

GCS16-090-120 PACKAGED UNITS COOLING & GAS HEAT

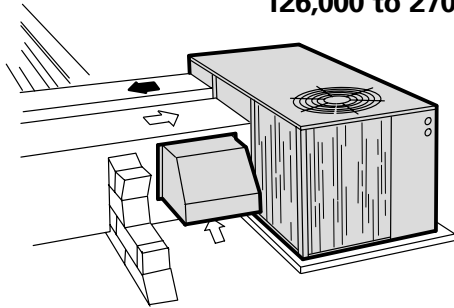
GCS16

(7.5 & 10 Ton)
(26.4 & 35.2 kW)

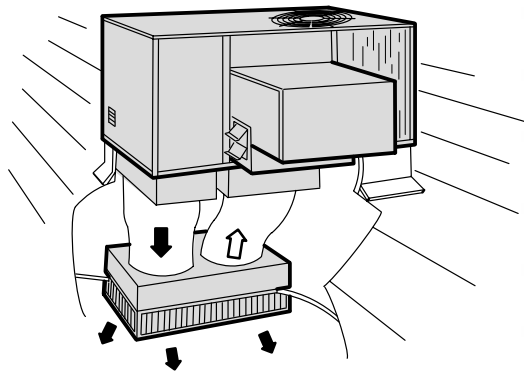
*88,000 to 119,000 Btuh (25.8 to 34.9 kW) Cooling Capacity
126,000 to 270,000 Btuh (36.9 to 79.1 kW) Input Heating Capacity

Bulletin No. 210094
August 1997
Supersedes August 1995

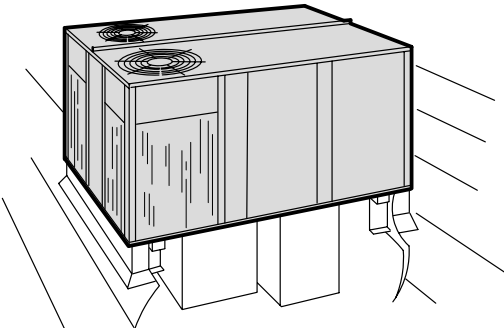
*ARI Standard Ratings



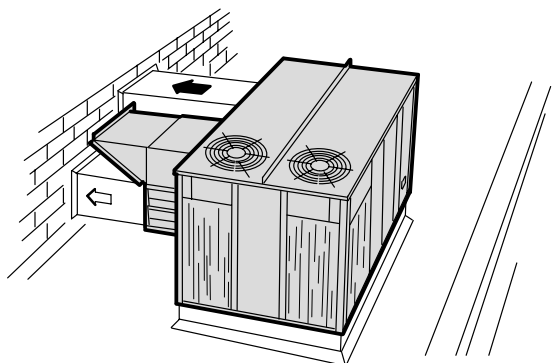
Horizontal (Side) Supply and Return Air Installation with OAD16 Outdoor Air Dampers.



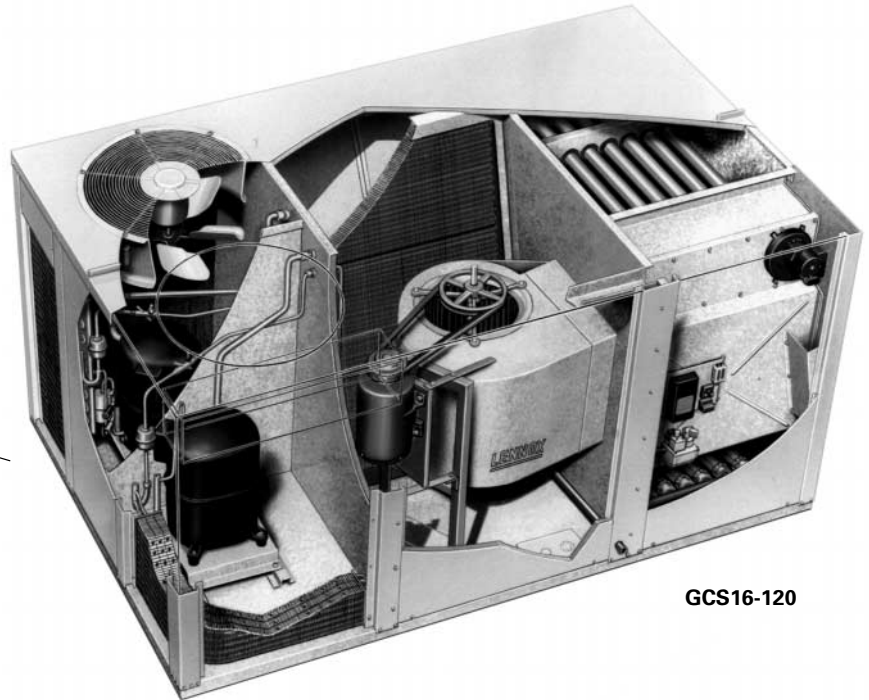
Down-Flow Supply and Return Air Installation With RMF16 Roof Mounting Frame, REMD16M Economizer and RTD11 Ceiling Diffuser.



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



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



GCS16-120



Tubular Heat Exchanger, Inshot Gas Burners, Induced Draft Blower and Gas Train.



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FEATURES

Application □ Lennox GCS16 series all season DX cooling and gas fired heating units are designed for bottom (down-flow) 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-flow 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 with a choice of thermostats and related controls. A factory installed commercial controls platform is furnished standard. Units are shipped factory assembled, piped and wired. Each unit is factory test operated insuring unit dependability.

Approvals □ The design of the units with the Lennox roof mounting frame is A.G.A./C.G.A. certified as combination heating-cooling units for outdoor installation. Models have been rated in accordance with standards included in ARI Standard 210/240-94. Units have been sound tested in accordance with test conditions included in ARI Standard 270-95. Units and components within are bonded for grounding to meet safety standards for servicing required by U.L., National Electrical Codes, C.G.A. and Canadian Electrical Codes.

Equipment Warranty □ Heat exchanger has a limited warranty for a full ten years. Compressors have a limited warranty for a full five years. All other components have a limited warranty for one year. Refer to Lennox Equipment Limited Warranty included with unit for details.

Cabinet □ 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.

Tubular Heat Exchanger □ Tubular heat exchanger is constructed of aluminized steel for superior resistance to corrosion and oxidation. Curving design allows complete exposure of heating surfaces to supply air stream. Round surfaces create minimum air resistance and allows air to wipe all surfaces for excellent heat transfer. Internal baffles prolong flue gas passage resulting in maximum heat transfer. Compact design reduces space requirement in unit cabinet. Removable cabinet panels allow service access. Heat exchanger has been laboratory life cycle tested.

Heating System □ Aluminized steel inshot burners provide efficient, trouble free operation and are unaffected by adverse wind or atmospheric conditions. Burner Venturi mixes air and gas in correct proportion for proper combustion. Burners can be removed individually for service. Equipped with direct spark ignition. Spark is intermittent and occurs only when required. Electronic flame sensor controls assure safe and reliable operation. Should loss of flame occur, flame sensor controls will initiate 3 to 5 attempts at re-ignition before locking out unit operation. Redundant automatic dual gas valve has manual shut-off, pressure regulation and provides two stage operation. Induced draft blower prepurges heat exchanger and safely vents flue products. Centrifugal switch proves blower operation before allowing gas valve to open. Induced draft blower only operates during heating cycle. Flame rollout switch protects against loss of combustion air due to flue vent or intake air blockage. Peep hole with cover is furnished in cabinet access panel for flame viewing.

Fan and Limit Controls □ Factory installed and accurately located. Fan time delay allows blower operation to continue approximately 90 seconds after burner shut-off. Dual limit controls (primary and secondary) have fixed temperature setting and protect heating system from abnormal operating conditions.

Refrigeration System □ Factory sealed refrigerant system consists of multiple compressors, condenser coil and direct drive fan(s), evaporator coil and belt drive blower, expansion valves, high capacity drivers, thermometer wells, high pressure switches, loss of charge switches and full operating charge of refrigerant. Factory installed freezestat 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 separate expansion valve, compressor and refrigerant charge.

Compressors □ Rugged and reliable compressors are hermetically sealed, suction cooled and overload protected. Units have internal pressure relief valve. Compressors are internally protected from excessive current and temperature. Crankcase heaters are furnished on all compressors. GCS16-090 and -120 have two compressors. Compressor monitor (non-adjustable) prevents compressor operation when outdoor temperature is below 40°F (4°C). In addition, the compressors are installed on resilient rubber mounts in the unit, assuring quiet and vibration free operation.

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. See specifications table for motors and drives available.

Condenser Fan(s) □ GCS16-090 models are equipped with a single fan. GCS16-120 has two. Direct drive fan(s) draw large air volumes uniformly through condenser coil 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 PVC coated steel wire fan guard(s) are furnished.

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

OPTIONAL ACCESSORIES Must Be Ordered Extra

Low Ambient Control Kit (Optional) □ System will operate satisfactorily down to 45°F (7.2°C) 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 30°F (-1°C). See Optional Accessories tables.

Timed-Off Control (Optional) □ Timed-off control available for field installation. Prevents compressor short-cycling. Automatic reset control will shut the compressor off and hold it off for 5 minutes. Kit (40G20) includes two LB-50709BA controls.

❖ **Cold Weather Kit (Optional)** □ Electric heater (65C03) is available to automatically control the minimum temperature in the gas burner compartment. Heater is C.G.A. certified to allow cold weather operation of unit down to -60°F (-50°C) when outdoor temperature is below 40°F (4°C).

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 U.S. National Roofing Contractors Association.

OPTIONAL ACCESSORIES (Must Be Ordered Extra)

REMD16M Down-Flow Economizer Dampers (Optional) □ Economizer consists of: mechanically linked recirculated air dampers and outdoor air dampers, damper motor and controls. Economizer cabinet field installs on the unit cabinet. Economizers are shipped factory wired and only require plug-in connection. 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. 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 amount of mechanical cooling necessary. Two cleanable polyurethane media frame filters are furnished for extra air filtering and bird screen protection. 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 paint 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 damper 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 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.

GED16 Gravity Exhaust Dampers (Optional) □ Optional for use with REMD16M and EMDH16M-95 & -135 economizer damper sections. 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. Neoprene coated fiberglass dampers prevent blow-back and outdoor air infiltration during off cycle. Bird screen is provided.

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.

OAD16 Outdoor Air Damper Section (Optional) □ Damper section with factory installed and linked dampers field installs external to the unit cabinet. Interchangeable unit cabinet panel with opening for installation is furnished with damper for down-flow air applications. Two-piece cabinet 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.

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. See Optional Accessories tables.

LPG/Propane Conversion Kits (Optional) □ LPG/Propane models, a field conversion kit is required for changeover from natural gas. See Optional Accessories tables.

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 6 x 8 x 10 in. (152 x 203 x 254 mm), 78 inch (2.0 m) 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. See basic unit dimension drawing.

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. 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. 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. See Optional Accessories tables.

- SRT16-95 used with the RMF16-95 with GCS16-090.
- SRT16-135 used with the RMF16-135/160 with GCS16-120.

OPTIONAL TEMPERATURE CONTROL SYSTEMS

Electro-Mechanical Thermostat and Control 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. 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. ☼ For applications with economizer, a Nite Relay (**20G52**) is required. Two time clocks are available for the system. Automatic 7 day time clock programs a weekly schedule. Any day or days can be omitted. 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 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. See Price Book for time clock selection and catalog numbers. Also available is a Warm Up Kit (**39G77**) which holds the economizer outdoor air dampers closed during nite heat operation and morning warm up. See Flowchart on Page 6.

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 a switching subbase (**58C93**) with system selector switch (Heat-Auto-Cool-Off) and fan switch (Auto-On). ☼ For applications with economizer, a Nite Relay (**20G52**) is required. 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 programs a weekly schedule. Any day or days can be omitted. 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. 24 hour nite setback time clock 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. See Price Book for time clock selection and catalog numbers. Also available is a Warm Up Kit (**39G77**) which holds economizer outdoor air dampers closed during nite heat operation and warm up. See Flowchart on page 6.

T7300 Thermostat and Control System (Optional) □ Programmable thermostat (**81G59**) has internal or optional remote temperature sensing, touch sensitive keyboard, automatic switching from heat to cool, °F or °C temperature readout, no anticipator, droop/no droop selection, indicator LEDs, hour/day programming, override capabilities, time readout, stage status indicators, operational mode readout and battery back-up. Switching subbase (**81G60**) has selectable output staging up to two heat and two cool, manual system switch (Heat-Off-Auto-Cool), fan switch (Auto-On) and two status LEDs for monitoring various equipment operation. Subbase 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 with 3-hour override and setpoint adjustment (**86G67**) 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 Flowchart on page 7.

