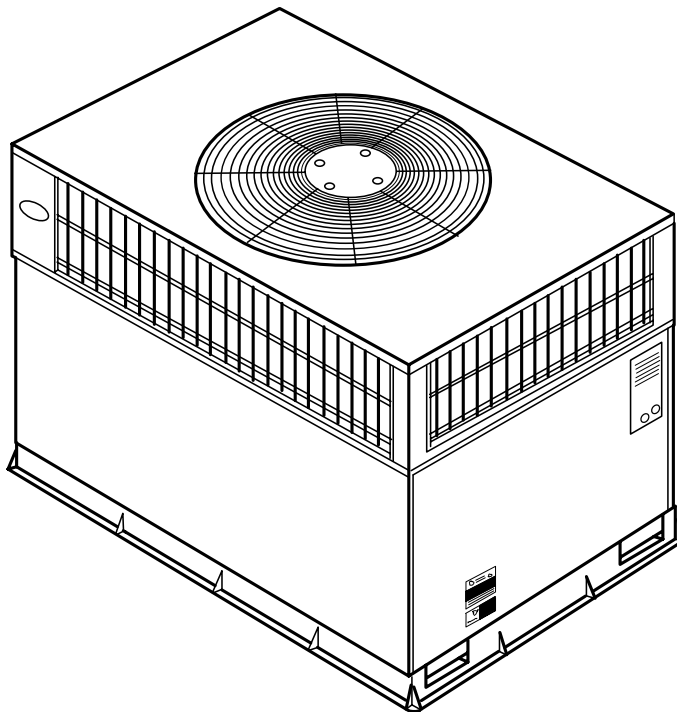




Product Data

50GS Single-Packaged Electric Cooling Units

1-1/2 to 5 Nominal Tons



UNIT 50GS

Single packaged Cooling Unit for Residential and Light Commercial use.

Features/Benefits

One-piece cooling unit with optional electric heater, low installation cost, dependable performance and easy maintenance.

Easy Installation

Factory-assembled package is a compact, fully self-contained, electric cooling unit that is pre-wired, pre-piped, and pre-charged for minimum installation expense. 50GS units are available in a variety of standard cooling sizes with voltage options to meet residential and light commercial requirements. Units install easily on a rooftop or a ground-level pad. The high-tech composite unit base eliminates rust problems associated with ground level applications.

Efficient operation

High-efficiency design with SEERs (Seasonal Energy Efficiency Ratios) of 10.0.

Durable, dependable components

Compressors are designed for high efficiency. Each compressor is hermetically sealed against contamination to help promote longer life and dependable operation. Vibration isolation provides quiet operation. All compressors have internal high-pressure and overcurrent protection.

Convertible duct configuration

Unit is designed for easy use in either downflow or horizontal applications. Each unit is easily converted from horizontal to downflow with included duct covers.

Durable, dependable components

Direct-drive multi-speed, PSC (permanent split capacitor) blower motor is standard on all 50GS models.

Direct-drive, PSC condenser-fan motors are designed to help reduce energy consumption and provide for cooling operation down to 40°F outdoor temperature. Motormaster® II low ambient kit is available as a field-installed accessory.

Corporate thermostats include the Time Guard® II anti-short cycle protection circuitry. If a non-Carrier thermostat is used the Time Guard II field installed anti-short cycle kit is recommended.

Refrigerant system is designed to provide dependability. Liquid refrigerant strainers are used to promote clean, unrestricted operation. Each unit leaves the factory with a full refrigerant charge. Refrigerant service connections are provided for checking operating pressures.

Evaporator and condenser coils are computer-designed for optimum heat

transfer and cooling efficiency. The evaporator coil is fabricated from copper tube and aluminum fins and is located inside the unit for protection against damage. The condenser coil is internally mounted on the top tier of the unit. A FIOP (Factory-Installed Option) metal louvered grille is available on all models. Copper fin coils and pre-coated fin coils are available from the factory by special order. These coils are recommended in applications where aluminum fins are likely to be damaged due to corrosion. They are ideal for seacoast applications.

Low sound ratings ensure a quiet indoor and outdoor environment with sound ratings as low as 75 dB.

Easy to service cabinets provide easy single-panel accessibility to serviceable components during maintenance and installation. The unit base with integrated drain provides easy ground level installation with or without a mounting pad. Convenient riggingholds are provided to manipulate the unit on the jobsite. A nesting feature ensures a

positive unit base to roof curb seal when the unit is roof mounted. A convenient 3/4-in. wide perimeter flange makes frame mounting on a rooftop easy.

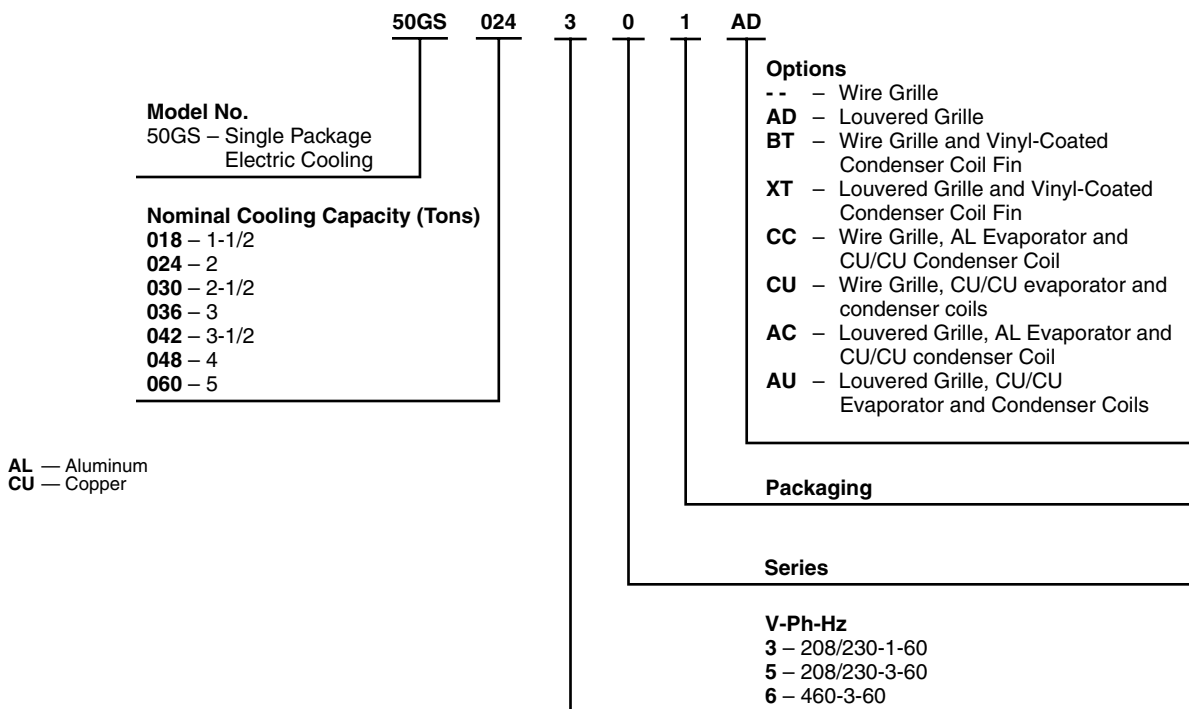
Downflow operation is easily provided in the field to allow vertical ductwork connections. The unit base utilizes knockout style seals on the bottom openings to ensure a positive seal in the horizontal airflow mode.

Cabinets are constructed of heavy-duty, phosphated, zinc-coated prepainted steel capable of withstanding 500 hours of salt spray. Interior surfaces of the evaporator and electric heat compartments are insulated with cleanable semi-rigid insulation board, which keeps the conditioned air from being affected by the outdoor ambient temperature and provides improved indoor air quality. (Conforms to American Society of Heating, Refrigeration and Air Conditioning Engineers No. 62P.) The sloped drain minimizes standing water in the drain, which is provided with an external drain.

Table of contents

	Page
Features/Benefits	1,2
Model Number Nomenclature	3
ARI Capacities	3
Physical Data	4
Options and Accessories	5,6
Base Unit Dimensions	7,8
Accessory Dimensions	9
Selection Procedure	10
Performance Data	11-15
Typical Piping and Wiring	16
Application Data	17
Electrical Data	18,19
Typical Wiring Schematics	20-22
Controls	23
Guide Specifications	24,25

Model number nomenclature



ARI* capacities

COOLING CAPACITIES AND EFFICIENCIES

UNIT 50GS	NOMINAL TONS	STANDARD CFM	NET COOLING CAPACITIES (Btuh)	SEER†	SOUND RATINGS‡ (dB)
018	1-1/2	600	18,000	10.0	75
024	2	800	24,600	10.0	75
030	2-1/2	1000	28,800	10.0	75
036	3	1200	34,400	10.0	80
042	3-1/2	1400	42,000	10.0	80
048	4	1600	46,500	10.0	80
060	5	2000	60,000	10.0	80

LEGEND

dB — Sound Levels (decibels)
db — Dry Bulb
SEER — Seasonal Energy Efficiency Ratio
wb — Wet Bulb

* Air Conditioning & Refrigeration Institute.

† Rated in accordance with U.S. Government DOE Department of Energy) test procedures and/or ARI Standard 210/240-94.

‡ Tested in accordance with ARI Standard 270-95 (not listed in ARI).

NOTES:

- Ratings are net values, reflecting the effects of circulating fan heat. Ratings are based on:
Cooling Standard: 80°F db, 67°F wb indoor entering-air temperature and 95°F db outdoor entering-air temperature.
- Before purchasing this appliance, read important energy cost and efficiency information available from your retailer.

Options and accessories

Factory-installed options

Louvered grille provides hail and vandalism protection. A wire grille is standard on all models. See model number nomenclature for louvered grille options.

Coil options include copper/copper and vinyl-coated construction for refrigerant coils. Units are shipped standard with copper tube/aluminum fin construction. See model number nomenclature for coil options.

Field-installed accessories

Economizer with Solid-State Controls and Barometric Relief Dampers
Manual Air Damper (25% open)
Filter Rack
Electric Heaters
Flat Roof Curbs (8-in. and 14-in.)
Square-to-Round Duct Transition Kit
Thermostats
Controls Upgrade Kit
Crankcase Heater
Compressor Hard Start Kit (for use on single-phase units only)
Rigging Kit
Low Ambient Kit (Motormaster® II Control)
Solid-State Time Guard® II Device

Economizer with solid-state controls and barometric relief dampers includes filter racks and provide outdoor air during cooling and reduce compressor operation.

Manual outside air damper includes hood and filter rack with adjustable damper blade for up to 25% outdoor air.

