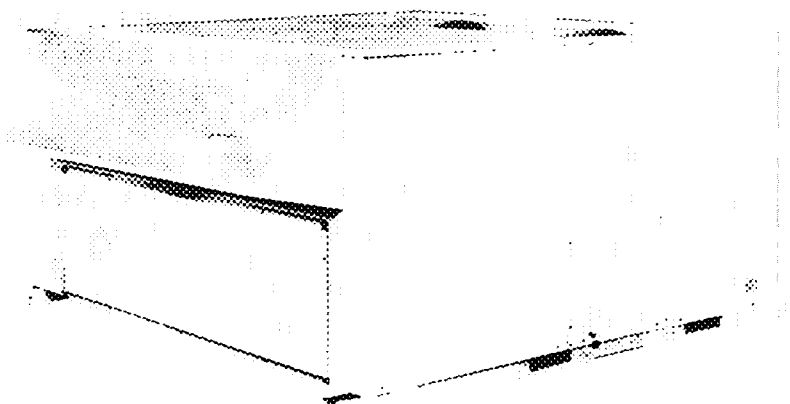




Product Data

50TJ024 Single-Package Rooftop Units Electric Cooling with Electric Heat Option

20 Nominal Tons



Single-Package Rooftop Units with

- single power entry to unit
- Cycle-LOC™ compressor anticycle protection

Features/Benefits

Convertible vertical discharge units with reliable, efficient performance.

Application adaptability

All units provide either horizontal or vertical air delivery and can be curb-, pier-, or slab-mounted. Although they are shipped in the vertical discharge configuration for fit-up to standard roof curb, the units can be easily converted to horizontal discharge with the use of the horizontal supply/return adapter curb assembly

Easy installation

The compact units are self-contained and can be easily transported, rigged, and installed. Terminal boards, located in the base unit control box, are self-contained and allow easy connection to room thermostat, outdoor thermostat(s), economizer, and electric heat. Self-supporting panels allow for quick removal and easy servicing.

Durable, dependable construction

Produced for durability in any climate, the weather resistant cabinets are designed with Carrier Weather Armor® coating. They are made of pre-painted, galvanized steel for a long life and attractive appearance.

Low cost, efficient operation

High energy efficiency and lower utility costs are ensured through part load operation. The 50TJ unit features two semi-hermetic compressors and 50%

and 100% capacity steps. To maximize energy efficiency, the 50TJ's cooling coils feature staggered copper tubes and mechanically bonded aluminum fins.

Quiet and efficient operation is provided by belt-driven evaporator air fans. The belt-driven evaporator fan motor allows available static pressure to meet job requirements. Condenser fans are direct-driven, factory-lubricated, and positioned for quiet, efficient vertical discharge. In addition, evaporator fans are capable of moving ample air quantities and achieving high external static pressures suitable for the most demanding application.

Year-round ventilation is enhanced by a manual air damper that can be preset to admit up to 25% outdoor air. Units equipped with an economizer have a mixed-air thermistor, fully modulating damper that admits up to 100% outdoor air and provides low-cost cooling. Enthalpy control uses outdoor air to provide cooling when conditions are acceptable.

Proven compressor reliability

Design techniques feature computer-programmed balance between compressor, condenser, and evaporator. Carrier specified semi-hermetic compressors are equipped with crankcase heaters, an internal thermal protector, and circuit breaker for overcurrent protection. The crankcase heater prevents refrigerant dilution of oil during off cycles, thus providing proper lubrication at start-up and prolonging compressor life. The compressor is also protected by a Cycle-Loc™ device. If any safety device trips, the Cycle-Loc compressor protection prevents short cycling by locking off the compressor.

Integrated economizers

During a first stage call for cooling, if outdoor enthalpy is below the control set point, the mixed air sensor modulates the outdoor air damper open to achieve set point. When second-stage cooling is called for, the compressor and economizer are energized. If enthalpy is above set point, the first stage of compression is activated and the economizer stays at vent position.

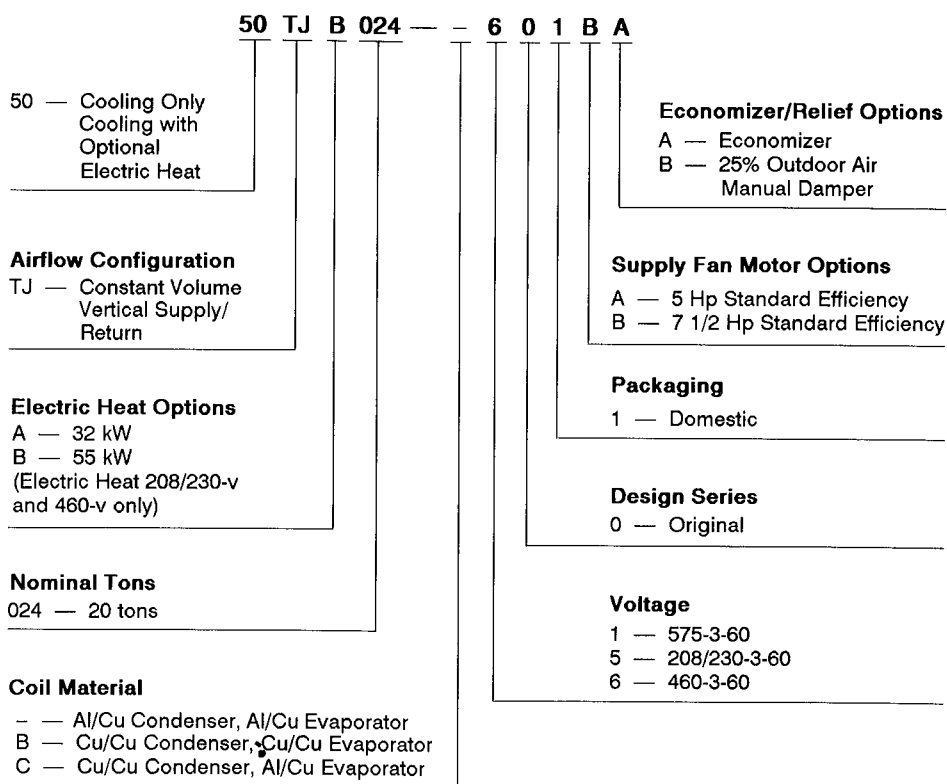
Electric heaters

Electric heat is optional on 208/230 and 460-v units. An integrated economizer is also available as a factory-installed option. All units are constant volume (CV).

