


CMHGV 2101 / 2140



**AIR COOLED WATER CHILLER
WITH BUILT-IN HYDRAULIC MODULE
AIR / WATER**
R 407 C refrigerant

CE MARKING

This product marked  conforms to the essential requirements of the Directives:

- Low voltage no. 73/23 EEC, modified 93/68 EEC.
- Electromagnetic Compatibility no. 89/336 EEC, modified 92/31 and 93/68 EEC.
- Pressure Equipment Directive No. 97/23/CE.



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APPLIANCES FILLED WITH R 407 C

R 407 C

- Fluid R 407 C, as opposed to R22, is not a pure fluid but a blend composed of:
 - 23% R 32 + 25% R 125 + 52% R 134 A.
- The compressors approved for operation with this fluid are filled beforehand with polyalcohol oil.
Contrary to mineral oil, it is very hygroscopic: it absorbs the humidity of the ambient air very quickly. This can modify its lubricant properties and lead in time to the destruction of the compressor.

MAINTENANCE INSTRUCTIONS

- 1 - Never add oil to the appliance; the compressor is filled with polyalcohol oil, a special oil which cannot tolerate the presence of other oils.
- 2 - The instruments used for:
 - filling,
 - pressure measurements,
 - emptying under vacuum,
 - recovering the fluid,must be compatible and only used for the R 407 C fluid.

- 3 - The weight of the refrigerant contained in the storage bottle must be checked constantly. Do not use it from the moment the remaining weight is less than 10% of the total weight.
- 4 - In the case of a new charge:
 - do not use the charging cylinder,
 - use a balance and a dip pipe type R 407 C cylinder,
 - charge the weight of R 407 C as per the value indicated on the unit's identification plate,
 - IMPORTANT: see instruction 3 above.
- 5 - The charge **must** be undertaken in liquid phase.
- 6 - In case of leakage, do not complete the charge: recover the remaining refrigerant for recycling and perform a total charge. Recovery, recycling or the destruction of the fluid must be done in compliance with the laws in force in the country concerned.
- 7 - If the refrigerant circuit is opened, you must:
 - avoid the entry of air into the circuit as much as possible,
 - replace the filter drier,
 - perform the "vacuum operation" at a minimum level of **0.3 mbar (static)**.

1 - GENERALITIES

- The equipment must be installed, started-up and maintained by authorised and qualified personnel, in accordance with local rules and professional standards.
- The recommendations and instructions presented in the manual and on labels must be followed.

1.1 - GENERAL SUPPLY CONDITIONS

- The units must be securely anchored to the truck's trailer during transport.
- Generally speaking, the material is transported at the consignee's risk.
- In the event of damages during transport, the consignee must notify the carrier by registered letter within three days following delivery.

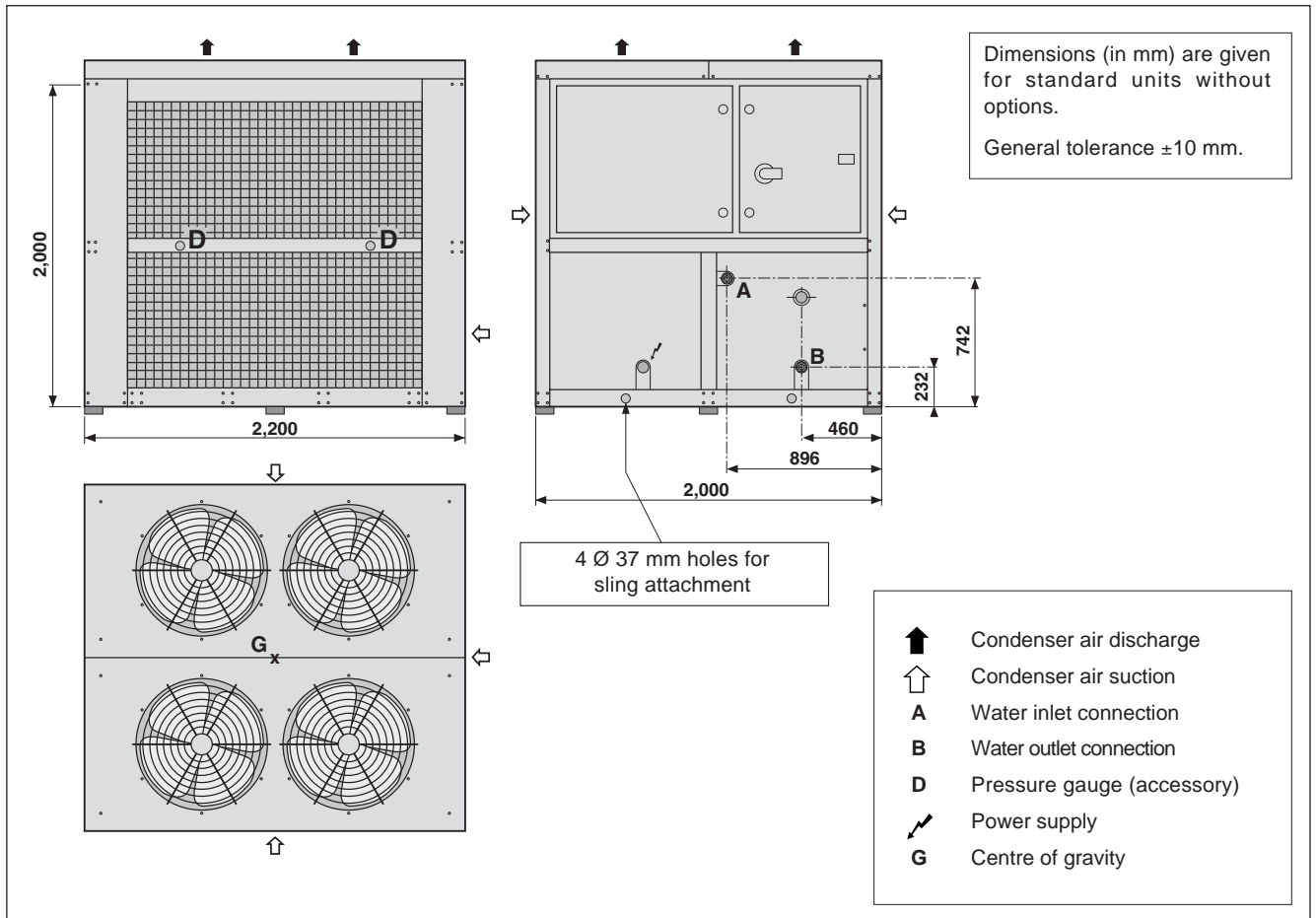
1.2 - VOLTAGE

- Before carrying out any operation, check that the voltage indicated on the unit corresponds to the mains voltage.
- Before servicing the unit, ensure that the electrical power supply has been shut off and warning signs installed.

1.3 - TECHNICAL AND PHYSICAL CHARACTERISTICS

- See technical data.

