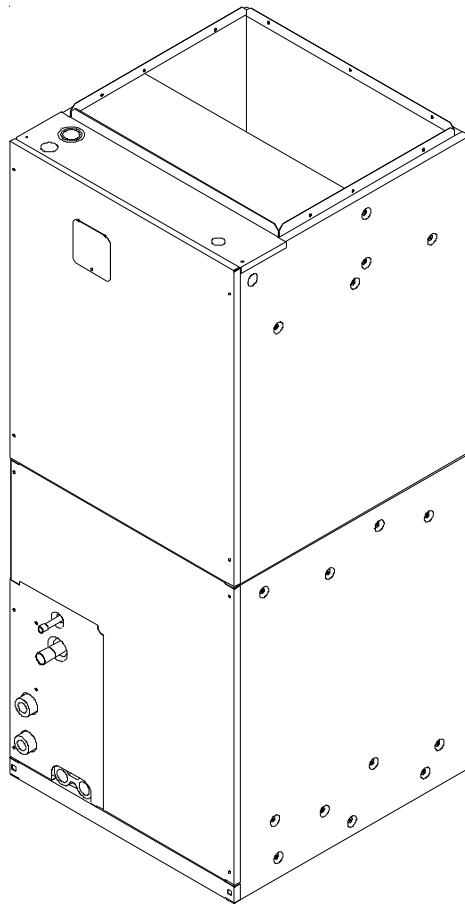


# TECHNICAL MANUAL

## MBVC Blowers

- Refer to Service Manual RS6200007 for installation, operation, and troubleshooting information.
- All safety information must be followed as provided in the Service Manual.
- Refer to the appropriate Parts Catalog for part number information.
- Models listed on page 2.



This manual is to be used by qualified, professionally trained HVAC technicians only. Goodman does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

