

# MBVC

## BLOWER CABINET INSTALLATION INSTRUCTIONS

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[www.goodmanmfg.com](http://www.goodmanmfg.com) -or- [www.amana-hac.com](http://www.amana-hac.com)  
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THIS PRODUCT CONTAINS ELECTRONIC COMPONENTS WHICH REQUIRE A DEFINITE GROUND. PROVISIONS ARE MADE FOR CONNECTION OF THE GROUND. A DEDICATED GROUND FROM THE MAIN POWER SUPPLY OR AN EARTH GROUND MUST BE PROVIDED.

### NOTICE

IF A "1 FLASH" ERROR CODE OR AN "Ec" HTR TOO LARGE ERROR IS ENCOUNTERED ON STARTUP, VERIFY THAT THE ELECTRIC HEATER DIP SWITCHES HAVE BEEN SET TO THE APPROPRIATE HEATER SIZE. SEE PAGES 7 AND 8 FOR THE HEATER KIT AIRFLOW DELIVERY AND DIP SWITCH SETTINGS.

### INTRODUCTION

This booklet contains the installation and operating instructions for your modular blower cabinet. All warnings and precautions within this booklet must be observed. Improper installation can result in unsatisfactory operation or dangerous conditions and void the warranty. Read this booklet and any instructions packaged with accessories prior to installation. Give this booklet to the user and explain its provisions. The user should retain this booklet for future reference.

**NOTE:** Upon start up in communicating mode the circuit board will display a "1 Flash" error code on the diagnostic LED and an "Ec" HTR TO LARGE error at the communicating display. This is an indication that the dip switches on the control board need to be configured in accordance with the Electric Heating Airflow Table on page 7 of this manual. Configuring the dip switches and resetting power to the unit will clear the error code.

### ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

**NOTE:** Discharge body's static electricity before touching unit. An electrostatic discharge can adversely affect electrical components.

Use the following precautions during modular blower installation and servicing to protect the integrated control module from damage. By putting the modular blower, the control, and the person at the same electrostatic potential, these steps will help avoid exposing the integrated control module to electrostatic discharge. This procedure is applicable to both installed and uninstalled (ungrounded) blowers.

1. Disconnect all power to the blower. Do not touch the integrated control module or any wire connected to the control prior to discharging your body's electrostatic charge to ground.
2. Firmly touch a clean, unpainted, metal surface of the modular blower near the control. Any tools held in a person's hand during grounding will be discharged.

3. Service integrated control module or connecting wiring following the discharge process in step 2. Use caution not to recharge your body with static electricity; (i.e., do not move or shuffle your feet, do not touch ungrounded objects, etc.). If you come in contact with an ungrounded object, repeat step 2 before touching control or wires.
4. Discharge your body to ground before removing a new control from its container. Follow steps 1 through 3 if installing the control on a blower. Return any old or new controls to their containers before touching any ungrounded object.

### IMPORTANT NOTE TO THE OWNER REGARDING PRODUCT WARRANTY

Your warranty certificate is supplied as a separate document with the unit installed by your contractor. Read the limited warranty certificate carefully to determine what is and is not covered and keep the warranty certificate in a safe place. If you are unable to locate the warranty certificate please contact your installing contractor or contact customer service (877-254-4729) to obtain a copy.

**IMPORTANT:** To register your Goodman® brand unit, go to [www.goodmanmfg.com](http://www.goodmanmfg.com). Click on the word "Warranty" located on the left side of the home page. Next, click on the word "Product Registration" located on the left side of the Warranty page and complete the forms in the manner indicated on the Product Registration page.

To register your Amana® brand unit, go to [www.amana-hac.com](http://www.amana-hac.com). Click on the word "Warranty" located on the top right of the home page. Next, click on the word "Product Registration" located on the left side of the Warranty page and complete the forms in the manner indicated on the Product Registration page.

Product limited warranty certificates for models currently in production can be viewed at [www.goodmanmfg.com](http://www.goodmanmfg.com) or [www.amana-hac.com](http://www.amana-hac.com). If your model is not currently in production or does not appear on the website, please contact your installing contractor or contact customer service (877-254-4729) to obtain a copy of your warranty certificate.

Each product overview page contains a Product Warranty link; by clicking on it you will be able to view the limited warranty coverage for that specific product. To view warranty registration information, click on the Product Warranty text on the left navigation panel on the home page of each website. The Online Product Registration pages are located in this same section.

### CHECKING PRODUCT RECEIVED

Upon receiving the unit, inspect it for damage from shipment. Claims for damage, either shipping or concealed, should be



filed immediately with the shipping company. Check the unit model number, specifications, electrical characteristics and accessories to determine if they are correct. In the event an incorrect unit is shipped, it must be returned to the supplier and must NOT be installed. The manufacturer assumes no responsibility for installation of incorrectly shipped units.

## REPLACEMENT PARTS

### ORDERING PARTS

When reporting shortages or damages, or ordering repair parts, give the complete unit model and serial numbers as stamped on the unit's nameplate.



Replacement parts for this appliance are available through your contractor or local distributor. For the location of your nearest distributor, consult the white business pages, the yellow page section of the local telephone book or contact:


SERVICE PARTS DEPARTMENT  
 GOODMAN MANUFACTURING COMPANY, L.P.  
 5151 SAN FELIPE, SUITE 500  
 HOUSTON, TEXAS 77056  
 (713) 861 – 2500



## IMPORTANT SAFETY INSTRUCTIONS

### RECOGNIZE SAFETY SYMBOLS, WORDS, AND LABELS

The following symbols and labels are used throughout this manual to indicate immediate or potential hazards. It is the owner's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of property damage, product damage, personal injury or death.

 <b>WARNING</b>	
<b>HIGH VOLTAGE!</b> DISCONNECT ALL POWER BEFORE SERVICING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.	

 <b>WARNING</b>
<b>ONLY INDIVIDUALS MEETING THE REQUIREMENTS OF AN "ENTRY LEVEL TECHNICIAN", AT A MINIMUM, AS SPECIFIED BY THE AIR CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI) MAY USE THIS INFORMATION. ATTEMPTING TO INSTALL OR REPAIR THIS UNIT WITHOUT SUCH BACKGROUND MAY RESULT IN PRODUCT DAMAGE, PERSONAL INJURY, OR DEATH.</b>

 <b>DANGER</b> <b>PELIGRO</b>

<b>CARBON MONOXIDE POISONING HAZARD</b>
Special Warning for Installation of Furnace or Air Handling Units in Enclosed Areas such as Garages, Utility Rooms or Parking Areas
Carbon monoxide producing devices (such as an automobile, space heater, gas water heater, etc.) should not be operated in enclosed areas such as unventilated garages, utility rooms or parking areas because of the danger of carbon monoxide (CO) poisoning resulting from the exhaust emissions. If a furnace or air handler is installed in an enclosed area such as a garage, utility room or parking area and a carbon monoxide producing device is operated therein, there must be adequate, direct outside ventilation.
This ventilation is necessary to avoid the danger of CO poisoning which can occur if a carbon monoxide producing device continues to operate in the enclosed area. Carbon monoxide emissions can be (re)circulated throughout the structure if the furnace or air handler is operating in any mode.
CO can cause serious illness including permanent brain damage or death.
B10259-216

### GENERAL INFORMATION

The MBVC Blower Cabinets are used in combination with a cased evaporator coil. This combination of blower and coil functions as the indoor part of a split air-conditioning system, and may be matched with a remote condensing or heat pump unit. The blower cabinet can also function as an electric furnace when used with an electric heater.

**NOTE:** The electric heating elements for electric furnace installation are not shipped with the cabinet and are field-installed.

Systems should be properly sized by heat gain and loss calculations made according to methods of the Air Conditioning Contractors Association (ACCA) or equivalent. It is the contractor's responsibility to ensure the system has adequate capacity to heat or cool the conditioned space.

### FEATURES

This modular blower is a part of the ComfortNet™ family of products. It may be installed as part of a "legacy" system using a standard 24 VAC thermostat. However, with the CTK01AA ComfortNet™ thermostat kit, this modular blower may be installed as part of a digitally communicating system. The ComfortNet™ system provides automatic airflow configuration, enhanced setup features, and enhanced diagnostics. It also reduces the number of thermostat wires to a maximum of four.

### CLEARANCES AND ACCESSIBILITY

The unit can be positioned for upflow, counterflow, horizontal right or horizontal left operation. Zero clearance is allowed

on all sides for combustible materials. Thirty-six inches should be allotted on the door side for maintenance and service.

To reduce risk of rusting, do not install the unit directly on the ground or on a floor that is likely to be wet. In such environments, the unit must be elevated by use of a sturdy, nonporous material.

## INSULATION

To ensure efficient operation, review the following precautions.

- If the unit is located in an area with high ambient temperature and/or high humidity, the air handler may be subject to nuisance sweating of the casing. On these installations, a wrap of 2" fiberglass insulation with a vapor barrier is recommended.
- The factory recommends insulating the duct running through any unconditioned spaces.

To reduce operating sound and vibration transmission use flexible canvas duct connections at the cabinet.

