

ASSEMBLY INSTRUCTIONS

ME



RIVACOLD

MASTERING COLD



1. General Information

1.1 General details

The present assembly instructions represent an integral part of the CONDENSING UNITS ME (identified, in the Present Document, with the name of PARTLY COMPLETED MACHINERY) constructed by Rivacold s.r.l.; for this reason, they must be part of the technical file of the end-machine in which the present PARTLY COMPLETED MACHINERY will be incorporated.

These instructions are issued with the purpose of supplying the technicians with the information and instructions essential to correctly operate the PARTLY COMPLETED MACHINERY in safe conditions.



ATTENTION: *since they must be easily and readily available for consultation, the present instructions must be stored in a known and accessible place.*



NOTE: *The Purchaser can request an additional copy of the present document (for example, in case the original document gets damaged) in writing to the Technical Department of the Producer (in this respect, please see Chapter 1.6.1 – Request of Assistance Intervention of the Present Chapter), undertaking commitment, in any case, to return the damaged copy to the Producer.*

1.2 Property of the information

These assembly instructions contain information of reserved property.

All rights are reserved.

These instructions may not be reproduced or photocopied, in whole or in part, without prior written consent by the Producer. The use of this documentation is allowed only to the client to whom the instructions have been supplied together with the semi-machine to which the instructions refer.

The Producer declares that the information contained in these instructions is congruent to the technical and safety specifications of the PARTLY COMPLETED MACHINERY to which the instructions refer. The drawings, the diagrams, and the technical data reported are updated to the date of publication of this document and are valid only for the PARTLY COMPLETED MACHINERY to which they have been attached.

The Producer reserves itself the right to make changes or improvements to the documentation without having to provide fore-notice.

The Producer does not take responsibility for direct or indirect damages to persons, things, or domestic animals which ensue to the use of this documentation or of the PARTLY COMPLETED MACHINERY in conditions that differ from those provisioned and intended.

1.3 Contents of the assembly instructions

The present Assembly Instructions are addressed to technicians, so that they may be knowledgeable of and correctly install the PARTLY COMPLETED MACHINERY .

These instructions, in fact, include with in them, in addition to a description of the PARTLY COMPLETED MACHINERY, the instructions and the indications to:

correctly transport and install the PARTLY COMPLETED MACHINERY ;

perform correct cleaning, adjustment, and maintenance interventions on the PARTLY COMPLETED MACHINERY;

pay attention to the most basic safety and anti-injury rules.

It is necessary to carefully read all the chapters to understand the indications supplied in these instructions and to operate with the PARTLY COMPLETED MACHINERY; for a subsequent and more smooth search of the contents, please refer to, chart 1 which contains a description of the topics treated in the chapters.

Chart 1 – Structure of the Assembly instructions.

CHAPTER	CONTENTS
Chapter 1 <i>General Information</i>	<ul style="list-style-type: none"> ➤ Description of the present assembly Instructions, of their structure, and of the conventions used; ➤ definition of the terms used; ➤ definition of the relationship between the Manufacturer and the Purchaser/User in terms of warranty and assistance conditions).
Chapter 2 <i>Description of the incomplete-machine</i>	<ul style="list-style-type: none"> ➤ Description of the PARTLY COMPLETED MACHINERY.
Chapter 3 <i>Safety and technical data</i>	<ul style="list-style-type: none"> ➤ Presentation of the general indications concerning the PARTLY COMPLETED MACHINERY, the solutions adopted for the protection of the operating personnel, the general warnings that must be observed to correctly operate with the machine, and the residual risks present; ➤ presentation of the main technical data concerning the PARTLY COMPLETED MACHINERY .
Chapter 4 <i>Transportation and Installation</i>	<ul style="list-style-type: none"> ➤ Description of the lifting and transportation modes of the PARTLY COMPLETED MACHINERY ; ➤ description of the modes of installation, connection, and arrangement for start-up of the PARTLY COMPLETED MACHINERY; ➤ description of the storage modes of the PARTLY COMPLETED MACHINERY .
Chapter 5 <i>Maintenance and Demolition</i>	<ul style="list-style-type: none"> ➤ Description of the procedures for the check-up and inspection of the parts and of the components of the PARTLY COMPLETED MACHINERY (especially of the parts most subject to wear-out);

CHAPTER	CONTENTS
	<ul style="list-style-type: none"> ➤ description of the procedures that allow the appointed personnel to perform the cleaning of the PARTLY COMPLETED MACHINERY ; ➤ presentation of the indications to perform the disassembly, the demolition, and the dismantling of the PARTLY COMPLETED MACHINERY .
Chapter 6 <i>Search for breakdowns</i>	<ul style="list-style-type: none"> ➤ List of the possible malfunctions of the PARTLY COMPLETED MACHINERY and of the correspondent solutions.
Chapter 7 <i>Annexes</i>	<ul style="list-style-type: none"> ➤ Wiring diagram. ➤ Refrigeration diagram.

1.4 Conventions and definitions

1.4.1 General details

The assembly instructions of the PARTLY COMPLETED MACHINERY are divided into chapters which allow, for each phase of the life-cycle of the PARTLY COMPLETED MACHINERY (transportation, installation, maintenance, and phase-out), to simplify the retrieval of the relative information necessary to the User of the PARTLY COMPLETED MACHINERY.

The entire documentation relative to the PARTLY COMPLETED MACHINERY has been prepared developing on the themes indicated by the Machines Directive (2006/42/CE), the PED Directive (97/23/CE), and the safety Norms in force.

Configuration of the organs and devices described and depicted in the documents may differ from the configuration supplied on the PARTLY COMPLETED MACHINERY in the specific set-up arranged in accordance to particular requirements or safety norms; in such case, some description, references, or procedures recommended can be of general type, though maintain their efficiency. The quoted drawings and photographs are supplied to serve as examples to which refer for an easier comprehension of the text.

1.4.2. Conventions applied to the terminology

PARTLY COMPLETED MACHINERY : the term used in the present assembly instructions to identify the CONDENSING UNITS ME.

IPD: acronym which stands for the Individual Protection Device(s).

1.4.3 Definitions

DANGEROUS AREA

Any AREA in proximity of the PARTLY COMPLETED MACHINERY in which the presence of an exposed person represents a risk to that person's safety and health.

USER

Any PERSON (professional/company) who adequately uses the machine on which the PARTLY COMPLETED MACHINERY is installed, or who assigns its use or operations connected to its use to qualified persons.

EXPOSED PERSON

Any PERSON who stations entirely or partially in a dangerous area or in proximity of those areas.

MECHANICAL MAINTENANCE WORKER

QUALIFIED TECHNICIAN who can intervene on any mechanical organ to perform the necessary regulation, repair works, or maintenance interventions.

The mechanical maintenance worker is not usually qualified to perform interventions on the electrical systems in the presence of voltage.

ELECTRICAL MAINTENANCE WORKER

QUALIFIED TECHNICIAN who is responsible for all the interventions of electrical type (regulation, maintenance, and repair works) and who, when necessary, operates in the presence of voltage inside the electrical cabinets and the shunt boxes.

PERSONNEL APPOINTED TO DISPLACEMENT

QUALIFIED PERSONNEL which performs displacement tasks with the PARTLY COMPLETED MACHINERY, or with the equipment used in the case that the tasks require the use of lifting devices.

TECHNICIAN OF THE PRODUCER

QUALIFIED TECHNICIAN made available by the Producer of the PARTLY COMPLETED MACHINERY to perform complex operations in special circumstances or, in any case, whenever agreed with the user.

1.4.4. Personal means of protection and behavioral norms

For each one of the operations described in the present instructions, the means of protection that the appointed personnel is responsible for using, and the behavioral norms which allow to protect the safety of the operators are indicated.



NOTE:

the Paragraph 3.6 – General Warnings and Behavioral norms of Chapter 3 – Safety and Technical data reports, in particular, a series of general recommendations to comply with in order to avoid conditions of risk for the persons or damages to the partly completed machinery.

1.4.5. Print-out conventions

The graphic layout of the present assembly instructions is such to allow that *the contents may be easily and readily identified*; with this objective in mind, for example, the instructions are linked to lists, as indicated below:

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

1. this is the way in which numbered lists are identified that are meant to explain a complex procedure (the order in which the actions are presented is not mandatory to correctly and safely perform the intervention being examined).

The *italics* are used, in particular, for:

cross references; the cross references used in these instructions are expressed in the following manner: "Paragraph/Figure/Chart" with the number and, usually, the specification of "the Chapter" with the relative number and title (when not specified, it is implied that the paragraph, chart, or figure belong to the current Chapter); the specialized and technical terms, the first time they appear in the text; the terms in a foreign language which is not commonly/widely used (these too, only the first time they appear in the text). The **bold text** is used to highlight words, sentences, or parts of a procedure. Furthermore, to ensure a more in-depth knowledge of the PARTLY COMPLETED MACHINERY, the text of the present assembly instructions are associated with added indications that complete them, and which supply supplementary information, essential precautions, or especially significant dangers to be considered; the following notation is used in this concern:



NOTE: indicates the notes, precautions, suggestions, and other points to which the attention of the reader wants to be drawn, or which completes the explanation with added information.



ATTENTION: indicates situations or operations in which the possibility of causing damage to the semi-machine, the equipment connected to it, or the environment subsists.



DANGER: indicates situations or operations in which the possibility of causing damage to the semi-machine, the equipment connected to it, or the environment subsists.

GRAPHIC SYMBOLS USED TO INDICATE THE NECESSITY TO WEAR INDIVIDUAL PROTECTION DEVICES

The graphic symbols used in the present instructions to indicate the need to wear specific IPDs are illustrated in this paragraph.



Indicates the necessity to use protection gear for the head suitable to perform the operation described.



Indicates the necessity to use protection gloves suitable to perform the operation described (if need be, dielectric to execute interventions on the electrical system).



Indicates the necessity to use protection clothing suitable to perform the operation described.



Indicates the necessity to use anti-injury boots suitable to perform the operation described.



Indicates the necessity to use protective eyewear suitable to perform the operation described.

