

Installation Manual: BMAT Series - Full Cased Coils for Cooling

BMAT - full-cased multi-position coils



**REFRIGERANT SAFETY
GROUP A2L**

 **CAUTION**

Risk of fire

This unit uses a mildly flammable (A2L) refrigerant. See [A2L refrigerant safety considerations](#) to ensure safe installation, operation, and servicing of this unit.

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Avenue Londonderry, NH 03053

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Supersedes: Nothing

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About this manual

Read all sections of this manual and keep it for future reference.



WARNING: Cancer and Reproductive Harm – www.P65Warnings.ca.gov.

This installation manual covers the following:

- Installation of BMAT coils with furnaces.
- ① **Note:** BMAT coils may have provisions to use braze free connections. Regardless, sweat connect fittings can be used if desired. The coils are shipped with a low psi. nitrogen charge.

CAUTION

If using this coil with R454B refrigerant, read [A2L refrigerant safety considerations](#) before installation.

Certification



Assembled at a facility with
an ISO 9001:2015-certified
Quality Management
System



Safety

It is important to understand the safety symbols used in this manual. Read safety information carefully and follow all safety requirements to ensure correct installation.

Understanding safety symbols and instructions

Understand and pay particular attention to the signal words **DANGER**, **WARNING**, **CAUTION**, as well as the **NOTICE**, **Important**, and **Note** alerts.

DANGER indicates an **imminently** hazardous situation, which, if not avoided, **will result in death or serious injury**.

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

CAUTION indicates a **potentially** hazardous situation, which, if not avoided **may result in minor or moderate injury**. It is also used to alert against unsafe practices and hazards involving only property damage.

NOTICE indicates information considered important, but not hazard-related, such as messages relating to property damage.

Important indicates information that is essential to complete a task or may result in damage to the device if not followed.

Note indicates something of special interest or importance. Notes can contain any any type of information except safety information.

Safety requirements

Read these safety requirements carefully to ensure correct installation.

WARNING

Improper installation may create a condition where the operation of the product could cause personal injury or property damage. Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual for assistance. For additional information, consult a qualified installer or service agency.

WARNING

The furnace area must not be used as a broom closet or for any other storage purposes, as a fire hazard may be created. Never store items such as the following on, near, or in contact with the furnace.

1. Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners, or other cleaning tools
2. Soap powders, bleaches, waxes or other cleaning compounds; plastic items or containers; gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids or other volatile fluid
3. Paint thinners and other painting compounds
4. Paper bags, boxes, or other paper products

Never operate the furnace with the blower door removed. To do so could result in serious personal injury and/or equipment damage.

 WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children must be supervised to ensure that they do not play with the appliance.

 CAUTION

This product must be installed in strict compliance with the enclosed installation instructions and any applicable local, state, and national codes including but not limited to building, electrical, and mechanical codes.

 CAUTION

This unit uses a mildly flammable (A2L) refrigerant. See [A2L refrigerant safety considerations](#) to ensure safe installation and operation of this unit.

NOTICE

If applying this coil with an oil furnace, a 6 in. long section of duct is required between leaving-air opening of the furnace and the entering-air end of the coil.

A2L refrigerant safety considerations

 CAUTION

You must read all of this section before installing this unit.

 WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example, open flames, an operating gas appliance, or an operating electric heater).

Do not pierce or burn

Be aware that refrigerants may not contain an odor.

⚠ WARNING

Any required ventilation openings must be kept clear of obstruction.

⚠ WARNING

Auxiliary devices which may be a potential ignition source shall not be installed in the duct work, unless they have been approved by the appliance manufacturer or are suitable for use with the refrigerant being used.

Examples of such potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching devices.

⚠ WARNING

Any indoor field-made refrigerant joints shall be tightness tested with no leaks detected. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 25% of the maximum allowable pressure.

Note to the Inspector

The *A2L refrigerant safety considerations* section contains considerations unique to R-454B refrigerant installations and include field-testing the refrigerant detection system (RDS).

General

Table 1: Safety considerations

Item number	Safety consideration
1	Any room with an appliance containing more than 3.91 lb in a refrigerating circuit must be constructed such that any refrigerant leak cannot stagnate in a way that would create a fire or explosion hazard.
2	Before beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, item 3 to item 7 below must be adhered to before conducting work on the system.
3	Work must be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
4	Instruct all maintenance staff and others working in the local area on the nature of work being carried out. Avoid work in confined spaces.
5	The area must be checked with an appropriate refrigerant detector before and during work to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants: non-sparking, adequately sealed, or intrinsically safe.
6	If conducting any hot work on the refrigerating equipment or any associated parts, you must have appropriate fire-extinguishing equipment on hand. Have a dry powder or CO ₂ fire extinguisher adjacent to the charging area.

Table 1: Safety considerations

Item number	Safety consideration
7	If conducting work in relation to the refrigerating system that involves exposing any pipework, do not use any sources of ignition in such a manner that may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, must be kept sufficiently far away from the site of installation, repair, removal, and disposal, during which refrigerant might possibly be released to the surrounding space. Before conducting any work, survey the area around the equipment to ensure that there are no flammable hazards or ignition risks. Display "No Smoking" signs.
8	Ensure the area is in the open or that it is adequately ventilated before opening the system or while conducting any hot work. The ventilation must safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
9	Ensure that the sensor is not obstructed in any way.

Room size requirements

WARNING

If the unit must be installed in a residence with a minimum room area less than what is determined to be the minimum from [Table 2](#), then that room must also not have any continuously operating open flames or other potential ignition sources. A device with a continuous pilot light may be present if that device is provided with an effective flame arrest.

Note: Minimum installation height (X and W) is not applicable to this model series.

Table 2: Minimum room area

System charge (lb - oz)	Minimum room area (ft ²)	Minimum total conditioned room area (ft ²) (Z)	Minimum total conditioned room area (m ²) (Y)	Minimum airflow (CFM)
4-0	200	120	11.14	216
5-0	250	150	13.93	271
6-0	300	180	16.72	325
7-0	350	210	19.50	379
8-0	400	240	22.29	433
9-0	450	270	25.08	487
10-0	499	300	27.86	541
11-0	549	330	30.65	595
12-0	599	360	33.43	649
13-0	649	390	36.22	704
14-0	699	420	39.01	758
15-0	749	450	41.79	812
16-0	799	480	44.58	866
17-0	849	510	47.37	920
18-0	899	540	50.15	974
19-0	949	570	52.94	1028
20-0	999	600	55.72	1082
21-0	1049	630	58.51	1136

Note:

- Minimum total conditioned room area refers to the combined area of all air conditioned rooms in the residence.

If the system charge is not listed in the above table, use the formulas below to calculate the respective values:

- Minimum conditioned room area (ft²) = system charge x 29.9903
- Minimum conditioned room area (m²) = system charge x 2.786
- Minimum system airflow (CFM) = system charge x 54.117

Altitude adjustment factors

If the unit is being installed at an elevation or altitude of 2600 ft (800 m) or higher, adjust the total conditioned room area (TA_{min}) in the minimum room area table by multiplying it by the altitude adjustment factor in [Table 3](#) below:

Table 3: Altitude adjustment factor (feet and meters)

$H_{alt}(ft)$	$H_{alt}(m)$	Altitude adjustment factor
0-2600	0-800	1.00
2600	800	1.02
3300	1000	1.05
4000	1200	1.07
4600	1400	1.10
5200	1600	1.12
5900	1800	1.15
6600	2000	1.18
7200	2200	1.21
7900	2400	1.25
8500	2600	1.28
9200	2800	1.32
9800	3000	1.36
10500+	3200+	1.40

Mechanical ventilation

Table 4: Mechanical ventilation

Item number	Safety consideration
1	If installing the unit in a residence below the determined total conditioned area from Table 2 , then extra mechanical ventilation is required.

Refrigerant equipment checks

Table 5: Refrigerant equipment checks

Item number	Safety consideration
1	Where electrical components are being changed, they must be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines must be followed. If in doubt, consult the manufacturer's technical department for assistance.
2	<p>Apply the following checks to installations using flammable refrigerants:</p> <ul style="list-style-type: none"> • Ensure the actual refrigerant charge is in accordance with the room size within which the refrigerant-containing parts are installed. • Ensure the ventilation machinery and outlets are operating adequately and are not obstructed. • Ensure marking on the equipment continues to be visible and legible. Correct any markings and signs that are illegible. • Install refrigerating pipe or components in a position where they are unlikely to be exposed to any substance that may corrode refrigerant-containing components, unless the components are constructed of materials that are inherently resistant to being corroded or are suitably protected against being corroded.

Electrical devices checks

Table 6: Electrical devices checks

Item number	Safety consideration
1	Repair and maintenance to electrical components must include initial safety checks and component inspection procedures.
2	If a fault exists that could compromise safety, then do not connect any electrical supply to the circuit until the fault is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, use an adequate temporary solution. This must be reported to the owner of the equipment so all parties are advised.
3	<p>Initial safety checks must include:</p> <ul style="list-style-type: none"> • Ensure capacitors are discharged: take care to avoid the possibility of sparking. • Ensure no live electrical components and wiring are exposed while charging, recovering, or purging the system. • Ensure there is continuity of earth bonding.

