YORK®
Heating and Air Conditioning

TECHNICAL GUIDE

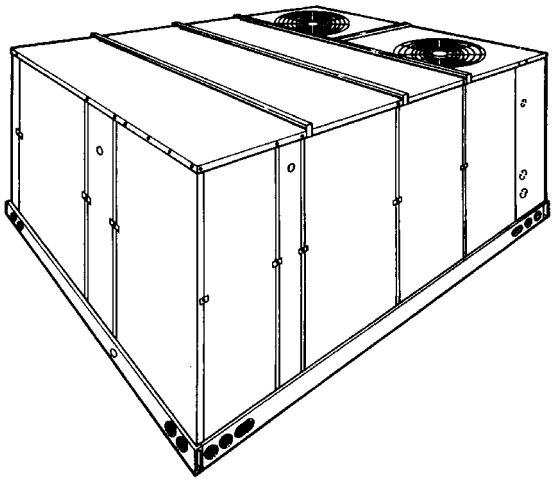
SUNLINE 2000™

SINGLE PACKAGE
AIR-TO-AIR
HEAT PUMPS

MODEL BQ240

20 NOMINAL TONS

9.5 EER



C SA® US

DESCRIPTION

York® Sunline 2000™ Heat Pumps are convertible single package units. All models have dual 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.

These heat pumps utilize a unique ambient compensated time-temperature defrost system. The defrost module automatically increases the time interval between defrost cycles as the outdoor ambient temperature decreases. This helps to eliminate unnecessary and costly defrosts.

All units include:

- Powder Paint finish that meets ASTM-B-117 1000 hour salt spray standards
- Two-stage cooling provided by dual independent refrigeration circuits with expansion valves, filter-driers, high and low pressure/loss of charge switches and freezestats
- Hermetically sealed compressors with crankcase heaters
- Permanently lubricated motors
- Bottom or side air discharge configuration capability (field convertible)
- Belt Drive Blower Motor with standard and high static drive options
- Manufactured under the quality standards of ISO9001
- Twenty-four volt control circuit with compressor lock-out
- Zero-25% fixed air damper with hood
- Copper tube/aluminum fin coils
- Hinged filter access and tool free latched doors
- Hinged tool free blower, blower motor, filters and electrical panel access
- Rigging holes in base rails for lifting
- Single point power connection
- Complete factory package - tested, charged and wired
- CSA agency approvals on all units

WARRANTY

- Factory Limited Parts Warranty
- One-year parts warranty
- A Five-year parts warranty on the compressor and electric heat elements.

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PRODUCT NOMENCLATURE

20 Ton Sunline Model Number Nomenclature

B	Q	240	C00	A	2	A	AA	1	0	1	2	4	A

Product Category

B = HP, Single Pkg., R-22

Product Identifier

Q = 9.0-10.0 EER HP

Nominal Cooling Capacity

240 = 20 Ton

Heat Type and Nominal Heat Capacity

C00 = Cooling Only. No field installed electric heat

Electric Heat Options

E18 = 18 KW
E36 = 36 KW
E54 = 54 KW
E72 = 72 KW

Airflow

A = Std. Drive
B = Std. Drive/Single Input Econo.
C = Std. Drive/Single Input Econo./Power Exhaust (Downflow Only)
D = Std. Drive/Motorized Damper
E = Std. Drive/Motorized Damper/Barometric Relief
J = Std. Drive/Single Input Econo./Barometric Relief
N = Hi Static Drive
P = Hi Static Drive/Single Input Econo.
Q = Hi Static Drive/Single Input Econo./Power Exhaust (Downflow Only)
R = Hi Static Drive/Motorized Damper
K = Hi Static Drive/Motorized Damper/Barometric Relief
S = Hi Static Drive/Single Input Econo./Barometric Relief

Voltage

2 = 208/230-3-60
4 = 460-3-60
5 = 575-3-60

Installation Options

A = No Options Installed
B = Option 1
C = Option 2
D = Options 1 & 2
E = Option 3
F = Option 4
G = Options 1 & 3
H = Options 1 & 4
J = Options 1, 2 & 3
K = Options 1, 2, & 4
L = Options 1,3 & 4
M = Options 1, 2, 3, & 4
N = Options 2 & 3
P = Options 2 & 4
Q = Options 2, 3, & 4
R = Options 3 & 4
S = Option 5
T = Options 1 & 5
U = Options 1, 3, & 5
V = Options 1, 4, & 5
W = Options 1, 3, 4, & 5
X = Options 3 & 5
Y = Options 4 & 5
Z = Options 3, 4 & 5

Options

1 = Disconnect
2 = Non-Pwr'd Conv. Outlet
3 = Smoke Detector S.A.
4 = Smoke Detector R.A.
5 = Pwr'd Conv. Outlet

Additional Options

Standard Cabinet	Hinged Filter Door & Tool Free Access Cabinet
AA = None AB = Phase Monitor AC = Coil Guard AD = Dirty Filter Switch AE = Phase Monitor & Coil Guard AF = Phase Monitor & Dirty Filter Switch AG = Coil Guard & Dirty Filter Switch AH = Phase Monitor, Coil Guard & Dirty Filter Switch RC = Coil Guard & American Flag TA = Technicoat Condenser Coil TJ = Technicoat Evaporator Coil TS = Technicoat Evaporator & Condenser Coils	BA = Hinged Filter Door & Tool Free Access Panels BB = Phase Monitor, Hinged Filter Door & Tool Free Access Panels BC = Coil Guard, Hinged Filter Door & Tool Free Access Panels BD = Dirty Filter Switch, Hinged Filter Door & Tool Free Access Panels BE = Phase Monitor & Coil Guard, Hinged Filter Door & Tool Free Access Panels BF = Phase Monitor & Dirty Filter Switch, Hinged Filter Door & Tool Free Access Panels BG = Coil Guard & Dirty Filter Switch, Hinged Filter Door & Tool Free Access Panels BH = Phase Monitor, Coil Guard & Dirty Filter Switch, Hinged Filter Door & Tool Free Access Panels

ZZ = If desired option combination is not listed above, ZZ will be assigned and configuration options will be located in digits 15-18.

Product Generation

1 = First Generation
2 = Second Generation

Configuration Options (not required for all units)
These four digits will not be assigned until a quote is requested, or an order placed.

- SS Drain Pan
- CPC Controller, DFS, APS
- Johnson Controller, DFS, APS
- Honeywell Controller, DFS, APS
- Novar Controller, DFS, APS
- Simplicity IntelliComfort Controller
- Simplicity IntelliComfort Controller w/ModLinc
- 2" Pleated filters
- 4" Pleated filters
- BAS Ready Economizer (2-10 V.D.C. Actuator without a controller)
- Double Wall Construction
- Any Combination of Additional Options that Don't Have an Option Code Pre-assigned

Product Style

A = Style A

FEATURES

All models are available with a wide variety of factory-mounted options such as stainless steel heat exchangers, phase monitor, dirty filter switch, and coil guard 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 the field installation and to provide years of dependable operation.

All models (including those with an economizer) are suitable for either bottom or horizontal duct connections. **Models with factory installed 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 these “factory mounted” outdoor air damper options:

- Single enthalpy economizer with or without power exhaust
- BAS-ready economizer with or without power exhaust
- Motorized outdoor air damper
- Barometric Relief Damper

A fixed outdoor air intake assembly will be 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 static drive option is available for applications with a higher CFM and/or static pressure requirement.

All compressors have 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 freezestat and low pressure/loss of charge switch to protect all system components.

- **Simplicity® Controls** - Simplicity® control boards have standardized a number of features previously available only as options or by utilizing additional controls.
  - **Low Ambient** - An integrated low-ambient control allows all units to operate in the cooling mode down to 0ºF outdoor ambient without additional assistance. Optionally, the control board can be programmed to lockout the compressors when the outdoor air temperature is low or when free cooling is available.
  - **Anti-Short Cycle Protection** - To aid compressor life, an anti-short cycle delay is incorporated into the standard controls. Compressor reliability is further ensured by programmable minimum run times. For testing, the anti short cycle delay can be temporarily overridden with the push of a button.
  - **Fan Delays** - Fan on and fan off delays are fully programmable. Furthermore, the heating and cooling fan delay times are independent of one another. All units are programmed with default values based upon their configuration of cooling and heat.
  - **Safety Monitoring** - The control board monitors the high and low-pressure switches, the freezestats, the gas valve, if applicable, and the temperature limit switch on gas and electric heat units. The unit control board will alarm on ignition failures, compressor lockouts and repeated limit switch trips.
  - **Nuisance Trip Protection and Strikes** - To prevent nuisance trouble calls, the control board uses a “three times, you’re out” philosophy. The high and low-pressure switches and the freezestats must trip three times within two hours before the unit control board will lock out the associated compressor.
  - **On Board Diagnostics** - Each alarm will energize a trouble light on the thermostat, if so equipped, and flash an alarm code on the control board LED. Each high and low-pressure switch alarm as well as each freezestat alarm has its own flash code. The control board saves the five most recent alarms in memory, and these alarms can be reviewed at any time. Alarms and programmed values are retained through the loss of power.

All units have long lasting powder paint cabinets with 1000 hour salt spray test approval under ASTM-B117 procedures.

All models are CSA approved.

- **Warranty -** All models include a one-year limited parts warranty on the complete unit. Compressors and electric heater elements carry a five-year warranty.
- **Electric Heat Operation** - All electric heat models (factory installed only) 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.
- **BAS Controls** - York’s Sunline™ series units offer factory mounted BAS controls such as Simplicity® Intelli-*Comfort*™, Novar, Honeywell, Johnson, and CPC.

FACTORY-INSTALLED OPTIONS

- **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.

- **BAS-READY ECONOMIZER -** Includes a slide-in / plug-in damper assembly with fully modulating spring-return motor actuator with zero to 95-degree rotation capable of introducing up to 100% outdoor air with nominal 1% leakage type dampers.

  Actuator requires 2-10 VDC input from an external source, such as a field-installed or factory-installed BAS controller. BAS-ready actuators have an adjustable auxiliary end-switch for optional power exhaust control.

  For units with Simplicity® Intelli-Comfort™ control, a factory-installed, dry bulb sensor determines if outdoor air temperature is low enough to provide free-cooling operation. (Field-installed humidity sensors for either outdoor air or outdoor & return air streams are available for single enthalpy and differential enthalpy configurations, respectively).