1.5 Warranty

1.5.1. General conditions

The Producer, company Rivacold s.r.l., guarantees that the PARTLY COMPLETED MACHINERY and the equipment produced by the Producer are void of material and processing flaws, for a period which is agreed on the date in which the sale contract of the PARTLY COMPLETED MACHINERY is stipulated.

1.5.2. Parts excluded from warranty

The parts subject to wear-out and all the tools and consumption material which may be supplied by the Producer together with the PARTLY COMPLETED MACHINERY are excluded from the warranty.

1.5.3. Operations which entail the cancellation of the warranty

Any attempt to dismantle, change, or tamper with a component of the PARTLY COMPLETED MACHINERY on the part of the User or unauthorized personnel entails the cancellation of the warranty and absolves the Producer of any responsibility for any potential damages both to persons and things deriving from said attempts.

The Producer deems itself likewise absolved of any responsibility and will cancel the warranty relative to the PARTLY COMPLETED MACHINERY in the following cases:

- ▶ use of the PARTLY COMPLETED MACHINERY for which it is not expressly intended (in this respect, please see *Paragraph 3.5 – Proper and improper use of the PARTLY COMPLETED MACHINERY of Chapter 3 – Safety and Technical data*);
- ▶ use contrary to what required by the norms in force in the country where the semi-machine is installed;
- ▶ installation of the PARTLY COMPLETED MACHINERY in conditions different from those specified in *Chapter 4 – Transportation and Installation*;
- ▶ installation not compliant to the specifications reported in *Chapter 4 – Transportation and Installation*;
- ▶ total or partial failure to observe the instructions reported in the present instructions;
- ▶ failure to perform or incorrect maintenance;
- ▶ use of non-original spare parts or spare parts not specified by the Producer.

1.6 Assistance

As far as the maximum exploitation of the performances supplied by the PARTLY COMPLETED MACHINERY and the extraordinary maintenance operations are concerned, these instructions in no case replace the experience of the installers, the users, and the trained and qualified maintenance workers.

In this respect, the Technical Assistance Service of the company RIVACOLD S.R.L. supplies:

support by telephone concerning the most basic characteristics and the interventions that can be performed on the PARTLY COMPLETED MACHINERY;
transmission of documentation;



ATTENTION:

in case of doubts on the correct interpretation of the instructions reported in the present assembly instructions, contact the Technical Assistance Service (as indicated below) to obtain the NECESSARY clarifications.

1.6.1. Requests for assistance interventions

To speak with the Technical Assistance Service, contact:

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 assistance interventions, always specify the name, model, and serial number of the PARTLY COMPLETED MACHINERY .

2. Description of the partly completed machinery

The PARTLY COMPLETED MACHINERY that is the subject of the present document represents an enclosed and silenced condensing unit, used in commercial refrigeration.

The unit is engineered along the style of split units for air conditioning, of which it maintains the main benefits : outdoor installation, low noise level, and reduced encumbrance. Depending on the models, it is possible to have units equipped with a single motorized ventilator, or with a double ventilator, for the condensing unit. Moreover, the different models are always complete with refrigeration accessories, such as : liquid receivers, dehydrator filter, liquid meter, double pressure meter, curved condenser with copper pipe and aluminum fins, speed adjuster of the condenser fans, liquid line interception faucet, and suction.

All the models have, furthermore, a casing resistance (in certain cases incorporated in the very compressor), which prevents the accumulation of liquid in the lower area of the compressor during periods of break. The unit is always enclosed in a self-supporting housing made of steel varnished with epoxy powder, and is equipped with electrical equipment with a main disconnecting switch (the power supply wire that must be connected to the switch is not supplied).

The PARTLY COMPLETED MACHINERY, depending on the model, is available with two different voltages: 230/1/50Hz-400/3/50Hz

Independently of the configuration, at any rate, the PARTLY COMPLETED MACHINERY is always supplied without the air evaporators, therefore, it is not capable of performing the function for which it has been manufactured, since the evaporation unit is missing.



For this reason, it represents an incomplete-machine, as defined by the Machines Directive 2006/42/CE. It therefore is the duty of the purchaser to insert it in a complete refrigeration circuit, in order to define the refrigeration cycle foreseen. The PARTLY COMPLETED MACHINERY can, however, freely circulate on the market, because it is accompanied by a correspondent declaration of incorporation by the manufacturer, and by the correspondent instructions for the assembly, that allow the simple integration in the end machine (which will have to be marked CE, pursuant to the directives applicable to it by the integrating subject).

3. Safety and technical data

3.1 General safety details

3.1.1. Engineering Criteria

The principles and the concepts introduced by the paragraphs pertinent to the harmonized norms indicated in Chart 2 have been adopted in the engineering of the PARTLY COMPLETED MACHINERY.

Chart 2 – Main harmonized norms used in the engineering of the PARTLY COMPLETED MACHINERY.

NORM	TITLE
UNI EN ISO 12100: 2010	Safety of the machinery - General engineering principles - Evaluation of the risk and reduction of the risk
UNI EN ISO 13857: 2008	Safety of the machinery - Safety distances to prevent the upper and lower limbs from reaching dangerous areas
UNI EN 953: 2009	Safety of the machinery - General requisites for the engineering and the manufacture of the guards (fixed, mobile)
UNI EN 378-1: 2008	Refrigeration systems and heat pumps - Safety and environmental requisites – Part 1: basic requisites, definitions, classification and selection criteria
UNI EN 378-2: 2008	Refrigeration systems and heat pumps - Safety and environmental requisites - Part 2: engineering, manufacture, tests, marking, and documentation
CEI EN 60335-1: 2008	Safety of the electrical equipment for domestic use and similar equipment - Part 1: General norms

The adherence to the paragraphs pertinent to the aforementioned harmonized norms allows for the elimination or reduction of risks in the best possible manner, both during normal functionality, and during maintenance operations. The components used have been chosen accurately among those available on the market, and the materials which make up the PARTLY COMPLETED MACHINERY are void of risks to the health and integrity of the persons. All the parts supplied by third parties are marked CE (where required) and are compliant to the relative directives of reference. All the parts/details have been diligently inspected in compliance to the quality standards established by the norms in force. Furthermore, precautionary and protection measure necessary to confront residual risks have been applied on the PARTLY COMPLETED MACHINERY (in this respect, please see Paragraph 3.3 – Warnings concerning residual risks).

3.2. Devices and solutions for protection

3.2.1. Passive safety devices

The devices and constructional solutions described below have been adopted on the PARTLY COMPLETED MACHINERY .
 Steel sheet fixed guards and grid in correspondence of the mobile parts.
 External housing with fixed access doors.
 Safety signs in correspondence of the fixed guards.

3.2.2. Active safety devices

The active safety devices described below have been adopted on the machine.
 HBP maximum safety pressure meter.
 The units with a risk category of PED = 1 are equipped with a fuse cap (replaced by a safety valve in the case of a unit of category PED > 1) on the liquid receiver.



ATTENTION: *is absolutely forbidden to changr the setting of pressure switch safety HBP*

3.3. Warnings concerning residual risks

In order to avoid any condition of danger to persons or of damages to the PARTLY COMPLETED MACHINERY caused by residual risks, that is, those risks that persist in spite of all the measures adopted, or potential risks that aren't apparent, the Producer advises the maintenance workers and all personnel appointed to operate the PARTLY COMPLETED MACHINERY to scrupulously follow the warnings indicated in the following pages.



ATTENTION: *always follow the signs and indications on the labels applied on the PARTLY COMPLETED MACHINERY and exclusively operate based on the instructions supplied in the present instructions (such as those reported, for example in Paragraph 3.6 – General Warnings and Behavioral Norms).*

3.3.1. Lifting and transportation

3.3.1.1. Residual risks present during the lifting and transportation phases

During the lifting and transportation phases, risks are presented tied to:

operations on the PARTLY COMPLETED MACHINERY by unqualified, untrained, uninformed, or incorrectly equipped personnel;
 incorrect choice or incorrect use of the means to transport and displace the PARTLY COMPLETED MACHINERY (for example, tackle, hoists) ;
 crushing of the operators appointed to displacement operations;
 loss of stability of the load during performance of the operations being examined;
 projection of mobile parts of the PARTLY COMPLETED MACHINERY that cannot be removed or cannot be appropriately fastened;
 collision of parts or components of the PARTLY COMPLETED MACHINERY against persons or things due to unexpected movements of the PARTLY COMPLETED MACHINERY, or due to incorrect behavior on the part of the personnel appointed to the operation;
 collision or drop of components of the PARTLY COMPLETED MACHINERY, which damage the PARTLY COMPLETED MACHINERY and the relative protections;
 unhealthy positions or excessive strain of the operators appointed to transportation and displacement of the components of the PARTLY COMPLETED MACHINERY.

3.3.1.2. Necessary individual protection devices



3.3.1.3. Warnings to follow during the lifting and transportation phases

During the lifting and transportation phases, it is necessary to follow the warnings described in the present paragraph.

For these operations, only designate specialized personnel trained concerning the procedures for the displacement of machineries, and capable of choosing and safely using the lifting and transportation means most suitable to the circumstance (for example, tackle, hoists).

Inspect and, if necessary, make sure that all the parts that are capable of moving are correctly fastened (or else, if required, removed and reassembled once the operation is completed).

Do not lift, for any reason, the various parts of the PARTLY COMPLETED MACHINERY by grabbing it by non-structural elements (for example, cables or sheaths).

Make sure that there are no persons in proximity of the area where the lifting, displacement, and unloading operations are being performed, and always keep at a safety distance.

Always provide fore-notice that maneuvers are about to start.

Do not transit beneath hanging loads.

Do not let yourself be transported together with the loads.

3.3.2. Installation and connection

3.3.2.1. Residual risks present during the installation and connection phases

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

► operations on the PARTLY COMPLETED MACHINERY performed by unqualified, untrained, uninformed, or incorrectly equipped personnel;

contact with elements under voltage;

collision or crushing by components of the PARTLY COMPLETED MACHINERY which are being displaced/moved;

tripping or falling in correspondence of the electrical power supply;

damage of the PARTLY COMPLETED MACHINERY during the installation and connection phases.

3.3.2.2. Necessary individual protection devices



3.3.2.3. Signs present

The PARTLY COMPLETED MACHINERY is supplied with specific danger and prohibition signs; in this respect, please see *Paragraph 3.4 – Signs concerning Safety*.