Electric heaters provide heat in the unit when required. Heater sizes range from 5.0 to 20.0 kW. The electric heater design allows the use of a single-point

power supply for the entire unit, resulting in lower installed costs.

Flat roof curbs in both 8 in. and 14 in. sizes are available for roof mounted applications.

Square-to-round duct transition kit enables 018-048 size units to be fitted to 14 in. round ductwork.

Compressor hard start kit assists compressor start-up by providing additional starting torque on single phase units and prolongs compressor motor life.

Thermostats provide control for the system heating and cooling functions. Thermostat models are available in both programmable and non-programmable versions.

Controls upgrade kit supplies high and low pressure safety protection and protects the unit from operating in unsuitable conditions.

Crankcase heater provides anti-floodback protection for low-load cooling applications.

Rigging kit includes lifting brackets which are inserted into the unit base rigging holds to lift the unit for rooftop applications.

Low-ambient kit (Motormaster II control) allows the use of mechanical cooling down to outdoor temperatures as low as 0°F.

Solid-state Time Guard II device provides short-cycling protection for the compressor. Not required with corporate electronic thermostats.

Filter rack features easy installation, serviceability, and high-filtering performance for vertical or horizontal applications.

ELECTRIC HEATERS

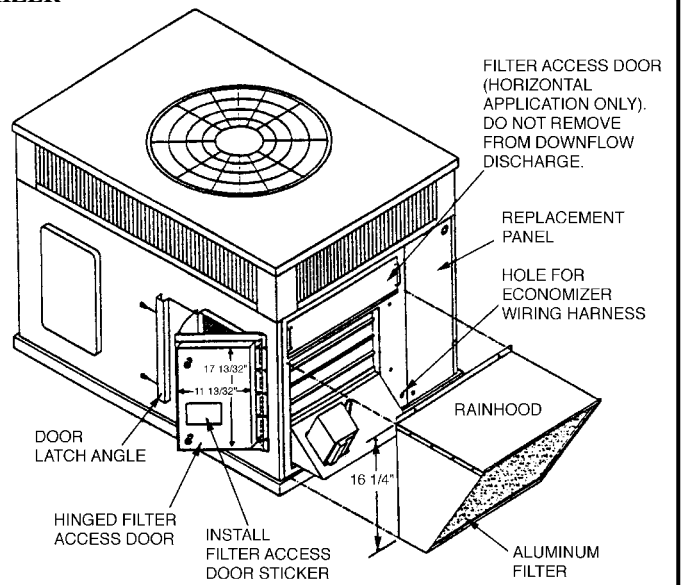
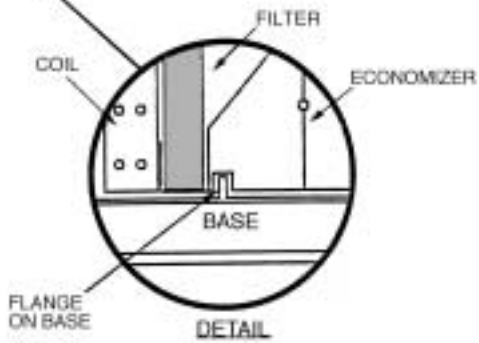
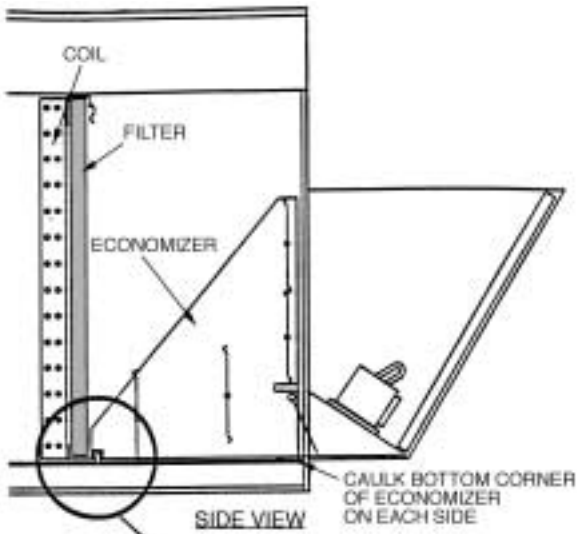
ODS CATALOG ORDERING NO.	NOMINAL CAPACITY (kW)	USED WITH SIZES						
		018	024	030	036	042	048	060
ELECTRIC HEATERS (208/230 — SINGLE PHASE — 60 Hz)								
CPHEATER052A00	5.0	X	X	X	X	X	X	X
CPHEATER069A00	7.5	X	X	X	X	X	X	X
CPHEATER065A00	10.0	X	X	X	X	X	X	X
CPHEATER051A00	15.0			X	X	X	X	X
CPHEATER053A00	20.0					X	X	X
ELECTRIC HEATERS (208/230 — 3 PHASE — 60 Hz)								
CPHEATER055A00	5.0			X	X	X	X	X
CPHEATER056A00	10.0			X	X	X	X	X
CPHEATER057A00	15.0			X	X	X	X	X
CPHEATER059A01	20.0					X	X	X
ELECTRIC HEATERS (460 — 3 PHASE — 60 Hz)								
CPHEATER060A00	5.0				X	X	X	X
CPHEATER061A00	10.0				X	X	X	X
CPHEATER062A00	15.0				X	X	X	X
CPHEATER063A00	20.0					X	X	X

LEGEND

ODS — Order Distribution System

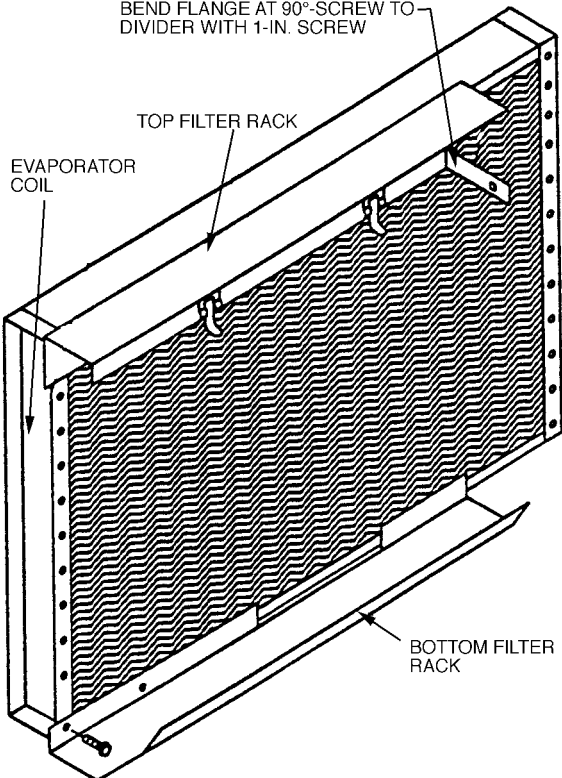
NOTE: Electric heaters are rated at 240 v and 480 v. Refer to Multiplication Factors table for other voltages.

ECONOMIZER

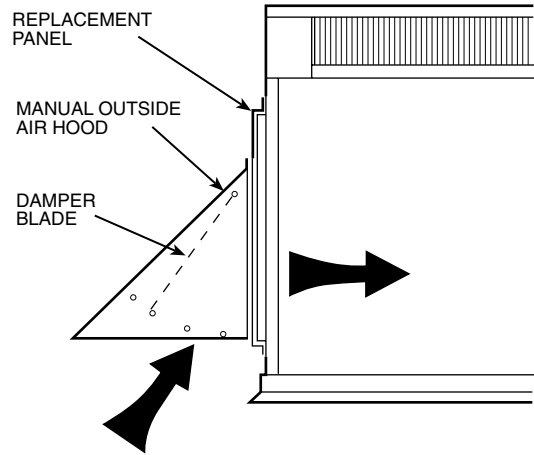


FILTER RACK

BEND FLANGE AT 90°-SCREW TO DIVIDER WITH 1-IN. SCREW

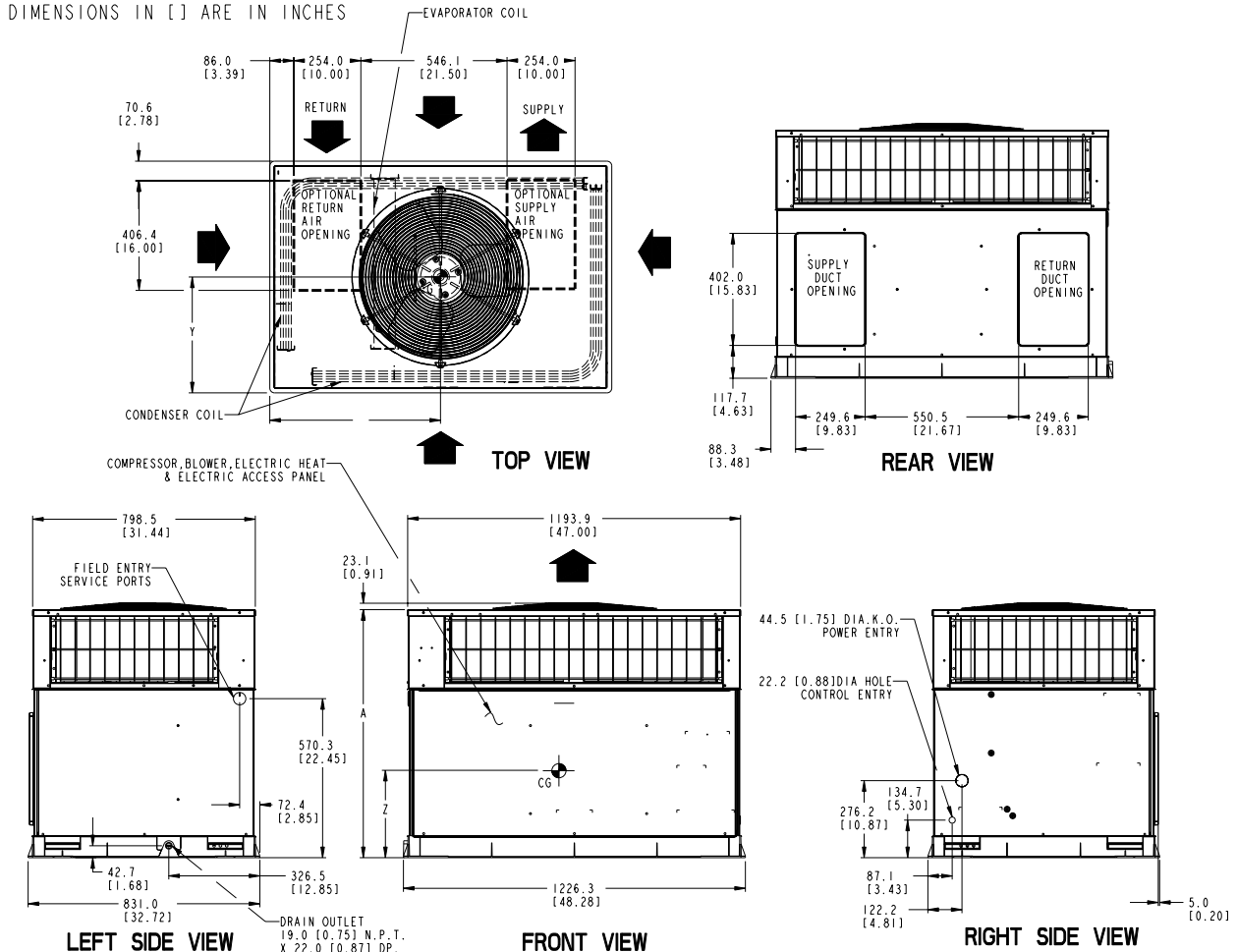


MANUAL OUTSIDE AIR DAMPER



Base unit dimensions—50GS018-042

DIMENSIONS IN [] ARE IN INCHES



REQUIRED CLEARANCE TO COMBUSTIBLE MATL.

