



# USE, MAINTENANCE AND INSTALLATION MANUAL

## AIR CONDITIONERS FOR ELECTRICAL ENCLOSURES



**VZ1550**  
**VZ1850**  
**VZ1400**  
**VZ2000**

Manual Code VR-197-0-0002

**ABB SACE S.p.A.**  
An ABB Group Company  
Automation and Distribution Boards  
23846 Garbagnate Monastero (LC)  
Tel.: ++39 031 3570 1 - Telefax: ++39 031 3570 228  
<http://www.abb.com>

Date: 05-may-06	ABB SACE S.p.A.	SERIE VZ
-----------------	-----------------	----------

# ABSTRACT

## VZ SERIES

### AIR CONDITIONING UNIT

1	REFERENCE NORMS AND SYMBOLS' DESCRIPTION.....	3
1.1	Reference norms.....	3
1.2	Symbols' description.....	3
2	DATA LABEL.....	4
3	CAUTION.....	5
3.1	General Warnings.....	5
3.2	Warnings on Handling.....	5
3.3	Warnings on positioning and installation.....	6
3.4	Warnings on non-scheduled maintenance.....	6
4	DESCRIPTION OF THE UNIT.....	7
5	TECHNICAL DATA.....	8
5.1	Table.....	8
6	HANDLING AND TRANSPORT.....	9
7	INSTALLATION.....	10
7.1	Installation of ACU.....	10
7.2	Installation of accessories.....	14
8	USE.....	15
8.1	Use intended by the Manufacturer.....	15
8.2	Contraindications.....	15
9	FIRST START.....	16
10	SCHEDULED MAINTENANCE.....	17
10.1	What you must verify during scheduled maintenance.....	17
11	TROUBLESHOOTING.....	19
12	SAFETY AND PROTECTION DEVICES.....	20
12.1	Description.....	20
12.2	Check-up.....	20
13	DISPOSAL OF THE ACU.....	20
13.1	Uninstallation.....	20
13.2	Materials in the ACU.....	20
13.3	Special materials:.....	21
14	ATTACHMENTS.....	21

Before proceeding with installation of the Air Conditioning Unit (from now on ACU or Unit), it's necessary to read this manual carefully. This manual is bundled with the ACU, and must be stored with care.

# 1 REFERENCE NORMS AND SYMBOLS' DESCRIPTION

## 1.1 Reference norms

<b>MECHANICAL CONSTRUCTION</b>	UNI - ISO Norms
<b>ELECTRICAL CONSTRUCTION</b>	IEC - CEI - EN - Norms
<b>PIPING CONSTRUCTION</b>	ISPESL – ISO - Norms

The ACU complies:

- With norms 89/392 CEE, 91/368 CEE, 89/336 CEE, 73/23 CEE, and subsequent modifications.
- With norms CEI- EN 60204-1 (Safety of Machinery - Electrical Equipment of Machinery).
- With norm ISO R 1662 (Refrigerant Plants - Safety Requirements).

For the above ACU exists a technical documentation and working procedures

	<i>If other devices are bundled with the ACU, they will be supplied with their own instruction manuals.</i>
--	---

## 1.2 Symbols' description


The symbols below are mentioned on this manual or on the Unit itself.

	Warning		Useful suggestions		See "Use, scheduled maintenance and installation manual"
	To be performed by a trained technician		See also page or chapter		Contact the Manufacturer
	Operation not allowed		Operation to be performed by two persons		
	Print or Copy this		Environmental care		

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

## 2 DATA LABEL

Locate the label on the ACU to know technical data. If something is nonconforming, please contact the retailer or the Manufacturer of the ACU.

	<i>Data on the label are necessary to correctly connect the machine, to start and to service it.</i>
---	--

On the label there are data concerning the ACU (model, serial number, weight, etc.) and data concerning the cooling capacity at fixed ambient conditions - (see. norm UNI EN 814). The data label is shown below.

The label is on the internal frame of the ACU.



Manufacturer identification data

Refrigerant type

Operating conditions

Current FLA

Current LRA

		<b>ABB SACE S.p.A.</b> An ABB Group Company Automation and Distribution Boards 23846 Garbagnate Monastero (LC)	
Model ... ..	Serial Number ... ..		
Supply Voltage ... ..	Frequency ... ..		
Refrigerant ... ..	Quantity ... ..		
A35/A35	Cool. Cap. ... ..	El. PWR ... ..	
A50/A35	Cool. Cap. ... ..	El. PWR ... ..	
FLA ... ..	LRA ... ..	Net Weight ... ..	
Indoor Protection ... ..	Manuf. Year ... ..		
Made in Italy in compliance with  norms			

Refrigerant quantity

Input Power

Cooling capacity

*Data label sample*


Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

### 3 CAUTION

#### 3.1 General Warnings

This manual is addressed to:

- Shipping clerks
- Installers
- Users
- Maintenance operators

	<i>The knowledge and the application of safety norms are the base to correctly perform the installation with no risks at all, and to maintain the Unit in it's best efficiency.</i>
---	---

The installer must read carefully the content of chapter “**INSTALLATION**”.

