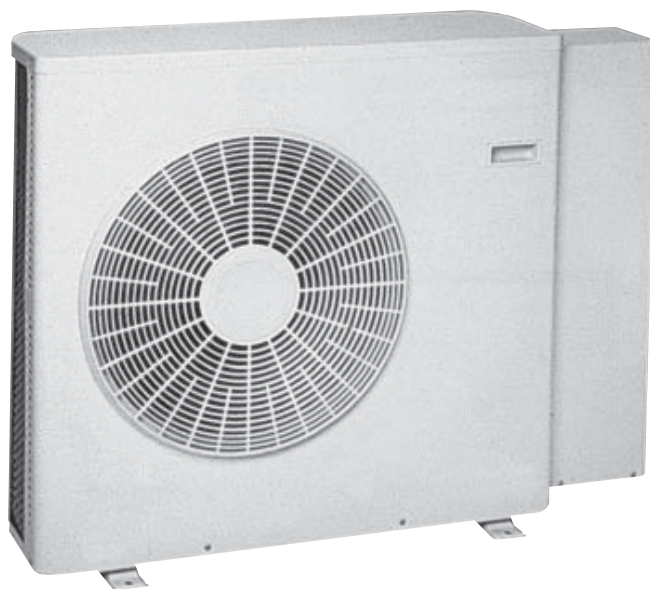


INSTALLATION INSTRUCTIONS

PMERV 5



AIR COOLED WATER CHILLER HEAT PUMP

R 407 C refrigerant

CE MARKING

This product marked **CE** 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.



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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 (for "split systems", refer to the installation instructions as the charge must consider the length of the connecting lines),
 - IMPORTANT: see paragraph 3.
- 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)**.

The installation must be specially designed in order to respect local noise regulations.

1 - GENERAL

1.1 - GENERAL SUPPLY CONDITIONS

- Generally speaking, the material is transported at the consignee's risk.
- The consignee must immediately provide the carrier with written reserves if he finds any damage caused during transport.

1.2 - RECOMMANDATIONS

- 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 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.

1.3 - VOLTAGE

- Before carrying out any operation, check that the voltage indicated on the unit corresponds to the mains voltage.

1.4 - USE OF EQUIPMENT

- This heat pump is designed for **heating/cooling floor** type installations.

1.5 - OPERATING CONDITIONS

- Refer to the nominal conditions and operating limitations in the technical manual.

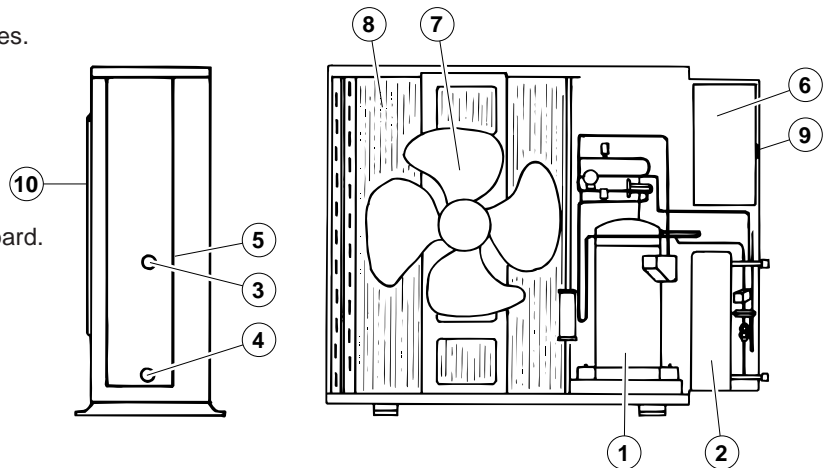
2 - PRESENTATION

2.1 - DESCRIPTION

- 1 - Sound-proofed hermetic compressor.
- 2 - Water exchanger with stainless steel plates.
- 3 - Water outlet connector.
- 4 - Water inlet connector.
- 5 - Hole for connecting cables.
- 6 - Electrical box.
- 7 - Fan motor.
- 8 - "Plate-Fin" air heat exchanger.
- 9 - Microprocessor control unit display keyboard.
- 10 - Fan protection plastic grille.

