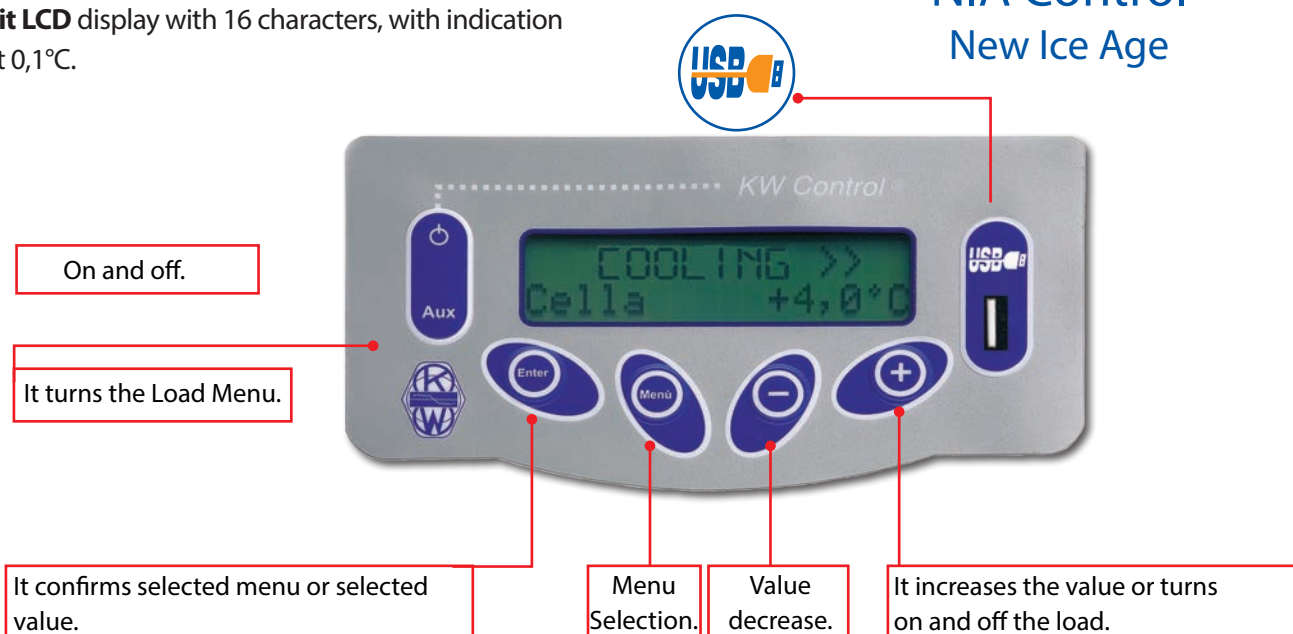
This is an evolution in terms of quality regarding the management of refrigerating machines. kw has researched how to provide greater reliability to the entire system with lower power consumption, and extreme flexibility in technical solutions for systems that adapt to different environmental conditions for laboratory use. **Other innovations:** easy to read and use even by technically non-qualified users; many opportunities to implement alarms and record work configurations and significant events to maintain the quality of stored products.



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 displays allows to know the state of preservation of the stored biological materials /medications etc. 24/7 etc. with no need of additional direct controls.

Alarm List:

- ☒ Min/max temperature audiovisual 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.

This is possible thanks to a 2.3 Ah buffer battery which feeds the control system.



Check Service:

The last **32 functional failures** are saved and can be displayed 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**



The controller **for every open door alarm** records the following:

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

–**dd/mm/yy**

Motocompressors' operation time shall be recorded too.

Data Logger Function:

The controller shall record the temperatures in addition to the alarms (up to two channels).

The memory capacity allows to record an input every 20 m for about 4 months.



The USB serial door allows the download of the recorded data through the control unit on usB pen drive. T values and alarm events can therefore be displayed in a graphic chart or as a table through a free dedicated software (**reader USB software**).

Security

Maximum security software against wrong and accidental handling and storage.

