USER'S MANUAL (PART 2)

ROOF MOUNT AIR CONDITIONER FOR ELECTRICAL ENCLOSURE

ARC150.002

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1 - TECHNICAL DATA

CONTROL TYPE			ARTICLE CODE
Digital thermostat with alarms			**ARC150.002**
FEATURES		**Unit**	
Power supply		V | ph| Hz	230 | 1 | 50/60
Cooling capacity EN14511	A35-A35	W	1460 / 1520
	A35-A50	W	1090 / 1130
Absorbed electric power EN14511	A35-A35	W	870 / 930
	A35-A50	W	1050 / 1180
Rated current		A	5.1 / 6.2
Motor circuit breaker / Delayed pre fuse (advised)		A	10
Electrical connection		-	connector
Air flow rate (free blow)	enclosure	m3/h	600 / 625
Operating temperature	ambient	°C (°F)	+20 |+55 (+68/+ 131)
	enclosure	°C (°F)	+20 |+45 (+68/+ 113)
Refrigerant		- | g	R134a | 500
Protection degree EN60529/1	ambient	-	IP34
	enclosure	-	IP54 (when installed on enclosure with the same protection degree)
Design	casing	-	Galvanised sheet steel
	cover	-	Galvanised sheet steel powder coated RAL7035
Weight		kg	37
Conformity / Certifications		-	CE

WARNING

- **Safety of AIR CONDITIONER is warranted only by proper use of these instruction which must be kept.**
- **Installation must be done by qualified personnel only after enclosure power supply disconnecting.**
- **Before any operation, switch off the power supply.**
- **The appliance is classified as not accessible to the general public**
- **The air conditioner is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.**
- **Children being supervised not to play with the air conditioner.**
- **The air conditioner must be installed in accordance with national wiring regulations**
- **Upstream of the electrical connection, an efficient disconnection system must be provided in compliance with the standard**
- **Internal and external components of electrical enclosure don't have to affect the proper installation of air conditioner.**
- **Inside of electrical enclosure there must not be components that could affect the proper ventilation.**
- **Provide a proper fixing of the electrical enclosure to the floor to prevent accidental tipping due to the supplementary weight of installed AIR CONDITIONER.**
- **Installation position of AIR CONDITIONER must be selected to ensure good ventilation. Take care that any internal/external components of enclosure don't obstruct air passage. (see section 2.2 GENERAL CHECKS BEFORE INSTALLATION)**
- **The heat loss of the components installed inside of the electrical enclosure must be lower than useful cooling power of the AIR CONDITIONER.**
- **AIR CONDITIONER must be handled in upright position and protected against accidental tipping over.**
- **Do not modify the AIR CONDITIONER structure if it is not specified in these instruction or associated instructions.**
- **During transportation of enclosures with installed air conditioner a proper bracket must be used to support the cooling unit weight.**
- **Install only original spare parts and accessories.**
- **Protection against access to live parts must be warranty by installer.**
- **The supply connector of the AIR CONDITIONER must only be connected and disconnected when electrical enclosure is electrically disconnected.**
- **Follow all technical data shown in this manual**

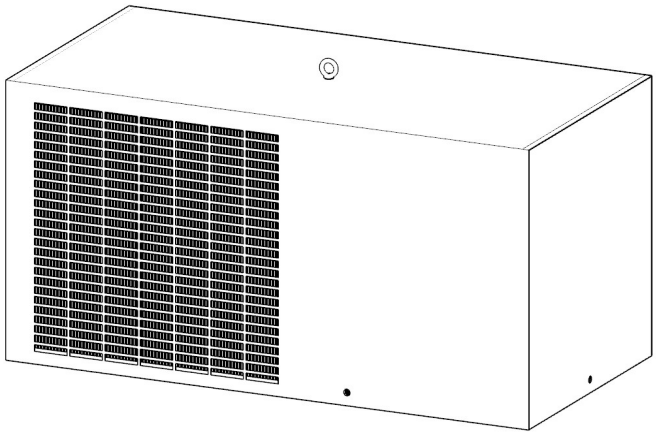
2 - INSTALLATION

2.1 PRODUCT HANDLING

AIR CONDITIONER ARC series must be handled in upright position and protected against accidental tipping over.

The air conditioner handling, when unpacked, can be done thanks to lifting eye bolt. Air conditioners ARC series are fitted with lifting eye bolts.

Check the proper fixing of eye bolts before lift the air conditioner.



