

USE AND MAINTENANCE HANDBOOK

UK

FS



RIVACOLD
MASTERING COLD



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INDEX

1 General information	Page 03
1.1 General information	Page 03
1.2 Property of information	Page 03
1.3 Contents of use and maintenance handbook	Page 03
1.4 Convention and definitions	Page 04
1.5 Warranty	Page 06
1.6 Support	Page 06
2 Machine description	Page 06
2.1 Control panel	Page 07
3 Safety and technical data	Page 08
3.1 Safety general information	Page 08
3.2 Protection device and solutions	Page 08
3.3 Residual risk Warnings	Page 08
3.4 Safety signs	Page 11
3.5 Work Area and position of the operator	Page 11
3.6 Noise and vibration indications	Page 12
3.7 Proper and improper use of the machine	Page 12
3.8 General warnings and behavioural norms	Page 12
3.9 Machine data and technical features	Page 13
3.10 Technical data and overall dimensions	Page 13
4 Transport and installation	Page 13
4.1 General information	Page 13
4.2 Transportation and movement	Page 14
4.3 Installation	Page 14
4.4 Storage	Page 17
5 Machine use	Page 18
5.1 Machine use	Page 18
5.2 Alarm signals	Page 22
6 Maintenance and demolition	Page 23
6.1 General maintenance information	Page 23
6.2 Emergency system	Page 24
6.3 Cleaning and maintenance	Page 25
6.4 Out of service, dismantling and demolition	Page 26
7 Optional	Page 27
8 Faults search	Page 28
9 Attachments	Page 30

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1. General Information

1.1. General Information

This Use and Maintenance Handbook is an integral part of the BLOCKSYSTEM FS (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"> ➤ Description of this use and maintenance handbook, of its layout and the conventions used; ➤ definition of the terms used; ➤ definition of the relationship between the manufactures and the purchaser/user (in terms of the warranty and support conditions). 	All staff using the MACHINE.
Chapter 2 Machine description	<ul style="list-style-type: none"> ➤ Description of the MACHINE and its functioning. 	All staff using the MACHINE.
Chapter 3 Safety and Technical Data	<ul style="list-style-type: none"> ➤ Presentation of general indications for the MACHINE, on the solutions implemented to protect operator staff, on generic warnings to comply with to correctly, use the machine and the residual risks present during the phases of the life cycle of the MACHINE; ➤ presentation of the main technical data concerning the MACHINE. 	All staff using the MACHINE (in particular, the mechanic and electric maintenance workers and the personnel appointed to its handling).

CHAPTER	CONTENTS	RECIPIENTS
Chapter 4 Transportation and Installation	<ul style="list-style-type: none"> • Description of the lifting and transportation modes of the MACHINE; • description of the modes of connection to the power supply and of the appliances; • description of the storage modes of the MACHINE. 	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 5 Machine use	<ul style="list-style-type: none"> • Description of the procedures to follow in order to use the MACHINE. 	All staff using the MACHINE.
Chapter 6 Maintenance and Demolition	<ul style="list-style-type: none"> • Description of the verification and control procedures of the parts and the components of the MACHINE (in particular, the parts most subject to wear out); • description of the procedures that allow the appointed personnel to perform the cleaning of the MACHINE; • presentation of the indications to perform the dismantling, demolition, and disposal of the MACHINE. 	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 7 Optional	<ul style="list-style-type: none"> • Description of the possible optional features that can be installed on the MACHINE. 	All staff using the MACHINE.
Chapter 8 faults search	<ul style="list-style-type: none"> • List of the possible malfunctions of the machine and the relative solutions. 	All staff using the MACHINE.
Chapter 9 Attachments	<ul style="list-style-type: none"> • Indications for the retrieval of the: technical sheet of the MACHINE, refrigerant diagram, electrical wiring diagram of the MACHINE, documentation of the components present on the MACHINE. 	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 SERIES FS.

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:



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



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 SYMBOLOGY 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 SERIES FS 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 – Machine Use and in Chapter 6 – 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)	
ITALIA	
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 is a refrigeration assembly comprised of a condensing unit (external cell), an evaporating unit (internal cell) and an electrical panel located inside the condensing unit. The refrigerant follows the compression refrigerator cycle mode. The machine can be equipped with an electrical heater defrost (type MBP and LBP) or a fan defrost (type HBP) controlled by an electronic control unit. Defrosting is done automatically with a frequency that can be modified by the user; it can also be activated manually using the controls.

This solution provides a product that is easy to use, easy to install and highly versatile. The use of leading edge technology has allowed the machine's dimensions to be optimized, improving the installation method, especially on cells with reduced sizes.

The FS line is available in two different versions: a nitrogen loaded machine with tap attachments for all models or, where available, with refrigerant gas loaded and quick connections; in this case pre-loaded connection piping can be requested.

The models use the following codes:

FS = with nitrogen load and tap attachments

FS/R = with refrigerant gas load, quick connections and piping kit in 2.5/5/10 m lengths.

The FS model is a split Blocksystem with wall mounting for the refrigeration of cells from 1/3 HP to 3 HP.

2.1. Control panel

Below (Table 2) reports the description of the commands on the management software.

Figure 1 Control panel

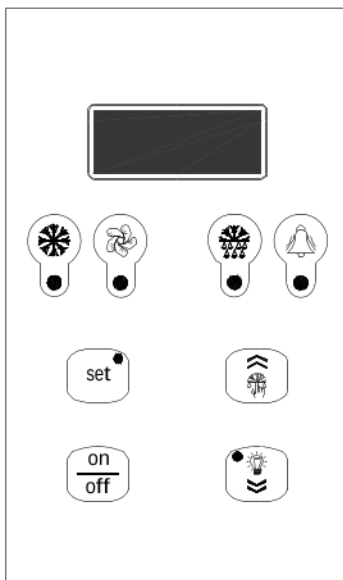
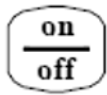



Table 2 – commands descriptions.

SIMBOL	DESCRIPTION
	Green "COMPRESSOR" LED OFF: The compressor is off LIT: The compressor is operating. BLINKING: The switch on request is pending (delays or protective devices activated)
	Green "FANS" LED OFF: The fans are off LIT: The fans are operating BLINKING: The switch on request is pending (delays or protective devices activated)
	Green "DEFROSTING" LED OFF: Defrosting is not activated LIT: Defrosting is in progress BLINKING: Manual defrosting is in progress; a defrosting request is pending (delays or protective devices activated); network synchronised (master/slave) defrosting
	Yellow "ALARM LED" OFF: No alarm is in progress LIT: A serious alarm is in progress (and alarm relay activated) BLINKING: A non-serious alarm is in progress or a serious alarm has been silenced (alarm relay deactivated)
	"SETPOINT" key + "SETPOINT/REDUCED SET" green LED LIT: The setpoint is displayed BLINKING: The reduced set is activated ENTER" key: This is used to set the setpoint, to access the programming menu, and to view the machine status (if held down for 1 second); to enter the programming mode, this key must be held down for 5 seconds.
	"UP" key: This is used to command manual defrosting (if held down for more than 5 seconds) as well as to increase the value of the parameter being displayed and to scroll forwards through the menu list.

SIMBOL	DESCRIPTION
	"ON/OFF" key: This is used as a manual on-off control, to confirm a parameter value and it also allows you to return to the previous menu. To switch the machine on or off, hold this key down for more than 5 seconds.
	"DOWN" key: This is used to command the lights manually (if held down for 1 second); it also decreases the value of the parameter being displayed and scrolls back through the menu list.

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 3* were implemented.

Table 3 – 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
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 following construction solutions and devices were adopted for the machine

- Fixed guards on all sides of the machine which enclose the entire body of the condensing unit and the evaporator.
- Fixed guards in metal or plastic mesh near the moving parts.
- Safety signs near the machine protections.

3.2.2. Active Safety Devices

The machine includes active safety devices as described below.

- Safety pressure switch on the compressor
- Security valve (when provided)

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

There are risks during the installation and connection phase related to:

- operations on the machine by unqualified, untrained, uninformed and incorrectly equipped personnel.
- contact with parts under voltage;
- impact or crushing due to moving parts of the machine;
- tripping or falling near the electrical supply connections;
- projection of and/or contact with the refrigerant loaded in the machine;
- damage to the machine during the installation and connection phases.

3.3.2.2. Necessary Individual Protection Devices



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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 4.

Table 4 – 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 due to the presence of elements under voltage in proximity of the area in which the machine is positioned.
F		This label warns about the obligation to read the manual for the installation
G		Warning to the sharp parts durino 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 FS 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 FS 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 was designed and built **exclusively** for industrial and commercial refrigeration in a fixed location. It is exclusively designed to be installed on a vertical wall.

The MACHINE can **only** use the refrigerant for which it was designed (typically R404A). Check the machine label in order to identify the refrigerant gas for which the machine was designed and built.

The machine was designed and built to operate in environments where **there is no danger of explosion** and by itself cannot generate a potentially explosive atmosphere.

The machine must be adequately protected from atmospheric agents.

It is good practice to keep powder extinguishers near the machine. To prevent the possibility of a fire the machine must be kept clean of plastic pieces, oils, solvents, paper, and rags.

Use of the machine for operations other than its intended use could cause harm to people or the machine itself and are thus considered **improper uses** for which the Manufacturer is not responsible.



WARNING: for a different destination of use, prior consultation with the Manufacturer's Technical Office is essential.