	MILLIMETERS [IN.]
TOP OF UNIT	355.6 [14.00]
DUCT SIDE OF UNIT	50.8 [2.00]
SIDE OPPOSITE DUCTS	355.6 [14.00]
BOTTOM OF UNIT	12.7 [0.50]
ELECTRIC HEAT PANEL	914.4 [36.00]

NEC. REQUIRED CLEARANCES.

	MILLIMETERS [IN.]
BETWEEN UNITS, POWER ENTRY SIDE	1066.8 [42.00]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	914.0 [36.00]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	1066.8 [42.00]

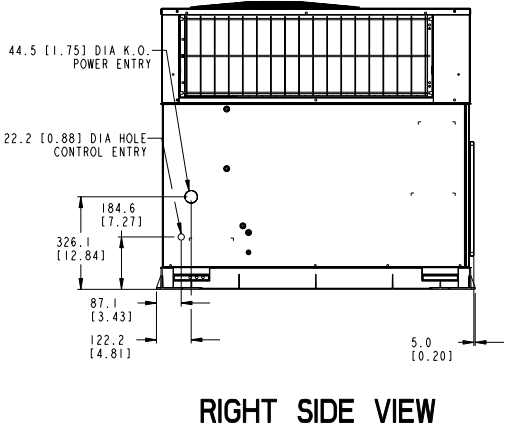
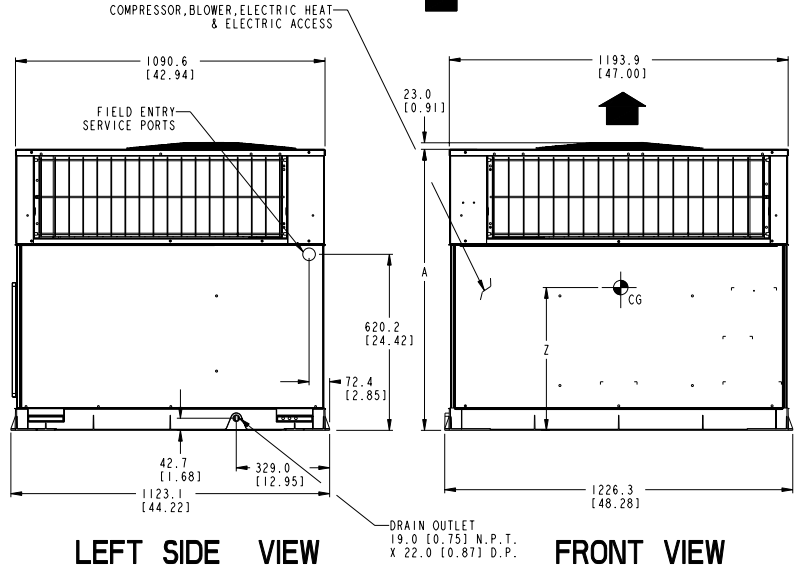
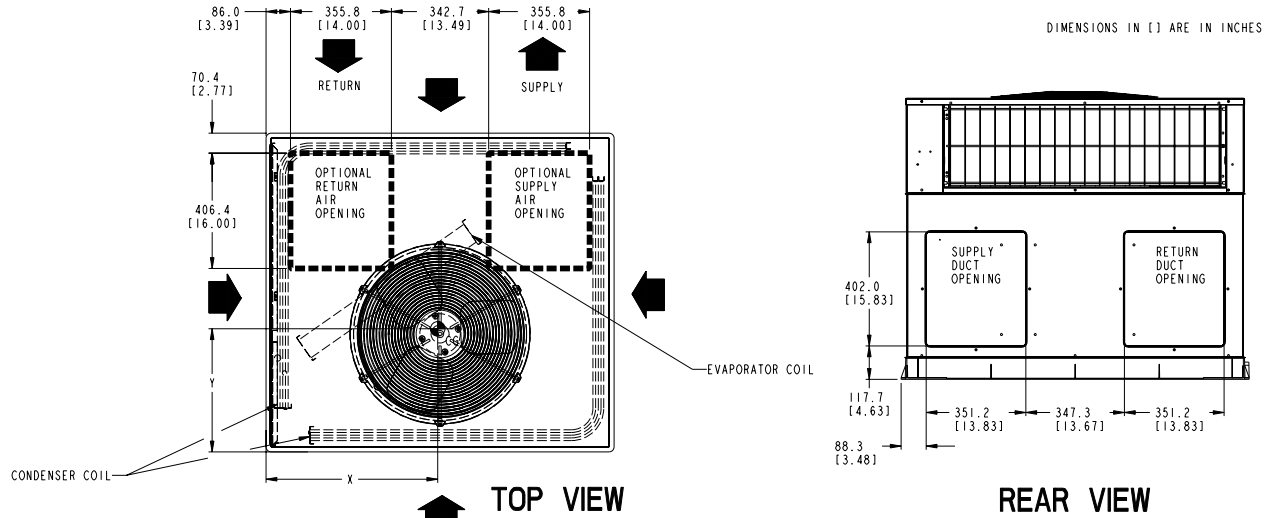
REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	MILLIMETERS [IN.]
EVAP. COIL ACCESS SIDE	914.0 [36.00]
POWER ENTRY SIDE	1066.8 [42.00]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	1219.2 [48.00]
SIDE OPPOSITE DUCTS	914.0 [36.00]
DUCT PANEL	304.8 [12.00]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISE.

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT in. [mm] "A"	CENTER OF GRAVITY in. [mm]		
		lb	kg		X	Y	Z
50GS018	208/230-1-60	254	115.2	35.02 [889.5]	20.0 [508.0]	13.0 [330.2]	15.0 [381.0]
50GS024	208/230-1-60	260	117.9	35.02 [889.5]	19 [482.6]	13.0 [330.2]	15.0 [381.0]
50GS030	208/230-1-60, 208/230-3-60	258	117.0	35.02 [889.5]	19 [482.6]	14 [355.6]	15.0 [381.0]
50GS036	208/230-1-60, 208/230-3-60, 460-3-60	268	121.6	37.02[940.3]	20.0 [50.80]	14 [355.6]	13.0 [330.2]
50GS042	208/230-1-60, 208/230-3-60, 460-3-60	294	133.3	35.02 [889.5]	19 [482.6]	14 [355.6]	13.0 [330.2]

Base unit dimensions—50GS048-060



REQUIRED CLEARANCE TO COMBUSTIBLE MATL.

	MILLIMETERS [IN.]
TOP OF UNIT.....	355.6 [14.00]
DUCT SIDE OF UNIT.....	50.8 [2.00]
SIDE OPPOSITE DUCTS.....	355.6 [14.00]
BOTTOM OF UNIT.....	12.7 [0.50]
ELECTRIC HEAT PANEL.....	914.4 [36.00]

NEC. REQUIRED CLEARANCES.

	MILLIMETERS [IN.]
BETWEEN UNITS, POWER ENTRY SIDE.....	1066.8 [42.00]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE.....	914.0 [36.00]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE.....	1066.8 [42.00]

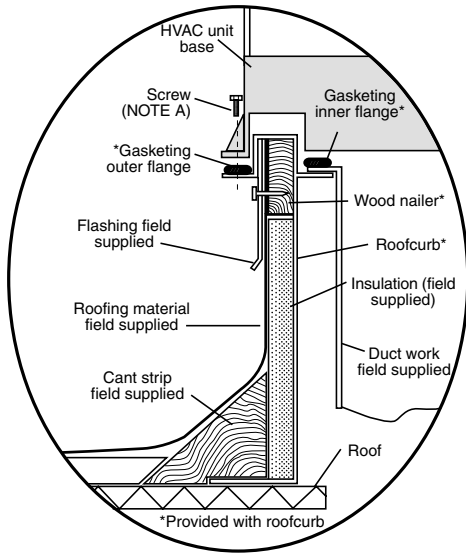
REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	MILLIMETERS [IN.]
EVAP. COIL ACCESS SIDE.....	914.0 [36.00]
POWER ENTRY SIDE.....	1066.8 [42.00]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP.....	1219.2 [48.00]
SIDE OPPOSITE DUCTS.....	914.0 [36.00]
DUCT PANEL.....	304.8 [12.00]*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISE.

