



## Indoor Gas-Fired Make-Up Air Handlers Standard and High Efficiency

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Packaged Unit for Heating, Cooling,  
Ventilating and Make-Up Air Applications





# Features and Benefits

## General

The Trane indoor make-up air handler product line is a packaged air, heating and cooling system, suitable for heating, cooling, ventilating and make-up air applications. These units are designed for indoor use only. Unit sizes range from 900 to 9,800 cfm (0.4-4.6 cu m/s) with 1/2 to 15 hp motor capabilities. These units are available with inputs from 100,000 Btu/h to 1,200,000 Btu/h (29.3 to 351.4 kW).

Duct furnaces are AGA and CGA certified for safety and performance with a range of 100,000 Btu/h input to 400,000 Btu/h (29.3 to 117.1 kW) input per duct furnace. The units can be ordered as heating only, heating with evaporative cooling or packaged heating and cooling systems.

The mechanical configuration is determined by selecting one of the four standard arrangements. Arrangements are divided into two classifications – standard and high cfm blower types.

The standard blower unit consists of a blower cabinet that houses dampers, filters and blower in one cabinet. An optional evaporative cooling unit is available on units up to 800 MBh (234.3 kW). Trane recommends the use of 409 stainless steel whenever evaporative cooling is installed upstream of a duct furnace section(s).

The high cfm blower unit utilizes a separate damper/filter cabinet with a "V" bank filter arrangement, a blower cabinet and up to three duct furnaces (1200 MBh) (351.4 kW). An optional cooling coil cabinet is offered on units up to 800 MBh. Trane recommends the use of 409 stainless steel whenever a coil is used upstream of a furnace section(s). Both standard and high cfm blower arrangements may also include outside air and/or return air.

All units are completely packaged, rail-mounted, wired, piped and test fired to assure a smooth installation and easy start-up.

All furnaces have optional left or right hand access. The maximum discharge air temperature for all duct furnaces is 150 F (66 C).

## Control Options

In addition to a versatile offering of mechanical features, this new unit also offers a wide variety of factory installed control options. Control components are located in the main electrical cabinet. The main electrical cabinet is located out of the airstream as part of the blower transition, between the blower cabinet and the first furnace for both standard and high cfm units. The standard electrical control scheme consists of a solid-state fan time delay, two pre-wired relay sockets for fan on and damper open functions mounted on the unit's main connection board, a solid stage gas ignition system and room or duct thermostats. The units are also equipped with a blower door safety interlock, a 24 VAC circuit breaker, a high temperature limit switch in each furnace section and a reverse airflow switch located in the blower cabinet as standard equipment.

Gas control options range from single stage to six stages of fire, mechanical or electronic modulation and direct digital control (DDC). Air control options offer a similar range of control features from manual dampers to modulating dampers that may include mixed air, dry bulb, pressure sensing, enthalpy control, DDC interface or ASHRAE cycle control arrangements.

Units are available in a standard or high efficiency line. The high efficiency line features an integral flue vent fan and sealed flue collector for improved combustion. It reduces air requirements and wind effects on the system's efficiency. Intermittent pilot ignition reduces pilot gas losses and the flue vent fan allows for horizontal venting through side walls.



# Contents

## Features and Benefits

- AGA and CGA certified duct furnaces
- FM (Factory Mutual) Compliant
- Heating capacities from 100 MBh to 1200 MBh (29.3 kW- 351.4 kW)
- Gravity and power vented furnaces
- Cfm ranges from 900 to 9800 cfm (0.4-4.6 cu. m/s)
- Motor sizes up to 15 horsepower
- ODP motors with high efficiency and totally enclosed options
- Left hand or right hand service access
- Draw-thru coil cabinet with stainless steel drain pan
- Evaporative cooling with standard 8 or optional 12" media (203 or 305 mm)
- Standard 18-gauge cabinets
- Standard 20-gauge aluminized steel heat exchanger
- Standard one-inch washable filters
- Standard single stage combination gas valve
- Standard high temperature limit (each furnace)
- Standard blower door safety interlock switch
- Standard reverse airflow safety switch
- Standard 24-volt circuit breaker
- Standard printed circuit main connection board
- Wiring harnesses with stamped wire numbers
- Solid stage automatic pilot ignition control
- Solid-state fan time delay
- Over 40 standard gas and air control packages



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# Model Number Description

**G S A A 40 G D C D0 N 2 B Q 1 0 1 A 0 ±**  
 1 2 3 4 5,6 7 8 9 10,11 12 13 14 15 16 17 18 19 20 21

### Digit 1 — Gas Heating Equipment

G = Gas

### Digit 2 — Unit Type

S = Indoor Make-Up Air Handler  
 G = High Efficiency Indoor Make-Up Air Handler  
 D = Indoor Duct Furnace  
 L = High Efficiency Indoor Duct Furnace

### Digit 3 — Furnace Type

A = Standard Temp Rise (30-80 F) LH  
 B = Standard Temp Rise (30-80 F) RH  
 S = Special Furnace Type  
 Note: LH = Left Hand RH = Right Hand

### Digit 4 — Development Sequence

A = First Generation

### Digits 5 and 6 — Input Capacity

Single Furnace  
 10 = 100 MBh Input  
 15 = 150 MBh Input  
 20 = 200 MBh Input  
 25 = 250 MBh Input  
 30 = 300 MBh Input  
 35 = 350 MBh Input  
 40 = 400 MBh Input  
 Double Furnace  
 50 = 500 MBh Input  
 60 = 600 MBh Input  
 70 = 700 MBh Input  
 80 = 800 MBh Input  
 Triple Furnace  
 12 = 1200 MBh Input  
 SS = Special unit

### Digit 7 — Venting Type

G = Gravity Venting (All GS Units)  
 P = Power Venting (All GG Units)  
 S = Special Venting

### Digit 8 — Main Power Supply

A = 115/60/1  
 B = 208/60/1  
 C = 230/60/1  
 D = 208/60/3  
 E = 230/60/3  
 F = 460/60/3  
 G = 575/60/3  
 S = Special Main Power Supply

### Digit 9 — Gas Control Option

(Intermittent Pilot Ignition)

A = Single-Stage  
 B = Two-Stage  
 C = Hydraulic Modulating (60-100)  
 D = Hydraulic Modulating (75-200)  
 E = Hydraulic Modulating w/Bypass and limit (60-100)  
 F = Hydraulic Modulating w/Bypass (75-200)  
 G = Electronic Modulating w/Room T-Stat  
 H = Electronic Modulating w/Duct T-Stat  
 J = Electronic Modulating w/Duct T-Stat and Override Room Thermostat  
 K = Electronic Modulating w/External 4-20 mA Input (Furnace 1)  
 L = Electronic Modulating w/External 4-20 mA Input (All furnaces)  
 M = Electronic Modulating w/External 0-10 VDC Input (Furnace 1)  
 N = Electronic Modulating w/External 0-10 VDC Input (All furnaces)  
 P = VAV Control Two-Stage  
 R = VAV Control Three-Stage  
 T = VAV Control Four-Stage  
 U = S-350 2-Stage Modular Electronic Control System  
 W = S-350 3-Stage Modular Electronic Control System  
 X = S-350 4-Stage Modular Electronic Control System  
 Y = S-350 6-Stage Modular Electronic Control System  
 S = Special Gas Control

### Digit 10, 11 — Design Sequence

D0 = Design Sequence

### Digit 12 — Fuel Type

N = Natural Gas  
 P = LP Gas (Propane)  
 L = Natural Gas with 100% Lockout  
 S = Special Fuel type

### Digit 13 — Heat Exchanger Material

1 = Aluminized Steel  
 2 = #409 Stainless Steel (First Furnace Only)  
 3 = #409 Stainless Steel (All Furnace Sections)  
 4 = #321 Stainless Steel (First Furnace Only)  
 5 = #321 Stainless Steel (All Furnace Sections)  
 6 = #409 Stainless Steel Package (First Furnace Only)  
 7 = #409 Stainless Steel Package (All Furnace Sections)  
 8 = #321 Stainless Steel Package (First Furnace Only)  
 9 = #321 Stainless Steel Package (All Furnace Sections)  
 S = Special Heat Exchanger Package

### Digit 14 — Indoor Arrangements

A = Indoor Duct Furnace  
 B = Blower (Standard)  
 D = Blower (Standard) Evaporative Cooler  
 G = Blower (High CFM)  
 K = Blower (High CFM) /Cooling  
 S = Special Rooftop Arrangement

### Digit 15 — Indoor Heating Unit Motor Selection

0 = No Motor (Duct Furnace)  
 A = 1/2 HP w/Contactor  
 B = 3/4 HP w/Contactor  
 C = 1 HP w/Contactor  
 D = 1 1/2 HP w/Contactor  
 E = 2 HP w/Contactor  
 F = 3 HP w/Contactor  
 G = 5 HP w/Contactor  
 H = 1/2 HP w/Magnetic Starter  
 J = 3/4 HP w/Magnetic Starter  
 K = 1 HP w/Magnetic Starter  
 L = 1 1/2 HP w/Magnetic Starter  
 N = 2 HP w/Magnetic Starter  
 P = 3 HP w/Magnetic Starter  
 Q = 5 HP w/Magnetic Starter  
 R = 7 1/2 HP w/Magnetic Starter  
 T = 10 HP w/Magnetic Starter  
 U = 15 HP w/Magnetic Starter  
 S = Special Motor

# Model Number Description

## Digit 16 — Motor Speed

- 0 = No Motor (Duct Furnace)
- 1 = Single Speed ODP 1800 RPM
- 2 = Single Speed TEFC 1800 RPM
- 3 = Single Speed High Efficiency ODP 1800 RPM
- 4 = Single Speed High Efficiency TEFC 1800 RPM
- 5 = 2S1W ODP 1800/900 RPM
- 6 = 2S2W ODP 1800/1200 RPM
- S = Special Motor Speed and Starter

## Digit 17 — Coil Options

- 0 = No cooling Coil selection
- A = DX Coil, 4-Row, Single Circuit
- B = DX Coil, 4-Row, Dual Circuit
- C = DX Coil, 6-Row, Single Circuit
- D = DX Coil, 6-Row, Dual Circuit
- E = Chilled Water Coil, 4-Row,
- G = Chilled Water Coil, 6-Row,
- S = Special Coil

## Digit 18 — Air Inlet Configuration

- 0 = None (Indoor Duct Furnace)
- 1 = Outside Air (OA) Horizontal Inlet
- 3 = Return Air (RA) Bottom Inlet
- 4 = Outside and Return Air (OA/RA)
- S = Special Air Inlet Configuration

## Digit 19 — Air Control and Damper Arrangement

- 0 = None
- A = Outside Air 2 Pos. Motor/SR
- B = Return Air 2 Pos. Motor/SR
- C = OA/RA 2 Pos SR
- E = OA/RA Mod Mtr w/Mixed Air Control/Min Pot/SR
- H = OA/RA Mod Mtr w/Mixed Air Control/SR
- K = OA/RA Mod Mtr w/Min Pot/SR
- M = OA/RA Mod Mtr w/Dry Bulb/Mixed Air Control/Min Pot/SR
- N = OA/RA Mod Mtr w/Enthalpy Controlled Economizer/SR
- P = OA/RA Mod Mtr w/Space Pressure Controller
- R = OA/RA Mod Mtr w/S-350 P Proportional Mixed Air Control/SR
- U = OA/RA Mtr. w/External 0-10 VDC and 4-20 mA Analog Input/SR (External Input)
- W = ASHRAE Cycle I (OA/RA 2 Pos. w/Warm-up Stat/SR
- X = ASHRAE Cycle II (OA/RA Mod w/Warm-up Stat/Mixed Air/min pot/SR
- Y = ASHRAE Cycle III (OA/RA Mod. w/Warm-up Stat/Mixed Air/SR
- Z = Manual Dampers
- S = Special Air Control and Damper Arrangement

## Digit 20

- 0 = Non-California Shipment
- 1 = California Shipment

## Digit 21 — Miscellaneous Options

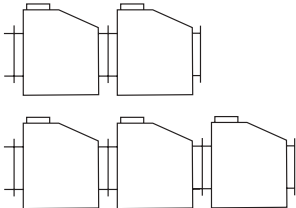
- A = Orifices for Elevation Above 2000 Feet (Specify Elevation)
- B = 12" Evaporative Media (Celdek)
- D = Horizontal Return
- E = Interlock Relay - 24V Coil DPDT 10A
- F = Freezestat
- G = Fan Time Delay (Indoor Duct Furnace)
- H = Return Air Firestat
- J = Supply Air Firestat
- K = Manual Blower Switch
- L = 409 Stainless Steel Furnace Drip Pan
- M = Double Wall Construction
- P = Low Leak Dampers
- Q = Clogged Filter Switch
- R = High/Low Gas Pressure Limit Switches
- T = Status Indicator Lamps (Elec Cabinet)
- V = Manual Reset High Limit Switch
- W = Interlock Relay —24/115V Coil SPDT 10A
- X = Interlock Relay —24/115-230V Coil DPDT 10A
- Y = Ambient Lockout
- Z = 8" Evaporative Media (Glasdek)
- 1 = 12" Evaporative Media (Glasdek)
- 2 = Hinged Service Access Doors



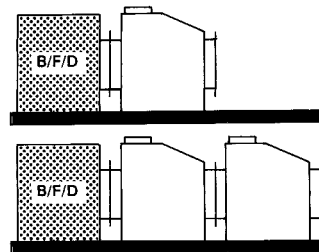
# Unit Configurations

## Indoor Make-Up Air Handler Gravity Vented

Unit Type	Standard Features
<b>Arrangement A</b> Indoor Gas Duct Furnace	<ul style="list-style-type: none"> <li>- Natural or LP (Propane Gas)</li> <li>- Single Stage 24 Volt Gas Valve</li> <li>- Intermittent Pilot Ignition</li> <li>- Orificed for Operation Up to 2000' Above Sea Level</li> <li>- Aluminized Steel Heat Exchanger</li> <li>- 24 Volt High Temperature Safety Circuit</li> <li>- 24 Volt Control Circuitry</li> <li>- Blow-thru Applications Only</li> </ul>

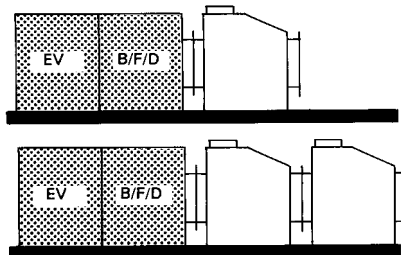


## Arrangement B Indoor Heating Unit with Standard Blower



- Natural or LP (Propane Gas)
- Single Stage 24 Volt Gas Valve
- Intermittent Pilot Ignition
- Orificed for Operation Up to 2000' Above Sea Level
- Aluminized Steel Heat Exchanger
- 24 Volt High Temperature Safety Circuit
- Terminal Block Wiring, Single Point Connection
- Quick Opening Access Doors (Blower Section)
- Single, Forward Curved Blower
- Insulated Blower/Filter/Damper Cabinet
- 1" Permanent Filters
- Fan Time Delay Relay
- Electrical Cabinet Isolated from the Airstream
- 24 Volt Control Circuitry
- Low Voltage Circuit Breaker
- Blower Door Interlock Switch with Service Override

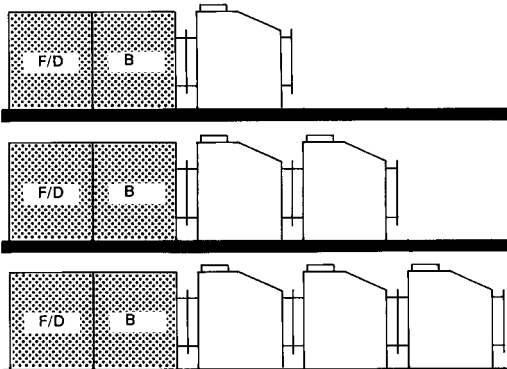
## Arrangement D Indoor Heating Unit with Standard Blower and Evaporative Cooler

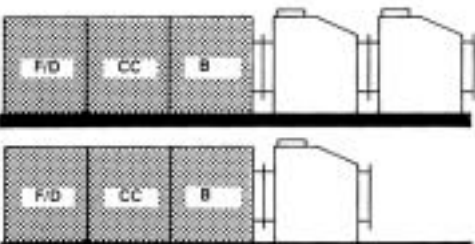


- Same as Arrangement B with
- Evaporative Cooler
  - High Efficiency 8" Media
  - Self Cleaning Design
  - Sealed Pump Motor with Float Valve
  - 24 Volt Control Circuitry
  - Heavy Duty Stainless Steel Water Tank
  - Easy Access Intake Filter and PVC Distribution Tubes

# Unit Configurations

## Indoor Make-Up Air Handler Gravity Vented

Unit Type	Standard Features
<p><b>Arrangement G</b> Indoor Heating Unit with High Cfm Blower</p> 	<ul style="list-style-type: none"> <li>- Natural or LP (Propane Gas)</li> <li>- Single Stage 24 Volt Gas Valve</li> <li>- Intermittent Pilot Ignition</li> <li>- Orificed for Operation Up to 2000' Above Sea Level</li> <li>- Aluminized Steel Heat Exchanger</li> <li>- Electrical Cabinet Isolated from the Airstream</li> <li>- 24 Volt High Temperature Safety Circuit</li> <li>- Terminal Block Wiring, Single Point Connection</li> <li>- Quick Opening Access Doors (Blower Section)</li> <li>- 1 Permanent Filters</li> <li>- Fan Time Delay Relay</li> <li>- Standard V-bank Filter and Damper Cabinet</li> <li>- Insulated Filter/Damper and Blower Cabinet</li> <li>- Single Forward Curved Blower</li> <li>- 24 Volt Control Circuitry</li> <li>- Low Voltage Circuit Breaker</li> <li>- Blower Door Interlock Switch with Service Override</li> </ul>

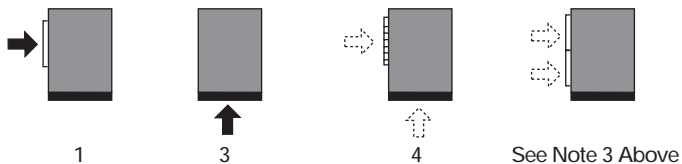
<p><b>Arrangement K</b> Indoor Heating Unit with High Cfm Blower and Cooling Coil Section</p> 	<p>Same as Arrangement G with</p> <ul style="list-style-type: none"> <li>- Coil Section</li> <li>- Mounting for 4 to 6 Row Coils – Single or Dual Circuit</li> <li>- Stainless Steel Drain Pan with 3/4" Tapped Outlets</li> </ul>
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Motors/air inlet configuration/air control and damper arrangement must be selected and added to the list price of each unit.

**NOTES:**

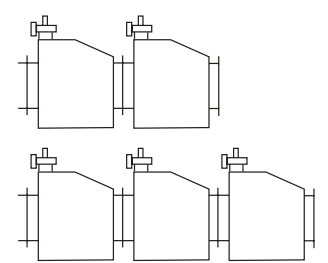
1. Arrangements are shown with the maximum number of furnaces available.
2. Legend is as follows:  
 B/F/D - Standard Blower/Filter/Damper  
 SP - Supply Plenum  
 EV - Evaporative Cooler  
 F/D - Filter/Damper  
 B - High Cfm Blower  
 CC - Cooling Coil
3. Horizontal outside air over return air. Specify air inlet Configuration 4 and then select miscellaneous Option D for horizontal return.

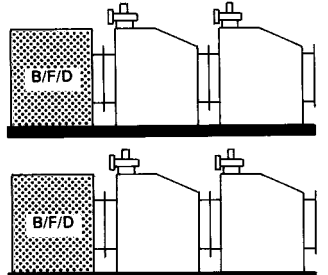
**Air Inlet Configuration**

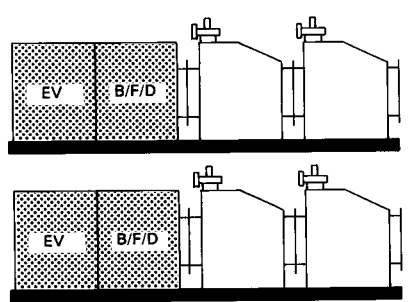


# Unit Configurations

## High Efficiency Indoor Make-Up Air Handler Power Vented

Unit Type	Standard Features
<p><b>Arrangement A</b> High Efficiency Indoor Gas Duct Furnace</p> 	<ul style="list-style-type: none"> <li>- Natural or LP (Propane Gas)</li> <li>- Single Stage 24 Volt Gas Valve</li> <li>- Intermittent Pilot Ignition</li> <li>- Orificed for Operation Up to 2000' Above Sea Level</li> <li>- Aluminized Steel Heat Exchanger</li> <li>- 24 Volt High Temperature Safety Circuit</li> <li>- 24 Volt Control Circuitry</li> <li>- Factory Installed Flue Vent Fan</li> <li>- Sealed Draft Diverter</li> <li>- Blow-thru Applications Only</li> </ul>

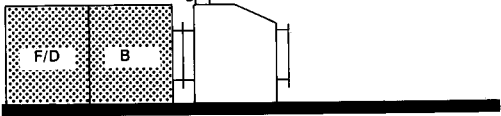
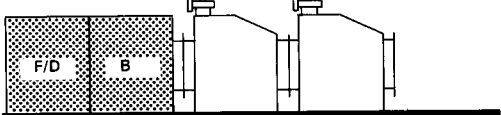
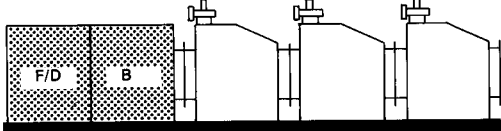
<p><b>Arrangement B</b> High Efficiency Indoor Heating Unit with Standard Blower</p> 	<ul style="list-style-type: none"> <li>- Natural or LP (Propane Gas)</li> <li>- Single Stage 24 Volt Gas Valve</li> <li>- Intermittent Pilot Ignition</li> <li>- Orificed for Operation Up to 2000' Above Sea Level</li> <li>- Aluminized Steel Heat Exchanger</li> <li>- 24 Volt High Temperature Safety Circuit</li> <li>- Terminal Block Wiring, Single Point Connection</li> <li>- Quick Opening Access Doors (Blower Section)</li> <li>- Single, Forward Curved Blower</li> <li>- Insulated Blower/Filter/Damper Cabinet</li> <li>- 1" Permanent Filters</li> <li>- Fan Time Delay Relay</li> <li>- Electrical Cabinet Isolated from the Airstream</li> <li>- 24 Volt Control Circuitry</li> <li>- Low Voltage Circuit Breaker</li> <li>- Blower Door Interlock Switch with Service Override</li> <li>- Factory Installed Flue Vent Fan - Sealed Draft Diverter</li> </ul>
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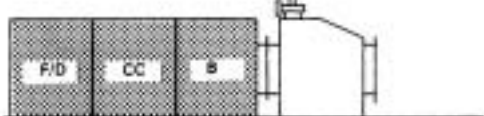
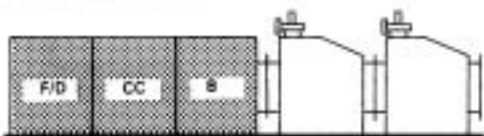
<p><b>Arrangement D</b> High Efficiency Indoor Heating Unit with Standard Blower and Evaporative Cooler</p> 	<p>Same as Arrangement B with</p> <ul style="list-style-type: none"> <li>- Evaporative Cooler</li> <li>- High Efficiency 8" Media</li> <li>- Self Cleaning Design</li> <li>- Sealed Pump Motor with Float Valve</li> <li>- 24 Volt Control Circuitry</li> <li>- Heavy Duty Stainless Steel Water Tank</li> <li>- Easy Access Intake Filter and PVC Distribution Tubes</li> </ul>
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# Unit Configurations

## High Efficiency Indoor Make-Up Air Handler Power Vented

Unit Type	Standard Features
<b>Arrangement G</b> High Efficiency Indoor Heating Unit with High Cfm Blower	<ul style="list-style-type: none"> <li>- Natural or LP (Propane Gas)</li> <li>- Single Stage 24 Volt Gas Valve</li> <li>- Intermittent Pilot Ignition</li> <li>- Orificed for Operation Up to 2000' Above Sea Level</li> <li>- Aluminized Steel Heat Exchanger</li> <li>- Electrical Cabinet Insulated from the Airstream</li> <li>- 24 Volt High Temperature Safety Circuit</li> <li>- Terminal Block Wiring, Single Point Connection</li> <li>- Quick Opening Access Doors (Blower Section)</li> <li>- 1 Permanent Filters</li> <li>- Fan Time Delay Relay</li> <li>- Standard V-bank Filter and Damper Cabinet</li> <li>- Insulated Filter/Damper and Blower Cabinet</li> <li>- Single Forward Curved Blower</li> <li>- 24 Volt Control Circuitry</li> <li>- Low Voltage Circuit Breaker</li> <li>- Blower Door Interlock Switch with Service Override</li> <li>- Factory Installed Flue Vent Fan</li> <li>- Sealed Draft Diverter</li> </ul>
	
	
	

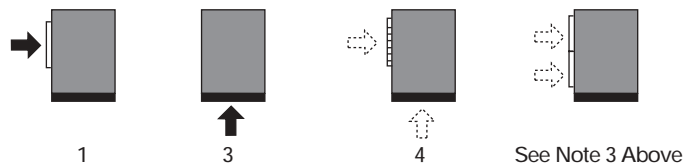
<b>Arrangement K</b> Indoor Heating Unit with High Cfm Blower and Cooling Coil Section	Same as Arrangement G with <ul style="list-style-type: none"> <li>- Coil Section</li> <li>- Mounting for 4 to 6 Row Coils – Single or Dual Circuit</li> <li>- Stainless Steel Drain Pan with 3/4" Tapped Outlet</li> </ul>
	
	

Motors/air inlet configuration/air control and damper arrangement must be selected and added to the list price of each unit.

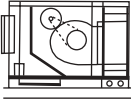
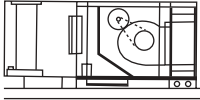
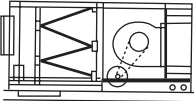
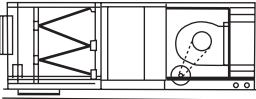
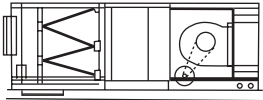
### NOTES:

1. Arrangements are shown with the maximum number of furnaces available.
2. Legend is as follows:
  - B/F/D - Standard Blower/Filter/Damper
  - SP - Supply Plenum
  - EV - Evaporative Cooler
  - F/D - Filter/Damper
  - B - High Cfm Blower
  - CC - Cooling Coil
3. Horizontal outside air over return air. Specify air inlet Configuration 4 and then select miscellaneous Option D for horizontal return.

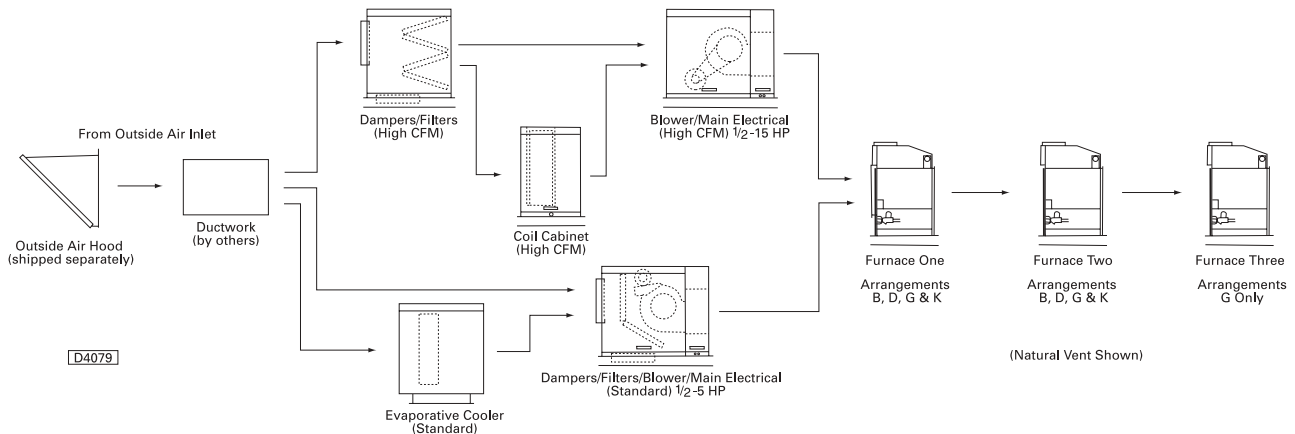
### Air Inlet Configuration



## Indoor Makeup Air Arrangement Reference

	Furnace Type A, B Temperature Rise 30 F-80 F	Furnace Type A, B Temperature Rise 60 F-160 F	Furnace Type A, B Temperature Rise 90 F-180 F
<b>Standard Blower Arrangements B</b>  	<b>Capacity 10-40</b> 10 - 900-2,400 CFM, 1/2-3 HP 15 - 1,400-3,600 CFM, 1/2-5 HP 20 - 1,800-4,900 CFM, 1/2-5 HP 25 - 2,300-5,500 CFM, 1/2-5 HP 30 - 2,700-6,500 CFM, 3/4-5 HP 35 - 3,200-8,500 CFM, 3/4-5 HP 40 - 3,700-8,500 CFM, 3/4-5 HP ESP .1-2" in WC	<b>Capacity 60-80</b> 50 - 2,300-5,200 CFM, 1/2-5 HP 60 - 2,700-6,000 CFM, 3/4-5 HP 70 - 3,200-7,500 CFM, 1/2-5 HP 80 - 3,700-7,500 CFM, 3/4-5 HP  ESP .1-2" in WC	N/A
<b>Standard Blower W/Evap. Arrangements D</b>  	<b>Capacity 10-40</b> 10 - 900-2,400 CFM, 1/2-3 HP 15 - 1,400-3,600 CFM, 1/2-5 HP 20 - 1,800-4,900 CFM, 1/2-5 HP 25 - 2,300-5,500 CFM, 1/2-5 HP 30 - 2,700-6,500 CFM, 3/4-5 HP 35 - 3,200-8,500 CFM, 1/4-5 HP 40 - 3,700-8,500 CFM, 3/4-5 HP ESP .1-2" in WC	<b>Capacity 60-80</b> 50 - 2,300-5,200 CFM, 1/2-5 HP 60 - 2,700-6,000 CFM, 3/4-5 HP 70 - 3,200-7,500 CFM, 1/2-5 HP 80 - 3,700-7,500 CFM, 3/4-5 HP  ESP .1-2" in WC	N/A
<b>High CFM Blower Arrangements G</b>  	<b>Capacity 20-40</b> 20 - 1,800-4,900 CFM, 1/2-5 HP 25 - 2,300-5,500 CFM, 1/2-7 1/2 HP 30 - 2,700-7,400 CFM, 1/2-7 1/2 HP 35 - 3,200-8,600 CFM, 1/2-10 HP 40 - 3,700-9,800 CFM, 1/2-10 HP  ESP .1-2" in WC	<b>Capacity 60-80</b> 50 - 2,300-6,000 CFM, 1/2-10 HP 60 - 2,700-7,400 CFM, 1/2-10 HP 70 - 3,200-8,600 CFM, 1/2-10 HP 80 - 3,700-9,800 CFM, 3/4-15 HP  ESP .1-2" in WC	<b>Capacity 12</b> 12 - 4,500-9,800 CFM, 1-15 HP  ESP .1-2" in WC
<b>High CFM Blower W/Cooling Arrangements K* DX Coil</b>  	<b>Capacity 10-40</b> 10 - 1,600-2,400 CFM, 1/2-5 HP 15 - 1,600-3,000 CFM, 1/2-5 HP 20 - 2,100-4,400 CFM, 1/2-5 HP 25 - 2,500-4,400 CFM, 1/2-5 HP 30 - 2,800-5,800 CFM, 3/4-7 1/2 HP 35 - 3,200-5,800 CFM, 3/4-7 1/2 HP 40 - 3,700-6,800 CFM, 3/4-7 1/2 HP ESP .1-2" in WC	<b>Capacity 60-80</b> 50 - 2,500-4,400 CFM, 1-5 HP 60 - 2,800-5,800 CFM, 3/4-7 1/2 HP 70 - 3,200-5,800 CFM, 3/4-7 1/2 HP 80 - 3,700-6,500 CFM, 3/4-7 1/2 HP  ESP .1-2" in WC	N/A
<b>High CFM Blower W/Cooling Arrangements K* Chilled Water Coil</b>  	<b>Capacity 10-40</b> 10 - 960-2,400 CFM, 1/2-5 HP 15 - 1,400-2,900 CFM, 1/2-5 HP 20 - 1,800-4,300 CFM, 1/2-5 HP 25 - 2,300-4,300 CFM, 1/2-5 HP 30 - 2,700-5,700 CFM, 1/2-7 1/2 HP 35 - 3,200-5,700 CFM, 3/4-7 1/2 HP 40 - 3,700-6,300 CFM, 3/4-7 1/2 HP ESP .1-2" in WC	<b>Capacity 60-80</b> 50 - 2,300-4,300 CFM, 1/2-5 HP 60 - 2,700-5,700 CFM, 3/4-7 1/2 HP 70 - 3,200-5,700 CFM, 3/4-7 1/2 HP 80 - 3,700-6,300 CFM, 3/4-7 1/2 HP  ESP .1-2" in WC	N/A

\*The maximum CFM for Arrangements K is 6,500. A two-speed motor may be utilized for non-cooling air flow up to 9,800 cfm.



# General Data

**Table G-1 — Filter Data**

Rooftop Arrangement	Unit Size			
	10,15	20,25,50	30,35,60,70	40,80,12
B-D	(4)16 x 20	(4)20 x 20	(4)16 x 20 (2)20 x 20	(6)20 x 20
G-K	(8)16 x 20	(8)20 x 20	(8)16 x 20 (4)20 x 20	(12)20 x 20

**Table G-2 — Metric Conversion Table**

Unless otherwise specified, the following conversions may be used for calculating SI unit measurements:

1 cubic foot = 0.028 m <sup>3</sup>	1 inch water column = 0.029 kPa
1 foot = 0.305 m	1 gallon = 3.785 L
1 inch = 25.4 mm	1,000 Btu/Cu. Ft. = 37.5 MJ/m <sup>3</sup>
1 psig = 6.894 kPa	1 liter/second = CFM x 0.472
1 pound = 0.453 kg	1 meter/second = FPM ÷ 196.8
1,000 Btu per hour = 0.293 kW	



# Application Considerations

## Gas Heating Value

The majority of gas heating units are installed in applications where natural gas is readily available. In areas where natural gas is not available, Trane units may be ordered directly from the factory for use on LP (propane) gas.

Gas heat content varies by fuel type and location. The standard gross heating value for natural gas is 1,000 Btuh per cubic foot; for propane it is 2,500 Btuh per cubic foot. Significant variations from these standard values should be taken into account in equipment selections. To account for variations in the gross heating value of the fuel, adjust the total heat input required and select the unit on the basis of the adjusted load using the following formula:

$$\text{Adjusted load} = \frac{\text{Calculated load} \times \text{Standard gross heat value (Btuh/cu ft)}}{\text{Actual gross heat value (Btuh/cu ft)}}$$

## Low Temperature Rise

Trane recommends against the setup of a unit which will result in a temperature rise of less than 20 F. With such low temperature rises, the flue gases passing through the heat exchanger are cooled to condensate before reaching the flue outlet. This condensate is corrosive and will result in shortened heat exchanger life.

## Air Density

Catalog performance data is based on elevations up to 2,000 feet (610 m) above sea level. Above 2,000 feet (610 m), the unit's heating capacity must be derated four percent for each 1,000 feet (305 m) above sea level and special orifice selections are required. Table PAF-1 contains correction factors that can be applied to the unit's cataloged heating capacity, fan rpm, and fan bhp to obtain actual values for elevations above 2,000 feet (610 m).

## Corrosive Atmospheres

Corrosion of heat exchangers and draft diverters have two basic variables — moisture (condensation) and sulfur. These two ingredients form to make sulfuric acid in the combustion process. Condensation occurs commonly in make-up air systems, using large amounts of fresh air, when air temperatures entering the heat exchanger drop to 40 F or below. This reaction can also occur in recirculating systems where some quantity of outside air is introduced upstream of the exchanger. The sulfur will always be present as an integral component of the gas. The resulting concentration of the acid is governed by the amount of sulfur in the gas. This concentration varies from gas to gas and geographically within the same type of gas.

Beyond sulfuric acid corrosion, there is the area of chlorinated or halogenated hydrocarbon vapor corrosion. This type of corrosion occurs when substances are mixed with combustion air that will cause the formation of hydrochloric or hydrofluoric acid when burned. These basic substances are found in degreasers, dry cleaning solvents, glues, cements, paint removers and aerosol propellants. Specific chemicals included in this group are trichloroethylene, perchloroethylene, carbon tetrachloride, methylene chloride, methyl chloroform and refrigerants 11, 12, 21, 22 and 114.

If sufficient ppm content of these corrosives is present, none of the common heat exchanger materials will hold up. The dilemma becomes whether to place the gas heating equipment outside of the area to be conditioned or use equipment in the space which does not burn a fuel such as gas (i.e., electric or hydronic).

Units should not be installed in areas with corrosive or inflammable atmospheres. Locations containing solvents or chlorinated hydrocarbons will produce corrosive acids when coming in contact with burner flames. This reaction will greatly reduce the life of the heat exchanger and may void the warranty. For added protection against heat exchanger corrosion, optional 409 and 321 stainless steel construction is available.