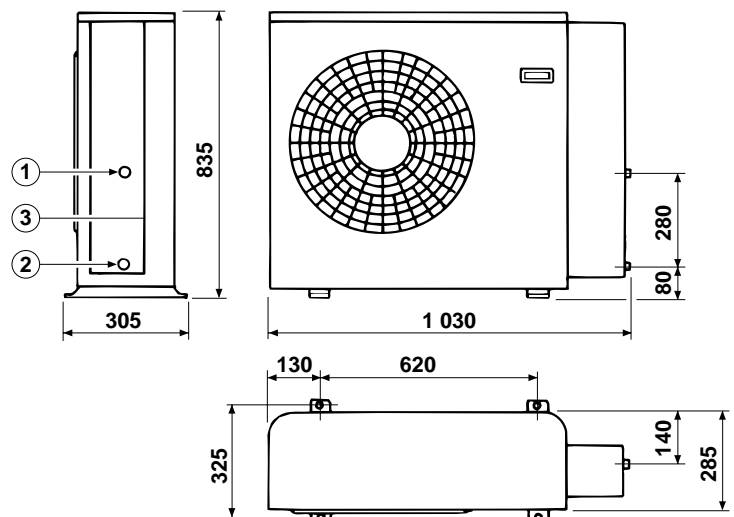
Materials:

- Copper piping.
- Painted sheet metal cabinet.
- Copper/aluminium exchanger.
- Plastic grille.



2.2 - DIMENSIONS AND WEIGHT

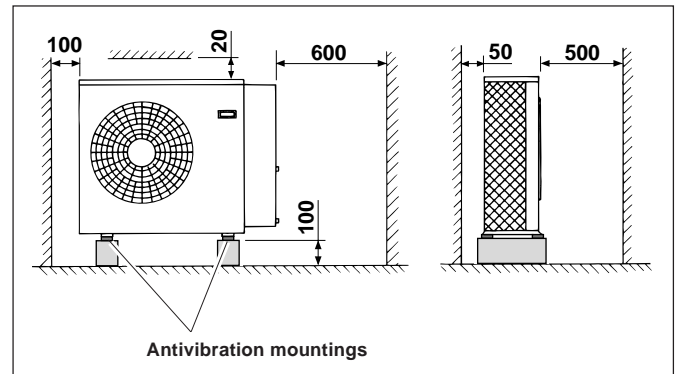
1	Connection 3/4" (male) - water outlet
2	Connection 3/4" (male) - water inlet
3	Holes for electric cables



	PMERV 5
Weight (kg)	70

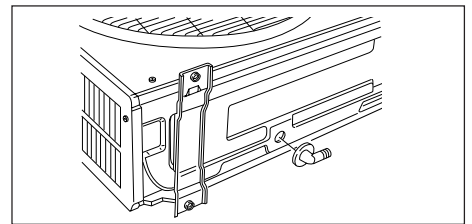
3 - INSTALLATION

- Safety index: IP 24.
- Select the location for the unit on the basis of the following criteria:
 - the unit must be installed outside,
 - the unit must not be installed near the following:
 - . sources of heat,
 - . combustible materials,
 - . return/air intake of an adjacent building,
 - it is necessary to make sure that the free space around the unit is provided (see the minimum dimensions on the drawing opposite),
 - installation must be simple and make maintenance work easy,
 - the unit must be fixed on a hard base and must be protected from risks of flooding, (we recommend that the unit be raised approximately 100 mm off the ground to facilitate the installation of condensate drainage tubing, as required),
 - use the anti-vibration mountings supplied, making sure that they are not compressed too much when the fastening screws are tightened,
 - the blown air must not be directed towards surrounding windows,
 - vibrations and noise must not be transmitted to a nearby building,
 - avoid:
 - . excessive exposure to salty air or sulfuric gas,
 - . 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.



DRAINAGE OF CONDENSATES

- If necessary, use the accessory part supplied to connect the condensate drainage tube.
- The base has 2 drainage holes (one on each side).
- For condensate drainage, place the splined elbow in one of the holes, depending on the unit's inclination or the preferred side, and plug the other hole with the plastic cover.
- In this case, the tank and the drain line must be protected against freezing risks.



4 - CONNECTIONS

4.1 - HYDRAULIC CONNECTION

- Connect the water pipes to the corresponding connections. Refer to \varnothing and placement page 3.
- Install the hydraulic filter (supplied) on the water intake. Connect it using 2 isolation valves for cleaning purposes.

Note:

- Insulated "flexible water pipes" accessories 1 metre in length can be used:
- \varnothing 3/4" code K 60 L 054 Z.

4.2 - ELECTRICAL CONNECTION

4.2.1 - GENERAL

- The acceptable voltage variation is: $\pm 10\%$ during operation.
- The electrical connection conduits must be fixed.
- Use the cable clamps located inside the switch box.
- Class 1 unit.
- The electrical installation must comply with the standards and regulations applicable where the unit is being installed (in particular NF C 15-100 \simeq CEI 364).

