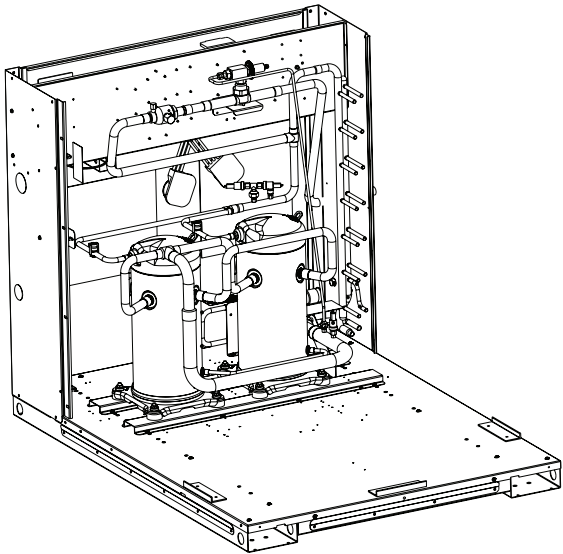


Installation Instructions

Hot Gas Bypass Kit, R-410A



Model Numbers

BAYHGBP010

Used With:

All TTA models

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provided to alert installing contractors to potential hazards that could result in death or personal injury. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

Read this manual thoroughly before operating or servicing this unit.

ATTENTION: Warnings, Cautions, and Notices appear at appropriate sections throughout this literature. Read these carefully:

⚠ 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, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

NOTICE: Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns!

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs such as HCFCs and HFCs.

Responsible Refrigerant Practices!

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified. The Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that

must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state electrical codes. Failure to follow code could result in death or serious injury.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- Before installing/servicing this unit, technicians **MUST** put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. **ALWAYS** refer to appropriate MSDS sheets and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate MSDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.
- If there is a risk of arc or flash, technicians **MUST** put on all Personal Protective Equipment (PPE) in accordance with NFPA 70E or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit.

Failure to follow recommendations could result in death or serious injury.

⚠ WARNING

R-410A Refrigerant under Higher Pressure than R-22!

The unit described in this manual uses R-410A refrigerant which operates at higher pressures than R-22 refrigerant. Use **ONLY** R-410A rated service equipment or components with this unit. For specific handling concerns with R-410A, please contact your local Trane representative. Failure to use R-410A rated service equipment or components could result in equipment or components exploding under R-410A high pressures which could result in death, serious injury, or equipment damage.

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Pre-Installation

General Operation and Installation

The purpose of a hot gas bypass system is to artificially load the compressor upon a decrease in evaporator load. The Hot Gas Bypass (HGBP) regulator valve automatically responds to changes in suction pressure. When the refrigerant evaporating pressure is above the bypass valve setting, the valve remains closed. When the cooling evaporator load drops, the suction pressure drops below the bypass valve setting and the valve begins to open. A portion of the hot gas is injected directly into the indoor coil distributor, which maintains the compressor suction pressure at the valve set point. The amount of valve opening is proportional to the change in the suction pressure, thereby, providing capacity modulation.

Important: *The HGBP line should not exceed 75 feet. For greater length, contact applications support.*

Low head pressure problems are possible with hot gas bypass applications due to:

1. Operation at low outdoor ambient temperatures.
2. Some hot gas bypasses the condenser, causing further reduction in head pressure. (The published low ambient limit does not apply when hot gas bypass is utilized.)

The application of a modulating head pressure control is highly recommended.

The installed accessory requires running an additional refrigerant line between the condensing unit and air handler. Please see "[Installation of Interconnecting Tubing](#)," p. 12 for the requirements of this line.

This accessory kit is designed for R-410A applications only and cannot be used on heat pump systems. Some aspects of the installation, such as the top cover removal, may require an additional technician.

Inspection

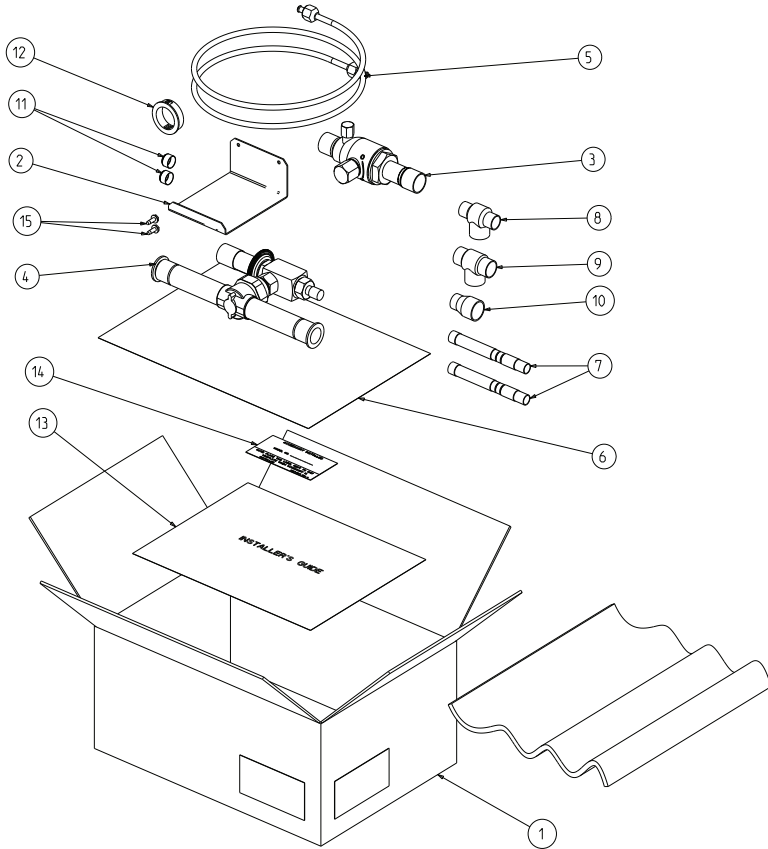
Inspect the shipping carton and its contents. Check for concealed damage before it is stored or used. If damaged, it should be reported to, and claims made against the transportation company. Replace damaged parts with authorized parts only.