RT6223003r1  
January 2011

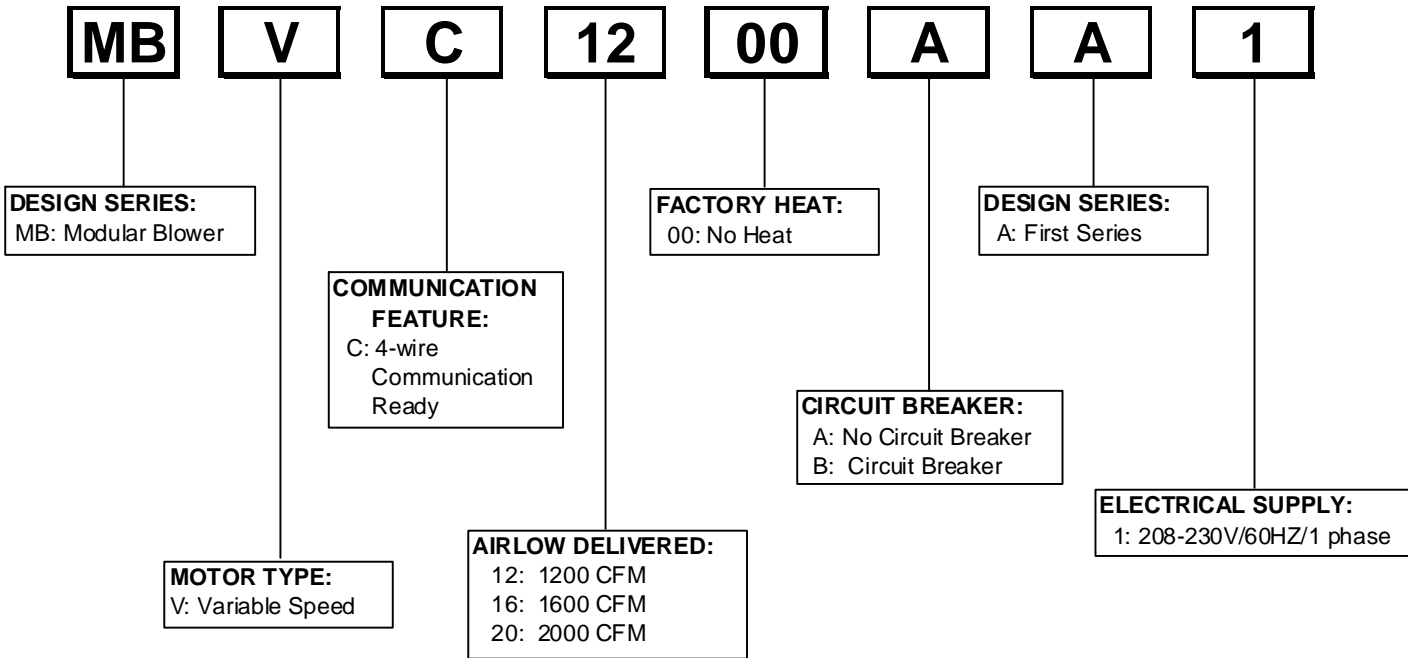
# PRODUCT IDENTIFICATION


The model number is used for positive identification of component parts used in manufacturing. Please use this number when requesting service or parts information.

MBVC1200AA-1\*\*

MBVC1600AA-1\*\*

MBVC2000AA-1\*\*



**⚠ WARNING** **HIGH VOLTAGE!** Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death. 

**⚠ WARNING** Goodman will not be responsible for any injury or property damage arising from improper service or service procedures. If you install or perform service on this unit, you assume responsibility for any personal injury or property damage which may result. Many jurisdictions require a license to install or service heating and air conditioning equipment.

**⚠ WARNING** Installation and repair of this unit should be performed ONLY by individuals meeting (at a minimum) the requirements of an "entry level technician" as specified by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). Attempting to install or repair this unit without such background may result in product damage, personal injury or death.

**⚠ WARNING** The United States Environmental Protection Agency ("EPA") has issued various regulations regarding the introduction and disposal of refrigerants introduced into this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. These regulations may vary by jurisdiction. Should questions arise, contact your local EPA office.

**⚠ WARNING** Do not connect or use any device that is not design certified by Goodman for use with this unit. Serious property damage, personal injury, reduced unit performance and/or hazardous conditions may result from the use of such non-approved devices.

**⚠ WARNING** To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.

# PRODUCT DESIGN

## GENERAL INFORMATION

The MBVC Blower Cabinets are used in combination with a cased evaporator coil for a two-piece blower and coil combination. 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 and allows for a variety of mix-matching possibilities.

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. Electric heater kits (HKR) are available as sales accessories for supplemental electric heat.

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.

The MBVC blower cabinet uses a variable speed motor that maintains a constant airflow with a higher duct static. It is approved for applications with cooling coils of up to 0.8 inches W.C. external static pressure and includes a feature that allows airflow to be changed to  $\pm 10\%$ .

The MBVC blower cabinets, with proper coil matches, can be positioned for upflow, counterflow, horizontal right or horizontal left operation. All units are constructed with R-4.2 insulation. In areas of extreme humidity (greater than 80% consistently), insulate the exterior of the blower with insulation having a vapor barrier equivalent to ductwork insulation, providing local codes permit.

The CAPX/CHPX coils are equipped with a thermostatic expansion valve that has a built-in internal check valve for refrigerant metering. The CACF/CAPF/CHPF coils are equipped with a fixed restrictor orifice.

The coils are designed for upflow, counterflow, or horizontal application, using ECM motors on the MBVC models.