Detection of refrigerant

Table 7: Detection of refrigerant

Item number	Safety consideration
1	Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. Do not use a halide torch or any other detector using a naked flame.
2	<p>The following leak detection methods are deemed acceptable for all refrigerant systems.</p> <ul style="list-style-type: none"> Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate or may need re-calibration. Calibrate the detection equipment in a refrigerant-free area. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Set leak detection equipment at a percentage of the LFL of the refrigerant and calibrate to the refrigerant employed. Ensure the appropriate percentage of gas with a maximum of 25% is confirmed. Leak detection fluids are also suitable for use with most refrigerants but avoid the use of detergents containing chlorine as the chlorine may react with the refrigerant and corrode the copper pipework. Examples of leak detection fluids are bubble method and fluorescent method agents.
3	If a leakage of refrigerant is found that requires brazing, recover all of the refrigerant from the system or isolate the leakage by means of shut-off valves in a part of the system remote from the leak. Remove refrigerant according to the <i>Removal and evacuations</i> section of the outdoor unit's <i>Installation Manual</i> .

Decommissioning

Before you begin:

Before attempting the procedure, complete the following:

- Ensure that the technician is completely familiar with the equipment and all its detail.
- Ensure to safely recover all refrigerants.
- Take an oil and refrigerant sample, in case analysis is required before reusing the recovered refrigerant.
- Ensure that electrical power is available.
- Ensure that mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- Ensure that all personal protective equipment is available and being used correctly.
- Ensure that the recovery process is supervised at all times by a competent person.
- Ensure that recovery equipment and cylinders conform to the appropriate standards.

Follow the steps below to ensure the unit is correctly and safely decommissioned:

1. Isolate the system electrically.
2. Connect a recovery machine to remove refrigerant from the system.
3. Ensure that the cylinder is situated on the scales before recovery takes place.
4. Start the recovery machine and operate in accordance with instructions provided with the machine.

Note:

- Do not overfill cylinders to more than 80% volume liquid charge.
 - Do not exceed the maximum working pressure of the cylinder, even temporarily.
5. When the cylinders have been filled correctly and the process completed, ensure that the cylinders and the equipment are removed from the site promptly and that all isolation valves on the equipment are closed off.

- ❶ **Note:** Do not charge recovered refrigerant into another refrigerating system unless it has been cleaned and checked.

Label the equipment stating that it has been decommissioned and emptied of refrigerant. Date and sign the label. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating that the equipment contains a flammable refrigerant.

Wiring installation

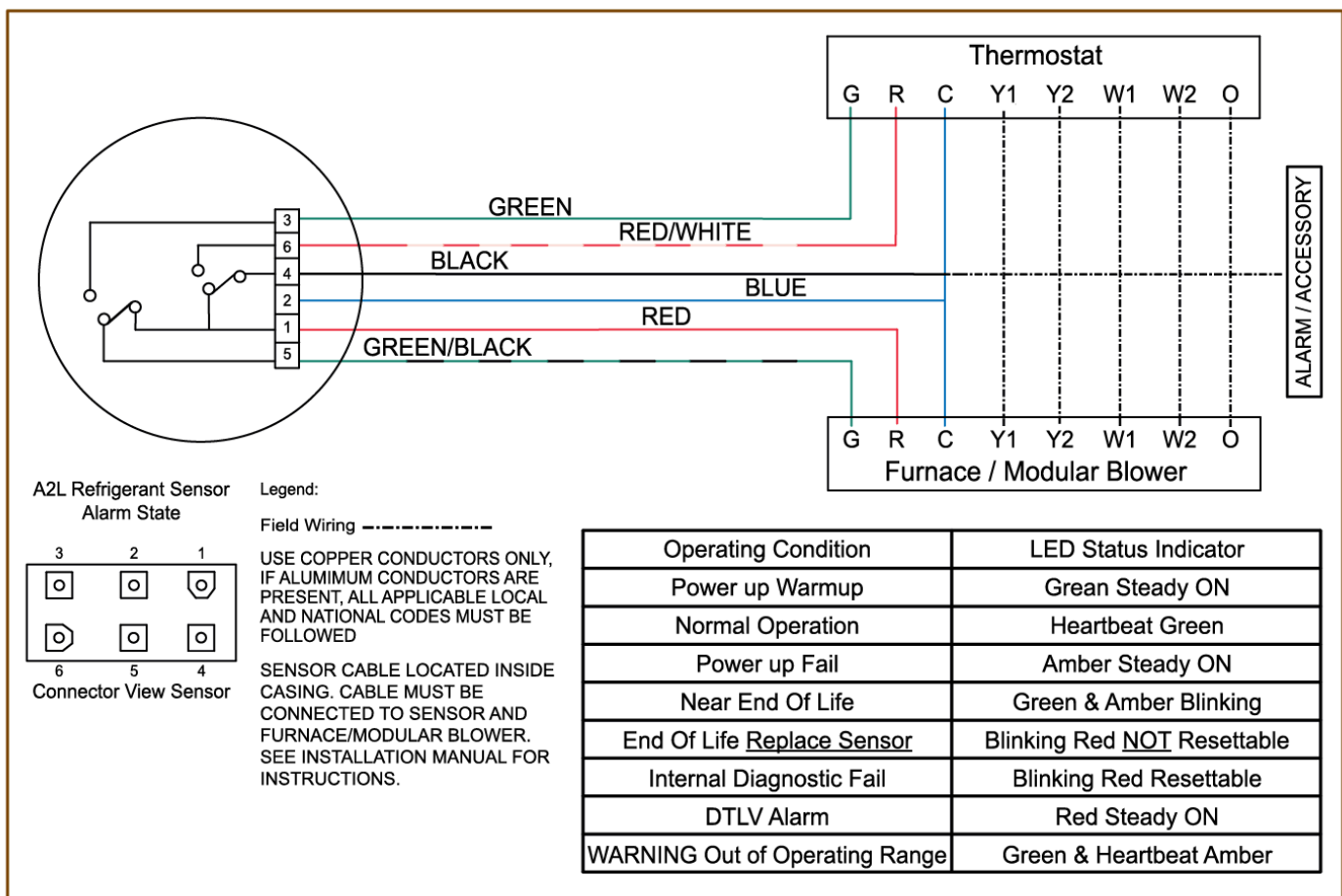
NOTICE

Cap unused wiring connections.

See [Connecting the wiring](#) for specific information on connecting the wiring for this coil and the chosen indoor and outdoor units.

- ❶ **Note:** The 6-pin sensor harness is included in the loose parts kit.

Figure 1: Refrigerant detection system wiring



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- ❶ **Note:** Pin #4/Black wire, Alarm/Accessory is energized with 24V in alarm state. This can be used to power an audible alarm or any other accessories.

Understanding RDS status codes and fault codes

If the coil model has a factory-installed refrigerant detection system (RDS), it is important to understand the RDS status codes and fault codes.

LED1 is located behind the sensor. The fault code can be viewed from the reflection on the delta plate.

- Status codes that indicate the state of the RDS
- Fault codes

Figure 2: Danfoss sensor LED backlight location

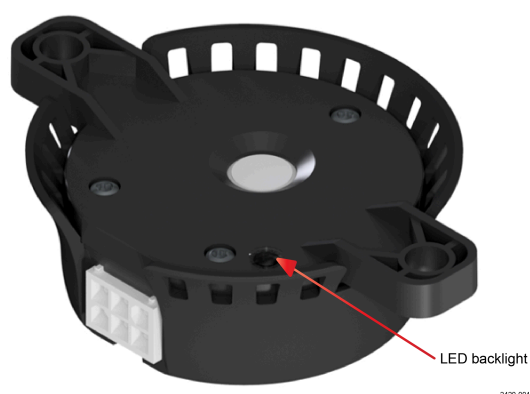


Table 8 gives an overview of the RDS status codes and fault codes and how they display.

Table 8: RDS status codes and fault codes

LED1 display	Description	Condition	Solution
Off	No power to A2L sensor	No power to A2L sensor	Supply power to unit.
Green steady ON	A2L sensor powered	No active faults, normal operation	No action needed.
Heartbeat green	A2L sensor powered and test mode on	Normal operation	No action needed.
Amber steady ON	Power up fail	A2L sensor failure has occurred and can be detected	Ensure that the A2L sensor is properly plugged in. Ensure that the A2L sensor harness is not damaged.

Table 8: RDS status codes and fault codes

LED1 display	Description	Condition	Solution
Red steady ON	Leak detected above 15% low flammable limit (LFL)	Sensor detects refrigerant above alarm level	<ol style="list-style-type: none"> 1. The owner is to notify service personnel as soon as possible. 2. Maintain power to the unit and try to keep the house ventilated by opening windows if possible. <p>① Note: There is potential for the A2L sensor to detect gas or propane leakage. If the service person cannot find a refrigerant leakage, check on the gas pipe for leaks, check on the other gas heat components for leaks, and make any necessary repairs.</p>
Green and amber blinking	Near end of life	No active faults, normal operation	No immediate action needed, but be sure to replace the sensor with the same part number of the current A2L sensor.
Blinking red resettable	Internal diagnostic fail	Sensor communicates failure	If this fault code occurs during normal operation, cycle the power of the unit. If the fault code remains, then replace the sensor with a new correct A2L sensor. The sensor may have this fault code if the unit is out of temperature range, humidity range, or is at its end of life.
Blinking red not resettable	End of life - replace sensor	Sensor communicates failure	If this fault code occurs during normal operation, then replace the sensor with the same part number of the current A2L sensor.
Green and heartbeat amber	WARNING - Out of operating range	Loss of communications with sensor	Ensure that the A2L sensor is properly plugged in. Ensure that the A2L sensor harness is not damaged.

Preparing for installation

Complete the necessary preparation before you begin the installation:

1. Inspect the unit and perform a pressure check.
2. Make sure that you are aware of the installation limitations.
3. Make sure that you are aware of the required clearances.
4. Become familiar with the unit components.
5. Check the unit dimensions.