4.2.2 - POWER SUPPLY

- 230 V / 1 / 50 Hz.
- The power supply must come from an isolation and electric protection device (not supplied) in accordance with existing regulations. The installation must be protected by a **20A double-pole circuit-breaker** (not included).

Note: The unit is designed to be connected to a power supply having a TT neutral regime (neutral to ground) or TN.S regime (to neutral) as per NF C 15-100.

POWER SUPPLY CABLE

- Section : 3 G 2.5 mm².
- This section is given as an indication only.
It should be checked and adapted, if necessary, according to installation conditions.
- Make the electrical connections to the terminal board as per the electrical diagrams.

CURRENT

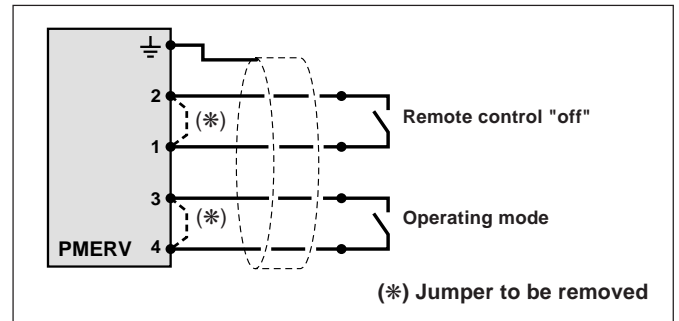
		COOLING mode	HEATING mode
Nominal current	A	7.8	6.4
Max. current	A	9.6	8
Starting current	A	45	45

4.2.3 - REMOTE CONTROL

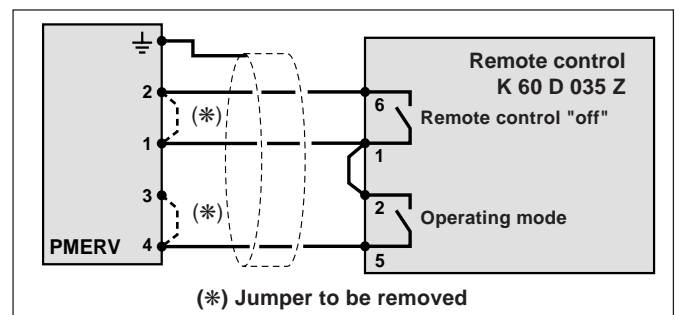
- The unit is factory-wired for heating mode operation. Operating control of unit is possible by connecting 2 potential-free, high-quality external switches (not included):
 - 1 for the remote On/Off signal(contact closed = operation authorized, contact open = off),
 - 1 for change-over of the operating mode (contact closed = heating mode, contact open = cooling mode).
- The On/Off signal is connected to terminals 1 and 2 of the PCB located in the switch box (remove the existing bridge - see diagram).
- The mode change-over signal is connected to terminals 3 and 4 of the PCB (remove the existing bridge - see diagram).
- The wiring of these contacts must not be routed near power cables in order to avoid electromagnetic disturbances.
- Use shielded cable.
- Max. connection cable length: 20 m.
- Minimum wire size: 0.25 mm².

WARNING:

Mode changes (heating/cooling) are to be performed with the unit shutdown.



The "Remote control unit, K 60 D 035 Z" can perform this function.

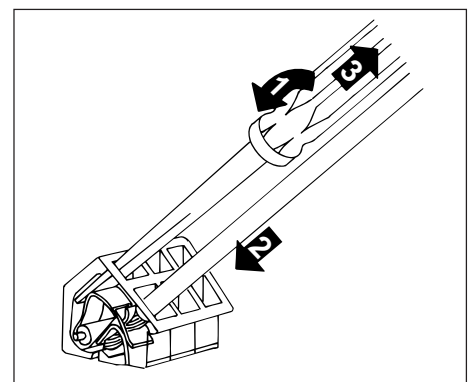


4.2.4 - MISCELLANEOUS

- Alarm transfer:**
Potential-free, closing contact (2A - 250 VAC max.) located on the PMERV terminal board (terminals 5 and 6 of the PCB) for remote signaling. See electrical diagrams.
- Water circulating pump control:**
Do not use this contactor for the underfloor "Heating/cooling" application.

4.2.5 - PCB CONNECTION DETAILS

- Note:** The terminals are of the "cage with spring" type. Follow the indications below to connect them.
 - These terminals take the following wires:
 - . rigid,
 - . flexible (avoid splicing the strands!),
 - . with ends.
 - A single conductor per securing point.
 - Make sure that the wires are correctly connected to the terminal board. Incorrect connection can cause operating problems as well as overheating which can cause fires.



