

Installation Instructions

B Series

Multi-Position & Hydronic Air Handlers

Electric or Hot Water Heat, with available Variable-Speed High Efficiency ECM Motor

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ISO 9001:2008
—Registered Quality System—



AIR HANDLER SAFETY

Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol.

This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER" or "WARNING." These words mean:

⚠ DANGER

You can be killed or seriously injured if you don't immediately follow instructions.

⚠ WARNING

You can be killed or seriously injured if you don't follow instructions.

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed.

WARNING!

This product may contain fiberglass wool insulation. Glass wool fibers are known to the State of California to cause cancer. Disturbing insulation during installation, maintenance, or repair may expose you to glass wool fibers and may cause respiratory, skin or eye irritation. For further information on risks associated with fiberglass wool, consult Material Safety Data Sheet available from OEM.

INSTALLATION REQUIREMENTS

These instructions are intended as a general guide only and do not supersede any national or local codes in any way. Compliance with all local, state, or national codes pertaining to this type of equipment should be determined prior to installation.

Read this entire instruction manual, as well as the instructions supplied in separate equipment, before starting the installation.

All models are designed for indoor installation only.

The installation of the air handler, field wiring, warm air ducts, etc. must conform to the requirements of the National Electrical Code, ANSI/NFPA No. 70 (latest edition) in the United States, and any state laws, and local ordinances (including plumbing or wastewater codes). Local authorities having jurisdiction should be consulted before installation is made. Such applicable regulations or requirements take precedence over the general instructions in this manual.

Install the conditioned air plenum, ducts and air filters (not provided) in accordance with NFPA 90B Standard for the Installation of Warm Air Heating and Air-Conditioning Systems (latest edition).

Some models are configured for upflow air discharge only, and some models are configured for upflow or horizontal left-hand air discharge.

Do not remove the cabinet knockouts until it has been determined which knockouts would need to be removed for the installation.

Select the final installation position that best suits the site conditions. Consider required clearances, space, routing requirements for refrigerant line, condensate disposal, filters, ductwork, wiring, and accessibility for service. Refer to the air handler rating plate on the air handler for specific information.

Tools and Parts Needed

Assemble the required tools and parts before starting installation. Read and follow the instructions provided with any tools listed here.

- ¼" nut driver
- Level
- Screw driver
- Adjustable wrench
- Tape measure
- Hammer
- Sealant

Check local codes, check existing electrical supply, and read "Ductwork Requirements," and "Electrical Requirements," before purchasing parts.


- UL listed wire nuts
- Replacement orifice (if needed). See "Verify Orifice Size." The correct orifice size may be contained in the replacement orifice package located inside the control box of the outdoor unit. If this package does not contain the correct orifice for your air handler, you must purchase the correct orifice size.

Outdoor System Requirements

The air handler is designed to match, and must be used with, outdoor units as rated in AHRI. The indoor sections are manufactured with an interchangeable refrigerant metering device to provide optimum refrigerant control and system performance with a variety of different capacities of outdoor units. In some cases, the AHRI rating may require that the air handler refrigerant metering device be changed to obtain rated performance.


Location Requirements

WARNING



Electrical Shock Hazard

Disconnect power before servicing
Replace all parts and panels before operating.
Electrically ground air handler.
Connect ground wire to ground terminal marked "GRD".
Failure to do so can result in death or electrical shock.



Explosion Hazard

Keep flammable materials and vapors, such as gasoline, away from this unit.
Place this unit so that the heating elements are at least 18 inches (46 cm) above the floor for a garage installation.
Failure to follow these instructions can result in death, explosion, or fire.

NOTE: When the unit is installed in a very humid space and used in cooling applications, excessive sweating may occur on outside of unit. To prevent excessive sweating wrap unit with 1" fiberglass insulation. All openings should be sealed to prevent air leakage that could cause condensate to form inside the cabinet.

- If installed in an unconditioned space, sealant should be applied around the electrical wires, refrigerant tubing, and condensate lines where they enter the cabinet.
- Electrical wires should be sealed on the inside where they exit the conduit opening. Sealant is required to prevent air leakage into and condensate from forming inside the air handler, control box, and on electrical controls.
- The air handler must be installed in such a way as to allow free access to the coil/filter compartment and blower/control compartment.

Installation Clearances

Non-Ducted Return Closet Installation

The air handler can be installed in a closet with a false bottom to form a return air plenum or be installed with a return air plenum under the air handler.

Louvers or return air grilles are field supplied. Local codes may limit application of systems without a ducted return to single-story buildings.

- Install louvers in a closet. Use the "Minimum Filter Requirements Chart" to determine the opening size that will provide the amount of free air you will require. If using louvers or grilles, match the free area rating of the louver or grille to the Minimum Return Air Free Area you determined to be necessary by consulting the "Minimum Filter Requirements Chart."
- If the free area is not known, assume a 25% free area for wood or a 75% free area for metal louvers or grilles.
- If the return air plenum is used, the return air grille should be immediately in front of the opening in the plenum to allow for the free flow of return air.
- When not installed in front of the opening, there must be adequate clearance around the air handler to allow for the free flow of return air.

Configuration Options

For ease in installation, it is best to make any necessary coil configuration changes before setting air handler in place.

- Vertical upflow Air Handlers only contain 1 drain pan.
- Multi-position Air Handlers contain 2 drain pans.

Vertical Installations

Upflow

The air handler must be supported on the bottom only and set on solid floor or field supplied supporting frame. Securely attach the air handler to the floor or supporting frame. For best efficiency and airflow, horizontal drain pan (if installed) should be removed from units in upflow configurations.

Horizontal Installations

Horizontal installations can be left-hand or right-hand air supply.

Adequate support must be provided to ensure cabinet integrity. Units mounted horizontal should be mounted with a slight angle toward the drain connections to be used so that the drain pan will empty completely without water standing in the pan.

Ensure that there is adequate room to remove service and access panels if installing in the horizontal position.

IMPORTANT:

- This coil is provided with a secondary drain that should be trapped and piped to a location that will give the occupant a visual warning that the primary drain is clogged. See "Install Condensate Drain."
- When an evaporator coil is installed in an attic or above a finished ceiling, an auxiliary drain pan should be provided under the air handler as specified by most local building codes.
- Extend suction line insulation into the coil cabinet by 2" to prevent moisture from dripping onto the insulation (the rubber grommet may need to be removed).

Conversion from Vertical to Horizontal

A vertical only air handler may be converted to horizontal air discharge by installing a horizontal drain pan kit (see accessories).

A multi-position air handler may be converted from horizontal left-hand discharge to horizontal right-hand discharge without additional parts.

Suspended Cabinet Installation

NOTE: Air handlers cannot be installed horizontally lying on or suspended from either the front or back of the air handler. It must be positioned with one side parallel to the floor when in the horizontal position.

The suspending means must be field fabricated, and should consist of two "cradles" made by attaching two rods to a length of angle iron or suitable gauge steel.

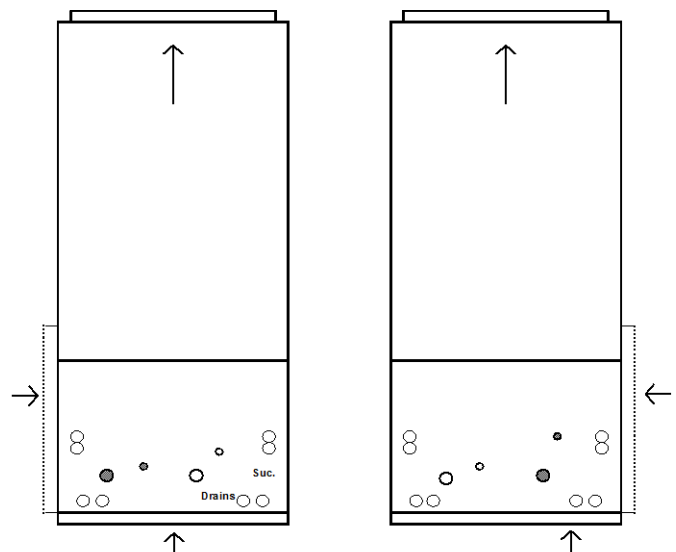


Figure 1. Air Handler in vertical position. 12-30, & 36 size models are side air return capable. Side return field installed filter rack available as an accessory. Side of cabinet must be cut to obtain side air return access.

