HEAT CONTROLLER, INC.

ENGINEERING DESIGN GUIDE

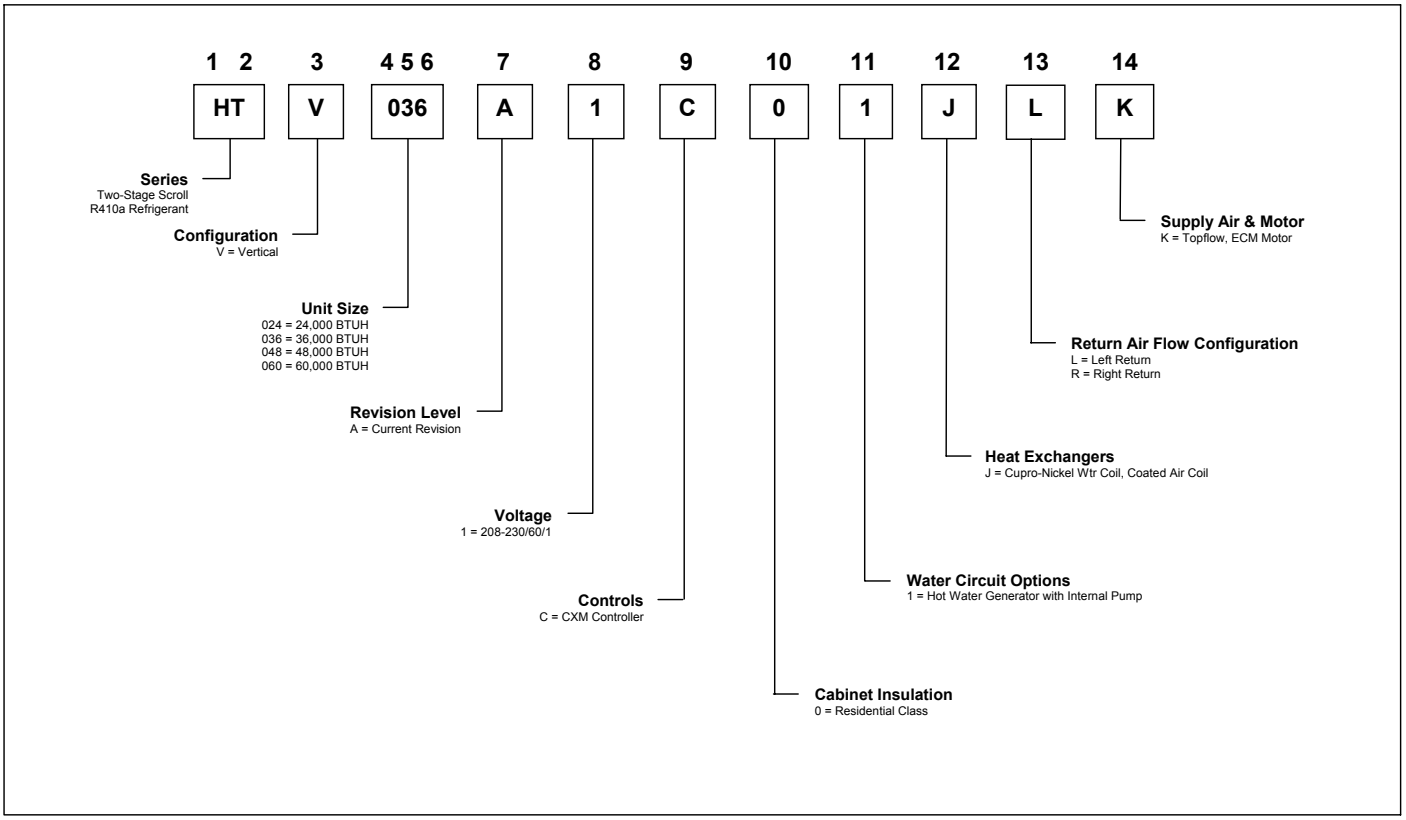
HT Series
GeoMax2
Two-Stage
Geothermal Heat Pumps
2 to 5 Tons

1900 Wellworth Ave., Jackson, Michigan 49203 • Ph. 517-787-2100 • Fax 517-787-9341 • www.heatcontroller.com

THE QUALITY LEADER IN CONDITIONING AIR

Model Breakdown

MODEL NOMENCLATURE – TWO STAGE GEOTHERMAL HEAT PUMP



What's the New GeoMax 2 system from Heat Controller?

The GeoMax 2 Geothermal Heat Pumps are some of the most efficient and innovative geothermal units on the market today! Packed with features, they offer the best value to the homeowner who is interested in quiet comfort and low operating costs as a result of almost unbelievable operating efficiencies.

Technically, they are state-of-the-art with digital electronic controls, multi-stage scroll compressors, computer controlled fan motors, zero ozone depleting refrigerant, and much, much more.

Design Features

- Four capacities to meet all application requirements–two, three, four, and five ton models
- Efficient operation from 20˚ F to 120˚ F entering water temperatures. Flow rates may be as low as 1.5 gpm/ton.
- Top suppy air discharge for upfow applications.
- Left or right hand return air positions for all models. Vertical cabinets include a deluxe filter rack/duct collar.
- Variable speed ECM2 blower motor adjusts to multiple duct system applications and provides soft start for added comfort and quiet operation.
- Narrow cabinet design for easy movement through doorways.
- Internally trapped condensate piping for easy, compact installations.
- Internal electric heat unit (optional) designed for easy field installation.
- Electrical box located at corner for easy field wiring from two sides.
- Loop pump power block with circuit breaker.
- Coax freeze protection is field selectable for well or closed loop installations.
- Air coil freeze protection using high accuracy thermistors.
- Coaxial heat exchanger, refrigerant suction lines, hot water generator coil, and all water pipes are fully insulated to reduce condensation in low temperature conditions.
- Isolation mounted compressors and low RPM blowers are used to reduce noise. Compressor compartment and interior cabinet is insulated with 1/2" coated glass fiber.
- Double isolated compressor for extra quiet operation.
- Safety features include: high pressure and loss of charge to protect the coompressor; condensate overflow protection; freeze protection sensors to safeguard the coaxial heat exchanger and air coil; hot water high-limit hot water generator pump shutdown; fault lockout enables emergency heat and prevents comopressor operation until thermostat or circuit breaker has been reset.

Operating Efficiencies

- Top of the industry ARI/ASHRAE/ISO 13256-I ratings for heating COP's, cooling EER's.
- Hot water generator (HWG) with internal pump generates hot water at dramatic savings while improving system performance.
- High efficiency scroll compressors for quiet, reliable operation.
- Oversized coaxial tube water-to-refrigerant heat exchanger for high efficiency and extra heating capacity. Convoluted (cupro nickel) water tube fuctions efficiently at low flow rates and provides resistance to freeze-damage.
- Oversized rifled copper tube/lanced aluminum fin air-to-refrigerant heat exchanger offers high efficiencies at low air velocity.
- Large, low RPM blower is both quiet and efficient and provides high static capability.

Service Advantages

- Three removable access panels for the compressor compartment and one or two for the air handler compartment offer quick access to all internal components even with ductwork in place making the unit service friendly!
- Bi-directional thermal expansion valve.
- Brass, swivel-water connections for easy connections of loop and hot water piping.
- Insulated divider and separate air handling/compressor access panels allow service testing without air bypass.
- Designed for in-place service in tight installations spaces.
- CXM control features LED status light with memory feature for easy diagnostics.
- Control box and fan motors have quick-attach wiring connections for fast removal.
- Factory installed biflow liquid line filter drier.
- 75 VA control transformer with circuit breaker.
- Internal drop-out blower assembly for easy servicing.
- High and low pressure service ports in refrigerant circuit.
- E-Coated refrigerant-to-air coil helps protect the coil from corrosion and extends life expectancy.

Factory Quality

- All units are built using our state of the art manufacturing system that is designed to assure quality of the highest standards
  Our system:
  -Verifies that the correct components are being assembled.
  -Automatically performs special leak tests on all joints.
  -Conducts pressure tests.
  -Performs highly detailed run test.
  -Automatically won't allow a "failed" unit to be packaged for shipment.
  -Creates computer database of run test for future service analysis and diagnostics.
- Heavy-gauge steel cabinets are painted with durable epoxy for a long-lasting finish.
- All refrigerant brazing is performed in a nitrogen-rich environment.
- Units are deep evacuated to less than 50 microns prior to refrigerant charging.
- All joints are halogen leak-tested to ensure leak rate of less than 1/4 ounce per year.

Options & Accessories

- Optional internal auxiliary electric heat.
- Electronic auto-changeover thermostats with indicator LED's.
- Closed loop flow controller and hose kits

What's New

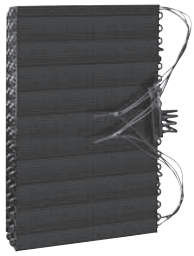
R-410A Refrigerant

R-410A is a non-chlorine based, HFC-410A, refrigerant with zero ozone depletion and low global warming potential. It is seen as the future all refrigerants used worldwide.

R-410 characteristics are:

- Near azeotropic mixture of 50% R-32 and 50% R-125.
- Virtually no glide.
- 50-60% higher operating pressures than R-22.
- Although a binary blend the two components have the same leak rate. As a result refrigerant can be added, if necessary, without recovering the charge.

