

# VEDANT CORPORATION

***Go Green • Go GeoThermal***

***“One Company, One Call, Complete Comfort!”***

## **AIR CONDITIONING PLANNED MAINTENANCE 32-POINT CHECK LIST**



- ✓ Check and clean condenser coils.
- ✓ Check and clean drain pan.
- ✓ Check and clean condensate drains to prevent water overflow.
- ✓ Leak test all coils and connections for Freon leaks.
- ✓ Check capacitors for hazardous leaks.
- ✓ Monitor Freon site glass.
- ✓ Inspect for interior cabinet contamination and mold growth.
- ✓ Clean and sanitize evaporator coil [in place] for mold and mildew prevention. [Removal for cleaning additional charge.]
- ✓ Check and clean air filters.\*
- ✓ Check all supply vents for proper air circulation.
- ✓ Test heating elements for trouble-free operation.
- ✓ Check crank case heater.
- ✓ Check safety controls.
- ✓ Check all pumps and auxiliary equipment.
- ✓ Check reversing valve for proper operation.
- ✓ Lubricate motor and blower bearings.
- ✓ Note all corrosion spots and apply protective film, on equipment as needed.
- ✓ Inspect, clean and spray controls and switches.
- ✓ Check thermostat calibration & battery life.
- ✓ Check all electrical components for proper operation.
- ✓ Check all wire connections and replace, as needed.
- ✓ Check all relays for trouble-free operation.
- ✓ Inspect and clean contactor points.
- ✓ Test compressor's running amperage.
- ✓ Document motor amperages to compare to future visits.
- ✓ Check refrigerant flow control device.
- ✓ Test and monitor refrigerant pressures.
- ✓ Check operating temperatures and temperature drop across coils.
- ✓ System efficiency evaluation.
- ✓ Provide a detailed report upon completion of a maintenance visit.
- ✓ Provide preferential emergency service to **Agreement Holders**.
- ✓ Preferred customer discounts on all parts & labor, not covered under manufacturer's warranty.

\* Does not include replacement of filters

# VEDANT CORPORATION

## Manual For Panel Air Conditioner

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## 1. UPON ARRIVAL

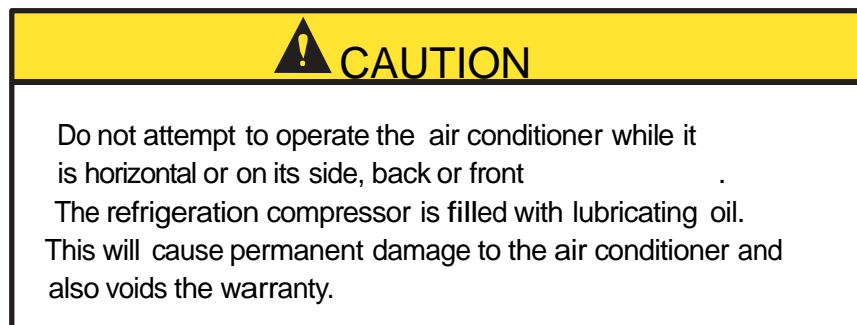
**PLEASE READ THE SERVICE MANUAL COMPLETELY BEFORE ATTEMPTING TO INSTALL THE CLOSED LOOP AIR CONDITIONER. FAILURE TO FOLLOW ANY PROCEDURE OR WARNING GIVEN WILL VOID THE WARRANTY.**

### A. UNPACKING AND INSPECTION

Inspect the Closed Loop Air Conditioner upon arrival. Check for concealed damage that may have occurred during shipping. Look for dents, scratches, loose assemblies, evidence of oil, etc. Any damage evidence upon receipt should be noted. Damage should be brought to the attention of the proper authorities immediately. We cannot accept responsibility for freight damages. However, we are ready to assist you in any way possible. After removal from the crate, be sure to remove any shipping clamps or packing from the compressor.

### B. HANDLING THE AIR CONDITIONER

If the air conditioner has been in a horizontal position, be certain it is placed in an upright, vertical position for a minimum of five (5) minutes before operating in order to allow oil to drain back.



### C. HOW TO IDENTIFY OUR CLOSED LOOP AIR CONDITIONER

For installation and maintenance as outlined in this manual, first refer to the nameplate which provides important data regarding the capacity of the unit, the type and amount of refrigerant required for re-charging and the electrical power characteristics.

