Product
Data

39T
Central Station Air-Handling Units

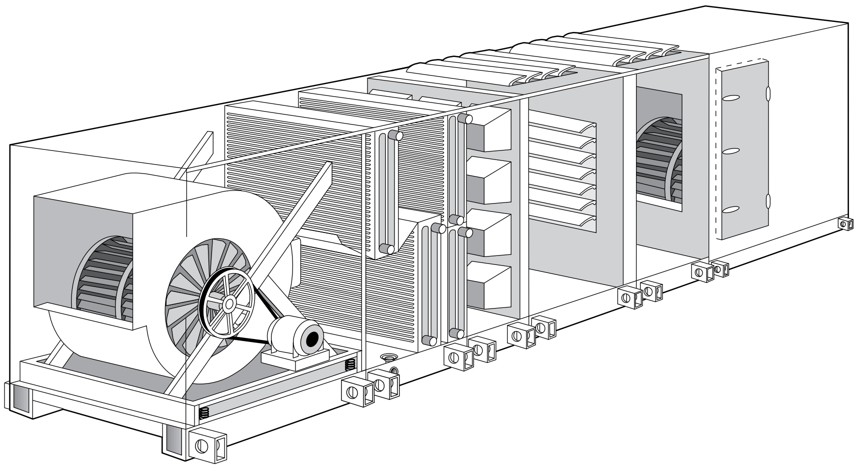
Nominal 3,500 to 46,000 Cfm

COMMERCIAL UNITARY SYSTEMS

Quality Assurance

Carrier Corporation
UL REGISTERED FIRM
ISO 9002 #A2260

Approvals:
ISO 9002
EN 29002
BS5750 PART 2
ANSI/ASQC Q92



Features/Benefits

- **Flanged and gasketed modular components — units are available as a single assembly up to 40 ft long, or shipped in sections**
- **Sloped stainless steel condensate drain pan complies with ASHRAE Standard 62**
- **Efficient design means 39T units require less space than competitive units**
- **Design versatility — flexible, compact units; forward-curved, airfoil, and plenum fan wheels**
- **Factory-installed, internally-mounted fan motors and drives operate in a clean environment to extend motor and belt life**
- **Available with single- or double-wall construction**
- **Manufactured at an ISO 9002 listed facility to guarantee quality**

Carrier can deliver the air handler components needed to suit your specification requirements. In addition to a wide choice of coil, fan, casing, and filter section arrangements, the 39T Series offers flexibility in installation and maintenance.

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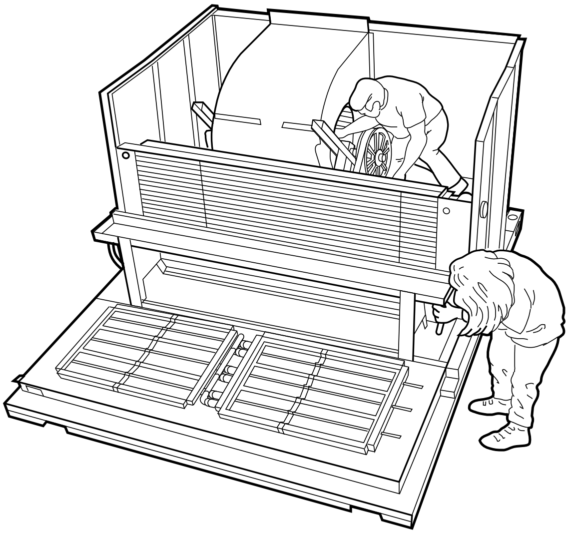
ARI certification

The Air-Conditioning and Refrigeration Institute (ARI) is a voluntary, nonprofit organization comprised of the manufacturers of air conditioning, refrigeration, and heating products. More than 90 percent of the air conditioning and refrigeration machinery and components manufactured in the United States is produced by members of ARI.

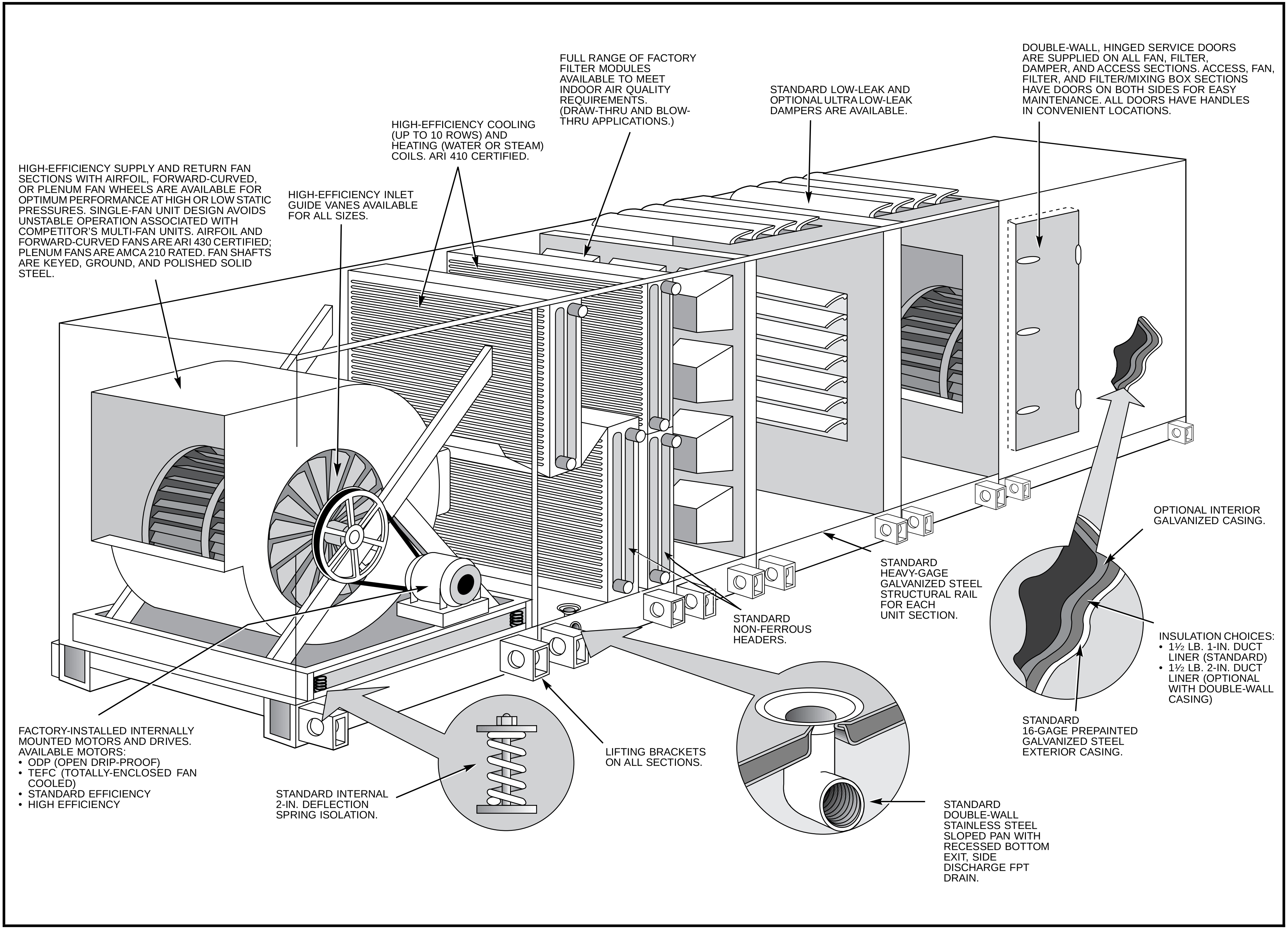
Carrier 39T Air-Handling Units are rated in accordance with ARI Standard 430, which is the industry standard for central station air-handling units. Certification by participating manufacturers of units within the scope of this program requires that the ratings and performance of any central station unit certified to ARI be established in accordance with the ARI Standard.

Coils installed in the Carrier 39T Air-Handling Units are rated in accordance with ARI Standard 410.

The ARI has not established standards for plenum fans.



39T AIR HANDLERS ARE BUILT USING STATE-OF-THE-ART MANUFACTURING TECHNIQUES


DOUBLE-WALL, HINGED SERVICE DOORS ARE SUPPLIED ON ALL FAN, FILTER, DAMPER, AND ACCESS SECTIONS. ACCESS, FAN, FILTER, AND FILTER/MIXING BOX SECTIONS HAVE DOORS ON BOTH SIDES FOR EASY MAINTENANCE. ALL DOORS HAVE HANDLES IN CONVENIENT LOCATIONS.
STANDARD LOW-LEAK AND OPTIONAL ULTRA LOW-LEAK DAMPERS ARE AVAILABLE.
FULL RANGE OF FACTORY FILTER MODULES AVAILABLE TO MEET INDOOR AIR QUALITY REQUIREMENTS. (DRAW-THRU AND BLOW-THRU APPLICATIONS.)
HIGH-EFFICIENCY COOLING (UP TO 10 ROWS) AND HEATING (WATER OR STEAM) COILS. ARI 410 CERTIFIED.
HIGH-EFFICIENCY INLET GUIDE VANES AVAILABLE FOR ALL SIZES.
HIGH-EFFICIENCY SUPPLY AND RETURN FAN SECTIONS WITH AIRFOIL, FORWARD-CURVED, OR PLENUM FAN WHEELS ARE AVAILABLE FOR OPTIMUM PERFORMANCE AT HIGH OR LOW STATIC PRESSURES. SINGLE-FAN UNIT DESIGN AVOIDS UNSTABLE OPERATION ASSOCIATED WITH COMPETITOR'S MULTI-FAN UNITS. AIRFOIL AND FORWARD-CURVED FANS ARE ARI 430 CERTIFIED; PLENUM FANS ARE AMCA 210 RATED. FAN SHAFTS ARE KEYED, GROUND, AND POLISHED SOLID STEEL.
OPTIONAL INTERIOR GALVANIZED CASING.
INSULATION CHOICES:
• 1½ LB. 1-IN. DUCT LINER (STANDARD)
• 1½ LB. 2-IN. DUCT LINER (OPTIONAL WITH DOUBLE-WALL CASING)
STANDARD 16-GAGE PREPAINTED GALVANIZED STEEL EXTERIOR CASING.
STANDARD HEAVY-GAGE GALVANIZED STEEL STRUCTURAL RAIL FOR EACH UNIT SECTION.
STANDARD NON-FERROUS HEADERS.
STANDARD DOUBLE-WALL STAINLESS STEEL SLOPED PAN WITH RECESSED BOTTOM EXIT, SIDE DISCHARGE FPT DRAIN.
LIFTING BRACKETS ON ALL SECTIONS.
STANDARD INTERNAL 2-IN. DEFLECTION SPRING ISOLATION.
FACTORY-INSTALLED INTERNALLY MOUNTED MOTORS AND DRIVES.
AVAILABLE MOTORS:
• ODP (OPEN DRIP-PROOF)
• TEFC (TOTALLY-ENCLOSED FAN COOLED)
• STANDARD EFFICIENCY
• HIGH EFFICIENCY

Engineered for durability and longevity

Casing withstands 5-in. wg negative and 9-in. wg positive total static pressure to easily meet your design conditions while maintaining structural integrity.

Panels of prepainted 16-gage galvanized steel and double-wall service doors will hold their shape through years of operation.

Gasketing between overlapping panels helps to ensure leak-free performance.

Internally-mounted motors and drives operate in a clean environment, giving longer life to motor and belts. Belts and drives are factory installed and aligned.

Factory balancing of fan wheel ensures smooth, trouble-free operation.

Double-wall coil drain pan with stainless steel liner provides positive condensate drainage and superior corrosion resistance. Complies with ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) Standard 62 for Indoor Air Quality.

Convenient installation

Flanges and gaskets on every section give maximum unit configuration flexibility and allow easy installation of separately-shipped or field-supplied sections.

The small footprint of the unit contributes to application and installation flexibility, ensuring economical use of building space. Accessibility is required from only one side of the unit, increasing location options. This may result in floor space savings of 20% over competitive units.

Shipping options add to the versatility of 39T units. You have the choice of single-piece shipment (unit up to 40 ft in length) or shipment in sections to meet your unit configuration and rigging needs.

Rugged steel lifting brackets assure safe rigging and placement of unit.

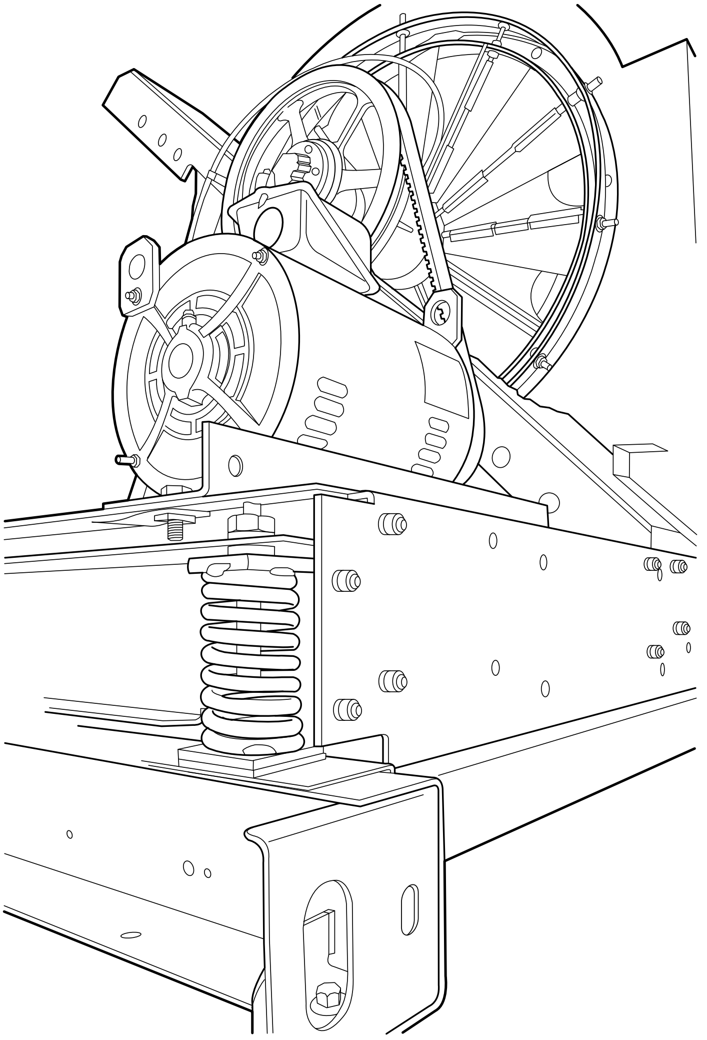
Internal isolation of the fan assembly reduces vibration and eliminates the need for isolation of unit at time of installation. Fan and motor bearings are mounted on a corrosion-resistant steel frame, which is isolated from the outer casing with factory-installed spring isolators and vibration-absorbent fan discharge seal.

Easy service and maintenance

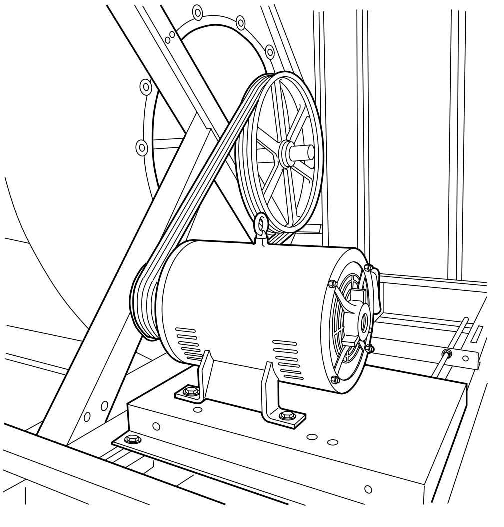
Doors on both sides of fan, filter, and access sections allow service and maintenance access from both sides of the unit and provide greater unit placement flexibility.

Access section with double-wall hinged door can be provided wherever you require it, for convenient cleaning and maintenance of the unit.

Slide-out coils make servicing easy.



INTERNAL ISOLATION OF FAN ASSEMBLY



INTERNALLY-MOUNTED MOTORS AND DRIVES ON SOLID-STEEL SHAFTS

Optimum performance

High-efficiency airfoil, plenum, and forward-curved fans minimize air turbulence and avoid surging and unbalanced operation, thus cutting operating expenses.

Exclusive Carrier coil surface results in efficient heat transfer. Since less heating and cooling fluid are circulated, pumping costs are reduced.

Standard low-leak dampers in mixing box sections seal tightly. Optional ultra low-leak dampers are also available.

Inlet guide vanes maximize horsepower savings in VAV (variable air volume) applications by deflecting air toward the direction of fan rotation.

Pillow-block bearings are rated at 200,000 hours average life in 07-32 size airfoil fans and 07-39 size forward-curved fans. Bearings in plenum fans, 39-92 size airfoil fans, and 49-61 size forward-curved fans have 400,000 hour average life.

Minimum 1-in. thick, 1½-lb density fiberglass duct liner is securely fastened to casing for reliable performance. Optional 2-in. thick, 1½-lb density fiberglass duct liner is available with double-wall unit casing.

Casing construction options include galvanized steel double walls with 2-in. thick, 1½-lb density fiberglass insulation.

Provisions for indoor air quality requirements

Filtration flexibility includes flat, angle, or bag filter sections as required by your particular job.

Optional 20-gage galvanized steel liner keeps the airstream clean and provides a solid, washable surface that is easy to maintain.

Sloped coil drain pan with stainless steel liner removes condensate completely, eliminating build-up of stagnant water during shutdown periods. Keeps the air handler free of odors and bacteria. Stainless liner provides an easy-to-clean surface that resists corrosion.

Extensive coil selection

39T air handlers have a wide selection of coils to meet your application needs. All 39T coils have Carrier's high-performance coil surface; the coil tubes are mechanically expanded into the fins for improved fin bonding and peak thermal transfer. The coils have non-ferrous headers and galvanized-steel casings, and are available with right- or left-hand connections. Water coils have inlets at the bottom and outlets at the top, to ensure counterflow.

Chilled water coils — These coils have headers precisely sized to minimize water pressure loss. Chilled water coils are manufactured of ½-in. OD copper tubes with aluminum plate fins (8, 11, or 14 fins per in.). Copper fins are optional. Large and medium face area coils, as well as a bypass face area coil, are available in 4, 6, 8, or 10 rows. Steel coil connectors with male pipe thread are standard.

Direct expansion coils — The direct expansion coils offer design flexibility plus optimization of coil performance. Coils are available in large or medium face area, with 4, 6, or 8 rows. The tubes are of ½-in. OD copper with aluminum-plate fins, and 8, 11, or 14 fins per inch. Copper fins are available as an option. Choose from half, full, or double circuits. For full design flexibility, all direct expansion coils have at least 2 splits; you can match a coil with one or 2 compressors for independent refrigerant systems.

Hot water coils — The Carrier line of hot water (U-bend) coils is designed to provide heating capability for a complete range of applications, at a working pressure of 175 psig at 400 F. Hot water coils are offered in 1 or 2 rows, with fin spacings of 8, 11, or 14 fins per inch. Coils have aluminum plate fins with copper tubes; copper fins are optional. Hot water coils are available with large, medium, or bypass face areas.

Steam coils — The 39T inner distributing tube (IDT) steam coils are designed for a working pressure of 175 psig at 400 F. The plate-fin steam coil is available in one row, with 6, 9, or 12 aluminum fins per in., and one-in. OD copper tubes. (Optional copper fins are available.) Steam coils are available with medium or bypass face areas, and are sloped to drain condensate.

Steam coils are especially suited to applications where sub-freezing air enters the air-handling unit, or where uniformity of leaving-air temperature is required.

Electric heat coil — The 39T electric heat coils may be ordered for factory installation into the electric heat section, which is equipped with full-support slide tracks for easy installation or service. All electric heaters are suitable for both constant volume (CV) or VAV applications.

Components for customizing standard units

Face and bypass components with bypass cooling and heating coils — Four different component combinations provide controlled mixing of bypass air and conditioned air. These include bypass heating, bypass cooling, bypass heating/cooling, and bypass cooling/heating.

Blow-thru coil and damper components — These components are available for single-duct, dual-duct, and multizone applications requiring cooling only or both heating and cooling.

Diffuser component — If a final filter section will be installed downstream from the fan section, installing the diffuser between the two ensures that the airstream is fully distributed over the face of the filter bank.

Plenum (plug) fan with single-inlet airfoil wheel — This fan component can be used when the application demands duct placement flexibility in a draw-thru or blow-thru unit configuration. Plenum fans are available with several internal options, including standard or small wheel sizes, Class I or Class II (higher speeds) construction, inlet guide vanes, and extra safety features including inlet screens and wheel cages.

Optional air mixer — When installed immediately downstream from a mixing box or filter mixing box, the air mixer (AMX1) section blends air streams with different temperatures to within a range of 6° F. The AMX1 section prevents air stratification and ensures that exiting blended air has a uniform velocity. Blended air helps to prevent coil freeze-up and equalizes coil discharge temperatures.

Product Integrated Controls (PIC)

Carrier's proven direct digital controls are available for all sizes of the 39T air handler. Product Integrated Control function independently or as part of the Carrier Comfort Network (CCN). When used in conjunction with digital air volume (DAV) as part of a CCN, the PIC option provides a fully integrated variable air volume system for maintaining zone indoor air quality. Zone temperature, ventilation rate, humidity, and carbon dioxide levels can be regulated according to individual user-defined zone set points.

The controls are monitored and regulated from processors in a remotely-mounted control box. All controls are internally wired to a junction box in the unit's fan section. The junction box is then connected to the remote control box, which can be mounted in a convenient location.

Standard controls shipped with the PIC-equipped units include the following:

- Remote Control Box with Processor Module
- Supply Fan Status Switch (Airflow Switch)
- Supply Air Temperature Sensor
- Space Temperature Sensor
- Return Air Temperature Sensor
- Outdoor Air Temperature Sensor
- Low Temperature Thermostat

Optional sensors are also available in packages for basic CV and VAV units and units equipped with a field-or factory-supplied mixing box. These packages include some or all of the following controls, depending on the PIC option ordered:

- Filter Status Switch
- Mixing Box Damper Actuators
- Enthalpy Controls
- Mixed-Air Temperature Sensor
- Inlet Guide Vane Actuators (VAV Units)
- Outdoor Air Velocity Pressure Transducer
- Heat Interlock Relay
- High Pressure Switch
- Supply and Return Velocity Pressure Transducers
- Static Pressure Transducer

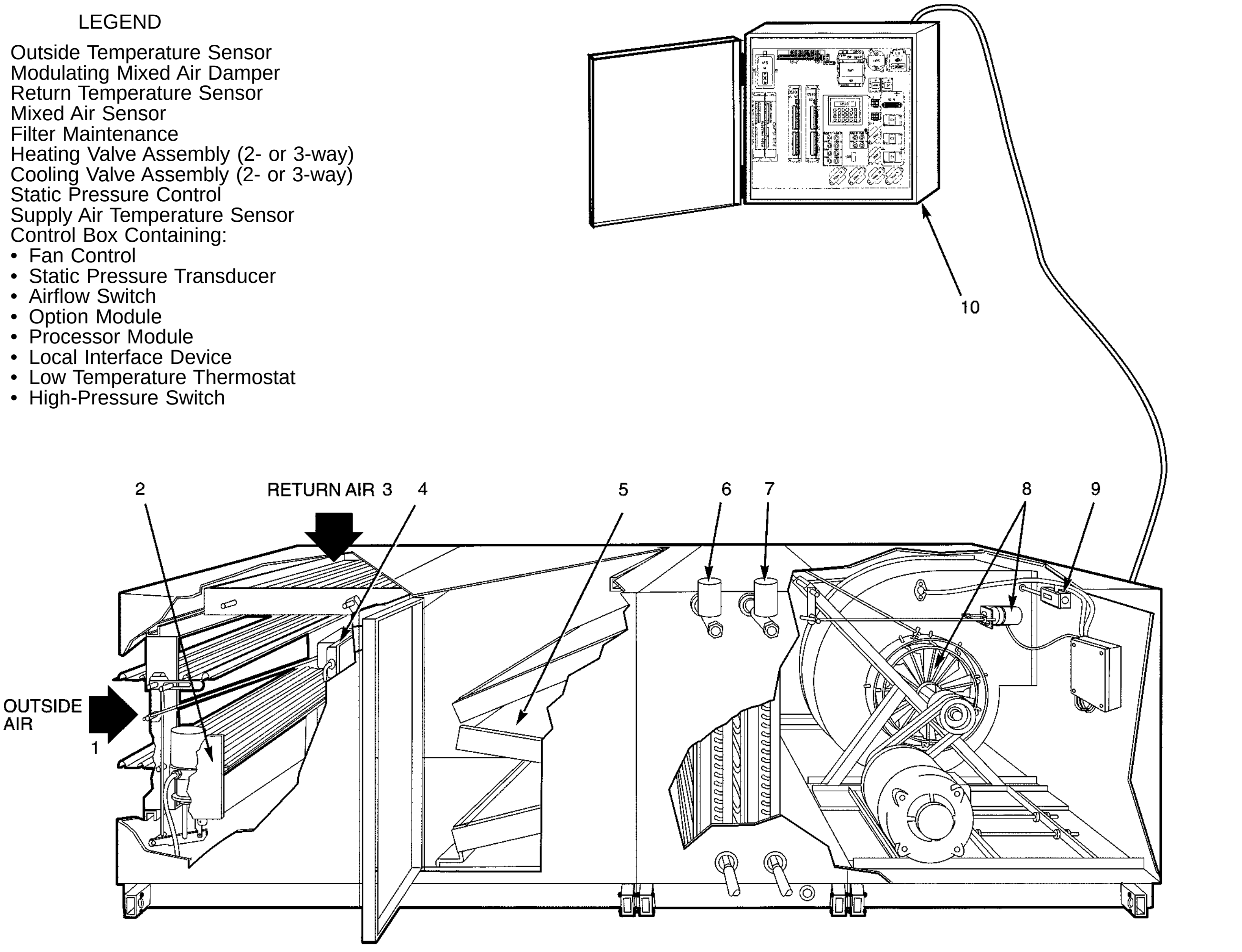
Accessory kits are also available for field installation and use with the PIC option. These include the following:

- DX Kit (contains relay module and outdoor air thermostat)
- Electric Heat Kit (contains relay module)
- Option Module (Slave Processor)
- HSIO (Local Interface Device)
- Water Valve Kit (for use with chilled and hot water coils)
- Damper Actuator Kit
- IAQ Sensor Kit (contains CO_2 Sensors)
- Humidity Sensor Kit (includes relative humidity sensor for duct and occupied space)
- Humidifier Package

The following sections give more detailed descriptions of some of the 39T PIC features and benefits.

LEGEND

1 — Outside Temperature Sensor
2 — Modulating Mixed Air Damper
3 — Return Temperature Sensor
4 — Mixed Air Sensor
5 — Filter Maintenance
6 — Heating Valve Assembly (2- or 3-way)
7 — Cooling Valve Assembly (2- or 3-way)
8 — Static Pressure Control
9 — Supply Air Temperature Sensor
10 — Control Box Containing:
- Fan Control
- Static Pressure Transducer
- Airflow Switch
- Option Module
- Processor Module
- Local Interface Device
- Low Temperature Thermostat
- High-Pressure Switch



Indoor air quality (IAQ) functions provide monitoring and control of temperature, ventilation rates, and building pressure.

Demand-controlled ventilation override can be provided using CO_2 or VOC (volatile organic compound) sensors. A differential comparison feature can be selected to ensure the quality of the outside air before it is brought into the building.

Night purge provides improved indoor air quality by removing airborne contaminants (that build up during the system's off cycle) just before occupancy.

In VAV systems, a constant supply of outside air can be provided as the supply air is modulated to meet load conditions.

Optional computer interface is provided for remote PIC configuration using a Building Supervisor.

Local interface device can be supplied for unit configuration. A keypad input device and alphanumeric display are supplied with some PIC options, or an accessory portable device can be used for one or several units.

Factory-mounted and tested actuators are available for dampers, fan inlet guide vanes, and water valves; all are controlled by the PIC control box.

Factory assembly and wiring of controls to junction box minimizes installation time.

Control options include differential enthalpy, electric heat staging, mixed-air low limit, humidification, dehumidification, fan tracking (VAV), smoke control, and filter maintenance.

Self-monitoring diagnostics provide an on-board check of overall unit operation including all control modules and sensors (inputs) and control devices (outputs).

Quick Test on-board software program allows service technicians to test all inputs and outputs of the PIC and to easily commission the unit.

Local and remote alarm monitoring can detect a wide variety of system conditions.

Occupied/unoccupied time of day scheduling is by an internal 365-day clock which provides 8 different time periods per week.

Holiday scheduling provides 18 user-defined holidays.

Hot water or steam heating coil control is available to raise return-air temperature on VAV units or room air temperature on CV units to occupied and unoccupied set points.

Electric heater control is available for up to 8 stages of electric heat.

Preheat coil control tempers cold outside air introduced by the mixing box. The control maintains the temperature of the air leaving the preheat coil to the user-defined set point by modulating a steam or hot water valve.

Chilled water cooling coil control lowers supply-air temperature (VAV) or room temperature (CV) to an occupied or unoccupied set point.

Direct-Expansion (DX) cooling coil control regulates up to 8 standard stages of DX cooling using a patented control algorithm. Maintains supply-air temperature (VAV) or room temperature (CV) to an occupied or unoccupied set point.

Fan tracking option maintains a constant airflow differential between supply and return fans in a VAV system as the supply fan is modulated.

Mixed air damper control controls the outside air, return air, and exhaust air dampers, maintaining the room temperature (CV) or supply-air temperature (VAV).

Nighttime free cooling starts the fan during the unoccupied hours to precool the space using outside air.

Adaptive optimal start/morning warmup ensures that the heating/cooling temperature set points are achieved at the time of occupancy. Morning warmup initiates a heat cycle with no outside air to efficiently preheat the space.

Adaptive optimal stop (constant volume applications) allows the occupied space temperature to drift to an extended occupied set point during the last portion of the occupied time period.

Duct static pressure control is achieved by modulating the inlet guide vanes (IGVs) or a fan motor speed controller in VAV applications. The IGVs have a ''spring return'' feature to automatically close in the event of power failure or fan shutdown.

Fan overpressurization safety switch protects supply duct from overpressurization on VAV units.

Two-level demand limiting can be enabled with load shed commands from the Carrier Comfort Network.

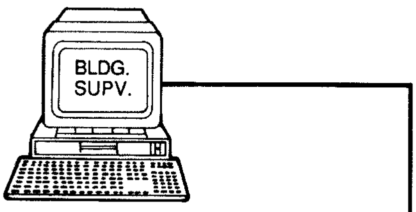
Unoccupied set point scheduling controls the space temperature to an unoccupied cooling and heating set point.

Heat interlock relay enables VAV units to open or close room terminals during periods of heating.

Smoke control option performs smoke evacuation, smoke purge, building pressurization, and fire shutdown functions.

Features/Benefits (cont)

Carrier Comfort Network (CCN)



The Carrier Comfort Network provides complete environmental systems for IAQ, temperature, and space control.

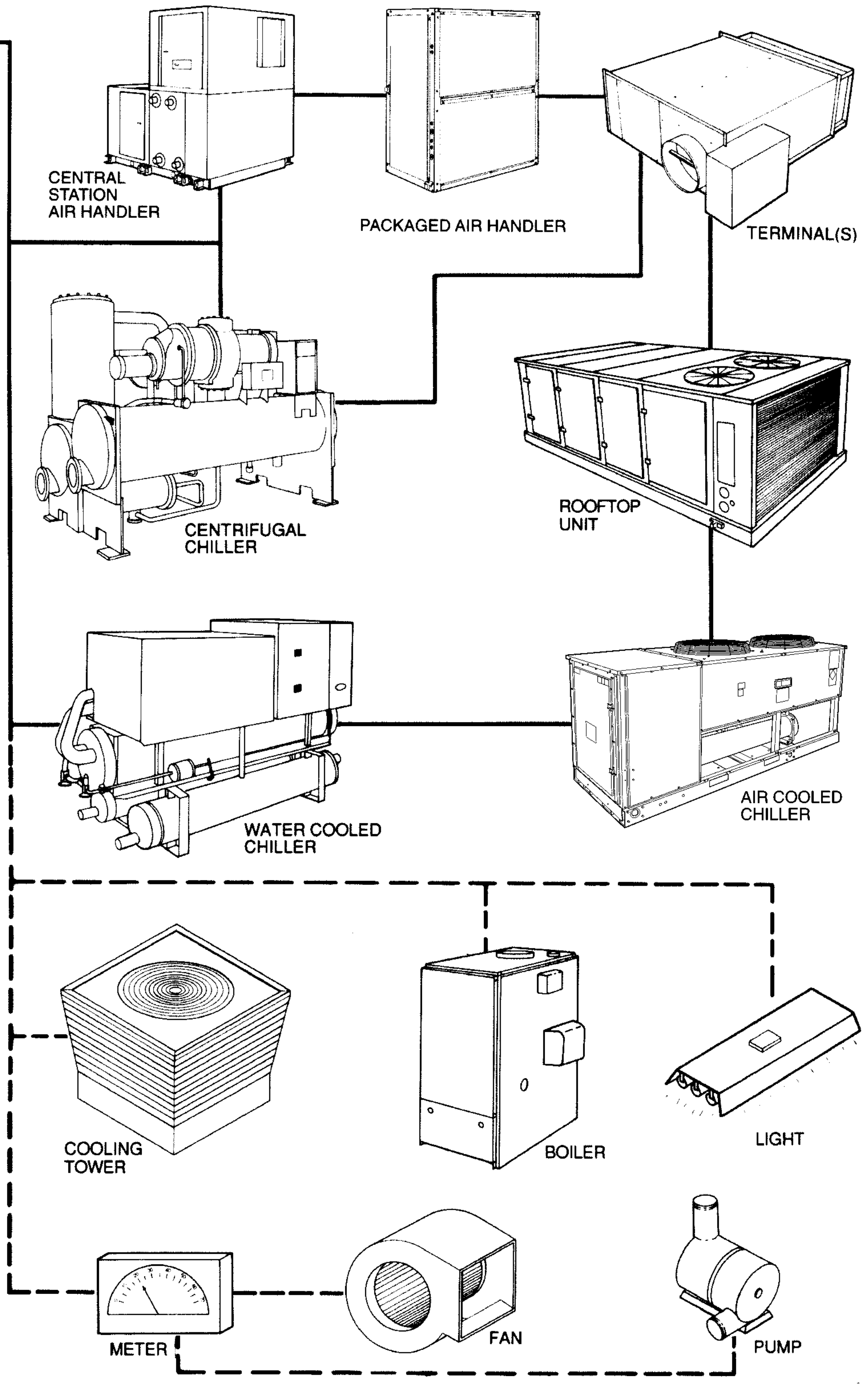
With the Carrier Comfort Network, you can manage and control your indoor environment.

Some of the Carrier products you can manage using the CCN:

- Building Supervisor
- Central Station Air Handlers
- Packaged Air Handlers
- Centrifugal Chillers
- Reciprocating Chillers (water- or air-cooled)
- Rooftop Units
- Terminals

You can also use the CCN to manage other products, including:

- Cooling Towers
- Metering Devices
- Boilers
- Pumps
- Fans
- Lighting Controls



——— Carrier Product Control
- - - - Non-Carrier Product Control

Component description

39TH (HORIZONTAL) AND 39TV (VERTICAL) UNIT COMPONENTS

COMPONENT	DESCRIPTION	UNIT SIZE AVAILABILITY
ACC1	Access (upstream location)	07-92
AFS3	Airfoil Fan, Horizontal Draw-Thru	07-92
AFS4	Airfoil Fan, Vertical Draw-Thru	07-92
AFS5	Airfoil Fan, Blow-Thru	07-92
ANG1	Angle Filter	07-92
BCF1	Bag/Cartridge Filter (upstream location, 2-in. prefilters)	07-92
EHS1	Electric Heating Coil	07-92
FCS3	Forward-Curved Fan (horizontal draw-thru)	07-61
FCS4	Forward-Curved Fan (vertical draw-thru)	07-61
FCS5	Forward-Curved Fan (blow-thru)	07-61
FLT1	Flat Filter	07-92
FMB1	Combination Filter Mixing Box (top and rear inlet, standard dampers)	07-92
FMB2	Combination Filter Mixing Box (bottom and rear inlet, standard dampers)	07-92
FMB3	Combination Filter Mixing Box (top and rear inlet, premium dampers)	07-92
FMB4	Combination Filter Mixing Box (bottom and rear inlet, premium dampers)	07-92
LCS1	Large Cooling Coil	07-92
MCS1	Medium Cooling Coil	07-92
MHS1	Medium Heating Coil	07-92
MXB1	Mixing Box (top and rear inlet, standard dampers)	07-92
MXB5	Mixing Box (top and rear inlet, for use with EXB1, standard dampers)	07-92
MXB6	Mixing Box (top and rear inlet, premium dampers)	07-92
MXB7	Mixing Box (top and rear inlet, for use with EXB2, premium dampers)	07-92
VCS1	Vertical Cooling Coil	07-61

39TR RETURN FAN COMPONENTS

COMPONENT	DESCRIPTION	UNIT SIZE AVAILABILITY
EXB1	Exhaust Box (standard dampers)	07-92
EXB2	Exhaust Box (premium dampers)	07-92
RAF2	Return-Air Airfoil Fan	07-92
RFC2	Return-Air Forward-Curved Fan	07-61

39TS COMPONENTS

COMPONENT	DESCRIPTION	UNIT SIZE AVAILABILITY
AMX1	Air Mixer	07-92
BCF2	Bag/Cartridge Filter (downstream location, 2-in. prefilters)	07-92
BCC2	Bypass Cooling Coil	07-92
BCS1	Blow-Thru Cooling/Heating Coil (front discharge)	07-92
BCS2	Blow-Thru Cooling/Heating Coil (top discharge)	07-92
BCS3	Blow-Thru Cooling Coil (front discharge)	07-92
BCS4	Blow-Thru Cooling Coil (top discharge)	07-92
BCS7	Blow-Thru Cooling Coil (full front discharge, downstream components)	07-92
BPH1	Bypass Heating Coil	07-92
BPH2	Bypass Heating Coil (extended length)	07-92
DIF2	Diffuser	07-92
FBP1	Face and Bypass Damper	07-92
ZDS1	Zone Damper (blow-thru front discharge)	07-92
ZDS2	Zone Damper (blow-thru top discharge)	07-92

39TP PLENUM FAN COMPONENTS

COMPONENT	DESCRIPTION	UNIT SIZE AVAILABILITY
PAF3	Plenum Fan (draw-thru)	11-92
PAF5	Plenum Fan (blow-thru)	11-92

Model number nomenclature

POSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
UNIT	3	9	T	H	2	6	G	G	G	A	U	-	D	G	J	A	B	

FACTORY-ASSEMBLED BASE UNITS

POSITION 1,2,3 — MODEL NO.: 39T

POSITION 4 — UNIT TYPE:
- H = HORIZ. UNIT (SEE PAGE 54)
- V = VERT. UNIT (SEE PAGE 54)
- R = RETURN FAN (SEE PAGE 54)

POSITION 5,6 — UNIT SIZE: 07, 09, 11, 13, 17, 21, 26, 32, 39, 49, 61, 74, 92

POSITION 7,8 — DRAW THRU FIOPS:
- - = NO ACCESSORIES (SEE PAGE 55)
- Return fan: POS. 7 — EXB OPTIONS: - = NO EXB; A = EXB1 S.D.; B = EXB2 P.D. POS. 8 — —

POSITION 9 — COIL:
- PREHEAT COIL FOR COIL SECTION IN POS. 7 & 8
- - = NO COILS (SEE PAGE 57)
- Return fan: —

POSITION 10 — COIL SECTIONS:
- - = NO COIL SECTION (SEE PAGE 56)
- Return fan: —

POSITION 11, POSITION 12 — COILS:
- COIL(S) FOR COIL SECTION(S) IN POSITION 10
- POS. 11 = 1ST. COIL IN AIRFLOW
- POS. 12 = 2ND. COIL IN AIRFLOW
- - = NO COILS (SEE PAGE 57)
- Return fan: —

POSITION 13 — FANS: - = NO FAN (SEE PAGE 58)

POSITION 14 — FAN RPM: - = NO DRIVE (SEE PAGE 59)

POSITION 15 — MOTOR: - = NO MOTOR (SEE PAGE 60)

POSITION 16 — PIC:
- - = NO PIC (SEE PAGE 61)
- Return fan: PIC = Y/N RETURN FAN PIC INCL WITH DT PIC UNIT

POSITION 17 — WALL/INSUL./EXP — HAND:

WALL/INSUL./EXP	HAND
A = 1.5# T.S.	R
B = DW + 1.5#	R
E = A +EXPORT	R
F = B + EXPORT	R
1 = 1.5# T.S.	L
2 = DW + 1.5#	L
5 = 1 + EXPORT	L
6 = 2 + EXPORT	L

POSITION 18 — SPECIAL ORDER:
- (BLANK) = STD.
- CARRIER S.O. MODS.
- 1 = COPPER FIN COILS
- 2 = .025 WALL TUBE
- 3 = (FUTURE)
- 6 = V.P. + LIGHT
- 8 = (FUTURE)
- COMBINE OPTIONS: A = 1+2; B = 1+2+6
- E = (FUTURE)
- Z = S.O. OTHER THAN ABOVE

FIELD-INSTALLED, SEPARATELY-SHIPPED COMPONENTS*

POSITION 1,2,3: 39T; 39T (PLENUM FANS ONLY)

POSITION 4:
- S = SEPARATE SHIPPED COMPS.*
- P = PLENUM FAN

POSITION 5,6:
- 39T: 07, 09, 11, 13, 17, 21, 26, 32, 39, 49, 61, 74, 92
- 39T (plenum fans only): 11, 13, 17, 21, 26, 32, 39, 49, 61, 74, 92

POSITION 7, POSITION 8:
- 39T: POSITION 7 — A, B, C, D, E, G, H, J, K, L, M, N, S, T, U; POSITION 8 — — (SEE PAGE 64)
- Plenum fans: MODEL — Q=DRAW THRU, R=BLOW THRU; IGV — 1- W/O IGV, 2- W/ IGV (SEE PAGE 66)

POSITION 9:
- 39T: —
- Plenum fans: FAN TYPE — A=CLASS 1,CW; B=CLASS1,CCW; C=CLASS 2,CW; D=CLASS2,CCW

POSITION 10:
- 39T: COOLING COIL — - = NO COIL; C = CW; X = DX
- Plenum fans: CAGE — 1 = NO CAGE; 2 = WHEEL CAGE

POSITION 11:
- 39T: HEATING COIL (SEE PAGE 57)
- Plenum fans: DIAMETER — S = SMALL; A = STANDARD

POSITION 12:
- 39T: COOLING COIL (SEE PAGE 57)
- Plenum fans: INLET SCREEN — 1 = W/O SCREEN; 2 = W/ SCREEN

POSITION 13:
- 39T: —
- Plenum fans: RPM (SEE PAGE 66)

POSITION 14:
- 39T: —
- Plenum fans: MOTOR (SEE PAGE 67)

POSITION 15:
- 39T: —
- Plenum fans: FRAME

	FRAME
A	143 T
B	145 T
C	182 T
D	184 T
E	213 T
F	215 T
G	254 T
H	256 T
J	284 T
K	286 T
L	324 T
M	326 T
N	364 T
P	365 T
Q	404 T
R	405 T
S	444 T
T	445 T

POSITION 16: — ; —

POSITION 17:

WALL/INSUL./EXP	HAND
A = 1.5# T.S.	R
B = DW + 1.5#	R
E = A +EXPORT	R
F = B + EXPORT	R
1 = 1.5# T.S.	L
2 = DW + 1.5#	L
5 = 1 + EXPORT	L
6 = 2 + EXPORT	L

- Plenum fans: AS ABOVE

POSITION 18:
- (BLANK) = STD.
- CARRIER S.O. MODS.
- 1 = COPPER FIN COILS
- 2 = .025 WALL TUBE
- 3 = (FUTURE)
- 6 = V.P. + LIGHT (FAN)
- 8 = (FUTURE)
- COMBINE OPTIONS: A = 1+2; B = 1+2+6
- E = (FUTURE)
- Z = S.O. OTHER THAN ABOVE

*The 39TS and 39TP components can also be factory installed. Contact your Carrier representative for assistance.

LEGEND

CCW — Counterclockwise		**EXP** — Export Crate		**R** — Right-Hand	
CW — Clockwise (Position 9), Chilled Water (Position 10)		**FIOP** — Factory-Installed Option		**S.D.** — Standard Dampers	
COMPS — Components		**IGV** — Inlet Guide Vanes		**S.O.** — Special Order	
DT — Draw-Thru		**INSUL.** — Insulation		**T.S.** — Tuf-Skin™	
DW — Double Wall		**L** — Left-Hand		**V.P.** — Viewports	
DX — Direct Expansion		**P.D.** — Premium Dampers		**W/** — With	
EXB — Exhaust Box		**PIC** — Product-Integrated Controls		**W/O** — Without	

NOTES:
1. See Component Selection section, pages 54-67 for detailed list of selections for each model number position.
2. All components have individual base rails.
3. Connection flanges are supplied between all components.
4. Hand refers to fan motor location or coil header location when facing component inlet. For components with one access door, hand also refers to door location when facing component inlet. Motor, header, and door hand must be the same in factory-assembled unit.

Physical data

Carrier®

FANS

AIRFOIL

39T UNIT SIZE	07	09	11	13	17	21	26	32	39	49	61	74	92
Wheel Diameter (in.)	13 1/4	14 9/16	16 3/16	17 13/16	19 11/16	21 9/16	24	26 7/16	29 1/8	35 9/16	39 3/8	43 7/16	43 7/16
Max Speed (rpm)	4300	4000	3700	3200	2700	2700	2400	2100	1925	1500	1350	1200	1200
Fan Sheave Bore (in.)	1 7/16	1 11/16	1 11/16	1 15/16	1 15/16	2 3/16	2 3/16	1 7/16	1 11/16	1 15/16	1 15/16	2 7/16	2 7/16
Fan Shaft Wt (lb)	13	20	22	33	35	48	52	71	72	109	141	180	190
Fan Wheel Wt (lb)	17	19	21	30	46	52	67	88	115	160	189	272	272
No. of Fan Blades	8	8	8	8	8	8	8	8	8	8	8	8	8
MOTOR FRAME SIZE													
Maximum													
ODP	215T	215T	254T	256T	256T	286T	286T	326T	364T	365T	404T	405T	405T
TEFC	213T	213T	215T	256T	256T	284T	284T	324T	324T	364T	364T	404T	404T
Minimum	143T	145T	145T	145T	145T	182T	182T	184T	213T	215T	215T	256T	256T
MOTOR HP													
Maximum	7.5	10	15	20	20	30	30	50	60	75	75	100	100
Minimum	1	1.5	2	2	2	3	3	5	7.5	10	10	20	20

FORWARD-CURVED*

39T UNIT SIZE	07	09	11	13	17	21	26	32	39	49	61
Wheel Diameter (in.)	12	15	15	18	20	22	25	25	27 1/2	30	36
Max Speed (rpm)	2000	1600	1600	1400	1200	1175	1000	1000	900	840	650
Fan Sheave Bore (in.)	1 3/16	1 3/16	1 3/16	1 7/16	1 7/16	1 11/16	1 11/16	1 15/16	1 15/16	1 11/16	1 11/16
Fan Shaft Wt (lb)	9	10	11	17	18	29	31	46	49	40	40
Fan Width	11	11	15	15	15	20	20	22	25	27 1/2	30
Fan Wheel Wt (lb)	10	13	17	30	47	60	73	82	93	112	139
No. of Fan Blades	43	51	51	48	37	37	37	37	37	37	37
MOTOR FRAME SIZE											
Maximum											
ODP	213T	215T	254T	254T	256T	284T	284T	326T	364T	365T	365T
TEFC	184T	213T	215T	254T	256T	284T	284T	324T	324T	364T	364T
Minimum	143T	145T	145T	145T	145T	145T	182T	184T	213T	213T	213T
MOTOR HP											
Maximum	7.5	10	15	20	20	25	25	40	50	50	50
Minimum	1	1.5	2	2	2	2	3	5	7.5	7.5	7.5

LEGEND

ODP — Open Drip Proof
TEFC — Totally-Enclosed, Fan Cooled

*Forward-curved fans available on sizes 07-61 only.

NOTES:
1. Motor data applies to units with or without inlet guide vanes.
2. Data shown is for 60 Hz motors. Contact Application Engineering for 50 Hz applications.

Physical data (cont)

FANS (cont)

PLENUM — STANDARD WHEEL

39T UNIT SIZE	11	13	17	21	26	32	39	49	61	74	92
WHEEL DIAMETER (in.)	18¼	20	22¼	27	30	30	36½	40¼	44½	49	60
MAX SPEED (rpm)											
Class I	2393	2183	1962	1548	1391	1391	1129	1023	926	840	686
Class II	3122	2848	2560	2020	1818	1818	1473	1335	1208	1097	896
FAN SHEAVE BORE (in.)	1⁷⁄₁₆	1⁷⁄₁₆	1⁷⁄₁₆	1¹¹⁄₁₆	1¹¹⁄₁₆	1¹¹⁄₁₆	2³⁄₁₆	2⁷⁄₁₆	2⁷⁄₁₆	2¹⁵⁄₁₆	3³⁄₁₆
FAN SHAFT WT (lb)											
Class I	16	18	20	37	37	37	37	68	68	70	162
Class II	17	22	29	37	37	37	39	72	91	138	162
FAN WHEEL WIDTH (in.)	6.07	6.62	7.38	8.95	9.94	9.94	12.14	13.34	14.74	16.24	19.88
FAN WHEEL WT (lb)											
Class I	34	38	60	74	94	94	142	221	245	341	591
Class II	38	46	60	101	123	123	184	241	341	484	750
NO. OF FAN BLADES	8	8	8	8	8	8	8	8	8	8	8
MOTOR FRAME SIZE											
Maximum	254T	256T	284T	286T	324T	324T	326T	364T	365T	405T	405T
Minimum	143T	143T	145T	145T	145T	145T	145T	145T	182T	213T	213T
MOTOR HP											
Maximum	15	20	25	30	40	40	50	60	75	100	100
Minimum	2	2	2	2	3	3	5	7.5	10	20	20

PLENUM — SMALL WHEEL

39T UNIT SIZE	21	26	32	39	49	61	74	92
WHEEL DIAMETER (in.)	24½	27	27	33	36½	40¼	44½	54¼
MAX SPEED (rpm)								
Class I	1782	1548	1548	1265	1129	1023	926	759
Class II	2325	2020	2020	1652	1473	1335	1208	991
FAN SHEAVE BORE (in.)	1¹¹⁄₁₆	1¹¹⁄₁₆	1¹¹⁄₁₆	1¹⁵⁄₁₆	2³⁄₁₆	2⁷⁄₁₆	2⁷⁄₁₆	2¹⁵⁄₁₆
FAN SHAFT WT (lb)								
Class I	22	37	37	37	37	68	68	108
Class II	30	37	37	37	39	72	91	148
FAN WHEEL WIDTH (in.)	8.12	8.95	8.95	10.93	12.14	13.34	14.74	17.98
FAN WHEEL WT (lb)								
Class I	66	74	74	123	142	221	245	472
Class II	80	101	101	156	184	241	341	598
NO. OF FAN BLADES	8	8	8	8	8	8	8	8
MOTOR FRAME SIZE								
Maximum	284T	286T	286T	326T	326T	364T	405T	405T
Minimum	145T	145T	145T	145T	145T	182T	213T	213T
MOTOR HP								
Maximum	30	40	40	50	60	75	100	100
Minimum	2	3	3	5	7.5	10	20	20

NOTES:
1. Motor data applies to units with or without inlet guide vanes.
2. Data shown is for 60 Hz motors. Contact Application Engineering for 50 Hz applications.

