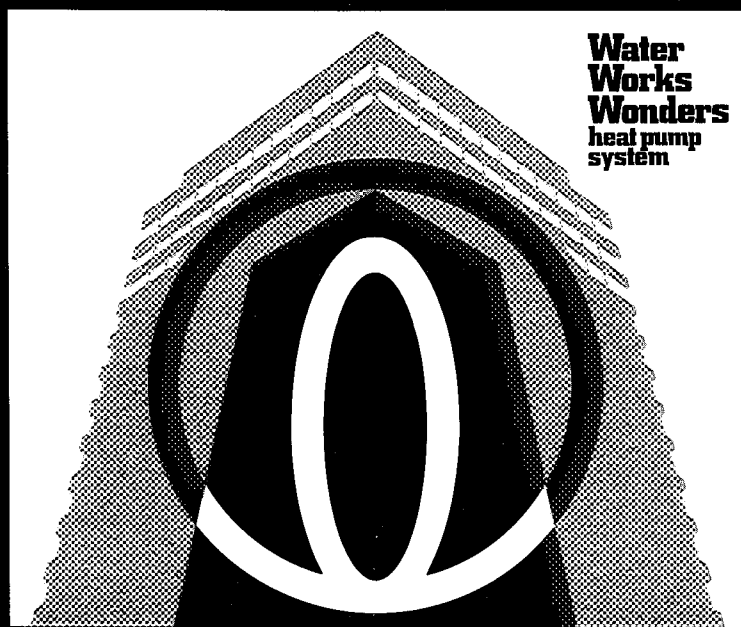


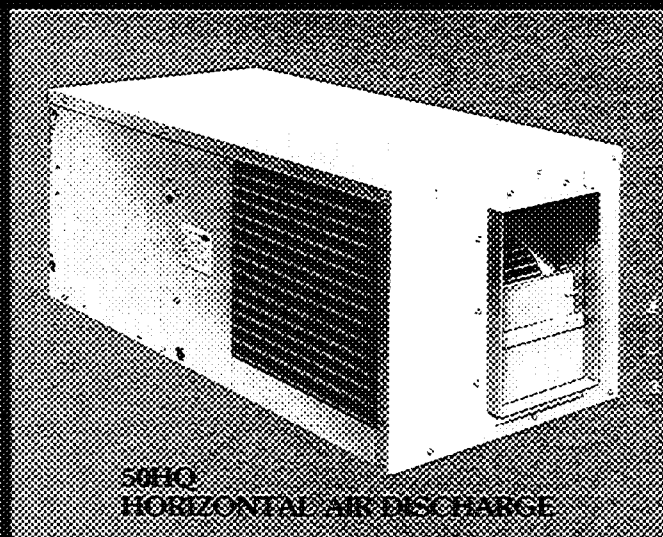
Carrier Water Source Heat Pump Systems

50HQ, VQ
Cooling: 14,000 — 80,000 Btuh
Heating: 17,000 — 82,000 Btuh

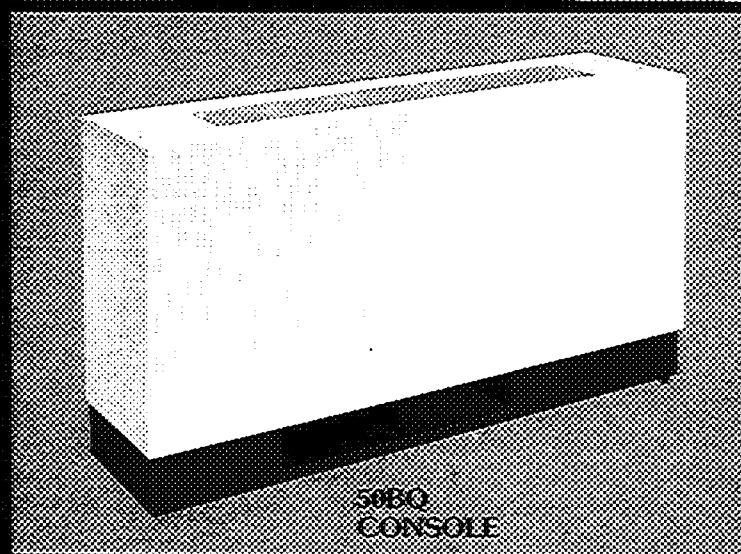
50BQ
Cooling: 6,500 — 19,500 Btuh
Heating: 9,000 — 25,500 Btuh



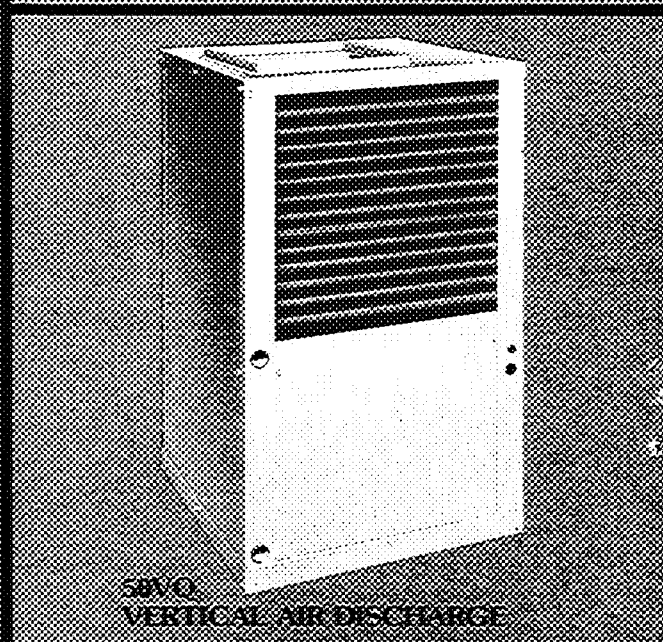
**Water
Works
Wonders**
heat pump
system



50HQ
HORIZONTAL AIR DISCHARGE



50BQ
CONSOLE



50VQ
VERTICAL AIR DISCHARGE

**High-efficiency heat pumps for a
wide range of commercial applications**

Carrier

A source of outstanding performance. . .

50BQ,HQ,VQ water source heat pump systems

Water is an inexpensive, readily available reusable energy source. A more efficient medium than air for heat rejection or extraction, it is the reason for the high seasonal efficiency of Carrier's 50BQ,HQ,VQ water source heat pumps. The water, circulated in a closed loop system at a relatively constant temperature provides excellent cooling and heating performance in commercial buildings all year long. The 50BQ,HQ,VQ units are uncomplicated, complex control systems are not required and the constant water temperature means units are not affected by extreme outdoor weather conditions.

There are 3 types of heat pumps available for a wide variety of building applications; 50HQ horizontal air discharge, 50VQ vertical air discharge and 50BQ console models. 50HQ and 50VQ units are available in 9 sizes from 14,000 Btuh to 80,000 Btuh cooling and 17,000 Btuh to 82,000 Btuh heating. The 50BQ comes in 5 sizes from 6,500 Btuh to 19,000 Btuh cooling and 9,000 Btuh to 25,000 Btuh heating.

The 50BQ console units, in an attractive beige cabinet, are acoustically insulated and fit right in with room or office decor. The 50VQ unit is compact and easily tucks away in a closet or storage room. Horizontal 50HQ units are ideal for a crawl space or above a suspended ceiling. Either way, each HQ/VQ unit is out of the way saving valuable floor space. The horizontal unit can also be field modified for side air discharge.

These versatile heat pumps will satisfy a wide range of building requirements. The smaller capacity units are ideal for hotels/motels, condominiums and apartments. The larger systems will provide excellent year round air conditioning for larger buildings such as government centers, schools and office buildings. Any combination of the 3 types of unit can be employed in a building. One floor or zone may be best suited for 50VQ units, another zone may best utilize console or horizontal units. Mix or match according to specific building requirements — the choice is yours.

Installation is quick and easy — units are compact and self contained resulting in lower field installation costs than for a built-up system. Units are wired and charged at the factory — ready to operate upon reaching the job site. After unit placement, connect water piping, wiring, condensate drain and ductwork and the unit is ready to provide efficient, reliable cooling and heating. Console units do not require ductwork — place them in the conditioned space, make connections and they are ready to operate.

The 50 Series water source heat pumps are very efficient on both heating and cooling. Energy efficiency ratios on cooling range to 10.4. The C O P's on heating are to 3.3 which means heat pumps that deliver 3 units of heat energy for each unit of electrical energy consumed. Units also operate more reliably since they are not burdened by the defrost control problem encountered by air-cooled heat pumps. High efficiency and reliability mean more economical use of energy. More economy and less energy usage mean lower operating costs.

The closed circuit water loop: an uncomplicated, low-cost energy system

The 50 Series water source heat pumps are connected in parallel in a closed circuit water loop with the water maintained between 60 and 90 F by a closed circuit water cooler and boiler. Each unit operates independently, circulating conditioned air to the room or zone as required.

The water loop acts as an energy conduit and storage reservoir, transferring heat energy where it is needed, when it is needed. The result: no heat energy is ever wasted if it is needed elsewhere in the system. In addition, the system offers these significant advantages.

Low first costs — Because the water loop is maintained in the 60 to 90 F range, non-insulated pipes can be used. Generally, a smaller boiler and water cooler are utilized. And, the cost of a central plant chiller is eliminated. The water loop system can be planned and 50BQ,HQ,VQ heat

pumps installed on a floor-by-floor/zone-by-zone pay-as-you-go basis. There's no need to tie up funds while the building is unoccupied or being renovated.

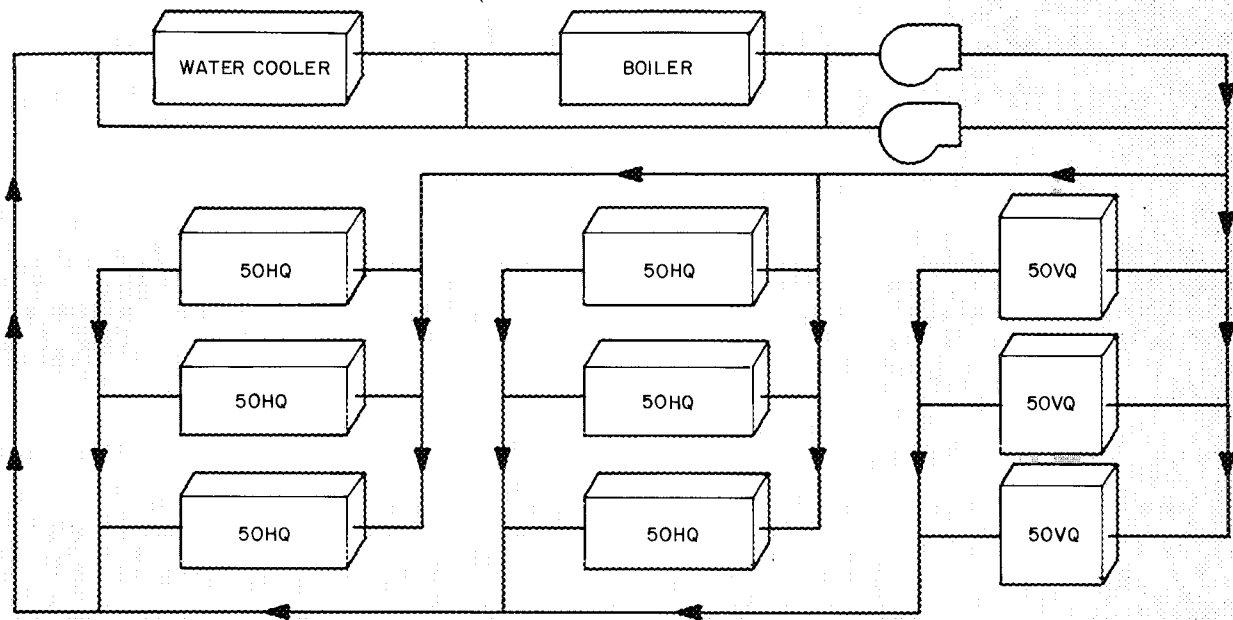
Low operating costs are possible because the system uses energy that might in other systems be thrown away.

Individual room/zone control and metering — Whatever the season, exposure, temperature or time of day, each unit can be controlled individually. There is no changeover inconvenience or discomfort to tenants.

Most of the energy costs associated with the 50BQ,HQ,VQ heat pumps are unit related and can be readily identified to the individual user.

Exceptional flexibility — The boiler's energy source can be electric, gas or oil and can be supplemented with solar or waste heat.

Typical closed circuit water loop



Standard features for years of heating and cooling excellence.

Three-speed PSC fan motors for all-
climate versatility, economical opera-
tion, and effective humidity control.
Speed can be changed quickly using
plug-in connector mounted in unit.

**Heat pump qualified Carrier com-
pressors** standard on all 50HQ,VQ
units. Life-cycle tested and qualified for
heat pump duty. Internal line-break
protection, overcurrent and over-

temperature protection. Internally
spring mounted to minimize vibration
transmission.

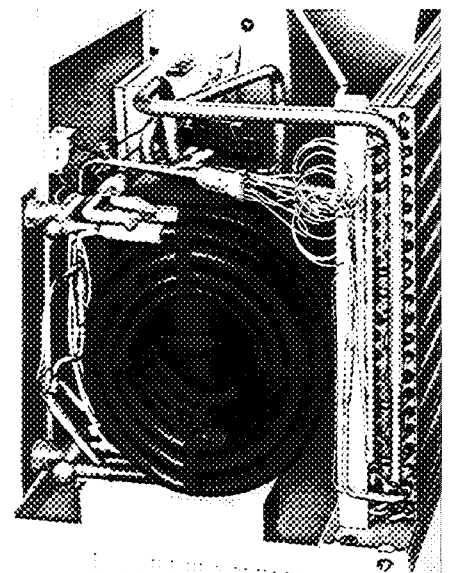
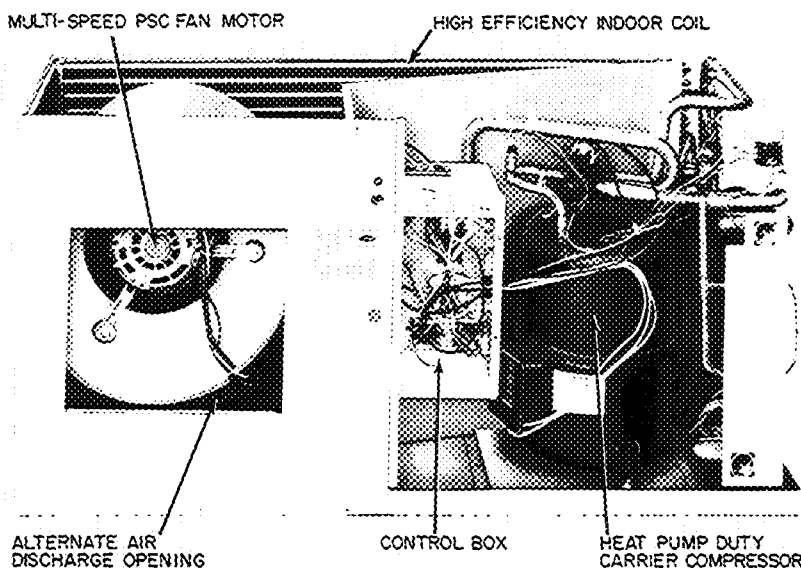
Service panels removable for com-
ponent accessibility.