## 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.

## 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. The table below compares the valid CT systems.

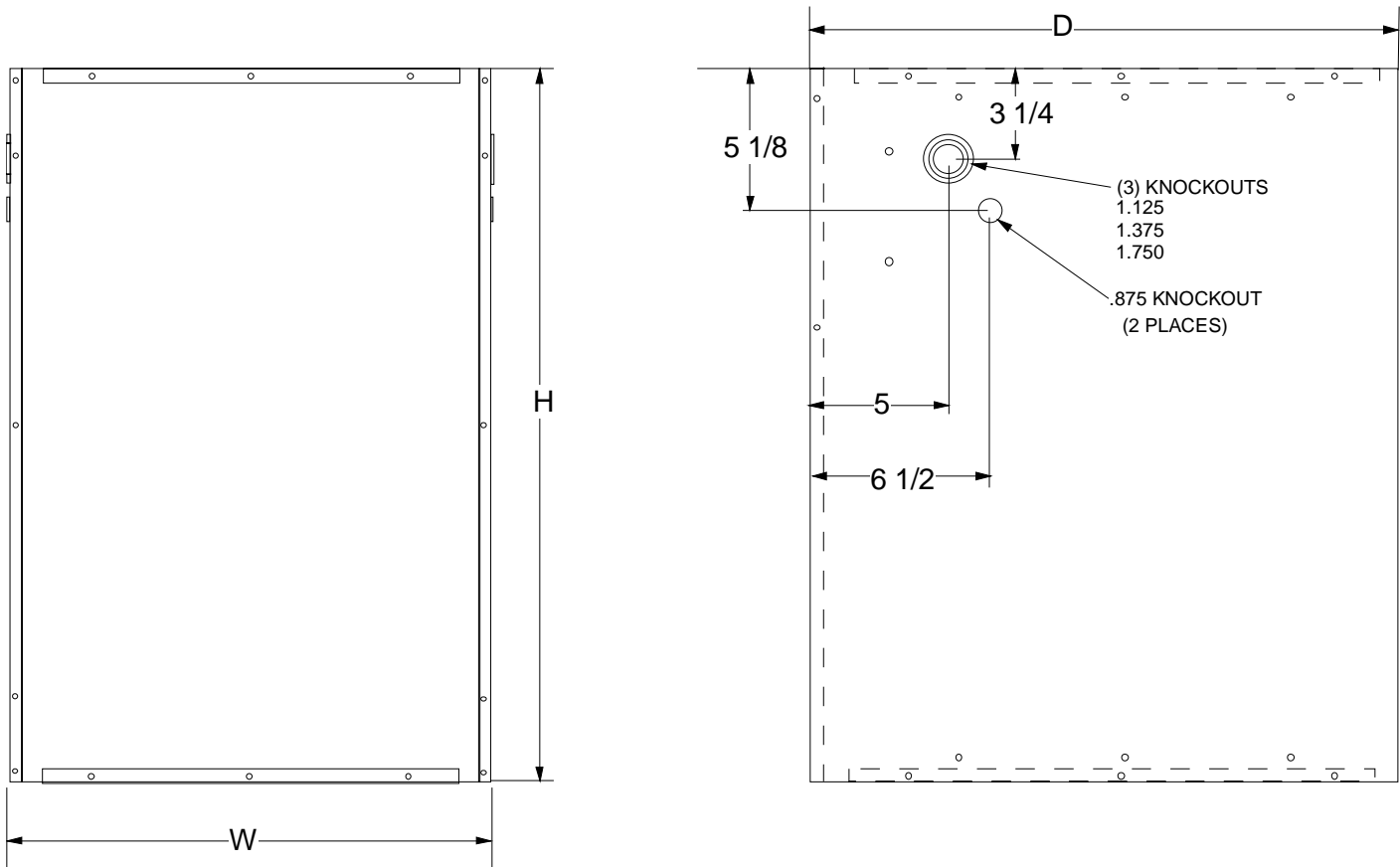
<i>CT compatible Modular Blower</i>	<i>CT compatible Air Conditioner</i>	<i>Full CT system benefits &amp; features</i>
<i>CT compatible Modular Blower</i>	<i>CT compatible Heat Pump</i>	<i>Full CT system benefits &amp; features</i>

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.

On the other hand, the indoor unit, outdoor unit, and thermostat comprising a ComfortNet system "communicate" digitally with one another. It is now a two-way communications path. The thermostat still sends commands to the indoor and outdoor units. However, the thermostat may also request and receive information from both the indoor and outdoor units. This information may be displayed on the CT thermostat. The indoor and outdoor units also interact with one another. The outdoor unit may send commands to or request information from the indoor unit. This two-way digital communications between the thermostat and subsystems (indoor/outdoor unit) and between subsystems is the key to unlocking the benefits and features of the ComfortNet system.

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.