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 (**36G62** °F / **36G63** °C) with integral sensor that installs in the conditioned space or a remote thermostat (**36G64** °F / **36G65** °C) 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 Flowchart on page 7.

☼ **T8600 and T8621 Electronic Thermostat Control Systems (Optional)** - All thermostats feature built-in time delays, system switch (Heat-Off-Cool-Auto), fan switch (Auto-On) for continuous or intermittent blower operation, touch sensitive key-board and LCD display with time, day, status and temperature readout in °F or °C. T8600 thermostats have a wiring wallplate and 5-1-1 day programming for weekdays and Saturday/Sunday schedules. T8621 thermostats have a switching subbase and full independent 7 day programming. Both thermostats have four different time and temperature settings per day. T8600 has two LEDs to indicate Energy Savings (Setback) and System On. T8621 has one LED to indicate System On. Both thermostats have instant override capabilities for skipping current program, running previous program, temporarily raising or lowering for current program or overriding program indefinitely. Three AAA alkaline batteries protect programs in case of power failure. See below for catalog numbers and descriptions.

Model No.	Catalog No.	Description
T8600C1055	71E91	Man. Change 1 htg./1 clg. 5-1-1 day
T8600D1079	27H31	Auto Change 1 htg./1 clg. 5-1-1 day
T8621A7010	75E25	Auto Change 1 htg./1 clg. 7 day
T8621D7014	75E27	Auto Change 2 htg./2 clg. 7 day

SP11 Remote Status Panel (**12F83**) is available for checking unit operation from within the conditioned area. Also available is a Warm Up Kit (**39G77**) which holds the economizer outdoor air dampers closed during nite heat operation and morning warm up. See Flow Chart on page 6.

SP11 Remote Status Panel (Optional) The operation of the unit can be checked on the Remote Status Panel (**12F83**) 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 cooling operation. Heat Mode light is green and reflects heating operation. Compressor 1 light is green when operating and will turn red if there is an operational malfunction. Compressor 2 light is not required and should be disregarded. The No Heat and Filter lights will show red and indicate a requirement for service. Additional controls are required for use with the Status Panel must be specified when ordering. Filter Switch Kit (**97C85**) is used with the Filter light. Status Panel Readout Relay Kit (**14F92**) is required to interface status panel with unit operation.

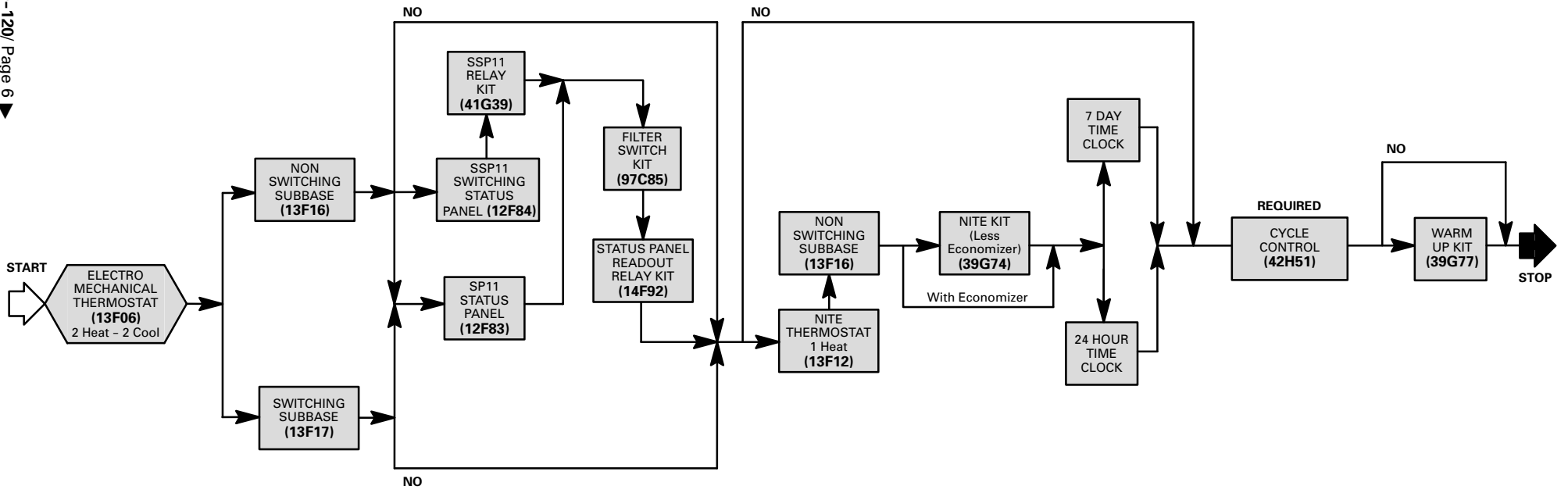
SSP11 Remote Switching Status Panel (Optional) □ The operation of the unit can be controlled and observed on the Switching Status Panel (**12F84**) conveniently located within the conditioned area. Signal lights on the panel indicate Cool Mode, Heat Mode, Compressor 1, Compressor 2, No Heat and Filter. 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 light is green when operating and will turn red if there is an operational malfunction. Compressor 2 light is not required and should be disregarded. 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 (**14F92**) is required to interface status panel with unit operation.

OPTIONAL DDC TEMPERATURE CONTROL SYSTEMS (Field Installed)

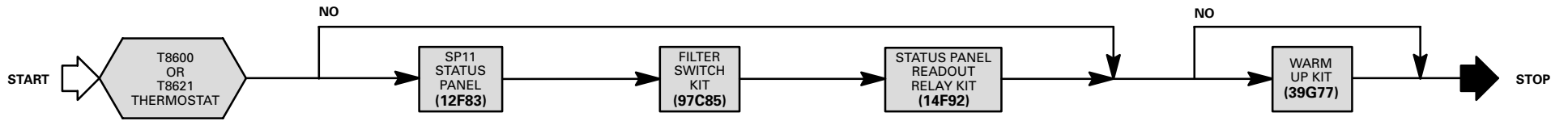
System and Component Description	Field Installed Catalog No.
CPC 810-3060 KIT	□
Control Module/Blower Proving Switch/Return Air Sensor/Discharge Air Sensor/Wiring Harness □ Network communications (RS-485, shielded pair twisted wire), 8 analog/digital inputs, 8 form-C relay outputs, 2 analog outputs, 24 VAC, output connections (2 stage heat/2 stage cool, 2 auxiliary outputs (user defined), economizer, fan), input connections (space temperature, discharge and return air temperature, 2 compressor monitoring, 2 aux inputs (user defined), local override (1 to 240 minutes), Blower Proving Switch monitors blower operation and locks out unit in case of blower failure, Return Air Sensor provides input to module to determine heating or cooling operation and number of stages required, Discharge Air Sensor monitors leaving air temperature during unit operation	61J81
Sensor □ Room temperature	48J43
Dirty Filter Switch □ Senses static pressure increase indicating a dirty filter condition	33K00
JOHNSON UNT KIT	□
Control Module/Blower Proving Switch/Return Air Sensor/Discharge Air Sensor/Wiring Harness □ Stand alone control of all heating, cooling and economizer functions, various operation modes (including: occupied, unoccupied, warm-up, standby), network communications, 6 analog inputs, 4 binary inputs, momentary override, advanced unit diagnostics, indoor air quality control, outdoor air temperature and humidity monitoring, alarm monitoring of: sensors, airflow, economizer, dirty filter, heating /cooling operation, cooling limit. Blower Proving Switch monitors blower operation and locks out unit in case of blower failure. Control module may be used in multi-zone applications (i.e. L-Zone).	79K86
TE-6400 Zone Sensor □ Room temperature, terminal block style wiring, quick-mount design, latching door mechanism, warmer/cooler setpoint adjustment, optional override button, nickel sensors, options for choosing mounting, plug-in phone style jack connection for handheld commissioning tool	42N44
Zone Commissioning Tool □ Handheld interface tool, monitor and adjust 36 analog and binary points, password protected, carrying case	60K37
Dirty Filter Switch □ Senses static pressure increase indicating a dirty filter condition	33K00
JOHNSON FACILITATOR KIT	□
Control Module/Blower Proving Switch/Return Air Sensor/Discharge Air Sensor/Wiring Harness □ Stand alone control of all heating, cooling and economizer functions, various operation modes (including: occupied, unoccupied, warm-up, standby), network communications, 6 analog inputs, 4 binary inputs, momentary override, advanced unit diagnostics, indoor air quality control, outdoor air temperature and humidity monitoring, alarm monitoring of: sensors, airflow, economizer, dirty filter, heating /cooling operation, cooling limit. Blower Proving Switch monitors blower operation and locks out unit in case of blower failure. Control module for use in single zone applications.	86K63
TE-6400 Zone Sensor □ Room temperature, terminal block style wiring, quick-mount design, latching door mechanism, warmer/cooler setpoint adjustment, optional override button, nickel sensors, options for choosing mounting, plug-in phone style jack connection for handheld commissioning tool	42N44
Dirty Filter Switch □ Senses static pressure increase indicating a dirty filter condition	33K00
NOVAR ETM-2050 KIT	□
Electronic Thermostat Module (ETM)/Blower Proving Switch/Return Air Sensor/Discharge Air Sensor/Wiring Harness □ Module monitors unit operation from different sensors installed in unit, has outputs for 2 stage heat/2 stage cool, automatic or continuous blower operation, economizer damper operation and night setback, features: day/occupied mode with low enthalpy (outdoor air damper open), high enthalpy (outdoor air damper closed) or night/unoccupied mode (outdoor air damper closed), network communication (RS-485, shielded pair twisted wire), local override (1 to 255 minutes), watchdog function, failsafe operation, ETM allows units to be daisy chained together (up to 31 units) to be operated from one central location with an executive type control processor (onsite or offsite), built-in time delays, built-in unit operating defaults, diagnostic LEDs indicate various operating functions, surge suppression protects ETM against lightning or voltage spikes, Blower Proving Switch monitors blower operation and locks out unit in case of blower failure, Return Air Sensor provides input to ETM module to determine heating or cooling operation and number of stages required, Discharge Air Sensor monitors leaving air temperature during unit operation	10J38
Dirty Filter Switch □ Senses static pressure increase indicating a dirty filter condition	33K00
Room Temperature Sensor □ Provides input to ETM module to determine heating or cooling operation and number of stages required (ordered separately)	97H53
Night Setback Override Switch □ Allows momentary override of night setback during unoccupied mode	Field Furnished
NOVAR CUSTOM CONTROLLER KIT	□
Control Module/Blower Proving Switch/Discharge Air Sensor/Room Air Sensor/Wiring Harness □ User definable comfort setpoint, on/off and time of day control, cycle II ventilation control	91K90
Dirty Filter Switch □ Senses static pressure increase indicating a dirty filter condition	33K00

