



KwiKool™

PORTABLE COOLING SYSTEMS

KCA/KCW Operation Manual



**CEILING
MASTER**

KwiKool CeilingMaster Series KCA/KCW

Operation Manual

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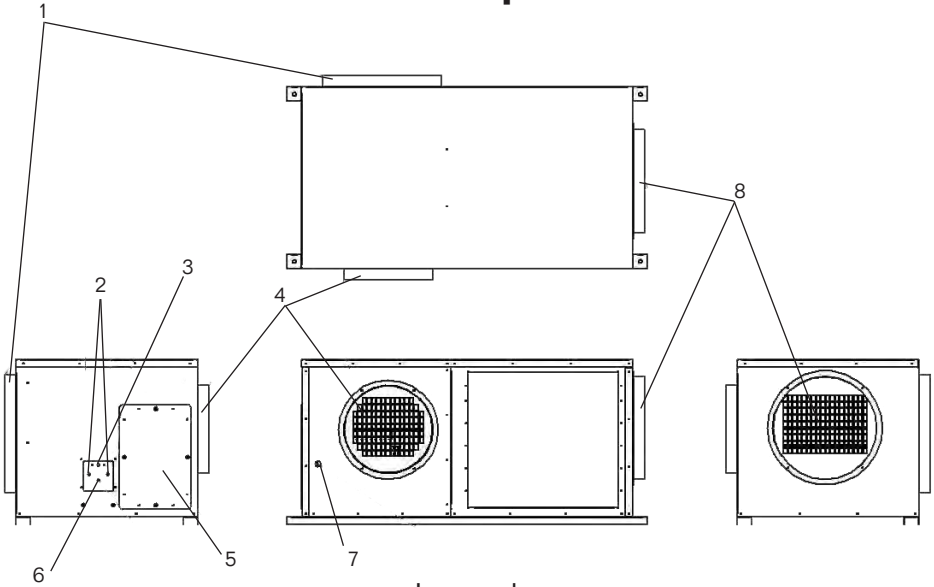
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Before installing and using your KwiKool Portable Cooling System, read this manual carefully for instructions and proper usage and all safeguards.

This manual should be retained for future reference.

I / Unit Components



Legend

- | | |
|--------------------------------|--|
| 1. Evaporator Return | 5. Electrical Panel Cover |
| 2. Schrader Port | 6. 1/4" Condensate Pump Discharge Nipple |
| 3. Manual High Pressure Switch | 7. Power Entry |
| 4. Evaporator Supply | 8. Condenser Hot Air Discharge |

II / KCA/KCW Standard Features

- A. Built-in high lift condensate pump
- B. Built-in HD mounting brackets
- C. Built-in duct collars for supply and return air, and condensate discharge air
- D. Fire alarm / EPO (emergency power off) N/O connection
- E. Automatic shut off with alarm signal output and audible alarm for:
 - 1. Condensate Pump
 - 2. High Pressure Switch Activation
 - 3. Low Pressure Switch Activation

III / Introduction

If you are reading this, then you have made the decision to purchase the smallest most powerful ceiling mounted unit made, KwiKool's CeilingMaster.

The information in this manual will explain how to assemble, install and operate the KCA/KCW ceiling mounted unit. Please read the complete manual before proceeding to try an install the unit. If you have any questions after reading the manual, please feel free to contact our technical support department at: **1-800-KWIKOOL (800-594-5665)**.

NOTE: All Electrical and Mechanical work should be completed by a licensed professional and should be completed in accordance with local building codes. Diversity Industries, Inc. is not responsible for injuries, and/or damages for use or misuse of unit, improper installation, or failure to follow local building codes.

IV / In the Package

After you have uncrated your new CeilingMaster, you should check the following:

- A.** Check for damage not apparent upon delivery of unit (if damage is noted and is severe enough to warrant a claim, call freight company immediately and file a claim).
- B.** Check to make sure that there are 3 duct collars attached to the KCA unit. 2 Duct collars will be attached to the KCW unit.

V / Installation

- A.** Before you begin installation, it is important to verify that you have sufficient clearance for the unit in the space above the ceiling for the unit to fit. The most important clearance items are the condenser discharge and the condenser inlets. You need a minimum clearance of 24" for the condenser inlets and sufficient area and/or clearance to run duct if necessary to move the heat to another area or space. The evaporator needs no clearance except the amount of clearance needed to attach the duct work and the space needed for the duck work.

