

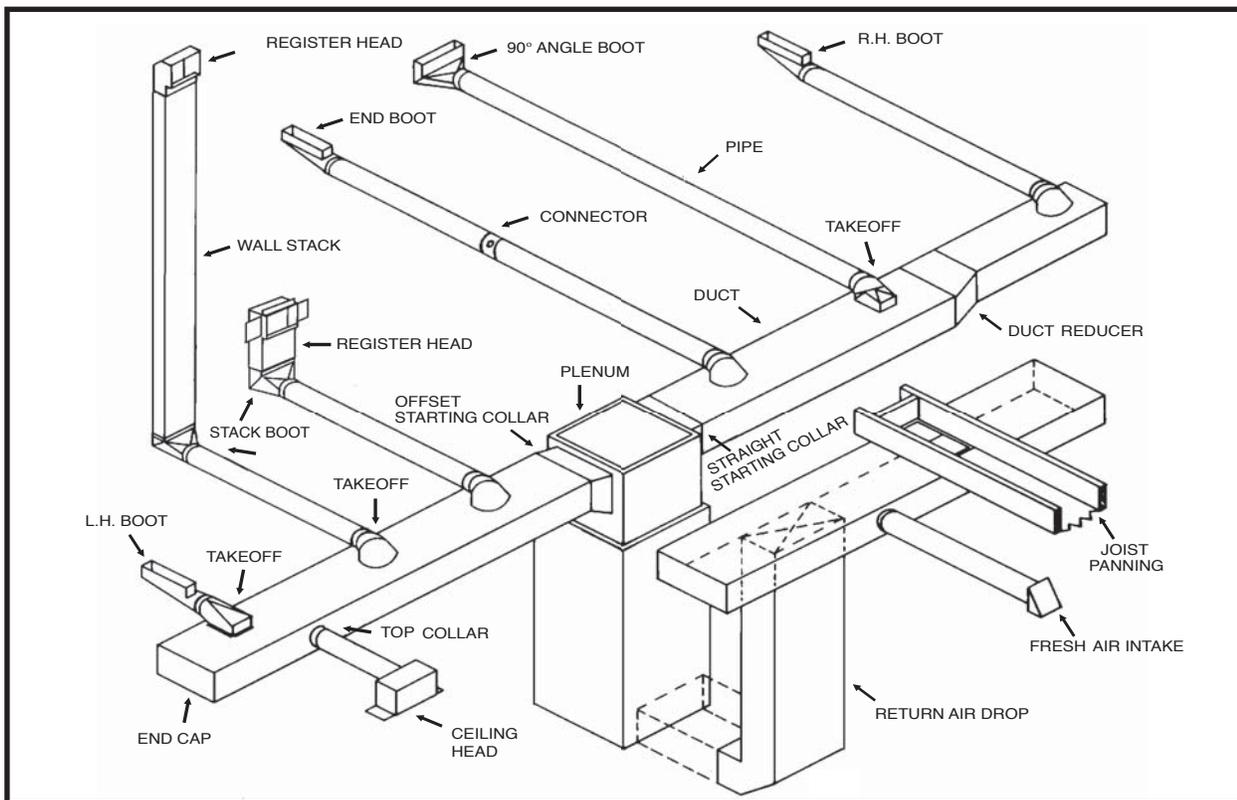


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Ductwork Installation Guide



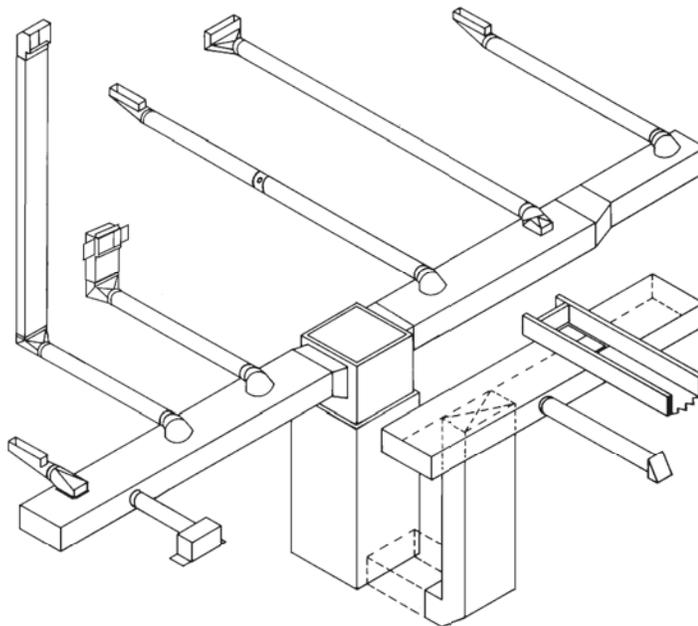
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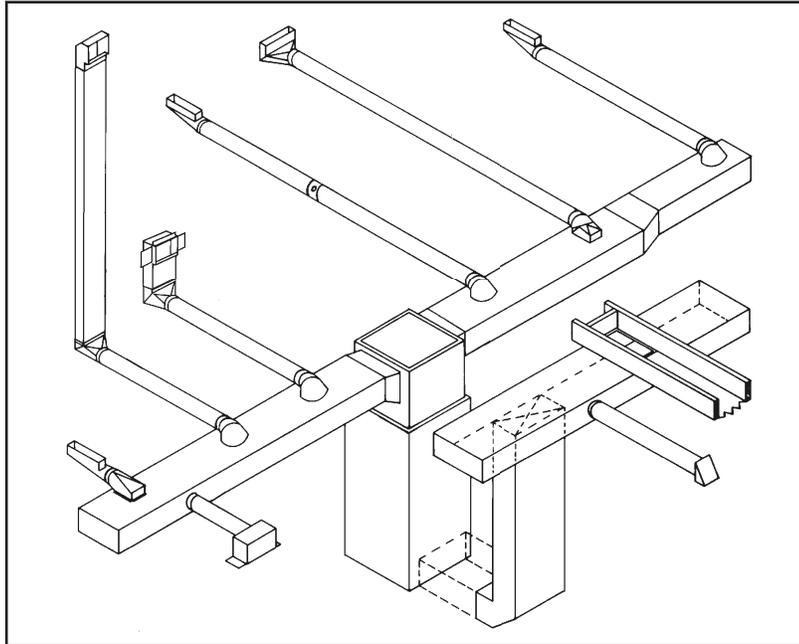
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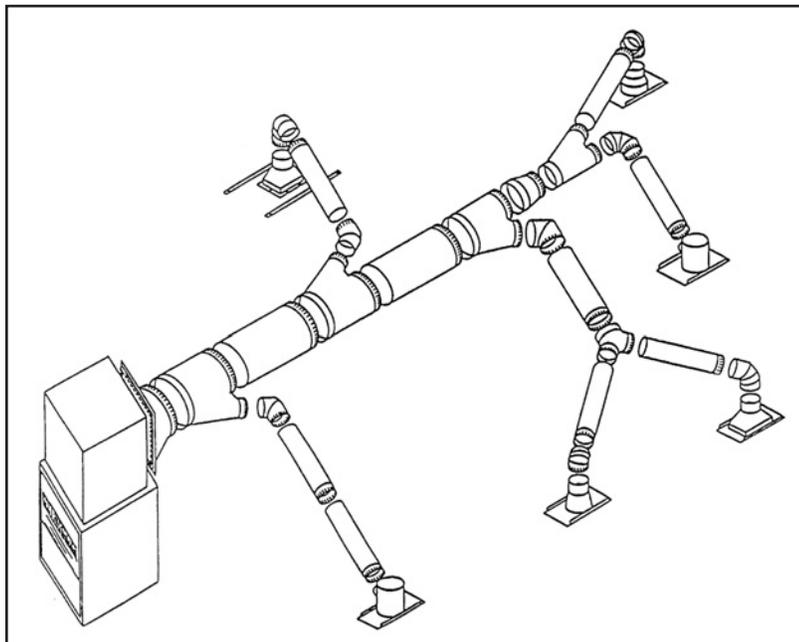
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Extended Plenum System



