

(6) 2



CITY OF PORTLAND, OREGON - BUREAU OF DEVELOPMENT SERVICES

1900 SW Fourth Avenue, Suite 5000 • Portland, Oregon 97201 • www.portlandonline.com/bds • Fax 503-823-7425



Facility Permit Plan Intake Form

FOR INTAKE, STAFF USE ONLY		Building/Mechanical _____	TOM LEE 3
Date Received _____	Electrical _____	Plumbing _____	
Building Registration # _____	Fire _____	Planning _____	EMILY 2
Fixed Bid _____	BES _____	PDOT _____	
Bin # _____	Structural _____	Other _____	ERIC 1
Building Permit # _____			
Mechanical # _____			
Plumbing Permit # _____			
Electrical Permit # _____			

APPLICANT: Complete all sections below that apply to the project. Please print legibly.

Print Name Anthony Harnish Sign Name [Signature]
 Street Address 1951 NW Overton St.
 City Portland State Oregon Zip Code 97209
 Day Phone 503-471-5242 FAX 503-274-7686 email a.harnish@detemple.com

Plans / permits available for pick up at 1900 SW 4th Avenue, 2nd floor between 8:00 am to 5:00 pm

Contact Name for plan/permit pick up Anthony Harnish
 Day Phone 503-471-5242 email a.harnish@detemple.com

Project Building Name / # OHS C wing
 Project Address or Location 3181 SW Sam Jackson Parkway Portland, OR 97239
 Project Name and Description _____

Total Project Value _____ Project Reference #/Billing ID # 12-OHS-009
 Building Contractor _____ CCB # _____
 Mechanical Contractor DeTemple Company Inc CCB # 2510
 Electrical Contractor _____ CCB# _____ License # _____
 Plumbing Contractor _____ CCB# _____ License # _____

Building Permit [Y] [N] Alarms Required
 No. of Stories _____ [Y] [N] Smoke Det. Req'd
 Const. Type _____ [Y] [N] Sprinklers Req'd
 [Y] [N] Struct. Eng / Calcs Submitted

Electrical Permit
 Please provide a completed standard electrical permit application form. You may mail or deliver it to 1900 SW 4th Avenue, Portland, Oregon 97201 or FAX to 503-823-7425.

Plumbing Permit

Number of Fixtures _____
 Back Flow Devices _____
 Water Service (# of Feet) _____
 Medical Gas _____
 Other _____



Mechanical Permit
 Mechanical Valuation \$63,975
 Description Remove and replace roof top unit for OHS - C-wing Elevators

13-223431-FA

15T

Project: ~Untitled79
Prepared By:

08/09/2013
02:10PM

OHSU C-Wing

15T

**Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report
Spec Sheet**

*New
unit*

Unit Report For 15T

Project: ~Untitled79
Prepared By:

08/09/2013
02:10PM

Unit Parameters

Unit Model:..... **50TC-D16A2A6-6B0G0**
 Unit Size:..... **16 (15 Tons)**
 Volts-Phase-Hertz:..... **460-3-60**
 Heating Type:..... **None**
 Duct Cfg:..... **Vertical Supply / Vertical Return**
 Two-Stage Compressor Models
 Round Tube Plate Fin

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:..... **9' 7.875"**
 Unit Width:..... **5' 3.375"**
 Unit Height:..... **4' 9.375"**
 *** Total Operating Weight:..... **1533 lb**

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Condensate Drain Line Size:..... **3/4**
 Return Air Filter Type:..... **Throwaway**
 Return Air Filter Quantity:..... **6**
 Return Air Filter Size:..... **18 x 24 x 2**

Unit Configuration

Medium Static Option
 Al/Cu - Al/Cu
 Electromechanical Controls w/W7220 Econo Controller
 Temperature Economizer with Barometric Relief
 Standard Packaging
 2-Speed indoor fan motor controlled by VFD

Warranty Information

5-Year compressor parts (STD.)
 1-Year parts (STD.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

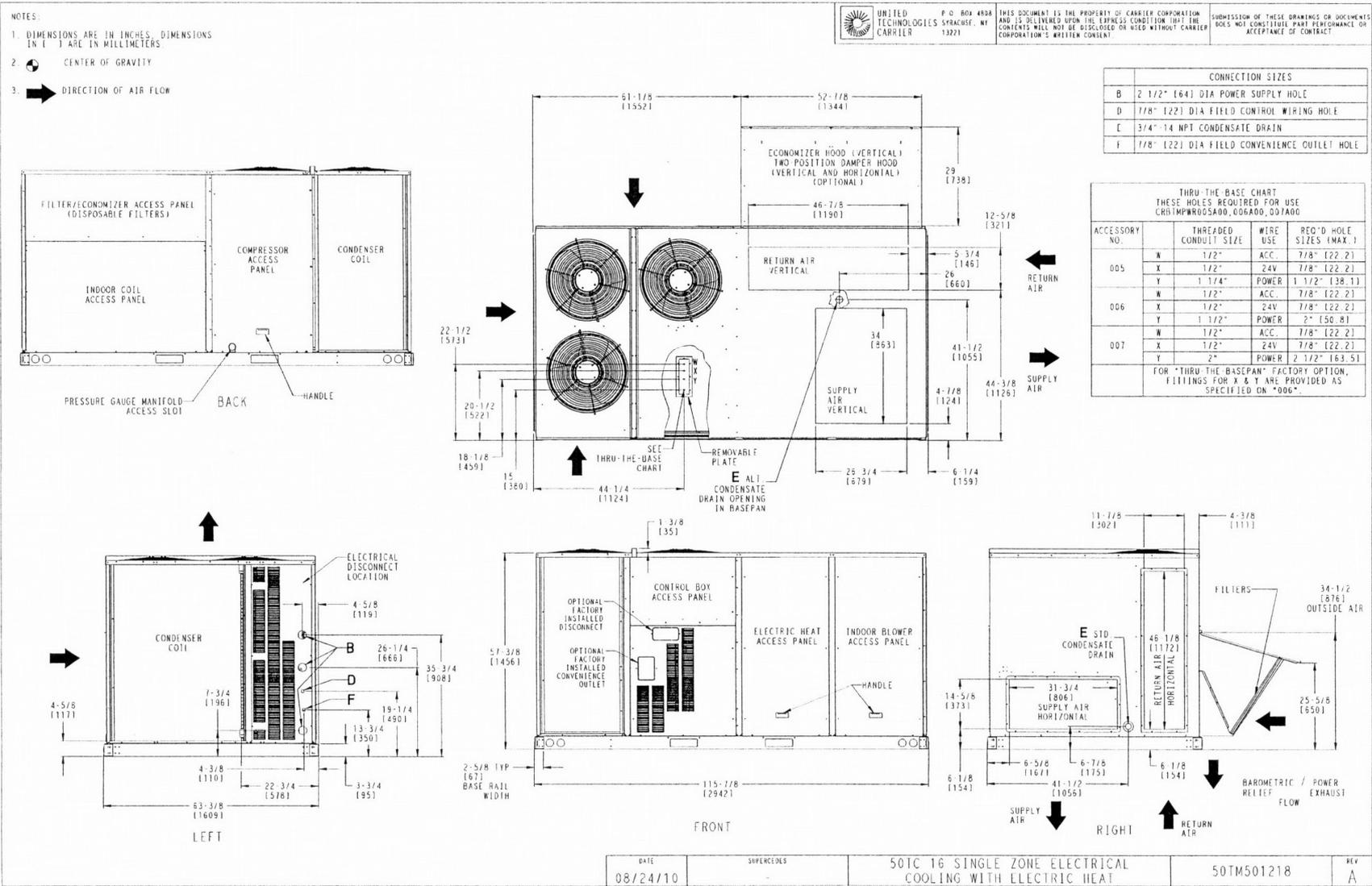
Ordering Information

Part Number	Description	Quantity
50TC-D16A2A6-6B0G0	Rooftop Unit	1
	Base Unit	
	Medium Static Option	
	Electromechanical control, Temperature economizer with barometric relief and W7220 economizer contro	
	2-Speed Indoor Fan (VFD) Controller	
	Accessories	
CRLOWAMB040A00	Motormaster I Low Ambient Kit	1
CRWINSTR001A00	Winter Start Package	2

Certified Drawing for 15T

Project: ~Untitled79
Prepared By:

08/09/2013
02:10PM



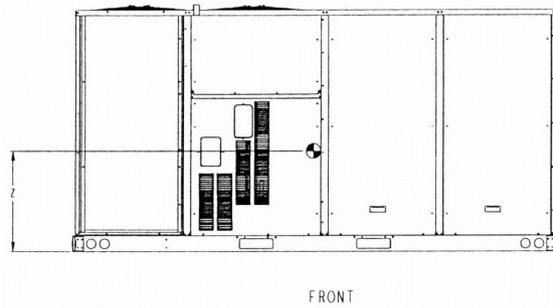
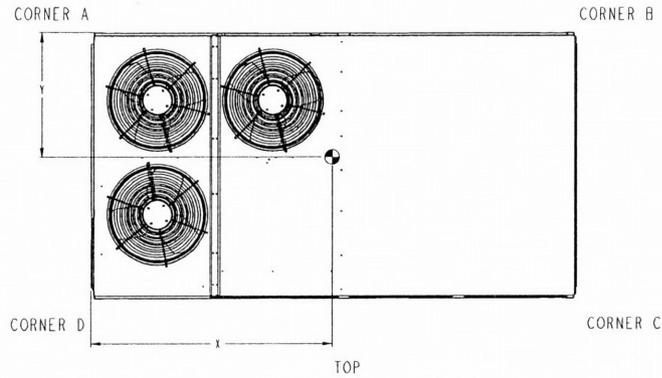
Certified Drawing for 15T

Project: ~Untitled79
Prepared By:

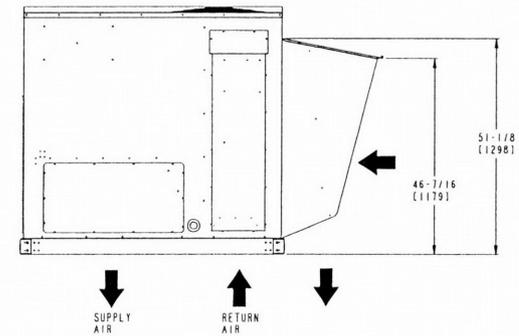
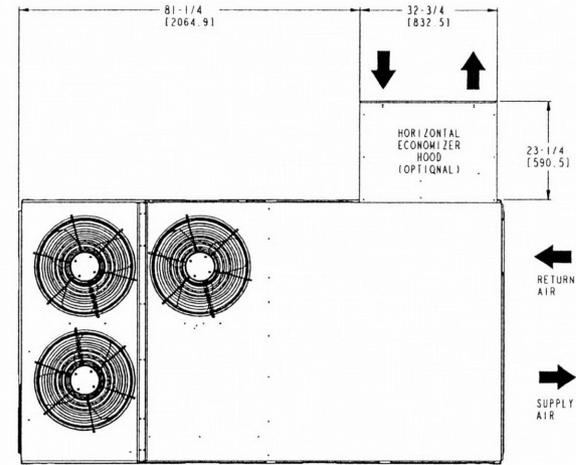
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UNIT	STD UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.					
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z			
50TC 16	1305	593	268	122	325	148	389	177	322	146	58 1/2	[1486]	32	[813]	21	[533]

STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT & WITHOUT PACKAGING.
FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



UNITED TECHNOLOGIES SYRACUSE, NY 13221
 P.O. BOX 4808
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HORIZONTAL ECONOMIZER

DATE 05/21/12	SUPERCEDES -	50TC 16 SINGLE ZONE ELECTRICAL COOLING WITH ELECTRIC HEAT	50TM501218	REV B
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Performance Summary For 15T

Project: ~Untitled79
Prepared By:

08/09/2013
02:10PM

Part Number:50TC-D16A2A6-6B0G0

ARI EER:..... 11.00
IEER:..... 12.6

Base Unit Dimensions

Unit Length:..... 115.9 in
Unit Width:..... 63.4 in
Unit Height:..... 57.4 in

Operating Weight

Base Unit Weight:..... 1305 lb
Medium Static Option:..... 45 lb
Temperature Economizer with Barometric Relief:..... 132 lb
2-Speed Indoor Fan (VFD) Controller:..... 20 lb

