

USE AND MAINTENANCE HANDBOOK



ST-SP



RIVACOLD

MASTERING COLD



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1. General Information

1.1 General Information

This Use and Maintenance Handbook is an integral part of the BLOCKSYSTEM ST-SP (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 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 ST OR SP.

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:

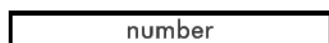
- ▶ this symbol identifies a generic pointed list or a pointed list formed by simple actions (the order in which the actions are presented is not binding, but recommended);
- 1. in this way an explanatory numbered list identifies a complex procedure (the order in which the actions are presented is binding to correctly and safely conduct the intervention in question).

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

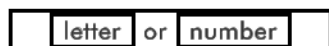
- ▶ cross references; cross references used in this handbook are expressed in the following format: "Paragraph/Figure/Table" with the number and, generally, the specification of the "Chapter" with the number and relative name (when not specified it is assumed the paragraph, table or figure belongs to 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 ST-SP 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 3.7 – 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)
 Italy
 Telephone: (+39) 0721 919911
 Fax: (+39) 0721 490015
 E mail ufficiotecnico@rivacold.com

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

2. Machine description

The machine is a cooling system consisting of an external condensing unit, an internal evaporating unit, and an electronic control panel housed within the condensing unit. The refrigerant follows the compression refrigeration cycle. The machine is available with a defrost system incorporating heaters (type MBP and LBP) or ventilation (type HBP), managed by an electronic control unit. Defrost is automatic and the user can set the cyclic frequency; or manually operate it via a suitable control unit.

This technology enables us to provide a simple, easy to install and versatile product. The use of advanced technology permits us to supply a machine with compact dimensions perfect for installation in small areas.

The ST-SP range is available in two different versions: the first loaded with nitrogen and all models supplied with tap connections, and where available a second loaded with refrigerant and supplied with quick release couplings; in this case it is possible to request connection pipes preinstalled.

Models codes are as follows:

- ST-SP = loaded with nitrogen and tap connections.
- ST-SP/R = loaded with refrigerant gas, quick release couplings and a pipe kit 2.5/5/10 m long.

The ST model is a split Blocksystem, floor or roof-mounted to refrigerate cold rooms ranging from 1/3 HP to 10 HP.

The SP model is a split Blocksystem, wall-mounted to refrigerate cold rooms ranging from 2 HP to 20 HP.

2.1 Control panel

Table 2 below describes the control panel.

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Figure 1 Control panel

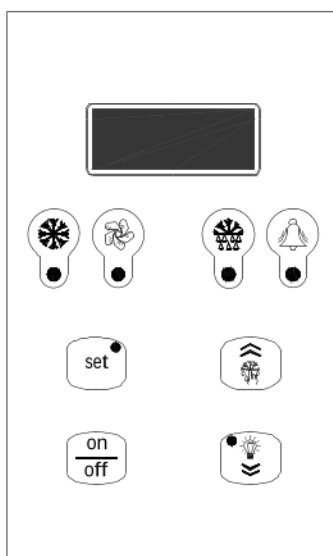






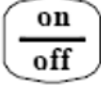



Table 2 – commands descriptions.

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.
	"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 machine is supplied with the following:

- Fixed guards on all sides of the machine, enclosing the entire condenser and evaporator units.
- Fixed guards made of wire mesh or plastic where moving parts are involved.
- Safety signs on all machine guards.

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 Residual Risks During the Installation and Connection Phases

During the Installation and connection there are risks associated with:

- Machine operation by unqualified, untrained, uninformed or improperly equipped staff;
- Contact with electrically live components;
- Impact or crushing by machine components when moving;
- Tripping or falling over power supply connections;
- Ejection and/or contact with the refrigerant gas loaded;
- Machine damage during installation and connection.

3.3.2.2 Necessary Individual Protection Devices



3.3.2.3 Signs Present

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

3.3.2.4 Attention Warnings During Installation and Connection Phases

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

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

3.3.3 Machine use

3.3.3.1 Residual Risks during Machine Use Phase

During machine use the following risks are present due to:

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

3.3.3.2 Necessary Individual Protection Devices



3.3.3.3 Signs Present

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

3.3.3.4 Attention warnings during machine use

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

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

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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 during condenser cleaning

3.5 Work Area and Position of the Operator

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

3.6 Noise and Vibration Indications

3.6.1 Noise

BLOCKSYSTEM ST-SP 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 ST-SP 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 **solely** for permanent industrial and commercial refrigeration. The ST Blocksystem **must** be installed on an horizontal surface; the SP Blocksystem on a vertical one.

The MACHINE can **only** use the refrigerant gas it has been designed for (typically R404A). Alternatively the manufacturer can supply models able to use other refrigerant gases (e.g. R134a). Check the machine tag to identify the correct refrigerant gas to use.

The machine was designed and built to be operated in areas **without the risk of explosion**, the machine itself however does not create this type of risk. The machine must be adequately protected from the elements.

It is good practice to place powder fire extinguishers near the machine. To reduce the risk of fire it is necessary to keep plastic parts, oils, solvents, paper and rags away from the machine.

Use of the machine other than that stated can cause harm to people or damage the actual machine itself, and is deemed as **improper use** for which the Manufacturer cannot be held responsible.



WARNING: *in the case of different use it is essential to previously contact the Technical Department of the Manufacturer.*

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

A suitable EC machine identification tag is mounted on the machine identifying the following, and must also be stated in all communications with the manufacturer regarding servicing and/or spare part requests. It is located on the condensing unit (Picture 2).

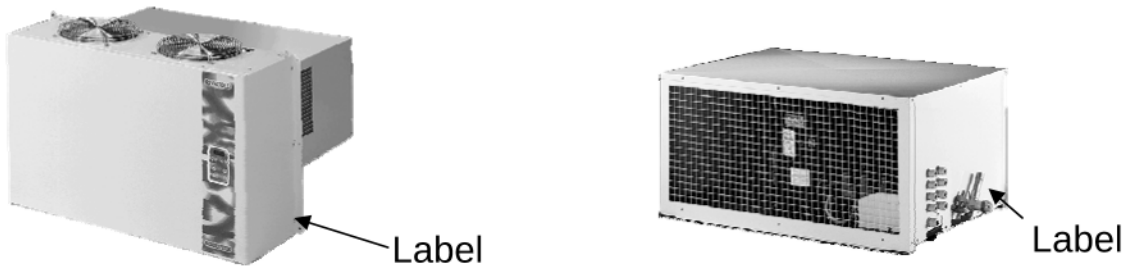
Information listed:

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

Identification of the Serial Number

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

Picture 2 – Position of the identification plate CE.



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 information contained in this paragraph is required when the machine is transported and handled during the situations below described:

- storage of the machine;
- assembly and initial installation of the machine;
- un-installation and disassembly of the machine;
- movement and relocation of the machine.



DANGER:

the Manufacturer cannot be held responsible for any damage to property and/or people arising from improper operations carried out by unqualified, untrained or unauthorised staff.

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



During machine transportation or handling it is necessary to follow the instructions below:

- check that the lifting equipment is suitable for the machine's size and weight (check the specifications of the Blocksystem ST-SP type as stated in Chapter 9 - Attachments).
- Do not damage whatsoever the machine's structure or guards with tools.

4.2.1 Lifting



DANGER: *all lifting operations must be carried out under the direct supervision of a qualified mechanical serviceman or technician appointed by the Manufacturer.*

The lifting and subsequent positioning of the machine can be carried out by any suitable means ensuring effective and safe handling (for example a hoist with a harness system).

To correctly carry out lifting operations, follow the instructions below.

- ▶ Never use two lifting means simultaneously.
- ▶ Never stand under suspended loads.
- ▶ If steel wire ropes are used, always use a correct eye with the lifting hook.
- ▶ If steel wire ropes are used, be careful not to create folds with a radius of curvature lesser than the one of the eyes at the end of the rope.
- ▶ Use ropes of suitable length so that the angle between the ropes and the horizontal plane is always greater than 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 lose 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 cannot be held responsible for any damage to property and/or people arising from improper operations carried out by unqualified, untrained or unauthorized staff.*

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



The Blocksystem ST-SP **must** be installed in well ventilated areas. As well as this the Blocksystems ST **must** only installed on a horizontal surface while the Blocksystem SP on a vertical one. In the case of any other type of installation contact the manufacturer.



