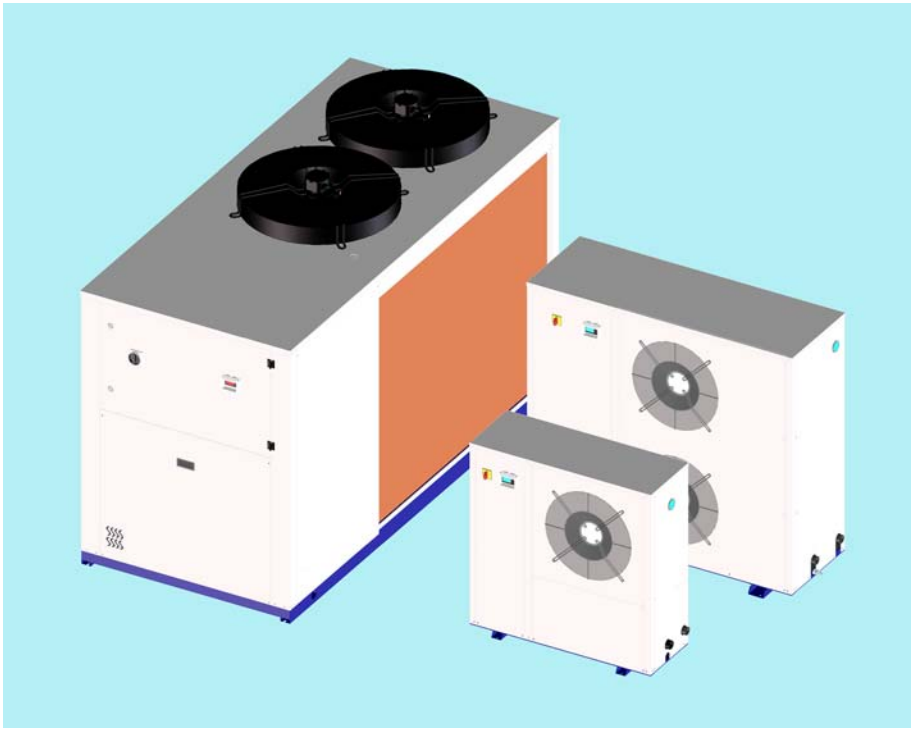
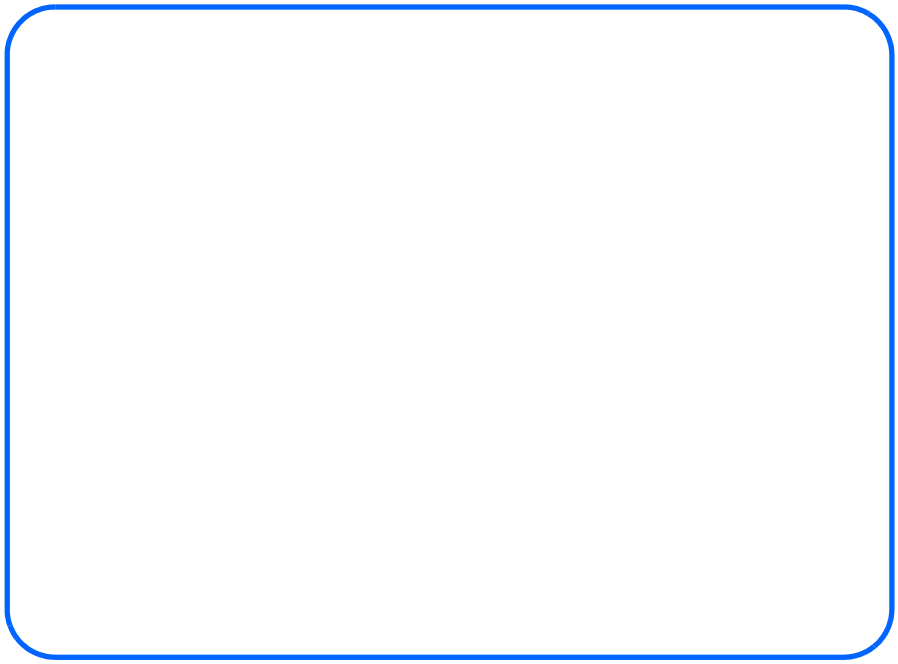
Water Refrigerators

MCCG - CG 013÷301



MAINTENANCE AND OPERATING MANUAL

Water Refrigerators



CHAPTER 1

ELECTRONIC CONTROL QUICK REFERENCE GUIDE

The machines are equipped with an electronic control panel, which can be programmed by means of some buttons. It controls the operation of refrigerant circuits basing on the measured control parameters. Here below are indicated some basic instructions to start the unit. For further information consult Electronic Board chapter.

1.1 Unit switching on and off

ATTENTION

*Before switching on the unit be sure that all personnel have read and understood the Chapter 3 "**Safety**" of this manual.*

Press the button for 5 seconds **to start up the machine.**

The led of icon flashes for 5 seconds then it remains lit.

1.2 How to put the unit in stand by

Stand-by modality is obtained every time the unit is switched off.

It is indicated by the symbol lit.

Also in stand-by modality the controller can:

1. Display the measured values
2. Manage the alarms by displaying and signalling.

1.3 Display

The display is divided in 3 zones (for further information please consult Chapter 8 "***User interface***").

Upper-left zone: it displays the evaporator's temperature.

Lower-left zone: It displays the condensation temperature / pressure or the hour.

Right zone: Signalling icons.

1.4 Information about the status of the unit

1.4.1 Display icons

ICON	MEANING	ICON	MEANING
°C	Celsius degrees (If displayed)	L	Low pressure alarm
	Fahrenheit degrees (If not displayed)		Antifreeze resistance
bar	Bar/Psi		Pump ON
1	Compressor 1	Flow!	Flow meter alarm
2	Compressor 2		Time to defrost starting (hour)
	Stand-by unit		Fan ON
	General alarm	Menu	Indication for Function Menu entering
H	High pressure alarm		

1.4.2 Symbols and leds on the display

LED	LED STATUS	MEANING	LED	LED STATUS	MEANING
	Steady	Unit on in heat pump modality		Steady	Defrosting enabled
	Steady	Unit on in chiller modality		Unlit	Defrosting disabled or terminated
	Flashing	Programming phase (if flashes together with led)			Clock adjustment
	Flashing	Time to defrost starting			

1.4.3 Access to "Pr1" parameters (User level)

To enter the menu of "**Pr1**" parameters which can be access by the user:

1. Press for some seconds SET + buttons (and start flashing), in the upper part of the display appears "**ALL**", the first group of parameters.
2. Select the various groups using and buttons.
3. After selecting a group, press SET button:
   if the selected group is part of the selected menu or any parameter of this group has been moved in this menu, in the lower part of the display it appears the "Label" and the code of the group's first parameter present in "**Pr1**", its value appears in the upper part of the display.
   It will not be possible to enter a parameter's group which is not part of this menu.
4. It is possible to scroll or modify the parameters contained in the group.

1.4.4 How to modify a parameter's value

1. Enter the programming procedure.
2. Select the desired parameter.
3. Press SET button to enable the value's adjustment.
4. Modify the value by means of and buttons.
5. Press SET to store the new value and to pass to the code of the following parameter.
6. To exit the procedure: Press SET + when a parameter is displayed, or wait (about 240 seconds) without pressing any button.

NOTE

The new value is stored also when the programming procedure is terminated for "time out", without pressing SET button.

ATTENTION

It is possible to modify the value of parameters contained in **CF** *group (Configuration parameters) only when unit is in stand-by.*

1.5 Installation of the MCCG (motocondensing) unit

To install the motocondensing units follow the instructions in paragraph 6.7 "***Cooling circuit connections in motocondensing units"*** and consult the enclosed diagram.

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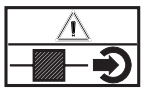
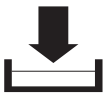
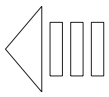
CHAPTER 2

GENERAL INFORMATION

2.1 Description

The machines described in this manual are called “WATER REFRIGERATORS” or simply “REFRIGERATORS”.
This manual is written for those responsible for the installation, use and maintenance of the unit.
These refrigerators have been designed exclusively for civil applications to cool a liquid flow.
The components used are of high quality and all the projecting process, from the production to the unit checking, has been manufactured in conformity with ISO 9001 norms.
In most applications, the liquid of the user circuit is water and the term “WATER” will be used even if the liquid of the user circuit is different from water (e.g. a mixture of water and glycol).
Here below the term “PRESSURE” will be used to indicate the gauge pressure.
The following symbols are shown on the stickers on the unit as well as on the overall dimension drawing and refrigeration circuits in this manual.
Their meaning is the following:

	Water inlet in the machine **Install an adequate water filter on the inlet pipelines**
	Water outlet from the machine
	Indications for lifting the unit
	Water drainage point from the machine
	Water filling point
	Cooling air flow
	Direction of the refrigerant gas flow and water circuit
	Direction of pump rotation (if installed) and of fan rotation
	Electric shock risk
	Air vent

To describe the unit components it is necessary the MODEL and the CODE NUMBER.

2.2 How to interpret the code of the model

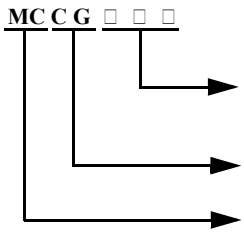
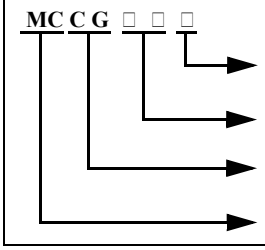
MODELLO MCCG-CG013÷020	DESCRIPTION
	Cooling capacity expressed in HP at nominal conditions * Cygnus model code MCCygnus model code. **MC** is written only in the motocondensing units

Table 1 HOW TO INTERPRET THE CODE OF THE MODEL

MCCG-CG031÷301 MODEL	DESCRIPTION
	N° of cooling circuits Cooling capacity expressed in HP at nominal conditions * Cygnus model code MCCygnus model code. **MC** is written only in the motocondensing units

* Inlet water temperature 12°C, outlet water temperature 7°C, ambient temperature 35°C.

In CG - MCCG 013÷301 model

ATTENTION

This manual provides the user, installer and maintenance technician with all the technical information required for installation, operation and carrying out routine maintenance operations to ensure long life.
If spare parts are required, this must be original.
Requests for SPARE PARTS and for any INFORMATION concerning the unit must be sent to the distributor or to the nearest service centre, providing the MODEL and MACHINE NUMBER shown on the machine data plate and on the first page of this manual.

CHAPTER 3

SAFETY

This machinery was designed to be safe in the use for which it was planned provided that it is installed, started up and maintained in accordance with the instructions contained in this manual.
The manual must therefore be studied by all those who want to install, use or maintain the unit.
The machine contains electrical components which operate at the line voltage, and also moving parts as fans and/or pump.
It must therefore be isolated from the electricity supply network before being opened.
All maintenance operations which require access to the machinery must be carried out by expert or appropriately trained persons who have a perfect knowledge of the necessary precautions.
Avoid the presence of children in the unit installation place.

3.1 General

When handling or maintaining the unit and all auxiliary equipment, the personnel must operate with care observing all instructions concerning health and safety at installation site.
Most accidents which occur during the operation and maintenance of the machinery are a result of failure to observe basic safety rules or precautions.
An accident can often be avoided by recognising a situation that is potentially hazardous.
The user should make sure that all personnel concerned with operation and maintenance of the unit and all auxiliary equipment have **read and understood** all warnings, cautions, prohibitions and notes written in this manual as well as on the unit.
Improper operation or maintenance of the unit and auxiliary equipment could be dangerous and result in an accident causing injury or death.
Do not operate the unit and auxiliary equipment until the instructions in the Operating section of this manual are understood by all personnel concerned.
Do not carry out any servicing, repair or maintenance work on the unit and auxiliary equipment until the instructions in the relevant sections of this manual are clearly understood by all personnel concerned.
We cannot anticipate every possible circumstance which might represent a potential hazard.
The warnings in this manual are therefore not all-inclusive.
If the user employs an operating procedure, an item of equipment or a method of working which is not specifically recommended, he must ensure that the unit and auxiliary equipment will not be damaged or made unsafe and that there is no risk to persons or property.

3.2 General precautions

3.2.1 Liquids of the user circuit

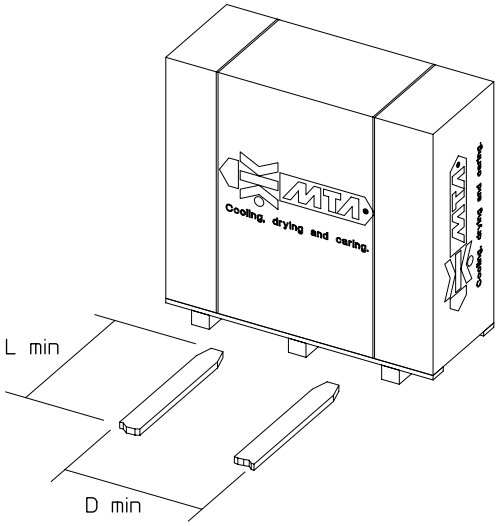
The liquids of the user circuit must be compatible with the materials used.
These can be water or mixtures of water and glycol, for example.
The addition of anti-corrosive chemical additives and operating in a pH range between 7 and 8 is recommended.
Even in the case of glycol mixtures, the use of appropriate chemical additives (consult the glycol supplier) is very important to protect the refrigerator materials from possible corrosion caused by the chemical degradation to which glycol is subject.
If the liquids of the user circuit contains dangerous substances (e.g. ethylene glycol) is very important to collect any liquid which leaks because it could cause damages to the ambient.
Furthermore, when the refrigerator is no longer used, dangerous liquids must be disposed of by firms specialised and authorised for treating them.

3.2.2 Lifting and carriage precautions

Avoid injury by using a hoist to lift heavy loads.
Check all chains, hooks, shackles and slings are in good condition and are of the correct capacity.
They must be tested and approved according to local safety regulations.
Cables, chains or ropes must never be applied directly to lifting eyes.
Always use an appropriate shackle or hook properly positioned.
Arrange lifting cables so that there are no sharp bends.
Use a spreader bar to avoid side loads on hooks, eyes and shackles.
When a load is on a hoist stay clear of the danger area beneath and around it.
Keep lifting acceleration and speed within safe limits and never leave a load hanging on a hoist for longer than is necessary.

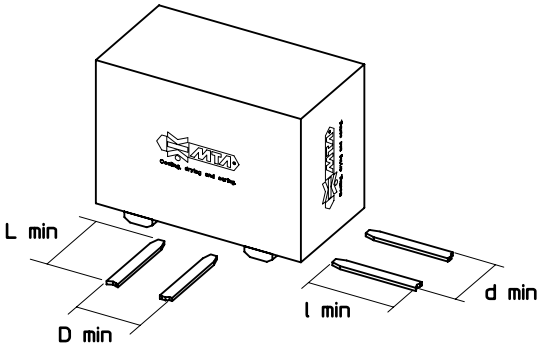
The handling of refrigerators equipped with pallet can be done using fork-lift trucks in accordance with the drawing on the side; the lifting can be done from all sides of the unit.