5 - OPERATION OF "COMPACT" μ CHILLER ELECTRONIC CONTROL

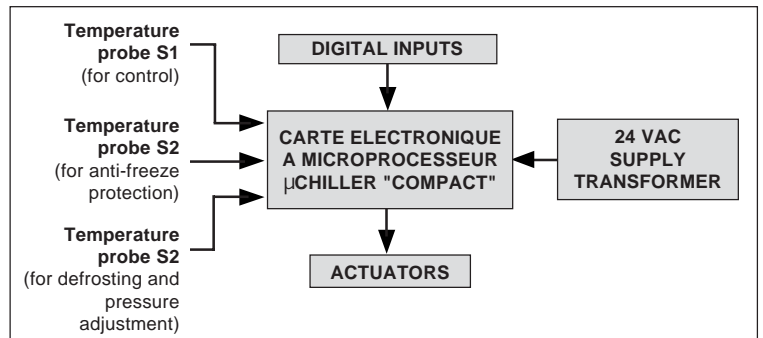
- See wiring diagram page 11.

5.1 - 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.

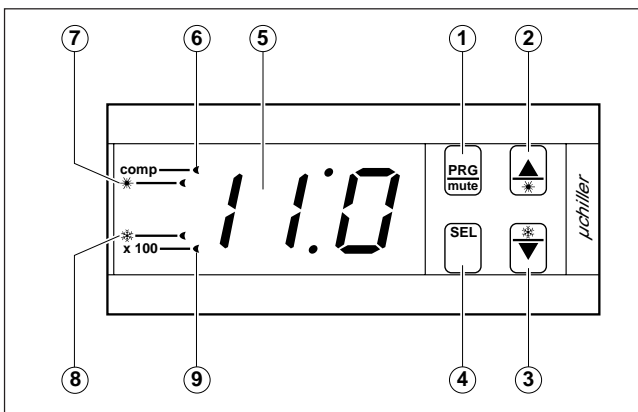
5.2 - PRINCIPLE

- The microprocessor controls the operation of the machine and of the associated alarms. It continuously compares the water temperature measured by a probe (S1) and the setpoint temperature value entered via the keyboard. Each operating request produced by the control unit is indicated by the light (6) (see below). This light flashes if a safety delay is in progress. It stays on when the compressor is operating.
- The **control** probe S1 is located on the **water inlet** in the factory.



5.3 - PRESENTATION

5.3.1 - DISPLAY KEYBOARD



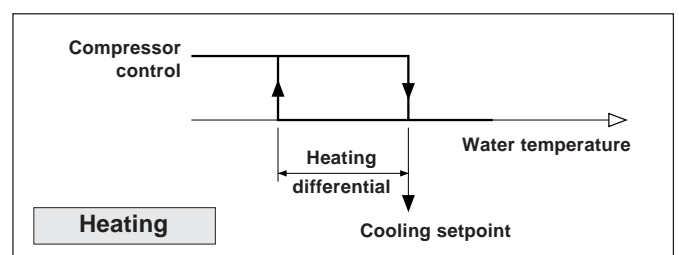
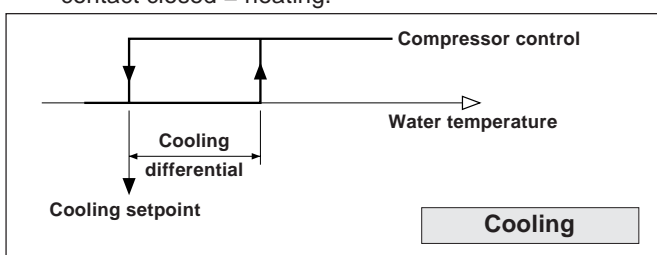
- ① Key for:
 - Return to normal display/validation of parameters,
 - Stopping audible alarm.
- ② Key for:
 - Cooling mode operation ("Summer").
 - Incrementation of parameters.
- ③ Key for:
 - Heating mode operation ("Winter").
 - Decrementation of parameters.
- ④ Key for access to parameters.
- ⑤ LED display.
- ⑥ Compressor "ON" light.
- ⑦ Cooling light ("Summer").
- ⑧ Heating light ("Winter").
- ⑨ Compressor operating hours x 100 light.

5.3.2 - CTN TYPE TEMPERATURE PROBE

Temperature (°C)	Ohmic value (Ohm)
-20	67 740
-10	42 250
0	27 280
10	17 960
20	12 090
25	10 000
30	8 310
40	5 820
50	4 160
60	3 020
70	2 220

5.4 - OPERATING MODES

- The machine is wired in the factory to operate in heating mode.
- The operating mode (heating/cooling) can be switched remotely by connecting one external contact **not supplied** connected to the PMERV (see paragraph 4.2.3 for details):
 - contact open = cooling,
 - contact closed = heating.



