

Number One
Air Conditioning
Maker

Carrier

Advance Product Data

Division of
Carrier Corporation

Carrier Parkway • Syracuse, N.Y. 13221

CARRIER

WATER SOURCE HEAT PUMP

50 HQ, VQ

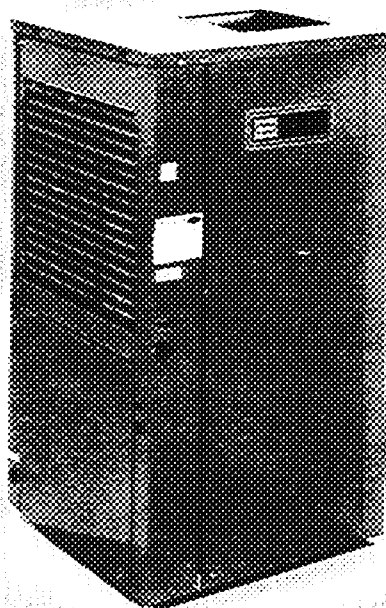
014-080

Cooling Capacities

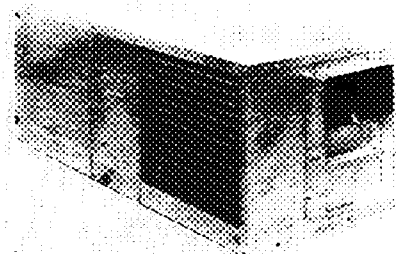
14000-80000 BTUH

Heating Capacities

10000-60000 BTUH



50 VQ
VERTICAL AIR DISCHARGE



50 HQ
HORIZONTAL AIR DISCHARGE

For entering water temperatures from 45 F to 60 F

High efficiency heat pumps for a wide range of applications

Book	1	4
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PC 111

Form 50HQ, VQ-2APD New

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

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CARRIER'S GROUND WATER SOURCE HEAT PUMP

This publication provides performance, selection and system guidelines for Carrier's Water Source Heat Pump Models 50 HQ (horizontal) and 50VQ (vertical) when utilizing entering water temperatures between 45° F and 60°F. (Refer to other Carrier's Publications for performance data when utilizing higher temperatures). These units are available in nine sizes with capacities ranging from a nominal 14000 BTUH to 80000 BTUH in cooling and 10000 BTUH to 60000 BTUH in heating. Available voltages are 208/230 - 1Ø, 208/230 - 3Ø, and 460 - 3Ø.

UNIT DESCRIPTION

The 50HQ/VQ unit is a water to air heat pump for space conditioning. Unit cabinet is constructed of heavy gauge die formed galvanized steel. VQ unit is for base mounting and HQ unit is intended for suspension. Supply air duct flanges are provided for field installation. Units have pilot holes for return duct on ducted return systems. Units are complete with multi speed PSC fan motors, centrifugal fan wheels, air to refrigerant heat exchanger, water-to-refrigerant cupro-nickel heat exchanger, capillary metering device, pilot operated refrigerant reversing valve, heat pump qualified compressor and low water temperature and high pressure safety cutouts. Units are factory wired and charged.

SYSTEM GUIDELINES

The 50HQ WSHP unit can easily be installed in a crawlspace or attic space or the 50VQ in a closet utilizing conventional ductwork typical to other heat pump applications. Ratings are based on an entering air temperature of 80°F db, 62, 67, 72° Fwb and 70°F in the cooling mode and heating mode respectively. (Deviations from this, contact a Carrier dealer.)

The unit can be used in an open loop, once through system utilizing ground water or a closed loop, recirculating the water in an earth coupled system. Because the earth's temperature remains relatively constant, the unit can be

operated highly efficient year round with minimal, if any, seasonal limitation imposed on the application.

Prior to any WSHP installation, the quantity and quality of the water must be addressed. If a well (open loop) is used exclusively for the WSHP, the amount of water available must be equal to or exceed the design gpm as shown in performance tables for the given size unit selected for the application. Once an adequate quantity of water has been established, the valve arrangement as shown on the diagram will control the actual water flow to unit. Installation must include recommended valves.

Local codes should be abided when discharging the water. If discharge is directed to another well, the supply and return well should be placed far enough apart to avoid and transfer of heat between the two wells. If discharge water is directed to a pond and stream, etc., address thermal pollution. Limitations of water temperatures do exist when discharging to a body of water. Supply and return lines should be insulated when penetrating the frost zone to prevent freeze-up.

All of Carrier's 50HQ/VQ WSHP intended for entering water temperatures in the range of 45°F to 60°F have a cupro-nickel water-to-refrigerant heat exchanger as standard. Regardless, the quality of water being used must be determined to ensure heat exchanger life. The limits for water quality stated in this publication must not be exceeded.

In a closed loop or earth coupled system where the water is recirculated, the earth acts as a heat sink and heat source depending on the mode in which the heat pump is operating. In this system, the necessary length of pipe is buried in the ground. The buried pipe should be placed below the frost zone; be given a uniform means of support with adjacent piping adequately space for proper heat transfer. A heating and air conditioning contractor or consulting engineer can advise the size and length pipe needed and application/installation details.

Other specialties such as storage tanks, solar panels and/or swimming pools can be incorporated into systems. These applications should be addressed by qualified systems oriented contractors or consulting engineers.

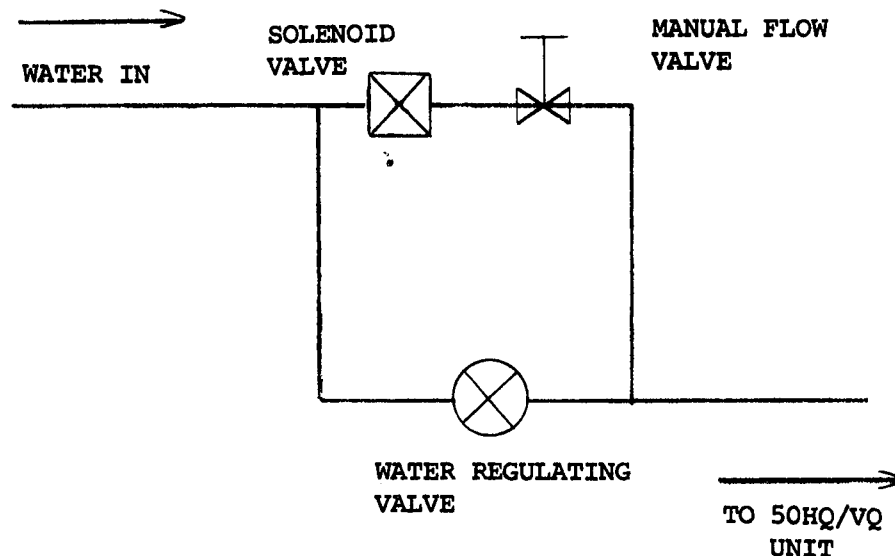
Reliability and performance of this unit is highly dependent on the proper design and installation.

PRECAUTIONS

1. Do not reverse water connections as indicated on unit. Potential freeze up if connections are reversed.
2. Provide the amount of water as indicated on performance charts.

PIPING/VALVES

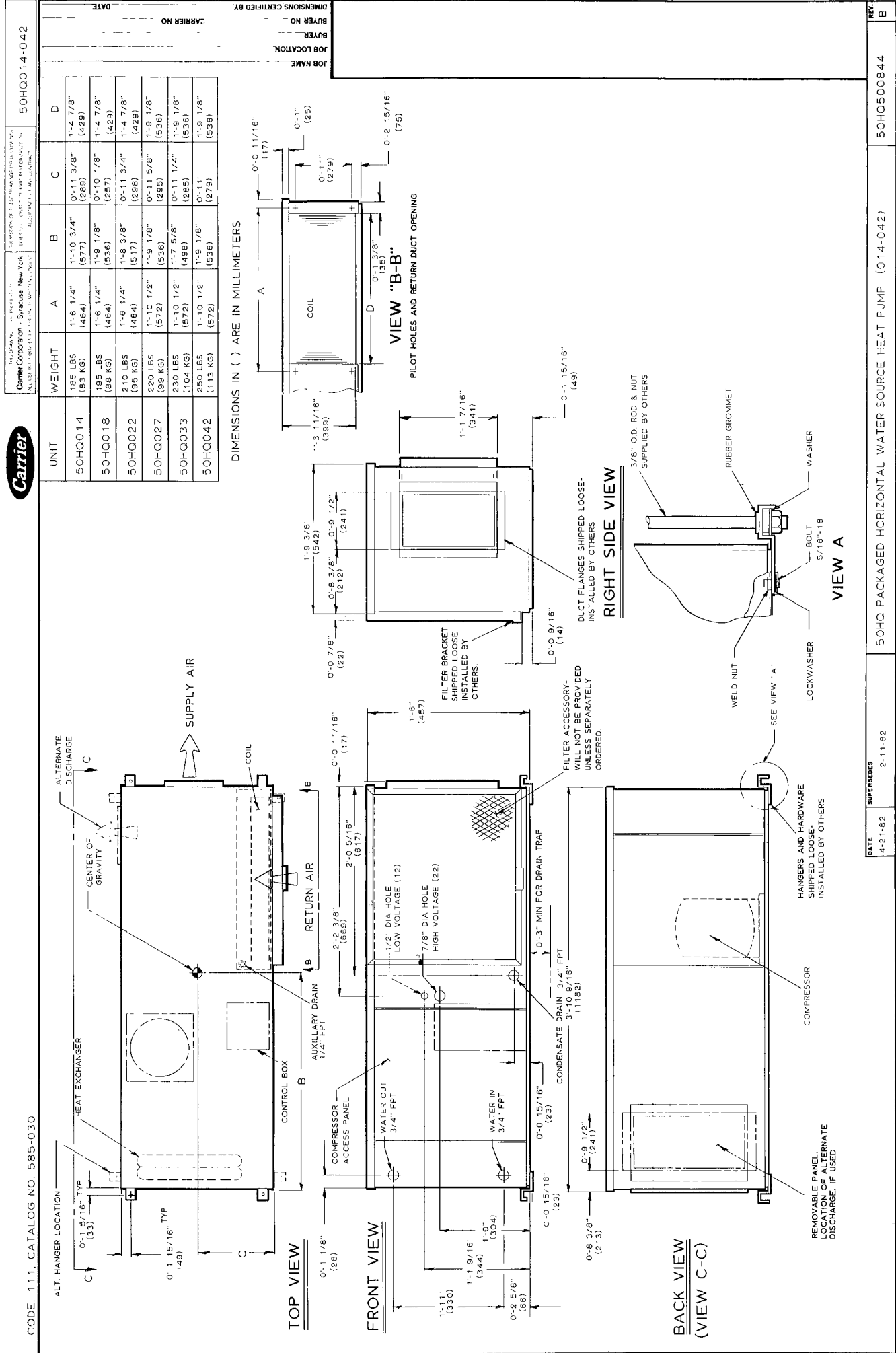
A water regulating valve (50 HQ/VQ 014-042: Penn V46AC-1; 50HQ/VQ 048-080: Penn V46AE-1) to be used to control water flow to unit in cooling mode. A line voltage solenoid valve to be installed in parallel with water regulating valve. Manual flow valve to be installed downstream of solenoid valve. All valves to be field purchased and installed. Valve sizes for 50HQ/VQ 014-042 to be 3/4"; for 50 HQ/VQ 048-080 to be 1½".



