

HEAT CONTROLLER LLC

INSTALLATION, OPERATION
& MAINTENANCE MANUAL

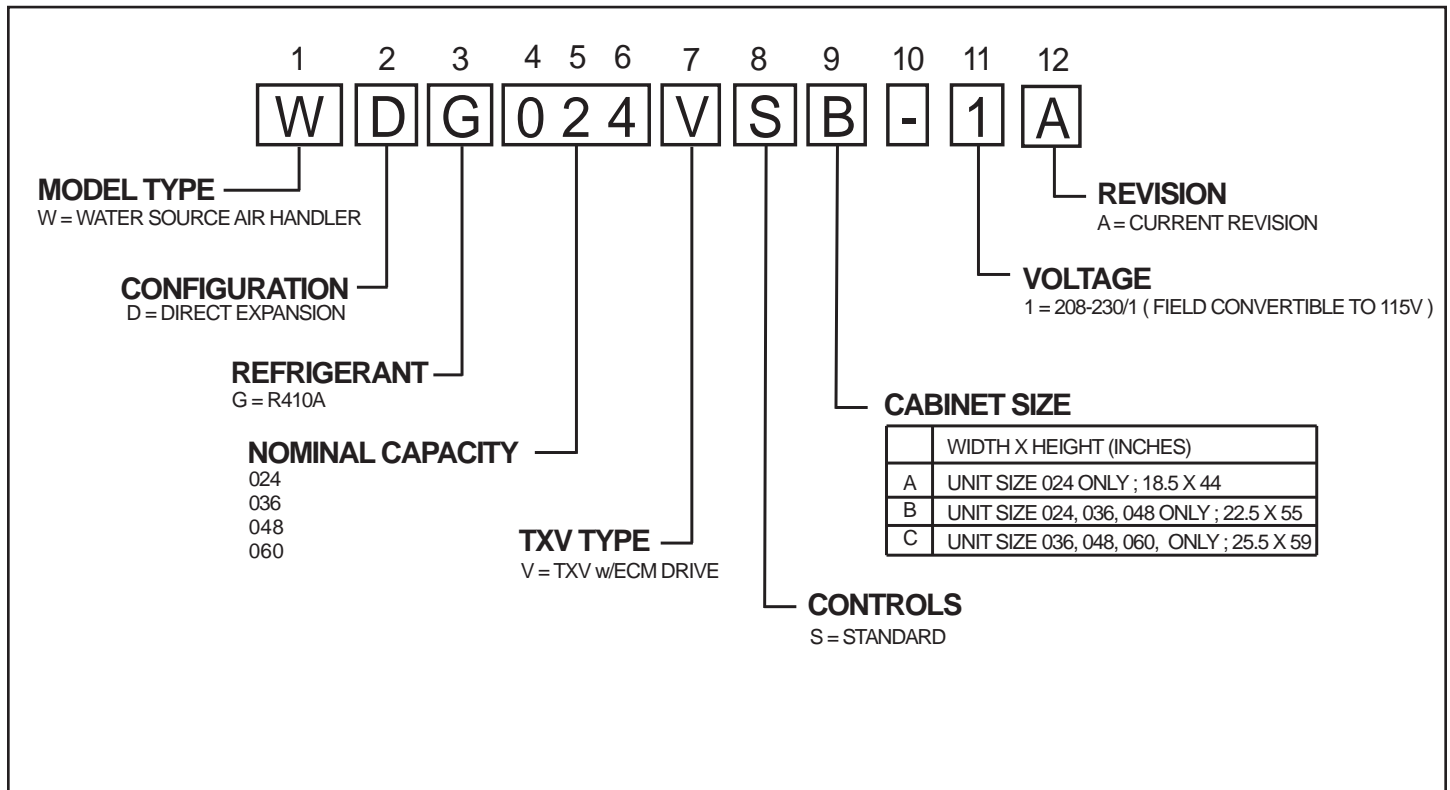
Residential Air Handler

WDG Air Handler Series

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Model Nomenclature



General Information

Inspection

Upon receipt of the equipment, carefully check the shipment against the bill of lading. Make sure all units have been received. Inspect the packaging of each unit, and inspect each unit for damage. Insure that the carrier makes proper notation of any shortages or damage on all copies of the freight bill and completes a common carrier inspection report. Concealed damage not discovered during unloading must be reported to the carrier within 15 days of receipt of shipment. If not filed within 15 days, the freight company can deny the claim without recourse. Note: It is the responsibility of the purchaser to file all necessary claims with the carrier. Notify your equipment supplier of all damage within fifteen (15) days of shipment.

Storage

Equipment should be stored in its original packaging in a clean, dry area. Store units in an upright position at all times. Stack units a maximum of 3 units high.

Unit Protection

Cover units on the job site with either the original packaging or an equivalent protective covering. Cap the open ends of pipes stored on the job site. In areas where painting, plastering, and/or spraying has not been completed, all due precautions must be taken to avoid physical damage to the units and contamination by foreign material. Physical damage and contamination may prevent proper start-up and may result in costly equipment clean-up.

Examine all pipes, fittings, and valves before installing any of the system components. Remove any dirt or debris found in or on these components.

Pre-Installation

Installation, Operation, and Maintenance instructions are provided with each unit. Horizontal equipment is designed for installation above false ceiling or in a ceiling plenum. Other unit configurations are typically installed in a mechanical room. The installation site chosen should include adequate service clearance around the unit. Before unit start-up, read all manuals and become familiar with the unit and its operation. Thoroughly check the system before operation.

Prepare units for installation as follows:

1. Compare the electrical data on the unit nameplate with ordering and shipping information to verify that the correct unit has been shipped.
2. Keep the cabinet covered with the original packaging until installation is complete and all plastering, painting, etc. is finished.
3. Verify refrigerant tubing is free of kinks or dents and that it does not touch other unit components.
4. Inspect all electrical connections. Connections must be clean and tight at the terminals.

⚠ WARNING! ⚠

WARNING! These instructions are intended as an aid to qualified licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in property damage, personal injury or death.

⚠ CAUTION! ⚠

CAUTION! DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes. Corrosive conditions and high temperature or humidity can significantly reduce performance, reliability, and service life.

⚠ CAUTION! ⚠

CAUTION! CUT HAZARD - Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing.

Safety

The installation of water source heat pump units and all associated components, parts and accessories which make up the installation shall be in accordance with the regulations of ALL authorities having jurisdiction and MUST conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with ALL applicable codes and regulations.

Replacement Parts

Any replacement part must be the same as or an approved alternate to the original part supplied. The manufacturer will not be responsible for replacement parts not designed to physically fit or operate within the design parameters the original parts were selected for. When ordering replacement parts, it is necessary to order by part number and include the complete model number and serial number from the coil rating plate. (See parts list for unit component part numbers. Parts are available through the local distributor.)

Safety

Warnings, cautions and notices appear throughout this manual. Read these items carefully before attempting any installation, service, or troubleshooting of the equipment.

DANGER: Indicates an immediate hazardous situation, which if not avoided will result in death or serious injury. DANGER labels on unit access panels must be observed.

WARNING: Indicates a potentially hazardous situation, which if not avoided could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation or an unsafe practice, which if not avoided could result in minor or moderate injury or product or property damage.

NOTICE: Notification of installation, operation or maintenance information, which is important, but which is not hazard-related.

⚠ WARNING! ⚠
WARNING! The EarthPure® Application and Service Manual should be read and understood before attempting to service refrigerant circuits with HFC-410A.
⚠ WARNING! ⚠
WARNING! To avoid the release of refrigerant into the atmosphere, the refrigerant circuit of this unit must be serviced only by technicians who meet local, state, and federal proficiency requirements.
⚠ CAUTION! ⚠
CAUTION! It is recommended that an auxiliary secondary drain pan be installed under units containing evaporator coils that are located in any area of a structure where damage to the building or building contents may occur as a result of an overflow of the coil drain pan or a stoppage in the primary condensate drain piping.

