VULCANIC

VULCANIC S.A.
48, rue Louis Ampère – Zone Industrielle des Chanoux
F – 93330 NEUILLY SUR MARNE (France)
Tél. : (33) 01.49.44.49.20 – Fax : (33) 01.49.44.49.41
E-mail : catalogue-vulcanic@vulcanic.com
Web : www.vulcanic.com

VERTICAL AIR CONDITIONERS FOR ELECTRICAL CABINETS

PLEASE READ CAREFULLY AND FULLY THIS MANUAL BEFORE INSTALLING THE UNIT THIS MANUAL IS AN INTEGRAL PART OF THE PRODUCT AND SHOULD ACCOMPANY IT UNTIL ITS POSSIBLE DISASSEMBLY.

GB

CONTENTS

CONGRATULATIONS! By choosing a VULCANIC cabinet air conditioner, you have opted for equipment that has been the focus of our attention during its manufacturing in our plant at Neuilly-sur-Marne, near Paris, as well as during the individual test procedures; all these operations take place according to certification by ISO 9001.

1. INTRODUCTION:

VULCANIC moonoblock stand-alone refrigerated air conditioners are designed to maintain the temperature inside **sealed** enclosures, and especially cabinets containing electronic components with a limited maximum operating temperature (generally 40°C).
They are a good alternative to air/water exchangers whenever a cold water system is not available, and to air/air exchangers when the ambient temperature is too high.

The equipment in the CA range has been designed for vertical installation against the door or a side panel of a cabinet.

To select the refrigerating power of your air conditioner, you will very probably have performed a **heat balance** check. Otherwise, you can confirm your choice using the "CLIMAT 8" calculation software. This software, developed by our engineers, can be downloaded free of charge from our site www.vulcanic.com. If you feel it is necessary, VULCANIC can help you establish this heat balance.

Your air conditioner embodies improvements making for easy installation and maintenance. However, you should read the following chapters with care, if only to make the most of the many possibilities this product offers you.

2. SCOPE OF SUPPLY:

The wallet containing this manual also contains:
- The self-adhesive seal(s) to be installed between the air conditioner and the cabinet to be cooled.
- A deflector with 2 "TORX" attaching screws for channelling the cold air.
- An extension plug for electrical connection to the connector.
- 4 nuts and 4 lock washers for attaching the air conditioner to your cabinet.

OPTIONS that can be delivered with the air conditioner:
- Magnetic hanging to be placed on the cooling air inlet of the condenser recommended when the ambient air is liable to be particularly dusty or oily
  Ref. 81001-01, filter 81001-12.
- Semi-recessing kit Ref. 81200-01.
- Fast assembly kit: Ref. 81100-51.

3. DESCRIPTION:

To ensure traceability concerning the ISO 9001 certification, each VULCANIC air conditioner has a C.E identification plate riveted to the housing, bearing its reference and essential technical characteristics.

- The **model** describes briefly the technical characteristics of the air conditioner: more explicitly than the reference.

CA	35 to 270	M or T	E
↑	↑	↑	↑
CA = Vertical cabinet air conditioner	Figure equivalent to 1/10 of approximate nominal power	Single or three-phase electric supply	Electronic regulation

1. The **reference** is numerical (e.g.: 80812.12).
2. The **date** of manufacture is indicated in the month/year format (e.g.: 04 / 03).
3. The **order number** refers to some of the commercial information in coded form, for instance the order receipt number, the order post and the total quantity manufactured for this order post (e.g. A 423684 B 3/12).
4. The **coolant** (refrigerating fluid) is an HFC, generally of the type R134a.
5. The **load** is regulatory information. It relates to the mass of coolant contained in the circuit, expressed in kg.
6. The power supply voltage (in Volts) is followed by the number of phases and the frequency in Hertz (e.g.: 230 / 1 / 50).
7. **The maximum absorbed current** (in amperes) is also regulatory information allowing the installer to calibrate the electric power supply protection device.
8. The **nominal cooling power** (in kW) is given under the conditions defined by the DIN 3168 standard for a 35°C setpoint and in an ambience at 35°C (L35/L35) or in an ambience at 50°C (L35/L50).
9. The **mass** of the air conditioner is given in kg.

