HEAT CONTROLLER, INC.

Installation & Owner's Manual

AIR HANDLERS:
Variable Speed

AHGV Hydronic Air Handler

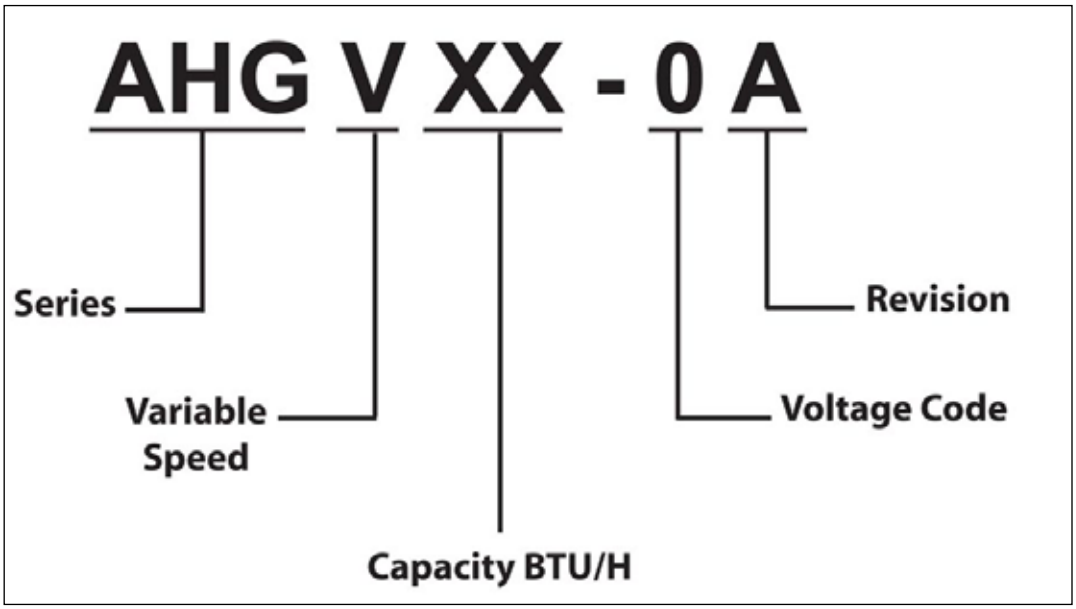
HAGV Electric Air Handler with Optional Heat

Heat Controller, Inc. • 1900 Wellworth Ave. • Jackson, MI 49203 • (517)787-2100 • www.heatcontroller.com

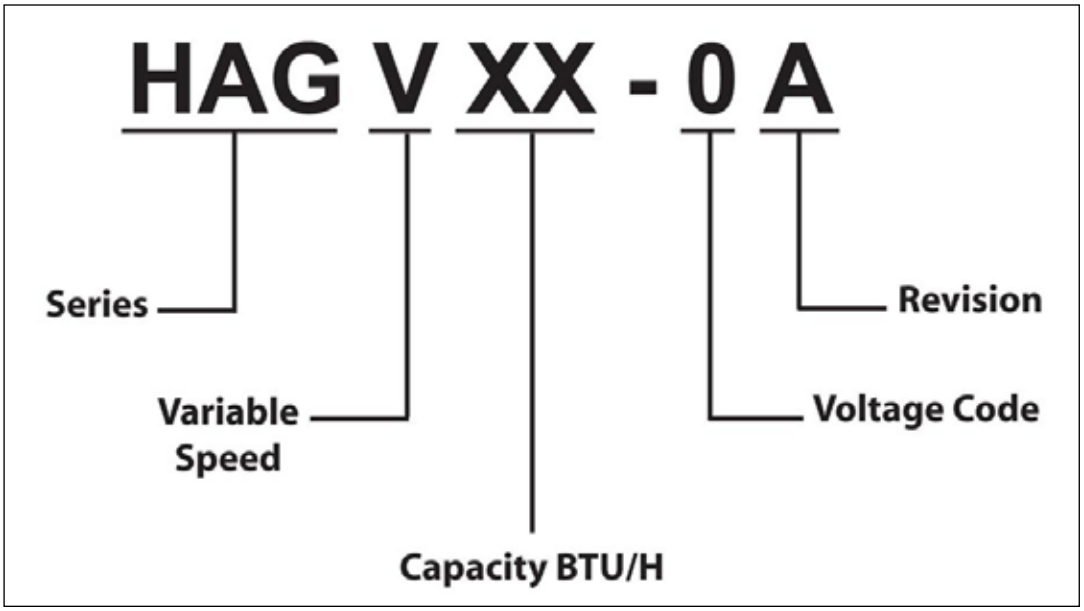
Table of Contents

Unit Nomenclatures

AHGV:



HAGV:



Air Handler Installation Instructions

Electric and Hydronic

GENERAL INFORMATION

This single piece air handler provides the flexibility for installation in any upflow or horizontal application. These versatile models may be used with or without electric or hot water heat. The ECM variable speed motor provides a selection of air volume to match any application. The unit can be positioned for bottom return air in the upflow position and end return air in the horizontal position.

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's delivery receipt. A separate request for inspection by the carrier's agent should be made in writing. See local Distributor for more information. Heat Controller, Inc. assumes no liability for freight damage.

Installation of accessories or field conversion should be accomplished before setting the unit in place or connection any wiring, electric heat, duct, or piping.

REFERENCE

This instruction should be used in conjunction with instructions supplied with each field installed accessory as well as outdoor section.

Installer should pay particular attention to the words; ***NOTE***, ***CAUTION***, and ***WARNING***:

NOTES are intended to clarify or make the installation easier.

CAUTION identifies procedure which, if not followed carefully, could result in personal injury, property damage or product damage.

WARNING is given to alert the installer that sever personal injury, death or equipment damage may result if installation procedures are not handled properly.

LIMITATIONS

These units must be wired and installed in accordance with all national and local codes. Voltage limits are as follows.

Air Handler Voltage	Normal Oper. Voltage Range
120/60/1	104-126
208/230/60/1	187-253

LOCATION

Location is usually predetermined. Check with owner's or dealer's installation plans. If location has not been decided, consider the following in choosing a suitable location.

1. Select a location with adequate structural support, space for service access, clearance for return and supply duct connections.

NOTE: Service access is generally specified by local codes.

2. Normal operating sound levels may be objectionable if the air handler is placed directly over some rooms such as bedrooms, study, etc.
3. Precautions should be taken to locate the unit and duct work so that supply air does not short circuit to the return air.
4. Select a location that will permit installation of condensate drain line to an open drain.

NOTE: When the coil is installed in a draw-thru application, it is recommended to trap the primary and secondary drain line. If the secondary drain is not used, it must be capped.

5. When the evaporator coil is installed in an attic or above a finished ceiling, an auxiliary drain pan should be provided under the coil as is specified by most local building codes.
6. Proper electrical supply must be available.
7. Clearances must also be taken into consideration, and provided for as follows:
   a. Refrigerant piping and connections are located in the front.
   b. Maintenance and servicing through the front access side of the unit with both sides and rear of unit having zero clearance.
   c. Condensate drain lines are connected in the front (clear of filter).
   d. When no electric heat is used, the unit as well as all duct work and plenum are designed for zero clearance to combustible materials.

CAUTION

If electric heat is used, a minimum clearance of 1" Must be maintained on all sides of the supply air Duct and/or plenum continuously for up to 3'

Air Handler Installation Instructions

Electric and Hydronic

INSTALLATION/OPERATION SAFETY RULES:

1. Read these rules and instructions carefully. Failure to follow these rules and the installation instructions could cause a malfunction of the unit, and a possible safety hazard. Keep these instructions nearby the unit for future reference.
2. While this unit has been designed and manufactured to comply with National codes, it is the installer's responsibility to install this unit to comply with National codes and/or prevailing local codes and regulations. HCI assumes no responsibility for units installed in violation of any code or regulation.
3. Before servicing, allow unit to cool.