PHYSICAL DATA

50HQ, VQ		014	018	022	027	033	042	048	060	080
UNIT SIZE		1-0	1-5	1-10	1-14	1-14	2-6	3-11	4-11	6-0
R-22 Charge (lb-oz)* Refrigerant Control					Capillary Tube					
FAN					Centrifugal - Direct Drive					
Diameter (in. nom.)		9	9	9	9	9	10	10	10	12
Width (in. nom.)		7	7	7	7	7	7	8	10	9
Cfm Range		400-600	500-700	600-800	750-900	900-1050	1150-1300	1400-1700	1800-2100	2200-2500
Motor Hp		1/8	1/8	1/6	1/6	1/4	1/3	1/2	3/4	1
Motor Rpm (Nominal)						1075				
CU-NI WATER-TO-REFRIG HEAT EXCHANGER										
Max Working Pressure (psig)						300				
Water Flow Range (gpm)		2.5-5.5	3.5-6.5	4-8	5-10	6-12	7.5-14	8-16	11-21	14-28
Water Connection (in.)		3/4	3/4	3/4	3/4	3/4	3/4	1	1	1
Water Volume (gal.)		.10	.19	.21	.25	.36	.43	.50	.72	.86
AIR-TO-REFRIG COIL										
Rows...Fins per inch		2...13	3...13	3...13	3...13	3...13	4...13	3...15	3...15	4...15
Copper Tube Size (in.)						3/8				
COMPRESSOR										
Rpm						Hermetic				
						3500				
OPERATING WEIGHT (lb)	HQ VQ	185 220	195 240	210 260	220 270	230 290	250 320	300 320	325 350	360 380
ACCESSORY FILTER (1)										
Size (in.)	HQ VQ			1x17x23 1x21x21		Replaceable Media			1x23x37 1x24x40	

*Factory Charged



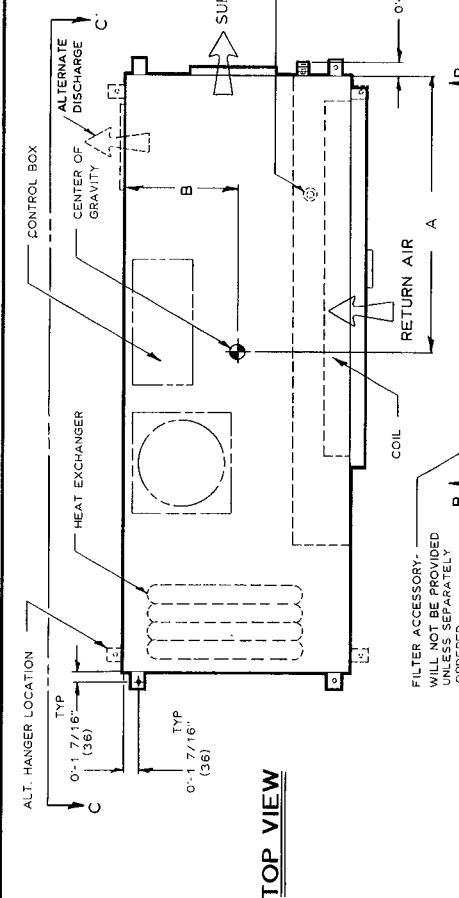
CODE 111, CATALOG NO. 585-031



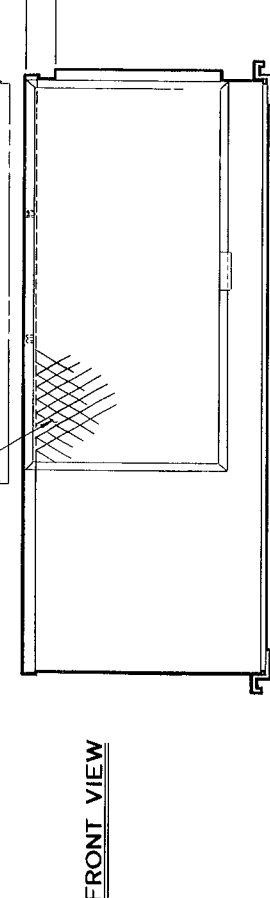
50HQ048-080

UNIT	WEIGHT	A	B	C	D	E	F	G	H
50HQ048	300 LBS (136 KG)	2'-3 1/4" (692)	0'-10 1/4" (260)	0'-4 11/16" (119)	0'-3 7/8" (98)	2'-1 1/8" (538)	0'-3 3/8" (86)	1'-10 1/2" (571)	
50HQ060	325 LBS (147 KG)	2'-5 3/8" (746)	1'-0" (305)	0'-3 3/8" (86)	1'-1 1/8" (333)	2'-7 11/16" (605)	0'-3 3/8" (86)	2'-5" (737)	
50HQ080	360 LBS (163 KG)	2'-6" (762)	1'-0 1/2" (318)	0'-3 7/8" (98)	1'-0" (305)	3'-1 11/16" (957)	0'-3 7/8" (99)	2'-11" (689)	

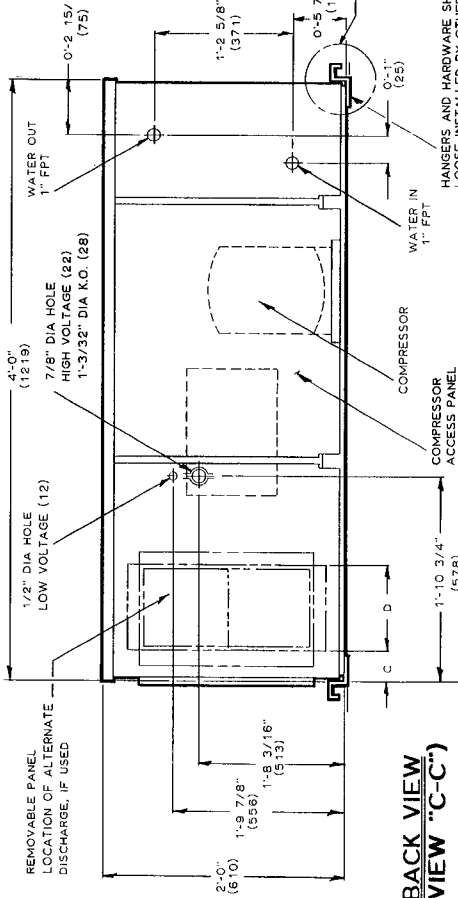
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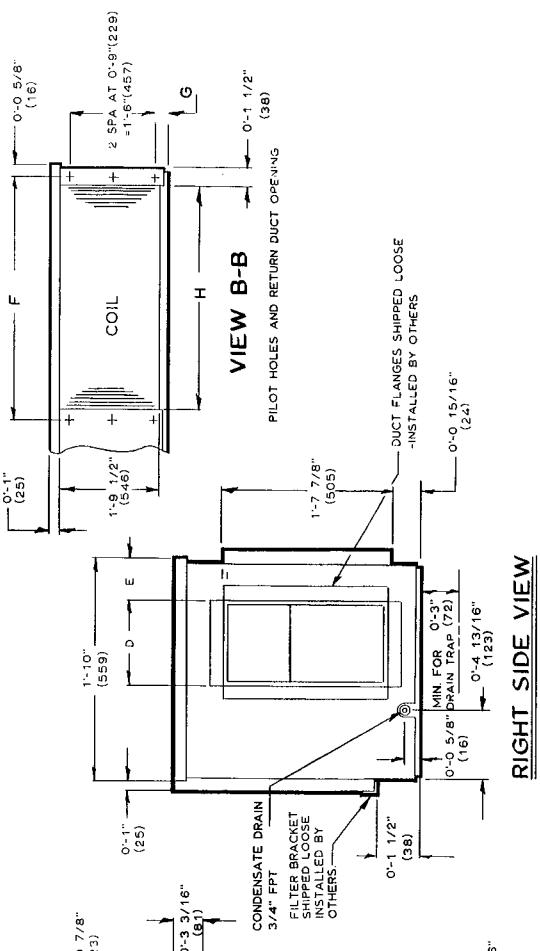
TOP VIEW



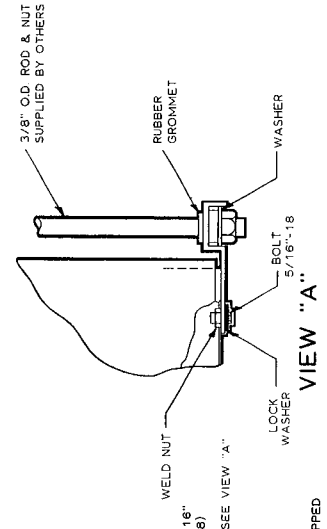
FRONT VIEW



BACK VIEW
(VIEW "C-C")



VIEW B-B



RIGHT SIDE VIEW

VIEW "A"

