
Submittal Data



Large Belt Drive (HBH/V) Series

HBH 072-120

HBV 072-300

60Hz - HFC-410A



Large Belt Drive (HBH/V) Series Submittal Data

Models HBH072 - 120
HBV072 - 300

60Hz - HFC-410A
English Language/I-P Units



SUBMITTAL DATA - I-P UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ Btuh

EER: _____

Heating Capacity: _____ Btuh

COP: _____

Ambient Air Temp: _____ °F

Entering Water Temp (Clg): _____ °F

Entering Air Temp (Clg): _____ °F

Entering Water Temp (Htg): _____ °F

Entering Air Temp (Htg): _____ °F

Airflow: _____ CFM

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (lb)

ELECTRICAL DATA

Power Supply: _____ Volts

_____ Phase _____ Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

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Large Belt Drive (HBH/V) Series Submittal Data

Models HBH072 - 120
HBV072 - 300

60Hz - HFC-410A

English Language/S-I Units



SUBMITTAL DATA - S-I UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ kW

EER: _____

Heating Capacity: _____ kW

COP: _____

Ambient Air Temp: _____ °C

Entering Water Temp (Clg): _____ °C

Entering Air Temp (Clg): _____ °C

Entering Water Temp (Htg): _____ °C

Entering Air Temp (Htg): _____ °C

Airflow: _____ l/s

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (kg)

ELECTRICAL DATA

Power Supply: _____ Volts

_____ Phase _____ Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

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Unit Features

THE HBH/V (BELT DRIVE) SERIES

The award winning Series raises the bar for water-source heat pump efficiencies, features and application flexibility. Not only does the HB exceed ASHRAE 90.1 efficiencies, but it also uses EarthPure® HFC-410A zero ozone depletion refrigerant, making it an extremely environmentally-friendly option. TC is eligible for additional LEED (Leadership in Energy and Environmental Design) points because of the “green” technology design.

Available in sizes 6 tons (21.1 kW) through 25 tons (87.9 kW) with multiple cabinet configurations, the (HBH/V) Series offers a wide range of units for most any installation. The Series has an extended range refrigerant circuit, capable of ground loop (geothermal) applications (may require optional extended range insulation), ground water (geothermal) applications, as well as water loop (boiler-tower) applications. Standard features are many. Microprocessor controls, galvanized steel cabinet, epoxy powder coat painted front access panel, galvanized steel with epoxy powder coat painted drain pan and TXV refrigerant metering device are just some of the features of the flexible Series.

MARS’s exclusive double isolation compressor mounting system makes the HBH/V one of the quietest units on the market. Compressors are mounted on specially engineered sound-tested EPDM grommets to a heavy gauge mounting plate, which is further isolated from the cabinet base with rubber grommets for maximized vibration and sound attenuation. The easy access control box and large access panels make installing and maintaining the unit easier than other water-source heat pumps currently in production.

Options such as coated air coil, DDC controls, and dual point power allow customized design solutions. Optional blower motor/sheave drive packages expand the operating range and help overcome some of the challenges associated with ductwork for retrofit installations. A cupro-nickel water-coil and sound absorbing UltraQuiet package are options that make a great unit even better.

The HBH/V Series Water-Source Heat Pumps are designed to meet the challenges of today’s HVAC demands with one of the most innovative products available on the market.

UNIT FEATURES

- Horizontal sizes 072 (6 Tons, 21.1 kW), 096 (8 Tons, 28.1 kW), 120 (10 Tons, 35.2 kW)
- Vertical sizes 072 (6 Tons, 21.1 kW), 096 (8 Tons, 28.1 kW), 120 (10 Tons, 35.2 kW), 160 (13.3 Tons, 46.9 kW), 192 (16 Tons, 56.3 kW), 240 (20 Tons, 70.3 kW), 300 (25 Tons, 87.9 kW)
- Horizontal unit configuration can be ordered with left or right return air and straight or back supply air discharge. Discharge is field convertible. Field conversion uses all existing parts including panels and belts
- Vertical configuration can be ordered with front or back return and top, front, or back discharge.
- Electrical box is on right side and can be field converted to left side of unit
- Electric power can enter from either side of front
- Water can be connected to either side
- Copeland scroll compressors
- Dual refrigeration circuits (All Models)
- Exceeds ASHRAE 90.1 efficiencies
- Galvanized steel construction with attractive matte black epoxy powder coat painted front access panel
- Insulated divider and separate compressor/air handler compartments
- TXV metering device
- Extended range 20 to 120°F (-6.7 to 48.9°C) operation (may require optional extended range insulation)
- Hanger brackets standard for horizontal units
- Premium duty motor that is VFD compatible

AVAILABLE OPTIONS

- Blower motor/sheave drive packages
- LonWorks, BACnet, Modbus and Johnson N2 compatibility options for DDC controls
- Cupro-nickel water-coil
- Sound absorbing UltraQuiet package
- Coated air coil
- Dual point power

Selection Procedure

Reference Calculations

Heating	Cooling	
$LWT = EWT - \frac{HE}{GPM \times 500}$ $LAT = EAT + \frac{HC}{CFM \times 1.08}$	$LWT = EWT + \frac{HR}{GPM \times 500}$ $LAT (DB) = EAT (DB) - \frac{SC}{CFM \times 1.08}$	$LC = TC - SC$ $S/T = \frac{SC}{TC}$

Legend and Glossary of Abbreviations

BTUH = BTU(British Thermal Unit) per hour	HWC = hot water generator (desuperheater) capacity, Mbtuh
CFM = airflow, cubic feet/minute	FPT = female pipe thread
COP = coefficient of performance = BTUH output/BTUH input	KW = total power unit input, kilowatts
DB = dry bulb temperature (°F)	LAT = leaving air temperature, °F
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)	LC = latent cooling capacity, BTUH
EER = energy efficiency ratio = BTUH output/Watt input	LWT = leaving water temperature, °F
MPT = male pipe thread	MBTUH = 1000 BTU per hour
ESP = external static pressure (inches w.g.)	S/T = sensible to total cooling ratio
EWT = entering water temperature	SC = sensible cooling capacity, BTUH
GPM = water flow in U.S. gallons/minute	TC = total cooling capacity, BTUH
HE = total heat of extraction, BTUH	WB = wet bulb temperature (°F)
HC = air heating capacity, BTUH	WPD = waterside pressure drop (psi & ft. of hd.)
HR = total heat of rejection, BTUH	

Conversion Table - to convert inch-pound (English) to S-I (Metric)

Air Flow	Water Flow	Ext Static Pressure	Water Pressure Drop
Airflow (L/s) = CFM x 0.472	Water Flow (L/s) = gpm x 0.0631	ESP (Pa) = ESP (in of wg) x 249	PD (kPa) = PD (ft of hd) x 2.99

Selection Procedure

- Step 1 Determine the actual heating and cooling loads at the desired dry bulb and wet bulb conditions.
- Step 2 Obtain the following design parameters: Entering water temperature, water flow rate in GPM, air flow in CFM, water flow pressure drop and design wet and dry bulb temperatures. Air flow CFM should be between 300 and 450 CFM per ton. Unit water pressure drop should be kept as close as possible to each other to make water balancing easier. Go to the appropriate tables and find the proper indicated water flow and water temperature.
- Step 3 Select a unit based on total and sensible cooling conditions. Select a unit which is closest to the actual cooling load.
- Step 4 Use data from performance tables at the design water flow and water temperature. Read the total and sensible cooling capacities (Note: interpolation is permissible, extrapolation is not).
- Step 5 Read the heating capacity. If it exceeds the design criteria it is acceptable. It is quite normal for Water-Source Heat Pumps to be selected on cooling capacity only since the heating output is usually greater than the cooling capacity.
- Step 6 Determine the correction factors associated with the variable factors of dry bulb and wet bulb (page 14).

 Corrected Total Cooling =
 tabulated total cooling x wet bulb correction.
 Corrected Sensible Cooling =
 tabulated sensible cooling x wet/dry bulb correction.
- Step 7 Determine the correction factor associated with antifreeze in system loop. If heating EWT is 50°F or below you may have to use antifreeze. Calculate leaving water temperature per performance data selection notes (page 18). If antifreeze is required, use correction table for correcting total and sensible capacities.
- Step 8 Compare the corrected capacities to the load requirements. Normally if the capacities are within 10% of the loads, the equipment is acceptable. It is better to undersize than oversize, as undersizing improves humidity control, reduces sound levels and extends the life of the equipment.
- Step 9 When completed, calculate water temperature rise and assess the selection. If the units selected are not within 10% of the load calculations, then review what effect changing the GPM, water temperature and/or air flow and air temperature would have on the corrected capacities. If the desired capacity cannot be achieved, select the next larger or smaller unit and repeat the procedure. Remember, when in doubt, undersize slightly for best performance.

Example Equipment Selection For Cooling

Step 1 Load Determination:

Assume you have determined that the appropriate cooling load at the desired dry bulb 80°F and wet bulb 65°F conditions is as follows:

Total Cooling.....90,500 BTUH
 Sensible Cooling.....73,300 BTUH
 Entering Air Temp.....80°F Dry Bulb / 65°F Wet Bulb

Step 2 Design Conditions:

Similarly, you have also obtained the following design parameters:

Entering Water Temp (Cooling).....90°F
 Entering Water Temp (Heating).....60°F
 Water Flow (Based upon 12°F rise in temp.).....18 GPM
 Air Flow.....2,800 CFM

Step 3, 4 & 5 HP Selection:

After making your preliminary selection (TCH096), we enter the data from tables at design water flow and water temperature and read Total Cooling, Sens. Cooling and Heat of Rej. capacities:

Total Cooling.....93,200 BTUH
 Sensible Cooling.....70,390 BTUH
 Heat of Rejection.....120,100 BTUH
 Airflow.....3,200 CFM

Step 6, 7 & 8 Entering Air, Airflow and Antifreeze Corrections:

Next, we determine our correction factors.

Airflow 2800 ÷ 3200 = 88% Antifreeze - None

Table	Ent Air	Air Flow	Corrected
Corrected Total Cooling =	93,200 x .977 x	.976 x 1 =	88,871
Corrected Sens Cooling =	70,390 x 1.088 x	.933 x 1 =	71,453
Corrected Heat of Rej. =	120,100 x .998 x	.976 =	116,983

Step 9 Water Temperature Rise Calculation & Assessment:

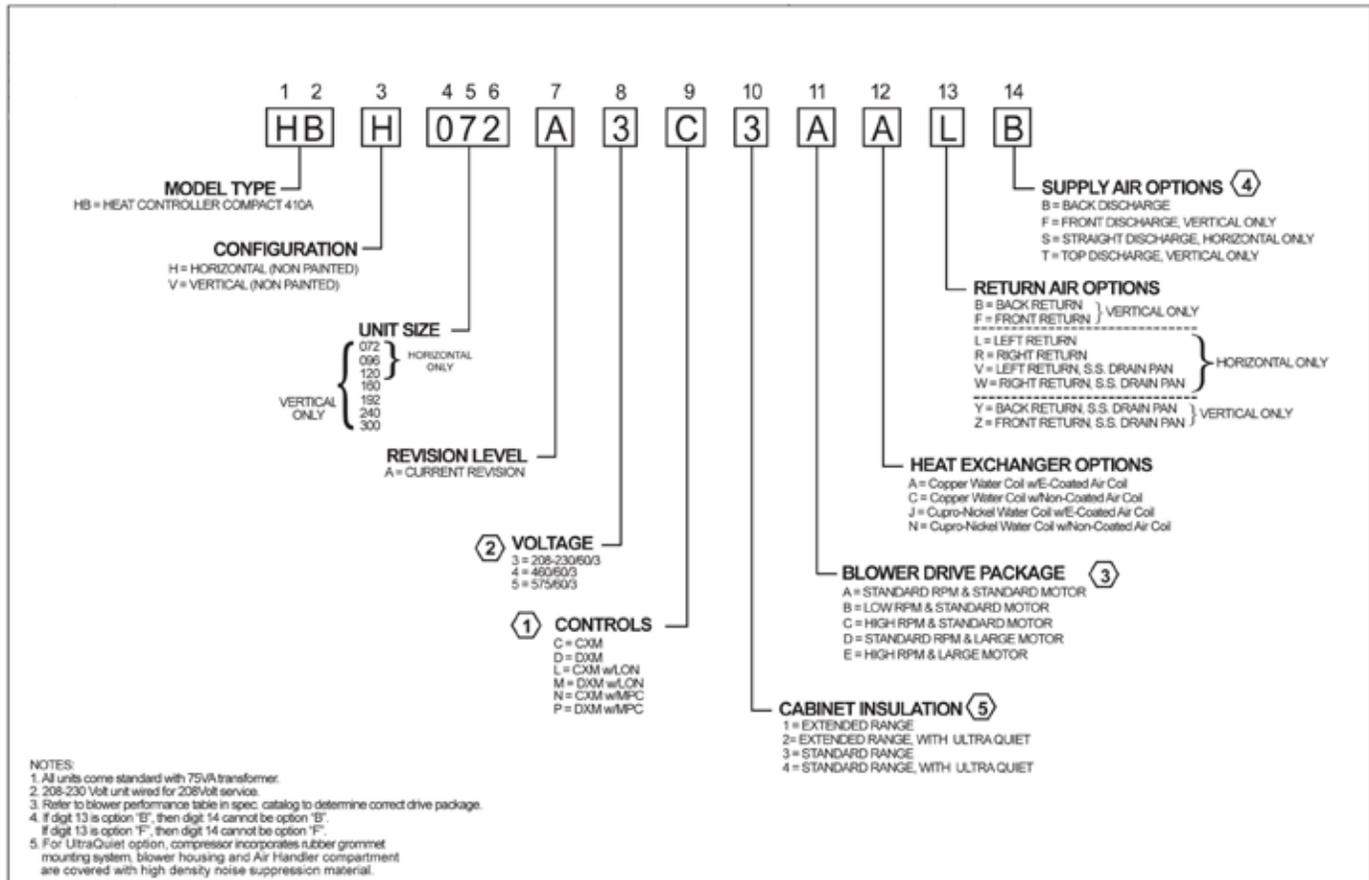
Rise = Heat of Reject ÷ (GPM x 500)
 Actual Temperature Rise 116,983 ÷ 9,000 = 13.0°F

When we compare the Corrected Total Cooling and Corrected Sensible Cooling figures with our load requirements stated in Step 1, we discover that our selection is within +/- 10% of our sensible load requirement. Furthermore, we see that our Corrected Total Cooling figure is slightly undersized as recommended, when compared to the actual indicated load.

Alternate Step 7: If your EWT for heating is 40°F then system requires antifreeze. If a solution of 15% Propylene Glycol is required, then:

Corrected Total Cooling = 88,871 x .986 = 87,626
 Corrected Sens Cooling = 71,453 x .986 = 70,452

HBH/V Series Nomenclature



Performance Data – AHRI/ASHRAE/ISO 13256-1

ASHRAE/AHRI/ISO 13256-1. English (I-P) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 86°F		Heating 68°F		Cooling 59°F		Heating 50°F		Cooling 77°F		Heating 32°F	
	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
HBH/V072	69,000	13.3	92,500	5.0	78,500	19.7	75,500	4.4	71,000	14.6	58,000	3.5
HBH/V096	95,000	13.7	123,000	5.0	104,500	20.0	101,000	4.4	98,000	15.2	77,000	3.6
HBH/V120	119,000	13.3	160,000	4.6	134,000	19.3	132,500	4.0	122,500	14.5	103,000	3.3
HBV160	157,000	14.2	207,000	4.9	172,000	19.6	168,000	4.4	162,000	15.2	125,000	3.5
HBV192	191,500	14.3	243,000	5.1	211,000	19.5	196,500	4.5	199,000	15.8	149,000	3.7
HBV240	233,000	13.9	318,000	5.0	263,500	19.2	260,500	4.4	240,000	14.8	198,500	3.5
HBV300	300,000	13.5	395,000	4.8	341,500	18.7	321,500	4.3	310,000	14.5	240,000	3.4

Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature.
 Heating capacities based upon 68°F DB, 59°F WB entering air temperature.
 All ratings based upon operation at lower voltage of dual voltage rated models.
 All TCH/V072 ratings @ 2400CFM w/20GPM. Sheave setting for AHRI is 2.5 turns open.
 All TCH/V096 ratings @ 3200CFM w/24GPM. Sheave setting for AHRI is 3.0 turns open.
 All TCH/V120 ratings @ 4000CFM w/30GPM. Sheave setting for AHRI is 3.0 turns open.

ASHRAE/AHRI/ISO 13256-1. Metric (S-I) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30°C		Heating 2°C		Cooling 15°C		Heating 10°C		Cooling 25°C		Heating 0°C	
	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP
HBH/V072	20.22	3.9	27.11	5.0	23.01	5.8	22.13	4.4	20.80	4.3	17.00	3.5
HBH/V096	27.84	4.0	36.04	5.0	30.63	5.9	29.60	4.4	28.72	4.5	22.57	3.6
HBH/V120	34.88	3.9	46.89	4.6	39.27	5.7	38.83	4.0	35.90	4.2	30.19	3.3
HBV160	46.01	4.2	60.668	4.9	50.41	5.7	49.24	4.4	47.48	4.5	36.64	3.5
HBV192	56.13	4.2	71.22	5.1	61.84	5.7	57.59	4.5	58.32	4.6	43.67	3.7
HBV240	68.29	4.1	93.20	5.0	77.23	5.6	76.35	4.4	70.34	4.3	58.18	3.5
HBV300	87.93	4.0	115.77	4.8	100.09	5.5	95.23	4.3	90.86	4.2	70.34	3.4

Cooling capacities based upon 27°C DB, 19°C WB entering air temperature.
 Heating capacities based upon 20°C DB, 15°C WB entering air temperature.
 All ratings based upon operation at lower voltage of dual voltage rated models.
 All HBH/V072 ratings @ 1133 l/s w/1.26 l/s. Sheave setting for AHRI is 2.5 turns open.
 All HBH/V096 ratings @ 1510 l/s w/1.51 l/s. Sheave setting for AHRI is 3.0 turns open.
 All HBH/V120 ratings @ 1888 l/s w/1.89 l/s. Sheave setting for AHRI is 3.0 turns open.

Performance Data – Selection Notes

For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 42°F [5.6°C] when the JW3 jumper is not clipped (see example below). Otherwise, appropriate levels of a proper antifreeze solution should be used in systems with leaving water temperatures of 42°F [5.6°C] or below and the JW3 jumper should be clipped. This is due to the potential of the refrigerant temperature being as low as 32°F [0°C] with 40°F [4.4°C] LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for standard range equipment or systems without antifreeze.

Example:

At 50°F EWT (Entering Water Temperature) and 1.5 gpm/ton, a 8 ton unit has a HE of 72,200 Btuh.

To calculate LWT, rearrange the formula for HE as follows:

$HE = TD \times GPM \times 500$, where HE = Heat of Extraction (Btuh); TD = temperature difference (EWT - LWT) and GPM = U.S. Gallons per Minute.

$$TD = HE / (GPM \times 500)$$

$$TD = 72,200 / (12 \times 500)$$

$$TD = 12^\circ\text{F}$$

$$LWT = EWT - TD$$

$$LWT = 50 - 12 = 38^\circ\text{F} - \text{antifreeze must be used}$$

In this example, a higher flow rate will be required for EWTs at or below 50°F without antifreeze.