# MBVC BLOWER SPECIFICATIONS



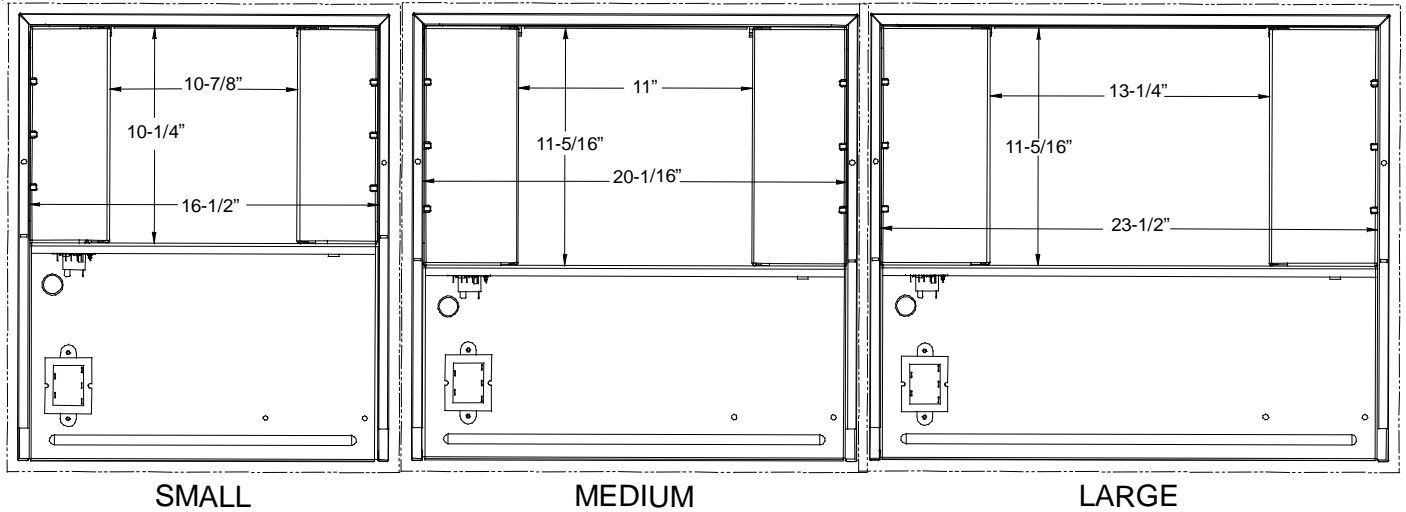
MBVC1200/1600/2000

MODEL	Physical Information				Dimensions, inches (mm)			Shipping Weight lbs.(kg)
	Blower Wheel (D x W)	Blower Motor (HP)	MCA <sup>1</sup>	MOP <sup>1</sup>	W	H	D	
MBVC1200	10X8	1/2	4.3	15	17½ (445)	26 (660)	21 (533)	72 (32.6)
MBVC1600	10X8	3/4	6.3	15	21 (533)	30 (762)	21 (533)	82 (37.2)
MBVC2000	11X10	3/4	5.8	15	24½ (622)	30 (762)	21 (533)	94 (42.6)

<sup>1</sup> Minimum Circuit Ampacity (MCA) and Maximum Overcurrent Protection (MOP) for blower without supplemental heat installed. Refer to unit nameplate for MCA and MOP with approved accessory heaters installed.

# MBVC BLOWER SPECIFICATIONS

## BLOWER OPENING DIMENSIONS (TOP VIEW)



MBVC1200/1600/2000

### HKR HEATER DATA

BLOWER	HEATER KIT				
	NO HEAT KIT	HKR-03*	HKR05-(C)*	HKR-06*	HKR-08(C)*
<b>MBVC</b>					
1200AA-1**	X	X	X	X	X
1600AA-1**	X	X	X	X	X
2000AA-1**	X	X	X	X	X

^ = Circuit 1: Single Phase for Air Handler Motor  
Circuit 2: 3-Phase for HKR3 Heater Kits

\* = Revision level that may or may not be designated  
C = Circuit Breaker option

X = Allowable combinations  
~ = Restricted combinations

BLOWER	HEATER KIT			
	HKR-10(C)*	HKR-15C*	HKR-20C*	HKR-21C*
<b>MBVC</b>				
1200AA-1**	X	X	~	~
1600AA-1**	X	X	~	~
2000AA-1**	X	X	X	~

^ = Circuit 1: Single Phase for Air Handler Motor  
Circuit 2: 3-Phase for HKR3 Heater Kits

\* = Revision level that may or may not be designated  
C = Circuit Breaker option

