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Carrier

Advance Product Data

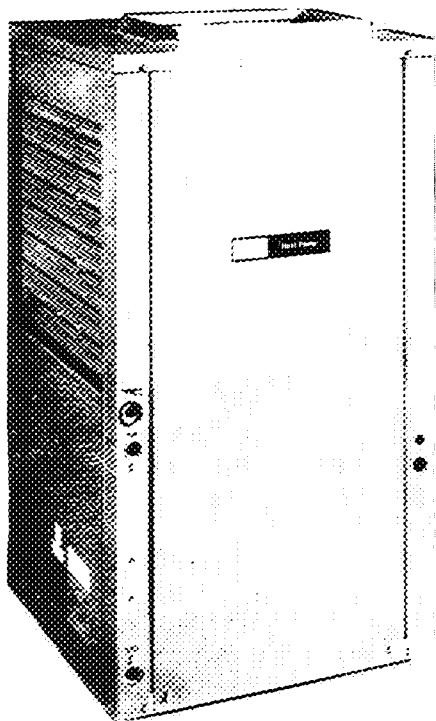
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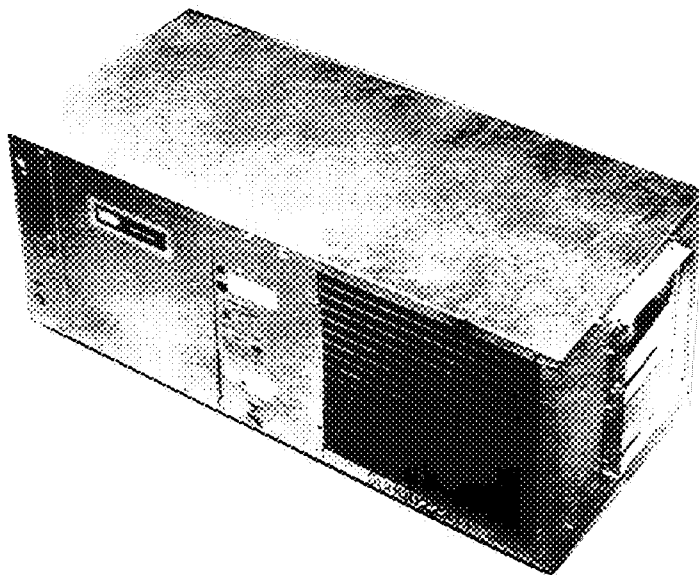
50HQ,VQ 014-080

WATER SOURCE HEAT PUMP



50VQ

VERTICAL MODEL



50HQ

HORIZONTAL MODEL

FOR ENTERING WATER TEMPERATURES
FROM 45 F TO 60 F

Book	1	4
Tab	5a	5a

8/84

PC 111

Form 50HQ,VQ-3APD
Supersedes 50HQ,VQ-2APD

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

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TABLE OF CONTENTS

	<u>PAGE</u>
INTRODUCTION	1 - 2
PRECAUTIONS	2
PIPING VALVES	2
PHYSICAL DATA	3
CERTIFIED PRINTS	4 - 7
SELECTION EXAMPLE	8 - 9
RATINGS	10 - 18
WATER QUALITY	19
WATER PRESSURE DROP	19
FAN PERFORMANCE	20
ELECTRICAL DATA	21
SEQUENCE OF OPERATION	22
WIRING DIAGRAM	23
VALVE INSTALLATION	24
VALVE ADJUSTMENT	24
VALVE SPECIFICATION	25
CONVERSION PROCEDURE	26

CARRIER'S GROUND WATER SOURCE HEAT PUMP

This publication provides performance, modifications, selection, and system guidelines for Carrier's Water Source Heat Pump Models 50HQ (Horizontal) and 50VQ (Vertical) when utilizing entering water temperatures between 45 degrees F. and 60 degrees F. (Refer to other Carrier Publications for performance data when utilizing temperatures between 60 degrees F. and 90 degrees F.). These units are available in nine sizes with capacities ranging from a nominal 14,000 BTUH to 80,000 BTUH in cooling and 10,000 BTUH to 60,000 BTUH in heating. Available voltages are 208/230-10, 208/230-30, 277-10 and 460-30.

UNIT DESCRIPTION

The 50HQ/VQ unit is a water-to-air source heat pump for space conditioning. The unit's cabinet is constructed of heavy gauge galvanized steel. The VQ unit is for base mounting and HQ unit is intended for suspension using the recommended hanger kit. Units are complete with multi-speed PSC fan motors, centrifugal fan wheels, air-to-refrigerant heat exchanger capillary metering device, pilot operated refrigerant reversing valve, heat pump qualified compressor, low water temperature cut-out, high pressure cut-out and an optional water-to-refrigerant cupro-nickel heat exchanger must be ordered. All units are factory wired and charged for entering water temperatures of 60-90 degrees F.

SYSTEM GUIDELINES

The 50HQ Water Source Heat Pump (WSHP) unit can easily be installed in a crawlspace or attic, while the 50VQ is a closet or basement installation, utilizing conventional ductwork typical to other heat pump applications. Cooling ratings are based on an entering air temperature of 80 degrees F. dry bulb, 62, 67, and 72 degrees wet bulb, while the heating ratings are based on 70 degrees F. (Deviations from this, contact a Carrier dealer.)