Electro deposition-Coated Air Coil



All HT series models feature an e-coated air-coil. This Electro-deposition process will provide years of protection against corrosion from airborne chemicals resulting from modern building material out gassing and most environmental chemicals found in the air. Modern building materials such as counter-tops, floor coverings, paints and other materials can "outgas" chemicals into the home's air. Some of these chemicals are suspected of contributing to corrosion in the air coils found in both traditional and geothermal heating and cooling equipment. Corrosion often results in refrigerant leaks and eventual failure of the air coil costing hundreds of dollars

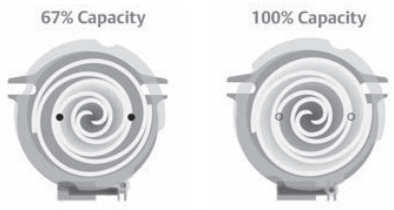
Copeland Scroll Compressor

Achieve a greater level of comfort. The Copeland Scroll UltraTech™ provides superior comfort to fixed-capacity compressors by incorporating a revolutionary two-step design. With a unique 67% part-load capacity step, systems with UltraTech™ maintain precise temperature levels and lower relative humidity. This eliminates uneven peaks and valleys and allows for steady cooling comfort. Homeowners now have a better, more efficient way to power their heating and cooling system, raising their level of comfort, while lowering energy bills. So when your customers need a new heating and cooling system, make sure it has the best technology inside – the Copeland Scroll UltraTech™ compressor.

Save with superior efficiency. Over 40% of summer utility bills can come from the air conditioner compressor operation. A system with the Copeland Scroll UltraTech™ compressor delivers higher efficiency than any other single compressor system. In fact, systems with UltraTech™ provide up to 60% greater energy efficiency as compared to 13-SEER systems – which can save homeowners hundreds of dollars a year in energy costs.

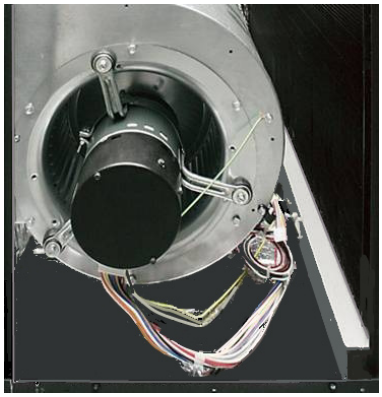
Take it easy with quieter control. Copeland Scroll UltraTech™ is remarkably quiet at both full- and part-load capacity. It is up to four times quieter than a reciprocating compressor. Homeowners can enjoy its superior efficiency and comfort without having to hear the operation.

Learn the beauty of the design. With Copeland Scroll UltraTech™, two internal bypass ports enable the system to run at 67% part-load capacity for better efficiency and humidity control. Based on demand, the modulation ring is activated, sealing the bypass ports and instantly shifting capacity to 100%. Take advantage of "shift on the fly" stage changing (no stopping and starting required like other two-stage compressors).



While Copeland Scroll Ultra Tech™ builds on established scroll technology, it is still a scroll at heart, which means it operates with fewer moving parts and result in unsurpassed reliability and virtually silent operation.

1. Copeland UltraTech Two-Stage Scroll Compressor
2. Latest Technology-Electronically commutated, Programmable, Variable Speed Blower Motor
3. Electro deposition coated air coil
4. Fully Insulated Blower Section, with Fully Insulated Compressor Section
5. Integrated Filter Rack with Return Air Duct Connection
6. Sloped Stainless Steel Drain Pan with Condensate Overflow Sensor
7. Unit Performance Sentinel: Automatic Alert System Lets Homeowner Know If The System Is Not Running At Peak Performance*
8. Double Spring And Grommet Compressor Isolation For Ultra Quiet Operation
9. Five Easily Removable Service Access Panels



*When installed with a thermostat that has a fault LED

HT Series Ratings

ARI/ASHRAE/ISO 13256-1

at EWT (Entering Water Temperature)

Model	Capacity Modulation	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
HTV024	Full	25,250	14.7	30,700	4.9	28,800	22.7	25,550	4.4	26,550	17.1	19,750	3.7
	Part	19,350	16.9	22,300	5.6	22,100	28.5	18,450	4.7	21,250	24.1	16,450	4.3
HTV036	Full	36,150	14.4	44,700	4.9	41,100	21.3	36,550	4.3	38,150	16.9	28,950	3.7
	Part	26,150	17.2	30,700	5.9	30,100	29.1	24,650	4.8	28,850	25.0	22,050	4.2
HTV048	Full	48,350	14.5	59,800	4.8	54,500	20.9	48,150	4.3	50,550	16.6	37,450	3.7
	Part	36,050	16.6	44,200	5.7	40,600	26.5	35,250	4.7	39,550	23.0	31,150	4.2
HTV060	Full	61,450	13.9	72,200	4.6	68,500	20.3	59,450	4.1	64,750	16.2	47,950	3.6
	Part	44,850	16.3	51,000	5.2	51,800	27.5	41,650	4.4	49,750	23.4	37,450	4.0

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 HT ratings based upon 208V operation

HT Electrical Data

Model	Rated Voltage	Voltage Min/Max	Compressor			HWG Pump FLA	Ext Loop FLA	Fan Motor FLA	Total Unit FLA	Min Circ Amp	Max. Fuse Size *
			RLA	LRA	Qty						
024	208-230/60/1	197/254	10.3	53.6	1	0.4	4.0	4.3	19.0	21.6	30
036	208-230/60/1	197/254	16.7	84.5	1	0.4	4.0	4.3	25.4	29.6	45
048	208-230/60/1	197/254	21.2	98.9	1	0.4	4.0	7.0	32.6	37.9	50
060	208-230/60/1	197/254	25.6	121.5	1	0.4	4.0	7.0	37.0	43.4	60

*HACR circuit breaker in USA only - All fuses Class RK-5

HT Physical Data

Model	HTV024	HTV036	HTV048	HTV060
Compressor (1 Each)	Two-Stage Scroll			
Factory Charge R410a, oz	58	78	81	144
ECM Fan Motor & Blower Wheel				
Fan Motor Type & Speeds	ECM Variable Speed			
Fan Motor, hp	1/2	1/2	1	1
Blower Wheel Size (Dia x W), in	9 x 7	11 x 10	11 x 10	11 x 10
Water Connection Size				
Swivel	1”	1”	1”	1”
HWG Water Connection Size				
Swivel	1”	1”	1”	1”
Air Coil Dimensions (H x W), in	28 x 20	28 x 25	32 x 25	36 x 25
Standard Filter - 1” Fiberglass Throwaway, in	24 x 24	2 - 14 x 30	2-10x30/1-12x30	3 - 12 x 30
Weight - Operating, lbs	266	327	416	443
Weight - Packaged, lbs	276	337	426	453

Dimensions

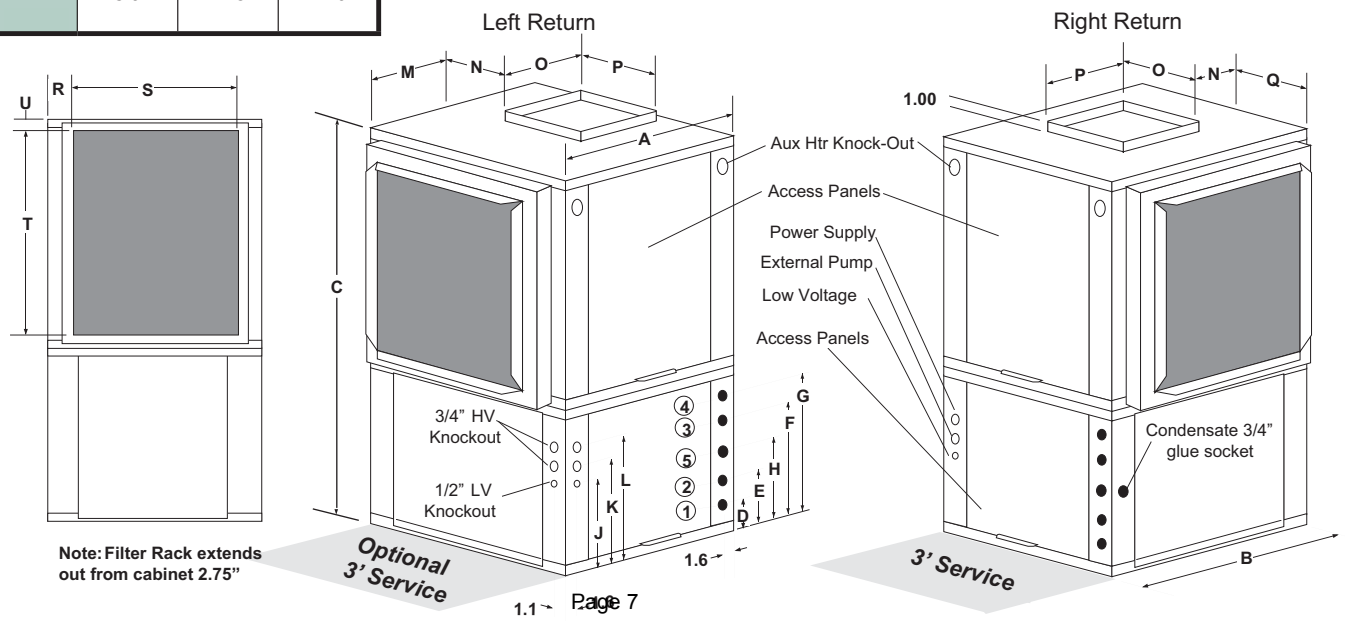
Vertical Upflow Model		Discharge Connection Duct Flange Installed (+/- 0.10 in) M Left Return	N	O Supply Width	P Supply Depth	Q Right Return	Return Connection (+/- 0.10 in) R	S Return Depth	T Return Height	U
HTV024	in	7.2	5.8	14.0	14.0	4.3	1.8	22.3	26.2	1.6
HTV036	in	6.2	6.3	18.0	18.0	5.1	1.5	27.8	26.2	1.5
HTV048	in	6.2	6.3	18.0	18.0	5.1	1.5	27.8	30.2	1.5
HTV060	in	6.2	6.3	18.0	18.0	5.1	1.5	27.8	34.2	1.5

Vertical Upflow Model		Water Connections 1 D In	2 E Out	3 F HWG IN	4 G HWG Out	5 H Condensate	Loop Water IPT	HWG IPT
HTV024	in	2.4	5.4	13.9	16.9	9.8	1" Swivel	1" Swivel
HTV036	in	2.4	5.4	15.9	18.9	10.8	1" Swivel	1" Swivel
HTV048	in	2.4	5.4	15.9	18.9	10.8	1" Swivel	1" Swivel
HTV060	in	2.4	5.4	15.9	18.9	10.8	1" Swivel	1" Swivel

Vertical Upflow Model		Overall Cabinet A Width	B Depth	C Height
HTV024	in	22.4	25.6	48.4
HTV036	in	25.4	30.6	50.4
HTV048	in	25.4	30.6	54.4
HTV060	in	25.4	30.6	58.4

Vertical Upflow Model		Electrical Knockouts J 1/2" Low Voltage	K 1/2" External Pump	L 3/4" Power Supply
HTV024	in	6.0	9.5	12.0
HTV036	in	8.0	11.5	14.0
HTV048	in	8.0	11.5	14.0
HTV060	in	8.0	11.5	14.0

Condensate is 3/4" PVC female glue socket and is switchable from front to side
Unit shipped with deluxe duct collar/filter rack extending from unit approximately 3" and is suitable for duct connection.
Discharge flange is field installed.



