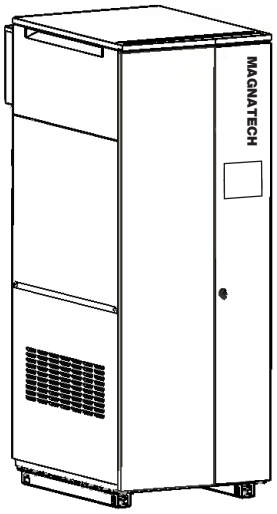
Volume Water Heater

Brute MagnaTech®

BMGV	Volume Water Heater

Indoor / Outdoor, Sizes 1600 - 4000



Date:

Project #:

Engineer:

Prepared By:

Bid Date:

BRADFORD WHITE®

Submittal Data

Project Name:

Location:

Contractor:

Standard Features

- ASME "HLW" stamp
- 160 psi maximum working pressure
- Meets NSF/ANSI-372 Low Lead Content certification
- Certified for Category IV vent
- Indoor / Outdoor
- Low NOx system exceeds the most stringent regulations for air quality - 9ppm NOx
- High condensing efficiency
- Modulation down to 20% of full fire (5:1 turndown)
- Sophisticated gas/air valve allows for constant control of modulation
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Stainless steel heat exchanger with welded construction
- Electronic PID modulating control with large touchscreen and color display
- Multiple independent heat demands
- Controller cascades with up to eight (total) MagnaTech units, if equipped with the same controller
- Accepts 4-20ma or 0-10VDC external modulation or external set point control
- Modbus RTU & BACnet MSTP on board
- Domestic water pump control with time delay
- Sensor for DHW tank
- Horizontal or vertical direct vent
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- "Knock-down" feature: Removable top section for easy handling and installation
- High and low gas pressure switches
- Vent temperature cutoff
- Normally open alarm contact
- Air filter
- Built-in condensate trap
- Water flow switch
- Temperature & pressure gauge
- Low water cutoff
- 125 psi (861kPa) ASME rated pressure relief valve
- Groove lock fittings (optional flange adapter)
- Burner site glass
- 10-Year limited warranty

Heater Data

Number of Units

Fuel

- ☐ Natural
- ☐ Propane

Voltage

- ☐ 120V, single ph (1600-2000)
- ☐ 208V, single ph (1600-2000)
- ☐ 220/240V, single ph (1600-2000)
- ☐ 208V, three ph (2000-4000)
- ☐ 480V, three ph (2000-4000)
- ☐ 600V, three ph (2000-4000)

Factory Mounted Options

- ☐ ASME CSD-1
- ☐ ASME "H" Stamp (instead of standard "HLW" Stamp)
- ☐ BACnet IP gateway
- ☐ LonWorks gateway
- ☐ Additional auto & manual reset high limit switches
- ☐ Alarm bell with silence switch
- ☐ Groove lock to flange connections
- ☐ 125 psi pressure relief valve (std)
- ☐ 30 psi pressure relief valve
- ☐ 50 psi pressure relief valve
- ☐ 60 psi pressure relief valve
- ☐ 75 psi pressure relief valve
- ☐ 150 psi pressure relief valve

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Accessories for Field Mounting

- ☐ Gateway for BACnet IP
- ☐ Gateway for LonWorks
- ☐ Condensate neutralizer
- ☐ Condensate neutralizer with pump
- ☐ Vent terminal for outdoor unit
- ☐ Screen for outdoor unit air
- ☐ Vent terminal for horizontal stainless steel vent
- ☐ Screen for vertical stainless steel vent
- ☐ Screen for horizontal CPVC vent
- ☐ Screen for vertical CPVC vent
- ☐ Screen for horizontal polypropylene vent
- ☐ Screen for vertical polypropylene vent
- ☐ Screen/adapter for vertical or horizontal PCV ducted air
- ☐ Screen for horizontal galvanized or vertical ducted air
- ☐ Screen for horizontal polypropylene ducted air
- ☐ Screen for vertical polypropylene ducted air

Sizing Data

	Model	Minimum Input Rate		Maximum Input Rate		Minimum Output Rate		Maximum Output Rate		Thermal Efficiency
		MBH	***kw***	**MBH**	***kw***	**MBH**	***kw***	**MBH**	***kw***	**%**
☐	**1600**	320	*93.8*	1600	*469*	304	*89.1*	1520	*445*	96
☐	**2000**	400	*117.2*	1999	*586*	379	*111.0*	1895	*555*	96
☐	**2500**	500	*146.5*	2499	*732*	475	*139.2*	2374	*696*	96
☐	**3000**	600	*175.8*	3000	*879*	563	*165.0*	2814	*825*	95
☐	**3500**	700	*205.1*	3500	*1025*	655	*191.9*	3276	*960*	96
☐	**4000**	800	*234.4*	4000	*1172*	760	*222.7*	3800	*1113*	96

