Boiler and Volume Water Heater Pocket Catalog

Built to be the Best™

BRADFORD WHITE®
WATER HEATERS

BRADFORD WHITE®
WATER HEATERS

Ambler, PA

Visit us on the web at: www.bradfordwhite.com

For questions regarding where to purchase water heaters or who your local Bradford White representative is, contact the
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800-523-2931 • Fax: 215-641-1670

For questions regarding tank and/or parts warranty and limitations on warranties, contact our
24/7 Warranty Support:
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BVWHPC-0316

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BVWHPC-0316

Manufacturing and Training Facility

The company's 120,000 sq. ft. manufacturing facility in Rochester, New Hampshire is where the design, testing, and manufacturing of Bradford White boilers and volume water heaters take place. This facility includes a state-of-the-art training facility and engineering lab where boilers can be live fired in a 'hands-on' learning environment.

Manufacturing Facility

Training Facility

Committed to American Manufacturing, Wholesale Distribution, and Professional Installation.

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Bradford White's Complete Line of Residential and Commercial Boilers and Volume Water Heaters

Bradford White's hydronic boilers and volume water heaters are available in a wide range of sizes and are suitable for nearly every application. Our comprehensive line-up includes products with inputs of 50,000 to 4,000,000 BTU/Hr. and thermal efficiencies as high as 98%. Each one is ruggedly built for long service life and offers a contractor-friendly design for easy installation. You can count on innovative heat transfer technology and advanced control features that maximize efficiency. Look to the Brute™ Series from Bradford White for a solution to your next residential or commercial application.

For complete information on our residential and commercial boiler and volume water heater line, please visit **www.bradfordwhite.com**.

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The Brute™ Deluxe

200–400 Series

Residential and Light Duty Commercial Boilers and Volume Water Heaters

The Brute™ LX

Combination Boiler and Water Heater

Energy-Saving Home Heating and Hot Water in One

The Brute™ 150–850

Residential and Commercial Volume Water Heaters

Highly Versatile, Energy-Saving Solutions for Large Volumes of Hot Water

The Brute MagnaTech™

Featuring Variable Speed Pump Control

Commercial, High Efficiency Condensing Boiler and Volume Water Heater

A Perfect Balance of Size, Form, and Function

Product Highlights

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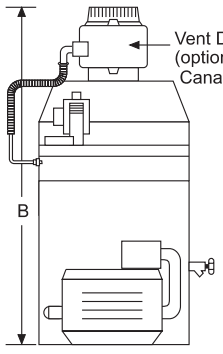
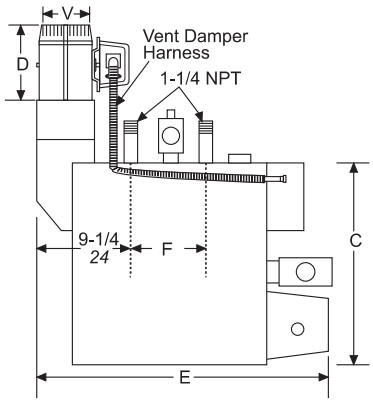
Brute™ Mini
Residential Boiler

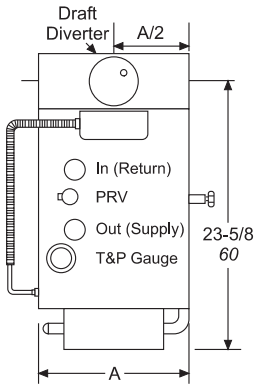
The Brute™ Mini boilers are well-known for economy, durability, and the capacity to keep the largest homes comfortable on the coldest days.

- Spark ignition
- Efficient up to 85% AFUE
- Built-in draft diverter and automatic vent
- Low-mass heat exchanger results in super-quick heating response
- Very compact to save space
- Easy to install, reliable, and proven in the field over many years
- Has a unique hybrid and two-pass heat exchanger design
- 20-Year pro-rated heat exchanger warranty



Dimensions shown in inches *cm*





Brute™ Mini Specifications

Model	Input MBTU/hr	Input *kW*	Heat Capacity MBTU/hr Natural	Heat Capacity MBTU/hr Propane	Heat Capacity kw *Natural*	Heat Capacity kw *Propane*	AFUE % Natural	AFUE % Propane
BJVS050	50	*14.7*	43	43	*12.6*	*12.6*	85.0	85.4
BJVS075	75	*22.0*	64	64	*18.8*	*18.8*	85.0	85.2
BJVS100	100	*29.3*	85	85	*24.9*	*24.9*	85.0	85.0
BJVS125	125	*36.6*	106	106	*31.1*	*31.1*	85.0	85.0
BJVS160	160	*46.9*	136	136	*39.8*	*39.8*	85.0	85.0
BJVS225	225	*65.9*	191	190	*56.0*	*55.7*	85.0	85.0

