

USE AND MAINTENANCE HANDBOOK

UK

FA R290



RIVACOLD  
FT R290  
MASTERING COLD



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# 1. General Information

## 1.1 General Information

This Use and Maintenance Handbook is an integral part of the BLOCKSYSTEM FA FT R290 (identified, in this document, with the term MACHINE) manufactured by RIVACOLD SRL ; for this reason, it must accompany the MACHINE if transferred to a new user or owner. This handbook must be carefully stored and protected from any agents which could cause its deterioration, for the entire lifecycle of the machine.

This handbook was drafted for the purpose of providing operators and technicians responsible for the maintenance of the machine with the essential information and instructions to correctly operate the machine in safe conditions.



**ATTENTION:** Please keep this manual in a safe and accessible place for use as an immediate reference by any operator or engineer.

This handbook contains all the data and information necessary for preliminary training of staff responsible for managing the MACHINE correctly; for this purpose, its use is compulsory.



**DANGER:** for clarity, some illustrations in this handbook show the machine or its components when opened or dismantled; it is however forbidden to use the machine in such conditions.

Even though all the attention notes and warnings for correct use of the MACHINE by the operators have been highlighted or to enable staff responsible for maintenance to intervene correctly, this handbook assumes that, in the environments in which the MACHINE is installed, all norms in force are complied with in relation to safety and hygiene in the workplace matters and that staff responsible for operation and maintenance have a level of training that allows them to correctly interpret the information reported.



**NOTE:** the user can request a copy of this document (for example, in case of damage to the original document) by making a written request to the Manufacturer's Technical Office (see Paragraph 1.6.1 – Request for Support in this chapter), making a commitment, in any case, to replace the damaged copy.

## 1.2 Property of information

This Use and Maintenance Handbook contains confidential information.

All rights reserved.

This handbook cannot be reproduced or photocopied, all or in part, without the prior, written consent of the manufacturer. Use of this documentation material is only permitted to the client to whom the handbook was provided with the machine and only for purposes of installation, use and maintenance of the machine to which the handbook refers.

The manufacturer declares that the information contained in this handbook complies with the technical and safety specifications of the machine to which the handbook refers. The drawings, diagrams and technical data reported are updated on the date of publication of this document and are exclusively valid for the machine to which they are attached.

The manufacturer reserves the right to make changes or improvements without prior notice to this documentation material.

The manufacturer does not assume any responsibility for direct or indirect damage to persons, property or domestic animals as a result of use of this documentation material or the machine in conditions other than those planned.

## 1.3 Contents of the Use and Maintenance Handbook

This Maintenance Handbook is for use by operators and technicians to allow them to understand and correctly use the MACHINE.

This handbook, in fact, other than a functional description of the MACHINE and its main parts, also contains the instructions and indications to:

- transport and install the MACHINE correctly;
- correctly use the MACHINE;
- conduct correct cleaning, regulation and maintenance of the MACHINE;
- pay attention to the fundamental safety and accident prevention regulations.

The aforementioned staff will therefore have the chance to understand the potential of the MACHINE and the problems that may arise during its management.

It is necessary to carefully read all the chapters to understand the instructions provided in this handbook and to operate the MACHINE; for subsequent, easy searches of the contents, refer to *Table 1*, containing a description of the topics covered in the chapters.

*Table 1 – Layout of Use and Maintenance Handbook*

CHAPTER	CONTENTS	RECIPIENTS
Chapter 1 General Information	<ul style="list-style-type: none"> <li>➤ Description of this use and maintenance handbook, of its layout and the conventions used;</li> <li>➤ definition of the terms used;</li> <li>➤ definition of the relationship between the manufactures and the purchaser/user (in terms of the <b>warranty and support conditions</b>).</li> </ul>	All staff using the MACHINE.
Chapter 2 Machine description	<ul style="list-style-type: none"> <li>➤ Description of the MACHINE and its functioning.</li> </ul>	All staff using the MACHINE.
Chapter 3 Safety and Technical Data	<ul style="list-style-type: none"> <li>➤ Presentation of general indications for the MACHINE, on the solutions implemented to protect operator staff, <b>on generic warnings to comply with to correctly</b>, use the machine and the residual risks present during the phases of the life cycle of the MACHINE;</li> <li>➤ presentation of the main <b>technical data</b> concerning the MACHINE.</li> </ul>	All staff using the MACHINE (in particular, the mechanic and electric maintenance workers and the personnel appointed to its handling).
Chapter 4 Transportation and Installation	<ul style="list-style-type: none"> <li>➤ Description of the <b>lifting and transportation</b> modes of the MACHINE;</li> <li>➤ description of the modes of connection to the power supply and of the appliances;</li> <li>➤ description of the <b>storage</b> modes of the MACHINE.</li> </ul>	All staff using the machine (in particular the mechanic and electric maintenance workers, the technicians of the Producer, and the personnel appointed to handling.)

CHAPTER	CONTENTS	RECIPIENTS
Chapter 5 Maintenance and Demolition	<ul style="list-style-type: none"> <li>➤ Description of the <b>verification and control</b> procedures of the parts and the components of the MACHINE (in particular, the parts most subject to wear out);</li> <li>➤ description of the procedures that allow the appointed personnel to perform the <b>cleaning</b> of the MACHINE;</li> <li>➤ presentation of the indications to perform the <b>dismantling, demolition, and disposal</b> of the MACHINE.</li> </ul>	All staff using the machine (in particular the mechanic and electric maintenance workers, the technicians of the Producer, and the personnel appointed to handling.)
Chapter 6 faults search	<ul style="list-style-type: none"> <li>➤ List of the possible malfunctions of the machine and the relative solutions.</li> </ul>	All staff using the MACHINE.
Chapter 7 Attachments	<ul style="list-style-type: none"> <li>➤ <b>Indications for the retrieval of the:</b> <ul style="list-style-type: none"> <li>▪ technical sheet of the MACHINE,</li> <li>▪ refrigerant diagram,</li> </ul> </li> </ul>	All staff using the MACHINE.

## 1.4. Convention and Definitions

### 1.4.1. General Information

The Use and Maintenance Handbook of the MACHINE was divided into chapters to enable, for each phase of the MACHINE life (transport, installation, use, regulation, maintenance and decommissioning), easy availability of relative necessary information for the user of the MACHINE.

All the documentation relating to the MACHINE was drafted by developing the topics indicated by the Machinery Directive (2006/42/EC), PED Directive (97/23/CE) and the safety norms in force; therefore, the *complete reading of all the relative material* is indispensable to obtain the best performance from the MACHINE and ensure maximum duration of all its units.

The configuration of certain units or devices described or shown in the documents can differ from that in the MACHINE in the specific preparation according to particular requirements or safety norms; in this case, certain descriptions, references or procedures recommended can be generic in order to maintain their efficiency. Drawings mentioned or photographs are provided for example purposes as a reference for easy comprehension of the text.

### 1.4.2. Term conventions

MACHINE: the term used in this Use and Maintenance Handbook to indicate the BLOCKSYSTEM FA FT R290. IPD: the acronym indicates Individual Protection Device/s.

### 1.4.3. Definitions

**DANGER ZONE** Any ZONE inside or near the MACHINE in which the presence of an exposed person composes a risk to the safety and health of that person.

**USER** Any PERSON (business person/company) adequately using the MACHINE or that assigns its use or operations connected to use to trained people.

**EXPOSED PERSON** Any PERSON located inside or partly in the danger zone or near these zones.

**OPERATOR** Staff, generally without specific skills, that conduct the operations necessary to operate the MACHINE and clean the MACHINE and the place in which it is installed; if necessary, the operator can conduct simple regulation and restore of functioning operations on the MACHINE.

**MECHANICAL MAINTENANCE PERSON** QUALIFIED TECHNICIAN who can intervene on any mechanical unit to regulate or repair it and conduct the necessary maintenance operations. The mechanical maintenance person is not enabled to conduct intervention on the electrical systems when voltage is present.

**ELECTRICAL MAINTENANCE PERSON** QUALIFIED TECHNICIAN responsible for all electrical intervention (regulation, maintenance and repairs) and, when necessary, works with voltage present inside the electrical cabinets and the shunt boxes.

**MOVEMENT STAFF** QUALIFIED STAFF that perform the tasks of moving the MACHINE or the materials used if the operation requires the use of lifting devices.

**MANUFACTURER TECHNICIAN** QUALIFIED TECHNICIAN made available by the manufacturer of the MACHINE to conduct complex operations in particular situations or, however, when agreed with the user.

### 1.4.4. Individual Protection Devices and Behaviour Norms

For each of the operations described in this handbook, the individual protection devices were indicated for responsible staff which must be used (if necessary, in addition to those staff must wear when installing the MACHINE) and the behaviour norms that enable operator safety to be safeguarded.



#### NOTE:

Paragraph 3.8 – General Warnings and Behaviour Norms in Chapter 3 – Safety and Technical Data in particular reports a series of general recommendations to comply with to avoid risk conditions for people or damage to the machine.

### 1.4.5. Machine status

The status of the MACHINE is the feature that describes both the functioning mode (for example, on and off) and the safety conditions present (for example, guards included, guards excluded and electrical power sectioning).

### 1.4.6. Typographic conventions

The graphical settings of this Use and Maintenance Handbook enable *easy recognition of contents*; in this optic, for example, the instructions are associated with lists, indicated as follows:

➤ this symbol identifies a generic pointed list or a pointed list formed by simple actions (the order in which the actions are presented is not binding, but recommended);

1. in this way an explanatory numbered list identifies a complex procedure (the order in which the actions are presented is binding to correctly and safely conduct the intervention in question).

Text in *Italics* is used, in particular for:

➤ cross references; cross references used in this handbook are expressed in the following format: "Paragraph/Figure/Table" with the number and, generally, the specification of the "Chapter" with the number and relative name (when not specified it is assumed the paragraph, table or figure belongs to the current chapter);

➤ technical and specialist terms, the first time they appear in the text;

➤ foreign terms not commonly used (they too, usually only the first time they appear in the text).

**Bold text** is used to highlight words, sentences or parts of procedures.

In the description of the MACHINE, its components, its use and maintenance, explanatory figures of the portion in question are used and these identify the specific points of interest, with the following notation:

**number** Symbolic representation of a command or signalling device (for example, buttons, selectors or indicator lights).

**letter or number** Symbolic representation of a part of the MACHINE.

Furthermore, to guarantee more in-depth knowledge of the MACHINE and the indications for its correct and safe use, the text of this Use and Maintenance Handbook comes with indications that complete it, providing additional news, indispensable attention or danger notes that are particularly significant to consider; the following notation is used in relation to this:



**NOTE:** indicates the notes, the warnings, the suggestions and other points the reader should pay attention to or complete the explanation with further news.



**ATTENTION:** indicates situations or operations where there is a valid possibility of causing damage to the machine, the equipment connected to it or the environment.



**DANGER:** indicates situations or operations which must be followed or information to which particular attention must be paid to avoid harming people.

**GRAPHIC SYMBOLY USED TO INDICATE THE NEED FOR INDIVIDUAL PROTECTION DEVICES**

This paragraph indicates the graphic symbols used in this handbook to indicate the need to wear certain IPD.



Indicates the need to use suitable head protection to conduct the operation described.



Indicates the need to use suitable protective gloves to conduct the operation described (possibly dielectric to conduct electrical system intervention).



Indicates the need to use suitable protective clothing to conduct the operation described.



Indicates the need to use suitable safety footwear to conduct the operation described.



Indicates the need to use suitable protective goggles to conduct the operation described.

## 1.5. Warranty

### 1.5.1. General Conditions

The manufacturer, RIVACOLD SRL , guarantees the BLOCKSYSTEM FA FT R290 and its equipment manufactured by the same manufacturer as being free of material and manufacturing defects for a period agreed and stipulated in the sales contract of the MACHINE.

### 1.5.2. Parts excluded from warranty

The warranty excludes pieces that wear and all consumable tools and materials possibly supplied by the manufacturer with the MACHINE.

### 1.5.3. Responsibility of the User

The client is responsible for:

- electrical system set-up;
- consumable tools and materials.

### 1.5.4. Operations causing warranty invalidity

Any attempt to dismantle, modify or tamper with a MACHINE component by the user or by unauthorised staff leads to the warranty becoming invalid and removes the manufacturer from any responsibility regarding possible damage to persons or property deriving from such tampering.

The manufacturer is also removed from possible responsibility and the warranty is invalid for the MACHINE in the following cases:

- unplanned use of the MACHINE (see Paragraph 3.6 – Proper and improper use of the machine Chapter 3 – Safety and Technical Data);
- use contrary to requisites in norms in force in the country of use;
- installing the MACHINE in conditions other than those specified in Chapter 4 – Transport and Installation;
- connections non-conforming to specifications reported in Chapter 4 – Transport and Installation;
- use of work equipment other than those specified in Chapter 5 – Maintenance and Demolition;
- total or partial non-compliance with the instructions reported in this handbook;
- no or incorrect maintenance;
- use of non-original parts or those not specified by the manufacturer.

## 1.6. Support

Regarding maximum use of the performance provided by the MACHINE and the extraordinary maintenance operations, this handbook does not replace the experience of the installers, users or maintenance staff that is trained and qualified.

On the subject, the Technical Support Service of RIVACOLD SRL provides:

- telephone support on the features and simplest interventions to conduct on the MACHINE ;
- sending of documentation material;



#### ATTENTION:

*in case of doubt on the correct interpretation of instructions in this Use and Maintenance Handbook, contact the Technical Support Service (as indicated below) to obtain the NECESSARY clarifications.*

### 1.6.1. Intervention Support Requests

To contact the Technical Support Service contact the:

Technical Office of Rivacold s.r.l.	
Via Sicilia, 7	
Fraz. Montecchio 61022 VALLEFOGLIA (PU)	
Italy	
Telephone:	(+39) 0721 919911
Fax:	(+39) 0721 490015
E mail	ufficiotecnico@rivacold.com

During the requests for support, specify the name, model and registration of the machine.

## 2. Machine description

The machine represents a refrigerating system made up of a condensing unit (outside the cold room), an evaporating unit (inside the cold room), and an electronic control board placed within the condensing unit. The refrigerant fluid follows the modes of the compression refrigeration cycle. The machine can be equipped with one or two refrigerating cycle, the condenser can be at air or water. The machine is equipped with a hot-gas defrosting system controlled by the electronic control unit. The defrost is automatic and takes place with a preset frequency that can be modified by the user; it can also be enabled manually via the specific control.

This solution allows the customer to have a product that is easy to use and install and which is incredibly versatile. The use of state of the art technological solutions has allowed us to optimize the machine's overall dimensions, improving its installation procedures, especially on cold rooms with reduced dimensions.

The machines are equipped with:

- self-supporting casing in zinc-plated metal sheet, which is coated with epoxy powder;
- front panel easy to be removed in order to guarantee an easy access to the components and fast maintenance intervention;
- hermetic compressors with thermal motor protection;
- electronic board that can be programmed according to different user requirements;
- heat exchangers with aluminum fins and copper coils;
- condensation by air (optional condensation by water);
- direct gas expansion with capillary tube or thermostatic expansion valve (optional where not fitted as standard);
- automatic defrosting with programmable run, duration and frequency settings;
- integral evaporating condensing water tray, or condensing water direct discharge;
- integral or remote control panel (optional);
- additional electronic module for Master and Slave operation (optional);
- additional electronic module for monitoring, recording and remote management (optional).

The FA model is for wall-mounted, saddle version installation.

The FT model is for wall installation with plug-in insulating panel fitted version.



All refrigerant containing parts are made tight by welding, brazing or a similar permanent connection, and our factory leak test procedure ensures a leakage rate in accordance with current legislation. Under such conditions it is possible to define the machine a "hermetically sealed system" as per Section 3.1.7 of EN378-1 standard.

## 3. Safety and Technical Data

### 3.1. Safety General Information

#### 3.1.1. Engineering Criteria

For the machine design, the principles and concepts introduced in the relevant paragraphs of the norms indicated in *Table 2* were implemented.

Table 2 – Main norms used in the machine design.

NORM	TITLE
UNI EN ISO 12100-1: 2009	Safety of the machinery - Key concepts, general engineering principles - Part 1: Base terminology, methodology
UNI EN ISO 12100-2: 2009	Safety of the machinery - Key concepts, general engineering principles - Part 2: Technical principles
UNI EN ISO 14121-1: 2007	Safety of the machinery - Evaluation of the risks - Part 1: principles
UNI EN ISO 13857: 2008	Safety of the machinery - Safety distances to prevent upper and lower limbs from reaching dangerous areas
UNI EN 953: 2009	Safety of the machinery - Guards - General requisites for the engineering and the construction of the fixed and mobile guards
UNI EN 1127-1: 2008	Explosive atmosphere – Prevention of explosion and protection from explosion- Part 1 : Fondamental concept and methodology
CEI EN 60204-1: 2006	Machinery safety – Electrical equipment on the machine - Part 1: General rules:
CEI EN 60335-1: 2008	Safety of the electrical equipment intended for domestic use and other similar equipment - Part 1: General norms

The compliance of the paragraphs to the aforementioned norms has enabled risks to be eliminated or reduced as much as possible, both during normal functioning and during regulation and maintenance operations, for the entire lifecycle of the machine.

The components used were carefully chosen among those available on the market and the materials composing the machine (and the machine accessory tools) present no risks to personal health and safety. All the parts provided by third parties are CE marked (when planned) and comply with the relevant reference directives. All the details were closely controlled in compliance with the qualitative standards prescribed by the laws in force.

For the machine, the warning and protection measures were also implemented that are necessary to confront residual risks (see *Paragraph 3.3 – Residual Risk Warnings on this*).

### 3.2. Protection Devices and Solutions

#### 3.2.1. Passive Safety Devices

The machine includes implemented devices and construction solutions as described below.

- Fastened guards, on all sides of the machine, which enclose the entire body of the machine.
- Fastened guards in metal or plastic mesh over the mobile units.
- Safety signs corresponding to the machine protections.

### 3.3. Residual Risk Warnings

To avoid all dangerous conditions for people or damage to the machine caused by residual risks, i.e. those risks that persist despite all the devices implemented, or potential risks that are not obvious, the manufacturer recommends the operators, maintenance staff and all staff working on the machine scrupulously follow the warnings on the following pages.



#### ATTENTION:

*always comply with the notifications and instructions on the plates applied to the machine and operate exclusively based on the instructions provided in this handbook (for example those reported in Paragraph 3.8 – General Warnings and Behaviour Norms).*

#### 3.3.1. Lifting and Transportation

##### 3.3.1.1. Residual Risks During Lifting and Transport Phases

During the lifting and transport phases, risks are present related to:

- operations on the machine by staff that is unqualified, untrained, uninformed or not correctly equipped.
- wrong choice or wrong use of transport and movement vehicles (for example, forklift or hoist) for the machine;
- crushing of operators responsible for movement;
- loss of load stability during the operations in question;
- projection of mobile parts of the machine that cannot be adequately removed or fastened;
- knocking of parts or machine components with people or property due to sudden movements of the machine or incorrect behaviour of the employees conducting the operation;
- knocking or falling of machine components, damaging the machine and the relative protections;
- possible unhealthy or excessively forced movements by transport and movement operators of the machine components.

### 3.3.1.2. Necessary Individual Protection Devices



#### 3.3.1.3. Attention Warnings During Lifting and Transport Phases

During the lifting and transport phases, it is necessary to follow the attention warnings in this paragraph.