The maintainer must read carefully the content of the chapter “**SCHEDULED MAINTENANCE**”.

Never make any operation if you are not sure of the consequences it could produce. In doubt, please contact the Customers’ Care in your are, or directly the Manufacturer of the Unit.

The Manufacturer of the Unit declines every responsibility for any damage caused by an improper use of the machines. Especially in the following cases:

- misuse;
- non-trained personnel use;
- incorrect installation;
- faulty material;
- unauthorized service or modifications;
- use of non-original spare parts;
- carelessness of general prescription and specifically of those in the present manual;
- exceptional events.


This manual explains the use of the Unit intended by the Manufacturer.

This manual must be stored carefully and must be available for reference. If necessary, make copies of it, to be used on the field.

This manual must be kept with the Unit, until it is dismissed.

**The Manufacturer reserves the right to modify manual contents without any prior notice.**

#### 3.2 Warnings on Handling

	<i>The transport must be performed by qualified personnel only</i>
---	--

This manual points out the best and more appropriate way for the *transport* and the handling of the Unit.

Always use suitable means of *transport*.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

### 3.3 Warnings on positioning and installation



*Positioning and installation must be performed by trained personnel only.*

The installer must verify that every part of the Unit is in good working conditions, prior to install it. In case of doubt, please contact the Manufacturer.



*The use of Personal Protection Devices may be necessary, depending on working conditions.*

### 3.4 Warnings on non-scheduled maintenance



*Every operation of non-scheduled maintenance must be performed by trained and qualified technicians.*

## 4 DESCRIPTION OF THE UNIT

**VZ series** ACU are packaged type, designed and manufactured to cool electrical enclosures and similar items.

They are manufactured to be positioned on the external walls of the enclosure; their shape makes them suitable for many applications.

The Unit operation is based on the principle of the reversed Rankine cycle, so heat is transferred by a fluid (refrigerant) that acquires it in the evaporator coil and releases it from the condenser coil; this happens in a sealed circuit. The fluid is driven by an electrically actuated compressor.

The evaporator coil is directly facing the electrical enclosure internal, while the condenser is facing the external room.

All models are designed with forced-air-circulation evaporator and condenser, with radial fans, to improve performances and to uniform the temperature's distribution in the enclosure internal.

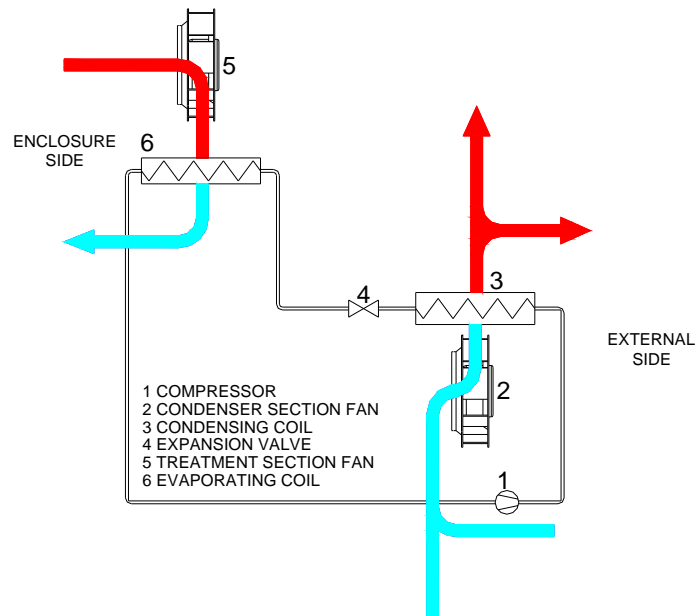
All models are basically equipped with temperature controller; they can also be equipped with several optional accessories.

**VZ series** Units are manufactured with galvanized steel plates; they have self-sustaining structure, and RAL 7032 standard color.

All Units are manufactured to grant maximum safety and reliability.

All the Units are designed, manufactured and verified in compliance with ISO 9001 Norms, which ensures high quality standards.

Every Unit is tested extensively, to verify its compliance with design specifications.