DATE	SUPPLEMENTS	DATE	50HQ PACKAGED HORIZONTAL WATER SOURCE	HEAT PUMP (048-080)	50HQ501414	REV.
4-20-82	2-11-82					B



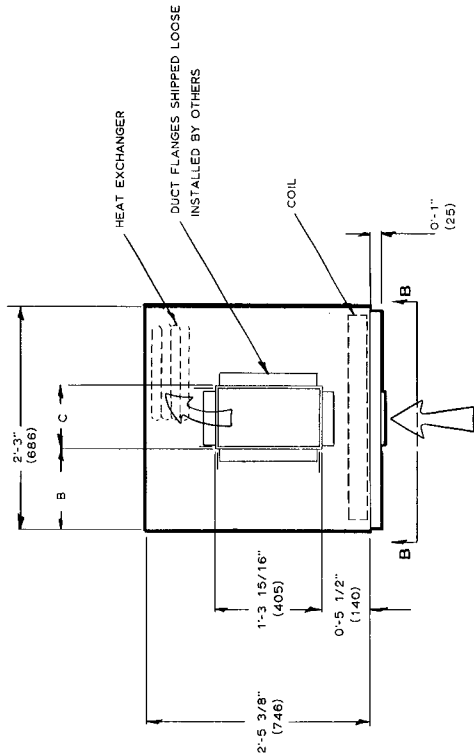
50VQ048-080

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APPROVAL OF ANY CONTRACT

UNIT	WEIGHT	A	B	C	D	E	F	G	H
50VQ048	320 LBS (145 KG)	1'-10 1/4" (565)	0'-6 13/16" (173)	0'-10 1/2" (267)	1'-7" (483)	1'-7" (483)	2'-1 7/16" (646)	1'-11 13/16" (605)	1'-11 13/16" (605)
50VQ060	355 LBS (161 KG)	0'-8 1/4" (210)	0'-5 1/2" (140)	1'-1 1/8" (333)	0'-11" (279)	2'-9" (838)	0'-11 7/16" (291)	3'-1 13/16" (960)	3'-1 13/16" (960)
50VQ080	390 LBS (177 KG)	0'-8 1/4" (210)	0'-6 1/16" (154)	1'-0" (305)	0'-11" (279)	2'-9" (838)	0'-11 7/16" (291)	3'-1 13/16" (960)	3'-1 13/16" (960)

DIMENSIONS IN () ARE IN MILLIMETERS



TOP VIEW

FILTER ACCESSORY-
WILL NOT BE PROVIDED
UNLESS SEPARATELY ORDERED

ACCESS PANEL

CONDENSATE DRAIN
3/4" FPT

COMPRESSOR

1'-2 15/16"
(379)

4'-0"
(1219)

FILTER BRACKET
SHIPPED AT FAN
OPENING-
INSTALLED BY
OTHERS.

0'-7 3/8"
(187)

0'-2 5/16"
(59)

0'-4 1/2"
(114)

1/2" DIA HOLE
LOW VOLTAGE (12)

7/8" DIA HOLE
HIGH VOLTAGE
1-3/32" DIA K.O. (28)

WATER OUT
1" FPT

WATER IN
1" FPT

0'-5 7/16"
(136)

0'-3 15/16"
(100)

0'-1"
(25)

ACCESS PANEL

3'-0 9/16"
(929)

3'-2 1/8"
(968)

CONTROL BOX

SUPPLY AIR

RETURN AIR

COIL

H

1'-9 3/8"
(543)

0'-0 5/16"
(8)

0'-3"
(76)

0'-3 7/8"
(98)

D SPA AT E/F

G

VIEW "B-B"

PILOT HOLES AND RETURN DUCT OPENING

RIGHT SIDE VIEW

FRONT VIEW

50VQ PACKAGED VERTICAL WATER SOURCE HEAT PUMP (048-080)

DATE 4-26-82

SUPERSEDES 2-11-82

REV. A

50VQ00594

8

SELECTION EXAMPLE

I. DETERMINE COOLING AND HEATING LOAD REQUIREMENTS

Given:

Total Net Cooling Load: 50,000 BTUH
Sensible Load: 35,000 BTUH
Total Heat Load: 31,000 BTUH
Indoor Air Quantity: 1550 cfm
EAT Cooling: 82°F DB/67°F WB
EAT Heating: 70°F
External Static Pressure Required: 0.2 in. wg
EWT Cooling and Heating: 55°F
Available gpm: 10 gpm
Required Voltage: 230/1

II. DETERMINE LOCATION OF UNIT

Given: Unit needed for installation in crawl space
Select: 50HQ

III. SELECT UNIT FROM COOLING CAPACITIES TABLE WHICH MEET COOLING REQUIREMENTS

Enter cooling capacities table at 1550 cfm, 67° wb temperature, and 55°F water entering temperature. Select a 50HQ048 which has a total capacity of 52.4 MBH; SCH of 34.6 MBH with 7.5 gpm at 55°F EWT. Correct Sensible Heat Capacity for a 82° DB. By interpolation, correction factor is 1.85.

$$\begin{aligned}\text{Corrected SHC} &= (1.85 \times \text{cfm}) + \text{SHC} \\ &= (1.85 \times 1550) + 34,600 = 37,500 \text{ BTUH}\end{aligned}$$

IV. DETERMINE HEATING CAPACITY OF SELECTED UNIT.

Enter heat capacity table for 50HQ048 at 1550 cfm. Capacity is 40.6 MBH with 8 gpm at 55°F EWT. Adequate quantity of gpm is available.

V. DETERMINE EXTERNAL STATIC PRESSURE AVAILABLE

Enter Fan Performance Table for selected unit. Unit operation is 230 volt. The 50HQ048 provides 0.23 in. wg. at medium speed.

VI. DETERMINE HEAT EXCHANGER WATER PRESSURE DROP FOR PUMP SELECTION.

Required water is always greater in heating mode than in the cooling mode. Required gpm in cooling mode is 8 with an 8 ft. pressure drop. This value must be added to other accessories in system to determine pump requirements.

LEGEND

BF = Bypass Factor	SHC = Sensible Heat Capacity MBH
EAT = Entering Air Temperature °F	THR = Total Heat of Rejection MBH
DB = Dry Bulb	THA = Total Heat of Absorption MBH
WB = Wet Bulb	KW = Total Power Input
TC = Total Capacity MBH	EWT = Entering Water Temperature °F

COOLING CAPACITY NOTES

1. Net capacities shown include a deduction for fan motor heat.
2. Direct interpolation is permissible. Do not extrapolate.
3. 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
.20	.87	1.74	2.62	3.49	4.36	shown below.
.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:

$$t|_{db} = t|_{edb} - \frac{\text{sensible heat capacity (Btuh)}}{109 \times \text{cfm}}$$

$$t|_{wb} = \text{wet-bulb temperature corresponding to enthalpy of air leaving indoor coil (h|}_{wb})$$

$$h|_{wb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

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

50 HQ/VQ 014 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		0.75	1.2	0.75	1.5	0.75	2	0.75	2.25
COOLING	400	150/0.16	72 WB	TC	14.9	15.7	14.6	15.5	14.3	15.4	13.9	15.5
				SHC	7.4	7.6	7.3	7.5	7.2	7.4	7.0	7.5
				KW	1.65	1.43	1.69	1.39	1.73	1.37	1.77	1.40
				THR	20.1	20.2	19.9	19.9	19.7	19.7	19.5	19.9
	400	150/0.16	67 WB	TC	13.6	14.7	13.3	14.7	12.9	14.6	12.5	14.4
				SHC	9.4	9.7	9.3	9.7	9.1	9.6	9.0	9.5
				KW	1.56	1.39	1.60	1.36	1.64	1.34	1.68	1.36
				THR	18.5	19.0	18.3	19.0	18.0	18.8	17.8	18.7
	400	150/0.16	62 WB	TC	12.2	13.4	11.9	13.5	11.6	13.5	11.3	13.4
				SHC	11.2	11.8	11.1	11.7	10.9	11.7	10.7	11.7
				KW	1.48	1.34	1.52	1.32	1.56	1.31	1.60	1.33
				THR	16.9	17.6	16.7	17.6	16.5	17.6	16.3	17.6
COOLING	475	155/0.19	72 WB	TC	15.2	15.9	14.9	15.8	14.6	15.6	14.3	15.5
				SHC	7.8	7.9	7.8	7.8	7.7	7.7	7.5	7.6
				KW	1.67	1.44	1.72	1.41	1.76	1.38	1.80	1.40
				THR	20.4	20.4	20.3	20.2	20.2	20.0	19.9	19.9
	475	155/0.19	67 WB	TC	14.0	15.0	13.6	15.0	13.3	15.0	12.9	14.8
				SHC	10.2	10.4	10.1	10.3	9.9	10.2	9.8	10.2
				KW	1.59	1.40	1.63	1.38	1.67	1.36	1.71	1.38
				THR	19.0	19.4	18.8	19.3	18.6	19.3	18.2	19.2
	475	155/0.19	62 WB	TC	12.7	13.9	12.4	13.9	12.1	13.9	11.7	13.8
				SHC	12.2	12.7	12.1	12.8	11.9	12.6	11.6	12.6
				KW	1.52	1.36	1.56	1.35	1.60	1.32	1.64	1.35
				THR	17.5	18.1	17.3	18.2	17.1	18.1	16.9	18.0
COOLING	550	160/0.24	72 WB	TC	15.4	16.1	15.2	16.0	14.9	15.8	14.5	15.6
				SHC	8.2	8.2	8.2	8.1	8.1	8.0	8.0	7.9
				KW	1.69	1.46	1.74	1.43	1.79	1.39	1.83	1.41
				THR	20.8	20.7	20.7	20.5	20.5	20.2	20.3	20.1
	550	160/0.24	67 WB	TC	14.3	15.3	13.9	15.2	13.6	15.3	13.2	15.1
				SHC	10.9	11.0	10.8	10.8	10.7	10.8	10.5	10.7
				KW	1.62	1.42	1.66	1.39	1.70	1.38	1.74	1.40
				THR	19.3	19.8	19.1	19.5	18.9	19.6	18.6	19.5
	550	160/0.24	62 WB	TC	13.2	14.3	12.8	14.3	12.5	14.2	12.2	14.1
				SHC	13.1	13.6	12.8	13.6	12.5	13.4	12.2	13.3
				KW	1.55	1.38	1.59	1.36	1.63	1.34	1.68	1.40
				THR	18.0	18.6	17.8	18.6	17.7	18.4	17.5	18.3