4. INSTALLATION OF AIR CONDITIONER:

Qualified professionals, working according to professional practice rules, must carry out the installation, the electric connection and commissioning of your air conditioner.

4.1. CHOICE OF LOCATION:

In its standard design form, your air conditioner can be installed against a cabinet side panel or a door inside a room where the temperature is included between 5°C and 50°C.
The "all seasons" kit is indispensable when the ambient temperature is less than 5° C.

To choose the best location, you should take into consideration:

- The width of the cabinet:
  You can install your air conditioner against a side panel as long as the cabinet is no wider than 2400 mm (i.e three 800 mm doors). Beyond that, the dynamic pressure of the fan will no longer guarantee correct temperature consistency.

- The distribution of the components in the cabinet:
  Since your air conditioner is designed essentially to maintain the temperature of electronic components like variators, stabilized power supplies, power units, etc, an optimum installation would be as close as possible to the components.
  Mounting the unit on the door of the compartment containing these sensitive components is a way of making the most of the refrigerated power of your air conditioner.

- If the electronic components do not have an integrated version:
  Whatever location you choose, you can improve temperature maintenance by installing one or several relay blower fans inside the cabinet.

4.2. CABINET CUTOUT:

 **important:**

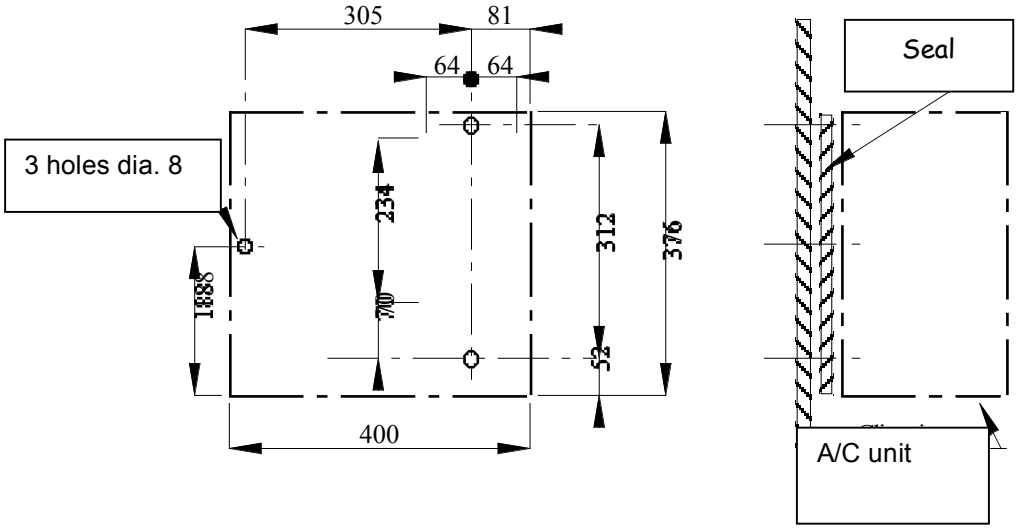
- Before making the cutout, make sure there is nothing liable to get in the way, even partially, of air circulation inside the cabinet.
- For instance, if you have to install electric channelling (as is frequently the case when the air conditioner is installed against a side panel), it is essential to ensure that they do not block, **even partially**, the air conditioner inlet and outlet holes.

  Leave a gap of at least 100 mm between the air conditioner inlet and outlet holes and the components inside the cabinet.