*Basic cooling circuit diagram*

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

## 5 TECHNICAL DATA

### 5.1 Table

Characteristics	Measuring units	Models							
		VZ1550		VZ1850		VZ1400		VZ2000	
Supply voltage (standard)	<b>V</b>	230		230		230		230	
Frequency	<b>Hz</b>	50	60	50	60	50	60	50	60
Cooling capacity	<b>W</b>	605	670	810	900	1300	1480	1926	2200
Input power	<b>W</b>	330	360	400	450	650	720	800	920
Current LRA FLA	<b>A</b>	8		12,5		21		22	
	<b>A</b>	2				4		4,5	
Fuse protection	<b>A</b>	4,9		5,9		8			
Air flow rate (evaporator side).	<b>mc/h</b>	380		350		350		500	
Air flow rate (condenser side)	<b>mc/h</b>	400		400		600		950	
Electrical protection degree (enclosure side)	<b>IP</b>	54		54		54		54	
Refrigerant gas (standard)	<b>Type</b>	R134a		R134a		R134a		R134a	
Refrigerant quantity (weight)	<b>g</b>	490		490		550		550	
Maximum external working temperature	<b>°C</b>	55		55		55		55	
Noise level	<b>dB(A)</b>	64		64		66		66	
Overall dimensions (WxDxH)	<b>(mm)</b>	380 x 198 x 1025		380 x 198 x 1025		380 x 198 x 1025		380 x 230 x 1100	
Weight	<b>Kg</b>	33		33		36		42	
Color	<b>RAL</b>	7032		7032		7032		7032	
Reference to drilling template		A		A		A		B	

- (1) Cooling capacity is referred at the following working conditions:  
 External temperature 35°C – Internal temperature 35°C - R. H. = 50%.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------



## 6 HANDLING AND TRANSPORT



*The Unit must be transported by qualified personnel only.*

The weight of **VZ series** Units is listed in chapter “**TECHNICAL DATA**”.

During handling keep the Unit upright, even if it is possible to incline it until 45°.

If during transport the Unit was stored horizontally. It's necessary to wait at least 6 hours before switching it on.

Lift the Unit only taking it for the body. During transport, the Units will be packaged alone or in couple, over a wooden pallet.

In case it is necessary to move the electrical enclosure after the installation of the Unit, it's necessary to separate it from the enclosure, package it again and transport it packaged alone.


During transport hold the Unit absolutely upright, avoiding horizontal position.

While unpacking the Unit, be careful at spare parts bundled with it.

