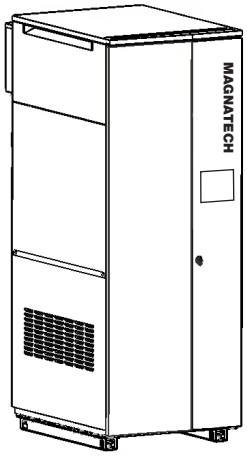
Brute MagnaTech® HTD

Hydronic Boiler

BMGH	Hydronic Boiler

Indoor / Outdoor, Sizes 1600 - 4000



Date:

Project #:

Engineer:

Prepared By:

Bid Date:

BRADFORD WHITE®

Submittal Data

Project Name:

Location:

Contractor:

Standard Features

- ASME "H" stamp
- 160 psi maximum working pressure
- Certified for Category II and Category IV vent systems
- Indoor / Outdoor
- Low NOx system exceeds the most stringent regulations for air quality - 9ppm NOx
- High condensing efficiency
- Modulation down to 5% of full fire (20:1 turndown)
- Sophisticated gas/air valve allows for constant control of modulation
- Real-Time O_2 sensing maintains efficiency throughout the modulation range
- 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
- Variable speed boiler pump control with fixed Delta T control for variable flow through boiler
- Controller cascades with up to eight 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
- Multiple pump control for boiler pump, system pump, and indirect domestic water pump, each with delay
- Indirect water heater priority
- Sensor for indirect DHW tank
- Outdoor reset with air sensor
- 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
- 75 psi (517kPa) ASME rated pressure relief valve
- Groove lock fittings (optional flange adapter)
- Burner site glass
- 10-Year limited warranty

Boiler Data

Number of Units

Fuel

☐ Natural

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
☐ BACnet IP gateway
☐ LonWorks gateway
☐ Additional auto & manual reset high limit switches
☐ Alarm bell with silence switch
☐ Groove lock to flange connections
☐ 75 psi pressure relief valve (std)
☐ 30 psi pressure relief valve
☐ 50 psi pressure relief valve
☐ 60 psi pressure relief valve
☐ 125 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	Combustion Efficiency
		MBH	***kw***	**MBH**	***kw***	**MBH**	***kw***	**MBH**	***kw***	**%**	**%**
☐	**1600**	80	*23.4*	1600	*469*	76	*22.3*	1520	*445*	95	96.0
☐	**2000**	100	*29.3*	1999	*586*	95	*27.8*	1895	*555*	95	93.6
☐	**2500**	125	*36.6*	2499	*732*	119	*34.9*	2374	*696*	95	93.8
☐	**3000**	150	*44.0*	3000	*879*	141	*41.3*	2814	*825*	95	93.8
☐	**3500**	175	*51.3*	3500	*1025*	164	*48.1*	3276	*960*	95	93.6
☐	**4000**	200	*58.6*	4000	*1172*	190	*55.7*	3800	*1113*	95	93.1

Model	Product Weight		Operating Weight		Shipping Weight		Water Content	
	lbs	***kg***	**lbs**	***kg***	**lbs**	***kg***	**gal**	***l***
1600	1410	*640*	1582	*718*	1610	*731*	22	*83*
2000	1410	*640*	1582	*718*	1610	*731*	22	*83*
2500	1810	*822*	2064	*937*	2010	*913*	31	*117*
3000	1810	*822*	2064	*937*	2010	*913*	31	*117*
3500	2325	*1056*	2789	*1266*	2525	*1146*	56	*212*
4000	2325	*1056*	2789	*1266*	2525	*1146*	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**
MCA	**12**	**6**	**4**	**12**	**5**	**6**
MOP	**20**	**15**	**15**	**20**	**15**	**15**