HBH/V096

EWT °F	WATER/BRINE			Heating - EAT 70°F				
	FLOW gpm	PD psi	PD ft.	HC	kW	HE	LAT	COP
50	12.0	1.7	4.0	96.7	7.17	72.2	95.9	4.0
	18.0	4.5	10.3	101.9	7.27	77.1	97.4	4.1
	24.0	7.9	18.2	104.7	7.32	79.8	98.2	4.2

Performance Data – HBH/V072

2,400 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btuh

WATER/BRINE				Cooling - EAT 80/67°F					Heating - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	20.0	6.8	15.8	Operation not recommended					49.5	5.0	32.5	87.1	2.9
	10.0	1.2	2.7	82.3	56.8	3.6	94.5	23.0	54.7	5.0	37.5	89.0	3.2
	15.0	3.3	7.7	81.1	55.8	3.4	92.8	23.6	56.8	5.1	39.6	89.9	3.3
30	20.0	6.2	14.3	80.2	55.1	3.4	91.7	23.8	58.0	5.1	40.7	90.3	3.4
	10.0	1.0	2.2	82.4	57.4	3.9	95.6	21.2	63.2	5.1	45.6	92.3	3.6
	15.0	3.0	7.0	82.6	57.1	3.7	95.1	22.4	66.1	5.2	48.4	93.4	3.7
40	20.0	5.6	13.0	82.4	56.8	3.6	94.6	22.9	67.7	5.2	50.0	94.1	3.8
	10.0	0.9	2.0	80.7	57.2	4.2	95.1	19.0	72.3	5.3	54.4	95.8	4.0
	15.0	2.8	6.5	81.9	57.4	4.0	95.6	20.5	76.0	5.3	57.8	97.2	4.2
50	20.0	5.3	12.2	82.3	57.4	3.9	95.6	21.1	78.0	5.4	59.7	98.0	4.3
	10.0	0.5	1.2	77.7	56.3	4.7	93.6	16.7	81.8	5.4	63.3	99.5	4.4
	15.0	2.2	5.1	79.7	56.9	4.4	94.7	18.2	86.0	5.5	67.2	101.1	4.6
60	20.0	4.4	10.1	80.6	57.2	4.3	95.1	18.9	88.3	5.5	69.4	102.0	4.7
	10.0	0.5	1.1	73.9	54.9	5.2	91.4	14.3	91.1	5.6	72.0	103.1	4.8
	15.0	2.1	4.8	76.3	55.8	4.8	92.8	15.8	95.6	5.7	76.3	104.8	4.9
70	20.0	4.2	9.6	77.5	56.2	4.7	93.5	16.5	98.0	5.7	78.5	105.7	5.0
	10.0	0.4	0.9	69.4	53.1	5.7	88.9	12.2	99.8	5.8	80.2	106.4	5.1
	15.0	1.9	4.5	72.2	54.2	5.4	90.5	13.4	104.4	5.9	84.4	108.2	5.2
80	20.0	3.9	9.1	73.5	54.7	5.2	91.2	14.1	106.7	5.9	86.5	109.1	5.3
	10.0	0.4	0.8	67.1	52.1	6.0	87.7	11.2	103.7	5.8	83.8	107.9	5.2
	15.0	1.9	4.4	69.8	53.3	5.7	89.2	12.4	108.0	5.9	87.8	109.6	5.3
85	20.0	3.9	8.9	71.2	53.8	5.5	89.9	13.0	110.1	6.0	89.7	110.4	5.4
	10.0	0.3	0.8	64.8	51.2	6.4	86.4	10.2	107.6	5.9	87.4	109.4	5.3
	15.0	1.8	4.3	67.5	52.3	6.0	87.9	11.3	111.7	6.0	91.1	111.0	5.4
90	20.0	3.8	8.8	68.9	52.9	5.8	88.6	11.9	113.5	6.0	92.8	111.7	5.5
	10.0	0.3	0.7	60.1	49.2	7.1	84.2	8.5	Operation not recommended				
	15.0	1.8	4.1	62.7	50.3	6.6	85.4	9.4					
20.0	3.7	8.5	64.1	50.9	6.4	86.1	10.0						
100	10.0	0.2	0.6	55.8	47.5	7.9	82.7	7.1					
	15.0	1.7	3.9	58.1	48.4	7.4	83.4	7.8					
	20.0	3.6	8.3	59.4	48.9	7.2	83.9	8.3					
110	10.0	0.2	0.5	52.2	46.3	8.8	82.2	5.9					
	15.0	1.6	3.7	54.1	46.9	8.3	82.3	6.5					
	20.0	3.5	8.0	55.1	47.3	8.0	82.5	6.9					
120													

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data – HBH/V096

3,200 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btuh

WATER/BRINE				Cooling - EAT 80/67°F					Heating - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	24.0	10.2	23.5	Operation not recommended					67.1	6.60	44.6	87.4	3.0
30	12.0	2.1	4.9	109.6	77.9	4.9	126.2	22.4	73.6	6.73	50.7	89.3	3.2
	18.0	5.3	12.1	109.3	77.9	4.7	125.3	23.3	76.9	6.79	53.7	90.2	3.3
	24.0	9.3	21.4	108.9	77.8	4.6	124.6	23.7	78.7	6.83	55.4	90.7	3.4
40	12.0	1.9	4.4	108.7	77.3	5.3	126.7	20.7	84.8	6.95	61.1	92.5	3.6
	18.0	4.8	11.0	109.5	77.8	5.0	126.5	21.9	89.0	7.03	65.1	93.7	3.7
	24.0	8.4	19.3	109.6	77.9	4.9	126.2	22.5	91.4	7.07	67.3	94.4	3.8
50	12.0	1.7	4.0	106.7	76.2	5.7	126.2	18.7	96.7	7.17	72.2	95.9	4.0
	18.0	4.5	10.3	108.2	77.0	5.4	126.6	20.1	101.9	7.27	77.1	97.4	4.1
	24.0	7.9	18.2	108.8	77.3	5.2	126.7	20.8	104.7	7.32	79.8	98.2	4.2
60	12.0	1.5	3.4	103.6	74.8	6.3	124.9	16.5	108.8	7.40	83.6	99.4	4.3
	18.0	3.8	8.8	105.8	75.8	5.9	125.9	18.0	114.9	7.51	89.3	101.2	4.5
	24.0	6.8	15.8	106.8	76.3	5.7	126.2	18.8	118.2	7.58	92.4	102.1	4.6
70	12.0	1.3	3.1	99.6	73.1	6.9	123.1	14.5	121.0	7.63	95.0	102.9	4.6
	18.0	3.6	8.4	102.4	74.3	6.5	124.4	15.9	127.7	7.76	101.2	104.9	4.8
	24.0	6.6	15.2	103.7	74.9	6.2	125.0	16.6	131.3	7.83	104.6	105.9	4.9
80	12.0	1.2	2.8	94.9	71.1	7.6	120.9	12.5	132.8	7.86	106.0	106.3	5.0
	18.0	3.4	7.9	98.2	72.5	7.1	122.4	13.8	139.8	8.01	112.5	108.4	5.1
	24.0	6.3	14.5	99.7	73.1	6.9	123.2	14.5	143.5	8.09	115.9	109.4	5.2
85	12.0	1.1	2.7	92.3	70.0	8.0	119.6	11.6	138.3	7.98	111.1	107.9	5.1
	18.0	3.4	7.7	95.7	71.4	7.5	121.3	12.8	145.3	8.13	117.5	109.9	5.2
	24.0	6.2	14.2	97.3	72.1	7.2	122.0	13.5	148.8	8.21	120.8	111.0	5.3
90	12.0	1.1	2.5	89.6	68.9	8.4	118.4	10.6	143.9	8.10	116.2	109.5	5.2
	18.0	3.3	7.6	93.2	70.4	7.9	120.1	11.8	150.8	8.25	122.6	111.5	5.4
	24.0	6.1	14.0	94.9	71.1	7.6	120.9	12.5	154.2	8.34	125.7	112.5	5.4
100	12.0	1.0	2.3	83.9	66.6	9.3	115.7	9.0	Operation not recommended				
	18.0	3.1	7.2	87.7	68.1	8.7	117.5	10.0					
	24.0	5.9	13.6	89.6	68.9	8.4	118.3	10.6					
110	12.0	0.9	2.0	77.8	64.0	10.4	113.1	7.5					
	18.0	3.0	6.8	81.7	65.7	9.7	114.8	8.4					
	24.0	5.7	13.1	83.7	66.5	9.4	115.6	8.9					
120	12.0	0.8	1.8	71.5	61.2	11.5	110.6	6.2					
	18.0	2.8	6.5	75.4	63.0	10.8	112.2	7.0					
	24.0	5.5	12.6	77.4	63.8	10.4	113.0	7.4					

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data – HBH/V120

4,000 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btu/h

WATER/BRINE				Cooling - EAT 80/67°F					Heating - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	30.0	16.0	36.9	Operation not recommended					91.8	9.0	61.1	89.2	3.0
30	15.0	4.0	9.2	141.5	98.1	6.6	163.9	21.6	99.2	9.2	67.8	90.9	3.2
	22.5	8.6	19.9	140.4	98.2	6.3	162.0	22.2	103.3	9.3	71.6	91.9	3.3
	30.0	14.5	33.4	139.2	98.0	6.2	160.5	22.4	105.6	9.4	73.7	92.4	3.3
40	15.0	3.5	8.0	140.6	97.2	7.0	164.4	20.1	112.5	9.5	80.1	94.0	3.5
	22.0	7.7	17.8	141.5	98.0	6.7	164.2	21.3	117.8	9.6	84.9	95.2	3.6
	30.0	13.0	30.0	141.5	98.2	6.5	163.7	21.7	120.8	9.7	87.6	95.9	3.6
50	15.0	3.2	7.4	137.4	95.6	7.5	163.0	18.3	126.8	9.9	93.2	97.3	3.8
	22.5	7.2	16.6	139.9	96.8	7.1	164.1	19.7	133.3	10.0	99.2	98.8	3.9
	30.0	12.2	28.3	140.8	97.3	6.9	164.4	20.3	136.9	10.1	102.5	99.6	4.0
60	15.0	2.4	5.5	132.6	93.5	8.1	160.3	16.3	141.7	10.2	106.9	100.7	4.1
	22.5	5.8	13.4	136.2	95.0	7.7	162.4	17.7	149.3	10.4	114.0	102.5	4.2
	30.0	10.2	23.6	137.7	95.8	7.5	163.2	18.5	153.6	10.5	117.9	103.5	4.3
70	15.0	2.2	5.1	126.6	90.9	8.9	156.9	14.3	156.8	10.5	120.9	104.2	4.4
	22.5	5.5	12.7	130.9	92.8	8.3	159.4	15.7	165.6	10.7	129.0	106.2	4.5
	30.0	9.8	22.6	133.0	93.6	8.1	160.6	16.4	170.4	10.8	133.4	107.3	4.6
80	15.0	2.1	4.7	119.9	88.0	9.7	153.1	12.3	172.0	10.9	135.0	107.7	4.6
	22.5	5.2	12.0	124.6	90.0	9.1	155.7	13.7	181.6	11.1	143.8	110.0	4.8
	30.0	9.4	21.7	126.9	91.0	8.8	157.1	14.4	186.9	11.2	148.6	111.2	4.9
85	15.0	2.0	4.6	116.4	86.5	10.2	151.2	11.5	179.5	11.0	141.9	109.5	4.8
	22.5	5.1	11.9	121.1	88.5	9.6	153.8	12.7	189.4	11.3	151.0	111.7	4.9
	30.0	9.3	21.5	123.5	89.6	9.3	155.1	13.4	194.8	11.4	155.8	113.0	5.0
90	15.0	2.0	4.5	113.0	85.0	10.7	149.3	10.6	187.0	11.2	148.7	111.2	4.9
	22.5	5.1	11.7	117.7	87.0	10.0	151.8	11.8	197.2	11.5	158.1	113.5	5.0
	30.0	9.2	21.2	120.1	88.1	9.7	153.2	12.4	202.7	11.6	163.1	114.8	5.1
100	15.0	1.9	4.3	106.0	81.8	11.7	146.0	9.0	Operation not recommended				
	22.5	4.9	11.4	110.6	83.9	11.0	148.1	10.0					
	30.0	9.0	20.8	112.9	84.9	10.7	149.3	10.6					
110	15.0	1.8	4.1	99.6	78.9	12.9	143.6	7.7					
	22.5	4.8	11.1	103.7	80.8	12.1	145.0	8.6					
	30.0	8.8	20.4	105.9	81.8	11.8	145.9	9.0					
120	15.0	1.7	3.9	94.2	76.5	14.2	142.6	6.6					
	22.5	4.7	10.8	97.5	78.0	13.4	143.1	7.3					
	30.0	8.6	19.9	99.4	78.8	13.0	143.5	7.7					

Interpolation is permissible; extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.
 AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
 Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
 All performance is based upon the lower voltage of dual voltage rated units.
 Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
 Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.
 Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in the shaded areas.

Performance Data – HBV160

5,600 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btuh

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	42.0	10.6	24.6	Operation not recommended					110.5	9.3	78.8	86.2	3.5
30	21.0	3.3	7.6	166.5	122.6	8.1	194.3	20.4	119.6	10.3	84.6	87.7	3.4
	31.5	6.2	14.3	160.7	118.4	7.7	187.1	20.8	124.3	10.6	88.1	88.5	3.4
	42.0	9.7	22.3	157.0	115.7	7.5	182.8	20.8	126.8	10.8	90.1	88.9	3.5
40	21.0	2.8	6.4	171.3	125.8	8.8	201.5	19.4	137.3	11.3	98.8	90.7	3.6
	31.5	5.2	12.1	168.9	124.3	8.4	197.6	20.1	143.8	11.6	104.3	91.7	3.6
	42.0	8.3	19.2	167.0	123.0	8.2	195.0	20.4	147.4	11.7	107.5	92.3	3.7
50	21.0	1.9	4.4	171.4	125.7	9.6	204.0	17.9	157.4	12.0	116.5	94.0	3.9
	31.5	4.0	9.1	171.8	126.1	9.1	202.8	18.9	165.7	12.2	124.1	95.3	4.0
	42.0	6.6	15.2	171.4	125.8	8.9	201.6	19.3	170.3	12.3	128.4	96.1	4.1
60	21.0	1.8	4.2	168.0	123.6	10.3	203.2	16.2	178.6	12.4	136.2	97.5	4.2
	31.5	3.8	8.8	170.5	125.1	9.8	204.1	17.3	188.5	12.6	145.5	99.1	4.4
	42.0	6.4	14.7	171.3	125.7	9.6	204.0	17.9	194.0	12.7	150.7	100.0	4.5
70	21.0	1.7	4.0	162.0	120.5	11.2	200.2	14.5	200.0	12.8	156.3	101.0	4.6
	31.5	3.6	8.4	166.1	122.6	10.6	202.4	15.6	211.1	13.0	166.7	102.8	4.8
	42.0	6.1	14.1	167.8	123.5	10.4	203.2	16.2	217.1	13.1	172.2	103.8	4.8
80	21.0	1.7	3.9	154.4	117.1	12.1	195.8	12.7	220.7	13.2	175.6	104.4	4.9
	31.5	3.5	8.1	159.4	119.2	11.5	198.7	13.8	232.2	13.6	185.9	106.3	5.0
	42.0	5.9	13.6	161.7	120.3	11.2	200.1	14.4	238.0	13.8	191.0	107.3	5.1
90	21.0	1.6	3.8	145.6	113.9	13.2	190.7	11.0	239.6	13.8	192.4	107.5	5.1
	31.5	3.4	7.9	151.1	115.8	12.5	193.9	12.1	250.2	14.4	201.0	109.3	5.1
	42.0	5.6	13.0	153.8	116.8	12.2	195.5	12.6	255.0	14.8	204.7	110.1	5.1
100	21.0	1.6	3.6	136.4	111.4	14.4	185.6	9.5	Operation not recommended				
	31.5	3.3	7.7	141.9	112.8	13.7	188.6	10.4					
	42.0	5.6	12.9	144.7	113.6	13.3	190.2	10.9					
110	21.0	1.5	3.5	127.2	110.0	15.8	181.2	8.0					
	31.5	3.2	7.4	132.5	110.6	15.0	183.6	8.8					
	42.0	5.5	12.7	135.2	111.1	14.6	185.0	9.3					
120	21.0	1.4	3.2	118.7	110.3	17.4	178.2	6.8					
	31.5	3.1	7.2	123.4	109.9	16.5	179.6	7.5					
	42.0	5.4	12.4	125.9	109.9	16.0	180.6	7.9					

Interpolation is permissible, extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in shaded areas.



Performance Data – HBV192

6,400 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btuh

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	48.0	14.1	32.5	Operation not recommended					128.8	11.3	90.3	86.6	3.3
30	24.0	4.4	10.1	195.9	146.9	9.7	229.0	20.2	141.7	12.0	100.6	88.5	3.4
	36.0	8.1	18.6	179.6	137.5	8.8	209.5	20.5	148.1	12.3	105.9	89.4	3.5
	48.0	12.4	28.7	169.8	131.7	8.3	198.2	20.4	151.6	12.5	109.0	89.9	3.6
40	24.0	3.8	8.8	209.3	154.3	10.9	246.4	19.2	164.0	12.9	119.8	91.7	3.7
	36.0	7.0	16.1	202.2	150.4	10.1	236.8	19.9	172.2	13.2	127.2	92.9	3.8
	48.0	10.8	25.0	196.8	147.4	9.7	230.1	20.2	176.8	13.3	131.3	93.5	3.9
50	24.0	3.3	7.6	211.4	155.5	11.8	251.7	17.9	187.6	13.6	141.2	95.1	4.0
	36.0	5.5	12.6	210.9	155.1	11.2	249.1	18.9	197.7	13.8	150.5	96.5	4.2
	48.0	8.8	20.2	209.1	154.2	10.9	246.2	19.3	203.3	14.0	155.7	97.3	4.3
60	24.0	2.8	6.5	206.6	153.5	12.7	249.9	16.3	211.9	14.1	163.6	98.6	4.4
	36.0	5.2	12.1	210.5	155.2	12.1	251.7	17.4	223.7	14.4	174.6	100.3	4.6
	48.0	8.4	19.5	211.4	155.6	11.8	251.6	18.0	230.2	14.5	180.7	101.2	4.7
70	24.0	2.7	6.2	197.8	149.5	13.5	244.0	14.6	236.1	14.6	186.2	102.1	4.7
	36.0	5.0	11.6	204.2	152.4	12.9	248.4	15.8	249.2	14.9	198.4	104.0	4.9
	48.0	8.1	18.8	206.9	153.6	12.6	250.0	16.4	256.3	15.1	204.9	105.0	5.0
80	24.0	2.6	6.1	186.9	144.3	14.5	236.3	12.9	259.6	15.1	208.0	105.5	5.0
	36.0	4.9	11.4	194.4	147.8	13.8	241.6	14.1	273.4	15.5	220.5	107.5	5.2
	48.0	8.0	18.4	198.0	149.5	13.5	244.1	14.6	280.6	15.7	226.9	108.5	5.2
90	24.0	2.5	5.9	175.4	138.9	15.6	228.6	11.2	281.8	15.8	227.9	108.7	5.2
	36.0	4.8	11.1	182.9	142.4	14.8	233.5	12.3	295.3	16.3	239.5	110.6	5.3
	48.0	7.7	17.7	186.7	144.2	14.5	236.2	12.9	302.0	16.7	245.0	111.6	5.3
100	24.0	2.5	5.7	165.0	134.2	17.0	222.9	9.7	Operation not recommended				
	36.0	4.6	10.7	171.3	137.0	16.1	226.2	10.7					
	48.0	7.5	17.4	174.9	138.7	15.7	228.3	11.2					
110	24.0	2.4	5.5	157.4	131.7	18.7	221.2	8.4					
	36.0	4.5	10.5	161.6	132.9	17.6	221.6	9.2					
	48.0	7.4	17.0	164.3	134.0	17.1	222.6	9.6					
120	24.0	2.3	5.3	155.1	133.4	21.0	226.8	7.4					
	36.0	4.3	9.9	155.7	131.7	19.5	222.3	8.0					
	48.0	7.3	16.8	157.0	131.6	18.9	221.4	8.3					

Interpolation is permissible, extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.
 All performance data is based upon the lower voltage of dual voltage rated units.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in shaded areas.



Performance Data – HBV240

8,000 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btuh

WATER / BRINE				COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
EWT °F	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	60.0	11.4	26.4	Operation not recommended					165.0	16.7	108.0	87.1	2.9
30	30.0	3.6	8.3	263.8	186.8	13.2	309.0	19.9	182.6	17.1	124.4	89.1	3.1
	45.0	6.7	15.5	255.5	183.3	12.8	299.0	20.0	191.0	17.2	132.2	90.1	3.3
	60.0	10.6	24.4	249.5	180.9	12.6	292.4	19.9	195.7	17.3	136.7	90.6	3.3
40	30.0	3.4	7.8	267.5	188.9	14.1	315.5	19.0	211.9	17.6	151.9	92.5	3.5
	45.0	6.3	14.5	265.9	187.7	13.5	311.9	19.7	222.9	17.8	162.3	93.7	3.7
	60.0	9.3	21.4	263.5	186.7	13.2	308.6	19.9	229.1	17.9	168.1	94.5	3.8
50	30.0	2.9	6.6	263.8	188.5	15.0	314.9	17.6	242.8	18.1	181.1	96.0	3.9
	45.0	4.8	11.1	267.1	189.0	14.3	315.9	18.6	256.5	18.3	194.0	97.6	4.1
	60.0	7.7	17.8	267.5	188.8	14.0	315.4	19.1	264.1	18.4	201.2	98.5	4.2
60	30.0	2.5	5.8	254.8	186.2	16.0	309.5	15.9	274.6	18.6	211.1	99.7	4.3
	45.0	4.7	10.7	261.5	188.0	15.3	313.7	17.1	290.7	18.9	226.3	101.6	4.5
	60.0	7.5	17.3	264.1	188.5	14.9	315.0	17.7	299.6	19.0	234.7	102.6	4.6
70	30.0	2.4	5.6	242.4	182.2	17.2	301.1	14.1	306.5	19.1	241.2	103.4	4.7
	45.0	4.5	10.4	251.2	185.1	16.4	307.1	15.3	324.7	19.5	258.2	105.5	4.9
	60.0	7.3	16.8	255.2	186.3	16.0	309.7	16.0	334.6	19.7	267.4	106.6	5.0
80	30.0	2.4	5.5	228.0	176.9	18.5	291.1	12.3	338.0	19.8	270.5	107.0	5.0
	45.0	4.4	10.2	237.7	180.5	17.6	297.8	13.5	357.5	20.2	288.6	109.3	5.2
	60.0	7.1	16.5	242.5	182.2	17.2	301.1	14.1	368.0	20.5	298.1	110.5	5.3
90	30.0	2.3	5.3	212.7	170.5	20.0	280.9	10.6	368.2	20.5	298.3	110.5	5.3
	45.0	4.3	9.9	222.5	174.7	19.0	287.4	11.7	388.3	21.1	316.4	112.8	5.4
	60.0	6.9	15.9	227.5	176.7	18.5	290.8	12.3	398.7	21.4	325.6	114.0	5.5
100	30.0	2.3	5.2	197.8	163.6	21.7	271.6	9.1	Operation not recommended				
	45.0	4.2	9.7	206.8	167.9	20.6	277.1	10.0					
	60.0	6.8	15.7	211.7	170.0	20.1	280.2	10.5					
110	30.0	2.2	5.1	184.4	157.0	23.5	264.8	7.8					
	45.0	4.1	9.5	192.1	160.8	22.4	268.5	8.6					
	60.0	6.7	15.4	196.4	162.9	21.8	270.9	9.0					
120	30.0	2.2	5.0	174.1	151.8	25.7	261.9	6.8					
	45.0	4.0	9.3	179.7	154.6	24.4	263.0	7.4					
	60.0	6.6	15.1	183.0	156.3	23.8	264.2	7.7					

Interpolation is permissible, extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.
 All performance data is based upon the lower voltage of dual voltage rated units.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in shaded areas.