MCCG-CG 013÷071



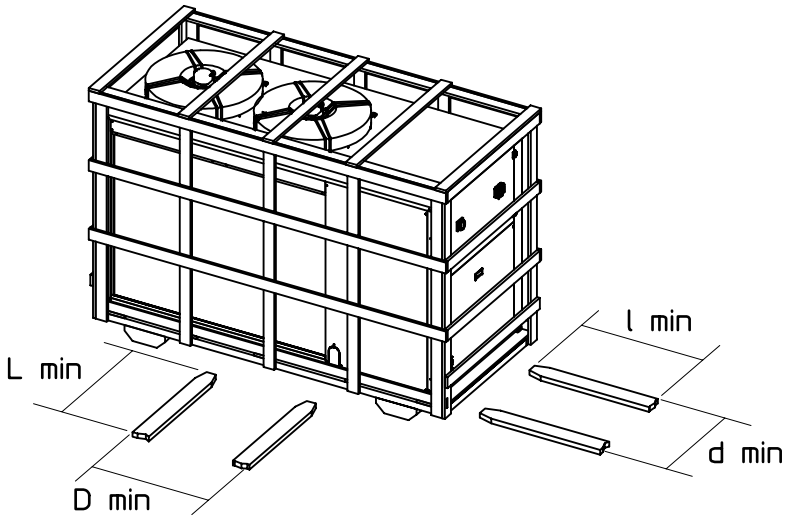
MODEL	L min	D min
MCCG-CG 013÷020	500	580
MCCG-CG 031÷071	600	700

MCCG-CG 081÷171



MODEL	L min	D min	l min	d min
MCCG-CG 081÷101	900	600	1400	600
MCCG-CG 131÷171	1200	700	1200	700

MCCG-CG 211÷301



MODEL	L min	D min	l min	d min
MCCG-CG 211÷301	1200	800	2000	700

To calculate the handling efforts, please refer to the weights indicated in the following table:

CYGNUS (CG) model	Pointing weight of the units with accumulation group [kg]
CG 013	117
CG 015	120
CG 020	130
CG 031	212
CG 051	243
CG 071	245
CG 081	397
CG 101	415
CG 131	526
CG 171	561
CG 211	673
CG 251	698
CG 301	715

CYGNUS motorcondensing models (MCCG)	Pointing weight of the units with accumulation group [kg]
MCCG 013	95
MCCG 015	98
MCCG 020	108
MCCG 031	147
MCCG 051	177
MCCG 071	178
MCCG 081	323
MCCG 101	337
MCCG 131	445
MCCG 171	477
MCCG 211	584
MCCG 251	605
MCCG 301	620

3.2.3 Installation precautions

For the connection to the electrical net see chapter Chapter 6 "***Installation***".

3.2.4 Precautions during operation

Operation must be carried out by competent personnel under a qualified supervisor.
All the water piping must be painted or clearly marked in accordance with local safety regulations in the place of installation.
Never remove or tamper with the safety devices, guards or insulation materials fitted to the unit or auxiliary equipment.
All electrical connections must comply with local codes.
The unit and auxiliary equipment must be earthen and protected by fuses against short-circuits and overloading.
When mains power is switched on, lethal voltages are present in the electrical circuits and extreme caution must be exercised whenever it is necessary to carry out any work on the electrical system.
Do not open any electrical panels or cabinets or touch any electrical components or associated equipment while voltage is applied unless it is necessary for measurements, tests or adjustments.
Such work should be carried out only by a qualified electrician equipped with the proper tools and wearing appropriate body protection against electrical hazards.

3.2.5 Maintenance and repair precautions

Maintenance, overhaul and repair work must be carried out by competent personnel under a qualified supervisor.
When disposing of parts and waste material of any kind make sure that there is no pollution of any drain or natural water-course and that no burning of waste takes place which could cause pollution of the air.
Protect the environment by using only approved methods of disposal.
If replacement parts are needed use only original spares.
Keep a written record of all maintenance and repair work carried out on the unit and auxiliary equipment.
The frequency and the nature of the work required over a period can reveal adverse operating conditions which should be corrected.
Use only refrigerant gas specified on the specification plate of the unit.
Make sure that all instructions concerning operation and maintenance are strictly followed and that the complete unit, with all accessories and safety devices, is kept in good working order.
The accuracy of pressure and temperature gauges must be regularly checked.
They must be renewed when acceptable tolerances are exceeded.
Keep the machine clean at all times.
Protect components and exposed openings by covering them, for example, with clean cloth or tape during maintenance and repair work.
Do not weld or carry out any operation which produces heat near a system which contains oil or flammable liquids.
The systems which may contain oil or flammable liquids must be completely drained and cleaned (with steam, for example), before carrying out these operations.
Never weld, nor modify in any way, a vessel which may be put under pressure.
To prevent an increase in working temperature, inspect and clean heat exchanging surfaces (i.e. condenser fins) regularly. For every unit establish a suitable time schedule for cleaning operations.
Avoid to damage the safety valves and other pressure relief devices.
Avoid plugging by paint, oil or dirt accumulation.
Precautions must be taken when carrying out welding or any repair operation which generates heat, flames or sparks.
The adjacent components must always be screened with non-flammable material and if the operation is to be carried out near any part of the lubrication system, or close to a component which may contain oil, the system must first be thoroughly purged, preferably by steam cleaning.
Never use a light source with an open flame to inspect any part of the machine.
Before dismantling any part of the unit ensure that all heavy movable parts are secured.
When a repair has been completed, make sure no tools, loose parts or rags are left in, or on the machine.
Check the direction of rotation of electric motors (the pump if installed) when starting up the unit initially and after any work on the electrical connections or switch gear.
All guards must be reinstated after carrying out repair or maintenance work.
Do not use flammable liquid to clean any component during operation.
If chlorinated hydrocarbon non-flammable fluids are used for cleaning, safety precautions must be taken against any toxic vapours which may be released.

ATTENTION

Before removing any panels or dismantling any part of the unit, carry out the following operations:
- Isolate the unit from the main electrical power supply by disconnecting the cable from the electrical power source.
- Lock the isolator in the "OFF" position with a lock.
- Attach a warning label to the main isolator switch conveying: "WORK IN PROGRESS - DON NOT APPLY VOLTAGE".
- Do not switch on electrical power or attempt to start the unit if a warning label is attached.

3.3 Refrigerant gases

R407c is used as refrigerant in these units.
Never attempt to mix refrigerant gases.
To clean out a very heavily contaminated refrigerant system, e.g. after a refrigerant compressor burnout, a qualified refrigeration engineer must be consulted to carry out the task.

The manufacturer's instructions and local safety regulations should always be observed when handling and storing high pressure gas cylinders.

3.3.1 Refrigerant safety schedule

Denomination:	R407c (23% Difluoromethane (R32); 25% Pentafluoroethane (R125); 52% R134a).
INDICATION OF THE DANGERS	
Major dangers:	Asphyxia.
Specific dangers:	Rapid evaporation can cause freezing.
FIRST AID MEASURES	
General information:	Do not give anything to unconscious persons.
Inhalation:	Take the person outdoors. Use oxygen or artificial respiration if necessary. Do not administer adrenaline or similar substances.
Contact with the eyes:	Thoroughly wash with plenty of water for at least 15 minutes and call a doctor.
Contact with the skin:	Wash immediately with plenty of water. Remove contaminated clothing immediately.
FIRE-FIGHTING MEASURES	
Means of extinction:	Any means.
Specific dangers:	Pressure increase.
Specific methods:	Cool the containers with water sprays.
MEASURES IN THE EVENT OF ACCIDENTAL LEAKAGE	
Individual precautions:	Evacuate personnel to safe areas. Provide adequate ventilation. Use means of personal protection.
Environmental precautions:	Evaporates.
Cleaning methods:	Evaporates.
HANDLING AND STORAGE	
Handling technical measures/ precautions:	Ensure sufficient air change and/or extraction in the work areas.
recommendations for safe use:	Do not inhale vapours or aerosols.
Storage	Close properly and store in a cool, dry well-ventilated place. Store in its original containers. Incompatible products: explosives, flammable materials, organic peroxide.
CONTROL OF EXPOSURE/INDIVIDUAL PROTECTION	
Control parameters:	AEL (8-h e 12-h TWA) = 1000 ml/m3 for each of the three components.
Respiratory protection:	For rescue and maintenance work in tanks, use autonomous breathing apparatus. The vapours are heavier than air and can cause suffocation, reducing the oxygen available for breathing.
Protection of the eyes:	Safety goggles.
Protection of the hands:	Rubber gloves.
Hygiene measures:	Do not smoke.
PHYSICAL AND CHEMICAL PROPERTIES	
Colour:	Colourless.
Odour:	Similar to ether.
Boiling point:	-43.9°C at atm. press.
Flammability point:	Non flammable.
Relative density:	1.138 kg/l at 25°C.
Solubility in water:	Negligible.
STABILITY AND REACTIVITY	
Stability:	No reactivity if used with the relative instructions.
Materials to avoid:	Alkaline metal, earthy alkaline metals, granulated metals salts, Al, Zn, Be, etc. in powder.
Hazardous decomposition products:	Halogen acids, traces of carbonyl halides.
TOXICOLOGICAL INFORMATION	

Acute toxicity:	(R32) LC50/inhalation/4 hours/lab. rats >760 ml/l (R125) LC50/inhalation/4 hours/lab. rats >3480 mg/l (R134a) ALC/inhalation/4 hours/lab. rats = 567 ml/l.
Local effects:	Concentrations substantially above the TLV can cause narcotic effects. Inhalation of products in decomposition can lead to respiratory difficulty (pulmonary oedema).
Long-term toxicity:	Has not shown any cancerogenic, teratogenic or mutagenic effects in experiments on animals.
	ECOLOGICAL INFORMATION
Global warming potential HGWP (R11=1):	R125: 0.84 - R134a: 0.28
Ozone depletion potential ODP (R11=1):	0
Considerations on disposal:	Usable with reconditioning.

CHAPTER 4

TECHNICAL DATA

4.1 Main technical data

The main technical data are given on the machine data plate:

For all MCCG-CGmodels	
MODEL and CODE	They identify the size of the unit and the type of construction.
MANUAL	This is the code number of the manual.
SERIAL NUMBER	This is the construction number of the unit.
MANUFACTURING YEAR	This is the year of the final test of the unit.
VOLTAGE/PHASE/FREQUENCY	Electric alimentation characteristics.
MAX. CONSUMPTION (I max)	This is electrical current consumed by the unit during the limit working conditions (refrigerant condensing temperature is 65°C = 149°F; refrigerant evaporating temperature is 10°C = 50°F).
INSTALLED POWER (P max)	It is the power absorbed by the unit during the limit working conditions (refrigerant condensing temperature is 65°C = 149°F; refrigerant evaporating temperature is 10°C = 50°F).
PROTECTION	As defined by the EN 60529 European standard.
REFRIGERANT	This is the refrigerant fluid in the unit.
REFRIGERANT QUANTITY	This is the quantity of refrigerant fluid contained in the unit.
For CG 013÷071 MCCG 013÷301 models	
MAX. COOLING PRESSURE	This is the design pressure of the refrigeration circuit.
MAX. COOLING TEMPERATURE	This is the design temperature of the refrigeration circuit.
For CG 081÷301 models	
MAX. COOLING PRESSURE HP SIDE	This is the design pressure of the refrigeration circuit of the high pressure side
MAX. COOLING PRESSURE LP SIDE	This is the design pressure of the refrigeration circuit of the low pressure side
For all MCCG-CGmodels	
USER CIRCUIT FLUID	Fluid used by the unit (normally water).
MAX. UTILIZATION PRESSURE	Max. designed pressure of the utilization circuit.
MAX. TEMPERATURE	Design temperature of the user circuit; this should not be confused with the maximum working temperature which is established when the offer is made.
AMBIENT TEMPERATURE	Min. and max. cooling air temperature value.
WEIGHT	This is the approximate weight of the unit before packing.

Tabella 2 DATA PLATE AND MEANING OF ABBREVIATIONS

4.2 Other data relative to the standard machines MCCG-CG

Model			013	015	020	031	051
Tank capacity	**water volume**	**(litres)**	25	25	25	70	70
PUMP P0	**water flow rate min/max**	**(m^3/h)**	0.25/1.0	0.3/1.3	0.4/2	-	-
	available head	**(bar)**	0.36	0.40	0.24	-	-
	absorbed power	**(kW)**	0.2	0.2	0.2	-	-
PUMP P1	**water flow rate min/max**	**(m^3/h)**	0.25/1.0	0.3/1.3	0.4/2	0.55/2.65	0.8/3.75
	available head	**(bar)**	0.71	0.75	0.59	1.34	1.13
	absorbed power	**(kW)**	0.4	0.4	0.4	0.61	0.61
Axial fan	**number of fans**		1	1	1	2	2
	complete air flow	**(m3/h)**	3850	3850	3500	7900	7300

Model			071	081	101	131	171
Tank capacity	water volume	(litres)	70	150	150	150	150
PUMP P0	water flow rate min/max	(m^3/h)	-	1.25/6.2	1.6/8.3	2.1/10.8	2.5/12.6
	available head	(bar)	-	0.89	0.33	0.73	0.48
	absorbed power	(kW)	-	0.61	0.61	0.82	0.82
PUMP P1	water flow rate min/max	(m^3/h)	1.0/4.38	1.25/6.2	1.6/8.3	2.1/10.8	2.5/12.6
	available head	(bar)	0.92	1.70	1.04	1.58	1.30
	absorbed power	(kW)	0.61	0.88	0.88	1.32	1.32
Axial fan	number of fans		2	2	2	4	4
	complete air flow	(m3/h)	7000	11750	11500	18000	17600

Model			211	251	301
Tank capacity	water volume	(litres)	150	150	150
PUMP P0	water flow rate min/max	(m^3/h)	2.9/14.2	3.2/16.5	3.7/18.3
	available head	(bar)	0.90	0.75	0.53
	absorbed power	(kW)	1.12	1.12	1.12
PUMP P1	water flow rate min/max	(m^3/h)	2.9/14.2	3.2/16.5	3.7/18.3
	available head	(bar)	1.73	1.59	1.40
	absorbed power	(kW)	1.84	1.84	1.84
Axial fan	number of fans		2	2	2
	complete air flow	(m3/h)	23400	22800	22800

NOTE

- The head is the head available to the user:
it refers to the following conditions: air ambient temperature of 35° C, inlet water temperature of 12°C and outlet water temperature of 7° C.
- It is possible for the pump installed to be different from the standard. In this case reference should be made to the data in the offer.

ATTENTION

The installation of an adeguate water filter on the unit inlet is recommended.

4.3 Performance

The performance of the unit depends principally on the water flow rate of the user circuit, on its temperature and on the ambient temperature.
These data are defined in the offer and it is to these that reference should be made.
In the following table you can find the nominal values of the cooling efficiency (gauged in kW for the different versions) at the following conditions: ambient temperature of 35°C, evaporator water inlet temperature of 12°C, evaporator water outlet temperature of 7°C, relative humidity equal to 50%.

Model	Efficiency (kW)	Model	Efficiency (kW)
CG 013	4.1	CG 101	28.5
CG 015	4.8	CG 131	37.1
CG 020	6.9	CG 171	43.8
CG 031	9.7	CG 211	49.8
CG 051	13.5	CG 251	57.0
CG 071	16.7	CG 301	65.5
CG 081	21.2		

Tabella 3 CYGNUS EFFICIENCY

In the following table you can find the nominal values of the cooling efficiency (gauged in kW for the different versions) at the following conditions: ambient temperature of 35°C and at evaporation temperature of 5°C.