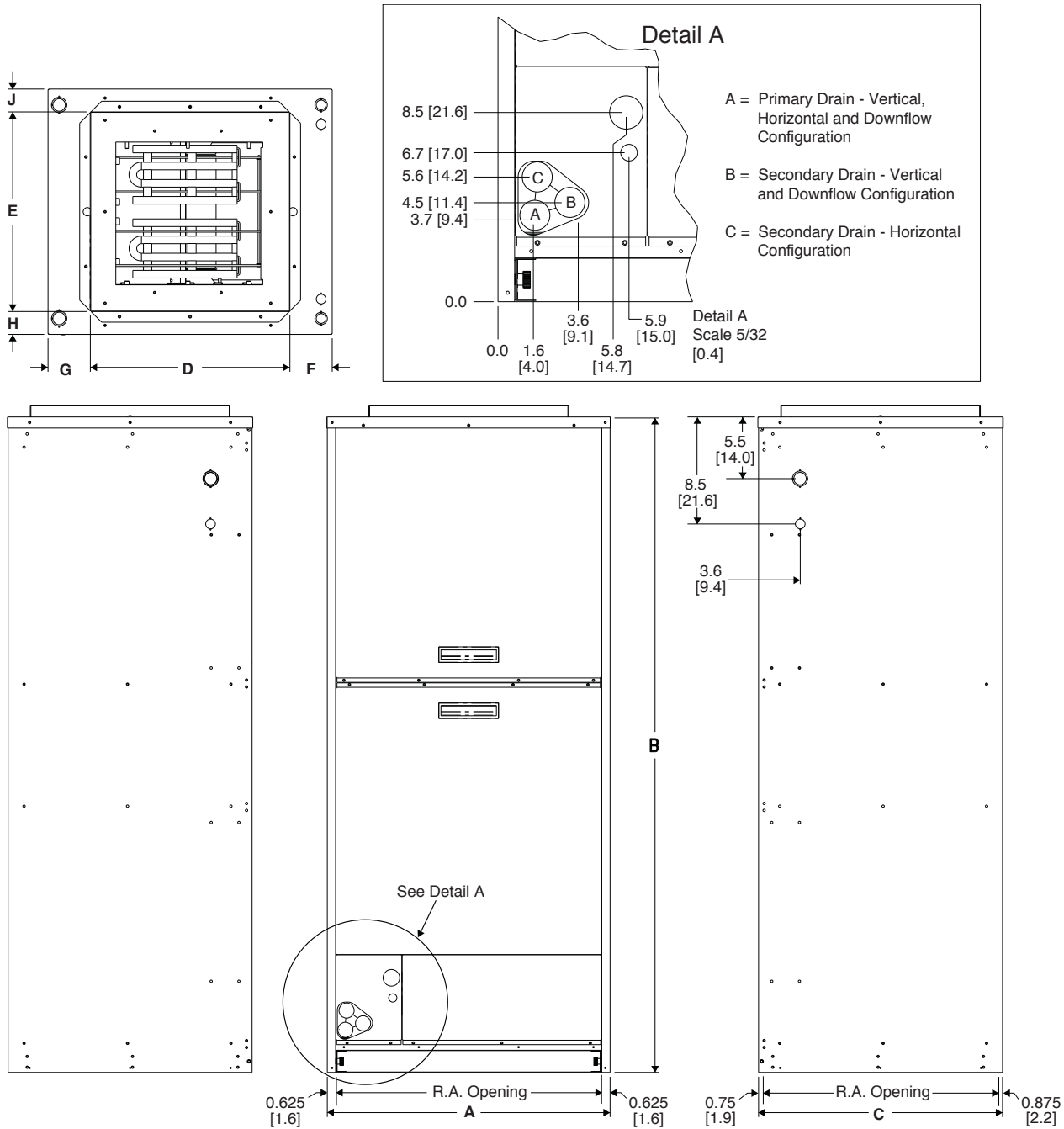
⚠ WARNING! ⚠
WARNING! All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state, and federal statutes for the recovery and disposal of refrigerants. To avoid leakage of compressor oil, refrigerant lines of the compressor must be sealed after it is removed.
⚠ CAUTION! ⚠
CAUTION! To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. The mechanical components and filters will quickly become clogged with construction dirt and debris, which may cause system damage.

Model Physical Data

Table 1: Physical Data

Model	024-B	024-C	036-C	036-D	048-C	048-D	060-D
Emerson ECM Fan Motor & Blower in. [cm]							
Liquid I.D.	3/8 [0.95]	3/8 [0.95]	3/8 [0.95]	3/8 [0.95]	3/8 [0.95]	3/8 [0.95]	3/8 [0.95]
Suction I.D.	3/4 [1.9]	3/4 [1.9]	7/8 [2.22]	7/8 [2.22]	7/8 [2.22]	7/8 [2.22]	7/8 [2.22]
Fan Motor Type/Speeds	ECM Variable						
Fan Motor (hp)	1/2				1		
Blower Wheel Size (Dia x W) in. [mm]	9 x 7 [229 x 178]		12 x 10 [305 x 254]				
Air Coil Dimensions (H x W) in. [mm]	3 - 2 Row 14 x 17 [356 x 432]		3 - 2 Row 24 x 17 [610 x 432]				3 - 3 Row 24x17 [610 x 432]
Filter Standard - 1" [25mm] Throwaway	16 x 20 [406 x 508]	20 x 20 [508 x 508]		20 x 24 [508 x 610]	20 x 20 [508 x 508]	20 x 24 [508 x 610]	
Weight - Operating lbs. [kg]	80 [36]	163 [74]	173 [78]	181 [82]	180 [82]	188 [85]	198 [90]
Weight - Packaged lbs. [kg]	96 [44]	179 [81]	198 [90]	206 [93]	218 [99]	226 [103]	236 [107]

Unit Dimensional Data



Cabinet Size	Overall Cabinet			1	2	3	4	5	6
	A Width	B Height	C Depth	D	E	F	G	H	J
B - Cabinet	in. 18.5	44.0	22.0	14.0	14.0	2.3	2.3	4.1	4.1
C - Cabinet	in. 22.0	55.0	22.0	18.0	18.0	2.1	2.1	2.1	2.1
D - Cabinet	in. 25.5	59.0	22.0	18.0	18.0	3.8	3.8	2.1	2.1

Installation

Air Handlers are designed for upflow, horizontal, and downflow applications. The coils have a dry nitrogen holding charge and are equipped with brazing stub refrigerant connections for easy installation. Both models come equipped with a factory installed TXV.

The installer should read the installation manual supplied with the compressor section for refrigerant line set sizing, connection procedure, and other important information pertaining to the system installation.

The installer should:

1. Where precise forming of refrigerant lines is required, a copper tubing bender is recommended for small diameter tubing. One should avoid sharp bends and contact of the refrigerant lines with metal surfaces.
2. Refrigerant lines should be protected where they pass through the raw edges of holes.
3. Air Handler must be level for proper condensate drainage.
4. Seal the openings into the cabinet to reduce risk of condensate blow off from the coil.

Air Handler Installation

⚠ WARNING! ⚠

WARNING! Electric furnaces may be connected to more than one supply circuit.

Charging the System

Air Handlers are designed to match HTS split units. For correct charging, please refer to the Compressor Section IOM.

Upflow Installation

1. Position unit on plenum box or other suitable foundation. Provide a minimum height for proper unrestricted airflow based on CFM requirement for each unit size.
2. If a return air duct is connected to the air handler, it must be the same dimensions as shown in the outline drawing in Figure 2.
3. Plenum box and unit should be isolated from the foundation using a suitable isolating material.
4. Openings where field wiring enters the cabinet must be completely sealed. Location of power entry is shown on the outline drawing.
5. After ductwork connections are made, seal airtight and per local codes.

Downflow Installation

1. Position unit on plenum box or other suitable foundation. Provide a minimum height for proper unrestricted airflow based on CFM requirement for each unit size.
2. If a return air duct is connected to the air handler, it must be the same dimensions as shown in the outline drawing in Figure 2.
3. Plenum box and unit should be isolated from the foundation using a suitable isolating material.
4. **Openings where field wiring enters the cabinet must be completely sealed.** Location of power entry is shown on the outline drawing.

5. After ductwork connections are made, seal airtight and per local codes.
6. The unit is then placed with the blower side down and the coil is replaced on the coil channel supports with the drain connections at the bottom. The unit is now in downflow position with front access.
Position the ECM wire harness connection at the 4 to 8 o'clock position to prevent condensation from entering motor controller.
7. If a return duct is connected to the air handler, it must be the same dimensions as the return opening.
8. After ductwork connections are made, seal airtight and per local codes.

Horizontal Right Installation

For maximum efficiency and customer ease of filter maintenance, it is recommended that a properly sized remote filter grille be installed for horizontal applications. Airflow should not exceed the face velocity of the filter being used. **The factory installed filter should then be removed from the unit.**

1. To convert the unit to horizontal right, front access, slide the coil out on the coil channel supports and rotate the complete coil 180 degrees.
2. The coil is then inserted back into the cabinet on the opposite side coil channel supports. The unit is now horizontal right with front access.
Position the ECM wire harness connection at the 4 to 8 o'clock position to prevent condensation from entering motor controller.
3. If the unit is suspended, it must be supported from the bottom near both ends as well as the middle to prevent sagging. The service access must remain unobstructed. If the unit is supported along the length of the front and back with rails, the air handler only needs to be suspended at both ends. See Figure 1.
If the unit is not suspended it must be supported as mentioned above and isolated carefully to prevent sound transmission. Vibration isolators (purchased locally) must be placed under the unit.
4. It is always recommended that an auxiliary drain pan be installed under a horizontal air handler (See Condensate Piping) to prevent possible damage to ceilings.
5. Isolate the auxiliary drain pan from the unit or from the structure.
6. Connect the auxiliary drain line to a separate drain line (no trap is needed in this line) and terminate according to national and local codes.
7. If a return duct is connected to the air handler, it must be the same dimensions as the return opening shown in the outline drawing on Figure 2.
8. Openings where field wiring enters the cabinet must be completely sealed.
9. After ductwork connections are made, seal airtight and per local codes.

Horizontal Left Installation

1. **For maximum efficiency** and customer ease of filter maintenance, it is recommended that a properly sized remote filter grille be installed for horizontal applications. Airflow should not exceed the face velocity of the filter being used. **The factory installed filter should then be removed from the unit.**
2. Unit is shipped from the factory in the upflow or horizontal left configuration. Unit conversion is not required. Conversion is required: Rotate motor to ensure connection at the 4 to 8 o'clock position.