COILS

39T UNIT SIZE	07	09	11	13	17	21	26
CHILLED WATER/ DIRECT EXPANSION							
Large Face Area							
Nominal Capacity (cfm) at 550 fpm	3688	4921	5748	7173	8,894	11,440	14,214
Size (Length x Width) (in.)	$42\frac{15}{16}$ x $22\frac{1}{2}$	$46\frac{7}{8}$ x $27\frac{1}{2}$	$54\frac{3}{4}$ x $27\frac{1}{2}$	$62\frac{5}{8}$ x 30	$66\frac{9}{16}$ x 35	$70\frac{1}{2}$ x $42\frac{1}{2}$	$78\frac{3}{8}$ x $47\frac{1}{2}$
Total Face Area (sq ft)	6.7	9.0	10.5	13.0	16.2	20.8	25.8
Medium Face Area							
Nominal Capacity (cfm) at 550 fpm	2868	4026	4703	5977	6,989	9,421	11,970
Size (Length x Width) (in.)	$42\frac{15}{16}$ x $17\frac{1}{2}$	$46\frac{7}{8}$ x $22\frac{1}{2}$	$54\frac{3}{4}$ x $22\frac{1}{2}$	$62\frac{5}{8}$ x 25	$66\frac{9}{16}$ x $27\frac{1}{2}$	$70\frac{1}{2}$ x 35	$78\frac{3}{8}$ x 40
Total Face Area (sq ft)	5.2	7.3	8.6	10.9	12.7	17.1	21.8
Bypass (Chilled Water Only)							
Nominal Capacity (cfm) at 550 fpm	2868	4026	4703	5977	6,989	9,421	11,970
Size (Length x Width) (in.)	$42\frac{15}{16}$ x $17\frac{1}{2}$	$46\frac{7}{8}$ x $22\frac{1}{2}$	$54\frac{3}{4}$ x $22\frac{1}{2}$	$62\frac{5}{8}$ x 25	$66\frac{9}{16}$ x $27\frac{1}{2}$	$70\frac{1}{2}$ x 35	$78\frac{3}{8}$ x 40
Total Face Area (sq ft)	5.2	7.3	8.6	10.9	12.7	17.1	21.8
HOT WATER HEATING							
Large Face Area							
Nominal Capacity (cfm) at 700 fpm	4694	6263	7316	9129	11,320	14,559	18,090
Size (Length x Width) (in.)	$42\frac{15}{16}$ x $22\frac{1}{2}$	$46\frac{7}{8}$ x $27\frac{1}{2}$	$54\frac{3}{4}$ x $27\frac{1}{2}$	$62\frac{5}{8}$ x 30	$66\frac{9}{16}$ x 35	$70\frac{1}{2}$ x $42\frac{1}{2}$	$78\frac{3}{8}$ x $47\frac{1}{2}$
Total Face Area (sq ft)	6.7	9.0	10.5	13.0	16.2	20.8	25.8
Bypass							
Nominal Capacity (cfm) at 700 fpm	3651	5124	5985	7607	8,894	11,990	15,234
Size (Length x Width) (in.)	$42\frac{15}{16}$ x $17\frac{1}{2}$	$46\frac{7}{8}$ x $22\frac{1}{2}$	$54\frac{3}{4}$ x $22\frac{1}{2}$	$62\frac{5}{8}$ x 25	$66\frac{9}{16}$ x $27\frac{1}{2}$	$70\frac{1}{2}$ x 35	$78\frac{3}{8}$ x 40
Total Face Area (sq ft)	5.2	7.3	8.6	10.9	12.7	17.1	21.8
STEAM HEATING COIL							
Large Face Area							
Nominal Capacity (cfm) at 700 fpm	4381	6149	6385	8216	10,673	14,388	17,138
Size (Length x Width) (in.)	$41\frac{7}{8}$ x 21	$46\frac{7}{8}$ x 24	$54\frac{3}{4}$ x 24	$65\frac{5}{8}$ x 27	$66\frac{9}{16}$ x 33	$70\frac{1}{2}$ x 42	$78\frac{3}{8}$ x 45
Total Face Area (sq ft)	6.3	7.8	9.1	11.7	15.3	20.6	24.5
Bypass							
Nominal Capacity (cfm) at 700 fpm	3129	4099	4788	6390	7,762	11,305	14,853
Size (Length x Width) (in.)	$41\frac{7}{8}$ x 15	$46\frac{7}{8}$ x 21	$54\frac{3}{4}$ x 21	$65\frac{5}{8}$ x 24	$66\frac{9}{16}$ x 24	$70\frac{1}{2}$ x 33	$78\frac{3}{8}$ x 39
Total Face Area (sq ft)	4.5	6.8	8.0	10.4	11.1	16.2	21.2

Physical data (cont)

COILS (cont)

39T UNIT SIZE	32	39	49	61	74	92
CHILLED WATER/ DIRECT EXPANSION						
Large Face Area						
Nominal Capacity (cfm) at 550 fpm	17,898	21,334	27,052	33,446	40,567	50,401
Size (Length x Width) (in.)	81½ x 27½ (U) 81½ x 30 (L)	89⅜ x 30 (U) 89⅜ x 32½ (L)	101³⁄₁₆ x 35 (U) 101³⁄₁₆ x 35 (L)	113 x 37½ (U) 113 x 40 (L)	128¾ x 40 (U) 128¾ x 42½ (L)	128¾ x 50 (U) 128¾ x 52½ (L)
Total Face Area (sq ft)	32.5	38.8	49.2	60.8	73.8	91.6
Medium Face Area						
Nominal Capacity (cfm) at 550 fpm	14,785	17,067	21,255	26,973	33,191	40,567
Size (Length x Width) (in.)	81½ x 47½	89⅜ x 50	101³⁄₁₆ x 55	113 x 30 (U) 113 x 32½ (L)	128¾ x 32½ (U) 128¾ x 35 (L)	128¾ x 40 (U) 128¾ x 42½ (L)
Total Face Area (sq ft)	26.9	31.0	38.7	49.0	60.4	73.8
Bypass (Chilled Water Only)						
Nominal Capacity (cfm) at 550 fpm	14,785	17,067	21,255	26,973	31,962	40,567
Size (Length x Width) (in.)	81½ x 22½ (U) 81½ x 25 (L)	89⅜ x 25 (U) 89⅜ x 25 (L)	101³⁄₁₆ x 27½ (U) 101³⁄₁₆ x 27½ (L)	113 x 30 (U) 113 x 32½ (L)	128¾ x 32½ 128¾ x 32½	128¾ x 40 (U) 128¾ x 42½ (L)
Total Face Area (sq ft)	26.9	31.0	38.6	49.0	58.1	73.8
HOT WATER HEATING						
Medium Face Area						
Nominal Capacity (cfm) at 700 fpm	18,818	21,722	27,052	34,329	42,243	51,630
Size (Length x Width) (in.)	81½ x 47½	89⅜ x 50	101³⁄₁₆ x 55	113 x 30 (U) 113 x 32½ (L)	128¾ x 32½ (U) 128¾ x 35 (L)	128¾ x 40 (U) 128¾ x 42½ (L)
Total Face Area (sq ft)	26.9	31.0	38.7	49.0	60.4	73.8
Bypass						
Nominal Capacity (cfm) at 700 fpm	13,866	16,291	20,904	27,463	32,856	39,114
Size (Length x Width) (in.)	81½ x 35	89⅜ x 37½	101³⁄₁₆ x 42½	113 x 50	128¾ x 52½	128¾ x 30 (U) 128¾ x 32½ (L)
Total Face Area (sq ft)	19.8	23.3	29.9	39.2	46.9	55.9
STEAM HEATING COIL						
Medium Face Area						
Nominal Capacity (cfm) at 700 fpm	17,640	20,650	26,530	31,010	39,130	50,260
Size (Length x Width) (in.)	80½ x 45	88⅜ x 48	101³⁄₁₆ x 54	112 x 27 (U) 112 x 30 (L)	127¹¹⁄₁₆ x 30 (U) 127¹¹⁄₁₆ x 33 (L)	127¹¹⁄₁₆ x 39 (U) 127¹¹⁄₁₆ x 42 (L)
Total Face Area (sq ft)	25.2	29.5	38.8	44.3	55.9	66.5
Bypass						
Nominal Capacity (cfm) at 700 fpm	12,950	15,470	20,650	26,110	31,640	35,420
Size (Length x Width) (in.)	80½ x 33	88⅜ x 36	101³⁄₁₆ x 42	112 x 48	127¹¹⁄₁₆ x 51	127¹¹⁄₁₆ x 27 (U) 127¹¹⁄₁₆ x 30 (L)
Total Face Area (sq ft)	18.5	22.1	27.4	37.3	45.2	50.6

LEGEND

U — Upper Coil
L — Lower Coil

DIRECT-EXPANSION COIL CIRCUITING DATA

LARGE FACE AREA COILS

39T UNIT SIZE	07			09		11			13		
CIRCUITING TYPE	**Quarter**	**Half**	**Full**	**Half**	**Full**	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**
Airflow (cfm) at 550 fpm	3688			4921		5748			7173		
Total Face Area (sq ft)	6.7			8.9		10.5			13.0		
Tubes in Face	18			22		22			24		
Tube Length (in.)	42 15/16			46⅞		54¾			62⅝		
No. of Circuits — Total	4	9	18	11	22	11	22	44	12	24	48
4-Row Coil											
Circuit Equivalent Length (in.)	89.9	39.1	24.8	41.7	26.1	47.0	28.7	—	52.2	31.4	—
Face-Split Coils											
No. of TXVs	2	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	2	4,5	9	5,6	11	5,6	11	—	6	12	—
Suction Connections (in. OD)	⅞	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	⅞	⅞	1⅛	⅞	1⅜	⅞	1⅜	—	⅞	1⅜	—
Distributor Tube Length (in.)	11	16	15	21	18	21	18	—	21	18	—
Distributor Nozzle Size†	4	4	4	5	5	6	6	—	8	8	—
Row-Split Coils											
No. of TXVs	2	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	2	4,5	9	5,6	11	5,6	11	—	6	12	—
Suction Connections (in. OD)	⅞	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	⅞	⅞	1⅛	⅞	1⅜	⅞	1⅜	—	⅞	1⅜	—
Distributor Tube Length (in.)	11	16	15	21	18	21	18	—	21	18	—
Distributor Nozzle Size†	4	4	4	5	5	6	6	—	8	8	—
6-Row Coil											
Circuit Equivalent Length (in.)	—	59.4	29.0	63.4	30.9	71.2	34.9	—	79.1	38.8	—
Face-Split Coils											
No. of TXVs	—	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	—	4,5	9	5,6	11	5,6	11	—	6	12	—
Suction Connections (in. OD)	—	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	—	⅞	1⅛	⅞	1⅜	⅞	1⅜	—	⅞	1⅜	—
Distributor Tube Length (in.)	—	16	15	21	18	21	18	—	21	18	—
Distributor Nozzle Size†	—	4	4	5	5	6	6	—	8	8	—
Row-Split Coils											
No. of TXVs	—	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	—	4,5	9	5,6	11	5,6	11	—	6	12	—
Suction Connections (in. OD)	—	1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	—	⅞	1⅛	⅞	1⅜	⅞	1⅜	—	⅞	1⅜	—
Distributor Tube Length (in.)	—	16	15	21	18	21	18	—	21	18	—
Distributor Nozzle Size†	—	4	4	5	5	6	6	—	8	8	—
8-Row Coil											
Circuit Equivalent Length (in.)	—	79.7	39.1	85.0	41.7	—	47.0	22.7	—	52.2	25.4
Face-Split Coils											
No. of TXVs	—	2	2	2	2	—	2	4	—	2	4
No. of Circuits/Distributor*	—	4,5	9	5,6	11	—	11	11	—	12	12
Suction Connections (in. OD)	—	1⅛	1⅜	1⅛	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Connections (in. OD)	—	⅞	1⅛	⅞	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Tube Length (in.)	—	16	15	15	18	—	18	13	—	18	13
Distributor Nozzle Size†	—	4	4	5	5	—	6	3	—	8	4
Row-Split Coils											
No. of TXVs	—	2	2	2	4	—	2	4	—	2	4
No. of Circuits/Distributor*	—	4,5	9	5,6	11	—	11	11	—	12	12
Suction Connections (in. OD)	—	1⅛	1⅜	1⅛	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Connections (in. OD)	—	⅞	1⅛	⅞	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Tube Length (in.)	—	16	15	15	18	—	18	13	—	18	13
Distributor Nozzle Size†	—	4	4	5	5	—	6	3	—	8	4

LEGEND

TXV — Thermostatic Expansion Valve

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 32 large face area coil has 5 circuits on one distributor and 6 circuits on the other distributor; the lower coil has 6 circuits on each distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

Physical data (cont)

Carrier

DIRECT EXPANSION COIL CIRCUITING DATA (cont)
LARGE FACE AREA COILS (cont)

39T UNIT SIZE	17			21			26		
CIRCUITING TYPE	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**
Airflow (cfm) at 550 fpm		8895			11,439			14,215	
Total Face Area (sq ft)		16.2			20.8			25.8	
Tubes in Face		28			34			38	
Tube Length (in.)		66 9/16			70½			78⅜	
No. of Circuits — Total	14	28	56	17	34	68	19	38	76
4-Row Coil									
Circuit Equivalent Length (in.)	54.9	32.7	—	57.5	34.0	—	62.7	36.6	—
Face-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	4	—
No. of Circuits/Distributor*	7	14	—	8,9	17	—	9,10	9,10	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞/1⅛	1⅜	—	1⅛	1⅛	—
Distributor Tube Length (in.)	21	21	—	15	21	—	28	18	—
Distributor Nozzle Size†	10	10	—	12	12	—	15	15	—
Row-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	4	—
No. of Circuits/Distributor*	7	14	—	8,9	17	—	9,10	9,10	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞/1⅛	1⅜	—	1⅛	1⅛	—
Distributor Tube Length (in.)	21	21	—	15	21	—	28	18	—
Distributor Nozzle Size†	10	10	—	12	12	—	15	15	—
6-Row Coil									
Circuit Equivalent Length (in.)	83.0	40.8	—	87.0	42.7	—	94.9	46.7	—
Face-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	4	—
No. of Circuits/Distributor*	7	14	—	8,9	17	—	9,10	9,10	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞/1⅛	1⅜	—	1⅛	1⅛	—
Distributor Tube Length (in.)	21	21	—	15	21	—	28	18	—
Distributor Nozzle Size†	10	10	—	12	12	—	15	15	—
Row-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	4	—
No. of Circuits/Distributor*	7	14	—	8,9	17	—	9,10	9,10	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞/1⅛	1⅜	—	1⅛	1⅛	—
Distributor Tube Length (in.)	21	21	—	15	21	—	28	18	—
Distributor Nozzle Size†	10	10	—	12	12	—	15	15	—
8-Row Coil									
Circuit Equivalent Length (in.)	—	54.9	26.7	—	57.5	28.0	—	62.7	30.6
Face-Split Coils									
No. of TXVs	—	2	4	—	2	4	—	4	8
No. of Circuits/Distributor*	—	14	14	—	17	17	—	9,10	9,10
Suction Connections (in. OD)	—	1⅝	1⅝	—	1⅝	1⅝	—	1⅝	1⅝
Distributor Connections (in. OD)	—	1⅜	1⅜	—	1⅜	1⅜	—	1⅛	1⅛
Distributor Tube Length (in.)	—	21	13	—	21	21	—	18	13
Distributor Nozzle Size†	—	10	5	—	12	6	—	15	8
Row-Split Coils									
No. of TXVs	—	2	4	—	2	4	—	4	8
No. of Circuits/Distributor*	—	14	14	—	17	17	—	9,10	9,10
Suction Connections (in. OD)	—	1⅝	1⅝	—	1⅝	1⅝	—	1⅝	1⅝
Distributor Connections (in. OD)	—	1⅜	1⅜	—	1⅜	1⅜	—	1⅛	1⅛
Distributor Tube Length (in.)	—	21	13	—	21	21	—	18	13
Distributor Nozzle Size†	—	10	5	—	12	6	—	15	8

LEGEND

TXV — Thermostatic Expansion Valve

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 32 large face area coil has 5 circuits on one distributor and 6 circuits on the other distributor; the lower coil has 6 circuits on each distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

DIRECT EXPANSION COIL CIRCUITING DATA (cont)

LARGE FACE AREA COILS (cont)

39T UNIT SIZE	32						39						49					
CIRCUITING TYPE	Half		Full		Double		Half		Full		Double		Half		Full		Double	
Airflow (cfm) at 550 fpm	17,898						21,334						27,052					
Total Face Area (sq ft)	32.5						38.8						49.2					
Tubes in Face (Upper/Lower)	22/24						24/26						28/28					
Tube Length (in.)	81½						89⅜						101 3/16					
No. of Circuits — Total	23		46		92		25		50		100		28		56		112	
COIL SECTIONS	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L
4-Row Coil																		
Circuit Equivalent Length (in.)	64.8	64.8	37.7	37.7	—		70.1	70.1	40.3	40.3	—		78	78	44.2	44.2	—	
Face-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	5, 6	6	11	12	—		6	6,7	12	13	—		7	7	14	14	—	
Suction Connections (in. OD)	1⅛	1⅛	1⅜	1⅜	—		1⅛	1⅜	1⅜	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—	
Distributor Tube Length (in.)	15	15	14	14	—		15	15	18	18	—		15	15	21	21	—	
Distributor Nozzle Size†	10	10	10	10	—		12	12	12	12	—		12	12	15	15	—	
Row-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	5, 6	6	11	12	—		6	6,7	12	13	—		7	7	14	14	—	
Suction Connections (in. OD)	1⅛	1⅛	1⅜	1⅜	—		1⅛	1⅜	1⅜	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—	
Distributor Tube Length (in.)	19	19	22	22	—		21	21	23	23	—		23	23	23	23	—	
Distributor Nozzle Size†	10	10	10	10	—		12	12	12	12	—		12	12	15	15	—	
6-Row Coil																		
Circuit Equivalent Length	98.0	98.0	48.3	48.3	—		105.9	105.9	52.2	52.2	—		117.7	117.7	58.1	58.1	—	
Face-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	5, 6	6	11	12	—		6	6,7	12	13	—		7	7	14	14	—	
Suction Connections (in. OD)	1⅛	1⅛	1⅜	1⅜	—		1⅛	1⅜	1⅜	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—	
Distributor Tube Length (in.)	15	15	14	14	—		15	15	18	18	—		15	15	21	21	—	
Distributor Nozzle Size†	10	10	10	10	—		12	12	12	12	—		12	12	15	15	—	
Row-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	5, 6	6	11	12	—		6	6,7	12	13	—		7	7	14	14	—	
Suction Connections (in. OD)	1⅛	1⅛	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—	
Distributor Tube Length (in.)	19	19	22	22	—		21	21	23	23	—		23	23	23	23	—	
Distributor Nozzle Size†	10	10	10	10	—		12	12	12	12	—		12	12	15	15	—	
8-Row Coils																		
Circuit Equivalent Length	—		64.8	64.8	31.7	31.7	—		70.1	70.1	34.3	34.3	—		78	78	38.2	38.2
Face-Split Coils																		
No. of TXVs	—		2	2	4	4	—		2	2	4	4	—		2	2	4	4
No. of Circuits/Distributor*	—		11	12	11	12	—		12	13	12	13	—		14	14	14	14
Suction Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅝	1⅜	1⅝	—		1⅝	1⅝	1⅝	1⅝
Distributor Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜
Distributor Tube Length (in.)	—		14	14	14	14	—		18	18	18	18	—		21	21	21	21
Distributor Nozzle Size†	—		10	10	5	5	—		12	12	6	6	—		15	15	6	6
Row-Split Coils																		
No. of TXVs	—		2	2	4	4	—		2	2	4	4	—		2	2	4	4
No. of Circuits/Distributor*	—		11	12	11	12	—		12	13	12	13	—		14	14	14	14
Suction Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅝	1⅜	1⅝	—		1⅝	1⅝	1⅝	1⅝
Distributor Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜
Distributor Tube Length (in.)	—		22	22	14	14	—		23	23	18	18	—		23	23	21	21
Distributor Nozzle Size†	—		10	10	5	5	—		12	12	6	6	—		15	15	6	6

LEGEND

L — Lower
TXV — Thermostatic Expansion Valve
U — Upper

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 32 large face area coil has 5 circuits on one distributor and 6 circuits on the other distributor; the lower coil has 6 circuits on each distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

Physical data (cont)

DIRECT EXPANSION COIL CIRCUITING DATA (cont)
LARGE FACE AREA COILS (cont)

39T UNIT SIZE	61						74						92					
CIRCUITING TYPE	Half		Full		Double		Half		Full		Double		Half		Full		Double	
Airflow (cfm) at 550 fpm	33,446						40,567						50,401					
Total Face Area (sq ft)	60.8						73.8						91.6					
Tubes in Face (Upper/Lower)	30/32						32/34						40/42					
Tube Length (in.)	113						128¾						128¾					
No. of Circuits — Total	31		62		124		33		66		132		41		82		164	
COIL SECTIONS	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L
4-Row Coil																		
Circuit Equivalent Length (in.)	85.8	85.8	48.2	48.2	—		96.3	96.3	53.4	53.4	—		96.3	96.3	53.4	53.4	—	
Face-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	4	4	—	
No. of Circuits/Distributor*	7,8	8	15	16			8	8,9	16	17	—		10	10,11	10	10,11	—	
Suction Connections (in. OD)	1⅜	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—		1⅛	1⅛	1⅛	1⅛	—	
Distributor Tube Length (in.)	20	20	20	20	—		26	26	19	19	—		21	21	19	19	—	
Distributor Nozzle Size†	12	12	17	17	—		20	20	20	20	—		25	25	12	12	—	
Row-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		4	4	4	4	—	
No. of Circuits/Distributor*	7,8	8	15	16	—		8	8,9	16	17	—		5	5,6	10	10,11	—	
Suction Connections (in. OD)	1⅜	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—		1⅛	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—	
Distributor Tube Length (in.)	26	26	28	28	—		26	26	28	28	—		16	16	19	19	—	
Distributor Nozzle Size†	12	12	17	17	—		20	20	20	20	—		12	12	12	12	—	
6-Row Coil																		
Circuit Equivalent Length	129.5	129.5	64	64	—		145.2	145.2	71.9	71.9	—		145.2	145.2	71.9	71.9	—	
Face-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	4	4	—	
No. of Circuits/Distributor*	7,8	8	15	16	—		8	8,9	16	17	—		10	10,11	10	10,11	—	
Suction Connections (in. OD)	1⅜	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—		1⅛	1⅛	1⅛	1⅛	—	
Distributor Tube Length (in.)	20	20	20	20	—		26	26	19	19	—		21	21	19	19	—	
Distributor Nozzle Size†	12	12	17	17	—		20	20	20	20	—		25	25	12	12	—	
Row-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		4	4	4	4	—	
No. of Circuits/Distributor*	7,8	8	15	16	—		8	8,9	16	17	—		5	5,6	10	10,11	—	
Suction Connections (in. OD)	1⅜	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—		1⅛	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—	
Distributor Tube Length (in.)	26	26	28	28	—		26	26	28	28	—		16	16	19	19	—	
Distributor Nozzle Size†	12	12	17	17	—		20	20	20	20	—		12	12	12	12	—	
8-Row Coils																		
Circuit Equivalent Length	—		85.8	85.8	42.2	42.2	—		96.3	96.3	47.4	47.4	—		96.3	96.3	47.4	47.4
Face-Split Coils																		
No. of TXVs	—		2	2	4	4	—		2	2	4	4	—		4	4	8	8
No. of Circuits/Distributor*	—		15	16	15	16	—		16	17	16	17	—		10	10,11	10	10,11
Suction Connections (in. OD)	—		1⅝	1⅝	1⅝	1⅝	—		1⅝	1⅝	1⅝	1⅝	—		1⅝	1⅝	1⅝	1⅝
Distributor Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜	—		1⅛	1⅛	1⅛	1⅛
Distributor Tube Length (in.)	—		20	20	20	20	—		19	19	19	19	—		19	19	13	13
Distributor Nozzle Size†	—		17	17	8	8	—		20	20	10	10	—		12	12	6	6
Row-Split Coils																		
No. of TXVs	—		2	2	4	4	—		2	2	4	4	—		4	4	8	8
No. of Circuits/Distributor*	—		15	16	15	16	—		16	17	16	17	—		10	10,11	10	10,11
Suction Connections (in. OD)	—		1⅝	1⅝	1⅝	1⅝	—		1⅝	1⅝	1⅝	1⅝	—		1⅝	1⅝	1⅝	1⅝
Distributor Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅛	1⅛
Distributor Tube Length (in.)	—		28	28	20	20	—		28	28	19	19	—		19	19	13	13
Distributor Nozzle Size†	—		17	17	8	8	—		20	20	10	10	—		12	12	6	6

LEGEND

L — Lower
TXV — Thermostatic Expansion Valve
U — Upper

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 32 large face area coil has 5 circuits on one distributor and 6 circuits on the other distributor; the lower coil has 6 circuits on each distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

DIRECT EXPANSION COIL CIRCUITING DATA (cont)

MEDIUM FACE AREA COILS

39T UNIT SIZE	07			09		11			13		
CIRCUITING TYPE	**Quarter**	**Half**	**Full**	**Half**	**Full**	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**
Airflow (cfm) at 550 fpm	2868			4026		4703			5977		
Total Face Area (sq ft)	5.2			7.3		8.6			10.9		
Tubes in Face	14			18		18			20		
Tube Length (in.)	42 15/16			46⅞		54¾			62⅝		
No. of Circuits — Total	4	7	14	9	18	9	18	36	10	20	40
4-Row Coil											
Circuit Equivalent Length (in.)	69.6	39.1	24.8	41.7	26.1	47.0	28.7	—	52.2	31.4	—
Face-Split Coils											
No. of TXVs	2	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	2	3,4	7	4,5	9	4,5	9	—	5	10	—
Suction Connections (in. OD)	⅞	⅞/1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	⅞	⅞	⅞	⅞	1⅛	⅞	1⅛	—	⅞	1⅛	—
Distributor Tube Length (in.)	11	12	14	16	15	16	15	—	15	15	—
Distributor Nozzle Size†	3	3	3	4	4	5	5	—	6	6	—
Row-Split Coils											
No. of TXVs	2	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	2	3,4	7	4,5	9	4,5	9	—	5	10	—
Suction Connections (in. OD)	⅞	⅞/1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	⅞	⅞	⅞	⅞	1⅛	⅞	1⅛	—	⅞	1⅛	—
Distributor Tube Length (in.)	11	12	14	16	15	16	15	—	15	15	—
Distributor Nozzle Size†	3	3	3	4	4	5	5	—	6	6	—
6-Row Coil											
Circuit Equivalent Length (in.)	—	59.4	29.0	63.4	30.9	71.2	34.9	—	79.1	38.8	—
Face-Split Coils											
No. of TXVs	—	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	—	3,4	7	4,5	9	4,5	9	—	5	10	—
Suction Connections (in. OD)	—	⅞/1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	—	⅞	⅞	⅞	1⅛	⅞	1⅛	—	⅞	1⅛	—
Distributor Tube Length (in.)	—	12	14	16	15	16	15	—	15	15	—
Distributor Nozzle Size†	—	3	3	4	4	5	5	—	6	6	—
Row-Split Coils											
No. of TXVs	—	2	2	2	2	2	2	—	2	2	—
No. of Circuits/Distributor*	—	3,4	7	4,5	9	4,5	9	—	5	10	—
Suction Connections (in. OD)	—	⅞/1⅛	1⅜	1⅛	1⅜	1⅛	1⅜	—	1⅛	1⅜	—
Distributor Connections (in. OD)	—	⅞	⅞	⅞	1⅛	⅞	1⅛	—	⅞	1⅛	—
Distributor Tube Length (in.)	—	12	14	16	15	16	15	—	15	15	—
Distributor Nozzle Size†	—	3	3	4	4	5	5	—	6	6	—
8-Row Coil											
Circuit Equivalent Length (in.)	—	79.7	39.1	85.0	41.7	—	47.0	22.7	—	52.2	25.4
Face-Split Coils											
No. of TXVs	—	2	2	2	2	—	2	4	—	2	4
No. of Circuits/Distributor*	—	3,4	7	4,5	9	—	9	9	—	10	10
Suction Connections (in. OD)	—	⅞/1⅛	1⅜	1⅛	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Connections (in. OD)	—	⅞	⅞	⅞	1⅛	—	1⅛	1⅛	—	1⅛	1⅛
Distributor Tube Length (in.)	—	12	14	16	15	—	15	13	—	15	13
Distributor Nozzle Size†	—	3	3	4	4	—	5	3	—	6	3
Row-Split Coils											
No. of TXVs	—	2	2	2	2	—	2	4	—	2	4
No. of Circuits/Distributor*	—	3,4	7	4,5	9	—	9	9	—	10	10
Suction Connections (in. OD)	—	⅞/1⅛	1⅜	1⅛	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Connections (in. OD)	—	⅞	⅞	⅞	1⅛	—	1⅛	1⅛	—	1⅛	1⅛
Distributor Tube Length (in.)	—	12	14	16	15	—	15	13	—	15	13
Distributor Nozzle Size†	—	3	3	4	4	—	3	3	—	6	3

LEGEND

TXV — Thermostatic Expansion Valve

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 61 medium face area coil has 6 circuits on each distributor; the lower coil has 6 circuits on one distributor and 7 circuits on the other distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

Physical data (cont)

DIRECT EXPANSION COIL CIRCUITING DATA (cont)

MEDIUM FACE AREA COILS (cont)

39T UNIT SIZE	17			21			26		
CIRCUITING TYPE	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**
Airfow (cfm) at 550 fpm		6989			9420			11,970	
Total Face Area (sq ft)		12.7			17.1			21.8	
Tubes in Face		22			28			32	
Tube Length (in.)		66 9/16			70½			78⅜	
No. of Circuits — Total	11	22	44	14	28	56	16	32	64
4-Row Coil									
Circuit Equivalent Length (in.)	54.9	32.7	—	57.5	34.0	—	62.7	36.6	—
Face-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	2	—
No. of Circuits/Distributor*	6	11	—	7	14	—	8	16	—
Suction Connections (in. OD)	1⅛	1⅜	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞	1⅜	—	1⅛	1⅜	—
Distributor Tube Length (in.)	21	18	—	21	21	—	15	21	—
Distributor Nozzle Size†	6	6	—	10	10	—	12	12	—
Row-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	2	—
No. of Circuits/Distributor*	6	11	—	7	14	—	8	16	—
Suction Connections (in. OD)	1⅛	1⅜	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞	1⅜	—	1⅛	1⅜	—
Distributor Tube Length (in.)	21	18	—	21	21	—	15	21	—
Distributor Nozzle Size†	6	6	—	10	10	—	12	12	—
6-Row Coil									
Circuit Equivalent Length (in.)	83.0	40.8	—	87.0	42.7	—	94.9	46.7	—
Face-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	2	—
No. of Circuits/Distributor*	6	11	—	7	14	—	8	16	—
Suction Connections (in. OD)	1⅛	1⅜	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞	1⅜	—	1⅛	1⅜	—
Distributor Tube Length (in.)	21	18	—	21	21	—	15	21	—
Distributor Nozzle Size†	6	6	—	10	10	—	12	12	—
Row-Split Coils									
No. of TXVs	2	2	—	2	2	—	2	2	—
No. of Circuits/Distributor*	6	11	—	7	14	—	8	16	—
Suction Connections (in. OD)	1⅛	1⅜	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	⅞	1⅜	—	⅞	1⅜	—	1⅛	1⅜	—
Distributor Tube Length (in.)	21	18	—	21	21	—	15	21	—
Distributor Nozzle Size†	6	6	—	10	10	—	12	12	—
8-Row Coil									
Circuit Equivalent Length (in.)	—	54.9	26.7	—	57.5	28.0	—	62.7	30.6
Face-Split Coils									
No. of TXVs	—	2	4	—	2	4	—	2	4
No. of Circuits/Distributor*	—	11	11	—	14	14	—	16	16
Suction Connections (in. OD)	—	1⅜	1⅜	—	1⅝	1⅝	—	1⅝	1⅝
Distributor Connections (in. OD)	—	1⅜	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Tube Length (in.)	—	18	13	—	21	13	—	21	21
Distributor Nozzle Size†	—	6	3	—	10	5	—	12	6
Row-Split Coils									
No. of TXVs	—	2	4	—	2	4	—	2	4
No. of Circuits/Distributor*	—	11	11	—	14	14	—	16	16
Suction Connections (in. OD)	—	1⅜	1⅜	—	1⅝	1⅝	—	1⅝	1⅝
Distributor Connections (in. OD)	—	1⅜	1⅜	—	1⅜	1⅜	—	1⅜	1⅜
Distributor Tube Length (in.)	—	18	13	—	21	13	—	21	21
Distributor Nozzle Size†	—	6	3	—	10	5	—	12	6

LEGEND

TXV — Thermostatic Expansion Valve

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 61 medium face area coil has 6 circuits on each distributor; the lower coil has 6 circuits on one distributor and 7 circuits on the other distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

DIRECT EXPANSION COIL CIRCUITING DATA (cont)

MEDIUM FACE AREA COILS (cont)

39T UNIT SIZE	32			39			49		
CIRCUITING TYPE	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**	**Half**	**Full**	**Double**
Airflow (cfm) at 550 fpm		14,785			17,067			21,255	
Total Face Area (sq ft)		26.9			31.0			38.7	
Tubes in Face (Upper/Lower)		38			40			44	
Tube Length (in.)		81½			89⅜			101 3/16	
No. of Circuits — Total	19	38	76	20	40	80	22	44	88
4-Row Coil									
Circuit Equivalent Length (in.)	64.8	37.7	—	70.1	40.3	—	78	44.2	—
Face-Split Coils									
No. of TXVs	2	4	—	2	4	—	2	4	—
No. of Circuits/Distributor*	9,10	9,10	—	10	10	—	11	11	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	1⅛	1⅛	—	1⅛	1⅛	—	1⅜	1⅜	—
Distributor Tube Length (in.)	21	18	—	21	18	—	21	21	—
Distributor Nozzle Size†	15	8	—	17	8	—	20	12	—
Row-Split Coils									
No. of TXVs	2	4	—	4	4	—	4	4	—
No. of Circuits/Distributor*	9,10	9,10	—	5	10	—	5,6	11	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅛	1⅝	—	1⅛	1⅝	—
Distributor Connections (in. OD)	1⅛	1⅛	—	⅞	1⅜	—	⅞	1⅜	—
Distributor Tube Length (in.)	28	18	—	16	18	—	16	21	—
Distributor Nozzle Size†	15	8	—	8	8	—	12	12	—
6-Row Coil									
Circuit Equivalent Length	98	48.3	—	105.9	52.2	—	117.7	58.1	—
Face-Split Coils									
No. of TXVs	2	4	—	2	4	—	2	4	—
No. of Circuits/Distributor*	9,10	9,10	—	10	10	—	11	11	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅜	1⅝	—	1⅜	1⅝	—
Distributor Connections (in. OD)	1⅛	1⅛	—	1⅛	1⅛	—	1⅜	1⅜	—
Distributor Tube Length (in.)	21	18	—	21	18	—	21	21	—
Distributor Nozzle Size†	15	8	—	17	8	—	20	12	—
Row-Split Coils									
No. of TXVs	2	4	—	4	4	—	4	4	—
No. of Circuits/Distributor*	9,10	9,10	—	5	10	—	5,6	11	—
Suction Connections (in. OD)	1⅜	1⅝	—	1⅛	1⅝	—	1⅛	1⅝	—
Distributor Connections (in. OD)	1⅛	1⅛	—	⅞	1⅜	—	⅞	1⅜	—
Distributor Tube Length (in.)	28	18	—	16	18	—	16	21	—
Distributor Nozzle Size†	15	8	—	8	8	—	12	12	—
8-Row Coils									
Circuit Equivalent Length	—	64.8	31.7	—	70.1	34.3	—	78	38.2
Face-Split Coils									
No. of TXVs		4	8	—	4	8	—	4	8
No. of Circuits/Distributor*	—	9,10	9,10	—	10	10	—	11	11
Suction Connections (in. OD)	—	1⅝	1⅝	—	1⅝	1⅝	—	1⅝	1⅝
Distributor Connections (in. OD)	—	1⅛	1⅛	—	1⅛	1⅛	—	1⅜	1⅜
Distributor Tube Length (in.)	—	18	13	—	18	13	—	21	13
Distributor Nozzle Size†	—	8	4	—	8	4	—	12	6
Row-Split Coils									
No. of TXVs	—	4	8	—	4	8	—	4	8
No. of Circuits/Distributor*	—	9,10	9,10	—	10	10	—	11	11
Suction Connections (in. OD)	—	1⅝	1⅝	—	1⅝	1⅝	—	1⅝	1⅝
Distributor Connections (in. OD)	—	1⅜	1⅛	—	1⅜	1⅛	—	1⅜	1⅜
Distributor Tube Length (in.)	—	18	13	—	18	13	—	21	13
Distributor Nozzle Size†	—	8	4	—	8	4	—	12	6

LEGEND

TXV — Thermostatic Expansion Valve

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 61 medium face area coil has 6 circuits on each distributor; the lower coil has 6 circuits on one distributor and 7 circuits on the other distributor.

†Factory-supplied distributors have factory-selected nozzle sizes shown. If necessary, replace factory-supplied nozzles with field-supplied and installed nozzles. Consult Electronic Catalog ACAPS (applied coil and air-handler performance and selection) program for correct nozzle selection.

Physical data (cont)

Carrier®

DIRECT EXPANSION COIL CIRCUITING DATA (cont)

MEDIUM FACE AREA COILS (cont)

39T UNIT SIZE	61						74						92					
CIRCUITING TYPE	**Half**		**Full**		**Double**		**Half**		**Full**		**Double**		**Half**		**Full**		**Double**	
Airflow (cfm) at 550 fpm	26,973						33,191						40,567					
Total Face Area (sq ft)	49.0						60.4						73.6					
Tubes in Face (Upper/Lower)	24/26						26/28						32/34					
Tube Length (in.)	113						128¾						128¾					
No. of Circuits — Total	25		50		100		27		54		108		33		66		132	
COIL SECTIONS	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L
4-Row Coil																		
Circuit Equivalent Length (in.)	85.8	85.8	48.2	48.2	—		96.3	96.3	53.4	53.4	—		96.3	96.3	53.4	53.4	—	
Face-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	6	6,7	12	13	—		6,7	7	13	14	—		8	8,9	16	17	—	
Suction Connections (in. OD)	1⅛	1⅜	1⅜	1⅜	—		1⅛	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—	
Distributor Tube Length (in.)	15	15	18	18	—		15	15	21	21	—		26	26	18	18	—	
Distributor Nozzle Size†	12	12	15	15	—		12	12	17	17	—		20	20	20	20	—	
Row-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	6	6,7	12	13	—		6,7	7	13	14	—		8	8,9	16	17	—	
Suction Connections (in. OD)	1⅛	1⅜	1⅜	1⅜	—		1⅛	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—	
Distributor Tube Length (in.)	21	21	23	23	—		22	22	23	23	—		26	26	28	28	—	
Distributor Nozzle Size†	12	12	15	15	—		12	12	17	17	—		20	20	20	20	—	
6-Row Coil																		
Circuit Equivalent Length	129.5	129.5	64	64	—		145.2	145.2	71.9	71.9	—		145.2	145.2	71.9	71.9	—	
Face-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	6	6,7	12	13	—		6,7	7	13	14	—		8	8,9	16	17	—	
Suction Connections (in. OD)	1⅛	1⅜	1⅜	1⅜	—		1⅛	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—	
Distributor Tube Length (in.)	15	15	18	18	—		15	15	21	21	—		26	26	18	18	—	
Distributor Nozzle Size†	12	12	15	15	—		12	12	17	17	—		20	20	20	20	—	
Row-Split Coils																		
No. of TXVs	2	2	2	2	—		2	2	2	2	—		2	2	2	2	—	
No. of Circuits/Distributor*	6	6,7	12	13	—		6,7	7	13	14	—		8	8,9	16	17	—	
Suction Connections (in. OD)	1⅛	1⅜	1⅜	1⅜	—		1⅛	1⅜	1⅝	1⅝	—		1⅜	1⅜	1⅝	1⅝	—	
Distributor Connections (in. OD)	⅞	⅞	1⅜	1⅜	—		⅞	⅞	1⅜	1⅜	—		1⅛	1⅛	1⅜	1⅜	—	
Distributor Tube Length (in.)	21	21	23	23	—		22	22	23	23	—		26	26	28	28	—	
Distributor Nozzle Size†	12	12	15	15	—		12	12	17	17	—		20	20	20	20	—	
8-Row Coils																		
Circuit Equivalent Length	—		85.8	85.8	42.2	42.2	—		96.3	96.3	47.4	47.4	—		96.3	96.3	47.4	47.4
Face-Split Coils																		
No. of TXVs	—		2	2	4	4	—		2	2	4	4	—		2	2	4	4
No. of Circuits/Distributor*	—		12	13	12	13	—		13	14	13	14	—		16	17	16	17
Suction Connections (in. OD)	—		1⅜	1⅝	1⅜	1⅝	—		1⅝	1⅝	1⅝	1⅝	—		1⅝	1⅝	1⅝	1⅝
Distributor Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜
Distributor Tube Length (in.)	—		18	18	18	18	—		21	21	21	21	—		18	18	18	18
Distributor Nozzle Size†	—		15	15	6	6	—		17	17	8	8	—		20	20	10	10
Row-Split Coils																		
No. of TXVs	—		2	2	4	4	—		2	2	4	4	—		2	2	4	4
No. of Circuits/Distributor*	—		12	13	12	13	—		13	14	13	14	—		16	17	16	17
Suction Connections (in. OD)	—		1⅜	1⅝	1⅜	1⅝	—		1⅝	1⅝	1⅝	1⅝	—		1⅝	1⅝	1⅝	1⅝
Distributor Connections (in. OD)	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜	—		1⅜	1⅜	1⅜	1⅜
Distributor Tube Length (in.)	—		23	23	18	18	—		23	23	21	21	—		28	28	18	18
Distributor Nozzle Size†	—		15	15	6	6	—		17	17	8	8	—		20	20	10	10

LEGEND

L — Lower
TXV — Thermostatic Expansion Valve
U — Upper

*Where each distributor has the same number of circuits, that number is shown once. When a coil has an uneven number of circuits per distributor, both values are shown. For example, the upper coil of a half-circuit size 61 medium face area coil has 6 circuits on both distributors; the lower coil has 6 circuits on one distributor and 7 circuits on the other distributor.

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COIL VOLUME (gal. water)

39T UNIT SIZE	07	09	11	13	17	21	26	32	39	49	61	74	92
CHILLED WATER													
Large Face Area													
4-Row	2.5	3.3	3.9	4.8	6.0	7.7	9.6	13.0	16.0	20.0	25.0	30.0	38.0
6-Row	3.7	5.0	5.8	7.3	9.0	11.6	14.4	20.0	24.0	30.0	38.0	46.0	57.0
8-Row	5.0	6.6	7.8	9.7	12.0	15.4	19.2	27.0	32.0	40.0	50.0	61.0	75.0
10-Row	6.2	8.3	9.7	12.1	15.0	19.3	24.0	33.0	40.0	51.0	63.0	76.0	94.0
Medium Face Area													
4-Row	1.9	2.7	3.2	4.0	4.7	6.4	8.1	11.0	13.0	16.0	20.0	25.0	30.0
6-Row	2.9	4.1	4.8	6.0	7.1	9.5	12.1	17.0	19.0	24.0	30.0	37.0	46.0
8-Row	3.9	5.4	6.3	8.1	9.4	12.7	16.1	22.0	26.0	32.0	40.0	50.0	61.0
10-Row	4.8	6.8	7.9	10.1	11.8	15.9	20.2	28.0	32.0	40.0	50.0	62.0	76.0
Bypass Face Area													
4-Row	1.9	2.7	3.2	4.0	4.7	6.4	8.1	11.0	13.0	16.0	20.0	24.0	30.0
6-Row	2.9	4.1	4.8	6.0	7.1	9.5	12.1	17.0	19.0	24.0	30.0	36.0	46.0
8-Row	3.9	5.4	6.3	8.1	9.4	12.7	16.1	22.0	26.0	32.0	40.0	48.0	61.0
10-Row	4.8	6.8	7.9	10.1	11.8	15.9	20.2	28.0	32.0	40.0	50.0	60.0	76.0
HOT WATER													
Large Face Area													
1-Row	0.6	0.8	1.0	1.2	1.5	1.9	2.4	—	—	—	—	—	—
2-Row	1.2	1.7	1.9	2.4	3.0	3.9	4.8	—	—	—	—	—	—
Medium Face Area													
1-Row	—	—	—	—	—	—	—	2.8	3.2	4.0	5.0	6.2	7.6
2-Row	—	—	—	—	—	—	—	5.5	6.4	7.9	10.1	12.4	15.2
Bypass Face Area													
1-Row	0.5	0.7	0.8	1.0	1.2	1.6	2.0	2.0	2.4	3.1	4.0	4.8	5.7
2-Row	1.0	1.4	1.6	2.0	2.4	3.2	4.0	4.1	4.8	6.1	8.1	9.7	11.5

NOTE: One gallon of water weighs 8.33 lbs.

CHILLED WATER COIL CONNECTION SIZES

CIRCUIT TYPE	FACE AREA	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
		Nozzle Size (in. MPT)												
HALF	**LARGE, MEDIUM, BYPASS**	1½	1½	1½	2½	2½	2½	2½	—	—	—	—	—	—
FULL		2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
DOUBLE	**LARGE**	2½	2½	2½	3	3	3	3	3	3	3	3	3	3
	MEDIUM	2½	2½	2½	2½	3	3	3	3	3	3	3	3	3
	BYPASS	2½	2½	2½	2½	3	3	3	2½	2½	2½	3	3	3

NOTE: The following sizes have two coils: Large and bypass face area — sizes 32-92, medium face area — sizes 61-92.

HOT WATER COIL CONNECTION SIZES

FACE AREA	39T UNIT SIZE												
	07	09	11	13	17	21	26	32	39	49	61	74	92
	Nozzle Size (in. MPT)												
LARGE	1½	1½	1½	1½	1½	1½	1½	—	—	—	—	—	—
MEDIUM	—	—	—	—	—	—	—	2½	2½	2½	1½	1½	1½
BYPASS	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	2½	2½	1½

NOTE: The following sizes have two coils: medium face area — sizes 61-92, bypass face area — size 92.

Physical data (cont)

STEAM COIL CONNECTION SIZES

FACE AREA	CONNECTION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
		Nozzle Size (in. MPT)												
LARGE	Inlet	3	3	3	3	3	3	3	—	—	—	—	—	—
	Outlet	2	2	2	2	2	2	2	—	—	—	—	—	—
MEDIUM	Inlet	—	—	—	—	—	—	—	3	3	3	3	3	3
	Outlet	—	—	—	—	—	—	—	2	2	2	2	2	2
BYPASS	Inlet	2½	3	3	3	3	3	3	3	3	3	3	3	3
	Outlet	1½	2	2	2	2	2	2	2	2	2	2	2	2

NOTE: The following sizes have two coils: medium face area — sizes 61-92; bypass face area — size 92.

OPERATING CHARGE (Approximate) — DIRECT EXPANSION COIL

NUMBER OF ROWS	FACE AREA	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
		Refrigerant R-22 (lb)												
4	Large	4	5	5	6	8	11	13	14	19	21	30	38	45
	Medium	3	4	5	5	7	9	11	10	12	19	21	30	38
6	Large	5	7	7	9	12	15	19	25	31	39	47	53	66
	Medium	4	6	7	8	10	13	15	19	24	31	39	47	53
8	Large	7	8	10	12	15	20	24	35	40	48	60	70	87
	Medium	5	7	9	10	13	16	21	30	32	40	48	60	70

COIL MOISTURE BLOWOFF LIMITS (Fpm)

FINS PER INCH	ALUMINUM FINS	COPPER FINS
8	550	500
11	550	425
14	550	375

NOTE: See ACAPS (applied coil and air handler performance and selection) computer program for specific limitations. Data shown is for general use in ''worst case'' conditions.

FILTERS

39T UNIT SIZE	07	09	11	13	17	21	26	32	39	49	61	74	92
FLAT FILTER (FLT1)													
Cell Size (in.)	20x20x2 or 20x20x4												
Quantity	1	—	—	—	—	—	3	2	—	6	12	7	9
Cell Size (in.)	16x25x2 or 16x25x4												
Quantity	—	1	—	4	3	4	4	2	2	2	—	—	1
Cell Size (in.)	20x25x2 or 20x25x4												
Quantity	—	2	3	—	3	3	2	5	8	4	6	14	15
Cell Size (in.)	16x20x2 or 16x20x4												
Quantity	2	—	—	2	—	—	—	—	—	3	—	—	—
Nominal Face Area (sq ft)	7.2	9.7	10.4	15.6	18.8	21.5	26.4	28.5	33.3	41.7	54.2	68.0	79.9
ANGLE (ANG1) AND FILTER MIXING BOX (FMB1-FMB4) FILTER													
Cell Size (in.)	16x20x2												
Quantity	—	—	6	3	—	16	15	10	—	18	7	14	18
Cell Size (in.)	16x25x2												
Quantity	4	6	3	6	9	—	5	10	20	12	28	28	36
Nominal Face Area (sq ft)	11.1	16.7	21.7	23.3	25.0	35.6	47.2	50.0	55.5	73.3	93.3	108.8	140
BAG/CARTRIDGE FILTER (BCF1,BCF2)													
Cell Size (in.)	24x24												
Quantity	2*	2	2	—	3	2	4	6	8	8	10	10	15
Cell Size (in.)	24x20												
Quantity	—	—	—	3	—	4	4	2	—	—	—	7	3
Cell Size (in.)	24x12												
Quantity	—	—	1	3	3	1	—	—	—	6	5	—	5
Nominal Face Area (sq ft)	8.0	8.0	10.0	16.0	18.0	23.3	29.3	30.7	32.0	44.0	50.0	63.3	80.0

*For BCF2 size 07 only, do not use two 24-in. x 24-in. filters — use four 24-in. x 12-in. filters.

NOTES:
1. Do not exceed filter manufacturer's velocity limits when selecting filters.
2. Flat filter section accepts either 1-in., 2-in., or 4-in. standard-type filters.
3. Angle filter section and filter mixing box sections accept 2-in. nominal size filters.
4. Bag-cartridge filter sections accept 2-in. pre-filters. Filters must be a combination of bag filters in sizes shown or 6-in. or 12-in. deep rigid media filters with header. Filter section accepts ⅞-in. headers.
5. All filters are field supplied.
6. Filters that have cardboard-type frames are usually not suitable for use in flat or bag-cartridge filter sections.
7. For bag filters longer than 12 in., add ACC1 (1 ft - 10¹⁄₁₆ in. airway length) as required.

Physical data (cont)

COMPONENT WEIGHTS (Lb) (Single-Wall Casing)*

SECTION TYPE	COMPONENT†	39T UNIT SIZE						
		07	09	11	13	17	21	26
FAN	AFS3	375	500	625	775	925	1050	1300
	AFS4	375	500	625	775	925	1050	1300
	AFS5	375	500	625	775	925	1050	1300
	FCS3	325	550	575	725	875	1000	1350
	FCS4	325	550	575	725	875	1000	1350
	FCS5	325	550	575	725	875	1000	1350
	PAF3	—	—	710	900	1025	1160	1415
	PAF5	—	—	710	900	1025	1160	1415
	RAF2	375	500	625	775	925	1050	1300
	RFC2	325	550	575	725	875	1000	1350
COIL	LCS1	80	120	160	200	240	280	540
	MCS1	80	120	160	200	240	280	340
	MHS1	50	60	70	90	110	130	160
	VCS1	175	250	300	375	450	525	600
	BPH1	145	163	185	200	220	245	270
	BPH2	228	246	268	283	303	328	353
	BCC2	80	120	160	200	240	280	540
	EHS1	154	168	190	204	226	260	306
	BCS1	380	450	520	600	690	790	900
	BCS2	380	450	520	600	690	790	900
	BCS3	260	310	350	390	450	550	650
	BCS4	260	310	350	390	450	550	650
	BCS7	220	270	305	340	400	490	595
DAMPER	ZDS1	125	140	155	173	190	205	225
	ZDS2	125	140	155	173	190	205	225
	FBP1	118	150	176	212	250	298	340
	EXB1	150	180	200	240	365	395	425
	EXB2	150	180	200	240	365	395	425
DIFFUSER	DIF2	140	147	158	169	180	191	204
MIXING BOX	MXB1	160	190	230	275	400	450	500
	MXB5	160	190	230	275	400	450	500
	MXB6	160	190	230	275	400	450	500
	MXB7	160	190	230	275	400	450	500
FILTER MIXING BOX	FMB1	300	330	380	425	575	625	675
	FMB2	300	330	380	425	575	625	675
	FMB3	300	330	380	425	575	625	675
	FMB4	300	330	380	425	575	625	675
ACCESS	ACC1	67	75	83	91	99	107	115
AIR MIXER	AMX1	220	233	252	360	392	422	448
FILTER	ANG1	125	148	170	194	212	233	254
	BCF1	138	154	170	188	210	250	304
	BCF2	212	246	282	328	368	404	445
	FLT1	94	102	118	130	142	154	166

*For double-wall casing, multiply by 1.25.
†For complete component definition, see page 9.

NOTES:
1. Coil section weights are without coil. See separate table, page 28, for dry coil weights.
2. Fan section weights are without motors. See separate table, page 29, for motor weights.
3. Filter section weights are without filters. Filters are not shipped with the unit.

COMPONENT WEIGHTS (Lb) (Single-Wall Casing)* (cont)

SECTION TYPE	COMPONENT†	39T UNIT SIZE					
		32	39	49	61	74	92
FAN	AFS3	1776	1957	2415	2840	3304	3880
	AFS4	1776	1957	2415	2840	3304	3880
	AFS5	1776	1957	2415	2840	3304	3880
	FCS3	1654	1825	2180	2479	—	—
	FCS4	1654	1825	2180	2479	—	—
	FCS5	1654	1825	2180	2479	—	—
	PAF3	1900	2090	2555	2995	3475	4055
	PAF5	1900	2090	2555	2995	3475	4055
	RAF2	1776	1957	2415	2840	3304	3880
	RFC2	1654	1825	2180	2479	—	—
COIL	LCS1	577	651	754	876	995	1210
	MCS1	383	422	487	592	649	730
	MHS1	340	378	440	514	586	665
	VCS1	677	775	965	1160	—	—
	BPH1	340	378	440	514	586	665
	BPH2	425	467	537	621	703	790
	BCC2	577	651	754	876	995	1210
	EHS1	354	402	466	542	616	697
	BCS1	1022	1160	1434	1719	1965	2406
	BCS2	1022	1160	1434	1719	1965	2406
	BCS3	753	853	1074	1288	1483	1845
	BCS4	753	853	1074	1288	1483	1845
	BCS7	671	759	952	1131	1308	1634
DAMPER	ZDS1	241	266	333	366	452	452
	ZDS2	241	266	333	366	452	452
	FBP1	380	428	490	594	666	745
	EXB1	498	622	700	862	1010	1110
	EXB2	498	622	700	862	1010	1110
AIR MIXER	AMX1	568	629	680	883	1172	1217
MIXING BOX	MXB1	574	712	814	1002	1178	1310
	MXB5	574	712	814	1002	1178	1310
	MXB6	574	712	814	1002	1178	1310
	MXB7	574	712	814	1002	1178	1310
FILTER MIXING BOX	FMB1	775	910	1014	1200	1377	1510
	FMB2	775	910	1014	1200	1377	1510
	FMB3	775	910	1014	1200	1377	1510
	FMB4	775	910	1014	1200	1377	1510
ACCESS	ACC1	123	130	139	152	166	174
DIFFUSER	DIF2	218	230	244	262	278	292
FILTER	ANG1	273	292	325	365	393	432
	BCF1	354	402	466	542	613	698
	BCF2	484	533	608	699	785	880
	FLT1	178	192	220	255	281	314

*For double-wall casing, multiply by 1.25.
†For complete component definition, see page 9.