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

- **POWER EXHAUST** - Our 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. BAS-ready economizer actuators have an adjustable auxiliary end-switch to provide a range of damper positions available to energize power exhaust.

  The exhaust fan, motor and controls are installed and wired at the factory. The rain hood must be assembled and installed in the field.

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

- **MOTORIZED OUTDOOR AIR INTAKE DAMPER** - Includes a slide-in / plug-in damper assembly with a 2-position, spring return motor actuator which opens to a 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.

- **BAROMETRIC RELIEF DAMPER -** This damper option can be used to relieve internal building air pressure on units with an economizer without 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.

- **PHENOLIC COATED EVAPORATOR AND CONDENSER COILS** - Special coating process that utilizes Technicoat 10-1" processes. Coating is applied by total immersion of the complete coil for maximum protection.

- **ELECTRIC HEATERS** wired for single point power supply. These nickel chromium heater elements are provided with limit and automatic reset capability to prevent operation at excessive temperatures.

- **FILTER OPTIONS** - Standard units are shipped with 2" throw-away filters installed. 2" pleated and 4" pleated filters are offered as a factory installed option.

- **CONVENIENCE OUTLET** - This 110 volt outlet can be "powered" by the unit with a stepdown transformer or you may order the unit with a "non-powered" convenience outlet that can be wired in the field.

- **DISCONNECT SWITCH** - For gas heat units and cooling units with electric heat, a HACR breaker sized to the unit is provided. For cooling only units, a switch sized to the largest electric heat available for the particular unit is provided. Factory installed option only.

- **BAS - Building Automation System Controls Simplicity® Intelli-*Comfort*™ CONTROL -** The York® Simplicity® Intelli-*Comfort*™ control is factory installed. It includes a supply air sensor, a return air sensor, and an outside air sensor. There are provisions for a field installed dirty filter indicator switch, an air-proving switch, an Outside Air Humidity sensor, a Return Air Humidity sensor, an Inside IAQ sensor, and an Outside Air IAQ sensor. Construction mode operation, 365-day real time clock with 7 day programming plus holiday scheduling is built-in. Two different modes of demand ventilation are achieved through the Intelli-*Comfort*™ using CO_2 sensors. It uses an inside CO_2 sensor to perform Demand Ventilation. It can also use an Outside CO_2 sensor to perform Differential Demand Ventilation. It uses a Patented Comfort Ventilation algorithm to provide comfortable ventilation air temperature. The patented economizer-loading algorithm will protect the equipment when harsh operating conditions exist. Humidity in the occupied space or return duct can be monitored and controlled via humidity sensors and the on-board connection for hot gas re-heat system. It uses the INTELLI-Start™ algorithm to maximize energy savings by recovering the building from the Unoccupied Setpoints to the Occupied Setpoints just in time for the Occupied Time Period to begin. The Simplicity® Intelli-*Comfort*™ balances space temperature, ventilation air temperature, CO_2 and humidity for ultimate comfort.

- **Simplicity® Intelli-*Comfort*™ with ModLINC CONTROL -** The York® Simplicity® Intelli-*Comfort*™ with ModLINC control is factory installed. It includes all the features of the Intelli-Comfort ™ control with an additional control to translate communications from MODBUS to the BACnet MSTP protocol.

- **Novar® BAS CONTROL -** The Novar® ETC-3 building automation system controller is factory installed. Includes supply air sensor, return air sensor, dirty filter indicator switch, and air proving switch.
- **JOHNSON CONTROLS BAS CONTROL -** The Johnson Control YK-UNT-1126 building automation system controller is factory installed. Includes supply air sensor, return air sensor, dirty filter indicator switch, and air proving switch.
- **CPC BAS CONTROL -** The Computer Process Controls Model 810-3060 ARTC Advanced Rooftop building automation system controller is factory installed. Includes supply air sensor, return air sensor, dirty filter indicator switch and air proving switch.
- **HONEYWELL BAS CONTROL -** The Honeywell W7750C building automation system controller is factory installed. Includes air supply sensor, return air sensor, dirty filter indicator switch, and air proving switch.
- **COIL GUARD** - Customers can purchase a coil guard kit to protect the condenser coil from damage. This is not a hail guard kit.
- **SMOKE DETECTORS** - (supply air & return air) The smoke detectors stop operation of the unit by interrupting power to the control board if smoke is detected within the air compartment.

⚠WARNING

Factory installed smoke detectors in the return air, may be subjected to freezing temperatures during “off” times due to out side air infiltration. these smoke detectors have an operational limit of 32°F to 131°F. smoke detectors installed in areas that could be out side those limitations will have to be moved to prevent having false alarms.

- **STAINLESS STEEL DRAIN PAN-** An optional rust-proof stainless steel drain pan is available to provide years of trouble-free operation in corrosive environments.
- **PHASE MONITORS** - Designed to prevent unit damage. The phase monitor will shut the unit down in an out-of-phase condition.
- **HIGH STATIC DRIVE** - Includes a belt and blower pulley upgrade to enhance blower performance.
- **DIRTY FILTER SWITCH** - This kit includes a differential pressure switch that energizes the fault light on the unit thermostat, indicating that there is an abnormally high pressure drop across the filters. Factory installed option or field installed accessory.
- **HINGED FILTER DOOR/”TOOL FREE” BLOWER AND ACCESS PANELS (not hinged)** - This option allows for easy access and maintenance.

  NOTE: Knobs are shipped separately within the unit to prevent shipping damage. These must be field installed for tool free operation.

- **HINGED/"TOOL FREE" BLOWER, BLOWER MOTOR, FILTER AND ELECTRIC ACCESS PANELS -** This option allows for complete hinged and tool free access to the unit's blower, blower motor, filters and electrical panel sections.

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.
- **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.
- **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.
- **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 building air pressure on units with an economizer without 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.
- **HIGH STATIC 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 requirements.
- **ENTHALPY ACCESSORY CONTROL KIT** - This kit contains the required components to convert a single enthalpy economizer to dual enthalpy.
- **BURGLAR BARS** - Mount in the supply and return openings to prevent entry into the duct work.
- **WOOD SKID** - Allows unit to be handled with 90” forks.

- **CO_2 SENSOR** - Senses CO_2 levels and automatically overrides the economizer when levels rise above the present limits.
- **COIL GUARD** - Customers can purchase a coil guard kit to protect the condenser coil from damage. This is not a hail guard kit.
- **PHASE MONITORS** - Designed to prevent unit damage. The phase monitor will shut the unit down in an out-of-phase condition.

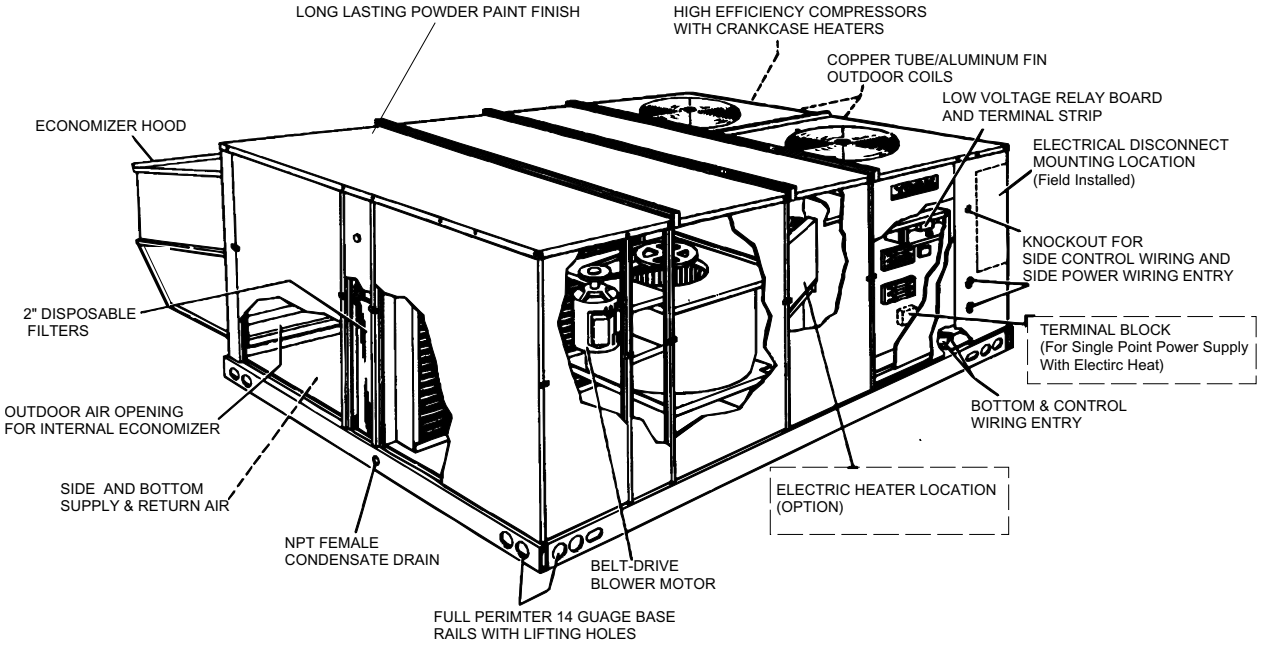


FIGURE 1: SUNLINE 2000™ HEAT PUMP

TABLE 1: RATINGS

MODEL	COOLING CAPACITY[1] 80//67-95° F			HEATING CAPACITY[1] 47° F		17° F		ELECTRIC HEAT NOM. CAPACITY[2] (KW)
	MBH	EER	IPLV	MBH	COP	MBH	COP	KW
BQ240	218	9.5	10.2	210	3.1	130	2.0	18,36,54,72

1. Certified in accordance with the Unitary Large Equipment Certification Program which is based on ARI Standard 340/360.
2. Models with electric heat have single point power supply.

EER = Energy Efficiency Ratio at full load - the cooling capacity in BTU's per hour (Btuh) divided by the power input expressed in BTUH per watt (Btuh/watt).

COP = Coefficient of Performance - the total heating capacity provided by the refrigeration system, including circulating fan heat, but excluding supplementary resistance (Btu's per hour) divided by the total electric input (watts) x 3.412.

IPLV = Integrated part load value. The EER of the unit operating on first stage only.