Freezestat on heating mode. Shuts
unit off automatically on restricted
water flow or extremely low water tem-
peratures. Locks compressor out to

prevent potentially costly damage.
Manual reset.

High-pressure switch protects unit
from excessive condensing pressures.
Shuts down compressor if pressure
rises above setting.

Front-mounted control box quickly
and easily removable for ready servic-
ing, if required.



WATER-TO-REFRIGERANT
HEAT EXCHANGER

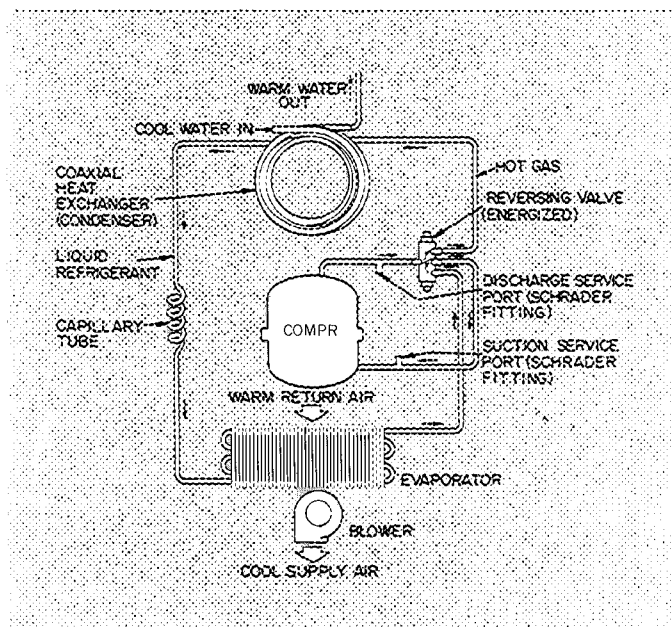
Reliable heating and cooling with the reverse cycle water source heat pump

The 50BQ,HQ,VQ packaged water source heat pumps operate in much the same manner as a conventional air source heat pump except that in lieu of an outdoor coil and its associated defrost cycle, there is a water-to-refrigerant heat exchanger.

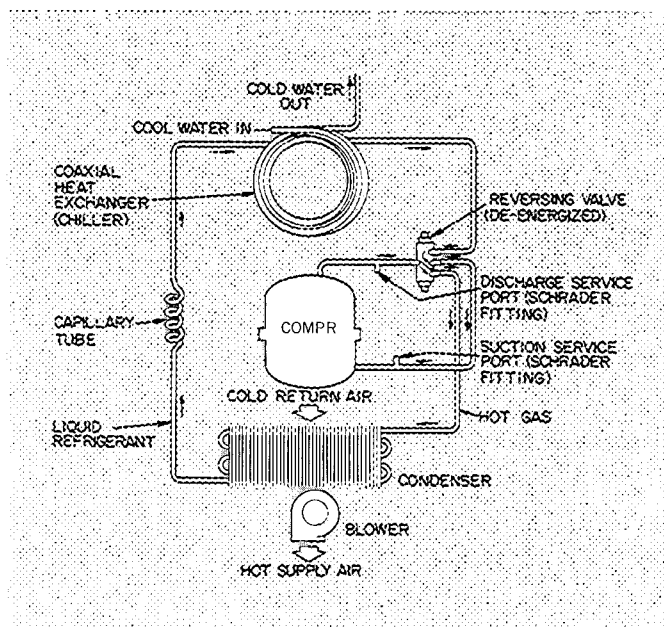
In the cooling mode, heat is extracted from the indoor space by the low temperature refrigerant in the evaporator. As this liquid refrigerant extracts heat, it evaporates into a gas. The gas is compressed in the compressor to a high-pressure, high-temperature gas. The extracted heat and

the heat of compression are removed by the water in the heat exchanger. The gas condenses into a liquid, which is fed into the expansion device. A portion of this liquid flashes, thereby cooling the remaining liquid. The liquid then enters the evaporator, thus completing the cycle.

In the heating mode, the flow is reversed. The heat extracted from the water evaporates the refrigerant in the heat exchanger. The extracted heat and the heat of compression warm the cool return air passing over the indoor coil.



COOLING CYCLE



HEATING CYCLE

Accessories

50HQ,VQ

Thermostat and subbase (24 volt) located in the conditioned space. Provides selection of heating, cooling, continuous or cycling fan operation.

Time Guard II protects unit compressor by preventing short cycling. Provides a 5-minute delay before restarting compressor after a shutdown.

Start thermistor provides easier compressor starting under adverse conditions.

Replacement filter media — Quick and easy replacement of media without cost of filter frame.

50HQ,VQ,BQ

Water control valve package contains balancing and shutoff valves. Provides gallons per minute (GPM) control and water shutoff.

Flexible hose kit — Provides connection between water supply and return valves, and unit supply/return connections. Excellent for application requiring minimum clearances.

50BQ

25% outside air damper — Console unit can be ducted to outdoors for fresh ventilation air all year long.

Physical data and dimensions

50HQ,VQ

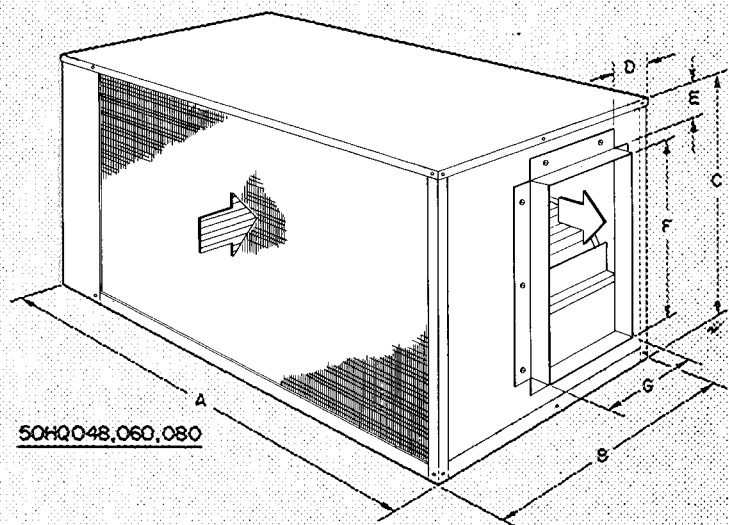
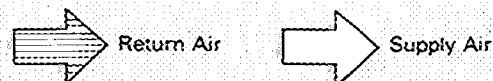
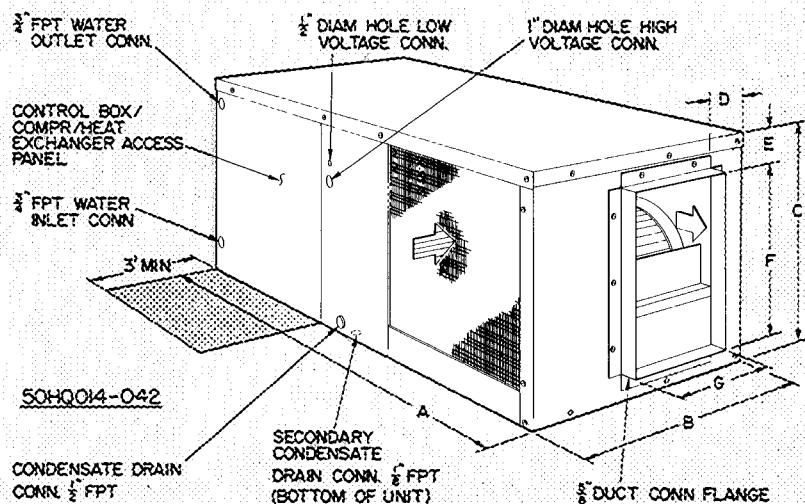
PHYSICAL DATA

UNIT 50HQ,VQ	014	018	020	027	033	042	048	060	080
R-22 CHG (lb-oz)* Refrig Control	1-8	1-10	2-1	2-0	2-3	2-11	—	—	—
FAN	Capillary Tube								
Diameter (in. Nom)	10	10	10	10	10	11	10	10	12
Width (in. Nom)	7	7	7	7	7	7	8	10	9
Range Cfm	400-600	500-700	600-800	750-1000	950-1200	1040-1375	1400-1800	1750-2250	2300-3000
Motor Hp	1/8	1/8	1/6	1/6	1/4	1/3	1/2	3/4	1
Motor Rpm (3-speed)	1075 Nominal								
HEAT EXCHANGER									
Water Flow Rate (Gpm)	2.5-5	3-6	4-8	4.5-9	5-10	6-12	7-14	8.5-17	11.5-23

*Factory refrigerant charge

50HQ WEIGHTS AND DIMENSIONS

MODEL 50HQ	014	018	022	027	033	042	048	060	080
OPERATING WT (lb)	185	195	210	220	230	250	300	325	360
DIMENSIONS (ft-in.)									
A	3-10-3/8						4-0		
B	1-10-3/16						1-11		
C	(includes 1-in accessory filter)						(includes 1-in accessory filter)		
D	1-6						2-0-7/16		
E	0-3-7/16						0-3-7/16		
F	0-2-3/8						0-2-3/8		
SUPPLY DUCT CONN. (ft-in.)							1-0-7/16	1-7-7/8	0-11-15/16
G	1-1-3/8						1-0-7/16	1-1-1/16	0-11-15/16
ACCESSORY FILTER (1) Size (in.)	0-9-7/16						Replaceable Media		
	17 x 22-3/4								

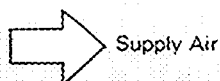
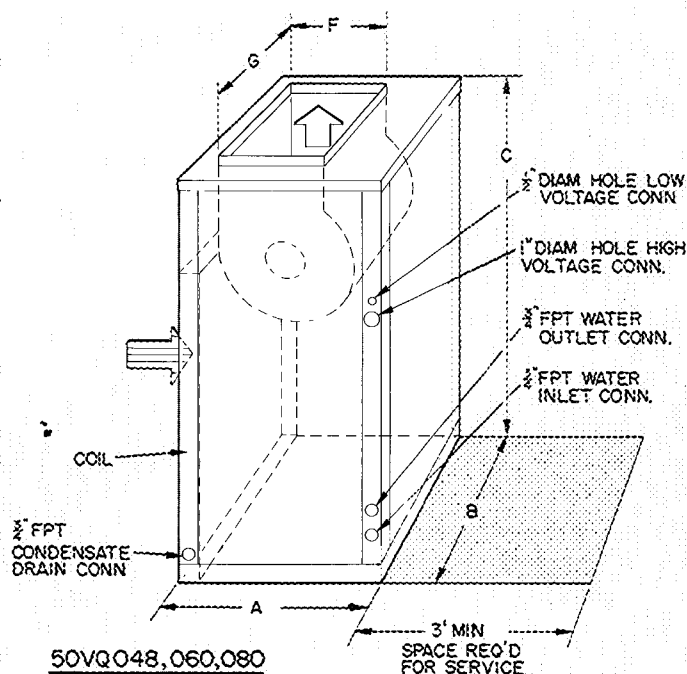
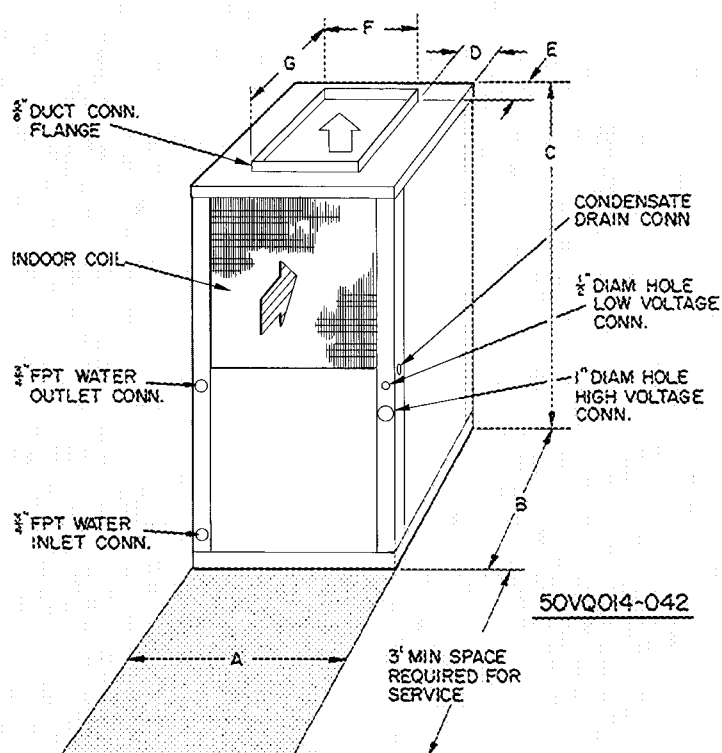


Physical data and dimensions (cont)

50VQ

50VQ WEIGHTS AND DIMENSIONS

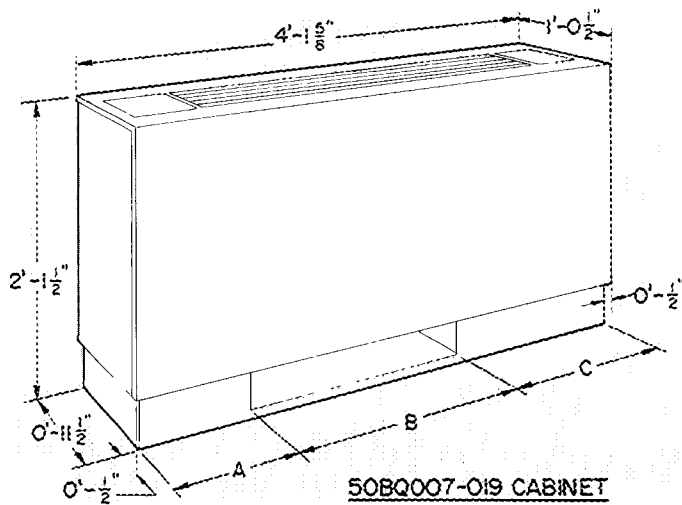
MODEL 50VQ	014	018	022	027	033	042	048	060	080
OPERATING WT (lb)	220	240	260	270	290	320	—	—	—
DIMENSIONS (ft-in.)									
A			1-9-1/8					2-0	
B			1-9-1/8					1-10	
C			3-2-5/16					4-0	
D			0-5-1/2					—	
E			0-1					—	
SUPPLY DUCT CONN. (ft-in.)			0-9-7/16					1-7-7/8	
F			1-1-3/8				1-0-7/16	1-1-1/16	0-11-15/16
G									
FILTER (1) Size (in.)	16 x 20	16 x 20	Disposable, 1-in thick 16 x 20	20 x 20	20 x 20	20 x 20		—	