NOTES:
1. Coil section weights are without coil. See separate table, page 28, for dry coil weights.
2. Fan section weights are without motors. See separate table, page 29, for motor weights.
3. Filter section weights are without filters. Filters are not shipped with the unit.

Physical data (cont)

DRY COIL WEIGHTS (Lb)

COIL TYPE	FACE AREA	ROWS	FINS PER IN.	39T UNIT SIZE												
				07	09	11	13	17	21	26	32	39	49	61	74	92
CHILLED WATER OR DIRECT EXPANSION	LARGE	4	8	123	146	172	204	245	305	367	476	556	745	914	967	1183
			11	127	150	177	211	252	315	379	491	575	771	946	1001	1225
			14	130	154	182	217	260	325	392	507	593	797	978	1035	1266
		6	8	166	196	235	283	340	426	516	669	784	1062	1308	1385	1696
			11	171	203	245	292	352	441	534	692	812	1100	1356	1436	1759
			14	176	209	251	302	363	455	552	716	839	1139	1405	1487	1821
		8	8	207	246	298	359	434	544	662	858	1007	1372	1695	1795	2199
			11	214	255	308	372	449	564	686	889	1044	1423	1759	1863	2282
			14	221	263	318	385	464	583	710	920	1080	1474	1822	1930	2364
		10*	8	249	296	360	436	527	663	808	1047	1230	1682	2082	2205	2702
			11	258	306	373	452	546	687	838	1086	1276	1745	2161	2289	2805
			14	266	317	385	468	566	711	868	1124	1321	1809	2240	2373	2908
	MEDIUM	4	8	102	130	145	174	198	256	313	378	427	516	673	805	967
			11	104	134	149	179	204	264	323	391	441	534	696	833	1001
			14	107	138	154	185	210	272	334	403	456	552	720	861	1035
		6	8	136	176	199	240	274	357	440	533	604	734	956	1151	1385
			11	141	182	205	248	283	369	455	551	625	761	993	1194	1436
			14	145	187	212	256	293	381	470	570	647	787	1028	1236	1487
		8	8	170	221	251	305	349	455	563	684	777	948	1238	1491	1795
			11	176	229	259	315	361	472	584	709	806	983	1284	1547	1863
			14	182	236	268	326	373	488	604	733	834	1018	1329	1603	1930
		10*	8	206	268	305	372	427	558	692	841	958	1171	1529	1845	2222
			11	213	278	316	386	442	579	718	872	993	1215	1586	1915	2307
			14	220	287	327	399	458	599	743	903	1029	1258	1644	1985	2391
	BYPASS	4	8	102	130	145	174	198	256	313	407	456	559	673	805	967
			11	104	134	149	179	204	264	323	420	471	578	696	833	1001
			14	107	138	154	185	210	272	334	433	486	596	720	861	1035
		6	8	136	176	199	240	274	357	440	570	641	787	958	1151	1385
			11	141	182	205	248	283	369	455	589	663	815	993	1194	1436
			14	145	187	212	256	293	381	470	609	686	843	1028	1236	1487
		8	8	170	221	251	305	349	455	563	729	822	1011	1238	1491	1795
			11	176	229	259	315	361	472	584	755	852	1048	1284	1547	1863
			14	182	236	268	326	373	488	604	781	882	1084	1329	1603	1930
		10*	8	206	268	305	372	427	558	692	895	1011	1244	1529	1845	2222
			11	213	278	316	386	442	579	718	928	1049	1290	1586	1915	2307
			14	220	287	327	399	458	599	743	961	1086	1336	1644	1985	2391
HOT WATER	LARGE	1	8	45	55	60	70	81	100	118	—	—	—	—	—	—
			11	46	56	62	71	84	102	121	—	—	—	—	—	—
			14	47	58	63	73	86	105	124	—	—	—	—	—	—
		2	8	59	72	79	93	109	134	159	—	—	—	—	—	—
			11	60	74	82	95	112	138	164	—	—	—	—	—	—
			14	62	76	84	98	116	142	169	—	—	—	—	—	—
	MEDIUM	1	8	—	—	—	—	—	—	—	121	135	160	213	250	296
			11	—	—	—	—	—	—	—	124	139	165	220	258	305
			14	—	—	—	—	—	—	—	128	143	170	227	266	315
		2	8	—	—	—	—	—	—	—	164	184	220	295	349	412
			11	—	—	—	—	—	—	—	169	190	227	305	361	427
			14	—	—	—	—	—	—	—	174	196	235	315	373	441
	BYPASS	1	8	37	47	51	60	67	84	101	93	105	128	159	183	234
			11	38	48	53	61	69	87	104	96	108	132	164	189	242
			14	39	50	54	63	71	89	107	99	111	135	169	195	249
		2	8	48	61	67	79	90	113	137	127	143	176	220	256	327
			11	49	63	69	82	92	117	141	131	148	181	228	265	338
			14	51	65	71	84	95	120	146	135	152	187	235	273	349
STEAM	LARGE	1	6	110	110	125	150	180	230	245	—	—	—	—	—	—
			9	115	130	145	175	210	265	285	—	—	—	—	—	—
			12	130	145	165	200	240	305	360	—	—	—	—	—	—
	MEDIUM		6	—	—	—	—	—	—	—	250	285	325	435	515	615
			9	—	—	—	—	—	—	—	290	330	370	505	600	715
			12	—	—	—	—	—	—	—	365	420	475	640	770	950
	BYPASS		6	80	102	115	140	145	190	195	195	220	260	330	390	475
			9	93	116	130	160	165	215	220	225	255	300	390	455	550
			12	108	132	150	185	190	255	275	280	325	375	505	595	705

*Chilled water only.

NOTES:
1. Weights shown include headers and are the sum of two coils where applicable.
2. Coils are full-length.
3. Weights shown are for aluminum-fin coils; for copper fins, multiply by 1.20.
4. To obtain approximate wet (filled) weight, multiply by 1.20.

MOTOR WEIGHTS (Lb)

OPEN DRIP-PROOF (ODP)

MOTOR TYPE	MOTOR HP															
	1	**1.5**	**2**	**3**	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**75**	**100**
Standard	35	56	65	59	71	97	110	159	205	229	274	335	375	460	504	722
High Efficiency	36	42	43	66	78	107	118	220	260	286	274	481	516	740	798	1015

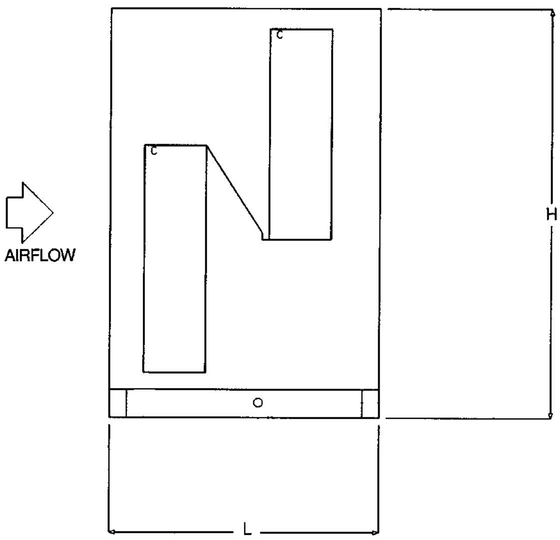
NOTES:
1. Weight of sheaves and belts not included.
2. Motor weights vary by vendor.

TOTALLY ENCLOSED FAN COOLED (TEFC)

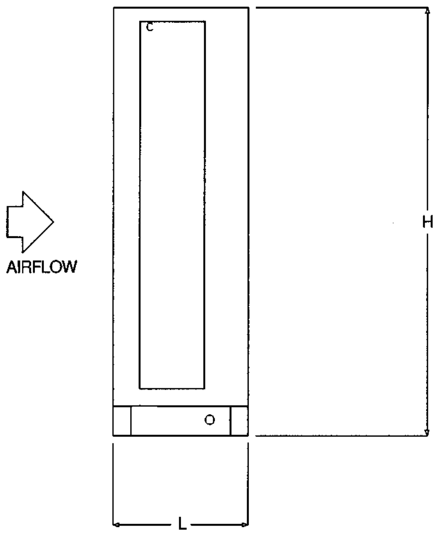
MOTOR TYPE	MOTOR HP															
	1	**1.5**	**2**	**3**	**5**	**7.5**	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**75**	**100**
Standard	48	76	80	77	105	149	179	289	340	431	395	477	526	770	865	1273
High Efficiency	48	46	45	75	95	146	160	238	300	335	390	533	568	789	855	1394

NOTES:
1. Weight of sheaves and belts not included.
2. Motor weights vary by vendor.

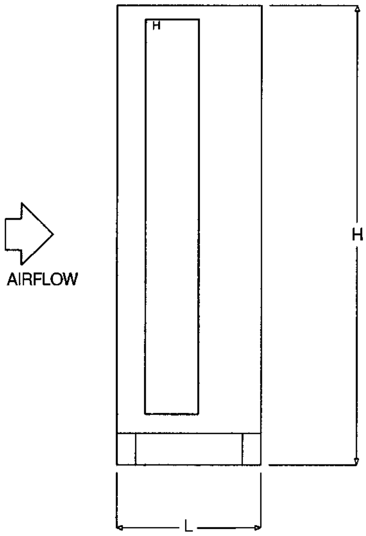
COMPONENT DIMENSIONS



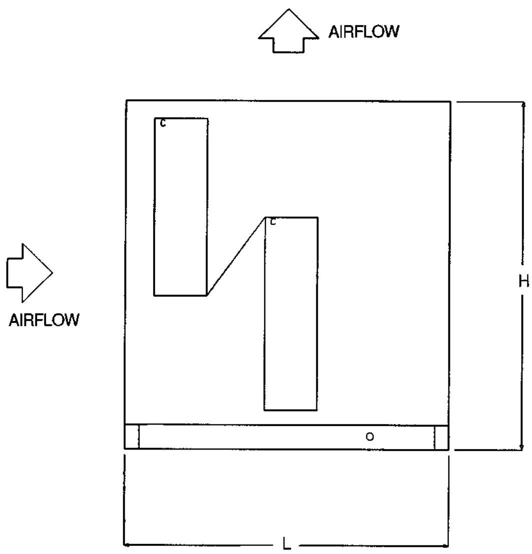
LCS1 — SIDE VIEW



MCS1 — SIDE VIEW



MHS1 — SIDE VIEW



VCS1 — SIDE VIEW

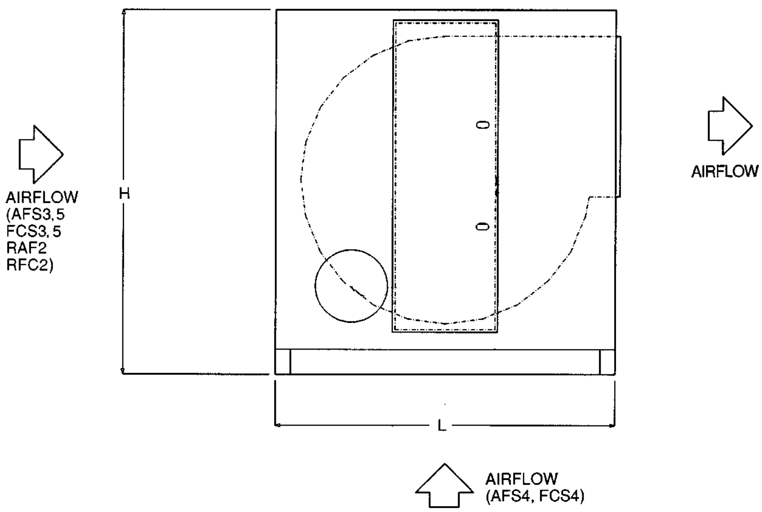
DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
LCS1	L	1- 6⅛	1-6⅛	1-6⅛	1-6⅛	1- 6⅛	1-6⅛	1-6⅛	3-1 13/16	3-1 13/16	3-1 13/16	3- 1 13/16	3- 1 13/16	3- 5¾
	W*	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10- 4½	11- 8¼	11- 8¼
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6- 5 9/16	6- 9 9/16	8- 1¼
MCS1	L	1- 6⅛	1-6⅛	1-6⅛	1-6⅛	1- 6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛	1-10 1/16	1-10 1/16	1-10 1/16
	W*	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10- 4½	11- 8¼	11- 8¼
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6- 5 9/16	6- 9 9/16	8- 1¼
MHS1	L	1- 2 3/16	1-2 3/16	1-2 3/16	1-2 3/16	1- 2 3/16	1-2 3/16	1-2 3/16	1-6⅛	1-6⅛	1-6⅛	1- 6⅛	1- 6⅛	1- 6⅛
	W*	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10- 4½	11- 8¼	11- 8¼
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6- 5 9/16	6- 9 9/16	8- 1¼
VCS1	L	2- 5 15/16	2-9⅞	2-9⅞	3-1 13/16	3- 5¾	3-9 11/16	4-1⅝	4-5 9/16	4-9½	5-5⅜	6- 1¼	—	—
	W*	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10- 4½	—	—
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6- 5 9/16	—	—

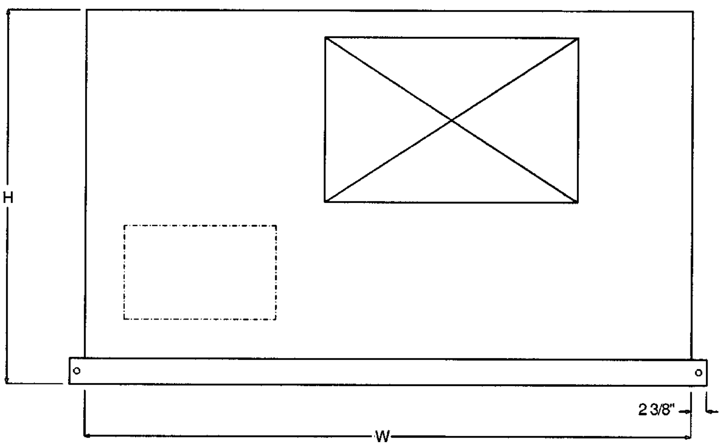
*Not shown. See fan sections on page 31 for typical end view.

NOTES:
1. LCS1 and VCS1 sizes 32-92 shown; size 07-26 sections have one coil.
2. Length includes flanges on both sides of component.

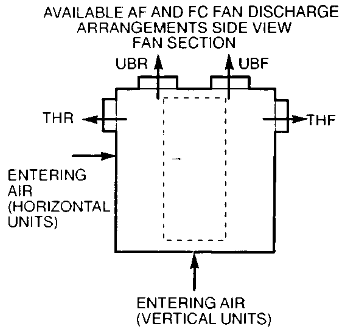
COMPONENT DIMENSIONS (cont)



ALL AFS, FCS, RAF, AND RFC — SIDE VIEW



ALL AFS, FCS, RAF, AND RFC — END VIEW



LEGEND

AF — Airfoil
FC — Forward-Curved
THF — Top Horizontal Front
THR — Top Horizontal Rear
UBF — Upblast Front
UBR — Upblast Rear

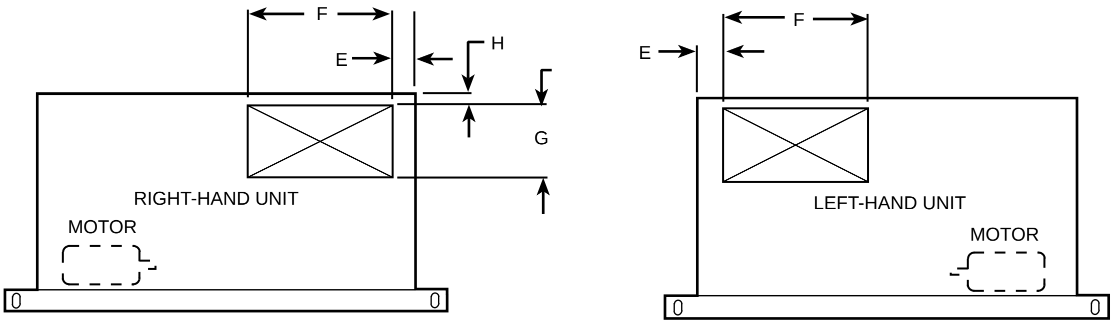
DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74*	92*
AFS3,4 FCS3,4	L	2- 4 3/4	2-8 11/16	2-8 11/16	3-0 5/8	3- 4 9/16	3-8 1/2	4-0 7/16	4-4 3/8	4-8 5/16	5-4 3/16	6-0 1/16	6-4 5/8	7-7 3/4
	W	4- 5 11/16	4-9 5/8	5-5 1/2	6-1 3/8	6- 5 1/4	6-9 1/4	7-5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3-2 1/4	3-2 1/4	3-6 13/16	3-10 1/8	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4
AFS5 FCS5	L	2- 5 15/16	2-9 7/8	2-9 7/8	3-1 13/16	3- 5 3/4	3-9 11/16	4-1 5/8	4-5 9/16	4-9 1/2	5-5 3/8	6-1 1/4	6-5 13/16	7-8 15/16
	W	4- 5 11/16	4-9 5/8	5-5 1/2	6-1 3/8	6- 5 1/4	6-9 1/4	7-5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3-2 1/4	3-2 1/4	3-6 13/16	3-10 1/8	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4
RAF2, RFC2	L	3- 1 13/16	3-5 3/4	3-5 3/4	3-9 11/16	4- 1 5/8	4-5 9/16	4-9 1/2	5-1 7/16	5-5 3/8	6-1 1/4	6-9 1/8	7-1 1/16	8-4 13/16
	W	4- 5 11/16	4-9 5/8	5-5 1/2	6-1 3/8	6- 5 1/4	6-9 1/4	7-5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3-2 1/4	3-2 1/4	3-6 13/16	3-10 1/8	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4

*AFS and RAF only.

NOTES:
1. Length of AFS3,4 and FCS3,4 includes flange on one side of component. Length of AFS5, FCS5, RAF2, and RFC2 includes flanges on both sides of component.
2. See following page for discharge dimensions.

COMPONENT DIMENSIONS (cont)

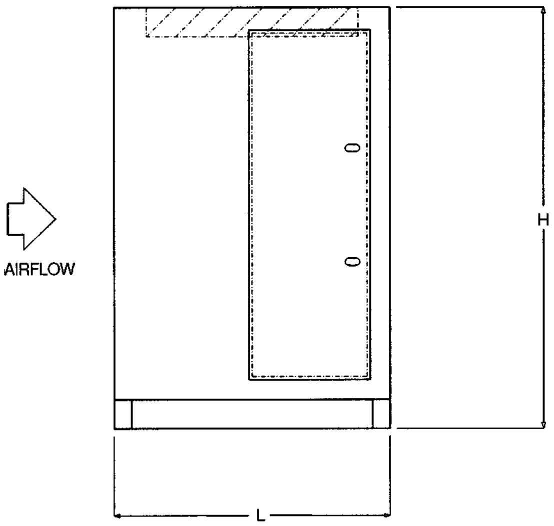


ALL AFS, FCS, RAF, AND RFC DISCHARGE DIMENSIONS — END VIEW, THF LOCATION SHOWN

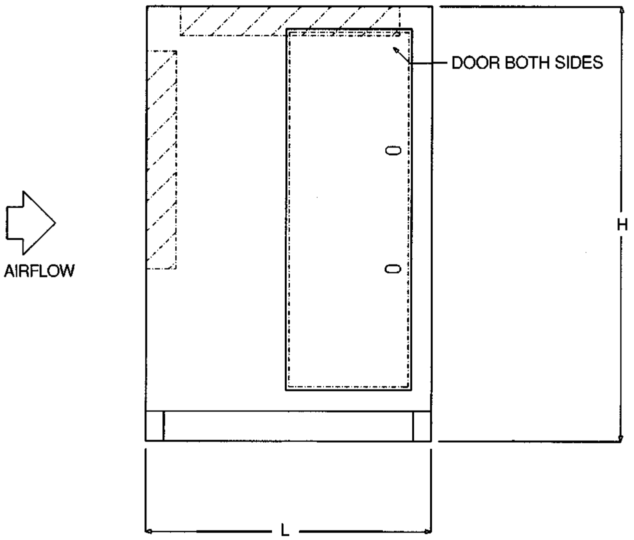
DIMENSIONS (ft-in.)

UNIT SIZE	TYPE OF FAN WHEEL							
	Forward-Curved (FCS, RFC Fans)				Airfoil (AFS, RAF Fans)			
	E	F	G	H	E	F	G	H
07	1- 1 15/16	1- 1 15/16	1- 2 11/16	0-4 3/16	0-11 1/4	1- 7 1/4	1- 1 7/16	0-4 3/16
09	1- 3 3/4	1- 2 1/2	1- 5 13/16	0-4 3/16	1- 0 1/4	1- 9 1/4	1- 2 1/4	0-4 3/16
11	1- 5 11/16	1- 6 5/16	1- 5 13/16	0-4 3/16	1- 3	1-11 5/8	1- 4 1/4	0-4 3/16
13	1- 6 3/4	1- 6 13/16	2- 0 1/2	0-4 3/16	1- 3 1/4	2- 1 15/16	1- 6 1/4	0-4 3/16
17	1- 8 7/8	1- 7 13/16	2- 2 5/16	0-4 3/16	1- 4 7/16	2- 4 11/16	1- 7 13/16	0-4 3/16
21	1- 8 1/4	2- 1	2- 3 3/8	0-4 3/16	1- 4 15/16	2- 7 5/8	1- 7 1/2	0-4 3/16
26	1-11 3/4	2- 1 7/8	2- 9 5/16	0-4 3/16	1- 7 1/8	2-11 1/8	1-11 7/16	0-4 3/16
32	1-10 7/8	2- 4 1/8	2- 7 3/8	0-4 1/2	1- 5 1/2	3- 2 7/8	2- 1 9/16	0-4 1/8
39	2- 3 1/16	2- 7 5/8	2-11 1/4	0-4 1/8	1- 9 3/8	3- 7	2- 3 3/8	0-4 1/8
49	2- 7 3/4	2-10 1/8	3- 2 5/16	0-5 11/16	1-10 9/16	4- 4 3/8	2-11 5/16	0-4 1/8
61	3- 0 5/8	3- 0 1/8	4- 3 1/16	0-4 1/8	2- 1 7/8	4- 9 5/8	3- 3 1/8	0-4 1/8
74	—	—	—	—	2- 4 1/2	5- 4 1/4	3- 7 1/16	0-4 1/8
92	—	—	—	—	2- 4 1/2	5- 4 1/4	3- 8 15/16	0-6 5/16

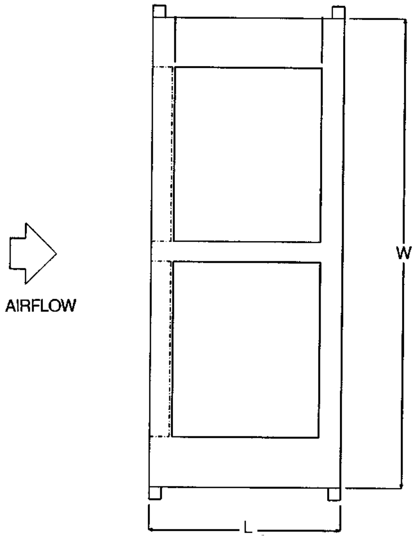
COMPONENT DIMENSIONS (cont)



EXB1, EXB2 — SIDE VIEW



MXB5, MXB7 — SIDE VIEW



EXB1, EXB2, MXB5, MXB7 — TOP VIEW

DIMENSIONS (ft-in.)

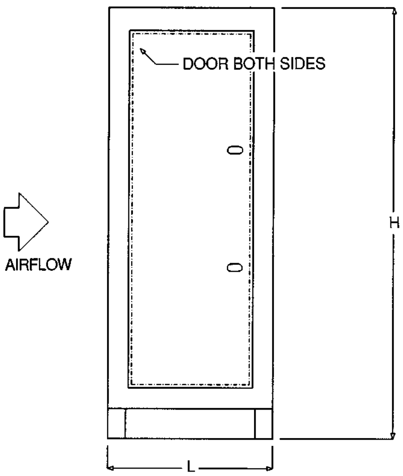
COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
EXB1 EXB2 MXB5 MXB7	L	2- 5 15/16	2-5 15/16	2-5 15/16	2-5 15/16	3- 1 13/16	3-1 13/16	3-1 13/16	3-1 13/16	3-5 3/4	3-5 3/4	4-1 5/8	4-5 9/16	4-5 9/16
	W	4- 5 11/16	4-9 5/8	5-5 1/2	6-1 3/8	6- 5 1/4	6-9 1/4	7-5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3-2 1/4	3-2 1/4	3-6 13/16	3-10 1/8	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4
	DAMPER AREA*	3.4	4.6	5.7	6.5	7.8	10.5	13.1	13.3	15.9	19.4	25.4	28.1	28.1

*Area in sq ft per face (rear or top).

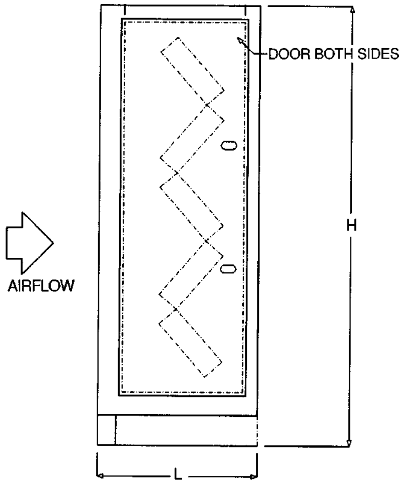
NOTE: Length includes flanges on both sides of component.

Dimensions (cont)

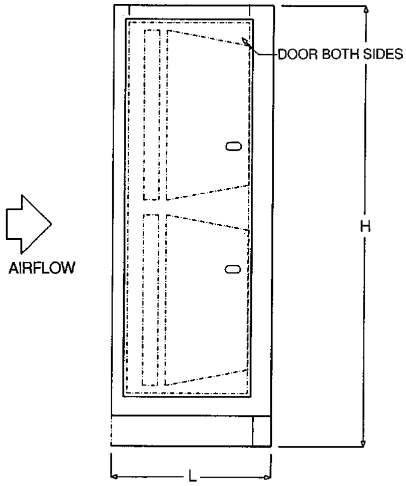
COMPONENT DIMENSIONS (cont)



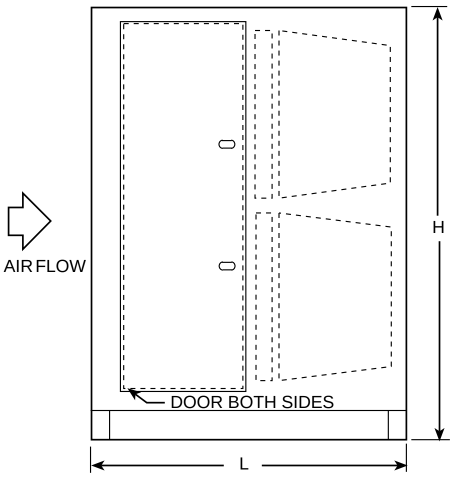
ACC1 — SIDE VIEW



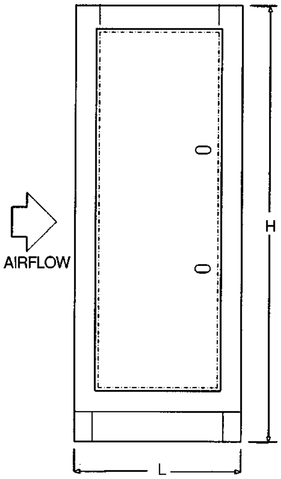
ANG1 — SIDE VIEW



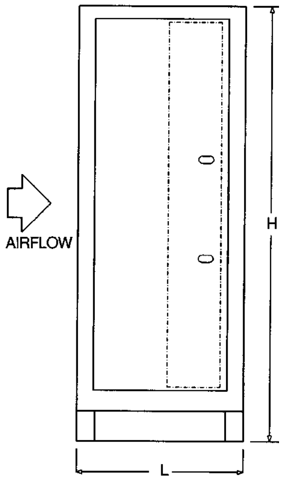
BCF1 — SIDE VIEW



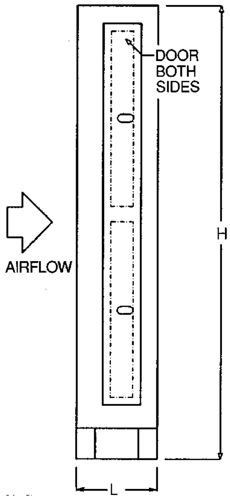
BCF2 — SIDE VIEW



DIF2 — SIDE VIEW



EHS1 — SIDE VIEW



FLT1 — SIDE VIEW

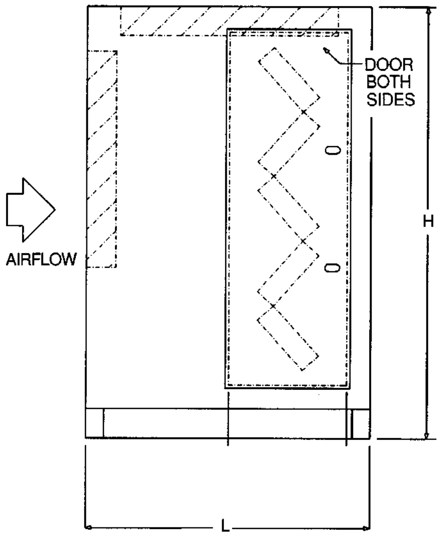
DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
ACC1 ANG1 BCF1 DIF2 EHS1	L	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16
	W*	4- 5 11/16	4- 9 5/8	5- 5 1/2	6- 1 3/8	6- 5 1/4	6- 9 1/4	7- 5 1/16	7- 9 1/16	8- 4 7/8	9- 4 3/4	10- 4 1/2	11- 8 1/4	11- 8 1/4
	H	2-10 1/4	3- 2 1/4	3- 2 1/4	3- 6 13/16	3-10 1/8	4- 6	4- 9 15/16	4- 9 15/16	5- 1 13/16	5- 9 3/4	6- 5 9/16	6- 9 9/16	8- 1 1/4
BCF2	L	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3- 5 3/4	3 -5 3/4	3- 5 3/4	3- 5 3/4
	W*	4- 5 11/16	4- 9 5/8	5- 5 1/2	6- 1 3/8	6- 5 1/4	6- 9 1/4	7- 5 1/16	7- 9 1/16	8- 4 7/8	9- 4 3/4	10- 4 1/2	11- 8 1/4	11- 8 1/4
	H	2-10 1/4	3- 2 1/4	3- 2 1/4	3- 6 13/16	3-10 1/8	4- 6	4- 9 15/16	4- 9 15/16	5- 1 13/16	5- 9 3/4	6 -5 9/16	6- 9 9/16	8- 1 1/4
FLT1	L	0-10 1/4	0-10 1/4	0-10 1/4	0- 10 1/4	0-10 1/4	0-10 1/4	0-10 1/4	0-10 1/4	0-10 1/4	0-10 1/4	0-10 1/4	0-10 1/4	0-10 1/4
	W*	4- 5 11/16	4- 9 5/8	5- 5 1/2	6- 1 3/8	6- 5 1/4	6- 9 1/4	7- 5 1/16	7- 9 1/16	8- 4 7/8	9- 4 3/4	10- 4 1/2	11- 8 1/4	11- 8 1/4
	H	2-10 1/4	3- 2 1/4	3- 2 1/4	3- 6 13/16	3-10 1/8	4- 6	4- 9 15/16	4- 9 15/16	5- 1 13/16	5- 9 3/4	6- 5 9/16	6- 9 9/16	8- 1 1/4

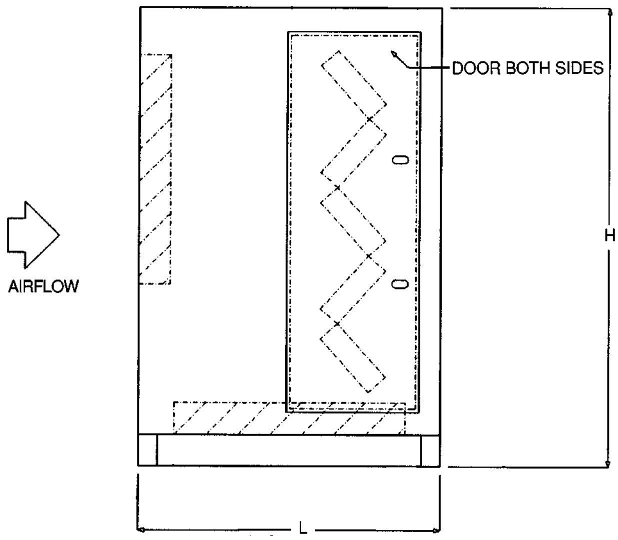
*Not shown. See fan sections on page 31 for typical end view.

NOTE: Length includes flanges on both sides of component.

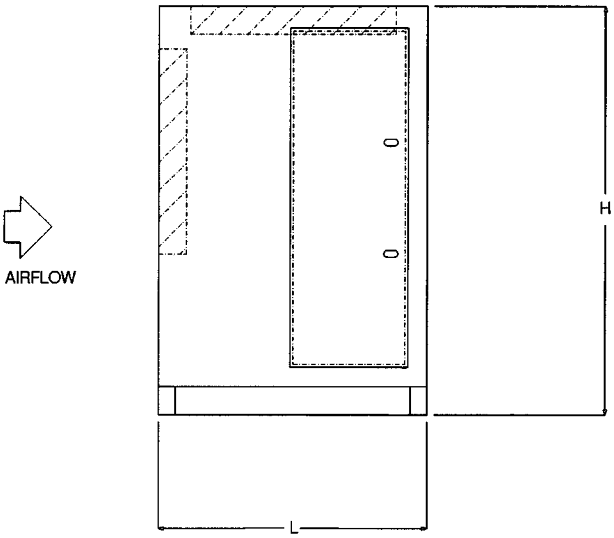
COMPONENT DIMENSIONS (cont)



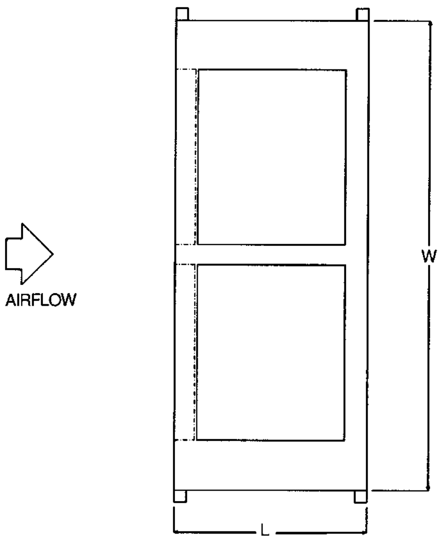
FMB1, FMB3 — SIDE VIEW



FMB2, FMB4 — SIDE VIEW



MXB1, MXB6 — SIDE VIEW



FMB1-4, MXB1, MXB6 — TOP VIEW

DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
FMB1 FMB2 FMB3 FMB4 MXB1 MXB6	L	2- 4¾	2-4¾	2-4¾	2-4¾	2- 4¾	3-0⅝	3-0⅝	3-0⅝	3-4 9/16	3-4 9/16	4-0 7/16	4-4⅜	4-4⅜
	W	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10-4½	11-8¼	11-8¼
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6-5 9/16	6-9 9/16	8-1¼
	DAMPER AREA*	3.4	4.6	5.7	6.5	7.8	10.5	13.1	13.3	15.9	19.4	25.4	28.1	28.1

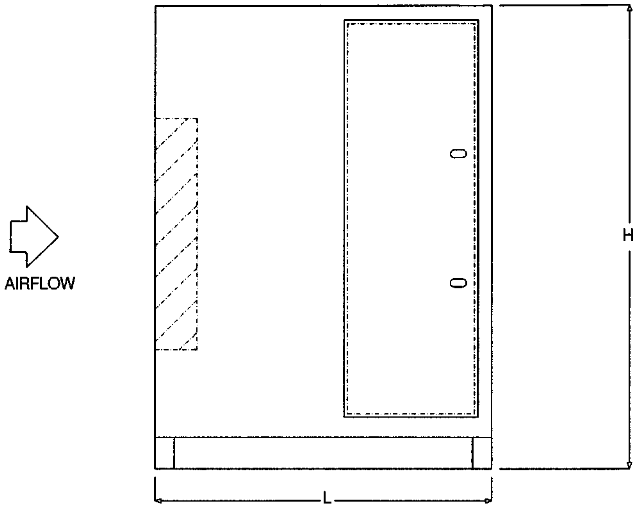
*Area in sq ft per face (rear, top, or bottom).

NOTE: Length includes flange on one side of component.

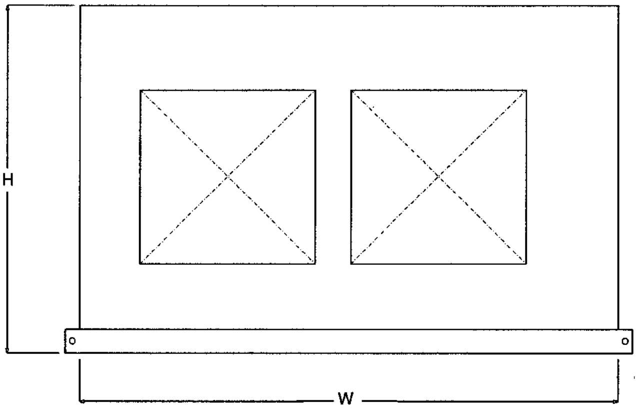
Dimensions (cont)

Carrier

COMPONENT DIMENSIONS (cont)



AMX1 — SIDE VIEW

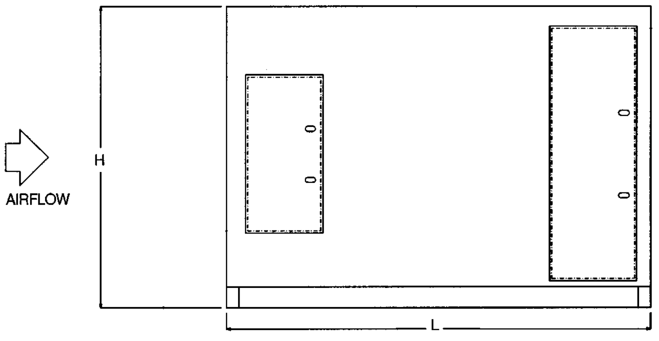


AMX1 — END VIEW (32 SIZE SHOWN)

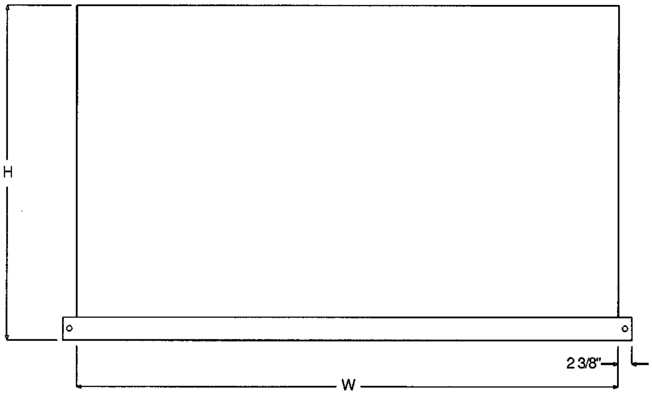
DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
AMX1	L	2- 5 15/16	2-5 15/16	2-5 15/16	3-1 13/16	3- 1 13/16	3-5¾	3-5¾	4-1⅝	4-5 9/16	4-5 9/16	5-1 7/16	5-5⅜	6-1¼
	W	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10-4½	11-8¼	11-8¼
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6-5 9/16	6-9 9/16	8-1¼

NOTE: Length includes flanges on both sides of component.



PAF3, PAF5 — SIDE VIEW



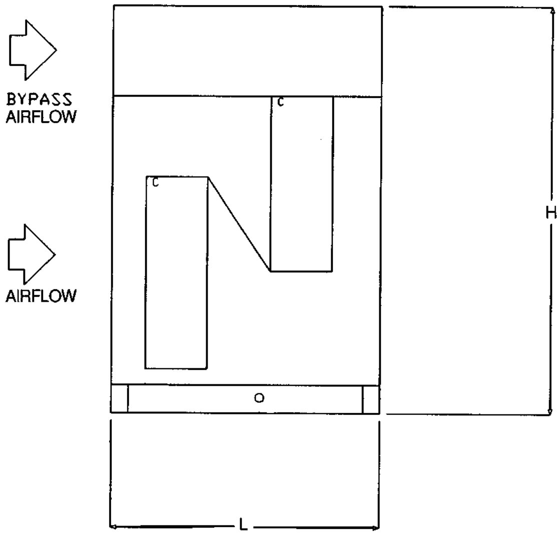
PAF3, PAF5 — END VIEW

DIMENSIONS (ft-in.)

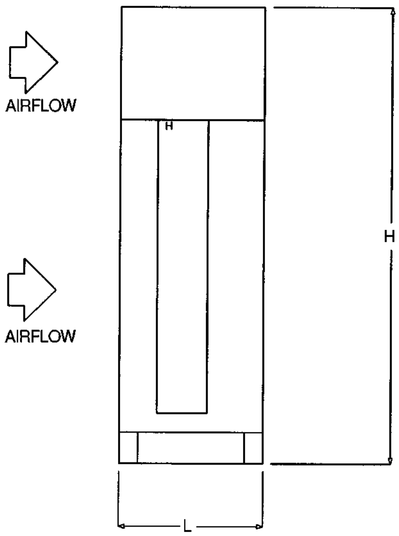
COMPONENT TYPE	DIMENSION	39T UNIT SIZE										
		11	13	17	21	26	32	39	49	61	74	92
PAF3 PAF5	L	5-9 5/16	6-1¼	6- 5 3/16	6-5 3/16	6-9⅛	6-9⅛	7-1 1/16	7-1 1/16	7-8 15/16	8-0⅞	9-4⅝
	W	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10-4½	11-8¼	11-8¼
	H	3-2¼	3-6 13/16	3-10⅛	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6-5 9/16	6-9 9/16	8-1¼

NOTE: Length includes flanges on both sides of component.

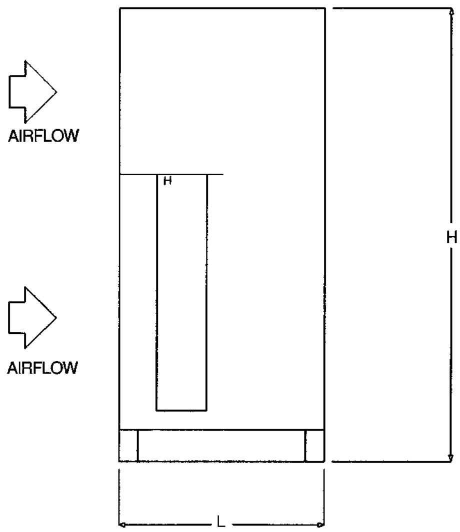
COMPONENT DIMENSIONS (cont)



BCC2 — SIDE VIEW



BPH1 — SIDE VIEW



BPH2 — SIDE VIEW

DIMENSIONS (ft-in.)

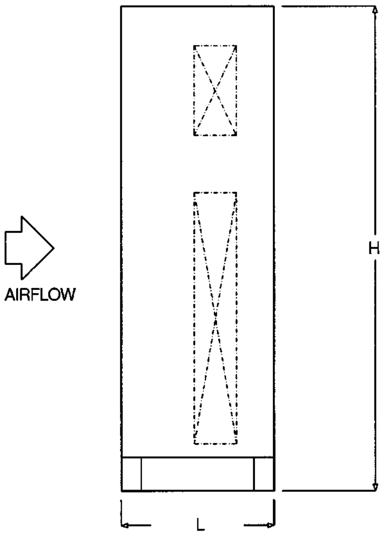
COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
BCC2	L	1- 6 1/8	1- 6 1/8	1- 6 1/8	1- 6 1/8	1- 6 1/8	1- 6 1/8	1- 6 1/8	3-1 13/16	3-1 13/16	3-1 13/16	3-1 13/16	3-1 13/16	3-1 13/16
	W*	4- 5 11/16	4- 9 5/8	5- 5 1/2	6- 1 3/8	6- 5 1/4	6- 9 1/4	7- 5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3- 2 1/4	3- 2 1/4	3- 6 13/16	3-10 1/8	4- 6	4- 9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4
BPH1	L	1- 2 3/16	1- 2 3/16	1- 2 3/16	1- 2 3/16	1- 2 3/16	1- 2 3/16	1- 2 3/16	1-6 1/8	1-6 1/8	1-6 1/8	1-6 1/8	1-6 1/8	1-6 1/8
	W*	4- 5 11/16	4- 9 5/8	5- 5 1/2	6- 1 3/8	6- 5 1/4	6- 9 1/4	7- 5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3- 2 1/4	3- 2 1/4	3- 6 13/16	3-10 1/8	4- 6	4- 9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4
BPH2	L	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	1-10 1/16	2-2	2-2	2-2	2-2	2-2	2-2
	W*	4- 5 11/16	4- 9 5/8	5- 5 1/2	6- 1 3/8	6- 5 1/4	6- 9 1/4	7- 5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3- 2 1/4	3- 2 1/4	3- 6 13/16	3-10 1/8	4- 6	4- 9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4

*Not shown. See fan sections on page 31 for typical end view.

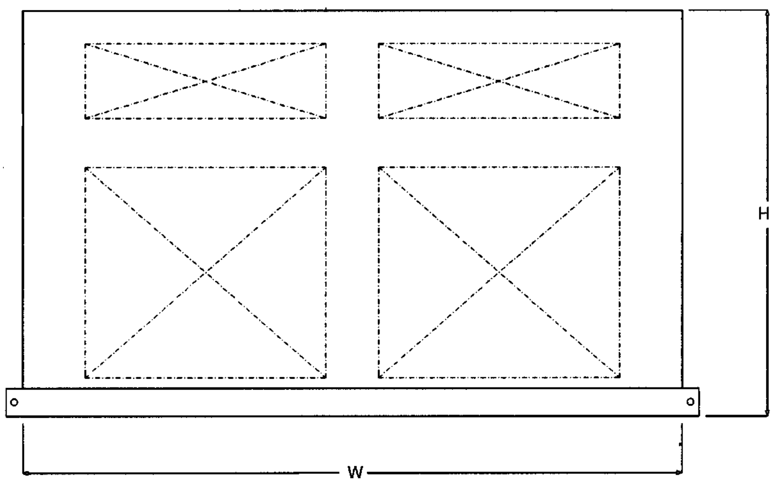
NOTES:
1. BCC2, sizes 32-92 shown; size 07-26 sections have one coil.
2. Length includes flanges on both sides of component.

Dimensions (cont)

COMPONENT DIMENSIONS (cont)



FBP1 — SIDE VIEW



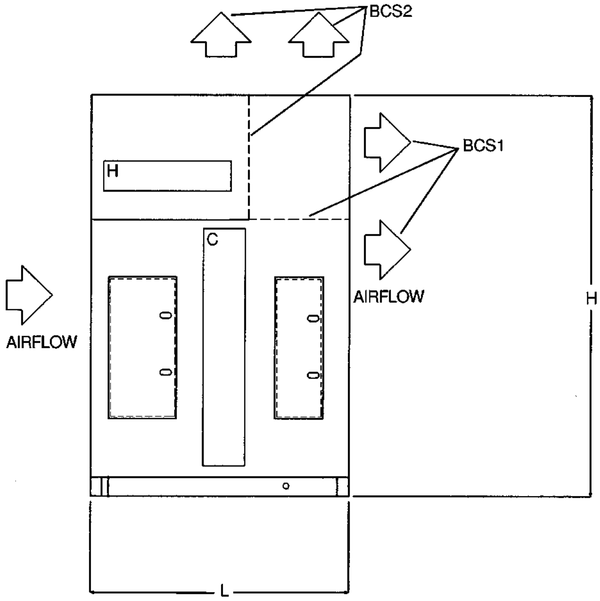
FBP1 — END VIEW

DIMENSIONS (ft-in.)

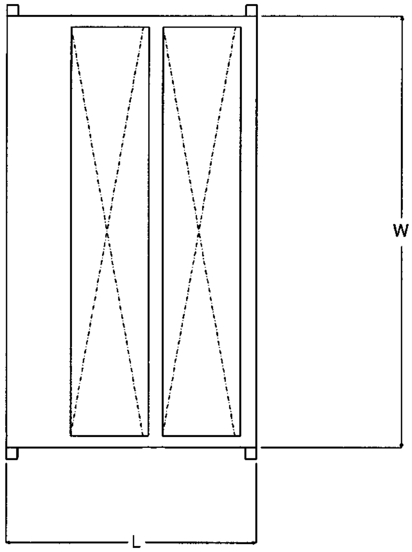
COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
FBP1	L	1- 6⅛	1-6⅛	1-6⅛	1-6⅛	1- 6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛	1-6⅛
	W	4- 5 11/16	4-9⅝	5-5½	6-1⅜	6- 5¼	6-9¼	7-5 1/16	7-9 1/16	8-4⅞	9-4¾	10-4½	11-8¼	11-8¼
	H	2-10¼	3-2¼	3-2¼	3-6 13/16	3-10⅛	4- 6	4-9 15/16	4-9 15/16	5-1 13/16	5-9¾	6-5 9/16	6-9 9/16	8-1¼

NOTE: Length includes flanges on both sides of component.

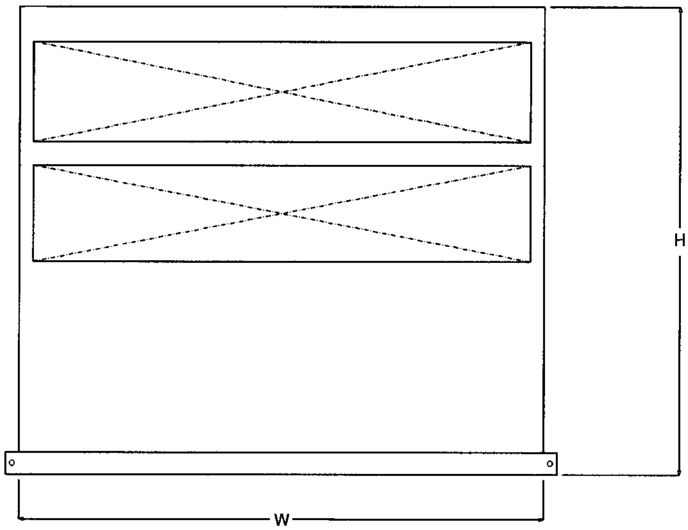
COMPONENT DIMENSIONS (cont)



BCS1, BCS2 — SIDE VIEW



BCS2 — TOP VIEW



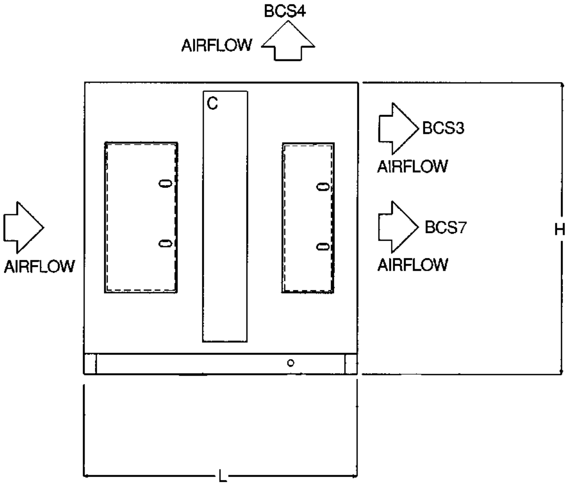
BCS1 — END VIEW

DIMENSIONS (ft-in.)

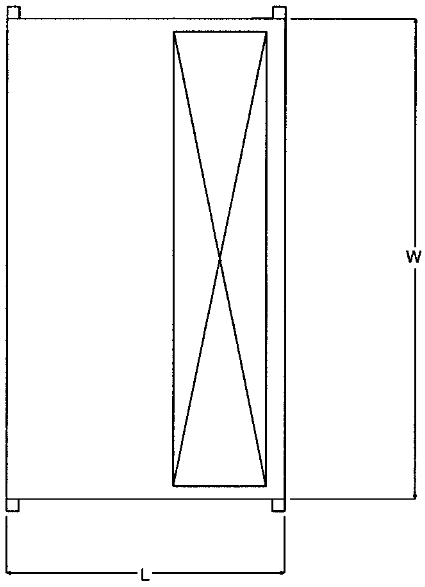
COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
BCS1 BCS2	L	2-5 15/16	2-9 7/8	2-9 7/8	3-1 13/16	3-5 3/4	3-9 11/16	4-1 5/8	4- 5 9/16	4-9 1/2	5- 5 3/8	6- 1 1/4	6-9 1/8	7- 1 1/16
	W	4-5 11/16	4-9 5/8	5-5 1/2	6-1 3/8	6-5 1/4	6-9 1/4	7-5 1/16	7- 9 1/16	8-4 7/8	9- 4 3/4	10- 4 1/2	11-8 1/4	11- 8 1/4
	H	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-5 13/16	6-5 5/8	6-9 9/16	6-11 7/8	7-3 11/16	7-11 11/16	8-11 1/2	9-7 3/8	10-11 1/8

NOTES:
1. Sizes 07-49 shown. Sizes 61-92 have 2 cooling coils.
2. Length includes flanges on both sides of component.