## 2. INSTALLING / RUNNING OF CLOSED LOOP AIRCONDITIONER.

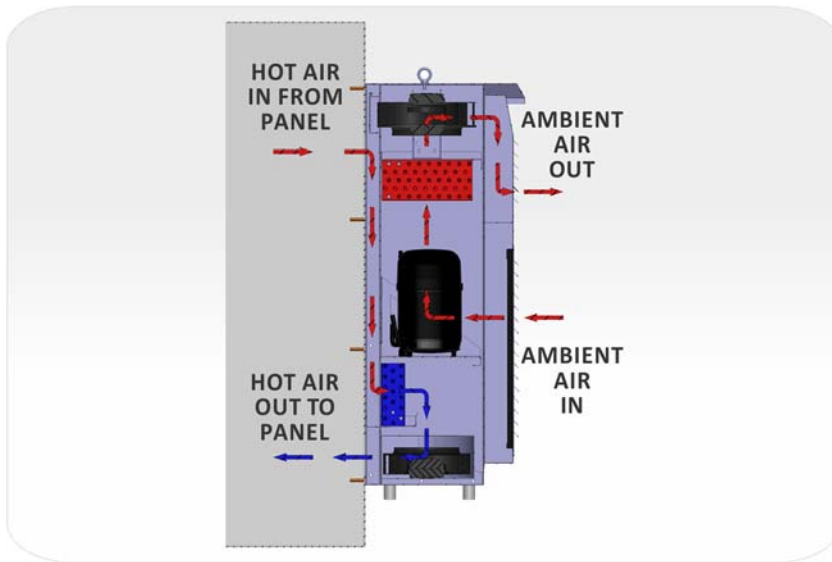
When mounting the Closed Loop air conditioner to the electronic cabinet or enclosure, the following procedure is to be followed:

- I-bolts are provided on top surface of the unit to facilitate the lifting. Please ensure that the I-bolts are fully screwed in before making an attempt to lift the unit.
- The unit should be lifted with crane or I Lifting arrangement showed be done and aligned with the cutout on the panel.
- Mounting bolts should then be carefully inserted in the corresponding mounting holes and fully tightening.
- The power cord should be checked for any damages and cuts during transit and the unit should be connected to the recommended rating power source.
- Immediately after applying power, the evaporator blower (enclosure air) should start running.
- You will need to set the cooling thermostat or controller set point below the ambient temperature to operate the compressor.
- Operate the air conditioner with the compressor running for five (5) to ten (10) minutes.

- Condenser air temperatures should be warmer than normal room temperatures within a few minutes after the condenser impellers s

### 3. HOW IT WORKS

#### A. PRINCIPLE OF OPERATION



The Closed Loop air conditioner is designed specifically to cool and dehumidify the internal environment of cabinet and enclosures which are used to package electronic components, thus assuring a cool, clean atmosphere for optimum performance and longevity.

Hot air inside the electronic cabinet or enclosure is drawn into the return air plenum of the air conditioner by the evaporator blower. This air is drawn through the evaporator coil, cooled and discharged back by the same blower, into the cabinet. Any moisture in this air condenses on the evaporator coil, collects in a tray and drains out. The Closed Loop design of the air conditioner assures that this clean, cooled air never mixes with dirty, hot room air that is used only for cooling the compressor and accomplishes the heat exchange through the condenser coil. Generally, the cabinet or enclosure air, which is being cooled and recirculated over and over again, does not require any filtering media.

Room, or ambient air drawn into the air conditioner through the inlet filter, across the compressor and through the condenser coil is usually dirty, dusty and or humid, depending upon the specific environment. The blower discharges this air back to the ambient environment. The temperature of this discharge air will be quite warm or actually hot, depending on the ambient temperature and the workload imposed on the air conditioner.

The internal temperature and humidity have to be maintained within safe limits. If the temperature is too low then moisture is likely to condense on the circuit boards and components if the panel is opened for some reason. This can happen near a small opening such as a screw hole even in a closed panel. The temperature has to be above the ambient dew point (which can go as high as 25°C) so as to avoid this. Industrial electronic components can operate safely up to 35°C. Rapid fluctuations, even within this range, would induce thermal stress and are harmful.

Inside humidity above sixty per cent would increase corrosion and cause erratic behavior due to air path leakage. The ideal value is fifty five per cent and this too must be held steady. The worst time for humidity problems is during the rainy season when it is hot and humid or in the sunny periods after the rain passes.

The inlet filter removes most of the dirt so that relatively clean air passes through the condenser coil

## 4. GENERAL MAINTENANCE

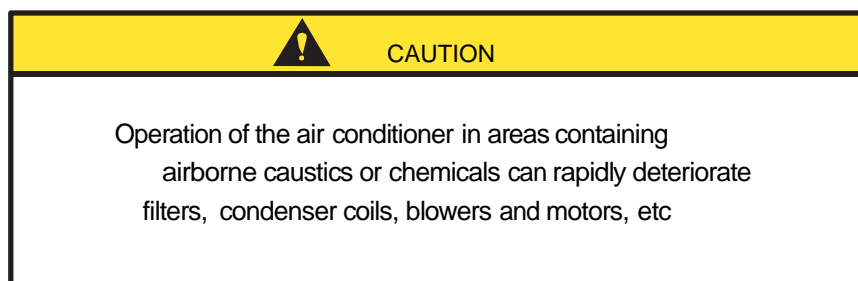
### COMPRESSOR

The compressor requires no maintenance. It is hermetically sealed, properly lubricated at the factory and should provide years of satisfactory operating service. Under no circumstances should the access fitting covers be loosened, removed or tampered with. Breaking of seals on compressor access fittings during warranty period will void warranty on hermetic system. Recharging ports are provided for the ease and convenience of reputable refrigeration repair service personnel for recharging the air conditioner.