TEMPERATURE CONTROL SELECTION FLOWCHARTS

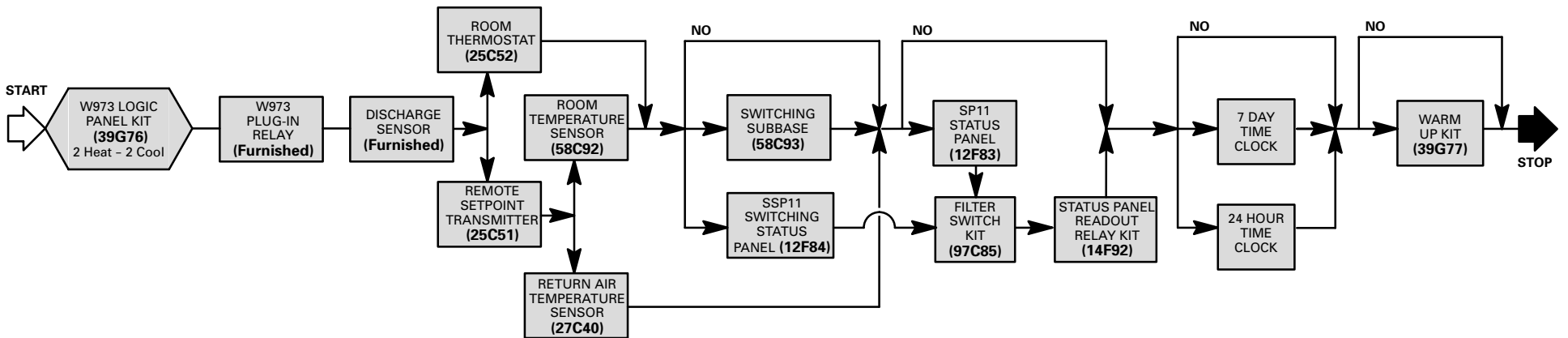
OPTIONAL ELECTRO-MECHANICAL THERMOSTAT CONTROL SYSTEM



OPTIONAL T8600/T8621 THERMOSTAT CONTROL SYSTEM

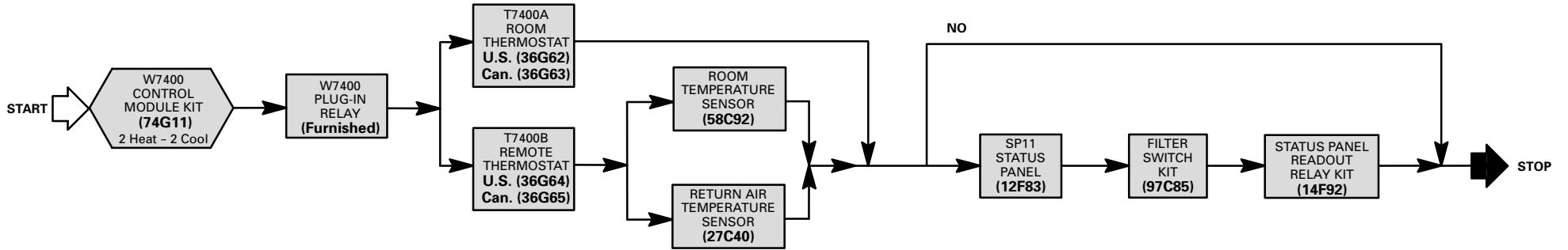


OPTIONAL W973 CONTROL SYSTEM

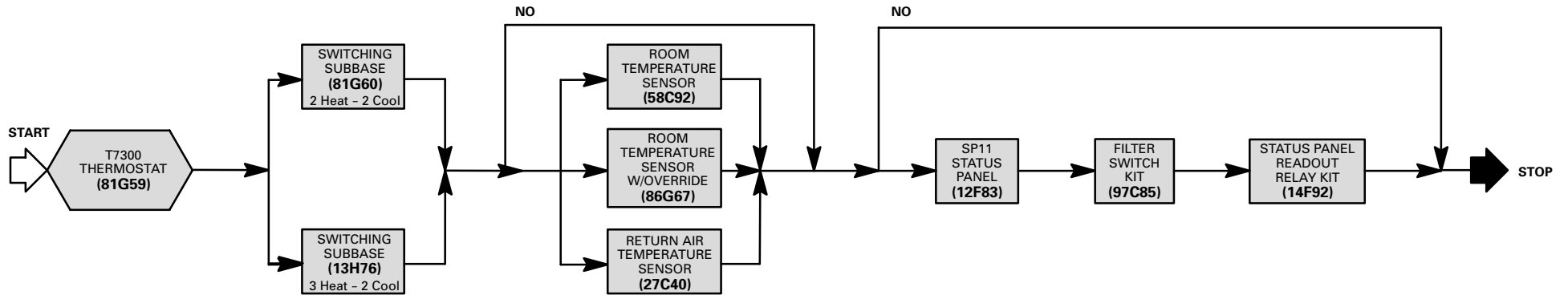


TEMPERATURE CONTROL SELECTION FLOWCHARTS

OPTIONAL W7400 CONTROL SYSTEM

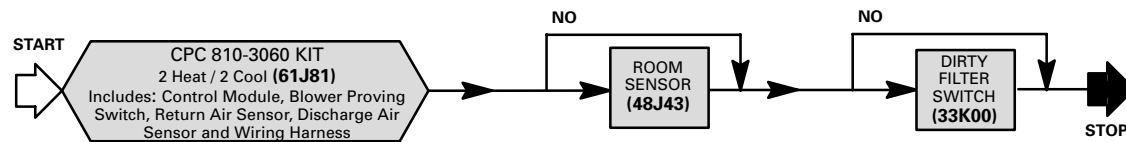


OPTIONAL T7300 CONTROL SYSTEM

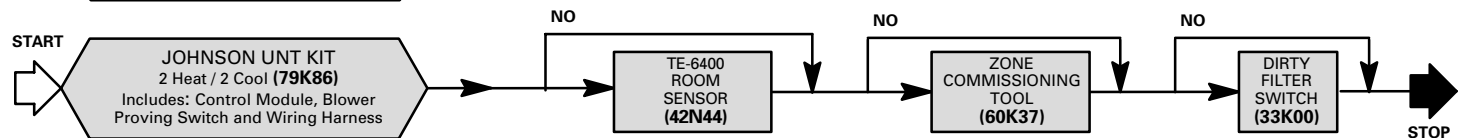


DDC TEMPERATURE CONTROL SELECTION FLOWCHARTS

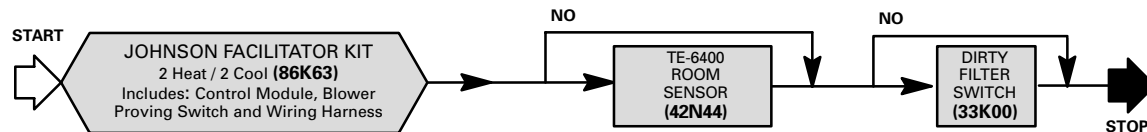
CPC 810-3060



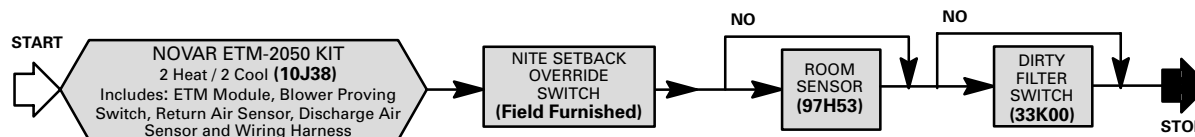
JOHNSON UNT



JOHNSON FACILITATOR



NOVAR ETM-2050



SPECIFICATIONS

Model No.		GCS16-090	GCS16-120		
★ARI Standard 210/240 Ratings	Total cooling capacity □ Btuh (kW)		88,000 (25.8)	119,000 (34.9)	
	Total unit watts		9,780	13,220	
	EER (Btuh/Watts)		9.0		
	Integrated Part Load Value		9.3	8.6	
*Sound Rating Number (db)		86	88		
Refrigerant Charge (HCFC-22)	Stage 1		6 lbs. 4 oz. (2.83 kg)	7 lbs. 4 oz. (3.29 kg)	
	Stage 2		5 lbs. 14 oz. (2.66 kg)	7 lbs. 4 oz. (3.29 kg)	
Evaporator Blower and Drive Selection	Blower wheel nominal dia. x width □ in. (mm)		12 x 12 (305 x 305)	15 x 15 (381 x 381)	
	Factory Installed □ Drives	Nominal motor horsepower (W)		2 (1492)	3 (2238)
		Max. usable motor output □ hp (W)		2.30 (1716)	3.45 (2574)
		Voltage & phase		208/230, 460 or 575v □ 60 hz □ 3 ph	
RPM range		740 □ 1010	730 □ 950		
Evaporator Coil	Net face area □ sq. ft. (m ²)		7.75 (0.72)	9.46 (0.88)	
	Tube diameter □ in. (mm) & No. of rows		3/8 (9.5) □ 3	3/8 (9.5) □ 4	
	Fins per inch (m)		14 (551)	12 (472)	
Condenser Coil	Net face area □ sq. ft. (m ²)		15.67 (1.46)	20.0 (1.86)	
	Tube diameter □ in. (mm) & No. of rows		3/8 (9.5) □ 2		
	Fins per inch (m)		20 (787)		
Condenser Fans	Diameter □ in. (mm) & No. of blades		24 (610) □ 4	(2) 20 (508) □ 5	
	Air volume □ cfm (L/s)		5300 (2500)	6400 (3020) Total	
	Motor horsepower (W)		3/4 (560)	(2) 1/3 (224)	
	Motor watts		660	875 Total	
Two Stage Heating Capacity (Natural Gas Only)	Input (low) □ Btuh (kW)		126,000 (36.9)	170,000 (49.8)	
	Output (low) □ Btuh (kW)		98,000 (28.7)	132,500 (38.8)	
	Input (High) □ Btuh (kW)		200,000 (58.6)	270,000 (79.1)	
	Output (High) □ Btuh (kW)		160,000 (46.9)	216,000 (63.3)	
	A.G.A./C.G.A. Thermal Efficiency		80%		
Two Stage Heating Capacity (LPG/Propane Gas Only)	Input (low) □ Btuh (kW)		126,000 (36.9)	170,000 (49.8)	
	Output (low) □ Btuh (kW)		98,000 (28.7)	132,500 (38.8)	
	Input (High) □ Btuh (kW)		175,000 (51.3)	236,250 (69.2)	
	Output (High) □ Btuh (kW)		142,600 (41.8)	192,500 (56.4)	
	A.G.A./C.G.A. Thermal Efficiency		81.5%		
Gas Supply Connections fpt □ in. (mm)		Natural/LPG/Propane		3/4 (19)	
Recommended Gas Supply Pressure □ wc. in. (kPa)	Natural		7 (1.7)		
	LPG/Propane		11 (2.7)		
Condensate drain size mpt □ in. (mm)		1 (25.4)			
No. & size of filters □ in. (mm)		(4) 16 x 20 x 2 (406 x 508 x 51)	(4) 16 x 25 x 2 (406 x 635 x 51)		
Net weight of basic unit □ lbs. (kg) (1 Package)		875 (397)	1100 (499)		
Electrical characteristics		208/230, 460 or 575v □ 60 hz □ 3 ph			

*Sound Rating Number in accordance with test conditions included in ARI Standard 270.

★Rated in accordance with ARI Standard 210/240; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air.

□ Integrated Part Load Value rated at 80°F (27°C) outdoor air temperature.

□ Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. In Canada, nominal motor output is also maximum usable motor output.

HIGH ALTITUDE DERATE

A.G.A. certified units must be derated when installed at an elevation of more than 2000 feet (610 m) above sea level. If unit is installed at an altitude higher than 2000 feet (610 m), the unit must be derated 4% for every 1000 feet (305 m) above sea level. Thus, at an altitude of 4000 feet (1210 m), the unit would require a derate of 16%.

ϕ C.G.A. certified units must be derated when installed at an elevation of more than 2000 feet (610 m) above sea level. If unit is installed at an altitude higher than 2000 feet (610 m), the unit must be derated 10% for elevations between 2000 feet and 4500 feet (610 m and 1370 m) above sea level.

NOTE □ This is the only permissible derate for these units.

OPTIONAL ACCESSORIES (Must Be Ordered Extra)

Unit Model No.		GCS16-090		GCS16-120	
LPG/Propane Conversion Kit		LB-55755DA (32G88)			
Roof Mounting Frame □ (Net Weight)		RMF16-95 (107 lbs.) (49 kg)		RMF16-135/160 (119 lbs.) (54 kg)	
Economizer Dampers	Model No. Net Weight	REMD16M-95 (118 lbs.) (54 kg)		REMD16M-135 (125 lbs.) (57 kg)	
	No. & size of filters	in.	(2) 16 x 25 x 1		
mm		(2) 406 x 635 x 25			
Horizontal Economizer Dampers	Model No. Net Weight	EMDH16M-95 (120 lbs.) (54 kg)		EMDH16M-135 (137 lbs.) (62 kg)	
	No. & size of filters	in.	(2) 16 x 25 x 1		
mm		(2) 406 x 635 x 25			
Exhaust Dampers □ (Net Weight) □ Net Face Area		GED16-95/135/160 (5 lbs.) (2 kg) □ 0.43 sq. ft. (0.04 m ²)			
Differential Enthalpy Control		54G44			
Horizontal Supply and Return Air Kit □ (Net Weight)		LB-55756BA (34G71) (30 lbs.) (14 kg)		LB-55756BB (35G42) (35 lbs.) (16 kg)	
Bottom Power Entry Kit □ (Net Weight)		LB-55757CA (12 lbs.) (5 kg)			
Ceiling Supply and Return Air Diffusers (Net Weight)	Step-Down	RTD11-95 (88 lbs.) (40 kg)		RTD11-135 (125 lbs.) (57 kg)	
	Flush	FD11-95 (75 lbs.) (34 kg)		FD11-135 (95 lbs.) (43 kg)	
	Transition	SRT16-95 (29 lbs.) (13 kg)		SRT16-135 (38 lbs.) (17 kg)	
Outdoor Air Dampers No. & size of filters	Model No. Net Weight	OAD16-95 (41 lbs.) (19 kg)		OAD16-135 (43 lbs.) (20 kg)	
	in. (mm)	(1) 16 x 20 x 1 (406 x 508 x 25)			
Automatic OAD16 Damper Kit □ (Net Weight)		35G21 (7 lbs.) (3 kg)			
Low Ambient Control Kit		LB-57113BG (15J80)		LB-57113BH (16J86)	
Timed-Off Control Kit (2) LB-50709BA		40G20			

ELECTRICAL DATA

Model No.		GCS16-090			GCS16-120		
Line voltage data □ 60 Hz □ 3 phase		208/230v	460v	575v	208/230v	460v	575v
Compressors (2)	Rated load amps □ each (total)	14.8/14.1 (28.9)	7.7/7.1 (14.8)	6.4/5.8 (12.2)	17.3 (34.6)	9.6 (19.2)	7.0 (14.0)
	Locked rotor amps □ each (total)	130 (260.0)	64 (128.0)	52 (104.0)	150 (300.0)	73 (146.0)	50 (100.0)
Condenser Fan Motor(s)	Full load amps (total)	3.7	1.9	1.6	2.1 (4.2)	1.2 (2.4)	1.0 (2.0)
	Locked rotor amps (total)	7.3	3.7	3.4	5.1 (10.2)	2.7 (5.4)	2.3 (4.6)
Evaporator Blower Motor	Motor Output - hp (W)	2 (1492)			3 (2238)		
	Full load amps	7.5	3.4	2.7	10.6	4.8	3.9
	Locked rotor amps	41.0	20.4	16.2	58.0	26.8	23.4
▶ Recommended maximum fuse size (amps)		50	25	20	60	35	30
† Minimum Circuit Ampacity		44.0	23.0	19.0	54.0	29.0	22.0
Unit power factor		.88	.88	.88	.88	.88	.88

† Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

▶ Where current does not exceed 100 amps, HACR type circuit breaker may be used in place of fuse (U.S. only).

