

INSTALLATION MANUAL

**UNCASED “N” COILS
UPFLOW FOR COOLING/HEAT PUMPS
FLEX COILS FOR FIELD INSTALLED METERING
DEVICES
MODELS: CU**



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SECTION I: GENERAL

This instruction covers the installation of the following coils with 80+ or 90+ AFUE furnaces.

The coils have sweat connect fittings. All coils are shipped with a low pressure inert gas holding charge.

SECTION II: SAFETY



This is a safety alert symbol. When you see this symbol on labels or in manuals, be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER**, **WARNING**, or **CAUTION**.

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 indicated 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.

▲ 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

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 or additional information, consult a qualified installer or service agency.

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.

INSPECTION

As soon as a coil is received, it should be checked to insure it is still under pressure per Figure 1. The coil should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's delivery receipt. A separate request for inspection by the carrier's agent should be made in writing. See Local Distributor for more information. Check drain pan for cracks or breakage.

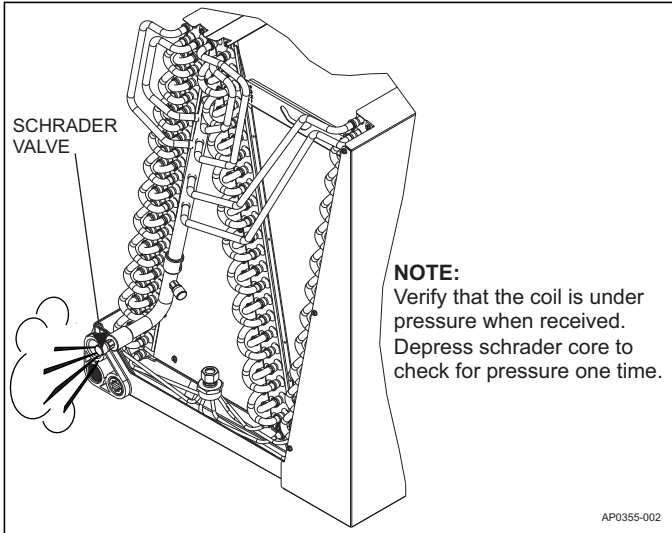


FIGURE 1: Pressure Check

CLEARANCES

During Installation

Dimensions for indoor coils are provided in Figure 3 and Table 1. Clearance must be provided for:

1. Refrigerant piping and connections
2. Maintenance and servicing access - including cleaning the coil
3. Condensate drain line
4. Filter removal / change
5. Removal of coil assembly

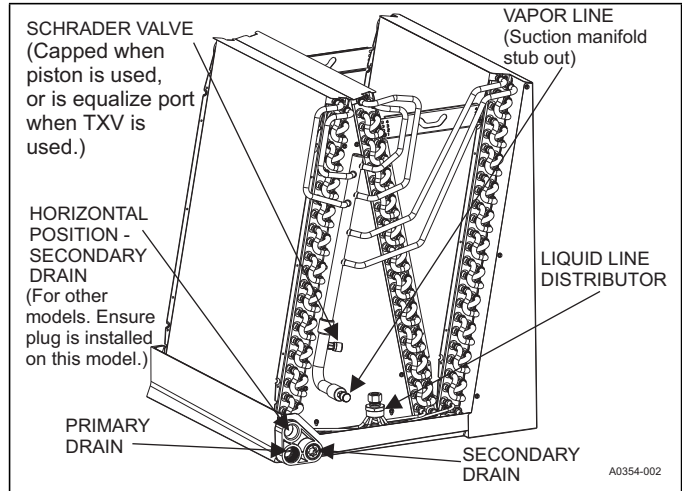


FIGURE 2: Component Location - Coil CU

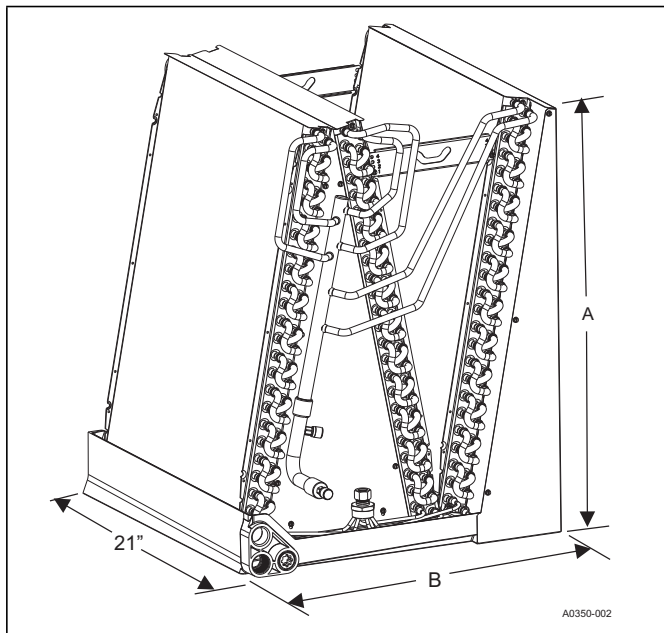


FIGURE 3: Coil - CU

Models	Dimensions ¹		Refrigerant Connections ² Line Size	
	A	B		
CU18AXA1	13-3/8	13-3/8	3/8	3/4
CU18BXA1	13-1/4	16-3/8		
CU24AXA1	15-3/8	13-3/8		
CU24BXA1	15-1/4	16-3/8		
CU24CXA1	14-7/8	19-7/8		
CU30AXA1	19-3/8	13-3/8		
CU30BXA1	19-1/2	16-3/8		
CU30CXA1	19-1/4	19-7/8		
CU30DXA1	19	23-3/8		
CU36BXA1	21-1/2	16-3/8		
CU36CXA1	21-1/8	19-7/8		
CU36DXA1	21-1/4	23-3/8		
CU42CXA1	23-1/8	19-7/8		
CU42DXA1	22-7/8	23-3/8		
CU48CXA1	25-1/8	19-7/8		
CU48DXA1	25	23-3/8		
CU60CXA1	29-1/4	19-7/8		
CU60DXA1	29	23-3/8		

TABLE 1: Dimensions - CU Coils

1. All dimensions are in inches.
2. Refrigerant line sizes may require larger lines for extended line lengths. See Application Data part number 247077.