Required Materials

- Copper tube for connection between condensing unit and air handler.
- Tubular insulation suitable for HVAC use - 1/2" minimum thickness.

Provided Materials

Figure 1. Materials Shipping List



1. CARTON
2. HOT GAS BYPASS MOUNTING BRACKET
3. VALVE-BALL
4. VALVE-HOT GAS BYPASS
5. ASSY-CAPILLARY
6. BAG-FLAT CLEAR
7. VALVE-CHECK
8. TEE - TUBE; .63 C X .63 C X .88 C
9. TEE - TUBE; .75 C X .75 C X .88 C
10. REDUCER - TUBE; .88 C X .62 C
11. TUBE CAP
12. BUSHING - SNAP; 1.13 ID
13. INSTALLATION GUIDE
14. INSTALLED ACCESSORY LABEL
15. 10-16 B HXW 1/2 SCREW

Installation

Hot Gas Bypass Kit Installation

⚠ WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

⚠ WARNING

Refrigerant Vapor Hazard!

All fluorocarbon refrigerant vapors are heavier than air. Vapors may collect and concentrate in confined spaces or low lying areas which will result in the displacement of air. This poses a potential health risk due to suffocation. Provide adequate ventilation to the work area to avoid over-exposure of fluorocarbon refrigerants. Refer to the appropriate MSDS sheets and OSHA guidelines for information referring to allowable personal exposure levels and handling guidelines. Failure to follow proper handling guidelines could result in death or serious injury.

Preparation

1. Ensure all power to the unit has been disconnected and locked out.
2. Remove compressor access panel and top cover on the B-side of the unit (TTA 180, 240F, and 300F) (See [Figure 2](#)), leaving the condenser motor and fan assembly intact.

Note: This is accomplished by removing the screws in the edge of the top cover. Lift the edge of the cover, opposite the control box, and lay it across the control box section. It is not necessary to disconnect the motor leads (See [Figure 2](#)).

