KOLDWAVE

Portable Air Conditioners
Model KWV–10

SETUP, OPERATION, AND MAINTENANCE MANUAL
10 TON PORTABLE VERTICAL AIR CONDITIONING UNIT

KOLDWAVE
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KWV-10G*ATA**
REV — 02/26/20

Koldwave

MODEL NO.	HKW30G3ATA60-TR				
SERIAL NUMBER	1610057				
VOLTS	208/230	PHASE	3	CYCLE	60
COMP. LRA	351 EA	QTY	2	RLA	53.6 EA
EVAP. MOTOR HP	15.0	FLA	35		
COND. MOTOR HP	3.0 EA	QTY	2	RLA	8.6 EA
ELEC. HEATER KW	60				
MCA	240.8				
MOP	250				
FACTORY CHARGE	R-410A	46 lb 0oz CKT1			
		46 lb 0oz CKT2			

TEST PRESS. HISIDE 500 PSIG - LOSIDE 250 PSIG

COMPRESSOR MOTOR AND FAN ARE THERMALLY PROTECTED

USE COPPER CONDUCTORS ONLY.

EXT. STATIC PRESS - 0.1 TO 1.0 IN. WC.

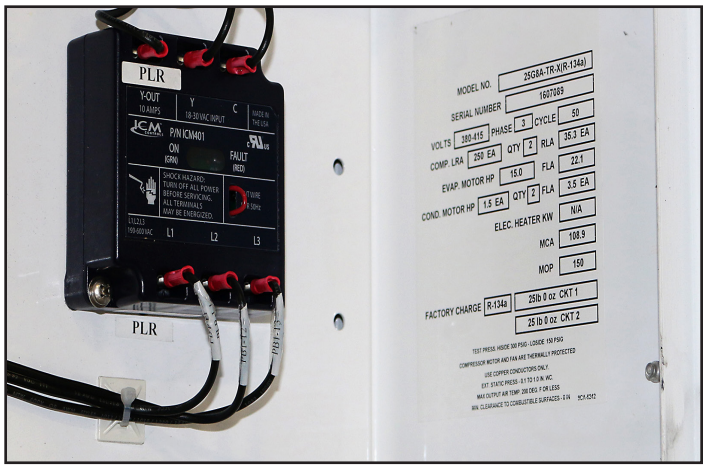
MAX OUTPUT AIR TEMP. 200 DEG. F OR LESS

MIN. CLEARANCE TO COMBUSTIBLE SURFACES - 0 IN

9CA-6242

IDENTIFICATION OF YOUR PORTABLE UNIT

The Data Tag contains important information on how identify your Koldwave Unit. See Figure 1 for more information on locating tag.



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WARNING: HIGH VOLTAGE – DISCONNECT POWER BEFORE SERVICING	
DISCONNECT POWER Failure to disconnect power before servicing could lead to severe personal injury or death.	**RE-CONNECT ALL GROUNDS** All parts of this product capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for servicing, they must be reconnected at their original location.

SPECIFICATIONS

TECHNICAL DATA		KWV10G*ATA[KW]	
Total Capacity [1]	BTUH	119,770	
Sensible Capacity [1]	BTUH	85,670	
Cooling Operating Range [8]		65° F - 115° F	
Refrigerant Type		R-410a	
Compressor Type (Qty)		Scroll (2)	
Filter	Type	Cleanable	
	Size	14 X 54.5	
	Qty	1	
Evaporator Coil Face Area	Sq. Ft.	9	
Evaporator Coil Rows Deep		3	
Evaporator	CFM	4,000	
	ESP	NA	
	HP	1.5	
Condenser Coil Face Area	Sq. Ft.	11.25	
Condenser Coil Rows Deep		4	
Condenser	CFM	7,500	
	ESP	NA	
Condenser Air Movement Type		Belt Drive DWDI	
Condenser Motor HP (Qty)		3.0 (1)	
		Cooling Only	
208/230-3-60	FLA	52.4	
	MCA	57.2	
	kW [3]	17.4	
460-3-60	FLA	25.9	
	MCA	28.3	
	kW [4]	16.3	
Heater Type (Optional)		Finned Tubular	
		Heating Only	
Available Electric Heat	kW / Stages	15 / 1	30 / 2
208/230-3-60 [6]	FLA	44.2	83.5
	MCA	45.4	84.7
	kW [3]	16	31
460-3-60 [7]	FLA	23.3	44.1
	MCA	23.9	44.7
	kW [4]	16	31
Unit Dimensions	Inches	65.5" L x 35.5" W x 83" H	
Approximate Net Unit Weight	Lbs.	1140 [5]	