ATTENTION: *before installation it is necessary to develop a plan for refrigeration system defining: a) all components of the system, including the condensing unit, the evaporator, the distribution, the thermostatic valve, the front cell electric panel, the size of the pipes, any safety devices, etc.. b) the location of the plant; c) the path of the pipes.*

Leave enough space around the machine to carry out maintenance operations safely.

Also during installation leave enough space around the machine to carry out maintenance operations safely.

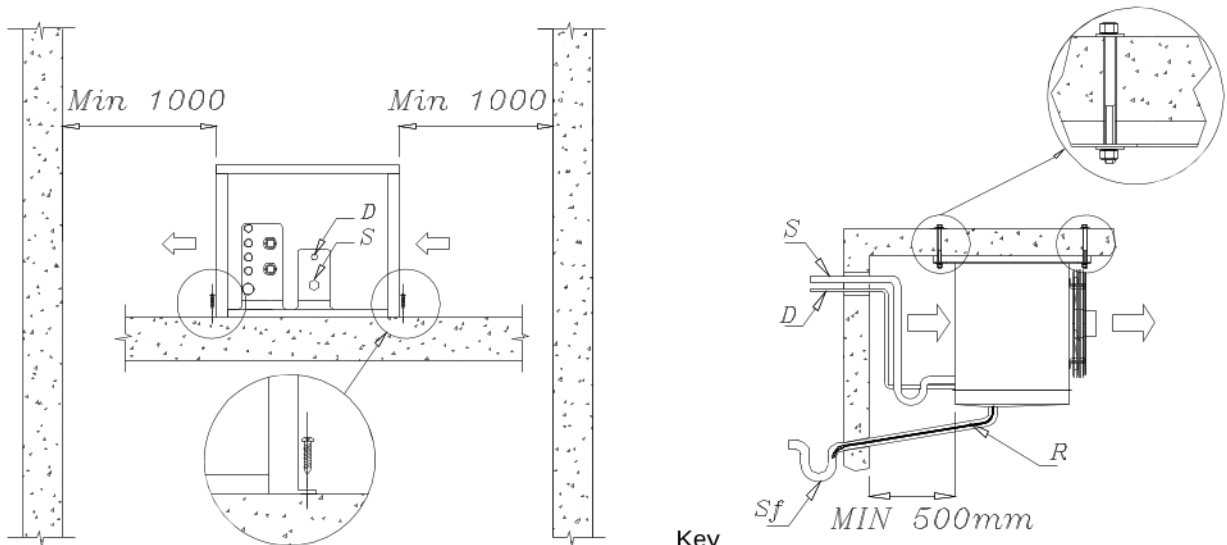
For correct machine operation, the following minimum thickness of the cell walls are recommended (insulating polyurethane): MBP and HBP cell insulation thickness **60 mm**; LBP cell insulation thickness **100 mm**.

4.3.1 Blocksystem ST-SP Installation Methods

To install the machine follow the procedure below:

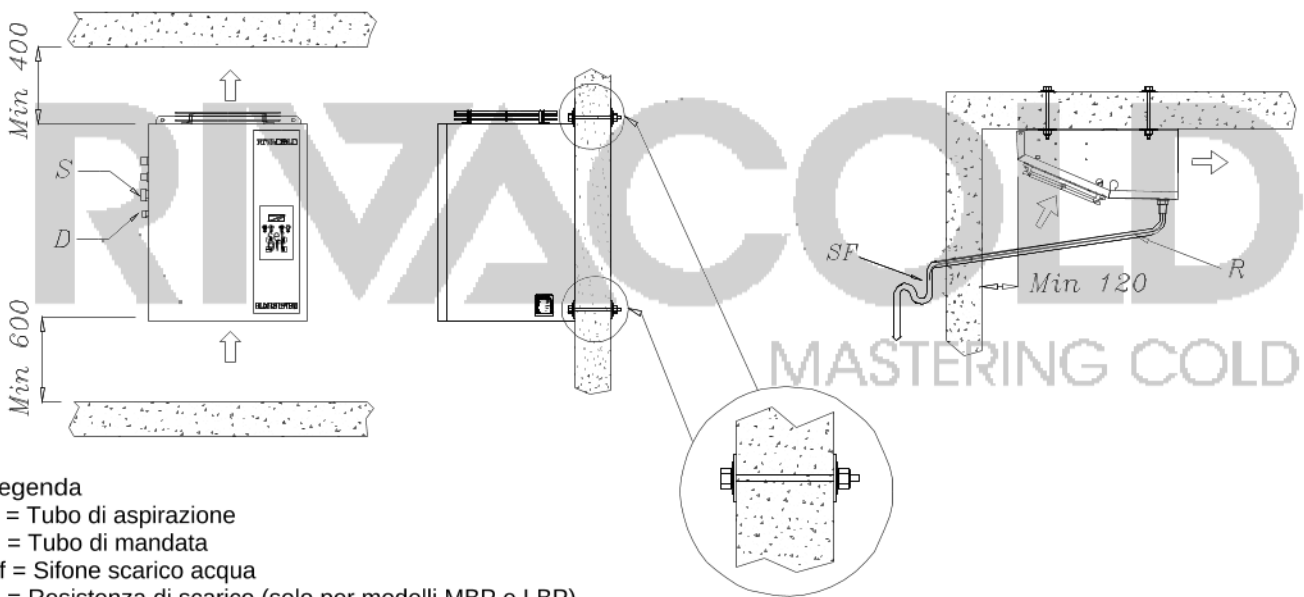
1. Raise the machine by a suitable means, with correct lifting hooks.
2. For the Blocksystem ST, fix the condensation unit on the floor or ceiling with the 4 screws as shown in Picture 3. For the Blocksystem SP, fix the condensation unit to the vertical wall with the 4 screws as shown in Picture 4, always leaving a minimum ground clearance of 600 mm.
3. Continue by fixing the evaporator inside the cell with the 4 steel bolts (Picture 3 for ST picture 4 for SP).
4. Lengthen the discharge pipe of the evaporator tank with a rubber hose (minimum temperature resistance: 90 °C) to the outside of the cell to create a siphon (Picture 3 for ST and Picture 4 for SP). N.B. in the case of the MBP and LBP models insert the discharge resistance into the hose.
5. Make a hole in the wall of the cell (Picture 3 for ST and Picture 4 for SP) to pass the feeding and aspiration pipes and water drain hose.
6. Make a hole to pass the following cables: power, evaporator fan, discharge resistance, defrost heater, and cell light.

Picture 3 installation ST machine



Key
 S = Suction pipe
 D = Discharge pipe
 Sf = Water drainage siphon
 R = Drainage heater (MBP and LBP models only)

Picture 4 installation SP machine



Legenda
 S = Tubo di aspirazione
 D = Tubo di mandata
 Sf = Sifone scarico acqua
 R = Resistenza di scarico (solo per modelli MBP e LBP)

7. Make another hole for the micro-port cable, the temperature probes and defrost end. **N.B. it is necessary that these cables are placed away from the ones which carry the electrical power to avoid signal interference.**



ATTENTION: the SPM300 / SPM370 / SPL350 / SPL450 models are supplied with two support legs. For the mounting position, see the corresponding technical sheet shown in Paragraph 9 - Attachments.

Installation of the Evaporator

See Picture 3 and Picture 4 and the specifications listed in Chapter 9 - Attachments.

