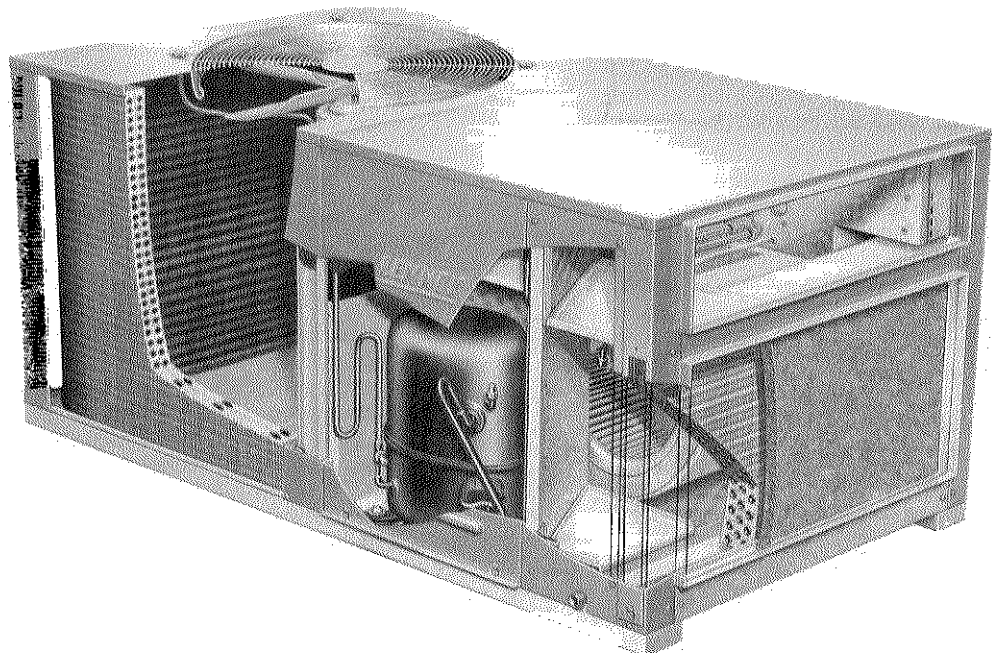




CHA10 SERIES — HORIZONTAL SINGLE PACKAGE AIR CONDITIONERS

***23,000 to 56,500 Btuh Total Cooling Capacity
11,900 to 112,700 Btuh Optional Electric Heat**

***ARI Standard 210 Certified Ratings**

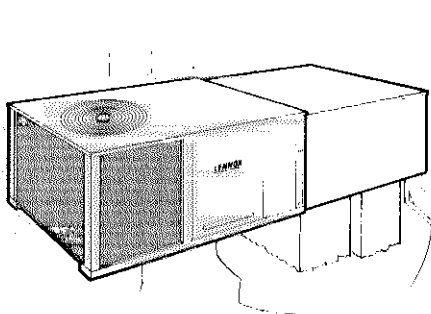


Single Package Air Conditioning Units Feature Energy Saving Operation And Minimum Installation Cost

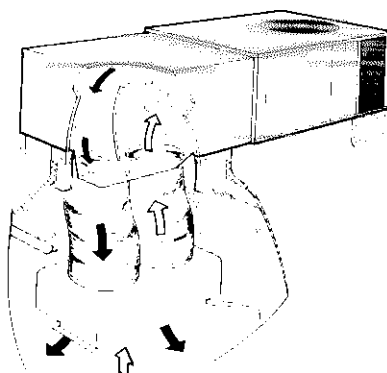
The Lennox CHA10 series single package air conditioning units are designed for residential or small commercial establishments. Units can be installed with ducts extended through a wall in a crawl space, basement, utility room or attic. Installation on a slab at grade level or out of sight on a rooftop will save valuable interior floor space. Optional accessories available for rooftop installations include duct enclosure, POWER SAVER[®] dampers and roof mounting frame. The mounting frame mates to the bottom of the CHA10 and duct enclosure and when flashed into the roof permits weatherproof duct connection and entry into the conditioned area. Optional POWER SAVER and controls reduce cooling operating costs. Externally mounted optional minimum fresh air damper (manual) is also available. In addition a choice of flush or step-down diffusers are available for a combination ceiling supply and return air distribution system. Units contain all refrigeration components

(evaporator and condensing unit), air movers, air filters and optional additive electric heat in one complete package. Optional electric heaters are available in several sizes for all season applications, space is provided in the unit for field installation. Powerful evaporator blower moves large air volumes quietly and economically. Evaporator supply and return air openings are both at the same end of the cabinet. Condenser air is drawn through the wrap-around "U" configuration condenser coil and discharged quietly and efficiently up and out the top panel. Large evaporator and condenser coils ensure maximum air contact and heat transfer. Cabinet is constructed of heavy gauge galvanized steel with a baked-on enamel finish. Units are shipped completely assembled, piped, prewired and pre-charged ready to install. In addition, units are test operated at the factory to ensure proper operation. Installer has only to locate unit, connect duct work, power supply and mount thermostat.

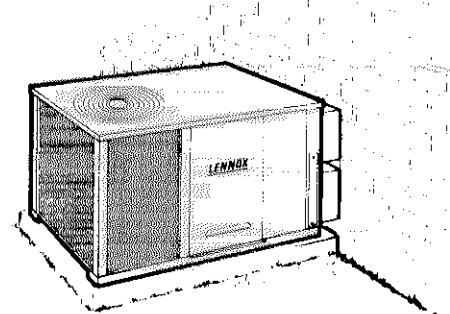
Typical Applications



Rooftop installation with optional RT10 duct enclosure



Rooftop installation with optional duct enclosure and combination ceiling supply and return air system.



Unit on slab at grade level

NOTE — Specifications, Ratings and Dimensions subject to change without notice.

FEATURES

Rugged Cabinet — Constructed of heavy gauge galvanized steel. A five station wash metal preparation assures a perfect bonding surface for the finish coat of baked-on outdoor enamel. Removable panels permit complete service access to interior of cabinet. Conditioned air section of cabinet is lined with thick fiberglass insulation. Supply and return air openings have flanges for ease of duct connection. Heavy gauge steel support rails under base elevates unit above mounting surface. Drainage holes are provided in condenser coil section of the base for moisture removal. Electrical inlets are furnished in cabinet for wiring entry.

Refrigeration System — Complete factory sealed refrigeration system consists of: compressor, condenser coil and fan(s), evaporator coil and blower, suction and discharge line service gauge ports, liquid line strainer, low pressure switch-automatic reset (CHA10-460, 510 & 650 models), and a full operating refrigerant charge.

Compressor and Controls Compartment — Compressor and control box are located in a separate compartment of the cabinet, isolating them from the weather. Control box is conveniently located for service access with all controls factory installed and wired. Cabinet access panel removal permits complete access to the compartment.

Dependable and Quiet Compressor — Rugged and reliable compressor is hermetically sealed. Suction cooled, overload protected, and equipped with internal pressure relief valve. Internally protected from excessive current and temperature. The entire running gear is spring mounted within the sealed housing. In addition, the compressor is installed on resilient rubber mounts in the unit, assuring quiet and vibration free operation.

Large Evaporator and Condenser Coils — Lennox designed and fabricated coils are constructed of precisely space ripple-edged aluminum fins machine fitted to copper tubes. Copper tubing construction provides maximum coil life and ease of service. Condenser coil is a wrap-around "U" shaped configuration providing extra large surface area for maximum strength and contact area. Evaporator coil is a slab type. Coil is thoroughly tested under pressure to insure leakproof construction.

Drain Pan — Evaporator coil drain pan is constructed of heavy gauge galvanized steel. Equipped with a galvanized pipe (mpt) drain outlet extended outside of the cabinet.

Efficient Condenser Fan — Direct drive fan draws large air volumes uniformly through the entire coil resulting in high refrigerant cooling capacity. Condenser fan motor is totally enclosed for maximum protection from weather, dust and corrosion. A rain shield on the motor provides additional protection from moisture. Air is drawn through the coil at both sides and end and discharged up and out through the top panel. Corrosion resistant PVC coated steel wire fan guard is furnished as standard.

Powerful Evaporator Blower — CHA10-261 thru 510 units are equipped with direct drive blowers that deliver large air volumes with low power consumption. Each blower is statically and dynamically balanced as an assembly before it is installed in the unit. Multispeed motor is isolated on rubber mounts. A choice of blower speeds is available on each blower. See blower performance charts. Change in blower speed is easily accomplished by a simple change in wiring.

CHA10B-650 units are equipped with the Lennox designed "sulky" belt drive blower that moves large air volumes quietly and economically. All moving parts are mounted on a rigid steel frame, that floats on highly resilient rubber cushion mounts. By loosening one bolt on the hinged motor cradle the proper belt tension or change is easily accomplished. Blower wheel is statically and dynamically balanced. Bearing are self-aligning and permanently lubricated. Adjustable motor pulley permits variable blower speed adjustments.

Cleanable Air Filter — One inch frame filters are furnished as standard equipment. Media is washable or vacuum cleanable polyurethane, coated with oil for increased efficiency. Use RP products filter coating No. 418 (order no. 30165) for reoiling after cleaning. Separate access panel provides easy removal for servicing.

Optional Condenser Coil Guards — Three guards are required per unit and must be ordered extra. LB-33656B for CHA10-261, 311, 410 models, LB-34491B for CHA10-460 & 510 models and LB-37965B for CHA10B-650 models.

Thermostat (Optional) — Thermostat is not furnished and must be ordered extra. For cooling only applications a single stage cooling thermostat is required. When optional additive electric heat is ordered a heating-cooling thermostat will be required.