### CONDENSER AND EVAPORATOR AIR MOVERS

Impeller motors require no maintenance. All bearings, shafts, etc. are lubricated during manufacturing for the life of the motor.

If one of the condenser impeller motors (ambient impellers) should fail, it is not necessary to remove the air conditioner from the cabinet or enclosure to replace the blower. The condenser blower is mounted on its own bulkhead and is easily accessible by removing the front cover



### REFRIGERANT LOSS

Each air conditioner is thoroughly tested prior to leaving the factory to insure against refrigeration leaks. Shipping damage or microscopic leaks not found with sensitive electronic refrigerant leak detection equipment during manufacture may require repair or recharging of the system. Qualified professionals, generally available through a local, reputable air conditioning repair or service company, should only perform this work. Should the refrigerant charge be lost, access ports on the suction and discharge sides of the compressor are provided for recharging and/or checking suction and discharge pressures.

Please refer to the data on the nameplate, which specifies the type of refrigerant and the charge size in grams. Before recharging, make sure there are no leaks and that the system has been properly evacuated into a deep vacuum.

Should the Freon charge be lost, charging lines are provided on the suction and discharge sides of the compressor for recharging and / or checking suction and discharge pressures. They are brazed shut, and must only be opened by a trained technician. Under no circumstance should the refrigerant lines be loosened, removed or tampered with. Only trained personnel must attend them as the System contains gases under pressure.

### INLET FILTER:

Proper maintenance of the inlet filter will assure normal operation of your CLOSED Loop air conditioner. If filter maintenance is delayed or ignored, the maximum ambient temperature under which the unit is designed to operate will be decreased.

As the compressor operating temperature increases above normal due to dirty or clogged inlet filter (or

plugged condenser coil), the air conditioner's compressor will stop operating due to actuation of the thermal overload cut-out switch located on the compressor housing. As soon as the compressor temperature has dropped to within the switch's cut-in setting, the compressor will restart automatically. However, the above condition will continue to take place until the filter has been cleaned or replaced.

It is recommended that the air conditioner be stopped when abnormally high compressor operating temperature causes automatic shutdown of the unit. The above-described shutdown is symptomatic of clogged or dirty filters, thus causing a reduction in cooling airflow across the surface of the compressor and condenser coil.

Continued operation under the above conditions can and will damage and shorten compressor life. The air conditioner features an easily removable inlet filter to facilitate necessary cleaning. There should be no reason to neglect this necessary maintenance.

### **HOW TO REMOVE, CLEAN OR INSTALL A NEW INLET AIR FILTER**

The air filters are designed to provide excellent filtering efficiency with a high dust holding capacity and a minimum amount of resistance to airflow. To achieve maximum performance from your air handling equipment, air filters should be cleaned on a regular basis.

The inlet air filter is located behind the front access cover. To remove filter, push or pull to it after opening the front access cover. The filter may now be cleaned or a new filter installed.

#### **Cleaning Instructions:**

1. Flush the filter with warm water from the exhaust side to the intake side. **DO NOT USE CAUSTICS.**
2. After flushing, allow filter to drain. Placing it with a corner down will assure complete drainage