X = Allowable combinations  
~ = Restricted combinations

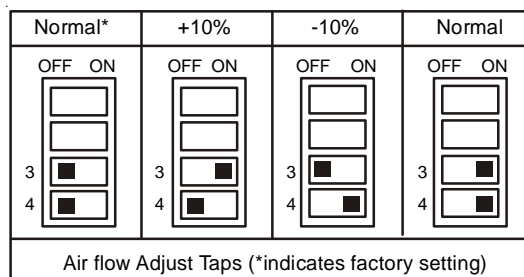
# BLOWER PERFORMANCE DATA

HTR KW	MBVC1200*	MBVC1600*	MBVC2000*	SWITCH 9	SWITCH 10	SWITCH 11
3	600	800	800	ON	ON	ON
5	600	800	800	ON	ON	OFF
6	635	800	800	ON	OFF	ON
8	740	1000	1000	ON	OFF	OFF
10	1000	1000	1200	OFF	ON	ON
15	1400	1500	1500	OFF	ON	OFF
20	NR	NR	2000	OFF	OFF	ON
21	NR	NR	NR	ON^	ON^	ON^

^ Factory setting

MODEL	LOW STAGE COOL	HIGH STAGE COOL	COOL SELECTION SWITCHES		ADJUST SELECTION SWITCHES		PROFILE SELECTION SWITCHES	
			1	2	3	4	5	6
MBVC1200	400	600	OFF	OFF	OFF	OFF	OFF	OFF
	540	800	ON	OFF	ON	OFF	ON	OFF
	670	1000	OFF	ON	OFF	ON	OFF	ON
	800	1200	ON	ON	ON	ON	ON	ON
MBVC1600	670	1000	OFF	OFF	OFF	OFF	OFF	OFF
	800	1200	ON	OFF	ON	OFF	ON	OFF
	940	1400	OFF	ON	OFF	ON	OFF	ON
	1070	1600	ON	ON	ON	ON	ON	ON
MBVC2000	800	1200	OFF	OFF	OFF	OFF	OFF	OFF
	1070	1600	ON	OFF	ON	OFF	ON	OFF
	1200	1800	OFF	ON	OFF	ON	OFF	ON
	1340	2000	ON	ON	ON	ON	ON	ON

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.



## Thermostat "Fan Only" Mode

During "Fan Only" operations, the CFM output is 30% of the maximum CFM capability.

## CFM Trim Adjust

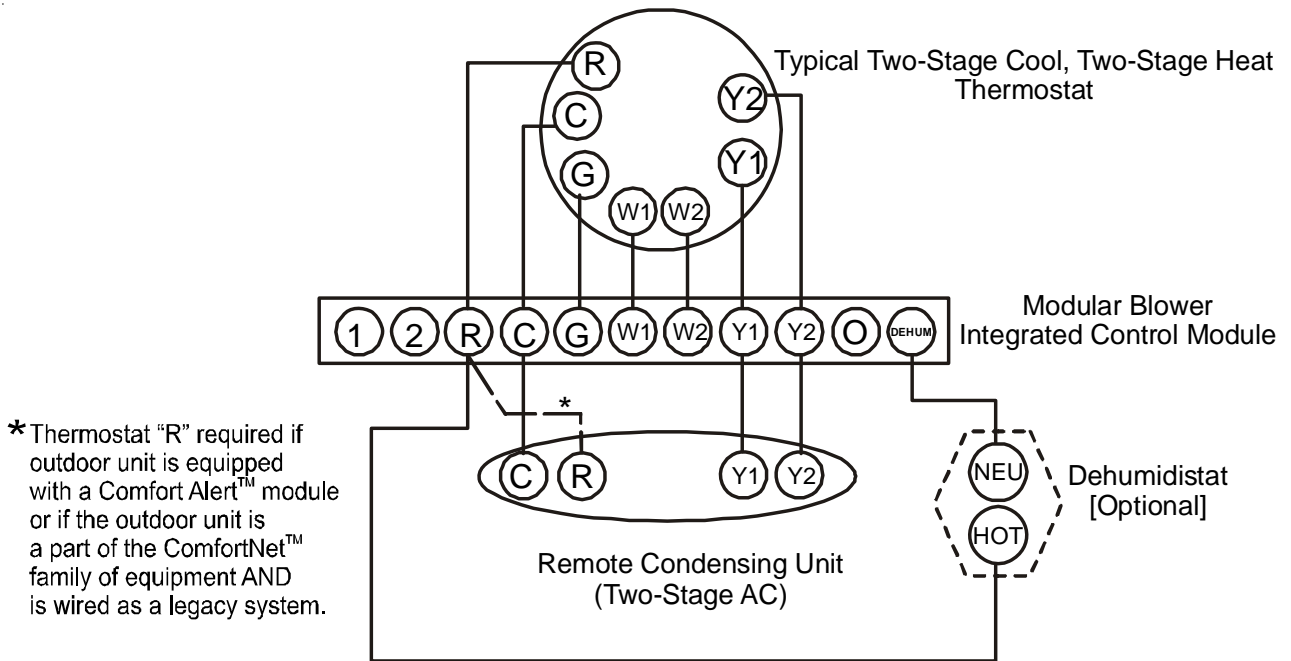
Minor adjustments can be made through the dipswitch combination of 3-4.