Drain Pan Connections

Horizontal installations can be either "Right" or "Left."

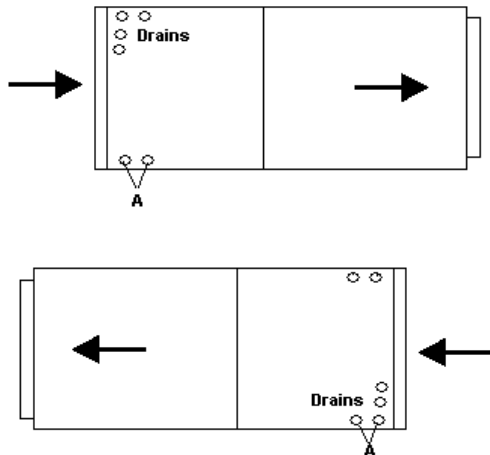


Figure 2. Air Handler in horizontal right and left positions respectively. Use condensate drains with the letter-A. Depending on the air handler a horizontal drain pan location change may be required.

Right-to-Left or Left-to-Right Airflow Conversion (12-30, & 36 MBTUH Size Models)

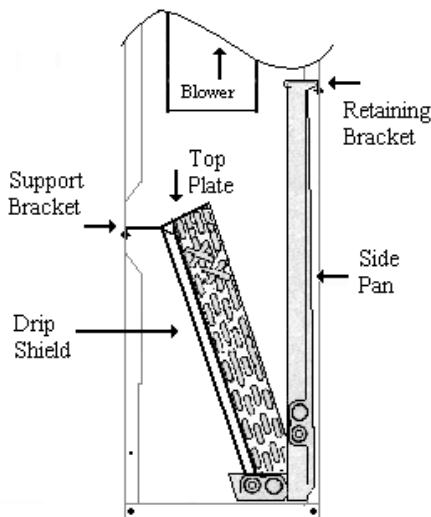


Figure 3. Drawing of Air Handler (12-30, or 36 MBTUH Size Model) in vertical position ready for Left-to-Right airflow if desired.

1. Remove and set aside all front panels.
2. Locate slant coil support bracket and remove the 2 screws from the side of the cabinet.
3. Remove the horizontal drain pan retaining bracket.
4. Carefully remove coil assembly and drain pan(s) as one assembly from the unit.
5. If the air handler is to be used for upflow, the horizontal pan and bracket can be discarded.

6. Remove the screws holding the coil bracket to the left side of top plate. Reposition coil support bracket to right side of top plate.
7. Remove drip shield from front left-hand side of coil assembly and attach to front right-hand side.
8. Repeat for the rear drip shields. Failure to move drip shields will allow air by-pass around coil.
9. If needed for horizontal installation, slide the horizontal drain pan over the bottom pan. If vertical application, only install bottom pan. Install the pan(s) into bottom left hand side of the air handler. If installed properly the drains should match knockouts on the connection panel. (Refer to drawing)
10. Install coil assembly back into unit.
11. Re-install slant coil support bracket retaining screws.
12. Determine knockouts required and remove from panels accordingly.

Right-to-Left Airflow Conversion (31, 37-60 MBTUH Size Models)

These models are shipped in the left-to-right airflow configuration. To convert to right airflow follow the following five steps.

Side Bracket

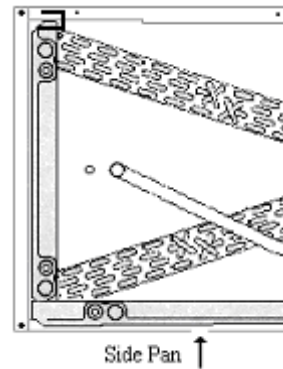



Figure 4. Air Handler (31, 37-60 MBTUH Size Models) in left-to-right airflow configuration.

1. Remove and set aside front panels.
2. Remove side bracket with 2 screws.
3. Carefully remove coil assembly and bottom drain pan as one assembly from the unit.
4. Move side drain pan from left hand side of coil to right.
5. Move coil support bracket under top plate from left hand side of coil to right.
6. Install modified coil assembly back into unit.
7. Reinstall side bracket with 2 screws on opposite side.
8. Determine knockouts required and remove from panels accordingly.

Caution: Take care when removing coil assembly from unit. Installation in this configuration may cause the coil to tip into unit once clear of the cabinet. Support the coil when removing.


Electrical Requirements

⚠ WARNING



Electrical Shock Hazard

Disconnect power before servicing.
Replace all parts and panels before operating.
Electrically ground air handler.
Connect ground wire to ground terminal marked "GRD".
Failure to do so can result in death or electrical shock.



Explosion Hazard

Keep flammable materials and vapors, such as gasoline, away from this unit.
Place this unit so that the heating elements are at least 18 inches (46 cm) above the floor for a garage installation.
Failure to follow these instructions can result in death, explosion, or fire.

NOTE: Use copper conductors only.

- All field wiring must be done in accordance with National Electrical Code, applicable requirements of UL and local codes, where applicable.
- Electrical wiring, disconnect means and over-current protection are to be supplied by the installer. Refer to the air handler rating plate for maximum over-current protection, minimum circuit Ampacity, as well as operating voltage.
- The power supply must be sized and protected according to the specifications supplied on the product.

Ductwork Requirements

- Install the conditioned air plenum, ducts and air filters (not provided) in accordance with NFPA 90B Standard for the Installation of Warm Air Heating and Air-Conditioning Systems (latest edition).
- The air handler is provided with flanges for the connection of the plenum and ducts.
- Replacement air filters must be listed as Class 2 furnace air filters.
- Supply and return ductwork must be adequately sized to meet the system's air requirements and static pressure capabilities. Ductwork should be insulated with a minimum of 1" thick insulation with a vapor barrier in conditioned areas and 2" minimum in unconditioned areas.
- Supply plenum should be the same size as the flanged opening provided around the blower outlet

and should extend ideally at least 3 ft. from the air handler before turning or branching off plenum into duct runs. The plenum forms an extension of the blower housing and minimizes air expansion losses from the blower.

INSTALLATION INSTRUCTIONS

Inspect Shipment

⚠ WARNING

Excessive Weight Hazard

Use two or more people to move and install air handler.

Failure to do so can result in back or other injury.

All air handlers are performance tested. Each unit consists of a blower assembly, refrigerant coil and controls, in an insulated, factory-finished enclosure. Knockouts are provided for electrical wiring entrance.

1. Check the unit rating plate to confirm specifications are as ordered.
2. Upon receipt of equipment, carefully inspect it for possible shipping damage. Take special care to examine the unit if the carton is damaged.

If damage is found, it should be noted on the carrier's freight bill. Damage claims should be filed with the carrier immediately. Claims of shortages should be filed with the seller within 5 days.

NOTE: If any damages are discovered and reported to the carrier, do not install the unit because your claim may be denied.

Filter Size Chart

<u>Unit Size (MBTUH)</u>	<u>Filter Size</u>
12-24	12" X 20"
25-30 & 36	16" X 20"
31 & 37-48	16" X 24"
60	18" X 24"

Install Condensate Drain

The air handler is provided with ¼" NPT condensate drain connections. A field fabricated secondary drain pan, with a drain pipe to the outside of the building, is required in all installations over a finished living space or in any area that may be damaged by overflow from the main drain pan. In some localities, local codes may require a secondary drain pan for horizontal installations. For horizontal applications make sure unit is tilted with a ¼" drop in the horizontal position towards the drain pan to ensure proper condensate drainage. The blower and coil

should also be tilted ½" from back to front toward the drain line so that the drain pan will empty completely without water standing in pan.

1. Remove the appropriate drain knockouts. See "Drain Pan Connections Section". You may need to remove the indoor coil assembly from the cabinet.
2. Remove any web from inside and threaded drain pan hole to which a drain line is to be connected. Use care when removing the web so as not to damage the coil.
3. Connect primary drain line connection to the primary drain pan connection. The primary drain connection is flush with the bottom of the inside of the pan. Secondary connection is raised above the bottom of the inside of the pan.
4. Secondary drain connections, if used, should be connected to a separate drainage system. Run the secondary drain so the occupant will be able to notice if water is flowing through the secondary drain.
5. Install a 2" trap in both the primary and secondary drain lines as close to the unit as practical. Make sure the top of the trap is below the connection to the drain pan to allow complete drainage of the pan.