Figure 2. Access Panel and Top Cover Removal

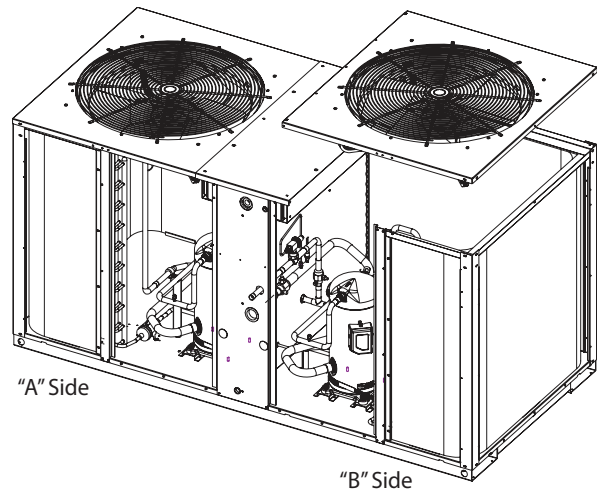


Figure 3. Typical HGBP Schematic - Single/Dual Compressor

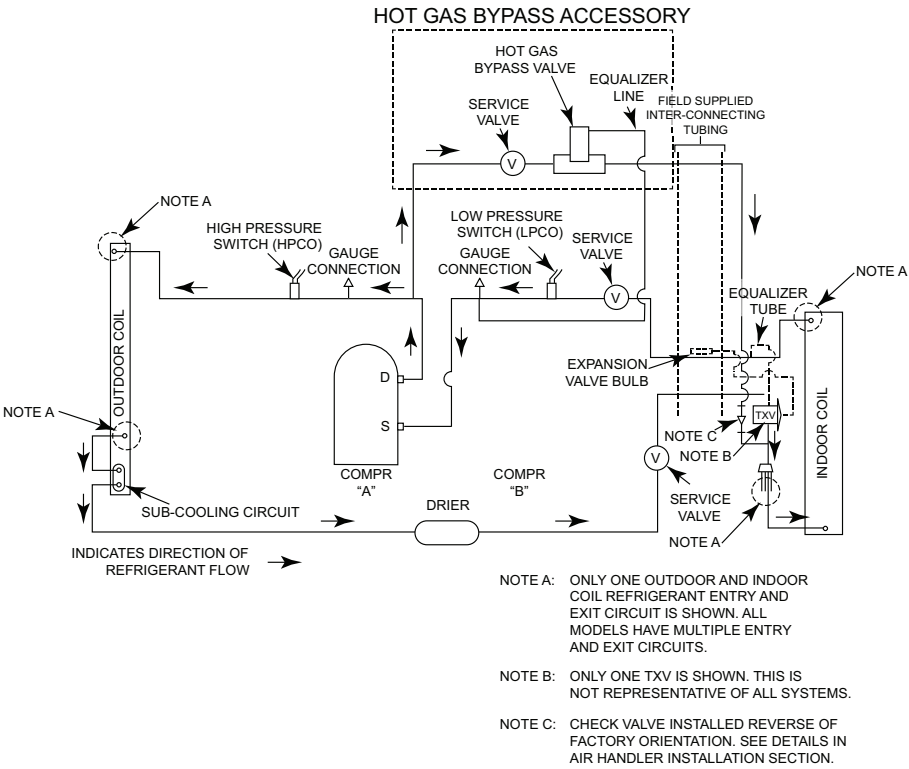
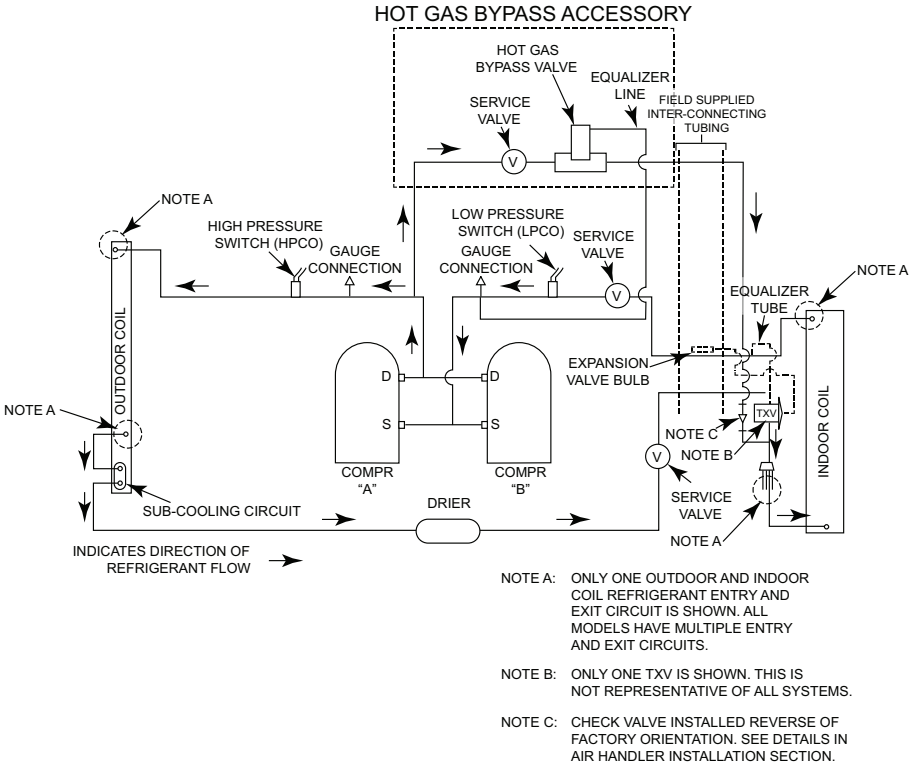


Figure 4. Typical HGBP Schematic - Manifolded Compressor



Installation

⚠ WARNING

Contains Refrigerant!

System contains oil and refrigerant and may be under positive pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives. Failure to follow proper procedures or the use of non-approved refrigerants, refrigerant substitutes, or refrigerant additives could result in death or serious injury or equipment damage.

⚠ WARNING

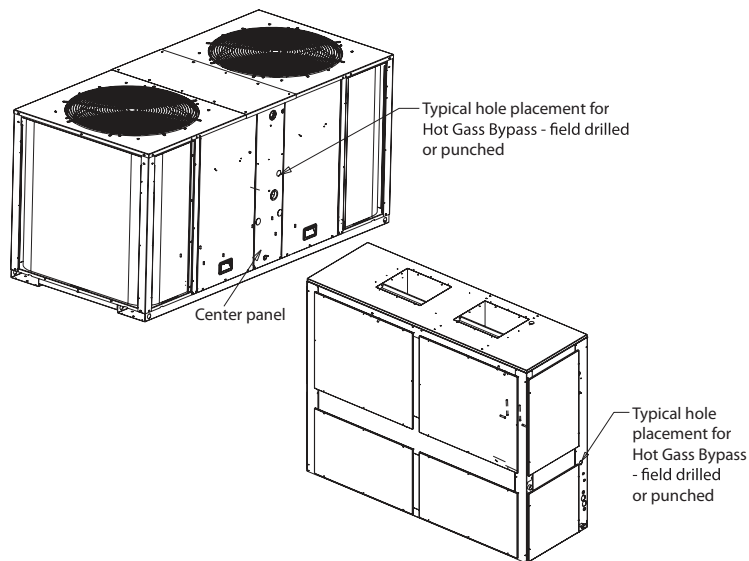
R-410A Refrigerant under Higher Pressure than R-22!