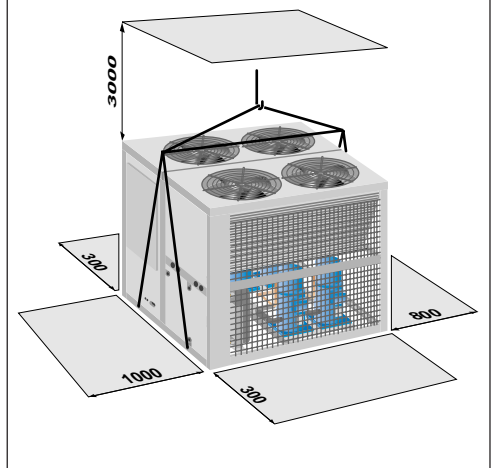
2 - DIMENSIONS



3 - INSTALLATION

- Prior to all servicing or other actions on the equipment, installation, commissioning, operation, or maintenance, the personnel in charge of these operations shall become familiar with the instructions and recommendations provided in the installation manual of the unit as well as the elements of the project's technical file.
- The personnel responsible for receiving the unit must conduct a visual inspection in order to identify all damage to which the unit may have been subjected during transport: refrigerating circuit, electrical cabinet, cassis and cabinet.
- The unit must not be installed near the following:
 - sources of heat,
 - combustible materials,
 - return/air intake of an adjacent building.
- The unit must be installed, started, maintained and repaired by qualified servicing personnel in compliance with the requirements of all directives, laws and regulations and in accordance with standard trade practices.
- During installation, troubleshooting and maintenance operations, the use of pipes as a step: under the stress, the pipe may rupture and the refrigerant may cause serious burns.
- The unit is delivered on a wooden pallet and shrink-wrapped.
- A lift truck may be used to remove the unit from its pallet.
- Handle the unit with care.
- Crane installation: once the plastic film has been removed, the machine may be lifted by placing the hoisting hooks into the four \varnothing 37 holes.
- Spacers or protective pads should be placed between the slings and body to avoid damage.
- The unit's centre of gravity and weight are indicated on the space requirement diagrams and in the table of the technical documentation.

Clearances to be respected



- Before installation, verify the following points:
 - the unit must be installed outside in an appropriate location and in compliance with environmental requirements (sound level, integration, etc...),
 - the unit's installation location must be perfectly level and strong enough to support the weight of the unit and must have adequate inundation protection,
 - sufficient space around the unit should be provided in order to facilitate servicing and maintenance operations (see drawing page 3),
 - air suction to the coil and fan discharge must not be obstructed,
 - install the unit above the region's average snowfall level,
 - vibrations and noise must not be transmitted to adjacent buildings,
 - install the machine on anti-vibration pads and fit hoses on piping elements, as required,
 - if necessary, consult an acoustics specialist concerning the unit's optimum location.
- **AVOID:**
 - excessive exposure to sea-air or corrosive gases,
 - the proximity of the extractor fan,
 - projections of mud (next to a roadway or path, for example),
 - areas where there is strong wind blowing against the unit's air exhaust.
- Protection index of the unit: - IP 44 : for the electrical equipment,
(IPXXB : for the mechanical hazards).

4 - CONNECTIONS

4.1 - HYDRAULIC CONNECTION

- Connect the water pipes to the corresponding connections: **male 2" 1/2 (66 x 76)**.
- Connect the hydraulic filter (supplied with the unit) onto the water intake. Also provide 2 isolation valves for intake cleaning purposes.
- The pipes must be at a sufficient distance from the removable panels to enable servicing operations to be performed.
- Make the connection with flexible hoses preferably.
- **The diameter of the pipes must be calculated according to the installation (take care with high head losses).**

4.2 - ELECTRICAL CONNECTION

4.2.1 - GENERALITIES

- In all cases, refer to the wiring diagrams supplied with the unit or supplied upon request.
- The acceptable voltage variation is: $\pm 10\%$ during operation.
- The electrical connection conduits must be fixed.
- Short circuit current: 10 kA as per IEC 947-2.
- Class 1 unit.
- Use the holes fitted with grommets for passing cables into the unit.
- To pass the cables inside the electric box, use stuffing box (not supplied) to be assembled on the plate at the back of the electric box.
- The electrical installation must comply with the standards and regulations applicable where the unit is being installed (in particular NFC 15-100 \approx CEI 364).
- The unit is designed to be connected to a mains supply with a TT, IT or TN.S neutral point connection (as per NF C 15-100).
- **Electrical diagram 10 05 814.**

4.2.2 - MAINS SUPPLY

- The power supply must be three-phase 400V/50 Hz, connected to the power supply switch in the unit's electrical box (see electrical diagrams).
Place cable glands (not supplied) for the passage in the bottom of the box.
- **CAUTION:**
Before starting the unit, ensure that the phase rotation order is correct. The phase-sequence controller restricts the unit from operating if the 3 supply phases are not in order or if a phase is absent.
- The power supply must come from an isolation and electric protection device (not supplied) in accordance with existing regulations.
- The sizing of the power supply cables is to be ensured by the installer in accordance with the installation conditions and as per current standards.
Cable sizes, indicated below, are given for information purposes.
They are calculated in accordance with NFC 15-100 (\approx CEI 364) with the following hypotheses:
 - Maximum current, see table below.
 - Multi-pole copper cable with PR insulation.
 - Installation in non-ventilated cable duct (installation method No. 41). No other power cable.
 - Ambient temperature 40°C.

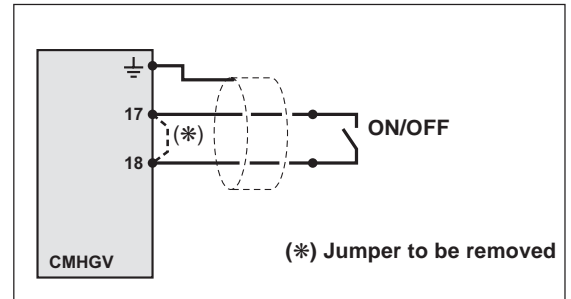
- The lengths indicated below correspond to a voltage drop less than 5% in the cable.

CMHGV		2101	2124	2140
Starting current	A	220	240	290
Max. total current	A	113	135	143
Power supply cable section	mm²	50	50	50
Max. connection length	m	200	200	200

- The complete electrical specifications are given in the table of the technical documentation.

4.2.3 - CONTROL BY EXTERNAL CONTACT

- The unit can be controlled remotely by connecting a good-quality, potential-free external contact (not supplied) for the remove ON/OFF signal (contact closed = operation authorized, contact open = OFF).
- The ON/OFF signal is connected to terminals 17 and 18 of the terminal strip located in the electrical box (remove the existing jumper - see diagram).
- The wiring of this contact must not be routed near power cables in order to avoid electromagnetic disturbances.
- Use shielded cable with twisted pair (shielding grounded on generator side).
- Max. connection cable length: 100 m.
- Minimum wire size: 0.5 mm².



4.2.4 - REMOTE CONTROL

- See § 5.

4.2.5 - MISCELLANEOUS

• Alarm transfer:

Potential-free contact (2A resistive - 250 VAC maximum) available on terminals 25 and 26 of the terminal strip in the electrical box.

- Contact open = Alarm or power supply loss.

Note: this contact's direction of actuation may be changed through parameterisation. See § 7.

5 - OPTION AND ACCESSORIES

5.1 - OPTION (FACTORY INSTALLATION)

5.1.2 - BACKUP PUMP OPTION

- Code **70601105**.
- The switchover of the electrical supply onto the 2nd pump is performed manually by a switch box placed near the pumps.

Procedure: This operation is to be performed by qualified personnel.

- Stop the generator and the pump (time delay).
- Close the valve of the pump to be shut down.
- Open the valve of the pump to be started.
- Select the pump to be started with the switch located in the box.
- Restart the generator.
- Check that the pump is operating.

5.2 - ACCESSORIES



5.2.1 - ANTI-VIBRATION KIT

- The kit includes:
 - 1 set of 6 anti-vibration plates, thickness 25 mm code **70600036**,

5.2.2 - HP AND LP PRESSURE GAUGES

- Code **70970007**.
- The accessory includes 1 set of 2 pressure gauges (HP and LP). Two per apparatus must be controlled.
 - Remove the caps on the riser of the front panel.
 - Install the pressure gauges.
 - Connect the capillary tubes to the pressure taps.