NOTE: Horizontal runs must also have an anti-siphon air vent (standpipe) installed ahead of the horizontal run. See Figure 5. An extremely long horizontal run may require an oversized drain line to eliminate air trapping.

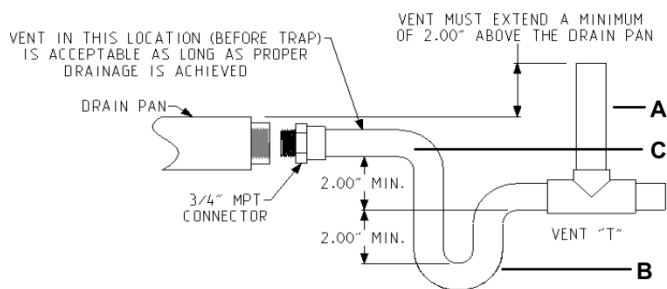


Figure 5. Typical condensate drain connection with A- Antisiphon Air Vent, B- Drain Trap, and C- Drain Line. Secondary drain not shown.

NOTE: Do not operate air handler without a drain trap. The condensate drain is on the negative pressure side of the blower; therefore, air being pulled through the condensate line will prevent positive drainage without a proper trap.

6. Route the drain line to the outside or to an appropriate drain. Drain lines must be installed so they do not block service access to the front of the air handler. A 24" clearance is required for filter, coil, or blower removal and service access.

NOTE: Check local codes before connecting the drain line to an existing drainage system.

7. Insulate the drain lines where sweating could cause water damage.

Upon completion of installation, it is the responsibility of the installer to ensure the drain pan(s) is capturing all condensate, and all condensate is draining properly and not dripping into duct/system.

1. Pour several quarts of water into drain pan, enough to fill drain trap and line.
2. Check to make sure the drain pan is draining completely, no leaks are found in drain line fittings, and water is draining from the end of the primary drain pan.
3. Correct any leaks found.

Install Ductwork

IMPORTANT:

- Install ductwork in accordance with NFPA 90B and any local codes.
- Connect supply air duct to the flange on top of the air handler. If an isolation connector is used, it must be nonflammable.
- A return air duct system is recommended. If the unit is installed in a confined space or closet, a return connection must be run to a location outside the cabinet.

Thermal Expansion Valve (TXV)

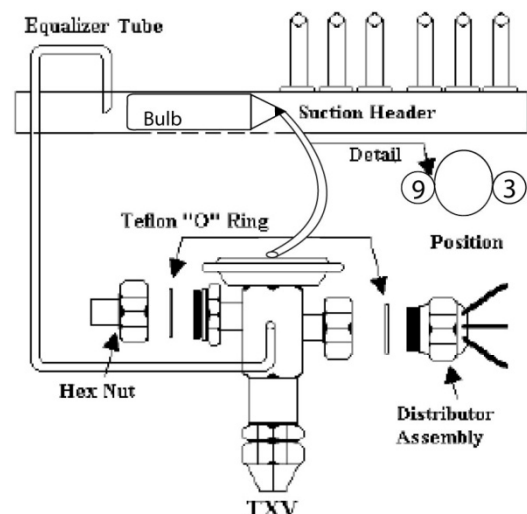


Figure 6. Diagram of Thermal Expansion Valve

Some models are equipped with a factory installed thermal expansion valve. The sensing bulb of the valve needs to be removed during installation and reattached

to the header (Fig 6). For optimum performance, attach and insulate the bulb at a 10 to 2 o'clock position outside of the cabinet to the main suction line no more than one foot from suction line connection.

Pistons

As shipped from the factory, the piston installed in each coil is chosen for the nominal BTUH capacity of the coil. A label on the liquid line identifies the piston size. For optimum performance the piston should be sized to match the nominal BTUH of the condensing unit.

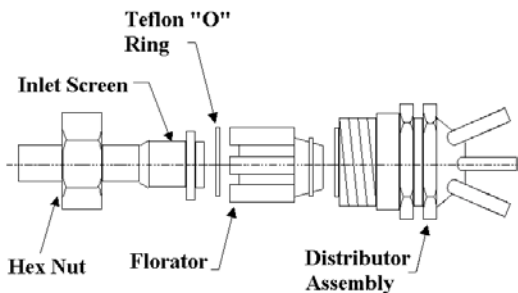


Figure 7. Side view of Piston Orifice

When changing pistons use the following procedure:

1. Loosen hex nut located on liquid line and separate from distributor assembly.
2. Remove the existing piston from inside the distributor assembly
3. Insert the desired piston into the distributor assembly.
4. Inspect "O" ring and replace if damaged. Ensure gasket is in place.
5. Re-install hex nut to body and torque to 10 ft-lbs.

Connect Refrigerant Lines

Refrigerant lines must be connected by a licensed, EPA certified refrigerant technician in accordance with established procedures.

IMPORTANT:

- Connecting refrigerant lines must be clean, dehydrated, refrigerant-grade copper lines. Air handler coils should be installed only with specified line sizes for approved system combinations.
- Use care with the refrigerant lines during the installation process. Sharp bends or possible kinking in the lines will cause a restriction.
- Do not remove the caps from the lines or system connection points until connections are ready to be completed.

1. Route the suction and liquid lines from the fittings on the indoor coil to the fittings on the

outdoor unit. Run the lines in a direct path, avoiding unnecessary turns and bends.

2. Ensure that the suction line is insulated over the entire exposed length and that both suction and liquid lines are not in direct contact with floors, walls, ductwork, floor joists, or other piping.
3. Connect the suction and liquid line to the evaporator coil.
4. To avoid damaging the rubber grommets in the cabinet while brazing, slide the rubber grommets over the refrigerant lines until they are away from the heat source.
5. Braze with an alloy of silver or copper and phosphorus with a melting point above 1,100°F.
NOTE: Do not use soft solder.
6. Reinstall the rubber grommets after brazing is finished.
7. Make sure the outdoor air conditioning unit has been put in place according to the Installation Instructions and is connected to the refrigerant lines.

Refrigerant Charging Instructions

When charging in cooling mode, the outdoor temperature should be 60°F or higher. To allow the pressures to stabilize, operate the system a minimum of 10 minutes between adjustments.

TXV – Use the subcooling recommended by the outdoor unit instructions, or use the range of 6°F to 15°F subcooling. If equipped, adjust the TXV to 6°F to 10°F superheat.


Fixed Orifice – Use the superheat recommended by the outdoor unit instructions, or use the superheat table below.

Outdoor Air Temp. (°F)	Nominal Superheat (°F)	Minimum Superheat (°F)
60	31	28
65	28	25
70	25	22
75	22	20
80	20	16
85	16	13
90	13	10
95	10	6
100	8	6
105	6	4
110	5	4
115	5	4

For heat pumps initially charged in the cooling mode, final adjustment in heating mode is acceptable if necessary. When charging heat pumps in the heating mode, refer to the outdoor unit charging instructions.


Supply Voltage Connections

⚠ WARNING



Electrical Shock Hazard

Disconnect power before servicing.
 Replace all parts and panels before operating.
 Electrically ground air handler.
 Connect ground wire to ground terminal marked "GRD".
 Failure to do so can result in death or electrical shock.



Explosion Hazard

Keep flammable materials and vapors, such as gasoline, away from this unit.
 Place this unit so that the heating elements are at least 18 inches (46 cm) above the floor for a garage installation.
 Failure to follow these instructions can result in death, explosion, or fire.

1. Disconnect all power supplies.
2. Remove the air handler access panel.
3. Route the field supply wires to the air handler electrical connection box.
4. Using UL listed wire nuts, connect the field supply wires to the air handler; black-to-black, and yellow-to-yellow (240V) or white-to-white (120V), as shown in Figure 8.