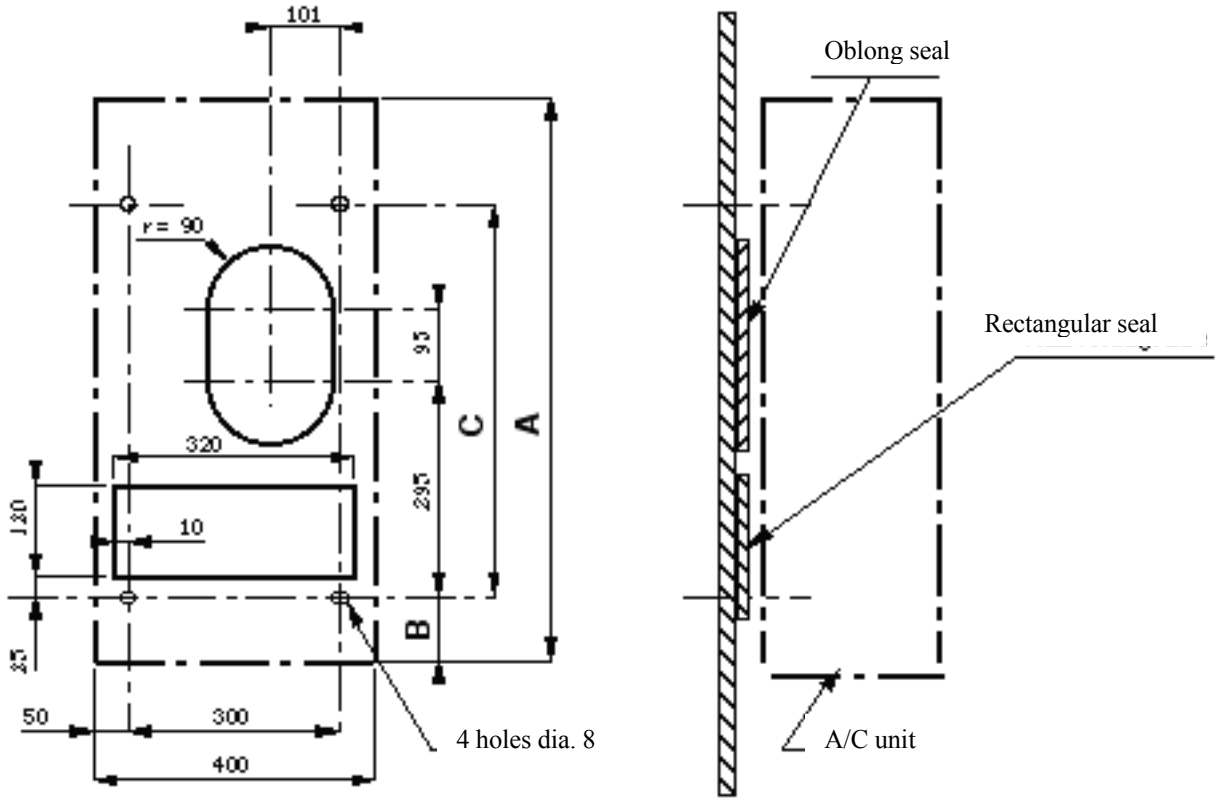
  Trace the Ø 8 attaching holes and the air passage holes on the side panel or door of the cabinet where the air conditioner will be installed, as indicated in the following sketches.

  Drill and cut according to the trace.
  Glue the seals to the perimeter of the cut holes.

CA 35 air conditioner



CA 85 à 250 air conditioners



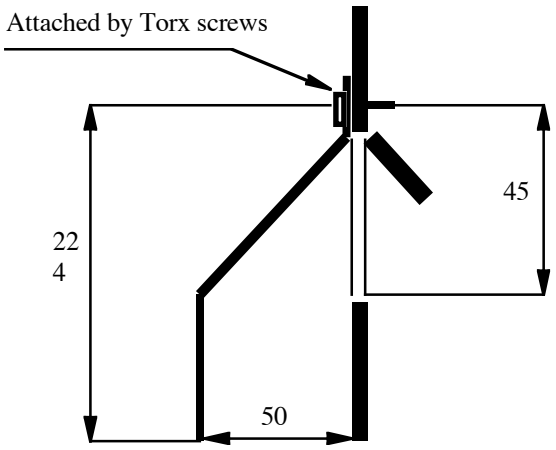
		CA 85	CA 120	CA 170	CA 210	CA 250
SIZES	A	800	898	948	988	988
	B	100	200	200	200	200
	C	545	545	545	590	590