Round Duct System



Product Checklist

	Qty.	Size
Plenum		
Custom Plenum	_____	_____
Universal Plenum	_____	_____

Main Trunk Line

Rectangular Duct	_____	_____
Round Pipe	_____	_____
Rectangular		
Reducers	_____	_____
Rectangular		
S.W. Elbow	_____	_____
Rectangular		
B.W. Elbow	_____	_____
Drive Cleats	_____	_____
“S” Cleat	_____	_____
Rectangular		
End Cap	_____	_____
Duct Hanger	_____	_____
Rectangular		
Starting Collar	_____	_____

Branch Runs

Round Pipe	_____	_____
90° Elbow	_____	_____
Damper	_____	_____
Pipe Bracket	_____	_____
90° Vent Saddle	_____	_____
Round Starting Collar	_____	_____
90° Tee	_____	_____
Round Reducer	_____	_____
Branch Wye	_____	_____
Perimeter Boot-90°	_____	_____
Perimeter Boot-End	_____	_____
Perimeter Boot-Straight	_____	_____

Return Air

	Qty.	Size
Return Air Drop	_____	_____
Return Air Drop	_____	_____
Joist Panning	_____	_____
Joist Pan Header	_____	_____

Wall Stack

Wall Stack	_____	_____
Stack Boot-End	_____	_____
Stack Boot-Straight	_____	_____
Stack Boot-90°	_____	_____
Register Stack Head	_____	_____

Black Smoke Pipe

Pipe	_____	_____
Endcap	_____	_____
Elbows	_____	_____
Trim Collar	_____	_____
Connectors	_____	_____
Round to Oval Transitions	_____	_____

Misc.

Adjustable Roof Flashing	_____	_____
Rain Cap	_____	_____
Non-Adjustable Rain Cap	_____	_____
Fresh Air Intake	_____	_____
Insulated Flex	_____	_____
Recessed Dryer Vent Box	_____	_____
Multi-Cut Hole Cutter	_____	_____
May-Aire Fresh Air Exchange	_____	_____



Introduction

The information supplied is designed to provide a basic understanding of an air distribution system and the components required to successfully complete an entire ductwork installation.

The installation guide is broken into **4 stages**.

- 1. Plenum**
- 2. Main Trunk Line**
- 3. Branch Runs**
- 4. Return Air**

Each stage consists of:

What it Does? Where it Goes? Components Required? How to Install?

KEYS for SUCCESS

At the end of each stage a **KEYS for SUCCESS** box will appear which is designed as important reminders to the installer to ensure a successful installation. It is important to read the entire installation manual prior to beginning.

According to NHRAW (North American Heating, Refrigeration & Air conditioning Wholesalers) the goals for any finished duct system are:

- 1.** The system is reasonably air tight.
- 2.** The system is noise/vibration free.
- 3.** The system minimizes resistance to air flow.
- 4.** The system is economical.

Keep each of the **4 goals** in mind as you begin the installation of your duct system.



Preparation

As with any project, it is important to plan ahead to ensure a successful installation.

To assist in the planning, a set of questions has been prepared to provide direction and to help avoid any unforeseen problems that may arise. It is important to answer each question before you begin the actual installation.

1. What equipment will be needed to complete the installation?

Although each installation may vary, the tools/supplies listed below provide a good foundation to work from:

- hammer
- sheet metal screws
- sabre saw
- screwdriver
- metal hangers
- tin snips
- duct, pipe & fittings*
(*will vary by installation)

2. How much ductwork will be needed to complete the installation?

3. What is the best location for outlets and inlets?

4. What is the most efficient pathway for routing the duct?

5. What type of return air system will be utilized?

6. How much air will be required for each room?



STAGE 1

What it Does?

The plenum is the central collecting chamber of the conditioned fresh air leaving the furnace.

Where it Goes?

The plenum is the first stage of the ductwork system.

The plenum is attached to the supply air opening of the furnace.

Components Required?

The only component required for this stage of the installation is a plenum kit assembly which should provide you with all of the necessary components needed.

How to Install?

The plenum is manufactured in two designs, a *Universal Plenum* and the *Custom Plenum*.

The *Universal Plenum* allows the installer to trim the panels to fit the appropriate size required, for any brand furnace.

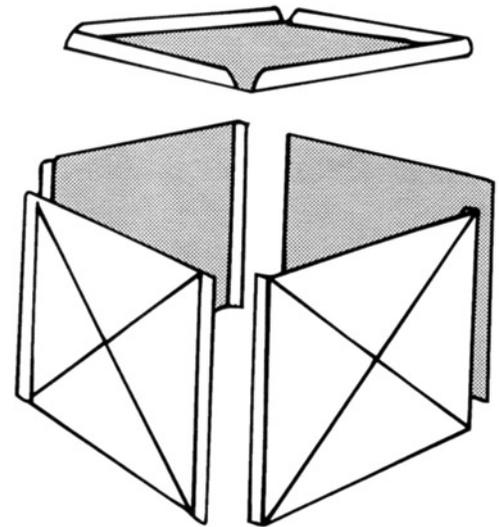
The *Custom Plenum* is manufactured to the exact dimensions specified to fit all furnaces.



