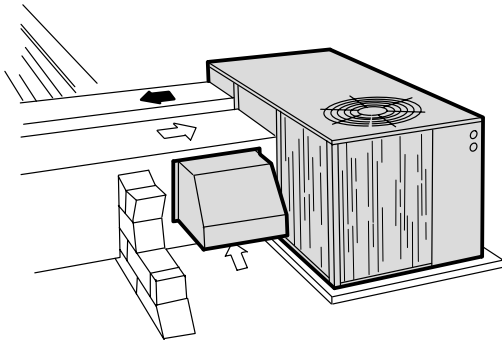
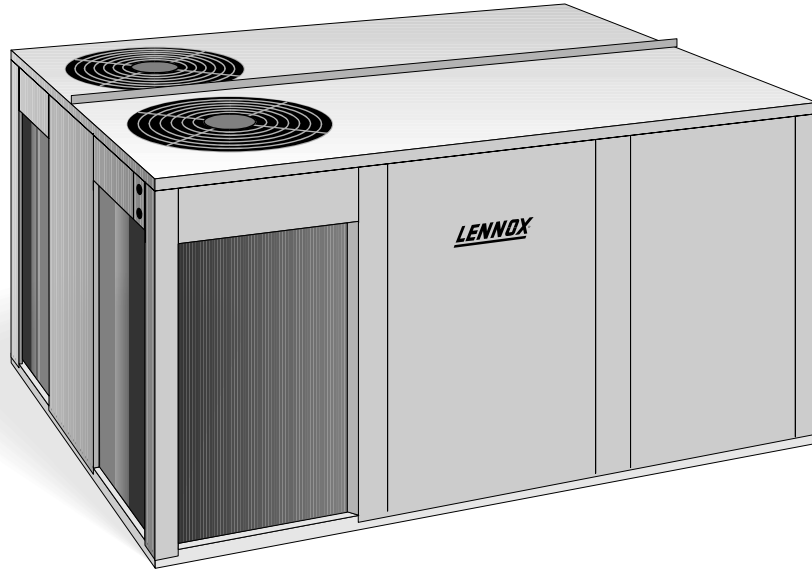


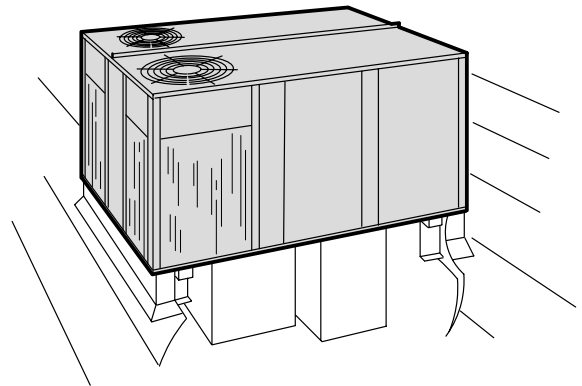


**CHA16-953 thru CHA16-1603
PACKAGED UNITS
COOLING AND ELECTRIC HEAT**
 23.7 to 38.0 kW (81 000 to 129 700 Btuh) Cooling Capacity
 6.3 thru 38.3 kW (21 400 to 130 600) Optional Electric Heat

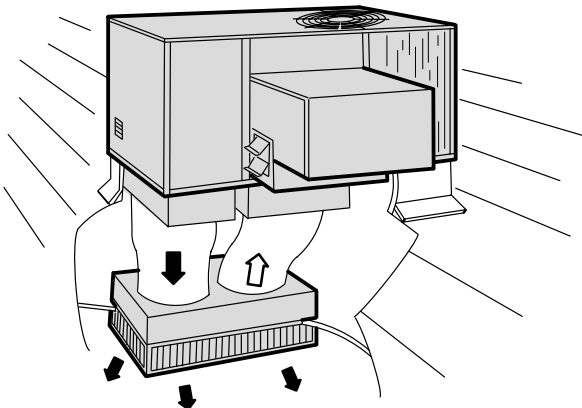
CHA16
 26.4 to 44.0 kW
 (7.5 to 12.5 Ton)
 Bulletin #490003
 December 1995
 Supersedes
 October 1994



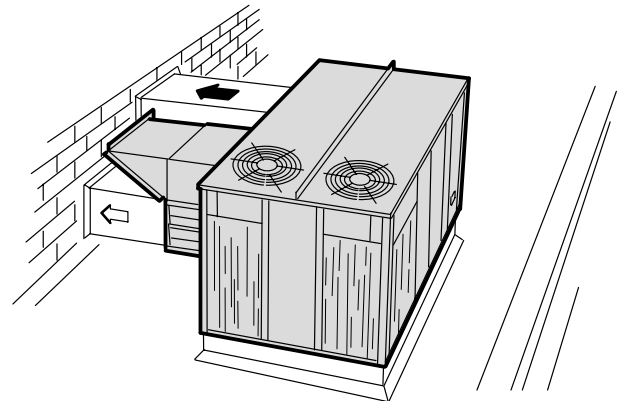
Horizontal (Side) Supply and Return Air Installation with OAD16 Outdoor Air Dampers.



Down-Flo Supply and Return Air Installation With RMF16 Roof Mounting Frame.



Down-Flo Supply and Return Air Installation With RMF16 Roof Mounting Frame, REMD16M Economizer and RTD11 Ceiling Diffuser.



Horizontal (Side) Supply and Return Air Installation with RMF16 Roof Mounting Frame and EMDH16M Economizer Dampers.

FEATURES

Application — Lennox CHA16 single package air conditioning units are designed for bottom (down-flo) or side (horizontal) handling of supply and return air. A separate roof mounting frame mates to the unit base and when flashed into the roof permits weatherproof duct connections and entry into the conditioned area in down-flo applications. The units can also be installed at grade level with horizontal (side) duct connections. A choice of RTD11 step-down or FD11 flush ceiling diffusers are available for combination ceiling supply and return air distribution systems. Optional economizer dampers provide “free cooling” by using outdoor air in lieu of mechanical refrigeration. Units are available for cooling only or cooling with electric heat. Thermostat and system controls are not furnished and must be ordered extra. Available as options are W973 control system, W7400 control system, electro-mechanical, or T7300 thermostat control systems. Units are shipped factory assembled, piped and wired. Each unit is factory test operated insuring unit dependability.

Completely Tested — CHA16-953-1353 units have been tested in the Lennox Research Laboratory Environmental Test Rooms which meet American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 37 requirements. The rating test conditions are those included in Air Conditioning and Refrigeration Institute (ARI) Standard 210/240-89 while operating at rated voltage and air volumes. CHA16-1603 units have been tested in the Lennox Research Laboratory Environmental Test Rooms which meet American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 37 requirements. The rating test conditions are those included in the Air Conditioning and Refrigeration Institute (ARI) Standard 360-86 while operating at rated voltage and indoor air volumes. In addition, units have been sound rated in the Lennox reverberant sound test room in accordance with test conditions for Air-Conditioning and Refrigeration Institute (ARI) Standard 270-84. Units and components within are bonded for grounding to meet safety standards for servicing required by Underwriter’s Laboratories (U.L.) and the International Electrotechnical Commission (IEC). Blower data is from unit tests conducted in the Lennox Laboratory air test chamber.

Cabinet — Rugged cabinet is constructed of heavy gauge galvanized steel. Cabinet is subject to a five station metal wash process resulting in a perfect bonding surface for a paint finish of powder enamel, electrostatically bonded to the metal. Large removable cabinet panels allow service access. Base section and cabinet panels exposed to conditioned air are lined with thick fiberglass insulation. Electrical inlets are provided in cabinet base and condenser section cabinet panel for wiring entry. Control box with factory installed controls is conveniently located for service access. A low voltage terminal strip is provided in the control box for ease of field wiring connections. Lifting brackets are furnished for ease of handling and rigging. Evaporator coil condensate drain connection extends outside of cabinet for ease of connection.

Air Filters — Disposable frame type 51 mm (2 inch) thick commercial grade filters are furnished as standard. Filters are readily accessible for service. See dimension drawings. Filter rack is designed to accept 25 mm (1 inch) thick cleanable filters.

Refrigeration System — Factory sealed refrigerant system consists of multiple compressors, condenser coil and direct drive fan(s), evaporator coil (dual circuit) and belt drive blower, expansion valves, high capacity driers, thermometer wells, high pressure switches, loss of charge switches and full operating charge of refrigerant. Factory installed freeze-stat prevents evaporator coil freeze-up during low ambient operation. Independent refrigerant circuits provide staging control to fit varying cooling loads.

Copper Tube Evaporator and Condenser Enhanced Fin Coils — Extra large surface area and circuiting of coils provide maximum cooling efficiency, excellent heat transfer and low air resistance. Coils are constructed of precisely spaced ripple-edged aluminum fins fitted to durable copper tubes. Fins are equipped with collars that grip tubing for maximum contact area. Flared shoulder tubing connections and silver soldering provide tight, leakproof joints. Long life copper tubing is easy to field service. Coil is thoroughly factory tested under high pressure to insure leakproof construction. The evaporator coil is face split with separate circuits. Each circuit has its separate expansion valve, compressor and refrigerant charge.

Condenser Fan(s) — CHA16-953 is equipped with a single fan. CHA16-1353 and -1603 have two. Direct drive fan(s) draw large air volumes uniformly through condenser coils and discharges it vertically. Fan orifice design and low fan tip speed keeps operating sound level at a minimum. Uniform air flow through the coil results in high refrigerant cooling capacity. Fan motor is permanently lubricated and overload protected. Motor is resiliently mounted. Corrosion resistant polyvinyl chloride (PVC) coated steel wire fan guard(s) are furnished.

Supply Air Blower — Belt drive centrifugal blower delivers large air volume efficiently and with minimum power consumption. Blower wheel is heavy duty, with forward curved blades and double inlet. Wheel is statically and dynamically balanced to eliminate vibration and designed to give maximum air delivery. Bearings are heavy duty, self aligning, permanently sealed and lubricated. Design of motor mounting base permits quick and simple motor changeover, belt tension adjustment or belt changing. Adjustable motor pulley allows for variable speed adjustments. Motor is overload protected.

Compressors — Rugged and reliable compressors are hermetically sealed, suction cooled and overload protected. CHA16-953, -1353, -1603 (2nd stage only) units have internal pressure relief valve. Compressors are internally protected from excessive current and temperature. Crankcase heaters are furnished on all compressors. Compressor monitor (non-adjustable) prevents compressor operation when outdoor temperature is below 4°C (40°F). In addition, the compressors are installed on resilient rubber mounts in the unit, assuring quiet and vibration free operation.

OPTIONAL ACCESSORIES (Must Be Ordered Extra)

ECH16 Additive Electric Heat (Optional) — Available factory or field installed in 10kW through 90kW sizes. Helix wound nichrome heating elements are exposed directly in the air stream resulting in instant heat transfer, lower coil temperatures and long service life. Elements are accurately located and insulated from the heavy gauge steel support frame by high quality insulators. Time delays bring the elements on and off the line in sequence and equal increments in response to demand with a time delay between each element. Elements are equipped with individual limit controls providing positive protection in case of overheating. Some heaters may be two stage controlled with each stage being energized only when required. Fuse block for electric heaters must be ordered extra, see Optional Accessories tables. Factory installed heaters will have the fuse block factory installed. Fuse block must be field installed on field installed heaters. Wiring harness and mounting screws are provided with fuse block.

Timed-Off Control (Optional) — Timed-off control is available for field installation. Prevents compressor short-cycling. Automatic reset control provides a time delay between compressor shutoff and start-up. Kit (40G20) includes two LB-50709BA controls and must be ordered extra.

Bottom Power Entry Kit (Optional) — Factory or field installed kit LB-55757CA (34G70) is provided for bottom power entry into the unit within the confines of the roof mounting frame. Kit contains wiring junction box with cover 152 mm x 203 mm x 254 mm (6 in. x 8 in. x 10 in.), 2.0 m (78 inch) length of armored cable and necessary installing hardware. Galvanized steel junction box with prepunched mounting holes and electrical knockouts installs on electrical inlet openings located in the unit base. Kit must be ordered extra. See basic unit dimension drawing.

Low Ambient Control Kit (Optional) — System will operate satisfactorily down to 7°C (45°F) outdoor air temperature without additional controls. If air conditioning operation is required at low ambients a field installed low ambient kit can be added enabling the unit to operate down to minus 1°C (30°F). Kits must be ordered extra. See Optional Accessories tables.

RMF16 Roof Mounting Frame (Optional) — Sturdy mounting frame mates to the single package unit and provides an automatic weather sealed rooftop installation. Shipped knocked down for ease of shipping and handling it is easily field assembled. A nailer strip is secured to the frame sides to facilitate flashing. Approved by United States National Roofing Contractors Association.

OPTIONAL ACCESSORIES (Must Be Ordered Extra)

REMD16M Economizer Dampers (Optional) — Economizer consists of: mechanically linked recirculated air dampers and outdoor air dampers, damper motor and controls. Economizers are shipped factory wired and only require plug-in connection. Formed low leakage (less than 3%) dampers rotate smoothly in nylon bearings. Outdoor air dampers are equipped with stainless steel seals for minimum air leakage. The positioning of the dampers is accomplished with a 24 volt fully modulating spring return damper motor with adjustable minimum damper position switch. Damper motor is controlled by the room thermostat, mixed air controller and solid-state adjustable outdoor air enthalpy control. The enthalpy control allows for 0 to 100% outdoor air (first stage of cooling) to be used for “free cooling” when outdoor humidity and temperature are acceptable. Additionally, an integrated economizer cycle can be accomplished by allowing the outside air dampers to remain open, continuing to admit outside air, and cycling the compressors to provide dehumidification and additional cooling, as needed. The integrated economizer cycle uses only the minimum amount of mechanical cooling necessary. Two cleanable polyurethane media frame filters are furnished for extra air filtering and bird screen protection.

REMD16M-95, -135 and -160 are available for down-flo applications only. Economizer cabinet is constructed of heavy gauge galvanized steel with a powder enamel paint finish electrostatically bonded to the metal and completely insulated with thick fiberglass insulation. Economizer cabinet field installs on the unit cabinet. Provisions have been made in the economizer cabinet for easy field installation of optional GED16 gravity exhaust dampers. See dimension drawings.

EMDH16M Horizontal Economizer Dampers (Optional) — The EMDH16M horizontal economizer cabinet section contains recirculated air dampers, outdoor air dampers, damper motor and controls. Economizer section field installs on the unit cabinet. Outdoor air hood is shipped separately and is field installed. Economizer is factory assembled and wired and only requires field plug-in connection. Cabinet is constructed of heavy gauge galvanized steel with a powdered enamel finish electrostatically bonded to the metal. Completely insulated with thick fiberglass insulation. Recirculated damper section of cabinet has flanged air openings for ease of duct connection. Formed low leakage (less than 3%) dampers rotate smoothly in nylon bearings. Outdoor air damper blades are equipped with stainless steel seals for minimum air leakage. The positioning of the dampers is accomplished with a 24 volt fully modulating spring return damper motor with adjustable minimum positioner. Damper motor is controlled by the room thermostat, mixed air controller and solid-state adjustable outdoor air enthalpy control. The enthalpy control allows for 0 to 100% outdoor air (first stage of cooling) to be used for “free cooling” when outdoor humidity and temperature are acceptable. Additionally, an integrated economizer cycle can be accomplished by allowing the outside air dampers to remain open, continuing to admit outside air, and cycling the compressors to provide dehumidification and additional cooling as needed. The integrated economizer cycle uses only the minimum amount of mechanical cooling necessary. Two cleanable polyurethane media frame filters are furnished for extra air filtering and bird screen protection. See dimension drawing. Provisions have been made in the economizer cabinet for easy field installation of optional GED16 gravity exhaust dampers. Requires Optional Horizontal Supply and Return Air Kit for duct connection to unit. See Optional Accessories tables.