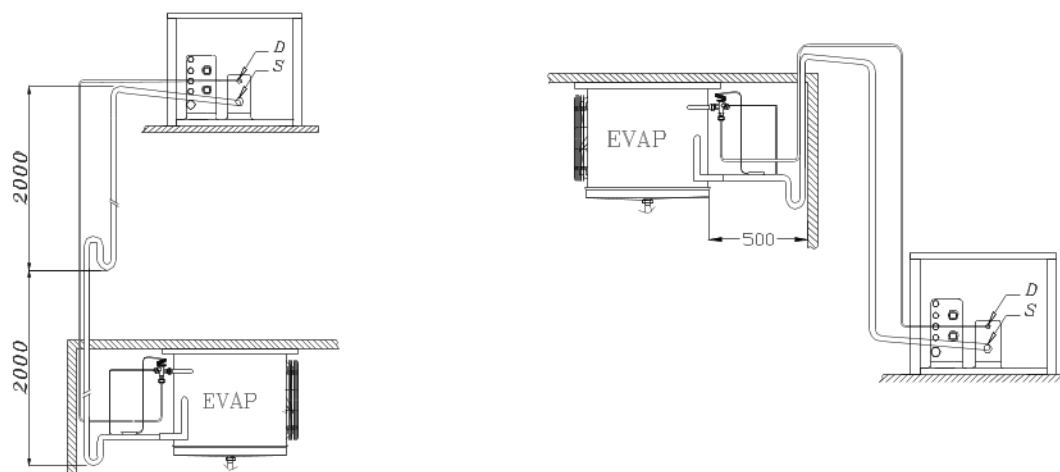
Refrigerator Connection

To carry out this connection provide the liquid and aspiration pipe, according to the diameters of the connections present on the machine.

The recommended diameters correspond to the maximum lengths of 10 meters. For greater lengths the diameters must be resized to ensure the correct gas speed.

The pipes must be fixed to the wall at all corners, welds, or every 1.5-2 meters along straight sections.

Picture 5 position mode condenser – evaporator



Suction Line Insulation

With an evaporation temperature below $-10\text{ }^{\circ}\text{C}$ the suction lines must be insulated with an anti-condensation pipe at least 13 mm thick, to limit overheating.

Oil Return

All systems must be designed to guarantee oil return to the compressor. In the situation shown in Figura 5, with the condensing unit located above the evaporator, it is important to provide siphons on the suction line every 2 m in height difference to ensure oil return to the compressor. However in the case of horizontal sections, it is important that the suction line has a slope of at least 3% towards the compressor.

Oil Adding

In most cases for systems where the pipes do not exceed 10 meters, it is not necessary to add oil. If the pipes are over-sized compared to normal or higher than 10 feet, a small amount of oil needs to be added.

Vacuum

Crucial for correct functioning of the refrigeration system and long life of the compressor, correct vacuum must be run into the system, ensuring the content of air, and especially humidity, are below the values permitted. The introduction of the new gases requires the use of new polyester oils having higher hygroscopic characteristics that require more attention when running the vacuum; so it is recommended to run the vacuum on both sides of the circuit. In any case, the target to be achieved is to obtain a pressure not exceeding 5 Pa.



ATTENTION: to avoid irreparable damage to the compressor do not start it in a vacuum condition and without the gas loaded.

ATTENTION: during the vacuum and loading stage remember to power up the solenoid valve coil of the liquid line.

Refrigerant Loading

After the vacuum operation, the system must be loaded with the refrigerant type indicated on the EC tag or any alternative type. For correct loading it is recommended, after having run the vacuum, to pump part of the refrigerant into the compressor to "break the vacuum"; then start the compressor to suck the remaining required to complete the loading process.

To ensure the correct amount of gas has been loaded, use the pressure gauges connected to the pressure intakes provided; the pressure must comply with the correct working conditions of the machines.



ATTENTION: the refrigerant gas mixtures must only be loaded into the system in the liquid state. The loading operations must be carried out only by qualified staff.



DANGER: For loading, recovery and refrigerant check operations, wear gloves to protect against low temperatures.

Leakage Control

A system can only operate regularly over time, throughout the life of the compressor, if all the requirements related to the installation are correctly carried out, also taking into account the leakage of refrigerant. It has been estimated that a refrigerant leakage equal to that of 10% of the total system loaded, in 15 working years of the compressor, will still allow the correct operation of the cooling system. With the new gases (R134a, R404A and mixtures) the risk of leakage through poorly carried out welds and connections is greater due to the reduced molecular size of the gas, therefore it is essential that welds are checked for leakage using suitable methods and equipment for the gas concerned.

Crankcase Heater (optional)

If the compressor operates at a temperature below $+5\text{ }^{\circ}\text{C}$, it is advisable to use a crankcase heater to prevent the accumulation of liquid at the bottom of the compressor during periods of inactivity, inevitably requiring choking of the condenser, for example by reducing the air inlet (e.g. by the speed adjuster).

Working Cycle

The systems must be set up so as not to exceed 5 on /off cycles per hour. Activation of the Thermal/Power protection system shuts down the compressor, and can be re-started only after the protection system has been re-set.

Operation Time

The systems must be set up to run at a maximum of 80% of normal operational time. 100% compressor operation can only occur under severe load or environmental temperature conditions, outside normal operational limits.

pressure switch

All machines are equipped with a safety HBP pressure switch calibrated to a max. 28bar. The safety LBP pressure switches, are calibrated according to the gas used and the compressor mode. It is recommended to use the values shown in the following table:

	Gas	°C=[bar]	Set	Differenziale
LBP Applicazione MPB	R404A	-25 °C= 1,5 bar	3 bar	1,5 bar
LBP Applicazione LBP	R404A	-46 °C=0 bar	3 bar	3 bar

Safety Valves on the Liquid Receiver

The machines under risk category 0, are not fitted with a safety valve.

The machines under risk category ≥1, are fitted with a safety valve.

The risk category of each machine is stated on the identification tag mounted on the machine.

4.3.2 Connection to the mains

The power supply (in terms of voltage and frequency) is provided by the Purchaser and must be sufficient to correctly power the machine. It is also important to take into account the following:

- ▶ The power cable must be well tensioned (avoiding twisting and overlapping), not exposed to possible damage or tampering by children, placed far away from liquid, water or heat, and must be in good condition (when damaged it must be replaced by qualified.)
- ▶ Place a suitable differential thermo-switch, between the power cable and the machine, complying with all current legislation of the country the machine is to be installed; ensuring the line voltage matches the voltage indicated on the tag (see the tag mounted on the machine); a tolerance of allowed ±10% is allowed of the rated voltage.



ATTENTION: *the differential thermo-switch must be placed near the machine so that it can be easily seen and accessed by technicians if maintenance is required.*

- ▶ It is necessary that the size of the power cord is adequate for the power consumption of the machine.



ATTENTION: *It is mandatory, according to law, to ensure that the machine is correctly electrically grounded. All liability is declined if this is not carried out; any liability is declined if the electrical system to which the plant is connected to is not compliant with all current regulations.*

- ▶ Mount the door-switch supplied to the door of the cell: which every time the door is opened turns on the internal light, and shuts down both the compressor and condenser fans.



ATTENTION: *the door-switch cable and any other control cable must be placed far away from the ones powered with electricity to avoid signal interference.*

- ▶ Mount the cell light to the ceiling of the cell and connect the cable as described in the instructions in the supporting sheet.
- ▶ Using the LBP range (-15°/-25°C) a cable to connect the door resistor is provided. This connection must be carried out using a fuse sized according to the resistor used.



ATTENTION: *do not connect the CELL LIGHT and DOOR RESISTOR cables to the 230V line. The labels attached to each cable shows the connections to be carried out. The maximum power of the light that can be connected to the cell light cable (included) is 100W for an incandescent lamp and 66W for a neon lamp (power supply 230V-50Hz). The maximum power of the resistor that can be connected to the door resistance cable (included with all LBP models) is 300W (power supply 230V-50Hz).*

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 Starting / Shutdown

When the machine is powered "OFF" is flashed alternating with the temperature of the cell.

To turn on (off) the machine it is necessary to press the "ON/OFF" button on the control panel for more than 5 seconds.



ATTENTION:

when the machine is powered the notice OFF is displayed on the control panel alternating the temperature of the cell.

5.1.3 Parameter variation procedure

Functioning of the Blocksystem series SF, series P and series SV 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.