Plenum Kit Assembly

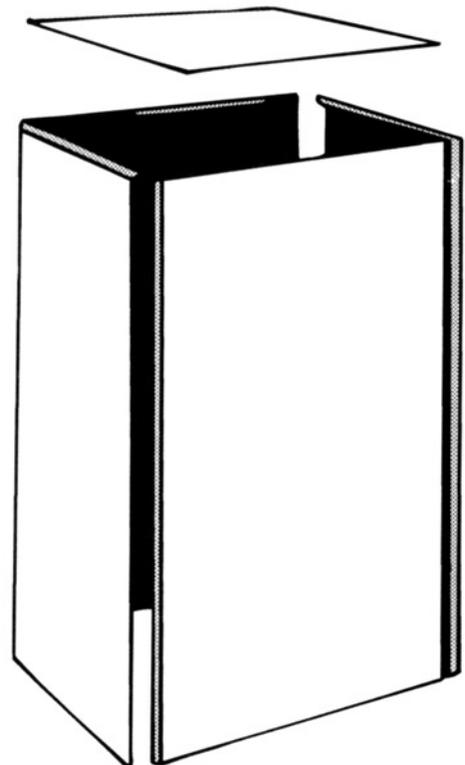
Custom Plenum

1. Assemble 3 panels together by sliding the flat edges into the slots.
2. Insert top panel into position.
3. Place final side panel into position.
4. Secure with sheet metal screws along edges.



Universal Plenum

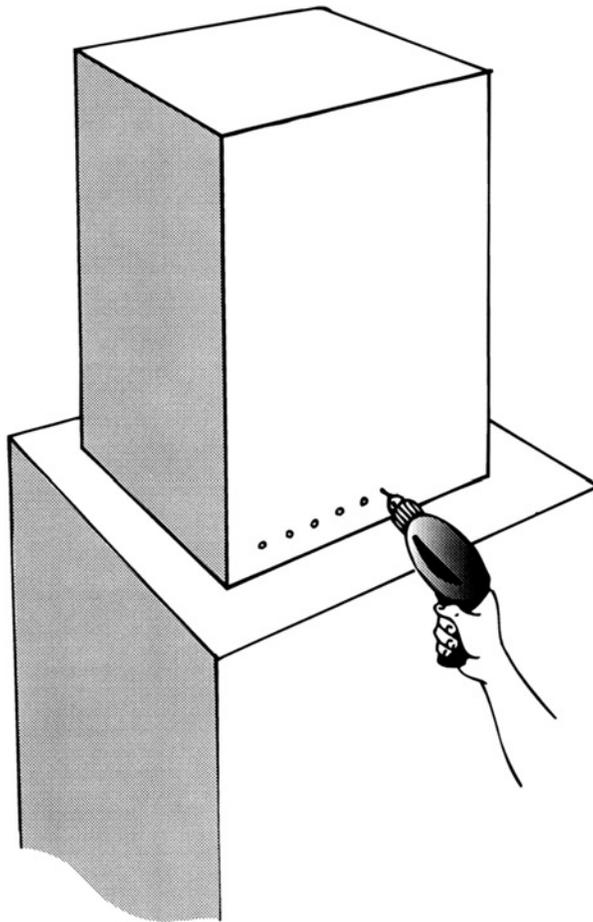
1. Determine the appropriate dimensions
2. Trim necessary panels to fit dimensions
3. Assemble side panels.
4. Secure with sheet metal screws.
5. Position and secure top panel.



Note: It is not recommended that the height of the plenum be reduced unless required due to space restrictions.

Plenum to Furnace Assembly

After the plenum has been assembled the plenum must now be secured to the furnace. The installer must first determine whether the furnace is an upflow or downflow furnace. On an upflow furnace the plenum is secured to the top of the furnace. Once the furnace type is established the installer simply places the plenum over the supply air opening of the furnace and secures the plenum with sheet metal screws along the bottom edges.



KEYS of SUCCESS

 Trunk lines should only come off the sides of the plenum rather than the top.

 Trunk Lines must come off the plenum at least 6" below the top of the plenum in order to maximize air mixing.

Main Trunk Line

STAGE 2

Prior to the installation of the main trunk line it is important to determine how many supply outlets will be required in order to design the main trunk line to incorporate necessary reductions.

What it Does?

The main trunk line is the central distribution source for conditioned air leaving the plenum.

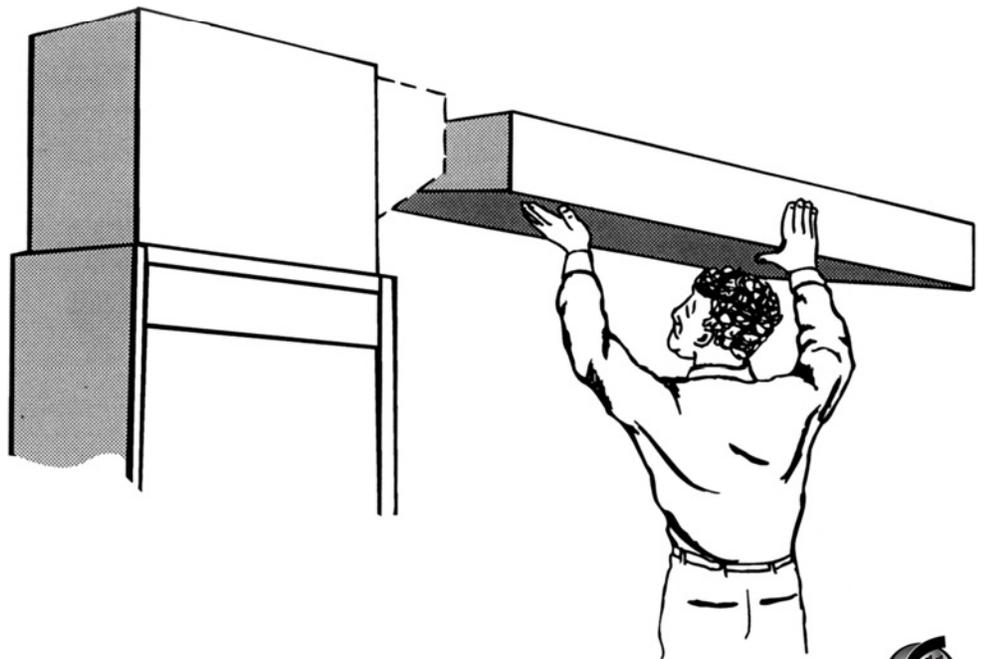
(This type of system is sometimes referred to as the extended plenum system).