On units using outside air, with entering air temperature below 40 F, condensation of flue gas in the heat exchanger is possible. In these cases, stainless steel heat exchangers are recommended. An optional 409 or 321 stainless steel heat exchanger is recommended whenever there is an evaporative cooler or cooling coil upstream of the furnace section(s).

Careful review of the job application with respect to use, probable contaminants within a conditioned space and the amount of fresh air to be brought in will help to make the proper selection of heat exchanger material. This review will help to eliminate problems before they begin.

# Application Considerations

## FM and IRI Requirements

IRI, which stands for Industrial Risk Insurers, and FM, which stands for Factory Mutual, are both basically insurance companies which insure commercial/industrial firms against a variety of losses. Both publish requirements which must be met by certain equipment operating in the facilities they are preparing to insure.

Listed below is our interpretation of the requirements of both insurers pertaining to heating units only to the extent of features/controls required by IRI and/or FM. There are a number of additional requirements which pertain to electrical service, details of installation, etc., and we urge you to obtain copies of the publications pertaining to these details if you are involved in a job where IRI or FM adherence has been indicated. The requirements detailed herein are our interpretations of the latest publications in our possession and we must disclaim any responsibility for errors due to our interpretation and/or lack of any updated revision of these standards. Our intent is to provide you with an understanding of the application of these standards and how we believe our indirect-fired gas heating equipment applies.

## IRI Requirements

1

All input sizes require 100 percent shutoff. This requires that any natural gas unit, equipped with intermittent pilot ignition, must employ a "lock-out" type ignition system which will shut off pilot gas if the pilot fails to light at any time. This system is required by AGA on LP gas units as standard equipment. However, for natural gas units, you will need to specify fuel type "L" Natural Gas with 100 percent lockout.

2

All units require AGA certification or UL listed controls. Our units are AGA certified and meet this requirement.

3

Models with inputs of 150,000 to 400,000 Btuh (43.9-117.1 kW) require mechanical exhaust and a safety interlock. For our units this means a power vented unit.

## FM Requirements

1

All units must be AGA certified or UL listed. Our units are AGA certified.

2

The high limit control must be in a circuit, the voltage of which does not exceed 120 VAC. All of our high limits would meet this requirement.

The specific requirement for an "IRI or FM gas train," while it applies to direct and indirect-fired gas heating equipment as well as oil-fired, comes into play only with units having an input in excess of 400,000 Btuh (117.1 kW). This may be one of the reasons why the majority of gas heating equipment manufacturers (indirect-fired) limit their largest individual furnace to 400,000 Btuh (117.1 kW).

## Minimum/Maximum Gas Inlet Pressures

Gas valves are suitable to a maximum inlet pressure of 0.5 psi (14 inches water column) (3.5 kPa) on natural gas. If the main gas supply pressure is greater than 14 inches WC (3.5 kPa), a step down pressure regulator must be field installed ahead of the gas valve. Minimum inlet pressure for natural gas units is 6 1/2 inches WC (1.6 kPa).

For LP (propane) gas, the minimum inlet pressure is 11 1/2 inches WC (2.9 kPa) and the maximum inlet pressure is 14 inches WC (3.5 kPa).

## High Pressure Regulators — Natural Gas Only

The Trane gas heating products contained in this catalog are designed to operate at a pressure of 3.5-inch WC (water column) (0.9 kPa) when firing on natural gas. This is the "manifold" pressure or that which is present at the burner orifices. All five and six-function valves provide a built-in pressure regulator which is capable of reducing "supply" pressures from a maximum of 14-inch WC (3.5 kPa) (1/2 psi) down to 3.5-inch WC (0.9 kPa) on the leaving side of the valve. The valve typically drops about 1 1/2-inch (38 mm) so the minimum supply pressure is 5-inch WC (1.3 kPa).

Whenever supply pressures exceed 14-inch WC (3.5 kPa), a high pressure regulator should be selected. We supply an Equimeter regulator which is fitted with pressure springs and capacity orificing to meet the requirements of each specific job. In order to select the proper spring/orifice combination, we need to know what the supply pressure is on that particular job and the input size of the unit being ordered. More than one unit can be run from one regulator; however, we recommend that each unit have its own regulator.

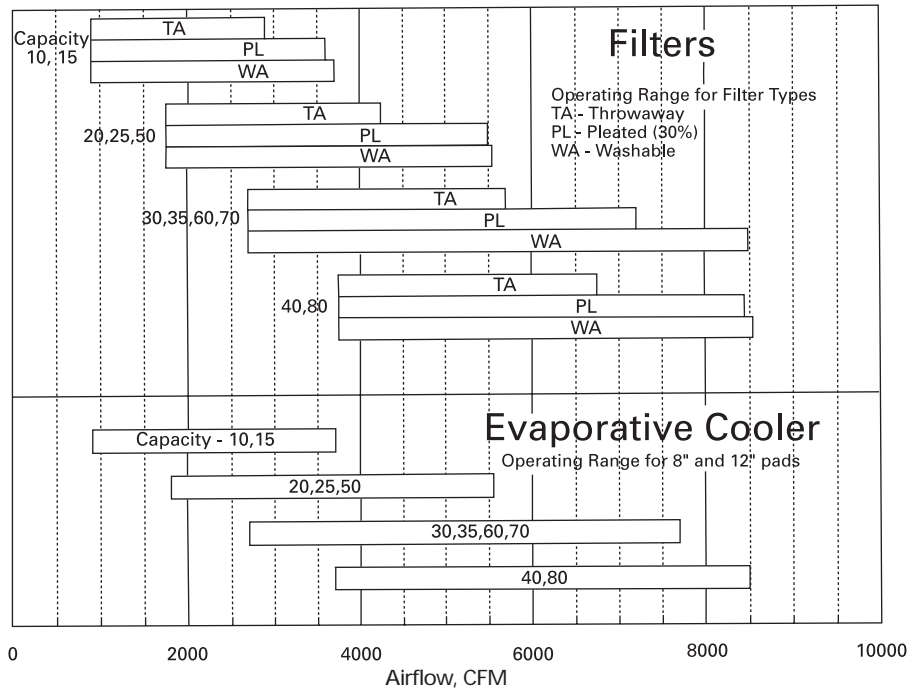
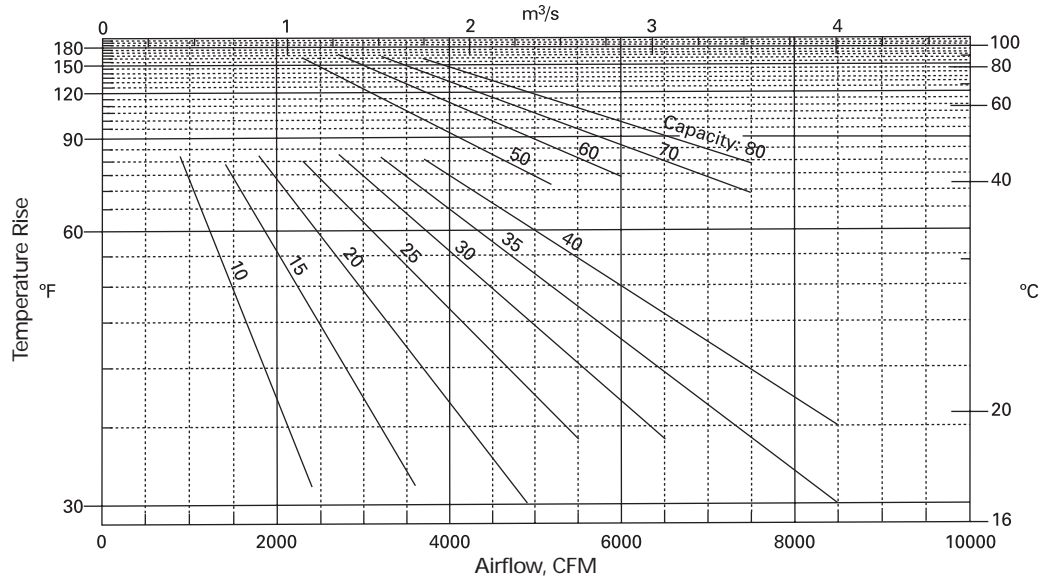
We require that the job supply pressure be included on all jobs requiring high pressure regulators along with the unit size. The table that follows displays the regulator's range as it pertains to inlet pressure and MBh. NA requires the customer to contact a local utility or an industrial supply house.

These devices are **not available** from Trane for LP gas. LP accessories must be secured from the gas supplier or industrial supply house.



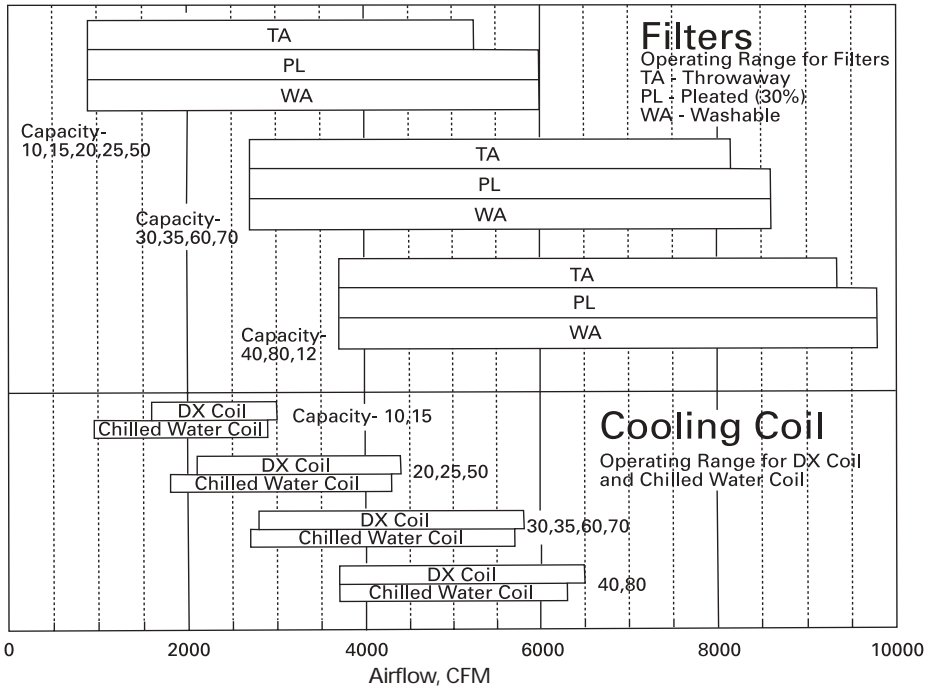
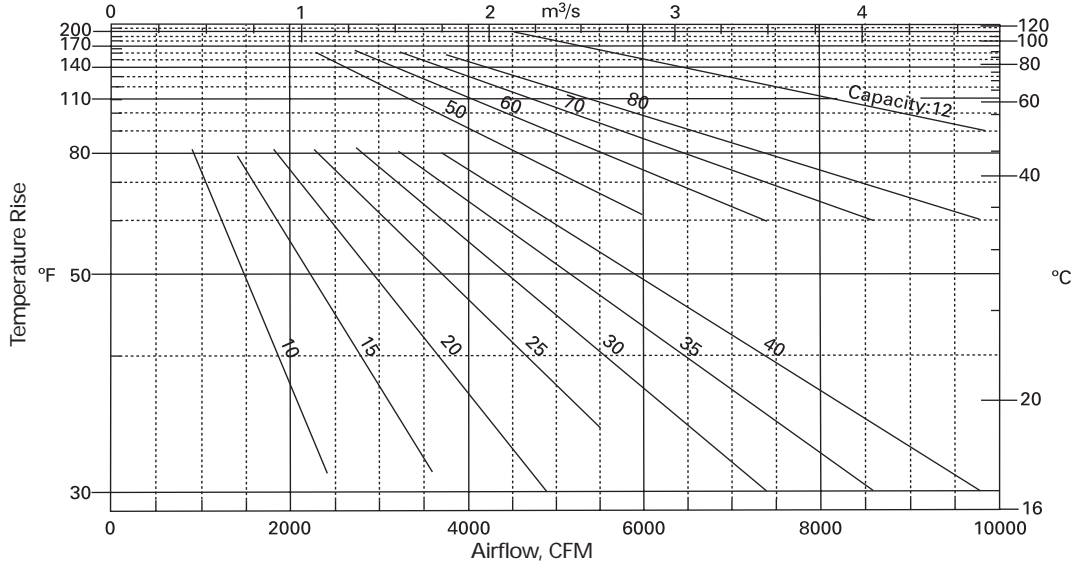
# Selection Procedure

Quick Sizer Chart 1  
Furnace Type (A, B) Arrangement (B, D)



# Selection Procedure

Quick Sizer Chart 2  
Furnace Type (A, B) Arrangement (G, K)



# Selection Procedure

## Step 1

To properly select a unit, two of the three following items must be known: temperature rise (TR) required, cubic feet per minute of air delivery (cfm) required and output (Btu/h out) required. From any two of these items the third item can be determined, as well as the input (Btu/h In) required, by using the following:

$$TR = BTU/H \text{ Out} \div (1.085 \times CFM)$$

$$CFM = BTU/H \div (1.085 \times TR)$$

$$BTU/H \text{ Out} = (CFM \times 1.085) \times TR$$

$$BTU/H \text{ In} = BTU/H \text{ Out} \div \text{Efficiency}$$

.80 or .79

(The value 1.085 represents a constant.)

With any two of the three required values, match these requirements to a unit with the nearest input (Btu/h), temperature rise (TR) and airflow (cfm) capabilities keeping in mind that:

$$BTU/H \text{ Out} = BTU/H \text{ In} \times \text{Efficiency}$$

Refer to the "Arrangement Reference" to match a capacity range (Btu/h), air delivery (cfm) and temperature rise (TR) with a rooftop arrangement.

The top portion of Quick Sizer Charts 1 and 2 allows the use of temperature rise and cfm to determine capacity, or temperature rise and capacity to determine cfm, or capacity and cfm to determine temperature rise. Follow the top chart down to the corresponding filter and cooling range for the selection.

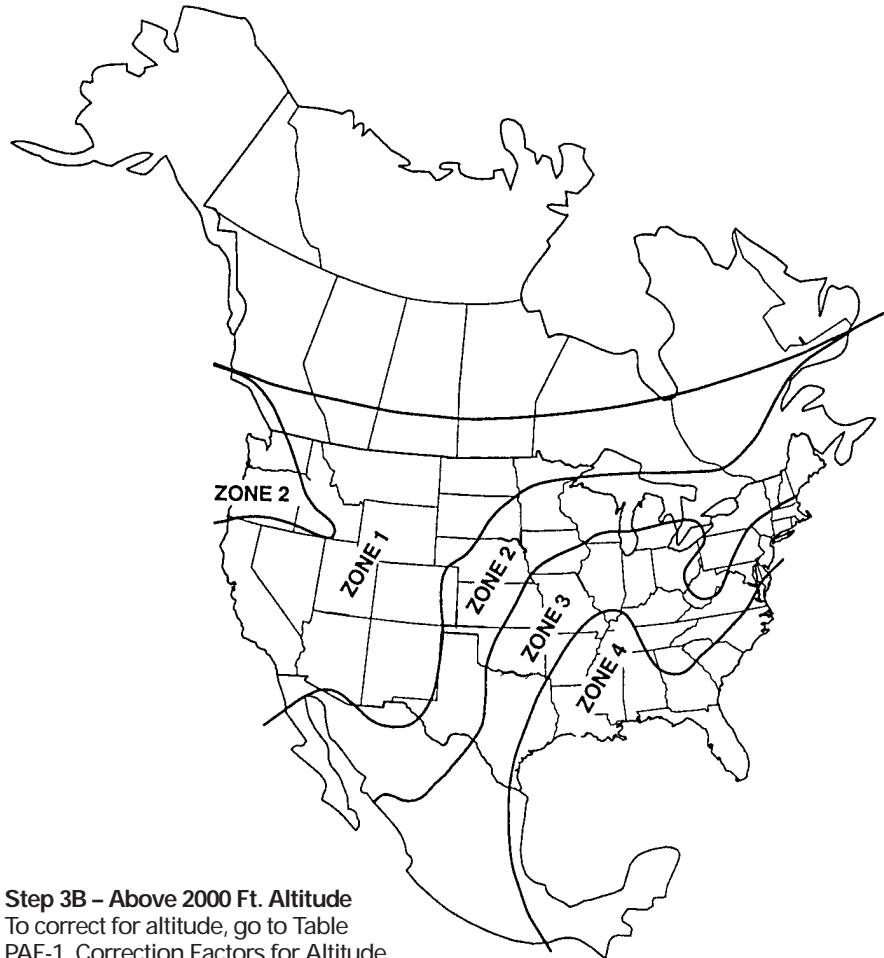
## Step 2

Once capacity, temperature rise and cfm have been determined, go to the accessory pressure losses table for the arrangement and calculate pressure losses for unit accessories. Add the losses for filters, plenums, dampers, rainhood with screen or moisture eliminators, evaporative cooler or cooling coil and losses due to ductwork to determine the total esp.

## Step 3A – 2000 Ft. Altitude and Below

Refer to the performance table for the selection and determine rpm and bhp for the total external static pressure (esp). Go to the table row that most closely matches unit capacity, temperature rise and cfm, and follow the row out to the column that equals the total esp for rpm and bhp values.

Figure SP-1 — Zone Chart



## Step 3B – Above 2000 Ft. Altitude

To correct for altitude, go to Table PAF-1, Correction Factors for Altitude. From this table, determine the correction factor from temperature and altitude for the system. Correct the esp from ductwork to actual esp for altitude, then add sp from accessories as shown below. Refer to the performance table for the selected unit. Go to the row that most closely matches unit capacity, temperature rise and cfm, and follow the row out to the column that equals the corrected actual esp for rpm and bhp values. The bhp value cannot be corrected to actual bhp for altitude as shown below.

$$\text{Actual ESP} = \text{Duct ESP} \times \text{Factor} + \text{Access. SP}$$

$$\text{Actual BHP} = \text{Cat. BHP} \div \text{Factor}$$

$$\text{Corrected BTUH Input} = \text{Catalog BTUH Input} \div \text{Factor}$$

$$\text{Corrected BTUH Output} = \text{Corrected BTUH Input} \times \text{Efficiency}$$

## Performance

Evaporative cooling is most commonly used in areas where the relative humidity is low and the dry bulb temperatures are high. However, cooling through evaporation can be used in most areas.

Evaporative cooling is best utilized whenever the wet bulb depression (difference between dry and wet bulb temperature) is a minimum of 15 F.

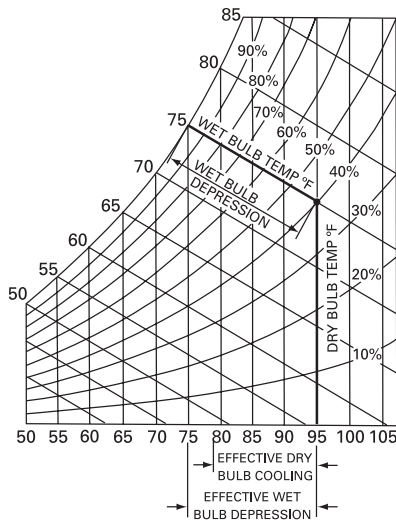
The efficiency of the evaporative cooler is determined by a variety of factors: geographical location, application, air change requirements, sufficient water supply, airflow and maintenance. In most instances, efficiency is expected to be between 77 percent and 88 percent. Heat gains in the distribution system will affect the final output temperature.

For SI metric conversion, see Table G-2 on page 11.



# Selection Procedure

Figure SP-2 — Psychrometrics Chart



Use the psychrometric chart (shown in Figure SP-2) or actual humidity temperature readings to estimate the leaving dry bulb temperature at the outlet of the evaporative cooler.

**Example:**

Entering Dry Bulb: 95 F  
 Entering Wet Bulb: 75 F  
 Wet Bulb Depression (95 F - 75 F) = 20 F  
 Effective Wet Bulb Depression (20 F x .85) = 17 F  
 Leaving Dry Bulb Temperature (95 F - 17 F) = 78 F  
 Leaving Wet Bulb = Entering Wet Bulb = 75 F

**Selection Method**

The easiest method for selecting an evaporative cooler is to first determine the required number of air changes per minute.

**1**

Using Figure SP-1, choose the geographical zone in which the unit is to be installed.

**2**

Determine the internal load within the structure:

**Normal Load:** structures with normal people loads, and without high internal heat gains.

**High Load:** Structures with high equipment loads (i.e., factories, laundromats, beauty salons, restaurant kitchens, etc.), and structures with high occupancy (night clubs, arenas, etc.).

**3**

Determine whether the structure has normal or high heat gains.

**Normal Gain:** Structures that have insulated roofs or are in shaded areas.

Structures that have two or more stories or facing directions with no sun.

**High Gain:** Structures that have uninsulated roofs, unshaded areas, or rooms that are exposed to sun.

**4**

Using Table SP-1, determine the required air changes per minute based on zone selection and the type of heat load.

**5**

Finally, determine the air quantity for the space chosen, by calculating the volume (L x W x H). Multiply this volume by the air changes per minute.

**Example:**

Structure Dimensions: 25 L x 24 W x 10 H = 6000 Ft<sup>3</sup>  
 Exterior Load Type: Normal  
 Interior Load Type: Normal  
 Location: Dallas, Texas – Zone 3  
 Air Changes Per Minute: 3/4  
 Evaporative Cooler Requirements: 6000 Ft<sup>3</sup> x 3/4 Air Change/Minute = 4500 CFM Required  
 See the evaporative cooler performance chart for unit size that would best apply.

Table SP-1 — Air Changes Per Minute

Type Heat Load	Zone			
	1	2	3	4
High Load/High Gain	3/4	1	1 1/3	2
High Load/Normal Gain	1/2	3/4	1	1 1/3
Normal Load/High Gain	1/2	3/4	1	1 1/3
Normal Load/Normal Gain	1/2	1/2	3/4	1

**Cooling Coils**

Cooling coils are used in air handling systems to cool and dehumidify an air stream for comfort purposes. To reduce the cooling load in buildings, most applications recirculate a large percentage of the air. Usually recirculated air is 75 to 80 percent of the airflow with the remainder being outside fresh air. Some codes require 100 percent outside air, particularly for hospitals and schools. Also many engineers specify higher percentages of outside air to meet the requirements of ASHRAE Standard 62-1989 "Ventilation for Acceptable Indoor Air Quality."

**1**

In order to select the least expensive coil to meet the specific performance criteria, the following information is required:

- Unit size
- Airflow in scfm or acfm and altitude (see "Fan Selection at Altitude")
- Entering air dry bulb and wet bulb temperatures based on ratio of outside to return air.
- Cooling load MBh (1000's Btu/h) or leaving air wet bulb.

**2**

For chilled water coils, the following additional information is required.

- Fluid type: water, ethylene glycol, propylene glycol and percent of mixture.
- Entering fluid temperature – F
- Leaving fluid temperature – F or rate of flow gpm.

Chilled water catalog tables are based on:

45 F entering water temperature  
 Entering air temperature of 80 F DB/  
 67 F WB. Data is certified in accordance with ARI Standard 410. For other than these conditions, please consult the factory.

For SI metric conversion, see Table G-2 on page 11.

# Selection Procedure

3

For DX (refrigerant) coils, the following additional information is required:

- Refrigerant type
- Suction temperature – F
- Liquid temperature – F
- Type of circuiting desired
- Is hot gas bypass required?

DX catalog tables are based on:

- 45 F suction temperature
- Entering air temperature of 80 F DB/67 F WB
- R-22 refrigerant
- 100 F liquid temperature

Data is certified in accordance with ARI Standard 410. For other than these conditions, please consult the factory.

4

When specifying a coil, one of the most important pieces of information is the airflow in scfm. As stated in the “Fan Selection at Altitude” section, scfm means Standard cfm or air at a density of 0.075 lb./cu. ft. A fan must be selected using acfm or actual cfm. A cooling coil or heating coil must be selected using scfm. Up to an altitude of approximately 1,500 feet above sea level, very little error would be introduced in the selection of a cooling coil. For altitudes above 1,500 feet above sea level, the coil must be selected using scfm. The relationship between acfm and scfm is shown by the following equation:

$$\text{SCFM} = \text{ACFM} \times (\text{Actual Density} \div 0.075)$$

The term “0.075 ÷ Actual Density” is referred to as the density correction factor, herein called the “Factor.” This factor can be found in Table PAF-1. The previous equation can then be rewritten as:

$$\text{SCFM} = (\text{ACFM} \div \text{Factor})$$

Example: A cooling coil must be selected at 5,000 ft. altitude. The unit delivers 10,000 acfm. What is the scfm? At 5,000 ft. altitude, the factor from Table PAF-1 is 1.20, therefore:

$$\text{SCFM} = 10,000 \text{ ACFM} \div 1.20 = 8,333 \text{ SCFM}$$

5

The entering air temperatures, both wet bulb and dry bulb, must also be considered when selecting a coil. A majority of units usually use recirculated air with a percentage of outside air. The cooling coil must be selected using the mixed air temperature entering the coil.

The following example shows how to calculate the mixed air temperature:

- 25 percent outside air at 95 F DB/75 F WB
- 75 percent recirculated air at 78 F DB/67 F WB

The mixed dry bulb is simply the proportional value between the outside and recirculated dry bulb temperatures.

$$.25 \times 95 + .75 \times 78 = 82.3 \text{ F}$$

The mixed wet bulb temperatures must be calculated using either the humidity ratio from a psychrometric chart or from Table SP-2, The enthalpy of saturated air at various wet bulb temperatures.

Using Table SP-2, the enthalpy of the outside air at 75 F WB is 38.62 Btu/lb. and the recirculated air at 67 F WB is 31.63 Btu/lb., the mixed enthalpy is:

$$.25 \times 38.62 + .75 \times 31.63 = 33.38 \text{ Btu/lb.}$$

Using this value in Table SP-2, the interpolated wet bulb temperature is 69.1 F.

So the final mixed temperatures are:

$$82.3 \text{ F DB}/69.1 \text{ F WB}$$

Table SP-2 — Enthalpy of Saturated Air at Various Wet Bulb Temperatures

Wet Bulb Temp.	BTU per Pound	Wet Bulb Temp.	BTU per Pound
50	20.38	65	30.05
50.5	20.64	65.5	30.44
51	20.90	66	30.83
51.5	21.17	66.5	31.23
52	21.45	67	31.63
52.5	21.73	67.5	32.03
53	22.01	68	32.44
53.5	22.29	68.5	32.86
54	22.59	69	33.27
54.5	22.88	69.5	33.70
55	23.18	70	34.12
55.5	23.48	70.5	34.55
56	23.79	71	34.99
56.5	24.10	71.5	35.42
57	24.42	72	35.87
57.5	24.74	72.5	36.31
58	25.06	73	36.77
58.5	25.39	73.5	37.22
59	25.73	74	37.68
59.5	26.06	74.5	38.15
60	26.40	75	38.61
60.5	26.75	75.5	39.09
61	27.10	76	39.56
61.5	27.45	76.5	40.04
62	27.81	77	40.53
62.5	28.17	77.5	41.02
63	28.54	78	41.51
63.5	28.91	78.5	42.01
64	29.29	79	42.51
64.5	29.67	79.5	43.02

For SI metric conversion, see Table G-2 on page 11.



# Performance Adjustment Factors

**Table PAF-1 — Correction Factors for Altitude**

Temp.	Altitude (Feet)												
	0'	500'	1000'	1500'	2000'	2500'	3000'	3500'	4000'	4500'	5000'	5500'	6000'
F	39.92	29.38	28.86	28.33	27.82	27.31	26.82	26.32	25.84	25.36	24.90	24.43	23.98
	0.79	0.81	0.82	0.84	0.85	0.87	0.88	0.90	0.92	0.93	0.95	0.97	0.99
0	0.87	0.88	0.90	0.92	0.93	0.95	0.97	0.99	1.00	1.02	1.04	1.06	1.08
40	0.94	0.96	0.98	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.16	1.18
70	1.00	1.02	1.04	1.06	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.22	1.25
80	1.02	1.04	1.06	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.22	1.25	1.27
100	1.06	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.22	1.25	1.27	1.29	1.32
120	1.90	1.11	1.13	1.16	1.18	1.20	1.22	1.24	1.27	1.29	1.31	1.34	1.37

1. Actual ESP = Duct ESP x Factor ÷ Accs. SP
2. Actual BHP = Cat. BHP ÷ Factor
3. Correct BTUH Input = Catalog BTUH Input ÷ Factor
4. Corrected BTUH Output = Corrected BTUH Input x Efficiency



# Performance Data

**Table PD-1 – Standard or High Efficiency Indoor Duct Furnace – Arrangement A – 500-1200 MBh Performance Data**

Capacity (CA)	Input		Output		Temp. Rise Deg. F (Deg. C)	PD. in. W.C. (kPa)	Max. CFM (cu. m/s)	Temp. Rise Deg. F (Deg. C)	PD. in. W.C. (Pascals)
	(Max.) MBH (kW)	(Min.) MBH (kW)	MBH (kW)	Min. CFM (cu. m/s)					
50	500 (146.4)	250 (73.2)	400 (117.1)	2315 (1,093)	160 (89)	0.28 (0.07)	6173 (2,914)	60 (33)	0.96 (0.24)
60	600 (175.7)	300 (87.8)	480 (140.6)	2778 (1,311)	160 (89)	0.26 (0.06)	7407 (3,496)	60 (33)	1.00 (0.25)
70	700 (205.0)	350 (102.5)	560 (164.0)	3241 (1,530)	160 (89)	0.26 (0.06)	8642 (4,079)	60 (33)	0.96 (0.24)
80	800 (234.3)	400 (117.1)	640 (187.4)	3704 (1,748)	160 (89)	0.28 (0.07)	9877 (4,662)	60 (33)	1.00 (0.25)
12	1200 (351.4)	600 (175.7)	960 (281.1)	3704 (1,748)	180 (100)	0.42 (0.10)	9877 (4,662)	90 (50)	1.50 (0.37)

**Notes:**

Ratings shown are for unit installations at elevations between 0 and 2,000 ft. (610 m). For unit installations in U.S.A. above 2,000 ft. (610 m), the unit input must be derated 4% for each 1,000 ft. (305 m) above sea level; refer to local codes, or in absence of local codes, refer to National Fuel Gas Code, ANSI Standard Z223.1-1992 (N.F.P.A. No. 54) or the latest edition.

For installations in Canada, any references to deration at altitudes in excess of 2,000 ft. (610 m) are to be ignored. At altitudes of 2,000 to 4,500 ft. (610 to 1372 m), the unit must be derated to 90% of the normal altitude rating, and be so marked in accordance with the CGA certification.



# Performance Data

**Table PD-2 – Standard or High Efficiency Indoor Make-Up Air Handler — Arrangements B,D — 100-400 MBh Performance Data**

Capacity	TR (F)	CFM	Input Btu/Hr.		Max. Output Btu/Hr.	Total Adjusted Static Pressure (Inches of Water)											
			Max.	Min.		0.4		0.8		1		1.4		1.8		2	
						RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
10	82	900				730	.18	965	.33	1065	.41	1230	.58	1375	.76	1440	.86
	74	1,000				745	.21	980	.37	1080	.46	1245	.64	1390	.83	1455	.93
	61	1,200				795	.29	1015	.47	1110	.57	1280	.77	1425	.99	1490	1.10
	53	1,400	100,000	40,000	80,000	850	.39	1050	.59	1145	.69	1310	.92	1455	1.16	1520	1.28
	46	1,600				910	.52	1095	.73	1180	.85	1340	1.09	1485	1.36	1550	1.49
	41	1,800				980	.68	1145	.90	1225	1.03	1375	1.29	1515	1.57	1585	1.72
	37	2,000				1050	.87	1200	1.11	1275	1.24	1420	1.52	1550	1.82	1615	1.98
	34	2,200				1125	1.11	1265	1.36	1330	1.50	1465	1.79	1590	2.11	1655	2.27
	31	2,400				1200	1.38	1330	1.66	1390	1.80	1515	2.11	1635	2.44	1695	2.61
	15	79	1,400				745	.31	960	.49	1055	.59	1235	.81	1385	1.05	1460
74		1,500				770	.35	970	.54	1065	.65	1240	.87	1395	1.12	1465	1.24
55		2,000				895	.65	1060	.89	1135	1.00	1285	1.26	1425	1.54	1495	1.69
44		2,500	150,000	60,000	120,000	1035	1.13	1180	1.40	1245	1.55	1370	1.84	1490	2.14	1550	2.30
37		3,000				1180	1.84	1310	2.12	1370	2.28	1480	2.64	1585	2.98	1640	3.16
32		3,500				1335	2.79	1450	3.10	1505	3.27	1605	3.66	1705	4.07	1750	4.27
31		3,600				1370	3.02	1475	3.34	1530	3.50	1630	3.89	1730	4.32	1775	4.53
20	82	1,800				640	.33	830	.51	915	.62	1060	.84	1200	1.09	1265	1.23
	74	2,000				665	.41	845	.60	925	.71	1075	.95	1205	1.20	1265	1.34
	59	2,500				740	.66	895	.89	970	1.02	1105	1.28	1230	1.56	1290	1.70
	49	3,000	200,000	80,000	160,000	825	1.02	965	1.29	1030	1.43	1150	1.72	1265	2.03	1320	2.19
	42	3,500				915	1.50	1040	1.82	1100	1.98	1210	2.31	1315	2.64	1365	2.82
	37	4,000				1005	2.12	1120	2.48	1175	2.67	1275	3.04	1375	3.41	1420	3.60
	33	4,500				1105	2.91	1205	3.31	1255	3.52	1350	3.93	1440	4.35	1485	4.56
	30	4,900				1185	3.67	1280	4.11	1325	4.33	1415	4.78				
25	80	2,300				685	.52	850	.74	930	.85	1075	1.10	1205	1.36	1260	1.50
	74	2,500				715	.63	875	.86	945	.98	1085	1.23	1210	1.51	1270	1.66
	61	3,000				790	.96	935	1.23	1000	1.37	1125	1.66	1240	1.96	1295	2.12
	53	3,500	250,000	100,000	200,000	875	1.41	1005	1.72	1065	1.88	1175	2.21	1285	2.54	1335	2.71
	46	4,000				960	1.99	1080	2.35	1135	2.53	1240	2.90	1340	3.27	1385	3.46
	41	4,500				1055	2.73	1160	3.12	1210	3.32	1305	3.74	1400	4.15	1445	4.36
	37	5,000				1145	3.65	1245	4.06	1290	4.29	1380	4.74				
	34	5,500				1240	4.76										
30	82	2,700				740	.58	960	.94	1055	1.14	1235	1.58	1390	2.04	1460	2.27
	74	3,000				775	.72	975	1.09	1070	1.30	1245	1.76	1395	2.25	1470	2.50
	55	4,000				905	1.33	1070	1.80	1145	2.03	1290	2.55	1435	3.11	1500	3.41
	44	5,000	300,000	120,000	240,000	1045	2.30	1190	2.85	1255	3.14	1380	3.72	1500	4.33	1560	4.65
	37	6,000				1195	3.73	1325	4.30	1385	4.64						
	34	6,500				1275	4.64										
35	81	3,200				630	.55	830	.91	915	1.10	1070	1.55	1210	2.05	1280	2.31
	65	4,000				690	.86	865	1.26	945	1.48	1090	1.95	1220	2.47	1280	2.75
	52	5,000				770	1.40	925	1.88	995	2.12	1125	2.65	1250	3.22	1310	3.51
	43	6,000	350,000	140,000	280,000	860	2.18	995	2.73	1060	3.02	1180	3.60	1290	4.22	1345	4.55
	37	7,000				960	3.22	1080	3.86	1135	4.18	1245	4.84				
	32	8,000				1060	4.56										
	30	8,500															
40	80	3,700				650	.70	835	1.08	920	1.29	1070	1.74	1200	2.25	1265	2.52
	74	4,000				670	.82	845	1.22	930	1.43	1075	1.90	1205	2.42	1265	2.69
	59	5,000				745	1.34	900	1.81	975	2.05	1110	2.57	1235	3.13	1295	3.43
	49	6,000	400,000	160,000	320,000	830	2.07	970	2.62	1035	2.90	1155	3.48	1270	4.09	1325	4.41
	42	7,000				925	3.04	1045	3.68	1105	4.01	1215	4.66				
	37	8,000				1020	4.31										
	35	8,500															

**Notes:**

1. Values in this table are based on the basic package unit that includes blower and duct furnace(s).
2. Brake horsepower (BHP) includes typical belt losses.
3. Unit leaving air temperature (LAT) is limited to 150 F LAT = Entering Air Temperature (EAT) + Temperature Rise (TR).
4. Total External Static Pressure = Accessory Pressure Losses + External Static Pressure.