[1] Entering Air 80° F DB / 67° F WB with 95° F Outdoor Ambient
[2] Voltage Codes (*): 2 = 208/230-3-60
4 = 460-3-60
[3] kW at 0.8 Power Factor and 208 Volts
[4] kW at 0.8 Power Factor and 460 Volts
[5] Does not include options.
[6] Electric heater FLA listed at 220 volts.
[7] Electric heater FLA listed at 460 volts.
[8] Operating range can be extended lower by adding a low ambient option.

INSPECTION OF EQUIPMENT

Upon receipt of unit, inspect for visible or concealed damage. Report any damage to the carrier and file a damage claim.

MOUNTING THE EQUIPMENT

The unit is a self-contained air cooled system. It should be mounted on a level surface.

INSTALLATION OF UNITS

The standard configuration of the portable vertical unit is shown in Figure 1 - Standard Portable.

1. The unit shall be shipped as a single packaged unit.
2. The unit is fully charged with R410A when shipped.
3. The unit is provided with forklift pockets at the bottom for moving the unit to the desired location for installation.
4. Connect the condensate drain line for the unit. A “kazoo” tube is shipped loose with the unit. Run hose from the condensate drain connection to the desired condensate disposal location and attach the “kazoo” tube to the end of the hose.

NOTE: The “kazoo” tube acts as a condensate trap and is required.

5. Refer to the unit data plate for main power requirements. Electrical wiring and grounding must be installed in accordance with the latest revision of the AS/NZS 3000 standard. Route the incoming power to the unit’s main power connection. **Make sure the power supplied to the unit matches the unit power requirements for this unit.**

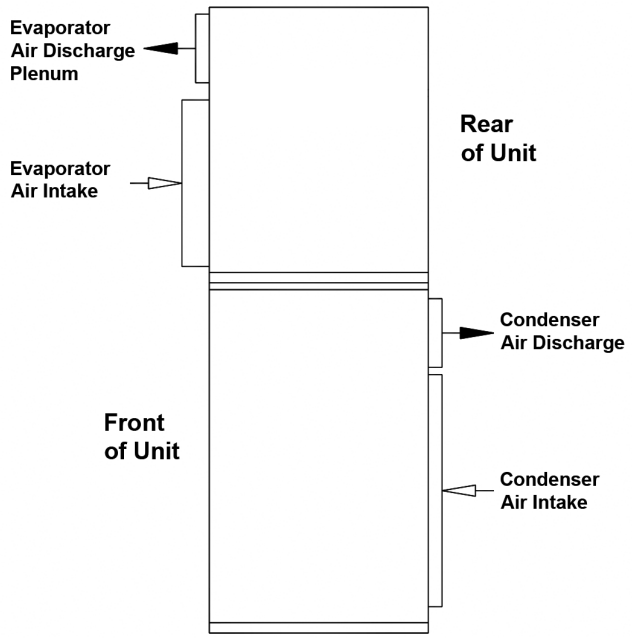


Figure 1 – Standard Portable

6. **[Optional]** Install the tent material under the tent clamps on each side of the cabinet. A 7/16" wrench is required to loosen the bolts securing the tent clamps.

NOTE: Do not over-torque tent clamp bolts.

OPERATING INSTRUCTIONS

Before electrical power is applied to the unit, make sure the unit is connected to an earth ground. The circuit breaker should be in the “OFF” position.