The unit described in this manual uses R-410A refrigerant which operates at higher pressures than R-22 refrigerant. Use ONLY R-410A rated service equipment or components with this unit. For specific handling concerns with R-410A, please contact your local Trane representative. Failure to use R-410A rated service equipment or components could result in equipment or components exploding under R-410A high pressures which could result in death, serious injury, or equipment damage.

Important: R-410A refrigerant must not be vented to the atmosphere.

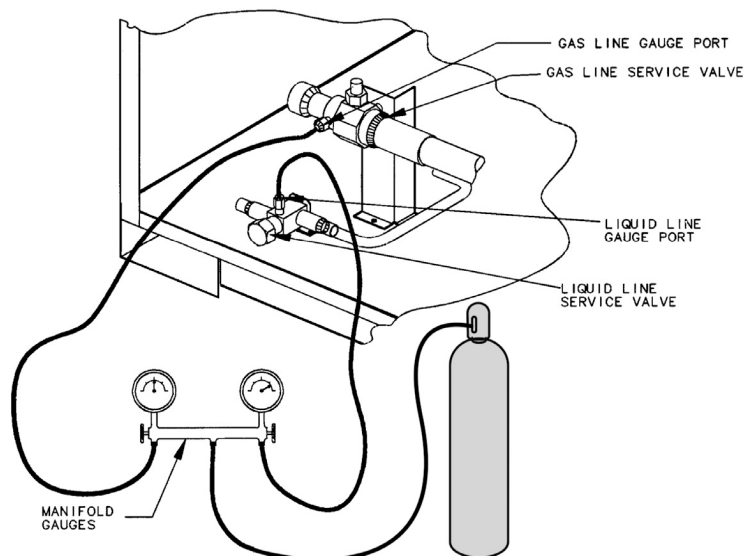
3. For new installations, release the nitrogen holding charge by removing line connection caps and slowly opening the service valve. For existing installations, properly recover R-410A from the system.
4. Check the HGBP diagrams, beginning on p. 13, to determine the exact location for cutting the tubing and placing the tees in the refrigerant lines.
5. Drill/punch hole in sheet metal panel in both the condensing unit and air handler to allow passage of the hot gas bypass tube, see Figure 5 below. Insert the provided bushings in the holes.
6. Cleaning, Cutting, and Fitting: Clean the outside surface of tube with sandpaper or steel wool at the location you plan to cut and install the "T" coupling. When cutting the tubing always use a tube cutter. After the tubing has been cut, its ends must be scraped or reamed with a pointed tool to remove any sharp burr in the end of the tube. Using a clean dry cloth, wipe away any small metal particles that may be in or around newly cut edges.

Figure 5. Hole Placement for HGBP Tube



Installation in Condensing Unit

Figure 6. Dry Nitrogen Supply Hook-up



FROM DWG. A668541

- Using a tube cutter, remove a $\frac{1}{2}$ " to $\frac{3}{4}$ " length of tube from the common compressor discharge (hot gas) line (ref. Preparation Step 6 and Figure 9, p. 13).

Important: On dual circuit units, the hot gas bypass kit must be installed on the lead circuit (circuit A).

- Remove plugs from the tubing ends of the HGBP accessory.
- From the interior of the condensing unit, assemble outlet end of the HGBP accessory with bracket punched hole through the bushing in the center panel. Insert the cut ends of the common discharge line into the inlet "T" of the accessory. Continue to refer to Figure 9, p. 13 while positioning the tubing assembly.

NOTICE:

Equipment Damage!

When installing bracket, be careful not to damage any parts in the control box.

- With the installation of the HGBP accessory complete, ensure that it does not come in contact with any metal that may rub or "chatter" during operation.
- Ensure manifold gauge hoses are attached to the service ports (one discharge port and one suction port) on the system.
- Attach center line manifold gauge to a dry nitrogen supply.

CAUTION

High Pressure!

Dry nitrogen cylinder must be equipped with a pressure regulating valve to control the flow of nitrogen. Adjust the regulating valve to emit nitrogen at low pressure only. Failure to follow recommendations could result in an explosion which could result in minor or moderate injury.

- Flow dry nitrogen through the system at about 2 to 3 psig (avoid any positive pressure buildup).

NOTICE:

Equipment Damage!

Painted areas of the unit must be shielded during brazing and all valves wrapped with a wet cloth to protect from heat.

Installation

⚠ WARNING

Hazard of Explosion and Deadly Gases!

Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids. Failure to follow all proper safe refrigerant handling practices could result in death or serious injury.

8. Begin brazing at the "T" on the common compressor discharge gas line. Braze the copper joints leak tight.
9. After brazing, shut off and disconnect nitrogen supply.
10. Remove the schraeder core on the suction line service port shown on [Figure 9](#) or [Figure 10, p. 14](#). Attach the HGBP equalizer line onto the open service port and onto the equalizer fitting on the valve.
11. Re-install the top cover
12. Evacuate the condensing unit.