User Security:

the following functions are available by entering a password:

- + Refrigerator On and Off**
- + Setpoint value variation**
- + Access to the service menu for all the functional parameters**



Special Functions: Maximum stored sample security.

2 CH MONITORING KIT (optional):

Regulation is performed with the average value of two sample sensors (RTD Pt 100 Ohm); in addition, a control function determines if the difference between the two sensors exceeds a value defined by Kw: in such case, there is a non-uniform warning inside the work chamber.

The malfunction of one of the two sensors automatically transfers the regulation on the other by generating an alarm.

Or one sensor can be set up for regulation and the other for an alarm. In this case, the alarm sensor can be position in the hottest spot detected in the mapped inner cabinet.

KEY TEST:

The down arrow key activates the automatic alarm test procedure.

- In particular:
- Buzzer sound
 - Remote alarm relay
 - Battery
 - High temperature alarm
 - Low temperature alarm

SAFETY CONTROL:

Even in case of regulation sensor failure, the temperature of the storage does not change significantly, since the controller continues to regulate the temperature with on and off timing of the compressor detected before sensor failure (adaptation to the environmental conditions in use!).

The failure is memorized and the alarm signal shows the failure type.

DISASTER RECOVERY:

The destruction of the cPu allows the cycle of the functions on the remote unit, data visualization excluded. The correct conservation is guaranteed with the on/off times previously recorded by the controller.

INFO TEST:

The functional test performed in the factory can be repeated by the user. It performs a functional test of the biologic freezer with a printed report without using external devices.

Energy Saving



With the **Green Ice project** KW continues to develop its product lines and is compliant with some fundamental management principles of modern companies:

- lower impact in the environment;
- energy cost reduction of its equipment.



Automatic control and recording of all the functional parameters ensure a very high operating efficiency, by allowing the energy consumption measurement and the implementation of the parameters for the coP increasing (coefficient of performance), namely promoting **Energy Saving**, in line with the Kw's **Green Ice Project**. **The use of HFO with low GWP allows to respect the conditions included in the F-gas European regulation.**

Night & DAY:

During night time, when possible, the set temperature can be raised to a predefined value, by saving energy.

Environmental Adaptability:

the fans of the condenser work independently; thus it is possible to keep the condensation constant, when the ambient T changes; this means an optimization of the condensation conditions and of 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 fridge-freezer.



The HPL Controller High Performance Line

Touch Tecnology:

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 3.4" display touch screen**.



HPL Control (High Performance Line)
Unique Display

ONE TOUCH

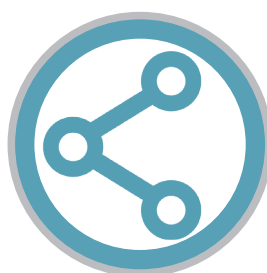
Touch screen solutions to communicate in a simple and immediate manner.

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 fridge-freezer with I-KW Smart controller, have the following advantages:



Total Connectivity

Total Connectivity:



- ☒ USB door
- ☒ SIM Card Slot
- ☒ WiFi Connection (optional)
- ☒ Ethernet door with Modbus protocol (optional)
- ☒ RS485 door with Modbus protocol
- ☒ Controlled access presetting

Total Traceability:



The controller records the functional data at high frequency and also **stores bar codes or other coding forms** (some of them with planned 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, by using Windows only (no specific software is needed).



Network KW

Network KW:



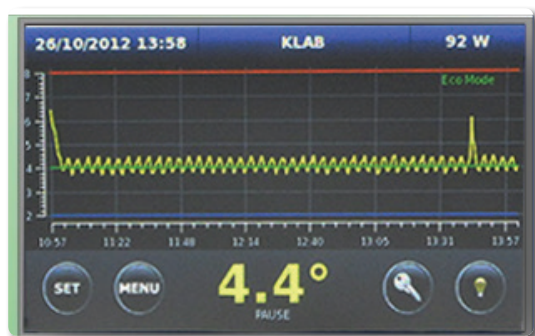
The Wi-Fi and/or LAN connection shall ensure that our HPL freezer shall be visible in the LAN of the hospital, of the research center or of the industrial lab.