	Dimensions														Water Connection	Gas Connection	Approx. Weight	
	A		B		C		D		E		F		V					
Model	inches	*cm*	inches	*cm*	inches	*cm*	inches	*cm*	inches	*cm*	inches	*cm*	inches	*cm*	inches	inches	lbs.	*kg*
BJVS050	13⅜	*34*	27¾	*71*	23⅝	*60*	6	*15*	26½	*67*	7	*18*	4	*10*	1¼	½	120	*54*
BJVS075	13⅜	*34*	27¾	*71*	24⅛	*61*	6	*15*	27½	*70*	7	*18*	5	*13*	1¼	½	126	*57*
BJVS100	16⅞	*43*	28¾	*73*	24⅛	*61*	6	*15*	27½	*70*	7	*18*	5	*13*	1¼	½	134	*61*
BJVS125	16⅞	*43*	28¾	*73*	23⅝	*60*	6	*15*	27½	*70*	7	*18*	6	*15*	1¼	½	138	*63*
BJVS160	20⅝	*52*	28¾	*73*	23⅝	*60*	6	*15*	27½	*70*	7	*18*	6	*15*	1¼	½	164	*74*
BJVS225	20⅝	*65*	31½	*80*	23¼	*59*	6¾	*17*	27½	*70*	8	*20*	7	*18*	1¼	¾*	181	*82*

*BJVS225 uses 1/2" NPT gas connection for propane

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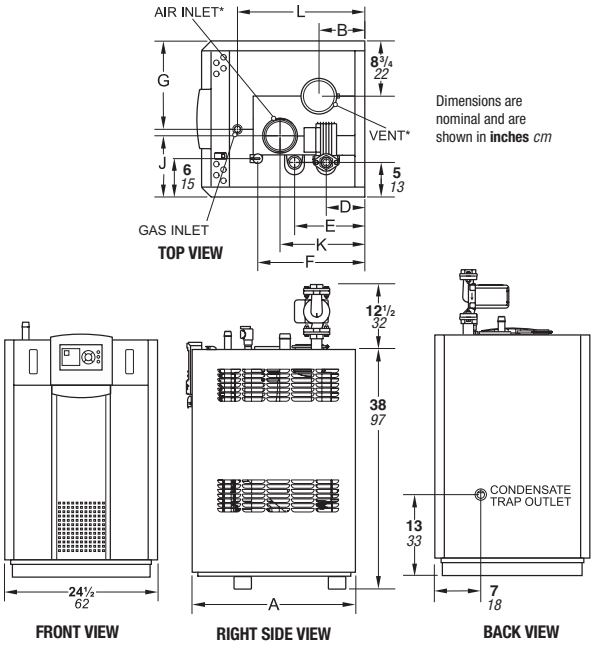
Brute™ Series
Residential Modulating, Condensing Boiler

High in efficiency and low in emissions, the Brute™ Series condensing boiler is a fully packaged, spacesaving hydronic solution. ENERGY STAR® Most Efficient rated, the Brute™ Series offers 95%+ AFUE to make it everything a modern boiler should be — easy-to-use, easy on the environment, powerful, and compact.

- Floor standing condensing boiler
- All connections are on top of unit
- Stainless steel heat exchanger
- Rated for alcove and closet installations
- Will qualify for Energy Rebates
- 95%+ AFUE
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Integrated Control System
- 80 to 210 MBH sizes
- Low NOx system exceeds the most stringent regulations for air quality — 10 ppm NOx
- Horizontal or vertical direct vent
- Easy to use and easy on the environment
- Easy to service
- Warranties: 12-Year heat exchanger + 2-Year parts



Brute™ Series Specifications

Model	A in.	A *cm*	B in.	B *cm*	Water Inlet D in.	Water Inlet D *cm*	Water Outlet E in.	Water Outlet E *cm*	PRV Outlet F in.	PRV Outlet F *cm*	G in.	G *cm*	J in.	J *cm*	K in.	K *cm*	L in.	L *cm*	Air Inlet Diameter* in.	Air Inlet Diameter* *cm*	Vent Diameter* in.	Vent Diameter* *cm*
BNTH080	19½	*49*	9½	*24*	7½	*19*	11	*28*	10¾	*35*	13¾	*35*	3½	*9*	11¾	*30*	13½	*34*	25¼	*97*	2	*5*
BNTH105	19½	*49*	8½	*21*	6¼	*16*	11	*28*	14¼	*36*	14¼	*36*	3½	*9*	11¾	*30*	13½	*34*	25	*97*	2	*5*
BNTH150	19½	*49*	5½	*14*	3¼	*8*	11	*28*	14¼	*36*	14¼	*36*	5	*13*	7½	*19*	13½	*34*	25	*9*	3	*8*
BNTH210	26¾	*68*	5½	*14*	3¼	*8*	18	*45*	14¼	*36*	14¼	*36*	5	*13*	7½	*19*	20½	*52*	25	*9*	3	*8*