HEAT PUMP WITH ELECTRIC HEAT			
MODEL	MBH	EER	IPLV
BQ240E18	218	9.5	10.2
BQ240E36	218	9.5	10.2
BQ240E54	216	9.5	10.1
BQ240E72	214	9.5	10.1

TABLE 2: INDOOR SOUND POWER RATINGS

Unit Size	CFM	ESP	Blower		Sound Power (db 10^{-12} Watts)									
					Octave B and Centerline Frequency (Hz)								SWL db(A)	db(A)@ 10 Ft.[1]
		IWG	RPM	BHP	63	125	250	500	1,000	2,000	4,000	8,000		
BQ240	8,000	1.00	1,020	6.65	102	102	92	85	87	80	75	70	92	59

1. 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 for dBA values cover matters of system design and application. This constitutes an exception to any specification or guarantee requiring a dBA value or sound data in any other form than sound power level ratings.

TABLE 3: COOLING CAPACITIES 20 TON

Air on Indoor Coil		Temperature of Air on Outdoor Coil															
		75°F								85°F							
CFM	WB (°F)	Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)						Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)					
				90	85	80	75	70	65			90	85	80	75	70	65
5000	77	272	16.3	111	97	76	55	34	-	259	17.8	114	93	72	51	29	8
	72	251	15.8	154	133	112	91	70	49	240	17.4	150	129	108	86	65	44
	67	229	15.3	191	168	147	127	106	85	220	17.0	186	165	143	122	101	80
	62	212	14.9	210	211	184	163	142	122	203	16.6	202	202	175	154	133	112
6000	77	283	16.4	130	107	83	59	36	12	270	17.8	127	103	79	55	31	7
	72	261	15.9	169	146	122	98	75	51	249	17.4	166	142	118	94	70	46
	67	238	15.4	208	185	161	137	114	90	229	17.0	205	181	157	133	109	85
	62	220	15.0	218	218	201	177	154	130	212	16.6	210	210	193	169	145	121
	57	220	15.0	220	220	202	178	154	131	212	16.7	212	212	193	169	145	121
7000	77	294	16.5	149	116	90	64	37	-	280	17.9	139	113	86	59	32	6
	72	270	16.0	185	159	132	106	79	53	259	17.5	182	155	129	102	75	48
	67	247	15.5	225	201	174	148	122	95	238	17.1	218	198	171	145	118	91
	62	228	15.1	226	225	218	191	165	138	220	16.7	219	219	210	183	156	129
	57	227	15.0	227	227	219	192	165	138	220	16.7	220	220	210	183	156	129
8000	77	305	16.6	168	126	97	68	39	-	291	18.0	152	122	93	63	34	4
	72	280	16.1	201	172	142	113	84	55	269	17.5	198	169	139	110	80	50
	67	256	15.6	233	217	188	159	130	100	246	17.1	226	215	185	156	126	97
	62	236	15.2	235	235	235	205	176	147	228	16.7	227	227	227	197	168	138
	57	236	15.1	236	236	235	205	177	147	228	16.8	228	228	227	197	168	138
8650	72	285	16.1	213	182	151	120	89	58	272	17.6	209	178	146	115	84	53
	67	260	15.6	234	230	199	168	137	107	249	17.1	228	226	195	164	133	101
	62	240	15.2	237	237	237	207	176	145	231	16.8	229	229	229	198	167	136
	57	239	15.1	239	239	238	207	176	146	231	16.8	231	231	229	198	167	136
9300	72	289	16.0	225	192	160	127	94	61	275	17.6	219	187	154	121	88	55
	67	264	15.6	242	242	211	178	145	113	252	17.2	232	232	205	172	139	106
	62	244	15.1	242	242	242	209	177	144	233	16.8	232	232	232	199	166	133
	57	243	15.1	243	243	243	210	178	145	233	16.8	233	233	233	200	168	135
		95°F								105°F							
5000	77	247	19.3	108	89	68	46	25	-	233	21.2	99	85	65	44	23	-
	72	229	18.9	147	125	104	82	61	39	216	20.8	142	121	100	78	57	36
	67	211	18.6	186	161	140	118	96	75	199	20.4	184	155	134	113	92	71
	62	196	18.3	195	195	167	145	124	102	187	20.1	184	184	157	136	115	93
6000	77	257	19.3	123	99	75	50	26	2	243	21.2	125	96	72	48	24	-
	72	238	18.9	163	139	114	90	66	41	225	20.8	159	134	110	86	62	38
	67	220	18.6	203	178	154	130	105	81	207	20.5	192	173	149	124	100	76
	62	204	18.3	203	203	184	160	136	111	194	20.1	193	193	174	150	125	101
	57	203	18.4	203	203	184	160	136	111	194	20.3	194	194	174	150	126	101
7000	77	267	19.3	139	109	82	55	27	-	252	21.3	151	108	79	52	25	-
	72	247	19.0	179	152	125	98	71	44	234	20.9	175	148	121	94	67	39
	67	228	18.6	212	196	168	141	114	87	215	20.5	201	190	163	136	109	81
	62	212	18.3	212	212	201	174	147	120	202	20.2	201	201	191	163	136	109
	57	212	18.4	212	212	201	174	147	120	202	20.3	202	202	191	163	136	109
8000	77	277	19.3	155	119	89	59	29	-	262	21.3	176	119	86	56	26	-
	72	257	19.0	196	166	136	106	76	46	242	20.9	192	162	132	101	71	41
	67	237	18.6	219	213	183	153	123	93	223	20.5	208	204	177	147	117	87
	62	220	18.3	219	219	219	189	159	129	209	20.2	209	207	207	177	147	117
	57	220	18.4	220	220	219	189	159	129	209	20.3	209	209	208	178	147	117
8650	72	259	19.0	205	173	142	110	79	47	244	20.9	201	169	138	106	75	43
	67	238	18.7	222	222	191	159	128	96	225	20.5	210	210	186	154	123	91
	62	222	18.4	222	222	220	189	157	126	211	20.2	210	210	209	177	146	114
	57	222	18.5	222	222	220	189	157	126	211	20.4	211	211	209	178	146	115
9300	72	260	19.1	214	181	148	115	82	49	246	21.0	206	177	144	111	78	45
	67	240	18.7	222	222	199	166	133	100	226	20.6	210	210	194	161	128	95
	62	223	18.4	222	222	222	189	156	123	212	20.3	210	210	210	177	144	111
	57	223	18.6	223	223	223	190	157	124	212	20.4	212	212	212	179	146	113

TABLE 3: COOLING CAPACITIES 20 TON (CONTINUED)

Air on Indoor Coil		Temperature of Air on Outdoor Coil															
		115°F								125°F							
CFM	WB (°F)	Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)						Total Cap.[1] (MBH)	Total[2] Input (kW)	Sensible Capacity (MBH)* Return Dry Bulb (°F)					
				90	85	80	75	70	65			90	85	80	75	70	65
5000	72	220	23.1	93	83	62	41	21	-	207	25.1	101	74	60	39	19	-
	67	204	22.7	137	116	96	75	54	33	191	24.6	133	112	91	71	50	30
	62	187	22.3	175	150	129	108	87	66	176	24.2	165	145	123	103	82	62
	57	177	22.0	175	175	147	126	105	85	170	23.8	166	166	137	117	96	76
6000	77	229	23.2	117	93	69	45	21	-	215	25.1	128	90	66	43	19	-
	72	212	22.7	154	130	106	82	58	34	199	24.6	150	126	102	78	54	31
	67	195	22.3	182	167	143	119	95	71	183	24.2	171	162	138	114	90	66
	62	184	22.0	182	182	163	139	115	91	175	23.9	172	172	153	129	105	82
	57	184	22.2	184	184	164	140	116	92	175	24.0	175	175	153	129	105	82
7000	77	238	23.2	142	103	76	49	22	-	223	25.1	156	107	73	46	19	-
	72	220	22.8	171	144	117	90	62	35	207	24.7	167	140	113	85	58	31
	67	202	22.3	189	185	157	130	103	76	190	24.2	178	178	152	125	98	70
	62	191	22.0	189	189	180	153	125	98	181	23.9	178	178	169	142	115	87
	57	191	22.2	191	191	180	153	126	98	181	24.1	181	181	170	142	115	88
8000	77	247	23.2	150	113	83	53	22	-	232	25.2	184	123	80	50	19	-
	72	228	22.8	188	158	127	97	67	36	214	24.7	184	154	123	93	62	32
	67	210	22.4	196	196	172	141	111	81	196	24.2	184	184	166	136	105	75
	62	198	22.0	196	196	196	166	135	105	187	23.9	184	184	184	154	124	93
	57	198	22.2	198	198	196	166	136	105	187	24.1	187	187	185	155	124	94
8650	72	230	22.8	197	166	134	102	71	39	215	24.7	185	162	130	98	66	35
	67	211	22.4	197	197	180	149	117	85	197	24.3	185	184	175	144	112	80
	62	200	22.1	197	197	197	166	134	102	188	23.9	185	185	185	154	122	90
	57	200	22.2	200	200	199	167	135	104	188	24.1	188	188	188	156	124	92
9300	72	231	22.9	198	173	140	107	74	41	216	24.7	186	170	137	104	71	38
	67	212	22.4	198	198	189	156	123	90	198	24.3	186	186	184	151	118	85
	62	201	22.1	198	198	198	165	132	99	190	24.0	187	187	187	154	121	88
	57	201	22.3	201	201	201	168	135	102	189	24.1	189	189	189	156	123	90

1. The capacities are gross ratings. For net capacity, deduct air blower motor, MBh = 3.415 x kW. Refer to the appropriate Blower Performance table for the kW of the supply air blower motor.
2. These ratings include the condenser fan motors (total 1.9 kW) and the compressor motors but not the supply air blower motor.