***WARNING**: ALWAYS SHUT OFF ELECTRICITY WHEN WORKING ON UNIT*. This will prevent any electrical shocks or burns.

4. Ground the unit to prevent electric shock. All electrical wiring should be in accordance with the National Electric Code.
5. Duct work must be installed in accordance with the standards of the National Fire Protection Association (NFPA) for the installation of Air Conditioning, Warm Air Heating and Ventilating Systems (NFPA 90A and 90B). Duct work in non-conditioned spaces must be insulated to prevent formation of condensate and for maximum efficiency.
6. The safety testing agency labels appear on the unit's cover and the factory installed coil (if provided) only. It does not cover any other equipment. Exterior surface of cabinet may sweat when units is installed in a non-conditioned space such as an attic or garage. Installer must provide protection such as full size auxiliary drain pan on all units installed in a non-conditioned space to prevent damage from condensation runoff. It is recommended that units installed in non-conditioned spaces be insulated with 1" thick fiberglass with the vapor barrier on the outside.
7. While designed to operate quietly when properly installed, several steps should be taken insure this. Use of isolation pads when mounting unit, flexible duct collars for discharge, and use of acoustical duct liners are all good installation practices that promote quite operation.
8. Cabinet insulation is rated for R-4.2 (standard). Some jurisdictions require R-6.0 on installations in a non-conditioned space. To achieve R-6.0, add insulation 1" thick to exterior of the unit to comply in these jurisdictions, putting the vapor barrier on the outside.

WARNING:

Hot water can scald. Water heated to a temperature which will satisfy space heating can scald and permanently injure a person upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, physically or mentally handicapped.

Check local, State, and National codes requiring a certain temperature water at the hot water tap. Special precautions must be used in addition to using the lowest possible temperature setting that satisfies your hot water needs. A Tempering device such as a mixing valve, should be used at the hot water taps, or water heater.

UNPACKING THE UNIT:

The unit should be unpacked on receipt and if any damage is found, follow the instructions under the "INSPECTION" section of this manual.

This air handler is completely assembled. (NOTE: Electric heat can be ordered as field installed, if field installed, refer to the separate installation instructions provided with the heater kit.) Only electrical power, thermostat wiring, hot water piping (if applicable) and duct connections are needed for installation. DX coils will also require refrigerant and condensate drain connections. Some units may have motor supports over the motor shaft. Remove these supports as necessary.

MINIMUM CLEARENCES:

These units have a 0" minimum clearance to combustible materials rating from all cabinet surfaces. The unit should be installed with serviceability clearance of 30" from the front of the unit. The unit can be serviced entirely from the front, including replacing the filter. Be sure to route primary and secondary condensate drain piping so that it does not obstruct replacement of the filter.

ARRANGEMENT:

Unit is shipped from the factory for installation in a vertical upflow or horizontal right to left air flow position (standard) or field convertible to a horizontal left to right air flow position.

Air Handler Installation Instructions

Electric and Hydronic

UPFLOW APPLICATION:
In an upflow installation the discharge outlet is at the top. Care should be taken to insure unit is level to permit proper condensate drainage. Normal upflow installation will be in a closet or basement. If installed in a closet, the closet should have a platform framed in, with an opening at the top of the platform centered in the closet. Connect the supply air outlet to a plenum. Install return air grilles from outside the closet to space below the platform. Platform must be at least 12" above the floor. If installed in a basement, run supply and return duct work in accordance with local codes.

HORIZONTAL APPLICATION:
Horizontal applications will normally be used in an attic or crawl space. This type of installation requires a return air duct be attached to the unit inlet. The opposite end of the return air duct is attached to a return air filter grille through the ceiling or wall. Remove air filter from unit if filter grille is used. The unit is shipped in right to left configuration. For left to right applications (before connecting drains, refrigerant or water piping) remove coil and doors and move horizontal pan to right side. Reinstall coil and doors.

CAUTION:
It is mandatory to use an emergency auxiliary drain pan with any coil or air handler installed in an attic or above a finished ceiling.

ELECTRICAL WIRING:
Refer to the unit nameplate for specific electrical data.

CAUTION:
Disconnect power at main fuse or circuit breaker distribution panel before wiring unit to prevent shock or fire hazard.

POWER WIRING:
Unit is suitable for use with copper conductors. Tighten all wire connectors. Take care not to damage heater ceramic insulators on electric heat models. For correct field wire size see unit nameplate and field wiring table inside electrical compartment door. Use 75°C minimum wire in unit wiring compartment. Units larger than 10 KW will require multiple sets of power conductors.

NOTE: See unit for complete wiring diagram located on blower housing.

CONTROL WIRING:
Field connections to the low voltage leads are made using appropriate field supplied wiring connectors. Consult installation instructions provided with accessory items for specific information on control wiring. Use 18 AWG minimum copper conductors for control wiring up to 50' between units. 16 AWG control conductors are recommended for lengths between 50' and 100'. Class 2 wiring is acceptable. ***Take care not to short control leads as, transformer burnout could result***. Some manufacturer's outdoor units are equipped with a 24 volt control transformer. If this type of outdoor unit is used with this air handler, use a thermostat with isolating contacts to prevent inter-connection of two separate Class 2 circuits. Set thermostat heat anticipator at 0.15 amps for units 12KW or smaller, set at .30 amps for 15 KW and larger.