Electrical power is supplied to the unit from a power source (shore power or generator) via a connecting cable, which terminates in the factory supplied power connection. Connect the main power wires to the power connectors. See Figure 2 – Power Input Location. This supplies power to the entire unit. Make sure that the power that will be supplied to the unit matches the electrical data label provided in the unit.

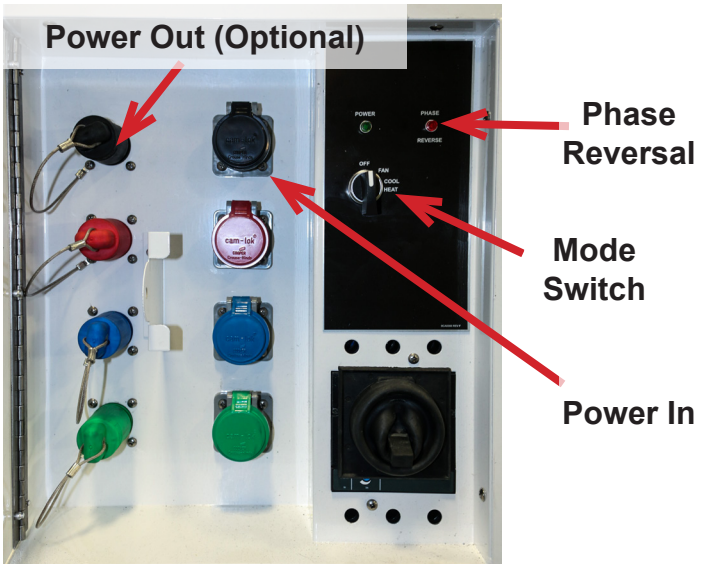


Figure 2 – Power Block Location

Internal wiring connects the incoming power to a circuit breaker, which also serves as a service disconnect switch. Switching the breaker to the "ON" position supplies power to the unit.

Once the power is turned "ON", proper sequencing of the three phase power input will be indicated by the lighting of the Phase Indicator Lamp (PIL). If the lamp is lit, change any two of the conductors (excluding the ground wire) at the power source. Do not change wiring internal to the unit! This unit will not run unless the phasing is correct.

CONTROLS

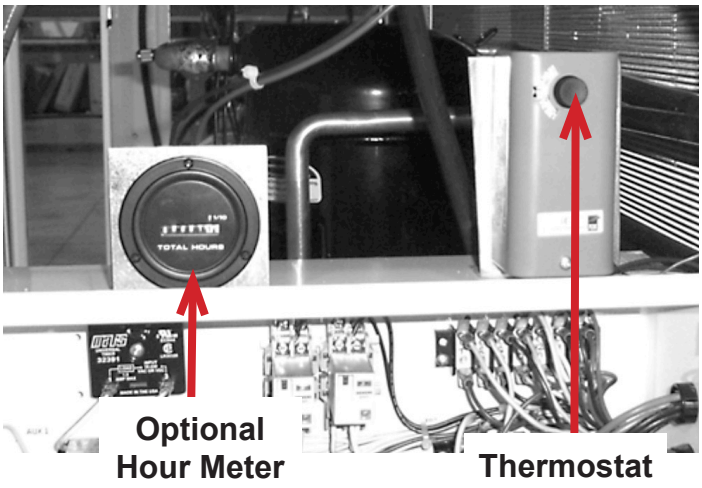


Figure 3 - Thermostat

NOTE: A time delay is built into the system to prevent Stage 1 and Stage 2 compressors from energizing simultaneously if two stages are desired to operate at the same time. This time delay is set to 5 minutes.

Thermostat Operation – Unit Mounted:

1. Set Mode Switch to the desired mode of operation (FAN, COOL or HEAT).
2. Set the thermostat settings on the Penn A28 thermostat (see Figure 3 – Thermostat) to the desired temperature setting. Turn the Temperature dial to the desired temperature setting.
3. Stage 1 and Stage 2 cooling or heating will operate based upon the thermostat setting and the mode selected in Step 1.