Model	Efficiency (kW)	Model	Efficiency (kW)
MCCG 013	4.3	**MCCG 101**	30.2
MCCG 015	5.1	**MCCG 131**	39.5
MCCG 020	7.4	**MCCG 171**	46.4
MCCG 031	10.4	**MCCG 211**	52.8
MCCG 051	14.8	**MCCG 251**	60.7
MCCG 071	17.8	**MCCG 301**	69.9
MCCG 081	22.4		

Tabella 4 MCCYGNUS EFFICIENCY

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CHAPTER 5

DESCRIPTION

ATTENTION

The following information refer only to the CG models, because the motocondensing units are not equipped with evaporator, pump and hydraulic group.

5.1 General

Cygnus range are monobloc units air condensed equipped with:

-hermetic compressors

- hydraulic group made up of a plate-type evaporator, an accumulation tank, a circulator or a pump (it depends on the model)

- a condenser made up a fin battery and axials fans.

Each chiller is equipped with a microprocessor control that manages the main functions of the unit such as the regulations, the alarms and the user interface.

The units use R407C.

The components used for these machines are of high quality and all the projecting process, from the production to the unit checking, has been manufactured in conformity with ISO 9001 norms.

5.2 Operating principle

All the units described in this manual work on the basis of the same principle.

A refrigerant circuit, according to the operating modality (summer or winter), cools or heat the surfaces of a tube plate evaporator, where in one side the refrigerant fluid evaporates and in the other side the liquid to be cooled flows.

The refrigerant compressor is managed by an electronic control that checks the water inlet temperature to the machine in order to keep the outlet temperature inside the set limits.

5.3 Materials

The data relating to the materials refer to standard machines.

In case of particular units special materials are used, so it is necessary to refer to the data on the offer.

5.3.1 Casing

The whole base, risers, panels are in galvanised carbon steel sheet fixed together with screws.

All the sheets are phospho-degreasing treated and painted with polyester-powders.

The structure has been designed for the easy access to all the unit components.

In all units the compressor site is covered with sound-absorbent material to reduce the unit noise.

5.3.2 Materials in contact with the liquid of the user circuit

Plate evaporator in stainless steel, braze welded with copper, tank in carbon steel, copper tubes.

5.4 Components

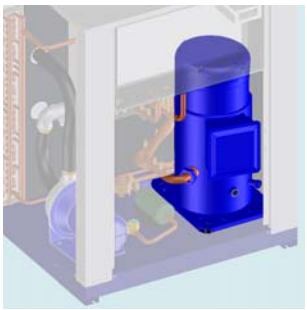
The data relating to the components refer to standard machines.

In case of particular units special materials are used, so it is necessary to refer to the data on the offer.

5.4.1 Compressors

MCCG-CG 013÷071

MCCG-CG 081÷171



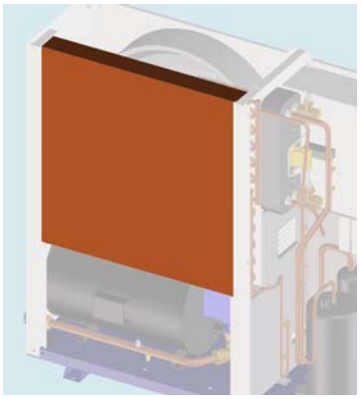
MCCG-CG 211÷301

The MCCG-CG 013÷020 units are equipped with a Rotary compressor of hermetic type, while the MCCG-CG 031÷301units are equipped with a Scroll compressor of hermetic type. The MCCG-CG 171 models have one compressor, while the MCCG-CG 211÷301 models have two tandem compressors.

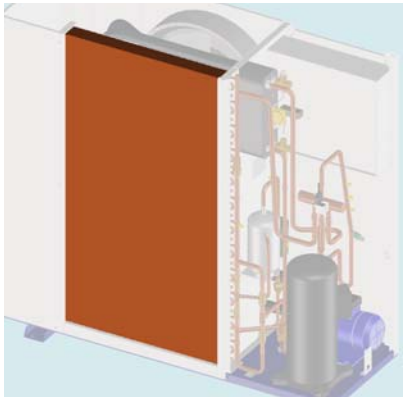
These components are positioned in the compressor site, sound isolated with a sound-absorbent mattress of 15÷20 mm thickness positioned on the side panels, compressor site - fan site separating panel and compressor site closing front panel.

5.4.2 Condenser

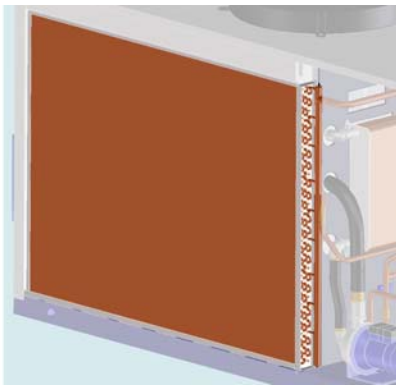
MCCG-CG 013÷020



MCCG-CG 031÷071



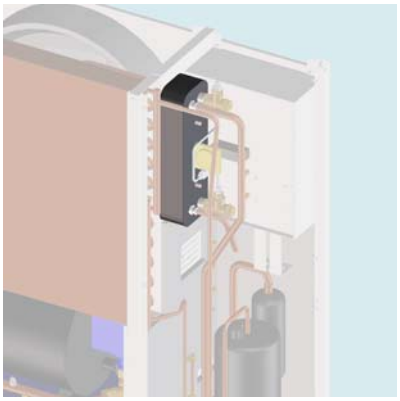
MCCG-CG 081÷301



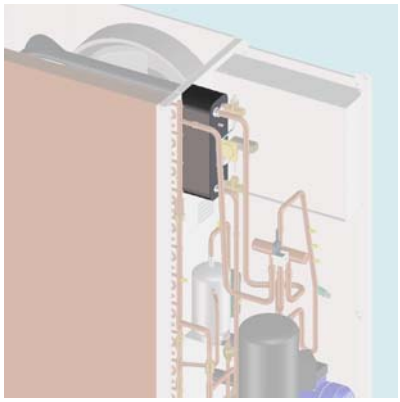
Consisting of a fin-pack battery with aluminium fins, copper tubes and shoulders in galvanised sheet.
The condenser batteries (**B**) have been calculated, dimensioned and designed by means of modern computerised design technics.
A good subcooling completes the total efficiency increasing the unit final COP (Coefficient Of Performance = cooling capacity/absorbed power).

5.4.3 Evaporator (only CG models)

MCCG-CG 013÷020



MCCG-CG 031÷071



MCCG-CG 081÷301

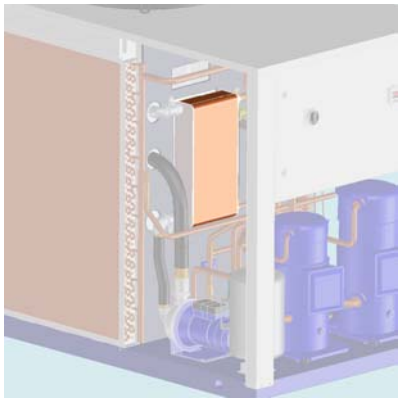


Plate evaporator in stainless steel, braze welded with copper, tank in carbon steel, copper tubes. It is positioned inside the compressor compartment in all models.
If requested, the compressor can be furnished with an antifreeze resistance, to prevent risks of freezing, see paragraph *5.4.6 "Antifreeze resistance"*.

NOTE
*The motocondensing versions **MCCG** are not equipped with the evaporator, but it must be installed a remote one. This operation have to be carried out by qualified personnel. For further information see paragraph 5.7.3 "Refrigerant circuit for motocondensing version".*

5.4.4 Fan/s

All units are equipped with axial fans.
The MCCG-CG 013÷071 and MCCG-CG 131÷171 units are equipped with fans which have vanes made up of plastic material, while the MCCG-CG 081÷101 and MCCG-CG 211÷301units are equipped with fan switch made up of aluminium sickle profile shovels.
The MCCG-CG 013÷071 units are equipped with conveyors made up of radiused polystyrene, while the MCCG-CG 081÷301 units are furnished with a nozzle notched in the cover plate.
All units can be furnished with an electronic regulator for the fans, more over only the MCCG-CG 013÷020 models can be furnished even with ON/OFF step regulation.
Up to the MCCG-CG 171 model the units are equipped with a single-phase fan, while MCCG-CG 201÷301 units are equipped with three-phases fans.
The protection rating is IPX4 and it has F insulation class to assure the external working with all types of climates. The assembly is completed with an external safety protection grill.

5.4.5 Hydraulic group (only CG models)

The CG may have three different configurations:

- without hydraulic group
- with hydraulic group and P0 pump
- with hydraulic group and P1 pump

These options can be choose during the offer.

The hydraulic group is composed by:

- tank;
- pump / circulator;
- drainage/filling valve;
- manual bleed valve;
- expansion tank of an adequate volume;
- 3 barg safety valve;
- water pressure gauge positioned on the pump outlet, in order to check the preloaded pressure of the plant (when the chiller is off) and the pump outlet pressure (when the chiller in on);
- differential pressure switch, positioned on the evaporator, that will stop the compressor if the water will not flow through the hydraulic side;

For the data concerning the pump and the tank see the paragraph ***4.2 "Other data relative to the standard machines MCCG-CG"***

5.4.6 Antifreeze resistance

The CG units can be equipped with a antifreeze resistance, if requested.

It is composed by a resistance wounded around the evaporator, the tank and the pump (but in the motocondensing units).

The resistance is checked by the electronic board, and its function is to prevent the components of the unit against the risk of freezing, when the temperature is lower than 0°C.

The logic and therm regulation parameter are described in the Chapter 8 "***Electronic Board***").

5.5 Overall dimension

See enclosures.

5.6 Minimum distances from walls in the installation ambient

See enclosures.

5.7 Water and refrigerant circuits

(See enclosures)

5.7.1 Water circuit (only CG models)

See 5.4.5 "*Hydraulic group (only CG models)*"

If the unit is not equipped with the hydraulic group, the water circuit is composed only with a plate type heat exchanger.

The following description refers to the unit complete of hydraulic group.

The water enters the unit, passes through the tank and, during evaporation phase, exchanges heat with the refrigerant fluid inside the plate type heat exchanger.

The water is sucked by a centrifugal pump [36], directly connected to the use water circuit.

At the pump outlet is connected a water pressure switch [70] positioned on the unit back site over the water connections. It indicates the water pressure at the plant outlet.

Between the evaporator inlet and outlet tubes there is a water differential pressure switch that protects the evaporator during water lacks.

ATTENTION

The installation of the water filter is recommended. It must be connected to the inlet tube.

5.7.2 Refrigerant circuit (only CG models)

The refrigerant is pumped by the hermetic type refrigerant compressor into the condenser.

The condenser is a fin-pack type heat exchanger and is cooled by an air-flow produced by one or two fans according to the unit model.

The condenser fan(s) is/are controlled by a regulator which regulates their speed according to the condensing temperature by means of a pressure probe positioned on the coil. For the smaller models CG013÷020 you can set the ON/OFF regulation.

After the condenser, the refrigerant liquid passes through:

- a capillary completed with drying filter for models CG 013÷020
- a drying filter, a flow indicator and a thermostat valve from model CG 031 and upper.

The refrigerant then enters the plate type evaporator.

When it exits the evaporator, the refrigerant is again sucked by the compressor and the cycle repeats itself.

All solderings for connecting the refrigerant circuit components are made with silver alloy.

5.7.3 Refrigerant circuit for motocondensing version

The motocondensing units MCCG have no evaporator and thermostatic valve, that have to be installed by the customer/installer.

It has been added two cocks (one in the liquid line, and one in the compressor sucking line) and a solenoid valve in the liquid line.

ATTENTION

The completing of the installation must be carried out by the customer/installer.
The sizing and building of the cooling lines that connect the motocondensing units and the motoevaporant units is very important, and so it must be carried out by qualified personnel.

For the installation see 6.7 "***Cooling circuit connections in motocondensing units"***.

Once the remote evaporator has been installed, the MCCG units will work as described in paragraph 5.7.2 "*Refrigerant circuit (only CG models)"*.

5.8 Electrical circuit

See annexes.

CHAPTER 6

INSTALLATION

ATTENTION

*Before carrying out the installation or operating on this machine, ensure that all the personnel has read and understood the Chapter 3 "**Safety**".*

6.1 Inspection

Immediately after uncrating, inspect the unit.

6.2 Positioning

1. The unit may be installed both outdoors and indoors.
2. If installed indoors, the room must be well ventilated. In some cases it may be necessary to install fans or extractors to limit the temperature of the room.
3. The ambient air must be clean and not contain flammable gas or solvents.
4. The minimum and maximum working ambient temperature are specified on the unit data plate. In extreme temperature conditions, the protection devices may trip.
5. The machine must be positioned on any flat surface capable of supporting its weight.
6. Leave at least one metre around the unit to permit access during service operations (see chapter 5.4.6 "*Overall dimension*").
7. Do not obstruct or disturb the condenser's flow of thermal exchanging air.
8. Position the unit in such a way that the thermal exchanging air cannot recirculate in the intake grilles.
9. Ensure that the unit is not subject to warm air from the cooling systems of other machines.

6.3 Antifreeze protection

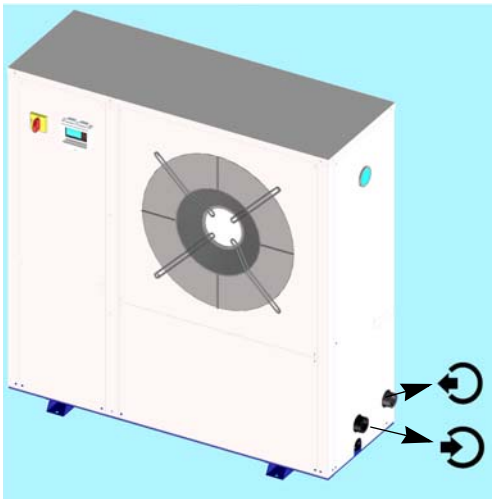
Even if the minimum working ambient temperature is above 0°C it is possible for the machine - during stoppages in the cold seasons - to find itself in an environment with a temperature below 0°C.
In these cases, if the machine is not emptied, antifreeze (ethylene glycol) must be added in the following percentages to prevent the formation of ice:

Min. ambient temp [°C]	Ethylene glycol [volume%]
<0	10
-5	15
-10	20
-15	30
-20	35

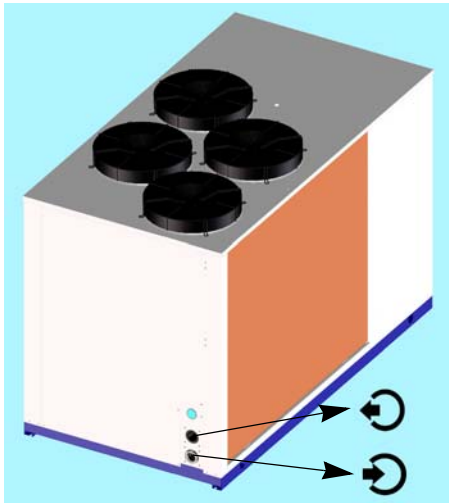
ATTENTION

*The antifreeze protection can be performed also following the indications in paragraph 10.2.2 "Water circuit emptying" or, if requested, by an antifreeze resistance, operating as described in Chapter 8 "**Electronic Board**".*

6.4 Hydraulic circuit (only CG units)



On the right side of the CG013÷071 units there are two water connections (see figure), the dimensions of their diameter are indicated in the table below.



On the back site of the CG081÷301 units there are two water connections (see figure), the dimensions of the diameter are indicated in the table below.