Installation

3. If the unit is suspended, it must be supported from the bottom near both ends as well as the middle to prevent sagging. The service access must remain unobstructed. If the unit is supported along the length of the front and back, the air handler only needs to be suspended at both ends. See Figure 1.
4. If the unit is not suspended it must be supported as mentioned above and isolated carefully to prevent sound transmission. Vibration isolators (purchased locally) must be placed under the unit.
5. It is always recommended that an auxiliary drain pan be installed under a horizontal air handler (See Condensate Drain Piping) to prevent possible damage to ceilings.
6. Isolate the auxiliary drain pan from the unit or from the structure.
7. Connect the auxiliary drain line to a separate drain line (no trap is needed in this line) and terminate according to national and local codes.
8. If a return duct is connected to the air handler, it must be the same dimensions as the return opening shown in the outline drawing on Figure 2.
9. **Openings where field wiring enters the cabinet must be completely sealed.** Location of power entry is shown on the outline drawing.
10. After ductwork connections are made, seal airtight and per local codes.

Duct Connections

The supply and return air ducts should be connected to the unit with flame retardant duct connectors.

NOTE: No sheetmetal screws may be used to attach return ductwork on the side.

NOTE: Any duct board return connection can be made to the sides of the unit using tape or mastic.

Figure 1: Mounting Installation Options

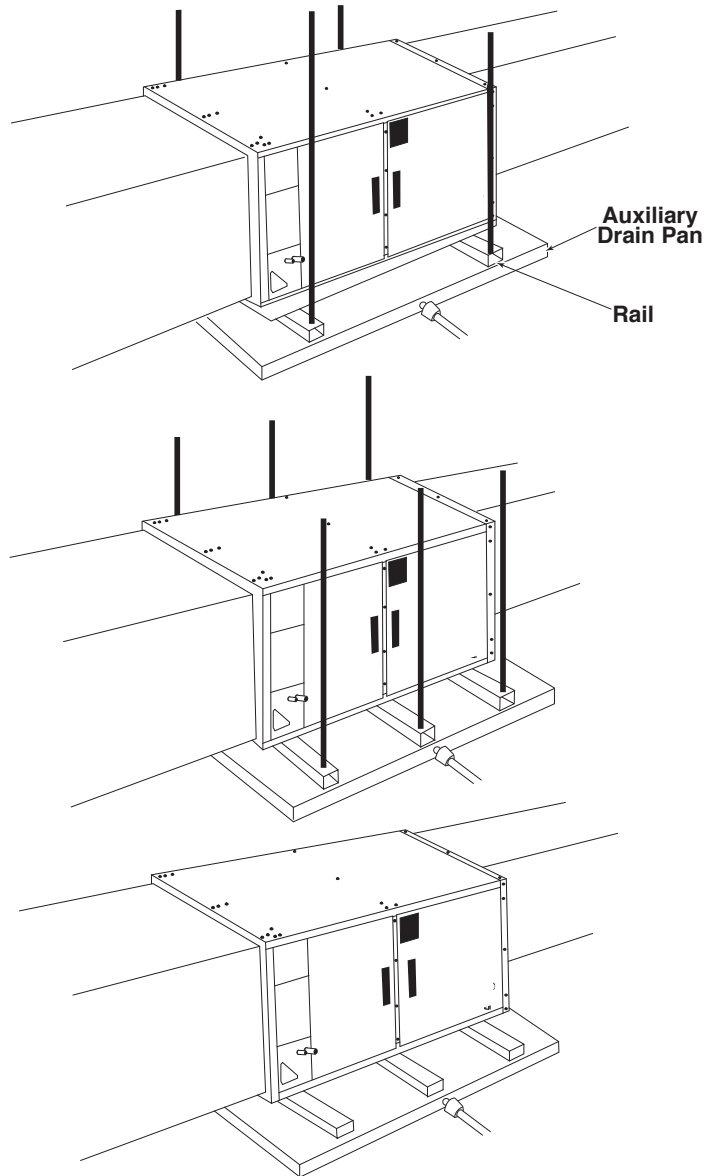
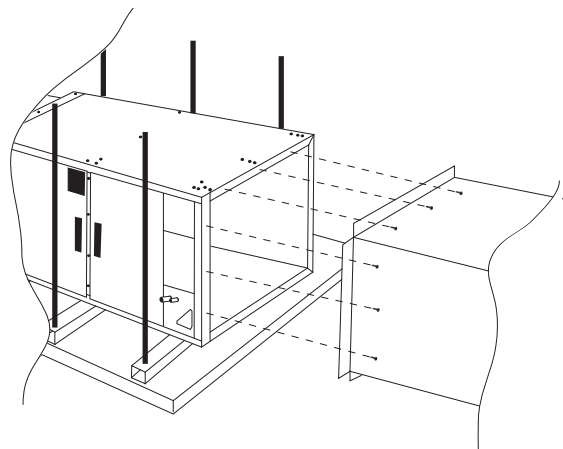


Figure 2: Flange Attachment



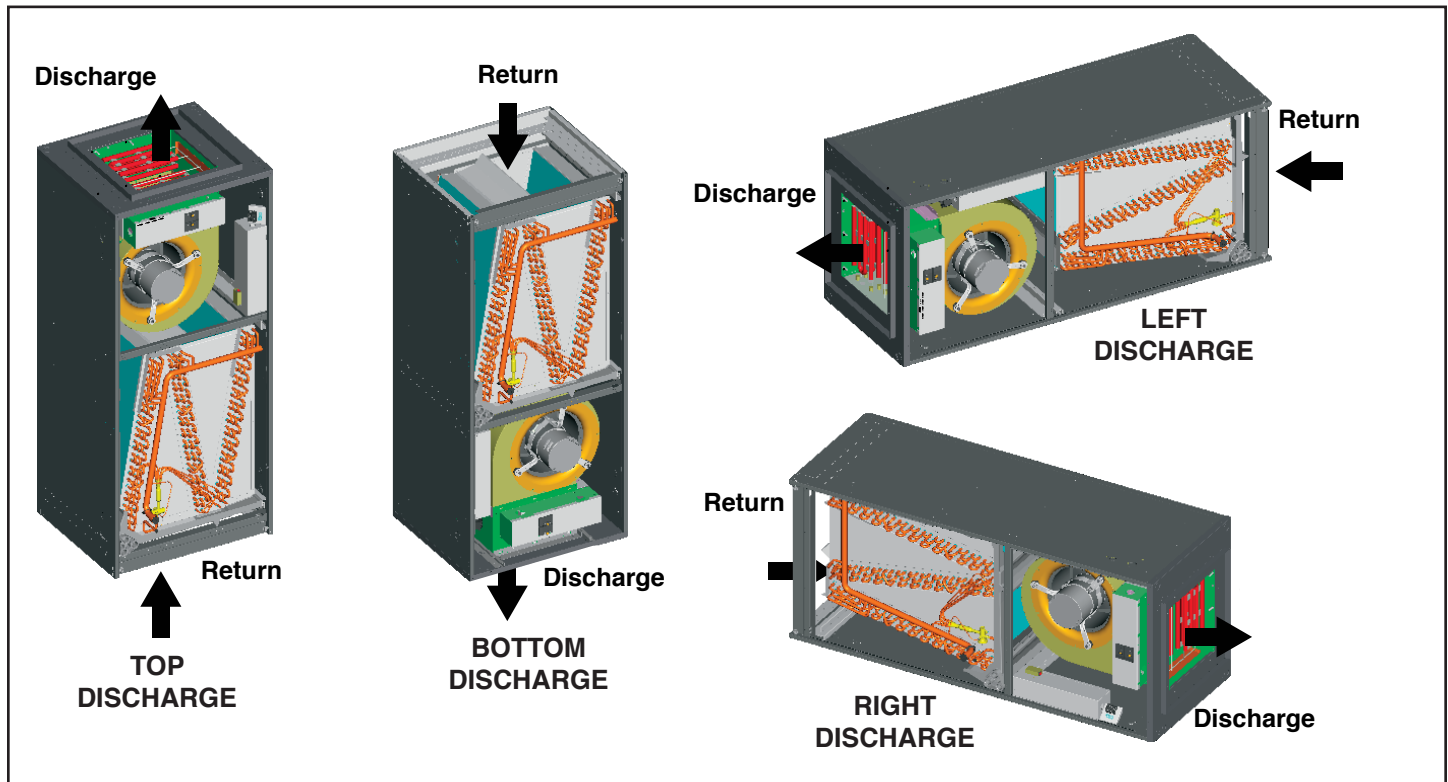
Installation

Applications

Air Handlers can be applied in upflow, downflow, horizontal right and horizontal left applications without modifications. For horizontal applications, installation of an auxiliary/secondary drain pan is required.

⚠ CAUTION! ⚠

CAUTION! For horizontal applications, the horizontal drain pan must be located under the indoor coil. Failure to place the pan under the coil can result in property damage.



1" to 2" Filter Rack Conversion

The unit is shipped with 1" filter rack from the factory. The conversion process is assumed that the unit is in upflow configuration.

1. Place unit on a flat surface. Remove 2 knurled thumb knobs that secure the filter rack door at the bottom of the unit.
2. Remove 3 screws that secure the lower filter tracks on each side of the unit.
3. Lift and rotate the filter tracks upside down and reinstall filter tracks and screws back.
4. Replace the filter rack door and the 2 knurled thumb knobs.

Installation

⚠ CAUTION! ⚠
CAUTION! HFC-410A systems operate at higher pressures than R-22 systems. Be certain that service equipment (gauges, tools, etc.) is rated for HFC-410A. Some R-22 service equipment may not be acceptable.

⚠ CAUTION! ⚠
CAUTION! Installation of a factory supplied liquid line bi-directional filter drier is required. Never install a suction line filter in the liquid line.