PERFORMANCE DATA
HTV024 Part Load

Performance capacities shown in thousands of Btuh.

560 CFM Rated Airflow

		WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
EWT °F	GPM	PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	7.0	4.5	10.3	Operation Not Recommended							11.4	1.06	7.8	88.8	3.14	1.9
30	3.5	1.2	2.8	21.6	13.5	0.62	0.57	23.6	37.8	-	13.3	1.10	9.6	92.1	3.54	2.0
	5.8	2.8	6.5	21.9	13.5	0.62	0.56	23.8	38.7	-	13.9	1.11	10.2	93.0	3.69	2.0
	7.0	4.1	9.4	21.9	13.5	0.62	0.56	23.8	39.3	-	14.1	1.11	10.3	93.3	3.74	1.9
40	3.5	1.1	2.5	22.4	14.5	0.65	0.64	24.6	34.8	-	15.7	1.17	11.8	96.0	3.95	2.0
	5.8	2.6	5.9	22.6	14.6	0.65	0.60	24.6	37.4	-	16.4	1.17	12.4	97.1	4.11	2.0
	7.0	3.6	8.4	22.6	14.6	0.64	0.60	24.7	37.8	-	16.6	1.17	12.6	97.4	4.16	2.0
50	3.5	1.0	2.3	22.2	14.9	0.67	0.73	24.7	30.3	0.7	17.9	1.19	13.9	99.7	4.41	2.1
	5.8	2.4	5.5	22.4	14.9	0.67	0.68	24.7	33.0	0.6	18.7	1.19	14.6	100.9	4.58	2.1
	7.0	3.4	7.9	22.5	14.9	0.67	0.67	24.7	33.7	0.6	18.9	1.20	14.8	101.2	4.63	2.0
60	3.5	1.0	2.2	21.4	14.8	0.69	0.84	24.2	25.6	1.1	20.0	1.23	15.8	103.1	4.77	2.2
	5.8	2.2	5.1	21.9	15.0	0.68	0.78	24.5	28.2	1.0	20.8	1.23	16.6	104.4	4.94	2.2
	7.0	3.2	7.4	22.0	15.0	0.68	0.76	24.6	29.0	0.9	21.0	1.24	16.8	104.8	4.99	2.1
70	3.5	0.9	2.1	20.2	14.3	0.71	0.96	23.5	21.1	1.4	22.0	1.24	17.7	106.3	5.18	2.3
	5.8	2.1	4.8	20.9	14.6	0.70	0.89	23.9	23.5	1.3	22.8	1.25	18.5	107.7	5.35	2.3
	7.0	3.0	7.0	21.1	14.7	0.70	0.87	24.0	24.2	1.2	23.1	1.25	18.8	108.1	5.39	2.3
80	3.5	0.8	1.9	18.9	13.7	0.73	1.09	22.6	17.3	1.8	23.9	1.26	19.6	109.5	5.55	2.4
	5.8	2.0	4.5	19.6	14.0	0.72	1.02	23.1	19.2	1.6	24.8	1.27	20.5	111.0	5.71	2.4
	7.0	2.8	6.5	19.8	14.1	0.71	1.00	23.2	19.8	1.5	25.1	1.27	20.7	111.4	5.76	2.4
90	3.5	0.8	1.8	17.6	13.2	0.75	1.24	21.8	14.3	2.2	25.8	1.28	21.4	112.6	5.88	2.6
	5.8	1.9	4.3	18.1	13.4	0.74	1.17	22.1	15.6	1.9	26.8	1.30	22.3	114.3	6.05	2.6
	7.0	2.7	6.2	18.4	13.5	0.73	1.14	22.3	16.1	1.8	27.1	1.30	22.6	114.8	6.10	2.5
100	3.5	0.8	1.8	16.2	12.5	0.78	1.40	20.9	11.6	2.4	Operation Not Recommended					
	5.8	1.8	4.1	16.7	12.7	0.76	1.33	21.2	12.6	2.2						
	7.0	2.6	6.0	16.9	12.8	0.76	1.31	21.3	12.9	2.0						
110	3.5	0.7	1.7	15.1	12.3	0.81	1.57	20.5	9.6	2.7						
	5.8	1.7	4.0	15.4	12.2	0.79	1.51	20.6	10.2	2.5						
	7.0	2.5	5.7	15.6	12.3	0.79	1.49	20.6	10.5	2.2						
120	3.5	0.7	1.6	14.2	12.2	0.86	1.82	20.4	7.8	3.0						
	5.8	1.7	3.9	14.5	12.1	0.84	1.71	20.3	8.4	2.7						
	7.0	2.4	5.5	14.6	12.1	0.83	1.69	20.3	8.6	2.4						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV024 Full Load

Performance capacities shown in thousands of Btuh.

800 CFM Rated Airflow

		WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
EWT °F	GPM	PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	8.0	5.6	10.3	Operation Not Recommended							15.0	1.47	10.0	87.4	3.00	2.4
30	4.0	1.5	2.8	30.6	19.6	0.64	1.02	34.1	30.1	-	17.8	1.53	12.6	90.6	3.41	2.4
	6.0	3.1	6.5	30.8	19.6	0.64	0.97	34.1	31.8	-	18.6	1.54	13.3	91.5	3.53	2.4
	8.0	5.1	9.4	31.0	19.7	0.63	0.95	34.2	32.8	-	19.1	1.55	13.8	92.1	3.60	2.4
40	4.0	1.3	2.5	30.4	20.0	0.66	1.11	34.2	27.3	-	21.2	1.61	15.8	94.6	3.88	2.5
	6.0	2.8	5.9	30.7	20.1	0.65	1.06	34.3	29.0	-	22.2	1.63	16.6	95.7	3.99	2.5
	8.0	4.5	8.4	30.8	20.1	0.65	1.03	34.3	29.9	-	22.7	1.64	17.1	96.3	4.05	2.4
50	4.0	1.3	2.3	29.6	20.1	0.68	1.23	33.8	24.2	1.1	24.4	1.69	18.6	98.2	4.24	2.6
	6.0	2.6	5.5	30.1	20.2	0.67	1.16	34.1	25.9	1.0	25.4	1.71	19.5	99.4	4.35	2.6
	8.0	4.3	7.9	30.3	20.2	0.67	1.13	34.2	26.8	0.9	25.9	1.73	20.0	100.0	4.40	2.6
60	4.0	1.2	2.2	28.4	19.7	0.69	1.35	33.0	21.0	1.5	27.2	1.76	21.2	101.5	4.53	2.8
	6.0	2.5	5.1	29.1	19.9	0.68	1.28	33.5	22.8	1.3	28.3	1.80	22.2	102.7	4.62	2.8
	8.0	4.0	7.4	29.4	20.0	0.68	1.24	33.7	23.6	1.1	28.8	1.81	22.7	103.4	4.66	2.7
70	4.0	1.1	2.1	27.0	19.0	0.71	1.50	32.1	18.0	2.0	29.9	1.84	23.6	104.6	4.75	3.7
	6.0	2.3	4.8	27.8	19.4	0.70	1.42	32.6	19.6	1.8	31.0	1.88	24.6	105.8	4.83	3.0
	8.0	3.8	7.0	28.2	19.6	0.69	1.38	32.9	20.5	1.5	31.5	1.89	25.0	106.5	4.87	3.0
80	4.0	1.0	1.9	25.4	18.3	0.72	1.66	31.0	15.3	2.6	32.3	1.92	25.8	107.4	4.93	3.4
	6.0	2.2	4.5	26.2	18.7	0.71	1.57	31.6	16.7	2.2	33.5	1.96	26.8	108.7	5.01	3.3
	8.0	3.5	6.5	26.7	18.9	0.71	1.53	31.9	17.5	1.9	34.0	1.98	27.3	109.4	5.04	3.3
90	4.0	1.0	1.8	23.7	17.5	0.74	1.84	30.0	12.9	3.2	34.7	2.00	27.9	110.2	5.09	3.6
	6.0	2.1	4.3	24.5	17.9	0.73	1.75	30.5	14.1	2.8	35.9	2.04	28.9	111.5	5.16	3.5
	8.0	3.4	6.2	25.0	18.1	0.72	1.70	30.8	14.7	2.3	36.5	2.06	29.4	112.2	5.19	3.5
100	4.0	1.0	1.8	22.0	16.7	0.76	2.05	29.0	10.7	4.0	Operation Not Recommended					
	6.0	2.0	4.1	22.8	17.1	0.75	1.95	29.5	11.7	3.5						
	8.0	3.2	6.0	23.3	17.3	0.74	1.89	29.7	12.3	2.8						
110	4.0	0.9	1.7	20.5	16.0	0.78	2.29	28.3	8.9	4.8						
	6.0	1.9	4.0	21.2	16.3	0.77	2.17	28.6	9.8	4.1						
	8.0	3.1	5.7	21.6	16.5	0.76	2.11	28.8	10.2	3.3						
120	4.0	0.9	1.6	19.1	15.5	0.81	2.55	27.8	7.5	5.7						
	6.0	1.8	3.9	19.7	15.7	0.80	2.43	28.0	8.1	4.8						
	8.0	3.0	5.5	20.0	15.8	0.79	2.36	28.1	8.5	4.0						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV036 Part Load

Performance capacities shown in thousands of Btuh.