Where it Goes?

The main trunk line is attached to the plenum and extends the entire length of the home. In most installations, the furnace will be centrally located with the main trunk line extending in both directions. Depending on the climate of the installation, the main trunk line may run above the ceiling or below the floor.

Components Required?

- starting collar or takeoff
- round or rectangular duct
- metal hangers
- sheet metal screws
- end cap
- trunk transition



Main Trunk Line

Rule of Thumb:

The width required for a section of rectangular duct is determined by counting the number of outlets that section will be required to serve. Multiply the outlet number by two and then add two. This total will be the width in inches required to properly heat/cool the room while maintaining a constant airflow pressure.

Note: The above calculation is used when installing 6" around pipe (standard) off the main trunk line.

Example: A section of duct will serve 5 supply air outlets. Six inch pipe will be used for branch runs. The width of the duct should be:

$$5 \text{ (supply air outlets)} \times 2 = 10$$

$$10 + 2 = 12$$

This section would require a 12" x 8" piece of duct.

*8" is standard rectangular duct height.

How to Install?

1. Attach a starting collar or takeoff to the plenum.

(a) cut hole in the plenum to match dimensions of the fitting.

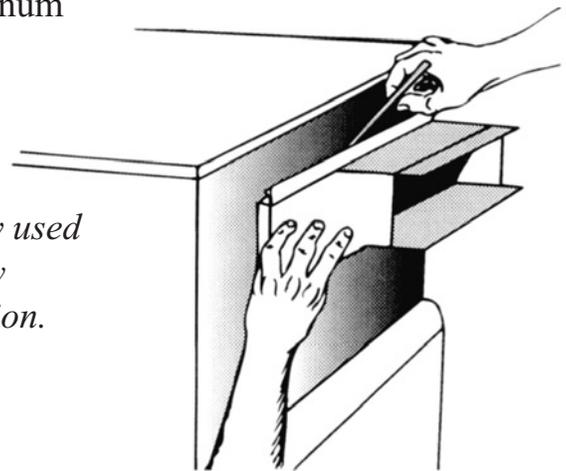
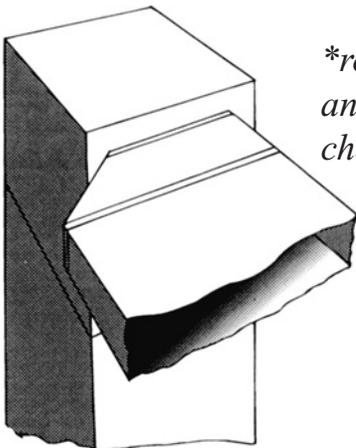
(b) position fitting in plenum hole, fold back tabs of fitting to secure into position.

*Be sure to attach fitting 6 inches from the top of the plenum

***DO NOT** install fittings on top of plenum

2. Secure main trunk line to the starting collar/takeoff

**rectangular duct is most commonly used and recommended due to its air flow characteristics and ease of installation.*

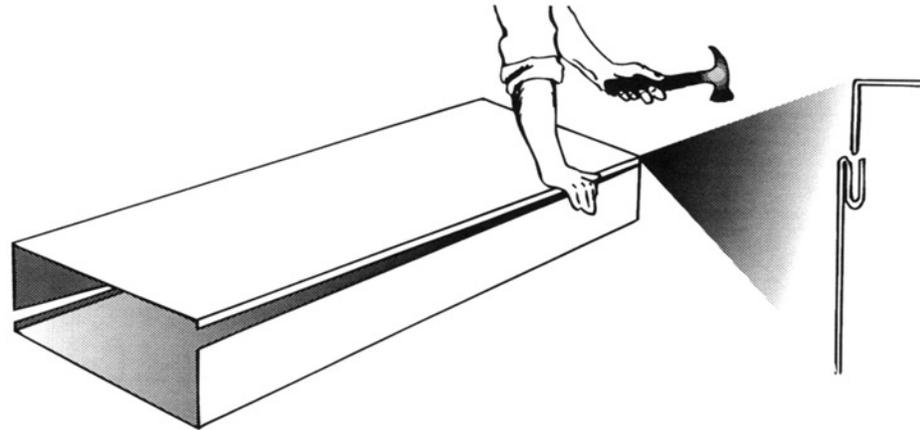


Rectangular Duct Assembly

Rectangular duct is manufactured in “L” shaped pieces which are connected using a snaplock system.

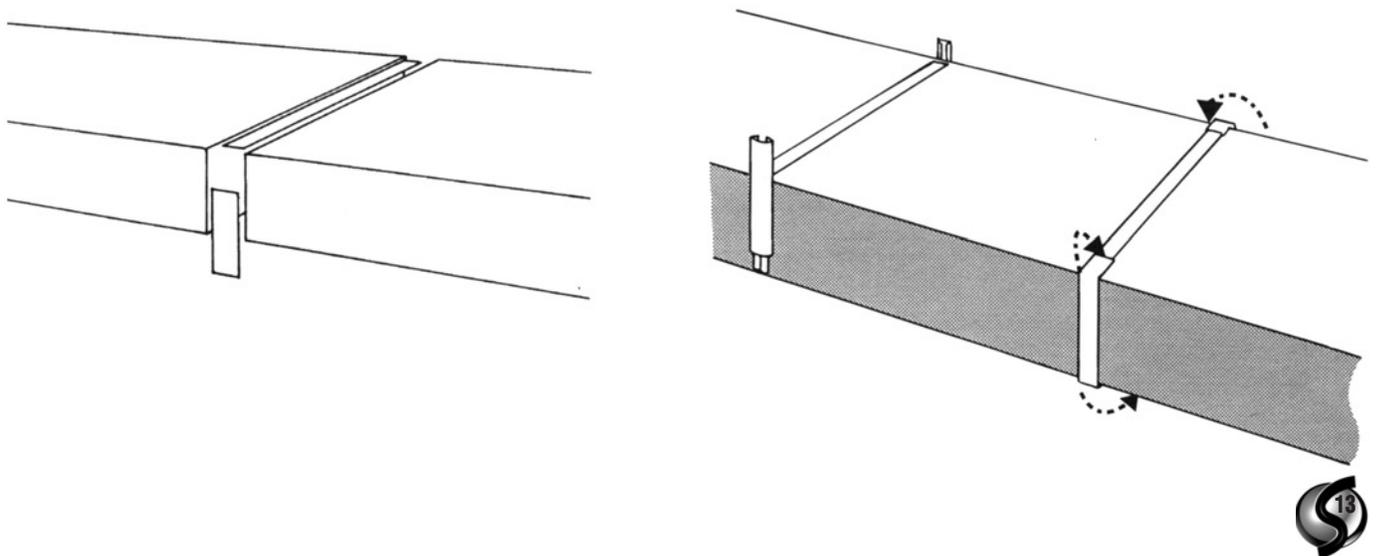
(a) Assemble rectangular duct.