Line Set Installation

Figure 4 illustrates a typical installations of an air handler I matched to an indoor compressor section. Table 1 shows typical line-set diameters at various lengths. Lineset lengths should be kept to a minimum and should always be installed with care to avoid kinking. Line sets over 60 feet [18 meters] long are not recommended due to potential oil transport problems and excessive pressure drop. If the line set is kinked or distorted, and it cannot be formed back into its original shape, the damaged portion of the line should be replaced. A restricted line set will effect the performance of the system.

All brazing should be performed using nitrogen circulating at 2-3 psi [13.8-20.7 kPa] to prevent oxidation inside the tubing. All linesets should be insulated with a minimum of 1/2" [13mm] thick closed cell insulation. All insulation tubing should be sealed using a UV resistant paint or covering to prevent deterioration from sunlight.

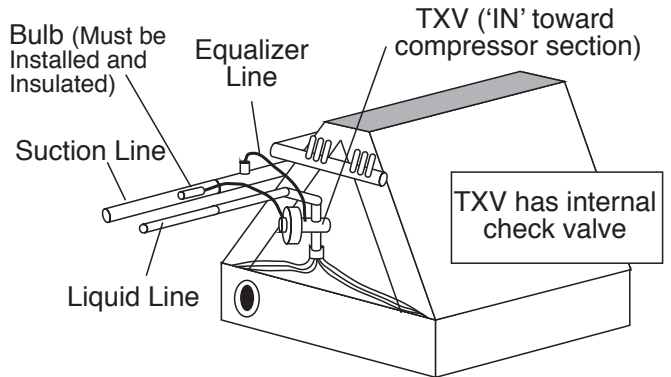
When passing refrigerant lines through a wall, seal opening
See compressor section IOM for refrigerant charge information.

with silicon-based caulk. Avoid direct contact with water pipes, duct work, floor joists, wall studs, floors or other structural components that could transmit compressor vibration. Do not suspend refrigerant tubing from joists with rigid straps. Do not attach line set to the wall. When necessary, use hanger straps with isolation sleeves to minimize transmission of line set vibration to the structure.

Installing the Indoor Coil and Lineset

Figure 3 shows the installation of the lineset and TXV to a typical indoor coil. Braze the copper line set to the coil. Nitrogen should be circulated through the system at 2-3 psi [13.8-20.7 kPa] to prevent oxidation inside the refrigerant tubing. Use a low silver phos-copper braze alloy on all brazed connections.

Figure 3: Air Coil Connection



Sensing Bulb

IMPORTANT: DO NOT perform any brazing with the TXV bulb attached to any line. After brazing operations have been completed, clamp the TXV bulb securely on the suction line at the 10 or 2 o'clock position with the strap provided in the parts bag. Insulate the TXV sensing bulb and suction line with the provided pressure sensitive insulation (size 4" x 7").

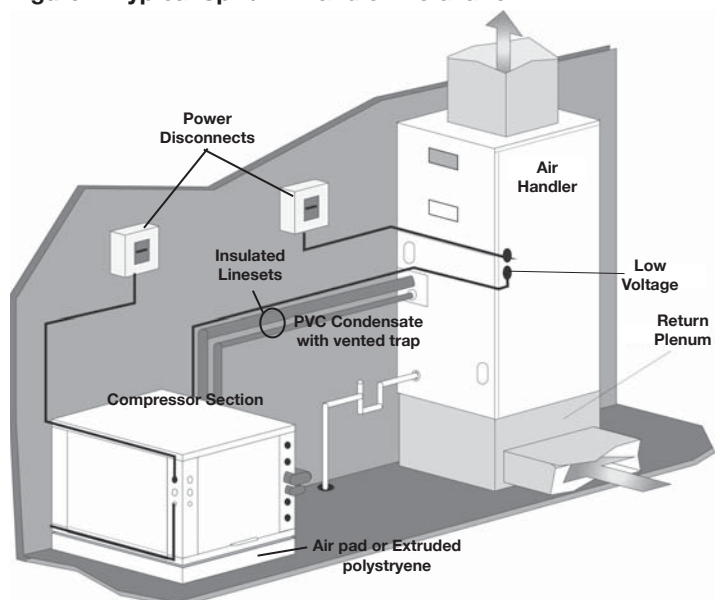
IMPORTANT: TXV sensing bulb should be located on a horizontal section of suction line, just outside of coil box.

IMPORTANT: Always protect TXV from heat when brazing.

IMPORTANT: TXV sensing bulb is shipped unattached. Installer must attach bulb to suction line after brazing and cooling line for proper unit operation.

NOTICE! The air coil should be thoroughly washed with a filming agent, (dishwasher detergent like Cascade) to help condensate drainage. Apply a 20 to 1 solution of detergent and water. Spray both sides of coil, repeat and rinse thoroughly with water. Care should be taken not to overflow drain pan. Wash after connecting condensate line.

Figure 4: Typical Split/Air Handler Installation



Installation

Evacuation and Charging the Unit

LEAK TESTING - The refrigeration line set must be pressurized and checked for leaks before evacuating and charging the unit. To pressurize the line set, attach refrigerant gauges to the service ports and add an inert gas (nitrogen or dry carbon dioxide) until pressure reaches 60-90 psig [413-620 kPa]. Never use oxygen or acetylene to pressure test. Use a good quality bubble solution to detect leaks on all connections made in the field. Check the service valve ports and stem for leaks. If a leak is found, repair it and repeat the above steps. For safety reasons do not pressurize system above 150 psig [1034 kPa]. System is now ready for evacuation and charging.

Condensate Drain Tubing

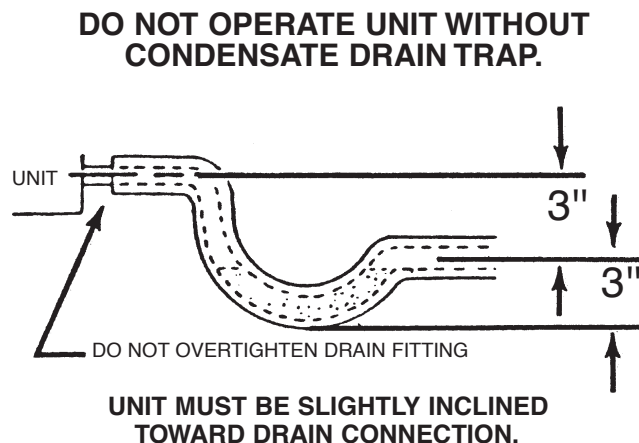
Consult local codes or ordinances for specific requirements.

IMPORTANT: When making drain fitting connections to the drain pan, use a thin layer of Teflon paste, silicone or Teflon tape and install hand tight.

IMPORTANT: When making drain fitting connections to drain pan, do not overtighten. Overtightening fittings can split pipe connections on the drain pan.

- Install drain lines so they do not block service access to front of the unit. Minimum clearance of 24 inches is required for filter, coil or blower removal and service access.
- Make sure unit is level or pitched slightly toward primary drain connection so that water will drain completely from the pan (See Figure 5).
- Do not reduce drain line size less than connection size provided on condensate drain pan.
- All drain lines must be pitched downward away from the unit a minimum of 1/8" per foot of line to ensure proper drainage.
- Do not connect condensate drain line to a closed or open sewer pipe. Run condensate to an open drain or outdoors.
- The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the line.
- Make provisions for disconnecting and cleaning of the primary drain line should it become necessary. Install a 3 in. trap in the primary drain line as close to the unit as possible. Make sure that the top of the trap is below connection to the drain pan to allow complete drainage of pan (See Figure 5).
- Auxiliary drain line should be run to a place where it will be noticeable if it becomes operational. Occupant should be warned that a problem exists if water should begin running from the auxiliary drain line.
- Plug the unused drain connection with the plugs provided in the parts bag, using a thin layer of Teflon paste, silicone or Teflon tape to form a water tight seal.
- Test condensate drain pan and drain line after installation is complete. Pour water into drain pan, enough to fill drain trap and line. Check to make sure drain pan is draining completely, no leaks are found in drain line fittings, and water is draining from the termination of the primary drain line.

Figure 5: Condensate Drain Trap



It is always recommended that an auxiliary drain pan be installed under a horizontally installed air handler.

Connect the auxiliary drain line to a separate drain line (no trap is needed in this line) and terminate according to local codes.

NOTE: DO NOT use a torch or flame near the plastic drain pan coupling.

NOTE: DO NOT tighten the drain pipe excessively. Support the condensate piping and traps outside the unit to prevent strain on the drain connection.

Electrical - Thermostat Wiring

⚠ CAUTION! ⚠

CAUTION! Many units are installed with a factory or field supplied manual or electric shut-off valve. **DAMAGE WILL OCCUR** if shut-off valve is **closed** during unit operation. A high pressure switch must be installed on the heat pump side of any field provided shut-off valves and connected to the heat pump controls in series with the built-in refrigerant circuit high pressure switch to disable compressor operation if water pressure exceeds pressure switch setting. The field installed high pressure switch shall have a cut-out pressure of 300 psig and a cut-in pressure of 250 psig. This pressure switch can be ordered from the manufacturer with a 1/4" internal flare connection as part number 39B0005N02.