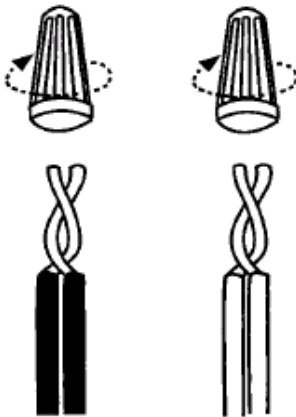



Figure 8. Field and Air Handler Wire Connections.

⚠ WARNING



Electrical Shock Hazard

Electrically ground air handler.
Connect ground wire to ground terminal marked "GND".
Failure to do so can result in death or electrical shock.

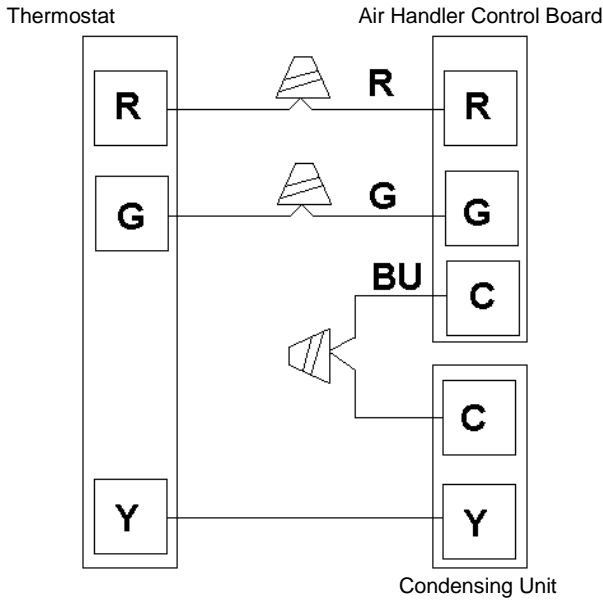
5. Connect ground wire to ground terminal marked "GND."
6. Replace the air handler access panel.

Unit Size (MBTUH)	Elec. Heat Kit (Kw)
12	5
18	10
24	12.5
25	15
30	17.5
31	17.5
36	20
37	20
42	20
48	25
60	25

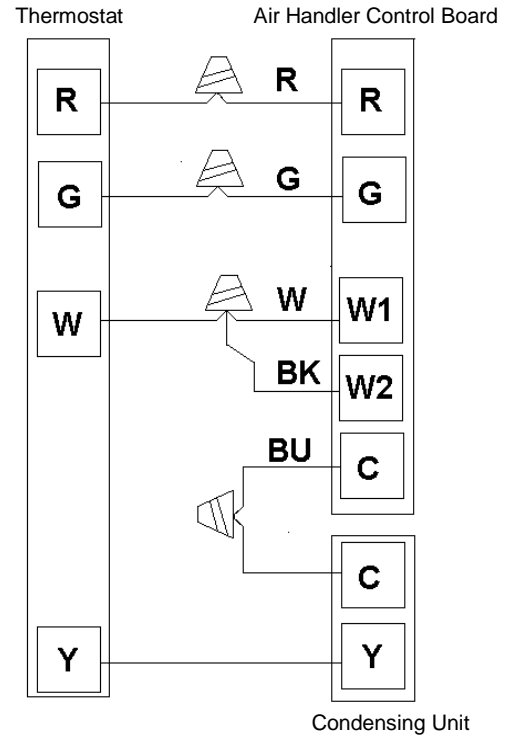
Table 1. Maximum allowable Kw Electric Heat Kits that can be field installed for their respective Air Handler Size.

Thermostat Connections – 3-Speed Motor (Electric Heat)

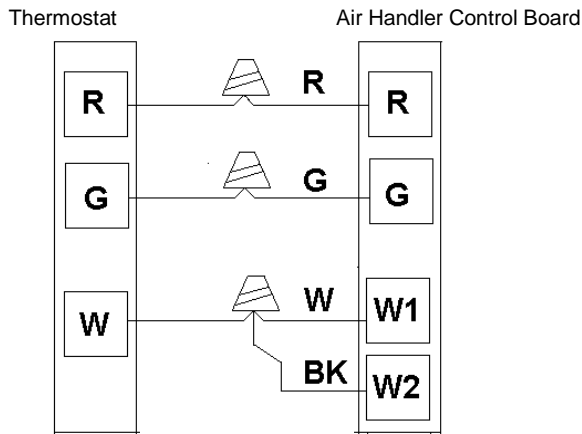
Maximum allowable current draw from power-stealing thermostats or other accessories is 18 mA. Exceeding this value may cause the Air Handler control board to operate abnormally.



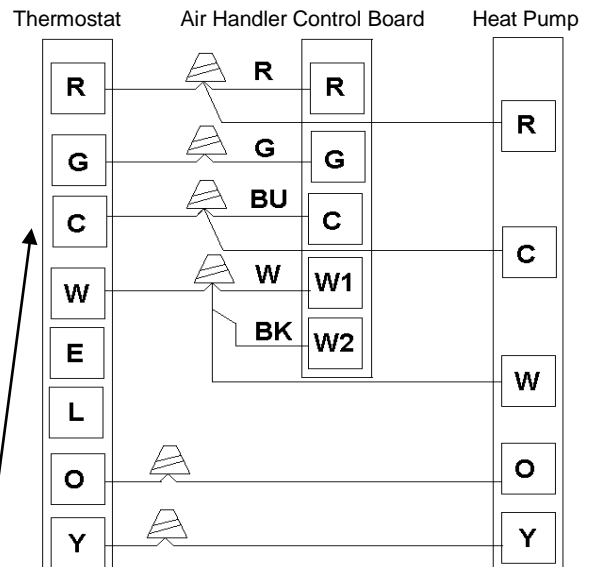
Cooling Only



Cooling with Electric Heat



Electric Heating Only



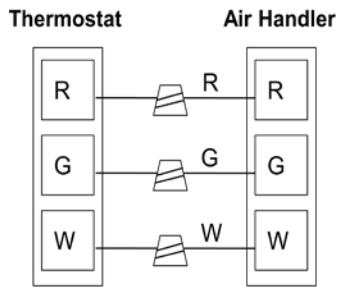
*Connect common (C) wire only if required. See Thermostat Installation Instructions.

Heat Pump with Electric Heat

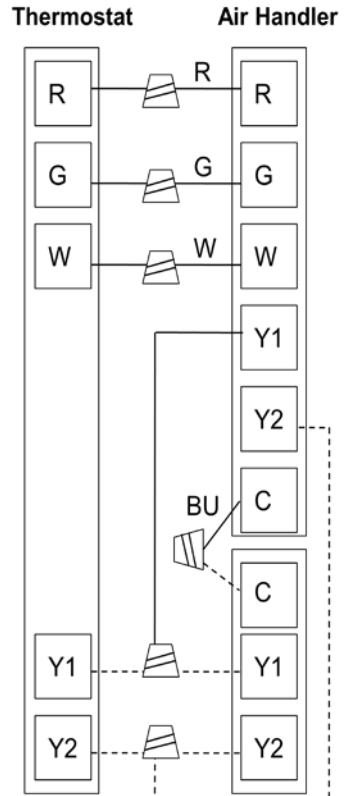
Thermostat Connections –

3-Speed Motor & Variable-Speed High Efficiency ECM Motor (Hot Water Heat)

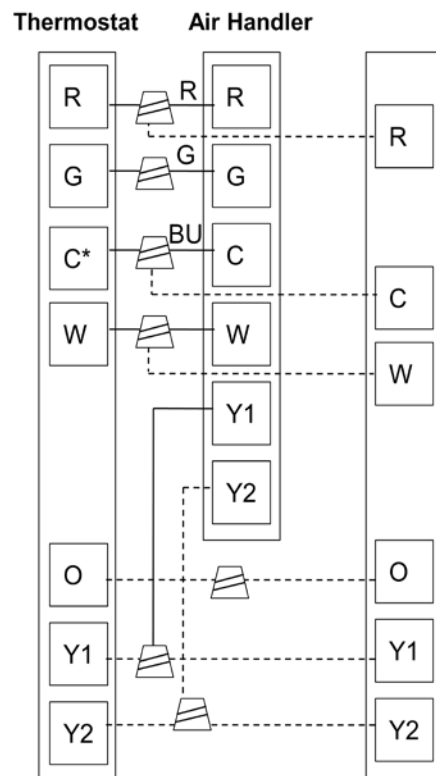
Maximum allowable current draw from power-stealing thermostats or other accessories is 18 mA. Exceeding this value may cause the Air Handler control board to operate abnormally.