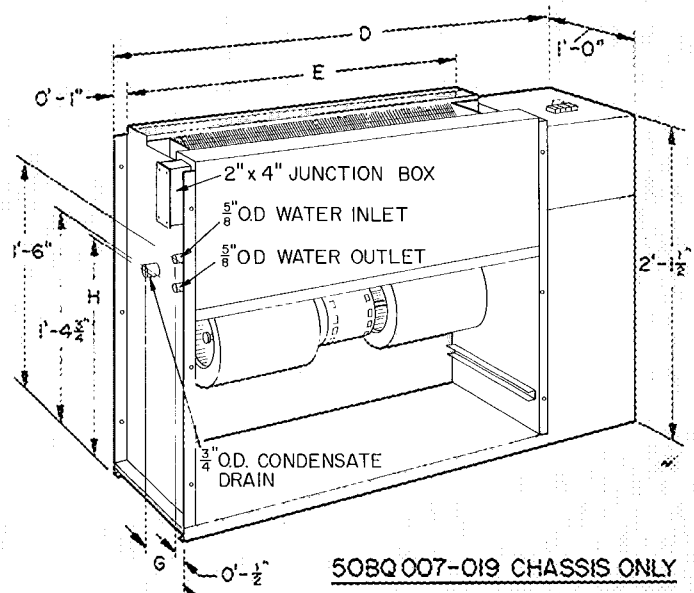
50BQ

PHYSICAL DATA AND DIMENSIONS

UNIT 50BQ	007	009	012	016	019
WEIGHT					
Operating (lb)	180	180	190	190	200
Shipping (lb)	190	190	210	210	230
REFRIGERANT					
Factory Charge (oz)	13	16	R-22 22	27	26
COMPRESSOR			Hermetically Sealed		
Rpm			3500		
BLOWER					
Wheel Size (in.)	48 x 69	48 x 69	48 x 69	56 x 84	56 x 84
Drive			Direct		
BLOWER MOTOR					
Hp	1/10	1/10	1/10	1/15	1/15
Type			PSC		
THERMAL OVERLOAD			Internal		
COIL					
Face Area (sq ft)	1	1	1-3/8	2	2
Rows...Fins/in.	2 12	3 12	3 12	3 12	3 12
Copper Tube Size			3/8		
HEAT EXCHANGER			Tube-in-Tube		
Water Connection			5/8 OD		
DIMENSIONS (ft-in.)					
A		0-10-9/16		0-10	
B		2- 4-1/2		2-8-1/2	
C		0-10-9/16		0-7-1/8	
D		3- 3		3- 6	
E		2- 4-1/2		2-8-1/2	
F		1- 2-1/2		1-0-1/2	
G		0- 6-3/8		0-5-7/8	
H		1- 4-3/4		1- 2	
FILTER (Type)			Throwaway		
Size (in.)		1/2 x 12 x 28		1/2 x 12 x 32	



50BQ007-019 CABINET



50BQ 007-019 CHASSIS ONLY

Selection procedure (with example)

I Determine cooling and heating load requirements

Given:

Total Net Cooling Load	28,000 Btuh
Sensible Heat Load	19,000 Btuh
Total Heating Load	19,000 Btuh
Indoor Air Quantity	900 cfm
External Static Pressure Required	20 in wg
Indoor Coil Air Temp — Ent Wet-Bulb (ewb)	67 F
Indoor Coil Air Temp — Ent Dry-Bulb (edb)	77 F
Water Temp Ent Heat Exchanger (Cooling)	75 F
Water Temp Ent Heat Exchanger (Heating)	60 F

II Select unit from Cooling Capacities table which meets cooling requirements

Enter Cooling Capacities table at 900 cfm, 67 F wet-bulb temperature air entering indoor coil and 75 F temperature water entering heat exchanger. Select a 50HQ027 which has TC of 27,900 Btuh, SHC of 19,600 Btuh and THR of 36,300 Btuh with 2.7 Kw power input. Required heat exchanger water at 75 F is 5 gpm. Bypass factor for 50HQ027 at 900 is .13. Correct SHC for 77 F db temperature air entering indoor coil. Refer to note 3 under Cooling Capacities table.

Bypass Factor

10	From Table
20	From Table
13	By Interpolation

Correction Factor

2.94
2.62
2.84

Correction Calculation: $2.84 \times 900 = 2,556$ Btuh
Corrected SHC: $19,600 - 2,556 = 17,044$

III Determine heating capacity of selected unit

Enter Heating Capacities table for 50HQ027 at 900 cfm air entering indoor coil and heat exchanger water flow of 5 gpm at 60 F. Find total heating capacity of 19,900 Btuh with 2.3 Kw power input. Total heat absorption (from water) is 11,100 Btuh.

IV Determine external static pressure available from selected unit

Enter Fan Performance table for selected unit. The 50HQ027 provides approximately 2 in wg at 900 cfm with fan speed setting at medium.

V Determine Heat Exchanger Water Pressure Drop

Per Heat Exchanger Pressure Drops table, the 50HQ027 has a pressure drop of 8 ft of water at 5 gpm.

Performance data

ARI CAPACITIES

UNIT 50HQ.VQ	CFM	COOLING		HEATING	
		TC	EER	TC	C O P
014	475	14	9.0	17	3.0
018	600	19	8.6	23.5	2.8
022	700	22	10.4	24.5	3.3
027	900	27	9.6	30.0	3.1
033	1075	33	8.6	40	2.7
042	1400	41	8.5	45	2.6
048	1600	47	9.2	48	3.1
060	2000	63	9.5	63	3.0
080	2600	80	8.9	82	3.1

TC — Total Capacity (1000 Btuh)

EER — Energy Efficiency Ratio

C O P — Coefficient of Performance



Rated in accordance with
ARI Standard 320

Cooling Standard 80 F db, 67 F wb indoor entering air temperature and 85 F entering, 95 F leaving water temperature

Heating Standard 70 F db indoor entering air temperature and 70 F entering water temperature

COOLING CAPACITIES

LEGEND

BF — Bypass Factor

Ewb — Entering Wet Bulb

Kw — Unit Total Power Input

SHC — Sensible Heat Capacity (1000 Btuh)

TC — Total Net Capacity (1000 Btuh)

THR — Total Heat Rejection (1000 Btuh)

COOLING RATING NOTES

- Net capacities shown include a deduction for fan motor heat.
- Direct interpolation is permissible. Do not extrapolate.
- SHC is based on 80 F db temperature of air entering indoor coil. Below 80 F db, subtract (corr factor x cfm) from SHC.

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

BYPASS FACTOR	ENTERING AIR DRY-BULB TEMP (F)					
	79	78	77	76	75	under 75
	81	82	83	84	85	over 85
	Correction Factor					
10	98	1.96	2.94	3.92	4.91	Use formula shown below
.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 = $1.09 \times (1 - BF) \times (db - 80)$

4 Formulas

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

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

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

where h_{ewb} = enthalpy of air entering indoor coil

50HQ,VQ014

COOLING CAPACITIES

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			400/150/ 10			500/161/ 12			600/173/ 14		
Ewt (F)	Gpm	~	Indoor Air — Ewb (F)								
			72	67	62	72	67	62	72	67	62
65	2.5	TC	16.5	14.9	13.3	17.2	15.5	14.0	17.7	15.9	14.5
		SHC	7.98	9.88	11.7	8.64	10.9	14.1	9.23	11.9	14.3
		KW	1.50	1.44	1.38	1.54	1.47	1.42	1.58	1.51	1.45
		THR	21.2	19.4	17.7	22.1	20.1	18.4	22.6	20.7	19.1
	4	TC	16.8	15.2	13.6	17.5	15.8	14.3	18.0	16.3	14.8
		SHC	8.09	10.0	11.9	8.74	11.1	13.3	9.33	12.0	14.4
		KW	1.47	1.40	1.34	1.51	1.44	1.38	1.55	1.47	1.41
		THR	21.4	19.6	17.8	22.2	20.3	18.6	22.8	20.9	19.3
	5.5	TC	16.9	15.3	13.7	17.6	15.9	14.4	18.0	16.4	14.9
		SHC	8.11	10.0	11.9	8.77	11.1	13.3	9.35	12.1	14.5
		KW	1.46	1.39	1.33	1.50	1.43	1.36	1.54	1.46	1.40
		THR	21.5	19.6	17.9	22.3	20.4	18.7	22.9	21.0	19.3
75	2.5	TC	15.8	14.2	12.7	16.5	14.8	13.3	16.9	15.2	13.9
		SHC	7.71	9.6	11.4	8.37	10.7	12.8	8.97	11.6	13.8
		KW	1.59	1.52	1.46	1.63	1.56	1.50	1.66	1.59	1.53
		THR	20.8	19.0	17.3	21.6	19.7	18.0	22.1	20.2	18.7
	4	TC	16.2	14.5	13.0	16.8	15.2	13.7	17.3	15.6	14.2
		SHC	7.85	9.75	11.6	8.50	10.8	13.0	9.09	11.8	14.1
		KW	1.54	1.48	1.41	1.59	1.51	1.45	1.62	1.55	1.49
		THR	21.0	19.2	17.5	21.8	19.9	18.3	22.4	20.5	18.9
	5.5	TC	16.3	14.7	13.2	15.9	15.3	13.8	17.4	15.7	14.4
		SHC	7.89	9.80	11.6	7.89	10.9	13.0	9.12	11.8	14.1
		KW	1.53	1.46	1.40	1.49	1.50	1.44	1.61	1.53	1.47
		THR	21.1	19.3	17.5	19.9	20.0	18.3	22.4	20.5	19.0
85	2.5	TC	15.1	13.5	12.0	15.7	14.0	12.6	16.1	14.4	13.3
		SHC	7.43	9.30	11.1	8.09	10.4	12.4	8.68	11.3	13.3
		KW	1.67	1.60	1.54	1.71	1.64	1.58	1.75	1.67	1.62
		THR	20.3	18.5	16.8	21.0	19.2	17.6	21.6	19.7	18.3
	4	TC	15.5	13.4	12.4	16.1	14.4	13.0	16.5	14.9	13.6
		SHC	7.58	9.46	11.2	8.24	10.5	12.6	8.83	11.5	13.6
		KW	1.63	1.56	1.50	1.67	1.59	1.53	1.70	1.63	1.57
		THR	20.6	18.7	17.0	21.3	19.4	17.8	21.9	20.0	18.5
	5.5	TC	15.6	14.0	12.5	16.2	14.6	13.2	16.7	15.0	13.7
		SHC	7.64	9.53	11.3	8.29	10.6	12.7	8.89	11.6	13.7
		KW	1.61	1.54	1.48	1.65	1.58	1.52	1.69	1.61	1.55
		THR	20.7	18.9	17.1	21.4	19.6	17.9	22.0	20.0	18.6

50HQ,VQ018

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			500/220/ 12			600/230/ 14			700/240/ 16		
Ewt (F)	Gpm	—	Indoor Air — Ewb (F)								
			72	67	62	72	67	62	72	67	62
65	3.5	TC	23.6	21.3	19.1	24.5	22.1	20.0	25.1	22.8	20.7
		SHC	11.2	13.7	16.2	11.9	14.9	17.8	12.6	16.0	19.3
		KW	2.07	1.98	1.91	2.11	2.03	1.95	2.16	2.06	1.98
	5	THR	30.1	22.0	25.1	31.1	28.5	20.8	31.9	29.2	26.9
		TC	24.0	21.7	19.6	24.9	22.6	20.5	25.5	23.2	21.1
		SHC	11.3	13.9	16.4	12.1	15.1	18.0	12.8	16.2	19.5
	6.5	KW	2.02	1.92	1.85	2.05	1.97	1.89	2.11	2.01	1.93
		THR	30.3	27.8	25.4	31.4	28.8	26.4	32.1	29.5	27.2
		TC	24.1	21.9	19.8	25.0	22.7	20.6	25.6	23.4	21.3
75	3.5	SHC	11.4	14.0	16.5	12.2	15.2	18.1	12.8	16.3	19.6
		KW	2.00	1.90	1.82	2.04	1.95	1.86	2.09	1.99	1.90
		THR	30.4	27.9	25.5	31.4	28.9	26.5	32.2	29.6	27.3
	5	TC	22.5	20.2	18.1	23.3	21.0	18.9	23.9	21.9	19.7
		SHC	10.7	13.3	15.7	11.5	14.4	17.3	12.2	15.6	18.9
		KW	2.21	2.21	2.04	2.24	2.16	2.08	2.29	2.19	2.12
	6.5	THR	29.9	26.9	24.6	30.4	27.8	25.5	31.1	28.6	26.2
		TC	23.0	20.8	18.6	23.9	21.6	19.5	24.4	22.3	20.1
		SHC	10.9	13.5	15.9	11.7	14.7	17.5	12.4	15.8	19.0
85	3.5	KW	2.14	2.05	1.98	2.18	2.10	2.02	2.23	2.13	2.05
		THR	29.7	27.2	24.8	30.7	28.1	25.8	31.4	28.9	26.6
		TC	23.2	21.0	18.9	24.0	21.8	19.7	24.6	22.4	20.4
	5	SHC	11.0	13.6	16.0	11.8	14.8	17.6	12.4	15.9	19.1
		KW	2.12	2.02	1.95	2.16	2.06	1.99	2.21	2.11	2.02
		THR	29.8	27.3	25.0	30.8	28.4	25.9	31.6	29.0	26.7
	6.5	TC	21.3	19.1	17.4	22.9	19.8	17.8	22.6	20.4	18.5
		SHC	10.3	12.8	15.2	11.1	14.0	16.7	11.7	15.1	18.1
		KW	2.35	2.26	2.19	2.39	2.30	2.23	2.43	2.34	2.23
	3.5	THR	28.7	26.2	23.9	29.6	27.1	24.9	30.3	27.7	25.6
		TC	21.9	19.7	17.6	22.7	20.4	18.4	23.4	21.0	19.1
		SHC	10.5	13.0	15.4	11.3	14.2	17.0	11.9	15.3	18.4
	5	KW	2.28	2.19	2.12	2.32	2.23	2.16	2.36	2.27	2.19
		THR	29.0	26.6	24.2	30.0	27.4	25.1	30.7	28.1	26.0
		TC	22.2	20.1	18.0	23.1	21.0	19.0	24.1	21.4	19.4
	6.5	SHC	10.6	13.2	15.6	11.5	14.3	17.2	12.1	15.5	18.5
		KW	2.24	2.15	2.08	2.28	2.18	2.09	2.31	2.20	2.22
		THR	29.2	26.9	24.6	30.3	27.8	25.2	31.0	28.2	26.3