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Model number nomenclature



Physical data

UNIT SIZE 50	TJ024	
OPERATING WT (lb)		
Unit	Al/Al*	2030
	Al/Cu*	2160
	Cu/Cu*	2270
Economizer		110
Roof Curb†		200
COMPRESSOR	Semi-Hermetic — 6 Cylinders	
Number	2	
Oil (oz)	160 ea	
REFRIGERANT	R-22	
Charge (lb) Sys 1**, Sys 2	16.25, 16.25	
REFRIGERANT METERING DEVICE	Capillary Tubes	
Upper Circuit		
No. ...Length (in.)...ID/OD	13. 25...0.055/0.125	
Lower Circuit		
No. ...Length (in.)...ID/OD	13. 25...0.055/0.125	
CONDENSER COIL	Copper Tubes, Aluminum or Copper Plate Fins	
Rows	4	
Fins/in.	13.6 Al or 12.4 Cu	
Total Face Area (sq ft)	22.2	
CONDENSER AIR FAN	Propeller Type, Direct Drive	
Nominal Cfm	11,400	
Number...Diameter (in.)	2...26	
Motor Hp (1075 Rpm)	1	
Watts Input (Total)	3000	
EVAPORATOR COIL	Copper Tubes, Aluminum or Copper Plate Fins	
Rows	4	
Fins/in.	14.4 Al or 13.1 Cu	
Total Face Area (sq ft)	17.9	
EVAPORATOR FAN	Centrifugal, Fixed Pitch Belt Drive (Either Motor Available)	
Quantity...Size (in.)	7½ hp 2...12x12	5 hp 2...12x12
Nominal Cfm	8000	8000
Maximum Allowable Rpm	1500	1500
Motor Pulley Pitch Diameter (in.)	6.10	5.10
Fan Pulley Pitch Diameter (in.)	8.40	8.40
Belt, Quantity...Type...Length (in.)	1 .BX.. 51	1...B .50
Factory Speed Setting (Rpm)	1287	1070
Motor Hp (Service Factor)	7½ (1.15)	5 (1.15)
Motor Frame Size	184T	184T
HIGH-PRESSURE SWITCH		
Cutout (psig)	426	
Reset (psig)	320	
LOW-PRESSURE SWITCH (Liquid Line)		
Cutout (psig)	7	
Reset (psig)	22	
AIR INLET SCREENS		
Economizer, Quantity...Size (in.)	2 .20 x 25 x 1 1 .20 x 20 x 1	
RETURN-AIR FILTERS (TYPE)	2-in Throwaway Fiberglass	
Quantity... Size (in.)	4.. 20 x 20 x 2 4. 16 x 20 x 2	

*Evaporator coil fin material/condenser coil fin material

†Weight of 14 in. roof curb

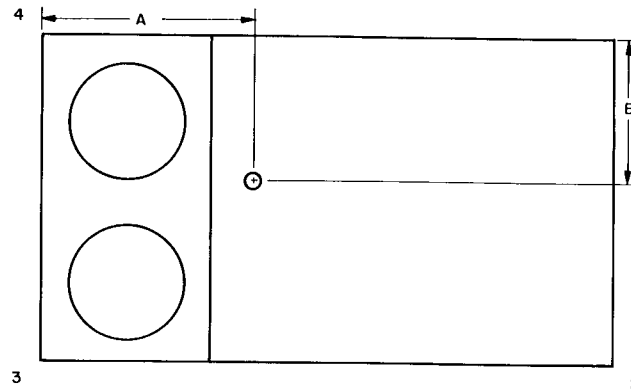
**System 1 consists of the upper portion of condenser coil and intertwined evaporator coil

NOTE: The 50TJ024 has one set (2) of fixed pulleys

Physical data (cont)

WEIGHT DISTRIBUTION AND CENTER OF GRAVITY

UNIT 50	WEIGHT (lbs) OF CORNER				DIMENSIONS (ft-in.)	
	1	2	3	4	A	B
TJ024	428	493	753	656	2-9	4-10



ARI capacity ratings

UNIT	TOTAL kW	COOLING CAP. NET (Btuh)	STANDARD CFM	EER	IPLV
50TJ024	25.2	217,000	6300	8.6	8.7

ARI — Air Conditioning and Refrigeration Institute

CFM — Cubic feet per minute

EER — Energy Efficiency Ratio

IPLV — Integrated part load value

NOTE: All units except 575-v units are ARI certified



Options and accessories

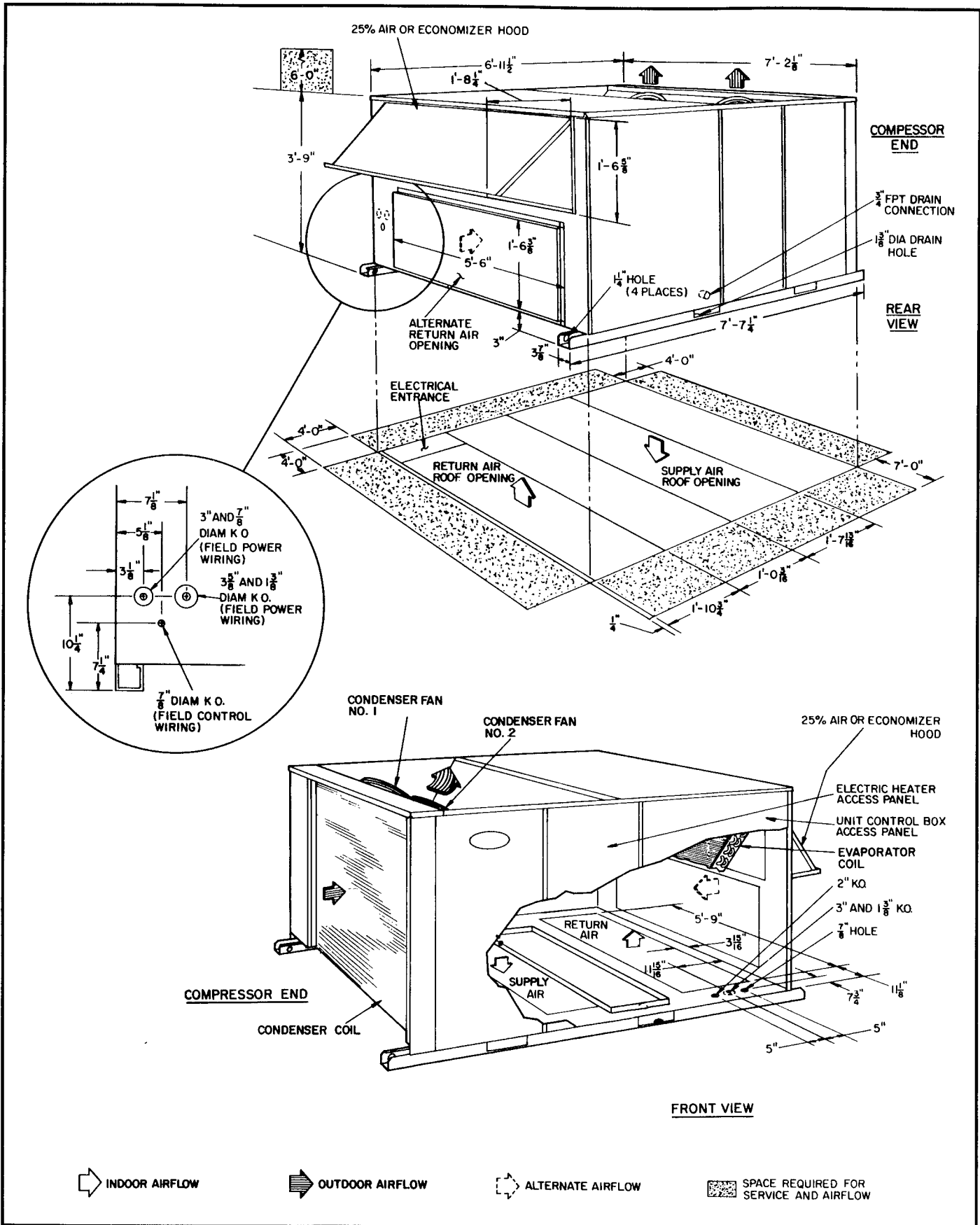
ITEM	OPTION*	ACCESSORY†
Integrated Economizer with Hood	X	X
Barometric Relief Damper		X
Two-Position Damper		X
Optional Motor and/or Drive	X	
Electric Heat**	X	X
Glycol Coil		X
Roof Curb		X
Remote Control Panel		X
Thermostat and Subbase		X
Power Exhaust		X
Motormaster® Head Pressure Control (-20 F Ambient)		X
Time Guard® II Control Circuit		X
Pressure Operated Unloader		X