Performance Data – HBV300

10,000 CFM Nominal Airflow Heating & Cooling

Performance capacities shown in thousands of Btuh

EWT °F	WATER / BRINE			COOLING - EAT 80/67 °F					HEATING - EAT 70°F				
	Flow GPM	PD PSI	PD FT	TC	SC	kW	HR	EER	HC	kW	HE	LAT	COP
20	75.0	15.7	36.3	Operation not recommended					211.4	21.4	138.3	87.5	2.9
30	37.5	5.0	11.6	342.5	241.7	17.4	401.8	19.7	230.6	21.9	155.8	89.3	3.1
	56.3	9.2	21.3	333.6	238.3	16.9	391.2	19.8	240.1	22.1	164.6	90.2	3.2
	75.0	14.3	32.9	327.1	235.6	16.7	383.9	19.6	245.4	22.3	169.5	90.7	3.2
40	37.5	4.7	10.8	345.6	242.7	18.3	408.1	18.9	264.5	22.7	187.1	92.4	3.4
	56.3	7.8	18.0	344.4	242.3	17.6	404.5	19.5	277.3	22.9	199.0	93.6	3.5
	75.0	13.1	30.2	341.9	241.5	17.3	401.0	19.7	284.5	23.1	205.7	94.3	3.6
50	37.5	3.4	7.9	340.4	240.6	19.4	406.7	17.5	301.4	23.5	221.4	95.8	3.8
	56.3	5.9	13.6	344.9	242.3	18.6	408.4	18.5	317.4	23.8	236.2	97.3	3.9
	75.0	9.6	22.3	345.7	242.7	18.2	407.9	19.0	326.4	24.0	244.5	98.2	4.0
60	37.5	2.9	6.6	329.3	236.3	20.7	400.0	15.9	339.9	24.3	257.0	99.4	4.1
	56.3	5.7	13.1	337.8	239.5	19.8	405.3	17.1	358.8	24.7	274.6	101.1	4.3
	75.0	9.3	21.5	341.1	240.8	19.3	407.1	17.7	369.2	24.9	284.2	102.1	4.3
70	37.5	2.8	6.4	314.0	230.3	22.3	389.9	14.1	378.6	25.1	292.8	103.0	4.4
	56.3	5.5	12.6	325.1	234.6	21.2	397.3	15.4	399.7	25.6	312.3	104.9	4.6
	75.0	9.0	20.8	330.2	236.6	20.6	400.6	16.0	411.2	25.9	322.7	106.0	4.6
80	37.5	2.7	6.2	296.0	223.0	24.0	378.0	12.3	416.3	26.1	327.4	106.5	4.7
	56.3	5.3	12.3	308.6	228.1	22.8	386.3	13.5	438.6	26.7	347.6	108.5	4.8
	75.0	8.8	20.4	314.7	230.5	22.2	390.4	14.2	450.2	27.0	358.1	109.6	4.9
90	37.5	2.6	5.9	276.8	214.9	26.0	365.5	10.6	451.7	27.1	359.4	109.7	4.9
	56.3	5.1	11.8	289.7	220.3	24.6	373.8	11.8	473.5	27.8	378.7	111.7	5.0
	75.0	8.5	19.6	296.2	223.1	24.0	378.1	12.3	484.3	28.2	388.1	112.7	5.0
100	37.5	2.5	5.8	257.5	206.4	28.2	353.9	9.1	Operation not recommended				
	56.3	5.0	11.6	269.8	211.8	26.8	361.2	10.1					
	75.0	8.4	19.3	276.3	214.6	26.0	365.2	10.6					
110	37.5	2.4	5.5	239.4	198.4	30.8	344.5	7.8					
	56.3	4.9	11.3	250.4	203.3	29.2	350.0	8.6					
	75.0	7.8	18.1	256.4	205.9	28.4	353.2	9.0					
120	37.5	2.2	5.2	224.0	192.0	33.7	339.0	6.6					
	56.3	4.9	11.4	233.0	195.6	31.9	341.8	7.3					
	75.0	7.3	16.9	238.0	197.8	31.0	343.9	7.7					

Interpolation is permissible, extrapolation is not.
 All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.
 All performance data is based upon the lower voltage of dual voltage rated units.
 See performance correction tables for operating conditions other than those listed above.
 See Performance Data Selection Notes for operation in shaded areas.

HBH/V Performance Data – Correction Tables

Air Flow Correction Table

Percent of Rated Airflow	Total Capacity	Sensible	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
75%	0.962	0.869	0.947	0.959	0.959	1.039	0.962
81%	0.975	0.902	0.960	0.972	0.970	1.024	0.973
88%	0.988	0.934	0.972	0.984	0.981	1.009	0.985
94%	0.994	0.967	0.986	0.992	0.990	1.004	0.992
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.007	1.028	1.014	1.009	1.010	1.000	1.005
113%	1.014	1.056	1.028	1.017	1.020	1.001	1.010
119%	1.019	1.083	1.046	1.024	1.036	1.008	1.013
125%	1.023	1.109	1.063	1.031	1.051	1.015	1.016

HBH072-120 Entering Air Correction Table Cooling

Entering Air WB °F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F									Power	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95		
50	0.7335	0.8825	*	*	*	*	*	*	*	*	0.9782	0.7834
55	0.8063	0.6757	0.8842	1.1119	*	*	*	*	*	*	0.9836	0.8424
60	0.8830		0.6734	0.8817	1.0918	*	*	*	*	*	0.9900	0.9301
65	0.9774			0.6682	0.8764	1.0885	1.1136	1.2949	*	*	0.9973	0.9981
66.2	0.9851			0.6177	0.8243	1.0357	1.0612	1.2452	*	*	0.9987	0.9879
67	1.0000			0.5842	0.7897	1.0000	1.0262	1.2119	*	*	1.0000	1.0000
70	1.0426				0.6609	0.8688	0.8941	1.0811	1.2916	*	1.0043	1.0420
75	1.1386					0.6517	0.6517	0.8594	1.0695	1.2838	1.0118	1.1128

* = Sensible capacity equals total capacity

AHRI/ISO/ASHRAE 13256-1 uses entering air conditions of Cooling - 80.6°F DB/66.2°F WB, 1 and Heating - 68°F DB/59°F WB entering air temperature

Entering Air Correction Table

Entering Air DB °F	Heating Capacity	Power	Heat of Extraction
50	1.040	0.839	1.101
55	1.030	0.883	1.075
60	1.018	0.920	1.053
65	1.008	0.960	1.026
68	1.001	0.984	1.011
70	1.000	1.000	1.000
75	0.978	1.038	0.979
80	0.968	1.091	0.943

Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Corr. Fct. EWT 30°F
		EWT 90°F			EWT 30°F		
		Total Cap	Sens Cap	Power	Htg Cap	Power	
Water	0	1.000	1.000	1.000			
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.995	0.995	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200



Blower Performance Data – HBH/V072 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
1800	BHP			0.28	0.32	0.35	0.39	0.42	0.45	0.48	0.52	0.56	0.60	0.64	0.69	0.72	0.76
	Sheave/Mtr			B	B	B	A	A	A	A	A	A	C	C	C	C	C
	RPM			599	645	690	735	775	815	850	885	910	940	965	995	1015	1040
	Turns Open			3	2	1	4	3.5	2.5	2	1.5	1	5	4.5	4	3.5	3
1900	BHP			0.31	0.36	0.40	0.44	0.49	0.53	0.57	0.62	0.65	0.69	0.73	0.76	0.80	0.84
	Sheave/Mtr			B	B	A	A	A	A	A	A	C	C	C	C	C	C
	RPM			604	655	695	740	780	820	855	890	920	950	980	1005	1030	1055
	Turns Open			3	2	5	4	3	2.5	2	1.5	5.5	4.5	4	3.5	3	3
2000	BHP		0.31	0.34	0.39	0.45	0.50	0.54	0.59	0.63	0.67	0.72	0.75	0.79	0.82	0.86	0.90
	Sheave/Mtr		B	B	B	A	A	A	A	A	A	C	C	C	C	C	C
	RPM		568	615	660	705	750	785	825	860	895	930	960	990	1015	1040	1065
	Turns Open		4.5	2.5	1.5	4.5	3.5	3	2.5	1.5	1	5	4.5	4	3.5	3	2.5
2100	BHP	0.33	0.38	0.42	0.46	0.50	0.54	0.59	0.65	0.70	0.74	0.78	0.81	0.85	0.89	0.94	0.98
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	531	583	630	670	715	755	795	835	875	905	940	970	1000	1025	1055	1080
	Turns Open	4.5	3.5	2	5	4.5	3.5	2.5	2	1.5	1	5	4	4	3	2.5	2.5
2200	BHP	0.37	0.40	0.45	0.49	0.55	0.60	0.65	0.70	0.75	0.79	0.83	0.87	0.92	0.96	1.00	1.04
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	C	C	C	C	C	E	E
	RPM	552	599	645	685	730	770	810	850	885	915	950	980	1010	1040	1065	1090
	Turns Open	4	3	2	5	4	3	2.5	2	1.5	5.5	4.5	4	3.5	3	2.5	2
2300	BHP	0.42	0.47	0.51	0.56	0.60	0.65	0.70	0.75	0.80	0.84	0.89	0.94	1.00	1.05	1.10	1.16
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	C	C	C	E	E	E	E
	RPM	573	620	660	705	745	785	820	860	895	925	960	990	1020	1050	1075	1105
	Turns Open	3.5	2.5	1.5	4.5	4	3	2.5	1.5	1	5	4.5	4	3.5	3	2.5	2
2400	BHP	0.48	0.52	0.57	0.61	0.66	0.72	0.78	0.83	0.87	0.92	0.97	1.02	1.07	1.13	1.19	1.25
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	C	C	E	E	E	E	E
	RPM	604	645	690	730	765	805	845	880	910	945	975	1010	1035	1065	1095	1125
	Turns Open	3	2	5	4	3.5	2.5	2	1.5	1	5	4	3.5	3	2.5	2	1.5
2500	BHP	0.52	0.57	0.61	0.66	0.72	0.78	0.83	0.89	0.94	1.00	1.03	1.08	1.14	1.20	1.25	1.31
	Sheave/Mtr	B	B	A	A	A	A	A	A	C	E	E	E	E	E	E	E
	RPM	620	660	700	740	780	815	850	885	920	950	985	1015	1045	1075	1100	1130
	Turns Open	2.5	1.5	4.5	4	3	2.5	2	1.5	5.5	4.5	4	3.5	3	2.5	2	1.5
2600	BHP	0.56	0.61	0.66	0.70	0.76	0.82	0.88	0.93	0.98	1.04	1.08	1.14	1.20	1.26	1.32	1.37
	Sheave/Mtr	B	A	A	A	A	A	A	A	C	E	E	E	E	E	E	E
	RPM	635	675	715	750	790	825	860	895	925	960	990	1020	1050	1080	1110	1135
	Turns Open	2.5	5	4.5	3.5	3	2	1.5	1	5	4.5	4	3.5	3	2.5	1.5	1.5
2700	BHP	0.61	0.66	0.71	0.76	0.82	0.87	0.93	0.98	1.04	1.10	1.15	1.21	1.27	1.33	1.39	1.45
	Sheave/Mtr	B	A	A	A	A	A	A	A	E	E	E	E	E	E	E	E
	RPM	655	695	730	770	805	840	875	905	940	970	1000	1030	1060	1090	1120	1145
	Turns Open	2	4.5	4	3.5	2.5	2	1.5	1	5	4.5	3.5	3	2.5	2	1.5	1
2800	BHP	0.66	0.72	0.77	0.83	0.88	0.93	0.99	1.05	1.11	1.16	1.22	1.30	1.37	1.44	1.51	1.57
	Sheave/Mtr	B	A	A	A	A	A	A	D	E	E	E	E	E	E	E	E
	RPM	670	710	750	785	815	850	885	915	950	980	1010	1040	1070	1100	1130	1155
	Turns Open	1.5	4.5	3.5	3	2.5	1.5	1.5	1	4.5	4	3.5	3	2.5	2	1.5	1
2900	BHP	0.71	0.77	0.82	0.87	0.93	0.98	1.04	1.10	1.16	1.22	1.30	1.36	1.43	1.50	1.57	1.63
	Sheave/Mtr	A	A	A	A	A	A	D	E	E	E	E	E	E	E	E	E
	RPM	685	725	765	795	830	860	895	925	955	985	1020	1045	1075	1105	1135	1160
	Turns Open	5	4	3.5	3	2	1.5	1	5	4.5	4	3.5	3	2.5	1.5	1	1
3000	BHP	0.79	0.84	0.90	0.95	1.01	1.07	1.13	1.19	1.25	1.31	1.38	1.46	1.52	1.59	1.66	
	Sheave/Mtr	A	A	A	A	A	D	D	E	E	E	E	E	E	E	E	
	RPM	710	745	780	815	850	885	915	945	975	1005	1035	1065	1090	1120	1150	
	Turns Open	4.5	4	3	2.5	2	1	1	5	4	3.5	3	2.5	2	1.5	1	

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.

Blower Performance Data – HBH/V096 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
2400	BHP	0.45	0.50	0.54	0.59	0.63	0.69	0.74	0.80	0.85	0.90	0.94	0.99	1.04	1.10	1.16	1.22
	Sheave/Mtr	B	B	B	B	B	A	A	A	A	A	A	A	A	A	C	C
	RPM	578	625	665	705	745	785	820	860	895	925	960	990	1020	1050	1080	1110
	Turns Open	5	4	3	2.5	1.5	5.5	5	4	3.5	3	2.5	2	1.5	1	4	3.5
2500	BHP	0.50	0.55	0.59	0.64	0.69	0.75	0.81	0.88	0.92	0.97	1.01	1.06	1.12	1.17	1.23	1.29
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	599	645	685	725	765	800	835	875	905	940	970	1005	1035	1060	1090	1120
	Turns Open	4.5	3.5	2.5	2	6	5	4.5	4	3.5	3	2.5	2	1	4.5	3.5	3
2600	BHP	0.55	0.60	0.65	0.69	0.75	0.80	0.86	0.92	0.97	1.02	1.08	1.13	1.19	1.25	1.30	1.36
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	625	665	705	740	780	815	850	885	920	950	985	1015	1045	1075	1100	1130
	Turns Open	4	3	2.5	1.5	5.5	5	4.5	3.5	3	2.5	2	1.5	1	4	3.5	3
2700	BHP	0.60	0.65	0.70	0.75	0.80	0.86	0.91	0.97	1.02	1.08	1.14	1.20	1.26	1.32	1.38	1.44
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	645	685	725	760	795	830	865	900	930	960	995	1025	1055	1085	1115	1140
	Turns Open	3.5	2.5	2	6	5.5	4.5	4	3.5	3	2.5	2	1.5	4.5	4	3.5	3
2800	BHP	0.65	0.71	0.76	0.82	0.87	0.93	0.98	1.04	1.10	1.16	1.21	1.28	1.36	1.43	1.50	1.56
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	665	705	745	780	810	845	880	910	945	975	1005	1035	1065	1095	1125	1150
	Turns Open	3	2.5	1.5	5.5	5	4.5	4	3	2.5	2	1.5	1	4	3.5	3	2.5
2900	BHP	0.71	0.76	0.82	0.87	0.92	0.98	1.03	1.09	1.16	1.22	1.29	1.36	1.43	1.50	1.57	1.63
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	685	720	760	795	825	860	890	920	955	985	1015	1045	1075	1105	1135	1160
	Turns Open	2.5	2	6	5.5	5	4	3.5	3	2.5	2	1.5	1	4	3.5	3	2.5
3000	BHP	0.78	0.84	0.89	0.95	1.00	1.06	1.12	1.18	1.24	1.30	1.37	1.43	1.50	1.58	1.64	1.71
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	700	740	775	810	845	880	910	940	970	1000	1030	1055	1085	1115	1140	1170
	Turns Open	2.5	1.5	5.5	5	4.5	4	3.5	2.5	2	1.5	1	4.5	3.5	3.5	3	2.5
3100	BHP	0.85	0.91	0.96	1.02	1.08	1.14	1.22	1.29	1.36	1.44	1.50	1.57	1.63	1.70	1.76	1.82
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	720	755	790	825	860	890	925	955	985	1015	1040	1070	1095	1125	1150	1175
	Turns Open	2	1	5.5	4.5	4	3.5	3	2.5	2	1.5	1	4	3.5	3	2.5	2
3200	BHP	0.93	1.00	1.07	1.14	1.20	1.26	1.32	1.38	1.44	1.51	1.57	1.64	1.70	1.78	1.85	1.92
	Sheave/Mtr	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	740	775	810	845	875	905	935	965	995	1025	1050	1080	1105	1135	1160	1185
	Turns Open	1.5	5.5	5	4.5	4	3.5	3	2	1.5	1	4.5	4	3.5	3	2.5	2

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.

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Blower Performance Data – HBH/V096 Standard Unit

Table Continued from Previous Page

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
3300	BHP	1.01	1.08	1.14	1.21	1.28	1.33	1.39	1.45	1.51	1.58	1.64	1.72	1.78	1.84	1.93	2.00
	Sheave/Mtr	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C	E
	RPM	755	790	820	855	890	915	945	975	1005	1035	1060	1090	1115	1140	1170	1195
	Turns Open	1	5.5	5	4	3.5	3	2.5	2	1.5	1	4	3.5	3	3	2.5	2
3400	BHP	1.08	1.15	1.22	1.29	1.35	1.41	1.47	1.53	1.59	1.68	1.75	1.83	1.90	1.96	2.02	2.08
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	A	C	C	C	C	E	E
	RPM	765	800	835	870	900	930	960	990	1015	1045	1070	1100	1125	1150	1175	1200
	Turns Open	6	5	4.5	4	3.5	3	2.5	2	1.5	1	4	3.5	3	2.5	2	2
3500	BHP	1.16	1.23	1.29	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.79	1.85	1.92	2.01	2.09	2.17
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	C	C	C	C	E	E	E
	RPM	780	815	845	880	910	940	970	1000	1025	1055	1080	1105	1130	1160	1185	1210
	Turns Open	5.5	5	4.5	3.5	3	2.5	2	1.5	1	4.5	4	3.5	3	2.5	2	1.5
3600	BHP	1.24	1.30	1.37	1.44	1.51	1.58	1.65	1.72	1.78	1.86	1.92	1.98	2.06	2.13	2.21	2.29
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	C	C	C	E	E	E	E
	RPM	795	825	860	890	920	950	980	1010	1035	1065	1090	1115	1145	1165	1190	1215
	Turns Open	5.5	4.5	4	3.5	3	2.5	2	1.5	1	4	3.5	3	2.5	2.5	2	1.5
3700	BHP	1.34	1.40	1.46	1.53	1.61	1.68	1.75	1.82	1.90	1.97	2.06	2.13	2.21	2.28	2.36	2.44
	Sheave/Mtr	A	A	A	A	A	A	A	A	C	C	E	E	E	E	E	E
	RPM	820	850	880	910	940	970	1000	1025	1055	1080	1110	1135	1160	1180	1205	1230
	Turns Open	5	4.5	3.5	3	2.5	2	1.5	1	4.5	4	3.5	3	2.5	2	1.5	1.5
3800	BHP	1.43	1.49	1.56	1.63	1.70	1.78	1.86	1.94	2.02	2.12	2.20	2.28	2.34	2.42	2.50	2.58
	Sheave/Mtr	A	A	A	A	A	A	A	A	E	E	E	E	E	E	E	E
	RPM	840	870	900	930	960	990	1020	1045	1070	1100	1125	1150	1170	1195	1220	1245
	Turns Open	4.5	4	3.5	3	2.5	2	1.5	1	4	3.5	3	2.5	2.5	2	1.5	1
3900	BHP	1.58	1.64	1.71	1.78	1.85	1.93	2.01	2.09	2.19	2.27	2.35	2.41	2.49	2.57	2.65	
	Sheave/Mtr	A	A	A	A	A	A	D	D	E	E	E	E	E	E	E	
	RPM	865	890	920	950	980	1010	1035	1060	1090	1115	1140	1160	1185	1210	1235	
	Turns Open	4	4	3	2.5	2	1.5	1	1	4	3.5	3	2.5	2	1.5	1.5	
4000	BHP	1.68	1.75	1.83	1.92	2.00	2.08	2.16	2.26	2.34	2.42	2.50	2.56	2.64	2.72	2.80	
	Sheave/Mtr	A	A	A	A	D	D	D	E	E	E	E	E	E	E	E	
	RPM	885	910	940	970	1000	1025	1050	1080	1105	1130	1155	1175	1200	1225	1250	
	Turns Open	4	3.5	2.5	2.5	2	1	1	4	3.5	3	2.5	2	2	1.5	1	

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.