Additive Electric Heat (Optional) — Available for field installation in 3.5 thru 30.0 kw sizes. See Electric Heat tables. The helix wound nichrome heating elements are exposed directly in the air stream resulting in instant heat transfer, lower coil temperatures and long service life. The elements are accurately located and insulated from the heavy gauge steel support frame by high quality insulators. Heaters, except 440/480 volt models, are equipped with circuit breakers to provide overload and short circuit protection. Circuit breakers are current sensitive and temperature compensated to shutoff heater if current draw is excessive. Must be reset manually. Each set of heating elements is equipped with an accurately located limit control with fixed temperature off setting and automatic reset. In addition, elements have supplemental thermal cutoff safety fuses providing positive protection in case of hazardous overheating. Cutoff fuses are mounted external to the element face plate for quick and easy replacement. Thermal time delay relay brings the heating elements on and off the line, in sequence and equal increments, with a time delay between each element. Control box and access cover are constructed of heavy gauge galvanized steel. Electrical inlet holes are provided in the box. Electric heaters are completely factory assembled with all controls installed and wired.

Timed-Off Control (Optional) — Timed-off control (77A24) is available as optional equipment for field installation. Prevents compressor short-cycling and also allows time for suction and discharge pressure to equalize, permitting the compressor to start in an unloaded condition. Automatic reset control will shut the compressor off and hold it off for 5 minutes.

Low Ambient Control (Optional) — Units will operate satisfactorily down to 35°F outdoor air temperature without any additional controls. For cases where operation of the unit is required below 35°F a Low Ambient Control Kit (BM-3434) can be added in the field, enabling it to operate properly down to 0°F.

PTC Start Kit — Furnished as standard equipment on CHA10-461, 511 and 651 single phase units. The solid-state PTC (Positive Temperature Coefficient) ceramic thermistor provides extra starting torque to solve most compressor hard starting problems. The start kit switches itself out of the circuit after start-up. Available as optional equipment on CHA10-261, 311 and 411 units.

Crankcase Heaters — Compressor crankcase heater is furnished as standard equipment on CHA10-410 thru 650 models. Crankcase heater is not furnished for the CHA10-261 and 311 models and must be ordered extra for field installation. Order number P-8-8852. Heaters prevent migration of liquid refrigerant into the compressor and ensures proper compressor lubrication at all times.

Completely Tested and Certified — Units have been thoroughly tested in the Lennox Research Laboratory environmental test room and accurately rated according to U.S. Department of Energy (DOE) test procedures and Air-Conditioning And Refrigeration Institute (ARI) Standard 210-81 conditions. In addition, units are U.L. Listed and have been sound tested in the Lennox reverberant sound test room and rated according to ARI Standard 270-75. Units coming within the scope of the ARI standard (135,000 Btuh or less) are Certified under the ARI Certification Program. DOE covered products are rated under 65,000 Btuh with single phase power input. Units and components within are bonded for grounding to meet safety standards for servicing required by U.L. and N.E.C. Optional electric heaters are U.L. Listed and rated and tested according to DOE test procedures and Federal Trade Commission (FTC) labeling regulations. Blower data is from unit tests conducted in the Lennox Laboratory air test chamber.

FEATURES

Optional Duct Enclosure — The RT10-65 duct enclosure is required for installation of the unit with the RMF9-65 roof mounting frame. Duct enclosure is completely insulated with a baked-on enamel finish and is shipped knocked down for field assembly. Supply and return air openings are located in the bottom of the enclosure. Field assembled return air plenum is furnished for ceiling diffuser applications. Plenum connects to unit return air opening segregating return air within the enclosure.

Optional POWER SAVER™ — The complete RD10-65 POWER SAVER and control system is shipped factory assembled and wired. The Lennox POWER SAVER system consists of: duct enclosure, mechanically linked outdoor air and recirculated air dampers with pressure operated exhaust air dampers. The positioning of these dampers is accomplished by a 24 volt 3 position spring return damper motor with adjustable minimum damper positioner and controlled by the room thermostat, adjustable mixed air controller, adjustable compressor monitor and adjustable enthalpy control. The enthalpy control allows 0 to 100% outdoor air to be used for "free cooling" when outdoor humidity and temperature are acceptable. The Lennox POWER SAVER will co-operate with any heating-cooling thermostat. A outdoor air intake hood is furnished and field installs over the outdoor air dampers. Shipped knocked down, it is easily field assembled. A cleanable polyurethane media frame filter is furnished with the hood providing extra air filtering and bird screen protection.

Optional RT10 Adapter Kit — Adapter kit (LB-29475BB) includes filler panels and securing brackets to mate the duct enclosure and roof mounting frame to CHA10-261, CHA10-311 and CHA10-410 models.

Optional Roof Mounting Frame — The RMF9-65 roof mounting frame mates to the unit and duct enclosure providing an automatic weather sealed installation. A mounting frame deck enclosure is furnished to provide a weatherproof deck for mounting the unit on the roof mounting frame. Approved by National Roofing Contractors Association.

Optional Minimum Fresh Air Damper — OAD3-46/65 minimum fresh air damper mounts external to the RT10-65 duct enclosure. Equipped with manually operated damper and fittings for installing.

Optional SP11 Remote Status Panel — 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 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 and must be specified when ordering. Filter switch kit (97C85) is used in conjunction with the Filter light. Operation of No Heat light requires an additional control, see Price Book. Wiring Junction Box (14F92) is required to interface status panel with unit operation. Box field installs in unit.

SPECIFICATIONS

Model No.		CHA10-261	CHA10-311	CHA10-411 CHA10-413	CHA10-461 CHA10-463	CHA10-511 CHA10-513	CHA10B-651 CHA10B-653
★ARI Standard 270 SRN		19	20	20	21	21	21
*ARI Standard 210 Ratings	Total cooling capacity (Btuh)	23,000	29,000	34,000	43,000	47,500	56,500
	Total unit watts	2590	3450	4090	5100	5950	6940
	†SEER (Btuh/Watts) 1 phase model only	8.85	8.25	8.2	8.9	8.15	8.2
	††EER (Btuh/Watts) 3 phase model only	----	----	8.0	8.45	8.0	8.15
Dehumidifying capacity		26%	26%	28%	26%	25%	26%
Refrigerant (R-22) charge		5 lbs. 0 oz.	5 lbs. 0 oz.	5 lbs. 13 oz.	8 lbs. 10 oz.	8 lbs. 7 oz.	10 lbs. 0 oz.
Evaporator Coil	Net face area (sq. ft.)	2.9	3.0	3.0	4.5	4.5	5.75
	Tube diam. (in.) & No. of rows	1/2 — 2	3/8 — 3	3/8 — 3	3/8 — 3	3/8 — 4	3/8 — 4
	Fins per inch	15	16	16	16	14	14
Evaporator Blower	Wheel nominal diam. x width (in.)	10 x 9	10 x 9	11 x 9	10 x 10	12 x 12	10 x 10
	Motor horsepower	1/4	1/3	1/2	1/2	3/4	1
	RPM range	Factory installed drives ---- **Optional motor pulley	---- ----	---- ----	---- ----	---- ----	980 — 1230 1175 — 1450
Condenser Coil	Net face area (sq. ft.)	11.6	11.6	11.6	15.3	15.3	18.1
	Tube diam. (in.) & No. of rows	3/8 — 2	3/8 — 2	3/8 — 2	3/8 — 2	3/8 — 2	3/8 — 2
	Fins per inch	13	15	15	13	15	15
Condenser Fan	Diameter (in.) and No. of blades	20 — 4	20 — 4	20 — 4	*24 — 4	24 — 4	24 — 4
	Air volume (factory setting)	3200	3200	3200	4100	4100	5500
	Rpm (factory setting)	1035	1035	1035	825	825	1065
	Motor horsepower	1/4	1/4	1/4	1/4	1/4	1/2
	Motor watts (factory setting)	300	300	300	320	320	580
Condensate drain size mpt (in.)		3/4	3/4	3/4	3/4	3/4	3/4
No. & size of filters (in.)		(1)16x25x1	(1)16x25x1	(1)16x25x1	(2)16x20x1	(2)16x20x1	(2)20x20x1
Net weight of basic unit (lbs.) (1 package)		310	330	335	495	515	565
Optional Condenser Coil Guard - 3 required per unit		LB-33656B		LB-34491B		LB-37965B	
Optional Duct Enclosure (Net weight)		RT10-65 (85 lbs.)		RT10-65 (85 lbs.)		RT10B-65 (95 lbs.)	
Optional POWER SAVER (Net weight) and No. & size of filter (in.)		RD10-65 (180 lbs.) (1) - 20 x 25 x 1		RD10-65 (180 lbs.) (1) - 20 x 25 x 1		RD10B-65 (190 lbs.) (1) - 20 x 25 x 1	
Optional Roof Mounting Frame (Net weight)		RMF9-65 (110 lbs.)		RMF9-65 (110 lbs.)			
RT10/RD10 Adapter Kit (Net weight)		LB-29475BB (4 lbs.)		----			
Optional Minimum Fresh Air Damper (Net weight)		OAD3-46/65 (7 lbs.)		OAD3-46/65 (7 lbs.)			
Optional Comb. Supply & Return Transition (Net wt.)		SRT10-65 (20 lbs.)		SRT10-65 (20 lbs.)			
Optional Combination Ceiling Supply And Return Step-Down Diffuser (Net weight)		RTD9-65 (67 lbs.)		RTD9-65 (67 lbs.)			
Optional Combination Ceiling Supply And Return Flush Diffuser (Net weight)		FD9-65 (33 lbs.)		FD9-65 (33 lbs.)			

★Rated in accordance with ARI Standard 270.