NOTE □ Extremes of operating range are plus and minus 10 % of line voltage.

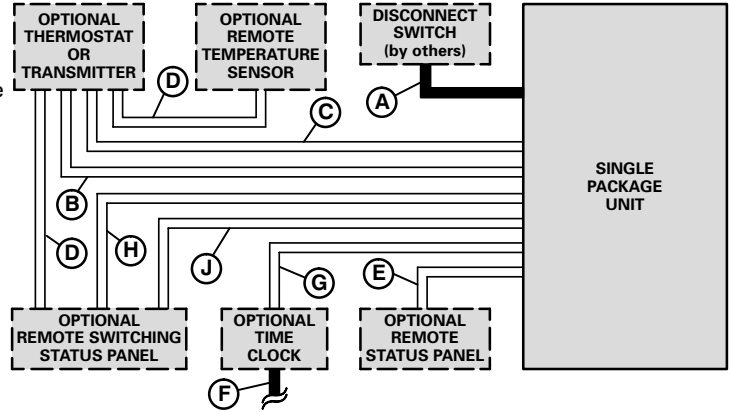
W973 CONTROL SYSTEM

- A Three wire power (See Electrical Data Table)
 - B Seven wire low voltage DC only
 - Five wire low voltage DC only with SSP11 Switching Status Panel
 - Seven wire low voltage DC only with switching subbase
 - C Two wire low voltage AC only with switching subbase
 - D Two wire low voltage DC only
 - E Nine wire low voltage AC only
 - F Two wire low voltage AC only
 - G Two wire low voltage AC only
 - H Thirteen wire low voltage AC only
 - J Two wire low voltage DC only
- AC Alternating current
DC Direct current

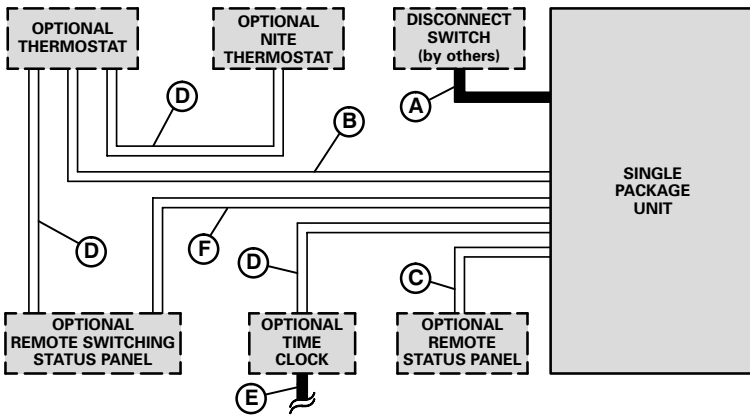
NOTE Run separate harness for AC and DC.
AC voltage interferes with DC signals.

Field wiring not furnished

NOTE All wiring must conform to NEC or CEC and local electrical codes.



ELECTRO-MECHANICAL THERMOSTAT CONTROL SYSTEM

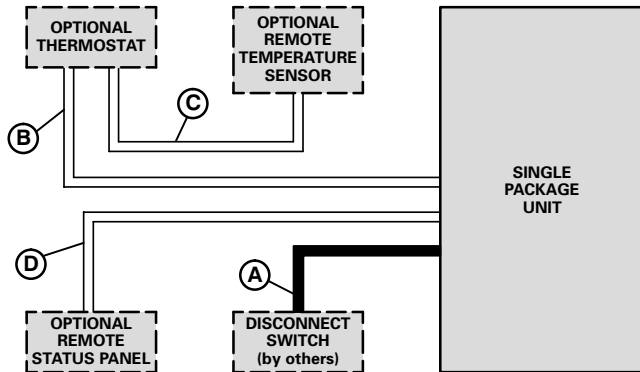


- A Three wire power (See Electrical Data Table)
- B Six wire low voltage
- Five wire low voltage with SSP11 Switching Status Panel
- C Nine wire low voltage
- D Two wire low voltage
- E Two wire low voltage
- F Sixteen wire low voltage

Field wiring not furnished

NOTE All wiring must conform to NEC or CEC and local electrical codes.

W7400, T7300, T8600 OR T8621 THERMOSTAT CONTROL SYSTEM



- A Three wire power (See Electrical Data Table)
- B Four wire low voltage (W7400 only)
- Nine wire low voltage
- C Two wire low voltage (T7300 only)
- Seven wire low voltage (T7300 Room Sensor with override)
- D Nine wire low voltage

Field wiring not furnished

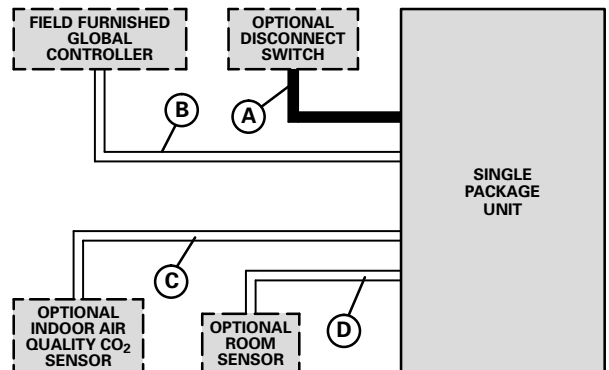
NOTE All wiring must conform to NEC or CEC and local electrical codes.

ALL DDC CONTROL SYSTEMS

- A Three wire power (See Electrical Data Table)
- B RS-485 shielded pair twisted wire + ground
- C Four wire low voltage
- D Two wire low voltage (Andover Infinity, CPC 810-3060 and Novar ETM-2050)
- Four wire low voltage (Honeywell W7620)
- Six wire low voltage (Johnson UNT and Facilitator)

Field wiring not furnished

NOTE All wiring must conform to NEC or CEC and local electrical codes.



BLOWER DATA

GCS16-090 BLOWER PERFORMANCE

Air Volume cfm (L/s)	STATIC PRESSURE EXTERNAL TO UNIT □ Inches Water Gauge (Pa)																			
	.20 (50)		.40 (100)		.50 (125)		.70 (175)		.80 (200)		.90 (225)		1.00 (250)		1.10 (275)		1.30 (325)		1.50 (375)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
2400 (1135)	-----	-----	-----	-----	810	0.85 (0.63)	905	1.05 (0.78)	955	1.15 (0.86)	1000	1.25 (0.93)	1050	1.40 (1.04)	1100	1.55 (1.16)	1195	1.95 (1.45)	-----	-----
2600 (1225)	-----	-----	-----	-----	840	1.00 (0.75)	930	1.20 (0.90)	970	1.30 (0.97)	1015	1.40 (1.04)	1060	1.55 (1.16)	1105	1.70 (1.27)	-----	-----	-----	-----
2800 (1320)	-----	-----	830	1.05 (0.78)	870	1.15 (0.86)	955	1.35 (1.00)	995	1.45 (1.08)	1035	1.60 (1.19)	1075	1.70 (1.27)	1115	1.85 (1.38)	-----	-----	-----	-----
3000 (1415)	-----	-----	860	1.20 (0.90)	905	1.30 (0.97)	980	1.55 (1.16)	1020	1.65 (1.23)	1060	1.80 (1.34)	1095	1.90 (1.42)	-----	-----	-----	-----	-----	-----
3200 (1510)	835	1.20 (0.90)	905	1.40 (1.04)	940	1.50 (1.12)	1010	1.75 (1.31)	1050	1.90 (1.42)	1085	2.00 (1.49)	-----	-----	-----	-----	-----	-----	-----	-----
3400 (1605)	880	1.40 (1.04)	945	1.60 (1.19)	980	1.75 (1.31)	1045	2.00 (1.49)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3600 (1700)	920	1.65 (1.23)	985	1.85 (1.38)	1015	2.00 (1.49)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3800 (1795)	965	1.90 (1.41)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

NOTE □ All data is measured external to the unit with dry coil and with the air filters in place. See Page 15 for Accessory Air Resistance data.

GCS16-120 BLOWER PERFORMANCE

Air Volume cfm (L/s)	STATIC PRESSURE EXTERNAL TO UNIT □ Inches Water Gauge (Pa)																			
	.20 (50)		.40 (100)		.50 (125)		.70 (175)		.80 (200)		.90 (225)		1.00 (250)		1.10 (275)		1.30 (325)		1.50 (375)	
	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)	RPM	BHP (kW)
3600 (1700)	-----	-----	672	1.14 (0.85)	707	1.24 (0.93)	772	1.47 (1.10)	802	1.60 (1.19)	831	1.74 (1.30)	860	1.87 (1.40)	887	2.00 (1.49)	940	2.30 (1.72)	985	2.60 (1.94)
3800 (1795)	-----	-----	690	1.27 (0.95)	725	1.39 (1.04)	790	1.64 (1.22)	820	1.78 (1.33)	850	1.93 (1.44)	878	2.06 (1.54)	905	2.20 (1.64)	950	2.46 (1.84)	994	2.76 (2.06)
4000 (1890)	642	1.18 (0.88)	715	1.43 (1.07)	746	1.54 (1.15)	809	1.81 (1.35)	838	1.95 (1.45)	866	2.09 (1.56)	895	2.24 (1.67)	920	2.38 (1.78)	968	2.66 (1.98)	1013	2.96 (2.21)
4200 (1980)	670	1.35 (1.01)	736	1.50 (1.12)	768	1.73 (1.29)	828	2.00 (1.49)	856	2.13 (1.59)	885	2.28 (1.70)	913	2.43 (1.81)	938	2.56 (1.91)	984	2.86 (2.13)	-----	-----
4400 (2075)	693	1.52 (1.13)	760	1.79 (1.34)	790	1.93 (1.44)	850	2.29 (1.71)	878	2.36 (1.76)	905	2.50 (1.87)	930	2.63 (1.96)	955	2.77 (2.07)	-----	-----	-----	-----
4600 (2170)	718	1.70 (1.27)	785	2.00 (1.49)	815	2.15 (1.60)	872	2.44 (1.82)	900	2.59 (1.93)	923	2.71 (2.02)	948	2.84 (2.12)	974	3.00 (2.24)	-----	-----	-----	-----
4800 (2265)	747	1.93 (1.44)	807	2.22 (1.66)	835	2.37 (1.60)	892	2.66 (1.98)	918	2.82 (2.10)	940	2.93 (2.19)	-----	-----	-----	-----	-----	-----	-----	-----
5000 (2360)	772	2.16 (1.61)	830	2.46 (1.84)	860	2.66 (2.06)	915	2.92 (2.18)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5200 (2455)	800	2.41 (1.80)	860	2.75 (2.05)	887	2.89 (2.16)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

NOTE □ All data is measured external to the unit with dry coil and with the air filters in place. See Page 15 for Accessory Air Resistance data.