VARIABLE SPEED MOTORS:
Electronic commutated and constant torque motors are factory programmed and cannot be re-programmed in the field. ECM motors have (4) jumper settings.
Refer to blower performance data located in the spec sheet for the particular product to select the tap setting that best fits the application

NOTE: All 208/230 volt motors are factory programmed for "0" second fan "ON" delay for use with electric heat. Motor must energize with electric heat. All 115 volt motors are factory programmed for "30" second fan "ON" delay for use with hydronic heat.

Air Handler Installation Instructions

Electric and Hydronic

PIPING:

HOT WATER PIPING FOR HYDRONIC AHGV UNITS:
If a residential water heater is used for space heating water, do not exceed a distance of 70' between the air handler and the water heater. The water heater should be the quick recovery type. Air handler and water heater must be located indoors and not subject to freezing temperatures.

WARNING:
Air handler must be located so that if any connections should leak, water will not cause damage to the adjacent area. When such locations can't be avoided, a suitable drain pan should be installed under the air handler, not over 1-1/2" deep, with minimum length and width at least 2" greater than the air handler dimensions and connected to an adequate drain. Under no circumstances is the manufacturer to be held libel for any water damage in connection with this air handler.

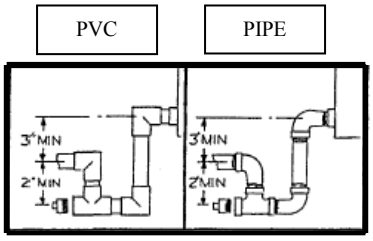
Total piping should not exceed 140'. All piping should be ¾" copper or approved PVC. It is recommended that the water shut-off valve for the water heater be located close to the water heater. Isolation valves are also recommended.
It is recommended that any devices installed, which could create a closed system, have a by-pass and/or the system have an expansion tank to relieve the pressure built up by thermal expansion in the water system.

WARNING:
Toxic chemicals such as used for treatment of boilers or non-potable water heating appliances shall never be introduced into a potable water space heating system.

WARNING:
When the system required water at temperatures higher than required for other uses, a means such as a mixing valve shall be installed to temper the water for those uses in order to reduce the scald hazard potential.

After piping has been installed, allow the system to fill with water and check connections for leaks. To insure complete filling of the system, follow start-up procedure.

CONDENSATE DRAIN PIPING:
The air handler "A" coil drain pan has two ¾" NPT female primary and two secondary connections (left or right hand). Horizontal pan has two ¾" NPT female, one primary and one secondary. Piping from each fitting used is to have 1-1/2 minimum trap and each run in such a manner as to provide enough slope for adequate drainage to a visible area. Do not pipe these two fittings together into a common drain. Cap unused connection.



Typical Condensate Traps

AIR FILTER:
A clean, appropriately sized filter must be used or system damage will occur. Filters are not supplied with this air handler, a field installed filter accessory is available.

Single Piece Air Handler Installation Instructions

Electric and Hydronic

CHECK TEST AND START UP:

HAGV UNITS Air handler with optional electric heat: The unit should be tested after the system has been completely installed to determine proper operation. Unit is equipped with heater time delay controls. If electric heater is field installed, all heating elements should turn on within one minute.

NOTE:
Circuit breakers are equipped with a visual "visi-trip" red flag indicator. If red indicator shows that circuit breaker has tripped, this indicated that a problem exists in your system which should be corrected before resetting breaker.

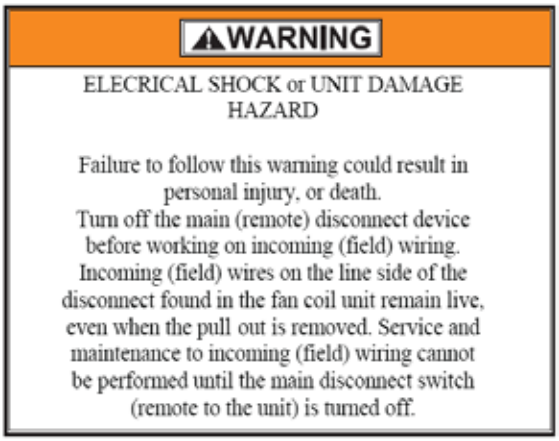
AHGV UNITS Hydronic air handler:

NOTE:
Heating system should not be switched on until system is filled and hot water coil vented.

