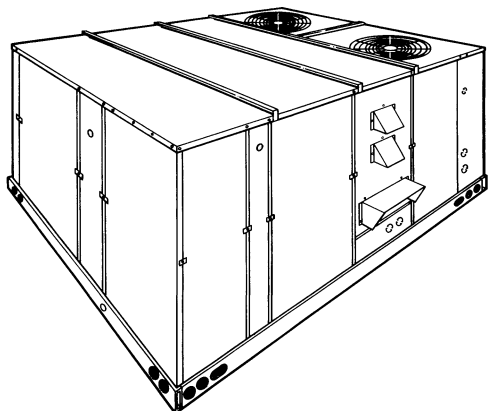




Heating and Air Conditioning Technical Guide



SINGLE PACKAGE GAS / ELECTRIC UNITS AND SINGLE PACKAGE AIR CONDITIONERS

**D2CE / D2CG 300 CONSTANT VOLUME
25 NOMINAL TONS
8.5 EER
SUNLINE 2000™**



DESCRIPTION

Sunline™ 2000 series convertible package rooftop models have two independent refrigerant circuits for efficient part load operation. Although the units are primarily designed for curb mounting on a roof, they can also be slab-mounted at ground level or set on steel beams above a finished roof.

Cooling only, cooling with gas heat and cooling with electric heat models are available with a wide variety of factory-mounted options and field-installed accessories to make them suitable for almost every application.

All units are self-contained and assembled on full perimeter base rails with holes in the four corners for overhead rigging.

Every unit is completely piped, wired, charged and tested at the factory to simplify field installation and to provide years of dependable operation. Powder paint cabinets provide an exceptionally durable finish with the 750 hour salt spray process per ASTM-B117 test standard.

All models (including those with an economizer) are suitable for either bottom or horizontal duct connections. Models with power exhaust are suitable for bottom duct connections only. For bottom duct, you remove the sheet metal panels from the supply and return air openings through the base of the unit. For horizontal duct, you replace the supply and return air panels on the rear of the unit with a side duct flange accessory.

All models are available with five different outdoor air damper options:

- Single enthalpy economizer
- Differential (dual) enthalpy economizer
- Single enthalpy economizer with power exhaust
- Differential (dual) enthalpy economizer with power exhaust
- Motorized outdoor air damper

A fixed outdoor air intake assembly is shipped in the return air compartment of all units ordered without an economizer or motorized outdoor air damper option. The assembly includes a rain hood with a damper that can be set for 10, 15 or 25% outdoor air. With bottom duct connections, the intake damper assembly should be mounted over the opening in the return air panel. With horizontal ductwork, it should be mounted on the return air duct.

All supply air blowers are equipped with a belt drive that can be adjusted to meet the exact requirements of the job. A high speed drive accessory is available for applications with a higher CFM and/or static pressure requirement.

All compressors include internal pressure relief. Every refrigerant circuit includes an expansion valve, a liquid line filter-drier, a discharge line high pressure switch and a suction line with a freestat and low pressure/loss of charge switch. The unit control circuit includes two 75 VA transformers, two 24-volt circuit breakers and a relay board with two compressor lockout circuits, a terminal strip for thermostat wiring, plus an additional set of pin connectors to simplify the interface of additional field controls.

All 208/230 and 460-volt models are ETL approved. All 208/230 and 575-volt models are CGA approved.

All models include a 1-year limited warranty on the complete unit. Compressors and electric heater elements carry an additional 4-year warranty. Aluminized steel tubular heat exchangers carry an additional 9-year warranty.

All gas heat models are built with two heating sections for two equal stages of capacity control. Each section includes a durable heat exchanger with aluminized steel tubes, a redundant gas valve, spark ignition, power venting, an ignition module for 100% shut-off and all of the safety controls required to meet the latest ANSI standards.

The gas supply piping can be routed into the heating compartment through a hole in the base pan of the unit or through a knockout in the piping panel on the front of the unit.

All electric heat models are wired for a single power source and include a bank of nickel chromium elements mounted at the discharge of the supply air blower to provide a high velocity and uniform distribution of air across the heating elements. Every element is fully protected against excessive current and temperature by fuses and two thermal limit switches.

The power supply wiring can be routed into the control box through a threaded pipe connection in the base pan of the unit or through a knockout in the wiring panel on the front of the unit.

All internal factory wiring is color coded and numbered for ease in servicing and troubleshooting.

FACTORY-INSTALLED OPTIONS

ECONOMIZERS

Interlocked outdoor and return air dampers are positioned by a fully modulating, spring return damper actuator capable of introducing up to 100% outdoor air with nominal 1% leakage type dampers. As the outdoor air intake dampers open, the return air dampers close. The changeover from compressor to economizer cooling is determined by one or two solid state enthalpy controls.

On single enthalpy, an outdoor air sensor determines when the outdoor air is cool and dry enough to provide "free" cooling. On differential enthalpy, one sensor monitors the outdoor air while a second sensor monitors the return air. Whenever the outdoor air is cooler and drier than the return air, the unit will switch to economizer operation. For either option, the first compressor stage can provide additional cooling during economizer operation if the room thermostat calls for second stage.

The dampers and controls are installed and wired at the factory. Only the accessory rain hood needs to be assembled and installed in the field.

These economizer options can be used on all duct configurations.

POWER EXHAUST

Both the single and differential economizer options are available with power exhaust. Whenever the outdoor air intake dampers are opened for free cooling, the exhaust fan will be energized to prevent the conditioned space from being over-pressurized during economizer operation.

The exhaust fan, motor and controls are installed and wired at the factory. Only the back-draft damper assembly needs to be field installed and the accessory rain hoods need to be assembled and installed in the field.

The power exhaust option can only be used on bottom duct configurations.

MOTORIZED OUTDOOR AIR INTAKE DAMPER

Interlocked outdoor and return air dampers are controlled by a 2-position, spring return damper actuator. The outdoor damper will open to some pre-set position whenever the supply air blower is operating and will drive fully closed when the blower shuts down.

The damper and controls are installed and wired at the factory. Only the accessory rain hood needs to be assembled in the field.

This damper option can be used on all duct configurations.

FIELD-INSTALLED ACCESSORIES

SINGLE INPUT ELECTRONIC ENTHALPY ECONOMIZERS

Includes a slide-in/plug-in damper assembly with fully modulating spring-return motor actuator capable of introducing up to 100% outdoor air with nominal 1% leakage type dampers.

The enthalpy system contains one sensor that monitors the outdoor air and determines when the air is cool enough and dry enough to provide “free” cooling.

The rainhood is painted to match the basic unit and must be field-assembled before installing.

Power exhaust is not available as a field installed option.

DUAL INPUT ELECTRONIC ENTHALPY ECONOMIZERS

Includes a slide-in / plug-in damper assembly with fully modulating spring-return motor actuator capable of introducing up to 100% outdoor air with nominal 1% leakage type dampers.

This enthalpy system contains one sensor that monitors the outdoor air and one sensor that monitors the return air. The logic module compares these two values and modulates the dampers providing the maximum efficiency of economizer system.

The rainhood is painted to match the basic unit and must be field-assembled before installing.

Power exhaust is not available as a field installed option.

MOTORIZED OUTDOOR AIR INTAKE DAMPER

Includes a slide-in/plug-in damper assembly with a 2-position, spring return motor actuator which opens to some pre-set position whenever the supply air blower is operating and will drive fully closed when the blower unit shuts down.

The rain hood is painted to match the basic unit and must be field assembled before installing.

Power exhaust is not available as a field installed option.

ROOF CURBS

Fourteen inch high roof curbs provide a water-tight seal between the unit and the finished roof. These full perimeter curbs meet the requirements of the National Roofing Contractors Association (NRCA) and are shipped knocked-down for field assembly. They're designed to fit inside the base rails of the unit and include both a wood nailing strip and duct hanger supports.

Unitary Products Group

ANTI-RECYCLE TIMERS

Two solid state timers prevent the compressors from short-cycling. Once a compressor is de-energized, it will remain de-energized for approximately five minutes.

HIGH ALTITUDE NATURAL GAS

Burner orifices and pilot orifices are provided for proper furnace operation at altitudes up to 6,000 feet.

PROPANE

Burner orifices, pilot orifices and gas valve parts are provided to convert a natural gas furnace to propane.

HIGH ALTITUDE PROPANE

Burner orifices and pilot orifices are provided for proper furnace operation at altitudes up to 6,000 feet. This accessory supplements the basic propane conversion kit.

SIDE DUCT FLANGES

One inch flanges replace the supply and return air panels on the rear of the unit to accommodate horizontal duct connections. These flanges can also be used individually for bottom supply/horizontal return or horizontal supply/bottom return. They cannot be used on units with power exhaust.

BAROMETRIC RELIEF DAMPER

This damper accessory can be used to relieve internal air pressure on units with an economizer but no power exhaust. This accessory includes a rain hood, a bird screen and a fully assembled damper. With bottom duct connections, the damper should be mounted over the opening in the return air panel. With horizontal ductwork, the accessory should be mounted on the return air duct.