Accessories

Motormaster I Low Ambient Kit:..... 30 lb
Winter Start Package:..... 1 lb

Total Operating Weight:..... **1533 lb**



Unit

Unit Voltage-Phase-Hertz:..... 460-3-60
Air Discharge:..... Vertical
Fan Drive Type:..... Belt
Actual Airflow:..... 6000 CFM
Site Altitude:..... 0 ft

Cooling Performance

Condenser Entering Air DB:..... 95.0 F
Evaporator Entering Air DB:..... 80.0 F
Evaporator Entering Air WB:..... 67.0 F
Entering Air Enthalpy:..... 31.44 BTU/lb
Evaporator Leaving Air DB:..... 58.9 F
Evaporator Leaving Air WB:..... 57.3 F
Evaporator Leaving Air Enthalpy:..... 24.59 BTU/lb
Gross Cooling Capacity:..... 184.78 MBH
Gross Sensible Capacity:..... 137.04 MBH
Compressor Power Input:..... 13.64 kW
Coil Bypass Factor:..... 0.198

Supply Fan

External Static Pressure:..... 1.00 in wg
Options / Accessories Static Pressure
Economizer:..... 0.05 in wg
Total External Static:..... 1.05 in wg
Fan RPM:..... 726
Fan Power:..... 3.03 BHP
NOTE:..... Selected IFM RPM Range: 627 - 851

Electrical Data (Before July 30, 2012)

Minimum Voltage:..... 414
Maximum Voltage:..... 506
Compressor #1 RLA:..... 12.2
Compressor #1 LRA:..... 100
Compressor #2 RLA:..... 12.8
Compressor #2 LRA:..... 100
Outdoor Fan Motor Qty:..... 3
Outdoor Fan FLA (ea):..... 0.8
Indoor Fan Motor Type:..... MED
Indoor Fan Motor FLA:..... 4.9

Performance Summary For 15T

Project: ~Untitled79
Prepared By:

08/09/2013
02:10PM

Power Supply MCA:.....	35.5
Power Supply MOCP (Fuse or HACR):.....	45
Min. Unit Disconnect FLA:.....	37
Min. Unit Disconnect LRA:.....	245
Electrical Convenience Outlet:.....	None

Electrical Data (July 30, 2012 and Beyond)

Indoor Fan Motor FLA:.....	4.9
Power Supply MCA:.....	36
Power Supply MOCP:.....	45
Disconnect Size FLA:.....	37
Disconnect Size LRA:.....	245

July 30th and beyond units can be identified by serial number 3112XXXXXXXX and higher

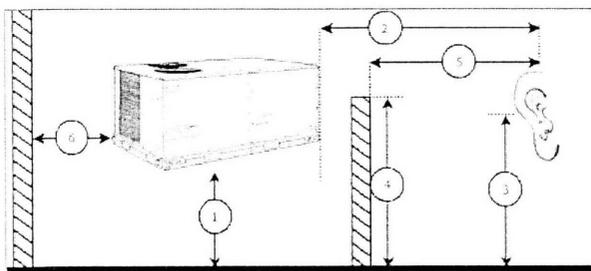
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	89.1	87.0	87.0
125 Hz	89.4	80.8	85.2
250 Hz	74.2	66.7	84.6
500 Hz	78.2	68.8	84.9
1000 Hz	76.7	68.6	82.2
2000 Hz	73.6	63.1	78.4
4000 Hz	75.7	60.3	75.3
8000 Hz	69.4	52.6	72.9
A-Weighted	82.8	73.0	87.0

Advanced Acoustics



Advanced Acoustics Parameters

1. Unit height above ground:.....	30.0	ft
2. Horizontal distance from unit to receiver:.....	50.0	ft
3. Receiver height above ground:.....	5.7	ft
4. Height of obstruction:.....	0.0	ft
5. Horizontal distance from obstruction to receiver:.....	0.0	ft
6. Horizontal distance from unit to obstruction:.....	0.0	ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
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Performance Summary For 15T

Project: ~Untitled79
Prepared By:

08/09/2013
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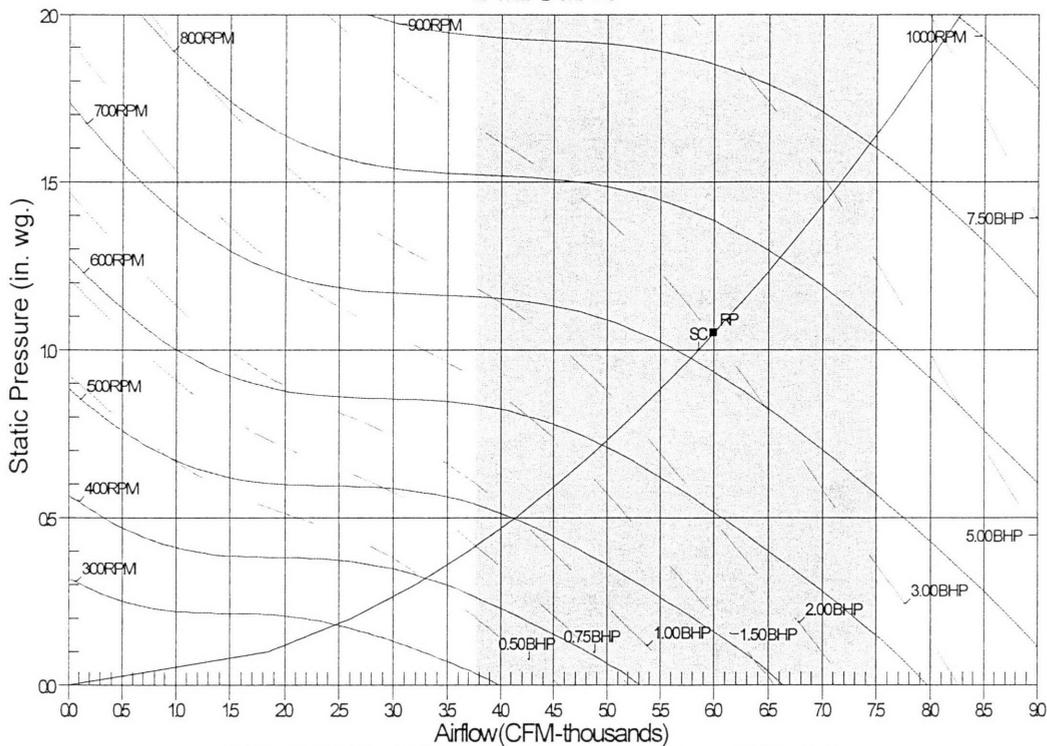
A	87.0	85.2	84.6	84.9	82.2	78.4	75.3	72.9	92.4 Lw
B	60.8	69.1	76.0	81.7	82.2	79.6	76.3	71.8	87.1 LwA
C	54.6	52.8	52.2	52.5	49.8	46.0	42.9	40.5	60.0 Lp
D	28.4	36.7	43.6	49.3	49.8	47.2	43.9	39.4	54.7 LpA

Legend

- A Sound Power Levels at Unit's Acoustic Center, Lw
- B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
- C Sound Pressure Levels at Specific Distance from Unit, Lp
- D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

Fan Curve



RPM=726 BHP=3.03 Maximum RPM=1100 Maximum BHP=6.10
Note: Please contact application engineering for selections outside the shaded region.
SC - System Curve RP - Rated Point

Spec Sheet for 15T

Project: ~Untitled79
Prepared By:

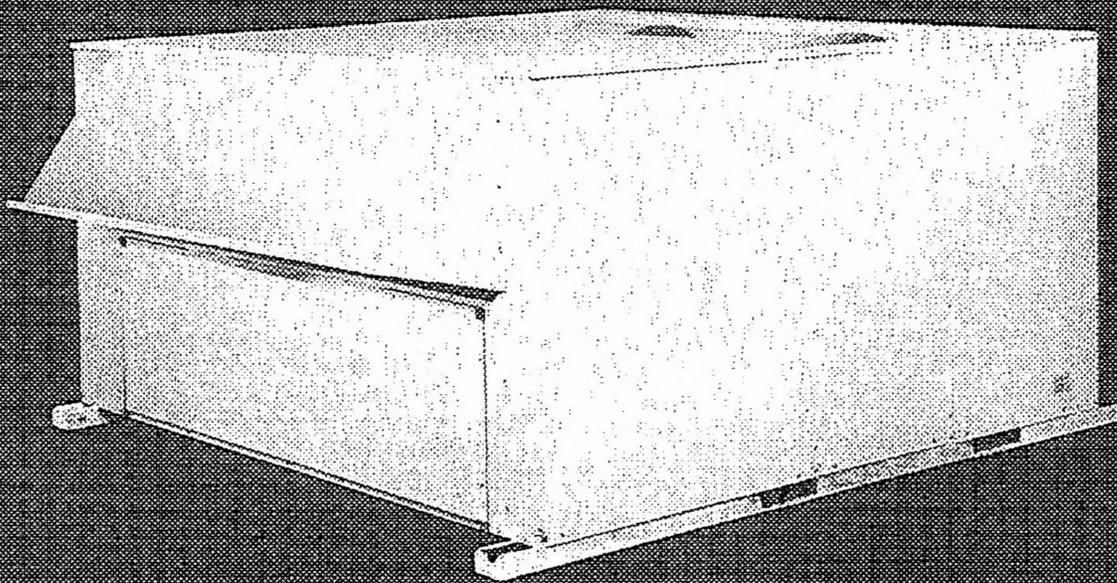
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old unit

50DP

Electric Cooling: 120,000 to 232,000 Btu/h
Electric Heating: 44,360 to 264,860 Btu/h

Carrier Single-Package Rooftop Cooling Units



Energy-efficient
cooling:

unsurpassed in the
10- to 20-ton range

Carrier

Questions about commercial cooling?

The 50DP, single-package rooftop unit, has the answers

Carrier's 50DP single-package, rooftop unit provides extraordinary cooling comfort at an uncommonly low cost. Ideally suited for offices, shopping centers, schools and other commercial building types, the 50DP meets today's high performance needs while delivering energy-efficient operation.

With Energy Efficiency Ratios (EER) to 8.3, you'll find the 50DP a leader in operating effectiveness. The EER rating reflects equipment cooling efficiency — the higher the rating, the more efficient the unit. The 50DP rates among the highest, which means the unit delivers more cooling (Btuh) while consuming proportionately less electrical energy. The result is money-saving, efficient operation.

Available in 4 nominal cooling capacities: 120,000 Btuh, 149,000, 180,000 and 222,000 Btuh, the 50DP is compact, self-contained and requires only one power connection point — a time and money saver at installation. Install the 50DP on the roof curb, connect field power and control wiring and you have dependable cooling comfort at an affordable price.

Electric resistance heat is available to provide indoor comfort all year long. Heaters come factory installed in the unit or fully assembled for installation at the jobsite.