## INSTALLATION INSTRUCTIONS

### BLOWER WITH CASED EVAPORATOR COIL INSTALLATION

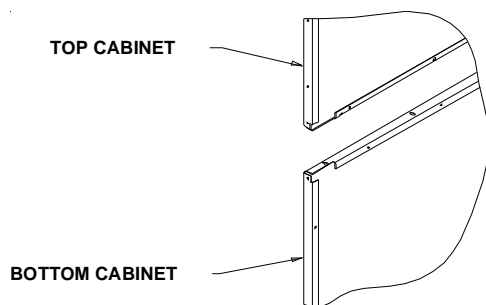


Figure 1 - Coil and Blower Connection

Secure the coil and blower together with the two connector plates and screws supplied in the blower bag assembly. Use one connector plate and six screws on each side of the unit.

If accessory electric heat is to be added, install now per the instructions shipped with the heater kit.

### UPFLOW INSTALLATION

For upflow installations, the blower cabinet must sit on top of the coil cabinet (Figure 2). **NOTE:** All panels should be in place before installing the cabinet.

1. Place the blower and coil cabinet assembly upright on the return duct or duct opening. Ensure that there is ample support for the cabinet assembly and all attached ductwork.
2. Connect refrigerant and condensate drain connections per the evaporator coil installation instructions. Ensure refrigerant and drain lines do not interfere with service access to the unit.
3. Attach supply ductwork. Seal connections between unit and ductwork as required to reduce/eliminate air leakage.
4. Make electrical connections as specified in *Electrical Connections* section of this manual.

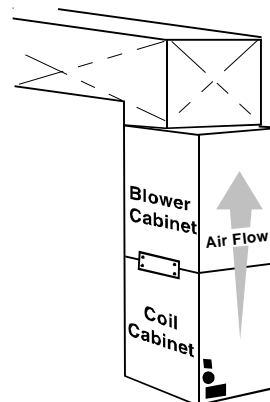


Figure 2 - Upflow Application

### COUNTERFLOW INSTALLATION

For counterflow installations, the evaporator coil cabinet must sit on top of the blower cabinet (Figure 3). **NOTE:** All panels should be in place when installing the unit.

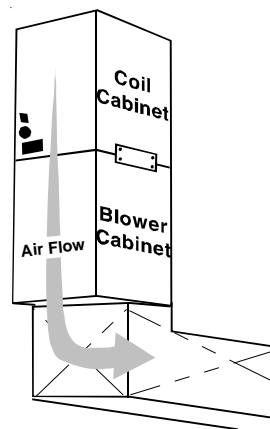


Figure 3 - Counterflow Application

**NOTE:** Supply ductwork for counterflow applications, must be Class I. However, if combustible ductwork is used, sheet metal protection is required.

1. Place the blower and coil cabinet assembly supply outlet on the supply duct or duct opening. Ensure there is ample support for the unit and all attached ductwork.
2. Connect refrigerant and condensate drain connections per the evaporator coil installation instructions. Ensure refrigerant and drain lines do not interfere with service access to the unit.
3. Attach return ductwork. Seal connections between unit and ductwork as required to reduce/eliminate air leakage.
4. Make electrical connections as specified in *Electrical Connections* section of this manual.

### HORIZONTAL INSTALLATION

For horizontal installations, the coil cabinet must be upstream of the blower cabinet (Figures 4 and 5). **NOTE:** All panels should be in place when installing the unit.

1. Set the unit near its final installation place. The unit must be supported along the entire length of the unit. Rubber isolation pads may be used to reduce sound and vibra-

tion transmission. Ensure there is ample support for the unit and all attached ductwork.

**NOTE:** Unit must be mounted with access panel facing the front as shown in following diagrams.

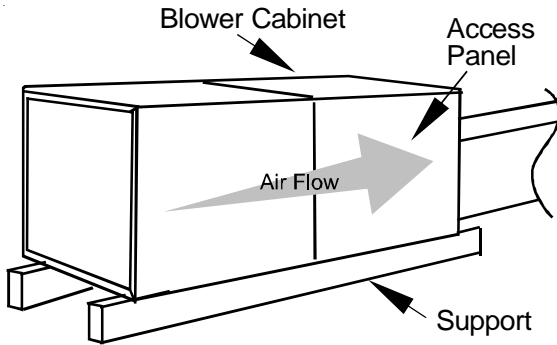


Figure 4 - Attic Installation

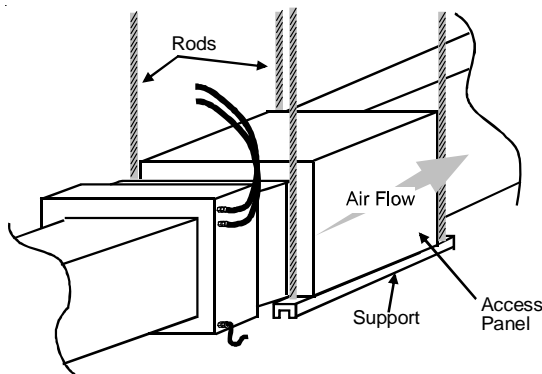


Figure 5 - Hanging Installation

2. If installed above a finished ceiling or living space, be sure to put a secondary drain pan under the entire unit, and pipe the drain separately from the main condensate drain.
3. Connect refrigerant and condensate drain connections per the coil section installation instructions. Ensure refrigerant and drain lines do not interfere with service access to the unit.
4. Attach return and supply ductwork. Seal connections.
5. Make electrical connections as specified in *Electrical Connections* section of this manual.

**COUNTERFLOW AND HORIZONTAL APPLICATIONS**

Loosen motor mount and rotate motor (See Figure 6). Be sure motor is oriented with the female connections on the casing pointing down. If the motor is not oriented with the connections pointing down, water could collect in the motor and cause premature failure.

**NOTE:** After rotating motor, tighten motor mount to secure motor. Be sure that the gap between the motor and the insulation is the same as it was before loosening the motor mount. This will ensure that the blower wheel is properly spaced inside the blower housing.

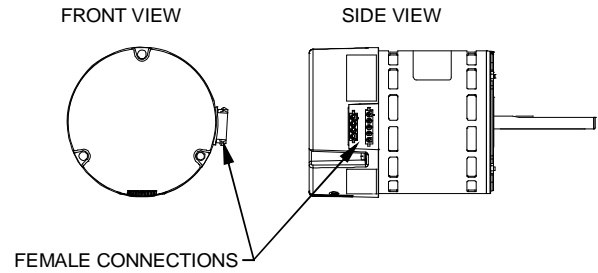




Figure 6- MBVC Motor Orientation

**ELECTRICAL CONNECTIONS**


Consult the local power company and local codes before installing this unit. All wiring must be in accordance with the National Electrical Code as well as all local codes. Knockouts have been provided on side and top of the cabinet for the installation of the electrical conduit. If the knockouts on the cabinet sides are used for electrical conduit, an adapter ring must be used in order to meet UL1995 safety requirements. Use Minimum Circuit Ampacity and type of wire to determine proper wire size. The unit **MUST** be properly grounded. A ground lug is provided in the unit.

Check all factory connections before connecting electrical power to unit to ensure none were loosened or disconnected during shipping and handling.

 <b>WARNING</b>	
<p><b>HIGH VOLTAGE!</b></p> <p>TO PREVENT PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, DISCONNECT THE ELECTRICAL POWER BEFORE ELECTRICALLY CONNECTING THE UNIT.</p>	

 <b>WARNING</b>
<p>TO AVOID THE RISK OF FIRE OR EQUIPMENT DAMAGE, USE COPPER CONDUCTORS.</p>

 <b>CAUTION</b>
<p>TO AVOID THE RISK OF PERSONAL INJURY, WIRING TO THE UNIT MUST BE PROPERLY POLARIZED AND GROUNDED.</p>

 <b>WARNING</b>
<p>ALL WIRING MUST COMPLY WITH APPLICABLE LOCAL AND NATIONAL CODES. TYPE AND LOCATION OF FUSED DISCONNECT SWITCH(ES) MUST COMPLY WITH ALL APPLICABLE CODES AND PROVIDE OVERCURRENT PROTECTION AS SHOWN ON THE NAMEPLATE.</p>

**208/230 VOLT LINE CONNECTIONS**

If heater kits will not be installed, remove the proper size knockout for the electrical conduit connection. Connect electrical conduit to the unit using two washers to make an approved connection.



The power supply wires must be connected to the red and black power wiring. Two wire nuts are provided in the bag assembly for this connection. Wrap the wire nuts with electrical tape. (Insulated crimp type connectors, field supplied, may be substituted for the wire nuts and electrical tape provided proper size connectors are used.) A ground wire **MUST** be connected to the ground lug inside the unit.

## LOW VOLTAGE WIRING

Low voltage wiring connections are made at the top of the cabinet. See the *24 Volt Thermostat Wiring* section of this manual for typical low voltage wiring connections. A minimum 18 AWG wire must be used for installations up to 50 feet and 16 AWG wire for installations over 50 feet.