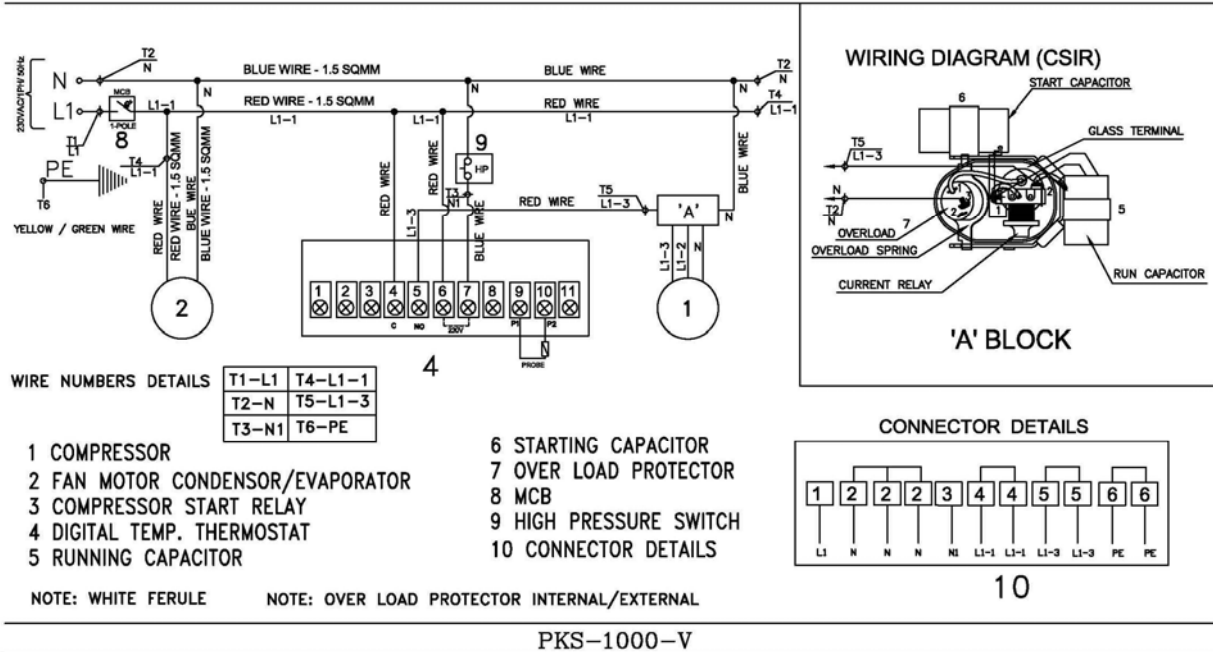
## **5. WARRANTY**

One year limited warranty is offered on the air conditioner as under: The Closed Loop Air Conditioner is guaranteed for a period of 12 months from the date of purchase invoice. Any part of the air conditioner found defective due to faulty workmanship or material during the guarantee period, should be repaired or replaced by us. The transportation of any parts or the whole unit through our workshop and its return will have to be prepaid by the customer. The guarantee is expressly limited to repair and replacement of the air conditioner only and does not cover any loss or consequent damages due to non-functioning of the air conditioner. The guarantee is void if a party other than ourselves carries out repairs or modifications or a party not authorized by us.

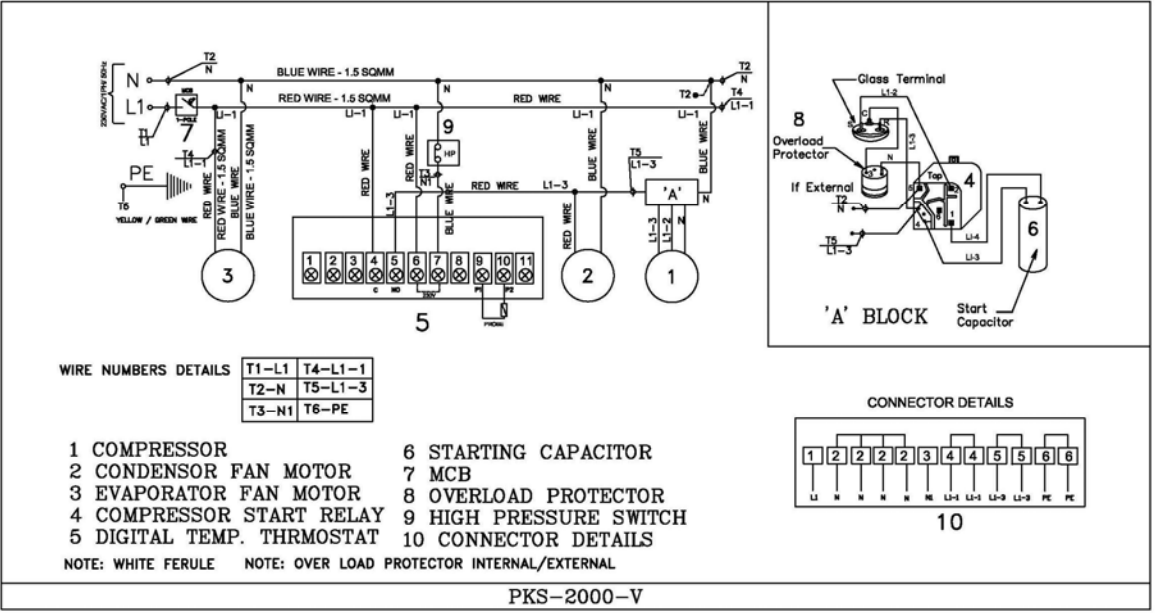
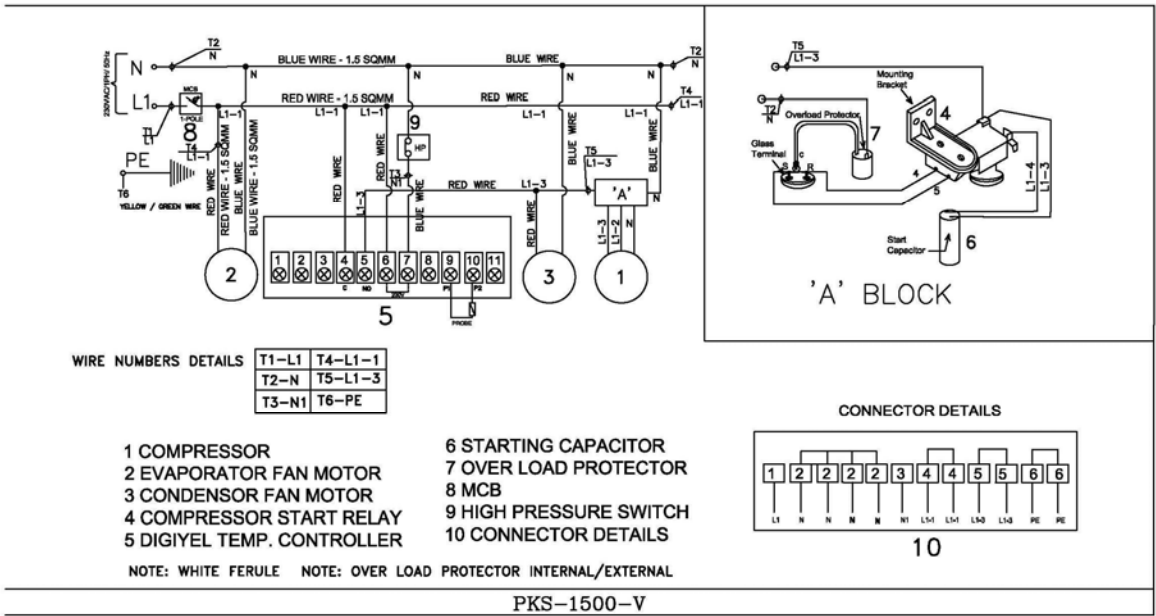
## 6. Technical Specification