In addition, **by simply entering the IP address through the browser, the controller provides worldwide all the information on the equipment status or else showing the critical events occurred.**

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

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

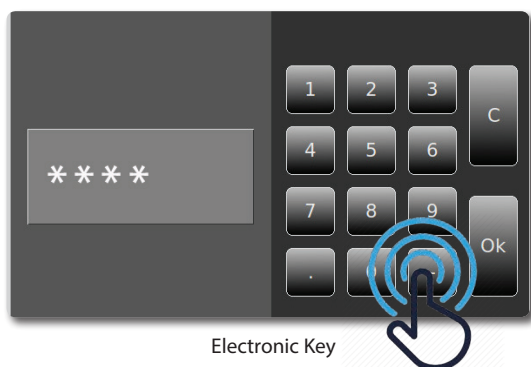
Data recording and filing is in compliance with the most developed standards, such as gMP, JAcIE, FAct, etc.

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

Access control:

The fridge-freezers equipped with the new controller have controlled access:

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



Electronic Key



Badge KW

"Door Opening" Event Traceability:

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

More particularly, 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.**

User Friendliness 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 area 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).

Smart controller is the state of the art of the freezer and ultra freezer control systems.

Green ICE



Environmental impact improvement and energy cost reduction.



These functions complement the functions offered by the HPL system and to contribute to energy saving and global warming reduction, with a lower indirect CO2 emission in the atmosphere.

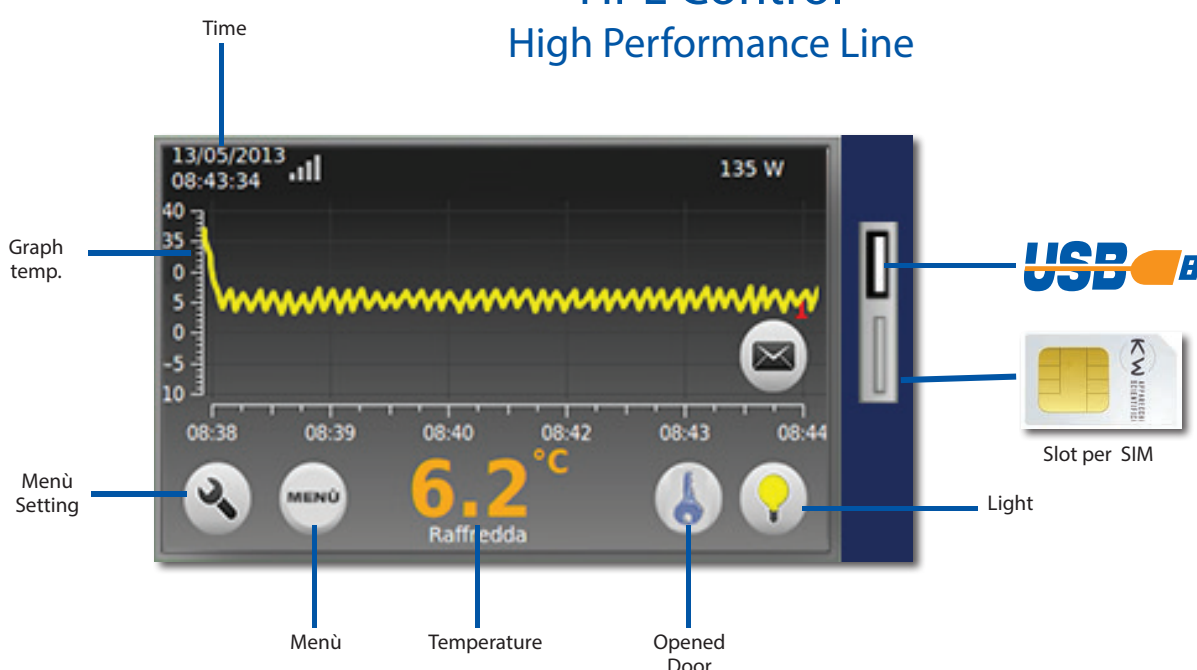
The energy saving is up to 15% compared to a standard fridge-freezer