1. Connect the unit to the water pipelines respecting the water flow direction as indicated in the figures above or in the annexed overall dimension drawings.
2. Provide two cocks (one at the inlet and one at the outlet) for excluding the unit when maintaining without emptying the user water circuit.
3. Fill the tank (if present) with water using:
   a remote discharge system.
   in this case it is necessary to leak manually the air from the tank by operating on the manual valve (*).
   If there are frequent air infiltrations into the water circuit it is advisable to install an automatic bleed valve.
4. If the unit is without pump, be sure that the pump installed by the user has the aspiration directly connected to the machine so that the pressure into the tank is not too high (0.5 bar suggested)

(*): Assure (by checking on the pressure gauge the tank pressure with pump stopped) that the pressure into the water circuit is about 0.5 bar to avoid that the pump during its operation puts in depression the tank by causing the possible air entering and however to obstacle the use of manual or automatic air vent systems.

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ATTENTION

The installation of a water filter is recommended connected to the inlet pipeline.

The hydraulic plant must be dimensioned so that the pressure values of the water flow into the unit are not higher than those indicated in the table below:

Model	IN/OUT water connections diameter	Max. pressure [bar] Units with tank	Max. pressure [bar] Units without tank
CG 013	1”	3	6
CG 015	1”	3	6
CG 020	1”	3	6
CG 031	1”	3	6
CG 051	1”	3	6
CG 071	1”	3	6
CG 081	1 1/4”	3	6
CG 101	1 1/4”	3	6
CG 131	1 1/2”	3	6
CG 171	1 1/2”	3	6
CG 211	2”	3	6
CG 251	2”	3	6
CG 301	2”	3	6

6.5 Expansion tank

The models from CG 006 to CG 016 are equipped with an expansion tank.
All other models are furnished with expansion tank (only if required) when the hydraulic group is installed.
If the installation is made by the client or if it is necessary to install a supplementary expansion tank, this must always be connected at the pump inlet.
To calculate the minimum volume of the expansion tank required for a given installation, the formula below cab be used and is valid if the pressure is less than or equal to 0.5 bar when the pump is stopped and the maximum working pressure of the expansion tank is greater than or equal to 4 bar.

The volume of the expansion tank V in litres is given by the formula:

$$V = 2 \cdot Vt \cdot (Pt_{min} - Pt_{max})$$

where:

Vt= total volume of the circuit in litres

Ptmin= specific weight at the minimum temperature obtainable by water over the year in °C (even with the plant stopped)

Ptmax= specific weight at the maximum temperature obtainable by water over the year in °C (even with the plant stopped)

Esempio di calcolo:

Vt=200 litres
percentage of ethylene glycol in volume = 30%
tmin=5 °C from the table **Ptmin**=(1.045+1.041)/2 = 1.043
tmax=40 °C from the table **Ptmax** = 1.0282
V=2 · 200 · (1.043 - 1.0282) = 5.92 litres

Table of specific weights P

	% Glycol	0%	10%	20%	30%	40%
Temperature [°C]	-20	1,0036	1,0195	1,0353	1,0511	1,0669
	-10	1,0024	1,0177	1,033	1,0483	1,0635
	0	1,0008	1,0155	1,0303	1,045	1,0598
	10	0,9988	1,013	1,0272	1,0414	1,0556
	20	0,9964	1,0101	1,0237	1,0374	1,051
	30	0,9936	1,0067	1,0199	1,033	1,0461
	40	0,9905	1,003	1,0156	1,0282	1,0408
	50	0,9869	0,9989	1,011	1,023	1,0351
	60	0,983	0,9945	1,006	1,0175	1,029
	70	0,9786	0,9896	1,0005	1,0115	1,0225

6.6 Electrical connections

The connection of the unit to the power supply network must be done in conformity with the laws and prescriptions in force in the installation place.
The power supply voltage, the frequency and the phase number must be as shown on the unit data plate.
The power supply voltage must not be, also for short periods, out of the tolerances given in the wiring diagram.
Except for different indications, the frequency tolerance is +/-1% of the nominal value (+/-2% for short periods).
In the event of three-phase supply, the system must be symmetrical (equal effective voltage values and equal phase angles among consecutive phases).
In particular, except for different indication, the max. unbalance between each phase is 2%. The unbalance is calculated as following:

$$\frac{MaxDifferenzaDellaTensioneDiFaseDallaVavg}{Vavg} \bullet 100$$

Vavg= average of voltage phases

In the event of single-phase supply, check that there is a neutral line in the electrical installation and it is earthen in the transformer cabin (TN system in compliance with IEC 364) or that this is done by the electricity supply company (TT system in compliance with IEC 364).
The phase conductor and the neutral wire must not be confused.

For the electrical supply:

1. connect the unit (PE terminal in the electrical panel) to the earthed system of the building
2. guarantee the automatic interruption of the power supply in the event of insulation failure (protection against indirect contacts in compliance with IEC 364) by means of a differential device (normally with operation nominal current of 0.03 A)
3. at the beginning of the electrical supply cable must be guaranteed a protection against direct contacts with a protection degree of IP2X or IPXXB at least
4. at the beginning of the electrical supply cable must be installed protection devices that protect against overcurrents (short circuit) (see information in the electrical wiring)
5. use conductors which transform the max. current required to the max. operating ambient temperature, according to the selected installation type (IEC 364-5-523) (see information in the electrical wiring)

Indications of electrical wiring:

- max. size permitted for the fuse type gG.
  In general, the fuses can be replaced with an automatic switch regulated by means of the unit max. absorbed current (contact the manufacturer if necessary)
- section and type of the power supply cable (if not already supplied):
  installation: insulated conductors, multipolar cable in duct, in air or over masonry (C type in compliance with IEC 364-5-523 1983) or without no other cable in contract
  working temperature: the max. working ambient temperature of the unit
  cable type: copper conductors, PVC insulation from 70°C (if not specified) or EPR insulation from 90°C

The harness of the power supply cable is made by the client.
Remove the control board and the unit front panel (see paragraph 10.2.1 "*Unit access*").
Flow the cable through the fairlead positioned in the low part of the left side panel by pulling it in the inside part of the compressor site.
Remove the sheath from the cable and flow it through the appropriate grilles under the electrical panel (see figure).
Wire the cable on the general switch-breaker as indicated in the figure below and in the electrical wiring annexed to the unit.

ATTENTION

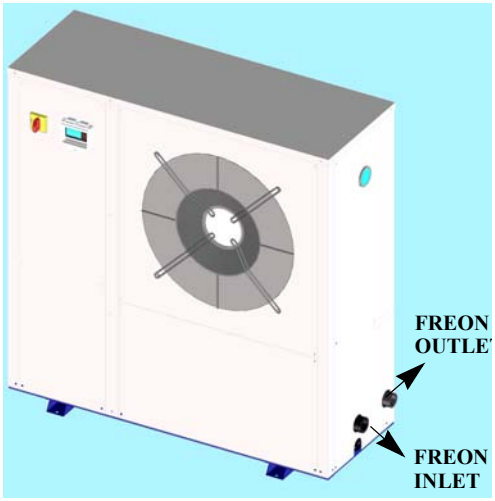
*To check the electrical connection of the unit to the electrical wiring see Chapter 7 "**Start up**".*

6.7 Cooling circuit connections in motocondensing units

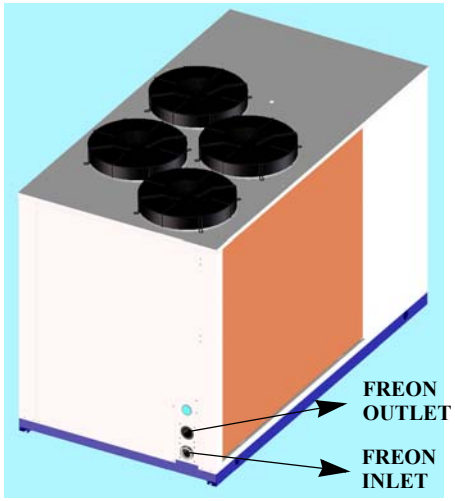
The motocondensing units MCCG are not equipped with the evaporator, the installation must be carried out by the customer/installer.

ATTENTION

The sizing and building of the cooling lines that connect the motocondensing units and the motoevaporant units is very important, and so it must be carried out by qualified personnel.



On the right side of the MCCG 013÷071 units there are two freon connections (see figure) that have to be welded, the dimensions of their diameter are indicated in the table below.



On the back site of the MCCG 081÷301 units there are two freon connections (see figure) that have to be welded, the dimensions of their diameter are indicated in the table below.

The table below shows the dimensions of the connections (they are the same for the piping that have to be used), and the maximum distance between the motocondensing and the motoevaporant unit.

Unit		MCCG 013	MCCG 015	MCCG 020	MCCG 031	MCCG 051	MCCG 071	MCCG 081	MCCG 101	MCCG 131	MCCG 171	MCCG 211	MCCG 251	MCCG 301
Suction line diameter	[mm]	Ø 12	Ø 16	Ø 16	Ø 18	Ø 22	Ø 28	Ø 28	Ø 35	Ø 35	Ø 35	Ø 42	Ø 42	Ø 42
Liquid line diameter	[mm]	Ø 8	Ø 8	Ø 8	Ø 10	Ø 10	Ø 12	Ø 12	Ø 16	Ø 16	Ø 18	Ø 18	Ø 22	Ø 22
Maximum distance between MCCG units and motoevaporant units	[m]	10	15	15	15	20	25	30	30	30	25	25	25	25

Table 5 MCCG CONNECTIONS

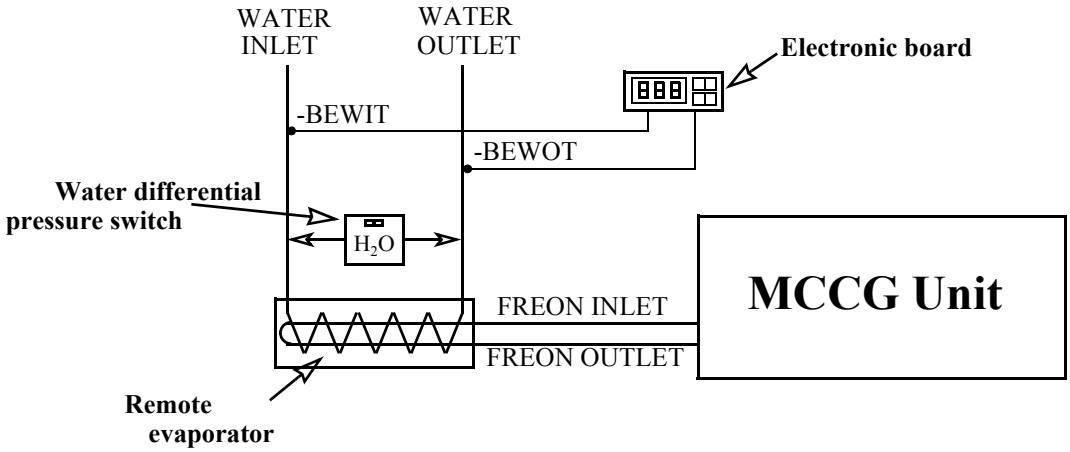
The MCCG units are furnished with a small charge of R407C, that will have to be completed during the installation, by a refrigerator technician.
The charge is complete when:

- The liquid indicator does not signal bubbles
- The overheating of the sicked gas is 4-8°K
- The sub-cooling of the liquid is 3-5°K

ATTENTION

The evaporator water inlet/outlet (BEWIT/BEWOT) temperature probes are furnished with the machine, their installation must be carried out by the customer/installer.

BEWIT utilized for the temperature regulation
BEWOT utilized for the antifreeze function
For the installation see the annexed diagrams.



ATTENTION

The maximum distance between the probes is 100m using screened cable.

If the **BEWOT** probe will not be used (antifreeze probe), it will have to be removed and disconnected from the bornes 5-4 of the electronic board (for further information see the wiring diagram), set the parameter **CF05**=0 to make it not enable (to modify the parameter see paragraphs 8.10 "***Programming by keyboard"*** and 8.18.2 "*Configuration parameters"*).

If the remote evaporator is already equipped with a temperature control system, the **BEWIT** and **BEWOT** probes are not necessary, but you will have to install the **MCCG REMOTE CONTROL KIT**. It is composed by two FINDER relays that have to be connected to the compressor enabling digital inputs. For the installation and the wiring see the diagram enclosed in the **KIT**.
More over it will be necessary to change the following parameters:
CF02=1, **CF04**=3, **CF05**=0, **CF07**=2, (**CF011**=6 only MCCG 211÷301 units).

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CHAPTER 7

START UP

ATTENTION

*Before starting up these units be sure that all personnel have read and understood the Chapter 3 "**Safety**".*

1. Check that the machine's on/off valves are open.
2. Check that the tank is completely full of water and properly vented.
   The modes equipped with the hydraulic group (optional), it is possible to check on the pressure gauge if the pressure is about 0.5 bar.
   Check that the ambient temperature is within the limits indicated on the machine data plate.
3. Check that the main switch is in the OFF position ("O").
4. Check that the power supply voltage is correct.
5. Power the machine (stand-by unit) by means of the supply line protection device.
6. Press the button for 5 seconds to **start up the unit**
   The led of the icon blinks for 5 sec. and than it lights on.
   For further information see Chapter 8 "***Unit switching on / off***".
7. In three-phase units MCCG-CG 031÷301, check that compresses works correctly (it must not be noisy or overheated) and check that the pump (if installed) and the fun (if installed) rotation direction is correct (it have to suck the air from inside the machine). The machines have been designed in order that these three components would have the some rotation direction. So, if one works in the right way even the other do.
   If the rotation direction is wrong for all the three components, invert two supply phases of the electronic board. If on the contrary they are not correctly connected, invert the borns phases of the corresponding counter.
8. In the models equipped with the pump (optional), it is possible to check the pressure difference between the value read by the pressure gauge positioned on the unit back panel with the pump running and the value read with the pump stopped. The difference must be greater than the available pressure head with maximum pump flow rate.
   If this difference is lower, it means that the water flow rate is greater than the permitted maximum value.
   To avoid damaging the pump it is necessary to increase the pressure drop in the hydraulic circuit: e.g. partially closing a pump outlet cock (the cock at pump outlet is installed by the client).
9. **If with the first start-up**, there is a high ambient temperature and the temperature of the water in the hydraulic circuit is much higher than the working value **(e.g. 25-30°C)** this means that the machine starts up overloaded with the consequence of **possible tripping of the protection devices**.
   To reduce this overload, a machine outlet valve can be gradually (but not totally!) **closed to reduce the flow of water passing through it.**
   Open the valve as the water temperature in the hydraulic circuit reaches the working value.
10. The machine is now ready for operation.
    If the thermal load is lower than that produced by the machine, the water temperature drops until it reaches the set-point value (**ST01**parameter) set following the indications of chapter Chapter 8 "***Electronic Board***".
    When **ST01** value has been reached, the thermostat controlling the water inlet temperature stops the compressor.
    If installed, the water pump continues to run however.

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CHAPTER 8

ELECTRONIC BOARD

8.1 User interface

8.1.1 Display

The display is divided in 3 zones.

Upper-left zone

Generally it displays the evaporator water inlet / outlet temperature.

NOTE
The displaying depends on the setting of parameter **CF36** *8.11 "**Values displayed (parameter CF36)**".*

Lower-left zone

Condensation temperature / pressure or evaporator water antifreeze temperature (heat pump water units), with the appropriate unit of measurement.