Model Number	PKS-1000-V	PKS-1500-V	PKS-2000-V	PKS-3000-V
Cooling Capacity In Watts	1000	1500	2000	3000
Rated Operating Voltage	230V 50Hz, Single $\phi$	230V 50Hz, Single $\phi$	230V 50Hz, Single $\phi$	230V 50Hz, Single $\phi$
Dimensions In mm HxWxD mm	1000 x 375 x 250	1000 x 375 x 250	1000 x 440 x 300	1400 x 400 x 330
Rated Current	3.1 Amps	5.1 Amps	7.7 Amps	8.5 Amps
Refrigerent	R134a	R134a	R134a	R134a
Temperature Operating Range	10°C to 45°C	10°C to 45°C	10°C to 45°C	10°C to 45°C
Duty Cycle	100%	100%	100%	100%
Weight In kgs	41	43	57	79
Standard Colour	RAL 7035	RAL 7035	RAL 7035	RAL 7035

## 7. ELECTRICAL CIRCUIT DIAGRAM

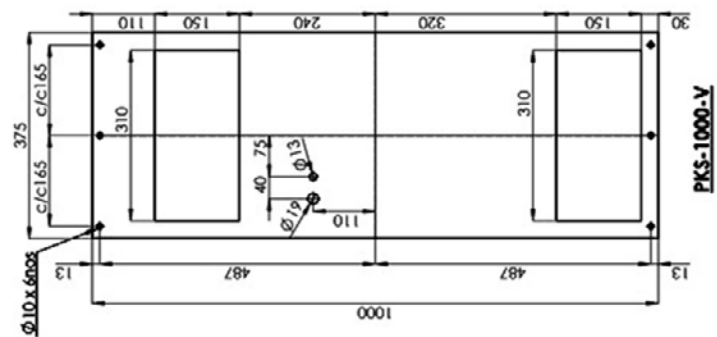
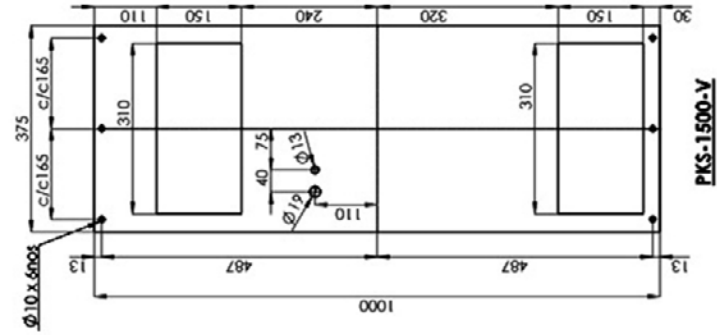
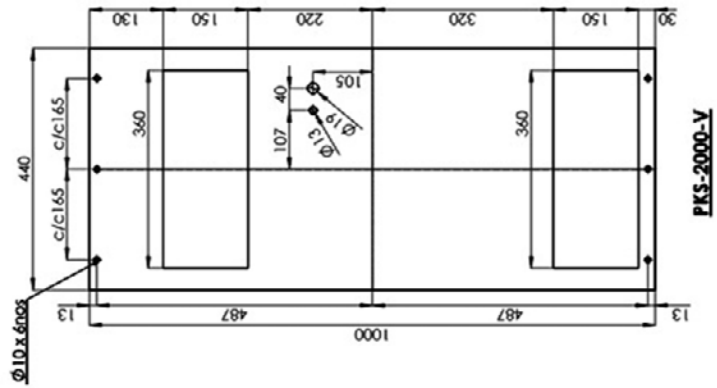
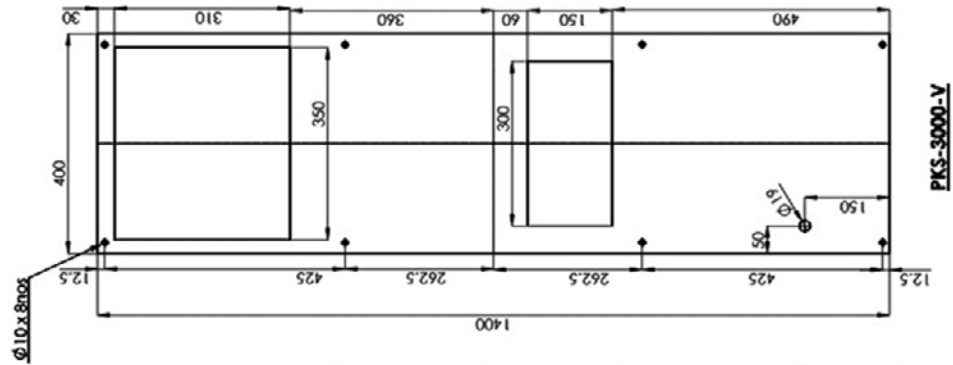