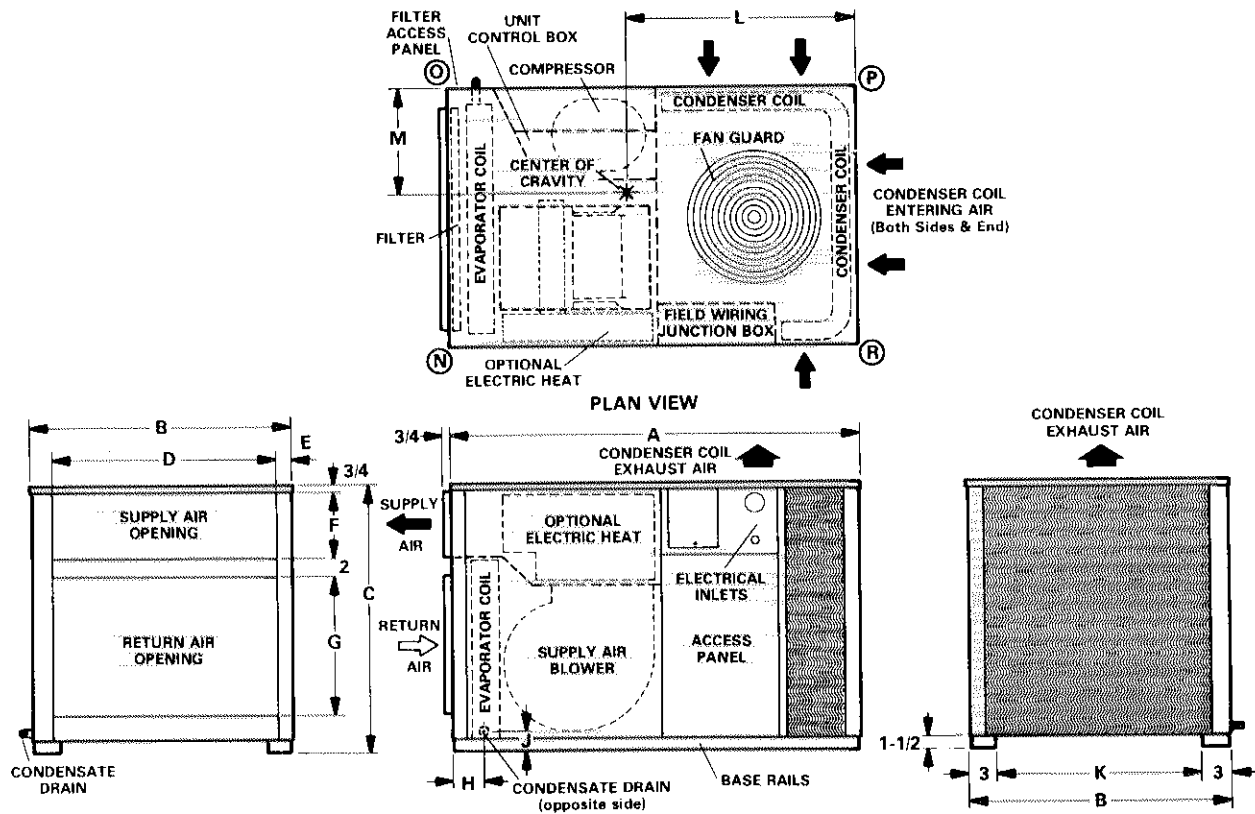
*Rated in accordance with ARI Standard 210; 450 cfm (maximum) evaporator air volume per ton of cooling capacity, 95F outdoor air temperature and 80F db/67F wb entering evaporator air.

**Optional motor pulley is furnished and must be field installed to obtain rpm range shown.

† Seasonal Energy Efficiency Ratio based on DOE test procedures.

††Energy Efficiency Ratio in accordance with ARI Standard 210.

DIMENSIONS (inches)



Model No.	A	B	C	D	E	F	G	H	J	K
CHA10-261, 311 & 410	52-11/16	28	28-3/4	24	1-13/16	7	15	4-7/8	2-3/8	22
CHA10-460 & 510	59-15/16	40-3/4	28-3/4	34	2-3/4	8	15	6	2-1/2	34-3/4
CHA10B-650	59-15/16	40-3/4	33-3/4	34	2-3/4	8	20	6	2-1/2	34-3/4

CENTER OF GRAVITY (in.)

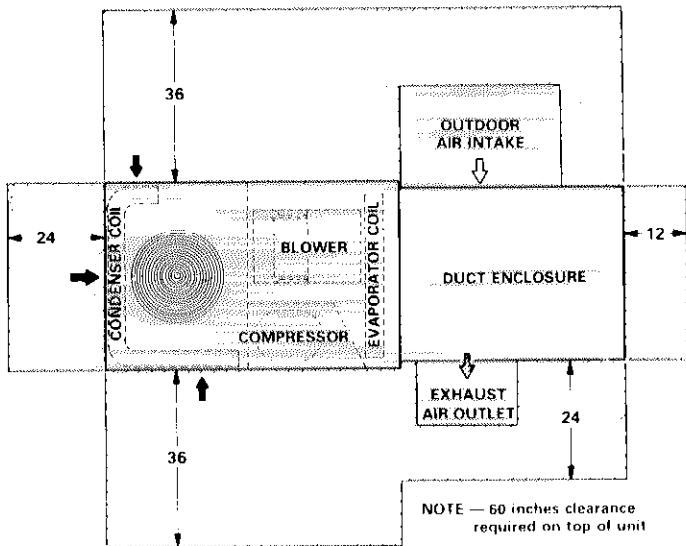
Model No.	L	M
CHA10-261	29-11/16	11-3/4
CHA10-311	29-11/16	11-3/4
CHA10-411-413	29-11/16	11-3/4
CHA10-461-463	34-5/8	17-1/2
CHA10-511-513	34-5/8	17-1/2
CHA10B-651-653	34-5/8	17-1/2

CORNER WEIGHTS (lbs.)

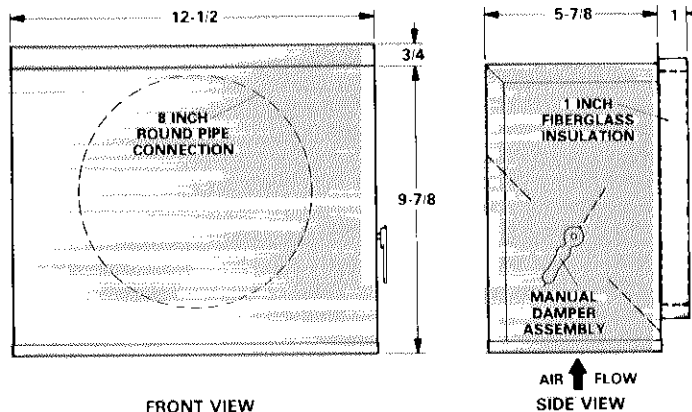
Model No.	N	O	P	R
CHA10-261	77	106	83	59
CHA10-311	82	113	87	63
CHA10-411-413	83	115	89	64
CHA10-461-463	130	173	126	94
CHA10-511-513	135	178	131	99
CHA10B-651-653	147	196	143	107

NOTE — Corner weights of basic unit with electric heat.

INSTALLATION CLEARANCES (inches)

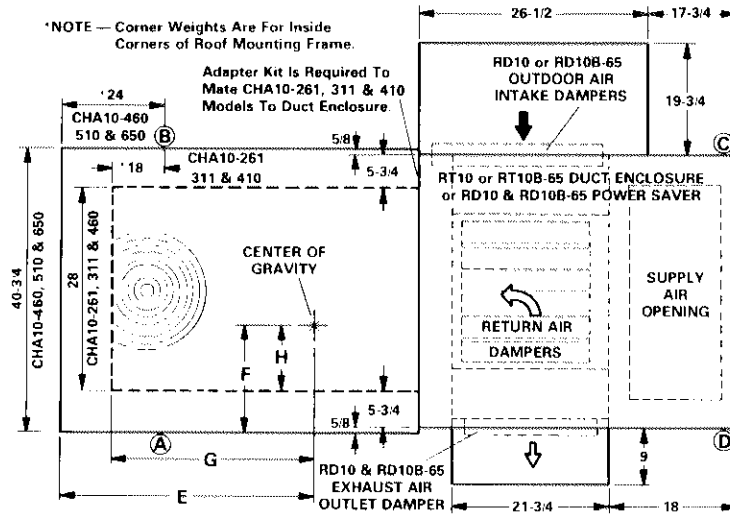


OPTIONAL OAD3-46/65 MINIMUM FRESH AIR DAMPER



OPTIONAL ROOFTOP ACCESSORIES — DIMENSIONS (inches)

*NOTE — Corner Weights Are For Inside Corners of Roof Mounting Frame.



CORNER WEIGHTS (lbs.)

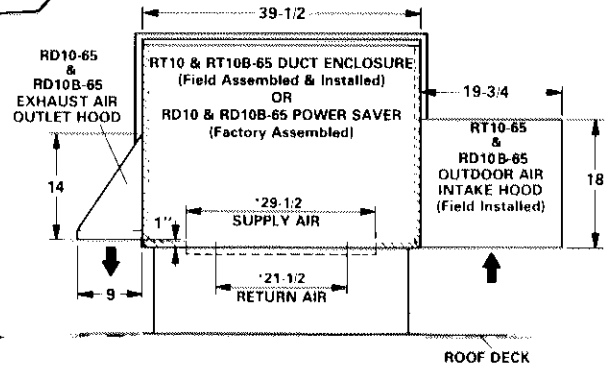
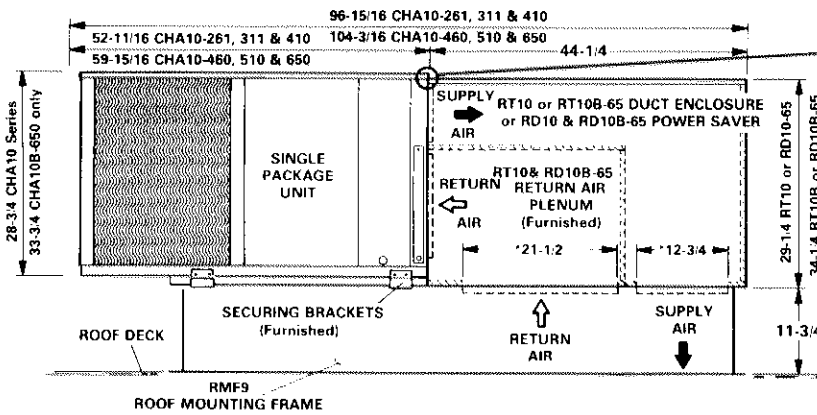
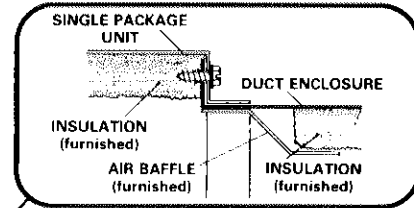
Model No.	A	B	C	D
CHA10-261	218	201	103	113
CHA10-311	225	208	106	116
CHA10-410	227	209	107	118
CHA10-460	370	240	87	136
CHA10-510	379	246	89	139
CHA10B-650	406	263	95	149

CENTER OF GRAVITY (in.)