*Factory installed

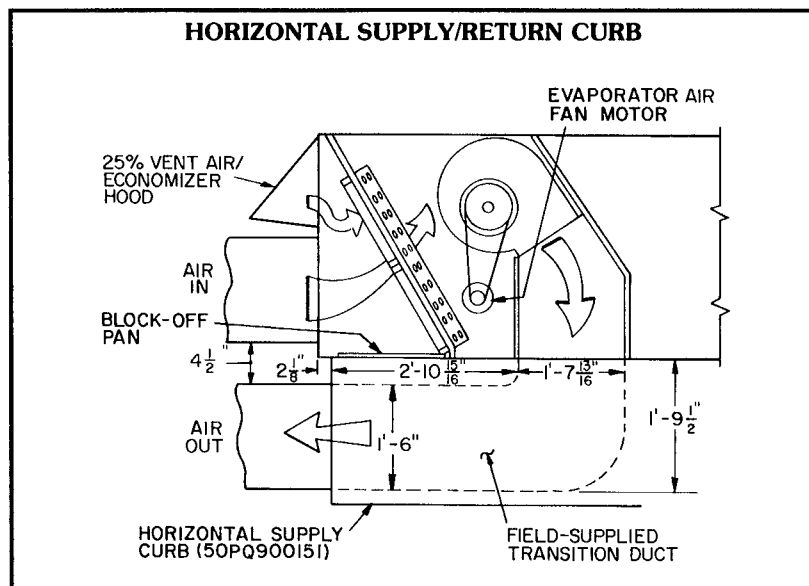
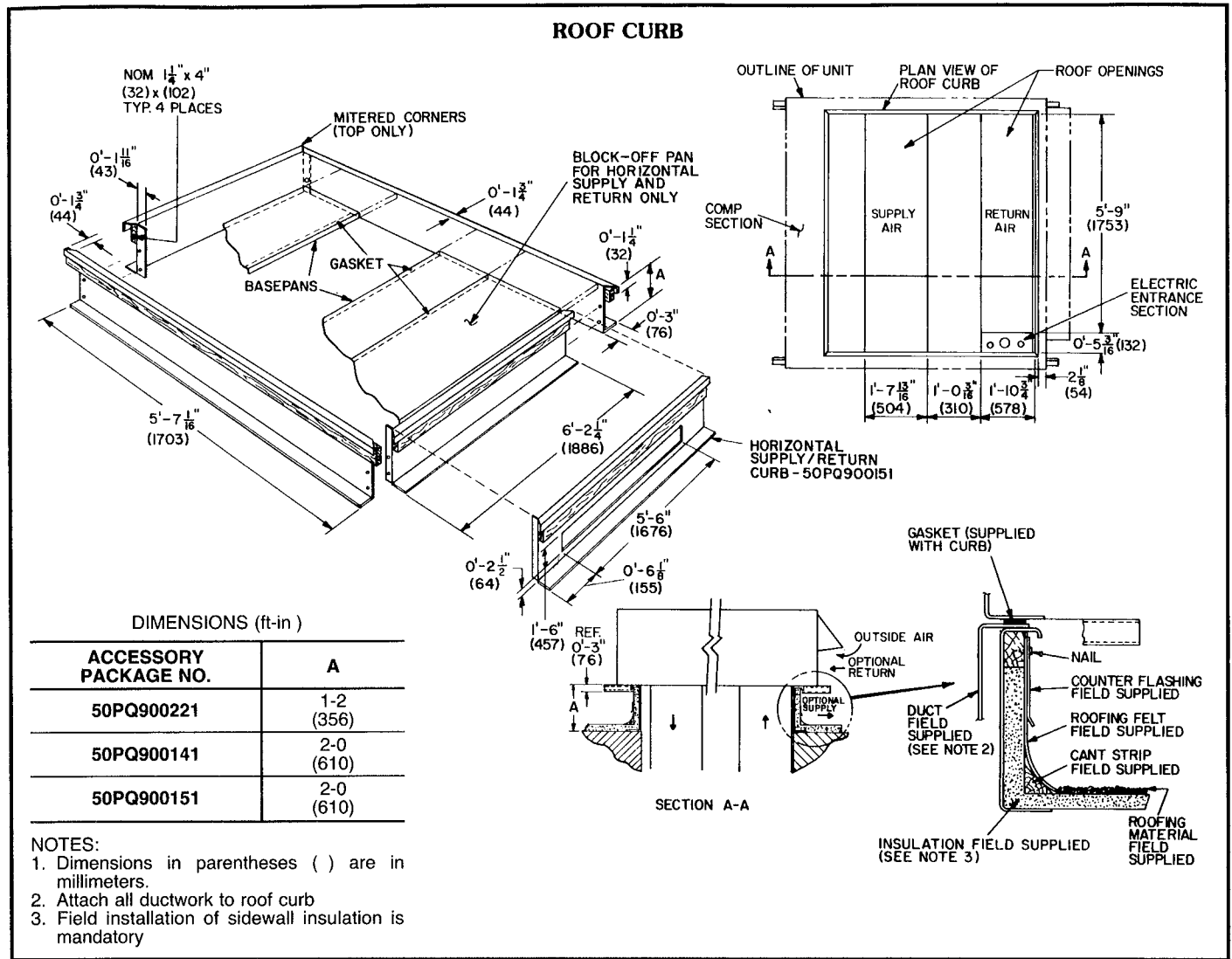
†Field installed