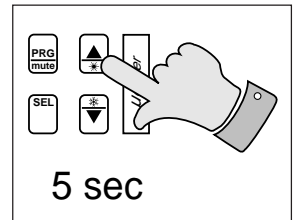
5.5 - STARTING

• Initial condition:

- Machine hydraulically and electrically connected ready to operate.
- Operating mode remote changeover switch is in required position (heating or cooling).
- The remote On/Off contact is open (off).
- Turn the installation on.
- The display comes on and shows the water temperature (read by the control probe S1).
- Close the possible remote on/off contact (not supplied) if it is not connected (see paragraph 4.2.3).
- The indicator lamp corresponding to the selected mode lights up:
 - indicator lamp (7) : Cooling,
 - indicator lamp (8) : Heating.
- The compressor "ON" indicator light (6) comes on if necessary (see diagram paragraph 5.4). 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 On/Off contact (in this case, restart is automatic as soon as this contact is closed).
The operating mode indicator lights (7) and (8) and the compressor operation light (6) go off.
- It is possible to stop and restart the current mode (selected remotely) by pressing the ▲ key (2) for the cooling mode or the ▼ key (3) for the heating mode.

NOTE:

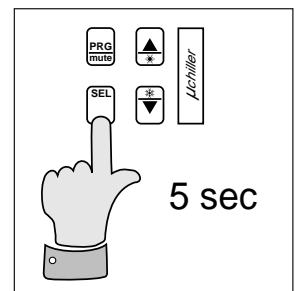
The controller's anti-short cycle system requires that the compressor operate for a minimum amount of time. If the machine should stop, the compressor may continue to function for a certain amount of time (150 seconds max.).



CAUTION: Changing the operating mode (heating/cooling) must only be done when the machine is stopped.

5.6 - ADJUSTING AND DISPLAYING THE PARAMETERS

- Parameters accessible by pressing the SEL (4) key for 5 seconds.
- The display displays the code of the 1st parameter on the list ("r1" - see below).
- By pressing the ▲ (2) or ▼ (3) keys, scroll through the parameter codes until you reach the one you want.
- Press SEL (4) to find out the value of the corresponding parameter.
- The value of the parameter can if necessary be changed using the ▲ (2) and ▼ (3) keys.
- Press SEL (4) to re-display the parameter codes.
- **To store the parameters which have been changed** and to exit the adjustment procedure, **press the PRG (1) key**. If during the adjustment procedure no key is pressed for 60 seconds (this period is indicated by the display flashing), the system **automatically** reverts to normal operation and display **without storing** the latest parameter changes.

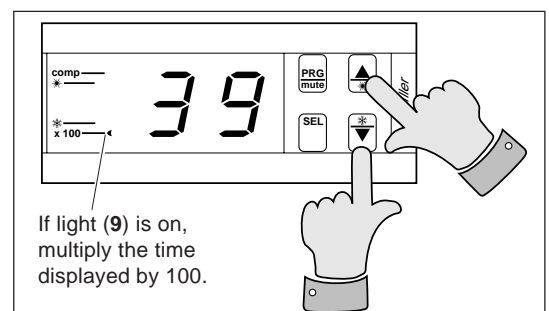


Code	Parameters	Factory setting	Installation setting	Adjustment range	Remarks
r 1	Set point Cooling ("Summer")	22 °C		10 to 30°C	Probe located on water return
r 2	Differential Cooling	2 k		0.3 to 19.9 k	
r 3	Set point Heating ("Winter")	35°C		25 to 45°C	
r 4	Differential Heating	2 k		0.3 to 19.9 k	
r 6	Water heat exchanger temperature (Probe S2 for anti-freeze)	-	-	-	Display only
r 8	Air heat exchanger temperature (Probe S3)	-	-	-	
c 9	Compressor hour meter	-	-	-	
c C	Pump hour meter	-	-	-	

- The hour meters are zeroed by pressing simultaneously on the ▲ (2) and ▼ (3) keys.

• Note:

The configuration and parameterization of each machine are factory-set for optimal "Cooling/Heating Floor" operation.



5.7 - ALARMS

- When an alarm occurs:
 - the bell rings (2 A closing contact - 250 VAC max.),
 - the display flashes and the alarm message appears cyclically (see table below),
 - the machine stops if necessary (see table below).
- Remedy the fault.

Important note: any work must be done by qualified, experienced person.
- The alarm is cancelled automatically when the fault is cleared.

NOTE: If the circulation pump control is used, the "Water output" alarm may need to be reset manually by simultaneously pressing the ▲(2) and ▼(3) keys.
- At that moment:
 - the alarm report is de-activated,
 - the display reverts to normal (no flashing),
 - the machine can re-start (if it was stopped).