3.3.2.4. Cautions to follow in the installation and connection phases

During the installation and connection phases, it is necessary to follow the cautions pointed out in the present paragraph.

Follow the indications relative to safety reported in *Paragraph 3.3.1 – Lifting and Transportation* during the necessary operations of movement of the components of the PARTLY COMPLETED MACHINERY.

Use the auxiliary equipment and, at any rate, any other machinery or tool (electric or pneumatic), only after having understood the indications reported in the relative Use and Maintenance Manuals, or after having undergone specific and formalized training.

Protect the piping of the connections to the energy sources with rigid sheaths or adequate cable-thru conduits.

Choose an installation site that:

- foresees a space sufficient for standard use, as also for maintenance of the unit,
- allows to correctly perform the connections necessary for operation of the unit,

With regards to the electrical energy, perform the grounding connection of the system **before any other connection** to the electrical distribution line.

Protect the power supply wire, which must be connected to the main switch, so that it comes into contact with the piping of the refrigeration system; this piping, made of metal, reaches very high temperatures.

Perform the required interventions, using work instruments up to norm (ladders, various tools), and paying the maximum attention to elements that could cause tripping, or cause cuts and contusions.

If the PARTLY COMPLETED MACHINERY is equipped with a fuse cap, the maximum load of gas is **10 Kg**.

3.3.3. Use of the partly completed machinery

Use of the PARTLY COMPLETED MACHINERY can take place only after its connection to the air-evaporating units, in order to define the foreseen refrigeration circuit. The residual risks indicated below are therefore to be understood as pertinent to use of the unit on the end machine in which it has been incorporated.

3.3.3.1. Residual risks present during the phase of use of the partly completed machinery

During use of the PARTLY COMPLETED MACHINERY, risks are present tied to:

use of the unit by unqualified, untrained, uninformed, or incorrectly equipped personnel;
contact with parts under voltage.

3.3.3.2. Necessary individual protection devices



3.3.3.3. Signs present

The PARTLY COMPLETED MACHINERY is supplied with specific danger and prohibition signs; in this respect, please see *Paragraph 3.4 – Signs concerning Safety*.

3.3.3.4. Cautions to be followed during use of the partly completed machinery

During use of the PARTLY COMPLETED MACHINERY, it is necessary to follow the cautions pointed out in the present paragraph.

Make the PARTLY COMPLETED MACHINERY operate only if all the protection and safety devices are intact.

Do not remove, for any reason, the safety devices and protections installed.

Adhere to all the safety and danger signs affixed on the PARTLY COMPLETED MACHINERY .

Make sure that all the safety and danger signs affixed on the PARTLY COMPLETED MACHINERY are always clearly readable.

Wear all the necessary IPD, regularly checking their integrity.

Do not intervene in correspondence of the PARTLY COMPLETED MACHINERY without having thoroughly and carefully read the present manual.

Use the auxiliary equipment and, at any rate, any other machinery or tool (electrical or pneumatic), only after having understood the indications reported in the relative Use and Maintenance Manuals, or after having undergone specific and formalized training.

Immediately signal anomalous situations of operation.

Do not perform any intervention (including cleaning) in correspondence of parts in movement or of hot surfaces.

Do not use the PARTLY COMPLETED MACHINERY when under the influence of pharmaceuticals or beverages that can reduce reflex readiness.

3.3.4. Maintenance and demolition

3.3.4.1. Residual risks present in the maintenance and demolition phases

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

operations on the PARTLY COMPLETED MACHINERY by unqualified, untrained, uninformed, or incorrectly equipped personnel.

collision or crushing by displaced components of the PARTLY COMPLETED MACHINERY ;

contact with hot elements of the PARTLY COMPLETED MACHINERY or of the relative equipment;

contact with refrigerant fluid,

contact with parts of the electrical system under voltage,

cuts in correspondence of the condenser fins.

3.3.4.2. Necessary individual protection devices



3.3.4.3. Signs present

The PARTLY COMPLETED MACHINERY is supplied with specific danger and prohibition signs; in this respect, please see *Paragraph 3.4 – Signs concerning Safety*.

3.3.4.4. Cautions to be followed in the maintenance and demolition phases

During the maintenance and demolition phases, it is necessary to follow the cautions pointed out in the present paragraph. Perform the required interventions using work instruments up to norm (ladders, various tools) and always wear the necessary IPD. The execution of the maintenance and demolition interventions must be performed by qualified and specifically trained personnel.

Check that the power supplies are appropriately disconnected, and that no one can reactivate them before conclusion of the required interventions; check, furthermore, that the possible residual energies have been de-charged before performing the interventions.

Operate as much as possible on the PARTLY COMPLETED MACHINERY and on the piping, only after having emptied them out and, before proceeding to restart the machine, ensure an accurate cleaning of the system.

Obtain the necessary work permits and check that all the procedures of arrangement of the PARTLY COMPLETED MACHINERY for the maintenance operations have been performed correctly.

Use the auxiliary equipment and, at any rate, any other machinery or tool (electrical or pneumatic), only after having understood the indications reported in the relative Use and Maintenance Manuals, or after having undergone specific and formalized training.

Do not use, for any reason, fuel, solvents, or flammable fluids to clean the details, but use commercial and approved, non-flammable and non-toxic detergents.

Do not walk on the housing cover; the surface cannot be treaded.

Do not perform changes, transformations, or application to the PARTLY COMPLETED MACHINERY that could jeopardize safety, without first having obtained written authorization from the Manufacturer.

To clean the condenser, exclusively use a jet of compressed air and, if need be, a vacuum.





At the end of the interventions, reassemble all the panels and the fixed guards previously removed.




Pay attention to keep the screws of the metal panels aptly separate from the screws necessary to fasten the protective plastic meshes of the ventilators. The two types of screws, in fact, are different.

3.4. Signs concerning safety

The sign labels indicated in *Chart 3* below are present on the PARTLY COMPLETED MACHINERY .

Chart 3 – Description of the sign labels present on the PARTLY COMPLETED MACHINERY

	LABEL	DESCRIPTION
A		Indicates that it is prohibited to remove the safety devices and protections installed; it is usually also accompanied by an explanatory writing: DO NOT REMOVE THE PROTECTIONS.
B		Indicates that it is prohibited to perform any whatsoever intervention (including lubrication and cleaning) in proximity of the parts in movement; it is usually accompanied by an explanatory writing: DO NOT REPAIR OR ADJUST WHILE IN MOVEMENT.
C		Indicas no touch at the area where it is positioned
D		Warns about the danger due to the presence of mobile parts in correspondence of the area of the machine where it is positioned.

E		Warns about the danger due to the presence of elements under voltage in correspondence of the area of the machine where it is positioned.
F		Warns about the danger due to the presence of hot surfaces in correspondence of the area of the machine where it is positioned.
G		Warns about the obligation to read the manual / assembly instructions

3.5 Proper and improper use of the partly completed machinery

The PARTLY COMPLETED MACHINERY is engineered and manufactured to be inserted in a refrigeration circuit, usable in the sector of commercial refrigeration.

Each PARTLY COMPLETED MACHINERY is capable of using the refrigerant gas specifically foreseen and indicated on its plate.

The PARTLY COMPLETED MACHINERY has been engineered and manufactured to work in environment where **a potentially explosive atmosphere is not present**. It has been engineered to be used outdoor (under roofs or even exposed to atmospheric agents).

It is a sound cautionary norm to arranged powder extinguishers nearby the PARTLY COMPLETED MACHINERY. To prevent the possibility of a fire outbreak, it is necessary to maintain the PARTLY COMPLETED MACHINERY clean of plastic pieces, oils, solvents, paper, and rags.

Use of the PARTLY COMPLETED MACHINERY for different operations, or the use of a refrigerant gas different from the one indicated on the plate, could cause damages to persons or to the PARTLY COMPLETED MACHINERY, and are therefore considered **improper uses**, for which the Manufacturer does not deem itself responsible.



ATTENTION: *in case a different use is intended, it is essential to first consult the Technical Department of the Producer.*

3.6. General warnings and behavioural norms

In order to avoid any condition of risk to persons or of damages to the PARTLY COMPLETED MACHINERY, we recommend that you scrupulously follow the general warnings and behavioral norms reported herein.



DANGER: *the Producer rejects any responsibility for potential damages to things and/or persons deriving from improper interventions performed by unqualified, untrained, or unauthorized personnel.*

The operators appointed to manage the PARTLY COMPLETED MACHINERY must be appropriately instructed to make the best use of it and without risks, and must operate in comfortable environment which can guarantee the best conditions of safety and hygiene possible.



DANGER: *prevent that the PARTLY COMPLETED MACHINERY be used by unauthorized personnel or by uninstructed personnel without due surveillance: in fact, before starting to work, each operator must be perfectly knowledgeable of the characteristics of the PARTLY COMPLETED MACHINERY; and must, furthermore, have FULLY read the present instructions.*

Before starting to use the PARTLY COMPLETED MACHINERY, make sure that any condition dangerous to safety has been duly eliminated and that no operators are present in the dangerous areas in proximity of the partly completed machinery.

Before starting to use the PARTLY COMPLETED MACHINERY, make sure that all the guards or other protections are in their proper place and that all the safety devices are present and efficient.

After having removed the packaging, make sure the machine is intact and undamaged in all its parts; if it isn't, contact the retailer.

Carefully read the labels on the PARTLY COMPLETED MACHINERY, do not cover them for any reason, and replace them immediately in the case they get damaged.

Do not lay liquid containers on the PARTLY COMPLETED MACHINERY.

Consult the present instructions concerning the safety prescriptions in force and the specific IPDS to wear for personal safety; in particular, in any case, the personnel appointed to operate the PARTLY COMPLETED MACHINERY must wear suitable clothing, avoiding or paying the necessary attention to:

- loose, flapping clothing,
- large sleeves,
- draping ties or scarves,

- necklaces, bracelets, and rings.

The personnel appointed to the maintenance of the PARTLY COMPLETED MACHINERY must be knowledgeable of all the procedures reported in *Chapter 5 – Maintenance and Demolition* and have the adequate technical preparation to be able to correctly interpret the instructions and the diagrams attached to the present instructions, and to be able to intervene on the PARTLY COMPLETED MACHINERY .