**Not offered on 575-v units.

Base unit dimensions



Accessory dimensions



Selection procedure

I Determine cooling and heating requirements at design conditions:

Given.

Cooling Capacity Required	210,000 Btuh
Sensible Heat Capacity	150,000 Btuh
Condenser Entering-Air Temperature	95 F Edb/78 F Ewb
Indoor-Air Temperature	80 F Edb/67 F Ewb
Evaporator Air Quantity	8000 cfm
External Static Pressure	1.40 in. wg
Heating Capacity	80,000 Btuh
Power Supply (V-Ph-Hz)	230-3-60

II Select unit based on required cooling capacity.

Enter cooling capacity table for 50TJ024 at condenser entering dry bulb temperature 95 F, evaporator air entering at 8000 cfm, 80 F edb and 67 F ewb. The 50TJ024 unit will provide a total cooling capacity of 234,000 Btuh, and a sensible heating capacity of 183,000 Btuh. For evaporator-air temperatures other than 80 F edb, calculate sensible heat capacity correction, as required, using the formula in the notes following the Cooling Capacities tables.

NOTE: Unit ratings are gross capacities and do not include the effect of indoor fan motor heat. To calculate net capacities, see Step VI.

III Select electric heat.

Heating load required is 80,000 Btuh.

$$\frac{80,000 \text{ Btuh}}{3414 \text{ Btu/W}} = 23,432 \text{ Watts of heat required}$$

$$= 23.4 \text{ kW}$$

Enter the Electric Resistance Heater Data table for the 50TJ024 at 230-3-60. The 31 kW electric heat most closely satisfies the heat required.

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

Enter Accessory/FIOP Pressure Drop table at selected unit size and heater kW

Use interpolation to find the static pressure loss for a 31 kW heater at 8000 cfm

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

Before entering the Fan Performance tables, calculate the total static pressure required based on unit components. From the given find

External static pressure	1.40 in. wg
31 kW Heater static pressure	0.13 in. wg
Total static pressure	1.53 in. wg

Enter Fan Performance table for unit 50TJ024. At 8000 cfm and 1.60 in. wg external static pressure, the fan speed is 1315 rpm and bhp is 6.56. The 7½ hp motor and drive are suitable, but if field conditions dictate, install a field-supplied drive or the 5 hp motor to obtain the necessary rpm.

VI Determine net cooling capacity.

Cooling capacities are gross capacities and do not include indoor-fan motor (IFM) heat. To determine input power to the motor, convert bhp to watts using the following information

$$\text{IFM Watts} = \frac{\text{Bhp} \times 746 \text{ Watts/Bhp}}{\text{Motor Efficiency}}$$

$$= \frac{6.56 \times 746}{0.82}$$

$$\text{IFM Watts} = 5968$$

Determine net cooling capacity using the following formula:

$$\begin{aligned} \text{Net capacity} &= \text{Gross capacity} - \text{IFM heat} \\ &= 234,000 \text{ Btuh} - 5968 \left(3414 \frac{\text{Btuh}}{\text{Watt}} \right) \\ &= 234,000 \text{ Btuh} - 20,375 \text{ Btuh} \\ &= 213,625 \text{ Btuh} \end{aligned}$$

$$\begin{aligned} \text{Net sensible capacity} &= 183,000 \text{ Btuh} - 20,375 \text{ Btuh} \\ &= 162,625 \text{ Btuh} \end{aligned}$$

As demonstrated above, the 50TJ024 with the 31 kW electric heater meets the cooling capacity, sensible heating capacity, and heating capacity requirements

NOTE: To obtain more sensible cooling, increase evaporator air quantity

Performance data

FAN PERFORMANCE

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
6000	809	1.61	831	1.73	898	2.01	963	2.37	1023	2.75	1084	3.10	1144	3.46	1200	3.82	1269	4.45	1325	4.66
6500	—	—	880	2.14	943	2.47	1004	2.86	1056	3.23	1115	3.69	1171	4.04	1232	4.50	1281	4.90	1364	5.48
7000	—	—	912	2.51	987	2.99	1043	3.48	1100	3.81	1151	3.97	1207	4.73	1250	5.22	1301	5.51	1397	5.82
7500	—	—	983	3.26	1034	3.71	1091	4.16	1137	4.53	1194	5.03	1242	5.57	1283	5.91	1318	6.12	1365	6.51
8000	—	—	1035	4.31	1084	4.43	1134	4.88	1188	5.39	1234	5.90	1275	6.28	1315	6.56	1364	6.97	1412	7.37
8500	—	—	—	—	1128	5.36	1185	5.70	1237	6.25	1275	6.78	1324	7.29	—	—	—	—	—	—
9000	—	—	—	—	1180	6.29	1234	6.67	1279	7.26	—	—	—	—	—	—	—	—	—	—

LEGEND

Indicates 7½ hp motor and drive

Boldface — Indicates 5 hp motor and drive.