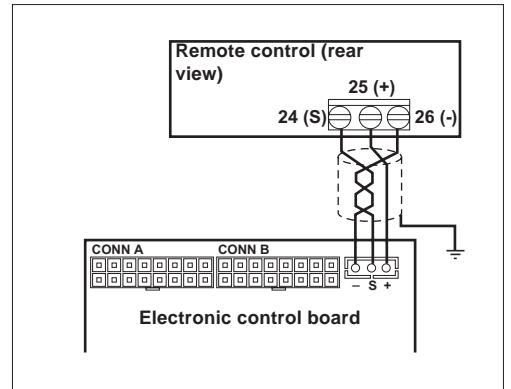
5.2.3 - REMOTE CONTROL

- Code **70250057**.
- The functions and display are exactly the same as those on controller.
- The only difference concerns the buttons  and  which are separated by the "ON/OFF" and "Mode" buttons.
- **The controller is designed to be installed inside sheltered rooms.**
- Connection:
 - on the electronic control board located in the electric box (in parallel with the box's display unit connection),
 - use twisted pair shielded cable with a cross section of at least 0.5 mm² (shielding of the ground on unit side), max. length: 100 meters.

CAUTION:

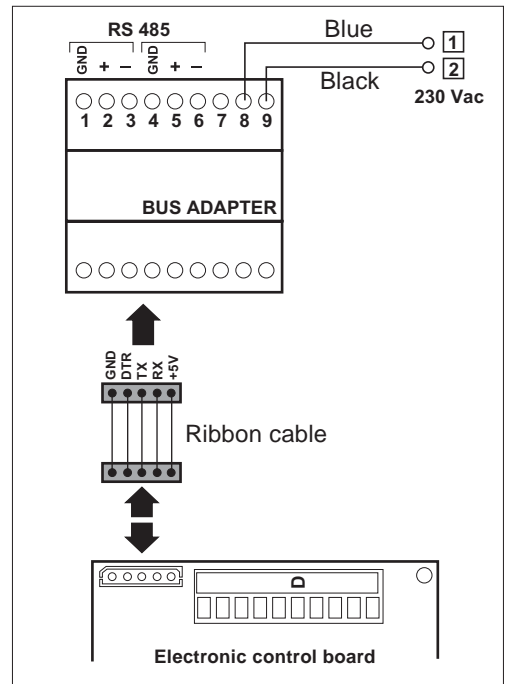
Do not route this cable near power cables.

The operation must take performed with the unit's power supply off and locked out.



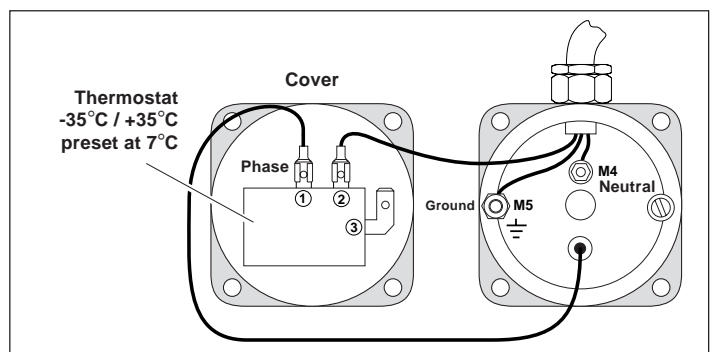
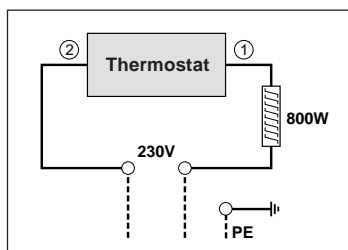
5.2.4 - RS 485 COMMUNICATION INTERFACE (MODBUS protocol)

- Code **70250056**.
- Secure the communication interface on the DIN rail next to the electronic board located in the electric box.
- Connect the ribbon cable (supplied) between the interface and the electronic control board located in the electric box.
- Connect the interface's 230 VAC power supply to terminals 1 and 2 on the terminal strip using the Blue and Black wires supplied, as shown opposite.



5.2.5 - 800 W ANTI-FREEZE RESISTANCE

- Code **70200010**.
- Power supply and control of this resistance shall be separate from all other installation circuits. It must be installed by qualified service personnel who are familiar with this type of equipment and in compliance with local regulations and recognized trade practices.
- **Before all operations on the unit, make sure that the power supply is disconnected and locked out.**
- The 230 VAC electrical power supply must be fitted with a separate overcurrent protection and disconnect switch in compliance with the rules and regulations in force.
- The power supply wiring must be secured. Use the cable gland located on the resistance cover.
 - **Note 1:** The resistance is equipped with an adjustable limiting thermostat set at approximately 7°C.
 - **Note 2:** **Power to the resistance must be turned on only when the circuit is full of water.**
 - **Note 3:** Make sure that wiring is securely clamped in the terminal block and the ground connection is correctly attached.



6 - STARTING

6.1 - CHECK:

- That all hydraulic connections are properly tightened and that the hydraulic system functions correctly:
 - purge the circuits,
 - position of valves,
 - hydraulic pressure.
- That there are no leaks.
- That the machine is stable.
- That the power cables are well fixed to their connection terminals (loose terminals can cause heat build-up on the terminal board).
- That the electric cables are well insulated from any sections of sheet metal or metal parts which could damage them.
- That electrical wiring is a safe distance from refrigeration lines.
- That probe, control and power cables are properly separated.
- That the machine is earthed.
- That there are neither tools nor other foreign objects in the unit.
- **IMPORTANT: If antifreeze is added (monopropylene glycol), a minimum rate of 15% to 20% is needed to avoid any risk of corrosion.**

6.2 - STARTING-UP THE UNIT

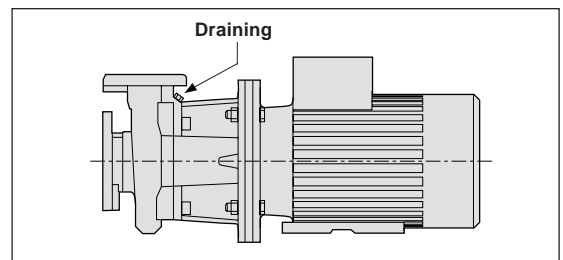
- Power up the unit.
- Start the unit. The water circulating pump must function. See details in § 7.5.

6.3 - CHECKS TO BE MADE

- Check that the rotation direction of the fan(s) and the pump is correct. If not, reverse 2 phases on the electrical power supply.
- HP and LP pressure and amperages are in accordance with the commissioning sheet.
- Check water flow.
- Check control system operation.
- Water circuit pressure.

NOTE: The equipment's buffer tank is equipped with a safety pressure switch which prohibits the water circulating pump from operating and thus the unit in case of insufficient pressure (cut-out 0.6 bar, interlocking 1.4 bar).

- **Purge** the hydraulic system, with special attention given to the **circulating pump**.



IMPORTANT:

- The unit's electronic control features a frost protection device that automatically starts the water circulating pump depending on the outside temperature (threshold: 0°C), even if the unit is turned off.
- When the unit is turned on, it is thus important to make sure that the hydraulic circuit is ready to operate (purge, water pressure, position of valves).
- The following must be undertaken in the event the unit is taken out of service or if there is a high risk of freezing:
 - either drain the installation,
 - or add glycol to the hydraulic circuit.

7 - OPERATION OF "ECH" ELECTRONIC CONTROL

- See wiring diagrams supplied with the machine.

7.1 - DELIVERY STATE

- The control unit is supplied fitted in the machine and factory pre-set.
- All the connections are made except those concerning the available signals or the options.