*Brute™ Series is shipped with adapters for the air and vent that accept standard pipe of the proper size and type

Model	AFUE %	Input MBTU/hr	Input *kw*	Output MBTU/hr	Output *kw*	Connections Water	Connections Gas	Max Vent Length 2" Dia.	Max Vent Length 3" Dia.	Weight lbs.
BNTH080	95	80	*23.4*	74	*21.7*	1"	½"	40 ft.	100 ft.	181
BNTH105	95	105	*30.8*	96	*28.1*	1"	½"	40 ft.	100 ft.	188
BNTH150	95	150	*44.0*	138	*40.4*	1"	½"	n/a	100 ft.	201
BNTH210	95	21	*61.5*	194	*56.8*	1"	½"	n/a	100 ft.	246

Dimensions shown in **inches** *cm*

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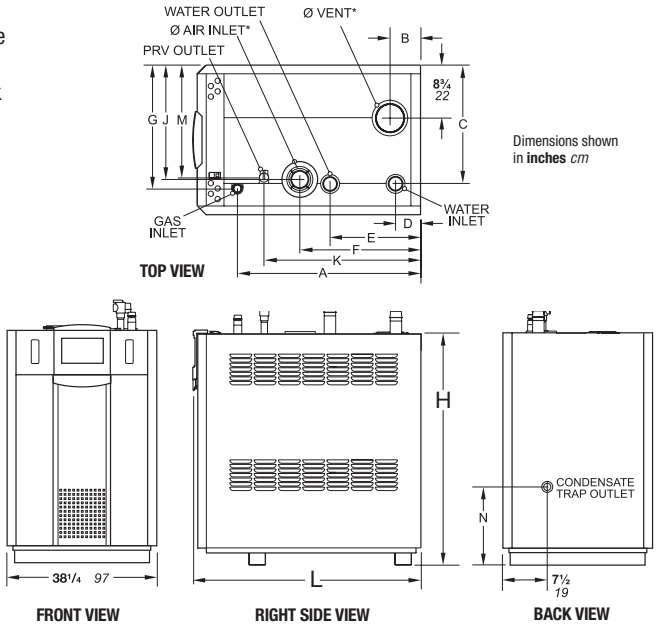
Brute™ Series
Volume Water Heater

Brute™ Series is a direct vent, sealed combustion, volume water heater with very high efficiency (95%+).
It features an ASME stainless steel heat exchanger, spark ignition system, and low NOx emissions for a package that's easy to use and easy on the environment.

- All connections are on top of unit
- Stainless steel heat exchanger
- Easy to service
- Low NOx system (10 ppm) exceeds the most stringent regulations for air quality
- Large color touch screen
- Integrated Control System
- Communicates with Building Automation Systems
- High-condensing efficiency
- 150 to 850 MBH sizes
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Horizontal or vertical direct vent
- Horizontal vent and air terminals
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Warranties: 8-Year pro-rated heat exchanger + 1-Year parts



Dimensions shown in **inches** *cm*

Brute™ Series Specifications

Model	W in.	W cm	L in.	L cm	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	H in.	H cm	J in.	J cm	K in.	K cm	M in.	M cm	N in.	N cm	Air Inlet* in.	Air Inlet* cm	Vent* in.	Vent* cm
BNTV150	25	64	19¼	49	13¼	34	5¼	14	19	48	3¼	8	10¾	28	7½	19	14¼	36	38¼	97	19½	49	7½	19	15¼	39	13	33	3	7.6	3	7.6
BNTV199	25	64	26¾	68	20½	52	5¼	14	19	48	3¼	8	17¾	45	7½	19	14¼	36	38¼	97	19½	49	11¾	30	15¼	39	13	33	3	7.6	3	7.6

*Brute™ Series is shipped with adapters for the air and vent that accept standard pipe of the proper size and type

Model	Thermal Efficiency %	Input MBTU/hr	Input kw	Output MBTU/hr	Output kw	Connection Size (NPT) Water	Connection Size (NPT) Gas	Weight lbs.
BNTV150	95	150	44	144	42	1¼"	½"	201
BNTV199	97	199	58.3	193	57	1¼"	½"	246