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 6 – 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

In order to identify the machine a CE identification tag has been attached to it; the identifying data included on this tag must be reported to the Manufacturer at every service request or when ordering replacement parts. It is located near the condensing unit (Figure 2). Specifically, the following data is included on the identification tag:

- code,
- serial number,
- amps (A),
- watts (W),
- refrigerant type,
- supply voltage (Volt/Ph/Hz),
- maximum operating pressure PS HP (high pressure side) - PS LP (low pressure side),
- maximum operating pressure TS HP (high pressure side) - TS LP (low pressure side),
- assembly category according to Directive 97/23/EC (PED)

Serial number identification

- numbers 1 and 2 = last two numbers of the year built,
- numbers 3 and 4 = week of the year in which the machine was produced,
- numbers 5, 6, 7 and 8 = progressive number

Figure 2 - Position of the CE identification tag.



3.10. Technical Data and Overall Dimensions

The technical features of the machine are found in *Chapter 9 – 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 instructions contained in this paragraph must be followed during machine transportation and moving which can occur in the following situations:

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



DANGER:

the Manufacturer denies any responsibility for any damages to persons and/or property, stemming from improper operations performed by unqualified, untrained, or unauthorized personnel.

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



During transportation or moving of the machine, the following warnings must be followed:

- Make sure all lifting equipment is suitable for the weight and size of the machine (check the technical specifications for the various types of Blocksystem FS as reported in *Chapter 9 - Attachments*).
- Do not strike the structure or guards on the machine with tools or any other object.

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*.

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:

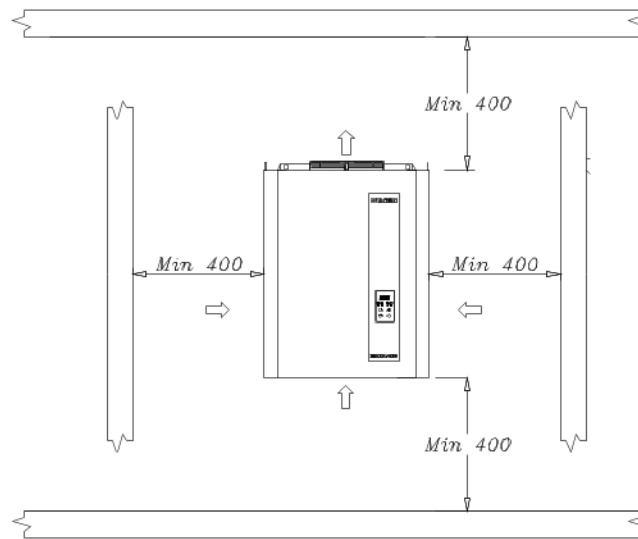
the Manufacturer denies any responsibility for any damages to persons and/or property stemming from improper operations performed by unqualified, untrained, or unauthorized personnel.

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



The Blocksystem FS **must** be installed in locations where good air circulation and exchange is guaranteed and **must** be installed only on a vertical wall. For different types of installation, contact the manufacturer. When positioning the moto-condensing units and the evaporator, comply with the minimum heights reported in Figure 3.

Figure 3 - Minimum heights



ATTENTION:

Before proceeding with installation, a refrigeration system project must be developed which defines: a) all components of the refrigeration system such as the condensing unit, evaporator, capillary, thermostatic valve, cell front, piping dimension, safety components, etc.; b) location of the system; c) piping layout.

During installation, leave sufficient space around the machine to perform the maintenance in safe conditions.

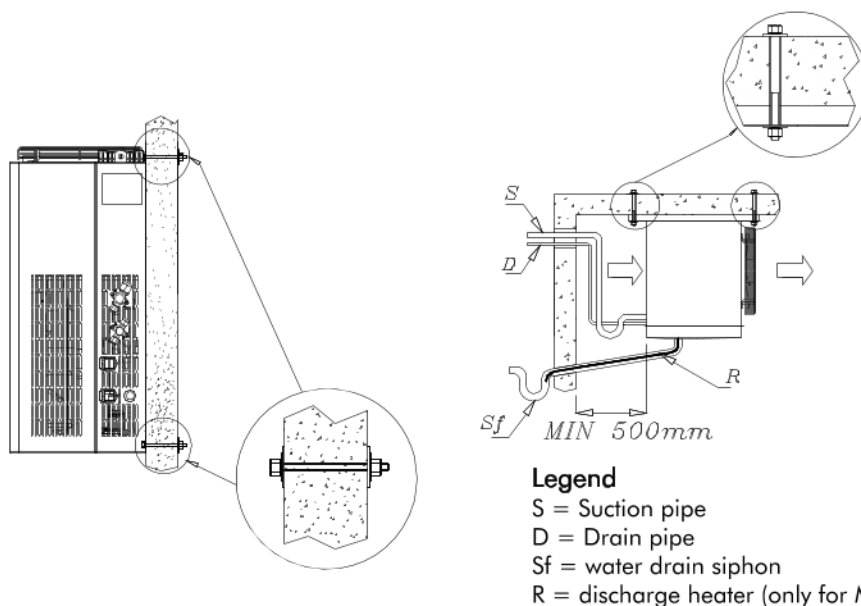
For correct machine operation, the following minimum cell wall thicknesses are recommended (polyurethane insulation): MBP and HBP cell insulation thickness **60 mm**; LBP cell insulation thickness **100 mm**.

4.3.1. SF Series Installation Method

Use the following procedure for machine installation:

1. Lift the machine using suitable lifting equipment and the appropriate hooks.
2. Attach the condenser part to the vertical wall using 4 screws as indicated in Figure 4, keeping a minimum of 400 mm from the ground (Figure 3).
3. Proceed with attaching the evaporator to the inside of the cell using 4 steel bolts (Figure 4).
4. Extend the drainpipe from the evaporator tray (minimum temperature resistance: 90°C) to the outside of the cell with a rubber hose, creating a siphon (Figure 4). Please Note: for models MBP and LBP, insert the discharge heater inside the hose.
5. Drill a hole on the wall of the cell (Figure 4) for the outlet and suction pipes and for the water drain pipe.
6. Drill a hole for the electrical cables: power supply cable, evaporator fan cable, discharge heater cable, defrosting heater cable, cell light cable.

Figure 4 - Installing the machine.



7. Drill a hole for the micro-door cable and the temperature and defrost end probes. **Please Note:** these cables must be far away from the electrical current cable in order to avoid signal disturbances.

INSTALLING THE EVAPORATOR

See Figure 4 and the technical specifications in Chapter 9 - Attachments.

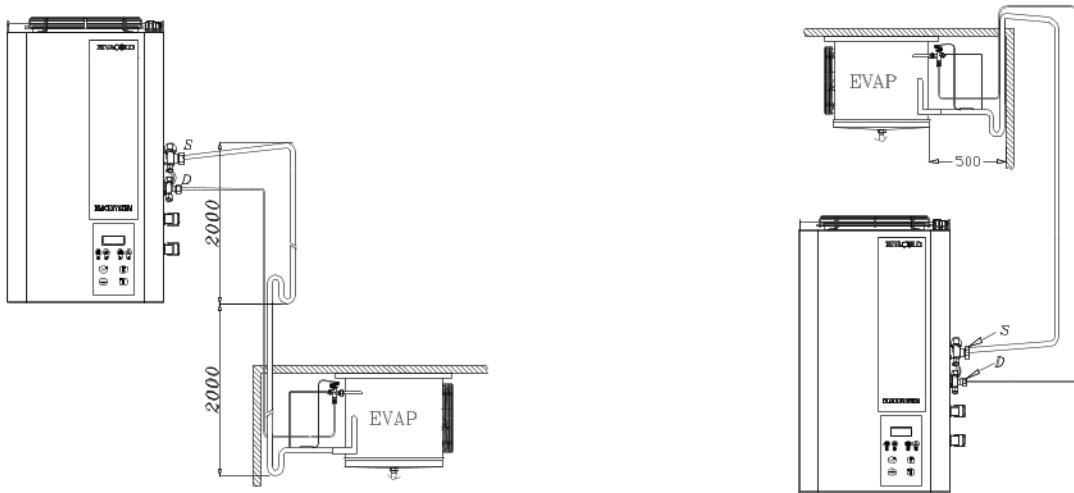
REFRIGERATOR CONNECTION

To perform this connection, prepare the piping for the liquid and suction line according to the diameters of the attachments on the machine.

The recommended diameters are valid up to a maximum length of 10 meters. For greater lengths, change the diameters in order to ensure the correct gas speed.

The piping must be fastened to the walls near the curves, the welds, and every 1.5 – 2 meters in straight runs.

Figure 5 - Condenser-evaporator positioning method.



INSULATING THE SUCTION LINE

When the evaporation temperature is less than -10 °C, the suction lines must be insulated with an anti-condensation pipe having a thickness of at least 13 mm in order to limit overheating.

OIL RETURN

All the systems must be designed in order to ensure oil return to the compressor. In the situation shown in Figure 5, with the condensing unit positioned above the evaporator, it is important to provide siphons on the suction line every 2 m of height difference in order to guarantee oil return to the compressor. In any event, when there are horizontal tracts, it is important that the suction piping has a downward slope of at least 3%, toward the compressor.

ADDING OIL

In most installations where all of the conductors do not exceed 10 meters, there is no need to add oil. Where the conductors are oversized in comparison to normal conditions or exceed 10 meters, a small quantity of oil must be added.

VACUUM

Correct performance of the vacuum on the system is of utmost importance for proper operation of the refrigeration machine and the duration of the compressors in order to ensure that the content of air and, above all, humidity remain below the values allowed. The introduction of new gases has required the use of new polyester-type oils with highly hygroscopic characteristics, which demand greater attention during performance of the vacuum. It is advisable to perform the vacuum on both sides of the circuit. At any rate, the goal is to reach a pressure not greater than 5 Pa.