Differential Enthalpy Control (Optional) — A solid-state return air enthalpy sensor is available to be used with the outdoor air enthalpy control to determine which air has the lowest enthalpy. The air with the lowest enthalpy will be selected. Return air enthalpy sensor (54G44) field installs in the return air section and must be ordered extra.

GED16 Gravity Exhaust Dampers (Optional) — For use with REMD16M and EMD16M-95, -135 and -160 economizer damper sections and must be ordered extra. Openings are provided in the economizer cabinet for easy field installation. See Dimension Drawing. Two exhaust dampers are furnished for installation on the economizer section. Rainhoods are also furnished for field installation on the -95-135-160 model. Neoprene coated fiberglass dampers prevent blow-back and outdoor air infiltration during off cycle. Bird screen is provided.

OAD16 Outdoor Air Damper Section (Optional) — Damper section with factory installed and linked dampers field installs external to the unit cabinet and must be ordered extra. Interchangeable unit cabinet panel with opening for installation is furnished with damper for down-flo air applications. Two-piece cabinet panel allows access to controls. See unit dimension drawing for location. Damper section field installs in return air duct for horizontal supply and return air applications. A cleanable polyurethane media frame type air filter is furnished and factory installed. Dampers allow a fixed amount of outdoor air into the system and can be adjusted for air quantities up to 25%. Damper section is available for manual or automatic operation. Manually operated dampers may be adjusted and locked in place for the amount of air desired. Automatic operation is available with the addition of a spring return 3 position damper actuator. Actuator only requires plug-in connection for operation. Automatic OAD16 Damper Kit (35G21) must be ordered extra.

Horizontal Supply and Return Air Kit (Optional) — Provides horizontal supply and return air duct connection to the side of the unit. Kit contains duct connection flanges for field installation on the supply and return air openings, screws for installing, two filler panels for supply and return air openings in the unit base not being used and a filter access panel to replace the existing cabinet panel above the return air opening. Kit must be ordered extra. See Optional Accessories tables.

RTD11 Combination Ceiling Supply and Return Diffuser Assembly (Optional) — Step-down mount diffuser extends slightly below ceiling level and discharges conditioned air out through grilles on all four sides. Aluminum grilles are fitted with double deflection louvers for precise directional control of air flow. Return air enters through the large center grille. Assembly also includes insulated diffuser box with flanges for ease of duct connection, hanging rings for suspending and interior transition to insure low static and even air flow on all four sides. Transition is sealed internally to prevent recirculation. Diffuser assembly is completely factory assembled. Diffuser readily adapts to T-bar ceiling grids and plaster ceilings. Must be ordered extra, see Optional Accessories tables.

FD11 Combination Ceiling Supply and Return Diffuser Assembly (Optional) — Flush mount diffuser installs almost flush with the ceiling level and discharges conditioned air out through fixed blade louvers on all four sides. Fixed blade louvers insure that air flow will be evenly distributed. Return air enters through large center grille. Assembly also includes insulated diffuser box with flanges for ease of duct connections, support hanger eyelets at the top corners for secure installation and interior transition to insure low static and even air flow on all four sides. Transition is sealed internally to prevent recirculation. Diffuser assembly is completely factory assembled. Diffuser readily adapts to T-bar ceiling grids and plaster ceilings. Must be ordered extra, see Optional Accessories tables.

SRT16 Supply and Return Transitions (Optional) — Transitions field install in the roof mounting frame and provide segregated and simple duct connections to supply and return diffuser. Completely insulated galvanized steel transitions have flanges for ease of duct connection. Duct from the transitions to the diffuser is not furnished and must be provided by installer. Transitions are completely factory assembled and easily field installed in the roof mounting frame with minimum costs and labor requirements. Must be ordered extra, see Optional Accessories tables

- SRT16-95 used with the RMF16-95 with CHA16-953.
- SRT16-135 used with the RMF16-135/160 with CHA16-1353.
- SRT16-160 used with the RMF16-135/160 with CHA16-1603.

OPTIONAL TEMPERATURE CONTROL SYSTEMS

Electro-Mechanical Thermostat and Controls System (Optional) —

Two stage heat and two stage cool thermostat (13F06) with dual temperature selector levers. Uses subbase (13F17) with manual system switch (Off-Heat-Auto-Cool) and fan switch (Auto-On) or non-switching subbase (13F16). SP11 Remote Status Panel (12F83) or SSP11 Remote Switching Status Panel (12F84) is available for observing and controlling unit operation from the conditioned area. A SSP11 Relay Kit (41G39) is required for switching functions of the Switching Status Panel. Kit must be ordered extra and field installed. For nite operation the following are available. Single stage heating thermostat (13F12) and non-switching subbase (13F16). For applications without the economizer a Nite Kit (39G74), containing a plug-in relay, is required to override the operation of day thermostat. Two time clocks are available for the system. Automatic 7 day time clock (43G98) programs a weekly schedule. Any day or days can be omitted. Each day of the week is clearly separated from every other day. Day and nite periods are distinctly marked. When the settings have been made the clock will turn the system on and off. Spaced in 2 hour increments and equipped with battery back-up in case of power outage. 24 hour nite setback time clock (43G99) automatically programs the system to keep conditioned area at a more conservative temperature level (nite setback thermostat setting) during a period of vacancy. Spaced in 15 minute increments and equipped with battery back-up in case of power outage. Also available is a Warm Up Kit (39G77) which holds the economizer outdoor air dampers closed during nite heat operation and morning warm up. Cycle Control (42H51) is required with CHA16-953 thru -1603 units. Control, with plug-in connections, provides a timed-on and timed-off function to prevent compressor short-cycling. See Flow Chart on page 5.

W973 Control System (Optional) — Logic Panel (39G76) controls the operation of the economizer dampers and the stages of cooling and heating in response to a signal from the thermostat. To maintain stable temperatures the logic panel balances the conditioned space thermostat demand against the system output. System output is measured by a discharge sensor (furnished with the logic panel) located in the discharge air duct of the unit. The combined demand and output signals from the sensor determines economizer damper position and number of cooling or heating stages energized. The logic panel field installs in the unit or in a remote panel located within the conditioned space. W973 Plug-In Relay (furnished with the logic panel) is required to adapt the control system to the unit. Two thermostats are available for the system. Dual set point room thermostat (25C52) or transmitter (25C51) with a choice of remote sensors. Both have separate heating-cooling locking set points concealed under the cover and do not have indicating thermometer. The room thermostat has integral sensor and installs in the conditioned space. The transmitter installs outside the conditioned space with a Room Temperature Sensor (58C92) in the conditioned area or a Return Air Temperature Sensor (27C40) in the return air duct of the unit. Thermostat and transmitter are furnished with a wiring wallplate. Also available is switching subbase (58C93) with system selector switch (Heat-Auto-Cool-Off) and fan switch (Auto-On). SP11 Remote Status Panel (12F83) or SSP11 Remote Switching Status Panel (12F84) is available for observing and controlling unit operation from the conditioned area. Two time clocks are available for the system. Automatic 7 day time clock (43G98) programs a weekly schedule. Any day or days can be omitted. Each day of the week is clearly separated from every other day. Day and nite periods are distinctly marked. When the settings have been made the clock will turn the system on and off. Spaced in 2 hour increments and equipped with battery back-up in case of power outage. 24 hour nite setback time clock (43G99) automatically programs the system to keep the conditioned area at a more conservative temperature level (nite set back thermostat setting) during a period of vacancy. Spaced in 15 minute increments and equipped with battery back-up in case of power outage. Also available is a Warm Up Kit (39G77) which holds the economizer outdoor air dampers closed during nite heat operation and warm up. See Flow Chart on page 5.

W7400 Control System (Optional) — Control Module (74G11) controls the operation of the economizer dampers and the stages of heating and cooling. Controlling input signals are setpoint, space temperature sensor and time-of-day scheduling from the thermostat. The control module balances the space temperature signal against the number of stages operating for system output. System output is measured and updated by monitoring the actual space temperature deviation from set point, and the rate of change of the space temperature. The control

module field installs in the unit or in a remote panel located within the conditioned area. Two thermostats are available for the system. A room thermostat (43G96) with integral sensor that installs in the conditioned space or a remote thermostat (43G97) that installs outside the conditioned space with a Room Temperature Sensor (58C92) in the conditioned area or a Return Air Temperature Sensor (27C40) in the return air duct of the unit. Both thermostats are equipped with touch sensitive keyboard, automatic switching from heat to cool, no anticipator, zero droop, indicator lights, hour/day programming, override capabilities, time readout, stage status indicators, battery back-up and wiring wallplate. W7400 Plug-In Relay (furnished with the control module) provides separate set points for the economizer dampers and DX cooling. SP11 Remote Status Panel (12F83) is available for checking unit operation within the conditioned area. See Flow Chart on page 6.

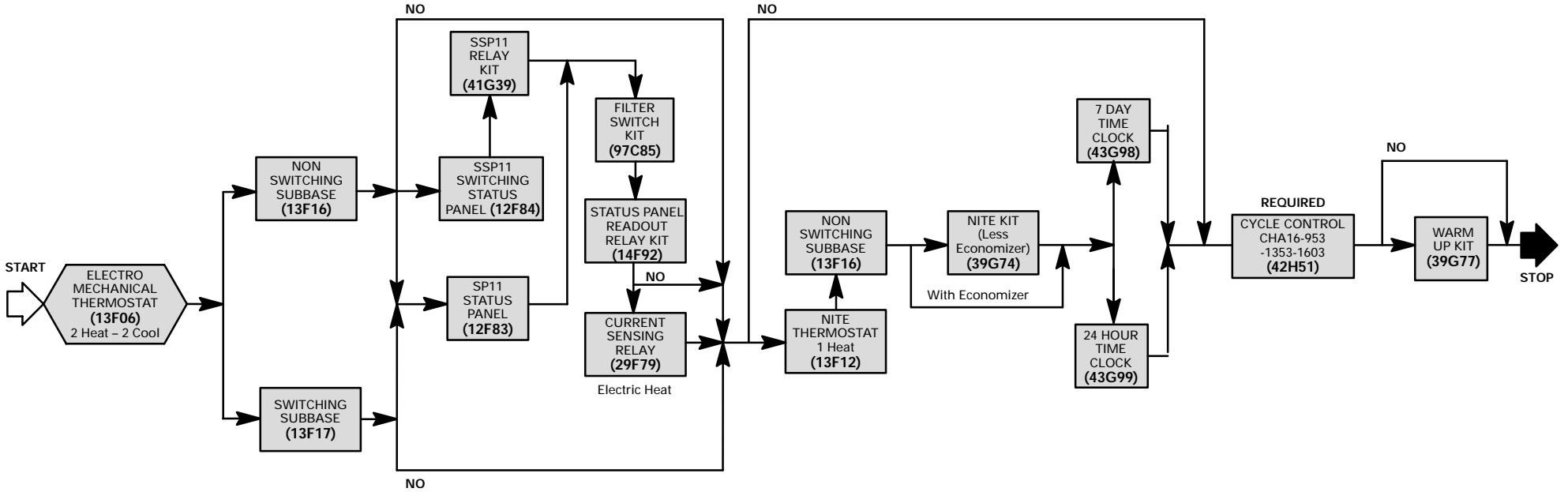
T7300 Thermostat and Control System (Optional) — T7300 programmable thermostat (81G59) has internal or optional remote temperature sensing, touch sensitive keyboard, automatic switching from heat to cool, °C or °F temperature readout, no anticipator, droop/ no droop selection, indicator LED's, hour/day programming, override capabilities, time readout, stage status indicators, operational mode readout and battery back-up. T7300 thermostat has a choice of subbases. Switching subbase (81G60) features selectable output staging up to two heat and two cool, indicator LED's, manual system switch (Heat-Off-Auto-Cool) and fan switch (Auto-On). Switching subbase (13H76) features selectable output staging up to three heat and two cool, indicator LED's, manual system switch (Auto-Cool-Off-Heat-Emergency Heat) (Heat Pump Only) and fan switch (Auto-On). Both subbases also features an auxiliary relay output which controls economizer operation during occupied and unoccupied periods. Also available is a Room Temperature Sensor (58C92) or Room Temperature Sensor (86G67) with 3-hour override and setpoint adjustment for installation in the conditioned area and a Return Air Temperature Sensor (27C40) for installation in the return air duct of the unit. SP11 Status Panel (12F83) is available for checking unit operation from within the conditioned area. See Flow Chart on page 6.

SP11 Remote Status Panel (Optional) — The operation of the unit can be checked at a glance on the Remote Status Panel (12F83) conveniently located within the conditioned area. Signal lights on the panel indicate "Cool Mode", "Heat Mode", "Compressor 1", "Compressor 2", "No Heat" and "Filter". The Cool Mode signal light is green when lit and indicates economizer damper operation or DX cooling operation for units without the economizer. Heat Mode light is green and reflects heating operation. Compressor 1 and Compressor 2 lights are green when operating and will turn red if there is an operational malfunction. The No Heat and Filter lights will show red and indicate a requirement for service. The following field installed controls are required for use with the status panel and must be ordered extra. Filter Switch Kit (97C85) is required for operation of the filter light. Status Panel Readout Relay Kit is required to interface status panel with unit operation. See flowchart for kit selection. Current Sensing Relay (29F79) is required with electric heat for operation of the No Heat light.

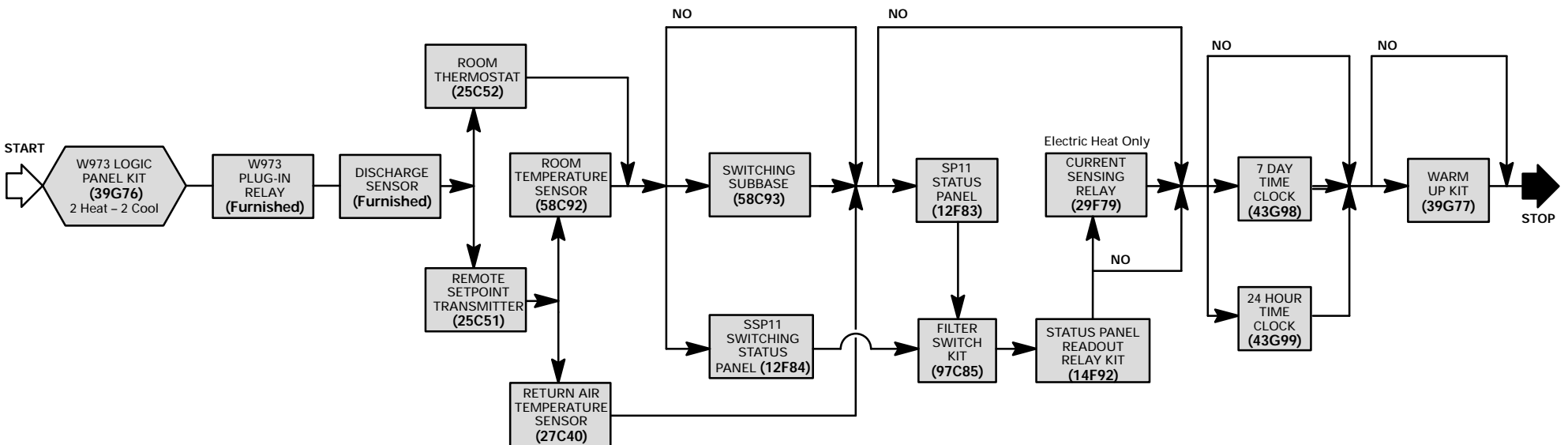
SSP11 Remote Switching Status Panel (Optional) — The operation of the unit can be controlled and observed on the Switching Status Panel (12F84) conveniently located within the conditioned area. Signal lights on the panel indicate "Cool Mode", "Heat Mode", "Compressor 1", "Compressor 2", "No Heat" and "Filter". The Cool Mode signal light is green when lit and indicates economizer damper operation or DX cooling operation for units without the economizer. Heat Mode light is green and reflects heating operation. Compressor 1 and Compressor 2 lights are green when operating and will turn red if there is an operational malfunction. The No Heat and Filter lights will show red and indicates a requirement for service. Additionally, panel is equipped with a system selector switch (Off — Heat — Auto — Cool — Emergency Heat) (Heat Pump Only), fan switch (Auto — On) and after hours timer. Fan switch provides a choice of intermittent (Auto) or continuous (On) blower operation. Manually operated after hours timer (0 to 12 hours) overrides night setback controls providing normal operation for time period set. A momentary push button switch is used to initiate the timer period. The following field installed controls are required for use with the status panel and must be ordered extra. Filter Switch Kit (97C85) is required for operation of the filter light. Status Panel Readout Relay Kit is required to interface status panel with unit operation. See flowchart for kit selection. Current Sensing Relay (29F79) is required with electric heat for operation of the No Heat light.