1. place one half on the floor
2. Position the second half on top of the first half.
3. At one end, line up the edges and slide the tongue and groove into position.
4. Secure in place by gently tapping the edges with a hammer.



(b) Connect two sections of assembled duct using “S” and drive cleats.

“S” and drive cleats are metal attachment connectors that help to assemble the top and bottom sides (“S”) and the left and right sides (drive). Drives are typically 2” longer than the duct section allowing the extra 1” on each side to be bent over to secure the section.

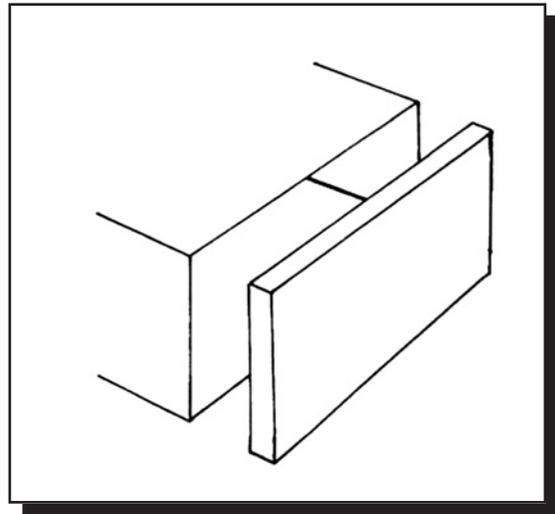
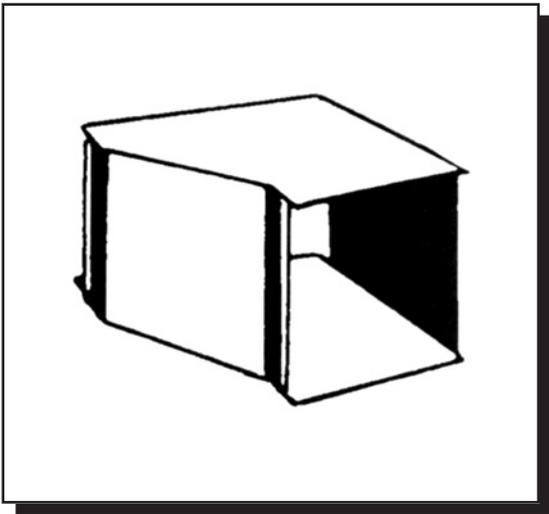


Main Trunk Line

- (c) Assemble the remainder of the predetermined amount of duct incorporating transition/reducer at points where a takeoff is to be installed.

A transition/reducer is installed to maintain a balanced pressurized air flow system. When a takeoff or takeoffs are installed on a section of the main trunkline, the airflow pressure at that point is thus reduced requiring a smaller amount of duct to distribute the conditioned air.

- (d) At the end of the duct run, install a rectangular end cap to halt the air flow at that point.



- (e) Fasten the duct to the floor joists using metal hangers or other appropriate fasteners.

In most installations the main trunk line is routed through the center of the home, either in the basement or the attic. When a necessary turn in the main trunk line is required, a short way or long way elbow may be used.

KEYS to SUCCESS

-  Avoid as many turns in the main trunk line as possible
-  Plan for the locations of branch runs that will takeoff from the main trunk line in order to install necessary transitions/reducers in the main run.

Branch Runs

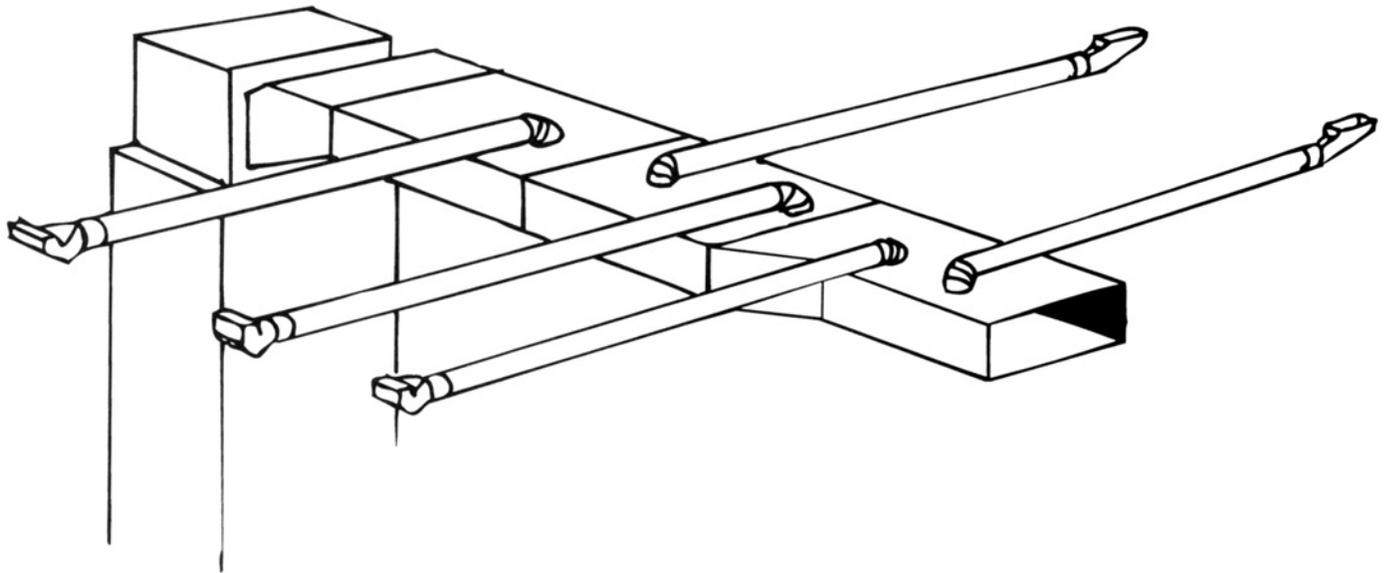
STAGE 3

What it Does?