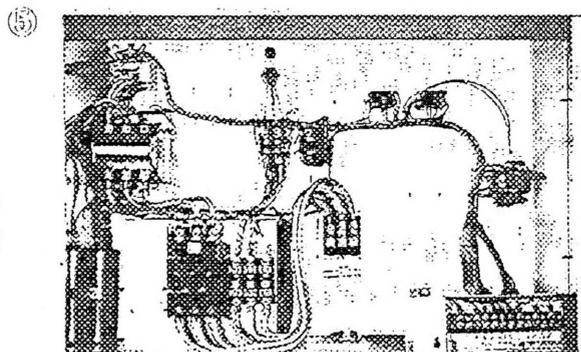
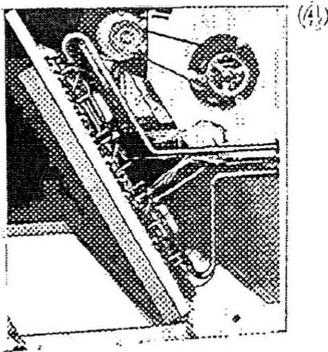
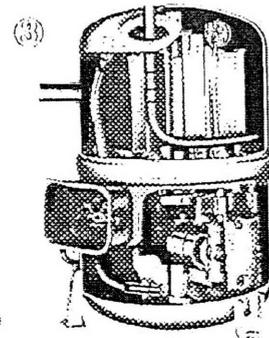
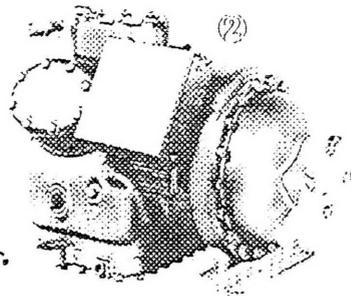
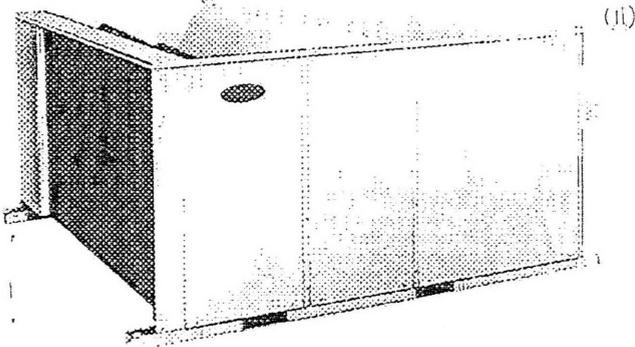
Horizontal or vertical air delivery, curb- or pier-mounted, new work or replacement, the 50DP, with quality standard features and a complete line of accessories and options, provides a system that will fit most any job plan.

For high quality, all electric, year-round indoor comfort in the 10- to 20-ton range, choose the 50DP single-package rooftop cooling unit with optional electric heat. Money savings and high performance are as close as your Carrier representative. Get his answers about the 50DP today.

ARI CAPACITY RATINGS

UNIT	TOTAL KW	COOLING CAP. NET BTU/HR	STANDARD CFM	EER
50DP012	14.5	120,000	4000	8.3
50DP014	18.6	149,000	5000	8.0
50DP016	21.7	180,000	6000	8.3
50DP020	27.6	222,000	7200	8.0

NOTE Capacities for 50DP014, 016, 020 are not within scope limitations of ARI Certification Program



- (1) Base Unit
- (2) Compressor (016, 020)
- (3) Compressor (012, 014)
- (4) Indoor Air Fan
- (5) Control Box

Dependable built-in features assure easy installation, top performance, dollar savings

Reliable, high-performance cooling power — Carrier-specified hermetic compressors (012 and 014) and semi-hermetic compressors (016 and 020) are equipped with crankcase heaters, internal linebreak for protection against overcurrent and overtemperature conditions and Cycle-LOC™ compressor protection. Solid-state Cycle-LOC prevents compressor short cycling by shutting off compressor if any safety device trips. Compressor is restarted by manual reset at the room thermostat (except 016,020 units which require circuit breaker reset at the unit)

Quiet, high volume fan operation — Belt-driven indoor air fans provide quiet and efficient operation. Outdoor fans are direct driven, factory lubricated, and positioned for quiet efficient vertical discharge. In addition, indoor fans are capable of moving ample air quantities and achieving high external static pressures suitable for the most demanding application.

Refrigerant coils — Built with energy efficiency in mind, the 50DP cooling coils feature staggered copper tubes and mechanically bonded aluminum fins to give you the most for your cooling dollar

Terminal board — Located in base unit control box for easy connection to room thermostat, outdoor thermostat(s), economizer and electric heat.

Part-load operation — The 10, 12-1/2 and 18-1/2 ton units feature 2 compressors and 50% and 100% capacity steps. The 15-ton unit uses the rugged Carrier 06D com-

pressor with capacity steps of 67% and 100%. Part-load operation assures you high energy efficiency and lower utility bills.

Tough units for rooftop operation — Weathertight Weather Armor cabinet stands up to extreme outdoor conditions. Design meets Carrier's stringent rain test requirements. Strong, watertight interface between unit and roof is provided by the specially designed roof curb, approved by the National Roofing Contractors Association.

Trouble-free rigging — All units are built as an integrated unit — rigid and strong, making rigging simple and convenient. Predrilled lifting holes in the base rails make the rigging job still easier

Convenient duct connections — Openings in the base pan permit side-by-side or concentric ductwork connections without requiring unit internal modifications. Side connections for horizontal duct applications can be made using side supply curb accessory. Gasketing is provided with roof curb for a weathertight installation.

Ventilation air — Standard equipment includes manual damper which can be preset to admit up to 25% outdoor air for year-round ventilation. Units equipped with economizer have a thermostatically controlled, fully modulating damper which admits up to 100% outdoor air and provides low-cost cooling on mild days. Enthalpy control governs economizer cooling changeover to provide lowest cost operation in mild weather

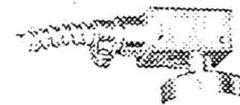
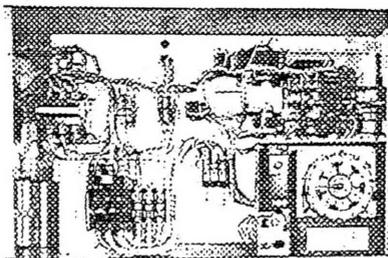
Optional variable volume operation provides maximum flexibility

Variable air volume option employs electric unloaders to match system cooling capacity to varying load requirements and interlocks compressor operation with economizer operation for maximum energy efficiency.

Capacity control occurs when a discharge air thermostat, responding to discharge air temperature, regulates an unloader step controller and thus loads and unloads the unit. On a rise in supply air temperature, the controller allows the economizer to act as the first step in cooling (provided the outdoor air is below the enthalpy set point of the changeover controller). As the supply air temperature continues to rise, the economizer moves to vent position and the com-

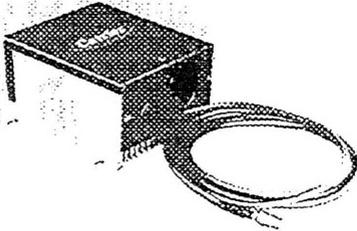
pressor loads sequentially until it reaches 100% capacity.

An adjustable 7-day timer provides round-the-clock operation. Also included is an ON/OFF switch. The prewired, factory-installed monitor panel includes everything necessary to assure proper variable volume system operation.



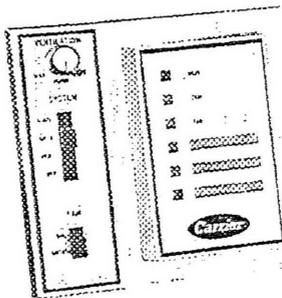
Options and accessories (cont.)

Motormaster® head pressure control — Units are designed to operate at outdoor temperatures down to 35 F. Below 35 F, accessory 32LT Motormaster control modulates outdoor fan motor to maintain correct condensing temperature at outdoor temperatures down to -20 F. Field-installed accessory.



→ **Winter start relay package** — Provides 3-minute timed bypass of low-pressure switch.

• **Remote control panel** consists of a separate heating and cooling thermostat assembly plus a decorative wall-mounted panel. In addition to switches for heating, cooling and fan operation, the panel contains indicator lights and, for economizer-equipped units, a ventilation control knob. Field-installed accessory.

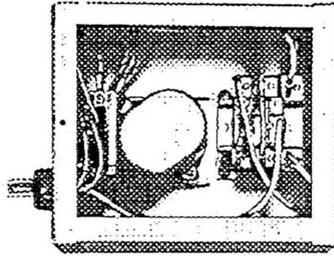


Relief damper operates automatically to help exhaust stale indoor air during economizer operation. Accessory comes fully assembled for easy installation.

Roof curb with insulated basepans supports unit and frames roof opening for interior ductwork. When curb is in place and ductwork connected, unit can be installed any time, to meet your tightest schedule. Curb design meets all National Roofing Contractors Association (NRCA) requirements. Field-installed accessory.

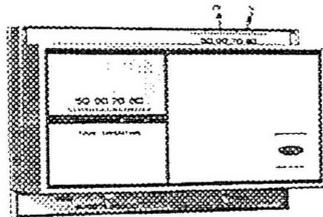
Hydronic coil installs easily into electric heater compartment. (Both cannot be used simultaneously.) Designed for add-on type applications or new work where boiler system is utilized. Field-installed accessory.

Time Guard® circuit protects compressor against "jiggling" of thermostat; automatically prevents compressor from restarting for at least 5 minutes after shutdown. Field-installed accessory.



Thermostat assembly — Precise temperature control for cooling systems and optional heaters is provided by this attractive wall-mounted 24-volt accessory. One- or 2-stage heating available, depending on base unit and application requirements.

A thermostat subbase is available that goes hand-in-hand with Cycle-LOC™ circuitry. If a safety device trips, compressor shuts off and light on thermostat comes on. Reset is accomplished by following standard Cycle-LOC procedures. Field-installed accessory.



Alternate fan motor and drive (50DP012 and 014) — Provides increased performance for application requirements beyond standard unit operation range. An alternate higher speed drive is available for 50DP016 applications. Factory-installed option.

Two-position damper — Single blade damper, operated by a spring return motor, closes off the 25% air inlet when unit is shut down. Field-installed accessory.

→ **Economizer assembly** — Automatically controlled dampers open to admit cool, filtered outdoor air. To maximize energy savings, a factory-installed or field-installed economizer provides integrated economizer/compressor operation. In contrast to straight changeover control

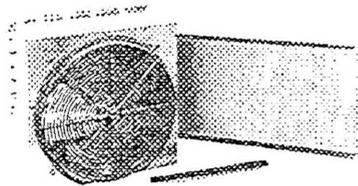
(economizer or mechanical cooling), the integrated feature allows for a much higher changeover point, thus expanding the range in which free outside air can be used for cooling.

During economizer mode, compressor cycles on only at high room demand to maintain top operating efficiency.

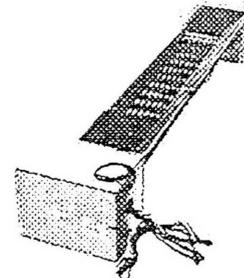
Outdoor air damper is fully gasketed for low leakage. Low-leakage dampers save energy because outside air leakage is minimized when the outdoor air damper is closed.

Economizer is a factory option or field-installed accessory. Complete factory assembly permits easy installation. Unit also includes wiring plug for quick connection to base unit.

