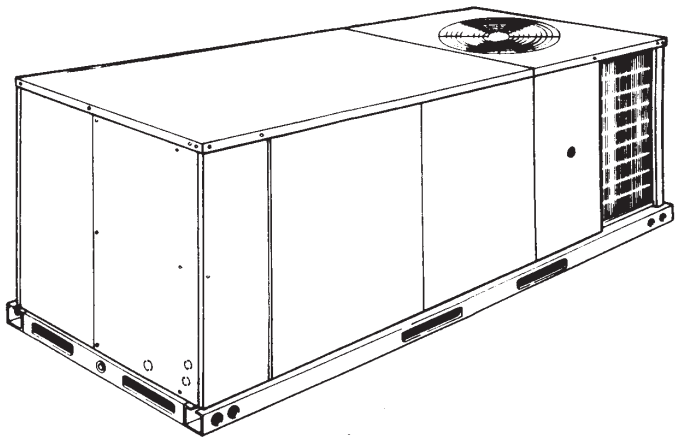
SUNLINE 2000™ ELECTRIC / ELECTRIC SINGLE PACKAGE AIR CONDITIONERS

INSTALLATION INSTRUCTION

Supersedes: 035-12046-002-A-0302 | 035-12046-003-A-0204

MODELS D1EE 048 & 060
and D2EE 036 (11 SEER)



GENERAL

YORK Model DEE units are single package air conditioners designed for outdoor installation on a rooftop or a slab. Electric heaters are available as field-installed accessories.

The units are completely assembled on rigid, permanently attached base rails. All piping, refrigerant charge, and electrical wiring is factory-installed and tested. The units require only electric power and duct connections at the point of installation.

The electric heaters have nickel-chrome elements and utilize single point power connection.

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. Refer to Form 50.15-NM for additional information.

REFERENCE

Additional information on the design, installation, operation and service of this equipment is available in the following reference forms:

- 55.70-N1 -General Installation
- 55.70-N2 -Pre-start & Post-start Check List
- 530.18-N1.2V -Economizer Accessory
- 530.18-N1.13V -Man. Outdoor Air Damper Accy 0-35%
- 530.18-N1.14V -Man. Outdoor Air Damper Accy 0-100%
- 530.18-N1.12V -Motorized Outdoor Air Damper Accy.
- 530.18-N1.8V -Coil Guard
- 530.18-N7.1V -Electric Heater Accessory
- 530.18-N7.2V -Fuse Block Accessory
- 690.15-N25V -Low Ambient to 0°F

Renewal Parts:

- Refer to Parts Manual for complete listing of replacement parts on this equipment.

All forms referenced in this instruction may be ordered from:

Standard Register
Toll Free Tel: 877-318-9675/Fax. 877-379-7920

APPROVALS

Design certified by U.L. and C.G.A. as follows:

1. For use as a cooling only unit or cooling unit with electric heat.
2. For outdoor installation only.
3. For installation on combustible material.

Installer should pay particular attention to the words: *NOTE, CAUTION* and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

CAUTION

THIS PRODUCT MUST BE INSTALLED IN STRICT COMPLIANCE WITH THE ENCLOSED INSTALLATION INSTRUCTIONS AND ANY APPLICABLE LOCAL, STATE, AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO, BUILDING, ELECTRICAL, AND MECHANICAL CODES.

WARNING

INCORRECT INSTALLATION MAY CREATE A CONDITION WHERE THE OPERATION OF THE PRODUCT COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

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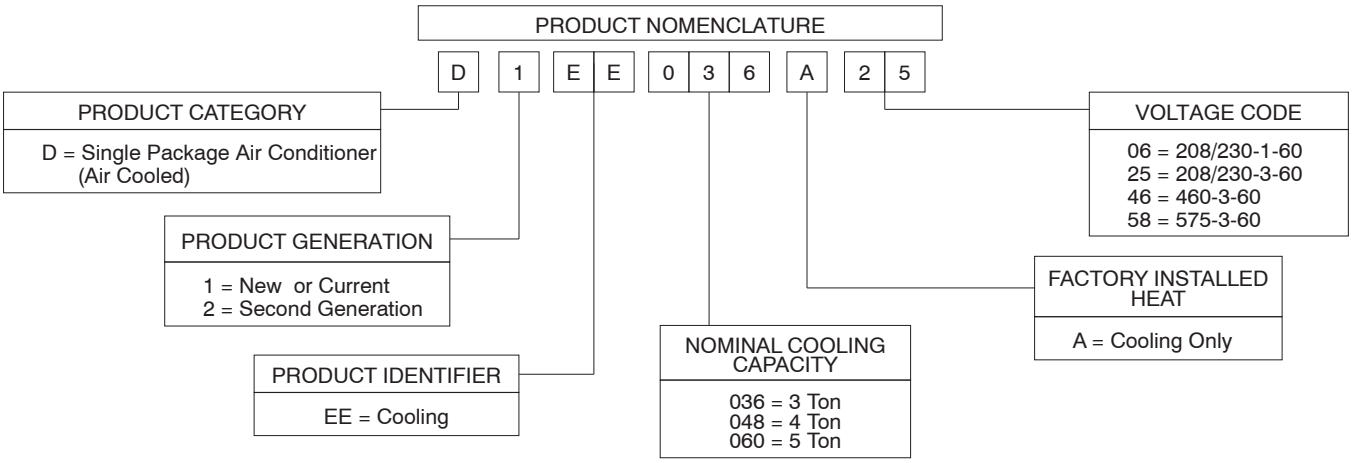


INSTALLATION

LIMITATIONS

These units must be installed in accordance with the current edition of the following national and local safety codes:

In USA:

1. National Electrical Code ANSI/NFPA No. 70.
2. Local electric utility requirements.

In Canada:

1. Canadian Electrical Code C22.1.
2. Canadian Installation Codes CAN/CGA-B149.1 and .2.

Refer to Table 1 for Unit Application Data.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and / or the customer's expense.

Size of unit for proposed installation should be based on heat loss / heat gain calculation made according to the methods of Air Conditioning Contractors of America (ACCA).

TABLE 1 - UNIT APPLICATION DATA

Voltage Variation Min. / Max.[1]	208/230V	187 / 253
	460V	414 / 504
	575V	518 / 630
Wet Bulb Temperature (°F) of Air on Evaporator Coil, Min. / Max.		57 / 72
Dry Bulb Temperature (°F) of Air on Condenser Coil, Min.[2] / Max.		45 / 120

[1]Utilization range "A" in accordance with ARI Standard 110.
[2]A low ambient accessory is available for operation down to 0°F

LOCATION

Use the following guidelines to select a suitable location for these units.

1. Unit is designed for outdoor installation only.
2. Condenser must have an unlimited supply of air. Where a choice of location is possible, position unit on either north or east side of building.
3. For ground level installation, a level pad or slab should be used. The thickness and size of the pad or slab used should meet local codes and unit weight. Do not tie the slab to the building foundation.
4. Roof structures must be able to support the weight of the unit and its options and / or accessories. Unit must be installed on a solid level roof curb or appropriate angle iron frame.

CAUTION: If a unit is to be installed on a roof curb or special frame other than a YORK roof curb, gasketing must be applied to all surfaces that come in contact with the unit underside.

5. Maintain level tolerance to 1/2" maximum across the entire length or width of the unit.
6. Elevate the unit sufficiently to prevent any blockage of the air entrances by snow in areas where there will be snow accumulation. Check the local weather bureau for the expected snow accumulation in your area.

RIGGING AND HANDLING

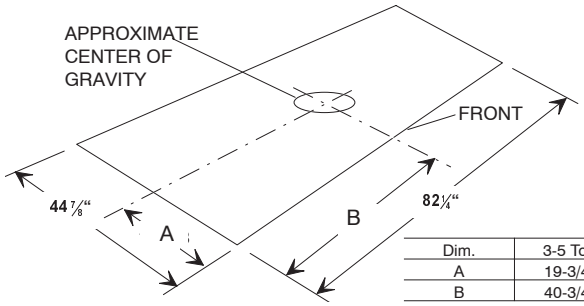
Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails. Spreaders, whose length exceeds the largest dimension across the unit, **MUST** be used across the top of the unit.