Bhp — Brake horsepower input to fan

Rpm — Revolutions per minute

NOTES:

1. Fan performance data that is not shaded or in boldface requires a field-supplied drive
2. Static pressure losses (i.e., economizer, electric heater, glycol coil) must be added to external static pressure before entering Fan Performance table

3. To convert bhp to watts, use the following equation:

$$\text{Watts input} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

Motor efficiencies

5 hp — 0.85

7½ hp — 0.82

Service factors:

5 hp — 1.15

7½ hp — 1.15

4. All other rpm's require replacement drives
5. Add electric heater pressure loss to external static pressure required before using table
6. Fan performance is based on wet coils, clean filters, and casing losses

ELECTRIC RESISTANCE HEATER DATA

UNIT	HEATER kW			HEATER STAGES	% HEAT PER STAGE	MAXIMUM STAGES*
	Unit Voltages					
	208	230	460			
50TJ024	26	31	30	2	50/50	2
	42	52	51	2	33/67	3

*Maximum number of stages using accessory outdoor air thermostats

GLYCOL COIL CAPACITY

CFM	4000			5000			6000		
	Cap.	GPM	ΔP	Cap.	GPM	ΔP	Cap.	GPM	ΔP
Ent Fluid Temp (F)									
200	259	27	1.2	294	31	1.5	326	35	1.8
180	207	22	0.9	235	25	1.1	259	27	1.3
160	156	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. ΔP is fluid pressure in ft of head.
3. Cap. is 1000's of Btu/h

Performance data (cont)

COOLING CAPACITIES

TEMP (F) AIR ENT COND (Edb)		Evap Air — Cfm/BF											
		6000/0.04			7000/0.05			8000/0.05			9000/0.06		
		Evap Air — Ewb (F)											
		72	67	62	72	67	62	72	67	62	72	67	62
85	TC	256.0	238.0	217.0	259.0	243.0	224.0	262.0	247.0	230.0	265.0	250.0	236.0
	SHC	132.0	168.0	200.0	139.0	181.0	215.0	146.0	192.0	226.0	154.0	202.0	235.0
	kW	19.0	18.6	17.9	19.1	18.7	18.1	19.3	18.8	18.3	19.4	18.9	18.5
95	TC	247.0	226.0	201.0	252.0	231.0	210.0	255.0	236.0	218.0	258.0	239.0	226.0
	SHC	129.0	164.0	191.0	136.0	177.0	206.0	144.0	189.0	217.0	151.0	200.0	226.0
	kW	20.8	20.2	19.5	21.0	20.4	19.8	21.1	20.6	20.0	21.2	20.7	20.3
105	TC	236.0	211.0	188.0	240.0	217.0	196.0	243.0	222.0	204.0	245.0	226.0	213.0
	SHC	125.0	158.0	184.0	133.0	171.0	194.0	141.0	184.0	204.0	148.0	196.0	213.0
	kW	22.6	21.8	21.0	22.8	22.0	21.4	22.9	22.2	21.7	23.0	22.4	22.0
115	TC	221.0	193.0	168.0	226.0	198.0	180.0	229.0	204.0	190.0	232.0	210.0	199.0
	SHC	121.0	150.0	168.0	129.0	163.0	180.0	136.0	176.0	190.0	143.0	189.0	199.0
	kW	24.3	23.4	22.8	24.5	23.7	23.1	24.6	23.8	23.4	24.7	23.9	23.7

LEGEND

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

NOTES:

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

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

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

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

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) SHC

BYPASS FACTOR (BF)	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	82	83	84	85	over 85
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.

$$\text{Correction Factor} = 1.10 \times (1 - \text{BF}) \times (\text{edb} - 80)$$

ACCESSORY/FIOP STATIC PRESSURE DROP* (in. wg)

UNIT	UNIT VOLTAGE	CFM	ELECTRIC HEATERS (kW)		GLYCOL COIL	ECONOMIZER
50TJ024	208/230-3-60	6000	09 (26-31)	12 (42-52)	.35	.07
		7200	11 (26-31)	16 (42-52)	.44	.09
		9000	.15 (26-31)	19 (42-52)	.58	.11
	460-3-60	6000	09 (30)	.12 (51)	.35	.07
		7200	11 (30)	.15 (51)	.44	.09
		9000	15 (30)	.19 (51)	.58	.11

FIOP — Factory Installed Option

*The static pressure drops must be added to external static pressure. The sum and the evaporator air cfm should then be used in conjunction with the Fan Performance table to determine blower rpm and bhp.

Electrical data

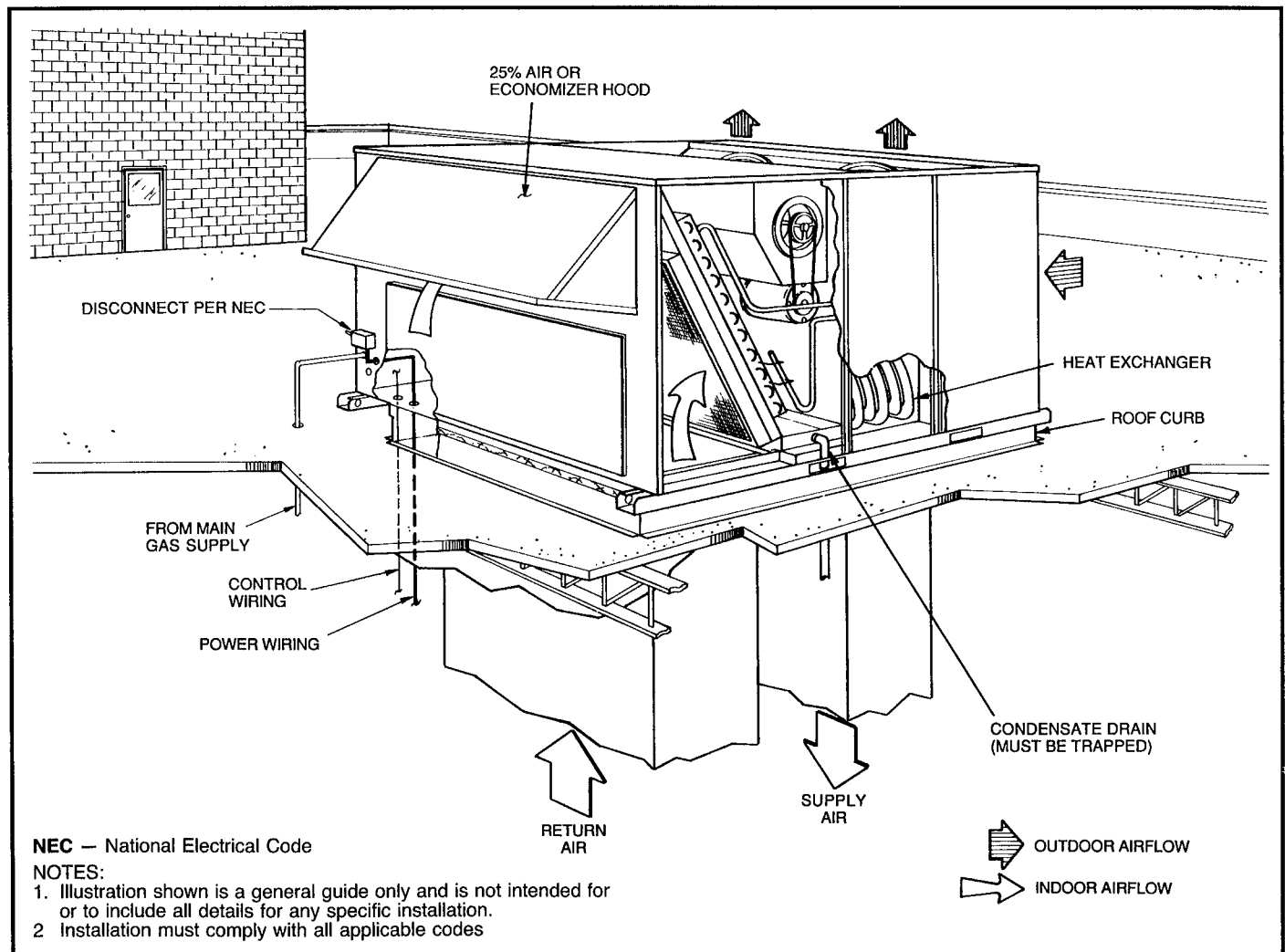
V-PH-HZ	VOLTAGE RANGE		COMPRESSOR		CONDENSER FAN MOTOR		EVAPORATOR FAN MOTOR		OPTIONAL ELECTRIC HEATERS		POWER SUPPLY	
	Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	kW	MCA	MOCP (Amps)
208/230-3-60	187	253	49.3 (ea)	170 (ea)	2	5.4 (ea)	7½	21.9	— 72/82 117/135	— 26/34 42/56	144/144 144/144 174/196	175/175 175/175 200/200
							5	16.2	— 72/82 117/135	— 26/34 42/56	138/138 138/138 167/189	175/175 175/175 175/200
460-3-60	414	508	19.9 (ea)	77 (ea)	2	2.7 (ea)	7½	10.0	— 39 66	— 32 55	66 66 95	80 80 100
							5	6.6	— 39 66	— 32 55	62 62 91	80 80 100
575-3-60	518	632	15.9 (ea)	62 (ea)	2	5.6 (ea)	7½	9.0	—	—	56	70
							5	6.1	—	—	53	60