TABLE 4: HEATING CAPACITIES - 20 TON

CFM	Return Air ºF	CAP & KW	BQ240							
			OUTDOOR AIR TEMPERATURE, ºF (72% RH)							
			-10	0	10	20	30	40	50	60
6000	55	MBH	37	65	93	121	149	176	204	232
		KW	12.1	12.5	13.0	13.5	14.0	14.5	15.0	15.5
	70	MBH	34	62	90	118	146	173	201	229
		KW	14.3	14.8	15.3	15.8	16.3	16.8	17.3	17.8
	80	MBH	33	61	89	116	144	172	200	228
		KW	16.1	16.5	17.0	17.5	18.0	18.5	19.0	19.5
7000	55	MBH	41	69	97	125	153	180	208	236
		KW	11.5	12.0	12.5	13.0	13.5	13.9	14.4	14.9
	70	MBH	38	66	94	122	150	177	205	233
		KW	13.8	14.3	14.8	15.3	15.8	16.2	16.7	17.2
	80	MBH	37	65	93	121	148	176	204	232
		KW	15.5	16.0	16.5	17.0	17.5	18.0	18.5	18.9
8000	55	MBH	45	73	101	129	157	184	212	240
		KW	10.9	11.4	11.9	12.4	12.9	13.4	13.9	14.4
	70	MBH	42	70	98	126	154	182	209	237
		KW	13.3	13.8	14.3	14.7	15.2	15.7	16.2	16.7
	80	MBH	41	69	97	125	152	180	208	236
		KW	15.0	15.5	16.0	16.5	17.0	17.4	17.9	18.4
8500	55	MBH	45	73	101	129	157	184	212	240
		KW	10.6	11.1	11.6	12.1	12.6	13.1	13.6	14.1
	70	MBH	42	70	98	126	154	182	209	237
		KW	12.9	13.4	13.9	14.4	14.9	15.4	15.9	16.4
	80	MBH	41	69	97	125	152	180	208	236
		KW	14.7	15.2	15.6	16.1	16.6	17.1	17.6	18.1
9000	55	MBH	45	73	101	129	157	184	212	240
		KW	10.3	10.8	11.3	11.8	12.3	12.8	13.3	13.7
	70	MBH	42	70	98	126	154	182	209	237
		KW	12.6	13.1	13.6	14.1	14.6	15.1	15.5	16.0
	80	MBH	41	69	97	125	152	180	208	236
		KW	14.3	14.8	15.3	15.8	16.3	16.8	17.3	17.7

THE MBH AND KW VALUES DO NOT INCLUDE THE SUPPLY AIR BLOWER MOTOR.
FOR NET CAPACITY, ADD THE SUPPLY AIR BLOWER MOTOR HEAT (MBH= 3.415 x KW)

CFM, STATIC PRESSURE, AND POWER - ALTITUDE AND TEMPERATURE CORRECTIONS

The information below should be used to assist in application of product when being applied at altitudes at or exceeding 1000 feet above sea level.

The air flow rates listed in the standard blower performance tables are based on standard air at sea level. As the altitude or temperature increases, the density of air decreases. In order to use the indoor blower tables for high altitude applications, certain corrections are necessary.

A centrifugal fan is a "constant volume" device. This means that, if the rpm remains constant, the CFM delivered is the same regardless of the density of the air. However, since the air at high altitude is less dense, less static pressure will be generated and less power will be required than a similar application at sea level. Air density correction factors are shown in Table 5 and Figure 2.

TABLE 5: ALTITUDE CORRECTION FACTORS

AIR TEMP	ALTITUDE (FEET)										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
40	1.060	1.022	0.986	0.950	0.916	0.882	0.849	0.818	0.788	0.758	0.729
50	1.039	1.002	0.966	0.931	0.898	0.864	0.832	0.802	0.772	0.743	0.715
60	1.019	0.982	0.948	0.913	0.880	0.848	0.816	0.787	0.757	0.729	0.701
70	1.000	0.964	0.930	0.896	0.864	0.832	0.801	0.772	0.743	0.715	0.688
80	0.982	0.947	0.913	0.880	0.848	0.817	0.787	0.758	0.730	0.702	0.676
90	0.964	0.929	0.897	0.864	0.833	0.802	0.772	0.744	0.716	0.689	0.663
100	0.946	0.912	0.880	0.848	0.817	0.787	0.758	0.730	0.703	0.676	0.651

The examples below will assist in determining the airflow performance of the product at altitude.

Example 1: What are the corrected CFM, static pressure, and BHP at an elevation of 5,000 ft. if the blower performance data is 6,000 CFM, 1.5 IWC and 4.0 BHP?

Solution: At an elevation of 5,000 ft the indoor blower will still deliver 6,000 CFM if the rpm is unchanged. However, Table 5 must be used to determine the static pressure and BHP. Since no temperature data is given, we will assume an air temperature of 70°F. Table 5 shows the correction factor to be 0.832.

Corrected static pressure = 1.5 x 0.832 = 1.248 IWC

Corrected BHP = 4.0 x 0.832 = 3.328

Example 2: A system, located at 5,000 feet of elevation, is to deliver 6,000 CFM at a static pressure of 1.5". Use the unit blower tables to select the blower speed and the BHP requirement.

Solution: As in the example above, no temperature information is given so 70°F is assumed.

The 1.5" static pressure given is at an elevation of 5,000 ft. The first step is to convert this static pressure to equivalent sea level conditions.

Sea level static pressure = 1.5 / .832 = 1.80"

Enter the blower table at 6000 sCFM and static pressure of 1.8". The rpm listed will be the same rpm needed at 5,000 ft.

Suppose that the corresponding BHP listed in the table is 3.2. This value must be corrected for elevation.