BEFORE LIFTING A UNIT, MAKE SURE THAT ITS WEIGHT IS DISTRIBUTED EQUALLY ON THE CABLES SO THAT IT WILL LIFT EVENLY.

Units may also be moved or lifted with a forklift. Slotted openings in the base rails are provided for this purpose.

LENGTH OF FORKS MUST BE A MINIMUM OF 42".

Remove the nesting brackets from the four corners on top of the unit. All screws that are removed when taking these brackets off must be replaced on the unit.



Dim.	3-5 Ton
A	19-3/4"
B	40-3/4"

FIG. 1 - CENTER OF GRAVITY

Refer to Table 2 for unit weights and to Figure 1 for approximate center of gravity.

CLEARANCES

All units require certain clearances for proper operation and service. Refer to Figure 5 for the clearances required for combustible construction, servicing, and proper unit operation.

WARNING: Do not permit overhanging structures or shrubs to obstruct outdoor air discharge outlet.

DUCTWORK

Ductwork should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return duct system shall be used. This shall not preclude use of economizers or outdoor fresh air intake. The supply and return air duct connections at the unit should be made with flexible joints to minimize the transmission of noise.

The supply and return air duct systems should be designed for the CFM and static requirements of the job. They should NOT be sized to match the dimensions of the duct connections on the unit.

CAUTION: When fastening ductwork to the side duct flanges on the unit, insert the screws through the duct flanges only. DO NOT insert the screws through the casing.

Outdoor ductwork must be insulated and water-proofed.

Refer to Figure 5 for information concerning side and bottom supply and return air duct openings.

FILTERS

1" filters are supplied with each unit. 2" replacement filters may be used with no modification to the filter racks. Filters must always be installed ahead of the evaporator coil and must be

kept clean or replaced with same size and type. Dirty filters will reduce the capacity of the unit and will result in frosted coils or safety shutdown. Minimum filter area and required sizes are shown in Table 2.

CONDENSATE DRAIN

Plumbing must conform to local codes. Use a sealing compound on male pipe threads. Install a condensate drain line from the 3/4" PVC female connection on the unit to spill into an open drain.

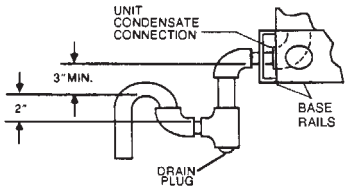


FIG. 2 - RECOMMENDED DRAIN PIPING

NOTE: The condensate drain line MUST be trapped to provide proper drainage. See Figure 2.

SERVICE ACCESS

Access to all serviceable components is provided by the following removable panels:

- Compressor compartment
- Heater compartment
- Blower compartment
- Main control box
- Filter compartment
- Motor Access (on units w/belt-drive option)

Refer to Figure 5 for location of these access panels.

CAUTION: Make sure that all screws are replaced on the unit to maintain an air-tight seal.

THERMOSTAT

The room thermostat should be located on an inside wall approximately 56" above the floor where it will not be subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with thermostat for general installation procedure. Color coded insulated wires (#18 AWG) should be used to connect thermostat to unit. See Figure 4 for wiring details.

NOTE: If the unit has an economizer, remove jumper J1 from terminals 8 and 10 on the relay board to prevent simultaneous operation of the compressor and the economizer. If you want to control the economizer on a second stage of cooling, use a thermostat with two stages of cooling.

POWER AND CONTROL WIRING

Field wiring to the unit must conform to provisions of the National Electrical Code (NEC) ANSI/NFPA 70 (in USA), current Canadian Electric Code (CEC) C22.1 (in Canada) and/or local ordinances. The unit must be electrically grounded in accordance with the NEC and CEC (as specified above) and/or local codes. Voltage tolerances which must be maintained at the compressor terminals during starting and running conditions are indicated on the unit Rating Plate and Table 1.

The wiring harness furnished with this unit is an integral part of a UL design certified unit. Field alteration to comply with electrical codes should not be required.

A disconnect switch should be field provided for the unit. The switch must be separate from all other circuits. Refer to Figure 5 for installation location. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram.

Electrical lines must be sized properly to carry the load. USE COPPER CONDUCTORS ONLY. Each unit must be wired with a separate branch circuit fed directly from the meter panel and properly protected.

CAUTION: When connecting electrical power and control wiring to the unit, waterproof type connectors MUST BE USED so that water or moisture cannot be drawn into the unit during normal operation. The above waterproofing conditions will also apply when installing a field-supplied disconnect switch.

Refer to Figure 4 for typical field wiring and to the appropriate unit wiring diagram for control circuit and power wiring information.

BLOWER SPEED SELECTION

Three blower motor speeds are available on the direct-drive units. The speed selection for the direct-drive units is determined by the CFM and ESP requirements of the applications. All units with belt-drive option have an adjustable motor pulley to achieve the above conditions.

All direct-drive units with 208/230 voltage are shipped with the wire labeled #116 connected to the “HIGH” speed tap on the blower motor. If a lower blower motor speed is desired, this wire should be moved to the “MED” or “LOW” speed tap on the motor for the speed desired.

TABLE 2 - PHYSICAL DATA

MODELS		DEE		
		036	048	060
EVAPORATOR BLOWER	CENTRIFUGAL BLOWER (Dia. x Wd. in.)	12 x 10	12 x 10	12 x 10
	FAN MOTOR HP (Direct-Drive)	½	¾	1
	FAN MOTOR HP (Belt-Drive)	1.5	1.5	1.5
EVAPORATOR COIL	ROWS DEEP	3	3	3
	FINS PER INCH	13	13	13
	FACE AREA (Sq. Ft.)	3.6	4.3	5.1
CONDENSER FAN	PROPELLER DIA. (in.)	22	22	22
	FAN MOTOR HP	½	½	½
	NOM. CFM TOTAL	4,500	4,200	4,500
CONDENSER COIL	ROWS DEEP	2	2	2
	FINS PER INCH	18	18	18
	FACE AREA (Sq. Ft.)	17.1	17.1	17.1
AIR FILTERS (SEE NOTE)	QUANTITY PER UNIT (15" x 20" x 1")	2	2	2
	QUANTITY PER UNIT (14" X 25" X 1")	1	1	1
	TOTAL FACE AREA (sq. ft.)	6.6	6.6	6.6
CHARGE	REFRIGERANT 22 (lbs./oz.)	9/12	9/8	9/8
COMPRESSOR	QUANTITY PER UNIT (HERMETIC TYPE)	1/RECPT	1/RECPT	1/SCROLL

NOTE: Filter racks are adapted for 1" or 2" thick filters.

WEIGHTS (LBS)		
Basic Unit	3 Ton	545
	4 Ton	585
	5 Ton	610
ACCESSORIES / OPTIONS		
Electric Heat (Nominal KW)	5 - 7 KW	18
	10 - 15 KW	23
	20 - 30 KW	28
Economizer		50
Motorized Outdoor Air Damper		26
Relief/Fixed Air Damper		10
Roof Mounting Curb		92
Belt-Drive Blower		5

All direct-drive units with 460 and 575 voltage are shipped with the wire labeled #116 connected to the “HIGH” speed tap on the blower motor. If the medium speed is required, connect wire #116 to the “MED” speed tap and the blue motor lead to the “HIGH” speed tap. If the low speed is required, connect wire #116 to the “LOW” speed tap, the blue motor lead to the “HIGH” speed tap and the orange motor lead to the “MED” speed tap.

COMPRESSORS

On some units the compressor is mounted on springs which have been tightened down for shipment only.