The unit can be used in an open loop (well), a once through system utilizing ground water or a closed loop, recirculating the water in an earth coupled loop.

Prior to any W.S.H.P. installation, the quantity and quality of the water must be addressed and fully analyzed. For guidelines refer to page 19. If an open loop is used exclusively for the W.S.H.P., the amount of water available must be equal to or exceed the design GPM, as shown in the performance tables for the given size unit selected for the application. Once an adequate quantity and quality of the water has been established, the valve arrangement as shown in Diagram 1 will control the actual water flow and optimum pressures to the unit. Installation must include the recommended valve.

Local codes should be abided when discharging the return water. If discharge is directed to another well, the supply and return well should be placed far enough apart to avoid the transfer of heat between the two. Strong considerations should be for a 50,000 BTUH system 100 feet minimum and 100,000 BTUH system 140 feet minimum. If discharge water is directed to a pond or stream etc., address a local environmental agency. Supply and return lines should be insulated and installed below the frost line to prevent any future problems.

All of Carrier's 50HQ/VQ W.S.H.P. intended for entering water temperature in the range of 45 degrees F to 60 degrees F should have a cupro-nickel water-to-refrigerant heat exchanger. Regardless, the quality of the water being used must be determined to ensure heat-exchanger life.

In a closed loop or earth coupled system, the earth acts as a heat sink and heat source, depending on the mode in which the W.S.H.P. is operating. In this system, the necessary length of pipe is buried in the ground either in a horizontal, vertical or combination of both. The buried pipe must be placed below the frost zone; be given a uniform means of support with adjacent piping adequately spaced for proper heat transfer. A heating and air conditioning contractor or consulting engineer can advise the size and length of pipe needed and application details to insure a water temperature range 45 to 60 degrees F.

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

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. Lack of freeze-up protection will occur.
2. Installation of the unit must not be in an area where 40 degrees F or lower is experienced.
3. Make certain the well is properly tested to meet two times the GPM required for at least a 24 hour period.
4. If water being used has a high sand content, a filter is to be used prior to W.S.H.P.
5. Cupro-nickel and air coils are unsatisfactory when sulfides are present.
6. A supplementary drain pan must be installed in all units to accommodate only sweating caused by low water temperatures.

PIPING/VALVES

A dual acting water regulating valve (Singer 265 Series) is to be installed in the water outlet. This valve has the ability to maintain proper water quantity in either heating or cooling modes.

50HQ, VQ

UNIT SIZE	014	018	022	027	033	042	048	060	080
R-22 Charge (lb-oz) * (Standard Unit)	1-8[1-3]	1-13[1-10]	2-2[1-13]	2-6	2-6[2-11]	2-14	4-3	5-3	6-8
R-22 Charge (lb-oz) ** (Modified Unit)	1-0[0-5]	1-5[1-2]	1-4[1-5]	1-14	1-14[2-3]	2-6	3-11	4-11	6-0

Capillary Tube

FAN										
Diameter (in. nominal)	9	9	9	9	9	10	10	10	10	12
Width (in. nominal)	7	7	7	7	7	7	8	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 [1/6]	1/8 [1/6]	1/6	1/6	1/6	1/3	1/2	3/4		1
Motor RPM (Nominal)					1075					

Max Working Pressure (psig)

	300	5-10	6-12	7.5-14	8-16	11-21	14-28
Max Working Pressure (psig)							
Water Flow Range (gpm)		4-8	6-12	7.5-14	8-16	11-21	14-28
Water Connection (in.)	2.5-5.5	3/4	3/4	3/4	1	1	1
Water Volume (gal.)	.10	.19	.21	.43	.50	.72	.86

Rows...Fins per inch

Rows...	2...13	3...13	3...13	3...13	3...13	3...15	4...15
Copper Tube Size (in.)						3/8	

RPM

Hermetic
3500

OPERATING WEIGHT (LB)	HQ	VQ
185	220	290
195	230	300
210	250	320
220	270	325
240	300	350
260	320	380
360		

SIZE (in.)