BF — Bypass Factor
 Ewb — Entering Wet-Bulb
 Kw — Unit Total Power Input
 SHC — Sensible Heat Capacity (1000 Btuh)
 TC — Total Net Capacity (1000 Btuh)
 THR — Total Heat Rejection (1000 Btuh)

Performance data (cont)

COOLING CAPACITIES

50HQ,VQ022

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			600/265/ 14			700/281/ 16			800/298/ 18		
			Indoor Air — Ewb (F)								
Ewt (F)	Gpm		72	67	62	72	67	62	72	67	62
65	4	TC	25.5	23.0	20.6	26.3	23.7	21.4	26.8	24.3	22.0
		SHC	12.1	15.0	17.7	12.8	16.0	19.1	13.4	17.0	20.4
		KW	1.92	1.84	1.77	1.97	1.88	1.81	2.01	1.92	1.84
		THR	31.6	28.8	26.2	32.5	29.6	27.1	33.2	30.3	27.8
	6	TC	26.1	23.6	21.2	26.8	24.3	21.9	27.4	24.8	22.5
		SHC	12.3	15.2	18.0	13.0	16.3	19.4	13.6	17.2	20.7
		KW	1.88	1.79	1.72	1.93	1.84	1.76	1.97	1.88	1.80
		THR	32.0	29.2	26.7	32.9	30.1	27.5	33.6	30.8	28.2
	8	TC	26.2	23.8	21.4	26.9	24.5	22.2	27.5	25.0	22.7
		SHC	12.4	15.3	18.1	13.0	16.3	19.5	13.6	17.3	20.8
		KW	1.87	1.78	1.70	1.92	1.82	1.74	1.96	1.86	1.78
		THR	32.1	29.4	26.8	33.0	30.2	27.7	33.7	30.9	28.4
75	4	TC	24.1	21.6	19.3	24.8	22.2	20.0	25.3	22.7	20.6
		SHC	11.6	14.4	17.1	12.2	15.4	18.5	12.8	16.4	19.7
		KW	2.04	1.96	1.88	2.08	2.00	1.92	2.12	2.03	1.96
		THR	30.5	27.8	25.2	31.3	28.5	26.0	31.9	29.2	26.7
	6	TC	24.7	22.2	19.9	25.4	22.9	20.6	25.9	23.4	21.2
		SHC	11.8	14.7	17.4	12.5	15.7	18.8	13.1	16.7	20.0
		KW	1.99	1.90	1.82	2.03	1.94	1.87	2.07	1.98	1.90
		THR	31.0	28.3	25.7	31.8	29.0	26.5	32.5	29.7	27.2
	8	TC	24.9	22.5	20.2	25.6	23.2	20.9	26.1	23.7	21.5
		SHC	11.9	14.8	17.5	12.5	15.8	18.9	13.1	16.8	20.2
		KW	1.97	1.88	1.80	2.01	1.92	1.84	2.06	1.96	1.88
		THR	31.2	28.4	25.9	32.0	29.2	26.7	32.6	29.9	27.4
85	4	TC	22.5	20.1	17.9	23.1	20.7	18.6	23.6	21.1	19.2
		SHC	11.0	13.8	16.4	11.6	14.8	17.7	12.2	15.8	18.8
		KW	2.16	2.07	1.99	2.21	2.11	2.03	2.24	2.15	2.07
		THR	29.3	26.6	24.2	30.1	27.3	25.0	30.7	27.9	25.7
	6	TC	23.3	20.8	18.5	23.9	21.4	19.2	24.4	21.9	19.8
		SHC	11.3	14.0	16.7	11.9	15.1	18.0	12.5	16.1	19.2
		KW	2.10	2.02	1.94	2.13	2.06	1.98	2.19	2.09	2.02
		THR	29.9	27.2	24.6	30.7	27.9	25.5	31.3	28.5	26.2
	8	TC	23.6	21.1	18.8	24.2	21.7	19.5	24.7	22.2	20.1
		SHC	11.4	14.2	16.8	12.0	15.2	18.2	12.6	16.2	19.4
		KW	2.08	1.99	1.91	2.13	2.03	1.96	2.16	2.07	2.00
		THR	30.1	27.4	24.9	30.9	28.2	25.7	31.5	28.8	26.4

50HQ,VQ027

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			775/287/ 11			900/335/ 13			1025/385/ 14		
			Indoor Air — Ewb (F)								
Ewt (F)	Gpm	—	72	67	62	72	67	62	72	67	62
65	5	TC	30.5	28.6	26.2	31.1	29.1	26.9	30.9	29.4	27.5
		SHC	14.8	18.9	22.9	15.3	19.9	24.4	15.5	20.8	25.9
		KW	2.5	2.4	2.3	2.5	2.5	2.4	2.6	2.5	2.5
		THR	38.3	36.2	33.6	39.1	36.9	34.5	39.0	37.5	35.3
	7.5	TC	30.1	28.4	26.6	29.5	28.6	26.8	29.6	28.6	27.5
		SHC	14.5	18.6	22.9	14.5	19.2	23.5	14.7	19.8	25.4
		KW	2.3	2.3	2.2	2.4	2.3	2.3	2.4	2.4	2.4
		THR	37.5	35.7	33.7	36.9	36.0	34.8	37.3	36.2	35.0
	10	TC	28.8	28.2	26.7	28.8	28.6	27.2	29.1	28.7	27.1
		SHC	13.9	18.1	22.4	14.0	18.9	23.7	14.4	19.7	24.8
		KW	2.3	2.1	2.1	2.2	2.2	2.2	2.4	2.4	2.3
		THR	35.9	34.9	33.4	35.8	35.6	34.1	36.7	36.1	34.4
75	5	TC	29.6	27.3	24.3	30.0	27.9	25.3	30.1	28.3	25.9
		SHC	14.5	18.5	21.9	15.0	19.6	23.8	15.4	20.7	25.2
		KW	2.8	2.6	2.5	2.7	2.7	2.6	2.8	2.7	2.7
		THR	38.1	35.5	32.2	38.6	36.3	33.5	38.9	36.9	34.4
	7.5	TC	29.6	27.7	25.3	29.6	28.1	25.9	29.6	28.4	26.5
		SHC	14.4	18.5	22.5	14.7	19.4	23.9	15.0	20.4	25.4
		KW	2.6	2.5	2.4	2.6	2.6	2.5	2.7	2.6	2.6
		THR	37.7	35.6	32.9	37.8	36.2	33.8	38.1	36.7	34.7
	10	TC	28.8	27.9	26.1	29.0	27.9	26.6	29.1	28.5	27.0
		SHC	14.0	18.3	22.6	14.2	18.9	24.0	14.5	19.9	25.2
		KW	2.5	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.4
		THR	36.6	35.3	33.4	36.6	35.5	34.1	36.9	36.4	34.7
85	5	TC	28.3	25.6	21.8	28.9	26.2	22.9	29.1	26.6	23.9
		SHC	14.1	17.9	20.7	14.7	19.1	22.4	15.3	20.2	23.8
		KW	2.9	2.8	2.7	2.9	2.9	2.8	3.0	2.9	2.8
		THR	37.3	34.4	30.3	38.2	35.2	31.6	38.6	35.9	32.9
	7.5	TC	28.6	26.3	23.3	28.9	26.8	24.4	29.0	27.0	24.2
		SHC	14.1	18.1	21.5	14.6	19.2	23.2	15.0	20.5	24.0
		KW	2.8	2.7	2.6	2.8	2.8	2.7	2.9	2.8	2.8
		THR	37.4	34.8	31.5	37.8	35.5	32.8	38.1	35.1	32.2
	10	TC	28.6	26.6	23.9	28.7	27.1	24.7	29.0	27.2	25.3
		SHC	14.0	18.2	21.8	14.4	19.3	23.4	14.9	20.0	24.7
		KW	2.7	2.7	2.6	2.8	2.7	2.6	2.8	2.8	2.7
		THR	37.1	34.9	32.1	37.4	35.7	33.1	37.9	36.0	33.8

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			950/418/ 14			1075/450/ 15			1200/520/ 17		
			Indoor Air — Ewb (F)								
Ewt (F)	Gpm	---	72	67	62	72	67	62	72	67	62
65	6	TC	41.5	37.8	34.3	42.4	38.7	35.2	42.9	39.2	35.8
		SHC	19.8	24.5	29.2	20.5	25.8	31.0	21.1	26.9	32.5
		KW	3.59	3.42	3.27	3.67	3.50	3.35	3.77	3.60	3.45
		THR	52.8	48.6	44.7	53.9	49.7	45.8	54.7	50.4	46.7
	9	TC	42.1	38.4	35.0	42.9	39.3	35.8	43.5	39.8	36.4
		SHC	20.0	24.8	29.5	20.7	26.1	31.3	21.3	27.2	32.9
		KW	3.53	3.36	3.20	3.61	3.43	3.28	3.72	3.54	3.38
		THR	53.2	49.0	45.1	54.3	50.1	46.2	55.2	51.0	47.1
	12	TC	42.2	38.5	35.1	43.0	39.4	36.0	43.6	39.9	36.6
		SHC	20.0	24.8	29.6	20.8	26.1	31.4	21.4	27.2	32.9
		KW	3.52	3.34	3.18	3.59	3.42	3.26	3.70	3.53	3.37
		THR	53.3	49.1	45.2	54.3	50.1	46.3	55.3	51.0	47.2
75	6	TC	39.7	36.1	32.6	40.5	36.8	33.5	41.0	37.4	34.1
		SHC	19.1	23.8	28.3	19.8	25.1	30.1	20.4	26.2	31.6
		KW	3.78	3.61	3.46	3.86	3.68	3.53	3.96	3.79	3.64
		THR	51.6	47.4	43.5	52.6	48.4	44.6	53.5	49.3	45.6
	9	TC	40.4	36.8	33.4	41.2	37.6	34.3	41.7	38.1	34.8
		SHC	19.3	24.1	28.7	20.1	25.4	30.5	20.7	26.5	32.0
		KW	3.71	3.53	3.37	3.79	3.60	3.45	3.90	3.71	3.55
		THR	52.1	47.9	44.1	53.1	48.9	45.1	54.0	49.8	46.1
	12	TC	40.5	37.0	33.7	41.3	37.8	34.5	41.8	38.3	35.0
		SHC	19.4	24.2	28.8	20.1	25.4	30.6	20.7	26.5	32.2
		KW	3.69	3.51	3.35	3.77	3.58	3.42	3.88	3.69	3.53
		THR	52.2	48.0	44.2	53.2	49.0	45.3	54.1	49.9	46.2
85	6	TC	37.8	34.1	30.8	38.5	34.9	31.6	38.9	35.3	32.2
		SHC	18.3	22.9	27.4	19.1	24.3	29.2	19.7	25.4	30.6
		KW	3.98	3.81	3.66	4.05	3.88	3.73	4.16	3.98	3.84
		THR	50.3	46.1	42.3	51.2	47.1	43.4	52.0	47.9	44.3
	9	TC	38.6	35.1	31.7	39.3	35.8	32.5	39.8	36.3	33.1
		SHC	18.6	23.3	27.9	19.4	24.6	29.7	20.0	25.8	31.1
		KW	3.89	3.71	3.56	3.97	3.79	3.63	4.08	3.89	3.74
		THR	50.8	46.7	42.9	51.8	47.7	44.0	52.6	48.5	44.9
	12	TC	38.8	35.4	32.1	39.5	36.1	32.9	40.0	36.5	33.4
		SHC	18.7	23.5	28.1	19.5	24.7	29.8	20.1	25.9	31.3
		KW	3.87	3.68	3.52	3.95	3.76	3.59	4.06	3.86	3.70
		THR	51.0	46.9	43.2	51.9	47.9	44.2	52.8	48.7	45.1

50HQ,VQ042

Water Flow Data			Indoor Air (Cfm/ Fan Watts/ BF)								
			1225/580/ 14			1400/640/ 17			1575/745/ 20		
			Indoor Air — Ewb (F)								
Ewt.(F)	Gpm	--	72	67	62	72	67	62	72	67	62
65	7.5	TC	51.1	46.6	42.6	52.1	47.5	43.7	52.6	48.1	44.5
		SHC	24.9	31.5	37.9	26.1	33.6	40.6	27.1	35.3	42.9
		KW	4.9	4.6	4.4	5.0	4.7	4.5	5.2	4.9	4.7
		THR	66.8	61.4	56.7	68.2	62.7	58.2	69.3	63.8	59.6
	11	TC	51.6	47.1	43.1	52.5	47.9	44.1	53.0	48.5	44.9
		SHC	25.1	31.7	38.2	26.3	33.9	40.9	27.4	35.5	43.1
		KW	4.8	4.6	4.3	4.9	4.6	4.5	5.0	4.9	4.6
		THR	67.1	61.7	57.0	68.5	63.1	58.5	69.7	64.1	60.0
	14.0	TC	51.7	47.2	43.3	52.6	48.1	44.3	53.1	48.7	45.1
		SHC	25.1	31.8	38.3	26.3	33.8	40.9	27.2	35.6	43.2
		KW	4.8	4.6	4.3	5.0	4.7	4.5	5.1	4.9	4.6
		THR	67.1	61.7	57.1	68.5	63.1	58.6	69.6	64.2	59.9
75	7.5	TC	48.9	44.4	40.5	49.8	45.3	41.6	50.3	45.8	42.4
		SHC	24.1	30.6	36.9	25.3	32.7	39.5	26.2	34.4	41.6
		KW	5.1	4.9	4.7	5.3	4.9	4.8	5.4	5.1	4.9
		THR	65.3	59.9	55.3	66.6	61.2	56.8	67.7	62.2	58.2
	11	TC	49.5	45.1	41.3	50.4	46.0	42.3	50.9	46.5	43.1
		SHC	24.3	30.9	37.3	25.5	32.9	39.9	26.4	34.7	42.0
		KW	5.1	4.8	4.6	5.2	4.9	4.7	5.4	5.1	4.9
		THR	65.7	60.4	55.8	67.0	61.6	57.3	68.0	62.7	58.7
	14	TC	49.6	45.3	41.5	50.5	46.1	42.5	51.0	46.6	43.3
		SHC	24.4	31.0	37.4	25.5	33.0	40.0	26.5	34.8	42.1
		KW	5.1	4.8	4.5	5.2	5.0	4.7	5.4	5.1	4.8
		THR	65.8	60.5	55.9	67.1	61.7	57.4	68.1	62.8	58.7
85	7.5	TC	46.5	42.0	38.2	47.3	42.8	39.3	47.7	43.4	40.2
		SHC	23.2	29.6	35.7	24.4	31.7	38.2	25.4	33.4	40.0
		KW	5.4	5.1	4.9	5.5	5.2	5.0	5.7	5.4	5.2
		THR	63.6	58.3	53.7	64.9	59.5	55.3	65.9	60.5	56.8
	11	TC	47.3	42.9	39.2	48.1	43.7	40.3	48.5	44.2	41.1
		SHC	23.5	30.0	36.2	24.7	32.0	38.8	25.6	33.8	40.7
		KW	5.3	5.0	4.8	5.4	5.1	4.9	5.6	5.3	5.1
		THR	64.2	59.0	54.5	65.4	60.1	56.0	66.4	61.2	57.3
	14	TC	47.5	43.2	39.5	48.3	44.0	40.6	48.7	44.4	41.3
		SHC	23.6	30.1	36.4	24.7	32.1	38.9	25.7	33.9	40.9
		KW	5.3	5.0	4.8	5.4	5.1	4.9	5.6	5.3	5.1
		THR	64.3	59.1	54.7	65.5	60.3	56.2	66.5	61.3	57.5