SUMMARY TABLE OF ALARMS

(*) Factory settings

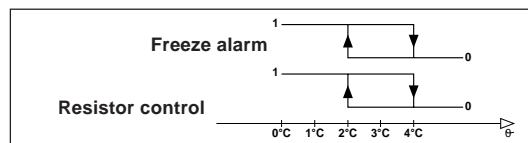
Alarm	Message	Inhibition delay (*)	Threshold (*)	Cancellation	Machine stop	Pump stop	Report	Remarks
Fault on probe 1	E1	-	-	Auto	X		X	
Fault on probe 2	E2	-	-	Auto	X		X	Actuates anti-freeze resistors
Fault on probe 3	E3	-	-	Auto	X		X	
Water flow rate	FL	30" on start-up 10" in operation	-	Auto	X	X	X	Alarm enabled if pump running
H.P. (unused)	H1	-	Pressure switch	Auto	X		X	Fan time delay, stopped 1'
L.P.	L1	150" on start-up	Pressure switch	Auto	X		X	
Water heat exchanger frozen	A1	-	2°C	Auto	X		X	
Defrosting too long	r1	-	10 mn	Auto	-	-	-	Self-cancellation with correct defrosting cycle
Compressor maintenance	n1	-	10 000 h	Manual				
Memory error	EE EP	-	-	According to seriousness of fault	According to seriousness of fault	According to seriousness of fault	According to seriousness of fault	After-sales department operation to renew parameters or change the electronics
Min. voltage supply control	EU	-	-	Auto	According to seriousness of fault	According to seriousness of fault	According to seriousness of fault	
Max. voltage supply control	EO	-	-	Auto	X	X	X	
Interference on supply control	EL	-	-	Auto	-	-	-	Ventilation on high speed

NOTE: The alarms are not activated when the machine is off (except for probe and memory faults).

5.8 - SPECIAL OPERATING FEATURES

5.8.1 - ANTI-FREEZE PROTECTION OF WATER HEAT EXCHANGER

- 2 functions performed:
 - control of a heating resistor,
 - anti-freeze alarm stopping the machine.
- Operating diagram (see opposite).



The setting of these thresholds can be changed in the factory on request to suit the machine's operating conditions.

5.8.2 - REMOTE CONTROL

- Do not use this contactor for the "Heating/cooling floor" application.

5.8.3 - REMOTE CONTROL

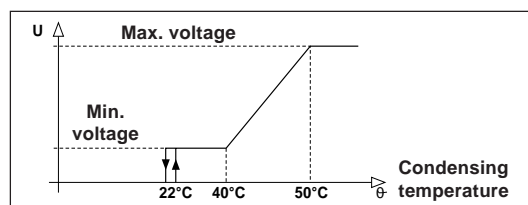
- See details in paragraph 4.2.3.

5.8.4 - POWER CUT

- If the power is cut to the control circuits, the electronic control unit returns to the operating mode it was in before the power was cut and the parameters are still stored in memory when the power is restored.

5.8.5 - HEAD PRESSURE CONTROL

- The PMERV 5 comes with a factory-installed specific voltage control board, controlled directly by the μCHILLER electronic control device.
- On the basis of temperature information (taken by the probe S3 located on the condenser), the control unit varies the fan's supply voltage according to the diagram opposite.
- This system is operational in cooling mode.



5.8.6 - DEFROSTING (In heating mode only)

- The control is regulated to operate as follows:
 - If the temperature detected by probe S3 is less than -3°C (for at least 10 seconds), the machine starts de-icing (switching of cooling cycle and stopping of fan) until the temperature read by S3 rises to +7°C. (However, the duration of a de-icing phase is limited to 10 minutes. If de-icing is stopped by this time delay, alarm "r1" appears on the display).
A period of 40 minutes must pass before a new de-icing phase can start.
- For special operating conditions, it may be necessary to change these settings. In this case, contact the after sales service.

NOTE: Message "d1" appears on the display during the defrosting phase.

5.8.7 - CYCLE INVERSION VALVE

- The valve is activated in **cooling mode**.

6 - STARTING

IMPORTANT NOTE

**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.**

6.1 - CHECK:

- That hydraulic connections are properly tight and that the hydraulic circuit functions correctly:
 - purge of 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. Terminals that are poorly tightened may cause overheating and malfunctions.
- That the electric cables are well insulated from any sections of sheet metal or metal parts which could damage them.
- 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 units.

6.2 - STARTING-UP THE UNIT

- Turn the water on.
- Power up the unit.
- Start the appliance (see previous paragraph).