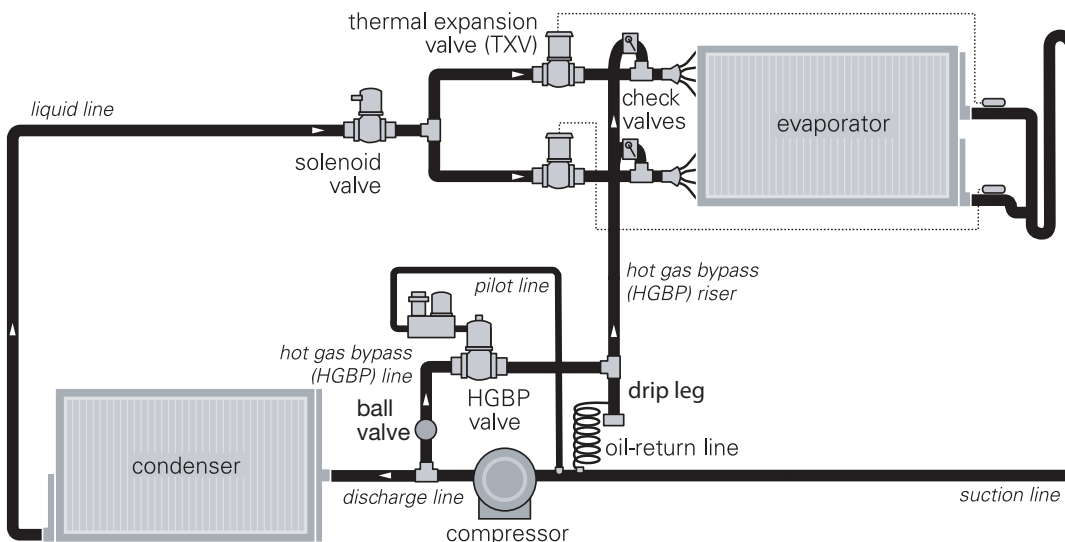
Table 1. Discharge line sizes

Unit	Discharge Line	
	5/8"	3/4"
073D	X	
090D		X
120D		X
120E	X	
120F		X
150E	X	
180E	X	
180F		X
240E		X
240F		X
300F		X

Table 2. HGBP line sizes

Unit	HGBP Line	
	5/8"	3/4"
073D	X	
090D	X	
120D		X
120E	X	
120F	X	
150E	X	
180E	X	
180F	X	
240E		X
240F		X
300F		X

Figure 7. Hot Gas Bypassed to Evaporator Inlet



Notes:

1. The oil-return line is field supplied and installed.
2. The drip leg is attached to the suction line using 5 feet of 1/8" tubing. This allows for proper oil return to the compressor and avoids equipment damage.
3. Refer to Equipment damage notice on p. 11 for additional details.

Installation of Interconnecting Tubing

⚠ WARNING

Hazard of Explosion and Deadly Gases!

Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids. Failure to follow all proper safe refrigerant handling practices could result in death or serious injury.

Note: For existing installations, skip steps 1 and 2.

⚠ CAUTION

High Pressure!

Dry nitrogen cylinder must be equipped with a pressure regulating valve to control the flow of nitrogen. Adjust the regulating valve to emit nitrogen at low pressure only. Failure to follow recommendations could result in an explosion which could result in minor or moderate injury.

1. Keep the three condensing unit service valves (suction, liquid and HGBP) shut. Flow dry nitrogen through the HGBP line at about 2 to 3 psig (avoid any positive pressure buildup). See [Figure 3, p. 7](#) and [Figure 4, p. 7](#).
2. Braze in the suction and liquid interconnecting tubing per unit Installation, Operation, and Maintenance (IOM) Guide.
3. Install a hot gas bypass line from the end of the HGBP accessory into the air handler section through the punched hole. Extend tube into air handler clear of any obstructions for future brazing.

NOTICE:

Equipment Damage!

Care should be taken to prevent trapping oil in the HGBP line. Horizontal sections of HGBP lines should always slope in a direction which allows gravity to naturally drain any oil toward a point of return to the system. If the HGBP line has a vertical riser, a drip leg is required (see [Figure 7, p. 11](#)). The drip leg is attached to the suction line using 5 feet of 1/8" tubing. This allows for proper oil return to the compressor and avoids equipment damage. The HGBP line should not exceed 75-feet in total length. Contact a technical service representative if any specific questions arise during installation.

4. Braze the HGBP line into the system, starting from the condensing unit and working toward the air handler.

Important: *Horizontal sections of HGBP lines should always slope in a direction which allows gravity to naturally drain any oil or liquid refrigerant away from the HGBP valve.*

Installation in Air Handler

1. Ensure the service valves are closed on the condensing unit. Attach manifold gauge hoses to the ports of the service valves (suction and liquid).
2. Attach center line manifold gauge to a dry nitrogen supply.

⚠ CAUTION

High Pressure!

Dry nitrogen cylinder must be equipped with a pressure regulating valve to control the flow of nitrogen. Adjust the regulating valve to emit nitrogen at low pressure only. Failure to follow recommendations could result in an explosion which could result in minor or moderate injury.