2.2 GENERAL CHECKS BEFORE INSTALLATION

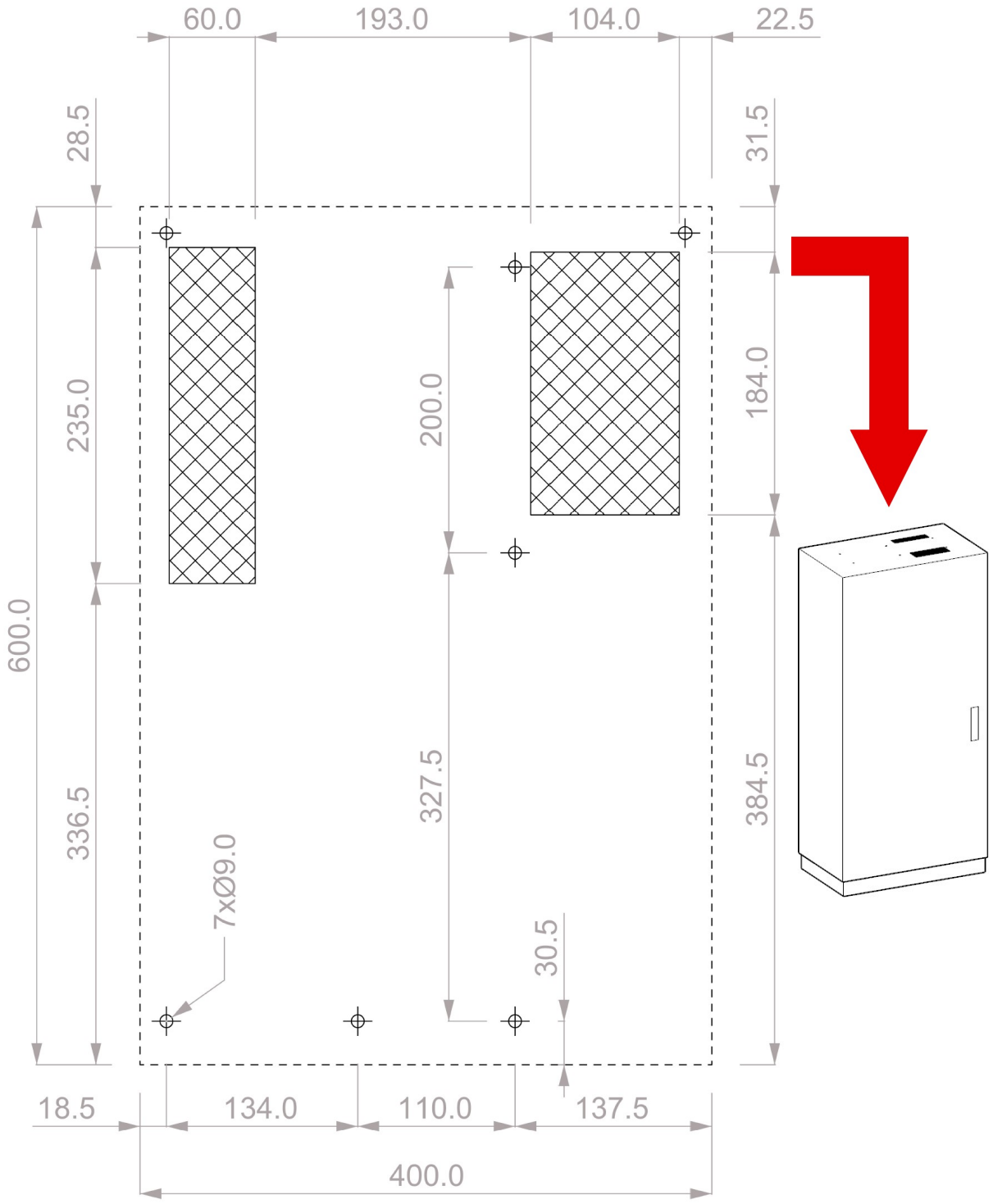
Before the installation make sure that the cabinet is disconnected from the electrical supply.

GENERAL CHECKS
- electrical enclosure must be disconnected form power supply
- electrical data shown on rating label pasted on air conditioner side must be guaranteed
- Electrical enclosure must be sized according to air conditioner dimensions and weight.
- Electrical enclosure must have at least IP54 protection degree
- Internal and external components of electrical enclosure don't have to affect the proper installation of air conditioner
- The installation site must be free from excessive dirt, aggressive ambient conditions and moisture.
- The installation site must be free from hot air flows
- The internal side of electrical enclosure must be free from dirt and moisture
- The environment temperature must be within the range specified on label pasted on air conditioner side
- Inside of electrical enclosure there must not be components that could affect the proper ventilation
- the enclosure positioning with installed air conditioner must be carefully selected to ensure good ventilation (clearance between the air conditioner and the near walls must be at least 500 mm in each side).
- Proper disposing of condensate discharge