HOT WATER HEAT ONLY



COOLING w/ HOT WATER HEAT



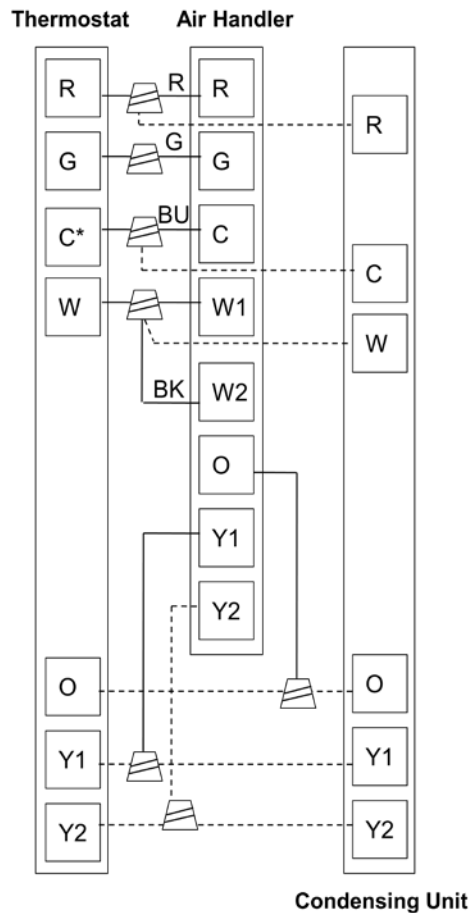
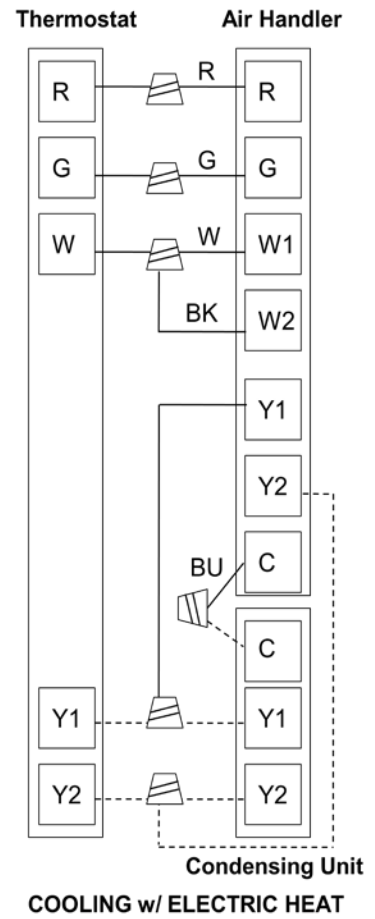
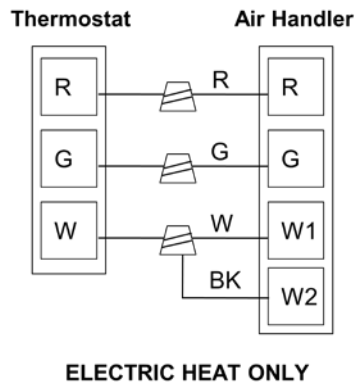
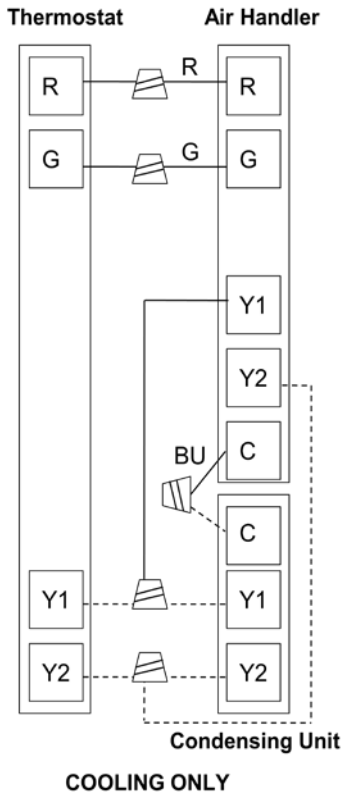
Condensing Unit

*Connect common (C) wire only if required per thermostat installation instructions.

HEAT PUMP w/ HOT WATER HEAT

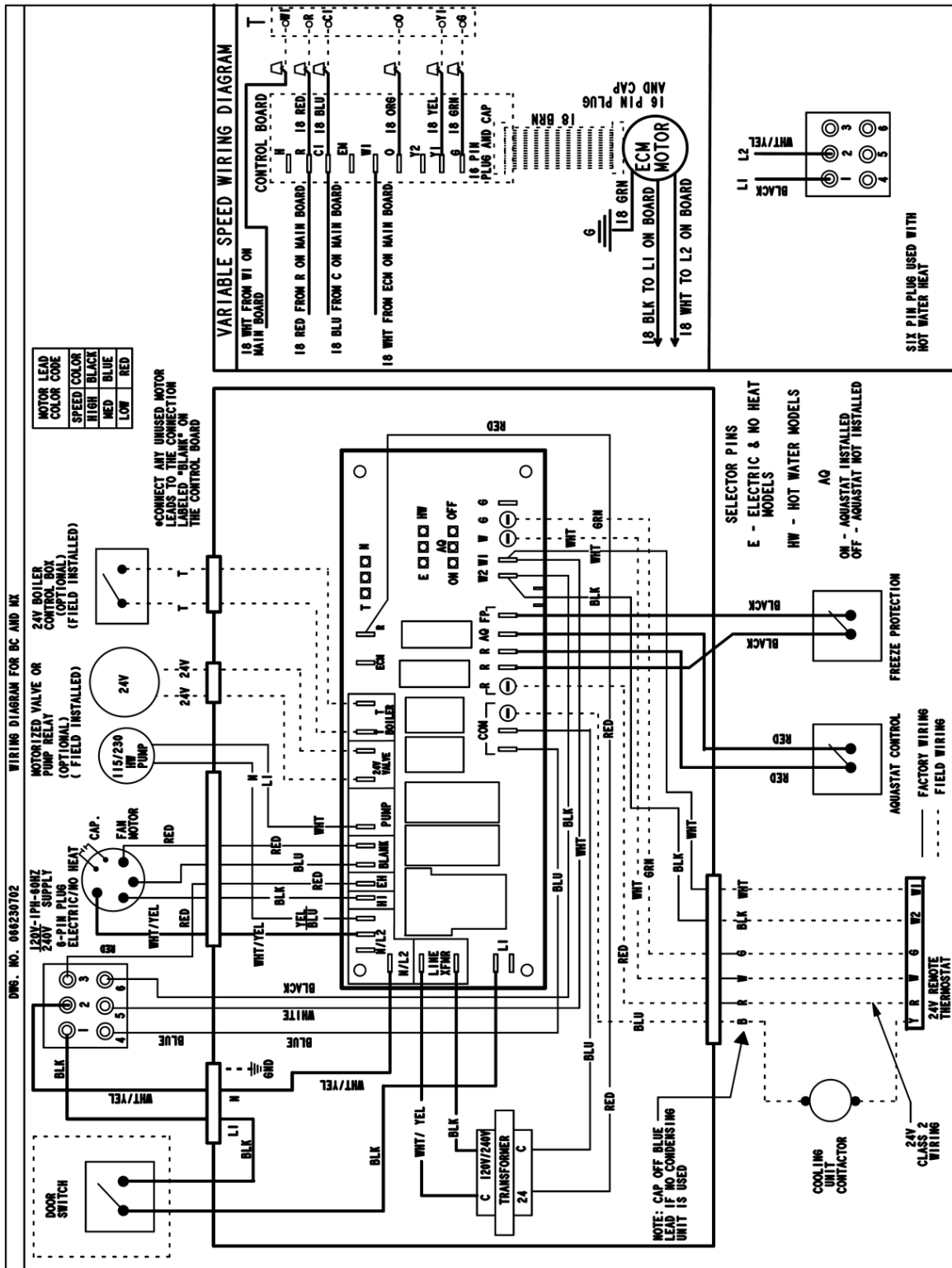
Thermostat Connections – Variable-Speed High Efficiency ECM Motor (Electric Heat)

Maximum allowable current draw from power-stealing thermostats or other accessories is 18 mA. Exceeding this value may cause the Air Handler control board to operate abnormally.