800 CFM Rated Airflow

		WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
EWT °F	GPM	PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	8.0	4.7	10.9	Operation Not Recommended							17.3	1.46	12.3	90.0	3.48	2.4
30	4.0	1.2	2.8	29.8	18.9	0.63	0.79	32.5	37.7	-	19.1	1.51	14.0	92.1	3.71	2.4
	6.0	2.6	6.1	30.1	18.9	0.63	0.75	32.7	40.3	-	19.8	1.51	14.6	92.9	3.84	2.4
	8.0	4.5	10.4	30.3	19.0	0.63	0.73	32.8	41.6	-	20.1	1.51	15.0	93.3	3.91	2.4
40	4.0	1.1	2.5	30.6	20.4	0.67	0.90	33.6	34.0	-	21.8	1.56	16.5	95.2	4.08	2.5
	6.0	2.6	5.9	30.8	20.4	0.66	0.84	33.7	36.9	-	22.6	1.57	17.3	96.2	4.22	2.5
	8.0	4.4	10.2	31.0	20.5	0.66	0.81	33.7	38.3	-	23.1	1.58	17.7	96.7	4.29	2.4
50	4.0	1.0	2.2	30.3	21.1	0.70	1.03	33.8	29.4	0.8	24.6	1.64	19.0	98.5	4.40	2.6
	6.0	2.5	5.7	30.7	21.2	0.69	0.95	33.9	32.2	0.7	25.6	1.64	20.0	99.6	4.57	2.6
	8.0	4.2	9.7	30.9	21.2	0.69	0.92	34.0	33.7	0.7	26.2	1.65	20.5	100.3	4.64	2.5
60	4.0	0.9	2.0	29.2	21.2	0.72	1.19	33.3	24.6	1.3	27.5	1.66	21.9	101.9	4.87	2.7
	6.0	2.4	5.5	29.9	21.3	0.71	1.09	33.7	27.3	1.2	28.7	1.66	23.0	103.2	5.06	2.7
	8.0	4.1	9.5	30.2	21.4	0.71	1.05	33.8	28.7	1.1	29.4	1.67	23.7	104.0	5.16	2.6
70	4.0	0.8	1.8	27.7	20.6	0.74	1.36	32.3	20.4	1.8	30.5	1.68	24.8	105.3	5.34	2.8
	6.0	2.3	5.3	28.6	20.9	0.73	1.26	32.9	22.7	1.7	32.0	1.68	26.2	107.0	5.56	2.8
	8.0	4.0	9.2	29.0	21.1	0.73	1.21	33.1	24.0	1.5	32.7	1.69	27.0	107.9	5.68	2.8
80	4.0	0.7	1.7	26.0	19.8	0.76	1.56	31.3	16.7	2.3	33.7	1.70	27.9	109.0	5.82	3.0
	6.0	2.3	5.2	26.9	20.2	0.75	1.45	31.9	18.6	2.1	35.3	1.71	29.5	110.9	6.06	3.0
	8.0	3.9	9.0	27.4	20.4	0.75	1.39	32.2	19.7	1.9	36.2	1.71	30.4	111.9	6.20	2.9
90	4.0	0.6	1.5	24.2	19.0	0.79	1.78	30.3	13.6	2.7	36.9	1.72	31.0	112.7	6.30	3.2
	6.0	2.1	4.9	25.1	19.4	0.77	1.66	30.8	15.1	2.5	38.8	1.73	32.9	114.9	6.57	3.2
	8.0	3.7	8.5	25.6	19.6	0.77	1.60	31.1	16.0	2.2	39.9	1.74	33.9	116.1	6.73	3.1
100	4.0	0.6	1.4	22.7	18.5	0.81	2.02	29.6	11.2	3.1	Operation Not Recommended					
	6.0	2.1	4.8	23.4	18.7	0.80	1.89	29.9	12.4	2.8						
	8.0	3.6	8.3	23.8	18.9	0.79	1.83	30.1	13.0	2.5						
110	4.0	0.6	1.3	21.5	18.3	0.85	2.30	29.3	9.4	3.5						
	6.0	2.0	4.6	22.0	18.3	0.83	2.16	29.4	10.2	3.1						
	8.0	3.4	7.9	22.3	18.4	0.82	2.09	29.5	10.7	2.8						
120	4.0	0.5	1.2	20.7	18.0	0.87	2.57	29.4	8.1	3.8						
	6.0	1.9	4.5	21.1	18.3	0.87	2.44	29.5	8.6	3.4						
	8.0	3.3	7.7	21.3	18.4	0.86	2.40	29.5	8.9	3.1						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV036 Full Load

Performance capacities shown in thousands of Btuh.

1200 CFM Rated Airflow

EWT °F	GPM	WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
		PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	9.0	5.9	13.7	Operation Not Recommended							26.1	2.30	18.2	90.1	3.32	2.9
30	4.5	1.7	3.9	43.9	30.7	0.70	1.61	49.4	27.2	-	28.3	2.34	20.3	91.9	3.54	3.0
	6.8	3.3	7.6	44.1	30.7	0.70	1.51	49.3	29.3	-	29.6	2.37	21.5	92.9	3.66	3.0
	9.0	5.7	13.1	44.3	30.7	0.69	1.45	49.2	30.4	-	30.3	2.38	22.2	93.4	3.73	2.9
40	4.5	1.5	3.5	43.2	30.7	0.71	1.77	49.2	24.4	-	32.3	2.43	24.0	94.9	3.90	3.1
	6.8	3.2	7.3	43.8	30.8	0.70	1.66	49.4	26.4	-	33.8	2.46	25.4	96.1	4.03	3.0
	9.0	5.4	12.5	44.0	30.9	0.70	1.60	49.4	27.5	-	34.7	2.48	26.2	96.8	4.10	3.0
50	4.5	1.3	3.1	41.9	30.3	0.72	1.93	48.5	21.7	1.4	36.3	2.52	27.7	98.0	4.22	3.3
	6.8	3.1	7.1	42.9	30.6	0.71	1.81	49.0	23.7	1.2	38.1	2.56	29.4	99.4	4.36	3.3
	9.0	5.2	12.0	43.3	30.7	0.71	1.75	49.2	24.7	1.0	39.2	2.59	30.3	100.2	4.43	3.1
60	4.5	1.2	2.8	40.4	29.6	0.73	2.11	47.6	19.1	1.9	40.4	2.62	31.5	101.2	4.52	3.6
	6.8	2.9	6.8	41.5	30.1	0.72	1.98	48.3	20.9	1.6	42.6	2.68	33.4	102.8	4.65	3.5
	9.0	5.0	11.6	42.0	30.3	0.72	1.92	48.6	21.9	1.4	43.8	2.71	34.5	103.8	4.73	3.5
70	4.5	1.1	2.5	38.5	28.7	0.75	2.32	46.4	16.6	2.5	44.7	2.74	35.3	104.5	4.78	3.9
	6.8	2.9	6.6	39.8	29.3	0.74	2.17	47.2	18.3	2.2	47.2	2.81	37.6	106.4	4.91	3.8
	9.0	4.8	11.0	40.4	29.6	0.73	2.10	47.6	19.2	1.8	48.5	2.86	38.8	107.4	4.98	3.8
80	4.5	1.0	2.3	36.5	27.7	0.76	2.55	45.2	14.3	3.4	49.0	2.87	39.2	107.8	5.01	4.3
	6.8	2.8	6.5	37.9	28.4	0.75	2.39	46.0	15.9	2.9	51.9	2.96	41.8	110.0	5.13	4.2
	9.0	4.5	10.4	38.6	28.7	0.75	2.31	46.5	16.7	2.3	53.5	3.01	43.2	111.3	5.20	4.1
90	4.5	0.9	2.1	34.5	26.7	0.78	2.81	44.1	12.2	4.2	53.6	3.02	43.3	111.3	5.20	4.7
	6.8	2.6	6.1	35.8	27.4	0.76	2.63	44.8	13.6	3.6	56.8	3.13	46.1	113.8	5.32	4.7
	9.0	4.4	10.2	36.5	27.7	0.76	2.55	45.2	14.3	3.0	58.6	3.19	47.7	115.2	5.38	4.6
100	4.5	0.8	1.9	32.4	25.7	0.79	3.12	43.0	10.4	5.1	Operation Not Recommended					
	6.8	2.6	6.0	33.7	26.3	0.78	2.92	43.7	11.5	4.4						
	9.0	4.2	9.7	34.4	26.7	0.78	2.82	44.0	12.2	3.6						
110	4.5	0.8	1.8	30.4	24.7	0.81	3.49	42.3	8.7	6.1						
	6.8	2.5	5.8	31.6	25.3	0.80	3.25	42.7	9.7	5.2						
	9.0	4.0	9.2	32.3	25.6	0.79	3.14	43.0	10.3	4.3						
120	4.5	0.7	1.6	28.6	23.8	0.83	3.91	41.9	7.3	7.3						
	6.8	2.5	5.8	29.7	24.3	0.82	3.64	42.1	8.2	6.2						
	9.0	3.8	8.8	30.2	24.6	0.81	3.51	42.2	8.6	5.1						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV048 Part Load

Performance capacities shown in thousands of Btuh.