TEMPERATURE CONTROL SELECTION FLOWCHARTS

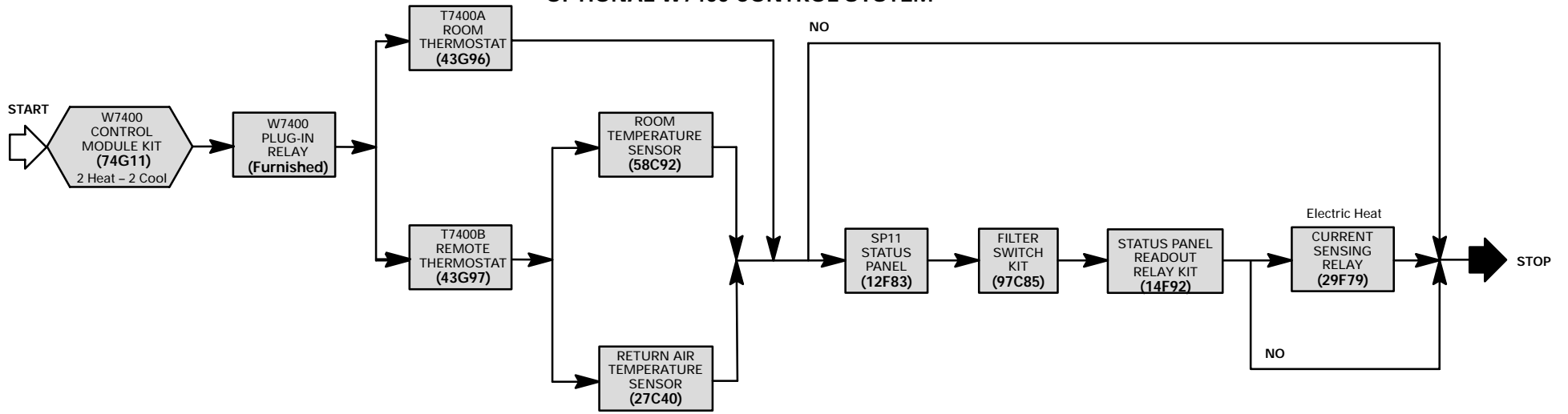
OPTIONAL ELECTRO-MECHANICAL THERMOSTAT



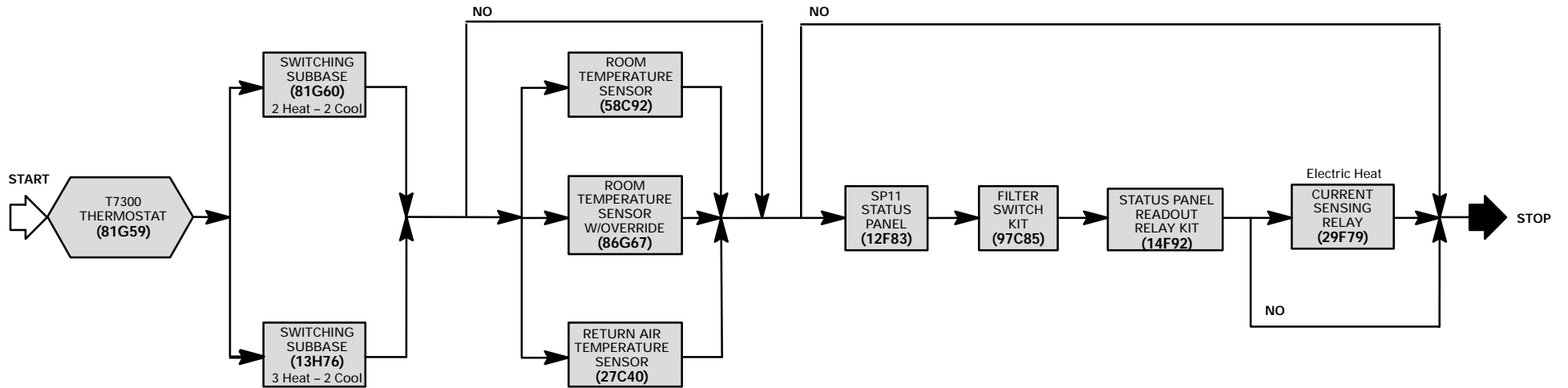
OPTIONAL W973 CONTROL SYSTEM



OPTIONAL W7400 CONTROL SYSTEM



OPTIONAL T7300 CONTROL SYSTEM



SPECIFICATIONS — CHA16-953-1353-1603

Model Number		CHA16-953	CHA16-1353	CHA16-1603
Cooling Ratings	Total cooling capacity — kW (Btuh)	*23.7 (81 000)	*32.1 (109 400)	*38.0 (129 700)
	Total power input — kW	*9.03	*11.8	*15.2
	Coefficient of Performance — Output/Input	*2.65	*2.71	*2.56
	Energy Efficiency Ratio — Btuh/Watt	*9.0	*9.2	*8.8
	Integrated Part Load Value	*9.1	*8.6	*8.5
★Sound rating number (bels)		8.4	8.6	- - -
Refrigerant HCFC-22 Charge furnished	Circuit 1	2.7 kg (6 lbs. 0 oz.)	3.2 kg (7 lbs. 2 oz.)	6.0 kg (13 lbs. 4 oz.)
	Circuit 2	2.7 kg (6 lbs. 0 oz.)	3.2 kg (7 lbs. 2 oz.)	3.2 kg (7 lbs. 1 oz.)
Evaporator Blower	Blower wheel nominal diameter x width — mm (in.)	305 x 305 (12 x 12)	381 x 381 (15 x 15)	381 x 381 (15 x 15)
	Motor output — kW (hp) — (minimum-maximum)	1.5 — 1.7 (2 — 2.30)	1.5 — 1.7 (2 — 2.30)	2.2 — 2.5 (3 — 3.45)
Evaporator Coil	Net face area — m ² (ft. ²)	0.72 (7.75)	0.88 (9.46)	1.11 (11.90)
	Tube outside diameter — mm (in.) — number of rows	9.5 (3/8) — 3	9.5 (3/8) — 3	9.5 (3/8) — 3
	Fins per m (fins per inch)	551 (14)	472 (12)	472 (12)
Condenser Coil	Net face area — m ² (ft. ²)	1.46 (15.67)	2.18 (20.00)	2.27 (24.40)
	Tube outside diameter — mm (in.) — number of rows	9.5 (3/8) — 2	9.5 (3/8) — 2	9.5 (3/8) — 2
	Fins per m (fins per inch)	787 (20)	787 (20)	787 (20)
Condenser Fan(s)	Diameter — mm (in.) — number of blades	610 (24) — 4	(2) 508 (20) — 5	(2) 559 (22) — 4
	Air volume — m ³ /s (cfm)	2.15 (4600)	2.90 (6100) (total)	3.55 (7500) (total)
	Motor output — W (hp)	373 (1/2)	(2) 249 (1/3)	(2) 373 (1/2)
	Total motor input — W	320	520 (total)	770 (total)
Condensate drain size — male pipe thread — mm (in.) polyvinyl chloride		25.4 (1)		
Number and size of filters — mm (in.)		(4) 406 x 508 x 51 (16 x 20 x 2)	(4) 406 x 635 x 51 (16 x 25 x 2)	(4) 508 x 635 x 51 (20 x 25 x 2)
Net weight of basic unit — kg (lbs.) 1 Package		347 (765)	479 (755)	517 (1140)

★Sound rating number rated at test conditions for Air Conditioning and Refrigeration Institute (ARI) Standard 270.

*The rating test conditions are those included in Air Conditioning and Refrigeration Institute (ARI) Standard 210/240 or *360 while operating at rated voltage and air volumes. Cooling Ratings: 35°C (95°F) outdoor air temperature, 26.7°C (80°F) dry bulb and 19.4°C (67°F) wet bulb entering evaporator air.

OPTIONAL ACCESSORIES — CHA16-953-1353-1603 (Must Be Ordered Extra)

Unit Model Number		CHA16-953	CHA16-1353	CHA16-1603
Electric Heat	Model Number	ECH16-95	ECH16-135/160	ECH16-135/160
	†Fuse Block	61H84	72G11	72G14
Roof Mounting Frame — Net Weight — kg (lbs.)		RMF16-95 (32G90) 47 (107)	RMF16-135/160 (32G91) 54 (119)	RMF16-135/160 (32G91) 54 (119)
Economizer Dampers	Net Weight — kg (lbs.)	REMD16M-95 (74G22) 54 (118)	REMD16M-135 (74G23) 57 (125)	REMD16M-160 (51G25) 64 (140)
	Number and size of filters — mm (in.)	(2) 406 x 635 x 25 (16 x 25 x 1)	(2) 406 x 635 x 25 (16 x 25 x 1)	(2) 508 x 635 x 25 (20 x 25 x 1)
Horizontal Economizer Dampers	Net Weight — kg (lbs.)	EMDH16M-95 (68G80, 24H06) 54 (120)	EMDH16M-135 (68G80, 24H07) 62 (137)	EMDH16M-160 (68G77, 24H08) 67 (147)
	Number and size of filters — mm (in.)	(2) 406 x 635 x 25 (16 x 25 x 1)	(2) 406 x 635 x 25 (16 x 25 x 1)	(2) 508 x 635 x 25 (20 x 25 x 1)
Exhaust Dampers — Net Weight — kg (lbs.) — (Net Face Area)		GED16-95/135/160 2 kg (5 lbs.) — (0.04 m ²) (0.43 ft. ²) (96G84)		
Differential Enthalpy Control		54G44		
Horizontal Supply and Return Air Kit — Net Weight — kg (lbs.)		(34G71) 14 (30)	(35G42) 16 (35)	(51G27) 19 (42)
Bottom Power Entry Kit — Net Weight — kg (lbs.)		(34G70) 5 kg (12 lbs.)		
Ceiling Supply and Return Air Diffusers Net Weight kg (lbs.)	Step-Down	RTD11-95 (29G04) 40 (88)	RTD11-135 (29G05) 57 (125)	RTD11-185 (29G06) 178 (392)
	Flush	FD11-95 (29G08) 34 (75)	FD11-135 (29G09) 43 (95)	FD11-185 (29G10) 131 (289)
	Transition	SRT16-95 (33G96) 13 (29)	SRT16-135 (97H10) 17 (38)	SRT16-160 (97H11) 32 (70)
Outdoor Air Dampers	Net Weight — kg (lbs.)	OAD16-95 (35G24, 35G22) 19 (41)	OAD16-135 (35G24, 35G23) 20 (43)	OAD16-160 (35G24, 64G94) 20 (45)
	Number & size of filters — mm (in.)	(1) 406 x 508 x 25 (16 x 20 x 1)		
Automatic OAD16 Damper Kit — Net Weight — kg (lbs.)		35G21 3 (7)		
Low Ambient Control Kit		15J80	16J86	16J87

†Must be ordered extra. Factory installed heaters will have fuse block installed. Fuse block must be field installed in field installed heaters.

ELECTRICAL DATA — CHA16-953-1353-1603

Model Number		CHA16-953	CHA16-1353	CHA16-1603
Line voltage data (50 hz — 3 phase with neutral)		380/420V	380/420V	380/420V
Voltage range (minimum — maximum)		342-462V	342-462V	342-462V
Compressor 1	Rated load (A)	7.0	9.4	14.2
	Locked rotor (A)	46.0	55.0	91.0
Compressor 2	Rated load (A)	7.0	9.4	9.4
	Locked rotor (A)	46.0	55.0	55.0
Condenser Fan Motor(s) (1 Phase)	Full load (A) (total)	1.7	1.0/1.0 (2.0)	1.5/1.5 (3.0)
	Locked rotor (A) (total)	3.3	2.7/2.7 (5.4)	3.2/3.2 (6.4)
Evaporator Blower Motor	Output — kw (hp)	1.5 (2)	1.5 (2)	2.2 (3)
	Full load (A)	3.3	3.3	4.6
	Locked rotor (A)	20.4	20.4	31.0
Electric Heat — Per Element (A)		15.7	15.7	15.7

*Refer to local electrical codes to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 75°C (167°F).

OPTIONAL ELECTRIC HEAT DATA (Heater Fuse Block Must Be Ordered Extra)

NOTE — Refer to local electrical codes to determine wire, fuse and disconnect requirements. Use wires suitable for at least 75°C (167°F).

ECH16 SERIES ELECTRIC HEAT FOR CHA16-953

Electric Heat Model Number and Shipping Weight	Number of Elements	Number of Steps	Volts Input	Heating Capacity	
				kW	Btuh
ECH16-82/95-10 (61H73) 17 kg (38 lbs.)	1	1	380	6.3	21 400
			400	6.9	23 700
			420	7.7	26 100
ECH16-82/95-15 (61H74) 17 kg (38 lbs.)	1	1	380	9.4	32 100
			400	10.4	35 600
			420	11.5	39 200
ECH16-82/95-20 (61H75) 19 kg (42 lbs.)	2	1	380	12.5	42 800
			400	13.9	47 400
			420	15.3	52 300
ECH16-82/95-30 (61H76) 19 kg (42 lbs.)	2	1	380	18.8	64 200
			400	20.8	71 100
			420	23.0	78 400
ECH16-82/95-40 (61H77) 24 kg (53 lbs.)	3	†2	380	26.1	85 500
			400	27.8	95 800
			420	30.6	104 500

†May be used with two stage control.

ECH16 SERIES ELECTRIC HEAT FOR CHA16-1353,-1603

Electric Heat Model Number and Shipping Weight	Number of Elements	Number of Steps	Volts Input	Heating Capacity	
				kW	Btuh
ECH16-135/160-15 (72G26) 17 kg (38 lbs.)	1	1	380	9.4	32 100
			400	10.4	35 600
			420	11.5	39 200
ECH16-135/160-20 (72G27) 19 kg (42 lbs.)	2	1	380	12.5	42 800
			400	13.9	47 400
			420	15.3	52 300
ECH16-135/160-30 (72G28) 19 kg (42 lbs.)	2	1	380	18.8	64 200
			400	20.8	71 100
			420	23.0	78 400
ECH16-135/160-40 (72G29) 24 kg (53 lbs.)	3	†2	380	26.1	85 500
			400	27.8	95 800
			420	30.6	104 500
ECH16-135/160-50 (72G30) 26 kg (58 lbs.)	4	†2	380	31.3	106 900
			400	34.7	118 500
			420	38.3	130 600

†May be used with two stage control.