Model	Product Weight		Operating Weight		Shipping Weight		Water Content	
	lbs	***kg***	**lbs**	***kg***	**lbs**	***kg***	**gal**	***l***
1600	1390	*630*	1562	*709*	1590	*721*	22	*83*
2000	1390	*630*	1562	*709*	1590	*721*	22	*83*
2500	1785	*810*	2039	*925*	1985	*900*	31	*117*
3000	1785	*810*	2039	*925*	1985	*900*	31	*117*
3500	2278	*1033*	2742	*1244*	2478	*1124*	56	*212*
4000	2278	*1033*	2742	*1244*	2478	*1124*	56	*212*

Clearances

	Clearance to Combustibles		Suggested Service Clearance	
	inches	*cm*	inches	*cm*
Front	18	*46*	24	*61*
Back	11	*28*	24	*61*
Left	4	*10*	8	*20*
Right	4	*10*	8	*20*
Top	1	*2.5*		

Suggested Top Service Clearance by Model

1600/2000		2500/3000		3500/4000	
inches	*cm*	inches	*cm*	inches	*cm*
12	*30*	15	*38*	24	*61*

Electrical Data

Size	**1600**			**2000**					
Voltage	**120**	**240/220**	**208 1Φ**	**120**	**240/220**	**208 1Φ**	**208 3Φ**	**480**	**600**
FLA	**6.2**	**3.4**	**3.6**	**18.6**	**10.1**	**12.5**	**7.5**	**3.5**	**4.4**
MCA	**7.8**	**4.2**	**4.5**	**23.3**	**12.7**	**15.6**	**9.4**	**4.4**	**5.5**
MOP	**20**	**15**	**15**	**30**	**25**	**25**	**15**	**15**	**15**

Size	**2500/3000**			**3500/4000**			
Voltage	**208 3Φ**	**480 3Φ**	**600 3Φ**	**208 3Φ**	**480**	**600**	
FLA	**9.5**	**4.4**	**3**	**9.9**	**3.6**	**4.5**	**Full Load Amperage**
MCA	**12**	**6**	**4**	**12**	**5**	**6**	**Minimum Circuit Ampacity**
MOP	**20**	**15**	**15**	**20**	**15**	**15**	**Max Over-current Protection**

Vent System

Model	Air Pipe Size		Maximum Ducted Air Pipe Length		Category IV Vent Pipe Size		Maximum Category IV Vent Pipe Length	
	inches	*cm*	ft*	*m*	inches	*cm*	ft*	*m*
1600	6	*15*	100	*30.5*	6	*15*	100	*30.5*
2000	8	*20*	100	*30.5*	8	*20*	100	*30.5*
2500	8	*20*	100	*30.5*	8	*20*	100	*30.5*
3000	10	*25*	100	*30.5*	10	*25*	100	*30.5*
3500	10	*25*	100	*30.5*	10	*25*	100	*30.5*
4000	12	*30*	100	*30.5*	12	*30*	100	*30.5*

*Equivalent Feet: Equivalent Feet: To calculate maximum equivalent length, measure the linear feet of the pipe and add 5 feet (1.5m) for each elbow used.
Category II pipe size may vary. Draft must remain between -0.01 and -0.001" w.c..

Notes:

1. Installations in the U.S. require exhaust vent pipe that is CPVC complying with ANSI/ASTM D1785 F441, stainless steel complying with UL1735, or polypropylene complying with ULC S636.
2. Installations in Canada require exhaust vent pipe that is certified to ULC S636.
3. Intake (air) pipe must be PVC or CPVC that complies with ANSI/ASTM D1785 F441, ABS that complies with ANSI/ASTM D1527, stainless steel, or galvanized material.

Water Flow Requirements

Water Hardness
1-10 grains per gallon

Model	Flow Rate	Temp Rise	Headloss*	*Flow Rate*	*Temp Rise*	*Headloss**
	GPM	**°F**	**Ft**	*LPM*	*°C*	*m*
1600	**152**	**20**	**31.0**	*525*	*11.1*	*10.1*
2000	**152**	**25**	**33.0**	*575*	*14*	*10.1*
2500	**190**	**25**	**33.7**	*719*	*13.9*	*10.0*
3000	**190**	**30**	**36.0**	*719*	*17*	*11.0*
3500	**222**	**30**	**30.6**	*839*	*17*	*9.0*
4000	**224**	**34**	**30.0**	*848*	*19*	*9.1*