ACCESSORY AIR RESISTANCE

Unit Model No.	Air Volume		Total Resistance □ inches water gauge (Pa)						
			Wet Evaporator Coil	REMD16M Down-flow Economizer	EMDH16M Horizontal Economizer	RTD11 Step-Down Diffuser			FD11 Flush Diffuser
	cfm	L/s				2 Ends Open	1 Side 2 Ends Open	All Ends & Sides Open	
GCS16-090	2400	1185	.12 (30)	.03 (7)	.03 (7)	.21 (52)	.18 (45)	.15 (37)	.14 (35)
	2600	1225	.13 (32)	.04 (10)	.04 (10)	.24 (60)	.21 (52)	.18 (45)	.17 (42)
	2800	1320	.14 (35)	.04 (10)	.04 (10)	.27 (67)	.24 (60)	.21 (52)	.20 (50)
	3000	1415	.16 (40)	.05 (12)	.05 (12)	.32 (80)	.29 (72)	.25 (62)	.25 (62)
	3200	1510	.18 (45)	.05 (12)	.05 (12)	.41 (102)	.37 (92)	.32 (80)	.31 (77)
	3400	1605	.19 (47)	.06 (15)	.06 (15)	.50 (124)	.45 (112)	.39 (97)	.37 (92)
	3600	1700	.21 (52)	.06 (15)	.06 (15)	.61 (152)	.54 (134)	.48 (119)	.44 (109)
	3800	1795	.23 (57)	.07 (17)	.07 (17)	.73 (182)	.63 (157)	.57 (142)	.51 (127)
GCS16-120	3600	1700	.12 (30)	.03 (7)	.03 (7)	.36 (90)	.28 (70)	.23 (57)	.15 (37)
	3800	1795	.13 (32)	.04 (10)	.04 (10)	.40 (99)	.32 (80)	.26 (65)	.18 (45)
	4000	1890	.14 (35)	.04 (10)	.04 (10)	.44 (109)	.36 (90)	.29 (72)	.21 (52)
	4200	1980	.15 (37)	.05 (12)	.05 (12)	.49 (122)	.40 (99)	.33 (82)	.24 (60)
	4400	2075	.16 (40)	.05 (12)	.05 (12)	.54 (134)	.44 (109)	.37 (92)	.27 (67)
	4600	2170	.17 (42)	.06 (15)	.06 (15)	.60 (149)	.49 (122)	.42 (104)	.31 (77)
	4800	2265	.18 (45)	.07 (17)	.07 (17)	.65 (162)	.53 (132)	.46 (114)	.35 (87)
	5000	2360	.19 (47)	.09 (22)	.09 (22)	.69 (172)	.58 (144)	.50 (124)	.39 (97)
	5200	2455	.20 (50)	.10 (25)	.10 (25)	.75 (186)	.62 (154)	.54 (134)	.43 (107)

CEILING DIFFUSER AIR THROW DATA

Model No.	Air Volume		*Effective Throw Range			
			RTD11 Step-Down		FD11 Flush	
	cfm	L/s	ft.	m	ft.	m
GCS16-090	3000	1415	27 □ 33	8 □ 10	25 □ 30	8 □ 9
	3375	1595	30 □ 37	9 □ 11	28 □ 34	9 □ 10
	3750	1770	34 □ 41	10 □ 12	31 □ 38	9 □ 12
GCS16-120	4400	2075	34 □ 42	10 □ 13	32 □ 40	10 □ 12
	4950	2335	38 □ 47	12 □ 14	36 □ 45	11 □ 14
	5500	2595	43 □ 52	13 □ 16	40 □ 50	12 □ 15

*Throw is the horizontal or vertical distance an airstream travels on leaving the outlet or diffuser before the maximum velocity is reduced to 50 ft. (15 m) 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 combination air to air DX mechanical cooling system and gas fired heating 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 manufacturer shall have parts and service available throughout the U.S. and Canada.

The installed weight shall not be more than lbs.(kg). Entire unit shall have a width of not more than inches (mm), a depth of not more than inches (mm) and an overall height of not more than inches (mm). 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 or side (horizontal) handling of conditioned air. All air distribution ducts shall be fiberglass or ga. galvanized steel insulated with inch (mm) thick lb./ft.3 (kg/m3) density fiberglass or equivalent.

Approvals □ All electrical components shall have U.L. Listing. All wiring shall be in compliance with NEC and CEC.

Equipment Warranty □ Heat exchangers have a limited warranty for a full ten years. Compressors have a limited warranty for a full five years. All other components have a limited warranty for one year. Refer to the Lennox Equipment Limited Warranty certificate included with the unit for details.

Cooling System □ The total certified cooling capacity shall not be less than Btuh (kW) with an evaporator air volume of cfm (L/s), an entering wet bulb air temperature of °F (°C), an entering dry bulb air temperature of °F (°C) and a condenser entering temperature of °F (°C). 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 sq. ft. (m2) (evaporator) and sq. ft. (m2) (condenser).

Multiple compressors shall be resiliently mounted, have overload protection, compressor monitor and crankcase heater. Units shall have internal pressure relief. The refrigeration system shall have suction and liquid line service gauge ports, high pressure switches, loss of charge switches, thermometer well, driers, freestat and full refrigerant charge. Control option available shall consist of low ambient control and timed-off control. Shall be rated in accordance with ARI Standard 210/240-94.

Heating System □ The heating capacity output shall be Btuh (kW) with a gas input of Btuh (kW).

Tubular heat exchanger and inshot type gas burners shall be constructed of aluminized steel. Controls shall consist of direct spark ignition, electronic flame sensor controls, flame rollout switch, limit controls and automatic redundant dual gas valve with staging control and centrifugal switch on induced draft blower. Unit shall be available for use with LPG/propane as an option. Complete service access shall be provided for controls and wiring. Shall be A.G.A./C.G.A. design certified for outdoor installation.

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. Shall have peep hole with cover for flame viewing of burners. 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 cfm (L/s) at an external static pressure of inches water gauge (Pa) requiring bhp (W) and rpm.

Condenser Fan(s) □ Direct drive propeller type condenser fan(s) shall discharge vertically and be direct driven by a hp (W) 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 thansq. ft. (m2) of free area.

OPTIONAL ACCESSORIES

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. Frame shall be approved by U.S. National Roofing Contractors Association.

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. 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 55° F (13° C) mixed air controller, damper actuator, adjustable outdoor air 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 rainhoods 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 for GCS16-090 & 120 shall provide bottom power entry to the unit within the confines of the roof mounting frame.

Ceiling Diffusers □ Furnish and install a (flush or step-down) optional combination ceiling supply and return air diffuser. It shall be capable of not less than ft. (m) 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.

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.

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.

UNIT DIMENSIONS \square inches (mm)

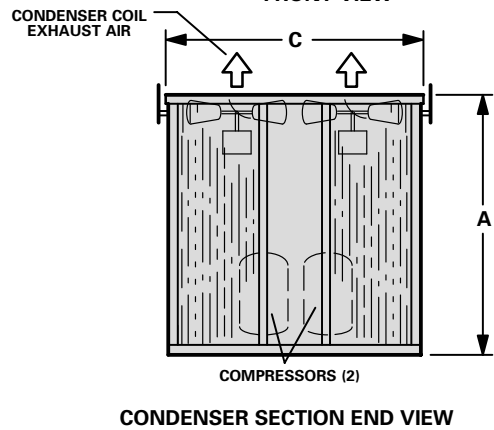
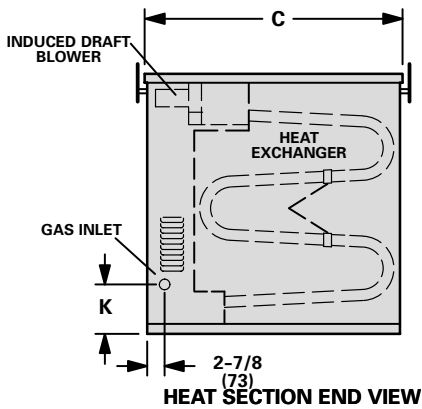
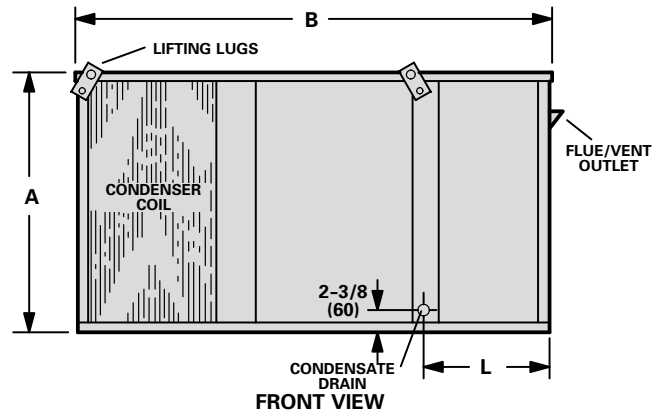
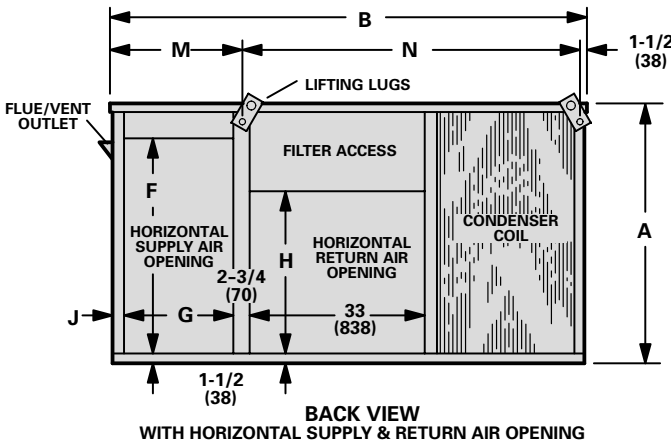
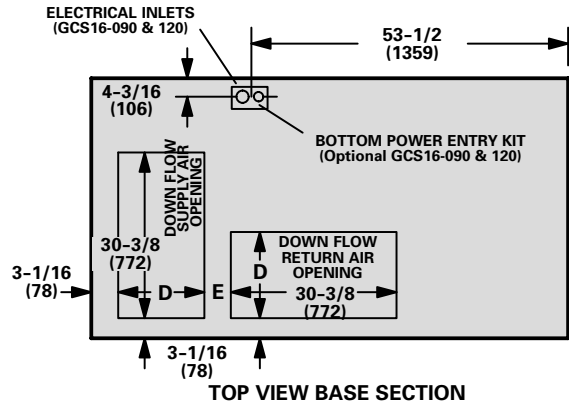
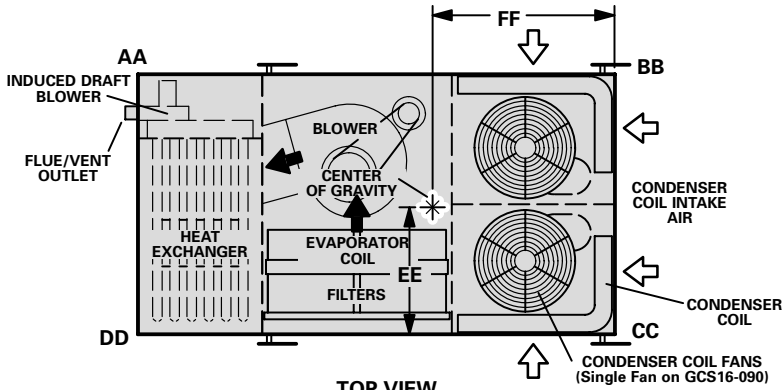
GCS16-090 & -120

CORNER WEIGHTS \square lbs. (kg)

Model No.	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
GCS16-090	236	107	283	128	194	880	162	73
GCS16-120	255	116	345	156	287	130	213	97

CENTER OF GRAVITY \square in. (mm)

Model No.	EE		FF	
	in.	mm	in.	mm
GCS16-090	28-1/2	724	40	1016
GCS16-120	32-3/4	832	40	1016



Model No.	A		B		C		D		E		F		G	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
GCS16-090	39	991	88-1/2	2248	48	1219	16-1/2	419	5-5/8	142	32-1/8	816	19-7/16	494
GCS16-120	46	1168	94	2388	60	1524	24	610	4-7/16	113	39-1/8	994	25-1/4	641

Model No.	H		J		K		L		M		N	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
GCS16-090	24-5/8	625	1-5/8	41	9-3/4	248	25-1/16	637	22-1/8	562	64-7/8	1648
GCS16-120	31-5/8	803	2	51	14	356	31-3/16	792	28-1/2	724	64	1626

ACCESSORY DIMENSIONS □ inches (mm)