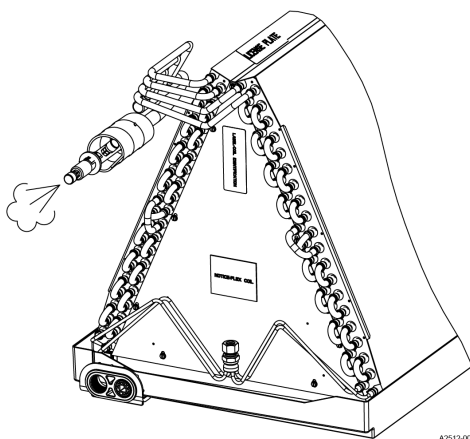
Inspecting the unit

As soon as you receive the coil, complete the following inspection checks:

1. Inspect the coil for possible damage caused during transit.
2. Check the drain pan for cracks or breakage.
3. If damage is evident, note the extent of the damage on the carrier's delivery receipt. Make a separate request for inspection by the carrier's agent in writing. Consult your local distributor for more information.
4. Check the coil to ensure it is still under pressure. See [Performing a pressure check](#).

Performing a pressure check

Figure 3: Pressure check



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1. Depress the Schrader valve core once to check for pressure.

Understanding installation airflow limitations

Install the coil in accordance with all national and local safety codes and the following airflow limits:

Table 9: BMAT coil airflow limits

Coil size	Outdoor unit (ton)	CFM limits	
		Minimum	Maximum
18	1 1/2	525	675
24	1 1/2	525	675
	2	700	900
30	2	700	900
	2 1/2	875	1125
36	2 1/2	875	1125
	3	1050	1350

Table 9: BMAT coil airflow limits

Coil size	Outdoor unit (ton)	CFM limits	
		Minimum	Maximum
42	3	1050	1350
	3 1/2	1225	1575
48	3	1050	1350
	3 1/2	1225	1575
	4	1400	1800
60	4	1600	1800
	5	1750	2250

Providing the required clearances

During installation, it is important to be aware of the required clearances.

Provide clearances for the following:

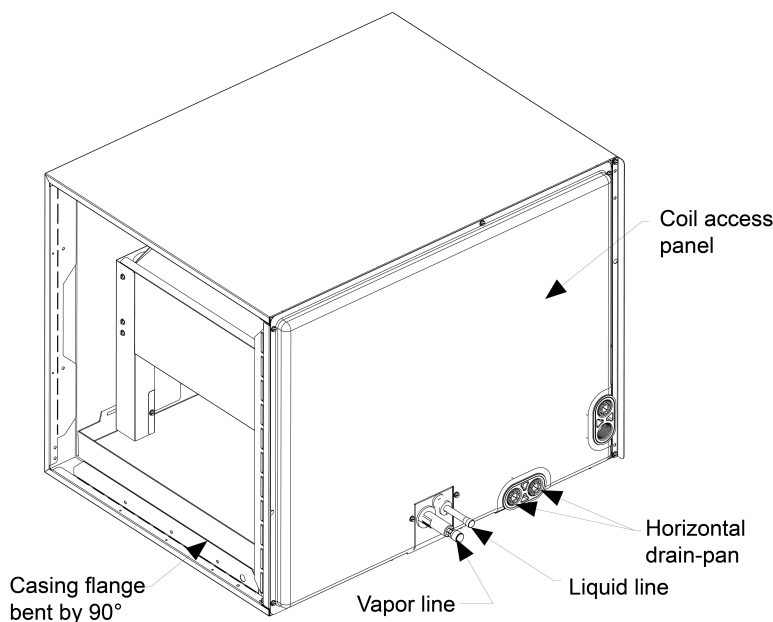
- Refrigeration piping and connections
- Maintenance and servicing access, including access for cleaning the coil
- Condensate drain line
- Removal of the coil assembly

Table 10: Required service clearances

Front	24 in.
Rear and sides	0 in.

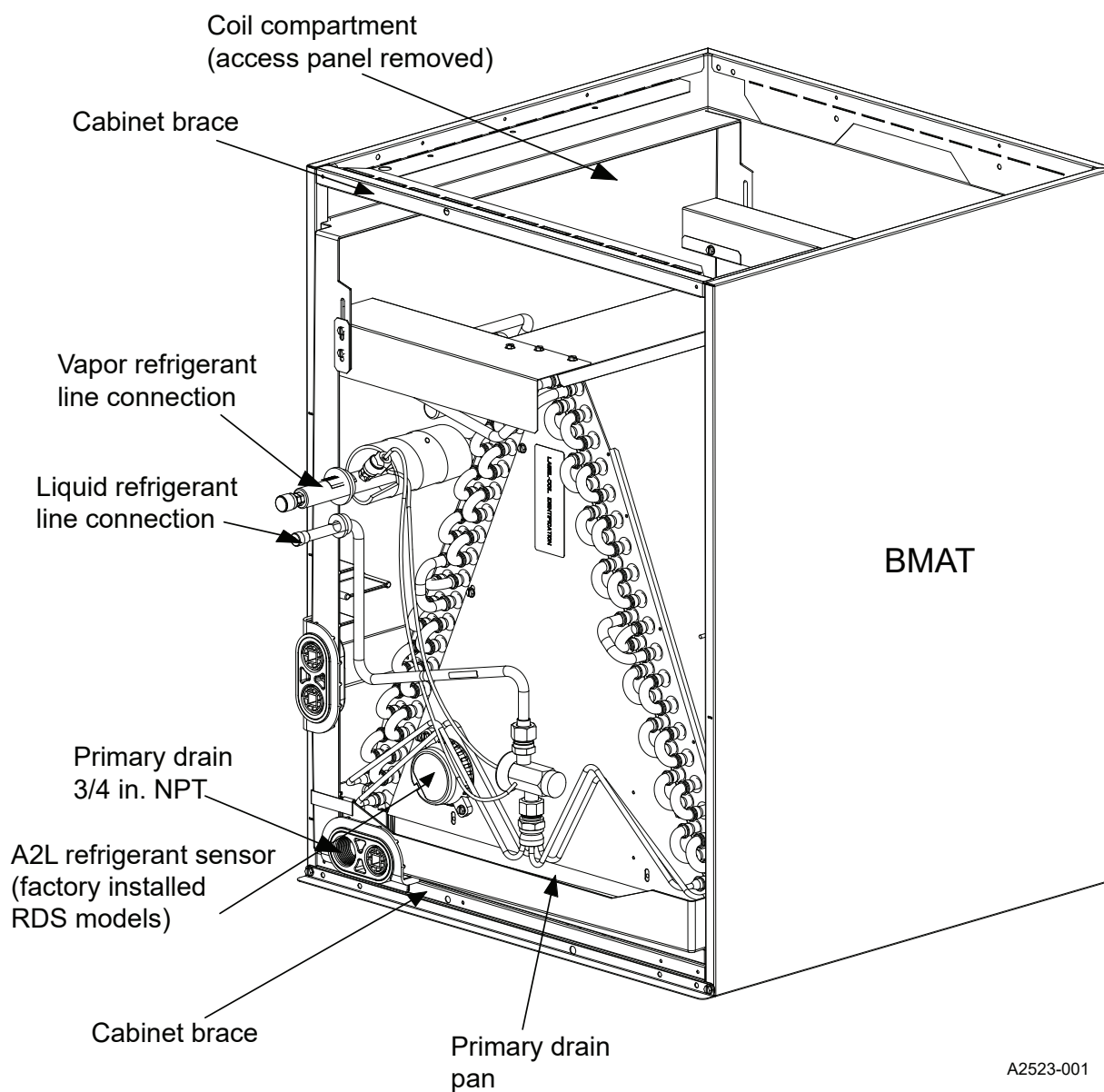
Becoming familiar with the unit components

Note: The 6-pin sensor harness is included in the loose parts kit.