* Allowable pH: 6.5 to 9.5
Headloss is for the heater only (no piping)

Water Hardness
11-15 grains per gallon

Model	Flow Rate	Temp Rise	Headloss*	*Flow Rate*	*Temp Rise*	*Headloss**
	GPM	**°F**	**Ft**	*LPM*	*°C*	*m*
1600	**177**	**17**	**41.0**	*670*	*9.4*	*12.5*
2000	**177**	**21**	**43.9**	*670*	*12*	*13.4*
2500	**220**	**21**	**46.0**	*833*	*11.7*	*14*
3000	**220**	**26**	**46.0**	*833*	*14*	*14*
3500	**266**	**25**	**40.6**	*1007*	*14*	*12*
4000	**266**	**29**	**41.2**	*1007*	*16*	*12.6*

* Allowable pH: 6.5 to 9.5
Headloss is for the heater only (no piping)

Recovery Data

Temperature Rise

Model	40°F	50°F	60°F	70°F	80°F	90°F	100°F
	GPH	**GPH**	**GPH**	**GPH**	**GPH**	**GPH**	**GPH**
1600	**4562**	**3649**	**3041**	**2607**	**2281**	**2027**	**1825**
2000	**5702**	**4562**	**3802**	**3258**	**2851**	**2534**	**2281**
2500	**7128**	**5702**	**4752**	**4073**	**3564**	**3168**	**2851**
3000	**8553**	**6843**	**5702**	**4888**	**4277**	**3802**	**3421**
3500	**9979**	**7983**	**6653**	**5702**	**4989**	**4435**	**3992**
4000	**11405**	**9124**	**7603**	**6517**	**5702**	**5069**	**4562**

Temperature Rise

Model	*22°C*	*28°C*	*33°C*	*39°C*	*44°C*	*50°C*	*56°C*
	LPH	*LPH*	*LPH*	*LPH*	*LPH*	*LPH*	*LPH*
1600	*17268*	*13815*	*11512*	*9868*	*8634*	*7675*	*6907*
2000	*21585*	*17268*	*14390*	*12335*	*10793*	*9594*	*8634*
2500	*26982*	*21585*	*17988*	*15418*	*13491*	*11992*	*10793*
3000	*32378*	*25902*	*21585*	*18502*	*16189*	*14390*	*12951*
3500	*37775*	*30219*	*25184*	*21584*	*18885*	*16788*	*15111*
4000	*43171*	*34537*	*28781*	*24669*	*21585*	*19187*	*17268*

Dimensional Data

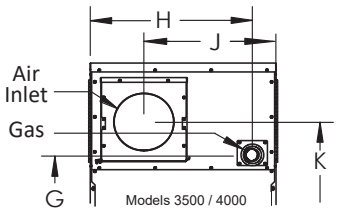
Model	A	B	C	D	E	G	H	J
1600	29.3 (*75*)	79.8 (*203*)	38.0 (*96*)	57.5 (*147*)	49.8 (*126*)	60.8 (*154*)	2.6 (*7*)	8.4 (*21*)
2000	29.3 (*75*)	79.8 (*203*)	38.0 (*96*)	57.5 (*147*)	49.8 (*126*)	60.8 (*154*)	2.6 (*7*)	8.4 (*21*)
2500	30.8 (*78*)	87.0 (*221*)	41.5 (*105*)	60.5 (*154*)	60.8 (*154*)	71.0 (*180*)	4.0 (*10*)	9.8 (*25*)
3000	30.8 (*78*)	87.0 (*221*)	41.5 (*105*)	60.5 (*154*)	60.8 (*154*)	71.0 (*180*)	4.0 (*10*)	9.8 (*25*)
3500	34.5 (*88*)	97.0 (*246*)	52.0 (*133*)	70.0 (*178*)	60.8 (*154*)	80.8 (*205*)	28.8 (73)	26.5 (67)
4000	34.5 (*88*)	97.0 (*246*)	52.0 (*133*)	70.0 (*178*)	60.8 (*154*)	80.8 (*205*)	28.8 (73)	26.5 (67)

inches (cm)