Model No.	E	F	G	H
CHA10-261	----	----	37 1/2	13 1/4
CHA10-311	----	----	37 1/2	13 1/4
CHA10-410	----	----	37 1/2	13 1/4
CHA10-460	45 1/8	16 5/8	----	----
CHA10-510	45 1/8	16 5/8	----	----
CHA10B-650	45 1/8	16 5/8	----	----

NOTE - Corner weight of basic unit with SRT10-65, RD10-65, RMF9-65 and electric heat.

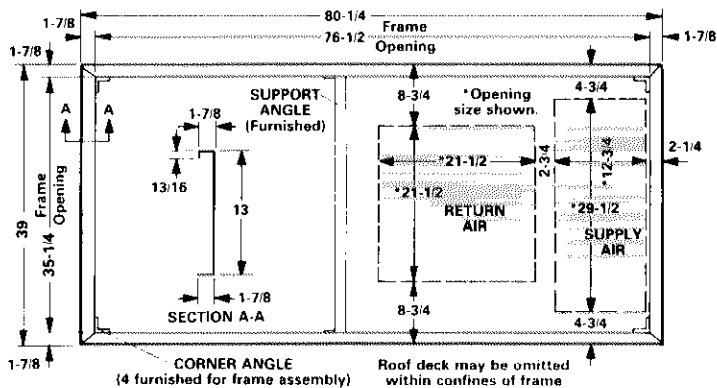
Duct Enclosure Mounting Detail



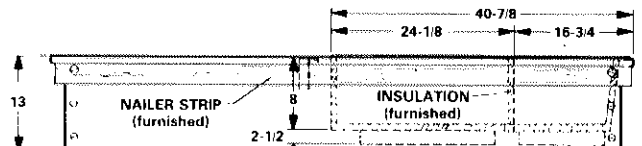
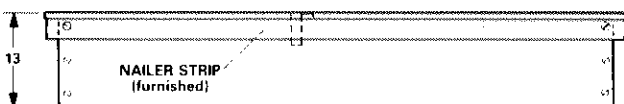
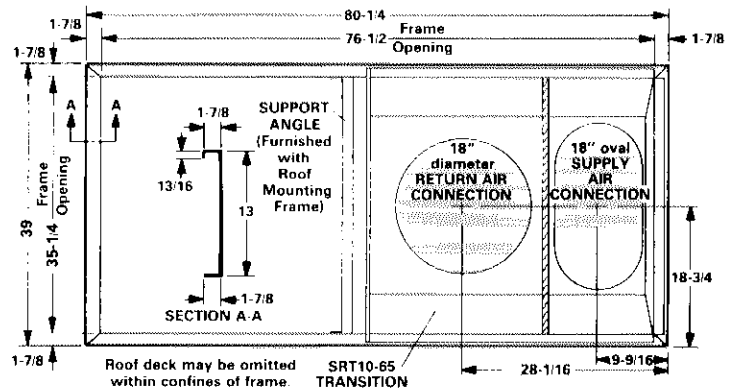
*Opening sizes in bottom of RT10/RD10

RMF9-65 ROOF MOUNTING FRAME

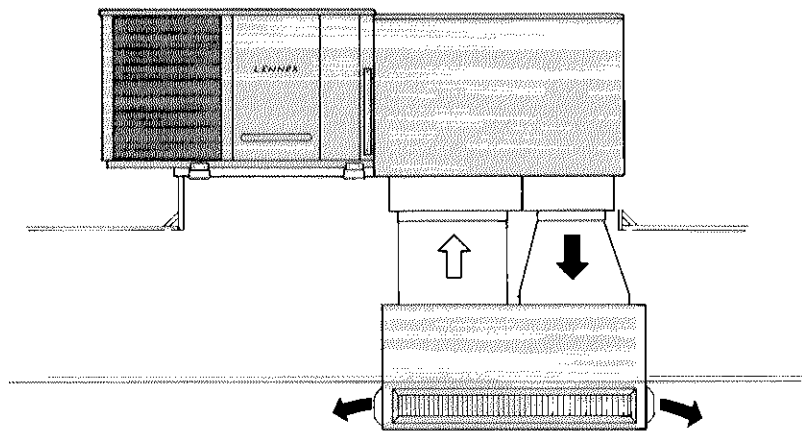
ROOF MOUNTING FRAME WITH DOUBLE DUCT OPENING



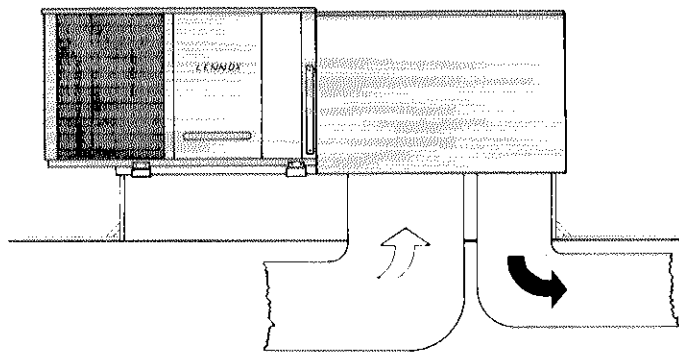
ROOF MOUNTING FRAME WITH COMBINATION CEILING SUPPLY AND RETURN



AIR PATTERN



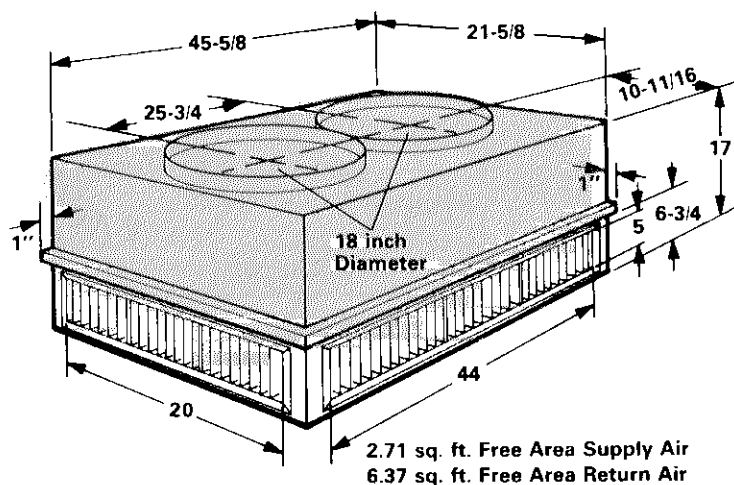
Combination Supply and Return Air Ceiling
Step-Down or Flush Diffuser



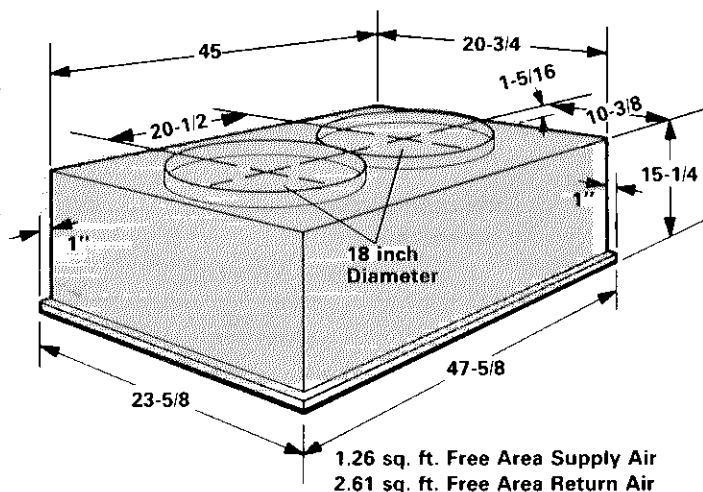
Separate Supply and Return (Double) Duct

COMBINATION CEILING SUPPLY AND RETURN AIR DIFFUSERS

RTD9-65 STEP-DOWN CEILING DIFFUSER



FD9-65 FLUSH CEILING DIFFUSER



Optional RTD9-65 Combination Ceiling Supply and Return Diffuser

Assembly — RTD9-65 step-down mount diffuser extends slightly below ceiling level when installed 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 connection collars for round duct connection, hanging rings for suspending, molded fiberglass 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.

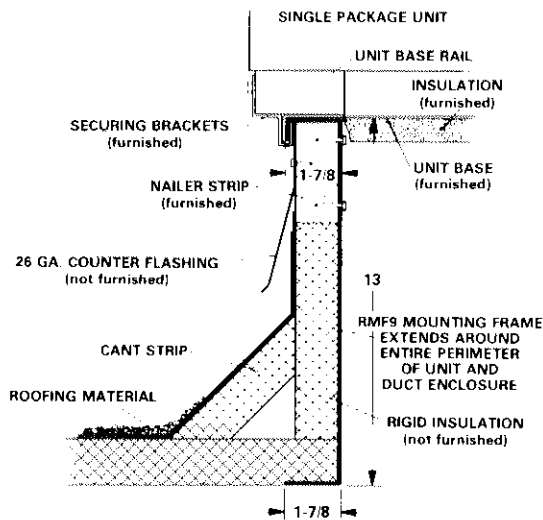
Optional FD9-65 Combination Ceiling Supply and Return Diffuser

Assembly — FD9-65 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 connection collars for round duct connection, support hanger eyelets at the top corners for secure installation, molded fiberglass 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.