ECONOMIZER / POWER EXHAUST RAIN HOODS

A rain hood accessory must be used on units with an economizer, a motorized damper, or a combined economizer with power exhaust option. These accessories include all the hood panels, the necessary components and hardware for field assembly.

HIGH SPEED DRIVE

A smaller blower pulley and a shorter belt increase the speed of the supply air blower for applications with a higher CFM and/or static pressure requirement.

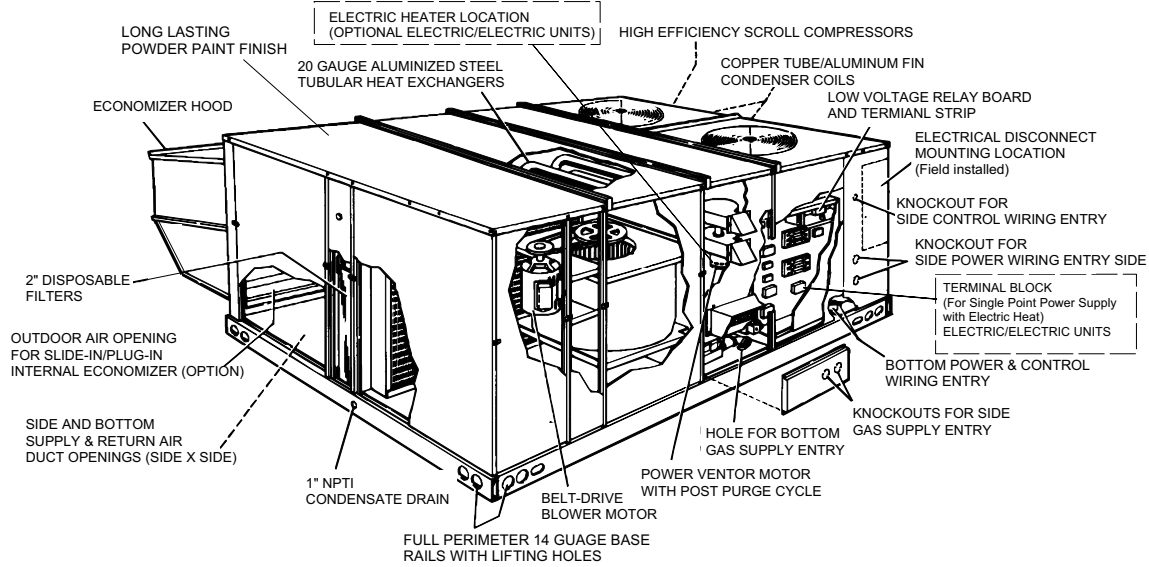
LOW AMBIENT CONTROLS TO 0°F

An autotransformer and a thermostat maintain stable system operation by reducing the speed of the condenser fan motor at low outdoor temperatures. The kit

also includes a 1-phase motor to replace the unit's standard 3-phase condenser fan motor. Standard units can operate down to 45°F.

Provides coil guard and fasteners.

COIL GUARD KIT



CAPACITY RATINGS - (ARI 360)*

MODEL	MBH	EER	IPLV	MODEL	MBH	EER	IPLV
COOLING WITH GAS HEAT				COOLING WITH ELECTRIC HEAT			
D2CG300N240	290	8.5	8.3	D2CE300E018	290	8.5	8.6
D2CG300N320	290	8.5	8.3	D2CE300E036	290	8.5	8.6
COOLING ONLY				D2CE300E054	287	8.5	8.2
D2CE300	290	8.5	8.7	D2CE300E072	284	8.5	8.2

* Outside the scope of ARI Standard 340/360.
 EER=Energy Efficiency Rating at full load-the cooling capacity in Btu's per hour (Btuh) divided by the power input in watts, expressed in Btuh per watt (Btuh/watt).
 IPLV - Integrated part load value.
 NOTE: All cooling is three stage.

GAS HEAT RATINGS				
MODEL	MBH Input		MBH Output	
	Stage 1&2	Stage 1	Stage 1&2	Stage 1
D2CG300N240	300	150	240	120
D2CG300N320	400	200	320	160

Note: All gas units are two-stage heating. First stage is 50% of total.
 All models are 80% Steady State Efficiency (S.S.E.).

Unit Size	CFM)	ESP	Blower		Sound Power (db 10 ⁻¹² Watts)									
					Octave Band Centerline Frequency (Hz)								SWL	db(A) @ 10 Ft.*
					IWG	RPM	BHP	63	125	250	500	1,000		
300	10,000	1.30	1,160	12.5	108	108	98	91	93	86	81	76	98	65

* At a distance of 10 ft.from the blower.

NOTE: These values have been derived using a model of sound propagation, measuring the indoor ambient sound levels ten feet from the source. The dBA values provided are for reference only. Calculation of dBA values cover matters of system design and application. This constitutes an exception to any speci-

fication or guarantee requiring a dBA value or sound data in any other form than sound power level ratings.

COOLING CAPACITIES 25 TON (DCE / DCG300)

Air On Evaporator Coil		Temperature of Air on Condenser Coil																			
		85°F								95°F											
		CFM	WB °F	Total Cap. ¹ MBH	Power Input ² KW	Sensible Capacity ¹ , MBH								Total Cap. ¹ MBH	Power Input ² KW	Sensible Capacity ¹ , MBH					
Entering Dry Bulb, °F								Entering Dry Bulb, °F													
				86	83	80	77	74	71	68					86	83	80	77	74	71	68
12,000	72	371	27.1	277	240	203	167	130	-	-	354	28.8	268	231	195	158	122	-	-		
	67	340	26.1	335	299	262	226	189	152	116	325	27.7	324	288	251	214	178	141	105		
	62	329	25.5	329	329	329	293	256	219	183	315	27.1	315	315	315	278	241	205	168		
	57	329	25.5	329	329	329	292	256	219	183	314	27.1	314	314	314	278	241	205	168		
11,000	72	365	27.0	260	226	193	159	125	-	-	348	28.6	257	223	189	155	122	-	-		
	67	336	25.9	317	283	249	216	182	148	114	321	27.5	312	279	245	211	178	144	110		
	62	324	25.3	324	324	313	279	245	212	178	309	26.9	309	309	307	273	239	206	172		
	57	324	25.3	324	324	315	281	247	214	180	309	26.9	309	309	309	275	242	208	174		
10,000	72	359	26.8	244	213	182	151	120	-	-	342	28.5	245	214	184	153	122	-	-		
	67	332	25.7	298	268	237	206	175	144	113	317	27.4	301	270	239	208	177	146	115		
	62	318	25.2	318	318	296	265	235	204	173	304	26.8	304	304	299	268	237	207	176		
	57	318	25.1	318	318	301	270	239	208	177	304	26.7	304	304	304	273	242	211	180		
9,000	72	354	26.6	229	201	173	145	117	-	-	338	28.2	228	200	172	144	116	-	-		
	67	326	25.5	280	252	224	196	168	141	113	312	27.1	279	251	223	195	167	139	111		
	62	314	25.0	314	306	282	254	226	198	170	300	26.5	300	295	280	253	225	197	169		
	57	314	25.0	314	308	286	258	230	203	175	300	26.5	300	297	285	257	229	201	173		
8,000	72	349	26.4	215	190	165	140	115	-	-	334	28.0	211	186	161	136	111	-	-		
	67	321	25.3	262	237	212	187	162	137	112	307	26.9	257	232	207	182	157	132	107		
	62	310	24.8	310	293	268	243	218	193	168	297	26.3	297	287	262	237	212	187	162		
	57	310	24.8	310	297	272	247	222	197	172	297	26.3	297	291	266	241	216	191	166		
6,000	72	318	25.2	186	167	148	129	110	-	-	304	26.8	177	158	138	119	100	-	-		
	67	290	24.0	226	206	187	168	149	130	111	277	25.5	213	194	175	156	137	118	99		
	62	282	23.7	277	258	240	221	201	192	163	270	25.2	262	243	225	206	187	167	148		
	57	282	23.7	281	262	243	224	205	186	167	270	25.2	266	247	228	209	190	171	152		