Model	K	N	P	Q	R	S	T	U
1600	67.4 (*171*)	30.4 (*77*)	16.0 (*41*)	23.0 (*58*)	10.2 (*26*)	14.0 (*36*)	13.0 (*33*)	6.3 (*16*)
2000	67.4 (*171*)	30.4 (*77*)	16.0 (*41*)	23.0 (*58*)	10.2 (*26*)	14.0 (*36*)	13.0 (*33*)	6.3 (*16*)
2500	76.4 (*194*)	34.5 (*88*)	17.7 (*45*)	27.2 (*69*)	11.8 (*30*)	18.3 (*46*)	14.8 (*38*)	6.0 (*15*)
3000	76.8 (*195*)	34.5 (*88*)	17.7 (*45*)	27.2 (*69*)	11.8 (*30*)	18.3 (*46*)	14.8 (*38*)	6.0 (*15*)
3500	85.6 (*217*)	40.0 (*102*)	21.6 (*55*)	30.7 (*78*)	13.0 (*33*)	16.0 (*41*)	17.4 (*44*)	6.7 (*17*)
4000	85.6 (*217*)	40.0 (*102*)	21.6 (*55*)	30.7 (*78*)	13.0 (*33*)	16.0 (*41*)	17.4 (*44*)	6.7 (*17*)

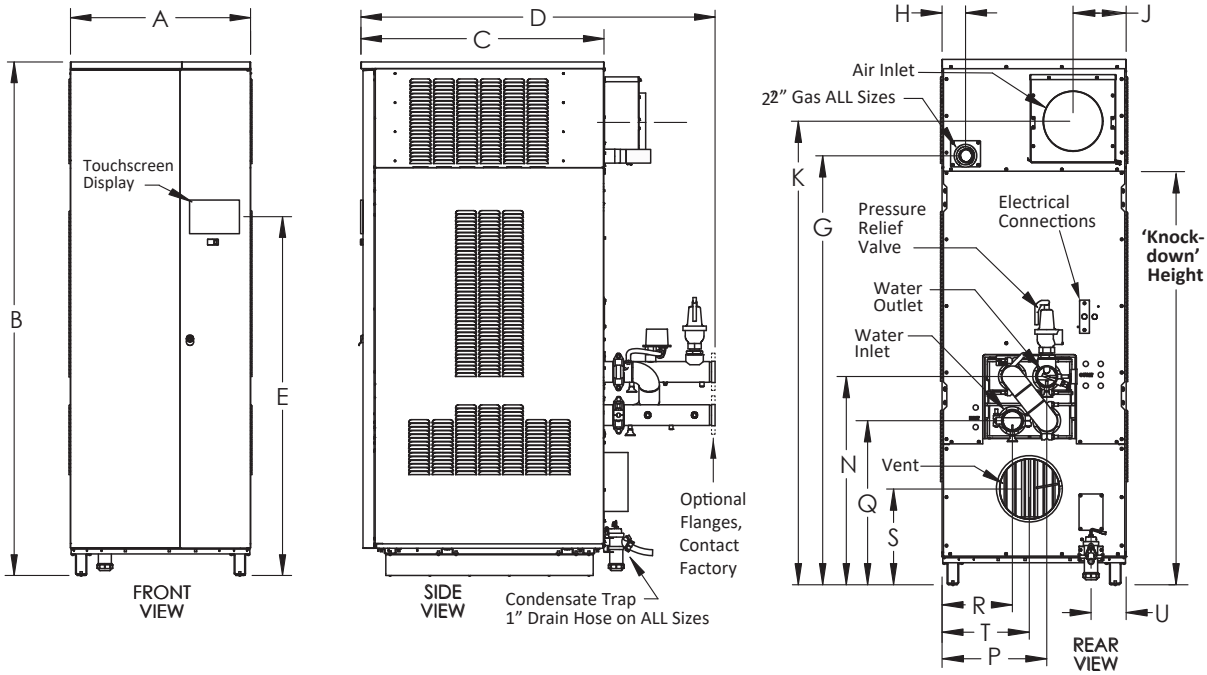
inches (cm)

Model	Vent Collar Diameter	Air Inlet Collar Diameter	'Knockdown' Height	Water Connection	Gas Connection	Condensate Line
1600	6 (*15*)	6 (*15*)	60.8 (*154*)	3" groove lock (opt. flange)	2" NPT	1"
2000	8 (*20*)	8 (*20*)	60.8 (*154*)	3" groove lock (opt. flange)	2" NPT	1"
2500	8 (*20*)	8 (*20*)	71.0 (*180*)	3" groove lock (opt. flange)	2" NPT	1"
3000	10 (*25*)	10 (*25*)	71.0 (*180*)	3" groove lock (opt. flange)	2" NPT	1"
3500	10 (*25*)	10 (*25*)	80.8 (*205*)	4" groove lock (opt. flange)	2" NPT	1"
4000	12 (*30*)	12 (*30*)	80.8 (*205*)	4" groove lock (opt. flange)	2" NPT	1"



Models 3500 and 4000 differ from the other sizes in the location of their Air Inlet and Gas Supply.

MagnaTech



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