LIMITATIONS

These coils should be installed in accordance with all national and local safety codes. Refer to Table 2.

TABLE 2: Coil Air Flow Limits

Coil Size	Outdoor Unit Tons	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
42	3	1050	1350
	3-1/2	1225	1575
48	3	1050	1350
	3-1/2	1225	1575
60	4	1400	1800
	5	1750	2250

SECTION III: COIL METERING DEVICES

A piston or a TXV is to be installed in the field. There is an installation manual that comes with the TXV kit. It is recommended to install the piston or TXV kit prior to installation of coil and brazing of line set. Until brazing is completed and cooled, the TXV sensing bulb must not be installed.

The outdoor technical guide for outdoor units can be consulted for required piston or TXV for the indoor coil. The piston and the Schrader core are supplied with the outdoor unit. When the piston is used instead of the TXV, the Schrader core is installed in the suction line Schrader port and is capped with the supplied plastic cap. The Schrader core must not be installed if the TXV is installed, because the TXV equalizer line attaches to the suction line port.

⚠ CAUTION

COIL UNDER PRESSURE.

Verify that pressure has been released by depressing Schrader valve core shown in Figure 1.

The coil requires a metering device to be added.

See outdoor unit documentation for correct TXV or piston to be used.

NOTICE

To prevent moisture and contaminants from entering the system, the coil should not be open to atmosphere for extended periods of time. If the coil cannot be brazed into the refrigeration system during a routine installation period, the ends should be temporarily closed or plugged. For a short term delay, use masking tape over the ends of the copper tubing to close the tube from the air. For a longer term delay, use plugs or caps. There is no need to purge the coil if this procedure is followed.

PISTON INSTALLATION

⚠ WARNING

Failure to install Schrader valve core on piston applications could result in total refrigerant loss of the system!

Install Schrader Valve Core and Piston as follows:

1. Relieve any holding charge left in the coil by depressing schrader valve core on the end of the suction manifold stub out.
2. After holding charge is completely discharged, loosen and remove the Schrader core from the valve stem on the end of the suction manifold stub out.
3. Raise the distributor body approximately 2" vertically to mate up with the liquid line. Ensure liquid line can pass through the tubing hole in the access panel. Adjust as necessary.
4. Remove Schrader valve cap from Schrader valve stem on the vapor line shown in Figure 2.
5. Install Schrader valve core supplied with the outdoor unit into Schrader valve stem using a valve core tool.
6. Loosen and remove the liquid line connection nut and the sealing disc from the distributor assembly. Note that the fitting has right hand threads.
7. Slide the nut over the liquid line to be installed, and discard the seal disc.
8. Install required size piston into the distributor. Refer to supplied Tabular Data Sheet for specific piston size and indoor coil match up. See Figure 4 below.
9. Verify that the Teflon washer is still in place in the distributor opening. See Figure 4.

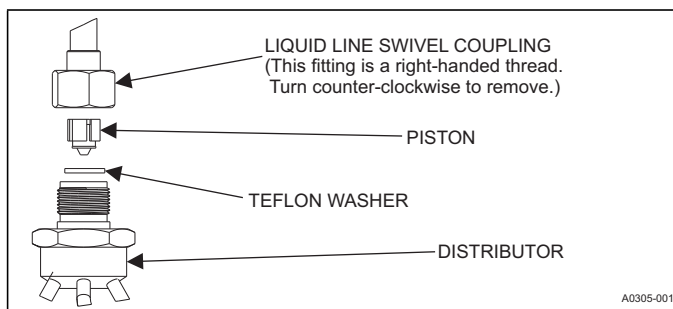


FIGURE 4: Piston Installation

⚠ CAUTION

Do not over torque. Do not use slip joint pliers.

This will distort the aluminum distributor and the brass fitting (potentially causing leaks).

10. After piston is installed, install the liquid line to the top of the piston/distributor assembly. Hand tighten, and turn an additional 1/4 turn to seal. Do not over tighten fittings.
11. Replace black plastic cap on Schrader valve stem of the vapor line.
12. After line set is installed, leak test the system.

THERMOSTATIC EXPANSION VALVE (TXV) INSTALLATION

▲ CAUTION

Outdoor unit model numbers ending with an "H" have a factory installed hard start kit which is required when a TXV is installed. Outdoor unit model numbers with no "H" ending do not require a hard start kit unless local regulations dictate it.

The following are basic steps for installation. For detailed instructions, refer to the Installation Instructions accompanying the TXV kit. Install TXV kit as follows:

IMPORTANT

Refer to the Technical Guide for the unit to determine the proper TXV kit to be used on this product.

1. Relieve any holding charge left in the coil by depressing schrader valve core on the suction manifold stub out.
2. After holding charge is completely discharged, loosen and remove the Schrader core from the valve stem on the end of the suction manifold stub out.
3. Remove and discard the Schrader valve cap from Schrader valve stem on the vapor line shown in Figure 2.
4. Place a backup wrench on distributor, loosen and remove brass distributor nut. Retain brass nut for use on liquid line. Keep Teflon washer in place and discard clear disk.
5. Install the thermal expansion valve to the distributor assembly with supplied fittings. Ensure Teflon washer is seated in distributor. Hand tighten and turn an additional 1/4 turn to seal. Do not over tighten fittings. See Figure 5.