Air On Evaporator Coil		Temperature of Air on Condenser Coil																			
		105°F								115°F											
		CFM	WB °F	Total Cap. ¹ MBH	Power Input ² KW	Sensible Capacity ¹ , MBH								Total Cap. ¹ MBH	Power Input ² KW	Sensible Capacity ¹ , MBH					
Entering Dry Bulb, °F								Entering Dry Bulb, °F													
				86	83	80	77	74	71	68					86	83	80	77	74	71	68
12,000	72	337	30.7	264	228	191	155	118	-	-	320	32.6	261	224	188	151	114	-	-		
	67	310	29.5	309	283	246	210	173	137	100	294	31.3	294	278	242	205	169	132	95		
	62	300	28.8	300	300	300	263	226	190	153	285	30.5	285	285	285	248	212	175	138		
	57	299	28.8	299	299	299	263	226	190	153	285	30.5	285	285	285	248	211	175	138		
11,000	72	331	30.5	254	221	187	153	119	-	-	315	32.3	252	218	185	151	117	-	-		
	67	306	29.3	302	276	242	208	174	141	107	291	31.0	291	273	239	205	171	138	104		
	62	295	28.5	295	295	294	260	226	192	159	280	30.3	280	280	280	246	213	179	145		
	57	294	28.5	294	294	294	261	227	193	160	280	30.3	280	280	280	246	213	179	145		
10,000	72	326	30.2	244	213	183	152	121	-	-	310	32.1	243	212	181	151	120	-	-		
	67	302	29.0	294	268	237	206	176	145	114	287	30.8	287	267	236	205	174	143	112		
	62	290	28.3	290	290	287	256	226	195	164	276	30.0	276	276	276	245	214	183	152		
	57	290	28.2	290	290	290	259	228	197	166	275	29.9	275	275	275	244	214	183	152		
9,000	72	322	30.0	228	200	172	144	116	-	-	306	31.8	228	200	172	144	116	-	-		
	67	297	28.8	276	251	223	195	167	139	111	283	30.5	274	251	223	195	167	139	111		
	62	286	28.1	286	284	271	243	215	187	159	272	29.8	272	272	262	234	206	178	150		
	57	286	28.1	286	285	273	245	217	189	161	272	29.7	272	272	261	234	206	178	150		
8,000	72	319	29.8	212	187	162	137	112	-	-	303	31.6	213	188	163	138	113	-	-		
	67	293	28.6	259	234	209	184	159	134	109	278	30.3	260	235	210	185	160	135	110		
	62	283	28.0	283	278	255	230	205	180	155	269	29.6	269	269	248	223	198	173	148		
	57	283	28.0	283	280	257	232	207	182	157	269	29.6	269	269	248	223	198	173	148		
6,000	72	290	28.3	180	161	141	122	103	-	-	276	30.0	183	164	145	125	106	-	-		
	67	264	26.9	224	200	181	162	142	123	104	251	28.5	222	203	194	165	146	127	108		
	62	258	26.6	258	241	223	204	184	165	146	245	28.2	245	239	220	201	182	163	144		
	57	258	26.6	258	242	224	205	186	167	148	245	28.2	245	240	221	202	182	163	144		

¹These capacities are gross ratings. For net capacity, deduct the heat of the supply air blower motor, MBH = 3.415 x KW. Refer to the appropriate Blower Performance Table for the KW of the supply air blower motor.

²These ratings include the condenser fan motors (Total 2.3 KW) and the compressor motors but not the supply air blower motor.

Nominal Rating

All Sensible Capacity

BLOWER PERFORMANCE 25 TON (DCE/DCG300)

DCE300-BOT TOM DUCT CONNECTIONS (COOLING APPLICATIONS)

BLOWER SPEED (rpm)	PULLEY TURNS OPEN:	7500 CFM			8750 CFM			10000 CFM			11250 CFM			12500 CFM		
		ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)
STANDARD DRIVE:																
975	6.0*	1.4	5.9	4.9	1.0	7.3	6.0	0.5	8.8	7.2	-	-	-	-	-	-
1005	5.0	1.6	6.2	5.1	1.2	7.7	6.3	0.7	9.2	7.6	0.1	10.9	8.9	-	-	-
1040	4.0	1.8	6.6	5.4	1.4	8.1	6.7	0.9	9.7	8.0	0.3	11.4	9.4	-	-	-
1070	3.0	2.0	6.9	5.7	1.6	8.5	7.0	1.1	10.2	8.3	0.6	11.9	9.8	-	-	-
1100	2.0	2.1	7.3	6.0	1.8	8.9	7.3	1.3	10.6	8.7	0.8	12.4	10.2	0.2	14.3	11.7
1135	1.0	2.4	7.7	6.3	2.0	9.3	7.6	1.6	11.1	9.1	1.0	13.0	10.6	0.4	14.9	12.2
1165	0.0	2.6	8.0	6.6	2.2	9.7	8.0	1.8	11.6	9.5	1.3	13.5	11.0	0.7	15.5	12.7
ACCESSORY DRIVE:																
1140	6.0	2.4	7.7	6.3	2.1	9.4	7.7	1.6	11.2	9.2	1.1	13.1	10.7	0.5	15.0	12.3
1180	5.0	2.7	8.2	6.7	2.3	9.9	8.1	1.9	11.8	9.7	1.4	13.7	11.2	0.8	15.8	12.9
1215	4.0	2.9	8.6	7.0	2.6	10.4	8.5	2.2	12.3	10.1	1.7	14.3	11.7	1.1	16.4	13.5
1255	3.0	3.2	9.1	7.4	2.9	11.0	9.0	2.5	12.9	10.6	2.0	15.0	12.3	1.4	17.2	14.1
1290	2.0	3.4	9.5	7.8	3.1	11.5	9.4	2.7	13.5	11.1	2.2	15.6	12.8	-	-	-
1330	1.0	3.7	10.0	8.2	3.4	12.0	9.9	3.0	14.1	11.6	2.6	16.4	13.4	-	-	-
1365	0.0	3.9	10.5	8.6	3.7	12.6	10.3	3.3	14.7	12.1	2.9	17.0	13.9	-	-	-

NOTES:

Blower performance is based on cooling only unit, with fixed outdoor air, 2" T/A filters and a dry evaporator coil.

Refer to page 7 for additional static resistances.

ESP - External Static Pressure available for the supply and return air duct system. All internal unit resistances have been deducted from the total static pressure of the blower.

* FACTORY SETTING

BLOWER PERFORMANCE - 25 TON (DCE/DCG300)

DCG300-BOT TOM DUCT CONNECTIONS (COOLING APPLICATIONS)

BLOWER SPEED (rpm)	PULLEY TURNS OPEN:	7500 CFM			8750 CFM			10000 CFM			11250 CFM			12500 CFM		
		ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)	ESP (iwg)	OUTPUT (bhp)	INPUT (kW)
STANDARD DRIVE:																
975	6.0*	1.2	5.9	4.9	0.5	7.3	6.0	-	-	-	-	-	-	-	-	-
1005	5.0	1.4	6.2	5.1	0.7	7.7	6.3	-	-	-	-	-	-	-	-	-
1040	4.0	1.6	6.6	5.4	0.9	8.1	6.7	0.2	9.7	8.0	-	-	-	-	-	-
1070	3.0	1.8	6.9	5.7	1.1	8.5	7.0	0.4	10.2	8.3	-	-	-	-	-	-
1100	2.0	2.0	7.3	6.0	1.3	8.9	7.3	0.6	10.6	8.7	-	-	-	-	-	-
1135	1.0	2.2	7.7	6.3	1.6	9.3	7.6	0.8	11.1	9.1	-	-	-	-	-	-
1165	0.0	2.4	8.0	6.6	1.8	9.7	8.0	1.0	11.6	9.5	0.2	13.5	11.0	-	-	-
ACCESSORY DRIVE:																
1140	6.0	2.2	7.7	6.3	1.6	9.4	7.7	0.9	11.2	9.2	-	-	-	-	-	-
1180	5.0	2.5	8.2	6.7	1.9	9.9	8.1	1.2	11.8	9.7	0.3	13.7	11.2	-	-	-
1215	4.0	2.7	8.6	7.0	2.1	10.4	8.5	1.4	12.3	10.1	0.6	14.3	11.7	-	-	-
1255	3.0	3.0	9.1	7.4	2.4	11.0	9.0	1.7	12.9	10.6	0.9	15.0	12.3	-	-	-
1290	2.0	3.2	9.5	7.8	2.7	11.5	9.4	2.0	13.5	11.1	1.2	15.6	12.8	-	-	-
1330	1.0	3.5	10.0	8.2	3.0	12.0	9.9	2.3	14.1	11.6	1.5	16.4	13.4	-	-	-
1365	0.0	3.7	10.5	8.6	3.2	12.6	10.3	2.6	14.7	12.1	1.8	17.0	13.9	-	-	-

NOTES:

Blower performance is based on cooling only unit, with fixed outdoor air, 2" T/A filters and a dry evaporator coil.

Refer to page 7 for additional static resistances.

ESP - External Static Pressure available for the supply and return air duct system. All internal unit resistances have been deducted from the total static pressure of the blower.