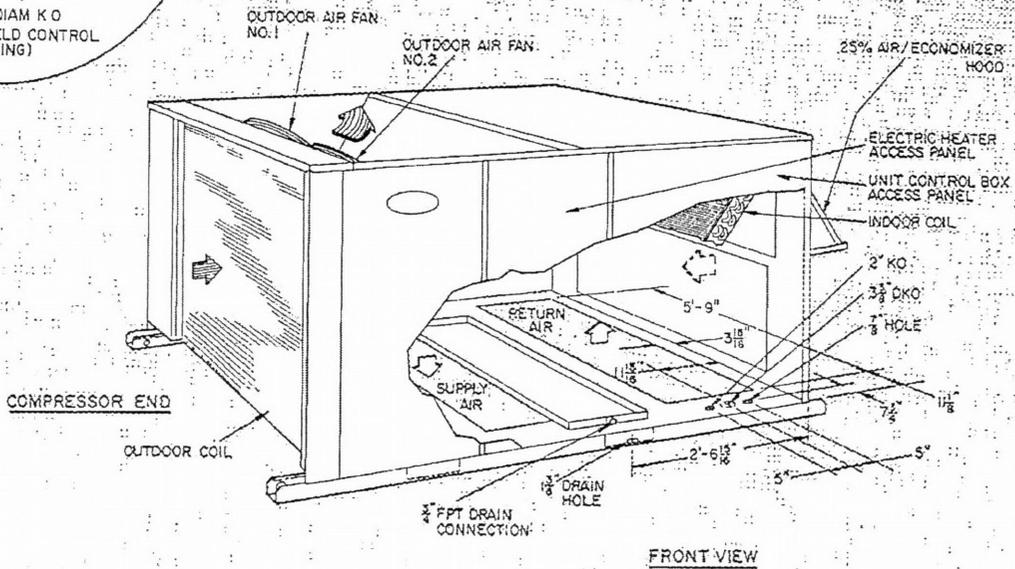
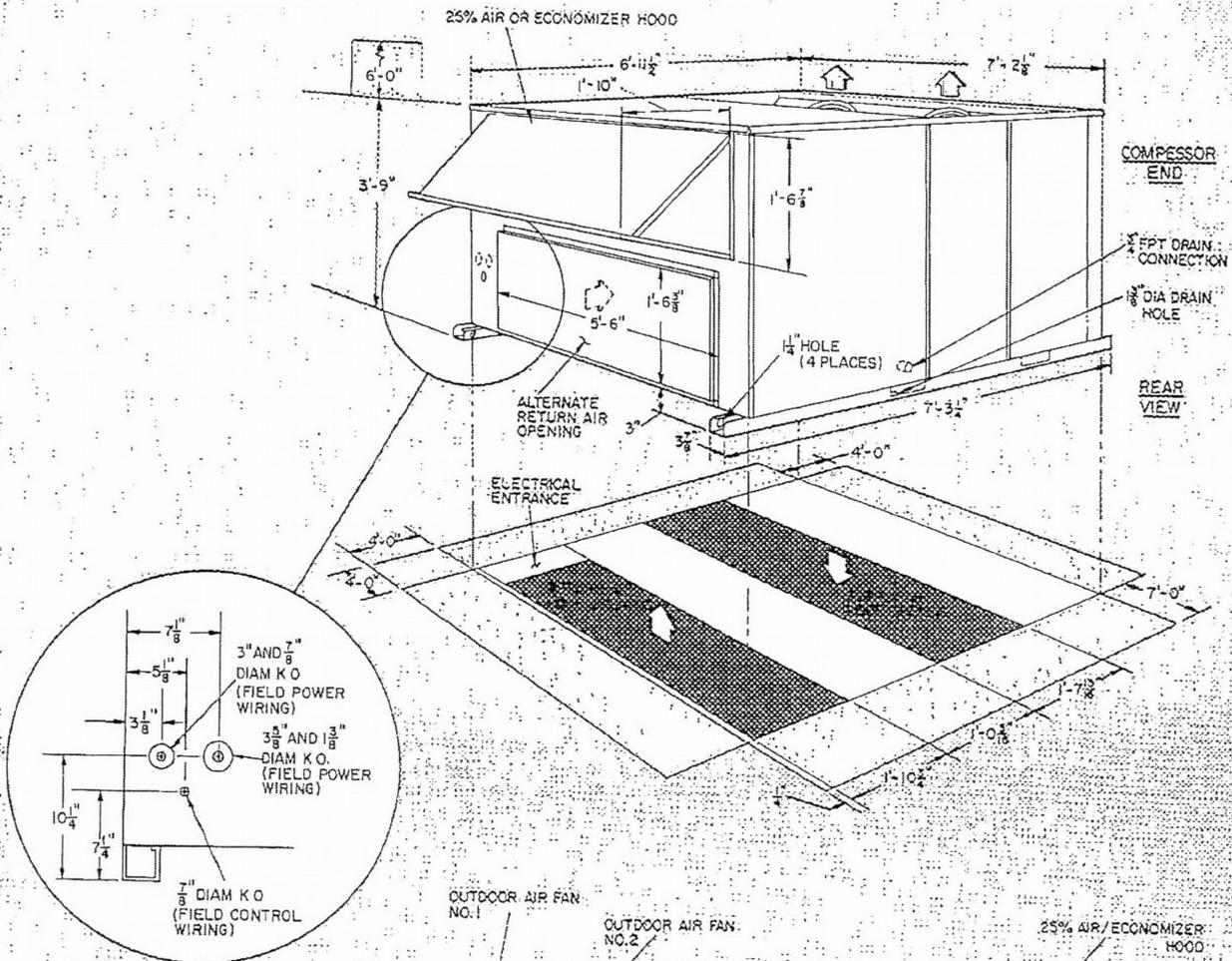
→ **Power exhaust** — Coupled with the economizer, up to 75% of the return air at 0.1 in. wg static pressure may be exhausted. Also eliminates overpressurization of the building. Designed for use with the bottom duct connection arrangements. Field-installed accessory.



Electric resistance heaters — Complete with high temperature limit switches and overcurrent protection. Offered in 3 heating capacities for each unit size. When heaters are installed, unit electrical input is single point at the factory-supplied terminal block. Connection point is suitable for copper or aluminum wire. Available as factory-installed option or field-installed accessory. The accessory heaters are fully factory assembled for slip-in installation with an easy-connect wiring harness.



Base unit dimensions



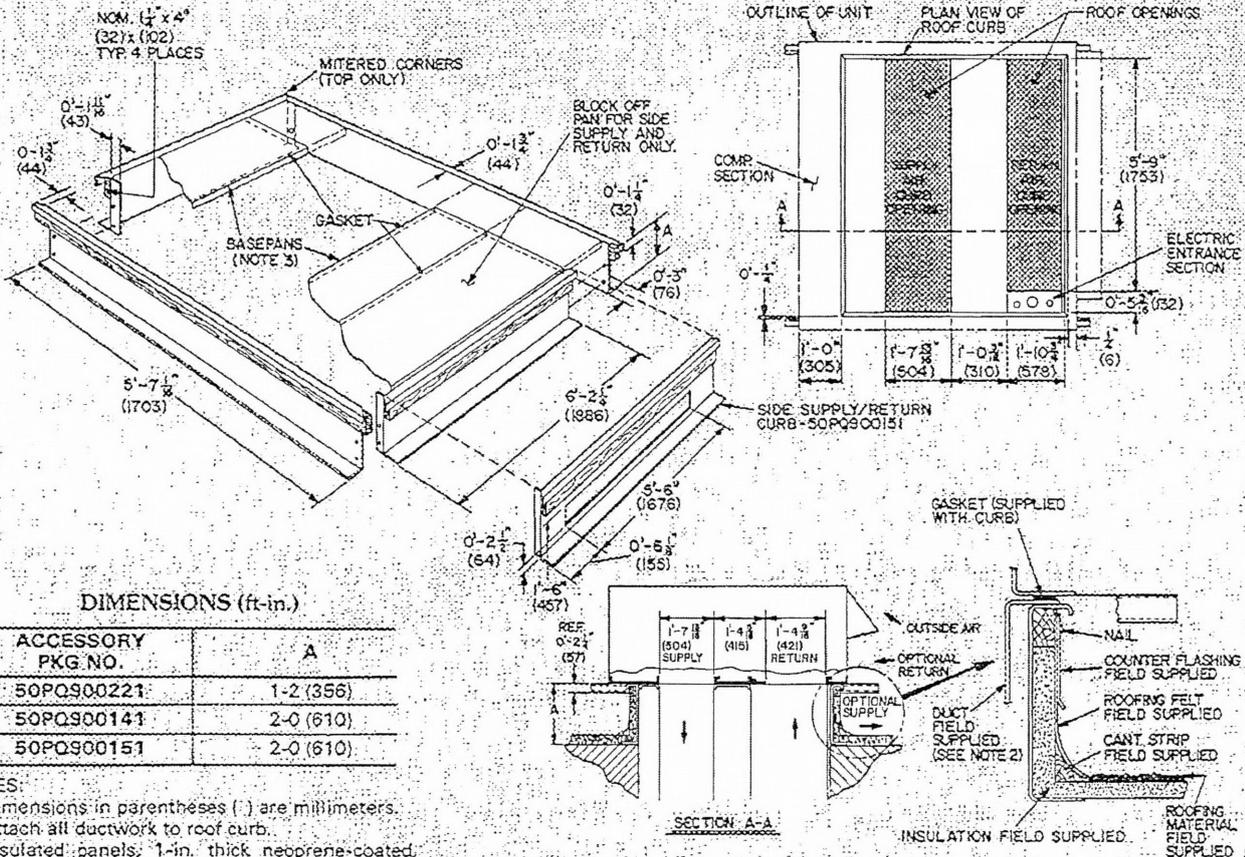
INDOOR AIRFLOW

OUTDOOR AIRFLOW

ALTERNATE AIRFLOW

SPACE REQUIRED FOR SERVICE AND AIRFLOW

Accessory dimensions



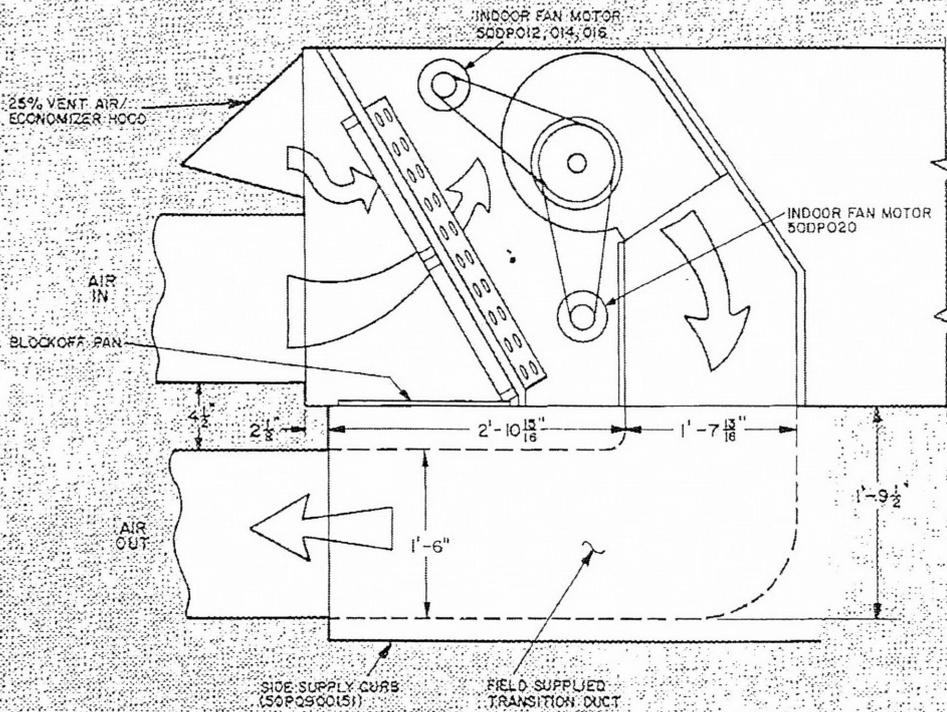
DIMENSIONS (ft.-in.)

ACCESSORY PKG. NO.	A
50PQ900221	1-2 (356)
50PQ900141	2-0 (610)
50PQ900151	2-0 (610)

NOTES:

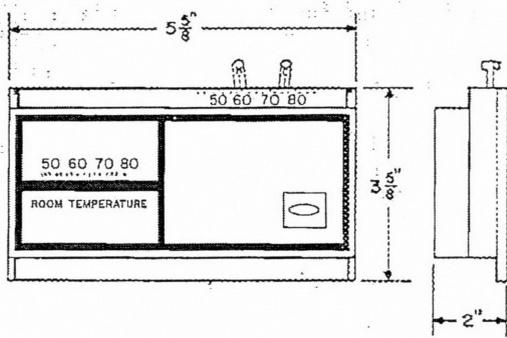
1. Dimensions in parentheses () are millimeters.
2. Attach all ductwork to roof curb.
3. Insulated panels, 1-in. thick neoprene-coated, 1-1/2 lb density.