BF — Bypass Factor
 Ewb — Entering Wet-Bulb
 Kw — Unit Total Power Input
 SHC — Sensible Heat Capacity (1000 Btuh)
 TC — Total Net Capacity (1000 Btuh)
 THR — Total Heat Rejection (1000 Btuh)

Performance data (cont)

COOLING CAPACITIES

50HQ,VQ048

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			1400/655/ 11			1600/750/ 13			1800/845/ 14		
			Indoor Air — Ewb (F)								
Ewt (F)	Gpm	—	72	67	62	72	67	62	72	67	62
65	8.5	TC	55.1	51.4	46.6	56.0	52.2	47.7	55.9	52.4	49.2
		SHC	26.6	34.2	41.2	27.5	36.1	43.9	27.9	36.6	46.2
		KW	4.6	4.5	4.4	4.8	4.6	4.5	4.8	4.6	4.5
	12.5	THR	69.7	65.5	60.4	71.0	66.9	61.9	71.3	67.3	63.2
		TC	54.1	51.3	47.4	54.2	51.5	48.1	54.4	51.5	48.8
		SHC	26.0	33.8	41.4	26.4	34.9	43.6	26.9	35.8	45.6
	16.5	KW	4.4	4.3	4.2	4.5	4.4	4.3	4.6	4.5	4.4
		THR	68.1	64.9	60.7	68.6	65.6	61.9	69.1	62.9	62.9
		TC	52.3	50.6	47.4	52.5	51.2	47.9	53.7	51.4	48.7
	8.5	SHC	25.1	33.1	41.1	24.9	32.5	42.9	25.8	34.5	44.8
		KW	4.3	4.2	4.1	4.4	4.4	4.3	4.6	4.5	4.4
		THR	65.7	64.0	60.5	65.8	64.8	61.4	68.2	63.9	61.7
75	8.5	TC	53.4	48.6	42.4	53.7	49.4	44.2	53.9	49.9	45.8
		SHC	32.6	33.3	39.1	26.8	35.1	42.1	27.5	36.7	44.7
		KW	5.0	4.8	4.8	5.1	4.9	4.8	5.2	5.1	4.9
	12.5	THR	69.0	63.9	57.2	69.8	65.0	59.4	70.5	65.9	61.5
		TC	52.7	49.2	45.0	53.4	49.7	45.8	53.0	50.2	46.7
		SHC	25.6	33.2	40.4	26.4	34.6	42.7	26.7	36.2	45.0
	16.5	KW	4.8	4.6	4.5	4.9	4.8	4.6	4.9	4.8	4.8
		THR	67.7	63.9	59.3	68.9	64.7	60.5	68.8	65.7	61.8
		TC	50.9	49.4	46.2	51.3	49.4	47.1	51.5	50.4	47.8
	8.5	SHC	24.9	32.6	40.2	25.3	33.6	42.7	25.8	35.4	44.9
		KW	4.9	4.7	4.6	4.9	4.8	4.7	4.9	4.8	4.8
		THR	66.2	62.4	58.3	67.7	64.1	59.4	67.9	64.8	60.9
85	8.5	TC	50.5	44.9	37.8	51.1	49.4	45.6	51.8	49.0	46.3
		SHC	25.1	31.8	36.7	26.0	33.7	42.5	26.2	35.8	44.3
		KW	5.3	5.1	5.0	5.4	5.2	5.1	5.3	5.2	5.2
	12.5	THR	67.3	61.1	53.6	68.3	64.5	59.1	68.9	65.7	60.5
		TC	50.8	46.7	41.5	51.1	47.4	43.3	51.3	47.9	44.2
		SHC	25.0	32.4	38.6	25.7	34.2	41.6	26.4	36.0	43.6
	16.5	KW	5.1	4.9	4.8	5.2	5.1	4.9	5.3	5.2	5.1
		THR	67.0	62.4	56.7	67.6	63.5	58.9	68.2	64.6	60.4
		TC	50.9	47.1	42.3	51.4	48.0	43.7	51.5	48.1	44.8
	8.5	SHC	24.9	32.3	38.8	25.6	34.4	41.7	26.5	35.6	43.9
		KW	4.9	4.9	4.7	4.8	5.0	4.7	5.0	5.0	4.8
		THR	66.0	62.1	57.1	66.6	63.5	58.9	67.5	64.1	60.2

50HQ,VQ060

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			1750/785/ 14			2000/900/ 15			2250/1012/ 17		
Ewt (F)	Gpm	—	Indoor Air — Ewb (F)								
			72	67	62	72	67	62	72	67	62
65	11.5	TC	74.2	67.6	61.5	75.5	68.9	62.9	76.5	69.9	64.1
		SHC	35.9	45.1	53.9	37.4	47.7	57.5	38.8	50.2	60.8
		KW	6.2	5.9	5.7	6.4	6.1	5.8	6.6	6.3	6.0
	17	THR	93.9	86.2	79.3	95.8	88.2	81.4	97.4	89.8	83.2
		TC	69.9	66.8	62.2	69.6	66.8	63.3	69.7	67.3	63.9
		SHC	33.6	43.9	53.9	34.0	45.2	57.2	34.6	46.9	59.6
	22.5	KW	5.8	5.6	5.5	5.9	5.8	5.7	6.0	5.9	5.8
		THR	88.1	84.6	79.6	88.2	84.9	81.3	88.7	86.0	82.3
		TC	65.9	63.8	61.4	65.6	64.3	62.0	65.6	64.5	62.0
75	11.5	SHC	31.6	41.6	52.8	31.9	43.1	55.3	32.2	44.3	57.0
		KW	5.5	5.4	5.3	5.6	5.6	5.5	5.8	5.7	5.6
		THR	83.4	81.0	78.3	83.5	82.0	79.4	84.0	82.6	79.8
	17	TC	70.7	64.4	55.1	71.4	65.7	57.7	72.1	66.5	60.0
		SHC	34.5	43.8	50.9	35.7	46.5	55.0	37.0	48.9	58.9
		KW	6.5	6.3	6.1	6.7	6.5	6.3	6.8	6.6	6.4
	22.5	THR	91.3	84.2	74.3	92.6	86.2	77.5	93.8	87.5	80.3
		TC	69.2	65.0	59.7	70.0	65.8	61.0	70.1	66.6	62.0
		SHC	33.6	43.7	53.1	34.7	45.8	56.5	35.4	48.1	59.6
85	11.5	KW	6.2	6.0	5.9	6.4	6.2	6.0	6.5	6.4	6.2
		THR	88.8	84.2	78.2	90.3	85.4	80.0	90.8	86.8	81.7
		TC	67.0	64.3	59.8	67.5	64.5	60.8	66.8	64.4	61.6
	17	SHC	32.5	42.9	52.8	33.3	44.4	55.9	33.4	45.6	58.4
		KW	6.0	5.9	5.7	6.2	6.0	5.9	6.3	6.2	6.1
		THR	86.1	82.9	77.9	87.0	83.6	79.5	86.7	83.8	80.8
	22.5	TC	65.6	58.4	48.6	68.5	59.9	51.1	69.1	61.7	53.7
		SHC	33.4	41.3	47.5	34.9	44.2	51.0	36.2	47.1	53.7
		KW	6.9	6.7	6.5	7.1	6.9	6.7	7.3	7.0	6.9
95	11.5	THR	89.4	79.5	69.2	91.0	81.6	72.3	92.2	83.9	75.4
		TC	67.6	62.4	54.4	68.4	63.4	56.8	69.1	64.1	59.0
		SHC	33.2	42.9	50.6	34.5	45.5	54.5	35.7	47.8	58.1
	17	KW	6.7	6.5	6.3	6.8	6.6	6.4	7.0	6.8	6.6
		THR	88.6	82.8	74.2	90.0	84.4	77.1	91.3	85.6	79.9
		TC	66.3	62.4	57.0	66.9	63.3	58.5	67.4	63.7	59.6
	22.5	SHC	32.5	42.7	51.8	33.5	44.9	55.3	34.5	46.8	58.2
		KW	6.5	6.3	6.2	6.6	6.5	6.3	6.8	6.6	6.5
		THR	86.9	82.4	76.4	87.9	83.8	78.4	89.0	84.7	80.1

50HQ.VQ080

COOLING CAPACITIES

Water Flow Data			Indoor Air (Cfm/Fan Watts/BF)								
			2300/1205/ 14			2600/1380/ 17			3000/1600/ 20		
Ewt (F)	Gpm	—	72	67	62	72	67	62	72	67	62
65	15	TC	91.9	85.4	78.2	92.9	86.5	79.8	93.7	87.2	81.8
		SHC	45.1	58.5	71.1	46.6	61.6	75.5	48.6	65.4	80.8
		KW	8.2	7.9	7.6	8.4	8.1	7.9	8.7	8.4	8.2
		THR	117.8	110.5	102.5	119.6	112.4	104.9	121.5	113.9	108.0
	22	TC	88.0	84.4	78.8	80.1	84.5	79.8	88.2	84.8	80.7
		SHC	42.9	57.4	70.9	43.8	59.4	74.7	45.0	62.5	78.6
		KW	7.7	7.6	7.4	7.9	7.8	7.6	8.2	8.0	7.9
		THR	112.5	108.5	102.2	113.3	109.2	104.0	114.3	110.4	105.7
	29	TC	83.2	81.7	77.9	83.6	81.9	78.1	83.5	81.8	79.0
		SHC	40.4	55.2	69.7	41.2	57.2	72.5	42.0	59.4	76.4
		KW	7.4	7.4	7.2	7.7	7.6	7.4	7.9	7.8	7.7
		THR	106.8	105.1	100.7	107.9	106.1	101.7	108.6	106.8	103.5
75	15	TC	89.3	81.9	70.2	90.2	82.9	73.0	90.7	84.0	77.8
		SHC	44.3	57.3	67.1	45.9	60.5	72.1	47.9	64.7	77.8
		KW	8.8	8.4	8.2	9.0	8.7	8.4	9.3	9.0	8.7
		THR	117.1	108.6	96.1	118.8	110.5	100.0	120.2	112.6	105.7
	22	TC	87.7	82.3	75.9	88.6	82.9	77.3	87.9	83.8	78.8
		SHC	43.3	57.1	69.8	44.8	59.8	74.1	45.8	63.8	78.4
		KW	8.4	8.1	7.9	8.6	8.4	8.1	8.8	8.6	8.4
		THR	114.2	108.1	100.7	115.9	109.4	103.2	116.1	111.4	105.7
	29	TC	84.6	81.1	76.0	85.5	81.7	77.2	85.2	81.6	78.0
		SHC	41.6	55.9	69.6	43.0	58.6	73.5	43.9	61.3	77.2
		KW	8.1	7.9	7.7	8.4	8.2	8.0	8.6	8.4	8.3
		THR	110.3	106.3	100.6	112.1	107.7	102.5	112.6	108.4	104.4
85	15	TC	85.8	74.2	61.9	86.7	75.5	66.7	87.4	78.1	70.6
		SHC	43.1	54.2	61.8	45.0	57.7	66.7	47.2	62.6	70.6
		KW	9.3	9.0	8.7	9.6	9.2	8.9	9.9	9.5	9.3
		THR	115.3	102.6	89.6	117.1	104.8	95.2	118.8	108.4	100.3
	22	TC	85.4	79.0	69.1	86.1	80.0	72.3	86.8	81.0	75.9
		SHC	42.8	56.1	66.5	44.3	59.3	71.5	46.4	63.4	75.8
		KW	8.9	8.7	8.4	9.2	8.9	8.7	9.5	9.2	9.0
		THR	113.8	106.6	95.8	115.2	108.4	99.9	116.9	110.3	104.6
	29	TC	84.1	79.0	72.5	84.8	79.7	74.1	84.9	80.7	76.2
		SHC	42.0	55.8	68.2	43.4	58.8	72.4	44.9	62.8	76.2
		KW	8.8	8.5	8.3	9.0	8.8	8.5	9.3	9.1	8.9
		THR	111.9	106.0	98.8	113.4	107.5	101.2	114.3	109.4	104.5

BF — Bypass Factor
 Ewb — Entering Wet-Bulb
 Kw — Unit Total Power Input
 SHC — Sensible Heat Capacity (1000 Btuh)
 TC — Total Net Capacity (1000 Btuh)
 THR — Total Heat Rejection (1000 Btuh)

COOLING CAPACITIES

50BQ007

Water Flow Data			Indoor Air Cfm		
			230		
Ewt (F)	Gpm	—	Indoor Air — Ewb (F)		
			70	67	61
64	.9	TC	8.11	7.80	6.76
		SHC	4.37	4.99	6.03
		KW	7.6	7.6	7.6
		THR	10.92	10.51	9.79
75	.9	TC	7.72	7.43	6.44
		SHC	4.16	4.75	5.74
		KW	8.1	8.1	8.1
		THR	10.49	10.10	9.41
85	.9	TC	8.11	7.80	6.76
		SHC	4.37	4.99	6.03
		KW	7.6	7.6	7.6
		THR	10.92	10.51	9.79
85	1.9	TC	7.33	7.05	6.11
		SHC	3.95	4.51	5.45
		KW	8.8	8.8	8.8
		THR	10.18	9.79	9.12
85	1.9	TC	7.72	7.42	6.44
		SHC	4.16	4.75	5.74
		KW	8.1	8.1	8.1
		THR	10.49	10.10	9.41