After this unit is installed, back out the compressor bolts until the sleeve clears the top grommet.

CAUTION: Do Not loosen compressor mounting bolts.

OPTIONAL ECONOMIZER RAIN HOOD

The following procedure should be used when assembling an economizer rain hood onto a unit. Refer to Figure 3. The outdoor and return air dampers, damper actuator, the linkage and all the controls are factory mounted as part of the economizer option.

All of the hood components, including the filters, the gasketing and the hardware for assembling are located above the top filter racks within the filter section. The outdoor air sensor is in the bag of parts located at the bottom of the return air section.

1. With filter section access panel removed, take out hood components, filters and sensor described above. Remove and discard outdoor air opening cover on back unit (Upper right hand corner).

2. Remove the 1/2" knockout (A) in the units rear panel (located to the right side of the outdoor air opening). Insert the two loose wires from inside the unit, into the 1/2" bushing provided. Insert wires and bushing into knockout. Snap bushing into place.

3. Mount the outdoor air sensor to the rear panel, just below the knockout described in Step 2. Secure with two self-drilling screws at dimples (B) provided in the panel.

   NOTE: Sensor must be positioned so that the sensing ports are at the top (louvers pointing downward) and terminal connections to the right.

4. Connect the two wires, indicated in Step 2, to the sensor as follows:

   - Wire #73 to terminal (+)
   - Wire #74 to terminal (S)

5. Assemble the LH and RH side plates to the top cover (2 screws each side) to form the hood. Apply gasketing to the flange surface on each side plate. Extend gasketing 1/4" beyond top and bottom of each flange to insure adequate corner sealing. Secure this assembly to the unit back panel (upper right hand corner). First, remove screw (C) on unit top cover. Then slip flange of hood cover in under flange of unit top cover, replace screw (C), engaging hole (E) in hood flange and tighten. Attach the two side plates to the unit panel by using two self-drilling screws for each side plate at dimples (D) provided in the panel.

6. Position fillpiece at bottom of hood, between the two side plates but do not secure at this time. (Slotted openings MUST be downward for drainage). After fillpiece is properly positioned, note where contact is made with the unit panel. Remove fillpiece and apply gasket material to this area to provide a seal. Reposition fillpiece and secure with 2 screws.

7. Install the two filters into the hood assembly, sliding down along retainers on side plates, into fillpiece at bottom of hood.

   NOTE: Install filters so that “Air Flow” arrows point toward the unit.

8. Install filter cover over the end of the hood with one screw (center of hood), securing filters into position.

CAUTION: When proceeding with steps 9 and 10, extreme care must be exercised while turning both the set point and minimum position adjusting screws to prevent twisting them off.

9. The enthalpy set point for the dampers may now be set by selecting the desired set-point from graph in Figure 6. For a single enthalpy economizer, carefully turn the set-point adjusting screw to the “A”, “B”, “C” or “D” setting corresponding to the lettered curve. For a dual enthalpy economizer, carefully turn the set-point adjusting screw fully clockwise past the “D” setting.

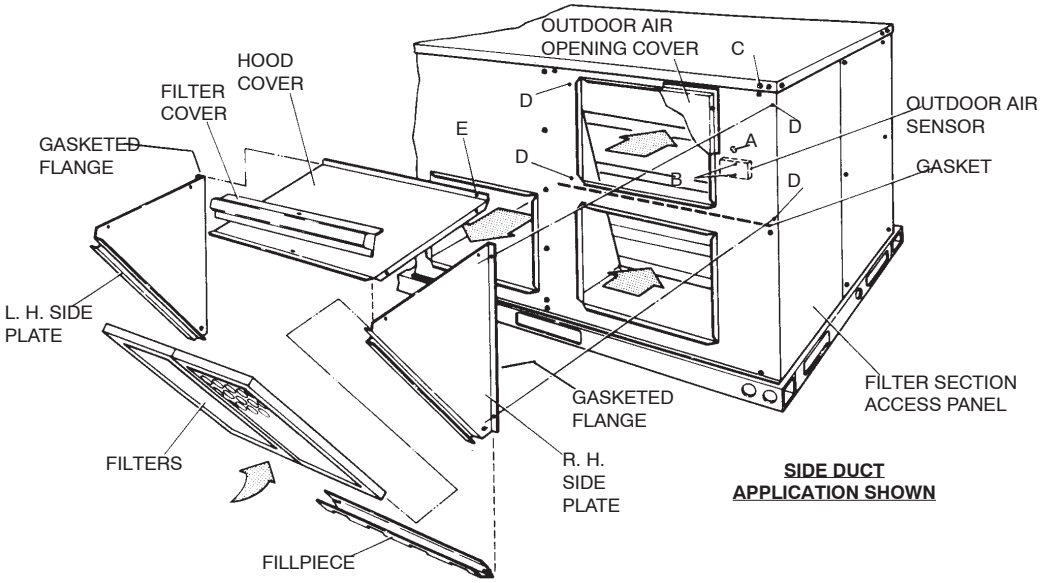


FIG. 3 - ECONOMIZER RAIN HOOD ASSEMBLY (OPTION)

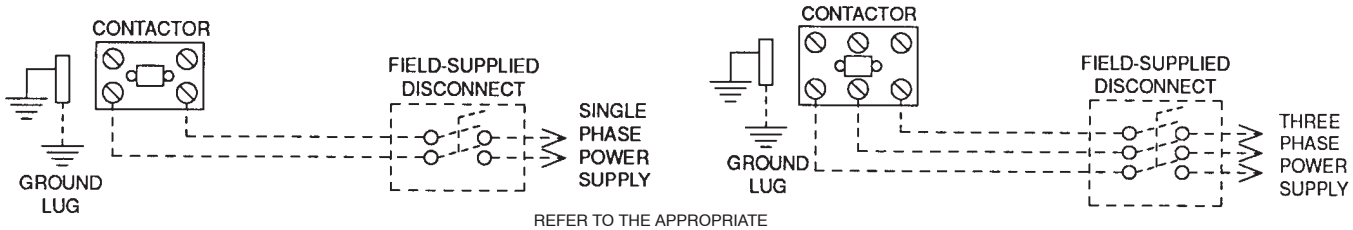
10. To check that the damper blades move smoothly without binding, carefully turn the minimum position adjusting screw fully clockwise and then energize and de-energize terminals “R” to “G”. With terminals “R” to “G” energized, turn the minimum position screw counterclockwise until the desired minimum position has been attained.

11. Replace the filter section access panel.

DISCONNECT SWITCH BRACKET FOR UNITS WITH OPTIONAL BELT-DRIVE BLOWER

A special bracket for mounting a field-supplied disconnect switch is provided in each unit ordered with an optional belt-drive supply air blower. The bracket is shipped inside the blower compartment taped to the top of the blower housing.

POWER WIRING



REFER TO THE APPROPRIATE ELECTRICAL DATA TABLE TO SIZE THE DISCONNECT SWITCH, OVERCURRENT PROTECTION AND WIRING.

CONTROL WIRING

COOLING ONLY (24 VOLT THERMOSTAT)

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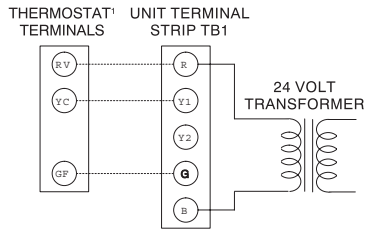

[1]24 VOLT THERMOSTAT 2TH07701024 IF THE UNIT HAS AN ECONOMIZER, REMOVE JUMPER J1 FROM TERMINALS 8 AND 10 ON THE RELAY BOARD TO PREVENT SIMULTANEOUS OPERATION OF THE COMPRESSOR AND THE ECONOMIZER. IF YOU WANT TO CONTROL THE ECONOMIZER ON A SECOND STAGE OF COOLING, USE THE THERMOSTAT 2TH04701224.