When the space temperature rises approximately 1° F above the setting the system will turn "ON". The differential between stages is approximately 2° F. The equipment will not cycle more than 6 times per hour in the cooling mode.

UNIT COMPONENTS

Optional Deflection Registers

The supply grilles are divided into 2 rows of manually adjustable louvers.

The horizontal louvers are in the front row. These are individually adjusted by hand.

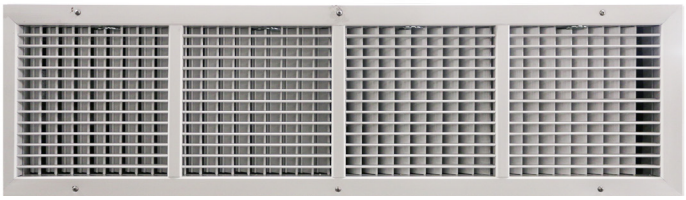
The vertical louvers are the second or back row. Each section has a louver adjustment tab. The tab will adjust the vertical louvers as a section and can be moved with your finger.

Optional Hour Meter

The unit may be equipped with an optional hour meter. This meter indicates the cumulative operating time of the system.

ELECTRIC HEAT (Optional)

Electric heat elements are located in the Discharge Plenum.



To access them, remove Plenum grille.

Sight Glass

Each refrigerant circuit has a sight glass to determine that a liquid seal of refrigerant exists going to the expansion valve.

The sight glass also has a moisture indicator to detect the presence of moisture in the refrigerant. The indicator is yellow if moisture is present and green in color if there is no moisture.

If bubbles appear in the sight glass, the system is either undercharged with refrigerant or there may be a restriction in the liquid line upstream of the sight glass.

NOTE: Bubbles will occur for a minute or two when the compressor system starts. Bubbles will also be present during low ambient operation or on the 20-ton unit circuit 1 when the hot gas bypass is activated. Do not add charge to overcome bubbles for these reasons.

Access Fittings

Each refrigerant circuit is provided with Schrader type access fittings. These can be used to adjust the refrigerant charge if necessary.

Air Flow

The units are provided with an air proving switch. If air flow is not detected, the unit will not allow the cooling circuit to function. This protects in the case of a motor or belt failure.

Pressure Switches

Each refrigerant circuit is provided with a High and a Low pressure switch. These units contain lockout relays that activate when the pressure switch(s) open the circuit. The main power to the unit must be switched Off and then On to reset the lock out relays

CAUTION: Unit power should be turned off when doing any work on the unit when one or both of the pressure switches has been opened. Unit may start when the pressure switches automatically reset, thus causing a hazard to the service personnel.

The high pressure switch is a manual reset type. See Figure 5.

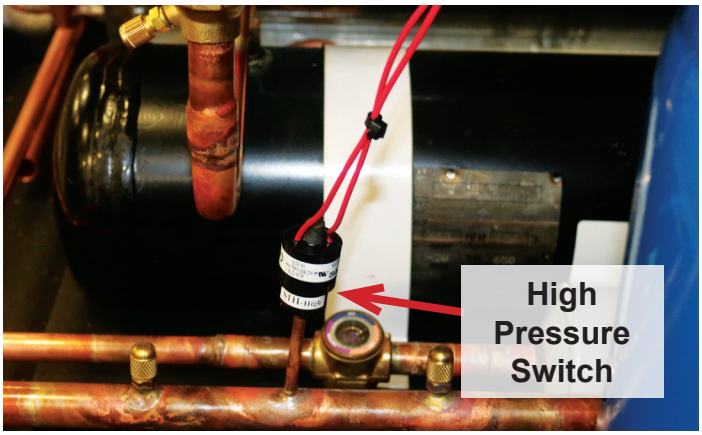


Figure 5 - Manual Reset Switch

Hot Gas Bypass – (Optional)

Units have a Hot Gas Bypass valve on System 1. This valve helps keep the system running when the space load drops. It functions by artificially loading the evaporator with some hot discharge gas from the compressor into the inlet of the evaporator.