					GPM							
					3	5.5	2	5.5	1	5.5	0.75	5.5
HEATING	400	150/0.16	70 DB	TC	10.3	10.5	10.6	11.0	10.2	11.5	10.2	11.6
				KW	1.36	1.37	1.37	1.39	1.35	1.42	1.35	1.42
				THA	7.6	7.7	7.8	8.1	7.5	8.6	7.5	8.7
HEATING	475	155/0.19	70 DB	TC	10.5	10.6	10.6	11.0	10.2	11.3	10.2	11.6
				KW	1.32	1.32	1.33	1.34	1.31	1.36	1.31	1.37
				THA	7.8	7.9	7.9	8.3	7.6	8.6	7.6	8.8
HEATING	550	160/0.24	70 DB	TC	10.4	10.6	10.6	11.0	10.4	11.3	10.3	11.4
				KW	1.29	1.29	1.29	1.31	1.29	1.32	1.29	1.33
				THA	7.8	7.9	7.9	8.3	7.8	8.6	7.7	8.7

50 HQ/VQ 018 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		1	1.75	1	2	1.5	2.5	1.5	3
COOLING	500	220/0.09	72 WB	TC	19.1	20.4	18.7	20.3	19.7	20.1	19.4	19.5
				SHC	9.4	9.7	9.2	9.7	9.5	9.6	9.4	9.4
				KW	2.40	1.96	2.46	1.96	2.21	1.93	2.29	1.93
				THR	26.6	26.5	26.4	26.5	26.7	26.2	26.5	25.6
	500	220/0.09	67 WB	TC	17.4	19.0	16.9	18.9	18.1	18.9	17.8	18.6
				SHC	11.9	12.4	11.7	12.3	12.2	12.3	12.1	12.1
				KW	2.26	1.90	2.32	1.91	2.13	1.89	2.21	1.90
				THR	24.5	25.0	24.2	24.9	24.8	24.8	24.7	24.5
	500	220/0.09	62 WB	TC	17.5	17.6	15.3	17.5	16.5	17.5	16.0	17.3
				SHC	17.5	15.1	14.0	15.1	14.6	15.0	14.4	14.8
				KW	2.50	1.84	2.21	1.85	2.04	1.84	2.11	1.85
				THR	25.4	23.4	22.2	23.4	22.9	23.3	22.7	23.1
COOLING	575	225/0.10	72 WB	TC	19.3	20.8	19.0	20.4	20.1	20.1	19.8	19.7
				SHC	9.8	10.1	9.7	10.0	10.0	9.8	9.9	9.6
				KW	2.42	1.98	2.50	1.97	2.24	1.94	2.32	1.94
				THR	26.9	27.0	26.9	26.6	27.2	26.1	27.1	25.8
	575	225/0.10	67 WB	TC	17.8	19.4	17.3	19.3	18.5	19.1	18.2	19.0
				SHC	12.7	13.0	12.5	13.0	12.9	12.8	12.9	12.8
				KW	2.30	1.92	2.36	1.93	2.15	1.90	2.24	1.92
				THR	25.0	25.4	24.7	25.3	25.3	25.1	25.3	25.0
	575	225/0.10	62 WB	TC	16.3	18.1	15.8	18.0	17.0	17.9	16.6	17.7
				SHC	15.4	16.1	15.1	16.1	15.7	15.9	15.5	15.8
				KW	2.19	1.87	2.25	1.88	2.08	1.86	2.14	1.87
				THR	23.1	24.0	22.9	23.9	23.5	23.7	23.3	23.6
COOLING	650	235/0.12	72 WB	TC	19.6	21.1	19.2	20.6	20.2	20.2	20.0	19.9
				SHC	10.2	10.5	10.1	10.3	10.3	10.0	10.3	9.9
				KW	2.45	2.01	2.52	1.99	2.26	1.95	2.34	1.96
				THR	27.3	27.4	27.1	26.9	27.3	26.4	27.3	26.0
	650	235/0.12	67 WB	TC	18.1	19.6	17.6	19.6	18.8	19.4	18.4	19.0
				SHC	13.5	13.6	13.3	13.6	13.6	13.4	13.5	13.2
				KW	2.34	1.94	2.40	1.95	2.19	1.93	2.26	1.93
				THR	25.4	25.7	25.1	25.7	25.7	25.5	25.5	25.1
	650	235/0.12	62 WB	TC	16.7	18.5	16.3	18.3	17.5	18.2	17.0	18.0
				SHC	16.3	17.1	16.0	16.9	16.7	16.7	16.5	1.66
				KW	2.23	1.90	2.29	1.90	2.12	1.88	2.18	1.90
				THR	23.7	24.5	23.4	24.2	24.1	24.1	23.8	24.0

					GPM							
					4.5	6.5	4	6.5	3.5	6.5	3	6.5
HEATING	500	220/0.09	70 DB	TC	15.8	16.0	16.3	16.7	16.7	17.2	16.8	17.4
				KW	2.00	2.01	2.03	2.05	2.05	2.08	2.06	2.10
				THA	11.3	11.6	11.8	12.1	12.1	12.5	12.3	12.8
HEATING	575	225/0.10	70 DB	TC	15.8	16.1	16.2	16.5	16.5	16.8	16.7	17.2
				KW	1.93	1.94	1.95	1.96	1.96	1.98	1.98	2.00
				THA	11.5	11.8	11.9	12.2	12.1	12.4	12.4	12.8
HEATING	650	235/0.12	70 DB	TC	15.6	15.8	16.0	16.3	16.3	16.5	16.6	16.9
				KW	1.88	1.88	1.89	1.90	1.90	1.91	1.92	1.93
				THA	11.6	12.0	11.8	12.1	12.1	12.3	12.4	12.6

50 HQ/VQ 022 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		1.5	2.5	1.5	2.75	1.75	3	1.75	3.25
COOLING	600	260/0.11	72 WB	TC	24.6	25.2	24.0	24.9	24.1	24.5	23.6	24.3
				SHC	11.8	11.9	11.6	11.8	11.6	11.7	11.4	11.6
				KW	2.03	1.75	2.09	1.78	2.06	1.81	2.12	1.86
				THR	31.0	30.7	30.6	30.4	30.6	30.2	30.2	30.2
	600	260/0.11	67 WB	TC	22.5	24.0	21.9	23.7	22.1	23.3	21.4	23.1
				SHC	14.9	15.3	14.6	15.2	14.7	15.0	14.4	14.9
				KW	1.94	1.72	1.99	1.75	1.98	1.78	2.03	1.82
				THR	28.6	29.4	28.2	29.2	28.3	28.9	27.8	28.8
	600	260/0.11	62 WB	TC	20.2	22.3	19.6	22.0	19.7	21.6	18.8	21.2
				SHC	17.6	18.6	17.3	18.4	17.4	18.2	16.9	18.1
				KW	1.85	1.67	1.90	1.70	1.89	1.73	1.95	1.77
				THR	26.1	25.6	25.6	27.3	25.7	27.0	25.0	26.8
COOLING	675	275/0.12	72	TC	24.8	25.4	24.4	25.0	24.4	24.7	24.0	24.4
				SHC	12.2	12.2	12.0	12.0	12.0	11.9	11.9	11.8
				KW	2.06	1.77	2.12	1.80	2.09	1.83	2.16	1.87
				THR	31.3	31.0	31.0	30.7	31.0	30.4	30.8	30.3
	675	275/0.12	67 WB	TC	22.9	24.3	22.4	23.9	22.4	23.8	21.9	23.4
				SHC	15.6	15.8	15.4	15.7	15.4	15.7	15.2	15.5
				KW	1.97	1.74	2.03	1.77	2.01	1.81	2.07	1.85
				THR	29.2	29.8	28.7	29.5	28.8	29.5	28.4	29.2
	675	275/0.12	62 WB	TC	20.9	22.6	20.1	22.2	20.4	21.9	19.5	21.7
				SHC	18.8	19.3	18.4	19.2	18.6	19.1	18.0	19.1
				KW	1.89	1.69	1.94	1.72	1.93	1.76	2.00	1.80
				THR	26.9	27.9	26.2	27.7	26.5	27.5	25.8	27.4
COOLING	750	290/0.14	72 WB	TC	25.2	25.5	24.7	25.1	24.7	24.7	24.2	24.5
				SHC	12.6	12.4	12.4	12.2	12.4	12.1	12.3	12.0
				KW	2.09	1.79	2.15	1.81	2.12	1.85	2.19	1.89
				THR	31.7	31.2	31.5	30.8	31.4	30.6	31.1	30.4
	750	290/0.14	67 WB	TC	23.3	24.6	22.6	24.2	22.8	23.9	22.2	23.5
				SHC	16.3	16.4	16.1	16.2	16.1	16.1	15.9	16.0
				KW	2.00	1.77	2.06	1.79	2.04	1.83	2.10	1.86
				THR	29.6	30.1	29.1	29.8	29.3	29.6	28.8	29.4
	750	290/0.14	62 WB	TC	21.4	23.0	20.7	22.7	20.9	22.3	20.2	22.0
				SHC	19.8	20.3	19.5	20.1	19.5	20.0	19.2	19.9
				KW	1.92	1.72	1.97	1.75	1.96	1.78	2.01	1.82
				THR	27.4	28.4	27.0	28.2	27.0	28.0	26.6	27.7

					GPM							
					5.5	8	5	8	4.5	8	4	8
HEATING	600	260/0.11	70 DB	TC	14.8	15.3	15.9	16.2	16.5	16.9	17.0	17.8
				KW	1.72	1.75	1.78	1.80	1.81	1.83	1.84	1.88
				THA	11.0	11.5	11.9	12.2	12.5	12.8	12.9	13.6
HEATING	675	275/0.12	70 DB	TC	15.2	15.4	15.8	16.2	16.4	17.0	17.1	17.3
				KW	1.72	1.73	1.75	1.77	1.78	1.81	1.81	1.82
				THA	11.4	11.5	11.9	12.3	12.5	12.9	13.0	13.2
HEATING	750	290/0.14	70 DB	TC	15.1	15.6	15.8	16.1	16.4	16.8	17.0	17.6
				KW	1.70	1.72	1.73	1.75	1.76	1.77	1.79	1.82
				THA	11.4	11.8	12.0	12.2	12.5	12.8	13.0	13.5