Branch Runs are used to distribute the conditioned air from the main trunk line to the predetermined supply air outlets in the floor or wall.

Where it Goes?

The Branch Run is attached to the main trunklines and is routed to the designated supply outlet.



Components Required?

- Starting collar or takeoff
- 6" round pipe or other appropriate pipe
- Metal hangers
- Elbows
- Perimeter boots
- Sheet metal screws

Branch Runs

How to Install?

The number of branch runs required will vary by each installation.

The first step in the branch run installation is to install necessary boot or fitting into the predetermined supply air outlet location.

Colder Climates

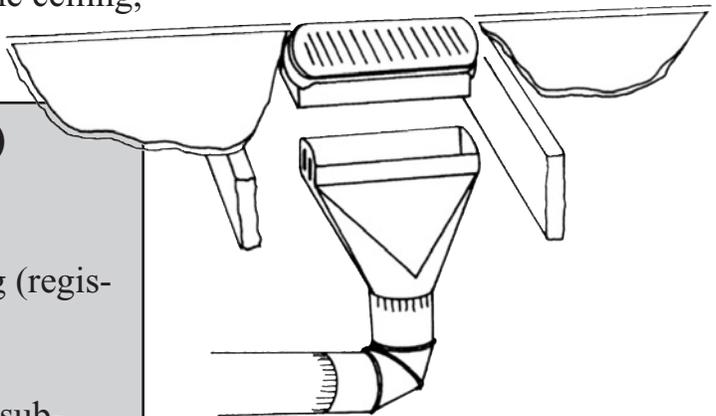
The supply air register should be located on the floor near an outside wall, preferably under a window in order to minimize drafting.

Warm Climates

The supply air register should be located on the ceiling, for optimum air conditioning performance.

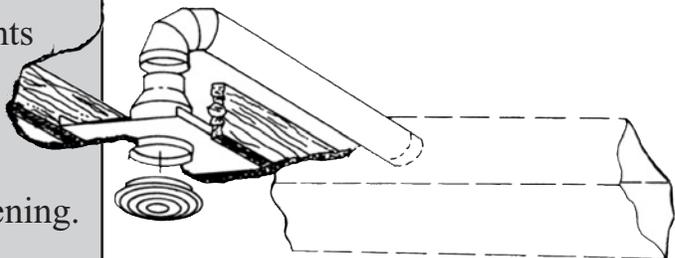
Floor Installation (Colder Climates)

1. Locate floor joists
2. Determine the location of the outlet.
3. Trace the rectangular opening of the fitting (register boot) on the floor
4. Use a key hole or sabre saw to cut out the tracing, cutting through both the floor and sub-floor.
5. Smooth sides of the opening with a coarse file.
6. Install fittings (register boot) by nailing into the sub floor at each end of the boot opening.



Drop Ceiling Installation

1. Locate both the wall studs and the ceiling joists
2. Determine the location of the outlet.
3. Trace the rectangular fitting of the opening onto the ceiling.
4. Use a key hole or sabre saw to cut out the opening.
5. Smooth sides of the opening.
6. Install fitting. (Ceiling diffuser or register box)



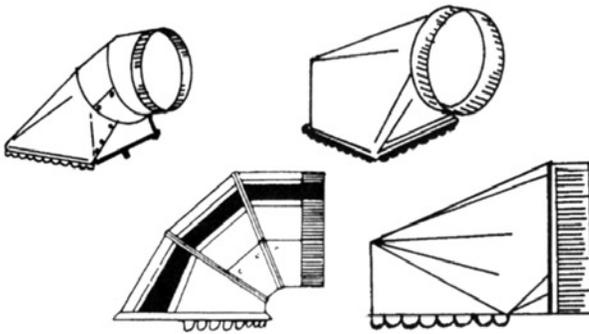
Branch Runs

Once the boot has been secured into position, the next step is to install the branch run.

1. Attache a top takeoff or side takeoff to the main trunkline. The takeoff required will vary by each installation.

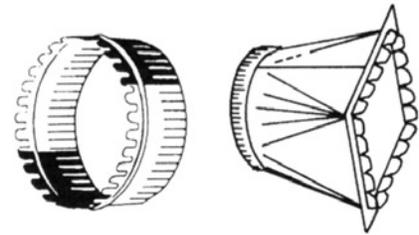
Top-Takeoff

- typically rectangular to round or round to round
- adjustable or non-adjustable
- various rises

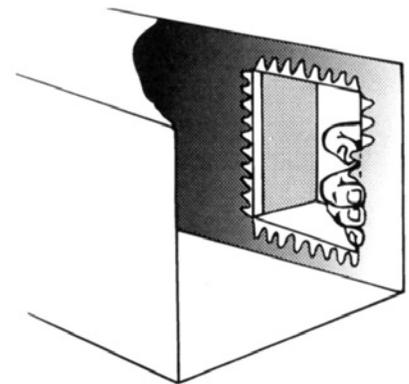
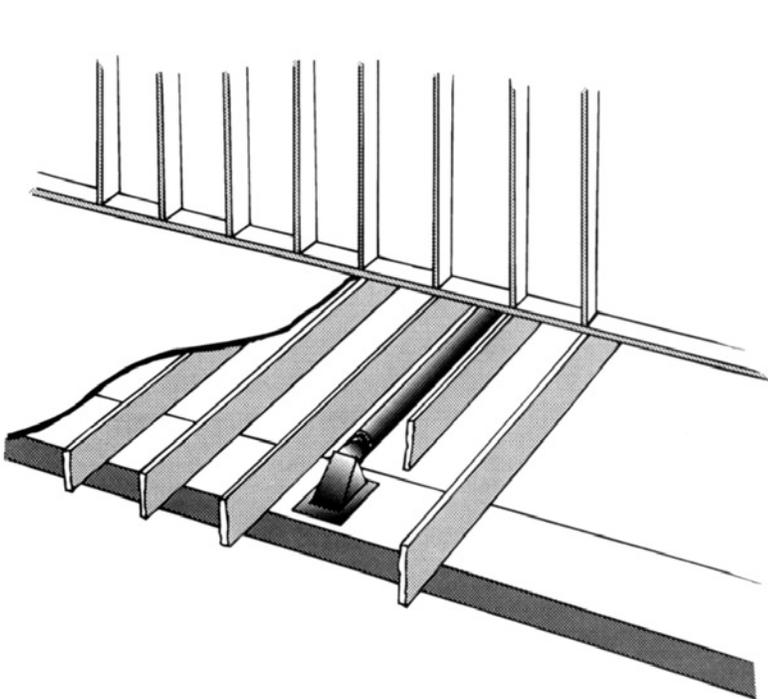