BHP at 5,000 ft = 3.2 x .832 = 2.66

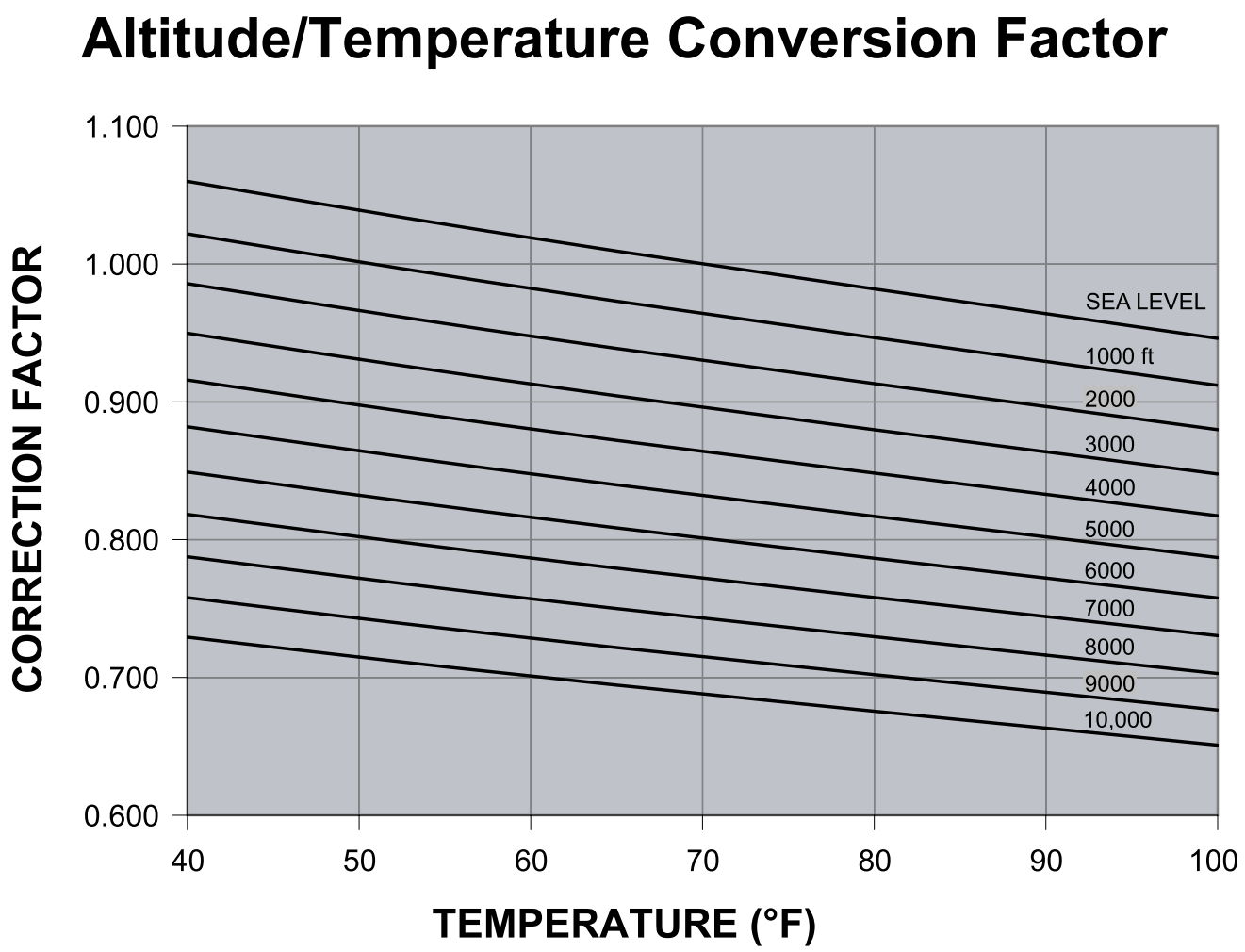


FIGURE 2: ALTITUDE/TEMPERATURE CONVERSION FACTOR

TABLE 6: BLOWER PERFORMANCE - 20 TON SUPPLY AIR

BOTTOM DUCT CONNECTIONS

Blower Speed (RPM)	Motor Pulley (Turns Open)*	CFM														
		6000			7000			8000			9000			9300		
		ESP	BHP	KW	ESP	BHP	KW	ESP	BHP	KW	ESP	BHP	KW	ESP	BHP	KW
208 VOLT AND STANDARD DRIVE																
870	6.0**	0.4	2.1	1.8	0.1	2.3	2.0	-	-	-	-	-	-	-	-	-
900	5.0	0.8	3.2	2.7	0.5	3.5	2.9	0.2	3.8	3.2	-	-	-	-	-	-
930	4.0	1.1	4.1	3.4	0.9	4.5	3.8	0.6	4.9	4.1	0.1	5.1	4.3	-	-	-
950	3.0	1.3	4.6	3.9	1.1	5.1	4.3	0.8	5.5	4.6	0.4	5.9	5.0	-	-	-
980	2.0	1.6	5.3	4.5	1.4	5.8	4.9	1.2	6.3	5.3	0.7	6.9	5.8	0.2	7.3	6.1
1015	1.0	1.9	5.9	5.0	1.7	6.5	5.5	1.5	7.0	5.9	1.0	7.7	6.5	0.6	8.2	6.9
208 VOLT AND HIGH STATIC DRIVE																
950	6.0	1.3	4.6	3.9	1.1	5.1	4.3	0.8	5.5	4.6	0.4	5.9	5.0	-	-	-
980	5.0	1.6	5.3	4.5	1.4	5.8	4.9	1.2	6.3	5.3	0.7	6.9	5.8	0.2	7.3	6.1
1010	4.0	1.8	5.8	4.9	1.7	6.3	5.3	1.5	6.9	5.8	1.0	7.5	6.3	0.5	7.9	6.7
1020	3.5	1.9	6.1	5.1	1.8	6.5	5.5	1.6	7.1	6.0	1.1	7.8	6.6	0.6	8.3	7.0
1035	3.0	2.0	6.2	5.2	1.9	6.8	5.7	1.7	7.4	6.2	1.2	8.1	6.8	0.7	8.6	7.3
1050	2.5	2.1	6.4	5.4	2.0	7.0	5.9	1.8	7.6	6.4	1.3	8.3	7.0	-	-	-
1075	2.0	2.3	6.6	5.5	2.1	7.2	6.0	1.9	7.8	6.6	1.5	8.6	7.2	-	-	-
1100	1.0	2.4	6.7	5.6	2.2	7.3	6.1	2.1	7.9	6.7	-	-	-	-	-	-
230/460/575 VOLT AND STANDARD DRIVE																
870	6.0**	0.4	2.1	1.8	0.1	2.3	2.0	-	-	-	-	-	-	-	-	-
900	5.0	0.8	3.2	2.7	0.5	3.5	2.9	0.2	3.8	3.2	-	-	-	-	-	-
930	4.0	1.1	4.1	3.4	0.9	4.5	3.8	0.6	4.9	4.1	0.1	5.1	4.3	-	-	-
950	3.5	1.3	4.6	3.9	1.1	5.1	4.3	0.8	5.5	4.6	0.4	5.9	5.0	-	-	-
980	2.5	1.6	5.3	4.5	1.4	5.8	4.9	1.2	6.3	5.3	0.7	6.9	5.8	0.2	7.3	6.1
1015	1.5	1.9	5.9	5.0	1.7	6.5	5.5	1.5	7.0	5.9	1.0	7.7	6.5	0.6	8.2	6.9
1025	1.0	2.0	6.1	5.1	1.8	6.6	5.6	1.6	7.3	6.1	1.1	7.9	6.7	0.7	8.6	7.3
230/460/575 VOLT AND HIGH STATIC DRIVE																
950	6.0	1.3	4.6	3.9	1.1	5.1	4.3	0.8	5.5	4.6	0.4	5.9	5.0	-	-	-
980	5.0	1.6	5.3	4.5	1.4	5.8	4.9	1.2	6.3	5.3	0.7	6.9	5.8	0.2	7.3	6.1
1015	4.0	1.9	5.9	5.0	1.7	6.5	5.5	1.5	7.0	5.9	1.0	7.7	6.5	0.6	8.2	6.9
1035	3.5	2.0	6.2	5.2	1.9	6.8	5.7	1.7	7.4	6.2	1.2	8.1	6.8	0.7	8.6	7.3
1050	3.0	2.1	6.4	5.4	2.0	7.0	5.9	1.8	7.6	6.4	1.3	8.3	7.0	-	-	-
1080	2.0	2.3	6.6	5.5	2.1	7.2	6.0	1.9	7.8	6.6	1.5	8.6	7.2	-	-	-
1100	1.5	2.4	6.7	5.6	2.2	7.3	6.1	2.1	7.9	6.7	-	-	-	-	-	-
1120	1.0	2.5	6.8	5.7	2.3	7.4	6.2	2.2	8.1	6.8	-	-	-	-	-	-

NOTES:

1. Blower performance includes fixed outdoor air, 2” T/A filters, a dry indoor coil and no electric heat.
2. Refer to page 14 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.

* Do NOT close the pulley below 1 turn open.

** Factory setting.

TABLE 7: BLOWER MOTOR AND DRIVE DATA

Model	Drive	Blower Range (RPM)	Motor[1]			Adjustable Motor Pulley[2]				Fixed Blower Pulley				Belt (Notched)		
			HP	Frame	EFF. %	Desig-nation	Outside Diameter	Pitch Dia. (In.)	Bore (In.)	Desig -nation	Outside Diameter	Pitch Dia. (In.)	Bore (In.)	Desig-nation	Pitch Dia. (In.)	Qty.
BQ240	Standard	870/1025	7.5	213T	89	1VP68	6.75	5.5 6.5	1-3/8	BK120	11.75	11.4	1-3/16	BX83	84.8	1
	High Static	950/1120								BK110	10.75	10.4	1-3/16	BX80	81.8	1

1. All motors have a nominal speed of 1800 RPM, at 1.5 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.
2. Do not close this pulley below 1 turn open.

TABLE 8: STATIC RESISTANCES[1]

EXTERNAL STATIC PRESSURE DROP

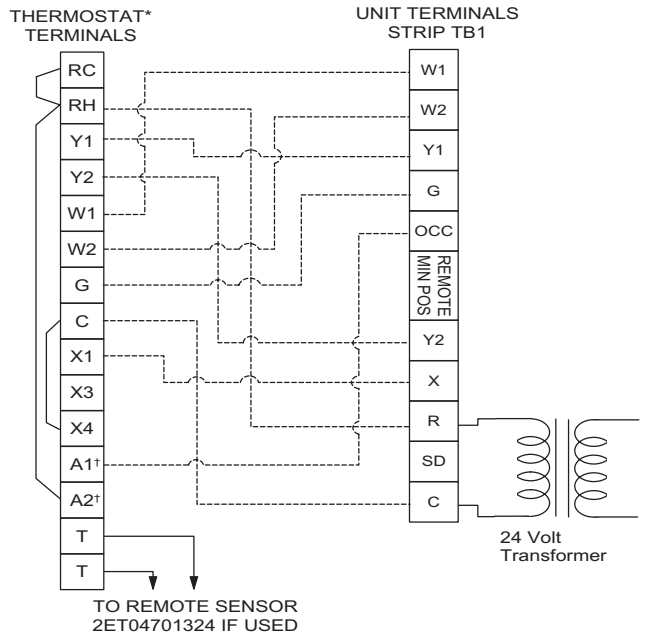
DESCRIPTION		RESISTANCE, IWG CFM BQ240		
		6000	8000	9300
WET COIL		0.1	0.1	0.1
ELECTRIC HEAT OPTIONS	18 KW	0.1	0.1	0.1
	36 KW	0.1	0.2	0.3
	54 KW	0.2	0.3	0.4
	72 KW	0.2	0.4	0.6
ECONOMIZER OPTION		0.1	0.1	0.2
HORIZONTAL DUCT CONNECTIONS[2]		0.2	0.3	0.5

1. Deduct these resistance values from the available external static pressures shown in the respective Blower Performance Table.(See Note 2 for exception).
2. Since the resistance to airflow will be less for horizontal duct connections than for bottom duct connections, add these pressures to the ESP values listed in the respective units' blower performance table.

TABLE 9: POWER EXHAUST PERFORMANCE

MOTOR SPEED	STATIC RESISTANCE OF RETURN DUCTWORK, IWG									
	0.2		0.3		0.4		0.5		0.6	
	CFM	KW	CFM	KW	CFM	KW	CFM	KW	CFM	KW
HIGH[1]	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	-	-	-	-

1. Factory Setting
Power Exhaust motor is a 3/4 HP, PSC type with sleeve bearings, a 48 frame and inherent protection.



* Electronic programmable Thermostat 2ET0770010024 (includes subbase).
† Terminals A1 and A2 provide a relay output to close the outdoor economizer dampers when the thermostat switches to the set-back position.

FIGURE 3: ELECTRONIC THERMOSTAT FIELD WIRING

NOTE: This unit does NOT REQUIRE a heat pump thermostat. It is designed to work with a standard two-stage cool, two-stage heat thermostat; however, the thermostat must provide a “G” signal when there is a call for “W1”.

⚠ CAUTION

The thermostat must provide a “G” signal when there is a call for “W1.”The unit control board will energize the indoor blower when the compressors are energized; however, if the thermostat calls for “W2” during the anti-short-cycle delay, the electric heat (when installed) will be energized immediately upon the call for “W2.”

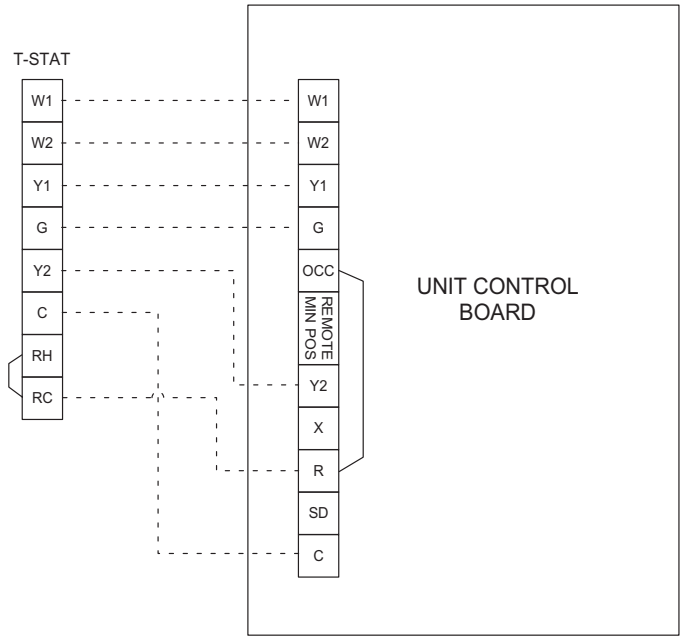


FIGURE 4: FIELD WIRING 24 VOLT THERMOSTAT

⚠ CAUTION

The thermostat must provide a “G” signal when there is a call for “W1.”The unit control board will energize the indoor blower when the compressors are energized; however, if the thermostat calls for “W2” during the anti-short-cycle delay, the electric heat (when installed) will be energized immediately upon the call for “W2.”