The area where the maintenance operations are performed must always be kept clean, dry, and with the suitable equipment available and efficient.

In case it were necessary to perform interventions in proximity of electrical components, always operate with dry hands and use dielectric gloves (operating on the electrical components with wet hands can lead to an almost certain danger of electrical shock).



DANGER:

it is necessary to make sure that, before starting any type of intervention on the PARTLY COMPLETED MACHINERY or in correspondence of its components or accessory equipment, the power supply is disconnected; if this isn't possible, it is necessary to adopt measures which allow, in any case, to safely operate in correspondence of the PARTLY COMPLETED MACHINERY .



DANGER:

tampering or the unauthorized replacement of one or more parts of the PARTLY COMPLETED MACHINERY and the use of accessories, tools, and consumption materials different from those indicated by the Producer can cause danger of injury.



DANGER:

Refrigerating gas leaks caused by pressure relief valve intervention may cause damages to things and / or people



ATTENTION:

all the materials with an environmental impact which must be eliminated after interventions or processing operations on the PARTLY COMPLETED MACHINERY must be disposed of in accordance to the norms in force. If necessary, entrust their disposal to specialized companies.

3.7. Technical data and characteristics of the partly completed machinery

3.7.1. Identification plate

To identify the PARTLY COMPLETED MACHINERY , a specific CE identification plate has been applied on it (for example, in figure 1); the identification data reported on this plate must be signaled to the offices of the Producer whenever requesting an intervention or whenever ordering spare parts. More specifically, the following data is reported on the identification plate:

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

Serial number identification



- figure 1 and 2 = last two digits of the year of construction,
- figure 3 and 4 = week of year in which the semi- machine has been produced,
- figures 5, 6 , 7 and 8 = sequential number

Figure 1

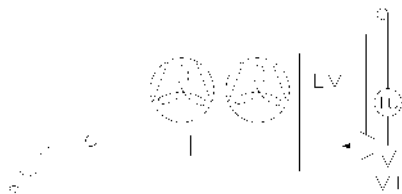
3.7.2 Technical data

All the units are supplied pressurized with nitrogen. Refer to the annexed wiring and refrigeration diagrams for that which concerns the technical data.

It is possible to connect one or more evaporators to each condensing unit, obviously, complying to the rules dictated by refrigeration; at any rate, it is necessary to choose the individual components with care.

Figure 2 below reports the general refrigeration diagram of the evaporating part.

Figure 2



Key to symbols:

- EV** = Evaporator
- VT** = Thermostatic valve
- S** = Siphon

4. Transportation and installation

4.1. General details

The installation of the PARTLY COMPLETED MACHINERY is performed directly by **qualified personnel**.

Before proceeding to incorporate the PARTLY COMPLETED MACHINERY onto the end-machine, it is necessary, however, to arrange the power supplies and utilities necessary for the system to function correctly, following the indications reported in the Present Chapter and, if necessary, preemptively consulting the Technical Department of the Producer.



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 Producer rejects any responsibility for potential damages to things and/or persons deriving from improper interventions performed by unqualified, untrained, or unauthorized personnel.

4.1.1. Power supplies and utilities

The power supplies and utilities (responsibility of the Purchaser) necessary for the PARTLY COMPLETED MACHINERY to function exclusively consist of the supply of electrical energy.

Except if indicated differently, the following are the **responsibility of the Purchaser**:

the arrangement of the transportation means necessary to transport the PARTLY COMPLETED MACHINERY to the premises where it will be assembled and installed;

the arrangement of the tools necessary for the assembly and installation;

the arrangement of the auxiliary means and consumption materials (for example, non-flammables and non-corrosives, materials and instruments necessary for cleaning operations, and covering cloths).

4.2. Transportation and displacement

The indications contained in this paragraph must be followed during the operations of transportation and displacement of the PARTLY COMPLETED MACHINERY, which can occur during the procedure of installation of the PARTLY COMPLETED MACHINERY onto the end-machine.



DANGER:

the Producer rejects any responsibility for potential damages to things and/or persons deriving from improper interventions performed by unqualified, untrained, or unauthorized personnel.

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



During the transportation and displacement of the PARTLY COMPLETED MACHINERY, it is necessary to comply with the following warnings:

check that the lifting equipment is suitable for the weight and dimensions of the PARTLY COMPLETED MACHINERY.
Do not bump the structure or the protections of PARTLY COMPLETED MACHINERY with equipment or anything else.

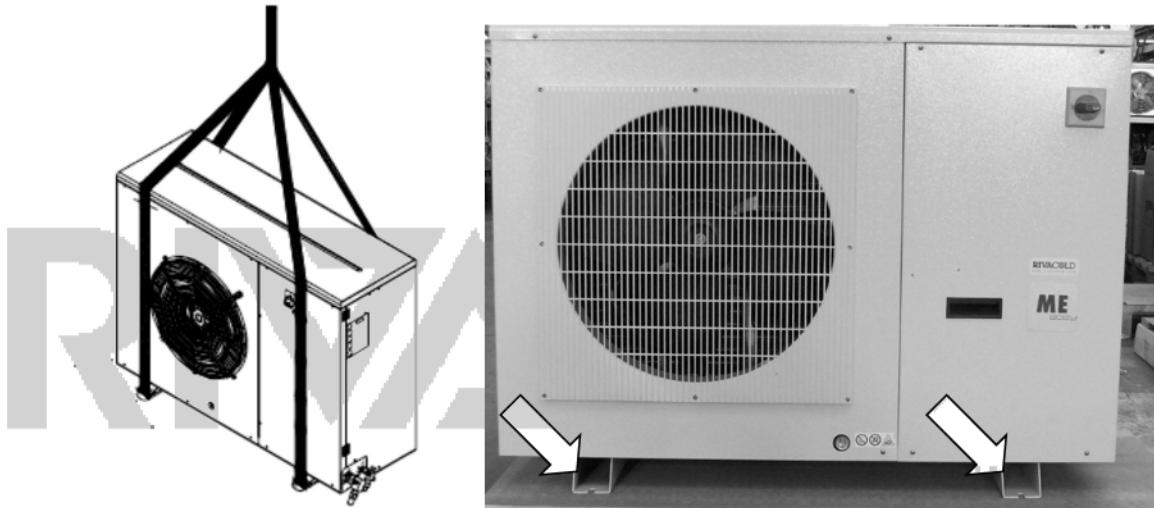
4.2.1. Lifting



DANGER: *the lifting operations must be performed under the direct supervision of a qualified mechanical maintenance worker.*

Lifting for displacement and the subsequent positioning of the PARTLY COMPLETED MACHINERY can be performed using belts, as shown in Figure 3. The belts must be inserted in the support feet of the structure, as indicated by the arrows in Figure 3.

Figure 3



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

Never use two lifting means simultaneously.

Never station underneath hanging loads.

If steel ropes are used, always apply the end eye to the lifting hook.

If steel ropes are used, pay attention not to create acute folds, that is, a curvature radius smaller than the one of the eyelets of the rope ends.

Use ropes with an adequate length, so that the angle between the ropes and the horizon is always greater than 45°.



ATTENTION: *during all these operations, follow the precautions necessary to avoid collisions (especially with the plastic guards of the ventilators) and topple-overs, displacing the INCOMPLETE-MACHINE so as not to lose the conditions of balance.*



DANGER: *make sure that there is no unauthorized personnel in proximity of the area where the lifting, displacement, and unloading operations are taking place, and always keep at a safety distance.*

4.3 Installation



DANGER: *the Manufacturer rejects any responsibility for possible damages to things and/or persons, stemming from improper interventions performed by unqualified, untrained, or unauthorized personnel.*

To perform the task being examined, the following Individual Protection Devices are necessary:



Before proceeding with the installation, it is necessary to have developed a project for the lodging of the refrigeration system, which must define the following:
 all the components of the refrigeration system (e.g. condensing unit, evaporator, piping dimensions, possible safety components, etc.);
 placement of the system;
 path of the piping (lay-out).



DANGER: *If the condensing unit is installed in closed environments, a good air circulation must be nonetheless guaranteed. In case that the unit is installed in closed environments that do not comply with this requisite, it is obligatory to equip the system with an acoustic buzzer, to signal the outflow of refrigerant gas.*

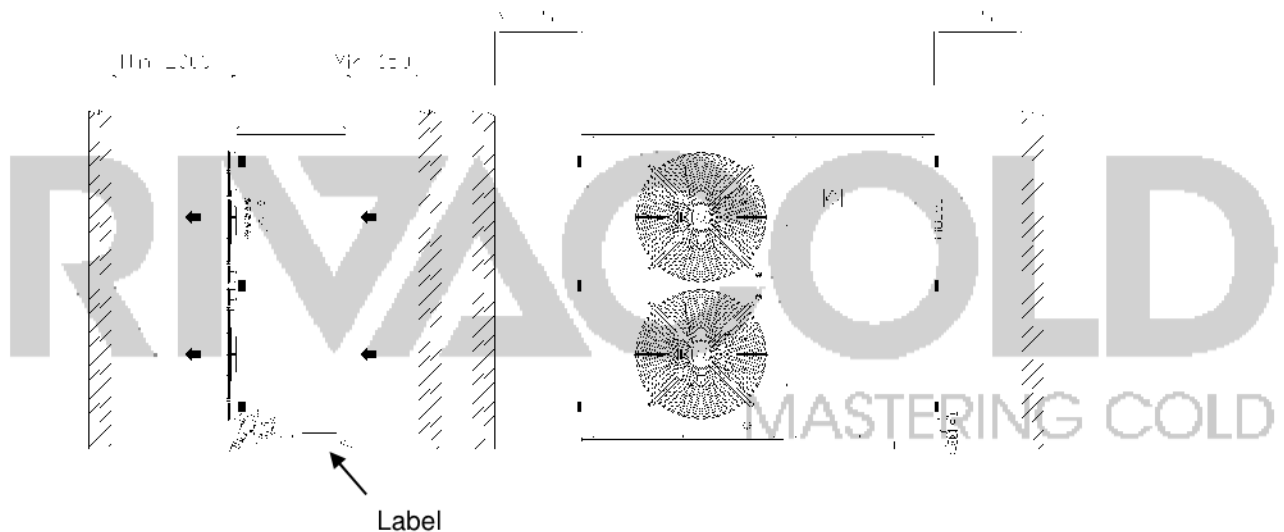
The PARTLY COMPLETED MACHINERY must be installed on pavement, level with respect to the horizon. Alternatively, the PARTLY COMPLETED MACHINERY can be also be fastened on brackets set at a height. The brackets, however, are not part of the unit supply.