1. Fill and pressurize the water heater and air handler.
2. The water heater should be started.
3. Vent air from the water tank by opening a hot water spigot.
4. Vent and flush the supply and return lines by attaching a hose to the volume purge valve and running purge water to a safe location. Run approximately 5 gallons of water at a high flow rate to purge.
5. Energize the unit by switching on the line voltage source and the thermostat. The fan and pump should start simultaneously. The water coil should become warm after a few minutes of operation.
6. Units are rated at temperatures of 130° -180° F. Set water source temperature at design temperature and take proper safeguards for water usage at supply points as per local codes and safety considerations.

SYSTEM SHUT-DOWN:
For short periods of time during freezing temperatures if the system is to be left unused, to prevent freezing of the air handler and piping, do the following: Do not turn the system off and leave the air handler's thermostat on in heat mode. If the water heater and air handler must be shut down for extended periods, a qualified service technician should insure that the air handler and coil are completely drained of water.

PERIODIC MAINTENANCE:
The filter must be changed monthly to permit proper airflow for safe and efficient operation. All other maintenance should be performed by a licensed technician.



ELECTRICAL DATA

Model Number	Motor Data				Electric Heater Data						Minimum Circuit Ampacity					Maximum Overcurrent Protection				
	Motor HP	Volts 1 Ph	Motor Type	Motor Amps (1)	No Circuits	Kw (2)	Amps 115V	Amps 208V	Amps 208V	Amps 240V	Amps 240V	MCA 115V	MCA 208V	MCA 208V	MCA 240V	MCA 240V	MOCP 115V (3,4)	MOCP 208V (3,4)	MOCP 208V (3,4)	MOCP 240V (3,4)	MOCP 240V (3,4)
							Cr 1	Cr 1	Cr 2	Cr 1	Cr 2	Cr 1	Cr 1	Cr 2	Cr 1	Cr 2	Cr 1	Cr 1	Cr 2	Cr 1	Cr 2
0 TO 15 Kw																					
HAGV24-00-1A HAGV36-00-1A	0.50	208/240	ECM	4.3	0	0	-	-	-	-	-	-	5.4	-	5.4	-	-	10.0	-	10.0	-
					1	5	-	18.0	-	20.8	-	-	28.8	-	30.3	-	-	35.0	-	40.0	-
					1	10	-	36.1	-	41.7	-	-	49.4	-	56.4	-	-	60.0	-	60.0	-
					2	15	-	18.0	36.1	20.8	41.7	-	26.8	49.4	30.3	56.4	-	35.0	60.0	40.0	60.0
AHGV24-0A AHGV36-0A	0.50	115	ECM	7.7	0	0	7.7	-	-	-	-	9.6	-	-	-	-	15.0	-	-	-	-
0 TO 20 Kw																					
HAGV48-00-1A HAGV60-00-1A	0.75	208/240	ECM	6.8	0	0	-	-	-	-	-	-	8.5	-	8.5	-	-	15.0	-	15.0	-
					1	5	-	18.0	-	20.8	-	-	29.3	-	32.8	-	-	35.0	-	40.0	-
					1	10	-	36.1	-	41.7	-	-	51.9	-	58.9	-	-	60.0	-	70.0	-
					2	15	-	18.0	36.1	20.8	41.7	-	29.3	51.9	32.8	58.9	-	35.0	60.0	40.0	70.0
					2	20	-	36.1	36.1	41.7	41.7	-	51.9	51.9	58.9	58.9	-	60.0	60.0	70.0	70.0
AHGV48-0A AHGV60-0A	1.00	115	ECM	12.8	0	0	12.8	-	-	-	-	16.0	-	-	-	-	20.0	-	-	-	-

(1) Motor Nameplate Amps
(2) Nominal Kw At 240V (Derate 25% For 208V)
(3) Fuse or HACR Breaker
(4) Maximum Overcurrent Device, Overcurrent Protection Installed On Breaker Models Are Sized Per MCA