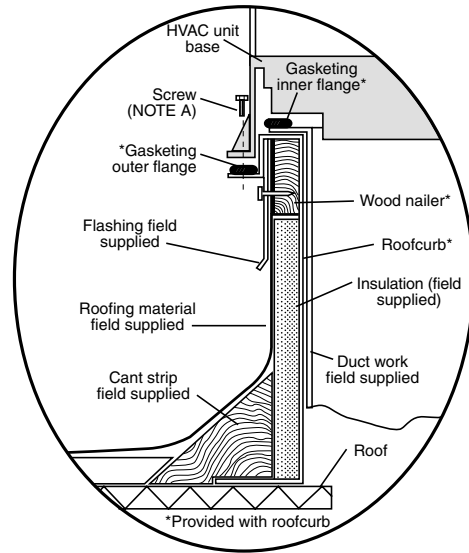
UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT in. [mm] "A"	CENTER OF GRAVITY in. [mm]		
		lb	kg		X	Y	Z
50GS048	208/230-1-60, 208/230-3-60, 460-3-60	324	145	38.98 [990.2]	20 [508]	17 [432]	17 [432.0]
50GS060	208/230-1-60, 208/230-3-60, 460-3-60	389	176	38.98 [990.2]	19 [482.6]	16 [406]	17 [432.0]

Accessory dimensions



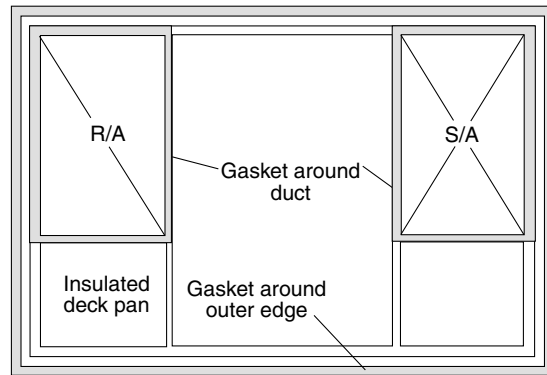
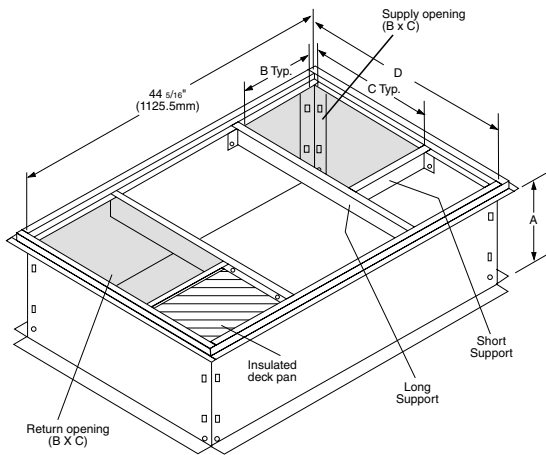
Roof Curb for Small Cabinet

Note A: When unit mounting screw is used, retainer bracket must also be used.



Roof Curb for Large Cabinet

Note A: When unit mounting screw is used, retainer bracket must also be used.



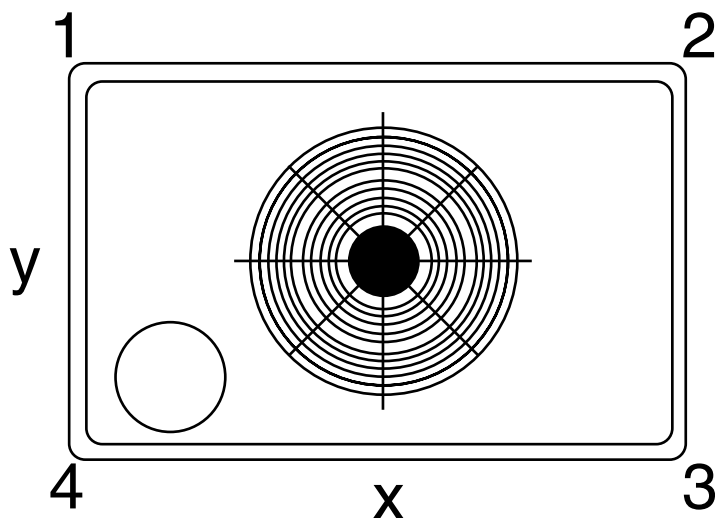
C00076

UNIT SIZE	ODS CATALOG NO.	A IN. [MM]	B in. [mm]	C in. [mm]	D in. [mm]
50GS018-042	CPRFCURB006A00	8 [203]	11[279]	16 1/2 [419]	28-3/4 [730]
	CPRFCURB007A00	14 [356]	11[279]	16 1/2 [419]	28-3/4 [730]
50GS048-060	CPRFCURB008A00	8 [203]	16-3/16 [411]	17 3/8[441]	40-1/4 [1022]
	CPRFCURB009A00	14 [356]	16 3/16 [411]	17 3/8 [441]	40-1/4 [1022]

NOTES:

1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied as required to unit being installed.
3. Dimensions in [] are in millimeters.
4. Roof curb is made of 16 gage steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Insulated panels: 1-in. (25.4 mm) thick fiberglass 1 lb (.45 kg) density.
7. Dimensions are in inches.
8. When unit mounting screw is used (see Note A), a retainer bracket must be used as well. This bracket must also be used when required by code for hurricane or seismic conditions. This bracket is available through Micrometl.

50GS CORNER WEIGHTS



lb.

CORNER WEIGHTS (SMALL CABINET)							CORNER WIEGHTS (LARGE CABINET)			
UNIT 50GS	UNIT	018	024	030	036	042	UNIT 50GS	UNIT	048	060
	Total weight	254	260	258	268	294		Total weight	324	389
	Corner 1	58	60	59	62	76		Corner 1	69	84
	Corner 2	47	50	48	50	50		Corner 2	45	54
	Corner 3	55	56	56	58	71		Corner 3	88	106
	Corner 4	94	94	95	98	97		Corner 4	122	145

Selection Procedure

I Determine cooling and heating requirements at design conditions:

Given:

Required Cooling Capacity (TC) 33,000 Btuh
 Sensible Heat Capacity (SHC) 23,000 Btuh
 Required Heating Capacity 15,000 Btuh
 Condenser Entering Air Temperature 95°F
 Indoor-Air Temperature 80°F edb, 67°F ewb
 Evaporator Air Quantity 1200 cfm
 External Static Pressure. 0.27 in. wg
 Electrical Characteristics. 230-1-60

II Select unit based on required cooling capacity.

Enter Net Cooling Capacities table at condenser entering temperature of 95°F. Unit 50GS036 at 1200 cfm and 67°F ewb (entering wet bulb) will provide a total capacity of 34,500 Btuh and a SHC of 24,500 Btuh. Calculate SHC correction, if required, using Note 3 under Cooling Capacities tables.

III Select electric heat.

The required heating capacity is 15,000 Btuh (given). Determine the electric heat capacity in kW.

$$\frac{15,000 \text{ Btuh}}{3414 \text{ Btuh/kW}} = 4.4 \text{ kW of heat required}$$

Enter the Electric Heater table for 208/230, single-phase, 50GS036 unit. The 5-kW heater at 240v most closely satisfies the heating required.

$$5 \text{ kW} \times 3.413 = 17,065 \text{ BTUS}$$

IV Determine fan speed and power requirements at design conditions.

Before entering the air delivery tables, calculate the total static pressure required. From the given, Filter Pressure Drop table, find:

Electric Heater	0.00 in. wg
External static pressure	0.27 in. wg
Filter	<u>.13 in. wg</u>
Total static pressure	0.40 in. wg

Enter the table for Wet Coil Air Delivery — Horizontal Discharge, 230 and 460 V. At 0.4 in. wg external static pressure and medium speed, the motor delivers 1286 cfm and uses 604 watts—to adjust for 208v, the motor delivers 1159 cfm (deduct 10%).

Performance data

NET COOLING CAPACITIES

50GS018		Evaporator Air—Cfm/Bypass Factors—BF								
Temp (F) Air Ent Condenser		525/0.118			600/0.159			675/0.187		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	15.7	18.5	20.9	16.5	19.2	21.5	17.2	19.8	21.9
	SHC	13.5	11.6	9.5	14.9	12.7	10.2	16.2	13.6	10.7
	KW	1.75	1.80	1.83	1.77	1.81	1.84	1.78	1.82	1.85
95	TC	14.5	17.3	19.9	15.3	18.0	20.5	16.0	18.6	20.9
	SHC	13.0	11.2	9.2	14.4	12.3	9.9	15.6	13.3	10.4
	KW	1.82	1.89	1.92	1.84	1.89	1.93	1.86	1.90	1.94
105	TC	13.3	16.0	18.7	14.0	16.7	19.3	14.8	17.2	19.8
	SHC	12.4	10.7	8.8	13.7	11.8	9.5	14.8	12.8	10.1
	KW	1.88	1.97	2.02	1.91	1.99	2.03	1.93	2.00	2.04
115	TC	12.0	14.5	17.4	12.8	15.2	18.0	13.7	15.7	18.4
	SHC	11.8	10.2	8.4	12.8	11.2	9.1	13.7	12.2	9.7
	KW	1.95	2.04	2.11	1.98	2.06	2.13	2.01	2.08	2.14

50GS024		Evaporator Air—Cfm/Bypass Factors—BF								
Temp (F) Air Ent Condenser		700/0.183			800/0.221			900/0.242		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	22.6	25.1	27.4	23.3	25.8	28.0	23.9	26.4	28.5
	SHC	19.2	16.1	12.9	20.7	17.2	13.5	22.1	18.1	14.0
	KW	2.38	2.44	2.50	2.40	2.46	2.51	2.41	2.47	2.53
95	TC	21.3	23.9	26.3	22.0	24.6	26.9	22.6	25.1	27.4
	SHC	18.7	15.7	12.5	20.2	16.8	13.1	21.6	17.8	13.7
	KW	2.50	2.57	2.64	2.52	2.59	2.65	2.54	2.60	2.66
105	TC	19.8	22.6	25.1	20.6	23.2	25.7	21.2	23.7	26.1
	SHC	18.1	15.2	12.1	19.7	16.4	12.8	21.2	17.4	13.4
	KW	2.61	2.70	2.77	2.65	2.72	2.79	2.66	2.73	2.81
115	TC	18.3	21.0	23.7	18.9	21.6	24.2	19.7	22.1	24.7
	SHC	17.4	14.7	11.7	18.9	15.9	12.4	19.7	17.0	13.0
	KW	2.69	2.83	2.91	2.73	2.85	2.93	2.77	2.86	2.95

50GS030		Evaporator Air—Cfm/Bypass Factors—BF								
Temp (F) Air Ent Condenser		875/0.160			1000/0.194			1125/0.222		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	26.4	29.6	32.4	27.2	30.3	33.0	27.9	30.9	33.5
	SHC	23.8	19.9	15.7	25.6	21.2	16.5	27.1	22.5	17.1
	KW	2.77	2.84	2.91	2.79	2.86	2.92	2.81	2.87	2.94
95	TC	24.9	28.1	31.0	29.9	28.8	31.6	30.5	29.4	32.0
	SHC	23.3	19.3	15.2	25.0	20.7	16.0	26.1	22.0	16.7
	KW	2.94	3.01	3.09	3.06	3.03	3.10	3.08	3.05	3.12
105	TC	23.4	26.4	29.4	24.3	27.1	30.1	25.1	27.7	30.5
	SHC	22.6	18.8	14.8	24.3	20.2	15.6	25.1	21.5	16.3
	KW	3.09	3.19	3.27	3.14	3.21	3.29	3.16	3.22	3.31
115	TC	21.8	24.8	27.9	23.0	25.7	28.4	23.9	25.9	28.8
	SHC	21.8	18.2	14.2	23.0	19.0	15.1	23.9	20.9	15.8
	KW	3.23	3.37	3.46	3.29	3.39	3.48	3.35	3.40	3.50

See Legend and Notes on page 13.