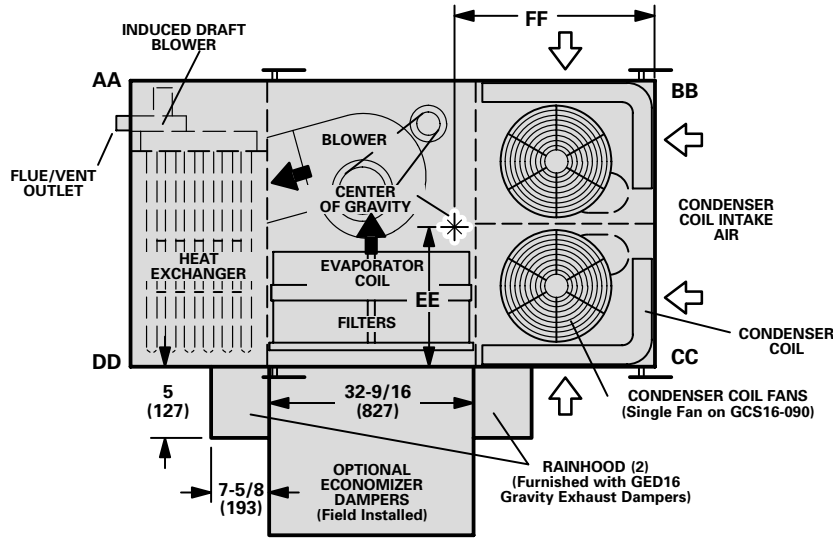
GCS16-090 & -120 UNITS WITH REMD16M ECONOMIZER DAMPER SECTION AND RMF16 ROOF MOUNTING FRAME

CORNER WEIGHTS □ lbs. (kg)

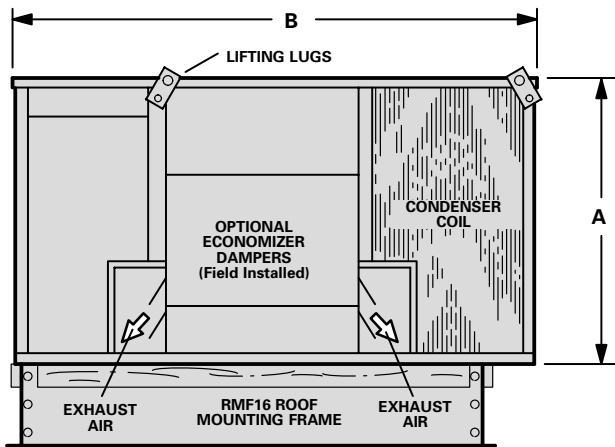
Model Number	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
GCS16-090	256	116	295	134	295	134	256	116
GCS16-120	274	124	313	142	404	183	354	161

CENTER OF GRAVITY □ inches (mm)

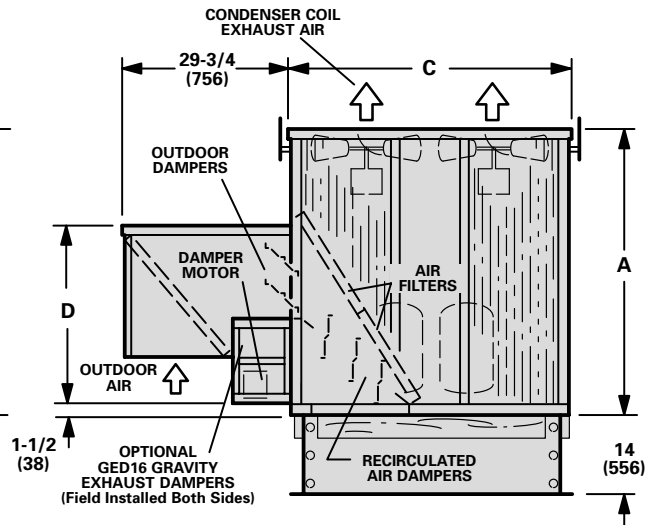
Model Number	EE		FF	
	inch	mm	inch	mm
GCS16-090	24	610	41	1041
GCS16-120	28	711	41	1041



TOP VIEW



BACK VIEW



CONDENSER SECTION END VIEW

Model Number	A		B		C		D	
	inch	mm	inch	mm	inch	mm	inch	mm
GCS16-090	39	991	88-1/2	2248	48	1219	28-9/16	725
GCS16-120	46	1168	94	2388	60	1524	34-9/16	878

ACCESSORY DIMENSIONS □ inches (mm)

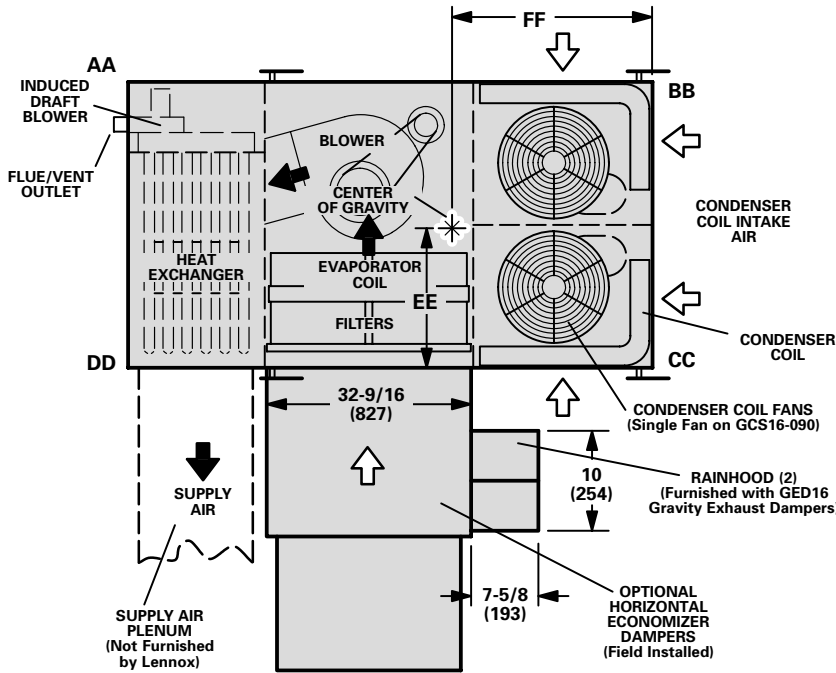
**GCS16-090 & -120 UNITS WITH
EMDH16 HORIZONTAL ECONOMIZER DAMPER SECTION**

CORNER WEIGHTS □ lbs. (kg)

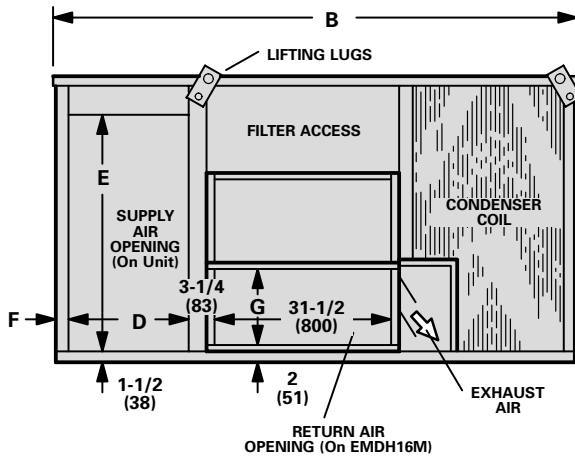
Model Number	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
GCS16-090	233	106	264	120	265	120	234	106
GCS16-120	251	114	325	147	374	170	287	130

CENTER OF GRAVITY □ inches (mm)

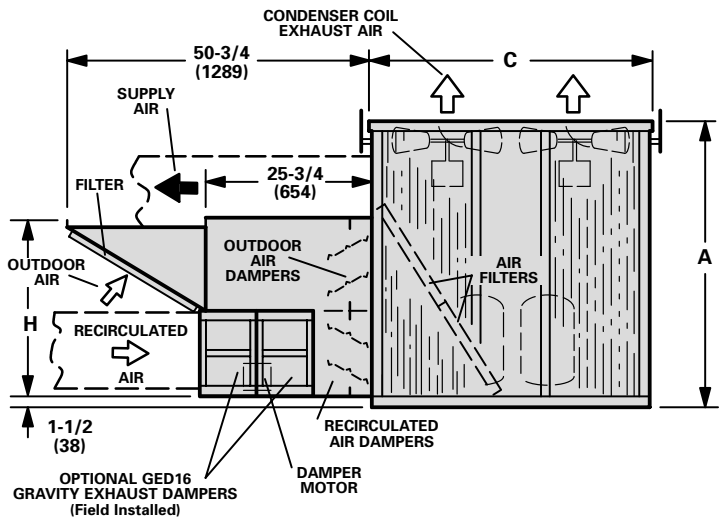
Model Number	EE		FF	
	inch	mm	inch	mm
GCS16-090	24	610	41	1041
GCS16-120	27	686	41	1041



TOP VIEW



BACK VIEW

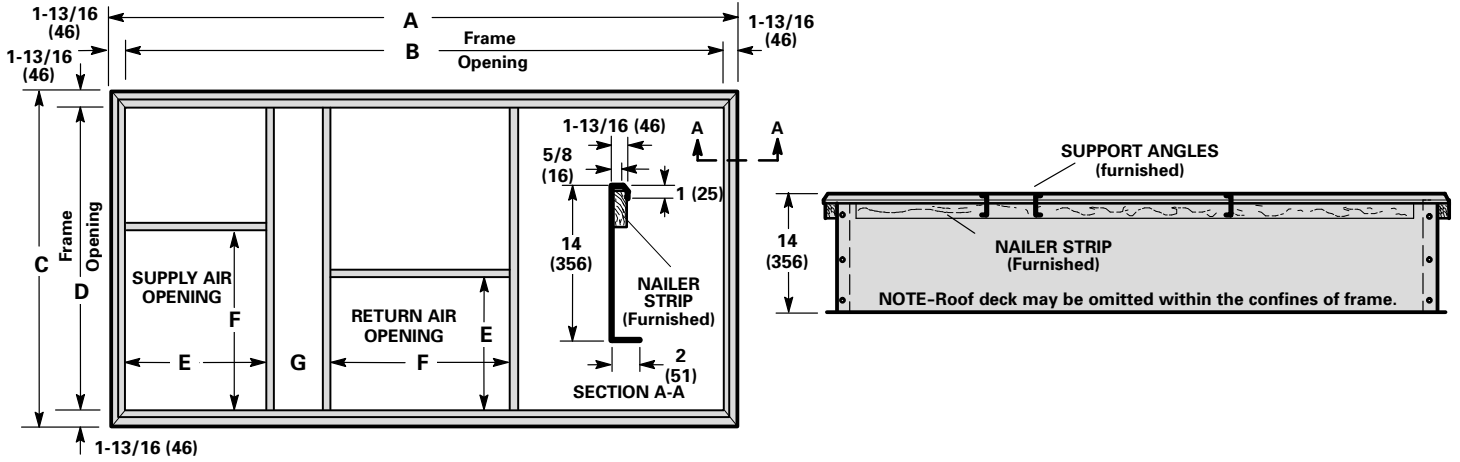


CONDENSER SECTION END VIEW

Model Number	A		B		C		D		E		F		G		H	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
GCS16-090	39	991	88-1/2	2248	48	1219	19-7/16	494	32-1/8	816	1-5/8	41	13-1/4	337	28-3/4	730
GCS16-120	46	1168	94	2388	60	1524	25-1/4	641	39-1/8	994	2	51	19-1/4	489	34-3/4	883