Side-Takeoff

- used when there is not sufficient room between the main trunk line and the floor.



2. Cut the appropriate opening in the main trunk line and secure the takeoff into position. Most takeoffs are manufactured with tabs that are used to secure the fitting.



Note: in basement installations, be sure there is sufficient room between the floor and the main trunk line to install a top-takeoff.

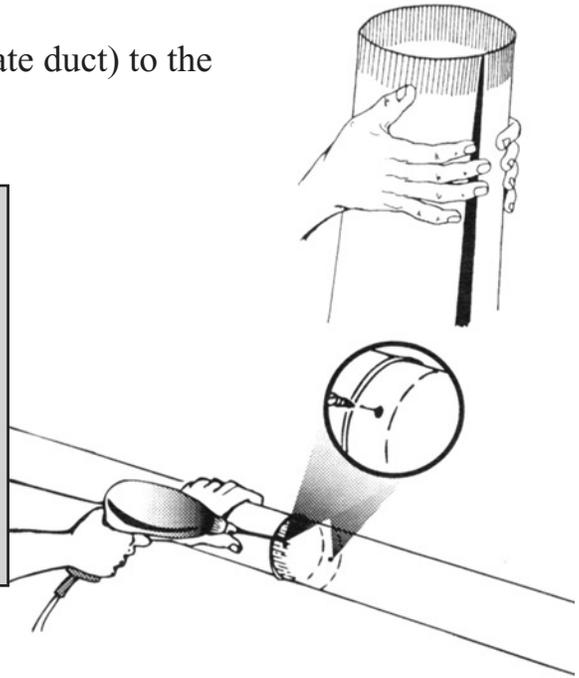


Branch Runs

3. Attach 6" round galvanized pipe (or other appropriate duct) to the take-off. Secure using sheet metal screws.

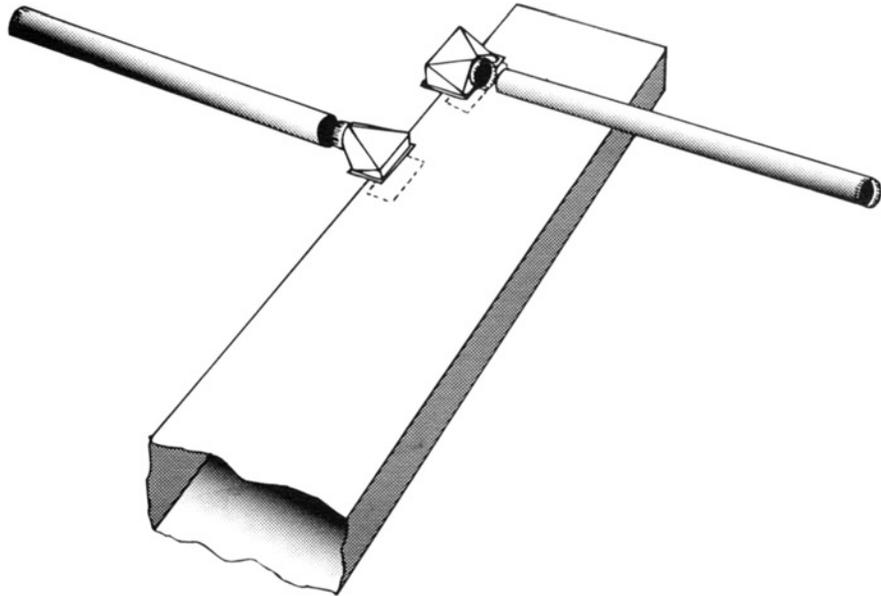
Pipe Assembly

1. Hold pipe with both hands.
2. Start with one end and lock together as you slide down the pipe.
3. To join two sections of pipe simply insert the crimped end of one pipe to the smooth end of another section of pipe. Secure with sheet metal screw or other appropriate fasteners.



4. Attach the second end of the pipe to the fitting (register boot) in the supply outlet location.

Note: Various fittings such as elbows and angles may be required to efficiently run to the supply outlet.



KEYS of SUCCESS

- ⚙️ Avoid as many turns as possible when installing the branch run.
- ⚙️ Proper positioning of supply air outlets is essential to reach maximum efficiencies for the system
- ⚙️ The crimped end of the pipe should always face the register boot.

STAGE 4

What it Does?

For every cubic foot of air the system delivers to the home, an equal amount of air must be returned to the furnace. The return air system is designed to redirect air that has been circulated throughout the home, back to the furnace where it can be reconditioned and delivered back into the supply air.

Where it Goes?

The return air is directed from predetermined return inlets and is directed back to the furnace. In homes where air can easily locate in one central area, one central return may suffice.

Components Required?

Many of the same components used on the supply side of the system can be used to redirect air back to the furnace.

- return air drop assembly
- joist panning
- adjustable pan header
- sheet metal screws
- return air grille

How to Install?

The principles and components used in the supply side distribution can be utilized on the return air side.

1. The first step in the return air system is to install the Return Air Drop Assembly.

In most installations the return air system is installed at a ceiling level and the return air inlet on the furnace unit is located near the floor. This type of installation requires a Return Air Drop Assembly which consists of a collar, 2 sections of duct, slips and drives, and a return elbow.