- Only appoint specialist and trained staff for these operations for machinery movement operations that are capable of choosing and using the lifting and transport vehicles in a safe manner most appropriate for the situation (for example a crane or hoist).
- Check and, if necessary, ensure that all the parts capable of moving are correctly fastened (or, if planned, removed and reassembled when the operation is complete).
- Do not lift, for any reason, the various parts of the machine by grabbing them by non-structural elements (for example, cables or sheaths).
- Ensure there are no people near the zone where the lifting, movement and unloading operations take place and always keep a safe distance.
- Always give warning of the start of manoeuvres.
- Do not transit under suspended loads.
- Do not carry anyone on the loads.

### 3.3.2. Installation and Connection

#### 3.3.2.1. Risks During Installation and Connection Phases

During the installation and connection phases, risks are present related to:

- operations on the machine by staff that is unqualified, untrained, uninformed or not correctly equipped.
- contact with electrically powered elements;
- knocking or crushing by moved machine components;
- tripping or falling over electrical power connections;
- machine damage during the installation and connection phases.

#### 3.3.2.2. Necessary Individual Protection Devices



#### 3.3.2.3. Signs Present

The machine is supplied with specific danger and forbidden signs; see *Paragraph 3. 4 – Safety Signs*.

#### 3.3.2.4. Attention Warnings During Installation and Connection Phases

During the installation and connection phases, it is necessary to follow the attention warnings in this paragraph.

- Follow the instructions relating to safety reported in *Paragraph 3.3.1 – Lifting and Transport* during the necessary movement operations of the machine components.
- Use the auxiliary equipment and, however, any other machinery or equipment (electrical or pneumatic) only having understood the instructions reported in the relative Use and Maintenance Handbook or after specific and formal training.
- Choose an installation location which:
  - includes sufficient space for normal use and maintenance of the machine,
  - enables the correct connections necessary for machine functioning,
- In relation to electrical energy, the earthing system connection must be connected **before any other connection** to the electrical mains line.
- Protect connection tubing to energy sources using adequate rigid sheathing or cable passages.
- Conduct the intervention requested using standardised work tools (ladders, various tools) and pay maximum attention to elements that could cause tripping or cause cuts and trauma.
- The operational settings of the machine cannot be dealt with until the machine is inspected: the presence of possible assembly or installation errors could in fact lead to serious accidents for the operators responsible for the operations.
- Before proceeding with the inspection and the first functioning of the machine, check its parts do not present any physical damage due to knocks, tears or abrasion and that all the connections present were correctly conducted, with no possibility of disconnection.

### 3.3.3. Machine use

#### 3.3.3.1. Residual Risks during Machine Use Phase

During machine use the following risks are present due to:

- use of the machine by staff that is unqualified, untrained, uninformed or not correctly equipped.
- contact with electrically powered parts;



### 3.3.3.2. Necessary Individual Protection Devices



### 3.3.3.3. Signs Present

The machine is supplied with specific danger and forbidden signs; see *Paragraph 3. 4 – Safety Signs*.

### 3.3.3.4. Attention warnings during machine use

During use of the machine, it is necessary to follow the attention warnings in this paragraph.

- Only use the machine if all the safety protection devices are intact.
- Do not remove, for any reason, the safety devices and protections installed.
- Comply with all the safety and danger signs affixed to the machine.
- Ensure all the safety and danger signs affixed to the machine are legible.
- Wear all the IPD necessary, regularly checking their integrity (immediately signal any IDP that are no longer capable of conducting the specific task they were assigned for).
- Do not intervene on the machine without having fully and carefully read this handbook.
- Use the auxiliary equipment and, however, any other machinery or equipment (electrical or pneumatic) only having understood the instructions reported in the relative Use and Maintenance Handbook or after specific and formal training.
- Immediately signal functioning anomaly situations.
- Do not conduct any intervention (including cleaning) on movement units or hot surfaces.
- Do not conduct unpermitted operations on the machine (refer to the instructions reported in this handbook).
- Do not use the machine when under the influence of medicine or beverages that can slow your reflexes.

## 3.3.4. Maintenance and Demolition

### 3.3.4.1. Risks During Maintenance and Demolition Phases

During the maintenance and demolition phases, risks are present related to:

- operations on the machine by staff that is unqualified, untrained, uninformed or not correctly equipped.
- contact with powered electrical parts;
- knocking or crushing by moved machine components;
- contact with hot elements on the machine or relative equipment;
- contact with the refrigerant.

### 3.3.4.2. Necessary Individual Protection Devices



### 3.3.4.3. Signs Present

The machine is supplied with specific danger and forbidden signs; see *Paragraph 3. 4 – Safety Signs*.

### 3.3.4.4. Attention warnings during maintenance and demolition Phases







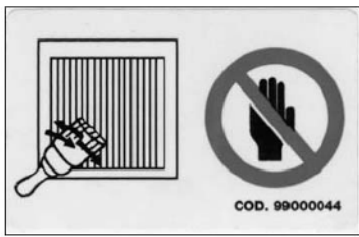
During the maintenance and demolition phases, it is necessary to follow the attention warnings in this paragraph.

- Conduct the interventions requested using the standardised work tools (ladders, various tools) and always wearing the necessary IPD.
- The implementation of maintenance and demolition interventions must be performed by qualified, specifically trained staff.
- Check that the power supplies are adequately sectioned and that nobody can reactivate them prior to concluding the requested interventions (use of locks, adequate signs and consolidated work procedures); also check that any residual energy was discharged before conducting the intervention.
- Operate, as much as possible, on the machine and the tubing only after emptying it and before proceeding to restarting, guaranteeing adequate cleaning of the system.
- Obtain the necessary work permits and check all the preparation procedures of the machine for maintenance operations are correctly conducted.
- Use the auxiliary equipment and, however, any other machinery or equipment (electrical or pneumatic) only having understood the instructions reported in the relative Use and Maintenance Handbook or after specific and formal training.
- Do not use, for any reason, petrol, solvents or inflammable fluids to clean parts, but use commercial, approved detergent that is inflammable and non-toxic.
- Do not make changes, transformations or applications to the machine that could prejudice safety, without having obtained written authorisation from the manufacturer.
- Before restarting the machine, check that all the safety devices of the machine were restored.

### 3.4. Safety signs

Signaling labels are present on the machine, which are indicated in *Table 3*.

*Table 3 – Description of the signaling labels present on the machine.*

	LABEL	DESCRIPTION
A		This label indicates that it is forbidden to remove the safety devices and protections installed on the machine; it is usually accompanied by the explicatory writing: DO NOT REMOVE THE PROTECTION DEVICES.
B		This label indicates that it is forbidden to perform any intervention (including lubrication and cleaning) in proximity of moving parts; it is usually accompanied by the explicatory writing: DON NOT REPAIR OR REGULATE DURING MOTION.
C		This label warns about the danger due to the presence of mobile parts in proximity of the area in which the machine is positioned.
D		This label warns about the danger due to the presence of warm surfaces in proximity of the area in which the machine is positioned.
E		This label warns about the danger to the presence of refrigerant fluid fired (only for model with R290).
F		This label warns about the danger due to the presence of elements under voltage in proximity of the area in which the machine is positioned.
G		This label warns about the obligation to read the manual for the installation
H		Warning to the sharp parts during condenser cleaning

### 3.5. Work Area and Position of the Operator

The machine functions automatically requesting the intervention of the operator corresponding to the control and command software only to manually start and stop and for functioning programming. The operator's work area therefore exclusively corresponds to the control panel on the machine.

### 3.6. Noise and Vibration Indications

#### 3.6.1. Noise

BLOCKSYSTEM FA FT R290 were designed and manufactured to reduce the noise emitted during normal functioning to a minimum. The level of mass acoustic pressure A generated by BLOCKSYSTEM FA FT R290 and measured, following the criteria set by the norms in force, during functioning is less than 70 dB (A).

#### 3.6.2. Vibrations

In use conditions in compliance with the instructions supplied by the manufacturer in this handbook, the vibrations were not such to create dangerous situations.

The operator however, if vibrations occur, should immediately stop the machine and signal the phenomenon to the manufacturer's support service.

### 3.7. Proper and Improper Use of the Machine

The machine has been designed and built for the **sole** industrial and commercial refrigeration in permanent premises.

The Block system FA FT R 290 is exclusively designed to be installed on a vertical wall.

The MACHINE can **only** use the refrigerant gas for which it has been designed, which is R290.

The machine has been designed and built to operate in premises **without a potentially explosive atmosphere**.

The machine must be adequately protected against atmospheric agents.

It is a sound cautionary norm to place powder extinguishers near the machine. To prevent the possibility of a fire outbreak, the machine must be kept clean of pieces of plastic, oils, solvents, paper, and rags.

Use of the machine for different operations could cause damages to persons or to the machine itself, and such operations are therefore considered **improper uses** for which the Manufacturer does not deem itself responsible.



**WARNING:** *in case of a different destination of use, it is indispensable to consult the Manufacturer's Technical Office in advance.*

### 3.8. General Warnings and Behavioural Norms

To avoid any risky conditions to people or damage to the machine, we recommend you scrupulously follow the general warnings and behavioural norms reported here.



**DANGER:** *the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained or unauthorised staff.*

- ▶ The operators responsible for machine management must be adequately trained to use it at its best and without risk and must operate in a comfortable environment that guarantees the best safety and hygiene conditions possible.



**DANGER:** *prevent the machine being used by unauthorised staff or untrained staff without supervision: in fact, before starting work, each operator must be perfectly aware of the position and functioning of all the controls and features of the machine. Furthermore, the operator must have read this handbook ENTIRELY.*

- ▶ Before using the machine, ensure that any dangerous conditions to safety are adequately eliminated and that there are no operators present in the danger zones near the machine.
- ▶ Before using the machine, ensure all the guards are in place and that all safety devices are present and efficient.
- ▶ Warn supervisors of any functioning irregularities in the machine or any problems relating to the integrity of the machine protections.
- ▶ Carefully read the machine labels. Do not cover them for any reason and replace them immediately if damaged.
- ▶ Do not rest liquid containers on the machine.
- ▶ Consult this handbook on the safety specifications in force and the specific IPD to implement for personal safety; in particular, however, the staff responsible for the machine must wear suitable clothing, by avoiding or paying due attention to:
  - loose clothing,
  - wide sleeves,
  - ties or hanging scarves,
  - necklaces, bracelets and rings.
- ▶ Staff responsible for maintenance of the machine must be aware of all the procedures reported in *Chapter 5 – Maintenance and Demolition* and be adequately prepared technically to correctly interpret the instructions and diagrams in this handbook and to intervene on the machine.
- ▶ The area where the maintenance operations take place must always be clean, dry and with suitable equipment always available and efficient.
- ▶ The work area must never be occupied in such a manner to interfere with the free movement of the operator. In case of emergency, immediate access to the machine must be guaranteed for responsible staff.
- ▶ In the aforementioned area, access to people who are not directly responsible for machine functioning is forbidden, to avoid danger due to distraction or negligence during machine intervention.
- ▶ If intervention has to be conducted near the electrical components, work with dry hands and use dielectric gloves (working on electrical components with wet hands leads to almost certain danger of electrical shock).

**DANGER:**

*you should ensure that before starting any type of machine intervention or corresponding to its components or accessory equipment to section power; if this is not possible, it is necessary to take measures to allow you to operate on the machine in safe conditions.*

**DANGER:**

*tampering or unauthorised replacement or one or more parts of the machine and use of accessories, tools or consumable materials other than those indicated by the manufacturer can generate danger of injury.*

**ATTENTION:**

*all the materials with environmental impact which must be eliminated after interventions or processes on the machine must be disposed of according to norms in force. If necessary, entrust specialist structures to dispose of them.*

## 3.9. Machine Data and Technical features

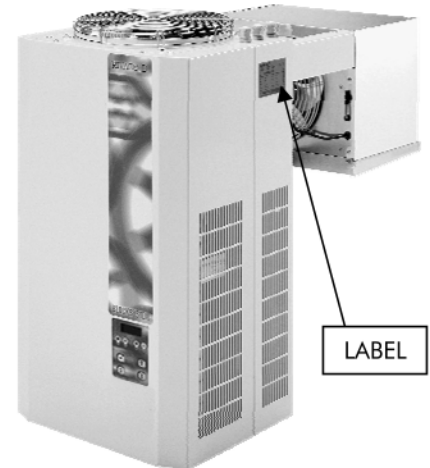
### 3.9.1. Identification Plate

To identify the machine, a CE identification plate is affixed to it; the identification data reported on this plate must be notified to the manufacturer's offices on each request for intervention or to order spare parts. Specifically, the identification plate reports the following data:

- code,
- registration,
- ampere absorption (A),
- Watt absorption (W),
- refrigerant type,
- power voltage (Volt/Ph/Hz),
- maximum operating pressure PS HP (high pressure side) – PS LP (low pressure side),
- maximum operating temperature TS HP (high pressure side) – TS LP (low pressure side),
- overall class according to directive 97/23/ CE (PED).

**REGISTRATION IDENTIFICATION**

- figure 1 and 2 = last two figures of year of manufacture,
- figure 3 and 4 = week of year in which the machine was manufactured,
- figures 5, 6, 7 and 8 = progressive number.



## 3.10. Technical Data and Overall Dimensions

The technical features of the machine are found in *Chapter 7 – Attachments* in this handbook.

## 4. Transport and Installation

### 4.1. General information

The installation and possible re-installation of the machine must be conducted directly by **qualified staff**.

Before proceeding to installing the machine, it is necessary to prepare the power supplies and utilities necessary for the correct functioning of the system, following the indications reported in this chapter and, if necessary, consulting the **manufacturer's** Technical Office in advance.

**ATTENTION:**

*This product as sold complies with the 97/23CE (PED) standard and is marked with the relevant category. After purchase it is the responsibility of the owner to ensure that this equipment is regularly maintained continue its compliance up to the stage when it is finally decommissioned according to the relevant national law.*

**DANGER:**

*the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained or unauthorised staff.*

### 4.1.1. Power and Utilities

The power supplies and utilities necessary (responsibility of the purchaser) for machine functioning exclusively consist in the supply of electrical energy.

Unless otherwise indicated, the **purchaser is responsible for:**

- the preparation of transport vehicles to transport the machine to the assembly or installation location;
- the preparation of equipment necessary for assembly and installation;
- the preparation of the installation location;
- the preparation of auxiliary vehicles and consumable materials (for example, non-flammable and non-corrosive detergents, materials and tools necessary for cleaning and cover).

### 4.2. Transportation and Movement

The indications contained in this paragraph must be complied with during the transport and movement phases of the machine, which can occur in the following situations:

- machine storage;
- assembly and first installation of the machine;
- de-installation and dismantling of the machine;
- moving and relocating the machine.

**DANGER:***the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained or unauthorised staff.*

To conduct the task in question, the following Individual Protection Devices are necessary:



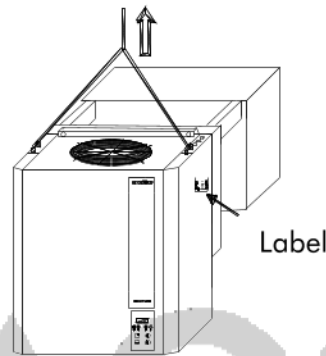
During transport or movement of the machine, it is necessary to follow the warnings below:

- Check the lifting equipment is suitable for the weight and dimensions of the machine.
- Do not bang the structure or guards of the machine with equipment or otherwise.

#### 4.2.1. Lifting

**DANGER:***lifting operations must be conducted with the direct supervision of a qualified mechanical maintenance person or a manufacturer technician.*

Lifting to move and subsequently position the machine can be performed using any adequate vehicle that guarantees its lifting in a safe and efficient manner (for example a hoist using a harness system for the machine). See Figure 2.

*Figure 2 – Lifting the machine.*

To correctly perform the lifting operations, follow the warnings reported below.

- Never use two lifting vehicles simultaneously.
- Never stay under suspended loads.
- If using steel ropes, always apply the end eye to the lifting hook.
- If using steel ropes, pay attention not to create sharp bends, i.e. with a bending radius lower than that of the rope end eyelets.
- Use adequately wide ropes, to enable the angle between the ropes and the horizon to always be over 45°.

#### 4.2.2. Machine movement

For reduced distances, as in the case of transport to the assembly or storage locations of the machine, it is necessary to use lifting equipment (for example, forklift and hoists) suitable for the dimensions and weight of the machine.

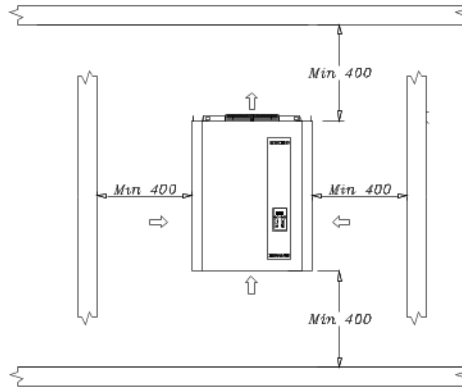
**ATTENTION:***during all these operations follow the precautions necessary to avoid knocking and tipping over, moving the machine in a manner not to loose balance.***DANGER:***ensure there are no unauthorised staff near the zone where the lifting, movement and unloading operations take place and always keep a safe distance.*

#### 4.3. Installation

**DANGER:***the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained or unauthorised staff.*

To conduct the task in question, the following Individual Protection Devices are necessary:





During installation, leave the machine sufficient space to conduct maintenance in safe conditions.  
 For correct functioning of the machine, we recommend the following thicknesses of the coldroom walls (polyurethane insulation):  
 MBP and HBP coldroom insulation thickness **60 mm**; LBP coldroom insulation thickness **100 mm**.

**DANGER:** given that the machine contains refrigerant fluid R290, it is important that the premises where the machine is installed be properly ventilated.

**DANGER:** Do not install the equipment near external sources of heat/ignition, such as for example loose flames or hot surfaces (gas or electrical cookers, ovens, etc.), near electrical components (switches, relays, etc.), and near highly flammable materials"

### 4.3.1. FT series plug-in version installation method

To proceed to installation of the machine, implement the following procedure:

1. On the wall of the cold room, make a hole of suitable dimensions as indicated in Figure 4 according to the specific sizes of each type of machine, as shown in Table 5.

Figure 4 - Installation of the FT model.

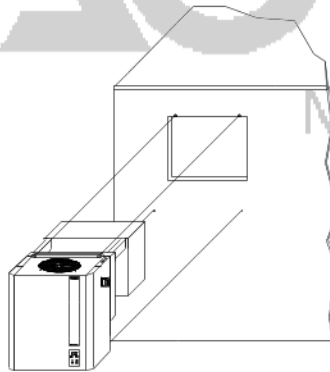


Table 5 – Opening size by type in the FT model.

1x250	1x300	1x350

2. Lift the machine with a forklift (or other suitable lifting mechanism) using the appropriate lifting hooks.

3. Place the machine on the cold room wall by inserting the evaporator section into the hole from the outside.
4. Fix the machine to the cold room wall with appropriate screws (included).
5. Seal the perimeter of the buffer with silicone (of suitable characteristics for using the cold room) to avoid infiltration of hot air inside the cold room. On the upper side, perform the operation prior to positioning.

### 4.3.2. FA series the saddle version installation method

To proceed to installation of the machine, implement the following procedure:

1. Before mounting the cold room ceiling, make n° 2 grooves on the upper end of the wall and a hole for water discharge as shown in Figure 5 according to the specific sizes of each type of machine, as shown in Table 6.

Figure 5 - Installation of the FA model.