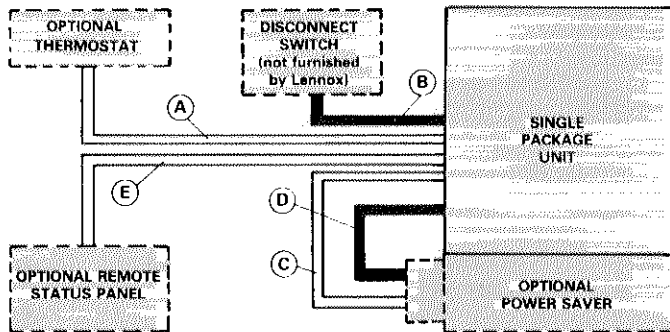
Optional SRT10-65 Supply and Return Transitions

— 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 collars for round duct connection. Round duct from the transitions to the diffuser is not furnished and must be provided by the installer. Transitions are completely factory assembled and easily field install in the roof mounting frame with minimum costs and labor requirement.

TYPICAL FLASHING FOR RMF9 ROOF MOUNTING FRAME



FIELD WIRING



- A — Three wire low voltage (Cooling only installation)
Four wire low voltage (All season installation)
- B — Two or Three wire power (See electrical data table)
- C — Four wire low voltage (Power Saver installation)
- D — Two wire power (Cooling only Power Saver installation)
Three wire power (All season Power Saver installation)
- E — Seven wire low voltage (SP11 installation)

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

— Field wiring not furnished —

ELECTRICAL DATA

CHA10-261, CHA10-311, CHA10-411 AND CHA10-460 MODELS

Model No.	CHA10-261	CHA10-311	CHA10-411	CHA10-413	CHA10-461	CHA10-463	
Line voltage data	†208/230v 60hz — 1ph	†208/230v 60hz — 1ph	†208/230v 60 — 1ph	††208/230v 60hz — 3ph	†208/230v 60hz — 1ph	††208/230v 60hz — 3ph	††460v 60hz — 3ph
Compressor	Rated load amps	11.8	16.1	18.9	12.5	20.6	15.3
	Locked rotor amps	54.0	87.0	93.9	66.0	107.0	72.5
Condenser Coil Fan	Full load amps	1.4	1.4	1.4	1.4	1.9	1.9
	Locked rotor amps	3.3	3.3	3.3	3.3	3.3	3.3
Evaporator Coil Blower	Full load amps	2.2	2.3	3.9	3.9	3.9	3.9
	Locked rotor amps	4.1	5.4	7.8	7.8	5.8	5.8
Recommended maximum fuse size (amps)	30	35	45	35	50	40	20
Unit power factor	.97	.96	.97	.88	.94	.87	.87
*Maximum circuit ampacity	20.4	23.8	28.9	21.0	31.6	25.0	12.5

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.

†Extremes of operating range are plus 10% and minus 5% of line voltage.

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

**Motors are rated at 230 volts. FLA shown are for step-down transformer output.

CHA10-510 AND CHA10B-650 MODELS

Model No.	CHA10-511	CHA10-513	CHA10B-651	CHA10B-653
Line voltage data	†208/230v 60hz — 1ph	††208/230v 60hz — 3ph	††460v 60hz — 3ph	††208/230v 60hz — 3ph
Compressor	Rated load amps	26.5	16.8	8.1
	Locked rotor amps	124.0	98.1	45.0
Condenser Coil Fan	Full load amps	1.9	1.9	**1.9
	Locked rotor amps	3.3	3.3	**3.3
Evaporator Coil Blower	Full load amps	6.0	6.0	**6.0
	Locked rotor amps	11.6	11.6	**11.6
Recommended maximum fuse size (amps)	60	45	20	70
Unit power factor	.98	.88	.88	.92
*Minimum circuit ampacity	41.1	29.0	14.1	44.9

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.

†Extremes of operating range are plus 10% and minus 5% of line voltage.

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

**Motors are rated at 230 volts. FLA shown are for step-down transformer output.

ELECTRIC HEAT DATA

ELECTRIC HEAT RATINGS

Model Number	†Output Btuh	†A.F.U.E.
ECH9-41-161	15,000	98.7
ECH9-41-261	24,000	99.2
ECH9-41-311	29,000	99.3
ECH9-41-471	43,000	99.5
ECH9-41-631	56,000	99.6
ECH9-46-381	36,000	99.1
ECH9-46-561	52,000	99.4
ECH9-46-751	68,000	99.5
ECH9-46-941	85,000	99.6
ECH9-65-381	37,000	99.2
ECH9-65-561	53,000	99.4
ECH9-65-751	70,000	99.5
ECH9-65-941	86,000	99.6
ECH9-65-1131	102,000	99.7

† Annual Fuel Utilization Efficiency based on DOE test procedures and FTC labeling regulations.

CHA10-261 AND CHA10-311 ELECTRIC HEAT DATA

Model No.	Optional Electric Unit Model No. & Net Weight	No. of Steps	Volts Input	Electric Heat Kw Input	Electric Heat Btuh Input	* Minimum Circuit Ampacity	
CHA10-261 CHA10-311	ECH9-41-161 (14 lbs)	1	208	3.5	11,900	24	
			220	3.9	13,300		
			230	4.2	14,300		
	ECH9-41-261 (14 lbs)	1	240	4.6	15,700	27	
			208	5.7	19,500		38
			220	6.4	21,900		
	ECH9-41-311 (14 lbs)	1	230	7.0	23,900	43	
			240	7.6	25,900		
			208	6.9	23,600		45
ECH9-41-471 (15 lbs)	1	220	7.7	26,300	51		
		230	8.4	28,700			
		240	9.2	31,400			
ECH9-41-471 (15 lbs)	1	208	10.4	35,500	66		
		220	11.6	39,600			
		230	12.7	43,400		75	
240	13.8	47,100					

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.

CHA10-411-413 ELECTRIC HEAT DATA

Model No.	Optional Electric Unit Model No. & Net Weight	No. of Steps	Volts Input	Electric Heat Kw Input	Electric Heat Btuh Input	* Minimum Circuit Ampacity	
CHA10-411	ECH9-41-161 (14 lbs)	1	208	3.5	11,900	29	
			220	3.9	13,300		
			230	4.2	14,300		
			240	4.6	15,700		
	ECH9-41-261 (14 lbs)	1	208	5.7	19,500	39	
			220	6.4	21,900		
			230	7.0	23,900		
	ECH9-41-311 (14 lbs)	1	240	7.6	25,900	45	
			208	6.9	23,600		46
			220	7.7	26,300		
	ECH9-41-471 (15 lbs)	1	230	8.4	28,700	53	
			240	9.2	31,400		
			208	10.4	35,500		67
	ECH9-41-471 (15 lbs)	1	220	11.6	39,600	77	
			230	12.7	43,400		
240			13.8	47,100			
ECH9-41-631 (16 lbs)	2	208	13.8	47,100	88		
		220	15.5	52,900			
		230	16.9	57,700		101	
240	18.4	62,800					
CHA10-413	ECH9-41-313 (15 lbs)	1	208	6.8	23,200		29
			220	7.6	25,900		
			230	8.3	28,300	32	
			240	9.0	30,700		
	ECH9-41-473 (15 lbs)	1	208	10.4	35,500		41
			220	11.6	39,600		
			230	12.7	43,400	46	
			240	13.8	47,100		
	ECH9-41-563 (15 lbs)	1	208	12.4	42,300		48
			220	13.9	47,500		
			230	15.2	51,900	55	
			240	16.5	56,300		

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.

CHA10-461-463 ELECTRIC HEAT DATA

Model No.	Optional Electric Unit Model No. & Net Weight	No. of Steps	Volts Input	Electric Heat Kw Input	Electric Heat Btuh Input	* Minimum Circuit Ampacity	
CHA10-461	ECH9-46-381 (20 lbs)	1	208	8.3	28,300	55	
			220	9.2	31,400		
			230	10.1	34,500		63
			240	11.0	37,600		
	ECH9-46-561 (23 lbs)	1	208	12.4	42,300	80	
			220	13.9	47,500		
			230	15.2	51,900		91
	240	16.5	56,300				
	ECH9-46-751 (24 lbs)	2	208	16.5	56,300	105	
			220	18.5	63,200		
			230	20.2	69,000		120
	240	22.0	75,100				
CHA10-463	ECH9-46-313 (23 lbs)	1	208	6.8	23,200	29	
			220	7.6	25,900		
			230	8.3	28,300		32
			240	9.0	30,700		
	ECH9-46/65-313 (23 lbs)	2	440	7.6	25,900	15	
			460	8.3	28,300		
			480	9.0	30,700		
	ECH9-46-563 (23 lbs)	1	208	12.4	42,300	48	
			220	13.9	47,500		
			230	15.2	51,900		55
			240	16.5	56,300		
	ECH9-46/65-563 (23 lbs)	2	440	13.9	47,500	28	
			460	15.2	51,900		
			480	16.5	56,300		
	ECH9-46-783 (28 lbs)	2	208	17.1	58,400	65	
220			19.2	65,500			
230			20.9	71,400	74		
240			22.8	77,800			
ECH9-46/65-783 (28 lbs)	3	440	19.2	65,600		37	
		460	20.9	71,400			
		480	22.8	77,800			

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 75°C (167°F).