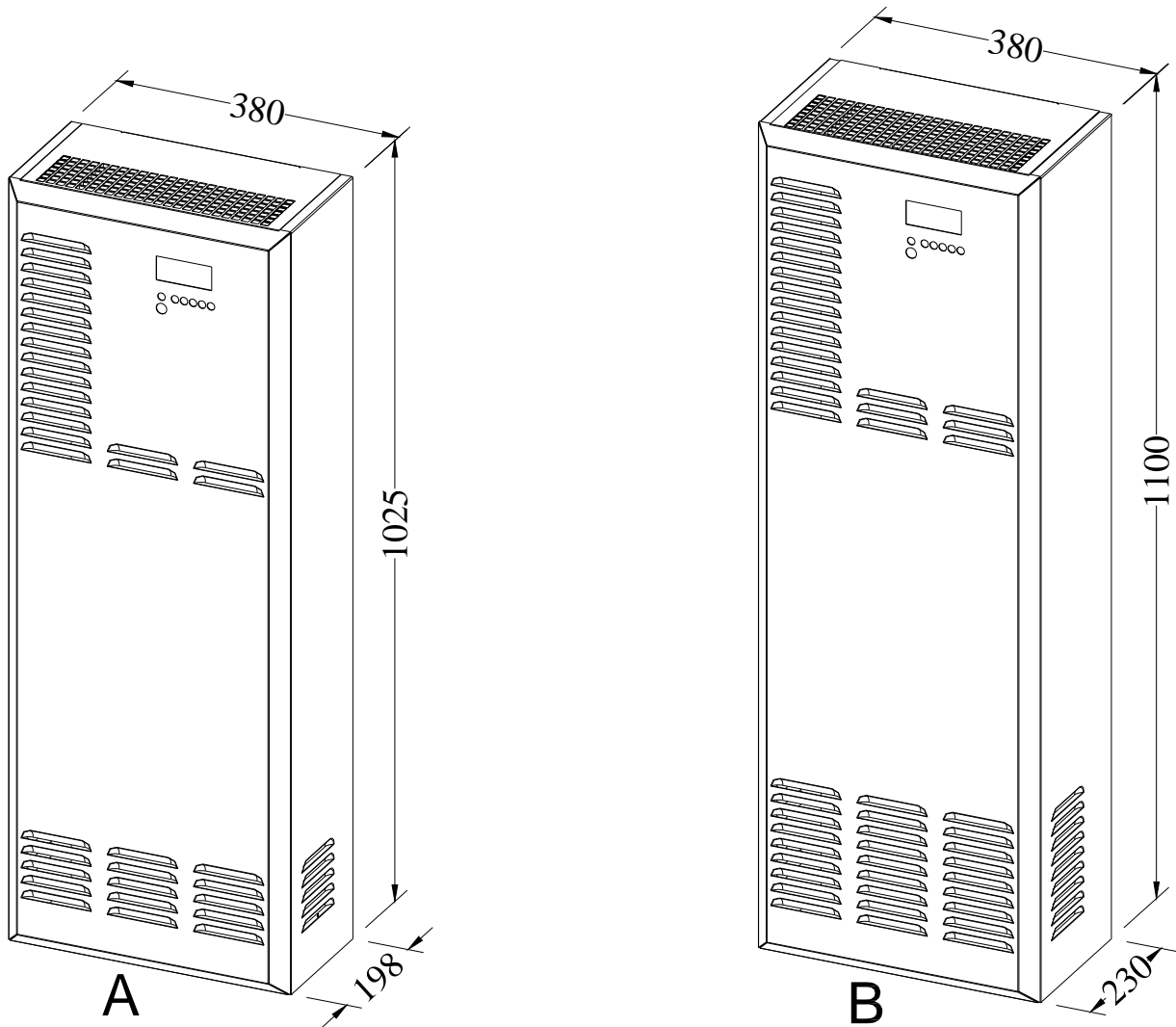
## 7 INSTALLATION

### 7.1 Installation of ACU

The ACU must be installed on the wall of the electrical enclosure, over a smooth surface, to avoid vibrations. Leave a suitable distance between the ACU and its neighborhood, to easily service it, if necessary, and to allow air circulation.

	<p>Verify that the part where the ACU will be mounted is capable of supporting the weight of the ACU, especially if it is going to be mounted on the door of the enclosure.</p>
---	---

Make the openings for air inlet, air outlet, cables and mounting screws as follows.



Overall dimension

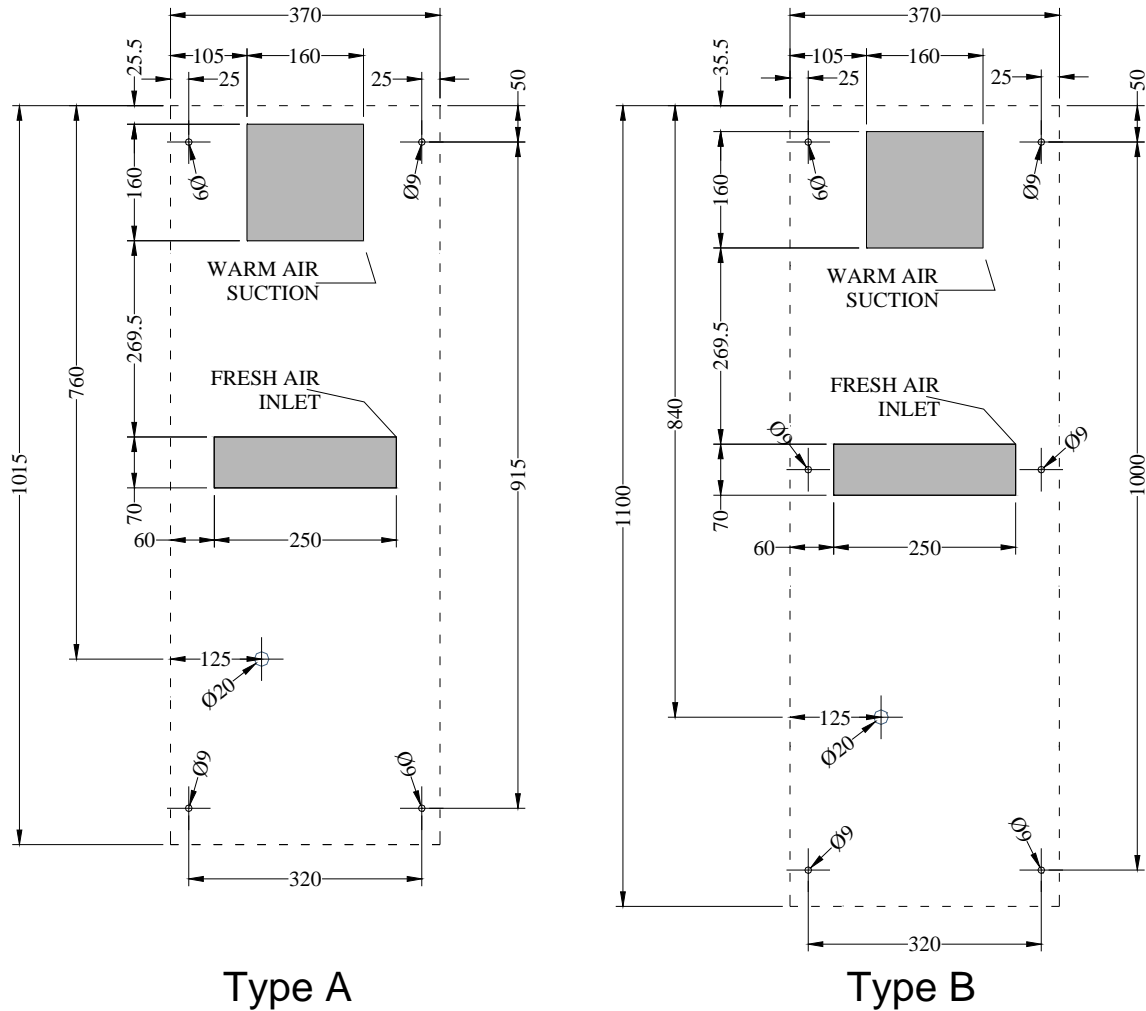
When the ACU must be installed on the door of the electrical enclosure, be sure that the hinges of that door are strong enough, and verify that, when opening the door, the enclosure is stable and does not tip over.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

Make the openings as shown in the following schemes.