50 HQ/VQ 027 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		2	3	2	3.25	2	3.5	2	3.75
COOLING	750	330/0.11	72 WB	TC	30.9	30.6	30.3	30.3	29.5	29.9	28.8	29.6
				SHC	14.8	14.6	14.6	14.4	14.3	14.3	14.0	14.2
				KW	2.63	2.33	2.71	2.38	2.78	2.43	2.86	2.50
				THR	39.2	38.0	38.7	37.8	38.2	37.6	37.7	37.5
	750	330/0.11	67 WB	TC	28.3	29.3	27.6	28.9	26.9	28.6	26.1	28.0
				SHC	18.6	18.8	18.3	18.6	18.0	18.5	17.7	18.3
				KW	2.51	2.29	2.58	2.33	2.65	2.39	2.72	2.44
				THR	36.2	36.5	37.8	36.2	35.2	36.1	34.7	35.7
	750	330/0.11	62 WB	TC	25.4	27.2	24.6	26.7	23.7	26.3	22.6	25.7
				SHC	22.1	22.8	21.7	22.6	21.2	22.5	20.7	22.2
				KW	2.40	2.22	2.46	2.26	2.54	2.32	2.61	2.37
				THR	32.9	34.2	32.4	33.9	31.7	33.6	30.9	33.2
COOLING	825	345/0.12	72 WB	TC	31.0	30.9	30.6	30.4	29.9	30.0	29.1	29.7
				SHC	15.1	14.9	15.0	14.7	14.7	14.5	14.4	14.4
				KW	2.65	2.36	2.74	2.40	2.82	2.45	2.89	2.51
				THR	39.4	38.3	39.2	38.0	38.8	37.7	38.2	37.6
	825	345/0.12	67 WB	TC	28.7	29.5	28.0	29.4	27.3	28.8	26.5	28.5
				SHC	19.3	19.3	19.1	19.3	18.8	19.1	18.5	19.0
				KW	2.54	2.31	2.61	2.37	2.69	2.41	2.76	2.48
				THR	36.7	36.8	36.3	36.8	37.8	36.5	35.2	36.3
	825	345/0.12	62 WB	TC	26.2	27.5	25.2	27.1	24.1	26.8	23.3	26.3
				SHC	23.3	23.7	22.8	23.5	22.3	23.4	21.9	23.3
				KW	2.43	2.24	2.50	2.29	2.58	2.35	2.65	2.40
				THR	33.8	34.6	33.0	34.3	32.3	34.2	31.7	33.8
COOLING	950	360/0.13	72 WB	TC	31.3	31.0	31.0	30.5	30.3	30.8	29.4	29.8
				SHC	15.5	15.1	15.4	14.9	15.2	15.1	14.9	14.6
				KW	2.68	2.38	2.78	2.42	2.86	2.50	2.93	2.53
				THR	39.8	38.5	39.7	38.1	39.3	38.7	38.6	37.8
	950	360/0.13	67 WB	TC	29.1	29.8	28.4	29.4	27.7	29.0	26.9	28.7
				SHC	20.1	19.8	19.8	19.7	19.6	19.5	19.2	19.5
				KW	2.58	2.33	2.65	2.38	2.73	2.43	2.80	2.50
				THR	37.3	37.2	36.8	36.9	36.3	36.6	35.7	36.5
	950	360/0.13	62 WB	TC	26.7	27.9	25.8	27.5	24.9	27.1	23.8	26.7
				SHC	24.3	24.6	23.9	24.4	23.4	24.3	22.8	24.2
				KW	2.47	2.27	2.54	2.32	2.61	2.37	2.69	2.43
				THR	34.4	35.1	33.8	34.8	33.1	34.5	32.3	34.3

					GPM							
					7	10	6.5	10	6	10	5.5	10
HEATING	750	330/0.11	70 DB	TC	18.8	19.3	20.1	20.3	20.6	21.0	21.4	22.0
				KW	2.20	2.23	2.27	2.29	2.30	2.33	2.35	2.38
				THA	13.7	14.2	14.9	15.1	15.3	15.7	16.0	16.5
HEATING	825	345/0.12	70 DB	TC	19.1	19.2	19.9	20.2	20.5	21.1	21.5	21.5
				KW	2.19	2.20	2.23	2.25	2.26	2.30	2.32	2.32
				THA	14.0	14.2	14.7	15.0	15.3	15.8	16.1	16.2
HEATING	900	360/0.13	70 DB	TC	18.9	19.4	19.8	20.0	20.5	20.7	21.4	21.9
				KW	2.16	2.19	2.21	2.21	2.24	2.25	2.29	23.7
				THA	13.9	14.4	14.7	14.8	15.3	15.5	16.1	16.5

50 HQ/VQ 033 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		2.5	4	2.5	4.5	2.5	5	2.5	5.5
COOLING	900	400/0.13	72 WB	TC	37.3	37.3	36.6	37.0	35.8	36.6	34.9	36.0
				SHC	17.8	17.7	17.6	17.5	17.2	17.4	16.9	17.2
				KW	3.64	3.17	3.73	3.21	3.82	3.25	3.91	3.31
				THR	48.7	47.3	48.4	47.1	47.8	46.8	47.2	46.4
	900	400/0.13	67 WB	TC	34.1	35.4	33.4	35.0	32.7	34.6	31.7	34.1
				SHC	22.3	22.6	22.1	22.3	21.7	22.1	21.3	21.9
				KW	3.46	3.10	3.56	3.13	3.65	3.18	3.73	3.24
				THR	45.0	45.2	44.6	44.9	44.1	44.6	43.4	44.3
	900	400/0.13	62 WB	TC	30.7	33.0	29.6	32.7	28.8	32.2	27.6	31.8
				SHC	26.5	27.4	26.0	27.2	25.6	27.0	25.0	26.8
				KW	3.31	3.01	3.40	3.05	3.48	3.10	3.57	3.16
				THR	41.1	42.5	40.3	42.3	39.8	42.0	38.9	41.7
COOLING	975	420/0.14	72 WB	TC	37.4	37.7	36.9	37.4	36.2	36.9	35.3	36.4
				SHC	18.1	18.0	17.9	17.9	17.7	17.7	17.3	17.5
				KW	3.66	3.21	3.77	3.24	3.87	3.29	3.96	3.34
				THR	48.9	47.8	48.8	47.6	48.4	47.3	47.7	46.9
	975	420/0.14	67 WB	TC	34.6	35.8	33.9	35.4	33.1	34.9	32.2	34.4
				SHC	23.0	23.1	22.8	22.9	22.5	22.7	22.1	22.5
				KW	3.51	3.14	3.60	3.17	3.69	3.21	3.78	3.27
				THR	45.6	45.7	45.2	45.4	44.7	45.0	44.1	44.7
	975	420/0.14	62 WB	TC	31.5	33.4	30.5	33.0	29.3	32.6	28.4	32.2
				SHC	27.7	28.4	27.2	28.1	26.6	27.9	26.1	27.7
				KW	3.36	3.05	3.44	3.08	3.53	3.13	3.62	3.19
				THR	42.0	43.1	41.3	42.8	40.4	42.5	39.8	42.2
COOLING	1050	450/0.15	72 WB	TC	37.6	38.0	37.3	37.7	36.6	36.5	35.7	36.0
				SHC	18.4	18.3	18.3	18.2	18.1	17.6	17.7	17.4
				KW	3.71	3.26	3.83	3.29	3.93	3.30	4.02	3.36
				THR	49.3	48.2	49.3	48.0	48.9	46.9	48.4	46.5
	1050	450/0.15	67 WB	TC	35.0	36.0	34.1	35.4	33.4	35.1	32.5	34.6
				SHC	23.7	23.6	23.4	23.3	23.2	23.2	22.8	23.0
				KW	3.57	3.18	3.65	3.20	3.75	3.25	3.84	3.31
				THR	46.2	46.0	45.7	45.5	45.2	45.4	44.6	45.1
	1050	450/0.15	62 WB	TC	32.0	33.8	30.8	33.4	29.9	33.0	28.8	32.5
				SHC	28.7	29.2	28.1	29.0	27.7	28.8	27.1	28.6
				KW	3.41	3.10	3.50	3.14	3.58	3.18	3.67	3.24
				THR	42.7	43.6	41.8	43.3	43.1	43.1	40.4	42.7

					GPM							
					8	12	7.5	12	6.5	12	6	12
HEATING	900	400/0.13	70 DB	TC	25.7	26.7	27.5	28.2	28.3	28.9	29.1	30.7
				KW	3.38	3.45	3.51	3.56	3.56	3.60	3.62	3.73
				THA	17.8	18.5	19.2	19.8	19.9	20.4	20.5	21.8
HEATING	975	420/0.14	70 DB	TC	26.1	26.6	27.3	27.9	28.2	28.8	28.8	30.1
				KW	3.37	3.40	3.45	3.49	3.50	3.54	3.55	3.63
				THA	18.1	18.6	19.1	19.6	19.9	20.4	20.4	21.5
HEATING	1050	450/0.15	70 DB	TC	26.0	27.0	27.2	27.8	28.1	29.0	29.3	30.6
				KW	3.34	3.41	3.41	3.45	3.47	3.53	3.55	3.63
				THA	18.1	18.9	19.1	19.6	19.8	20.6	20.8	21.9