Replaceable Media

*Factory Charged

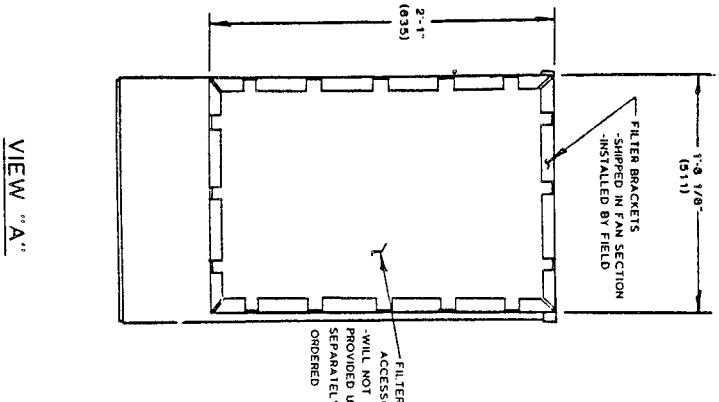
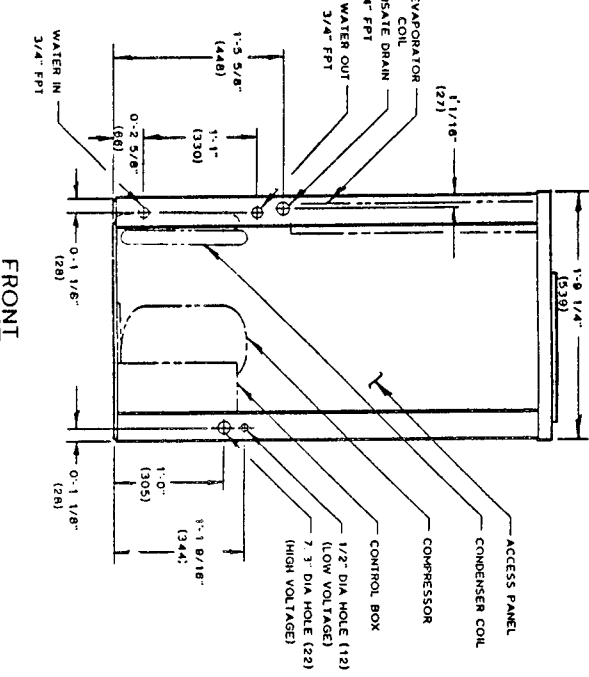
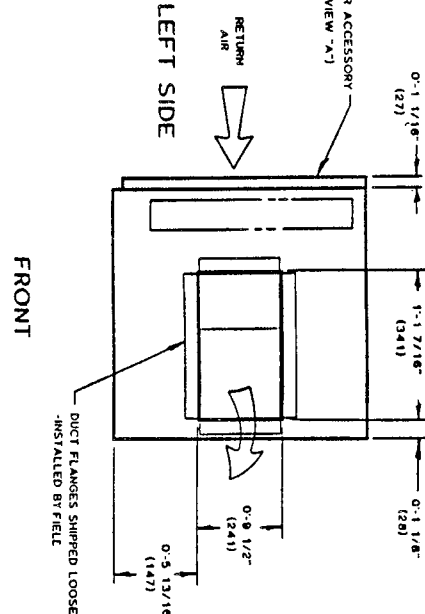
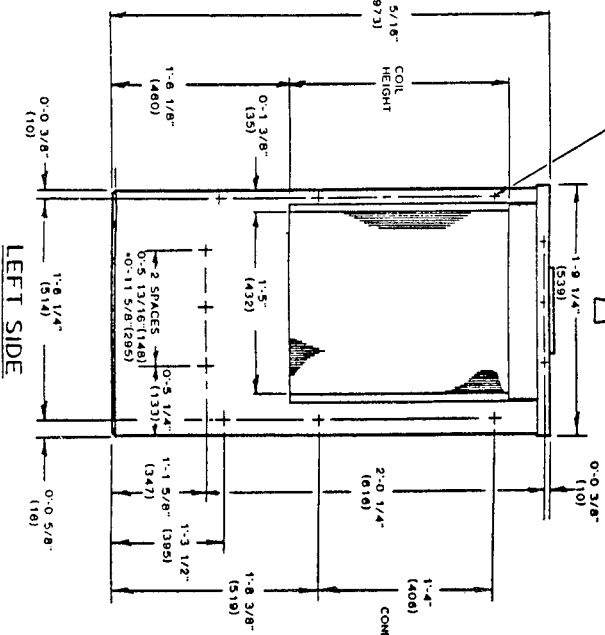
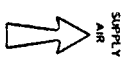
**Field modified for 45°-60° E.W.T.

[] Values apply to 277-volt units only

UNIT	WEIGHT	COIL HEIGHT
50V0014	220 LBS (99 KG)	1'-5" (432)
50V0018	240 LBS (108 KG)	
50V0022	260 LBS (117 KG)	
50V0027	270 LBS (121 KG)	
50V0033	290 LBS (130 KG)	
50V0042	320 LBS (144 KG)	1'-9 1/4" (540)

NOTES:
 1. DIMENSIONS IN () ARE IN MILLIMETERS.