Blower Performance Data – HBH/V120 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
3000	BHP	0.75	0.81	0.86	0.91	0.97	1.03	1.09	1.15	1.21	1.27	1.34	1.41	1.47	1.54	1.61	1.67
	Sheave/Mtr	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A
	RPM	680	720	755	790	825	860	895	925	955	985	1015	1045	1070	1100	1130	1155
	Turns Open	5	4	3.5	3	2.5	1.5	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1
3100	BHP	0.82	0.88	0.94	0.99	1.04	1.10	1.17	1.26	1.33	1.40	1.46	1.53	1.59	1.66	1.72	1.80
	Sheave/Mtr	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	C
	RPM	700	735	775	805	840	875	905	940	970	1000	1025	1055	1080	1110	1135	1165
	Turns Open	4.5	4	3	2.5	2	6	5.5	4.5	4.5	3.5	3	3	2.5	2	1.5	4
3200	BHP	0.90	0.96	1.03	1.10	1.17	1.23	1.29	1.35	1.41	1.47	1.55	1.61	1.68	1.74	1.81	1.89
	Sheave/Mtr	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	C
	RPM	720	755	790	825	860	890	920	950	980	1010	1040	1065	1095	1120	1145	1175
	Turns Open	4	3.5	3	2	1.5	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1	3.5
3300	BHP	0.98	1.04	1.11	1.18	1.25	1.31	1.37	1.43	1.49	1.55	1.62	1.68	1.75	1.81	1.88	1.95
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	C
	RPM	740	770	805	840	875	905	935	965	995	1020	1050	1075	1105	1130	1155	1180
	Turns Open	4	3	2.5	2	6	5.5	5	4	4	3	2.5	2.5	2	1.5	1	3.5
3400	BHP	1.06	1.13	1.19	1.26	1.33	1.38	1.44	1.50	1.56	1.65	1.72	1.80	1.87	1.94	2.00	2.06
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	A	A	A	C	C
	RPM	755	790	820	855	890	915	945	975	1005	1035	1060	1090	1115	1140	1165	1190
	Turns Open	3.5	3	2.5	1.5	6	5	4.5	4	3.5	3	2.5	2	1.5	1	4	3
3500	BHP	1.14	1.21	1.27	1.34	1.40	1.46	1.52	1.58	1.65	1.71	1.77	1.84	1.90	1.98	2.06	2.14
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	A	A	A	C	C
	RPM	770	805	835	870	900	930	960	990	1020	1045	1070	1100	1125	1150	1175	1200
	Turns Open	3	2.5	2	6	5.5	5	4.5	3.5	3.5	3	2.5	2	1.5	1	3.5	3
3600	BHP	1.23	1.29	1.36	1.42	1.50	1.57	1.64	1.71	1.77	1.84	1.90	1.96	2.05	2.13	2.21	2.27
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	790	820	855	885	915	945	975	1005	1030	1060	1085	1110	1140	1165	1190	1210
	Turns Open	3	2.5	1.5	6	5.5	4.5	4	3.5	3	2.5	2	1.5	1.5	4	3.5	3
3700	BHP	1.32	1.38	1.44	1.51	1.58	1.65	1.73	1.81	1.88	1.96	2.03	2.10	2.18	2.26	2.34	2.42
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	810	840	870	900	930	960	990	1020	1045	1075	1100	1125	1150	1175	1200	1225
	Turns Open	2.5	2	6	5.5	5	4.5	4	3	3	2.5	2	1.5	1	3.5	3	2.5
3800	BHP	1.41	1.47	1.54	1.61	1.68	1.75	1.82	1.91	1.99	2.07	2.17	2.25	2.31	2.39	2.47	2.55
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	830	860	890	920	950	980	1005	1035	1060	1085	1115	1140	1160	1185	1210	1235
	Turns Open	2	1.5	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1	1	3.5	3	2.5
3900	BHP	1.54	1.60	1.67	1.74	1.82	1.89	1.96	2.04	2.14	2.22	2.30	2.38	2.46	2.52	2.60	2.68
	Sheave/Mtr	B	A	A	A	A	A	A	A	A	A	A	C	C	C	C	
	RPM	850	875	905	935	965	995	1020	1045	1075	1100	1125	1150	1175	1195	1220	1245
	Turns Open	2	6	5.5	5	4.5	3.5	3	2.5	2.5	2	1.5	1	3.5	3	2.5	2
4000	BHP	1.63	1.71	1.78	1.86	1.94	2.03	2.11	2.19	2.27	2.37	2.45	2.51	2.59	2.67	2.75	2.85
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	A	A	C	C	C	C	
	RPM	865	895	920	950	980	1010	1035	1060	1085	1115	1140	1160	1185	1210	1235	1260
	Turns Open	6	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1	1	3.5	3	2.5	2

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.

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Blower Performance Data – HBH/V120 Standard Unit

Table Continued from Previous Page

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
4100	BHP	1.73	1.81	1.90	1.97	2.05	2.12	2.20	2.27	2.34	2.42	2.52	2.62	2.70	2.80	2.90	
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	A	A	C	C	C	C	
	RPM	885	915	945	970	1000	1025	1055	1080	1105	1130	1155	1180	1200	1225	1250	
	Turns Open	6	5.5	4.5	4	4	3	2.5	2	2	1.5	1	3.5	3	2.5	2	
4200	BHP	1.87	1.94	2.02	2.08	2.16	2.24	2.32	2.40	2.48	2.58	2.68	2.76	2.86	2.96		
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	A	C	C	C	C		
	RPM	905	935	965	990	1020	1045	1070	1095	1120	1145	1170	1190	1215	1240		
	Turns Open	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1	3.5	3.5	3	2.5		
4300	BHP	2.00	2.07	2.16	2.23	2.31	2.41	2.49	2.57	2.66	2.74	2.84	2.94	3.02	3.15		
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	C	C	C	E	E		
	RPM	930	955	985	1010	1035	1065	1090	1115	1140	1160	1185	1210	1230	1255		
	Turns Open	5	4.5	4	3.5	3	2.5	2	1.5	1.5	4	3.5	3	2.5	2		
4400	BHP	2.14	2.22	2.32	2.40	2.48	2.56	2.65	2.74	2.82	2.92	3.00	3.10	3.18			
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	C	E	E	E			
	RPM	950	975	1005	1030	1055	1080	1110	1135	1155	1180	1200	1225	1245			
	Turns Open	4.5	4	3.5	3	3	2.5	2	1.5	1	4	3	3	2.5			
4500	BHP	2.30	2.38	2.46	2.54	2.62	2.72	2.80	2.88	3.00	3.08	3.16	3.26				
	Sheave/Mtr	A	A	A	A	A	A	A	A	D	E	E	E				
	RPM	970	995	1020	1045	1070	1100	1125	1145	1170	1195	1215	1240				
	Turns Open	4.5	4	3.5	3	2.5	2	1.5	1.5	1	3.5	3	2.5				
4600	BHP	2.39	2.45	2.54	2.63	2.72	2.83	2.92	3.00	3.10	3.18	3.28	3.38				
	Sheave/Mtr	A	A	A	A	A	A	A	D	D	E	E	E				
	RPM	980	1000	1025	1050	1075	1105	1130	1150	1175	1195	1220	1245				
	Turns Open	4	3.5	3.5	3	2.5	2	1.5	1	1	3.5	3	2.5				
4700	BHP	2.46	2.52	2.62	2.72	2.82	2.92	3.02	3.12	3.22	3.32	3.40	3.50				
	Sheave/Mtr	A	A	A	A	A	A	D	D	E	E	E	E				
	RPM	985	1005	1030	1055	1080	1105	1130	1155	1180	1205	1225	1250				
	Turns Open	4	3.5	3	2.5	2	1.5	1.5	1	4	3.5	2.5	2.5				
4800	BHP	2.57	2.64	2.74	2.84	2.94	3.04	3.14	3.24	3.32	3.42	3.52	3.60				
	Sheave/Mtr	A	A	A	A	A	D	D	D	E	E	E	E				
	RPM	990	1010	1035	1060	1085	1110	1135	1160	1180	1205	1230	1250				
	Turns Open	4	3.5	3	2.5	2	1.5	1	1	3.5	3	2.5	2				
4900	BHP	2.68	2.78	2.88	3.00	3.06	3.16	3.26	3.36	3.44	3.54	3.64	3.75				
	Sheave/Mtr	A	A	A	D	D	D	D	E	E	E	E	E				
	RPM	995	1020	1045	1070	1090	1115	1140	1165	1185	1210	1235	1255				
	Turns Open	3.5	3	3	2.5	1.5	1.5	1	4	3.5	3	2.5	2				
5000	BHP	2.82	2.92	3.00	3.10	3.20	3.28	3.38	3.48	3.56	3.66	3.74					
	Sheave/Mtr	A	A	D	D	D	D	D	E	E	E	E					
	RPM	1005	1030	1050	1075	1100	1120	1145	1170	1190	1215	1235					
	Turns Open	3.5	3	2.5	2	1.5	1	1	3.5	3	2.5	2					

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.



Blower Performance Data – HBV160 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50		
4200	BHP			0.69	0.78	0.86	0.95	1.02	1.11	1.21	1.32	1.41	1.50	1.57	1.64	1.72	1.80		
	Sheave/Mtr			B	B	B	B	A	A	A	A	A	A	A	C	C	C		
	RPM			547	594	640	685	725	765	805	845	880	915	945	975	1005	1030		
	Turns Open			5.5	4	3	1.5	6	5	4	3.5	2.5	2	1	3.5	3	2.5		
4400	BHP			0.75	0.83	0.92	1.01	1.11	1.21	1.31	1.41	1.51	1.60	1.68	1.76	1.85	1.94		
	Sheave/Mtr			B	B	B	B	A	A	A	A	A	A	A	C	C	C		
	RPM			563	609	655	695	735	775	815	855	890	925	955	985	1015	1045		
	Turns Open			5	3.5	2.5	1.5	5.5	5	4	3	2.5	1.5	1	3.5	2.5	2		
4600	BHP		0.75	0.85	0.95	1.03	1.11	1.19	1.30	1.40	1.50	1.60	1.70	1.78	1.89	2.00	2.10		
	Sheave/Mtr			B	B	B	B	B	A	A	A	A	A	C	C	C	C		
	RPM			526	573	625	665	705	745	785	825	860	895	930	960	995	1025	1050	
	Turns Open			6	4.5	3	2.5	1	5.5	4.5	3.5	3	2.5	1.5	4	3	2.5	2	
4800	BHP		0.83	0.94	1.03	1.12	1.20	1.30	1.40	1.53	1.63	1.73	1.82	1.92	2.00	2.12	2.22		
	Sheave/Mtr			B	B	B	B	A	A	A	A	A	A	C	C	C	C		
	RPM			542	594	640	680	720	760	795	835	870	905	935	970	1000	1030	1055	
	Turns Open			5.5	4	3	2	6	5	4.5	3.5	3	2	1	3.5	3	2	1.5	
5000	BHP		0.93	1.02	1.11	1.20	1.31	1.41	1.52	1.64	1.76	1.85	1.95	2.03	2.12	2.24	2.36		
	Sheave/Mtr			B	B	B	B	A	A	A	A	A	A	C	C	C	C		
	RPM			563	609	650	690	735	770	805	840	880	910	945	975	1005	1035	1065	
	Turns Open			5	3.5	2.5	1.5	5.5	5	4	3.5	2.5	2	1	3.5	3	2	1.5	
5200	BHP	0.93	1.02	1.10	1.20	1.29	1.39	1.50	1.61	1.72	1.83	1.94	2.06	2.15	2.26	2.38	2.50		
	Sheave/Mtr			B	B	B	B	A	A	A	A	A	A	C	C	C	C		
	RPM			542	583	625	665	705	745	780	815	850	885	920	955	985	1015	1045	1075
	Turns Open			5.5	4.5	3	2	1	5.5	4.5	4	3	2.5	1.5	1	3	2.5	2	1.5
5400	BHP	1.03	1.10	1.19	1.29	1.39	1.50	1.59	1.70	1.80	1.92	2.03	2.16	2.26	2.38	2.50	2.62		
	Sheave/Mtr			B	B	B	B	A	A	A	A	A	C	C	C	C	C		
	RPM			563	599	640	680	720	760	790	825	860	895	925	960	990	1020	1050	1080
	Turns Open			5	4	3	2	1	5	4.5	3.5	3	2.5	1.5	4	3	2.5	1.5	1
5600	BHP	1.12	1.19	1.28	1.39	1.50	1.61	1.72	1.84	1.93	2.06	2.17	2.29	2.40	2.54	2.69	2.83		
	Sheave/Mtr			B	B	B	A	A	A	A	A	A	C	C	C	C	C		
	RPM			583	620	655	695	735	770	805	840	870	905	935	970	1000	1030	1060	1090
	Turns Open			4.5	3.5	2.5	1.5	5.5	5	4	3.5	2.5	2	1.5	3.5	3	2	1.5	1
5800	BHP	1.17	1.28	1.39	1.49	1.60	1.70	1.81	1.90	2.02	2.14	2.28	2.40	2.52	2.67	2.81	2.96		
	Sheave/Mtr			B	B	B	A	A	A	A	A	A	C	C	C	C	C		
	RPM			588	630	670	710	750	780	815	845	880	910	945	975	1005	1035	1065	1095
	Turns Open			4	3	2	1	5.5	4.5	4	3	2.5	2	1	3.5	2.5	2	1.5	1
6000	BHP	1.25	1.40	1.51	1.61	1.73	1.84	1.94	2.05	2.18	2.30	2.42	2.54	2.67	2.79	2.94	3.08		
	Sheave/Mtr			B	B	B	A	A	A	A	A	A	C	C	C	C	E		
	RPM			604	645	685	720	760	795	825	860	895	925	955	985	1015	1040	1070	1100
	Turns Open			4	2.5	1.5	6	5	4.5	3.5	3	2	1.5	1	3	2.5	2	1.5	1
6200	BHP	1.40	1.51	1.62	1.75	1.86	1.98	2.09	2.20	2.34	2.49	2.63	2.78	2.92	3.06	3.18			
	Sheave/Mtr			B	B	B	A	A	A	A	A	A	C	C	C	E	E		
	RPM			625	660	695	735	770	805	840	875	905	935	965	995	1025	1055	1080	
	Turns Open			3.5	2.5	1.5	5.5	5	4	3.5	2.5	2	1.5	4	3	2	1.5	1	
6400	BHP	1.55	1.68	1.79	1.90	2.04	2.18	2.32	2.44	2.56	2.68	2.80	2.92	3.07	3.19	3.33			
	Sheave/Mtr			B	B	B	A	A	A	A	A	A	C	C	E	E	E		
	RPM			640	680	715	750	785	820	855	885	915	945	975	1005	1035	1060	1090	
	Turns Open			3	2	1	5	4.5	3.5	3	2.5	1.5	1	3.5	2.5	2	1.5	1	
6600	BHP	1.73	1.84	1.94	2.06	2.20	2.34	2.46	2.58	2.70	2.82	2.94	3.07	3.19	3.34	3.46			
	Sheave/Mtr			B	B	A	A	A	A	A	A	C	E	E	E	E			
	RPM			665	700	730	765	800	835	865	895	925	955	985	1015	1040	1070	1095	
	Turns Open			2.5	1.5	5.5	5	4	3.5	3	2	1.5	1	3	2.5	2	1.5	1	
6800	BHP	1.87	1.98	2.08	2.20	2.34	2.48	2.62	2.74	2.86	2.96	3.08	3.24	3.38	3.55				
	Sheave/Mtr			B	B	A	A	A	A	A	C	E	E	E	E				
	RPM			685	715	745	775	810	845	880	910	940	965	995	1025	1050	1080		
	Turns Open			2	1	5.5	4.5	4	3	2.5	2	1	4	3	2.5	2	1		
7000	BHP	2.03	2.13	2.22	2.36	2.50	2.62	2.76	2.88	3.00	3.12	3.22	3.37	3.49	3.61				
	Sheave/Mtr			B	A	A	A	A	A	D	E	E	E	E	E				
	RPM			705	730	755	790	825	855	890	920	950	980	1005	1035	1060	1085		
	Turns Open			1.5	6	5	4.5	3.5	3	2.5	1.5	1	3.5	3	2	1.5	1		

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.



Blower Performance Data – HBV192 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
4800	BHP		0.98	1.07	1.16	1.24	1.34	1.47	1.59	1.69	1.78	1.87	1.96	2.06	2.18	2.30	2.42
	Sheave/Mtr		B	B	B	B	A	A	A	A	A	A	A	C	C	C	C
	RPM		615	660	700	740	775	815	855	890	920	955	985	1015	1045	1075	1105
	Turns Open		5.5	4.5	3	2	5.5	4	3.5	3	2.5	1.5	1	5.5	5	4.5	4
5000	BHP	0.99	1.07	1.18	1.27	1.37	1.49	1.60	1.73	1.82	1.92	2.00	2.10	2.22	2.32	2.44	2.56
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	594	635	680	720	760	795	830	870	900	935	965	1000	1030	1055	1085	1115
	Turns Open	6	5	4	2.5	5.5	5	3.5	3.5	3	2	1.5	1	5	4.5	4	3.5
5200	BHP	1.09	1.18	1.28	1.36	1.48	1.59	1.70	1.82	1.93	2.02	2.14	2.24	2.36	2.48	2.60	2.72
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	620	660	700	735	775	810	845	880	915	945	980	1010	1040	1070	1100	1130
	Turns Open	5.5	4.5	3.5	2	5.5	4.5	3.5	3	2.5	2	1	5.5	5	4.5	4	3.5
5400	BHP	1.19	1.29	1.39	1.48	1.59	1.70	1.80	1.92	2.03	2.16	2.26	2.38	2.50	2.62	2.74	2.87
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	640	680	720	755	790	825	860	895	925	960	990	1020	1050	1080	1110	1140
	Turns Open	5	4	2.5	6	5	4.5	3.5	3	2.5	1.5	1	5.5	5	4	3.5	3
5600	BHP	1.30	1.40	1.51	1.62	1.74	1.85	1.95	2.08	2.18	2.31	2.42	2.57	2.71	2.86	2.98	3.12
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C	E
	RPM	660	700	740	775	810	845	875	910	940	975	1005	1035	1065	1095	1120	1150
	Turns Open	4.5	3.5	2	5.5	5	4	3	2.5	2	1.5	5.5	5	4.5	4	3.5	3
5800	BHP	1.41	1.52	1.63	1.73	1.84	1.95	2.06	2.18	2.32	2.44	2.57	2.72	2.86	3.00	3.15	3.27
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	C	C	C	E	E	E
	RPM	680	720	760	790	825	860	890	920	955	985	1015	1045	1075	1105	1135	1160
	Turns Open	4	3	6	5	4.5	3.5	3	2.5	1.5	1	5.5	5	4.5	4	3	3
6000	BHP	1.56	1.67	1.78	1.89	2.00	2.12	2.24	2.36	2.48	2.60	2.74	2.89	3.01	3.15	3.30	3.42
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	C	C	C	E	E	E	E
	RPM	700	740	775	810	845	880	910	940	970	1000	1030	1060	1085	1115	1145	1170
	Turns Open	3.5	2.5	5.5	5	4	3	2.5	2	1.5	6	5	4.5	4	3.5	3	2.5
6200	BHP	1.70	1.83	1.94	2.06	2.17	2.30	2.44	2.58	2.73	2.87	3.02	3.14	3.28	3.40	3.54	3.66
	Sheave/Mtr	B	A	A	A	A	A	A	A	A	C	E	E	E	E	E	E
	RPM	720	760	795	830	865	895	925	955	985	1015	1045	1070	1100	1125	1155	1180
	Turns Open	3	5.5	5	4.5	3.5	3	2.5	1.5	1	5.5	5	4.5	4	3.5	3	2.5
6400	BHP	1.88	2.02	2.16	2.28	2.42	2.54	2.66	2.78	2.90	3.04	3.16	3.31	3.43	3.58	3.72	3.86
	Sheave/Mtr	B	A	A	A	A	A	A	A	C	E	E	E	E	E	E	E
	RPM	745	780	815	845	880	910	940	970	1000	1030	1055	1085	1110	1140	1165	1190
	Turns Open	2.5	5	4.5	4	3.5	2.5	2	1.5	6	5	4.5	4	3.5	3	2.5	2
6600	BHP	2.06	2.18	2.32	2.46	2.58	2.70	2.82	2.94	3.07	3.19	3.34	3.46	3.60	3.74	3.88	4.02
	Sheave/Mtr	A	A	A	A	A	A	A	A	E	E	E	E	E	E	E	E
	RPM	765	795	830	865	895	925	955	985	1015	1040	1070	1095	1125	1150	1175	1200
	Turns Open	5.5	5	4.5	3.5	3	2.5	1.5	1	5.5	5	4.5	4	3.5	3	2.5	2
6800	BHP	2.22	2.36	2.50	2.62	2.74	2.86	3.00	3.10	3.27	3.41	3.58	3.72	3.85	3.97	4.11	4.23
	Sheave/Mtr	A	A	A	A	A	A	D	D	E	E	E	E	E	E	E	E
	RPM	780	815	850	880	910	940	970	1000	1030	1055	1085	1110	1135	1160	1190	1215
	Turns Open	5.5	4.5	4	3.5	2.5	2	1.5	1	5	4.5	4	3.5	3	2.5	2	2
7000	BHP	2.40	2.54	2.66	2.80	2.92	3.04	3.14	3.27	3.39	3.54	3.66	3.78	3.96	4.12	4.28	4.44
	Sheave/Mtr	A	A	A	A	A	D	D	E	E	E	E	E	E	E	E	E
	RPM	800	835	865	900	930	960	985	1015	1040	1070	1095	1120	1150	1175	1200	1225
	7000	5	4	3.5	3	2	1.5	1	5.5	5	4.5	4	3.5	3	2.5	2	1.5
7200	BHP	2.58	2.70	2.85	2.99	3.14	3.28	3.42	3.54	3.66	3.81	3.93	4.06	4.22	4.38	4.54	4.70
	Sheave/Mtr	A	A	A	A	D	D	E	E	E	E	E	E	E	E	E	E
	RPM	820	850	885	915	945	975	1005	1030	1055	1085	1110	1135	1160	1185	1210	1235
	Turns Open	4.5	4	3	3	2	1.5	5.5	5	4.5	4	3.5	3	2.5	2.5	2	1.5
7400	BHP	2.76	2.88	3.02	3.16	3.31	3.45	3.61	3.75	3.92	4.06	4.20	4.36	4.52	4.68	4.81	4.97
	Sheave/Mtr	A	A	D	D	D	D	E	E	E	E	E	E	E	E	E	E
	RPM	840	870	900	930	960	990	1020	1045	1075	1100	1125	1150	1175	1200	1220	1245
	Turns Open	4	3.5	3	2.5	1.5	1	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1.5
7600	BHP	2.94	3.07	3.22	3.36	3.50	3.63	3.82	3.98	4.14	4.34	4.50	4.66	4.78	4.94		
	Sheave/Mtr	A	D	D	D	D	E	E	E	E	E	E	E	E	E		
	RPM	860	890	920	950	980	1005	1035	1060	1085	1115	1140	1165	1185	1210		
	Turns Open	4	3	2.5	2	1	5.5	5	4.5	4	3.5	3	2.5	2	2		
7800	BHP	3.22	3.34	3.49	3.63	3.78	3.96	4.12	4.28	4.44	4.63	4.76	4.92				
	Sheave/Mtr	D	D	D	D	D	E	E	E	E	E	E	E				
	RPM	880	905	935	965	995	1025	1050	1075	1100	1130	1150	1175				
	Turns Open	3.5	3	2	1.5	1	5.5	5	4.5	4	3.5	3	2.5				
8000	BHP	3.41	3.58	3.75	3.92	4.06	4.26	4.42	4.58	4.74	4.90						
	Sheave/Mtr	D	D	D	D	E	E	E	E	E	E						
	RPM	895	925	955	985	1010	1040	1065	1090	1115	1140						
	Turns Open	3	2.5	1.5	1	5.5	5	4.5	4	3.5	3						

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.