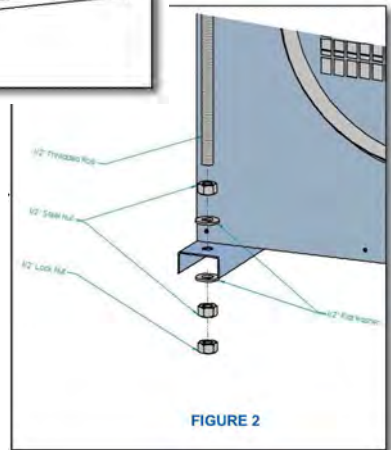
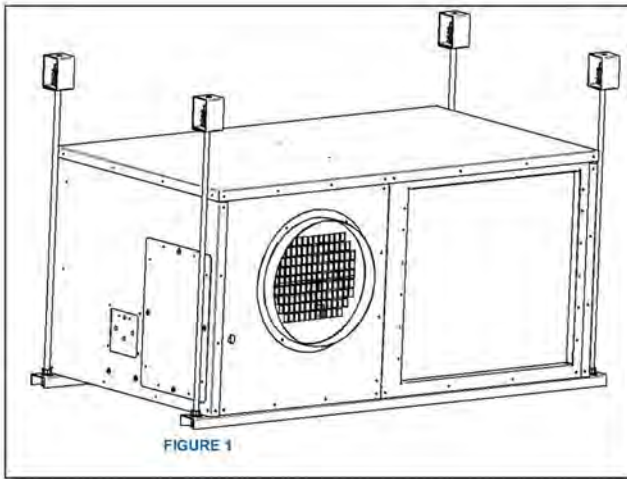
NOTE: The KCA model uses the space above the ceiling for the condenser supply and return. It is mandatory that consideration be made for movement of the heat so as not to short cycle the condenser by allowing the heat to be sucked directly into the condenser inlet(s). If you have questions about this please call KwiKool's technical support at: 1-800-KWIKOOL (800-594-5665)

- B. Things you will need for installation:**

1. Four (4) mounting rods (all-thread) with mounting hardware and vibration isolators all rated to handle the load requirements.
2. Power cable and connector to mount unit.
3. 1/4" Rated drain line with 2 clamps. For distance needed to reach hard pipe drain line.

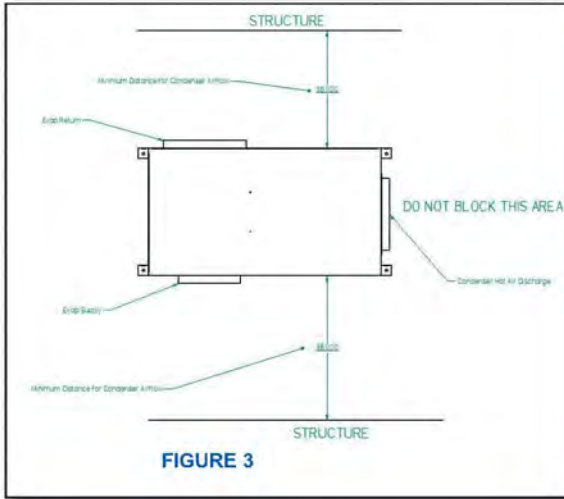
4. Standard 24 volt thermostat with thermostat wire.
5. Return air duct with a filter grill (minimum 24" x 24")
6. Supply duct with "T" connections as necessary for proper air distribution (dampers are suggested but not required for balancing of system)
7. Hot air exhaust duct (optional)

C. The KCA/KCW comes equipped with mounting rails. These rails are made so that the installer has maximum flexibility in installation methods. Vibration isolation is required but can be installed on the unit or on the attachment to the building structure. One common installation method and one that is tried and true is shown in figures 1 and 2.



D. All mounting hardware and vibration isolator shall be supplied by others. Make sure all hardware can handle the loads applied. Mounting of unit could be from joists, the concrete above or any other method provided a mechanical engineer verifies the safety of the installation method for the individual application and location.