ELECTRIC HEAT DATA

CHA10-511-513 ELECTRIC HEAT DATA

Model No.	Optional Electric Unit Model No. & Net Weight	No. of Steps	Volts Input	Electric Heat Kw Input	Electric Heat Btuh Input	*Minimum Circuit Ampacity
CHA10-511	ECH9-46-381 (20 lbs)	1	208	8.3	28,300	58
			220	9.2	31,400	65
			230	10.1	34,500	
			240	11.0	37,600	
	ECH9-46-561 (23 lbs)	1	208	12.4	42,300	82
			220	13.9	47,500	94
			230	15.2	52,000	
			240	16.5	56,300	
	ECH9-46-751 (24 lbs)	2	208	16.5	56,300	107
			220	18.5	63,200	123
			230	20.2	69,000	
			240	22.0	75,100	
ECH9-46-941 (26 lbs)	2	208	20.7	70,700	132	
		220	23.1	78,900	151	
		230	25.3	86,400		
		240	27.5	93,900		
CHA10-513	ECH9-46-313 (23 lbs)	1	208	6.8	23,200	32
			220	7.6	26,000	35
			230	8.3	28,300	
			240	9.0	30,700	
	ECH9-46/65-313 (23 lbs.)	2	440	7.6	26,000	18
			460	8.3	28,300	
			480	9.0	30,700	
	ECH9-46-563 (23 lbs)	1	208	12.4	42,300	51
			220	13.9	47,500	58
			230	15.2	51,900	
			240	16.5	56,300	
	ECH9-46/65-563 (23 lbs)	2	440	13.9	47,500	29
			460	15.2	51,900	
			480	16.5	56,300	
	ECH9-46-783 (28 lbs.)	2	208	17.1	58,400	67
			220	19.2	65,600	77
			230	20.9	71,400	
			240	22.8	77,900	
	ECH9-46/65-783 (28 lbs)	3	440	19.2	65,600	38
			460	20.9	71,400	
			480	22.8	77,900	
	ECH9-46-943 (28 lbs)	2	208	20.7	70,700	80
			220	23.2	79,200	91
			230	25.3	86,400	
240			27.6	94,200		
ECH9-46/65-943 (28 lbs)	3	440	23.2	79,200	46	
		460	25.3	86,400		
		480	27.6	94,200		

CHA10B-651-653 ELECTRIC HEAT DATA

Model No.	Optional Electric Unit Model No. & Net Weight	No. of Steps	Volts Input	Electric Heat Kw Input	Electric Heat Btuh Input	*Minimum Circuit Ampacity
CHA10B-651	ECH9-65-381 (20 lbs)	1	208	8.3	28,300	58
			220	9.2	31,400	66
			230	10.1	34,500	
			240	11.0	37,600	
	ECH9-65-561 (23 lbs)	1	208	12.4	42,300	84
			220	13.9	47,500	95
			230	15.2	52,000	
			240	16.5	56,300	
	ECH9-65-751 (24 lbs)	2	208	16.5	56,300	108
			220	18.5	63,200	124
			230	20.2	69,000	
			240	22.0	75,100	
ECH9-65-941 (26 lbs)	2	208	20.7	70,700	133	
		220	23.1	78,900	152	
		230	25.3	86,400		
		240	27.5	93,900		
ECH9-65-1131 (28 lbs)	2	208	24.8	84,700	158	
		220	27.7	94,600	181	
		230	30.3	103,500		
		240	33.0	112,700		
CHA10B-653	ECH9-65-313 (23 lbs)	1	208	6.8	23,200	35
			220	7.6	26,000	36
			230	8.3	28,300	
			240	9.0	30,700	
	ECH9-46/65-313 (23 lbs)	2	440	7.6	26,000	18
			460	8.3	28,300	
			480	9.0	30,700	
	ECH9-65-563 (23 lbs)	1	208	12.4	42,300	52
			220	13.9	47,500	59
			230	15.2	51,900	
			240	16.5	56,300	
	ECH9-46/65-563 (23 lbs)	2	440	13.9	47,500	30
			460	15.2	51,900	
			480	16.5	56,300	
	ECH9-65-783 (28 lbs)	2	208	17.1	58,400	68
			220	19.2	65,600	78
			230	20.9	71,400	
			240	22.8	77,900	
	ECH9-46/65-783 (28 lbs)	3	440	19.2	65,600	39
			460	20.9	71,400	
			480	22.8	77,900	
	ECH9-65-943 (28 lbs)	2	208	20.7	70,700	81
			220	23.2	79,200	92
			230	25.3	86,400	
240			27.6	94,200		
ECH9-46/65-943 (28 lbs)	3	440	23.2	79,200	46	
		460	25.3	86,400		
		480	27.6	94,200		
ECH9-65-1133 (28 lbs)	2	208	24.8	84,700	95	
		220	27.7	94,600	108	
		230	30.3	103,500		
		240	33.0	112,700		
ECH9-65-1133 (28 lbs)	3	440	27.7	94,600	55	
		460	30.3	103,500		
		480	33.0	112,700		

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for a least 75°C (167°F).

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 75°C (167°F).

COOLING RATINGS

NOTE To determine sensible capacity, leaving wet bulb and dry bulb temperatures not shown in the tables, see Miscellaneous Engineering Data section, Page 9.

CHA10-261 COOLING CAPACITY

Enter. Wet Bulb (°F)	Total Air Vol. (cfm)	Outdoor Air Temperature Entering Condenser Coil (°F)																							
		85						95						105						115					
		Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)						
				Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)						
			76	80	84				76	80	84				76	80	84				76	80	84		
63	800	22,700	1760	.78	.90	1.00	22,000	1920	.78	.90	1.00	20,800	2050	.80	.92	1.00	19,600	2200	.82	.95	1.00				
	900	23,100	1770	.80	.93	1.00	22,400	1940	.80	.93	1.00	21,200	2070	.82	.96	1.00	20,000	2220	.85	.99	1.00				
	1000	23,400	1780	.83	.96	1.00	22,700	1950	.82	.96	1.00	21,500	2080	.85	.99	1.00	20,200	2240	.88	1.00	1.00				
67	800	24,500	1810	.61	.72	.83	23,700	1980	.61	.72	.83	22,400	2120	.62	.74	.85	21,000	2280	.63	.76	.89				
	900	24,900	1820	.63	.74	.86	24,100	1990	.62	.74	.86	22,700	2130	.63	.76	.89	21,300	2290	.65	.79	.92				
	1000	25,200	1830	.64	.76	.89	24,400	2000	.63	.76	.89	23,000	2140	.65	.78	.92	21,500	2300	.67	.81	.95				
71	800	26,300	1850	.46	.57	.67	25,500	2040	.45	.56	.66	24,100	2180	.46	.57	.68	22,600	2360	.47	.58	.70				
	900	26,700	1860	.47	.58	.69	25,900	2050	.46	.57	.68	24,400	2200	.47	.59	.70	22,900	2370	.47	.60	.73				
	1000	27,000	1870	.48	.59	.71	26,200	2050	.47	.59	.70	24,700	2200	.47	.60	.73	23,100	2380	.48	.62	.75				

CHA10-311 COOLING CAPACITY

Enter. Wet Bulb (°F)	Total Air Vol. (cfm)	Outdoor Air Temperature Entering Condenser Coil (°F)																							
		85						95						105						115					
		Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)						
				Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)						
			76	80	84				76	80	84				76	80	84				76	80	84		
63	1000	29,900	2480	.76	.87	.95	28,500	2620	.78	.90	.95	27,100	2780	.80	.92	.95	25,600	2960	.82	.95	.95				
	1125	30,600	2500	.79	.92	.95	29,200	2640	.81	.94	.95	27,700	2800	.83	.95	.95	26,400	3000	.86	.95	.95				
	1250	31,000	2520	.82	.95	.95	29,800	2660	.84	.95	.95	28,500	2840	.87	.95	.95	27,200	3030	.90	.95	.95				
67	1000	31,900	2540	.59	.70	.81	30,400	2690	.60	.72	.83	28,900	2850	.61	.74	.86	27,400	3040	.63	.76	.88				
	1125	32,400	2560	.61	.73	.85	30,900	2700	.62	.75	.87	29,400	2870	.63	.77	.90	27,800	3060	.65	.79	.93				
	1250	32,900	2570	.63	.76	.89	31,300	2720	.64	.78	.91	29,800	2880	.66	.80	.94	28,200	3080	.68	.83	.95				
71	1000	34,200	2610	.44	.54	.65	32,600	2760	.44	.55	.66	31,100	2930	.45	.56	.68	29,500	3140	.45	.58	.70				
	1125	34,700	2630	.45	.56	.68	33,100	2770	.45	.57	.69	31,500	2950	.46	.59	.71	29,900	3150	.47	.60	.73				
	1250	35,100	2640	.46	.58	.71	33,500	2790	.46	.59	.73	31,900	2960	.47	.61	.75	30,200	3170	.48	.62	.77				

CHA10-411-413 COOLING CAPACITY

Enter. Wet Bulb (°F)	Total Air Vol. (cfm)	Outdoor Air Temperature Entering Condenser Coil (°F)																							
		85						95						105						115					
		Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)						
				Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)						
			76	80	84				76	80	84				76	80	84				76	80	84		
63	1200	35,200	2970	.72	.84	.91	33,300	3140	.74	.86	.91	31,300	3340	.77	.89	.91	29,200	3580	.80	.91	.91				
	1350	36,000	2990	.75	.87	.91	34,100	3160	.78	.90	.91	31,900	3380	.80	.91	.91	30,000	3650	.84	.91	.91				
	1500	36,400	3000	.78	.91	.91	34,700	3190	.81	.91	.91	32,700	3420	.84	.91	.91	30,700	3700	.87	.91	.91				
67	1200	37,400	3030	.56	.67	.78	35,300	3220	.58	.69	.80	33,100	3440	.59	.71	.83	30,700	3700	.61	.74	.87				
	1350	38,000	3050	.58	.70	.81	35,900	3240	.60	.72	.84	33,600	3460	.61	.75	.87	31,200	3730	.64	.78	.91				
	1500	38,500	3070	.60	.73	.85	36,300	3260	.62	.75	.88	34,000	3490	.64	.78	.91	31,500	3760	.66	.82	.91				
71	1200	40,000	3110	.42	.52	.62	37,700	3320	.43	.53	.64	35,300	3560	.43	.55	.66	32,800	3840	.44	.57	.69				
	1350	40,600	3130	.43	.54	.65	38,200	3340	.43	.55	.67	35,700	3580	.44	.57	.70	33,100	3870	.45	.59	.73				
	1500	41,000	3140	.44	.56	.68	38,600	3350	.44	.57	.70	36,100	3600	.45	.59	.73	33,400	3890	.47	.61	.76				

COOLING RATINGS

NOTE - To determine sensible capacity, leaving wet bulb and dry bulb temperatures not shown in the tables, see Miscellaneous Engineering Data section, Page 9.