# Performance Data

**Table PD-3 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangements B,D – 500-800 MBh Performance Data**

Capacity	TR (F)	CFM	Input Btu/Hr.		Max. Output Btu/Hr.	Total Adjusted Static Pressure (Inches of Water)											
						0.4		0.8		1		1.4		1.8		2	
						RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
50	160	2,300				735	.58	895	.80	970	.91	1110	1.17	1235	1.44	1295	1.58
	147	2,500				765	.70	920	.93	990	1.06	1125	1.32	1250	1.60	1305	1.75
	123	3,000				855	1.08	995	1.36	1055	1.50	1175	1.79	1290	2.10	1345	2.26
	105	3,500	500,000	200,000	400,000	950	1.59	1075	1.92	1130	2.08	1240	2.41	1345	2.75	1395	2.92
	92	4,000				1050	2.26	1165	2.63	1215	2.81	1315	3.18	1410	3.56	1455	3.75
	82	4,500				1155	3.11	1255	3.52	1305	3.72	1395	4.14	1485	4.55	1530	4.76
	74	5,000				1260	4.15	1350	4.60	1395	4.83						
71	5,200				1300	4.62											
60	164	2,700				800	.67	1010	1.05	1105	1.25	1275	1.69	1425	2.16	1495	2.40
	147	3,000				840	.83	1035	1.22	1130	1.45	1295	1.92	1445	2.41	1510	2.67
	111	4,000	600,000	240,000	480,000	1000	1.59	1150	2.06	1225	2.31	1370	2.86	1510	3.44	1575	3.75
	88	5,000				1170	2.76	1300	3.35	1360	3.64	1480	4.24	1600	4.89		
	74	6,000				1350	4.44										
70	161	3,200				690	.64	875	1.01	960	1.22	1110	1.68	1250	2.19	1315	2.46
	129	4,000				765	1.02	930	1.44	1010	1.67	1145	2.16	1270	2.70	1330	2.99
	103	5,000	700,000	280,000	560,000	870	1.70	1010	2.20	1080	2.46	1210	3.01	1325	3.60	1380	3.91
	86	6,000				985	2.68	1110	3.25	1170	3.55	1280	4.16	1390	4.82		
	74	7,000				1105	4.00	1215	4.66	1270	4.99						
	69	7,500				1165	4.81										
80	159	3,700				705	.80	885	1.20	965	1.41	1105	1.88	1240	2.40	1300	2.68
	147	4,000				730	.95	900	1.36	980	1.58	1120	2.07	1245	2.60	1305	2.88
	118	5,000	800,000	320,000	640,000	825	1.57	975	2.05	1040	2.31	1175	2.85	1295	3.43	1350	3.73
	88	6,000				930	2.46	1060	3.02	1120	3.31	1235	3.91	1350	4.55	1400	4.88
	84	7,000				1040	3.66	1160	4.30	1210	4.63						
	79	7,500				1100	4.39										

**Notes:**

1. Values in this table are based on the basic package unit that includes blower and duct furnace(s).
2. Brake horsepower (BHP) includes typical belt losses.
3. Unit leaving air temperature (LAT) is limited to 150 F LAT = Entering Air Temperature (EAT) + Temperature Rise (TR).
4. Total External Static Pressure = Accessory Pressure Losses + External Static Pressure.

# Performance Data

**Table PD-4 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangements B,D – 100-400 MBh Accessory Pressure Loss**

Capacity	CFM	Pressure Loss (Inches of Water)									
		Rainhood with		Filters			Evaporative Cooling Pad		Return or Outside Air Damper		
		Screen	Mstr. Elim.	Throwaway	Washable	Pleated	8"	12"			
				2"	1"	2"	1"	2"			
10	900	.01	.02	.03	<.01	<.01	.03	.02	<.01	.01	.02
	1,000	.01	.02	.04	<.01	<.01	.04	.02	.01	.02	.02
	1,200	.02	.03	.05	<.01	<.01	.05	.03	.02	.02	.03
	1,400	.03	.04	.06	<.01	.01	.06	.03	.02	.03	.04
	1,600	.04	.05	.07	.01	.02	.08	.04	.03	.04	.06
	1,800	.05	.06	.08	.02	.02	.10	.05	.04	.06	.07
	2,000	.06	.07	.09	.02	.03	.12	.07	.05	.07	.09
	2,200	.07	.09	.10	.02	.03	.14	.08	.06	.08	.10
2,400	.08	.11	.12	.03	.04	.16	.09	.07	.10	.12	
15	1,400	.03	.04	.06	<.01	.01	.06	.03	.02	.03	.04
	1,500	.03	.04	.06	.01	.02	.07	.04	.03	.04	.05
	2,000	.06	.07	.09	.02	.03	.12	.07	.05	.07	.09
	2,500	.09	.12	.12	.03	.04	.17	.10	.07	.11	.13
	3,000	.13	.17	.16	.04	.06	.23	.14	.10	.15	.19
	3,500	.18	.23	.19	.06	.08	.30	.18	.14	.21	.25
	3,600	.19	.24	—	.06	.09	.31	.19	.15	.22	.27
20	1,800	.02	.03	.06	<.01	.01	.07	.04	.02	.03	.03
	2,000	.03	.04	.07	.01	.02	.08	.04	.03	.04	.04
	2,500	.04	.06	.09	.02	.03	.12	.07	.04	.06	.06
	3,000	.06	.08	.12	.03	.04	.16	.09	.06	.09	.08
	3,500	.09	.11	.14	.04	.05	.21	.12	.08	.12	.11
	4,000	.11	.15	.17	.05	.07	.26	.16	.10	.15	.15
	4,500	.14	.19	—	.06	.09	.31	.19	.13	.20	.19
4,900	.17	.22	—	.07	.10	.36	.22	.16	.23	.22	
25	2,300	.04	.05	.08	.02	.02	.10	.06	.03	.05	.05
	2,500	.04	.06	.09	.02	.03	.12	.07	.04	.06	.06
	3,000	.06	.08	.12	.03	.04	.16	.09	.06	.09	.08
	3,500	.09	.11	.14	.04	.05	.21	.12	.08	.12	.11
	4,000	.11	.15	.17	.05	.07	.26	.16	.10	.15	.15
	4,500	.14	.19	—	.06	.09	.31	.19	.13	.20	.19
	5,000	.17	.23	—	.07	.11	.38	.23	.16	.24	.23
5,500	.21	.28	—	.09	.13	.44	.28	.20	.29	.28	
30	2,700	.03	.04	.07	.01	.02	.09	.05	.03	.04	.04
	3,000	.04	.05	.08	.02	.02	.10	.06	.04	.05	.05
	4,000	.06	.09	.12	.03	.04	.17	.10	.06	.10	.08
	5,000	.10	.13	.16	.04	.06	.24	.14	.10	.15	.13
	6,000	.14	.19	—	.06	.09	.33	.20	.14	.21	.19
	6,500	.17	.23	—	.07	.11	.38	.23	.17	.25	.22
35	3,200	.04	.05	.09	.02	.03	.11	.06	.04	.06	.05
	4,000	.06	.09	.12	.03	.04	.17	.10	.06	.10	.08
	5,000	.10	.13	.16	.04	.06	.24	.14	.10	.15	.13
	6,000	.14	.19	—	.06	.09	.33	.20	.14	.21	.19
	7,000	.20	.26	—	.09	.13	.43	.27	.20	.29	.25
	8,000	.26	.34	—	.11	.16	—	—	—	—	.33
8,500	.29	.39	—	.13	.18	—	—	—	—	.37	
40	3,700	.04	.06	.09	.02	.03	.11	.06	.04	.07	.06
	4,000	.05	.07	.10	.02	.03	.13	.07	.05	.08	.07
	5,000	.08	.11	.13	.03	.05	.19	.11	.08	.12	.10
	6,000	.11	.15	.17	.05	.07	.26	.16	.12	.18	.15
	7,000	.16	.21	—	.07	.09	.33	.21	.16	.24	.20
	8,000	.20	.27	—	.09	.12	.42	.26	.21	.31	.26
8,500	.23	.31	—	.10	.14	—	—	—	—	.30	

# Performance Data

**Table PD-5 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangements B,D – 500-800 MBh Accessory Pressure Loss**

		Pressure Loss (Inches of Water)									
Capacity	CFM	Rainhood with		Filters			Evaporative Cooling Pad		Return or Outside Air Damper		
		Screen	Mstr. Elim.	Throwaway	Washable	Pleated	8"	12"			
50	2,300	.04	.05	.08	.02	.02	.10	.06	.03	.05	.05
	2,500	.04	.06	.09	.02	.03	.12	.07	.04	.06	.06
	3,000	.06	.08	.12	.03	.04	.16	.09	.06	.09	.08
	3,500	.09	.11	.14	.04	.05	.21	.12	.08	.12	.11
	4,000	.11	.15	.17	.05	.07	.26	.16	.10	.15	.15
	4,500	.14	.19	—	.06	.09	.31	.19	.13	.20	.19
	5,000	.17	.23	—	.07	.11	.38	.23	.16	.24	.23
	5,200	.19	.25	—	.08	.12	.40	.25	.17	.26	.25
60	2,700	.03	.04	.07	.01	.02	.09	.05	.03	.04	.04
	3,000	.04	.05	.08	.02	.02	.10	.06	.04	.05	.05
	4,000	.06	.09	.12	.03	.04	.17	.10	.06	.10	.08
	5,000	.10	.13	.16	.04	.06	.24	.14	.10	.15	.13
	6,000	.14	.19	—	.06	.09	.33	.20	.14	.21	.19
70	3,200	.04	.05	.09	.02	.03	.11	.06	.04	.06	.05
	4,000	.06	.09	.12	.03	.04	.17	.10	.06	.10	.08
	5,000	.10	.13	.16	.04	.06	.24	.14	.10	.15	.13
	6,000	.14	.19	—	.06	.09	.33	.20	.14	.21	.19
	7,000	.20	.26	—	.09	.13	.43	.27	.20	.29	.25
	7,500	.22	.30	—	.10	.14	.	.	.22	.34	.29
80	3,700	.04	.06	.09	.02	.03	.11	.06	.04	.07	.06
	4,000	.05	.07	.10	.02	.03	.13	.07	.05	.08	.07
	5,000	.08	.11	.13	.03	.05	.19	.11	.08	.12	.10
	8,000	.11	.15	.17	.05	.07	.26	.16	.12	.18	.15
	7,000	.16	.21	—	.07	.09	.33	.21	.16	.24	.20
	7,500	.18	.24	—	.07	.11	.38	.23	.18	.28	.23



# Performance Data

**Table PD-6 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangements G – 200-400 MBh Performance Data**

Capacity	TR (F)	CFM	Input Btu/Hr.		Max. Output Btu/Hr.	Total Adjusted Static Pressure (Inches of Water)											
						0.4		0.8		1		1.4		1.8		2	
						RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
20	82	1,800	200,000	80,000	160,000	495	.29	650	.49	720	.59	835	.82	940	1.07	985	1.20
	74	2,000				510	.35	665	.56	730	.67	845	.91	950	1.17	995	1.31
	59	2,500				560	.55	695	.79	755	.92	870	1.20	970	1.48	1015	1.63
	49	3,000				620	.84	735	1.09	795	1.24	900	1.56	995	1.88	1040	2.05
	42	3,500				685	1.23	790	1.50	840	1.65	935	2.00	1025	2.37	1065	2.56
	37	4,000				755	1.73	845	2.04	890	2.20	975	2.55	1060	2.95	1100	3.16
	33	4,500				825	2.37	905	2.72	950	2.90	1025	3.25	1105	3.65	1140	3.87
	30	4,900				885	2.98	960	3.36	995	3.56	1070	3.94	1140	4.34	1175	4.55
25	80	2,300	250,000	100,000	200,000	520	.43	665	.66	730	.78	845	1.04	945	1.31	995	1.45
	74	2,500				540	.52	675	.75	740	.88	855	1.15	955	1.44	1000	1.58
	61	3,000				595	.79	710	1.03	770	1.17	875	1.49	975	1.81	1020	1.98
	53	3,500				655	1.15	760	1.42	810	1.56	905	1.89	1000	2.26	1040	2.45
	46	4,000				720	1.61	810	1.93	855	2.08	945	2.41	1030	2.79	1070	3.00
	41	4,500				790	2.21	870	2.55	910	2.73	990	3.08	1065	3.45	1105	3.66
	37	5,000				860	2.95	930	3.31	995	3.51	1040	3.90	1110	4.29	1145	4.49
	34	5,500				935	3.84	995	4.22	1025	4.43	1095	4.87	1160	5.30	1195	5.51
30	82	2,700	300,000	120,000	240,000	520	.47	705	.89	785	1.12	915	1.60	1025	2.10	1070	2.36
	74	3,000				530	.56	710	.99	790	1.24	925	1.76	1035	2.29	1085	2.57
	55	4,000				595	.95	740	1.43	810	1.70	940	2.30	1060	2.96	1110	3.30
	44	5,000				670	1.55	795	2.10	850	2.39	965	3.03	1075	3.74	1125	4.12
	37	6,000				750	2.40	860	3.02	910	3.35	1010	4.05	1105	4.80	1155	5.19
	32	7,000				840	3.54	935	4.25	985	4.62	1070	5.38	1155	6.19	1200	6.61
	30	7,400				875	4.09	970	4.84	1015	5.22	1100	6.02	1180	6.85	1220	7.28
	35	81				3,200	350,000	140,000	280,000	495	.50	665	.87	720	1.07	840	1.51
65		4,000	530	.74	680	1.17				745	1.40	860	1.88	960	2.41	1005	2.68
52		5,000	585	1.17	720	1.67				780	1.94	890	2.50	985	3.07	1030	3.37
43		6,000	650	1.79	765	2.33				820	2.64	925	3.29	1015	3.94	1060	4.28
37		7,000	720	2.65	825	3.21				870	3.53	965	4.25	1055	5.01	1095	5.38
32		8,000	795	3.75	885	4.37				930	4.70	1015	5.44	1095	6.27	1135	6.70
30		8,600	840	4.54	925	5.21				965	5.55	1045	6.30	1125	7.15	1165	7.60
40		80	3,700	400,000	160,000	320,000				500	.61	660	1.02	725	1.23	840	1.69
	74	4,000	515				.70	665	1.13	730	1.36	850	1.83	950	2.35	995	2.63
	59	5,000	565				1.11	700	1.60	760	1.87	875	2.41	975	2.99	1020	3.29
	49	6,000	625				1.70	745	2.21	800	2.51	905	3.15	1000	3.81	1045	4.14
	42	7,000	695				2.50	795	3.05	845	3.35	940	4.05	1030	4.80	1075	5.18
	37	8,000	760				3.52	855	4.15	900	4.47	985	5.17	1070	5.97	1110	6.40
	33	9,000	835				4.82	915	5.53	960	5.88	1035	6.59	1115	7.40	1150	7.85
	30	9,800	895				6.07	970	6.84	1010	7.23	1080	7.99	1150	8.80	1190	9.24

**Notes:**

1. Values in this table are based on the basic package unit that includes blower and duct furnace(s).
2. Brake horsepower (BHP) includes typical belt losses.
3. Unit leaving air temperature (LAT) is limited to 150 F LAT = Entering Air Temperature (EAT) + Temperature Rise (TR).
4. Total External Static Pressure = Accessory Pressure Losses + External Static Pressure.

# Performance Data

**Table PD-7 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangement K – 100-400 MBh Performance Data**

Capacity	TR (F)	CFM	Input Btu/Hr.		Max. Output Btu/Hr.	Total Adjusted Static Pressure (Inches of Water)											
						Max.	Min.	0.4		0.8		1		1.4		1.8	
			RPM	BHP				RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
10	82	900			80,000	730	.18	965	.33	1065	.41	1230	.58	1375	.76	1440	.86
	74	1,000				745	.21	980	.37	1080	.46	1245	.64	1390	.83	1455	.93
	61	1,200				795	.29	1015	.47	1110	.57	1280	.77	1425	.99	1490	1.10
	53	1,400	100,000	40,000		850	.39	1050	.59	1145	.69	1310	.92	1455	1.16	1520	1.28
	46	1,600				910	.52	1095	.73	1160	.85	1340	1.09	1485	1.36	1550	1.49
	41	1,800				980	.68	1145	.90	1225	1.03	1375	1.29	1515	1.57	1585	1.72
	37	2,000				1050	.87	1200	1.11	1275	1.24	1420	1.52	1550	1.82	1615	1.98
	34	2,200				1125	1.11	1265	1.36	1330	1.50	1465	1.79	1590	2.11	1655	2.27
	31	2,400				1200	1.38	1330	1.66	1390	1.80	1515	2.11	1635	2.44	1695	2.61
15	79	1,400			120,000	745	.31	960	.49	1055	.59	1235	.81	1385	1.05	1460	1.17
	74	1,500				770	.35	970	.54	1065	.65	1240	.87	1395	1.12	1465	1.24
	55	2,000				895	.65	1060	.89	1135	1.00	1285	1.26	1425	1.54	1495	1.69
	44	2,500	150,000	60,000		1035	1.13	1180	1.40	1245	1.55	1370	1.84	1490	2.14	1550	2.30
	37	3,000				1180	1.84	1310	2.12	1370	2.28	1480	2.64	1585	2.98	1640	3.16
	32	3,500				1335	2.79	1450	3.10	1505	3.27	1605	3.66	1705	4.07	1750	4.27
	31	3,600				1370	3.02	1475	3.34	1530	3.50	1630	3.89	1730	4.32	1775	4.53
20	82	1,800			160,000	495	.29	650	.49	720	.59	835	.82	940	1.07	985	1.20
	74	2,000				510	.35	665	.56	730	.67	845	.91	950	1.17	995	1.31
	59	2,500				560	.55	695	.79	755	.92	870	1.20	970	1.48	1015	1.63
	49	3,000	200,000	80,000		620	.84	735	1.09	795	1.24	900	1.56	995	1.88	1040	2.05
	42	3,500				665	1.23	790	1.50	840	1.65	935	2.00	1025	2.37	1065	2.56
	37	4,000				755	1.73	845	2.04	890	2.20	975	2.55	1060	2.95	1100	3.16
	33	4,500				825	2.37	905	2.72	950	2.90	1025	3.25	1105	3.65	1140	3.87
	30	4,900				885	2.98	960	3.36	995	3.56	1070	3.94	1140	4.34	1175	4.55
25	80	2,300			200,000	520	.43	665	.66	730	.78	845	1.04	945	1.31	995	1.45
	74	2,500				540	.52	675	.75	740	.88	855	1.15	955	1.44	1000	1.58
	61	3,000				595	.79	710	1.03	770	1.17	875	1.49	975	1.81	1020	1.98
	53	3,500	250,000	100,000		655	1.15	760	1.42	810	1.56	905	1.89	1000	2.26	1040	2.45
	46	4,000				720	1.61	810	1.93	855	2.08	945	2.41	1030	2.79	1070	3.00
	41	4,500				790	2.21	870	2.55	910	2.73	990	3.08	1065	3.45	1105	3.66
	37	5,000				860	2.95	930	3.31	995	3.51	1040	3.90	1110	4.29	1145	4.49
	34	5,500				935	3.84	995	4.22	1025	4.43	1095	4.87	1160	5.30	1195	5.51
30	82	2,700			240,000	520	.47	705	.89	785	1.12	915	1.60	1025	2.10	1070	2.36
	74	3,000				530	.56	710	.99	790	1.24	925	1.76	1035	2.29	1085	2.57
	55	4,000				595	.95	740	1.43	810	1.70	940	2.30	1060	2.96	1110	3.30
	44	5,000	300,000	120,000		670	1.55	795	2.10	850	2.39	965	3.03	1075	3.74	1125	4.12
	37	6,000				750	2.40	860	3.02	910	3.35	1010	4.05	1105	4.80	1155	5.19
	32	7,000				840	3.54	935	4.25	985	4.62	1070	5.38	1155	6.19	1200	6.61
	30	7,400				875	4.09	970	4.84	1015	5.22	1100	6.02	1180	6.85	1220	7.28
	35	81	3,200				280,000	495	.50	665	.87	720	1.07	840	1.51	940	2.00
65		4,000			530	.74		680	1.17	745	1.40	860	1.88	960	2.41	1005	2.68
52		5,000			585	1.17		720	1.67	780	1.94	890	2.50	985	3.07	1030	3.37
43		6,000	350,000	140,000	650	1.79		765	2.33	820	2.64	925	3.29	1015	3.94	1060	4.28
37		7,000			720	2.65		825	3.21	870	3.53	965	4.25	1055	5.01	1095	5.38
32		8,000			795	3.75		885	4.37	930	4.70	1015	5.44	1095	6.27	1135	6.70
30		8,600			840	4.54		925	5.21	965	5.55	1045	6.30	1125	7.15	1165	7.60
40	80	3,700			320,000	500	.61	660	1.02	725	1.23	840	1.69	945	2.20	990	2.47
	74	4,000				515	.70	665	1.13	730	1.36	850	1.83	950	2.35	995	2.63
	59	5,000				565	1.11	700	1.60	760	1.87	875	2.41	975	2.99	1020	3.29
	49	6,000	400,000	160,000		625	1.70	745	2.21	800	2.51	905	3.15	1000	3.81	1045	4.14
	42	7,000				695	2.50	795	3.05	845	3.35	940	4.05	1030	4.80	1075	5.18
	37	8,000				760	3.52	855	4.15	900	4.47	985	5.17	1070	5.97	1110	6.40
	33	9,000				835	4.82	915	5.53	960	5.88	1035	6.59	1115	7.40	1150	7.85
	30	9,800				895	6.07	970	6.84	1010	7.23	1080	7.99	1150	8.80	1190	9.24

**Notes:**

1. Values in this table are based on the basic package unit that includes blower and duct furnace(s).
2. Brake horsepower (BHP) includes typical belt losses.
3. Unit leaving air temperature (LAT) is limited to 150 F LAT = Entering Air Temperature (EAT) + Temperature Rise (TR).
4. Total External Static Pressure = Accessory Pressure Losses + External Static Pressure.

# Performance Data

**Table PD-8 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangement G, K – 500-800 MBh Performance Data**

Capacity	TR (F)	CFM	Input Btu/Hr.		Max. Output Btu/Hr.	Total Adjusted Static Pressure (Inches of Water)											
			Max.	Min.		0.4		0.8		1		1.4		1.8		2	
						RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
50	160	2,300				560	.48	700	.72	760	.85	875	1.11	975	1.38	1020	1.53
	147	2,500				585	.58	715	.83	775	.97	885	1.24	985	1.53	1030	1.68
	123	3,000				645	.89	765	1.15	820	1.31	920	1.63	1015	1.96	1060	2.13
	105	3,500	500,000	200,000	400,000	715	1.31	820	1.59	865	1.75	960	2.11	1050	2.49	1095	2.68
	92	4,000				790	1.86	880	2.17	925	2.33	1010	2.70	1095	3.11	1130	3.33
	82	4,500				865	2.54	945	2.89	985	3.07	1065	3.44	1140	3.86	1180	4.09
	74	5,000				945	3.38	1015	3.78	1055	3.97	1125	4.36	1195	4.79	1230	5.02
	67	5,500				1020	4.40	1090	4.84	1125	5.05	1190	5.48	1255	5.92	1285	6.15
	61	6,000				1100	5.62	1165	6.09	1195	6.33	1255	6.80	1315	7.26	1345	7.50
60	164	2,700				570	.57	750	1.01	820	1.25	945	1.73	1050	2.24	1095	2.50
	147	3,000				590	.68	760	1.15	835	1.40	960	1.92	1065	2.47	1115	2.75
	111	4,000				675	1.21	815	1.73	885	2.03	1010	2.67	1120	3.34	1170	3.69
	88	5,000	600,000	240,000	480,000	775	2.01	890	2.61	950	2.93	1055	3.63	1160	4.40	1210	4.80
	74	6,000				880	3.16	985	3.84	1030	4.20	1125	4.96	1220	5.78	1265	6.21
	63	7,000				995	4.71	1080	5.48	1125	5.88	1210	6.72	1290	7.60	1330	8.06
	60	7,400				1040	5.46	1125	6.27	1165	6.68	1245	7.55	1320	8.46	1360	8.93
70	161	3,200				540	.60	690	.98	755	1.19	865	1.64	965	2.13	1010	2.39
	129	4,000				595	.92	735	1.36	795	1.59	900	2.09	1000	2.64	1040	2.92
	103	5,000				675	1.48	795	2.02	850	2.29	950	2.86	1045	3.46	1085	3.77
	86	6,000	700,000	280,000	560,000	755	2.27	865	2.90	915	3.23	1010	3.88	1095	4.55	1135	4.90
	74	7,000				845	3.35	940	4.05	985	4.42	1075	5.18	1155	5.94	1195	6.32
	65	8,000				935	4.75	1020	5.51	1065	5.92	1145	6.77	1220	7.63	1255	8.07
	60	8,600				995	5.78	1075	6.56	1110	6.99	1190	7.89	1260	8.82	1295	9.28
80	159	3,700				550	.72	695	1.13	760	1.35	870	1.83	970	2.35	1015	2.62
	147	4,000				570	.84	710	1.28	770	1.51	885	2.00	980	2.53	1025	2.82
	118	5,000				635	1.34	760	1.87	820	2.14	925	2.70	1020	3.29	1065	3.59
	98	6,000	800,000	320,000	640,000	710	2.05	820	2.65	875	2.97	970	3.62	1060	4.28	1105	4.62
	84	7,000				790	3.02	890	3.66	935	4.02	1025	4.77	1110	5.52	1150	5.91
	74	8,000				875	4.30	960	4.97	1005	5.35	1090	6.17	1165	7.03	1205	7.46
	66	9,000				960	5.91	1040	6.63	1080	7.03	1155	7.89	1225	8.83	1265	9.31
	60	9,800				1030	7.47	1105	8.24	1140	8.65	1210	9.54	1280	10.52	1315	11.03

Notes:

1. Values in this table are based on the basic package unit that includes blower and duct furnace(s).
2. Brake horsepower (BHP) includes typical belt losses.
3. Unit leaving air temperature (LAT) is limited to 150 F LAT= Entering Air Temperature (EAT) + Temperature Rise (TR).
4. Total External Static Pressure = Accessory Pressure Losses + External Static Pressure.
5. See Tables PD-10, 11, 13 and 14 for cfm limitations on Arrangement K.

**Table PD-9 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangement G – 1200 MBh Performance Data**

Capacity	TR (F)	CFM	Input Btu/Hr.		Max. Output Btu/Hr.	Total Adjusted Static Pressure (Inches of Water)											
			Max.	Min.		0.4		0.8		1		1.4		1.8		2	
						RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
12	197	4,500				660	1.26	785	1.75	840	2.01	945	2.55	1035	3.12	1080	3.43
	177	5,000				700	1.60	820	2.14	875	2.42	975	2.99	1065	3.60	1105	3.91
	147	6,000				790	2.46	895	3.10	945	3.43	1035	4.09	1120	4.77	1160	5.12
	126	7,000	1,200,000	480,000	960,000	885	3.63	980	4.36	1025	4.74	1110	5.49	1185	6.26	1225	6.65
	111	8,000				985	5.15	1065	5.95	1105	6.38	1185	7.24	1260	8.10	1295	8.54
	98	9,000				1080	7.07	1160	7.94	1195	8.40	1265	9.36	1335	10.33	1370	10.81
	90	9,800				1165	8.93	1235	9.85	1265	10.34	1335	11.36	1400	12.41	1430	12.94

Notes:

1. Values in this table are based on the basic package unit that includes blower and duct furnace(s).
2. Brake horsepower (BHP) includes typical belt losses.
3. Unit leaving air temperature (LAT) is limited to 150 F LAT = Entering Air Temperature (EAT) + Temperature Rise (TR).
4. Total External Static Pressure = Accessory Pressure Losses + External Static Pressure.

# Performance Data

## Standard DX Coil Performance Data

**Table PD-10 – Indoor Make-Up Air Gas Heating Units – Refrigerant (R-22) DX Coil Performance**

Capacity based on 80 F EDB, 67 F EWB, 45 F Sat. Suction, 100 F Liquid													
NUMBER OF ROWS													
Unit Capacity (CA)	Air Flow (SCFM)	Face Velocity (FPM)	Fin Spacing (FPF)	4				6					
				Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)	Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)		
10	1600	334	* 96	54.2	57 / 56	0.27	62	68.7	53 / 53	0.41	84		
			* 120	59.9	55 / 55	0.32	65	72.5	52 / 52	0.48	89		
			* 144	64.0	54 / 54	0.37	70	75.8	51 / 51	0.56	95		
		2400	481	96	63.5	61 / 59	0.43	62	81.7	57 / 56	0.63	84	
				120	72.4	59 / 58	0.46	65	88.1	55 / 55	0.67	89	
				144	80.0	57 / 56	0.49	70	94.5	54 / 54	0.72	95	
	15	1600	334	* 96	54.2	57 / 56	0.27	62	68.7	53 / 53	0.41	84	
				* 120	59.9	55 / 55	0.32	65	72.5	52 / 52	0.48	89	
				* 144	64.0	54 / 54	0.37	70	75.8	51 / 51	0.56	95	
			3000	601	96	71.3	62 / 60	0.59	62	89.8	59 / 58	0.87	84
					120	82.0	60 / 58	0.63	65	101.2	57 / 56	0.93	89
					144	91.3	58 / 57	0.67	70	111.1	55 / 55	1.00	95
20		2100	296	* 96	79.4	56 / 55	0.23	84	95.9	52 / 52	0.34	115	
				* 120	86.7	54 / 54	0.27	89	102.0	51 / 51	0.40	122	
				* 144	91.9	53 / 53	0.31	95	106.2	50 / 50	0.47	130	
			4400	596	96	105.6	62 / 60	0.58	84	142.1	58 / 57	0.87	115
					120	123.1	60 / 58	0.62	89	158.7	56 / 55	0.94	122
					144	138.6	58 / 57	0.66	95	172.3	54 / 54	1.00	130
	25, 50	2500	353	* 96	88.6	57 / 56	0.30	84	108.5	53 / 53	0.45	115	
				* 120	97.3	55 / 54	0.35	89	116.1	52 / 52	0.53	122	
				* 144	103.6	54 / 53	0.41	95	121.3	51 / 51	0.61	130	
			4400	596	96	105.6	62 / 60	0.58	84	142.1	58 / 57	0.87	115
					120	123.1	60 / 58	0.62	89	158.7	56 / 55	0.94	122
					144	138.6	58 / 57	0.66	95	172.3	54 / 54	1.00	130
30, 60		2800	299	* 96	107.3	55 / 54	0.23	105	126.8	52 / 52	0.34	145	
				* 120	117.1	54 / 53	0.27	112	134.3	51 / 51	0.40	155	
				* 144	124.0	53 / 52	0.32	119	140.1	50 / 50	0.47	166	
			5800	594	96	147.7	61 / 59	0.58	105	187.5	58 / 57	0.87	145
					120	169.9	59 / 58	0.63	112	208.0	56 / 55	0.92	155
					144	189.1	58 / 57	0.67	119	228.2	54 / 54	0.99	166
	35, 70	3200	341	* 96	116.7	56 / 55	0.28	105	139.3	53 / 53	0.43	145	
				* 120	127.8	55 / 54	0.33	112	149.6	51 / 51	0.50	155	
				* 144	135.8	53 / 53	0.39	119	156.6	50 / 50	0.58	166	
			5800	594	96	147.7	61 / 59	0.58	105	187.5	58 / 57	0.87	145
					120	169.6	59 / 58	0.63	112	208.0	56 / 55	0.92	155
					144	189.1	58 / 57	0.67	119	228.2	54 / 54	0.99	166
40, 80		3700	355	* 96	132.3	56 / 55	0.30	115	161.9	53 / 53	0.46	158	
				* 120	144.6	55 / 54	0.35	122	173.9	51 / 51	0.53	170	
				* 144	153.5	54 / 53	0.41	130	182.1	50 / 50	0.62	182	
			6500	599	96	166.3	61 / 59	0.59	115	209.6	58 / 57	0.88	158
					120	190.0	59 / 58	0.63	122	237.0	56 / 55	0.94	170
					144	210.6	58 / 57	0.68	130	259.7	54 / 54	1.00	182

Conversions:  
 2119 SCFM = 1 m/s  
 196.8 FPM = 1 m/s  
 3.412 MBH = 1 kW  
 (F-32) 5/9 = C  
 1 In. W.C. = 248.8 Pa  
 1 LB. = 0.453 kg

Notes:  
 1.) Data certified in accordance with ARI Standard 410.  
 2.) Capacity based on 80 F EDB, 67 F EWB, 45 F Sat. Suction, 100 F Liquid.  
 3.) Weight listed is the total weight of the dry coil.  
 4.) Coils denoted by an asterisk ( \* ) require special pricing; consult your Trane representative for special coil requirements and pricing.

# Performance Data

## Standard DX Coil Performance Data

Table PD-11 – Indoor Make-Up Air Gas Heating Units – Refrigerant (R-22) DX Coil Performance

Capacity based on 80 F EDB, 67 F EWB, 45 F Sat. Suction, 100 F Liquid											
NUMBER OF ROWS											
Unit Capacity (CA)	Air Flow (SCFM)	Face Velocity (FPM)	Fin Spacing (FPF)	4				6			
				Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)	Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)
10	1600	320	96	78.6	62 / 60	0.23	62	94.2	58 / 57	0.34	84
			120	87.4	59 / 58	0.24	65	102.9	55 / 55	0.36	89
			144	94.3	57 / 56	0.26	70	109.4	53 / 53	0.38	95
	2400	481	96	98.7	66 / 63	0.43	62	124.4	60 / 59	0.64	84
			120	111.2	63 / 61	0.46	65	138.5	58 / 57	0.68	89
			144	121.7	61 / 60	0.49	70	149.9	56 / 55	0.73	95
15	1600	320	96	78.6	62 / 60	0.23	62	94.2	58 / 57	0.34	84
			120	87.4	59 / 58	0.24	65	102.9	55 / 55	0.36	89
			144	94.3	57 / 56	0.26	70	109.4	53 / 53	0.38	95
	3000	601	96	110.2	67 / 64	0.59	62	142.9	62 / 61	0.88	84
			120	124.9	65 / 62	0.64	65	161.1	59 / 58	0.94	89
			144	139.2	62 / 61	0.66	70	176.0	57 / 57	1.01	95
20	2100	244	96	98.0	60 / 58	0.14	84	119.5	54 / 54	0.21	115
			120	108.6	57 / 56	0.15	89	127.6	53 / 52	0.23	122
			144	116.7	55 / 55	0.16	95	133.3	51 / 51	0.24	130
	4400	596	96	168.6	67 / 64	0.58	84	215.7	62 / 60	0.87	115
			120	194.5	64 / 62	0.63	89	238.1	59 / 58	0.94	122
			144	217.7	61 / 60	0.67	95	261.2	57 / 56	1.00	130
25, 50	2500	312	96	115.4	62 / 60	0.22	84	143.1	56 / 56	0.32	115
			120	129.3	59 / 58	0.23	89	154.2	54 / 54	0.35	122
			144	140.5	57 / 56	0.25	95	162.3	53 / 53	0.37	130
	4400	596	96	168.6	67 / 64	0.58	84	215.7	62 / 60	0.87	115
			120	194.5	64 / 62	0.63	89	238.1	59 / 58	0.94	122
			144	217.7	61 / 60	0.67	95	261.2	57 / 56	1.00	130
30, 60	2800	276	96	145.9	60 / 58	0.18	105	173.4	55 / 55	0.26	145
			120	161.6	57 / 56	0.19	112	185.3	53 / 53	0.28	155
			144	173.5	55 / 55	0.20	119	195.5	52 / 52	0.30	166
	5800	594	96	226.2	67 / 63	0.58	105	290.6	61 / 60	0.87	145
			120	257.4	64 / 62	0.63	112	326.5	58 / 58	0.93	155
			144	285.0	61 / 60	0.66	119	356.4	56 / 56	1.00	166
35, 70	3200	328	96	162.6	62 / 60	0.24	105	194.7	57 / 56	0.35	145
			120	181.2	59 / 58	0.25	112	212.0	54 / 54	0.38	155
			144	195.8	57 / 56	0.27	119	225.2	53 / 53	0.40	166
	5800	594	96	226.2	67 / 63	0.58	105	290.6	61 / 60	0.87	145
			120	257.4	64 / 62	0.63	112	326.5	58 / 58	0.93	155
			144	285.0	61 / 60	0.66	119	356.4	56 / 56	1.00	166
40, 80	3700	341	96	185.6	62 / 60	0.25	115	225.6	57 / 56	0.38	158
			120	206.3	59 / 58	0.27	122	245.6	54 / 54	0.40	170
			144	222.4	57 / 56	0.29	130	260.9	53 / 53	0.43	182
	6500	599	96	250.8	67 / 63	0.59	115	328.1	61 / 60	0.88	158
			120	287.1	64 / 62	0.63	122	367.3	58 / 57	0.95	170
			144	324.3	61 / 60	0.67	130	400.1	56 / 56	1.01	182

Conversions:  
 2119 SCFM = 1 m/s  
 196.8 FPM = 1 m/s  
 3.412 MBH = 1 kW  
 (F-32) 5/9 = C  
 1 In. W.C. = 248.8 Pa  
 1 LB. = 0.453 kg

Notes:  
 1.) Data certified in accordance with ARI Standard 410.  
 2.) Capacity based on 95 F EDB, 74 F EWB, 45 F Sat. Suction, 100 F Liquid.  
 3.) Weight listed is the total weight of the dry coil.  
 4.) Coils denoted by an asterisk ( \* ) require special pricing; consult your Trane representative for special coil requirements and pricing.