LEGEND

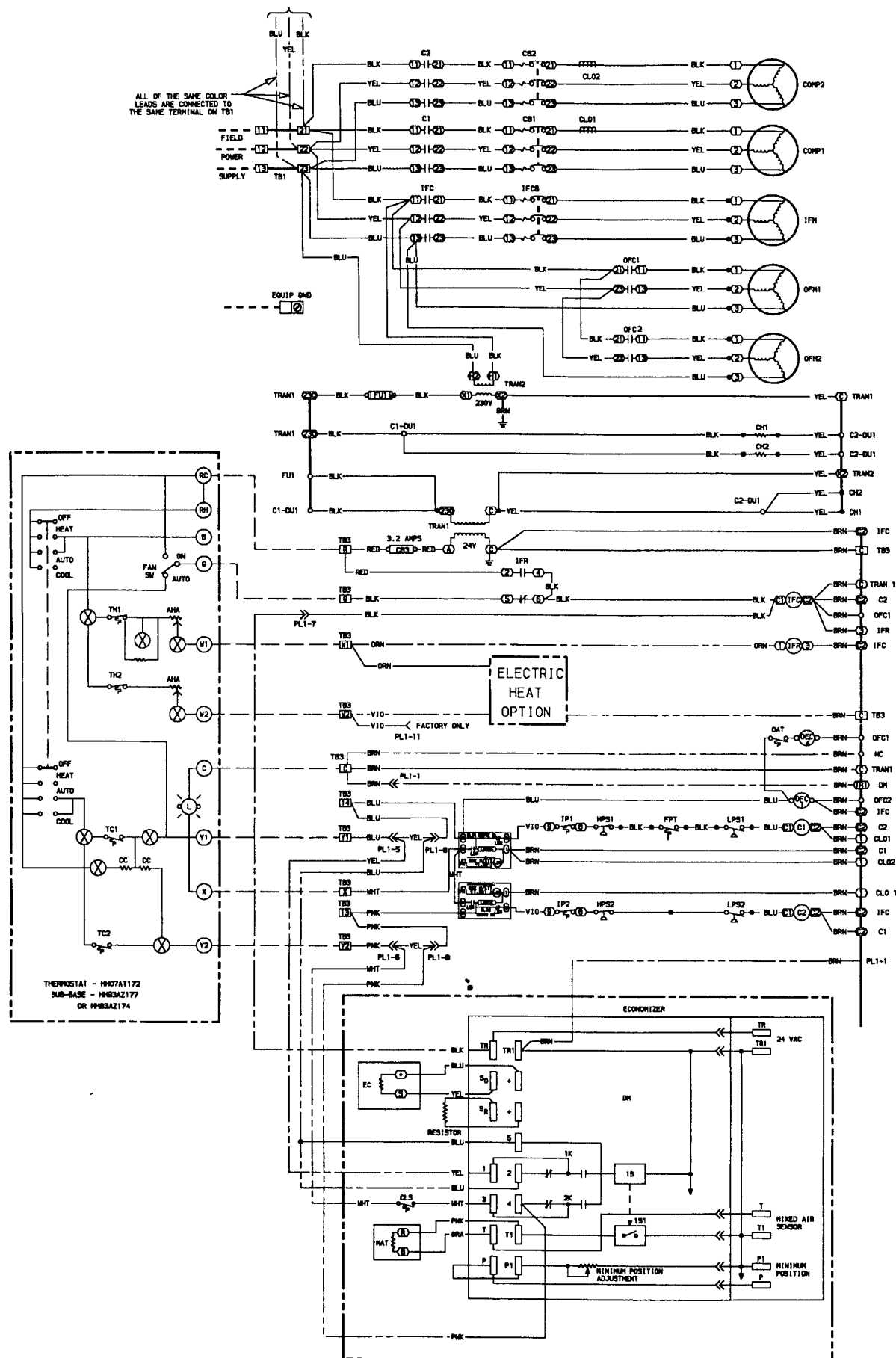
FLA — Full Load Amps
 Hp — Horsepower
 LRA — Locked Rotor Amps
 MCA — Minimum Circuit Amps
 MOCP — Maximum Overcurrent Protection
 RLA — Rated Load Amps