**Legend**

- DH = Water discharge hole
- S = Siphon
- T = Water discharge tube
- OT = Overflow tube
- SIL = Silicon

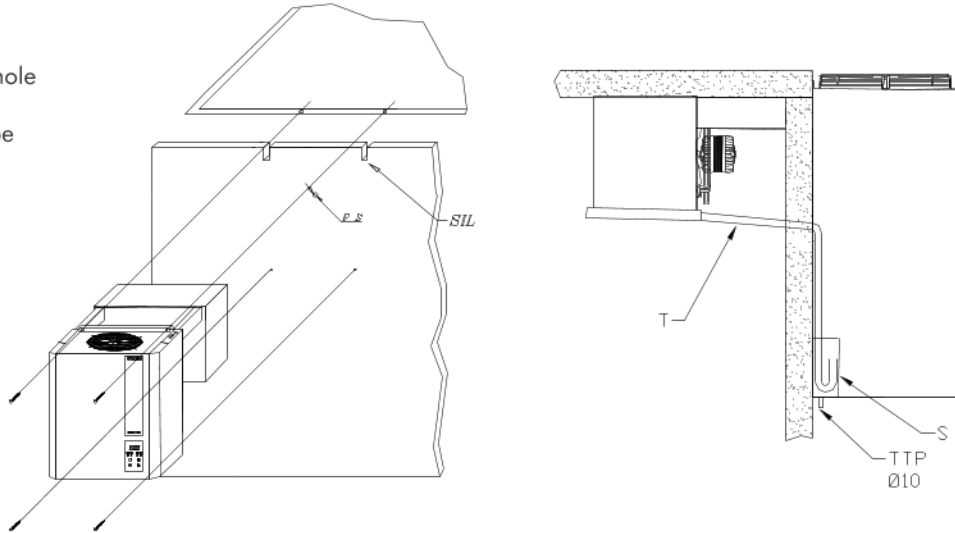


Table 6 - Grooves size by type in the FA model.

1x250	1x300	1x350

2. Remove the aluminum tray underneath the evaporator by unscrewing the 4 screws.
3. Lift the machine with a forklift (or other suitable lifting mechanism) using the appropriate lifting hooks.
4. Place the machine on the grooves in the cold room wall.
5. Fix the machine to the cold room wall with appropriate screws (included).
6. Seal the grooves perimeter with silicon (of suitable characteristics for using the cold room) to avoid infiltration of hot air inside the cold room.
7. Replace the tray under the evaporator and fix it with the 4 screws previously removed.
8. Check the proper operation of the evaporator condensation water discharge.
9. To connect the water-cooled condensers, the pipes used must not have a smaller diameter than those present on the Block system SF R 290, and you must follow the inlet and outlet indications. Install the water supply shut-off valve within reach of the operator.



**ATTENTION:** never close the water shut-off valve while the device is in use.

To improve the machine's performance and endurance, check that:

- ▶ the water's temperature ranges between 5°C and 20°C the condensing units are made for operating with well-water.
- ▶ the pressure of the water ranges between 1 and 5 bar.



**ATTENTION:** the water pipelines must be protected against the low external temperatures.



**WARNING:** We recommend connecting a hose to the overflow tube for allowing water drainage in case of malfunctions or improper use.

### 4.3.3. Connection to electrical power mains

The electrical power supply (also in terms of voltage and frequency) supplied by the purchaser must be sufficient to correctly power the machine. Specifically the following instructions must be followed:

- ▶ The power cable must be laid out (no rolling or overlapping) in a position not exposed to possible knocks or tampering. It must not be near liquids, water or heat sources and must not be damaged (if so, replace it using qualified staff).
- ▶ Prepare a thermo-magnetic differential switch between the power line and the machine --- and ensure the voltage of the line corresponds to the voltage indicated on the plate (see label applied to the machine); tolerance permitted  $\pm 10\%$  of nominal voltage.



**ATTENTION:** the thermo-magnetic differential switch must be placed in the immediate vicinity of the machine to ensure it is well visible and reachable by the technician in case of maintenance.

- ▶ It is necessary for the section of the power cable to be adequate to the power absorbed by the machine.



**ATTENTION:** It is compulsory, pursuant to law, to connect the machine to an efficient earthing system. All responsibilities are declined for non-compliance with this directive; all responsibility is declined if the electrical system used for connection is not implemented according to laws in force.

- ▶ Fasten the micro-door supplied on the door jamb of the coldroom which automatically causes, on opening, the lights in the coldroom to switch on and the compressor and fans to stop in the evaporator and condenser.



**ATTENTION:** the micro-door cable must pass far from the cables with electrical power to avoid signal disturbances.



**ATTENTION:** installation of electrical components inside the cold room is entirely the care and responsibility of the installer. It is mandatory to only use material adapt to type risk, see regulations In force

## 4.4. Storage

If necessary to store the machine for a period before installation (or following de-installation), we recommend you protect it adequately and store it in a suitable environment, with the following features:

- ▶ external surfaces resistant to atmospheric agents;
- ▶ protected against access to unauthorised people;
- ▶ with the following environmental conditions:
  - good ventilation;
  - room temperature between  $-20\text{ }^{\circ}\text{C}$  and  $+50\text{ }^{\circ}\text{C}$ ;
  - relative humidity of compressed air 30% and 80%;
  - possibly in dry, dust-free atmosphere.



**ATTENTION:** do not remove any packaging possibly present for certain components of the machine and take adequate precautions to protect the exposed parts.

### 4.4.1. De-installation

If the machine must be de-installed, proceed following the inverse order for installation reported in Paragraph 4.3 - Installation.



**DANGER:** the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained or unauthorised staff.

To conduct the task in question, the following Individual Protection Devices are necessary:



## 5. Maintenance and Demolition

### 5.1. General Maintenance Information

To guarantee maximum reliability to the machine and avoid dangerous conditions, scrupulously comply with the instructions and warnings reported in the following pages.



**DANGER:** for safety reasons, all the maintenance operations reported in this chapter must only be conducted by qualified technicians that are specifically trained. The responsible technicians must also have all the tools and IDP necessary to operate safely.





**ATTENTION:** to always guarantee operators full efficiency and safety of the machine and prevent problems linked to deterioration of the safety measures or machine stoppages which can be taxing, it is necessary to implement efficient preventive maintenance, by planning interventions with planned intervals, with the purpose of renewing or replacing the normal wear parts and audit the general status of the mechanical and electrical components composing the machine (and its auxiliary equipment), thereby providing the instructions on possible extraordinary operations which may become necessary.



**ATTENTION:** machines equipped with R290 refrigerant gases are supplied with factory sealed refrigerant circuit. It's strictly prohibited any work on it. For every problem on the refrigerating system, the machine should be returned to the manufacturer .

Before conducting any type of maintenance or cleaning intervention reported in this paragraph, it is necessary to section the machine from the electrical power supply; do so by removing the plug from the power socket.



**DANGER:** the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained, inadequately equipped or unauthorised staff.

### 5.1.1. Safety Signs

To conduct correct maintenance and cleaning operations, it is indispensable to take into consideration the indications reported below.

- ▶ During interventions, it is necessary to signal machine intervention using specific signs (these signs are positioned in such a manner to prevent any undesired intervention on the machine).
- ▶ During the interventions **only authorised staff** can access the work area.



**ATTENTION:** the maintenance and cleaning operations must only be conducted by expert and specialist staff that have read and understood all the indications reported in this Use and Maintenance Handbook.



**DANGER:** only dismantle the parts of the machine actually necessary to conduct the specific maintenance operation. Furthermore, before re-delivering the machine to operators, it is necessary to verify its integrity and functionality.

- ▶ All the materials with environmental impact which must be eliminated after maintenance interventions must be disposed of according to norms in force.



**ATTENTION::** to dispose of materials with high environmental impact, if necessary, appoint specialist structures.

In any case, to conduct all the maintenance and cleaning operations reported below on the machine, the following Individual Protection Devices are necessary:



### 5.1.2. Verification of Material Availability

With an advance of at least **60 days** from the fixed date for maintenance interventions, conduct a detailed examination of the necessary material:

1. check the material is in the warehouse,
2. if necessary, ask the manufacturer's Technical Office for the missing pieces, at least **30 days** in advance.

## 5.2. Cleaning and maintenance



**DANGER:** the manufacturer declines all responsibility for any damage to property and/or persons deriving from incorrect or incomplete maintenance.



**DANGER:** before conducting any planned ordinary maintenance interventions, ensure the machine is sectioned from the power supply; also wait for any hot surfaces to cool.



**ATTENTION:** in case of replacement of machine components, they must be replaced with identical and original components.



**ATTENTION:** Any measures taken to braze on a product category risk PED ≥ 1, must be conducted by qualified professionals.

### 5.2.1. Interventions and relevant frequency

- Visually check the entire refrigerating circuit, even inside the machines, to search for refrigerant leaks, which are also announced by traces of lubricating oil. Promptly intervene and examine in further depth if in doubt. Check for refrigerant gas leaks every 6 months.  
If you uncover leakage, you must immediately intervene and check again **within 30 days** to make sure that the repair was successful.
- Check, **every four months**, regular flow of the refrigerant through the sight-glass present on the liquid line.
- Check, **every four months**, the oil level through the specific sight-glass (where included) placed on the housing of the compressor.
- Check, **every four months**, the noise level of the compressor. This operation must be performed with caution, since it requires that the system be working; check for the presence of clicking sounds or vibrations, which may be a symptom of breakage or of excessive mechanical play between the moving parts.
- **Regularly** check that the condensed water discharge is not clogged and that the water discharge coil is efficient (where included).
- In machines equipped with an hydraulic system, **regularly** check the level of water and glycol. If it is not sufficient, add the right amount. It is forbidden to use the system at a temperature below  $-5^{\circ}\text{C}$  with the water+glycol mixture with which the machine is provided.
- You can lift the cap to inspect the evaporator. **Regularly** check that the evaporator functions properly.



**ATTENTION:** on completion of each maintenance and cleaning operation, reset all the fastened protections.

### 5.3. Out of service, dismantling and demolition

To perform these dismantling and demolition operations, the following Individual Protection Devices are necessary:



#### 5.3.1. Machine placed out of service

To place a machine out of service for a long period, follow the operations below:

2. Remove machine voltage.
2. Clean the machine.
3. Also conduct the maintenance operations and then cover the machine with a sheet.

#### 5.3.2. Dismantling

If it is necessary to dismantle the machine, follow the procedures indicated below.

1. Isolate the machine from electrical power.
2. Refer to the *Paragraph 4.4.1 – De-installation in Chapter 4 – Transport and Installation*, proceed to de-install the machine; also contact the manufacturer's Technical Office to obtain the necessary support during this intervention.
3. To proceed to moving the machine components, work according to the instructions reported in *Paragraph 4.2 – Transport and Movement in Chapter 4 – Transport and Installation*.
4. Organise the components adequately based on the fact they have to be transported to another location (refer to *Paragraph 4.2 – Transport and Movement in Chapter 4 – Transport and Installation*), which must be stored (refer to *Paragraph 4.4 - Storage in Chapter 4 – Transport and Installation*) or demolished (refer to *Paragraph 6.3.3 – Demolition*).



**DANGER:** the manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained, inadequately equipped or unauthorised staff.

#### 5.3.3. Demolition and disposal

When the machine has reached the end of its lifecycle, before proceeding to final disposal, it is necessary to perform a series of operations to minimise environmental impact linked to the disposal of the machine components, as requested by the norms in force on waste disposal.

These operations are:

1. Separate and store the parts with environmental impact, or rather:
  - a. separate the various parts that could cause pollution;
  - b. select the materials to encourage their recycling, dividing them for differentiated disposal (in particular select the plastic or rubber elements).
2. The gas contained in this system **must not** be dispersed in the environment. Thermal insulation of the buffer and oil in the compressor must undergo differentiated collection; for this reason, we recommend you dispose of the generator only in specialist collection centres and not as normal iron scrap, following the norm directives in force.
3. Dispose of the casing, or rather:
  - a. having removed and stored the polluting elements, entrust disposal of the casing to specialist structures.

**ATTENTION:**

on demolishing the machine, ensure the identification plate of the machine and the relevant technical documentation can no longer be used.

It is the faculty of the client to return these elements to the manufacturer's Technical Office for their destruction.

Simple conservation in an inaccessible location of the aforementioned elements is not permitted.

On completion of the interventions, communicate to the manufacturer's Technical Office that the machine has been disposed of.

## 6. Faults search

	POSSIBLE CAUSES	SOLUTIONS
A	<p><b><u>The compressor does not start up and does not release a humming sound</u></b></p> <ol style="list-style-type: none"> <li>Lack of voltage. Start-up relay with open contacts.</li> <li>Thermal protector is intervening.</li> <li>Loose electrical connections or wrong electrical connections.</li> </ol>	<ol style="list-style-type: none"> <li>Check the supply line or substitute the relay.</li> <li>Check the electrical connections.</li> <li>Tighten the connections or carry them out again in compliance to the electrical wiring diagram.</li> </ol>
B	<p><b><u>The compressor does not start up (but releases a humming sound) and the thermal protector intervenes</u></b></p> <ol style="list-style-type: none"> <li>Wrong electrical connections.</li> <li>Low voltage supply to the compressor.</li> <li>Faulty start-up of the condenser.</li> <li>The relay doesn't close.</li> <li>The winding on the electrical motor is interrupted or in short circuit.</li> </ol>	<ol style="list-style-type: none"> <li>Re-do the connections.</li> <li>Identify the cause and eliminate it.</li> <li>Identify the cause and replace the condenser.</li> <li>Identify the cause and substitute the relay if necessary.</li> <li>Substitute the compressor.</li> </ol>
C	<p><b><u>The compressor starts up, but the relay doesn't open</u></b></p> <ol style="list-style-type: none"> <li>Wrong electrical connections.</li> <li>Low voltage supply to the compressor.</li> <li>Relay blocked in closure.</li> <li>Excessive discharge pressure.</li> <li>The winding on the electrical motor is interrupted or in short circuit.</li> </ol>	<ol style="list-style-type: none"> <li>Check the electrical circuit.</li> <li>Identify the cause and eliminate it.</li> <li>Identify the cause and eliminate it.</li> <li>Identify the cause and substitute the relay if necessary.</li> <li>Replace the compressor.</li> </ol>
D	<p><b><u>Intervention of the thermal protector</u></b></p> <ol style="list-style-type: none"> <li>Low voltage supply to the compressor (unbalanced phases on the tri-phase motors).</li> <li>Defective thermal protector.</li> <li>Defective electric-run condenser.</li> <li>Excessive discharge pressure.</li> <li>High suction pressure.</li> <li>Overheated compressor, hot return gas.</li> <li>Winding of the compressor motor in short circuit.</li> </ol>	<ol style="list-style-type: none"> <li>Identify the cause and eliminate it.</li> <li>Check its characteristics and replace it if necessary.</li> <li>Identify the cause and eliminate it.</li> <li>Check the ventilation and any potential restrictions or obstructions in the system circuit.</li> <li>Check the sizing of the system. Replace the condensing unit with a more powerful one, if necessary.</li> <li>Check the refrigerant load; if need be, repair the loss and add gas if necessary till the charge stated in the label.</li> <li>Replace the compressor.</li> </ol>
E	<p><b><u>The compressor starts up and circulates, the functioning cycles are of brief duration</u></b></p> <ol style="list-style-type: none"> <li>Thermal protector.</li> <li>Thermostat.</li> <li>Intervention of the high pressure switch, due to the insufficient cooling of the condenser.</li> <li>Intervention of the high pressure switch, due to the excessive load of refrigerant gas.</li> <li>Intervention of the low pressure switch, due to the scarce load of refrigerant gas.</li> <li>Intervention of the low pressure switch, due to the restriction or clogging of the expansion valve.</li> </ol>	<ol style="list-style-type: none"> <li>See previous point (thermal protector intervention).</li> <li>Small differential; correct the regulation.</li> <li>Check the correct functioning of the motor fan or clean the condenser.</li> <li>Reduce the load of refrigerant gas.</li> <li>Repair the loss and add refrigerant gas.</li> <li>Replace the expansion valve.</li> </ol>
F	<p><b><u>The compressor operates uninterruptedly or for long periods</u></b></p> <ol style="list-style-type: none"> <li>Scarce load of refrigerant gas.</li> <li>Thermostat with contacts locked in closure.</li> <li>System not sufficiently sized in function of the load.</li> <li>Excessive load to cool or insufficient insulation.</li> <li>Evaporator covered with ice.</li> <li>Restriction in the system circuit.</li> <li>Clogged condenser.</li> </ol>	<ol style="list-style-type: none"> <li>Repair the loss and add refrigerant gas till the charge stated in the label.</li> <li>Replace the thermostat.</li> <li>Replace the system with a more powerful one.</li> <li>Reduce the load and improve insulation, if possible.</li> <li>Perform defrosting till the charge stated in the label.</li> <li>Identify the resistance and eliminate it.</li> <li>Clean the condenser.</li> </ol>
G	<p><b><u>Electric-run condenser damaged, interrupted, or in short circuit</u></b></p> <ol style="list-style-type: none"> <li>Wrong electric-run condenser.</li> </ol>	<ol style="list-style-type: none"> <li>Replace the condenser with the correct type.</li> </ol>
H	<p><b><u>Start-up relay defective or burnt out</u></b></p> <ol style="list-style-type: none"> <li>Wrong relay.</li> <li>Relay mounted in the incorrect position.</li> <li>Wrong electric-run condenser.</li> </ol>	<ol style="list-style-type: none"> <li>Replace the relay with the correct one.</li> <li>Re-assemble the relay in the correct position.</li> <li>Replace the condenser with the correct type.</li> </ol>
I	<p><b><u>Cold-room temperature too high</u></b></p> <ol style="list-style-type: none"> <li>Thermostat regulated too high.</li> <li>Undersized expansion valve.</li> <li>Undersized evaporator.</li> <li>Insufficient air circulation.</li> </ol>	<ol style="list-style-type: none"> <li>Regulate it correctly.</li> <li>Replace the expansion valve with a suitable one.</li> <li>Replace it, increasing the surface of the evaporator.</li> <li>Improve air circulation,</li> </ol>
L	<p><b><u>Frosted suction piping</u></b></p> <ol style="list-style-type: none"> <li>Expansion valve with excessive passage of gas or oversized.</li> </ol>	<ol style="list-style-type: none"> <li>Adjust the valve or substitute it with a correctly sized one.</li> </ol>

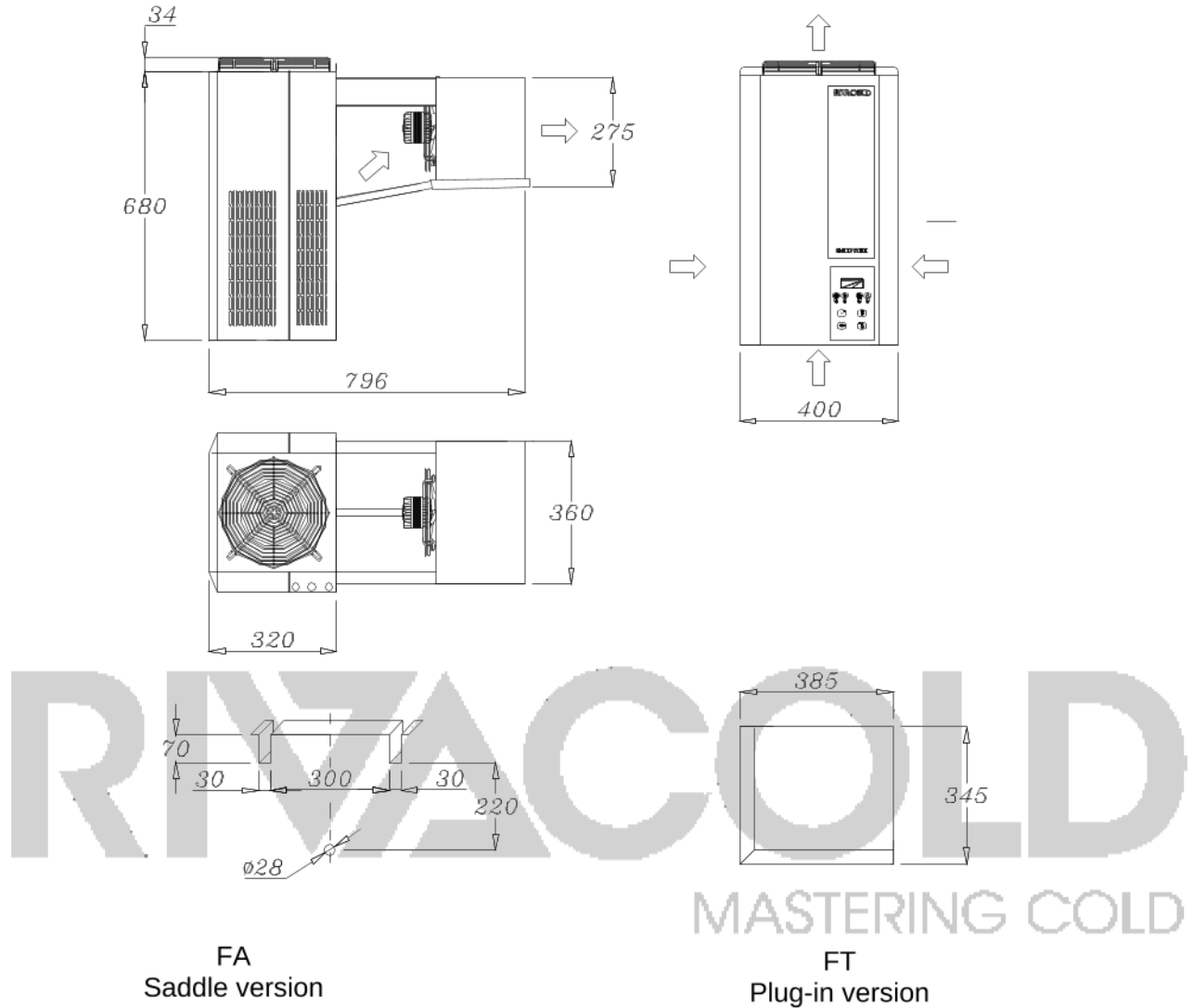
POSSIBLE CAUSES		SOLUTIONS	
2	Expansion valve locked in open position.	2	Clean the valve of foreign substances and replace it, if necessary.
3	Evaporator fan does not work.	3	Identify the cause and eliminate it.
4	Gas load too high.	4	Reduce the load.