3. Flow dry nitrogen through the HGBP line at about 2 to 3 psig (avoid any positive pressure buildup).

Installation

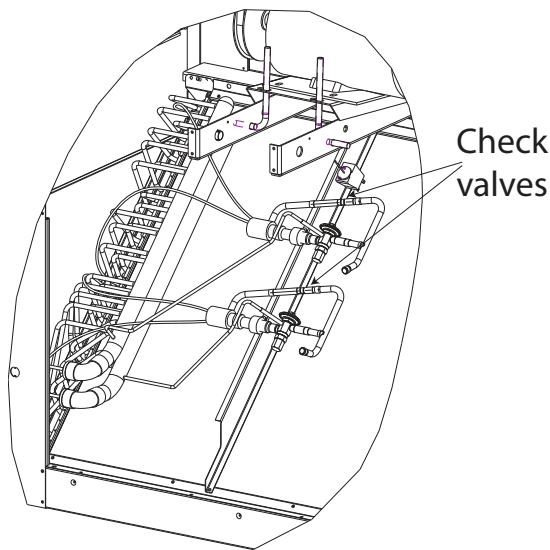
⚠ WARNING

Hazard of Explosion and Deadly Gases!

Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids. Failure to follow all proper safe refrigerant handling practices could result in death or serious injury.

- Using a brazing torch, unsweat the factory installed check valves (Circuit A only for dual circuit units) which are on the distributor side ports, as shown in [Figure 8](#). For TWE300E/251E units unsweat the factory installed caps on the distributor side port.

Figure 8. Location of Check Valve



Note: If removing the valve is difficult, a tubing cutter can be used to first cut the factory check valve in half and then sweat out either end. New check valves are supplied with this kit.

- Shut off nitrogen supply.
- Fit up all of the interconnecting tubing before brazing on the system. See [Figure 11, p. 15](#) and [Figure 12, p. 16](#) for details. Using the parts provided, cap the liquid lines for all units except TWE300E/251E and lay out the tubing as shown in the diagrams. This layout ensures proper oil return to the compressor.

- Install oil return line between drip leg and compressor suction tubing. See [Figure 7, p. 10](#).

⚠ CAUTION

High Pressure!

Dry nitrogen cylinder must be equipped with a pressure regulating valve to control the flow of nitrogen. Adjust the regulating valve to emit nitrogen at low pressure only. Failure to follow recommendations could result in an explosion which could result in minor or moderate injury.

- Connect nitrogen supply to HGBP and liquid line service valve ports. Flow dry nitrogen through the system at about 2 to 3 psig (avoid any positive pressure buildup).

⚠ WARNING

Hazard of Explosion and Deadly Gases!

Never solder, braze or weld on refrigerant lines or any unit components that are above atmospheric pressure or where refrigerant may be present. Always remove refrigerant by following the guidelines established by the EPA Federal Clean Air Act or other state or local codes as appropriate. After refrigerant removal, use dry nitrogen to bring system back to atmospheric pressure before opening system for repairs. Mixtures of refrigerants and air under pressure may become combustible in the presence of an ignition source leading to an explosion. Excessive heat from soldering, brazing or welding with refrigerant vapors present can form highly toxic gases and extremely corrosive acids. Failure to follow all proper safe refrigerant handling practices could result in death or serious injury.

- Braze together evaporator coil tubing starting with the HGBP line. Work from the point it enters the air handler toward the distributor. Braze on the liquid line caps where applicable. Braze the copper joints leak tight.
- After brazing, shut off and disconnect nitrogen supply.
- Open all service valves.

⚠ WARNING

Hazard of Explosion!

Never use an open flame to detect gas leaks. Explosive conditions may occur. Use a leak test solution or other approved methods for leak testing. Failure to follow recommended safe leak test procedures could result in death or serious injury or equipment or property-only damage.

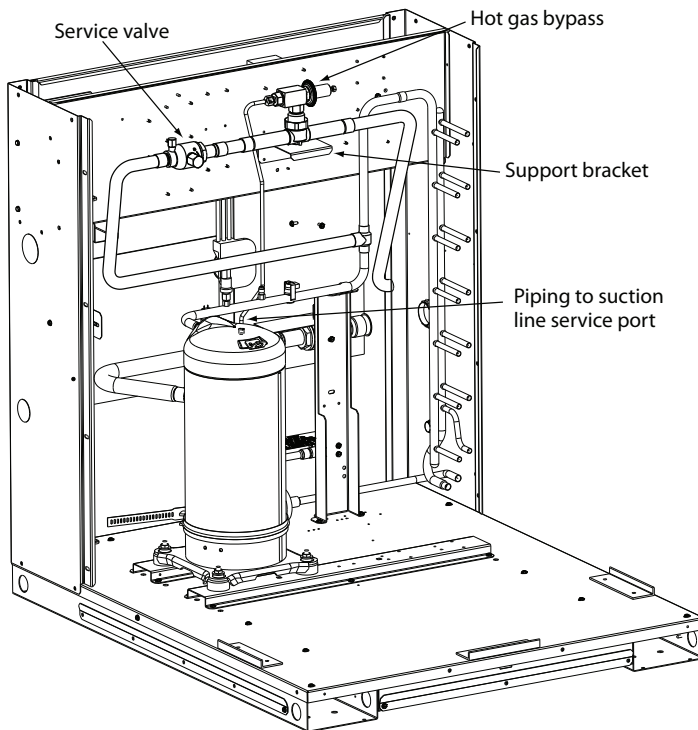
⚠ WARNING

Hazardous Pressures!