Figure 4: Component location - BMAT full-cased horizontal left or right coil


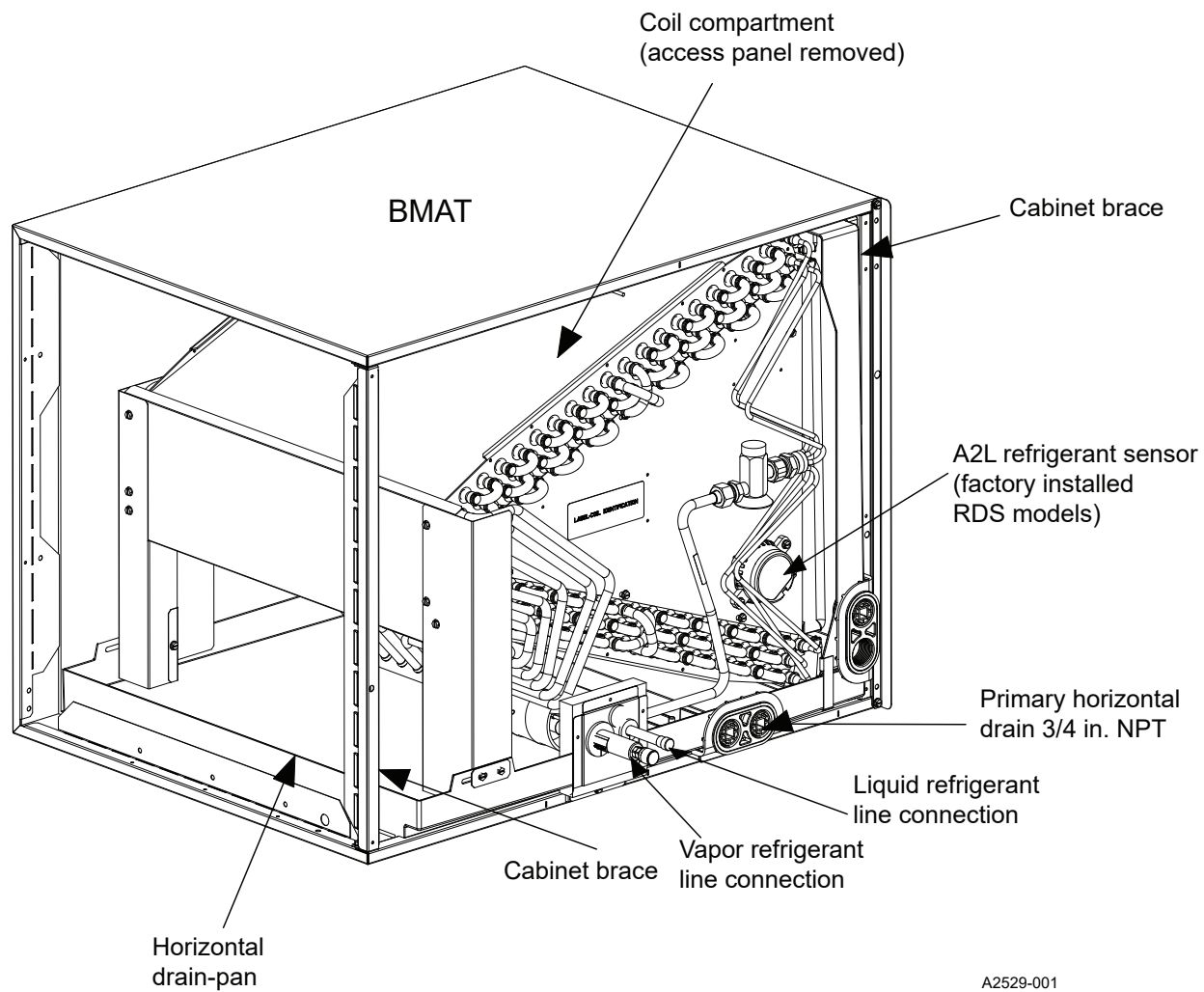
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Note: The 6-pin sensor harness is included in the loose parts kit.

Figure 5: Component location with access panel removed - BMAT coils vertical

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Figure 6: Component location with access panel removed - BMAT coils horizontal



Checking the unit dimensions

Use the following diagrams and tables to check the unit dimensions.

Figure 7: Dimensions - BMAT full-cased horizontal left or right coil

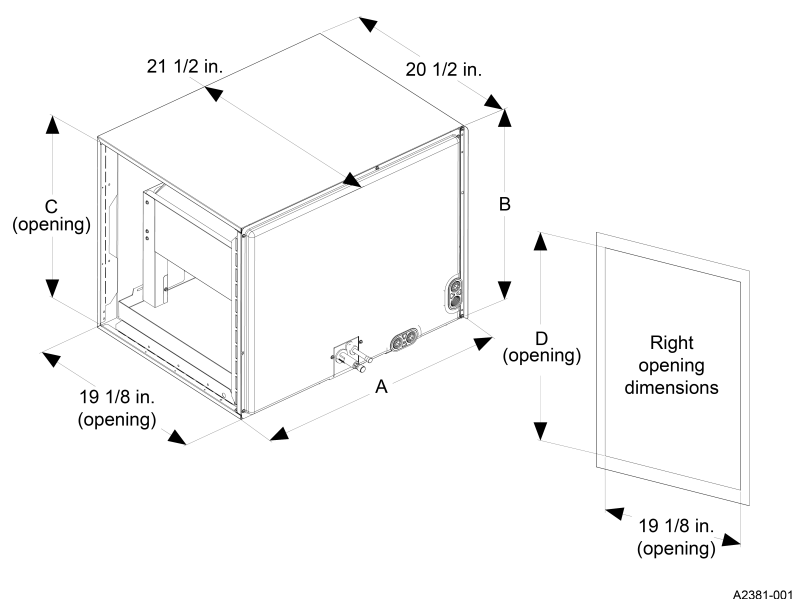


Table 11: Dimensions - BMAT full-cased horizontal left or right coil

Models	Dimensions				Refrigerant connections line size	
	Height A (in.)	Width B (in.)	Opening widths		Liquid (in.)	Vapor (in.)
BMAT18A5AASA	23	14 1/2	13 1/2	13 1/2	3/8	3/4
BMAT24A5ABSA	23	14 1/2	13 1/2	13 1/2		
BMAT24B5ABSA	23	17 1/2	16 1/2	16 1/2		
BMAT30B5ACSA	25 5/8	17 1/2	16 1/2	16 1/2		
BMAT30C5ACSA	27	21	20	20		
BMAT30B5AZSA	27	17 1/2	16 1/2	16 1/2		
BMAT36B5ADSA	25 5/8	17 1/2	16 1/2	16 1/2		
BMAT36B5CDSA	25 5/8	17 1/2	16 1/2	16 1/2		
BMAT36C5ADSA	27	21	20	20		
BMAT36C5CDSA	27	21	20	20		
BMAT42C5CESA	28 3/4	21	20	20		7/8
BMAT48C5CFSA	33	21	20	20		
BMAT60C5CGSA	37 1/4	21	20	20		
BMAT60C5CHSA	39	21	20	20		

Note:

- Refrigerant line sizes may require larger lines for extended line lengths. Refer to *Application Data part number 6802444*.
- The adapter fitting must be field installed for any refrigeration piping sizes not shown in the table.
- Refer to the *Technical Guide* for the outdoor unit for the correct refrigeration piping size.

Installing the unit

Complete the necessary steps to install the unit. The installation approach varies depending on what coil model you are installing.

Installing the coil: BMAT coils

It is important to understand the following to install BMAT coils correctly:

- How to use the duct flanges if needed
- The requirements for different installation applications

NOTICE

For maximum performance, if a BMAT coil is being installed in upflow or downflow orientation, it is recommended that the horizontal drain be removed from the assembly. This can be achieved by removing the horizontal drain pan support straps, cutting the foam gasket that seals the attachment point of the horizontal drain pan and primary drain pan, and removing the entire horizontal drain pan assembly.

Using the duct flanges: BMAT coils

Duct flanges are shipped with BMAT coils. If duct flanges are necessary, complete the following steps:

- ❶ **Note:** If you do not use the duct flanges, leave them as received from the factory, folded down or uninstalled.
1. For **integrated duct flanges**, fold the flanges outward and secure the flanges in place using screws as shown in [Figure 8](#). For **field-installed duct flanges**, attach the flanges shipped in the bag with the coil as shown in [Figure 9](#).
 2. Use the tie plates to secure the coil to the furnace as shown in [Figure 10](#) and [Figure 11](#).

NOTICE

For horizontal applications, the coil cabinet can be installed so that it is slightly pitched toward the front or drain connection end of coil. Ensure that the horizontal pan drains water adequately before completing the unit installation.

Figure 8: Duct flanges - BMAT coils

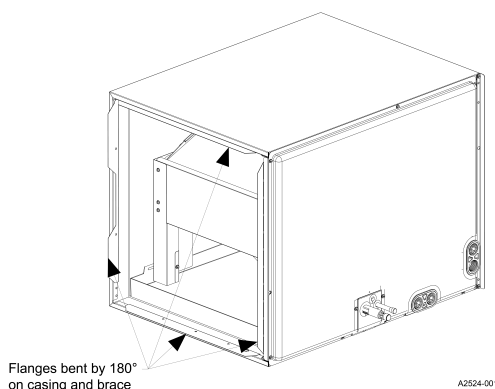


Figure 9: Field-installed duct flanges - BMAT coils

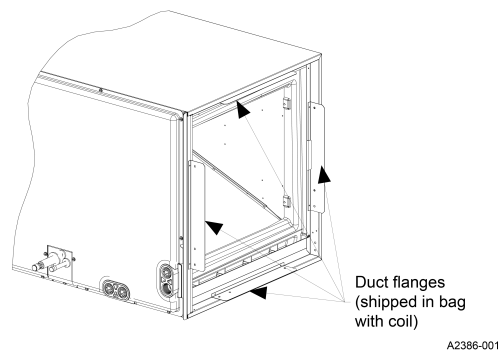
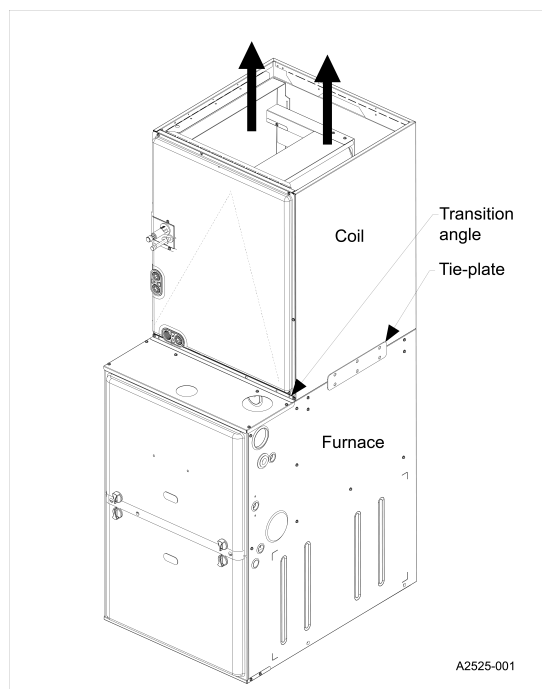
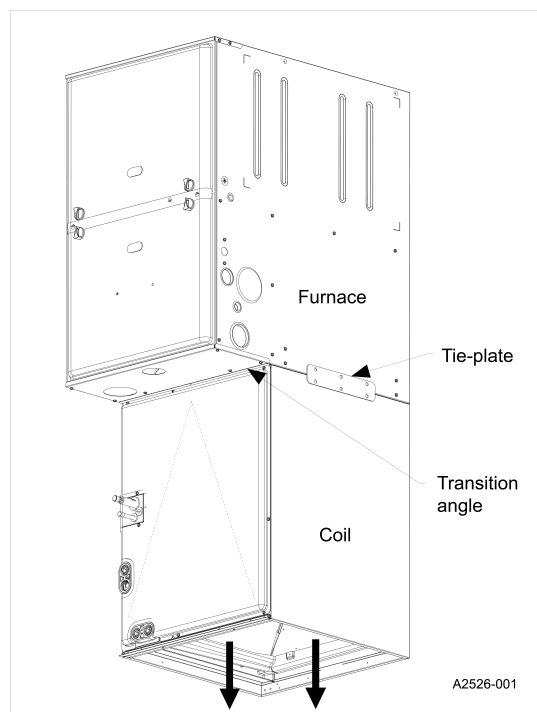