1050 CFM Rated Airflow

		WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
EWT °F	GPM	PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	11.0	4.0	9.3	Operation Not Recommended							22.7	2.14	15.4	90.0	3.12	3.3
30	5.5	1.1	2.5	37.9	23.6	0.62	1.19	42.0	31.9	-	25.1	2.17	17.7	92.2	3.39	3.4
	8.3	2.2	5.2	38.1	23.7	0.62	1.12	42.0	34.0	-	26.0	2.18	18.6	93.0	3.49	3.3
	11.0	3.9	8.9	38.4	23.6	0.62	1.09	42.1	35.2	-	26.5	2.19	19.1	93.4	3.55	3.3
40	5.5	1.0	2.3	40.1	25.8	0.64	1.35	44.8	29.7	-	29.0	2.21	21.5	95.6	3.84	3.5
	8.3	2.1	5.0	40.5	25.8	0.64	1.27	44.8	31.9	-	30.3	2.23	22.7	96.7	3.99	3.4
	11.0	3.7	8.6	40.6	25.8	0.64	1.24	44.8	32.7	-	31.0	2.23	23.3	97.3	4.06	3.4
50	5.5	0.9	2.1	40.1	26.4	0.66	1.48	45.2	27.2	0.9	33.4	2.25	25.7	99.4	4.34	3.6
	8.3	2.1	4.9	40.5	26.4	0.65	1.40	45.2	28.9	0.8	34.9	2.27	27.2	100.8	4.52	3.5
	11.0	3.6	8.3	40.6	26.4	0.65	1.39	45.3	29.2	0.8	35.8	2.27	28.0	101.6	4.62	3.5
60	5.5	0.9	2.0	39.3	26.7	0.68	1.71	45.2	23.0	1.6	37.9	2.29	30.1	103.4	4.85	3.7
	8.3	2.0	4.7	40.0	26.8	0.67	1.60	45.5	25.0	1.4	39.8	2.31	31.9	105.1	5.06	3.7
	11.0	3.5	8.1	40.3	26.8	0.67	1.55	45.5	26.0	1.3	40.8	2.31	32.9	106.0	5.17	3.7
70	5.5	0.8	1.8	37.6	26.1	0.70	1.92	44.1	19.6	2.2	42.5	2.33	34.6	107.5	5.35	3.8
	8.3	2.0	4.6	38.6	26.5	0.69	1.80	44.8	21.5	2.0	44.7	2.35	36.6	109.4	5.57	3.8
	11.0	3.2	7.5	39.1	26.6	0.68	1.74	45.0	22.4	1.8	45.8	2.36	37.8	110.4	5.69	3.8
80	5.5	0.7	1.7	35.3	25.3	0.71	2.15	42.7	16.4	2.8	47.1	2.37	39.0	111.5	5.81	4.1
	8.3	1.9	4.5	36.6	25.7	0.70	2.02	43.5	18.1	2.5	49.4	2.40	41.2	113.5	6.02	4.0
	11.0	3.2	7.3	37.2	26.0	0.70	1.96	43.9	19.0	2.3	50.6	2.42	42.3	114.6	6.13	4.0
90	5.5	0.7	1.6	32.8	24.3	0.74	2.41	41.1	13.6	3.3	51.4	2.43	43.1	115.3	6.20	4.4
	8.3	1.8	4.2	34.1	24.8	0.73	2.27	41.9	15.0	3.0	53.7	2.47	45.3	117.4	6.38	4.3
	11.0	3.1	7.2	34.8	25.0	0.72	2.20	42.3	15.8	2.7	54.9	2.49	46.4	118.4	6.47	4.3
100	5.5	0.6	1.5	30.3	23.3	0.77	2.70	39.6	11.2	3.8	Operation Not Recommended					
	8.3	1.8	4.1	31.6	23.8	0.75	2.55	40.3	12.4	3.5						
	11.0	2.9	6.8	32.2	24.0	0.75	2.48	40.7	13.0	3.1						
110	5.5	0.6	1.5	28.0	22.6	0.81	3.03	38.4	9.3	4.3						
	8.3	1.7	4.0	29.1	22.9	0.79	2.87	38.9	10.2	3.9						
	11.0	2.9	6.6	29.7	23.1	0.78	2.79	39.2	10.7	3.5						
120	5.5	0.6	1.4	26.2	22.3	0.85	3.41	37.8	7.7	4.7						
	8.3	1.6	3.8	27.0	22.4	0.83	3.22	38.0	8.4	4.2						
	11.0	2.7	6.3	27.4	22.4	0.82	3.14	38.1	8.8	3.8						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV048 Full Load

Performance capacities shown in thousands of Btuh.

1600 CFM Rated Airflow

EWT °F	GPM	WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
		PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	12.0	4.8	11.0	Operation Not Recommended							32.1	3.09	21.6	88.6	3.04	3.9
30	6.0	1.3	2.9	57.6	37.1	0.64	2.24	65.3	25.7	-	35.3	3.12	24.6	90.4	3.31	4.1
	9.0	2.6	6.1	58.1	37.2	0.64	2.12	65.3	27.5	-	36.9	3.16	26.1	91.3	3.41	4.0
	12.0	4.5	10.5	58.4	37.2	0.64	2.05	65.4	28.5	-	37.7	3.19	26.9	91.8	3.47	4.0
40	6.0	1.2	2.7	57.3	38.1	0.67	2.44	65.7	23.5	-	40.6	3.17	29.8	93.5	3.76	4.2
	9.0	2.6	5.9	57.9	38.2	0.66	2.31	65.8	25.1	-	42.6	3.21	31.7	94.7	3.89	4.1
	12.0	4.4	10.1	58.2	38.2	0.66	2.24	65.8	26.0	-	43.8	3.23	32.7	95.3	3.97	4.1
50	6.0	1.1	2.5	56.0	38.5	0.69	2.64	65.0	21.2	2.0	46.3	3.16	35.5	96.8	4.29	4.4
	9.0	2.5	5.7	57.1	38.6	0.68	2.50	65.7	22.9	1.7	48.7	3.22	37.7	98.2	4.43	4.3
	12.0	4.2	9.6	57.5	38.7	0.67	2.43	65.8	23.7	1.4	50.1	3.26	39.0	99.0	4.51	4.3
60	6.0	1.0	2.3	53.9	37.8	0.70	2.85	63.6	18.9	2.9	52.1	3.31	40.8	100.2	4.62	4.7
	9.0	2.4	5.5	55.5	38.3	0.69	2.70	64.7	20.5	2.5	55.1	3.38	43.5	101.9	4.77	4.6
	12.0	4.0	9.2	56.1	38.5	0.69	2.63	65.1	21.4	2.1	56.7	3.42	45.0	102.8	4.85	4.6
70	6.0	1.0	2.2	51.3	36.7	0.72	3.09	61.8	16.6	4.0	58.1	3.46	46.3	103.6	4.92	5.1
	9.0	2.3	5.4	53.2	37.5	0.70	2.92	63.1	18.2	3.3	61.5	3.55	49.4	105.6	5.08	5.1
	12.0	3.8	8.8	54.0	37.8	0.70	2.84	63.7	19.0	2.8	63.4	3.61	51.1	106.7	5.16	5.0
80	6.0	0.9	2.1	48.4	35.4	0.73	3.35	59.8	14.4	5.0	64.3	3.63	51.9	107.2	5.19	5.7
	9.0	2.3	5.2	50.4	36.3	0.72	3.17	61.2	15.9	4.3	68.1	3.74	55.3	109.4	5.33	5.6
	12.0	3.6	8.3	51.4	36.7	0.72	3.08	61.9	16.7	3.6	70.2	3.81	57.2	110.6	5.41	5.5
90	6.0	0.9	2.0	45.2	34.1	0.76	3.66	57.7	12.4	6.4	70.4	3.81	57.4	110.8	5.41	6.3
	9.0	2.2	5.0	47.3	35.0	0.74	3.45	59.0	13.7	5.4	74.7	3.95	61.2	113.2	5.54	6.2
	12.0	3.5	8.1	48.3	35.4	0.73	3.36	59.7	14.4	4.4	77.0	4.03	63.3	114.6	5.60	6.1
100	6.0	0.8	1.9	42.0	32.9	0.78	4.01	55.6	10.5	7.8	Operation Not Recommended					
	9.0	2.1	4.8	44.0	33.7	0.77	3.78	56.9	11.6	6.7						
	12.0	3.3	7.7	45.0	34.1	0.76	3.67	57.6	12.3	5.4						
110	6.0	0.8	1.8	38.8	31.9	0.82	4.42	53.9	8.8	9.4						
	9.0	2.0	4.7	40.7	32.5	0.80	4.16	54.9	9.8	8.0						
	12.0	3.2	7.3	41.7	32.8	0.79	4.04	55.5	10.3	6.6						
120	6.0	0.7	1.7	35.9	31.2	0.87	4.90	52.6	7.3	11.2						
	9.0	1.9	4.5	37.6	31.6	0.84	4.61	53.3	8.1	9.5						
	12.0	3.0	7.0	38.5	31.8	0.83	4.47	53.7	8.6	7.8						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV060 Part Load

Performance capacities shown in thousands of Btuh.