## OPERATION ON 208 VOLT SUPPLY

The unit transformer is factory connected for 230 V operation. If unit is to operate on 208 V, disconnect the red wire from terminal 3 of the unit transformer and connect them to terminal 2 of the unit transformer.

## 24 VOLT THERMOSTAT WIRING

**NOTE:** Wire routing must not interfere with the circulator blower operation or routine maintenance.

The modular blower's integrated control module provides terminals for "Y1" and "Y2" and "W1" and "W2" thermostat connections. This allows the modular blower to support the systems shown in the table below. Refer to the following figures for typical connections to the integrated control module. Thermostat wiring entrance holes are located in the top of the blower. Wire routing must not interfere with circulator blower operation or routine maintenance.

**NOTE:** A removable plug connector is provided with the control to make thermostat wire connections. This plug may be removed, wire connections made to the plug, and replaced. It is **strongly** recommended that multiple wires into a single terminal be twisted together prior to inserting into the plug connector. Failure to do so may result in intermittent operation.

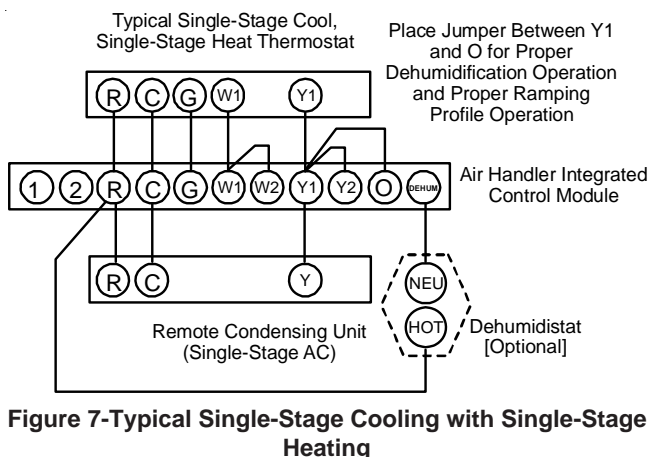


Figure 7-Typical Single-Stage Cooling with Single-Stage Heating

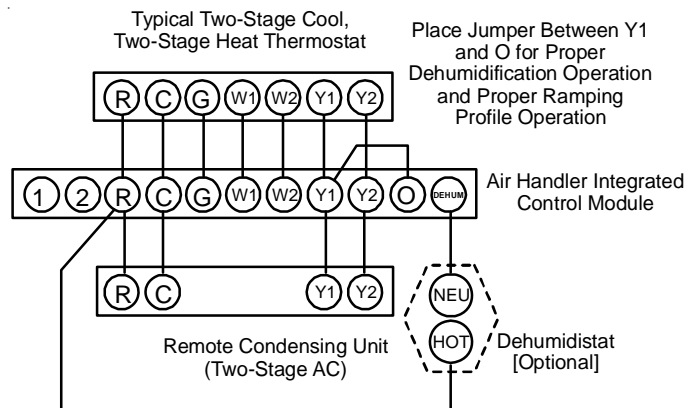


Figure 8-Typical Two-Stage Cooling with Two-Stage Heating

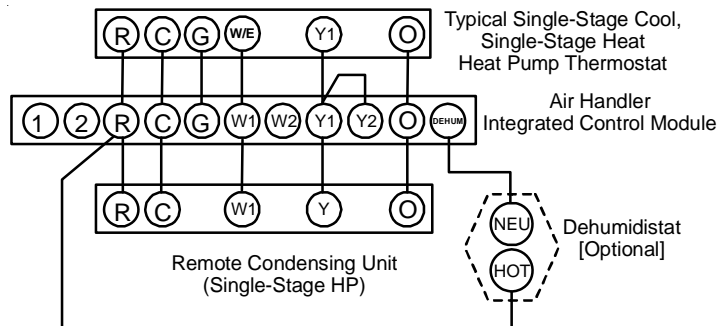


Figure 9-Typical Single-Stage Heat Pump with Auxiliary/Emergency Heating

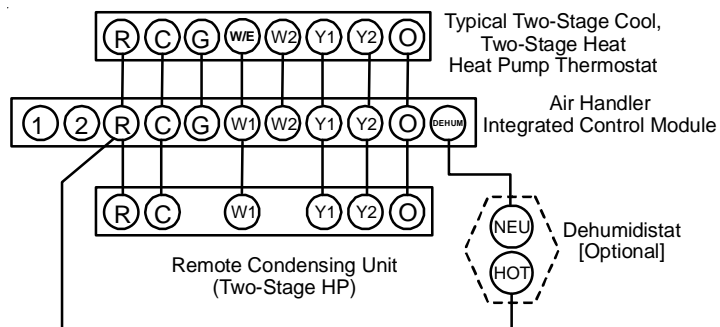


Figure 10-Typical Two Stage Heat Pump heating and Auxiliary/Emergency Heating

## 24 VOLT DEHUMIDISTAT WIRING

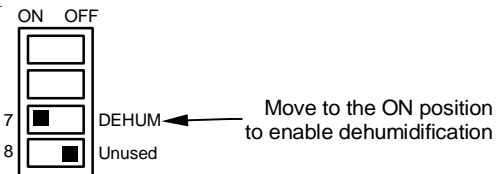
The optional usage of a dehumidistat allows the modular blower's circulator blower to operate at a slightly lower speed during a combined thermostat call for cooling and dehumidistat call for dehumidification. This lower blower speed enhances dehumidification of the conditioned air as it passes through the AC coil. For proper function, a dehumidistat applied to this modular blower must operate on 24 VAC and utilize a switch which *opens on humidity rise*.

To install/connect a dehumidistat:

1. Turn OFF power to modular blower.
2. Secure the dehumidistat neutral wire (typically the white lead) to the screw terminal marked "DEHUM" on the modular blower's integrated control module.
3. Secure the dehumidistat hot wire (typically the black lead) to the screw terminal marked "R" on the modular blower's integrated control module.

- Secure the dehumidistat ground wire (typically the green lead) to the ground screw on the modular blower.  
**NOTE:** Ground wire may not be present on all dehumidistats.
- Turn ON power to modular blower.

To enable the dehumidification function, move the dehumidification dipswitch from OFF to ON.



## CIRCULATOR BLOWER

This modular blower is equipped with a variable speed circulator blower. This blower provides ease in adjusting blower speeds. The Specification Sheet applicable to your model provides an airflow table, showing the relationship between airflow (CFM) and external static pressure (E.S.P.), for the proper selection of heating and cooling speeds. The heating blower speed is shipped set at “21 kW”, and the cooling blower speed is set at “D”. These blower speeds should be adjusted by the installer to match the installation requirements so as to provide the correct electric heating CFM and correct cooling CFM.

Use the CFM LED (green), adjacent to the integrated control module electric heat connector to obtain an approximate airflow quantity. The green CFM LED blinks once for each 100 CFM of airflow.

- Determine the tonnage of the cooling system installed with the modular blower. If the cooling capacity is in BTU/hr divide it by 12,000 to convert capacity to TONS.  
**Example:** Cooling Capacity of 30,000 BTU/hr.  
 $30,000/12,000 = 2.5$  Tons
- Determine the proper air flow for the cooling system. Most cooling systems are designed to work with air flows between 350 and 450 CFM per ton. Most manufacturers recommend an air flow of about 400 CFM per ton.  
**Example:** 2.5 tons X 400 CFM per ton = 1000 CFM

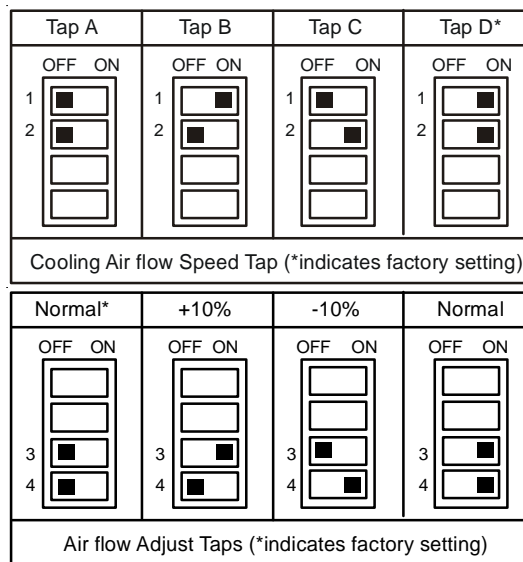
The cooling system manufacturer’s instructions must be checked for required air flow. Any electronic air cleaners or other devices may require a specific airflow; consult installation instructions of those devices for requirements.

- Knowing the modular blower model, locate the high stage cooling air flow charts in the Specification Sheet applicable to your model. Look up the cooling air flow determined in step 2 and find the required cooling speed and adjustment setting.

**Example:** A MBVC1200 modular blower installed with a 2.5 ton air conditioning system. The air flow needed is 1000 CFM. Looking at the cooling speed chart for MBVC1200, find the air flow closest to 1000 CFM. A cooling airflow of 1000 CFM can be attained by setting the cooling speed to “C” and the adjustment to “Normal” (no adjustment).