COOLING / HEATING (24 VOLT THERMOSTAT)

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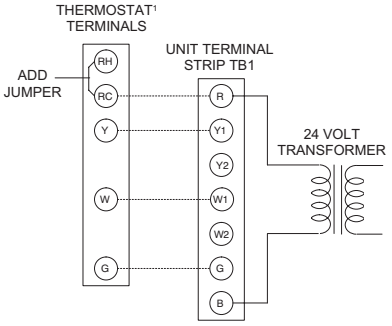
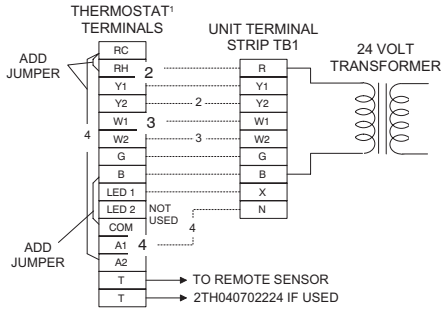


[1]24 VOLT THERMOSTAT 2TH07701024. IF THE UNIT HAS AN ECONOMIZER, REMOVE JUMPER J1 FROM TERMINALS 8 AND 10 ON THE RELAY BOARD TO PREVENT SIMULTANEOUS OPERATION OF THE COMPRESSOR AND THE ECONOMIZER. IF YOU WANT TO CONTROL THER ECONOMIZER ON A SECOND STAGE OF COOLING OR HAVE AND ELECTRIC HEAT ACCESSORY WITH TWO STAGES OF HEAT, USE THERMOSTAT 2TH0471024

COOLING / HEATING (ELECTRONIC THERMOSTAT)



[1] ELECTRONIC PROGRAMMABLE THERMOSTAT 2ET04700224 (INCLUDES SUBBASE)

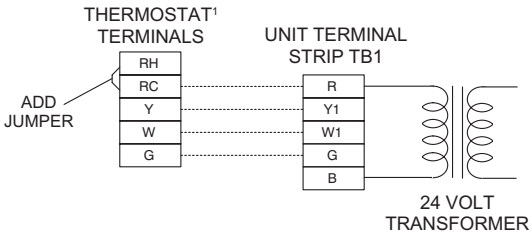
[2] SECOND STAGE COOLING IS NOT REQUIRED ON UNITS LESS ECONOMIZER.

[3] SECOND STAGE HEATING IS ONLY REQUIRED ON UNITS WITH A TWO STAGE ELECTRIC HEATER.

[4] REMOVE JUMBER J2 FROM TERMINALS 4 AND 9 ON JUMPER PLUG CONNECTOR P6 ON UNITS WITH ECONMIZER. TERMINALS A1 AND A2 PROVIDE A RELAY OUT-PUT TO CLOSE THE OUTDOOR ECONOMIZER DAMPERS WHEN THE THERMOSTAT SWITCHES TO THE SET-BACK POSITION.

COOLING / HEATING (ELECTRONIC THERMOSTAT)

COOLING / HEATING (ELECTRONIC THERMOSTAT) SINGLE STAGE



[1]ELECTRONIC PROGRAMMABLE THERMOSTAT 2ET07701024 (INCLUDES SUBBASE). IF THIS UNIT HAS AND ECONOMIZER, REMOVE JUMPER J1 FROM TERMINALS 8 AND 10 ON THE RELAY BOARD TO PREVENT SIMULTANEOUS OPERATION OF THE COMPRESSOR AND THE ECONOMIZER. IF YOU WANT TO CONTROL THE ECONOMIZER ON A SECOND STAGE OF COOLING, USE THERMOSTAT 2ET04700224.

FIG. 4 - TYPICAL FIELD WIRING

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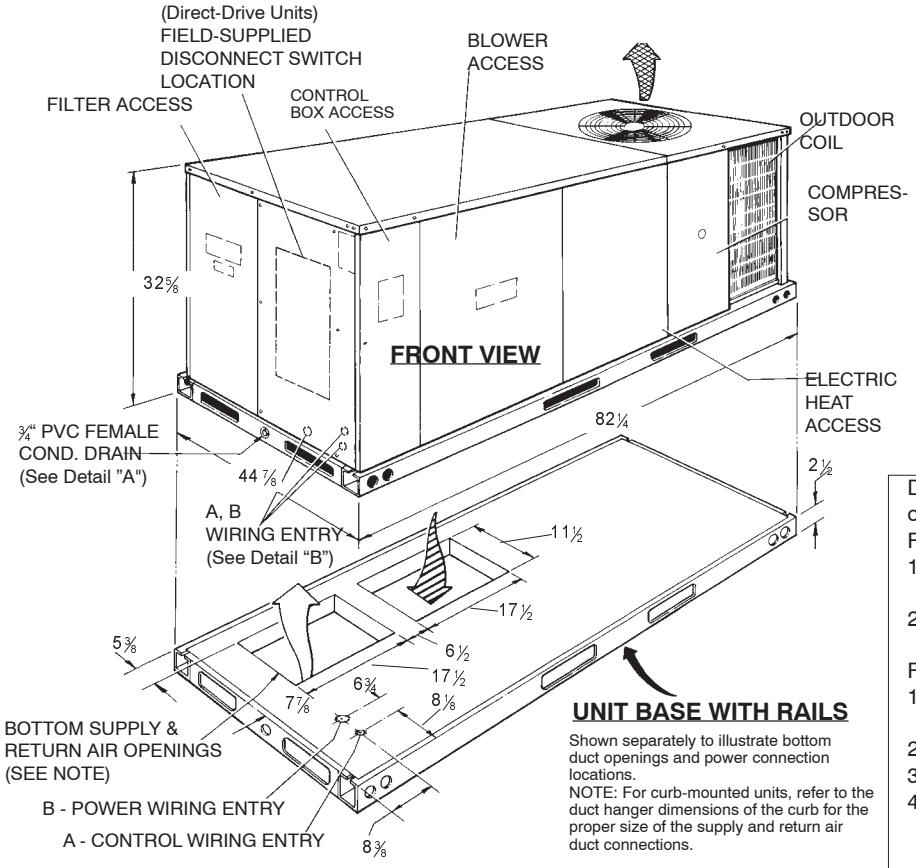
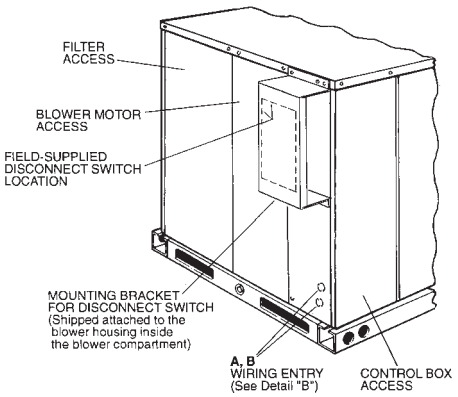




DISCONNECT SWITCH LOCATION AND MOTOR ACCESS PANEL FOR UNIT WITH "BELT-DRIVE" OPTION

UNIT BASE WITH RAILS

Shown separately to illustrate bottom duct openings and power connection locations.
NOTE: For curb-mounted units, refer to the duct hanger dimensions of the curb for the proper size of the supply and return air duct connections.

DUCT COVERS - Units are shipped with all air duct openings covered.

For side duct applications;

1. Remove and discard the supply and return air duct covers.
2. Connect ductwork to duct flanges on the rear of the unit.

For bottom duct applications;

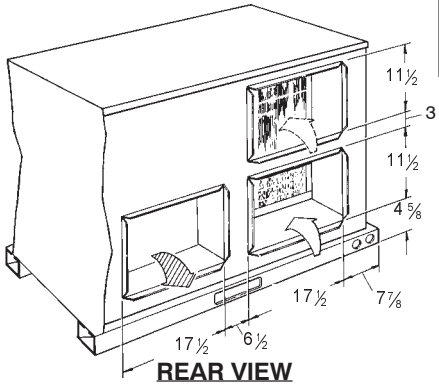
1. Remove the side supply air duct cover to gain access to the bottom supply air knockout panel.
2. Remove and discard the bottom knockout panel.
3. Replace the side duct cover.
4. With filter section access panel removed from the unit, remove and discard the bottom return air knockout panel.
5. Replace the filter access panel.