DANGER: *the brackets must be suitable for the dimensions and the weight of the machine.*

Fasten, therefore, the PARTLY COMPLETED MACHINERY to the ground (or to the brackets), interposing anti-vibrant rubbers. Leave a space around the machine sufficient to perform the maintenance works in safe conditions. Evaluate what shown in Figure 4 concerning the recommended safety distances.

Figure 4



After having installed and fastened the PARTLY COMPLETED MACHINERY, in the case that the compressor were to be locked by means of the brackets (to avoid damage during the transportation), it is necessary to proceed to unlock the compressor, removing the brackets.

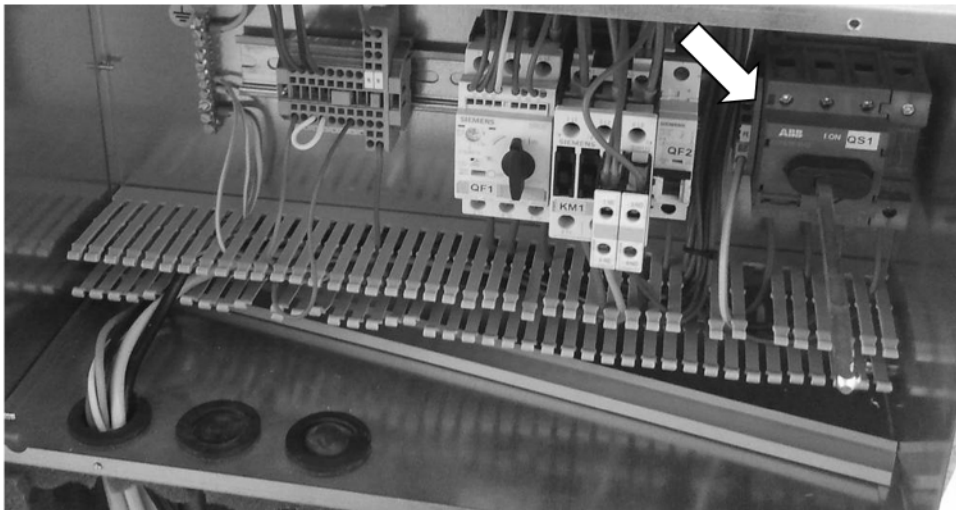
4.3.1. Electrical connection



DANGER: *the electrical connections can be performed only by qualified personnel (electricians).*

The electrical power supply (also in terms of voltage and frequency) supplied by the Purchaser must be sufficient to correctly supply power to the machine. To be specific, it is necessary to adopt the following indications:
 Perform the electrical connections as indicated in the annexed wiring diagram. More specifically, it is necessary to connect a power supply wire to the disconnecting switch of the machine (the arrow in Figure 5), complying with the indications of the wiring diagram. The wire must be protected and gathered up, so that it cannot come into contact with the copper piping, which reaches very high temperatures.

Figure 5



Arrange a differential magneto-thermal switch between the power supply line and the electrical equipment placed on board of the machine, adequately sized for the application and in compliance to the laws in force in the country of installation. Make sure that the power supply voltage is the same as the one indicated on the plate of the condensing unit; the tolerance allowed is 10% of the nominal voltage.



ATTENTION: *the differential magneto-thermal switch must be placed in the immediate vicinity of the unit, in order for it to be well visible and accessible by the technician, in the case of maintenance.*

► It is necessary that the diameter of the power supply wire be adequate to the power absorbed by the unit. Moreover, the power supply wire must be suitable for the installation of the unit outdoor.



ATTENTION: *It is obligatory under terms of law to connect the condensing unit to an efficient grounding system. Any responsibility for the inobservance of this provision is rejected; any responsibility is rejected in the event that the electrical system to which the machine is connected is not built in accordance to the norms in force.*

4.3.2. Refrigerant connection

The recommended diameters are valid up to max. lengths of 10 m. For greater lengths, size the diameters so as to guarantee the correct speed of the gas, or contact the Technical Assistance of the Manufacturer.

The piping must be, in principle, as short as possible. This is necessary both to reduce the losses of load and overall volume of the refrigerant fluid, and therefore its quantity.

The piping must be fastened to the walls near the curbs, the welds, and every 1.5 – 2 meters.

The attachment of the suction in outlet of the evaporator must have a brief horizontal segment, followed by a syphon.

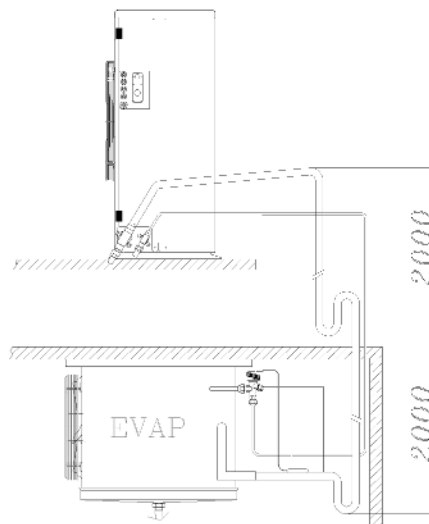
4.3.3 Suction piping

With an evaporation temperature lower than -10°C, the suction lines must be insulated with an anti-condensation pipe having a thickness of at least 13 mm, to limit overheating. Perform the sizing of the suction piping to ensure oil return to the compressor.

All the systems must be engineered so as to ensure, at any rate, oil return to the compressor.

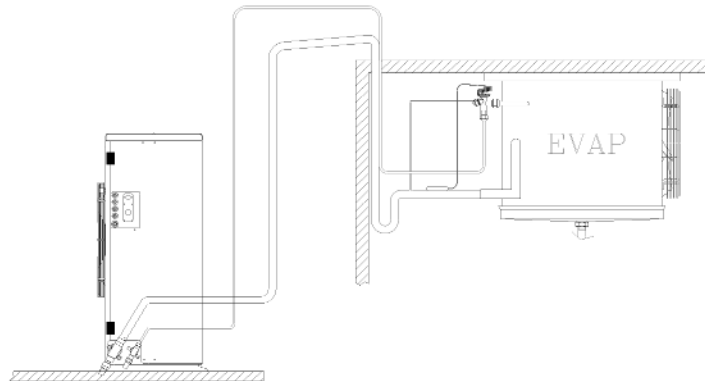
In the situation in which the condensing unit is positioned above the evaporator, it is important to provide syphons on the suction line every 2 m of height difference, to guarantee oil return to the compressor (see *Figure 6*)

Figure 6



At any rate, when there are horizontal tracts, it is important that the suction piping have a slope of at least 3% downward, toward the compressor (Figure 7).

Figure 7



4.3.4. Adding oil

With the majority of installations in which the ducts do not exceed 10 meters, it is not necessary to add oil. In cases in which the ducts are over-sized with respect to standard conditions or in case they exceed 10 meters, a small quantity of oil must be added.

4.3.5. Vacuum

Of utmost importance for the proper operation of the refrigeration machine and the duration of the compressors, is the correct performance of the vacuum on the system, so as to ensure that the content of air and, above all, humidity remain below the values allowed. The introduction of new gases has required the use of new polyester-type oils, being highly hygroscopic, which demand greater cautions during performance of the vacuum; it is advisable to perform the vacuum on both sides of the circuit. At any rate, the goal to be reached is the obtainment of a pressure not greater than 5 Pa.



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

4.3.6. Loading the refrigerant

After the vacuum operation, the system must be loaded with the type of refrigerant indicated on the plate of the compressors and of the condensing unit or, alternatively, with other possibly allowed types. For a correct loading operation, we recommend, after having performed the vacuum, to pump part of the refrigerant in the compressors to “break the vacuum;” then, start-up the compressors to enable suction of the remaining part of the load.

To correctly quantify the gas load, use HPB and LBP manometers connected to the pressure intakes already arranged; the pressures must be compatible to the operational conditions of the condensing unit.



ATTENTION: *the mixtures of refrigerant gases must be loaded into the system in their liquid state.*



DANGER: *For the loading, recovery, and control maneuvers of the refrigerant, use protective gloves against low temperatures. The loading operations must be performed only by specialized technicians.*

4.3.7. Controlling the leakages

A system can operate regularly over time, for the entire duration of the compressors, only if all the regulations relative to the correct installation are observed, amongst which the absence of refrigerant leakages; it is important that inspections be performed on the leakages of the welds, with methods and equipment suitable to the type of gas employed.

4.3.8. Work cycles

- ▶ The systems must be sized so as not to exceed 5 on /off cycles per hour.
- ▶ The intervention of the Thermal/Ammetric protection turns off the compressor, which will be reactivated after the time necessary to restore the contacts of the protector has elapsed.

4.3.9. Functioning times

- ▶ The systems are sized for maximum 80% of the time of standard functioning.
- ▶ 100% functionality of the compressor can only occur in stressful conditions of load and temperature of the environment, outside the functioning limits allowed.

4.4. Arrangement for start-up



DANGER:

the Manufacturer rejects any responsibility for possible damages to things and/or persons, stemming from improper interventions performed by unqualified, untrained, or unauthorized personnel.

To perform the task being examined, the following Individual Protection Devices are necessary:



Before bringing the PARTLY COMPLETED MACHINERY to standard operations, certain preliminary inspections are necessary, to be performed at start-up.

4.4.1. Pre-heating of the compressor casing

At least 12 hours before start-up of the motorized compressor, it is necessary to put the casing resistance under voltage, so as to eliminate the risk of dilution of the lubricant oil with the refrigerant fluid.



ATTENTION:

Make sure to inspect the correct set-up of the refrigeration circuit and the electrical one once more, especially checking the correct grounding system of the equipment. Check that all the faucets of the refrigeration circuit are open, and that the bypass ones toward the outside, which must also be equipped with caps, are sealed.