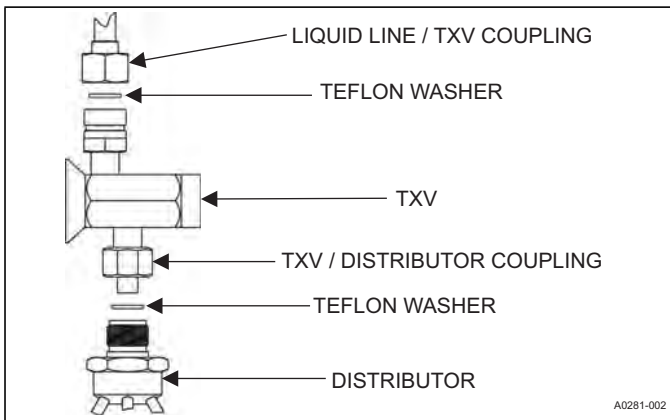


FIGURE 5: TXV Installation

▲ CAUTION

Do not over torque. Do not use slip joint pliers. This will distort the aluminum distributor and the brass fitting (potentially causing leaks).

6. Slide the nut removed in step 4 over the supplied liquid line. Place supplied Teflon washer from TXV kit in place on TXV, and install liquid line to the top of the thermal expansion valve. Adjust assembly so liquid line aligns with hole in access panel. Hand tighten the liquid line, and apply an additional 1/4 turn to seal.

▲ WARNING

Schrader valve core **MUST NOT** be installed with TXV installation. Poor system performance or system failure could result.

7. Install the TXV equalizer line onto the vapor line by hand tightening the 1/4" SAE coupling nut to the equalizer port, and apply an additional 1/3 turn to seal. See Figures 2 and 6.

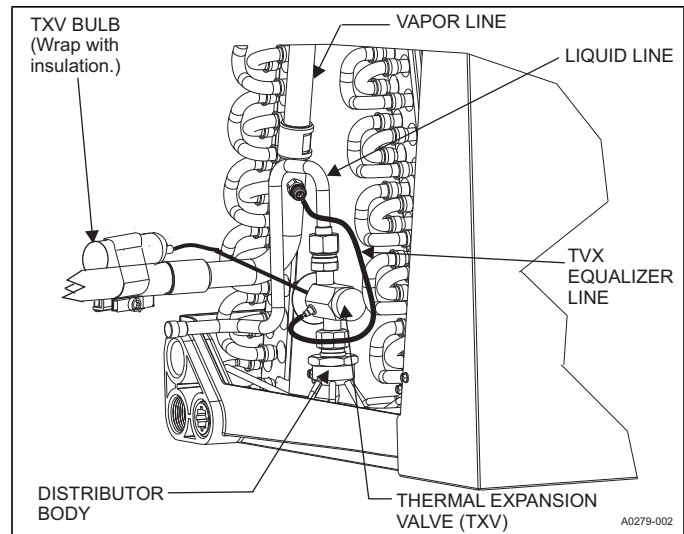


FIGURE 6: TXV Bulb and Equalizer Line Installations

▲ CAUTION

In all cases, mount the TXV temperature sensing bulb after vapor line is brazed and sufficiently cooled.

8. Pass the bulb tube for the TXV temperature sensing through the tube opening in the split grommet of the access panel.
9. Install the TXV bulb to the vapor line near the duct access panel, using the bulb clamp(s) furnished with the TXV assembly. Ensure the bulb is making maximum contact. See Figures 6 and 7.
 - a. If possible, install the temperature bulb on a horizontal run of the vapor line. Ensure that the bulb is installed at a 10 o'clock or 2 o'clock position.

- b. If bulb installation is made on a vertical run, locate the bulb at least 16" (40.6 cm) from any bend, and on the tubing sides opposite the plane of the bend. Position the bulb with the tail of the bulb at the top, so that the bulb acts as a reservoir. See Figure 8.
- c. Insulate the bulb using thermal insulation provided to protect it from the effect of the surrounding ambient temperature. Cover completely to insulate.

10. After line set is installed, leak test the system.

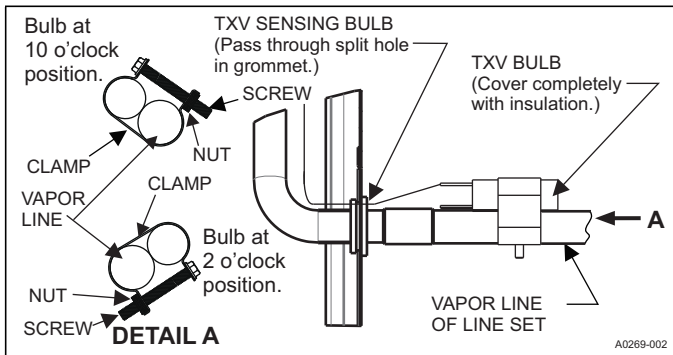


FIGURE 7: Proper Bulb Location

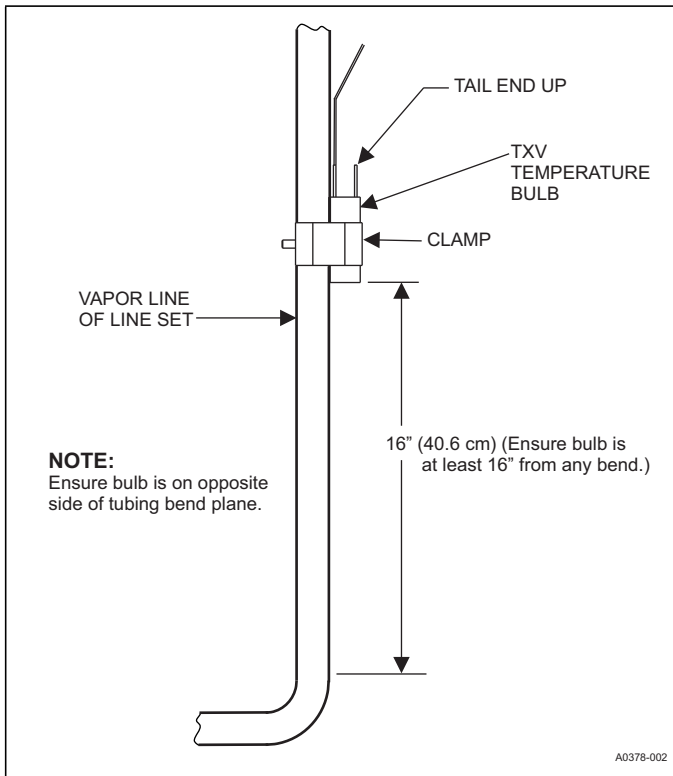


FIGURE 8: Vertical Temperature Bulb Orientation

SECTION IV: COIL INSTALLATION - CU

These upflow coils are designed for installation on top of upflow furnaces only.