50 HQ/VQ 042 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		3	5	3	5.5	3	6	3	6.5
	1150	615/0.09	72 WB	TC	46.5	46.2	45.7	45.7	44.6	45.0	43.7	44.4
				SHC	22.3	21.9	22.0	21.7	21.6	21.4	21.3	21.2
				KW	4.73	4.14	4.84	4.19	4.95	4.25	5.07	4.32
				THR	61.4	59.3	60.9	58.9	60.2	58.4	59.7	58.0
	1150	615/0.09	67 WB	TC	42.6	43.8	41.8	43.5	40.7	43.0	39.2	42.4
				SHC	28.3	38.3	38.0	38.2	27.6	28.0	27.0	27.8
				KW	4.51	4.04	4.62	4.10	4.73	4.17	4.84	4.25
				THR	56.9	56.6	56.3	56.4	55.6	56.1	54.5	55.9
	1150	615/0.09	62 WB	TC	38.6	41.1	37.2	40.7	35.7	40.2	34.7	39.6
				SHC	34.0	34.8	33.2	34.7	32.5	34.5	32.0	34.2
				KW	4.32	3.94	4.43	4.00	4.54	4.07	4.64	4.14
				THR	52.2	53.6	51.1	53.4	50.0	53.1	49.3	52.7
COOLING	1225	650/0.09	72 WB	TC	46.4	46.5	45.8	46.0	45.0	45.3	43.9	44.6
				SHC	22.5	22.2	22.3	22.0	22.1	21.7	21.6	21.4
				KW	4.76	4.19	4.89	4.24	5.01	4.30	5.12	4.37
				THR	61.4	59.7	61.3	59.3	60.8	58.9	60.0	58.4
	1225	650/0.09	67 WB	TC	43.0	44.1	42.1	43.6	41.2	43.1	39.5	42.7
				SHC	29.1	28.8	28.8	28.7	28.4	28.4	27.7	28.3
				KW	4.57	4.09	4.68	4.15	4.79	4.21	4.90	4.30
				THR	57.4	57.0	56.9	56.7	56.3	56.4	55.0	56.3
	1225	650/0.09	62 WB	TC	39.0	41.6	38.0	41.1	36.6	40.5	35.1	39.8
				SHC	35.0	35.8	34.5	35.6	33.8	35.3	33.0	35.0
				KW	4.39	4.00	4.49	4.05	4.59	4.12	4.70	4.19
				THR	52.9	54.2	52.1	53.9	51.1	53.5	49.9	53.1
COOLING	1300	690/0.10	72 WB	TC	46.7	46.7	46.1	46.2	45.3	45.5	44.1	44.8
				SHC	22.9	22.5	22.7	22.3	22.5	22.0	22.0	21.7
				KW	4.82	4.25	4.96	4.30	5.08	4.38	5.19	4.43
				THR	61.9	60.2	61.8	59.8	61.3	59.3	60.6	58.8
	1300	690/0.10	67 WB	TC	39.7	42.0	38.4	41.4	36.9	40.9	35.8	40.2
				SHC	36.2	36.8	35.5	36.5	34.7	36.3	34.1	35.9
				KW	4.45	4.06	4.56	4.11	4.66	4.18	4.77	4.25
				THR	53.8	54.8	52.8	54.4	51.7	54.1	50.9	53.7
	1300	690/0.10	62 WB	TC	43.3	44.2	42.5	43.9	41.6	43.2	40.2	42.8
				SHC	29.8	29.3	29.5	29.2	29.1	28.9	28.6	28.9
				KW	4.64	4.14	4.75	4.21	4.85	4.26	4.96	4.35
				THR	57.9	57.3	57.5	57.2	56.7	56.7	55.9	56.6

					GPM							
					10.5	14	9.5	14	8.5	14	7.5	14
HEATING	1150	615/0.09	70 DB	TC	30.4	30.7	32.1	33.0	33.8	34.3	34.8	36.0
				KW	3.96	3.98	4.08	4.14	4.20	4.22	4.26	4.33
				THA	20.6	21.0	22.1	22.9	23.6	24.0	24.4	25.4
HEATING	1225	650/0.09	70 DB	TC	30.4	31.0	32.4	32.8	33.5	34.3	34.6	35.9
				KW	3.95	3.99	4.08	4.11	4.15	4.20	4.22	4.30
				THA	20.7	21.2	22.4	22.7	23.3	24.0	24.2	25.3
HEATING	1300	690/0.10	70 DB	TC	30.7	30.9	32.2	33.2	33.5	34.4	34.5	26.3
				KW	3.97	3.98	4.06	4.13	4.14	4.19	4.20	4.31
				THA	21.0	21.1	22.2	23.1	23.3	24.0	24.2	25.6

50 HQ/VQ 048 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		3.75	6.5	3.75	7	3.75	7.5	3.75	8
COOLING	1400	665/0.14	72 WB	TC	56.5	56.2	55.6	55.5	54.2	55.3	52.7	54.2
				SHC	27.0	26.6	26.7	26.4	26.2	26.3	25.6	25.9
				KW	4.27	3.65	4.43	3.76	4.57	3.88	4.71	3.99
				THR	70.0	67.8	69.6	67.4	68.6	67.6	67.6	66.9
	1400	655/0.14	67 WB	TC	51.6	53.5	49.7	52.6	47.8	51.8	45.8	51.2
				SHC	34.0	34.2	33.2	33.8	32.4	33.5	31.9	33.4
				KW	4.10	3.60	4.24	3.69	4.38	3.80	4.52	3.92
				THR	64.6	64.9	63.1	64.3	61.6	63.8	60.2	63.7
	1400	655/0.14	62 WB	TC	44.7	50.0	42.7	49.1	40.7	48.2	38.3	47.5
				SHC	39.6	41.9	38.6	41.4	37.6	41.0	36.3	40.9
				KW	3.94	3.53	4.07	3.62	4.22	3.73	4.38	3.85
				THR	57.1	61.2	55.6	60.6	55.1	60.0	54.9	59.7
COOLING	1550	715/0.15	72 WB	TC	56.9	56.6	56.3	55.9	54.9	55.2	53.5	54.8
				SHC	27.6	27.1	27.5	26.8	27.0	26.6	26.5	26.5
				KW	4.34	3.72	4.51	3.82	4.66	3.93	4.80	4.06
				THR	70.7	68.5	70.5	68.1	69.7	67.7	68.7	67.7
	1550	715/0.15	67 WB	TC	52.7	53.8	50.6	53.5	48.6	52.4	46.5	51.7
				SHC	35.5	35.1	34.7	35.1	33.9	34.6	33.1	34.4
				KW	4.19	3.65	4.33	3.77	4.46	3.87	4.60	3.99
				THR	65.9	65.4	64.4	65.4	62.8	64.7	61.1	64.3
	1550	715/0.15	62 WB	TC	46.1	50.7	44.2	49.8	42.2	49.0	40.2	48.1
				SHC	41.8	43.7	40.9	43.2	39.8	42.9	38.7	42.5
				KW	4.02	3.60	4.15	3.69	4.29	3.80	4.44	3.91
				THR	58.8	62.2	57.3	61.6	55.8	61.1	55.1	60.5
COOLING	1700	810/0.16	72 WB	TC	57.3	56.7	56.3	55.9	55.3	55.2	54.0	54.5
				SHC	28.2	27.3	27.9	27.1	27.6	26.8	27.2	26.6
				KW	4.46	3.82	4.62	3.92	4.78	4.03	4.93	4.15
				THR	71.4	68.9	71.0	68.4	70.4	68.1	69.5	67.7
	1700	810/0.16	67 WB	TC	53.2	54.4	51.6	53.4	49.7	53.0	47.6	52.0
				SHC	36.8	36.1	36.2	35.7	35.4	35.7	34.6	35.3
				KW	4.32	3.77	4.45	3.86	4.59	3.99	4.73	4.10
				THR	66.8	66.4	65.7	65.7	64.3	65.6	62.6	64.9
	1700	810/0.16	62 WB	TC	47.3	50.8	45.4	50.1	43.4	49.5	41.5	48.7
				SHC	43.8	44.7	42.8	44.5	41.8	44.4	40.6	44.1
				KW	4.15	3.69	4.28	3.80	4.42	3.91	4.56	4.03
				THR	60.4	62.6	59.0	62.2	57.5	61.9	55.9	61.5

					GPM							
					9	16	8.5	16	8	16	7.5	16
HEATING	1400	665/0.14	70 DB	TC	36.8	38.4	38.7	40.4	40.5	42.4	42.1	44.5
				KW	4.08	4.17	4.19	4.28	4.29	4.40	4.38	4.52
				THA	26.6	27.9	28.2	29.6	29.8	31.4	31.1	33.1
HEATING	1550	715/0.15	70 DB	TC	37.0	38.5	39.4	40.4	40.6	42.3	41.7	43.6
				KW	4.05	4.13	4.19	4.24	4.25	4.34	4.31	4.41
				THA	26.8	28.1	28.9	29.8	29.9	31.4	30.9	32.6
HEATING	1700	810/0.16	70 DB	TC	37.8	39.3	39.4	40.5	41.0	42.6	42.6	43.8
				KW	4.11	4.19	4.19	4.25	4.28	4.36	4.35	4.42
				THA	27.4	28.7	28.7	29.7	30.2	31.5	31.5	32.6