ATTENTION: *In order to avoid irreparable damage to the compressors, do not start them up in empty conditions and without the gas load.*



ATTENTION: *During the vacuum and loading phase, remember to apply voltage to the solenoid valve reel on the liquid line.*

LOADING THE REFRIGERANT

After the vacuum operation, the system must be loaded with the type of refrigerant indicated on the CE tag or, alternatively, with other allowed types. For a correct loading operation, after having performed the vacuum, we recommend pumping part of the refrigerant in the compressors to "break the vacuum;" then, start the compressors to enable suction of the remaining part of the load.

To correctly quantify the gas load, use the gauges connected to the prepared pressure intakes; the pressures must be compatible with the operational conditions of the machine.



ATTENTION: *The mixtures of refrigerant gases must be loaded into the system in their liquid state. Loading operations must only be performed by specialized technicians*

**DANGER:**

For the loading, recovery, and control of the refrigerant, use gloves that protect against low temperatures.

LEAKAGE CHECK

A system can operate regularly over time, for the entire life of the compressor, only if all of the requirements for correct installation are observed, including having no refrigerant leaks. It is estimated that refrigerant leaks equal to 10% of the total charge during 15 years of compressor operation, still ensure good operation of the refrigerant system. With the new gases (R124a; R404A and mixtures), the possibility of refrigerant leaks through the welds and incorrectly performed connections increase the reduced molecular dimension of the gas; for this reason it is important that the welds are checked for leaks using the appropriate methods and equipment for the type of gas used.

CRANKCASE HEATER (OPTIONAL)

Whenever the compressor operates at a temperature less than +5°C, a crankcase heater is recommended in order to avoid the build-up of liquid in the lower part of the compressor during stoppages. It is also necessary to choke the condenser, for example, by reducing its air capacity (ie. by means of a speed regulator).

WORK CYCLE

The systems must be sized in order to not exceed 5 on/off cycles per hour. When the Thermal/Amperometric protection is triggered, the compressor is shut down and will be restarted after the time needed to reset the contacts on the protector.

OPERATION TIMES

Systems must be sized for normal operation 80% of the time. 100% operation of the compressor can occur only in harmful load and environmental temperature characteristics, outside of the allowable limits.

PRESSURE SWITCHES

All machines are equipped with HBP safety pressure switches calibrated at a max. of 28 bars. LBP safety pressure switches are calibrated according to the gas used and the application of the compressor. The values in the following table are recommended:

	Gas	°C=[bar]	Set	Differential
LBP Application MPB	R404A	-25 °C=1.5 bars	3 bars	1.5 bars
LBP Application LBP	R404A	-40 °C=0 bars	3 bars	3 bars

The risk category for each machine is indicated on the machine's identification tag.

SAFETY VALVES ON THE LIQUID RECEIVER

Machines in risk category 0 are not equipped with safety valves

Machines in risk categories ≥ 1 , are equipped with safety valves.

The risk category for each machine is indicated on the machine's identification tag.

4.3.2. Connection to the electrical supply line

The electrical power supply (also in terms of voltage and frequency) supplied by the Purchaser must be sufficient to correctly supply power to the machine. To be specific, it is necessary to adopt the following indications:

- ▶ The power cable must be stretched (avoid coiling and overlaps) in a location where it is not exposed to any shocks or handling by minors. It must not be near liquids, water or heat sources and must not be damaged (if damage occurs, have it changed by qualified personnel).
- ▶ Prepare a differential thermomagnetic switch between the power supply line and the machine that is of adequate size for the application and the current laws in the country where installed and make sure that the line voltage corresponds with the voltage indicated on the tag (see the label applied to the machine); allowed tolerance $\pm 10\%$ of the rated voltage.

**ATTENTION:**

the differential thermomagnetic switch must be placed in the immediate vicinity of the unit, in order for it to be well visible and accessible by the technician, in the event of maintenance.

- ▶ The power supply cable section must be adequate for the power absorbed by the machine.

**ATTENTION:**

The law requires that the condensing unit is connected to an efficient earthing system. Any responsibility for the failure to comply with this provision is denied; any responsibility is denied in the event that the electrical system to which the machine is connected is not built according to current regulations.

- ▶ Attach the provided micro-door on the cell door batten which will cause the cell light to automatically turn on whenever opened along with turning off the compressor and the fans on both the evaporator and the condenser.

**ATTENTION:**

the micro-door cable and cable from the remote panel, if present, must be kept far from the electrical cables in order to avoid signal disturbances.

- ▶ Attach the lamp to the cell ceiling and connect the cell light cable according to the instructions given inside the support.
- ▶ Units in the LBP series (-15°C/-25°C) come equipped with a cable for connecting the door heater. This connection must be performed using a fuse with the proper size for the door heater used.

**ATTENZIONE:**

do not connect the CELL LIGHT and DOOR HEATER to the 230 Volt line. The tag attached to each cable indicates the connection to be performed.

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 °C and +50 °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. Machine use

5.1. Machine use



DANGER: for the machine, only operators correctly training and informed on the risks present can intervene on the machine and only having fully read this use and maintenance handbook. 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 use the machine, the following Individual Protection Devices are necessary:



5.1.1. Operation

Before starting the machine, it is necessary to ensure:

- ▶ the locking screws are tight;
- ▶ the electrical connections were correctly installed;
- ▶ the coldroom door is closed to ensure the micro-door contact is closed.

5.1.2. Switch on/off

To turn on (off) the machine, the "ON/OFF" button on the control panel must be pressed for more than 5 seconds.



ATTENTION: when the machine is first turned on, the word OFF shows on the control panel, alternating with the cell temperature.

5.1.3. Parameter variation procedure

Functioning of the Blocksystem series FS is regulated by the parameters set in the memory of the electronic central unit by the manufacturer (see Table 6). We recommend you do not change these values unless strictly necessary and in any case always contact the enabled staff. As well as for functioning, the parameters are sub-divided by safety/accessibility level:

- ▶ level 0 SETPOINT parameters direct access (see Paragraph 5.1.3.1);
- ▶ level 1 frequent use parameters access without password (see Paragraph 5.1.3.2).

The parameters can be changed on the keyboard, via the LAN (Master/Slave) network or using the Supervision network.

MACOLD

MASTERING COLD

5.1.3.1. Coldroom temperature regulation

The fields of the temperature values for which the Blocksystem series FS can operate are reported in

Table 5.

Table 5 – Temperature value fields.

	Minimum	Maximum
High temperature HBP (Not planned for SV)	+2	+10
Medium temperature MBP	- 5	+ 5
Low temperature LBP	- 25	- 15

It is possible to access the regulation set point of the temperature in a direct manner to display or change the value. In relation to this, implement the following procedure:

1. Press and release SETPOINT: the display shows "SET" (if there are alarms ongoing the procedure is slightly different; see Paragraph 5.1.4)
2. Press SETPOINT: in this way the green SET led switches on and the display shows the SETPOINT value.
3. Press UP and DOWN to set the new value.
4. Press SETPOINT or ON/OFF (or wait for the 5 second timeout) to confirm the value; in this way the SET led switches off and the display shows "SET".
5. Press ON/OFF (or wait for the 5 second timeout) to return to normal view.

5.1.3.2. Change level 1 parameters

To change the parameters corresponding to level 1, use the following procedure:

1. press SET for 5 seconds until the displays shows "reg" (regulation parameters);
2. press UP and DOWN to display the desired menu on the display;
3. press SET to access the menu; in this way the code appears of the first parameter of the menu selected;
4. press UP and DOWN to display the desired parameter;
5. press SET to display the parameter value;
6. press UP and DOWN to set the desired value;
7. press SET to confirm the value and return to the parameters list; or press ON/OFF to confirm the value and return to menu list;
8. to pass to the parameters list to the menu list press ON/OFF;
9. to exit the change parameters procedure press ON/OFF again.

If you don't press one of the keys for more than 15 seconds, the possible value display is stored in the relative parameter and you are forced to exit the change parameters procedure.

5.1.4. Machine status view

To view the machine status, use the following procedure:

1. press and release SET: the display will show "SEt" or "AAL" if there are alarms in progress;
2. press UP and DOWN to view the relevant status. The statuses could be:
 - AAL alarms ongoing (if present)
 - SEt setpoint
 - Pb1 coldroom temperature probe value
 - Pb2 evaporator temperature probe value
 - Pb3 probe value 3 (if present)
 - Out relay outputs status
 - InP digital inputs status
3. press SET to display the value;
4. in the case of alarms status, outputs status, inputs status, press UP and DOWN to scroll respectively the ongoing alarms, the outputs and the inputs;
5. press SET or ON/OFF (or wait for the 5 second timeout) to return to the list of statuses;
6. press ON/OFF (or wait for the 5 second timeout) to return to normal view.

Table 6 – Machine parameters.