This uncased coil installation instructions apply to UPG furnace models with a supply air plenum the size called out in Table 3 based on cabinet width of the furnace. If plenum is fabricated in two pieces, duct locks (Pittsburgh lock, snap lock, etc) are recommended for use on the back side of the plenum.

Three standard S-Locks are fabricated and required for coil door installation.

All duct work for housing an uncased coil should be fabricated and installed in accordance with local and/or national codes. The following installation procedures are provided for reference only for those who desire to follow it. Experienced sheet metal duct work technicians may choose to follow their own practices as long as those practices comply 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.

TABLE 3: Outer Duct Work Dimensions

COIL SIZE	WIDTH	DEPTH
A	13-1/2"	20"
B	16-1/2"	20"
C	20"	20"
D	23-1/2"	20"

1. Fold all 4 duct flanges on the furnace to the upward position as shown in Figure 9.

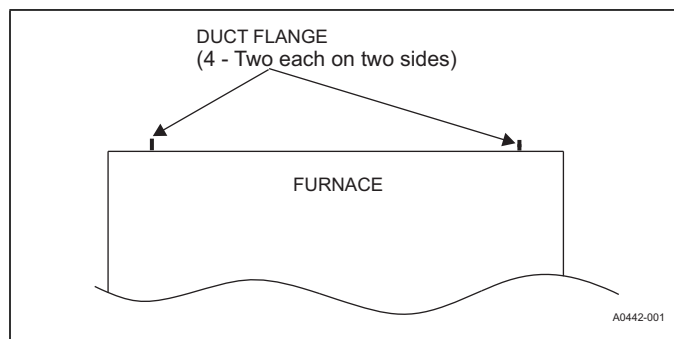
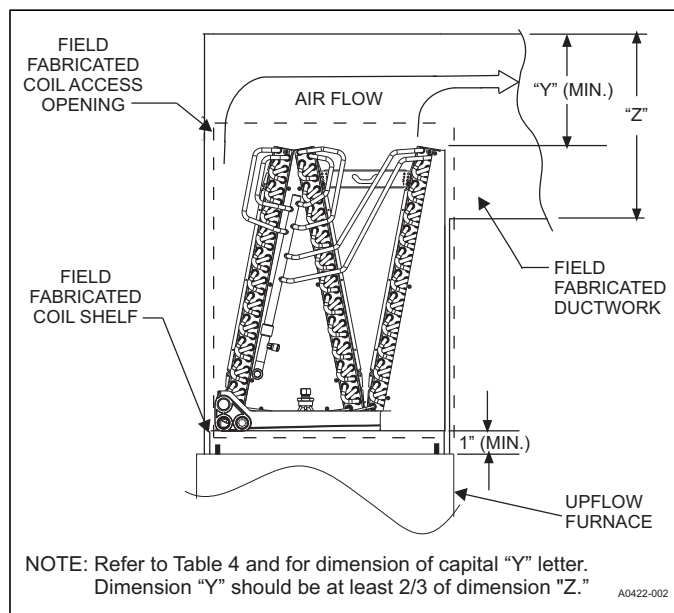


FIGURE 9: Duct Flanges

2. Fabricate the duct work to house the coil in accordance with Figures 10 and 11.



NOTE: Refer to Table 4 and for dimension of capital "Y" letter. Dimension "Y" should be at least 2/3 of dimension "Z."

FIGURE 10: Upflow Coil Installation

NOTICE

Dimension "Y" should be at least 2/3 of dimension "Z". Refer to Figure 10.

TABLE 4: Coil Projection Dimensions - CU Coils

COIL SIZE	DIMENSION "Y" INCHES
CU18	3-1/2
CU24	4-1/2
CU30	4-1/2
CU36	5-1/2
CU48	6-1/2
CU60	9

3. Install plenum on furnace and secure with screws through the 1/2" flange out on plenum.
4. Cut opening in the front of supply air plenum. Refer to Figures 10 and 11 and Tables 4 and 5 for coil and coil access dimensions.