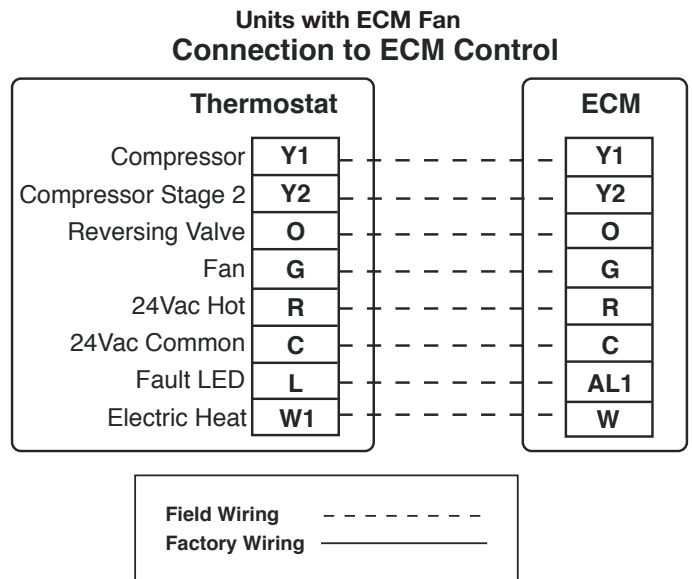
⚠ CAUTION! ⚠

CAUTION! Refrigerant pressure activated water regulating valves should never be used with the manufacturer's equipment.

Thermostat Installation

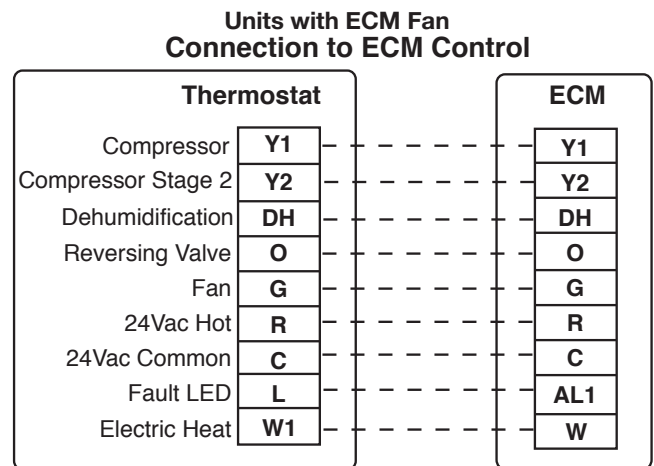
The thermostat should be located on an interior wall in a larger room, away from supply duct drafts. DO NOT locate the thermostat in areas subject to sunlight, drafts or on external walls. The wire access hole behind the thermostat may in certain cases need to be sealed to prevent erroneous temperature measurement. Position the thermostat back plate against the wall so that it appears level and so the thermostat wires protrude through the middle of the back plate. Mark the position of the back plate mounting holes and drill holes with a 3/16" (5mm) bit. Install supplied anchors and secure plate to the wall. Thermostat wire must be 18 AWG wire. Wire the appropriate thermostat as shown in Figures 6 and 7 to the low voltage terminal strip on the ECM control board. Practically any heat pump thermostat will work with these units, provided it has the correct number of heating and cooling stages.

Figure 6: Three Heat / Two Cool, Manual / Auto Changeover Programmable



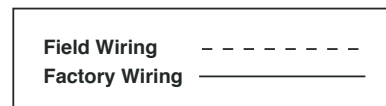
See equipment wiring diagram for more details.

Figure 7: Three Heat / Two Cool, Auto / Manual Changeover Programmable (7 Day) - Non-Programmable, With Humidity Control



Notes:

- 1) ECM dehumidification mode slows down fan speed in the cooling mode when dehumidification output from thermostat is active. Normal heating and cooling fan speeds are not affected.
- 2) ECM board DIP switch SW9 must be in dehumid. mode.



See equipment wiring diagram for more details.

ECM Blower Control

The ECM fan is controlled by an interface board that converts thermostat inputs and field selectable CFM settings to signals used by the ECM motor controller. Units manufactured before July 2005 have version I (P/N 69243707). Units manufactured after July 2005 have version II (P/N 17B0019N01). Fan speeds are selected with jumpers for version I or via a nine position DIP switch for version II. To take full advantage of the ECM motor features, a multi-stage thermostat should be used (2-stage heat/2-stage cool or 3-stage heat/2-stage cool).

HFC-410A packaged units built after May 2009 have ECM controller version III (P/N 17B0034N02). This controller includes logic and a relay to control.

Note: Power must be off to the unit for at least three seconds before the ECM motor will recognize a speed change. The motor will recognize a change in the CFM Adjust or dehumidification mode settings while the unit is powered.

There are four different airflow settings from lowest airflow rate (speed tap 1) to the highest airflow rate (speed tap 4). The charts below indicate settings for both versions of the ECM interface board, followed by detailed information for each setting.

Cooling Settings: The cooling setting determines the cooling (normal) CFM. Cooling (normal) setting is used when the unit is not in dehumidification mode. Tap 1 is the lowest CFM setting, while tap 4 is the highest CFM setting. To avoid air coil freeze-up, tap 1 may not be used if the dehumidification mode is selected. Consult submittal data or specifications catalog for the specific unit series and model to correlate speed tap setting to airflow in CFM.

Heating Settings: The heating setting determines the heating CFM. Tap 1 is the lowest CFM setting, while tap 4 is the highest CFM setting. Consult submittal data or specifications catalog for the specific unit series and model to correlate speed tap setting to airflow in CFM.

Auxiliary/Emergency Heat Settings: The auxiliary/emergency heat setting determines the CFM when the unit is in auxiliary heat or emergency heat mode. This setting is used for residential units with internal electric heat. When auxiliary electric heat is energized (i.e. compressor and electric heat), the greater of the auxiliary/emergency or heating setting will be used. A "G" (fan) signal must be present from the thermostat for electric heat to operate. Consult the submittal data or specifications catalog for the specific unit series and model to correlate speed tap setting to airflow in CFM.

CFM Adjust Settings: The CFM adjust setting allows four selections. The NORM setting is the factory default position. The + or – settings adjust the airflow by +/- 5%. The +/- settings are used to "fine tune" airflow adjustments. The TEST setting runs the ECM motor at 400 CFM/nominal ton at a constant CFM. Example: WDG024 = 800 CFM.

Dehumidification Mode Settings: The dehumidification mode setting provides field selection of humidity control. When operating in the normal mode, the cooling airflow settings are determined by the cooling tap setting above. When dehumidification is enabled there is a reduction in airflow in

cooling to increase the moisture removal of the heat pump. Consult submittal data or specifications catalog for the specific unit series and model to correlate speed tap to airflow in CFM. The dehumidification mode can be enabled in two ways.

1. **Constant Dehumidification Mode:** When the dehumidification mode is selected (via DIP switch or jumper setting), the ECM motor will operate with a multiplier applied to the cooling CFM settings (approx. 20-25% lower airflow). Any time the unit is running in the cooling mode, it will operate at the lower airflow to improve latent capacity. The "DEHUM" LED will be illuminated at all times. Heating airflow is not affected. **NOTE:** Do not select dehumidification mode if cooling setting is tap 1.
2. **Automatic (Humidistat-controlled) Dehumidification Mode:** When the dehumidification mode is selected (via DIP switch or jumper setting) AND a humidistat is connected to terminal DH (version II) or HUM (version I), the cooling airflow will only be reduced when the humidistat senses that additional dehumidification is required. The DH (or HUM) terminal is reverse logic. Therefore, a humidistat (not dehumidistat) is required. The "DEHUM" LED will be illuminated only when the humidistat is calling for dehumidification mode. Heating airflow is not affected. **NOTE: Do not select dehumidification mode if cooling setting is tap 1.**

ECM Blower Control

Table b: ECM Board Tap Settings

Cooling settings:

Tap Setting	Version I 69243707	Version II and III (17B0019N01 & 17B0034N01)	
	HP CFM Jumper	DIP Switch	
		SW1	SW2
1	1	ON	ON
2	2	ON	OFF
3	3	OFF	ON
4	4	OFF	OFF

Heating settings:

Tap Setting	Version I 69243707	Version II and III (17B0019N01 & 17B0034N01)	
	DELAY Jumper	DIP Switch	
		SW3	SW4
1	1	ON	ON
2	2	ON	OFF
3	3	OFF	ON
4	4	OFF	OFF

Aux/Emerg Heat settings:

Tap Setting	Version I 69243707	Version II and III (17B0019N01 & 17B0034N01)	
	AUX CFM Jumper	DIP Switch	
		SW5	SW6
1	1	ON	ON
2	2	ON	OFF
3	3	OFF	ON
4	4	OFF	OFF

CFM Adjust settings:

Tap Setting	Version I 69243707	Version II and III (17B0019N01 & 17B0034N01)	
	CFM Adj Jumper	DIP Switch	
		SW7	SW8
TEST	1	ON	ON
-	2	ON	OFF
+	3	OFF	ON
NORM	4	OFF	OFF

Dehum Mode settings:

Tap Setting	Version I 69243707	Version II and III (17B0019N01 & 17B0034N01)
	Dehumid Jumper	DIP Switch
		SW9
NORM	pins 1,2	ON
Dehumid	pins 2,3	OFF