5.1.3.1 Coldroom temperature regulation

The fields of the temperature values for which the Blocksystem series ST and SP 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 Display

To display the machine status follow the procedure below:

1. press and release SET: the display shows "SEt" or "AAL" if there are any alarms present;
2. press UP or DOWN until the required parameter is displayed. The parameters can be:
 - AAL alarms in progress (if any)
 - SEt setpoint
 - Pb1 cell temperature probe value
 - Pb2 evaporator temperature probe value
 - Pb3 probe 3 value (if present)
 - Out outlet relays status
 - InP digital inlets status
3. press SET to display the value;
4. in the case of input or output alarms, press UP and DOWN to scroll the respective alarms present.
5. press SET or ON/OFF (or wait for the 5 seconds timeout) to return to the list of status;
6. press ON/OFF (or wait for the 5 seconds timeout) to return to the 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
		List of -CPr compressor parameters					
Ont	1	Compressor ON time in the event of probe failure	0 ... 60	min	15	15	15
OFt	1	Compressor OFF time in the event of probe failure	0 ... 60	min	15	15	15
		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					
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

Code	Level	Descr.	Range	Unit	MBP	LBP	HBP
		List of -dEF defrosting parameters					
dtY*	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		1	1	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	15	15	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]	10	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
		List of -FAn fan parameters					
FSt	1	Fans switch on temperature	-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

Code	Level	Descr.	Range	Unit	MBP	LBP	HBP
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
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:** To unlock the keyboard, simultaneously press "SET" and "ON/OFF" for at least 5 seconds.



****ATTENTION:** the "LAN" network parameter is only used in case of MASTER/SLAVE and TELEMAGEMENT functioning.

5.2 Alarm signals

If an alarm arises the circuit starts up the following:

- ▶ the display shows the related alarm code. Specifically the controller displays the alarm code and the temperature normally displayed alternatively;
- ▶ the alarm LED is lit;
- ▶ the alarm relay is activated.

For some alarms and alerts the led and/or the relay are not activated. By pressing any button the relay turns off (if activated) and the led flashes, while the alarm code remains displayed. The led turns off and the alarm code disappears only when the problem is resolved. Table 7 explains each alarm and related actions to be undertaken.

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
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

(*) Nothing is displayed.

(**) A network alarm is an alarm propagated by the master to all the network devices, when so programmed, if the alarm relay is activated on the master itself.

Under certain operating conditions, the signals listed on Tabella 8 are displayed.

Table 8 – 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 at start up the connection terminal / control does not work properly, the terminal displays "88.8" and 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:: *only properly trained technicians can undertake actions on any arising risks only after having carefully read this operating and maintenance manual. The Manufacturer disclaims any liability for any damage to property and/or people arising from improper activities carried out by unqualified, untrained or unauthorized staff.*



DANGER: *before carrying out any cleaning activities make sure the power supply is off, and all hot surfaces have cooled down.*

In the case of electronic control unit failure or any other anomaly where immediate replacement is not possible, the EMERGENCY SYSTEM can be used to keep the system operating until the replacement is carried out. To use this system, after having disconnected the machine, proceed as follows:

1. Remove all connections between the L terminals and the relays of the board (terminals 25-28 - 33-36-38);
2. as shown in the chart in Picture 6, connect a thermostat between the L terminal, the NO terminals (terminals 32,37) and the NC terminal (terminal 34) of the compressor, defrost and fan relays (COMP, DEF and FAN);
3. then connect the L terminal to the NO terminal of the ON/OFF relay (terminal 26 for the crankcase heater, door and discharge power supply if present);
4. reconnect the Blocksystm ST-SP to the supply line by setting the thermostat to the desired temperature.



DANGER: *this is a temporary connection! As soon as possible contact your dealer or the manufacturer directly to replace the damaged part.*

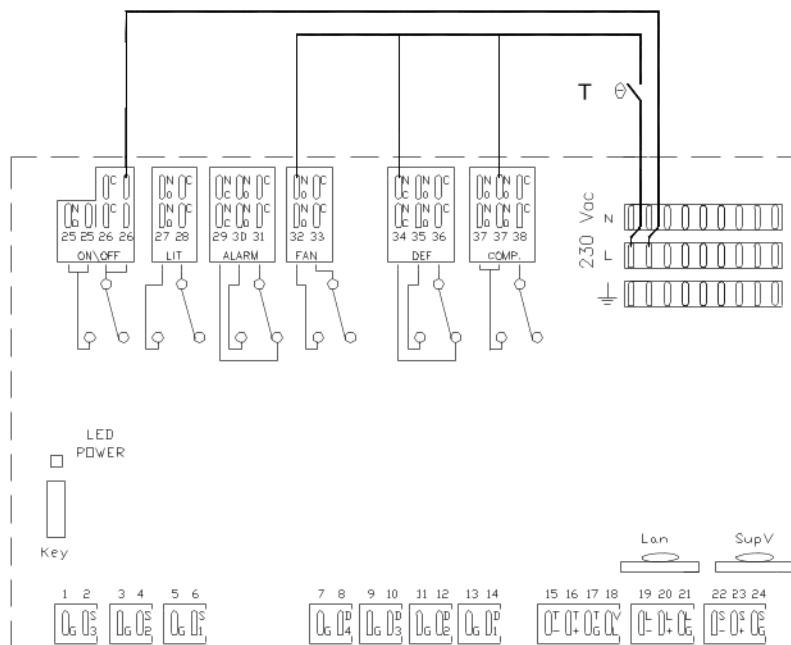


ATTENTION: *during all the emergency phases, defrost is not available, so it is advisable to minimize the opening of the cell.*

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 Servicing and routine maintenance

The most significant and important actions relating to the routine maintenance can be summarized as follows:

- ▶ Weekly; check the cleanliness of the evaporator, in particular that there is no ice build up. In case of ice build up perform a manual defrosting by pressed the button "UP" for more than 5 seconds. Repeat this procedure until the evaporator is free of ice. Check after 12 hours.
- ▶ Regularly; clean (at least **every month**) the condenser by removing dust and grease. If the environment where the machine is installed is very dusty, more frequent cleaning will be required.
- ▶ Clean **every four months** the contacts, both fixed and movable, of all the contacts, replacing them if necessary.
- ▶ Check (**every four months**) the tension of all the electrical terminals placed inside both the panels and the terminal boards of each user; carefully check also the tension of the fuses.
- ▶ Visually inspect the entire cooling system, even inside the, for leakage of the refrigerant, also identifiable by oil traces. Rectify quickly and if in doubt investigate thoroughly. Check for refrigerant gas leaks:
 - for systems with **3 kg \leq of refrigerant load < 30 kg**, the check must be carried out **yearly**;
 - for systems with **30 kg \leq of refrigerant load < 300 kg**, the check must be carried out every **six months**;
 - for systems with **refrigerant load \geq 300 kg**, the check must be carried out every **three months**.
 For leakages requiring a refrigerant addition greater than the 10% of the total gas loaded, the repair must be carried out within 30 days from the date of detection.
- ▶ Check **every four months** the regular flow of the refrigerant by the gauge located on the liquid line.
- ▶ Check **every four months** the oil level by the suitable gauge (if present) located on the crankcase of the compressor.
- ▶ Carefully inspect, **every four months**, by the gauge located on the liquid line, the colour of the element sensitive to moisture. Green indicates dry, yellow indicates moisture. In case of moisture immediately stop the machine and replace the liquid filter, also replace the refrigerant and oil. Repeat the check after 3 working days.
- ▶ Check every four months the noise level of the compressor. This operation must be carefully carried out as it requires the machine to be running; check for a ticking sound or vibrations that could indicate problems or excessive mechanical clearances between the moving parts.
- ▶ Check regularly that the condensation water drain is not blocked. For MBP and LBP models check the water drain heater is working efficiently.



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

6.3.2 Interventions on safety valve (where planned)

We recommend you replace the safety valve in case it needed to intervene; during drainage, in fact, the accumulation on the seal of the valve of processing residue from components and tubing can cause the seal to become faulty.



DANGER: *before replacing the valve, check the system, in the zone in which it is operating, is not under pressure or at a high temperature.*



DANGER: *do not dismantle the safety valve without recovering the gas in advance that is present in the liquid receiver.*



ATTENTION: *maintenance is not planned for safety valves. Removal of the cap and tampering with the seal are considered unauthorised modifications to calibration; this means the manufacturer's warranty is not valid. The inspection of safety valves is reserved for the proposed authorities and is governed by specific legal norms, in force in the country of installation.*

We recommend you check the safety valve **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 6.4.3 – Demolition and disposal).