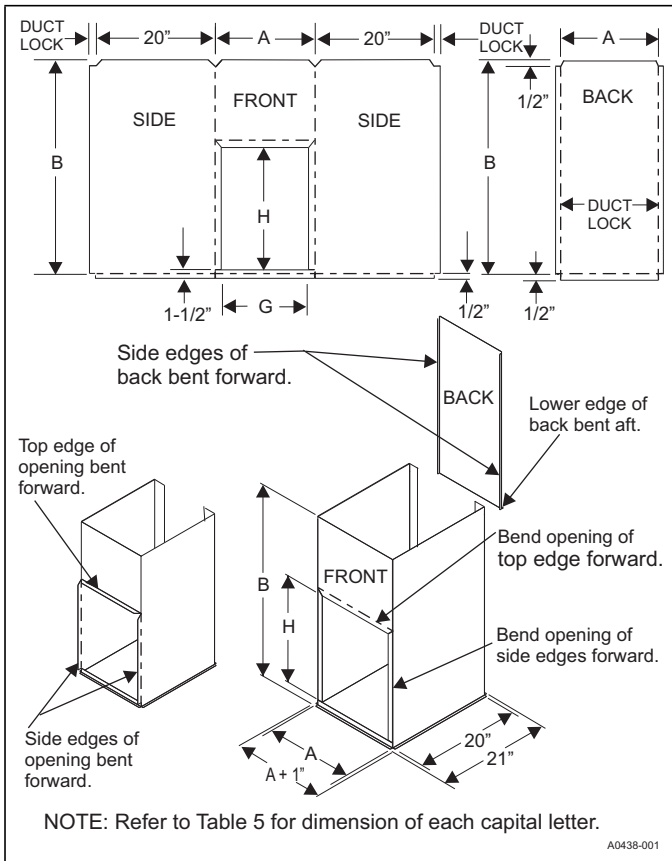


FIGURE 11: Duct Work Coil Installation and Access Fabrication

TABLE 5: Duct Work Dimensions¹ - CU Coils (Refer to Figures 11,12,14)

COIL MODEL	A	B (MIN)	C	D	E	F	G	H
CU18A	13-1/2	20	9-1/2	15	15-1/2	13	11-1/2	14
CU24A	13-1/2	20	9-1/2	17	17-1/2	13	11-1/2	16
CU30A	13-1/2	24	9-1/2	21	21-1/2	13	11-1/2	20
CU18B	16-1/2	20	12-1/2	15	15-1/2	16	14-1/2	14
CU24B	16-1/2	20	12-1/2	17	17-1/2	16	14-1/2	16
CU30B	16-1/2	24	12-1/2	21	21-1/2	16	14-1/2	20
CU36B	16-1/2	26	12-1/2	23	23-1/2	16	14-1/2	22
CU24C	20	20	16	17	17-1/2	19-1/2	18	16
CU30C	20	24	16	21	21-1/2	19-1/2	18	20
CU36C	20	26	16	23	23-1/2	19-1/2	18	22
CU42C	20	28	16	25	25-1/2	19-1/2	18	24
CU48C	20	30	16	27	27-1/2	19-1/2	18	26
CU60C	20	34	16	31	31-1/2	19-1/2	18	30
CU30D	23-1/2	24	19-1/2	21	21-1/2	23	21-1/2	20
CU36D	23-1/2	26	19-1/2	23	23-1/2	23	21-1/2	22
CU42D	23-1/2	28	19-1/2	25	25-1/2	23	21-1/2	24
CU48D	23-1/2	30	19-1/2	27	27-1/2	23	21-1/2	26
CU60D	23-1/2	34	19-1/2	31	31-1/2	23	21-1/2	30

1. All Dimensions are in inches.

5. Using a folding tool and hand seamer, bend the sides and top edges of the cut opening forward from the plenum at a 90 degree angle. Refer to Figure 11.
6. Fabricate a coil shelf using a flat piece of metal illustrated in Figure 12.

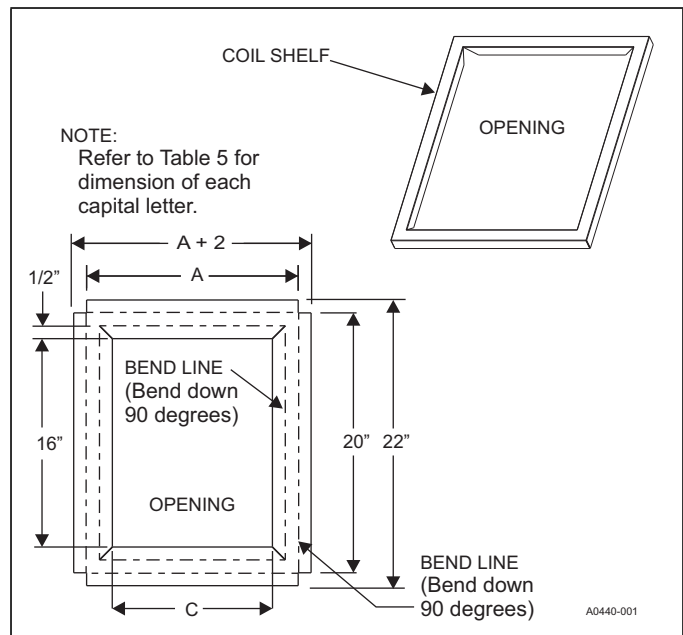


FIGURE 12: Coil Shelf

7. Install coil shelf through plenum opening so that duct flanges on furnace support the coil shelf (refer to Figure 13). Install the coil shelf level or pitched slightly toward the drain end (high in the back, low in the front). Pitch should not exceed 1/4" per length of coil. Install the appropriate metering device (piston or TXV).