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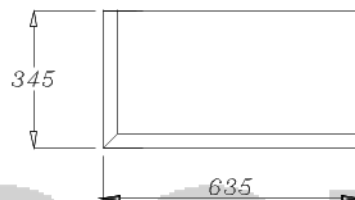
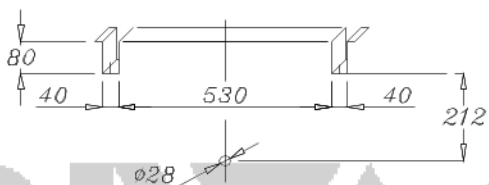
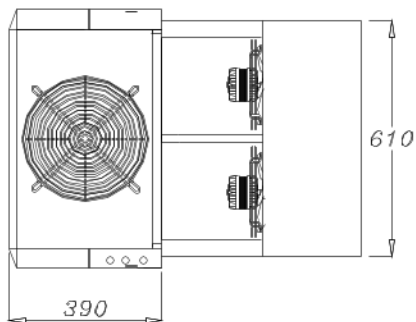
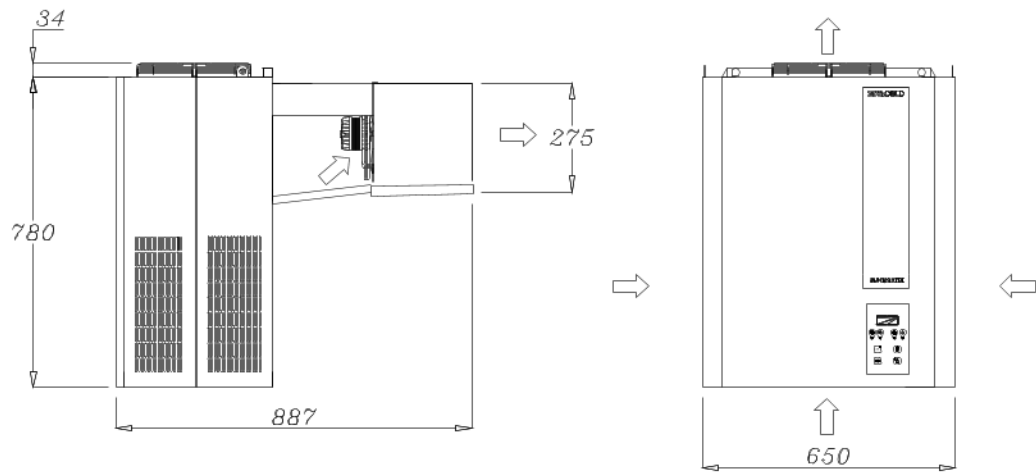
## 7. Allegati Attachments

### Schede Tecniche modelli blocksystem FA FT 290 Technical models Blocksystems FA FT 290

Figura 5 – Limiti dimensionali della macchina e foro da praticare sul soffitto della cella/ Machine dimensions and hole to do on the ceiling of coolroom



MBP		HBP		Fastening Screws
Mod.	Net. Weight [Kg]	Mod.	Net. Weight [Kg]	
FAM006P001	53,0	FAL006P001	65,0	Self-tap. 4.8x32
FTM006P001	54,5	FTL006P001	66,5	
FAM009P001	56,0	FAL009P001	65,0	
FTM009P001	57,5	FTL009P001	66,5	



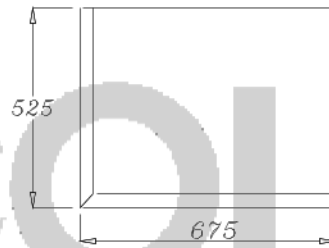
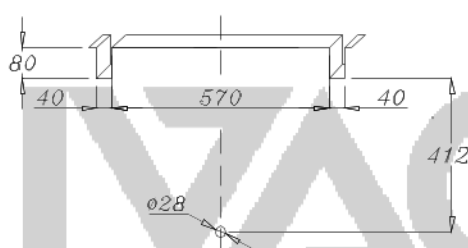
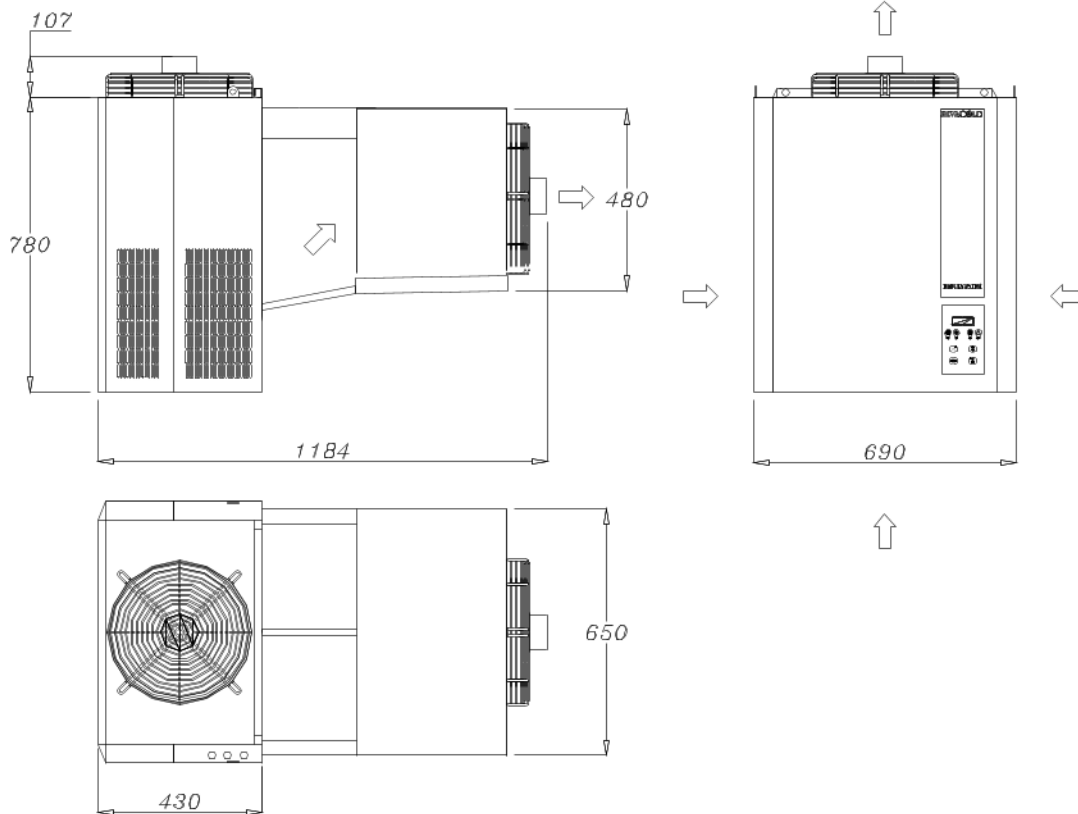
RIVACOLD

FA  
Saddle version

FT  
Plug-in version

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MBP		LBP		Fastening screws
Mod.	Net. Weight [Kg]	Mod.	Net. Weight [Kg]	
FAM016P001	82,0	FAL012P001	80,0	Self-tap. 4.8x32
FTM016P001	84,3	FTL012P001	82,3	
FAM028P002	83,0	FAL016P002	92,0	
FTM028P002	85,3	FTL016P002	94,3	



RIVACOLD  
MASTERING COLD

FA  
Saddle version

FT  
Plug-in version

MBP		LBP		Fastening screws
Mod.	Net. Weight [Kg]	Mod.	Net. Weight [Kg]	
FAM034P002	98,0	FAL020P002	106,0	Self-tap. 4.8x32
FTM034P002	101,5	FTL020P002	109,5	
FAM040P002	109,0			
FTM040P002	112,5			

# Schema frigorifero Refrigerator diagram

Figura 6 – Circuito mono-compressore raffreddamento ad aria / Mono-compressor circuit air cooling

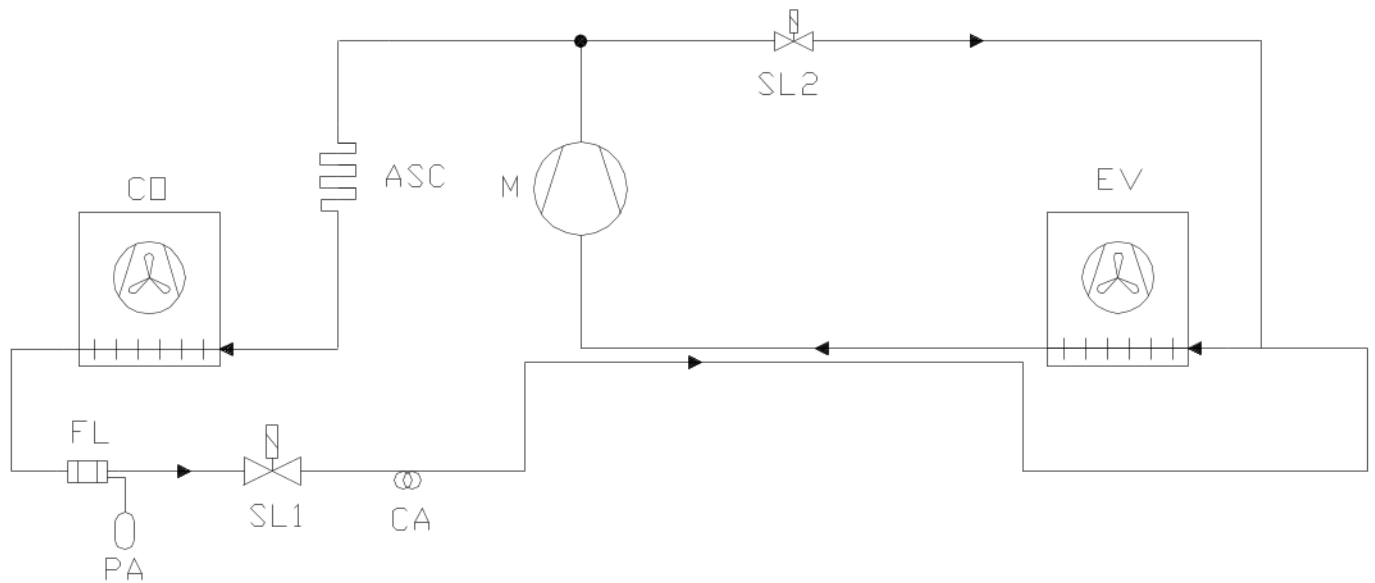


Figura 7 – Circuito mono-compressore raffreddamento ad acqua / Mono-compressor circuit water cooling

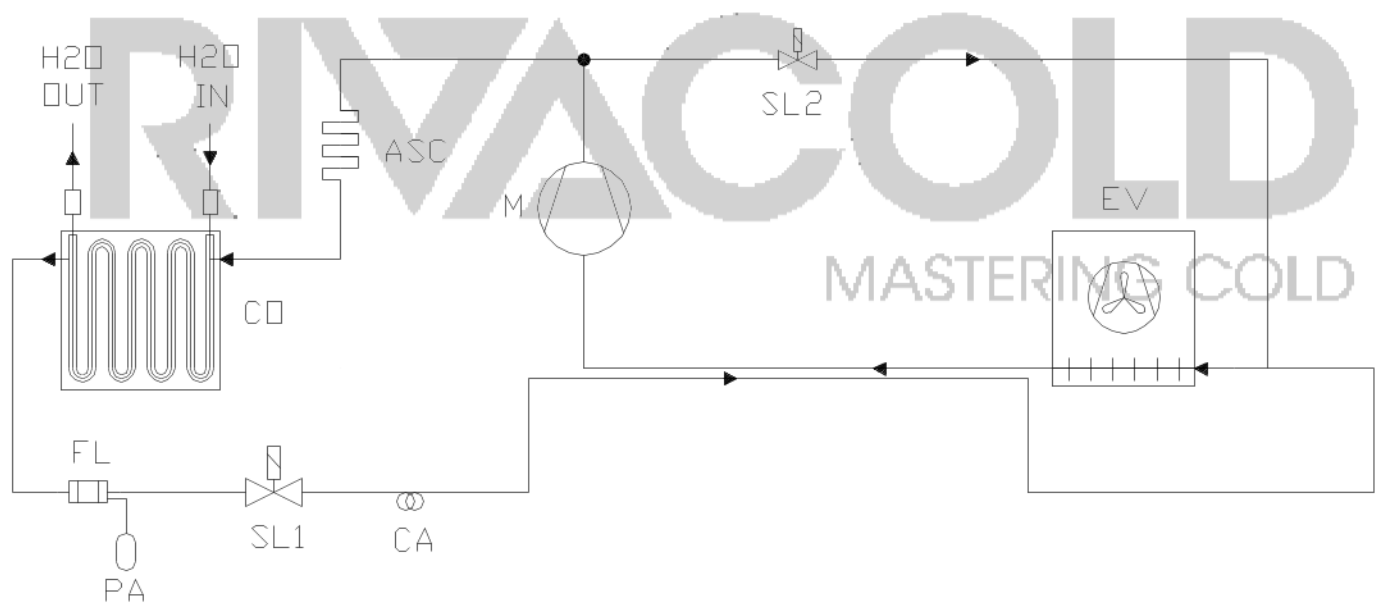
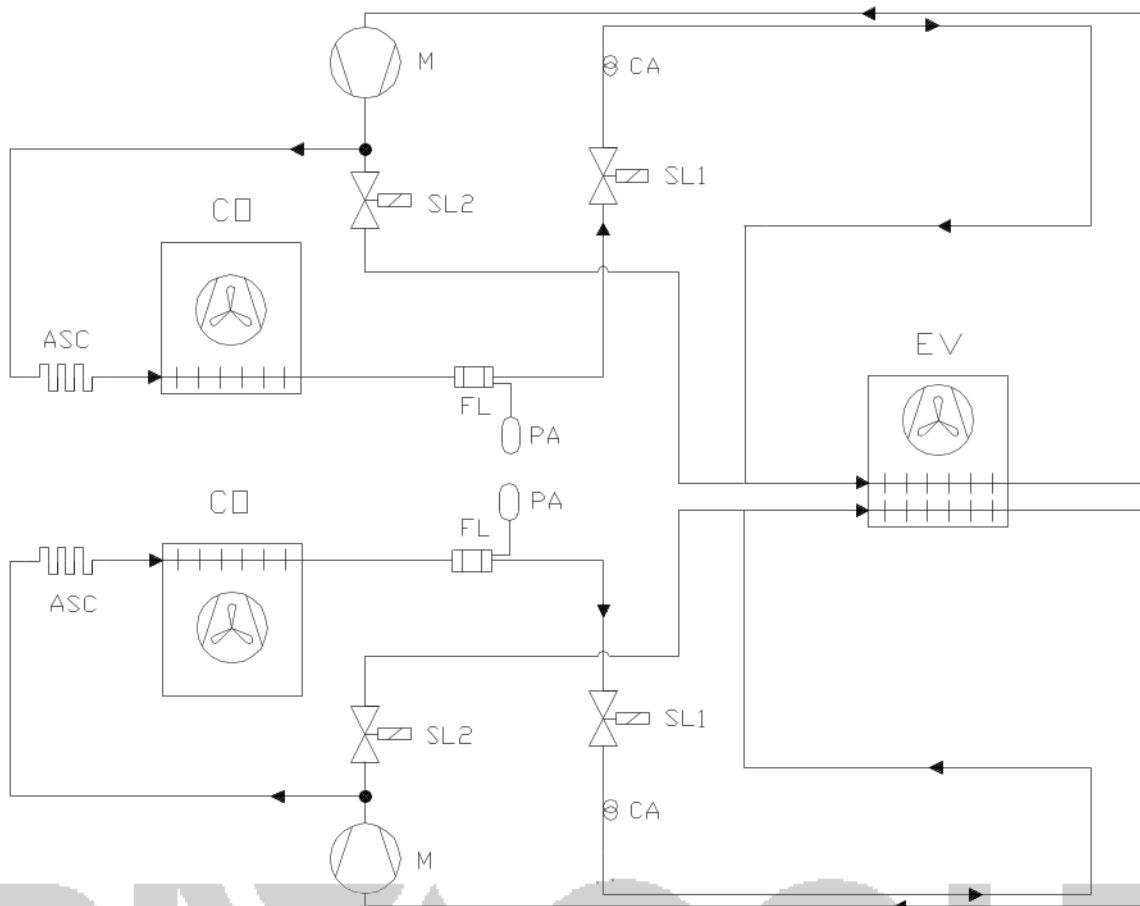