→ ROOF CURB

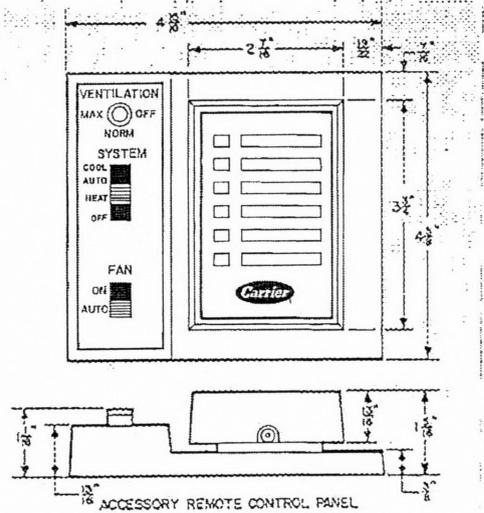


→ SIDE SUPPLY/RETURN CURB

Accessory dimensions (cont)



ACCESSORY ZONE THERMOSTAT



ACCESSORY REMOTE CONTROL PANEL

ACCESSORY REMOTE CONTROL PACKAGE

Physical data

UNIT SIZE -- 50DP	012	014	016	020
OPERATING WEIGHT (lb)				
Unit	1210	1270	1450	1940
with Economizer	1360	1420	1600	2090
Roof Curb	200	200	200	200
COMPRESSOR				
Qty Type	2 P()64	2 P()77	1 06D()537	2 06DA824
Capacity Steps (%)	50, 100	50, 100	67, 100	50, 100
REFRIGERANT				
Charge (lbs), Sys 1, Sys 2	22 7.9, 6.6	22 8.3, 8.3	22 23.2, —	22 17.0, 17.0
CONDENSER COIL (Copper Tube)		14 Aluminum Plate Fins per inch		
Rows	2	3	3	4
Total Face Area (sq ft)	18.9	18.9	18.9	22.2
CONDENSER AIR FAN		Propeller Type, Direct Drive		
Nominal Cfm	9000	8000	12,000	11,400
Quantity - Diameter (in.)	2 22	2 22	2 26	2 26
Watts Input (Total)	1385	1400	2672	3000
EVAPORATOR COIL (Copper Tube)				
Aluminum Plate Fins per inch	14	15	14	14
Total Face Area (sq ft)	14.7	13.8	16.5	17.9
Rows	2	3	3	4
EVAPORATOR AIR FAN*		Centrifugal Belt Drive		
Quantity, Size (in)	2 (10x10)	2 (10x10)	2 (10x10)	2 (12x12)
Nominal Cfm	4000	5000	6000	7200
Rpm Range — Std	753-1066	805-1093	916-1186	—
— Alt	878-1191	978-1265	1159-1429	—
— Pulley A (Fixed Pitch)	—	—	—	846
— Pulley B (Fixed Pitch)	—	—	—	1058
Max Allowable Rpm	1550	1550	1550	1550
Fan Pulley Pitch Diameter (in) — Std	5.5	6.0	6.4	6.6
— Alt	5.5	6.0	6.4	—
Motor Pulley Pitch Diameter — Std	2.4-3.4	2.8-3.8	3.4-4.4	—
— Alt	2.8-3.8	3.4-4.4	4.3-5.3	—
— Pulley A	—	—	—	3.2
— Pulley B	—	—	—	4.0
Motor Hp [SF] (Nominal 1750 rpm) — Std	1 [1.25]	2 [1.15]	3 [1.15]	5 [1.15]
— Alt	1-1/2 [1.20]	3 [1.15]	—	—
INDOOR AIR FILTERS (50DP) TYPE		10% efficient, Disposable Fiberglass		
No Size (in.)	(4) 16x25x2 (2) 16x20x2	(4) 16x25x2 (2) 16x20x2	(2) 20x20x2 (3) 16x20x2 (2) 16x25x2	

SF — Motor Service Factor

*012, 014 and 016 units have adjustable standard and alternate drives. The 020 unit has 2 non-adjustable pulleys. Pulley A is in-

stalled in unit, pulley B is shipped with unit. The 020 unit is not offered with alternate drive.

Selection procedure (with example)

I Determine cooling and heating requirements at design conditions.

Given:

Cooling Capacity Required (TC) 179,000 Btuh
 Sensible Heat Capacity (SHC) 128,000 Btuh
 Condenser Entering Air
 Temperature 95 F Edb/78 F Ewb
 Indoor Air Temperature 80 F Edb/67 F Ewb
 Evaporator Air Quantity 6,000 cfm
 External Static Pressure 66 in. wg
 Heating Capacity 76,000 Btuh
 Power Supply 230-3-60

II Determine unit size.

Select unit based on cooling requirements.

Enter 50DP016 Cooling Capacities table at given cooling requirements. Read that at 95 F condenser entering dry-bulb and 67 F evaporator entering wet-bulb at 6000 cfm, unit 50DP016 provides a Total Capacity of 187,000 Btuh and a Sensible Heat Capacity of 135,000 Btuh. For indoor air temperature other than 80 F Edb, calculate sensible heat correction using formula in notes following Cooling Capacities table

III Select electric heat.

Heating load required is 76,000 Btuh.

$$\frac{76,000 \text{ Btuh}}{3,414 \text{ Btu/kW}} = \text{kW of heat required}$$

Enter the Electric Resistance Heater Data table for the 50DP016 at 230-3-60. The 31 kW electric heat most closely satisfies the heating required.

IV Find heating coil static pressure loss.

Enter Static Pressure Losses table (page 8) at selected unit size and heater kW.

Find that at given air quantity (6000 cfm), pressure loss is .09 in. wg.

V Determine fan speed and motor horsepower requirements at design conditions.

Adjust unit external static pressure by adding heater static pressure loss.

$$.66 \text{ in. wg} + .09 \text{ in. wg} = 0.75 \text{ in. wg}$$

Enter Fan Performance table for unit 50DP016. Interpolate to see that at 6000 cfm and 0.75-in. wg external static pressure, the fan speed is 1184 rpm and bhp is 2.96. The standard motor and drive is suitable but if field conditions dictate, the optional drive may make a better selection because of its ability to be adjusted to higher rpm's.

VI Select unit that corresponds to power source electrical characteristics.

From Electrical Data table, select 50DP016 unit with 230-v, 3-ph, 60-Hz electrical characteristics.

VII Calculate EER for full load operating condition of unit.

Re-enter the 50DP016 Cooling Capacities table at 80 db, 67 wb entering air on the indoor coil and 95 db ambient on the outdoor coil. At this condition, the compressor kW input is 16.3 kW or 16,300 Watts.

The outdoor condenser fan Watts from the Physical Data table is 2672 Watts. Using the bhp previously determined from the Fan Performance table, at 6000 cfm and 0.75-in. wg ESP, the evaporator fan Watts input can be calculated using the formula and motor efficiencies on the Fan Performance table, page 10.

$$\text{Watts input} = \frac{2.96 \times 746}{0.84} = 2629 \text{ Watts}$$

The gross capacity must be reduced by the indoor fan heat to get net cooling capacity.

This is then divided by total Watts input.

$$\begin{aligned} \text{EER} &= \frac{\text{Gross capacity} - (\text{Indoor fan Watts} \times 3.413 \text{ Btu/Watt})}{\text{Compressor Watts} + \text{Outdoor fan Watts} + \text{Indoor fan Watts}} \\ &= \frac{187,000 - (2629 \times 3.413)}{16,300 + 2672 + 2629} \end{aligned}$$

$$\text{EER} = \frac{178,027}{21,601} = 8.24 \text{ Btu/Watt}$$

Performance data

STATIC PRESSURE LOSSES* (in. wg)

ACCESSORY/FIOP			CFM				
Electric Heaters							
MODEL	Unit Voltage	kW	4000	5000	6000	7200	
50DP012, 014	208-230/3/60	14-17	.05	.07	.09	—	
		26-31	.05	.07	.09	—	
		42-52	.06	.08	.12	—	
		56	.07	.10	.15	—	
	460/3/60	16	.05	.07	.09	—	
		30	.05	.07	.09	—	
50DP016, 020	208-230/3/60	26-31	.05	.07	.09	.11	
		42-52	.06	.08	.12	.16	
		56-69	.07	.10	.15	.20	
		30	.05	.07	.09	.11	
	460/3/60	51	.06	.08	.12	.15	
		73	.07	.10	.15	.20	
		Economizer		.03	.05	.07	.09
		Hydronic Coil		.18	.26	.35	.44

*Static pressure losses must be added to external static pressure before entering Fan Performance table

Performance data (cont)

GROSS COOLING CAPACITIES

50DP012

Temp (F) Air Ent Cond (Edb)	Evap Air — Cfm/BF									
	3000/.153			4000/.187			5000/.216			
	Evap Air — Ewb (F)									
	72	67	62	72	67	62	72	67	62	
85	TC	132	123	110	132	124	110	138	131	124
	SHC	65	81	95	70	85	95	75	99	120
	kW	12.2	11.7	11.1	12.4	11.8	11.4	12.5	12.1	11.7
95	TC	128	116	100	134	122	106	135	126	117
	SHC	63	79	91	70	80	90	75	99	117
	kW	13.0	12.3	11.9	13.3	12.6	12.0	13.4	12.9	12.3
105	TC	122	107	90	127	114	100	130	119	109
	SHC	61	75	85	65	87	100	73	97	109
	kW	13.6	13.1	12.6	13.9	13.1	12.0	14.1	13.5	13.1
115	TC	113	96	81	125	105	90	123	109	101
	SHC	58	71	80	66	85	92	72	93	101
	kW	14.4	13.8	13.3	14.6	14.1	13.0	14.8	14.2	13.9

50DP020

Temp (F) Air Ent Cond (Edb)	Evap Air — Cfm/BF									
	5400/0.03			7200/0.06			9000/0.06			
	Evap Air — Ewb (F)									
	72	67	62	72	67	62	72	67	62	
85	TC	248	231	207	257	242	222	261	248	233
	SHC	120	148	170	125	155	175	137	181	223
	kW	20.6	20.1	19.3	23.3	22.5	21.5	26.4	25.3	24.4
95	TC	240	221	191	253	232	207	254	238	224
	SHC	112	145	173	125	155	184	131	170	220
	kW	22.3	21.6	20.7	22.9	22.1	21.0	23.0	22.3	21.8
105	TC	231	203	172	245	225	191	246	226	209
	SHC	110	143	163	125	155	183	133	177	209
	kW	24.1	23.2	22.2	24.7	23.7	22.5	25.0	24.0	23.7
115	TC	217	184	154	228	195	165	235	206	195
	SHC	107	135	153	125	155	175	134	182	195
	kW	25.8	24.7	23.8	28.4	26.3	24.7	26.8	25.6	25.3

BF — Bypass Factor
 Edb — Entering Dry-Bulb
 Ewb — Entering Wet-Bulb
 kW — Compressor Motor Power Input
 SRC — Gross Sensible Heat Capacity (1000 Btuh)
 TC — Gross Total Capacity (1000 Btuh)
 TLDB — Temperature Leaving Dry-Bulb

- 1 Direct interpolation is permissible. Do not extrapolate
- 2 The following formulas may be used

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.09 \times \text{cfm}}$$

$$t_{lwb} = \text{Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (} h_{lwb} \text{)}$$

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where
 h_{ewb} = Enthalpy of air entering evaporator coil

- 3 SHC is based on 80 F edb temperature of air entering evaporator coil

Below 80 F edb, subtract (corr factor x cfm) from SHC.

Above 80 F edb, add (corr factor x cfm) to SHC.