5. INSTALLING THE AIR CONDITIONER ON THE CABINET:

Offer up the air conditioner to the installation position while holding it absolutely vertical and insert the 4 x M6 attaching studs in the Ø 8 holes in the cabinet.
Make attachment secure by means of the 4 nuts supplied with lock washers.

5.1. ASSEMBLY OF A DEFLECTOR:

This deflector is designed to channel the cold air outlet flow vertically toward the bottom of the air-conditioned cabinet interior to ensure thorough distribution.
It is particularly useful when the electric components are located immediately next to the blowing vent.



Use the 2 supplied TORX screws to attach the deflector of the blowing vent, using the holes drilled specifically for the purpose.

5.2. ELECTRIC CONNECTION:

The CA range circuit breakers are cabled according to the diagrams of the following table. Contact VULCANIC to obtain any necessary information concerning these diagrams and their nomenclature:

MODEL	REFERENCE	DIAG. No
CA 35 / 230V single	80740-00	4.500.634-00
CA 85 / 230V single	80812-08	4.500.635-00
CA 85 / 400V single	80814-08	4.500.833-00
CA 120 / 230V single	80812-12	4.500.609-00
CA 120 / 400V 3-P	80834-12	4.500.610-00
CA 170 / 230V single	80812-17	4.500.539-00
CA 170 / 400V 3-P	80834-17	4.500.540-00
CA 210 / 230V single	80812-21	4.500.623-00
CA 210 / 400V 3-P	80834-21	4.500.622-00
CA 250 / 400V 3-P	80834-25	4.500.587-00

Caution:

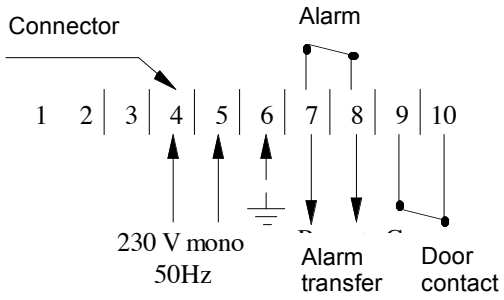
In the permanent configuration, the electric power supply circuit must be capable of tolerating the maximum absorbed current indicated on the nameplate. It should be suitably protected upstream, with a distributed ground, by a circuit breaker (curve D) will by fuses (type aM), with a suitable rating.
Because an air conditioner is designed to protect electronic components inside a cabinet, its electric power supply should not be interrupted unless it is absolutely essential.

Connect up the air conditioner using the **plug-in connector** or the interconnecting cable (option without a connector), referring to either one of the following diagrams:

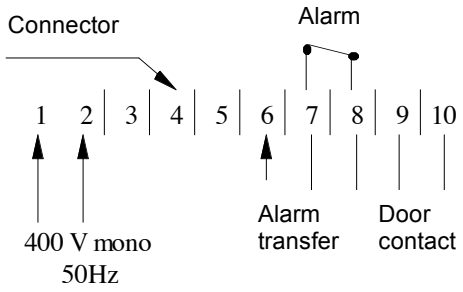
- The design of your air conditioner guarantees that the fans run in the right direction whatever the phase order of the three-phase setup. To minimize risks of deterioration in case of a wrong connection, the power supply connector uses different terminals according to the voltage and the number of phases.

