

## Product Features and Benefits

### Full Product Line Offering

#### Feature

- All models are 80% thermally efficient
- Blower performance up to 3.0" W.C.
- DX or chilled water section with factory installed coil
- Building management system compatible controls
- Safety control devices (Smoke detectors and gas safety switches)
- Input ranges from 75,000 to 1,200,000 Btu/Hr

### Easy Installation

#### Feature

- Separate line and low voltage terminal strips (premium units) or low voltage terminal connections (standard units)
- Dead front disconnect switches

### Easy to Service

#### Feature

- Job specific wiring diagrams
- Gas manifold positioned to allow for easy burner/pilot access
- Design provides simplified heat exchanger removal
- Gas manifold designed for easy orifice inspection

#### Benefit

- Saves fuel compared with less efficient equipment
- Applications can include longer ductwork lengths or accessories with higher pressure drops
- One unit can provide both heating and cooling
- Allows for energy savings by operating the unit only during the required time periods
- Insures the safety of the building occupants
- Flexible units to accommodate a variety of heating requirements

#### Benefit

- Allows for quick and accurate field wiring connections
- Saves labor time compared to field mounting a box type disconnect switch

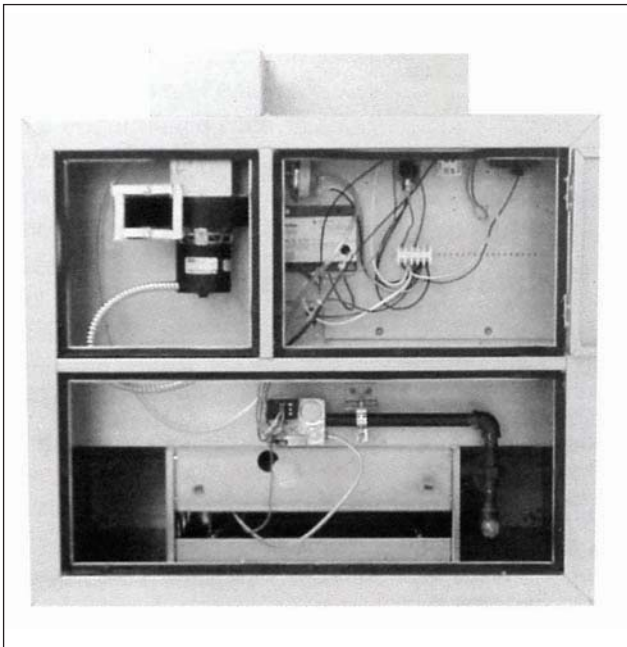
#### Benefit

- Allows for easy troubleshooting
- Prevents the need to disconnect the gas piping when servicing the burner
- The heat exchanger can be removed without disconnecting the gas, electrical, or ductwork connections (separated combustion and outdoor units)
- Simplifies the service inspection process

**Indoor Separated Combustion (DFS)****For Heating, Heating/Cooling and Make-Up Air Systems**

The indoor separated combustion duct furnace was designed for use with a building's heating, heating/cooling and make-up air systems. Separated combustion duct furnaces are specifically designed for buildings with hostile atmospheric conditions, such as high humidity, or negative pressures. Available in 11 power exhausted model sizes, the unit covers a wide variety of applications. They have input ranges from 75,000 to 400,000 Btu/Hr and can operate on either natural or propane gas. The airflow direction can be specified when ordering the unit. The duct furnace is certified for location either upstream or downstream from cooling coils and has a drain pan that allows connection to a condensate drain line.

**Figure 5.1**  
**Indoor Separated Combustion Duct Furnace (DFS)**

**Standard Features:**

- CSA certification for use in the US and Canada
- ETL certification
- 80% thermally efficient
- Power exhaustor motor
- Separate electrical, venting, and gas control access with fully gasketed doors
- 20 gauge aluminized steel cabinet
- 115V control step down transformer with 24V gas controls
- Aluminized steel heat exchanger
- Aluminized steel burner with stainless steel separator strip
- Certified to 3.0" W.C. external static pressure
- Single stage intermittent pilot with continuous retry control system for operation on natural gas
- Differential pressure switch for proof of combustion air
- Power exhaustor relay for pre-purge and post-purge
- Separate line voltage and low voltage terminal strips
- Right side access to burner and gas controls (when looking into the discharge) with slide-out burner drawer
- Side or bottom gas connection access
- High limit safety control