50BQ009

Water Flow Data			Indoor Air Cfm		
			350		
Ewt (F)	Gpm	—	Indoor Air — Ewb (F)		
			70	67	61
65	1.3	TC	9.78	9.36	8.32
		SHC	5.72	6.76	8.11
		KW	8.9	8.9	8.9
		THR	12.88	12.36	11.02
75	1.1	TC	9.30	8.91	7.92
		SHC	5.45	6.44	7.72
		KW	9.2	9.2	9.2
		THR	12.38	11.88	10.59
85	2.3	TC	9.78	9.36	8.32
		SHC	5.72	6.76	8.11
		KW	8.9	8.9	8.9
		THR	11.02	12.36	11.02
85	1.1	TC	8.84	8.46	7.52
		SHC	5.17	6.11	7.33
		KW	9.8	9.8	9.8
		THR	12.00	11.52	10.27
85	2.3	TC	9.30	8.91	7.92
		SHC	5.45	6.44	7.72
		KW	9.2	9.2	9.2
		THR	12.38	11.88	10.59

BF — Bypass Factor
 Ewb — Entering Wet-Bulb
 Kw — Unit Total Power Input
 SHC — Sensible Heat Capacity (1000 Btuh)
 TC — Total Net Capacity (1000 Btuh)
 THR — Total Heat Rejection (1000 Btuh)

Performance data (cont)

COOLING CAPACITIES

50BQ012

Water Flow Data			Indoor Air Cfm		
			450		
			Indoor Air — Ewb (F)		
Ewt (F)	Gpm	—	70	67	61
65	1.6	TC	13.83	13.00	11.54
		SHC	7.80	8.74	10.82
		KW	1.25	1.25	1.25
		THR	18.13	17.30	15.86
75	1.6	TC	13.17	12.38	10.99
		SHC	7.43	8.32	10.30
		KW	1.31	1.31	1.31
		THR	17.42	16.63	15.25
75	3.1	TC	13.83	13.00	11.54
		SHC	7.80	8.74	10.82
		KW	1.25	1.25	1.25
		THR	18.13	17.30	15.86
85	1.6	TC	12.50	11.75	10.43
		SHC	7.05	7.90	9.78
		KW	1.36	1.36	1.36
		THR	16.90	16.13	14.78
85	3.1	TC	13.30	12.50	11.10
		SHC	7.50	8.40	10.40
		KW	1.30	1.30	1.30
		THR	17.60	16.80	15.40

50BQ016

Water Flow Data			Indoor Air Cfm		
			450		
			Indoor Air — Ewb (F)		
Ewt (F)	Gpm	—	70	67	61
65	1.9	TC	16.60	16.28	14.28
		SHC	9.45	10.92	13.55
		KW	1.47	1.47	1.47
		THR	21.42	20.60	18.85
75	1.9	TC	15.80	15.50	13.60
		SHC	9.00	10.40	12.90
		KW	1.51	1.51	1.51
		THR	20.80	20.00	18.30
75	3.8	TC	16.60	16.28	14.28
		SHC	9.45	10.92	13.55
		KW	1.47	1.47	1.47
		THR	21.42	20.60	18.85
85	1.9	TC	15.17	14.88	13.06
		SHC	8.64	9.98	12.38
		KW	1.56	1.56	1.56
		THR	19.97	19.20	17.57
85	3.8	TC	15.80	15.50	13.60
		SHC	9.00	10.40	12.90
		KW	1.51	1.51	1.51
		THR	20.80	20.00	18.30

50BQ019

Water Flow Data			Indoor Air Cfm		
			450		
			Indoor Air — Ewb (F)		
Ewt (F)	Gpm	—	70	67	61
65	2.4	TC	20.69	19.95	17.96
		SHC	11.03	12.50	14.50
		KW	2.07	2.07	2.07
		THR	27.40	26.27	23.99
75	2.4	TC	20.69	19.95	17.96
		SHC	11.03	12.50	14.50
		KW	2.11	2.11	2.11
		THR	27.93	26.78	23.07
75	4.7	TC	20.69	19.95	17.96
		SHC	11.03	12.50	14.50
		KW	2.07	2.07	2.07
		THR	27.40	26.27	23.99
85	2.4	TC	18.91	18.24	16.42
		SHC	10.08	11.42	13.25
		KW	2.14	2.14	2.14
		THR	25.54	24.48	22.37
85	4.7	TC	20.69	19.95	17.96
		SHC	11.03	12.50	14.49
		KW	2.11	2.11	2.11
		THR	27.93	26.78	23.07

HEATING CAPACITIES

50HQ,VQ014

Water Flow Data			Indoor Air		
			Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	—	400/150	500/161	600/173
60	2.5	TC	13.1	13.5	13.8
		KW	1.53	1.48	1.45
		THA	9.90	10.4	10.7
		TC	13.9	14.4	14.7
60	4	KW	1.58	1.52	1.49
		THA	10.6	11.1	11.5
		TC	14.3	14.9	15.2
		KW	1.60	1.55	1.51
70	2.5	THA	10.9	11.5	11.9
		TC	15.4	15.9	16.3
		KW	1.67	1.60	1.56
		THA	11.8	12.4	12.7
70	4	TC	16.4	17.0	17.4
		KW	1.74	1.66	1.61
		THA	12.7	13.4	13.8
		TC	17.0	17.6	18.1
80	5.5	KW	1.77	1.69	1.64
		THA	13.1	13.9	14.4
		TC	18.0	18.6	19.0
		KW	1.83	1.74	1.69
80	2.5	THA	13.9	14.7	15.2
		TC	19.2	20.0	20.4
		KW	1.92	1.82	1.76
		THA	14.9	15.9	16.5
80	4	TC	19.9	20.7	21.2
		KW	1.96	1.86	1.80
		THA	15.5	16.5	17.1
		TC	19.9	20.7	21.2

50HQ,VQ018

Water Flow Data			Indoor Air		
			Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	—	500/220	600/230	700/240
60	3.5	TC	16.4	16.9	17.1
		KW	2.19	2.12	2.07
		THA	11.6	12.2	12.5
		TC	17.9	17.6	17.8
60	5	KW	2.25	2.17	2.11
		THA	12.0	12.8	13.1
		TC	17.5	18.0	18.3
		KW	2.28	2.20	2.14
70	6.5	THA	12.5	13.1	13.5
		TC	19.3	19.8	20.1
		KW	2.42	2.32	2.26
		THA	13.8	14.5	15.0
70	5	TC	20.0	20.6	21.0
		KW	2.49	2.39	2.32
		THA	14.4	15.2	15.8
		TC	20.4	20.9	21.3
80	6.5	KW	2.52	2.44	2.38
		THA	14.9	15.8	16.5
		TC	22.2	22.8	23.2
		KW	2.68	2.56	2.46
80	3.5	THA	16.1	16.9	17.5
		TC	23.2	23.8	24.3
		KW	2.77	2.64	2.54
		THA	16.8	17.7	18.3
80	5	TC	23.8	24.3	25.1
		KW	2.83	2.76	2.62
		THA	17.3	18.4	19.1
		TC	23.8	24.3	25.1

BF — Bypass Factor
 Ewb — Entering Wet-Bulb
 Kw — Unit Total Power Input
 SHC — Sensible Heat Capacity (1000 Btuh)
 TC — Total Net Capacity (1000 Btuh)
 THR — Total Heat Rejection (1000 Btuh)

HEATING CAPACITIES

50HQ,VQ022

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	--	600/265	700/281	800/298
60	4	TC	18.4	19.0	19.5
		KW	1.96	1.93	1.91
		THA	13.9	14.5	15.0
	6	TC	19.4	20.0	20.6
		KW	2.01	1.98	1.96
		THA	14.7	15.4	16.0
70	8	TC	19.9	20.6	21.1
		KW	2.04	2.01	1.98
		THA	15.2	15.9	16.5
	4	TC	21.8	22.5	23.0
		KW	2.15	2.10	2.07
		THA	16.8	17.5	18.1
80	6	TC	22.9	23.7	24.4
		KW	2.22	2.17	2.13
		THA	17.7	18.6	19.3
	8	TC	23.6	24.4	25.1
		KW	2.26	2.20	2.17
		THA	18.3	19.2	19.9
90	4	TC	25.3	26.1	26.8
		KW	2.36	2.30	2.25
		THA	19.7	20.7	21.4
	6	TC	26.7	27.7	28.4
		KW	2.45	2.38	2.33
		THA	20.9	22.0	22.8
100	8	TC	27.5	28.6	29.4
		KW	2.50	2.43	2.38
		THA	21.6	22.7	23.6

50HQ,VQ033

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	--	950/418	1075/450	1200/520
60	6	TC	28.4	29.0	29.5
		KW	3.2	3.2	3.2
		THA	20.7	21.3	21.7
	9	TC	29.8	30.3	30.9
		KW	3.30	3.27	3.28
		THA	21.9	22.4	22.8
70	12	TC	30.7	31.3	31.8
		KW	3.35	3.32	3.32
		THA	22.6	23.2	23.6
	6	TC	33.2	33.7	34.3
		KW	3.5	3.45	3.44
		THA	24.7	25.2	25.7
80	9	TC	34.9	35.5	36.1
		KW	3.62	3.56	3.55
		THA	26.1	26.8	27.3
	12	TC	35.8	36.5	37.1
		KW	3.68	3.61	3.60
		THA	26.8	27.6	28.1
90	6	TC	38.3	38.9	39.5
		KW	3.8	3.75	3.72
		THA	28.9	29.6	30.2
	9	TC	40.3	41.1	41.7
		KW	3.9	3.86	3.84
		THA	30.6	31.5	32.1
100	12	TC	41.5	42.3	43.1
		KW	4.0	3.9	3.9
		THA	31.7	32.6	33.3

50HQ,VQ027

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	--	775/287	900/335	1025/385
60	5	TC	19.1	19.9	20.3
		KW	2.3	2.3	2.3
		THA	10.2	11.1	12.2
	7.5	TC	20.1	20.5	21.4
		KW	2.3	2.4	2.4
		THA	13.1	14.5	15.6
70	10	TC	21.3	21.9	22.6
		KW	2.4	2.5	2.5
		THA	19.2	19.4	21.8
	5	TC	24.9	25.4	26.7
		KW	2.5	2.6	2.6
		THA	18.3	20.5	23.9
80	7.5	TC	26.5	27.2	28.0
		KW	2.6	2.6	2.7
		THA	23.5	25.1	27.6
	10	TC	26.3	27.6	28.3
		KW	2.6	2.6	2.7
		THA	24.8	25.4	26.9
90	5	TC	28.8	29.1	30.2
		KW	2.7	2.7	2.8
		THA	25.9	26.7	28.9
	7.5	TC	29.2	31.0	31.8
		KW	2.7	2.8	2.8
		THA	26.8	28.1	30.4
100	10	TC	29.9	32.2	32.8
		KW	2.8	2.9	2.9
		THA	28.9	30.4	32.5

50HQ,VQ042

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	--	1225/580	1400/640	1575/745
60	7.5	TC	30.6	31.2	31.8
		KW	3.6	3.6	3.6
		THA	21.9	22.3	22.7
	11	TC	31.8	32.4	32.9
		KW	3.6	3.6	3.7
		THA	22.8	23.3	23.7
70	14	TC	32.4	32.9	33.5
		KW	3.7	3.7	3.7
		THA	23.3	23.8	24.2
	7.5	TC	36.0	36.5	37.0
		KW	3.8	3.9	3.9
		THA	26.3	26.9	27.1
80	11	TC	37.5	38.0	38.5
		KW	3.9	4.0	4.0
		THA	27.6	28.1	28.4
	14	TC	38.0	38.7	39.1
		KW	4.0	3.9	4.0
		THA	28.0	28.7	28.9
90	7.5	TC	41.7	42.2	42.7
		KW	4.2	4.2	4.3
		THA	31.1	31.6	31.8
	11	TC	43.6	44.0	44.4
		KW	4.3	4.3	4.4
		THA	32.7	33.1	33.4
100	14	TC	45.3	45.7	46.2
		KW	4.4	4.4	4.5
		THA	43.3	44.5	45.7

Ewt — Entering Water Temperature
 Kw — Unit Total Power Input
 TC — Total Capacity (1000 Btuh)
 THA — Total Heat Absorbed (from heat exchanger water) (1000 Btuh)

Performance data (cont)

HEATING CAPACITIES

50HQ,VQ048

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	—	1400/855	1600/750	1800/845
60	8.5	TC	33.8	35.2	35.9
		KW	4.1	4.0	4.0
		THA	14.8	16.1	17.7
	12.5	TC	35.6	36.4	37.9
		KW	4.1	4.2	4.2
		THA	19.0	21.0	22.6
	16.5	TC	37.7	38.8	40.0
		KW	4.2	4.4	4.4
		THA	27.8	28.1	31.6
70	8.5	TC	44.1	44.9	47.2
		KW	4.5	4.6	4.6
		THA	26.5	29.7	34.6
	12.5	TC	46.9	48.1	49.6
		KW	4.6	4.6	4.7
		THA	34.1	36.4	40.0
	16.5	TC	46.6	48.9	50.1
		KW	4.6	4.6	4.7
		THA	36.0	36.8	39.0
80	8.5	TC	51.0	51.5	53.4
		KW	4.7	4.8	4.9
		THA	45.8	47.3	51.2
	12.5	TC	51.7	54.9	56.3
		KW	4.8	4.9	4.9
		THA	38.9	40.7	44.1
	16.5	TC	52.9	57.0	58.1
		KW	4.9	5.1	5.1
		THA	41.9	44.1	47.1

50HQ,V080

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	—	2300/1205	2600/1380	3000/1600
60	15	TC	65.5	66.8	68.1
		KW	6.9	6.9	7.0
		THA	47.5	48.4	49.3
	22	TC	68.1	69.3	70.4
		KW	6.9	6.9	7.1
		THA	49.5	50.6	51.4
	29	TC	69.3	70.4	71.7
		KW	7.1	7.1	7.2
		THA	50.6	51.6	52.5
70	15	TC	77.0	78.1	79.2
		KW	7.3	7.5	7.5
		THA	57.1	58.4	58.8
	22	TC	80.2	81.3	82.4
		KW	7.5	7.7	7.7
		THA	59.9	60.9	61.6
	29	TC	81.3	82.4	83.7
		KW	7.6	7.7	7.7
		THA	60.7	62.3	62.7
80	15	TC	89.2	90.3	91.4
		KW	8.1	8.1	8.3
		THA	67.9	68.6	69.0
	22	TC	93.3	94.2	95.0
		KW	8.3	8.3	8.4
		THA	70.9	71.8	73.5
	29	TC	96.9	97.8	98.9
		KW	8.5	8.5	8.6
		THA	74.8	75.8	76.2

Ewt — Entering Water Temperature
 Kw — Unit Total Power Input
 TC — Total Capacity (1000 Btuh)
 THA — Total Heat Absorbed (from heat exchanger water) (1000 Btuh)