CHA10-461-463 COOLING CAPACITY

Enter. Wet Bulb (°F)	Total Air Vol. (cfm)	Outdoor Air Temperature Entering Condenser Coil (°F)																							
		85						95						105						115					
		Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)						
				Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)						
			76	80	84				76	80	84				76	80	84				76	80	84		
63	1400	44,400	3740	.75	.86	.94	41,900	3990	.77	.89	.94	39,500	4250	.79	.92	.94	37,100	4510	.82	.94	.94				
	1575	45,400	3780	.78	.90	.94	42,900	4040	.80	.93	.94	40,300	4300	.83	.94	.94	38,200	4580	.86	.94	.94				
	1750	45,800	3810	.81	.94	.94	43,700	4080	.83	.94	.94	41,400	4360	.87	.94	.94	39,100	4640	.90	.94	.94				
67	1400	47,300	3850	.58	.69	.80	44,500	4120	.59	.71	.83	41,800	4380	.61	.74	.86	39,200	4650	.63	.76	.89				
	1575	48,100	3880	.60	.72	.84	45,200	4150	.62	.74	.87	42,400	4420	.63	.77	.90	39,600	4680	.66	.80	.94				
	1750	48,700	3910	.62	.75	.87	45,800	4170	.64	.78	.91	42,900	4440	.66	.81	.94	40,100	4710	.68	.84	.94				
71	1400	50,600	3980	.43	.54	.64	47,500	4250	.44	.55	.66	44,500	4530	.45	.57	.68	41,600	4810	.45	.58	.71				
	1575	51,300	4000	.44	.55	.67	48,100	4280	.45	.57	.69	45,000	4560	.46	.59	.72	42,000	4840	.47	.61	.75				
	1750	51,900	4030	.45	.57	.70	48,600	4310	.46	.59	.72	45,400	4590	.47	.61	.75	42,400	4860	.48	.63	.78				

CHA10-511-513 COOLING CAPACITY

Enter. Wet Bulb (°F)	Total Air Vol. (cfm)	Outdoor Air Temperature Entering Condenser Coil (°F)																							
		85						95						105						115					
		Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)						
				Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)						
			76	80	84				76	80	84				76	80	84				76	80	84		
63	1600	49,200	4340	.75	.87	.94	46,700	4670	.77	.90	.94	44,200	4980	.80	.92	.94	41,500	5260	.82	.94	.94				
	1800	50,300	4380	.79	.91	.94	47,400	4710	.81	.94	.94	45,100	5030	.83	.94	.94	42,700	5330	.86	.94	.94				
	2000	51,100	4410	.82	.94	.94	48,800	4760	.84	.94	.94	46,300	5090	.87	.94	.94	43,800	5390	.90	.94	.94				
67	1600	52,400	4460	.58	.70	.81	49,600	4800	.60	.72	.83	46,700	5110	.61	.74	.86	43,800	5390	.63	.76	.89				
	1800	53,200	4490	.61	.73	.85	50,300	4830	.62	.75	.88	47,400	5140	.64	.78	.91	44,400	5420	.66	.80	.94				
	2000	53,900	4520	.63	.76	.89	51,000	4860	.64	.78	.92	48,000	5170	.66	.81	.94	44,900	5450	.68	.84	.94				
71	1600	56,000	4600	.43	.54	.65	52,900	4940	.44	.55	.67	49,800	5260	.45	.57	.69	46,600	5540	.46	.58	.71				
	1800	56,800	4630	.44	.56	.68	53,600	4970	.45	.58	.70	50,400	5290	.46	.59	.72	47,100	5570	.47	.61	.75				
	2000	57,400	4650	.45	.58	.71	54,200	4990	.46	.60	.73	50,900	5310	.47	.61	.76	47,500	5590	.48	.64	.79				

CHA10B-651-653 COOLING CAPACITY

Enter. Wet Bulb (°F)	Total Air Vol. (cfm)	Outdoor Air Temperature Entering Condenser Coil (°F)																							
		85						95						105						115					
		Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)			Total Cool Cap. (Btuh)	Comp. Motor Watts Input	Sensible To Total Ratio (S/T)						
				Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)					Dry Bulb (°F)						
			76	80	84				76	80	84				76	80	84				76	80	84		
63	2000	58,500	5080	.76	.88	.94	55,400	5320	.78	.91	.94	51,800	5590	.81	.94	.94	48,800	5900	.84	.94	.94				
	2250	59,800	5130	.79	.92	.94	56,400	5370	.82	.94	.94	53,400	5660	.85	.94	.94	50,300	5970	.88	.94	.94				
	2500	60,900	5170	.83	.94	.94	57,900	5430	.85	.94	.94	54,800	5720	.89	.94	.94	51,600	6020	.92	.94	.94				
67	2000	62,200	5220	.59	.71	.82	58,600	5460	.60	.73	.85	55,000	5720	.62	.75	.88	51,300	6010	.64	.78	.91				
	2250	63,100	5250	.61	.74	.86	59,500	5490	.63	.76	.89	55,800	5760	.65	.79	.92	52,000	6040	.67	.82	.94				
	2500	63,900	5280	.63	.77	.90	60,300	5520	.65	.80	.93	56,500	5790	.67	.83	.94	52,700	6070	.70	.86	.94				
71	2000	66,400	5360	.44	.55	.66	62,600	5600	.44	.56	.67	58,700	5870	.45	.57	.70	54,800	6160	.46	.59	.72				
	2250	67,300	5390	.45	.57	.69	63,400	5630	.45	.58	.71	59,400	5900	.46	.60	.73	55,300	6190	.47	.62	.76				
	2500	68,000	5410	.46	.59	.72	64,100	5650	.47	.60	.74	60,000	5920	.48	.62	.77	55,900	6210	.49	.65	.80				

BLOWER DATA

CHA10-261 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
0	1255	985	760
.05	1225	965	745
.10	1195	945	725
.15	1170	925	710
.20	1140	900	690
.25	1110	880	670
.30	1080	850	645
.40	1010	790	585
.50	925	710	510
.60	815	585	410

NOTE — All cfm is measured external to the unit with the air filter in place.

CHA10-261 ELECTRIC HEAT AIR RESISTANCE

Air Volume (cfm)	Total Resistance (inches water gauge)		
	Electric Heaters		
	ECH-41-161	ECH9-41-261 ECH9-41-311	ECH9-41-313 ECH9-41-471 ECH9-41-473 ECH9-41-563
600	.03	.04	.06
700	.04	.06	.07
800	.06	.07	.09
900	.07	.09	.11
1000	.08	.11	.13
1100	.10	.13	.15
1200	.12	.15	.18
1300	.14	.18	.21

CHA10-311 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
0	1390	1325	1175	1040
.05	1355	1295	1150	1015
.10	1325	1265	1125	995
.15	1295	1235	1100	970
.20	1265	1205	1075	950
.25	1235	1175	1050	925
.30	1200	1145	1025	905
.40	1140	1085	970	860
.50	1070	1020	895	---

NOTE - All cfm is measured external to the unit with the air filter in place.

CHA10-311 ELECTRIC HEAT AIR RESISTANCE

Air Volume (cfm)	Total Resistance (inches water gauge)		
	Electric Heaters		
	ECH9-41-161	ECH9-41-261 ECH9-41-311	ECH9-41-313 ECH9-41-471 ECH9-41-473 ECH9-41-563
800	.06	.07	.09
900	.07	.09	.11
1000	.08	.11	.13
1100	.10	.13	.15
1200	.12	.15	.18
1300	.14	.18	.21
1400	.17	.21	.24

CHA10-411-413 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
0	1630	1365	1080
.05	1600	1345	1070
.10	1570	1320	1060
.15	1540	1300	1050
.20	1510	1275	1035
.25	1475	1250	1020
.30	1440	1230	1005
.40	1360	1175	965
.50	1265	1115	925
.60	1170	1050	---
.70	1050	---	---

NOTE — All cfm is measured external to the unit with the air filter in place.

CHA10-411-413 ELECTRIC HEAT AIR RESISTANCE

Air Volume (cfm)	Total Resistance (inches water gauge)			
	Electric Heaters			
	ECH9-41-161	ECH9-41-261 ECH9-41-311	ECH9-41-313 ECH9-41-471 ECH9-41-473 ECH9-41-563	ECH9-41-631
900	.07	.09	.11	.12
1000	.08	.11	.13	.14
1100	.10	.13	.15	.17
1200	.12	.15	.18	.20
1300	.14	.18	.21	.24
1400	.17	.21	.24	.28

BLOWER DATA

CHA10-461-463 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
0	1945	1630	1305
.05	1905	1610	1305
.10	1870	1585	1300
.15	1825	1565	1290
.20	1780	1540	1280
.25	1745	1510	1260
.30	1695	1485	1240
.40	1610	1420	1190
.50	1525	1335	1125
.60	1435	1240	1040
.70	1340	1130	---

NOTE — All cfm is measured external to the unit with the air filter in place.

CHA10-461-463 ELECTRIC AIR HEAT RESISTANCE

Air Volume (cfm)	Total Resistance (inches water gauge)			
	Electric Heaters			
	ECH9-46-381	ECH9-46-561 ECH9-46-313 ECH9-46-563 ECH9-46/65-313 ECH9-46/65-563	ECH9-65-751	ECH9-46-783 ECH9-46/65-783
1000	.09	.12	.14	.19
1100	.10	.13	.16	.21
1200	.11	.14	.17	.23
1300	.12	.16	.19	.26
1400	.13	.17	.21	.28
1500	.13	.18	.23	.31
1600	.14	.20	.25	.34
1700	.15	.22	.27	.37

CHA10-511-513 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
0	2430	2010	1710
.05	2390	1990	1695
.10	2355	1965	1670
.15	2320	1935	1650
.20	2280	1905	1625
.25	2240	1875	1595
.30	2205	1845	1570
.40	2130	1780	1510
.50	2045	1710	1440
.60	1955	1635	1365
.70	1855	1550	1285
.80	1750	1455	1200
.90	1635	1365	1110

NOTE — All cfm is measured external to the unit with the air filter in place.