2.3 FITTING

1) Make the fixing hole on the enclosure as is shown in the drilling template

VIEW FROM EXTERNAL OF ELECTRICAL ENCLOSURE



Deburr all sharp edges to avoid accidental injuries

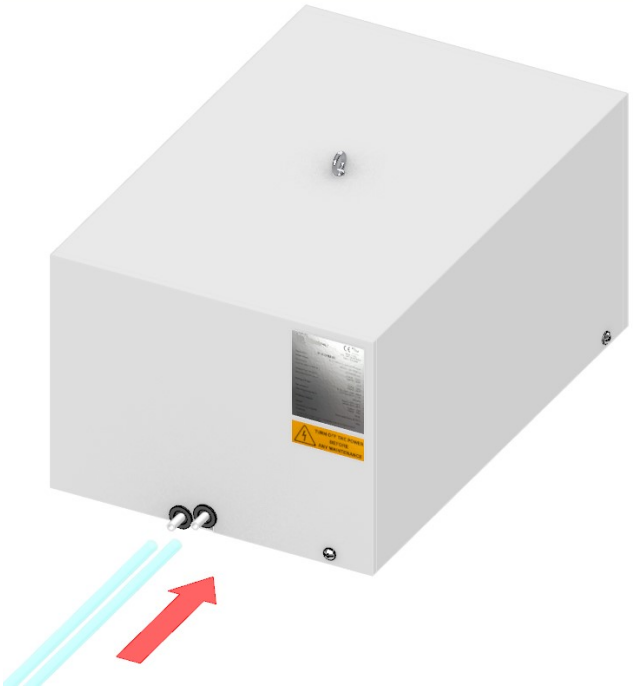
2) Apply the gasket (included in fixing kit) on the bottom panel of the air conditioner;

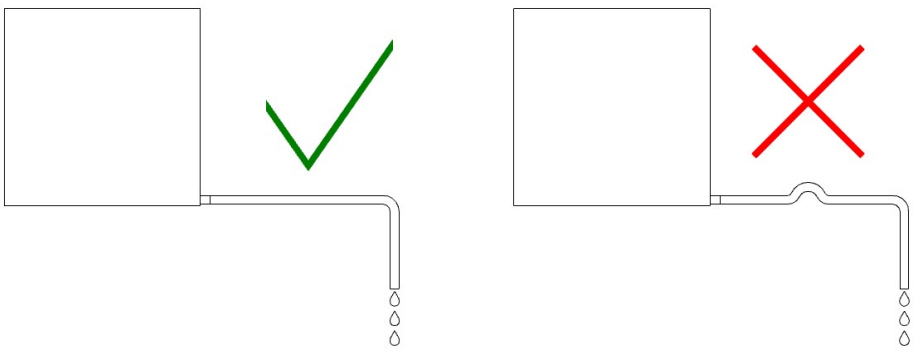
3) Lift the air conditioner by lifting eyebolt and place it on the enclosure roof

4) Mount the air conditioner on the electrical cabinet according to the drilling template with adequate M6 screws and washers against unscrewing (not included in mounting kit)

5) Connect an adequate hose to the condensate drain pipe like is shown by picture below. (ARC150 is fitted with two condensate drain pipes in order to ensure proper drainage in case of occlusion of a drain pipe)

Air conditioner produces condensate because the moist air inside of the enclosure meets cold heat exchanger (evaporator) and then it becomes water; water production decreases during air conditioner working because enclosure air becomes dry.





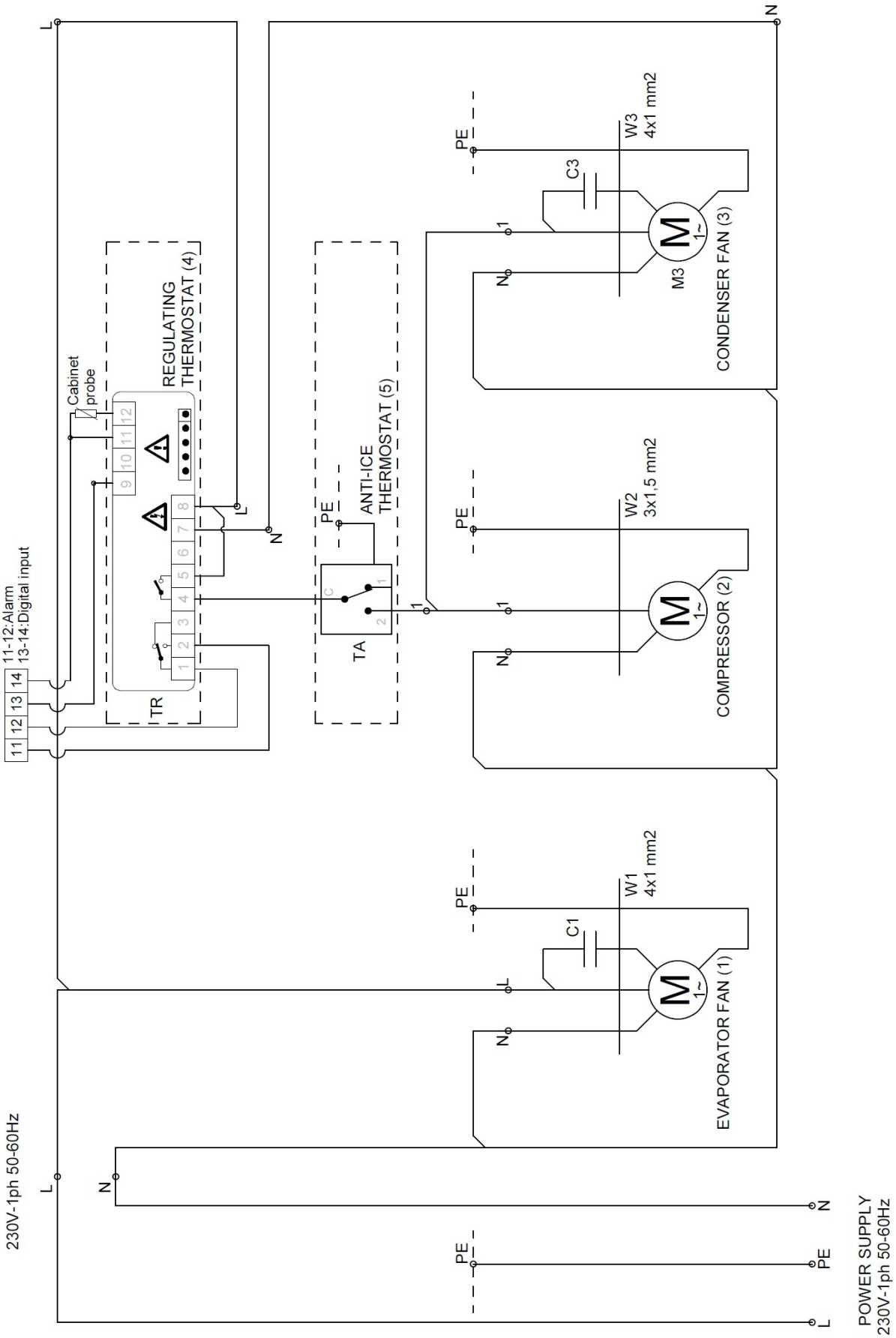
The condensate must be properly evacuated to avoid accidental damage to the electrical enclosure