Performance data (cont)

NET COOLING CAPACITIES

50GS036		Evaporator Air—Cfm/Bypass Factors—BF								
Temp (F) Outdoor Air Entering Condenser		1050/0.169			1200/0.193			1350/0.214		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	32.8	35.9	39.4	32.9	36.2	39.8	33.1	36.3	39.9
	SHC	29.2	24.1	19.3	30.3	25.1	19.8	31.4	25.8	20.0
	KW	3.3	3.4	3.4	3.4	3.5	3.6	3.6	3.7	3.8
95	TC	31.2	34.2	37.7	31.5	34.5	38.1	31.9	34.6	38.0
	SHC	28.5	23.6	18.8	29.8	24.5	19.2	30.6	25.3	19.4
	KW	3.4	3.6	3.7	3.6	3.7	3.8	3.8	3.9	4.0
105	TC	29.6	32.6	35.9	30.2	32.8	36.2	30.5	32.8	36.1
	SHC	27.8	23.0	18.2	29.0	23.9	18.6	29.5	24.7	18.8
	KW	3.6	3.8	3.9	3.8	3.9	4.0	4.0	4.1	4.3
115	TC	27.9	30.9	34.1	28.8	31.1	34.3	29.2	31.0	34.2
	SHC	26.9	22.4	17.5	28.1	23.4	18.0	28.1	24.2	18.2
	KW	3.8	4.0	4.1	4.0	4.1	4.3	4.2	4.4	4.5

50GS042		Evaporator Air—Cfm/Bypass Factors—BF								
Temp (F) Air Ent Condenser		1225/0.040			1400/0.064			1575/0.093		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	38.9	43.6	48.3	40.2	44.8	49.4	41.4	45.8	50.3
	SHC	35.6	29.7	23.5	38.8	32.2	25.0	41.4	34.5	26.4
	KW	4.08	4.17	4.27	4.10	4.20	4.29	4.13	4.22	4.31
95	TC	36.5	41.3	46.1	37.8	42.5	47.1	39.4	43.4	47.9
	SHC	34.5	28.9	22.8	37.6	31.4	24.3	39.4	33.7	25.7
	KW	4.34	4.44	4.55	4.37	4.47	4.58	4.40	4.50	4.60
105	TC	33.8	38.7	43.7	35.6	39.8	44.7	37.3	40.6	45.5
	SHC	33.1	27.9	22.0	35.6	30.4	23.5	37.3	32.8	25.0
	KW	4.53	4.72	4.83	4.63	4.74	4.86	4.69	4.77	4.88
115	TC	31.3	35.7	40.9	33.3	36.8	41.9	34.9	37.6	42.6
	SHC	31.3	26.6	21.1	33.3	29.3	22.7	34.9	31.7	24.2
	KW	4.73	4.93	5.11	4.82	4.99	5.13	4.91	5.03	5.16

50GS048		Evaporator Air—Cfm/Bypass Factors—BF								
Temp (F) Air Ent Condenser		1400/0.084			1600/0.113			1800/0.149		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	42.9	48.0	53.0	44.2	49.2	54.2	45.5	50.2	55.1
	SHC	39.4	32.9	25.9	42.7	35.5	27.5	45.5	37.9	29.0
	KW	4.68	4.77	4.87	4.70	4.80	4.90	4.72	4.82	4.93
95	TC	40.9	45.8	50.9	42.1	47.0	52.0	43.6	47.9	52.9
	SHC	38.6	32.1	25.2	41.6	34.7	26.8	43.6	37.2	28.3
	KW	5.10	5.20	5.29	5.13	5.22	5.32	5.15	5.24	5.35
105	TC	38.5	43.4	48.5	39.4	44.5	49.6	41.7	45.4	50.4
	SHC	37.2	31.2	24.4	41.5	33.7	26.0	41.7	36.3	27.5
	KW	5.50	5.66	5.75	5.57	5.68	5.79	5.62	5.69	5.81
115	TC	36.0	40.9	45.9	37.9	41.8	46.9	39.8	42.6	47.6
	SHC	36.0	30.3	23.5	37.9	32.8	25.2	39.8	35.3	26.7
	KW	5.93	6.15	6.25	6.02	6.16	6.28	6.12	6.18	6.30

See Legend and Notes on page 13.

Performance data (cont)

NET COOLING CAPACITIES

50GS060										
Temp (F) Air Ent Condenser		Evaporator Air—Cfm/Bypass Factors—BF								
		1750/0.039			2000/0.053			2250/0.079		
		Evaporator Air — Ewb (F)								
		62	67	72	62	67	72	62	67	72
85	TC	53.9	61.5	69.3	56.1	63.6	71.1	58.0	65.2	72.4
	SHC	48.8	41.4	33.4	53.7	45.2	35.7	58.0	48.8	37.9
	kW	6.12	6.33	6.52	6.21	6.38	6.57	6.25	6.42	6.62
95	TC	50.7	58.1	65.8	52.8	60.0	67.5	55.2	61.4	68.8
	SHC	47.4	40.1	32.2	51.9	43.9	34.5	55.2	47.4	36.7
	kW	6.44	6.69	6.89	6.53	6.74	6.94	6.63	6.78	6.98
105	TC	47.2	54.4	62.2	49.6	56.1	63.7	52.2	57.5	64.9
	SHC	45.7	38.7	30.9	49.6	42.5	33.3	52.2	46.0	35.5
	kW	6.75	7.07	7.27	6.87	7.11	7.33	7.01	7.15	7.37
115	TC	43.7	50.4	58.2	46.6	52.0	59.6	49.1	53.3	60.7
	SHC	43.7	37.2	29.6	46.6	40.9	32.0	49.1	44.4	34.2
	kW	7.08	7.43	7.67	7.24	7.50	7.73	7.38	7.53	7.77

LEGEND

EWB —Entering Wet-Bulb

kW—Total Unit Power Input

SHC—Sensible Heat Capacity (1000 Btuh)

TC—Total Capacity (1000 Btuh) (net)

BF—Bypass Factor

NOTES:

1. Ratings are net; they account for the effects of the evaporator-fan motor power and heat.
2. Direct interpolation is permissible. Do not extrapolate.
3. The following formulas may be used:

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

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

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

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

4. The 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. Correction Factor = $1.10 \times (1 - BF) \times (edb - 80)$.

WET COIL AIR DELIVERY—HORIZONTAL AND DOWNFLOW DISCHARGE UNIT 50GS018-060

230 AND 460 VOLT

Unit 50GS	Motor Speed		External Static Pressure (in.wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018	Low	Watts	227	212	196	177	165	153	—	—	—	—	—
		Cfm	1000	915	825	710	530	340	—	—	—	—	—
	Med	Watts	—	—	—	—	—	—	—	—	—	—	—
		Cfm	—	—	—	—	—	—	—	—	—	—	—
	High	Watts	287	275	266	253	242	234	226	—	—	—	—
		Cfm	1150	1032	963	807	698	503	250	—	—	—	—
024	Low	Watts	280	275	270	267	264	262	260	—	—	—	—
		Cfm	880	825	765	693	600	450	281	—	—	—	—
	Med	Watts	380	375	365	360	355	350	344	335	312	—	—
		Cfm	1136	1085	1010	946	865	787	650	495	360	—	—
	High	Watts	485	475	470	460	455	445	437	430	415	385	—
		Cfm	1415	1332	1266	1180	1100	1000	900	780	480	256	—
030	Low	Watts	280	275	270	267	264	262	260	—	—	—	—
		Cfm	880	825	765	693	600	450	281	—	—	—	—
	Med	Watts	380	375	365	360	355	350	344	335	312	—	—
		Cfm	1136	1085	1010	946	865	787	650	495	360	—	—
	High	Watts	485	475	470	460	455	445	437	430	415	385	—
		Cfm	1415	1332	1266	1180	1100	1000	900	780	480	256	—
036	Low	Watts	576	566	556	538	512	497	481	466	450	435	—
		Cfm	1385	1297	1220	1165	1090	995	905	846	715	609	—
	Med	Watts	680	671	660	624	604	620	602	558	534	512	496
		Cfm	1572	1460	1375	1305	1286	1192	1125	1046	891	800	730
	High	Watts	810	800	790	782	766	742	723	709	688	661	627
		Cfm	1685	1620	1560	1486	1389	1322	1284	1170	1000	897	800
042	Low	Watts	—	675	660	650	640	630	620	610	595	580	—
		Cfm	—	1387	1326	1275	1204	1142	1081	995	918	850	—
	Med	Watts	—	886	855	825	795	778	765	750	735	718	700
		Cfm	—	1458	1406	1350	1285	1224	1163	1091	1013	932	870
	High	Watts	—	—	—	1000	950	925	910	890	875	855	833
		Cfm	—	—	—	1488	1424	1360	1296	1233	1148	1071	1005
048	Low	Watts	—	727	712	700	688	666	644	622	595	569	—
		Cfm	—	1640	1600	1575	1505	1450	1390	1300	1205	1145	—
	Med	Watts	—	853	836	821	807	782	756	730	699	667	640
		Cfm	—	1860	1830	1770	1700	1642	1565	1482	1385	1290	1210
	High	Watts	—	979	959	943	927	897	868	838	802	766	730
		Cfm	—	2090	2048	1997	1922	1845	1750	1600	1550	1425	1380
060	Low	Watts	1033	949	864	836	822	808	772	737	705	674	642
		Cfm	2050	2000	1945	1905	1880	1820	1775	1695	1627	1530	1480
	Med	Watts	1084	1054	1024	994	971	955	928	897	867	835	803
		Cfm	2248	2179	2110	2058	2000	1932	1885	1829	1740	1638	1569
	High	Watts	—	—	1184	1152	1120	1102	1084	1056	1029	997	965
		Cfm	—	—	2278	2207	2124	2041	2000	1960	1856	1748	1645

NOTE: Deduct 10% for 208v.