CHA10-511-513 ELECTRIC HEAT AIR RESISTANCE

Air Volume (cfm)	Total Resistance (inches water gauge)				
	Electric Heaters				
	ECH9-46-381	ECH9-46-561 ECH9-46-313 ECH9-46/65-313 ECH9-46/65-563	ECH9-46-751	ECH9-46-941	ECH9-46-783 ECH9-46/65-563 ECH9-46-943 ECH9-46/65-943
1200	.11	.14	.17	.21	.23
1300	.12	.16	.19	.23	.26
1400	.13	.17	.21	.26	.28
1500	.13	.18	.23	.28	.31
1600	.14	.20	.25	.30	.34
1700	.15	.22	.27	.33	.37
1800	.16	.24	.29	.35	.40
1900	.17	.25	.32	.38	.43
2000	.18	.27	.34	.41	.47

CHA10B-651-653 BLOWER PERFORMANCE

Air Volume (cfm)	STATIC PRESSURE EXTERNAL TO UNIT — (Inches Water Gauge)																						
	0		.10		.20		.30		.40		.50		.60		.70		.80		.90		1.00		
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM
1800	865	.46	920	.49	970	.53	1021	.58	1067	.63	1110	.68	1158	.73	1192	.78	1238	.83	1275	.88	1313	.92	
1900	915	.53	968	.57	1018	.62	1059	.67	1105	.72	1150	.77	1191	.82	1233	.87	1271	.93	1307	.98	1343	1.03	
2000	964	.61	1014	.66	1060	.72	1104	.77	1150	.82	1188	.86	1229	.91	1267	.96	1304	1.03	1340	1.08	1375	1.15	
2100	1013	.72	1060	.78	1104	.82	1150	.88	1187	.92	1225	.97	1265	1.03	1304	1.09	1340	1.14	---	---	---	---	
2200	1065	.84	1109	.89	1150	.94	1188	.98	1225	1.03	1267	1.08	1304	1.15	---	---	---	---	---	---	---	---	
2300	1112	.95	1154	1.01	1192	1.05	1233	1.08	1271	1.15	---	---	---	---	---	---	---	---	---	---	---	---	
2400	1162	1.09	1200	1.14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	

NOTE - All cfm is measured external to the unit with the air filter in place.

CHA10B-651-653 ELECTRIC HEAT AIR RESISTANCE

Air Volume (cfm)	Total Resistance (inches water gauge)					
	Electric Heaters					
	ECH9-65-381	ECH9-65-313 ECH9-65-561 ECH9-65-563	ECH9-46/65-313 ECH9-46/65-563	ECH9-65-751	ECH9-65-941	ECH9-65-783 ECH9-65-943 ECH9-46/65-783 ECH9-65-1131 ECH9-46/65-943 ECH9-65-1133
1800	.16	.24	.29	.35	.40	
1900	.17	.25	.32	.38	.43	
2000	.18	.27	.34	.41	.47	
2100	.20	.29	.37	.44	.50	
2200	.22	.32	.39	.47	.53	
2300	.23	.34	.42	.51	.57	
2400	.25	.37	.46	.55	.61	

ACCESSORY AIR RESISTANCE

Model No.	Air Volume (cfm)	Total Resistance (inches water gauge)				
		RD10 Power Saver	RTD9-65 Diffuser			FD9-65 Diffuser
			2 Sides Open	3 Sides Open	4 Sides Open	
CHA10-261	600	.09	.11	.10	.09	.09
	700	.10	.13	.11	.10	.10
	800	.12	.15	.13	.11	.11
	900	.13	.17	.14	.12	.12
	1000	.14	.19	.16	.14	.14
	1100	.15	.22	.18	.15	.15
	1200	.16	.25	.20	.17	.17
CHA10-311	800	.12	.15	.13	.11	.11
	900	.13	.17	.14	.12	.12
	1000	.14	.19	.16	.14	.14
	1100	.15	.22	.18	.15	.15
	1200	.16	.25	.20	.17	.17
	1300	.17	.29	.22	.18	.18
	1400	.18	.33	.25	.20	.20
CHA10-410	900	.13	.17	.14	.12	.12
	1000	.14	.19	.16	.14	.14
	1100	.15	.22	.18	.15	.15
	1200	.16	.25	.20	.17	.17
	1300	.17	.29	.22	.18	.18
	1400	.18	.33	.25	.20	.20
	1500	.20	.38	.28	.22	.22
	1600	.21	.43	.32	.24	.24
CHA10-460	1000	.14	.19	.16	.14	.14
	1100	.15	.22	.18	.15	.15
	1200	.16	.25	.20	.17	.17
	1300	.17	.29	.22	.18	.18
	1400	.18	.33	.25	.20	.20
	1500	.20	.38	.28	.22	.22
	1600	.21	.43	.32	.24	.24
	1700	.23	.49	.36	.27	.27
CHA10-510	1200	.16	.25	.20	.17	.17
	1300	.17	.29	.22	.18	.18
	1400	.18	.33	.25	.20	.20
	1500	.20	.30	.28	.22	.22
	1600	.21	.43	.32	.24	.24
	1700	.23	.49	.36	.27	.27
	1800	.24	.56	.40	.30	.30
	1900	.25	.64	.45	.33	.33
	2000	.27	.73	.50	.36	.36
CHA10B-650	1800	.24	.56	.40	.30	.30
	1900	.25	.64	.45	.33	.33
	2000	.27	.73	.50	.36	.36
	2100	.28	.83	.56	.40	.40
	2200	.30	.95	.63	.44	.44
	2300	.32	1.08	.71	.48	.48
	2400	.33	1.23	.79	.53	.53

NOTE - RT10 Duct Enclosure has no appreciable air resistance.

RTD9-65 DIFFUSER GRILLE AIR THROW DATA

Sides Open	Air Volume (cfm)	*Effective Throw (ft)		
		Horizontal Vanes 180° Straight	Horizontal Vanes 22° Down	Horizontal Vanes 45° Down
Two Sides Open	600	21	19	14
	800	22	21	15
	1000	24	22	16
	1200	25	23	17
	1400	27	25	18
	1600	29	26	19
	1800	31	27	20
	2000	33	28	21
	2200	35	30	22
Three Sides Open	600	15	14	8
	800	16	15	9
	1000	17	16	10
	1200	18	17	11
	1400	19	18	12
	1600	20	18	12
	1800	21	19	13
	2000	23	20	14
	2200	25	22	16
Four Sides Open	600	11	10	7
	800	12	11	8
	1000	13	12	8
	1200	14	13	9
	1400	15	14	9
	1600	16	14	10
	1800	17	15	10
	2000	18	16	11
	2200	19	17	12
2400	20	18	12	

*Effective throw is terminated at a point where conditioned air velocity has decreased to 50 fpm.

FD9-65 DIFFUSER GRILLE AIR THROW DATA

Air Volume (cfm)	*Effective Throw (ft)
600	7
800	8
1000	8
1200	9
1400	9
1600	10
1800	11
2000	12
2200	12
2400	13

*Terminated at the point where conditioned air velocity has decreased to 50 fpm.

GUIDE SPECIFICATIONS

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

General — Furnish and install a single package air to air DX 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 manufacturer shall have parts and service available throughout the United States.

The installed weight shall not be more than lbs. Entire unit shall have a width of not more than inches, a depth of not more than inches and an overall height of not more than 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.

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

Roof Mounting Frame — Furnish and install a steel roof mounting frame. 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 National Roofing Contractors Association.

Air Distribution — Equipment shall be capable of end or bottom handling of conditioned air. All air distribution ducts shall be fiberglass or ga. galvanized steel insulated with inch thick lb. density fiberglass or equivalent.

Furnish and install a (flush or stepdown) optional combination ceiling supply and return air grille. It shall be capable of not less than ft. radius of effective throw.

Cooling System — The total certified cooling capacity shall not be less than Btuh with an evaporator air volume of cfm, an entering wet bulb air temperature of F, an entering dry bulb air temperature of F and a condenser entering temperature of 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 sq. ft. (evaporator) and sq. ft. (condenser).

The compressor shall be resiliently mounted, have overload protection, internal pressure relief and crankcase heater. The refrigeration system shall have suction and discharge line service gauge ports, liquid line strainer, low pressure switch and full refrigerant charge. Control options available shall consist of timed off control, low ambient control and start controls. Shall comply with ARI Standard 210 test conditions and DOE test procedures.

Additive Electric Heaters — The certified total heating capacity output shall be Btuh with Kw input at volts power supply.

Optional electric heaters shall be field installed. Heating elements shall be nichrome bare wired exposed directly to the air stream. Thermal time delay relay shall bring the elements on and off in sequence with a time delay between each element. Circuit breakers shall provide overload and short circuit protection. Safety devices shall consist of limit controls and thermal cutoff safety fuses. Heaters shall be U.L. Listed.

Cabinet — Shall be of galvanized steel with a baked-on outdoor enamel paint finish. 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. Base shall elevate unit off mounting surface. Optional condenser coil guards shall be available.

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

Air Movers — Centrifugal conditioned air blower shall be direct driven by a multi-speed motor. CHA10B-650 models shall have permanently lubricated ball bearings, adjustable belt driven and motor mount where belt tension can be easily adjusted. Blower shall be capable of delivering cfm at an external static pressure of inches water gauge requiring not more than bhp and rpm. Blowers shall be statically and dynamically balanced.

Propeller type condenser fan shall be direct driven by a hp permanently lubricated and inherently protected motor.

Air Filters — Cleanable filters furnished shall have not less than sq. ft. of free area.

Duct Enclosure — Furnish and install an optional field assembled duct enclosure. Enclosure shall attach to the single package unit and mate to the roof mounting frame providing weatherproof duct connection and entry into the conditioned area. Brackets shall be provided to secure unit to frame. Enclosure shall be of galvanized steel with a baked-on outdoor enamel finish and shall be completely insulated.

POWER SAVER — Furnish and install complete with controls an optional duct enclosure with air mixing damper assembly including outdoor air and recirculated air dampers with pressure operated exhaust air dampers. The assembly shall mount within the confines of the duct enclosure and provide for the introduction of outside air for minimum ventilation and free cooling. Outdoor air intake hood shall include air filter. Damper motor shall be 24 volt, 3 position spring return. Controls shall include adjustable mixed air controller, adjustable compressor monitor and adjustable enthalpy control.

Minimum Fresh Air Damper — Optional fresh air damper shall be available to provide outdoor air requirements. Damper box field installs external to duct enclosure and shall be manually operated.

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, No Heat and Filter.