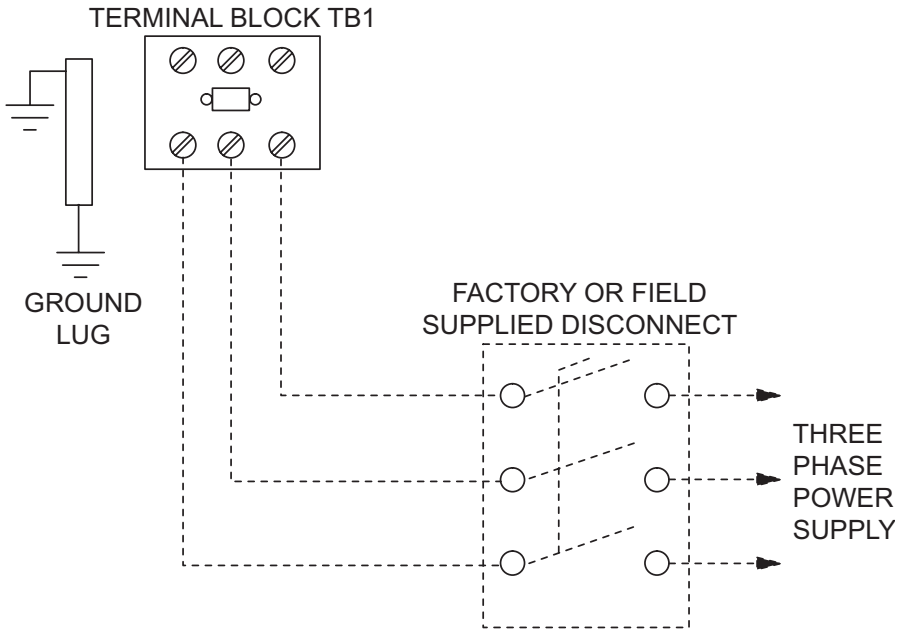


FIGURE 5: FIELD WIRING DISCONNECT

TABLE 10: VOLTAGE LIMITATIONS

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

TABLE 11: ELECTRICAL DATA -WITHOUT POWERED CONVENIENCE OUTLET

MODEL (TON-NAGE)	VOLTAGE	COMPRESSORS		OD FAN MOTORS FLA EACH	ID BLOWER MOTOR FLA	CONV OUTLET AMPS	HEATER OPTION				MIN. CIRCUIT AMPACITY (AMPS)	MAX. FUSE/ BRKR[1] SIZE (AMPS)
		RLA EACH	LRA EACH				MODEL	KW[2]	STAGES	AMPS		
BQ240 (20)	**208**	30.1	225	3.7	21.7	0.0	-	0.0	-	-	96.8	125
							E18	13.5	1	37.5	143.7	150
							E36	27.0	2	74.9	143.7	150
							E54	40.6	2	112.7	168.0	175
							E72	54.1	2	150.2	190.5	200
	230	30.1	225	3.7	20.0	0.0	-	0.0	-	-	95.1	125
							E18	18.0	1	43.3	149.3	150
							E36	36.0	2	86.6	149.3	150
							E54	54.0	2	129.9	154.9	175
							E72	72.0	2	173.2	203.4	225
	460	15.5	114	1.9	10.0	0.0	-	0.0	-	-	48.7	60
							E18	18.0	1	21.7	75.7	80
							E36	36.0	2	43.3	75.7	80
							E54	54.0	2	65.0	77.5	90
							E72	72.0	2	86.6	102.8	110
	575	12.1	80	1.5	8.0	0.0	-	0.0	-	-	38.2	50
							E18	18.0	1	17.3	59.9	60
							E36	36.0	2	34.6	59.9	60
							E54	54.0	2	52.0	62.0	70
							E72	72.0	2	69.3	81.5	90

Note 1: Maximum HACR breaker of the same amp size is acceptable.
Note 2: Only 18kW of the 36 or 54kW, or only 36kW of the 72kW electric heat can be simultaneously energized with the mechanical heating. The full heater kW operates only if both compressors are locked out.

TABLE 12: ELECTRICAL DATA -WITH POWERED CONVENIENCE OUTLET

MODEL (TON-NAGE)	VOLTAGE	COMPRESSORS		OD FAN MOTORS FLA EACH	ID BLOWER MOTOR FLA	CONV OUTLET AMPS	HEATER OPTION				MIN. CIRCUIT AMPACITY (AMPS)	MAX. FUSE/ BRKR[1] SIZE (AMPS)
		RLA EACH	LRA EACH				MODEL	KW[2]	STAGES	AMPS		
BQ240 (20)	**208**	30.1	225	3.7	21.7	10.0	-	0.0	-	-	106.8	125
							E18	13.5	1	37.5	153.7	175
							E36	27.0	2	74.9	153.7	175
							E54	40.6	2	112.7	180.5	200
							E72	54.1	2	150.2	200.5	225
	230	30.1	225	3.7	20.0	10.0	-	0.0	-	-	105.1	125
							E18	18.0	1	43.3	159.3	175
							E36	36.0	2	86.6	159.3	175
							E54	54.0	2	129.9	167.4	175
							E72	72.0	2	173.2	213.4	225
	460	15.5	114	1.9	10.0	5.0	-	0.0	-	-	53.7	60
							E18	18.0	1	21.7	80.7	90
							E36	36.0	2	43.3	80.7	90
							E54	54.0	2	65.0	83.7	90
							E72	72.0	2	86.6	107.8	110
	575	12.1	80	1.5	8.0	4.0	-	0.0	-	-	42.2	50
							E18	18.0	1	17.3	63.9	70
							E36	36.0	2	34.6	63.9	70
							E54	54.0	2	52.0	67.0	70
							E72	72.0	2	69.3	85.5	90

Note 1: Maximum HACR breaker of the same amp size is acceptable.
Note 2: Only 18kW of the 36 or 54kW, or only 36kW of the 72kW electric heat can be simultaneously energized with the mechanical heating. The full heater kW operates only if both compressors are locked out.

TABLE 13: ELECTRIC HEAT CORRECTION FACTORS

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

TABLE 14: PHYSICAL DATA

MODEL			BQ240
SUPPLY AIR BLOWER	CENTRIFUGAL BLOWER (Dia. x Wd. in.)		18 x 15
	FAN MOTOR HP		7.5
INDOOR COIL	ROWS DEEP		4
	FINS PER INCH		15
	FACE AREA (Sq. Ft.)		20.5
OUTDOOR FAN (Two Per Unit)	PROPELLER DIA. (in.) (Each)		30
	FAN MOTOR HP (Each)		1.25
	NOM. CFM TOTAL (Each)		7200
OUTDOOR COIL	ROWS DEEP		3
	FINS PER INCH		15
	FACE AREA (Sq. Ft.)		43.3
COMPRESSOR (Qty. Per Unit)	SCROLL		2
AIR FILTERS	QUANTITY PER UNIT (16" X 20" X 2")		4
	QUANTITY PER UNIT (16" X 25" X 2")		4
	TOTAL FACE AREA (sq. ft.)		20.0
CHARGE	REFRIGERANT 22 (lbs./oz.)	SYSTEM NO. 1	25/8
		SYSTEM NO. 2	25/0

TABLE 15: OPERATING WEIGHTS (LBS.)

MODEL			BQ240
Basic Unit	BQ (Heat Pump)		2050
Options	Economizer		250
	Economizer with Power Exhaust		335
	Motorized Damper		150
	Electric Heater	18 KW	25
		36 KW	30
		54 KW	35
		72 KW	40
Accessories	Roof Curb		185
	Barometric Damper		45
	Wood Skid		220

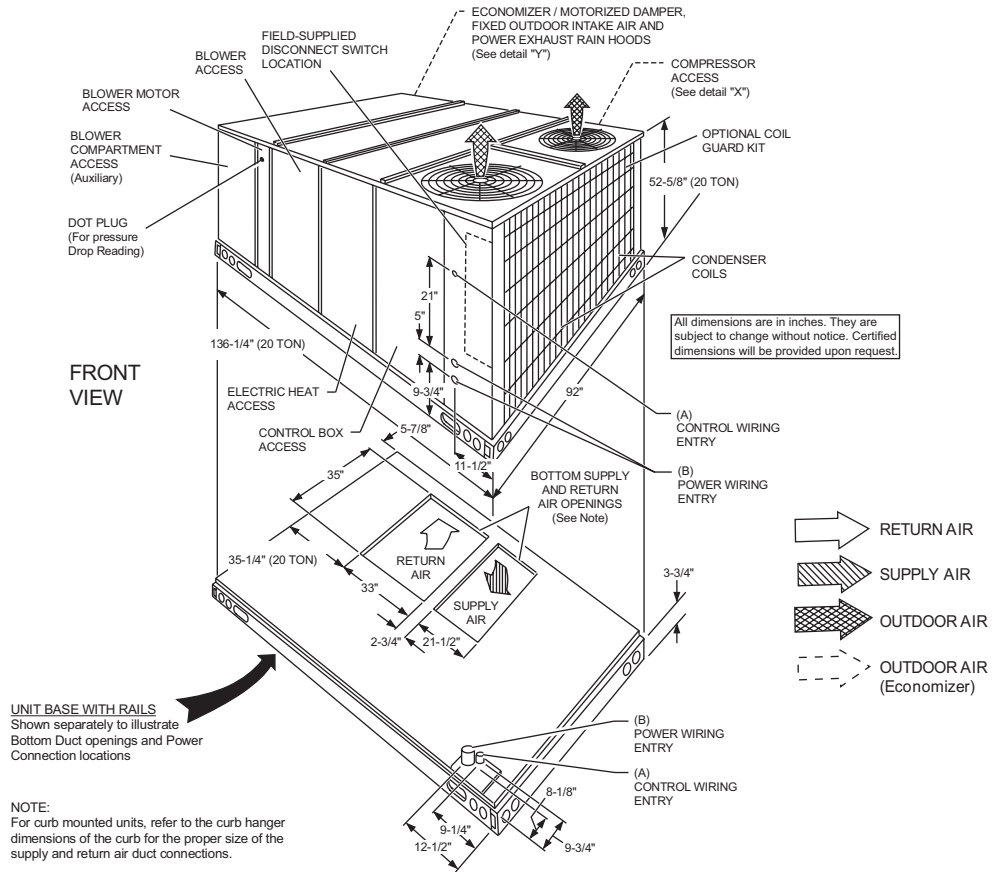


FIGURE 6: UNIT DIMENSIONS - 20 TON

TABLE 16: MINIMUM CLEARANCES

LOCATION	CLEARANCE
Front	36”
Back	24” (Less Economizer) 49” (With Economizer
Left Side (Filter Access)	24” (Less Economizer) 36” (With Economizer)[1]
Right Side (Cond. Coil)	36”
Below Unit[2]	0”
Above Unit[3]	72” With 36” Maximum Horizontal Overhang (For Condenser Air Discharge)

1. If economizer is factory installed, the unassembled rainhood must be removed from its ride along position in front of evaporator coil, or in the outdoor air compartment, prior to final installation.
2. Units (applicable in U.S.A. only) may be installed on combustible floors made from wood or class A, B or C roof covering material.
3. Units must be installed outdoors. Overhanging structures or shrubs should not obstruct outdoor air discharge outlet.