Table 8a: ECM Version II Interface Layout

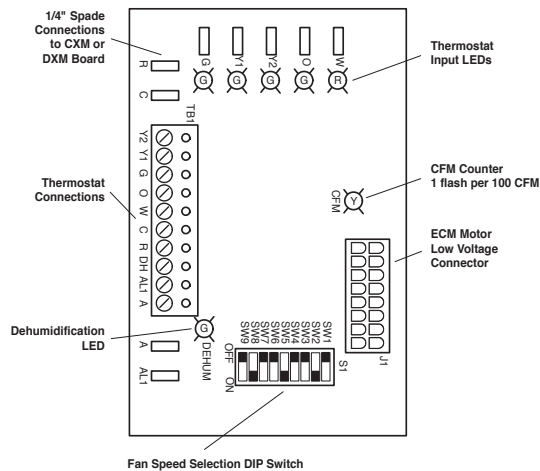


Table 8b: ECM Version I Interface Layout

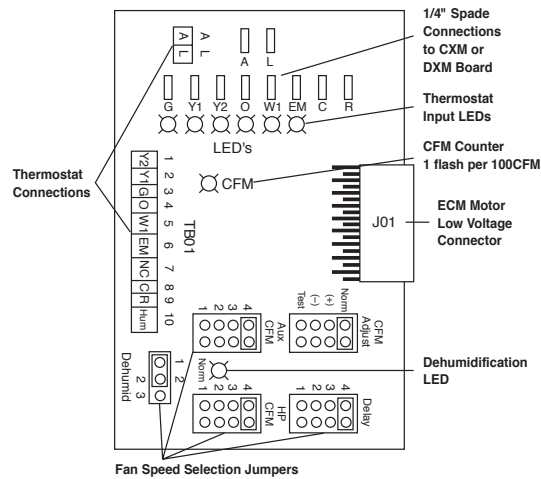
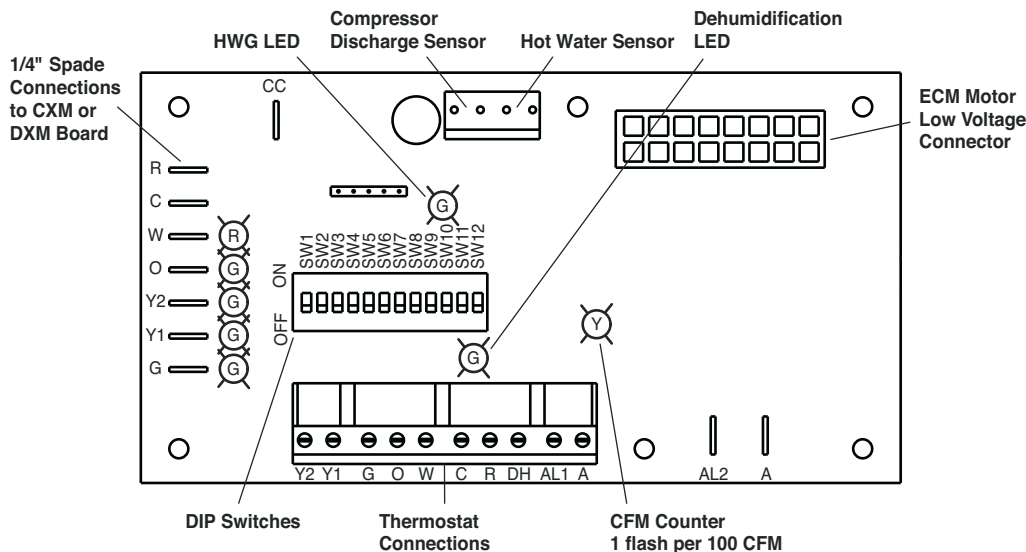


Figure 8c: ECM Version III Interface Layout



Blower Performance Data

WDG Blower

Airflow in CFM with wet coil and clean air filter

Model	Max ESP (in. wg)	Fan Motor (hp)	Tap Setting	Cooling Mode			Dehumid Mode			Heating Mode			AUX CFM	Aux/ Emerg Mode
				Stg 1	Stg 2	Fan	Stg 1	Stg 2	Fan	Stg 1	Stg 2	Fan		
WDG 024	0.50	1/2	4	810	950	475	630	740	475	920	1060	475	4	1060
	0.50	1/2	3	725	850	425	560	660	425	825	950	425	3	950
	0.50	1/2	2	620	730	370	490	570	370	710	820	370	2	820
	0.50	1/2	1	520	610	300				600	690	300	1	690
WDG 036	0.50	1/2	4	1120	1400	700	870	1090	700	1120	1400	700	4	1400
	0.50	1/2	3	1000	1250	630	780	980	630	1000	1250	630	3	1350
	0.50	1/2	2	860	1080	540	670	840	540	860	1080	540	2	1350
	0.50	1/2	1	730	900	450				730	900	450	1	1350
WDG 048	0.75	1	4	1460	1730	870	1140	1350	870	1560	1850	870	4	1850
	0.75	1	3	1300	1550	780	1020	1210	780	1400	1650	780	3	1660
	0.75	1	2	1120	1330	670	870	1040	670	1200	1430	670	2	1430
	0.75	1	1	940	1120	560				1010	1200	560	1	1350
WDG 060	0.75	1	4	1670	2050	1020	1300	1600	1020	1860	2280	1020	4	2280
	0.75	1	3	1500	1825	920	1160	1430	920	1650	2050	920	3	2040
	0.75	1	2	1280	1580	790	1000	1230	790	1430	1750	790	2	1750
	0.75	1	1	1080	1320	660				1200	1470	660	1	1470

Factory shipped on Tap Setting 2

During Auxiliary operation (residential units only) the CFM will run at the higher if the heating (delay jumper) or AUX settings

Airflow is controlled within +/- 5% up to Max ESP shown with wet coil and standard 1" fiberglass filter

Do not select Dehumidification mode if HP CFM is on setting 1

All units AHRI/ISO/ASHRAE 13256-1 rated HP (Cooling) Delay (Heating) CFM Setting 3

Electrical - Power Wiring

⚠ WARNING! ⚠

WARNING! Electrical shock hazard - Lock unit disconnect switch in open position before servicing unit. Failure to follow this warning could result in property damage, personal injury, or death.

1. These Air Handlers are shipped from the factory wired for 230 volts. The units may be wired for 208 or 115 volts. Follow instructions on unit wiring diagram located on blower housing and in the Service Facts document included with the unit.
2. The selection of wire and fuse sizes should be made according to the Minimum Branch Circuit Ampacity and the Maximum Overcurrent Device listed on the unit nameplate.
3. Field wiring diagrams for electric heaters and unit accessories are shipped with the accessory.
4. Wiring must conform to National and Local codes.
5. Ground unit per local codes with good safety procedures.

NOTE: If air handler is used with or without a heater, the electrical entry hole as well as any other cabinet penetrations must be sealed air-tight.

Wiring Instructions for 115 volt Conversion from 230 volt

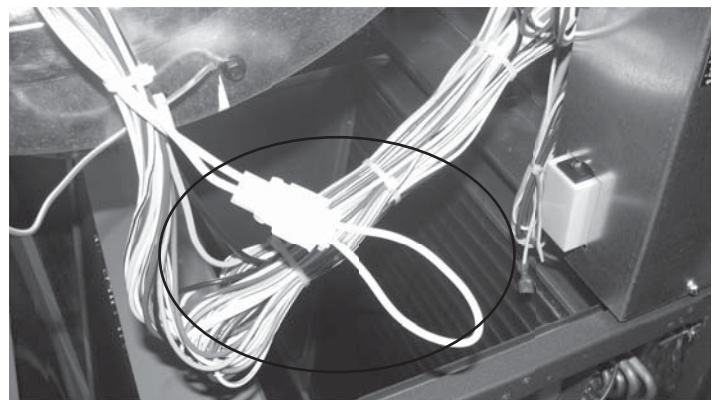
1. Disconnect all power to the unit.
2. Disconnect Transformer primary orange wire from power block T2 and insulate open end of wire. Connect the white lead from transformer primary wire to power block terminal T2.
Note: (L2 will be used as Neutral)
3. Remove plug in ECM power wiring harness (Fig. 8) and Install 2 pin jumper plug provided in control box (Fig. 9).

NOTE: When supplementary heaters are installed, inspect to insure that all packaging material has been removed.