1350 CFM Rated Airflow

		WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
EWT °F	GPM	PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	14.0	4.1	9.4	Operation Not Recommended							28.4	2.44	20.0	89.5	3.40	3.4
30	7.0	0.5	1.1	49.1	34.5	0.70	1.56	54.4	31.4	-	31.3	2.54	22.7	91.5	3.61	3.5
	10.5	1.9	4.4	50.1	34.9	0.70	1.52	55.2	32.9	-	32.3	2.55	23.6	92.2	3.71	3.5
	14.0	3.9	9.0	51.6	35.7	0.69	1.51	56.7	34.3	-	32.8	2.55	24.1	92.5	3.77	3.4
40	7.0	0.4	0.9	51.9	37.1	0.71	1.71	57.8	30.4	-	35.7	2.66	26.7	94.5	3.94	3.6
	10.5	1.9	4.3	52.3	37.2	0.71	1.63	57.9	32.2	-	37.0	2.68	27.9	95.4	4.05	3.6
	14.0	3.7	8.6	52.7	37.2	0.71	1.59	58.1	33.1	-	37.7	2.69	28.5	95.8	4.10	3.5
50	7.0	0.3	0.7	52.0	37.9	0.73	1.91	58.5	27.3	1.0	40.4	2.82	30.8	97.7	4.19	3.7
	10.5	1.8	4.1	52.6	37.9	0.72	1.79	58.7	29.4	0.9	41.9	2.83	32.3	98.8	4.34	3.7
	14.0	3.5	8.2	52.8	37.9	0.72	1.74	58.7	30.4	0.8	42.8	2.84	33.1	99.3	4.42	3.6
60	7.0	0.3	0.6	50.2	37.1	0.74	2.15	57.5	23.3	1.7	45.2	2.86	35.5	101.0	4.64	3.9
	10.5	1.7	4.0	51.3	37.6	0.73	2.01	58.2	25.6	1.5	47.0	2.87	37.2	102.2	4.80	3.8
	14.0	3.4	7.8	51.8	37.8	0.73	1.94	58.4	26.7	1.4	47.9	2.88	38.1	102.9	4.88	3.8
70	7.0	0.2	0.5	47.5	35.8	0.75	2.44	55.9	19.5	2.3	50.0	2.90	40.2	104.3	5.06	4.1
	10.5	1.7	3.9	49.1	36.6	0.75	2.28	56.8	21.5	2.1	52.1	2.92	42.1	105.7	5.23	4.1
	14.0	3.2	7.5	49.8	36.9	0.74	2.20	57.3	22.6	1.9	53.1	2.93	43.1	106.4	5.32	3.5
80	7.0	0.2	0.4	44.5	34.3	0.77	2.78	53.9	16.0	3.0	54.8	2.95	44.8	107.6	5.45	4.4
	10.5	1.6	3.8	46.1	35.1	0.76	2.59	55.0	17.8	2.7	57.0	2.98	46.8	109.1	5.61	4.3
	14.0	3.1	7.2	46.9	35.5	0.76	2.51	55.5	18.7	2.4	58.1	3.00	47.9	109.9	5.68	4.3
90	7.0	0.1	0.3	41.2	32.8	0.79	3.16	52.0	13.0	3.5	59.5	3.02	49.2	110.8	5.77	4.7
	10.5	1.6	3.6	42.9	33.5	0.78	2.96	53.0	14.5	3.2	61.7	3.06	51.3	112.3	5.91	4.6
	14.0	2.9	6.8	43.7	33.9	0.78	2.86	53.5	15.3	2.9	62.9	3.09	52.4	113.1	5.97	4.0
100	7.0	0.1	0.2	38.1	31.5	0.82	3.59	50.4	10.6	4.1	Operation Not Recommended					
	10.5	1.5	3.5	39.6	32.0	0.81	3.38	51.1	11.7	3.7						
	14.0	2.8	6.5	40.4	32.4	0.80	3.27	51.6	12.4	3.3						
110	7.0	0.1	0.2	35.5	30.7	0.86	4.08	49.4	8.7	4.7						
	10.5	1.4	3.3	36.7	31.0	0.84	3.84	49.8	9.5	4.1						
	14.0	2.7	6.2	37.3	31.2	0.83	3.73	50.0	10.0	3.7						
120	7.0	0.0	0.1	33.7	30.3	0.90	4.63	49.5	7.3	5.1						
	10.5	1.4	3.2	34.4	30.4	0.88	4.36	49.3	7.9	4.6						
	14.0	2.6	6.0	34.9	30.6	0.88	4.24	49.3	8.2	4.1						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

PERFORMANCE DATA
HTV060 Full Load

Performance capacities shown in thousands of Btuh.

2000 CFM Rated Airflow

		WPD		COOLING - EAT 80°F DB / 67°F WB							HEATING - EAT 70°F					
EWT °F	GPM	PSI	FT	TC	SC	Sens/Tot Ratio	KW	HR	EER	HWG	HC	KW	HE	LAT	COP	HWG
20	15.0	5.0	11.6	Operation Not Recommended							41.6	3.73	28.9	89.3	3.27	4.0
30	7.5	0.6	1.5	68.0	49.7	0.73	2.99	78.2	22.7	-	45.3	3.83	32.2	91.0	3.47	4.1
	11.3	2.3	5.3	69.0	50.3	0.73	2.86	78.7	24.2	-	47.1	3.88	33.9	91.8	3.56	4.1
	15.0	4.8	11.0	70.4	51.3	0.73	2.80	79.9	25.2	-	48.1	3.90	34.8	92.3	3.61	4.0
40	7.5	0.5	1.2	69.8	51.5	0.74	3.23	80.8	21.6	-	51.4	3.99	37.8	93.8	3.78	4.3
	11.3	2.2	5.0	70.7	51.8	0.73	3.07	81.2	23.0	-	53.6	4.05	39.8	94.8	3.88	4.2
	15.0	4.5	10.4	71.0	51.9	0.73	2.99	81.2	23.7	-	54.8	4.08	40.9	95.4	3.94	4.1
50	7.5	0.4	1.0	70.0	52.3	0.75	3.51	82.0	19.9	2.1	57.6	4.15	43.4	96.7	4.06	4.5
	11.3	2.1	4.8	70.7	52.4	0.74	3.31	82.0	21.3	1.9	60.2	4.22	45.8	97.9	4.18	4.4
	15.0	4.3	9.9	71.1	52.4	0.74	3.22	82.1	22.1	1.5	61.6	4.26	47.1	98.5	4.24	4.3
60	7.5	0.3	0.8	68.0	51.8	0.76	3.83	81.1	17.7	3.0	64.0	4.33	49.2	99.6	4.33	4.8
	11.3	2.1	4.7	69.5	52.2	0.75	3.60	81.8	19.3	2.6	67.0	4.41	52.0	101.0	4.45	4.7
	15.0	4.1	9.4	70.1	52.4	0.75	3.49	82.0	20.0	2.2	68.7	4.46	53.5	101.8	4.52	4.7
70	7.5	0.3	0.7	65.2	50.8	0.78	4.21	79.5	15.5	4.1	70.5	4.51	55.1	102.7	4.58	5.3
	11.3	2.0	4.5	67.2	51.5	0.77	3.94	80.7	17.1	3.5	74.1	4.61	58.4	104.3	4.71	5.2
	15.0	3.9	8.9	68.1	51.8	0.76	3.81	81.1	17.9	2.9	76.1	4.67	60.1	105.2	4.78	5.1
80	7.5	0.2	0.5	61.8	49.4	0.80	4.64	77.7	13.3	5.4	77.3	4.71	61.3	105.8	4.82	5.8
	11.3	1.9	4.4	64.2	50.4	0.78	4.34	79.0	14.8	4.5	81.5	4.83	65.0	107.7	4.95	5.7
	15.0	3.6	8.4	65.3	50.8	0.78	4.19	79.6	15.6	3.7	83.8	4.90	67.1	108.8	5.02	5.6
90	7.5	0.2	0.4	58.1	47.8	0.82	5.14	75.6	11.3	6.7	84.4	4.92	67.7	109.1	5.04	6.5
	11.3	1.8	4.2	60.6	48.9	0.81	4.80	77.0	12.6	5.7	89.2	5.06	72.0	111.3	5.17	6.4
	15.0	3.5	8.0	61.9	49.4	0.80	4.63	77.7	13.4	4.8	91.9	5.14	74.4	112.5	5.24	6.3
100	7.5	0.1	0.3	54.1	46.1	0.85	5.72	73.7	9.5	8.3	Operation Not Recommended					
	11.3	1.8	4.1	56.7	47.2	0.83	5.34	74.9	10.6	7.0						
	15.0	3.3	7.6	58.0	47.8	0.82	5.15	75.6	11.3	5.8						
110	7.5	0.1	0.2	50.2	44.3	0.88	6.40	72.0	7.8	10.0						
	11.3	1.7	4.0	52.7	45.4	0.86	5.96	73.0	8.8	8.5						
	15.0	3.1	7.2	54.0	46.0	0.85	5.75	73.6	9.4	6.9						
120	7.5	0.0	0.1	46.4	42.7	0.92	7.18	70.9	6.5	11.9						
	11.3	1.7	3.9	48.7	43.7	0.90	6.68	71.5	7.3	10.1						
	15.0	2.9	6.8	49.9	44.2	0.89	6.45	71.9	7.7	8.3						

†ARI/ASHRAE/ISO 13256-1 (WLHP applications) certified conditions are 86°F EWT, 80.6°F DB / 66.2°F WB EAT in cooling and 68°F DB / 59°F WB EAT in heating.

Interpoaltion is permissable, 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.

Operation below 60°F EWT requires optional insulated water circuit.

Operation below 40°F EWT is based upon 15% antifreeze solution.

Legend

CFM = airflow, cubic feet/minute
EWT = entering water temperature, ˚F
GPM = water flow in US gallons/minute
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, Mbtuh
TC = total cooling capacity, Mbtuh
SC = sensible cooling capacity, Mbtuh
KW = total power unit input, KiloWatts
HR = total heat of rejection, Mbtuh
HE = total heat of extraction, Mbtuh
HWC = Hot Water Generator (desuperheater) capacity, Mbtuh
WPD = Water coil pressure drop (psi & ft hd)
EER = Energy Efficiency Ratio = BTU output/Watt input
COP = Coefficient of Performance = BTU output/BTU input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
LC = latent cooling capacity, Mbtuh
S/T = sensible to total cooling ratio

Note:
For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40˚F when the JW3 jumper is not clipped. This is due to the potential of the refrigerant temperature being as low as 32˚F with 40˚F LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for systems without antifreeze.