The enclosure must be IP 54 protected, if enclosure is not airtight, condensate production could increase.

The enclosure IP54 degree is guaranteed only if the air conditioner is proper mounted.

3 - ELECTRICAL CONNECTION

3.1 WIRING DIAGRAM



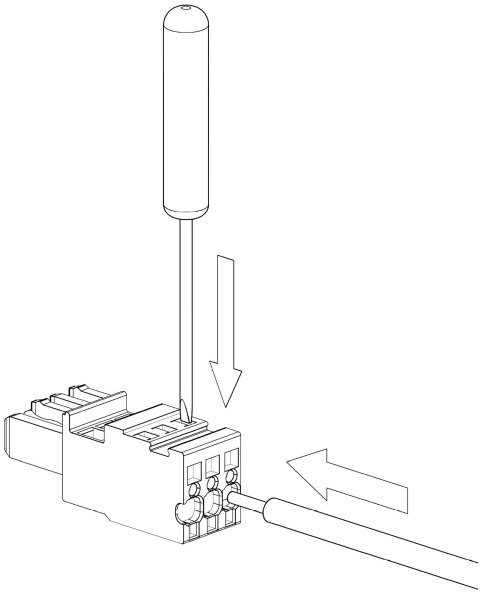
3.2 ELECTRICAL INSTALLATION

The electrical installation must be carried out by a qualified electrician who is responsible for compliance with the applicable standards and regulations.

Upstream of the electrical connection, a power line disconnector must be provided

Before the installation make sure that the cabinet is disconnected from the electrical supply.

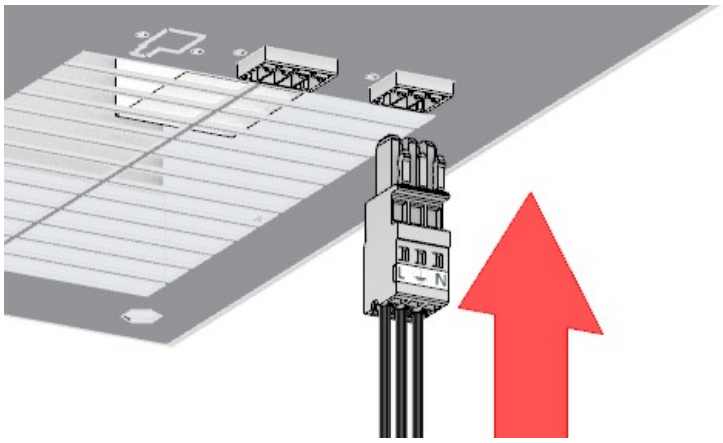
Wire male plug (included) with an adequate cable as is shown by following picture