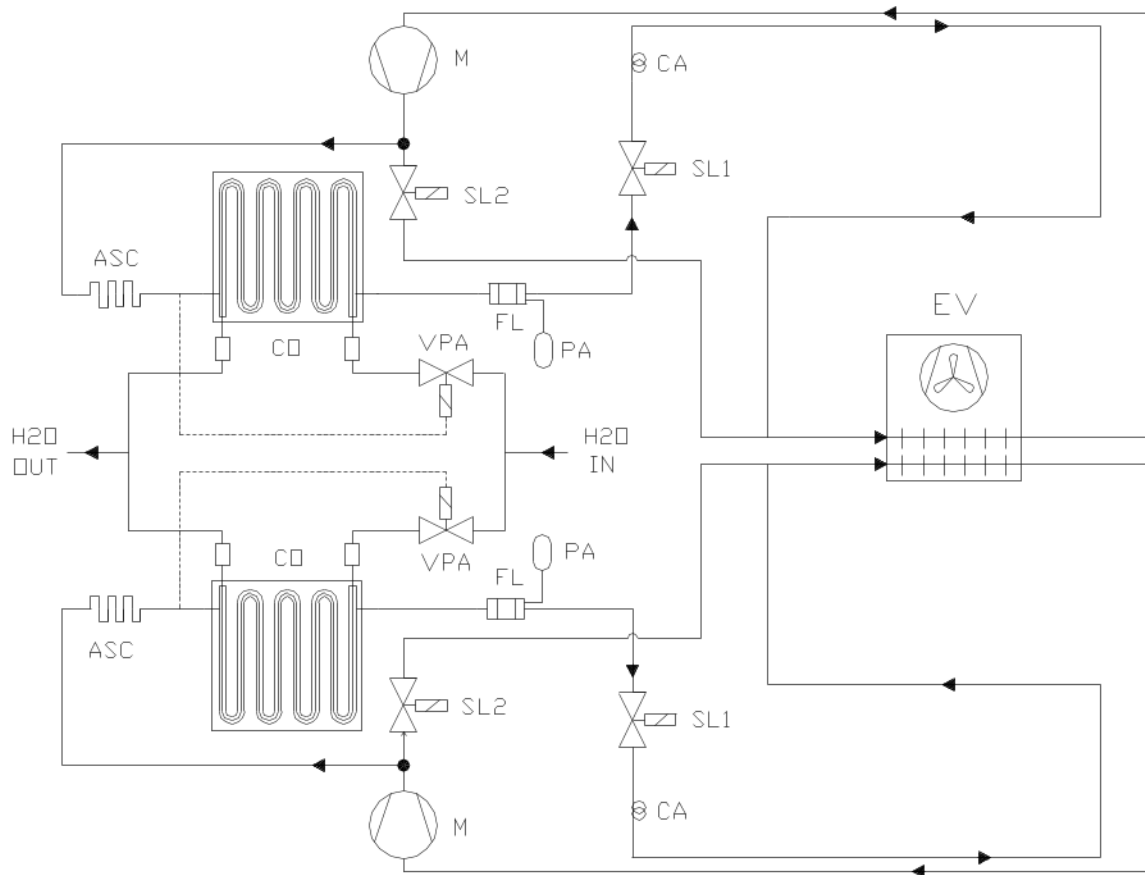


Figura 8 – Circuito bi-compressore raffreddamento ad aria / Dual compressor circuit air cooling



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Figura 9 – Circuito bi-compressore raffreddamento ad acqua / Dual compressor circuit water cooling



CO =	Condensatore / Condenser	SL2 =	Valvola Solenoide Gas Caldo / Hot gas solenoid valve
M =	Compressore / Compressor	EV =	Evaporatore / Evaporator
PA =	Pressostato di alta / High pressure switch	CA =	Capillare / Capillary tube
FL =	Filtro deidratatore / Drier filter	ASC =	Tubazione per evaporazione acqua di condensa Condensate water evaporating pipe
SL1 =	Valvola Solenoide del liquido / Liquid solenoid valve	VPA =	Valvola controllo pressione acqua Check valve pressure water

	SL1	SL2	VPA
MBP – ARIA AIR	–	•	–
MBP – ACQUA WATER	–	•	•
LBP – ARIA AIR	•	•	–
LBP – ACQUA WATER	•	•	•

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**RIVACOLD S.r.l. - Costruzione Gruppi Frigoriferi e Accessori**

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n° REV.	DATA	TIPO di MODIFICA	FIRMA	APPROV.
00	15/12/2014	EMISSIONE	ROSSI	FOSCHI
01	08/07/2015	MODIFY MDF	FOSCHI	FOSCHI
02	09/02/2016	MODIFY rrd	ROSSI	FOSCHI

PARAMETERS PROGRAMMATION		LEVEL	RANGE	U.M.	DEFAULT	BT	TN	AT						
<b>SET UP</b>														
Set	SETPOINT		LS-US	°C/°F	2	-18	2	5						
Hy	DIFFERENTIAL	Pr1	0,1_25,5°C;1_45°F	°C/°F	2	2	2	2						
LS	MINIMUM SET POINT	Pr2	-55°C_SET;-67°F_SET	°C/°F	-5	-25	-5	2						
US	MAXIMUM SET POINT	Pr2	SET_150°C;SET_302°F	°C/°F	8	-15	5	10						
odS	OUTPUTS ACTIVATION DELAY AT START UP	Pr1	0_255	MIN	3	3	3	3						
AC	ANTI-SHORT CYCLE DELAY	Pr1	0_60	MIN	3	3	3	3						
CCI	CONTINUOUS CYCLE DURATION	Pr2	0_24	HOUR	0	0	0	0						
CCS	CONTINUOUS CYCLE SET POINT	Pr2	-55_155°C;-67_302°F	°C/°F	2	2	2	2						
Con	COMPRESSOR ON TIME WITH FAULTY PROBE	Pr2	0_255	MIN	15	15	15	15						
CoF	COMPRESSOR OFF TIME WITH FAULTY PROBE	Pr2	0_255	MIN	15	15	15	15						
CF	MEASUREMENT UNIT:CELSIUS. FAHRENHEIT	Pr2	°C(0);°F(1)	FLAG	°C	°C	°C	°C						
rES	RESOLUTION (ONLY C): DECIMAL, INTEGER	Pr2	dE(0);in(1)	FLAG	dE	dE	dE	dE						
Lod	LOCAL DISPLAY: DEFAULT DISPLAY	Pr2	flag	FLAG	P1	P1	P1	P1						
rEd	REMOTE DISPLAY: DEFAULT DISPLAY	Pr2	flag	FLAG	P1	P1	P1	P1						
dLy	DISPLAY DELAY	Pr1	0_24;	MIN	0	0	0	0						
rPA	REGULATION PROBE A	Pr1	flag	FLAG	P1	P1	P1	P1						
rPb	REGULATION PROBE B	Pr1	flag	FLAG	nP	nP	nP	nP						
rPE	VIRTUAL PROBE PERCENTAGE (room temperature) (0=rPb, 100=rPA)	Pr1	0_100(100=rPA;0=rPB)	FLAG	100	100	100	100						
<b>DEFROST</b>														
dPA	DEFROST PROBE A	Pr1	flag	FLAG	P2	P2	P2	P2						
dPb	DEFROST PROBE B	Pr1	flag	FLAG	nP	nP	nP	nP						
dPE	VIRTUAL PROBE PERCENTAGE (defrost temperature) (0=rPb, 100=rPA)	Pr1	0_100(100=dPA;0=dPB)	FLAG	100	100	100	100						
tdF	DEFROST TYPE	Pr1	EL(0);in(0)	FLAG	in	in	in	EL						
EdF	DEFROST MODE:CLOCK OR INTERVAL	Pr1	rtc(0);in(1)	FLAG	in	in	in	in						
Srt	HEATER SET POINT DURING DEFROST	Pr1	-55°C_150°C;-67_302°F	°C/°F	150	150	150	150						
Hyr	DIFFERENTIAL FOR HEATER	Pr1	0,1_50°C;1_45°F	°C/°F	2	2	2	2						
tod	TIME OUT FOR HEATER	Pr1	0_255	MIN	255	255	255	255						
dtP	MINIMUM TEMPERATURE DIFFERENCE TO START DEFROST	Pr1	0,1_50°C;1_45°F	°C/°F	0,1	0,1	0,1	0,1						
ddP	DELAY BEFOR STARTING DEFROST	Pr1	0_60	MIN	60	60	60	60						
d2P	DEFROST WITH TWO PROBES	Pr1	n(0);Y(1)	FLAG	n	n	n	n						
dtE	DEFROST TERMINATION TEMPERATURE (PROBE A)	Pr1	-55_50°C;-67_122°F	°C/°F	10	5	5	5						
dtS	DEFROST TERMINATION TEMPERATURE (PROBE B)	Pr1	-55_50°C;-67_122°F	°C/°F	8	8	8	8						
ldF	INTERVAL BETWEEN DEFROSTS	Pr1	0_120	HOUR	4	6	6	6						
MdF	DEFROST MAXIMUM DURATION	Pr1	0_255	MIN	15	15	15	15						
dSd	START DEFROST DELAY	Pr1	0_255	MIN	0	0	0	0						
dFd	DISPLAY DURING DEFROST	Pr1	rt(0);it(1);Set(2);dEF(3)	FLAG	dEF	dEF	dEF	dEF						
dAd	DEFROST DISPLAY TIME OUT	Pr1	0_255	MIN	0	0	0	0						
Fdt	DRAIN DOWN TIME	Pr1	0_255	MIN	2	2	2	2						
dPO	DEFROST AT START UP	Pr1	n(0);Y(1)	FLAG	n	n	n	n						
dAF	DEFROST DELAY AFTER CONTINUOUS CYCLE	Pr1	0_24	HOUR	0	0	0	0						
<b>FANS</b>														
FPA	FAN PROBE A	Pr1	flag	FLAG	P2	P2	P2	P2						
FPb	FAN PROBE B	Pr1	flag	FLAG	nP	nP	nP	nP						
FPE	VIRTUAL PROBE PERCENTAGE	Pr1	0_100(100=FPA;0=FPb)	FLAG	100	100	100	100						
FnC	FAN OPERATING MODE	Pr1	flag	FLAG	C-n	O-n	O-n	O-y						
Fnd	FAN DELAY AFTER DEFROST	Pr1	0_255	MIN	3	4	3	3						
FCi	TEMPERATURE DIFFERENTIAL TO AVOID SHORT CYCLES OF FANS	Pr1	0_50°C;0_90°F	°C/°F	0	0	0	0						
FSt	FAN STOP TEMPERATURE	Pr1	-55_50°C;-67_122°F	°C/°F	12	-5	8	50						
FHy	ISTERISI FERMO VENTOLE	Pr1	0,1_25,5°C;1_45°F	°C/°F	2	2	2	2						
Fod	FAN ACTIVATION TIME AFTER DEFROST	Pr1	0_255	MIN	0	0	0	0						
Fon	FAN ON TIME	Pr1	0_15	MIN	0	0	0	0						
FoF	FAN OFF TIME	Pr1	0_15	MIN	0	0	0	0						
<b>ALARM</b>														
rAL	PROBE FOR TEMPERATURE ALARM	Pr1	flag	FLAG	P1	P1	P1	P1						
ALC	TEMPERATURE ALARM CONFIGURATION	Pr1	rE(0);Ab(1)	FLAG	rE	rE	rE	rE						
ALU	HIGH TEMPERATURE ALARM SETTING	Pr1	NUM	°C/°F	10	10	10	10						
ALL	LOW TEMPERATURE ALARM SETTING	Pr1	NUM	°C/°F	10	10	10	10						
Ahy	DIFFERENTIAL FOR TEMPERATURE ALARM	Pr1	0,1_25,5°C;1_45°F	°C/°F	2	2	2	2						
Ald	TEMPERATURE ALARM DELAY	Pr1	0_255	MIN	0	0	0	0						
dLU	HIGH TEMPERATURE ALARM SETTING (DEFROST PROBE)	Pr2	NUM	°C/°F	150	150	150	150						
dLL	LOW TEMPERATURE ALARM SETTING (DEFROST PROBE)	Pr2	NUM	°C/°F	-55	-55	-55	-55						



# CONTROLLERS

## XM670K - CUSTOMIZED

### CONTENTS

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### 1. GENERAL WARNING

#### 1.1 PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

#### 1.2 SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "Dixell S.p.A." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

### 2. GENERAL DESCRIPTION

The **XM670K** are high level microprocessor based controllers for multiplexed cabinets suitable for applications on medium or low temperature. It can be inserted in a LAN of up to 8 different sections which can operate, depending on the programming, as stand alone controllers or following the commands coming from the other sections. The **XM670K** are provided with 6 relay outputs to control the solenoid valve, defrost - which can be either electrical or hot gas - the evaporator fans, the lights, an auxiliary output and an alarm output. The devices are also provided with two probe inputs, one for temperature control, one to control the defrost. Finally, the **XM670K** are equipped with the three digital inputs (free contact) fully configurable by parameters.

The instruments are equipped with the HOTKEY connector that permits to be programmed in a simple way. Direct serial output **RS485 ModBUS-RTU** compatible permits a simple XWEB interfacing.

### 3. USER INTERFACE



#### SET

To display and modify target set point; in programming mode it selects a parameter or confirm an operation.

By holding it pressed for 3s when max or min temperature is displayed it will be erased.

In programming mode it browses the parameter codes or increases the displayed value.

By holding it pressed for 3s the give access to the "Section" menu.

By pressing and releasing this key you get the access to fast access menu

in programming mode it browses the parameter codes or decreases the displayed value.

By pressing and releasing this key you can activate or deactivate the auxiliary output



By holding it pressed for 3s the defrost is started.

Switch ON and OFF the room light.

By pressing for about 3s switch ON and OFF the instrument.

Measurement unit

Measurement unit

Measurement unit

Measurement unit

#### KEY COMBINATIONS

- To lock and unlock the keyboard.
- SET** + To enter the programming mode.
- SET** + To exit the programming mode.

#### 3.1 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
	ON	Compressor and valve regulation enabled, to see valve opening percentage you should see the <b>fast access menu</b>
	Flashing	Anti-short cycle delay enabled
	ON	Defrost enabled
	Flashing	Drip time in progress
	ON	An alarm is occurring
	ON	Energy saving enabled
	ON	The fan is running
	Flashing	Door opened or delay to restart fan after defrost
AUX	ON	The auxiliary relay is ON
°C° F/Bar/PSI	ON	Measurement unit
°C° F/Bar/PSI	Flashing	Programming phase
	ON	The controller is working in "ALL" mode
	Flashing	The controller is working in remote virtual display mode
	Flashing	During the CLOCK modification (if clock is present)

#### 3.2 HOW TO ENTER INTO FAST ACCESS MENU

1. Press and release the **o** key.
2. First Label will be displayed. By pressing the **o** or **n** keys it's possible to navigate the menu

#### 3.3 HOW TO SEE THE MAX AND MIN TEMPERATURE RECORDED

1. Press and release the **o** key.
2. First Label will be displayed. By pressing the **o** or **n** keys it's possible to navigate the menu. Search the **L** label and press **SET** to see minimum temperature; search the **H** label and press **SET** to see maximum temperature;

#### 3.4 HOW TO SEE AND MODIFY THE SET POINT

1. Push for about 3 seconds the **SET** key: the display will show the Set point value;
2. The measurement unit starts blinking;
3. To change the Set value push the **o** or **n** arrows within 10s.
4. To store the new set point value push the **SET** key again or wait 10s.

#### 3.5 HOW TO START A MANUAL DEFOST

- Push the **DEF** key for more than 3 seconds and a manual defrost will start.

#### 3.6 TO ENTER IN PARAMETERS LIST "PR1"

To enter the parameter list "Pr1" (user accessible parameters) operate as follows:

1. Enter the Programming mode by pressing the **SET** and **DOWN** key for few seconds (measurement unit starts blinking).
2. The instrument will show the first parameter present in "Pr1"

#### 3.7 TO ENTER IN PARAMETERS LIST "PR2"

To access parameters in "Pr2":

1. Enter the "Pr1" level.
  2. Select "Pr2" parameter and press the **SET** key.
  3. The **"PAS"** flashing message is displayed, shortly followed by "0 -" with a flashing zero.
  4. Use **o** or **n** to input the security code in the flashing digit; confirm the figure by pressing **SET**. The security code is "321".
  5. If the security code is correct the access to "Pr2" is enabled by pressing **SET** on the last digit. Another possibility is the following: after switching ON the instrument the user can push **Set** and **DOWN** keys within 30 seconds.
- NOTE:** each parameter in "Pr2" can be removed or put into "Pr1" (user level) by pressing **"SET" + n**. When a parameter is present in "Pr1" LED is on.

#### 3.8 HOW TO CHANGE THE PARAMETER VALUE

1. Enter the Programming mode.
2. Select the required parameter with **o** or **n**.

3. Press the "SET" key to display its value (measurement unit starts blinking).
  4. Use **o** or **n** to change its value.
  5. Press "SET" to store the new value and move to the following parameter.
- To exit:** Press **SET + UP** or wait 15s without pressing a key.  
**NOTE:** the new programming is stored even when the procedure is exited by waiting the time-out.

### 3.9 ON/OFF FUNCTION



By pushing the **ON/OFF** key, the instrument shows "OFF". During the OFF status, all the relays are switched OFF and the regulations are stopped; if a monitoring system is connected, it does not record the instrument data and alarms.

**N.B.** During the OFF status the Light and AUX buttons are active.

### 4. FAST ACCESS MENU (NOT PRESENT)

### 5. THE SECTION MENU

This menu allows to access to a particular feature of the XM series related to the LAN (Local Area Network) of controllers. With a single keyboard it is possible to control either the module of the local section of the LAN or all the instruments connected to the LAN. This depends on the programmed value of this menu as follows:

**LOC:** the keyboard controls the parameters, the status and the alarms of the local section of the LAN;  
**ALL:** every command given by the keyboard is effective on all sections of the LAN.



Push the **UP** key for more than 3 seconds.  
 The label corresponding to the section controlled by the keyboard will be displayed.  
 With **UP** or **DOWN** key select the section you want to control.  
 Press **SET** key to confirm and exit.

### 6. REAL TIME CLOCK FUNCTIONS (NOT PRESENT)

### 7. ELECTRONIC EXPANSION VALVE MENU (NOT PRESENT)

### 8. CONTROLLING LOADS (NOT PRESENT)

### 9. PARAMETER LIST

#### REGULATION

<b>rC</b>	<b>Access to CLOCK submenu (if present);</b>
<b>EEU</b>	<b>Access to EEV submenu (only XM679K);</b>
<b>Hy</b>	<b>Differential:</b> (0,1+25,5°C; 1+45°F): Intervention differential for set point, always positive. Solenoid valve Cut IN is Set Point Plus Differential (Hy). Solenoid valve Cut OUT is when the temperature reaches the set point.
<b>Int</b>	<b>Integral time for room temperature regulation (Only XM679K):</b> (0 ÷ 255 s) integral time for room temperature PI regulator. 0= no integral action;
<b>CrE</b>	<b>Continuous regulation activation (Only XM679K):</b> (n+Y) n= standard regulation; Y= continuous regulation. Use it only in centralized plants;
<b>LS</b>	<b>Minimum set point limit:</b> (-55,0°C÷SET; -67°F÷SET) Sets the minimum acceptable value for the set point.
<b>US</b>	<b>Maximum set point limit:</b> (SET+150°C; SET+302°F) Set the maximum acceptable value for set point.
<b>OdS</b>	<b>Outputs activation delay at start up:</b> (0+255 min) This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter. (AUX and Light can work)
<b>AC</b>	<b>Anti-short cycle delay:</b> (0+60 min) interval between the solenoid valve stop and the following restart.
<b>CCt</b>	<b>Compressor ON time during continuous cycle:</b> (0,0+24,0h; resolution 10min) Allows to set the length of the continuous cycle: compressor stays on without interruption for the CCt time. Can be used, for instance, when the room is filled with new products.
<b>CCS</b>	<b>Set point for continuous cycle:</b> (-55+150°C / -67+302°F) it sets the set point used during the continuous cycle.
<b>Con</b>	<b>solenoid valve ON time with faulty probe:</b> (0+255 min) time during which the solenoid valve is active in case of faulty thermostat probe. With CO=0 solenoid valve is always OFF.
<b>CoF</b>	<b>solenoid valve OFF time with faulty probe:</b> (0+255 min) time during which the solenoid valve is off in case of faulty thermostat probe. With COF=0 solenoid valve is always active.