Figure 10: Vertical upflow applications with furnaces**Figure 11: Vertical downflow applications with furnaces**

Repositioning the transition angle

The coil cabinet has a factory-installed transition angle on the bottom front side of the cabinet. For **downflow applications with a furnace**, you must reposition this angle to the top front side of the cabinet.

1. Remove the two screws that fasten the transition angle to the bottom front side of the cabinet.
2. Remove the two screws from the top front side of the cabinet.
3. Remove the transition angle, rotate the transition angle 180° end for end, and secure the transition angle to the top front side of the cabinet.

Horizontal right and left applications: BMAT coils

See the following figures for an illustration of horizontal right and left applications of BMAT coils with furnaces.

Note: When positioning the BMAT coil for horizontal right or left application, set the unit so it is sloped 1/4 in. toward the drain plug.

Figure 12: BMAT horizontal right application with furnace

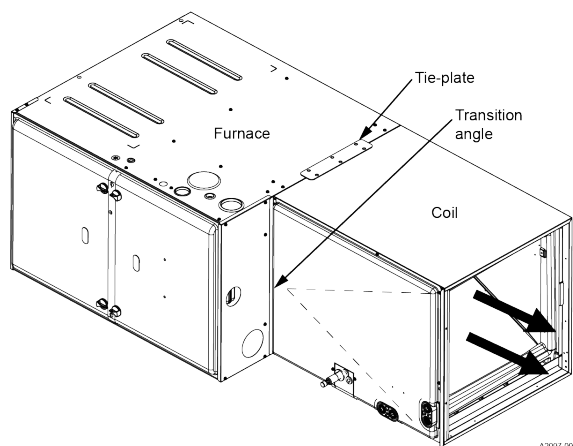
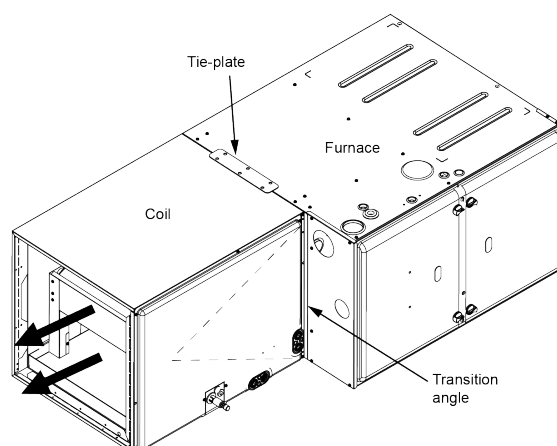
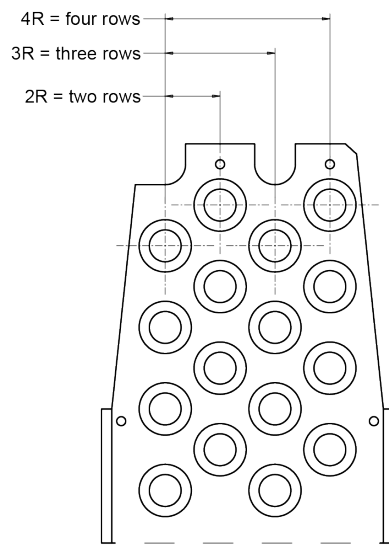


Figure 13: BMAT horizontal left application with furnace



NOTICE

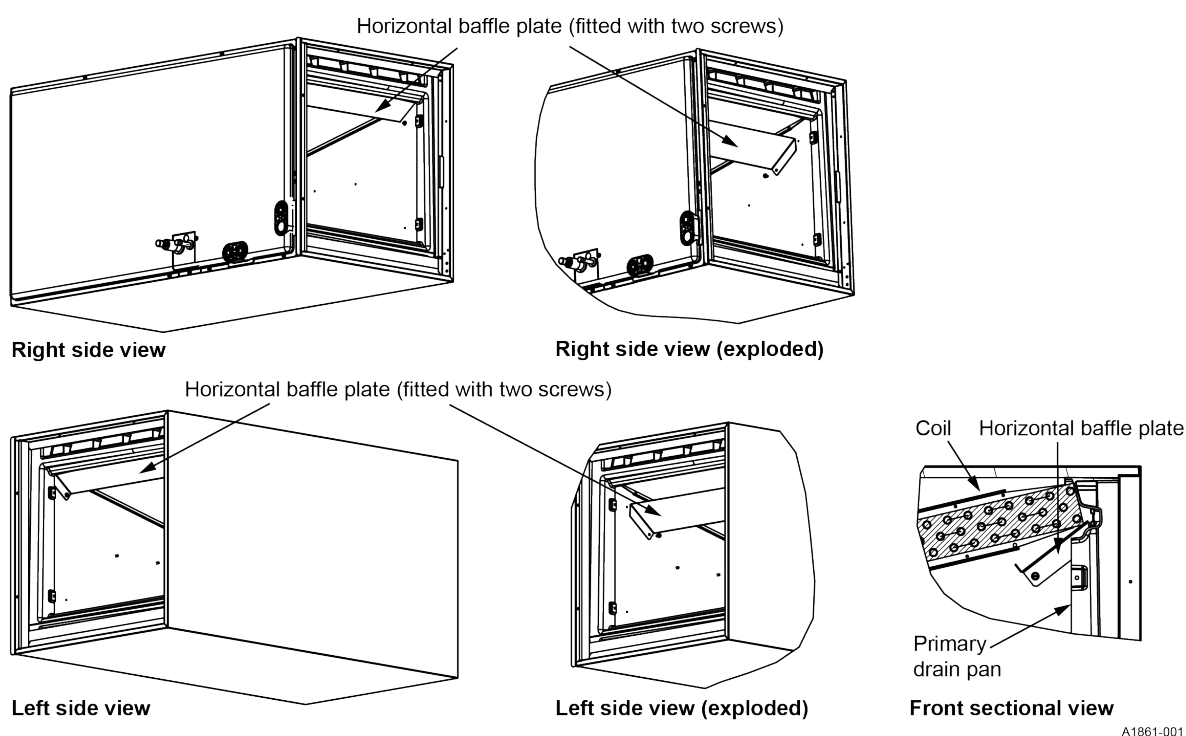
BMAT coils that have a three-row heat exchanger configuration have the risk of condensate blowing off of the heat exchanger fins into the outlet ductwork in horizontal right applications that require high airflow. See [Figure 14](#). The three-row heat exchanger models are BMAT***D, BMAT***E, BMAT***F, BMAT***G, and BMAT***H.

Figure 14: BMAT heat exchanger row configurations

Installing a horizontal baffle plate: BMAT60C*G and BMAT60C*H

If installing the unit in a horizontal right airflow application, a horizontal baffle plate may be required to eliminate any water blow-off issues. This only applies to the BMAT60C*G and BMAT60C*H models.

Complete the following steps and see [Figure 15](#) to install a horizontal baffle plate:

Figure 15: Horizontal baffle plate installation: BMAT60C*G and BMAT60C*H

Note: Only use a horizontal baffle plate on the BMAT60C*G and BMAT60C*H models.

1. With the coil removed from the cabinet and laying on its horizontal drain pan, locate the pre-drilled holes in the front and rear coil delta plates.
2. Insert the horizontal baffle plate into the end of the coil. Insert one end of the horizontal baffle plate into the top side of the primary drain pan.
3. Secure the horizontal baffle plate in place with two screws, one in the front delta plate and one in the rear delta plate.

Performing necessary connections

It is important to make the following connections during unit installation:

1. Connect the duct system.
2. Connect the refrigerant lines.
3. Connect the condensate drain.
4. Connect the wiring.

Connecting the duct system

You can handle air supply and return in several ways. Use the option best suited to the installation. You can use upflow, horizontal, or downflow applications.

Adhere to the following:

- The vast majority of problems encountered with heating and cooling systems can be linked to incorrectly designed or installed duct systems. To help ensure a successful installation, correctly design and install the duct system.
- Use flexible duct connectors to minimize the transmission of vibration or noise into the conditioned space.

WARNING

For BMAT coils, use 1/2 in. screws to connect duct work to cabinet. If pilot holes are drilled, drill only through field duct and unit flange.