Dimensions shown in **inches** *cm*

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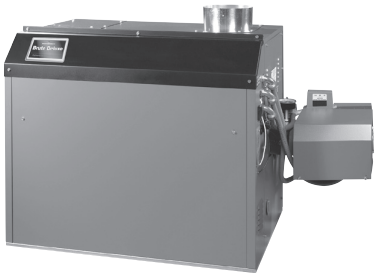
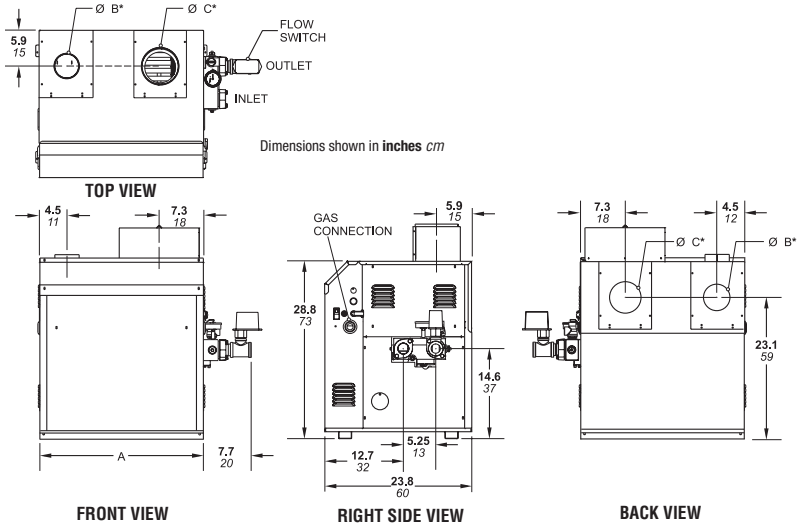
Brute™ Deluxe
Residential and Light Commercial Boiler



- Glass-lined cast iron or bronze headers and non-ferrous waterways
- 10 finned tube heat exchanger design for quick and efficient heat transfer
- NOx below 10 ppm
- 2-stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet

The Brute™ Deluxe, 200 – 400 series boiler operates at an environmentally friendly 85% efficiency with low NOx emissions. Easy to use, install, and maintain, it utilizes basic cap and bulb temperature controls and a low voltage terminal strip for simple troubleshooting.

- Ambient temperatures from -40°F to +140°F
- Tolerant of glycol systems
- Waterways able to operate in a maximum water hardness of 17 gpg
- Hydronic models supply temps from 130°F to 240°F
- Heat exchanger is removable from top, back, or front
- Washable air filter
- Gas supply right or left side (field convertible)
- Maintains efficiency and low NOx levels at low and high fire
- Fan-assisted combustion system
- Warranties: 10-Year heat exchanger + 1-Year parts



* Air connections may be on top or back and are field convertible.

Brute™ Deluxe Specifications

Model	Input MBTU/hr	Input *kw*	Output MT2H MBTU/hr	Output MT2H *kw*	Gas Conn. Size Inches MBTU/hr	Water Conn. Size Inches MBTU/hr	Shipping Weight in.	Shipping Weight *kg*
BMT2H0200	200	*58.6*	170	*50.4*	¾ NPT	1½ NPT	270	*123*
BMT2H0300	299	*87.9*	255	*74.7*	¾ NPT	1½ NPT	300	*136*
BMT2H0400	399	*117.2*	340	*99.6*	¾ NPT	1½ NPT	330	*150*

Model	A in.	A *cm*	Water Outlet B* in.	Water Outlet B* *cm*	Vent Conn. C* in.	Vent Conn. C* *cm*	Horiz. Vent Pipe in.	Horiz. Vent Pipe *cm*
BMT2H0200	20½	*52*	4	*10*	5	*13*	4	*10*
BMT2H0300	26½	*67*	4	*10*	6	*15*	5	*13*
BMT2H0400	33½	*85*	6	*15*	7	*18*	6	*15*

* Air connections may be on top or back and are field convertible.

Dimensions shown in **inches** *cm*

EFFICIENCY DATA

Model	Thermal Efficiency %	Combustion Efficiency	AFUE %
BMT2H0200	N/A	N/A	85.1
BMT2H0300	N/A	N/A	85.1
BMT2H0400	85.3	83.4	N/A

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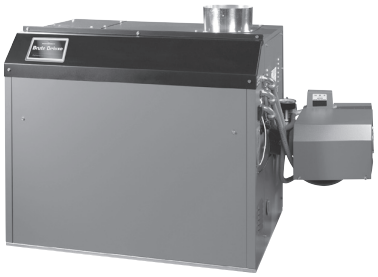
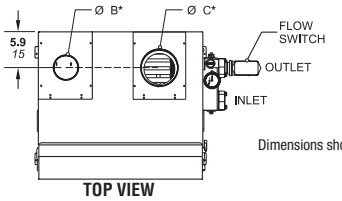
Brute™ Deluxe
Residential and Light Commercial Volume Water Heater