7.2 - PRINCIPLE

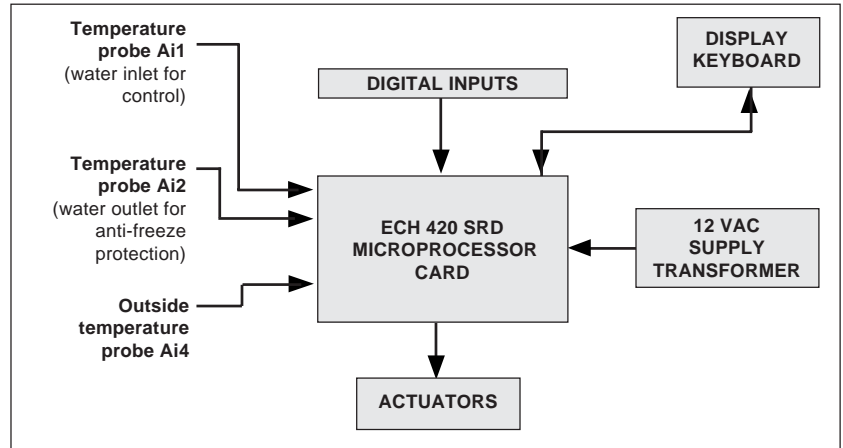
- The microprocessor controls the operation of the machine and of the associated alarms.

It continuously compares the water temperature measured by the probe (Ai1) and the setpoint temperature value entered via the keyboard.

Each operating request generated by the control system is signalled by indicator lights (6) or (8) - see below.

Each light flashes if a safety delay is in progress. The light shines steady when the corresponding circuit is in operation.

- The **control** probe is located on the **water inlet** in the factory.



7.3 - PRESENTATION

7.3.1 - DISPLAY KEYBOARD

(1) Key for:

- local On / Off control,
- access to parameters (in combination with button (2)),
- alarm clearance,
- hour counter reset.

(2) Key for:

- access to parameters (in combination with button (1)).

(3) LED display.

(4) Cooling mode indicator.

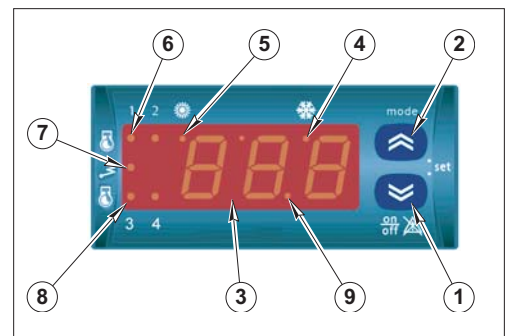
(5) Heating mode indicator (not used).

(6) Compressor on indicator, circuit A.

(7) Anti-freeze on indicator (not used).

(8) Compressor on indicator, circuit B.

(9) Decimal point: if illuminated when the operating time is displayed, the value must be multiplied by 100.

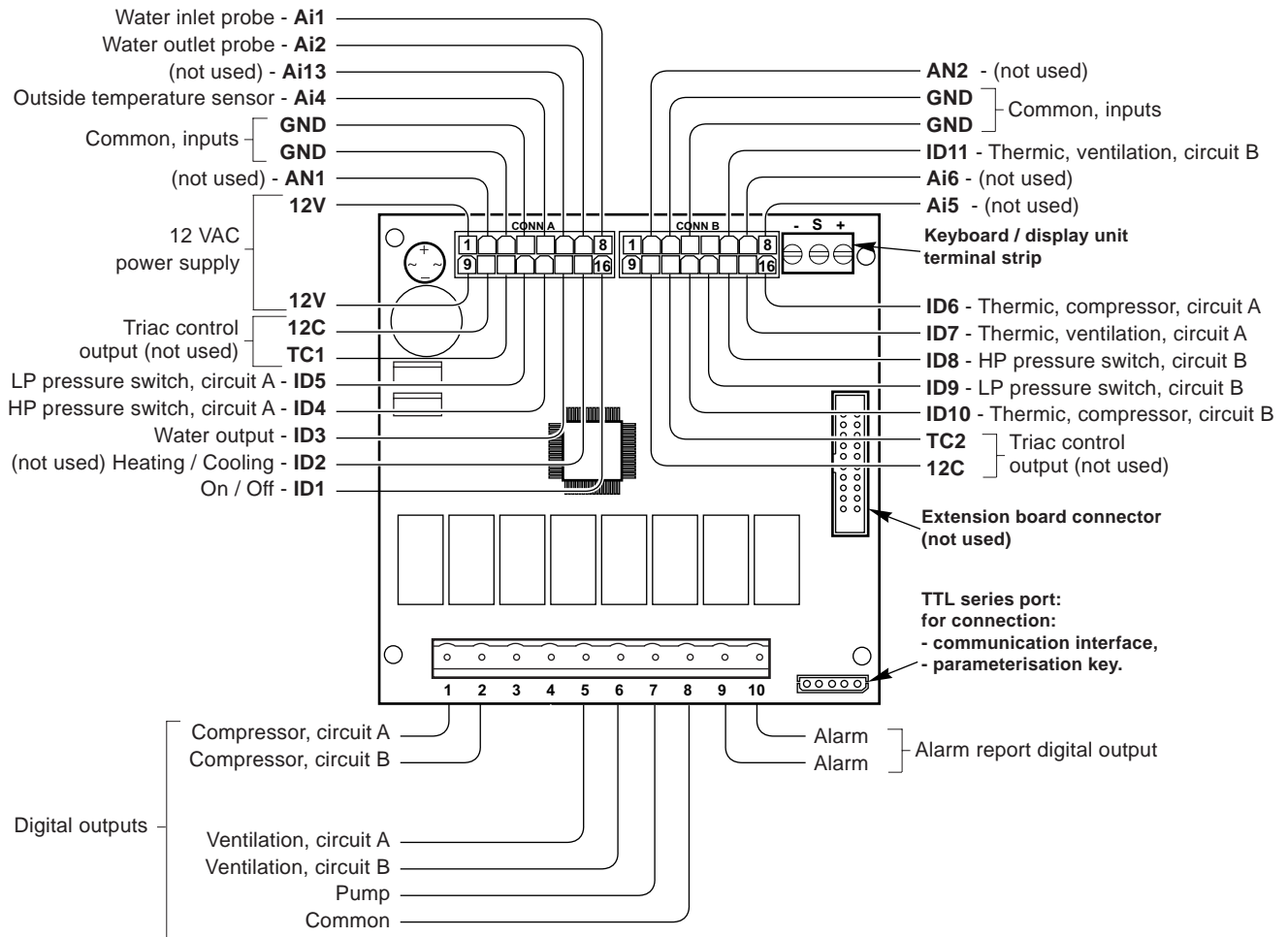


7.3.2 - CTN TYPE TEMPERATURE PROBE

- 10 kΩ at 25° C

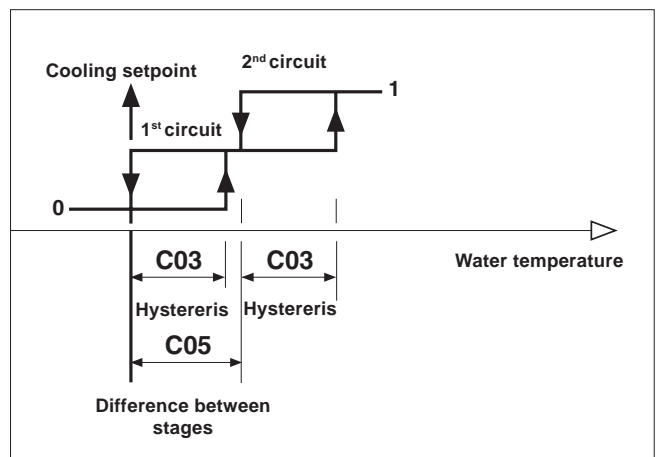
Temperature (°C)	Ohmic value (Ohm)
-20	67,740
-10	42,450
0	27,280
10	17,960
20	12,090
25	10,000
30	8,313
40	5,820
50	4,161
60	3,021
70	2,229

7.3.3 - INPUT / OUTPUT BOARD



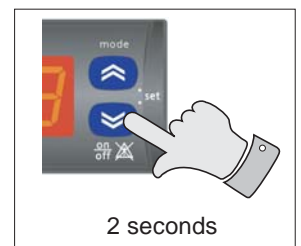
7.4 - OPERATING MODE COOLING

- Staged triggering of cooling circuits depending on the difference in relation to the water setpoint temperature.
- **Note:** An **automatic** refrigerating circuit switchover system allows their operating time to be shared.