# Performance Data

**Table PD-12 – Standard Conditions and Specifications – Refrigerant DX Coil**

<b>CONDITIONS</b>		
Elevation	0 Ft.	
Entering Air Temperature DB:	80 F	95 F
Entering Air Temperature WB:	67 F	74 F
Suction Temperature:	45 F	45 F
Liquid Temperature:	100 F	100 F
Fouling Factor:	0 HR x Ft <sup>2</sup> x F/BTU	
<b>SPECIFICATIONS</b>		
Coil Type:	FD — Staggered Tube Pattern	
Tube Size:	1/2" O.D. x 0.016" TWT Copper	
Row Sizes:	4,6	
Fin Type:	DE – Optional DH	
Fin Size:	0.0055" Aluminum	
Fin Spacing:	Standard – 96, (120), 144 Fins/Ft. Optional – 72 thru 180 Fins/Ft.	
Circuiting:	Standard – Single Optional – Dual: a) Intertwined b) Face-Split	
Turbulators:	No	
<b>DIMENSIONAL DATA LISTING</b>		
Unit Size	Fixed Finned Width	Fixed Finned Length
10, 15	30.00	23.00
20, 25, 50	30.00	34.00
30, 35, 60, 70	30.00	45.00
40, 80	30.00	50.00

**Note:**

- Above specification is for standard coil with standard fin spacing.  
Specify fin spacing and dual circuiting.
- Special coils — contact your Trane representative.
- Every order requires a coil selection.

# Performance Data

## Standard Chilled Water Coil Performance Data

Table PD-13 – Indoor Make-Up Air Gas Heating Units – Chilled Water Coil Performance

Capacity based on 80 F EDB, 67 F EWB, 45 F EWT, 70 GPM												
NUMBER OF ROWS												
Unit Capacity (CA)	Air Flow (SCFM)	Face Velocity (FPM)	Fin Spacing (FPF)	4				6				
				Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)	Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)	
10	960	200	96	44.6	53 / 52	0.08	158	52.0	48 / 48	0.11	204	
			120	48.1	51 / 50	0.09	164	54.5	47 / 47	0.13	213	
			144	50.6	49 / 49	0.11	170	56.1	46 / 46	0.16	222	
	2400	501	96	78.5	58 / 56	0.35	158	99.7	54 / 53	0.52	204	
			120	86.9	56 / 55	0.40	164	108.1	52 / 52	0.60	213	
			144	93.4	55 / 54	0.45	170	114.3	51 / 51	0.68	222	
	15	1400	292	96	57.9	55 / 54	0.15	158	69.9	51 / 50	0.22	204
				120	63.0	53 / 52	0.17	164	74.2	49 / 49	0.26	213
				144	67.0	51 / 51	0.20	170	77.2	48 / 48	0.29	222
2900		605	96	85.8	60 / 57	0.46	158	110.7	55 / 54	0.70	204	
			120	95.5	58 / 56	0.53	164	108.1	54 / 53	0.79	213	
			144	103.0	56 / 55	0.60	170	114.3	52 / 52	0.90	222	
20		1800	254	96	77.4	54 / 53	0.12	197	92.3	50 / 50	0.17	260
				120	83.9	52 / 51	0.14	206	97.5	49 / 48	0.21	274
				144	89.0	51 / 50	0.16	215	101.3	48 / 48	0.24	287
	4300	607	96	124.8	60 / 58	0.47	197	160.4	56 / 55	0.70	260	
			120	138.7	58 / 57	0.53	206	175.2	54 / 53	0.79	274	
			144	149.6	57 / 56	0.60	215	186.2	53 / 52	0.90	287	
	25, 50	2300	325	96	90.5	56 / 54	0.17	197	110.4	51 / 51	0.26	260
				120	98.8	54 / 53	0.20	206	117.6	50 / 50	0.31	274
				144	105.3	52 / 52	0.23	215	123.0	49 / 49	0.35	287
4300		607	96	124.8	60 / 58	0.47	197	160.4	56 / 55	0.70	260	
			120	138.7	58 / 57	0.53	206	175.2	54 / 53	0.79	274	
			144	149.6	57 / 56	0.60	215	186.2	53 / 52	0.90	287	
30, 60		2700	288	96	110.1	55 / 54	0.14	240	132.8	51 / 50	0.21	324
				120	119.7	53 / 52	0.17	252	141.0	49 / 49	0.25	341
				144	127.4	52 / 51	0.19	264	147.0	48 / 48	0.29	359
	5700	608	96	162.1	60 / 58	0.47	240	207.6	56 / 55	0.70	324	
			120	180.2	58 / 57	0.53	252	227.0	55 / 54	0.79	341	
			144	194.2	57 / 56	0.60	264	241.2	53 / 53	0.90	359	
	35, 70	3200	355	96	121.9	56 / 55	0.19	240	149.2	52 / 51	0.28	324
				120	133.2	54 / 53	0.22	252	159.4	50 / 50	0.33	341
				144	142.2	53 / 52	0.25	264	167.0	49 / 49	0.38	359
5700		608	96	162.1	60 / 58	0.47	240	207.6	56 / 55	0.70	324	
			120	180.2	58 / 57	0.53	252	227.0	55 / 54	0.79	341	
			144	194.2	57 / 56	0.60	264	241.2	53 / 53	0.90	359	
40, 80		3700	355	96	137.7	57 / 55	0.20	258	169.1	52 / 52	0.30	349
				120	150.6	55 / 54	0.23	271	181.0	51 / 51	0.35	369
				144	160.8	53 / 53	0.27	284	189.8	50 / 50	0.40	389
	6300	605	96	178.0	60 / 58	0.47	258	227.8	56 / 55	0.69	349	
			120	197.9	58 / 57	0.52	271	248.9	55 / 54	0.78	369	
			144	213.3	57 / 56	0.59	284	264.4	53 / 53	0.89	389	

Conversions:  
 2119 SCFM = 1 m/s  
 196.8 FPM = 1 m/s  
 3.412 MBH = 1 kW  
 (F-32) 5/9 = C  
 1 In. W.C. = 248.8 Pa  
 1 LB. = 0.453 kg

Notes:  
 1.) Data certified in accordance with ARI Standard 410.  
 2.) Capacity based on 80 F EDB, 67 F EWB, 45 F EWT, 70 GPM.  
 3.) Weight listed is the total weight of the coil filled with fluid.  
 4.) Consult your Trane representative for special coil requirements.

# Performance Data

## Standard Chilled Water Coil Performance Data

Table PD-14 – Indoor Make-Up Air Gas Heating Units – Chilled Water Coil Performance

Capacity based on 95 F EDB, 74 F EWB, 45 F EWT, 70 GPM													
NUMBER OF ROWS													
Unit Capacity (CA)	Air Flow (SCFM)	Face Velocity (FPM)	Fin Spacing (FPF)	4				6					
				Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)	Capacity (MBH)	L.A.T. (DB / WB)	A.P.D. In.W.C.	WT. (LBS)		
10	960	200	96	63.4	56 / 54	0.08	158	74.0	50 / 50	0.12	204		
			120	68.3	53 / 52	0.09	164	77.6	48 / 48	0.14	213		
			144	72.0	51 / 51	0.11	170	80.0	47 / 47	0.16	222		
		2400	501	96	110.6	64 / 61	0.34	158	140.8	58 / 57	0.52	204	
				120	122.4	61 / 59	0.39	164	152.8	56 / 55	0.59	213	
				144	131.8	59 / 58	0.44	170	161.8	54 / 53	0.67	222	
	15	1400	292	96	82.0	59 / 57	0.14	158	99.2	53 / 52	0.22	204	
				120	89.2	56 / 55	0.17	164	105.4	51 / 50	0.26	213	
				144	94.9	54 / 53	0.19	170	109.8	50 / 49	0.29	222	
			2900	605	96	120.6	66 / 62	0.46	158	156.0	60 / 58	0.69	204
					120	134.3	63 / 61	0.52	164	170.7	57 / 56	0.78	213
					144	145.0	61 / 59	0.59	170	181.6	56 / 55	0.89	222
20		1800	254	96	109.8	58 / 56	0.11	197	131.2	52 / 51	0.17	260	
				120	119.0	55 / 54	0.13	206	138.6	50 / 50	0.20	274	
				144	126.3	53 / 52	0.15	215	143.9	49 / 49	0.23	287	
			4300	607	96	175.1	66 / 62	0.46	197	226.1	60 / 58	0.69	260
					120	195.3	63 / 61	0.52	206	247.5	58 / 57	0.78	274
					144	210.8	61 / 60	0.59	215	263.2	56 / 56	0.89	287
	25, 50	2300	325	96	128.0	60 / 57	0.17	197	156.4	54 / 53	0.26	260	
				120	139.7	57 / 56	0.20	206	166.8	52 / 51	0.31	274	
				144	149.0	55 / 54	0.23	215	174.4	50 / 50	0.35	287	
			4300	607	96	175.1	66 / 62	0.46	197	226.1	60 / 58	0.69	260
					120	195.3	63 / 61	0.53	206	247.5	58 / 57	0.78	274
					144	210.8	61 / 60	0.59	215	263.2	56 / 56	0.89	287
30, 60		2700	288	96	155.8	59 / 57	0.14	240	188.3	53 / 53	0.21	324	
				120	169.4	56 / 55	0.17	252	200.0	51 / 51	0.25	341	
				144	180.2	55 / 54	0.19	264	208.6	50 / 50	0.29	359	
			5700	608	96	227.8	66 / 63	0.46	240	292.9	61 / 59	0.69	324
					120	253.7	64 / 61	0.51	252	320.4	58 / 57	0.77	341
					144	273.7	62 / 60	0.59	264	340.8	57 / 56	0.89	359
	35, 70	3200	355	96	172.1	61 / 58	0.19	240	211.2	55 / 54	0.28	324	
				120	188.1	58 / 57	0.22	252	225.7	53 / 52	0.33	341	
				144	200.8	56 / 55	0.25	264	236.7	51 / 51	0.37	359	
			5700	608	96	227.8	66 / 63	0.46	240	292.9	61 / 59	0.69	324
					120	253.7	64 / 61	0.51	252	320.4	58 / 57	0.77	341
					144	273.7	62 / 60	0.59	264	340.8	57 / 56	0.89	359
40, 80		3700	355	96	194.3	61 / 59	0.20	258	239.1	55 / 54	0.30	349	
				120	212.5	58 / 57	0.23	271	256.0	53 / 53	0.35	369	
				144	227.1	57 / 56	0.26	284	269.0	52 / 52	0.40	389	
			6300	605	96	250.4	66 / 63	0.45	258	321.3	61 / 59	0.68	349
					120	278.8	64 / 61	0.51	271	351.4	59 / 58	0.77	369
					144	300.7	62 / 60	0.58	284	373.6	57 / 56	0.88	389

Conversions:  
 2119 SCFM = 1 m/s  
 196.8 FPM = 1 m/s  
 3.412 MBH = 1 kW  
 (F-32) 5/9 = C  
 1 In. W.C. = 248.8 Pa  
 1 LB. = 0.453 kg

Notes:  
 1.) Data certified in accordance with ARI Standard 410.  
 2.) Capacity based on 95 F EDB, 74 F EWB, 45 F EWT, 70 GPM.  
 3.) Weight listed is the total weight of the coil filled with fluid.  
 4.) Consult your Trane representative for special coil requirements.



# Performance Data

**Table PD-15 – Standard Conditions and Specifications – Chilled Water Coil**

<b>CONDITIONS</b>		
Elevation	0 Ft.	
Entering Air Temperature DB:	80 F	95 F
Entering Air Temperature WB:	67 F	78 F
Entering Water Temperature:	45 F	45 F
Water Flow Rate:	70 GPM	70 GPM
Tube Velocity:	4 Ft./Sec.	
Fouling Factor:	0 HR x FT <sup>2</sup> x F/BTU	
<b>SPECIFICATIONS</b>		
Coil Type:	W — Full Row Serpentine	
Tube Size:	5/8" O.D. x 0.024" TWT Copper	
Row Sizes:	4,6	
Fin Type:	Prima-Flo®	
Fin Size:	0.0075" Aluminum	
Fin Spacing:	Standard — 96, (120), 144 Fins/Ft. Optional — 80 thru 168 Fins/Ft.	
Circuiting:	Single Circuit	
Drainable:	Yes	
Turbulators:	No	
<b>DIMENSIONAL DATA LISTING</b>		
Unit Size	Fixed Finned Width	Fixed Finned Length
10, 15	30.00	23.00
20, 25, 50	30.00	34.00
30, 35, 60, 70	30.00	45.00
40, 80	30.00	50.00

Note:

1. Above specification is for standard coil with standard fin spacing.
2. Special coils – contact your Trane representative.
3. Every order requires a coil selection.

# Performance Data

Table PD-16 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangement G, K – 100-400 MBh – Accessory Pressure Loss

Capacity	CFM	Pressure Loss (Inches of Water)							Return or Outside Air Damper
		Rainhood with		Filters			Pleated		
		Screen	Mstr. Elim.	Throwaway	Washable	1"		2"	
10	900	.01	.02	.01	<.01	<.01	<.01	<.01	.02
	1,000	.01	.02	.01	<.01	<.01	.01	<.01	.02
	1,200	.02	.03	.02	<.01	<.01	.02	<.01	.03
	1,400	.03	.04	.02	<.01	<.01	.02	<.01	.04
	1,600	.04	.05	.03	<.01	<.01	.03	.01	.06
	1,800	.05	.06	.03	<.01	<.01	.03	.02	.07
	2,000	.06	.07	.04	<.01	<.01	.04	.02	.09
	2,200	.07	.09	.04	<.01	<.01	.04	.02	.11
	2,400	.08	.11	.05	<.01	<.01	.05	.03	.12
15	1,400	.03	.04	.02	<.01	<.01	.02	<.01	.04
	1,500	.03	.04	.02	<.01	<.01	.02	.01	.05
	2,000	.06	.07	.04	<.01	<.01	.04	.02	.09
	2,500	.09	.12	.05	<.01	.01	.05	.03	.13
	3,000	.13	.17	.06	.01	.02	.07	.04	.19
	3,500	.18	.23	.08	.01	.02	.09	.05	.25
	3,600	.19	.24	.08	.02	.02	.10	.05	.27
20	1,800	.02	.03	.03	<.01	<.01	.03	.02	.03
	2,000	.03	.04	.04	<.01	<.01	.04	.02	.04
	2,500	.04	.06	.05	<.01	.01	.05	.03	.06
	3,000	.06	.08	.06	.01	.02	.07	.04	.08
	3,500	.09	.11	.08	.01	.02	.09	.05	.11
	4,000	.11	.15	.09	.02	.03	.12	.07	.15
	4,500	.14	.19	.11	.02	.03	.14	.08	.19
	4,900	.17	.22	.12	.03	.04	.16	.10	.22
25	2,300	.04	.05	.04	<.01	<.01	.05	.02	.05
	2,500	.04	.06	.05	<.01	.01	.05	.03	.06
	3,000	.06	.08	.06	.01	.02	.07	.04	.08
	3,500	.09	.11	.08	.01	.02	.09	.05	.11
	4,000	.11	.15	.09	.02	.03	.12	.07	.15
	4,500	.14	.19	.11	.02	.03	.14	.08	.19
	5,000	.17	.23	.12	.03	.04	.17	.10	.23
	5,500	.21	.28	.14	.04	.05	.20	.12	.28
30	2,700	.03	.04	.03	<.01	<.01	.03	.01	.04
	3,000	.04	.05	.03	<.01	<.01	.03	.02	.05
	4,000	.06	.09	.05	<.01	.01	.05	.03	.08
	5,000	.10	.13	.06	.01	.02	.08	.04	.13
	6,000	.14	.19	.08	.02	.02	.10	.06	.19
	7,000	.20	.26	.10	.02	.03	.13	.08	.25
	7,400	.22	.29	.11	.02	.03	.15	.08	.28
	35	3,200	.04	.05	.03	<.01	<.01	.04	.02
4,000		.06	.09	.05	<.01	.01	.05	.03	.08
5,000		.10	.13	.06	.01	.02	.08	.04	.13
6,000		.14	.19	.08	.02	.02	.10	.06	.19
7,000		.20	.26	.10	.02	.03	.13	.08	.25
8,000		.26	.34	.12	.03	.04	.17	.10	.33
8,600		.30	.40	.13	.03	.05	.19	.11	.38
40	3,700	.04	.06	.03	<.01	<.01	.04	.02	.06
	4,000	.05	.07	.04	<.01	<.01	.04	.02	.07
	5,000	.08	.11	.05	<.01	.01	.06	.03	.10
	6,000	.11	.15	.07	.01	.02	.08	.04	.15
	7,000	.16	.21	.08	.02	.02	.10	.06	.20
	8,000	.20	.27	.10	.02	.03	.13	.07	.26
	9,000	.26	.35	.12	.03	.04	.16	.09	.33
	9,800	.31	.41	.13	.03	.05	.18	.11	.39

# Performance Data

**Table PD-17 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangement G, K – 500-800 MBh – Accessory Pressure Loss**

		Pressure Loss (Inches of Water)							Return or Outside Air Damper
Capacity	CFM	Rainhood with		Filters			Pleated		
		Screen	Mstr. Elim.	Throwaway	Washable	2"			
50	2,300	.04	.05	.04	<.01	<.01	.05	.02	.05
	2,500	.04	.06	.05	<.01	.01	.05	.03	.06
	3,000	.06	.08	.06	.01	.02	.07	.04	.08
	3,500	.09	.11	.08	.01	.02	.09	.05	.11
	4,000	.11	.15	.09	.02	.03	.12	.07	.15
	4,500	.14	.19	.11	.02	.03	.14	.08	.19
	5,000	.17	.23	.12	.03	.04	.17	.10	.23
	5,500	.21	.28	.14	.04	.05	.20	.12	.28
	6,000	.25	.33	.16	.04	.06	.23	.14	.33
60	2,700	.03	.04	.03	<.01	<.01	.03	.01	.04
	3,000	.04	.05	.03	<.01	<.01	.03	.02	.05
	4,000	.06	.09	.05	<.01	.01	.05	.03	.08
	5,000	.10	.13	.06	.01	.02	.08	.04	.13
	6,000	.14	.19	.08	.02	.02	.10	.06	.19
	7,000	.20	.26	.10	.02	.03	.13	.08	.25
	7,400	.22	.29	.11	.02	.03	.15	.08	.28
70	3,200	.04	.05	.03	<.01	<.01	.04	.02	.05
	4,000	.06	.09	.05	<.01	.01	.05	.03	.08
	5,000	.10	.13	.06	.01	.02	.08	.04	.13
	6,000	.14	.19	.08	.02	.02	.10	.06	.19
	7,000	.20	.26	.10	.02	.03	.13	.08	.25
	8,000	.26	.34	.12	.03	.04	.17	.10	.33
80	3,700	.04	.06	.03	<.01	<.01	.04	.02	.06
	4,000	.05	.07	.04	<.01	<.01	.04	.02	.07
	5,000	.08	.11	.05	<.01	.01	.06	.03	.10
	6,000	.11	.15	.07	.01	.02	.08	.04	.15
	7,000	.16	.21	.08	.02	.02	.10	.06	.20
	8,000	.20	.27	.10	.02	.03	.13	.07	.26
	9,000	.26	.35	.12	.03	.04	.16	.09	.33
	9,800	.31	.41	.13	.03	.05	.18	.11	.39

**Table PD-18 – Standard or High Efficiency Indoor Make-Up Air Handler – Arrangement G – 1200 MBh – Accessory Pressure Loss**

		Pressure Loss (Inches of Water)							Return or Outside Air Damper
Capacity	CFM	Rainhood with		Filters			Pleated		
		Screen	Mstr. Elim.	Throwaway	Washable	2"			
12	4,500	.06	.09	.05	<.01	<.01	.05	.03	.08
	5,000	.08	.11	.05	<.01	.01	.06	.03	.10
	6,000	.11	.15	.07	.01	.02	.08	.04	.15
	7,000	.16	.21	.08	.02	.02	.10	.06	.20
	8,000	.20	.27	.10	.02	.03	.13	.07	.26
	9,000	.26	.35	.12	.03	.04	.16	.09	.33
	9,800	.31	.41	.13	.03	.05	.18	.11	.39

# Performance Data

**Table PD-19 – Evaporative Cooling Performance Data and Pressure Drop – Rooftop Arrangement D**

Unit Size	CFM		Efficiency Range		8" Saturation Efficiency Range		12" Saturation 8" or 12" Deep Media		Pressure Drop in. of Water		"A" Unit Width	(1) Shipping Wt.	(1) Operating Wt.
	(cu. m/s) Min.	(cu. m/s) Max.	Min.	Max.	Min.	Max.	Face Area Ft. <sup>2</sup> (m <sup>2</sup> )	In. (mm) Size	Min. (KPa)	Max. (KPa)	In. (mm)	lb. (kg)	lb. (kg)
10, 15	800 (0.378)	4,500 (2.124)	78	88	89	92	7.01 (0.65)	31 x 32 7/16 (787) (827)	0.03 (0.01)	0.23 (0.06)	32 3/4 (832)	137 (62)	301 (136)
20, 25, 50	1,600 (0.755)	5,500 (2.596)	77	88	88	92	9.38 (0.87)	31 x 43 7/16 (787) (1106)	0.03 (0.01)	0.20 (0.05)	43 3/4 (1111)	166 (75)	386 (175)
30, 35, 60, 70	2,400 (1.133)	8,500 (4.012)	77	86	88	92	11.75 (1.09)	31 x 54 7/16 (787) (1386)	0.05 (0.01)	0.30 (0.07)	54 3/4 (1391)	192 (87)	468 (212)
40, 80	3,200 (1.510)	8,500 (4.012)	77	86	87	92	12.92 (1.20)	31 x 60 (787) (1524)	0.07 (0.02)	0.28 (0.07)	60 1/4 (1530)	206 (93)	509 (231)

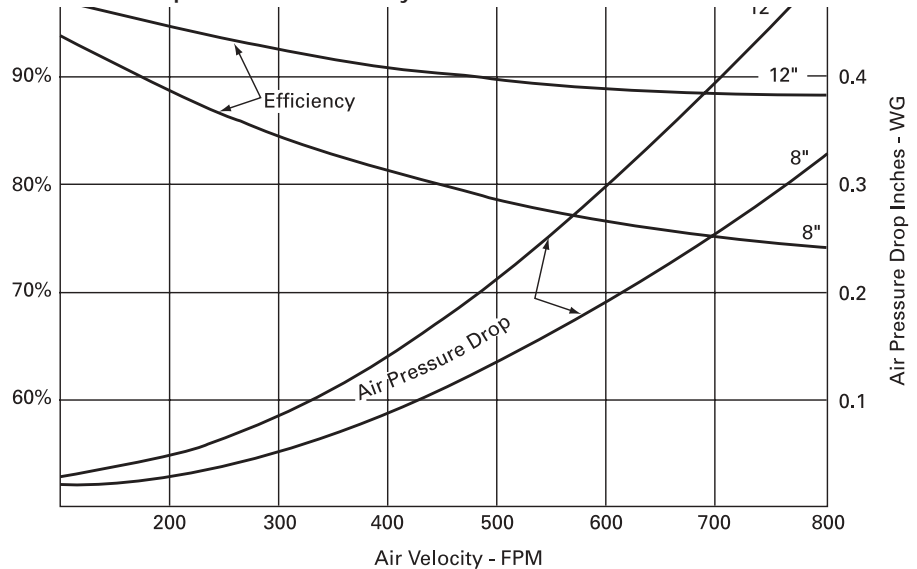
Note:

1. These weights are for evaporative cooler only.

## CELdek® Evaporative Media

The Trane Evaporative Cooler uses high efficiency CELdek® media. CELdek® is made from a special cellulose paper, impregnated with insoluble anti-rot salts and rigidifying saturants. The cross fluted design of the pads induces high-turbulent mixing of air and water for optimum heat and moisture transfer. The Trane evaporative coolers are standard with eight-inch deep media which produce high efficiency and high face velocities, along with a two-inch distribution pad to disperses the water evenly over the pads. We offer an optional 12-inch deep media (see chart at right for efficiencies). Sump motor hp is 1/50<sup>th</sup>.

**Chart PD-1 – Evaporative Cooler Efficiency/A.P.D. Chart**





# Electrical Data

## Indoor Make-Up Air Handler Standard or High Efficiency – Motor Electrical Data

Voltage	1/2 HP	3/4 HP	1 HP	1 1/2 HP	2 HP	3 HP	5 HP	7 1/2 HP	10 HP	15 HP
115/60/1 ODP	7.2	10.9	13.4	18.0	26.0	33.0	NA	NA	NA	NA
208/60/1 ODP	4.3	6.0	6.7	9.3	11.5	16.5	NA	NA	NA	NA
230/60/1 ODP	4.3	5.5	6.7	9.0	13.0	16.5	NA	NA	NA	NA
208/60/3 ODP	2.8	2.6	3.2	4.8	6.2	8.4	12.2	24.0	28.0	44.9
230/60/3 ODP	2.8	2.6	3.2	4.8	6.2	8.4	12.2	21.6	26.6	40.6
460/60/3 ODP	1.4	1.3	1.6	2.4	3.1	4.2	6.1	10.8	13.3	20.3
575/60/3 ODP	1.1	1.4	1.5	1.9	2.5	3.6	5.3	8.6	10.6	15.6
115/60/1 TE	9.0	11.4	13.6	17.6	24.6	34.0	NA	NA	NA	NA
208/60/1 TE	3.9	4.5	6.8	8.0	12.3	17.0	NA	NA	NA	NA
230/60/1 TE	4.5	5.7	6.8	8.8	12.3	17.0	NA	NA	NA	NA
208/60/3 TE	2.1	2.8	3.4	4.8	6.4	9.4	14.0	21.8	28.7	42.6
230/60/3 TE	2.2	2.8	3.6	4.9	6.4	9.2	13.0	20.4	26.4	28.4
460/60/3 TE	1.1	1.4	1.8	2.4	3.2	4.6	6.5	10.2	13.2	19.2
575/60/3 TE	0.9	1.3	1.7	1.9	2.6	3.6	5.1	7.6	9.6	14.4
115/60/1 HEODP	5.2	6.4	9.2	12.5	16.4	NA	NA	NA	NA	NA
208/60/1 HEODP	2.8	4.2	NA	NA	NA	NA	NA	NA	NA	NA
230/60/1 HEODP	2.6	5.2	4.6	6.3	8.2	NA	NA	NA	NA	NA
208/60/3 HEODP	1.8	2.5	3.6	5.0	6.7	9.2	14.7	22.1	29.0	40.0
230/60/3 HEODP	1.6	2.3	2.8	3.8	5.4	8.0	12.8	19.2	25.2	36.0
460/60/3 HEODP	0.8	1.2	1.4	1.9	2.7	4.0	6.4	9.6	25.2	18.0
575/60/3 HEODP	NA	NA	1.1	1.8	2.3	3.2	5.2	7.7	10.1	14.5
115/60/1 HETE	5.5	7.6	9.2	14.0	19.2	NA	NA	NA	NA	NA
208/60/1 HETE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
230/60/1 HETE	2.8	3.8	4.6	7.0	9.6	NA	NA	NA	NA	NA
208/60/3 HETE	NA	NA	3.2	4.6	6.2	8.8	14.7	21.4	29.0	41.2
230/60/3 HETE	4.6	6.3	3.0	4.2	5.8	8.0	12.0	18.8	25.2	37.0
460/60/3 HETE	2.3	3.2	1.5	2.1	2.9	4.0	6.0	9.4	12.6	18.5
575/60/3 HETE	NA	NA	1.1	1.8	2.4	3.2	4.8	7.5	10.2	14.9
208/60/3 2S1W	NA	NA	3.0/1.0	4.4/1.8	6.2/3.0	9.0/3.4	15.0/6.0	21.0/7.5	29.0/9.6	NA
230/60/3 2S1W	NA	NA	3.0/1.0	4.4/1.8	5.9/2.9	8.0/3.3	14.0/6.2	19.5/7.5	25.0/9.3	NA
460/60/3 2S1W	NA	NA	1.5/0.5	2.2/1.9	3.1/1.3	3.8/1.6	6.8/2.8	10.0/4.0	12.0/4.3	18.0/6.0
575/60/3 2S1W	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115/60/1 2S2W	9.2/6.0	9.2/4.6	11.9/6.9	NA	NA	NA	NA	NA	NA	NA
208/60/1 2S2W	NA	5.0/2.5	6.3/3.0	NA	NA	NA	NA	NA	NA	NA
230/60/1 2S2W	4.6/3.0	4.6/2.3	6.0/3.6	NA	NA	NA	NA	NA	NA	NA
208/60/3 2S2W	2.4/1.6	3.0/1.9	3.4/2.0	5.0/2.6	6.5/3.5	9.3/4.9	NA	20.0/11.0	27.0/14.0	NA
230/60/3 2S2W	2.1/1.4	2.7/1.7	3.2/2.0	4.8/2.9	6.3/3.5	8.5/4.6	NA	19.0/10.0	25.0/12.5	NA
460/60/3 2S2W	1.1/0.7	1.3/0.9	1.5/1.0	2.3/1.3	3.0/1.7	4.6/2.7	NA	9.7/5.5	12.2/7.0	NA
575/60/3 2S2W	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1. ODP = Open Drip Proof
2. TE = Totally enclosed
3. HEODP = High Efficiency Open Drip Proof
4. HETE = High Efficiency Totally Enclosed
5. 2S1W = Two Speed One Winding
6. 2S2W = Two Speed Two Winding
7. NA = Not Available

FLA based on NEC Ratings

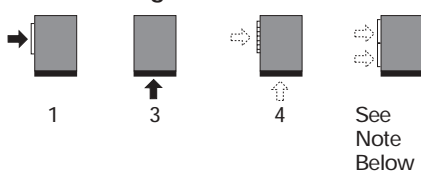
### Pilot Control

Intermittent pilot ignition is standard on all outdoor units. Intermittent pilot ignition contains a solid-state ignition control system that ignites the pilot by spark for each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. Both the pilot and burners are extinguished during the off cycle. Energy savings will be realized using this system as the pilot is extinguished in the off cycle.

### Air Inlet Configuration

The air inlet configuration defines the entering air opening for the gas heating units. This selection does not include dampers and must match the required opening for the air control and damper arrangement. A horizontal return air feature is offered on air inlet configurations 3 and 4.

### Air Inlet Configuration



Note: Horizontal outside air over return air. Specify air inlet configuration 4 and then select miscellaneous option "D" for horizontal return.

### Damper Options

Dampers shall be of the opposed blade type, constructed of galvanized steel with neoprene nylon bushings, blades to be mechanically interlocked.

Optional low leak dampers shall be of the opposed blade type, construction of galvanized steel with neoprene nylon bushings and vinyl blade edge seals, blades to be mechanically interlocked.

### Outside Air or Return Air

**Two-Position Motor/Spring Return**  
Units with outside air or return air only shall be provided with a damper, two-position spring return damper motor and controls. The motor shall power the damper fully open when the unit is on and fully closed when the unit is off.

### Outside Air/Return Air

**Two-Position Spring Return**  
A two-position spring return motor with interlocked outside and return air dampers shall be provided. The motor shall power either the outside air damper fully open and the return air damper fully closed or the outside air damper fully closed and the return air damper fully open in response to an outside air temperature sensor. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

### Outside Air/Return Air Modulating Motor with Mixed Air Control/ Minimum Position Potentiometer/ Spring Return

A modulating motor with interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position.

The spring return feature drives the outside air damper fully closed and the return air damper fully open when the unit is off.

### Outside Air/Return Air Modulating Motor with Mixed Air Temperature Control/Spring Return

Modulating motor with interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream.

The spring return feature drives the outside air damper fully closed and the return air damper fully open when the unit is off.

### Outside Air/Return Air Modulating Motor with Minimum Position Potentiometer/Spring Return

A modulating motor with interlocked outside and return air dampers shall be provided. The motor shall position the outside and return air dampers in response to a manually set potentiometer.

The spring return feature drives the outside air damper fully closed and the return air damper fully open when the unit is off.

### Outside Air/Return Air Modulating Motor with Dry Bulb/ Mixed Air Temperature Control and Minimum Position Potentiometer/Spring Return

A modulating motor with interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller and dry bulb thermostat located in the mixed air stream. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position. The spring return feature drives the outside air damper fully open and the return air damper fully closed when the unit is off.

### Outside Air/Return Air Modulating Motor with Enthalpy Controlled Economizer/Spring Return

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to an enthalpy controlled economizer. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

# Controls

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## **Outside Air/Return Air Modulating Motor with Space Pressure Controller**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a pressure sensor located in the building. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **Outside Air/Return Air Modulating Motor with S-350P Proportional Mixed Air Control/Spring Return**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a solid-state mixed air sensor and S-350 proportional controller.

When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **Outside Air/Return Air Modulating Motor with External 4-20 mA or 0-10 VDC Analog Input/Spring Return**

A modulating motor interlocked with outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a 4-20 mA or 0-10 VDC signal supplied by an external DDC controller. The spring return feature drives the outside air damper fully closed and the return air damper fully open when the unit is shut down.

## **ASHRAE Cycle I (Outside/Return Air Two Position with Warm-Up Stat/Spring Return)**

A two-position spring return motor with interlocked outside and return air dampers shall be provided. The motor shall power the outside air damper fully open after a warm-up period determined by a minimum supply air temperature sensor when the unit is on, and fully closed when the unit is off.

## **ASHRAE Cycle II (Outside Air/Return Air Modulating Motor with Warm-Up Stat/Mixed Air Temperature Controller/Minimum Position Potentiometer/Spring Return)**

A modulating motor with interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream after a warm-up period determined by a minimum supply air temperature sensor. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position.

When the unit is off, the motor will drive the outside air damper full closed and the return air damper full open.

## **ASHRAE CYCLE III (Outside Air/ Return Air Modulating Motor with Warm-Up Thermostat/Mixed Air Temperature Controller/Spring Return)**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream after a warm up period determined by a minimum supply air temperature sensor. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position.

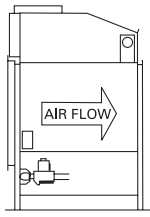
When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **Manual Dampers**

Units with outside air and return air shall be provided with manually set outside and return air dampers.

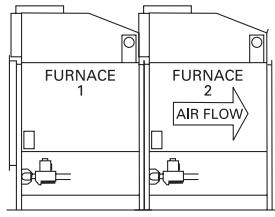
# Controls

## Gas Control Reference



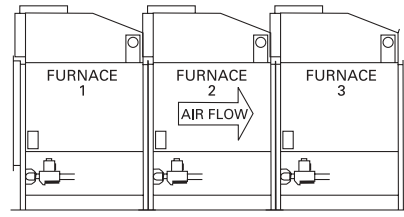
1 Stage  
2 Stage  
Modulation

Single Furnace  
Capacities "10-40"



1 Stage  
2 Stage  
4 Stage  
Modulation

Dual Furnace  
Capacities "50-80"



1 Stage  
2 Stage  
3 Stage  
6 Stage  
Modulation

Triple Furnace  
Capacity "12"

## Gas Controls

### Single-Stage Control

Gas heating units are provided with an automatic single-stage gas valve as standard. This valve is an on/off type control, typically activated by a low voltage single-stage thermostat (thermostat not included).

### Two-Stage Gas Valve

This gas valve provides two stages of heat. Ignition is at low fire (one half of the unit's full rated input). Requires the use of an optional two-stage thermostat.

### Hydraulic Modulating Gas Valve

Provides modulated heat output. Ignition is at low fire (one half of the unit's full rated input), and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40 percent to 100 percent of rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

### Hydraulic Modulating Gas Valve with Bypass

Provides modulated heat output. Ignition is at low fire (one half of the unit's full rated input), and a discharge temperature sensing bulb located in the air stream shall modulate the gas input from 40 percent to 100 percent rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit. An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing bulb, allowing full fire. Requires the use of an optional thermostat to control the electric valve.

### Electronic Modulating — Room or Duct Stat Control

Provides modulated heat output. An automatic valve in series with the modulating valve shall be provided to cycle the unit. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

Available for use with a room thermostat or duct thermostat with a remote setpoint adjustment. A duct thermostat is available with an optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat's setpoint.

### Electronic Modulating — 4-20 mA/ 0-10 VDC Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input. The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control. When "furnace one only" is specified on double and triple furnaces, additional furnace sections will have single-stage on-off control.

### Discharge Air Control with Outside Air Reset

Unit provided with factory-mounted discharge air controller, discharge air sensor, outdoor air reset, summer/winter thermostat and velocity pressure switch. The outdoor air reset range is from 10 F to 60 F. Full reset occurs at 10 F outside air temperature. There is a straight line relationship between outside air temperature and reset. Therefore, at 60 F outside air temperature, no reset will occur. The amount of reset is adjustable from 20 F to 50 F.

A discharge air controller provides a two-minute delay between successive on and off stages. A summer/winter thermostat locks out heating when outside air temperature is above 55 F. The velocity pressure switch is provided for protection against high temperatures at low airflows. Available in two-stage (half of the unit's full rated input-single furnace units only), three-stage (33 percent of the unit's full rated input) and four-stage (25 percent of the unit's full rated input). Three and four-stage is available on double and triple furnace units only.