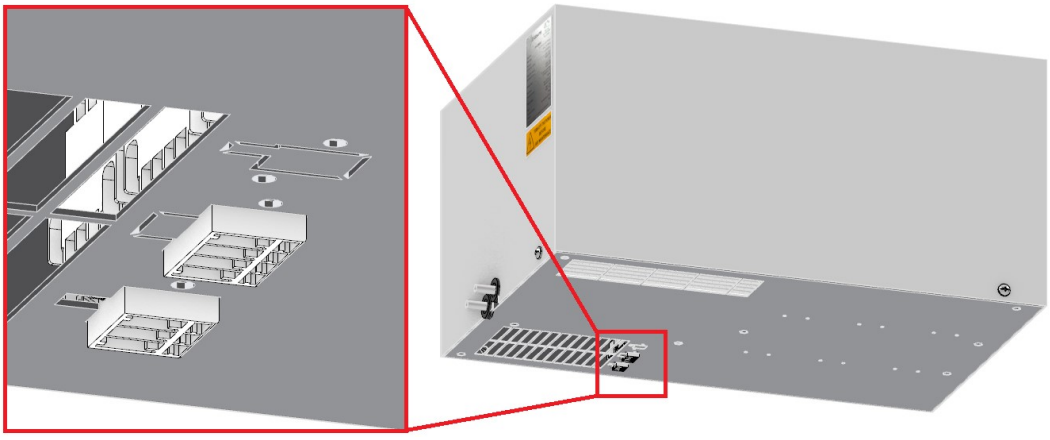
Cable section must be at least 1,5mm^2

The male plug is fitted with spring terminals:

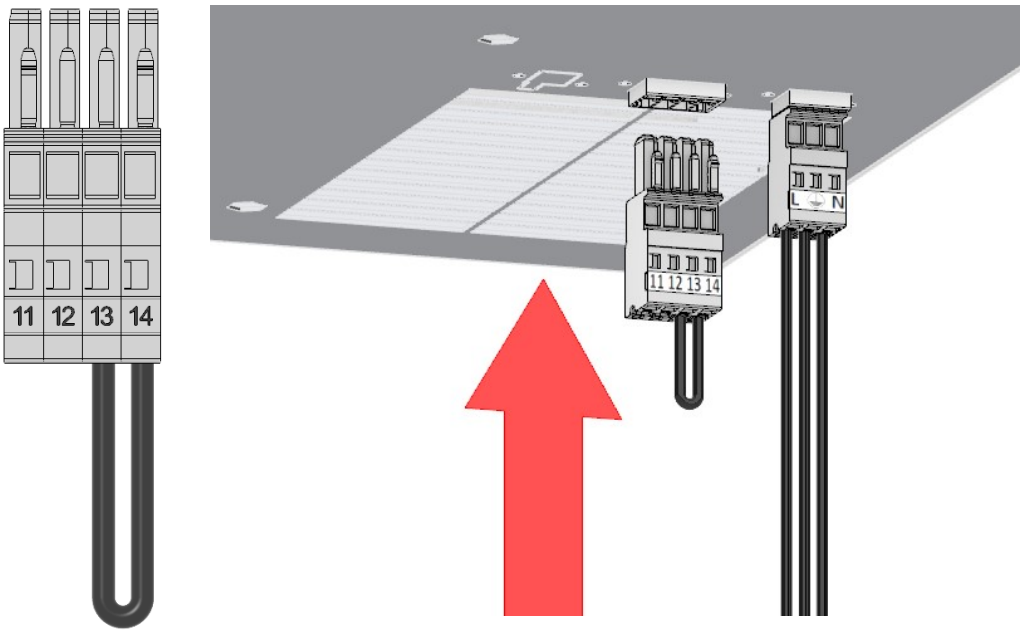
1. Push the spring with a screwdriver and then insert the wire.
2. Check the proper wire insertion.
3. Insert male connector inside of 3 poles female connector placed on the bottom of the air conditioner.



When the air conditioner is installed on electrical enclosure, female connector is accessible only from inside the enclosure.



1) Insert signal connector (included in installation kit, refer to picture below) inside of 4 poles female connector placed on the bottom of the air conditioner.



3.3 ALARM OUTPUT / DIGITAL INPUT

ARC150 is fitted with an electronic controller which permits alarm output and digital input signals. Signals wiring is available on signals connector included in air conditioner packaging.

3.3.1 Alarm output (poles 11-12)

Alarm output is activated according to alarm parameters (for example in case of enclosure temperature higher than ALU value, digital input not activated… See PARAMETERS at **4.2 DIGITAL THERMOSTAT INSTRUCTION** section)

Alarm output is a dry contact.

3.3.2 Digital input (poles 13-14)

WARNING: proper functions of air conditioner are allowed only if digital input is activated. (Closed contact between poles 13-14).

Poles 13-14 are factory wired with a bridge.
Bridge can be removed to wire, for example, a door limit switch.

Electrical data shown on rating label, pasted on air conditioner side, must be followed

Install the delayed pre-fuse recommended to protect the line and enclosure components against short-circuit.

Upstream of the electrical connection, an efficient disconnection system must be provided and it must be clearly identified

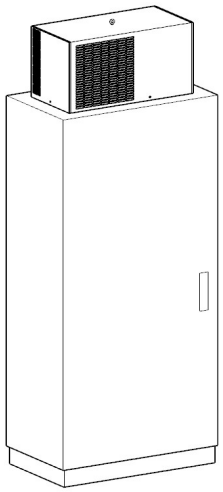
Air conditioner is already fitted with a temperature controller, no additional temperature control must be connected upstream of the unit.