MAINTENANCE

Bearings

Motor and Blower bearings are permanently lubricated and require no maintenance.

Belts

The condenser and evaporator blowers are belt driven and are provided with adjustable sheaves to change the speed. The drive belts should be examined periodically for wear and for correct tension. If the belts are too tight it can cause bearing wear and a loose belt can cause slippage. If the two legs of the belt are pressed in, midway between the pulley and the sheave, and results in 1” to 1-1/2” of movement, the belt is tensioned properly. Belt tension can be adjusted by means of the adjusting bolt, which requires loosening a nut to move the motor to change belt position.

Filter Maintenance

If the unit has disposable filters, inspect at least once a month and change as required. Access to the disposable filter is gained through the return air grille.

The unit may also contain optional cleanable filter(s) installed in the evaporator return air section. The return air grille must be removed to gain access to the filters. Check filters every few weeks to verify that the filters are clean.

After a period of use, dirt, lint, and the original water soluble adhesive coating are easily removed by simply flushing the filter in a stream of water.

Apply a new coating of adhesive, such as RP Super Filter Coat, to restore the filter characteristics.

FRESH AIR DAMPER - OPTIONAL

This unit is supplied with an optional fresh air slide damper. The fresh air is introduced AFTER the DX coil, and is not conditioned.

Thermostat

The unit has a digital thermostat for one stage of cooling refer to the appendix at the end of the manual for operating instructions.

(Optional) Time Delay (TD) – Compressor Short Cycling

A time delay relay that delays the start of the compressor for 5 minutes when there is a call for cooling.

REFRIGERATION SYSTEM COMPONENTS

Compressor

The compressor is scroll hermetic type. The function of the compressor is to create a differential in refrigerant pressure. It converts low pressure, low temperature refrigerant vapor entering the suction side of the compressor into a high pressure, high temperature gas at the discharge side of the compressor. The function of the compressor also pumps the refrigerant through the piping and components within the refrigeration system.

Condenser Coil

The condenser receives the high-pressure high-temperature gas from the compressor after it passes through the vibration eliminator. As the condenser blower draws the ambient air across the fins and tubes of the condenser coil and the high-pressure high-temperature gas enters the condenser coil, the gas starts to condense back into liquid state. At the outlet piping of the condenser coil, the gas has been turned back into liquid refrigerant and flows toward the receiver.

Evaporator Coil

As the liquid refrigerant passes through the expansion valve, the liquid refrigerant’s pressure is regulated downward. This significant change in pressure causes a drop in temperature of

the refrigerant. When the warmer ambient air is drawn over the cooler evaporator coil, the warmer or latent heat is exchanged. As the heat is being exchanged, the exchange of heat energy causes the liquid refrigerant to boil into a vapor and greatly reducing the temperature of the air on the outlet side of the coil. The liquid refrigerant is converted into the lower temperature, lower pressure refrigerant causing it to changing into a vapor state.

Filter Drier

The filter drier, filters loose particles, moisture and possible brazing residue from the system. If the unit starts tripping on low pressure cutout and the refrigerant line is frosted up to the outlet of the filter drier, check the refrigerant pressure drop across the filter drier and replace the filter drier if necessary.

Sight Glass

A liquid sight glass is located before the liquid line solenoid valve. During the cooling mode of operation, pure liquid should flow through the liquid sight glass. The liquid refrigerant will appear clear enough to see the back of the inside of the sight glass. Flashing (bubbles) will appear in the sight glass during the first minute or two of operation until the expansion valve fully adjusts. If flashing is constant during the cooling mode, it may be an indication the unit is short of refrigerant. There may also be some flashing during hot gas bypass operation. See the Troubleshooting Chart for further details.