Display Touch Screen

- ✓ **TFT 4.3" color Display Touch Screen.**
- ✓ ARM9 microprocessor technology.
- ✓ Menu with multiple windows and temperature chart.
- ✓ Available in 5 languages.
- ✓ On/Off > controlled access through an electronic key with password.

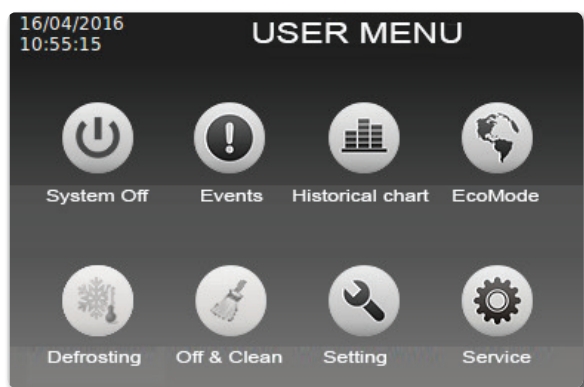
Display	TFT Touch screen 4.3" wide
Power Supply	from Power Board
Dimension	170x110x35 mm
Front ports	USB - Slot per SIM Card
Port	Ethernet, RS485
Slot	per modem GSM
CPU	Atmel® at91 256 Mb flash
Operating System Linux	

HPL Control High Performance Line

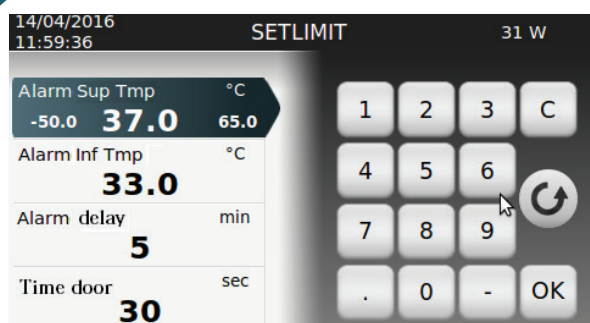


Control System

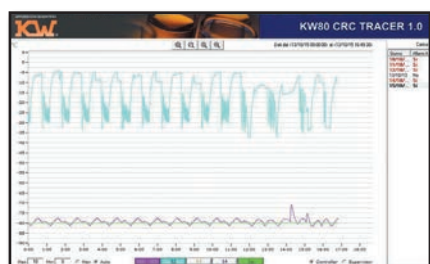
Control, recording, supervision and complete traceability of all parameters and events, complete connectivity with the environment, very high operating and access security.



- + **Two independent sensors;** one for the adjustment and the other one for the T alarm. For automatic recording temperature alarm.
- + USB interface on the anterior panel for data thermo-recording and updates.
- + **Lead buffer battery, supply backup and charge circuit (autonomy 24h).**



Set point modification and alarm threshold



Software Tracer



- + Set point modification and alarm threshold:** controlled modification with an electronic key with password in order to avoid intrusions, accidental handling and for a better 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** through the USB door. The "Tracer" software allows to display and analyze the recorded data on a PC.

Alarm

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

Alarms List:

- ☒ High/low temperature audiovisual alarm.
- ☒ Power failure audiovisual alarm.
- ☒ Open door alarm.
- ☒ High pressure condenser 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, alarm critical temperature; day/month/ year/ hour (minutes alarm start); alarm duration (for HT and LT) day/month/ year/hour (minutes black out start);

- **Door opening:** stored recording: number of daily openings; number of critical openings; total opening time.