Blower Performance Data – HBV240 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50			
6000	BHP				1.78	1.89	2.00	2.12	2.24	2.36	2.48	2.60	2.74	2.89	3.01	3.15	3.30			
	Sheave/Mtr				B	B	B	A	A	A	A	A	A	A	A	C	C			
	RPM				775	810	845	880	910	940	970	1000	1030	1060	1085	1115	1145			
	Turns Open				5.5	4.5	4	6	5	4.5	3.5	3	2.5	1.5	1	3.5	3			
6200	BHP			1.82	1.93	2.04	2.15	2.30	2.44	2.58	2.73	2.87	2.99	3.14	3.26	3.40	3.52			
	Sheave/Mtr				B	B	B	A	A	A	A	A	A	A	C	C	C			
	RPM				755	790	825	860	895	925	955	985	1015	1040	1070	1095	1125	1150		
	Turns Open				6	5	4.5	3.5	5.5	5	4	3.5	2.5	2	1.5	4	3.5	3		
6400	BHP			2.00	2.14	2.26	2.40	2.52	2.64	2.76	2.88	3.02	3.14	3.28	3.40	3.56	3.70			
	Sheave/Mtr				B	B	B	A	A	A	A	A	A	A	C	C	C			
	RPM				775	810	840	875	905	935	965	995	1025	1050	1080	1105	1135	1160		
	Turns Open				5.5	4.5	4	3	5.5	4.5	4	3	2.5	2	1	4	3	2.5		
6600	BHP		2.02	2.16	2.30	2.42	2.56	2.68	2.80	2.92	3.05	3.17	3.29	3.43	3.55	3.71	3.85			
	Sheave/Mtr				B	B	B	A	A	A	A	A	A	A	C	C	C			
	RPM				755	790	825	855	890	920	950	980	1010	1035	1060	1090	1115	1145	1170	
	Turns Open				6	5.5	4.5	3.5	6	5	4	3.5	3	2	1.5	1	3.5	3	2.5	
6800	BHP		2.18	2.32	2.46	2.58	2.70	2.84	2.94	3.06	3.21	3.35	3.52	3.66	3.82	3.94	4.06			
	Sheave/Mtr				B	B	B	A	A	A	A	A	A	C	C	C	C			
	RPM				770	805	840	870	900	935	960	990	1020	1045	1075	1100	1130	1155	1180	
	Turns Open				5.5	5	4	3	5.5	4.5	4	3	2.5	2	1	4	3.5	2.5	2	
7000	BHP	2.22	2.34	2.48	2.62	2.74	2.86	2.98	3.10	3.22	3.34	3.49	3.61	3.73	3.90	4.06	4.22			
	Sheave/Mtr				B	B	B	A	A	A	A	A	A	C	C	C	C			
	RPM				755	785	820	855	885	915	945	975	1005	1030	1060	1085	1110	1140	1165	1190
	Turns Open				6	5.5	4.5	3.5	6	5	4.5	3.5	3	2.5	1.5	1	3.5	3	2.5	2
7200	BHP	2.38	2.52	2.64	2.78	2.92	3.06	3.21	3.35	3.47	3.62	3.74	3.88	4.00	4.16	4.32	4.48			
	Sheave/Mtr				B	B	B	A	A	A	A	A	C	C	C	C	C			
	RPM				770	805	835	870	900	930	960	990	1015	1045	1070	1100	1125	1150	1175	1200
	Turns Open				5.5	5	4	3.5	5.5	4.5	4	3	2.5	2	1.5	4	3.5	3	2	1.5
7400	BHP	2.56	2.68	2.82	2.95	3.09	3.24	3.38	3.53	3.67	3.84	3.98	4.12	4.26	4.42	4.58	4.74			
	Sheave/Mtr				B	B	B	A	A	A	A	A	C	C	C	C	C			
	RPM				790	820	855	885	915	945	975	1005	1030	1060	1085	1110	1135	1160	1185	1210
	Turns Open				5	4.5	3.5	6	5	4.5	3.5	3	2.5	1.5	1	3.5	3	2.5	2	1.5
7600	BHP	2.74	2.86	2.98	3.12	3.26	3.41	3.55	3.70	3.89	4.05	4.21	4.40	4.53	4.69	4.85	5.01			
	Sheave/Mtr				B	B	B	A	A	A	A	A	C	C	C	C	E			
	RPM				810	840	870	900	930	960	990	1015	1045	1070	1095	1125	1145	1170	1195	1220
	Turns Open				4.5	4	3.5	5.5	4.5	4	3	2.5	2	1.5	4	3.5	3	2.5	2	1.5
7800	BHP	2.98	3.13	3.25	3.39	3.54	3.68	3.83	3.99	4.15	4.34	4.50	4.66	4.82	4.95	5.11	5.27			
	Sheave/Mtr				B	B	A	A	A	A	A	C	C	C	C	E	E			
	RPM				830	860	885	915	945	975	1005	1030	1055	1085	1110	1135	1160	1180	1205	1230
	Turns Open				4	3.5	6	5	4.5	3.5	3	2.5	1.5	0	3.5	3	2.5	2	1.5	1
8000	BHP	3.18	3.30	3.44	3.61	3.78	3.94	4.10	4.29	4.45	4.61	4.77	4.93	5.09	5.25	5.38	5.54			
	Sheave/Mtr				B	B	A	A	A	A	A	C	C	C	E	E	E			
	RPM				850	875	900	930	960	990	1015	1045	1070	1095	1120	1145	1170	1195	1215	1240
	Turns Open				4	3.5	5.5	4.5	4	3.5	2.5	2	1.5	4	3.5	3	2.5	2	1.5	1
8200	BHP	3.35	3.48	3.65	3.79	3.96	4.13	4.27	4.44	4.58	4.72	4.88	5.08	5.24	5.44	5.64				
	Sheave/Mtr				B	A	A	A	A	A	C	C	E	E	E	E				
	RPM				865	890	920	945	975	1005	1030	1060	1085	1110	1135	1160	1180	1205	1230	
	7000				3.5	5.5	5	4.5	3.5	3	2.5	1.5	1	3.5	3	2.5	2	1.5	1	
8400	BHP	3.62	3.74	3.89	4.03	4.18	4.33	4.49	4.65	4.81	4.97	5.16	5.36	5.56	5.72	5.92				
	Sheave/Mtr				A	A	A	A	A	C	C	E	E	E	E	E				
	RPM				880	905	935	965	995	1020	1045	1070	1095	1120	1145	1170	1195	1215	1240	
	Turns Open				6	5.5	4.5	4	3	2.5	2	1.5	4	3.5	3	2.5	2	1.5	1	

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.

Table Continued on Next Page

Blower Performance Data – HBV240 Standard Unit

Table Continued from Previous Page

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
8600	BHP	3.81	3.98	4.12	4.29	4.46	4.62	4.78	4.94	5.10	5.28	5.48	5.64	5.84	6.04	6.20	
	Sheave/Mtr	A	A	A	A	A	A	A	A	E	E	E	E	E	E	E	
	RPM	895	925	950	980	1010	1035	1060	1085	1110	1135	1160	1180	1205	1230	1250	
	Turns Open	5.5	5	4	3.5	3	2	1.5	1	3.5	3	2.5	2	1.5	1.5	1	
8800	BHP	4.06	4.22	4.41	4.57	4.73	4.92	5.08	5.24	5.40	5.60	5.76	5.96	6.16	6.32		
	Sheave/Mtr	A	A	A	A	A	A	D	E	E	E	E	E	E	E		
	RPM	915	940	970	995	1020	1050	1075	1100	1125	1150	1170	1195	1220	1240		
	Turns Open	5	4.5	3.5	3	2.5	1.5	1	4	3	3	2.5	2	1.5	1		
9000	BHP	4.38	4.54	4.70	4.86	5.02	5.18	5.34	5.50	5.68	5.88	6.08	6.24	6.44	6.60		
	Sheave/Mtr	A	A	A	A	D	D	D	E	E	E	E	E	E	E		
	RPM	935	960	985	1010	1035	1060	1085	1110	1135	1160	1185	1205	1230	1250		
	Turns Open	4.5	4	3.5	3	2	1.5	1	3.5	3	2.5	2	1.5	1	1		
9200	BHP	4.65	4.76	4.90	5.08	5.26	5.44	5.62	5.80	6.00	6.16	6.36	6.56	6.72			
	Sheave/Mtr	A	A	A	D	D	D	E	E	E	E	E	E	E			
	RPM	955	975	1000	1025	1050	1075	1100	1125	1150	1170	1195	1220	1240			
	Turns Open	4	3.5	3	2.5	1.5	1	4	3.5	2.5	2.5	2	1.5	1			
9400	BHP	4.83	4.94	5.12	5.32	5.52	5.72	5.92	6.12	6.32	6.48	6.68	6.88				
	Sheave/Mtr	A	A	D	D	D	D	E	E	E	E	E	E				
	RPM	970	990	1015	1040	1065	1090	1115	1140	1165	1185	1210	1235				
	Turns Open	3.5	3.5	2.5	2	1.5	1	3.5	3	2.5	2	1.5	1				
9600	BHP	5.10	5.24	5.44	5.64	5.84	6.04	6.24	6.40	6.60	6.80	6.96	7.16				
	Sheave/Mtr	D	D	D	D	D	E	E	E	E	E	E	E				
	RPM	985	1005	1030	1055	1080	1105	1130	1150	1175	1200	1220	1245				
	Turns Open	3.5	3	2	1.5	1	4	3.5	3	2.5	2	1.5	1				

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.



Blower Performance Data – HBV300 Standard Unit

All Data is Wet Coil

SCFM	ESP	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
7500	BHP	2.69	2.84	2.96	3.11	3.27	3.45	3.60	3.78	3.96	4.08	4.23	4.38	4.53	4.69	4.86	5.03
	Sheave/Mtr	B	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C
	RPM	890	925	955	990	1020	1050	1075	1105	1135	1155	1180	1205	1230	1255	1275	1295
	Turns Open	4.5	3.5	2.5	2	5.5	5	4.5	3.5	3	2.5	2	1.5	1	3.5	3	2.5
7800	BHP	2.87	3.04	3.18	3.36	3.54	3.72	3.87	4.05	4.20	4.35	4.50	4.65	4.80	4.97	5.14	5.30
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	A	C	C	C	C
	RPM	910	945	975	1010	1040	1070	1095	1125	1150	1175	1200	1225	1250	1270	1290	1310
	Turns Open	4	3	2	5.5	5	4.5	4	3	2.5	2.5	1.5	1	4	3	2.5	2.5
8100	BHP	3.10	3.26	3.42	3.60	3.78	3.96	4.14	4.34	4.52	4.70	4.88	5.06	5.21	5.35	5.53	5.68
	Sheave/Mtr	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C
	RPM	935	965	995	1025	1055	1085	1115	1145	1170	1195	1220	1245	1265	1285	1310	1330
	Turns Open	3.5	2.5	1.5	5.5	5	4	3.5	3	2.5	2	1.5	4	3.5	3	2.5	2
8400	BHP	3.36	3.52	3.74	3.92	4.14	4.36	4.57	4.75	4.93	5.11	5.29	5.47	5.62	5.80	5.94	6.12
	Sheave/Mtr	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	955	985	1020	1045	1075	1105	1135	1160	1185	1210	1235	1260	1280	1305	1325	1350
	Turns Open	3	2	5.5	5	4.5	3.5	3	2.5	2	1.5	1	3.5	3	2.5	2	1.5
8700	BHP	3.60	3.79	4.00	4.22	4.43	4.65	4.83	5.01	5.19	5.37	5.55	5.76	5.97	6.14	6.35	6.56
	Sheave/Mtr	B	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C
	RPM	975	1005	1035	1065	1095	1125	1150	1175	1200	1225	1250	1275	1300	1320	1345	1370
	Turns Open	2.5	6	5	4.5	4	3	3	2	1.5	1	3.5	3	2.5	2	1.5	1
9000	BHP	3.90	4.12	4.30	4.51	4.73	4.91	5.09	5.30	5.48	5.66	5.89	6.08	6.32	6.56	6.76	
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C	
	RPM	1000	1030	1055	1085	1115	1140	1165	1195	1220	1245	1270	1290	1315	1340	1360	
	Turns Open	6	5.5	4.5	4	3.5	3	2.5	1.5	1	3.5	3	2.5	2	1.5	1.5	
9300	BHP	4.34	4.56	4.74	4.96	5.14	5.35	5.53	5.71	5.89	6.08	6.29	6.50	6.67	6.88	7.05	
	Sheave/Mtr	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C	
	RPM	1020	1050	1075	1105	1130	1160	1185	1210	1235	1260	1285	1310	1330	1355	1375	
	Turns Open	5.5	5	4.5	3.5	3	2.5	2	1.5	1	3	3	2.5	2	1.5	1	
9600	BHP	4.64	4.85	5.03	5.25	5.46	5.67	5.88	6.13	6.34	6.52	6.66	6.84	7.02	7.16		
	Sheave/Mtr	A	A	A	A	A	A	A	A	C	C	C	C	C	C		
	RPM	1040	1070	1095	1125	1150	1175	1200	1230	1255	1280	1300	1325	1350	1370		
	Turns Open	5	4.5	4	3.5	3	2	1.5	1	3.5	3	2.5	2	1.5	1		
9900	BHP	4.93	5.15	5.33	5.53	5.78	5.99	6.20	6.41	6.62	6.83	7.04	7.21	7.42			
	Sheave/Mtr	A	A	A	A	A	A	A	C	C	C	C	C	C			
	RPM	1060	1090	1115	1140	1170	1195	1220	1245	1270	1295	1320	1340	1365			
	Turns Open	4.5	4	3.5	3	2.5	1.5	1.5	3.5	3	2.5	2	2	1.5			
10200	BHP	5.36	5.57	5.77	5.95	6.17	6.35	6.53	6.74	6.94	7.18	7.42	7.61				
	Sheave/Mtr	A	A	A	A	A	A	C	C	C	C	C	E				
	RPM	1085	1110	1135	1160	1190	1215	1240	1265	1285	1310	1335	1355				
	Turns Open	4	3.5	3	2.5	2	1.5	4	3	3	2.5	2	1.5				
10500	BHP	5.52	5.75	5.99	6.23	6.47	6.71	6.95	7.19	7.43	7.62	7.86	8.10				
	Sheave/Mtr	A	A	A	A	A	A	C	C	C	E	E	E				
	RPM	1100	1130	1155	1180	1205	1230	1255	1280	1305	1325	1350	1375				
	Turns Open	4	3	2.5	2	1.5	1	3.5	3	2.5	2	1.5	1				
10800	BHP	6.00	6.24	6.48	6.72	6.96	7.20	7.39	7.63	7.87	8.11	8.30					
	Sheave/Mtr	A	A	A	A	A	C	C	E	E	E	E					
	RPM	1125	1150	1175	1200	1225	1250	1270	1295	1320	1345	1365					
	7000	3.5	3	5	1.5	1	3.5	3.5	2.5	2	1.5	1.5					

A = Standard Static/Standard Motor, B = Low Static/Standard Motor, C = High Static/Standard Motor, D = Standard Static/Large Motor, E = High Static/Large Motor
 Unit factory shipped with standard static sheave and drive at 2.5 turns open. Other speed require field selection.
 For applications requiring higher static pressures, contact your local representative. Performance data does not include drive losses and is based on sea level conditions.
 Do not operate in black regions. All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.

HBH Physical Data

Model	072	096	120
Compressor Quantity	Scroll		
Number of Circuits (Compressors)	2		
Factory Charge HFC-410a (oz) [kg] per circuit	60 [1.70]	76 [2.15]	80 [2.27]
Blower Motor			
Blower Motor Quantity	1		
Standard Motor (hp) [kW]	1 [0.75]	2 [1.49]	3 [2.24]
Large Motor (hp) [kW]	2 [1.49]	3 [2.24]	5 [3.73]
Blower			
No. of Blowers	1		
Blower Wheel Size D x W (in) [cm]	12 x 12 [30.48 x 30.48]		
Water Connection Size			
FPT (in) [mm]	1-1/4" [31.8]	1-1/2" [38.1]	
Coax Volume			
Volume (US Gallons) [liters]	1.62 [6.13]	1.81 [6.85]	2.40 [9.08]
Condensate Connection Size			
FPT (in) [mm]	3/4" [19.1]		
Air Coil Data			
Air Coil Dimensions H x W (in) [cm]	20 x 54 [50.8 x 137.2]	20 x 64 [50.8 x 162.6]	
Air Coil Total Face Area (ft ²) [m ²]	7.5 [0.70]	8.9 [0.83]	
Miscellaneous Data			
Filter Standard - 1" [25.4mm] Throwaway (qty) (in) [cm]	(QTY.3) 16 x 20 [40.6 x 50.8] (QTY.1) 20 x 20 [50.8 x 50.8]		
Weight - Operating (lbs) [kg]	586 [265.8]	644 [292.1]	698 [316.6]
Weight - Packaged (lbs) [kg]	626 [283.9]	684 [310.3]	738 [334.8]

All units have grommet compressor mountings, and 1/2" & 1-3/4" electrical knockouts.

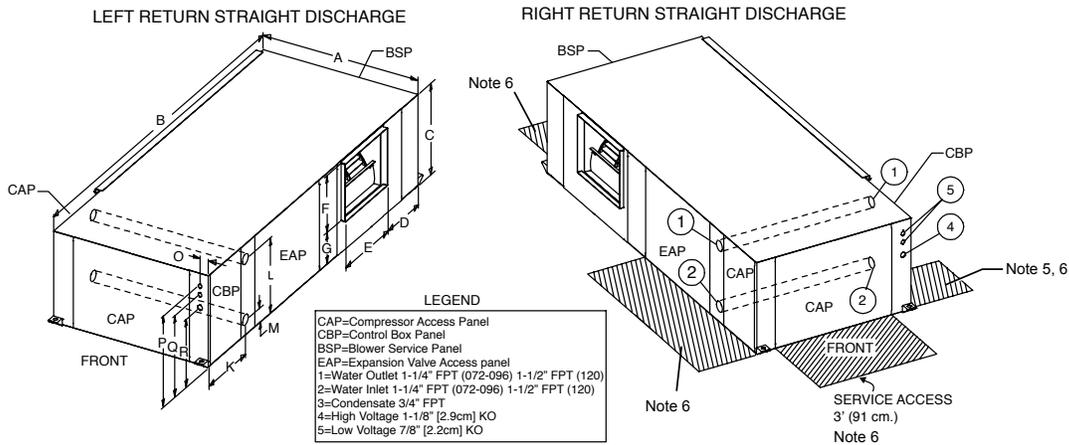
Unit Maximum Water Working Pressure	Max Pressure PSIG [kPa]
Base Unit	500 [3445]

HBH072-120 Corner Weights

	TCH072	TCH096	TCH120
Weight - Operating (lbs) [kg]	586 [265.8]	644 [292.1]	698 [316.6]
Weight - Packaged (lbs) [kg]	626 [283.9]	684 [310.3]	738 [334.8]
Weight - Corner - Control box/Compressor side (lbs) [kg]	235 [106.6]	254 [115.2]	271 [122.9]
Weight - Corner - Compressor side (lbs) [kg]	101 [45.8]	120 [54.4]	137 [62.1]
Weight - Corner - Blower side (lbs) [kg]	180 [81.6]	190 [86.2]	200 [90.7]
Weight - Corner - Air Coil side (lbs) [kg]	70 [31.8]	80 [36.3]	90 [40.8]

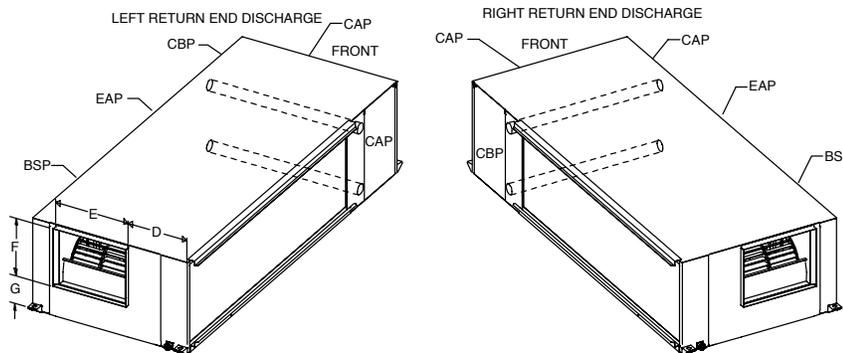
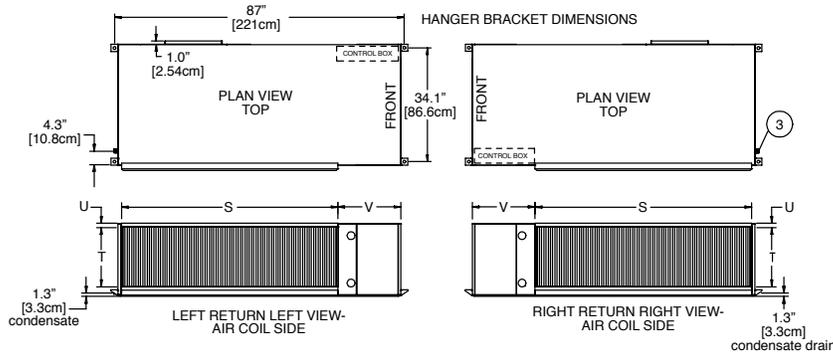
HBH072-120 Dimensional Data

ALL CONFIGURATIONS REQUIRE SERVICE ACCESS AREA DESCRIBED IN NOTES 5 AND 6.



NOTES:
- All dimensions in table are inches (cm).

- Access is required for all removable panels and installer should take care to comply with all building codes and allow adequate clearance for future field service.
- Water inlet and water outlet connections are available on either side (left or right) of the unit. Qty (2x) MPT Plugs are shipped loose in a plastic bag tied to the water leg in front of the unit. Installer must plug water inlet/outlet side not being connected to.
- Condensate drain is available on end opposite compressor.
- Electrical access is available on either side (left or right) of the front.
- Electric box is on right side. It can be field converted to left side. Conversion should only be attempted by qualified service technician. If electric box relocated to opposite side, and water connected to opposite side, then this access is not required.
- Units require 3" (9.1 cm) clearance for water connections, CAP, CSP, EAP and BSP service access.
- Overall cabinet width dimensions does not include filter rail and duct flange.