### S-350 Modular Electronic Control System Two-Stage

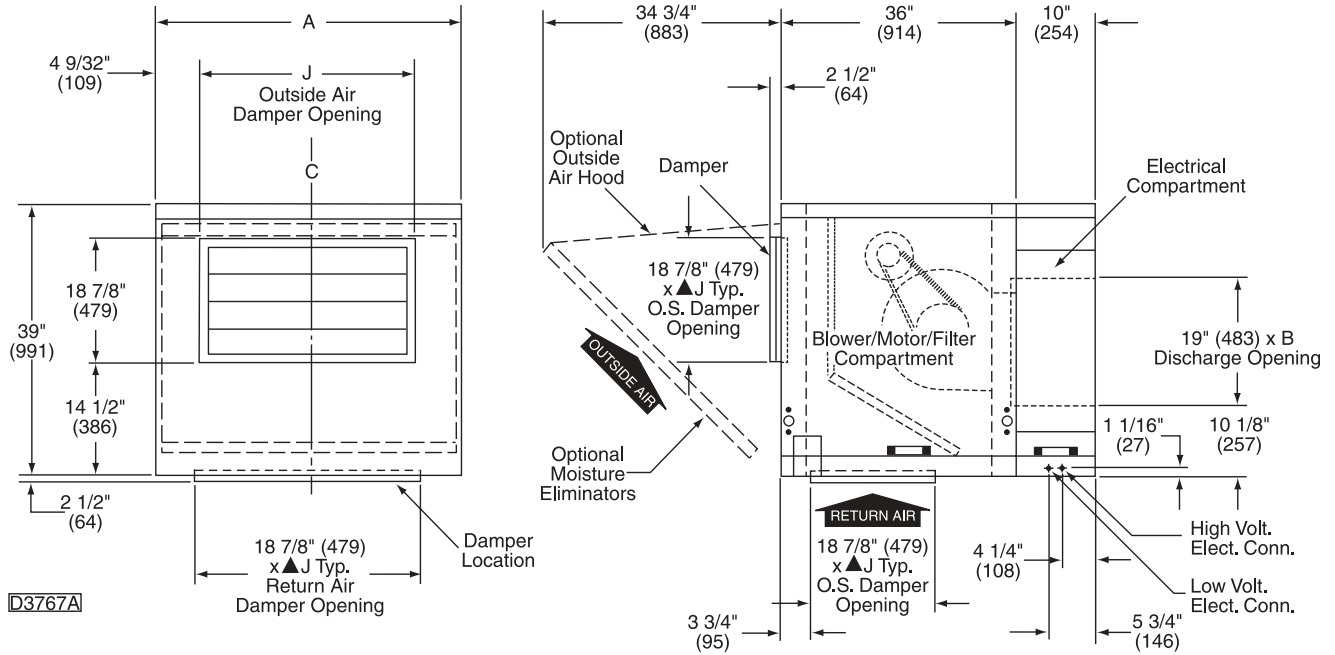
The basic system utilizes a controller module with discharge air sensor, setpoint and one-stage output, a stage module with differential setpoint and one-stage output and a display module with LCD display for temperature readout. The system stages the unit's rate of fire based upon sensed discharge air temperature, setpoint setting and differential setting between stages. Provided as a two-stage (all furnaces), three and four-stage (double and triple furnaces only) and six-stage (triple furnace only).





# Dimensional Data

## Standard Blower Module for Arrangements B, D Unit Sizes 10-80 (100-800 MBh)



Model	A	B	J
10/15	32 <sup>7</sup> / <sub>8</sub> " (835)	15 <sup>9</sup> / <sub>16</sub> " (395)	24" (610)
20/25/50	43 <sup>7</sup> / <sub>8</sub> " (1114)	23 <sup>13</sup> / <sub>16</sub> " (605)	35" (889)
30/35	54 <sup>7</sup> / <sub>8</sub> " (1394)	34 <sup>13</sup> / <sub>16</sub> " (884)	46" (1168)
40/80	60 <sup>3</sup> / <sub>4</sub> " (1534)	45 <sup>13</sup> / <sub>16</sub> " (1164)	51 <sup>1</sup> / <sub>2</sub> " (1308)

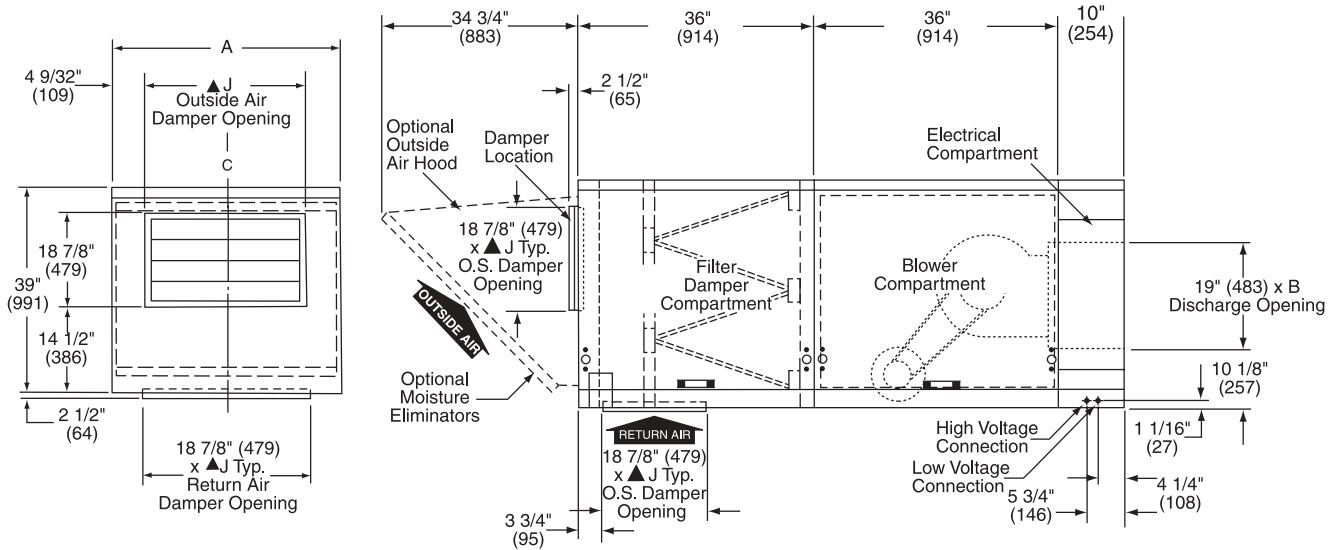
### STANDARD BLOWER MODULE Unit Sizes 10-80 (Left Hand Service Access Shown)

Note: The dimensions shown do not include base skid rail.

DIMENSIONS ARE IN INCHES, DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.

# Dimensional Data

**Detail Drawing**  
**High CFM Blower Module for Arrangement G**  
**Unit Sizes 10-12 (100-1200 MBh)**  
**100 and 150 MBh Units Not Available on Arrangement G**



Model	A	B	ΔJ
10/15*	32 7/8" (835)	15 9/16" (395)	24" (610)
20/25/50	43 7/8" (1114)	23 13/16" (605)	35" (889)
30/35	54 7/8" (1394)	34 13/16" (884)	46" (1168)
60/70	60 3/8" (1534)	45 13/16" (1164)	51 1/2" (1308)

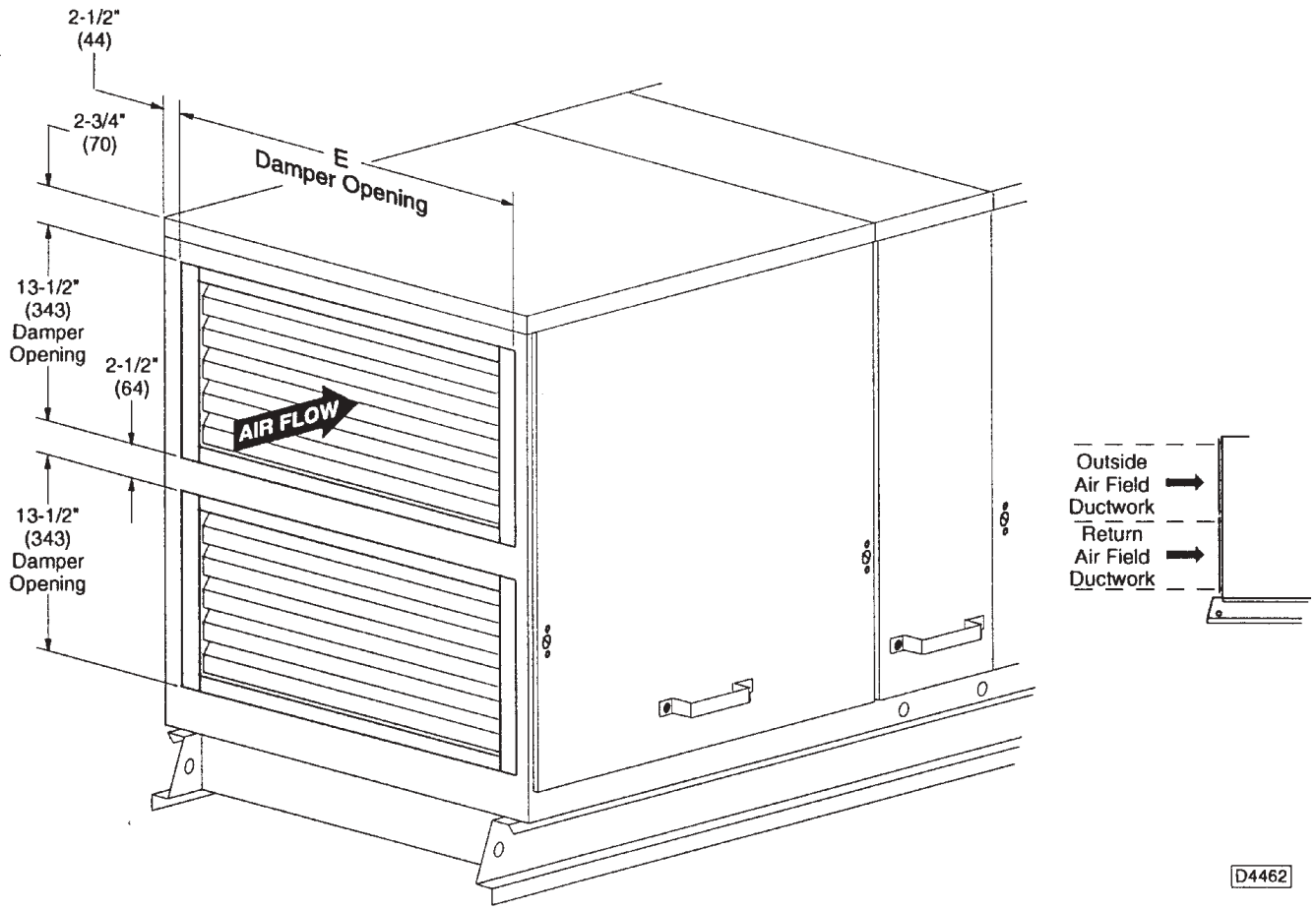
**HIGH CFM BLOWER MODULE**  
**\*For Cooling Arrangements Only**  
**(Left Hand Service Access Shown)**

Note: The dimensions shown do not include base skid rail.

DIMENSIONS ARE IN INCHES, DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.

# Dimensional Data

Over/Under Air Intake without Hood  
 Arrangements B, D, G, K  
 Unit Sizes 10-12 (100-1200 MBh)



Model	E Dimension
10/15	27 <sup>3</sup> / <sub>4</sub> " (705)
20/25/50	38 <sup>3</sup> / <sub>4</sub> " (984)
30/35	49 <sup>3</sup> / <sub>4</sub> " (1264)
40/80/12	55 <sup>3</sup> / <sub>4</sub> " (1403)

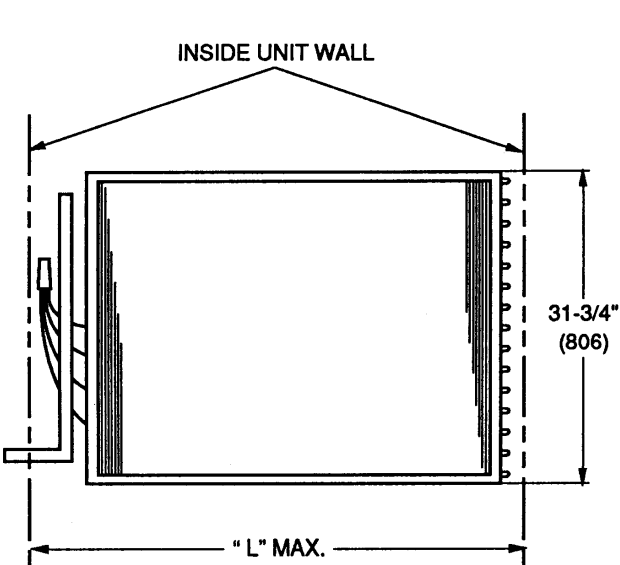
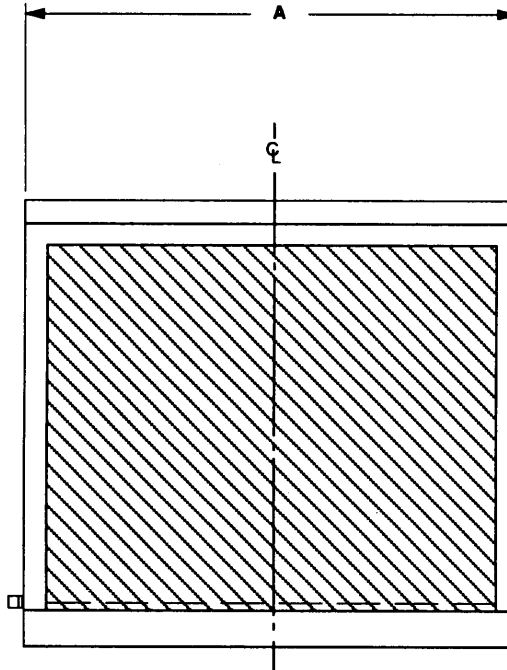
DIMENSIONS ARE IN INCHES, DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.

# Dimensional Data

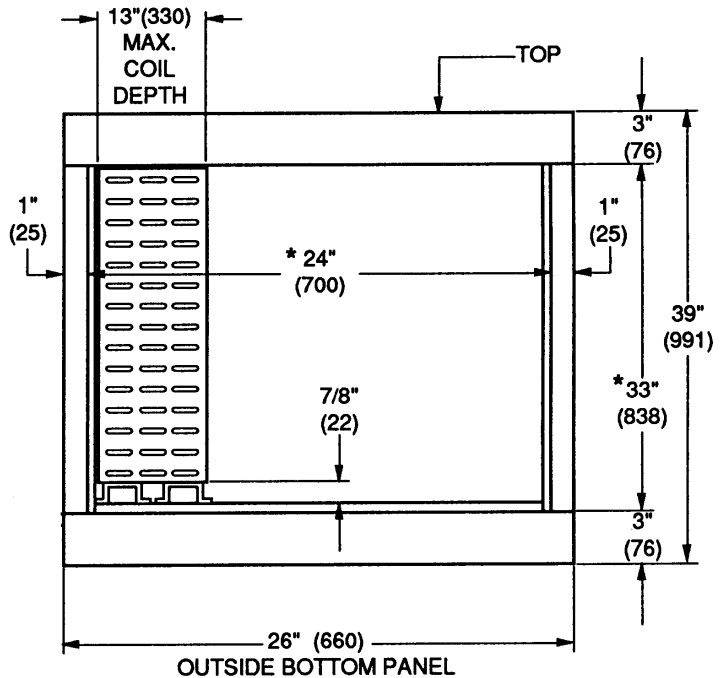
## Coil Module Arrangement K Unit Sizes 10-80 (100-800 MBh)

Model	A
10/15	32 7/8" (835)
20/25/50	43 7/8" (1114)
30/35	54 7/8" (1394)
60/70	60 3/8" (1534)

DIMENSIONS ARE IN INCHES, DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.



Unit Size	"L" Inside Max. Cabinet Opening
10/15	32 1/4" (794)
20/25/50	42 1/4" (1073)
30/35/60/70	53 1/4" (1353)
40/80	58 3/4" (1492)

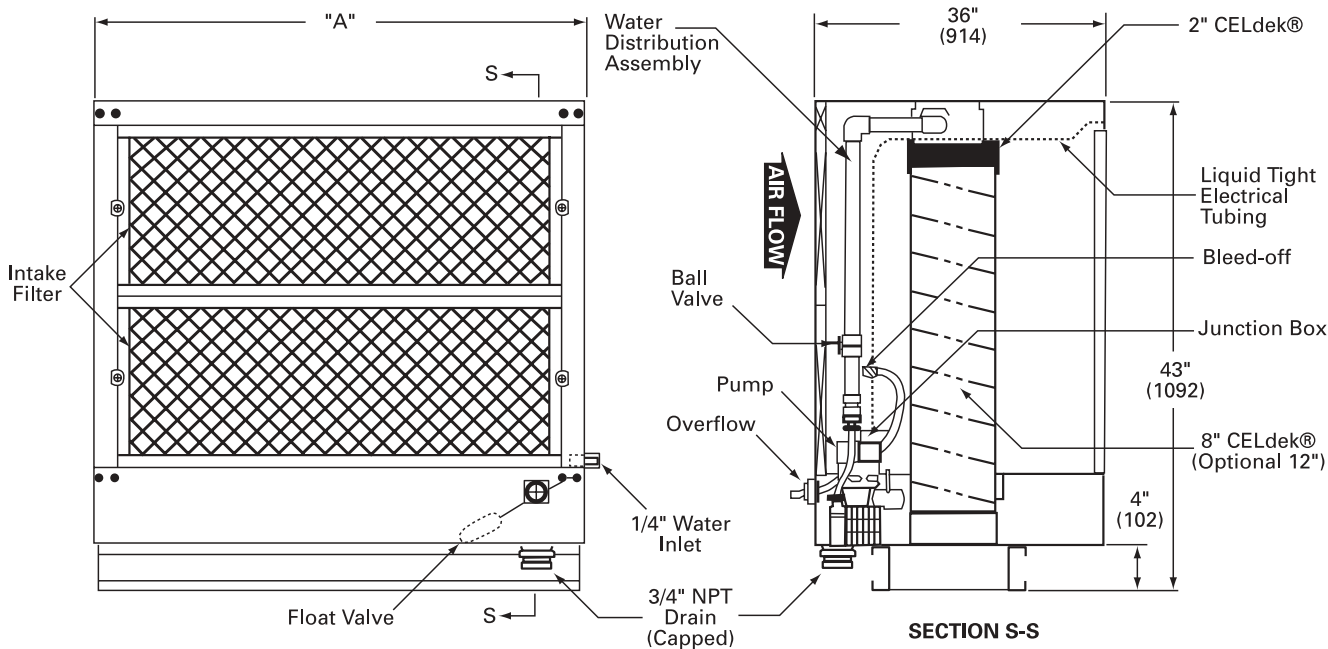


Side Opening of Cooling Module

- The coil section drain pan connection is 3/4 inch NPT pipe thread. It is a female fitting that just protrudes outside of the unit base rail. It is located on the service side of the unit.
- The drain pan is constructed of stainless steel, including the fitting. It is sloped towards the center of the pan and level across the width of the unit.
- P-trap required external to the unit provided by others.

# Dimensional Data

## Evaporative Cooler Module Arrangement D Unit Sizes 10-80 (100-800 MBh)



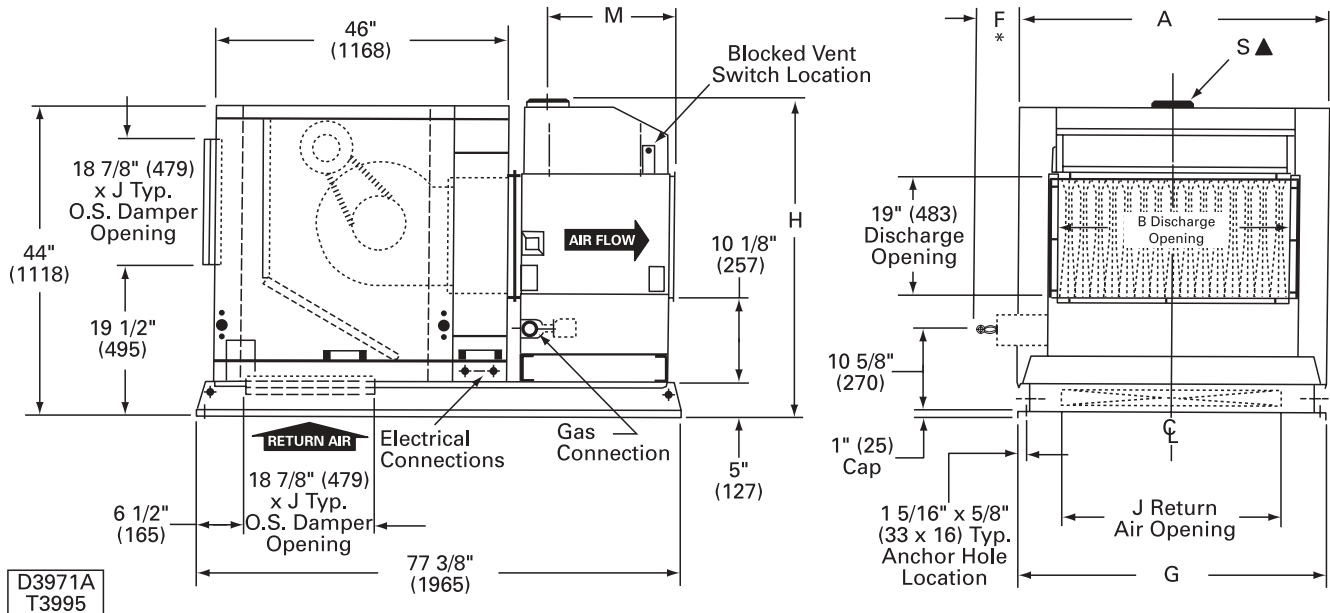
### EVAPORATIVE COOLER MODULE Models 10/80

Model	A
10/15	32 <sup>7</sup> / <sub>8</sub> " (835)
20/25/50	43 <sup>7</sup> / <sub>8</sub> " (1114)
30/35	54 <sup>7</sup> / <sub>8</sub> " (1394)
60/70	60 <sup>3</sup> / <sub>8</sub> " (1534)

DIMENSIONS ARE IN INCHES, DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.

# Dimensional Data

Indoor Make-Up Air Handler with Standard Blower – Arrangement B  
 Models GSAA, GSBA – 10, 15, 20, 25, 30, 35, 40 (100-400 MBh)  
 Single Furnace



GRAVITY VENT  
 (Left Hand Unit Shown)

Dimensions are in inches.  
 Dimensions in parentheses are in millimeters.

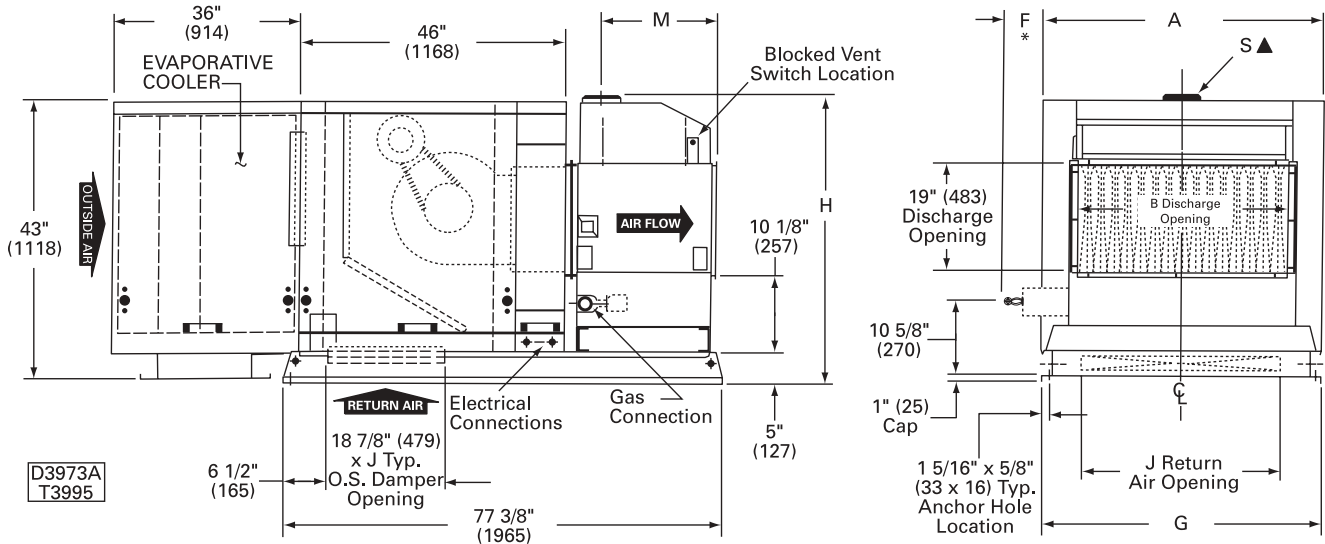
## Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
10	32 7/8 (835)	15 9/16 (395)	1/2	1/2	16 5/8 (416)	31 1/16 (789)	40 5/8 (1032)	24 (610)	21 1/4 (540)	6 R (152)
15	32 7/8 (835)	18 5/16 (465)	1/2	1/2	20 1/2 (521)	31 1/16 (789)	45 5/8 (1159)	24 (610)	20 1/4 (514)	7 R (178)
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

Note:  
 Dimensions are in inches (Dimensions in parentheses are in millimeters).  
 \*\*F\* Dimension is the recommended clearance to service the burner drawer.  
 "J" is an outside dimension for return air dampers.  
 "S" Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

## Indoor Make-Up Air Handler with Standard Blower and Evaporative Cooler – Arrangement D Models GSAA, GSBA – 10, 15, 20, 25, 30, 35, 40 (100-400 MBh) Single Furnace



GRAVITY VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
10	32 7/8 (835)	15 9/16 (395)	1/2	1/2	16 3/8 (416)	31 1/16 (789)	40 5/8 (1032)	24 (610)	21 1/4 (540)	6 R (152)
15	32 7/8 (835)	18 5/16 (465)	1/2	1/2	20 1/2 (521)	31 1/16 (789)	45 5/8 (1159)	24 (610)	20 1/4 (514)	7 R (178)
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

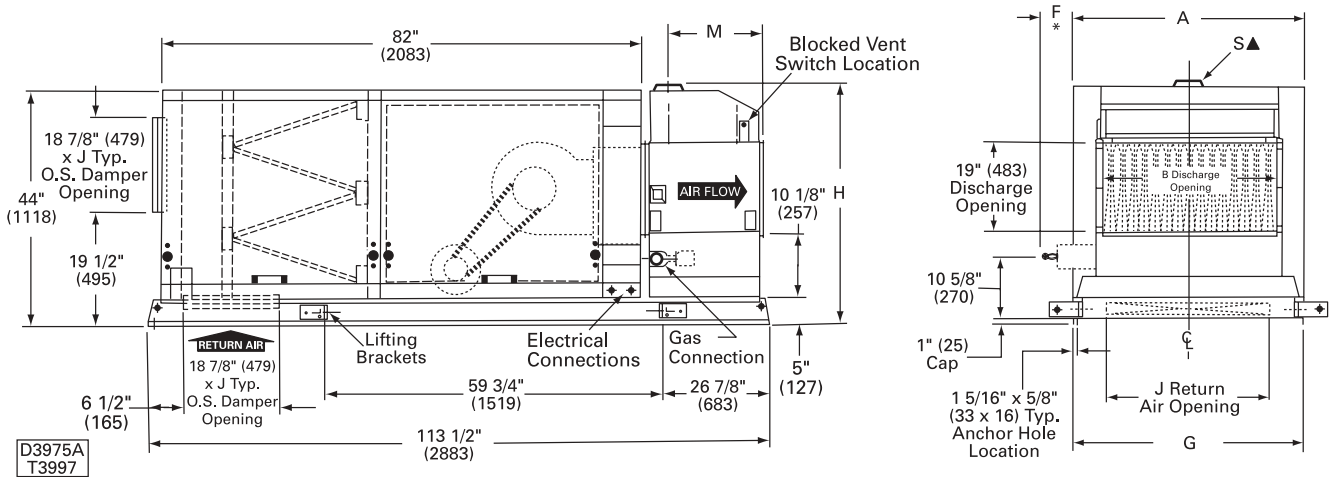
\*\*"F" Dimension is the recommended clearance to service the burner drawer.

"J" is an outside dimension for return air dampers.

"S" Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

## Indoor Make-Up Air Handler with High Cfm Blower – Arrangement G Models GSAA, GSBA – 20, 25, 30, 35, 40 (200-400 MBh) Single Furnace



GRAVITY VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

### Unit Dimensional Data

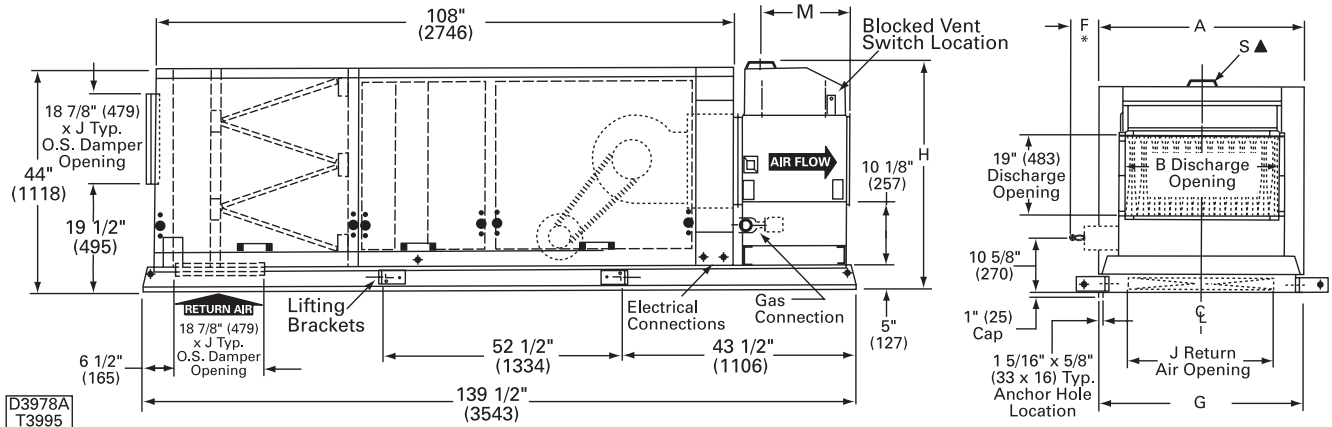
Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

Note:  
Dimensions are in inches (Dimensions in parentheses are in millimeters).  
\*“F” Dimension is the recommended clearance to service the burner drawer.  
“J” is an outside dimension for return air dampers.  
“S” Dimension Legend: R = Round; OV = Oval.



# Dimensional Data

## Indoor Make-Up Air Handler with High Cfm Blower and Cooling Coil Section – Arrangement K Models GSAA, GSBA – 10, 15, 20, 25, 30, 35, 40 (100-400 MBh)



### GRAVITY VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
10	32 7/8 (835)	15 9/16 (395)	1/2	1/2	16 3/8 (416)	31 1/16 (789)	40 5/8 (1032)	24 (610)	21 1/4 (540)	6 R (152)
15	32 7/8 (835)	18 5/16 (465)	1/2	1/2	20 1/2 (521)	31 1/16 (789)	45 5/8 (1159)	24 (610)	20 1/4 (514)	7 R (178)
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

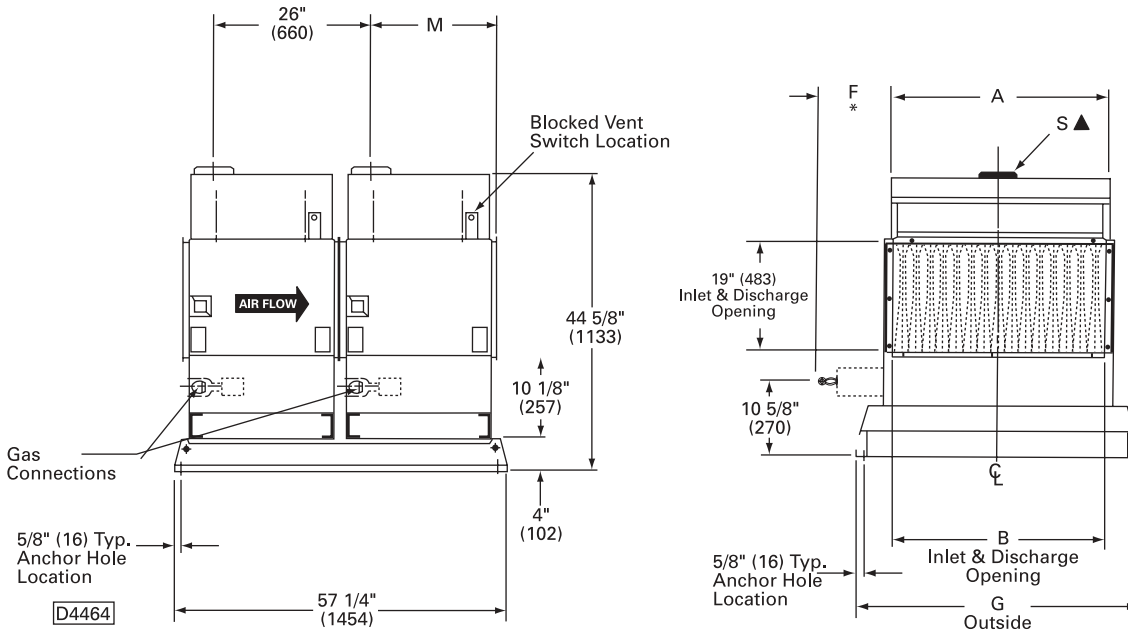
\*\*"F" Dimension is the recommended clearance to service the burner drawer.

"J" is an outside dimension for return air dampers.

"S" Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

## Indoor Duct Furnace – Arrangement A Models GDAA, GDBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### GRAVITY VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

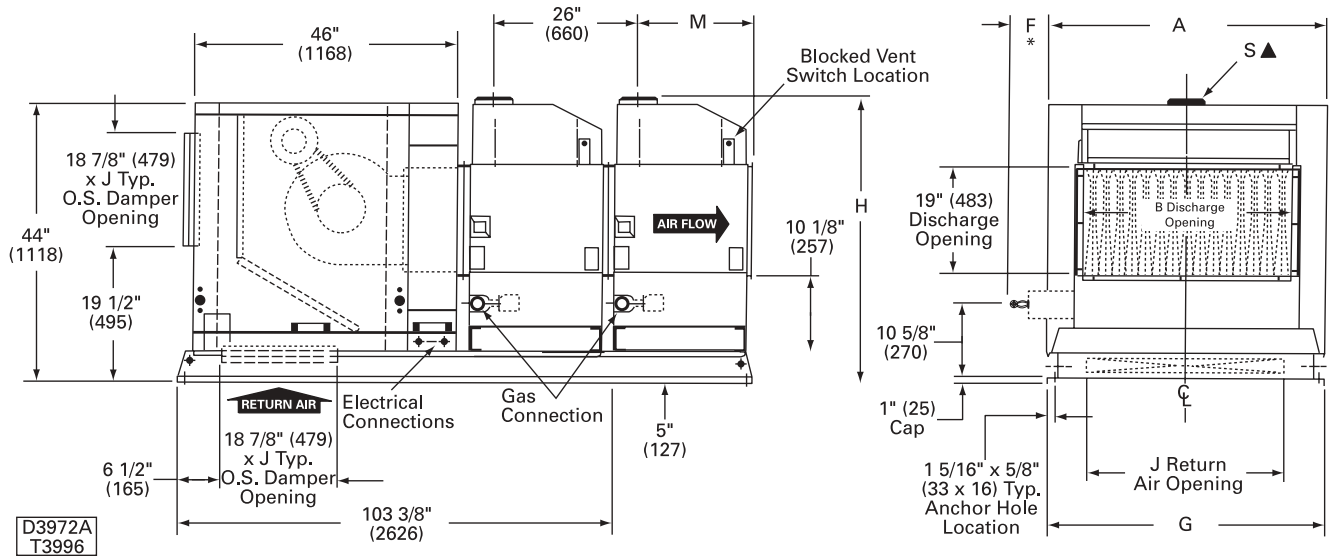
#### Unit Dimensional Data

Capacity	A	B	F*	G	M	S
50	31 5/8 (803)	29 5/16 (745)	37 5/8 (956)	41 1/8 (1045)	20 1/4 (514)	8 R (203)
60	37 1/8 (943)	34 13/16 (884)	43 1/8 (1095)	52 1/8 (1324)	20 1/4 (514)	10 OV (254)
70	42 5/8 (1083)	40 5/16 (1024)	48 5/8 (1235)	52 1/8 (1324)	20 1/4 (514)	10 OV (254)
80	48 1/8 (1222)	45 13/16 (1164)	54 1/8 (1375)	57 5/8 (1464)	21 1/4 (540)	12 OV (305)

Note:  
Dimensions are in inches (Dimensions in parentheses are in millimeters).  
\* "F" Dimension is the recommended clearance to service the burner drawer.  
"S" Dimension Legend: R = Round; OV = Oval.  
Gas inlet sizes: Natural Gas = 3/4" Dia. LP Gas = 1/2" or 3/4" Dia.