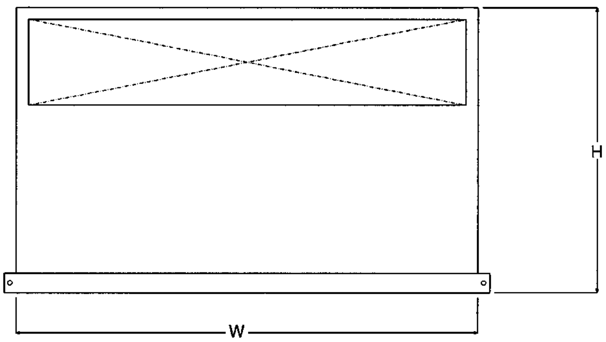
COMPONENT DIMENSIONS (cont)



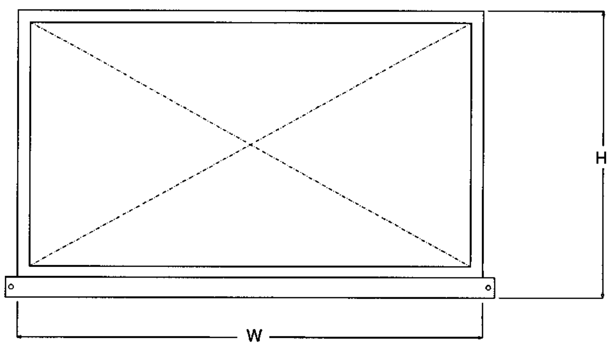
BCS3, 4, 7 — SIDE VIEW



BCS4 — TOP VIEW



BCS3 — END VIEW



BCS7 — END VIEW

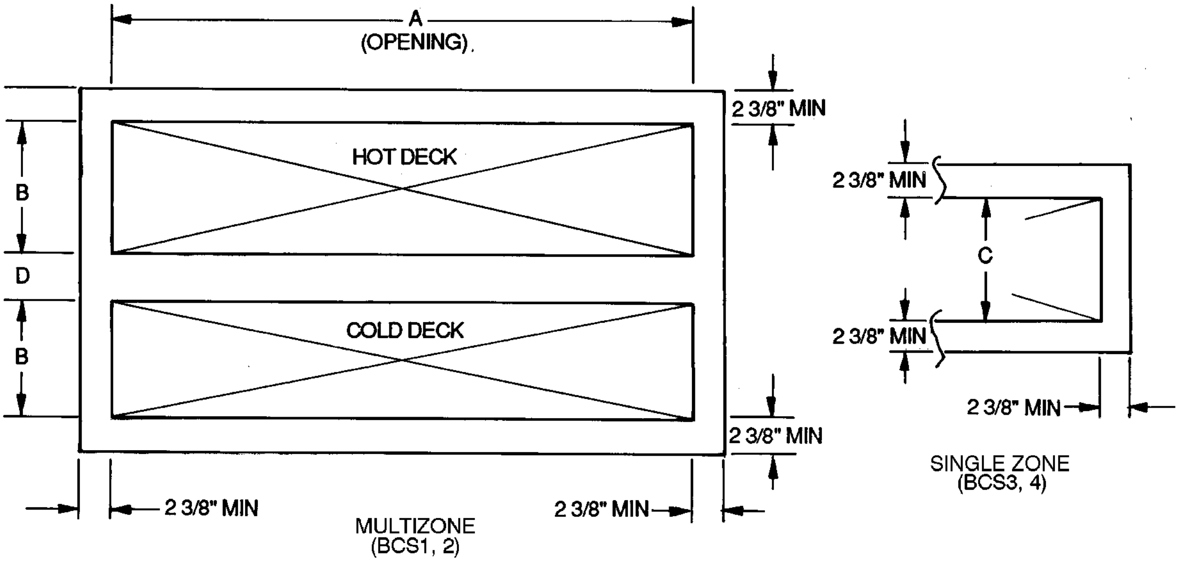
DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
BCS3 BCS4 BCS7	L	2- 5 15/16	2-9 7/8	2-9 7/8	3-1 13/16	3- 5 3/4	3-9 11/16	4-1 5/8	4-5 9/16	4-9 1/2	5-5 3/8	6-1 1/4	6-9 1/8	7-1 1/16
	W	4- 5 11/16	4-9 5/8	5-5 1/2	6-1 3/8	6- 5 1/4	6-9 1/4	7-5 1/16	7-9 1/16	8-4 7/8	9-4 3/4	10-4 1/2	11-8 1/4	11-8 1/4
	H	2-10 1/4	3-2 1/4	3-2 1/4	3-6 13/16	3-10 1/8	4-6	4-9 15/16	4-9 15/16	5-1 13/16	5-9 3/4	6-5 9/16	6-9 9/16	8-1 1/4

NOTES:
1. Sizes 07-49 shown. Sizes 61-92 have 2 cooling coils.
2. Length includes flanges on both sides of component.

COMPONENT DIMENSIONS (cont)

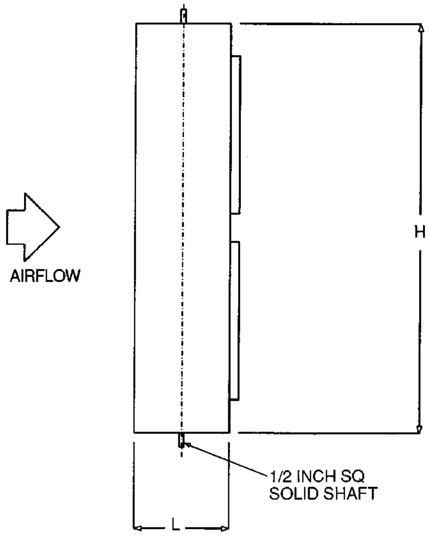
BLOW-THRU COIL (BCS) DISCHARGE DUCT DIMENSIONS (BCS1-4)



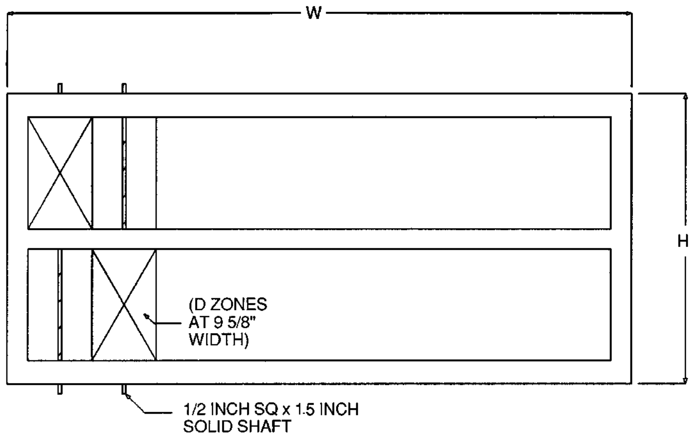
39T UNIT SIZE	DIMENSIONS (ft-in.)						NUMBER OF ZONES
	A (Opening)	B	C		D		
			BCS3 Horizontal Discharge	BCS4 Horizontal Discharge	BCS1 Horizontal Discharge	BCS2 Vertical Discharge	
07	4- 0¹³⁄₁₆	0-9¹³⁄₁₆	0-9⁷⁄₁₆	0-9⁷⁄₁₆	0-1⁹⁄₁₆	0-1⁹⁄₁₆	5
09	4- 4³⁄₄	0-9¹³⁄₁₆	0-9⁷⁄₁₆	0-9⁷⁄₁₆	0-1⁹⁄₁₆	0-1⁹⁄₁₆	5
11	5- 0⁵⁄₈	0-9¹³⁄₁₆	0-9⁷⁄₁₆	0-9⁷⁄₁₆	0-1⁹⁄₁₆	0-1⁹⁄₁₆	6
13	5- 8¹⁄₂	0-9¹³⁄₁₆	0-9⁷⁄₁₆	0-9⁷⁄₁₆	0-1⁹⁄₁₆	0-1⁹⁄₁₆	7
17	6- 0⁷⁄₁₆	1-1¹³⁄₁₆	1-3³⁄₈	1-1³⁄₈	0-1⁹⁄₁₆	0-1⁹⁄₁₆	7
21	6- 4³⁄₈	1-1¹³⁄₁₆	1-3³⁄₈	1-1³⁄₈	0-1⁹⁄₁₆	0-1⁹⁄₁₆	7
26	7- 0¹⁄₄	1-1¹³⁄₁₆	1-3³⁄₈	1-1³⁄₈	0-1⁹⁄₁₆	0-1⁹⁄₁₆	8
32	7- 4³⁄₁₆	1-5⁵⁄₁₆	1-5⁵⁄₁₆	1-5¹³⁄₁₆	0-4¹⁄₄	0-2³⁄₈	9
39	8- 0¹⁄₁₆	1-5⁵⁄₁₆	1-5⁵⁄₁₆	1-5¹³⁄₁₆	0-4¹⁄₄	0-2³⁄₈	9
49	8-11⁷⁄₈	1-9¹⁄₄	1-9³⁄₄	1-9¹⁄₄	0-4¹⁄₄	0-2³⁄₈	11
61	9-11¹¹⁄₁₆	1-9¹⁄₄	1-9³⁄₄	1-9¹⁄₄	0-4¹⁄₄	0-2³⁄₈	12
74	11- 3⁷⁄₁₆	2-1³⁄₁₆	2-1³⁄₁₆	2-1³⁄₁₆	0-4¹⁄₄	0-2³⁄₈	14
92	11- 3⁷⁄₁₆	2-1³⁄₁₆	2-0⁵⁄₈	2-1³⁄₁₆	0-4¹⁄₄	0-2³⁄₈	14

Dimensions (cont)

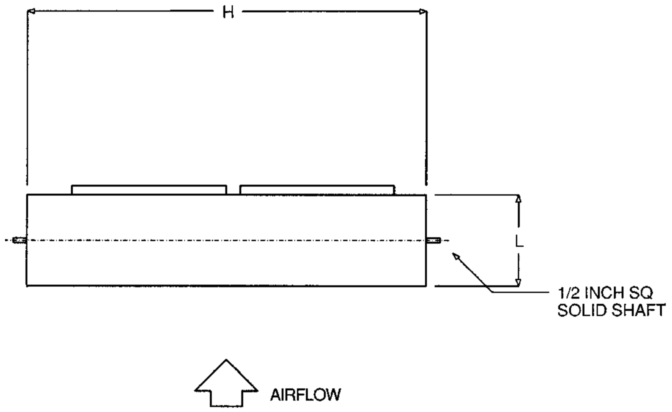
COMPONENT DIMENSIONS (cont)



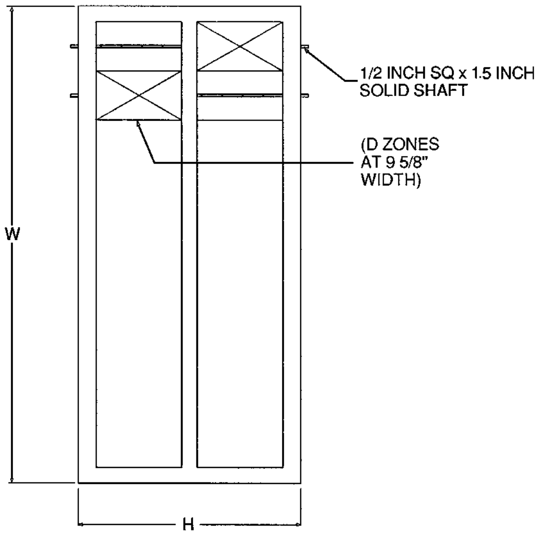
ZDS1



ZDS1 — END VIEW



ZDS2



ZDS2 — TOP VIEW

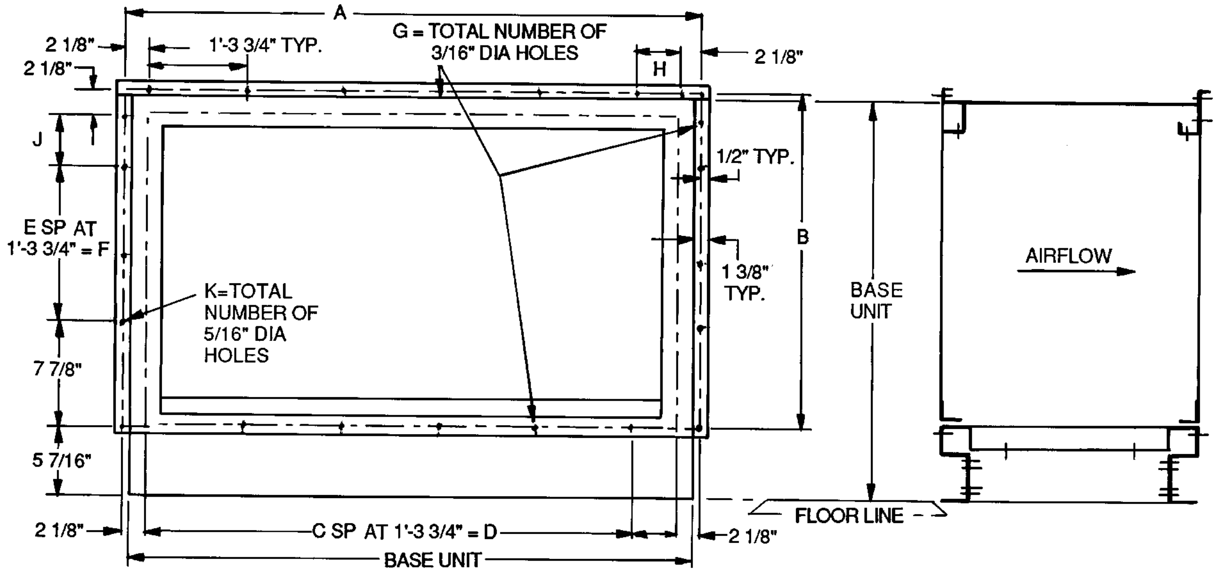
DIMENSIONS (ft-in.)

COMPONENT TYPE	DIMENSION	39T UNIT SIZE												
		07	09	11	13	17	21	26	32	39	49	61	74	92
ZDS1 ZDS2	L	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼	0-10¼
	W	4- 5⅛	4- 9⅛	5- 5	6- 0⅞	6- 4¾	6- 6¹¹⁄₁₆	7- 4⁹⁄₁₆	7- 8½	8- 4⅜	9- 4³⁄₁₆	10- 4	11- 7¾	11- 7¾
	H	2- 1⅝	2- 1⅝	2- 1⅝	2- 1⅝	2- 9½	2- 9½	2- 9½	3- 7¼	3- 7¼	4- 3⅛	4-f3⅛	4-11	4-11
	D	5	5	6	7	7	7	8	9	9	11	12	14	14

NOTE: Length includes flanges on both sides of component.

COMPONENT DIMENSIONS (cont)

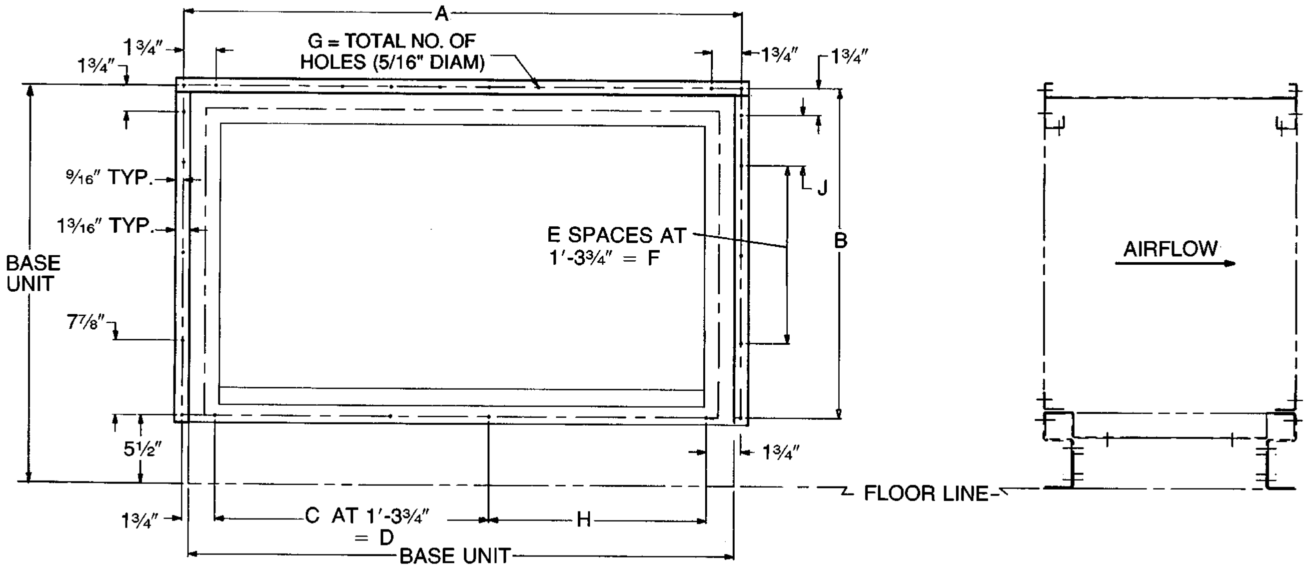
BOLTING PATTERNS
Unit and Accessory Flange Connection — Sizes 07-26



39T UNIT SIZE	A	B	C	D	E	F	G	H	J	K
07	4′- 7 7/16″	2′-5 11/16″	3	3′-11¼″	1	1′-3¾″	14	0′- 3 15/16″	0′- 3 15/16″	4
09	4′-11⅜″	2′-9⅝″	3	3′-11¼″	1	1′-3¾″	14	0′- 7⅞″	0′- 7⅞″	4
11	5′- 7¼″	2′-9⅝″	3	3′-11¼″	1	1′-3¾″	14	1′- 3¾″	0′- 7⅞″	4
13	6′- 3⅛″	3′-1 9/16″	4	5′- 3″	1	1′-3¾″	16	0′- 7⅞″	0′-11 13/16″	4
17	6′- 7 1/16″	3′-5½″	4	5′- 3″	1	1′-3¾″	16	0′-11 13/16″	1′- 3¾″	4
21	6′-11″	4′-1⅜″	4	5′- 3″	2	2′-7½″	17	1′- 3¾″	0′- 7⅞″	5
26	7′- 6⅞″	4′-5 5/16″	5	6′- 6¾″	2	2′-7½″	19	0′- 7⅞″	0′-11 13/16″	5

NOTE: Connection bolts and gasket material are factory supplied.

BOLTING PATTERNS
Unit and Accessory Flange Connection — Sizes 32-92



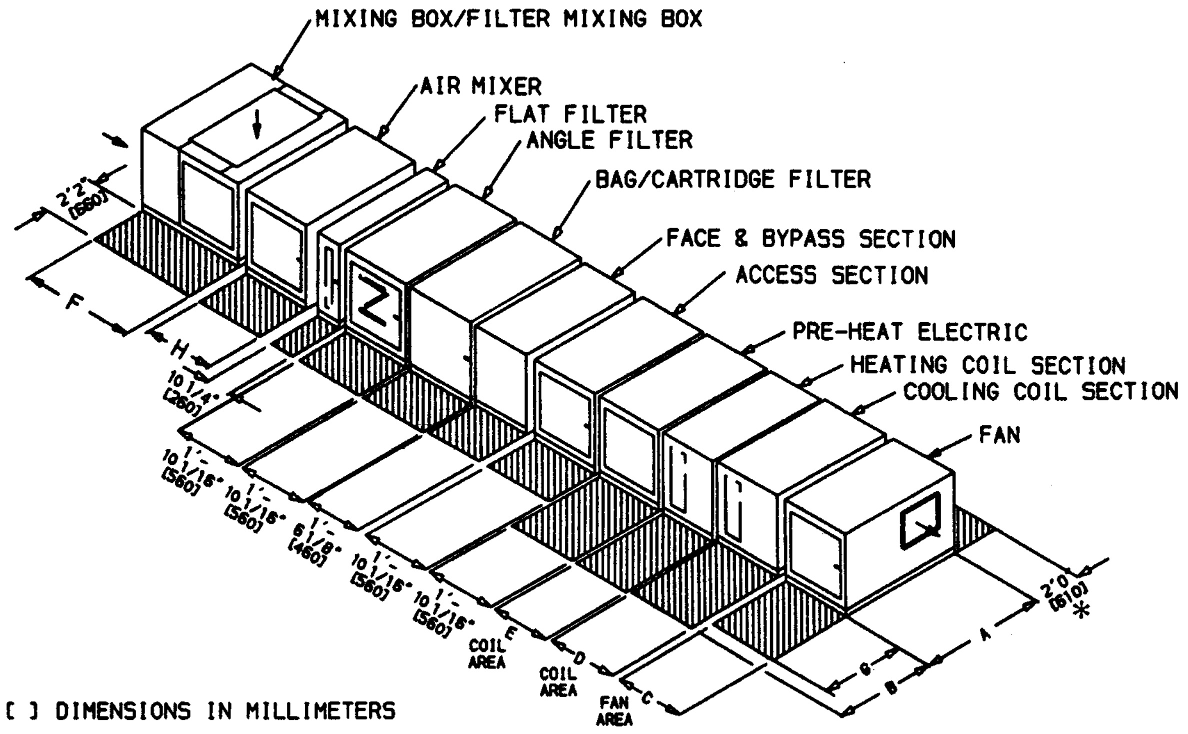
39T UNIT SIZE	A	B	C	D	E	F	G	H	J
32	7′-10 1/16″	4′-4 15/16″	5	6′- 6¾″	2	2′- 7½″	24	0′-11 13/16″	0′-11 13/16″
39	8′- 5 15/16″	4′-8⅞″	6	7′-10½″	3	3′-11¼″	26	0′- 3 15/16″	—
49	9′- 5¾″	5′-4¾″	7	9′- 2¼″	3	3′-11¼″	26	—	0′- 7⅞″
61	10′- 5 9/16″	0′-6⅝″	7	9′- 2¼″	4	5′- 3″	30	0′-11 13/16″	—
74	11′- 9 5/16″	6′-4 9/16″	8	10′- 6″	4	5′- 3″	34	0′-11 13/16″	0′- 3 15/16″
92	11′- 9 5/16″	7′-8 5/16″	8	10′- 6″	5	6′- 6¾″	36	0′- 7⅞″	0′- 3 15/16

NOTE: Connection bolts and gasket material are factory supplied.

Carrier

SERVICE AREA REQUIREMENTS

HORIZONTAL DRAW-THRU, SIZES 07-26



SERVICE AREA DIMENSIONS (ft-in.)

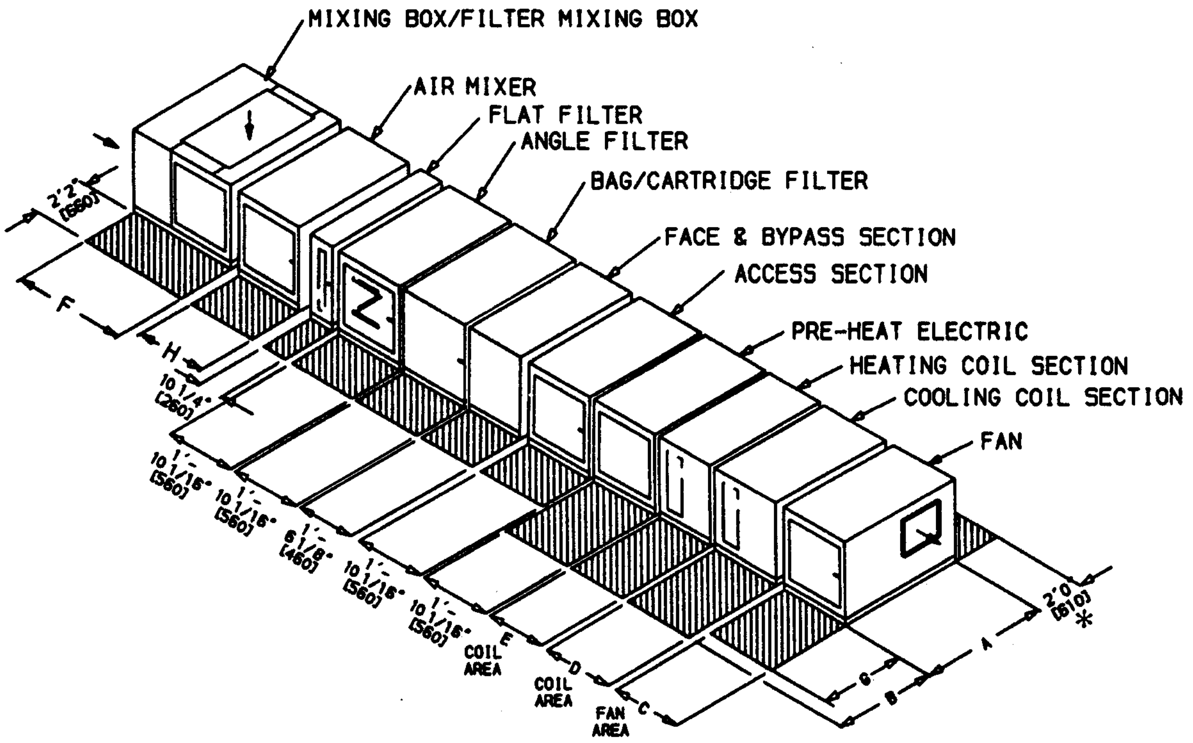
<table>
<tr><th rowspan="3">39T
UNIT SIZE</th><th rowspan="3">A</th><th rowspan="3">B</th><th rowspan="3">C</th><th colspan="2">D</th><th colspan="2">E</th><th rowspan="3">F</th><th rowspan="3">G</th><th rowspan="3">H</th></tr>
<tr><th colspan="2">Cooling Coil Section</th><th colspan="2">Heating Coil Section</th></tr>
<tr><th>LCS1, BCC2</th><th>MCS1</th><th>MHS1</th><th>BPH2</th></tr>
<tr><td>07</td><td>4-5 11/16</td><td>5- 6 5/8</td><td>2-5 15/16</td><td rowspan="7">1-6 1/8</td><td rowspan="7">1-6 1/8</td><td rowspan="7">1-2 3/16</td><td rowspan="7">1-10 1/16</td><td rowspan="4">2-5 15/16</td><td rowspan="5">2-0</td><td>2-5 15/16</td></tr>
<tr><td>09</td><td>4-9 5/8</td><td>5-10 9/16</td><td>2-9 7/8</td><td>2-5 15/16</td></tr>
<tr><td>11</td><td>5-5 1/2</td><td>6- 6 1/2</td><td>2-9 7/8</td><td>2-5 15/16</td></tr>
<tr><td>13</td><td>6-1 3/8</td><td>7- 2 3/8</td><td>3-1 13/16</td><td>3-1 13/16</td></tr>
<tr><td>17</td><td>6-5 1/4</td><td>7- 6 1/4</td><td>3-5 3/4</td><td rowspan="3">3-1 13/16</td><td>3-1 13/16</td></tr>
<tr><td>21</td><td>6-9 1/4</td><td>7-10 3/16</td><td>3-9 11/16</td><td rowspan="2">2-2</td><td>3-5 3/4</td></tr>
<tr><td>26</td><td>7-5 1/16</td><td>8- 6</td><td>4-1 5/8</td><td>3-5 3/4</td></tr>
</table>

*Service area required for access door on side opposite motor or when external isolation is supplied.

NOTE: See page 9 for component description.

SERVICE AREA REQUIREMENTS (cont)

HORIZONTAL DRAW-THRU, SIZES 32-92



[ ] DIMENSIONS IN MILLIMETERS

SERVICE AREA DIMENSIONS (ft-in.)

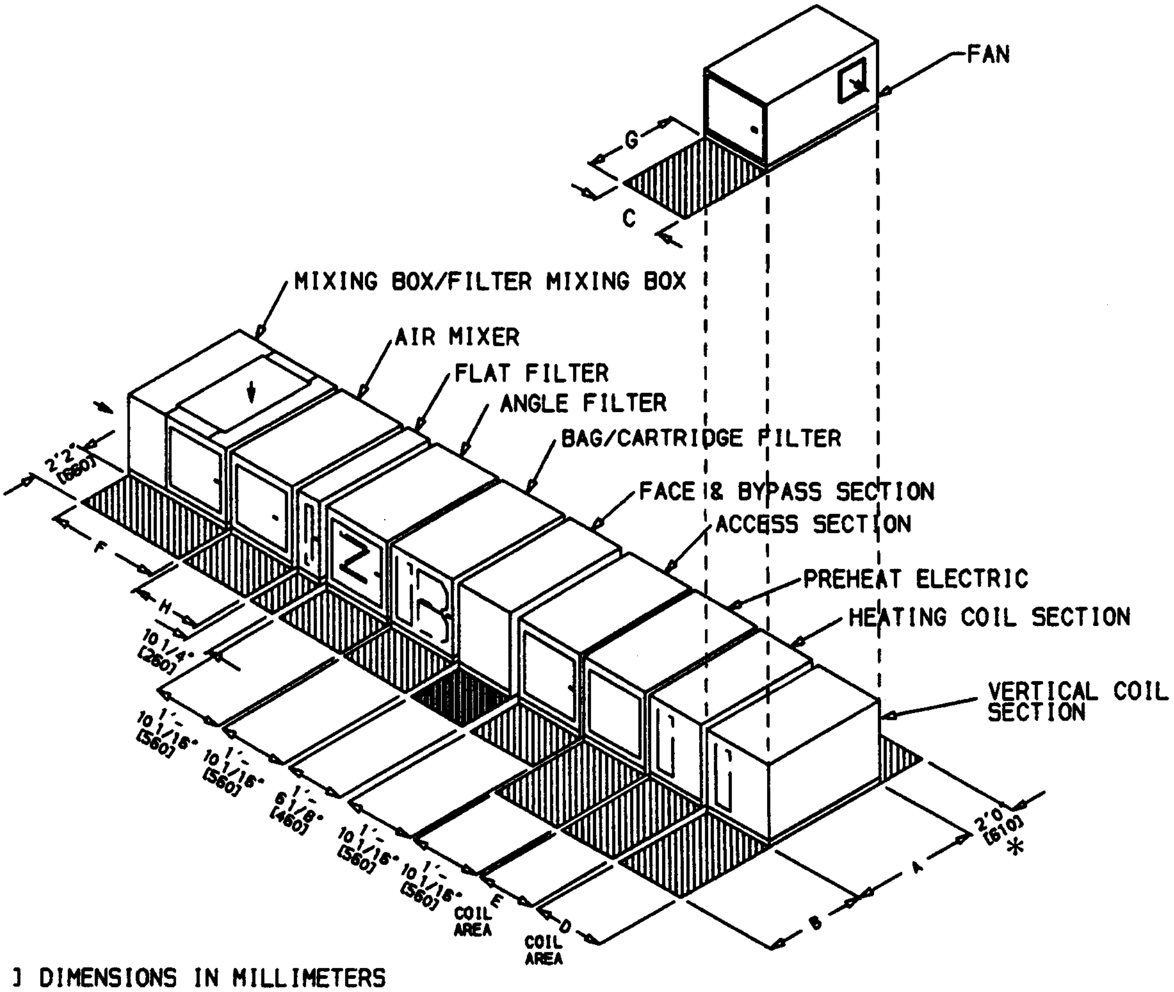
<table>
<tr><th rowspan="3">39T UNIT SIZE</th><th rowspan="3">A</th><th rowspan="3">B</th><th rowspan="3">C</th><th colspan="2">D</th><th colspan="3">E</th><th rowspan="3">F</th><th rowspan="3">G</th><th rowspan="3">H</th></tr>
<tr><th colspan="2">Cooling Coil Section</th><th colspan="3">Heating Coil Section</th></tr>
<tr><th>LCS1, BCC2</th><th>MCS1</th><th>MHS1</th><th>BPH2</th><th>BPH1</th></tr>
<tr><td>32</td><td>7-9</td><td>8-10</td><td>4-5 9/16</td><td rowspan="5">3-1 13/16</td><td rowspan="3">1-6⅛</td><td rowspan="6">1-6⅛</td><td rowspan="6">2-2</td><td rowspan="6">1-6⅛</td><td>3-1 13/16</td><td rowspan="2">2-2</td><td>4-1⅝</td></tr>
<tr><td>39</td><td>8-4⅞</td><td>9- 5⅞</td><td>4-9½</td><td rowspan="2">3-5¾</td><td>4-5 9/16</td></tr>
<tr><td>49</td><td>9-4 11/16</td><td>10- 5 11/16</td><td>5-5⅜</td><td>2-9</td><td>4-5 9/16</td></tr>
<tr><td>61</td><td>10-4 9/16</td><td>11- 5 9/16</td><td>6-1 3/16</td><td rowspan="3">1-10 1/16</td><td>4-1⅝</td><td rowspan="3">3-1</td><td>5-1 7/16</td></tr>
<tr><td>74</td><td rowspan="2">11-8¼</td><td rowspan="2">12 9¼</td><td>6-5 3/16</td><td rowspan="2">4-5 9/16</td><td>5-5⅜</td></tr>
<tr><td>92</td><td>7-8 15/16</td><td>3-5¾</td><td>6-1 3/16</td></tr>
</table>

*Service area required for access door on side opposite motor or when external isolation is supplied.

NOTE: See page 9 for component description.

SERVICE AREA REQUIREMENTS (cont)

VERTICAL DRAW-THRU, SIZES 07-26



[ ] DIMENSIONS IN MILLIMETERS

SERVICE AREA DIMENSIONS (ft-in.)

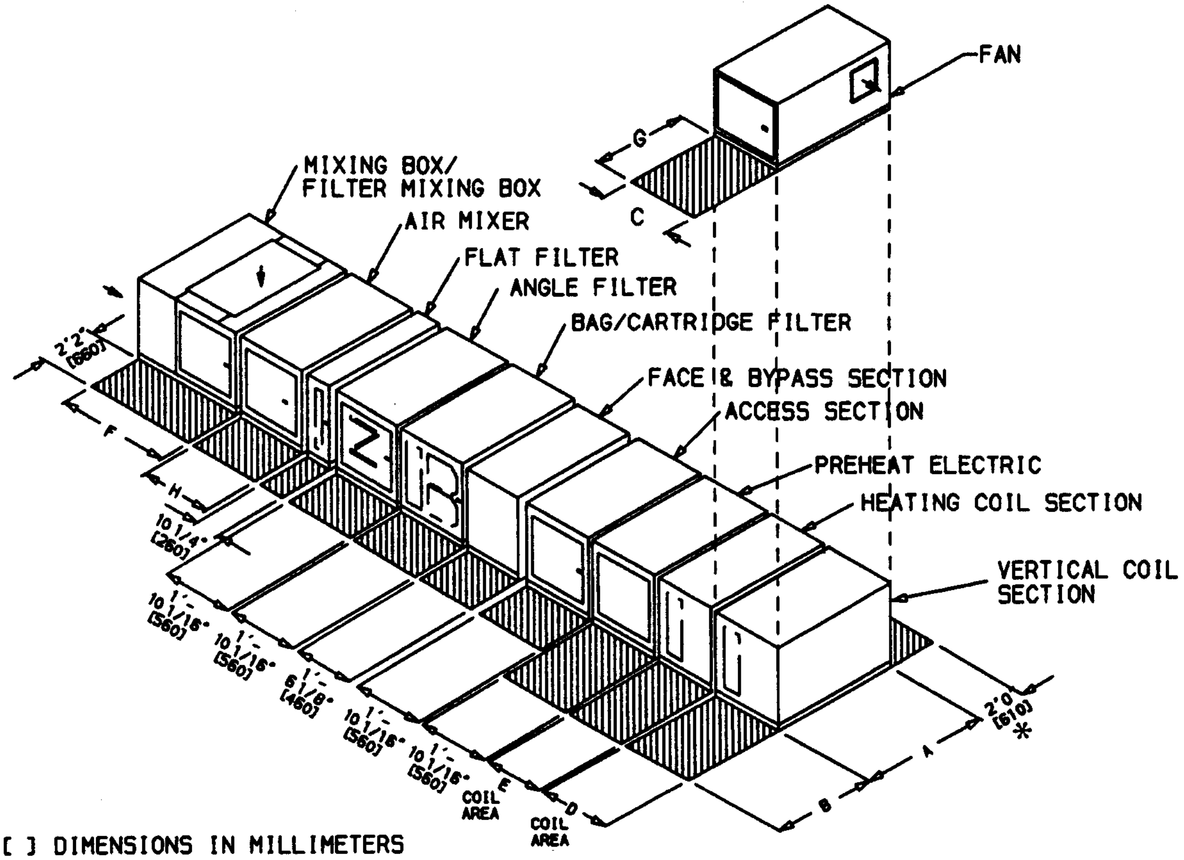
39T UNIT SIZE	A	B	C	D	E		F	G	H
				VCS1	BPH1, MHS1	BPH2			
07	4-5¹¹⁄₁₆	5- 6⅝	2-5¹⁵⁄₁₆						2-5¹⁵⁄₁₆
09	4-9⅝	5-10⁹⁄₁₆	2-9⅞				2-5¹⁵⁄₁₆		2-5¹⁵⁄₁₆
11	5-5½	6- 6½	2-9⅞					2-0	2-5¹⁵⁄₁₆
13	6-1⅜	7- 2⅜	3-1¹³⁄₁₆	1-6⅛	1-2³⁄₁₆	1-10¹⁄₁₆			3-1¹³⁄₁₆
17	6-5¼	7- 6¼	3-5¾						3-1¹³⁄₁₆
21	6-9¼	7-10³⁄₁₆	3-9¹¹⁄₁₆				3-1¹³⁄₁₆	2-2	3-5¾
26	7-5¹⁄₁₆	8- 6	4-1⅝						3-5¾

*Service area required for access door on side opposite motor or when external isolation is supplied.

NOTE: See page 9 for component description.

SERVICE AREA REQUIREMENTS (cont)

VERTICAL DRAW-THRU, SIZES 32-61



SERVICE AREA DIMENSIONS (ft-in.)

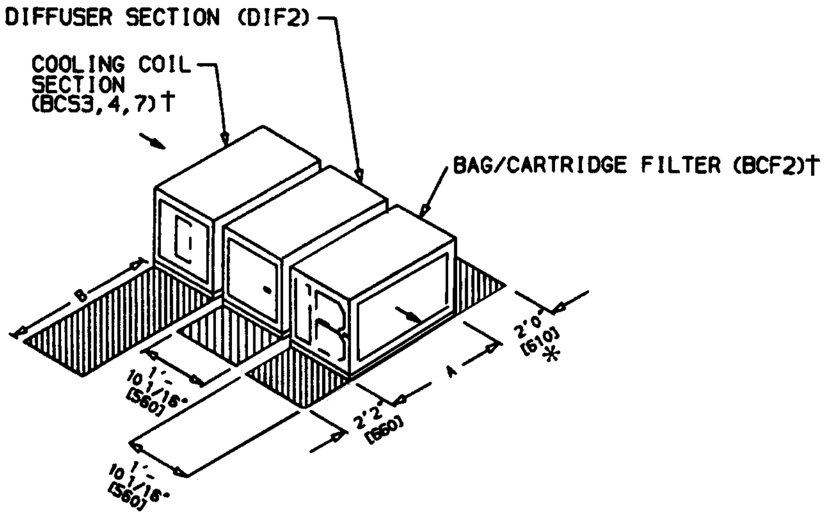
39T UNIT SIZE	A	B	C	D	E			F	G	H
				VCS1	MHS1	BPH2	BPH1			
32	7-9	8-10	4-5 9/16	4-5 9/16	1-6 1/8	2-2	1-6 1/8	3-1 13/16	2-2	4-1 5/8
39	8-4 7/8	9- 5 7/8	4-9 1/2	4-9 1/2				3-5 3/4		4-5 9/16
49	9-4 11/16	10- 5 11/16	5-5 3/8	5-5 3/8					2-9	4-5 9/16
61	10-4 9/16	11- 5 9/16	6-1 3/16	6-1 3/16				4-1 5/8	3-1	5-1 7/16

*Service area required for access door on side opposite motor or when external isolation is supplied.

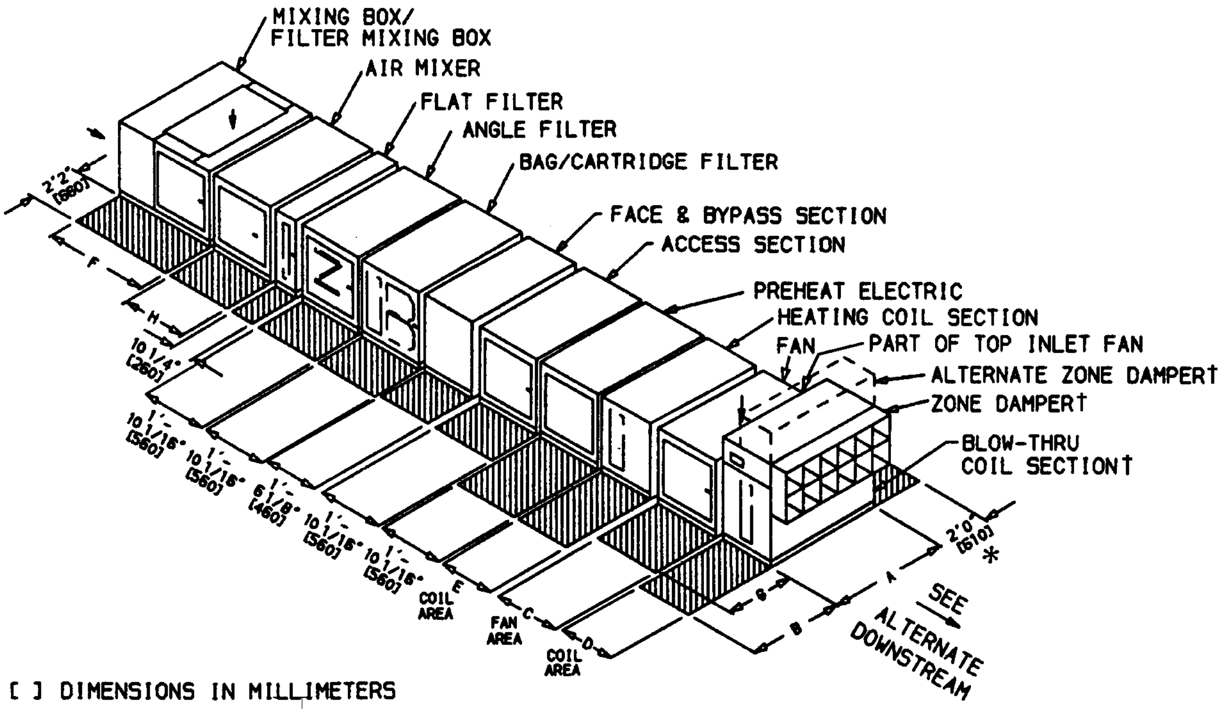
NOTE: See page 9 for component description.

SERVICE AREA REQUIREMENTS (cont)

BLOW-THRU, SIZES 07-26



ALTERNATE DOWNSTREAM



[ ] DIMENSIONS IN MILLIMETERS

SERVICE AREA DIMENSIONS (ft-in.)

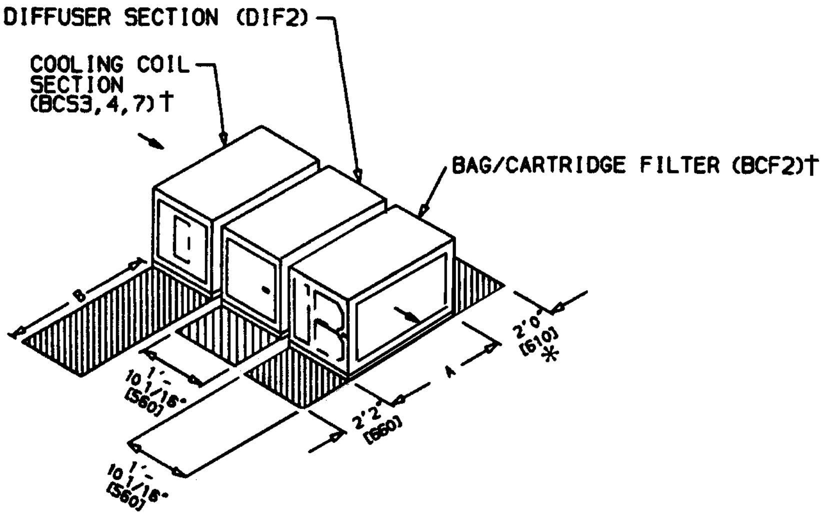
39T UNIT SIZE	A	B	C	D	E		F	G	H
				BCS1, 2, 3, 4, 7	BPH1, MHS1	BPH2			
07	4-5 11/16	5- 6 5/8	2-5 15/16	2-5 15/16	1-2 3/16	1-10 1/16	2-5 15/16	2-0	2-5 15/16
09	4-9 5/8	5-10 9/16	2-9 7/8	2-9 7/8					2-5 15/16
11	5-5 1/2	6- 6 1/2	2-9 7/8	2-9 7/8					2-5 15/16
13	6-1 3/8	7- 2 3/8	3-1 13/16	3-1 13/16					3-1 13/16
17	6-5 1/4	7- 6 1/4	3-5 3/4	3-5 3/4			3-1 13/16		3-1 13/16
21	6-9 1/4	7-10 3/16	3-9 11/16	3-9 11/16				2-2	3-5 3/4
26	7-5 1/16	8- 6	4-1 5/8	4-1 5/8					3-5 3/4

*Service area required for access door on side opposite motor or when external isolation is supplied.
†Blow-thru sections downstream from fan must be ordered separately and field assembled on unit.

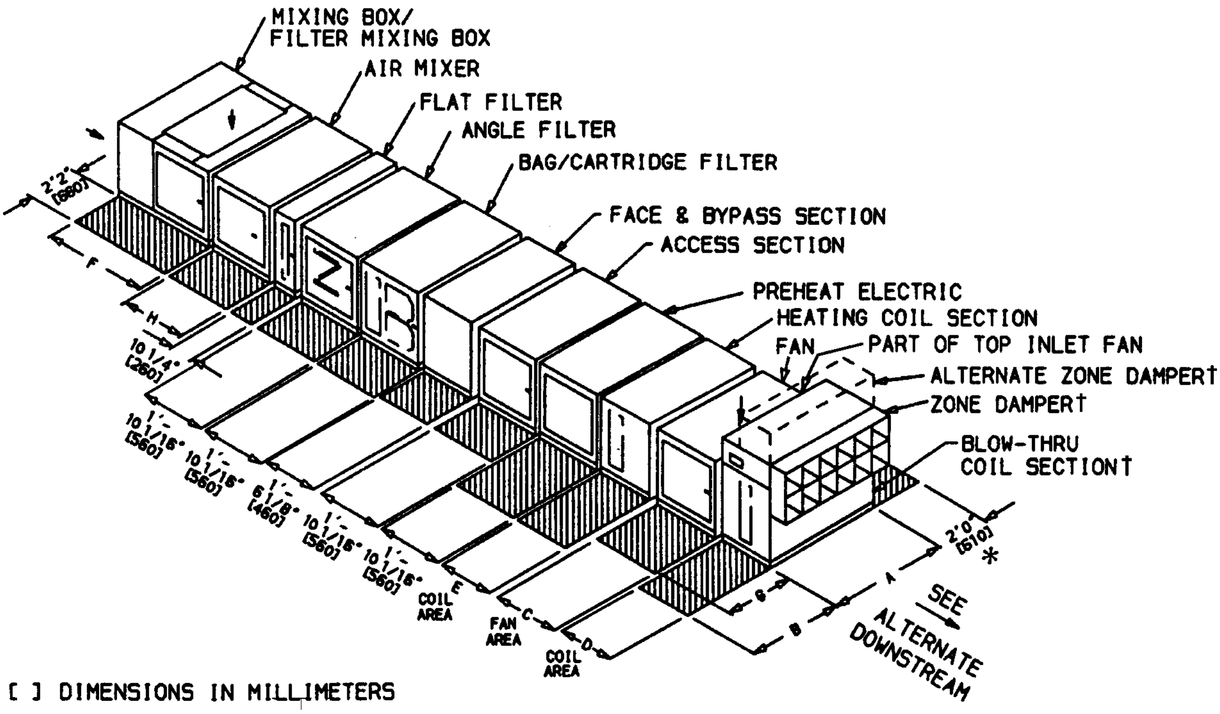
NOTE: See page 9 for component description.

SERVICE AREA REQUIREMENTS (cont)

BLOW-THRU, SIZES 32-92



ALTERNATE DOWNSTREAM



[ ] DIMENSIONS IN MILLIMETERS

SERVICE AREA DIMENSIONS (ft-in.)

39T UNIT SIZE	A	B	C	D	E			F	G	H
				BCS1, 2, 3, 4, 7	MHS1	BPH2	BPH1			
32	7-9 11/16	8-10	4-5 9/16	4-5 9/16	1-6 1/8	2-2	1-6 1/8	3-1 13/16	2-2	4-1 5/8
39	8-4 7/8	9- 5 7/8	4-9 1/2	4-9 1/2				3-5 3/4		4-5 9/16
49	9-4 11/16	10- 5 11/16	5-5 3/8	5-5 3/8					2-9	4-5 9/16
61	10-4 9/16	11- 5 9/16	6-1 3/16	6-1 3/16				4-1 5/8	3-1	5-1 7/16
74	11-8 1/4	12- 9 1/4	6-5 3/16	6-5 3/16				4-5 9/16		5-5 3/8
92			7-8 15/16	7-8 15/16						6-1 3/16

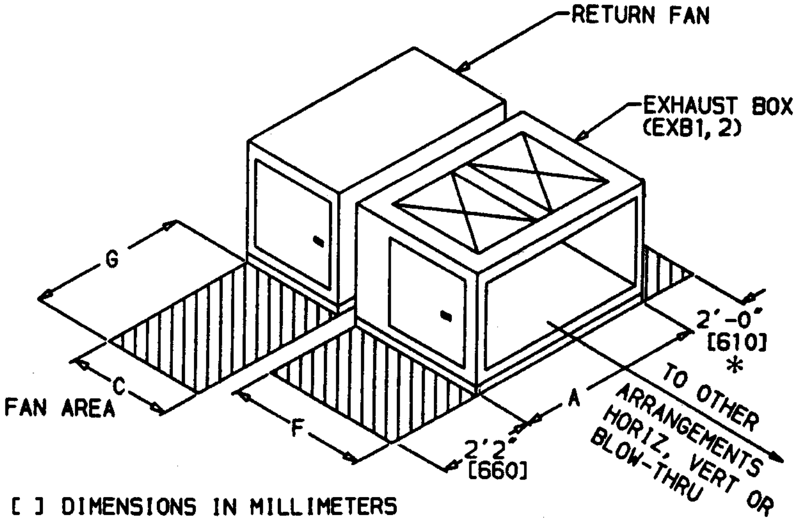
*Service area required for access door on side opposite motor or when external isolation is supplied.
†Blow-thru sections downstream from fan must be ordered separately and field-assembled on unit.

NOTE: See page 9 for component description.

Dimensions (cont)

SERVICE AREA REQUIREMENTS (cont)

RETURN FAN, SIZES 07-92



SERVICE AREA DIMENSIONS (ft-in.)

39T UNIT SIZE	A	C	F	G
07	4-5 11/16	2-5 15/16	2-5 15/16	2-0
09	4-9 5/8	2-9 7/8		
11	5-5 1/2	2-9 7/8		
13	6-1 3/8	3-1 13/16		
17	6-5 1/4	3-5 3/4	2-11 7/16	
21	6-9 1/4	3-9 11/16		2-2
26	7-5 1/16	4-1 5/8		

39T UNIT SIZE	A	C	F	G
32	7-9	4-5 9/16	3-1 13/16	2-2
39	8-4 7/8	4-9 1/2	3-5 3/4	
49	9-4 11/16	5-5 3/8		2-9
61	10-4 9/16	6-1 3/16	4-1 3/8	3-1
74	11-8 1/4	6-5 3/16	4-5 9/16	
92		7-8 15/16		

*Service area required for access door on side opposite motor or when external isolation is supplied.

NOTE: See page 9 for component identification.

Selection data

Size selection

This catalog has been designed to provide a quick and accurate means of selecting and specifying a central station air-handling unit. Start with the information you have — required airflow and preferred coil face velocity — to select a nominal unit size from the charts on pages 52 and 53. Next, refer to the component descriptions and unit configurations on pages 54-67. After determining the unit size and unit configuration, use the worksheet on page 68 to record dimension and weight information for each section and to add the total unit weight and length.