W973 CONTROL SYSTEM

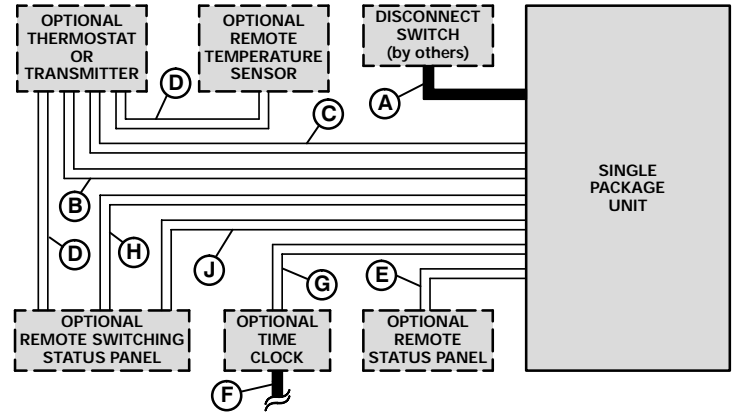
- A — Three phase with neutral (See Electrical Data Table)
- B — Seven wire 24V — DC only
 - Five wire 24V — DC only — with SSP11 Switching Status Panel
 - Seven wire 24V — DC only — with switching subbase
- C — Two wire 24V — AC only — with switching subbase
- D — Two wire 24V — DC only
- E — Nine wire 24V — AC only
- F — Two wire 24V — AC only
- G — Two wire 24V — AC only
- H — Thirteen wire 24V — AC only
- J — Two wire 24V — DC only

AC — Alternating current
DC — Direct current

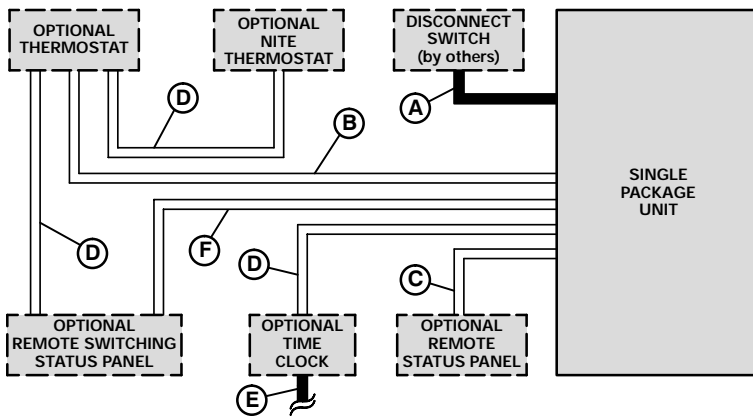
NOTE — Run separate harnesses for AC and DC.
AC voltage interferes with DC signals.

— Field wiring not furnished —

NOTE — All wiring must conform to local electrical codes.



ELECTRO-MECHANICAL THERMOSTAT CONTROL SYSTEM



- A — Three phase with neutral (See Electrical Data Table)

- B — Six wire 24V
 - Five wire 24V — with SSP11 Switching Status Panel

- C — Nine wire 24V

- D — Two wire 24V

- E — Two wire 24V

- F — Sixteen wire 24V

— Field wiring not furnished —

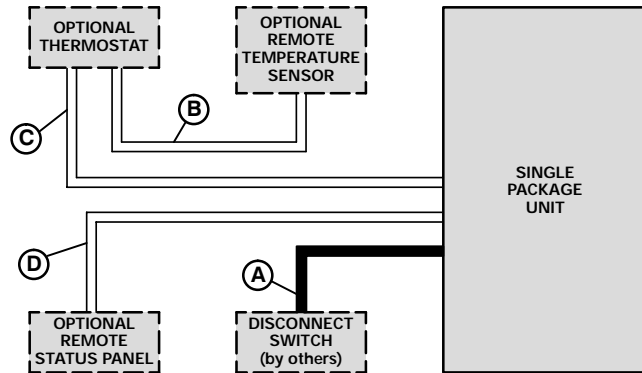
NOTE — All wiring must conform to local electrical codes.

W7400 CONTROL SYSTEM

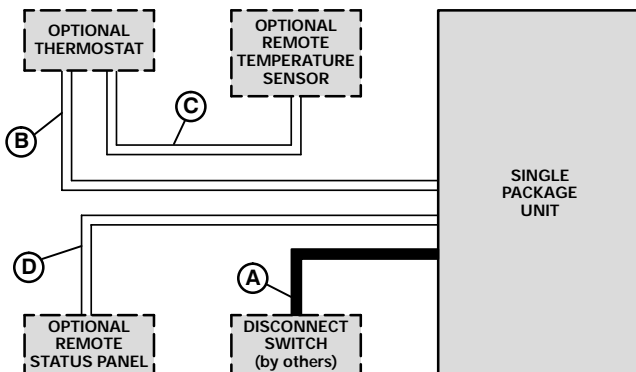
- A — Three phase with neutral (See Electrical Data Table)
- B — Two wire 24V
- C — Four wire 24V
- D — Nine wire 24V

— Field wiring not furnished —

NOTE — All wiring must conform to local electrical codes.



T7300 THERMOSTAT CONTROL SYSTEM



- A — Three phase with neutral (See Electrical Data Table)

- B — Nine wire 24V

- C — Two wire 24V

- Seven wire 24V (Room Sensor with Override)

- D — Nine wire 24V

— Field wiring not furnished —

NOTE — All wiring must conform to local electrical codes.

RATINGS — 50hz

NOTE — Temperatures and capacities not shown in tables, see bulletin — Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data Section.

CHA16-953 COOLING CAPACITY (With One Compressor Only Operating)

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																							
			18°C (65°F)						24°C (75°F)						29°C (85°F)						35°C (95°F)					
			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)		
			kW	Btuh		kW	Dry Bulb			kW		Btuh	kW	Dry Bulb				kW	Btuh	kW	Dry Bulb			kW	Btuh	kW
24°C 75°F	27°C 80°F	29°C 85°F			24°C 75°F		27°C 80°F	29°C 85°F	24°C 75°F		27°C 80°F			29°C 85°F	24°C 75°F	27°C 80°F	29°C 85°F				24°C 75°F	27°C 80°F	29°C 85°F			
17.2°C (63°F)	1.25	2700	12.9	44 900	2.93	.73	.87	1.00	12.4	42 300	3.06	.74	.88	1.00	11.8	40 400	3.23	.75	.90	1.00	11.3	38 500	3.44	.77	.93	1.00
	1.40	3000	13.2	44 900	2.93	.75	.89	1.00	12.6	43 100	3.07	.76	.91	1.00	12.1	41 200	3.25	.79	.94	1.00	11.5	39 300	3.46	.79	.96	1.00
	1.55	3300	13.4	45 600	2.94	.77	.92	1.00	12.8	43 800	3.08	.78	.94	1.00	12.3	41 900	3.26	.80	.97	1.00	11.8	40 100	3.48	.82	.99	1.00
19.4°C (67°F)	1.25	2700	13.9	47 400	2.95	.57	.70	.88	13.3	45 400	3.10	.57	.71	.84	12.7	43 400	3.29	.58	.73	.86	12.1	41 300	3.52	.59	.74	.89
	1.40	3000	14.1	48 200	2.95	.58	.72	.86	13.5	46 200	3.11	.59	.73	.88	12.9	44 100	3.30	.60	.75	.90	12.3	41 900	3.54	.61	.77	.92
	1.55	3300	14.3	48 800	2.96	.59	.74	.89	13.7	46 800	3.11	.60	.75	.91	13.1	44 600	3.31	.61	.77	.93	12.4	42 400	3.55	.62	.79	.96
21.7°C (71°F)	1.25	2700	14.9	51 000	2.97	.43	.55	.67	14.3	48 900	3.14	.43	.56	.68	13.7	46 700	3.35	.43	.56	.70	13.0	44 400	3.61	.43	.57	.71
	1.40	3000	15.2	51 800	2.98	.43	.56	.69	14.5	49 600	3.15	.43	.57	.70	13.9	47 300	3.37	.43	.58	.72	13.2	44 900	3.62	.44	.59	.74
	1.55	3300	15.4	52 400	2.98	.43	.57	.71	14.7	50 200	3.16	.44	.58	.73	14.0	47 800	3.38	.44	.59	.75	13.3	45 400	3.64	.44	.61	.76

CHA16-953 TOTAL COOLING CAPACITY (With Both Compressors Operating)

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																							
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)		
			kW	Btuh		kW	Dry Bulb			kW		Btuh	kW	Dry Bulb				kW	Btuh	kW	Dry Bulb			kW	Btuh	kW
24°C 75°F	27°C 80°F	29°C 85°F			24°C 75°F		27°C 80°F	29°C 85°F	24°C 75°F		27°C 80°F			29°C 85°F	24°C 75°F	27°C 80°F	29°C 85°F									
17.2°C (63°F)	1.25	2700	23.4	79 800	6.81	.75	.90	1.00	22.1	75 500	7.33	.75	.92	1.00	20.8	71 100	7.95	.79	.96	1.00	19.4	66 100	8.70	.82	1.00	1.00
	1.40	3000	23.8	81 200	6.86	.77	.93	1.00	22.5	76 900	7.39	.79	.96	1.00	21.1	72 100	8.02	.82	1.00	1.00	19.8	67 700	8.84	.85	1.00	1.00
	1.55	3300	24.2	82 600	6.90	.80	.97	1.00	22.8	77 900	7.44	.82	1.00	1.00	21.6	73 600	8.13	.85	1.00	1.00	20.3	69 100	8.97	.88	1.00	1.00
19.4°C (67°F)	1.25	2700	24.9	84 900	7.00	.58	.72	.86	23.4	80 000	7.56	.59	.74	.89	22.0	74 900	8.23	.60	.77	.92	20.4	69 700	9.01	.62	.80	.96
	1.40	3000	25.2	86 000	7.04	.59	.75	.90	23.7	81 000	7.61	.60	.77	.93	22.2	75 800	8.28	.62	.80	.97	20.6	70 400	9.09	.64	.83	1.00
	1.55	3300	25.5	86 900	7.08	.61	.77	.93	24.0	81 900	7.65	.62	.80	.97	22.4	76 600	8.34	.64	.83	1.00	20.8	71 100	9.15	.66	.86	1.00
21.7°C (71°F)	1.25	2700	26.5	90 400	7.22	.42	.56	.70	25.0	85 200	7.83	.43	.57	.72	23.4	79 800	8.56	.43	.59	.74	21.7	74 100	9.41	.44	.61	.77
	1.40	3000	26.8	91 500	7.26	.43	.58	.72	25.3	86 200	7.88	.43	.59	.75	23.6	80 600	8.61	.44	.61	.78	21.9	74 800	9.48	.45	.63	.81
	1.55	3300	27.1	92 400	7.30	.44	.59	.75	25.5	86 900	7.92	.44	.61	.78	23.8	81 300	8.66	.45	.63	.81	22.1	75 300	9.53	.46	.65	.84

CHA16-1353 COOLING CAPACITY (With One Compressor Only Operating)

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																							
			18°C (65°F)						24°C (75°F)						29°C (85°F)						35°C (95°F)					
			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)		
			kW	Btuh		kW	Dry Bulb			kW		Btuh	kW	Dry Bulb				kW	Btuh	kW	Dry Bulb			kW	Btuh	kW
24°C 75°F	27°C 80°F	29°C 85°F			24°C 75°F		27°C 80°F	29°C 85°F	24°C 75°F		27°C 80°F			29°C 85°F	24°C 75°F	27°C 80°F	29°C 85°F									
17.2°C (63°F)	1.70	3600	16.6	56 800	3.72	.70	.85	1.00	15.9	54 400	4.04	.71	.87	1.00	15.3	52 200	4.36	.72	.90	1.00	14.4	49 300	4.68	.74	.93	1.00
	1.90	4050	17.0	58 100	3.76	.72	.89	1.00	16.3	55 600	4.07	.74	.91	1.00	15.6	53 200	4.40	.76	.95	1.00	14.7	50 200	4.72	.78	.98	1.00
	2.10	4500	17.2	58 900	3.78	.74	.93	1.00	16.6	56 800	4.10	.77	.95	1.00	15.8	54 000	4.43	.79	.98	1.00	15.1	51 400	4.77	.82	1.00	1.00
19.4°C (67°F)	1.70	3600	17.5	59 800	3.80	.55	.68	.81	16.8	57 500	4.13	.55	.68	.83	16.0	54 800	4.47	.56	.70	.86	15.3	52 300	4.81	.57	.72	.89
	1.90	4050	17.9	61 200	3.83	.56	.70	.85	17.2	58 700	4.16	.58	.71	.87	16.4	55 900	4.51	.58	.74	.90	15.6	53 400	4.86	.59	.75	.94
	2.10	4500	18.2	62 100	3.85	.57	.72	.89	17.5	59 800	4.19	.58	.74	.92	16.7	57 100	4.54	.60	.76	.94	15.9	54 200	4.90	.62	.79	.98
21.7°C (71°F)	1.70	3600	18.3	62 400	3.86	.41	.53	.66	17.7	60 400	4.21	.41	.54	.66	16.9	57 800	4.57	.42	.55	.68	16.2	55 300	4.94	.42	.56	.69
	1.90	4050	18.7	63 700	3.89	.42	.55	.68	18.0	61 400	4.24	.42	.56	.69	17.3	59 000	4.60	.42	.56	.74	16.5	56 500	4.98	.43	.58	.72
	2.10	4500	18.9	64 500	3.91	.42	.56	.70	18.3	62 500	4.27	.43	.57	.71	17.5	59 800	4.64	.43	.59	.73	16.7	57 200	5.03	.44	.60	.76

CHA16-1353 TOTAL COOLING CAPACITY (With Both Compressors Operating)

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																							
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)		
			kW	Btuh		kW	Dry Bulb			kW		Btuh	kW	Dry Bulb				kW	Btuh	kW	Dry Bulb			kW	Btuh	kW
24°C 75°F	27°C 80°F	29°C 85°F			24°C 75°F		27°C 80°F	29°C 85°F	24°C 75°F		27°C 80°F			29°C 85°F	24°C 75°F	27°C 80°F	29°C 85°F									
17.2°C (63°F)	1.70	3600	31.2	106 600	8.77	.75	.91	1.00	29.6	101 200	9.41	.77	.95	1.00	27.9	95 400	10.05	.79	.97	1.00	26.3	89 900	10.66	.82	1.00	1.00
	1.90	4050	31.7	108 300	8.85	.78	.95	1.00	30.2	103 000	9.50	.80	.98	1.00	28.5	97 400	10.16	.83	1.00	1.00	27.1	92 500	10.84	.86	1.00	1.00
	2.10	4500	32.4	110 500	8.91	.81	.98	1.00	30.8	105 200	9.59	.83	1.00	1.00	29.4	100 300	10.30	.86	1.00	1.00	27.9	95 300	11.01	.89	1.00	1.00
19.4°C (67°F)	1.70	3600	32.9	112 500	8.99	.58	.73	.87	31.4	107 100	9.68	.59	.74	.90	29.7	101 400	10.37	.61	.76	.93	28.0	95 500	11.05	.62	.79	.96
	1.90	4050	33.7	115 000	9.07	.60	.75	.91	32.0	109 400	9.77	.61	.77	.94	30.4	103 700	10.48	.63	.80	.98	28.6	97 700	11.17	.64	.83	1.00
	2.10	4500	34.2	116 700	9.15	.62	.78	.95	32.6	111 400	9.86	.64	.81	.98	30.8	105 200	10.58	.65	.83	1.00	29.0	99 200	11.28	.66	.86	1.00
21.7°C (71°F)	1.70	3600	34.6	118 300	9.20	.43	.57	.70	33.2	113 400	9.94	.44	.58	.72	31.6	107 800	10.70	.44	.59	.74	29.8	101 800	11.45	.45	.61	.76
	1.90	4050	35.4	120 800	9.27	.44	.59	.73	33.7	115 200	10.03	.44	.60	.75	32.0	109 400	10.81	.45	.61	.77	30.4	103 900	11.57	.46	.63	

RATINGS — 50hz

NOTE — Temperatures and capacities not shown in tables, see bulletin — Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data Section.