7.5 - STARTING

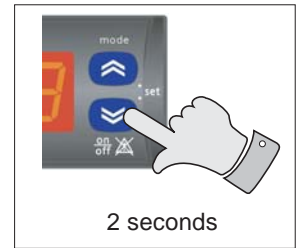
- **Initial condition:**
 - Machine hydraulically and electrically connected ready to operate.
 - If connected, the remote On/Off contact is open (Off).
- **Turn the installation on:**
 - The display unit is off (except for the "decimal" point which remains illuminated); this means that the controller is off. Turn it off by pressing and holding the "ON/OFF" button for 2 seconds.
 - The cooling indicator light (4) illuminates and the display unit then indicates the message "E00" which identifies shutdown by the remote On/Off contact (if used).
- **To start the unit:**
 - Close the remote On/Off contact. The water inlet temperature is displayed. The circulating pump starts.
 - The operating lights of the compressors (6) and (8) illuminate if required (see diagram, paragraph 7.4). If the light flashes, it means that the compressor is starting required but that a safety delay is in progress. This light stays on when the compressor has started.



• **To stop the unit:**

- Open the remote Off (stop) contact.
- The indicator lights of compressors (6) and (8) go off and the message "E00" is displayed.
- The water circulating pump stops after 1 minute.

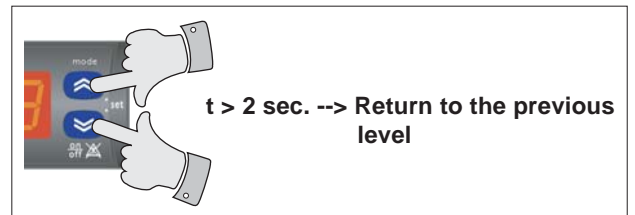
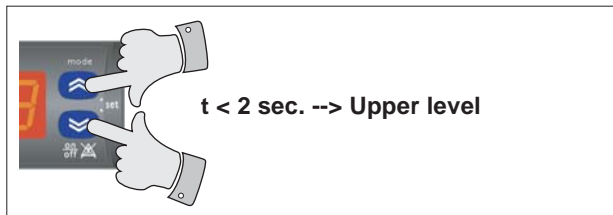
Note: the unit can be shut off locally by pressing and holding the "ON/OFF" button for 2 seconds. Locally-controlled shut-off has priority over the remote control command. The display unit is off at this time (except for the "decimal" point which remains illuminated).



7.6 - PARAMETERS - DISPLAYING AND ADJUSTING

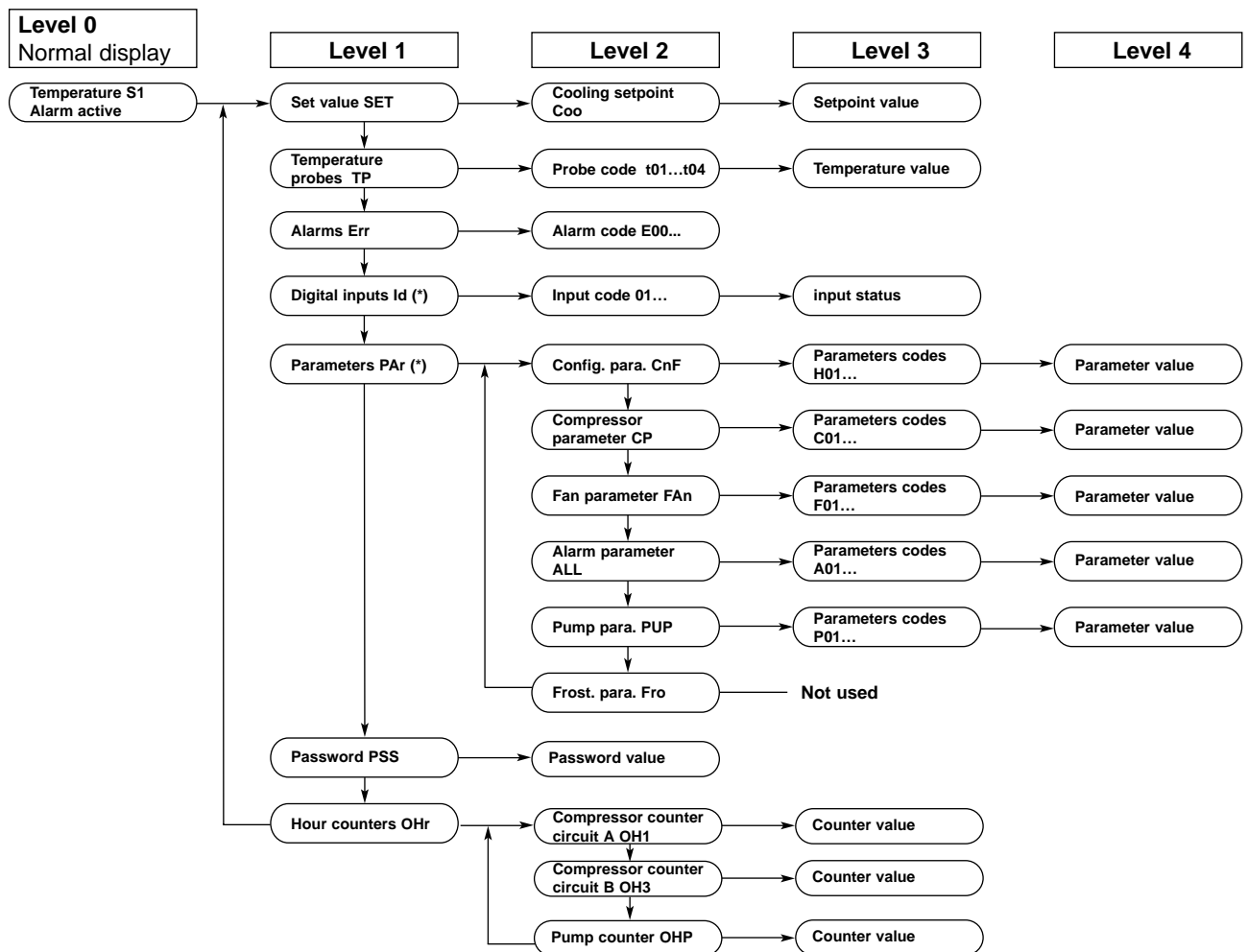
7.6.1 - GENERALITIES

- Parameter access is structured within a multi-level menu, see the diagram below. Simultaneously pressing the "ON/OFF" (1) and "Mode" (2) buttons for a brief moment (less than 2 seconds) gives access to the next level. Simultaneously pressing for a long moment (longer than 2 seconds) turns you to the previous level.



- Button (1) or button (2) is used to scroll through the entries ("Label") within the same level or to increase or decrease a parameter value.

7.6.2 - PARAMETERS ACCES DIAGRAM



(*) Accessible to qualified personnel only after entering the password (PSS).

Note 1: Indicator lamps (6) and (8) flash when levels 1 and above are accessed.

Note 2: The normal display (level 0) returns automatically after 5 minutes if no buttons are pressed.

7.6.3 - SET POINT ADJUSTMENT

- Simultaneously press buttons (1) and (2) for at least 2 seconds, "SET" is displayed.
- Press the 2 buttons again, "Coo" is displayed.
- Simultaneously press the 2 buttons again for 2 seconds. The setpoint value appears. If needed, modify the value with the buttons.
- Press the 2 buttons simultaneously to validate the setpoint.
- Return to the normal display by simultaneously pressing the 2 buttons for more than 2 seconds.