Figure 8: Remove Harness Plug



Figure 9: Install Two Pin Jumper Plug



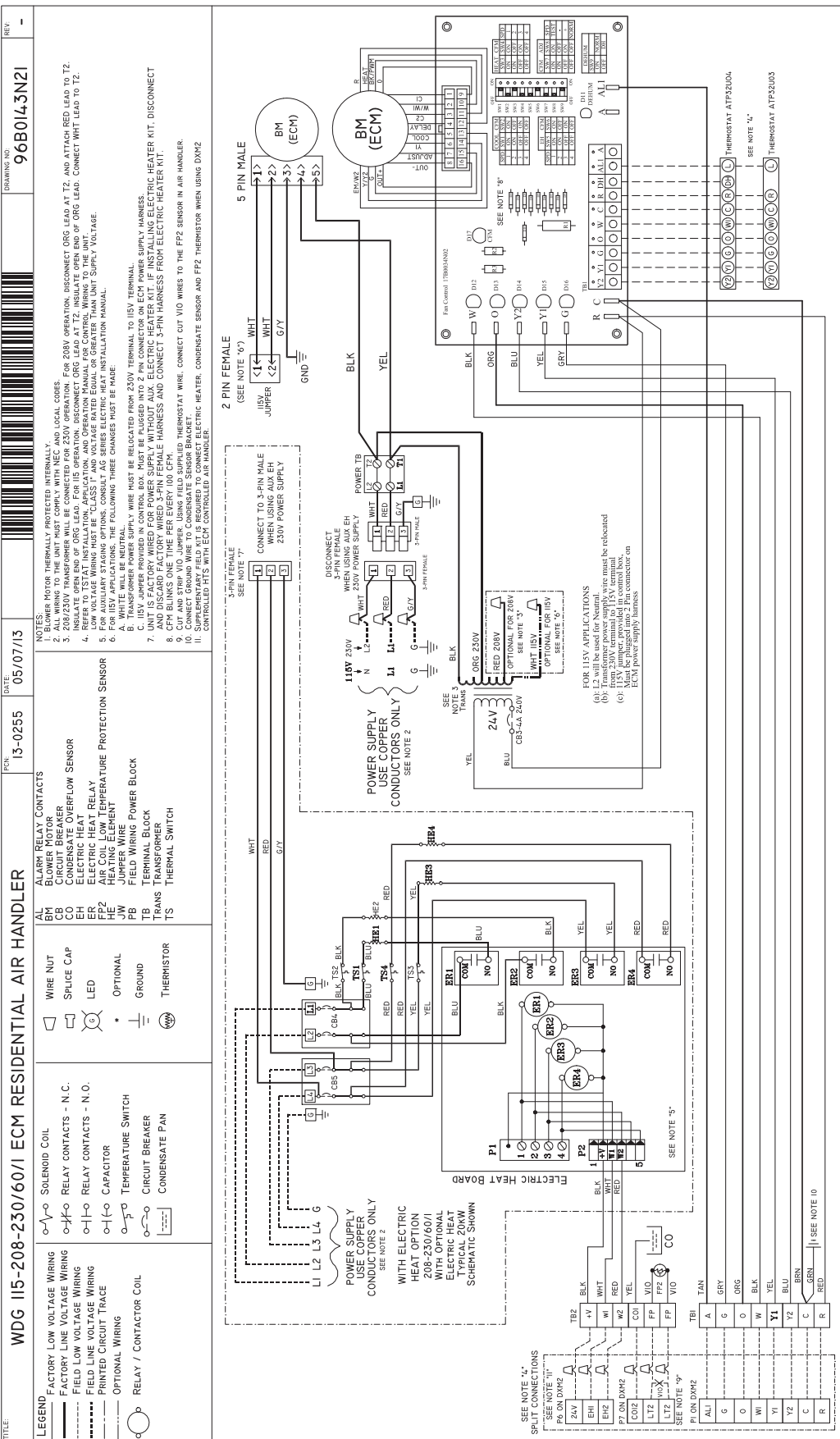
Note: For 115V power only. Damage will occur to motor with 230V power supply if 115V jumper is used.

Table 3: Electric Table

Model	Volt Code 208/230	Rated Voltage Dual Rated (115) 208/230	Voltage Min/ Max Dual Rated (115) 208/230	Fan Motor FLA	Fan Motor HP	Max Fan ESP	Min Circ Amp (115) 208/230	Total Unit FLA	Max Fuse/ HACR/ (115) 208/230
024	1	(115) 208/230	(114/132) 197/254	(7.7) 4.3	1/2	1.0	(7.8) 4.9	(7.7) 4.3	(15) 15
036	1	(115) 208/230	(114/132) 197/254	(7.7) 4.3	1/2	0.9	(7.8) 4.9	(7.7) 4.3	(15) 15
048	1	(115) 208/230	(114/132) 197/254	(12.8) 7	1	1.0	(14.4) 8.6	(12.8) 7	(25) 15
060	1	(115) 208/230	(114/132) 197/254	(12.8) 7	1	0.7	(14.4) 8.6	(12.8) 7	(25) 15

Rated Voltage of 208/230/60/1, field convertible to 115V.

WDG024-060 Wiring Diagram 115-208-230/60/1 ECM



Electric Heat Installation

Overview

The HG Series Auxiliary Electric Heat mounts internally in upflow (Figures 10-12) or downflow units and horizontal units. Horizontal units are rated for zero clearance at the unit and 1" clearance for first three feet of duct, vertical units rated for zero clearance for both unit and duct. Downflow units can not be located directly over a discharge register. The discharge plenum must be constructed from non combustible material. The HG electric heat contains a four stage relay control board which activates the elements directly via an internally wired low voltage harness. Low voltage signals (W1 and W2) are staged from the DXM2 control.

Vertical Upflow or Downflow and Horizontal Installation

1. Disconnect power to the unit
2. Remove blower access panels.
3. Clip wire-tie holding electric heat low voltage 3-wire harness to discharge panel stiffener.
4. Remove blower mounting screws and then drop down blower assembly as shown in Figure 11. Removal of blower wires should not be necessary.
5. Install electric heat in discharge flange where blower assembly has been removed using provided screws as shown in Figure 12.
- 5.5 For downflow or horizontal right discharge units, the air handler support bracket must be removed to re-install the blower housing assembly. After re-installing the blower housing, re-install the air handler support bracket.
6. Re-install blower assembly, Figure 12, into electric heat assembly using blower mounting screws. Check blower wiring for proper wiring connections.
7. Route the low voltage harness through the provided 'pie' bushing and plug into electric heat control board connector P2 as shown in Figure 18.
8. Install power conduit through unit corner post knockout and attach conduit directly to the electric heat control box.
9. Optional: HG**C kits only. Blower power may be supplied from T3 & T4 CB5 breaker. Refer to WDG wiring diagram 96B0005N58.

Figure 10: Typical air handler installation

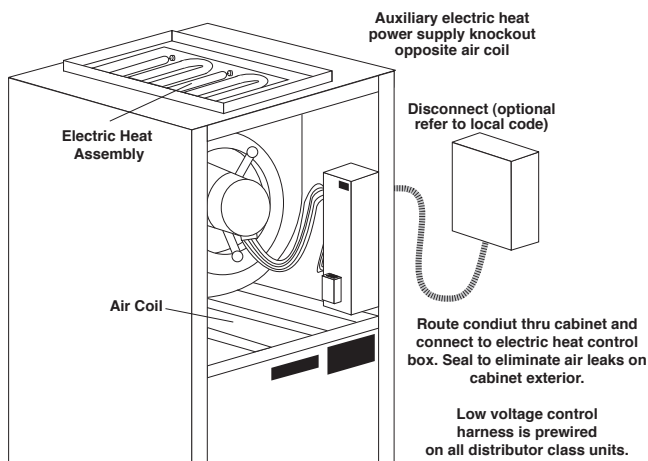


Figure 11: Blower removal

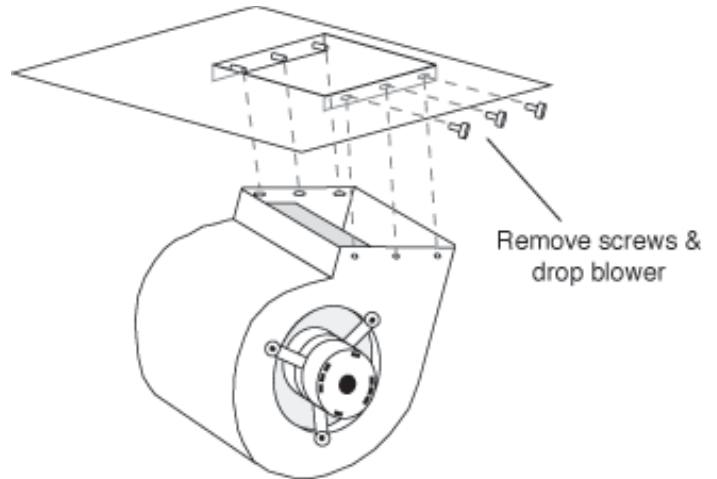
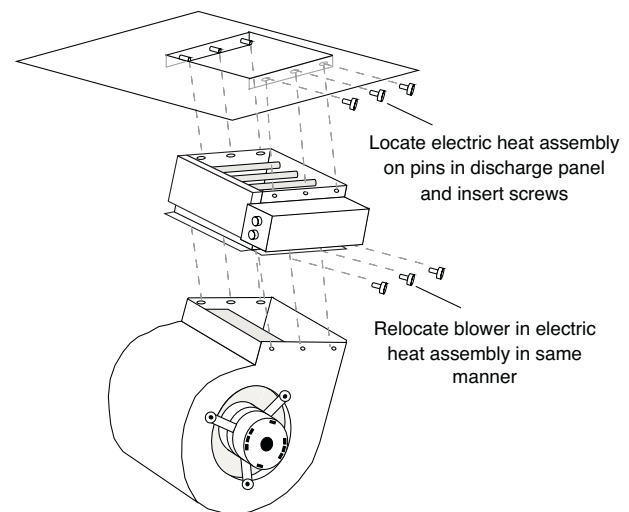
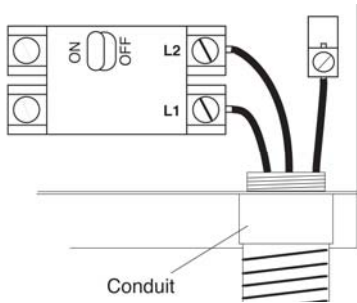


Figure 12: HG electric heat mounting and blower re-installation



Electric Heat Wiring

Figure 13: Power Wiring, 4, 5, 8, and 10kw



Wiring and Setup (all models)

1. Install power wiring and connect to power block or circuit breakers. In 12, 15 or 20kW models two power circuits may be used to reduce wiring and breaker costs as in Figure 16. If a single circuit supply is desired, install the optional single circuit accessory kit (P/N 16B0002N02), as shown in Figure 15, that can be obtained from your distributor.
2. Ensure unit airflow setting is above minimum airflow rating for the electric heat model from Table 2.
3. Check staging jumpers for the application. Typically only 5 kW (factory setting on all models except 10kW on 20kW models) is needed for first stage electric (W1) to minimize electric demand. This staging can be adjusted by moving the staging jumpers as shown in Figure 17. Whatever is jumped to P1 pin 1 will be energized on 1st stage of electric heat, and P1-2 will be energized as stage 2 electric heat. See Table 5 for staging options.
4. Mark the appropriate box of the electric heat model installed on the additional serial plate on the exterior of the unit.
5. Turn on the power to the unit and the auxiliary electric heat.