*Connect common (C) wire only if required per thermostat installation instructions.

Wiring Diagram



Note: 6-Pin Plug serves as connection for electric heat kits to control board.

If your unit is equipped with a multi-function control board, then for electric heat installations insure that heat selector pin is set to "E".

Blower Performance Data- 3-Speed Motor

All data is given while air handler is operating with a dry DX coil and air filter installed.

Speeds marked in **bold with an asterisk*** are the factory speed settings for both heating and cooling.

Heating speeds should not be reduced below factory setting.

Unit Size (MBTUH)	Fan Speed Setting	Airflow (CFM) vs. External Static Pressure (Inches W.C.)									
		Electric Heat Models					Water Heat Models				
		0.10	0.20	0.30	0.40	0.50	0.10	0.20	0.30	0.40	0.50
12	*Low	632	612	570	501	456	600	581	542	476	433
	Med	814	747	674	596	482	773	710	640	566	458
	High	862	791	705	626	525	819	751	670	595	499
18	*Low	632	612	570	501	456	600	581	542	476	433
	Med	814	747	674	596	482	773	710	640	566	458
	High	862	791	705	626	525	819	751	670	595	499
24	Low	632	612	570	501	456	600	581	542	476	433
	Med	814	747	674	596	482	773	710	640	566	458
	*High	862	791	705	626	525	819	751	670	595	499
25	Low	757	725	673	602	549	719	689	639	572	522
	*Med	893	862	823	746	660	848	819	782	709	627
	High	1111	1059	1005	964	904	1055	1006	955	916	859
30	Low	757	725	673	602	549	719	689	639	572	522
	Med	893	862	823	746	660	848	819	782	709	627
	*High	1111	1059	1005	964	904	1055	1006	955	916	859
31	*Low	1221	1187	1099	1080	1018	1160	1128	1044	1026	967
	Med	1329	1267	1208	1146	1073	1263	1204	1148	1089	1019
	High	1383	1317	1260	1188	1103	1314	1251	1197	1129	1048
36	Low	1221	1187	1099	1080	1018	1160	1128	1044	1026	967
	*Med	1329	1267	1208	1146	1073	1263	1204	1148	1089	1019
	High	1383	1317	1260	1188	1103	1314	1251	1197	1129	1048
37	*Low	1251	1263	1253	1214	1133	1188	1200	1190	1153	1076
	Med	1396	1397	1371	1309	1215	1326	1327	1302	1244	1154
	High	1731	1668	1588	1487	1379	1644	1585	1509	1413	1310
42	Low	1251	1263	1253	1214	1133	1188	1200	1190	1153	1076
	*Med	1396	1397	1371	1309	1215	1326	1327	1302	1244	1154
	High	1731	1668	1588	1487	1379	1644	1585	1509	1413	1310
48	Low	1627	1582	1513	1432	1328	1546	1503	1437	1360	1262
	*Med	1801	1706	1620	1513	1398	1711	1621	1539	1437	1328
	High	1854	1748	1656	1552	1448	1761	1661	1573	1474	1376
60	Low	1640	1583	1552	1497	1439	1558	1504	1474	1422	1367
	*Med	1961	1892	1814	1704	1616	1863	1797	1723	1619	1535
	High	2072	2001	1889	1789	1643	1968	1901	1795	1700	1561

Blower Performance Data—Variable-Speed High Efficiency ECM Motor

Unit Size	Operating Mode	Thermostat Terminals						Control Board Taps								
		X = Energized Terminal						Cool				Heat				
		HUM	EM	W1	Y1	Y2	G	A	B	C	D	A	B	C	D	
							CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	
25	Continuous Blower						X	500	400	350	350					
	Hi Cooling / HP Heating	**			X	X		1000	800	700	600					
	Low Cooling/ HP Heating				X			700	560	490	420					
	Aux. Heat			X	X	X		***	***	***	***	1000	800	700*	600*	
	Emer. Heat		X	X				***	***	***	***	1000	800	700*	600*	
30, 31	Continuous Blower						X	600	500	400	350					
	Hi Cooling / HP Heating	**			X	X		1200	1000	800	600					
	Low Cooling/ HP Heating				X			840	700	560	420					
	Aux. Heat			X	X	X		***	***	***	***	1200	1100	1100	1100	
	Emer. Heat		X	X				***	***	***	***	1200	1100	1100	1100	
37	Continuous Blower						X	600	500	400	350					
	Hi Cooling / HP Heating	**			X	X		1200	1000	800	600					
	Low Cooling / HP Heating				X			840	700	560	420					
	Aux. Heat			X	X	X		***	***	***	***	1200	1100*	1100*	1100*	
	Emer. Heat		X	X				***	***	***	***	1200	1100*	1100*	1100*	
42	Continuous Blower						X	800	700	600	500					
	Hi Cooling / HP Heating	**			X	X		1600	1400	1200	1000					
	Low Cooling / HP Heating				X			1120	980	840	700					
	Aux. Heat			X	X	X		***	***	***	***	1600	1400	1200*	1100*	
	Emer. Heat		X	X				***	***	***	***	1600	1400	1200*	1100*	
48	Continuous Blower						X	800	700	600	500					
	Hi Cooling / HP Heating	**			X	X		1600	1400	1200	1000					
	Low Cooling / HP Heating				X			1120	980	840	700					
	Aux. Heat			X	X	X		***	***	***	***	1600	1400*	1200*	1100*	
	Emer. Heat		X	X				***	***	***	***	1600	1400*	1200*	1100*	
60	Continuous Blower						X	900	800	700	600					
	Hi Cooling / HP Heating	**			X	X		1850	1600	1400	1200					
	Low Cooling / HP Heating				X			1295	1120	980	840					
	Aux. Heat			X	X	X		***	***	***	***	1850	1600	1400*	1200*	
	Emer. Heat		X	X				***	***	***	***	1850	1600	1400*	1200*	

* This CFM is not approved for use with the highest kW heater size.

** Humidistat will reduce cooling airflow by 10% in high humidity.

***Airflow is the greater of the COOL and HEAT values when both electric heat and heat pump are operating.

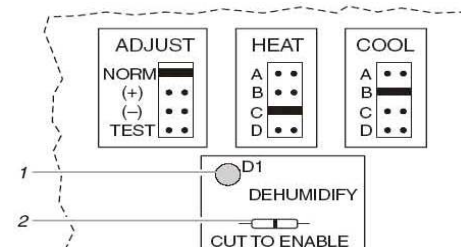
Adjust tap (+) will increase airflow by 10%, while tap (-) will decrease airflow by 12%.

Adjust tap TEST will cause the motor to run at 70% of full airflow. Use this for troubleshooting only.

At the start of a call for cooling there is a short run at 82% of airflow for 7.5 minutes.

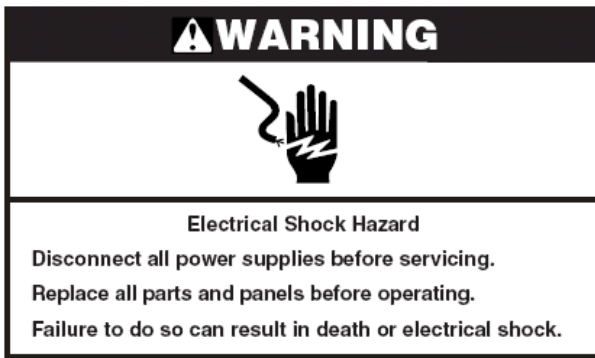
At the end of a call for cooling there is a blower off delay of 1 minute.

Control Board Taps and Dehumidify Resistor.