Thermostatic Expansion Valve

The expansion valve regulates the amount of liquid refrigerant entering into the evaporator. As the liquid enters into the expansion valve, the valve will start to change the state by changing the pressure of the liquid refrigerant as it passes through and starts to enter the evaporator coil. When the environments load conditions start to change, the bulb recognizes a change in temperature at the outlet piping of the evaporator to the suction side of the compressor and automatically adjusts the valve to maintain the correct flow into the evaporator coil.

ROUTINE MAINTENANCE

To keep the Portable Air Conditioner unit operating safely and efficiently, it is recommended that a qualified service technician check the entire system at least once a year. Check the system more frequently depending on use and surrounding conditions.

Filters

It is very important to keep the air filters clean. Be sure to inspect them at least once each month when the system is in constant operation. The unit typically has a cleanable air filter. Remove the filter and use a brush to brush caked on dust from the filter. Next, use a stream of warm water to rinse remaining dust from the filter then reinstall.

If the unit is equipped with disposable type air filters, replace them with the same type and size.

NOTE: Do not attempt to clean disposable air filters.

Condenser Coil

Inspect the condenser coil. If the condenser coil is dirty, clean with a stream of cold water, and pressurized air not exceeding 50 psig, or vacuum cleaner. Do not use hot water or steam, which can cause excessive high pressure in the refrigerant system. Clean the condenser coil in the opposite direction of the airflow.

Blower and Motor Drive Components

The Evaporator and Condenser Blower Bearings are pre-greased and sealed and require no maintenance. The evaporator and condenser fan motors may require oil on both bearing ends however; the motors may also be sealed from servicing so if they are, then the bearings are permanently lubricated. Check for oil plugs at the top of the motor on each end of the motor over

the bearing area. If there are oil plugs, the motor requires oiling. Each motor requires ten (10) droplets of SAE 5W 30 oil after every 2-3 years of normal operation.

CAUTION: Over lubricating will cause the bearing to overheat and could cause the bearing seal to blow out.

Belt Tensioning

Excessive belt tension is the number one cause for blower and motor bearing failure. Proper belt tension and pulley alignment are essential for trouble free operation. Insufficient deflection indicates that the belt tension is entirely too tight, and if not loosened somewhat, noise due to excessive vibration, premature bearing failure, shortened belt life, and a reduction in fan performance may result. **Deflection** is the amount the belt gives when force is applied, usually by finger, to the belt at the approximate center point to the belt span. Tight belts may also overload the motor and cause the efficiency drop considerably or even premature motor failure as well. **Belt Span** is the distance in inches between the drive shaft center point and the fan shaft center point. Refer to Figure 7 – Belt Tensioning below.

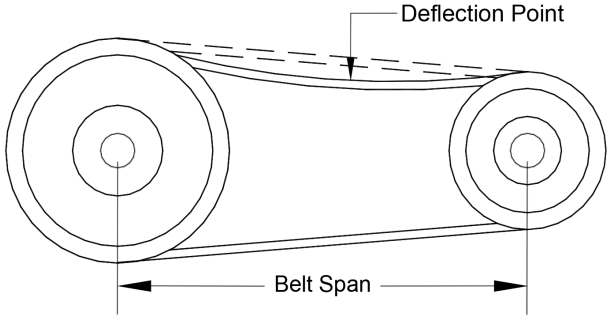


Figure 7 – Belt Tensioning

Excessive deflection is an indication that the belt is not tight enough. If not corrected, slippage may occur causing loss of blower speed and belt failure. The belts will glaze then crack or even break due to increased temperatures caused by slippage. Belts may slip during start-up, but slipping should stop as soon as the fan reaches full speed. For proper tensioning, an excellent method to use is listed in the equation below. Belt span is in inches.

$$\text{Deflection} = \frac{\text{Belt Span}}{64}$$

Check the sheave alignment to make sure that the sheave faces are in the same plane. Check this by placing a straight edge across the face of the sheaves. Any gap between the edge and sheave faces indicates misalignment.