6.3 - CHECKS TO BE MADE

- Water flow-rate.
 - **Note:** The PMERV water output must be permanent (particular attention should be paid in the case of control of the terminal units on 2-way valve).
- Hydraulic circuit pressures.
- Cooling circuit pressures.
- Control system operation.

IMPORTANT:

- **If antifreeze is added (monopropylene glycol), a minimum rate of 15% to 20% is needed to avoid any risk of corrosion.**
- The LP controller (standard, factory installed) cuts off at 0.5 bar (automatic reset).
- The HP controller (accessory, not factory installed) cuts off at 29 bar (manual reset).

7 - MAINTENANCE INSTRUCTIONS

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.

IMPORTANT NOTE

- **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.**
 - **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.**
-
- **Carry out the following operations at least once a year** (the frequency depends on the installation and operating conditions):
 - Check for leaks on the refrigerating circuit.
 - Check for traces of corrosion or oil stains around the refrigerating components.
 - Inspect the composition and the condition of the coolant and check that it does not contain traces of refrigerating fluid.
 - Cleaning the exchangers.
 - Checking the wear parts.
 - Checking the operating instructions and points.
 - Check the safety devices: particularly check that the high and low-pressure controllers are properly connected on the refrigerating circuit and that they disengage the electrical circuit if triggered.
 - De-dusting the electrical equipment cabinet.
 - Checking that the electrical connections are secure.
 - Checking the earth connection.
 - Check the hydraulic circuit (clean the filter, water quality, etc...).

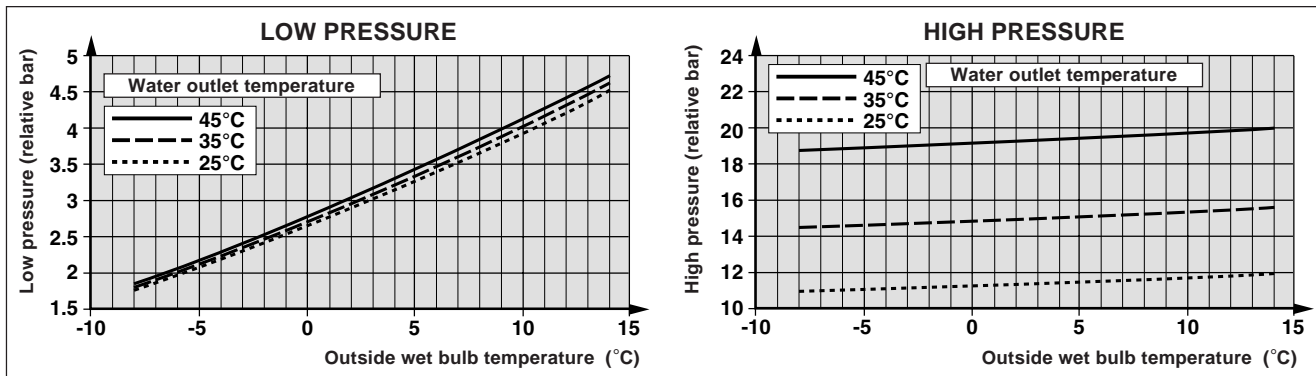
8 - TROUBLESHOOTING

- 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 loaded with R 407 C, refer to the specific instructions at the beginning of 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.
- The technical information, relative to the safety requirements of the various applicable directives, is indicated on the manufacturer's plate of the unit and mentioned on the 1st page of this manual.

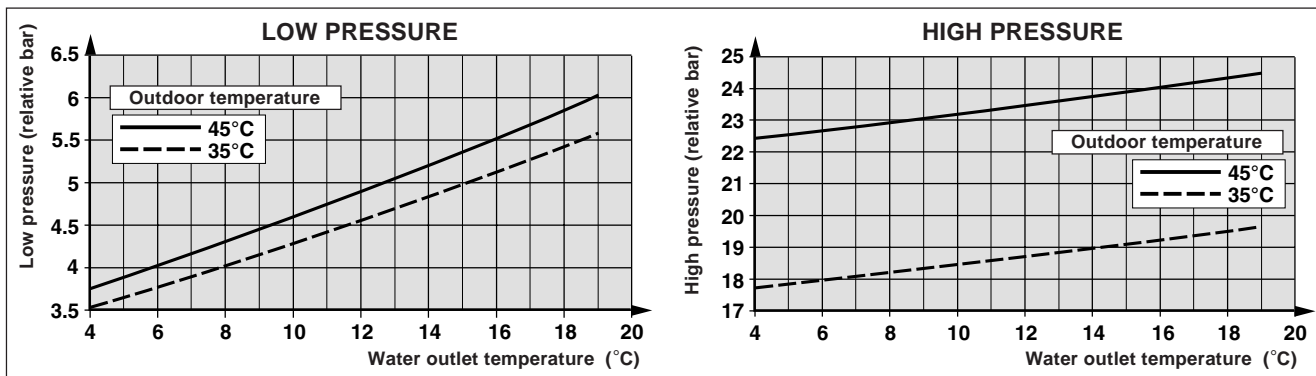
After any operation on the refrigerating circuit, you must fit a filter dryer: type 53 S.