1. Dehumidify LED
2. Dehumidify resistor

The motor control board that provides airflow selection also features LED indicators that display operating mode, humidity control, and airflow CFM. In addition, thermostat signals for emergency heat (EM), aux. heat (W1), reversing valve (O), compressor stage 1 (Y1), compressor stage 2 (Y2), and blower (G) are all indicated by lit LED's on this board. If a humidistat is used, the dehumidify LED will light when the humidistat opens and the motor runs at reduced airflow. The control board also has a CFM LED that displays the operating CFM. This red LED flashes once for each 100 CFM. For example, if the operating CFM is 1200, the CFM LED will flash 12 times, then pause before repeating the 12-flash pattern.



To change blower speed for 3-Speed Motor: (Refer to “Wiring Diagram – 3-Speed Motor.”)

As shipped from the factory, the cooling and heating speeds are the same. In some cases it may be necessary to change speed for cooling or heating. To do so, use the following procedure:

1. Disconnect all power supplies.
2. Remove the air handler access panel.
3. Locate the motor wire running from the blower motor to the control board motor tap.
4. Remove the motor wire from the control board and replace with desired motor speed wire from P9 or P10 in the Blank area of board.
5. Replace all panels.
6. Reconnect power.

Check Blower Operation

1. Set thermostat to FAN ON.
2. The indoor blower should come on.

Check Hot Water Heat (if used)

1. Set thermostat to call for auxiliary heat (approximately 5°F above ambient temperature). The indoor blower and auxiliary heat should come on together.
2. Set the thermostat so it does not call for heat.

Check Airflow

Cooling Blower Speed

- For proper cooling operation, the airflow through the indoor coil should be between 350 and 450 CFM per ton of cooling capacity (350 - 450 CFM per 12,000 BTU/HR) based on the rating of the outdoor unit.
- The cooling blower speed is factory configured to provide correct airflow for an outdoor unit that matches the maximum cooling capacity rating of the air handler.
- If the outdoor unit is smaller than the maximum cooling capacity rating for the air handler, the cooling blower speed may need to be changed. Refer to “Blower Performance Chart.”

IMPORTANT: The cooling blower speed must be set to provide a minimum of 350 CFM airflow per ton (12,000 BTU/HR) of outdoor cooling capacity.

Hydronic Coil Installation

ADP hydronic air handlers can be used with potable water systems and are shipped with or without circulating pumps. Kits are also available. Refer to pipe and pump sizing in the Air Handler's Engineering & Specification Guide for units with external pumps.

NOTICE
If connecting to tankless water heater, the circulating pump may need to be changed to get proper flow. Refer to water heater instructions for details.

NOTICE
Copper tubing is recommended, but other approved materials are acceptable.

WARNING!
Solder joints on domestic water lines are to be made with **NO-LEAD SOLDER**.

NOTICE
The State of Mass requires the use of a pump timer on domestic water applications to periodically circulate water during the off cycle. This pump timer requirement is a standard factory installed feature on all B Series Air Handlers. A 50' maximum distance between water heater and air handler is also required.

NOTICE
In addition to the factory installed freeze protection on all Air Handlers with hot water coils it is recommended that water piping be insulated to prevent freezing when in unconditioned spaces such as attics, crawl spaces, or within structures that may be unoccupied during freezing conditions. Using a water-glycol solution can also help prevent pipe freezing.

Proper water heating sizing should consider both the gallon capacity AND the BTU input of the water heater.

To determine water heater gallon capacity
A minimum 40 gallon high recovery and/or high efficiency gas or oil fired water heater is recommended. The following volume-sizing guide is satisfactory in most areas.

1. Determine Volume

CFM	Water Heater Requirements
600-800	40 gallons
1000-1200	40 gallons
1400-1600	Either 2 -40 gallons piped together, 1 high input 50 gallon (63,000 to 75,000 Btu/hr input), or 1 -72 (or higher) gallon tank.
2000	Any combination of water heaters piped together with a total output of 105,000 Btu/hr.

2. Determine water heater BTU/HR input requirements.

Assume water heater recovery efficiency of 76%
 BTU/HR input=
 Mild climates: structure heat loss X 1.51
 Cold climates: structure heat loss X 1.58

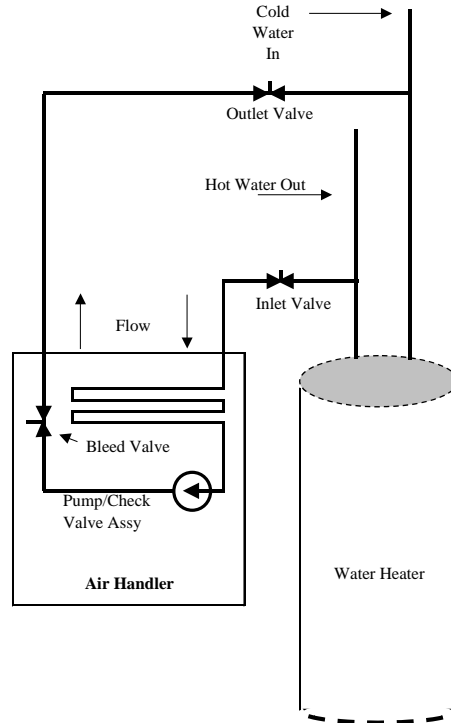


Figure 9. Typical installation with domestic hot water heater, many variations on external valves are possible.

Hot Water Coil Water Purging

Purge valves comes standard on all Air Handlers with factory installed circulating pumps. If utilizing an external circulating pump please make use of an external purge valve or other mechanism to purge hot water coil after installation. Take precautions while purging the Air Handler to keep the Multi-function Control Board and other electrical components from getting wet.

Close the supply valve (Inlet) and open the water return (Outlet). Manually open purge valve, use bucket or hose to discard water during purging process. Close the purge valve. Once return line is purged, close return valve (Outlet) and open supply valve (Inlet). Open bleed valve, use bucket or hose to discard water during purging process. Close purge valve.

Apply power to the fan coil. Engage pump to verify proper flow direction the right (IN) should be warmer/quicker than the left (OUT).

CAUTION
Open bleed valve while pump is running to remove any residue/deposits left from the installation process. Hot water is preferred in this process. **NO CHEMICALS**

CAUTION
Do not engage pump until the purge process is completed.

Sequence of Operations

The Blower Door Safety Switch circuit must be complete for all Sequence of Operations to take place.

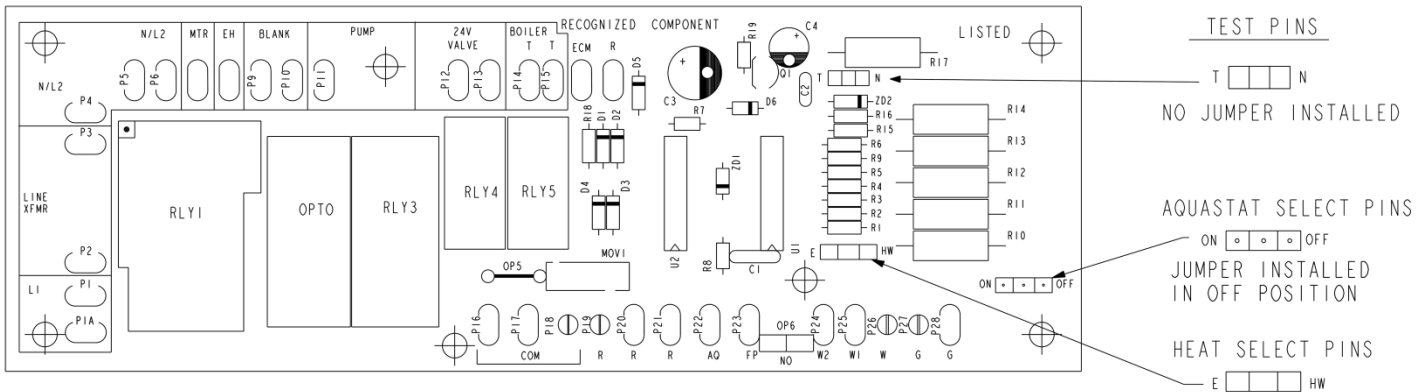


Figure 10. Drawing of Multi-function Control Board, installed in all B Series Air Handlers.

!!Please take precautions while installing the Air Handler to keep Multi-function Control Board and other controls from getting wet!!