- Electric power supply cable:

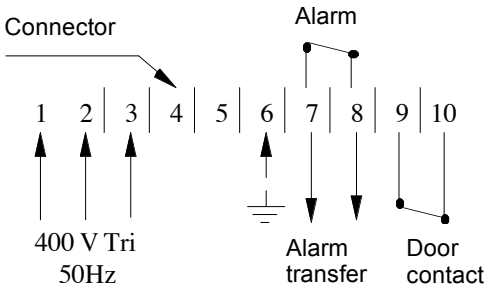
230 V AC SINGLE PHASE AIR CONDITIONERS



400 V AC SINGLE PHASE AIR CONDITIONERS



400 VAC THREE-PHASE AIR CONDITIONERS



- **Connection of general alarm transfer** across terminals 7 and 8:
  This is a totally potential-free normally closed contact (breaking capacity 2 A at 250 VAC) which trips more particularly if:
  - the cabinet temperature is too high: factory set to 42°C,
  - the cabinet temperature is too low: factory set to 15°C,
  - regulation probe fault,
  - lack of power supply voltage,
  - failure of the refrigerator circuit (compressor condensation pressure or temperature too high).

Caution:

The user must utilize this alarm transfer so as to act in the event of a fault , but must not turn off the air conditioner electric power supply in any case.

- **Connection of door contact** across terminals 9 and 10:

The normally closed door contact must be totally potential-free and operated by the opening of the air-conditioned cabinet door: It will turn off the air conditioner entirely when the cabinet door is open (therefore when the contact opens). If this option is not taken, it will be necessary to shunt terminals 9 and 10.

Caution:

Avoid having the power supply cable run alongside the door contact and general alarm transfer connection cables (low voltage) in the same ducting, and keep them at least 30 mm apart.

6. START-UP PROCEDURE:

As soon as the air conditioner is powered up, the regulator runs through a self-test sequence during which it displays **"- - -"** for 5 seconds, then indicates the temperature measured inside the cabinet to be air-conditioned.
If there is no fault, the alarm transfer contact closes between terminals 7 and 88 of the interface connector and the evaporation fan begins to rotate.

The compressor ❄ and the condenser fan (the one that can be seen from the outside) will only operate if there is a demand for cooling, i.e. when the setpoint is below the measured value.
The electronic regulator is configured in the works to cover most cases of industrial use: IT IS PROHIBITED TO MODIFY THE ADJUSTMENTS without the agreement of VULCANIC

- Setpoint (compressor stoppage) = 31°C,
- Engaging of compressor = setpoint + 4°C (differential) = 35°C.

Note:

When the air conditioner is energized, the high-temperature (42°C) and low-temperature (15°C) alarms are inhibited for 10 minutes to give the cabinet time to stabilize between these 2 thresholds.

Caution:

The condensation and evaporation fans must turn clockwise when supplied with electric power, whatever the electric network phase connection order.

Otherwise, it is possible that maintenance on the electric unit may have caused an error in the wiring inside the unit.

6.1. USE OF ELECTRONIC REGULATOR:

The regulator has 3 programming keys on the right of the display:

- Incrementation : ▲ (at the top and on the left)
- Decrementation: ▼ (at the top and on the right)
- Adjustment: **SET** (at the bottom, on the right or on the left).

... as well as 4 test LEDs:

- Compressor activated by the regulator, symbolised by the pictogram ❄ at the top right of the display (this LED flashes during an anti-short-cycle delay or a change of setpoints).
- Forced operation of the compressor, symbolised by the pictogram ❄, at the top left of the display.
- Evaporation fan activated, symbolised by the pictogram, to the right of the LED described above.
- Alarm, symbolised by the pictogram, at the bottom left of the display.

Normally, the display indicates the temperature measurement in °C

To **display the setpoint temperature** press firmly on **SET**. The setpoint value appears after 5 seconds.

To **display the maximum temperature** reached by the measurement, press fleetingly on ▲.
The message **"Hi"** appears followed immediately by the maximum recorded temperature that appears for 5 seconds. When this maximum temperature has just been updated, its value is replaced by the message "**rSt**" which flashes around 5 times.

To **display the minimum temperature** reached by the measurement, press fleetingly on ▼.
The message **"Lo"** appears followed immediately by the minimum recorded temperature that appears for 5 seconds. When this minimum temperature has just been updated, its value is replaced by the message "**rSt**" which flashes around 5 times.