HBH072-120 Dimensional Data

Model	Overall Cabinet			Discharge Connections Duct Flange				Water Connections			Electrical Knockouts				Return Air Connections Using Return Air Opening				
	A	B	C	D	E	F	G	K	L	M	O	P	Q	R	S	T	U	V	
	Width	Depth	Height		Supply Depth	Supply Width	Supply Height		1 Water Outlet	2 Water Inlet					Return Depth	Return Height			
072-120	in.	36.3	84.9	21.6	14.0	17.0	13.5	7.8	15.0	8.3	4.0	2.0	18.8	16.8	13.8	65.0	18.0	1.0	18.9
	cm.	92.2	215.6	54.9	35.6	43.2	34.3	19.8	38.1	21.1	10.2	5.1	47.8	42.7	35.1	165.1	45.7	2.5	48.0

HBV Physical Data

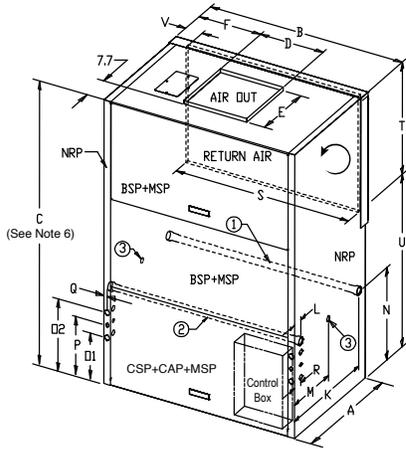
Model	072	096	120	160	192	240	300
Compressor	Scroll						
Number of Circuits (Compressors)	2						
Factory Charge HFC-410a - (oz) [kg] per circuit	60 [1.70]	76 [2.15]	80 [2.27]	112 [3.18]	136 [3.86]	196 [5.56]	224 [6.35]
Blower Motor							
Blower Motor Quantity	1						
Standard Motor (hp) [kw]	1 [.75]	1.5 [1.12]	3 [2.23]	3 [2.24]	3 [2.24]	5 [3.73]	7.5 [5.60]
Optional Large Motor (hp) [kw]	2 [1.49]	3 [2.24]	5 [3.73]	5 [3.73]	5 [3.73]	7.5 [5.59]	10 [7.46]
Blower							
No. of Blowers	1			2		3	
Blower Wheel Size D x W (in) [cm]	12 x 12 [30.48 x 30.48]						
Water Connection Size							
FPT (in) [mm]	1-1/4" [31.8]		1-1/2" [38.1]	2" [50.8]		2-1/2" [63.5]	
Coax Volume							
Volume (US Gallons) [liters]	1.62 [6.13]	1.81 [6.85]	2.40 [9.08]	3.62 [13.70]	4.83 [18.28]	4.90 [18.55]	7.39 [27.98]
Condensate Connection Size							
FPT (in) [mm]	3/4" [19.1]						
Air Coil Data							
Air Coil Dimensions H x W (in) [cm]	32 x 34 [81.28 x 86.36]	36 x 36 [91.44 x 91.44]		36 x 76 [91.44 x 193.04]			
Air Coil Total Face Area (ft ²) [m ²]	7.6 [0.71]	9.0 [0.84]		19 [1.77]			
Air Coil Tube Size (in) [cm]	3/8" [0.953]						
Air Coil Fin Spacing (fpi) [fins per cm]	14 [5.5]					12 [4.72]	
Air Coil Number of Rows	3			2	3		4
Miscellaneous Data							
Filter Standard - 1" [25.4mm] Throwaway (qty) (in) [cm]	(QTY.4) 20 x 20 [50.8 x 50.8]			(QTY.4) 20 x 25 [50.80 x 63.5]			
				(QTY.2) 20 x 30 [50.80 x 76.2]			
Weight - Operating (lbs) [kg]	586 [265.8]	644 [292.1]	698 [316.6]	1069 [484.9]	1164 [528.0]	1184 [537.1]	1297 [588.3]
Weight - Packaged (lbs) [kg]	626 [283.9]	684 [310.3]	738 [334.8]	1149 [521.2]	1244 [564.3]	1264 [573.3]	1377 [624.6]

All units have grommet compressor mountings, and 1/2" & 1-3/4" electrical knockouts.

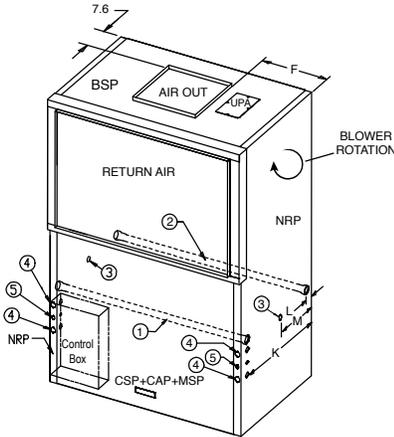
Unit Maximum Water Working Pressure	Max Pressure PSIG [kPa]
Base Unit	500 [3445]

HBV072-120 Dimensional Data

ALL CONFIGURATIONS REQUIRE SERVICE ACCESS AREA DESCRIBED IN NOTES 7, 8, 9, AND 10.



REAR RETURN TOP DISCHARGE (RR/TD)



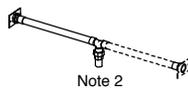
FRONT RETURN TOP DISCHARGE (FR/TD)



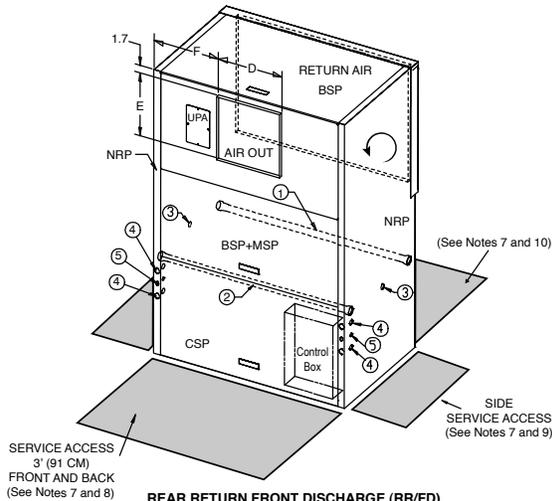
LEGEND	TCV072-096	TCV120
① Water Inlet (See Note 2)	1-1/4" FPT	1-1/2" FPT
② Water Outlet (See Note 2)	1-1/4" FPT	1-1/2" FPT
③ Condensate Drain (See Note 3)		1" FPT
④ High Voltage Access (See Note 4)	1-3/8" [3.49 CM]	
⑤ Low Voltage Access (See Note 4)	7/8" [2.2 CM]	
BSP - Blower Service Panel CAP - Control Access Panel CSP - Compressor Access Panel MSP - Motor Service Panel NRP - Non Removable Panel UPA - Upper Pulley Access		

NOTES:

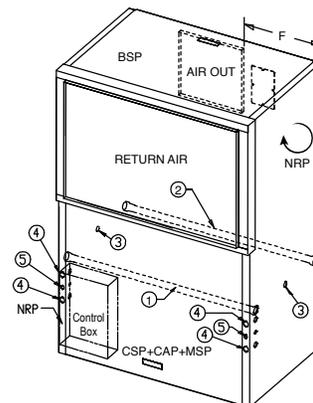
- All dimensions in table are inches (cm)
- While access to all removable panels may not be required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
- Water inlet and water outlet connections are factory shipped on the left side. Union allows field conversion to right side.
- Condensate drain is available on either side (left or right) of unit. Drain hose and drain connection will be tied inside the unit. Installer will untie the drain hose, form trap, and connect to the condensate drain hole of installer's choice.
- Electrical access is available on either side (left or right) of unit and is also available in the front on the left or right side of the unit.
- Overall width - Add 3.12" (8cm) for 1" (2.5cm) or 2" (5cm) Filter Frame; or 5.12" (13cm) for 4" (10.2cm) and for front or rear supply add additional 1.06" (2.7cm) for supply duct collar.
- Overall cabinet height dimension does not include duct flange for top discharge configuration.
- While access to all removable panels may not be required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
- Units require 3 feet (91 cm) clearance, CAP, CSP, MSP and BSP service access.
- Side service access must be 2 feet (9.4cm) on any side that connections are made.
- Filter removal is from bottom of frame, allow 2 feet (9.4cm) access for servicing.



ALL CONFIGURATIONS



REAR RETURN FRONT DISCHARGE (RR/FD)



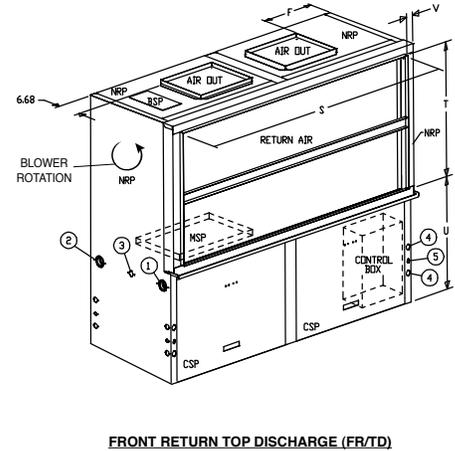
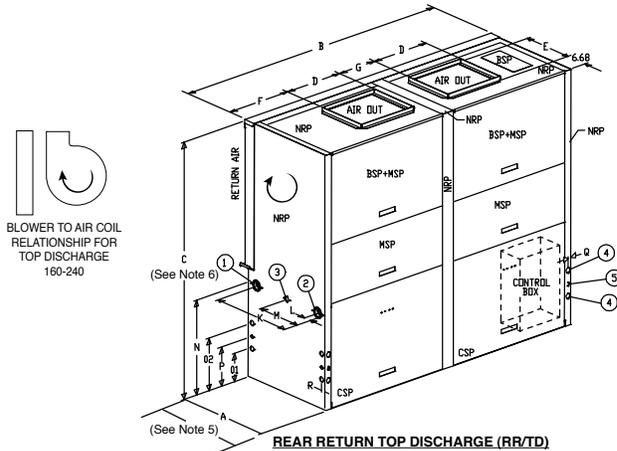
FRONT RETURN REAR DISCHARGE (FR/RD)



Model	Overall Cabinet			Discharge Connection Duct Flange			Water Connections				Electric Knockouts					Return Air Connections Using Return Air Opening			
	A	B	C	D	E	F	K	L	M	N	O1	O2	P	Q	R	S	T	U	V
	Depth	Width	Height	Supply Width	Supply Depth		Water Inlet	Water Outlet	Con- densate						Return Depth	Return Height			
072-120	in. 29.0	41.0	69.8	17.5	14.8	11.9	22.0	7.3	14.5	21.3	8.0	15.0	11.3	1.0	1.5	36.0	36.8	30.6	2.7
	cm. 73.7	104.1	177.2	44.5	37.5	30.2	55.9	18.4	36.8	54.0	20.3	38.1	28.6	2.5	3.8	91.4	93.3	77.8	6.9

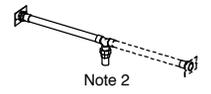
HBV160-240 Dimensional Data

ALL CONFIGURATIONS REQUIRE SERVICE ACCESS AREA DESCRIBED IN NOTES 7, 8, 9, AND 10.

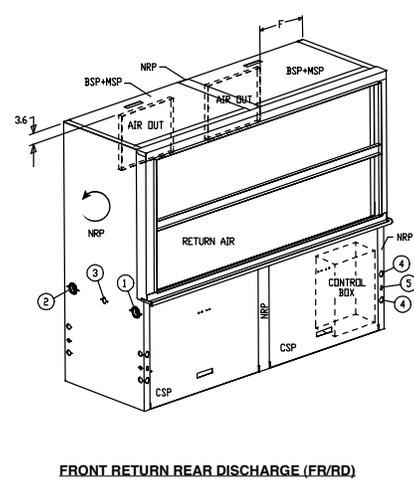
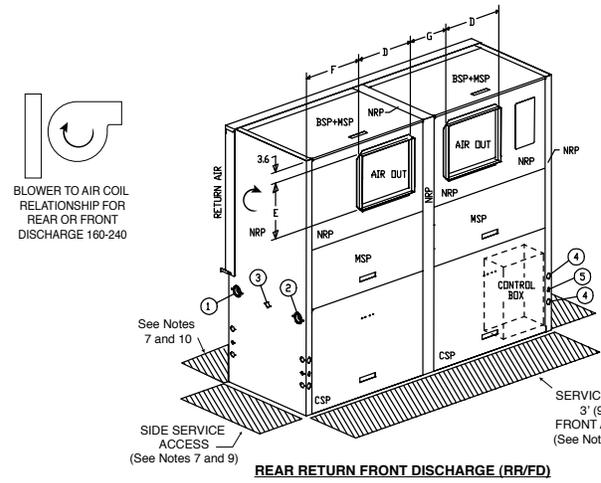


LEGEND	TCV160-240
① WATER INLET (SEE NOTE 2)	2" FPT
② WATER OUTLET (SEE NOTE 2)	2" FPT
③ CONDENSATE DRAIN (SEE NOTE 3)	1" FPT
④ HIGH VOLTAGE ACCESS (SEE NOTE 4)	1-3/8" (3.49 CM)
⑤ LOW VOLTAGE ACCESS (SEE NOTE 4)	7/8" (2.2 CM)
BSP - BLOWER SERVICE PANEL	
CAP - CONTROL ACCESS PANEL	
CSP - COMPRESSOR ACCESS PANEL	
MSP - MOTOR SERVICE PANEL	
NRP - NON REMOVABLE PANEL	

- NOTES:
- All dimensions in table are inches (cm)
 - While access to all removable panels may not be required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
 - Water inlet and water outlet connections are factory shipped on the left side. Union allows field conversion to right side.
 - Condensate drain is available on either side (left or right) of unit. Drain hose and drain connection will be tied inside the unit. Installer will untie the drain hose, form trap, and connect to the condensate drain hole of installer's choice.
 - Electrical access is available on either side (left or right) of unit and is also available in the front on the left or right side of the unit.
 - Overall width - Add 3.12" (8cm) for 1" (2.5cm) or 2" (5cm) Filter Frame; or 5.12" (13cm) for 4" (10.2cm) and for front or rear supply add additional 1.06" (2.7cm) for supply duct collar.
 - Overall cabinet height dimension does not include duct flange for top discharge configuration.
 - While access to all removable panels may not be required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
 - Units require 3 feet(91 cm) clearance, CAP, CSP, MSP and BSP service access.
 - Side service access must be 2 feet (9.4cm) on any side that connections are made.
 - Filter removal is from bottom of frame, allow 2 feet (9.4cm) access for servicing.



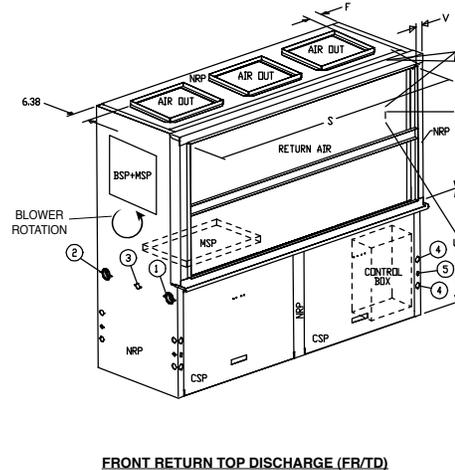
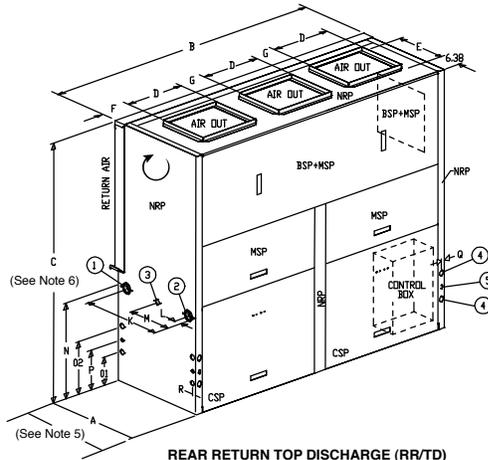
ALL CONFIGURATIONS



Model	Overall Cabinet			Discharge Connection Duct Flange				Water Connections			Electrical Knockouts					Return Air Connections Using Return Air Opening				
	A	B	C	D	E	F	G	K	L	M	O1	O2	P	Q	R	S	T	U	V	
	Depth	Width	Height	Supply Width	Supply Depth	Supply Width	Supply Depth	Water Inlet	Water Outlet	Condensate						Return Depth	Return Height			
160-	in.	29.0	82.0	69.8	17.5	14.8	17.9	11.5	26.1	3.1	14.5	8.0	15.0	11.3	1.0	1.5	77.0	35.8	31.7	2.6
240	cm.	73.7	208.3	177.2	44.5	37.5	45.4	29.3	66.3	7.9	36.8	20.3	38.1	28.6	2.5	3.8	195.6	90.8	80.5	6.7

HBV300 Dimensional Data

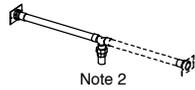
ALL CONFIGURATIONS REQUIRE SERVICE ACCESS AREA DESCRIBED IN NOTES 7, 8, 9, AND 10.



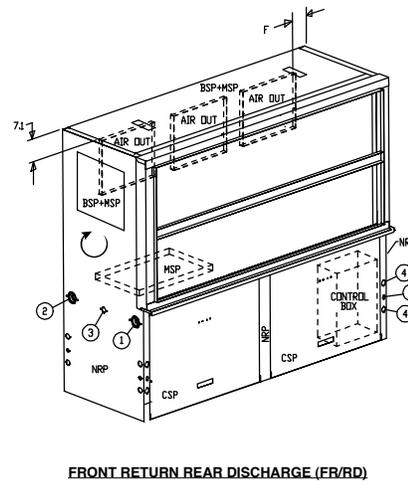
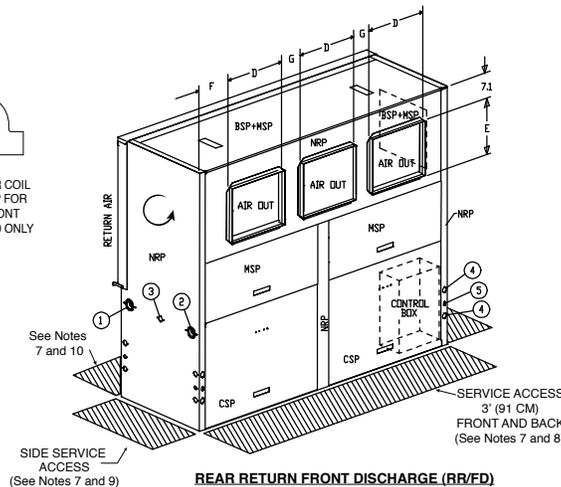
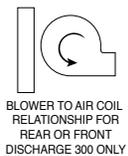
LEGEND	TCV300
① WATER INLET (SEE NOTE 2)	2-1/2" FPT
② WATER OUTLET (SEE NOTE 2)	2-1/2" FPT
③ CONDENSATE DRAIN (SEE NOTE 3)	1" FPT
④ HIGH VOLTAGE ACCESS (SEE NOTE 4)	1-3/8" [3.49 CM]
⑤ LOW VOLTAGE ACCESS (SEE NOTE 4)	7/8" [2.2 CM]
BSP - BLOWER SERVICE PANEL CAP - CONTROL ACCESS PANEL CSP - COMPRESSOR ACCESS PANEL MSP - MOTOR SERVICE PANEL NRP - NON REMOVABLE PANEL	

NOTES:

- All dimensions in table are inches (cm)
- While access to all removable panels may not be required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
- Water inlet and water outlet connections are factory shipped on the left side. Union allows field conversion to right side.
- Condensate drain is available on either side (left or right) of unit. Drain hose and drain connection will be tied inside the unit. Installer will untie the drain hose, form trap, and connect to the condensate drain hole of installer's choice.
- Electrical access is available on either side (left or right) of unit and is also available in the front on the left or right side of the unit.
- Overall width - Add 3.12" (8cm) for 1" (2.5cm) or 2" (5cm) Filter Frame; or 5.12" (13cm) for 4" (10.2cm) and for front or rear supply add additional 1.06" (2.7cm) for supply duct collar.
- Overall cabinet height dimension does not include duct flange for top discharge configuration.
- While access to all removable panels may not be required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
- Units require 3 feet (91 cm) clearance, CAP, CSP, MSP and BSP service access.
- Side service access must be 2 feet (9.4cm) on any side that connections are made.
- Filter removal is from bottom of frame, allow 2 feet (9.4cm) access for servicing.