- Where the return air duct is short or sound may be a problem, use acoustical duct liner inside the duct. You must insulate duct work that runs through an unheated space during the heating season or an uncooled space during the cooling season. It is best practice to use a vapor barrier to prevent absorption of moisture from the surrounding air into the insulation.
- Correctly size the supply air duct by using a transition to match the unit opening. Suspend all ducts using flexible hangers and never fasten ducts directly to the structure. Fabricate and install duct work in accordance with local and/or national codes. This includes the standards of the National Fire Protection Association for Installation of Air Conditioning and Ventilating Systems, NFPA No. 90B.

CAUTION

Equipment should never be operated without filters.

Connecting the refrigerant lines

CAUTION

The coil is under inert gas pressure. Relieve pressure from the coil by depressing the Schrader core at the end of the suction manifold stub-out.

NOTICE

Avoid handling aluminum coil components after handling the copper refrigeration piping or other tubing without first cleaning your hands.

NOTICE

Route the refrigeration piping to the coil in a manner that does not obstruct service access to the coil, air handling system, furnace flue, or filter.

Depending on the coil model and application, it is possible to connect the refrigerant lines in one of two ways: by brazing the connections or by using non-braze connections.

Some coil models have lines that are expanded to receive the field refrigeration piping, and some coil models have straight piping connections ready to accept braze-free connectors. You can still use these straight piping connections for brazing, but you need to expand the pipe in the field using a swage tool or alternatively you can use a sweat coupling.

Make suction and liquid line connections outside of the cabinet. Leave the tubing connection panel attached to the cabinet. If you are brazing the connections, remove the coil access panel.

Brazing the refrigerant lines

The following steps explain how to braze the refrigerant lines. For braze-free connections, see [Using braze-free refrigerant line connections](#).

CAUTION

Dry nitrogen should always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to insure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.

1. Remove the grommets where tubes exit the cabinet to prevent burning them during brazing. In some units, the vapor line grommet may be shipped as a loose part with the unit.
2. Cut the end of the suction tube using a tube cutter. Place the tube cutter as close as possible to the end of the tube to allow as much depth as possible for the connection and brazing of the suction line. To ensure that the suction line fits into the connection, deburr the stub-out, including inner pressure protrusion from cutting.

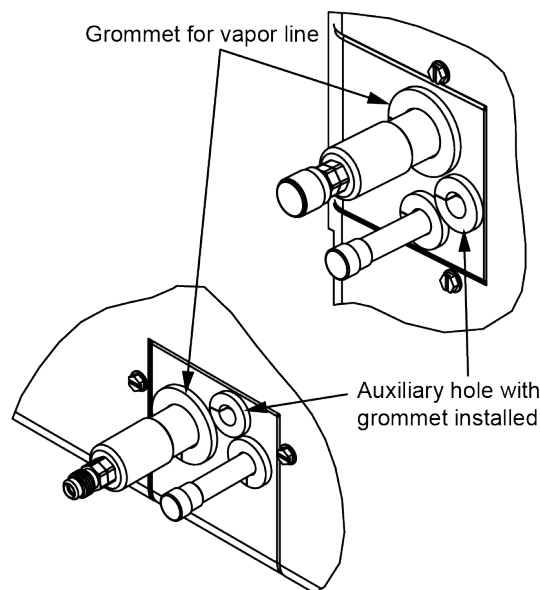
3. Remove the liquid line copper cap that is soft soldered onto the outside of the 3/8 in. stub protruding from the front of the coil cabinet tubing panel as follows:
 - a. Screw a sheet metal screw into the center of the cap.
 - b. Apply a small amount of heat to the cap while pulling on the screw using slip joint pliers.
4. Insert the liquid line and the suction line into the coil connections at the coil cabinet tubing panel.
5. Wrap a water-soaked rag around the coil connection tubes inside the cabinet to avoid transferring excess heat to the coil and the TXV.
6. Purge the refrigerant lines with dry nitrogen during brazing.

NOTICE

All indoor coil connections are copper-to-copper and must be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. **Do not** use soft solder.

7. Braze the suction line and the liquid line, and allow the joints to cool.
8. Secure the sensing bulb and equalizer line capillary tubes with nylon cable ties to prevent leaks from the tubes rubbing.
9. Install the grommets to the lines carefully to prevent air leakage. In some units, the vapor line grommet may be shipped as a loose part with the unit. See [Figure 16](#).
10. Refer to the *Installation Manual* for the outdoor unit and complete the leak check, evacuation, and charging according to the instructions provided. Check all field-brazed joints and metering device connections.
11. Locate the A2L refrigerant sensor mounted to the coil delta plate. Attach the sensor harness found in the loose parts kit to the sensor and create a drip loop in the harness where it plugs into the sensor. This action will keep condensation that may collect on the harness wire from flowing directly into the sensor.
12. Route the sensor wire through the extra hole in the tubing access panel.
13. Attach the coil access panel to the cabinet.
14. Ensure that lines are sound isolated by using appropriate hangers or strapping.

Figure 16: Vapor line grommet



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Using braze-free refrigerant line connections

The following steps explain how to use braze-free refrigerant line connections. For brazed connections, see [Brazing the refrigerant lines](#).

1. Remove the grommets where suction tube exits the cabinet. In some units, the vapor line grommet may be shipped as a loose part with the unit.
2. Remove the coil door but leave the tubing access panel in place.
3. Cut the end of the suction tube using a tube cutter. Place the tube cutter as close as possible to the end of the tube to allow as much straight tubing as possible for the braze-free connector. Deburr the stub-out after cutting.
4. Cut the end of the liquid line using a tube cutter. Place the tube cutter as close as possible to the end of the tube to allow as much straight tubing as possible for the braze-free connector. Deburr the stub-out after cutting.
5. Fit a braze-free connector and the field suction line into the coil suction line connection at the coil cabinet tubing panel. Complete the suction line connection.
6. Fit a braze-free connector and the field liquid line into the coil liquid line connection at the coil cabinet tubing panel. Complete the liquid line connection.
7. Secure the TXV sensing bulb and equalizer line capillary tubes with nylon cable ties to prevent leaks from the tubes rubbing.
8. Install the grommets to the lines carefully to prevent air leakage. In some units, the vapor line grommet may be shipped as a loose part with the unit. See [Figure 16](#).
9. Refer to the *Installation Manual* for the outdoor unit and complete the leak check, evacuation, and charging according to the instructions provided. Check all field braze-free connection joints and metering device connections.
10. Locate the A2L refrigerant sensor mounted to the coil delta plate. Attach the sensor harness found in the loose parts kit to the sensor and create a drip loop in the harness where it plugs into the sensor. This action will keep condensation that may collect on the harness wire from flowing directly into the sensor.
11. Route the sensor wire through the extra hole in the tubing access panel.
12. Attach the coil access panel to the cabinet.
13. Use appropriate hangers or strapping to ensure that the lines are sound isolated.

Connecting the condensate drain

Adhere to the following:

- Pitch all drain lines 1/4 in./ft away from the unit drain pan and make sure that the drain lines are no smaller than the coil drain connection.
- Route the drain line so that it does not impede access to the coil, furnace, or filter and is not exposed to freezing temperatures.
- Instruct the homeowner that the indoor coil drain pan must be inspected and cleaned regularly to prevent odors and ensure proper drainage.

NOTICE

For BMAT coils, when the coil is installed in an attic or above a finished ceiling, an auxiliary drain pan must be provided under the coil as is specified by most local building codes.

- Install the coil level or pitched slightly toward the drain end. Suggested pitch must not exceed 1/4 in./ft of coil.
- Note that you can remove drain plugs using a standard 3/8 in. drive socket ratchet or needle-nose pliers.

- If the coil has a secondary drain, pipe it to a location that gives the occupant a visual warning that the primary drain is clogged. If a secondary drain is not used, you must plug the secondary drain. See [Figure 17](#), [Figure 18](#).

⚠ CAUTION

Avoid double trapping.

⚠ CAUTION

Threaded drain connections must be hand tightened, plus no more than one turn.

- Do not use PTFE tape, pipe thread compound, or other sealants. Use of a sealant can cause damage and premature failure of the drain pan.