PILOT HOLES FOR FILTER BRACKET
 DUCT FLANGES SHIPPED LOOSE
 INSTALLED BY FIELD



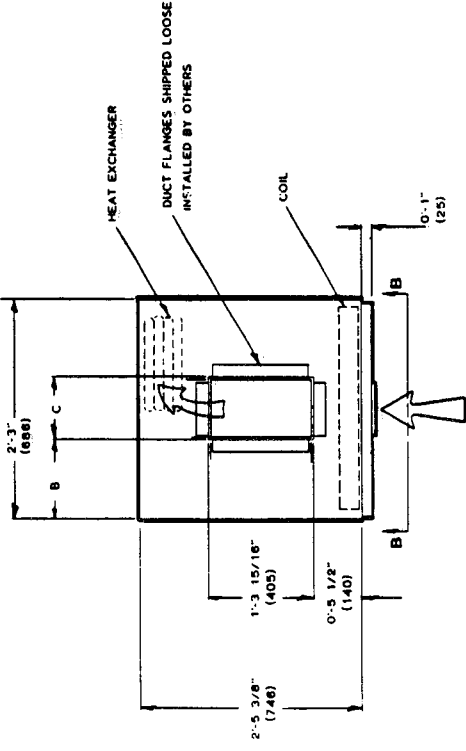


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50VQ048-080

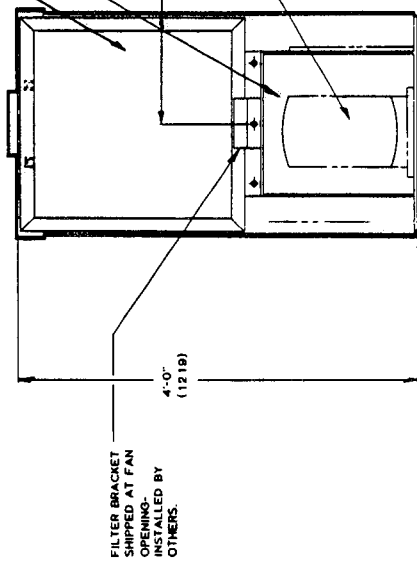
UNIT	WEIGHT	A	B	C	D	E	F	G	H
50VQ048	320 LBS (145 KG)	1'-10 1/4" (565)	0'-8 13/16" (173)	0'-10 1/2" (267)	1	1'-7" (483)	1'-7" (483)	2'-1 7/16" (648)	1'-11 13/16" (608)
50VQ060	385 LBS (181 KG)	0'-8 1/4" (210)	0'-5 1/2" (140)	1'-1 1/8" (323)	3	0'-11" (279)	2'-9" (636)	0'-11 7/16" (291)	2'-1 13/16" (600)
50VQ080	380 LBS (177 KG)	0'-8 1/4" (210)	0'-8 1/16" (154)	1'-0" (305)	3	0'-11" (279)	2'-9" (636)	0'-11 7/16" (291)	2'-1 13/16" (600)

DIMENSIONS IN () ARE IN MILLIMETERS

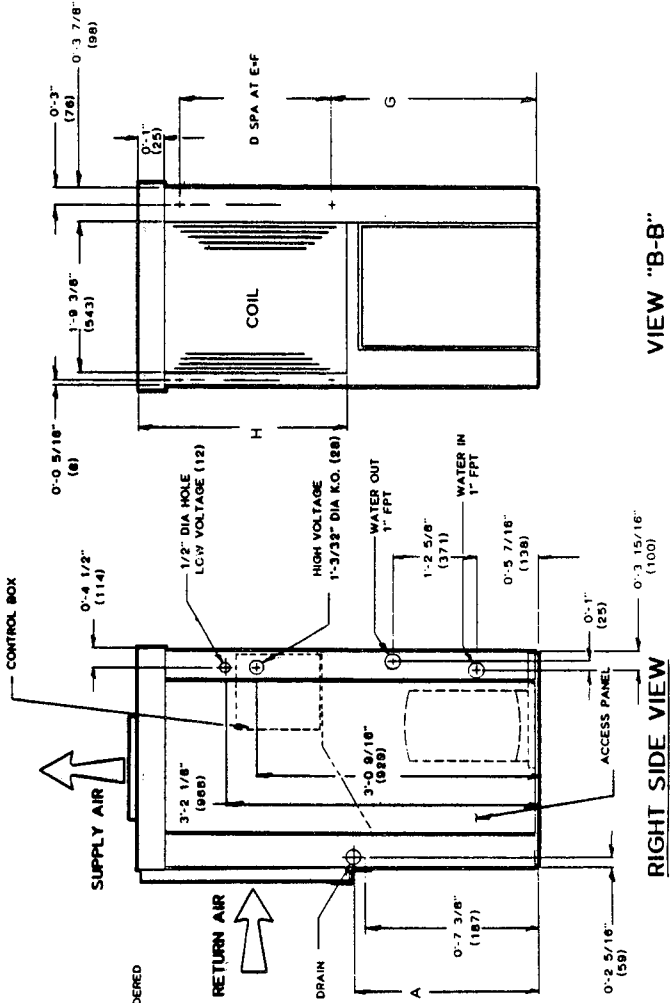


TOP VIEW

FILTER ACCESSORY - WILL NOT BE PROVIDED UNLESS SEPARATELY ORDERED



FRONT VIEW



RIGHT SIDE VIEW

VIEW "B-B"