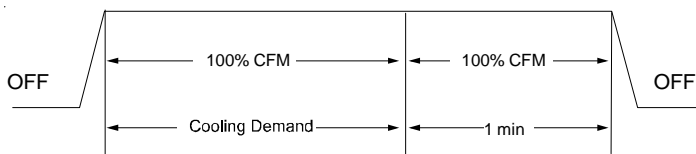
- Locate the blower speed selection DIP switches on the integrated control module. Select the desired “cooling” speed tap by positioning switches 1 and 2 appropriately. Select the desired “adjust” tap by positioning switches 3 and 4 appropriately. Refer to the following figure for switch positions and their corresponding taps. Verify CFM by counting the number of times the green CFM LED blinks.
- Continuous fan speed is 30% of the modular blower’s maximum airflow capability.

**Example:** If the modular blower’s maximum airflow capability is 2000 CFM, the continuous fan speed will be  $0.30 \times 2000 \text{ CFM} = 600 \text{ CFM}$ .

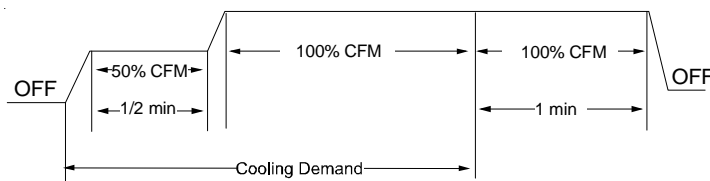


- The multi-speed circulator blower also offers several custom ON/OFF ramping profiles. These profiles may be used to enhance cooling performance and increase comfort level. The ramping profiles are selected using DIP switches 5 and 6. Refer to the following figure for switch positions and their corresponding taps. Refer to the bullet points below for a description of each ramping profile. Verify profile selection by counting the green CFM LED blinks and timing each step of the ramping profile.

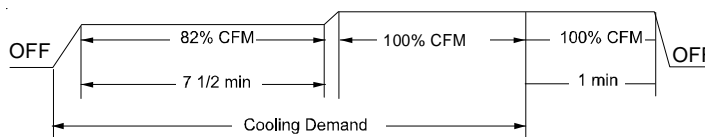
- Profile A provides only an OFF delay of one (1) minute at 100% of the cooling demand airflow.



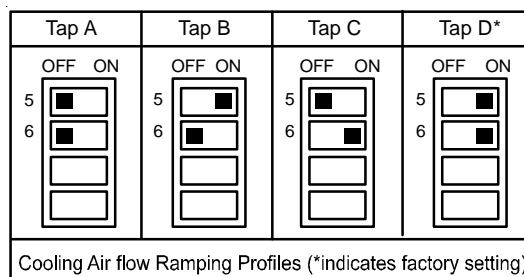
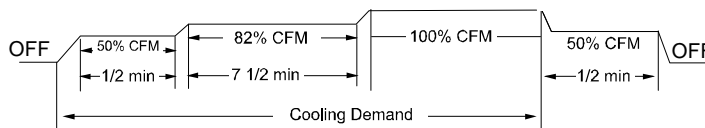
- Profile B ramps up to full cooling demand airflow by first stepping up to 50% of the full demand for 30 seconds. The motor then ramps to 100% of the required airflow. A one (1) minute OFF delay at 100% of the cooling airflow.



- Profile C ramps up to 82% of the full cooling demand airflow and operates there for approximately 7 1/2 minutes. The motor then steps up to the full demand airflow. Profile C also has a one (1) minute 100% OFF delay.



- Profile D ramps up to 50% of the demand for 1/2 minute, then ramps to 82% of the full cooling demand airflow and operates there for approximately 7 1/2 minutes. The motor then steps up to the full demand airflow. Profile D has a 1/2 minute at 50% airflow OFF delay.



7. If an electric heater kit has been installed, determine the heater kilowatt (kW) rating. Find the heater size in the table below. Set dipswitches 9, 10, and 11 for the installed heater as shown in the table below. The adjust setting (already established by the cooling speed selection) also applies to the electric heater kit airflow. Thus, the electric heater airflow is adjusted by the same amount. Verify selected CFM by counting the green CFM LED blinks.

Speed Selection Dip Switches						Htr Kw	9	10	11	MBVC1200*	MBVC1600*	MBVC2000*																												
						3	ON	ON	ON	600	800	800																												
						5	ON	ON	OFF	600	800	800																												
						6	ON	OFF	ON	635	800	800																												
TAP	1	2	3	4	5	6																																		
A	OFF	OFF	OFF	OFF	OFF	OFF																																		
B	ON	OFF	ON	OFF	ON	OFF																																		
C	OFF	ON	OFF	ON	OFF	ON																																		
D	ON	ON	ON	ON	ON	ON																																		
Profiles	Pre-Run		Short-Run		OFF Delay		Model	Tap	Low Stage Cool	High Stage Cool	Cont. Fan																													
A	-----		-----		60 sec/100%		MBVC1200 *	A	400	600	420																													
B	-----		30 sec/50%		60 sec/100%			B	540	800																														
C	-----		7.5 min/82%		60 sec/100%			C	670	1000																														
D	30 sec/50%		7.5 min/82%		30 sec/50%			D	800	1200																														
To set airflow: (1) Select model and desired high stage cooling airflow. Determine the corresponding tap (A, B, C, or D). Set dip switches 1 and 2 to the appropriate ON / OFF positions. (2) Select model and installed electric heater size. Set switches 9, 10, and 11 to the appropriate ON/OFF positions. (3) Select the airflow adjustment factor tap A and D are 0%; Tap B is +10%; Tap C -10%. Set dip switches 3 and 4 to the appropriate ON / OFF positions.																																								
To set Comfort Mode: Select desired Comfort Mode profile (see profiles above). Set switches 5 and 6 to the appropriate ON / OFF positions.																																								
01.40A000.45																																								
<table border="1"> <tr> <td rowspan="4">MBVC1600 *</td> <td>A</td> <td>670</td> <td>1000</td> <td rowspan="4">600</td> </tr> <tr> <td>B</td> <td>800</td> <td>1200</td> </tr> <tr> <td>C</td> <td>940</td> <td>1400</td> </tr> <tr> <td>D</td> <td>1070</td> <td>1600</td> </tr> <tr> <td rowspan="4">MBVC2000 *</td> <td>A</td> <td>800</td> <td>1200</td> <td rowspan="4">600</td> </tr> <tr> <td>B</td> <td>1070</td> <td>1600</td> </tr> <tr> <td>C</td> <td>1200</td> <td>1800</td> </tr> <tr> <td>D</td> <td>1340</td> <td>2000</td> </tr> </table>													MBVC1600 *	A	670	1000	600	B	800	1200	C	940	1400	D	1070	1600	MBVC2000 *	A	800	1200	600	B	1070	1600	C	1200	1800	D	1340	2000
MBVC1600 *	A	670	1000	600																																				
	B	800	1200																																					
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MBVC2000 *	A	800	1200	600																																				
	B	1070	1600																																					
	C	1200	1800																																					
	D	1340	2000																																					

Airflow Table

21 kW*	20 kW	15 kW	10 kW	8 kW	6 kW	5 kW	3 kW
OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>	OFF ON 9 <input type="checkbox"/> <input type="checkbox"/> 10 <input type="checkbox"/> <input type="checkbox"/> 11 <input type="checkbox"/> <input type="checkbox"/>
Electric Heating Air Flow (*indicates factory setting)							

**NOTE:** Upon start up in communicating mode the circuit board will display a “1 Flash” error code on the diagnostic LED and an “Ec” HTR TOO LARGE error at the communicating display. This is an indication that the dip switches on the control board need to be configured in accordance with the Electric Heating Airflow Table on page 7 of this manual. Configuring the dip switches and resetting power to the unit will clear the error code.

## TROUBLESHOOTING


### ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

**NOTE:** Discharge body's static electricity before touching unit. An electrostatic discharge can adversely affect electrical components.

Use the following precautions during modular blower installation and servicing to protect the integrated control module from damage. By putting the modular blower, the control, and the person at the same electrostatic potential, these steps will help avoid exposing the integrated control module to electrostatic discharge. This procedure is applicable to both installed and uninstalled (ungrounded) blowers.


1. Disconnect all power to the blower. Do not touch the integrated control module or any wire connected to the control prior to discharging your body's electrostatic charge to ground.
2. Firmly touch a clean, unpainted, metal surface of the modular blower near the control. Any tools held in a person's hand during grounding will be discharged.
3. Service integrated control module or connecting wiring following the discharge process in step 2. Use caution not to recharge your body with static electricity; (i.e., do not move or shuffle your feet, do not touch ungrounded objects, etc.). If you come in contact with an ungrounded object, repeat step 2 before touching control or wires.
4. Discharge your body to ground before removing a new control from its container. Follow steps 1 through 3 if installing the control on a blower. Return any old or new controls to their containers before touching any ungrounded object.