HYDRONIC PERFORMANCE DATA

HOT WATER CAPACITY-BOILER LOOP 65℉ EAT 180℉ EWT 20℉ Δt (NO PUMP)									
MODEL	CFM	GPM	BTUH	LAT ℉	LWT ℉	APD IWC	WPD FT	ROWS	FPI
AHGV24-0A	600	3.4	33080	118.8	160	0.07	1.8	2	12
	800	4.1	40000	114.1		0.11	1.1		
	900	4.4	43120	112.2		0.13	1.2		
	600	4.7	45530	138.0		0.10	1.5	3	
	800	5.7	56060	132.6		0.16	2.2		
	900	6.2	60880	130.4		0.20	2.6		
AHGV36-0A	1000	4.7	45680	110.1		0.16	1.4	2	
	1200	5.2	51010	107.2		0.23	1.7		
	1400	5.7	55830	104.8		0.29	2.1		
	1000	6.7	65020	128.0		0.25	2.9	3	
	1200	7.5	73410	124.4		0.34	3.7		
	1400	8.3	81080	121.4		0.44	1.4		
AHGV48-0A	1400	6.7	65130	110.9		0.15	2.4	2	
	1600	7.3	70690	108.7		0.19	2.8		
	1800	7.8	75860	106.9		0.24	3.2		
	1400	9.5	92390	128.9		0.23	1.4	3	
	1600	10.4	101100	126.3		0.29	1.6		
	1800	11.2	109250	124.0		0.36	1.9		
	1400	11.4	111020	141.1		0.31	2.1	4	
	1600	12.6	122430	138.6		0.39	2.5		
	1800	13.7	133200	136.2		0.47	3.0		
AHGV60-0A	1800	7.8	75860	106.9		0.24	3.2	2	
	2000	8.3	80690	105.2		0.28	1.1		
	2100	8.5	83000	104.4		0.31	1.0		
	1800	9.5	92390	128.9		0.36	1.9	3	
	2000	12.0	116930	121.9		0.43	2.1		
	2100	12.4	120600	121.0		0.46	2.3		
	1800	13.7	133200	136.2		0.47	3.0	4	
	2000	14.7	143400	134.1		0.57	3.4		
	2100	12.4	120600	121.0		0.46	2.3		