50DP014

Temp (F) Air Ent Cond (Edb)	Evap Air — Cfm/BF									
	3750/.058			5000/.090			6250/.125			
	Evap Air — Ewb (F)									
	72	67	62	72	67	62	72	67	62	
85	TC	169	156	140	174	162	145	180	169	163
	SHC	85	106	125	92	121	145	105	143	163
	kW	15.0	14.3	13.5	15.4	14.8	14.1	15.6	15.1	14.8
95	TC	162	147	128	168	154	140	175	162	156
	SHC	82	103	120	92	117	140	106	142	156
	kW	16.0	15.1	14.4	16.4	15.6	14.9	16.7	16.0	15.7
105	TC	153	135	115	163	144	130	167	152	148
	SHC	79	98	113	88	114	130	105	140	148
	kW	16.8	16.0	15.3	17.3	16.4	15.9	17.7	16.8	16.6
115	TC	143	121	103	149	129	119	156	140	138
	SHC	76	98	103	85	108	115	102	135	138
	kW	17.6	16.9	16.4	18.1	17.3	16.9	18.5	17.6	17.5

50DP016

Temp (F) Air Ent Cond (Edb)	Evap Air — Cfm/BF												
	3000/.056			4500/.086			6000/.112			7500/.136			
	Evap Air — Ewb (F)												
	72	67	62	72	67	62	72	67	62	72	67	62	
85	TC	186	169	151	203	188	169	212	196	180	224	208	196
	SHC	89	105	120	98	122	145	105	135	167	120	158	186
	kW	15.6	14.9	14.2	16.3	15.5	14.6	16.1	15.0	14.5	17.0	16.3	15.6
	TLDB	52.8	47.9	43.3	60.0	55.1	50.4	63.9	58.9	54.5	—	—	—
95	TC	179	158	136	196	178	154	204	187	169	216	199	188
	SHC	86	100	113	95	119	138	103	135	161	117	155	178
	kW	16.7	16.0	15.4	17.4	16.4	15.8	17.2	16.3	15.5	18.2	17.3	16.7
	TLDB	53.7	49.4	45.4	60.6	55.7	51.9	64.3	59.4	55.4	—	—	—
105	TC	168	144	121	186	164	138	194	175	158	205	188	178
	SHC	82	94	106	91	113	130	101	130	149	115	152	168
	kW	17.8	17.1	16.5	18.5	17.6	16.9	18.3	17.8	16.8	19.3	18.3	17.8
	TLDB	54.9	51.3	47.6	61.4	57.0	53.5	64.6	60.1	57.2	—	—	—
115	TC	155	130	108	175	149	126	183	158	144	194	172	166
	SHC	76	88	100	87	107	120	97	124	136	112	147	157
	kW	19.0	18.3	17.5	19.5	18.8	18.2	19.4	18.5	18.3	20.4	19.3	19.1
	TLDB	55.8	53.1	49.4	62.3	58.2	55.5	65.2	61.0	58.2	—	—	—

Ratings apply only to units with variable volume option

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	82	83	84	85	corr. fac.
	Correction Factor					
05	1.04	2.07	3.11	4.14	5.18	Use formula shown below
10	98	1.96	2.94	3.92	4.90	
20	87	1.74	2.62	3.49	4.36	
30	76	1.53	2.29	3.05	3.82	

Interpolation is permissible
 Correction Factor = 1.09 x (1 - BF) x (edb - 80)

Performance data (cont)

FAN PERFORMANCE

UNIT MODEL 50DP	CFM	EXTERNAL STATIC PRESSURE (in. wg)																			
		0.20		0.40		0.60		0.80		1.00		1.20		1.40		1.60		1.80		2.00	
		Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
012	3000	630	0.39	733	0.51	826	0.64	910	0.78	988	0.92	1062	1.08	1135	1.26	—	—	—	—	—	—
	3200	659	0.45	755	0.58	846	0.72	929	0.86	1004	1.01	1076	1.17	1145	1.34	1213	1.53	—	—	—	—
	3400	689	0.53	779	0.66	868	0.80	948	0.95	1022	1.11	1091	1.27	1158	1.44	1222	1.63	1287	1.83	—	—
	3600	719	0.61	804	0.75	890	0.90	967	1.05	1041	1.22	1108	1.38	1173	1.56	1235	1.74	1296	1.94	1357	2.16
	3800	750	0.70	830	0.85	912	1.00	988	1.16	1060	1.33	1126	1.50	1189	1.68	1250	1.87	1309	2.07	1367	2.28
	4000	782	0.80	857	0.96	935	1.12	1010	1.28	1079	1.46	1146	1.64	1207	1.82	1266	2.01	1324	2.21	1379	2.42
	4200	814	0.91	885	1.07	959	1.24	1032	1.41	1100	1.59	1165	1.78	1226	1.97	1283	2.16	1340	2.36	1394	2.57
	4400	846	1.03	914	1.20	984	1.37	1054	1.56	1122	1.74	1184	1.93	1245	2.13	1302	2.33	1356	2.53	1410	2.74
	4600	879	1.16	943	1.39	1010	1.52	1077	1.71	1143	1.90	1205	2.09	1264	2.30	1321	2.51	1375	2.71	1426	2.92
	4800	912	1.30	973	1.48	1036	1.67	1101	1.87	1165	2.07	1227	2.27	1284	2.47	1340	2.69	1394	2.91	1444	3.12
5000	945	1.45	1003	1.64	1064	1.84	1126	2.04	1188	2.25	1248	2.46	1305	2.67	1359	2.89	1413	3.12	1463	3.34	
014	3750	732	0.77	848	0.94	949	1.10	1041	1.26	1124	1.43	1194	1.61	1247	1.80	1274	1.99	—	—	—	—
	4000	764	0.90	876	1.09	974	1.25	1065	1.42	1146	1.59	1221	1.77	1284	1.97	1331	2.17	1357	2.37	—	—
	4250	797	1.05	904	1.24	1001	1.42	1089	1.59	1170	1.78	1244	1.96	1312	2.15	1369	2.36	1413	2.57	1440	2.78
	4500	831	1.21	934	1.41	1028	1.61	1113	1.78	1193	1.97	1267	2.16	1335	2.36	1398	2.57	1451	2.79	1493	3.01
	4750	865	1.38	965	1.60	1056	1.81	1139	1.99	1217	2.19	1290	2.39	1358	2.59	1422	2.80	1480	3.02	1531	3.24
	5000	900	1.58	996	1.80	1084	2.03	1166	2.23	1241	2.42	1314	2.63	1381	2.84	1444	3.05	1504	3.27	—	—
	5250	935	1.79	1028	2.02	1112	2.28	1193	2.48	1266	2.67	1338	2.89	1405	3.11	1468	3.32	1527	3.54	—	—
	5500	971	2.02	1060	2.26	1142	2.51	1221	2.74	1294	2.96	1362	3.16	1429	3.39	1491	3.62	—	—	—	—
	5750	1007	2.27	1093	2.52	1173	2.78	1249	3.02	1321	3.26	1387	3.47	1452	3.69	1515	3.93	—	—	—	—
	6000	1044	2.54	1126	2.80	1205	3.06	1277	3.32	1349	3.57	1414	3.80	1476	4.02	1539	4.27	—	—	—	—
6250	1080	2.83	1159	3.10	1236	3.37	1307	3.64	1377	3.91	1441	4.15	1502	4.38	—	—	—	—	—	—	
016	3000	—	—	—	—	—	—	940	0.89	1038	1.13	1115	1.37	1167	1.53	1193	1.56	1201	1.40	1192	1.07
	3300	—	—	—	—	—	—	951	0.98	1049	1.22	1138	1.50	1211	1.75	1265	1.97	1299	2.08	1316	2.04
	3600	—	—	—	—	—	—	966	1.10	1059	1.34	1149	1.60	1231	1.90	1301	2.20	1357	2.46	1398	2.64
	3900	—	—	—	—	—	—	986	1.25	1073	1.47	1159	1.73	1241	2.03	1318	2.35	1386	2.67	1443	2.97
	4200	—	—	—	—	929	1.24	1012	1.43	1091	1.65	1172	1.89	1251	2.18	1328	2.49	1400	2.83	1466	3.18
	4500	790	1.02	879	1.23	960	1.43	1039	1.64	1114	1.85	1189	2.09	1264	2.36	1338	2.67	1410	3.00	1479	3.36
	4800	830	1.21	915	1.43	993	1.64	1068	1.86	1140	2.09	1210	2.32	1290	2.58	1351	2.88	1420	3.20	1488	3.55
	5100	870	1.42	953	1.65	1028	1.88	1099	2.11	1168	2.35	1235	2.59	1301	2.85	1367	3.13	1433	3.44	1499	3.78
	5400	911	1.66	991	1.90	1063	2.15	1131	2.39	1197	2.64	1262	2.89	1325	3.15	1386	3.42	1449	3.72	1512	4.05
	5700	952	1.92	1030	2.18	1099	2.44	1165	2.69	1228	2.95	1290	3.22	1351	3.48	1410	3.76	1468	4.05	1528	4.37
	6000	994	2.21	1069	2.48	1136	2.76	1200	3.03	1260	3.29	1320	3.57	1379	3.85	1436	4.13	1492	4.43	1547	4.73
	6300	1035	2.53	1109	2.82	1174	3.10	1235	3.39	1294	3.67	1351	3.95	1408	4.24	1463	4.54	1518	4.84	—	—
	6600	1078	2.88	1148	3.18	1213	3.48	1271	3.78	1329	4.07	1384	4.37	1438	4.67	1492	4.98	1544	5.29	—	—
6900	1120	3.26	1188	3.58	1251	3.89	1309	4.20	1364	4.51	1417	4.82	1470	5.13	1522	5.45	—	—	—	—	
7200	1163	3.68	1229	4.01	1290	4.33	1347	4.66	1400	4.98	1452	5.31	—	—	—	—	—	—	—	—	
7500	1205	4.13	1270	4.47	1329	4.81	1385	5.15	1437	5.49	—	—	—	—	—	—	—	—	—	—	
020	5500	655	1.32	714	1.53	785	1.85	850	2.21	914	2.62	978	3.06	1036	3.54	1117	4.36	1237	5.94	—	—
	5750	691	1.54	734	1.69	798	2.00	865	2.38	928	2.79	988	3.23	1048	3.82	1107	4.28	1193	5.30	—	—
	6000	731	1.79	754	1.88	816	2.18	882	2.59	943	2.98	1000	3.47	1058	3.90	1112	4.41	1176	5.11	—	—
	6250	—	—	773	2.56	839	2.40	897	2.77	957	3.18	1016	3.65	1069	4.10	1126	4.64	1175	5.17	—	—
	6500	—	—	797	2.27	857	2.61	915	2.98	969	3.38	1028	3.84	1082	4.33	1136	4.86	1187	5.40	—	—
	6750	—	—	816	2.48	876	2.83	928	3.17	984	3.64	1042	4.08	1098	4.59	1146	5.07	1198	5.64	—	—
	7000	—	—	836	2.71	895	3.07	949	3.44	1005	3.88	1058	4.35	1109	4.82	1159	5.35	1209	5.90	—	—
	7250	—	—	861	2.99	914	3.32	971	3.74	1023	4.15	1073	4.60	1123	5.10	1174	5.63	—	—	—	—
	7500	—	—	891	3.31	936	3.63	989	4.01	1034	4.38	1091	4.91	1139	5.41	—	—	—	—	—	—
	7750	—	—	923	3.68	953	3.88	1007	4.30	1054	4.69	1107	5.20	1152	5.69	—	—	—	—	—	—
	8000	—	—	857	4.11	979	4.22	1027	4.62	1077	5.06	1122	5.51	—	—	—	—	—	—	—	—
	8250	—	—	—	—	999	4.53	1046	4.95	1097	5.42	—	—	—	—	—	—	—	—	—	—
	8500	—	—	—	—	1018	4.87	1067	5.34	—	—	—	—	—	—	—	—	—	—	—	—
8750	—	—	—	—	1041	5.26	1087	5.71	—	—	—	—	—	—	—	—	—	—	—	—	
9000	—	—	—	—	1069	5.71	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

- Standard motor and drive
- Optional motor and drive (016 unit offered with optional drive only)
- Field-supplied motor and/or drive

Rpm — Revolutions per minute
Bhp — Brake horsepower input to fan

Conversion — Bhp to watts
Watts input = $\frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$

- Motor efficiencies
- 1 Hp — 0.81
 - 1-1/2 Hp — 0.78
 - 2 Hp — 0.83
 - 3 Hp — 0.84
 - 5 Hp — 0.85

NOTES

- 1 Fan performance is based on wet coils, clean filters and casing losses
- 2 Add electric heater pressure loss to external static pressure required before using table
- 3 Motors have service factors as shown in Physical Data table on page 7
- 4 Condenser fan watts input are shown in Physical Data table on page 7
- 5 50DP020 unit has pulley A (846 rpm) installed and pulley B (1058 rpm) shipped with unit. Unit is not offered with optional motor and drive

Performance data (cont)

HYDRONIC COIL CAPACITY

CFM Ent Fluid Temp (F)	4000			5000			6000		
	Cap	GPM	ΔP	Cap	GPM	ΔP	Cap	GPM	ΔP
200	259	27	1.2	294	31	1.5	325	35	1.8
180	207	22	0.9	235	25	1.1	259	27	1.3
160	166	16	0.6	176	19	0.7	194	20	0.8

NOTES

- 1 Ratings at 70 F entering air temperature with 25% by volume ethylene glycol
- 2 Δ P is fluid pressure in ft of head
- 3 Cap is 1000's of Btu/h