#### DISPLAY

<b>CF</b>	<b>Temperature measurement unit:</b> °C=Celsius; °F=Fahrenheit. !!! <b>WARNING !!!</b> When the measurement unit is changed the parameters with temperature values <b>have to be checked</b> .
<b>PrU</b>	<b>Pressure mode:</b> (rEL or AbS) it defines the mode to use the pressure. !!! <b>WARNING !!!</b> the setting of PrU is used for all the pressure parameters. If PrU=rEL all pressure parameters are in relative pressure unit, if PrU=AbS all pressure parameters are in absolute pressure unit. (Only XM679K)
<b>PMU</b>	<b>Pressure measurement unit:</b> (bAr - PSI - MPA) it selects the pressure measurement units. MPA= the value of pressure measured by kPA*10. (Only XM679K)
<b>PmD</b>	<b>Way of displaying pressure :</b> (tEM - PrE) it permits showing the value measured by pressure probe with tEM= temperature or by PrE= pressure; (Only XM679K)
<b>rES</b>	<b>Resolution (for °C):</b> (in = 1°C; dE = 0.1 °C) allows decimal point display;
<b>Lod</b>	<b>Instrument display:</b> (nP; P1; P2, P3, P4, P5, P6, tEr, dEF) it selects which probe is displayed by the instrument. P1, P2, P3, P4, P5, P6, tEr= virtual probe for thermostat, dEF= virtual probe for defrost.
<b>red</b>	<b>Remote display:</b> (nP; P1; P2, P3, P4, P5, P6, tEr, dEF) it selects which probe is displayed by the X-REP. P1, P2, P3, P4, P5, P6, tEr= virtual probe for thermostat, dEF= virtual probe for defrost.
<b>dLy</b>	<b>Display delay:</b> (0 +24,0 m; resolution 10s) when the temperature increases, the display is updated of 1 °C/1°F after this time.
<b>rPA</b>	<b>Regulation probe A:</b> (nP; P1; P2, P3, P4, P5) first probe used to regulate room temperature. If rPA=nP the regulation is performed with real value of rPb.
<b>rPb</b>	<b>Regulation probe B:</b> (nP; P1; P2, P3, P4, P5) second probe used to regulate room temperature. If rPb=nP the regulation is performed with real value of rPA

**rPE Regulation virtual probe percentage:** (0 ÷ 100%) it defines the percentage of the rPA respect to rPb. The value used to regulate room temperature is obtained by:  

$$\text{value\_for\_room} = (\text{rPA} \cdot \text{rPE} + \text{rPb} \cdot (100 - \text{rPE})) / 100$$

#### ELECTRONIC EXPANSION VALVE SUBMENU (Only XM679K)

<b>FtY</b>	<b>Kind of gas</b> (R22, 134, 404, 407, 410, 507, CO2): Type of gas used by plant. <b>Fundamental parameter for correct functioning of all system.</b>
<b>SSH</b>	<b>Superheat set point:</b> (0,1°C ÷ 25,5°C) [1°F ÷ 45°F] it's the value used to regulate superheat
<b>CyP</b>	<b>Cycle Period:</b> (1 ÷ 15s) it permits to set cycle time;
<b>Pb</b>	<b>Proportional band:</b> (0,1 ÷ 60,0 / 1+108°F) PI proportional band;
<b>rS</b>	<b>Band Offset:</b> (-12,0 ÷ 12,0°C / -21+21°F) PI band offset;
<b>inC</b>	<b>Integration time:</b> (0 ÷ 255s) PI integration time;
<b>PEO</b>	<b>Probe Error opening percentage:</b> (0+100%) if a temporary probe error occurs, valve opening percentage is PEO until PEd time is elapsed;
<b>PEd</b>	<b>Probe Error delay before stopping regulation:</b> (0÷239 sec. - On=unlimited) if probe error duration is bigger than PEd then valve totally closes. Pf message is showed. If PEd=On valve opening is PEO until probe error finishes;
<b>OPE</b>	<b>Start opening Percentage:</b> (0+100%) Opening valve percentage when start function is active. This phase duration is Sfd time;
<b>SFd</b>	<b>Start Function duration:</b> (0,0 ÷ 42,0 min: resolution 10s) It sets start function duration and post-defrost duration. <b>During this phase the alarms are neglected;</b>
<b>OPd</b>	<b>Opening Percentage after defrost phase:</b> (0+100%) Opening valve percentage when after defrost function is active. This phase duration is Pdd time;
<b>Pdd</b>	<b>Post Defrost Function duration:</b> (0,0 ÷ 42,0 min: resolution 10s) It sets start function duration and post-defrost duration. <b>During this phase the alarms are neglected;</b>
<b>MnF</b>	<b>Maximum opening percentage at normal Functioning:</b> (0+100%) during regulation it sets the maximum valve opening percentage;
<b>dCL</b>	<b>Delay before stopping valve regulation:</b> (0 ÷ 255s) When the cooling request goes off, the electronic valve regulation can go on for the dCL time in order to prevent uncontrolled superheat variation;
<b>Fot</b>	<b>Forced opening percentage:</b> (0+100% - nu) it permits to force the valve opening to the specified value. This value overwrite the value calculated by PID algorithm. !!! <b>WARNING !!!</b> to obtain the correct superheat regulation you have to set Fot=nu;
<b>tPP</b>	<b>Type of Pressure Transducer:</b> (PP - Lan) it sets type of pressure transducer to use: PP= 4+20mA pressure transducer or ratiometric transducer 0+5V depending on P5C parameter, Lan= the pressure signal arrives from another XM600K; Referred to Pb5
<b>PA4</b>	<b>Probe value At 4mA or At 0V:</b> (-1,0 ÷ P20 bar / -14 ÷ PSI / -10 ÷ P20 kPA*10) pressure value measured by probe at 4mA or at 0V (related to PrM parameter) Referred to Pb5
<b>P20</b>	<b>Probe value 20mA or At 5V:</b> (PA4 ÷ 50,0 bar / 725 psi / 500 kPA*10) pressure value measured by probe at 20mA or at 5V (related to PrM parameter) Referred to Pb5
<b>LPL</b>	<b>Lower Pressure Limit for superheat regulation:</b> (PA4 ÷ P20 bar / psi / kPA*10) when suction pressure comes down to LPL the regulation is performed with a LPL fixed value for pressure, when pressure comes back to LPL the normal pressure value is used. (related to PrM parameter)
<b>MOP</b>	<b>Maximum Operating Pressure threshold:</b> (PA4 ÷ P20 bar / psi / kPA*10) if suction pressure exceeds maximum operating pressure value, instrument signals situation with MOP alarm. (related to PrM parameter)
<b>LOP</b>	<b>Lowest Operating Pressure threshold:</b> (PA4 ÷ P20 bar / psi / kPA*10) if the suction pressure comes down to this value a low pressure alarm is signalled with LOP alarm. (related to PrM parameter)
<b>dML</b>	<b>delta MOP-LOP:</b> (0 ÷ 100%) when a MOP alarm occurs valve will close of the dML percentage every cycle period until MOP alarm is active. When LOP occurs valve will open of the dML percentage every cycle period until LOP alarm is active.
<b>MSH</b>	<b>Maximum Superheat alarm:</b> (LSH + 80,0°C / LSH + 144°F) when superheat exceeds this value an high superheat alarm is signalled after interval SHd
<b>LSH</b>	<b>Lowest Superheat alarm:</b> (0,0 ÷ MSH °C / 0÷MSH °F) when superheat goes down to this value a low superheat alarm is signalled after interval SHd
<b>SHy</b>	<b>Superheat alarm Hysteresis:</b> (0,1+25,5°C/1+45°F) hysteresis for superheat alarm deactivation
<b>SHd</b>	<b>Superheat alarm activation delay:</b> (0,0 ÷ 42,0 min: resolution 10s) when a superheat alarm occurs, the time SHd have to pass before signalling alarm;
<b>FrC</b>	<b>Fast-recovery Constant:</b> (0+100 s) permits to increase integral time when SH is below the set-point. If FrC=0 fast recovery function is disabled.

#### DEFROST

<b>dPA</b>	<b>defrost Probe A:</b> (nP; P1; P2, P3, P4, P5) first probe used for defrost. If rPA=nP the regulation is performed with real value of dPb.
<b>dPb</b>	<b>defrost Probe B:</b> (nP; P1; P2, P3, P4, P5) second probe used for defrost. If rPB=nP the regulation is performed with real value of dPA.
<b>dPE</b>	<b>defrost virtual probe percentage:</b> (0+100%) it defines the percentage of the dPA respect to dPb. The value used to regulate room temperature is obtained by: $\text{value\_for\_defrost} = (\text{dPA} \cdot \text{dPE} + \text{dPb} \cdot (100 - \text{dPE})) / 100$
<b>tdF</b>	<b>Defrost type:</b> (EL - in) EL = electrical heater; in = hot gas;
<b>EdF</b>	<b>Defrost mode:</b> (rtc - in) (only if RTC is present) rtc= defrost activation via RTC; in= defrost activation with idf.
<b>Srt</b>	<b>Heater set point during defrost:</b> (-55,0 ÷ 150,0°C; -67 ÷ 302°F) if tdF=EL during the defrost relay perform an ON/OFF regulation with Srt as set point.
<b>Hyr</b>	<b>Differential for heater:</b> (0,1°C ÷ 25,5°C, 1°F ÷ 45°F) the differential for heater;
<b>tod</b>	<b>Time out for heater:</b> 0 ÷ 255 (min), if the defrost probe temperature is bigger than Srt for all tod time the defrost ends although the defrost probe temperature is lower than dIE or dIS. It permits to reduce defrost duration;
<b>dtP</b>	<b>Minimum temperature difference to start defrost:</b> [0,1°C ÷ 50,0°C] [1°F ÷ 90°F] if the difference between the two defrost probes stays lower than dtP for all ddP time the defrost is activated;
<b>ddP</b>	<b>Delay before starting defrost (related to dtP):</b> (0 ÷ 60 min) delay related to dtP.
<b>d2P</b>	<b>Defrost with two probes:</b> (n - Y) n= only the dPA probe is used to defrost management; Y= defrost is managed with dPA probe and dPb probe. Defrost can performed only if both probe value are lower than dIE for dPA probe and dIS for dPb probe;
<b>dtE</b>	<b>Defrost termination temperature (Probe A):</b> (-55,0+50,0°C; -67+122°F) (Enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe dPA which causes the end of defrost;



<b>dtS</b>	<b>Defrost termination temperature (Probe B):</b> (-55,0+50,0°C; -67+122°F) (Enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe <b>dPb</b> which causes the end of defrost;
<b>ldF</b>	<b>Interval between defrosts:</b> (0+120h) Determines the time interval between the beginning of two defrost cycles;
<b>MdF</b>	<b>Maximum duration of defrost:</b> (0+255 min) When <b>dPA</b> and <b>dPb</b> aren't present, it sets the defrost duration, otherwise it sets the maximum duration for defrost;
<b>dSd</b>	<b>Start defrost delay:</b> (0 + 255 min) This is useful when different defrost start times are necessary to avoid overloading the plant.
<b>dFd</b>	<b>Display during defrost:</b> <b>rt</b> = real temperature; <b>it</b> = temperature reading at the defrost start; <b>Set</b> = set point; <b>dEF</b> = "dEF" label;
<b>dAd</b>	<b>Defrost display time out:</b> (0+255 min) Sets the maximum time between the end of defrost and the restarting of the real room temperature display.
<b>Fdt</b>	<b>Drain down time:</b> (0+255 min.) time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.
<b>dPo</b>	<b>First defrost after start-up:</b> <b>y</b> = Immediately; <b>n</b> = after the ldF time
<b>dAF</b>	<b>Defrost delay after continuous cycle:</b> (0+23.5h) time interval between the end of the fast freezing cycle and the following defrost related to it.

**FAN**

<b>FPA</b>	<b>Fan probe A:</b> (nP; P1; P2, P3, P4, P5) first probe used for fan. If FPA=nP the regulation is performed with real value of FPB;
<b>FPB</b>	<b>Fan probe B:</b> (nP; P1; P2, P3, P4, P5) second probe used for defrost. If FPB=nP the regulation is performed with real value of FPB;
<b>FPE</b>	<b>Fan virtual probe percentage:</b> (0+100%) it defines the percentage of the FPA respect to FPB. The value used to regulate room temperature is obtained by: $\text{value\_for\_defrost} = (\text{FPA} \cdot \text{FPE} + \text{FPB} \cdot (100 - \text{FPE})) / 100$
<b>FnC</b>	<b>Fan operating mode:</b> <b>C-n</b> = running with the solenoid valve, OFF during the defrost; <b>C-y</b> = running with the solenoid valve, ON during the defrost; <b>O-n</b> = continuous mode, OFF during the defrost; <b>O-y</b> = continuous mode, ON during the defrost;
<b>Fnd</b>	<b>Fan delay after defrost:</b> (0+255 min) The time interval between the defrost end and evaporator fans start.
<b>Fct</b>	<b>Temperature differential avoiding short cycles of fans</b> (0.0°C + 50.0°C; 0°F + 90°F) If the difference of temperature between the evaporator and the room probes is more than the value of the Fct parameter, the fans are switched on;
<b>FSt</b>	<b>Fan stop temperature:</b> (-50+110°C; -58+230°F) setting of temperature, detected by evaporator probe, above which the fan is always OFF.
<b>FHy</b>	<b>Differential to restart fan:</b> (0.1°C + 25.5°C) (1°F + 45°F) when stopped, fan restarts when fan probe reaches FSt-FHy temperature;
<b>Fod</b>	<b>Fan activation time after defrost:</b> (0 + 255 min.) it forces fan activation for indicated time;
<b>Fon</b>	<b>Fan ON time:</b> (0+15 min) with <b>Fnc</b> = C_n or C_y, (fan activated in parallel with compressor). It sets the evaporator fan ON cycling time when the compressor is off. With <b>Fon</b> = 0 and <b>FoF</b> ≠ 0 the fan are always off, with <b>Fon</b> =0 and <b>FoF</b> = 0 the fan are always off.
<b>Fof</b>	<b>Fan OFF time:</b> (0+15 min) with <b>Fnc</b> = C_n or C_y, (fan activated in parallel with compressor). It sets the evaporator fan off cycling time when the compressor is off. With <b>Fon</b> = 0 and <b>FoF</b> ≠ 0 the fan are always off, with <b>Fon</b> =0 and <b>FoF</b> = 0 the fan are always off.

**MODULATING OUTPUT (AnOUT) if present**

<b>trA</b>	<b>Kind of regulation with PWM output:</b> (UAL – rEG – AC) it selects the functioning for the PWM output if CoM isn't equal to OA7. <b>UAL</b> = the output is at FSA value; <b>rEG</b> = the output is regulated with fan algorithm described in fan section; <b>AC</b> = anti-sweat heaters control (require the XWEB5000 system);
<b>SOA</b>	<b>Fixed value for analog output:</b> (0 + 100%) value for the output if <b>trA</b> =UAL;
<b>SdP</b>	<b>Default value for Dew point:</b> (-55,0+50,0°C; -67+122°F) default value of dew point used when there is no supervising system (XWEB5000). Used only when <b>trA</b> =AC;
<b>ASr</b>	<b>Dew-point offset (trA=AC) / Differential for modulating fan regulation (trA=rEG):</b> (-25.5°C + 25.5°C) (-45°F + 45°F);
<b>PbA</b>	<b>Differential for anti-sweat heaters:</b> (0.1°C + 25.5°C) (1°F + 45°F)
<b>Ami</b>	<b>Minimum value for analog output:</b> (0+AMA)
<b>AMA</b>	<b>Maximum value for analog output:</b> (Ami + 100)
<b>AMt</b>	<b>Anti-sweat heaters cycle period (trA=AC) / Time with fan at maximum speed (trA=rEG):</b> (0+255 s) when the fan starts, during this time the fan is at maximum speed;

**ALARMS**

<b>rAL</b>	<b>Probe for temperature alarm:</b> (nP - P1 - P2 - P3 - P4 - P5 – tEr) it selects the probe used to signal alarm temperature
<b>ALC</b>	<b>Temperature alarm configuration:</b> <b>rE</b> = High and Low alarms related to Set Point; <b>Ab</b> = High and low alarms related to the absolute temperature.
<b>ALU</b>	<b>High temperature alarm setting:</b> (ALC= rE, 0 + 50°C or 90°F / ALC= Ab, ALL ÷ 150°C or 302°F) when this temperature is reached and after the <b>ALd</b> delay time the <b>HA</b> alarm is enabled.
<b>ALL</b>	<b>Low temperature alarm setting:</b> (ALC= rE, 0 + 50°C or 90°F / ALC= Ab, - 55°C or - 67°F + ALU) when this temperature is reached and after the <b>ALd</b> delay time, the <b>LA</b> alarm is enabled.
<b>AHy</b>	<b>Differential for temperature alarm:</b> (0.1°C + 25.5°C / 1°F + 45°F) Intervention differential for recovery of temperature alarm;
<b>ALd</b>	<b>Temperature alarm delay:</b> (0+255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.
<b>dLU</b>	<b>High temperature alarm (defrost probe):</b> (ALC= rE, 0 + 50°C or 90°F / ALC= Ab, ALL ÷ 150°C or 302°F) when this temperature is reached and after the <b>ddA</b> delay time the <b>HAd</b> alarm is enabled.
<b>dLL</b>	<b>Low temperature alarm (defrost probe):</b> (ALC= rE, 0 + 50°C or 90°F / ALC= Ab, - 55°C or - 67°F ÷ ALU) when this temperature is reached and after the <b>ALd</b> delay time, the <b>LAd</b> alarm is enabled.
<b>dAH</b>	<b>Differential for temperature alarm (defrost probe):</b> (0.1°C + 25.5°C / 1°F + 45°F) Intervention differential for recovery of temperature alarm;
<b>dda</b>	<b>Temperature alarm delay (defrost probe):</b> (0+255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.
<b>FLU</b>	<b>High temperature alarm (defrost probe):</b> (ALC= rE, 0 + 50°C or 90°F / ALC= Ab, ALL ÷ 150°C or 302°F) when this temperature is reached and after the <b>FAd</b> delay time the <b>HAF</b> alarm is enabled.