Calculate LWTas follows:

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

Part Load Operation

Part Load Cooling Corrections 400 CFM per Ton													
Ent Air WB F	Total Clg Cap	Sens Clg Cap Multipliers- Entering DB F										Power	Heat of Rej
		60	65	70	75	80	**80.6**	85	90	95	100		
45	0.876	*	*	*	*	*	*	*	*	*	*	0.981	0.895
50	0.883	1.178	1.292	*	*	*	*	*	*	*	*	0.985	0.901
55	0.903	0.829	1.024	1.123	*	*	*	*	*	*	*	0.989	0.918
60	0.935		0.725	0.895	1.088	*	*	*	*	*	*	0.993	0.945
65	0.979			0.626	0.857	1.095	1.095	*	*	*	*	0.998	0.982
66.2	0.991			0.490	0.728	1.039	1.039	1.283	*	*	*	0.999	0.993
67	1.000			0.438	0.673	1.000	1.000	1.245	*	*	*	1.000	1.000
70	1.035				0.552	0.847	0.847	1.097	1.335	*	*	1.003	1.030
75	1.105					0.567	0.567	0.833	1.085	1.324	*	1.008	1.088

* Sensible capacity equals total capacity.

Part Load Heating Corrections			
Ent Air DB F	Htg Cap	Power	Heat of Ext
20	1.110	0.674	1.206
25	1.107	0.676	1.202
30	1.102	0.687	1.192
35	1.094	0.706	1.179
40	1.084	0.732	1.161
45	1.073	0.764	1.140
50	1.060	0.802	1.117
55	1.046	0.846	1.090
60	1.031	0.893	1.061
65	1.016	0.945	1.031
68	1.006	0.978	1.013
70	1.000	1.000	1.000
75	0.984	1.058	0.968
80	0.968	1.117	0.936

Airflow Part Load		**Heating**			**Cooling**				
CFM Per Ton of Clg	% of Nominal	Htg Cap	Power	Heat of Ext	Total Cap	Sens Cap	S/T	Power	Heat of Rej
240	60.0	0.946	1.241	0.881	0.920	0.781	0.849	0.959	0.927
275	68.8	0.960	1.163	0.915	0.942	0.832	0.883	0.964	0.946
300	75.0	0.969	1.115	0.937	0.956	0.867	0.906	0.969	0.959
325	81.3	0.978	1.076	0.956	0.969	0.901	0.929	0.975	0.970
350	87.5	0.986	1.043	0.973	0.981	0.934	0.952	0.982	0.981
375	93.8	0.993	1.018	0.988	0.991	0.967	0.976	0.990	0.991
400	**100.0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
425	106.3	1.006	0.990	1.010	1.007	1.033	1.025	1.011	1.008
450	112.5	1.012	0.986	1.017	1.013	1.065	1.051	1.023	1.015
475	118.8	1.017	0.983	1.024	1.018	1.098	1.079	1.036	1.021
500	125.0	1.021	0.981	1.030	1.021	1.131	1.108	1.051	1.026
520	130.0	1.024	0.979	1.034	1.023	1.159	1.133	1.063	1.030

Full Load Operation

Full Load Cooling Corrections 400 CFM per Ton													
Ent Air WB F	Total Clg Cap	Sens Clg Cap Multipliers- Entering DB F										Power	Heat of Rej
		60	65	70	75	**80**	80.6	85	90	95	100		
45	0.832	*	*	*	*	*	*	*	*	*	*	0.946	0.853
50	0.850	1.066	1.246	*	*	*	*	*	*	*	*	0.953	0.870
55	0.880	0.737	0.958	1.119	*	*	*	*	*	*	*	0.964	0.896
60	0.922		0.686	0.892	1.102	*	*	*	*	*	*	0.977	0.932
65	0.975			0.641	0.868	1.093	1.120	*	*	*	*	0.993	0.979
66.2	0.990			0.547	0.763	1.038	1.065	1.261	*	*	*	0.997	0.991
67	1.000			0.505	0.717	1.000	1.027	1.223	*	*	*	1.000	1.000
70	1.040				0.603	0.857	0.884	1.080	1.302	*	*	1.011	1.035
75	1.117					0.610	0.637	0.834	1.062	1.296	*	1.033	1.101

* Sensible capacity equals total capacity.

Full Load Heating Corrections			
Ent Air DB F	Htg Cap	Power	Heat of Ext
20	1.098	0.701	1.197
25	1.084	0.714	1.177
30	1.072	0.731	1.157
35	1.061	0.753	1.138
40	1.052	0.779	1.120
45	1.043	0.808	1.102
50	1.035	0.841	1.084
55	1.027	0.877	1.065
60	1.019	0.915	1.045
65	1.010	0.957	1.023
68	1.004	0.982	1.010
70	1.000	1.000	1.000
75	0.989	1.045	0.974
80	0.976	1.093	0.946

Airflow Full Load		**Heating**			**Cooling**				
CFM Per Ton of Clg	% of Nominal	Htg Cap	Power	Heat of Ext	Total Cap	Sens Cap	S/T	Power	Heat of Rej
240	60.0	0.946	1.153	0.896	0.925	0.788	0.852	0.913	0.922
275	68.8	0.959	1.107	0.924	0.946	0.829	0.876	0.926	0.942
300	75.0	0.969	1.078	0.942	0.960	0.861	0.897	0.937	0.955
325	81.3	0.977	1.053	0.959	0.972	0.895	0.921	0.950	0.968
350	87.5	0.985	1.032	0.974	0.983	0.930	0.946	6582	0.979
375	93.8	0.993	1.014	0.988	0.992	0.965	0.973	0.982	0.990
400	**100.0**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
425	106.3	1.006	0.989	1.011	1.007	1.033	1.027	1.020	1.009
450	112.5	1.012	0.982	1.019	1.012	1.064	1.052	1.042	1.018
475	118.8	1.018	0.979	1.027	1.016	1.092	1.075	1.066	1.025
500	125.0	1.022	0.977	1.033	1.018	1.116	1.096	1.091	1.032
520	130.0	1.026	0.975	1.038	1.019	1.132	1.110	1.112	1.037

Blower Performance

Airflow in CFM with wet coil and clean air filter

Model	Max ESP (in. wg)	Fan Motor (hp)	Tap Setting	Cooling Mode			Dehumid Mode			Heating Mode			AUX CFM	Aux/ Emerg Mode
				Stg 1	Stg 2	Fan	Stg 1	Stg 2	Fan	Stg 1	Stg 2	Fan		
024	0.50	1/2	4	810	950	475	630	740	475	920	1060	475	4	1060
	0.50	1/2	3	725	850	425	560	660	425	825	950	425	3	950
	0.50	1/2	2	620	730	370	490	570	370	710	820	370	2	820
	0.50	1/2	1	520	610	300				600	690	300	1	690
036	0.50	1/2	4	1120	1400	700	870	1090	700	1120	1400	700	4	1400
	0.50	1/2	3	1000	1250	630	780	980	630	1000	1250	630	3	1350
	0.50	1/2	2	860	1080	540	670	840	540	860	1080	540	2	1350
	0.50	1/2	1	730	900	450				730	900	450	1	1350
048	0.75	1	4	1460	1730	870	1140	1350	870	1560	1850	870	4	1850
	0.75	1	3	1300	1550	780	1020	1210	780	1400	1650	780	3	1660
	0.75	1	2	1120	1330	670	870	1040	670	1200	1430	670	2	1430
	0.75	1	1	940	1120	560				1010	1200	560	1	1350
060	0.75	1	4	1670	2050	1020	1300	1600	1020	1860	2280	1020	4	2280
	0.75	1	3	1500	1825	920	1160	1430	920	1650	2050	920	3	2040
	0.75	1	2	1280	1580	790	1000	1230	790	1430	1750	790	2	1750
	0.75	1	1	1080	1320	660				1200	1470	660	1	1470

Factory shipped on Tap Setting 2
During Auxiliary operation (residential units only) the CFM will run at the higher if the heating (delay jumper) or AUX settings
Airflow is controlled within +/- 5% up to Max ESP shown with wet coil and standard 1" fiberglass filter
Do not select Dehumidification mode if HP CFM is on setting 1

ECM Control Features

ECM Board Tap Settings

Cooling settings:

Tap Setting	DIP Switch SW1	DIP Switch SW2
1	ON	ON
2	ON	OFF
3	OFF	ON
4	OFF	OFF

Heating settings:

Tap Setting	DIP Switch SW3	DIP Switch SW4
1	ON	ON
2	ON	OFF
3	OFF	ON
4	OFF	OFF

Aux/Emerg Heat settings:

Tap Setting	DIP Switch SW5	DIP Switch SW6
1	ON	ON
2	ON	OFF
3	OFF	ON
4	OFF	OFF

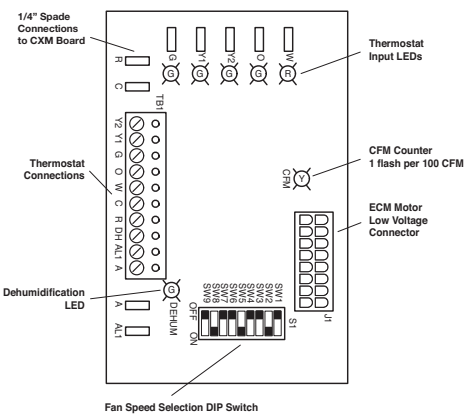
CFM Adjust settings:

Tap Setting	DIP Switch SW7	DIP Switch SW8
TEST	ON	ON
-	ON	OFF
+	OFF	ON
NORM	OFF	OFF

Dehum Mode settings:

Tap Setting	DIP Switch SW9
NORM	ON
Dehumid	OFF

ECM Interface Layout



ECM Control Features

The ECM fan is controlled by an interface board that converts thermostat inputs and field selectable CFM settings to signals used by the ECM motor controller.