Code	Level	Descr.	Range	Unit	MBP	LBP	HBP
		List of -PPS passwords					
PPA		Parameters access password Entering a pre-set password will give access to protected parameters	0 ... 255		-	-	-
		List of -rEG adjustment parameters					
SEt	0	Setpoint	LSE ...HSE	°C [°F]	2	-18	5
diF	1	Differential temperature > setpoint + diff. -> adjustment On temperature ≤ setpoint -> adjustment Off	0.1 ... 50.0	°C [°F]	2	2	2
		List of -Pro probe parameters					
CA1	1	Probe 1 calibration	-20.0 ... 20.0	°C [°F]	0	0	0
CA2	1	Probe 2 calibration			0	0	0
CA3	1	Probe 3 calibration			0	0	0

Code	Level	Descr.	Range	Unit	MBP	LBP	HBP	
List of -CPr compressor parameters								
Ont	1	Compressor ON time in the event of probe failure	In the event of an adjustment probe error, the compressor is enabled in cyclical mode with set operation and off times. In particular: Ont=0: the compressor remains off Ont>0 and OFt=0: the compressor remains on	0 ... 60	min	15	15	15
OFt	1	Compressor OFF time in the event of probe failure		0 ... 60	min	15	15	15
dOn	1	Compressor activation delay The time, starting from the switch on request, after which the compressor is effectively activated. In the event of network control in sequential mode, this represents the activation delay from compressor to compressor	0 ... 250	sec	0	0	0	
dOF	1	Minimum compressor OFF time The time, starting from the moment of deactivation, for which it is not possible to restart the compressor	0 ... 60	min	3	3	3	
dbi	1	Delay between switch on times The time, starting from the moment of previous activation, for which the compressor cannot be restarted.	0 ... 60	min	0	0	0	
OdO	1	Outputs delay at power-on (compressor, fans, defrosting) This is used to delay the enabling of adjustments after the instrument has been switched on for a set amount of time. The transition from stand-by to machine activated (ON command from the keyboard) bypasses this delay	0 ... 60	min	3	3	3	
List of -dEF defrosting parameters								
dY*	1	Defrosting type 0 = heating element: ends at temperature or after maximum safe time (timeout) 1 = hot gas : ends at temperature or after maximum safe time (timeout) For defrosting using a heating element, there is a 1 second delay between the compressor switching off and the defrosting relay being triggered	0,1		0	0	0	
dit	1	Defrosting interval The maximum time (from start to start) between two consecutive defrosting cycles. When this time expires, a defrosting cycle is enabled (cyclical defrosting). The timer is reset at each defrosting request (even if not cyclical). 0 = cyclical defrosting disabled	0 ... 250	h	6	6	6	
dct	1	Defrosting interval count mode 0 = counts if the compressor is operating 1 = counts all the time	0,1		1	1	1	
dOH	1	Defrosting start delay at power-on The time, as from when the instrument is switched on, for which any defrosting requests are frozen (manual defrosting excluded)	0 ... 250	min	0	0	0	
dEt*	1	Defrosting timeout When the set time expires, defrosting is in any case ended, even if the defrost end temperature has not been reached, passing on to the drip phase	1 ... 250	min	30	30	15	
dSt*	1	Defrost end temperature The probe 2 temperature above which defrosting is ended. If, at the start of a defrosting cycle, the temperature is greater than that set, no defrosting will be carried out. In the event of a probe 2 malfunction, the defrosting cycle will in any case terminate after reaching a time limit	-50.0 ... 199.0	°C [°F]	15	15	10	
dS2	1	Defrost end temperature for the second evaporator The probe 3 temperature above which defrosting for the second evaporator is ended. If, at the start of a defrosting cycle, the temperature is greater than that set, no defrosting will be carried out. In the event of a probe 3 malfunction, the defrosting cycle will in any case terminate after reaching a time limit. This function is only enabled if P01=3o4, Co4=3 and CP0=2 (alarm relay used for second evaporator defrosting and probe 3 used to detect the temperature of the second evaporator). In this case, the dripping phase will begin after the defrosting cycles of both evaporators have ended.	-50.0 ... 199.0	°C [°F]	10	10	10	
dPO	1	Defrosting at power-on 0 = disabled 1 = defrosting when the instrument is switched on	0,1	flag	0	0	0	

Code	Level	Descr.	Range	Unit	MBP	LBP	HBP	
List of -FAn fan parameters								
FSt	1	Fans switch on temperature	$probe2 \geq FSt$: fans off $Fot \leq probe2 < (FSt - FAd)$: fans on $probe2 < (Fot - FAd)$: fans off	-50.0 ... 199.0	°C [°F]	8	-5	50
Fot	1	Fans switch off temperature		-50.0 ... 199.0	°C [°F]	-50	-50	-50
FAd	1	Fans switch on and off differential		1.0 ... 90.0	°C [°F]	2	2	2
Fdt	1	Post-dripping time The time after the dripping phase, during which the fans remain switched off	0 ... 60	min	1	2	0	
dt	1	Dripping time The time after a defrosting cycle during which the compressor and the evaporator are stopped in order to favour evaporator dripping	0 ... 60	min	2	2	0	
dFd	1	Fans deactivated during defrosting 0 = fans activated (operation set from FPt) 1 = fans deactivated	0,1	flag	1	1	0	
FCO	1	Fans activated with compressor off 0 = fans deactivated 1 = fans activated (operation set from FPt) 2 = fans in duty cycle operation	0 ... 2		0	0	0	
Fon	1	Fans ON time during duty cycle operation (FCO=2)	1 ... 60	min	15	15	15	
FoF	1	Fans OFF time during duty cycle operation (FCO=2)	1 ... 60	min	15	15	15	
List of -ALr alarm parameters								
AFd	1	Temperature alarm threshold differential This sets the re-entry temperature threshold after a high- or low-temperature alarm condition	1.0 ... 90.0	°C [°F]	2	2	2	
HAL	1	Maximum alarm threshold Above this value (absolute or referred to the setpoint) an alarm is triggered If the reference is relative, the unmarked value is added to the setpoint	-50.0 ... 199.0	°C [°F]	10	10	10	
LAL	1	Minimum alarm threshold Below this value (absolute or referred to the setpoint) an alarm is triggered If the reference is relative, the unmarked value is subtracted from the setpoint	-50.0 ... 199.0	°C [°F]	-10	-10	-10	
PAO	1	Temperature alarm delay at power-on	0 ... 10	h	4	4	4	
dao	1	Temperature alarm delay after defrost The time, starting from the end of the dripping phase, during which no alarm is signalled. In the event of contemporaneous network defrosting, the time refers to the defrosting end command	0 ... 999	min	60	60	60	
OAO	1	Temperature alarm delay after door closure The time, after the door is closed again and during which no alarm is signalled	0 ... 10	h	0	0	0	
dAt	1	Defrosting alarm timeout enabling This enables the signalling of any defrosting end due to the maximum time limit being reached (timeout). 0 = signal disabled 1 = signal enabled	0,1	flag	0	0	0	
List of -diS display parameters								
ndt	1	Decimal point display 0 = display without decimal point 1 = display with decimal point.	0,1	flag	1	1	1	
ddl	1	Display during the defrosting phase 0 = normal display (as set from the ddd par.) 1 = freezes the temperature value displayed at the start of defrosting until the end of defrosting and the reaching of the setpoint 2 = "dF" until the end of defrosting and the reaching of the setpoint The ddl parameter can be controlled only if the standard display (ddd par.) includes the adjustment probe (probe 1 or network probe)	0,1,2		0	0	0	
Ldd	1	Defrosting display block timeout The time, starting from the end of defrosting (end of dripping phase), after which the normal display is in any case restored	0 ... 255	min	6	6	6	

Code	Level	Descr.	Range	Unit	MBP	LBP	HBP
dro	1	°C or °F selection 0 = °C 1 = °F This selection only affects temperature measurements. The values of the parameters concerning temperature maintain their current values and therefore, they must be varied manually to adapt them to the Fahrenheit scale.	0,1	flag	0	0	0
List of -CnF configuration parameters							
LOC (**)	1	Keyboard lock 0 = keyboards disabled 1 = main terminal keyboard enabled 2 = secondary terminal keyboard enabled 3 = keyboards enabled (the first to request a service has precedence until completion)	0 ... 3		1	1	1
rEL	1	Software release A read-only value that identifies the software version	0.0 ... 99.9		-	-	-
List of -Lan(***) network parameters							
dEA	1	Supervision network address (for Master only) The address to be set on each master must take into account the number of slaves present in the LAN network preceding it: "dEA"="dEA[previous master]"+"L01[previous master]" + 1 The Supervision network address for a Slave is "dEA[master]"+"L00")	1 ... 199		1	1	1



***ATTENTION:**

(*) **ATTENTION:** In order to unlock the keyboard, press "SET" and "ON/OFF" at the same time for at least 5 seconds.



****ATTENTION:**

the "Lan" network parameters is only used with MASTER/SLAVE and TELEMANAGEMENT operation.

5.2. Alarm signals

In case of alarms, the board normally activates the following actions:

- the relative alarm code is signalled on the display. In particular, the display control alternates the alarm code and the temperature normally displayed;
- the alarm led switches on;
- the relay alarm is activated.

For certain alarms and signals, the led and/or the relay is not activated. By pressing any key, the relay deactivates (if active) and the led flashes, while the display alarm code continues to be displayed. The led switches on and the alarm code disappears only when the cause that generated it is found. Table 8 reports in detail the descriptions of each alarm and the actions undertaken in this respect.

Table 7 – Alarms description.