PILOT HOLES AND RETURN DUCT OPENING

DATE 7/17/84
BY 4/26/82

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

50VQ500594

REV B



DIMENSIONS IN () ARE IN MILLIMETERS

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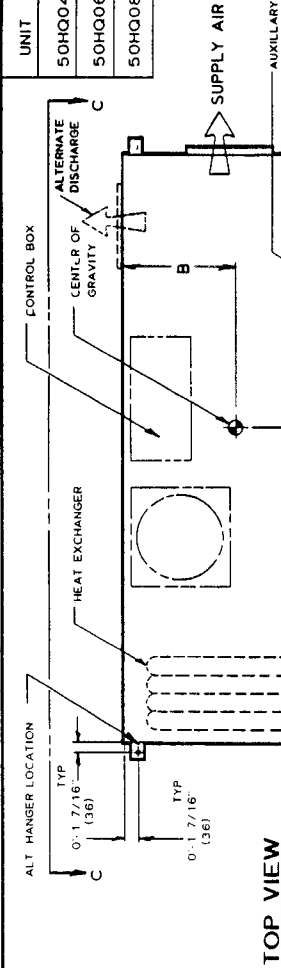
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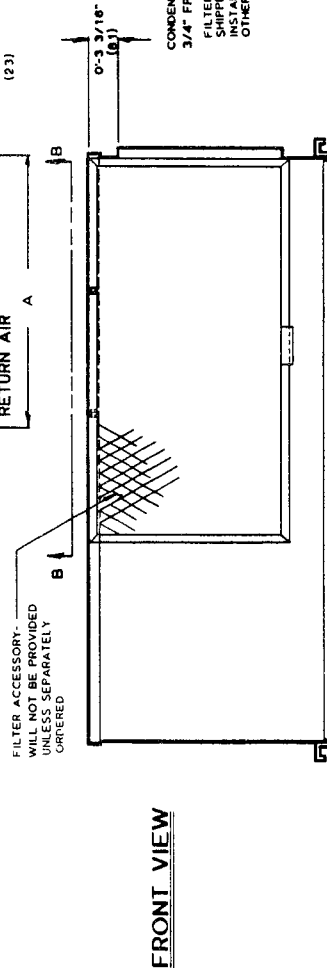
50HQ048-080

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'-10 1/2" (267)	0'-3 7/8" (98)	2'-1 1/8" (533)	0'-3 3/8" (86)	1'-10 1/2" (571)
50HQ060	325 LBS (147 KG)	2'-5 3/8" (748)	1'-0" (305)	0'-3 3/8" (86)	1'-1 1/8" (333)	0'-2 9/16" (85)	2'-2 11/16" (565)	0'-3 3/8" (86)	2'-5" (737)
50HQ080	360 LBS (163 KG)	2'-8" (762)	1'-0 1/2" (318)	0'-3 7/8" (98)	1'-0" (305)	0'-3 1/16" (78)	3'-1 11/16" (957)	0'-3 7/8" (89)	2'-11" (669)

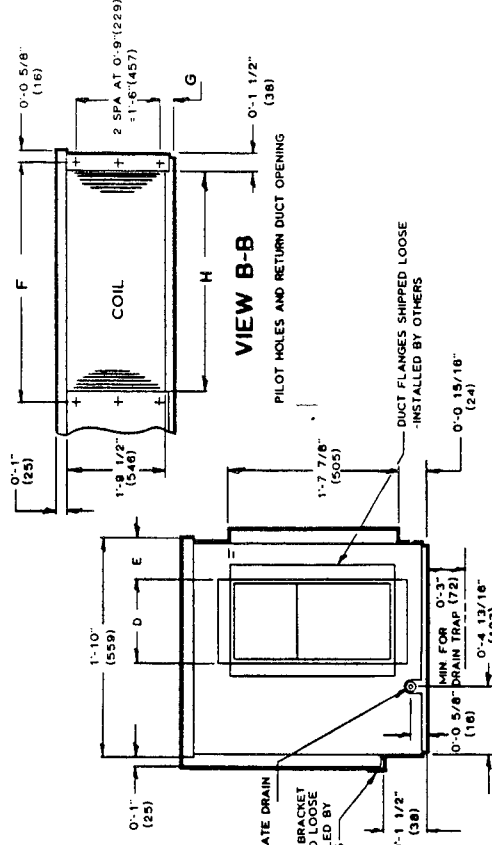
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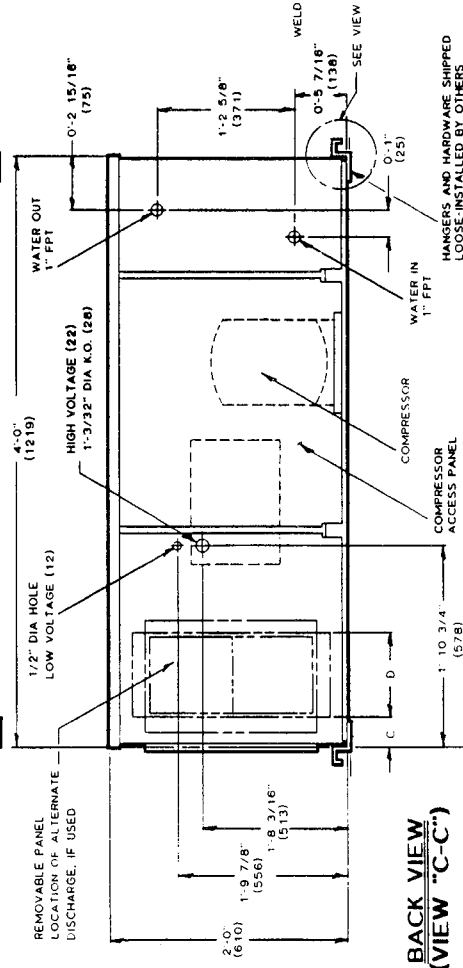
TOP VIEW