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

LIST OF OPENINGS			
Date	Time	Openings	Max Time
08/05/15	0 min	n°1	n°0
08/05/15	0 min	n°1	n°0
08/05/15	0 min	n°1	n°0
03/05/15	2 min	n°8	n°3
03/05/15	2 min	n°8	n°3

Alarm - Door opening

HPL Special Function



Disaster Recovery

The fridge-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:

- Buzzer sound • Remote alarm relay
- Battery • High temperature alarm
- Low temperature alarm

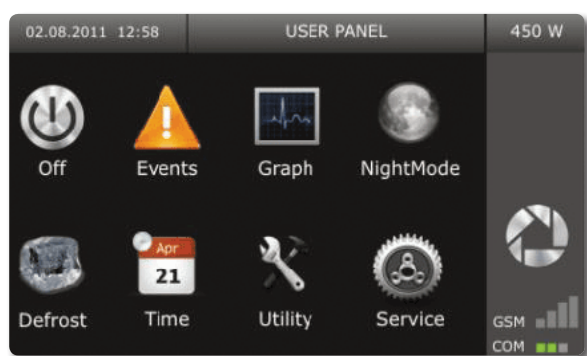
Enviromental Adaptability

The fans of the condenser are managed independently; thus it is possible to partialize fan operation and to keep condensation constant, when ambient T changes; this means to optimize the condensation conditions and therefore maximize the COP of the unit: **preventive and energy saving action.**

Safety Control

Even in case of regulation sensor failure, the temperature of the storage does not change significantly, since the controller continues timed thermostating with on and off timing of the compressor detected before sensor failure (adaptation to the environmental conditions in use!).

The failure is memorized and the activated alarm signal shows failure type.

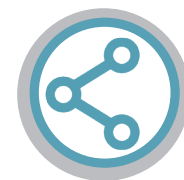


User Panel

Info test fuction

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 using external devices.

HPL Controller Connectivity



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



HPL Connectivity

Wireless:

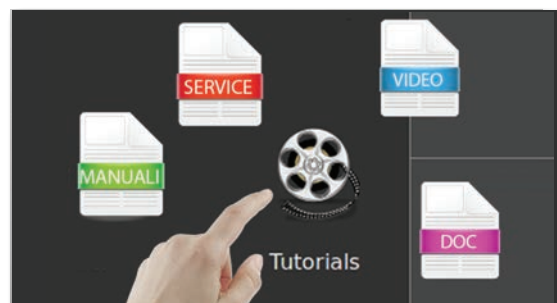
(Optional) – through the optional Wi-fi module, KW units can be connected to a wireless network from an access point (Router Wi-fi); or directly through a router.

Wired:

A P2P configuration allows to connect more i-KW units to the same network. Such configuration allow the supervision of each IP address from any PC part of the network through a browser while displaying preinstalled HTML pages on each terminal.

GSM Modul:

(Optional) - every i-KW80, can have a GSM form, becoming an independent unit, which transmits and receives SMS towards the recorded users;



Human Interface

Human Interface:

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

USB Port:

Standard production serial USB door for downloading data recorded by the controller. The freezer shall be equipped with the "Tracer" software allowing to display and analyze data.



Slot HPL

RS485/ Ethernet Modbus:

(Optional)-RS485 and/or Ethernet door with ModBus protocol.

Free Contacts:

The back of the fridge-freezer shall include a free slot for alarm signal remotization.

2016

Frigoematica (Smart Blood Bank)

2014

New KW image

2013

New Line HPL

2006

Rapid freezer for plasma -85°C

2002

Control **NEW ICE AGE KW CONTROL®**

2001

Medical Project® series

1990

Biological Bank -85°C®

1985

KW Apparecchi Scientifici S.r.l.

In the '70s

First **vertical** freezer -85°

1961

First **horizontal** freezer -85°

1953

KW (kalt/warm) Officine Meccaniche



ISO 13485:2016



ISO 9001:2015



ISO 14001:2015



OHSAS 18001:2007

Made in Italy

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