CHA16-1603 COOLING CAPACITY (With One Compressor Only Operating)

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																							
			18°C (65°F)						24°C (75°F)						29°C (85°F)						35°C (95°F)					
			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)		
			kW	Btuh		Dry Bulb			kW	Btuh		Dry Bulb			kW	Btuh		Dry Bulb			kW	Btuh		Dry Bulb		
m ³ /s	cfm			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F
17.2°C (63°F)	1.70	3500	24.8	84 800	5.67	.68	.80	.91	23.7	81 000	6.05	.69	.81	.93	22.5	76 900	6.43	.71	.83	.95	21.2	72 500	6.78	.72	.86	.98
	2.00	4200	25.7	87 900	5.76	.70	.83	.95	24.5	83 800	6.15	.72	.85	.97	23.3	79 600	6.53	.73	.87	.98	22.0	75 200	6.89	.75	.90	1.00
	2.30	4900	26.4	90 300	5.83	.72	.86	1.00	25.3	86 400	6.23	.74	.88	1.00	24.0	82 100	6.61	.75	.90	1.00	22.7	77 600	6.98	.77	.93	1.00
19.4°C (67°F)	1.70	3500	26.1	89 300	5.80	.55	.66	.76	25.0	85 400	6.20	.55	.67	.78	23.8	81 400	6.59	.56	.68	.80	22.6	77 100	6.96	.57	.69	.82
	2.00	4200	27.1	92 600	5.89	.56	.68	.79	25.9	88 400	6.29	.56	.69	.81	24.7	84 200	6.69	.57	.70	.83	23.4	79 800	7.08	.58	.72	.85
	2.30	4900	27.9	95 200	5.96	.57	.70	.82	26.6	90 900	6.37	.58	.71	.84	25.3	86 500	6.78	.59	.73	.87	24.0	81 900	7.17	.60	.75	.89
21.7°C (71°F)	1.70	3500	27.4	93 700	5.92	.42	.53	.63	26.3	89 700	6.34	.42	.53	.64	25.1	85 600	6.75	.42	.54	.65	23.8	81 400	7.15	.43	.55	.67
	2.00	4200	28.4	96 900	6.01	.43	.54	.65	27.1	92 700	6.44	.43	.55	.66	25.9	88 400	6.85	.44	.56	.68	24.6	83 900	7.26	.44	.57	.69
	2.30	4900	29.1	99 300	6.08	.43	.55	.67	27.8	95 000	6.51	.43	.56	.69	26.5	90 500	6.93	.43	.57	.70	25.2	86 000	7.35	.44	.58	.72

CHA16-1603 TOTAL COOLING CAPACITY (With Both Compressors Operating)

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																							
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)			Total Cooling Capacity		Compressor Motor Input	Sensible To Total Ratio (S/T)		
			kW	Btuh		Dry Bulb			kW	Btuh		Dry Bulb			kW	Btuh		Dry Bulb			kW	Btuh		Dry Bulb		
m ³ /s	cfm			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F			24°C/75°F	27°C/80°F	29°C/85°F
17.2°C (63°F)	1.70	3500	36.8	125 800	10.99	.72	.85	.97	34.9	119 200	11.60	.74	.87	1.00	32.9	112 400	12.15	.75	.90	1.00	30.8	105 300	12.64	.77	.93	1.00
	2.00	4200	37.9	129 300	11.13	.74	.88	1.00	35.9	122 500	11.74	.76	.90	1.00	33.7	115 000	12.32	.78	.93	1.00	31.7	108 400	12.82	.80	.96	1.00
	2.30	4900	38.7	132 300	11.24	.76	.91	1.00	36.7	125 200	11.87	.78	.93	1.00	34.6	118 100	12.46	.80	.96	1.00	32.2	110 100	12.94	.82	.99	1.00
19.4°C (67°F)	1.70	3500	39.0	133 200	11.27	.57	.70	.81	37.0	126 400	11.92	.58	.71	.83	35.0	119 400	12.53	.59	.73	.86	32.9	112 200	13.08	.60	.75	.88
	2.00	4200	40.1	136 900	11.41	.58	.71	.84	38.0	129 700	12.08	.59	.73	.86	35.8	122 400	12.70	.60	.75	.89	33.6	114 900	13.25	.62	.77	.92
	2.30	4900	41.0	139 900	11.54	.59	.73	.87	38.8	132 500	12.21	.61	.75	.90	36.6	124 900	12.83	.62	.77	.92	34.4	117 400	13.39	.63	.79	.95
21.7°C (71°F)	1.70	3500	41.1	140 200	11.55	.43	.56	.67	39.0	133 300	12.24	.44	.56	.68	36.9	126 100	12.89	.44	.57	.70	34.9	119 100	13.50	.45	.58	.72
	2.00	4200	42.1	143 900	11.70	.44	.57	.69	40.0	136 700	12.40	.44	.58	.70	37.9	129 400	13.06	.45	.59	.72	35.8	122 100	13.70	.45	.60	.74
	2.30	4900	43.0	146 900	11.82	.44	.58	.71	40.8	139 500	12.53	.45	.59	.72	38.7	132 000	13.22	.46	.60	.74	36.5	124 500	13.86	.47	.62	.76

BLOWER DATA

CHA16-953 BLOWER PERFORMANCE

Air Volume m ³ /s (cfm)	STATIC PRESSURE EXTERNAL TO UNIT — Pa (Inches Water Gauge)									
	50 (.20)	100 (.40)	125 (.50)	175 (.70)	200 (.80)	225 (.90)	250 (1.00)	275 (1.10)	325 (1.30)	375 (1.50)
	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))	Rev/Min (W (HP))
1.25 (2600)	-----	-----	760 604 (0.81)	825 701 (0.94)	860 761 (1.02)	900 821 (1.10)	930 880 (1.18)	965 940 (1.26)	1030 1059 (1.42)	1100 1216 (1.63)
1.30 (2800)	-----	750 642 (0.86)	785 694 (0.93)	855 813 (1.09)	885 865 (1.16)	920 933 (1.25)	950 992 (1.33)	985 1059 (1.42)	1045 1179 (1.58)	1110 1328 (1.78)
1.40 (3000)	-----	785 753 (1.01)	820 806 (1.08)	880 925 (1.24)	915 1000 (1.34)	945 1059 (1.42)	975 1119 (1.50)	1005 1186 (1.59)	1065 1320 (1.77)	1120 1455 (1.95)
1.50 (3200)	750 761 (1.02)	820 880 (1.18)	850 940 (1.26)	915 1082 (1.45)	945 1141 (1.53)	975 1209 (1.62)	1000 1268 (1.70)	1030 1328 (1.78)	1085 1477 (1.98)	1140 1649 (2.21)
*1.60 (*3400)	785 880 (1.18)	855 1029 (1.38)	885 1089 (1.46)	945 1223 (1.64)	975 1291 (1.73)	1000 1358 (1.82)	1030 1440 (1.93)	1060 1514 (2.03)	1110 1641 (2.20)	-----
1.70 (3600)	825 1029 (1.38)	890 1179 (1.58)	920 1253 (1.68)	980 1402 (1.88)	1005 1470 (1.97)	1035 1552 (2.08)	1060 1619 (2.17)	1085 1686 (2.26)	-----	-----
1.80 (3800)	865 1209 (1.62)	920 1350 (1.81)	950 1417 (1.90)	1010 1589 (2.13)	1040 1671 (2.24)	-----	-----	-----	-----	-----

NOTE — All data is measured external to the unit with dry coil and air filters in place. See Page 13 for Accessory Air Resistance data.

*Minimum air volume at 62 Pa (.25 in. w.g.) with electric heat.

Legend — Rev/Min = Blower speed required. W (HP) = Motor output required.

BLOWER DATA

CHA16-1353 BLOWER PERFORMANCE

Air Volume m ³ /s (cfm)	STATIC PRESSURE EXTERNAL TO UNIT — Pa (Inches Water Gauge)																			
	50 (.20)		100 (.40)		125 (.50)		175 (.70)		200 (.80)		225 (.90)		250 (1.00)		275 (1.10)		325 (1.30)		375 (1.50)	
	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)
1.70 (3600)	585	664 (0.89)	655	843 (1.13)	700	933 (1.25)	770	1134 (1.52)	795	1231 (1.65)	820	1343 (1.80)	850	1440 (1.93)	875	1552 (2.08)	935	1798 (2.41)	985	1999 (2.68)
1.80 (3800)	605	746 (1.00)	685	933 (1.25)	720	1022 (1.37)	785	1246 (1.67)	805	1358 (1.82)	830	1147 (1.94)	860	1552 (2.08)	890	1686 (2.26)	940	1902 (2.55)	995	2126 (2.85)
1.90 (4000)	630	850 (1.14)	705	1052 (1.41)	740	1119 (1.50)	795	1350 (1.81)	820	1462 (1.96)	845	1574 (2.11)	875	1686 (2.26)	905	1813 (2.43)	955	1992 (2.67)	1000	2245 (3.01)
2.00 (4200)	650	962 (1.29)	725	1171 (1.57)	755	1268 (1.70)	810	1499 (2.01)	835	1611 (2.16)	865	1723 (2.31)	890	1835 (2.46)	920	1962 (2.63)	970	2186 (2.93)	1005	2350 (3.15)
2.10 (4400)	680	1089 (1.46)	745	1313 (1.76)	780	1425 (1.91)	825	1656 (2.22)	855	1768 (2.37)	880	1872 (2.51)	910	2007 (2.69)	930	2111 (2.83)	980	2342 (3.14)	-----	-----
2.15 (4600)	705	1231 (1.65)	770	1455 (1.95)	795	1574 (2.11)	845	1813 (2.43)	870	1925 (2.58)	900	2052 (2.75)	925	2178 (2.92)	950	2283 (3.06)	995	2484 (3.33)	-----	-----
2.25 (4800)	730	1380 (1.85)	790	1619 (2.17)	810	1738 (2.33)	865	1984 (2.66)	890	2104 (2.82)	920	2231 (2.99)	945	2350 (3.15)	970	2477 (3.32)	-----	-----	-----	-----
2.35 (5000)	755	1544 (2.07)	810	1805 (2.42)	835	1932 (2.59)	885	2171 (2.91)	910	2290 (3.07)	935	2417 (3.24)	960	2544 (3.41)	-----	-----	-----	-----	-----	-----
2.45 (5200)	775	1716 (2.30)	830	2007 (2.69)	855	2119 (2.84)	910	2373 (3.18)	935	2492 (3.34)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

NOTE — All data is measured external to the unit with dry coil and with the air filters in place. See Page 13 for Accessory Air Resistance data.

NOTE — Data in shaded area denotes field furnished drive.

Legend — Rev/Min = Blower speed required. W (HP) = Motor output required.

CHA16-1603 BLOWER PERFORMANCE

Air Volume m ³ /s (cfm)	STATIC PRESSURE EXTERNAL TO UNIT — Pa (Inches Water Gauge)																			
	50 (.20)		100 (.40)		125 (.50)		175 (.70)		200 (.80)		225 (.90)		250 (1.00)		275 (1.10)		325 (1.30)		375 (1.50)	
	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)	Rev/ Min	W (HP)
2.00 (4200)	-----	-----	715	1141 (1.53)	750	1246 (1.67)	810	1425 (1.91)	840	1529 (2.05)	870	1619 (2.17)	900	1723 (2.31)	930	1828 (2.45)	985	2066 (2.77)	1035	2283 (3.06)
2.10 (4400)	-----	-----	740	1276 (1.71)	770	1365 (1.83)	830	1567 (2.10)	860	1671 (2.24)	890	1783 (2.39)	915	1872 (2.51)	945	1992 (2.67)	995	2208 (2.96)	1050	2469 (3.31)
2.15 (4600)	700	1238 (1.66)	765	1358 (1.82)	795	1589 (2.13)	855	1738 (2.33)	880	1828 (2.45)	910	1940 (2.60)	935	2052 (2.75)	960	2156 (2.89)	1015	2395 (3.21)	1065	2656 (3.56)
2.25 (4800)	730	1380 (1.85)	790	1596 (2.14)	820	1693 (2.27)	875	1895 (2.54)	905	2014 (2.70)	930	2120 (2.85)	955	2245 (3.01)	980	2432 (3.26)	1030	2544 (3.41)	1080	2842 (3.81)
2.35 (5000)	755	1537 (2.06)	815	1768 (2.37)	845	1887 (2.53)	900	2089 (2.80)	925	2208 (2.96)	950	2320 (3.11)	975	2439 (3.27)	1000	2544 (3.41)	1050	2798 (3.75)	1095	3029 (4.06)
2.45 (5200)	785	1775 (2.38)	845	1977 (2.65)	870	2089 (2.80)	920	2290 (3.07)	950	2425 (3.25)	975	2551 (3.42)	1000	2656 (3.56)	1025	2798 (3.75)	1070	3029 (4.06)	1115	3275 (4.39)
2.55 (5400)	810	1947 (2.61)	870	2201 (2.95)	895	2290 (3.07)	950	2544 (3.41)	970	2648 (3.55)	995	2760 (3.70)	1020	2887 (3.87)	1045	3051 (4.09)	1090	3267 (4.38)	1135	3536 (4.74)
2.65 (5600)	840	2201 (2.95)	895	2410 (3.23)	920	2529 (3.39)	970	2775 (3.72)	995	2894 (3.88)	1020	3021 (4.05)	1045	3148 (4.22)	1065	3260 (4.37)	1110	3521 (4.72)	1155	3790 (5.08)
2.75 (5800)	865	2425 (3.25)	920	2633 (3.53)	945	2783 (3.73)	995	3021 (4.05)	1020	3171 (4.25)	1045	3297 (4.42)	1065	3409 (4.57)	1090	3551 (4.76)	1130	3790 (5.08)	1175	4073 (5.46)

NOTE — All data is measured external to the unit with dry coil and with the air filters in place. See Page 13 for Accessory Air Resistance data.

NOTE — Data in shaded area denotes field furnished drive.

Legend — Rev/Min = Blower speed required. W (HP) = Motor output required.

ACCESSORY AIR RESISTANCE

Model Number	Air Volume		Total Resistance — Pa (Inches Water Gauge)						
			Wet Evaporator Coil	REMD16M Economizer	EMDH16M Horizontal Economizer	RTD11 Diffuser			FD11 Diffuser
	m ³ /s	cfm				2 Ends Open	1 Side 2 Ends Open	All Ends and Sides Open	
CHA16-953	1.15	2400	30 (0.12)	7 (0.03)	7 (0.03)	52 (0.21)	45 (0.18)	37 (0.15)	34 (0.14)
	1.25	2600	32 (0.13)	10 (0.04)	10 (0.04)	60 (0.24)	52 (0.21)	45 (0.18)	42 (0.17)
	1.30	2800	35 (0.14)	10 (0.04)	10 (0.04)	67 (0.27)	60 (0.24)	52 (0.21)	50 (0.20)
	1.40	3000	40 (0.16)	12 (0.05)	12 (0.05)	80 (0.32)	72 (0.29)	62 (0.25)	62 (0.25)
	1.50	3200	45 (0.18)	12 (0.05)	12 (0.05)	102 (0.41)	92 (0.37)	80 (0.32)	77 (0.31)
	1.60	3400	47 (0.19)	15 (0.06)	15 (0.06)	124 (0.50)	112 (0.45)	97 (0.39)	92 (0.37)
	1.70	3600	52 (0.21)	15 (0.06)	15 (0.06)	152 (0.61)	134 (0.54)	119 (0.48)	109 (0.44)
	1.80	3800	57 (0.23)	17 (0.07)	17 (0.07)	182 (0.73)	157 (0.63)	142 (0.57)	127 (0.51)
CHA16-1353	1.70	3600	30 (0.12)	7 (0.03)	7 (0.03)	90 (0.36)	70 (0.28)	57 (0.23)	37 (0.15)
	1.80	3800	32 (0.13)	10 (0.04)	10 (0.04)	99 (0.40)	80 (0.32)	65 (0.26)	45 (0.18)
	1.90	4000	35 (0.14)	10 (0.04)	10 (0.04)	109 (0.44)	90 (0.36)	72 (0.29)	52 (0.21)
	2.00	4200	37 (0.15)	12 (0.05)	12 (0.05)	122 (0.49)	99 (0.40)	82 (0.33)	60 (0.24)
	2.10	4400	40 (0.16)	12 (0.05)	12 (0.05)	134 (0.54)	109 (0.44)	92 (0.37)	67 (0.27)
	2.15	4600	42 (0.17)	15 (0.06)	15 (0.06)	149 (0.60)	122 (0.49)	104 (0.42)	77 (0.31)
	2.25	4800	45 (0.18)	17 (0.07)	17 (0.07)	162 (0.65)	132 (0.53)	114 (0.46)	87 (0.35)
	2.35	5000	47 (0.19)	22 (0.09)	22 (0.09)	172 (0.69)	144 (0.58)	124 (0.50)	97 (0.39)
CHA16-1603	2.00	4200	25 (0.10)	15 (0.06)	15 (0.06)	55 (0.22)	47 (0.19)	40 (0.16)	25 (0.10)
	2.10	4400	27 (0.11)	17 (0.07)	17 (0.07)	70 (0.28)	60 (0.24)	50 (0.20)	30 (0.12)
	2.15	4600	30 (0.12)	17 (0.07)	17 (0.07)	85 (0.34)	72 (0.29)	60 (0.24)	37 (0.15)
	2.25	4800	32 (0.13)	20 (0.08)	20 (0.08)	99 (0.40)	85 (0.34)	72 (0.29)	47 (0.19)
	2.35	5000	35 (0.14)	20 (0.08)	20 (0.08)	114 (0.46)	97 (0.39)	85 (0.34)	57 (0.23)
	2.45	5200	37 (0.15)	22 (0.09)	22 (0.09)	129 (0.52)	109 (0.44)	97 (0.39)	67 (0.27)
	2.55	5400	40 (0.16)	25 (0.10)	25 (0.10)	144 (0.58)	122 (0.49)	107 (0.43)	77 (0.31)
	2.65	5600	42 (0.17)	30 (0.12)	30 (0.12)	159 (0.64)	134 (0.54)	117 (0.47)	87 (0.35)
2.75	5800	45 (0.18)	32 (0.13)	32 (0.13)	174 (0.70)	147 (0.59)	127 (0.51)	97 (0.39)	

NOTE - Electric heaters have no appreciable air resistance.