If the drilling template, 1:1 scale,(optional accessory) is bundled with the ACU, place it on the external wall of the enclosure and cut out the openings and make the holes as shown on the template.

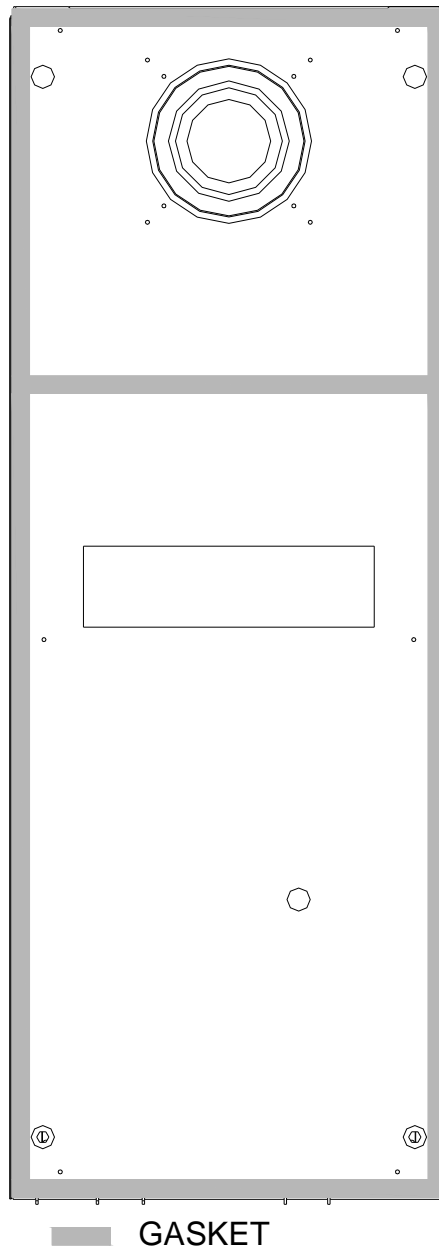
The drawing reference number of the drilling template is DIMA0003078 (for model VZ2000) and DIMA0003181 (for models VZ1550 – VZ1850 – VZ1400).



*Drilling template*


Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

Place the adhesive gasket (provided) along the unit's border and in middle position between air inlet and return air openings, as shown in picture below.