50 HQ/VQ 060 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		4.25	7	4.5	7.5	4.5	8	4.5	8.5
COOLING	1800	810/0.14	72 WB	TC	68.4	70.3	67.7	69.4	66.7	69.4	65.5	68.2
				SHC	33.2	33.7	33.0	33.3	32.7	33.3	32.2	32.9
				KW	6.38	5.61	6.44	5.70	6.62	5.83	6.78	5.94
				THR	88.6	88.1	88.0	87.5	87.6	87.8	86.8	87.0
	1800	810/0.14	67 WB	TC	63.2	66.4	62.5	65.7	60.9	64.9	58.7	64.1
				SHC	42.6	43.2	42.3	42.9	41.6	42.6	40.7	42.3
				KW	6.13	5.48	6.19	5.57	6.33	5.68	6.48	5.79
				THR	82.6	83.8	82.2	83.4	80.9	82.9	79.2	82.4
	1800	810/0.14	62 WB	TC	56.2	61.8	54.8	60.9	53.2	60.1	50.9	59.0
				SHC	50.4	52.8	49.7	52.4	48.9	52.0	47.8	51.6
				KW	5.87	5.33	5.94	5.42	6.08	5.52	6.23	5.23
				THR	74.7	78.7	73.6	78.1	72.5	77.5	70.6	76.8
COOLING	1950	880/0.15	72 WB	TC	70.9	68.9	68.3	70.0	67.3	69.0	65.9	68.8
				SHC	34.2	33.9	33.7	33.8	33.4	33.4	32.9	33.5
				KW	5.71	6.50	6.56	5.80	6.74	5.89	6.90	6.04
				THR	89.0	89.5	89.1	88.3	88.6	87.6	87.8	87.9
	1950	880/0.15	67 WB	TC	63.9	66.9	63.2	66.1	61.6	65.4	59.3	64.5
				SHC	44.0	44.2	43.7	43.9	43.0	43.7	42.1	43.4
				KW	6.24	5.57	6.31	5.66	6.44	5.77	6.59	5.89
				THR	83.6	84.5	83.2	84.0	81.9	83.7	80.2	83.2
	1950	880/0.15	62 WB	TC	57.0	62.4	56.2	61.7	54.1	60.7	51.7	59.7
				SHC	52.3	54.4	52.0	54.3	50.8	53.8	50.0	53.3
				KW	5.98	5.42	6.05	5.53	6.20	5.62	6.35	5.72
				THR	75.9	79.5	75.5	79.2	73.7	78.5	71.9	77.8
COOLING	2100	960/0.16	72 WB	TC	69.2	71.4	68.7	70.5	67.4	69.4	66.5	69.2
				SHC	34.5	34.7	34.3	34.4	33.9	33.9	33.7	34.0
				KW	6.61	5.82	6.67	5.91	6.83	6.00	7.02	6.15
				THR	90.2	89.9	89.8	89.2	89.1	88.4	88.7	88.7
	2100	960/0.16	67 WB	TC	64.3	67.2	63.6	66.6	62.1	65.6	60.3	64.7
				SHC	45.3	45.2	45.0	45.0	44.3	44.6	43.6	44.3
				KW	6.36	5.67	6.42	5.77	6.56	5.87	6.70	5.98
				THR	84.4	85.2	83.9	84.8	82.8	84.2	81.6	83.7
	2100	960/0.16	62 WB	TC	58.1	63.0	56.8	62.1	55.2	61.4	53.2	60.3
				SHC	54.3	56.2	53.7	55.8	52.8	55.5	51.6	55.0
				KW	6.10	5.54	6.18	5.62	6.31	5.73	6.46	5.84
				THR	77.5	80.5	76.4	80.0	75.3	79.6	73.7	78.8

					GPM							
					14	21	13.5	21	13	21	12.5	21
HEATING	1800	810/0.14	70 DB	TC	43.9	44.8	45.5	46.4	47.3	47.9	47.8	49.3
				KW	5.24	5.29	5.32	5.37	5.43	5.46	5.45	5.53
				THA	30.7	31.4	32.0	32.8	33.6	34.1	34.1	35.3
HEATING	1950	880/0.15	70 DB	TC	44.0	44.7	45.8	46.5	47.1	47.7	48.7	49.0
				KW	5.23	5.27	5.33	5.36	5.40	5.43	5.48	5.49
				THA	30.7	31.3	32.2	32.9	33.4	34.0	34.8	35.1
HEATING	2100	960/0.16	70 DB	TC	44.6	45.4	45.8	46.5	47.3	47.7	48.7	49.2
				KW	5.28	5.32	5.33	5.37	5.41	5.43	5.48	5.50
				THA	31.2	31.8	32.2	32.8	33.5	33.9	34.8	35.2

50 HQ/VQ 080 CAPACITY

					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		5	7.5	5	8	5.25	8.5	5.25	9
COOLING	2200	1100/0.07	72 WB	TC	87.1	88.2	85.8	87.4	84.7	86.5	82.7	86.3
				SHC	42.3	42.2	41.8	41.9	41.4	41.6	40.6	41.6
				KW	7.97	7.09	8.18	7.20	8.27	7.33	8.45	7.52
				THR	112.4	110.6	111.6	110.2	110.8	109.7	109.3	110.1
	2200	1100/0.07	67 WB	TC	80.5	83.5	79.3	82.4	78.4	81.7	76.5	80.4
				SHC	54.0	54.6	53.7	54.1	53.3	54.0	52.6	53.4
				KW	7.60	6.90	7.82	7.00	7.93	7.14	8.11	7.26
				THR	104.5	105.3	104.1	104.6	103.5	104.3	102.2	103.4
	2200	1100/0.07	62 WB	TC	74.4	77.7	71.9	76.8	70.6	76.3	67.8	75.0
				SHC	65.8	66.7	64.5	66.2	63.9	66.3	62.5	65.7
				KW	7.28	6.66	7.47	6.77	7.57	6.93	7.76	7.06
				THR	97.5	98.8	95.5	98.3	94.5	98.2	92.3	97.4
COOLING	2350	1210/0.08	72 WB	TC	87.7	88.5	86.3	87.7	85.3	86.6	83.2	85.7
				SHC	42.9	42.7	42.5	42.4	42.1	42.0	41.3	41.7
				KW	8.14	7.23	8.34	7.35	8.44	7.47	8.62	7.61
				THR	113.5	111.5	112.6	111.1	111.9	110.3	110.4	109.9
	2350	1210/0.08	67 WB	TC	81.0	84.1	79.5	82.9	78.8	81.7	77.1	80.9
				SHC	55.3	55.8	54.8	55.3	54.7	54.8	54.0	54.7
				KW	7.77	7.05	7.95	7.15	8.08	7.26	8.27	7.41
				THR	105.7	106.4	104.6	105.6	104.4	104.7	103.2	104.4
	2350	1210/0.08	62 WB	TC	75.0	78.1	72.4	77.4	71.4	76.4	68.6	75.1
				SHC	67.7	68.3	66.4	68.1	65.9	67.7	64.5	67.6
				KW	7.45	6.80	7.64	6.93	7.73	7.05	7.92	7.21
				THR	98.7	99.7	96.7	99.4	95.9	98.7	93.7	98.5
COOLING	2500	1300/0.08	72 WB	TC	87.4	88.2	86.2	87.6	85.7	86.9	83.6	86.0
				SHC	43.3	42.8	42.9	42.6	42.8	42.4	42.1	42.1
				KW	8.22	7.32	8.45	7.44	8.58	7.58	8.76	7.73
				THR	113.4	111.4	113.0	111.1	112.9	110.9	111.4	110.5
	2500	1300/0.08	67 WB	TC	85.1	84.0	80.0	83.5	78.9	82.2	77.4	81.5
				SHC	56.7	56.5	56.2	56.6	55.8	56.0	55.4	55.9
				KW	7.90	7.14	8.09	7.27	8.18	7.39	8.39	7.54
				THR	106.5	106.6	105.6	106.6	104.8	105.6	104.1	105.3
	2500	1300/0.08	62 WB	TC	75.7	78.8	74.0	77.9	72.1	76.9	70.0	75.9
				SHC	69.6	70.2	68.7	69.8	67.8	69.4	66.7	69.0
				KW	7.59	6.94	7.76	7.05	7.88	7.17	8.05	7.32
				THR	99.8	100.8	98.5	100.3	97.0	99.7	95.5	99.1

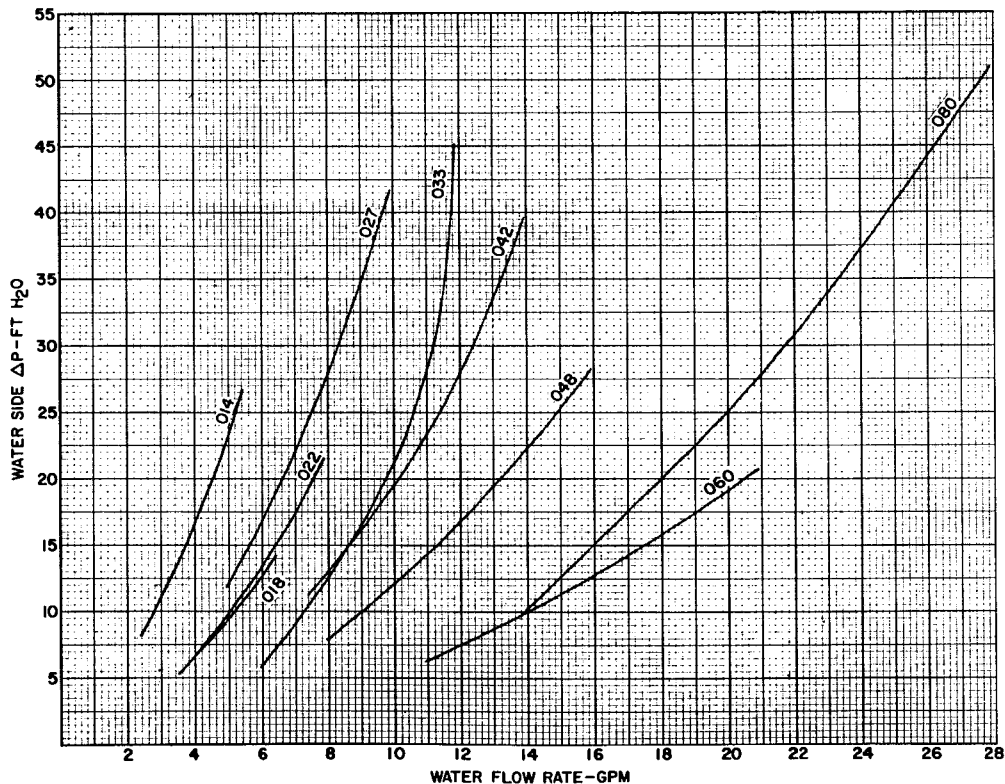
					GPM							
					16	28	15.5	28	15	28	14.5	28
HEATING	2200	1100/0.07	70 DB	TC	54.2	56.8	57.9	58.7	59.3	61.6	62.8	63.6
				KW	6.35	6.51	6.58	6.62	6.66	6.80	6.87	6.92
				THA	37.9	40.0	41.0	41.8	42.3	44.3	45.2	45.9
HEATING	2350	1210/0.08	70 DB	TC	54.9	56.7	57.7	58.9	59.5	62.6	61.8	63.5
				KW	6.41	6.52	6.58	6.65	6.68	6.86	6.82	6.91
				THA	38.3	39.9	40.8	41.8	42.3	44.9	44.3	57.8
HEATING	2500	1300/0.08	70 DB	TC	55.5	57.5	57.9	59.1	59.6	61.3	62.6	63.6
				KW	6.47	6.58	6.60	6.66	6.69	6.79	6.86	6.92
				THA	38.7	40.4	40.8	41.9	42.3	43.8	44.9	45.8

WATER QUALITY

As standard, the water-to-refrigerant heat exchanger is cupro-nickel. Regardless, a water analysis must be performed on the water which is being supplied to the WSHP. Contact a reputable water analysis firm to determine the quality of water. In the closed loop system, treating the water, if necessary, can easily be done by adding the recommended treatment to loop water. Because it is impractical to treat the water in a once through system, it must fall within the criteria listed below.