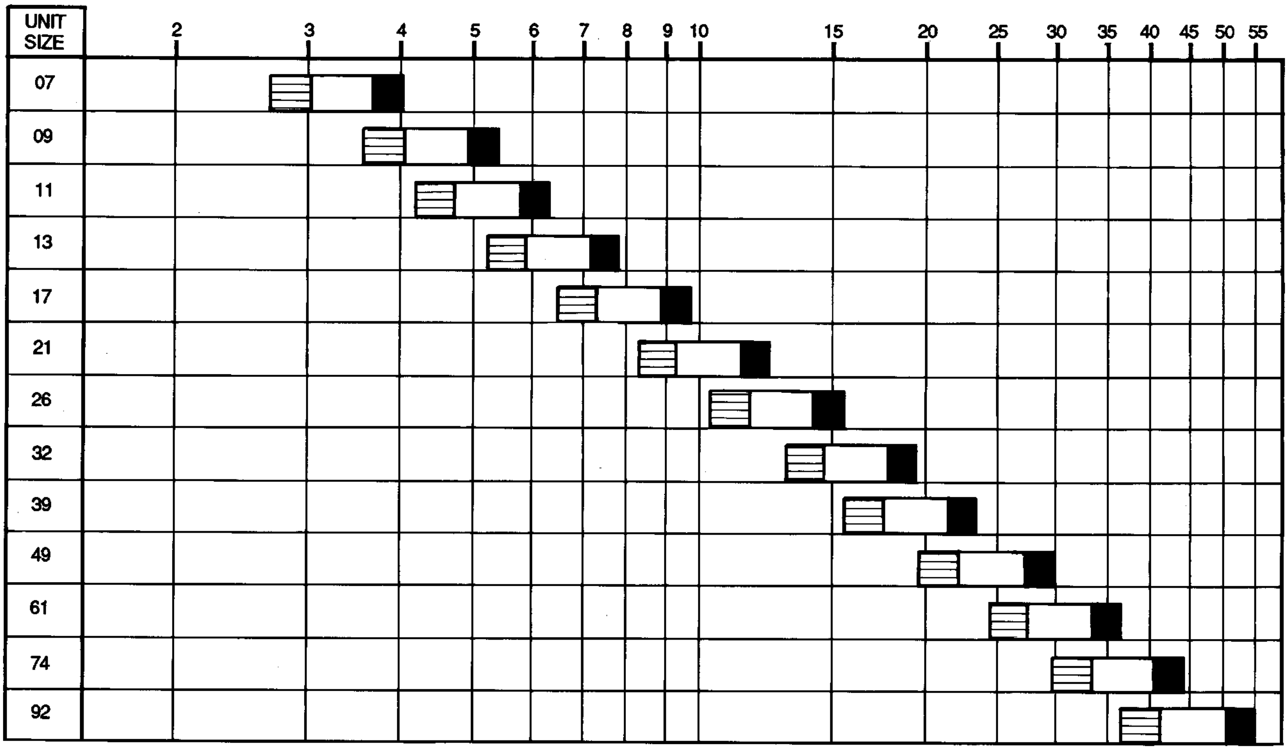
NOTE: Carrier's computer selection and performance programs provide exact coil and performance data certified to the ARI 410 and 430 standards. In addition to standard outputs, the programs provide coil moisture carryover information. When information from the computer selection programs is not available, use the following general guidelines for velocity limits to avoid moisture carryover.

MOISTURE CARRYOVER LIMITS (Fpm)

FINS PER IN.	ALUMINUM FINS	COPPER FINS
8	550	500
11	550	425
14	550	375

AIRFLOW (CFM x 1000)

DRAW-THRU



TO USE THE SELECTION CHART:

1. Find required airflow by reading across available airflow (cfm x 1000) scale at top of draw-thru chart.
2. Read down from the selected airflow until desired face velocity (fpm) is reached.
3. From this point, move to the left to determine unit size.
4. Use worksheet (page 68) to record unit size, section sequence, and physical data.

LEGEND

Face velocity 400 to 450 fpm

Most commonly used for high latent load applications. Space requirements and costs are higher than other selections.

Face velocity 450 to 550 fpm

Represents most standard commercial HVAC (Heating, Ventilation, and Air Conditioning) cooling applications. Good value and space balance.

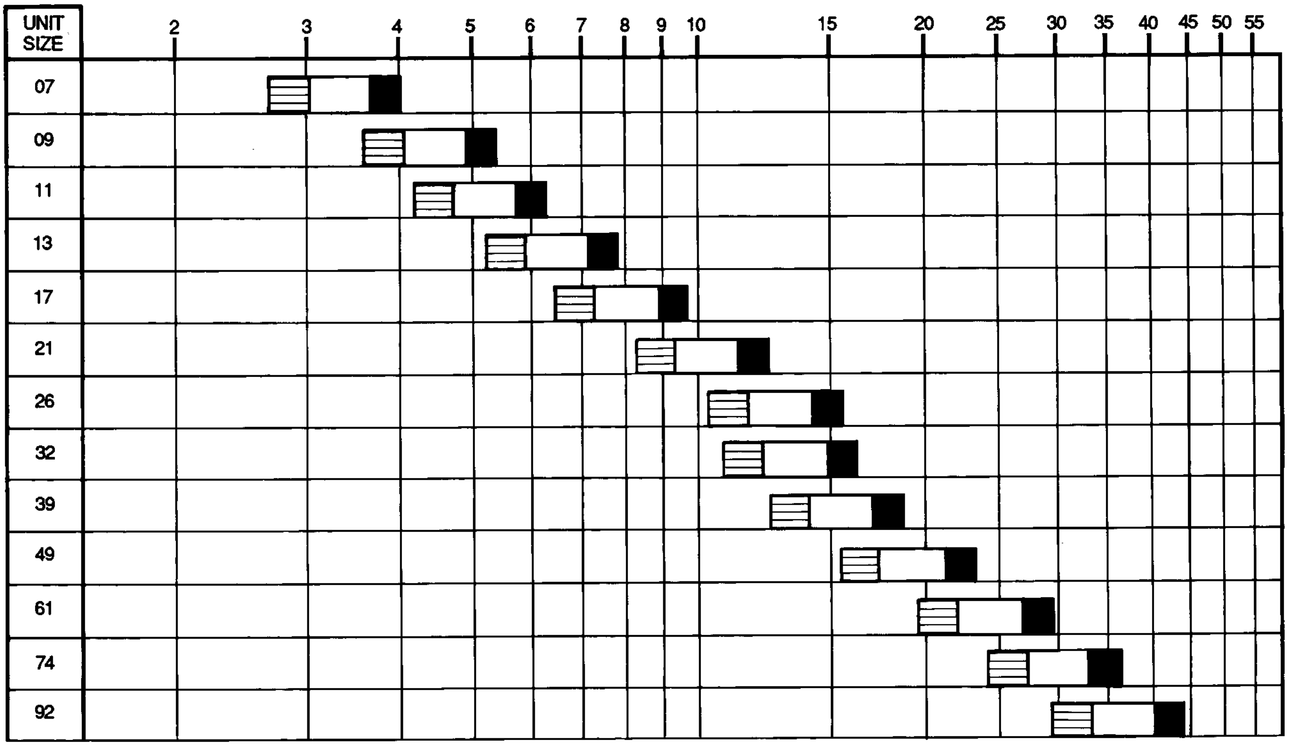
Face velocity 550 to 600 fpm

Best selection for space and cost if conditions permit.

NOTES:
1. Airflow is based on use of large face area coil.
2. Fan velocities are based on nominal cooling coil face area as shown by unit size; heat and vent applications can have velocities greater than 600 fpm.

AIRFLOW (CFM x 1000)

BLOW-THRU



TO USE THE SELECTION CHART:

1. Find required airflow by reading across available airflow (cfm x 1000) scale at top of blow-thru chart.
2. Read down from the selected airflow until desired face velocity (fpm) is reached.
3. From this point, move to the left to determine unit size.
4. Use worksheet (page 68) to record unit size, section sequence, and physical data.

LEGEND

(striped box) Face velocity 400 to 450 fpm

Most commonly used for high latent load applications. Space requirements and costs are higher than other selections.

(white box) Face velocity 450 to 550 fpm

Represents most standard commercial HVAC (Heating, Ventilation, and Air Conditioning) cooling applications. Good value and space balance.

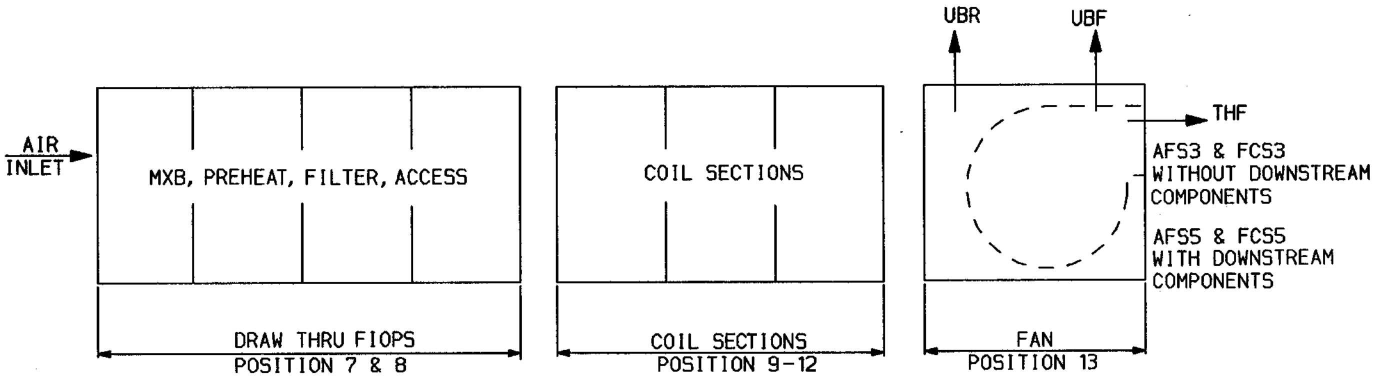
(black box) Face velocity 550 to 600 fpm

Best selection for space and cost if conditions permit.

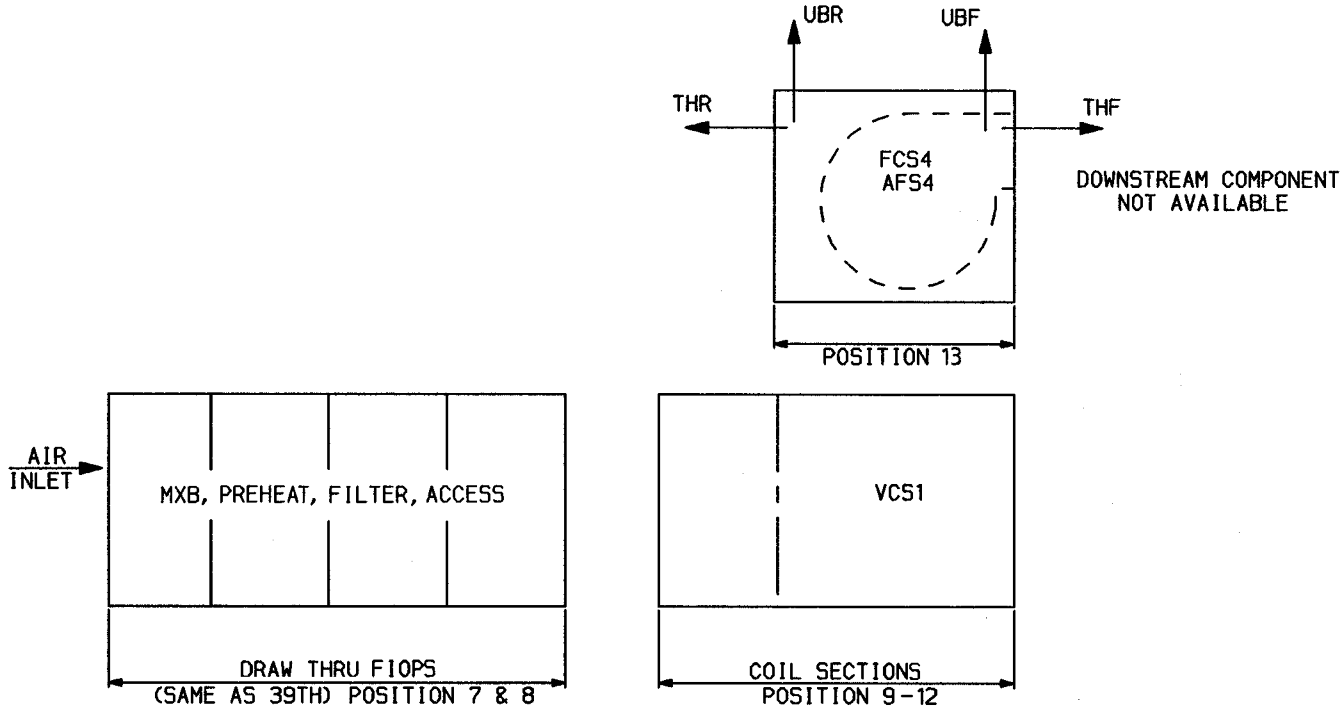
NOTES:
1. Airflow is based on use of large face area coil.
2. Fan velocities are based on nominal cooling coil face area as shown by unit size; heat and vent applications can have velocities greater than 600 fpm.

COMPONENT SELECTION

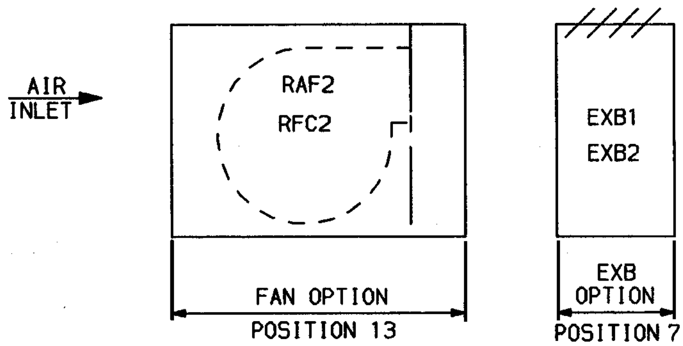
POSITION 4* — UNIT TYPE, BASE UNITS



39TH — HORIZONTAL UNIT



39TV — VERTICAL UNIT



39TR — RETURN FAN (Includes EXB1 or EXB2)

LEGEND

FIOP — Factory-Installed Option
THF — Top Horizontal Front
THR — Top Horizontal Rear
UBF — Upblast Front
UBR — Upblast Rear

*Refer to model number nomenclature, page 10.

NOTE: See page 9 for component description.

COMPONENT SELECTION (cont)

POSITIONS 7 AND 8*; DRAW-THRU FACTORY-INSTALLED OPTION (FIOP) COMPONENTS — 39TH AND 39TV UNITS

POSITION 7

POSITION 8

OPTION	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6
A	1	2	3	4	5	6	7, 1	7, 2	7, 3	8	—	—	9	—	—	A, 1	A, 2	A, 3	B, 1	B, 2	B, 3	C	—	—	D	—	—	E, 1	E, 2	E, 3
B	1, 5	2, 5	3, 5	4, 5	5, 4	6, 4	7, 1 5	7, 2 5	7, 3 5	8, 4	8, 5	8, 6	9, 4	9, 5	9, 6	A, 1 5	A, 2 5	A, 3 5	B, 1 5	B, 2 5	B, 3 5	C, 4	C, 5	C, 6	D, 4	D, 5	D, 6	E, 1 5	E 2 5	E, 3 5
C	1, 6	2, 6	3, 6	4, 6	—	—	7, 1 6	7, 2 6	7, 3 6	8, 4 5	8, 5 4	8, 6 4	9, 4 5	9, 5 4	9, 6 4	A, 1 6	A, 2 6	A, 3 6	B, 1 6	B, 2 6	B, 3 6	C, 4 5	C, 5 4	C, 6 4	D, 4 5	D, 5 4	D, 6 4	E, 1 6	E, 2 6	E, 3 6
D	1,4 5	2, 4 5	3, 4 5	4, 5 4	—	—	7, 1 4, 5	7, 2 4, 5	7, 3 4, 5	8, 4 6	—	—	9, 4 6	—	—	A, 1 4, 5	A, 2 4, 5	A, 3 4, 5	B, 1 4, 5	B, 2 4, 5	B, 3 4, 5	C, 4 6	—	—	D, 4 6	—	—	E, 1 4, 5	E, 2 4, 5	E, 3 4, 5
E	1, 4 6	2, 4 6	3, 4 6	4, 6 4	—	—	7, 1 4, 6	7, 2 4, 6	7, 3 4, 6	B, 4 5, 4	—	—	9, 4 5, 4	—	—	A, 1 4, 6	A, 2 4, 6	A, 3 4, 6	B, 1 4, 6	B, 2 4, 6	B, 3 4, 6	C, 4 5, 4	—	—	D, 4 5, 4	—	—	E, 1 4, 6	E, 2 4, 6	E, 3 4, 6
F	1, 5 4	2, 5 4	3, 5 4	—	—	—	7, 1 5, 4	7, 2 5, 4	7, 3 5, 4	8, 4 6, 4	—	—	9. 4 6, 4	—	—	A, 1 5, 4	A, 2 5, 4	A, 3 5, 4	B, 1 5, 4	B, 2 5, 4	B, 3 5, 4	C, 4 6, 4	—	—	D, 4 6, 4	—	—	E, 1 5, 4	E, 2 5, 4	E, 3 5, 4
G	1, 6 4	2, 6 4	3, 6 4	—	—	—	7, 1 6, 4	7, 2 6, 4	7, 3 6, 4	—	—	—	—	—	—	A, 1 6, 4	A, 2 6, 4	A, 3 6, 4	B, 1 6, 4	B, 2 6, 4	B, 3 6, 4	—	—	—	—	—	—	E, 1 6, 4	E, 2 6, 4	E, 3 6, 4
H	1, 4 5, 4	2, 4 5, 4	3, 4 5, 4	—	—	—	7, 1, 4 5, 4	7, 2, 4 5, 4	7, 3, 4 5, 4	—	—	—	—	—	—	A, 1, 4 5, 4	A, 2, 4 5, 4	A, 3, 4 5, 4	B, 1, 4 5, 4	B, 2, 4 5, 4	B, 3, 4 5, 4	—	—	—	—	—	—	E, 1, 4 5, 4	E, 2, 4 5, 4	E, 3, 4 5, 4
J	1, 4 6, 4	2, 4 6, 4	3, 4 6, 4	—	—	—	7, 1, 4 6, 4	7, 2, 4 6, 4	7, 3, 4 6, 4	—	—	—	—	—	—	A, 1, 4 6, 4	A, 2, 4 6, 4	A, 3, 4 6, 4	B, 1, 4 6, 4	B, 2, 4 6, 4	B, 3, 4 6, 4	—	—	—	—	—	—	E, 1, 4 6, 4	E, 2, 4 6, 4	E, 3, 4 6, 4
K	1, 4	2, 4	3, 4	—	—	—	7, 1 4	7, 2 4	7, 3 4	—	—	—	—	—	—	A, 1 4	A, 2 4	A, 3 4	B, 1 4	B, 2 4	B, 3 4	—	—	—	—	—	—	E, 1 4	E, 2 4	E, 3 4
L	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—	A	—	—	B	—	—	—	—	—	—	—	—	E	—	—

MXB/FMB LEGEND

T — Top Damper
B — Bottom
R — Rear Damper
PD — Premium Damper
SD — Standard Damper

COMPONENT LEGEND

1 — FLT1
2 — ANG1
3 — BCF1
4 — ACC1
5 — EHS1
6 — MHS1
7 — MXB1 T+R (SD)
8 — FMB1 T+R (SD)
9 — FMB2 R+B (SD)

A — MXB5 T+R (SD)†
B — MXB6 T+R (PD)
C — FMB3 T+R (PD)
D — FMB4 R+B (PD)
E — MXB7 T+R (PD)†

*Refer to model number nomenclature, page 10.
†MXB5 and 7 must be used with upstream components such as return fan or EXB. Other MXB/FMB components not suitable for use with upstream components.

NOTES:
1. Components listed in direction of airflow. For example, 4 and E in positions 7 and 8 represent component codes E, 1, 4, and 6. According to the component legend, the matching component names are MXB7, FLT1, ACC1, and MHS1.

AIR → FLOW

2. Position 9 defines preheat coil if used.
3. See page 9 for component descriptions.

COMPONENT SELECTION (cont)

POSITION 10* — COIL COMPONENT SECTIONS

OPTION	39TH UNITS Consist of:			39TV UNITS Consist of:		
A	LCS1 CW	—	—	VCS1 CW	—	—
B	MCS1 CW	—	—	VCS1 DX	—	—
C	LCS1 DX	—	—	LCS1 CW	VCS1 DX	—
D	MCS1 DX	—	—	LCS1 DX	VCS1 DX	—
E	LCS1 CW	MHS1	—	LCS1 CW	VCS1 CW	—
F	LCS1 DX	MHS1	—	LCS1 CW	ACC1	VCS1 DX
G	MCS1 CW	MHS1	—	LCS1 DX	ACC1	VCS1 DX
H	MCS1 DX	MHS1	—	LCS1 CW	ACC1	VCS1 CW
J	LCS1 CW	ACC1	MHS1	MCS1 CW	VCS1 DX	—
K	MCS1 CW	ACC1	MHS1	MCS1 DX	VCS1 DX	—
L	LCS1 DX	ACC1	MHS1	MCS1 CW	VCS1 CW	—
M	MCS1 DX	ACC1	MHS1	MCS1 CW	ACC1	VCS1 DX
N	LCS1 CW	LCS1 DX	—	MCS1 DX	ACC1	VCS1 DX
P	LCS1 CW	LCS1 CW	—	MCS1 CW	ACC1	VCS1 CW
Q	MCS1 CW	MCS1 DX	—	—	—	—
R	MCS1 CW	MCS1 CW	—	—	—	—
S	LCS1 CW	ACC1	LCS1 DX	—	—	—
T	LCS1 CW	ACC1	LCS1 CW	—	—	—
U	MCS1 CW	ACC1	MCS1 DX	—	—	—
V	MCS1 CW	ACC1	MCS1 CW	—	—	—
W	MHS1	LCS1 CW	—	—	—	—
X	MHS1	LCS1 DX	—	—	—	—
Y	MHS1	MCS1 CW	—	—	—	—
Z	MHS1	MCS1 DX	—	—	—	—
1	MHS1	ACC1	LCS1 CW	—	—	—
2	MHS1	ACC1	LCS1 DX	—	—	—
3	MHS1	ACC1	MCS1 CW	—	—	—
4	MHS1	ACC1	MCS1 DX	—	—	—

LEGEND

CW — Chilled Water
DX — Direct Expansion

*Refer to model number nomenclature, page 10.

NOTES:
1. Sections listed in direction of airflow.
2. Use positions 9, 11, and 12 to specify features of coils used in coil sections specified in position 10.
3. Specify “—” for no coils before fan section.
4. See page 9 for component descriptions.

COMPONENT SELECTION (cont)

POSITIONS 9, 11, 12* — 39T COOLING AND HEATING COILS

OPTION	CHILLED WATER UNIT SIZE									HW OR STEAM			DIRECT EXPANSION UNIT SIZE								
	07, 09			11 - 26			32 - 92			Hot Water Coils			07			09			11 - 92		
	Row	Fin	Cir	Row	Fin	Cir	Row	Fin	Cir	Row	Fin	Cir	Row	Fin	Cir	Row	Fin	Cir	Row	Fin	Cir
A	4	8	H	4	8	H	—	—	—	1	8	H	4	8	A	4	8	B	4	8	B
B	4	8	F	4	8	F	4	8	F	1	11	H	4	8	B	4	8	C	4	8	C
C	—	—	—	4	8	D	4	8	D	1	14	H	4	8	E	4	8	F	4	8	F
D	6	8	H	6	8	H	—	—	—	2	8	H	4	8	F	4	8	G	4	8	G
E	6	8	E	6	8	F	6	8	F	2	8	F	6	8	B	6	8	B	6	8	B
F	6	8	D	6	8	D	6	8	D	2	11	H	6	8	C	6	8	C	6	8	C
G	8	8	H	8	8	H	—	—	—	2	11	F	6	8	F	6	8	F	6	8	F
H	8	8	F	8	8	F	8	8	F	2	14	H	6	8	G	6	8	G	6	8	G
J	8	8	D	8	8	D	8	8	D	2	14	F	8	8	B	8	8	B	8	8	C
K	10	8	F	10	8	F	10	8	F	STEAM COILS			8	8	F	8	8	F	8	8	D
L	10	8	D	10	8	D	10	8	D	Row	Fin	Cir	8	8	G	8	8	G	8	8	G
M	4	11	H	4	11	H	—	—	—	1	6	F	4	11	A	4	11	B	4	11	B
N	4	11	F	4	11	F	4	11	F	1	9	F	4	11	B	4	11	C	4	11	C
P	—	—	—	4	11	D	4	11	D	1	12	F	4	11	E	4	11	F	4	11	F
Q	6	11	H	6	11	H	—	—	—	—	—	—	4	11	F	4	11	G	4	11	G
R	6	11	F	6	11	F	6	11	F	—-	—	—	6	11	B	6	11	B	6	11	B
S	6	11	D	6	11	D	6	11	D	—	—	—	6	11	C	6	11	C	6	11	C
T	8	11	H	8	11	H	—	—	—	—	—	—	6	11	F	6	11	F	6	11	F
U	8	11	F	8	11	F	8	11	F	—	—	—	8	11	G	6	11	G	6	11	G
V	8	11	D	8	11	D	8	11	D	—	—	—	8	11	B	8	11	B	8	11	C
W	10	11	F	10	11	F	10	11	F	—	—	—	8	11	F	8	11	F	8	11	D
X	10	11	D	10	11	D	10	11	D	—	—	—	8	11	G	8	11	G	8	11	G
Y	4	14	H	4	14	H	—	—	—	—	—	—	4	14	A	4	14	B	4	14	B
Z	4	14	F	4	14	F	4	14	F	—	—	—	4	14	B	4	14	C	4	14	C
1	—	—	—	4	14	D	4	14	D	—	—	—	4	14	E	4	14	F	4	14	F
2	6	14	H	6	14	H	—	—	—	—	—	—	4	14	F	4	14	C	4	14	C
3	6	14	F	6	14	F	6	14	F	—	—	—	6	14	B	6	14	B	6	14	B
4	6	14	D	6	14	D	6	14	D	—	—	—	6	14	C	6	14	C	6	14	C
5	8	14	H	8	14	H	—	—	—	—	—	—	6	14	F	6	14	F	6	14	F
6	8	14	F	8	14	F	8	14	F	—	—	—	6	14	G	6	14	G	6	14	G
7	8	14	D	8	14	D	8	14	D	—	—	—	8	14	B	8	14	B	8	14	C
8	10	14	F	10	14	F	10	14	F	—	—	—	8	14	F	8	14	F	8	14	D
9	10	14	D	10	14	D	10	14	D	—	—	—	8	14	G	8	14	G	6	14	G

OPTION	ELECTRIC HEAT UNIT SIZE																									
	07		09		11		13		17		21		26		32		39		49		61		74		92	
	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt	kW	Volt
A	12	A	17	A	15	A	29	A	29	A	45	A	34	A	39	A	66	A	79	A	79	A	79	A	133	A
B	12	D	17	D	15	D	29	D	29	D	45	D	34	D	39	D	66	D	79	D	79	D	79	D	133	D
C	12	F	17	F	15	F	29	F	29	F	45	F	34	F	39	F	66	F	79	F	79	F	79	F	133	F
D	17	A	24	A	25	A	45	A	45	A	74	A	74	A	79	A	99	A	99	A	99	A	119	A	166	A
E	17	D	24	D	25	D	45	D	45	D	74	D	74	D	79	D	99	D	99	D	99	D	119	D	166	D
F	17	F	24	F	25	F	45	F	45	F	74	F	74	F	79	F	99	F	99	F	99	F	119	F	166	F
G	24	A	34	A	39	A	64	A	64	A	99	A	99	A	119	A	133	A	133	A	133	A	133	A	199	A
H	24	D	34	D	39	D	64	D	64	D	99	D	99	D	119	D	133	D	133	D	133	D	133	D	199	D
J	24	F	34	F	39	F	64	F	64	F	99	F	99	F	119	F	133	F	133	F	133	F	133	F	199	F
K	34	A	45	A	56	A	78	A	78	A	119	A	119	S	133	A	159	A	159	A	159	A	159	A	266	A
L	34	D	45	D	56	D	78	D	78	D	119	D	119	D	133	D	159	D	159	D	159	D	159	D	266	D
M	34	F	45	F	56	F	78	F	78	F	119	F	119	F	133	F	159	F	159	F	159	F	159	F	266	F
N	45	A	64	A	78	A	92	A	92	A	159	A	159	A	166	A	199	A	199	A	199	A	199	A	332	A
P	45	D	64	D	78	D	92	D	92	D	159	D	159	D	166	D	199	D	199	D	199	D	199	D	332	D
Q	45	F	64	F	78	F	92	F	92	F	159	F	159	F	166	F	199	F	199	F	199	F	199	F	332	F
R	57	A	78	A	90	A	119	A	119	A	198	A	212	A	199	A	232	A	299	A	239	A	299	A	518	A
S	57	D	78	D	90	D	119	D	119	D	198	D	212	D	199	D	232	D	299	D	239	D	299	D	518	D
T	57	F	78	F	90	F	119	F	119	F	198	F	212	F	199	F	232	F	299	F	239	F	299	F	518	F
U	64	A	86	A	112	A	132	A	132	A	228	A	265	A	239	A	299	A	359	A	359	A	399	A	565	A
V	64	D	86	D	112	D	132	D	132	D	228	D	265	D	239	D	299	D	359	D	359	D	399	D	565	D
W	64	F	86	F	112	F	132	F	132	F	226	F	265	F	239	F	299	F	359	F	359	F	399	F	565	F
X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	279	A	332	A	432	A	496	A	465	A	678	A
Y	—	—	—	—	—	—	—	—	—	—	—	—	—	—	279	D	332	D	432	D	496	D	465	D	678	D
Z	—	—	—	—	—	—	—	—	—	—	—	—	—	—	279	F	332	F	432	F	496	F	465	F	678	F
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	-	—	—	—
9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

COIL CIRCUITING LEGEND

CHILLED WATER OR HEATING

Cir — Circuit
D — Double
F — Full
Fin — Fins Per in.
H — Half
HW — Hot Water

DIRECT EXPANSION

A — Face Split Quarter Circuit
B — Face Split Half Circuit
C — Face Split Full Circuit
Cir — Circuit
D — Double Circuit
E — Row Split Quarter Circuit
F — Row Split Half Circuit
Fin — Fins Per in.
G — Row Split Full Circuit

ELECTRIC HEAT VOLTAGE LEGEND

A — 208/3/60
D — 380/3/50
F — 480/3/60

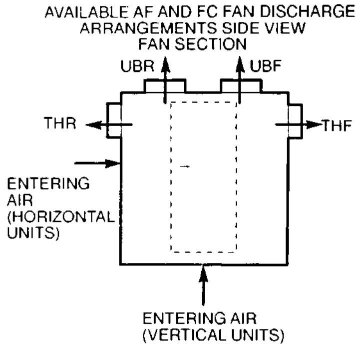
*Refer to model number nomenclature, page 10.

NOTE: Coils in Positions 9, 11, and 12 must be in direction of airflow through unit and are installed in coil sections according to sections specified in Positions 7 and 8 or coil section options specified in Position 10.

COMPONENT SELECTION (cont)

POSITION 13* — FANS

OPTION	39TH UNITS			39TV UNITS			39TR UNITS	
	Consist Of:			Consist Of:			Consist Of:	
	Fan	IGV	Discharge	Fan	IGV	Discharge	Fan	IGV
A	FCS3	N	THF	FCS4	N	THF	RFC2	N
B	FCS3	N	UBF	FCS4	N	UBF	RFC2	Y
C	FCS3	N	UBR	FCS4	N	UBR	—	—
D	FCS3	Y	THF	FCS4	N	THR	—	—
E	FCS3	Y	UBF	FCS4	Y	THF	—	—
F	FCS3	Y	UBR	FCS4	Y	UBF	—	—
G	FCS5	N	THF	FCS4	Y	UBR	—	—
H	FCS5	Y	THF	FCS4	Y	THR	—	—
J	AFS3	N	THF	AFS4	N	THF	RAF2	N
K	AFS3	N	UBF	AFS4	N	UBF	RAF2	Y
L	AFS3	N	UBR	AFS4	N	UBR	—	—
M	AFS3	Y	THF	AFS4	N	THR	—	—
N	AFS3	Y	UBF	AFS4	Y	THF	—	—
P	AFS3	Y	UBR	AFS4	Y	UBF	—	—
Q	AFS5	N	THF	AFS4	Y	UBR	—	—
R	AFS5	Y	THF	AFS4	Y	THR	—	—



LEGEND

AF — Airfoil
FC — Forward-Curved
IGV — Inlet Guide Vanes
THR — Top Horizontal Front
THR — Top Horizontal Rear
UBF — Upblast Front
UBR — Upblast Rear

*Refer to model number nomenclature, page 10.

NOTE: See page 9 for component descriptions.

COMPONENT SELECTION (cont)

POSITION 14* — FAN SPEED (RPM), AIRFOIL AND FORWARD-CURVED FANS

OPTION	39T UNIT SIZE													
	07		09		11		13		17		21		26	
	FAN TYPE													
	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS
A	—	2000	—	1600	—	1600	3200	1400	2700	1200	2700	1175	—	1000
B	4085	1900	3800	1520	3515	1520	3040	1330	2565	1140	2565	1116	2280	950
C	3881	1805	3610	1444	3339	1444	2888	1264	2437	1083	2437	1060	2166	903
D	3687	1714	3430	1372	3172	1372	2744	1200	2315	1029	2315	1007	2058	857
E	3502	1629	3258	1303	3014	1303	2606	1140	2199	978	2199	957	1955	815
F	3327	1548	3095	1238	2863	1238	2476	1083	2089	928	2089	909	1857	774
G	3161	1470	2940	1176	2720	1176	2352	1029	1985	882	1985	864	1764	735
H	3003	1397	2793	1117	2584	1117	2234	978	1886	838	1886	821	1676	698
J	2853	1327	2654	1061	2455	1061	2123	928	1791	796	1791	780	1592	663
K	2710	1260	2521	1008	2332	1008	2017	882	1702	756	1702	741	1513	630
L	2575	1197	2395	958	2215	958	1916	838	1617	718	1617	704	1437	598
M	2446	1137	2275	910	2105	910	1820	796	1535	682	1535	668	1365	569
N	2324	1080	2161	865	1999	865	1729	756	1459	648	1459	634	1297	540
P	2207	1026	2053	821	1899	821	1642	718	1386	616	1386	603	1232	513
Q	2097	975	1951	780	1804	780	1560	682	1317	585	1317	573	1170	487
R	1992	926	1853	741	1714	741	1482	648	1251	555	1251	544	1112	463
S	1892	880	1761	704	1628	704	1408	616	1188	528	1188	517	1056	440
T	1798	836	1672	668	1547	668	1337	—	1129	501	1129	—	1003	418
U	1707	—	1589	635	1469	635	1271	—	1072	—	1072	—	953	—
V	1623	—	—	603	1396	603	—	—	—	—	—	—	906	—
W	1541	—	—	—	1326	—	—	—	—	—	—	—	860	—
X	—	—	—	—	—	—	—	—	—	—	—	—	817	—

OPTION	39T UNIT SIZE											
	32		39		49		61		74		92	
	FAN TYPE											
	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS	AFS	FCS
A	2100	1000	1925	900	1500	840	1350	650	1200	—	1200	—
B	1995	950	1829	855	1425	798	1283	618	1140	—	1140	—
C	1895	903	1737	812	1354	758	1218	587	1083	—	1083	—
D	1800	857	1650	772	1286	720	1157	557	1029	—	1029	—
E	1710	815	1568	733	1221	684	1100	529	978	—	978	—
F	1625	774	1490	696	1160	650	1045	503	928	—	928	—
G	1544	735	1415	662	1102	617	992	477	882	—	882	—
H	1467	698	1344	629	1047	587	943	454	838	—	838	—
J	1393	663	1277	597	995	557	896	431	796	—	796	—
K	1324	630	1213	567	945	529	851	410	756	—	756	—
L	1257	598	1153	538	898	503	808	389	718	—	718	—
M	1194	569	1095	511	853	477	767	370	682	—	682	—
N	1135	540	1040	486	810	453	729	351	648	—	648	—
P	1078	513	988	462	770	431	693	334	616	—	616	—
Q	1024	487	938	438	731	409	658	317	—	—	—	—
R	972	463	892	417	694	389	625	301	—	—	—	—
S	924	440	847	—	—	370	594	—	—	—	—	—
T	878	418	805	—	—	351	564	—	—	—	—	—
U	834	—	765	—	—	—	—	—	—	—	—	—
V	—	—	726	—	—	—	—	—	—	—	—	—
W	—	—	—	—	—	—	—	—	—	—	—	—
X	—	—	—	—	—	—	—	—	—	—	—	—

*Refer to model number nomenclature, page 10.

NOTES:
1. Motors 15 Hp and less are variable pitch.
2. Motors 20 Hp and greater are fixed pitch.
3. Speeds shown are for 60 Hz motor applications. For 50 Hz motors, multiply by 0.83.
3. See page 9 for component descriptions.

Selection data (cont)

Carrier®

COMPONENT SELECTION (cont)

POSITION 15* — FAN MOTORS, AIRFOIL AND FORWARD-CURVED FANS

OPTION	39T UNIT SIZE																										
	07			09			11			13			17			21						26					
	FAN TYPE																										
	AF & FC															AF			FC			AF			FC		
	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V
A	7.5	RA	1	10	RA	1	15	RA	1	15	RA	1	20	RA	1	30	RA	6	25	RA	1	30	RA	6	25	RA	1
B	7.5	SA	5	10	SA	5	15	SA	5	15	RC	1	20	RC	1	30	SA	2	25	SA	5	30	SA	5	25	RC	1
C	7.5	SA	2	10	SA	2	15	SA	2	15	SC	4	20	SC	2	30	SA	5	25	SA	2	30	SA	2	25	SC	2
D	5	RA	1	7.5	RA	1	10	RA	1	15	SC	2	15	RA	1	25	RA	1	20	RA	1	25	RA	1	20	RA	1
E	5	RC	1	7.5	RC	1	10	RC	1	10	RA	1	15	RC	1	25	RC	1	20	RC	1	25	RC	1	20	RC	1
F	5	SC	4	7.5	SC	4	10	SC	4	10	RC	1	15	SC	4	25	SC	2	20	SC	2	25	SC	2	20	SC	2
G	5	SC	2	7.5	SC	2	10	SC	2	10	SC	4	15	SC	2	20	RA	1	15	RA	1	20	RA	1	15	RA	1
H	3	RA	1	5	RA	1	7.5	RA	1	10	SC	2	10	RA	1	20	RC	1	15	RC	1	20	RC	1	15	RC	1
J	3	RC	1	5	RC	1	7.5	RC	1	7.5	RA	1	10	RC	1	20	SC	2	15	SC	4	20	SC	2	15	SC	4
K	3	SC	4	5	SC	4	7.5	SC	4	7.5	RC	1	10	SC	4	15	RA	1	15	SC	2	15	RA	1	15	SC	2
L	3	SC	2	5	SC	2	7.5	SC	2	7.5	SC	4	10	SC	2	15	RC	1	10	RA	1	15	RC	1	10	RA	1
M	2	RA	6	3	RA	1	5	RA	1	7.5	SC	2	7.5	RA	1	15	SC	4	10	RC	1	15	SC	4	10	RC	1
N	2	RC	1	3	RC	1	5	RC	1	5	RA	1	7.5	RC	1	15	SC	2	10	SC	4	15	SC	2	10	SC	4
P	2	SC	4	3	SC	4	5	SC	4	5	RC	1	7.5	SC	4	10	RA	1	10	SC	2	10	RA	1	10	SC	2
Q	2	SC	2	3	SC	2	5	SC	2	5	SC	4	7.5	SC	2	10	RC	1	7.5	RA	1	10	RC	1	7.5	RA	1
R	1.5	RA	6	2	RA	6	3	RA	1	5	SC	2	5	RA	1	10	SC	4	7.5	RC	1	10	SC	4	7.5	RC	1
S	1.5	RC	1	2	RC	1	3	RC	1	3	RA	1	5	RC	1	10	SC	2	7.5	SC	4	10	SC	2	7.5	SC	4
T	1.5	SC	4	2	SC	4	3	SC	4	3	RC	1	5	SC	4	7.5	RA	1	7.5	SC	2	7.5	RA	1	7.5	SC	2
U	1.5	SC	2	2	SC	2	3	SC	2	3	SC	4	5	SC	2	7.5	RC	1	5	RA	1	7.5	RC	1	5	RA	1
V	1	RA	6	1.5	RA	6	2	RA	6	3	SC	2	3	RA	1	7.5	SC	4	5	RC	1	7.5	SC	4	5	RC	1
W	1	RC	1	1.5	RC	1	2	RC	1	2	RA	6	3	RC	1	7.5	SC	2	5	SC	4	7.5	SC	2	5	SC	4
X	1	SC	4	1.5	SC	4	2	SC	4	2	RC	1	3	SC	4	5	RA	1	5	SC	2	5	RA	1	5	SC	2
Y	1	SC	2	1.5	SC	2	2	SC	2	2	SC	4	3	SC	2	5	RC	1	3	RA	1	5	RC	1	3	RA	1
Z	7.5	RA	1	10	RA	1	15	RA	1	2	SC	2	2	RA	1	5	SC	4	3	RC	1	5	SC	4	3	RC	1
1	7.5	SA	2	10	SA	2	15	SA	2	20	RA	1	2	RC	1	5	SC	2	3	SC	4	5	SC	2	3	SC	4
2	5	RA	1	7.5	RA	1	10	RA	1	20	RC	1	2	SC	4	3	RA	1	3	SC	2	3	RA	1	3	SC	2
3	5	RC	1	7.5	RC	1	10	RC	1	20	SC	2	2	SC	2	3	RC	1	2	RA	6	3	RC	1	—	—	—
4	5	SC	2	7.5	SC	2	10	SC	2	15	RA	1	—	—	—	3	SC	4	2	RC	1	3	SC	4	—	—	—
5	3	RA	1	5	RA	1	7.5	RA	1	15	RC	1	—	—	—	3	SC	2	2	SC	4	3	SC	2	—	—	—
6	3	RC	1	5	RC	1	7.5	RC	1	15	SC	4	—	—	—	—	—	—	2	SC	2	—	—	—	—	—	—
7	3	SC	2	5	SC	2	7.5	SC	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

OPTION	39T UNIT SIZE																										
	32						39						49						61						74,92		
	FAN TYPE																										
	AF			FC			AF			FC			AF			FC			AF			FC			AF		
	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	H	Type	V	Hp	Type	V	Hp	Type	V
A	50	RA	4	40	RA	4	60	RA	2	50	RA	4	75	RA	2	50	RA	4	75	RA	2	50	RA	4	100	RA	2
B	50	RA	2	40	RA	2	60	SA	3	50	RA	2	75	SA	3	50	RA	2	75	SA	3	50	RA	2	100	RC	2
C	50	SA	2	40	RC	1	50	RA	4	50	RC	1	60	RA	2	50	RC	1	60	RA	2	50	RC	1	100	SA	3
D	40	RA	4	40	SA	2	50	RA	2	50	SA	2	60	RC	2	50	SA	2	60	RC	2	50	SA	2	100	SC	3
E	40	RA	2	40	SC	2	50	SA	2	50	SC	2	60	SA	3	50	SC	2	60	SA	3	50	SC	2	75	RA	2
F	40	RC	1	30	RA	6	40	RA	4	40	RA	4	60	SC	2	40	RA	4	60	SC	2	40	RA	4	75	RC	2
G	40	SA	2	30	RC	1	40	RA	2	40	RA	2	50	RA	4	40	RA	2	50	RA	4	40	RA	2	75	SA	3
H	40	SC	2	30	SA	2	40	RC	1	40	RC	1	50	RA	2	40	RC	1	50	RA	2	40	RC	1	75	SC	2
J	30	RA	6	30	SC	2	40	SA	2	40	SA	2	50	RC	1	40	SA	2	50	RC	1	40	SA	2	60	RA	2
K	30	RC	1	25	RA	1	40	SC	2	40	SC	2	50	SA	2	40	SC	2	50	SA	2	40	SC	2	60	RC	2
L	30	SA	2	25	RC	1	30	RA	6	30	RA	6	50	SC	2	30	RA	6	50	SC	2	30	RA	6	60	SA	3
M	30	SC	2	25	SC	2	30	RC	1	30	RC	1	40	RA	4	30	RC	1	40	RA	4	30	RC	1	60	SC	2
N	25	RA	1	20	RA	1	30	SA	2	30	SA	2	40	RA	2	30	SA	2	40	RA	2	30	SA	2	50	RA	4
P	25	RC	1	20	RC	1	30	SC	2	30	SC	2	40	RC	1	30	SC	2	40	RC	1	30	SC	2	50	RA	2
Q	25	SC	2	20	SC	2	25	RA	1	25	RA	1	40	SA	2	25	RA	1	40	SA	2	25	RA	1	50	RC	1
R	20	RA	1	15	RA	1	25	RC	1	25	RC	1	40	SC	2	25	RC	1	40	SC	2	25	RC	1	50	SA	2
S	20	RC	1	15	RC	1	25	SC	2	25	SC	2	30	RA	6	25	SC	2	30	RA	6	25	SC	2	50	SC	2
T	20	SC	2	15	SC	4	20	RA	1	20	RA	1	30	RC	1	20	RA	1	30	RC	1	20	RA	1	40	RA	4
U	15	RA	1	15	SC	2	20	RC	1	20	RC	1	30	SA	2	20	RC	1	30	SA	2	20	RC	1	40	RA	2
V	15	RC	1	10	RA	1	20	SC	2	20	SC	2	30	SC	2	20	SC	2	30	SC	2	20	SC	2	40	RC	1
W	15	SC	4	10	RC	1	15	RA	1	15	RA	1	25	RA	1	15	RA	1	25	RA	1	15	RA	1	40	SA	2
X	15	SC	2	10	SC	4	15	RC	1	15	RC	1	25	RC	1	15	RC	1	25	RC	1	15	RC	1	40	SC	2
Y	10	RA	1	10	SC	2	15	SC	4	15	SC	4	25	SC	2	15	SC	4	25	SC	2	15	SC	4	30	RA	6
Z	10	RC	1	7.5	RA	1	15	SC	2	15	SC	2	20	RA	1	15	SC	2	20	RA	1	15	SC	2	30	RC	1
1	10	SC	4	7.5	RC	1	10	RA	1	10	RA	1	20	RC	1	10	RA	1	20	RC	1	10	RA	1	30	SA	2
2	10	SC	2	7.5	SC	4	10	RC	1	10	RC	1	20	SC	2	10	RC	1	20	SC	2	10	RC	1	30	SC	2
3	7.5	RA	1	7.5	SC	2	10	SC	4	10	SC	4	15	RA	1	10	SC	4	15	RA	1	10	SC	4	25	RA	1
4	7.5	RC	1	5	RA	1	10	SC	2	10	SC	2	15	RC	1	10	SC	2	15	RC	1	10	SC	2	25	RC	1
5	7.5	SC	4	5	RC	1	7.5	RA	1	7.5	RA	1	15	SC	4	7.5	RA	1	15	SC	4	7.5	RA	1	25	SC	2
6	7.5	SC	2	5	SC	2	7.5	RC	1	7.5	RC	1	15	SC	2	7.5	RC	1	15	SC	2	7.5	RC	1	20	RA	1
7	5	RA	1	—	—	—	7.5	SC	4	7.5	SC	4	10	RA	1	7.5	SC	4	10	RA	1	7.5	SC	4	20	RC	1
8	5	RC	1	—	—	—	7.5	SC	2	7.5	SC	2	10	RC	1	7.5	SC	2	10	RC	1	7.5	SC	2	20	SC	2
9	5	SC	2	—	—	—	—	—	—	—	—	—	10	SC	2	—	—	—	10	SC	2	—	—	—	—	—	—

(shaded box) 3600 rpm motors. All others are 1800 rpm motors.

LEGEND

AF — Airfoil
FC — Foward-Curved
RA — Standard Efficiency, Open Drip-Proof
RC — Standard Efficiency, Totally-Enclosed Fan Cooled
SA — High Efficiency, Open Drip-Proof
SC — High Efficiency, Totally-Enclosed Fan Cooled
V — Voltage Code

VOLTAGE LEGEND

1 — 208/230/460
2 — 230/460
3 — 460
4 — 200/208
5 — 200
6 — 200/230/460

*Refer to model number nomenclature, page 10.

NOTES:
1. All motors are 1800 rpm, except shaded motors, which are 3600 rpm.
2. All motors have top mounted conduit box.
3. 3600 rpm motors required when fan rpm exceeds 2700.
4. **60 Hz motors shown. For 50 Hz motors, use field-supplied or contact Application Engineering.**
5. See page 9 for component descriptions.

COMPONENT SELECTION (cont)

POSITION 16* — PRODUCT-INTEGRATED CONTROLS (PIC)

	PIC OPTION	FACTORY-INSTALLED COMPONENTS IN REMOTE CONTROL BOX																					
		PSIO	**PSIO(S)**	**LTTR**	**OAVP**	**AFS**	**CR1**	**HIR**	**HPS**	**RVP**	**SF**	**SVP**	**TB5**	**SW**	**SP**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**
	CONSTANT VOLUME (CV)																						
A	**Fan, Coil — Basic (CV)**	X		X		X	X				X			X		X	X	X		X	X		
B	**Fan, Coil, Filter**	X		X		X	X				X			X		X	X	X		X	X		
C	**Fan, Coil, Filter, Field Supplied MXB**	X		X		X	X				X			X		X	X	X		X	X	X	
D	**Fan, Coil, Filter, MXB**	X		X		X	X				X			X		X	X	X		X	X	X	
F	**Fan, Coil, Filter, MXB, Smoke Control**	X	X	X		X	X				X		X	X		X	X	X		X	X	X	X
	VARIABLE AIR VOLUME (VAV) — IGV CONTROL																						
H	**Fan, Coil — Basic (VAV)**	X		X		X	X	X	X		X			X	X	X	X	X	X	X	X		
J	**Fan, Coil, Filter**	X		X		X	X	X	X		X			X	X	X	X	X	X	X	X		
K	**Fan, Coil, Filter, Field Supplied MXB**	X		X		X	X	X	X		X			X	X	X	X	X	X	X	X	X	
L	**Fan, Coil, Filter, MXB**	X		X		X	X	X	X		X			X	X	X	X	X	X	X	X	X	
N	**Fan, Coil, Filter, MXB, Fan Tracking**	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
P	**Fan, Coil, Filter, MXB, Smoke Control**	X	X	X		X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X
R	**Fan, Coil, Filter, MXB, Smoke Control, Fan Tracking**	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S	**Fan, Coil, Filter, MXB, Smoke Control, Constant Outside Air**	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X
U	**Fan, Coil, Filter, MXB, Constant Outside Air**	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X	
	VARIABLE AIR VOLUME (VAV) — VFD CONTROL																						
W	**Fan, Coil — Basic (VAV)**	X		X		X	X	X	X		X			X	X	X	X	X		X	X		
X	**Fan, Coil, Filter**	X		X		X	X	X	X		X			X	X	X	X	X		X	X		
Y	**Fan, Coil, Filter, Field Supplied MXB**	X		X		X	X	X	X		X			X	X	X	X	X		X	X	X	
Z	**Fan, Coil, Filter, MXB**	X		X		X	X	X	X		X			X	X	X	X	X		X	X	X	
2	**Fan, Coil, Filter, MXB, Fan Tracking**	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X
3	**Fan, Coil, Filter, MXB, Smoke Control**	X	X	X		X	X	X	X		X		X	X	X	X	X	X		X	X	X	X
5	**Fan, Coil, Filter, MXB, Smoke Control, Fan Tracking**	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
6	**Fan, Coil, Filter, MXB, Smoke Control, Constant Outside Air**	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X		X	X	X	X
8	**Fan, Coil, Filter, MXB, Constant Outside Air**	X	X	X	X	X	X	X	X		X			X	X	X	X	X		X	X	X	

LEGEND

AFS — Airflow Switch
C1 — Supply Damper Smoke Relay
C2 — Return Damper Smoke Relay
C3 — Exhaust Damper Smoke Relay
CR1 — Low Temperature Thermostat Relay
CV — Constant Volume
DSIO — Relay Module, Electric Heat and/or DX
DX — Direct Expansion
ENT — Enthalpy Switch
EXB — Exhaust Air Damper Actuator
FLTS — Filter Status Switch
HIR — Heater Interlock Relay
HPS — High-Pressure Switch
IGV — Inlet Guide Vane Actuator (Supply Fan)
IGVRF — Inlet Guide Valve Actuator (Return Fan)
LTT — Low Temperature Thermostat
LTTR — Manual Reset for LTT
MAD — Mixed-Air or Outdoor-Air Damper Actuator
MAT — Mixed-Air Temperature Sensor
MXB — Mixing Box
OAP — Outdoor Air Probe
OAT — Outdoor-Air Temperature Sensor
OAVP — Outdoor-Air Velocity Pressure Transducer
PSIO — Processor Module
PSIO(S) — Option (Slave Processor) Module
RAD — Return-Air Damper Actuator
RAT — Return-Air Temperature Sensor
RVP — Return Velocity Pressure Transducer
SAT — Supply-Air Temperature Sensor
SF — Supply Fan Relay
SP — Static Pressure Transducer
SPP — Static Pressure Probe
SPT — Space Temperature Sensor
SVP — Supply Velocity Pressure Transducer
SW — On/Off Power Switch
T1 — 21 v PSIO (Master) Transformer
T2 — 24 v Control Power Transformer
T3 — 24 v Chilled Water Valve Transformer
T4 — 24 v IGV Actuator (Supply) Transformer
T5 — 21 v PSIO (Slave) or DSIO Transformer
T6 — 24 v Hot Water Valve Transformer
T7 — 24 v MXB or Supply-Air/Smoke Relay Damper Actuator Transformer
T8 — 24 v Return-Air Damper/Smoke Relay Transformer
T9 — 24 v Exhaust-Air Damper/Smoke Relay Transformer
T10 — 24 v IGV Actuator (Return) Transformer
T11 — 24 v IGV Actuator (Supply — 74 and 92 Size Only) Transformer
T12 — 24 v IGV Actuator (Return — 74 and 92 Size Only) Transformer
TB5 — Terminal Block (Smoke)
VAV — Variable Air Volume
VFD — Variable Frequency Drive

*Refer to model number nomenclature, page 10.

NOTE: See following page for PIC accessory packages.