FRONT VIEW

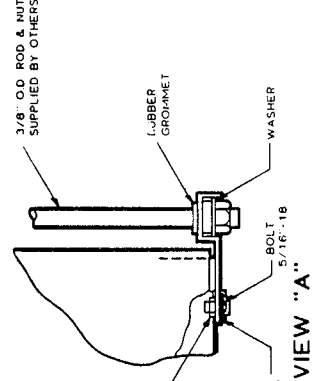


VIEW B-B



BACK VIEW
(VIEW "C-C")

RIGHT SIDE VIEW



VIEW "A"

DATE
CARRIER NO.
BUYER
JOB LOCATION
JOB NAME
DIMENSIONS CERTIFIED BY

DATE	REVISIONS	50HQ PACKAGED HORIZONTAL WATER SOURCE HEAT PUMP (048-080)	50HQ501414	C
7/17/84	4/20/82			

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: 230/1/60

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	14.5	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	2.01	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
EATING	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	30.9	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	2.46
				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	2.31
				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
EATING	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	58.3	70.0	57.3	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

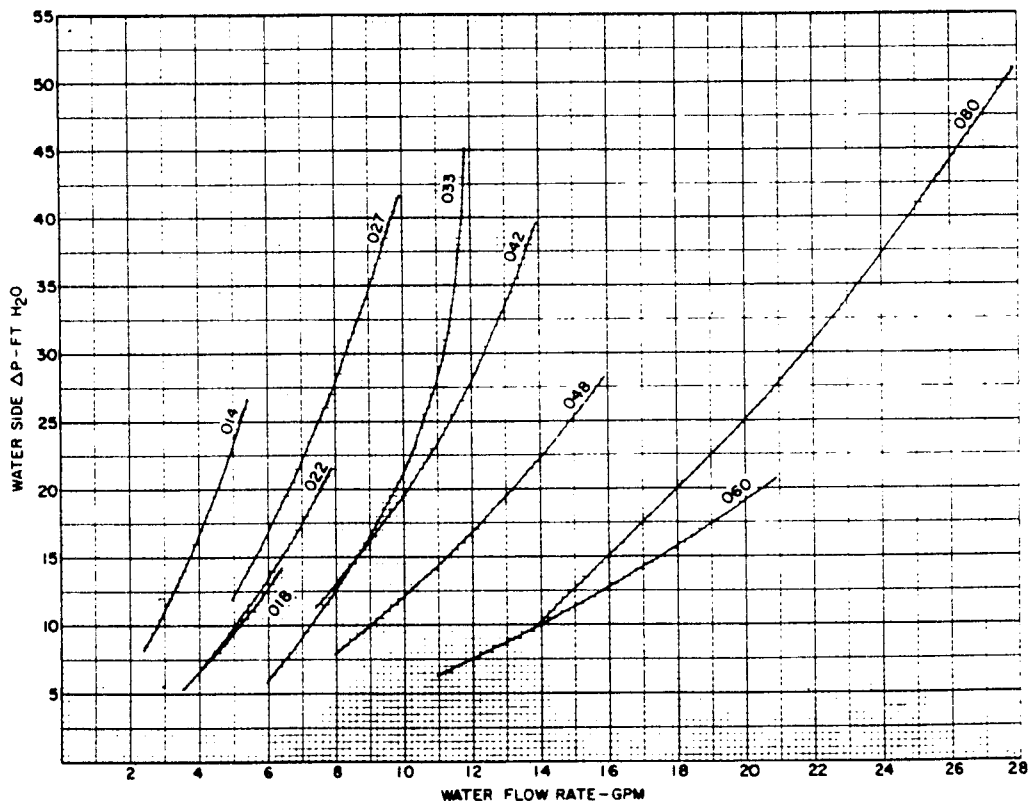
					EWT (°F)							
					45		50		55		60	
					GPM							
MODE	CFM	FAN WATT BF	EAT F		5	7.5	5	8	5.25	8.5	5.25	9
COOLING	2200	1100/0.07	72 WB	TC	87.1	88.2	85.8	87.4	84.7	86.5	82.7	86.3
				SHC	42.3	42.2	41.8	41.9	41.4	41.6	40.6	41.6
				KW	7.97	7.09	8.18	7.20	8.27	7.33	8.45	7.52
				THR	112.4	110.6	111.6	110.2	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	87.1	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

Whether our Water Source Heat Pumps are being applied in a well source or closed loop application, the quality and quantity of the water circulated through the heat exchanger must fall within the below listed table.