# 7. ELECTRICAL CIRCUIT DIAGRAM





# 8. PANEL CUT OUT DIAGRAM



**PANEL CUTOUTS FOR AIRCONDITIONER**

## 9. Troubleshooting

The following table details possible unit faults, their probable cause and suggested remedies. For any other problems not immediately recognizable and/or for technical assistance, contact our nearest Service Center.

FAULT	SUSPECTED COMPONENT	PROBABLE CAUSE	REMEDIAL ACTION
A/C does not start	a) Power / Cable connection b) Low thermostat  C) HP/LP (OPTIONAL)	a) Unit not getting any power  b) Low temperature thermostat has a 3-minute time delay. This could malfunction preventing the unit from starting C) HP/LP TRIP	a) Check mains supply  b) Change low thermostat  C) Manually Reset The HP/LP
Compressor does not start (Low Temp. Alarm)	Low temperature thermostat	The low temperature setting is more than panel temperature	Set low temperature thermostat to 35 °C
Compressor starts and trips	OLP (Over Load Protection)	Compressor is taking high current and OLP trips	Call qualified A/C technician
The A/C runs but inadequate cooling	Condenser	Condenser choke up	a) Clean the Condenser by blowing air b) Clean the filter as per instruction in the manual
	Thermostat	Thermostat setting	Set the thermostat in the required temp. range. We recommend 35°C as ideal setting
	Pressure Switch	Gas leakage	To be rectified with the help of qualified A/C technician.
		Panel load to high or surrounding ambient temp. too high	Check for any leakage in the panel and insulate it.
A/C unit making too much noise		Incorrect installation of the unit	Install the unit in correct manner and check its level
High Temp. Alarm		a) Gas leakage  b) A/C sizing not correct c) High Temperature thermostat defective.	a) Call qualified A/C technician b) Consult factory c) Change high temp. thermostat
Condensation observed in the panel or condensed water continuously flowing from drainpipe / vent.		a) Either panel door is open or outside air is coming in the panel b) Thermostat set at very low temperature	a) Check panel door and check panel for leakage  b) Set thermostat to 35°C

### 3. USER INTERFACE AND START UP

#### 3.1 easy

##### Display

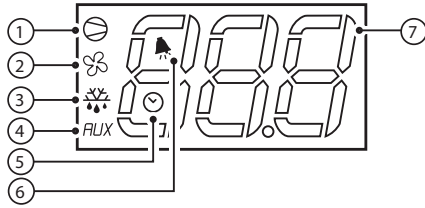


Fig. 3.a

but. no.	function	normal operation			start up
		ON	OFF	flash	
1	compressor	on	off	call	ON
2	fan	on	off	call	ON
3	defrost	on	off	call	ON
4	auxiliary output (AUX)	output active	output not active	-	ON
5	clock (RTC)	RTC available, enabled (tEN=1) and at least one time band has been set	RTC not available or not enabled (tEN=0) or no time band set	-	ON (if the clock is fitted)
6	alarm	alarm in progress	no alarm in progress	-	ON
7	digits	three digits with decimal point and range -199 to 999. See parameters /4, /5, /6 for the type of probe displayed, values in °C/°F and decimal point			

Table 3.a

##### Keypad (models C, S, X, Y)

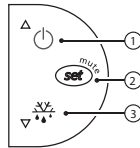


Fig. 3.b

but. no.	normal operation		start up	
	pressing the button alone	pressing with other buttons		
1	more than 3 s: switch ON/OFF	pressed together with 3 activates / deactivates the continuous cycle	-	
2	- 1 s: displays/sets the set point - more than 3 s: accesses the parameter setting menu (enter password 22) - mutes the audible alarm (buzzer)	-	for 1 s RESET current EZY set	pressed together (2 and 3) activate parameter reset procedure
3	more than 3 s: activates / deactivates the defrost	pressed together with 1 activates / deactivates the continuous cycle	for 1 s displays firmware version	

Table 3.b

#### 3.2 easy compact

##### Display

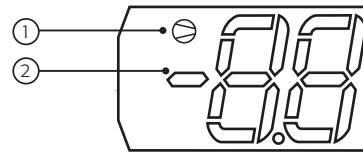


Fig. 3.c

but. no.	function	normal operation			start up
		ON	OFF	flash	
1	compressor	on	off	call	ON
2	digits	two digits with sign and decimal point, -99 to 99(*). See parameters /4, /5, /6 for the type of probe displayed, values in °C/°F and decimal point			

Table 3.c

(\*) The parameters that feature three digit values can be set from the supervisor. In this case, the display will show "---".