- E. Unit must have physical clearance on all sides. The top shall have a minimum of 3" clearance and the sides need at least 18" of air for condenser intakes. See figure 3



F. Electrical Requirements:

1. It is important to make sure you use the recommended breaker size for the unit being installed. The rating plate will give you a Maximum breaker size (MOP) and a recommended breaker size. **Make sure the wire and circuit are appropriately sized for the breaker size and unit being installed. Always use wire that is rated for the voltage and amperage of the unit.**
2. To install the power follow the following guidelines:
 - a. Open the electrical panel by removing the screws to the cover.
 - b. Bring your circuit with flex conduit to the unit and install the conduit to the cabinet with a conduit 1/2" or 3/4" BX connector or cable strain relief (Romex) connector, depending on which CeilingMaster model you purchased. Leave approximately 12" of wire past the connector and run the wire into the electrical box. Strip the ends of the wires and install the appropriate connectors to the 3 wires for single phase units and 4 wires on the 3-phase models.
 - c. Attach to the 2 or 3 hot wires to the line side of the main contactor (labeled L1, L2, etc) and attach the green ground wire to the ground screw inside the electrical box.
 - d. On single phase units connect the neutral to the contact that has a white wire on the load side of the contactor.
 - e. For 3-phase units this is not important, but it is important to make sure that the fans are rotating in the correct direction. If during testing the fans rotate in the wrong direction switch L1 and L2 and retry.
 - f. Connect the ground wire (green color) to the ground screw located in the bottom of the electrical box below the contactor.

WARNING: All electrical work should only be performed by qualified personnel. Installation or repair to any electrical components by non-certified personnel may result in personal injury and/or damage to the unit.

G. Drain Hose Connection - The KCA/KCW is equipped with a high lift internal condensate pump. Maximum lift is 20'. Use the provided 3/8" flexible hose and connect it to the 3/8" male connection on the unit for the evaporator coil condensate drain. The drain line must be located so it will not be exposed to freezing temperatures. The drain should be the full size of the drain connection. (Connect the drain hose to the condensate drain or the janitor closet.) A 1/2" ID (5/8" OD), PVC tubing or 3/8" copper tubing is required for the drain. Insulate the drain hose; condensation may occur during humid conditions. (Field supplied material). Plug in the 3/8" drain hose onto the unit and install the hose clamp. Then connect the 3/8" flexible line to the field supplied condensate line. Make sure the hose does not leak.

NOTE: do not use more than 15' of drain hose vertically. This is maximum head (lift) of the condensate pump.

When securing the drain hose to the highest vertical position (no more than 15' high) and running the hose to the drain, run the drain hose on a downward slope at a minimum rate of 1/4" per foot for proper drainage.

Check the following items: No kinks or bends in the drain hose; No traps in the drain hose; The end of the drain hose should be higher than the water level at the drain; No dripping from the drain hose at the clamping area

H. Wall Thermostat Connection - Preparation for thermostat connection:

1. Use with a single stage wall thermostat. (Type: standard 24 volt input system)
2. Set the wall thermostat to cooling system mode, since most wall thermostats are designed for both heating and cooling.
3. Prepare the wire harness for connection from the unit to the thermostat. The recommended wire size is: Wire Type: Thermostat cable / Solid Wire 16-26 AWG.
4. Identify the thermostat connectors labeled G, C, Y or Y1, and R

Connecting a Thermostat to Your KCA/KCW Unit

Wall Thermostat

KCA/KCW Wiring

Connector Name	Label Name	Color	Function
R	R - 24V	Red	24 VAC Power
C	C - Common	White	Common
Y or Y1	Y1	Yellow	Cool ON / OFF
W	Not Used	Not Used	Heat
G	G	Green	Fan ON / OFF

5. Install the wall thermostat to the proper location inside the room where it can be conveniently accessed. Do not install the wall thermostat where unusual heating conditions might be present (i.e. hot pipes, direct sunlight, etc.). Install the thermostat somewhere close to the area of the return filter grill.
Most standard thermostat devices will provide these basic functions:
Fan mode: ON / AUTO (Select the desired fan mode)
System mode: Cool / Heat

I. External Alarm Signal Connections - All KCA/KCW units are equipped with an alarm signal output relay type (Form-C, normal open dry contacts), which can be used for monitoring basic unit failure functions. Relay contactor (no connector) is closed when the following condition has occurred:

1. Condensate Tank Overflow
2. High Pressure Switch Closed
3. Low Pressure Switch Engaged
4. Cooling Function Fails

The output of the relay is rated at 5A at 30VDC or 5A at 250VAC (resistive load). This can be used to connect output is compatible with various warning devices such as alarm speakers, light indicators, etc.

Alarm contacts are labeled A1 and A2 on the external terminal block. Connect the warning device to these terminals.

The recommended warning signal wire size is 16AWG to 26AWG for a solid or stranded wire.

J. Fire Alarm Control Panel or Emergency Shut Off Connection - The KCA/KCW unit is equipped with a normally closed circuit which can be used to shut down the unit in a fire or emergency situation. Opening this circuit will shut the unit down and will not come back on until the circuit is reclosed.