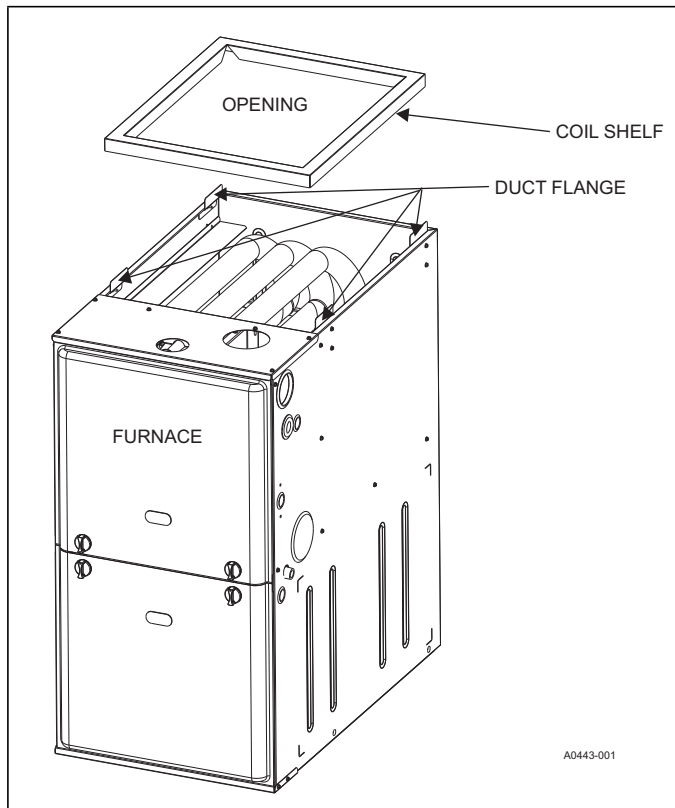


FIGURE 13: Coil Shelf Installation Position

8. Install coil through plenum opening, and position coil onto coil shelf over furnace opening as shown in Figure 10. If using a TXV, the bulb capillary tube must pass through the suction line opening, but do not attach bulb to suction line until after brazing is completed and piping is cooled.
9. Fabricate a coil access panel as shown in Figure 14 using lettered measurements listed in Table 5. Before making any bends or cuts, use supplied paper template from Figure 18 on the back page of this instruction manual to mark the drain and refrigeration piping openings on the coil access panel.
10. After access panel is properly configured, use adhesive and install 1" foam strip along inside lower edge of access panel.
11. Fabricate three standard S-Locks for coil access panel installation. Refer to designated sizes shown in Figure 14 and listed in Table 5. Install standard S-Locks onto sides and top edges of the plenum access opening.
12. Install the coil access panel onto the plenum. Screw the coil access panel in place at the bottom 1/2" flange and the top flange at the top S-Lock.
13. Complete brazing of refrigeration piping connections, and allow the piping to cool before installing vapor line gasket or TXV temperature bulb if applicable.
14. If TXV is installed on unit, attach the TXV temperature bulb to the vapor line. Install the split gasket around the vapor line and temperature bulb capillary tube.
15. Check for air leakage around access door and between the duct work and upflow furnace. Seal any leaks appropriately using duct mastic or silicon sealant to seal all openings.

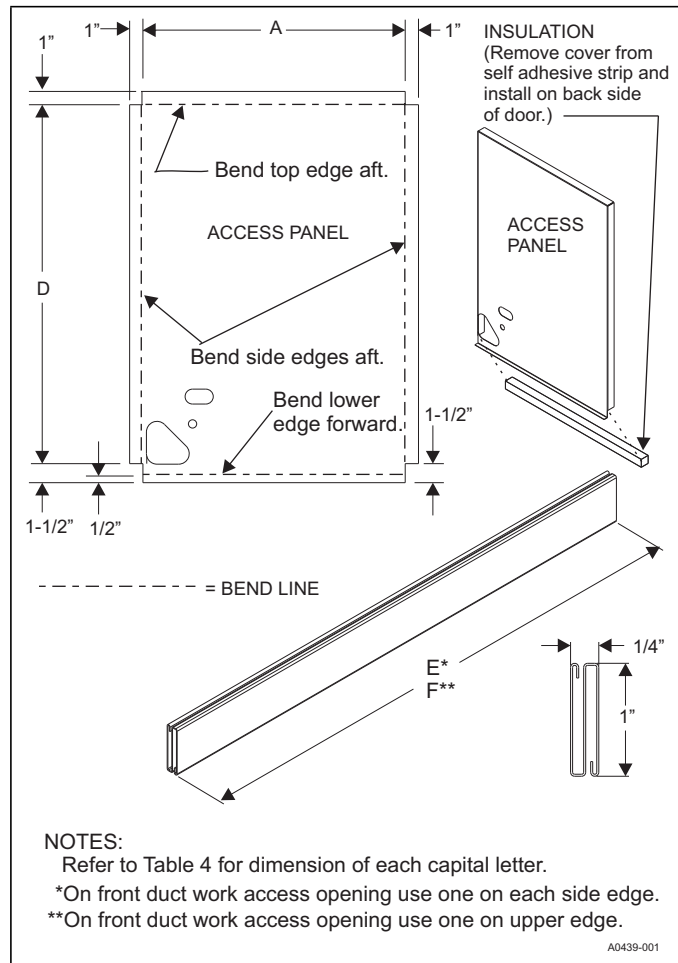


FIGURE 14: Access Panel and Standard S-Lock

CRITICAL COIL PROJECTION

The coil assembly must be located in the duct such that a minimum distance is maintained between the top of the coil and the top of the duct. Refer to Table 4.

SECTION V: DUCT CONNECTIONS

The vast majority of problems encountered with combination heating and cooling systems can be linked to improperly designed or installed duct systems. It is therefore highly important to the success of an installation that the duct system be properly designed and installed.

Use flexible duct collars to minimize the transmission of vibration/noise into the conditioned space.

Where return air duct is short, or where sound may be a problem, sound absorbing glass fiber should be used inside the duct. Insulation of duct work is a must where it runs through an unheated space during the heating season or through an uncooled space during the cooling season. The use of a vapor barrier is recommended to prevent absorption of moisture from the surrounding air into the insulation. The supply air duct should be properly sized by use of a transition to match unit opening. All ducts should be suspended using flexible hangers and never fastened directly to the structure. Duct work should be fabricated and installed 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.

SECTION VI: REFRIGERANT LINE CONNECTION

⚠ CAUTION

Coil is under inert gas pressure. Relieve pressure from coil by depressing schrader core at end of suction manifold stub out.

⚠ 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.

Connect lines as follows:

NOTICE

Route the refrigerant lines to the coil in a manner that will not obstruct service access to the coil, air handling system, furnace flue or filter.

NOTICE

Avoid handling aluminum coil components after handling the copper line set or other tubing without first cleaning hands.