CEILING DIFFUSER AIR THROW DATA

Model Number	Air Volume		*Effective Throw Range			
			RTD11 Step-Down		FD11 Flush	
	m ³ /s	cfm	m	feet	m	feet
CHA16-953	1.40	3000	8 — 10	27 — 33	8 — 9	25 — 30
	1.60	3375	9 — 11	30 — 37	9 — 10	28 — 34
	1.75	3750	10 — 12	34 — 41	9 — 11	31 — 38
CHA16-1353	2.10	4400	10 — 13	34 — 42	10 — 12	32 — 40
	2.35	4950	12 — 14	38 — 47	11 — 14	36 — 45
	2.60	5500	13 — 16	43 — 52	12 — 15	40 — 50
CHA16-1603	2.00	4200	12 — 14	39 — 46	12 — 15	40 — 48
	2.35	5000	13 — 15	41 — 50	13 — 16	43 — 52
	2.75	5800	13 — 16	43 — 52	14 — 17	45 — 54

† Throw is the horizontal or vertical distance an air stream travels on leaving the outlet or diffuser before the maximum velocity is reduced to 15 m (50 ft.) per minute. Four sides open.

GUIDE SPECIFICATIONS

Prepared for the guidance of architects, consulting engineers and mechanical contractors.

General — Furnish and install a single package air to air direct expansion mechanical cooling system, complete with automatic controls. The single package unit shall be a standard product of a firm regularly engaged in the manufacture of heating-cooling equipment.

The installed weight shall not be more than kg (lbs.). Entire unit shall have a width of not more than mm (inches), a depth of not more than mm (inches), and an overall height of not more than mm (inches). The equipment shall be shipped completely factory assembled, precharged, piped and wired internally ready for field connections. In addition, manufacturer shall test operate system at the factory before shipment.

Air Distribution — Equipment shall be capable of bottom (down-flo) or side (horizontal) handling of conditioned air. All air distribution ducts shall be fiberglass or galvanized steel insulated with mm (inch) thick kg/m³ (lb./ft.³) density fiberglass or equivalent.

Cooling System — The total cooling capacity shall not be less than kW (Btuh) with an evaporator air volume of m³/s (cfm), an entering wet bulb air temperature of °C (°F), an entering dry bulb air temperature of °C (°F) and a condenser entering temperature of °C (°F). The compressor power input shall not exceed kW at these conditions.

The coils shall be non-ferrous construction with aluminum fins mechanically bonded to durable copper tubes. Coils shall be pressure leak tested. Coil face area shall be not less than m² (ft.²) (evaporator) and m² (ft.²) (condenser).

Multiple compressors shall be resiliently mounted, have overload protection, compressor monitor and crankcase heater. The refrigeration system shall have suction and liquid line service valves with gauge ports, high pressure switches, loss of charge switches, thermometer wells, driers, freeze-stat and full refrigerant charge. Control option available shall consist of low ambient control and timed-off control.

Cabinet — Shall be galvanized steel with a powdered enamel paint finish electrostatically bonded to the metal. Cabinet panels where conditioned air is handled shall be fully insulated to prevent sweating and minimize sound. Openings shall be provided for power connection entry. Evaporator coil condensate drain extended outside cabinet shall be provided. Lifting brackets shall be provided for rigging.

Service Access — All components, wiring and inspection areas shall be completely accessible through removable panels.

Supply Air Blowers — Centrifugal supply air blower shall have permanently lubricated ball bearings and adjustable belt drive. Motor mount base shall permit ease of motor changeover and belt tension adjustment. Blower wheel shall be statically and dynamically balanced. Blower shall be capable of delivering m³/s (cfm) at an external static pressure of Pa (inches water gauge) requiring kW (bhp) and rev/min.

Condenser Fan(s) — Direct drive propeller type condenser fan(s) shall discharge vertically and be direct driven by a W (hp) motor. Fan motor shall be permanently lubricated and inherently protected. Fan(s) shall have a safety guard.

Air Filters — Disposable filters furnished shall have not less than m² (ft.²) of free area.

OPTIONAL ACCESSORIES

Additive Electric Heaters — The total heating capacity output shall be kW (Btuh) at volts power supply.

Electric heaters shall be available for factory or field installation. Heating elements shall be nichrome bare wire exposed directly to the air stream. Time delays shall bring the elements on and off in sequence with a time delay between each element. Limit controls shall provide overload and short circuit protection. Optional fuse block shall be required on electric heaters.

Roof Mounting Frame — Furnish and install a steel roof mounting frame for bottom discharge and return air duct connection. It shall mate to the bottom perimeter of the equipment. When flashed into the roof it shall make a unit mounting curb and provide weatherproof duct connection and entry into the conditioned area. Flashing shall be the responsibility of a roofing contractor.

Economizer Damper Section — Furnish and install complete with recirculated air dampers, outside air dampers, air filters, damper actuator and controls. Low leakage dampers shall ride in nylon bearings. The economizer section shall provide for the introduction of 100% outdoor air for minimum ventilation and free cooling. Integrated economizer cycle shall allow compressors to cycle for dehumidification and additional cooling, as needed, with 100% outdoor air intake. Damper actuator shall be 24 volt, fully modulating spring return. Controls shall include fixed 13° C (55° F) mixed air controller, damper actuator, adjustable minimum position switch and solid-state adjustable outdoor air enthalpy control. Cabinet shall be galvanized steel with a powdered enamel paint finish electrostatically bonded to the metal. Control option shall consist of differential enthalpy control (return air sensor).

Gravity Exhaust Dampers — Optional pressure operated dampers shall be available for field installation in economizer damper section. Neoprene coated fiberglass dampers shall prevent blow-back and outdoor air infiltration during off cycle. Shall be equipped with rain-hoods and bird screen.

Outdoor Air Damper Section — Optional outdoor dampers shall be available to provide outdoor air requirements of up to 25%. Shall be available for manual or automatic operation. Damper section field installs external to the unit. Shall be equipped with filter for extra air filtering and bird screen protection.

Horizontal Supply & Return Air Kit — Optional kit shall provide necessary cabinet parts to field convert unit for side (horizontal) supply and return air duct connections.

Bottom Power Entry Kit — Optional kit shall provide bottom power entry to the unit within the confines of the roof mounting frame.

Ceiling Diffusers — Furnish and install a (flush or stepdown) optional combination ceiling supply and return air diffuser. It shall be capable of not less than m (ft.) radius of effective throw. Supply and return transitions shall be available, for field installation in the roof mounting frame, to provide duct connection to the diffuser.

Remote Status Panel — Shall be available for installation within the conditioned area to observe equipment operation. The panel shall include signal lights for Cool Mode, Heat Mode, Compressor 1, Compressor 2, No Heat and Filter.

Remote Switching Status Panel — Shall be available for installation within the conditioned area to control and observe equipment operation. The panel shall include signal lights for Cool Mode, Heat Mode, Compressor 1, Compressor 2, No Heat and Filter. System selector switch and fan switch shall provide operational mode and blower operation. After hours timer switch shall override night setback controls and provide normal operation for time period set.

Control Systems — Shall provide a selection of thermostats and related controls to automatically operate the mechanical equipment through the heating or cooling and ventilating cycles as required.

DIMENSIONS — inches (mm)

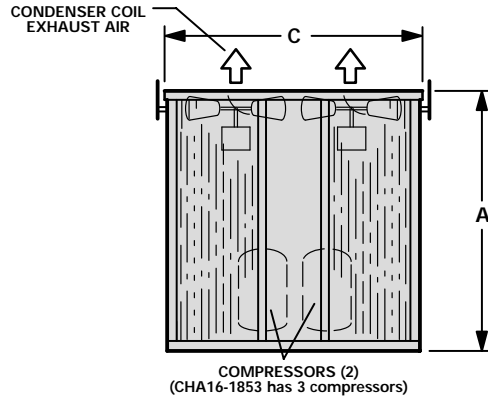
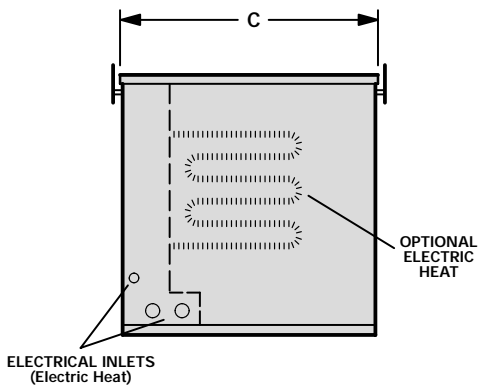
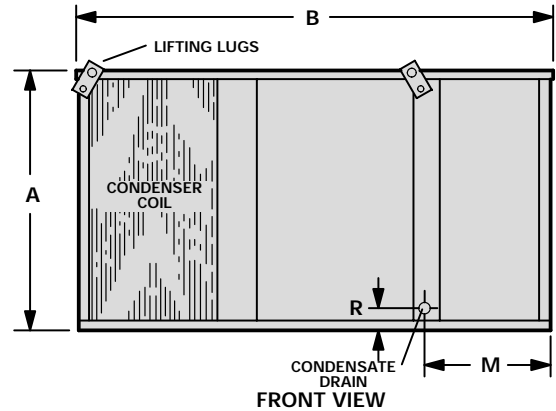
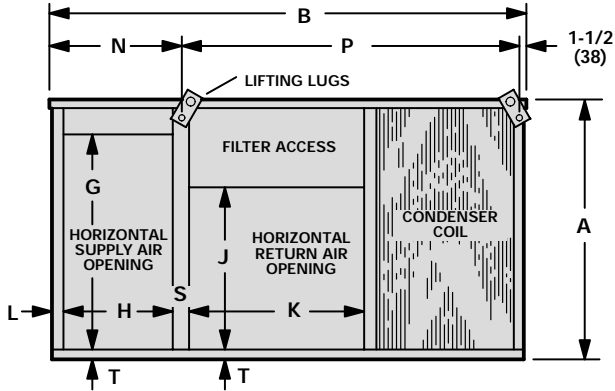
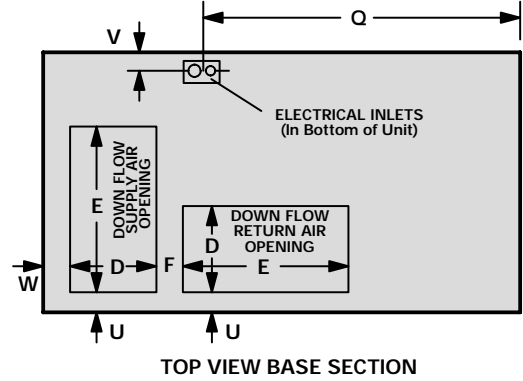
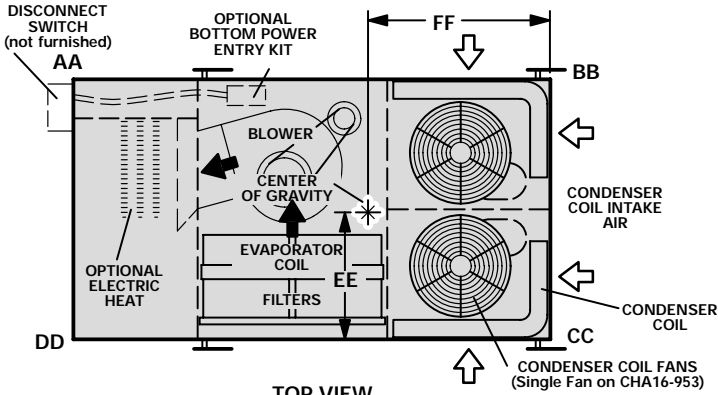
CHA16-953, -1353 AND -1603

CORNER WEIGHTS

Model Number	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
CHA16-953	177	80	284	129	186	84	116	53
CHA16-1353	210	95	346	157	308	140	187	85
CHA16-1603	227	103	399	181	327	148	186	84

CENTER OF GRAVITY

Model Number	EE		FF	
	inch	mm	inch	mm
CHA16-953	29	737	36-1/4	921
CHA16-1353	31	787	35-1/2	902
CHA16-1603	33	838	37	940

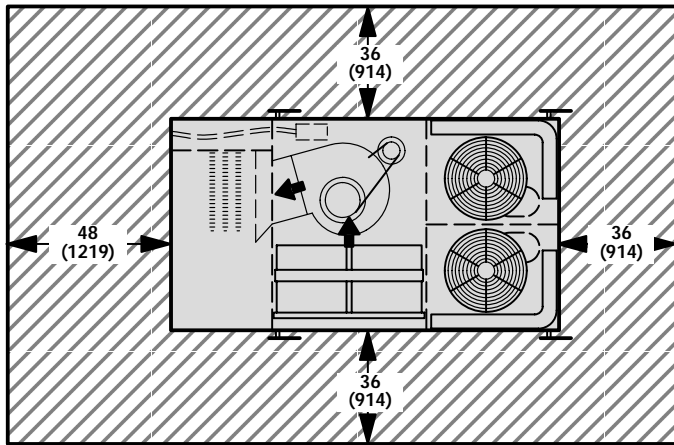


Model Number	A		B		C		D		E		F		G		H		J		K		L	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
CHA16-953	39	991	88-1/2	2248	48	1219	16-1/2	419	30-3/8	772	5-5/8	143	32-1/8	816	19-7/16	494	24-5/8	625	33	838	1-5/8	41
CHA16-1353	46	1168	94	2388	60	1524	24	610	30-3/8	772	4-7/16	113	39-1/8	994	25-1/4	641	31-5/8	803	33	838	2	51
CHA16-1603	46	1168	102	2591	60	1524	24	610	38	965	4-7/16	113	39-1/8	994	25-1/4	641	31-5/8	803	41	1041	2	51

Model Number	M		N		P		Q		R		S		T		U		V		W	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
CHA16-953	25-1/16	637	22-1/8	562	64-7/8	1648	54-1/2	1384	2-3/8	60	2-3/4	70	1-1/2	38	3-1/16	78	4-3/16	106	3-1/16	78
CHA16-1353	31-3/16	792	28-1/2	724	64	1626	54-1/2	1384	2-3/8	60	2-3/4	70	1-1/2	38	3-1/16	78	4-3/16	106	3-1/16	78
CHA16-1603	31-3/16	792	28-1/2	724	72	1829	62-1/2	1588	2-3/8	60	2-3/4	70	1-1/2	38	3-1/16	78	4-3/16	106	3-1/16	78

INSTALLATION CLEARANCES — inches (mm)

CHA16 BASIC UNIT



NOTE — Top Clearance Unobstructed.
NOTE — Entire perimeter of unit requires support when elevated above mounting surface.