* FACTORY SETTING

ELECTRICAL DATA - Units With Electric Heat

MODEL D2CE	POWER SUPPLY	ELECTRIC HEATER OPTION				MINIMUM CIRCUIT AMPACITY (AMPS)	MAXIMUM OVERCURRENT DEVICE (1) (AMPS)
		MODEL	KW(1)	STAGES	AMPS		
300A25	208-3-60	E018	13.5	1	37.5	139.5	175
300A25	208-3-60	E036	27.0	2	75.1	142.1	175
300A25	208-3-60	E054	40.6	2	112.6	189.0	200
300A25	208-3-60	E072	54.1	2	150.1	198.4	225
300A25	230-3-60	E018	18.0	1	43.3	139.5	175
300A25	230-3-60	E036	36.0	2	86.6	156.5	175
300A25	230-3-60	E054	54.0	2	129.9	178.2	200
300A25	230-3-60	E072	72.0	2	173.2	221.5	250
300A46	460-3-60	E018	18.0	1	21.7	68.3	80
300A46	460-3-60	E036	36.0	2	43.3	78.3	80
300A46	460-3-60	E054	54.0	2	65.0	89.1	100
300A46	460-3-60	E072	72.0	2	86.6	110.7	125
300A58	575-3-60	E018	18.0	1	17.3	56.1	70
300A58	575-3-60	E036	36.0	2	34.6	62.6	70
300A58	575-3-60	E054	54.0	2	52.0	71.2	80
300A58	575-3-60	E072	72.0	2	69.3	88.5	100

NOMINAL VOLTAGE	VOLTAGE	KW CAP. MULTIPLIER
208	208	1.00
240	230	0.92
480	460	0.92
600	575	0.92

PHYSICAL DATA BASIC UNITS

MODELS		DCE/DCG/DCV
		300
EVAPORATOR BLOWER	CEN TRIFU GAL BLOWER (Dia. x Wd. in.)	18 x 15
	FAN MOTOR HP	15
EVAPORATOR COIL	ROWS DEEP	4
	FINS PER INCH	13.5
	FACE AREA (Sq. Ft.)	25.0
CONDENSER FAN (Two Per Unit)	PROPELLER DIA. (in.) (Each)	30
	FAN MOTOR HP (Each)	1
	NOM. CFM TOTAL (Each)	7200
CONDENSER COIL	ROWS DEEP	3
	FINS PER INCH	15
	FACE AREA (Sq. Ft.)	43.3
COMPRESSOR (Qty. Per Unit)	12.5 TON, SCROLL, HERMETIC, TANDEM (2 STAGE, 50% ea.)	2
	QUANTITY PER UNIT (16" X 20" X 2")	2
AIR FILTERS	QUANTITY PER UNIT (16" X 25" X 2")	4
	QUANTITY PER UNIT (14" X 20" X 2")	3
	TOTAL FACE AREA (sq. ft.)	21.4
CHARGE	REFRIGERANT 22 (lbs./oz.)	20/8
	SYSTEM NO. 1	20/8
	SYSTEM NO. 2	20/0

OPERATING WEIGHTS

		MODEL SIZE (MBH)	300
Basic Unit		DCE (Cooling only)	2730
		DCV (Cooling only)	2795
		DCG (Gas / Electric)	N240 2930
			N320 2970
		DCV (Gas / Electric)	N240 2995
			N320 3035
Options		Economizer	160
		Economizer with Power Exhaust	245
		Motorized Damper	150
			18 KW 25
		Electric Heater (Elec/Elec only)	36 KW 30
			54 KW 35
			72 KW 40
		Roof Curb	185
		Barometric Damper	45
Accessories		Economizer/Motorized Damper	55
		Rain Hood	
		Economizer/Power Exhaust Rain Hood	90
		Wood Skid	220

BLOWER MOTOR AND DRIVE DATA

MODEL SIZE	DRIVE	BLOWER RANGE (RPM)	MOTOR ¹			ADJUSTABLE MOTOR PULLEY				FIXED BLOWER PULLEY				BELT (NOTCHED)		
			HP	FRAME	EFF. (%)	DESIGNATION	OUTSIDE DIA. (IN.)	PITCH DIA. (IN.)	BORE (IN.)	DESIGNATION	OUTSIDE DIA. (IN.)	PITCH DIA. (IN.)	BORE (IN.)	DESIGNATION	PITCH LENGTH (IN.)	QTY.
25 TON	Standard	975/1165	15	254T	91	1LVP58B70 A	7.5	6.2-7.4	1 5/8	1B5V110	11.3	11.1	1-7/16	5VX860	86.0	1
	High Speed Access	1140/1365								1B5V94	9.7	9.5	1-7/16	5VX840	84.0	1

¹All motors have a nominal speed of 1800 RPM, a 1.15 service factor and a solid base. They can operate to the limit of their service factor because they are located in the moving air, upstream of any heating device.

STATIC RESISTANCES*

DESCRIPTION	AIRFLOW (CFM)				
	7500 ESP (IWG)	8750 ESP (IWG)	10000 ESP (IWG)	11250 ESP (IWG)	12500 ESP (IWG)
DEDUCTIONS: (SUBTRACT VALUES BELOW FROM UNIT'S AVAILABLE ESP)					
ALLOWANCE FOR WET COIL:	0.10	0.10	0.10	0.10	0.10
ECONOMIZER (RETURN DUCT):	0.06	0.09	0.11	0.14	0.18
18kW ELECTRIC HEAT:	0.31	0.43	0.56	0.71	0.87
36kW ELECTRIC HEAT:	0.38	0.52	0.68	0.87	1.07
54kW ELECTRIC HEAT:	0.62	0.84	1.10	1.39	1.72
72kW ELECTRIC HEAT:	0.68	0.93	1.21	1.54	1.90
ADDITIONS: (ADD VALUES BELOW TO UNIT'S AVAILABLE ESP)					
HORIZONTAL (SIDE) SUPPLY DUCT:	0.31	0.26	0.27	0.31	0.41
HORIZONTAL (SIDE) RETURN DUCT:	0.05	0.05	0.05	0.05	0.05

POWER EXHAUST PERFORMANCE

MOTOR SPEED	STATIC RESISTANCE OF RETURN DUCT WORK, IWG									
	0.2		0.3		0.4		0.5		0.6	
	CFM	KW	CFM	KW	CFM	KW	CFM	KW	CFM	KW
HIGH*	5250	0.83	4500	0.85	4200	0.88	3750	0.93	3000	0.99
MEDIUM	4900	0.77	3900	0.79	3500	0.82	2900	0.85	-	-
LOW	4400	0.72	3700	0.74	3000	0.78	-	-	-	-

*Factory Setting

Power Exhaust motor is a 3/4 HP, PSC type with sleeve bearings, a 48 frame and in herent protection.

ELECTRICAL DATA Cooling Only Units and Units With Gas Heat

ELECTRICAL DATA - Cooling Only Units & Units With Gas Heat

MODEL NO.	POWER SUPPLY	COMPRESSORS		COND. FAN		SUPPLY AIR BLOWER MOTOR		MINIMUM CIRCUIT AMPACITY (AMPS)	MAXIMUM OVERCURRENT DEVICE (1) (AMPS)
		(QTY. 2)		(#1 & #2)		HP	RLA		
		RLA (ea.)	LRA (ea.)	HP (ea.)	FLA (ea.)				
D2CE300 & D2CG300	208/230-3-60	41.4	312	1	4.2	15	38.6	139.5	175
	460-3-60	20.0	150	1	2.1	15	19.3	68.3	80
	575-3-60	16.4	108	1	2.0	15	15.4	56.1	70

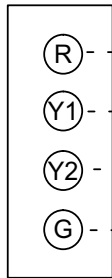
VOLTAGE LIMITATIONS**	POWER SUPPLY	VOLTAGE	
		MIN.	MAX.
	208/230-3-60	187	253
	460-3-60	414	506
	575-3-60	518	630

**Rated in accordance with ARI Standard 110, utilization range "A".

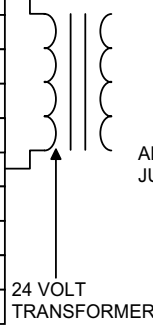
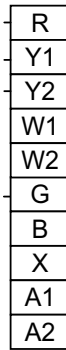
FIELD WIRING - DCE/DCG ELECTRIC/ELECTRIC AND GAS/ELECTRIC UNITS

CONTROL WIRING

COOLING ONLY (24 VOLT THERMOSTAT)
THERMOSTAT¹
TERMINALS



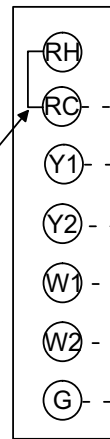
UNIT TERMINAL
BLOCK 1TB²



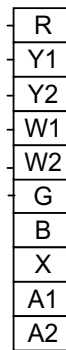
¹24 Volt Thermostat 2TH04701224.

²Terminal block 1TB - located on relay board in 24-volt section of the unit control box.

COOLING / HEATING (24 VOLT THERMOSTAT)
THERMOSTAT¹
TERMINALS



UNIT TERMINAL
BLOCK 1TB²



ADD JUMPER

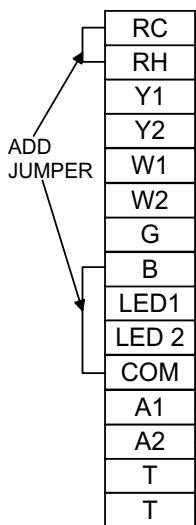
¹24 Volt Thermostat 2TH04701024 or 2TH04701524 (with subbase 2TB04700224 or 2TB04700324).