50HQ,VQ060

Water Flow Data			Indoor Air Cfm (70 F Edb)/Fan Watts		
Ewt (F)	Gpm	—	1750/785	2000/900	2250/1012
60	11.5	TC	49.9	51.0	51.9
		KW	5.2	5.2	5.2
		THA	36.4	37.5	38.2
	17	TC	52.4	53.3	54.4
		KW	5.4	5.4	5.3
		THA	38.5	39.4	40.1
	22.5	TC	54.0	55.1	55.9
		KW	5.5	5.4	5.4
		THA	39.8	40.8	41.5
70	11.5	TC	58.4	59.3	60.4
		KW	5.7	5.7	5.6
		THA	43.5	44.4	45.2
	17	TC	61.4	62.5	63.5
		KW	5.9	5.8	5.8
		THA	45.9	47.2	48.0
	22.5	TC	63.0	64.2	65.3
		KW	6.0	5.9	5.9
		THA	47.2	48.6	49.5
80	11.5	TC	67.4	68.5	69.5
		KW	6.2	6.1	6.1
		THA	50.9	52.1	53.2
	17	TC	70.9	72.3	73.4
		KW	6.4	6.3	6.3
		THA	53.8	55.4	56.5
	22.5	TC	73.0	74.4	75.9
		KW	6.5	6.4	6.4
		THA	55.8	57.4	58.6

HEATING CAPACITIES

EWT (F)	—	50BQ007		50BQ009		50BQ012		50BQ016		50BQ019	
		Water Flow Gpm	Indoor Air Cfm	Water Flow Gpm	Indoor Air Cfm	Water Flow Gpm	Indoor Air Cfm	Water Flow Gpm	Indoor Air Cfm	Water Flow Gpm	Indoor Air Cfm
			250		350		450		450		450
60	TC	9	7 190	1 1	9 100	1 6	12 400	1 9	14 300	2 4	19 000
	Kw		780		840		1 290		1 370		2 080
	THA		4 550		6 200		8 30		9 700		12 300
70	TC	1 9	7 520	2 3	9 500	3 1	13 200	3 8	15 200	4 7	20 100
	Kw		810		870		1 300		1 420		2 130
	THA		4 800		6 500		8 88		10 400		13 200
70	TC	9	7 816	1 1	9 680	1 6	13 711	1 9	15 900	2 4	20 900
	Kw		834		882		1 342		1 460		2 170
	THA		5 024		6 680		9 314		10 960		13 840
80	TC	1 9	8 058	2 3	10 200	3 1	13 994	3 8	16 680	4 7	22 500
	Kw		828		898		1 351		1 468		2 225
	THA		5 338		7 120		10 211		11 840		14 900
80	TC	9	8 365	1 1	10 500	1 6	14 700	1 9	17 400	2 4	22 740
	Kw		853		916		1 380		1 508		2 243
	THA		5 574		7 360		10 595		12 400		15 260
80	TC	1 9	8 852	2 3	11 050	3 1	15 965	3 8	18 630	4 7	23 620
	Kw		892		950		1 431		1 568		2 286
	THA		5 960		7 800		11 050		13 430		15 600

FAN PERFORMANCE

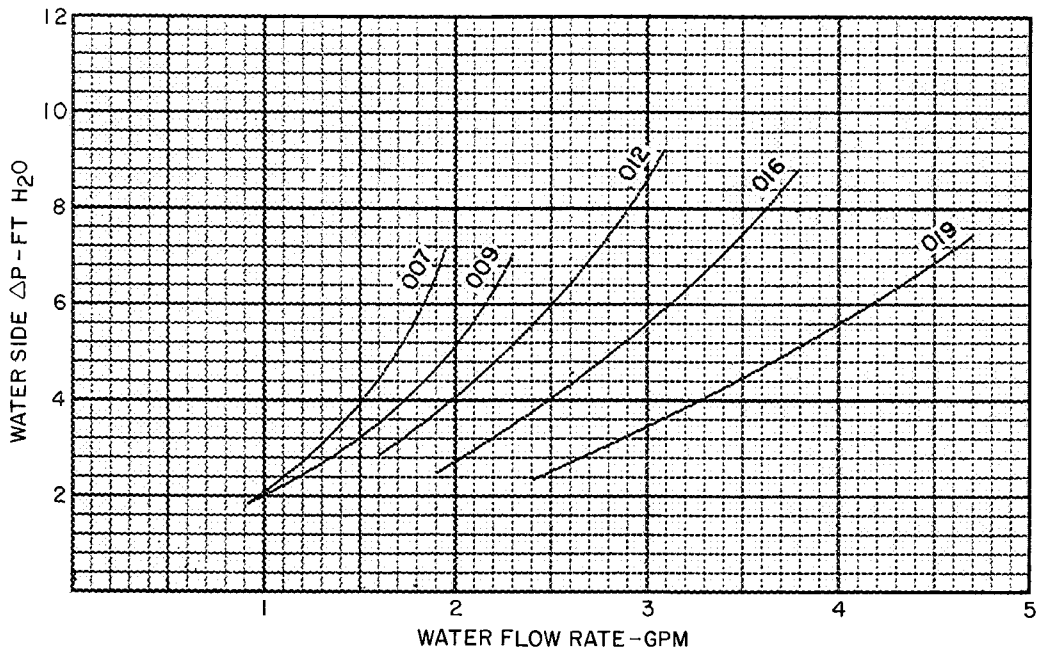
UNIT 50HQ.VQ	CFM	FAN SPEED	
		208 V	
		High	Med
		External Static Pressure (in wg)*	
014	400	56	42
	500	35	16
	600	06	—
018	500	51	40
	600	34	20
	700	14	—
022	600	58	51
	700	46	32
	800	27	—
027	750	53	45
	800	44	34
	900	20	—
033	900	52	44
	1000	37	—
	1100	11	—
042	1150	59	26
	1200	50	—
	1300	18	—
048	1300	65	42
	1400	51	13
	1500	36	—
	1600	18	—
060	1600	66	57
	1800	47	07
	2000	12	—
080	2000	1 00	64
	2200	82	—
	2400	54	—
	2600	20	—

*External static pressure includes deductions for wet coil and filter

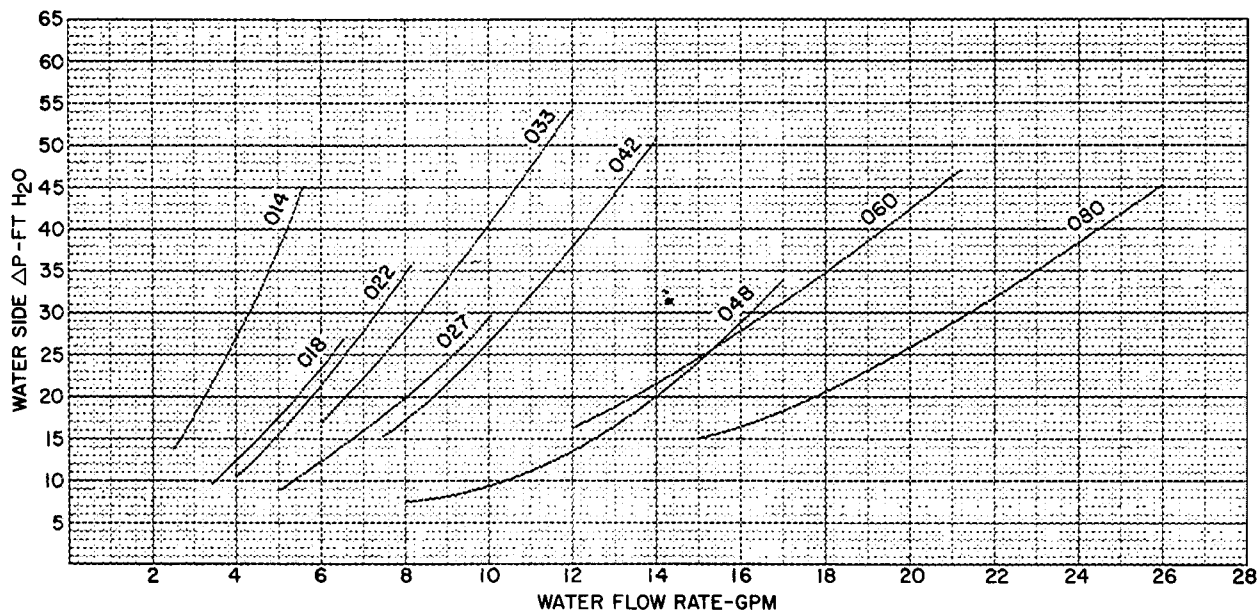
Performance data (cont)

HEAT EXCHANGER PRESSURE DROP

WATER SIDE PRESSURE DROP VS FLOW RATE
50BQ007-019



WATER SIDE PRESSURE DROP VS FLOW RATE
50HQ,VQ014-080



Electrical data

50HQ,VQ014-042

UNIT MODEL 50HQ,VQ	V/PH/HZ	OPERATING VOLTAGE		COMPRESSOR		FAN	MINIMUM CIRCUIT AMPS	MAXIMUM FUSE AMPS
		Max	Min	LRA	RLA	FLA		
014	208-230/1/60	253	197	37.5	9.6	7	12.7	15
018				53.0	13.4	9	17.7	25
022				65.0	13.3	1.5	18.1	25
027				66.0	16.2	1.7	22.0	35
033				88.0	23.2	2.5	31.6	50
042				100.0	27.7	3.2	37.8	50
033	208-230/3/60	253	187	87.0	13.8	2.5	19.8	25
042				100.0	18.5	3.2	26.3	35
033	460/3/60	506	414	30.0	6.0	1.4	8.9	15
042				36.5	6.9	1.6	10.2	15

FLA — Full Load Amps
LRA — Locked Rotor Amps
RLA — Rated Load Amps



50HQ,VQ048,060,080

UNIT MODEL 50HQ,VQ	V/PH/HZ	OPERATING VOLTAGE		COMPRESSOR		FAN	MINIMUM CIRCUIT AMPS	MAXIMUM FUSE AMPS
		Max	Min	LRA	RLA	FLA		
048	208-230/1/60	253	187	94.0	23.9	3.4	33.3	50
060			187	130.0	25.9	4.5	36.9	50
048	208-230/3/60	253	187	80.0	13.3	3.9	20.5	40
060				98.0	20.9	4.5	30.6	45
080				137.0	20.6	6.2	32.0	45
048	460/3/60	506	414	35.0	8.2	2.0	12.3	15
060				49.0	10.4	2.3	15.3	25
080				69.0	11.4	3.1	17.4	25

FLA — Full Load Amps
LRA — Locked Rotor Amps
RLA — Rated Load Amps



50BQ007-019

UNIT MODEL 50BQ	V/PH/HZ	TOTAL FLA	COMPRESSOR		FAN	MINIMUM CIRCUIT AMPS	MAXIMUM FUSE AMPS
			LRA	FLA	FLA		
007	208-230/1/60	4.04	21.3	3.8	24	4.9	15
009		4.18	21.3	3.8	38	5.1	15
012		7.13	34.0	6.6	53	8.8	20
016		7.57	37.5	7.1	47	9.3	20
019		10.97	57.0	10.5	47	13.6	25
007	277/1/60	3.56	22.3	3.3	26	4.4	15
009		3.67	22.3	3.3	37	4.5	15
012		5.66	33.0	5.2	46	7.0	15
016		6.80	36.5	6.2	60	8.4	15
019		12.00	55.0	9.1	60	12.0	25

FLA — Full Load Amps
LRA — Locked Rotor Amps



Controls

Sequence of operation

Fan switch — If the fan switch is at the ON position, the fan motor will run all the time power is supplied to the unit. At the AUTO position, fan motor cycles with the compressor.

THERMOSTAT CALLS FOR COOLING (reversing valve solenoid [RVS] is energized in cooling position) — Control voltage (24 v) is available at 0 and RVS is energized. The control voltage is also available at Y and if low water temperature cutout (LWTC), pressure switches (LPS and HPS) and lockout relay (LOR) are closed, the contactor is energized and the compressor runs. With the RVS energized, the flow of refrigerant is thru the heat exchanger (HX) which is acting as a condenser, and thru the capillary to the evaporator.

When the room thermostat is satisfied, the cooling thermostat breaks the connection to Y and the compressor

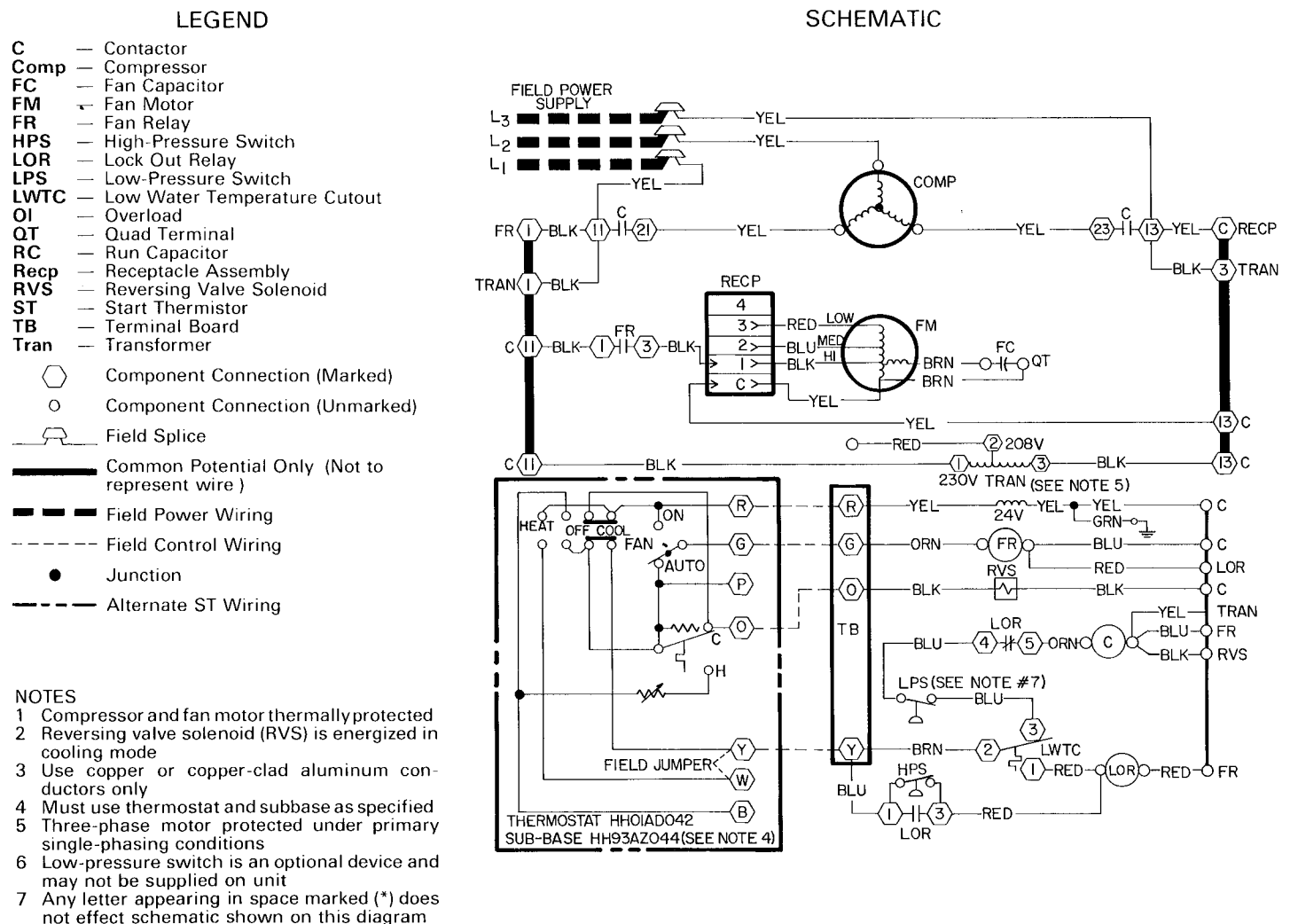
stops. Power (24 v) to 0 keeps the RVS energized during the OFF cycle of the compressor.