Cooling

When the thermostat calls for cooling, the circuit between R and G is completed, and the blower relay is energized. The Normally Open contacts close, causing the indoor blower motor to operate. The circuit between R and Y is also completed; this circuit closes the contactor in the outdoor fan motor. Circuit R and O or R and B energizes the reversing valve, switching it to the cooling position (depends on outdoor unit). Air Handler blower turns off 45 seconds after the thermostat stops calling for cooling.

Heating (electric heat only)

When the thermostat calls for heat, the circuit between R and W is completed, and the heater sequencer is energized. A time delay follows before the heating elements and the indoor blower motor comes on. Units with a second heat sequencer can be connected with the first sequencer to W on the thermostat sub base or connected to a second stage on the sub base. Air Handler blower turns off 30 seconds after the thermostat stops calling for heating.

Heating (heat pump with electric heat)

When the thermostat calls for heat, the circuits between R and Y and R and G are completed. Circuit R-Y energizes the contactor starting the outdoor fan motor and the compressor. Circuit R and G energizes the blower relay starting the indoor blower motor. Circuit R and O or R and B energizes the reversing valve, switching it to the heating position (depends on outdoor unit). If the room temperature should continue to fall, the circuit between R and W1 is completed by the second stage heat room thermostat. Circuit R-

W1 energizes a heat sequencer. The completed circuit will energize supplemental electric heat (if applicable). Units with a second heater sequencer can be connected with the first sequencer to W1 on the thermostat or connected to a second heating stage W2 on the thermostat sub base. Air Handler blower turns off 30 seconds after the thermostat stops calling for heating.

Emergency Heat (heat pump with electric heat)

If selector switch on thermostat is set to the emergency heat position, the heat pump will be locked out of the heating circuit, and all heating will be electric heat (if applicable). A jumper should be placed between W2 and E on the thermostat subbase so that the electric heat control will transfer to the first stage heat on the thermostat. This will allow the indoor blower to cycle on and off with the electric heat when the fan switch is in the AUTO position.

Heating (hot water heat only)

When the thermostat calls for heat, the circuit between R and W is completed, activating the hot water circulating pump. If a field installed circulating pump is being used the control board can still be wired to the pump directly or to an isolation valve supplying hot water to the Air Handler using the control board's 24V relay switch. A similar 24 V dry switching relay labeled TT can be used to activate a boiler or water heater valve. After the circuit between R & W are completed

Units with Factory Installed Aquastats- The water temperature inside the hot water coil must reach 130 deg. F before the circuit between R and G are complete activating the indoor blower motor. To deactivate a factory installed aquastat simply move the selector pin on the multi-function control board (See drawing above) from the on position to the off position.

Units without Factory Installed Aquastats or Deactivated Aquastats- A time delay of 60 seconds follows before the circuit between R and G are complete activating the indoor blower motor.

The Air Handler fan will turn off 30 seconds after the Thermostat stops calling for heating.

Heating (heat pump with hot water heat)

When the thermostat calls for heat, the circuits between R and Y and R and G are completed. Circuit R-Y energizes the contactor starting the outdoor fan motor and the compressor. Circuit R and G energizes the blower relay starting the indoor blower motor. Circuit R and O or R and B energizes the reversing valve, switching it to the cooling position (depends on outdoor unit). If the room temperature should continue to fall, the second stage heat room thermostat completes the circuit between R and W. If a field installed circulating pump is being used the control board can still be wired to the pump directly or to an isolation valve supplying hot water to the Air Handler using the control board's 24V relay switch. A similar 24 V dry switching relay labeled TT can be used to activate a boiler or water heater valve. After the circuit between R & W are completed

Units with Factory Installed Aquastats- The water temperature inside the hot water coil must reach 130 deg. F before the circuit between R and G are complete activating the indoor blower motor. To deactivate a factory installed aquastat simply move the selector pin on the multi-function control board (See drawing above) from the on position to the off position.

Units without Factory Installed Aquastats or Deactivated Aquastats- A time delay of 60 seconds follows before the circuit between R and G are complete activating the indoor blower motor.

The Air Handler fan will turn off 45 seconds after the Thermostat stops calling for heating.

Freeze Protection (hot water heat)

If the temperature of the water within the hot water coil were to drop below 40°F the circuit between R and W is completed, activating the hot water circulating pump, external circulating pump or isolation valve. Once the water temperature rises above 70°F the circuit between R and W is opened and hot water will stop circulating within the hot water coil.

Pump Timer (hot water heat)

The State of Massachusetts requires the use of a pump timer on domestic water applications to periodically circulate water during the off cycle. This pump timer requirement is a standard factory installed feature on all B Series Air Handlers. The Pump timer activates the circulating pump or isolation valve for one minute every six hours by completing the circuit between R and W. The Pump timer is skipped while the outdoor compressor is operating.

Air Handler Maintenance

At the beginning of each heating season the unit should be serviced by a qualified installer or servicing agency.

Assistance or Service

If you need further assistance, you may contact us at the address below with any questions or concerns. Please include a daytime phone number in your correspondence.

Advanced Distributor Products
1995 Air Industrial Park Road
Grenada, MS 38901



Air Handler Limited Warranty – Standard 5 Year

(Applies only to product installed within the United States or Canada)

Term of Standard Warranty: Advanced Distributor Products (ADP) warrants that products sold shall be of merchantable quality, free of defects in material and workmanship, under normal use and service, for a period of five (5) years from the date of installation, ***not*** to exceed six (6) years from the date of manufacture. Use of this product other than in a residential application will limit the warranted term to a period of (1) year from the date of installation, not to exceed two (2) years from the date of manufacture.

Warranty Procedure: Warranty parts should be replaced by a qualified local contractor or dealer and will require the following information: model number, serial number, date of installation and an accurate description of the problem. Contractor or dealer will contact a local ADP distributor for replacement parts.

Replacement Parts: If, during the term of this warranty, a warranted part fails, ADP will either provide a replacement part free of charge, or may at its option, grant a credit for the original purchase price of the defective article to a distributor of ADP products. ADP may require the return of a defective article for factory inspection to verify and/or determine the root cause of the failure. Covered components include all parts of this unit except for the following ***excluded components***, which are not covered by this warranty: cabinet, cabinet pieces, wiring and wiring harnesses.

Care of Equipment: For this warranty to apply, ADP product must be properly installed, operated, and maintained in accordance with the installation, operation and maintenance instructions provided with each unit. Unauthorized alteration of ADP product may void this warranty.

Conditions of Warranty: Replacement parts furnished under this warranty will be warranted for the balance of the original warranty term of the unit and will not serve to extend the original term. This warranty is void if the ADP product is removed from the original installation site. This warranty does not apply to damage caused by shipping, misuse, mishandling or damage caused by floods, winds, fires, lightning, or exposure to corrosive elements/environments (such as salt, chlorine, fluorine or other damaging chemicals).

Limitations of Warranty: The costs of refrigerant, refrigerant reclamation, miscellaneous material and labor charges for diagnostics, servicing or replacing parts are not covered. ADP shall have no liability for expenses incurred for repairs without prior, written authorization from ADP. No purchaser, distributor, dealer, representative, agent, person, firm or corporation has authority to alter, add to or modify this warranty, either orally or in writing.

No Other Warranties: ADP makes no warranty, express or implied, of fitness for any particular purpose, or of any other nature whatsoever, with respect to products manufactured or sold by ADP hereunder, except as specifically set forth above and on the face hereof. Any implied warranty of merchantability or fitness for a particular purpose on this product is limited in duration to the duration of this warranty. Some states and provinces do not allow limitations on how an implied warranty lasts, so the above limitation may not apply to you. It is expressly understood and agreed that ADP shall not be liable to buyer, or any customer of buyer, for direct or indirect, special, incidental, consequential or penal damages, or for any expenses incurred by reason of the use or misuse by buyer or third parties of said products. To the extent said products may be considered "consumer products", as defined in Sec. 101 of the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, ADP makes no warranty of any kind, express or implied, to "consumers," except as specifically set forth above on the face hereof. The foregoing is in lieu of all other warranties, express or implied, notwithstanding the provisions of the Uniform Commercial Code, the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, or any other statutory or common law, federal or state.

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