- 85% Combustion efficiency, 85% Thermal efficiency
- NOx below 10 ppm
- 2-stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet
- Ambient temperatures from -40°F to +140°F
- Tolerant of glycol systems

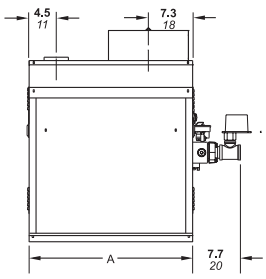
The Brute™ Deluxe, 200 – 400 series volume water heater operates at an environmentally friendly 85% efficiency with low NOx emissions. Easy to use, install, and maintain, it utilizes basic cap and bulb temperature controls and a low voltage terminal strip for simple troubleshooting.

- Waterways able to operate in a maximum water hardness of 17 gpg
- Volume water heater models supply temps from 130°F to 200°F
- Heat exchanger is removable from top, back, or front
- Washable air filter
- Gas supply right or left side (field convertible)
- Maintains efficiency and low NOx levels at low and high fire
- Fan-assisted combustion system
- Warranties: 10-Year heat exchanger + 1-Year parts

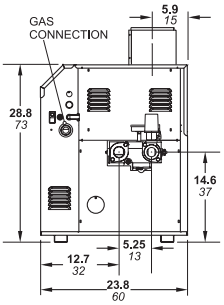


Dimensions shown in **inches** *cm*

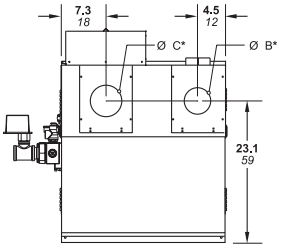
TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW



BACK VIEW

Brute™ Deluxe Specifications

Model	A in.	A cm	Input MBTU/hr	Input kw	Output MBTU/hr	Output kw	Thermal Efficiency %	Gas Conn. Size Inches	Water Conn. Size Inches	Air Conn. B* in.	Air Conn. B* cm	Vent Conn C* in.	Vent Conn C* cm	Horiz Vent Pipe in.	Horiz Vent Pipe cm	Shipping Weight lbs.	Shipping Weight kg
BMT2V0200	201/2	52	199.9	58.6	169.9	49.8	85	¾ NPT	1½ NPT	4	10	5	13	4	10	270	123
BMT2V0300	261/2	67	300	87.9	255	74.7	85	¾ NPT	1½ NPT	4	10	6	15	5	13	300	136
BMT2V0400	331/2	85	399.9	117.2	339.9	99.6	85	¾ NPT	1½ NPT	6	15	7	18	6	15	330	150

	Temperature Rise in Degrees															
	20º F		11º C		25º F		14º C		30º F		17º C		35º F		19º C	
Model	Flow gpm	H/L feet	Flow lpm	H/L m	Flow gpm	H/L feet	Flow lpm	H/L m	Flow gpm	H/L feet	Flow lpm	H/L m	Flow gpm	H/L feet	Flow lpm	H/L m
BMT2V0200	17	1.6	64	0.5	14	1.0	53	0.3	11	0.7	42	0.2	10	0.5	38	0.2
BMT2V0300	26	3.5	97	1.1	20	2.3	76	0.7	17	1.6	64	0.5	15	1.2	57	0.4
BMT2V0400	34	6.3	129	1.9	27	4.0	102	1.2	23	2.8	87	0.9	19	2.1	72	0.6

	HARD WATER						NORMAL WATER						SOFT WATER					
	Flow gpm	H/L feet	Temp Rise ºF	Flow lpm	H/L m	Temp Rise ºC	Flow gpm	H/L feet	Temp Rise ºF	Flow lpm	H/L m	Temp Rise ºC	Flow gpm	H/L feet	Temp Rise ºF	Flow lpm	H/L m	Temp Rise ºC
BMT2V0200	45	7.3	8	170	2.2	4	35	4.4	10	133	1.3	6	23	1.9	15	87	0.6	8
BMT2V0300	45	7.4	11	170	2.3	6	35	4.5	15	133	1.4	8	23	2.0	22	87	0.6	12
BMT2V0400	45	7.4	15	170	2.3	8	35	4.5	19	133	1.4	11	23	2.0	30	87	0.6	17

*Air connections may be on top or back of the Brute™ Deluxe and are field convertible.