# Dimensional Data

## Indoor Make-Up Air Handler with Standard Blower – Arrangement B Models GSAA, GSBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### GRAVITY VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
70	54 7/8 (1394)	40 7/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

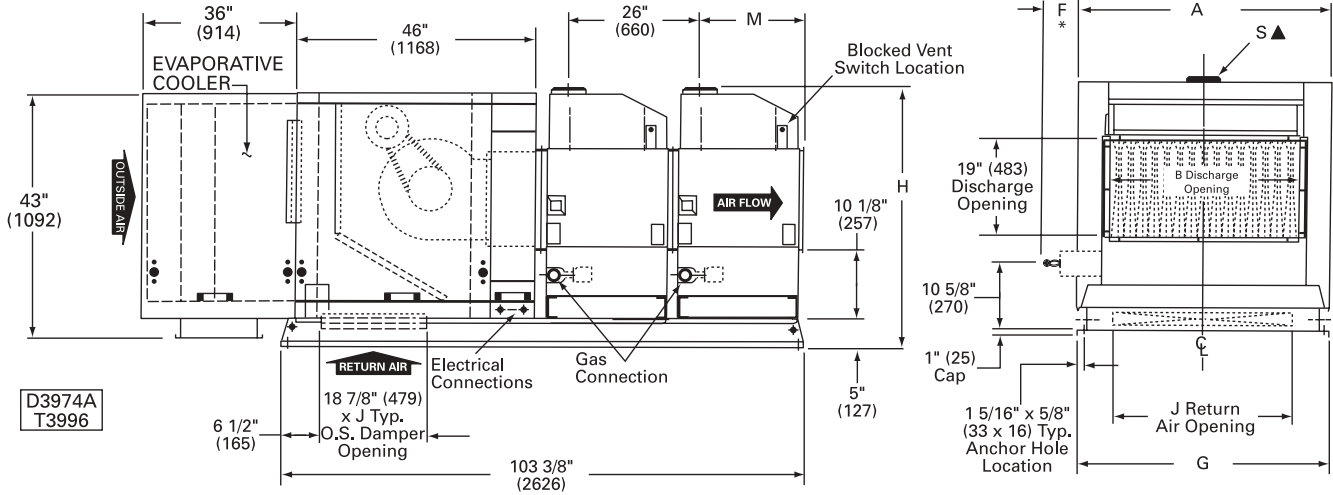
\*"F" Dimension is the recommended clearance to service the burner drawer.

"J" is an outside dimension for return air dampers.

"S" Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

## Indoor Make-Up Air Handler with Standard Blower and Evaporative Cooler – Arrangement D Models GSAA, GSBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



GRAVITY VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

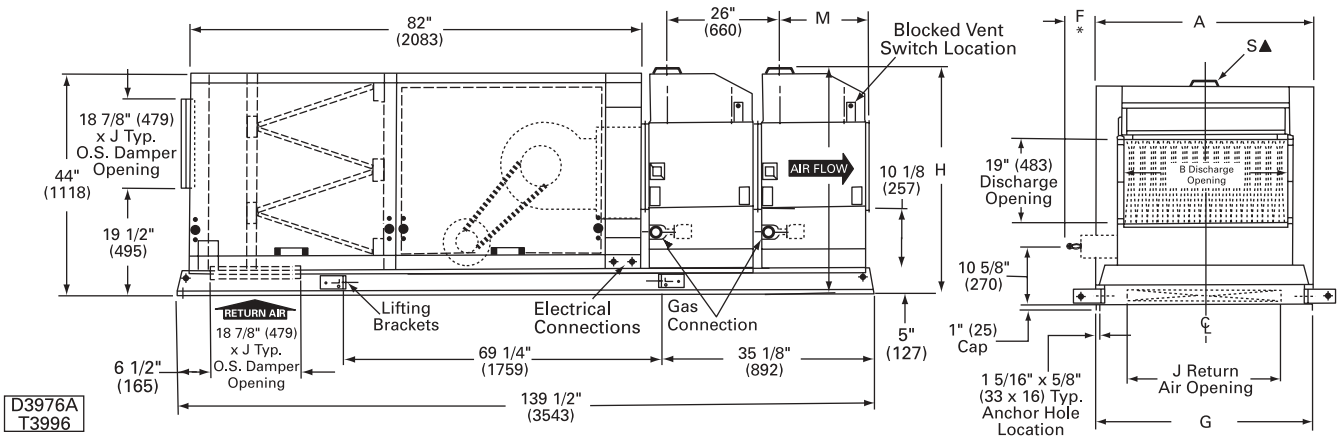
### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

Note:  
Dimensions are in inches (Dimensions in parentheses are in millimeters).  
\*“F” Dimension is the recommended clearance to service the burner drawer.  
“J” is an outside dimension for return air dampers.  
“S” Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

## Indoor Make-Up Air Handler with High Cfm Blower – Arrangement G Models GSAA, GSBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### GRAVITY VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

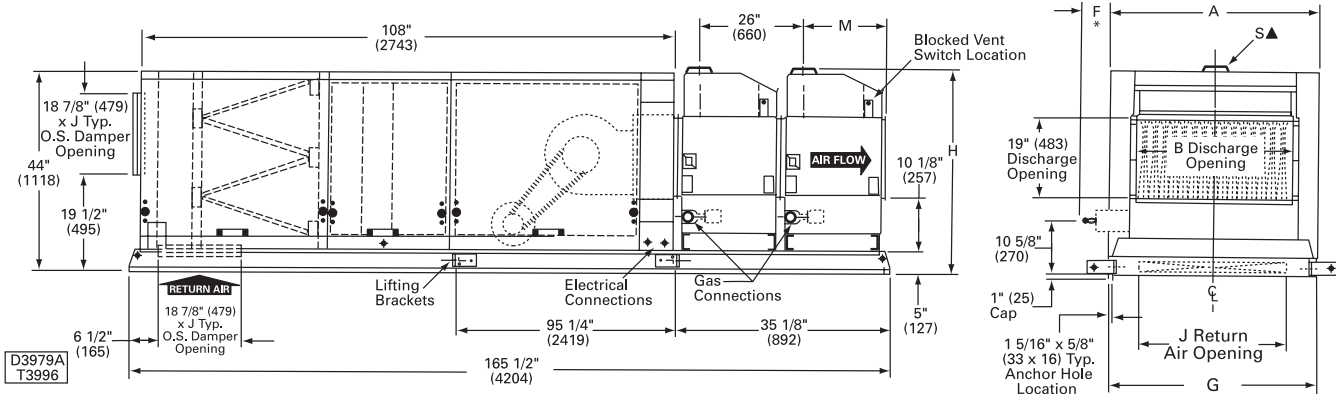
#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

Note:  
Dimensions are in inches (Dimensions in parentheses are in millimeters).  
\* "F" Dimension is the recommended clearance to service the burner drawer.  
"J" is an outside dimension for return air dampers.  
"S" Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

## Indoor Make-Up Air Handler with High Cfm Blower and Cooling Coil Section – Arrangement K Models GSAA, GSBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### GRAVITY VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

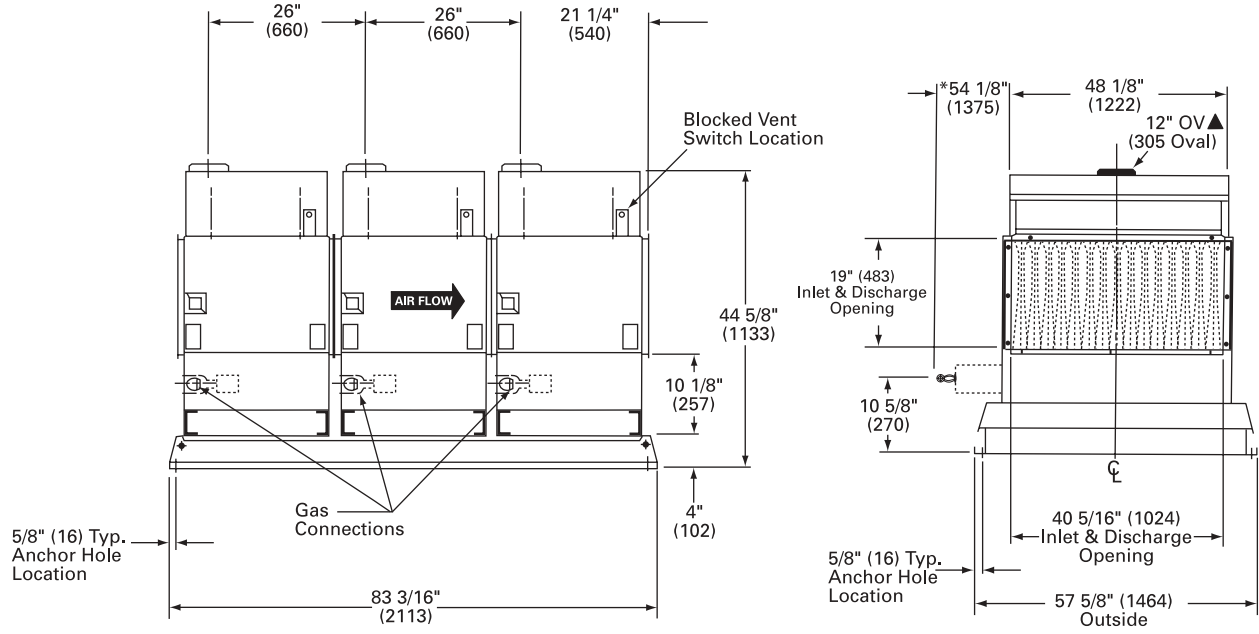
#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	H	J	M	S
			NAT	LP						
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	45 5/8 (1159)	35 (889)	20 1/4 (514)	8 R (203)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	45 5/8 (1159)	46 (1168)	20 1/4 (514)	10 OV (254)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	45 5/8 (1159)	51 1/2 (1308)	21 1/4 (540)	12 OV (305)

Note:  
Dimensions are in inches (Dimensions in parentheses are in millimeters).  
\* "F" Dimension is the recommended clearance to service the burner drawer.  
"J" is an outside dimension for return air dampers.  
"S" Dimension Legend: R = Round; OV = Oval.

# Dimensional Data

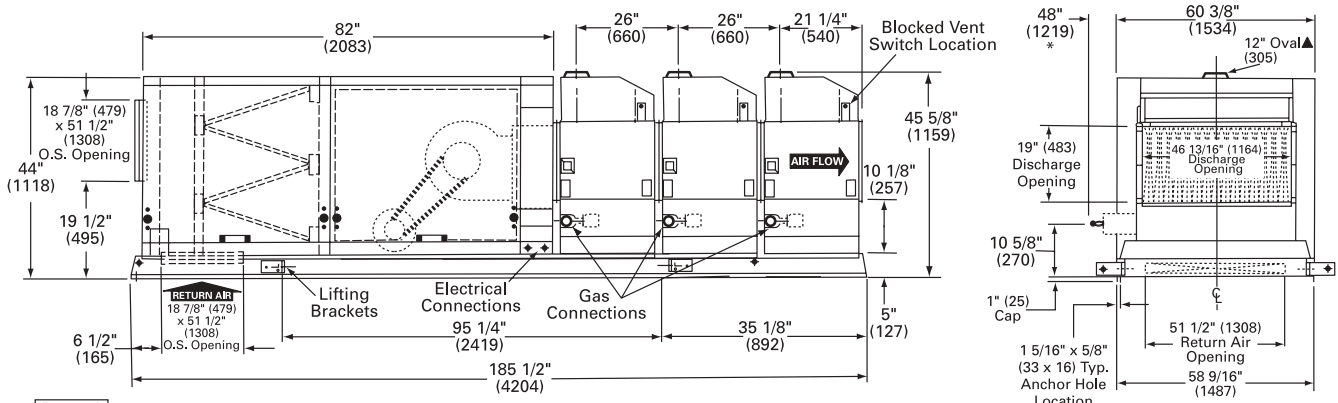
## Indoor Duct Furnace – Arrangement A Models GDA, GDBA – 12 (1200 MBh) Triple Furnace



D4466

GRAVITY VENT  
(Left Hand Unit Shown)

## Indoor Make-Up Air Handler with High Cfm Blower – Arrangement G Models GSAA, GSBA – 12 (1200 MBh) Triple Furnace



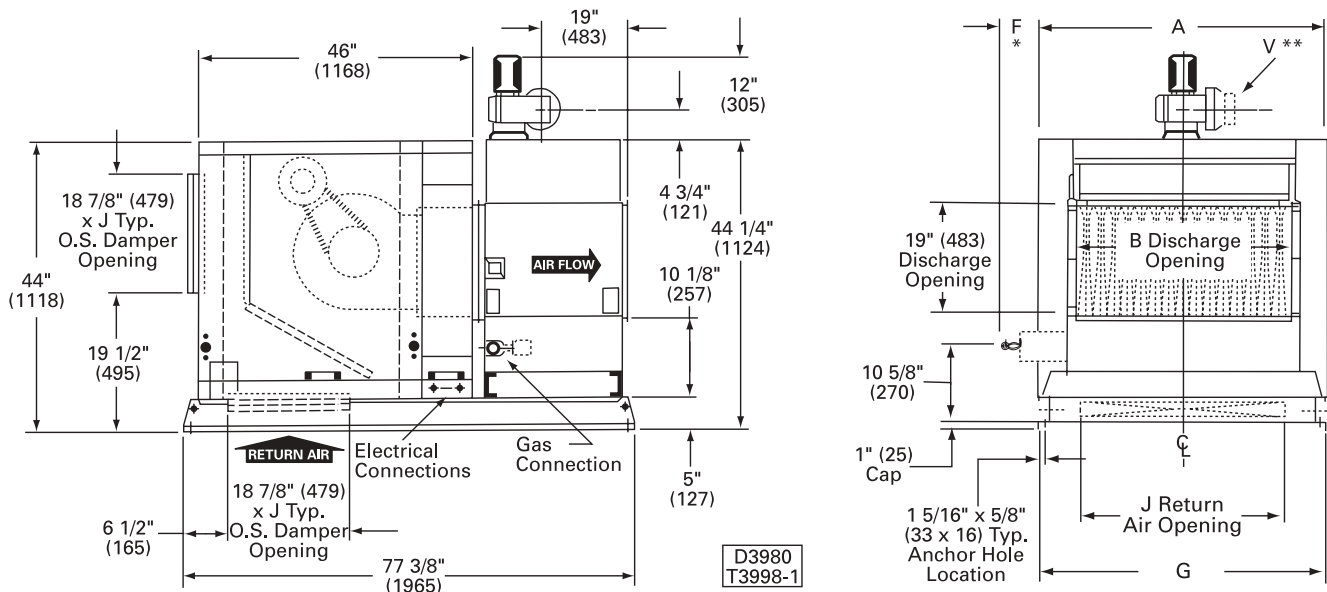
D3977A  
T3997

GRAVITY VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with Standard Blower – Arrangement B Models GGAA, GGBA – 10, 15, 20, 25, 30, 35, 40 (100-400 MBh) Single Furnace



### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
10	32 7/8 (835)	15 9/16 (395)	1/2	1/2	16 3/8 (416)	31 1/16 (789)	24 (610)	**4 (102)
15	32 7/8 (835)	18 5/16 (465)	1/2	1/2	20 1/2 (521)	31 1/16 (789)	24 (610)	**4 (102)
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	35 (889)	5 (127)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

\* "F" Dimension is the recommended clearance to service the burner drawer.

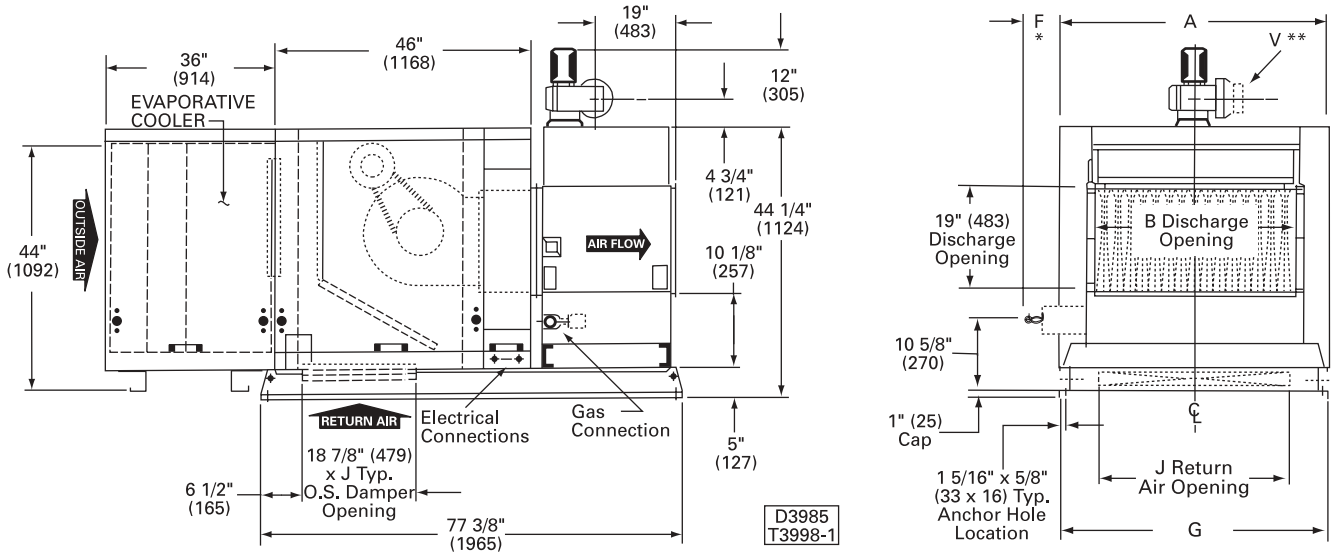
\*\* "V Dia." = The Flue Opening; Capacities 10 & 15 will require a field installed 5" to 4" Dia. reducer. Capacities 30/35/40 will require a field installed 5" to 6" Dia. increaser that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.



# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with Standard Blower and Evaporative Cooler – Arrangement D Models GGAA, GGBA – 10, 15, 20, 25, 30, 35, 40 (100-400 MBh) Single Furnace



### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
10	32 7/8 (835)	15 9/16 (395)	1/2	1/2	16 3/8 (416)	31 1/16 (789)	24 (610)	**4 (102)
15	32 7/8 (835)	18 5/16 (465)	1/2	1/2	20 1/2 (521)	31 1/16 (789)	24 (610)	**4 (102)
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	35 (889)	5 (127)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

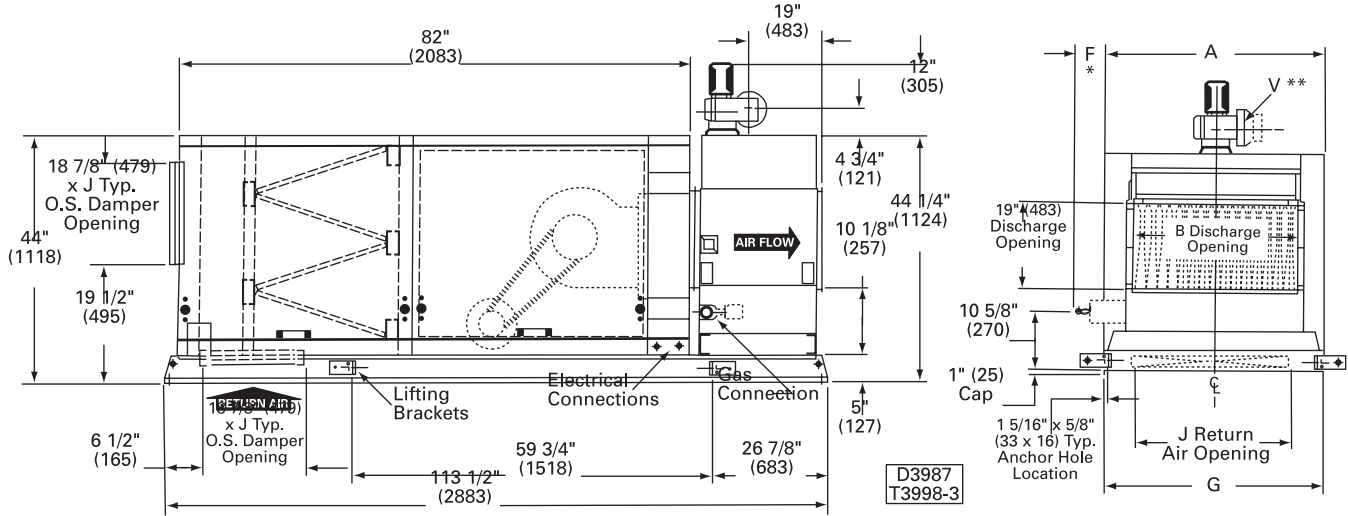
\*"F" Dimension is the recommended clearance to service the burner drawer.

\*\* "V Dia." = The Flue Opening; Capacities 10 & 15 will require a field installed 5" to 4" Dia. reducer. Capacities 30/35/40 will require a field installed 5" to 6" Dia. increaser that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with High Cfm Blower – Arrangement G Models GGAA, GGBA – 20, 25, 30, 35, 40 (200-400 MBh) Single Furnace



POWER VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	35 (889)	5 (127)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

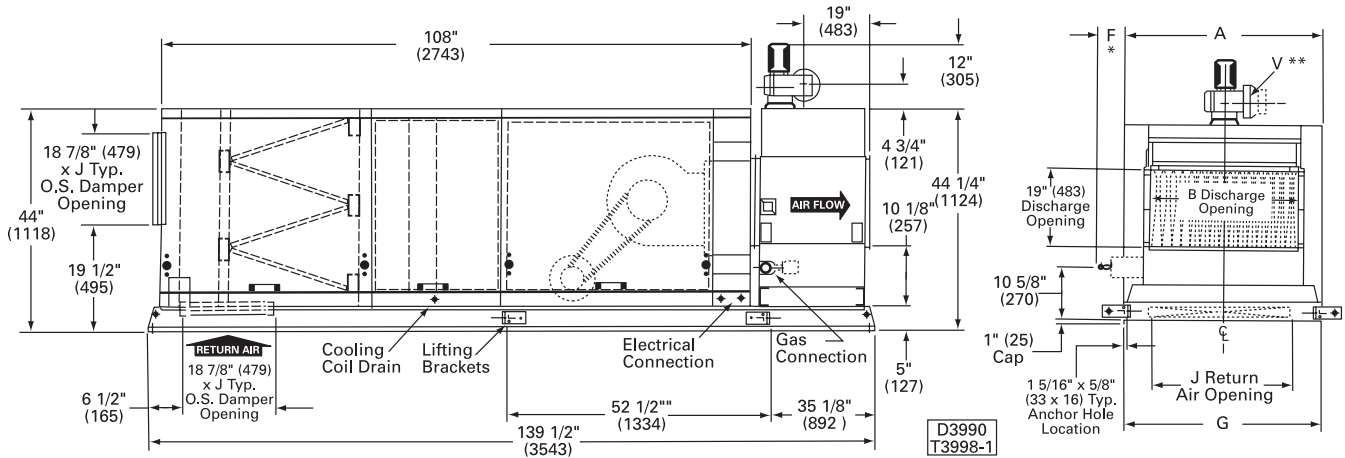
\*F\* Dimension is the recommended clearance to service the burner drawer.

\*\*V Dia." = The Flue Opening; Capacities 30/35/40 will require a field installed 5" to 6" Dia. increaser that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with High Cfm Blower and Cooling Coil Section – Arrangement K Models GGAA, GGBA – 10, 15, 20, 25, 30, 35, 40 (100-400 MBh)



### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
10	32 7/8 (835)	15 9/16 (395)	1/2	1/2	16 3/8 (416)	31 1/16 (789)	24 (610)	**4 (102)
15	32 7/8 (835)	18 5/16 (465)	1/2	1/2	20 1/2 (521)	31 1/16 (789)	24 (610)	**4 (102)
20	43 7/8 (1114)	23 13/16 (605)	1/2	1/2	23 1/2 (597)	42 1/16 (1068)	35 (889)	5 (127)
25	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
30	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
35	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
40	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

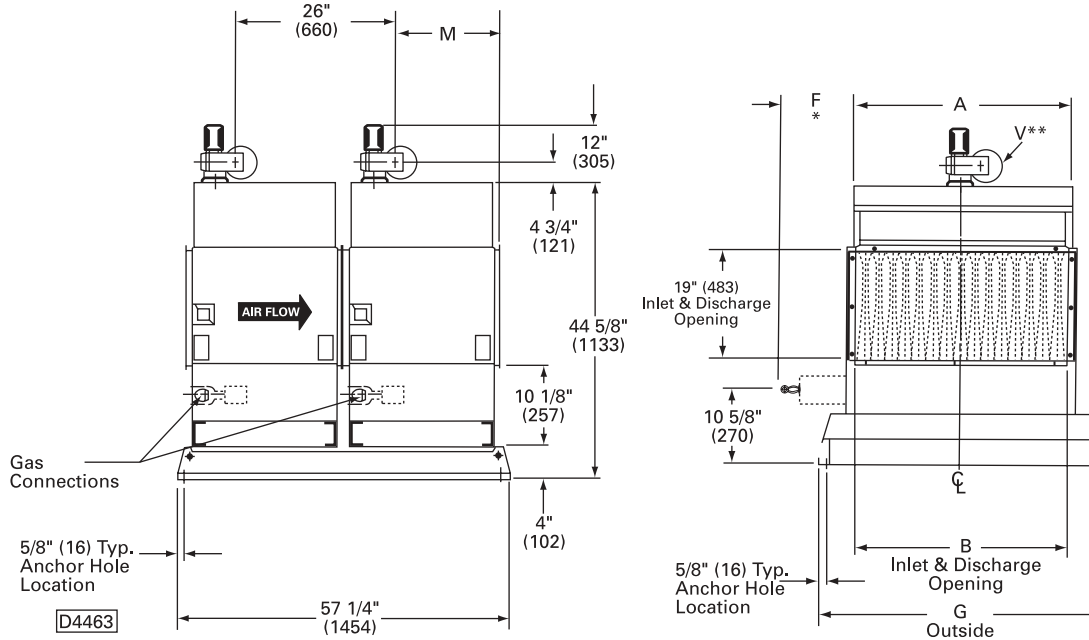
\*\* "F" Dimension is the recommended clearance to service the burner drawer.

\*\* "V Dia." = The Flue Opening; Capacities 10 & 15 will require a field installed 5" to 4" Dia. reducer. Capacities 30/35/40 will require a field installed 5" to 6" Dia. increaser that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.

# Dimensional Data

## High Efficiency Indoor Duct Furnace – Arrangement A Models GGAA, GGBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



POWER VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

### Unit Dimensional Data

Capacity	A	B	F*	G	M	V Dia.**
50	31 5/8 (803)	20 5/16 (745)	37 5/8 (956)	41 1/8 (1045)	20 1/4 (514)	5 (127)
60	37 1/8 (943)	34 3/16 (884)	43 1/8 (1095)	52 1/8 (1324)	20 1/4 (514)	6 (152)
70	42 5/8 (1083)	40 5/16 (1024)	48 5/8 (1235)	52 1/8 (1324)	20 1/4 (514)	6 (152)
80	48 1/8 (1222)	45 13/16 (1164)	54 1/8 (1375)	57 5/8 (1464)	21 1/4 (540)	6 (152)

### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

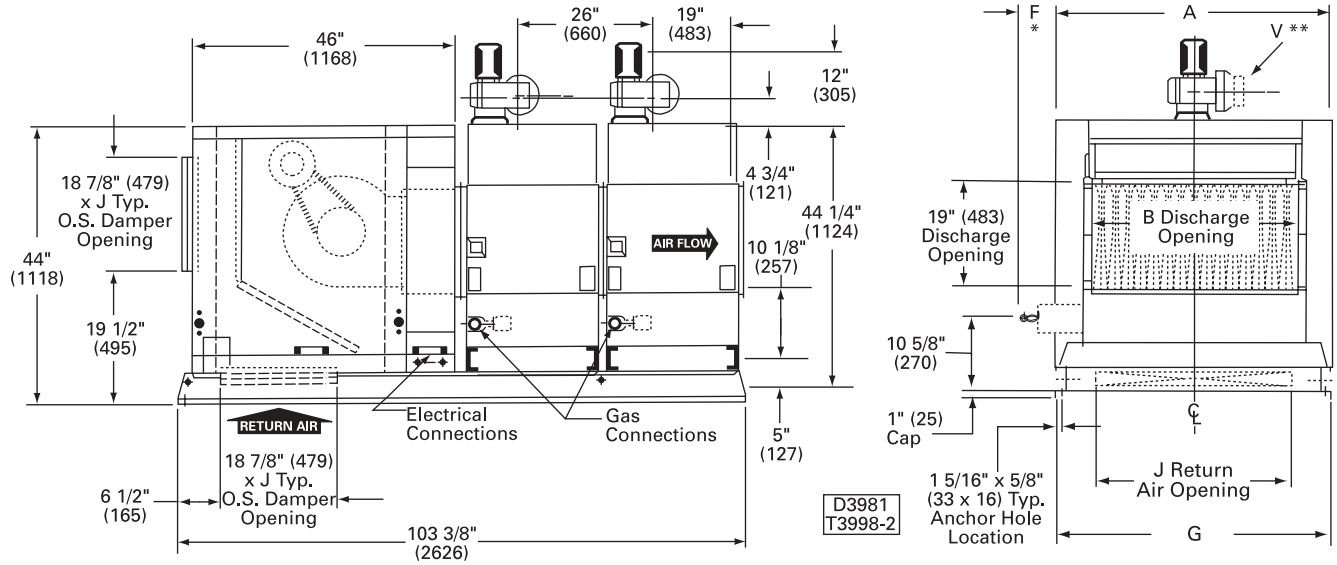
\*"F" Dimension is the recommended clearance to service the burner drawer.

\*\*"V" Dia. = Flue Opening (ME - Power Vent Units Only). The 5" to 6" increaser adapter is supplied by the manufacturer for unit capacities 60, 70 and 80.

Gas inlet sizes: Natural Gas = 3/4" Dia. LP Gas = 1/2" or 3/4" Dia.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with Standard Blower – Arrangement B Models GGAA, GGBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

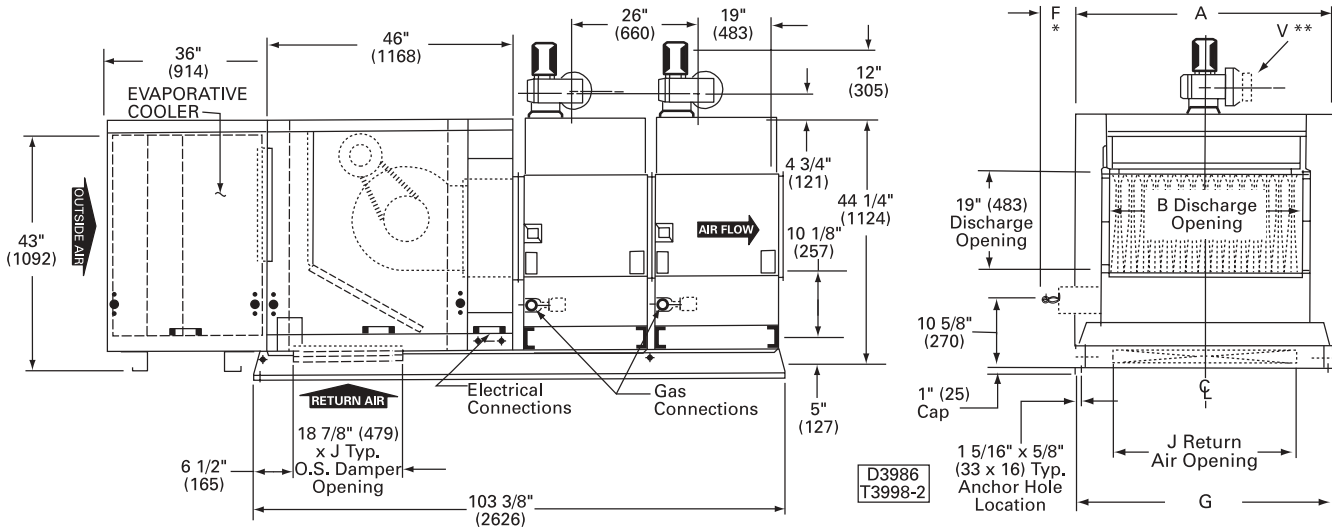
\*"F" Dimension is the recommended clearance to service the burner drawer.

\*\* "V Dia." = The Flue Opening; Capacities 60/70/80 will require 5" to 6" increaser on each furnace that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with Standard Blower and Evaporative Cooler – Arrangement D Models GGAA, GGBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



POWER VENT  
(Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

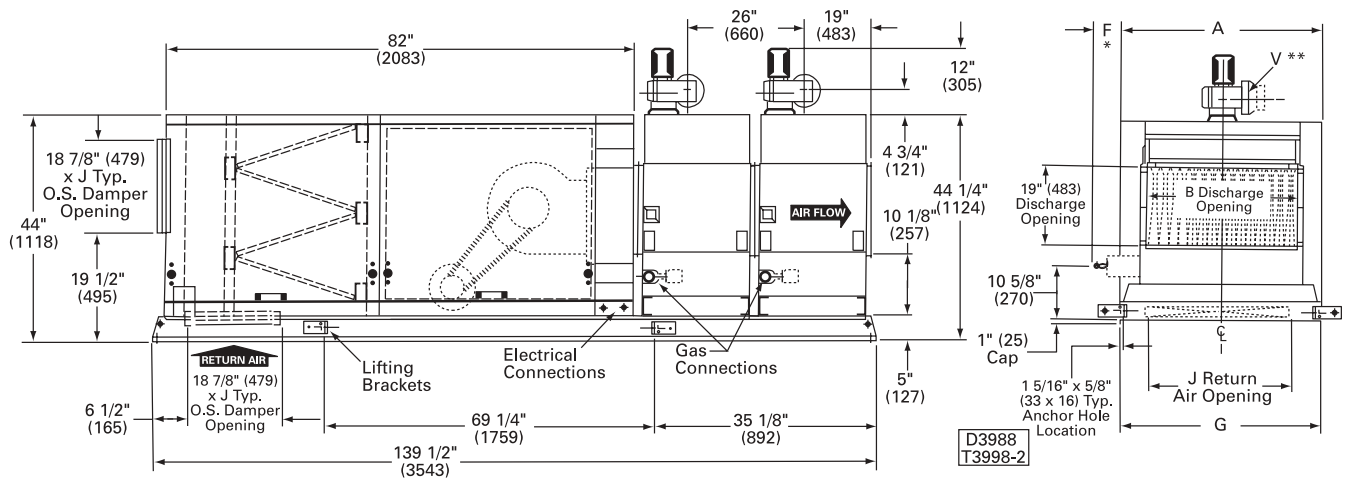
\*F\* Dimension is the recommended clearance to service the burner drawer.

\*\*V Dia." = The Flue Opening; Capacities 60/70/80 will require 5" to 6" increaser on each furnace that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with High Cfm Blower – Arrangement G Models GGAA, GGBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet			G	J	**V Dia.
			NAT	LP	F*			
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

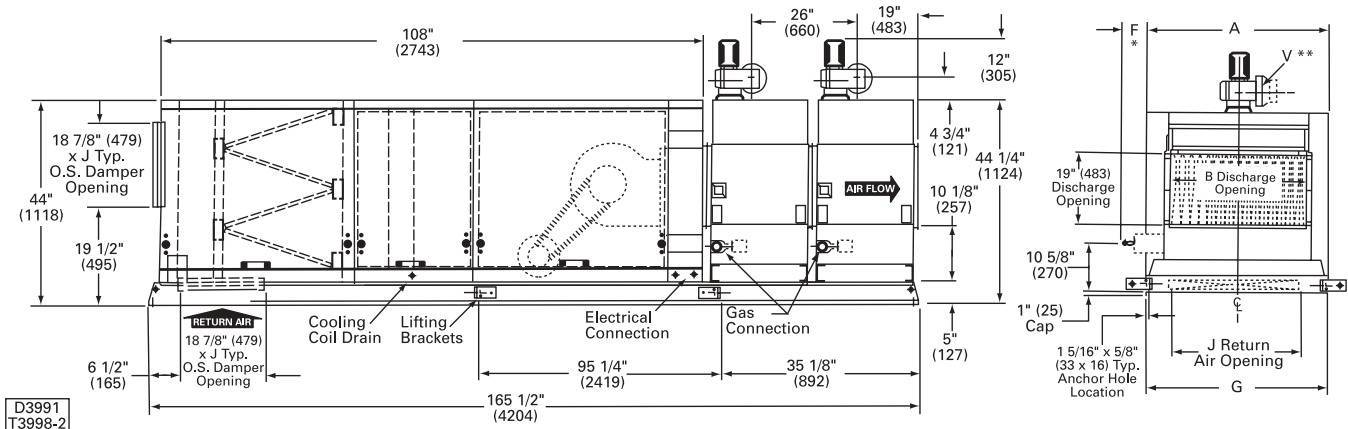
\*"F" Dimension is the recommended clearance to service the burner drawer.

\*\* "V Dia." = The Flue Opening; Capacities 60/70/80 will require 5" to 6" increaser on each furnace that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.

# Dimensional Data

## High Efficiency Indoor Make-Up Air Handler with High Cfm Blower and Cooling Coil Section – Arrangement K Models GGAA, GGBA – 50, 60, 70, 80 (500-800 MBh) Double Furnace



### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.

#### Unit Dimensional Data

Capacity	A	B	Gas Inlet		F*	G	J	**V Dia.
			NAT	LP				
50	43 7/8 (1114)	29 5/16 (745)	3/4	1/2 OR 3/4	31 1/2 (800)	42 1/16 (1068)	35 (889)	5 (127)
60	54 7/8 (1394)	34 13/16 (884)	3/4	1/2 OR 3/4	34 1/4 (870)	53 1/16 (1348)	46 (1168)	**6 (152)
70	54 7/8 (1394)	40 5/16 (1024)	3/4	1/2 OR 3/4	42 1/4 (1073)	53 1/16 (1348)	46 (1168)	**6 (152)
80	60 3/8 (1534)	45 13/16 (1164)	3/4	1/2 OR 3/4	48 (1219)	58 9/16 (1487)	51 1/2 (1308)	**6 (152)

#### Note:

Dimensions are in inches (Dimensions in parentheses are in millimeters).