**Optional Features - Factory Installed**

- 409 stainless steel heat exchanger and burner
- 409 stainless steel drip pan
- Single stage intermittent pilot with continuous retry control system for operation on propane gas
- Two-stage, mechanical modulation, and electronic modulation controls for either natural or propane gas
- Building management compatible gas controls for modulation control using a 0-10 Vdc or 4-20 mA input
- Multiple furnace electronic amplifier for controlling up to 4 duct furnaces with one discharge air sensor
- Gas control step down transformers for 208/230V/1Ph and 208/230/460/575V/3Ph
- Left side access to burner and gas controls
- Adjustable differential air flow proving system
- Fan delay timer
- High and/or low gas pressure switches
- Manual reset high limit switch
- Timed freeze protection
- Supply air fire stat
- Control relay - double pole, double throw
- Installed thermostats - two-stage and electronic modulation

**Accessories - Field Installed**

- Concentric vent kits—horizontal and vertical (see page 6)
- Power exhaustor step down transformers for 460V and 575V
- Electronic programmable heat/cool room thermostats—for single and two stage units
- Smoke detector
- 7-day digital and 7-day econo time clocks
- Single-stage room thermostats
- Two stage room and duct thermostats
- Electronic two stage duct thermostats
- Electronic modulating room and duct thermostats and a room override for the duct thermostat
- Summer/winter switch
- Condensate connection drain kits
- Pipe hanger adapter kits
- 5-10 PSI gas pressure regulator
- Room thermostat guards

**Special Applications**

A 409 stainless steel heat exchanger and burner is recommended when the unit is installed downstream of a cooling coil or evaporative cooler, and when the combined entering/return air to the unit is below 40°F.

**Variable Air Movement Applications**

When the air mover supplied by others can provide variable air movement (i.e. 2-speed or variable frequency drive units), the certified allowable minimum CFM of the separated combustion duct furnace can be 66% of the minimum listed CFM in Table 8.2 if the unit is applied as follows:

1. The unit is provided with two-stage, mechanical modulation, or electronic modulation gas controls.
2. The unit is provided with a factory installed discharge air controller.
3. The system does not include a room thermostat.

The factory installed discharge air thermostat will prevent the unit from firing above the allowable 100°F rise when the unit is at or above the minimum CFM by monitoring the discharge air and going to low fire. A room thermostat cannot be used, because it is located remote from the unit, and could cause the unit to over-fire.

Separated combustions indoor duct furnaces can be supplied with one of the following vent termination methods:

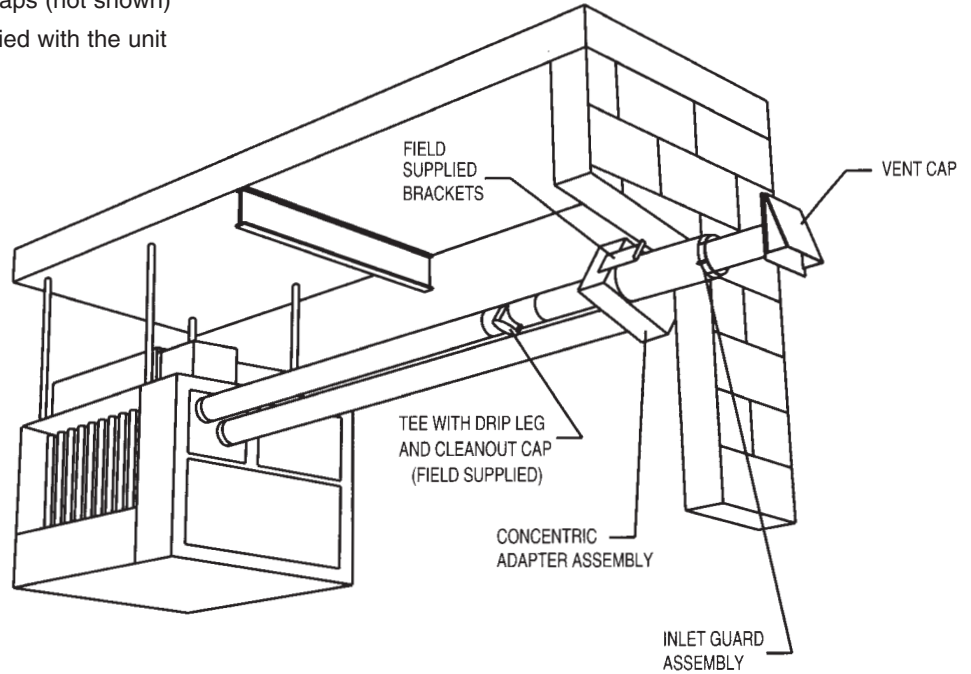
- Horizontal Concentric Venting — Figure 6.1
- Vertical Concentric Venting — Figure 6.2
- Separate Vent pipes — Includes 2 vent caps (not shown)

The vent termination method must be supplied with the unit and specified at the time of ordering.