ELECTRIC RESISTANCE HEATER DATA

UNIT 50DP	HEATER kW			HEATING STAGES	% HEAT PER STAGE	MAXIMUM STAGES*
	Unit Voltages					
	208	230	460			
012, 014	14	17	16	1	100	1
	26	31	30	2	50/50	2
	42	52	51	2	33/67	3
	56	—	—	2	50/50	4
016, 020	26	31	30	2	50/50	2
	42	52	51	2	33/67	3
	56	69	73	2	50/50	4

*Maximum number of stages using accessory outdoor air thermostats

Electrical data



50DP012

VOLTS/PH/HZ	VOLTAGE RANGE		COMPR		OUTDOOR FAN MOTOR		INDOOR FAN MOTOR		FACTORY-INSTALLED HEATER		POWER SUPPLY	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	kW	Min Ckt Amp	MOCP (Amps)
208-230/3/60	187	253	24.0 (ea)	136 (ea)	2	4.6	1.0	3.45	—	—	70	90
							1.5	5.50	—	—	70	90
							1.0	3.45	72-82	26-31	100-110	90
							1.0	3.45	117-135	42-52	155-180	150
							1.0	3.45	39-47	14-17	70	90
							1.5	5.50	72-82	26-31	100-110	90
							1.5	5.50	117-135	42-52	155-180	150
							1.5	5.50	39-47	14-17	70	90
460/3/60	414	508	10.5 (ea)	49 (ea)	2	2.1	1.0	1.60	—	—	30	35
							1.5	2.60	—	—	35	35
							1.0	1.60	39	30	55	50
							1.0	1.60	66	51	85	80
							1.0	1.60	21	16	30	35
							1.5	2.60	39	30	55	50
							1.5	2.60	66	51	90	80
							1.5	2.60	21	16	35	35
575/3/60	518	632	8.3 (ea)	41 (ea)	2	1.8	1.0	1.35	—	—	25	25
							1.5	1.70	—	—	25	25
							1.0	1.35	37	37.2	48	40
							1.5	1.70	37	37.2	49	45

50DP014

VOLTS/PH/HZ	VOLTAGE RANGE		COMPR		OUTDOOR FAN MOTOR		INDOOR FAN MOTOR		FACTORY-INSTALLED HEATER		POWER SUPPLY	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	kW	Min Ckt Amp	MOCP (Amps)
208-230/3/60	187	253	27.0 (ea)	137 (ea)	2	4.6	2.0	7.4	—	—	78	90
							3.0	8.4	—	—	81	90
							2.0	7.4	72-82	26-31	110-112	100-110
							2.0	7.4	117-135	42-52	152-179	125-150
							2.0	7.4	39-47	14-17	78	90
							3.0	8.4	72-82	26-31	104-116	110
							3.0	8.4	117-135	42-52	160-182	150-175
							3.0	8.4	39-47	14-17	81	90
460/3/60	414	508	11.6 (ea)	69 (ea)	2	2.3	2.0	3.3	—	—	35	40
							3.0	4.2	—	—	35	40
							2.0	3.3	39	30	55	50
							2.0	3.3	66	51	90	80
							2.0	3.3	21	16	35	40
							3.0	4.2	39	30	55	50
							3.0	4.2	66	51	90	80
							3.0	4.2	21	16	35	40
575/3/60	518	632	9.3 (ea)	55 (ea)	2	1.8	2.0	2.3	—	—	30	30
							3.0	3.8	—	—	30	30
							2.0	2.3	37	37.2	50	45
							3.0	3.8	37	37.2	52	50

Fuse only, unshaded values indicate fuses or circuit breakers may be used

Compr — Compressor

FLA — Full Load Amps

Hp — Nominal Horsepower

LRA — Locked Rotor Amps

MOCP — Maximum Overcurrent Protection

RLA — Rated Load Amps

Electrical data (cont)

50DP016

VOLTS/PH/HZ	VOLTAGE RANGE		COMPR		OUTDOOR FAN MOTOR		INDOOR FAN MOTOR		FACTORY-INSTALLED HEATER		POWER SUPPLY*	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	kW	Min Ckt Amps	MOCP (Amps)
208-230/3/60	187	253	61.6	266	2	7.7	3	10.4	— 117-135 156-180 72-82	— 42-52 56-69 26-31	105 165-185 210-240 105-120	125 150 200-225 125
460/3/60	414	508	32	120	2	3.3	3	4.7	— 66 96 39	— 51 73 30	55 90 130 55	60 90 125 60
575/3/60	518	632	25.6	96	2	2.6	3	3.8	— 50	— 49.6	50 70	45 50

Compr — Compressor
 FLA — Full Load Amps
 Hp — Nominal Horsepower
 LRA — Locked Rotor Amps
 MOCP — Maximum Overcurrent Protection
 RLA — Rated Load Amps

*Power exhaust accessory FLA is 4.6A at 208-230 volts and 2.3A at 460 volts. Unit Min Ckt Amps and MOCP values are unchanged.

 Fuse only



50DP020

VOLTS/PH/HZ	VOLTAGE RANGE		COMPR		OUTDOOR FAN MOTOR		INDOOR FAN MOTOR		FACTORY-INSTALLED HEATER		POWER SUPPLY*	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	kW	Min Ckt Amps	MOCP (Amps)
208-230/3/60	187	254	49.3 (ea)	139-153 (ea)	2	6.6	5.0	10.40	— 72-82.3 117-135 156-180	— 26-31 42-52 56-69	145-140 145-140 170-190 270-245	125-150 175-150 175 200-225
460/3/60	414	508	22.2 (ea)	77 (ea)	2	3.3	5.0	6.60	— 39 66 96	— 30 51 73	65 65 95 130	70 70 90 125

Compr — Compressor
 FLA — Full Load Amps
 Hp — Horsepower
 LRA — Locked Rotor Amps
 MOCP — Maximum Overcurrent Protection
 RLA — Rated Load Amps

*Power exhaust accessory FLA is 4.6A at 208-230 volts and 2.3A at 460 volts. Unit Min Ckt Amps and MOCP values are unchanged.

 Fuse only

**ETL LISTED
 CENTRAL COOLING
 AIR CONDITIONER (UL 465)**



NOTICE

This product has been safety tested by ETL Testing Laboratories, Inc. The test procedure is in strict conformance with prevailing and applicable ANSI/UL† standard as listed above.

Further information regarding the test procedures and compliance to existing industry standards may be obtained directly from ETL Testing Laboratories, Inc.

ETL Testing Laboratories, Inc.
 Industrial Park
 Cortland, New York 13045
 Telephone (607) 753-6711 TWX 510-2520792

*ANSI — American National Standards Institute
 †UL — Underwriters Laboratory, Inc.

Application notes

Ductwork — Ductwork should be attached to the curb on all units. Interior installation may proceed before unit is set in place on roof. If ductwork will be attached to unit, do not drill in condensate drain pan area — leaks may result

Field power connections — Factory-installed and field-installed electric heat allows single power entry to unit for both heating and cooling. Values shown for Minimum Circuit Amps and Maximum Overcurrent Protection Amps in Electrical Data apply to factory- or field-installed heaters.

Condensate traps — Evaporator coil is draw-through configuration. Trap (minimum 4 in. deep) must be field provided prior to start-up on cooling cycle. Install plug in condensate drain on opposite side of unit from trap.

Operating limits — Cfm and other values indicated illustrate the operating range of the equipment. Operation outside these limits is not recommended.

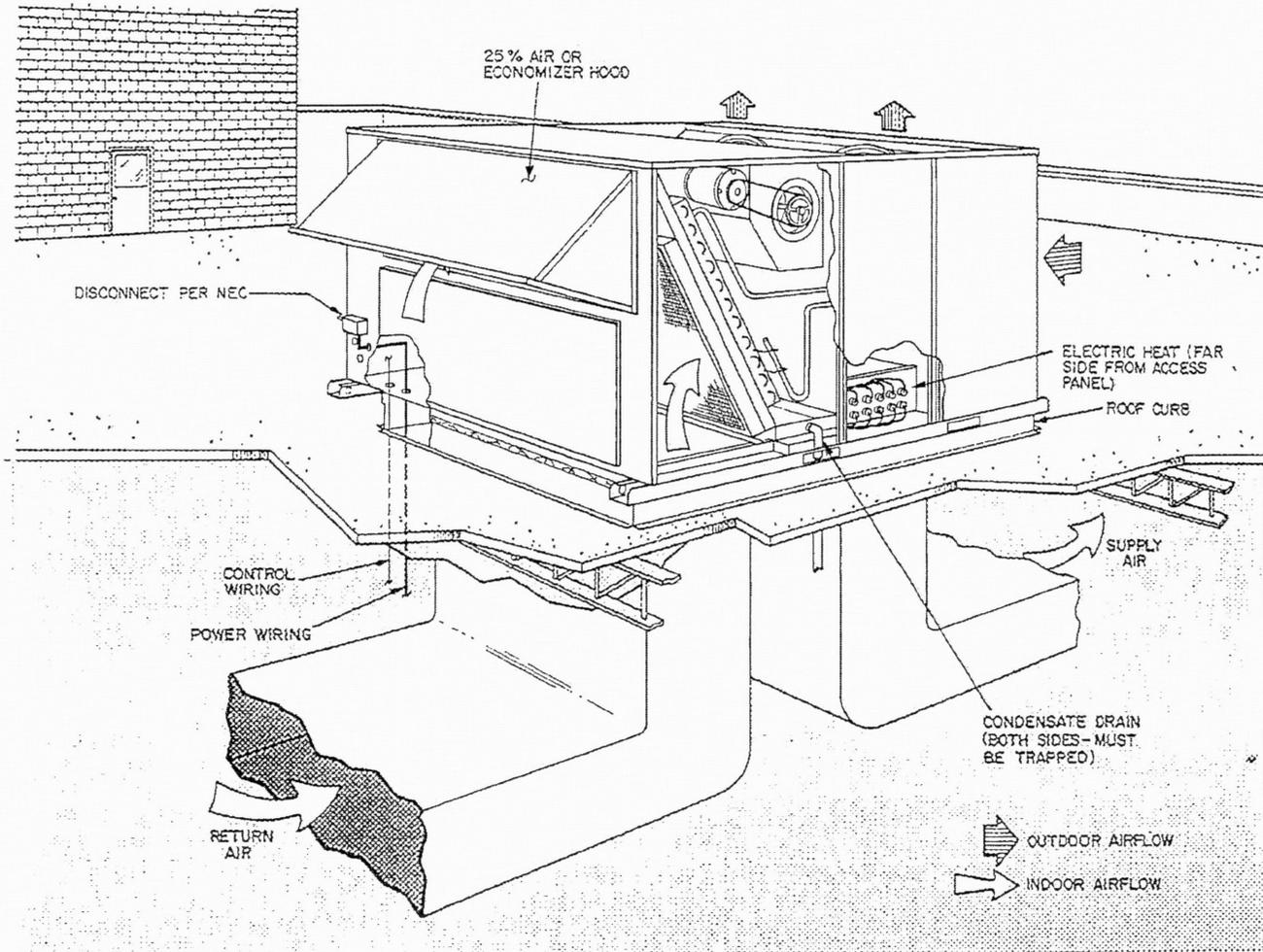
Low ambient cooling operation - Units are designed to operate at outdoor temperatures down to 35 F. At temperatures below 35 F, accessory Motormaster® will permit operation at outdoor temperatures as low as -20 F.

Roof curb — All curb installations must be counterflashed to prevent water leakage.