Selection data (cont)

COMPONENT SELECTION (cont)

POSITION 16* — PRODUCT-INTEGRATED CONTROLS (PIC) (cont)

PIC OPTION	FACTORY-INSTALLED COMPONENTS IN REMOTE CONTROL BOX							FACTORY INSTALLED/ WIRED IN UNIT										FACTORY SUPPLIED/ FIELD INSTALLED					
	T9	T10	T11	T12	C1	C2	C3	SAT	LTT	TUBING	FLTS	MAT	MAD	RAD	EXB	IGV	IGVRF	RAT	SPT	OAT	ENT	OAP	SPP
CONSTANT VOLUME (CV)																							
A Fan, Coil — Basic (CV)								X	X	X								X	X	X			
B Fan, Coil, Filter								X	X	X	X							X	X	X			
C Fan, Coil, Filter, Field Supplied MXB								X	X	X	X	X						X	X	X	X		
D Fan, Coil, Filter, MXB								X	X	X	X	X	X					X	X	X	X		
F Fan, Coil, Filter, MXB, Smoke Control	X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X		
VARIABLE AIR VOLUME (VAV) — IGV CONTROL																							
H Fan, Coil — Basic (VAV)			X					X	X	X						X		X	X	X			X
J Fan, Coil, Filter			X					X	X	X	X					X		X	X	X			X
K Fan, Coil, Filter, Field Supplied MXB			X					X	X	X	X	X				X		X	X	X	X		X
L Fan, Coil, Filter, MXB			X					X	X	X	X	X	X			X		X	X	X	X		X
N Fan, Coil, Filter, MXB, Fan Tracking	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
P Fan, Coil, Filter, MXB, Smoke Control	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
R Fan, Coil, Filter, MXB, Smoke Control, Fan Tracking	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
S Fan, Coil, Filter, MXB, Smoke Control, Constant Outside Air	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
U Fan, Coil, Filter, MXB, Constant Outside Air			X					X	X	X	X	X	X			X		X	X	X	X	X	X
VARIABLE AIR VOLUME (VAV) — VFD CONTROL																							
W Fan, Coil — Basic (VAV)								X	X	X								X	X	X			X
X Fan, Coil, Filter								X	X	X	X							X	X	X			X
Y Fan, Coil, Filter, Field Supplied MXB								X	X	X	X	X						X	X	X	X		X
Z Fan, Coil, Filter, MXB								X	X	X	X	X	X					X	X	X	X		X
2 Fan, Coil, Filter, MXB, Fan Tracking	X							X	X	X	X	X	X	X	X			X	X	X	X		X
3 Fan, Coil, Filter, MXB, Smoke Control	X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X
5 Fan, Coil, Filter, MXB, Smoke Control, Fan Tracking	X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X
6 Fan, Coil, Filter, MXB, Smoke Control, Constant Outside Air	X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
8 Fan, Coil, Filter, MXB, Constant Outside Air								X	X	X	X	X	X					X	X	X	X	X	X

See Legend on page 61.

COMPONENT SELECTION (cont)

PIC ACCESSORY PACKAGES

PACKAGE NO.	PACKAGE DESCRIPTION
39TA900001	Water Valve, 2-Way NO, ½-in., 0.4 Cv
39TA900002	Water Valve, 2-Way NO, ½-in., 1.3 Cv
39TA900003	Water Valve, 2-Way NO, ½-in., 2.2 Cv
39TA900004	Water Valve, 2-Way NO, ½-in., 3.6 Cv
39TA900005	Water Valve, 2-Way NO, ¾-in., 5.0 Cv
39TA900006	Water Valve, 2-Way NO, ¾-in., 6.2 Cv
39TA900007	Water Valve, 2-Way NO, 1-in., 8.2 Cv
39TA900008	Water Valve, 2-Way NO, 1-in., 11.0 Cv
39TA900009	Water Valve, 2-Way NO, 1¼-in., 16.0 Cv
39TA900010	Water Valve, 2-Way NO, 1½-in., 25.0 Cv
39TA900011	Water Valve, 2-Way NO, 2-in., 40.0 Cv
39TA900012	Water Valve, 2-Way NO, 2½-in., 56.0 Cv
39TA900013	Water Valve, 2-Way NO, 3-in., 85.0 Cv
39TA900014	Water Valve, 2-Way NC ½-in., 0.4 Cv
39TA900015	Water Valve, 2-Way NC, ½-in., 1.3 Cv
39TA900016	Water Valve, 2-Way NC, ½-in., 2.2 Cv
39TA900017	Water Valve, 2-Way NC, ½-in., 3.6 Cv
39TA900018	Water Valve, 2-Way NC, ¾-in., 5.0 Cv
39TA900019	Water Valve, 2-Way NC, ¾-in., 6.2 Cv
39TA900020	Water Valve, 2-Way NC, 1-in., 8.2 Cv
39TA900021	Water Valve, 2-Way NC, 1-in., 11.0 Cv
39TA900022	Water Valve, 2-Way NC, 1¼-in., 16.0 Cv
39TA900023	Water Valve, 2-Way NC, 1½-in., 25.0 Cv
39TA900024	Water Valve, 2-Way NC, 2-in., 40.0 Cv
39TA900025	Water Valve, 2-Way NC, 2½-in., 56.0 Cv
39TA900026	Water Valve, 2-Way NC, 3-in., 85.0 Cv
39TA900027	Water Valve, 3-Way, ½-in., 2.0 Cv
39TA900028	Water Valve, 3-Way, ½-in., 4.0 Cv
39TA900029	Water Valve, 3-Way, ¾-in., 6.8 Cv
39TA900030	Water Valve, 3-Way, 1-in., 12.0 Cv
39TA900031	Water Valve, 3-Way, 1¼-in., 16.0 Cv
39TA900032	Water Valve, 3-Way, 1½-in., 33.0 Cv
39TA900033	Water Valve, 3-Way, 2-in., 55.0 Cv
39TA900034	Water Valve, 3-Way, 2½-in., 74.0 Cv
39TA900035	Water Valve, 3-Way, 3-in., 101.0 Cv
39TA900038	Humidity Sensor — Duct
39TA900039	Humidity Sensor — Space
39TA900040	DX Cooling Coil Control
39TA900041	Electric Heat Control
39TA900042	Slave PSIO
39TA900043	HSIO
39TA900044	Humidifier Control*
39TA900045	Damper Actuator — 15 in.-lb
39TA900046	Damper Actuator — 50 in.-lb
39TA900047	Damper Actuator — 190 in.-lb
39TA900048	Optional Outputs*
CGCDXGAS001A00	CO_2 Sensor Calibration Service Kit
CGCDXPRM001A00	CO_2 Sensor User Interface Program (UIP)
CGCDXSEN001A00	Wall Mount CO_2 Sensor (No Display)*
CGCDXSEN002A00	Wall Mount CO_2 Sensor with Display*
CGCDXSEN003A00	Duct Mount CO_2 Sensor (No Display)*

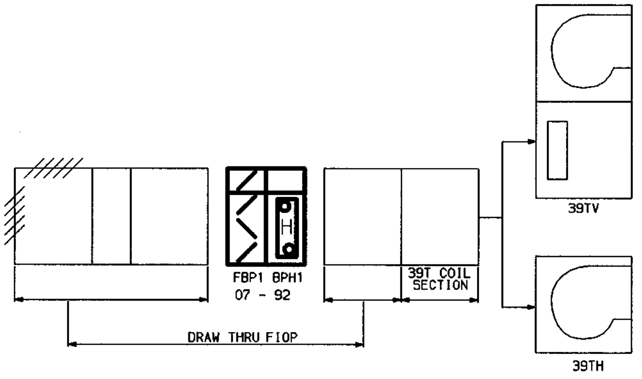
LEGEND

Cv — Coefficient of Velocity
DX — Direct Expansion
HSIO — Keyboard and Display Module
NC — Normally Closed
NO — Normally Open
PSIO — Processor Module

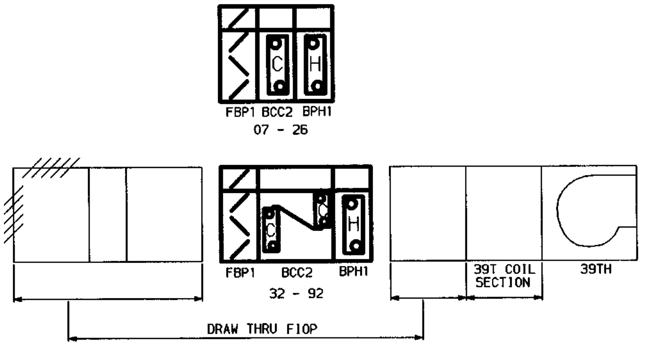
*Requires slave PSIO accessory package no. 39TA900042 unless slave PSIO is included with PIC option ordered with unit. The slave PSIO is included in options F, N-U, and 2-8.

COMPONENT SELECTION (cont)

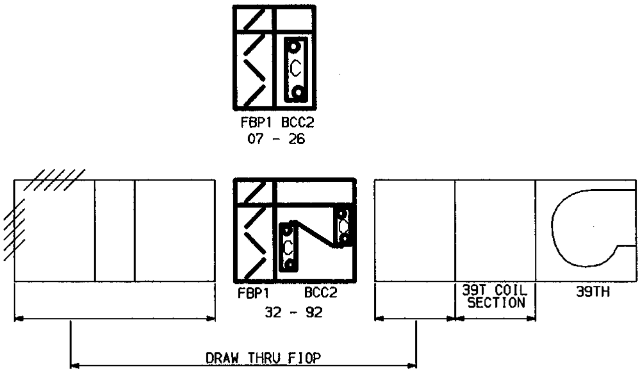
POSITION 7* — 39TS COMPONENTS AND TYPICAL ARRANGEMENTS



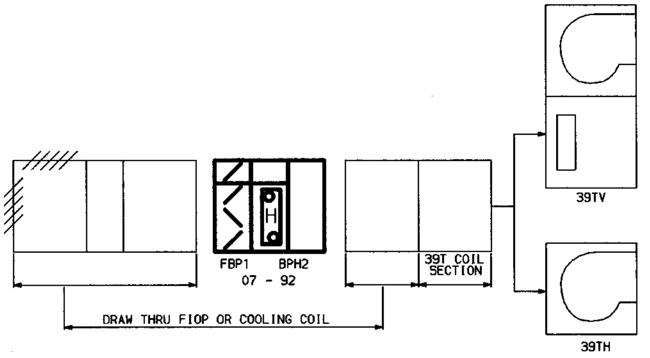
A — BYPASS HEATING



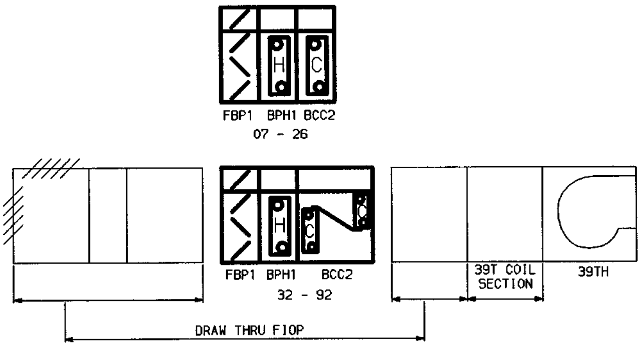
D — BYPASS COOLING AND HEATING



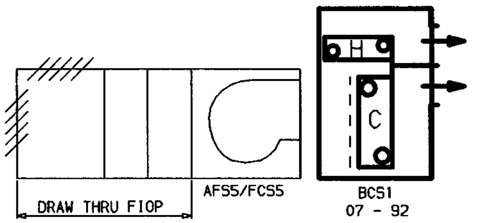
B — BYPASS COOLING



E — BYPASS HEATING WITH FULL FACE COIL DOWNSTREAM FROM BPH SECTION



C — BYPASS HEATING AND COOLING



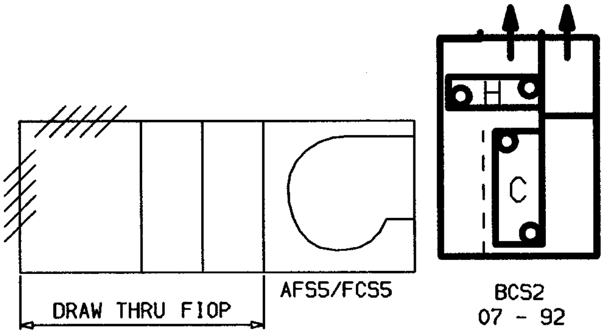
G — BCS1 COIL SECTION

*Refer to model number nomenclature, page 10.

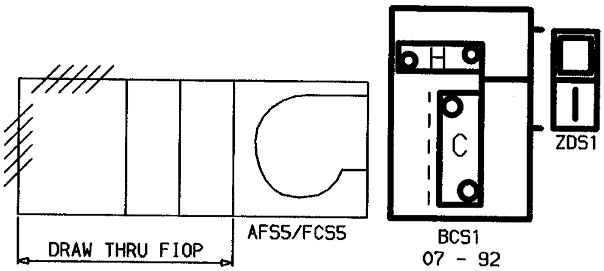
NOTES:
1. The 39TS components in arrangements A-U appear in **bold.** Each arrangement (codes A-U) includes all **bold** components shown. Separately-shipped components must also be ordered separately.
2. The 39TS components can be field or factory installed. Contact your local Carrier representative for assistance if factory installation is desired.

COMPONENT SELECTION (cont)

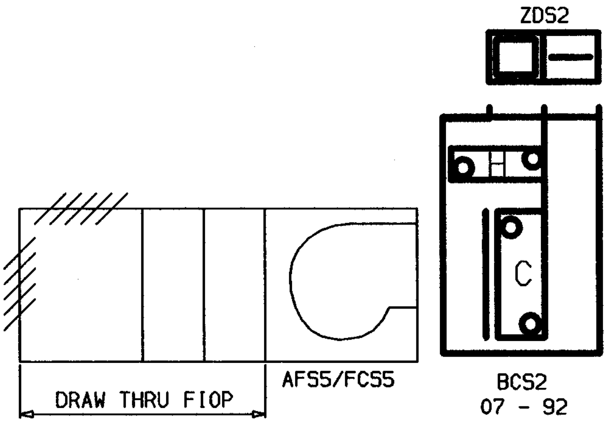
POSITION 7* — 39TS COMPONENTS AND TYPICAL ARRANGEMENTS (cont)



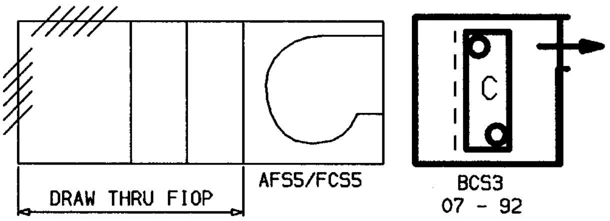
H — BCS2 COIL SECTION



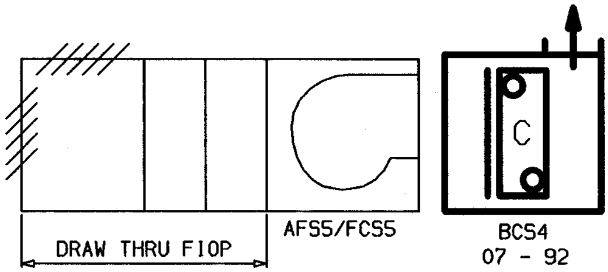
J — BCS1 COIL SECTION WITH ZDS1



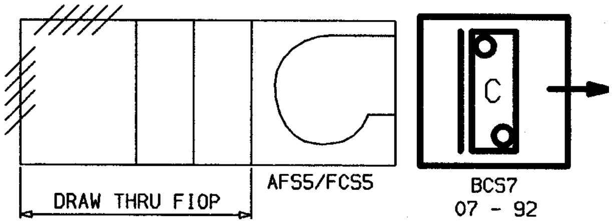
K — BCS2 COIL SECTION WITH ZDS2



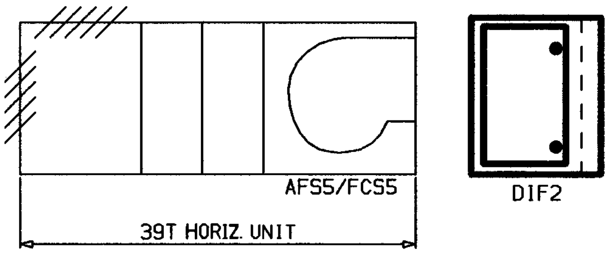
L — BCS3 COIL SECTION



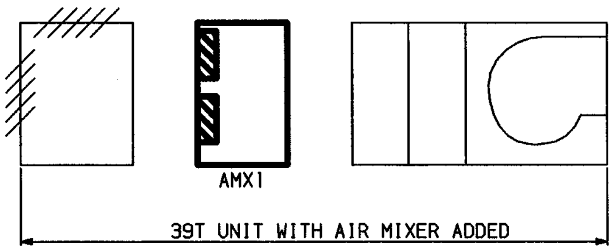
M — BCS4 COIL SECTION



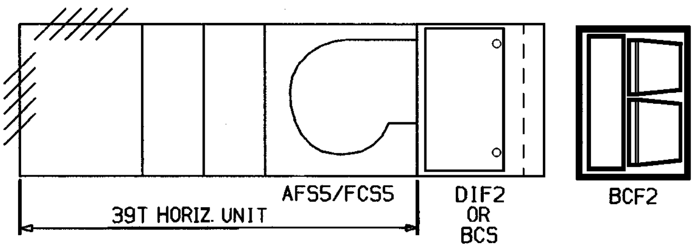
N — BCS7 COIL SECTION



S — DIFFUSER SECTION



T — AIR MIXER



U — BAG/CARTRIDGE FILTER, DOWNSTREAM LOCATION

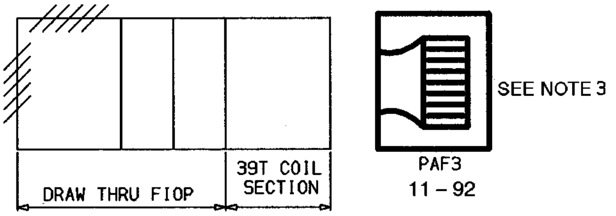
*Refer to model number nomenclature, page 10

NOTES:
1. The 39TS components in arrangements A-U appear in **bold.** Each arrangement (codes A-U) includes all **bold** components shown. Separately-shipped components must also be ordered separately.
2. The 39TS components can be field or factory installed. Contact your local Carrier representative for assistance if factory installation is desired.

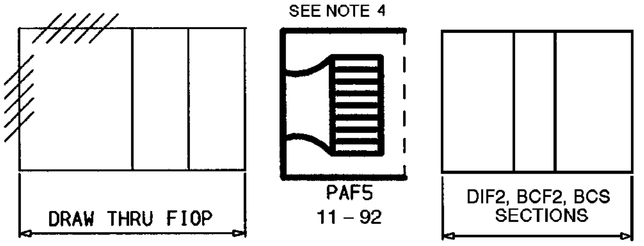
Selection data (cont)

COMPONENT SELECTION (cont)

POSITION 7* — PLENUM FANS, 39TP UNITS



Q — DRAW-THRU PLENUM FAN



R — BLOW-THRU PLENUM FAN
(CAN BE USED AS RETURN FAN)

*Refer to model number nomenclature, page 10.

NOTES:
1. The 39TP components in arrangements Q and R appear in **bold.** Separately-shipped components must also be ordered separately.
2. The 39TP components can be field or factory installed. Contact your local Carrier representative for assistance if factory installation is desired.
3. Field cut and fabricate discharge opening as required.
4. Open discharge can be used with 39TS downstream components.

POSITION 13* — FAN SPEED (RPM), PLENUM FANS — 39TP ONLY

OPTION	UNIT SIZE																		
	11	13	17	21		26		32		39		49		61		74		92	
	Fan Wheel Size																		
	Std (A)	Std (A)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)	Small (S)	Std (A)
A	3122	2848	2560	2325	2020	2020	1818	2020	1818	1652	1473	1473	1335	1335	1208	1208	1097	991	896
B	2965	2705	2432	2208	1919	1919	1727	1919	1727	1569	1399	1399	1268	1268	1147	1147	1042	941	851
C	2817	2570	2310	2098	1823	1823	1640	1823	1640	1490	1329	1329	1204	1204	1090	1090	989	894	808
D	2676	2441	2194	1933	1731	1731	1558	1731	1558	1416	1262	1262	1144	1144	1035	1035	940	849	768
E	2542	2319	2084	1893	1645	1645	1480	1645	1480	1345	1199	1199	1087	1087	983	983	893	807	730
F	2415	2203	1980	1799	1563	1563	1406	1563	1406	1278	1139	1139	1033	1033	934	934	848	766	693
G	2393	2183	1962	1782	1548	1548	1391	1548	1391	1265	1129	1129	1023	1023	926	926	840	759	686
H	2273	2073	1864	1692	1470	1470	1208	1470	1208	1201	1072	1072	971	971	879	879	798	721	651
J	2160	1970	1770	1608	1397	1397	1148	1397	1148	1141	1018	1018	923	923	835	835	758	685	619
K	2051	1871	1682	1527	1327	1327	1090	1327	1090	1084	967	967	877	877	793	793	720	650	588
L	1949	1778	1598	1451	1260	1260	1036	1260	1036	1030	919	919	833	833	754	754	684	618	558
M	1851	1689	1518	1378	1197	1197	984	1197	984	978	873	873	791	791	716	716	650	587	530
N	1759	1604	1442	1309	1137	1137	934	1137	934	926	829	829	752	752	680	680	617	557	504
P	1671	1524	1370	1244	1081	1081	888	1081	888	883	788	788	714	714	646	646	586	530	479
Q	1587	1448	1306	1182	1026	1026	843	1026	843	839	749	749	678	678	614	614	557	503	455
R	1508	1375	1240	1123	975	975	801	975	801	797	711	711	644	644	583	583	529	478	432
S	1432	1306	1178	1066	926	926	761	—	761	757	675	675	612	612	554	554	502	454	410
T	1361	1240	1119	1013	880	880	723	—	—	719	653	642	581	581	526	526	477	431	390
U	1292	1178	1063	962	836	836	687	—	—	683	610	610	552	552	500	500	453	410	370
V	1228	1119	1010	914	794	—	652	—	—	—	579	—	525	—	475	—	431	389	352
W	—	1063	—	—	754	—	—	—	—	—	550	—	498	—	451	—	409	369	333
X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	317

*Refer to model number nomenclature, page 10.

NOTES:
1. Motors 15 hp and less are variable pitch.
2. Motors 20 hp and greater are fixed pitch.
3. Speeds shown are for 60 Hz motor applications. For 50 Hz motors, multiply by 0.83.
4. [shaded] area (Options A - F) available with Class II construction only.
5. See page 9 for component descriptions.

COMPONENT SELECTION (cont)

POSITION 14* — FAN MOTORS, PLENUM FANS — 39TP ONLY

OPTION	UNIT SIZE																													
	11			13			17			21			26			32			39			49			61			74/92		
	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V	Hp	Type	V
A	15	RA	1	15	RA	1	25	RA	1	30	RA	6	40	RA	4	40	RA	4	50	RA	4	60	RA	2	75	RA	2	100	RA	2
B	15	SA	5	15	RC	1	25	RC	1	30	SA	2	40	RA	2	40	RA	2	50	RA	2	60	RC	2	75	RC	2	100	RC	2
C	15	SA	2	15	SC	4	25	SC	2	30	SA	5	40	RC	1	40	RC	1	50	RC	1	60	SA	3	75	SA	3	100	SA	3
D	10	RA	1	15	SC	2	20	RA	1	25	RA	1	40	SA	2	40	SA	2	50	SA	2	60	SC	2	75	SC	2	100	SC	3
E	10	RC	1	10	RA	1	20	RC	1	25	RC	1	40	SC	2	40	SC	2	40	RA	4	50	RA	4	60	RA	2	75	RA	2
F	10	SC	4	10	RC	1	20	SC	2	25	SC	2	30	RA	6	30	RA	6	40	RA	2	50	RA	2	60	RC	2	75	RC	2
G	10	SC	2	10	SC	4	15	RA	1	20	RA	1	30	SA	5	30	RC	1	40	RC	1	50	RC	1	60	SA	3	75	SA	3
H	7.5	RA	1	10	SC	2	15	RC	1	20	RC	1	30	SA	2	30	SA	2	40	SA	2	50	SA	2	60	SC	2	75	SC	2
J	7.5	RC	1	7.5	RA	1	15	SC	4	20	SC	2	25	RA	1	30	SC	2	40	SC	2	50	SC	2	50	RA	4	60	RA	2
K	7.5	SC	4	7.5	RC	1	15	SC	2	15	RA	1	25	RC	1	25	RA	1	30	RA	6	40	RA	4	50	RA	2	60	RC	2
L	7.5	SC	2	7.5	SC	4	10	RA	1	15	RC	1	25	SC	2	25	RC	1	30	RC	1	40	RA	2	50	RC	1	60	SA	3
M	5	RA	1	7.5	SC	2	10	RC	1	15	SC	4	20	RA	1	25	SC	2	30	SA	2	40	RC	1	50	SA	2	60	SC	2
N	5	RC	1	5	RA	1	10	SC	4	15	SC	2	20	RC	1	20	RA	1	30	SC	2	40	SA	2	50	SC	2	50	RA	4
P	5	SC	4	5	RC	1	10	SC	2	10	RA	1	20	SC	2	20	RC	1	25	RA	1	40	SC	2	40	RA	4	50	RA	2
Q	5	SC	2	5	SC	4	7.5	RA	1	10	RC	1	15	RA	1	20	SC	2	25	RC	1	30	RA	6	40	RA	2	50	RC	1
R	3	RA	1	5	SC	2	7.5	RC	1	10	SC	4	15	RC	1	15	RA	1	25	SC	2	30	RC	1	40	RC	1	50	SA	2
S	3	RC	1	3	RA	1	7.5	SC	4	10	SC	2	15	SC	4	15	RC	1	20	RA	1	30	SA	2	40	SA	2	50	SC	2
T	3	SC	4	3	RC	1	7.5	SC	2	7.5	RA	1	15	SC	2	15	SC	4	20	RC	1	30	SC	2	40	SC	2	40	RA	4
U	3	SC	2	3	SC	4	5	RA	1	7.5	RC	1	10	RA	1	15	SC	2	20	SC	2	25	RA	1	30	RA	6	40	RA	2
V	2	RA	6	3	SC	2	5	RC	1	7.5	SC	4	10	RC	1	10	RA	1	15	RA	1	25	RC	1	30	RC	1	40	RC	1
W	2	RC	1	2	RA	6	5	SC	4	7.5	SC	2	10	SC	4	10	RC	1	15	RC	1	25	SC	2	30	SA	2	40	SA	2
X	2	SC	4	2	RC	1	5	SC	2	5	RA	1	10	SC	2	10	SC	4	15	SC	4	20	RA	1	30	SC	2	40	SC	2
Y	2	SC	2	2	SC	4	3	RA	1	5	RC	1	7.5	RA	1	10	SC	2	15	SC	2	20	RC	1	25	RA	1	30	RA	6
Z	15	RA	1	2	SC	2	3	RC	1	5	SC	4	7.5	RC	1	7.5	RA	1	10	RA	1	20	SC	2	25	RC	1	30	RC	1
1	15	SA	2	20	RA	1	3	SC	4	5	SC	2	7.5	SC	4	7.5	RC	1	10	RC	1	15	RA	1	25	SC	2	30	SA	2
2	10	RA	1	20	RC	1	3	SC	2	3	RA	1	7.5	SC	2	7.5	SC	4	10	SC	4	15	RC	1	20	RA	1	30	SC	2
3	10	RC	1	20	SC	2	2	RA	1	3	RC	1	5	RA	1	7.5	SC	2	10	SC	2	15	SC	4	20	RC	1	25	RA	1
4	10	SC	2	15	RA	1	2	RC	1	3	SC	4	5	RC	1	5	RA	1	7.5	RA	1	15	SC	2	20	SC	2	25	RC	1
5	—	—	—	15	RC	1	2	SC	4	3	SC	2	5	SC	4	5	RC	1	7.5	RC	1	10	RA	1	15	RA	1	25	SC	2
6	—	—	—	15	SC	4	2	SC	2	2	RA	6	5	SC	2	5	SC	2	7.5	SC	4	10	RC	1	15	RC	1	20	RA	1
7	—	—	—	—	—	—	—	—	—	2	RC	1	3	RA	1	3	RA	1	7.5	SC	2	10	SC	2	15	SC	4	20	RC	1
8	—	—	—	—	—	—	—	—	—	2	SC	4	3	SC	4	3	RC	1	5	RA	1	7.5	RA	1	15	SC	2	20	SC	2
9	—	—	—	—	—	—	—	—	—	2	SC	2	—	—	—	3	SC	2	5	SC	2	7.5	SC	2	10	SC	2	—	—	—

[shaded box] 3600 rpm motors. All others are 1800 rpm motors.

LEGEND

RA — Standard Efficiency, Open Drip-Proof
RC — Standard Efficiency, Totally-Enclosed Fan Cooled
SA — High Efficiency, Open Drip-Proof
SC — High Efficiency, Totally-Enclosed Fan Cooled
V — Voltage Code

VOLTAGE LEGEND

1 — 208/230/460
2 — 230/460
3 — 460
4 — 200/208
5 — 200
6 — 200/230/460

*Refer to model number nomenclature, page 10.

NOTES:
1. All motors are 1800 rpm, except shaded motors, which are 3600 rpm.
2. All motors have top mounted conduit box.
3. 3600 rpm motors required when fan rpm exceeds 2700.
4. 60 Hz motors shown. For 50 Hz motors, contact Application Engineering.
5. See page 9 for component descriptions.

SPECIFICATION WORKSHEET

JOB NAME ____________________

MARK FOR ____________________

CAPACITY __________ CFM __________

STATIC PRESSURE (in. wg)

Internal ______ External ______ Total ______

RPM ______ BHP ______ CYCLES ______

MTR TYPE ____________________

PIPE CONNECTION SIZES (page 23)

COOLING COIL: SUPPLY ______ RETURN ______

HEATING COIL: SUPPLY ______ RETURN ______

FILTERS (page 25)

SIZE __________ QTY __________

SIZE __________ QTY __________

COMPONENT SEQUENCE		LENGTH	WEIGHT*
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
______	+	______	______
MOTOR	+	—	______
COIL	+	—	______

FOR MOTOR AND COIL WEIGHTS SEE PAGES 28 AND 29.

TOTAL ______ ______

COMMENTS: ____________________

____

____

PREPARED BY: ____________________

DATE: ____________________

*Weights shown in this book are nominal for single-wall components. For double-wall components, multiply weight shown by 1.25.

Cost-efficient, computerized coil and fan selection

The Products and Systems Electronic Catalog is a series of computer programs designed to run on an IBM or IBM-compatible personal computer to select products and systems offered by Carrier.

The Electronic Catalog is ideal for ''instant turnaround,'' continual input/output monitoring, and modifications. The ACAPS (Applied Coil and Air Handler Performance and Selection) program produces excellent results when used for 39T fan and coil selection.

General features:

- Selects chilled water, hot water, steam, or direct-expansion coils
- Generates performance curves for fans with or without inlet guide vanes
- Projects sound levels for specified unit
- Simple to use
- High accuracy
- Uses ARI approved methods
- Reduces engineering expense
- Provides detailed output
- Coil and fan selection from your own PC
- Permanent copy of results from printer
- Multiple selection output

Special features:

- Ideal for coil and fan selection for all size jobs
- Allows user to continually monitor and modify input/output
- Provides processing for special applications
  — Ethylene glycol or brine
  — Altitude
- Stores up to 20 selections

For coil and fan selection, use the following procedure:

I Obtain unit size from 39T size selection chart on pages 52 and 53.

II Choose horizontal draw-thru, vertical draw-thru, or blow-thru configuration.

III Refer to section sequence and dimensional drawings on pages 30-50 and 54-68 to select components and determine overall dimensions.

IV Refer to ACAPS computer selection program for fan and coil selection.

Selection data (cont)

MOTOR AND DRIVE PACKAGE DATA

FORWARD-CURVED FAN

39T UNIT SIZE	MOTOR FRAME	FAN DISCHARGE			
		THF/THR		UBF/UBR	
		Centerline Distance (in.)			
		Min	Max	Min	Max
07	143T	7.4	9.0	9.5	11.1
	145T	7.4	9.0	9.5	11.1
	182T	6.1	7.8	8.1	9.7
	184T	6.1	7.8	8.1	9.7
	213T	5.5	7.2	7.4	8.9
09	145T	10.1	12.1	12.8	14.3
	182T	8.8	11.0	11.4	12.9
	184T	8.8	11.0	11.4	12.9
	213T	8.1	10.3	10.5	12.1
	215T	8.1	10.3	10.5	12.1
11	145T	10.4	12.4	13.0	14.5
	182T	8.6	10.7	11.2	12.7
	184T	8.6	10.7	11.2	12.7
	213T	7.9	10.1	10.3	11.9
	215T	7.9	10.1	10.3	11.9
	254T	6.9	9.1	9.1	10.7
13	145T	11.6	13.9	14.8	16.3
	182T	10.8	13.1	13.8	15.4
	184T	10.8	13.1	13.8	15.4
	213T	9.8	12.4	12.9	14.5
	215T	9.8	12.4	12.9	14.5
	254T	8.9	11.5	11.7	13.4
17	145T	7.4	9.0	9.5	11.1
	182T	13.4	15.7	16.8	18.4
	184T	13.4	15.7	16.8	18.4
	213T	12.6	15.0	15.9	17.5
	215T	12.6	15.0	15.9	17.5
	254T	11.5	14.0	14.7	16.3
	256T	11.5	14.0	14.7	16.3
21	145T	7.4	9.0	9.5	11.1
	182T	15.7	17.6	19.2	20.7
	184T	15.7	17.6	19.2	20.7
	213T	15.6	17.6	19.0	20.5
	215T	15.6	17.6	19.0	20.5
	254T	14.5	16.5	17.7	19.3
	256T	14.5	16.5	17.7	19.3
	284T	13.6	15.8	16.8	18.5
26	182T	18.5	20.3	22.2	23.6
	184T	18.5	20.3	22.2	23.6
	213T	18.4	20.4	22.0	23.5
	215T	18.4	20.4	22.0	23.5
	254T	17.2	19.3	20.7	22.3
	256T	17.2	19.3	20.7	22.3
	284T	16.4	18.5	19.8	21.4
32	184T	14.4	17.2	19.3	21.3
	213T	14.0	16.9	18.7	20.7
	215T	14.0	16.9	18.7	20.7
	254T	13.4	16.5	18.1	20.1
	256T	13.4	16.5	18.1	20.1
	284T	13.0	16.2	17.5	19.5
	286T	13.0	16.2	17.5	19.5
	324T	12.5	15.9	16.7	18.9
	326T	12.5	15.9	16.7	18.9
39	213T	16.2	19.0	21.4	23.4
	215T	16.2	19.0	21.4	23.4
	254T	15.6	18.5	20.6	22.6
	256T	15.6	18.5	20.6	22.6
	284T	15.2	18.2	20.0	22.0
	286T	15.2	18.2	20.0	22.0
	324T	14.6	17.8	19.3	21.4
	326T	14.6	17.8	19.3	21.4
	364T	14.2	17.5	18.6	20.8
49	213T	21.2	24.2	27.5	29.5
	215T	21.2	24.2	27.5	29.5
	254T	20.7	23.7	26.7	28.7
	256T	20.7	23.7	26.7	28.7
	284T	20.3	23.4	26.1	28.2
	286T	20.3	23.4	26.1	28.2
	324T	19.8	23.0	25.4	27.5
	326T	19.8	23.0	25.4	27.5
	364T	19.4	22.7	24.7	26.9
	365T	19.4	22.7	24.7	26.9
61	213T	26.0	28.8	32.7	34.7
	215T	26.0	28.8	32.7	34.7
	254T	25.4	28.3	32.0	34.0
	256T	25.4	28.3	32.0	34.0
	284T	25.0	27.9	31.5	33.5
	286T	25.0	27.9	31.5	33.5
	324T	24.5	27.5	30.7	32.7
	326T	24.5	27.5	30.7	32.7
	364T	23.9	27.1	30.0	32.1
	365T	23.9	27.1	30.0	32.1

LEGEND

THF — Top Horizontal Front
THR — Top Horizontal Rear
UBF — Upblast Front
UBR — Upblast Rear

NOTE: Variable-speed drives are not available for motors of 20 Hp or greater.

MOTOR AND DRIVE PACKAGE DATA (cont)

AIRFOIL FAN

39T UNIT SIZE	MOTOR FRAME	FAN DISCHARGE			
		THF/THR		UBF/UBR	
		Centerline Distance (in.)			
		Min	Max	Min	Max
07	143T	7.4	9.5	9.5	11.1
	145T	7.4	9.5	9.5	11.1
	182T	6.1	8.3	8.1	9.7
	184T	6.1	8.3	8.1	9.7
	213T	5.5	7.7	7.4	8.9
	215T	8.1	10.3	10.5	12.1
09	145T	10.2	12.2	12.8	14.3
	182T	8.8	11.0	11.4	12.9
	184T	8.8	11.0	11.4	12.9
	213T	8.1	10.3	10.5	12.1
	215T	8.1	10.3	10.5	12.1
11	145T	10.3	12.2	12.6	14.1
	182T	8.5	10.5	10.8	12.3
	184T	8.5	10.5	10.8	12.3
	213T	7.7	9.9	9.9	11.5
	215T	7.7	9.9	9.9	11.5
	254T	6.7	8.9	8.7	10.3
13	145T	11.6	13.9	14.8	16.3
	182T	10.8	13.1	13.8	15.4
	184T	10.8	13.1	13.8	15.4
	213T	9.8	12.4	12.9	14.5
	215T	9.8	12.4	12.9	14.5
	254T	8.9	11.5	11.7	13.4
	256T	8.9	11.5	11.7	13.4
17	145T	10.3	12.2	12.6	14.1
	182T	13.4	15.7	16.8	18.4
	184T	13.4	15.7	16.8	18.4
	213T	12.6	15.0	15.9	17.5
	215T	12.6	15.0	15.9	17.5
	254T	11.5	14.0	14.7	16.3
	256T	11.5	14.0	14.7	16.3
21	182T	15.7	17.6	19.3	21.3
	184T	15.7	17.6	19.3	21.3
	213T	15.7	17.7	19.1	20.6
	215T	15.7	17.7	19.1	20.6
	254T	14.5	16.6	17.8	19.4
	256T	14.5	16.6	17.8	19.4
	284T	13.6	15.8	16.9	18.6
	286T	13.6	15.8	16.9	18.6
26	182T	18.5	20.4	22.5	23.9
	184T	18.5	20.4	22.5	23.9
	213T	18.5	20.5	22.2	23.8
	215T	18.5	20.5	22.2	23.8
	254T	17.3	19.3	21.0	22.5
	256T	17.3	19.3	21.0	22.5
	284T	16.4	18.6	20.1	21.7
	286T	16.4	18.6	20.1	21.7
32	184T	14.4	17.1	19.0	21.0
	213T	13.9	16.8	18.5	20.5
	215T	13.9	16.8	18.5	20.5
	254T	13.3	16.4	17.7	19.7
	256T	13.3	16.4	17.7	19.7
	284T	13.0	16.1	17.2	19.2
	286T	13.0	16.1	17.2	19.2
	324T	12.4	15.8	16.4	18.6
	326T	12.4	15.8	16.4	18.6

39T UNIT SIZE	MOTOR FRAME	FAN DISCHARGE			
		THF/THR		UBF/UBR	
		Centerline Distance (in.)			
		Min	Max	Min	Max
39	213T	16.2	18.9	21.0	23.0
	215T	16.2	18.9	21.0	23.0
	254T	15.5	18.4	20.3	22.3
	256T	15.5	18.4	20.3	22.3
	284T	15.1	18.1	19.7	21.7
	286T	15.1	18.1	19.7	21.7
	324T	14.5	17.7	19.0	21.0
	326T	14.5	17.7	19.0	21.0
	364T	14.0	17.3	18.2	20.4
49	215T	21.0	23.8	26.2	28.2
	254T	20.5	23.3	25.4	27.3
	256T	20.5	23.3	25.4	27.3
	284T	20.0	23.0	24.8	26.8
	286T	20.0	23.0	24.8	26.8
	324T	19.5	22.5	24.0	26.3
	326T	19.5	22.5	24.0	26.3
	364T	19.0	22.1	23.4	25.6
	365T	19.0	22.1	23.4	25.6
61	215T	25.9	28.5	32.0	34.0
	254T	25.3	28.0	31.0	33.1
	256T	25.3	28.0	31.0	33.1
	284T	24.9	27.7	30.7	32.7
	286T	24.9	27.7	30.7	32.7
	324T	24.3	27.2	29.9	32.0
	326T	24.3	27.2	29.9	32.0
	364T	23.7	26.8	29.2	31.3
	365T	23.7	26.8	29.2	31.3
	404T	23.2	26.3	28.5	30.7
74	256T	24.0	28.7	30.0	33.5
	284T	23.5	28.4	29.4	33.1
	286T	23.5	28.4	29.4	33.1
	324T	22.9	27.9	28.7	32.4
	326T	22.9	27.9	28.7	32.4
	364T	22.3	27.5	27.9	31.8
	365T	22.3	27.5	27.9	31.8
	404T	21.8	27.1	27.1	31.2
	405T	21.8	27.1	27.1	31.2
92	256T	33.6	40.5	43.5	48.5
	284T	33.2	40.1	42.9	48.0
	286T	33.2	40.1	42.9	48.0
	324T	32.6	39.7	42.1	47.4
	326T	32.6	39.7	42.1	47.4
	364T	32.1	39.3	41.3	46.7
	365T	32.1	39.3	41.3	46.7
	404T	31.5	38.9	40.6	46.1
	405T	31.5	38.9	40.6	46.1

LEGEND

THF — Top Horizontal Front
THR — Top Horizontal Rear
UBF — Upblast Front
UBR — Upblast Rear

NOTE: Variable-speed drives are not available for motors of 20 Hp or greater.

Carrier

MOTOR AND DRIVE PACKAGE DATA (cont)

PLENUM FAN

39T UNIT SIZE	MOTOR FRAME	FAN WHEEL Small Centerline Distance (in.) Min	Small Max	Standard Min	Standard Max
11	**143T**	—	—	20.6	23.6
	145T	—	—	20.6	23.6
	182T	—	—	20.5	23.4
	184T	—	—	20.5	23.4
	213T	—	—	20.1	23.6
	215T	—	—	20.1	23.6
	254T	—	—	19.9	23.9
13	**143T**	—	—	22.2	25.2
	145T	—	—	22.2	25.2
	182T	—	—	22.1	25.0
	184T	—	—	22.1	25.0
	213T	—	—	21.7	25.2
	215T	—	—	21.7	25.2
	254T	—	—	21.4	25.4
	256T	—	—	21.4	25.4
17	**145T**	—	—	25.2	28.1
	182T	—	—	24.0	27.8
	184T	—	—	24.9	27.8
	213T	—	—	24.5	27.9
	215T	—	—	24.5	27.9
	254T	—	—	24.0	28.0
	256T	—	—	24.0	28.0
	284T	—	—	23.7	28.2
21	**145T**	26.5	29.4	28.4	31.3
	182T	26.1	29.1	28.1	31.0
	184T	26.1	29.1	28.1	31.0
	213T	25.7	29.1	27.6	31.0
	215T	25.7	29.1	27.6	31.0
	254T	25.2	29.2	27.1	31.1
	256T	25.2	29.2	27.1	31.1
	284T	24.8	29.3	26.8	31.2
	286T	—	—	26.8	31.2
26	**145T**	28.4	31.3	32.2	35.1
	182T	28.1	31.0	31.9	34.8
	184T	28.1	31.0	31.9	34.8
	213T	27.6	31.0	31.4	34.8
	215T	27.6	31.0	31.4	34.8
	254T	27.1	31.1	31.0	34.9
	256T	27.1	31.1	31.0	34.9
	284T	26.8	31.2	30.6	35.0
	286T	26.8	31.2	30.6	35.0
	324T	—	—	30.0	35.2
32	**145T**	28.4	31.3	32.2	35.1
	182T	28.1	31.0	31.9	34.8
	184T	28.1	31.0	31.9	34.8
	213T	27.6	31.0	31.4	34.8
	215T	27.6	31.0	31.4	34.8
	254T	27.1	31.1	31.0	34.9
	256T	27.1	31.1	31.0	34.9
	284T	26.8	31.2	30.6	35.0
	286T	26.8	31.2	30.6	35.0
	324T	—	—	30.0	35.2
39	**145T**	34.7	37.6	37.6	40.4
	182T	34.3	37.2	37.1	40.0
	184T	34.3	37.2	37.1	40.0
	213T	33.8	37.2	36.6	40.0
	215T	33.8	37.2	36.6	40.0
	254T	33.2	37.2	36.0	39.9
	256T	33.2	37.2	36.0	39.9
	284T	32.8	37.3	35.6	40.0
	286T	32.8	37.3	35.6	40.0
	324T	32.2	37.4	34.9	40.1
	326T	32.2	37.4	34.9	40.1

39T UNIT SIZE	MOTOR FRAME	FAN WHEEL Small Centerline Distance (in.) Min	Small Max	Standard Min	Standard Max
49	**145T**	37.6	40.4	42.1	44.9
	182T	37.1	40.0	41.6	44.4
	184T	37.1	40.0	41.6	44.4
	213T	36.6	40.0	41.0	44.4
	215T	36.6	40.0	41.0	44.4
	254T	36.0	40.0	40.4	44.3
	256T	36.0	40.0	40.4	44.3
	284T	35.6	40.0	40.0	44.3
	286T	35.6	40.0	40.0	44.3
	324T	34.9	40.1	39.2	44.4
	326T	34.9	40.1	39.2	44.4
	364T	—	—	38.6	44.5
61	**182T**	41.6	44.4	45.6	48.3
	184T	41.6	44.4	45.6	48.3
	213T	41.0	44.4	44.9	48.2
	215T	41.0	44.4	44.9	48.2
	254T	40.4	44.3	44.2	48.0
	256T	40.4	44.3	44.2	48.0
	284T	40.0	44.3	43.7	48.0
	286T	40.0	44.3	43.7	48.0
	324T	39.2	44.4	42.9	48.0
	326T	39.2	44.4	42.9	48.0
	364T	38.6	44.5	42.3	48.1
	365T	—	—	42.3	48.1
74	**213T**	47.3	50.6	50.3	53.5
	215T	47.3	50.6	50.3	53.5
	254T	46.6	50.4	49.6	53.3
	256T	46.6	50.4	49.6	53.3
	284T	46.1	50.4	49.1	53.3
	286T	46.1	50.4	49.1	53.3
	324T	45.3	50.3	48.2	53.2
	326T	45.3	50.3	48.2	53.2
	364T	44.6	50.5	47.6	53.3
	365T	44.6	50.5	47.6	53.3
	404T	43.8	50.7	46.7	53.4
	405T	43.8	50.7	46.7	53.4
92	**213T**	55.2	58.4	60.6	63.8
	215T	55.2	58.4	60.6	63.8
	254T	54.5	58.2	59.9	63.5
	256T	54.5	58.2	59.9	63.5
	284T	54.0	58.1	59.3	63.5
	286T	54.0	58.1	59.3	63.5
	324T	53.1	58.0	58.4	63.3
	326T	53.1	58.0	58.4	63.3
	364T	52.4	58.0	57.7	63.3
	365T	52.4	58.0	57.7	63.3
	404T	51.4	58.1	56.7	63.3
	405T	51.4	58.1	56.7	63.3

NOTES:
1. Small fan wheel not available for sizes 11-17.
2. Variable-speed drives are not available for motors of 20 Hp or greater.

AIR FRICTION DATA

TYPICAL FILTER PRESSURE DROP (in. wg)

39T COMPONENT	FILTER TYPE		AIR VELOCITY THROUGH FILTERS (Fpm)										
			200	250	300	350	400	450	500	550	600	650	700
FLT1*	Throwaway (2 in.) Permanent (2 in.)		0.05 0.03	0.08 0.04	0.11 0.05	0.14 0.07	0.19 0.09	0.22 0.11	0.28 0.13	0.32 0.15	0.35 0.17	0.40 0.19	0.46 0.21
	Throwaway (4 in.)		0.06	0.09	0.12	0.15	0.19	0.22	0.28	0.30	0.35	0.40	0.46
FMB1*, FMB2* FMB3*, FMB4*	Throwaway (2 in.) Permanent (2 in.)		0.03 0.02	0.04 0.03	0.05 0.04	0.07 0.05	0.08 0.06	0.10 0.08	0.12 0.09	0.15 0.10	0.17 0.12	0.20 0.14	0.22 0.15
ANG1*	Throwaway (2 in.) Permanent (2 in.)		0.01 0.01	0.02 0.01	0.03 0.02	0.05 0.03	0.05 0.04	0.06 0.04	0.07 0.06	0.08 0.06	0.11 0.08	0.12 0.09	0.14 0.10
BCF1, BCF2	Bag†** % Effic	60-65 80-85 90-95	0.07 0.14 0.23	0.10 0.18 0.29	0.13 0.22 0.36	0.17 0.27 0.43	0.21 0.32 0.51	0.25 0.38 0.60	0.30 0.43 0.67	0.36 0.48 0.75	0.40 0.54 0.85	0.48 0.60 0.94	0.52 0.65 1.00
	Cartridge†† % Effic	60-65 80-85 90-95	0.11 0.20 0.23	0.15 0.25 0.30	0.19 0.30 0.37	0.23 0.35 0.44	0.27 0.40 0.51	0.31 0.45 0.58	0.35 0.50 0.65	0.39 0.55 0.72	0.43 0.60 0.79	0.47 0.65 0.85	0.51 0.71 0.92

*Filter data shown is for clean filter. Consult filter manufacturer's recommendation for final dirty-filter pressure drop. Typically, 0.5 in. wg is allowed for dirty filter.
†Add pressure drop for pre-filter (flat filter) if used.
**Filter data shown is for clean filter. Consult filter manufacturer's recommendation for final dirty-filter pressure drop. Typically, 1.0 in. wg is allowed for dirty filters.
††Filter data shown is for clean filter. Consult filter manufacturer's recommendation for final dirty-filter pressure drop. Typically, 1.5 in. wg is allowed for dirty filter.

NOTES:
1. Filters are field-supplied and installed. Pressure drop values shown are typical and can vary with manufacturer and filter efficiency.
2. See page 9 for component description.

COMPONENT PRESSURE DROP (in. wg)

COMPONENT	STANDARD DAMPERS OR COMPONENT CONSTRUCTION — Air Velocity Through Component (fpm)									
	400	600	800	1000	1200	1400	1600	1800	2000	3000	4000
AMX1	—	0.07	0.11	0.15	0.21	0.29	0.39	—	—	—	—
DIF2	0.01	0.02	0.04	0.05	0.08	0.10	0.14	—	—	—	—
EHS1	0.01	0.02	0.04	0.05	0.08	0.10	0.14	—	—	—	—
MXB1, MXB5 EXB1, FMB1, FMB2	0.02	0.05	0.10	0.15	0.22	0.31	0.40	0.50	0.62	—	—
ZDS1, ZDS2	—	—	—	0.03	0.04	0.06	0.07	0.09	0.10	0.25	0.48

COMPONENT	PREMIUM DAMPERS — Air Velocity Through Dampers (fpm)								
	400	600	800	1000	1200	1400	1600	1800	2000
MXB6, MXB7 EXB2, FMB3, FMB4 FBP1	0.02	0.04	0.06	0.09	0.12	0.16	0.22	0.32	0.35

NOTES:
1. Pressure drops listed for FMB and MXB components are for one full damper face. A damper face may have 2 damper sections depending on unit size.
2. ZDS components have standard dampers only.
3. FBP1 has premium dampers only.
4. See page 9 for component description.

COOLING COIL AIR FRICTION (in. wg, Dry Coil)

ROWS	FINS	FACE VELOCITY (fpm)				
		300	400	500	600	700
4	8 11 14	0.15 0.19 0.23	0.25 0.31 0.36	0.37 0.45 0.52	0.51 0.61 0.70	0.66 0.79 0.90
6	8 11 14	0.23 0.29 0.34	0.38 0.46 0.55	0.55 0.67 0.79	0.76 0.91 1.06	1.00 1.18 1.36
8	8 11 14	0.30 0.38 0.46	0.50 0.62 0.73	0.74 0.90 1.05	1.02 1.22 1.41	1.33 1.57 1.81
10	8 11 14	0.38 0.48 0.57	0.63 0.77 0.91	0.92 1.12 1.31	1.27 1.52 1.76	1.66 1.97 2.26

HEATING COIL AIR FRICTION (in. wg)

ROWS	FINS	FACE VELOCITY (fpm)								
		300	400	500	600	700	800	900	1000	1100
1 or 2	8 11 14	0.08 0.09 0.12	0.13 0.15 0.19	0.19 0.22 0.27	0.26 0.30 0.37	0.34 0.39 0.47	0.43 0.50 0.59	0.53 0.61 0.71	0.64 0.72 0.85	0.75 0.85 0.99

STEAM COIL AIR FRICTION (in. wg)

ROWS	FINS	FACE VELOCITY (fpm)									
		300	400	500	600	700	800	900	1000	1100	1200
1	6 9 12	0.03 0.07 0.12	0.05 0.11 0.18	0.07 0.17 0.27	0.10 0.22 0.37	0.13 0.30 0.47	0.16 0.38 0.58	0.20 0.46 0.72	0.25 0.55 0.85	0.29 0.65 1.01	0.34 0.76 1.15

Electric heat selection procedure

I Determine electric heat requirements based on size of selected unit.

Given:

Air Quantity . . . . 30,000 Cfm
Entering-Air Temperature . . . . 54 F
Leaving-Air Temperature . . . . 77 F
Maximum Air Velocity . . . . 650 Fpm
Electric Service 460-v, 3-ph, 60-Hz
Unit Type . . . . Horizontal Draw-Thru

II Determine heating load.