When using dry nitrogen cylinders for pressurizing units for leak testing, always provide a pressure regulator on the cylinder to prevent excessively high unit pressures. Never pressurize unit above the maximum recommended unit test pressure as specified in applicable unit literature. Failure to properly regulate pressure could result in a violent explosion, which could result in death or serious injury or equipment or property-only-damage.

12. Insulate the HGBP line with tubing insulation from the outdoor unit to the indoor unit. Extend the insulation into the air handler up to the installed "T" fitting. Ensure the insulation is properly secured to the tube. Seal any cabinet air gaps around the HGBP line entry point.
13. Evacuate, leak check, and charge the system; referring to the unit IOM for the proper procedures.

Figure 9. Condensing Unit - TTA073D - Typical HGBP Accessory Layout (Single circuit system shown. Dual circuit systems will only go to circuit A)



Installation

Figure 10. Condensing Unit - TTA240F - Typical HGBP Accessory Layout (Manifolded system shown. Dual circuit systems will only go to circuit A)

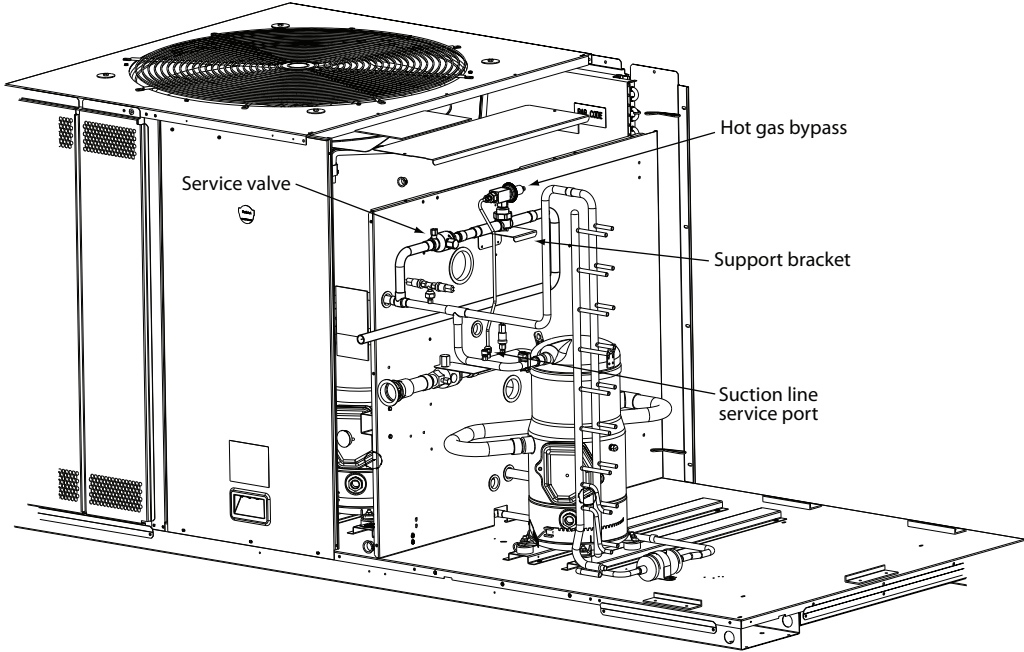
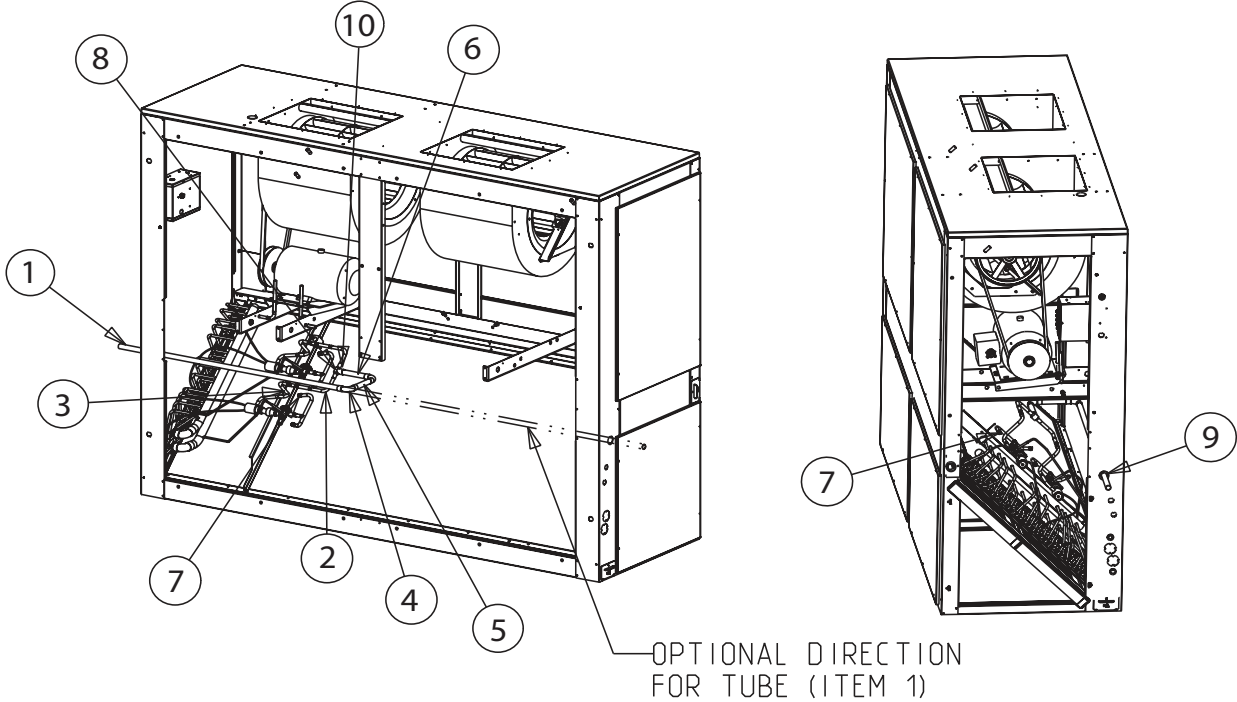