Figure 17: Drain traps

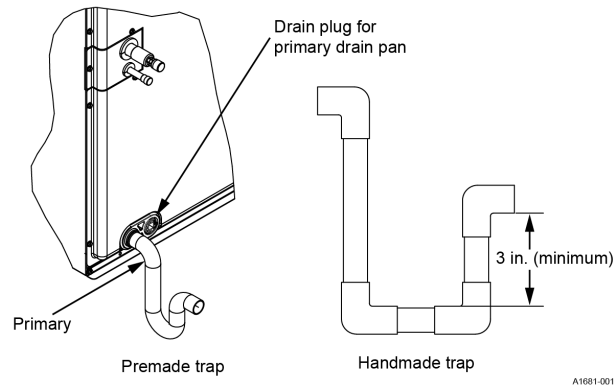
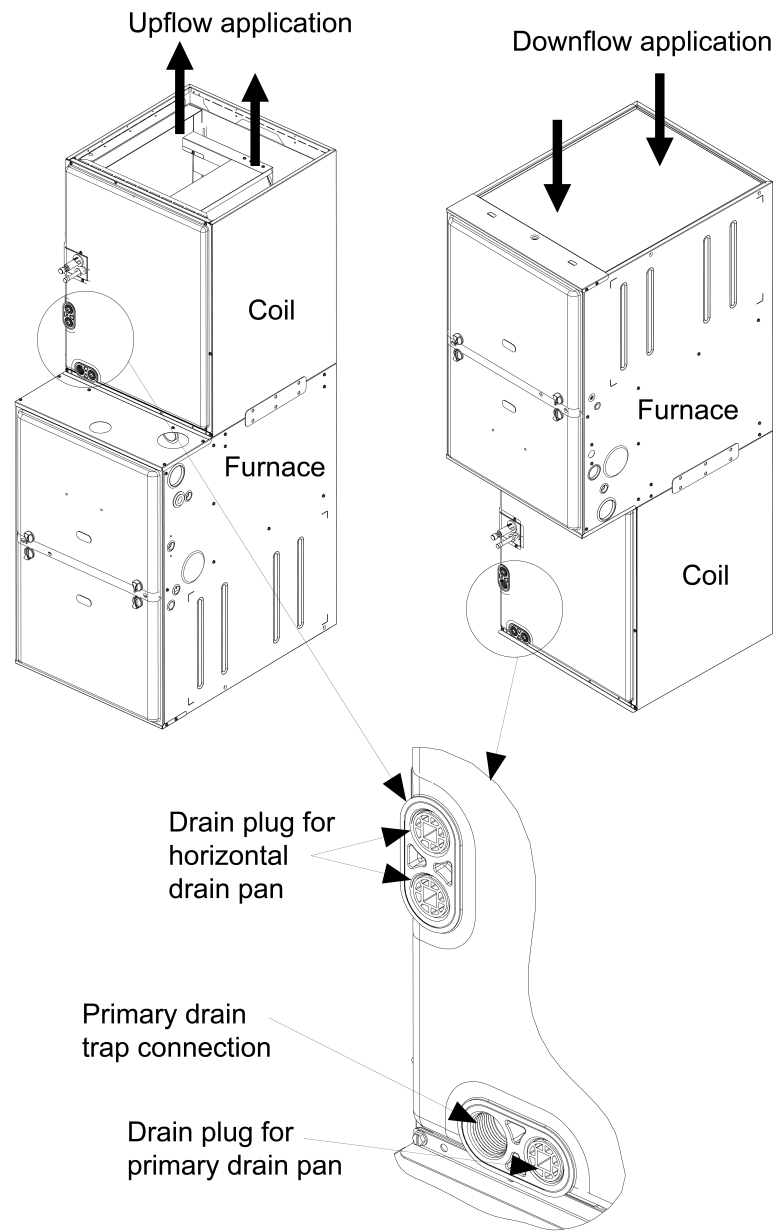
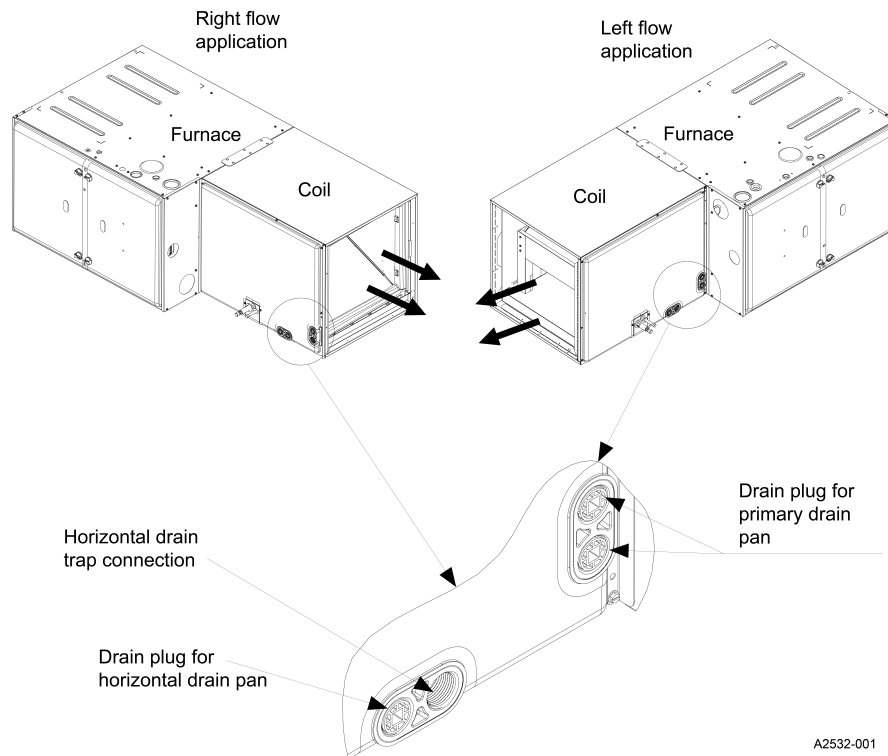


Figure 18: Location of coil trapped and plugged drain connections with furnace - BMAT upflow and downflow applications



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Figure 19: Location of coil trapped and plugged drain connections with furnace - BMAT horizontal applications



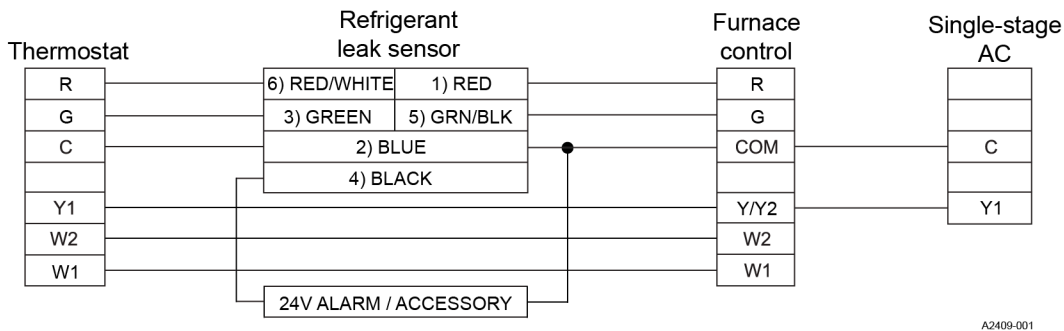
① **Note:** Verify that all drains are tapped or plugged.

Connecting the wiring

If installing a refrigerant detection system (RDS) to use this coil with R454B A2L refrigerant, refer to the RDS kit *Accessory Installation Manual* for control and sensor installation, and field wiring connections. If the coil is already equipped with a RDS, use the [Control wiring diagrams](#) for the connection of room thermostat, indoor air mover, and outdoor section.

Control wiring diagrams

Figure 20: Control wiring - standard ECM gas furnace and standard single-stage air conditioner - conventional wiring



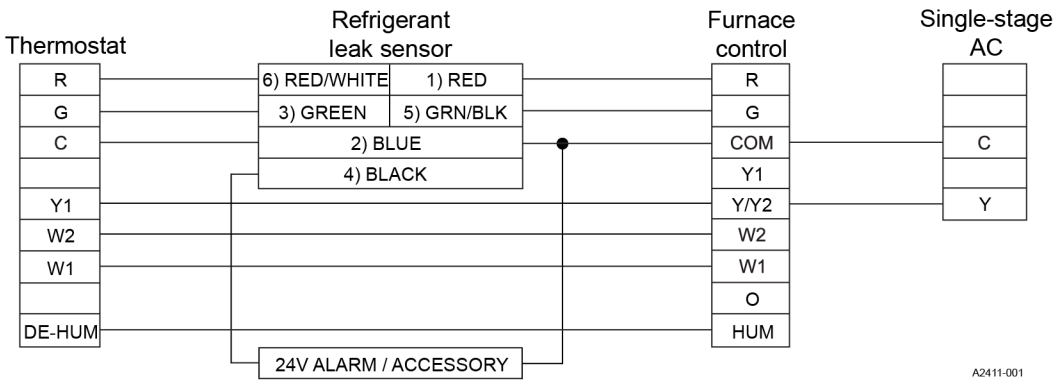
NOTICE

Refrigerant leak sensor 4) Black wire will be powered (24V) any time unit refrigerant detection system is in an alarm state.

W2 applicable on multi-stage gas furnace models only.

Cap any unused wires from the refrigerant leak sensor.

Figure 21: Control wiring - variable ECM gas furnace and standard single-stage air conditioner - conventional wiring



NOTICE

Refrigerant leak sensor 4) Black wire will be powered (24V) any time the unit refrigerant detection system is in an alarm state.

W2 applicable on multi-stage gas furnace models only.

If the humidistat is used for dehumidification input on the furnace control, the humidistat setting must be changed from NO to YES.

Cap any unused wires from the refrigerant leak sensor.

Adjusting the airflow

You must check and adjust airflow as required. Refer to the furnace or modular air handler *Installation Manual* for more information. To check the CFM, measure the static pressure drop across the coil using a portable manometer and static pressure tips. The entering and leaving air ends of the BMAT coils have provisions for inserting a 1/4 in. tube for a pressure measurement using a manometer. These access points are for reference only. See [Figure 22](#).

NOTICE

[Table 12](#) to [Table 13](#) have **dry coil** data. Run the system indoor fan only for approximately 15 min before taking measurements to assure a dry coil.

1. Prepare the coil for static pressure drop measurements by running the system indoor fan for approximately 15 min to ensure that the coil is dry.
2. With the indoor blower running at the appropriate speed for equipment operation, use a scratch awl to puncture or pierce the insulation material in the appropriate cabinet brace depending on the indoor coil location. Insert the static pressure tips and capture the internal coil pressure drop.
3. See the relevant coil airflow data in [Table 12](#) to [Table 13](#) to determine the airflow and make the necessary adjustments to keep the CFM within the airflow limitations of the coil.
4. After capturing airflow data and selecting the correct blower speed, seal the holes appropriately to prevent air leakage.