K. Connecting Fire Alarm Control Panel or EPO (Emergency Power Off) to KCA/KCW - First remove the jumper from the S1 and S2 terminals of the external terminal block. Connect the fire alarm signal wires or EPO wires to your KCA/KCW on the S1 and S2 terminals on the external terminal block. Test functionality.

The recommended fire alarm signal wire size is 16AWG to 26AWG for a solid wire, or 16AWG to 22AWG for a stranded wire. This function is used for test purposes and verification.

L. Ducting for use with Typical Drop Ceiling - Ducting for both supply and return including a filter grill with filter will need to be supplied by the installer. All ducting should be of the insulated type to prevent condensation from forming on the duct and dripping on or around the installation. All duct should keep an bends to a minimum and should be the largest radius possible. Make sure that all ducts are properly secured to maintain proper airflow and integrity of the cooling section. Avoid sharp bends and try to make air ducts travel in a straight line for best performance.

The following field supplied items are required:

1. Insulated supply duct(s)
2. Filter return air grill with a filter for evaporator air intake
3. Diffuser(s) for cold air
4. Duct clamps

CAUTION: DO NOT OPERATE UNIT WITHOUT A FILTER INSTALLED IN THE RETURN AIR FILTER GRILL

VI / Installation Checklist

A. Unit Installation -

1. Check and make sure all screws are tight and unit is secured in place.
2. Check and make sure inlet/outlet air exhaust are clear without blockage.
3. Make sure that there is adequate condenser air ventilation.
4. Check the condensate line and make sure that the connections are secure and that the line is properly insulated.

B. Wiring -

1. Check and make sure the unit is properly connected to the dedicated circuit breaker.
2. Check and make sure all wiring is properly connected and secured.
3. Check and make sure ground wire is tightened and secured.

C. Diffuser and Filter Grill Installation - Check and make sure that all devices for air distribution and connected properly with no air leaks.

D. Thermostat - Check and make sure that the 3rd party thermostat is connected properly to unit and secured to the wall.

E. Test Operation -

1. Check operation with wall thermostat - Set wall thermostat to FAN ON or FAN ONLY mode:
 - a. Fan should engage without compressor.
 - b. Set thermostat to FAN AUTO or COOL mode operation. During cool mode operation check and confirm that cooling is functional the 2 minute safety time delay.
2. Abnormal Noise - Check and observe noise during Fan / Cooling operation
3. Drain - During cooling operation check and observe condensation drip through normal drainage path.
4. Air Leakage- Check for air leakage from duct and duct connection.

VII / Inspection & Maintenance

Cleaning Air Filters - The air filter on the evaporator return grill should be checked at least once a week for dust buildup. Clean the air filter or replace if needed. If the unit is used in an abnormally dirty environment, more frequent inspection and/or cleaning may be required. A dirty air filter will reduce the air output, resulting in a decrease of the cooling capacity of your KCA / KCW.

VIII/ KCA & KCW Troubleshooting Guide

Fault	Possible Cause	Possible Solution
Unit Does Not Operate	Thermostat Has No Power	Check the breaker
	Power Interruption	The unit has auto restart and will automatically restart after a 2 minute safety delay when power is restored (some 3rd party thermostats require a manual reset)
	Blockage of Air Duct	Check ducting for any blockages for excessive bend radius'
	EPO N/C Switch Open	Check the EPO/Fire alarm contacts for a N/C condition, install the original factory jumper and retest
Low or No Cooling	Condenser Blocked	Make sure that the condenser inlets and outlets are not blocked. Verify that the condenser intake air is not overheated due to lack of ventilation or condenser heat
	Thermostat Malfunction	Test thermostat for proper outputs
	Dirty / Blocked Air Filters	Clean and/or replace air filter
	Excessive Duct Static	Evaporator ducting should not exceed 30' or equivalents and bend radius should be larger than twice that of duct diameter.
No Cooling - Alarm Sounding	High Pressure Switch Actuated	<ol style="list-style-type: none"> 1. Check condenser fan motors for operation 2. Check for over heating of condenser because of inadequate ducting of condenser heat 3. After checking 1 & 2 reset HPS by pressing the reset button

Fault	Possible Cause	Possible Solution
No Cooling - Alarm Sounding	Low Pressure Switch Actuated	Potentially low on refrigerant, Call a qualified technician since this is not user serviceable
	Condensate Pump Overflow	Check to make sure condensate line is not kinked or obstructed. If alarm still sounds after checking line for restrictions, call a qualified technician



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