ALL CONFIGURATIONS



Model	Overall Cabinet			Discharge Connection Duct Flange				Water Connections			Electrical Knockouts					Return Air Connections Using Return Air Opening				
	A	B	C	D	E	F	G	K	L	M	O1	O2	P	Q	R	S	T	U	V	
	Depth	Width	Height	Supply Width	Supply Depth	Supply Width	Supply Depth	Water Inlet	Water Outlet	Condensate						Return Depth	Return Height			
300	in.	29.0	82.0	69.8	17.5	14.8	6.3	8.6	25.7	3.1	14.5	8.0	15.0	11.3	1.0	1.5	77.0	35.8	31.7	2.6
	cm.	73.7	208.3	177.2	44.5	37.5	16.0	21.8	26.1	7.9	36.8	20.3	38.1	28.6	2.5	3.8	195.6	90.9	80.5	6.7

HBH/V Electrical Data – Standard

Model #	Voltage Code	Voltage	Min/Max Voltage	Blower Option	Compressor			Fan Motor FLA	Total FLA/ Rated Current	Min Circuit Amp	SCCR ka rms symmetrical	SCCR Volts Maximum	Max Fuse/ HACR
					QTY	RLA	LRA						
HBH/V072	H	208/230/60/3	197/254	A, B, C	2	10.4	73.0	3.2	24.0	26.6	N/A	N/A	35
	H	208/230/60/3	197/254	D, E	2	10.4	73.0	6.0	26.8	29.4	N/A	N/A	35
	F	460/60/3	414/506	A, B, C	2	5.8	38.0	1.6	13.2	14.7	N/A	N/A	20
	F	460/60/3	414/506	D, E	2	5.8	38.0	2.9	14.5	16.0	N/A	N/A	20
	N	575/60/3	518/633	A, B, C	2	3.8	36.5	1.2	8.8	9.8	N/A	N/A	15
	N	575/60/3	518/633	D, E	2	3.8	36.5	2.4	10.0	11.0	N/A	N/A	15
HBH/V096	H	208/230/60/3	197/254	A, B, C	2	13.7	83.1	6.0	33.4	36.8	N/A	N/A	50
	H	208/230/60/3	197/254	D, E	2	13.7	83.1	8.5	35.9	39.3	N/A	N/A	50
	F	460/60/3	414/506	A, B, C	2	6.2	41.0	2.9	15.3	16.9	N/A	N/A	20
	F	460/60/3	414/506	D, E	2	6.2	41.0	4.1	16.5	18.1	N/A	N/A	20
	N	575/60/3	518/633	A, B, C	2	4.8	33.0	2.4	12.0	13.2	N/A	N/A	15
	N	575/60/3	518/633	D, E	2	4.8	33.0	3.2	12.8	14.0	N/A	N/A	15
HBH/V120	H	208/230/60/3	197/254	A, B, C	2	15.6	110.0	8.5	39.7	43.6	N/A	N/A	50
	H	208/230/60/3	197/254	D, E	2	15.6	110.0	13.8	45.0	48.9	N/A	N/A	60
	F	460/60/3	414/506	A, B, C	2	7.8	52.0	4.1	19.7	21.7	N/A	N/A	25
	F	460/60/3	414/506	D, E	2	7.8	52.0	6.5	22.1	24.1	N/A	N/A	30
	N	575/60/3	518/633	A, B, C	2	5.8	38.9	3.2	14.8	16.3	N/A	N/A	20
	N	575/60/3	518/633	D, E	2	5.8	38.9	5.2	16.8	18.3	N/A	N/A	20
HBV160	H	208/230/60/3	197/254	A, B, C	2	23.2	164.0	8.5	54.9	60.7	5	600	80
	H	208/230/60/3	197/254	D, E	2	23.2	164.0	13.8	60.2	66.0	5	600	80
	F	460/60/3	414/506	A, B, C	2	11.2	75.0	4.1	26.5	29.3	N/A	N/A	40
	F	460/60/3	414/506	D, E	2	11.2	75.0	6.5	28.9	31.7	N/A	N/A	40
	N	575/60/3	518/633	A, B, C	2	7.9	54.0	3.2	19.0	21.0	N/A	N/A	25
	N	575/60/3	518/633	D, E	2	7.9	54.0	5.2	21.0	23.0	N/A	N/A	30
HBV192	H	208/230/60/3	197/254	A, B, C	2	25.0	164.0	8.5	58.5	64.8	5	600	80
	H	208/230/60/3	197/254	D, E	2	25.0	164.0	13.8	63.8	70.1	5	600	90
	F	460/60/3	414/506	A, B, C	2	12.2	100.0	4.1	28.5	31.6	N/A	N/A	40
	F	460/60/3	414/506	D, E	2	12.2	100.0	6.5	30.9	34.0	N/A	N/A	45
	N	575/60/3	518/633	A, B, C	2	9.0	78.0	3.2	21.2	23.5	N/A	N/A	30
	N	575/60/3	518/633	D, E	2	9.0	78.0	5.2	23.2	25.5	N/A	N/A	30
HBV240	H	208/230/60/3	197/254	A, B, C	2	30.1	225.0	13.8	74.0	81.5	5	600	110
	H	208/230/60/3	197/254	D, E	2	30.1	225.0	21.0	81.2	88.7	5	600	110
	F	460/60/3	414/506	A, B, C	2	16.7	114.0	6.5	39.9	44.1	N/A	N/A	60
	F	460/60/3	414/506	D, E	2	16.7	114.0	9.9	43.3	47.5	N/A	N/A	60
	N	575/60/3	518/633	A, B, C	2	12.2	80.0	5.2	29.6	32.7	N/A	N/A	40
	N	575/60/3	518/633	D, E	2	12.2	80.0	8.0	32.4	35.5	N/A	N/A	45
HBV300	H	208/230/60/3	197/254	A, B, C	2	48.1	245.0	21.0	117.2	129.2	5	600	150
	H	208/230/60/3	197/254	E	2	48.1	245.0	26.0	122.2	134.2	5	600	150
	F	460/60/3	414/506	A, B, C	2	18.6	125.0	9.9	47.1	51.8	5	600	70
	F	460/60/3	414/506	E	2	18.6	125.0	12.5	49.7	54.4	5	600	70
	N	575/60/3	518/633	A, B, C	2	14.7	100.0	8.0	37.4	41.1	N/A	N/A	50
	N	575/60/3	518/633	E	2	14.7	100.0	10.2	39.6	43.3	N/A	N/A	50

All fuses Class RK-5



HBH/V Electrical Data - Dual Point Power

Model #	Voltage Code	Voltage	Min/Max Voltage	Blower Option	Compressor Power Supply								Emergency Power Supply				
					QTY	RLA	LRA	Comp FLA/ Rated Current	Comp MCA	SCCR kA rmas symmetrical	SCCR Volts Maximum	Comp Max Fuse/ HACR	Fan FLA/ Rated Current	Fan MCA	SCCR kA rmas symmetrical	SCCR Volts Maximum	Fan Max Fuse/ HACR
HBH/V072	H	208/230/60/3	197/254	A, B, C	2	10.4	73.0	20.8	23.4	N/A	N/A	30	3.2	4.0	N/A	N/A	15
	H	208/230/60/3	197/254	D, E	2	10.4	73.0	20.8	23.4	N/A	N/A	30	6.0	7.5	N/A	N/A	15
	F	460/60/3	414/506	A, B, C	2	5.8	38.0	11.6	13.1	N/A	N/A	15	1.6	2.0	N/A	N/A	15
	F	460/60/3	414/506	D, E	2	5.8	38.0	11.6	13.1	N/A	N/A	15	2.9	3.6	N/A	N/A	15
	N	575/60/3	518/633	A, B, C	2	3.8	36.5	7.6	8.6	N/A	N/A	15	1.2	1.5	N/A	N/A	15
N	575/60/3	518/633	D, E	2	3.8	36.5	7.6	8.6	N/A	N/A	15	2.4	3.0	N/A	N/A	15	
HBH/V096	H	208/230/60/3	197/254	A, B, C	2	13.7	83.1	27.4	30.8	N/A	N/A	40	6.0	7.5	N/A	N/A	15
	H	208/230/60/3	197/254	D, E	2	13.7	83.1	27.4	30.8	N/A	N/A	40	8.5	10.6	N/A	N/A	15
	F	460/60/3	414/506	A, B, C	2	6.2	41.0	12.4	14.0	N/A	N/A	20	2.9	3.6	N/A	N/A	15
	F	460/60/3	414/506	D, E	2	6.2	41.0	12.4	14.0	N/A	N/A	20	4.1	5.1	N/A	N/A	15
	N	575/60/3	518/633	A, B, C	2	4.8	33.0	9.6	10.8	N/A	N/A	15	2.4	3.0	N/A	N/A	15
N	575/60/3	518/633	D, E	2	4.8	33.0	9.6	10.8	N/A	N/A	15	3.2	4.0	N/A	N/A	15	
HBH/V120	H	208/230/60/3	197/254	A, B, C	2	15.6	110.0	31.2	35.1	N/A	N/A	50	8.5	10.6	N/A	N/A	15
	H	208/230/60/3	197/254	D, E	2	15.6	110.0	31.2	35.1	N/A	N/A	50	13.8	17.3	N/A	N/A	30
	F	460/60/3	414/506	A, B, C	2	7.8	52.0	15.6	17.6	N/A	N/A	25	4.1	5.1	N/A	N/A	15
	F	460/60/3	414/506	D, E	2	7.8	52.0	15.6	17.6	N/A	N/A	25	6.5	8.1	N/A	N/A	15
	N	575/60/3	518/633	A, B, C	2	5.8	38.9	11.6	13.1	N/A	N/A	15	3.2	4.0	N/A	N/A	15
N	575/60/3	518/633	D, E	2	5.8	38.9	11.6	13.1	N/A	N/A	15	5.2	6.5	N/A	N/A	15	
HBV160	H	208/230/60/3	197/254	A, B, C	2	23.2	164.0	46.4	52.2	5	600	70	8.5	10.6	N/A	N/A	15
	H	208/230/60/3	197/254	D, E	2	23.2	164.0	46.4	52.2	5	600	70	13.8	17.3	N/A	N/A	30
	F	460/60/3	414/506	A, B, C	2	11.2	75.0	22.4	25.2	N/A	N/A	35	4.1	5.1	N/A	N/A	15
	F	460/60/3	414/506	D, E	2	11.2	75.0	22.4	25.2	N/A	N/A	35	6.5	8.1	N/A	N/A	15
	N	575/60/3	518/633	A, B, C	2	7.9	54.0	15.8	17.8	N/A	N/A	25	3.2	4.0	N/A	N/A	15
N	575/60/3	518/633	D, E	2	7.9	54.0	15.8	17.8	N/A	N/A	25	5.2	6.5	N/A	N/A	15	
HBV192	H	208/230/60/3	197/254	A, B, C	2	25.0	164.0	50.0	56.3	5	600	80	8.5	10.6	N/A	N/A	15
	H	208/230/60/3	197/254	D, E	2	25.0	164.0	50.0	56.3	5	600	80	13.8	17.3	N/A	N/A	30
	F	460/60/3	414/506	A, B, C	2	12.2	100.0	24.4	27.5	N/A	N/A	35	4.1	5.1	N/A	N/A	15
	F	460/60/3	414/506	D, E	2	12.2	100.0	24.4	27.5	N/A	N/A	35	6.5	8.1	N/A	N/A	15
	N	575/60/3	518/633	A, B, C	2	9.0	78.0	18.0	20.3	N/A	N/A	25	3.2	4.0	N/A	N/A	15
N	575/60/3	518/633	D, E	2	9.0	78.0	18.0	20.3	N/A	N/A	25	5.2	6.5	N/A	N/A	15	
HBV240	H	208/230/60/3	197/254	A, B, C	2	30.1	225.0	60.2	67.7	5	600	90	13.8	17.3	N/A	N/A	30
	H	208/230/60/3	197/254	D, E	2	30.1	225.0	60.2	67.7	5	600	90	21.0	26.3	N/A	N/A	45
	F	460/60/3	414/506	A, B, C	2	16.7	114.0	33.4	37.6	N/A	N/A	50	6.5	8.1	N/A	N/A	15
	F	460/60/3	414/506	D, E	2	16.7	114.0	33.4	37.6	N/A	N/A	50	9.9	12.4	N/A	N/A	20
	N	575/60/3	518/633	A, B, C	2	12.2	80.0	24.4	27.5	N/A	N/A	35	5.2	6.5	N/A	N/A	15
N	575/60/3	518/633	D, E	2	12.2	80.0	24.4	27.5	N/A	N/A	35	8.0	10.0	N/A	N/A	15	
HBV300	H	208/230/60/3	197/254	A, B, C	2	48.1	245.0	96.2	108.2	5	600	150	21.0	26.3	N/A	N/A	45
	H	208/230/60/3	197/254	E	2	48.1	245.0	96.2	108.2	5	600	150	26.0	32.5	N/A	N/A	50
	F	460/60/3	414/506	A, B, C	2	18.6	125.0	37.2	41.9	N/A	N/A	60	9.9	12.4	N/A	N/A	20
	F	460/60/3	414/506	E	2	18.6	125.0	37.2	41.9	N/A	N/A	60	12.5	15.6	N/A	N/A	25
	N	575/60/3	518/633	A, B, C	2	14.7	100.0	29.4	33.1	N/A	N/A	45	8.0	10.0	N/A	N/A	15
N	575/60/3	518/633	E	2	14.7	100.0	29.4	33.1	N/A	N/A	45	10.2	12.8	N/A	N/A	20	

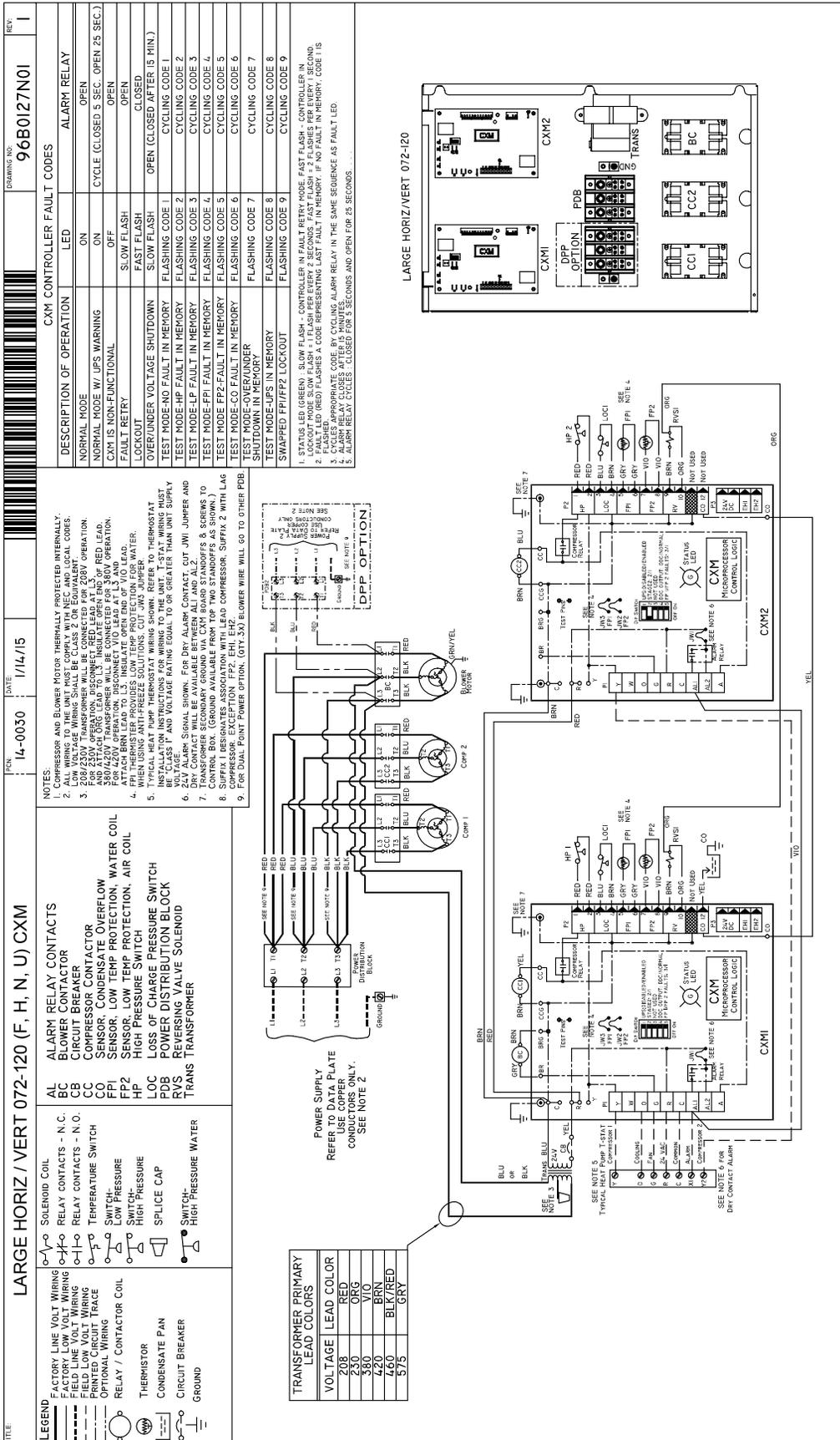
All fuses Class RK-5

HBH/V Series Wiring Diagram Matrix

Model	Wiring Diagram Part Number	Electrical	Control
HBH/V 072-300	96B0127N01	208/230/60/3 460/60/3 575/60/3	CXM
	96B0127N02		DXM
	96B0147N01		MPC
	96B0147N02		LON

All wiring diagrams available at www.heatcontroller.com.

Typical Wiring Diagram - Three Phase HBH/V072-300 with CXM Controller



Typical Wiring Diagram for MPC with CXM and DXM

TITLE LH 072-120 (F, H, N, U) CXM/DXM + MPC AUX	P.C.N. 10-0272	DATE 6/24/10	DRAWING NO. 96B0147N01	REV. B
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CXM + MPC OPTION

MPC
CXM

CONTROL BOX LAYOUT MPC OPTION

1. FACTORY CUT JWI (CXM) OR JW4 (DXM) JUMPER. DRY CONTACT WILL BE AVAILABLE BETWEEN AL1 AND AL2.

2. REFER TO MPC INSTALLATION, APPLICATION, AND OPERATION MANUAL FOR CONTROL WIRING TO THE UNIT. LOW VOLTAGE TERMINALS ARE CLASSIFIED BY VOLTAGE RATED EQUAL OR GREATER THAN UNIT SUPPLY VOLTAGE.

3. ASW SENSORS ARE NOT REQUIRED ON WATER-WATER APPLICATION. ASW06-ASW08 (DRY CONTACT SIGNAL) BETWEEN GND & SLIDE/OVR TERMINALS (WATER-AIR ONLY) MOVE JUMPER TO LSTAT. ASW09-ASW11 MOVE JUMPER TO RNET.

4. SUFFIX 1 DESIGNATES ASSOCIATION WITH LEAD COMPRESSOR. SUFFIX 2 WITH LAG COMPRESSOR. (APPLIES ONLY TO 2 COMP UNITS.) EXCEPTION: AL1, AL2, EHI, EH2, FPI & FP2.

5. CONNECT MANUAL RY CONTROL (DRY CONTACT SIGNAL) BETWEEN GND & SLIDE/OVR TERMINALS ON MPC.

DXM + MPC OPTION

MPC
DXM

CONTROL BOX LAYOUT MPC OPTION

1. FACTORY CUT JWI (CXM) OR JW4 (DXM) JUMPER. DRY CONTACT WILL BE AVAILABLE BETWEEN AL1 AND AL2.

2. REFER TO MPC INSTALLATION, APPLICATION, AND OPERATION MANUAL FOR CONTROL WIRING TO THE UNIT. LOW VOLTAGE TERMINALS ARE CLASSIFIED BY VOLTAGE RATED EQUAL OR GREATER THAN UNIT SUPPLY VOLTAGE.

3. ASW SENSORS ARE NOT REQUIRED ON WATER-WATER APPLICATION. ASW06-ASW08 (DRY CONTACT SIGNAL) BETWEEN GND & SLIDE/OVR TERMINALS (WATER-AIR ONLY) MOVE JUMPER TO LSTAT. ASW09-ASW11 MOVE JUMPER TO RNET.

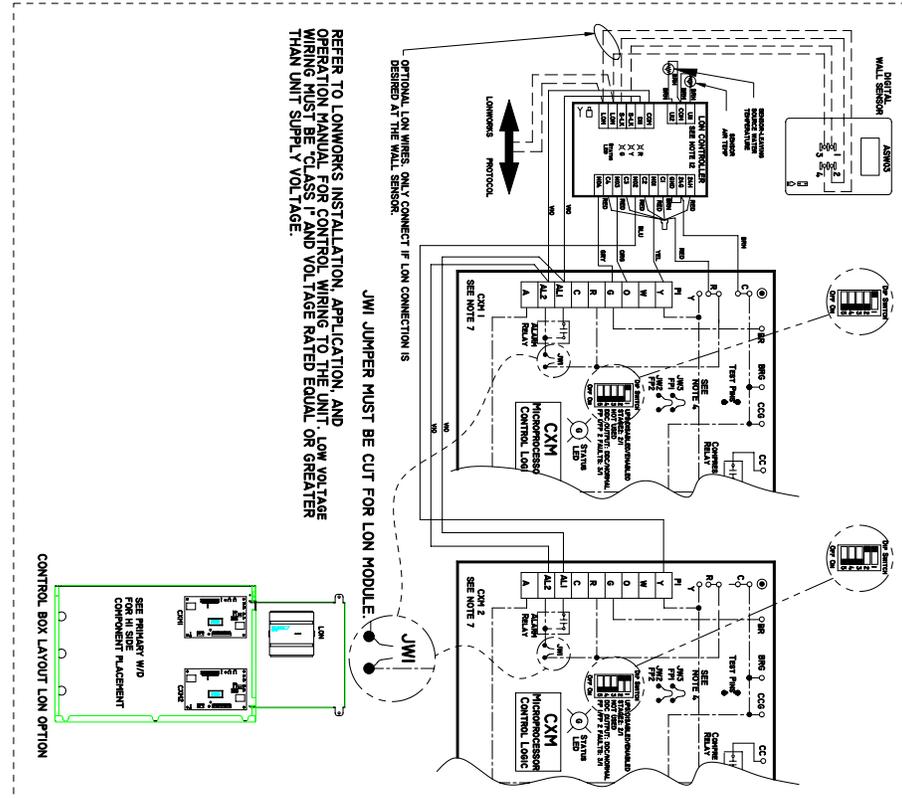
4. SUFFIX 1 DESIGNATES ASSOCIATION WITH LEAD COMPRESSOR. SUFFIX 2 WITH LAG COMPRESSOR. (APPLIES ONLY TO 2 COMP UNITS.) EXCEPTION: AL1, AL2, EHI, EH2, FPI & FP2.