Code	Parameters	Factory setting (terminal units)	Adjustment range
Coo	Cooling set point	12° C	12 to 25° C

Reminder: control on the installation return temperature.

Note:

All units are factory configured and parameterized for optimum operation in the terminal unit application.

7.6.4 - DISPLAY OF TEMPERATURES, ALARMS, AND HOUR COUNTERS

Accessible directly via the menu, see diagram 7.6.2.

- Temperatures "TP":
Displays the values indicated by each temperature probe.
- Alarms "Err":
Displays the list of all current alarms (scroll through the alarm messages with buttons (1) and/or (2)).
- Hour counters "OHr":
Displays the operating time of the compressors on circuit A ("OH1"), and the compressors on circuit B ("OH3") and the circulating pump ("OHP"). The counter can be reset by a long press (> 2 seconds) on button (1) when the counter value is displayed.

7.6.5 - ACCESS TO THE TECHNICAL PARAMETERS "PAR"

For qualified personnel after entering the password "PSS". Any incorrect adjustment may lead to serious malfunctions.

- Go to the "PSS" section in the menu. Briefly and simultaneously press buttons (1) and (2). The "---" message appears. Display the password ("199") using buttons (1) and (2) and validate it by simultaneously pressing buttons (1) and (2). It is now possible to enter the parameters section "PAR".

CAUTION:

After modifying one or more technical parameters, the controller must be turned off then back on again to reset it with its new parameters.

7.7 - ALARMS

- When an alarm occurs:
 - the alarm report is activated,
 - the corresponding code flashes on the display unit. See table,
 - the unit stops if necessary (see table below).

- Remedy the fault.

IMPORTANT NOTE:

All work must be carried out by qualified, experienced personnel.

- **CAUTION:** the alarms:- HP,
 - LP (low pressure),
 - Anti-freeze,
 - Water flow rate,

normally with automatic reset, have an event counter that shifts the alarm to **manual** reset if the alarm occurs several times during the last hour.

- The alarms are reset by briefly pressing the "ON/OFF" button (1).
- When the alarm is cleared:
 - the alarm report is de-activated,
 - the display reverts to normal (not flashing),
 - the machine can re-start (if it was stopped).
- **Note: Alarms are active in off mode.**
- **Special features of the alarm report:**
 - Potential-free contact (2A resistive - 250 VAC) available on the terminal strip of the electric box. Contact open in case of alarm or loss of power supply.
 - This report's operating logic can be changed by changing parameter **H45** from **1** to **0**.
 - The alarm report can be activated in case of shutdown by remote contact by changing parameter **H72** from **1** to **0**.

SUMMARY TABLE OF ALARMS

Alarm	Code	Inhibition delay	Compressor stop		Fan stop		Water pump shutdown	Reset	Remarks
			A	B	A	B			
Water inlet temperature probe fault, Ai1	E40		X	X	X	X		A	
Water inlet temperature probe fault, Ai2	E06		X	X	X	X		A	
Outside temperature sensor fault, Ai4	E42		X	X	X	X		A	Force water pump operation
H.P. circuit A	E01		X		X			A/M	
H.P. circuit B	E21			X		X		A/M	
L.P. circuit A	E02	120" at start-up	X		X			A/M	
L.P. circuit B	E22	120" at start-up		X		X		A/M	
Thermic, compressor, circuit A	E03		X		X			M	See also reset of the corresponding circuit breaker
Thermic, compressor, circuit B	E23			X		X		M	
Thermic, fan, circuit A	E04		X		X			M	
Thermic, fan, circuit B	E24			X		X		M	
Anti-freeze (water heat exchanger)	E05		X	X	X	X		A/M	From probe Ai2 (water outlet) Threshold = 6° C
Water flow rate	E41	10" in operation 30" at start-up					X If manual reset	A/M	
Configuration error	E45		X	X	X	X	X		Consult the After-Sales Service Department
Water inlet temperature too high	E46	2'						A	Threshold = 35 °C
Shutdown by remote contact	E00		X	X	X	X	X	A	No alarm report with H72 = 1

A = Auto
M = Manual

7.8 - SPECIAL OPERATING FEATURES

• Water circulating pump control:

- the pump is actuated when the unit operating,
- the pump is stopped when the unit is stopped. The shut-down of the pump is delayed 1 minute after the compressor stops,
- the unit's electronic control features a frost protection device that automatically starts the water circulating pump depending on the outside temperature (threshold: 0°C), even if the unit is turned off.

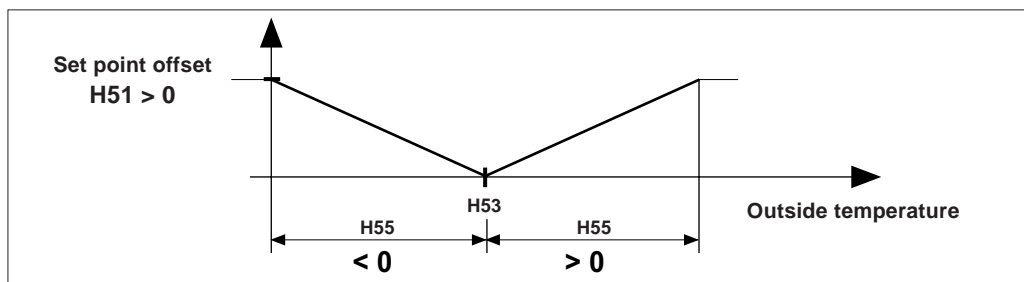
In the event of a faulty outside temperature sensor, circulating pump operation is forced, for safety reasons.

The "Water output" alarm (E41) stops the circulating pump when this alarm shifts to manual reset. In the event of a fault, the alarm report is actuated.

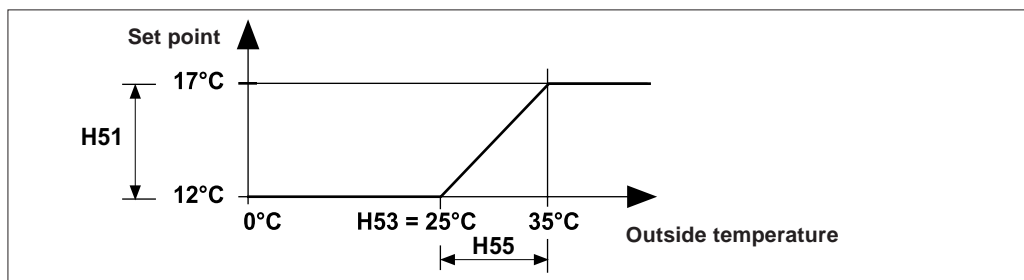
- **Pre-ventilation:**
 - in case of an operating request and in order to prepare the air exchanger, the fans are actuated approximately 20 seconds before the first compressor starts up.
- **Anti short-cycle time delays:**
 - the control of each cooling circuit features a time delay system in order to respect:
 - a maximum number of starts per hour (12),
 - a minimum stop time (150 seconds).
- **Starting the compressors:**
 - in order to reduce start-up currents:
 - the triggering of the 2nd cooling circuit is time delayed (10 seconds),
 - the triggering of the 2nd compressor of a cooling circuit is delayed (time delay unit on the compressor switch set at approximately 5 seconds).
- **Control hysteresis:**
 - see the operating diagrams in § 7.4,
 - the hysteresis of each stage in cooling mode is factory set at 1.5 k. Modification is possible. To do this, change parameter **C03** (cooling hysteresis) in the compressor section "CP",
 - the difference between the 2 stages is factory set at 1.5 k. Modification is possible. To do this, modify parameter **C05** in the compressor section "CP".
- **"Dynamic" set point:**
 - by changing **H50** from 0 to 1, an automatic setpoint compensation system is activated based on the outside temperature,
 - the following parameters allow the compensation slopes to be set:

Parameter	Designation	Factory setting
H51 =	Set point "offset" in cooling mode	5 k
H53 =	Outside temperature setting ("foot of slope") in cooling mode	25°C
H55 =	Proportional strip in cooling mode	+ 10 k

- **Principle:**



- **Example: Factory setting in cooling mode**



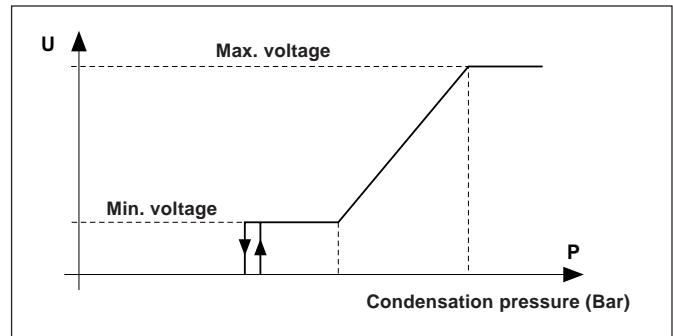
- **Adjustment of the value measured by the temperature probes ("Offset"):**

allows the difference between the value displayed and the verified value to be compensated.

Parameter	Probe offset	Units	Factory setting
H57	Probe Ai1 offset	Degree	0
H58	Probe Ai2 offset	Degree	0
H60	Probe Ai4 offset	Degree	0

8 - PROPORTIONAL CONDENSATION PRESSURE CONTROL OPERATION

- The unit is equipped with a separate condensation pressure control device.
- 1 voltage selector per refrigeration circuit for the power supply of the electric fans.
- Based on the information gathered by the specific pressure sensors, the control varies the supply voltage of the electric fans in accordance with the diagram opposite.
- Factory-set for optimal operation. For all other settings, consult us.
- The variable regulators are mounted inside the electric box.



9 - MAINTENANCE

IMPORTANT :

Before carrying out any work on the machine, make sure that it is switched off and that access to it is prevented. Any work must be carried out by personnel qualified and authorised to work on this type of machine.

GENERAL MAINTENANCE:

All equipment must be properly maintained in order to provide optimum performance over time. Faulty maintenance can result in the cancellation of the product warranty. Depending on the products, maintenance operations consist in the cleaning of filters (air, water), internal and external exchangers, casings, and the cleaning and protection of condensate tanks. Treating odours and the disinfection of room surfaces and volumes also contributes to the cleanliness of the air breathed by users.

TECHNIBEL proposes a wide range of perfectly adapted professional cleaning, maintenance and repair products for complete and efficient maintenance. For an optimum result, TECHNIBEL air-conditioners must be maintained with TECHNIBEL maintenance products.

9.1 - PERIODIC CHECKS

- **Carry out the following operations at least once a year** (the frequency depends on the installation and operating conditions):
 - Cleaning the air exchanger.
 - Checking the wear parts.
 - Checking the operating set points and temperatures.
 - Check the refrigerant circuit in accordance with the regulations in force.
 - Checking the safety devices.
 - De-dusting the electrical equipment cabinet.
 - Checking that the electrical connections are secure.
 - Checking the earth connection.
 - Check for leaks.
 - Check the operation and parameters as per the start-up data sheet.
 - Check the hydraulic circuit in accordance with standard trade practices (output, pressure, purge the circuit and particularly the pump – see paragraph 6.3, filter cleaning).
 - Check that the safety valve operates correctly.

9.2 - REFRIGERANT CIRCUIT RECOMMENDATIONS

- A new filter dryer must be installed after all servicing operations performed on the refrigerant circuit.

9.2.1 - MAINTENANCE

- Prior to all servicing or other actions on the equipment, installation, commissioning, operation, or maintenance, the personnel in charge of these operations shall become familiar with the instructions and recommendations provided in the installation manual of the unit as well as the elements of the project's technical file.
- The unit must be installed, started, maintained and repaired by qualified servicing personnel in compliance with the requirements of all directives, laws and regulations and in accordance with standard trade practices.
- During installation, troubleshooting and maintenance operations, the use of pipes as a step: under the stress, the pipe may rupture and the refrigerant may cause serious burns.
- During unit maintenance operations, the composition and the condition of the coolant will be checked, as well as the absence of all trace of refrigerant.
- During the unit's annual seal test, in accordance with the law, check that the high and low-pressure pressure controllers are correctly connected on the refrigerating circuit and that they disconnect the electrical circuit in case of tripping.
- During maintenance operations, make sure that there is no trace of corrosion or oil stains around the refrigerating components.
- Prior to all maintenance and servicing on the refrigerating circuit, one must first shut down the unit then wait a few minutes before installing temperature or pressure sensors. Certain equipment, such as the compressor and piping, may reach temperatures above 100°C and high pressures may lead to serious burns.

9.2.2 - TROUBLESHOOTING

- All maintenance and servicing operations on the refrigerating circuit must be conducted in accordance with standard trade practices and safety rules: recovery of the refrigerant, inert shielded (nitrogen) brazing, etc...
- All brazing operations must be conducted by qualified welders.
- For equipment charged with R 407 C, refer to the specific instructions in the installation manual.
- This unit is equipped with pressurized equipment, for example piping. Use only genuine parts listed in the spare parts list for replacing defective refrigeration components.
- Pipes may only be replaced by copper tubing in compliance with standard NF EN 12735-1.
- Leak detection, in the case of pressure testing:
 - Never use oxygen or dry air, as the risk of fire or explosion is present
 - Use dehydrated nitrogen or a nitrogen and refrigerant mix indicated on the manufacturer's plate
 - The test pressure, low and high pressure, must not exceed 20 bar and 15 bar in the case where the unit is equipped with the pressure gauge option.
- For high pressure circuit pipes made with copper tubing having a $\varnothing =$ or $> 1\frac{5}{8}$, the supplier will be requested to submit a certificate § 2.1 in accordance with standard NF EN 10204, which will be filed in the installation's technical file.
- All part replacement with other than genuine parts, all modifications of the refrigerating circuit, all replacement of refrigerant by a fluid other than that indicated on the manufacturer's plate, all use of the unit outside the application limits defined in the documentation, shall result in the cancellation of PED CE marking compliance which shall fall under the liability of the individual who carried out these modifications.

START-UP DATA SHEET

CMHGV	Range CMHGV 2101 to 2140		
Code:			
Serial Number:			
Started by:	Company:	Site:	Date:
Voltage measured on unit	V	L1-L2	L2-L3
		L3-L1	
FANS			
Measured amperage circuit A - Fan 1	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
Measured amperage circuit A - Fan 2	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
Measured amperage circuit B - Fan 1	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
Measured amperage circuit B - Fan 2	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
COMPRESSORS			
Measured amperage circuit A - Comp 1	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
Measured amperage circuit A - Comp 2	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
Measured amperage circuit B - Comp 1	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
Measured amperage circuit B - Comp 2	A/phase	L1	L2
Circuit breaker thermal setting	A		L3
HEAD PRESSURE CONTROL			
setting			
SENSORS (see control sheet)			
Water temperature control sensor positioned in:	Inlet	Outlet	
TEMPERATURES (°C) / PRESSURES (bar)			
Outside temperature			
Water type	Pure	Glycol water	% Glycol
Water inlet, generator			
Water outlet, generator			
Water circuit pressure			
Water flow rate			
ΔT :			
	Circuit A	Circuit B	
Suction, compressor			
Discharge, compressor			
Inlet, thermostatic expansion valve			
Outlet, thermostatic expansion valve			
Condensing pressure			
Evaporating pressure			
Superheating = (Compressor suction temperature - Evaporating temperature) = 7 to 8°C			
Sub-cooling = (Condensating temperature - Expansion valve inlet temperature) = 3 to 5°C			