CLEARANCES

Front	24"
Back	12" (Less Economizer) 36" (With Economizer or Fixed Air/Motorized Air Damper)
Left Side (Filter Access)	24" (Less Economizer) 36" (With Economizer)
Right Side (Cond. Coil)	24"
Below Unit[1]	0"
Above Unit[2]	72" (For Condenser Air Discharge)

NOTE:
Units and ductwork are approved for zero clearance to combustible materials when equipped with electric heaters.

[1] Units may be installed on combustible floors made from wood or class A, B or C roof covering material. (Applicable in USA only).
[2] Units must be installed outdoors. Overhanging structures or shrubs should not obstruct the outdoor coil nor the fan outlet.



REAR VIEW

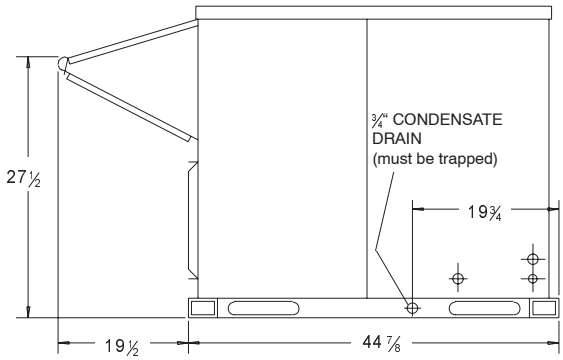
SIDE SUPPLY AND RETURN AIR OPENINGS

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

UTILITIES ENTRY DATA

HOLE	KNOCKOUT SIZE (DIA.)	USED FOR
A	7/8" *	Control Wiring (Side or Bottom)**
B	2" *	Power Wiring (Side or Bottom)

*Knockouts in the bottom of the unit can be located by the slice in the insulation.
**Do not remove the 2" knockout ring.



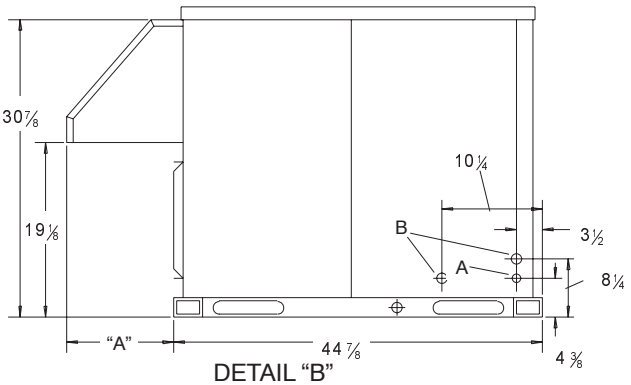
DETAIL "A"

UNIT WITH ECONOMIZER RAIN HOOD

AIR FLOW LEGEND

- RETURN AIR
- SUPPLY AIR
- OUTDOOR AIR
- OUTDOOR AIR (Economizer)

DIMENSION "A"	
FIXED OUTDOOR AIR DAMPER	12
MOTORIZED DAMPER	16 1/2



DETAIL "B"

UNIT WITH FIXED OUTDOOR AIR/MOTORIZED DAMPER RAIN HOOD

FIG. 5 - DIMENSIONS & CLEARANCES - 3 - 5 TONS

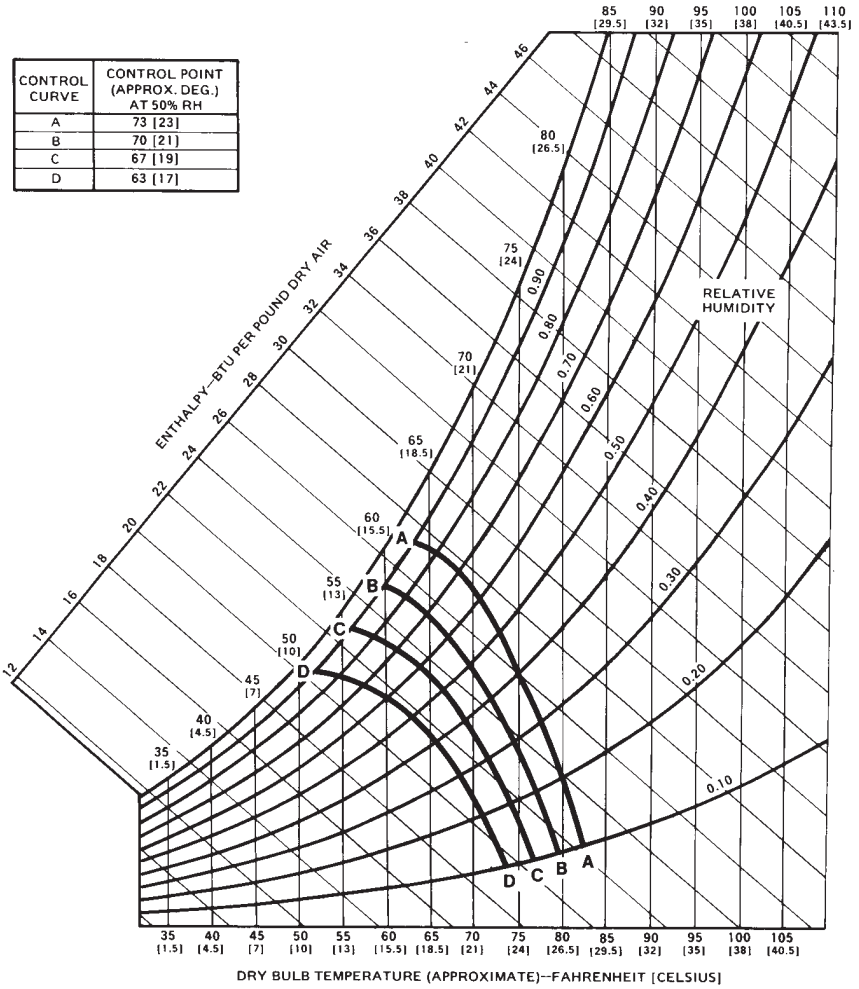


FIG. 6 - ENTHALPY SET POINT ADJUSTMENT

Install the bracket on the left hand side of the unit as shown in Figure 5. Several existing screws at the top of the unit and one screw approximately midway down from the top will be used for mounting the bracket. Screws should be loosened only - NOT REMOVED. Matching holes in the bracket have elongated keyways allowing easy installation. Re-tighten screws after bracket is in place to ensure panels will remain leak tight.

ELECTRIC HEATERS

Electric heaters are available as field-installed accessories. Refer to Form 530.18-N7.1V for installation instruction. These UL approved heaters are located within the central compartment of the unit (see Figure 5 for access panel) with the heating elements extending into the supply air chamber.