Heating Load = 1.1 x Cfm x Air Temp Rise
= 1.1 x 30,000 x 23
= 759,000 Btuh (759.0 MBtuh)

III Determine kilowatt equivalent of heating load.

$$\text{kW Heating Load} = \frac{759.0 \text{ MBtuh}}{3.413 \text{ MBtuh/kW}} = \frac{759.0}{3.413} = 222 \text{ kW}$$

IV Determine unit size.

Size of the electric heating coil face area is usually predetermined by the selection of the air-handling unit and the cooling coil. However, the heater size must be checked to assure that the minimum face velocity is provided for the heater.

$$\text{Minimum Face Area} = \frac{30{,}000}{650 \text{ Fpm}} = 46.2 \text{ Sq Ft}$$

The 39T unit that most closely meets this requirement is the size 61 unit (page 75, Electric Heater Data, Horizontal Heaters) with face area of 48.8 sq ft.

$$\text{Actual Face Velocity} = \frac{30{,}000}{48.8 \text{ Sq Ft}} = 615 \text{ Fpm}$$

V Determine unit electric heater size.

Enter the Electric Heater Data table (page 75) for the size 61 unit and select the heater which has a kW rating closest to but greater than the required kW and is available at the required voltage. The heater indicated is a 239-kW unit.

NOTE: The actual velocity of 615 fpm exceeds the minimum allowable value given in the ratings as 420 fpm.

VI Determine capacity of electric heater.

Capacity = 239 kW x 3.413
= 815.7 MBtuh

VII Calculate air temperature rise.

$$\text{Air Temp Rise} = \frac{815{,}700 \text{ Btuh}}{1.1 \times 30{,}000 \text{ Cfm}} = 24.7 \text{ F}$$

VIII Calculate the actual leaving-air temperature.

Leaving Air Temp = Ent Air Temp + Air Temp Rise
= 54 + 24.7
= 78.7 F

IX Determine air friction loss of electric heating coil.

Enter Component Pressure Drop table, page 73, and find (by interpolation) air friction loss of electric heater at 615 fpm to be 0.02 in. wg.

X Voltage variations.

Variations from the rated voltage of the electric heating coils can significantly affect the coil's rated output. The effects of voltage variation can be determined by the following formula.

$$kW_a = kW_r \times \left(\frac{V_a}{V_r}\right)^2$$

kW_a = Actual kW Output From Coil
kW_r = Rated kW Output From Coil
V_a = Actual Voltage at Coil
V_r = Rated Voltage at Coil

ELECTRIC HEATER DATA

HORIZONTAL HEATERS USED IN EHS1

39T UNIT SIZE	HEATER AREA (Sq Ft)	NO. OF CONTROL STEPS	HEATER COIL kW	TEMP RISE (°F)	MIN COIL FACE VEL (Fpm)	POWER SUPPLY, 3-PHASE CIRCUITS							
						208 Volts				240 Volts			
						Total FLA	No. Sub-Ckts*	MWG	Fuse	Total FLA	No. Sub-Ckts*	MWG	Fuse
07	6.39	3	12	20	300	34	1	8	45	29	1	8	40
			17	24	350	48	1	6	60	41	1	6	60
			24	30	400	67	2	4	90	58	2	4	80
			34	38	450	95	2(U)	1	125	92	2(U)	2	110
			45	45	500	125	3	2/0	175	109	3	1/0	150
			57	52	550	159	4(U)	3/0	200	138	3	2/0	175
			64	53	600	178	4(U)	4/0	225	154	4(U)	3/0	200
09	8.23	3	17	22	300	48	1	6	60	41	1	6	60
			24	27	350	67	2	4	90	58	2	4	80
			34	33	400	95	2(U)	1	125	82	2(U)	2	110
			45	39	450	125	3	2/0	175	109	3	1/0	150
			64	50	500	178	4(U)	4/0	225	154	4(U)	3/0	200
		6	78	55	550	217	5(U)	300	300	188	4(U)	250	250
			86	56	600	239	5(U)	350	300	207	5(U)	300	300
11	9.67	3	15	17	300	42	1	6	60	37	1	6	50
			25	24	350	70	2	3	90	61	2	4	80
			39	32	400	109	3	1/0	150	94	2(U)	1	125
			56	41	450	156	4(U)	3/0	200	135	3	2/0	175
			78	52	500	217	5(U)	300	300	188	4(U)	250	250
		6	90	54	550	250	6	400	350	217	5(U)	300	300
13	12.77	3	29	24	300	81	2(U)	2	110	70	2	3	90
			45	32	350	125	3	2/0	175	109	3	1/0	150
			64	40	400	178	4(U)	4/0	225	154	4(U)	3/0	200
			78	43	450	217	5(U)	300	300	188	4(U)	250	250
			92	46	500	256	6	400	350	222	5(U)	300	300
17	15.37	3	29	20	300	81	2(U)	2	110	70	2	3	90
			45	27	350	125	3	2/0	175	109	3	1/0	150
			64	33	400	178	4(U)	4/0	225	154	4(U)	3/0	200
			78	36	450	217	5(U)	300	300	188	4(U)	250	250
		6	92	38	500	256	6	400	350	222	5(U)	300	300
21	18.62	3	45	26	300	125	3	2/0	175	109	3	1/0	150
			74	36	350	206	5(U)	300	300	179	4	4/0	225
			99	42	400	275	6	500	350	239	5(U)	350	300
26	22.55	3	34	16	300	95	2(U)	1	125	82	2(U)	2	110
			74	30	350	206	5(U)	300	300	179	4(U)	4/0	255
			99	35	400	275	6	500	350	239	5(U)	350	300

LEGEND

ARI — Air Conditioning & Refrigeration Institute
FLA — Total Full Load Amps of Electric Heating Coils
Fuse — External Fuse Size Required Per Circuit
kW — Kilowatt Rating
MWG — Minimum Wire Gage
VEL — Velocity

*(U) signifies unequal kW per step.

NOTES:
1. Subcircuits are internal heater circuits of 48 A or less ampacity.
2. Minimum wire gage is based on 75 C copper conductors; 3 conductors per circuit.

> IMPORTANT: To avoid damage from overheating, coils must not be operated at less than minimum airflow (cfm).
> Minimum Cfm = Coil Face Area x Minimum Coil Face Velocity

3. Electric heat performance is not within the scope of ARI Standard 430 certification.
4. All ratings shown are at 60 Hz. To obtain kW ratings at 50 Hz when voltage does not change, multiply the 60 Hz rating by 0.833. For example, a 6-step heater in a size 32 unit has a rating of 119 kW at 60 Hz. To obtain the 50 Hz rating:
   119 x 0.833 = 99 kW at 50 Hz

If the voltage also varies from that shown in the table, use the formula in the following example to arrive at the correct rating at the new voltage before multiplying by 0.833:

Given:

$$kW_2 = kW_1 \left(\frac{V_2}{V_1}\right)^2$$

Where kW_1 = 60 Hz rating
kW_2 = 50 Hz rating
V_1 = 60 Hz voltage
V_2 = 50 Hz voltage

Example:

$$kW_2 = 119 \left(\frac{450}{480}\right)^2$$

kW_2 = 105
105 x 0.833 = 87 kW at 450 v, 50 Hz

208-, 240- and 480-V Heaters.

208- and 600-V Heaters.

Carrier

ELECTRIC HEATER DATA (cont)

HORIZONTAL HEATERS USED IN EHS1 (cont)

39T UNIT SIZE	HEATER AREA (Sq Ft)	NO. OF CONTROL STEPS	HEATER COIL kW	TEMP RISE (°F)	MIN COIL FACE VEL (Fpm)	POWER SUPPLY, 3-PHASE CIRCUITS — 208 Volts — Total FLA	208 Volts — No. Sub-Ckts	208 Volts — MWG	208 Volts — Fuse	240 Volts — Total FLA	240 Volts — No. Sub-Ckts	240 Volts — MWG	240 Volts — Fuse
32	24.0	3	39	32	160	109	3	1/0	150	94	2	1	125
		6	79	40	260	220	5	300	300	191	4	250	250
			119	51	310	331	7	(2)250	500	287	6	500	400
			133	50	350	370	8	(2)300	500	320	7	(2)250	400
		8	166	60	370	461	10	(2)500	600	400	9	(2)350	500
			199	62	425	553	12	(3)350	700	479	10	(2)500	600
			239	67	475	664	14	(3)500	1000	575	12	(3)400	800
			279	71	525	775	17	(4)400	1000	672	14	(3)500	1000
39	28.8	3	66	35	210	184	4	4/0	250	159	4	3/0	200
		6	99	42	260	275	6	500	350	239	5	350	300
			133	48	310	370	8	(2)300	500	320	7	(2)250	400
			159	50	350	442	10	(2)400	600	383	8	(2)350	500
		8	199	60	370	553	12	(3)350	700	479	10	(2)500	600
			232	61	420	644	14	(3)500	1000	559	12	(3)350	700
			299	68	490	830	18	(4)500	1200	720	15	(4)350	1000
			332	70	525	922	20	(4)500	1200	799	17	(4)400	1000
49	38.1	3	79	32	210	220	5	300	300	191	4	250	250
		6	99	38	220	275	6	500	350	239	5	350	300
			133	43	260	370	8	(2)300	500	320	7	(2)250	400
			159	43	310	442	10	(2)400	600	383	8	(2)350	500
			199	48	350	553	12	(3)350	700	479	10	(2)500	600
		8	299	60	420	830	18	(4)500	1200	720	15	(4)350	1000
			359	65	460	997	21	(5)400	1600	864	18	(4)500	1200
			432	70	515	1200	25	(6)400	1600	1040	22	(5)500	1600
61	48.8	3	79	32	160	220	5	300	300	191	4	250	250
		6	119	37	210	331	7	(2)250	500	287	6	500	400
			133	40	220	370	8	(2)300	500	320	7	(2)250	400
			159	40	260	442	10	(2)400	600	383	8	(2)350	500
			199	42	310	553	12	(3)350	700	479	10	(2)500	600
			239	37	420	664	14	(3)500	1000	575	12	(3)400	800
		8	359	61	425	1108	24	(5)500	1600	960	20	(5)400	1200
			498	50	650	1383	29	(6)500	N/A	1199	25	(6)400	1600
74	59.1	3	79	27	160	220	5	300	300	191	4	250	250
		6	119	31	210	331	7	(2)250	500	287	6	500	400
			133	33	220	370	8	(2)300	500	320	7	(2)250	400
			159	37	230	442	10	(2)400	600	383	8	(2)350	500
			199	41	260	553	12	(3)350	700	479	10	(2)500	600
		8	299	46	350	830	18	(4)500	1200	720	15	(4)350	1000
			399	58	370	1108	24	(5)500	1600	960	20	(5)400	1200
			465	60	420	1291	27	(6)500	N/A	1119	24	(5)500	1600
92	73.0	6	133	36	160	370	8	(2)300	500	320	7	(2)250	400
			166	33	220	461	10	(2)500	600	400	9	(2)350	500
			199	38	230	553	12	(3)350	700	479	10	(2)500	600
			266	45	260	739	16	(4)350	1000	640	11	(3)500	800
		8	332	47	310	922	20	(4)500	1200	799	17	(4)400	1000
			518	54	420	1438	N/A	N/A	N/A	1247	26	(6)500	1600
			565	57	430	1569	N/A	N/A	N/A	1360	29	(6)500	N/A
			678	64	460	1882	N/A	N/A	N/A	1632	N/A	N/A	N/A

LEGEND

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FLA — Total Full Load Amps of Electric Heating Coils
Fuse — External Fuse Size Required Per Circuit
kW — Kilowatt Rating
MWG — Minimum Wire Gage
VEL — Velocity

NOTES:
1. Subcircuits are internal heater circuits of 48 A or less ampacity.
2. Minimum wire gage is based on 75 C copper conductors; 3 conductors per circuit.

IMPORTANT: To avoid damage from overheating, coils must not be operated at less than minimum airflow (cfm).
Minimum Cfm = Coil Face Area x Minimum Coil Face Velocity

3. Electric heat performance is not within the scope of ARI Standard 430 certification.
4. All ratings shown are at 60 Hz. To obtain kW ratings at 50 Hz when voltage does not change, multiply the 60 Hz rating by 0.833. For example, a 6-step heater in a size 32 unit has a rating of 119 kW at 60 Hz. To obtain the 50 Hz rating:
   119 x 0.833 = 99 kW at 50 Hz

If the voltage also varies from that shown in the table, use the formula in the following example to arrive at the correct rating at the new voltage before multiplying by 0.833:

Given:

$$kW_2 = kW_1 \left(\frac{V_2}{V_1}\right)^2$$

Where kW_1 = 60 Hz rating
kW_2 = 50 Hz rating
V_1 = 60 Hz voltage
V_2 = 50 Hz voltage

Example:

$$kW_2 = 119 \left(\frac{450}{480}\right)^2$$

kW_2 = 105
105 x 0.833 = 87 kW at 450 v, 50 Hz

208-, 240- and 480-V Heaters.

208- and 600-V Heaters.

ELECTRIC HEATER DATA (cont)

HORIZONTAL HEATERS USED IN EHS1 (cont)

39T UNIT SIZE	HEATER AREA (Sq Ft)	NO. OF CONTROL STEPS	HEATER COIL kW	TEMP RISE (°F)	MIN COIL FACE VEL (Fpm)	POWER SUPPLY, 3-PHASE CIRCUITS							
						480 Volts				600 Volts			
						Total FLA	No. Sub-Ckts*	MWG	Fuse	Total FLA	No. Sub-Ckts*	MWG	Fuse
07	6.39	3	12	20	300	15	1	12	20	12	1	14	15
			17	24	350	21	1	10	30	17	1	10	25
			24	30	400	29	1	8	40	24	1	10	30
			34	38	450	41	1	6	60	33	1	8	45
			45	45	500	55	2	4	70	44	1	6	60
			57	52	550	69	2	3	90	55	2	4	70
			64	53	600	77	2(U)	3	100	62	2	4	80
09	8.23	3	17	22	300	21	1	10	30	17	1	10	25
			24	27	350	29	1	8	40	24	1	10	30
			34	33	400	41	1	6	60	33	1	8	45
			45	39	450	55	2	4	70	44	1	6	60
			64	50	500	77	2(U)	3	100	62	2	4	80
		6	78	55	550	94	2	1	125	76	2	3	100
			86	56	600	104	3	1	150	83	2	2	110
11	9.67	3	15	17	300	19	1	10	25	15	1	12	20
			25	24	350	31	1	8	40	25	1	8	35
			39	32	400	47	1	6	60	38	1	6	50
			56	41	450	68	2	4	90	54	2	4	70
			78	52	500	94	2(U)	1	125	76	2(U)	3	100
		6	90	54	550	109	3	1/0	150	87	2	2	110
			112	62	600	135	3	2/0	175	108	3	1/0	150
13	12.77	3	29	24	300	35	1	8	45	28	1	8	35
			45	32	350	55	2	4	70	44	1	6	60
			64	40	400	77	2(U)	3	100	62	2	4	80
			78	43	450	94	2(U)	1	125	76	2(U)	3	100
			92	46	500	111	3	1/0	150	89	2(U)	2	125
		6	119	54	550	144	3	3/0	200	115	3	1/0	150
		8	132	55	600	159	4	3/0	200	128	3	2/0	175
17	15.37	3	29	20	300	35	1	8	45	28	1	8	35
			45	27	350	55	2	4	70	44	1	6	60
			64	33	400	77	2	3	100	62	2	4	80
			78	36	450	94	2	1	125	76	2(U)	3	100
		6	92	38	500	111	3	1/0	150	89	2	2	125
			119	45	550	144	3	3/0	200	115	3	1/0	150
		8	132	46	600	159	4	3/0	200	128	3(U)	2/0	175
21	18.62	3	45	26	300	55	2	4	70	44	1	6	60
			74	36	350	90	2(U)	2	125	72	2(U)	3	90
			99	42	400	120	3	1/0	150	96	2(U)	1	125
		6	119	45	450	144	3	3/0	200	115	3	1/0	150
		8	159	55	500	192	4	250	250	154	4	3/0	200
			198	62	550	239	5(U)	350	300	191	4	250	250
			228	65	600	275	6(U)	500	350	220	5	300	300
26	22.55	3	34	16	300	41	1	6	60	33	1	8	45
			74	30	350	90	2(U)	2	125	72	2(U)	3	90
			99	35	400	120	3	1/0	150	96	2(U)	1	125
		6	119	37	450	144	3	3/0	200	115	3	1/0	150
		8	159	45	500	192	4	250	250	154	4	3/0	200
			212	55	550	256	6(U)	400	350	205	5(U)	300	300
			265	63	600	319	7(U)	(2) 250	400	256	6(U)	400	350

LEGEND

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Fuse — External Fuse Size Required Per Circuit
kW — Kilowatt Rating
MWG — Minimum Wire Gage
VEL — Velocity

*(U) signifies unequal kW per step.

NOTES:
1. Subcircuits are internal heater circuits of 48 A or less ampacity.
2. Minimum wire gage is based on 75 C copper conductors; 3 conductors per circuit.

> IMPORTANT: To avoid damage from overheating, coils must not be operated at less than minimum airflow (cfm).
> Minimum Cfm = Coil Face Area x Minimum Coil Face Velocity

3. Electric heat performance is not within the scope of ARI Standard 430 certification.
4. All ratings shown are at 60 Hz. To obtain kW ratings at 50 Hz when voltage does not change, multiply the 60 Hz rating by 0.833. For example, a 6-step heater in a size 32 unit has a rating of 119 kW at 60 Hz. To obtain the 50 Hz rating:
   119 x 0.833 = 99 kW at 50 Hz

If the voltage also varies from that shown in the table, use the formula in the following example to arrive at the correct rating at the new voltage before multiplying by 0.833:

Given:

$$kW_2 = kW_1 \left(\frac{V_2}{V_1}\right)^2$$

Where kW_1 = 60 Hz rating
kW_2 = 50 Hz rating
V_1 = 60 Hz voltage
V_2 = 50 Hz voltage

Example:

$$kW_2 = 119 \left(\frac{450}{480}\right)^2$$

kW_2 = 105
105 x 0.833 = 87 kW at 450 v, 50 Hz

208-, 240- and 480-V Heaters.

208- and 600-V Heaters.

ELECTRIC HEATER DATA (cont)

HORIZONTAL HEATERS USED IN EHS1 (cont)

39T UNIT SIZE	HEATER AREA (Sq Ft)	NO. OF CONTROL STEPS	HEATER COIL kW	TEMP RISE (°F)	MIN COIL FACE VEL (Fpm)	POWER SUPPLY, 3-PHASE CIRCUITS							
						480 Volts				600 Volts			
						Total FLA	No. Sub-Ckts	MWG	Fuse	Total FLA	No. Sub-Ckts	MWG	Fuse
32	24.0	3	39	32	160	47	1	6	60	38	1	6	50
		6	79	40	260	96	2	1	125	76	2	3	100
			119	51	310	144	3	3/0	200	115	3	1/0	150
			133	50	350	160	4	3/0	200	128	3	2/0	175
		8	166	60	370	200	5	250	250	160	4	3/0	200
			199	62	425	240	5	350	300	192	4	250	250
			239	67	475	288	6	500	400	230	8	350	300
			279	71	525	336	7	(2)250	500	269	8	400	350
39	28.8	3	66	35	210	80	2	3	100	64	2	4	80
		6	99	42	260	120	3	1/0	150	95	2	1	125
			133	48	310	160	4	3/0	200	128	3	2/0	175
			159	50	350	192	4	250	250	153	6	3/0	200
		8	199	60	370	240	5	350	300	192	4	250	250
			232	61	420	280	6	500	350	224	8	300	300
			299	68	490	360	8	(2)300	500	288	8	500	400
			332	70	525	400	9	(2)350	500	320	8	(2)250	400
49	38.1	3	79	32	210	96	2	1	125	76	3	3	100
		6	99	38	220	120	3	1/0	150	95	2	1	125
			133	43	260	160	4	3/0	200	128	3	2/0	175
			159	43	310	192	4	250	250	153	6	3/0	200
			199	48	350	240	5	350	300	192	6	250	250
		8	299	60	420	360	8	(2)300	500	288	8	500	400
			359	65	460	432	9	(2)400	600	346	8	(2)300	500
			432	70	515	520	11	(3)300	700	416	9(U)*	(2)400	600
61	48.8	3	79	32	160	96	2	1	125	76	3	3	100
		6	119	37	210	144	3	3/0	200	115	3	1/0	150
			133	40	220	160	4	3/0	200	128	3	2/0	175
			159	40	260	192	4	250	250	153	6	3/0	200
			199	42	310	240	5	350	300	192	6	250	250
			239	37	420	288	6	500	400	230	6	350	300
		8	359	61	425	480	10	(5)500	600	384	8	(2)350	500
			498	50	650	600	13	(3)400	800	480	10	(2)500	600
74	59.1	3	79	27	160	96	2	1	125	76	2	3	100
		6	119	31	210	144	3	3/0	200	115	3	1/0	150
			133	33	220	160	4	3/0	200	128	3	2/0	175
			159	37	230	192	4	250	250	153	6	3/0	200
			199	41	260	240	5	350	300	192	6	250	250
		8	299	46	350	360	8	(2)300	500	288	6	500	400
			399	58	370	480	10	(2)500	600	384	8	(2)350	500
			465	60	420	560	12	(3)350	700	448	10(U)*	(2)500	600
92	73.0	6	133	36	160	160	4	3/0	200	128	3	2/0	175
			166	33	220	200	5	250	250	160	6	3/0	200
			199	38	230	240	5	350	300	192	6	250	250
			266	45	260	320	7	(2)250	400	256	6	400	350
		8	332	47	310	400	9	(2)350	500	320	7	(2)250	400
			518	54	420	624	13	(3)500	800	499	11(U)*	(2)500	700
			565	57	430	680	15	(3)500	1000	544	12(U)*	(3)350	700
			678	64	460	816	17	(4)400	1200	653	14(U)*	(3)500	1000

LEGEND

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   119 x 0.833 = 99 kW at 50 Hz

If the voltage also varies from that shown in the table, use the formula in the following example to arrive at the correct rating at the new voltage before multiplying by 0.833:

Given:

$$kW_2 = kW_1 \left(\frac{V_2}{V_1}\right)^2$$

Where kW_1 = 60 Hz rating
kW_2 = 50 Hz rating
V_1 = 60 Hz voltage
V_2 = 50 Hz voltage

Example:

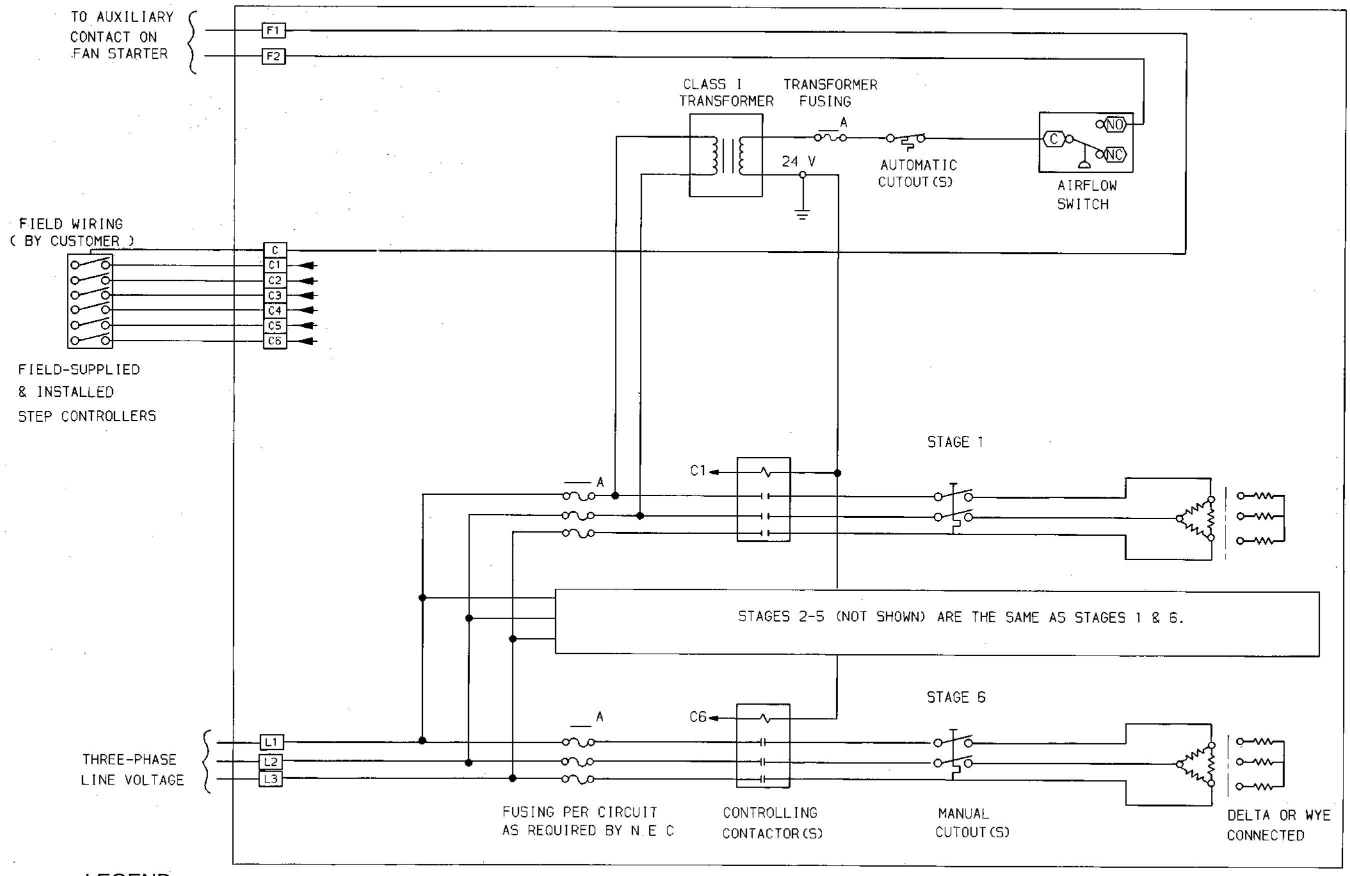
$$kW_2 = 119 \left(\frac{450}{480}\right)^2$$

$kW_2 = 105$
105 x 0.833 = 87 kW at 450 v, 50 Hz

208-, 240- and 480-V Heaters.

208- and 600-V Heaters.

Electric heater wiring schematic (typical)



LEGEND

NC — Normally Closed
NEC — National Electrical Code
NO — Normally Open

NOTE: All wiring must be copper and must conform to NEC.

Application data

Central station air handler

The central station air handler is a heating, ventilating, or air-conditioning unit that is centrally located in, or on, a building or structure and from which air is distributed to desired areas through a system of ducts.

The 39T factory packaged unit

Individual components, such as fans, coils, and filters, are assembled at the factory.

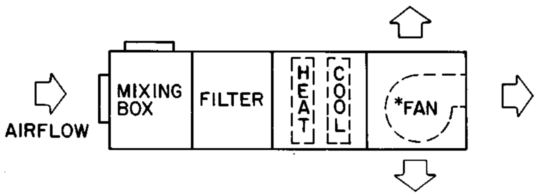
Packaged equipment is less costly than field-fabricated equipment and does not require assembly.

The basic air-handling unit consists of a fan section and a coil section. Other components, such as filter sections, air-mixing boxes, access sections, and damper sections, are also provided.

Central station configurations

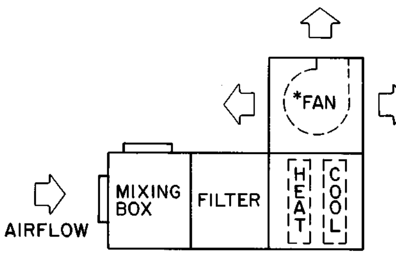
Draw-thru units

Horizontal



*Fan discharge may be upblast, downblast, or horizontal.

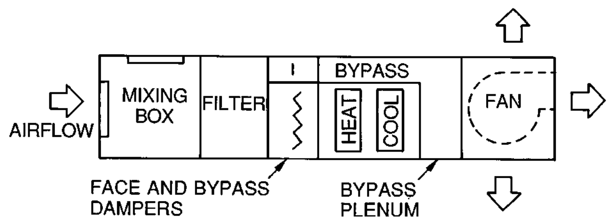
Vertical



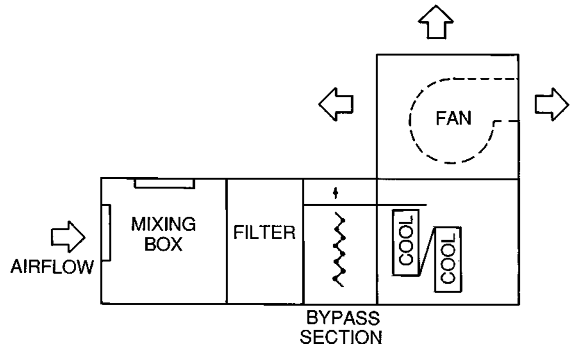
*Fan discharge may be horizontal or upblast.

Face and bypass units

Horizontal



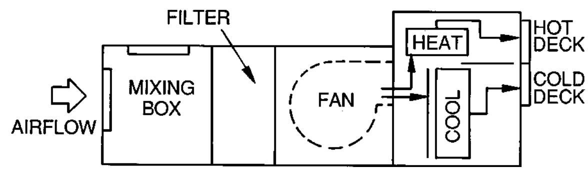
Vertical



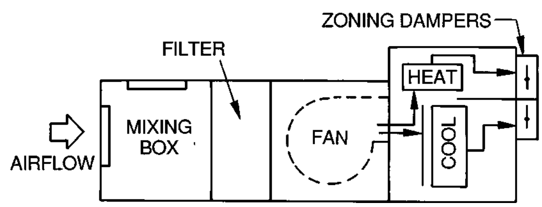
Blow-thru units

Blow-thru arrangements are more suitable on systems with a significant amount of fan (and motor) heat. Fan heat can add 0.3° F to 0.5° F per in. of total static pressure to the airstream. Therefore, on such systems, it is more efficient to use a blow-thru arrangement and add the fan heat before the cooling coil. With a draw-thru unit, the airstream must be subcooled to anticipate the addition of fan heat downstream of the cooling coil. Thermal storage and cold air distribution systems benefit from blow-thru applications.

Dual duct — Unit delivers 2 outputs; one outlet produces hot air while the other outlet produces cold air.



Multizone — Mixing dampers blend hot- and cold-deck temperatures to produce a desired temperature for individual zones. Several blending dampers per unit produce independent zones, each zone responding to its own thermostat.

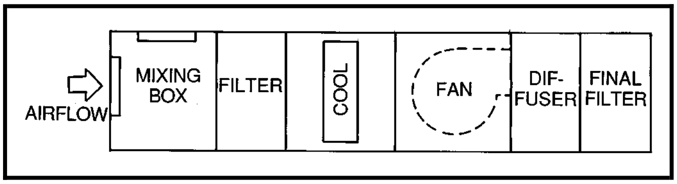


High filtration units

High filtration units employ a filter section ahead of the cooling and heating coils. A second filter section, called a final filter, is placed at the end of the unit at the point where the air enters the ductwork.

Considerations:

1. All components downstream from fan section must be of a positive-pressure type.
2. Air diffusers are required when air velocities approaching filters or coils can be higher than 600 fpm.



Fans

The 39T central station air handlers use belt-driven centrifugal fans. A centrifugal fan is one in which the air flows radially through the impeller. Centrifugal fans are classified according to fan wheel and blade construction. For example, 39T FCS and RFC fans have double-inlet, double-wheel (DIDW) construction with forward-curved blades, AFS and RAF fan wheels have DIDW construction with backward-inclined airfoil blades, and PAF fan wheels have single-inlet, single-wheel (SISW) construction with backward-inclined airfoil blades.

Laws of fan performance

Fan laws are used to predict fan performance under changing operating conditions or by fan size. They are applicable to all types of fans.

The fan laws are stated below. The symbols used in the formulas represent the following quantities:

CFM — Volume rate of flow through the fan.
RPM — Rotational speed of the impeller.
P — Pressure developed by the fan, either static or total.
Hp — Horsepower input to the fan.
D — Fan wheel diameter. The fan size number can be used if it is proportional to the wheel diameter.
W — Air density, varying directly as the barometric pressure and inversely as the absolute temperature.

Application of these laws is limited to cases where fans are geometrically similar.

FAN LAWS

VARIABLE	CONSTANT	LAW	FORMULA
SPEED (RPM)	Air Density, Fan Size, Distribution System	Airflow varies directly with the Speed.	$\frac{CFM_1}{CFM_2} = \frac{RPM_1}{RPM_2}$
		Pressure varies as the square of the Speed.	$\frac{P_1}{P_2} = \left(\frac{RPM_1}{RPM_2}\right)^2$
		Horsepower varies as the cube of the Speed.	$\frac{Hp_1}{Hp_2} = \left(\frac{RPM_1}{RPM_2}\right)^3$
FAN WHEEL DIAMETER OR FAN SIZE (D)	Air Density, Wheel Speed	Capacity and Horsepower vary as the square of the Fan Size.	$\frac{CFM_1}{CFM_2} = \frac{Hp_1}{Hp_2} = \left(\frac{D_1}{D_2}\right)^2$
		Speed varies inversely as the Fan Size.	$\frac{RPM_1}{RPM_2} = \frac{D_2}{D_1}$
		Pressure remains constant.	$P_1 = P_2$
	Air Density, Wheel Speed	Capacity varies as the cube of the Size.	$\frac{CFM_1}{CFM_2} = \left(\frac{D_1}{D_2}\right)^3$
		Pressure varies as the square of the Size.	$\frac{P_1}{P_2} = \left(\frac{D_1}{D_2}\right)^2$
		Horsepower varies as the fifth power of the Size.	$\frac{Hp_1}{Hp_2} = \left(\frac{D_1}{D_2}\right)^5$
AIR DENSITY (W)	Pressure, Fan Size, Distribution System	Speed, Capacity, and Horsepower vary inversely as the square root of Density.	$\frac{RPM_1}{RPM_2} = \frac{CFM_1}{CFM_2} = \frac{Hp_1}{Hp_2} = \left(\frac{W_2}{W_1}\right)^{1/2}$
	Airflow, Fan Size, Distribution System	Pressure and Horsepower vary with Density.	$\frac{P_1}{P_2} = \frac{Hp_1}{Hp_2} = \frac{W_1}{W_2}$
		Speed remains constant.	$RPM_1 = RPM_2$

Fan selection criteria

System requirements — The major factors that influence fan selection are airflow, external static pressure, fan speed, brake horsepower, and sound level. Additional system considerations include the fan control method, overloading, and non-standard air density. Fan selection for air-conditioning service usually involves choosing the smallest fan that provides an acceptable level of performance, efficiency and quality.

Pressure considerations — The static pressure is the resistance of the combined system apart from the fan. Contributors to static pressure include other components in the air handler, ductwork, and terminals. The static pressure is dependent on the airflow through the system, which is determined by the air conditioning requirements. As shown in the second fan law in the table on the preceding page, the static pressure varies as the square of the airflow (cfm). This ratio between pressure and airflow determines the system curve for any air-handling system.

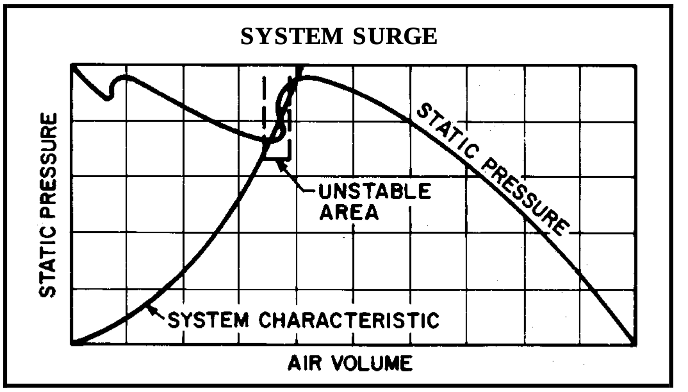
The static pressure used to select a fan should be the pressure calculated for the system at design airflow. If the static pressure is overestimated, the amount of increase in horsepower and air volume depends upon the steepness of the fan curves in the area of selection.

With forward-curved (FC) fans, if the actual static pressure of the system is less than the design static pressure, the fan has a tendency to deliver more air and draw correspondingly higher bhp (kW of energy). This higher current draw may overload the motor and trip circuit breakers. This is a common occurrence when FC centrifugal fans are operated before all the ductwork has been installed, or during the pull-down load on a VAV system.

With airfoil (AF) fans (non-overloading), if the actual static pressure is less than the design static pressure, the fan delivers more air with little or no increase in bhp in most applications. In this case, therefore, adding a safety factor to the calculated static pressure can increase fan horsepower (and costs) unnecessarily.

Stability — Fan operation is stable if it remains unchanged after a slight temporary disturbance, or if the fan operation point shifts to another location on the fan curve after a slight permanent disturbance. Fan operation is unstable if it fluctuates repeatedly or erratically. There are 3 main types of unstable fan operation:

System surge is a cycling increase and decrease in system static pressure. It can occur in forward-curved fan systems when the system characteristic curve is to the left of the fan performance curve peak. A forward-curved centrifugal fan has a performance curve with a slight dip to the left of peak performance. System surge can occur in this area because there are several possible operating points, instead of one, resulting in pulsing or pumping as the fan seeks one of the operating points.



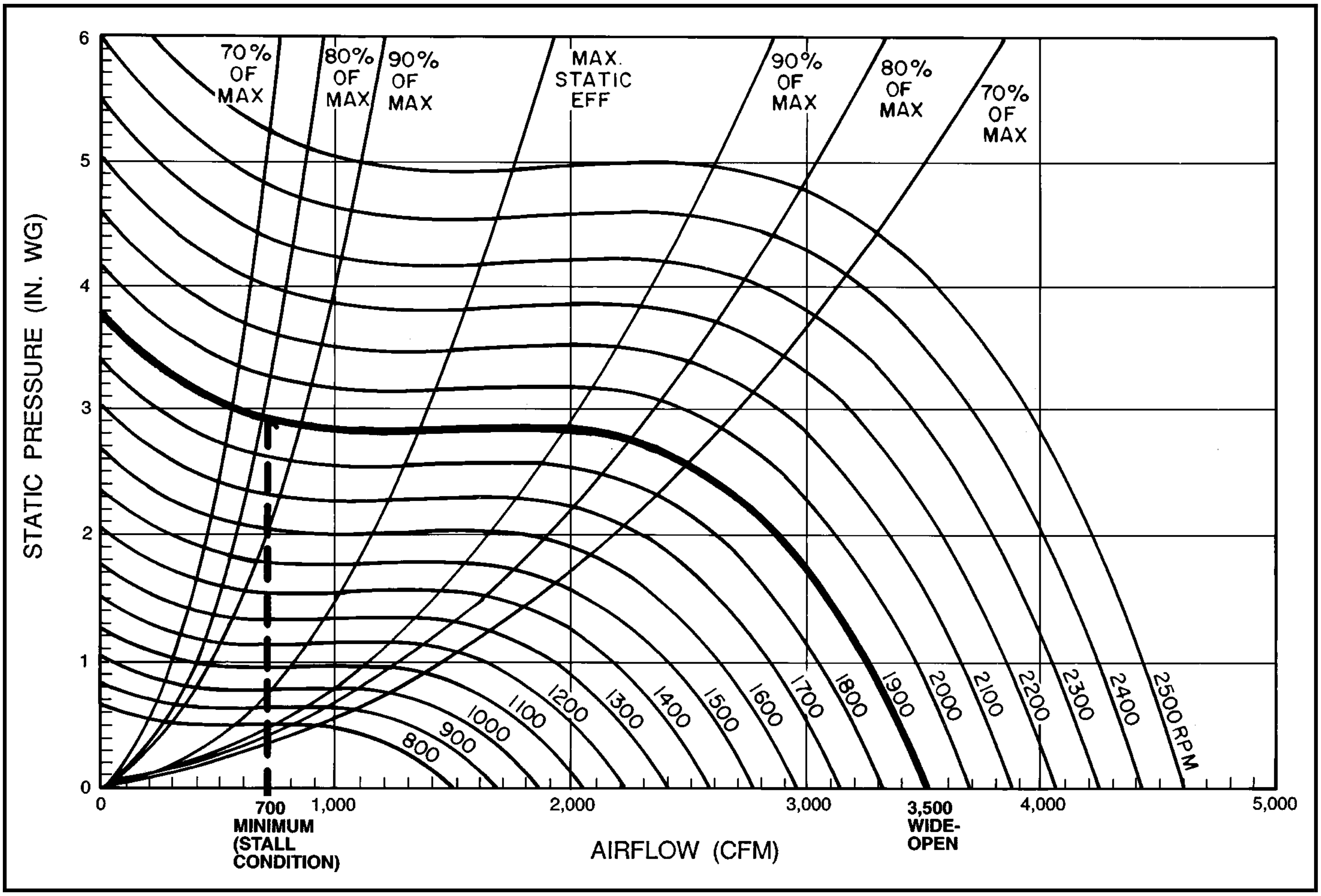
Parallel fan operation with 2 forward-curved fans in the same system can cause instability if the operating point is not selected properly. Because all 39T Series air handlers have only one supply fan, this type of instability is not a problem in systems with 39T air handlers.

Fan stall is the most common type of instability, and it occurs with any type of centrifugal fan when the fan is starved for air.

Normally, the rotation of the fan wheel forces the air through the blade passageway from the low pressure to the high pressure side of the fan. If the airflow is restricted too much, however, there is not enough air to fill the space between the blades and the air distribution between the blades becomes uneven and erratic. Air can flow backwards through the wheel and the noise level is substantially increased. If the fan runs in this condition for a long time, wheel failure is likely to occur.

Fan stall has been observed on VAV systems using forward-curved fan wheels where the initial design operating point is selected to the left of the peak performance line. In this case, most or all of the VAV boxes may throttle closed at very light loads, which can reduce the airflow to the point where the fan becomes starved for air.

For a given speed, the operating point where a fan stalls is a function of the wheel geometry and wheel speed. In general, the stall point is within the range of 15 to 25% of the airflow obtained at free delivery. For example, in the figure at right, wide-open airflow (wocfm) is 3,500 cfm at 1900 rpm. A minimum airflow of 700 cfm would equal 20% of 3,500 wocfm, and would fall within the fan's stall range.



Sound considerations — The fan is one of the main sound sources in an air conditioning system. Other sources of sound include the duct system and terminals, because they generate turbulence in the air flowing through them. Simply estimating fan sound does not give an accurate picture of total system sound, but because fan sound is a major component of system sound, fan sound should be minimized.

To minimize its sound generation, a fan must be correctly sized and should be selected to operate at or near peak efficiency. Oversized fans can generate much higher sound power levels than necessary, especially in VAV systems operating at low airflows. Undersized fans can also result in higher sound power levels because of increased fan speeds and the higher tip velocity of the air leaving the fan blades.

For VAV systems, the part load point at which the fan operates most of the time should be used to select a fan for lowest sound output.

NOTE: The outlet velocity has no direct effect on sound generation and is not a factor used to determine sound power.

VAV control systems also influence the sound level. Inlet guide vanes (IGVs) are a common device for modulating airflow. When used with airfoil fans, IGVs may increase the overall sound level by as much as 8 dB. When used with forward-curved fans, IGVs may slightly decrease sound levels or keep them the same.

Variable frequency drives (VFDs) are also used to modulate fan volume. A VFD reduces the sound power level as the fan speed is reduced. At 50% load, the sound level is reduced approximately 15 dB compared to the sound level at 100% load. When using variable frequency drives, it is important to be sure that the static deflection of the vibration isolators is adequate. At very low fan speeds, the fan frequency may approach the natural frequency of the spring isolation. If this happens, the vibration levels can be amplified and resonant vibration conditions can occur.

When sound level is a major consideration, a blow-thru fan should be considered because of the reduced discharge sound level. This sound reduction is due to the sound absorption of the coil section upstream from the fan. Blow-thru units also have a narrower discharge opening that more closely matches the main duct dimensions. Transition fittings and elbows can be reduced in size or eliminated, thereby eliminating a sound source.

To obtain projected sound data for a selected 39T unit, use the electronic catalog ACAPS software program.

Fan, motor, and drive heat considerations — The work output of a fan and its motor and drive contribute directly to the airflow and pressure exiting the air handler. Not all of the energy output of the fan generates airflow, however. Fan motors are not 100% efficient, and their efficiency loss translates directly into heat that must be factored in when calculating the temperature rise across a fan section. Fans also add a certain amount of heat to the airstream due to the effects of compression and bearing friction. Finally, belt drives do not transmit all of the energy generated by the motor. Some of the energy is lost in the form of heat due to belt tension and the type and number of belts. Belt drive bhp losses range from 2 to 6 percent; a 3% loss is typical.

Because the 39T Series air handlers all have their fans, motors, and drives located within the airstream, heat losses from these components affect the power requirements, cooling load, and heating load.

Power losses in the motor and drive should be allowed for when determining the motor output (bhp), so that the motor can be correctly sized and so that the additional heat output can be subtracted from cooling capacity or added to heating capacity. A typical example follows:

Given Fan Operating Point:

13,224 Cfm
9.6 Fan bhp

Calculate the required fan motor output (H_{mo}) due to drive loss.

H_{mo} = (Fan bhp) x (Drive Loss)
H_{mo} = 9.6 x 1.03
H_{mo} = 9.89 hp

Calculate the required fan motor output according to motor efficiency.

H_{mo} = (Motor Output) ÷ (Motor Efficiency [Typical])
H_{mo} = 9.89 ÷ 0.86
H_{mo} = 11.5 hp (Estimated Motor Size Required)

Convert horsepower to Btu per hour.

11.5 hp x 2545 = 29,268 Btuh

Calculate the increase in leaving-air temperature due to fan and motor heat and drive losses, where Q = total heat output and ΔT is the temperature change.

$Q = 1.1 \times cfm \times \Delta T$

29,268 Btuh = 1.1 x 13,224 x ΔT
29,268 Btuh = 14,546.4 x ΔT
ΔT = 2.01 F (use to estimate coil requirements)

Fan application

Certain fans are more efficient in low static pressure systems, while others operate best in higher pressure systems. Some fan types are designed to handle very large air volumes while others are more efficient at lower volumes. See the table at right.

Forward-curved (FC) fans are typically used for low to medium pressure applications (2 to 4.5-in. wg total static pressure [TSP]).

The FC fans are reasonably stable over a wide airflow (cfm) range at constant speed. Because of the relatively flat curve, FC fans tolerate modulation in airflow without large increases in static pressure. Most important, FC fans are lowest in first cost.

Airfoil (AF) fans have their greatest efficiency at higher static pressures (4.5 to 8.0 in. wg total static pressure).

Because of the shape of the AF fan performance curve, bhp decreases as air volume decreases only when a VAV volume control device such as inlet guide vanes (IGVs) or a variable-frequency drive (VFD) is used.

Airfoil fans are more expensive than FC fans and, in addition, there is a price premium for the volume control device, if required. Although IGVs add cost to an AF fan, they are sturdy and have good shut-off characteristics.

Plenum fans (sometimes called ″plug″ fans) are typically used in medium to high static pressure applications where ductwork requires discharge location flexibility. They can reduce the need for ductwork turns or diffusers, especially when equipment room space is limited.

Plenum fans are less efficient than double-inlet, double-wheel airfoil fans. General construction also differs from that of FC or AF fans. The fan does not have a scroll to enclose the fan wheel and direct airflow. Instead, the entire interior of the plenum fan section is pressurized by the fan.

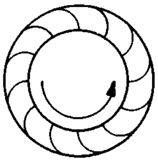
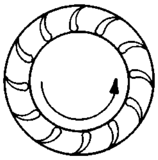
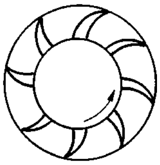
Plenum fans have single-inlet, single-wheel (SISW) construction. The fan shaft is parallel with the airflow, and the motor and bearings are located inside the plenum in the pressurized airstream. An optional inlet screen and wheel cage can be installed on the fan to help protect personnel during maintenance.

Plenum fans are generally used where there are space limitations, a need for discharge flexibility, a need for reduced discharge sound, or where duct configurations might change in the future. For example, in an application where there is not enough room in the building for a large main duct, several smaller duct runs may approach the mechanical equipment room from all sides. In such an application, several connections can be made to one or more sides of the plenum fan section. Installing contractors can cut outlets in the plenum box at the time of installation to suit the conditions at the job site.

Because the casing of a plenum fan section acts as a sound attenuator, plenum fans are also sometimes used when discharge sound levels need to be reduced.

Duct takeoffs from plenum fans can have relatively high pressure losses and can also create turbulence that causes a larger pressure drop across coil and filter sections. When selecting a plenum fan size, the pressure drop for the duct takeoffs must be added to the external static pressure for the rest of the system.

FAN TYPE AND APPLICATION

TYPE	CHARACTERISTICS	APPLICATION
Forward-Curved (FC) Side View 	• Double-inlet, double-wheel (DIDW) construction • Best at low or medium pressure (approximately 0 to 5 in. wg). • Horsepower increases continuously with increase in air quantity (overloads) as static pressure decreases. • Less expensive than AF fans. • Runs at relatively low speed, typically 400 to 1200 rpm. • Blades curve toward direction of rotation.	For low- to medium-pressure air-handling applications.
Airfoil (AF) Side View 	• Double-inlet, double-wheel (DIDW) construction • Best in high capacity and high-pressure applications (4 to 8 in. wg). • Horsepower peaks at high capacities. • Most expensive of centrifugal fans. • Operates at high speeds, typically 1200 to 2800 rpm. About double the speed of FC fan for similar air quantity. • Blades have aerodynamic shape similar to airplane wing and are curved away from direction of rotation.	For medium to high air capacity and pressure applications.
Plenum (PAF) End View 	• Single-inlet, single-wheel (SISW) construction. • Characteristics similar to DIDW airfoil fan. • Blades have aerodynamic shape similar to airplane wing and are curved away from direction of rotation. Fewer blades and wider blade spacing than AF fans.	Best in applications with limited space or multiple ducts.

To calculate the pressure losses from plenum fan duct takeoffs, use the following formula and refer to the figure at right.

$P_l = P_p - P_d = (C_v)\ (V_p)$

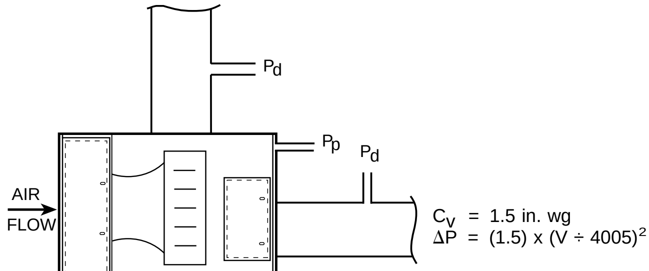
Where P_1 is the pressure loss, P_p is the plenum pressure, P_d is the duct pressure, C_v is the pressure loss coefficient, and V_p is the velocity pressure in the duct. Note that for radial duct takeoffs, C_v is 1.5 in. wg, while for axial duct takeoffs, C_v is 2.0 in. wg. To calculate velocity pressure (V_p) in the duct, use the following formula, where V is the air velocity in the duct:

$V_p = [(V) \div (4005)\ ]^2$

Also note that with more than one duct takeoff and different duct velocities, the highest duct velocity and highest C_v value should be used in the formulas.

PLENUM FAN APPLICATION

C_v = 1.5 in. wg
ΔP = (1.5) x $(V \div 4005)^2$



NOTE: V is the air velocity in the duct.

Duct design considerations

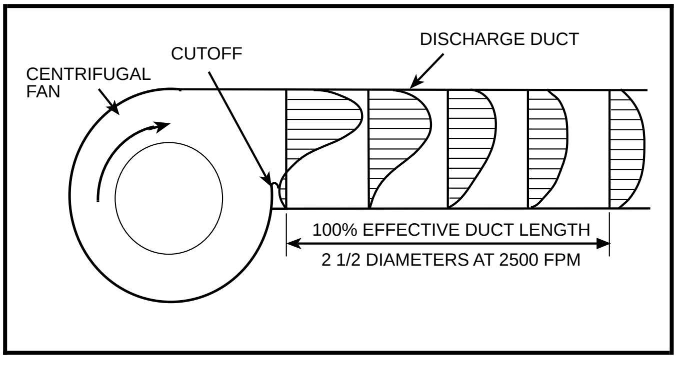
The discharge ductwork immediately downstream from the fan is critical for successful applications. Poorly designed ductwork can degrade fan performance and contributes to excessive pressure drop and noise.

The 39T Series airfoil and forward-curved fans are tested as part of a system with straight discharge ductwork, and the fan ratings are based on this duct design. When designing ductwork in the field, it is important to use a straight discharge duct of the correct dimensions to obtain maximum fan performance. The straight section of ductwork helps the airflow to develop a uniform velocity profile as it exits the fan and allows the velocity pressure to recover into static pressure. See the figure below.

For 100% recovery of velocity pressure into static pressure, the straight portion of the discharge duct must be at least at least 2½ times the discharge diameter in length for velocities of 2500 fpm or less. For each additional 1000 fpm, add one duct diameter to the length of the straight portion of the ductwork.

As an example of how to size the straight portion of duct, assume the fan has a 34 x 34 in. discharge outlet (8.03 sq ft). The equivalent diameter is 39 in., so the straight duct length required would be 8 ft long.

Plenum fans do not require straight ductwork of a particular minimum length, because velocity pressure is converted to static pressure inside the plenum fan section. Outlet ducts, however, should not be installed directly in line with the air discharge from the fan wheel.