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 request it is possible to fit the following options:

GAS R134A

As an alternative to the standard R404A the machine can be designed to use a different refrigerant gas, identifiable by the machine code (written on the identification EC tag place on the machine): Y=R134a.

WATER CONDENSATION

By replacing the air condenser with a water one.

To connect the water condenser pipes having a diameter not lesser than the ones placed on Blocksystem ST-SP are required, while at the same time taking into account the inlet and outlet specifications. The inlet pipe is distinguishable by a barostatic valve located on it to adjust the water flow. Install the water supply stopcock within easy reach of the operator.



ATTENTION:

never close the stopcock when the machine is running.

To improve machine lifetime and performance ensure that:

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



ATTENTION: *water pipes must be protected from low external temperatures.*

CONDENSATION CONTROL BY PRESSURE SWITCH

(optional when not supplied as standard)

stops the condenser fan when the condensing pressure falls below the set point minus the differential.

CONDENSATION CONTROL BY FAN SPEED CONTROLLER

(optional when not supplied as standard)

adjusts the speed of the condenser fan according to the condensation pressure, in order to stay within the set limits. It is connected to the high pressure circuit. The instructions for use are attached to the documentation of the machine.

MINIMUM PRESSURE SWITCH (when not supplied as standard)

It stops the machine when the pressure of the suction circuit falls below the set value minus the differential. This happens as a result of a serious failure.

THERMOSTATIC EXPANSION VALVE (when not supplied as standard)

If there is a particular type of thermo-static valve the refrigeration system is equipped with a liquid receiver and a thermo-static valve after the condenser.

CRANKCASE HEATER

Heats the compressor crankcase before start-up and keeps it warm during the shutdown. The heat produced evaporates any liquid refrigerant remaining inside the compressor.

REMOTE CONTROL PANEL

Allows the positioning of the control panel away from the machine; for example next to the cell door (max distance 100 m).

TENSION MONITOR

A device to protect the machine against electrical spiking, either high or low.

DIFFERENTIAL THERMO-SWITCH

A device to protect the machine against overloading, short circuits and indirect contacts.

ADDITIONAL MODULE FOR MASTER / SLAVE OPERATION

Allows the connection of two Blocksystem ST-SP in a cell and the possibility to synchronize functions (defrosting, temperature-alarms display and Blocksystem ST-SP speed).

ADDITIONAL MODULE FOR MONITORING, RECORDING AND REMOTE MANAGEMENT

A device making it possible to connect the Blocksystem ST-SP to a remote management system.

DIFFERENT VOLTAGE

The last number of the machine code model identifies the voltage as stated below:

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

REMOTE MANAGEMENT SYSTEM

Allows monitoring and programming of the Blocksystem ST-SP via a PC or data recorder. It also allows advanced management (communication via modem or GSM) of all the alarms of the Blocksystem ST-SP.

8. Faults search

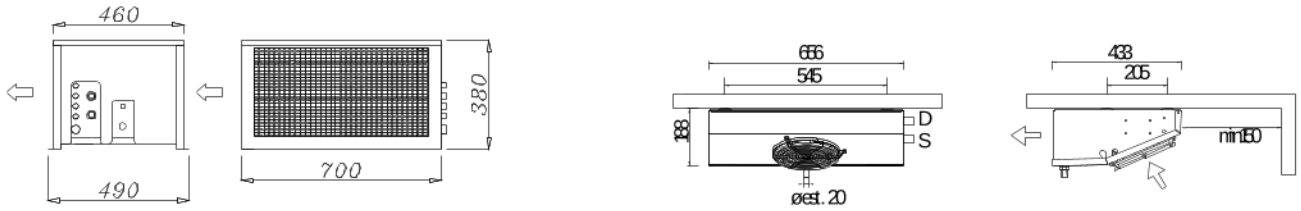
	POSSIBLE CAUSES	SOLUTIONS
A	<p>The compressor does not start and does not release a humming sound</p> <ol style="list-style-type: none"> 1 Lack of voltage. Start-up relay with open contacts. 2 Thermal cut-off intervenes. 3 Loose electrical connections or incorrect electrical connections. 	<ol style="list-style-type: none"> 1 Check the line or replace the relay. 2 Re-check the electrical connections. 3 Tighten or re-do the connections in accordance to the wiring diagram.
B	<p>The compressor does not start (releases humming sound) and the thermal cut-off intervenes</p> <ol style="list-style-type: none"> 1 Incorrect electrical connections. 2 Low voltage supply to the compressor. 3 Defective start-up of the condenser. 4 Relay does not close. 5 Winding of the electrical motor interrupted or in short-circuit. 	<ol style="list-style-type: none"> 1 Re-do the connections. 2 Identify the cause and eliminate it . 3 Identify the cause and replace the condenser. 4 Identify the cause and replace the relay if necessary. 5 Replace the compressor.
C	<p>The compressor starts but the relay does not open</p> <ol style="list-style-type: none"> 1 Incorrect electrical connections. 2 Low voltage supply to the compressor. 3 Relay blocked in closed position. 4 Excessive discharge pressure. 5 Winding of the electrical motor interrupted or in short-circuit. 	<ol style="list-style-type: none"> 1 Check the electrical circuit. 2 Identify the cause and eliminate it. 3 Identify the cause and eliminate it . 4 Identify the cause and replace the relay if necessary. 5 Replace the compressor.
D	<p>Intervention of the thermal cut-off</p> <ol style="list-style-type: none"> 1 Low voltage supply to the compressor (imbalanced phases on tri-phase motors). 2 Defective thermal cut-off. 3 Defective running condenser. 4 Excessive discharge pressure. 5 Suction pressure too high. 6 Compressor overheated, hot return gas. 7 Winding of the compressor motor in short-circuit. 	<ol style="list-style-type: none"> 1 Identify the cause and eliminate it. 2 Check its characteristics and replace it if necessary. 3 Identify the cause and eliminate it . 4 Check the ventilation and any possible restrictions or obstructions in the system circuit. 5 Check the sizing of the system. Replace the condensing unit with a more powerful one, if necessary. 6 Check the refrigerant load; repair the potential loss and add gas if necessary. <i>If the semi-machine does not have a safety valve, the load of refrigerant gas must be lower than 10 kg.</i> 7 Replace the compressor.
E	<p>The compressor starts and circulates, with short-spanded function cycles</p> <ol style="list-style-type: none"> 1 Thermal cut-off. 2 Thermostat. 3 Intervention of the high pressure meter, due to the insufficient cooling of the condenser. 4 Intervention of the high pressure meter, due to the excessive load of refrigerant gas. 5 Intervention of the low pressure meter, due to the scarce load of refrigerant gas. 6 Intervention of the low pressure meter, due to the restriction or clogging of the expansion valve. 	<ol style="list-style-type: none"> 1 See previous point (thermal cut-off intervention). 2 Small differential; correct adjustment . 3 Check that the motorized ventilator functions correctly or clean the condenser. 4 Reduce the refrigerant load. 5 Repair the loss and add refrigerant gas. <i>If the PARTLY COMPLETED MACHINERY does not have a safety valve, the load of refrigerant gas must be lower than 10 kg.</i> 6 Replace the expansion valve.
F	<p>The compressor functions uninterruptedly or for long periods</p> <ol style="list-style-type: none"> 1 Poor load of refrigerant gas. 2 Thermostat contacts blocked in closed position. 3 System insufficiently sized in function of the load. 4 Excessive load to cool or insufficient insulation. 5 Evaporator covered with ice. 6 Restriction in the system circuit. 7 Condenser clogged. 	<ol style="list-style-type: none"> 1 Repair the loss and add refrigerant gas. <i>If the PARTLY COMPLETED MACHINERY does not have a safety valve, the load of refrigerant gas must be lower than 10 kg.</i> 2 Replace the thermostat. 3 Replace the system with a more powerful one. 4 Reduce the load and improve insulation, if possible. 5 Defrost. 6 Identify the resistance and eliminate it . 7 Clean the condenser.
G	<p>Running condenser damaged, interrupted, or in short-circuit</p> <ol style="list-style-type: none"> 1 Incorrect running condenser. 	<ol style="list-style-type: none"> 1 Replace the condenser with the correct type.
H	<p>Start-up relay defective or burnt out</p> <ol style="list-style-type: none"> 1 Incorrect relay. 2 Relay assembled incorrectly . 3 Incorrect running condenser. 	<ol style="list-style-type: none"> 1 Replace with the correct relay. 2 Reassemble the relay in the correct position. 3 Replace the condenser with the correct type.
I	<p>Compartment temperature too high</p> <ol style="list-style-type: none"> 1 Thermostat regulated too high. 2 Expansion valve under-sized. 3 Evaporator under-sized. 4 Insufficient air circulation. 	<ol style="list-style-type: none"> 1 Regulate correctly. 2 Replace the expansion valve with a suitable one. 3 Replace it increasing the surface of the evaporator. 4 Improve air circulation.