##### Keypad (model S)

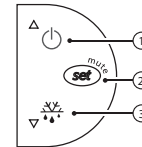


Fig. 3.d

but. no.	normal operation		start up	
	pressing the button alone	pressing with other buttons		
1	more than 3 s: switch ON/OFF	pressed together with 3 activates / deactivates the continuous cycle	-	
2	- 1 s: displays/sets the set point - more than 3 s: accesses the parameter setting menu (enter password 22) - mutes the audible alarm (buzzer)	-	for 1 s RESET current EY set	pressed together (2 and 3) activate parameter reset procedure
3	more than 3 s: activates / deactivates the defrost	pressed together with 1 activates / deactivates the continuous cycle	for 1 s displays firmware version	

Table 3.d

##### Keypad functions for easy and easy compact M models (models with keypad only)

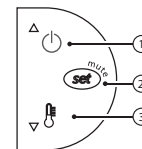


Fig. 3.e

but. no.	normal operation		start up	
	pressing the button alone			
1	more than 3 s: switch ON/OFF		-	
2	- 1 s: displays/sets the set point - more than 3 s: accesses the parameter setting menu (enter password 22) - mutes the audible alarm (buzzer)		-	pressed together activate parameter reset procedure
3	rapid selection of probe displayed		for 1 s displays firmware version	

Table 3.e

### 3.3 easy split

#### Display

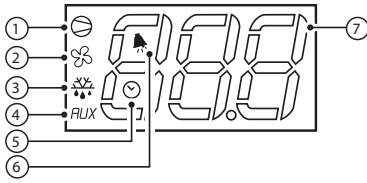


Fig. 3.f

but. no.	function	normal operation			start up
		ON	OFF	flash	
1	compressor 1/2	on	off	call	ON
2	fan	on	off	call	ON
3	defrost	on	off	call	ON
4	auxiliary output (AUX) - light	output active	output not active	-	ON
5	clock (RTC)	RTC available, enabled (tEN=1) and at least one time band has been set			ON (if the clock is fitted)
6	alarm	alarm in progress	no alarm in progress	-	ON
7	digits	three digits with decimal point and range -199 to 999. See parameters /4, /5, /6 for the type of probe displayed, values in °C/°F and decimal point			

Table 3.f

#### Keypad

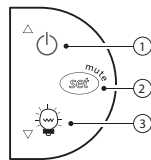


Fig. 3.g

but. no.	normal operation		start up
	pressing the button alone	pressing with other buttons	
1	more than 3 s: switch ON/OFF light (H1=4) or defrost	pressed together with 3 activates / deactivates the continuous cycle or defrost (see par. H6)	-
2	- 1 s: displays/sets the set point - more than 3 s: accesses the parameter setting menu (enter password 22) - mutes the audible alarm (buzzer)	-	for 1 s RESET current EZY set  pressed together (2 and 3) activate parameter reset procedure
3	more than 3 s: activates / deactivates light (H1=4) or defrost	pressed together with 1 activates / deactivates the continuous cycle or defrost (see par. H6)	for 1 s displays firmware version

Table 3.g

### 3.4 Preliminary configurations

Once the electrical connections have been completed, simply power-up the controller to make it operative.

CAREL then recommends to check that the display does not show any alarm signals (see par. "5.1 Table of alarms and signals" on page 31), then set the time and date (in the models fitted with RTC, see par. "4.11 Clock and time band parameters" page. 28), and finally set the parameters as desired. The main parameters are as follows:

#### Control parameters

st	set point
rd	set point differential
/P (only easy split)	select type of probe

#### Defrost parameters

d0	type of defrost
dl	interval between two defrosts
dt	end defrost temperature
dP	maximum defrost duration

#### Alarm parameters

Ad	temperature alarm delay
AL	low temperature alarm threshold/deviation
AH	high temperature alarm threshold/deviation
A0	alarm and fan temperature differential

Table 3.h



**Note:** The procedure for modifying the parameters is described in par. "5.4 Modifying the parameters" page 32.

### 3.5 Functions available from the keypad

#### On and off

**Switching the instrument ON:** press UP for more than 3 s (when pressing the button, the display shows ON).

**Switching the instrument OFF:** press UP for more than 3 s. The display shows the message "OFF", alternating with the temperature measured by the set probe.

In off status, the following functions are disabled (if featured by the model):

- compressor control / duty setting / continuous cycle;
- defrost;
- fan control;
- alarms : 'LO', 'HI', 'IA', 'cht', 'CHT';
- door switch:
  - easy, easy compact: A4=7/8;
  - easy split: A4=7/8/10/11;
- buzzer (when available).