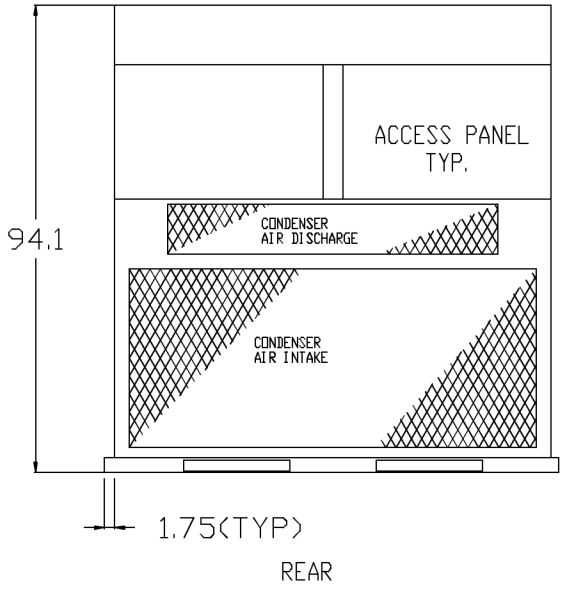
CAUTION: This method is only valid when the width of the surfaces between the belt edges is the same for both sheaves. When they are not equal or when using adjustable pitch pulleys, adjust so that the belts have approximately equal tension. Both shafts should be at right angles to the belt. Check the setscrew and/or bushing bolt tightness.

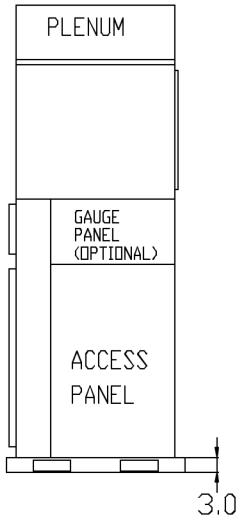
Belts tend to stretch somewhat after installation. Recheck belt tension after several hours of operation.

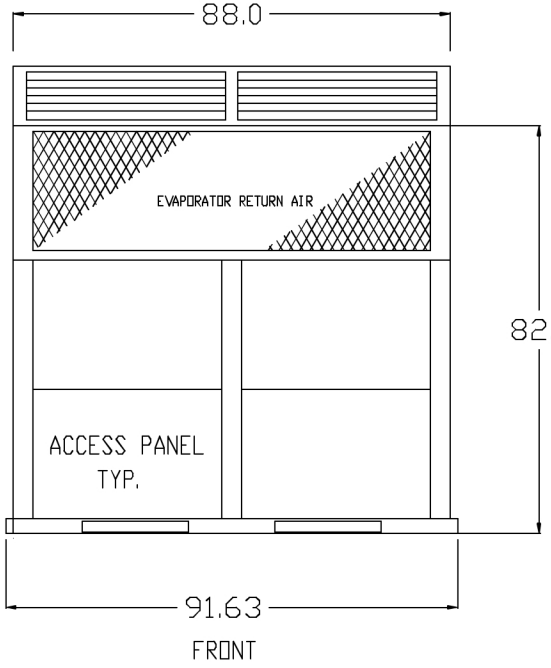
TROUBLESHOOTING GUIDE

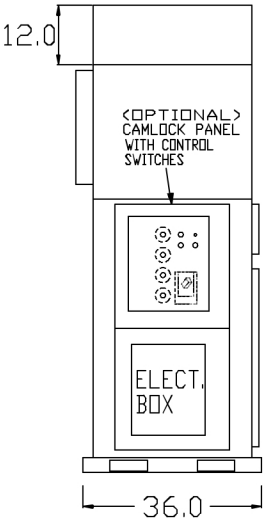
WARNING: BE AWARE OF HIGH POWER SITUATIONS WHILE TROUBLESHOOTING. THERE ARE ALSO MOVING BELTS, BLOWERS, AND MOTORS WHILE POWER IS CONNECTED TO THE UNIT. WHEN REACHING INTO ANY OF THE UNIT SECTIONS TO MAKE ADJUSTMENTS TO THE UNIT. PLEASE DISCONNECT POWER FROM THE UNIT.