²Terminal block 1TB - located on relay board in 24-volt section of the unit control box.

³Second stage heating is not required on units with a single stage electric heater.

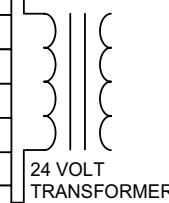
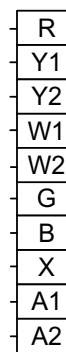
COOLING / HEATING (ELECTRONIC THERMOSTAT)

THERMOSTAT¹
TERMINALS



ADD JUMPER

UNIT TERMINAL
BLOCK 1TB²



TO REMOTE SENSOR
2TH04702224 IF USED

¹Electronic programmable Thermostat 2ET04700224 (includes subbase).

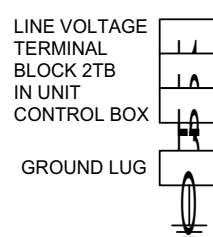
²Terminal block 1TB - located on relay board in 24-volt section of the unit control box.

³Second stage heating is not required on units with a single stage electric heater.

⁴Terminals A1 and A2 provide a relay output to close the outdoor economizer dampers when the thermostat switches to the set-back position.

Fan switch must be in "ON" position for minimum ventilation during heater operation.

POWER WIRING



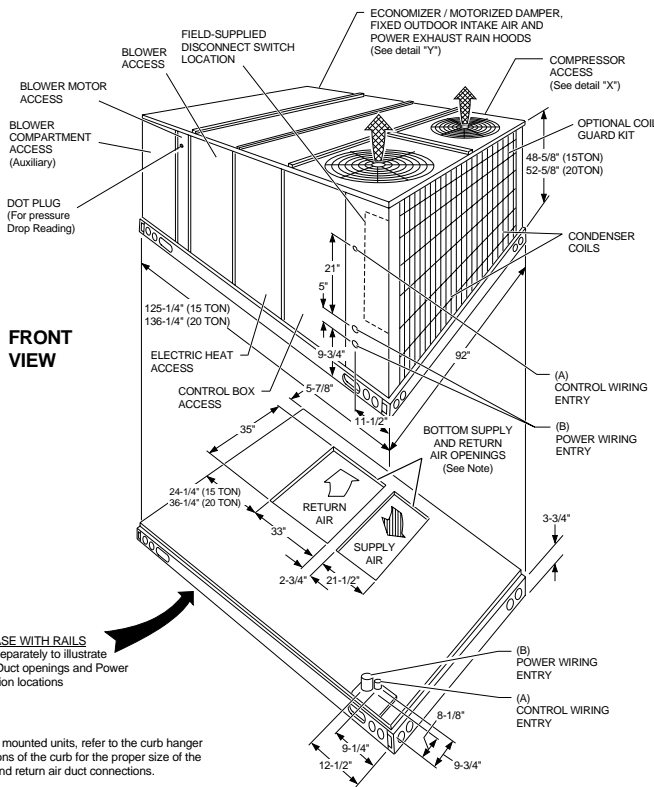
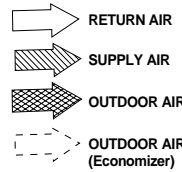
Refer to the ELECTRICAL DATA tables to size the power wiring, the fuses and the disconnect switch.

All dimensions are in inches. They are subject to change without notice. Certified dimensions will be provided upon request.

UTILITIES ENTRY DATA

HOLE	OPENING SIZE (DIA.)	USED FOR	
		Control Wiring	Front Bottom
A	1-1/8" KO		
	3/4" NPS (Fem.)		
B	3-5/8" KO		
	3" NPS (Fem.)		
C	2-3/8" KO	Gas Piping (Front) ¹	
D	1-11/16" Hole	Gas Piping (Bottom) ^{1,2}	

¹ 1" piping MPT required
² Opening in the bottom of the unit can be located by the slice in the insulation.



UNIT BASE WITH RAILS
 Shown separately to illustrate Bottom Duct openings and Power Connection locations

NOTE:
 For curb mounted units, refer to the curb hanger dimensions of the curb for the proper size of the supply and return air duct connections.

CLEARANCES

Front	36"
Back	24" (Less Econo mizer) 49" (With Econo mizer)
Left Side (Fil ter Ac cess)	24" (Less Econo mizer) 36" (With Econo mizer)
Right Side (Cond. Coil)	36"
Be low Unit ¹	0"
Above Unit ²	72" With 36" Maxi mum Hori zon tal Over hang (For Con denser Air Dis charge)

¹ Units (ap pli ca ble in U.S.A. only) may be in stalled on com bus ti ble floors made from wood or class A, B or C roof cov er ing ma te rial.
² Units must be in stalled ou tdoors. Over hang ing struc tures or shrubs should not ob struct con denser air dis charge ou tlet.

NOTE:
ELEC/ELEC Models: Units and duct work are ap proved for zero clear ance to com bus ti ble ma te ri als when equipped with electric heaters.

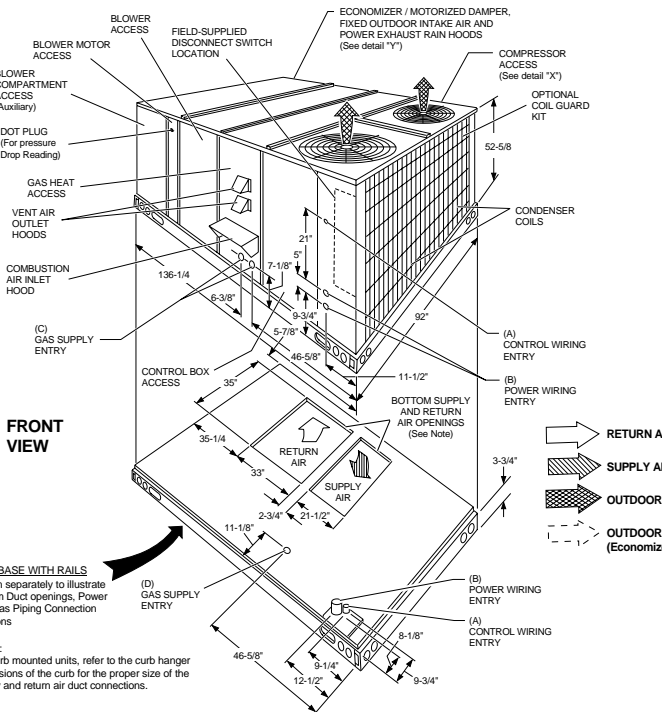
GAS/ELEC Models: A 1" clear ance must be pro vided be tween any com bus ti ble ma te rial and the sup ply air duct work for a dis tance of 3 feet from the unit.

The prod ucts of com bus tion must not be al low ed to ac cu mu late within a con fined space and re cir culate.

Lo cate unit so that the vent air ou tlet hood is at least:

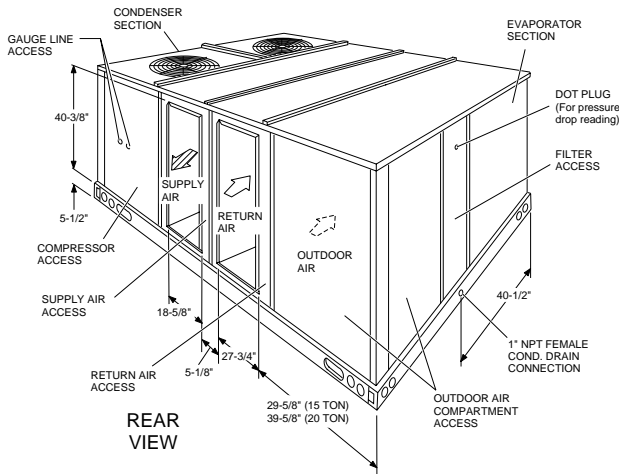
? Three (3) feet above any forced air in let lo cated within 10 hori zon tal feet (ex clud ing those in te gral to the unit).

? Four (4) feet be low, 4 hori zon tal feet from, or 1 foot above any door or gravity air in let into the build ing.



UNIT BASE WITH RAILS
 Shown separately to illustrate Bottom Duct openings, Power and Gas Piping Connection locations

NOTE:
 For curb mounted units, refer to the curb hanger dimensions of the curb for the proper size of the supply and return air duct connections.