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

TABLE 17: UTILITIES ENTRY DATA

HOLE	OPENING SIZE (DIA.)	USED FOR	
A	1-1/8” KO	Control Wiring	Front
	3/4” NPS (Fem.)		Bottom
B	3-5/8” KO	Power Wiring	Front
	3” NPS (Fem.)		Bottom

NOTE: All entry holes should be field sealed to prevent rain water entry into building.

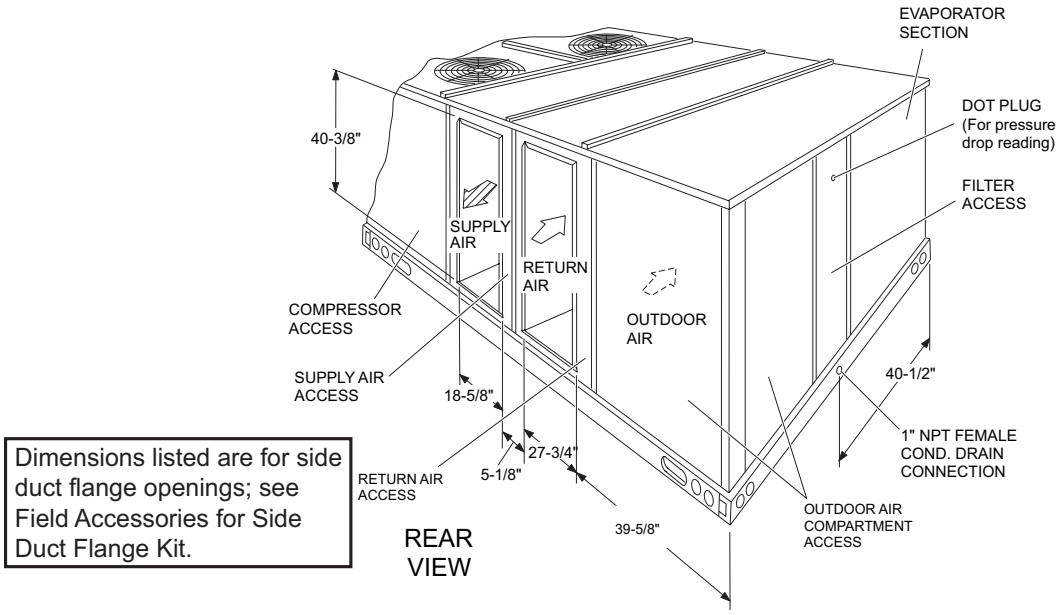


FIGURE 7 - REAR VIEW DIMENSIONS (20 TON)

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

For <u>bottom</u> 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 <u>side</u> duct applications:

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

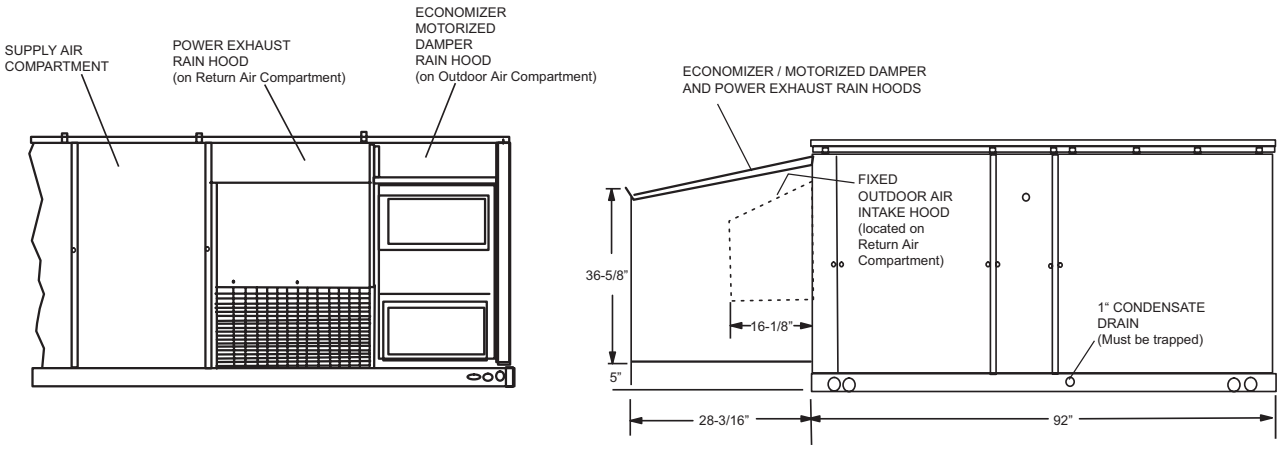


FIGURE 8 - UNIT DIMENSIONS BQ240 (RAINHOOD)

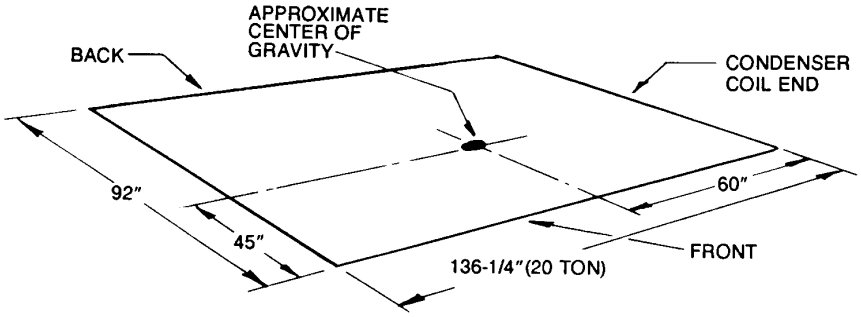


FIGURE 9: CENTER OF GRAVITY

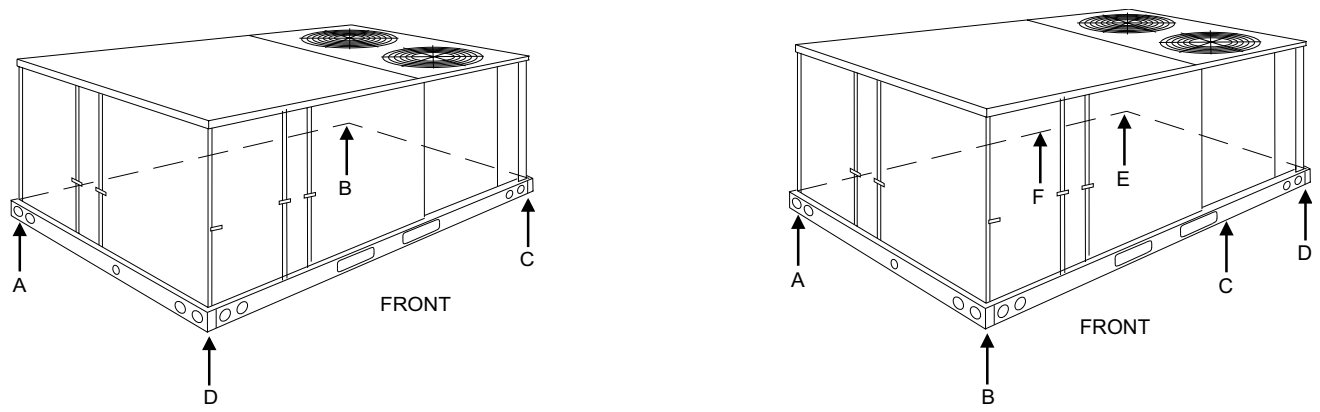


FIGURE 10: FOUR AND SIX POINT LOADS

TABLE 18: FOUR AND SIX POINT LOADS

UNIT	4 - POINT LOADS (LBS)				
	TOTAL	A	B	C	D
240	2340	504	641	669	526

NOTE: These weights are with economizer and 72 kW electric heat.

UNIT	6 - POINT LOADS (LBS)						
	TOTAL	A	B	C	D	E	F
240	2340	336	351	398	446	427	382

NOTE: These weights are with economizer and 72 kW electric heat.