PROBLEM	CAUSE	DESCRIPTION
Power Lamp (PL) OFF	**1.** No voltage to unit.	**1.** Check voltage at power supply and check for broken power wires.
Power Lamp (PL) ON	**1.** No cooling or no blower.	**1.** Check and/or replace defective selector switch. **2.** Check phase indicator light for correct phasing. **3.** Check for defective phase monitor.
Unit Locked in Cooling Mode	**1.** Thermostat incorrectly set. **2.** Defective thermostat. **3.** Defective compressor contactor CCR.	**1.** Check thermostat setting and selector switch mode. **2.** Replace thermostat. **3.** Replace compressor contactor CCR.
No Cooling	**1.** Dirty air filter. **2.** Check thermostat setting and mode selector switch. **3.** Defective power wiring to compressor. **4.** Defective compressor contactor CCR. **5.** Defective compressor motor **6.** Compressor won't start. **7.** Compression pressures almost equalized. **8.** Condenser motor tripped on overload may have also caused high pressure trip.	**1.** Clean or replace air filters in front of evaporator coil. **2.** Reset thermostat setting or mode selector switch. **3.** Check continuity of power wiring. **4.** Replace compressor contactor CCR. **5.** Check motor windings for shorts or opens and/or replace compressor if necessary. **6.** Internal overload opened up. Wait one hour to see if it resets and starts. **7.** Defective compressor valves. Replace compressor. **8.** Reset the overload and also check and reset the high pressure switch if required.
High Pressure Trips	**1.** Condenser air inlet and/or outlets are restricted. **2.** High-pressure switch open but doesn't reset. **3.** Defective condenser blower motor. **4.** Defective condenser blower motor contactor CCR. **5.** System is over-charged or has non-condensibles. **6.** Condenser blower v-belts loose, slipping, or broken.	**1.** Re-locate unit to a place with unobstructed airflow. **2.** Replace high-pressure switch. **3.** Replace condenser blower motor. **4.** Replace defective condenser blower motor contactor CCR. **5.** Remove some refrigerant. If the high side pressure doesn't start to drop, recover the refrigerant and re-charge with fresh R-410a to correct system charge. **6.** Re-tighten or replace v-belts.
Low Pressure Trips	**1.** Supply and return air grills in space are restricted. **2.** Dirty return air filter. **3.** Low-pressure switch open and does not reset. **4.** Defective evaporator blower motor **5.** Defective evaporator blower motor contactor CEM. **6.** System might be under charged check sight glass and perform leak checks. **7.** Expansion valve is sticking or binding. **8.** Filter drier is dirty or plugged. **9.** Evaporator blower v-belts loose, slipping, or broken.	**1.** Re-locate objects in front of air grills or re-locate supply and return air grills in space. **2.** Clean or replace air filter. **3.** Replace low-pressure switch. **4.** Replace evaporator blower motor. **5.** Replace defective evaporator blower motor contactor CEM. **6.** Recover refrigerant, repair leaks, re-leak check, evacuate and re-charge to system operating charge **7.** Replace expansion valve. **8.** Replace filter drier. **9.** Re-tighten or replace v-belts.









NOTES:

1). ALL DIMENSIONS OUTSIDE UNLESS OTHERWISE NOTED

REV.	DESCRIPTION	BY	ECN#	DATE
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G	CORRECTED OVER ALL HEIGHT 94.1 WAS 96.1	AK		8/10/05
F	CHANGED POD DIMENSIONS	AK		12/12/02

SHT. X OF X

KOLDWAVE

YORK, PA. U.S.A.

TITLE: OUTLINE DRAWING OF 12-20 TON PORTABLE A/C

DWN BY:	APP. BY:	SCALE:	
A. KHAN		NTS	
DATE: 12/12/02	DATE:	DWG. NO: CA3127	REV. LEV. H