While the following are enabled:

- temperature display, alternating with the message "OFF";
- parameter display and setting;
- alarms: "E0", "E1", "E2";
- the internal timer relating to parameter 'dl' is updated. If 'dl' expires in OFF status, a defrost is performed when restarting;
- auxiliary relay management, only in the following configurations:
  - H1= = 1/2 ("E0" alarm only);
  - H1= 3, A4= 6;
  - H1=4 (easy split only).



**Note:** when exiting OFF status, the following settings are set to zero (that is, are not saved prior to OFF): evaporator fan alarm hysteresis and management (A0), temperature control hysteresis (rd), cht pre-alarm hysteresis (AE). In addition, the delays are set to zero for the display of the temperature alarms (Ad, d8, c6), dripping (dd) and post-dripping (Fd).

## 5. TABLES OF ALARMS AND PARAMETERS

### 5.1 Table of alarms and signals

When an alarm is activated, the display shows the corresponding message that flashes alternating with the temperature; if fitted and enabled, the buzzer and the alarm relay are also activated.

All the alarms have automatic reset (that is, they stop when the causes are no longer present), except for alarm 'CHt' which has manual reset (instrument on/off using the UP button or by disconnecting the power supply). Pressing the SET button mutes the buzzer, while the code displayed and the alarm relay only go off when the causes of the alarm have been resolved. The alarm codes are shown in the table below:

The possible alarm codes are shown in the following table:

alarm code	buzzer and alarm relay	LED	alarm description	reset	ENABLE ALARM parameters involved	easy	easy compact	easy split
E0	active	ON	probe 1 error= control	automatic	-	✓	✓	✓
E1	not active	ON	probe 2 error= defrost	automatic	d0= 0 / 1 / 4, F0= 1	✓	✓	✓
E2	not active	ON	probe 3 error= condenser/product	automatic	easy, easy compact [A4=10/11] easy split [A4=13/14]	✓	-	✓
IA	active	ON	external alarm	automatic	[A4 = 1] [+A7]	✓	-	✓
dOr	active	ON	open door alarm	automatic	easy, easy compact [A4=7/8][+A7] easy split [A4=7/8/10/11][+A7]	✓	-	✓
LO	active	ON	low temperature alarm	automatic	[AL] [Ad]	✓	✓	✓
HI	active	ON	high temperature alarm	automatic	[AH] [Ad]	✓	✓	✓
EE	not active	ON	unit parameter error	not possible	-	✓	✓	✓
EF	not active	ON	operating parameter error	manual	-	✓	✓	✓
Ed	not active	ON	defrost ended by timeout	on first defrost ended correctly	[dP] [dt] [d4] [A8]	✓	✓	✓
dF	not active	OFF	defrost running	automatic	[d6=0]	✓	✓	✓
cht	not active	ON	dirty condenser pre-alarm	automatic	easy, easy compact [A4=10] easy split [A4=13]	✓	-	✓
CHt	active	ON	dirty condenser alarm	manual	easy, easy compact [A4=10] easy split [A4=13]	✓	-	✓
EtC	not active	ON	clock alarm	by setting the time	if bands are active	✓	-	✓
SrC (easy split only)	not active	ON	maintenance request signal	manual, set HMr=1	[HMP] [HMD] [HMr]	-	-	✓

Table 5.a



**Note:** in easy split controllers, when starting control (powering up the controller and/or switching from OFF status), the high temperature alarm signal is disabled until the first time the compressor stops, to avoid false signals. The first time the compressor stops indicates that the set temperature has been reached, and, consequently, the high temperature alarm signal is enabled. This function is always active.

### 5.2 Description of the main signals and alarms

#### LED flashing

The activation of the corresponding function is delayed by a timer, awaiting an external signal or disabled by another procedure that is already in progress. e.g. if is a continuous cycle in progress and a defrost is called, the latter will remain pending until the end of the continuous cycle, and the corresponding LED (defrost) will flash.

#### E0 steady or flashing

control probe error:

- probe not working: the probe signal is interrupted or short-circuited;
- probe not compatible with the instrument;

The alarm signal E0 is steady if it is the only active alarm (the temperature value is not displayed), while it flashes if other alarms are active or the second probe is displayed.

#### E1 flashing

evaporator probe or food conservation probe error:

- probe not working, the probe signal is interrupted or short-circuited;
- probe not compatible with the instrument;

#### E2 flashing

condenser probe or food conservation probe error:

- probe not working, the probe signal is interrupted or short-circuited;
- probe not compatible with the instrument;

#### IA flashing

immediate or delayed alarm from multifunction digital input:

- check the multifunction input and parameters A4 and A7.

#### dOr flashing

open door alarm:

- check the multifunction input and parameters A4 and A7.

#### LO flashing

low temperature alarm. The probe has measured a temperature lower than the set point by a value that exceeds parameter AL:

- check parameters AL, Ad and A0.

The alarm is automatically reset when the temperature returns within the set limits (see parameter AL).

#### HI flashing

high temperature alarm. The probe has measured a temperature higher than the set point by a value that exceeds parameter AH:

- check parameters AH, Ad and A0.

The alarm is automatically reset when the temperature returns within the set limits (see parameter AH).

#### EE displayed during operation or on power-up

unit parameter reading error. See Data errors.