ACCESSORY DIMENSIONS □ inches (mm) U.S. Only

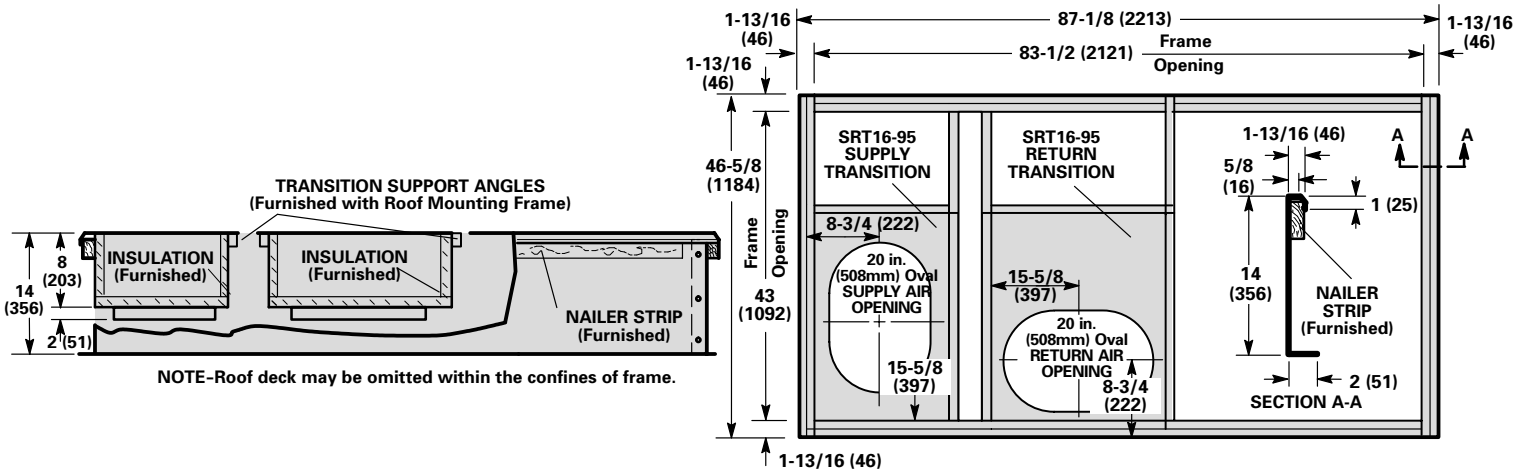
RMF16 SERIES ROOF MOUNTING FRAME WITH DOUBLE DUCT OPENING



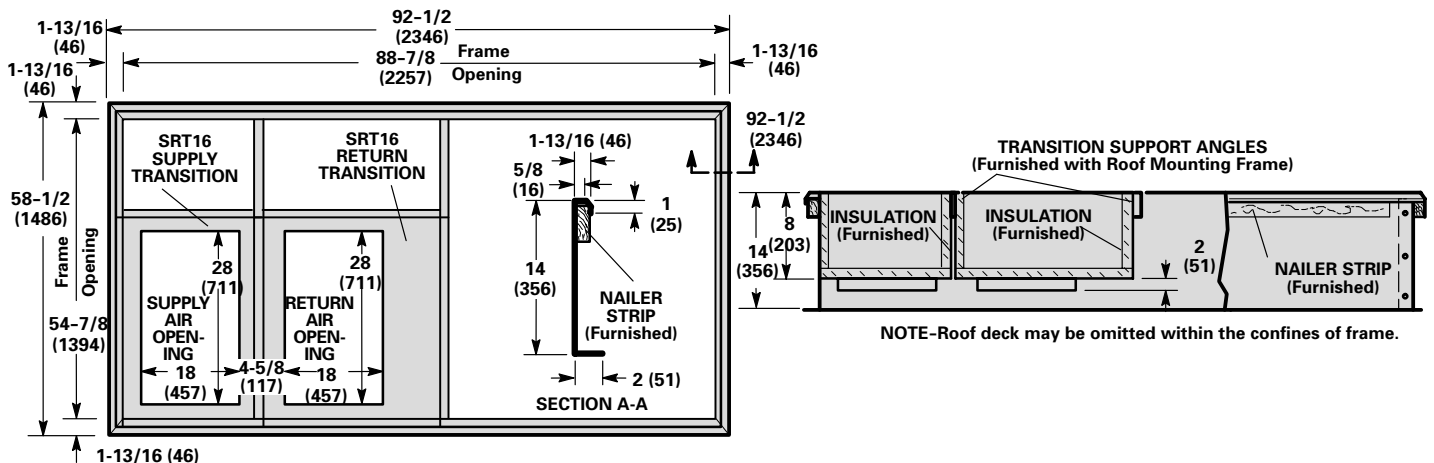
Model Number	A		B		C		D		E		F		G	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
RMF16-95	87-1/8	2213	83-1/2	2121	46-5/8	1184	43	1092	17-15/16	456	31-1/2	800	4	102
RMF16-135/160	92-1/2	2350	88-7/8	2257	58-1/2	1486	54-7/8	1394	25-1/4	641	*	*	3-3/16	81

*31-1/2 inches (800 mm) for GCS16-120 Units.

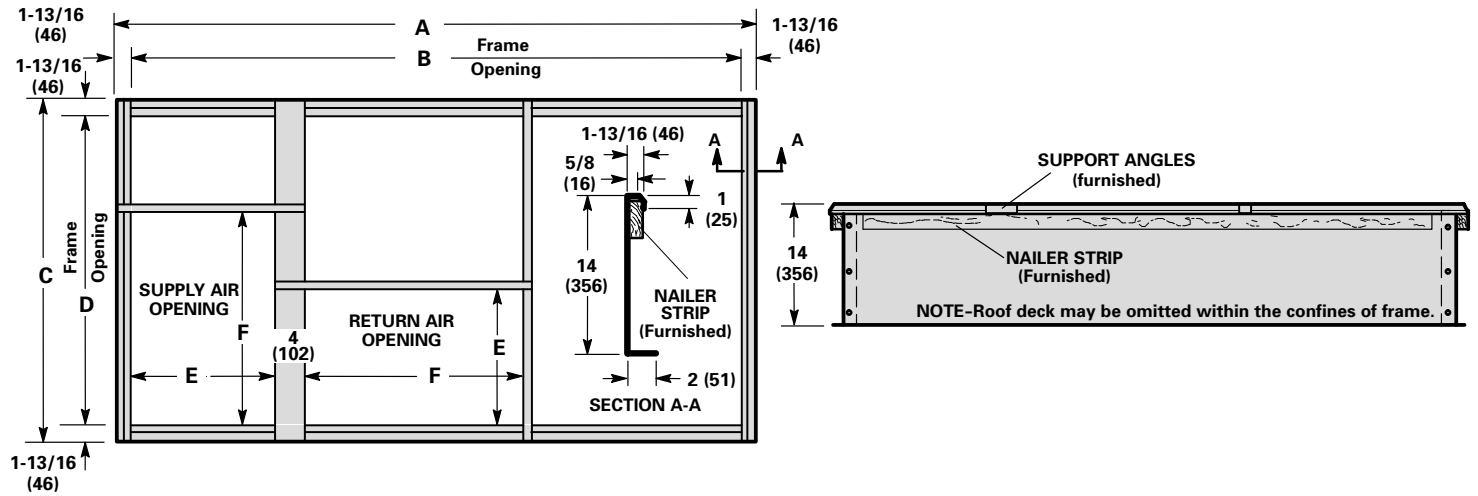
**RMF16-95 ROOF MOUNTING FRAMES WITH SRT16
SUPPLY AND RETURN AIR TRANSITIONS FOR FD11-95 AND RTD11-95 CEILING DIFFUSERS**



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



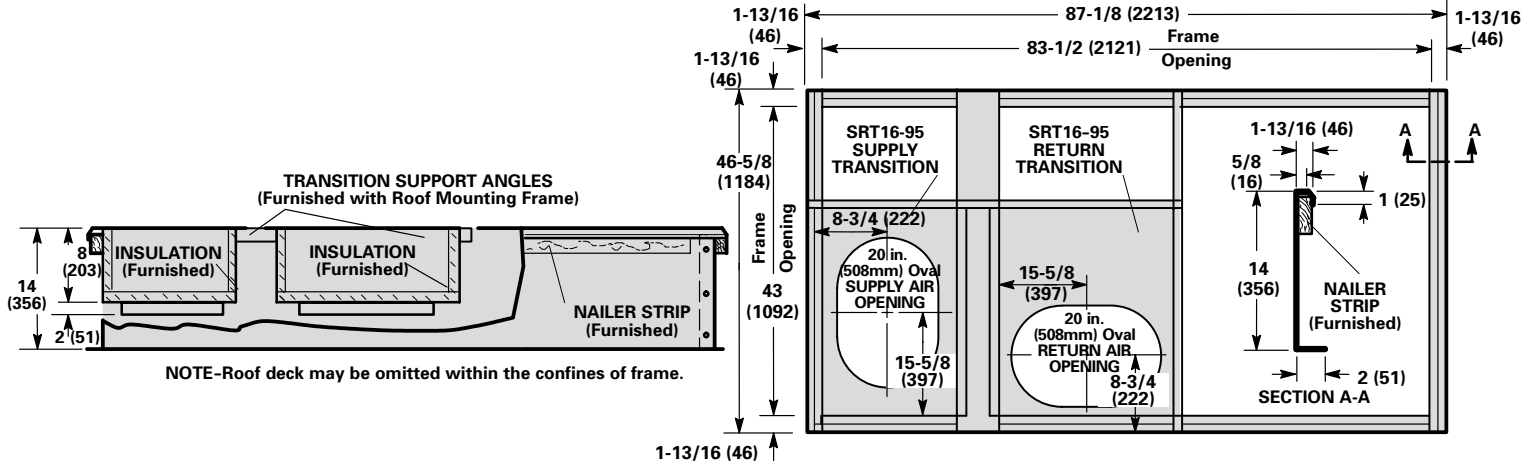
RMF16-95 and -135/160 ROOF MOUNTING FRAME WITH DOUBLE DUCT OPENING



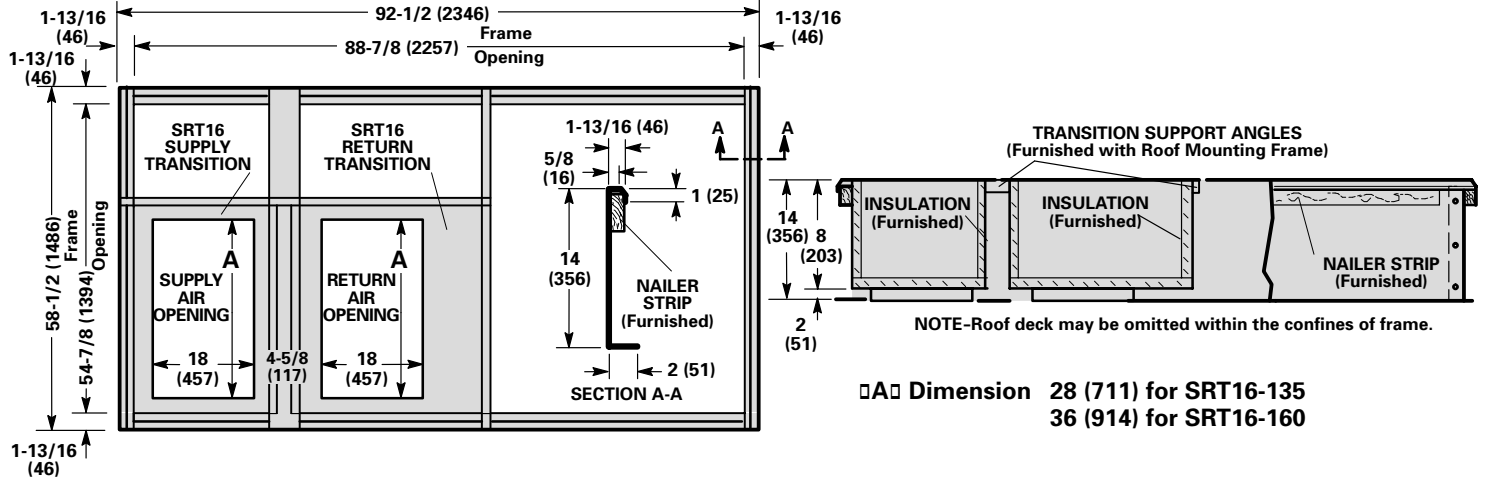
Model No.	A		B		C		D		E		F	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
RMF16-95	87-1/8	2213	83-1/2	2121	46-5/8	1184	43	1092	17-15/16	456	31-1/2	800
RMF16-135/160	92-1/2	2350	88-7/8	2257	58-1/2	1486	54-7/8	1394	25-1/4	641	*	*

*31-1/2 inches (800 mm) for -120 units.