Figure 11. Air Handler HGBP Accessory Layout (Manifolded system shown. Dual circuit systems will only go to circuit A)



Item Number	Description	Quantity Required	Provided with Kit?	
			Yes	No
1	Tubing	1		X
2	Tube	2		X
3	Check Valve ASM	2	X	
4	Elbow	2		X
5	Tube	1		X
6	Tube	1		X
7	1/2 Tube Cap	2	X	
8	5/8 x 5/8 x 5/8 Tee	1		X
9	Bushing	1	X	
10	Reducer 5/8 x 7/8	1	X	

Notes:

1. All parts not needed for every application.
2. Two check valves only needed for manifolded systems.
3. Items reference [Figure 11](#).

Operational Test

1. Close HGBP service valve.
2. Start the system and check for proper operation per unit IOM.
3. Slowly open the HGBP service valve.
4. The HGBP valve will begin to cycle and bypass at suction pressures lower than the factory set point of

102 psig. Above this pressure the system will operate normally without the use of HGBP.

Operation of the HGBP system can be verified by briefly shutting off the indoor fan while monitoring refrigerant pressures at the condensing unit. Once the indoor airflow blower has stopped, the HGBP valve will begin to open when the suction pressure drops below 102 psig. The opening of the valve will be accompanied by an audible hiss of refrigerant flowing through the hot gas line. If the valve has opened at the specified pressure level, the system is operational. Restart the indoor air handler. The HGBP service valve must remain open.

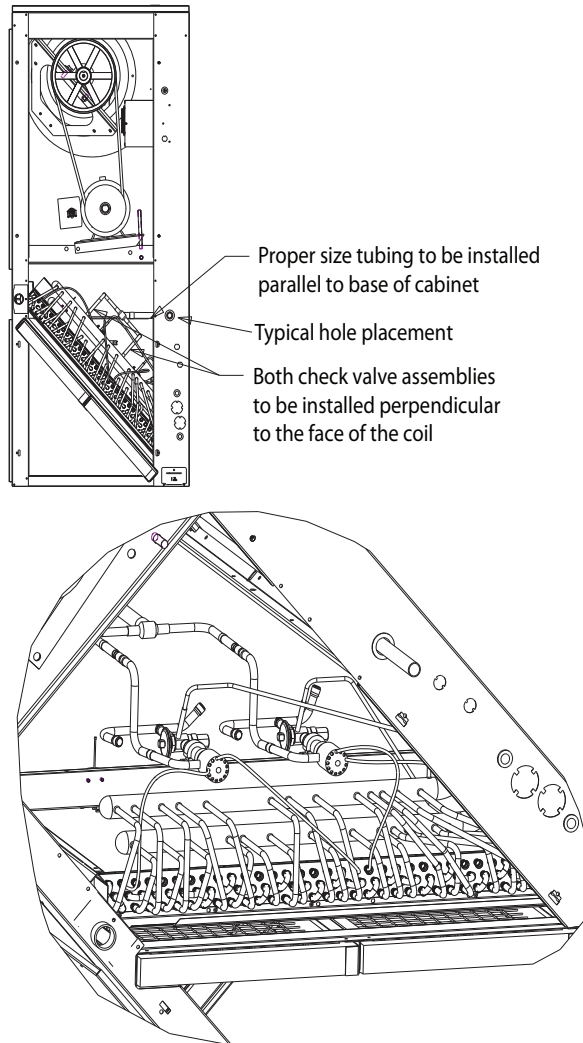
Installation

The factory set point ensures reliable operation for a typical split system layout. The HGBP valve is setscrew adjustable. If adjustment of the suction pressure set point

is found to be necessary. This procedure should only be conducted by qualified technicians.

Figure 12. Tubing Layout

Tubing layout (Manifolded system shown. Dual circuit systems will only go to circuit A.)



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