Fan control on variable air volume systems

Introduction

With their inherent characteristics of reducing airflow to meet demand, VAV systems can be a source of major energy savings, because fan brake horsepower (bhp) varies with the amount of air delivered.

The degree to which bhp savings are realized, however, is also affected by the type of fan volume control selected and the effectiveness of its application. Effective fan control assures proper duct pressure for the required control stability of the air terminals and provides quiet terminal unit operation when ″riding the fan curve.″

Consider the following when selecting a fan volume control method:

1. System parameters
   a. Airflow (cfm)
   b. Static pressure
   c. Percent volume reduction (turndown)
2. Fan type and selection point
   a. Design point efficiency
   b. Part load efficiency (especially the point where the fan will be operating most of the time).
   c. Part load stability
3. Ease of control installation and use
4. Motor selection
   a. Higher bhp inputs due to efficiency of VAV control method
   b. Compatibility with VAV control
5. Sound levels
   a. Fan-generated sound
   b. Terminal sound
   c. Control-generated sound
   d. System sound (ducts, fittings)
6. Initial cost and operating cost
7. Reliability and ease of maintenance

System parameters

Before a fan type or control is selected, analyze the system at both the design point and at part load. The fan is likely to be operating at part load a large percentage of the time.

Methods of fan air-volume control

- ″Riding the fan curve″ with terminal throttling (forward curved fans)
- Inlet guide vanes (IGVs)
- Variable frequency drives (VFDs)

A short description of some of these control methods follows. A summary comparison table is provided at the end of the section.

Forward-curved (FC) fans with terminal throttling (riding fan curve) — This is the simplest, most reliable, and most economical first-cost method of air volume control on VAV systems, since no accessories are required. This type of VAV control can be used on forward-curved fans with flat pressure characteristics and in systems where static pressure changes at the terminals are moderate. Air volume reduction is produced solely by throttling of terminal units in response to load reduction. As the units throttle, system resistance changes.

The chart at right, Forward-Curved Fan with Air Terminal Throttling, illustrates the reduction in bhp and airflow at constant speed. Point A is the peak airflow operating point. Note the required bhp at this airflow. As airflow is reduced by terminal throttling, move along the fan constant rpm curve to point B. Note the lower cfm and bhp values at B.

At reduced airflow conditions, the total system static pressure may undergo little or no change although air pressure loss through the air handling unit decreases. This means that duct pressure increases as pressure loss across the terminal unit increases. For low- and medium-static pressure systems, this increase in duct pressure should not result in noticeable sound level changes. However, at higher design static pressures, sound levels and duct leakage may increase and the control method should be reviewed to determine if it is feasible.

Inlet guide vanes —Inlet guide vanes (IGVs) are the most common method of variable air volume control. Substantial energy savings can be gained by using IGVs to reduce airflow and system pressure at reduced loads while maintaining a constant fan speed.

Inlet guide vanes (IGVs) are installed in the fan inlet to alter the fan's intake air supply, thereby modulating the fan output. The IGVs open and close in response to system pressure and air volume requirements.

Due to the additional airflow resistance of the IGVs in the airstream, fan speed must be increased to obtain the design airflow and static pressure compared to a unit without IGVs. The horsepower requirement also increases. Even though power requirements are slightly higher at the design pressure and airflow, however, the increase is offset by the reduction in power requirements at part load conditions.

With inlet guide vane control, the closing of the vanes causes the air to spin in the direction of fan rotation. The spin results in less static pressure being generated and less horsepower being required at the reduced airflow.

As the system load decreases and terminal units begin to throttle, duct static pressure increases. The pressure increase is detected by a static pressure sensor in the duct system. The sensor causes the operator to close the inlet guide vanes sufficiently to maintain duct pressure at the control setting.

Inlet guide vanes actually change the fan performance characteristics as well as reducing the amount of delivered air. As the vanes close, there is a new and different fan performance curve at each vane setting. Airflow, static pressure, and bhp are all different points on the new curves.

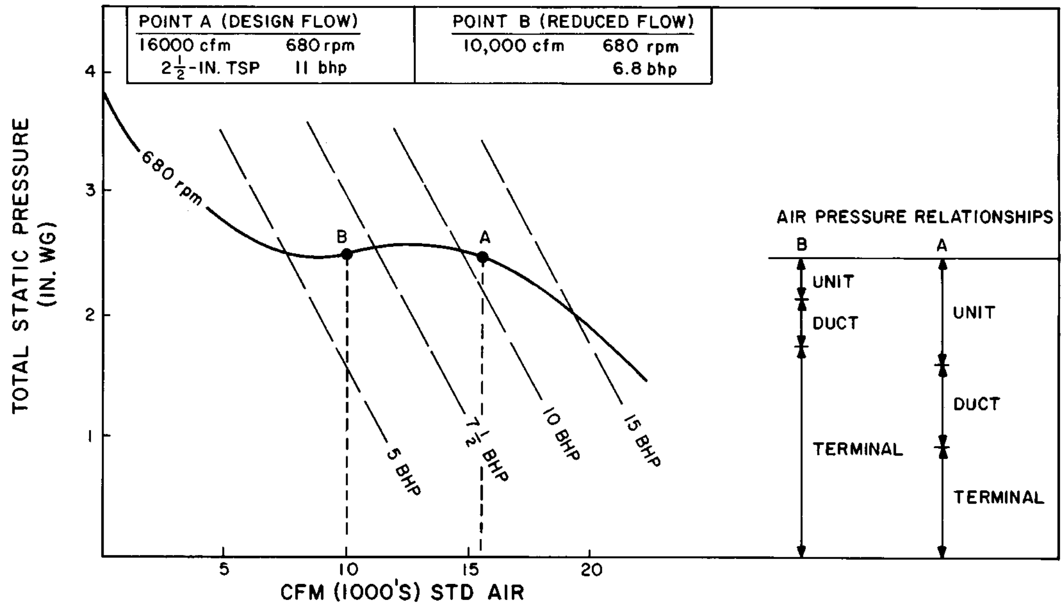
Two disadvantages of inlet guide vanes are:

1. As an obstruction to the airstream, they cause a slight fan efficiency loss (increase in required bhp at design conditions).
2. They are a source of sound generation at reduced cfm. While the sound caused by fan blades diminishes at lower airflows, the sound caused by the vanes increases. The overload sound level, then, is a function of both the inlet vane position and the quantity of air being handled. Sound attenuation devices designed to handle full airflow may be inadequate at reduced flow.

Variable frequency drives — Variable frequency drives (VFDs) are used to modulate the fan motor speed in response to air volume requirements. To vary the motor speed, a VFD changes the input frequency and line voltage into a wide range of frequency and voltage outputs, while maintaining a constant ratio of frequency to voltage.

Variable frequency drives convert input ac power to dc power and then convert the dc power to a different ac power output using an inverter. The inverter creates the ac output by rapidly switching the polarity of the voltage from positive to negative. Power output from the VFD is not a smooth sine wave, but has many "steps" in the wave form. This type of power output can cause a standard fan motor to exceed its rated temperature range. The stepped power output also results in motor efficiency losses that must be considered when calculating the energy savings offered by the VFD.

FORWARD-CURVED FAN WITH AIR TERMINAL THROTTLING
VARIATIONS IN BHP AT CONSTANT RPM



Because of the stepped power output generated by VFDs, fan motors rated for inverter duty are recommended. If a standard motor is used with a VFD, the motor should not be operated at the full service factor.

Variable frequency drives can be an effective way to control air volume and save energy. They can provide greater reduction in fan bhp than throttling with either fan discharge dampers or inlet guide vanes. At reduced load requirements, fan speed is reduced proportionately, with resulting lower airflow, lower static pressure, lower bhp requirements, and lower sound levels.

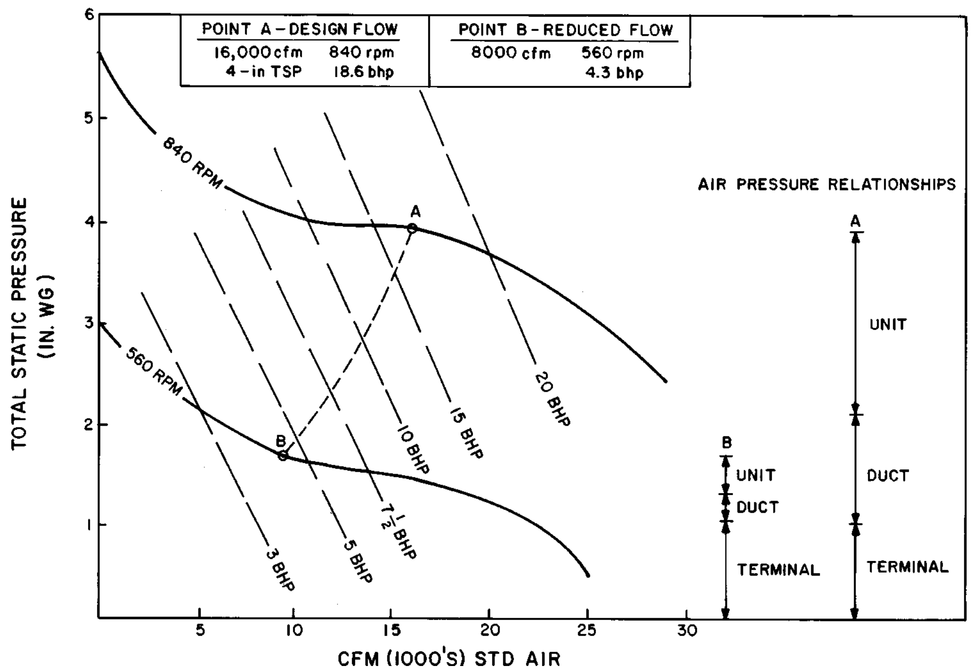
As the load decreases in a VAV system and the terminal units throttle, duct static pressure increases. A static pressure sensor in the duct system detects the pressure increase and initiates a fan speed change through the VFD. Fan speed is reduced until the duct sensor detects a satisfactory duct pressure.

The Variable Frequency Fan Speed Control chart illustrates the results of fan speed reduction as operation shifts from Point A to Point B. If duct pressure begins to fall due to terminal units opening, the duct sensor signals the VFD to increase fan speed.

This method of air volume control permits fan speed reduction down to as low as 10% of the design speed. With FC fans riding the fan curve at the lower rpm, airflow may be as low as 10% of peak design.

The method may be applied to any size VAV system with any type of fan. It is particularly cost effective on systems with high turndown requirements where the full speed reduction capability can be used.

VARIABLE FREQUENCY FAN SPEED CONTROL



FAN SUMMARY COMPARISON

TYPE OF CONTROL	FIRST-COST RANK	TURNDOWN RANGE (Normal)*	SOUND GENERATION RANK†	ENERGY-SAVINGS RANK	APPLICATION RANGE — NORMAL FOR AIR COND.	COMMENTS
FC Fan Terminal Throttling (Riding Fan Curve)	1 (Lowest Cost)	60-70%	4	4	TSP 0″ to 4.5″ Cfm 3,000 to 35,000	For moderate turndown systems with a flat fan curve and low to medium static pressure and cfm range.
FC Fan with 2-Speed Motor	2	(Not Applicable)	2	3	TSP 0″ to 4.5″ Cfm 3,000 to 35,000	For systems with predictable 2-load situations in low to medium static pressure range. Controls are more complicated.
FC Fan, With Inlet Guide Vanes	3	25-35%	3	2	TSP 0″ to 4.5″ Cfm 3,000 to 35,000	For moderate turndown systems with medium to high static pressure and cfm range. Sound remains constant or decreases as flow decreases.
AF Fan, With Inlet Guide Vanes	4	15-25%	5	2	TSP 4.5″ to 8.0″ Cfm 3,000 to 63,000	For moderate turndown systems with medium to high static pressure and cfm range. Inlet guide vanes will generate sound at reduced cfm levels.
FC Fan With Variable Frequency Drive	5	10-15%	1 (Quietest)	1 (Best)	TSP 0″ to 4.5″ Cfm 3,000 to 35,000	For high turndown, low to medium static pressure systems. Best energy savings. Fast payback. Fan generates least sound.
AF Fan With Variable Frequency Drive	5	10-15%	1 (Quietest)	1 (Best)	TSP 4.5″ to 8.0″ Cfm 5,000 to 63,000	For high turndown, medium to high static pressure systems. Best energy savings. Fan generates least sound.

LEGEND

AF — Airfoil
FC — Forward Curved
TSP — Total Static Pressure
*Percentage of modulation of the design airflow.
†Including part load.

NOTE: Rank is based on a relative scale of 1 to 5. Some methods have comparable rating.

Unit control arrangements with Product Integrated Controls (PIC)

Supply fan control

Supply fan control is used to match the supply fan delivery to the airflow required by the load in a variable air volume system. This is done by maintaining a constant static pressure in the supply duct at a point approximately ⅔ of the distance from the supply fan discharge.

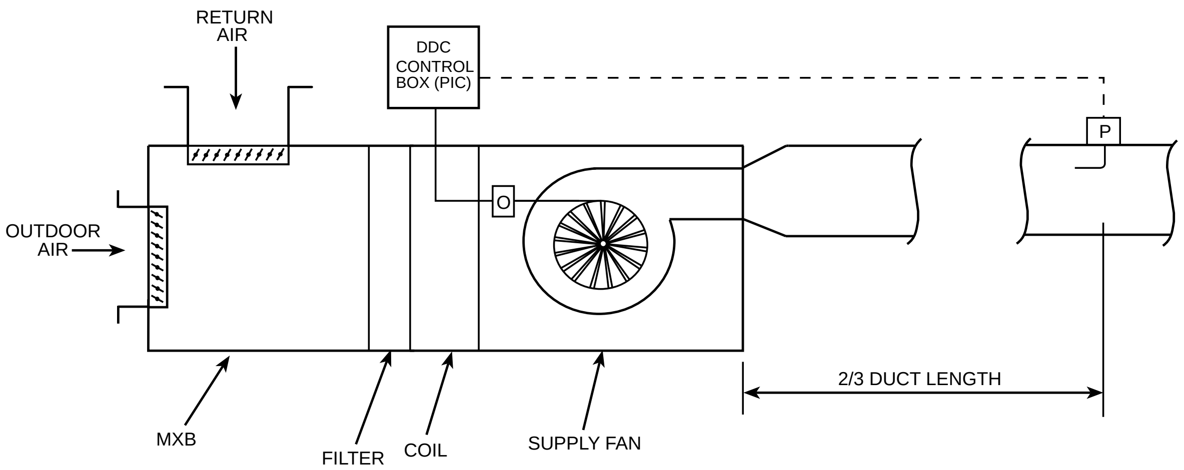
The PIC processor uses a control loop to provide the capability. The PIC processor measures the static pressure at the pick-up probe, compares it to the desired set point, and modulates the fan volume control device. See the Supply Fan Control figure. The volume control device can be either factory-installed inlet guide vanes (IGVs) or a field-installed variable frequency drive (VFD).

The VFD offers several advantages over inlet guide vanes. First, the VFD operates more efficiently in most applications, thus saving energy. The VFD also provides the ability to maintain control over a much larger airflow range (it has a higher turn-down ratio). The following guidelines should be used to ensure proper control:

- Forward-curved fans with IGVs should not operate below 35% of the maximum airflow for which the fan was selected.
- Airfoil and plenum fans with IGVs should not operate below 20% of the maximum airflow for which the fan was selected.
- Variable frequency drives should not be operated at below 10% of the maximum for which the fan was selected, regardless of the fan type.

For supply fan applications, the PIC option maintains the duct static pressure at a desired set point between 0.2 and 4.5 in. wg to within ±0.1 in. wg throughout the fan control range. In applications where over 100 ft of pneumatic tubing is required, the transducer must be removed from the control box and and remotely mounted near the static pressure pickup.

SUPPLY FAN CONTROL



LEGEND

DDC — Direct Digital Control
MXB — Mixing Box
PIC — Product Integrated Control

O Operator
- - - - Pneumatic Tubing
P Static Pressure Pick-Up

Return fan control

Return fan control, or "fan tracking" is used to ensure the desired quantity of air is removed from the space. This air quantity is always maintained at a fixed differential compared to the supply air quantity. By maintaining a fixed differential, a constant airflow ratio is maintained between the space and the surrounding environment. This return fan control is superior to building pressure control because it maintains a constant differential pressure rather than an absolute pressure. It is also not subject to the critical placement of a reference pressure signal, which can be adversely affected by wind patterns around building exteriors.

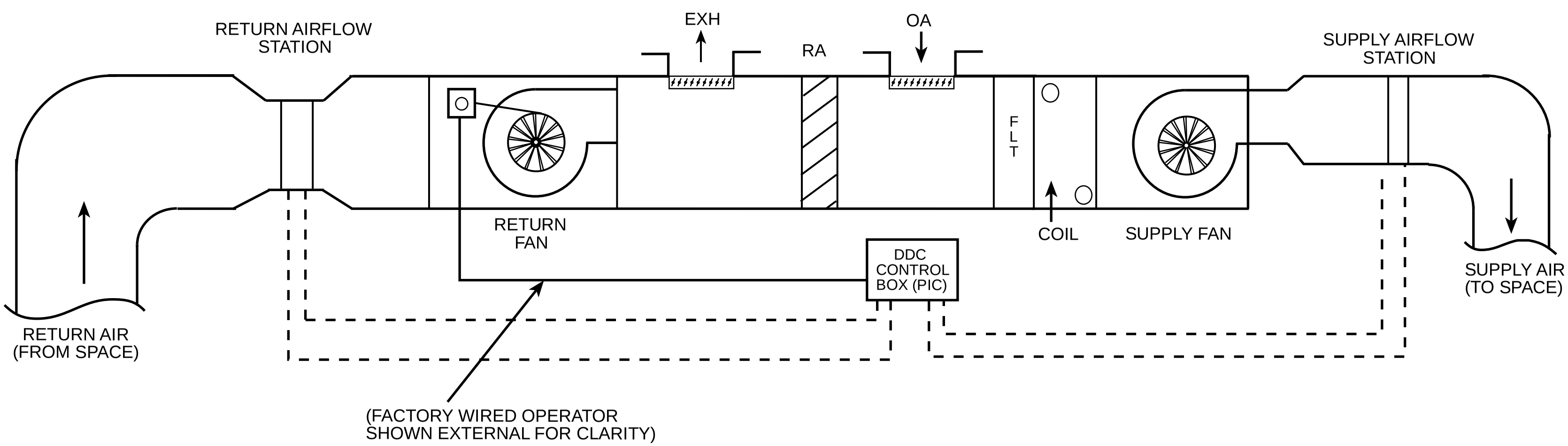
Differential pressure control is also required in many applications (such as cleanrooms or hospitals), where a positive pressure ensures airflow out to the surrounding environment. To accomplish this, the velocity for the supply air is measured using a field-installed airflow station in the supply duct. See the Return Fan Control figure. The pneumatic signal is piped to a factory-installed transducer in the PIC control box. The PIC processor then calculates the supply air quantity being delivered. The same measurement is performed on the return air stream. A control loop then calculates the desired output and the return fan volume control device (IGVs or VFD) is modulated to maintain the desired differential between the two airflows.

As with supply fan control, the VFD offers the same advantages over IGVs in return fan applications.

Some important issues must be considered to achieve good results using return fan control:

- The return fan must be capable of having its airflow controlled to a point which is equal to or less than the lowest airflow expected from the supply fan **minus** the desired differential airflow. For this reason, a VFD is the preferable control device for return fans due to its high turndown ratio.
- To achieve optimum performance, it is critical to properly size and select the return air velocity pressure stations. It is also necessary to correctly select air velocity probes with multiplication factors suitable for the application. In addition, the factory-supplied transducer may need to be reselected for a given return velocity range to ensure acceptable performance. For applications using a unity gain airflow station, return velocities should be maintained above 1000 fpm.

RETURN FAN CONTROL (FAN TRACKING)



LEGEND

DDC — Direct Digital Control
EXH — Exhaust Air
FLT — Filter Section
OA — Outdoor Air
PIC — Product-Integrated Control (Control Box)
RA — Return Air
- - - - Pneumatic Tubing
O Operator

Application data (cont)

Indoor air quality (IAQ) applications

Several types of control are available to improve indoor air quality and to comply with requirements from ASHRAE, OSHA (Occupational Safety and Health Administration), and other regulatory agencies. For VAV systems, the following types of control are provided:

- night purge
- constant outdoor air
- return fan control
- humidity control
- CO_2 demand-controlled ventilation override

For constant volume systems, all of the preceding types of control are available except for constant outdoor air and return fan control. The preceding section described return fan control. The following sections describe the additional IAQ functions and their capabilities.

Night purge changes the building air just prior to the scheduled occupancy time. The night purge feature is used to start the air handler fans and to open the mixed air dampers and exhaust damper (as applicable). This feature includes configurable purge durations from 5 to 240 minutes. It also includes independently configurable damper positions for low or high outdoor-air temperature and high outdoor air humidity conditions. This allows the purge rate to vary for each application regardless of climate conditions.

Constant outdoor air provides a fixed quantity of outdoor air for VAV systems, regardless of the supply airflow. Features include monitoring of the outdoor airflow in the outdoor air duct and modulation of the mixed air damper to maintain constant outdoor airflow over the entire mixing box pressure range. This saves fan horsepower compared to other controllers that regulate the return air damper to maintain a constant but artificially high negative mixing box pressure.

Humidity control maintains the desired minimum space relative humidity by controlling either a two-stage or modulating humidifier. Features include a configurable high duct-humidity override that prevents excessive humidity levels in the supply air duct system during humidification.

CO_2 demand-controlled ventilation override increases the minimum ventilation level in order to maintain the CO_2 level at or below the maximum level per person. Features include the ability to save energy by ventilating only to the actual rate required, rather than the maximum design occupancy rate. When combined with product integrated controls, the feature automatically adapts and changes ventilation quantity without operator set point adjustments. The feature has user-selectable values for minimum mixed-air temperature override, maximum damper ventilation override position, and supply air tempering (when hot water/steam heat is used).

Coils

Coil definitions

A coil, as the term is used with air-handling equipment, is a heat exchange device. A heating or cooling medium passes through the coil, where it either rejects heat to, or absorbs heat from, the airstream passing over the coil, depending upon the relative temperatures of medium and airstream.

Tube — The tube is a small-diameter pipe through which the heating or cooling medium passes as it rejects or absorbs heat. Coil tubes are generally constructed of copper but may be made of other metals.

Fin — The coil fin is a thin metal plate attached to the tube to improve the heat transfer efficiency from medium to airstream. Typically, it is made of either aluminum or copper.

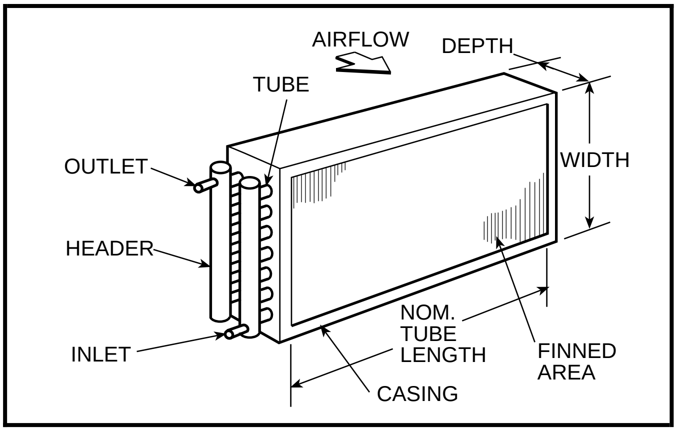
Header — The header is a pipe of large diameter to which several tubes are connected. It serves as a distributor of the heating or cooling medium to the tubes. Headers are typically of non-ferrous metal or steel.

Casing — The supporting metal structure for tubes and header is called a casing. It is usually made of galvanized steel but can be made of other materials (stainless steel).

Inlet and outlet — These are pipe stubs on the header where the heating or cooling medium enters and leaves the coil.

In water coils, the supply inlet is the pipe stub located on the side where the air leaves the coil. The outlet is the stub on the entering air side of the coil. Such an arrangement is known as counterflow.

In steam coils, the inlet is always the higher stub so that condensate will drain out of the lower stub.



Finned area or face area — The working area of the coil is defined as the width x length of the finned area through which air passes. This finned or face area does not include the extra dimensions for the casing.

Face velocity — This is the air velocity in fpm across the finned or face area of a coil. It is determined by dividing the air volume in cfm by the coil face area in square feet.

$$\text{Face Velocity (Fpm)} = \frac{\text{Air Volume (Cfm)}}{\text{Coil Face Area (Sq Ft)}}$$

The first step in selecting an air handler size is to determine the maximum allowable face velocity.

This maximum is determined by the specifier and is based primarily on the following criteria:

1. Avoidance of moisture carryover into the ductwork (applies to cooling coils only).
2. Air pressure drop across the coil.
3. Heat transfer efficiency.

The maximum safe air velocity without moisture carry-over into the ductwork depends on the type and spacing of the finned surface, the amount of moisture on the coil, and the geometry between coil and fan inlet or ductwork. Since coil moisture conditions vary, and coil versus duct geometry varies (for example, between draw-thru, blow-thru, vertical, or horizontal units), the specified maximum face velocity should allow for these variations.

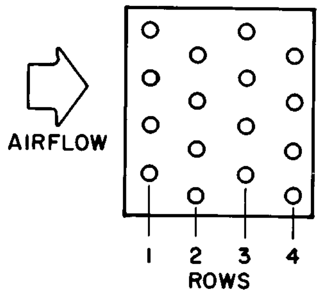
Fan horsepower is also affected by face velocity, since the air resistance across the coil varies roughly as the square of the face velocity.

For the above reasons, the maximum specified face velocity is normally a conservative figure (on the low side). Suggested design face velocities are as follows:

COIL TYPE	FACE VELOCITY RANGE
Cooling	400 to 550 fpm
Heating	400 to 1200 fpm

In variable air volume (VAV) applications, the system generally operates below peak air volume for extended periods. In such cases, the design face velocity is commonly selected at the higher end of the suggested range.

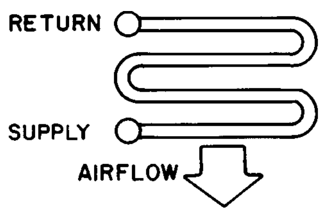
Tube face — This is the number of tubes in any one coil row.



Above is a 4-row coil with a 4-tube face. Note that tubes are staggered in adjacent rows.

Cooling coils are typically available in 4-, 6-, 8-, and 10-row configurations. Tubes should have an outside diameter (OD) of ½ in. to maximize heat transfer at minimum water flows. Coils should be sized for the most efficient use of water. Water temperature differences of 12 to 16° F are typical and represent optimum selection points.

Pass — That part of the circuit that passes through the airstream once.



Note that this is a 4-pass circuit.

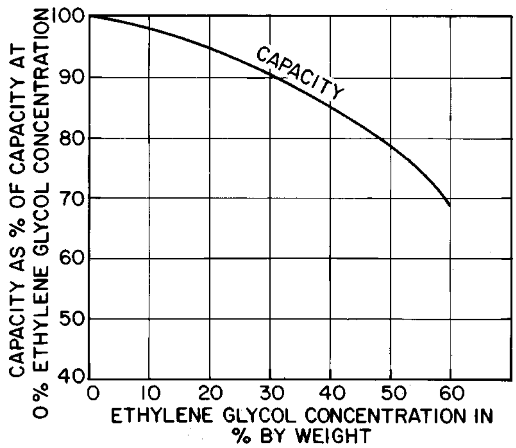
Direct expansion (DX) coil circuits — DX coils have a minimum of 2 intertwined refrigerant circuits. A full-circuit DX coil in a unit is sometimes referred to as a row-split coil because its intertwined circuits perform similarly to a conventional row-split coil.

Ethylene glycol

The effects of ethylene glycol usage on coil capacity and pressure drop can be determined from Carrier's computerized coil selection or performance programs. For a quick estimate of these effects, however, use the chart below.

The chart is based on 6-row/14-fin coil performance with the only variable being ethylene glycol concentration by weight.

ETHYLENE GLYCOL EFFECTS



NOTE: Use the percentage of ethylene glycol concentration for burst protection, not freeze-up protection.

Filters

Air is contaminated in varying degrees by soil, organic matter, spores, bacteria, smoke, dust, and fumes.

Air cleaning and filtration devices are required in order to create a clean work environment, reduce cleaning costs, and extend the life of machinery or equipment.

Filter ratings

Filters are rated according to efficiency and dust-holding capacity.

The most commonly accepted method of testing filter efficiency is per ASHRAE Standard 52. Previously used methods include AFI (American Filter Institute) and NBS (National Bureau of Standards) methods. Absolute, or HEPA (High Efficiency Particulate Air) filters, because of the unusually small particles involved, are tested by the DOP (Dioctylphthalate particle) test.

Filter dust-holding capacity is directly related to filter life. The filter is replaced when the amount of dirt and dust it contains builds up air resistance to an unacceptable level. Air resistance build-up is measured by a filter air-resistance gage.

Guide specifications

Central Station Air-Handling Unit

HVAC Guide Specifications

Size Range: **3,500 to 46,000 Nominal Cfm**
Carrier Model Number: **39T**

Part 1 — General

1.01 SYSTEM DESCRIPTION

A. Indoor mounted, central station air-handling unit designed to provide air to a conditioned space as required to meet specified performance requirements for ventilation, heating, cooling, filtration, and distribution. Unit shall be assembled for horizontal/vertical application, as shown on the drawings, and shall be arranged to discharge conditioned air as shown on the drawings. Units shall be supplied by the specified manufacturer.

B. Substitute units may be offered only as an alternate to the specified equipment.

1.02 QUALITY ASSURANCE

A. Unit performance shall be certified in accordance with ARI Standard 430 for Central Station Air-Handling Units.

B. Direct-expansion coils shall be designed and tested in accordance with ASHRAE 15 Safety Code for Mechanical Refrigeration (latest edition).

C. Coils shall be certified in accordance with ARI Standard 410.

D. Insulation and insulation adhesive shall comply with NFPA 90A requirements for flame spread and smoke generation.

E. Unit shall be manufactured in a facility registered to ISO 9002 manufacturing quality standard.

F. Unit shall be constructed in accordance with ETL and CSA standards and shall carry the ETL and CSA labels.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled in accordance with the unit manufacturer's instructions.

Part 2 — Products

2.01 EQUIPMENT

A. General:

1. Unit shall be Carrier factory-supplied, central station air handler. Unit may consist of a fan and coil section with a factory-installed chilled water or direct-expansion coil, preheat or reheat coil, heating coil section, electric heat section, face and bypass section, filter section, access section, mixing box or combination filter-mixing box, return fan, diffuser, zone dampers, exhaust box, or air mixer (blender) as indicated on the equipment schedule.
2. All unit sections shall be supplied with longitudinal 12-gage (unit sizes 49-92) or 14-gage (unit sizes 07-39) galvanized steel structural perimeter base rails that shall serve as housekeeping rails when unit is installed. Base rails shall be installed by the manufacturer at the factory. Perimeter lifting brackets for overhead lifting shall be provided on each section. Slinging of units in place of lifting brackets is not acceptable.
3. Units shall ship in the fewest number of sections to meet project requirements. All sections shall be individually flanged and gasketed to allow easy assembly and disassembly. Units up to 40 ft in length shall be capable of shipment fully assembled.
4. Each component section shall have mating flanges for bolted assembly. The flange shall extend around the complete perimeter of each section. Bolts shall be 5⁄16-in. diameter and shall be located no further apart than 16 in. on center. The manufacturer shall install sufficient closed cell gasket for full perimeter coverage.

B. Unit Cabinet:

1. All 39TH, 39TV, and 39TR unit panels shall be constructed of 16-gage galvanized steel with prepainted baked enamel finish. These panels shall be capable of withstanding Federal Test Method Standard No. 141 (method 6061) 500-hour salt-spray test. All 39TS and 39TP component panels shall be constructed of painted 16-gage galvanized steel. Casing panels shall be removable for easy access to the unit. All panels shall be gasketed to ensure a tight seal. No fan supports, structural members, panels, or flooring shall be welded, unless aluminum, stainless steel, or other corrosion-resistant material is used.
2. Access doors shall be of double wall construction. Multiple handles shall be provided to assure positive closure. Handles shall be Vent-Lok™ type, rated to meet 500-hour salt spray requirements. Doors shall open outward for negative pressure and inward for positive pressure applications. Doors shall be provided on both sides of all access sections.
3. Insulation shall have full coverage waterproof adhesive to firmly secure the material to the unit casing. Casings and insulation shall have the following characteristics as specified. (Select option a or b as appropriate.)
   a. Casing shall have 1-in. minimum thickness dual-density neoprene-faced fiberglass insulation with a density of not less than 1½ lb per cu ft.
   b. Casing shall be dual wall with 20-gage interior galvanized steel liner. Casing shall have 2-in. minimum thickness neoprene-faced dual-density fiberglass insulation with a density of not less than 1½ lb per cu ft.

C. Fan Section:

1. Fan section shall be constructed of insulated galvanized steel and have formed channel base. Fan scroll, wheel, shaft, bearings, drives, and motor shall be mounted on a structural steel assembly which shall be isolated from the outer casing with factory-installed 2-in. deflection spring isolators and vibration-absorbent fan discharge seal. Hinged access door per 2.01.B.2 shall be provided on both sides of unit.
2. Each unit shall have one fan wheel and scroll only. Fans shall be double-width, double inlet with forward-curved blades or backward-curved airfoil section blades, or shall be single-width, single inlet plenum (plug) type with backward-curved airfoil section blades, as indicated on the equipment schedule. All fans shall be AMCA Class 2 rated.

   Backward-inclined or backward-curved fans do not have the efficiency of airfoil blades and shall not be acceptable. Forward-curved wheels shall be bonderized steel painted with baked enamel or galvanized steel. Airfoil wheels shall be painted with zinc chromate primer and an enamel finish coat.

   Fans shall be supplied with inlet guide vanes (IGVs) for variable volume control, if specified.
3. Fan wheels shall be keyed to the shaft and shall be designed for continuous operation at the maximum rated fan speed and motor horsepower. Fan wheels and shafts shall be selected to operate at 25% below the first critical speed, and shall be statically and dynamically balanced as an assembly.
4. Fan shafts shall be solid steel, turned, ground, polished, and coated with rust-preventative oil. Access doors shall be provided so that the fan shaft can be accessed without the removal of casing panels and to facilitate the air balancing of the system.
5. Fan bearings for airfoil (unit sizes 07-32) and forward-curved (units sizes 07-39) fans shall be self-aligning, pillow-block, regreasable ball- or roller-type selected for a minimum average life of 200,000 hours. Airfoil fan sizes 39-92, forward curved fan sizes 49 and 61, and all plenum-type fans shall have roller bearings rated for 400,000 hours minimum average life.
6. A motor shall be mounted within the fan section casing on slide rails equipped with 2 adjusting screws. Motor shall be open drip-proof or totally enclosed fan cooled NEMA Design B with size and electrical characteristics as shown on the equipment schedule. Motor shall be mounted on a horizontal flat surface and shall not be supported by the fan or its structural members.
7. Fan motor and bearings shall have grease fittings. Bearing opposite drive side of fan section shall have a lubrication line extended to drive side of fan section.
8. Fan drive shall be designed for a minimum 1.3 service factor, shall be variable pitch for motors 15 hp and less, and shall be constant-speed fixed-pitch for 20 hp and larger. All drives shall be factory mounted, with belts aligned and tensioned.
9. The fan section shall come with a solid galvanized steel service floor of sufficient size to enable field personnel to work on or adjust the motor and drive without damaging insulation.

D. Coil Sections:

1. All coil sections shall be constructed of insulated, double-wall, prepainted galvanized steel panels. All coils shall be easily removeable from top or side of horizontal units and from the side of vertical units. Where 2 or more coils are installed in a coil bank, intermediate drain pans that extend a minimum of 6 in. from the coil face shall be provided and the condensate shall be piped to the bottom drain pan. The bottom coil shall not serve as a drain path for the upper coil.

   Main drain pan shall be insulated double-wall stainless steel, sloped toward drain fitting. Drain pan shall have a recessed vertical-exit non-trapping design, with integral elbow for side discharge and FPT connection, and shall comply with ASHRAE Standard 62. A maximum of one drain shall be supplied for each cooling coil section.

   Moisture shall not carry over past the coil. Coil sections shall have tracks to facilitate ease of coil removal for cleaning.
2. All water and direct expansion coils shall be tested at 450 psig air pressure. Coil performance shall be certified in accordance with ARI Standard 410. All coils shall have mill galvanized steel casings as standard.
3. Chilled water coils shall be aluminum plate fin type with belled collars and shall be bonded to ½-in. OD copper tubes by mechanical expansion. Coils shall have non-ferrous headers with steel MPT connections. Working pressure shall be 300 psig at 200 F.

   Coils shall be drainable and shall have non-trapping circuits. Headers shall have drain and vent connections accessible from the exterior of the unit.
4. Direct expansion coils shall be aluminum plate fin type with belled collars and shall be bonded to ½-in. OD copper tubes by mechanical expansion. Coils shall be provided with pressure-type brass distributors with solder-type connections and shall have a minimum of 2 distributors. Coils for full-face active or face-split operation shall have intertwined circuits for equal loading on each circuit. Suction and discharge connections shall be on the same end.
5. Blow-thru coil sections shall have a diffuser plate as an integral part of the coil section.

6. Hot water coils shall be aluminum plate fin type with belled collars bonded to ½-in. OD copper tubes by mechanical expansion. Coils shall have non-ferrous headers with steel MPT connections. Working pressures shall be 175 psig at 400 F. Headers shall have drain and vent connections accessible from the exterior of the unit.
7. Steam distributing coils (non-freeze type) shall be aluminum plate fin type with an outer copper tube diameter of 1 in. with a ⅝-in. diameter inner distributing tube and steel headers with MPT connections. Working pressure shall be 175 psig at 400 F.
8. Tube wall thicknesses shall not be less than 0.016 inches. Tube diameter on all water and refrigerant coils shall be ½-in. OD to ensure high thermal performance with lower total flow requirements and reduced pumping requirements.
9. Coil options shall be supplied as follows, if specified.
   a. Copper fin construction with stainless steel casings and tube sheets.
   b. Tube wall thickness of 0.025 inches.

E. Electric Heating Section:

1. Electric heating sections shall be constructed of prepainted galvanized steel and shall provide flush mounting of the heater control box access door on the side of the unit.

   Electric heating coils for use in air-handling units shall be open-wire type, 80% nickel, 20% chromium resistance coils, insulated by floating ceramic bushings and supported in a galvanized steel frame. Bushings shall be recessed into embossed openings and stacked into supporting brackets spaced on not more than 4-in. centers. Thermal cutouts for overtemperature protection shall be provided to meet UL and NEC requirements. Maximum element heating density shall be 55 watts/sq inch.

   An integral control box shall be furnished by the manufacturer. It shall contain thermal cutouts, primary and secondary control, sub-circuit fusing, airflow switch, and fused control transformer.

F. Filter Sections:

1. Each filter section shall be designed and constructed to house the specific type of filter shown on the equipment schedule. A double-walled hinged access door of the type described in Section 2.01.B.2 shall be provided on both sides of the section.
2. Filter tracks in flat and angle filter sections shall be constructed of extruded aluminum for increased rigidity.
3. Flat filter sections shall accept 1-in., 2-in., or 4-in. width filters. Sections shall include side access slide rails.
4. Angle filter sections shall accept 2-in. filters of standard sizes, arranged in horizontal V formation.
5. Bag cartridge filter sections shall be capable of accepting standard size 12-in. deep rigid media or bag filters. For filters with lengths longer than 12 in., additional access section(s) shall be available.

G. Damper Sections:

1. Mixing boxes and filter-mixing boxes shall have parallel blades and interconnecting outside-air and return-air dampers. All mixing boxes and filter mixing boxes shall have a double-wall hinged access door as specified; filter mixing boxes shall have doors on both sides of component. Floors of 16-gage steel shall be supplied for mixing boxes to protect insulation.
2. Face and bypass sections shall have opposed-acting damper blades.
3. All damper blades shall be galvanized steel, housed in a galvanized steel frame and mechanically fastened to a hex axle rod rotating in stainless steel bearings. To eliminate blade warping, dampers shall be sectionalized to limit blade length to no more than 48 inches. Neoprene blade seals are required to assure tight closure. Dampers shall be rated for a maximum leakage rate of 7 cfm per sq ft at 1 in. wg.

   Optional premium dampers for mixing box, filter mixing box, and exhaust box components shall be rated for a maximum leakage rate of 5 cfm per sq ft at 1.0 in. wg. Premium damper blades shall be double-skin galvanized steel airfoil type with stainless steel jam seals.

H. Access Sections:

1. Access sections shall be installed where indicated on the drawings and shall be as specified on the equipment schedule.
2. Access sections shall have a double-walled hinged door on both sides as specified in Section 2.01.B.2, and 16-gage floors to protect insulation.

I. Diffuser Section:

1. Diffuser section shall consist of casing (as specified) with an integral perforated aluminum plate. Diffuser section shall be placed on the discharge side of the supply fan to ensure even and uniform air distribution over the adjacent downstream component.
2. Diffuser section shall be available and required if a filter section directly follows the fan.
3. Blow-thru coil sections shall have their own integral diffuser plates; units with a blow-thru coil section installed directly after the fan section shall not require a separate diffuser section.

J. Air Mixer Section:

1. Unit panels shall be constructed of 16-gage pre-painted galvanized steel. Casing panels shall be removeable for easy access to the unit.
2. A hinged access door shall be provided downstream of mixer and shall be insulated double-wall, with baked-on enamel dogged fasteners to provide airtight compression of the perimeter gasket.
3. Insulation for casing panels on unit shall be 1-in. minimum thickness, dual-density fiberglass insulation with a density of not less than nominal 1½ lb per cubic ft.

   Insulation for units that are double-wall with a solid 20-gage galvanized steel inner liner shall be 2-in. 1½-lb. density fiberglass.
4. Insulation shall be secured to casing with waterproof adhesive.
5. Section shall mix 2 or more air streams of different temperatures (at nominal flow) to within a range of 6° F standard deviation of theoretical mixed-air temperature and provide a more uniform air velocity contour entering a downstream filter or coil bank.
6. Air mixer shall mix air with an entering face velocity not greater than 1500 fpm and shall have a range of 600 through 50,000 cfm for cooling duty and through 70,000 cfm for heating or ventilating duty.
7. Construction of mixer shall be of welded aluminum 0.081 framing and turbulators. The mixer shall have no moving parts and shall contain a primary set of direction-changing vanes, a secondary set of turbulator vanes, and a cone design for mixing of air streams.

K. Direct Digital Control:

The following guide specifications should be used as a basis for design when using factory-installed direct digital controls. These specifications should be reviewed to match the specific system control requirements and available control packages.

1. The Product Integrated Controls (PIC) option shall use a solid-state microprocessor-based controller to manage each function of the HVAC equipment to which it is connected using Direct Digital Control and specifically designed software. The PIC control box shall be remotely installed and connected to a junction box in the unit's fan section. Matching controls shall be factory installed and wired as an integral part of the unit. All application software performing the required control functions shall be factory-supplied with the PIC, pre-tested, and pre-configured.
2. All factory control wiring shall be internal to the unit. Factory-installed connectors shall be provided in PIC wiring at each unit section flange to ease disassembly and reassembly of unit. Internal wiring shall consist of plenum-rated wire. The electrical components shall belisted under UL. The unit shall be in compliance with the NFPA 90A standard.
3. The PIC shall be capable of providing stand-alone operation. The PIC shall accept analog and digital signals from sensors, switches, relays, etc., and shall multiplex the various signals into digital format. All closed-loop Direct Digital Control shall utilize PIC-based software algorithms that shall be resident in the PIC memory. All standard control, PIC-based algorithms shall operate independently of an online host computer or any other networked controller.
4. The control system shall provide the capability to perform the following functions. Performance of functions for constant volume (CV) and variable air volume (VAV) shall differ as specified.
   a. Control of the chilled water valve to maintain supply-air temperature (SAT) (VAV) or room temperature (CV) to an occupied or unoccupied set point.
   b. Control of up to 8 stages of direct expansion cooling to maintain SAT (VAV) or room temperature (CV) to an occupied or unoccupied set point. Failsafe control mode (if the processor module [PSIO] should fail) shall be configurable.
   c. Control of the hot water valve to maintain return-air temperature (VAV) or room temperature (CV) to an occupied or unoccupied set point.
   d. Control of 1 to 8 stages of electric heat to maintain return-air temperature (VAV) or room temperature (CV) to an occupied or unoccupied low set point. Failsafe control mode shall be provided to turn the stages off should the PSIO fail.
   e. Control fan inlet guide vanes (or field-supplied and installed variable-frequency drive) to maintain static pressure set point (VAV units only).
   f. Control of mixed-air damper to provide a constant outside airflow (cfm) during VAV operation.
   g. Indoor air quality control during occupied times using a single gas, single gas with indoor/outdoor differential control, or using two gases. When a single sensor reaches the field-adjustable setting, it shall modulate outside air control of dampers to reduce sensor (CO_2 or volatile organic compound [VOC]) levels. When 2 sensors are used for differential monitoring, they shall accomplish a comparative analysis of VOC gas levels and modulate supply, mixed, or return dampers to provide the best air to the space.
   h. Nightly purge of stagnant indoor air for a configured duration prior to occupancy.

i. Control of mixed-air damper (economizer) to provide integrated use of outside air to provide free cooling when controlling supply air, room temperature, or minimum outdoor air.

j. Control of two-position dampers to meet minimum outdoor air requirements during occupied periods.

k. Control of the supply fan based on the occupancy schedule.

l. Control of supply fan to cause adaptable start/morning warm-up of the system.

m. Control of the mixed-air damper to maintain a minimum position when the enthalpy switch or differential enthalpy calculation indicates the outside air is unsuitable for cooling.

n. Monitor the analog inputs for alarm exceedence. Alarms based on difference between fan state and fan commanded state.

o. Provide alarms based on freezestat, duct high humidity, pressurization, evacuation, smoke purge, and fire shutdown input states being true.

p. Allow manual and system override of selected output channels and internal values.

q. Support a human interface (HSIO) for display, set point, and diagnostic information.

r. Include a full electronic 365-day timeclock with backup capability. Timeclock supports hour, minute, day of week, day, month, and year.

s. Occupancy control with 8 periods for unit operation.

t. Occupancy control with 8 periods for optional control of a discrete output.

u. Support a factory Quick Test for line production check out.

v. Holiday table within the control.

w. Remote timed override and timed override messages from the Building Supervisor and HSIO.

x. Return fan capacity control.

y. Filter maintenance option.

aa. Smoke evacuation.

bb. Building pressurization.

cc. Fire shutdown.

dd. Humidifier control; proportional analog or two-stage discrete.

ee. Support ''Linking'' function for system operation.

ff. Runtime and consumables on all analog and discrete points.

gg. Maintenance and service data.

5. The PIC shall include a power supply that utilizes single-phase 120 vac or 230 vac (60 or 50 Hz).
   a. The PIC shall include an on/off switch to shut off the power to the controller.
   b. Surge protection shall be provided for the communication circuits.

6. Electronic Timeclock:

   The controller shall include a 365-day timeclock with back-up capability. Time clock shall support hour, minute, day of week, day, month, and year.

   The controller shall support a time schedule with up to 8 occupied/unoccupied periods and 18 operator-defined holidays. A holiday period shall be programmable up to 99 consecutive days. The periods shall have the capability of assigning any day of the week or holiday to any of the occupied/unoccupied periods.

7. Discrete and analog inputs shall be able to interact with PIC-resident algorithms for local processing or to provide a value for updating or alarm annunciation at a Building Supervisor.

   The operator shall be able to modify, add, or delete times and set points using a Local Interface Device or portable PC with Building Supervisor. Systems that cause the loss of time and set point configuration data when new options are added are not acceptable.

8. The PIC shall be capable of operating in either a stand-alone mode or as part of a network with Building Supervisor(s) and other PICs and FIDs (field-installed devices). The PIC shall be factory-configured for stand-alone operation. However, it shall be capable of local configuration via a Local Interface Device and remote configuration via a Building Supervisor. The operator shall be capable of making changes to PIC configurations as required to meet local operation conditions from either type of device.
   a. Analog inputs shall be monitored in order to provide feedback to a control loop, to annunciate that an analog alarm limit has been exceeded, to offer centralized analog monitoring, and/or to monitor consumable data.
   b. Each analog output shall be capable of individual configuration via the Local Interface Device, portable PIC, and the Building Supervisor.

9. Diagnostics:

The controller shall have an onboard diagnostic program which can be activated whenever the unit is stopped. The program shall check all inputs and outputs for failures. As a minimum, the following equipment must be included in the diagnostic program:

Inputs:

- thermistors
- fan status switch
- enthalpy switch
- mixed-air temperature sensor
- low-temperature thermostat (Freezestat)
- Static pressure transducer
- relative humidity sensor
- outdoor-air lockout switch (direct-expansion [DX] cooling)
- carbon dioxide and/or VOC sensor

Outputs:

- fan commanded state
- DX cooling stages
- heating/cooling coil valve
- electric heat stages
- electric heat check (with integral fan and IGV control)
- heat interlock relay
- humidifier outputs

10. Alarm Processing:

The PIC shall contain a routine to process alarms. Alarm processing shall consist of a scan of all input points. The status of a digital input shall be able to be compared to a discrete output or to be independently monitored for alarm logic purposes. An analog input shall be capable of comparison to configurable, occupied/unoccupied, high and low limits, initiating an alarm when the limits are exceeded. Alarm processing logic shall also monitor return to normal conditions as part of the alarm scan.

The controller shall be capable of providing local alarm indication for out-of-limit conditions, status, and thermistor or sensor failure. All alarms shall be displayed at the Local Interface Device and via the network to a remote Building Supervisor.

Metric conversion chart

METRIC TECH	X	= ENGLISH UNIT	X	= SI UNIT
Area				
cm^2			100	mm^2
cm^2	0.1550	in^2	645.2	mm^2
m^2			1.0	m^2
m^2	10.76	ft^2	0.09290	m^2
Length				
μ m			1.0	μ m
μ m	39.37	micro-inch	0.0254	μ m
mm			1.0	mm
mm	0.03937	in.	25.4	mm
mm	0.003281	ft	304.8	mm
m			1.0	m
m	3.281	ft	0.3048	m
m	1.094	yd	0.9144	m
Mass				
g			1.0	g
g	0.03527	oz	28.35	g
kg			1.0	kg
kg	2.205	lb	0.4536	kg
tonne, Mg			1.0	tonne, Mg
tonne, Mg	1.102	U.S. ton (2000 lb)	0.9072	tonne, Mg
Power				
kcal/h			1.163	W
kcal/h	3.968	Btu/h	0.2931	W
HP metric			0.7355	kW
HP metric	0.9863	HP (550 $\frac{ft \cdot lb}{s}$)	0.7457	kW
Mcal/h			1.163	kW
Mcal/h	0.3307	Ton refr.	3.517	kW
Pressure				
mm w.g. 4°C			9.806	Pa
mm w.g. 4°C	0.03937	in H_2O 39.2°F	249.1	Pa
mm Hg 0°C			0.1333	kPa
mm Hg 0°C	0.03937	in Hg 32°F	3.386	kPa
kg_f/cm^2			98.07	kPa
kg_f/cm^2	14.22	psi	6.895	kPa
mH_2O	3.281	ft H_2O	2.989	kPa

METRIC TECH	X	= ENGLISH UNIT	X	= SI UNIT
Temperature Interval				
°C			1.0	K
°C	1.8	°F	0.5556	°C
Velocity				
m/s			1.0	m/s
m/s	3.281	ft/s	0.3048	m/s
m/s	196.9	ft/min	0.00508	m/s
Volume				
mm^3			1.0x10^{-6}	L
mm^3	6.102x10^{-5}	in.^{3}	0.01639	L
L			1.0	L
L	0.03531	ft^3	28.32	L
m^3			1.0	m^3
m^3	1.308	yd^3	0.7646	m^3
L	0.2642	U.S. gal	3.785	L
L	2.113	U.S. pint	0.4732	L
mL, cm^3			1.0	mL
mL, cm^3	0.03381	U.S. oz	29.57	mL
Volume/Time				
m^3/h			0.2778	L/s
m^3/h	0.5886	ft^3/min	0.4719	L/s
m^3/h	4.403	U.S. gal/min	0.06309	L/s
L/h			2.778x10^{-4}	L/s
L/h	4.403x10^{-3}	U.S. gal/min	0.06309	L/s
(m^3/h)/ (1000 kcal/h)	1.780	cfm/ton	0.1342	L/s · kW

METRIC TECH	CONVERSION FACTOR	= ENGLISH UNIT	CONVERSION FACTOR	= SI UNIT
Temperature				
°C			°C + 273.15	K
°C	(°C x 1.8) + 32	°F	(°F − 32)÷1.8	°C

PREFIXES

M	MEGA-	10^6
k	KILO-	10^3
d	DECI	10^{-1}
c	CENTI	10^{-2}
m	MILLI	10^{-3}
μ	MICRO	10^{-6}

LEGEND

m	METER
cal	CALORIE
kg	KILOGRAM (mass)
kgf	KILOGRAM — FORCE
kp	KILOGRAM — FORCE
L	LITER
°C	DEGREES CELSIUS
K	KELVIN
W	WATT
Pa	PASCAL
J	JOULE
N	NEWTON
h	HOUR

UNITS

cP	CENTIPOISE
cSt	CENTISTOKE
HP metric =	(PS, CV, ch) METRIC HORSEPOWER
mm w.g.	MILLIMETERS WATER GAUGE
mm CE	MILLIMETERS WATER GAUGE
mm Hg	MILLIMETERS MERCURY
tonne =	1000 kg
kcal =	fg FRIGORIE
bar =	100 kPa

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