Full Load Amperage
Minimum Circuit Ampacity
Max Over-current Protection

Vent Information

Model	Vent / Air Connector Size		Air Pipe Size		Maximum Ducted Air Pipe Length		Category IV Vent Pipe Size		Maximum Category IV Vent Pipe Length		Typical Category II Vent Pipe Size***	
	inches	*cm*	inches	*cm*	ft**	*m*	inches	*cm*	ft**	*m*	inches	*cm*
1600	6	*15*	6	*15*	100	*30.5*	6 8*	*15* *20**	50 100	*15.2* *30.5*	14 14	*36* *36*
2000	8	*20*	8	*20*	100	*30.5*	8	*20*	100	*30.5*	14	*36*
2500	8	*20*	8	*20*	100	*30.5*	8 10*	*20* *25**	50 100	*15.2* *30.5*	18 18	*46* *46*
3000	10	*25*	10	*25*	100	*30.5*	10	*25*	100	*30.5*	18	*46*
3500	10	*25*	10	*25*	100	*30.5*	10 12*	*25* *30**	50 100	*15.2* *30.5*	22 22	*56* *56*
4000	12	*30*	12	*30*	100	*30.5*	12	*30*	100	*30.5*	22	*56*

*A vent increaser at the boiler outlet is required

**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: 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

English

Size	Output Max Btu/hr	25°F		30°F		35°F		40°F	
		Flow GPM	Head Loss* Feet	Flow GPM	Head Loss* Feet	Flow GPM	Head Loss* Feet	Flow GPM	Head Loss* Feet
1600	1,504,000	122	19.4	100	14	87	10	76	8
2000	1,883,000	150	30	128	23.5	109	17.1	95	13.6
2500	2,374,000	190	34	158	23.6	136	17.6	119	13.6
3000	2,814,000	226	47	190	34.2	164	25.8	142	18.9
3500	3,276,000	266	41	222	30.6	190	23.6	166	18.6
4000	3,724,000	300	48	255	38.2	218	28.5	190	22.5

*Headloss is for boiler only (no piping)

Metric

Size	Output Max kW	14°C		17°C		19°C		22°C	
		Flow LPM	Head Loss* m	Flow LPM	Head Loss* m	Flow LPM	Head Loss* m	Flow LPM	Head Loss* m
1600	441	461.8	5.9	378.5	4.3	329.3	3.0	287.7	2.4
2000	552	567.8	9.1	484.5	7.2	412.6	5.2	359.6	4.1
2500	696	719.2	10.4	598.1	7.2	514.8	5.4	450.5	4.1
3000	825	855.5	14.3	719.2	10.4	620.8	7.9	537.5	5.8
3500	960	1006.9	12.5	840.4	9.3	719.2	7.2	628.4	5.7
4000	1,091	1135.6	14.6	965.3	11.6	825.2	8.7	719.2	6.9

*Headloss is for boiler only (no piping)

Min Allowable Flow Rates

Size	Output Min BTU/Hr	Flow* GPM	Flow* LPM	Output Min K/W
1600	80,000	8	30	23.5
2000	100,000	11	42	29.5
2500	125,000	13	49	36.7
3000	150,000	16	61	44
3500	175,000	18	68	51.3
4000	200,000	21	79	58.7

*To operate at these minimum flow rates, the flow switch may need to be adjusted or replaced

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*)	97.5 (*248*)	52.0 (*133*)	70.0 (*178*)	60.8 (*154*)	81.3 (*207*)	7.0 (*18*)	8.3 (*21*)
4000	34.5 (*88*)	97.5 (*248*)	52.0 (*133*)	70.0 (*178*)	60.8 (*154*)	81.3 (*207*)	7.0 (*18*)	8.3 (*21*)

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	86.4 (*219*)	40.0 (*102*)	21.6 (*55*)	30.7 (*78*)	13.0 (*33*)	16.0 (*41*)	17.4 (*44*)	6.7 (*17*)
4000	86.4 (*219*)	40.0 (*102*)	21.6 (*55*)	30.7 (*78*)	13.0 (*33*)	16.0 (*41*)	17.4 (*44*)	6.7 (*17*)