# WIRING DIAGRAMS

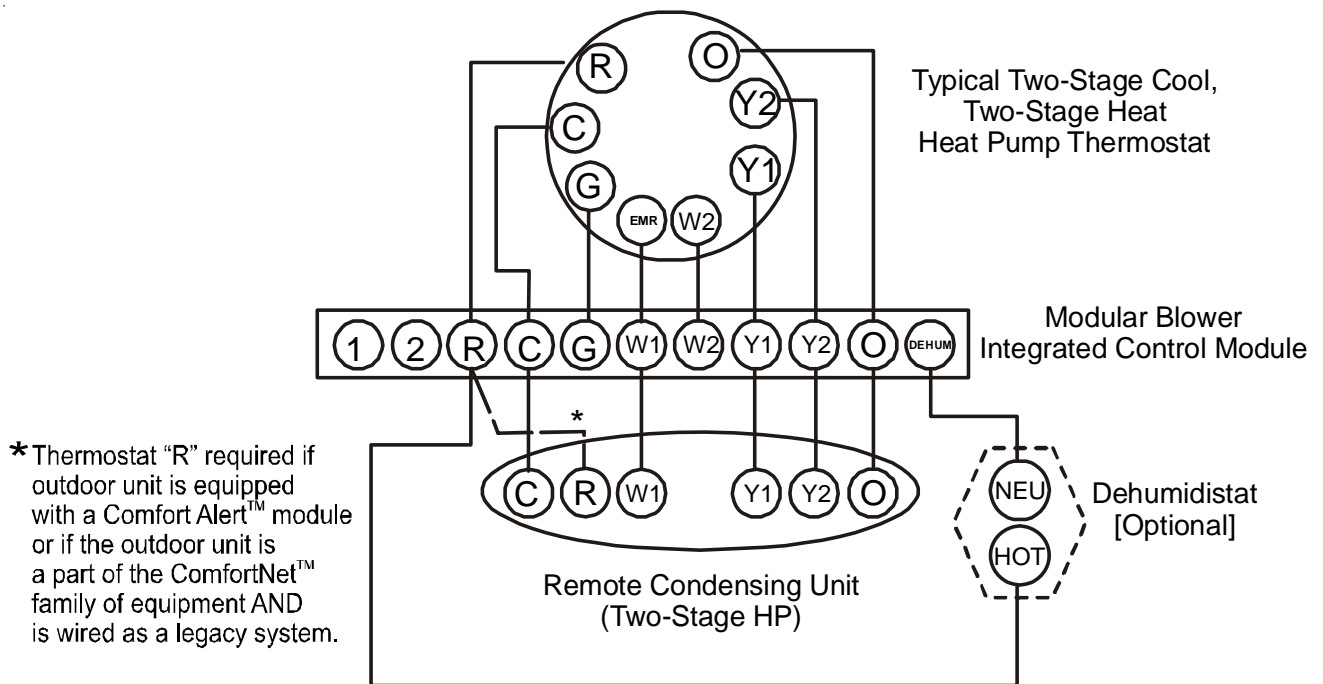
# THERMOSTATS

**WARNING**

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



**Typical Two-Stage Cooling with Two-Stage Heating**



**Typical Two Stage Heat Pump heating and Auxiliary/Emergency Heating**

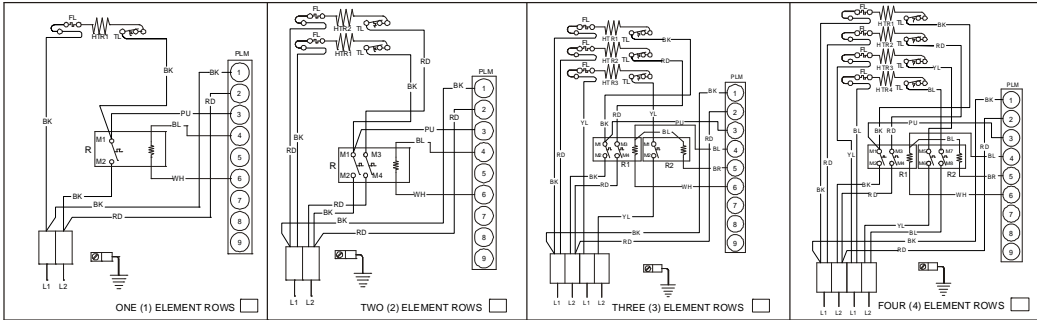
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