	Copper Coil	Cupro-Nickel Coil
Filtration (Microns)	<25	>25
Uninhibited Chloride (PPM)	<200	>200
Alkalinity (as CaCO_3)	80-100	>100
P.H.	7.2-7.6	<7.2, >7.6
Free Residual Chlorine Level (PPM)	1.0-1.7	>1.7
Sulfides (PPM)	not acceptable	<.1
Water Flow Rate (GPM) 014	<5.5	<6.0
Water Flow Rate (GPM) 018	<6.5	<7.5
Water Flow Rate (GPM) 022	<8.0	<9.0
Water Flow Rate (GPM) 027	<10.0	<10.5
Water Flow Rate (GPM) 033	<13.0	<14.0
Water Flow Rate (GPM) 042	<15.5	<16.5
Water Flow Rate (GPM) 048	<17.0	<18.0
Water Flow Rate (GPM) 060	<22.0	<23.0
Water Flow Rate (GPM) 080	<29.5	<31.0

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



FAN PERFORMANCE

SIZE 50HQ, VQ		UNIT VOLTAGE			
		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	208/230-1-60	197	253	9.6	37.5	0.9	12.7	20
HQ, VQ018				13.4	53.0	0.9	17.7	30
HQ, VQ022				13.3	65.0	1.5	18.1	30
HQ, VQ027				16.2	66.0	1.7	22.0	35
HQ, VQ033				23.3	88.0	2.5	31.6	50
HQ, VQ042				27.7	100.0	3.2	37.8	60
HQ, VQ048				23.9	94.0	3.4	33.3	50
HQ, VQ060				35.3	150.0	4.5	48.6	80
HQ, VQ033	208/230-3-60	187	253	13.8	87.0	2.5	19.8	30
HQ, VQ042				18.5	100.0	3.2	26.3	40
HQ, VQ048				16.8	80.0	3.9	24.9	40
HQ, VQ060				20.6	136.0	4.5	30.3	50
HQ, VQ080				20.7	137.0	6.2	32.1	50
HQ, VQ033	460-3-60	414	506	6.0	30.0	1.1	8.9	15
HQ, VQ042				6.9	36.5	1.6	10.2	15
HQ, VQ048				8.2	35.0	2.0	12.3	15
HQ, VQ060				10.4	49.0	2.3	15.3	25
HQ, VQ080				11.4	69.0	3.1	17.4	25

FLA - Full Load Amps

LRA - Locked Rotor Amps

RLA - Rated Load Amps

SEQUENCE OF OPERATION

FAN SWITCH

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

THERMOSTAT CALLS FOR COOLING

The 24 volt supplied by the unit will be directed through the thermostat energizing the reversing valve solenoid coil (RVS). Blower relay and (only if the lockout circuit is not energized) the compressor contactor. At this time, the Singer 265 water valve will open in response to an increase of refrigerant head pressure.

THERMOSTAT CALLS FOR HEATING

The 24 volt supplied by the unit will be directed through the thermostat energizing the blower relay and only if the lockout circuit is not energized, the compressor contactor. The RVS is not energized in the heating mode. At this time the Singer 265 water valve will open in response to a decrease of suction pressure.

THERMOSTAT SHUT-DOWN

When the thermostat is satisfied, the unit's 24 volt supply is now interrupted at the thermostat de-energizing all controls. Note: if fan is in AUTO position, fan will run regardless of temperature settings.

At this time, the refrigerant circuit will equalize and the Singer 265 valve will close to prevent any water flow.

If any safety devices are energized, the lockout circuit can be reset at the thermostat by turning the power source to the unit or resetting the unit's thermostat.

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
- LWCT — 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

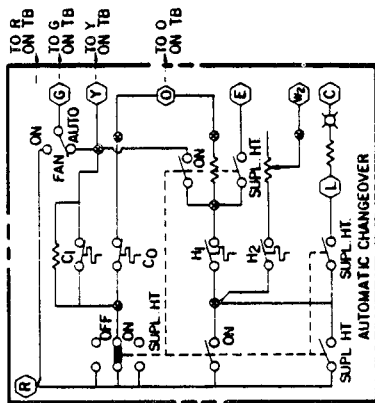
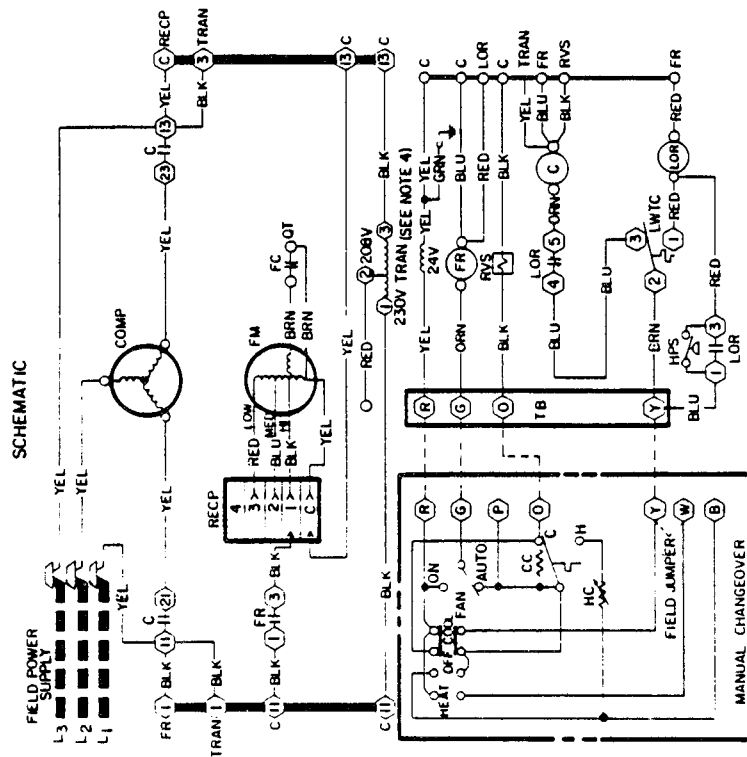
Field Control Wiring

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



- FIELD WIRING CONNECTION
- ⊗ DENOTES CONNECTION POINT BETWEEN SUBBASE AND THERMOSTAT

SINGER 265 DUAL ACTING WATER REGULATING VALVE

The Singer Model 265 is a pressure modulated, variable flow water regulating valve. It is designed to maintain optimum refrigerant pressure in the Water Source Heat Pumps.