Code displayed	Description/Control	LED enable	Relay enable	Reset Mode
E1	cold room probe temperature error if a probe is used for adjustment, the compressor will be activated cyclically and defrosting cycles will be disabled; if a balanced network probe is enabled, adjustment will continue, bypassing the malfunctioning probe	yes	yes	automatic when the condition ceases
E2	End defrostin probe g error defrosting will end due to timeout	yes	yes	automatic when the condition ceases
E3	3rd probe error (condenser temperature) the associated controls are disabled	blink.	no	automatic when the condition ceases
	3rd probe error (2nd evaporator temperature) defrosting will end due to timeout	yes	yes	
	heat alarm (*) adjustment is disabled	yes	no	automatic when the condition ceases
	HP pressure switch alarm(*) adjustment is disabled	yes	no	automatic when the condition ceases
	LP pressure switch alarm(*) adjustment is disabled	yes	no	automatic when the condition ceases
E4	repeated heat alarm adjustment is disabled permanently	yes	yes	at switch on
E5	repeated HP pressure switch alarm adjustment is disabled permanently	yes	yes	at switch on
E6	repeated LP pressure switch alarm adjustment is disabled permanently	yes	yes	at switch on

Code displayed	Description/Control	LED enable	Relay enable	Reset Mode
LO	low temperature alarm	yes	yes	automatic when the condition ceases
HI	high temperature alarm	yes	yes	automatic when the condition ceases
EE	data saving alarm default parameters are loaded	yes	yes	at power-on or after the parameter has been stored to memory
Ec	condenser cleaning alarm	blink.	no	automatic when the condition ceases
Er	network alarm (**)	yes	yes	automatic when the condition ceases
Ed	defrosting timeout alarm	blink.	no	automatic at the start of the next defrost
Od	door open timeout alarm normal operation is enabled again	blink.	no	automatic when the condition ceases
nx	slave x alarm (on master only)	yes	progr.	automatic when the condition ceases
Ux	slave x not connected (on master only) the slave is not controlled	blink.	no	automatic when the condition ceases
u0	master not connected (on slave only) the slave is released from the network and operates autonomously	blink.	no	automatic when the condition ceases
dx	slave x download failed(on master only)	blink.	no	manual or automatic when the condition ceases

(*) No writing appears on the display.

(**) For network alarms, we intend the alarm control propagated by the master to all network devices, on planning, in case of activation of the alarm relay on the master.

During functioning, in particular conditions, the signals reported in Table 9 are displayed.

Table 9 – Particular functioning conditions.

Code displayed	Description	Notes
OFF	unit in stand-by (operation disabled)	remains until the next ON command
dF	defrosting in progress	see par. "ddl"
dFu	defrosting not performed	displayed for 2 seconds when the defrosting command is not performed because the evaporator temperature is already above the defrosting end temperature (parameter dst)
uM	master unit	at switch on, the network configuration of the unit is displayed
uSx	slave x unit	
Cn	terminal/control connection interrupted	the terminal is not receiving data from the control



ATTENTION: if on start-up, the terminal connection/control is not working correctly, the terminal displays "88.8" and the leds are all off.

6. Maintenance and Demolition

6.1. 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.



WARNING: 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.

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.

6.1.1. 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:



6.1.2. 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.

6.2. Emergency system



DANGER: *for the machine, only operators correctly trained and informed on the risks present can intervene on the machine and only having fully read this use and maintenance handbook. The manufacturer declines all responsibility for any damage to property and/or persons deriving from improper interventions conducted by unqualified, untrained or unauthorised staff.*



DANGER: *before conducting any planned cleaning interventions, ensure the machine is sectioned from the power supply, and any hot surfaces have cooled.*

If a functioning fault or anomaly occurs on the electronic central unit and immediate replacement is not possible, the EMERGENCY SYSTEM can be used to maintain the unit operational until the central unit is replaced. To use this system, having sectioned the machine, proceed as follows:

1. Remove all bridges on the L terminals and the common ones on the board relays (terminals 25-28- 33-36-38);
2. As reported in the diagram in *Figure 6*, connect a thermostat between terminal L, the NO terminals (terminals 32,37) and the NC terminal (terminal 34) of the relays on the compressor, defrosting and fans (COMP, DEF and FAN).
3. Then make a bridge between the L terminals and the NO terminal of the ON/OFF relay (terminal 26 for power supply of the tolerance on the carter, door and drainage where present).
4. Connect the Blocksystm FS again to the power line and set the thermostat to the desired temperature.



DANGER: *what we've described is a temporary connection! As soon as possible contact the vendor or directly contact the manufacturer to replace the non-operating board.*

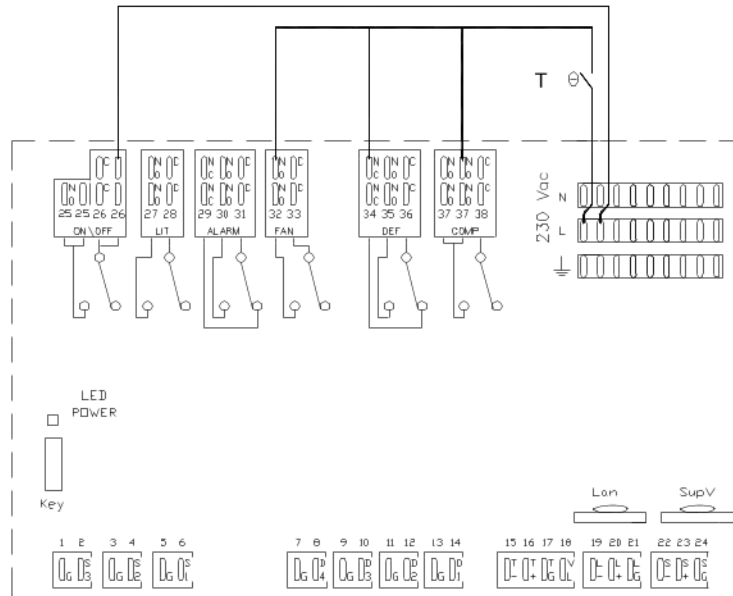


ATTENTION: *during the entire emergency phase, defrosting is excluded, therefore we recommend you reduce opening the coldroom to a minimum.*

5. When installing the new central unit, restore all the connections described in points 2, 3, 4 and 5.

Figure 6 – Emergency system.

Legend:
T = Thermostat



6.3. 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.

6.3.1. Interventions and relevant frequency

The most significant and important operations are related to ordinary maintenance and can be summarised as follows:

- On a **weekly basis** check the evaporator is clean, in particular that there is no ice accumulation. When the evaporator is obstructed by ice, conduct manual defrosting and keep the "UP" key pressed for more than 5 seconds. Repeat the procedure until the evaporator is completely clean. Check after 12 hours.
 - Periodically clean (at least **each month**) the condenser by removing dust and grease. If the room where the unit is installed is very dusty, you can clean it more frequently.
 - **Every four months** clean the fastened and mobile contacts, for all the counters and replace them if they show signs of deterioration.
 - Check (**every four months**) the tightening of all the electrical terminals both inside the panels and on the terminal blocks of each electrical utility; carefully also check tightening of the fuse elements.
 - Visually check the entire refrigerant circuit, also inside the machines, to search for refrigerant leaks, which can also be found looking for traces of lubricating oil. If in doubt, prompt, in-depth intervention is required. Check for refrigerating gas leaks:
 - for systems with **3 kg ≤ refrigerant load < 30 kg** the control must be **annual**;
 - for systems with **30 kg = refrigerant load < 300 kg** the control must be **six-monthly**;
 - for systems with a **refrigerant load ≥ 300 kg** the control must be **quarterly**.
 If a leak is detected, immediate intervention is required and an audit must be conducted **within 30 days** to ensure the repair was efficient.
 - **Every four months check** the regular flow of the refrigerant in the light on the liquid line.
 - **Every four months** check the level of oil using the specific light (where present) on the compressor carter.
 - **Every four months** use the passage light glass on the liquid line to examine the colour of the element sensitive to humidity. Green indicates dry, yellow indicates humidity. If humidity is indicated, stop the machine immediately and replace the filter on the liquid, replace the refrigerant and oil load. Repeat the control after 3 days of functioning.
 - **Every four months** check the noise of the compressor. This operation should be conducted with care because it requires the system to be functioning; check the presence of ticking or vibrations which are synonymous with breakages or excessive mechanical ranges between the moving parts.
- Regularly** check the drainage of condensate water is not clogged. For the MBP and LBP models, check the water drainage tolerance is efficient.



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

6.3.2. Interventions on safety valve (where planned)

Replacing the safety valve is recommended when it has been triggered; during draining, in fact, accumulation of work residues from components and pipes on the valve gasket can make the seal defective when closed again.



DANGER: before replacing the valve, make sure that in the area where you are working the system is not under pressure or at a high temperature.



DANGER: do not remove the safety valve without first having recovered the gas inside the liquid receiver.



ATTENTION: no maintenance is required for the safety valve. Removal of the valve cap or tampering with the seal are considered unauthorized calibration changes; this results in expiration of the manufacturer's warranty. Safety valve inspection is restricted to the authorities and is governed by the specific laws currently in force in the country where installed.

Safety valve inspection is recommended every three years.

6.4. Out of service, dismantling and demolition

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



6.4.1. Machine placed out of service

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

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

6.4.2. 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 6.2.3 - 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.

6.4.3. 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.

7. Optional

On the machine, on request of the client, it is possible to have the following optionals.

R134A GAS

An alternative to the standard R404A, the machine can be designed to use different refrigerating gases, recognised by the machine code (on the CE identification plate on the machine). Y=R134a.

WATER CONDENSATION

This is obtained by replacing the air condenser with a water condenser.

In order to connect the water condensers, pipes must be used with a diameter that is not less than the ones already used on the Blocksystem FS and respecting the inputs and outputs. If the unit is sized for cooling tower condensation, the input pipe has a coupling that connects the two smaller sectioned condenser pipes. When condensation is to be carried out using cistern water, the input pipe can be distinguished by the barostatic valve that regulates the water flow. Install the shutoff valve for the water supply line near the operator.