START-UP DATA SHEET

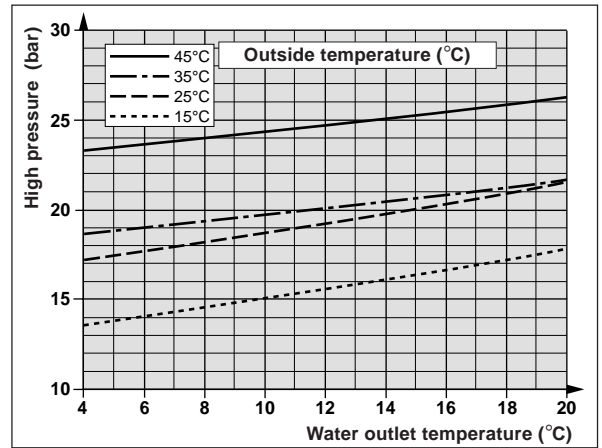
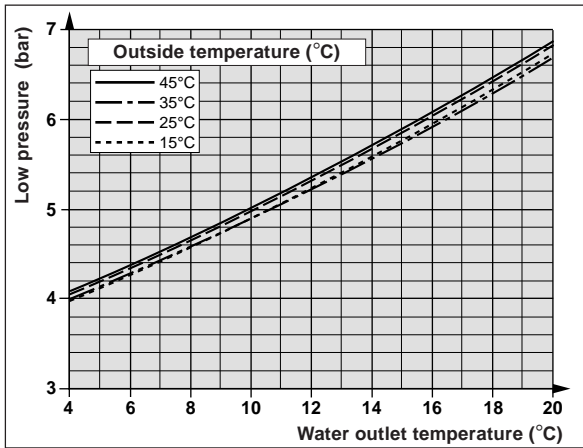
CMHGV	ECH PARAMETER SETTINGS				
Code:	Standard application				
Serial Number:					
Started by:	Company:	Site:	Date:		
Parameter	Min.	Max.	Unit	Factory value	Setting
G01 - Cooling set point	12	25	°C/°F	12	
H03 - Max. cooling set point limit	12	99	°C/°F	25	
H04 - Min. cooling set point limit	-40	12	°C/°F	12	
H45 - Alarm report polarity	0	1	flag	1	
H50 - "Dynamic set point" validation	0	1	flag	0	
H51 - Cooling "dynamic set point" offset	-50	80	°C/°F	5	
H53 - Cooling "dynamic set point" setting	-127	127	°C/°F	25	
H55 - Cooling "dynamic set point proportional strip	-50	80	°C/°F	10	
H57 - Probe Ai1 offset	-12.70	-12.70	°C/°F	0	
H58 - Probe Ai2 offset	-12.70	-12.70	°C/°F	0	
H60 - Probe Ai4 offset	-12.70	-12.70	°C/°F	0	
H64 - Temperature measurement unit (°C/°F)	0	1	flag	0	
H65 - Family series address (for communication)	0	14	num	0	
H66 - Device series address (for communication)	0	14	num	1	
H72 - Remote alarm report deactivation - to OFF	0	1	flag	1	
A01 - LP alarm disabling time	0	255	sec	120	
A02 - Number of events/hour, LP alarm	0	255	num	3	
A06 - Number of events/hour, water output	0	255	num	2	
A11 - Anti-freeze alarm set point	-127	127	°C/°F	3	
A12 - Anti-freeze alarm hysteresis	0	25.50	°C/°F	2	
A13 - Number of events/hour, anti-freeze alarm	0	255	num	2	
A15 - Max. alarm setpoint Water inlet temperature	-127	127	°C/°F	35	
A18 - Number of events/hour, HP alarm	0	255	num	3	
C03 - Control hysteresis in cooling mode	0	25.50	°C/°F	1,5	
C05 - Difference between stages	0	25.50	flag	1,5	
P01 - Water pump configuration (0 = permanent operation)	0	1	num	0	

10 - REFRIGERANT PRESSURE CURVES

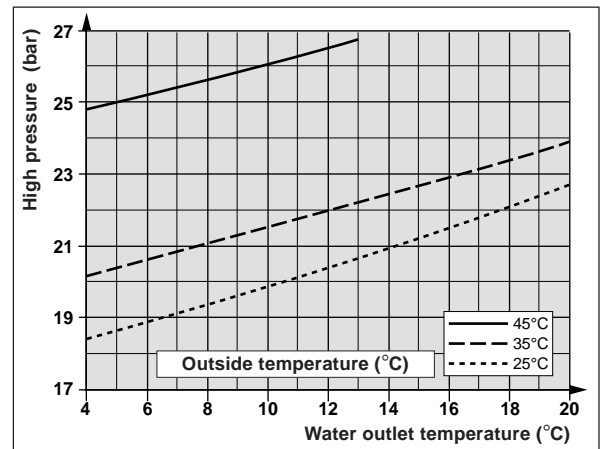
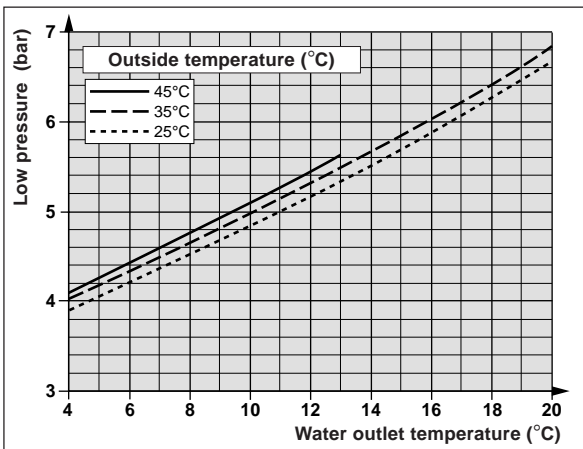
LOW PRESSURE

HIGH PRESSURE

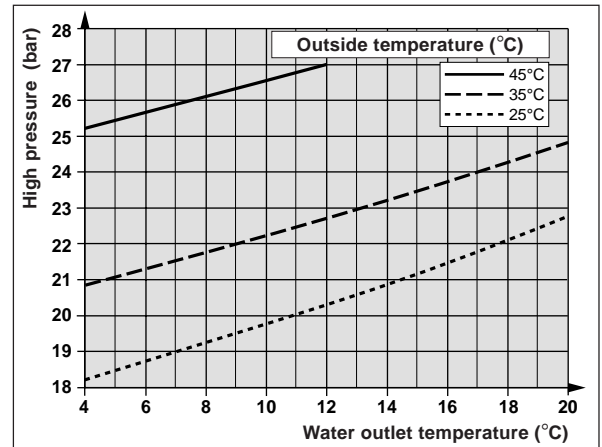
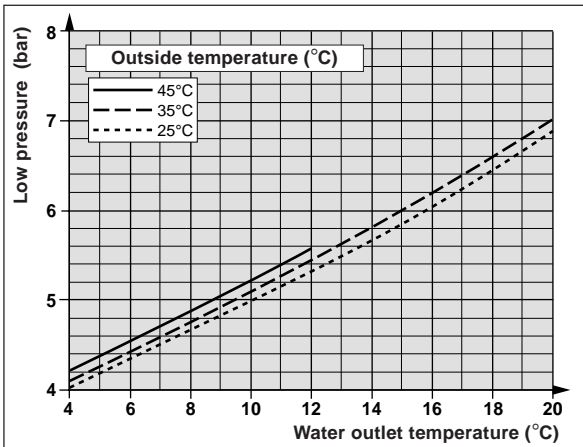
CMHGV
2101



CMHGV
2124



CMHGV
2140





Due to our policy of continuous development, our products are liable to modification without notice.

Technibel

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