<b>FLL</b>	<b>Low temperature alarm (defrost probe):</b> (ALC= rE, 0 + 50°C or 90°F / ALC= Ab, - 55°C or - 67°F ÷ ALU) when this temperature is reached and after the <b>FAd</b> delay time, the <b>LAF</b> alarm is enabled.
<b>FAH</b>	<b>Differential for temperature alarm (defrost probe):</b> (0.1°C + 25.5°C / 1°F + 45°F) Intervention differential for recovery of temperature alarm;
<b>FAd</b>	<b>Temperature alarm delay (defrost probe):</b> (0+255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.
<b>dAO</b>	<b>Delay of temperature alarm at start-up:</b> (0min+23h 50min) time interval between the detection of the temperature alarm condition after the instrument power on and the alarm signalling.
<b>EdA</b>	<b>Alarm delay at the end of defrost:</b> (0+255 min) Time interval between the detection of the temperature alarm condition at the end of defrost and the alarm signalling.
<b>dot</b>	<b>Temperature alarm exclusion after door open:</b>
<b>Sti</b>	<b>Stop regulation interval (Only XM679K):</b> (0.0+24.0 hours: tens of minutes) after regulating continuously for <b>Sti</b> time, the valve closes for <b>Std</b> time in order to prevent ice creation.
<b>Std</b>	<b>Stop duration (Only XM679K):</b> (0+60 min.) it defines stop regulation time after <b>Sti</b> . During this stop display shows <b>StP</b> message
<b>OA6</b>	<b>Sixth relay configuration (CPr-dEF-Fan-ALr-LiG-AUS-db-OnF):</b> <b>CPr</b> = relay works as a compressor or solenoid valve relay; <b>dEF</b> = relay works as defrost relay; <b>Fan</b> = relay works as a Fan relay; <b>ALr</b> = activation with alarm conditions; <b>LiG</b> = light activation; <b>AUS</b> = auxiliary relay, it can be switched ON/OFF also by key; <b>db</b> = dead band regulation ( <b>not compatible with CrE=y</b> ); <b>OnF</b> = ON/OFF functioning;

**OPTIONAL OUTPUT (AnOUT) if present**

<b>OA7</b>	<b>Modulating output configuration (if CoM=OA7):</b> (CPr - dEF - FAn - ALr - LiG - AUS - db) it selects the functioning of the modulating output in case of <b>CoM=OA7</b> : <b>CPr</b> = compressor; <b>dEF</b> = defrost; <b>FAn</b> = Fan; <b>ALr</b> = Alarm; <b>LiG</b> = Light; <b>AUS</b> = auxiliary; <b>db</b> = neutral zone (not available with CrE=Y);
<b>CoM</b>	<b>Type of functioning modulating output:</b> <ul style="list-style-type: none"> <li>For models with PWM / O.C. output → <b>PM5</b>= PWM 50Hz; <b>PM6</b>= PWM 60Hz; <b>OA7</b>= two state, it can be used as an open collector output;</li> <li>For models with 4÷20mA / 0÷10V output → <b>Cur</b>= 4÷20mA current output; <b>tEn</b>= 0÷10V voltage output;</li> </ul>
<b>AOP</b>	<b>Alarm relay polarity:</b> <b>cL</b> = normally closed; <b>oP</b> = normally opened;
<b>iAU</b>	<b>Auxiliary output is unrelated to ON/OFF device status:</b> <b>n</b> = if the instrument is switched off also the auxiliary output is switched off; <b>y</b> = the auxiliary output state is unrelated to the ON/OFF device status

**DIGITAL INPUTS**

<b>i1P</b>	<b>Digital input 1 polarity:</b> (cL - oP) <b>CL</b> : the digital input is activated by closing the contact; <b>OP</b> : the digital input is activated by opening the contact.
<b>i1F</b>	<b>Digital input 1 function:</b> (EAL – bAL – PAL – dor – dEF – AUS – LiG – OnF – Htr – FHU – ES – Hdy) <b>EAL</b> = external alarm; <b>bAL</b> = serious external alarm; <b>PAL</b> = pressure switch activation; <b>dor</b> = door open; <b>dEF</b> = defrost activation; <b>AUS</b> = auxiliary activation; <b>LiG</b> = light activation; <b>OnF</b> = switch on/off the instrument; <b>Htr</b> = change type of action ; <b>FHU</b> = not used; <b>ES</b> = activate energy saving; <b>Hdy</b> = activate holiday function;
<b>d1d</b>	<b>Time interval/delay for digital input alarm:</b> (0–255 min.) Time interval to calculate the number of the pressure switch activation when <b>i1F</b> =PAL. If <b>i1F</b> =EAL or bAL (external alarms), "d1d" parameter defines the time delay between the detection and the successive signalling of the alarm. If <b>i1F</b> =dor this is the delay to activate door open alarm
<b>i2P</b>	<b>Digital input 2 polarity:</b> (cL - oP) <b>CL</b> : the digital input is activated by closing the contact; <b>OP</b> : the digital input is activated by opening the contact.
<b>i2F</b>	<b>Digital input 2 function:</b> (EAL – bAL – PAL – dor – dEF – AUS – LiG – OnF – Htr – FHU – ES – Hdy) <b>EAL</b> = external alarm; <b>bAL</b> = serious external alarm; <b>PAL</b> = pressure switch activation; <b>dor</b> = door open; <b>dEF</b> = defrost activation; <b>AUS</b> = auxiliary activation; <b>LiG</b> = light activation; <b>OnF</b> = switch on/off the instrument; <b>Htr</b> = change type of action ; <b>FHU</b> = not used; <b>ES</b> = activate energy saving; <b>Hdy</b> = activate holiday function;
<b>d2d</b>	<b>Time interval/delay for digital input alarm:</b> (0–255 min.) Time interval to calculate the number of the pressure switch activation when <b>i2F</b> =PAL. If <b>i2F</b> =EAL or bAL (external alarms), "d2d" parameter defines the time delay between the detection and the successive signalling of the alarm. If <b>i2F</b> =dor this is the delay to activate door open alarm
<b>i3P</b>	<b>Digital input 3 polarity:</b> (cL - oP) <b>CL</b> : the digital input is activated by closing the contact; <b>OP</b> : the digital input is activated by opening the contact.
<b>i3F</b>	<b>Digital input 3 function:</b> (EAL – bAL – PAL – dor – dEF – AUS – LiG – OnF – Htr – FHU – ES – Hdy) <b>EAL</b> = external alarm; <b>bAL</b> = serious external alarm; <b>PAL</b> = pressure switch activation; <b>dor</b> = door open; <b>dEF</b> = defrost activation; <b>AUS</b> = auxiliary activation; <b>LiG</b> = light activation; <b>OnF</b> = switch on/off the instrument; <b>Htr</b> = change type of action ; <b>FHU</b> = not used; <b>ES</b> = activate energy saving; <b>Hdy</b> = activate holiday function;
<b>d3d</b>	<b>Time interval/delay for digital input alarm:</b> (0–255 min.) Time interval to calculate the number of the pressure switch activation when <b>i3F</b> =PAL. If <b>i3F</b> =EAL or bAL (external alarms), "d3d" parameter defines the time delay between the detection and the successive signalling of the alarm. If <b>i3F</b> =dor this is the delay to activate door open alarm
<b>nPS</b>	<b>Pressure switch number:</b> (0 ÷15) Number of activation of the pressure switch, during the "d#d" interval, before signalling the alarm event (i2F= PAL). If the nPS activation in the did time is reached, switch off and on the instrument to restart normal regulation.
<b>odc</b>	<b>Compressor and fan status when open door:</b> <b>no</b> = normal; <b>Fan</b> = Fan OFF; <b>CPr</b> = Compressor OFF; <b>F_C</b> = Compressor and fan OFF.
<b>rrd</b>	<b>Outputs restart after doA alarm:</b> <b>no</b> = outputs not affected by the doA alarm; <b>yES</b> = outputs restart with the doA alarm;

**RTC SUBMENU (if present)**

<b>CbP</b>	<b>Clock Presence</b> (n+y): it permits to disable or enable the clock;
<b>Hur</b>	<b>Current hour</b> (0 + 23 h)
<b>Min</b>	<b>Current minute</b> (0 + 59min)
<b>dAY</b>	<b>Current day</b> (Sun + SAt)
<b>Hd1</b>	<b>First weekly holiday</b> (Sun + nu) Set the first day of the week which follows the holiday times.
<b>Hd2</b>	<b>Second weekly holiday</b> (Sun + nu) Set the second day of the week which follows the holiday times.
<b>Hd3</b>	<b>Third weekly holiday</b> (Sun + nu) Set the third day of the week which follows the holiday times.
<b>ILE</b>	<b>Energy Saving cycle start during workdays:</b> (0 + 23h 50 min.) During the Energy Saving cycle the set point is increased by the value in HES so that the operation set point is SET + HES.

- dLE Energy Saving cycle length during workdays:** (0 + 24h 00 min.) Sets the duration of the Energy Saving cycle on workdays.
- ISE Energy Saving cycle start on holidays:** (0 + 23h 50 min.)
- dSE Energy Saving cycle length on holidays** (0 + 24h 00 min.)
- HES Temperature increase during the Energy Saving cycle** (-30+30°C / -54+54°F) sets the increasing value of the set point during the Energy Saving cycle.
- Ld1+Ld6 Workday defrost start** (0 + 23h 50 min.) These parameters set the beginning of the eight programmable defrost cycles during workdays. Ex. When **Ld2** = 12.4 the second defrost starts at 12.40 during workdays.
- Sd1+Sd6 Holiday defrost start** (0 + 23h 50 min.) These parameters set the beginning of the eight programmable defrost cycles on holidays. Ex. When **Sd2** = 3.4 the second defrost starts at 3.40 on holidays.

#### ENERGY SAVING

- ESP Energy saving probe selection:** (nP - P1 - P2 - P3 - P4 - P5 - tEr).
- HES Temperature increase during the Energy Saving cycle :** (-30+30°C / -54+54°F) sets the increasing value of the set point during the Energy Saving cycle.
- PEL Energy saving activation when light is switched off:** (n+Y) n= function disabled; Y= energy saving is activated when the light is switched off and vice versa;

#### LAN MANAGEMENT

- Lmd Defrost synchronisation:** y= the section send a command to start defrost to other controllers, n= the section don't send a global defrost command
- dEM Type of end defrost:** n= the of the LAN defrost are independent; y= the end of the defrost are synchronised;
- LSP L.A.N. set-point synchronisation:** y= the section set-point, when modified, is updated to the same value on all the other sections; n= the set-point value is modified only in the local section
- Lds L.A.N. display synchronisation:** y= the value displayed by the section is sent to all the other sections; n= the set-point value is modified only in the local section
- LOF L.A.N. On/Off synchronisation** this parameter states if the On/Off command of the section will act on all the other ones too: y= the On/Off command is sent to all the other sections; n= the On/Off command acts only in the local section
- Lli L.A.N. light synchronisation** this parameter states if the light command of the section will act on all the other ones too: y= the light command is sent to all the other sections; n= the light command acts only in the local section
- LAU L.A.N. AUX output synchronisation** this parameter states if the AUX command of the section will act on all the other ones too: y= the light command is sent to all the other sections; n= the light command acts only in the local section
- LES L.A.N. energy saving synchronisation** this parameter states if the energy saving command of the section will act on all the other ones too: y= the Energy Saving command is sent to all the other sections; n= the Energy Saving command acts only in the local section
- Lsd Remote probe display:** this parameter states if the section has to display the local probe value or the value coming from another section: y= the displayed value is the one coming from another section (which has parameter LdS = y); n= the displayed value is the local probe one.
- LPP Remote pressure probe:** n= the value of pressure probe is read from local probe; Y= the value of pressure probe is sent via LAN;
- StM Solenoid activation via LAN:** n= not used; Y= a generic cooling requests from LAN activate the solenoid valve connected to compressor relay;

#### PROBE CONFIGURATION

- P1C Probe 1 configuration:** (nP - Ptc - ntc - PIM) nP= not present; PtC= Ptc; ntc= Ptc; PtM= Pt1000;
- Ot Probe 1 calibration:** (-12.0+12.0°C/ -21+21°F) allows to adjust possible offset of the thermostat probe.
- P2C Probe 2 configuration:** (nP - Ptc - ntc - PtM) nP= not present; PtC= Ptc; ntc= Ptc; PtM= Pt1000;
- OE Probe 2 calibration:** (-12.0+12.0°C/ -21+21°F) allows to adjust possible offsets of the evaporator probe.
- P3C Probe 3 configuration:** (nP - Ptc - ntc - PtM) nP= not present; PtC= Ptc; ntc= Ptc; PtM= Pt1000;
- o3 Probe 3 calibration:** (-12.0+12.0°C/ -21+21°F) allows to adjust possible offset of the probe 3.
- P4C Probe 4 configuration:** (nP - Ptc - ntc - PIM) nP= not present; PtC= Ptc; ntc= Ptc; PtM= Pt1000;
- o4 Probe 4 calibration:** (-12.0+12.0°C/ -21+21°F) allows to adjust possible offset of the probe 4.
- P5C Probe 5 configuration:** (nP - Ptc - ntc - PtM - 420 - 5Vr) nP= not present; PtM= Pt1000; 420= 4+ 20mA; 5Vr= 0+5V ratiometric; (Only XM679K)
- o5 Probe 5 calibration:** (-12.0+12.0°C/ -21+21°F) allows to adjust possible offset of the probe 5. (Only XM679K)
- P6C Probe 6 configuration:** (nP - Ptc - ntc - PIM) nP= not present; PtC= Ptc; ntc= Ptc; PtM= Pt1000; (Only XM679K)
- o6 Probe 6 calibration:** (-12.0+12.0°C/ -21+21°F) allows to adjust possible offset of the probe 6. (Only XM679K)

#### SERVICE - READ ONLY

- ClT Coling time percentage:** it shows the effective cooling time calculated by XM600 during regulation;
- tMd Time to next defrost:** it shows time before the next defrost if interval defrost is selected;
- LSn L.A.N. section number** (1 ÷ 5) Shows the number of sections available in the L.A.N.
- Lan L.A.N. serial address** (1 ÷ LSn) Identifies the instrument address inside local network of multiplexed cabinet controller.
- Adr RS485 serial address** (1+247): Identifies the instrument address when connected to a ModBUS compatible monitoring system.
- Rel Release software:** (read only) Software version of the microprocessor.
- Ptb Parameter table:** (read only) it shows the original code of the dIXEL parameter map.
- Pr2 Access to the protected parameter list** (read only).

#### 10. DIGITAL INPUTS

The XM600 series can support up to 3 free of voltage contact configurable digital inputs (depending on the models). They are configurable via #F parameter

#### 10.1 GENERIC ALARM (EAL)

As soon as the digital input is activated the unit will wait for "did" time delay before signalling the "EAL" alarm message. The outputs status don't change. The alarm stops just after the digital input is deactivated.

#### 10.2 SERIOUS ALARM MODE (BAL)

When the digital input is activated, the unit will wait for "did" delay before signalling the "BAL" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is deactivated.

#### 10.3 PRESSURE SWITCH (PAL)

If during the interval time set by "d#d" parameter, the pressure switch has reached the number of activation of the "nPS" parameter, the "CA" pressure alarm message will be displayed. The compressor and the regulation are stopped. When the digital input is ON the compressor is always OFF. **If the nPS activation in the d#d time is reached, switch off and on the instrument to restart normal regulation.**

#### 10.4 DOOR SWITCH INPUT (dor)

It signals the door status and the corresponding relay output status through the "odc" parameter: no = normal (any change); Fan = Fan OFF; CPr = Compressor OFF; F\_C = Compressor and fan OFF. Since the door is opened, after the delay time set through parameter "d#d", the door alarm is enabled, the display shows the message "dA" and the regulation restarts after rrd time. The alarm stops as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

#### 10.5 START DEFOST (DEF)

It executes a defrost if there are the right conditions. After the defrost is finished, the normal regulation will restart only if the digital input is disabled otherwise the instrument will wait until the "MdF" safety time is expired.

#### 10.6 RELAY AUX ACTUATION (AUS)

This function allows to turn ON and OFF the auxiliary relay by using the digital input as external switch.

#### 10.7 RELAY LIGHT ACTUATION (LIG)

This function allows to turn ON and OFF the light relay by using the digital input as external switch.

#### 10.8 REMOTE ON/OFF (ONF)

This function allows to switch ON and OFF the instrument.

#### 10.9 KIND OF ACTION (HTR)

This function allows to change the kind of regulation from cooling to heating and vice versa.

#### 10.10 FHU - NOT USED

This function allows to change the kind of regulation from cooling to heating and viceversa.

#### 10.11 ENERGY SAVING INPUT (ES)

The Energy Saving function allows to change the set point value as the result of the SET+ HES (parameter) sum. This function is enabled until the digital input is activated.

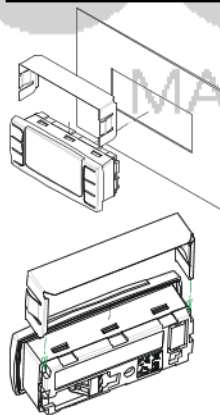
#### 10.12 CONFIGURABLE INPUT - HOLIDAY FUNCTION (HDY)

In Holiday function Energy saving and defrost cycles follow holiday times. (Sd1...Sd6)

#### 10.13 DIGITAL INPUTS POLARITY

The digital inputs polarity depends on "I#P" parameters: CL : the digital input is activated by closing the contact; OP : the digital input is activated by opening the contact.

#### 11. INSTALLATION AND MOUNTING



The CX660 keyboard shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied. The temperature range allowed for correct operation is 0÷60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

#### 12. ELECTRICAL CONNECTIONS

**XM670K/XM679K** is provided with screw terminal block to connect cables with a cross section up to 1,6 mm<sup>2</sup> for all the low voltage connection: the RS485, the LAN, the probes, the digital inputs and the keyboard. Other inputs, power supply and relays connections are provided with Faston connection (5.0 mm). Heat-resistant cables have to be used. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay. **N.B.** Maximum current allowed for all the loads is 16A.

#### 12.1 PROBE CONNECTIONS

The probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

**13. RS485 SERIAL LINE**

XM670K/XM679K is provided of a direct RS485 connection that allow the unit, to be linked to a network line ModBUS-RTU compatible with all dIXEL monitoring system.

**14. USE OF THE PROGRAMMING "HOT KEY"**

The XM units can UPLOAD or DOWNLOAD the parameter list from its own E2 internal memory to the "Hot Key" and vice-versa through a TTL connector.

**14.1 DOWNLOAD (FROM THE "HOT KEY" TO THE INSTRUMENT)**

1. Turn OFF the instrument by means of the ON/OFF key ,insert the "Hot Key" and then turn the unit ON.
2. Automatically the parameter list of the "Hot Key" is downloaded into the controller memory, the "doL" message is blinking. After 10 seconds the instrument will restart working with the new parameters. At the end of the data transfer phase the instrument displays the following messages: "end" for right programming. The instrument starts regularly with the new programming. "err" for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "Hot key" to abort the operation.

**14.2 UPLOAD (FROM THE INSTRUMENT TO THE "HOT KEY")**

1. When the XM unit is ON, insert the "Hot key" and push e key; the "uPL" message appears.
  2. The UPLOAD begins; the "uPL" message is blinking.
  3. Remove the "Hot Key".
- At the end of the data transfer phase the instrument displays the following messages:  
 "end" for right programming.  
 "err" for failed programming. In this case push "SET" key if you want to restart the programming again or remove the not programmed "Hot key".