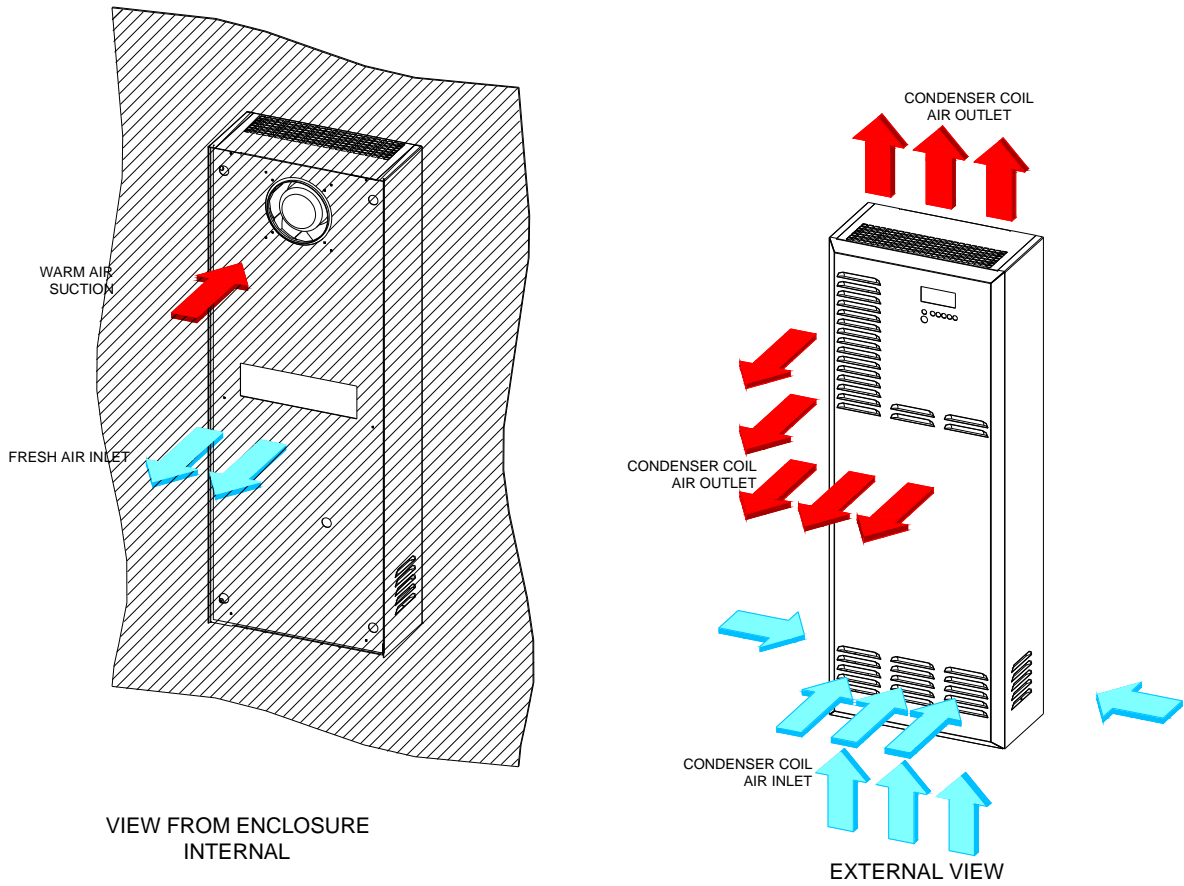
*How to place adhesive gasket*

Thread the power supply cables in the appropriate hole, then fix the ACU on the wall with M6 screws (not provided) of suitable length.

	<p><i>Operation to be performed by two persons.</i></p>
---	---

Verify the correct and free movement of the fan facing the nozzle.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------





*Working scheme*

Be sure that air can circulate freely to refresh the condenser coil; avoid damaging the electrical devices in the enclosure with metal chips produced when making openings and holes in the walls.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

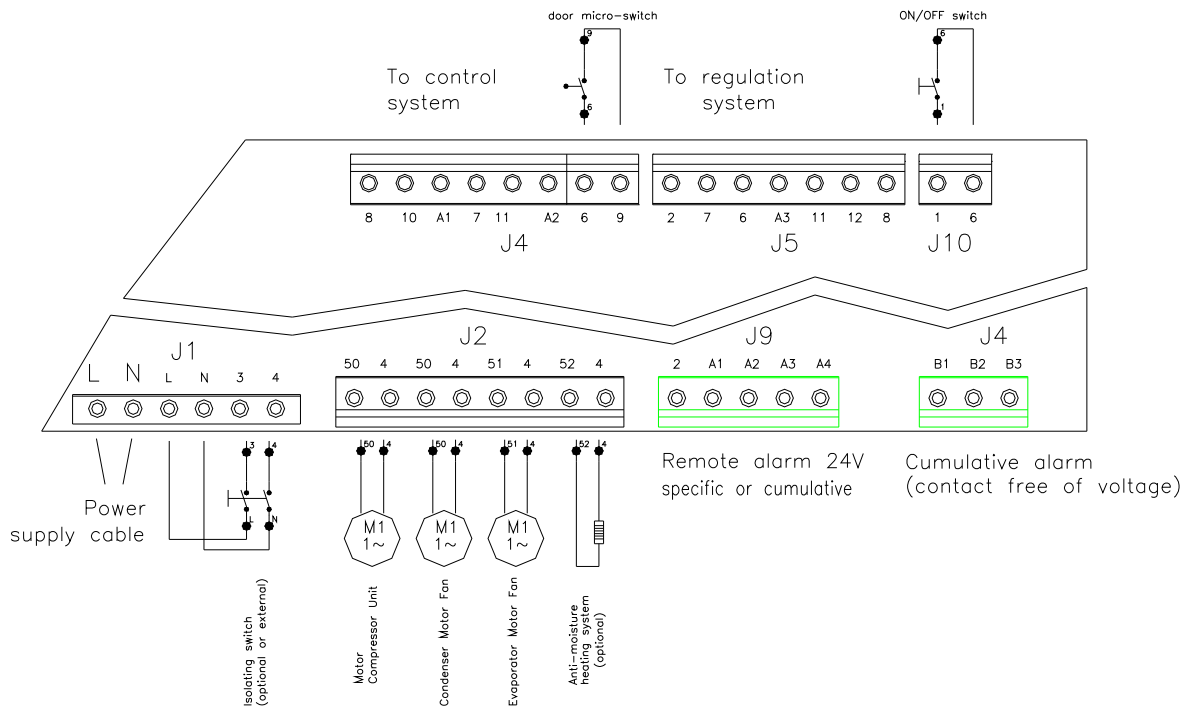
## 7.2 Installation of accessories

 Installation of optional accessories can be performed only by qualified technicians.

 The electrical board is located immediately beyond the command switchboard. To reach it, remove the external metal shell, as shown in chapter **"FIRST START"**.

To connect the door micro-switch, remove the jumper 6-9 in the terminal block J4, and connect the micro-switch as shown below.

To connect the auxiliary isolating switch of the ACU, remove the jumpers L-3 and N-4 on the terminal block J1 and connect the isolating switch as shown below.



*Scheme of the electrical board of the ACU.*

Drawing reference number of the label is ETIC0003079.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

## 8 USE


### 8.1 Use intended by the Manufacturer

The Unit is designed to cool electrical enclosures and similar items, and it is supplied to be mounted on them with mechanical fixing devices (not provided); it can be positioned indoor and also outdoor, but anyway sheltered from rain.