4.4.2. Inspection of closure of the panels.

Make sure that the panels of the structure of the PARTLY COMPLETED MACHINERY are positioned correctly, sealed, and fastened with their own fastening means.

4.4.3. Inspection of the lubricant oil return

We advise to check the oil level in the casing, where the LED is.

4.5. Storage

In case it were necessary to store the PARTLY COMPLETED MACHINERY for a certain period of time, before performing its installation, we recommend to adequately protect it, and to store it in a suitable environment, having the following characteristics:

outer surfaces resistant to atmospheric agents;
protected against access by unauthorized persons;
with the following environmental conditions:

- good circulation
- room temperature ranging between -20 °C and +50 °C;
- relative air humidity ranging between 30% and 80%;



ATTENTION:

do not remove the packages possibly present for certain components of the PARTLY COMPLETED MACHINERY, or adopt appropriate precautions to protect the parts exposed.

4.6. Uninstallation

In case it is necessary to uninstall the PARTLY COMPLETED MACHINERY, proceed by following the inverse order of the installation sequence reported in Paragraph 4.3 - Installation.



DANGER:

the Producer rejects any responsibility for potential damages to things and/or persons deriving from improper interventions performed by unqualified, untrained, or unauthorized personnel.

To perform the task being examined, the following Individual Protection Devices are necessary:



5. Maintenance and demolition

5.1. General details concerning maintenance

To guarantee the maximum reliability of the PARTLY COMPLETED MACHINERY and to prevent conditions of danger, diligently adhere to the instructions and cautions reported in the following pages.



DANGER: *due to safety reasons, all the maintenance operations reported in the present chapter must be solely performed by qualified and specifically trained technicians. The appointed technicians must, moreover, have all the instruments and IPD necessary to operate in safety .*



ATTENTION: *to always guarantee to the operators the full efficiency and safety of the PARTLY COMPLETED MACHINERY and to prevent problems tied to the wear-out of the safety measures or machine stops, which may prove costly, it is necessary to implement an effective **preventive maintenance**, planning interventions at programmed intervals, with the purpose of renovating or replacing the parts subject to normal wear-out, and of checking the general condition of the mechanical and electrical components that make up the PARTLY COMPLETED MACHINERY (and its auxiliary equipment), thus supplying the indications on eventual extraordinary operations that may become necessary.*

Before performing any maintenance or cleaning intervention reported in the present paragraph, it is necessary to disconnect the PARTLY COMPLETED MACHINERY from the electrical power supply, acting on the main disconnecting switch placed on the panel that seals the electrical equipment. The switch must be locked in open position with a padlock.



DANGER: *the Manufacturer rejects any responsibility for possible damages to things and/or persons, stemming from improper interventions performed by unqualified, untrained, inadequately equipped, or unauthorized personnel.*

5.2. Indications concerning safety

To correctly perform the maintenance and cleaning interventions, it is essential to bear in mind the indications reported below. During all interventions, it is necessary to provide notice of their performance on the PARTLY COMPLETED MACHINERY by way of suitable signs (these signs must be positioned so as to prevent any undesired intervention on the PARTLY COMPLETED MACHINERY).

During the interventions, **only authorized personnel** can access the work area.



ATTENTION: *the maintenance and cleaning interventions must be performed by expert personnel which has read and fully understood all the indication reported in the present assembly instructions.*

DANGER: *only dismantle the parts of the PARTLY COMPLETED MACHINERY actually necessary to perform the specific maintenance operation.*

All the materials with an environmental impact which must be eliminated after a maintenance intervention must be disposed of in accordance to the norms in force.



ATTENTION: *for the disposal of materials with a high environmental impact, if necessary, contact specialized companies.*

In any case, to perform all the maintenance and cleaning interventions reported below in correspondence of the PARTLY COMPLETED MACHINERY, the following Individual Protection Devices are necessary:



5.3. Checking the availability of materials

At least **60 days** in advance on the date scheduled for the maintenance intervention, perform a detailed examination of the materials necessary:

1. check if the material is available in stock,
2. if need be, request the missing materials to the Technical Department of the Producer, at least **30 days** in advance.

5.4. Maintenance and cleaning



DANGER: *the Producer rejects any responsibility for potential damages to things and/or persons deriving from an incorrect or incomplete maintenance.*

**DANGER:**

before performing all the necessary ordinary maintenance interventions, make sure the PARTLY COMPLETED MACHINERY has been disconnected from its electrical power supply; furthermore, wait for the hot surfaces to cool down.

**ATTENTION:**

in case of replacement of components of the PARTLY COMPLETED MACHINERY, the latter must be replaced with identical and original components.

**ATTENTION:**

any braze welding interventions on products of risk category PED ≥ 1 must be performed by qualified personnel.

5.4.1. Interventions and their relative frequency

The most significant and important operations relative to ordinary maintenance can be thus summarized:

Periodically clean (at least **once a month**) the condenser, removing dust and greases. If the environment where the unit is installed is very dusty, it may be necessary to clean the machine more frequently. Use a compressed air gun or, alternatively, a vacuum for the cleaning.

Clean, **every four months**, the contacts, fixed and mobile, of all the contactors, replacing them if they display signs of wear-out. Inspect (**every four months**) the tightening of all the electrical terminals, both inside the panels and in the terminal boards of each electrical utility.

Visually inspect the refrigeration circuit, also inside the PARTLY COMPLETED MACHINERY, to search for refrigerant leakages, which are hinted also by traces of lubricant oil. Promptly intervene and inspect in-depth in case of doubt. Check for possible leaks of refrigerant gas with a **yearly inspection**.

For leakages of such an entity to require an integration of refrigerant $> 10\%$ of the total gas load, the repair of the leakage must be performed **within 30 days** from the detection of the fault.

Inspect, **every four months**, the regular flow of refrigerant on the LED present on the liquid line.

Inspect, **every four months**, the oil level on the specific LED (where present), placed on the compressor casing.

Carefully examine, **every four months**, on the glass of the LED of passage on the liquid line, the color of the element sensitive to humidity. The green color indicates dry conditions, the yellow color indicates humid conditions. In case humidity is indicated, proceed to immediately stop the machine and to replace the filter on the liquid, replacing the load of refrigerant and oil. Repeat the inspection after 3 days of operation.

Inspect, **every four months**, the noise level of the compressor. This operation must be performed with caution, because it requires the system to be in operation; check for the presence of clicking sounds or vibrations, which may be symptoms of breakages, or of excessive mechanical play between the parts in movement.

**ATTENTION:**

at the end of each maintenance or cleaning intervention, reposition all the fixed guards. Do not disassemble the safety valve without having preventively recovered the gas.

**ATTENTION:**

pay attention to keep the screws of the metal panels aptly separate from the screws necessary to fasten the protective plastic meshes of the ventilators. The two types of screws, in fact, are different.

5.4.2. Interventions on the safety valve

We recommend that you replace the safety valve in case it has intervened; in fact, during the unloading, the accumulation on the gasket of the valve of residues of processing operations of the components and the piping can make the seal defective when it is closed again.

**DANGER:**

before replacing the valve, check that the system, in the area in which operations are being performed, is not under pressure or with a high temperature.

**DANGER:**

do not dismantle the safety valve without having first recovered the gas present inside the liquid receiver.

**ATTENTION:**

no maintenance is required on the safety valves. The removal of the cap or tampering with the seal are considered unauthorized changes of the calibration; the latter entail the cancellation of the warranty provided by the constructor. Inspection of the safety valves is reserved to the competent institutions and is governed by the specific norms of law in force in the country where the PARTLY COMPLETED MACHINERY is installed.

To check the safety valve (when provided) **every three years**.

5.5 Dismantling and demolition

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



5.5.1. Dismantling

In case it becomes necessary to dismantle the PARTLY COMPLETED MACHINERY , follow the procedure indicated below.

1. Insulate the PARTLY COMPLETED MACHINERY from the electrical power supply.
2. Referring to *Paragraph 4.6 - Uninstallation of Chapter 4 – Transportation and Installation*, proceed to uninstall the PARTLY COMPLETED MACHINERY; furthermore, contact the Technical Department of the Producer to obtain the necessary assistance during the intervention.
3. To proceed to the displacement of the PARTLY COMPLETED MACHINERY , operate in accordance to the instructions reported in *Paragraph 4.2 – Transportation and Displacement of Chapter 4 – Transportation and Installation*.
4. Arrange the components appropriately in function of the fact that they must be transported to another site (please refer to *Paragraph 4.2 –Transportation and Displacement of Chapter 4 – Transportation and Installation*), that they must be stocked (please refer to *Paragraph 4.5 - Storage of Chapter 4 – Transportation and Installation*), or that they must be demolished (please refer to *Paragraph 5.5.2 – Demolition and disposal*).



DANGER:

the Producer rejects any responsibility for potential damages to things and/or persons deriving from improper interventions performed by unqualified, untrained, improperly equipped, or unauthorized personnel.

5.5.2. Demolition and disposal

When the PARTLY COMPLETED MACHINERY has ended its life-cycle, before proceeding to its final disposal, it is necessary to perform a series of operations aimed at minimizing the environmental impact tied to the disposal of the components of the PARTLY COMPLETED MACHINERY , as required by the norms in force concerning the disposal of waste products.

The latter operations are:

1. Separate and stock the parts with an environmental impact, or rather:
 - a. separate the various parts that could cause pollution;
 - b. perform a selection of the materials with the purpose of favoring their recycling, assigning them to separate waste collection (in particular, select the plastic and rubber elements).
2. The gas contained inside the system **must not** be dispersed in the environment. The compressor oil is subjected to separate waste collection; for this reason, we recommend that you dispose of the unit only at specialized separate waste collection centers, and not treating it as standard iron scrap, and that you follow the normative provisions in force.
3. Dispose of the casings, that is, once the removal and storage of the pollutant elements has been completed, contact companies specialized in the disposal of such casings.



6. Search for breakdowns

	POSSIBLE CAUSES	SOLUTIONS
A	<p><u>The compressor does not start and does not release a humming sound</u></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><u>The compressor does not start (releases humming sound) and the thermal cut-off intervenes</u></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><u>The compressor starts but the relay does not open</u></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><u>Intervention of the thermal cut-off</u></p> <ol style="list-style-type: none"> 1 Low voltage supply to the compressor (imbalanced phases on tri-phase motors). 	<ol style="list-style-type: none"> 1 Identify the cause and eliminate it.