Performance data (cont)

ECONOMIZER/1-IN. FILTER PRESSURE DROP

UNIT 50GS	PRESSURE DROP (in. wg)
018-042	0.20
048, 060	0.25

MULTIPLICATION FACTORS

HEATER kW RATING	VOLTAGE DISTRIBUTION V/3/60	MULTIPLICATION FACTOR
240	200	.69
	208	.75
	230	.92
	240	1.00
480	440	.84
	460	.92
	480	1.00

Example: 15.0 kW (at 240v) heater on 208 v
 = 15.0 (.75 mult factor)
 = 11.25 capacity at 208 v

OUTDOOR SOUND: OCTAVE BAND DATA — DECIBELS

UNIT	50GS						
	018	024	030	036	042	048	060
Frequency (Hz)							
63	45.8	44.1	44.3	51.6	56.7	52.2	53.0
125	57.5	56.4	59.0	62.9	63.6	63.5	64.4
250	62.9	67.6	66.8	66.5	68.5	70.5	71.7
500	67.6	65.4	66.1	71.4	72.7	71.9	73.1
1000	69.0	67.6	68.8	75.4	76.2	72.7	74.1
2000	65.2	64.4	65.4	72.9	71.3	69.3	72.2
4000	61.0	60.7	61.6	69.3	68.0	66.4	67.4
8000	53.5	54.6	56.0	64.7	62.2	60.5	60.7

LEGEND

dB — Sound Levels (decibels)

FILTER PRESSURE DROP (In. wg)

FILTER SIZE	CFM																		
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
20 X 20 X 1	0.05	0.07	0.08	0.10	0.12	0.13	0.14	0.15	—	—	—	—	—	—	—	—	—	—	—
20 X 24 X1	—	—	—	—	0.09	0.10	0.11	0.13	0.14	0.115	0.16	—	—	—	—	—	—	—	—
24 X 30 X 1	—	—	—	—	—	—	—	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18

ELECTRIC HEAT PRESSURE DROP TABLES

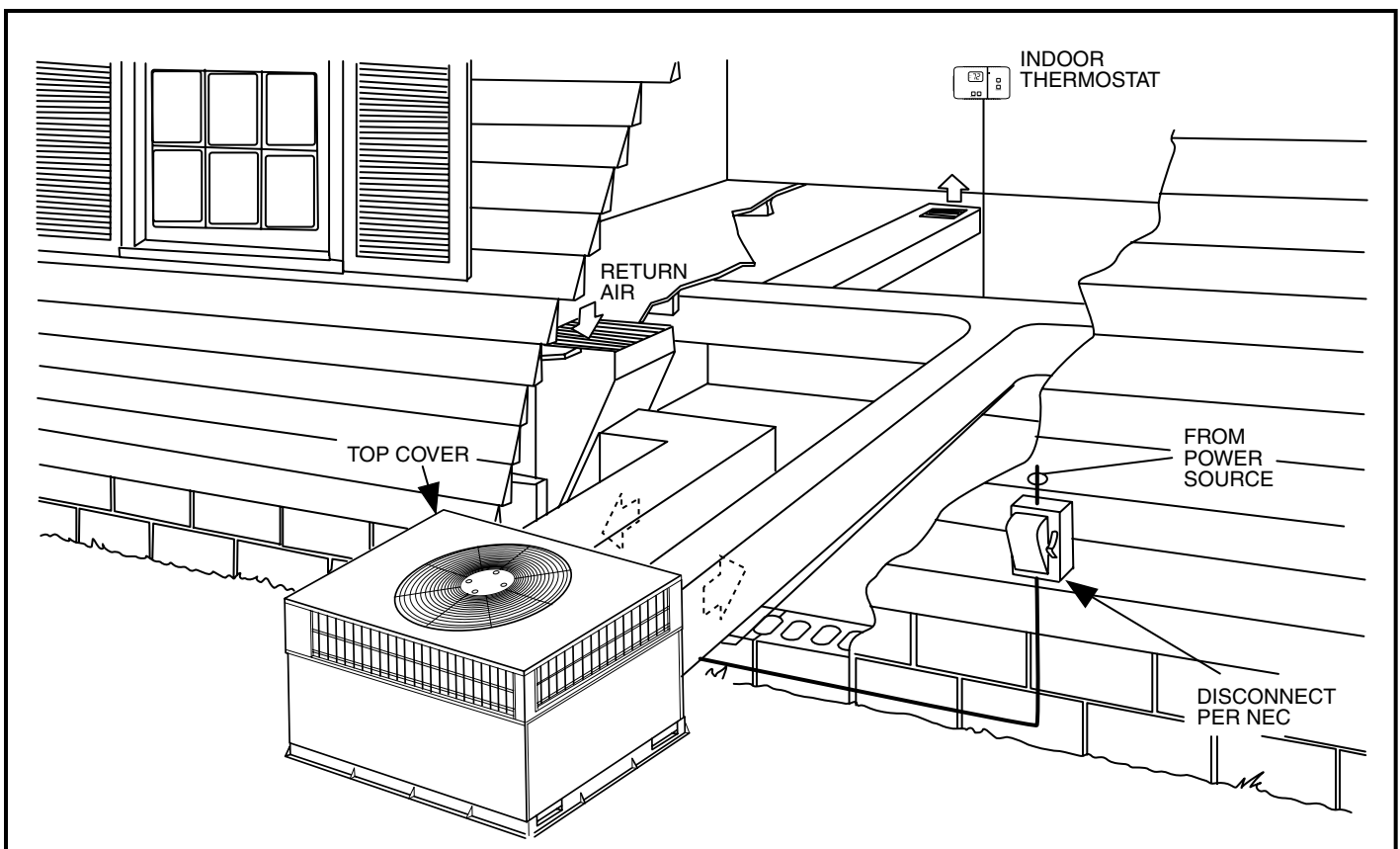
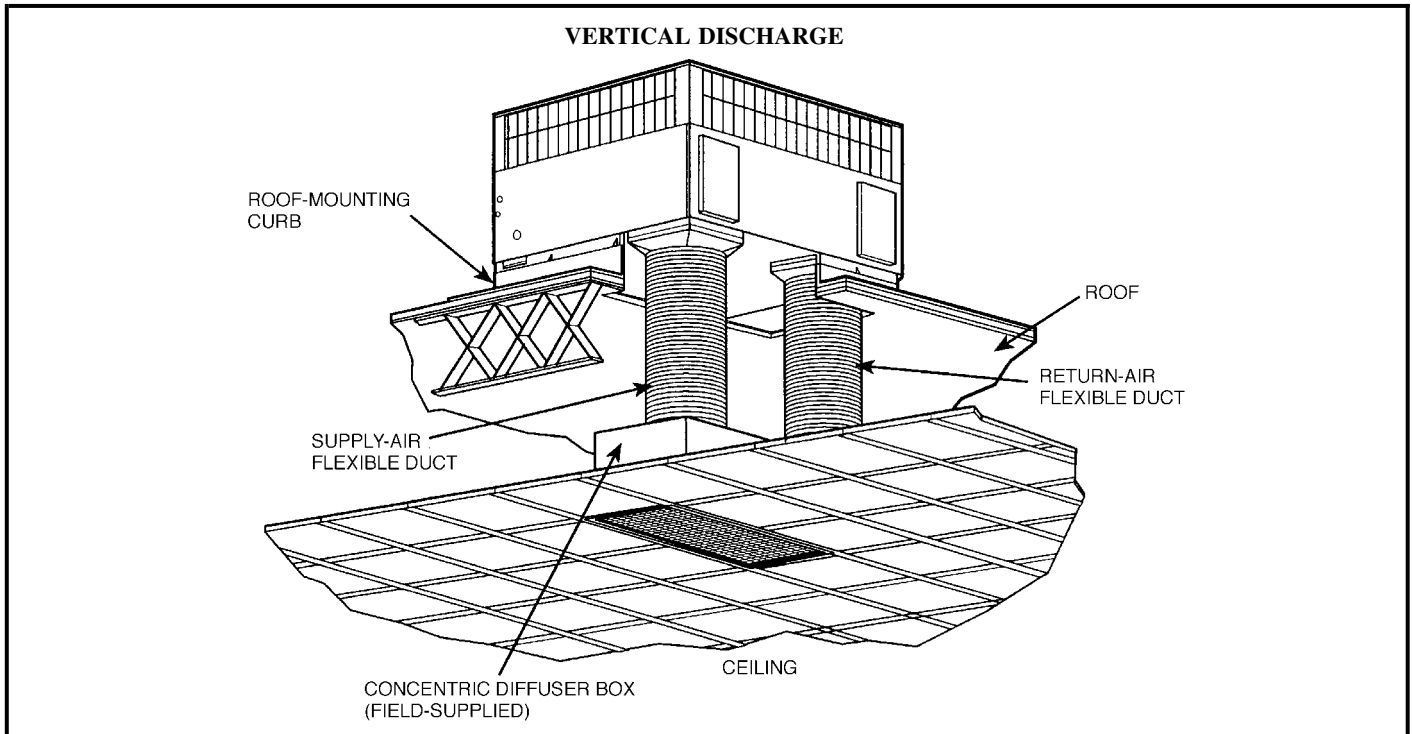
Small Cabinet: 018-042

STATIC	CFM											
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
5 Kw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.07
7.5 Kw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.07	0.08
10 Kw	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.07	0.09	0.10
15 Kw*	0.00	0.00	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18

Large Cabinet: 048-060

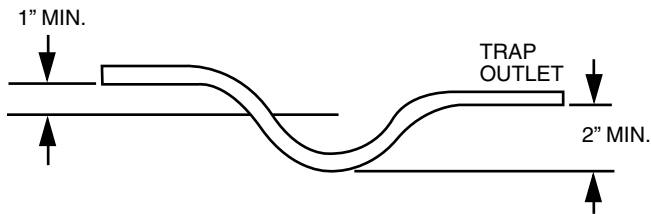
STATIC	CFM														
	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500
5 Kw	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12
7.5 Kw	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
10 Kw	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
15 Kw*	0.00	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
20 Kw	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16

Typical piping and wiring



Application data

Condensate trap — A 2-in. condensate trap must be field supplied.



Ductwork — Secure downflow discharge ductwork to roof curb. For horizontal discharge applications, attach ductwork to unit with flanges.

To convert a unit to downflow discharge — Units are equipped with factory-installed inserts in the down-flow

openings. Remove the inserts similar to removing an electrical knock-out. Use included duct cover to seal the horizontal discharge openings in the unit. Units installed in horizontal discharge orientation do not require duct covers.

Maximum cooling airflow — To minimize the possibility of condensate blow-off from the evaporator, airflow through the units should not exceed 450 cfm/ton.

Minimum cooling airflow — The minimum cooling airflow is 350 cfm/ton.

Minimum cooling ambient operating temperature — All standard units have a minimum ambient operating temperature of 40°F. With accessory low ambient temperature kit, units can operate at temperatures down to 0°F.