See chapter “**TECHNICAL DATA**” to use the Unit correctly.

### 8.2 Contraindications

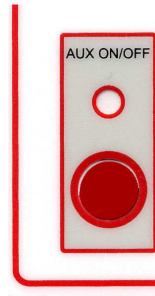
The Unit is not intended to work in areas classified AD.PE EEx d (Risk of explosions). It has no improved protections to sustain adverse atmospheric conditions. It is not intended for other uses than what above.

	<i>To be authorized to use the Unit in other ways than what written above, you must contact the Manufacturer or the dealer in your area.</i>
---	--

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

## 9 FIRST START

After you have installed the ACU, and you have connected it to the power supply line, press the ON/OFF switch on the front panel to start it up; the yellow LED will show the Unit is working. Verify that no strange noises (vibrations of metal plates, friction between the fan and the nozzle...) are produced by the Unit when working.



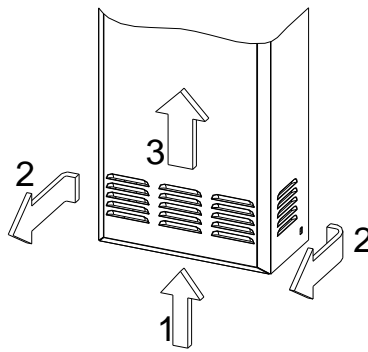
*ON/OFF Switch*

To set the value of working temperature, proceed as follows:

- Remove the screw indicated by arrow 1
- Pull gently the lower part of the metal cover as shows arrow 2, enlarging slightly the sides of the metal cover
- Lift the metal cover in direction of arrow 3.



*While removing the metal cover, be careful not to damage the ON/OFF switch.*



*How to remove the metal cover*


If the Unit is equipped with an electro-mechanical temperature controller, located immediately beyond the command panel, rotate its knob to set the temperature.

When the Unit is equipped with an electronic controller, see the manual of the device (bundled with the Unit).

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------



## 10 SCHEDULED MAINTENANCE

 Before every maintenance operation, switch off the main power supply of the Unit.

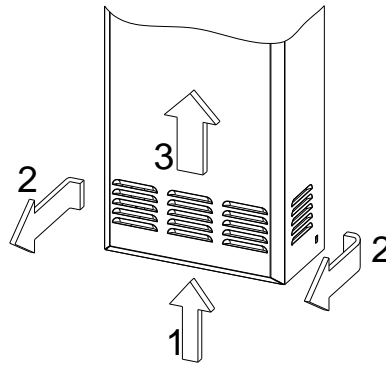
Before switching off the power supply of the Unit and removing the metal cover, pay attention to the noise produced by fans; in case of strange noises, please contact the customer care in your area.

### 10.1 What you must verify during scheduled maintenance

<b>Fans</b>	Verify that fans rotate freely and without any strange noise. In case, call the Customer's Care in your area.
<b>Air Filter (when present)</b>	Verify the condition of the filter. If clogged, try cleaning it with a vacuum cleaner or an air-blower gun or water; if it's not possible to clean it, replace it.
<b>Condenser coil</b>	Periodically, clean the condenser coil using an air-blower gun.
<b>Condensate draining basin</b>	Verify that the condensate draining works correctly and that no dirt is in the basin. Verify that the spiral pipe with hot refrigerant is located in the basin.

To clean the air filter, it's necessary to remove the metal cover; proceed as described below:

- Remove the screw indicated by arrow 1
- Pull gently the lower part of the metal cover as shows arrow 2, enlarging slightly the sides of the metal cover
- Lift the metal cover in direction of arrow 3.



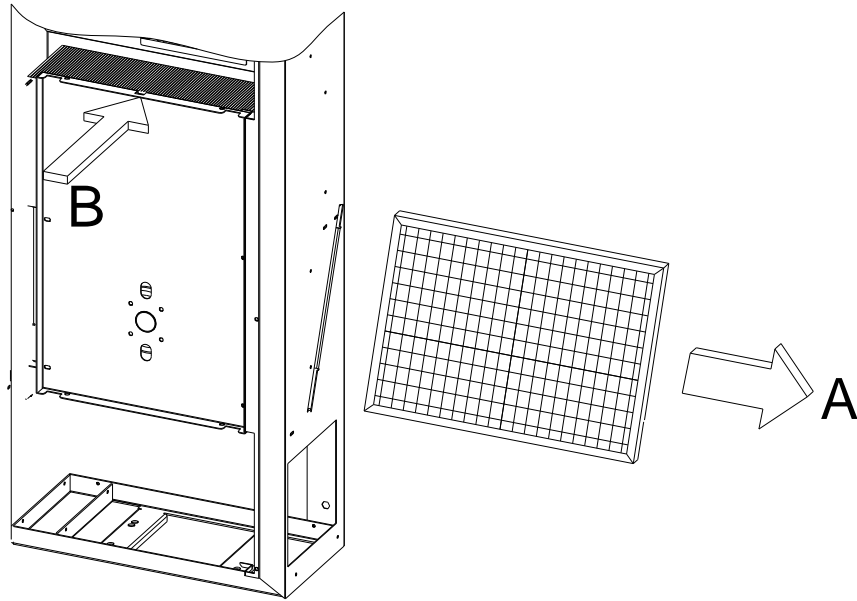
*How to remove the metal cover*

Remove the filter sliding it sideways in direction A; clean it using an air-blower gun or water; replace it if clogged.