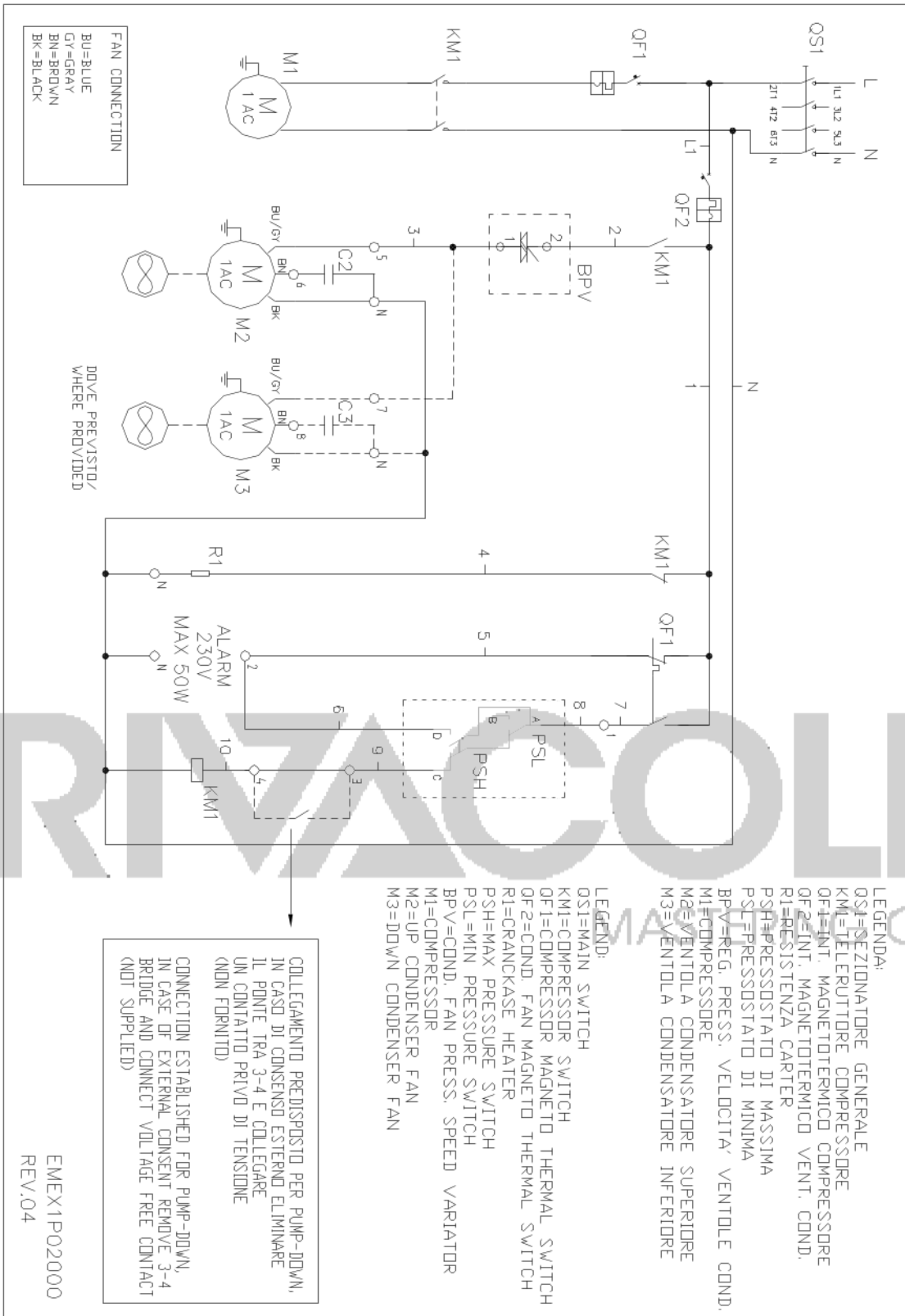
	POSSIBLE CAUSES	SOLUTIONS
	2 Defective thermal cut-off. 3 Defective running condenser. 4 Excessive discharge pressure. 5 Suction pressure too high. 6 Compressor overheated, hot return gas. 7 Winding of the compressor motor in short-circuit.	2 Check its characteristics and replace it if necessary. 3 Identify 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><u>The compressor starts and circulates, with short-spanded function cycles</u></p> 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.	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><u>The compressor functions uninterruptedly or for long periods</u></p> 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.	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><u>Running condenser damaged, interrupted, or in short-circuit</u></p> 1 Incorrect running condenser.	1 Replace the condenser with the correct type.
H	<p><u>Start-up relay defective or burnt out</u></p> 1 Incorrect relay. 2 Relay assembled incorrectly . 3 Incorrect running condenser.	1 Replace with the correct relay. 2 Reassemble the relay in the correct position. 3 Replace the condenser with the correct type.
I	<p><u>Compartment temperature too high</u></p> 1 Thermostat regulated too high. 2 Expansion valve under-sized. 3 Evaporator under-sized. 4 Insufficient air circulation.	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.
L	<p><u>Suction piping frosted</u></p> 1 Expansion valve with excessive flow of gas or over-sized. 2 Expansion valve blocked in open position. 3 Evaporator ventilator does not work. 4 High gas load.	1 Regulate the valve or replace it with one correctly sized. 2 Clean the valve of foreign substances or replace it if necessary. 3 Identify the cause and eliminate it. 4 Reduce the load.