ACCESSORY DIMENSIONS — inches (mm)

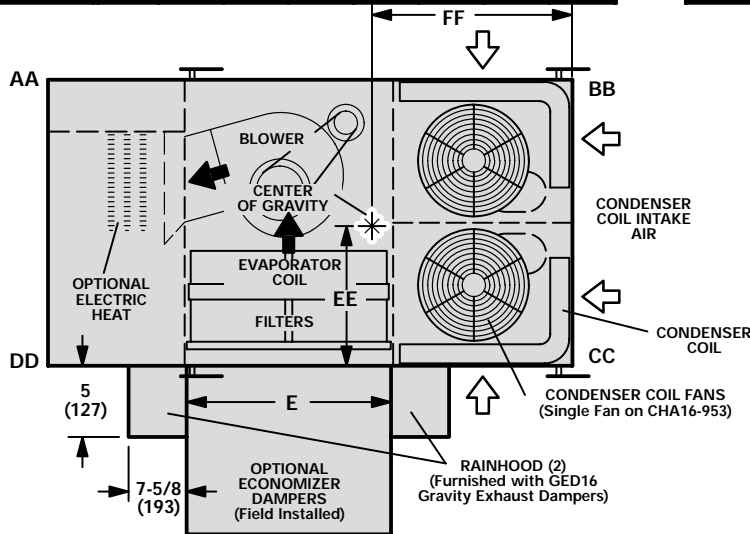
CHA16-953,-1353 AND -1603 UNIT WITH REMD16M ECONOMIZER DAMPER SECTION AND RMF16 ROOF MOUNTING FRAME

CORNER WEIGHTS

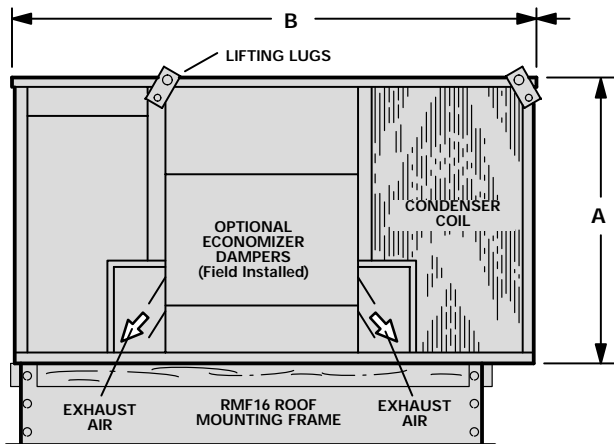
Model Number	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
CHA16-953	189	86	251	114	241	109	181	82
CHA16-1353	222	101	342	155	360	163	233	106
CHA16-1603	229	101	402	182	413	187	235	107

CENTER OF GRAVITY

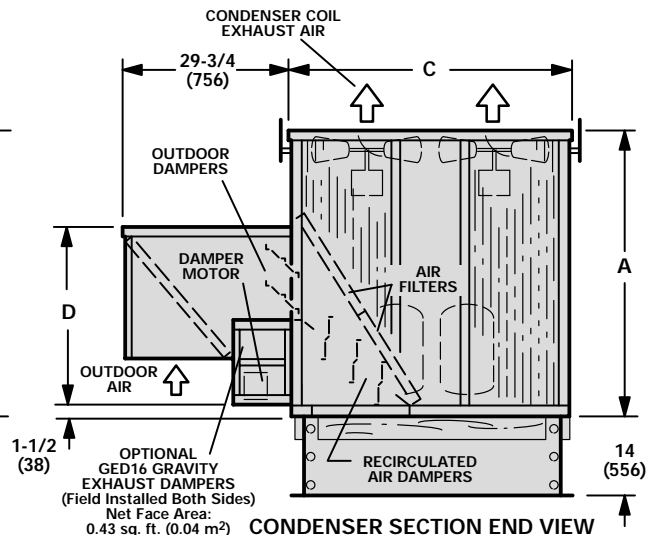
Model Number	EE		FF	
	inch	mm	inch	mm
CHA16-953	24-1/2	622	38	965
CHA16-1353	29-1/4	743	37	940
CHA16-1603	29-5/8	752	37	940



TOP VIEW



BACK VIEW



CONDENSER SECTION END VIEW

Model Number	A		B		C		D		E	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
CHA16-953	39	991	88-1/2	2248	48	1219	28-9/16	725	32-9/16	827
CHA16-1353	46	1168	94	2388	60	1524	34-9/16	878	32-9/16	827
CHA16-1603	46	1168	102	2591	60	1524	34-9/16	878	40-9/16	1030

ACCESSORY DIMENSIONS — inches (mm)

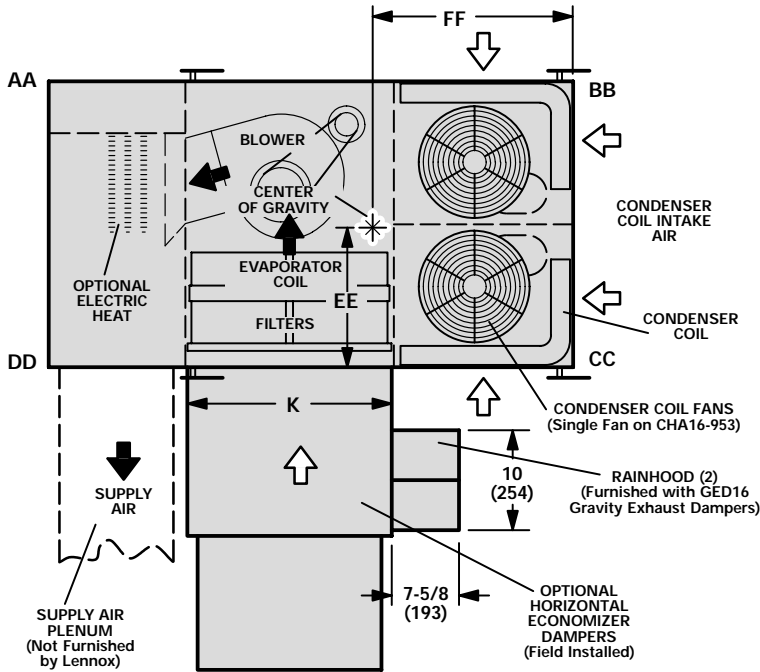
CHA16-953 -1353 AND -1603 UNITS WITH EMDH16 HORIZONTAL ECONOMIZER DAMPER SECTION

CORNER WEIGHTS

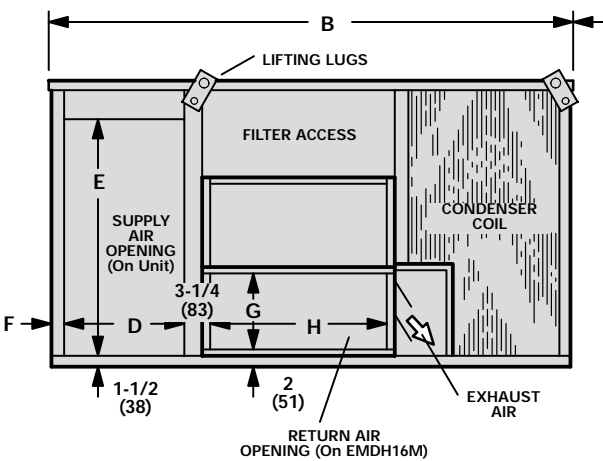
Model Number	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
CHA16-953	189	86	251	114	241	109	181	82
CHA16-1353	222	101	342	155	360	163	233	106
CHA16-1603	223	101	392	178	428	194	244	111

CENTER OF GRAVITY

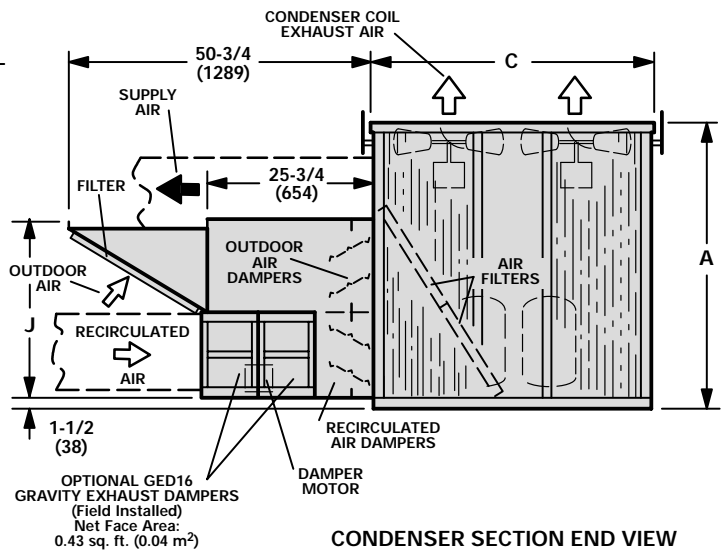
Model Number	EE		FF	
	inch	mm	inch	mm
CHA16-953	24-1/2	622	38	965
CHA16-1353	29-1/4	743	37	940
CHA16-1603	28-5/8	727	37	940



TOP VIEW



BACK VIEW



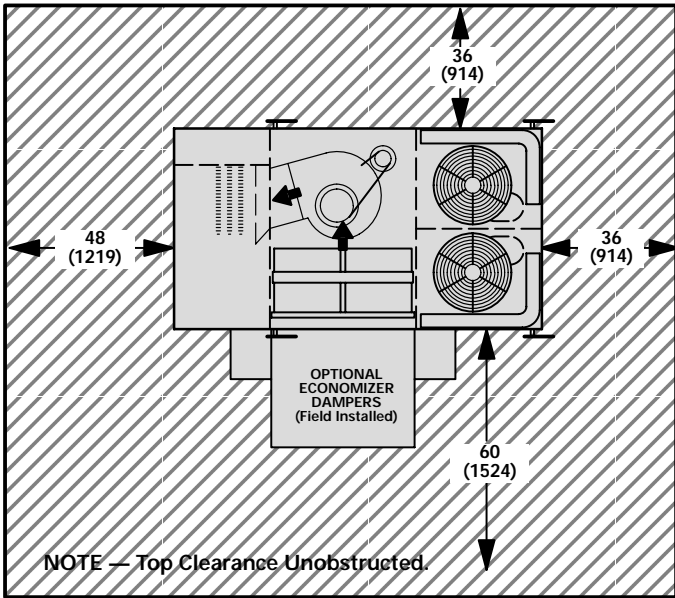
CONDENSER SECTION END VIEW

Model Number	A		B		C		D		E	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
CHA16-953	39	991	88-1/2	2248	48	1219	19-7/16	494	32-1/8	816
CHA16-1353	46	1168	94	2388	60	1524	25-1/4	641	39-1/8	994
CHA16-1603	46	1168	102	2591	60	1524	25-1/4	641	39-1/8	994

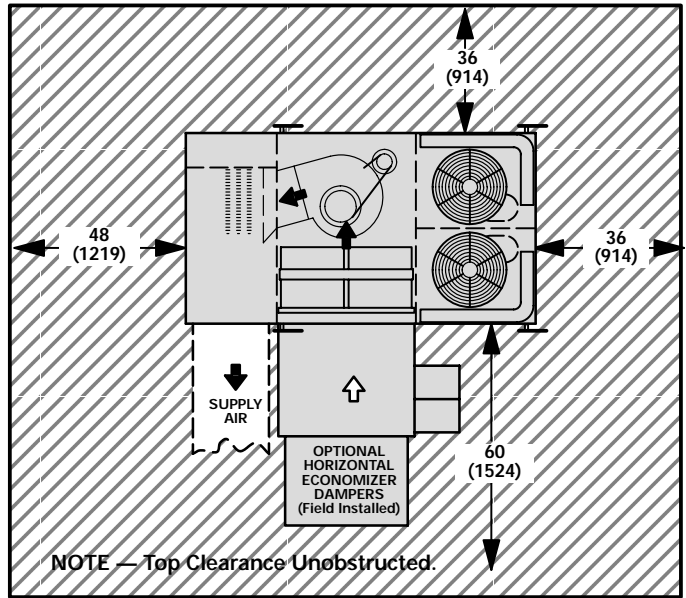
Model Number	F		G		H		J		K	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
CHA16-953	1-5/8	41	13-1/4	337	31-1/2	800	28-3/4	730	32-9/16	827
CHA16-1353	2	51	19-1/4	489	31-1/2	800	34-3/4	883	32-9/16	827
CHA16-1603	2	51	19-1/4	489	39-1/2	1003	34-3/4	883	40-9/16	1030

INSTALLATION CLEARANCES — inches (mm)

CHA16 UNIT WITH REMD16M ECONOMIZER DAMPER SECTION

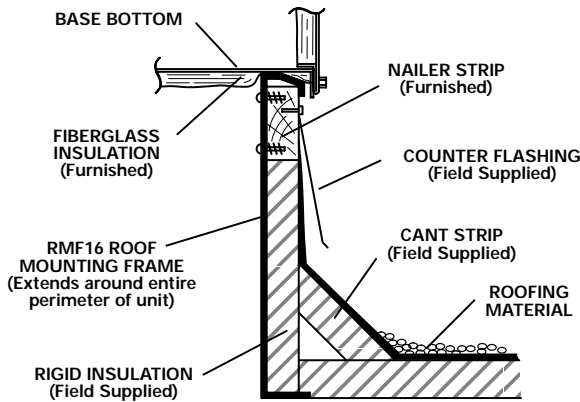


CHA16 UNIT WITH EMDH16M HORIZONTAL ECONOMIZER DAMPER SECTION



OPTIONAL ACCESSORY DIMENSIONS — inches (mm)

TYPICAL FLASHING DETAIL FOR RMF16 ROOF MOUNTING FRAME



ROOF MOUNTING FRAME SPECIFICATIONS

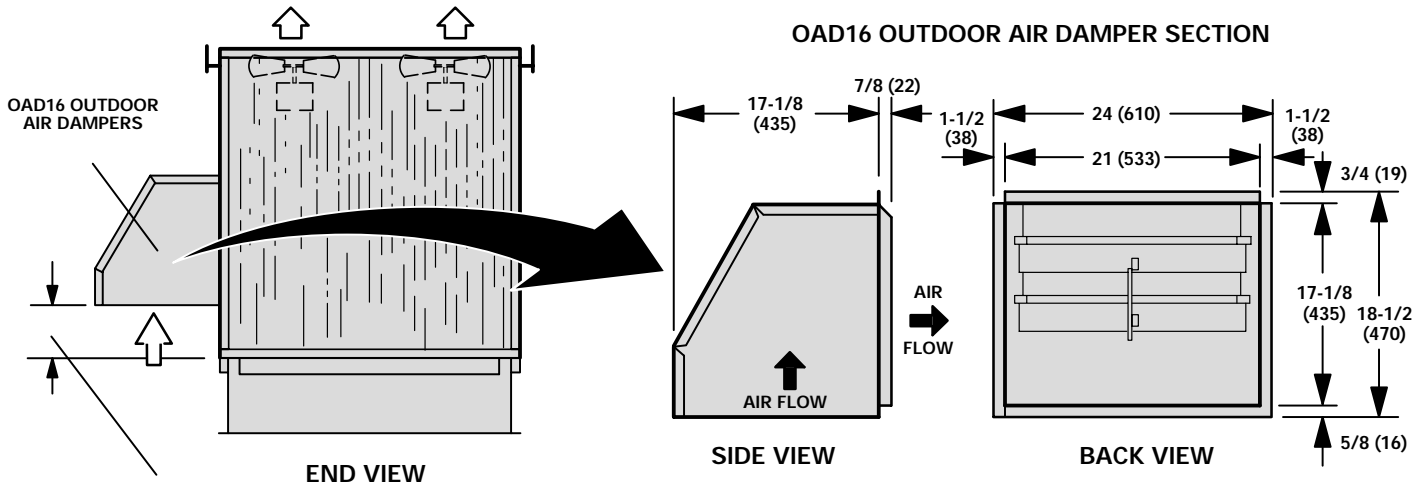
Roof Mounting frame is rigid enough to be spanned over its entire length or cantilevered if supported on both sides of center of gravity.