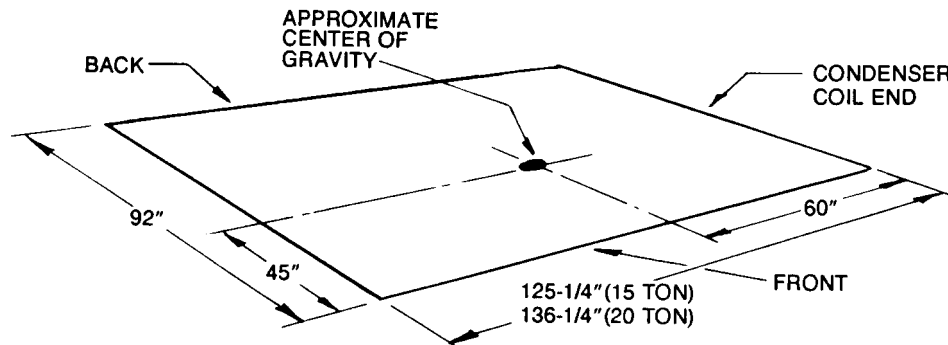
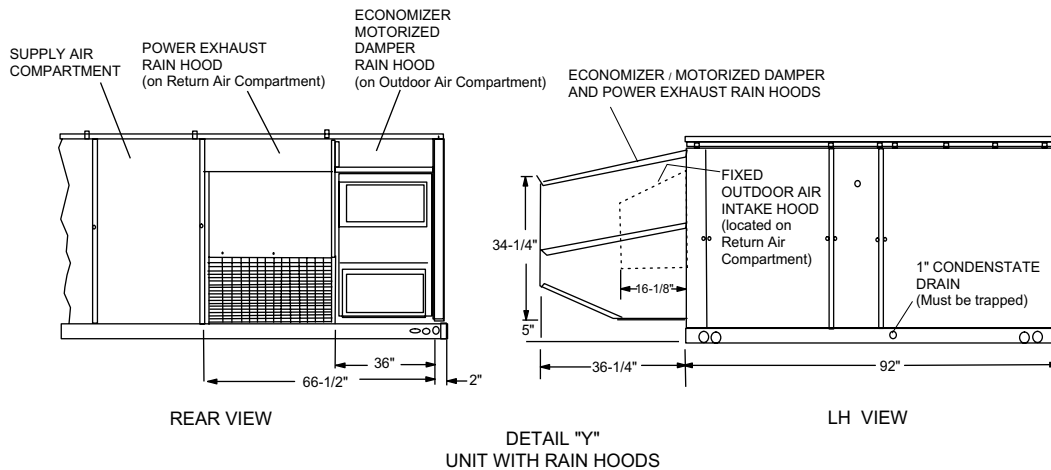
DUCT COVERS - Units are shipped with the bottom duct openings covered. An accessory flange kit is available for connecting side ducts.

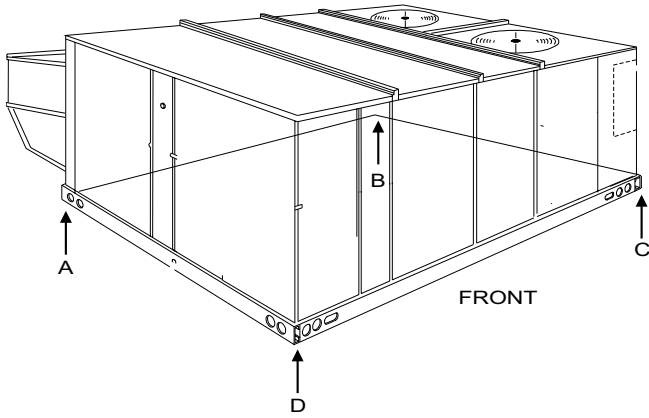
For **bottom** duct applications:

- 1 Remove the side panels from the supply and return air compartments to gain access to the bottom supply and return air duct covers.
- 2 Remove and discard the bottom duct covers. (Duct openings are closed with sheet metal covers except when the unit includes a power exhaust option. The covering consists of a heavy black paper composition.)
- 3 Replace the side supply and return air compartment panels.

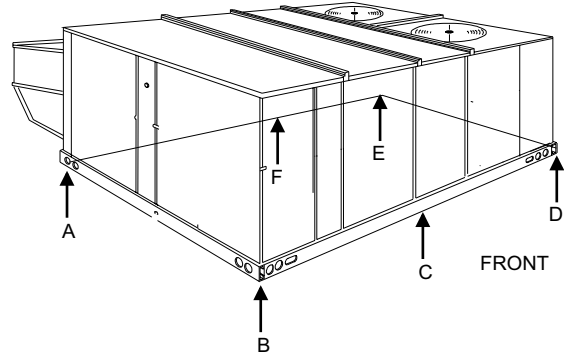
For side duct applications;

- 1 Replace the side panels on the supply and return air compartments with the accessory flange kit panels.
- 2 Connect ductwork to the duct flanges on the rear of the unit.





4 Point Loads



6 Point Loads

DCE UNIT	4 - POINT LOADS (LBS)				
	TOTAL	A	B	C	D
300	2,890	487	619	646	508

DCE

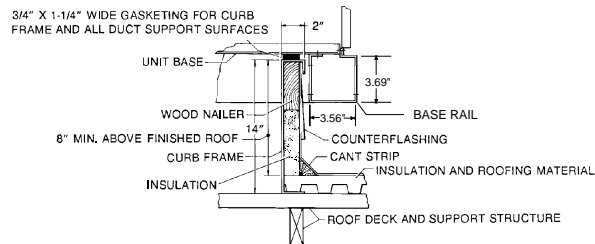
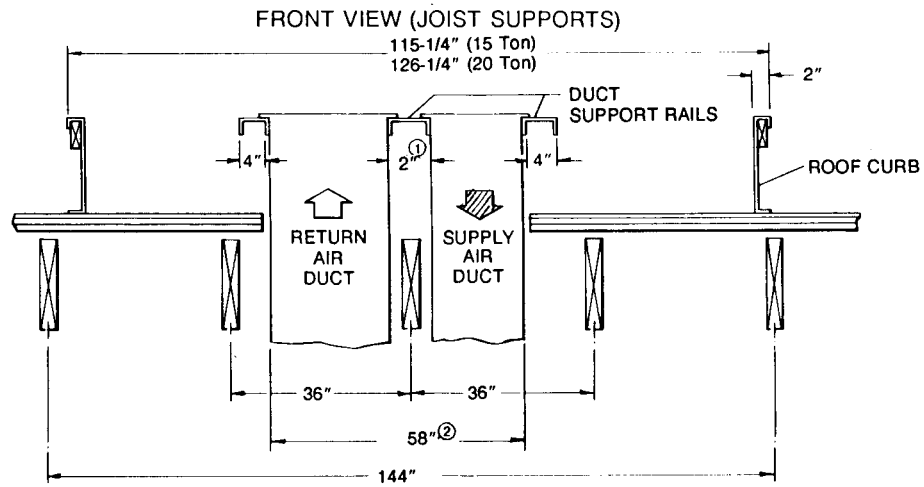
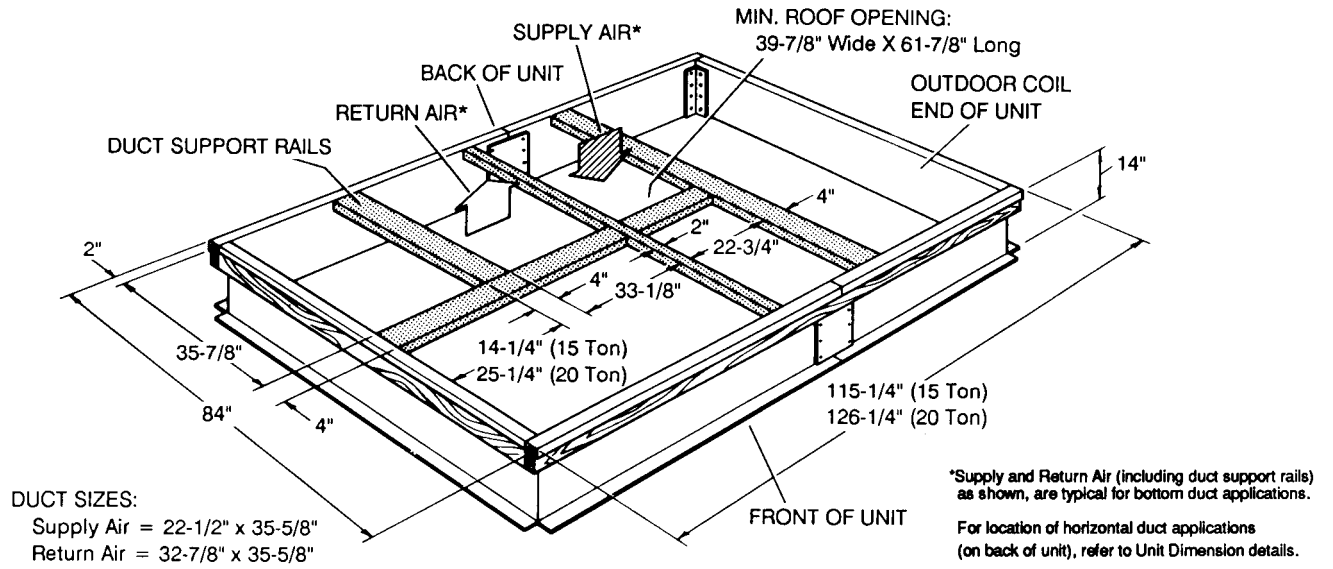
DCE UNIT	6 - POINT LOADS (LBS)						
	TOTAL	A	B	C	D	E	F
300	2,890	415	471	528	551	492	433