\*"F" Dimension is the recommended clearance to service the burner drawer.

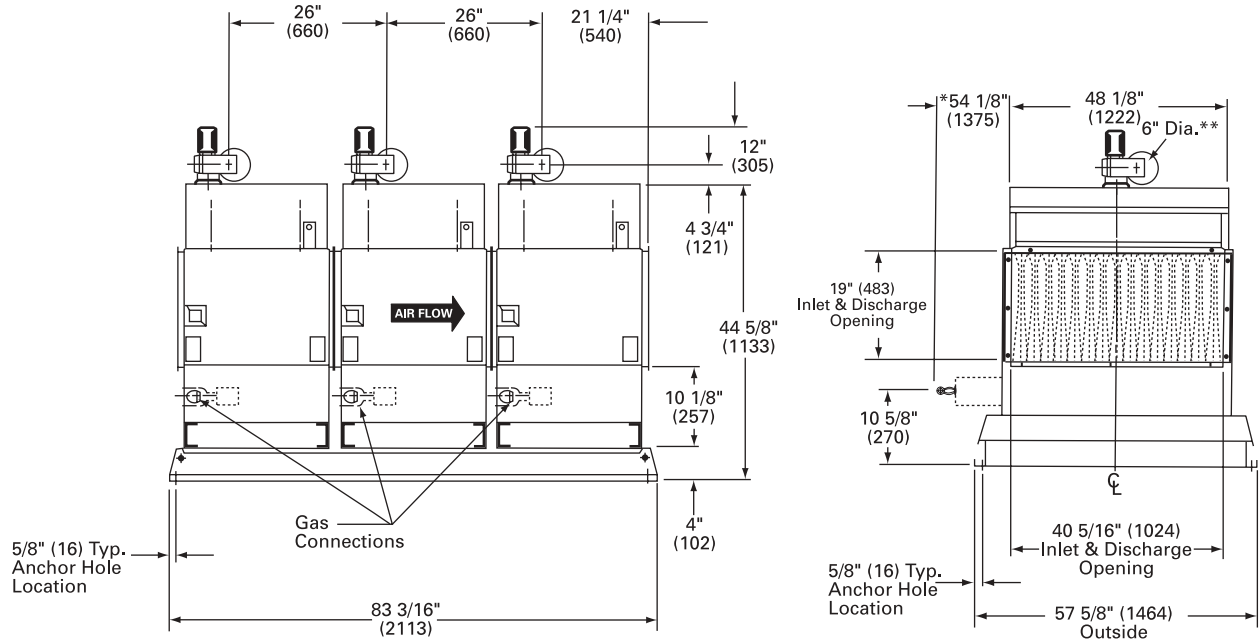
\*\* "V Dia." = The Flue Opening; Capacities 60/70/80 will require 5" to 6" increaser on each furnace that will be supplied with the unit.

"J" is an outside dimension for outside or return air dampers.



# Dimensional Data

## High Efficiency Indoor Duct Furnace – Arrangement A Models GGAA, GGBA – 12 (1200 MBh) Triple Furnace



D4465

### POWER VENT (Left Hand Unit Shown)

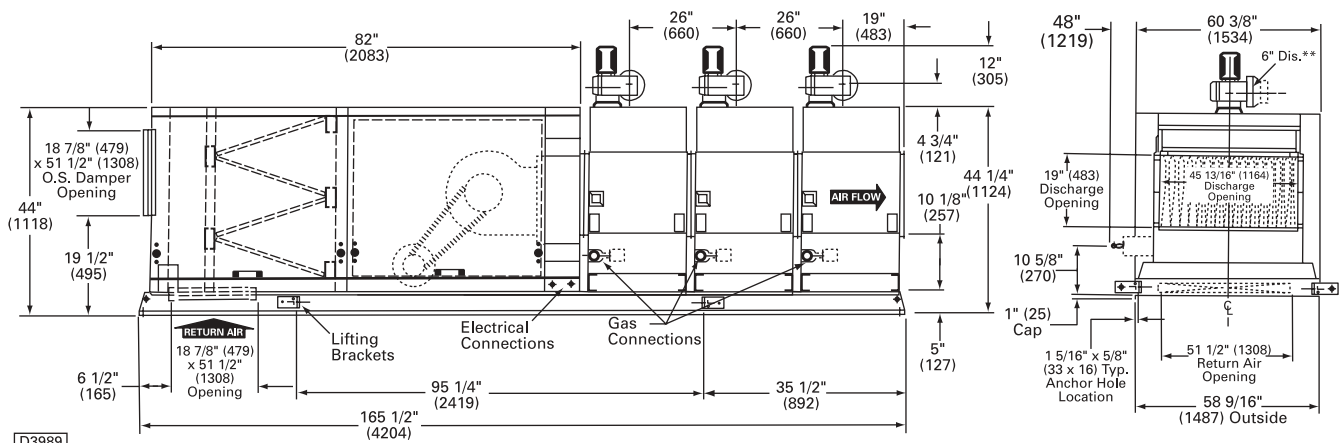
Note:

\*Recommended clearance to service the burner drawer.

\*\*6" Dia. = Flue Opening. The 5" to 6" increaser adapter is supplied by the manufacturer for this model.

Gas inlet sizes: Natural Gas = 3/4" Dia. LP Gas = 1/2" or 3/4" Dia.

## High Efficiency Indoor Make-Up Air Handler with High Cfm Blower – Arrangement G Models GGAA, GGBA – 12 (1200 MBh) Triple Furnace



D3989

### POWER VENT (Left Hand Unit Shown)

Dimensions are in inches.  
Dimensions in parentheses are in millimeters.



# Weights

**Table W-1 – Indoor Make-Up Air Handler Unit Weight Data (Pounds)**

Capacity	A		B		D		G		K		Outside Air Hood
	Net	Ship	Net	Ship	Net	Ship	Net	Ship	Net	Ship	
10	NA	NA	537	638	715	846	NA	NA	775	930	43
15	NA	NA	566	667	744	875	NA	NA	801	956	43
20	NA	NA	689	798	895	1035	848	988	950	1115	51
25	NA	NA	716	825	922	1062	898	1038	1000	1165	51
30	NA	NA	843	959	1083	1232	1066	1215	1176	1351	59
35	NA	NA	889	1005	1129	1279	1110	1259	1220	1395	59
40	NA	NA	950	1070	1206	1359	1183	1336	1302	1482	63
50	589	686	1035	1169	1241	1406	1209	1374	1311	1501	51
60	684	788	1219	1362	1459	1634	1434	1609	1544	1745	59
70	734	838	1289	1432	1529	1704	1503	1678	1613	1814	59
80	806	914	1386	1533	1642	1822	1612	1792	1730	1936	63
12	1198	1333	NA	NA	NA	NA	2040	2246	NA	NA	63

Note:

- Weights do not include motors or coils.
- 1 lb. = 0.453 Kg.

**Table W-2 – High Efficiency Indoor Make-Up Air Handler Unit Weight Data (Pounds)**

Capacity	A		B		D		G		K		Outside Air Hood
	Net	Ship	Net	Ship	Net	Ship	Net	Ship	Net	Ship	
10	NA	NA	536	637	714	845	NA	NA	774	929	43
15	NA	NA	561	662	739	870	NA	NA	799	954	43
20	NA	NA	676	785	882	1022	832	972	938	1103	51
25	NA	NA	703	812	909	1049	881	1021	984	1149	51
30	NA	NA	821	937	1061	1210	1037	1186	1146	1321	59
35	NA	NA	867	983	1107	1256	1089	1238	1199	1374	59
40	NA	NA	928	1048	1184	1337	1161	1314	1280	1460	63
50	589	686	1010	1144	1216	1381	1184	1349	1286	1476	51
60	684	788	1175	1318	1415	1590	1390	1565	1500	1701	59
70	734	838	1246	1389	1486	1661	1459	1634	1569	1770	59
80	806	914	1343	1490	1599	1779	1568	1748	1687	1893	63
12	1198	1333	NA	NA	NA	NA	1975	2181	NA	NA	63

Note:

- Weights do not include motors or coils.
- 1 lb. = 0.453 Kg.

# Weights

**Table W-3 – Motor Weights**

Voltage	1/2 HP	3/4 HP	1 HP	1 1/2 HP	2 HP	3 HP	5 HP	7 1/2 HP	10 HP	15 HP
115/60/1 ODP	20	25	25	40	42	80	NA	NA	NA	NA
208/60/1 ODP	21	27	25	40	66	80	NA	NA	NA	NA
230/60/1 ODP	21	25	25	40	42	80	NA	NA	NA	NA
208/60/3 ODP	20	24	31	29	35	47	49	99	118	152
230/60/3 ODP	20	24	31	29	35	47	49	99	118	150
460/60/3 ODP	20	24	31	29	35	47	49	99	118	150
575/60/3 ODP	20	20	27	31	37	56	73	105	116	150
115/60/1 TE	26	30	34	41	65	74	NA	NA	NA	NA
208/60/1 TE	27	36	39	48	65	74	NA	NA	NA	NA
230/60/1 TE	26	30	34	41	65	74	NA	NA	NA	NA
208/60/3 TE	18	23	28	32	36	55	65	90	123	295
230/60/3 TE	18	23	28	32	36	55	65	90	123	295
460/60/3 TE	18	23	28	32	36	55	65	90	123	295
575/60/3 TE	21	21	26	36	40	90	92	161	199	284
115/60/1 HEODP	32	33	38	58	72	NA	NA	NA	NA	NA
208/60/1 HEODP	32	30	NA	NA	NA	NA	NA	NA	NA	NA
230/60/1 HEODP	32	33	38	58	72	NA	NA	NA	NA	NA
208/60/3 HEODP	22	25	40	44	44	83	89	139	141	213
230/60/3 HEODP	24	26	40	43	44	80	91	137	138	238
460/60/3 HEODP	24	26	40	43	44	80	91	137	138	238
575/60/3 HEODP	NA	NA	41	44	45	90	100	170	141	215
115/60/1 HETE	28	37	38	41	53	NA	NA	NA	NA	NA
208/60/1 HETE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
230/60/1 HETE	28	37	38	41	53	NA	NA	NA	NA	NA
208/60/3 HETE	NA	NA	39	34	48	71	78	107	124	225
230/60/3 HETE	32	52	39	34	48	94	110	158	166	294
460/60/3 HETE	32	52	39	34	48	94	110	158	166	294
575/60/3 HETE	NA	NA	44	69	88	76	80	132	140	260
208/60/3 2S1W	NA	NA	34	38	48	66	81	125	143	NA
230/60/3 2S1W	NA	NA	34	38	48	66	81	125	143	NA
460/60/3 2S1W	NA	NA	34	38	41	58	94	125	136	218
575/60/3 2S1W	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
115/60/1 2S2W	23	30	37	NA	NA	NA	NA	NA	NA	NA
208/60/1 2S2W	NA	29	36	NA	NA	NA	NA	NA	NA	NA
230/60/1 2S2W	23	29	36	NA	NA	NA	NA	NA	NA	NA
208/60/3 2S2W	27	32	44	47	67	84	NA	221	192	NA
230/60/3 2S2W	26	32	44	47	67	84	NA	221	192	NA
460/60/3 2S2W	26	33	40	44	55	67	NA	214	230	NA
575/60/3 2S2W	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

1. ODP = Open Drip Proof
2. TE = Totally enclosed
3. HEODP = High Efficiency Open Drip Proof
4. HETE = High Efficiency Totally Enclosed
5. 2S1W = Two Speed One Winding
6. 2S2W = Two Speed Two Winding
7. NA = Not Available

FLA based on NEC Ratings

**Table W-4 – Evaporative Cooler Weight**

Unit Size	Shipping Wt.	Operating Wt.
	lb (Kg)	lb (Kg)
10, 15	137	301
20, 25, 50	166	386
30, 35, 60, 70	192	468
40, 80	206	509

Metric Conversion:  
1 lb. = 0.453 Kg.



# Options

# Thermostats



**Single-Stage Room Thermostat**  
(Order No. 134-0207-01)

- Low Voltage (24V)
- 40 F to 90 F Range
- Fan Auto-On Switch
- System Heat-Off-Cool Switch
- 3<sup>11</sup>/<sub>16</sub>" Diameter; 1<sup>3</sup>/<sub>4</sub>" Deep



**Two-Stage Room Thermostat**  
(Order No. 134-0207-04)

- Low Voltage (24V)
- 40 F to 90 F Range
- Fan Auto-On Switch
- System Off-Heat-Auto-Cool Switch
- 5<sup>5</sup>/<sub>8</sub>" W 3<sup>1</sup>/<sub>2</sub>" H 2<sup>1</sup>/<sub>8</sub>" D



**Single-Stage Room Thermostat with Summer/Winter Switch**  
(Order No. 134-0207-02)

- Low Voltage (24V)
- 55 to 95 F Range
- Fan Auto-On Switch
- 3<sup>1</sup>/<sub>2</sub>" W 4<sup>1</sup>/<sub>5</sub>" H 1<sup>3</sup>/<sub>8</sub>" D



**T7300 Programmable Room Thermostat**

- (Order No. 134-0207-05)
- Provides seven-day programmability for two stages of heating and two stages of cooling.
  - Heat-Off-Cool-Auto system switching four time periods per day for occupied and unoccupied modes with three-hour override of unoccupied mode.
  - Automatic heat-cool changeover and battery backup.



**Universal Guard**

- (Order No. 134-0207-07)
- Clear Plastic
  - Ring Base
  - Tumbler Lock and Two Keys
  - Cover: 6<sup>7</sup>/<sub>8</sub>" W 5<sup>5</sup>/<sub>8</sub>" H 3" D
  - Base: 6<sup>9</sup>/<sub>16</sub>" W 5<sup>1</sup>/<sub>2</sub>" H 3<sup>3</sup>/<sub>8</sub>" D

**Single-Stage Duct Thermostat**

(Order No. 134-0207-03)

- Low Voltage (24V)
- 55 to 175 F Range
- 5' Capillary
- 2" W 5<sup>5</sup>/<sub>8</sub>" H 2<sup>7</sup>/<sub>16</sub>" D

**Two-Stage Duct Thermostat**

(Order No. 134-0207-06)

- Low Voltage (24V)
- 55 to 175 F Range
- 5' Capillary
- 2" W 5<sup>5</sup>/<sub>8</sub>" H 2<sup>7</sup>/<sub>16</sub>" D

**Remote Control Station**

(Order No. 134-0201-01)

- Wall mounted
- Six LED status lamps
- System on/off, fan auto/on, heat auto/off, cool auto/off, auxiliary on/off switching and modulating damper potentiometer mounting.
- Plug-in terminal block wiring and wall mounting bracket.
- 6<sup>1</sup>/<sub>4</sub>" W x 3<sup>3</sup>/<sub>4</sub>" H x 1<sup>1</sup>/<sub>2</sub>" D

**Seven-Day Timeclock**

(Order No. 134-0201-02)

- Single pole double throw (SPDT) relay output at setpoint time
- Maximum of six setpoints per day
- 7<sup>3</sup>/<sub>4</sub>" H x 5" W x 3<sup>7</sup>/<sub>16</sub>" D

**24-Hour Timeclock**

(Order No. 134-0201-03)

- Single pole double throw (SPDT) relay output at setpoint time.
- Maximum 12 setpoints per day.
- 7<sup>3</sup>/<sub>4</sub>" H x 5" W x 3<sup>7</sup>/<sub>16</sub>" D



**Electronic Modulating Room Thermostat**

(Included with Gas Control)

- Low voltage (24 V)
- 60-85 F range
- Room thermostat
- 4 $\frac{1}{2}$ " H x 2 $\frac{1}{2}$ " W x 1 $\frac{1}{2}$ " D

**Electronic Modulating Duct Thermostat**

(Included with Gas Control)

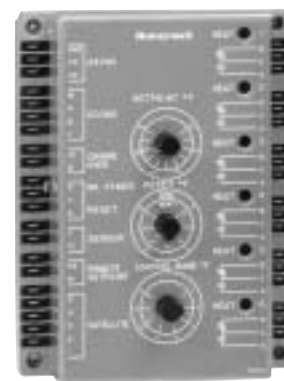
- Low voltage (24 V)
- 55-90 F range
- Sensor: 10-inch probe
- Remote temperature selector: 4 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " H x 1 $\frac{1}{8}$ " D
- Duct thermostat: 4 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " H x 1 $\frac{5}{8}$ " D

**Electronic Modulating Duct Thermostat with Room Override**

- Line voltage (115 V) roomstat
- 50-90 F range
- 2 $\frac{7}{8}$ " W x 4 $\frac{9}{16}$ " H x 1 $\frac{1}{4}$ " D
- Low voltage (24 V) Ductstat
- 55-90 F range
- Sensor: 10-inch probe
- Remote temperature selector: 4 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " H x 1 $\frac{5}{8}$ " D
- Duct thermostat: 4 $\frac{1}{4}$ " W x 4 $\frac{1}{4}$ " H x 1 $\frac{5}{8}$ " D

**Electronic Modulating 4-20 mA or 0-10 VDC Input**

- A200 signal conditioner.
- Control replaces amplifier in duct or room control package.

**Discharge Air Control with Outside Air Reset**

- Available in two, three and four-stage control. Shown above is the discharge air controller.



## Features Summary

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Trane indoor gas heating units have the following design features:

- All units have AGA and CGA certified duct furnaces.
- All units are fabricated from aluminized steel. The heat exchanger uses 20-gauge tubes and 18-gauge header sections.
- Units are complete, wired, tested and rail-mounted packages with blower drives preset.
- Units are available with left hand or right hand gas control configuration. This flexibility helps to meet special application requirements.
- Draw-thru cabinet arrangements have a stainless steel drain pan.
- Evaporative cooling arrangements come with a standard 8 or optional 12-inch media (203 or 305 mm).



# Mechanical Specifications

## Indoor Gas Duct Furnaces Arrangement A 50-80 (500-800 MBH)

### General

Units are completely factory assembled, piped, wired and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with four point suspension hangers. All units are available for operation on either natural or LP (propane) gas.

### Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifices. The pilot is also accessible through a side panel access plate. The high limit switch is accessible through a side panel access.

Duct discharge flanges for simple ductwork connection are provided.

### Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

### Draft Diverter

Standard draft diverter construction is corrosion resistant aluminized steel.

### Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners are individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment. Air shutter adjustment is fixed.

### Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24-volt combination single-stage automatic gas valve, including main operating valve and pilot safety shutoff, pressure regulator, manual main and pilot shutoff valve, and adjustable pilot valve. Gas valve is suitable to a maximum inlet pressure of 0.5 psi (14-inch W.C.) on natural gas. A 24-volt control transformer, a spill (blocked vent) switch and a high limit are provided.

All units are provided with a solid-state ignition control system which ignites the intermittent pilot by spark during each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. Pilot and burners are extinguished during the off cycle.

### FACTORY INSTALLED OPTIONS

#### Control Options (Per Furnace)

##### Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (40% of the unit's full rated input). Requires the use of an optional two-stage thermostat.

##### Hydraulic Modulating Gas Valve

Provides modulated heat output. Ignition is at low fire (40% of the unit's full rated input) and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

##### Hydraulic Modulating Gas Valve with Bypass

Provides modulated heat output. Ignition is at low fire (40% of the unit's full rated input) and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing, allowing full fire. Requires the use of an optional thermostat to control the electric valve.

##### Electronic Modulating – Room or Duct Stat Control

Provides modulated heat output. An automatic valve in series with the modulating valve shall be provided to cycle the unit. Ignition is at full fire (100% input) and modulates the gas input from 100% to 40% rated input.

Available for use with a room thermostat or duct thermostat with remote set point adjustment. Duct thermostat available with optional override room thermostat which

causes the unit to go to full fire when the room temperature falls below the override room thermostat's set point.

##### Electronic Modulating – 4-20 mA or 0-10VDC Input

Provides modulated heat output. Ignition is at full fire (100% input) and modulates the gas input from 100% to 40% rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control. When "furnace one only" is specified on double and triple furnaces, additional furnace sections will have single-stage on-off control.

##### Discharge Air Control with Outside Air Reset

The unit is provided with a factory-mounted discharge air controller, discharge air sensor, outdoor air reset, summer/winter thermostat and velocity pressure switch. The outdoor air reset range is from 10 F to 60 F. Full reset occurs at 10 F outside air temperature. There is a straight line relationship between outside air temperature and reset. Therefore, at 60 F outside air temperature, no reset will occur. The amount of reset is adjustable from 20 F to 50 F.

A discharge air controller provides a two-minute delay between successive on and off stages. A summer/winter thermostat locks out heating when the outside air temperature is above 55 F. The velocity pressure switch is provided for protection against high temperatures at low airflow's.

Available in three-stage (33% of the unit's full rated input) and four-stage (25% of the unit's full rated input).

##### S-350 Modular Electronic Control System

The basic system utilizes a controller module with discharge air sensor, setpoint and one-stage output, a stage module with differential setpoint and one-stage output and a display module with LCD display for temperature readout. The system stages the unit's rate of fire based upon sensed discharge air temperature, setpoint setting and differential setting between stages.

Provide as a three, four-stage (double and triple furnaces only) and six-stage (triple furnace only).



# Mechanical Specifications

## Heat Exchanger Options

### Type 409 Stainless Steel

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be aluminized steel. 409 stainless steel is recommended when outside air is used for make-up air in areas where outside temperatures are 40 F or below

### Type 409 Stainless Steel Package

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be 409 stainless steel. 409 stainless steel is recommended where outside air is used for make-up air in areas where temperatures are 40 F or below.

### Type 321 Stainless Steel

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. Burners and flue collector shall be aluminized steel.

### Type 321 Stainless Steel Package

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. The burners and flue collector shall be 409 stainless steel.

## Fan Time Delay Relay

The fan time delay relay minimizes cold blasts of air on start-up. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

## Orifices for Elevations over 2000 Feet

### Freezestat with Time Delay

The unit shall be provided with a freezestat (0-100 F) with the sensing bulb located in the discharge air stream. Wired as an interlock to prevent cold air discharge.

### Firestat

If the temperature reaches the setpoint, the unit will close all gas valves, return the dampers to their normal position and shut down the blower. Automatic reset.

### Supply Air Mounted

(Setpoint typically 150 F)

### Manual Blower Switch

### 409 Stainless Steel Furnace Drip Pan

### Clogged Filter Switch

A clogged filter pressure switch with adjustable operating range and normally open switch shall be installed to sense increased suction pressure by the blower due to filter obstruction. A provision for remote indication shall be

provided by a terminal block connection points. Includes a status lamp mounted in the electrical cabinet.

### Continuous Fan Relay – Interlock Relay - 24V Coil DPDT 10A

A relay is provided with 24 volt coil and double-pole, double-throw 10 amp contacts. It plugs into the main connection PC board in the electrical cabinet. May also be used as an exhaust fan interlock.

### Interlock Relay – 24/115V coil SPDT 10A

This relay has a selectable coil voltage of 24 or 115 volts and single-pole, double-throw 10 amp contacts with an LED on the indicator lamp. The relay is utilized as an auxiliary relay.

### Interlock Relay – 24/115-230V Coil DPDT 10A

This relay has a selectable coil voltage of 24, 115 or 230 volts and double-pole, double-throw 10 amp contacts. Utilized as an auxiliary relay for general purpose duty.

### High/Low Gas Pressure Limit Switches

A high pressure and a low pressure interlock switch and shutoff valve shall be provided for each furnace section. High/low gas pressure limits disengage heating upon detecting either high line pressure or low manifold pressure.

### Status Indicator Lamps (Electrical Cabinet)

Status indicator lamps shall include power on, blower on and one lamp per stage of heat mounted in the electrical cabinet.

### Airflow Proving Switch

### Ambient Lockout

## FIELD INSTALLED ACCESSORIES

### Manual Reset High Limit Switch

The unit shall be provided with a manual reset, high-limit switch wired in series to the lead furnace high limit. If the setpoint is reached, the gas valve will close and the blower will continue to run until the sensed temperature is below the set point.

### Flue Vent Fan

The flue vent fan provides power venting. It is provided with all fixtures for field mounting and wiring. The flue vent fan is activated in response to a single-stage thermostat. A centrifugal switch in the flue vent fan in turn activates the automatic electric gas valve. (One flue vent fan required per furnace.)

### High Gas Line Pressure Regulator

Reduces main gas line pressure to a minimum of 7 inches WC. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

### Remote Control Station

Wall mounted. Provides 6 LED status lamps with System On/Off, Fan Auto/On, Heat Auto/Off, Cool Auto/Off, Auxiliary On/Off switching and modulating damper potentiometer mounting. Designed for easy installation with plug-in terminal block wiring and wall mounting bracket.

### 7-Day Timeclock

Provides single-pole, double-throw (SPDT) relay output at setpoint time with a maximum six setpoints per day.

### 24-Hour Timeclock

Provides single-pole, double-throw (SPDT) relay output at setting time with a maximum 12 setpoints per day.

### Disconnect Switch

### 115V Convenience Outlet

GFI - Ground Fault Convenience Outlet is manual reset with weatherproof enclosure - requires separate 115V power source.

### Thermostats

Low-voltage room thermostat, single-stage with fan auto-on-switch and system heat-off cool switch.

Low-voltage room thermostat, single-stage with a fan auto-on switch.

Low-voltage room thermostat, two-stage with a fan auto-on switch and system off-heat-auto-cool switch.

Low-voltage programmable room thermostat, two-stage with LCD display, fan auto-on switch and system-off-heat-auto-cool switch.

A universal tamperproof guard for all room thermostats

Low-voltage duct thermostat, single-stage.

Low-voltage duct thermostat, two-stage.

Room thermostat, electronic modulating control.

Duct thermostat, electronic modulating control.

Duct thermostat, electronic modulating control with override room thermostat.

# Mechanical Specifications

## Indoor Make-Up Air Handler Arrangements B, D, G, K

### General

Units shall be completely factory assembled, piped, wired and test fired. All units shall contain duct furnaces that are AGA and CGA certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with four-point suspension hangers and shall be available for operation on either natural or LP (propane) gas.

The firing rate of each furnace will not exceed 400 MBh and shall contain its own heat exchanger, flue collector, venting, burners, safety and ignition controls.

All units shall be in compliance with FM (Factory Mutual) requirements.

### Electrical

Standard control relays shall be socket mounted with terminal block connections. All control wiring shall terminate at terminal strips (single point connection) and include an identifying marker corresponding to the wiring diagram.

Motor and control wiring shall be harnessed with terminal block connections.

### Casing

Casings shall be die-formed, 18-gauge galvanized steel and finished in air-dry enamel. Service and access panels shall be provided through easily removable side access panels with captive fasteners. Fan sections and supply plenums (when provided) shall be insulated with fire resistant, odorless, matte-faced one-inch glass fiber material.

### Heat Exchanger

Standard heat exchanger construction shall consist of 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

### Flue Collector

Standard flue collector construction shall be corrosion resistant aluminized steel.

### Burners

Burners shall be die-formed, corrosion resistant aluminized steel, with stamped porting and stainless steel port protectors. Port protectors prevent foreign matter from obstructing the burner ports. Burners are individually removable for ease of inspection and servicing. The entire burner assembly is easily removed with its slide-out drawer design. The pilot shall be accessible through an access plate without removing the burner drawer assembly.

### Evaporative Cooler (Standard on arrangement D only)

An evaporative cooler with eight-inch media shall be provided. The evaporative cooler shall be of a self-cleaning design with a stainless steel water tank, regulated water flow and overflow protection. The cooler shall have a cabinet assembly of heavy-gauge aluminized steel with weatherproof finish, a UL recognized thermally protected sealed recirculating pump motor, two-inch distribution pad, and corrosion-resistant PVC water distribution tubes.

### Cooling Coil Section (Standard on arrangement K only)

A cooling coil section, constructed of galvanized steel, shall be provided with the unit.

### Fans

The centrifugal fan shall be belt driven, forward curved, with a double inlet statically and dynamically balanced. The blower wheel shall be fixed on a keyed shaft, supported with rubber grommet on bearing only and ball bearing secured. 7 1/2 through 15 hp motors do not have the rubber grommets and are equipped with a pillow block bearing assembly on the drive side.

An access interlock switch shall be installed in the blower compartment and will disengage the blower upon removing the service panel. An override shall be incorporated into the access interlock switch for serviceability.

### Filters

(Standard on Arrangement B, D Only)  
The filter rack shall be constructed of galvanized steel with access through the side service panel. Standard filters are one-inch permanent washable type.

### Filters

#### (Standard on Arrangement G, K Only)

The filter rack shall be of v-bank design for minimal pressure drop and constructed of galvanized steel with access through the side service panel. Standard filters are one-inch permanent washable type.

### Electrical Cabinet

The electrical cabinet shall be isolated from the air stream with a non-removable access panel interior to the outer service panel. There is provision in this cabinet for component mounting, wire routing and high voltage isolation. Motor and control wiring shall be harnessed with terminal block connections.

### Controls

Standard units shall be provided with a 24-volt combination single-stage automatic gas valves, including a main operating valve and pilot safety shutoff, pressure regulator, manual main and pilot shutoff valve, and an adjustable pilot valve. Gas valves shall be suitable for NEC Class 2 use for a maximum inlet gas pressure of 0.5 psi (14" WC) on natural gas. All rooftop units shall be provided with a low voltage circuit breaker rated for 150% of the unit's normal 24-volt operating load.

Each duct furnace shall be provided with a 24-volt high temperature limit switch, a (redundant) combination gas valve and a fan time delay relay. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger. Double and triple furnace units shall contain a reverse airflow interlock switch. The normally closed switch, when activated, shall cause gas valves to close and continue blower operation.

All units are provided with a solid-state ignition control system which ignites the intermittent pilot by spark during each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. Pilot and burners are extinguished during the off cycle.

# Mechanical Specifications

## FACTORY INSTALLED OPTIONS

### Control Options (Per Furnace)

#### Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (one half of the unit's full rated input). Requires the use of an optional two-stage thermostat.

#### Hydraulic Modulating Gas Valve

Provides modulated heat output. Ignition is at low fire (one half of the unit's full rated input), and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

#### Hydraulic Modulating Gas Valve with Bypass

Provides modulated heat output. Ignition is at low fire (one half of the unit's full rated input), and a discharge temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit. An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing bulb, allowing full fire. Requires the use of an optional thermostat to control the electric valve.

#### Electronic Modulating – Room or Duct Stat Control

Provides modulated heat output. An automatic valve in series with the modulating valve shall be provided to cycle the unit. Ignition is at full fire (100% input), and modulates the gas input from 100% to 40% rated input.

Available for use with a room thermostat or duct thermostat with remote set point adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat's set point.

#### Electronic Modulating - 4-20 mA/ 0-10 VDC Input

Provides modulated heat output. Ignition is at full fire (100% input), and modulates the gas input from 100% to 40% rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control. When "furnace one only" is specified on double and triple furnaces, additional furnace sections will have single-stage on-off control.

#### Discharge Air Control with Outside Air Reset

The unit is provided with a factory-mounted discharge air controller, discharge air sensor, outdoor air reset, summer/ winter thermostat and velocity pressure switch. The outdoor air reset range is from 10 F to 60 F. Full reset occurs at 10 F outside air temperature. There is a straight line relationship between outside air temperature and reset. Therefore, at 60 F outside air temperature, no reset will occur. The amount of reset is adjustable from 20 F to 50 F.

A discharge air controller provides a two-minute delay between successive on and off stages. A summer/winter thermostat locks out heating when the outside air temperature is above 55 F. The velocity pressure switch is provided for protection against high temperatures at low airflows.

Available in two-stage (half of the unit's full rated input – single furnace units only), three-stage (33% of the unit's full rated input) and four-stage (25% of the unit's full rated input). Three and four-stage are available on double and triple furnace units only.

#### S-350 Modular Electronic Control System 2-Stage

The basic system utilizes a controller module with discharge air sensor, setpoint and one-stage output, a stage module with differential setpoint and one-stage output and a display module with LCD display for temperature readout. The system stages the unit's rate of fire based upon sensed discharge air temperature, setpoint setting and differential setting between stages.

Provided as a two-stage (all furnaces), three and four-stage (double and triple furnaces only) and six-stage (triple furnace only).

## Heat Exchanger Options

### Type 409 Stainless Steel (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be aluminized steel. 409 stainless steel is recommended when outside air is used for make-up air in areas where outside temperatures are 40 F or below.

### Type 409 Stainless Steel Package (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be 409 stainless steel. 409 stainless steel is recommended where outside air is used for make-up air in areas where outside temperatures are 40 F or below.

### Type 321 Stainless Steel (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. Burners and flue collector shall be aluminized steel.

### Type 321 Stainless Steel Package (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. The burners and flue collector shall be 409 stainless steel.

## Motors - General

All motors shall be ball bearing type with resilient base mount. Windings are Class "B", 1800 rpm with service factors of  $\frac{1}{2}$  -  $\frac{3}{4}$  hp = 1.25 and 1 - 5 hp = 1.15.

### Single-Speed Open Drip-proof 60 HZ/1800 RPM

Single-Phase (with contactor) - Optional 115V, 208V and 230V motors available in  $\frac{1}{2}$  - 2 hp models.

Three-Phase (with contactor) - Optional 208V, 230V and 460V motors available in  $\frac{1}{2}$  - 5 hp models.

Single-Phase (with magnetic starter) - Optional 115V, 208V and 230V motors available in  $\frac{1}{2}$  - 3 hp models.

Three-Phase (with magnetic starter) - Optional 208V, 230V, 460V and 575V motors available in  $\frac{1}{2}$ -5 hp models.

# Mechanical Specifications

**Single Speed TEFC 60 HZ/1800 RPM**  
Single-Phase (with contactor) -  
Optional 208V, 230V and 230V motors  
available in 1/2 - 1 1/2 hp models.

Single-Phase (with magnetic starter) -  
Optional 115V, 208V and 230V motors  
available in 1/2 - 3 hp models.

Three-Phase (with magnetic starter) -  
Optional 208V, 230V, 460V and 575V  
motors available in 1/2 - 5 hp models.

**Single-Speed High Efficiency ODP  
60 HZ/1800 RPM**

Single-Phase (with contactor) -  
Optional 115V and 230V motors  
available in 1/2 - 1 hp models. Optional  
208V motors available in 1/2 - 3/4 hp  
models.

Single-Phase (with magnetic starter) -  
Optional 115V and 230V motors  
available in 1/2 - 2 hp models. Optional  
208V motors available in 1/2 - 3/4 hp  
models.

Three-Phase (with magnetic starter) -  
Optional 208V, 230V and 460V motors  
available in 1/2 - 5 hp models. Optional  
575V motors available in 1 - 5 hp  
models.

**Single-Speed High Efficiency TEFC  
60 HZ/1800 RPM**

Single-Phase (with contactor) -  
Optional 115V and 230V motors  
available in 1/2 - 1 1/2 hp models.

Single-Phase (with magnetic starter) -  
Optional 115V and 230V motors  
available in 1/2 - 2 hp models.

Three-Phase (with magnetic starter) -  
Optional 230V and 460V motors  
available in 1/2 - 5 hp models. Optional  
208V and 575V available in 1 - 5 hp  
models.

**Two-Speed/One Winding Motors  
(Three Phase On;y)  
60 HZ/1800/900 RPM**

Three-Phase (with magnetic starter) -  
Optional 208V, 230V and 460V motors  
available in 1 - 5 hp models.

**Two-Speed/Two Winding Motors  
60 HZ/1800/1200 RPM**

Single-Phase (with magnetic starter) -  
Optional 115V and 230V motors  
available in 1/2 - 1 hp models. Optional  
208V motors available in 3/4 - 1 hp  
models.

Three-Phase (with magnetic starter) -  
Optional 208V and 230V motors  
available in 1/2 - 5 hp models. Optional  
460V motors available in 1/2 - 3 hp  
models.

**Manual Blower Switch**

A manual blower switch shall be  
factory installed in the electrical  
cabinet.

**DX or Chilled Water Cooling Coils**

A direct expansion (DX) or chilled water  
coil certified by ARI shall be provided  
with the unit (available on Arrangement  
K only).

**Damper Options**

Dampers shall be of the opposed blade  
type, constructed of galvanized steel  
with neoprene nylon bushings, blades  
to be mechanically interlocked.

Optional low leak dampers shall be of  
the opposed blade type, construction of  
galvanized steel with neoprene nylon  
bushings and vinyl blade edge seals,  
blades to be mechanically interlocked.

**Outside Air or Return Air/  
2 pos. Motor/SR**

Units with outside air or return air only  
shall be provided with a damper, two-  
position spring return damper motor  
and controls. The motor shall power the  
damper fully open when the unit is on  
and fully closed when the unit is off.

**OA/RA 2 Pos SR**

A two-position spring return motor  
with interlocked outside and return air  
dampers shall be provided. The motor  
shall power either the outside air  
damper fully open and the return air  
damper fully closed or the outside air  
damper fully closed and the return air  
damper fully open in response to an  
outside air temperature sensor. When  
the unit is off, the motor will drive the  
outside air damper fully closed and the  
return air damper fully open.

**OA/RA Mod Motor with Mixed Air  
Control/Min. Pot/Spring Return**

Modulating motor with interlocked  
outside and return air dampers shall be  
provided. The motor shall modulate the  
position of the outside and return air  
dampers in response to a thermostatic  
controller located in the mixed air  
stream. Units shall also be provided  
with a minimum position  
potentiometer for minimum outside air  
damper position.