7. Allegati – Alleged files

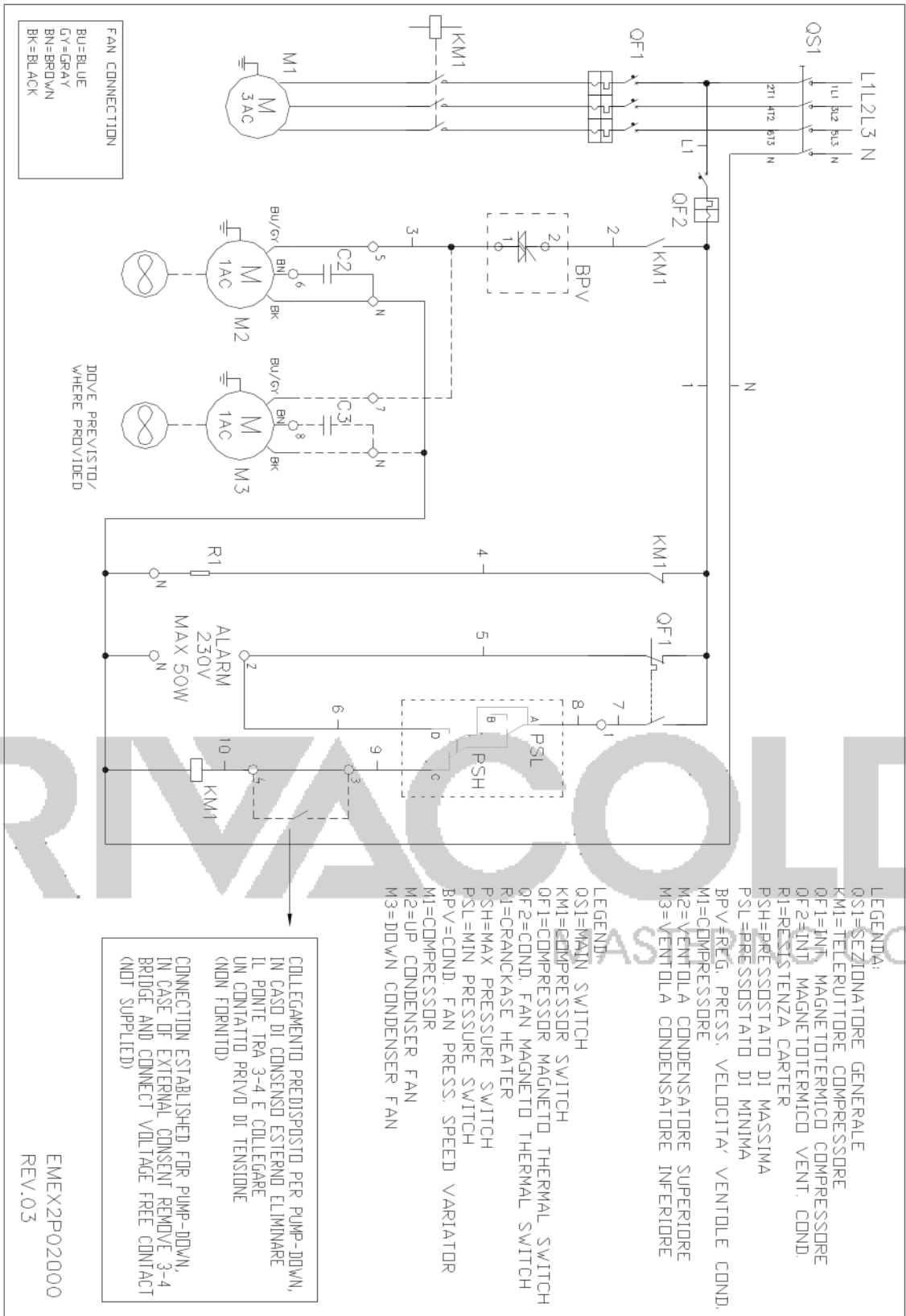
Schemi elettrici – electrical diagram

Monofase – single-phase

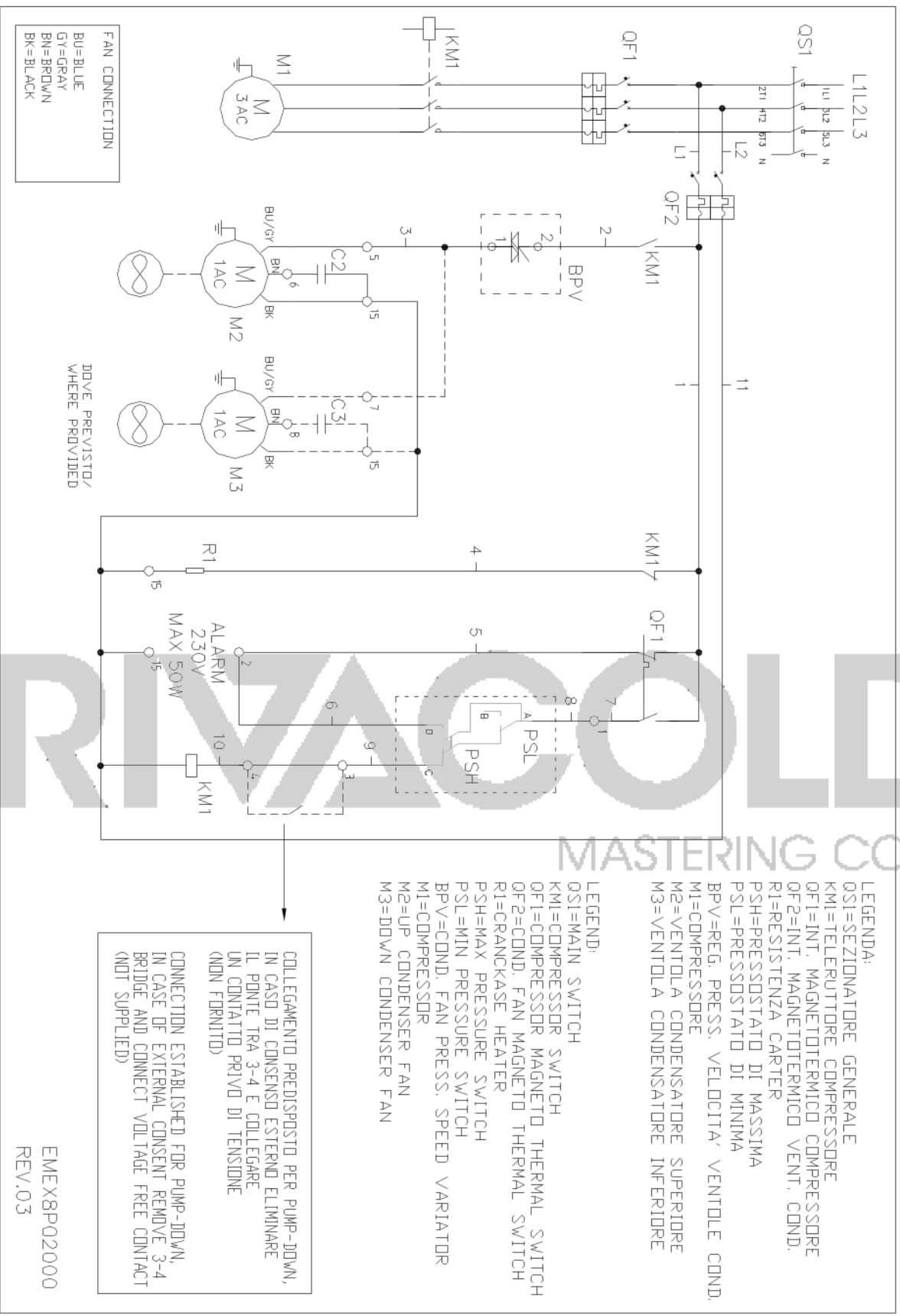
RIVACOLD
MASTERING COLD



Trifase 400v – tree-phase 400v



Trifase 230v – tree-phase 230v



FAN CONNECTION
 BU=BLUE
 GY=GRAY
 BN=BRDWN
 BK=BLACK

DOVE PREVISTO/
 WHERE PROVIDED



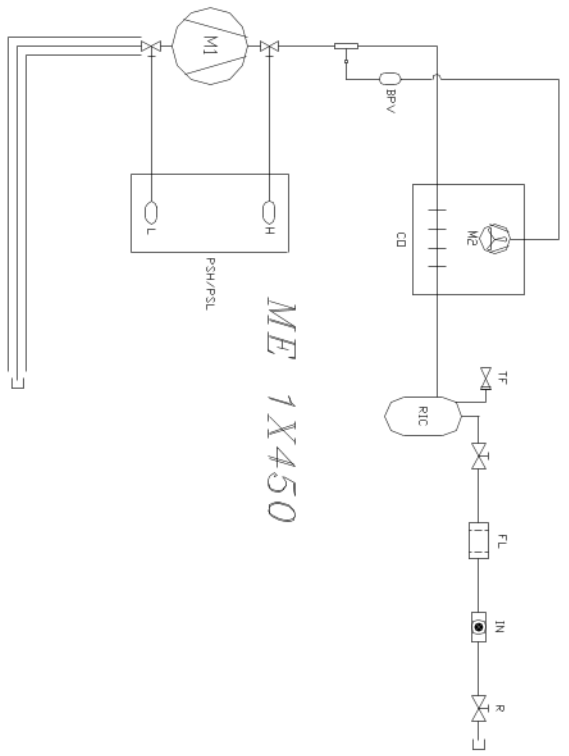
LEGENDA:
 QS1=SEZIONATORE GENERALE
 KM1=TELERUTTORE COMPRESSORE
 QF1=INT. MAGNETOTERMICO COMPRESSORE
 QF2=INT. MAGNETOTERMICO VENT. COND.
 R1=RESISTENZA CARTER
 PSH=PRESSOSTATO DI MASSIMA
 PSL=PRESSOSTATO DI MINIMA
 BPV=REG. PRESS. VELOCITA' VENTOLE COND.
 M1=COMPRESSORE
 M2=VENTOLA CONDENSATORE SUPERIORE
 M3=VENTOLA CONDENSATORE INFERIORE

LEGEND:
 QS1=MAIN SWITCH
 KM1=COMPRESSOR SWITCH
 QF1=COMPRESSOR MAGNETO THERMAL SWITCH
 QF2=COND. FAN MAGNETO THERMAL SWITCH
 R1=CRANKCASE HEATER
 PSH=MAX PRESSURE SWITCH
 PSL=MIN PRESSURE SWITCH
 BPV=COND. FAN PRESS. SPEED VARIATOR
 M1=COMPRESSOR
 M2=UP CONDENSER FAN
 M3=DOWN CONDENSER FAN

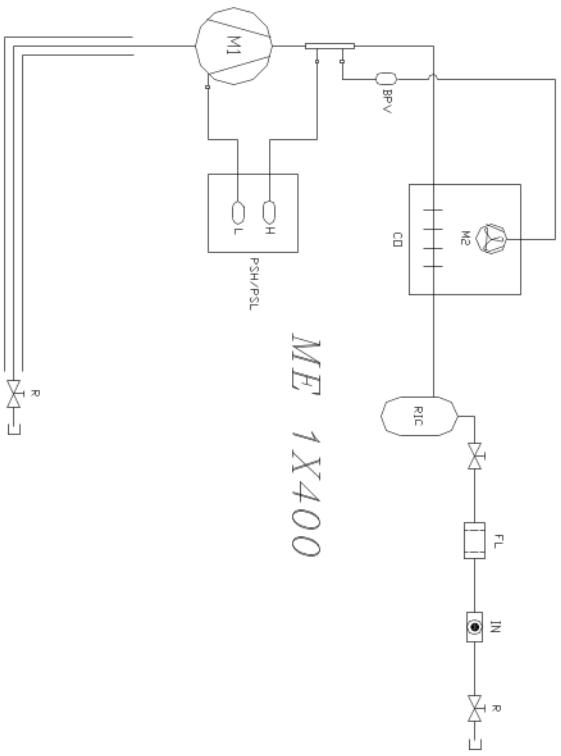
COLLEGAMENTO PREDISPOSTO PER PUMP-DOWN,
 IN CASO DI CONSENSO ESTERNO ELLIMINARE
 IL PONTE TRA 3-4 E COLLEGARE
 UN CONTATTO PRIVO DI TENSIONE
 (NON FORNITO)
 CONNECTION ESTABLISHED FOR PUMP-DOWN,
 IN CASE OF EXTERNAL CONSENT REMOVE 3-4
 BRIDGE AND CONNECT VOLTAGE FREE CONTACT
 (NOT SUPPLIED)

EMEX8P02000
 REV.03

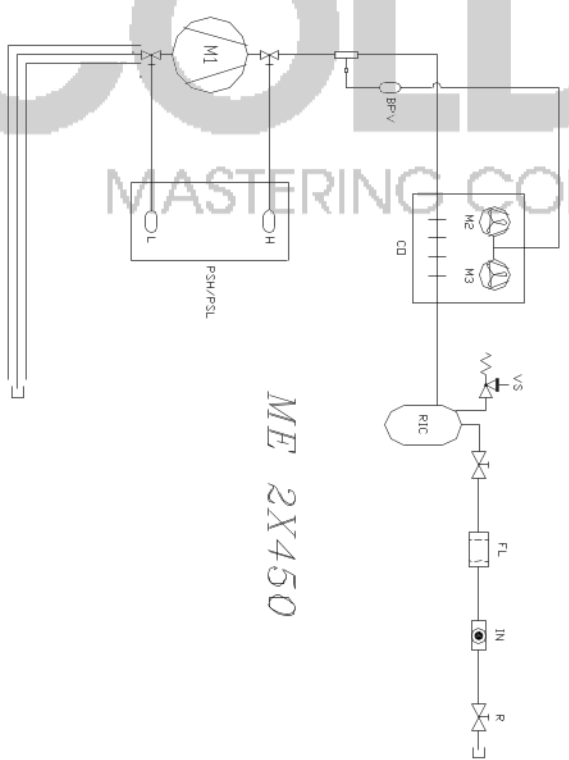
Schemi frigoriferi – refrigerator diagram



ME 1X450



ME 1X400



ME 2X450

Simbolo	Descrizione
M1	Compressore - Compressor
M2	Ventola condensatore 1 - Condenser fan 1
M3	Ventola condensatore 2 - Condenser fan 2
CO	Condensatore - Condenser
RIC	Ricevitore di liquido – Liquid receiver
VS	Valvola di sicurezza – Pressure relief valve
TF	Tappo fusibile – Fusible plug
FL	Filtro deidratatore – Drier filter
IN	Indicatore di liquido – Sight glass
R	Rubinetto – Shut-off valve
BPV	Variatore di velocità ventole condensatore Condenser fan speed variator

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