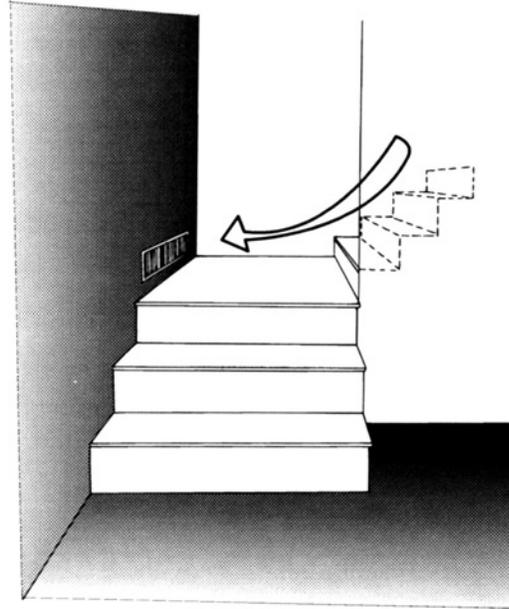
Assembly & Installation

1. Install the return air elbow to the return air opening in the furnace. Insert the return air elbow and fold back tabs.
(The installer may have to cut out the return air opening in the furnace)
2. Using slips and drives, connect one section of duct to the elbow.
3. Continue by connecting the second piece of duct.
4. Complete the installation by installing the collar fitting.

Return Air

2. The second step in the return air system is to locate and install the return air intake grille.

The location of return air grilles should be in low traffic areas on an inside wall.



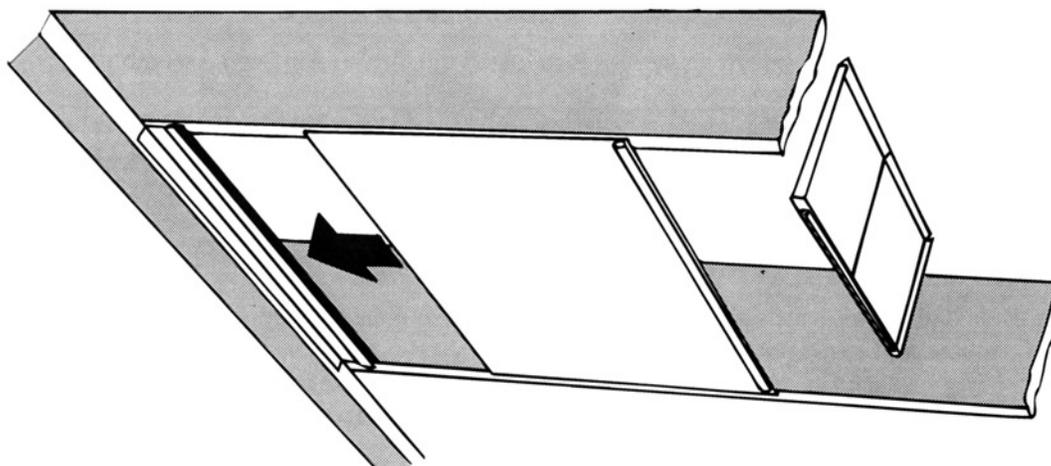
3. The third and final step of the return air installation is to join the return air grille and the return air drop assembly. This can be accomplished utilizing the wall studs, floor joints, and rectangular duct.

Wall studs and floor joints are utilized in place of duct for the return air system.

- (a) The air is drawn through the return air grille into the wall cavity down to the floor joist.
- (b) Joist panning is used to seal off the underside of the floor joists where the return air is directed to a section of rectangular duct.

(Joist panning is cut in 3' lengths and in widths to space across wood floor joists.)

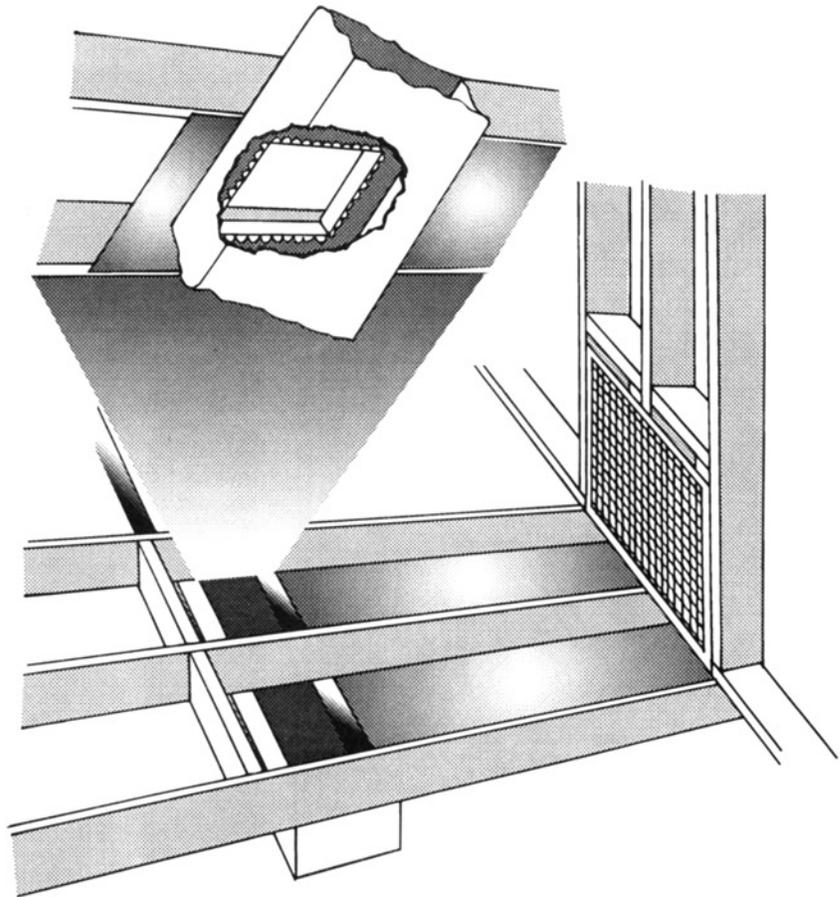
(An adjustable joist pan header is used to seal off the end of a joist.)



Return Air

3. (cont.)

- (c) A collar fitting is used to connect the joist panning to the rectangular duct.
- (d) Connect the rectangular duct to the collar of the *Return Air Assembly*.



KEYS to SUCCESS

-  Residential codes permit joist and panning installations as return air pathways only. These pathways should not be used for supply air.
-  Many of the same components and principles used in the supply side distribution can be utilized in the return air installation.
-  An effective location for the return air inlets will ensure maximum efficiencies.

Remember, these are basic duct installation instructions. Specific questions or problems should be directed to a qualified installer or contractor.



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