The spring return feature drives the  
outside air damper fully closed and the  
return air damper fully open when the  
unit is off.

**OA/RA Mod Mtr. with Mixed  
Air Control/Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall  
be provided. The motor shall modulate  
the position of the outside and return  
air dampers in response to a  
thermostatic controller located in the  
mixed air stream.

The spring return feature drives the  
outside air damper fully closed and the  
return air damper fully open when the  
unit is off.

**OA/RA Mod Mtr with Min Pot/  
Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall  
be provided. The motor shall position  
the outside and return air dampers in  
response to a manually set  
potentiometer.

The spring return feature drives the  
outside air damper fully closed and the  
return air damper fully open when the  
unit is off.

**OA/RA Mod Mtr with Dry Bulb/Mixed  
Air Control/Min Pot/Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall  
be provided. The motor shall modulate  
the position of the outside and return  
air dampers in response to a  
thermostatic controller and dry bulb  
thermostat located in the mixed air  
stream. Units shall also be provided  
with a minimum position  
potentiometer for minimum outside air  
damper position.

The spring return feature drives the  
outside air damper fully open and the  
return air damper fully closed when  
the unit is off.

**OA/RA Mod Mtr with Enthalpy  
Controlled Economizer/SR**

A modulating motor with spring return  
and interlocked outside and return air  
dampers shall be provided. The motor  
shall modulate the position of the  
outside and return air dampers in  
response to an enthalpy controlled  
economizer. When the unit is off, the  
motor will drive the outside air damper  
fully closed and the return air damper  
fully open.

# Mechanical Specifications

## **OA/RA Mod Mtr with Space Pressure Controller**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a pressure sensor located in the building. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **OA/RA Mod Mtr with S-350P Proportional Mixed Air Control/SR**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a solid-state mixed air sensor and S-350 Proportional controller. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **OA/RA Mtr. with External 4-20 mA or 0-10VDC Analog Input/Spring Return**

A modulating motor interlocked with outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a 4-10 mA or 0-10VDC signal supplied by an external DDC controller.

The spring return feature drives the outside air damper fully closed and the return air damper fully open when the unit is shut down.

## **ASHRAE Cycle I (OA/RA 2 pos with warm-up stat/SR)**

A two-position spring return motor with interlocked outside and return air dampers shall be provided. The motor shall power the outside air damper fully open after a warm up period determined by a minimum supply air temperature sensor when the unit is on, and fully closed when the unit is off.

## **ASHRAE Cycle II (OA/RA Mod with Warm-up Stat/Mixed Air/Min Pot/ Spring Return)**

A modulating motor with interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream after a warm-up period determined by a minimum supply air temperature sensor.

Units shall also be provided with a minimum position potentiometer for minimum outside air damper position. When the unit is off, the motor will drive the outside air damper full closed and the return air damper full open.

## **ASHRAE Cycle III (OA/RA Mod. with Warm-up Stat/Mixed Air/SR)**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream after a warm-up period determined by a minimum supply air temperature sensor. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **Manual Dampers**

Units with outside air and return air shall be provided with manually set outside and return air dampers.

## **Firestat**

If the temperature reaches the setpoint, the unit will close all gas valves, return the dampers to their normal position and shut down the blower. Automatic reset.

## **Return Air Mounted (setpoint typically 130 F)**

Standard on Arrangements B and D. Utilized on these arrangements as a reverse airflow switch.

## **Supply Air Mounted (setpoint typically 150 F)**

## **Freezestat**

The unit shall be provided with a freezestat (0-100 F) with the sensing bulb located in the discharge air stream. Wired as an interlock to prevent cold air discharge.

## **Orifices for Elevations over 2000 feet**

### **12" Evaporative Media (Arrangement D only)**

12" media shall be provided for the evaporative cooler.

### **409 Stainless Steel Furnace Drip Pan**

Replaces the standard aluminized steel furnace drain pan.

## **Double Wall Construction**

The construction will consist of a 24-gauge inner liner wall with 1-inch 1½ lb. density insulation. Access doors on the specified side will be hinged and of the same double wall design. Double wall is not available on the applicable evaporative cooler and furnace sections. Double wall construction will be provided by the manufacturer on applicable filter/damper, blower, coil and plenum cabinets.

## **Clogged Filter Switch**

A clogged filter pressure switch with adjustable operating range and normally open switch shall be installed to sense increased suction pressure by the blower due to filter obstruction. A provision for remote indication shall be provided by a terminal block connection points. Includes a status lamp mounted in the electrical cabinet.

## **Horizontal Return**

The unit shall be supplied with the return air opening at or under the outside air opening location depending on the air inlet configuration.

## **Continuous Fan Relay – 24V Coil DPDT 10A**

A relay is provided with 24 volt coil and double-pole, double-throw 10 amp contacts. It plugs into the main connection PC board in the electrical cabinet. Included as standard on Arrangements D and E. May also be utilized as an exhaust fan interlock.

## **Interlock Relay – 24/115V Coil SPDT 10A**

This relay has a selectable coil voltage of 24 or 115 volts and single-pole, double-throw 10 amp contacts with an LED on the indicator lamp. The relay is utilized as an auxiliary relay.

## **Interlock Relay – 24/115-230V Coil DPDT 10A**

This relay has a selectable coil voltage of 24, 115 or 230 volts and double-pole, double-throw 10 amp contacts. Utilized as an auxiliary relay for general purpose duty.

## **High/Low Gas Pressure Limit Switches**

A high pressure and a low pressure interlock switch and shutoff valve shall be provided for each furnace section. High/low gas pressure limits disengage heating upon detecting either high line pressure or low manifold pressure.

# Mechanical Specifications

## Status Indicator Lamps (Elec Cabinet)

Status indicator lamps shall include power on, blower on and one lamp per stage of heat mounted in the electrical cabinet.

## Ambient Lockout

## Airflow Proving Switch

## Hinged Service Access Doors

Optional hinged doors are mounted to the access side of the standard blower/filter/damper cabinet and high CFM filter/damper and blower cabinets in lieu of the standard removable access doors. The hinged doors include dual quick opening tool-less latches and full perimeter gasketing to assure a water tight seal and door stops to guard against closure while open. The remaining Duct Furnace(s), supply plenum cabinets (if applicable) are supplied with a standard removable door. The coil cabinet door utilizes a special removable vertical split door allowing for coil access and unit penetration for coil connections.

## FIELD INSTALLED ACCESSORIES

### Manual Reset High Limit Switch

The unit shall be provided with a manual reset, high-limit switch wired in series to the lead furnace high limit. If the setpoint is reached, the gas valve will close and the blower will continue to run until the sensed temperature is below the set point.

### Flue Vent Fan

The flue vent fan provides power venting. It is provided with all fixtures for field mounting and wiring. The flue vent fan is activated in response to a single-stage thermostat. A centrifugal switch in the flue vent fan in turn activates the automatic electric gas valve. (One flue vent fan required per furnace.)

### High Gas Line Pressure Regulator

Reduces main gas line pressure to a minimum of 7 inches WC. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

### Remote Control Station

Wall mounted. Provides six LED status lamps with System On/Off, Fan Auto/On, Heat Auto/Off, Cool Auto/Off, Auxiliary On/Off switching and Modulating damper potentiometer mounting. Designed for easy installation with plug-in terminal block wiring and wall mounting bracket. (Auxiliary On/Off may be used with the Evaporative Cooler fill and drain kit.)

### 7-Day Timeclock

Provides single-pole, double-throw (SPDT) relay output at setpoint time with a maximum six setpoints per day.

### 24-Hour Timeclock

Provides single-pole, double-throw (SPDT) relay output at setting time with a maximum 12 setpoints per day.

## Disconnect Switch

### 115V Convenience Outlet

GFI (Ground Fault Convenience Outlet) is manual reset with a weatherproof enclosure.

### Fill and Drain Kit (Arrangement D only)

Includes a three-way valve and relay for automatic fill and drain for the evaporative coolers. Optional freezestat provides automatic shutoff and drain upon meeting outside air setpoint.

### Optional Filters

(One-inch permanent standard)

Two-inch Permanent

Two-inch Throwing

One-inch 30% Pleated Media

Two-inch 30% Pleated Media

### Thermostats

Low-voltage room thermostat, single-stage with fan auto-on-switch and system heat-off cool switch.

Low-voltage room thermostat, single-stage with a fan auto-on switch.

Low-voltage room thermostat, two-stage with a fan auto-on switch and system off-heat-auto-cool switch.

Low-voltage programmable room thermostat, two-stage with LCD display, fan auto-on switch and system off-heat-auto-cool switch.

A universal tamperproof guard for all room thermostats.

Low-voltage duct thermostat, single-stage.

Low-voltage duct stat, two-stage.

Room thermostat, electronic modulating control.

Duct thermostat, electronic modulating control.

Duct thermostat, electronic modulating control with override room thermostat.

# Mechanical Specifications

## High Efficiency Indoor Gas Duct Furnaces Arrangement A 50-80 (500-800 MBh)

### General

Units are completely factory assembled, piped, wired and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with four point suspension hangers. All units are available for operation on either natural or LP (propane) gas.

### Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifices. The pilot is also accessible through a side panel access plate. The high limit switch is accessible through a side panel access.

Duct discharge flanges for simple ductwork connection are provided.

### Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

### Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners are individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment. Air shutter adjustment is fixed.

### Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24-volt combination single-stage automatic gas valve, including main operating valve and pilot safety shutoff, pressure regulator, manual main and pilot shutoff valve, and adjustable pilot valve. Gas valve is suitable to a maximum inlet pressure of 0.5 psi (14-inch W.C.) on natural gas. A 24-volt control transformer and a high limit are provided.

All units are provided with a solid-state ignition control system which ignites the intermittent pilot by spark during each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. Pilot and burners are extinguished during the off cycle.

### Flue Vent Fan

The flue vent fan is factory assembled to a sealed flue collection chamber and provides power venting. The flue vent fan is activated in response to a low voltage (24V) single stage thermostat. A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

## FACTORY INSTALLED OPTIONS

### Control Options (Per Furnace)

#### Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (40% of the unit's full rated input). Requires the use of an optional two-stage thermostat.

#### Hydraulic Modulating Gas Valve

Provides modulated heat output. Ignition is at low fire (40% of the unit's full rated input) and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

#### Hydraulic Modulating Gas Valve with Bypass

Provides modulated heat output. Ignition is at low fire (40% of the unit's full rated input) and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing, allowing full fire. Requires the use of an optional thermostat to control the electric valve.

#### Electronic Modulating - Room or Duct Stat Control

Provides modulated heat output. An automatic valve in series with the modulating valve shall be provided to cycle the unit. Ignition is at full fire (100% input) and modulates the gas input from 100% to 40% rated input.

Available for use with a room thermostat or duct thermostat with remote set point adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat's set point.

# Mechanical Specifications

## **Electric Modulating - 4-20 mA or 0-10 VDC Input**

Provides modulated heat output. Ignition is at full fire (100% input) and modulates the gas input from 100% to 40% rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control. When "furnace one only" is specified on double and triple furnaces, additional furnace sections will have single-stage on-off control.

## **Discharge Air Control with Outside Air Reset**

The unit is provided with a factory-mounted discharge air controller, discharge air sensor, outdoor air reset, summer/winter thermostat and velocity pressure switch. The outdoor air reset range is from 10 F to 60 F. Full reset occurs at 10 F outside air temperature. There is a straight line relationship between outside air temperature and reset. Therefore, at 60 F outside air temperature, no reset will occur. The amount of reset is adjustable from 20 F to 50 F.

A discharge air controller provides a two-minute delay between successive on and off stages. A summer/winter thermostat locks out heating when the outside air temperature is above 55 F. The velocity pressure switch is provided for protection against high temperatures at low airflow's.

Available in three-stage (33% of the unit's full rated input) and four-stage (25% of the unit's full rated input).

## **S-350 Modular Electronic Control System**

The basic system utilizes a controller module with discharge air sensor, setpoint and one-stage output, a stage module with differential setpoint and one-stage output and a display module with LCD display for temperature readout. The system stages the unit's rate of fire based upon sensed discharge air temperature, setpoint setting and differential setting between stages.

Provide as a three and four-stage (double and triple furnaces only) and six-stage (triple furnace only).

## **Heat Exchanger Options**

### **Type 409 Stainless Steel**

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be aluminized steel. 409 stainless steel is recommended when outside air is used for make-up air in areas where outside temperatures are 40 F or below

### **Type 409 Stainless Steel Package**

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be 409 stainless steel. 409 stainless steel is recommended where outside air is used for make-up air in areas where temperatures are 40 F or below.

### **Type 321 Stainless Steel**

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. Burners and flue collector shall be aluminized steel.

### **Type 321 Stainless Steel Package**

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. The burners and flue collector shall be 409 stainless steel.

### **Fan Time Delay Relay**

The fan time delay relay minimizes cold blasts of air on start-up. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

### **Orifices for Elevations over 2000 Feet**

### **Freezestat with Time Delay**

The unit shall be provided with a freezestat (0-100 F) with the sensing bulb located in the discharge air stream. Wired as an interlock to prevent cold air discharge.

### **Firestat**

If the temperature reaches the setpoint, the unit will close all gas valves, return the dampers to their normal position and shut down the blower. Automatic reset.

### **Supply Air Mounted (setpoint typically 150 F)**

## **Manual Blower Switch**

### **409 Stainless Steel Furnace Drip Pan**

### **Clogged Filter Switch**

A clogged filter pressure switch with adjustable operating range and normally open switch shall be installed to sense increased suction pressure by the blower due to filter obstruction. A provision for remote indication shall be provided by a terminal block connection points. Includes a status lamp mounted in the electrical cabinet.

### **Continuous Fan Relay (Interlock Relay - 24V Coil DPDT 10A**

A relay is provided with 24 volt coil and double-pole, double-throw 10 amp contacts. It plugs into the main connection PC board in the electrical cabinet. May also be used as an exhaust fan interlock.

### **Interlock Relay - 24/115V coil SPDT 10A**

This relay has a selectable coil voltage of 24 or 115 volts and single-pole, double-throw 10 amp contacts with an LED on the indicator lamp. The relay is utilized as an auxiliary relay.

### **Interlock Relay - 24/115-230V Coil DPDT 10A**

This relay has a selectable coil voltage of 24, 115 or 230 volts and double-pole, double-throw 10 amp contacts. Utilized as an auxiliary relay for general purpose duty.

### **High/Low Gas Pressure Limit Switches**

A high pressure and a low pressure interlock switch and shutoff valve shall be provided for each furnace section. High/low gas pressure limits disengage heating upon detecting either high line pressure or low manifold pressure.

### **Status Indicator Lamps (Electrical Cabinet)**

Status indicator lamps shall include power on, blower on and one lamp per stage of heat mounted in the electrical cabinet.

### **Airflow Proving Switch**

### **Ambient Lockout**



# Mechanical Specifications

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## FIELD INSTALLED ACCESSORIES

### Manual Reset High Limit Switch

The unit shall be provided with a manual reset, high-limit switch wired in series to the lead furnace high limit. If the setpoint is reached, the gas valve will close and the blower will continue to run until the sensed temperature is below the set point.

### High Gas Line Pressure Regulator

Reduces main gas line pressure to a minimum of 7 inches WC. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

### Remote Control Station

Wall mounted. Provides six LED status lamps with System On/Off, Fan Auto/On, Heat Auto/Off, Cool Auto/Off, Auxiliary On/Off switching and modulating damper potentiometer mounting. Designed for easy installation with plug-in terminal block wiring and wall mounting bracket.

### 7-Day Timeclock

Provides single-pole, double-throw (SPDT) relay output at setpoint time with a maximum six setpoints per day.

### 24-Hour Timeclock

Provides single-pole, double-throw (SPDT) relay output at setting time with a maximum 12 setpoints per day.

### Disconnect Switch

#### 115V Convenience Outlet

GFI - Ground Fault Convenience Outlet is manual reset with weatherproof enclosure - requires separate 115V power source.

## Thermostats

Low-voltage room thermostat, single-stage with fan auto-on-switch and system heat-off cool switch.

Low-voltage room thermostat, single-stage with a fan auto-on switch.

Low-voltage room thermostat, two-stage with a fan auto-on switch and system off-heat-auto-cool switch.

Low-voltage programmable room thermostat, two-stage with LCD display, fan auto-on switch and system-off-heat-auto-cool switch.

A universal tamperproof guard for all room thermostats

Low-voltage duct thermostat, single-stage.

Low-voltage duct thermostat, two-stage.

Room thermostat, electronic modulating control.

Duct thermostat, electronic modulating control.

Duct thermostat, electronic modulating control with override room thermostat.

# Mechanical Specifications

## High Efficiency Indoor Make-Up Air Handler Arrangement B, D, G, K

### General

Units shall be completely factory assembled, piped, wired and test fired. All units shall contain duct furnaces that are AGA and CGA certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with four-point suspension hangers and shall be available for operation on either natural or LP (propane) gas.

The firing rate of each furnace will not exceed 400 MBh and shall contain its own heat exchanger, flue collector, venting, burners, safety and ignition controls.

All units shall be in compliance with FM (Factory Mutual) requirements.

### Electrical

Standard control relays shall be socket mounted with terminal block connections. All control wiring shall terminate at terminal strips (single-point connection) and include an identifying marker corresponding to the wiring diagram

Motor and control wiring shall be harnessed with terminal block connections.

### Casing

Casings shall be die-formed, 18-gauge galvanized steel and finished in air-dry enamel. Service and access panels shall be provided through easily removable side access panels with captive fasteners. Fan sections and supply plenums (when provided) shall be insulated with fire-resistant, odorless, matte-faced, one-inch glass fiber material.

### Heat Exchanger

Standard heat exchanger construction shall consist of 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

### Burners

Burners shall be die-formed, corrosion resistant aluminized steel, with stamped porting and stainless steel port protectors. Port protectors prevent foreign matter from obstructing the burner ports. Burners are individually removable for ease of inspection and servicing. The entire burner assembly is

easily removed with its slide-out drawer design. The pilot shall be accessible through an access plate without removing the burner drawer assembly.

### Evaporative Cooler (Standard on Arrangement D only)

An evaporative cooler with eight-inch media shall be provided. The evaporative cooler shall be of a self-cleaning design with a stainless steel water tank, regulated water flow and overflow protection. The cooler shall have a cabinet assembly of heavy-gauge aluminized steel with weatherproof finish, a UL recognized thermally protected, sealed recirculating pump motor, two-inch distribution pad, and corrosion resistant PVC water distribution tubes.

### Coil Section (Standard on Arrangement K only)

A cooling coil section, constructed of galvanized steel, shall be provided with the unit.

### Fans

The centrifugal fan shall be belt driven, forward curved, with double inlet statically and dynamically balanced. The blower wheel shall be fixed on a keyed shaft, supported with rubber grommet on bearing only and ball bearing secured. 7 1/2 through 15 hp motors do not have the rubber grommets and are equipped with a pillow block bearing assembly on the drive side.

An access interlock switch shall be installed in the blower compartment and will disengage the blower upon removing the service panel. An override shall be incorporated into the access interlock switch for serviceability.

### Filters (Standard on Arrangement B,D only)

The filter rack shall be constructed of galvanized steel with access through the side service panel. Standard filters are one-inch permanent washable type.

### Filters (Standard on Arrangement G, K only)

The filter rack shall be of v-bank design for minimal pressure drop and constructed of galvanized steel with access through the side service panel. Standard filters are one-inch permanent washable type.

### Electrical Cabinet

The electrical cabinet shall be isolated from the air stream with a non-removable access panel interior to the outer service panel. There is a provision in this cabinet for component mounting, wire routing and high-voltage isolation.

Motor and control wiring shall be harnessed with terminal block connections.

### Controls

Standard units shall be provided with 24 volt combination single-stage automatic gas valves, including main operating valve and pilot safety shutoff, pressure regulator, manual main and pilot shutoff valve, and adjustable pilot valve. Gas valves shall be suitable for NEC Class 2 use for a maximum inlet gas pressure of 0.5 psi (14" WC) on natural gas. All rooftop units shall be provided with a low voltage circuit breaker rated for 150% of the units normal 24 volt operating load.

Each duct furnace shall be provided with a 24 volt high temperature limit switch, a (redundant) combination gas valve and a fan time delay relay. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger. Double and triple furnace units shall contain a reverse airflow interlock switch. The normally closed switch, when activated, shall cause gas valves to close and continue blower operation.

All units are provided with a solid-state ignition control system which ignites the intermittent pilot by spark during each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. The pilot and burners are extinguished during the off cycle.

### Flue Vent Fan

The flue vent fan is factory assembled to a sealed flue collection chamber and provides power venting. The flue vent fan is activated in response to a low voltage (24 volt) single stage thermostat. A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

# Mechanical Specifications

## FACTORY INSTALLED OPTIONS

### Control Options (Per Furnace)

#### Two-Stage Gas Valve

Provides two stages of heat. Ignition is at low fire (one half of the unit's full rated input). Requires the use of an optional two-stage thermostat.

#### Hydraulic Modulating Gas Valve

Provides modulated heat output. Ignition is at low fire (one half of the unit's full rated input), and a discharge air temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit in response to an optional low voltage single-stage thermostat.

#### Hydraulic Modulating Gas Valve with Bypass

Provides modulated heat output. Ignition is at low fire (one half of the unit's full rated input), and a discharge temperature sensing bulb located in the air stream shall modulate the gas input from 40% to 100% rated input. Provided with an automatic electric valve in series with the hydraulic valve which cycles the unit. An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing bulb, allowing full fire. Requires the use of an optional thermostat to control the electric valve.

#### Electronic Modulating - Room or Duct Stat Control

Provides modulated heat output. An automatic valve in series with the modulating valve shall be provided to cycle the unit. Ignition is at full fire (100% input), and modulates the gas input from 100% to 40% rated input.

Available for use with a room thermostat or duct thermostat with remote setpoint adjustment. A duct thermostat is available with an optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat's setpoint.

#### Electronic Modulating - 4-20 mA/ 0-10 VDC input

Provides modulated heat output. Ignition is at full fire (100% input) and modulates the gas input from 100% to 40% rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

When "furnace one only" is specified on double and triple furnaces, additional furnace sections will have single-stage on-off control.

#### Discharge Air Control with Outside Air Reset

The unit is provided with a factory-mounted discharge air controller, discharge air sensor, outdoor air reset, summer/winter thermostat and velocity pressure switch. The outdoor air reset range is from 10 F to 60 F. Full reset occurs at 10 F outside air temperature. There is a straight line relationship between outside air temperature and reset. Therefore, at 60 F outside air temperature, no reset will occur. The amount of reset is adjustable from 20 F to 50 F.

The discharge air controller provides a two-minute delay between successive on and off stages. A summer/winter thermostat locks out heating when the outside air temperature is above 55 F. The velocity pressure switch is provided for protection against high temperatures at low airflows.

Available in two-stage (half of the unit's full rated input – single furnace units only), three-stage (33% of the unit's full rated input) and four-stage (25% of the unit's full rated input). Three and four-stage available on double and triple furnace units only.

#### S-350 Modular Electronic Control System

The basic system utilizes a controller module with a discharge air sensor, setpoint and one-stage output, a stage module with differential setpoint and one-stage output and a display module with LCD display for temperature readout. The system stages the unit's rate of fire based upon sensed discharge air temperature, setpoint setting and differential setting between stages.

Provided as a two-stage (all furnaces), three and four-stage (double and triple furnaces only) and six-stage (triple furnace only).

## Heat Exchanger Options

### Type 409 Stainless Steel (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be aluminized steel. 409 stainless steel is recommended when outside air is used for make-up air in areas where outside temperatures are 40 F or below.

### Type 409 Stainless Steel Package (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 409 stainless steel. The burners and flue collector shall be 409 Stainless Steel. 409 stainless steel is recommended where outside air is used for make-up air in areas where outside temperatures are 40 F or below.

### Type 321 Stainless Steel (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. The burners and flue collector shall be aluminized steel.

### Type 321 Stainless Steel Package (one or all furnaces)

Heat exchanger tubes and headers shall be 20-gauge type 321 stainless steel. The burners and flue collector shall be 409 stainless steel.

## Motors - General

All motors shall be ball bearing type with resilient base mount. Windings are Class "B", 1800 rpm with service factors of  $\frac{1}{2}$  -  $\frac{3}{4}$  hp = 1.25 and 1 - 5 hp = 1.15.

### Single-speed Open Drip-proof 60 HZ/1800 RPM

Single-Phase (with contactor) —  
Optional 115V, 208V and 230V motors available in  $\frac{1}{2}$  - 2 hp models.

Three-Phase (with contactor) —  
Optional 208V, 230V and 460V motors available in  $\frac{1}{2}$  - 5 hp models.

Single-Phase (with magnetic starter) —  
Optional 115V, 208V and 230V motors available in  $\frac{1}{2}$  - 3 hp models.

Three-Phase (with magnetic starter) —  
Optional 208V, 230V, 460V and 575V motors available in  $\frac{1}{2}$  - 5 hp models.

# Mechanical Specifications

## **Single-Speed TEFC 60 HZ/1800 RPM**

Single-Phase (with contactor) —  
Optional 115V, 208V and 230V motors  
available in 1/2 - 1 1/2 hp models.

Single-Phase (with magnetic starter) —  
Optional 115V, 208V and 230V motors  
available in 1/2 - 3 hp models.

Three-Phase (with magnetic starter) —  
Optional 208V, 230V, 460V and 575V  
motors available in 1/2 - 5 hp models.

## **Single-Speed High Efficiency ODP 60 HZ/1800 RPM**

Single-Phase (with contactor) —  
Optional 115V and 230V motors  
available in 1/2 - 1 hp models. Optional  
208V motors available in 1/2 - 3/4 hp  
models.

Single-Phase (with magnetic starter) —  
Optional 115V and 230V motors  
available in 1/2 - 2 hp models. Optional  
208V motors available in 1/2 - 3/4 hp  
models.

Three-Phase (with magnetic starter) —  
Optional 208V, 230V and 460V motors  
available in 1/2 - 5 hp models. Optional  
575V motors available in 1 - 5 hp  
models.

## **Single-Speed High Efficiency TEFC 60 HZ/1800 Rpm**

Single-Phase (with contactor) - Optional  
115V and 230V motors available in  
1/2 - 1 1/2 hp models.

Single-Phase (with magnetic starter) -  
Optional 115V and 230V motors  
available in 1/2 - 2 hp models.

Three-Phase (with magnetic starter) -  
Optional 230V and 460V motors  
available in 1/2 - 5 hp models. Optional  
208V and 575V available in 1 - 5 hp  
models.

## **Two-Speed/One Winding Motors (Three Phase Only) 60 HZ/1800/900 RPM**

Three-Phase (with magnetic starter) -  
Optional 208V, 230V and 460V motors  
available in 1 - 5 hp models.

## **Two-Speed/Two Winding Motors 60 HZ/1800/1200 RPM**

Single-Phase (with magnetic starter) -  
Optional 115V and 230V motors  
available in 1/2 - 1 hp models. Optional  
208V motors available in 3/4 - 1 hp  
models.

Three-Phase (with magnetic starter) -  
Optional 208V and 230V motors  
available in 1/2 - 5 hp models. Optional  
460V motors available in 1/2 - 3 hp  
models.

## **Manual Blower Switch**

Manual blower switch shall be factory  
installed in the electrical cabinet.

## **DX or Chilled Water Cooling Coils**

A direct expansion (DX) or chilled water  
coil certified by ARI shall be provided  
with the unit (available on  
Arrangement K only).

## **Damper Options**

Dampers shall be of the opposed blade  
type, constructed of galvanized steel  
with neoprene nylon bushings, blades  
to be mechanically interlocked.

Optional low leak dampers shall be of  
the opposed blade type, construction  
of galvanized steel with neoprene  
nylon bushings and vinyl blade edge  
seals, blades to be mechanically  
interlocked.

## **Outside Air or Return Air/2 pos. Motor/ SR**

Units with outside air or return air only  
shall be provided with a damper, two-  
position spring return damper motor  
and controls. The motor shall power  
the damper fully open when the unit is  
on and fully closed when the unit is off.

## **OA/RA 2 pos SR**

A two-position spring return motor  
with interlocked outside and return air  
dampers shall be provided. The motor  
shall power either the outside air  
damper fully open and the return air  
damper fully closed or the outside air  
damper fully closed and the return air  
damper fully open in response to an  
outside air temperature sensor. When  
the unit is off, the motor will drive the  
outside air damper fully closed and the  
return air damper fully open.

## **OA/RA Mod Mtr. with Mixed Air Control/Min. Pot/Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall be  
provided. The motor shall modulate the  
position of the outside and return air  
dampers in response to a thermostatic  
controller located in the mixed air  
stream. Units shall also be provided  
with a minimum position  
potentiometer for minimum outside air  
damper position.

The spring return feature drives the  
outside air damper fully closed and the  
return air damper fully open when the  
unit is off.

## **OA/RA Mod Mtr. with Mixed Air Control/Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall be  
provided. The motor shall modulate the  
position of the outside and return air  
dampers in response to a thermostatic  
controller located in the mixed air  
stream.

The spring return feature drives the  
outside air damper fully closed and the  
return air damper fully open when the  
unit is off.

## **OA/RA Mod Mtr with Min Pot/ Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall be  
provided. The motor shall position the  
outside and return air dampers in  
response to a manually set  
potentiometer.

The spring return feature drives the  
outside air damper fully closed and the  
return air damper fully open when the  
unit is off.

## **OA/RA Mod Mtr with Dry Bulb/Mixed Air Control/Min Pot/Spring Return**

A modulating motor with interlocked  
outside and return air dampers shall be  
provided. The motor shall modulate the  
position of the outside and return air  
dampers in response to a thermostatic  
controller and dry bulb thermostat  
located in the mixed air stream. Units  
shall also be provided with a minimum  
position potentiometer for minimum  
outside air damper position.

The spring return feature drives the  
outside air damper fully open and the  
return air damper fully closed when the  
unit is off.

## **OA/RA Mod Mtr with Enthalpy Controlled Economizer/SR**

A modulating motor with spring return  
and interlocked outside and return air  
dampers shall be provided. The motor  
shall modulate the position of the  
outside and return air dampers in  
response to an enthalpy controlled  
economizer. When the unit is off, the  
motor will drive the outside air damper  
fully closed and the return air damper  
fully open.

# Mechanical Specifications

## **OA/RA Mod Mtr with Space Pressure Controller**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a pressure sensor located in the building. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **OA/RA Mod Mtr with S-350P Proportional Mixed Air Control/SR**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a solid-state mixed air sensor and S-350 proportional controller. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **OA/RA Mtr. with External 4-20 mA or 0-10VDC Analog Input/Spring Return**

A modulating motor interlocked with outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a 4-10 mA or 0-10VDC signal supplied by an external DDC controller.

The spring return feature drives the outside air damper fully closed and the return air damper fully open when the unit is shut down.

## **ASHRAE Cycle I (OA/RA 2 pos with Warm-up Stat/SR)**

A two-position spring return motor with interlocked outside and return air dampers shall be provided. The motor shall power the outside air damper fully open after a warm-up period determined by a minimum supply air temperature sensor when the unit is on, and fully closed when the unit is off.

## **ASHRAE Cycle II (OA/RA Mod with Warm-up Stat/Mixed Air/Min Pot/ Spring Return)**

A modulating motor with interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream after a warm-up period

determined by a minimum supply air temperature sensor. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position. When the unit is off, the motor will drive the outside air damper full closed and the return air damper full open.

## **ASHRAE Cycle III (OA/RA Mod. with Warm-up Stat/Mixed Air/SR)**

A modulating motor with spring return and interlocked outside and return air dampers shall be provided. The motor shall modulate the position of the outside and return air dampers in response to a thermostatic controller located in the mixed air stream after a warm-up period determined by a minimum supply air temperature sensor. Units shall also be provided with a minimum position potentiometer for minimum outside air damper position. When the unit is off, the motor will drive the outside air damper fully closed and the return air damper fully open.

## **Manual Dampers**

Units with outside air and return air shall be provided with manually set outside and return air dampers.

## **Firestat**

If the temperature reaches the setpoint, the unit will close all gas valves, return the dampers to their normal position and shut down the blower. Automatic reset.

## **Return Air Mounted (setpoint typically 130 F)**

Standard on Arrangement B and D. Utilized on these arrangements as a reverse airflow switch.

## **Supply Air Mounted (setpoint typically 150 F)**

## **Freezestat**

The rooftop unit shall be provided with a freezestat (0-100 F) with the sensing bulb located in the discharge air stream. Wired as an interlock to prevent cold air discharge.

## **Orifices for Elevations over 2000 Feet**

### **12" Evaporative Media (Arrangement D only)**

12" media shall be provided for the evaporative cooler.

### **409 Stainless Steel Furnace Drip Pan**

Replaces the standard aluminized steel furnace drip pan.

## **Double Wall Construction**

The construction will consist of a 24-gauge inner liner wall with 1-inch 1/2 lb. density insulation. Access doors on the specified side will be hinged and of the same double wall design. Double wall is not available on the applicable evaporative cooler and furnace sections. Double wall construction will be provided by the manufacturer on applicable filter/damper, blower, coil and plenum cabinets.

## **Clogged Filter Switch**

A clogged filter pressure switch with adjustable operating range and normally open switch shall be installed to sense increased suction pressure by the blower due to filter obstruction. A provision for remote indication shall be provided by terminal block connection points. Includes a status lamp mounted in the electrical cabinet.

## **Horizontal Return**

The unit shall be supplied with the return air opening at or under the outside air opening location depending on the air inlet configuration.

## **Continuous Fan Relay - 24V Coil DPDT 10A**

This relay is provided with a 24 volt coil and double-pole, double-throw 10 amp contacts. It plugs into the main connection PC board in the electrical cabinet. Included as standard on Arrangement D and E. May also be utilized as an exhaust fan interlock.

## **Interlock Relay - 24/115V Coil SPDT 10A**

This relay has a selectable coil voltage of 24 or 115 volts and single-pole, double-throw 10 amp contacts with an LED on the indicator lamp. The relay is utilized as an auxiliary relay.

## **Interlock Relay - 24/115-230V Coil DPDT 10A**

This relay has a selectable coil voltage of 24, 115 or 230 volts and double-pole, double-throw 10 amp contacts. Utilized as an auxiliary relay for general purpose duty.

## **High/Low Gas Pressure Limit Switches**

A high pressure and a low pressure interlock switch and shutoff valve shall be provided for each furnace section. High/low gas pressure limits disengage heating upon detecting either high line pressure or low manifold pressure.

# Mechanical Specifications

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## **Status Indicator Lamps (Electrical Cabinet)**

Status indicator lamps shall include power on, blower on and one lamp per stage of heat mounted in the electrical cabinet.

## **Ambient Lockout**

## **Airflow Proving Switch**

## **Hinged Service Access Doors**

Optional hinged doors are mounted to the access side of the standard blower/filter/damper cabinet and high CFM filter/damper and blower cabinets in lieu of the standard removable access doors. The hinged doors include dual quick opening tool-less latches and full perimeter gasketing to assure a water tight seal and door stops to guard against closure while open. The remaining Duct Furnace(s), supply plenum cabinets (if applicable) are supplied with a standard removable door. The coil cabinet door utilizes a special removable vertical split door allowing for coil access and unit penetration for coil connections.

## **Field Installed Accessories**

## **Manual Reset High Limit Switch**

The unit shall be provided with a manual reset high limit switch wired in series to the lead furnace high limit. If the setpoint is reached, the gas valve will close and the blower will continue to run until the sensed temperature is below the setpoint.

## **High Gas Line Pressure Regulator**

Reduces main gas line pressure to a minimum of seven inches WC.

Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

## **Remote Control Station**

Wall mounted. Provides six LED status lamps with System On/Off, Fan Auto/On, Heat Auto/Off, Cool Auto/Off, Auxiliary On/Off switching and Modulating damper potentiometer mounting. Designed for easy installation with plug-in terminal block wiring and wall mounting bracket. (Auxiliary On/Off may be used with the Evaporative Cooler fill and drain kit)

## **7-Day Timeclock**

Provides single-pole, double-throw (SPDT) relay output at setpoint time with a maximum of six setpoints per day.

## **24-Hour Timeclock**

Provides single-pole, double-throw (SPDT) relay output at setting time with maximum 12 setpoints per day.

## **Disconnect Switch**

## **115V Convenience Outlet**

GFI (Ground Fault Convenience Outlet) is manual reset with a weatherproof enclosure.

## **Fill and Drain Kit**

Includes three-way valve and relay for automatic fill and drain for the evaporative coolers. Optional freeze stat provides automatic shutoff and drain upon meeting outside air setpoint.

## **Optional Filters**

(One-inch permanent standard)

Two-inch Permanent

Two-inch Throwaway

One-inch 30% Pleated Media

Two-inch 30% Pleated Media

## **Thermostats**

Low voltage room thermostat, single stage with fan auto-on-switch and system heat-off cool switch

Low voltage room thermostat, single stage with fan auto-on switch

Low voltage room thermostat, two stage with fan auto-on switch and system off-heat-auto-cool switch

Low voltage programmable room thermostat, two stage with LCD display, fan auto-on switch and system off-heat-auto-cool switch.

Universal tamperproof guard for all room thermostats

Low voltage duct thermostat, single stage

Low voltage duct stat, two stage

Room thermostat, electronic modulating control

Duct thermostat, electronic modulating control

Duct thermostat, electronic modulating control with override room thermostat





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