The heaters are wired for a single point power supply. Power supply need only be brought into the single point terminal block

TABLE 3 - SUPPLY AIR PERFORMANCE - 3 THRU 5 TON w/Direct-Drive Blower

GAS HEAT VALUES SHOWN @ 230/460/575 VOLTS - Side Duct Connections

UNIT SIZE (MBH)	MOTOR SPEED	Available External Static Pressure - IWG*																	
		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.00	
		CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts	CFM	Watts
036	HI	-	-	-	-	1699	825	1650	785	1570	755	1430	725	1360	700	1280	680	1180	655
	MED	1684	800	1631	780	1582	750	1524	720	1410	690	1324	650	1260	630	1185	610	1100	590
	LOW	1487	710	1464	690	1421	670	1367	650	1315	620	1246	605	1185	590	1110	570	1020	545
048	HI	1996	960	1933	936	1868	910	1795	880	1722	845	1635	820	1544	790	1419	765	1300	740
	MED	1804	838	1765	810	1714	785	1650	765	1589	735	1508	705	1407	675	1306	645	1195	625
	LOW	1681	760	1640	738	1604	715	1541	695	1490	670	1416	645	1337	620	1230	595	1120	575
060	HI	2400	1155	2338	1125	2274	1095	2167	1045	2096	1010	1990	980	1887	945	1771	905	1629	855
	MED	2290	1105	2214	1065	2145	1030	2071	990	1990	950	1911	920	1828	885	1724	835	1604	798
	LOW	2150	1020	2100	990	2029	950	1965	910	1905	880	1816	838	1724	800	1644	770	1531	710

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS AND GAS-FIRED HEAT EXCHANGERS. REFER TO THE STATIC RESISTANCES TABLE FOR RESISTANCE VALUES ON APPLICATIONS OTHER THAN GAS / ELECTRIC UNITS WITH SIDE DUCT AIRFLOWS.

TABLE 4 - SUPPLY AIR PERFORMANCE - 3 & 4 TON w/Belt-Drive Blower

3 TON GAS HEAT VALUES SHOWN @ 230/460/575 VOLTS - Side Duct Connections

UNIT SIZE (MBH)	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
036	2000	843	860	880	925	919	1005	956	1065	993	1145	1030	1195	1067	1235
	1900	817	775	854	850	893	920	930	995	970	1065	1008	1125	1046	1170
	1800	790	700	828	760	867	840	906	905	944	980	985	1040	1025	1100
	1700	-	-	802	670	840	745	881	815	920	900	961	970	1001	1030
	1600	-	-	-	-	818	665	858	740	898	820	940	890	980	950
	1500	-	-	-	-	-	-	842	695	882	755	922	835	962	895
	1400	-	-	-	-	-	-	833	650	867	705	904	765	942	820
	1300	-	-	-	-	-	-	-	-	858	665	893	725	932	785
	1200	-	-	-	-	-	-	-	-	847	640	880	680	916	730

UNIT SIZE (MBH)	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
036	2000	1103	1270	-	-	-	-	-	-	-	-	-	-	-	-
	1900	1085	1210	-	-	-	-	-	-	-	-	-	-	-	-
	1800	1064	1145	1102	1180	-	-	-	-	-	-	-	-	-	-
	1700	1040	1075	1081	1115	1121	1140	-	-	-	-	-	-	-	-
	1600	1020	1005	1060	1050	1100	1085	-	-	-	-	-	-	-	-
	1500	1003	945	1044	995	1086	1035	-	-	-	-	-	-	-	-
	1400	982	880	1024	920	1067	965	1107	1000	-	-	-	-	-	-
	1300	970	835	1010	870	1053	920	1099	960	-	-	-	-	-	-
	1200	953	780	992	815	1034	855	1080	905	-	-	-	-	-	-

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS AND GAS-FIRED HEAT EXCHANGERS. REFER TO THE STATIC RESISTANCES TABLE FOR RESISTANCE VALUES ON APPLICATIONS OTHER THAN GAS / ELECTRIC UNITS WITH SIDE DUCT AIRFLOWS.

4 TON GAS HEAT VALUES SHOWN @ 230/460/575 VOLTS - Side Duct Connections

UNIT SIZE (MBH)	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
048	2000	843	860	880	925	919	1005	956	1065	993	1145	1030	1195	1067	1235
	1900	817	775	854	850	893	920	930	995	970	1065	1008	1125	1046	1170
	1800	790	700	828	760	867	840	906	905	944	980	985	1040	1025	1100
	1700	-	-	802	670	840	745	881	815	920	900	961	970	1001	1030
	1600	-	-	-	-	818	665	858	740	898	820	940	890	980	950
	1500	-	-	-	-	-	-	842	695	882	755	922	835	962	895
	1400	-	-	-	-	-	-	833	650	867	705	904	765	942	820
	1300	-	-	-	-	-	-	-	-	858	665	893	725	932	785
	1200	-	-	-	-	-	-	-	-	847	640	880	680	916	730

UNIT SIZE (MBH)	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
048	2000	1103	1270	-	-	-	-	-	-	-	-	-	-	-	-
	1900	1085	1210	-	-	-	-	-	-	-	-	-	-	-	-
	1800	1064	1145	1102	1180	-	-	-	-	-	-	-	-	-	-
	1700	1040	1075	1081	1115	1121	1140	-	-	-	-	-	-	-	-
	1600	1020	1005	1060	1050	1100	1085	-	-	-	-	-	-	-	-
	1500	1003	945	1044	995	1086	1035	-	-	-	-	-	-	-	-
	1400	982	880	1024	920	1067	965	1107	1000	-	-	-	-	-	-
	1300	970	835	1010	870	1053	920	1099	960	-	-	-	-	-	-
	1200	953	780	992	815	1034	855	1080	905	-	-	-	-	-	-

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS AND GAS-FIRED HEAT EXCHANGERS. REFER TO THE STATIC RESISTANCES TABLE FOR RESISTANCE VALUES ON APPLICATIONS OTHER THAN GAS / ELECTRIC UNITS WITH SIDE DUCT AIRFLOWS.

TABLE 5 - SUPPLY AIR PERFORMANCE - 5 TON w/Belt-Drive Blower

5 TON GAS HEAT VALUES SHOWN @ 230/460/575 VOLTS - Side Duct Connections

UNIT SIZE (MBH)	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
060	2500	1059	1560	1077	1590	1095	1630	1114	1650	1134	1660	1158	1685	1181	1720
	2400	1032	1405	1054	1470	1074	1525	1094	1560	1116	1595	1140	1620	1167	1640
	2300	1005	1260	1024	1275	1049	1370	1069	1440	1090	1475	1116	1505	1142	1535
	2200	980	1160	1002	1170	1022	1190	1044	1250	1066	1350	1090	1410	1117	1440
	2100	930	1060	957	1070	983	1080	1010	1100	1039	1160	1064	1260	1092	1340
	2000	877	950	908	975	941	1000	976	1020	1009	1050	1040	1100	1070	1225
	1900	-	-	-	-	894	885	940	940	980	980	1014	1020	1047	1095
	1800	-	-	-	-	855	815	903	860	950	905	988	940	1022	970
	1700	-	-	-	-	-	-	884	815	925	850	964	880	1001	910
	1600	-	-	-	-	-	-	864	770	908	805	948	835	987	870
	1500	-	-	-	-	-	-	-	-	882	740	926	780	965	830

UNIT SIZE (MBH)	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
060	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2400	1193	1665	-	-	-	-	-	-	-	-	-	-	-	-
	2300	1170	1580	1202	1620	-	-	-	-	-	-	-	-	-	-
	2200	1148	1480	1180	1530	-	-	-	-	-	-	-	-	-	-
	2100	1121	1385	1155	1425	1190	1475	-	-	-	-	-	-	-	-
	2000	1100	1285	1133	1340	1169	1385	1205	1445	-	-	-	-	-	-
	1900	1079	1180	1110	1240	1143	1280	1178	1330	1222	1375	-	-	-	-
	1800	1058	1060	1090	1135	1122	1190	1158	1240	1196	1295	-	-	-	-
	1700	1035	960	1071	1030	1103	1100	1134	1140	1164	1175	1197	1205	-	-
	1600	1020	900	1056	965	1088	1035	1118	1065	1145	1105	1170	1130	1198	1150
	1500	1004	860	1038	880	1070	925	1101	980	1130	1045	1158	1075	1184	1110

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS AND GAS-FIRED HEAT EXCHANGERS. REFER TO THE STATIC RESISTANCES TABLE FOR RESISTANCE VALUES ON APPLICATIONS OTHER THAN GAS / ELECTRIC UNITS WITH SIDE DUCT AIRFLOWS.