Electrical data

UNIT SIZE 50GS	V-PH-Hz	VOLTAGE RANGE		COMPRESSOR		OUTDOOR FAN MOTOR	INDOOR FAN MOTOR	ELECTRIC HEAT		POWER SUPPLY		
		Min	Max	RLA	LRA	FLA	FLA	Nominal kW*	FLA	MCA	Max Fuse or Ckt Bkr	MOCP
018	208/230-1-60	187	254	9	45	0.80	1.8	—/—	—/—	13.9/13.9	20/20	—
								3.8/5.0	18.1/20.8	24.8/28.3	25/30	—
								5.4/7.2	26.0/30.0	34.7/39.8	35/40	—
								7.5/10.0	36.1/41.7	47.4/54.3	50/60	—
024	208/230-1-60	187	254	12.8	61	0.8	2	—/—	—/—	18.8/18.8	25/25	—
								3.8/5.0	18.1/20.8	25.1/28.5	305/30	—
								5.4/7.2	2/30	35/40	35/40	—
								7.5/10.0	36.1/41.7	47.6/54.6	50/60	—
030	208/230-1-60	187	254	14.4	73	0.8	2	—/—	—/—	20.8/20.8	25/25	—
								3.8/5.0	18.1/20.8	25.1/28.5	25/30	—
								5.4/7.2	26.0/30.0	35/40	35/40	—
								7.5/10.0	36.1/41.7	47.6/54.6	50/60	—
	208/230-3-60	187	254	8.3	68	0.8	2	—/—	—/—	13.2/13.2	20/20	—
								3.8/5.0	10.4/12.0	15.5/17.5	20/20	—
								7.5/10.0	20.8/24.1	28.6/32.6	30/35	—
								11.3/15.0	31.3/36.1	41.6/47.6	45/50	—
036	208/230-1-60	187	254	15.1	81	1.4	2.8	—/—	—/—	23.1/23.1	30/30	—
								3.8/5.0	18.1/20.8	26.1/29.5	30/30	—
								5.4/7.2	26.0/30.0	36.0/41.0	40/45	—
								7.5/10.0	36.1/41.7	48.6/55.6	50/60	—
	208/230-3-60	187	254	10.9	78	1.4	2.8	—/—	—/—	17.8/17.8	25/25	—
								3.8/5.0	10.4/12.0	16.5/18.5	25/25	—
								7.5/10.0	20.8/24.1	29.6/33.6	30/35	—
								11.3/15.0	31.3/36.1	42.6/48.6	45/50	—
460-3-60	414	508	5.8	40	0.8	1.4	—/—	—/—	9.5	15	—	
							5	6	9.5	15	—	
							10	12	16.8	20	—	
							15	18	24.3	25	—	
042	208/230-1-60	187	254	18.6	105	1.4	4	—/—	—/—	28.7/28.7	35/35	—
								3.8/5.0	18.1/20.8	28.7/31.0	35/35	—
								5.4/7.2	26.0/30.0	37.5/42.5	40/45	—
								7.5/10.0	36.1/41.7	50.1/57.1	60/60	—
	208/230-3-60	187	254	10.7	85	1.4	4	—/—	—/—	18.8/18.8	25/25	—
								3.8/5.0	10.4/12.0	31.1/35.1	25/25	—
								7.5/10.0	20.8/24.1	44.1/50.1	35/40	—
								11.3/15.0	31.3/36.1	57.0/65.0	45/60	—
	460-3-60	414	508	5.3	42	0.8	2	—/—	—/—	9.4	15	—
								5	6	10.0	15	—
								10	12	17.5	20	—
								15	18	25.1	30	—
048	208/230-1-60	187	254	25.3	131	2.1	5	—/—	—/—	38.7/38.7	40/40	—
								3.8/5.0	18.1/20.8	38.7/38.7	40/40	—
								5.4/7.2	26.0/30.0	38.7/43.8	40/45	—
								7.5/10.0	36.1/41.7	51.4/58.3	60/60	—
	208/230-3-60	187	254	14.6	108	2.1	5	—/—	—/—	25.4/25.4	30/30	—
								3.8/5.0	10.4/12.0	25.4/25.4	30/30	—
								7.5/10.0	20.8/24.1	32.3/36.3	35/40	—
								11.3/15.0	31.3/36.1	45.3/51.4	50/60	—
	460-3-60	414	508	7.3	48	1.1	2.3	—/—	—/—	12.5	15	—
								5	6	12.5	15	—
								10	12	17.9	20	—
								15	18	25.4	30	—
060	208/230-1-60	187	254	28.9	147	2.1	6.8	—/—	—/—	45.0/45.0	60/60	—
								3.8/5.0	18.1/20.8	45.0/45.0	60/60	—
								5.4/7.2	26.0/30.0	41.0/46.0	45/50	—
								7.5/10.0	36.1/41.7	53.6/60.6	—	60/70
	208/230-3-60	187	254	18.6	125	2.1	6.8	—/—	—/—	32.2/32.2	40/40	—
								3.8/5.0	10.4/12.0	32.2/32.2	40/40	—
								7.5/10.0	20.8/24.1	34.6/38.6	40/40	—
								11.3/15.0	31.3/36.1	47.6/53.6	50/60	—
	460-3-60	414	508	8.5	66.5	1.1	3.2	—/—	—/—	14.9	20	—
								5	6	14.9	20	—
								10	12	19.0	20	—
								15	18	26.6	30	—
208/230-1-60	187	254	28.9	147	2.1	6.8	—/—	—/—	45.0/45.0	60/60	—	
							3.8/5.0	18.1/20.8	45.0/45.0	60/60	—	
							5.4/7.2	26.0/30.0	41.0/46.0	45/50	—	
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							5	6	14.9	20	—	
							10	12	19.0	20	—	
							15	18	26.6	30	—	
208/230-1-60	187	254	28.9	147	2.1	6.8	—/—	—/—	45.0/45.0	60/60	—	
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							5	6	14.9	20	—	
							10	12	19.0	20	—	
							15	18	26.6	30	—	

LEGEND

- FLA** — Full Load Amps
- HACR** — Heating, Air Conditioning and Refrigeration
- LRA** — Locked Rotor Amps
- MCA** — Minimum Circuit Amps
- MOCP** — Maximum Overcurrent Protection
- RLA** — Rated Load Amps



*Fuse or HACR Breaker.

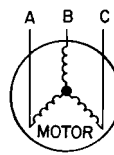
NOTES:

1. In compliance with NEC (National Electrical Code) requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The CGA (Canadian Gas Association) units may be fuse or circuit breaker.
2. Minimum wire size is based on 60 C copper wire. If other than 60 C wire is used, or if length exceeds wire length in table, determine size from NEC.
3. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

% Voltage imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

EXAMPLE: Supply voltage is 460-3-60.



- AB = 452 v
- BC = 464 v
- AC = 455 v

$$\begin{aligned} \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\ &= \frac{1371}{3} \\ &= 457 \end{aligned}$$

Determine maximum deviation from average voltage.

- (AB) 457 - 452 = 5 v
- (BC) 464 - 457 = 7 v
- (AC) 457 - 455 = 2 v

Maximum deviation is 7 v.

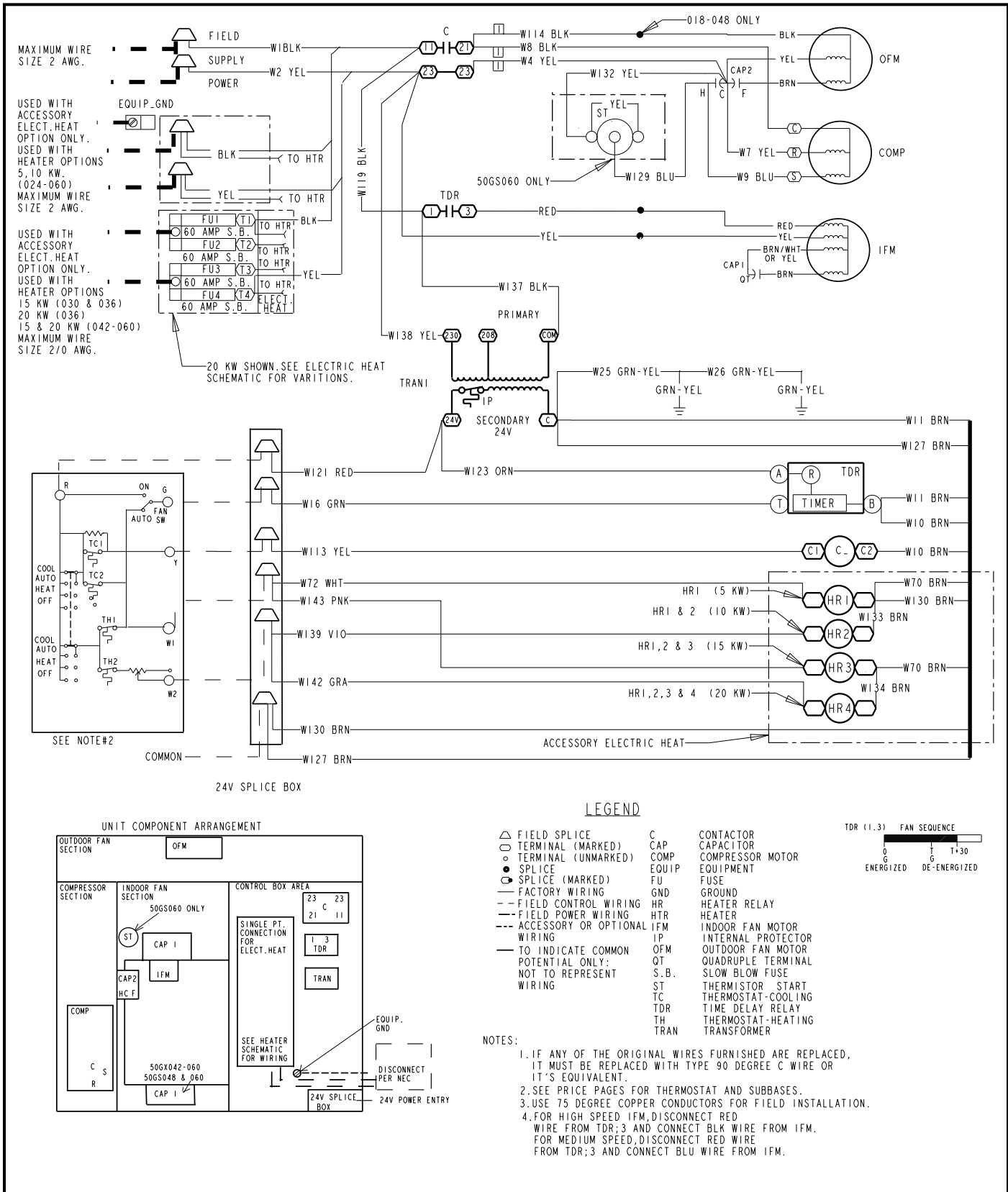
Determine percent of voltage imbalance.