Clean the condenser coil (see arrow B) with an air-blower gun, blowing downwards, after you removed the filter (if present).


 During maintenance, be careful not to damage the fins of the condenser coil.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------



*A Slide the filter – B Condenser coil*

Missing check-up may be a cause of malfunctions; periodical check-up, as explained in the table above, are required.

 *If necessary, do not hesitate to call the Customer's Care to have an efficient technical assistance to perform the check-up above.*

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

## 11 TROUBLESHOOTING

TROUBLE	CAUSE	RIMEDY
ACU does not start up	Missing power supply.	Verify the electrical connections to the supply line Verify the position of the switch (if present).
	The fuses are gone.	Call the Technical Assistance.
The ACU does not cool; the fan does not work.	Missing power supply.	Verify the electrical connections to the supply line
	The ACU is off	Push the ON/OFF switch to start the ACU up.
The ACU does not cool; the internal fan does not work.	The temperature controller set point is higher than room temperature.	Verify the temperature controller set-point
	The temperature controller does not work	Call the Technical Assistance.
	High-pressure side pressure-switch has worked	Verify if the condenser coil is clean and if the external fan works. Call the Technical Assistance.
The ACU does not cool enough	Room temperature is higher than maximum working temperature.	Verify room temperature and the power to sink.
	Too small refrigerant charge	Call the Technical Assistance.
	The condenser coil is clogged	Verify if the condenser coil is clean
	Internal fan does not work External fan does not work.	Call the Technical Assistance.
	Too small air flow rate in the enclosure internal.	Verify the air ducts of the openings of the enclosure; make sure the air can pass freely through the openings.
The ACU works intermittently.	Wrong temperature controller set point.	Verify the temperature controller set point. Call the Technical Assistance.
Condensate in the enclosure internal.	Too low temperature of treated air	Set the temperature controller at a higher temperature
	The electrical enclosure is not sealed	Seal the enclosure in some way.
Water leaks from the ACU	Condensate draining basin is dirty.	Clean the condensate draining basin
	Clogged draining pipe.	Clean the condensate draining pipe
	Condensate draining basin is full.	The ACU produces too much condensate; probably the enclosure is not sealed.

## 12 SAFETY AND PROTECTION DEVICES

### 12.1 Description

Name	Description
High pressure-switch.	It stops the Unit when pressure in the discharge line is higher than a fixed value; it resets when pressure goes down again to an allowed value. For multiple actions, verify if the condenser coil and the filter are clean, the fan is working and the room temperature is in the allowed range. In case of frequent actions of this pressure switch, then control if the condenser fan works properly, the filter and condenser coil are clean and the room temperature is higher than the allowed value.
Safety thermostat	When the unit is equipped with diagnostic module, it indicates High temperature condition in the enclosure. The LED "Max Temperature" will light on. When the Unit is in Heating Mode, the thermostat will also disconnect the electrical heater. In case of frequent actions of this thermostat when the Unit is in Cooling Mode, then control if the evaporator fan works properly and the thermal load is higher than cooling capacity.

### 12.2 Check-up

The refrigerant circuit is sealed so, if no accident occurs, no refrigerant leaks are possible; every two years the ACU must be checked up by a qualified technician, to verify the heat exchangers, the fans, the auxiliary circuits and mechanics and safety devices.

## 13 DISPOSAL OF THE ACU

### 13.1 Uninstallation

Every operation concerning the uninstallation of the ACU must be performed by qualified and authorized technicians.

All the operations concerning the uninstallation are listed in the service manual, in chapter concerning installation.

### 13.2 Materials in the ACU

The ACU is formed of materials that can be treated as secondary raw material (recyclable); the materials are listed below:

Structure:	Iron and steel plates.
Heat exchangers	Aluminium and copper.
Electrical parts	Copper, PVC e Various materials.
Compressor	Iron, copper and Various materials.
Painting	Epoxy material.

Date: 05-may-06	ABB SACE S.p.A.	VZ SERIES
-----------------	-----------------	-----------

### 13.3 Special materials:



*The dismissing of the ACU must be performed by authorized Companies.*

- The disposal of lubricant oil in the compressor must be performed authorized Companies
- The refrigerant must be evacuated by special devices, then stored in vessels and sent to qualified Companies for disposal.
- Electrical components and the dehydrator filter must be considered special materials, and they must be sent to an authorized Company for disposal.

## 14 ATTACHMENTS

- User Manual of electronic temperature controller (if present)