# WIRING DIAGRAMS

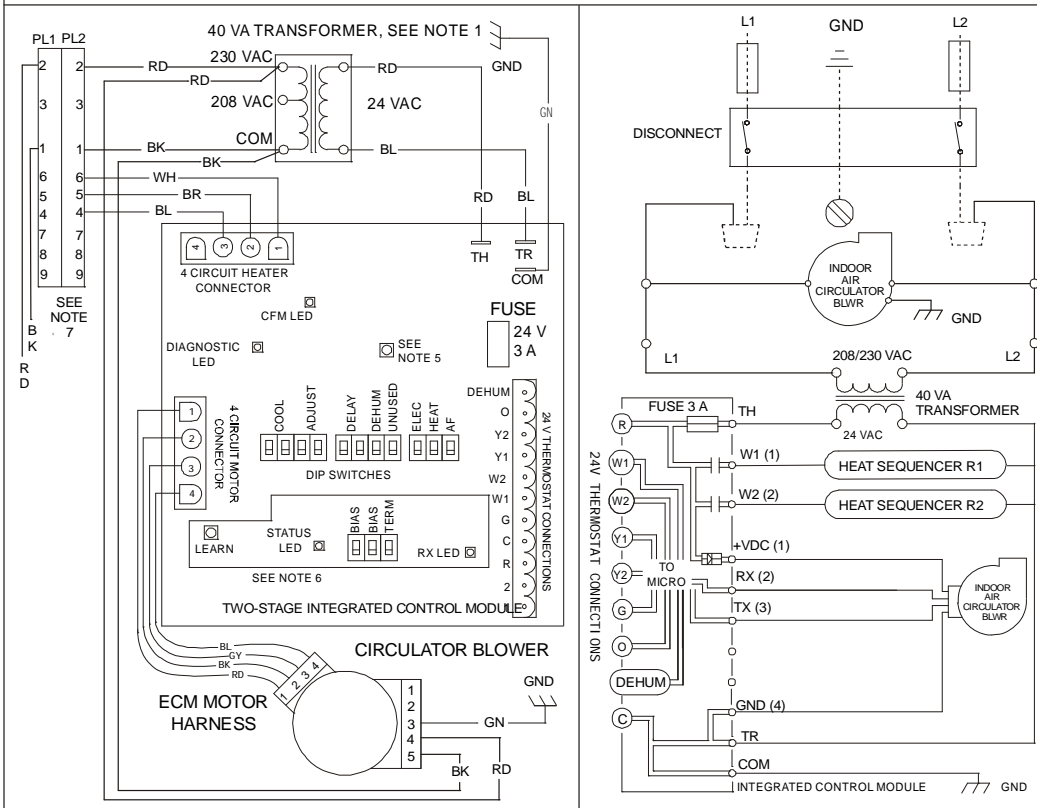


**WARNING**

**HIGH VOLTAGE!**  
**DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. 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.

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**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

RESISTER

OVERCURRENT PROT. DEVICE

PLUG CONNECTION