Fan speeds are selected with jumpers via a nine position DIP switch. To take full advantage of the ECM motor features, a multi-stage thermostat such as 7800-201 should be used (2-stage heat/2-stage cool or 3-stage heat/2-stage cool).

Note: Power must be off to the unit for at least three seconds before the ECM motor will recognize a speed change. The motor will recognize a change in the CFM Adjust or dehumidification mode settings while the unit is powered.

There are four different airflow settings from lowest airflow rate (speed tap 1) to the highest airflow rate (speed tap 4). The charts below indicate settings for both versions of the ECM interface board, followed by detailed information for each setting.

Cooling settings: The cooling setting determines the cooling (normal) CFM for all units with ECM motor. Cooling (normal) setting is used when the unit is not in dehumidification mode.

Tap 1 is the lowest CFM setting, while tap 4 is the highest CFM setting. To avoid air coil freeze-up, tap 1 may not be used if the dehumidification mode is selected. Consult airflow specifications for the specific unit model to correlate speed tap setting to airflow in CFM.

Heating settings: The heating setting determines the heating.

Tap 1 is the lowest CFM setting, while tap 4 is the highest CFM setting. Consult airflow specifications for the specific unit model to correlate speed tap setting to airflow in CFM.

Auxiliary/Emergency Heat settings: The auxiliary/emergency heat setting determines the CFM when the unit is in auxiliary heat or emergency heat mode. This setting is used for residential units with internal electric heat. When auxiliary electric heat is energized (i.e. compressor and electric heat), the greater of the auxiliary/emergency or heating setting will be used. A “G” (fan) signal must be present from the thermostat for electric heat to operate. Consult airflow specifications for the specific unit model to correlate speed tap setting to airflow in CFM.

CFM Adjust settings: The CFM adjust setting allows four selections. The NORM setting is the factory default position. The + or – settings adjust the airflow by +/- 15%. The +/- settings are used to “fine tune” airflow adjustments. The TEST setting runs the ECM motor at 70% torque, which causes the motor to operate like a standard PSC motor, and disables the CFM counter.

Dehumidification Mode settings: The dehumidification mode setting provides field selection of humidity control. When operating in the normal mode, the cooling airflow settings are determined by the cooling tap setting above. When dehumidification is enabled there is a reduction in airflow in cooling to increase the moisture removal of the heat pump. Consult airflow specifications for the specific unit model to correlate speed tap setting to airflow in CFM. The dehumidification mode can be enabled in two ways.

1. Constant Dehumidification Mode: When the dehumidification mode is selected (via DIP switch or jumper setting), the ECM motor will operate with a multiplier applied to the cooling CFM settings (approx. 20-25% lower airflow). Any time the unit is running in the cooling mode, it will operate at the lower airflow to improve latent capacity. The “DEHUM” LED will be illuminated at all times. Heating airflow is not affected. NOTE: Do not select dehumidification mode if cooling setting is tap 1.
2. Automatic (Humidistat-controlled) Dehumidification Mode: When the dehumidification mode is selected (via DIP switch or jumper setting) AND a humidistat is connected to terminal DH, the cooling airflow will only be reduced when the humidistat senses that additional dehumidification is required. The DH terminal is reverse logic. Therefore, a humidistat (not dehumidistat) is required. The “DEHUM” LED will be illuminated only when the humidistat is calling for dehumidification mode. Heating airflow is not affected. NOTE: Do not select dehumidification mode if cooling setting is tap 1.

Auxiliary Electric Heat

Auxiliary Heat Ratings

Auxiliary Electric Heat Model	HT Model				kW Rating		Btuh Rating		Minimum CFM Required
	024	036	048	060	230V	208V	230V	208V	
HGM5A	■				4.8	3.6	16300	12300	500
HGM8A	■				7.6	5.7	25900	19400	650
HGM10A	■				9.6	7.2	32700	24600	650
HGM12A	■				11.4	8.6	38900	29200	750
HGL10A		■	■	■	9.6	7.2	32700	24600	1300
HGL15A		■	■	■	14.4	10.8	49100	36900	1350
HGL20A			■	■	19.2	14.4	65500	49200	1350

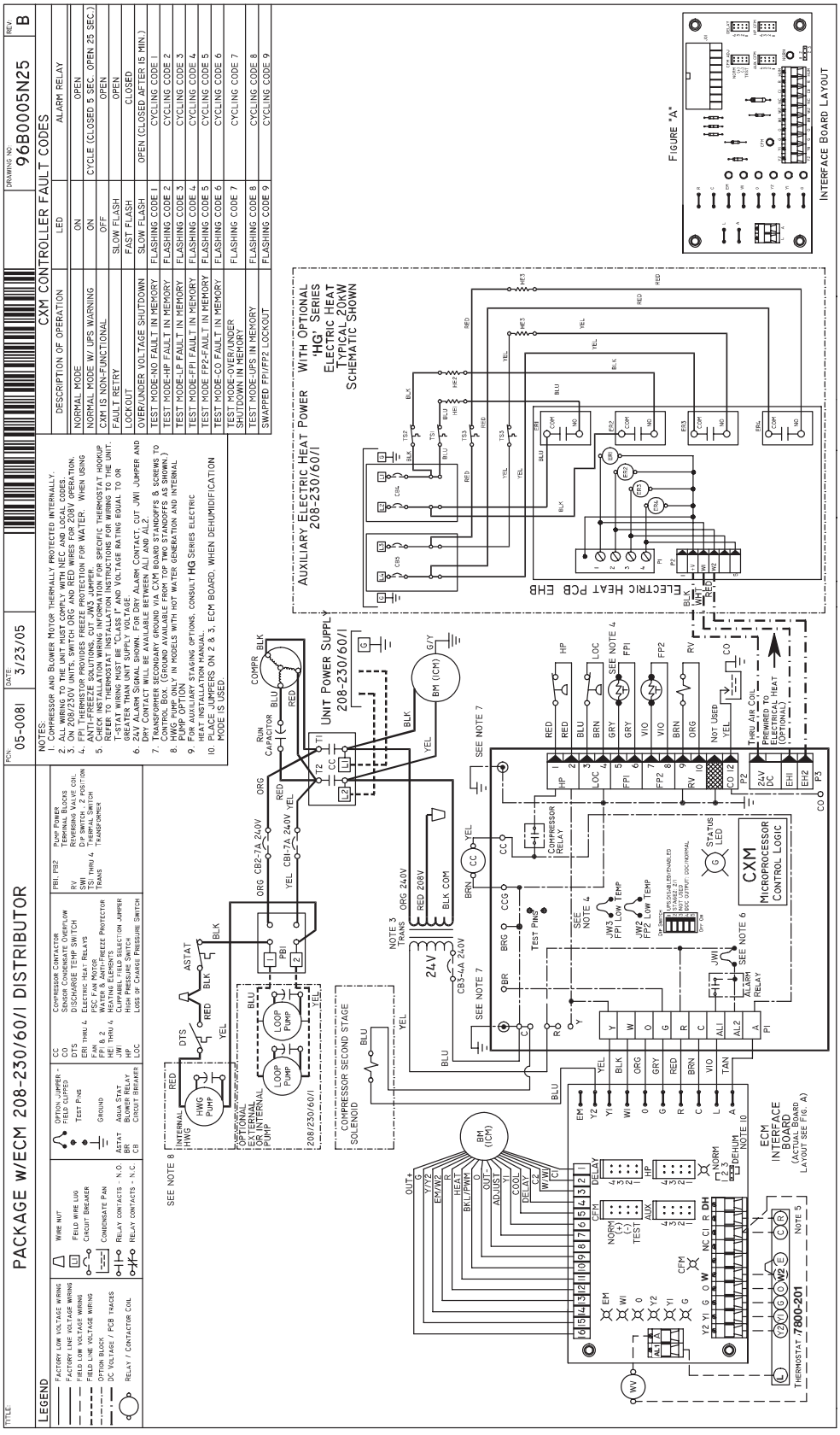
Grey area denotes compatibility
Note: Units rated for zero clearance for both unit and duct.

Auxiliary Heat Electrical Data

Auxiliary Electric Heat Model	Supply Circuit	Heater Amps		Minimum Circuit Amps		Maximum Fuse	
		230V	208V	230V	208V	230V	208V
HGM5A	Single	20.0	17.3	25.0	21.6	25	25
HGM8A	Single	31.7	27.5	39.6	34.4	40	35
HGM10A	Single	40.0	34.7	50.0	43.4	50	45
HGM12A	Single	47.5	41.2	59.4	51.5	60	60
	Dual - L1/L2 Dual - L3/L4	31.7 15.8	27.5 13.7	39.6 19.8	34.4 17.1	40 20	35 20
HGL10A	Single	40.0	34.7	50.0	43.4	50	45
HGL15A	Single	60.0	52.0	75.0	65.0	80	70
	Dual - L1/L2 Dual - L3/L4	40.0 20.0	34.7 17.3	50.0 25.0	43.4 21.6	50 25	45 25
HGL20A	Single	80.0	69.3	100.0	86.6	100	90
	Dual - L1/L2 Dual - L3/L4	40.0 40.0	34.7 34.7	50.0 50.0	43.4 43.4	50 50	45 45

All heaters rated single phase 208-230V 60Hz
All models 12kW or larger feature internal circuit breakers
All Fuses UL class K general purpose

Electrical Wiring Diagram



Design, material, performance data and components subject to change without notice.

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