NOTE
The displaying depends on the setting of parameter **CF36** *8.11 "**Values displayed (parameter CF36)**".*

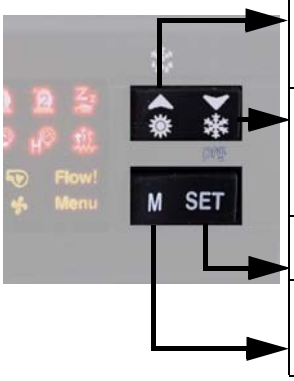
Right zone

Signalling icons.

8.1.2 Display icons

ICON	MEANING	ICON	MEANING
°C	Celsius degrees (If displayed)	L	Low pressure alarm
	Fahrenheit degrees (If not displayed)		Antifreeze resistance
bar	Bar/Psi		Pump on
1	Compressor 1	Flow!	Flow meter alarm
2	Compressor 2		Time to defrost starting (hour)
	Stand-by unit		Fan on
	General alarm	Menu	Indication for Function Menu entering
H	High pressure alarm		

8.2 Function of buttons



BUTTON	FUNCTION
▲	If pressed for 5 seconds, according to the programming, it allows to switch on or off the unit in chiller or heat pump modality. It selects IN/OUT water temperatures and ambient air temperatures in the upper part of the display. During programming phase it scrolls the parameter's codes or increases their values.
▼	If pressed for 5 seconds, according to the programming, it allows to switch on or off the unit in chiller or heat pump modality. It selects the displaying of external air temperature / defrosting temperature. During programming phase it scrolls the parameter's codes or decreases their values.
SET	If pressed for 5 seconds, it allows to display or modify the set point. During programming phase it selects a parameter of confirms a value.
M	It allows to enter Function Menu and to regulate the hour.

8.2.1 Function of combined buttons

BUTTONS	FUNCTION
▼ + SET	To enter programming phase (pressed for 5 sec).
▲ + SET	To exit programming phase.
▲ + SET	If pressed for more than 5 seconds they allow to start a manual defrosting cycle.

8.3 Symbols and leds on the display

LED	LED STATUS	MEANING	LED	LED STATUS	MEANING
☀	Steady	Unit on in heat pump modality	❄	Steady	Defrosting enabled
❄	Steady	Unit on in chiller modality	❄	Unlit	Defrosting disabled or terminated
❄	Flashing	Programming phase (if flashes together with ❄ led)	🕒		Clock adjustment
❄	Flashing	Time to defrost starting			

8.4 Remote terminal

8.4.1 Function of buttons

BUTTON	FUNCTION
menu	It allows to enter Function Menu and to regulate the hour.
set	It allows to display or modify the set point. During programming phase it selects a parameter or confirms a value.
▲	It selects IN/OUT water temperatures and ambient air temperatures in the upper part of the display During programming phase it scrolls the parameter's codes or increases their values.
▼	It selects the displaying of external air temperature / defrosting temperature. During programming phase it scrolls the parameter's codes or decreases their values.
❄	If pressed for 5 seconds it allows to switch on or off the unit in chiller or heat pump modality.
☀	If pressed for 5 seconds it allows to switch on or off the unit in chiller or heat pump modality.

If there is no communication between the unit and the remote terminal, in the upper part of the display it appears the message "noL" (no link).

8.5 Displaying during an alarm

During normal operation (no alarm), when an alarm occurs the alarm code and the appropriate icon flash in the lower part of the display, alternated to the temperature / pressure.

8.5.1 Alarm icons

There are four icons for alarm signalling:

⚠	General alarm
H	High pressure alarm
L	Low pressure alarm
Flow!	Flow meter alarm

8.6 How to silence the buzzer

Automatic silencing: it happens when the cause of the alarm has been eliminated.

Manual silencing: press and release one of the four buttons; the buzzer silences even if the alarm condition persists.

8.7 First start up

At the first start up of the unit in the lower part of the display it could appear the message "rtC" alternated with the temperature. It indicates that it is necessary to regulate the clock.

If the probes used to control the unit are not connected or are damaged, the appropriate alarm will be displayed.

However, it is possible to regulate the clock or to programme the unit.

8.8 How to regulate the clock (NOT ENABLE IN THESE UNITS)

1. Press M button for some seconds until the message "Hour" appears in the lower part of the display, and in the upper part of the display it appears the store.
2. Press SET button: the hour starts flashing.
3. Regulate the hour using ▼ and ▲ buttons.

   Confirm the new hour pressing SET button; the controller will display the following setting.
4. Repeat points 2. and 3. for the other parameters of the clock:
   - Min: minutes (0÷60)
   - UdAy: week day (Sun = Sunday, Mon = Monday, tuE = Tuesday, UEd = Wednesday, tHu = Thursday, Fri = Friday, SAt = Saturday).
   - dAy: month day (0÷31)
   - MntH: month (1÷12)
   - yEAr: year (00÷99)

8.9 Programming by "Hot Key"

8.9.1 How to programme the unit by a programmed key (Download)

With unit switched off:

1. Insert the key.
2. Switch on the unit.
3. It starts the download of data from the key to the unit.

During download phase the adjustments are blocked and in the lower part of the display it appears the flashing message "**dOL**".

At the end, in the upper part of the display it appears the message:

"**End**" If the programming was good (after 15 seconds it starts the adjustment).

"**Err**" If the programming was not good.

8.9.2 How to store the parameters of the unit in the key “UPL”

Instrument on:

1. Insert the key.
2. Use ▼ or ▲ buttons to select the function **UPL** in the upper part of the display.
3. Press SET.

   It starts the upload of data from the unit to the key.

During upload phase in the lower part of the display it appears the flashing message “**UPL**”.
At the end of programming phase the following messages appear in the upper part of the display:
“**End**” If the programming was good.
“**Err**” If the programming was not good
To exit “**UPL**” function, press M button or wait for time-out.

8.10 Programming by keyboard

The parameters of electronic control are divided in two groups and in two levels:

1. USER (Pr1);
2. SERVICCE (Pr2).

USER level allows to access user parameters, SERVICE level allows to access the parameters of unit configuration (it is protected by a password)

LABEL	ACTION
ALL	It displays all parameters
ST	It displays Thermoregulation parameters
CF	It displays Configuration parameters
Sd	It displays only the parameter of the Dynamic Setpoint (NOT ENABLE FUNCTION)
ES	It displays only the parameter of the Energy Saving (NOT ENABLE FUNCTION)
Ar	It displays only the parameter of the Antifreeze Resistance (NOT ENABLE FUNCTION)
LS	It displays only the LASER parameter (NOT ENABLE FUNCTION)

8.10.1 Access to “Pr1” parameters (User level)

To enter the menu of “**Pr1**” parameters which can be access by the user:

1. Press for some seconds SET + ▼ buttons (and start flashing), in the upper part of the display appears “**ALL**”, the first group of parameters.
2. Select the various groups using ▲ and ▼ buttons.
3. After selecting a group, press SET button:

   if the selected group is part of the selected menu or any parameter of this group has been moved in this menu, in the lower part of the display it appears the “Label” and the code of the group’s first parameter present in “**Pr1**”, its value appears in the upper part of the display.
   It will not be possible to enter a parameter’s group which is not part of this menu.
4. It is possible to scroll or modify the parameters contained in the group.

8.10.2 How to modify a parameter’s value

1. Enter the programming procedure.
2. Select the desired parameter.
3. Press SET button to enable the value’s adjustment.
4. Modify the value by means of ▲ and ▼ buttons.
5. Press SET to store the new value and to pass to the code of the following parameter.
6. To exit the procedure: Press SET + ▲ when a parameter is displayed, or wait (about 240 seconds) without pressing any button.

NOTE

The new value is stored also when the programming procedure is terminated for “time out”, without pressing SET button.

ATTENTION

You can modify the parameter of the **CF** (configuration parameters) *family only when the unit is in stand by.*

8.11 Values displayed (parameter CF36)

The values visualized on the display change according to the configuration of the **CF03** and **CF01** parameters.

Parameter CF36 = 0

In the upper part of the display it appears the probe **BEWIT**

The lower display visualize the probe **BCP1** if **CF06** =1,2,4, and the probe **BAT1** if **CF07**=1,4

Parameter CF36 = 1

The upper part of the display it appears the probe **BEWOT**

The lower display visualize the probe **BCP1** if **CF06** =1,2,4, and the probe **BAT1** if **CF07**=1,4

Parameter CF36 = 2

The upper part of the display it appears the probe **BEWOT**

The lower display visualize the Set LASER (NOT ENABLE FUNCTION).

Parameter CF36 = 3

The upper part of the display it appears the probe **BEWIT**

The lower display visualize the probe **BEWOT**.

If the probe **BEWIT** has been selected has default, every time you press ▲ for 30 sec the upper display visualizes the **BEWOT** probe, in the lower part of the display it will appear the "Label" **Pb2** than the default value will return to be displayed.

If the probe **BEWOT** has been selected has default, every time you press ▲ for 30 sec the upper display visualizes the **BEWOT** probe, in the lower part of the display it will appear the "Label" **Pb1** than the default value will return to be displayed.

8.12 Unit switching on / off

The pressure of ▼ button for 5 seconds allows to switch on or off the unit in chiller modality.

8.13 How to put the unit in stand by

Stand-by modality is obtained every time the unit is switched off.

It is indicated by the symbol Zz lit.

Also in stand-by modality the controller can:

1. Display the measured values
2. Manage the alarms by displaying and signalling.

8.14 Function menu (M button)

The access to Function Menu allows to:

1. Display and reset the alarms (see 8.14.3 "*How to display the alarms "ALrM"*").
   Reset the alarms (see "*How to reset an alarm "rSt"*").
2. Visualize the alarm history (see 8.14.4 "*How to display the alarm historic "ALoG"*").
   Reset the alarm history (see 8.14.4.2 "*How to reset the alarm history "ArSt"*")
3. Upload the parameters from the unit to the key (8.9.2 "*How to store the parameters of the unit in the key "UPL"*").
4. Visualize the operating hours (see 8.14.5 "*Displaying the operating hours of loads "C1Hr - C2Hr - PFHr"*").
   Reset the operating hours (see 8.14.5.1 "*Reset of the heads operating hours"*).

8.14.1 Access to Function menu

Press and release M button (menu).

The icon "**Menu**" will appear.

8.14.2 Exit Function menu

Press and release M button or wait for time out (15 seconds).

The icon "**Menu**" disappears.

8.14.3 How to display the alarms "ALrM"

1. Press M to enter Function menu.
2. Press ▲ or ▼ to select "**ALrM**" function.
3. Press and release SET button.
4. Press ▲ or ▼ to scroll all alarms.
5. To exit press M or wait for time out (30 seconds).

8.14.4 How to reset an alarm "rSt"

1. Press M to enter Function menu.
2. Select "**ALrM**" function
3. Press SET, in the lower part of the display it appears the alarm code.

4. If the alarm can be reset in the upper part of the display it appears the Label "**rSt**", it the alarm can not be reset it appears the Label "**NO**".
5. Use ▲ or ▼ button to scroll all the alarms.
6. When the Label "**rSt**" is displayed, press SET to reset the alarm and go to the following one.
7. To exit press M button or wait for time out (30 seconds).

8.14.4.1 How to display the alarm historic "ALoG"

1. Press M button to enter Function menu.
2. Use ▲ or ▼ button to select the function "**ALoG**".
3. Press SET until the Label with the alarm code will appear in the lower part of the display, and the Label "**n°**" with a progressive number will appear in the upper part of the display.
4. Using ▲ or ▼ button scroll all the alarms.
5. To exit "**ALoG**" function and to return to normal displaying, press M button or wait for time out (30 seconds).

The memory contains until 50 alarms, a further alarm will cancel from the memory the oldest one (the displaying is in increasing order, from the oldest one to the most recent one).

8.14.4.2 How to reset the alarm history "ArSt"

1. Enter Function menu.
2. Select "**ALoG**" function in the lower part of the display.
3. Press SET button.
4. Inside "**ALoG**" function, using ▲ or ▼ button, select the function "**ArSt**" in the lower part of the display and "**PAS**" in the upper part of the display.
5. Press SET: the password is required. In the lower part of the display it appears "**PAS**", "0" flashes in the upper part of the display.
6. Insert the password for resetting.
7. If the password is correct the Label "**ArSt**" flashes for 5 seconds to confirm the resetting.

After resetting the unit returns to normal displaying.

8.14.5 Displaying the operating hours of loads "C1Hr - C2Hr - PFHr"

1. Press M button to enter Function menu.
2. Press ▲ or ▼ button until the Label of a single load appears in the lower part of the display: **C1Hr** (operating hours of compressor 1), **C2Hr** (operating hours of compressor 2), **PFHr** (operating hours of water pump and of outlet fan).
   The operating hours will appear in the upper part of the display.
3. The icon 🕒 will be lit.

8.14.5.1 Reset of the heads operating hours

1. Press M button to enter Function menu.
2. Press ▲ or ▼ button until the Label of a single load appears in the lower part of the display (**C1Hr**, **C2Hr** "only MCCG-CG 211÷301" units, **PFHr**) and the operating hours appear in the upper part of the display.
3. Press SET button for 3 seconds: in the upper part of the display it will appear "0". It indicates that the reset has happened.
4. To exit Function menu, press M button or wait for time out (15 seconds).
5. For the other loads repeat the operations from point 2. to point 4.

8.15 Other functions by keyboard

8.15.1 How to display the Set Point

Press and release SET button.

In the lower part of the display it appears "**SetC**" (if chiller);.
The adjusted value appears in the upper part of the display.

8.15.2 How to modify the Set Point

1. Press SET button for 3 seconds at least.
2. The set point will flash.
3. Use ▲ or ▼ button to modify the set point value.
4. To store the new set point value press SET button or wait for time out to exit programming procedure.