### DIAGNOSTIC CHART

 **WARNING**

**HIGH VOLTAGE!**

**TO AVOID PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, DISCONNECT ELECTRICAL POWER BEFORE PERFORMING ANY SERVICE OR MAINTENANCE.**



Refer to the *Troubleshooting Chart* at the end of this manual for assistance in determining the source of unit operational problems. The red diagnostic LED blinks to assist in troubleshooting the unit. The number of blinks refers to a specific fault code.

### FAULT RECALL

The integrated control module is equipped with a momentary push-button switch that can be used to display the last six faults on the red diagnostic LED. The control must be in Standby Mode (no thermostat inputs) to use the feature. Depress the push-button for approximately two seconds and less than five seconds. The LED display will then display the six most recent faults beginning with the most recent fault and decrementing to the least recent fault. The faults may be cleared by depressing the button for greater than five seconds.

**NOTE:** Consecutively repeated faults are displayed a maximum of three times.

## COMFORTNET™ SYSTEM

### OVERVIEW

The ComfortNet™ system (or CT™ system) is a system that includes a ComfortNet™ compatible modular blower and air conditioner or heat pump with a CTK01AA thermostat. Any other system configurations are considered invalid ComfortNet™ systems and must be connected as a traditional (or legacy) system (see *Electrical Connections - 24 Volt Thermostat Wiring* for wiring connections).

A ComfortNet™ heating/air conditioning system differs from a legacy/traditional system in the manner in which the indoor unit, outdoor unit and thermostat interact with one another. In a traditional system, the thermostat sends commands to the indoor and outdoor units via analog 24 VAC signals. It is a one-way communication path in that the indoor and outdoor units typically do not return information to the thermostat.

In a ComfortNet™ system, the indoor unit, outdoor unit, and thermostat “communicate” digitally with one another creating a two-way communications path. The thermostat sends commands to the indoor and outdoor units, and also requests and receives information from both the indoor and outdoor units.



Two-way digital communications is accomplished using only two wires. The thermostat and subsystem controls are powered with 24 VAC. Thus, a maximum of 4 wires between the equipment and thermostat is all that is required to operate the system.

### AIRFLOW CONSIDERATION

Airflow demands are managed differently in a fully communicating system than they are in a legacy wired system. The system operating mode (as determined by the thermostat) determines which unit calculates the system airflow demand. If the indoor unit is responsible for determining the airflow demand, it calculates the demand and sends it to the ECM motor. If the outdoor unit or thermostat is responsible for determining the demand, it calculates the demand and transmits the demand along with a fan request to the indoor unit. The indoor unit then sends the demand to the ECM motor. The table below lists the various ComfortNet™ systems, the operating mode, and airflow demand source.

System	System Operating Mode	Airflow Demand Source
Air Conditioner + Air Handler	Cooling	Air Conditioner
	Heating	Air Handler
	Continuous Fan	Thermostat
Heat Pump + Air Handler	Cooling	Heat Pump
	Heat Pump Heating Only	Heat Pump
	HP + Electric Heat Strips	> of Heat Pump or Air Handler Demand
	Electric Heat Strips Only	Air Handler
	Continuous Fan	Thermostat

For example, assume the system is a heat pump matched with an air handler. With a call for low stage cooling, the heat pump will calculate the system's low stage cooling airflow demand. The heat pump will then send a fan request along with the low stage cooling airflow demand to the air handler. Once received, the air handler will send the low stage cooling airflow demand to the ECM motor. The ECM motor then delivers the low stage cooling airflow. See the applicable ComfortNet™ air conditioner or heat pump installation manual for the airflow delivered during cooling or heat pump heating.

In continuous fan mode, the CTK01AA thermostat provides the airflow demand. The thermostat may be configured for a low, medium, or high continuous fan speed. The low, medium, and high fan speeds correspond to 25%, 50%,

and 75%, respectively, of the air handlers' maximum airflow capability. During continuous fan operation, the thermostat sends a fan request along with the continuous fan demand to the air handler. The air handler, in turn, sends the demand to the ECM motor. The ECM motor delivers the requested continuous fan airflow.

### CTK01AA WIRING

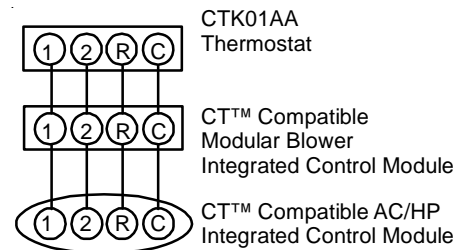
**NOTE:** Refer to section *Electrical Connections* for 208/230 volt line connections to the modular blower.

**NOTE:** A removable plug connector is provided with the control to make thermostat wire connections. This plug may be removed, wire connections made to the plug, and replaced. It is **strongly** recommended that multiple wires into a single terminal be twisted together prior to inserting into the plug connector. Failure to do so may result in intermittent operation.

Typical 18 AWG thermostat wire may be used to wire the system components. However, communications reliability may be improved by using a high quality, shielded, twisted pair cable for the data transmission lines. In either case, 100 feet is the maximum length of wire between indoor unit and outdoor unit, or between indoor unit and thermostat.

### FOUR-WIRE INDOOR AND OUTDOOR WIRING

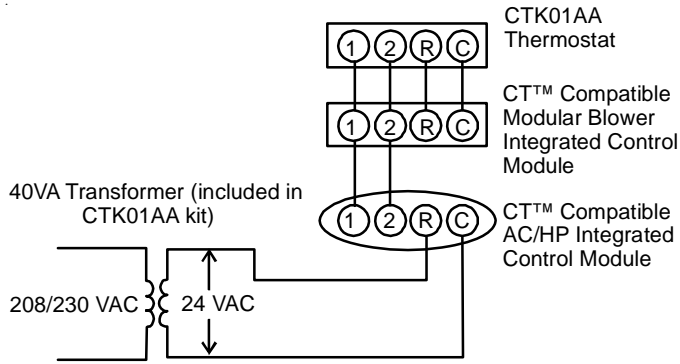
Typical wiring will consist of four wires between the indoor unit and outdoor unit and between the indoor unit and thermostat. The required wires are: (a) data lines, 1 and 2; (b) thermostat "R" (24 VAC hot) and "C" (24 VAC common).



System Wiring Using Four-Wires

### TWO-WIRE OUTDOOR, FOUR-WIRE INDOOR WIRING

Two wires only may be utilized between the indoor and outdoor units. For this wiring scheme, only the data lines, 1 and 2, are required between the indoor and outdoor units. A 40VA, 208/230 VAC to 24 VAC transformer must be installed in the outdoor unit to provide 24 VAC power to the outdoor unit's electronic control. The transformer is included with the CTK01AA kit. See kit instructions for mounting and wiring instructions. Four wires are required between the indoor unit and thermostat.



**System Wiring using Two-Wires between Air Handler and AC/HP and Four-Wires between Air Handler and Thermostat**

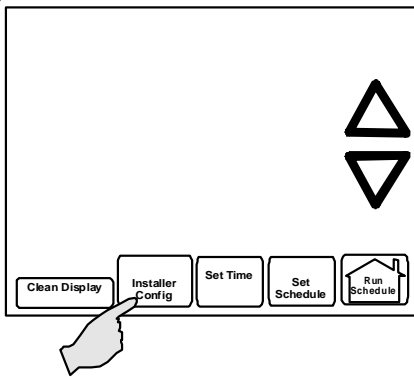
## COMFORTNET™ SYSTEM ADVANCED FEATURES

The ComfortNet™ system permits access to additional system information, advanced setup features, and advanced diagnostic/troubleshooting features. These advanced features are organized into a menu structure. The menus are accessed and navigated as described below.

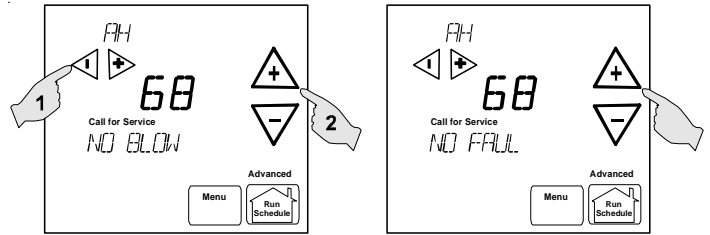
### ACCESSING AND NAVIGATING THE ADVANCED FEATURES MENU

The advanced system features are accessed using the ComfortNet™ thermostat. These advanced features are accessed as follows:

- On the CT™ thermostat Home Screen Display, touch the **Menu** key to display additional key choices.
- Touch and hold the **Installer Config** key for approximately 3 seconds to enter the Thermostat Options Configuration menu.
- Touch and hold the **Installer Config** key again for approximately 3 seconds to enter the Advanced Installer Configuration menu.



Upon entering the advanced menus, the Advanced Fault Menu is displayed. The display will change to the Fault Screen and indicate any faults that may be present in the indoor or outdoor equipment. If a fault is present, the Fault Screen will show the equipment and an error code with a description of the fault. Touch  $\triangleleft$  or  $\triangleright$  keys to view the fault status of any remaining equipment. The text “**NO FAULTS**” will be scrolled if no errors are present.