9 - PRESSURE CURVES

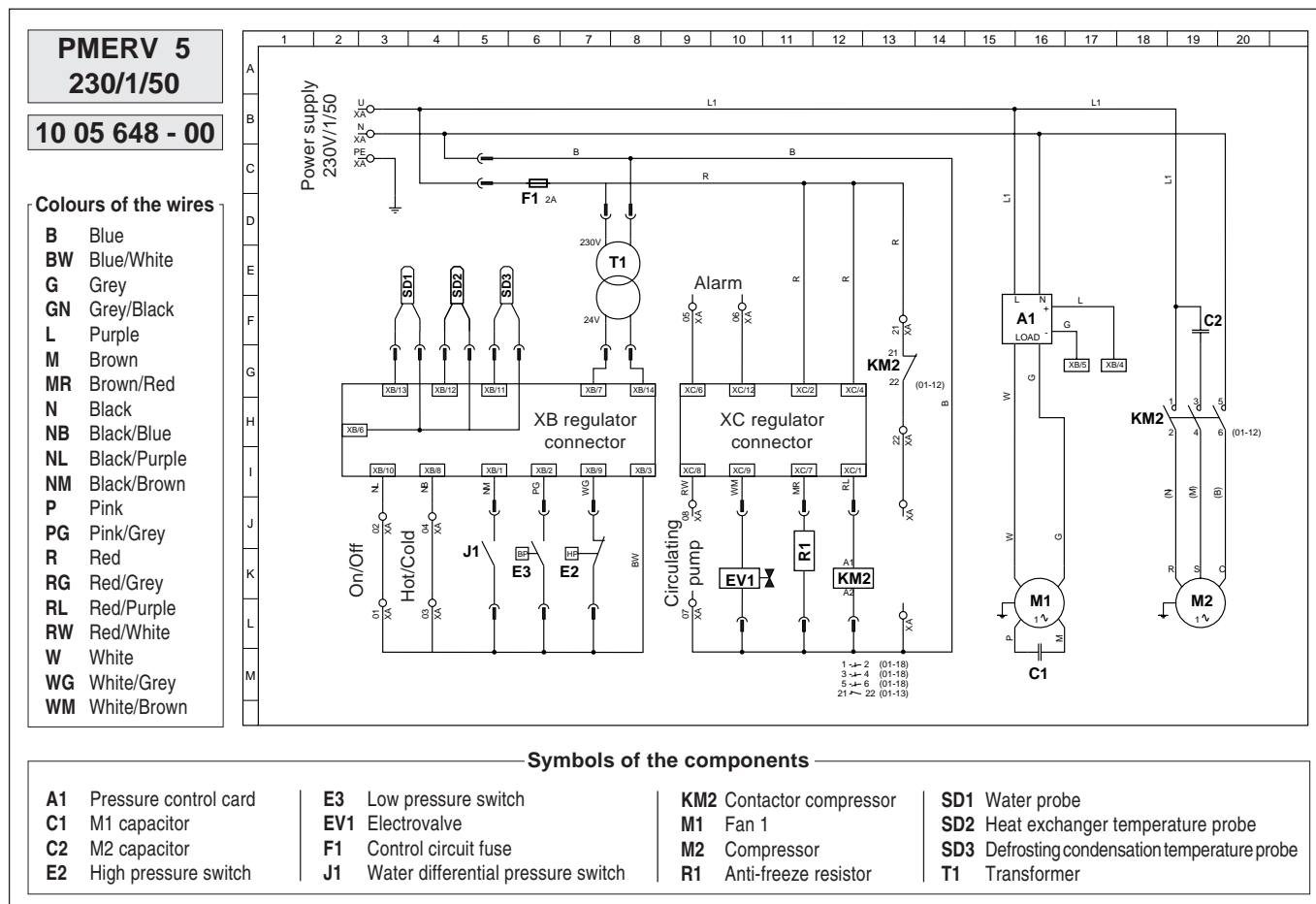
9.1 - HEATING MODE



9.2 - COOLING MODE



10 - WIRING DIAGRAM





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

Technibel

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