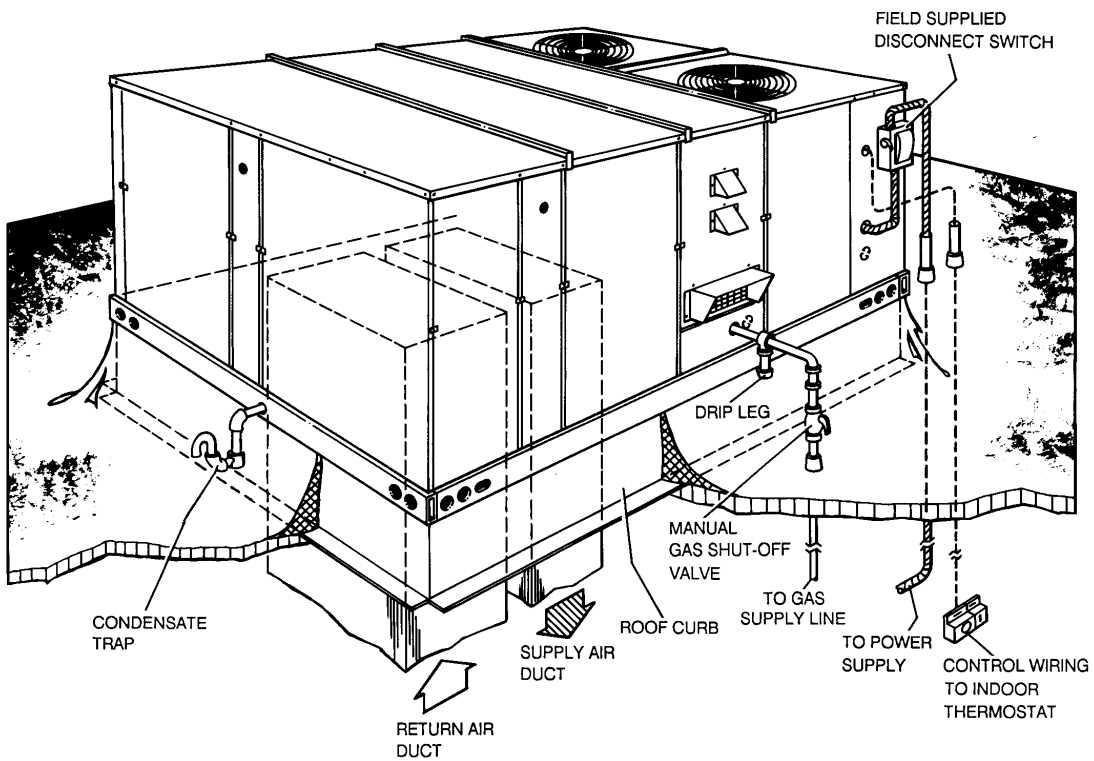
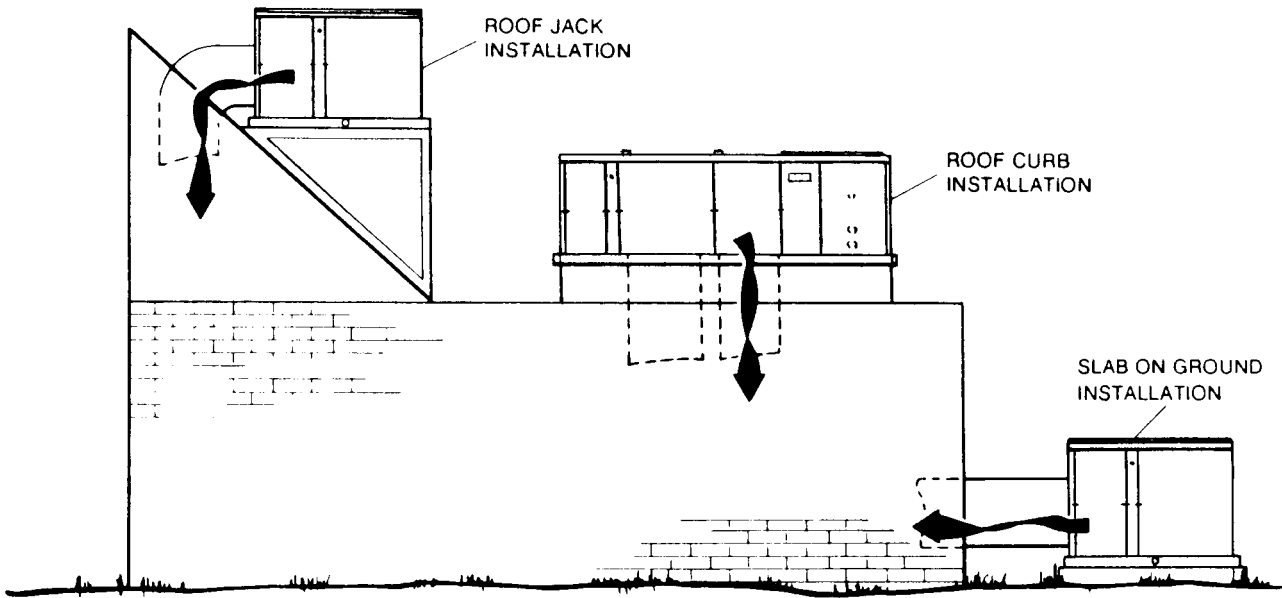
NOTE: These weights are with economizer and 24kW electric heat.

DCG UNIT	4 - POINT LOADS (LBS)				
	TOTAL	A	B	C	D
300	3,130	615	671	962	882

DCG UNIT	6 - POINT LOADS (LBS)						
	TOTAL	A	B	C	D	E	F
300	3,130	418	438	533	658	603	510

NOTE: These weights are with economizer, high heat and oversized motor.





MECHANICAL SPECIFICATIONS

GENERAL DESCRIPTION

Units shall be factory-assembled, single packaged, (DCG Electric Cooling/Gas Heat, DCE Electric Cooling/Optional Electric Heat), designed for outdoor mounted installation. Units shall have minimum EER ratings of 8.5. They shall have built in field convertible duct connections for down discharge supply/return or horizontal discharge supply/return, and be available with factory installed options or field installed accessories.

The units shall be factory wired, piped, charged with R-22 refrigerant and factory tested prior to shipment. All unit wiring shall be both numbered and color coded. Enclosed in each unit shall be a factory test log sheet consisting of the unit tested pressures, temperatures and amps, as tested prior to shipment.

All units shall be manufactured in a facility certified to ISO 9001 standards and the cooling performance shall be rated in accordance with DOE and ARI test procedures. Units shall be ETL & CGA listed, classified to ANSIZ21.47 standards, UL 1995/CAN/CSA No. 236-M90 conditions.

UNIT CABINET

1. Unit cabinet shall be constructed of G90 galvanized steel, with exterior surfaces coated with a non-chalking, powered paint finish, certified at 750 hours salt spray test per ASTM-B117 standards.
2. Indoor blower section shall be insulated with up to 1" thick insulation, coated on the air side. Aluminum foil faced insulation shall be used in the furnace compartment and be fastened with ridged fasteners to prevent insulation from entering the air stream.
3. Cabinet panels shall be "large" size, easily removable for servicing and maintenance.
4. Full perimeter base rails shall be provided to assure reliable transit of equipment, overhead rigging and proper sealing on roof curb applications.
5. Disposable 2" filters shall be furnished and be accessible through a removable access door, sealed air tight. Units filter track shall be designed to accommodate either 1" or 2" filters.
6. Fan performance measuring ports shall be provided on the outside of the cabinet to allow accurate air measurements of evaporator fan performance without removing panels or creating air by-pass of the coils.

7. Condensate pan shall be internally sloped and conform to ASHARE 62-89 self-draining standards. Condensate connection shall be a minimum of 1" I.D. female and be a ridged mount connection.
8. Unit shall incorporate a fixed outdoor air damper with an outdoor air intake opening covered with a bird screen and a rain hood painted to match the exterior of the unit.

INDOOR (EVAPORATOR) FAN ASSEMBLY

1. Fan shall be a belt drive assembly and include an adjustable-pitch motor pulley. Job site selected (B.H.P.) brake horse power shall not exceed the motors nameplate horse power rating, plus the service factor. Units shall be designed not to operate above service factor.
2. Fan wheel shall be double-inlet type with forward-curved blades, dynamically balanced to operate smoothly throughout the entire range of operation. Airflow design shall be constant air volume.
3. Bearings shall be sealed and permanently lubricated for longer life and no maintenance.

OUTDOOR (CONDENSER) FAN ASSEMBLY

1. The outdoor fans shall be of the direct-driven propeller type, discharge air vertically, have blades riveted to corrosion resistant steel spider brackets and shall be dynamically balanced for smooth operation.
2. The 2 outdoor fan motors shall be totally enclosed with permanently lubricated bearings, internally protected against overload conditions and staged independently.