ATTENTION: never close the water shut-off tap with the device functioning.

To improve the yield and duration of the machine, check that:

- ▶ the temperature of the water is between 20 and 30°C for the units with tower water condensate and between 5 and 20°C for units with well water condensate;
- ▶ water pressure is between 1 and 5 bar.



ATTENTION: the water tubes must be protected from low external temperatures.

CONDENSER FANS PRESSURE SWITCH (optional – where not standard)

Stops the condenser fan when condensation pressure goes under the calibration value less the differential.

CONDENSER FAN VELOCITY TRANSFORMER

Regulates the fan velocity of the condenser based on the condensation pressure, to maintain it within the limits established. It is connected to the high pressure circuit. The instructions for use are attached to the machine documentation.

MINIMUM PRESSURE SWITCH (optional – where not standard)

Stopping the machine, it intervenes when pressure in the suction circuit goes under the calibrated value less the differential. This occurs as the result of a fault.

THERMOSTAT VALVE EXPANSION (where not an optional)

If the lamination unit is the thermostat valve, the refrigeration system comes with a liquid receiver and a thermostat valve after the condenser.

CARTER TOLERANCE

Used to heat the compressor carter before start-up and keeping it warm during stoppage. The heat produced by the tolerance causes the evaporation of any refrigerant in liquid state which is found inside the compressor.

REMOTE PANEL (where not standard)

Allows positioning of the control panel at a certain distance from the machine, for example beside the door of the coldroom (maximum distance 100 m).

VOLTAGE MONITOR

Device that enables machine protection from low and excess voltage.

DIFFERENTIAL THERMO-MAGNETIC SWITCH

Device that protects the machine from surges, short circuits and indirect contacts.

ADDITIONAL MODULE FOR MASTER/SLAVE FUNCTIONING

Enables connection together of 2 Blocksystems FS in a coldroom with the possibility of synchronised functions (defrosting, alarm-temperature displays and Blocksystem FS running).

ADDITIONAL MODULE FOR MONITORING, REGISTRATION AND TELEMAGEMENT

Allows connection of the Blocksystem FS to a telemagement system.

DIFFERENT VOLTAGE

The last digit on the abbreviation of the machine model identifies the voltage according to the following diagram:

1	230/1/50 Hz
2	400/3/50 Hz
3	110/1/60 Hz
4	220/3/60 Hz
5	220/1/60 Hz
6	460/3/60 Hz
7	380/3/60 Hz
8	230/3/50 Hz

TELEMANAGEMENT SYSTEM

Enables monitoring and programming of the Blocksystem FS via a PC or data recorder. It gives the possibility of advanced management (communication via modem or GSM) of all the Blocksystem FS alarms.

8. Faults search

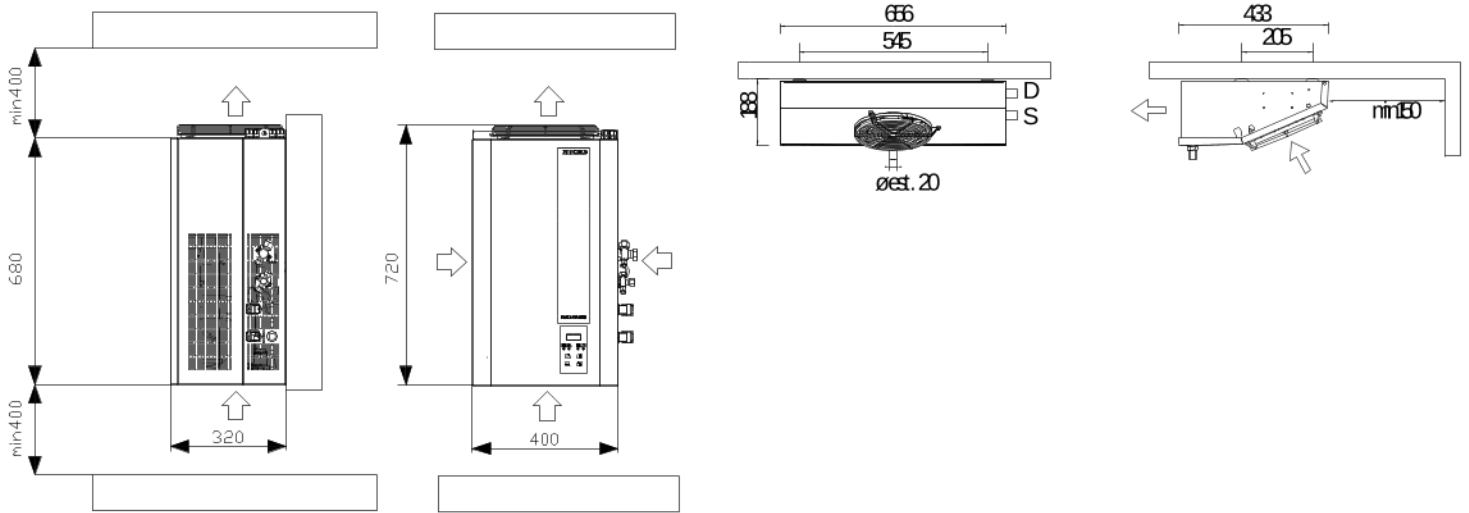
	POSSIBLE CAUSES	SOLUTIONS
A	<p><u>The compressor does not start up and does not release a humming sound</u></p> <ol style="list-style-type: none"> Lack of voltage. Start-up relay with open contacts. Thermal protector is intervening. Loose electrical connections or wrong electrical connections. 	<ol style="list-style-type: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

	POSSIBLE CAUSES	SOLUTIONS
L	Frosted suction piping	
	1 Expansion valve with excessive passage of gas or oversized.	1 Adjust the valve or substitute it with a correctly sized one.
	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.	