4 – STARTING AND ADJUSTMENT

4.1 GENERAL DESCRIPTION

Air conditioners are especially designed for dissipation of heat loss inside electrical enclosures with IP54 protection degree.
Air circulation inside the enclosures allows to keep enclosure air volume isolated from external ambient air, it preserves the inside of the enclosure against dirt and humidity which are present in the external air.

ARC150 series must be installed only on the roof of electrical enclosure



After finishing assembly of the conditioner, wait approx. 30 min. before starting it (the oil must collect in the compressor to ensure lubrication and cooling).

The air conditioner operates automatically, that is to say, after insertion, the evaporator fan operates continuously making the air inside the cabinet circulate. This way a uniform distribution of temperature inside the cabinet itself is attained. The built-in thermostat drives compressor and condenser fan according to set point value and other parameters (See PARAMETERS at **4.2 DIGITAL THERMOSTAT INSTRUCTION** section for references)

Compressor and condenser fan start after a delay set on thermostat (see parameter AC on parameters list for references) to permit a minimum interval between the compressor stop and the following restart.

During proper operations, the compressor and condenser fan turn OFF when internal enclosure temperature decreases under set point value.

4.2 DIGITAL THERMOSTAT INSTRUCTION

WARNING: the air conditioner is designed to operate at 35 ° C cabinet temperature. If the set point is changed the performance of the unit will vary.

1) Regulating thermostat is fixed on side of air conditioner.

2) Thermostat could be set into a range from 20°C up to 45°C. Follow thermostat instructions for parameter changing.

SET	To display target set point; in programming mode it selects a parameter or confirm an operation.
❄	(DEF) To start a manual defrost
∧	To see the max. stored temperature; in programming mode it browses the parameter codes or increases the displayed value.
∨	To see the min stored temperature; in programming mode it browses the parameter codes or decreases the displayed value.
⏻	To switch the instrument off, if onF = oFF.
☼	To switch the light, if oA1 = Lig

4.2.1 KEY COMBINATIONS:

∧ + ∨	To lock & unlock the keyboard.
SET + ∨	To enter in programming mode
SET + ∧	To return to the room temperature display

4.2.2 LED FUNCTION DESCRIPTION:

LED	MODE	FUNCTION
❄	ON	Compressor enabled
❄	Flashing	Anti-short cycle delay enabled
❄	ON	Defrost enabled
((•))	ON	An alarm is occurring
❄	ON	Continuous cycle is running
☼	ON	Energy saving enabled
☼	ON	Light on
AUX	ON	Auxiliary relay on
°C/°F	ON	Measurement unit
°C/°F	Flashing	Programming phase

4.2.3 MAX & MIN TEMPERATURE MEMORIZATION

How to see the min temperature
1. Press and release the ▼ key.
2. The “Lo” message will be displayed followed by the minimum temperature recorded.
3. By pressing the ▼ key again or by waiting 5s the normal display will be restored.

How to see the max temperature
1. Press and release the ▲ key.
2. The “Hi” message will be displayed followed by the maximum temperature recorded.
3. By pressing the ▼ key again or by waiting 5s the normal display will be restored.

How to reset the max and min temperature recorded
1. Hold press the **SET** key for more than 3s, while the max. or min temperature is displayed. (**rSt** message will be displayed)
2. To confirm the operation the “**rSt**” message starts blinking and the normal temperature will be displayed.

4.2.4 HOW TO SEE THE SET POINT

1. Push and immediately release the **SET** key: the display will show the Set point value;
2. Push and immediately release the **SET** key or wait for 5 seconds to display the probe value again.

4.2.5 HOW TO CHANGE THE SETPOINT

1. Push the **SET** key for more than 2 seconds to change the Set point value;
2. The value of the set point will be displayed and the “**°C**” or **“°F**” LED starts blinking;
3. To change the Set value push the ▲ or ▼ arrows within 10s.
4. To memorise the new set point value push the **SET** key again or wait 10s.

4.2.6 HOW TO CHANGE A PARAMETER VALUE

To change the parameter’s value operate as follows:
1. Enter the Programming mode by pressing the **SET +** ▼ keys for 3s (the “°C” or “°F” LED starts blinking).
2. Select the required parameter. Press the **SET** key to display its value
3. Use ▲ or ▼ to change its value.
4. Press **SET** to store the new value and move to the following parameter.

To exit: Press **SET +** ▲ or wait 15s without pressing a key.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

4.2.7 HOW TO LOCK THE KEYBOARD

1. Keep pressed for more than 3 s the ▲ + ▼ keys.
2. The **POF** message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set point or the MAX o Min temperature stored
3. If a key is pressed more than 3s the **POF** message will be displayed.

4.2.8 HOW TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the ▲ + ▼ keys, till the **Pon** message will be displayed.