Dimensions shown in **inches** *cm*

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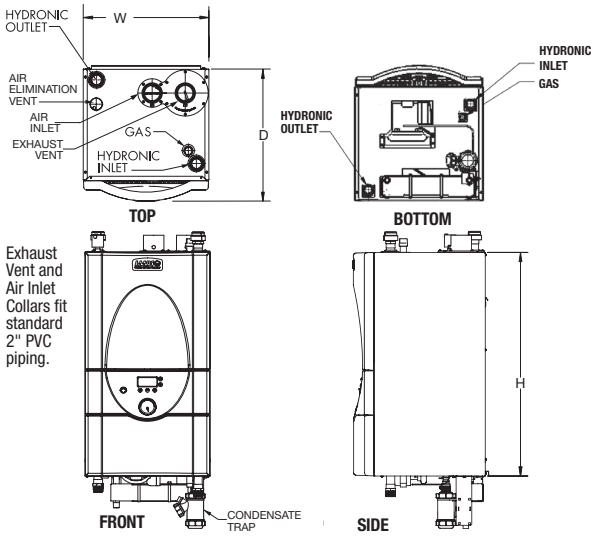
Brute™ LX
Residential Condensing Boiler—Wall Mounted

The Brute™ LX is a wall mounted 50–220 MBH, space heating boiler. The 125, 150, and 175 MBH sizes are also offered as Combination Boilers to meet all of the heating and hot water needs of the smallest to largest homes.

- 95% AFUE efficiency
- Heating sizes: 50, 75, 100, 125, 150, 175, and 220 MBH
- Combination Boiler sizes: 125, 150, and 175 MBH
- Fully modulating 20% to 100%
- Quiet variable speed blower
- Pump freeze protection
- Ultra-Low NOx emissions
- 2-Year parts warranty
- 15-Year heat exchanger warranty
- Natural or Propane Gas use
- Sleek, appliance-grade cabinet
- Lightweight, makes handling easy
- 150' of vent
- Stainless steel ASME heat exchanger
- Stainless steel brazed plate DHW heat exchanger (combi models)
- Advanced water flow technology
- Integrated control system with temperature control, diagnostics, outdoor reset capability, and easy access for field wiring
- Unique, sealed condensate trap does not need to be primed at startup



Brute™ LX Specifications

Model	Input MBTU/hr	Input kW	Output MBTU/hr	Output kW	Gas Connection Size inches	Water Connection Size inches	Shipping Weight lbs.	Shipping Weight kg
BLXHW050	50	*14.6*	47.5	*13.7*	½ NPT	¾ NPT	88	*40*
BLXHW075	75	*21.9*	71.3	*20.6*	½ NPT	¾ NPT	97	*44*
BLXHW100	100	*29.3*	95.0	*27.5*	½ NPT	¾ NPT	112	*51*
BLXHW125*	125	*36.6*	118.8	*34.5*	½ NPT	¾ NPT	126	*57*
BLXHW150*	150	*43.9*	142.5	*41.5*	½ NPT	1 NPT	140	*64*
BLXHW175*	175	*51.6*	166.3	*48.3*	½ NPT	1 NPT	153	*69*
BLXHW220	220	*64.4*	209.	*60.6*	½ NPT	1 NPT	161	*73*

*Available as Combination Boilers

Notes: For other boiler ratings:
Boiler Horsepower: HP = Output / 33,475
Radiation Surface: EDR sq. ft. = Output / 150

Appliance Surface	Suggested Service Access Clearance Inches	Inches *cm*
Left Side	6	*15*
Right Side	6	*15*
Top	12	*30*
Closet, Front	6	*15*
Front	24	*61*
Vent	1	*3*

Certified by CSA for zero clearance to combustible materials on all sides

Model	35ºF Rise GPM	35ºF Rise *l/m*	45ºF Rise GPM	45ºF Rise *l/m*	77ºF Rise *GPM*	77ºF Rise *l/m*	DHW Connection Size in.
BLXHW150	6.8	*24.6*	5.3	*20.1*	3.1	*11.7*	½
BLXHW175	8.1	*30.1*	6.3	*23.8*	3.7	*14.0*	½
BLXHW220	9.5	*36.0*	7.4	*28.0*	4.3	*16.3*	½

Model	Dimensions W in.	W *cm*	H in.	H *cm*	D in.	D *cm*
BLXHW050	17	*43*	30½	*78*	15¼	*39*
BLXHW075	17	*43*	30½	*78*	15¼	*39*
BLXHW100	17	*43*	30½	*78*	18	*46*
BLXHW125	17	*43*	30½	*78*	18	*46*
BLXHW150	17	*43*	35½	*90*	18	*46*
BLXHW175	17	*51.6*	35½	*90*	18	*46*
BLXHW220	17	*64.4*	38½	*90*	18	*46*