Touch the  $\triangleleft$  or  $\triangleright$  to step through the list of installed equipment, including the thermostat. Touch the **Installer Config** key to enter the submenus for the equipment displayed. The text “**WORKING**” will be displayed in the scrolling display area while the data is being retrieved. The first sub-menu is then displayed. See tables below for listing of modular blower submenus.

Touch the  $\triangleleft$  or  $\triangleright$  to step through the list of submenus and view settings. If a setting can be adjusted,  $\triangleleft$  and  $\triangleright$  keys will appear. Use the  $\triangleleft$  or  $\triangleright$  keys to adjust the setting to the desired value. Touch the  $\triangleleft$  or  $\triangleright$  to step to the next item. “**WORKING**” will appear as the settings are being updated. “**DONE**” will appear to indicate the change was accepted. If the change is not accepted, the display will show “**FAIL**” then revert to the Fault Screen.

Some parameters being displayed switch between the item name and the item value. Touch the **Hold** key to momentarily stop the display from switching.

To exit an equipment submenu and revert back to the equipment menus, touch the **Menu** key. Touch Menu again to revert back to the Thermostat Options Menu. Touch the **Run Schedule** key at any time it is displayed to step out of all menus and back to the CT™ thermostat Home Screen Display.

## MODULAR BLOWER ADVANCED FEATURES MENUS

<b>CONFIGURATION</b>	
Submenu Item	Indication (for Display Only; not User Modifiable)
Electric Heat Size (HTR KW)	Displays the size in kW of the selected electric heaters.
Motor HP (1/2, 3/4, or 1 MTR HP)	Displays the modular blower indoor blower motor horsepower.
Heat ON Delay (HT ON)	Displays the electric heat indoor blower ON delay.
Heat OFF Delay (HT OFF)	Displays the electric heat indoor blower OFF delay.

<b>DIAGNOSTICS</b>		
Submenu Item	Indication/User Modifiable Options	Comments
Fault 1 (FAULT #1)	Most recent fault	For display only
Fault 2 (FAULT #2)	Next most recent fault	For display only
Fault 3 (FAULT #3)	Next most recent fault	For display only
Fault 4 (FAULT #4)	Next most recent fault	For display only
Fault 5 (FAULT #5)	Next most recent fault	For display only
Fault 6 (FAULT #6)	Least recent fault	For display only
Clear Fault History (CLEAR)	NO or YES	Selecting "YES" clears the fault history

**NOTE:** Consecutively repeated faults are shown a maximum of 3 times

<b>IDENTIFICATION</b>	
Submenu Item	Indication (for Display Only; not User Modifiable)
Model Number (MOD NUM)	Displays the modular blower model number
Serial Number (SER NUM)	Displays the modular blower serial number (Optional)
Software (SOFTWARE)	Displays the application software revision

<b>SET-UP</b>		
Submenu Item	User Modifiable Options	Comments
Heat Airflow Trim (HT TRM)	-10% to +10% in 2% increments, default is 0%	Trims the electric heating airflow by the selected amount.

<b>STATUS</b>	
Submenu Item	Indication (for Display Only; not User Modifiable)
Mode (MODE)	Displays the current modular blower operating mode
CFM (CFM)	Displays the airflow for the current operating mode

## THERMOSTAT MENU

If this modular blower is installed with a CT™ compatible heat pump, the system is recognized as a heat pump system. The electric heat disabled temperature and heat pump disabled temperature must be set via the thermostat advanced menu. Navigate to the **THERMOSTAT** menu. Press the **INSTALLER CONFIG** key. Navigate to the **SETUP** menu and press the **INSTALLER CONFIG** button. Navigate to **AUX HT LOCK-OUT**. Adjust the electric heat disabled temperature to the desired setting using the back/forward arrows. Navigate to **HP BAL PNT**. Adjust the heat pump disabled temperature to the desired setting using the back/forward arrows.

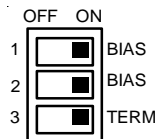
## DIAGNOSTICS

Accessing the modular blower's diagnostics menu provides ready access to the last six faults detected by the modular blower. Faults are stored most recent to least recent. Any consecutively repeated fault is stored a maximum of three times. Example: A clogged return air filter causes the modular blower's motor to repeatedly enter a limiting condition. The control will only store this fault the first three *consecutive* times the fault occurs. Navigate to the diagnostics menu as described above in *Accessing and Navigating the Advanced Features Menus*.

**NOTE:** It is highly recommended that the fault history be cleared when performing maintenance or servicing the modular blower.

## NETWORK TROUBLESHOOTING

**NOTE:** Indoor Unit BIAS and TERMINATION Dipswitches are factory set and should not be changed.



### Indoor Unit BIAS and TERMINATION Dipswitches

The ComfortNet™ system is a fully communicating system, and thus, constitutes a network. Occasionally the need to troubleshoot the network may arise. The integrated control has some on-board tools that may be used to troubleshoot the network. These tools are: red communications LED, green receive (Rx) LED, and LEARN button.

- Red communications LED – Indicates the status of the network. The table below indicates the LED status and the corresponding potential problem.
- Green receive LED – Indicates network traffic. The table below indicates the LED status and the corresponding potential problem.
- Learn button – Used to reset the network. Depress the button for approximately 2 seconds to reset the network.

## SYSTEM TROUBLESHOOTING

**NOTE:** Refer to the instructions accompanying the CT™ compatible outdoor AC/HP unit for troubleshooting information.

Refer to the Troubleshooting Chart in the Appendix for a listing of possible modular blower error codes, possible causes and corrective actions.



## Communciations Status LED's

LED	LED Status	Indication	Possible Causes	Corrective Action(s)	Notes & Cautions
Red Communications LED	Off	<ul style="list-style-type: none"> <li>• Normal condition</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
	1 Flash	<ul style="list-style-type: none"> <li>• Communications Failure</li> </ul>	<ul style="list-style-type: none"> <li>• Communications Failure</li> </ul>	<ul style="list-style-type: none"> <li>• Depress Learn Button</li> <li>• Verify that bus BIAS and TERM dipswitches are in the ON position.</li> </ul>	<ul style="list-style-type: none"> <li>• Depress once quickly for a power-up reset</li> <li>• Depress and hold for 2 seconds for an out-of-box reset</li> </ul>
	2 Flashes	<ul style="list-style-type: none"> <li>• Out-of-box reset</li> </ul>	<ul style="list-style-type: none"> <li>• Control power up</li> <li>• Learn button depressed</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
Green Receive LED	Off	<ul style="list-style-type: none"> <li>• No power</li> <li>• Communications error</li> </ul>	<ul style="list-style-type: none"> <li>• No power to modular blower</li> <li>• Open fuse</li> <li>• Communications error</li> </ul>	<ul style="list-style-type: none"> <li>• Check fuses and circuit breakers; replace/reset</li> <li>• Replace blown fuse</li> <li>• Check for shorts in low voltage wiring in modular blower/system</li> <li>• Reset network by depressing learn button</li> <li>• Check data 1/ data 2 voltages</li> </ul>	<ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• See Network Troubleshooting section.</li> </ul>
	1 Steady Flash	<ul style="list-style-type: none"> <li>• No network found</li> </ul>	<ul style="list-style-type: none"> <li>• Broken/ disconnected data wire(s)</li> <li>• Modular blower is installed as a legacy/ traditional system</li> </ul>	<ul style="list-style-type: none"> <li>• Check communications wiring (data 1/ data 2 wires)</li> <li>• Check wire connections at terminal block</li> <li>• Verify modular blower installation type (legacy/ traditional or communicating)</li> <li>• Check data 1/ data 2 voltages</li> </ul>	<ul style="list-style-type: none"> <li>• Turn power OFF prior to repair</li> <li>• Verify wires at terminal blocks are securely twisted together prior to inserting into terminal block</li> <li>• See Network Troubleshooting section</li> </ul>
	Rapid Flashing	<ul style="list-style-type: none"> <li>• Normal network traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Control is "talking" on network as expected</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
	On Solid	<ul style="list-style-type: none"> <li>• Data 1/ Data 2 miss-wire</li> </ul>	<ul style="list-style-type: none"> <li>• Data 1 and data 2 wires reversed at modular blower, thermostat, or CT™ compatible outdoor AC/HP</li> <li>• Short between data 1 and data 2 wires</li> <li>• Short between data 1 or data 2 wires and R (24VAC) or C (24VAC common)</li> </ul>	<ul style="list-style-type: none"> <li>• Check communications wiring (data 1/ data 2 wires)</li> <li>• Check wire connections at terminal block</li> <li>• Check data 1/ data 2 voltages</li> </ul>	<ul style="list-style-type: none"> <li>• Turn power OFF prior to repair</li> <li>• Verify wires at terminal blocks are securely twisted together prior to inserting into terminal block</li> <li>• See Network Troubleshooting section</li> </ul>