4.2.9 THE ON/OFF FUNCTION

With **onF = oFF**, pushing the **ON/OFF** key, the instrument is switched off. The **OFF** message is displayed. In this configuration, the regulation is disabled.
To switch the instrument on, push again the **ON/OFF** key.
WARNING: Loads connected to the normally closed contacts of the relays are always supplied and under voltage, even if the instrument is in standby mode.

4.2.10 PARAMETERS

Regulation

Hy **Differentia**l: (0,1 ÷ 25,5°C / 1÷255 °F) Intervention differential for set point. Compressor
Cut IN is Set Point + differential (Hy). Compressor Cut OUT is when the temperature reaches the set point.

Ot **Thermostat probe calibration**: (-12.0÷12.0°C; -120÷120°F) allows to adjust possible offset of the thermostat probe.

AC **Anti-short cycle delay**: (0÷50 min) minimum interval between the compressor stop and the following restart.

CH **Type of action**: CL = cooling; Ht = heating.

rES **Resolution (for °C):** (in = 1°C; dE = 0.1 °C) allows decimal point display.
dLy Display delay: (0 ÷20.0m; risul. 10s) when the temperature increases, the display is updated of 1 °C/1°F after this time.

IdF **Interval between defrost cycles**: (0÷120h) Determines the time interval between the beginning of two defrost cycles.

MdF **(Maximum) length for defrost**: (0÷255min) (0=no defrost) When P2P = n, (not evaporator probe: timed defrost) it sets the defrost duration, when P2P = y (defrost end based on temperature) it sets the maximum length for defrost.

ALU **MAXIMUM temperature alarm**: (SET÷110°C; SET÷230°F) when this temperature is reached the alarm is enabled, after the “ALd” delay time.

ALL **Minimum temperature alarm**: (-50.0 ÷ SET°C; -58÷230°F when this temperature is reached the alarm is enabled, after the “ALd” delay time.

i1P **Digital input polarity**: oP: the digital input is activated by opening the contact; CL: the digital input is activated by closing the contact.

i1F **Digital input configuration**: EAL = external alarm: “EA” message is displayed; bAL = serious alarm “CA” message is displayed. PAL = pressure switch alarm, “CA” message is displayed; dor = door switch function; dEF = activation of a defrost cycle; AUS =to switch on the second relay if oA1 = AUS; Htr = kind of action inversion (cooling –heating); FAn = not set it; ES = Energy saving.

did (0 ÷ 255 min) with i1F= EAL or i1F = bAL digital input alarm delay: delay between the
detection of the external alarm condition and its signalling.
with i1F= dor: door open signalling delay
with i1F = PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.

PbC **Type of probe**: it allows to set the kind of probe used by the instrument: PbC = PBC probe, ntc = NTC probe.

dP3 **Third probe display**- no available
.**dP4** **Fourth probe display**- no available

4.2.11 DIGITAL INPUT (ENABLED WITH P3P = N)

The free voltage digital input is programmable in different configurations by the “i1F” parameter.

Door switch input (i1f = dor)

It signals the door status and the corresponding relay output status through the **odc** parameter:
no= normal (any change);, **Fan=** fan OFF; **CPr**= Compressor OFF, **F_C**= Compressor and fan OFF.
Since the door is opened, after the delay time set through parameter **did**, the door alarm is enabled, the display shows the message **dA** and the regulation restarts is **rtr = yES**. The alarm stops as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

Digital inputs polarity

The digital input polarity depends on the **i1P** parameter.
i1P=CL: the input is activated by closing the contact.
i1P=OP: the input is activated by opening the contact

4.2.12 GENERIC ALARM (i1F = EAL)

As soon as the alarm input is activated (for example enclosure temperature higher than ALU value) the unit will wait for **did** time delay before signalling the **EAL** alarm message. The outputs status doesn’t change. The alarm stops just after the alarm input is de-activated.

4.3.13 SERIOUS ALARM MODE (i1F = bAL)

When the alarm input is activated (for example enclosure temperature higher than ALU value), the unit will wait for **did** delay before signalling the **CA** alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the alarm input is de-activated.

4.2.14 ALARM SIGNALS

Message	Cause	Outputs
“P1”	Room probe failure	Compressor output acc. to par. “Con” and “COF”
“P3”	Third probe failure	Outputs unchanged
“P4”	Fourth probe failure	Outputs unchanged
“HA”	Maximum temperature alarm	Outputs unchanged.
“LA”	Minimum temperature alarm	Outputs unchanged.
"HA2"	Condenser high temperature	It depends on the “Ac2” parameter
"LA2"	Condenser low temperature	It depends on the “bLL” parameter
“dA”	Door open	Compressor according to rrd
“EA”	External alarm	Output unchanged.
“CA”	Serious external alarm (i1F=bAL)	All outputs OFF.
“CA”	Pressure switch alarm (i1F=PAL)	All outputs OFF
“rtc”	Real time clock alarm	Alarm output ON; Other outputs unchanged; Defrosts according to par. “**IdF**” Set real time clock has to be set
rtF	Real time clock board failure	Alarm output ON; Other outputs unchanged; Defrosts according to par. “**IdF**” Contact the service