**15. ALARM SIGNALS**

Message	Cause	Outputs
"PON"	Keyboard enabled	Outputs unchanged
"POF"	Keyboard locked	Outputs unchanged
"rst"	Alarm reset	Alarm relay reset
"nOP"	probe not present	Compressor output acc. to par. "Con" and "COF"
"P1"	First probe failure	Compressor output acc. to par. "Con" and "COF"
"P2"	Second probe failure	Defrost end is timed
"P3"	Third probe failure	Outputs unchanged
"P4"	Fourth probe failure	Outputs unchanged
"P5"	Fifth probe failure	Outputs unchanged
"P6"	Sixth probe failure	Outputs unchanged
"HA"	Maximum temperature alarm	Outputs unchanged.
"LA"	Minimum temperature alarm	Outputs unchanged.
"HAd"	Defrost high temperature	Outputs unchanged.
"LAd"	Defrost low temperature	Outputs unchanged.
"FAD"	Defrost low temperature	Outputs unchanged.
"HAF"	Fan high temperature	Outputs unchanged.
"LAF"	Fan high temperature	Outputs unchanged.
"StP"	Stop due to regulation pauses (Sti and Std parameters)	Compressor and valve OFF
"PA" od."PAL"	Lock due to pressure switch	All outputs OFF.
"rtc"	RTC wrongly configured	Outputs unchanged
"rtf"	RTC failure	Outputs unchanged
"dA"	Door open	Compressor and fans restarts according to rrd and odc
"EA"	External alarm	Output unchanged.
"CA"	Serious external alarm (iF=bAL)	All outputs OFF.
"EE"	EEPROM failure	All outputs OFF.
"LOP"	Minimum operating pressure reached	according to dML
"MOP"	Maximum operating pressure reached	according to dML
"LSH"	Minimum superheat alarm	Valve closed
"MSH"	Maximum superheat alarm	outputs unchanged

**15.1 "EE" ALARM**

The dIXEL instruments are provided with an internal check for the data integrity. Alarm "EE" flashes when a failure in the memory data occurs. In such cases the alarm output is enabled.

**15.2 ALARM RECOVERY**

Probe alarms : "P1" (probe1 faulty), "P2", "P3", "P4", "P5", "P6"; they automatically stop 10s after the probe restarts normal operation. Check connections before replacing the probe. Temperature alarms "HA", "LA", "HAD", "LAd", "HAF", "LAF" automatically stop as soon as the thermostat temperature returns to normal values or when the defrost starts. External alarms "EAL", "BAL" stop as soon as the external digital input is disabled.

**16. TECHNICAL DATA**

**CX660 keyboard**

Housing: self extinguishing ABS.  
 Case: CX660 facia 35x77 mm; depth 18mm  
 Mounting: panel mounting in a 29x71 mm panel cut-out  
 Protection: IP20; Frontal protection: IP65  
 Power supply: from XM600K power module  
 Display: 3 digits, red LED, 14,2 mm high;  
 Optional output: buzzer

**Power modules**

Case: 8 DIN  
 Connections: Screw terminal block ≤ 1,6 mm<sup>2</sup> heat-resistant wiring and 5.0mm Faston

**Power supply:** depending on the model 12Vac - 24Vac - 110Vac ± 10% - 230Vac ± 10% or 90+230Vac with switching power supply.

**Power absorption:** 9VA max.

**Inputs:** up to 6 NTC/PTC/Pt1000 probes

**Digital inputs:** 3 free of voltage

**Relay outputs: Total current on loads MAX. 16A**

**Solenoid Valve:** relay SPST 5(3) A, 250Vac

**defrost:** relay SPST 16 A, 250Vac

**fan:** relay SPST 8 A, 250Vac

**light:** relay SPST 16 A, 250Vac

**alarm:** SPDT relay 8 A, 250Vac

**Aux:** SPST relay 8 A, 250Vac

**Valve output:** a.c. output up to 30W (Only XM679K)

**Optional output (AnOUT) DEPENDING ON THE MODELS:**

- **PWM / Open Collector outputs:** PWM or 12Vdc max 40mA
- **Analog output:** 4+20mA or 0+10V

**Serial output:** RS485 with ModBUS - RTU and LAN

**Data storing:** on the non-volatile memory (EEPROM).

**Kind of action:** 1B. **Pollution grade:** normal **Software class:** A. **Operating temperature:** 0+60 °C.

**Storage temperature:** -25+60 °C. **Relative humidity:** 20-85% (no condensing).

**Measuring and regulation range:**

**NTC probe:** -40+110°C (-58+230°F).

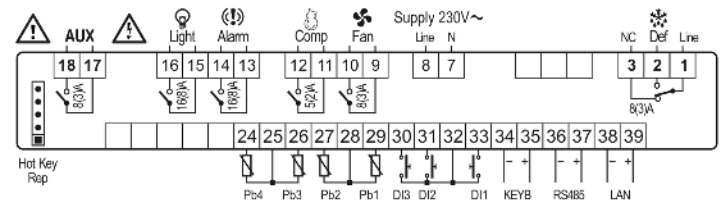
**PTC probe:** -50+150°C (-67 + 302°F)

**Pt1000 probe:** -100 + 100°C (-148 + 212°F)

**Resolution:** 0,1 °C or 1°C or 1 °F (selectable). **Accuracy (ambient temp. 25°C):** ±0,5 °C ±1 digit

**17. CONNECTIONS**

**17.1 XM670K - CUSTOMER - ALL POWER SUPPLY**



**18. DEFAULT SETTING VALUES**

Lab	Value	Menù	Description	Range
SEt	2	---	Set point	LS - US
<b>LT Regulation</b>				
Hy	2	Pr1	Differential	[0.1 °C ÷ 25.5 °C] [1 °F ÷ 45 °F]
LS	-5	Pr2	Minimum set point	[-55.0 °C ÷ SET] [-67 °F ÷ SET]
US	8	Pr2	Maximum set point	[SET ÷ 150.0 °C] [SET ÷ 302 °F]
odS	3	Pr1	Outputs activation delay at start up	0 ÷ 255 (min.)
AC	3	Pr1	Anti-short cycle delay	0 ÷ 60 (min.)
CCt	0	Pr2	Continuous cycle duration	0 ÷ 24.0(144) (hour.10min)
CCS	2	Pr2	Continuous cycle set point	[-55.0 °C ÷ 150.0 °C] [-67 °F ÷ 302 °F]
Con	15	Pr2	Compressor ON time with faulty probe	0 ÷ 255 (min.)
CoF	15	Pr2	Compressor OFF time with faulty probe	0 ÷ 255 (min.)
CF	°C	Pr2	Measurement unit: Celsius , Fahrenheit	°C(0) - °F(1)
rES	dE	Pr2	Resolution (only °C) : decimal, integer	dE(0) - in(1)
Lod	P1	Pr2	Local display: default display	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5) - P6(6) - tEr(7) - dEF(8)
rEd	P1	Pr2	Remote display: default display	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5) - P6(6) - tEr(7) - dEF(8)
dLy	0	Pr1	Display delay	0 ÷ 24.0(144) (Min.10s)
rPA	P1	Pr1	Regulation probe A	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5)
rPb	nP	Pr1	Regulation probe B	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5)
rPE	100	Pr1	Virtual probe percentage (room temperature)	0 ÷ 100 (100=rPA, 0=rPb)
<b>LT Defrost</b>				
dPA	-	P2	Defrost probe A	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5)
dPb	-	nP	Defrost probe B	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5)
dPE	-	100	Virtual probe percentage (defrost temperature)	0 ÷ 100 (100=dPA, 0=dPb)

<b>tdF</b>	-	In	Pr1	Defrost type	EL(0) - in(0)
<b>EdF</b>	-	In	Pr1	Defrost mode: Clock or interval	rtc(0) - in(1)
<b>Srt</b>	-	150	Pr1	Heater set point during defrost	[-55.0°C ÷ 150.0°C] [-67°F ÷ 302°F]
<b>Hyr</b>	-	2	Pr1	Differential for heater	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
<b>tod</b>	-	255	Pr1	Time out for heater	0 ÷ 255 (min.)
<b>dtP</b>	-	0.1	Pr1	Minimum temperature difference to start defrost	[0.1°C ÷ 50.0°C] [1°F ÷ 90°F]
<b>ddP</b>	-	60	Pr1	Delay before starting defrost	0 ÷ 60 (min.)
<b>d2P</b>	-	n	Pr1	Defrost with two probes	n(0) - Y(1)
<b>dtE</b>	-	10	Pr1	Defrost termination temperature (Probe A)	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
<b>dtS</b>	-	8	Pr1	Defrost termination temperature (Probe B)	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
<b>idF</b>	-	4	Pr1	Interval between defrosts	0 ÷ 120 (hours)
<b>MdF</b>	-	15	Pr1	Defrost Maximum duration	0 ÷ 255 (min.)
<b>dSd</b>	-	0	Pr1	Start defrost delay	0 ÷ 255 (min.)
<b>dFd</b>	-	dEF	Pr1	Display during defrost	rt(0) - it(1) - SEt(2) - dEF(3)
<b>dAd</b>	-	0	Pr1	Defrost display time out	0 ÷ 255 (min.)
<b>Fdt</b>	-	2	Pr1	Drain down time	0 ÷ 255 (min.)
<b>dPo</b>	-	n	Pr1	Defrost at start-up	n(0) - Y(1)
<b>dAF</b>	-	0	Pr1	Defrost delay after continuous cycle	0 ÷ 24.0(144) (hours.10min)
<b>MT TK Fan</b>					
<b>FPA</b>	-	P2	Pr1	Fan probe A	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5)
<b>FPb</b>	-	nP	Pr1	Fan probe B	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5)
<b>FPE</b>	-	100	Pr1	Virtual probe percentage (fan management)	0 ÷ 100 (100=FPA, 0=FPb)
<b>FnC</b>	-	C-n	Pr1	Fan operating mode	C-n(0) - O-n(1) - C-y(2) - O-y(3)
<b>Fnd</b>	-	3	Pr1	Fan delay after defrost	0 ÷ 255 (min.)
<b>FCt</b>	-	0	Pr1	Temperature differential to avoid short cycles of fans	[0.0°C ÷ 50.0°C] [0°F ÷ 90°F]
<b>FSt</b>	-	0	Pr1	Fan stop temperature	[-55.0°C ÷ 50.0°C] [-67°F ÷ 122°F]
<b>FHy</b>	-	12	Pr1	Fan stop differential	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
<b>Fod</b>	-	0	Pr1	Fan activation time after defrost (without compressor)	0 ÷ 255 (min.)
<b>Fon</b>	-	0	Pr1	Fan ON time	0÷15 (min.)
<b>FoF</b>	-	0	Pr1	Fan OFF time	0÷15 (min.)
<b>MT LT Alarm</b>					
<b>rAL</b>	-	P1	Pr1	Probe for temperature alarm	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5) - tEr(6)
<b>ALC</b>	-	rE	Pr1	Temperature alarm configuration	rE(0) - Ab(1)
<b>ALU</b>	-	10	Pr1	High temperature alarm setting	[0.0°C ÷ 50.0°C ÷ ALL ÷ 150.0°] [0°F ÷ 90°F ÷ ALL ÷ 302°F]
<b>ALL</b>	-	10	Pr1	Low temperature alarm setting	[0.0°C ÷ 50.0°C ÷ -55.0°C ÷ ALU] [0°F ÷ 90°F ÷ -67°F ÷ ALU°F]
<b>AHy</b>	-	2	Pr1	Differential for temperature alarm	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
<b>ALd</b>	-	0	Pr1	Temperature alarm delay	0 ÷ 255 (min.)
<b>dLU</b>	-	150	Pr2	High temperature alarm setting (defrost probe)	[0.0°C ÷ 50.0°C ÷ dLL ÷ 150.0°] [0°F ÷ 90°F ÷ dLL ÷ 302°F]
<b>dLL</b>	-	-55	Pr2	Low temperature alarm setting (defrost probe)	[0.0°C ÷ 50.0°C ÷ -55.0°C ÷ dLU] [0°F ÷ 90°F ÷ -67°F ÷ dLU°F]
<b>dAH</b>	-	1	Pr2	Differential for temperature alarm (defrost probe)	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
<b>ddA</b>	-	15	Pr2	Temperature alarm delay (defrost probe)	0 ÷ 255 (min.)
<b>FLU</b>	-	150	Pr2	High temperature alarm setting (fan probe)	[0.0°C ÷ 50.0°C ÷ FLL ÷ 150.0°] [0°F ÷ 90°F ÷ FLL ÷ 302°F]

<b>FLL</b>	-	-55	Pr2	Low temperature alarm setting (fan probe)	[0.0°C ÷ 50.0°C ÷ -55.0°C ÷ FLU] [0°F ÷ 90°F ÷ -67°F ÷ FLU°F]
<b>FAH</b>	-	1	Pr2	Differential for temperature alarm (fan probe)	[0.1°C ÷ 25.5°C] [1°F ÷ 45°F]
<b>FAd</b>	-	15	Pr2	Temperature alarm delay (fan probe)	0 ÷ 255 (min.)
<b>dAo</b>	-	4	Pr1	Delay of temperature alarm at start-up	0 ÷ 24.0(144) (hours.10min)
<b>EdA</b>	-	60	Pr1	Alarm delay at the end of defrost	0 ÷ 255 min
<b>dot</b>	-	0	Pr1	Temperature alarm exclusion after door open	0 ÷ 255 min
<b>Sti</b>	-	nu	Pr2	Stop regulation interval	"nu"(0) ÷ 24.0(144) (hour.10min)
<b>Std</b>	-	3	Pr2	Stop duration	1 ÷ 255 min
<b>oA2</b>	-	Alr	Pr2	Sixth relay output configuration	CPr(0) - dEF(1) - FAn(2) - ALr(3) - LiG(4) - AUS(5) - db(6) - OnF(7)
<b>oA5</b>	-	dEF	Pr2	Modulating output configuration (if CoM=oA7)	CPr(0) - dEF(1) - FAn(2) - ALr(3) - LiG(4) - AUS(5) - db(6) - OnF(7)
<b>oA6</b>	-	Onf	Pr2	Modulating output configuration	CUr(0) - tEn(1) - PM5(2) - PM6(3) - oA7(4)
<b>AOP</b>	-	OP	Pr1	Alarm relay polarity	OP(0) - CL(1)
<b>IAU</b>	-	n	Pr1	Auxiliary output independent from ON/OFF state	n(0) - Y(1)
<b>LT Digital Inputs</b>					
<b>i1P</b>	-	OP	Pr1	Digital input 1 polarity	OP(0) - CL(1)
<b>i1F</b>	-	dor	Pr1	Digital input 1 configuration	EAL(0) - bAL(1) - PAL(2) - dor(3) - dEF(4) - AUS(5) - LiG(6) - OnF(7) - Htr(8) - FHU(9) - ES(10) - Hdy(11)
<b>d1d</b>	-	10	Pr1	Digital input 1 activation delay	0 ÷ 255 (min.)
<b>i2P</b>	-	OP	Pr1	Digital input 2 polarity	OP(0) - CL(1)
<b>i2F</b>	-	bAL	Pr1	Digital input 2 configuration	EAL(0) - bAL(1) - PAL(2) - dor(3) - dEF(4) - AUS(5) - LiG(6) - OnF(7) - Htr(8) - FHU(9) - ES(10) - Hdy(11)
<b>d2d</b>	-	0	Pr1	Digital input 2 activation delay	0 ÷ 255 (min.)
<b>i3P</b>	-	OP	Pr1	Digital input 3 polarity	OP(0) - CL(1)
<b>i3F</b>	-	PAL	Pr1	Digital input 3 configuration	EAL(0) - bAL(1) - PAL(2) - dor(3) - dEF(4) - AUS(5) - LiG(6) - OnF(7) - Htr(8) - FHU(9) - ES(10) - Hdy(11)
<b>d3d</b>	-	90	Pr1	Digital input 3 activation delay	0 ÷ 255 (min.)
<b>nPS</b>	-	3	Pr1	Number of pressure switch activation before lock	0 ÷ 15
<b>OdC</b>	-	Fan	Pr1	Compressor and fan status when open door	no(0) - FAn(1) - OPr(2) - F-C(3)
<b>rrd</b>	-	0	Pr1	Outputs restart after door open alarm	0 ÷ 255 (min.)
<b>LT Energy Saving</b>					
<b>ESP</b>	-	P1	Pr1	Energy saving probe selection	nP(0) - P1(1) - P2(2) - P3(3) - P4(4) - P5(5) - tEr(6)
<b>HES</b>	-	0	Pr1	Temperature increasing during Energy Saving	[-30.0°C ÷ 30.0°C] [-54°F ÷ 54°F]
<b>PEL</b>	-	n	Pr1	Energy saving activation when Light switched off	n(0) - Y(1)
<b>LT L.A.N. Management</b>					
<b>LMd</b>	-	y	Pr2	Defrost Synchronisation	n(0) - Y(1)
<b>dEM</b>	-	y	Pr2	Defrost end Synchronisation	n(0) - Y(1)
<b>LSP</b>	-	n	Pr2	SET-POINT Synchronisation	n(0) - Y(1)
<b>LdS</b>	-	n	Pr2	Display Synchronisation (temperature sent via LAN)	n(0) - Y(1)
<b>LOF</b>	-	n	Pr2	ON/OFF Synchronisation	n(0) - Y(1)
<b>LLi</b>	-	y	Pr2	Light Synchronisation	n(0) - Y(1)
<b>LAU</b>	-	n	Pr2	AUX Synchronisation	n(0) - Y(1)
<b>LES</b>	-	n	Pr2	Energy Saving Synchronisation	n(0) - Y(1)
<b>LSd</b>	-	n	Pr2	Remote probe displaying	n(0) - Y(1)
<b>LPP</b>	-	n	Pr2	Pressure value sent in LAN	n(0) - Y(1)
<b>StM</b>	-	n	Pr2	Cooling request from LAN enable compressor	n(0) - Y(1)

relay					
LT Probe Configurations					
<b>P1C</b>	-	NiC	Pr2	P1 configuration	nP(0) - Ptc(1) - ntc(2) - PtM(3)
<b>o1</b>	-	0	Pr2	P1 calibration	[-12,0°C ÷ 12,0°C] [-21°F ÷ 21°F]
<b>P2C</b>	-	NiC	Pr2	P2 configuration	nP(0) - Ptc(1) - ntc(2) - PtM(3)
<b>o2</b>	-	0	Pr2	P2 calibration	[-12,0°C ÷ 12,0°C] [-21°F ÷ 21°F]
<b>P3C</b>	-	nP	Pr2	P3 configuration	nP(0) - Ptc(1) - ntc(2) - PtM(3)
<b>o3</b>	-	0	Pr2	P3 calibration	[-12,0°C ÷ 12,0°C] [-21°F ÷ 21°F]
<b>P4C</b>	-	nP	Pr2	P4 configuration	nP(0) - Ptc(1) - ntc(2) - PtM(3)
<b>o4</b>	-	0	Pr2	P4 calibration	[-12,0°C ÷ 12,0°C] [-21°F ÷ 21°F]
MT LT Service					
<b>CLt</b>	-- -	---	Pr1	ON/OFF percentage (C.R.O.)	(read only)
<b>tMd</b>	-- -	---	Pr1	Time remaining before next defrost activation (only for interval defrost)	(read only)
<b>LSn</b>	-- -	---	Pr1	Number of devices in LAN	1 ÷ 8 (read only)
<b>LAn</b>	-- -	---	Pr1	List of address of LAN devices	1 ÷ 247 (read only)
M T LT Other					
<b>Adr</b>	-	1	Pr1	Modbus address	1 ÷ 247
<b>rEL</b>	-- -	---	Pr1	Firmware release	(read only)
<b>Ptb</b>	-- -	---	Pr1	Parameter table	(read only)
<b>Pr2</b>	-- -	---	Pr1	PR2 menu access	(read only)

# RIVACOLD

MASTERING COLD