		POSSIBLE CAUSES	SOLUTIONS
L	<u>Suction piping frosted</u>		
	1	Expansion valve with excessive flow of gas or over-sized.	1 Regulate the valve or replace it with one correctly sized.
	2	Expansion valve blocked in open position.	2 Clean the valve of foreign substances or replace it if necessary.
	3	Evaporator ventilator does not work.	3 Identify the cause and eliminate it.
4	High gas load.	4 Reduce the load.	

RIVACOLD
MASTERING COLD

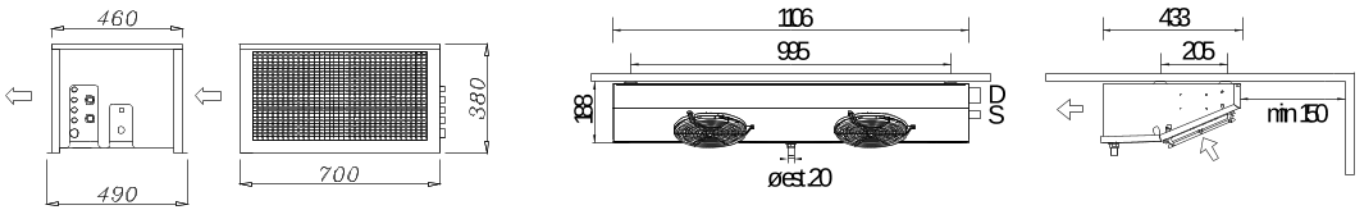
ST Range

Drawing 6



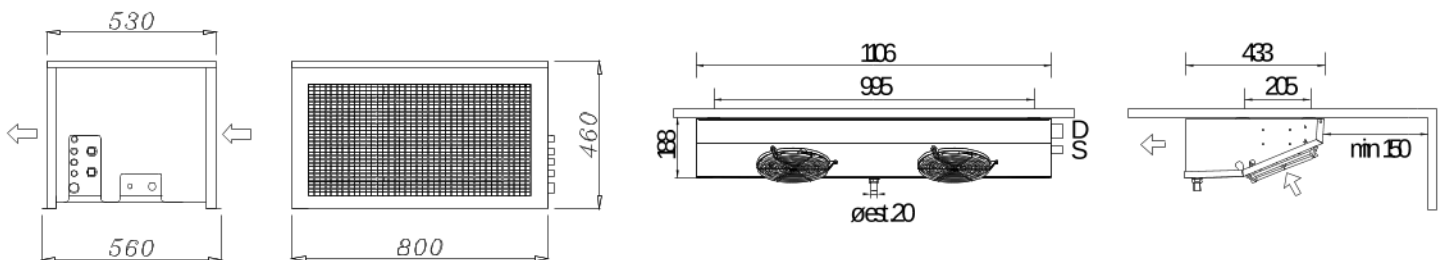
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
STH003_	10	6	44.3	6.1	STM003_	10	6	45.3	6.1	STL003_	10	6	53.8	6.1
STH006_	10	6	45.7	7.2	STM006_	10	6	46.7	7.2	STL006_	12	6	54.6	7.2

Drawing 7



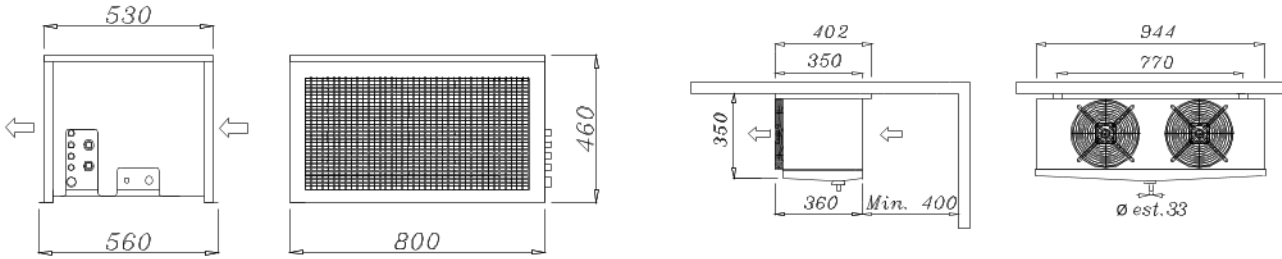
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
STH009_	12	6	53.5	10.7	STM009_	12	6	47	10.7	STL009_	12	6	68.6	10.7
STH016_	12	6	57	12.5	STM012_	12	6	55	10.7					
					STM016_	12	6	57	12.5					

Drawing 8



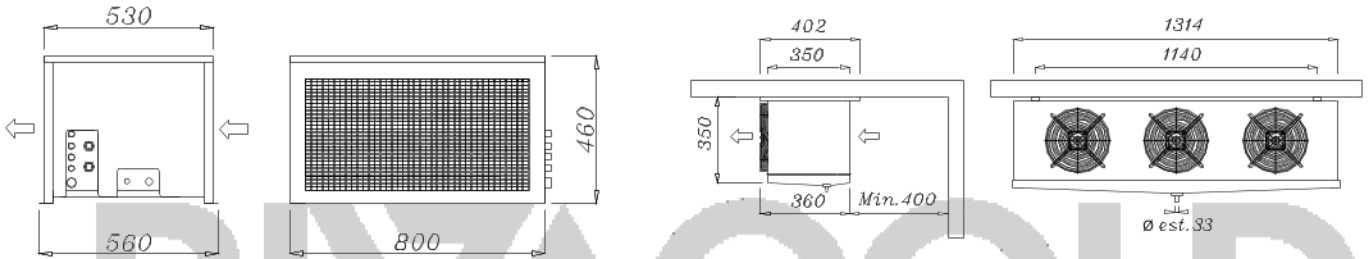
LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.
STL012_	12	10	65	10.7

Drawing 9



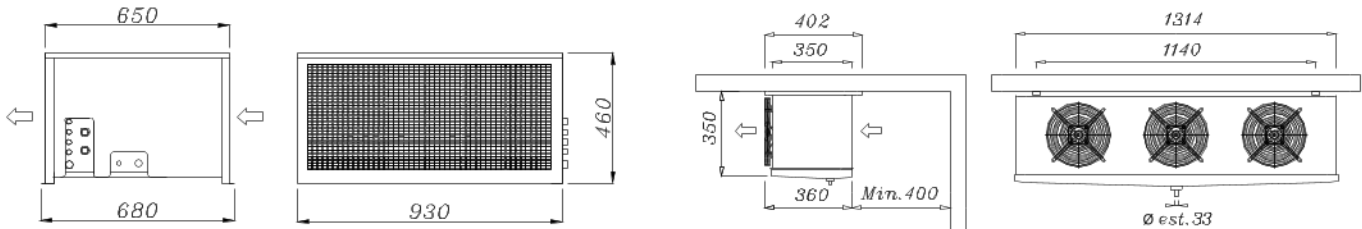
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
STH022__	16	10	62.3	17.7	STM022__	16	10	63	19	STL016__	16	10	74	19