8.16 Alarm codes and actions

COD.	MEANING	CAUSE	ACTION	RESET
P1	Alarm of **BEWIT** probe	Probe damaged or resistive value out of range	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic If the resistive value returns within the envisaged range.
P2	Alarm of **BEWOT** probe	Probe damaged or resistive value out of range	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic If the resistive value returns within the envisaged range.
P3	Alarm of **BCP1** probe	Probe damaged or resistive value / power value out of range	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic If the resistive value returns within the envisaged range.
P4	Alarm of **BAT1** probe	Probe damaged or resistive value out of range	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic If the resistive value returns within the envisaged range.
A01	High pressure switch alarm	Digital input / high pressure switch enabled	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for high pressure alarm flashes The alarm code is displayed	Manual The digital input is disabled and the resetting procedure is carried out
A02	Low pressure switch alarm	Digital input / low pressure switch enabled	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for low pressure alarm flashes The alarm code is displayed	Automatic It becomes manual after the value set of "*tripping per hour*" Manual The digital input is disabled and the resetting procedure is carried out
A05	High temperature High pressure	Analogue input enabled if **BCP1** or **BAT1** > of "*set value*"	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	manual Disabled if **BCP1** or **BAT1** < "*se vale*" and the resetting procedure is carried out
A06	Low pressure / temperature alarm	Analogue input enabled if **BCP1** or **BAT1** < "*set value*"	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Disabled if **BCP1** or **BAT1** > "*set value*"and the resetting procedure is carried out
A07	Antifreeze alarm	Digital input enabled if **BEWOT** < "*set value*" and actives for the "*time set*"	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic It becomes manual after "*tripping per hour*" Manual Disabling: - when the antifreeze regulation probe **BEWOT** > (**AR03**+**AR04**) in chiller modality; and resetting procedure

Table 6 ALARM CODES AND ACTIONS

COD.	MEANING	CAUSE	ACTION	RESET
A07	Antifreeze alarm	Digital input enabled if	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic It becomes manual after "*tripping per hour*" Manual Disabling: digital input not enabled resetting procedure
A07	Antifreeze alarm motocondensing units	Digital input enabled	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic It becomes manual after "*alarms interventions*" Manual Disabling: digital input disabled and the resetting procedure is carried out
A08	Flow meter alarm (air/water or water/water units)	Digital input enabled enabled for "*time set*"	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for flow meter alarm flashes The alarm code is displayed	Automatic It becomes manual after "*tripping per hour*" Manual Disabling: Digital input disabled for "*time set*" and reset procedure
A09	Compressor 1 thermal alarm	Digital input enabled	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Digital input disabled and the resetting procedure is carried out
A10	Compressor 2 thermal alarm	Digital input enabled	"open collector" outlet / alarm relay are activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Digital input disabled and the resetting procedure is carried out
A09-A10	Compressor1-2 thermal alarm	The alarm is visualized but not enabled during *"compressor thermal delay time"* after compressor start up	Relay alarm + buzzer activated	If ID is not activated Manual To reset the alarm enter the programming
A11	Pump thermal alarm	Digital input enabled	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Digital input disabled and the resetting procedure is carried out
A13	Compressor 1 maintenance alarm	Operating hours > "*set treshold*"	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Operating hours reset
A14	Compressor 2 maintenance alarm	Operating hours > "*set treshold*"	"open collector" outlet / alarm relay are activated The buzzer is activated The alarm code is displayed	Manual Operating hours reset
A15	Water pump / outlet fan (air/air) maintenance alarm	Operating hours> "*set treshold*"	"open collector" outlet / alarm relay are activated The buzzer is activated The alarm code is displayed	Manual Operating hour reset

Table 6 ALARM CODES AND ACTIONS

COD.	MEANING	CAUSE	ACTION	RESET
rtC	Clock alarm	Clock to be regulated	"open collector" outlet / alarm relay are activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Clock regulation and resetting procedure
rtF	Clock alarm	Clock damaged Clock malfunction	"open collector" outlet / alarm relay are activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Resetting procedure If after resetting the alarm persists replace the clock
EE	Eeprom error alarm	Memory data lost	"open collector" outlet / alarm relay are activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Manual Resetting procedure If after resetting the alarm persists the device remains blocked
ACF2	Configuration alarm	Condensation control probe not configured.	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic With correct re-programming
ACF3	Configuration alarm	Two digital inputs with the same configuration	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic With correct re-programming
ACF4	Configuration alarm	**CF28**= 1 and the digital input not configured or **CF28**= 2 probe **BAT1** different from 3	"open collector" outlet / alarm relay are activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic With correct re-programming
ACF5	Configuration alarm	**CF02** = 1 and (**CF04**≠ 2,3 and **CF05**≠ 3) or (**CF04** = 2 and **CF05** = 3) If **CF02**=1	"open collector" outlet / alarm relay is activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed	Automatic With correct re-programming
FErr	Operating manual	**CF04** = 3 and **CF05** = 2 with digital inputs simultaneously activated	The buzzer is activated The icon for general alarm flashes	Manual Disabling of the not active digital inputs + reset procedure
AFr	Net frequency alarm	Net frequency alarm	Net frequency out of range	"open collector" outlet / alarm relay are activated The buzzer is activated The icon for general alarm flashes The alarm code is displayed
ALOC	General alarm	ID configured as unit blocked generic alarm "*time set*" **AL21**	The buzzer is activated The icon for general alarm flashes	ID configured as unit blocked generic alarm "*fixed time*" Automatic: It becomes manual after "*tripping per hour set*" (reset procedure in function menu). It is memorized in the alarm historic only with manual rearm

Table 6 ALARM CODES AND ACTIONS

8.17 Outlet blocking

Alarm code	Alarm Description	Comp.1	Comp. 2	Antifreeze Resistances	Pump	Outlet Fan	Cond. Fan
P1	**BEWIT** probe	Yes	Yes	Yes with Ar19 =0			Yes
P2	**BEWOT** probe	Yes	Yes	Yes with Ar19 =0			Yes
P3	**BCP1** probe	Yes	Yes	Yes with Ar19 =0			Yes
P4	**BAT1** probe	Yes	Yes	Yes with Ar19 =0			Yes
A01	High pressure switch	Yes	Yes				
A02	Low pressure switch	Yes	Yes				Yes
A05	High temperature High pressure	Yes	Yes				
A06	Low pressure Low temperature	Yes	Yes				Yes
A07	Analogue input antifreeze	Yes	Yes				Yes
A07	Digital input antifreeze	Yes	Yes				Yes
A07	Motorcondensing antifreeze	Yes	Yes			Yes	Yes
A08	Flow meter	Yes	Yes	Boiler Res.Yes	Yes		
A09	Outlet fan thermal protection **CF01**= 0,1	Yes					
A10	Compressor 1 thermal protection		Yes				
A09-A10	Compressor 1-2 thermal protection	Yes	Yes				Yes
A11	Condensation fan thermal protection	Yes	Yes				Yes
A13	Compressor 1 maintenance						
A14	Compressor 2 maintenance						
A15	Water pump maintenance						
rtC	Clock alarm						
rtF	Clock alarm						
EE	Eeprom error	Yes	Yes	Yes	Yes	Yes	Yes
ACF2	Configuration alarm	Yes	Yes	Yes	Yes	Yes	Yes
ACF3	Configuration alarm	Yes	Yes	Yes	Yes	Yes	Yes
ACF4	Configuration alarm	Yes	Yes	Yes	Yes	Yes	Yes
ACF5	Configuration alarm	Yes	Yes	Yes	Yes	Yes	Yes
ACF6	Configuration alarm	Yes	Yes	Yes	Yes	Yes	Yes
FErr	Error during operation (motorcond.)	Yes	Yes	Yes	Yes	Yes	Yes
Afr	Net frequency alarm	Yes	Yes	Yes	Yes	Yes	Yes
ALOC	Generic alarm	Yes	Yes	Yes	Yes	Yes	Yes

Tabella 7

8.18 Parameters description

8.18.1 Thermoregulation parameters

Parameters	Description
ST01	It allows to fix the operating set point during chiller operation (from **ST05** to **ST06**)
ST02	It allows to fix the differential during chiller operation
ST03	It allows to fix the operating set point during heat pump operation (from **ST07** to **ST08**)
ST04	It allows to fix the differential during heat pump operation
Pr2	Password: it allows to set the numeric code of the password (from 0 to 999)

Table 8 THERMOREGULATION PARAMETERS DESCRIPTION

8.18.2 Configuration parameters

Parameters	Description
CF02	Motorcondensing unit: • 0= Yes • 1= Not
CF04	Configuration of analogue input **BEWIT** • 0 = Probe absent • 1= NTC temperature probe evaporator water inlet (ambient air to be conditioned). It appears in the upper part of the display. • 2 = Digital input (for units configured as motorcondensing). According to the selected polarity, with energized contact, it puts the unit in stand-by and starts it. ON is displayed in the upper part. With de-energized contact the unit is in stand-by, OFF is displayed in the upper part. If ON appears in the upper part of the display, using UP-DOWN buttons it is possible to select the operating modality (chiller - heat pump). During chiller modality: with **CF21**=2 and **CO08**=1 compressor 1 starts, with **CF21**=2 and **CO08**=0 a compressor required by the thermoregulator starts. “OnC” is displayed in the upper part. During heat pump modality: with **CF21**=2 and **CO08**= 1 compressor 1 starts, with **CF21**=2 and **CO08**= 0a compressor required by the thermoregulator starts. “OnH” is displayed in the upper part. When the modality has been chosen, the digital input enabling or disabling will switch on or off the unit and the appropriate loads (compressor). Only when the contact is energized, if the unit was switched off by keyboard, it must be switched on again by keyboard. • 3 = Digital input (for units configured as motorcondensing), according to the selected polarity it gives the possibility to switch on the unit in chiller modality ONLY. With de-energized contact, unit in stand-by, OFF displayed in the upper part. With energized contact, unit in chiller operation. “OnC” displayed in the upper part. The digital input enabling or disabling will switch on or off the unit and the appropriate loads (compressor). Only when the contact is energized, if the unit was switched off by keyboard, it must be switched on again by keyboard.
CF05	Configuration of analogue input **BEWOT** • 0=Probe absent • 1=NTC temperature probe evaporator water outlet / evaporator air outlet. It appears in the upper part of the display. • 2=It becomes a digital input which, according to the selected polarity, generates the antifreeze alarm. • 3=Digital input (for unit configured as motorcondensing). According to the selected polarity it gives the possibility to switch on the unit in heat pump modality ONLY. With de-energized contact, unit in stand-by, OFF displayed in the upper part. With energized contact, unit in chiller operation. “OnH” displayed in the upper part. The digital input enabling or disabling will switch on or off the unit and the appropriate loads (compressor). Only when the contact is energized, if the unit was switched off by keyboard, it must be switched on again by keyboard.

Table 9 CONFIGURATION PARAMETERS DESCRIPTION

Parameters	Description
CF07	Configuration of analogue input **BAT1** • 0 = Probe absent • 1 = NTC temperature probe for the control of the condensation fan speed regulation. It appears in the lower part of the display. • 2 = Adjustable digital input • 3 = NTC temperature probe which measures the external air temperature. It enables the management of the dynamic set point, of boiler function and of automatic “change-over”. • 4 = NTC temperature probe condenser antifreeze alarm (water/water or water/water with heat pump). It appears in the lower part of the display. • 5 = NTC temperature probe which measures the evaporating coil temperature during heat pump operation, it allows the management of combined defrosting cycle. It fixes the starting and stopping of defrosting cycle. • 6 = NTC probe, used to measure the temperature only
CF11	Configuration of analogue input **BATI**, if configured as digital input • 0= Compressor 1 thermal protection, according to the selected polarity the enabled input generates a compressor thermal protection alarm. • 1= Condensation fan thermal protection, according to the selected polarity the enabled input generates a condensation fan thermal protection alarm. • 2= Outlet fan thermal protection (air/air units) / Flow meter thermal protection (water/air or water/water units). According to the selected polarity and to the unit configuration, the enabled input generates an outlet fan thermal protection alarm or a flow meter thermal protection alarm. • 3= remote ON / OFF, according to the selected polarity the enabled input generates the remote OFF. It is possible to switch on or off the unit by keyboard only when the input is disabled. • 4= Remote chiller / heat pump. It is possible to switch on or off the unit only during the selected operating modality (see the section about the way to select the operating modality, parameter CF28 = 1). • 5= Compressor 2 thermal protection, according to the selected polarity the enabled input generates a compressor thermal protection alarm • 6= Compressor 2 / capacity step required, according the selected polarity (unit configured as motorcondensing) the enabled input switches on or off a compressor or the capacity control solenoid valve. • 7= Defrosting end, according to the selected polarity the enabled input fixes the defrosting cycle end. • 8= Energy Saving, according to the selected polarity the enabled input fixes the unit operation with the set point of Energy Saving. • 9= Antifreeze alarm, according to the selected polarity the enabled input generates the antifreeze alarm (also when the unit is configured as motorcondensing). ID3= high pressure switch input (not adjustable). According to the selected polarity the enabled input generates the condensation high pressure alarm. ID4= low pressure switch input (not adjustable). According to the selected polarity the enabled input generates the evaporation low pressure alarm. • 10= Compressor thermal 1 and 2. • 11= Generic alarm
CF28	t allows to select the operating modality (chiller / heat pump) by keyboard or by digital / analogue input. • 0 = Selection by keyboard which has the priority on the digital / analogue input. • 1 = Selection by digital input. The selection is enabled if a digital input is configured as 4 (remote chiller / heat pump). If the polarity of the digital input is 0: the “opened” status forces the unit to chiller operation, the “closed” status to heat pump operation. If the polarity of the digital input is 1: the “opened” status forces the unit to heat pump operation, the “closed” status to chiller operation. If no digital input has been configured to 4, the unit remains in stand-by. The selection to chiller or heat pump by keyboard is disabled. It is possible to switch on or off the unit by keyboard only during the selected operating modality. • 2 = Selection by analogue input, it has the priority on the digital input. In the event of external air temperatures included in the differential CF30, it is possible to change the operating modality by keyboard. Both with **CF28** =1 and **CF28**=2, if the unit is operating as chiller or as heat pump and the modification of the operating modality is required, the controller stops all the outlets and wait for a certain delay time (fixed), signalled by the chiller led or heat pump led flashing. The flashing led indicates the operating modality used when the unit will be restarted, respecting the protection time of the compressor.
CF32	It allows to select the unit of measurement: • 0 = Centigrade degrees / bar • 1 = Fahrenheit degrees / psi
CF34	Serial address

Table 9 CONFIGURATION PARAMETERS DESCRIPTION

Parameters	Description
CF36	It allows to select the default displaying of the upper and lower part. • 0 = **BEWIT** temperature is displayed in the upper part, **BCP1** or **BAT1** is displayed in the lower part. • 1 = **BEWOT** temperature is displayed in the upper part, **BCP1** or **BAT1** is displayed in the lower part. • 2 =**BEWOT** temperature is displayed in the upper pert of the display, the lower part visualize SET LASER (NOT ENABLED FUNCTION). • 3 = **BEWIT** temperature is displayed in the upper part, **BEWOT** is displayed in the lower part.
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 9 CONFIGURATION PARAMETERS DESCRIPTION

8.18.3 Dynamic set point parameters (NOT ENABLED FUNCTION)

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 10 DYNAMIC SET POINT PARAMETERS

8.18.4 Energy Saving parameters (NOT ENABLED FUNCTION)

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 11 ENERGY SAVING PARAMETERS DESCRIPTION

8.18.5 Compressor parameters

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 12 COMPRESSORS PARAMETERS DESCRIPTION

8.18.6 Ventilation parameters

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 13 VENTILATION PARAMETERS DESCRIPTION

8.18.7 Antifreeze support boiler resistance parameters

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 14 ANTIFREEZE SUPPORT BOILER RESISTANCE PARAMETERS

8.18.8 Defrosting parameters

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 15 DEFROSTING PARAMETERS DESCRIPTION

8.18.9 Alarm parameters

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 16 ALARM PARAMETERS DESCRIPTION

8.18.10 LASER operating parameters (NOT ENABLED FUNCTION)

Parameters	Description
Pr2	Password: it allows to fix a numeric code for the password (from 0 to 999)

Table 17 LASER OPERATING PARAMETERS (NOT ENABLED FUNCTION)

8.19 Parameter setting

8.19.1 Thermoregulation parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
ST01	Summer set point	**ST05**	**ST06**	°C °F	Dec Int	12.0
ST02	Summer differential	00.0 00.0	25.0 45.0	°C °F	Dec Int	2
ST03	Winter set point	**ST07**	**ST08**	°C °F	Dec Int	40
ST04	Winter differential	00.0 00.0	25.0 45.0	°C °F	Dec Int	3
Pr2	Password	0	999		-	-