**Figure 6.1**  
**Horizontal Concentric Venting:**

Kit includes:

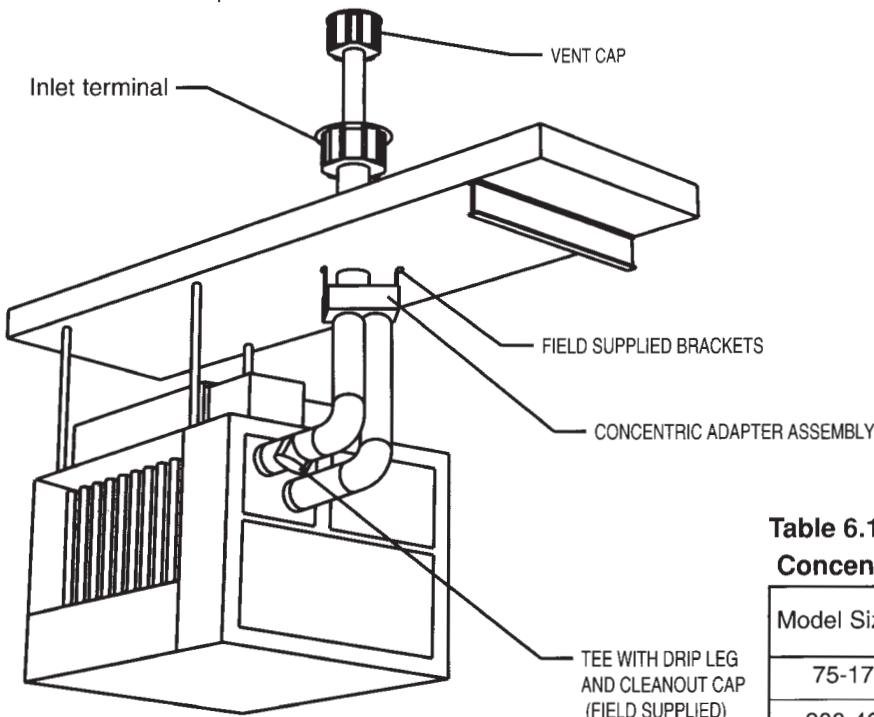
- Concentric adapter assembly
- Vent termination cap
- Inlet guard assembly



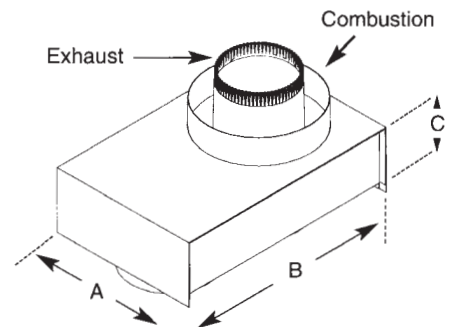
**Figure 6.2**  
**Vertical Concentric Venting:**

Kit includes:

- Concentric adapter assembly
- Vent termination cap
- Inlet terminal cap



**Figure 6.3**  
**Concentric Adapter Assembly**  
(Requires field supplied mounting brackets)

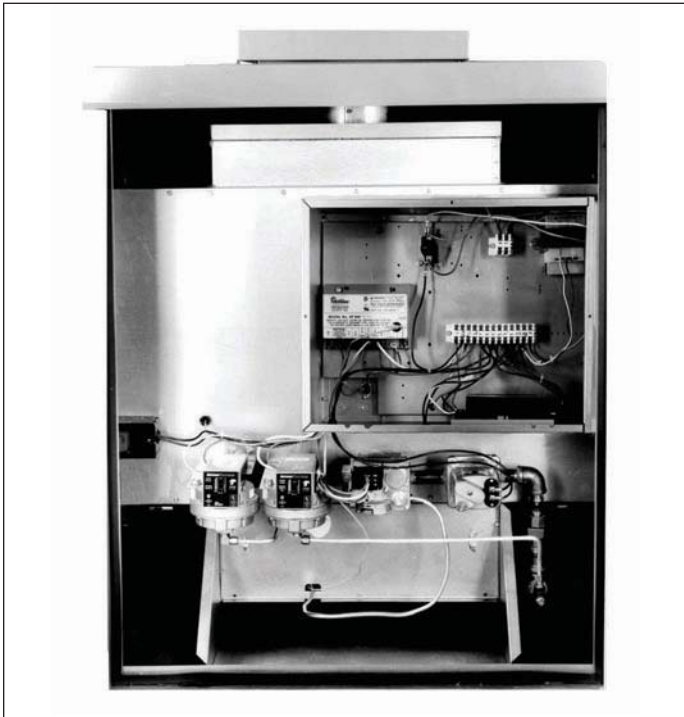


**Table 6.1**  
**Concentric Adapter Box Dimensions**

Model Sizes	A	B	C	Concentric Side	
				Exhaust	Combustion
75-175	8 <sup>1</sup> / <sub>4</sub> "	11 <sup>3</sup> / <sub>4</sub> "	4"	4"	6"
200-400	10 <sup>1</sup> / <sub>2</sub> "	16"	4"	6"	8"

**Outdoor Gravity & Power Exhausted (HFG/HFP)****For Heating, Heating/Cooling and Make-Up Air Systems**

The outdoor duct furnace was designed for use with a building's heating, heating/cooling and make-up air systems. Available in 11 gravity vented or power exhausted model sizes, the unit covers a wide variety of applications. They have input ranges from 75,000 to 400,000 Btu/Hr and can operate on either natural or propane gas. The airflow direction can be specified when ordering the unit. The duct furnace is certified for location either upstream or downstream from cooling coils and has holes to drain any condensate that may form onto the roof.

**Figure 7.1****Outdoor Duct Furnace (HFG)****Standard Features:**

- C.S.A. certification for use in the US and Canada
- ETL certification
- All units a minimum of 80% thermally efficient
- 18 gauge aluminized steel cabinet with a baked-on polyester powder paint finish on exterior casing parts
- Single 115V control step down transformer with 24V gas control circuit
- Aluminized steel heat exchanger
- Aluminized steel burner with stainless steel separator strip
- Certified to 3.0" W.C. external static pressure
- Combination combustion air/exhaust vent cap
- Single stage intermittent pilot with continuous retry control system for operation on natural gas.
- Separate line voltage and low voltage terminal strips
- Right side (when looking into the discharge) access to burner and gas controls with slide-out burner drawer
- Side or bottom gas connection access
- High limit safety control
- Rail type mounting base for slab installation

**Optional Features - Factory Installed**

- Power exhaust
- 409 stainless steel heat exchanger and burner
- 409 stainless steel drip pan
- Single stage intermittent pilot with lockout control system for operation on propane gas
- Two-stage, mechanical modulation, and electronic modulation controls for either natural or propane gas
- Building management compatible gas controls for modulation control using a 0-10 Vdc or 4-20 mA input
- Multiple furnace electronic amplifier for controlling up to 4 duct furnaces with one discharge air sensor
- Control step down transformers for 208/230V/1Ph and 208/230/460/575V/3Ph
- Left side access to burner and gas controls
- Adjustable differential air flow proving system
- Fan delay timer
- High and/or low gas pressure switches
- Manual reset high limit switch
- Timed freeze protection
- Supply air fire stat
- Control relay - double pole, double throw
- Installed thermostats - two-stage and electronic modulation

**Accessories - Field Installed**

- Electronic programmable heat/cool room thermostats - for single and two stage units
- Smoke detector
- 7-day digital and 7-day econo time clocks
- Single-stage room thermostats
- Two stage room and duct thermostats
- Electronic two stage duct thermostats
- Electronic modulating room and duct thermostats
- Room override for the duct thermostat
- 4 foot exhaust vent extension
- Summer/winter switch
- 5-10 PSI gas pressure regulator
- Room thermostat guards

**Special Applications**

A 409 stainless steel heat exchanger and burner is recommended when the unit is installed downstream of a cooling coil or evaporative cooler, and when the combined entering/return air to the unit is below 40°F.