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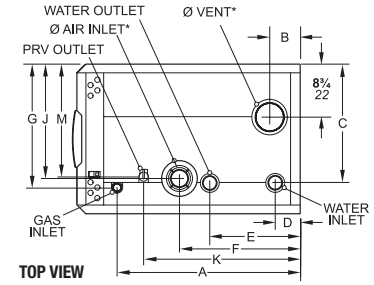
Brute™ Series
Commercial Modulating, Condensing Boiler

285 MBH Model

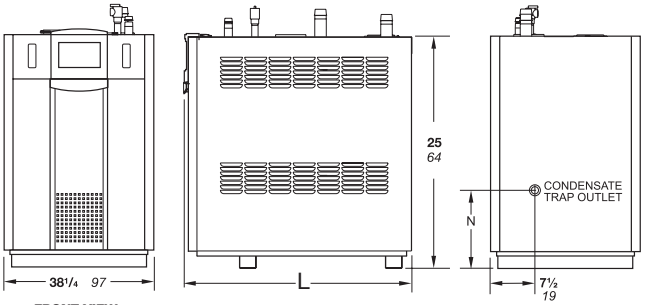
The Brute™ Series commercial boiler is a direct vent, sealed combustion, condensing hydronic boiler with 95%+ thermal efficiency that modulates with a 5 to 1 turndown. It features an ASME stainless steel heat exchanger, spark ignition system, and low NOx emissions.

- High condensing efficiency
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Large color touch screen
- 285 to 850 MBH sizes
- Stainless steel heat exchanger with welded construction
- Low NOx system exceeds the most stringent regulations for air quality — 10 ppm NOx
- Horizontal or vertical direct vent
- Communicates with Building Automation Systems
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Built-in condensate trap
- Vent temperature cutoff feature
- Direct spark ignition system
- Indirect water heater priority
- Sensor for indirect domestic water tank
- 160 psi maximum working pressure
- Warranties: 10-Year heat exchanger + 1-Year parts



TOP VIEW

Dimensions shown in **inches** *cm*



FRONT VIEW | RIGHT SIDE VIEW | BACK VIEW

Brute™ Series Specifications

Model	L in.	L cm	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	H in.	H cm	J in.	J cm	K in.	K cm	M in.	M cm	N in.	N cm	Air Inlet* in.	Air Inlet* cm	Vent* in.	Vent* cm
BNTH285	26¾	68	20¼	52	7¼	19	19¼	49	6¼	16	11¼	29	13½	34	14	36	38¼	97	15	38	17	43	18¾	48	13	33	4½	11	4½	11
BNTH399	31½	80	25	64	5¼	13	19¼	49	4¼	11	14¼	37	18½	47	19¼	49	38¼	97	16½	42	21¾	55	18¾	48	13	33	4½	11	4½	11
BNTH500	37¾	96	30¼	77	5¼	13	19½	50	4¼	11	15½	38	20	51	20½	52	38¼	97	19	48	26	66	18¾	48	13	33	4½	11	4½	11
BNTH600	37¾	96	29¾	76	5	13	19½	50	4¼	11	15	38	20	51	3	8	38¼	97	19	48	26	66	18¾	48	8¼	21	4½	11	4½	11
BNTH750	51	130	35½	90	6	15	19½	50	5¼	13	19	48	40½	103	3¼	8	38¼	97	19	48	30¾	78	18¾	48	8¼	21	4½	11	6½	17
BNTH850	55¼	140	39¼	101	6	15	19½	50	5¼	13	19	48	44¾	114	3½	9	38¼	97	19	48	35	89	18¾	48	8¼	21	4½	11	6½	17

Dimensions are nominal and are shown in inches, ***cm***
*Brute™ Series is shipped with adapters for the air and vent that accept standard pipe of the proper size and type

Model	AFUE %	Thermal Efficiency %	Combustion Efficiency %	Input MBTU/hr	Input *kw*	Output MBTU/hr	Output *kw*	Connection Size (NPT) Water	Connection Size (NPT) Gas	Weight lbs.
BNTH285	95.0	n/a	n/a	285	*83.5*	264	*78.8*	1¼"	¾"	276
BNTH399	n/a	96.5	96.5	399.9	*116.9*	386	*109.9*	1¼"	¾"	346
BNTH500	n/a	95.0	95.0	500	*146.5*	475	*139.2*	1½"	1"	381
BNTH600	n/a	95.3	96.0	600	*175.8*	572	*167.0*	1½"	1"	394
BNTH750	n/a	96.6	96.6	750	*219.8*	724	*208.9*	2"	1½"	469
BNTH850	n/a	95.7	95.7	850	*249.1*	813	*236.7*	2"	1½"	502

*Brute™ Series is shipped with adapters for the air and vent that accept standard pipe of the proper size and type