Typical piping and wiring



Typical control wiring schematic



LEGEND FOR TYPICAL CONTROL WIRING SCHEMATIC

AHA — Adjustable Heat Anticipator
BRK W/AT — Breaks With Amp Turns
C — Contactor, Compressor
CB — Circuit Breaker
CC — Cooling Compensator
CH — Crankcase Heater
CLO — Compressor Lockout
CLS — Compressor Lockout Switch
COMP — Compressor Motor
CT — Current Transformer
DM — Damper Motor
DU — Dummy Terminal
EC — Enthalpy Control
EQUIP — Equipment
FL — Fuse Link
FPT — Freeze Protection Thermostat
FU — Fuse
GND — Ground
HC — Heater Contactor
HPS — High Pressure Switch

HTR — Heater
IFC — Indoor-Fan Contactor
IFCB — Indoor-Fan Circuit Breaker
IFM — Indoor-Fan Motor
IFR — Indoor-Fan Relay
IP — Internal Protector
L — Light
LOR — Lockout Relay
LPS — Low Pressure Switch
LS — Limit Switch
MAT — Mixed Air Thermostat
NEUT — Neutral
OAT — Outdoor-Air Thermostat
OFC — Outdoor-Fan Contactor
OFM — Outdoor-Fan Motor
OP — Overcurrent Protector
PL — Plug Assembly
PRI — Primary
QT — Quadruple Terminal
SW — Switch

TB — Terminal Block
TC — Thermostat Cooling
TH — Thermostat Heating
TRAN — Transformer
 Terminal (Marked)
 Terminal (Unmarked)
 Terminal Block
 Splice
 Splice (Marked)
 Factory Wiring
 Field Control Wiring
 Field Power Wiring
 Accessory Wiring or Optional Wiring
 Accessory
 To indicate common potential only, not to represent wiring

Controls

Operating sequence

Cooling, units without an economizer — Turn unit power on and set thermostat assembly at COOL position and desired temperature. Set fan switch at AUTO position.

When room temperature rises, cooling contact no. 1 in the thermostat closes, energizing the first stage of cooling. This starts the first-stage compressor, evaporator fan motor, and condenser fan motor.

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 starts and runs.

If unit operation is interrupted by the low-pressure/loss-of-charge switch, freeze protection thermostat, high-pressure switch, compressor thermal protector or circuit breaker device, and there is a call for cooling, the Cycle-Loc™ circuit prevents the compressor from restarting until manual reset is accomplished at the thermostat. This occurs when the unit is turned to the OFF position and then back to the ON position.

All units have condenser fan cycling thermostats which at 55 F shut off one evaporator fan motor. This permits the unit to operate down to 40 F outdoor-air temperature.

Heating, units without an economizer

NOTE: If unit is equipped with heat, turn power on and set thermostat assembly at HEAT position and desired temperature. Set fan switch 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 the first stage of heat. The fan contactor is energized and the evaporator 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, units without an economizer — Turn unit power on. Set control at OFF position and fan switch at ON position. The evaporator fan contactor is energized through the switch on the thermostat, and the evaporator fan runs continuously. When controls are set at the HEAT or COOL position, the evaporator fan runs when there is a call for heating or cooling.

Cooling, units with an economizer — Upon a call for cooling, when outdoor ambient enthalpy is above the enthalpy control setting, the evaporator and condenser fans and compressor energize. The economizer damper moves to VENT position.

Upon a first-stage call for cooling, when outdoor ambient enthalpy is below the enthalpy control setting, the evaporator fan starts and economizer damper modulates to maintain mixed-air temperature. The compressor(s) remains off.

Upon a second-stage call for cooling, compressor no. 1 is energized and mechanical cooling is integrated with economizer cooling. If the air temperature is above 50 F, a cooling lockout switch prevents the compressor from running.

When supply-air temperature drops below a fixed set point, the economizer damper modulates to maintain the temperature at the fixed set point.

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

Heating, units with an economizer — The outdoor air damper stays at VENT position while the evaporator air fan is operating.

Application data

Outdoor installation — Units approved for outdoor installation only.

Condensate trap — Evaporator is draw-thru configuration. A trap (minimum 4 in. deep) must be field supplied prior to start-up on cooling cycle.

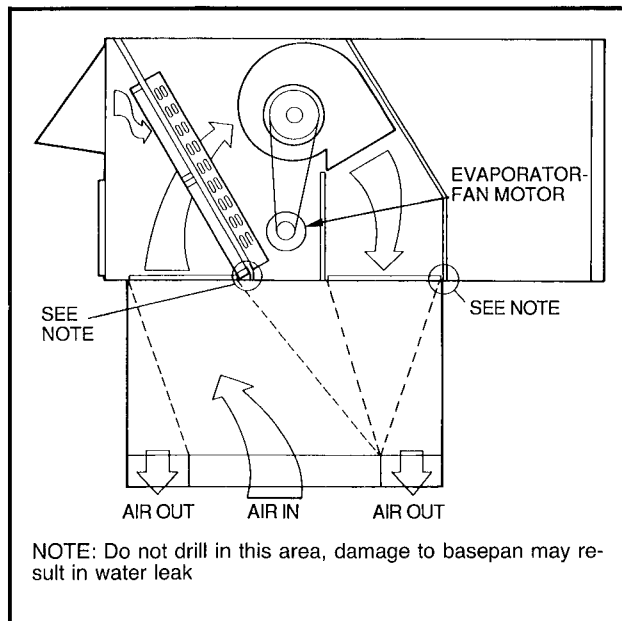
Roof curb — All curb installations must be in accordance with National Roofing Contractors Association (NRCA) recommendations.

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 is to be attached to unit, do not drill in condensate drain pan area — leaks may result. Field-fabricated concentric ductwork may be connected as shown.

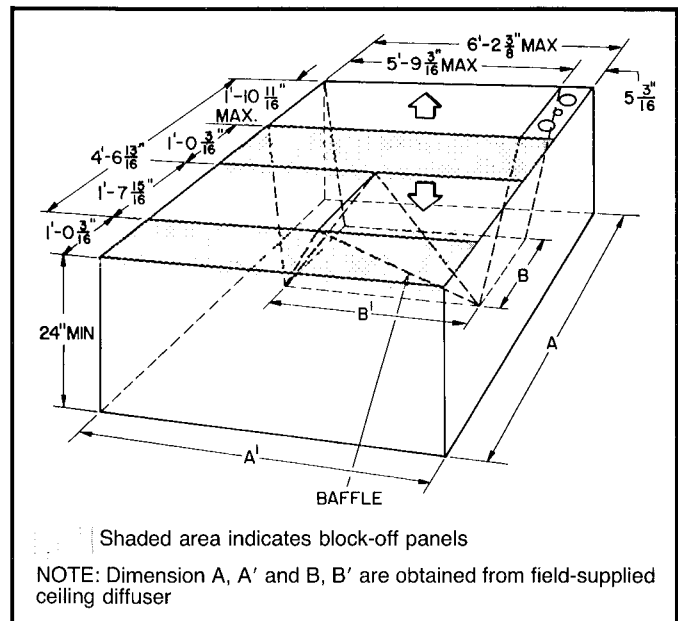
Field power connections — Factory-installed and field-installed electric heat allows single power entry to unit for both heating and cooling. Values shown for Minimum Circuit Amps and Maximum Overcurrent Protection Amps in Electrical Data apply to factory- or field-installed heaters.