$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\ &= 1.53\% \end{aligned}$$

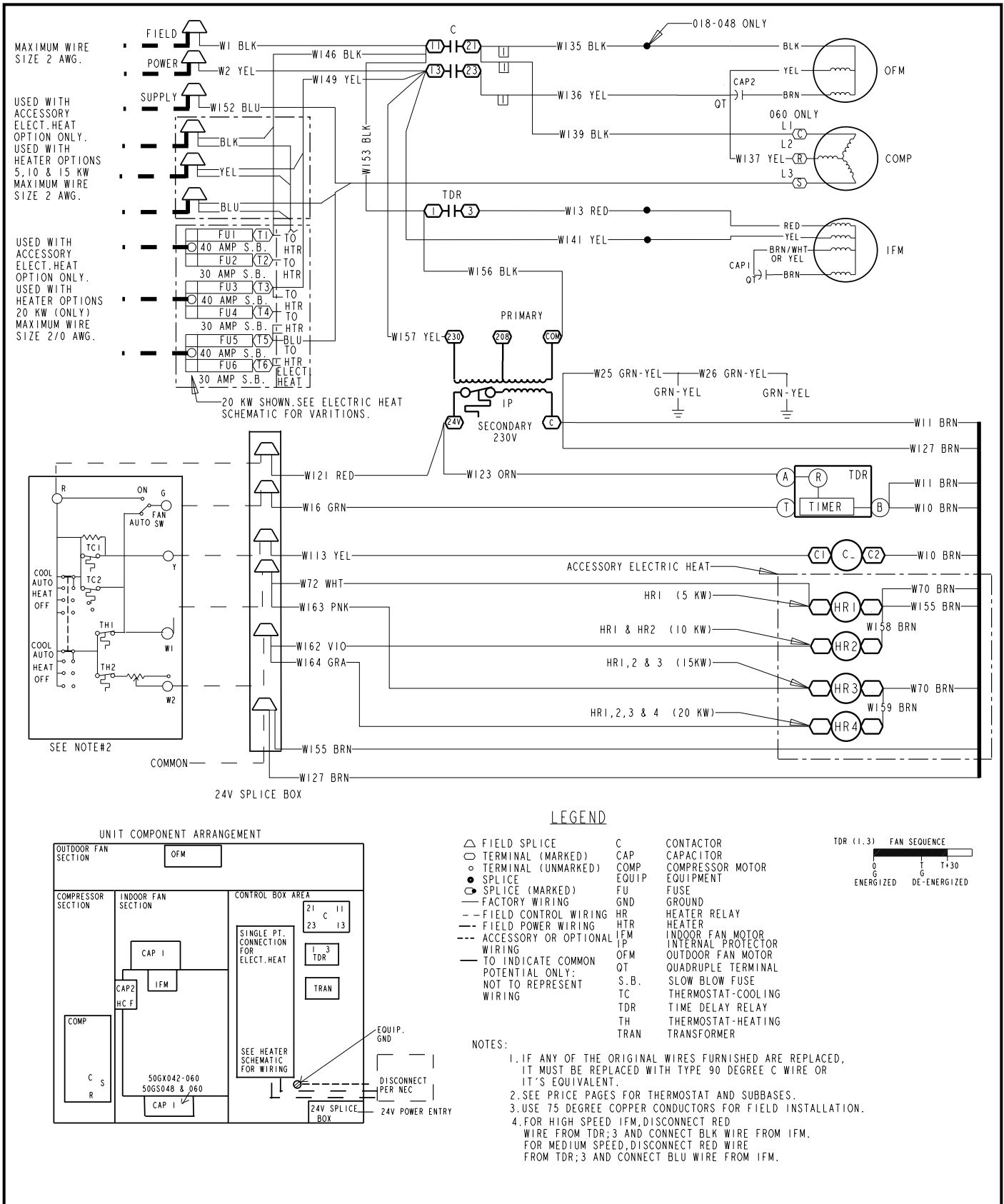
This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Typical wiring schematic — 208/230-1-60 shown



Typical wiring schematic — 208/230-3-60 shown



Controls

Operating sequence

Cooling — When the system thermostat calls for cooling, 24 V is supplied to the “Y” and “G” terminals of the thermostat. This completes the circuit to the contactor coil (C) and indoor (evaporator) fan time delay relay (IFR). The normally open contacts of C close and complete the circuit through compressor motor (COMP) to outdoor (condenser) fan motor (OFM). Both motors start instantly. The set of normally open contacts of IFR close and complete the circuit through IFM. The IFM starts instantly.

On the loss of the thermostat call for cooling, 24 v is removed from both the “Y” and “G” terminals (provided the fan switch is in the “AUTO” position) deenergizing the compressor contactor and opening the contacts supplying

power to compressor/OFM. After a 30-second delay, the IFM shuts off. If the thermostat fan selector switch is in the “ON” position, the IFM will run continuously.

NOTE: On units with a Time Guard® II device: once the compressor has started and then stopped, it cannot be restarted again until 5 minutes have elapsed.

Heating — If accessory electric heaters are installed, on a call for heat, circuit R-W is made through the thermostat contacts. Circuit R-G is made which energizes the IFR. If the heaters are staged, then the thermostat closes a second set of contacts (W2) when second stage is required. When thermostat is satisfied, contacts open, deenergizing the heater relay and the IFR.

Guide specifications

Packaged Gas Heating/Electric Cooling Units Constant Volume Application

HVAC Guide Specifications

Size Range: **1-1/2 to 5 Tons, Nominal Cooling**

40,000 to 130,000 Btuh,

Nominal Heating Input

Carrier Model Number: **50GS**

Part 1—General

SYSTEM DESCRIPTION

Outdoor rooftop or ground mounted, electric cooling unit utilizing a hermetic compressor for cooling duty. Unit shall discharge supply air vertically or horizontally as shown on contract drawings. Condenser fan/coil section shall have a draw-thru design with vertical discharge for minimum sound levels.

QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standards 210/240-94 and 270-95.
- B. Unit shall be designed in accordance with UL Standard 1995.
- C. Unit shall be manufactured in a facility registered to ISO 9001 manufacturing quality standard.
- D. Unit shall be UL listed and cULus certified as a total package for safety requirements.
- E. Roof curb shall be designed to conform to NRCA Standards.
- F. Insulation and adhesives shall meet NFPA 90A requirements for flame spread and smoke generation.
- G. Cabinet insulation shall meet ASHRAE Standard 62P.

DELIVERY, STORAGE AND HANDLING

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

Part 2 — Products

EQUIPMENT

A. General:

Factory-assembled, single-piece, heating and cooling unit. Contained within the enclosure shall be all factory 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 phosphated, zinc-coated, pre-painted steel capable of withstanding 500 hours of salt spray.
2. Normal service shall be through a single removable cabinet panel.
3. The unit shall be constructed on a rust proof unit base that has an externally trapped, integrated sloped drain.
4. Evaporator fan compartment top surface shall be insulated with a minimum 1/2-in. thick, flexible fiberglass insulation, coated on the air side and retained by adhesive and mechanical means. The evaporator wall sections will be insulated with a minimum

semi-rigid foil-faced board capable of being wiped clean. Aluminum foil-faced fiberglass insulation shall be used in the entire indoor air cavity section.

5. Unit shall have a field-supplied condensate trap.
- C. Fans:
1. The evaporator fan shall be 3-speed, direct-drive, as shown on equipment drawings.
 2. Fan wheel shall be made from steel, and shall be double-inlet type with forward curved blades with corrosion resistant finish. Fan wheel shall be dynamically balanced.
 3. Condenser fan shall be direct drive propeller type with aluminum blades riveted to corrosion resistant steel spiders, be dynamically balanced, and discharge air vertically.
- D. Compressor:
1. Fully hermetic compressors with factory-installed vibration isolation.
 2. Reciprocating and/or scroll compressors shall be standard on all units.
- E. Coils:
- Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed. (Copper/copper and vinyl-coated construction available as option.) Tube sheet openings shall be belled to prevent tube wear.
- F. Refrigerant Components:
- Refrigerant metering device shall be of the fixed orifice feed type.
- G. Filters:
- Filter section shall consist of field-installed, throw-away, 1-in. thick fiberglass filters of commercially available sizes.
- H. Controls and Safeties:
1. Unit controls shall be complete with a self-contained low voltage control circuit.
 2. Units shall incorporate a solid-state compressor protector that provides reset capability.
- I. Operating Characteristics:
1. Unit shall be capable of starting and running at 125°F ambient outdoor temperature per maximum load criteria of ARI Standard 210.
 2. Compressor with standard controls shall be capable of operation down to 40° F ambient outdoor temperature.
 3. Unit shall be provided with 30-second fan time delay after the thermostat is satisfied.
- J. Electrical Requirements:
- All unit power wiring shall enter the unit cabinet at a single location.
- K. Motors:
1. Compressor motors shall be of the refrigerant-cooled type with line-break thermal and current overload protection.

Guide specifications (cont)

2. All fan motors shall have permanently lubricated bearings, and inherent, automatic reset, thermal overload protection.
3. Condenser fan motor shall be totally enclosed.
- L. Special Features Available:
 1. Grille:

Wire grille shall be standard on all units. Louvered grille shall be available as a factory-installed option to provide hail guard and vandalism protection.
 2. Coil Options:

Shall include factory-installed optional copper/copper and vinyl-coated refrigerant coils.
 3. Economizer:
 - a. Economizer controls capable of providing free cooling using outside air.
 - b. Equipped with low leakage dampers not to exceed 3% leakage, at 1.0 in. wg pressure differential.
 - c. Spring return motor shuts off outdoor damper on power failure.
 4. Flat Roof Curb:

Curbs shall have seal strip and a wood nailer for flashing and shall be installed per manufacturer's instructions.
 5. Manual Outdoor Air Damper:

Package shall consist of damper, birdscreen, and rainhood which can be preset to admit outdoor air for year-round ventilation.
 6. Thermostat:

To provide for one-stage heating and cooling in addition manual or automatic changeover and indoor fan control.
 7. Low Ambient Package:

Shall consist of a solid-state control and condenser coil temperature sensor for controlling condenser-fan motor operation, which shall allow unit to operate down to 0° F outdoor ambient temperature.
 8. Filter Rack Kit:

Shall provide filter mounting for downflow applications.
 9. Controls Upgrade Kit:

Shall provide high and low pressure safety protection.
 10. Square-To-Round Duct Transitions:

Shall have the ability to convert the supply and return openings from rectangular to round.
 11. Compressor Protection:

Solid-state control shall protect compressor by preventing "short cycling."
 12. Crankcase Heater:

Shall provide anti-floodback protection for low-load cooling applications.
 13. Electric heaters:
 - a. Electric heater shall be available as a field-installed option.
 - b. Heater elements shall be open wire type, adequately supported and insulated with ceramic bushings.
 - c. Electric heater packages must provide single point power connection capability.



Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.