4.2.15 DEFAULT SETTING VALUES

Label	Name	Range	°C/°F	
Set	Set point	LS÷US	**31.0**	---
Hy	Differential	0,1÷25.5°C/ 1÷ 255°F	**4.0**	Pr1
Ot	Thermostat probe calibration	-12÷12°C /-120÷120°F	**0.0**	Pr1
AC	Anti-short cycle delay	0 ÷ 50 min	**3**	Pr1
CH	Kind of action	CL=cooling; Ht= heating	**cL**	Pr1
rES	Resolution	in=integer; dE= dec.point	**dE**	Pr1
IdF	Interval between defrost cycles	1 ÷ 120 hours	**8**	Pr1
MdF	(Maximum) length for defrost	0 ÷ 255 min	**0**	Pr1
ALU	MAXIMUM temperature alarm	Set÷ 110.0°C; Set÷230°F	**50.0**	Pr1
ALL	Minimum temperature alarm	-50.0°C÷Set/ -58°F÷Set	**-50.0**	Pr1
i1P	Digital input polarity	oP=opening;CL=closing	**oP**	Pr1
i1F	Digital input configuration	EAL, bAL, PAL, dor; dEF; Htr, AUS	**dor**	Pr1
did	Digital input alarm delay	0÷255min	**0**	Pr1
PbC	Kind of probe	Ptc; ntc	**ntc**	Pr1
dP3	Third probe display	--	**noP**	Pr1
dP4	Fourth probe display	--	**noP**	Pr1

5 – SPARE PARTS LIST

See wiring diagram page 6 for reference

	DESCRIPTION	CODE
1	Evaporator fan	VCENT190D230V
2	Compressor	COMPRGPT18RG
3	Condenser fan	VCENT220D230V
C 1	Evaporator fan capacitor	CON2UFS2M8F
C 3	Condenser fan capacitor	CON2UFS2M8F
4	Regulating thermostat	TERMDIG1S1D2R
5	Anti-ice thermostat	TERM.ALL.COND
	Supply connector (male plug)	SPINALIM3.1
	Signals connector (male plug)	SPIN-SEGN4

WARRANTY

WE
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guarantees that the product is free from any quality defects.

The product is guaranteed for a period of 12 months from the date of delivery, provided it operates under the following conditions:

1. value of power supply indicated in the data plate is completely respected;
2. requirements specified on user's manual are completely respected;
3. cabinet temperature is not higher or lower than its rated temperature;
4. ambient temperature is not higher or lower than its rated temperature;
5. the product is mounted on cabinets with a minimum IP54 protection level;
6. the product is mounted on cabinets that not requiring higher cooling power than expected;
7. the product is clearly identifiable by serial number.

The warranty does not apply if :

1. the cooling circuit has been modified about type and quantity of refrigerant or composition;
2. the unit operates in acid or corrosive ambient;
3. the unit has been modified without ALFAPLASTIC consent.

This warranty shall become null as soon as the product is altered or modified in its structure or in circuits.
The terms of this warranty (commencement and termination dates) are not modified by any repair or replacement of products.
For every part that results defective during the period of this warranty, ALFAPLASTIC shall repair or replace it. Any others charges arising from removal, handling and installation of the products shall not be refunded by ALFAPLASTIC.
Like is specified on user's manual, installation, handling, the correct earthing in accordance with all current standards are under the responsibility of costumer.
In the event of any damage caused by a defective product shall apply the EEC85.374 standard.
The malfunction must be communicated in writing to ALFAPLASTIC.
Warranty is void if the costumer is not in good standing with the payments

LEGAL RAPRESENTATIVE

FIORATTI P.

UE DECLARATION OF CONFORMITY

WE
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DECLARE THAT THE AIR CONDITIONER FOR ELECTRICAL CABINETS

AVC, AVE, ARC SERIES

DO COMPLY WITH THE FOLLOWING DIRECTIVES

2006/42/CE MACHINERY DIRECTIVE (17 May 2006)
2014/35/UE LOW VOLTAGE DIRECTIVE (26 February 2014)
2014/30/UE EMC DIRECTIVE (26 February 2014)
2011/65/UE ROHS DIRECTIVE (8 June 2011)

STANDARDS APPLIED TO MEET THE PRINCIPAL ELEMENTS OF THE DIRECTIVE

EN 60335-2-40:2003; A1; A2 (IEC 60335-2-40: 2002; A1; A2)
EN 60335-1: 2010; A11; A13; A14; A1; A2 (IEC 60335-1; A1; A2)

OTHER STANDARDS APPLIED

EN 55014-1: 2017
EN 55014-2: 2015
EN IEC 61000-3-2: 2019
EN 61000-3-3: 2013

LEGAL RAPRESENTATIVE

FIORATTI P.

Form: No 1_1		Date	Name
Description Declaration of Conformity for air conditioner AVC,AVE, ARC	**ISSUE**	01/06/2020	Ascheri M.
	REV. 1		
	REV. 2		
	REV. 3		