Figure 22: Pressure measurement access points

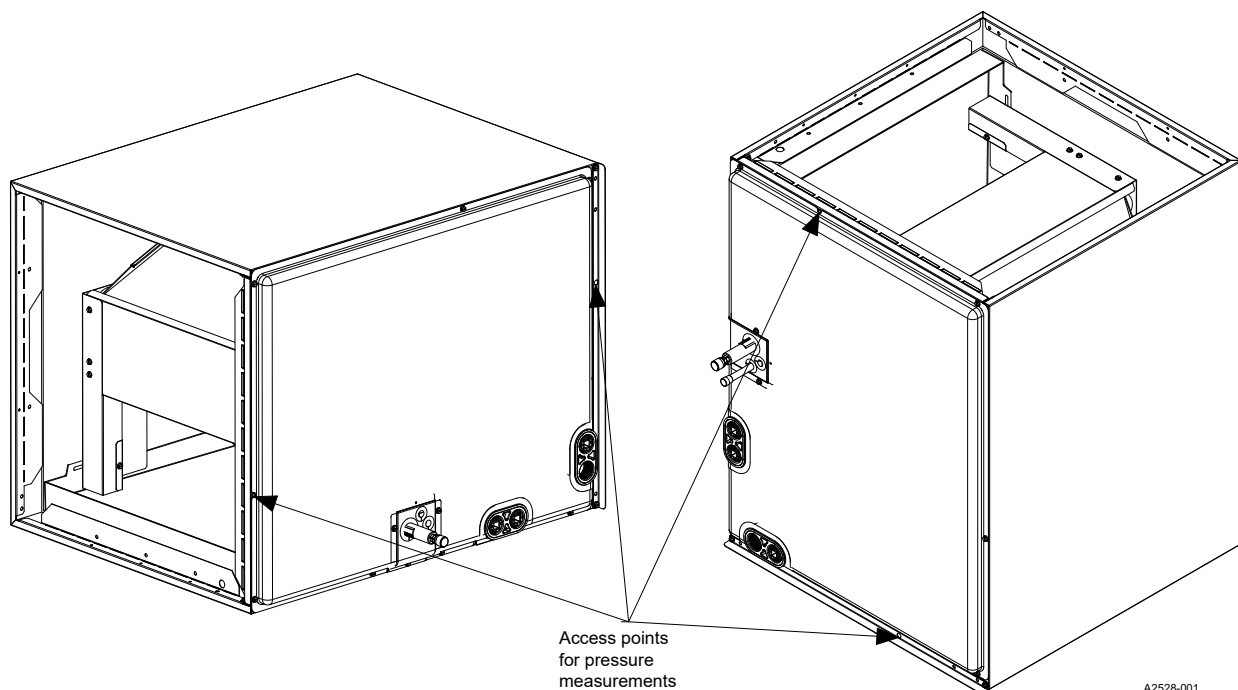
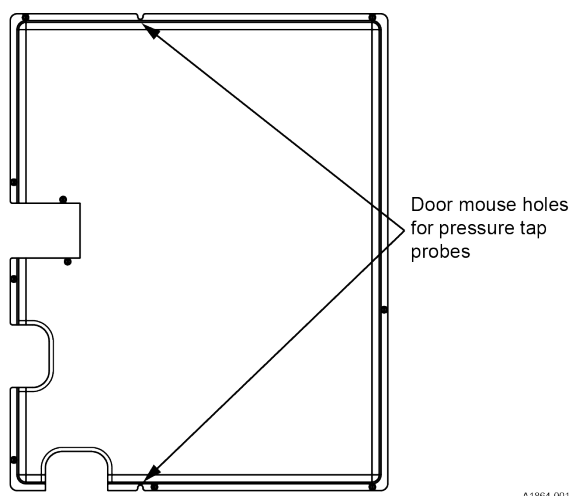
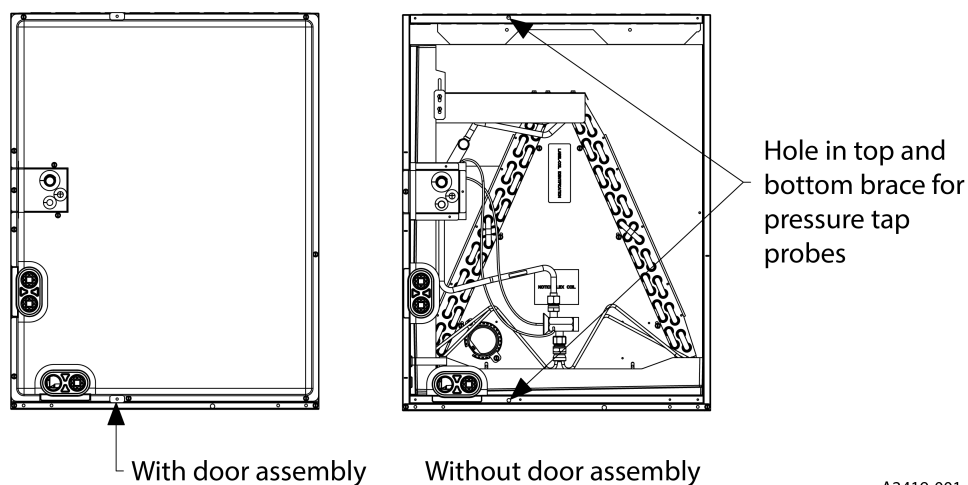


Figure 23: Door mouse holes

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Figure 24: Pressure tap tips

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Table 12: BMAT airflow data (CFM) - horizontal left

Models	CFM								
	400	600	800	1000	1200	1400	1600	1800	2000
	Coil pressure drop (in. W.C.)								
BMAT18A5*A	0.07	0.14	0.21	—	—	—	—	—	—
BMAT24A5*B	0.06	0.13	0.21	0.30	—	—	—	—	—
BMAT24B5*B	0.05	0.09	0.14	0.20	—	—	—	—	—
BMAT30B5*C	0.04	0.08	0.13	0.19	0.26	—	—	—	—
BMAT30C5*C	0.04	0.07	0.11	0.14	0.20	—	—	—	—
BMAT30B5*Z	0.04	0.08	0.13	0.20	0.28	—	—	—	—
BMAT36B5*D	0.05	0.11	0.18	0.25	0.36	0.49	—	—	—
BMAT36C5*D	0.04	0.07	0.12	0.16	0.23	0.31	—	—	—
BMAT42C5*E	0.03	0.07	0.11	0.15	0.22	0.28	0.37	—	—
BMAT48C5*F	0.03	0.06	0.09	0.13	0.19	0.25	0.32	0.40	—
BMAT60C5*G	0.02	0.05	0.08	0.12	0.17	0.23	0.30	0.37	0.45
BMAT60C5*H	0.02	0.05	0.08	0.12	0.17	0.23	0.30	0.37	0.46

① Note:

- Airflow data is for dry coil conditions only, tested without filters.
- For optimal performance, total system external static pressures of 0.2 in. W.C. to 0.6 in. W.C. are recommended. Applications above 0.6 in. W.C. are not recommended.

Table 13: BMAT airflow data (CFM) - horizontal right

Models	CFM								
	400	600	800	1000	1200	1400	1600	1800	2000
	Coil pressure drop (in. W.C.)								
BMAT18A5*A	0.07	0.14	0.23	—	—	—	—	—	—
BMAT24A5*B	0.06	0.13	0.21	0.31	—	—	—	—	—
BMAT24B5*B	0.05	0.09	0.15	0.20	—	—	—	—	—
BMAT30B5*C	0.04	0.08	0.13	0.18	0.25	—	—	—	—
BMAT30C5*C	0.04	0.07	0.11	0.15	0.20	—	—	—	—
BMAT30B5*Z	0.04	0.10	0.17	0.26	0.37	—	—	—	—
BMAT36B5*D	0.05	0.11	0.17	0.25	0.35	0.48	—	—	—
BMAT36C5*D	0.04	0.07	0.12	0.16	0.23	0.30	—	—	—
BMAT42C5*E	0.03	0.07	0.11	0.15	0.21	0.28	0.37	—	—
BMAT48C5*F	0.03	0.06	0.10	0.14	0.20	0.26	0.34	0.43	—
BMAT60C5*G	0.03	0.06	0.09	0.13	0.19	0.25	0.33	0.41	0.50
BMAT60C5*H	0.03	0.06	0.09	0.13	0.19	0.25	0.33	0.40	0.49

① Note:

- Airflow data is for dry coil conditions only, tested without filters.
- For optimal performance, total system external static pressures of 0.2 in. W.C. to 0.6 in. W.C. are recommended. Applications above 0.6 in. W.C. are not recommended.

Maintaining the unit

⚠ CAUTION

Ensure adequate precautions are taken to protect electrical components and structure from liquid.

If cleaning the coil as part of a future maintenance or servicing schedule, clean the coil with water or use Evap-Green by Nu-Calgon as an alternative to water. Evap-Green is the only pH neutral coil cleaner approved for use when correctly diluted.

- ① Note:** Rinse coils thoroughly after using Evap-Green for cleaning.

Service and disposal

Comply with national regulations. Components and accessories from the units are not part of ordinary domestic waste. Complete units, compressors, motors etc. are only to be disposed of via qualified disposal specialists. This unit uses flammable refrigerant R-454B. Please contact the dealer when you want to dispose of this unit. Law requires that the collection, transportation and disposal of refrigerants must conform with the regulations governing the collection and destruction of hydrofluorocarbons.

Online help resources

Alternatively, please visit our Service and Support webpage to find FAQs, videos, service bulletins, and more; bosch-homecomfort.us/service or use your cellphone to scan the code below.



Contact information

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