Drawing 10



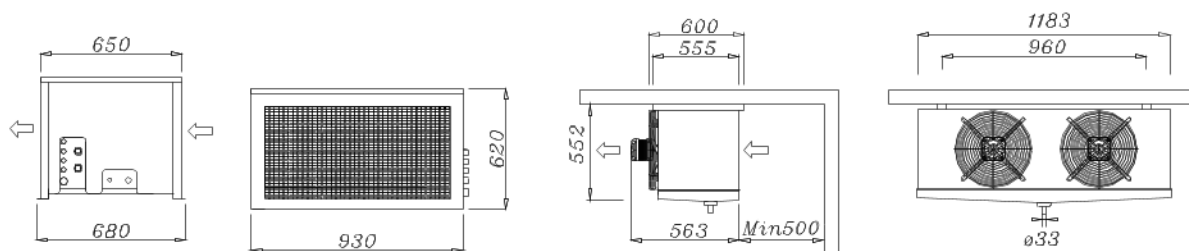
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
STH034__	16	10	84.8	25.2	STM34__	16	10	85	27	STL020__	16	10	70	30

Drawing 11



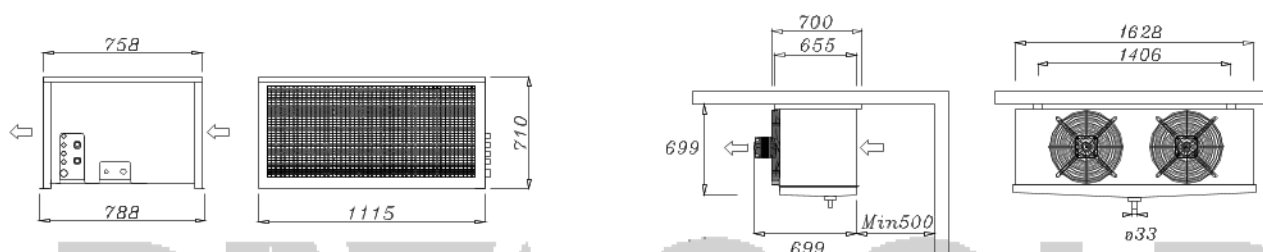
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
STH054__	16	10	90.8	28.2	STM040	16	10	87	30	STL024__	16	10	88	27
					STM054	18	10	89	30	STL034__	18	10	100	30

Drawing 12



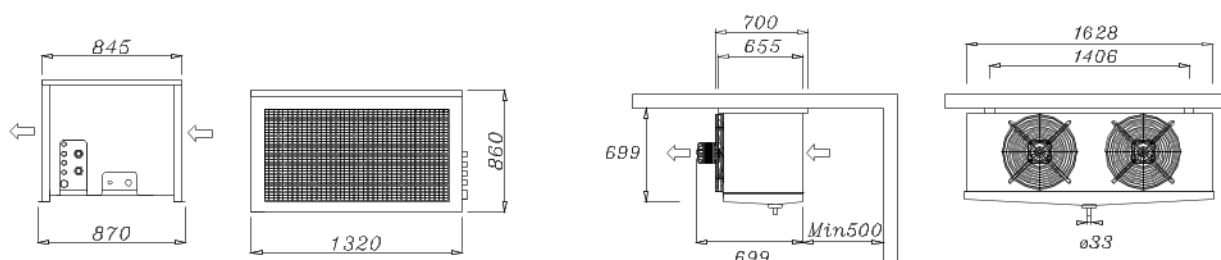
MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
STM068*	22	12	109.4	46.6	STL060*	22	12	125.4	46.6
STM080*	22	12	118.7	51.3	STL080*	22	12	126.7	51.3

Drawing 13



MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
STM110*	28	12	144.6	57.4	STL130*	28	16	173.6	57.4

Drawing 14

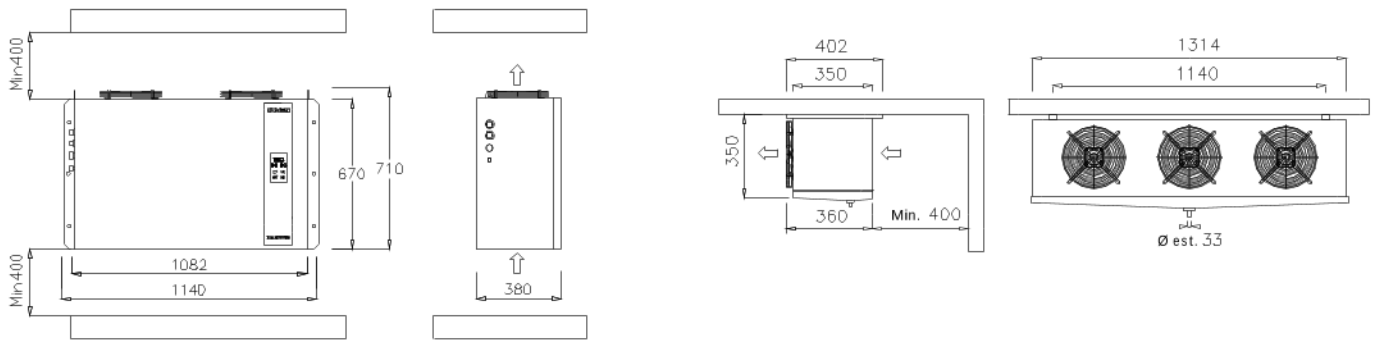


MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
STM140*	28	12	156.3	78.7	STL180*	35	16	232.3	78.7
STM200*	35	16	178	89	STL200*	35	16	229	89
					STL260*	35	16	232	89

* Modello non disponibile con attacchi rapidi e carica di refrigerante
 Model not available with fast connections and gas charge

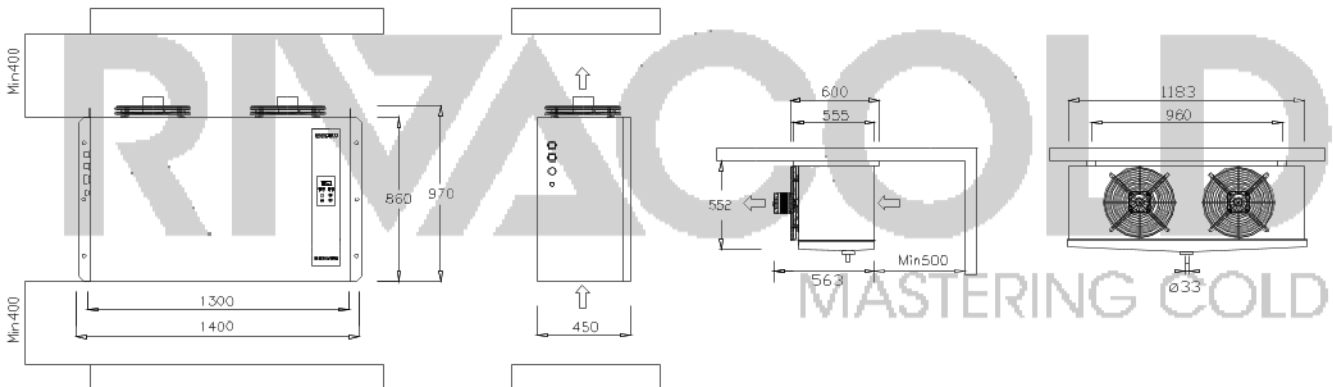
SP Range

Drawing 15



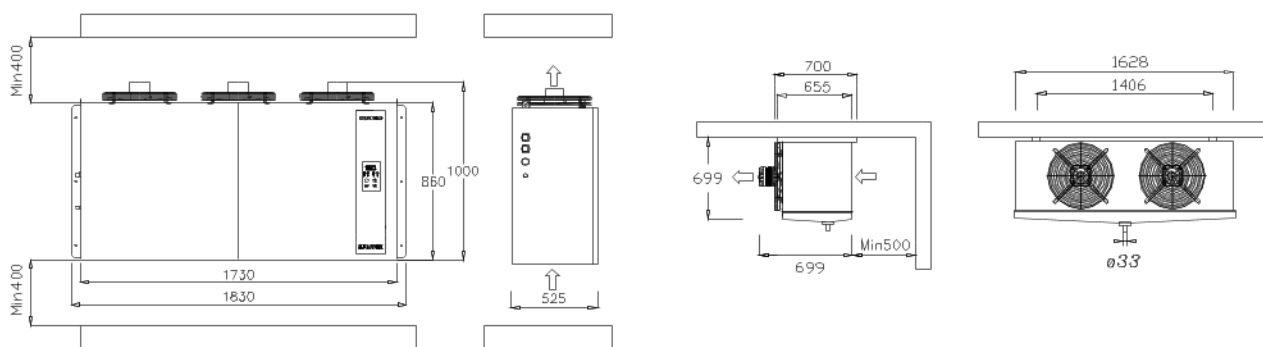
HBP					MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.				Cond.Unit	Evap.
SPH054	16	10	131.8	28.2	SPM054	16	10	94	27	SPL034	18	10	128	30