THERMOSTAT CALLS FOR HEATING (reversing valve solenoid [RVS] is de-energized in heating position) — Voltage is not supplied to 0 because of the resistance of the cooling compensator (CC) ahead of it. Control voltage (24 v) is applied to W and the field-supplied jumper carries voltage to Y and energizes the contactor (C) if the switches are closed. The compressor starts and, since the RVS is de-energized, the refrigerant flow is to the indoor coil which is now a condenser, then thru the capillary and the heat exchanger (HX), which acts as an evaporator.

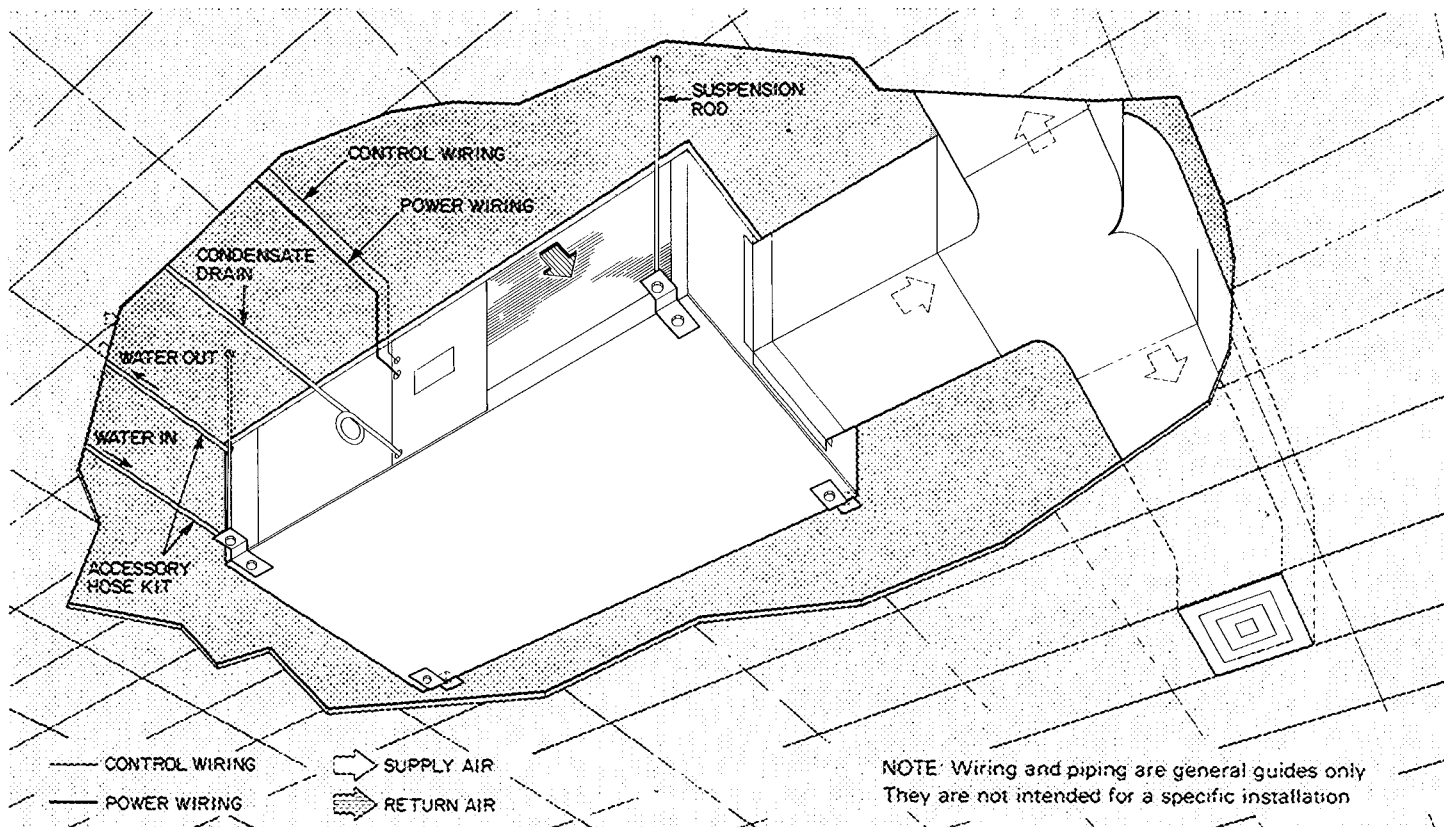
When the thermostat is satisfied, the heating thermostat breaks, de-energizing C by the loss of voltage to W.

There is no defrost cycle with a water-to-air heat pump.

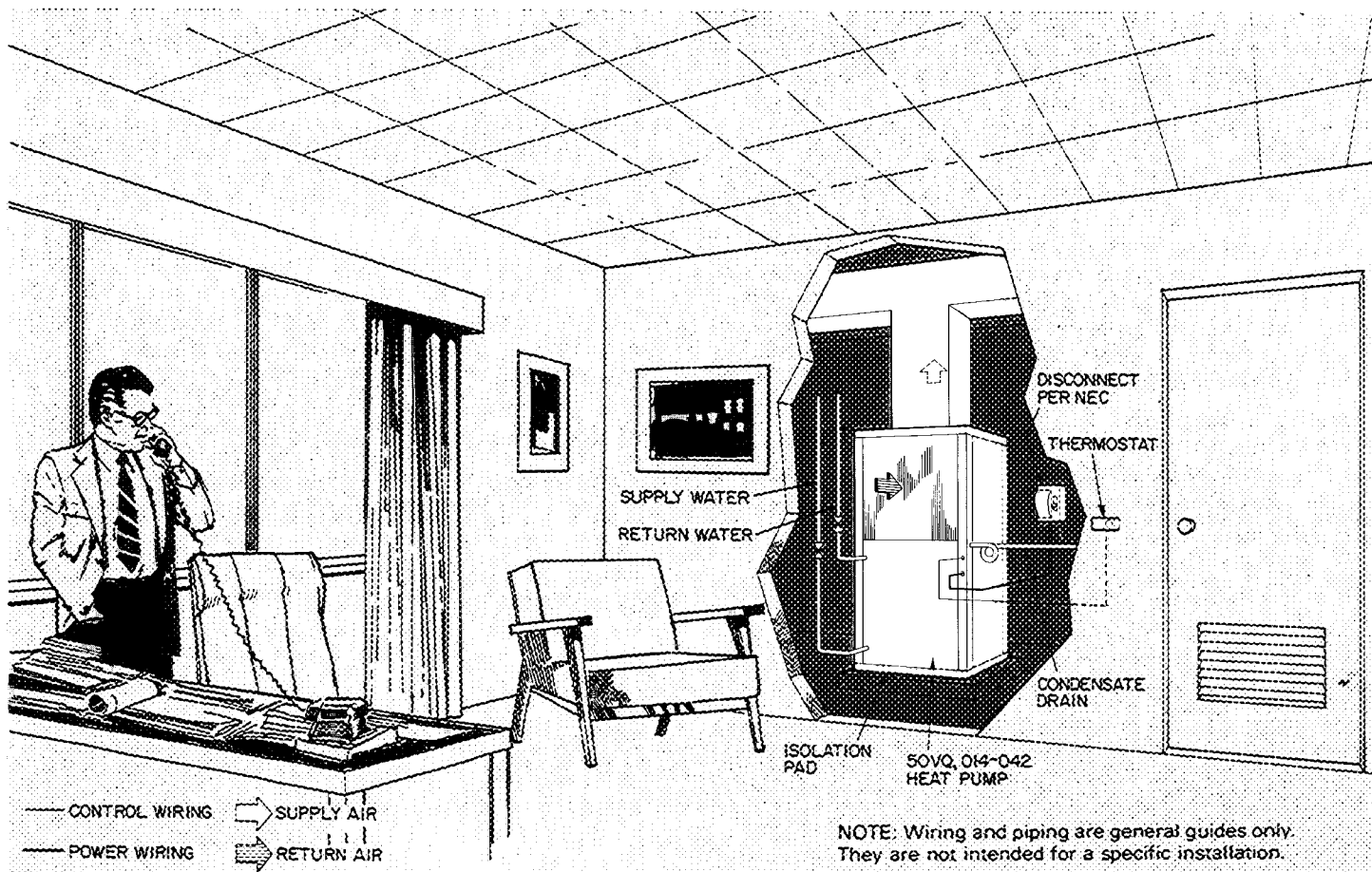
Typical wiring diagram (50HQ,VQ)



Typical piping and wiring (50HQ)



Typical piping and wiring (50VQ)



Guide specifications

General — Furnish packaged Water Source Heat Pump units of type, size, and capacity as shown on the equipment schedules. Unit performance shall be certified in accordance with Air Conditioning and Refrigeration Institute (ARI) Standard 320-76 for Water Source Heat Pumps

Equipment schedules and specifications are based on Carrier Model 50VQ for vertical units, 50HQ for horizontal units, and 50BQ for console units. Other manufacturers of equal quality may be submitted to the Engineer for approval

Units shall be of the horizontal, vertical or console type as shown on the drawings and consist of a fan, indoor (evaporator) coil, compressor, 4-way valve, and water-to-refrigerant heat exchanger with necessary controls in a factory-assembled package

Refrigeration circuit — Units shall include factory-assembled refrigeration circuit consisting of a hermetic motor-compressor with internally fused capacitor except on 3-phase units, air-to-refrigerant finned tube coil, capillary metering device, refrigerant reversing valve, pilot operated, water-to-refrigerant coaxial tube exchanger, and high-pressure and low water temperature safety cutouts, factory installed on the refrigeration circuit

Evaporator coil — Indoor (evaporator) coil shall be constructed with aluminum plate fins mechanically bonded to non-ferrous tubing with all joints brazed. Factory-installed refrigerant control shall be provided

Heat exchanger — Heat exchanger shall be a circular tube-in-tube type with a steel outer tube and copper integral finned inner tube

Compressor — Compressor shall be of the welded hermetic type suitable for heat pump duty with internal vibration isolation. Compressor motor power input shall not exceed specified kw at specified conditions as shown on the schedules. Units over 20,000 Btu's as rated a nominal ARI conditions shall have compressors with internal pressure relief valves.

Fan — Fan shall be of the centrifugal forward-curved blower type with double inlet, mounted on a motor shaft, dynamically and statically balanced. The fan shall deliver the cfm and external static pressure as indicated on the schedules. The multi-speed fan motor shall be factory lubricated. Fan discharge on horizontal units shall be capable of field conversion from side to front discharge to obtain proper discharge as shown on plans.

Horizontal units shall be provided with 4 mounting brackets per unit for ceiling suspension. Units shall be suspended by means of hanger rods and isolators provided by the contractor

Accessories

Thermostat and subbase shall be furnished by the unit manufacturer for wall mounting as detailed on plans

Filter shall be of the 1/2-in. thick replaceable media type. Filter shall be provided with the unit by the unit manufacturer for installation on the air inlet

Water control valves shall be furnished. Unit manufacturer shall provide combination balance and shutoff valve to provide water return line and gate shutoff valve for water supply line. Refer to plan detail for piping layout

Flexible hoses with threaded connections on each end shall be provided by unit manufacturer for connection between water supply and return valves and unit supply and return connections

Console units

Unit cabinet shall be constructed of heavy-gage die-form galvanized steel with welded corner bracing. Removable front panel shall be securely held in place by concealed fasteners. It shall be necessary to disconnect only the electrical, water, and drain connections to remove the chassis. All exposed cabinet parts shall be finished with an oven-baked enamel in a soft beige

Grilles shall be of the rigid bar type discharge grille with vanes factory pre-set to deflect the supply air into the room

Cabinet and chassis shall be supported by a heavy-gage metal base recessed 3 in. under the front of the unit to provide toe space and area for air to enter the chassis. Base shall be finished in black and of the same material.

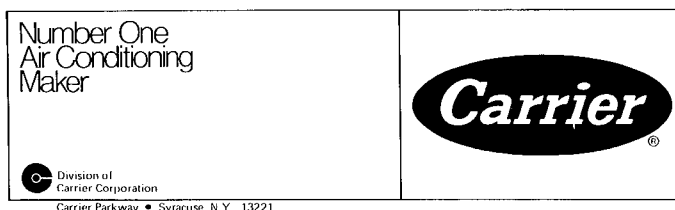
Console units shall be capable of field conversion to change water and electrical connections from right-hand to left hand or vice versa by merely removing cabinet, relocating one blank-off plate on chassis, rotating chassis and reinstalling cabinet

Controls shall be unit mounted on a panel located above the compressor compartment with pushbutton switches to select OFF-COOL-HEAT operation and HI-LOW blower speed. A unit-mounted thermostat with a remote bulb measuring return air temperature shall control the compressor for heating or cooling as manually selected. The thermostat shall be adjustable from warmer to cooler marked in increments ranging from approximately 60 to 90 F. The thermostat shall include a single point indicator with a dial marked HI-LOW

50HQ,VQ

Controls and protective devices — Controls and protective devices shall be factory wired and located in a readily accessible location. Control box shall be removable from front of unit. Compressor and fan motor shall have both thermal and current sensitive overload devices. A high-pressure switch shall be provided. Units shall be equipped with a low water temperature control for freeze-up protection. Controls shall have a lockout circuit which prevents units short cycling after control is activated.

Water connections — Supply and return connections shall be IPT copper fittings brazed to exchanger copper water tubes. Connection sub-assembly shall be mechanically fastened to the unit chassis. Condensate drain connections shall not be less than 3/4-inch. Supply, return and condensate shall be connected to loop and drain piping as detailed on plans.



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

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