Chlorides & Salt Water (ppm)	no upper limit
Sulfides (ppm)	Not to exceed 10 ppm
Iron Bacteria	no upper limit

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



FAN PERFORMANCE

		UNIT VOLTAGE			
SIZE 50HQ,VQ	CFM	230,460		208	
				Fan Speed	
		High	Medium	High	Medium
		External Static Pressure (in. WG*)			
014	400	0.62	0.49	0.53	0.39
	475	0.53	0.37	0.37	0.20
	550	0.39	0.20	0.16	----
018	500	0.56	0.48	0.47	0.36
	575	0.47	0.38	0.34	0.21
	650	0.34	0.24	0.19	0.02
022	600	0.56	0.51	0.52	0.45
	675	0.49	0.42	0.43	0.32
	750	0.39	0.27	0.30	0.09
027	750	0.54	0.50	0.47	0.40
	825	0.41	0.36	0.32	0.20
	900	0.26	0.19	0.12	----
033	900	0.50	0.44	0.43	0.35
	975	0.37	0.31	0.31	0.08
	1050	0.24	0.17	0.16	----
042	1150	0.51	0.43	0.46	0.12
	1225	0.37	0.21	0.28	----
	1300	0.23	----	0.01	----
048	1400	0.67	0.51	0.62	0.39
	1550	0.48	0.23	0.40	----
	1700	0.25	----	0.14	----
060	1800	0.63	0.36	0.54	----
	1950	0.50	0.07	0.40	----
	2100	0.34	----	0.21	----
080	2200	0.78	0.35	0.52	----
	2350	0.61	0.03	0.32	----
	2500	0.37	----	0.06	----

*External static pressure includes deductions for wet coil and filter.

ELECTRICAL DATA

UNIT MODEL 50 SERIES	V-PH-HZ	OPERATING VOLTAGE		COMPRESSOR		FAN	MIN CIRCUIT AMPS	MAX FUSE AMPS
		MIN	MAX	RLA	LRA	FLA		
HQ,VQ014 HQ,VQ018 HQ,VQ022 HQ,VQ027 HQ,VQ033 HQ,VQ042	208/230-1-60	197	253	9.6	37.5	0.9	12.7	20
HQ,VQ048 HQ,VQ060				13.4	53.0	0.9	17.7	30
	13.3			65.0	1.5	18.1	30	
	16.2			66.0	1.7	22.0	35	
	23.3			88.0	2.5	31.6	50	
	27.7			100.0	3.2	37.8	60	
		187		23.9	94.0	3.4	33.3	50
				35.3	150.0	4.5	48.6	80
HQ,VQ033 HQ,VQ042 HQ,VQ048 HQ,VQ060 HQ,VQ080	208/230-3-60	187	253	13.8	87.0	2.5	19.8	30
				18.5	100.0	3.2	26.3	40
				16.8	80.0	3.9	24.9	40
				20.6	136.0	4.5	30.3	50
				20.7	137.0	6.2	32.1	50
HQ,VQ033 HQ,VQ042 HQ,VQ048 HQ,VQ060 HQ,VQ080	460-3-60	414	508	6.0	30.0	1.1	8.9	15
				6.9	36.5	1.6	10.2	15
				8.2	35.0	2.0	12.3	15
				10.4	49.0	2.3	15.3	25
				11.4	69.0	3.1	17.4	25

FLA - Full Load Amps

LRA - Locked Rotor Amps

RLA - Rated Load Amps

50HQ,VQ 014-042 Pending UL Approval

50HQ,VQ 048-080 Pending ETL Approval

SEQUENCE OF OPERATION

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

Thermostat calls for cooling. (reversing valve solenoid [RVS] is energized in cooling position).

The control voltage (24 V) is available at Y and if low water temperature cutout (LWTC), high pressure switch (HPS) and lockout relay (LOR) are closed; the contractor is energized and the compressor runs. Control voltage is also available at 0 and the RVS is energized and SR-1 coil which is in parallel with the RVS, is energized. Therefore, the normally closed SR-1 contacts open so no control voltage gets to SR-2 coil so the normally open SR-2 contacts stay open so the solenoid valve coil stays in its normally closed position. Therefore, in the cooling mode all water is diverted to the Penn U46 A direct acting water regulating valve. With the RVS energized, the flow of refrigerant is through the water-to-refrigerant heat exchanger which is acting as a condenser, and through the capillary to the air-to-refrigerant evaporator.

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

To eliminate the sound associated with the reversing valve changing modes, power (24V) to 0 keeps the RVS energized during the OFF cycle of the compressor. SR-1 coil also is still energized so no water is flowing through solenoid valve; compressor is OFF so no head pressure is available so the water regulating valve is closed. Therefore, during OFF cycle, water flow to unit is stopped.

Thermostat calls for heating - (reversing valve solenoid [RSV] is de-energized in heating position) Due to the voltage drop across CC, the voltage at 0 is insufficient to energize the RVS; likewise SR-1. Therefore SR-1 contacts remain in the normally closed position; SR-2 is energized

thereby closing the normally open SR-2 contacts allowing control voltage to open the normally closed solenoid valve coil thus allowing water flow to the water-to-refrigerant heat exchanger. The direct-acting water regulating valve is closed because it is now measuring the suction pressure which is low relative to head pressure. Control voltage is also applied to W and the field supplied jumper carries voltage to Y and energizes the compressor contactor (provided are safety switches are closed). The compressor is started and since RVS is de-energized, the refrigerant flow is to the air-to-refrigerant coil which is acting as a condenser, then through the capillary and the water-to-refrigerant heat exchanger which is acting as an evaporator.

When the thermostat is satisfied, the heating thermostat breaks, de-energizing C by the loss of voltage to W therefore no control voltage is going to SR-2 coil so SR-2 contacts go to the normally open position breaking power to normally closed solenoid valve coil. Therefore, during OFF cycle, water flow to unit is stopped.

If any safety devices are energized, the lock out circuits can be reset at the thermostat by turning it off and then back on.

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

Solenoid valve coil (line voltage) manual flow valve and water regulating valve are field purchased.

UNIT WIRING DIAGRAM

LEGEND

- C Contactor
- CC Cooling Compensator
- Comp Compressor
- FC Fan Capacitor
- FM Fan Motor
- FR Fan Relay
- HC Heating Compensator
- HPS High-Pressure Switch
- LOR Lock Out Relay
- LWTC Low Water Temperature Cutout
- Recp Receptacle Assembly
- RVS Reversing Valve Solenoid
- ST Start Thermistor
- TB Terminal Board
- Tran Transformer

Component Connection (Marked)

Component Connection (Unmarked)

Field Splice

Common Potential Only. (Not to represent wire.)

Field Power Wiring

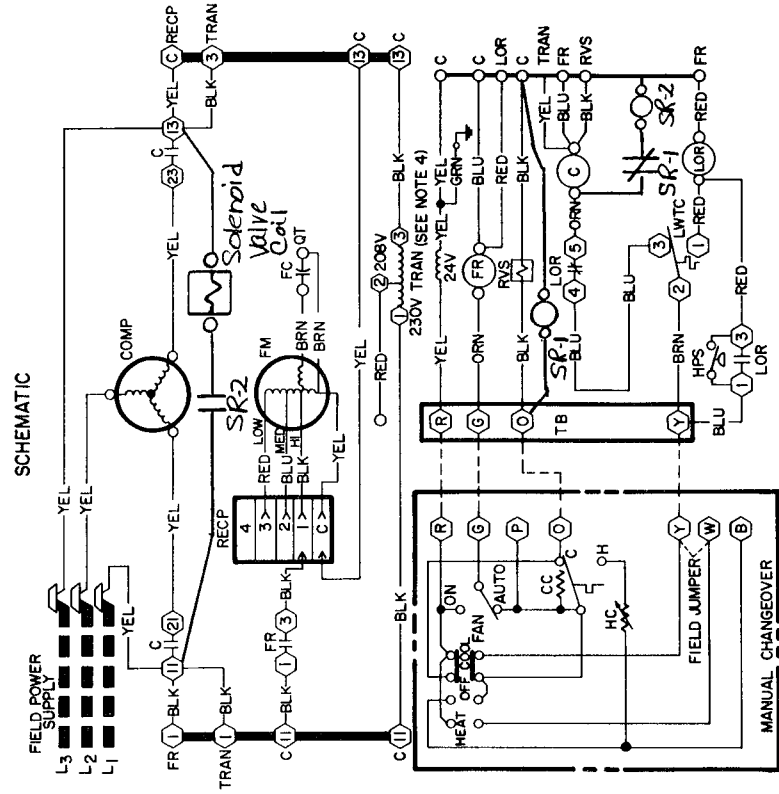
Field Control Wiring

Junction

Alternate ST Wiring

NOTES.

- 1 Compressor is protected against overload conditions by an internal device. Fan motor is inherently protected against overload.
2. Reversing valve solenoid (RVS) is energized in cooling mode.
3. Use copper or copper-clad aluminum conductors only.
4. All single-phase and 3-phase compressors are protected by the line break protectors.
5. For additional protection, a second LWTC is installed.



- FIELD WIRING CONNECTION
- ⊗ DENOTES CONNECTION POINT BETWEEN SUBBASE AND THERMOSTAT
- ⊕ AUTOMATIC CHANGEOVER