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8.19.2 Configuration parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
CF02	Motorcondensing unit 0 = NOT 1 = YES	0	1			0 1 only MCCG units with thermoregulator digital input, see 6.7 "***Cooling circuit connections in motocondensing units***"
CF04	**BEWIT** configuration 0 = probe absent 1 = NTC temperature at evaporator inlet 2 = thermoregulator request digital input 3 = cold request digital input	0	3			1 3 only MCCG units with thermoregulator digital input, see 6.7 "***Cooling circuit connections in motocondensing units***"
CF05	**BEWOT** configuration 0 = probe absent 1 = NTC temperature at evaporator outlet 2 = antifreeze alarm digital input 3 = warm request digital input	0	3			1 0 only MCCG units with thermoregulator digital input, see 6.7 "***Cooling circuit connections in motocondensing units***"
CF07	**BAT1** configuration 0 = probe absent 1 = NTC temperature condensation control 2 = In multi function digital 3 = external air temperature 4 = NTC temperature antifreeze alarm (water/water unit) 5 = NTC temperature defrosting 6 = NTC temperature recording	0	6			0 3 only CG units with antifreeze resistance 2 only MCCG units with thermoregulator digital input, see 6.7 "***Cooling circuit connections in motocondensing units***"

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Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
CF11	**BAT1** configuration if selected as digital input 0 = compressor 1 thermal protection 1 = pump thermal protection 2 = outlet fan / flow meter thermal protection 3 = remote on/off 4 = cool/heat 5 = compressor 2 thermal protection 6 = compressor 2 / step request 7 = defrosting end 8 = Energy saving 9 =antifreeze alarm 10 = compressor 1and 2 thermal protection 11 = generic alarm	0	11			4 6 only MCCG units 211÷301 with thermoregulator digital input, see 6.7 "***Cooling circuit connections in motocondensing units***"
CF28	Chiller / heat pump selection 0 = keyboard 1 = digital input 2 = analogue input	0	2			0
CF32	Selection of °C or °F 0 = °C / × Bar 1 = °F / × psi	0	1			0
CF34	Serial address	1	247			1
CF36	Default displaying 0 = **BEWIT** / **BCP1 - BAT1** 1 = **BEWOT** / **BCP1 - BAT1** 2 = **BEWOT** / SET LASER 3 = **BEWIT** / **BEWOT**	0	3			0 3 only for MCCG-CG 013÷020 with ON/OFF fan regulation
Pr2	Password	0	999			-

Tabella 19

8.19.3 Dynamic Set-Point Parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	0	999			

Tabella 20

8.19.4 Energy Saving Parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	0	999			

Tabella 21

8.19.5 Compressor parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	000	999			-

Tabella 22

8.19.6 Fan parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	000	999			-

Tabella 23

8.19.7 Antifreeze resistance/supply parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	000	999			-

Tabella 24

8.19.8 Defrosting parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	0	999			

Tabella 25

8.19.9 Alarm parameters

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	0	999			

Tabella 26

8.19.10 LASER parameters (NOT ENABLED FUNCTION)

Parameter	Description	Min	Max.	Udm	Resolution	Factory setting
Pr2	Password	0	999			

Tabella 27

8.20 Probe description

For the positioning of the **BEWIT**, **BEWOT**, **BCP1** and **BAT1** probes, see annexes.
Here below you can find the descriptions of the probes:

Code	Connector name	DESCRIPTION
BEWIT	**PB1**	EVAPORATOR WATER INLET TEMPERATURE PROBE
BEWOT	**PB2**	EVAPORATOR WATER OUTLET TEMPERATURE PROBE
BCP1	**PB3**	CONDENSER OUTLET PRESSURE TRANSDUCER
BAT1	**PB4**	AMBIENT TEMPERATURE PROBE IN CG UNITS CONDENSING COIL AMBIENT TEMPERATURE PROBE IN MCCG UNITS (motorcondensing)

CHAPTER 9

OTHER COMPONENTS SETTING

9.1 Refrigerant high and low pressure switches

The units are fitted with the following pressure switches:

1. **low pressure switch (LP)**
   This monitors refrigerant compressor intake pressure and will trip to avoid that values dangerous for compressor normal operation are reached.
   It is of an "automatic reset" type.
   The alarm **A02** (see chapter 8.16 "***Alarm codes and actions"***),produced by this pressure switch tripping, an have a delay time after the compressor starting to avoid simple intake pressure fluctuations or false alarms interfere with the unit normal operation.
   After the time set, the pressure switch tripping will be detected by the electronic board which will display the alarm signal **A02** (see chapter 8.16 "***Alarm codes and actions"***) band will stop the compressor/s and fan/s while the pump (if it is installed) will continue to operate.
   After the alarm tripping, if the compressor intake pressure increases and exceeds the pressure switch tripping value it will restart.
   It will be possible to start up the unit again following the alarm reset procedure described in chapter Chapter 8 "***Electronic Board"***.
   If the cause of the pressure switch tripping has not removed this cycle will repeat continuously.

2. **high pressure switch (HP)**
   This monitors the refrigerant compressor discharge pressure and prevents it increases to levels dangerous for compressor working and for people safety.
   It is of an "automatic reset" type".
   Its tripping is detected by the electronic board which will open the compressor power supply circuit and will display the alarm signal **A01** (see chapter 8.16 "***Alarm codes and actions"***) and the fan/s will be activated for 60 seconds to the max. speed to contrast the alarm situation, than they will be stopped.
   When the compressor outlet pressure drops below the reset point it is reset.
   It will be possible to start up the unit again following the alarm reset procedure described in chapter Chapter 8 "***Electronic Board"***.
   If the cause of the pressure switch tripping has not removed this cycle will repeat continuously.

The pressure switches LP and HP are screwed to the refrigerant circuit piping with SCHRAEDER valves (with needle) which prevent leakage during replacement.
The TRIP and RESET values of the pressure switches depend upon the refrigerant gas used and are listed in the table below:

COMPONENTS	REFRIGERANT	TRIP			RESET		
		bar	°C	°F	bar	°C	°F
Low pressure switch LP	R407c	1.7	-17.3	0.9	2.7	-8.9	16
High pressure switch HP		27.2	63.4	146.1	20.5	51.5	124.7

Table 28 SETTINGS OF THE HIGH AND LOW PRESSURE SWITCHES

9.2 Speed regulator and fan pressure switch

In the MCCG-CG 013÷020 units the fans can be checkd in two ways:

- with a speed regulator (**speed control**)
- by a pressure switch PV (**step**)

It depends on the configuration of the unit.

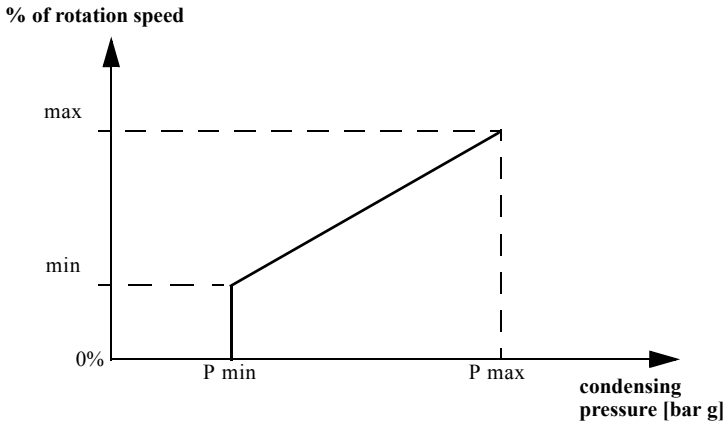
In the MCCG-CG 031÷301 units the fans are always managed by speed regulators.

1. **Units configured with fan pressure switch (PV)**
   In these units a pressure switch detects the refrigerant compressor outlet pressure and controls the fan operation powering them on or off.
   The TRIP and RESET values of the pressure switch depend upon the refrigerant gas used and are listed in the table below:

COMPONENT	REFRIGERANT	TRIP			RESET		
		bar	°C	°F	bar	°C	°F
Fan pressure switch PV	R407c	18	46.4	115.5	14	37	98.6

Table 29 SETTING OF PV PRESSURE SWITCH

2. **Units set with fans pressure switch**
   The unit is furnished with a speed regulator of fan rotation, which operates to maintain the condensing pressure within a pre-fixed value.
   These units are furnished with a pressure transducer positioned on the refrigerant compressor outlet pipeline.
   It commutates the measured pressure value into an electric signal, sent to the speed regulator.
   For example, if the temperature of the air sent to the condenser decreases, the pressure transducer will measure a decreasing of the condensing pressure. This pressure decreasing is sent to the speed regulator which will reduce the fan speed and consequently, the condenser air flow will be reduced.
   Analogously, when the air temperature to the condenser and the condensing pressure increase, the regulator will increase continuously the fan speed to increase the air flow through the condenser.
   The following graphic shows the progress of the fan rotation speed according to the condensing pressure changings.



ATTENTION

The pressureand the fans rotation speed values are set by the electronic control.

9.3 Water differential pressure switch (ONLY CG UNITS)

The unit is equipped with a differential pressure switch which detects the water pressure difference between the inlet and outlet of the evaporator nipple.

When the pressure switch measures a Dp lower than 25 mbar (250mm H2O), it sends an alarm signal to the board which stops the unit after the delay time set by parameter (if the pressure switch tripping happens at unit starting up) and displays the icon **Flow!** and the message **A08** (see paragraph 8.16 "***Alarm codes and actions***").

When Dp value returns to be higher than 25 mbar the alarm condition stops and the unit will automatically start again.

Its presence protects the integrity of the evaporator from the ice formation in the event of decrease or absence of flow through the water circuit.

CHAPTER 10

OPERATION AND MAINTENANCE

10.1 Operation

The machine operates in completely automatic mode.

There is not necessary to turn it off when there is no thermal load as it turns off automatically when the preset water outlet temperature has been reached.

10.2 Maintenance

ATTENTION

*Before proceeding with the installation or the maintenance of these units be sure that all personnel concerned have read and understood the Chapter 3 "**Safety**".*

These machines will give many years of trouble-free service if they are properly maintained and serviced.

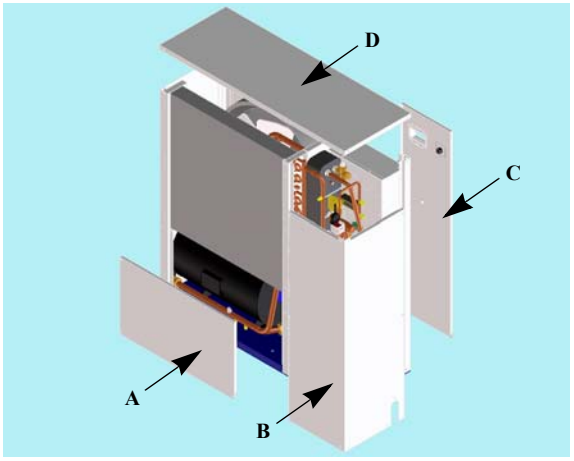
10.2.1 Unit access

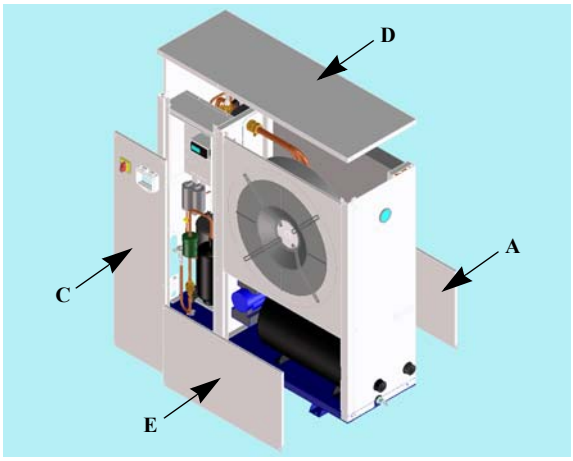
You can remove the protection panels for the maintenance of the unit.

To remove the panels use a screw drive and unscrew the fixing screws.

Here below you can see the panel you can remove.

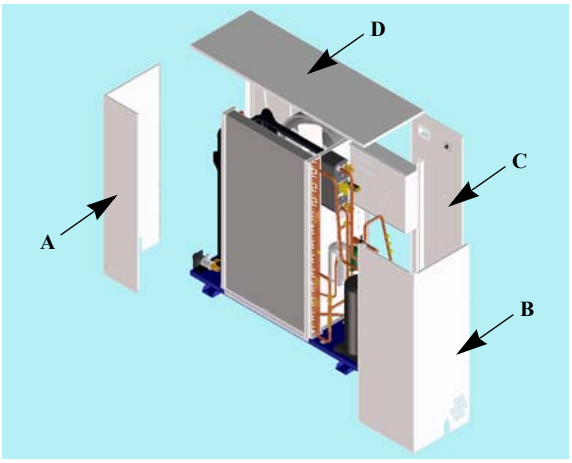
Unit MCCG-CG 013÷020

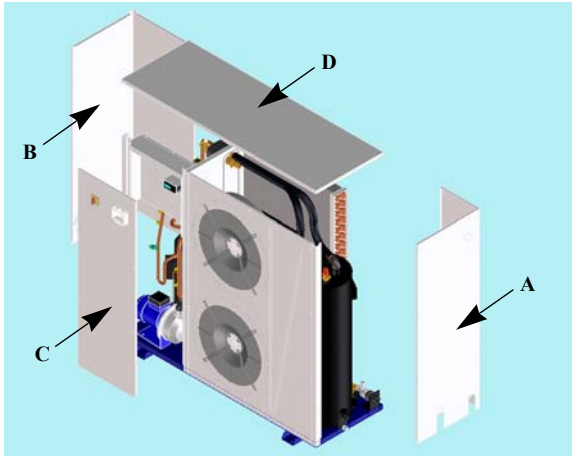




- to access the refrigerant circuit components remove the panel a **L** (B).
- to access the electric board components set the main switch on "O" and remove the panel (C).
- to access the water circuit components remove the panel (A) and (E).
- to access the fan and the condenser remove the panel (D).

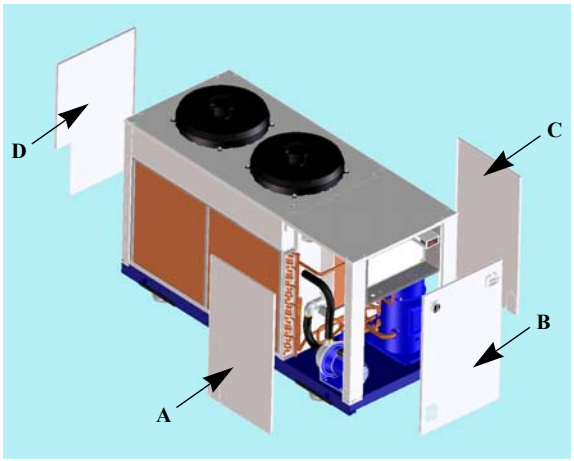
Unit MCCG-CG 031÷071





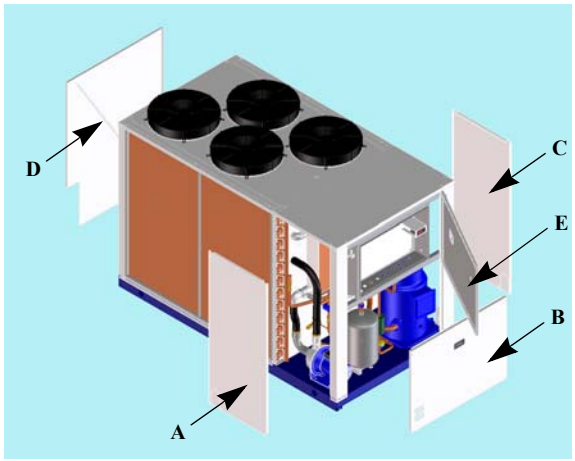
- to access the refrigerant circuit and the pump remove the panel a **L** (B).
- to access the electric board components set the main switch on “O” and remove the panel (C).
- to access the water circuit components remove the panel (A), before you have to remove the panel (D).
- to access the fan and the condenser remove the panel (D).