**Variable Air Movement Applications**

When the air mover supplied by others can provide variable air movement (i.e. 2-speed or variable frequency drive units), the certified allowable minimum CFM of the outdoor duct furnace can be 66% of the minimum listed CFM in Table 8.2 if the unit is applied as follows:

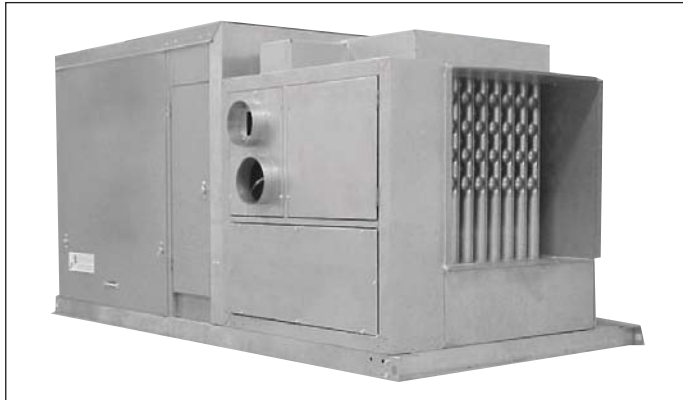
1. The unit is provided with two-stage, mechanical modulation, or electronic modulation gas controls.
2. The unit is provided with a factory installed discharge air controller.
3. The system does not include a room thermostat.

The factory installed discharge air thermostat will prevent the unit from firing above the allowable 100°F rise when the unit is at or above the minimum CFM by monitoring the discharge air and going to low fire. A room thermostat cannot be used, because it is located remote from the unit, and could cause the unit to over-fire.

## Indoor Separated Combustion For Heating, Heating/Ventilating/Cooling and Make-Up Air Systems

The indoor separated combustion duct furnace with blower, and/or cooling sections was designed for use with a building's heating, heating/ventilating/cooling and make-up air systems. Separated combustion duct furnaces are specifically designed for buildings with hostile atmospheric conditions, such as high humidity or negative pressures. They have input ranges from 75,000 to 1,200,000 Btu/Hr and can operate on either natural or propane gas. The airflow ranges from 556 to 14,500 CFM and the airflow direction can be specified when ordering the unit. The unit can be provided with a cooling coil section with either a factory installed DX or chilled water cooling coil or the coil can be provided by others.

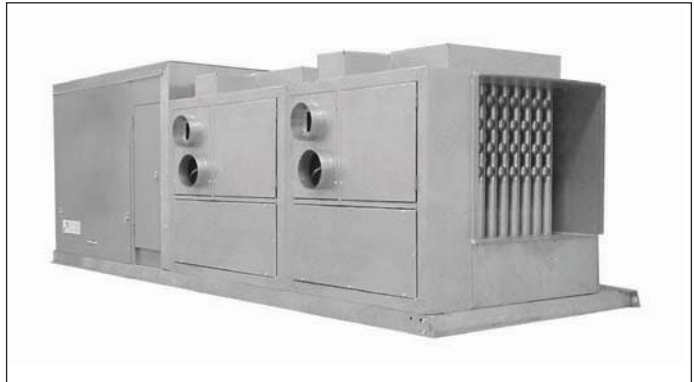
**Figure 16.1**  
**Indoor Separated Combustion Duct Furnace  
with Blower Section (DBS)**



### Standard Features:

- All standard duct furnace features (see page 5)
- ETL certification of the entire system unit
- 18 gauge aluminized steel blower cabinet with a baked-on polyester powder paint finish on blower and cooling cabinet exterior casing parts
- 115V step down transformer with 24V gas controls
- Aluminized steel heat exchanger and burner
- Blower performance up to 3.0" W.C. external static pressure
- Single stage intermittent pilot with continuous retry control system for operation on natural gas
- Separate line voltage and low voltage terminal strips
- Right side access to burner and gas controls (when looking into the discharge) with slide-out burner drawer
- Side or bottom gas and electrical connection access
- Fan timer and high limit safety control
- Combination suspension and slab type mounting
- Adjustable belt drive

**Figure 16.2**  
**Indoor Separated Combustion Multiple Duct Furnace  
with Blower Section (DBS)**



### Optional Features - Factory Installed

- All optional duct furnace features (see page 5)
- DX or chilled water section with optional factory installed cooling coil (see page 62 for performance and CFM ranges)
- 409 stainless steel heat exchanger and burner
- Open drip proof, totally-enclosed, high efficiency, and two speed motors
- Motor starters and contactors with one normally open contact
- Variable frequency drive
- 1" or 2" permanent, 2" disposable, and 2" FARR® 30/30 filters
- 1" Insulation for the blower and/or cooling cabinet sections
- Double wall construction for blower, and/or cooling cabinet sections
- Dead-front disconnect switches
- Two position, modulating, building pressure sensing, three position, building management (0-10 Vdc or 4-20 mA) damper actuators
- Economizer warm-up packages
- Step-down transformers for 460/575V/3Ph
- Left side access to blower, burner, and gas controls
- Mild temperature thermostat
- Supply and return air firestats
- Blower door interlock switch
- Convenience outlet
- Blower and motor vibration isolation
- Pillow block bearings
- Extended grease lines
- Burner/blower/damper service switches
- 6, 10, or 14 point circuit analyzer
- Electronic temperature control allows for two, three, four or six stage control