# **APPENDIX A**

# TROUBLESHOOTING INFORMATION: AIR HANDLER DIAGNOSTIC CODES

Symptoms of Abnormal Operation (Legacy & ComfortNet™ Thermostat)		Diagnostic/Status LED Codes		Fault Description		ComfortNet™ Thermostat Only Message Code		Possible Causes		Corrective Actions		Notes & Cautions	
<ul style="list-style-type: none"> <li>LED display is ON continuously</li> <li>Electric heaters fail to energize on a call for W1 or Auxiliary/Emergency heat</li> <li>Integrated control module LED display provides the indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message</li> </ul>	ON 1 Flash	<ul style="list-style-type: none"> <li>Normal operation</li> <li>Heater kit selected via dipswitches is too large for heater kits specified in shared data set</li> </ul>	None <i>HTR TOO LARGE</i>	<ul style="list-style-type: none"> <li>Normal operation</li> <li>Heater kit selected via dipswitches is too large for heater kits in shared data set</li> </ul>	None	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Use memory card for the specific model.</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded.</li> </ul>							
<ul style="list-style-type: none"> <li>Electric heat airflow is higher than expected on a call for W1 or Auxiliary/Emergency heat</li> <li>Integrated control module LED display provides the indicated error code.</li> </ul>	1 Flash	<ul style="list-style-type: none"> <li>Heater kit selected via dipswitches is too small for heater kits specified in shared data set</li> </ul>	<i>HTR TOO SMALL</i>	<ul style="list-style-type: none"> <li>Heater kit selected via dipswitches is too small for heater kits in shared data set</li> </ul>	<i>Ec</i>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Use memory card for the specific model.</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded.</li> </ul>							
<ul style="list-style-type: none"> <li>Electric heat airflow is higher than expected on a call for W1 or Auxiliary/Emergency heat</li> <li>Integrated control module LED display provides the indicated error code.</li> </ul>	1 Flash	<ul style="list-style-type: none"> <li>Heater kit selected via dipswitches does not match heater kits specified in shared data set</li> </ul>	<i>NO HTR MATCH</i>	<ul style="list-style-type: none"> <li>Heater kit selected via dipswitches is doesn't match heater kits in shared data set</li> </ul>	<i>Ec</i>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Use memory card for the specific model.</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded.</li> </ul>							
<ul style="list-style-type: none"> <li>No modular blower operation.</li> <li>Integrated control module LED display provides the indicated error code.</li> <li>ComfortNet™ thermostat displays "Battery Power"</li> </ul>	5 Flashes	<ul style="list-style-type: none"> <li>Open Fuse</li> </ul>	Not Displayed	<ul style="list-style-type: none"> <li>Short in low voltage wiring</li> </ul>	Not Displayed	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace fuse with 3-amp automotive type</li> </ul>							
<ul style="list-style-type: none"> <li>Modular blower fails to operate</li> <li>Integrated control module LED display provides no signal.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message</li> </ul>	None	<ul style="list-style-type: none"> <li>No 208/230 volt power to modular blower or no 24 volt power to integrated control module</li> <li>Blown fuse or circuit breaker</li> <li>Integrated control module has an internal fault.</li> </ul>	<i>INTERNAL FAULT</i>	<ul style="list-style-type: none"> <li>Manual disconnect switch OFF or 24 volt wire improperly connected or loose</li> <li>Blown fuse or circuit breaker</li> <li>Integrated control module has an internal fault</li> </ul>	<i>EE</i>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace integrated control module fuse with 3A automotive fuse.</li> <li>Replace integrated control module with correct replacement part</li> <li>Read precautions in "Electrostatic Discharge" section of manual.</li> </ul>							

# TROUBLESHOOTING INFORMATION: AIR HANDLER DIAGNOSTIC CODES

Symptoms of Abnormal Operation (Legacy & ComfortNet™ Thermostat)	Diagnostic/Status LED Codes	Fault Description	ComfortNet™ Thermostat Only Message Code	Possible Causes	Corrective Actions	Notes & Cautions
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	9 Flashes	<ul style="list-style-type: none"> <li>Data not yet on network.</li> </ul>	NO NET DATA	<ul style="list-style-type: none"> <li>Modular blower does not contain any shared data.</li> </ul>	<ul style="list-style-type: none"> <li>Populate shared data set using memory card.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair</li> <li>Use memory card for the specific model.</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded.</li> <li>Error code will be cleared once data is loaded.</li> </ul>
<ul style="list-style-type: none"> <li>Operation different than expected or no operation.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	11 Flashes	<ul style="list-style-type: none"> <li>Invalid memory card data.</li> </ul>	d4	<ul style="list-style-type: none"> <li>Shared data set on memory card has been rejected by integrated control module</li> </ul>	<ul style="list-style-type: none"> <li>Verify shared data set is correct for the specific model.</li> <li>Re-populate data using correct memory card if required.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair</li> <li>Use memory card for the specific model.</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded.</li> <li>Error code will be cleared once data is loaded.</li> </ul>



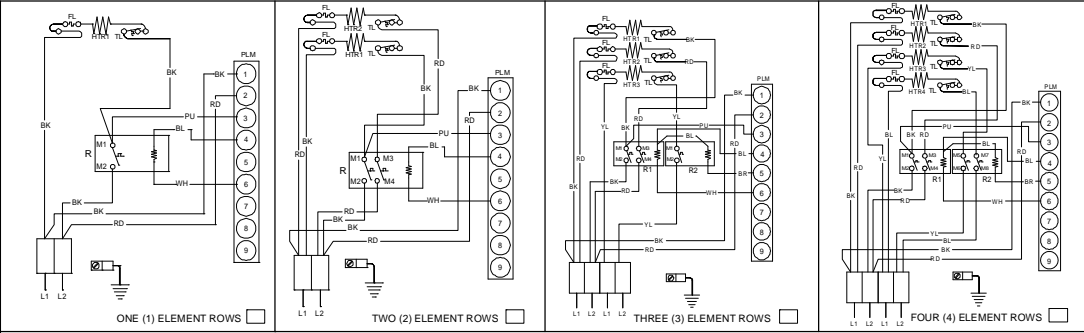
# TROUBLESHOOTING INFORMATION: AIR HANDLER DIAGNOSTIC CODES

Symptoms of Abnormal Operation (Legacy & ComfortNet™ Thermostat)		Diagnostic/Status LED Codes	Fault Description	ComfortNet™ Thermostat Only Message	Code	Possible Causes	Corrective Actions	Notes & Cautions
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor is not running when it should be running.</li> </ul>	MOTOR NOT RUN	b0	<ul style="list-style-type: none"> <li>Loose wiring connection at circulator motor power leads disconnected.</li> <li>Failed circulator blower motor.</li> </ul>	<ul style="list-style-type: none"> <li>Tighten or correct wiring connection.</li> <li>Check circulator blower motor. Replace if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair</li> <li>Replace circulator motor with correct replacement part.</li> </ul>	
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Integrated control module has lost communications with circulator blower motor.</li> </ul>	MOTOR COMM	b1	<ul style="list-style-type: none"> <li>Loose wiring connection at circulator motor control leads.</li> <li>Failed circulator blower motor.</li> <li>Failed integrated control module.</li> </ul>	<ul style="list-style-type: none"> <li>Tighten or correct wiring connection.</li> <li>Check circulator blower motor. Replace if necessary.</li> <li>Check integrated control module. Replace if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair</li> <li>Replace circulator motor with correct replacement part.</li> <li>Replace integrated control module with correct replacement part.</li> </ul>	
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor horse power in shared data set does not match circulator blower motor horse power.</li> </ul>	MOTOR MISMATCH	b2	<ul style="list-style-type: none"> <li>Incorrect circulator blower motor in modular blower.</li> <li>Incorrect shared data set in integrated control module.</li> </ul>	<ul style="list-style-type: none"> <li>Verify circulator blower motor horse power is the same specified for the specific modular blower model. Replace if necessary.</li> <li>Verify shared data set is correct for the specific model. Re-populate data using correct memory card if required.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair</li> <li>Replace motor with correct replacement part.</li> <li>Use memory card for the specific model</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded. Turn power off before removing memory card.</li> <li>Error code will be cleared once shared data and motor horse power match.</li> </ul>	
<ul style="list-style-type: none"> <li>Modular blower operates at reduced performance.</li> <li>Airflow delivered is less than expected.</li> <li>Integrated control module LED display provides indicated error code.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor is operating in a power, temperature, or speed limiting condition.</li> </ul>	MOTOR LIMITS	b3	<ul style="list-style-type: none"> <li>Blocked filters.</li> <li>Restrictive ductwork.</li> <li>Undersized ductwork.</li> <li>High ambient temperatures.</li> </ul>	<ul style="list-style-type: none"> <li>Check filters for blockage. Clean filters or remove obstruction.</li> <li>Check ductwork for blockage. Remove obstruction. Verify all registers are fully open.</li> <li>Verify ductwork is appropriately sized for system. Resize/replace ductwork if necessary.</li> <li>See "Installation Instructions" for installation requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>	
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor senses a loss of rotor control.</li> <li>Circulator blower motor senses high current.</li> </ul>	MOTOR TRIPS	b4	<ul style="list-style-type: none"> <li>Abnormal motor loading, sudden change in speed or torque, sudden blockage of modular blower/coil air inlet or outlet.</li> <li>High loading conditions, blocked filters, very restrictive ductwork, blockage of modular blower/coil air inlet or outlet.</li> </ul>	<ul style="list-style-type: none"> <li>Check filters, filter grills/registers, duct system, and modular blower/coil air inlet/outlet for blockages.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>	