REFRIGERANT COMPONENTS

1. Compressors:
 - A. Shall be fully hermetic type, direct drive, internally protected with internal high-pressure relief and over temperature protection. The hermetic motor shall be suction gas cooled and have a voltage range of + or - 10% of the unit nameplate voltage.
 - B. Shall have internal spring isolation and sound muffling to minimize vibration and noise, and be externally isolated on a dedicated, independent mounting.
- 2 Coils:
 - A. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally-enhanced copper tubes with all joints brazed. Special Phenolic coating shall be available as a factory option.

- B. Evaporator and Condenser coils shall be of the direct expansion, draw-thru, design.
 - C. Condenser coils shall be protected with factory installed coil guards
3. Refrigerant Circuit and Refrigerant Safety Components shall include:
- A. Balance-port thermostatic expansion valve with independent circuit feed system.
 - B. Filter drier/strainer to eliminate any moisture or foreign matter.
 - C. Accessible service gage connections on both suction and discharge lines to charge, evacuate, and measure refrigerant pressure during any necessary servicing or troubleshooting, without losing charge.
 - D. The refrigeration system shall provide at least 15 °F of sub-cooling at design conditions.
 - E. All Models shall have two independent circuits..
4. Unit Controls:
- A. Unit shall be complete with self contained low-voltage control circuit protected by a resettable circuit breaker on the 24 volt transformer side.
 - B. Unit shall incorporate a lock-out circuit which provides reset capability at the space thermostat or base unit, should any of the following standard safety devices trip and shut off compressor:
1. Loss-of-charge/Low-pressure switch.
 2. High-pressure switch.
 3. Freeze-protection thermostat, evaporator coil.

If any of the above safety devices trip, an LED (light-emitting diode) indicator shall illuminate.

- C. Unit shall incorporate "AUTO RESET" compressor over temperature, over current protection.
- D. Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up.

GAS HEATING SECTION (DCG MODELS)

1. Shall be designed with induced draft combustion with post purge logic and energy saving direct spark ignition, redundant main gas valve. Ventor wheel shall be constructed of stainless steel for corrosion resistance.
2. The heat exchanger shall be of the tubular type, constructed of T1-40 aluminized steel for corrosion

resistance and allowing minimum mixed air entering temperature of 25 °F.

3. Burners shall be of the in-shot type, constructed of aluminum coated steel and contain air mixture adjustments.
4. All gas piping shall enter the unit cabinet at a single location through either the side or curb, without any field modifications.
5. An integrated control board shall provide timed control of evaporator fan functioning and burner ignition.
6. Heating section shall be provided with the following minimum protection:
 - A. Primary and auxiliary high-temperature limit switches.
 - B. Induced draft motor speed sensor.
 - C. Flame roll out switch (manual reset).
 - D. Flame proving controls.
- 7 Unit shall have two independent stages of capacity.

ELECTRIC HEATING (DCE MODELS)

1. Nickel chromium electric heating elements shall be provided as required by the application with 1 or 2 stage control, as required, from 13.5 KW to 72 KW capacity.
2. The heating section shall have a primary limit control(s) and automatic reset to prevent the heating element system from operating at an excessive temperature.
3. Units with Electric Heating shall be wired for a single point power supply with branch circuit fusing (where required).

UNIT OPERATING CHARACTERISTICS

1. Unit shall be capable of starting and running at 125 °F outdoor temperature, exceeding maximum load criteria of ARI Standard 210/240.
2. The compressor, with standard controls, shall be capable of operation down to 25 °F outdoor temperature. Accessory low ambient kit shall be available for operation to 0 °F.
3. Unit shall be provided with fan time delay to prevent cold air delivery before heat exchanger warms up. (Gas heat only)

ELECTRICAL REQUIREMENTS

All unit power wiring shall enter unit cabinet at a single factory provided location and be capable of side or bottom entry, to minimize roof penetrations and avoid unit field modifications. Separate side and bottom openings shall be provided for the control wiring.

STANDARD LIMITED WARRANTIES

Compressor- 5 Years
Heat Exchanger - 10 Years
Elect. Heat. Elem.- 5 Years
Parts- 1 Year

OPTIONAL OUTDOOR AIR (Shall be made available by either/or):

- 1 **ELECTRONIC ENTHALPY AUTOMATIC ECONOMIZER** - Outdoor and return air dampers that are interlocked and positioned by a fully-modulating, spring-return damper actuator. The maximum leakage rate for the outdoor air intake dampers shall not exceed 2% when dampers are fully closed and operating against a pressure differential of 0.5 IWG. A unit-mounted potentiometer shall be provided to adjust the outdoor and return air damper assembly to take in CFM of outdoor air to meet the minimum ventilation requirement of the conditioned space during normal operation. During economizer operation, a mixed-air temperature control shall modulate the outdoor and return air damper assembly to prevent the supply air temperature from dropping below 55°F. Changeover from compressor to economizer operation shall be provided by an integral electronic enthalpy control that feeds input into the basic module. The outdoor intake opening shall be covered with a rain hood that matches the exterior of the unit. Water eliminator/filters shall be provided. Simultaneous economizer/compressor operation is also possible. Dampers shall fully close on power loss.
2. **DUAL INPUT DIFFERENTIAL ELECTRONIC ENTHALPY AUTOMATIC ECONOMIZER** - Outdoor and return air dampers that are interlocked and positioned by a fully-modulating, spring-return damper actuator. The maximum leakage rate for the outdoor air intake dampers shall not exceed 2% when dampers are fully closed and operating against a pressure differential of 0.5 IWG. A unit mounted potentiometer shall be provided to adjust the outdoor and return air damper assembly to take in the design CFM of outdoor air to meet the minimum ventilation requirement of the conditioned

space during normal operation. During economizer operation, a mixed-air temperature control shall modulate the outdoor and return air damper assembly to prevent the supply air temperature from dropping below 55°F. Changeover from compressor to economizer operation shall be provided by two integral electronic enthalpy controls - one that senses outdoor air and one that senses indoor air. Both enthalpy sensors supply input to the logic module which modulates both sets of dampers for maximum economizer savings. The outdoor intake opening shall be covered with a rain hood that matches the exterior of the unit. Water eliminator/filters shall be provided. Simultaneous economizer/compressor operation is also possible. Dampers shall fully close on power loss.

- 3 **MOTORIZED OUTDOOR AIR DAMPERS** - Outdoor and return air dampers that are interlocked and positioned by a 2-position, spring-return damper actuator. The maximum leakage rate for the outdoor air intake dampers shall not exceed 2% when dampers are fully closed and operating against a pressure differential of 0.5 IWG. A unit-mounted potentiometer shall be provided to adjust the outdoor and return air damper assembly to take in the design CFM of outdoor air to meet the ventilation requirements of the conditioned space during normal operation. Whenever the indoor fan motor is energized, the dampers open up to one of two pre-selected positions - regardless of the outdoor air enthalpy. Dampers return to the fully closed position when the indoor fan motor is de-energized. Dampers shall fully close on power loss.

OTHER PRE-ENGINEERED ACCESSORIES AVAILABLE

1. **ROOF CURB** - 14" high, full perimeter curb with wood nailer (shipped knocked-down).
2. **BAROMETRIC RELIEF DAMPER** - Contains a rain hood, air inlet screen, exhaust damper and mounting hardware. Used to relieve internal air pressure through the unit during economizer operation.
3. **PROPANE CONVERSION KIT** - Contains new orifices and gas valve parts to convert from natural to L.P. gas. One per unit required.
4. **HIGH ALTITUDE - NATURAL GAS** - Contains orifices required for applications between 2000 and 6000 feet altitude.

5. **HIGH ALTITUDE - PROPANE GAS** - Contains orifices required for applications between 2000 and 6000 feet altitude. Must be used with propane conversion kit.
6. **BURGLAR BARS** - Designed to work with above roofcurbs, depending on unit model. Fits duct openings of curb supply and return air openings.
7. **SIDE DUCT FLANGE** - Supply and return air duct flanges for side duct applications. Do not use on units with power exhaust.
8. **HIGH SPEED DRIVE** - Includes blower pulley and belt for higher CFM and/or static pressure requirements.
9. **WOOD SKID** - Allows unit to be handled with 90" forks.
10. **ECONOMIZER/MOTORIZED DAMPER RAIN HOOD (DCE/CG300 only)** - Contains all hood panels and the hardware for assembling.
11. **THERMOSTATS** - Multiple models available from A.C.O., M.C.O., Electronic or Electrical Mechanical versions.
12. **ANTI-RECYCLE TIMER** - Assures 5-minute off-time between compressor cycles.
13. **LOW AMBIENT KIT** - Provides unit cooling operation down to 0°F.

OTHER FACTORY INSTALLED OPTIONS

1. **POWER EXHAUST OPTION** - To work in conjunction with economizers.
2. **TECHNICOAT PHENOLIC COATED COND. COIL**
3. **ELECTRONIC ENTHALPY ECONOMIZER**
4. **DUAL INPUT ELECTRONIC ENTHALPY ECONOMIZER**

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036-21359-001-B-0302
Supersedes: 036-21359-001-A-0302

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