Unit MCCG-CG 081÷101



- to access the refrigerant circuit and the pump remove the panels (A) (B) and (C).
- to access the electric board components set the main switch on “O” and remove the panel (B).
- to access the water circuit, fan and condenser components remove the back panel (D).

Unit MCCG-CG 131÷301



- to access the refrigerant circuit and the pump remove the panels (A) (B) and (C).
- To gain access to the components of the power board, turn the main switch/circuit breaker to the open “O” position and open the doors of the power board (B) by turning the bolts with the provided keys.
- to access the water circuit, fan and condenser components remove the back panel (D).

10.2.2 Water circuit emptying

NOTE

If it will be necessary to empty the water circuit, the *CG* units are equipped with specific cocks.
The MCCG units are not equipped with cocks for the emptying of the water circuit, so it will be necessary to install adequate discharge systems in the water circuit.

Here below there are the different configurations and the positioning of the cock:

- in the CG 013÷021 models both **complete** and **without** hydraulic group there is a cock in the lower part of the connections side (see FIG. B)

- in the CG 031÷071 models **with** hydraulic group there is a cock in the lower part of the conntections side (see FIG. B), and a second one in the evaporator (see FIG. A)
  in the CG 031÷071 models **without** the hydraulic group there is only the cock in the evaporator (see FIG. A)

- in the CG 081÷301models **with** the hydraulic group there is a cock in the lower part of the connections side (see FIG.B), and a second one in the evaporator (see FIG. A)
  in the CG 031÷071models **without** hydraulic group there is only one cock in the evaporator (see FIG. A)

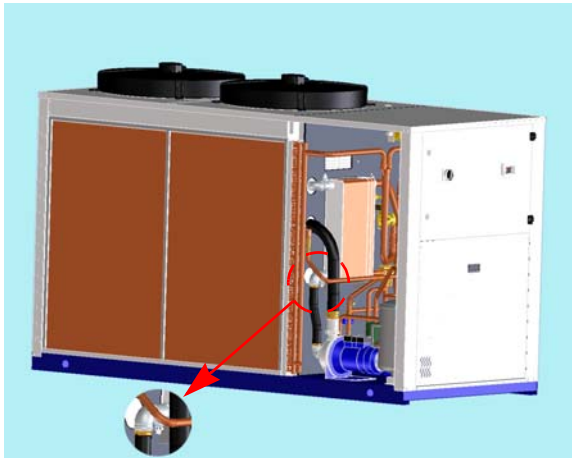
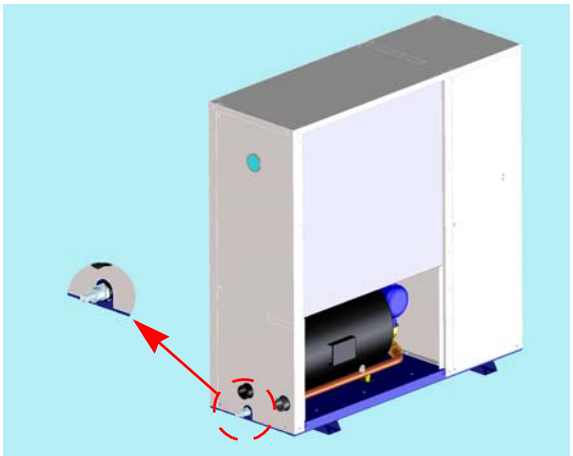
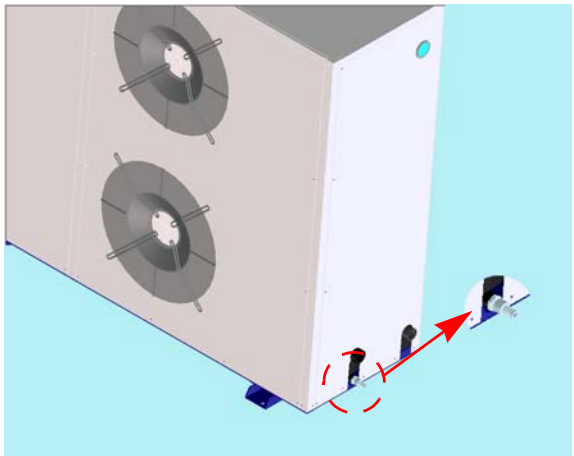
Unità CG 031÷071	Unità CG 081÷301
	

FIG. A

Unità CG 013÷020	Unità CG 031÷071
	

Unità CG 081÷301

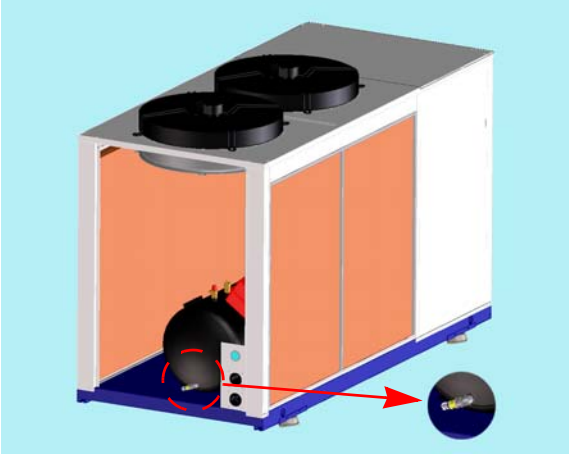


FIG. B

ATTENTION

The water circuit emptying operation becomes indispensable when the unit is without antifreeze resistance and must remain OFF for a long time in an ambient with temperatures which could reach the freezing values of water inside the evaporator (risk of evaporator breaking)

10.3 Maintenance schedule

OPERATION	1 day	1 month	6 months	1 year
Check for any alarm signals.	x			
Check that the water outlet temperature is within the envisaged range.	x			
Check that the water inlet temperature is in accordance with the value used for selecting the unit.		x		
In units with hydraulic group check that the pressure in the tank (with pump stopped) is about 0.5 bar.		x		
In units with hydraulic group check that the difference between the pump outlet pressure and inlet pressure (measured by a pressure gauge with the pump stopped) is within the limits envisaged and, in particular, is not lower than the value corresponding to the maximum flow.		x		
Clean the water filter (if installed). We recommend to clean the filter after a week from the unit starting.		x		
Check that the liquid indicator (if present) is full or with a small stream of bubbles when the compressor is running.			x	
Check that the unit current absorption is within the values on the data plate.			x	
Carry out visual inspection of refrigerant circuit, looking out for any deterioration of the piping or any traces of oil which might indicate a refrigerant leak.			x	
Check the condition and security of piping connections.			x	
Check the condition and security of electrical connections.			x	
Using a spanner, check that the connections between the compressor inlet and outlet pipelines have not slackened.			x	
Check that the ambient air temperature is in accordance to the value used for selecting the machine (normally 30-35°C / 77-86°F). Check that the ambient is well ventilated.		x		
Check that the fan operation is automatically started up. Clean the condenser fins with a soft sponge or a jet of clean compressed air. Check that the grilles of the unit are free from dirt and any other obstructions.			x	
Clean condenser fins with a mild detergent.				x

ATTENTION

- This plan is based on an average working situation.
- In some installations it may be necessary to increase the frequency of maintenance.

CHAPTER 11

TROUBLE SHOOTING

PROBLEM	CAUSE	SYMPTOM	REMEDY
A Water outlet temperature **BEWOT** higher than the expected.	**A1** Thermal load too high.	**A1.1** • **BEWOT** temperature higher than the expected value;	Restore the thermal load within the preset limits.
	A2 Ambient temperature too high.	**A2.1** See A1.1.	Reduce ambient temperature within design limits, for example by increasing local ventilation.
	A3 Condenser fins dirty.	**A3.1** See A1.1.	Clean the condenser fins.
	A4 Front surface of the condenser obstructed.	**A4.1** See A1.1.	Free the front surface of the condenser.
	A5 No refrigerant fluid in the plant.	**A5.1** • See A1.1; • low evaporation pressure; • if the flow indicator is present, check if there are a lot of bubbles.	Get a refrigerator technician to check for leaks and eliminate them. Fill the plant.
	A6 Compressor protection trips.	**A6.1** • The head and the body of the compressor are very hot; • the compressor stops and tries to restart after a short period (even a few seconds).	Get a refrigerator technician to check for leaks and eliminate them. Fill the plant.
B Low head values (water pressure) at pump delivery.	**B1** Water flow too high. The pump doesn't work properly (water flow too high, low head value, high power absorption).	**B1.1** • Possible increase in the outlet temperature **BEWOT** (See A1.1); • with pump installed on the machine: pressure difference, read on the machine pressure gauge, too low with pump stopped and pump running.	Restore the flow within the preset limits, e.g. by partially closing the pump outlet cock. Reset the pump thermal protection device and check the electrical absorption.
	B2 See point C. Before ice obstructs the whole evaporator, there is an increase in the head losses.	**B2.1** See point C.	See point C.
	B3 Evaporator obstructed by dirt carried by the water to be cooled.	**B3.1** High water temperature difference between inlet and outlet.	Depending on the type of dirt: • clean the evaporator by running a detergent solution which is not aggressive for steel and copper; • run a high water flow against the stream. Install a filter upstream from the unit.

Table 30 TROUBLE SHOOTING

PROBLEM	CAUSE	SYMPTOM	REMEDY
C Water differential pressure switch FLOW alarm trips. A alarm displayed: A08	**C1** The filter upstream from the unit is obstructed, if installed.	**C1.1** • Water does not flow. Pressure difference between inlet and outlet lower than 25mbar. • Alarm displayed: A08. • main alarm relay tripped.	Clean the upstream filter, if installed. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
	C2 The pump is defective or rotate in the wrong direction. (three-phases supply).	**C2.1** • See C1.1; • main alarm relay tripped.	Check the pump electrical supply and, if it is necessary, invert the two phases. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
	C3 Water inlet-outlet inverted (units without hydraulic kit).	**C3.1** • See C1.1; • main alarm relay tripped.	Invert the water inlet-outlet. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
D High pressure switch or alarm trips (HP) Alarm displayed: A01	**D1** The fan does not work.	**D1.1** • Refrigerant compressor stops; • the alarm A01 alternate with the value of the **BEWIT** probe; • main alarm relay tripped; • the led of the H lights up;	Repair or change the fan. Check the thermal protection of the fan. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board). Check the fan speed regulator system.
	D2 Ambient temperature too high.	**D2.1** • Ambient temperature higher than the maximum value; • See D1.1.	Reduce ambient temperature within design limits, for example by increasing local ventilation. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
	D3 Recirculation of warm air due to incorrect installation.	**D3.1** • Condenser cooling air temperature higher than the permitted value; • See D1.1.	Change the position of the unit or the position of any adjacent obstructions to avoid recirculation. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
	D4 See A3.	**D4.1** See D1.1.	Clean the condenser fins. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
	D5 See A4.	**D5.1** See D1.1.	Remove obstruction from condenser front surface. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
	D6 Thermal load too high.	**D6.1** • Water outlet temperature too high; • refrigerant compressor stops; • main alarm relay tripped.	Reduce the thermal load to within the design limits. Follow the alarm reset procedure to star up the unit again (chapter Electronic Board).
E Low pressure switch or alarm trips (LP) Alarm displayed: A02	**E1** No refrigerant fluid in the plant (see also A5).	**E1.1** • Refrigerant compressor stops; • the alarm A02 alternate with the value of the **BEWIT** probe; • main alarm relay tripped. • the led of the L lights up;	Call a qualified refrigeration technician to check for leaks and replenish refrigerant charge.
	E2 The water upstream filter is dirty, if installed	**E2.1** See E1.1.	Clean or change the upstream filter, if installed.

Table 30 TROUBLE SHOOTING

PROBLEM	CAUSE	SYMPTOM	REMEDY
F The compressor protection device trips. Alarm displayed: A09 or A10	**F1** Thermal load too high combined with a situation of refrigerant circuit unloaded (also see A5).	**F1.1** • The head and the body of the compressor are very hot; • the compressor stops and tries to restart after a short period (even a few seconds). • The compressor protection device trips • Alarm displayed A09 or A10 • The led of the icon ⚠ lights up.	Call a qualified refrigeration technician to check for leaks and replenish refrigerant charge.
	F2 The scroll compressor rotation direction is wrong (only three-phases units).	**F2.1** Refrigerant compressor stops the unit does not cool.	Invert two phases of the electrical supply.
G Digital display and all LEDs off, main switch P1 off (I).	**G1** The auxiliary board fuse trip.	**G1.1** Measuring with a tester the voltage at the transformer secondary winding connector, there will be not tension survey.	Check the causes of the fuse tripping. Replace the fuse.
	G2 Abnormal power consumption by one or more control board components.	**G2.1** Despite presence of power at the connectors of the control board, the display and all LEDs remain unlit.	Try to turn the unit OFF and ON again. If this doesn't solve the problem, contact the nearest service centre.
H Alarm displayed: P1, P2, P3, P4	**H1** **BEWIT**, **BEWOT**, **BCP1** or **BAT1** probes damaged.	**H1.1** • See problem; • main alarm relay tripped.	Check that the temperature probe is correctly connected to the control board connectors and that the cable is undamaged. If necessary replace the temperature sensor.
I Alarm displayed: A04	**I1** Water outlet temperature too low. The value of the parameter **Ar03** is higher then than the value measured by the BEWOT probe.	**I1.1** • see problem; • The compressor stops and restarts when the **Ar03**+**Ar04** value is exceeded; • main alarm relay tripped. • The led of the icon ⚠ lights up.	Identify and remove the cause of BEWOT temperature decreasing to a value lower than **Ar03**.
	I2 Water flow too low.	**I2.1** • See problem; • The compressor stops and restarts when the **Ar03**+**Ar04** value is exceeded; • main alarm relay tripped.	Increase the water flow.

Table 30 TROUBLE SHOOTING

PROBLEM	CAUSE	SYMPTOM	REMEDY
J Alarm visualized: A11 pump thermal protection	**J1** The thermal protection of the pump trips because the water flow is too high.	**J1.1** • See problem; • main alarm relay tripped; • the refrigerant compressor and the pump stop; • the alarm A11 alternate with the value of the **BEWIT** probe; • the pressure difference read on the machine gauge with the pump stopped and pump running is lower than the available head with maximum pump flow.	Reset the thermal protection device. Increase the pressure drop in the hydraulic circuit, for example by partially closing the pump output valve.
	J2 The grille through which the pump cooling air passes is obstructed.	**J2.1** • see problem; • main alarm relay tripped; • the refrigerant compressor and the pump stop.	Reset the thermal protection device. Free the grille.
	J3 The pump is defective.	**J3.1** • See problem; • main alarm relay tripped; • the refrigerant compressor and the pump stop; • the current absorbed by the pump is greater than the nominal rating; • the pump may be noisy.	Reset the thermal protection device. Replace the pump.
K Alarm ACF1,ACF2,ACF3, ACF4,ACF5	**K1** Configuration error.	**K1.1** ACFx blinks on the display and unit blocked	Turn off and turn on the unit. If this does not solve the problem, contact the nearest service centre.
L Alarm EE	**L1** The processor does not memorize the data in the right way	**L1.1** • The machine does not work • EE blinks on the display • The led of the icon ⚠ lights up.	Turn off and turn on the unit. If this does not solve the problem, contact the nearest service centre.

Table 30 TROUBLE SHOOTING