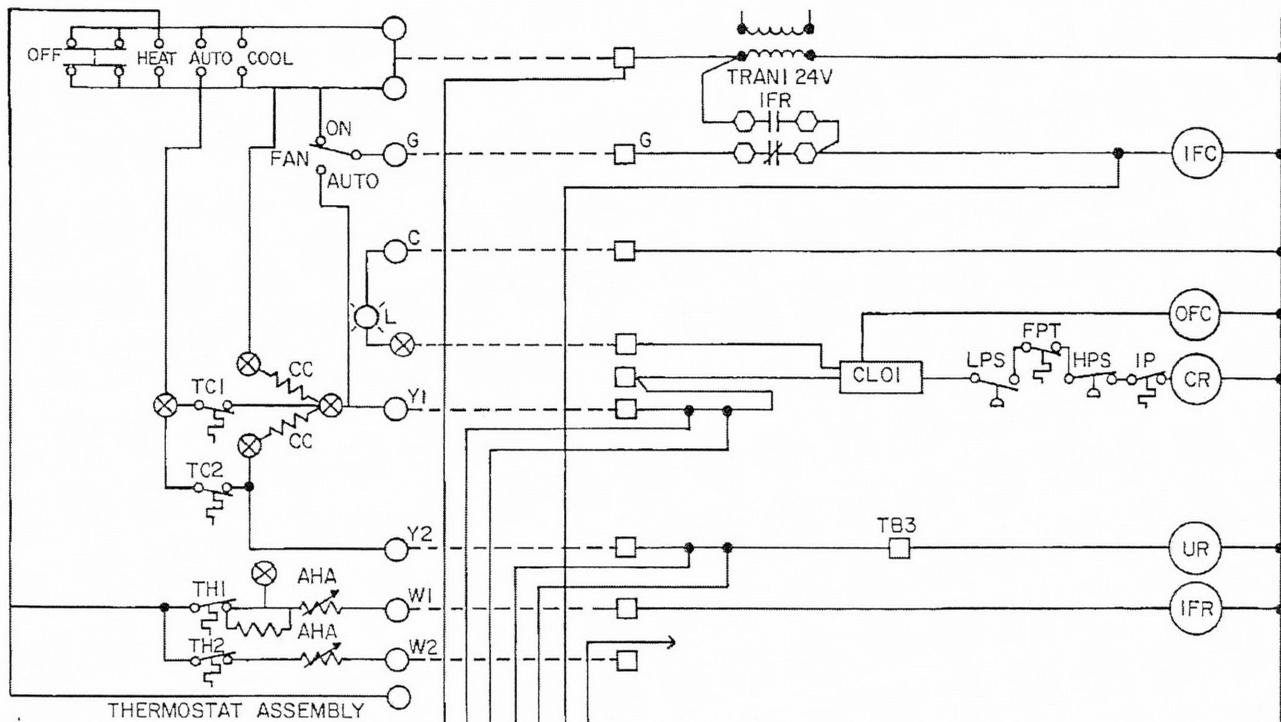
Power supply — Electric power may be brought to unit within curb perimeter through fittings provided in basepan. Provide power supply in accordance with local codes. Branch circuit protection to unit must be provided by fuses no larger than Maximum Overcurrent Protection Amps shown in Electrical Data.

Control wiring — 24-volt wiring to thermostat is NEC Class II

→ Typical piping and wiring



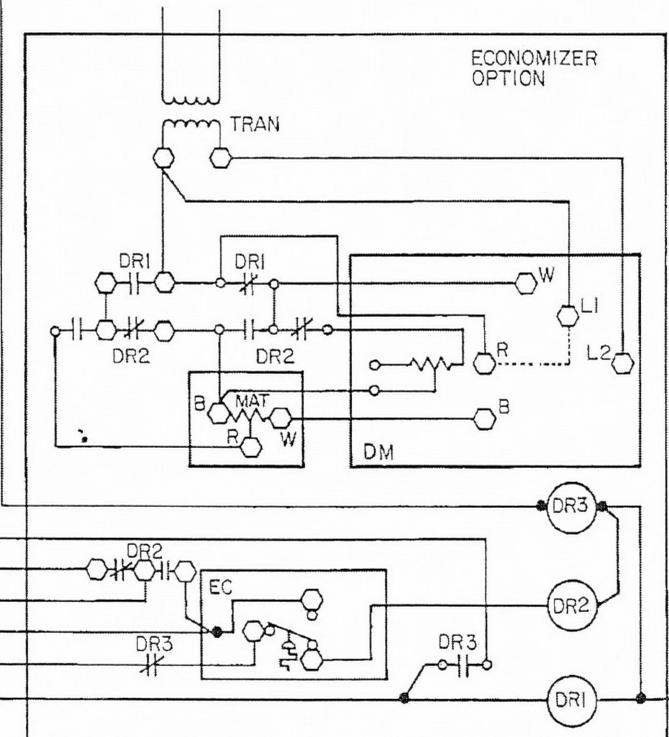
Typical wiring schematic



LEGEND

- AHA — Adjustable Heat Anticipator
- CR — Compressor Controller Relay
- CC — Cooling Compensator
- CLO — Compressor Lockout
- DM — Damper Motor
- DR — Damper Relay
- EC — Enthalpy Control
- FPT — Freeze Protection Thermostat
- HPS — High-Pressure Switch
- IFC — Indoor Fan Contactor
- IFR — Indoor Fan Relay
- IPⁱ — Internal Protector
- LPS — Low-Pressure Switch
- MAT. — Mixed Air Thermostat
- OAT. — Outdoor Air Thermostat
- OFC — Outdoor Fan Contactor
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- UR — Unloader Relay

- Terminal Block Connection
- Terminal (Unmarked)
- Terminal (Marked)
- Field Splice
- Splice (Marked)
- Wire Marker
- Factory Wiring
- Factory Splice
- Field Control Wiring
- To indicate common potential only; not to represent wire



Controls

Base unit operating sequence

Cooling — Power on and thermostat assembly set at COOL and desired temperature. Fan switch set at AUTO position.

Upon a rise in room temperature, cooling contact no. 1 in the thermostat closes, energizing the first-stage cooling contactor and the indoor fan contactor. The first-stage compressor (012,014,020) or unloaded compressor (016), outdoor fan motor and indoor fan motor start and run.

Upon a further rise in room temperature, cooling contact no. 2 in the thermostat closes, energizing the second-stage cooling contactor. The second-stage compressor (012,014,020) or loaded compressor (016) starts and runs.

If unit operation is interrupted by the low-pressure switch, high-pressure switch or compressor linebreak device (motor overload or overtemperature), and there is a call for cooling, the Cycle-LOC™ circuit prevents the compressor from restarting until manual reset is accomplished at the thermostat by turning the unit off and then on.

All units have condenser fan cycling thermostats which at 55 F shut off one outdoor fan motor. This permits unit to operate down to 35 F outdoor air temperature.

Heating — Power on and thermostat assembly set at HEAT and desired temperature. Fan switch set at AUTO position.

ALL UNITS — Upon a fall in room temperature, heating contact no. 1 in the thermostat closes, energizing the heating contactor to bring on first-stage heat. Fan contactor is energized, indoor fan starts and runs.

UNITS WITH TWO-STAGE HEAT — Upon a further fall in room temperature, heating contact no. 2 in the thermostat closes, energizing the second-stage heating contactor, and second-stage electric heat operates.

Air circulation — Unit power on. Control set at OFF, fan switch set at ON. Indoor fan contactor is energized through the switch on the thermostat, and the indoor fans run continuously. When controls are set at HEAT or COOL, operation is as above, except indoor fan runs continuously.

Economizer operating sequence (if supplied)

Cooling mode — Upon a call for cooling, when outdoor ambient is above the enthalpy control setting, the indoor and outdoor fans and compressor energize. The economizer damper moves to vent position.

Upon a first-stage call for cooling, when outdoor ambient is below the enthalpy control setting, the indoor fan starts and the economizer damper goes fully open. Compressor remains off.

Upon a second-stage call for cooling, compressor no. 1 (012,014,020) or unloaded compressor is energized and mechanical cooling is integrated with economizer cooling.

Economizer damper modulation occurs when the mixed air temperature goes below the mixed air thermostat setting.

A freeze protection thermostat (FPT) is located on the indoor coil. It detects frost buildup and turns off the compressor, allowing the coil to clear. Once frost has melted, the compressor can be reenergized.

Heating mode — Outdoor air damper stays at VENT position while evaporator air fan is operating.

Outdoor specifications

Base unit

Unit shall be a one-piece air-cooled electric cooling unit and shall be mounted on a full perimeter roof curb. Standard unit shall include a manual outdoor air inlet and shall include provisions for electric heat.

Total cooling capacity of unit shall be _____ Btuh or greater, and sensible capacity shall be _____ Btuh or greater at conditions of _____ cfm evaporator air entering unit at _____ F wet-bulb, _____ F dry-bulb and condenser entering air temperature of _____ F dry-bulb.

Heating capacity of unit shall be _____ kW.

Unit compressor(s) shall be serviceable semi-hermetic or welded fully hermetic with crankcase heater(s) and suitable vibration isolators. Compressors shall be of same manufacture as unit. The 50DP012,014,016 compressors shall have a 5-year warranty; the 50DP020 compressors shall have a one-year warranty with optional 4-year extension.

Coils — Indoor and outdoor coils shall be of nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.

Fans and motors — Indoor blowers shall be forward-curved, centrifugal, belt-driven type capable of delivering _____ cfm at _____ in wg external static pressure. Indoor blower motor shall be _____ hp with permanently lubricated bearings. Outdoor fans shall be of the propeller type, with

direct-driven permanently lubricated motor of _____ hp or less. Outdoor fans shall discharge upward.

Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked enamel finish. Cabinet interior shall be insulated with 1-in. thick neoprene-coated fiberglass. Cabinet panels shall be easily removable for service to all operating components. A condensate drain for the indoor coil shall be provided.

→ **Controls** — The cooling system shall be protected with high pressurestat, low pressurestats, loss-of-charge protection, indoor coil freezestats (except VAV units), and current and temperature sensitive overload devices.

Each of these devices shall be wired through the Cycle-LOC™ circuit to prevent compressor restart until reset at the thermostat (or unit circuit breaker).

Unit electrical connections — Unit with factory-installed electric heat shall have single-point power connection to a terminal block. Cabinet shall contain suitable openings for routing of all utility connections. The base unit shall contain a terminal strip in the control compartment to allow for terminal-to-terminal connection of room thermostat and field-installed accessories.

Maximum dimensions — Width _____ in., depth _____ in., height _____ inches.

Guide specifications (cont)

Accessories and options

The following factory-installed options (FIOP) or field-installed accessories (Accessory) shall be provided.

Roof curb shall be of the same manufacture as unit and shall include an insulated panel under compressor section to prevent condensation forming on the bottom. Dimensions shall be provided to allow for easy duct location and connection to roof curb prior to unit placement. Curb design shall comply with National Roofing Contractors Association requirements. (Accessory)

Economizer shall include return air and outside air dampers, outdoor air filter and hood, and fully modulating electric control system with enthalpy changeover control and adjustable mixed air thermostat. Economizer control shall be capable of introducing up to 100% outdoor air. The control changeover from mechanical cooling to economizer operation shall be fully automatic, through an adjustable enthalpy control device. Economizer shall be integrated type capable of simultaneous compressor and economizer operation for maximum benefit of outdoor air. (Accessory or FIOP)

Alternate motor and/or drive (50DP012,014,016) to provide added cfm and static pressure capability. (Option)

Electric resistance heaters shall be available in 3 selections (low, medium, high heat-to-cool ratio) and shall have open wire nichrome elements with all necessary safety and operating controls. Units with factory-installed heat shall have single power entry by terminal blocks suitable for copper or aluminum wires. (Accessory or FIOP)

Remote control panel — The panel shall provide central control of heating, cooling, indoor fan and outdoor air damper. Indicator lights for unit functions shall be provided. (Accessory)

Thermostat assembly shall provide staged heating and cooling, automatic changeover and fan control (Accessory)

Head pressure control — A solid-state outdoor air fan speed control to permit unit to operate down to -20 F shall be provided. (Accessory)

Relief damper — An automatic damper to relieve positive building pressure shall be provided. (Accessory)

Time Guard® circuit to prevent compressor short cycling as a result of a rapid change in thermostat setting. Also, automatically prevents compressor restart for at least 5 minutes after shutdown. (Accessory)

Power exhaust to be used only in conjunction with economizer, exhausts up to 75% of return air to 0.1 S.P. Eliminates overpressurization of the building. (Accessory)

Two-position damper allowing remote closure of 25% outside air opening when unit shuts down shall be provided (Accessory)

Variable volume (50DP016) to match unit capacity with changing load requirements. Used only with alternate drive pulley and economizer. Unit operation is programmed by a control panel located in the main control box. (FIOP)

Hydronic coil shall be furnished with suitable support rails, end plates, and hardware for ready field installation in heater compartment (Accessory)