### Accessories - Field Installed

- All accessory duct furnace features (see page 5)
- Concentric vent kits — horizontal and vertical (see page 6)
- Remote control panels
- Building pressure sensing damper controls
- Smoke detector
- 7-day digital and 7-day econo time clocks
- Single-stage room thermostats
- Two-stage room and duct thermostats
- Electronic two stage duct thermostats
- Electronic temperature control allows for two, three, four or six stage control
- Electronic modulating room and duct thermostats and a room override for the duct thermostat

**Outdoor Gravity Vented & Power Exhausted  
For Heating, Heating/Ventilating/Cooling and  
Make-Up Air Systems**

The outdoor duct furnace with blower, cooling, and/or downturn plenum sections was designed for use with a building's heating, heating/ventilating/cooling and make-up air systems. They have input ranges from 75,000 to 1,200,000 Btu/Hr and can operate on either natural or propane gas. The airflow ranges from 556 to 14,500 CFM and the airflow direction can be specified when ordering the unit. The unit can be provided with a cooling coil section with either a factory installed DX or chilled water cooling coil or the coil can be provided by others.

**Figure 17.1  
Outdoor Duct Furnace with Blower, Cooling Cabinet,  
and Downturn Plenum Sections (HPG)**



**Standard Features:**

- All standard duct furnace features (see page 7)
- ETL certification of the entire system unit
- 18 gauge insulated aluminized steel cabinet with a baked-on polyester powder paint finish on exterior casing parts
- 1" insulation for blower, cooling cabinet, and downturn plenum sections
- Single 115V control step down transformer with 24V gas control circuit
- Aluminized steel heat exchanger and burner
- Blower performance up to 3.0" W.C. external static pressure
- Single stage intermittent pilot with continuous retry control system for operation on natural gas
- Separate line voltage and low voltage terminal strips
- Right side (when looking into the discharge) access to burner and gas controls with slide-out burner drawer
- Side or bottom (through a roof curb) gas and electrical connection access
- Fan timer and high limit safety control
- Combination curb and slab type mounting base
- Adjustable belt drive

**Figure 17.2  
Outdoor Multiple Duct Furnace with Blower  
and Downturn Plenum Sections (HDG)**



**Optional Features - Factory Installed**

- All optional duct furnace features (see page 7)
- Downturn plenum section
- DX or chilled water section with optional factory installed cooling coil (see page 62 for performance and CFM ranges)
- 409 stainless steel heat exchanger and burner
- Open drip proof, totally-enclosed, high efficiency, and two speed motors
- Low voltage motor starters and contactors with one normally open contact
- Variable frequency drive
- 1" or 2" permanent, 2" disposable, and 2" FARR® 30/30 filters
- Double wall construction for blower, cooling cabinet, and/or downturn plenum sections
- Dead-front disconnect switches
- Two position, modulating, building pressure sensing, three position, building management (0-10 Vdc or 4-20 mA) damper actuators
- Economizer warm-up packages
- Discharge air dampers (Downturn plenum units only)
- Step-down transformers for 460/575V/3Ph
- Left side access to blower, burner, and gas controls
- Mild temperature thermostat
- Supply and return air firestats
- Blower door interlock switch
- Convenience outlet
- Evaporative cooling section
- Blower and motor vibration isolation
- Pillow block bearings
- Extended grease lines
- Burner/blower/damper service switches
- 6, 10, or 14 point circuit analyzer
- Electronic temperature control allows for two, three, four or six stage control

**Accessories - Field Installed**

- All accessory duct furnace features (see page 7)
- Remote control panels
- Building pressure sensing damper controls
- Evaporative cooler fill and drain kits
- Insulated roof curbs
- Roof curb discharge and return air connection kits
- Smoke detector
- 7-day digital and 7-day econo time clocks
- Single-stage room thermostats
- Two-stage room and duct thermostats
- Electronic two stage duct thermostats
- Electronic modulating room and duct thermostats
- Electronic temperature control allows for two, three, four or six stage control
- Room override for the duct thermostat