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



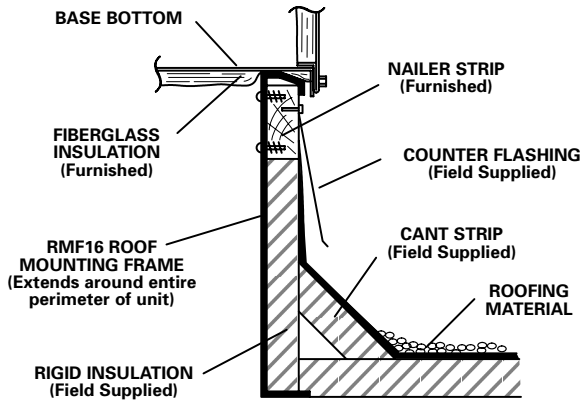
**RMF16-135/160 ROOF MOUNTING FRAMES WITH SRT16
SUPPLY AND RETURN AIR TRANSITIONS FOR FD11 & RTD11 CEILING DIFFUSERS**



□ A □ Dimension 28 (711) for SRT16-135
36 (914) for SRT16-160

ACCESSORY DIMENSIONS □ inches (mm)

TYPICAL FLASHING DETAIL FOR RMF16 ROOF MOUNTING FRAME



ROOF MOUNTING FRAME SPECIFICATIONS

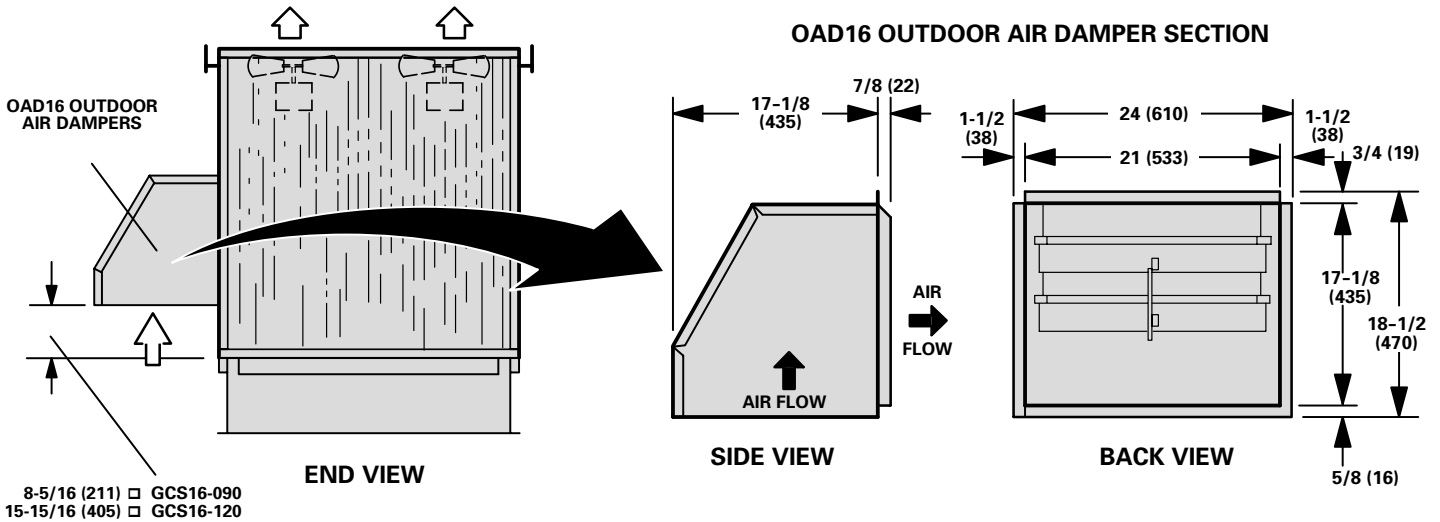
Roof Mounting frame is rigid enough to be spanned over its entire length or cantilevered if supported on both sides of center of gravity.

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.

GCS16 UNIT WITH OAD16 OUTDOOR AIR DAMPER SECTION DOWN-FLOW SUPPLY AND RETURN AIR

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

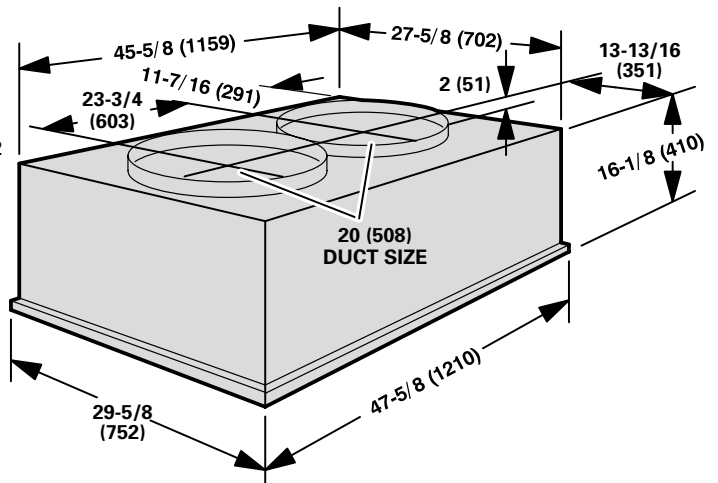
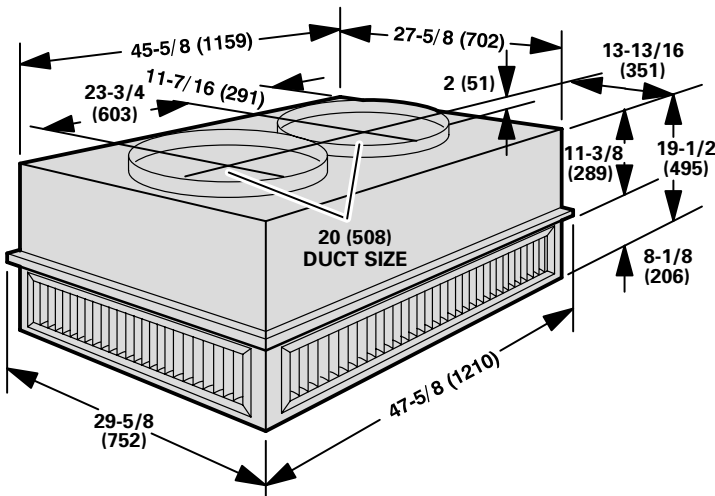


ACCESSORY DIMENSIONS □ inches (mm)

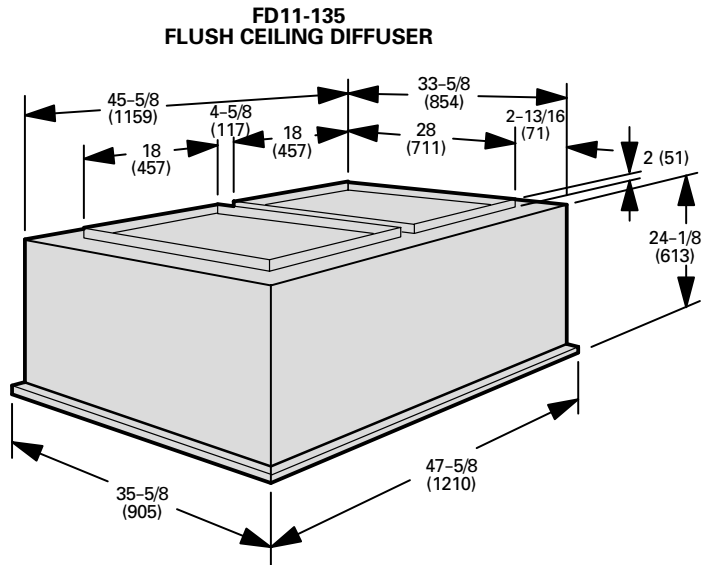
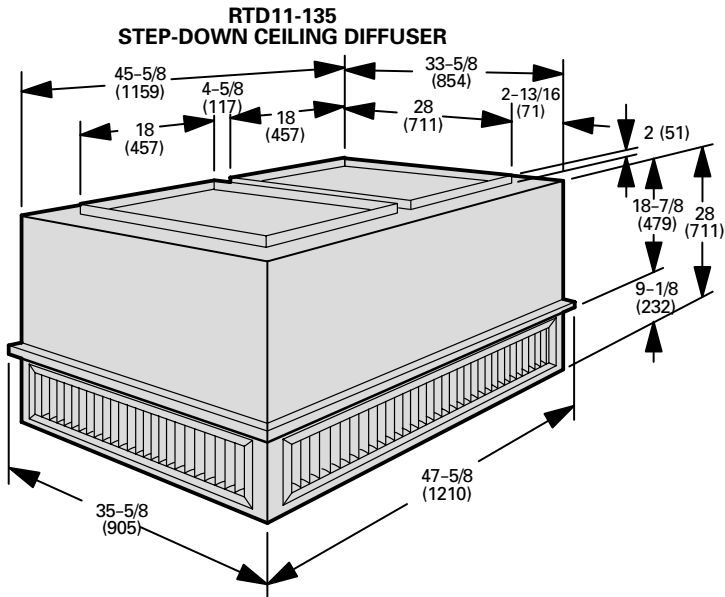
COMBINATION CEILING SUPPLY AND RETURN DIFFUSERS

RTD11-95 STEP-DOWN CEILING DIFFUSER

FD11-95 FLUSH CEILING DIFFUSER

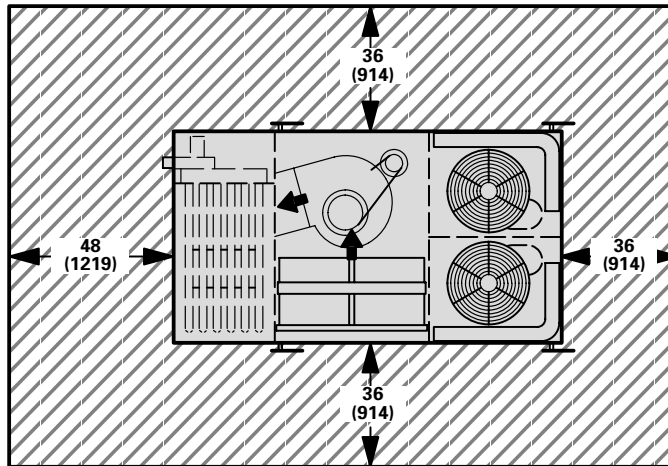


ACCESSORY DIMENSIONS □ inches (mm)



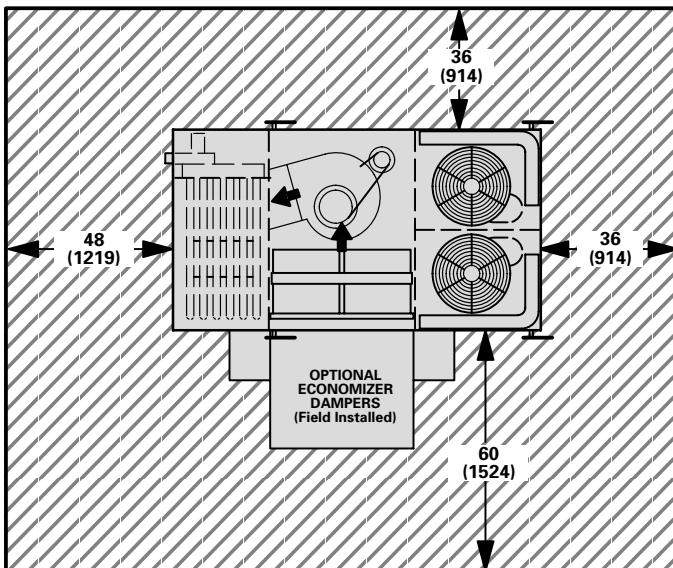
INSTALLATION CLEARANCES □ inches (mm)

GCS16 BASIC UNIT



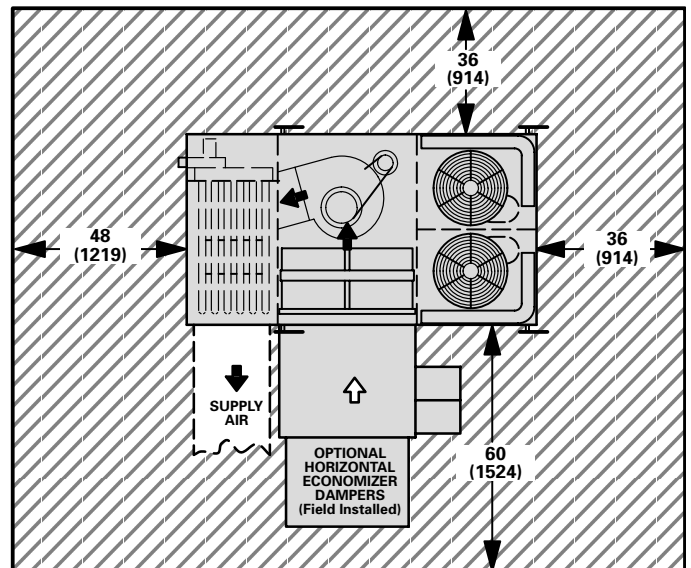
NOTE □ Top Clearance Unobstructed.
NOTE □ Entire perimeter of unit requires support when elevated above mounting surface.

GCS16 UNIT WITH REMD16M ECONOMIZER DAMPER SECTION



NOTE □ Top Clearance Unobstructed.

GCS16 UNIT WITH EMDH16M HORIZONTAL ECONOMIZER DAMPER SECTION



NOTE □ Top Clearance Unobstructed.