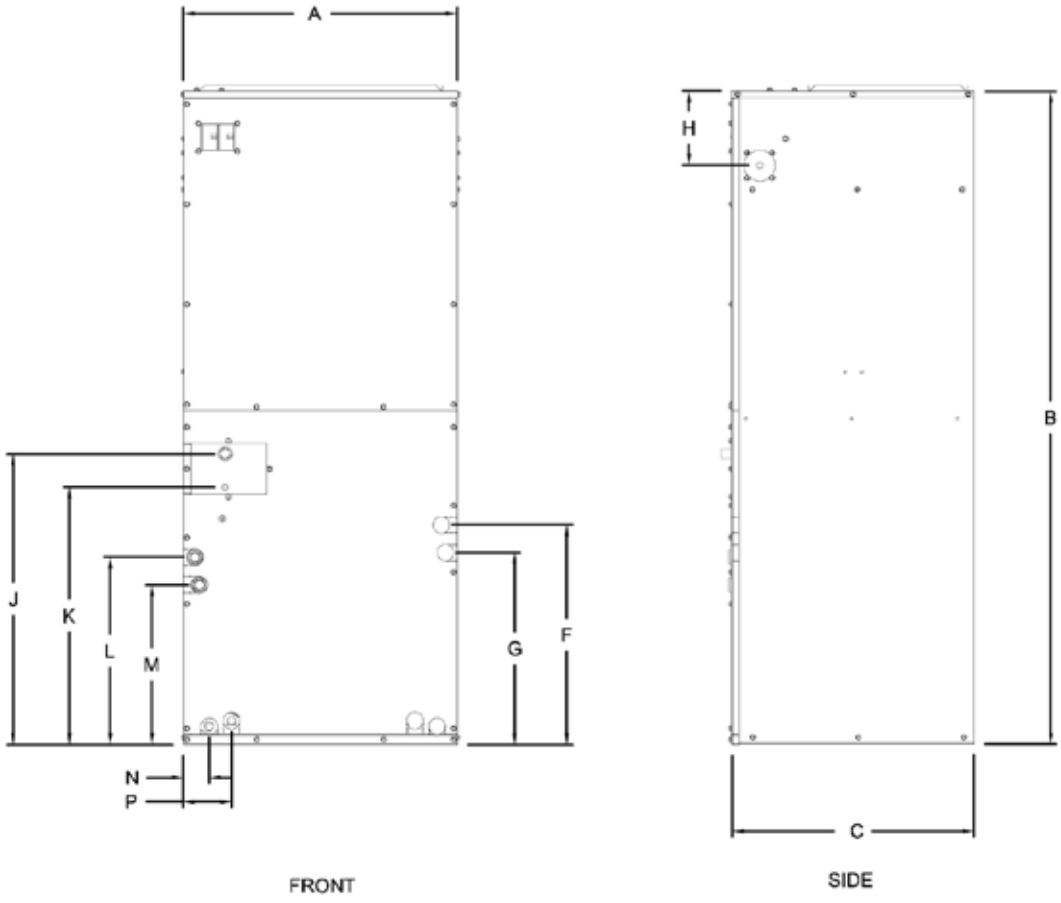
BLOWER PERFORMANCE DATA

Model Number	Model Type	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Blower Wheel	Jumper	CFM @ 0.10"	CFM @ 0.20"	CFM @ 0.30"	CFM @ 0.40"	CFM @ 0.50"
HAGV24-00-1A HAGV36-00-1A	Electric	1.5 Thru 3.0	0.50	240	10 X 7	A	1422	1421	1421	1416	1415
						B	1215	1214	1214	1214	1208
						C	898	989	989	982	969
						D	865	865	865	864	858
AHGV24-0A AHGV36-0A	Hydronic	1.5 Thru 3.0	0.50	120	10 X 7	A	1294	1255	1200	1137	1058
						B	1131	1104	1075	1082	1023
						C	974	942	909	853	831
						D	808	769	736	702	657
HAGV48-00-1A HAGV60-00-1A	Electric	3.5 Thru 5.0	0.75	240	12 X 9	A	1957	1919	1900	1871	1847
						B	1576	1565	1547	1517	1487
						C	1495	1482	1451	1432	1409
						D	1411	1385	1372	1338	1311
AHGV48-0A AHGV60-0A	Hydronic	3.5 Thru 5.0	1.00	120	12 X 9	A	2014	2007	1992	1968	1952
						B	1856	1839	1806	1788	1761
						C	1651	1632	1603	1584	1564
						D	1461	1440	1407	1396	1385

Model Number	Model Type	Nominal Tons	Motor HP	Volts 1 Ph. 50/60 Hz.	Blower Wheel	Jumper	AMPS @ 0.10"	AMPS @ 0.20"	AMPS @ 0.30"	AMPS @ 0.40"	AMPS @ 0.50"
HAGV24-00-1A HAGV36-00-1A	Electric	1.5 Thru 3.0	0.50	240	10 X 7	A	1.690	1.730	1.790	1.950	2.030
						B	1.020	1.110	1.190	1.270	1.390
						C	0.580	0.640	0.710	0.780	0.850
						D	0.440	0.510	0.570	0.640	0.690
AHGV24-0A AHGV36-0A	Hydronic	1.5 Thru 3.0	0.50	120	10 X 7	A	3.700	3.800	3.700	3.500	3.400
						B	2.700	2.800	3.000	3.100	3.200
						C	1.900	2.000	2.100	2.100	2.300
						D	1.200	1.300	1.500	1.600	1.700
HAGV48-00-1A HAGV60-00-1A	Electric	3.5 Thru 5.0	0.75	240	12 X 9	A	1.900	1.900	2.100	2.300	2.500
						B	1.100	1.200	1.400	1.500	1.600
						C	0.800	0.900	1.100	1.200	1.200
						D	0.900	1.000	1.200	1.300	1.400
AHGV48-0A AHGV60-0A	Hydronic	3.0 Thru 5.0	1.00	120	12 X 9	A	6.240	6.400	6.690	7.110	6.310
						B	4.970	5.130	5.320	5.510	5.650
						C	3.540	3.750	3.860	4.120	4.330
						D	2.580	2.720	2.850	3.070	3.290