Drawing 16



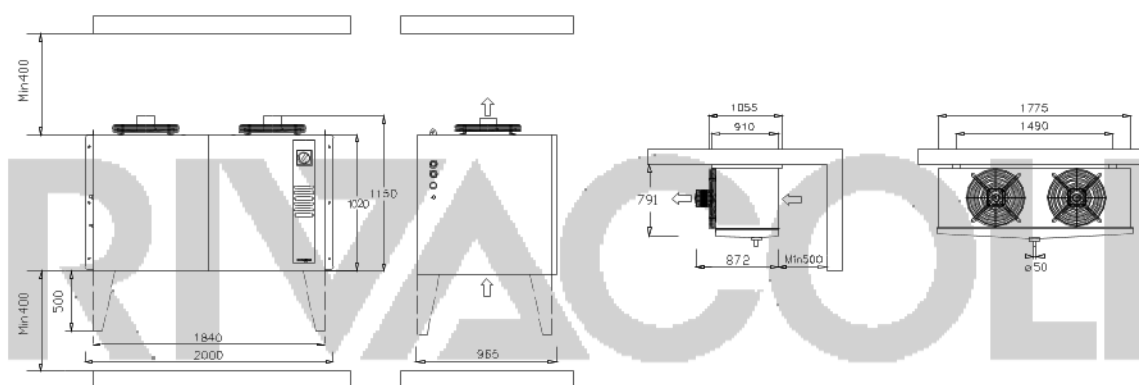
MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
SPM068*	22	12	117.4	46.6	SPL060*	28	12	144.4	46.6
SPM080*	22	12	130.7	51.3	SPL080*	28	12	145.7	51.3

Drawing 17



MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
SPM110*	28	12	211.6	68.4	SPL130*	28	16	254.6	68.4
SPM140*	28	12	218.3	78.7	SPL180*	35	16	262.3	78.7
SPM200*	35	16	241	89	SPL200*	35	16	292	89
					SPL260*	35	16	295	89

Drawing 22



MBP					LBP				
Mod.	S [mm]	D [mm]	Net. Weight [Kg]		Mod.	S [mm]	D [mm]	Net. Weight [Kg]	
			Cond.Unit	Evap.				Cond.Unit	Evap.
SPM300*	35	16	455.1	124.9	SPL350*	42	22	525.1	124.9
SPM370*	35	16	475.9	134.1	SPL450*	42	22	545.9	134.1

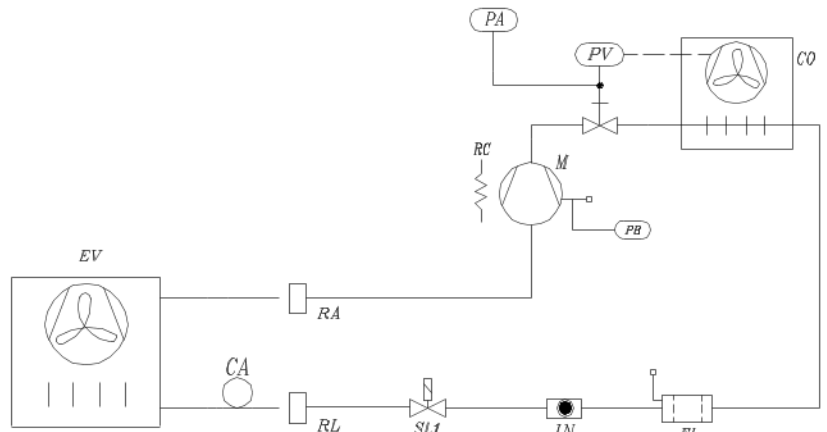
- * **Modello non disponibile con attacchi rapidi e carica di refrigerante**
 Model not available with fast connections and gas charge

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

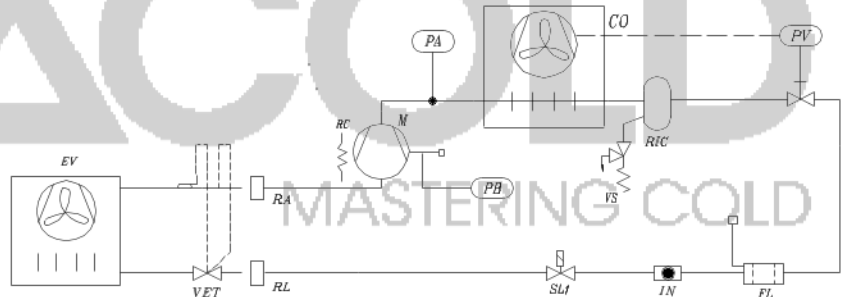
Legenda/Legend/Légende/Legenda/Legende

- 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
- SL1= Valvola solenoide liquido/Liquid solenoid valve
Vanne solénoïde liquide/Válvula solenoide líquido
Magnetventil Flüssigkeit
- SL2= Valvola solenoide gas caldo/Hot gas solenoid valve
Vanne solénoïde gaz chaud/Válvula solenoide gas caliente
Magnetventil Heißgas
- EV= Evaporatore/Evaporator
Évaporateur/Evaporador
Verdampfer
- VB= Valvola regolatrice di pressione
Pressure regulating valve
Vanne de régulation de la pression
Válvula regulacion de pression
Druckregelungsventil
- SR= Separatore di liquido/Liquid separator
Séparateur de liquide / Separador de líquido
Flüssigkeitabscheider
- RC= Resistenza carter/Crankcase heater
Résistance carte/Resistencia cárter
Gehäuse-Heizwiderstand
- RIC= Ricevitore di liquido/Liquid receiver
Récepteur/Receptor de líquido
Flüssigkeitssammler
- CA= Capillare/Capillary tube
Tube capillaire/Capilar
Kapillar
- VET= Valvola di espansione termostatica
Thermostatic expansion valve
Vanne thermostatique d'expansion
Válvula de expansión termostática
Thermostat-expansionsventil
- PV= Pressostato parzializzatore ventole
Pressure switch for condenser fan control
Pressostat pour le contrôle du motoventilateur de condenseur
Presostato para regulati3n ventilator
Druckwächter Trennung Ventilator Verflüssiger
- ASC= Tubazione per acqua di condensa
Condensate water evaporatine pipe
Tube d'écoulement de c'eau de condensation
Serpentin évaporati3n agua de condensaci3n
Kondenswasserleitung
- VS= Valvola di sicurezza/Pressure relief valve
Vanne de sûreté/Válvula de seguridad
Sicherheitsventil
- IN= Indicatore di liquido/ Sight glass
Indicateur de liquide/ Indicador de líquido
Flüssigkeitsanzeige

**Espansione a capillare/Capillary expansion/Expansion tube capillaire
Expansi3n por capilar/ kapillare Ausdehnung**



**Espansione a valvola/ Valve expansion/Expansion à vanne
Expansi3n por válvula/ Ventilausdehnung**



	SL1	SL2	VB	RC	PV	PB
HBP	--	--	--	OPTIONAL	OPTIONAL	OPTIONAL
MBP	•	•	--	OPTIONAL	OPTIONAL	OPTIONAL
LBP	•	•	•	OPTIONAL	OPTIONAL	OPTIONAL

- = di serie -- = non previsto
- = fitted as standard -- = not supplied
- = de série -- = non prévu
- = de serie -- = no previsto
- = serienmäßig -- = nicht vorgesehen

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