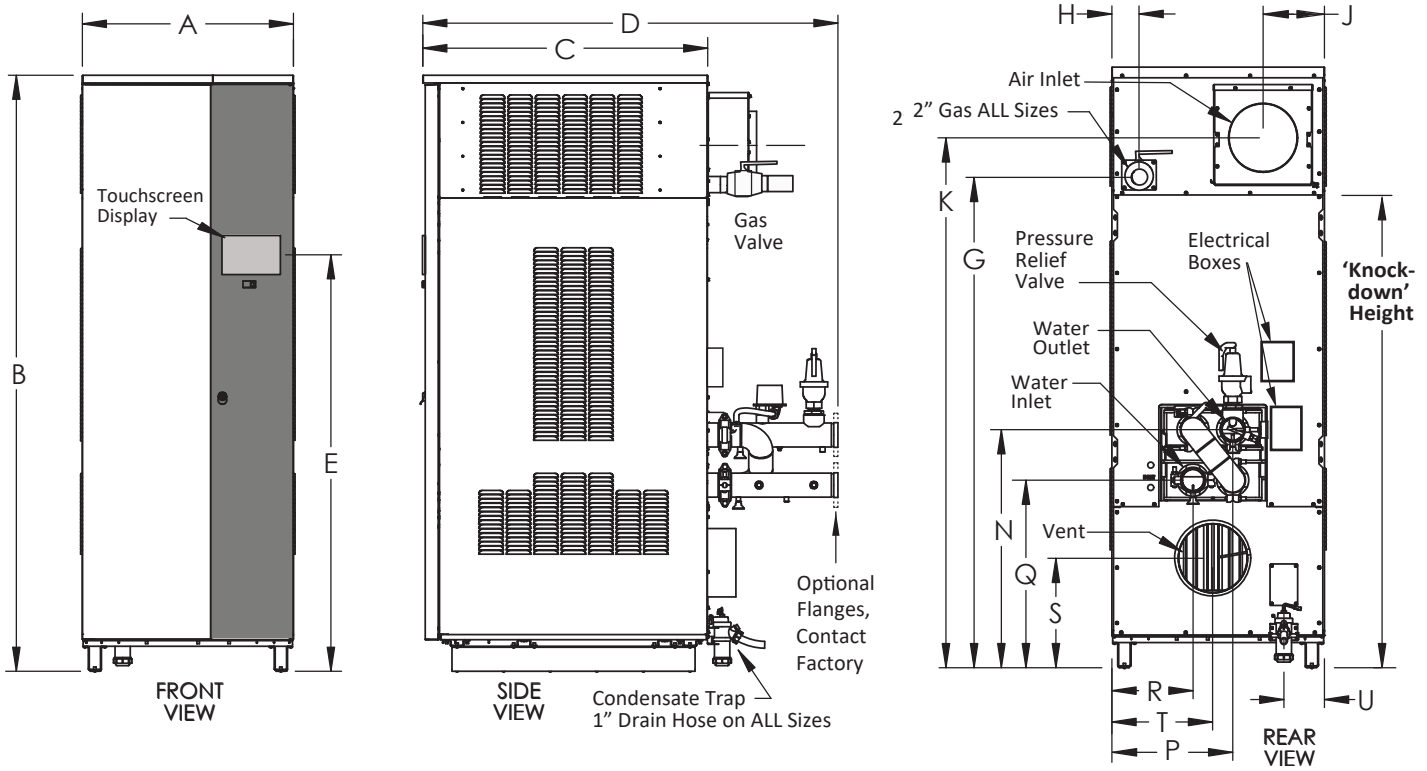
inches (cm)

Model	*Vent Collar Diameter	*Air Inlet Collar Diameter	'Knockdown' Height	Water Connection
1600	6 (*15*)	6 (*15*)	60.8 (*154*)	3" groove lock (opt. flange)
2000	8 (*20*)	8 (*20*)	60.8 (*154*)	3" groove lock (opt. flange)
2500	8 (*20*)	8 (*20*)	70.1 (*180*)	3" groove lock (opt. flange)
3000	10 (*25*)	10 (*25*)	70.1 (*180*)	3" groove lock (opt. flange)
3500	10 (*25*)	10 (*25*)	80.8 (*205*)	4" groove lock (opt. flange)
4000	12 (*30*)	12 (*30*)	80.8 (*205*)	4" groove lock (opt. flange)

* Collar dimension only.
Refer to section 1.G for vent and air pipe sizes.

inches *(cm)*

Brute MagnaTech® HTD



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