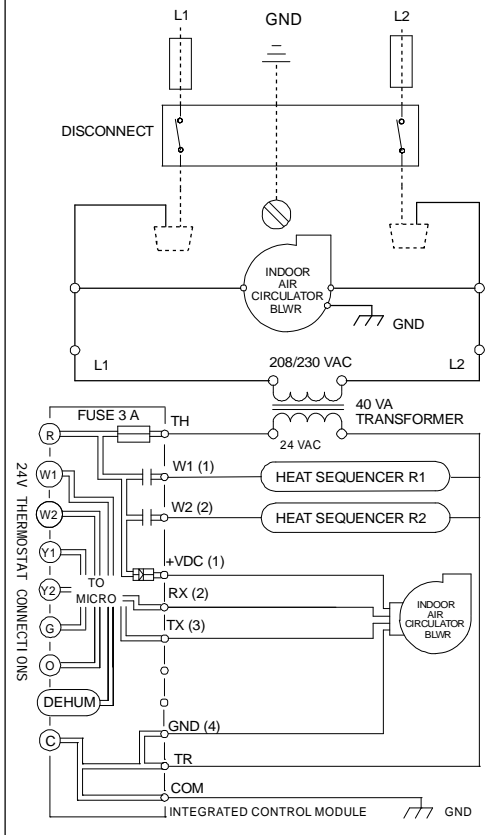
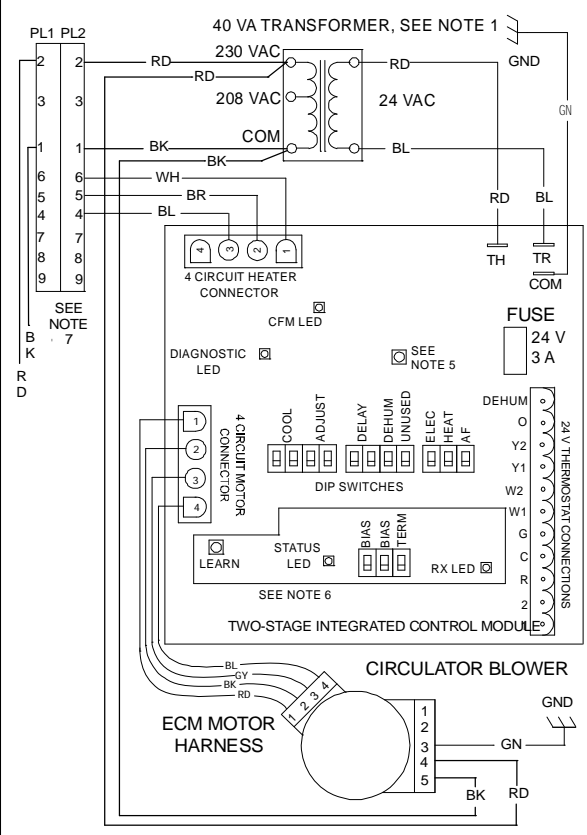
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<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor fails to start 10 consecutive times.</li> </ul>	<p>MTR LCKD ROTOR</p> <p>b5</p>	<ul style="list-style-type: none"> <li>Obstruction in circulator blower housing.</li> <li>Seized circulator blower motor bearings.</li> <li>Failed circulator blower motor.</li> </ul>	<ul style="list-style-type: none"> <li>Check circulator blower for obstructions. Remove and repair/replace wheel/motor if necessary.</li> <li>Check circulator blower motor shaft rotation and motor. Replace motor if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace motor with correct replacement part.</li> <li>Replace wheel with correct replacement part.</li> </ul>
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor shuts down for over or under voltage condition.</li> <li>Circulator blower motor shuts down due to over temperature condition on power module.</li> </ul>	<p>MOTOR VOLTS</p> <p>b6</p>	<ul style="list-style-type: none"> <li>High AC line voltage to modular blower.</li> <li>Low AC line voltage to modular blower.</li> <li>High ambient temperatures.</li> </ul>	<ul style="list-style-type: none"> <li>Check power to modular blower. Verify line voltage to blower is within the range specified on the modular blower rating plate.</li> <li>See "Installation Instructions" for installation requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>
<ul style="list-style-type: none"> <li>Modular blower fails to operate.</li> <li>Integrated control module LED display provides indicated error code.</li> <li>ComfortNet™ thermostat "Call for Service" icon illuminated.</li> <li>ComfortNet™ thermostat scrolls "Check Air Handler" message.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Circulator blower motor does not have enough information to operate properly.</li> <li>Motor fails to start 40 consecutive times.</li> </ul>	<p>MOTOR PARAMS</p> <p>b7</p>	<ul style="list-style-type: none"> <li>Error with integrated control module.</li> <li>Motor has a locked rotor condition.</li> </ul>	<ul style="list-style-type: none"> <li>Check integrated control module. Verify control is populated with correct shared data set. See data errors above for details.</li> <li>Check for locked rotor condition (see error code above for details).</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace with correct replacement part(s).</li> <li>Use memory card for the specific model.</li> <li>Insert memory card BEFORE turning power ON. Memory card may be removed after data is loaded. Turn power OFF before removing memory card.</li> </ul>
<ul style="list-style-type: none"> <li>Modular blower operates at reduced performance or operates on low stage when high stage is expected.</li> <li>Integrated control module LED display provides indicated error code.</li> </ul>	6 Flashes	<ul style="list-style-type: none"> <li>Airflow is lower than demanded.</li> </ul>	<p>LOW ID AIRFLOW</p> <p>b9</p>	<ul style="list-style-type: none"> <li>Blocked filters.</li> <li>Restrictive ductwork.</li> <li>Undersized ductwork.</li> </ul>	<ul style="list-style-type: none"> <li>Check filters for blockage. Clean filters or remove obstruction.</li> <li>Check ductwork for blockage. Remove obstruction. Verify all registers are fully open.</li> <li>Verify ductwork is appropriately sized for system. Resize/replace ductwork if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>

**WARNING** HIGH VOLTAGE! DISCONNECT ALL POWER BEFORE SERVICING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



NOTE: WHEN INSTALLING HEATER KIT, ENSURE SPEED TAP DOES NOT EXCEED MINIMUM BLOWER SPEED (MBS) SPECIFIED FOR THE AIRHANDLER/HEATER KIT COMBINATION ON THIS UNIT'S S&R PLATE. AFTER INSTALLING OPTIONAL HEAT KIT, MARK AN "X" IN THE  PROVIDED ABOVE. MARK ACCORDING TO NUMBER OF HEATER ELEMENT ROWS INSTALLED. NO MARK INDICATES NO HEAT KIT INSTALLED.



**NOTES:**

1. PLACE RED WIRE ON TRANSFORMER TERMINAL 2 FOR 208 VAC OPERATION.
2. MANUFACTURER'S SPECIFIED REPLACEMENT PARTS MUST BE USED WHEN SERVICING.
3. IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE BLOWER MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105°C. USE COPPER CONDUCTORS ONLY.
4. UNIT MUST BE PERMANENTLY GROUNDED AND CONFORM TO N.E.C. AND LOCAL CODES.
5. TO RECALL THE LAST 6 FAULTS, MOST RECENT TO LEAST RECENT, DEPRESS SWITCH FOR MORE THAN 2 SECONDS WHILE IN STANDBY (N THERMOSTAT INPUTS).
6. BIAS AND TERM DIPSWITCHES MUST BE IN "ON" POSITION. RED STATUS LED PROVIDES NETWORK STATUS. GREEN RX LED INDICATES NETWORK TRAFFIC. USE LEARN BUTTON TO RESET NETWORK.
7. DISCARD CONNECTOR PL1 WHEN INSTALLING OPTIONAL HEAT KIT.

**COLOR CODES:**

- PK PINK
- BR BROWN
- WH WHITE
- BL BLUE
- GY GRAY
- RD RED
- YL YELLOW
- OR ORANGE
- VT VIOLET
- GN GREEN
- BK BLACK

- LOW VOLTAGE (24V) ———
- LOW VOLTAGE FIELD - - - - -
- HI VOLTAGE (230V) ———
- HI VOLTAGE FIELD - - - - -
- JUNCTION ●
- TERMINAL ○
- INTERNAL TO INTEGRATED CONTROL ———
- EQUIPMENT GND ⚡
- FIELD GND ⊥
- FIELD SPLICE ⌋
- RESISTOR ⎓
- OVERCURRENT PROT. DEVICE ⎓
- PLUG CONNECTION ⌋

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Wiring is subject to change, always refer to the wiring diagram on the unit for the most up-to-date wiring.

### **Quality Makes the Difference!**

All of our systems are designed and manufactured with the same high quality standards regardless of size or efficiency. We have designed these units to significantly reduce the most frequent causes of product failure. They are simple to service and forgiving to operate. We use quality materials and components. Finally, every unit is run tested before it leaves the factory. That's why we know . . . **There's No Better Quality.**

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