Auxiliary Electric Heat Start-up

Put thermostat in emergency heat mode (or jumper thermostat input R to W and R to G) and set point to high setting. Unit will require 15-20 seconds before engaging emergency heat mode stage 1 (W1) and then another 15-20 seconds to engage stage 2 (W2) when in 'Test mode'. Verify proper electric heat operation.

Figure 14: Power Wiring, Single Circuit, 15, 20kw

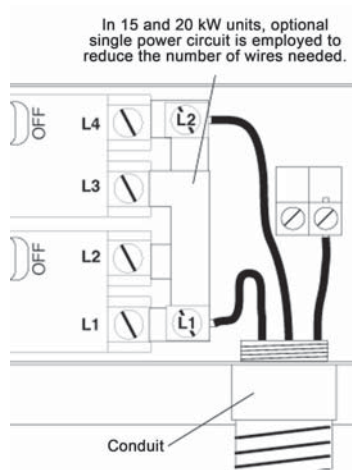


Figure 15: Power Wiring, Dual Circuits, 15 and 20kw

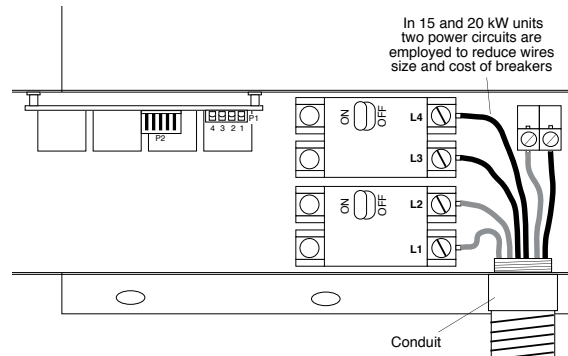
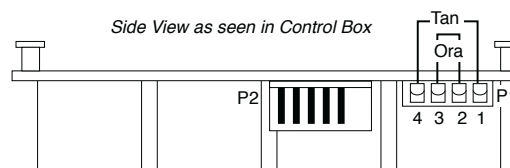
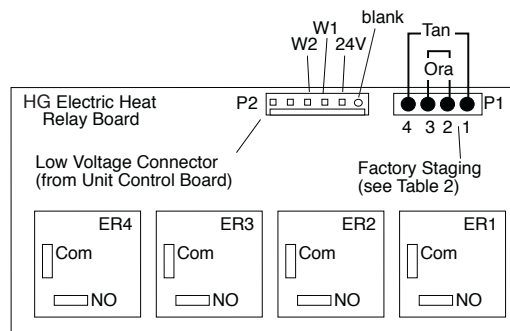


Figure 16: Staging Jumpers

Staging Example on a 15kW unit W1 (first stage) has 5kW ('ER1' 5kW & 'ER4' 0kW) and W2 (second stage) will have 10kW ('ER2 & 3' 5kW each)



Electrical Heat Staging Options

Figure 17: Low Voltage Harness Connection

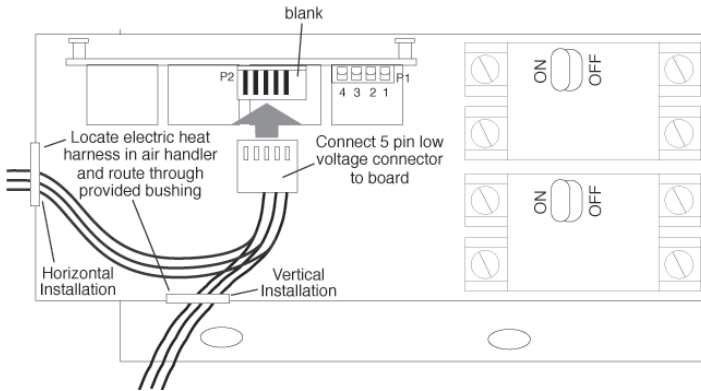


Table 4: HG Electric Heat Ratings

Auxiliary Electric Heat Model	WDG Models			kW Rating		Btuh Rating		Minimum CFM Required
	024	036	048-060	240V	208V	240V	208V	
HGM4C				3.8	2.9	13000	9900	500
HGM5C				4.8	3.6	16300	12300	500
HGM8C				7.6	5.7	25900	19400	650
HGM10C				9.6	7.2	32700	24600	650
HGL10C				9.6	7.2	32700	24600	1300
HGL15C				14.4	10.8	49100	36900	1350
HGL20C				19.2	14.4	65500	49200	1350

Black area denotes compatibility
 Note: Horizontal units rated for zero clearance unit and 1" clearance for the first three feet of duct, Vertical units rated for zero clearance for both unit and duct.

Table 5: HG Electric Heat Staging Options

Auxiliary Electric Heat Model	Staging Options	Factory Settings Stage 1	Staging in kW					
			Jumper 1-4, 2-3†		Jumper 1-3, 2-4†		Jumper 1-2-3	
			Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2
HGM4C	4	4	4	0	4	0	4	0
HGM5C	5	5	5	0	5	0	5	0
HGM8C	4 or 8	4	4	4	4	4	8	0
HGM10C	5 or 10	5	5	5	5	5	10	0
HGL10C	5 or 10	5	5	5	5	5	10	0
HGL15C	5, 10 or 15	5	5	10	10	5	15	0
HGL20C	5, 10, 15 or 20	10	10	10	10	10	15	5

† Factory jumper setting

Table 6: HG Electric Heat Electrical Data

Unit Model	Head Kit Model	Supply	Heater Amps 240	Heater Amps 208	Blower FLA	Minimum Circuit Amps		Maximum Breaker Size	
						240 V	208 V	240 V	208 V
024	HGM4C	SINGLE	15.8	14	4.3	25	23	25	25
	HGM 5C	SINGLE	20	17.3	4.3	30	27	30	30
	HGM 8C	SINGLE	31.7	27.5	4.3	45	40	45	40
	HGM 10C	SINGLE	40	34.7	4.3	55	49	60	50
036	HGL10C	SINGLE	40	34.7	4.3	59	52	60	60
	HGL15C	DUAL L1/L2	40	34.7	0	50	43	50	45
		L3/L4	20	17.3	4.3	34	30	35	30
048 and 060	HGL10C	SINGLE	40	34.7	7.0	59	52	60	60
	HGL15C	DUAL L1/L2	40	34.7	0.0	50	43	50	45
		L3/L4	20	17.3	7.0	34	30	35	30
	HGL20C	DUAL L1/L2	40	34.7	0.0	50	43	50	45
		L3/L4	40	34.7	7.0	59	52	60	60

All heaters rated single phase 208-240V 60Hz
 All models 15kW or larger feature internal circuit breakers
 All Fuses UL Class K general purpose

Unit & System Checkout

⚠ WARNING! ⚠

WARNING! Electrical shock hazard - Lock unit disconnect switch in open position before servicing unit. Failure to follow this warning could result in property damage, personal injury, or death.

After installation has been completed, it is recommended that the Air Handler be checked against the following checklist:

CHECKOUT PROCEDURE

- Power:** Make sure power is "OFF" at power disconnect switch.
- Field Wiring:** Check all field wiring for tight connections. See that grounding of unit is in accord with code
- Unit Suspension:** Make sure unit suspension (if used) is secure and that there are no tools or loose debris in, around or on top of the unit.
- Ducts:** Check all duct outlets; they must be open and unrestricted.

- Drain Lines:** Check drain lines and be sure all joints are tight.
- Drain Pan:** Make sure secondary drain pan is installed.
- Power Supply:** Check power supply for correct requirements per unit nameplate.
- Filters:** Check filters for proper size. Inform owner of proper procedure for removal and reinstallation.
- Operation:** Energize the system and carefully observe its operation; make any necessary adjustment.
- Procedure:** Instruct owner, engineer (if possible) on proper operating procedure and leave Use and Care Manual with owner.

MAINTENANCE

⚠ WARNING! ⚠

WARNING! These instructions are intended as an aid to qualified licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in property damage, personal injury or death.

For continuing high performance and to minimize possible equipment failure, it is essential that annual maintenance be performed on this equipment. Consult your local dealer as to the availability of a maintenance contract.

Air Filter

Check the system filter every ninety days or as often as found to be necessary and if obstructed, clean or replace at once.

IMPORTANT: Do not operate the system without a filter in place.

Indoor Coil - Drain Pipe - Drain Line

Inspect the indoor coil once each year for cleanliness and clean as necessary. In some cases, it may be necessary to remove the filter and check the return side of the coil with a mirror and flashlight.

IMPORTANT: Do not use caustic household drain cleaners or bleach in the condensate pan or near the indoor coil. Drain cleaners will quickly damage the indoor coil.

Revision History

Date	Page #	Description
17 June, 13	13, 14	Text Updates
16 May, 13	All	Miscellaneous Text Edits, New Wire Diagram ECM Board
21 Feb., 13	All	Various Updates
3 May, 12	All	First Published

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