HAGV Dimensioal Data

Air Handler with Optional Electric Heat



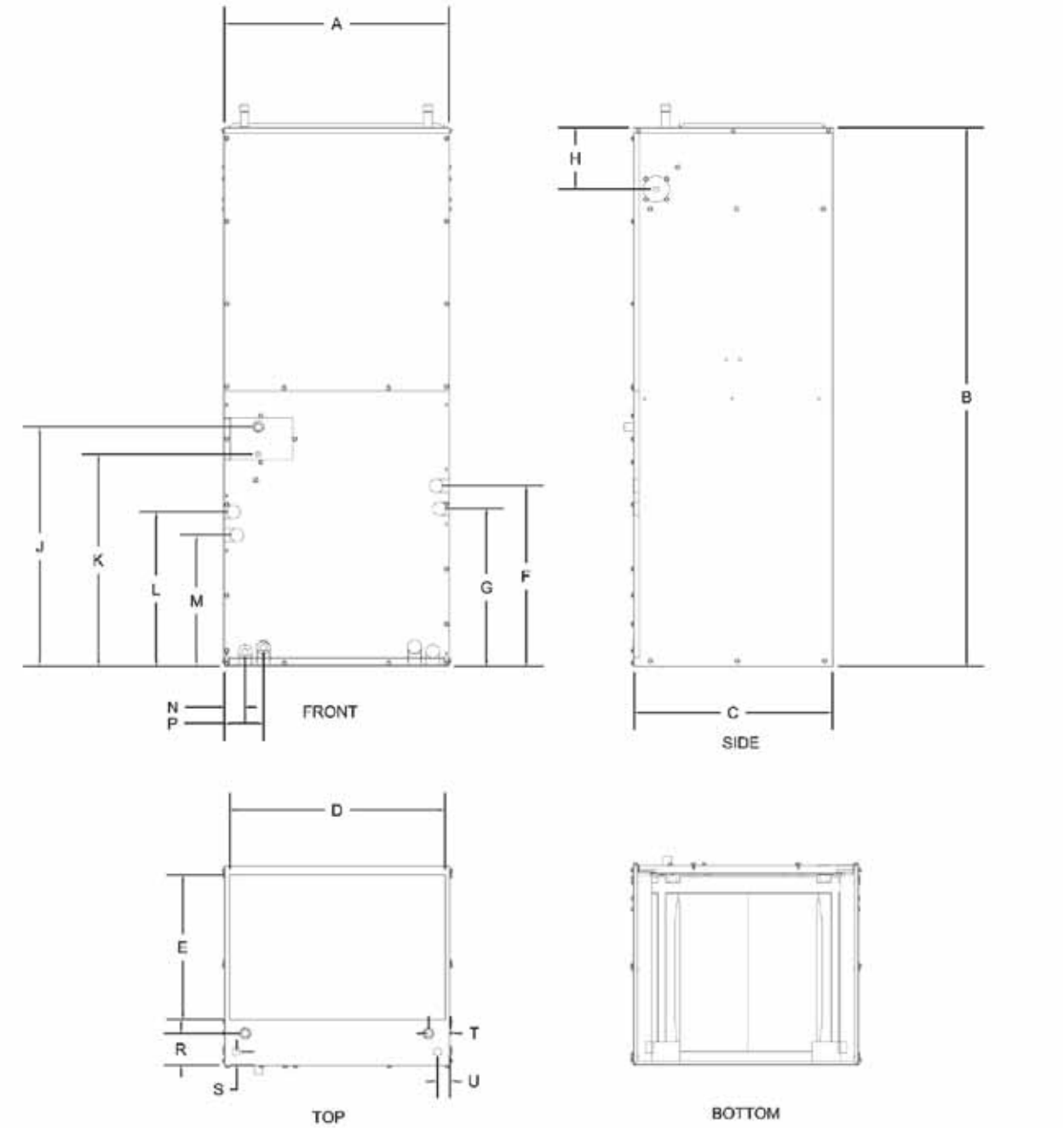
DIMENSIONS (inches)*

MODELS	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R
HAGV24-00-1A HAGV36-00-1A	21.00	48.00	21.00	19.00	12.50	14.50	13.00	6.75	20.00	17.00	12.75	10.30	2.30	4.35	5.00
HAGV48-00-1A HAGV60-00-1A	24.50	58.75	21.75	23.35	21.25	19.75	17.25	6.75	26.00	23.00	16.75	14.35	2.30	4.35	4.50

* All dimensions are approximate

AHGV Dimensioal Data

Hydronic Air Handler



DIMENSIONS (inches)*

MODELS	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
AHGV24/36	21.00	48.00	21.00	19.00	15.00	14.50	13.00	6.75	20.00	17.00	13.00	10.30	2.30	4.35	3.75	1.75	2.50	1.50
AHGV48/60	24.50	58.75	21.75	23.50	15.75	19.75	17.25	6.75	26.00	23.00	16.75	14.35	2.30	4.35	3.50	1.50	2.25	1.25

* All dimensions are approximate

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

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THE QUALITY LEADER IN CONDITIONING AIR

www.heatcontroller.com

6/2009