TABLE 6 - STATIC RESISTANCES

DESCRIPTION		EXTERNAL STATIC PRESSURE DROP RESISTANCE, IWG CFM										
		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
Economizer[1, 3]		0.07	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.23	0.26	0.30
Electric Heaters[1]	5 - 15 KW	0.04	0.05	0.06	0.07	0.08	0.10	0.12	0.14	0.16	0.19	0.22
	20 - 30 KW	0.06	0.07	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.23	0.26
Bottom Duct Connections[1]		0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.14	0.16	0.19	0.22
Cooling Only[2]		0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.23	0.26	0.29	0.32

[1]Deduct these resistance values from the available external static pressure shown in the respective Blower Performance Table.
[2]Add these resistance values to the available static resistance in the respective Blower Performance Table.
[3]The pressure thru the economizer is greater for 100% outdoor air than for 100% return air. If the resistance of the return air duct system is less than 0.25 IWG, the unit will deliver less CFM during full economizer operation.

TABLE 7 - MOTOR AND DRIVE DATA - Belt-Drive Blower

MODEL	BLOWER RANGE (RPM)	MOTOR*				ADJUSTABLE MOTOR PULLEY		FIXED BLOWER PULLEY		BELT	
		HP	RPM	FRAME SIZE	SERVICE FACTOR	PITCH DIA. (in.)	BORE (in.)	PITCH DIA. (in.)	BORE (in.)	PITCH LENGTH (in.)	DESIG-NATION
DEE036	790 - 1120	1-1/2	1725	56	1.15	2.4 - 3.4	7/8	5.7	1	37.3	A36
DEE048	790 - 1120	1-1/2	1725	56	1.15	2.4 - 3.4	7/8	5.7	1	37.3	A36
DEE060	850 - 1220	1-1/2	1725	56	1.15	2.4 - 3.4	7/8	5.2	1	37.3	A36

*All motors have solid bases and are inherently protected. These motors can be selected to operate into their service factor because they are located in the moving air, upstream of any heating device.

TABLE 8 - ELECTRICAL DATA - Units w/Direct-Drive Blower Motor

MODEL DEE	POWER SUPPLY	VOLTAGE LIMITATIONS (SEE NOTE 1)		COMPRESSOR		COND. FAN MOTOR, FLA	SUPPLY AIR BLOWER MOTOR, FLA	TOTAL UNIT AMPACITY, AMPS	MAX. FUSE SIZE, (SEE NOTE 2) AMPS	MAX. HACR BREAKER SIZE, AMPS
		MIN.	MAX.	RLA	LRA					
036	208/230-1-60	187	253	16.7	87	2.3	4.4	27.5	40	40
	208/230-3-60	187	253	13.1	110	2.3	4.4	23.1	35	35
	460-3-60	414	504	6.7	54	1.4	2.2	12.0	15	15
	575-3-60	518	630	5.1	44	1.4	2.2	10.7	15	—
048	208/230-1-60	187	253	18.7	135	2.3	5.0	38.6	60	60
	208/230-3-60	187	253	11.9	130	2.3	5.0	25.7	40	40
	460-3-60	414	504	6.3	64.0	1.4	2.2	13.2	20	20
	575-3-60	518	630	4.9	52.0	1.4	2.2	11.4	15	—
060	208/230-1-60	187	253	32.1	169	2.3	6.6	49.0	80	80
	208/230-3-60	187	253	19.3	123	2.3	6.6	33.0	50	50
	460-3-60	414	504	10.0	62	1.4	3.3	17.2	25	25
	575-3-60	518	630	7.9	50	1.4	3.3	14.6	20	—

NOTES: 1. Utilization Range “A” in accordance with ARI Standard 110. 2. Dual element, time delay type.

TABLE 9 - ELECTRICAL DATA - Units w/Belt-Drive Blower Motor

MODEL DEE	POWER SUPPLY	VOLTAGE LIMITATIONS (SEE NOTE 1)		COMPRESSOR		COND. FAN MOTOR, FLA	SUPPLY AIR BLOWER MOTOR, FLA	TOTAL UNIT AMPACITY, AMPS	MAX. FUSE SIZE, (SEE NOTE 2) AMPS	MAX. HACR BREAKER SIZE, AMPS
		MIN.	MAX.	RLA	LRA					
036	208/230-1-60	187	253	16.7	87	2.3	7.6	30.7	45	45
	208/230-3-60	187	253	13.1	110	2.3	5.3	23.9	35	35
	460-3-60	414	504	6.7	54	1.4	2.6	12.4	20	20
	575-3-60	518	630	5.1	44	1.4	2.0	9.8	15	15
048	208/230-1-60	187	253	18.7	135	2.3	8.6	42.6	60	60
	208/230-3-60	187	253	11.9	130	2.3	5.2	26.3	40	40
	460-3-60	414	504	6.3	64.0	1.4	2.6	14.3	20	20
	575-3-60	518	630	4.9	52.0	1.4	2.0	11.4	15	15
060	208/230-1-60	187	253	32.1	169	2.3	8.6	51.0	80	80
	208/230-3-60	187	253	19.3	123	2.3	6.0	32.4	50	50
	460-3-60	414	504	10.0	62	1.4	3.0	16.9	25	25
	575-3-60	518	630	7.9	50	1.4	2.4	13.7	20	20

NOTES: 1. Utilization Range “A” in accordance with ARI Standard 110. 2. Dual element, time delay type.

OPERATION

The heaters are wired for a single point power supply. Power supply need only be brought into the single point terminal block and thermostat wiring to the low voltage terminal strip located in the upper portion of the unit control box.

Fuses are supplied, where required, by the factory. Some KW sizes require fuses and others do not. Refer to the accessory instruction for electrical data.

COOLING SYSTEM

The cooling section is a complete factory package utilizing an air-cooled condenser. The system is factory-charged with Refrigerant-22. The compressor is hermetically sealed and internally sprung.

The compressors have inherent (internal) protection. If there is an abnormal temperature rise in the compressor, the protector will open to shut down the compressor.

PRELIMINARY OPERATION COOLING

After the installation has been completed, the crankcase heater of the compressor must be energized for at least 4 hours before starting the unit. After this initial warm-up, the compressor should be given three false starts (energized just long enough to make a few revolutions) with a 5 minute delay between each start before being put into full time service.

NOTE: Prior to each cooling season, the crankcase heater must be energized at least 10 hours before the system is put into operation.

COOLING SEQUENCE OF OPERATION

Single-Stage Cooling:
When the thermostat calls for "cooling", "R" is closed to "G" and "Y1" (wiring schematic) which completes the low voltage control circuit, immediately energizing the compressors, condenser fan motor and blower motor simultaneously.

Two-Stage Cooling:
A two-stage cooling thermostat may be used if the unit has an economizer. First-stage cooling is provided by the economizer if the outdoor air enthalpy is acceptable, and second-stage cooling is provided by the compressor. Jumper wire J1 must be removed. Refer to unit wiring diagram.

After the thermostat is satisfied and opens, the blower will continue to run for a short time. All other components will stop.

SAFETY CONTROLS

The refrigerant system is equipped with the following safety controls:

1. A Suction Line Freezestat to protect against low evaporator temperatures due to a low air flow or a low return air temperature.

2. A High Pressure Cutout Switch to protect against excessive discharge pressures due to a blocked condenser coil or a condenser motor failure.

3. A Low Pressure/Loss of Charge

   Switch to protect against loss of refrigerant charge.

If either of the above safety controls opens, the refrigerant system will be locked out. The lock out of the system can be reset by opening the 24V circuit either at the room thermostat or at the unit disconnect.

HEATING SEQUENCE OF OPERATION

The following sequence of operation is based on using a standard single-stage or two-stage heating thermostat.