Low ambient cooling operation — Units are designed to operate at outdoor temperatures down to 40 F. At temperatures below 40 F, the accessory Motormaster® head pressure control permits operation at outdoor temperatures as low as -20 F

CONCENTRIC DUCT AIR DISTRIBUTION



CONCENTRIC DUCT DETAILS



Guide specifications — 50TJ constant volume units

Packaged Rooftop Cooling Unit with Optional Electric Heat Constant Volume Application — Cooling Only

HVAC Guide Specifications

Size Range: **20 tons, Nominal Cooling**

Carrier Model Number: **50TJ**

Part 1 — General

1.01 SYSTEM DESCRIPTION

- A. Unit is an outdoor, rooftop-mounted, cooling unit utilizing two reciprocating, semi-hermetic compressors for cooling duty. Supply air is discharged vertically or horizontally (with horizontal supply/return adapter curb assembly).

1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standard 360. Designed in accordance with UL Standard 465.
- B. Unit shall be ETL and CSA listed (208/230-v and 460-v).
- C. Roof curb shall be designed to conform to NRCA Standards.
- D. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation

1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

A. General:

The 50TJ024 shall be a factory-assembled, single piece cooling unit. Contained within the unit enclosure shall be all factory-installed wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.

B. Unit Cabinet:

- 1. Unit cabinet shall be constructed of galvanized steel, precoated with a baked enamel finish
- 2. Indoor blower compartment interior surfaces shall be insulated with a minimum 1/2-in. thick, flexible fiberglass insulation coated on the air side.
- 3. Cabinet panels shall be easily removable for servicing.
- 4. Filters shall be accessible through an access panel.
- 5. The manual damper shall permit up to 25% outside air for year-round ventilation.
- 6. Holes shall be provided in the base rails for rigging shackles to facilitate overhead rigging

C. Fans:

1. Indoor Blower (Evaporator Fan):

- a. The fan shall be belt driven with fixed motor pulleys.
- b. The fan wheel shall be made from steel, be of the double inlet type with forward curved blades, and have a corrosion resistant finish. It shall also be dynamically balanced.
- c. Fan motor bearings shall be of the pillow back, ball-bearing type.

- 2. The condenser fan shall be of the direct driven, propeller type, with aluminum blades riveted to corrosion-resistant steel spiders. It shall be dynamically balanced and discharge air vertically.

D. Compressor:

- 1. The reciprocating semi-hermetic compressors shall have factory-installed external vibration isolation.
- 2. The factory-installed crankcase heater shall prevent refrigerant dilution of oil.

E. Coils:

- 1. Evaporator and condenser coils shall have aluminum or copper plate fins mechanically bonded to seamless copper tubes with all joints brazed.
- 2. Tube sheet openings shall be belled to prevent tube wear.
- 3. The evaporator coil shall have intertwined circuiting to provide two independent refrigeration systems

F. Refrigerant Components.

Shall include filter driers, service valves, expansion devices (capillary tubes).

G. Filter Section:

- 1. Standard filter section shall consist of two sizes of factory-installed low-velocity, 2-in. thick throwaway fiberglass filters of commercially available sizes.
- 2. Filter face velocity shall not exceed 400 fpm at nominal airflows.

H. Controls and Safeties:

1. Unit Controls:

Controls shall perform the following functions:

- a. Capacity control
- b. Economizer operation

2. Safeties:

- a. Should any of the following safety devices trip and shut off the compressor, the unit shall incorporate a solid-state compressor protector which will provide reset capability at the space thermostat:
 - 1) Compressor overtemperature, overcurrent.
 - 2) Low-pressure/loss-of-charge switch.
 - 3) High-pressure switch.
- b. Supply-air thermostat shall be located within the unit.

I. Operating Characteristics:

- 1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of ARI Standard 360.
- 2. Unit shall have standard controls and will operate in cooling to 40 F.

Guide specifications (cont)

J. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

K. Motors:

- 1 The compressor motor shall be of the refrigerant cooled type with internal thermal overload protection and shall use a calibrated circuit breaker for electrical protection.
2. All fan motors shall have permanently lubricated bearings and inherent automatic reset thermal overload protection and shall be totally enclosed.
- 3 Evaporator fan motor and compressor shall be protected against single phasing and overcurrent by manual reset calibrated circuit breakers.

L. Integrated Economizer:

- 1 The economizer shall be of the integrated type; capable of simultaneous economizer and compressor operation to provide cooling with outside air.
- 2 It shall be equipped with low-leakage dampers that shall not exceed 3% leakage, at 1.0 in. wg pressure differential.
3. The economizer shall be capable of introducing up to 100% outside air

M. Special Features:

Certain standard features are not applicable when the features designated * are specified. For assistance in amending the specifications, your local Carrier Sales office should be contacted.

1. Roof Curb:

- a The roof curb shall be formed of 16-gage steel with wood nailer strip and capable of supporting unit's entire weight.

* 2 Head Pressure Control Package:

Package shall consist of solid-state control sensors and a fan motor to regulate condenser fan speed to control head pressure at ambients down to -20 F

* 3. Power Exhaust Package.

Package shall include an exhaust fan, motor, and damper for vertical flow units with economizer to assure proper building pressurization.

* 4. Barometric Relief Damper Package:

- a. Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure.
- b. Damper shall close due to gravity upon unit shut down.

* 5 Thermostat and Subbase Assembly:

To provide staged heating and cooling in addition to automatic (or manual) changeover and fan control.

6. Two-Position Damper:

The two-position damper package shall include a single-blade damper and motor. It admits up to 25% outdoor air, and shall close upon unit shutoff.

7 Accessory Compressor Cycle Delay:

The compressor cycle delay prevents rapid cycling of the compressor by preventing it from restarting for a minimum of 5 minutes after shutdown.

8 Electric Heater Package:

Fully assembled for installation. The 50TJ024 208/230-v and 460-v are designed in accordance with UL standards and all units feature a single point connection.