INSTALLATION

The Model 265 valve must be installed in the water discharge line with the flow direction arrow on the body pointing toward the return well or drain. The valve may be mounted in any convenient position as long as the flow is in the direction of the arrow and the valve's capillary is long enough to reach the access connection between the refrigerant four-way valve and water to refrigerant heat exchanger.

ADJUSTMENT

The Model 265 valve has two manual adjustments. They are indicated on the label at the top of the spring housing. To obtain optimum performance of the Carrier Water Source Heat Pump, adjust to the listed pressures on Table III.

Factory set 70 PSIG (Heat) and 160 PSIG (Cool). The heating adjustment must be made before the cooling adjustment, whenever the heating adjustment is changed, cooling mode operation should be checked and i.e. adjusted as required for proper operation. For adjustment directions, refer to Table II.

TABLE I

MODE	CONDITION	OPTION
Heating Mode	40°F Leaving Water Temperature	8° Super Heat at Compressor
Cooling Mode	45°-60° Entering Water Temperature	225-296 psig Discharge Pressure

TABLE II

To Increase	In Heating Mode Turn Outer Stem	In Cooling Mode Turn Inner Screw
Refrigerant Head Pressure Suction Pressure	-- Clockwise	Clockwise --
Water Flow Rate Temperature ΔT Shut-Off	Clockwise Clockwise Counter Clockwise	Counter Clockwise Clockwise Clockwise

SPECIFICATIONS:

Sensing pressure range: 0 to 300 psig
 Closing plateau: 50-124 psig adjustable
 Maximum water pressure: 150 psig
 Water connections: 1/2 or 3/4 inch F.P.T.

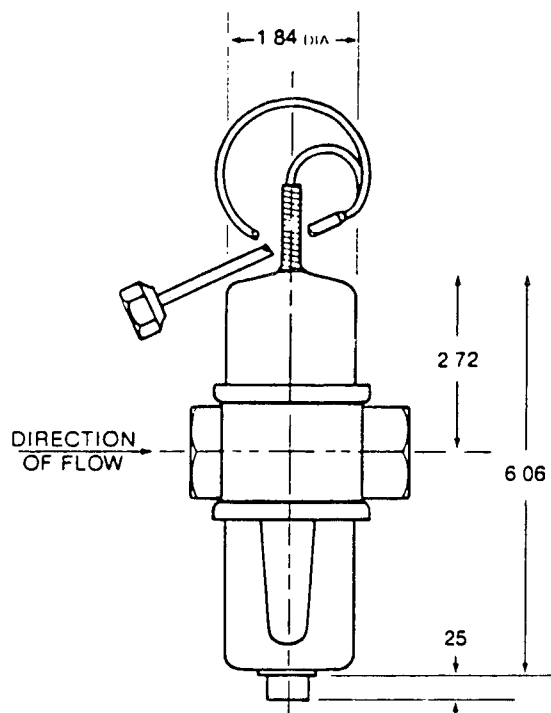


Illustration here shows a typical configuration

MAXIMUM (FULL OPEN) FLOW RATE - GPM

PRESSURE DROP	10	20	30	40	50
1/2" SIZE COOL	10.2	13.6	16.0	18.0	19.8
1/2" SIZE HEAT	10.7	15.1	18.2	20.5	22.5
3/4" SIZE COOL	13.2	18.3	22.0	24.6	26.4
3/4" SIZE HEAT	14.4	21.4	25.2	27.8	30.0

LOW TEMPERATURE FIELD CONVERSION PROCEDURE

1. Check to see if an access valve is factory installed between the water to refrigerant heat exchanger and the four-way reversing valve.
2. If supplied, proceed to step 3. If not supplied, obtain one bullet piercing valve and install. This valve must be permanent, leakproof seal type able to withstand any pressure and temperature for the life of the unit.
3. Purchase one Singer Model 265 water regulating valve.
4. Carefully drill one 3/4 inch hole in cabinet's corner post so the water valve flare nut and capillary may be internally connected.
5. Reduce refrigerant charge so the pressures and temperatures are matched to the chart shown in *Table I.
6. Place flare nut and capillary thru hole drilled in step 4 to protect the capillary from contact vibrations. Install one 3/4" Heyco bushing or similar equal to unit.
7. Install Singer 265 water valve within capillary reach to access fitting.
8. Connect flare nut to access connection and check for leaks.
9. Adjust water valve as described on Page 24.
10. A supplementary drain pan must be installed in all units to accommodate only sweating caused by low water temperatures.