To **reinitialise the maximum and minimum temperatures**, display the desired temperature according to the above method, and then press immediately on **SET** until the message **"rSt"** is displayed flashing.

To **modify the setpoint temperature**, press **SET** for 3 seconds while the measurement is displayed. The setpoint is displayed while the LED ❄ is flashing. Increment or decrement the setpoint by means of the ▲ and ▼ arrows within the 10 seconds that follow: the new setpoint is recorded without needing to be validated. To return to the measurement display press once more on **SET** or wait 10 seconds.

Note:

If the keyboard is locked the message **"PoF"** will be displayed flashing and the setpoint cannot be modified. See below

To **unlock the keyboard**, press simultaneously on ▲ and ▼ for 3 seconds.
The message **"Pon"** flashes approximately 3 times.

To **lock the keyboard**, press simultaneously on ▲ and ▼ for 3 seconds.
The message **"PoF"** flashes approximately 3 times.

To **modify the forced operation of the compressor**, press ▲ for 3 seconds while the measurement is displayed. The compressor will start at the end of the timeout, if any, representing a 4-minute anti-short-cycle.

To stop the compressor during forced operation, press again on ▲ for 3 seconds.

6.2. ADJUSTMENT OF REGULATION PARAMETERS:

Normally, the display indicates the temperature measurement in °C

To **enter the adjuster menu** press simultaneously on **SET** then on ▼ for 3 seconds while the measurement is displayed.

The display indicates the first parameter **"Con"** in the adjuster menu while the ✣ and ❄ LEDs are flashing.

 **Note:**

If the keyboard is locked the message **"PoF"** will be displayed flashing and the adjuster menu cannot be modified. In this case, unlock the keyboard using the above procedure.

Scroll through the parameters of the adjuster menu using ▲ or ▼.
Display the value of each parameter by pressing fleetingly on **SET**.
If necessary modify the value of each parameter with ▲ or ▼.
Validate the new value by pressing fleetingly on **SET**; the display will flash three times or so to acknowledge reception of the modification.

In this menu, only the parameters allowing default constant refrigerating power will appear in the event of an anomaly concerning the regulation probe:

Parameter name:	*Value by default:*
- **Con** = Duration of compressor operating periods in minutes, when the air conditioner is operating with power wave trains that are constant because of a probe fault Con = 0 indicates stoppage of the compressor.	0
- **CoF** = Duration of compressor stoppage periods in minutes, when the air conditioner is operating with power wave trains that are constant because of a probe fault	4

- Pr2 = changeover to configuration menu reserved for VULCANIC and protected by a confidential access code.

 **Note:**

The CoF parameter is adjusted by default to a value of 4 minutes. To simulate power that is 33% of the install refrigerated power, configure Con = 2. To simulate power that is 50% of the installed refrigerating power, configure Con = 4. To simulate power that is 66% of the installed refrigerating power, configure Con = 8. To simulate power that is 100% of the installed refrigerating power, configure Con > 0 and CoF = 0.

To return to the operator menu (measurement display), press simultaneously on **SET** then on ▲, or wait 15 seconds.

6.3. OPERATION TEST DIODES:

The LED ❄ lights up when the compressor and the condenser fan are operating. It flashes when a parameter is being configured (including if it concerns the setpoint temperature) and during the anti-short-cycle timeout phases (4 minutes between the last stop and the restarting of the compressor).
The LED ❄ lights up when the compressor and the condenser fan are operating in the forced mode, or pending this operation and the effect of the anti-short-cycle timeout (4 minutes between the last stop and the restarting of the compressor).

The LED lights up when the evaporator fan is operating. It flashes during the configuring of the "Con" or "Cof" parameters in adjuster menu.

The LED lights up in the event of a fault (indicated by one of the following messages).