1. Make suction and liquid line connections outside of the duct work. The lines are expanded to receive the field line set tubes for most outdoor unit matches.
2. Remove grommets where tubes exit the tubing connection panel to prevent burning them during brazing.
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 depth as possible for the connection and brazing of the suction line. To ensure suction line fits into connection, deburr the stub out (including inner pressure protrusion from cutting).
4. If coil does not have a factory installed TXV, install the required size piston or TXV kit.
5. If a TXV kit is installed, connect the TXV equalizer line to the suction header.
6. If the coil does have a factory installed TXV, remove the liquid line copper cap which is soft soldered on the outside of the 3/8" stub protruding from 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.
7. Install field fabricated coil door onto plenum.
8. Insert liquid and suction lines into the coil connections at the coil tubing panel.
9. Wrap a water soaked rag around the coil connection tubes inside the coil tubing panel and duct work to avoid transferring excess heat to the coil or TXV.
10. Purge refrigerant lines with dry nitrogen.

NOTICE

All indoor coil connections are copper-to-copper and should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. DO NOT use soft solder.

11. Braze the suction and liquid lines, and allow the joints to cool.
12. If piston is used, omit the remainder of this step. If a TXV is installed, accomplish the following:
 - a. Route the TXV sensing bulb through suction line opening in the coil tubing panel.
 - b. Secure sensing bulb and equalizer line capillary tubes with nylon cable ties to prevent leaks from tubes rubbing.
 - c. Omit the next step, and accomplish the steps following the next step.
13. If piston is used, install Schrader core into Schrader valve stem on the suction header, and reinstall cap.
14. Carefully attach the grommets to the lines on coil access panel to prevent air leakage.
15. Refer to Outdoor unit Installation Manual, and accomplish evacuation, leak check and charging instructions. Check all field brazed joints and metering device connections.
16. Ensure lines are sound isolated by using appropriate hangers or strapping.

SECTION VII: CONDENSATE DRAIN CONNECTIONS

All drain lines should be pitched away from unit drain pan and should be no smaller than the coil drain connection.

Route the drain line so that it doesn't interfere with accessibility to the coil, furnace, air handling system or filter and will not be exposed to freezing temperatures.

Instruct the owner that the indoor coil drain pan should be inspected and cleaned regularly to prevent odors and assure proper drainage.

Coils should be installed level or pitched slightly toward the drain end. Suggested pitch should not exceed 1/4-inch per foot of coil.

If the coil is provided with a secondary drain, it should be piped to a location that will give the occupant a visual warning that the primary drain is clogged. If the secondary drain is not used it must be plugged.

⚠ CAUTION

Avoid Double Trapping.

⚠ CAUTION

Threaded drain connections should be hand tightened, plus no more than 1 turn.

DO NOT use Teflon™ tape, "pipe dope", or other sealants. The use of a sealant may cause damage and premature failure of the drain pan.

SECTION VIII: COIL CLEANING

⚠ CAUTION

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

If the coil needs to be cleaned, it should be cleaned with water. As an alternative to water, EVAP-Green by Nu-Calgon is the only pH neutral coil cleaner approved to be used when it is properly diluted. ENSURE THE CLEANED COILS ARE THOROUGHLY RINSED AFTER USE OF EVAP-GREEN.

SECTION IX: AIR SYSTEM ADJUSTMENT

To check the CFM, measure the static pressure drop across the coil using a portable manometer and static pressure tips. Prepare coil for static pressure drop measurements - the coil must be dry.

Drill 2 holes, one 3" after the coil (before any elbows in the ductwork) and one 3" before the coil. Insert the pressure tips and read the pressure drop from the manometer. See Table 6 to determine the air flow, and make the necessary adjustments to keep the CFM within the air flow limitations of the coil.

TABLE 6: Uncased Upflow "N" Type Coil - Air Flow Data (CFM)

Models	External Static Pressure (in. wc.)						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
CU18A	500	700	840	1000	1118	1225	1323
CU18B	670	960	1180	1340	1498	1641	1773
CU24A	490	710	850	980	1096	1200	1296
CU24B	760	1050	1330	1520	1699	1862	2011
CU24C	910	1330	1640	1820	2035	2229	2408
CU30A	520	750	950	1040	1163	1274	1376
CU30B	670	1000	1230	1340	1498	1641	1773
CU30C	970	1410	1710	1940	2169	2376	2566
CU30D	1180	1720	2100	2360	2639	2890	3122
CU36B	710	1020	1210	1420	1588	1739	1878
CU36C	980	1420	1690	1960	2191	2400	2593
CU36D	1210	1750	2150	2420	2706	2964	3201
CU42C	970	1420	1750	1940	2169	2376	2566
CU42D	1190	1730	2130	2380	2661	2915	3148
CU48C	970	1450	1910	1940	2169	2376	2566
CU48D	1250	1820	2250	2500	2795	3062	3307
CU60C	910	1730	2140	1820	2035	2229	2408
CU60D	1220	1730	2140	2440	2728	2988	3228

1. Dry coil conditions only, tested without filters.
2. For optimal performance, external static pressures of 0.2" to 0.5" are recommended. Applications above 0.6" are not recommended.

SECTION X: INSTALLATION VERIFICATION

THERMAL EXPANSION VALVE (TXV) CHECK LIST

- Is coil metering device installed correctly?
- Was correct TXV installed per the outdoor unit Technical Guide?
- Is TXV temperature bulb positioned correctly?
- Is TXV temperature bulb insulated?
- Is equalizer line connected?