5. CONNECT MANUAL RY CONTROL (DRY CONTACT SIGNAL) BETWEEN GND & SLIDE/OVR TERMINALS ON MPC.

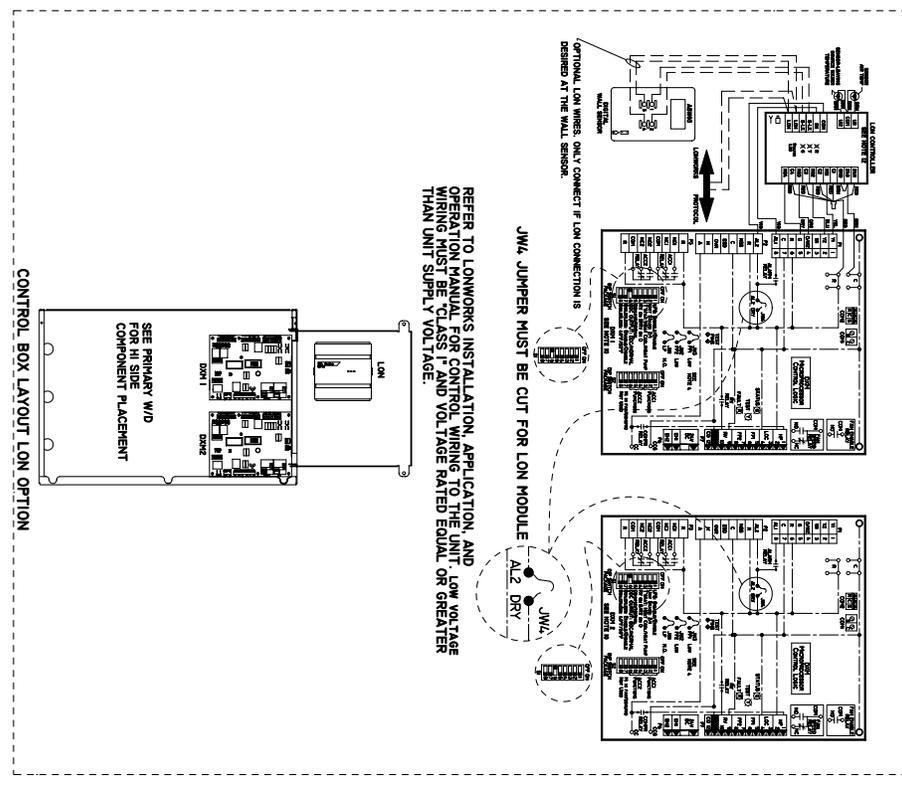
Typical Wiring Diagram – for LON with CXM and DXM

TITLE: LH 072-120 (F, H, N, U) CXM/DXM + LON AUX
 PKG: 1A-0-0313
 DATE: 6/5/14
 DRAWING NO: 96B014.7N02
 REV: B

CXM + LON OPTION



DXM + LON OPTION



Belt Drive (HBH/V) Series 60Hz Engineering Specifications – Page 1

General:

Furnish and install MARS HB Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Units shall be supplied completely factory built capable of operating over an entering water temperature range from 20° to 120°F (-6.7° to 48.9°C) as standard. Equivalent units from other manufacturers may be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated and certified in accordance with Air-Conditioning, Heating and Refrigeration Institute/International Standards Organization (AHRI/ISO 13256-1). All equipment must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the United States and CAN/CSA-C22.2 NO.236 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI/ISO and ETL-US-C labels.

All units shall be fully quality tested by factory run testing under normal operating conditions as described herein. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuation and accurately charge system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail criteria. Detailed report card will ship with each unit displaying status for critical tests and components. **Note: If unit fails on any cross check, it shall not be allowed to ship. Serial numbers will be recorded by factory and furnished to contractor on report card for ease of unit warranty status. Units tested without water flow are not acceptable.**

Basic Construction:

Horizontal units shall have one of the following air flow arrangements: Left Return/Back Discharge, Left Return/Straight Discharge, Right Return/Back Discharge, Right Return/Straight Discharge as shown on the plans. Units can be field converted without requiring new panels or belts. **Units that cannot be field converted shall not be acceptable.**

Vertical units shall have one of the following air flow arrangements: rear return/top discharge, front return/top discharge, rear return/front discharge, front return/rear discharge as shown on plans. Units can be field converted without requiring new panels or belts. **Units that cannot be field converted shall not be acceptable.**

If units with these arrangements are not used, the contractor is responsible for any extra costs incurred by other trades. All units must have a minimum of two access panels for serviceability of compressor compartment. **Units having only one access panel to compressor/heat exchangers/expansion device/refrigerant piping shall not be acceptable.**

Compressor section interior surfaces shall be lined with 1/2 inch (12.7mm) thick, 1-1/2 lb/ft³ (24 kg/m³) acoustic type glass fiber insulation. Air handling section interior surfaces shall be lined with 1/2 in (12.7mm) thick, 1-3/4 lb/ft³ (28 kg/m³) foil backed fiber insulation for ease of cleaning. Insulation placement shall be designed in a manner that will eliminate any exposed edges to prevent the introduction of glass fibers into the air stream. **Units without foil faced insulation in the air handling section will not be accepted.**

Horizontal heat pumps shall be fabricated from heavy gauge galvanized steel, with powder coat paint finish on front access panel. Color to be pewter. Both sides of the panel shall be painted for added protection.

Vertical heat pumps shall be fabricated from heavy gauge galvanized steel, with powder coat paint finish on all access panels. Color to be pewter. Both sides of the panel shall be painted for added protection.

Standard insulation must meet NFPA Fire Hazard Classification requirements 25/50 per ASTM E84, UL 723, CAN/ULC S102-M88 and NFPA 90A requirements; air erosion and mold growth limits of UL-181; stringent fungal resistance test per ASTM-C1071 and ASTM G21; and shall meet zero level bacteria growth per ASTM G22. **Unit insulation must meet these stringent requirements or unit(s) will not be accepted.**

Horizontal units to have discharge air duct collar, 1" (25.4mm) or 2"(50.8mm) filter rails with filters factory installed, and factory installed mounting brackets. Vertical units to have discharge air duct collar shipped loose, and 1"(25.4mm) 2"(50.8mm) or 4"(101.6mm) full filter frame with filters factory installed [1"(25.4mm) frame is field convertible for 2"(50.8mm) filters]. **If units with these factory installed provisions are not used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for his sub-contractor to install these provisions.**

All units must have an insulated panel separating the fan compartment from the compressor compartment. **Units with the compressor in the air stream are not acceptable.** Horizontal units shall have factory installed filter rails with filter removal from either side. Vertical units shall have factory installed full filter frame with filter removal from bottom. The contractor shall purchase one spare set of filters and replace factory shipped filters on completion of start-up. Filters shall be standard sizes. If units utilize non-standard filter sizes then the contractor shall provide 12 spare filter sets for each unit.

Cabinets shall have separate knockouts on front and sides for entrance of line voltage and low voltage control wiring. All factory-installed wiring passing through factory knockouts and openings shall be protected from sheet metal edges at openings by plastic ferrules. Supply and return water connections shall be copper FPT fittings, connections on both sides (installer to choose side and plug

Belt Drive (HBH/V) Series 60Hz Engineering Specifications – Page 2

opposite) and shall be securely mounted flush to the cabinet side allowing for connection of a flexible hose without the use of a backup wrench. **Water connections that protrude through the cabinet or require the use of a backup wrench shall not be allowed.** Water connections on only one side will not be accepted. All water connections and electrical knockouts must not interfere with the serviceability of unit. **Contractor shall be responsible for any extra costs involved in the installation of units that do not have this feature.** Contractor must ensure that units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

Option: Dual-point power.

Option: UltraQuiet package shall consist of high technology sound attenuating material that is strategically applied to the compressor and air handling compartment casings and fan scroll in addition to the standard ClimaQuiet system design, to further dampen and attenuate sound transmissions. Compressor is mounted on specially engineered sound-tested isolators.

Fan and Motor Assembly:

All units shall have belt-driven single centrifugal fan. Fan motor shall be premium duty, VFD compatible, permanently lubricated with thermal overload protection. Units supplied without permanently lubricated motors must provide external oilers for easy service. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. Airflow/Static pressure rating of the unit shall be based on a wet coil and a clean filter in place. **Ratings based on a dry coil and/or no filter, or on an ESP less than 0.25" (6.35 mm w.g.) shall NOT be acceptable.**

Option: Various blower drive packages for selectable static pressure/airflow.

Refrigerant Circuit:

All units shall contain an EarthPure® (HFC-410A) sealed refrigerant circuit including a high efficiency scroll compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, an enhanced corrugated aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger, reversing valve, coaxial (tube in tube) refrigerant to water heat exchanger, and safety controls including a high pressure switch, low pressure switch (loss of charge), water coil low temperature sensor, and air coil low temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch. **Units that cannot be reset at the thermostat shall not be acceptable.**

Hermetic compressors shall be internally sprung. The scroll compressors shall have a dual level vibration isolation system. The compressor(s) will be mounted on specially engineered sound-tested EPDM vibration isolation grommets to a large heavy gauge compressor mounting plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration attenuation. Compressor shall have thermal overload protection. Compressor shall be located in an insulated compartment isolated from air stream to minimize sound transmission.

Refrigerant to air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 625 PSIG (4309 kPa) refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 625 PSIG (4309 kPa) working refrigerant pressure and 500 PSIG (3445 kPa) working water pressure. The refrigerant to water heat exchanger shall be "electro-coated" with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all external steel and copper tubing. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93).

The unit water circuit is protected by two high pressure switches set at 300 PSI [2067 kPa]. Switches will reset automatically when pressure is reduced. **Units that do not have auto-reset water high pressure switches are not acceptable.**

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Expansion valves shall be dual port balanced type with external equalizer for optimum refrigerant metering. Units shall be designed and tested for operating ranges of entering water temperatures from 20° to 120°F (-6.7° to 48.9°C). Reversing valve shall be four-way solenoid activated refrigerant valve, which shall default to heating mode should the solenoid fail to function. If the reversing valve solenoid defaults to cooling mode, an additional low temperature thermostat must be provided to prevent over-cooling an already cold room.

Option: The unit shall be supplied with cupro-nickel coaxial water to refrigerant heat exchanger.

Option: The unit shall be supplied with extended range Insulation option, which adds closed cell insulation to internal water lines, and provides insulation on suction side refrigeration tubing including refrigerant to water heat exchanger.

Option: The refrigerant to air heat exchanger shall be coated.

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Drain Pan:

The drain pan shall be constructed of galvanized steel and have a powder coat paint application to further inhibit corrosion. This corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117. If plastic type material is used, it must be HDPE (High Density Polyethylene) to avoid thermal cycling shock stress failure over the lifetime of the unit. Drain pan shall be fully insulated. Drain outlet shall be located at pan as to allow unobstructed drainage of condensate. Drain outlet for horizontal units shall be connected from pan directly to 3/4" FPT fitting. For vertical units drain pan hose assembly can be connected to either side, drain outlet to be 1" FPT fitting. The unit as standard will be supplied with solid-state electronic condensate overflow protection. Mechanical float switches will NOT be accepted.

Option: The unit shall be supplied with stainless steel drain pan.

Electrical:

A control box shall be located within the unit compressor compartment and shall contain a 75VA transformer with load side circuit breaker protection, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Reversing valve and fan motor wiring shall be routed through this electronic controller. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 Volt and provide heating or cooling as required by the remote thermostat/sensor. Two compressor units shall have a solid-state time delay relay and random start to prevent both compressors from starting simultaneously.

Solid State Control System (CXM):

Units shall have a solid-state control system. **Units utilizing electro-mechanical control shall not be acceptable.** The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall interface with a heat pump type thermostat. The control system shall have the following features:

- a. Anti-short cycle time delay on compressor operation.
- b. Random start on power up mode.
- c. Low voltage protection.
- d. High voltage protection.
- e. Unit shutdown on high or low refrigerant pressures.
- f. Unit shutdown on low water temperature.
- g. Condensate overflow electronic protection.
- h. Option to reset unit at thermostat or disconnect.
- i. Automatic intelligent reset. Unit shall automatically reset the unit 5 minutes after trip if the fault has cleared. If a fault occurs 3 times sequentially without thermostat meeting temperature, then lockout requiring manual reset will occur.
- j. Ability to defeat time delays for servicing.
- k. Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low voltage, high voltage, low water/air temperature cut-out, condensate overflow, and control voltage status.
- l. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
- m. 24V output to cycle a motorized water valve or other device with compressor contactor.
- n. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
- o. Water coil low temperature sensing (selectable for water or anti-freeze).
- p. Air coil low temperature sensing.

NOTE: Units not providing the 8 safety protections of anti-short cycle, low voltage, high voltage, high refrigerant pressure, low pressure (loss of charge), air coil low temperature cut-out, water coil low temperature cut-out, and condensate overflow protections will not be accepted.

Option: Enhanced solid state control system (DXM)

This control system features two stage control of cooling and two stage control of heating modes for exacting temperature and dehumidification purposes.

Control shall have all of the above mentioned features of the CXM control system along with the following expanded features:

- a. Removable thermostat connector.
- b. Night setback control.
- c. Random start on return from night setback.
- d. Minimized reversing valve operation (Unit control logic shall only switch the reversing valve when cooling is demanded for the first time. The reversing valve shall be held in this position until the first call for heating, ensuring quiet operation and increased valve life.).
- e. Override temperature control with 2-hour timer for room occupant to override setback temperature at the thermostat.
- f. Dry contact night setback output for digital night setback thermostats.

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- g. Ability to work with heat pump or heat/cool (Y, W) type thermostats.
- h. Ability to work with heat pump thermostats using O or B reversing valve control.
- i. Emergency shutdown contacts.
- j. Boilerless system heat control at low loop water temperature.
- k. Ability to allow up to 3 units to be controlled by one thermostat.
- l. Relay to operate an external damper.
- m. Ability to automatically change fan speed from multistage thermostat.
- n. Relay to start system pump.
- o. 75 VA control transformer. Control transformer shall have load side short circuit and overload protection via a built in circuit breaker.

Digital Night Setback with Pump Restart (DXM w/ ATP32U03/04)

The unit will be provided with a Digital Night Setback feature using an accessory relay on the DXM controller with an ATP32U03/04 thermostat and an external, field-provided time clock. The external time clock will initiate and terminate the night setback period. The thermostat will have a night setback override feature with a programmable override time period.

An additional accessory relay on the unit DXM controller will energize the building loop pump control for the duration of the override period. **(Note: this feature requires additional low voltage wiring. Consult Application Drawings for details.)**

Remote Service Sentinel (CXM/DXM):

Solid state control system shall communicate with thermostat to display (at the thermostat) the unit status, fault status, and specific fault condition, as well as retrieve previously stored fault that caused unit shutdown. The Remote Service Sentinel allows building maintenance personnel or service personnel to diagnose unit from the wall thermostat. The control board shall provide a signal to the thermostat fault light, indicating a lockout. Upon cycling the G (fan) input 3 times within a 60 second time period, the fault light shall display the specific code as indicated by a sequence of flashes. A detailed flashing code shall be provided at the thermostat LED to display unit status and specific fault status such as over/under voltage fault, high pressure fault, low pressure fault, low water temperature fault, condensate overflow fault, etc. **Units that do not provide this remote service sentinel shall not be acceptable.**

Option: Lonworks interface system

Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a LONWORKS interface board, which is LONMark certified. This will permit all units to be daisy chained via a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

- a. Space temperature
- b. Leaving water temperature
- c. Discharge air temperature
- d. Command of space temperature setpoint
- e. Cooling status
- f. Heating status
- g. Low temperature sensor alarm
- h. Low pressure sensor alarm
- i. High pressure switch alarm
- j. Condensate sensor alarm
- k. Hi/low voltage alarm
- l. Fan "ON/AUTO" position of space thermostat as specified above
- m. Unoccupied/occupied command
- n. Cooling command
- o. Heating command
- p. Fan "ON/AUTO" command
- q. Fault reset command
- r. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Option: MPC (Multiple Protocol Control) interface system

Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a Multiple Protocol interface board. Available protocols are BACnet MS/TP, Modbus, or Johnson Controls N2. The choice of protocol shall be field selectable/changeable via the use of a simple selector switch. Protocol selection shall not require any additional programming or special external hardware or software tools. This will permit all units to be daisy chain connected by a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

- a. Space temperature
- b. Leaving water temperature

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- c. Discharge air temperature
- d. Command of space temperature setpoint
- e. Cooling status
- f. Heating status
- g. Low temperature sensor alarm
- h. Low pressure sensor alarm
- i. High pressure switch alarm
- j. Condensate overflow alarm
- k. Hi/low voltage alarm
- l. Fan “ON/AUTO” position of space thermostat as specified above
- m. Unoccupied/occupied command
- n. Cooling command
- o. Heating command
- p. Fan “ON/AUTO” command
- q. Fault reset command
- r. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Warranty:

MARS shall warranty equipment for a period of 12 months from start up or 18 months from shipping (which ever occurs first).

Option: Extended 4-year compressor warranty covers compressor for a total of 5 years.

Option: Extended 4-year refrigeration circuit warranty covers coils, reversing valve, expansion valve and compressor for a total of 5 years.

Option: Extended 4-year control board warranty covers the CXM/DXM control board for a total of 5 years.

FIELD INSTALLED OPTIONS

Hose Kits:

All units 120000 BTUH (35 kW) and below shall be connected with hoses. The hoses shall be 2 feet (61cm) long, braided stainless steel; fire rated hoses complete with adapters. Only fire rated hoses will be accepted.

Valves:

The following valves are available and will be shipped loose:

- a. Ball valve; bronze material, standard port full flow design, FPT connections.
- b. Ball valve with memory stop and PT port.
- c. “Y” strainer with blowdown valve; bronze material, FPT connections.
- d. Motorized water valve; slow acting, 24v, FPT connections.

Hose Kit Assemblies:

The following assemblies ship with the valves already assembled to the hose described:

- a. Supply and return hoses having ball valve with PT port.
- b. Supply hose having ball valve with PT port; return hose having automatic flow regulator valve with PT ports, and ball valve.
- c. Supply hose having “Y” strainer with blowdown valve, and ball valve with PT port; return hose having automatic flow regulator with PT ports, and ball valve.
- d. Supply hose having “Y” strainer with blowdown valve, and ball valve with PT port; return hose having ball valve with PT port.

Thermostats:

The thermostat shall be a MARS mechanical or electronic type thermostat as selected below with the described features:

- a. Single Stage Standard Manual Changeover (ATM11C11)
Thermostat shall be a single-stage, horizontal mount, manual changeover with HEAT-OFF-COOL system switch and fan ON-AUTO switch. Thermostat shall have a mechanical temperature set point indicator. Thermostat shall only require 4 wires for connection. Mercury bulb thermostats are not acceptable.
- b. Single Stage Digital Auto or Manual Changeover (ATA11U01)
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch and fan ON-AUTO switch. Thermostat shall have an LCD display with temperature and setpoint(s) in °F or °C. The Thermostat shall provide

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permanent memory of setpoint(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall provide temperature display offset for custom applications.

c. Multistage Digital Automatic Changeover (ATA22U01)

Thermostat shall be multi-stage (2H/2C), manual or automatic changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, setpoint(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of setpoint(s) without batteries. A fault LED shall be provided to indicate specific fault condition(s). Thermostat shall provide temperature display offset for custom applications. Thermostat shall allow unit to provide better dehumidification with optional DXM controller by automatically using lower fan speed on stage 1 cooling (higher latent cooling) as main cooling mode, and automatically shifting to high speed fan on stage 2 cooling.

d. Multistage Manual Changeover Programmable 5/2 Day (ATP21U01)

Thermostat shall be 5 day/2 day programmable (with up to 4 setpoints per day), multi-stage (2H/1C), manual changeover with HEAT-OFF-COOL-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, setpoint(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of setpoint(s) without batteries. Thermostat shall provide convenient override feature to temporarily change setpoint.

e. Multistage Automatic or Manual Changeover Programmable 7 Day (ATP32U03)

Thermostat shall be 7 day programmable (with up to 4 setpoints per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have a blue backlit dot matrix LCD display with temperature, setpoints, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24-hour clock. Fault identification shall be provided (when used with MARS CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

f. Multistage Automatic or Manual Changeover Programmable 7 Day with Humidity Control (ATP32U04)

Thermostat shall be 7 day programmable (with up to 4 setpoints per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Separate dehumidification and humidification setpoints shall be configurable for discreet outputs to a dehumidification option and/or an external humidifier. Installer configuration mode shall allow thermostat dehumidification mode to operate with ECM fan dehumidification mode via settings changes. Thermostat shall have a blue backlit dot matrix LCD display with temperature, relative humidity, setpoints, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with MARS CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

DDC Sensors:

MARS wall mounted DDC sensor to monitor room temperature and interfaces with optional interface system described above. Several types as described below:

- a. Sensor only with no display (LON and MPC).
- b. Sensor with override (LON only).
- c. Sensor with setpoint adjustment and override (MPC only).
- d. Sensor with setpoint adjustment and override, LCD display, status/fault indication (LON and MPC).

Revision History

Date:	Item:	Action:
02/10/15	Physical Data Table	Updated Filter Sizes
09/30/14	Physical Data Table - Large Motor; Text Edit - Page 44	Added/Updated
05/05/14	Physical Data Table - Page 29 & 31, Engineering Specifications - Page 44	Updated
03/24/14	Dimensional Data Table - Page 33 & 34	Corrected Depth, Width designation
02/07/14	Dimensional Data Table - Page 30	Corrected Depth, Width designation
09/30/13	Edit Text - Page 44	Updated
09/18/13	Updated Electrical Tables - Pages 35 & 36	Updated
02/06/13	Engineering Specifications	Updated
11/28/12	HBV 072-120 Dimensional Data	Updated
06/12/12	Engineering Specifications	Updated
04/26/12	Engineering Specifications	Updated
04/17/12	HBV Physical Data	Updated
04/13/12	All Pages	Added HBV sizes 160-300
04/02/12	Engineering Specifications	Updated
02/16/12	Dimensional Data Engineering Specifications	Updated
02/09/12	HB Physical Data Table	Updated
10/07/11	Dimensional Data Physical Data Table	Corrected S/R and drain diameters Corrected TCV drain diameter
08/09/11	Unit Maximum Working Water Pressure	Updated to Reflect New Safeties
08/03/11	Engineering Specifications	Added Digital Night Setback with Pump Restart (DXM w/ ATP32U03/04)
06/29/11	All Pages	Added HBV072-120
06/09/11	Engineering Specifications	Updated
04/07/11	Engineering Specification NOTICE	Updated
02/11/11	Performance Data Selection Notes	Updated
01/03/11	Format - All Pages	Updated
10/15/10	S-I Performance Data Table	Updated
10/15/10	Physical Data Table	Updated
09/14/10	Unit Features	Added
07/29/10	Dimensional Data	Updated
07/26/10	Wiring Diagrams	Updated
07/26/10	Compressor Mounting Information and Graphics Engineering Specifications	Updated to Reflect Spring/Grommet Change
06/11/10	Format - All Pages	Updated
06/11/10	Engineering Specifications	Updated
06/11/10	Wiring Diagrams	Updated All
10/15/09	Created	

Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.



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