WITH POWER TO UNIT AND THERMOSTAT IN THE HEATING MODE

Single-Stage Heating:

a. If the fan switch is in the "ON" position, the evaporator blower motor relay (BR) will be energized through terminal G to provide continuous blower operation. If the fan switch is in the "AUTO" position, the blower will operate only when there is a call for heating by the thermostat.

b. Upon a call for heat by the thermostat, the first stage of heat will be energized. Sequencer 1S (or contactor 2M) is always the first and last to complete its timing cycle and controls power to the evaporator blower motor.

c. The thermostat will cycle the electric heat to satisfy the heating requirements of the conditioned space.

Two-Stage Heating:

a. If the fan switch is in the "ON" position, the evaporator blower motor relay (BR) will be energized through terminal G to provide continuous blower operation. If the fan switch is in the "AUTO" position, the blower will operate only when there is a call for heating by the thermostat.

b. Upon a call for first-stage heat by the thermostat, the first stage of heat will be energized.

   If the thermostat calls for the second stage of heat, the second stage of heat will be energized.

   As before, sequencer 1S (or contactor 2M) maintains control of the evaporator blower.

c. The thermostat will cycle the electric heat to satisfy the heating requirements of the conditioned space.

CONTINUOUS BLOWER - Continuous blower operation is possible by closing the R to G circuit on the thermostat.

TABLE 10 - HEAT ANTICIPATOR SETTING

NOMINAL HEATER SIZE KW	VOLTAGE	SETTING, AMPS	
		TH1	TH2
5	240-1-60	0.16	-
7		0.35	-
10		0.35	-
15		0.35	0.19
20		0.35	0.38
30		0.35	0.38
5	240-3-60	0.35	-
7		0.35	-
10		0.35	-
15		0.35	0.19
20		0.35	0.38
30		0.35	0.38
7	480-3-60	0.35	-
10		0.35	-
15		0.35	-
20		0.37	0.29
30		0.37	0.29
10	600-3-60	0.35	-
15		0.35	-
20		0.37	0.29
30		0.37	0.29

HEAT ANTICIPATOR SETPOINTS

It is important that the anticipator setpoint be correct. Too high of a setting will result in longer heat cycles and a greater temperature swing in the conditioned space. Reducing the value below the correct setpoint will give shorter “ON” cycles and may result in the lowering of the temperature within the conditioned space. Refer to Table 10 for the required heat anticipator setting.

CHECKING SUPPLY AIR CFM

The speed of the supply air blower will depend on the required CFM, the unit accessories and the static resistances of both the supply and the return air duct systems. With this information, the speed for the supply air blower can be determined from the static resistance and blower performance data on Tables 3 thru 6.

TABLE 11 - BELT-DRIVE SUPPLY AIR MOTOR PULLEY ADJUSTMENT

TURNS OPEN*	BLOWER DRIVE RANGE (RPM)		
	3 TON	4 TON	5 TON
5	780	790	850
4	842	856	924
3	904	922	998
2	966	988	1072
1	1028	1054	1246
0	1090	1120	1220

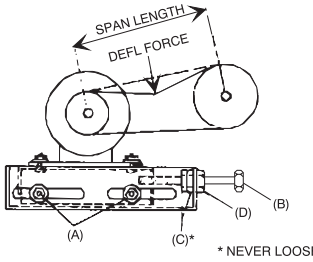
*Pulley can be adjusted in half-turn increments.

Knowing the required blower RPM and the blower motor HP, the speed setting for the direct-drive supply air motor can be determined.

CAUTION

Procedure for adjusting belt tension:

1. Loosen nut (D) from the motor mount.
2. Never loosen nuts (C) from each other while loosening nut (D).
3. Adjust the tension by turning bolt (B).
4. Do not loosen the four nuts (top and bottom) (A); unless additional tensioning distance is required; immediately re-tighten these bolts if loosened.
5. Use a belt tension checker to apply a perpendicular force to one belt at the midpoint of the span as shown. The deflection force should be applied until a specific deflection distance of 4mm (5/32")is obtained. To determine the deflection distance from normal position, use a straight edge from sheave to sheave as a reference line. The recommended deflection force is as follows:



Tension new belts at the max. deflection force recommended for the belt section. Check the belt tension at least two times during the first 24 hours of operation. Any re-tensioning should fall between the min. and max. deflection force values.

6. After adjusting, re-tighten nut (D) against the motor mount taking care not to loosen nuts (C).

FIG. 7 - BELT ADJUSTMENT

The setting (turns open) for the optional belt-drive supply air motor pulley can be determined from Table 11.

OPTIONAL BELT-DRIVE BLOWER

All units with belt-drive blowers have single-speed motors. The variable pitch pulley on the blower motor can be adjusted to obtain the desired supply air CFM. Refer to Table 7 for blower motor and drive data. The tension on the belts should be adjusted as shown in Figure 7.

Start the supply air blower motor. Adjust the resistances in both the supply and the return air duct systems to balance the air distribution throughout the conditioned space. The job specifications may require that this balancing be done by someone other than the equipment installer.

To check the supply air CFM after the initial balancing has been completed:

1. Remove the (two) 5/16" dot plugs from the holes located on the filter access panel side of the unit.
2. Insert at least 8" of 1/4 inch tubing into each of these holes for sufficient penetration into the air flow on both sides of the evaporator coil.

   NOTE: The tubes must be inserted and held in a position perpendicular to the air flow so that velocity pressure will not affect the static pressure readings.

3. Using an inclined manometer, determine the pressure drop across a dry indoor coil. Since the moisture on an indoor coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To assure a dry coil, the compressors should be de-energized while the test is being run.
4. Knowing the pressure drop across a dry coil, the actual CFM through the unit can be determined from the curve in Figure 8.

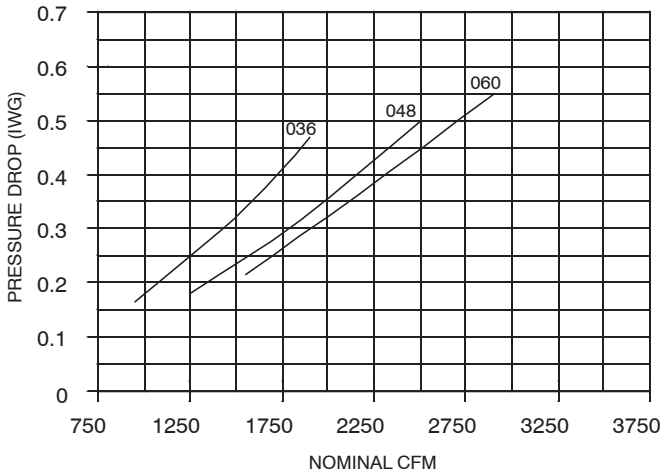


FIG. 8 - PRESSURE DROP ACROSS A DRY EVAPORATOR COIL VS SUPPLY AIR CFM, WITHOUT AIR FILTERS

WARNING: Failure to properly adjust the total system air quantity can result in poor system performance.

NOTE: DE-ENERGIZE THE COMPRESSORS BEFORE TAKING ANY TEST MEASUREMENTS TO ASSURE A DRY INDOOR COIL.

SECURE OWNER'S APPROVAL: *When the system is functioning properly, secure the owner's approval. Show him the location of all disconnect switches and the thermostat. Teach him how to start and stop the unit and how to adjust temperature settings within the limitations of the system.*

MAINTENANCE

NORMAL MAINTENANCE

CAUTION: Prior to any of the following maintenance procedures, shut off all power to the unit to prevent personal injury.

FILTERS - Inspect once a month. Replace disposable or clean permanent type as necessary. DO NOT replace permanent type with disposable.

MOTORS - Indoor fan and outdoor fan motors are permanently lubricated and require no maintenance.

OUTDOOR COIL - Dirt should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean coil, be sure power to the unit is shut off prior to cleaning.

NOTE: Exercise care when cleaning the coil so that the coil fins are not damaged.

Do not permit the outdoor air discharge to be obstructed by overhanging structures of shrubs.

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