FIGURE 15: TXV Check List

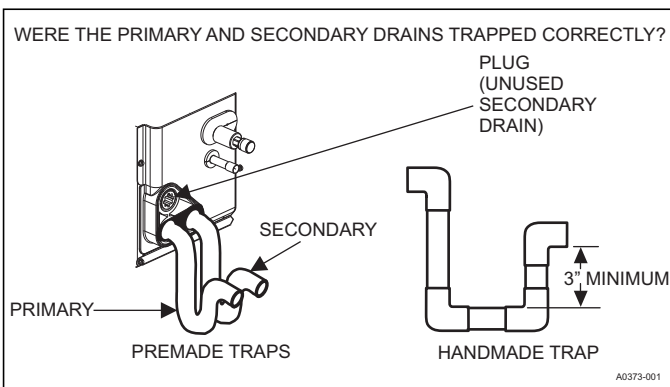


FIGURE 16: Drain Traps

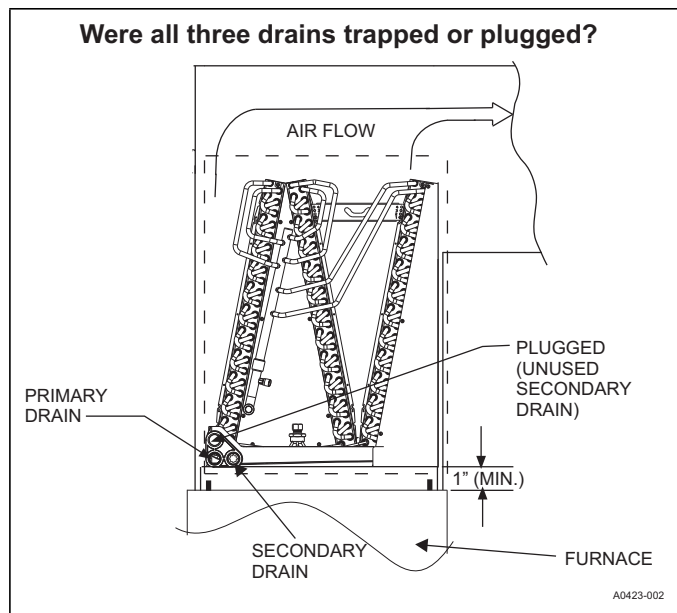


FIGURE 17: Location of Trapped and Plugged Drain Connections

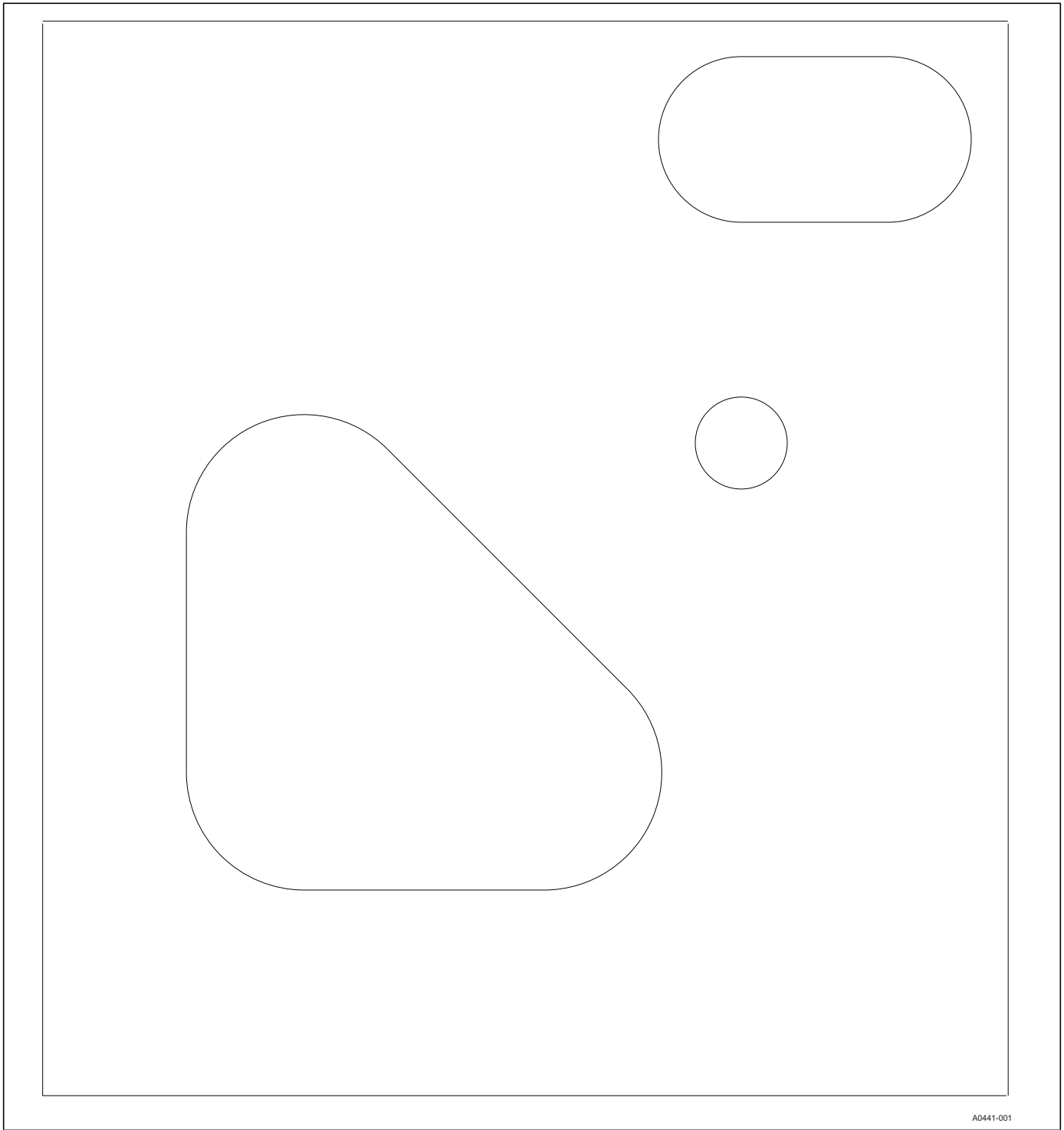


FIGURE 18: Template for Drain and Refrigerant Lines on Coil Access Door