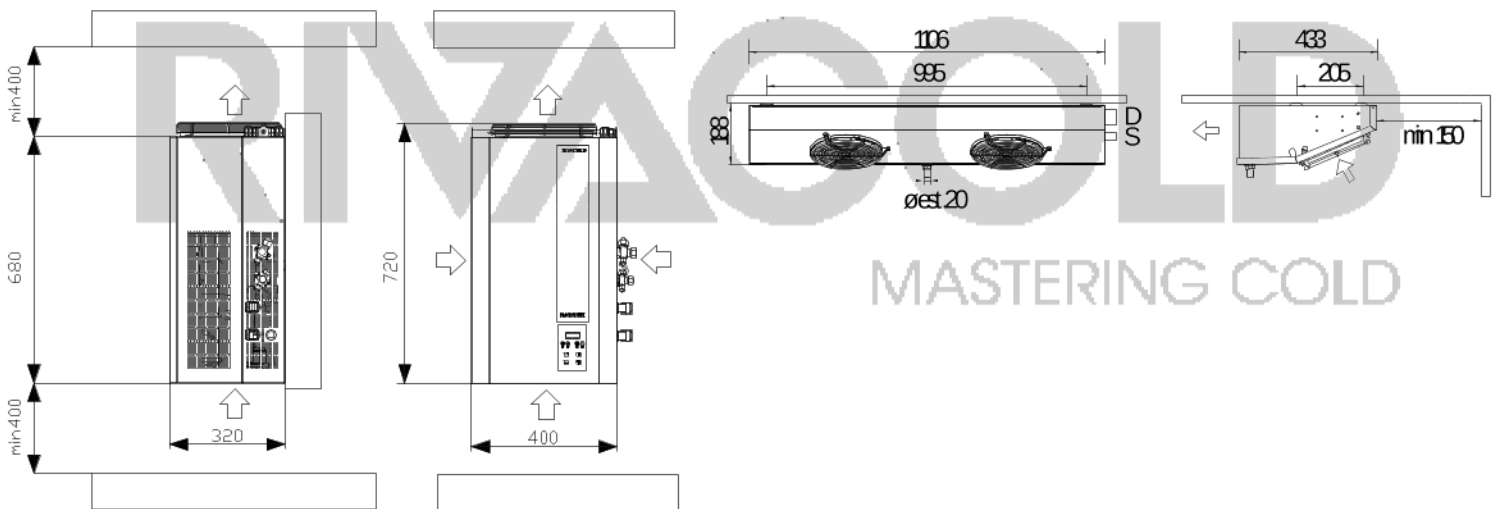
RIVACOLD
MASTERING COLD

9. Attachment

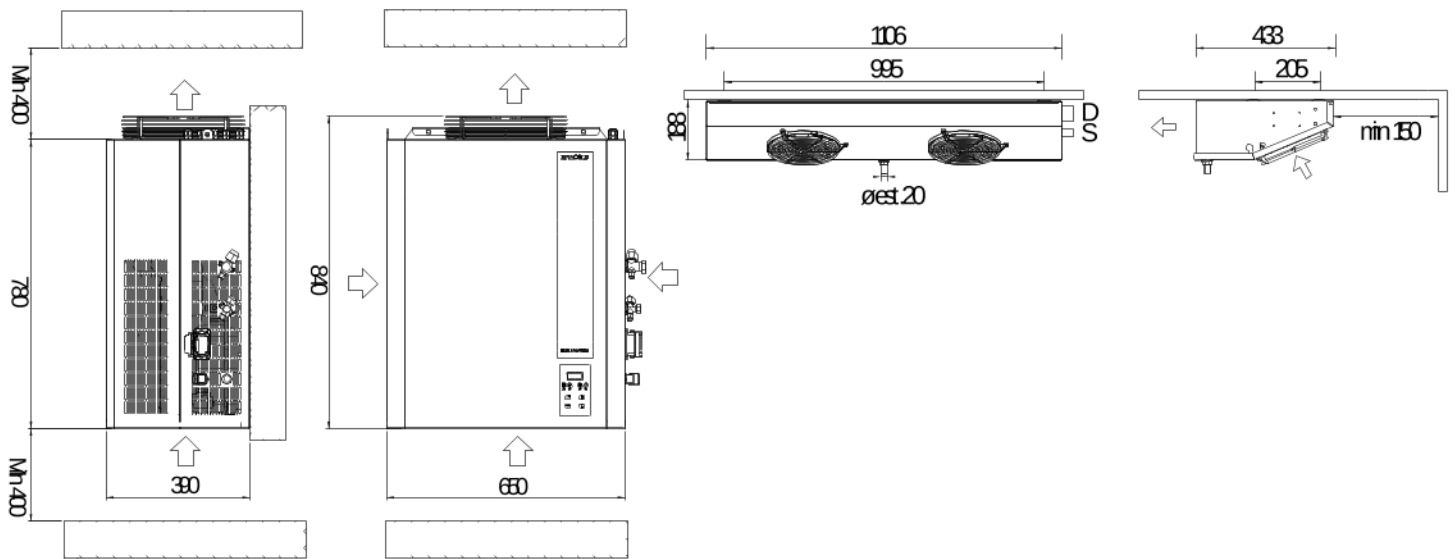
Schede Tecniche modelli Blocksystem FS



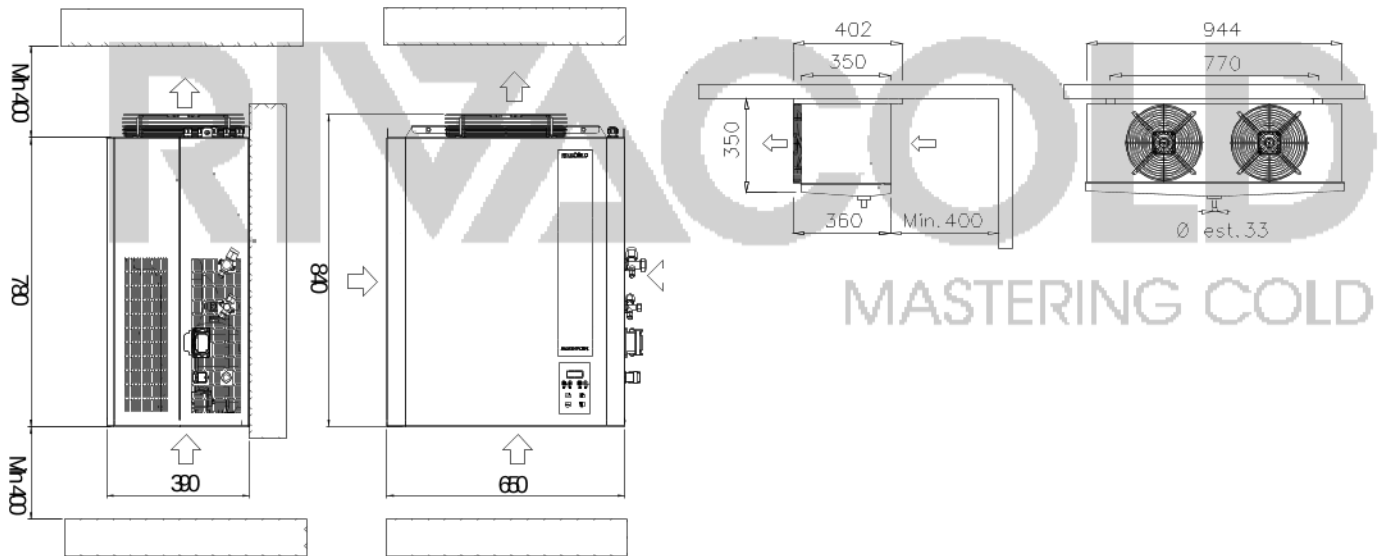
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
FSH003Z_	10	6	40	8	FSM003Z_	10	6	41	8	FSL003Z_	10	6	50	8
FSH006Z_	10	6	42	8	FSM006Z_	10	6	43	8	FSL006Z_	12	6	54	8



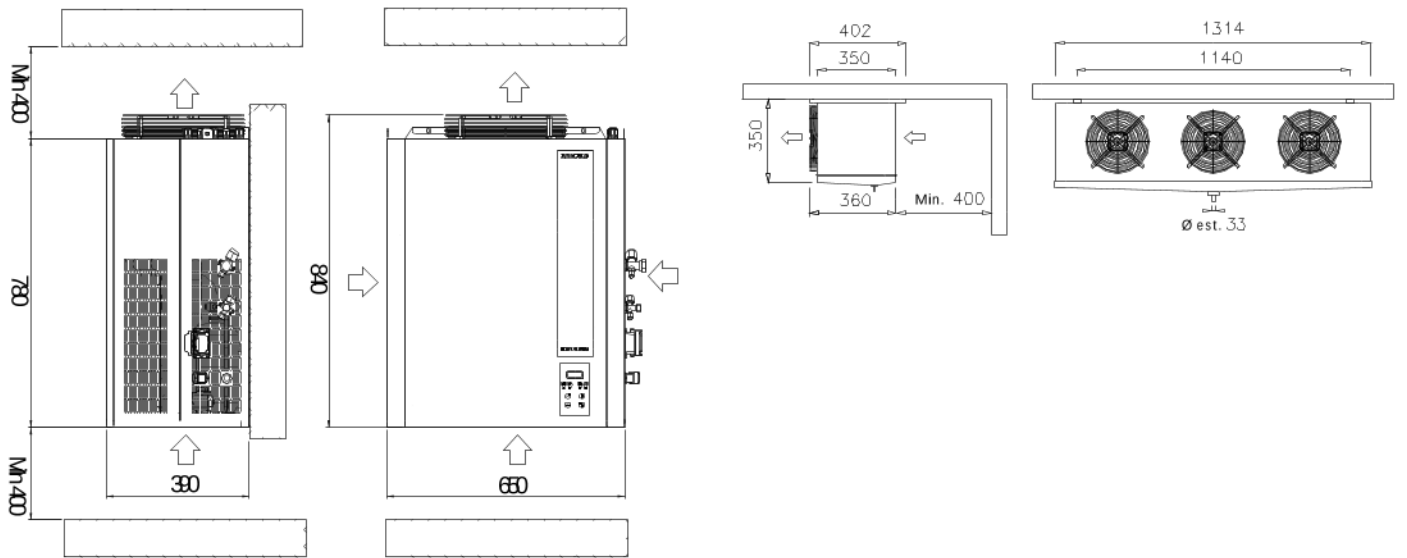
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
FSH007Z_	12	6	43	12	FSM007Z_	12	6	44	12	FSL009Z_	12	6	54	12
FSH009Z_	12	6	43	12	FSM009Z_	12	6	46	12					
FSH012Z_	12	6	46	12	FSM012Z_	12	6	49	12					



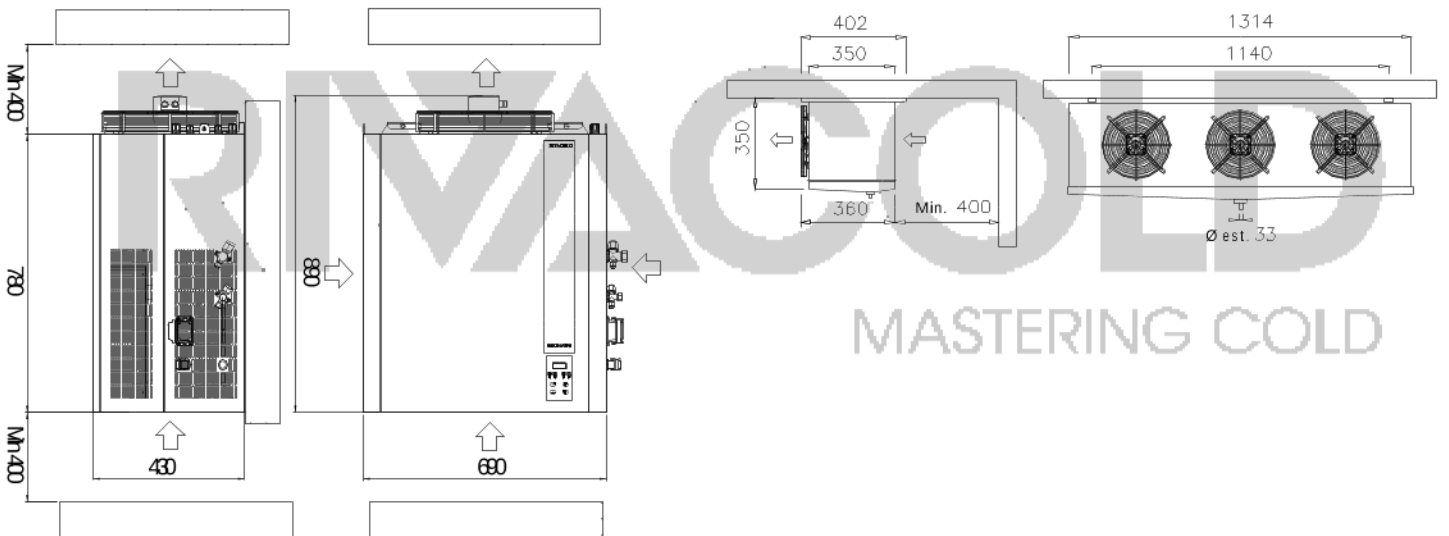
HBP					MBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
FSH016Z_	12	6	66	12	FSM016Z_	12	6	66	12



HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
FSH022Z_	16	10	65	18	FSM022Z_	16	10	66	19	FSL012Z_	16	10	59	19
										FSL016Z_	16	10	70	19



HBP					MBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
FSH028Z_	16	10	66	25	FSM028Z_	16	10	67	27



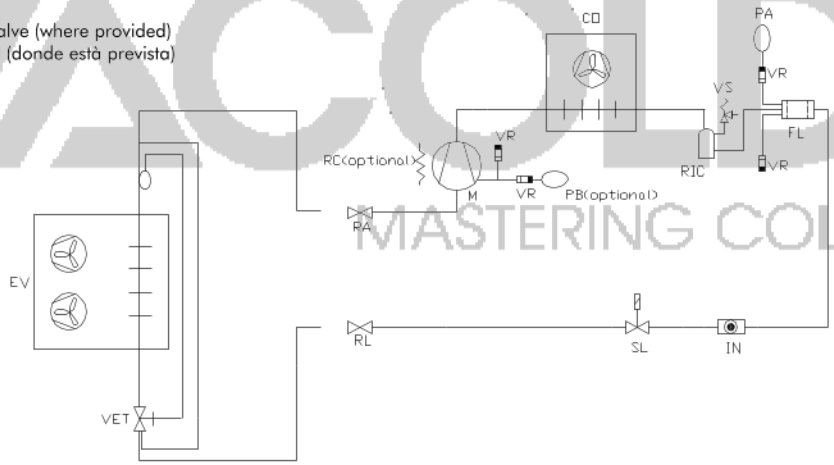
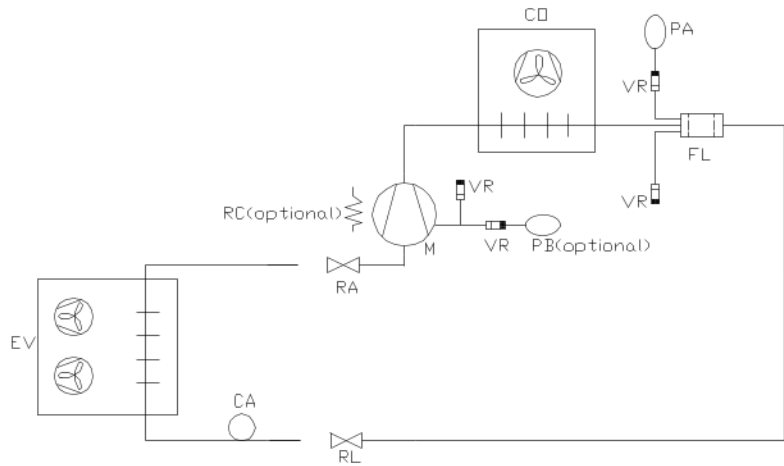
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
FSH034Z_	16	10	75	25	FSM034Z_	16	10	75	27	FSL020Z_	16	10	84	27
FSH040Z_	16	10	83	28	FSM040Z_	16	10	83	30	FSL024Z_	16	10	84	27

**Schema frigorifero standard/Standard Refrigerating Diagram/ Schéma de réfrigération standard
Esquema frigorífero estándar/Schemen Standardkühlschrank**

Legenda/Legend/Légende/Leyenda/Legende

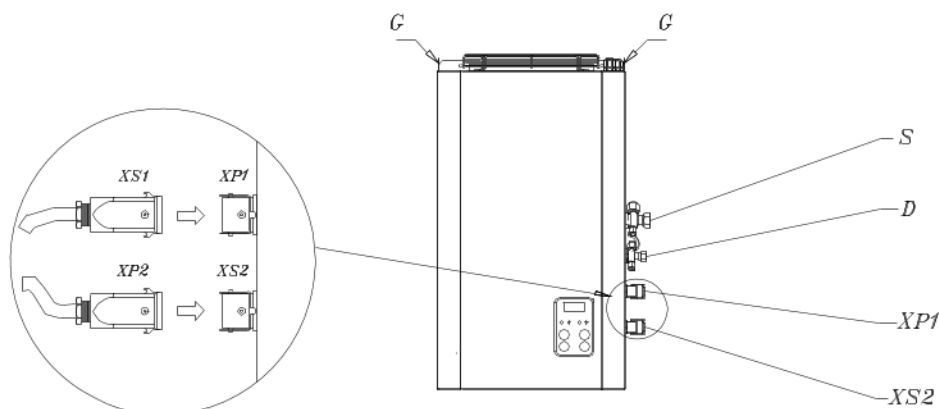
- CO= Condensatore/Condenser
Condenseur/Condensador
Verflüssiger
- M= Compressore/Compressor
Compresseur/Compresor
Verdichter
- PA= Pressostato di alta/HP pressure switch
Pressostat haute pression/Presostato de alta
Hochdruckschalter
- PB= Pressostato di bassa /LP pressure switch
Pressostat basse pression / Presostato de baja
Niederdruckschalter
- FL= Filtro deidratatore/Drier filter
Filtre déshydratateur/Filtro deshidratador
Trockner
- SL= Valvola solenoide liquido/Liquid solenoid valve
Vanne solénoïde liquide/Válvula solenoide líquido
Magnetventil Flüssigkeit
- EV= Evaporatore/Evaporator
Évaporateur/Evaporador
Verdampfer
- RC= Resistenza carter /Crankcase heater
Résistance carte /Resistencia carter
Gehäuse-Heizwiderstand
- RIC= Ricevitore di liquido/Liquid receiver
Récepteur/Receptor de líquido
Flüssigkeitssammler
- CA= Capillare/Capillary tube
Tube capillaire/Capilar
Kapillar
- VS= Valvola di sicurezza (dove prevista) / Pressure relief valve (where provided)
Vanne de sûreté (lors équipé) / Válvula de seguridad (donde está prevista)
Sicherheitsventil (wenn bereits vorgesehen)
- IN= Indicatore di liquido/ Sight glass
Indicateur de liquide/ Indicador de líquido
Flüssigkeitsanzeige
- VET= Valvola di espansione termostatica
Thermostatic expansion valve
Vanne thermostatique d'expansion
Válvula de expansión termostática
Thermostat-expansionsventil
- RA= Attacco linea di aspirazione
Suction line connection
Connexion ligne aspiration
Conexión línea de aspiración
Sangsanschlussleitung
- RL= Attacco linea liquido
Liquid line connection
Connexion ligne liquide
Conexión línea de liquido
Flüssigkeitsanschlussleitung
- VR= Valvola di ricarica / Recharge valve /
Vanne de rechargement /Válvula de recarga
Ladeventil

**Espansione a valvola/ Valve expansion/Expansion à vanne
Expansión por válvula/ Ventilausdehnung**



	RC	PB
HBP	OPTIONAL	OPTIONAL
MBP	OPTIONAL	OPTIONAL
LBP	OPTIONAL	OPTIONAL

**Tubazioni precaricate /Pre-charged pipe connections
Tuyaux préchargés / Tubos de conexión pre-cargados
Vorgefüllte Kältemittelleitungen**



Legenda / Key / Légende / Leyenda / Legende

S = Tubo di aspirazione/Suction pipe/Tube d'aspiration/Tubo de aspiración/ Saugrohr

D = Tubo di mandata/Discharge pipe/Tube de refoulement/Tubo de envío/ Druckrohr

XP1 = Spina connettore sonda/Probe connector plug/ Fiche connecteur sondes/Enchufe conector sondas/ Stecker Sonde

XS1 = Presa connettore sonda/Probe connector socket/ Prise connecteur sondes/Enchufe conector sondas/Steckdose Sonde

XP2 = Spina connettore ventole e resistenze/Fan and heater connector plug/Fiche connecteur ventilateur et résistances/ Enchufe conector ventiladores e resistencias/ Stecker Ventilatoren und Heizwiderstände

XS2 = Presa connettore ventole e resistenze/Fans and heaters connector socket/Prise connecteur ventilateur et résistances/Enchufe conector ventiladores y resistencias/ Steckdose Ventilatoren und Heizwiderstände

G = Ganci di sollevamento/Lifting hooks/Crochets de levage/Ganchos de levantamiento/Transporthaken

BLOCKSYSTEM	LIQUID LINE	SUCTION	Pipe connections m 2	Pipe connections m 5	Pipe connections m 10
FSH003Z001	6	10	KIT2610/Z	KIT5610/Z	KIT10610/Z
FSH006Z001	6	10	KIT2610/Z	KIT5610/Z	KIT10610/Z
FSH007Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSH009Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSH012Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSM003Z001	6	10	KIT2610/Z	KIT5610/Z	KIT10610/Z
FSM006Z001	6	10	KIT2610/Z	KIT5610/Z	KIT10610/Z
FSM007Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSM009Z001	6	12	KIT2612/Z	KIT5612/E	KIT10612/E
FSM012Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSL003Z011	6	10	KIT2610/Z	KIT5610/Z	KIT10610/Z
FSL006Z011	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSL009Z011	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z

FSH016Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSH022Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSH028Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSM016Z001	6	12	KIT2612/Z	KIT5612/Z	KIT10612/Z
FSM022Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSM028Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSL012Z011	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSL016Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z

FSH034Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSH040Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSM034Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSM040Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSL020Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z
FSL024Z012	10	16	KIT21016/Z	KIT51016/Z	KIT101016/Z

Schema Elettrico

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Componentistica presente sulla macchina non realizzata dal
Fabbricante

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