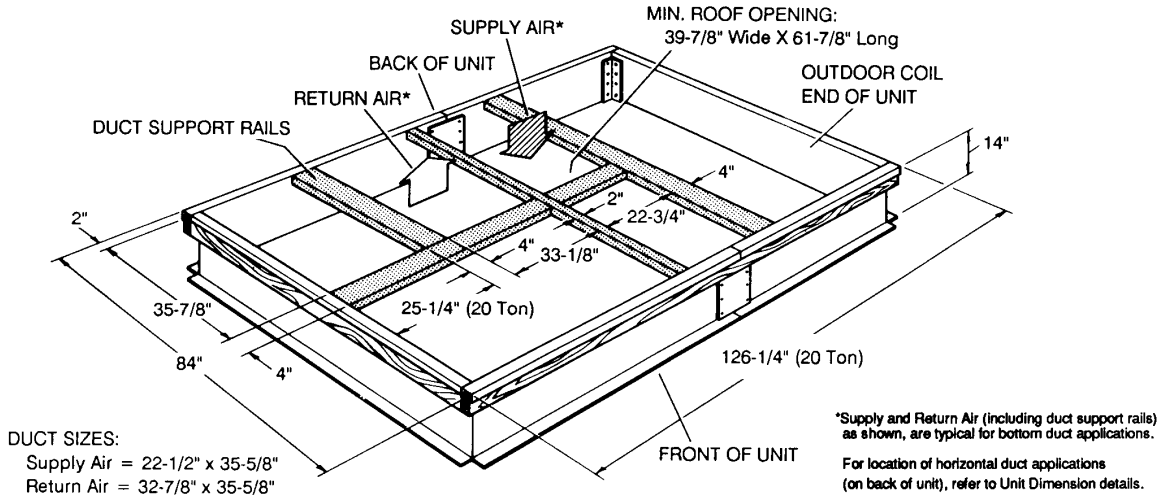


FIGURE 11: ROOF CURB DIMENSIONS - 20 TON

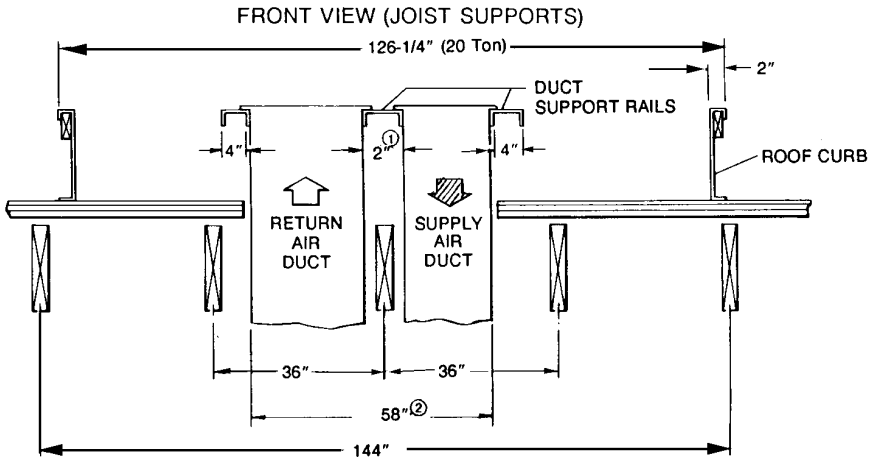


FIGURE 12: ROOF CURB BENEFITS

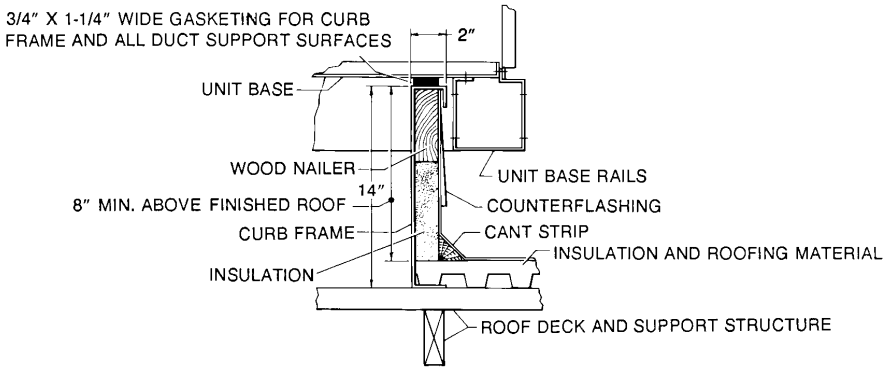


FIGURE 13: UNIT AND CURB APPLICATIONS

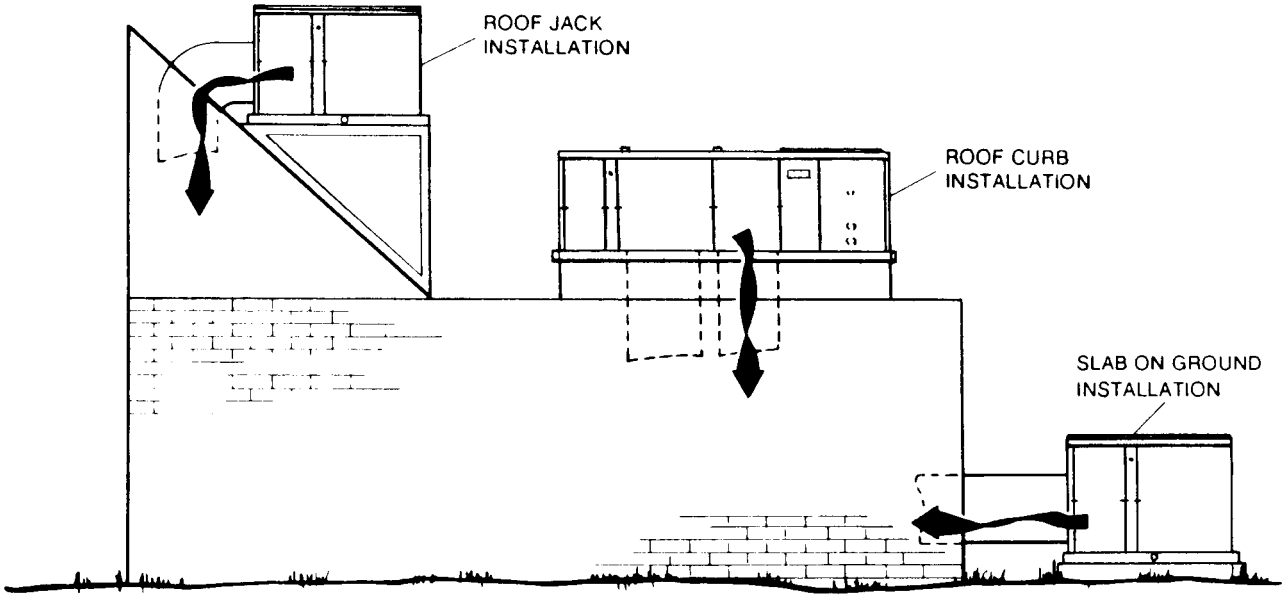


FIGURE 14: TYPICAL APPLICATIONS

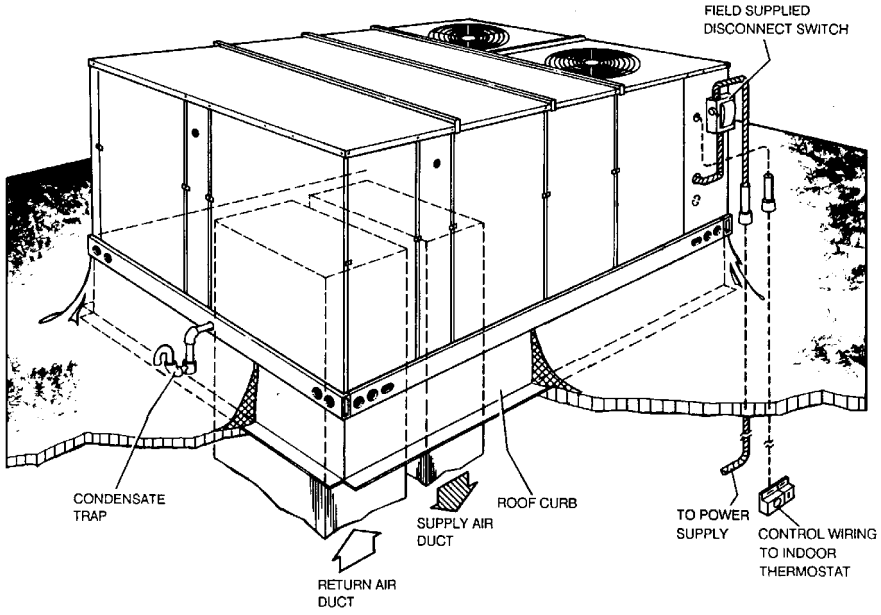


FIGURE 15: TYPICAL ROOF-TOP INSTALLATION

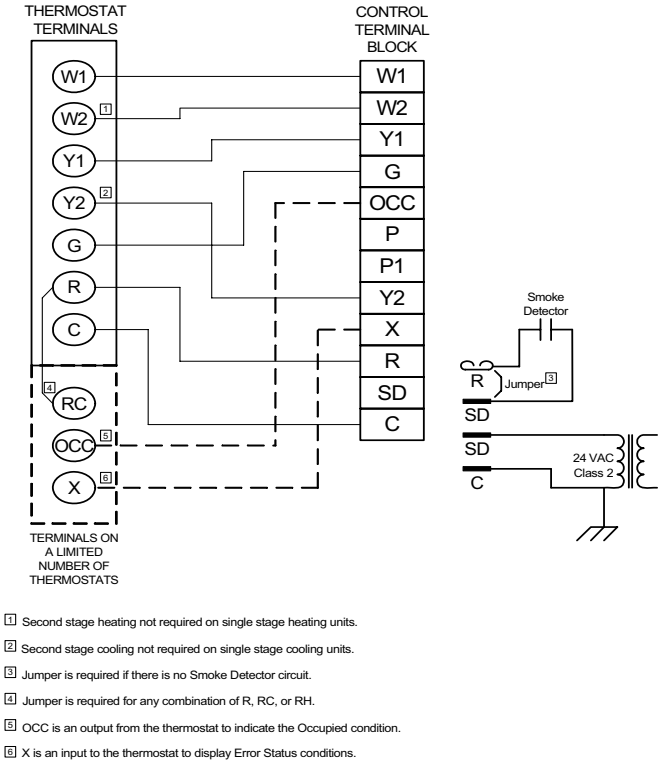


FIGURE 16: Simplicity® CONTROL WIRING DIAGRAM

GUIDE SPECIFICATIONS

GENERAL

Units shall be manufactured by York International Unitary Products Group is an ISO 9001 certified facility. York® Sunline 2000™ Heat Pumps are convertible single package units. All models have dual 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. These heat pumps utilize a unique ambient compensated time-temperature defrost system. The defrost module automatically increases the time interval between defrost cycles as the outdoor ambient temperature decreases. This helps to eliminate unnecessary, costly, defrosts.

DESCRIPTION

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 provide for quick and easy field installation. 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 air damper
- Barometric Relief 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.

UNIT CABINET

All units shall have long lasting powder paint cabinets with 1000 hour salt spray test approval under ASTM-B117 procedures. All units with supplemental electric heat shall be 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 shall be fully protected against excessive current and temperature by fuses and two thermal limit switches.

The power supply wiring shall 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 shall be color coded and numbered for ease in servicing and troubleshooting. All 208/230, 460 and 575 volt models shall be CSA approved.

INDOOR (EVAPORATOR) FAN ASSEMBLY

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

REFRIGERANT COMPONENTS

Compressors shall include crankcase heat and internal pressure relief. Every refrigerant circuit shall include bi-directional liquid line filter-driers, high pressure switches, lower pressure/loss of charge switches, suction line freezestats and high temperature switches to protect all system components. The unit control circuit shall include 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.

ELECTRIC HEATING SECTION

All units with supplemental electric shall be 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 shall be fully protected against excessive current and temperature by fuses and two thermal limit switches.

ELECTRICAL REQUIREMENTS

The power supply wiring shall 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 shall be color coded and numbered for ease in servicing and troubleshooting. All 208/230, 460 and 575 volt models shall be CSA approved.

STANDARD LIMITED WARRANTIES

All models shall include a 1-year limited warranty on the complete unit. Compressors and electric heater elements shall carry an additional 4-year warranty.

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Supersedes: 262256-YTG-A-0706

Unitary Products Group

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