Roof Mounting Frame	RMF16
*Moment of inertia (I) (inch ⁴) (mm ⁴)	42 (1.75 x 10 ⁷)
*Section modulus $\frac{I}{C}$ (inch ³) (mm ³)	5.8 (9.5 x 10 ³)
Weight (lb./ft.) (kg/m) of length	5.5 (8.2)
Design strength (psi) (mPa)	20 000 (138)

*Includes both sides of frame.

CHA16 UNIT WITH OAD16 OUTDOOR AIR DAMPER SECTION DOWN-FLO SUPPLY AND RETURN AIR

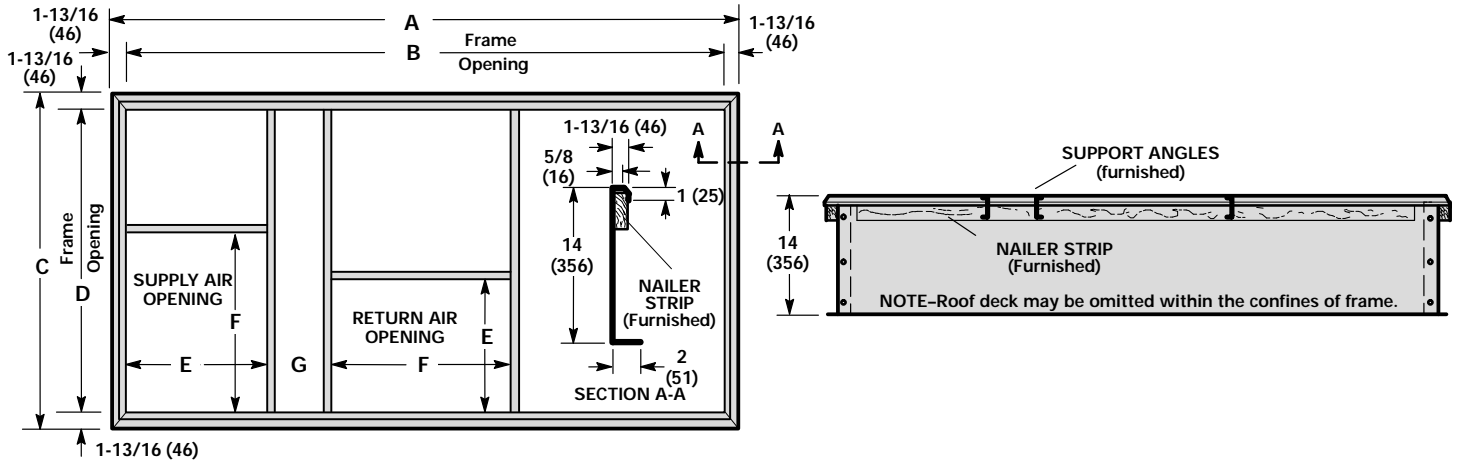
NOTE — For Horizontal (Side) Supply And Return Air OAD16 Field Installs on Return Air Duct



8-5/16 (211) — CHA16-953
15-15/16 (405) — CHA16-1353 AND -1603

OPTIONAL ACCESSORY DIMENSIONS — inches (mm)

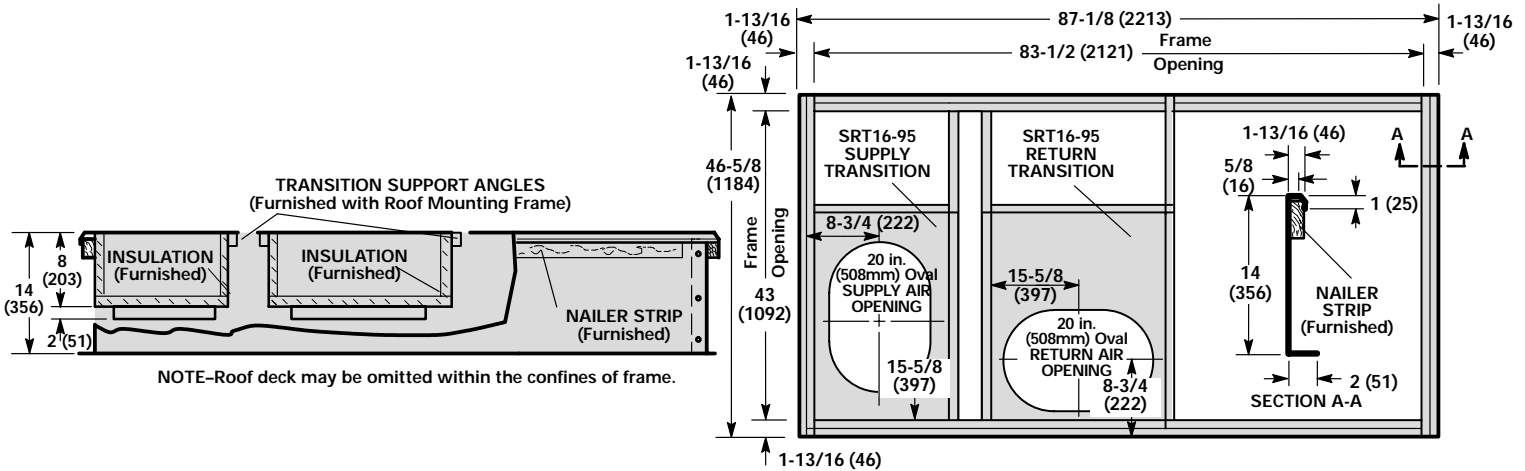
RMF16 SERIES ROOF MOUNTING FRAME WITH DOUBLE DUCT OPENING



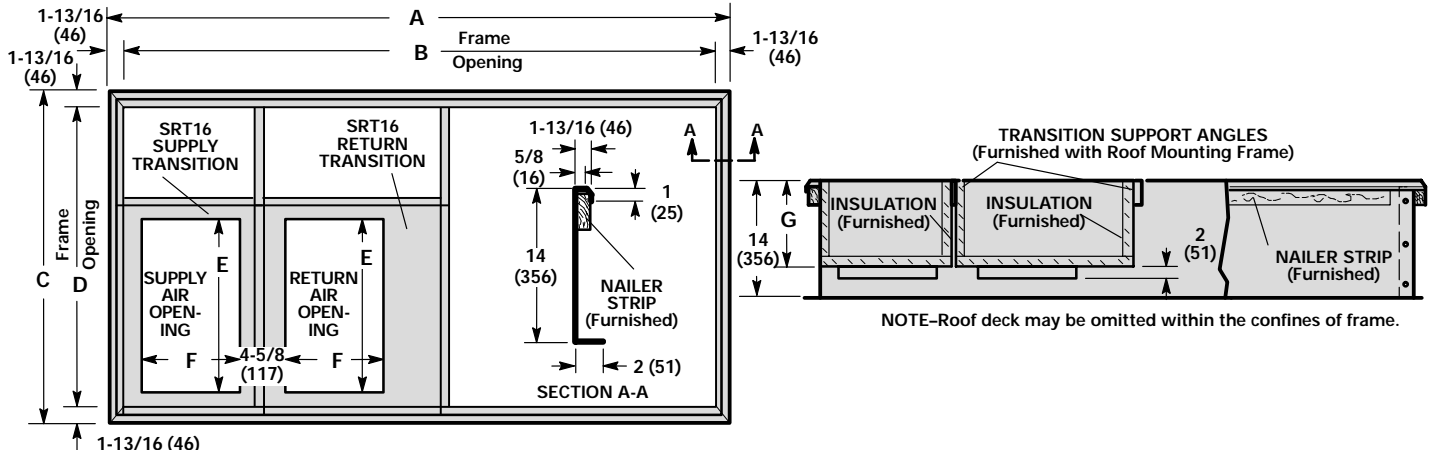
Model Number	A		B		C		D		E		F		G	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
RMF16-95	87-1/8	2213	83-1/2	2121	46-5/8	1184	43	1092	17-15/16	456	31-1/2	800	4	102
RMF16-135/160	92-1/2	2350	88-7/8	2257	58-1/2	1486	54-7/8	1394	25-1/4	641	*	*	3-3/16	81

*31-1/2 inches (800 mm) for CHA16-1353 Units. 39-1/2 inches (1003 mm) for CHA16-1603 Units.

RMF16-95 ROOF MOUNTING FRAMES WITH SRT16 SUPPLY AND RETURN AIR TRANSITIONS FOR FD11-95 AND RTD11-95 CEILING DIFFUSERS



RMF16-135/160 ROOF MOUNTING FRAMES WITH SRT16 SUPPLY AND RETURN AIR TRANSITIONS FOR FD11 AND RTD11 CEILING DIFFUSERS

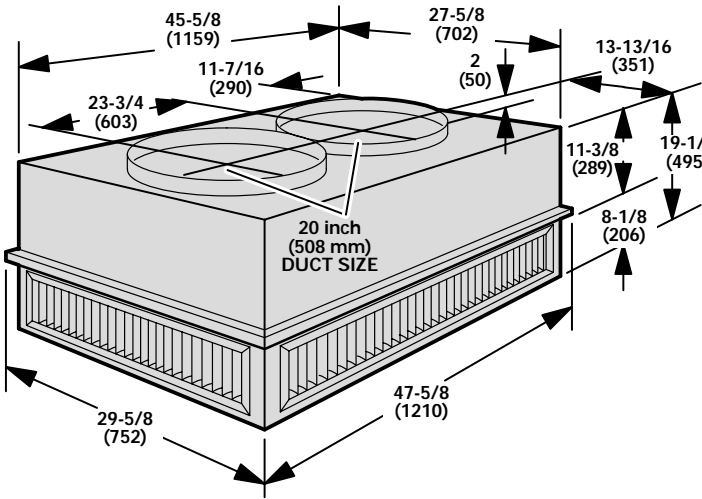


Model Number	A		B		C		D		E		F		G	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
RMF16-135/160	92-1/2	2346	88-7/8	2257	58-1/2	1486	54-7/8	1394	*	*	18	457	8	203

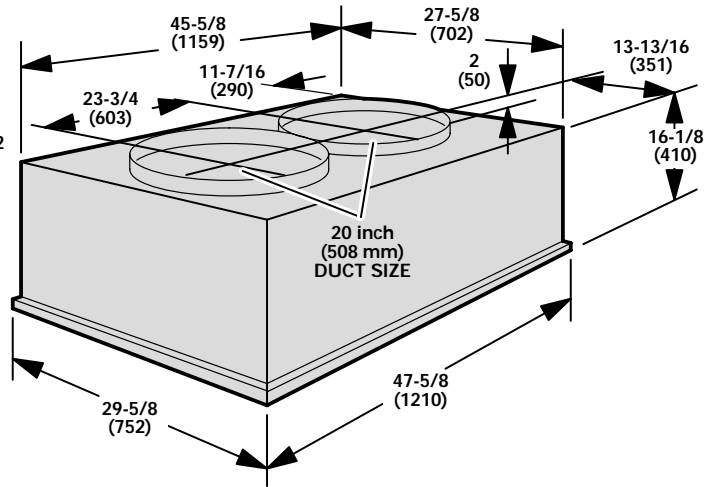
*28 inches (711 mm) for SRT16-135 Transition. 36 inches (914 mm) for SRT16-160 Transition.

COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

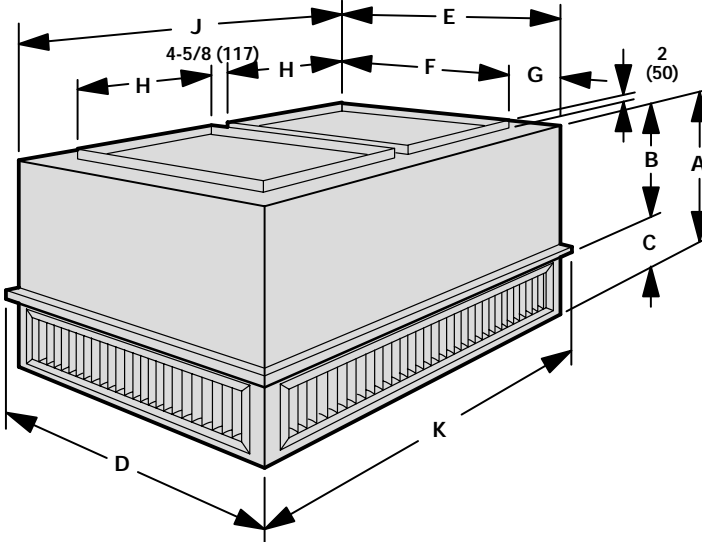
RTD11-95 STEP-DOWN CEILING DIFFUSER



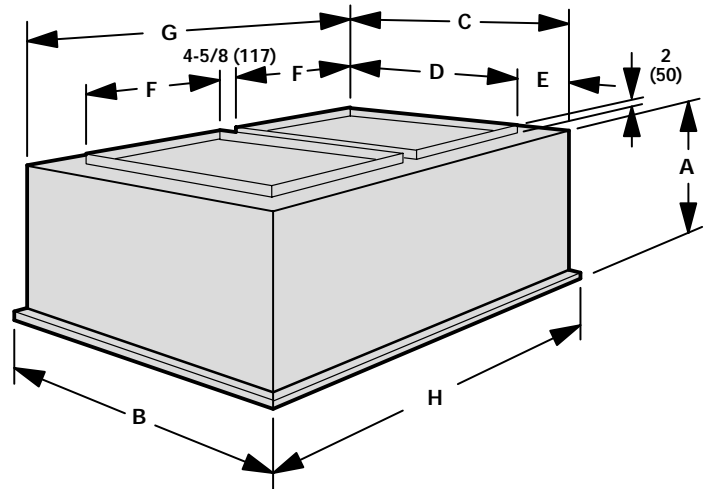
FD11-95 FLUSH CEILING DIFFUSER



**RTD11-135 AND RTD11-185
STEP-DOWN CEILING DIFFUSER**



**FD11-135 AND FD11-185
FLUSH CEILING DIFFUSER**



Model Number	A		B		C		D		E	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
RTD11-135	28	711	18-7/8	479	9-1/8	232	35-5/8	905	33-5/8	854
RTD11-185	34	864	23-7/8	606	10-1/8	257	47-5/8	1210	45-5/8	1159

Model Number	A		B		C		D	
	inch	mm	inch	mm	inch	mm	inch	mm
FD11-135	24-1/8	613	35-5/8	905	33-5/8	854	28	711
FD11-185	30-1/8	613	47-5/8	1210	45-5/8	1159	36	914

Model Number	F		G		H		J		K	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
RTD11-135	28	711	2-13/16	71	18	457	45-5/8	1159	47-5/8	1210
RTD11-185	36	914	4-13/16	122	18	457	45-5/8	1159	47-5/8	1210

Model Number	E		F		G		H	
	inch	mm	inch	mm	inch	mm	inch	mm
FD11-135	2-13/16	71	18	457	45-5/8	1159	47-5/8	1210
FD11-185	4-13/16	122	18	457	45-5/8	1159	47-5/8	1210