6.4. ALARM MESSAGES:

The message “**P1**” flashes in the event of a fault in the measurement probe. The alarm transfer contact opens and the compressor operates in wave trains according to the average power that depends on the setting of the parameters “Con” and “CoF”. The compressor remains entirely at a stop if "Con" = 0 (factory default adjustment).

The message “**HA**” is displayed (alternating with the measured temperature) when the high temperature alarm threshold is reached (factory adjustment at 42°C) on completion of any time delays. The alarm transfer contact opens but the operation of the air-conditioning is not interrupted. The fault disappears as soon as the measurement drops 1°C below the high alarm threshold (i.e. 41°C).
The HA temperature alarm is inhibited for ten minutes when the air-conditioner is energized and after a door is closed.

The message “**LA**” is displayed (alternating with the measure the temperature) when the high temperature alarm threshold is reached (factory adjustment at 15°C) on completion of any time delays. The alarm transfer contact opens but the operation of the air-conditioning is not interrupted. The fault disappears as soon as the measurement rises 1°C above the low alarm threshold (i.e. 16°C).
The LA temperature alarm is inhibited for 10 minutes when the air-conditioner is energized and after a door is closed.

The air-conditioning stops (compressor and fans) when the door opens. The message “**dA**” is displayed (alternating with the measured temperature) and the alarm transfer contact opens following a 10-minute timeout. The fault disappears as soon as the door closes again.

The message “**PAL**” is displayed (alternating with the measured temperature) when the condensation pressure of the coolant or the temperature of the compressor windings are too high.

The air-conditioner then stops irreversibly and the alarm transfer contact opens. **After the fault has disappeared, the electric power supply must be cut off fleetingly to reset.** The air-conditioner becomes operational again if we comply with the anti-short-cycle timeout and the alarm inhibitions on start-up

Caution:

Although the rear connector is equipped with a preferential ground pin, it is prohibited to disconnect it while live. Use the isolating switch or the dedicated fuse holder located in the air-conditioned electric cabinet.

The message “**EE**” is displayed when a software problem occurs.
Press on any key. if the display indicates **“rSt”** for 3 seconds, the air conditioner becomes operational again immediately. Otherwise return the regulator to VULCANIC for repair.

7. MAINTENANCE:

To open the air conditioner detach the 4 side fastening screws and remove the front cover while pulling the supporting handles to the side.

Maintenance is confined to a few elementary operations.

- **Cleaning the condenser:** At variable intervals depending on the ambience of the room where the air conditioned cabinet is installed, (once per month to once per year depending on how polluted the air is), clean the fins of the condenser using a suitable means (low pressure blower, vacuum cleaner, degreaser...) taking care not to damage them. With the unit open, take advantage of the opportunity to clean the condensate recovery pan.

Note:

A fouled condenser is detrimental to the operation of the air conditioner and increases power consumption. Excessive fouling causes an overpressure of the coolant that triggers a “PAL” fault, irreversibly cutting off the operation of the device.

Note:

Never use any other type of filter than the one recommended at the risk of otherwise increasing excessively the condensation pressure and causing a failure to occur.

- **Condensation compartment cleaning:** When the air-conditioner is not equipped with a magnetic filter and the environment is particularly polluted (dust and oil), it is sometimes necessary to clean the entire condensation compartment.
  In this case, remove the electric unit as follows:
  - Disconnect the three polarised connectors located under the electric unit, immediately to the left of the condensation fan.
  - Undo the ¼ turn screws in the front panel.
  - Lift the electric unit to release it, then move away the lower section.

8. GUARANTEE:

Our guarantee complies with the interunion agreements of the Electrical Construction industry and our general conditions of sale.

Deterioration caused by:
- Use at a voltage 10% greater than the scheduled nominal voltage,
- Wear caused by a lack of maintenance, impact, clumsy or inexperienced users,
- Use of a filter (condenser cooling air inlet) different from the one recommended by VULCANIC,
- Failure to comply with this manual, the professional practice rules and the legislation, and phenomena of corrosion or fouling are not binding on the liability of VULCANIC.