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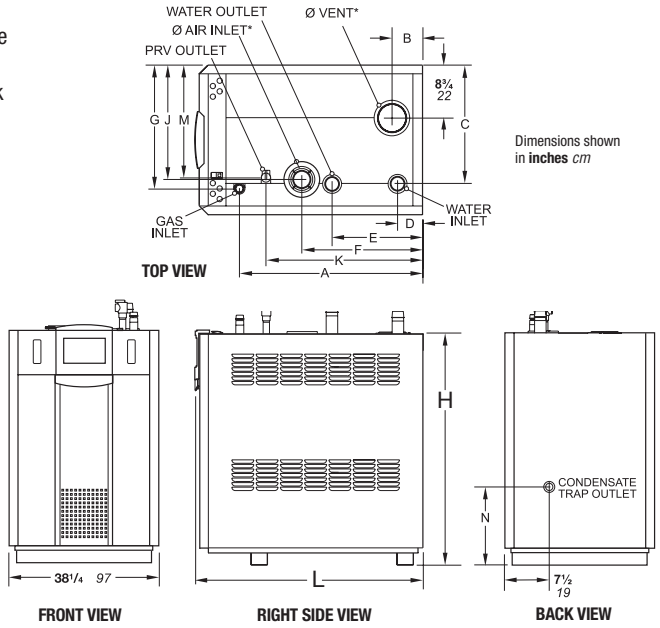
Brute™ Series
Volume Water Heater

Brute™ Series is a direct vent, sealed combustion, volume water heater with very high efficiency (95%+).
It features an ASME stainless steel heat exchanger, spark ignition system, and low NOx emissions for a package that's easy to use and easy on the environment.

- All connections are on top of unit
- Stainless steel heat exchanger
- Easy to service
- Low NOx system (10 ppm) exceeds the most stringent regulations for air quality
- Large color touch screen
- Integrated Control System
- Communicates with Building Automation Systems
- High-condensing efficiency
- 150 to 850 MBH sizes
- Modulation down to 20% of full fire (5:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Horizontal or vertical direct vent
- Horizontal vent and air terminals
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Warranties: 8-Year pro-rated heat exchanger + 1-Year parts



Dimensions shown in **inches** *cm*

Brute™ Series Specifications

Model	W in.	W cm	L in.	L cm	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	H in.	H cm	J in.	J cm	K in.	K cm	M in.	M cm	N in.	N cm	Air Inlet* in.	Air Inlet* cm	Vent* in.	Vent* cm
BNTV285	25	64	26¾	68	20¼	11.5	7¼	19	19¾	50	4¼	11	11¼	29	13½	34	14	36	38¼	97	15	38	17	43	18¾	48	13	33	4½	11	4½	11
BNTV399	25	64	31½	80	25	64	5¼	13	19¾	50	4¼	11	14¾	37	18½	47	19¼	49	38¼	97	16½	42	21¾	55	18¾	48	13	33	4½	11	4½	11
BNTV500	25	64	37¾	96	30¼	77	5¼	13	19¾	50	4¼	11	15½	38	20	51	20½	52	38¼	97	19	48	26	66	18¾	48	13	33	4½	11	4½	11
BNTV600	25	64	37¾	96	29¾	76	5	13	19½	50	4¼	11	15	38	20	51	3	8	38¼	97	19	48	26	66	18¾	48	8¼	21	4½	11	4½	11
BNTV750	25	64	51	130	35½	90	6	15	19½	50	5¼	13	19	48	40½	103	3¼	8	38¼	97	19	48	30¾	78	18¾	48	8¼	21	4½	11	6½	17
BNTV850	25	64	55¼	140	39¾	101	6	15	19½	50	5¼	13	19	48	44¾	114	3½	9	38¼	97	19	48	35	89	18¾	48	8¼	21	4½	11	6½	17

*Brute™ Series is shipped with adapters for the air and vent that accept standard pipe of the proper size and type

Model	Thermal Efficiency %	Input MBTU/hr	Input kw	Output MBTU/hr	Output kw	Connection Size (NPT) Water	Connection Size (NPT) Gas	Weight lbs.
BNTV285	95	285	83.5	269	78.8	2"	¾"	276
BNTV399	96	399	116.9	375	109.9	2"	¾"	346
BNTV500	96	500	146.5	475	139.2	2"	1"	381
BNTV600	97	600	175.8	576	167.0	2"	1"	394
BNTV750	94	750	219.8	723	208.9	2"	1½"	469
BNTV850	96	850	249.1	810	236.7	2"	1½"	502

Dimensions shown in **inches** *cm*

Committed to American Manufacturing, Wholesale Distribution, and Professional Installation.

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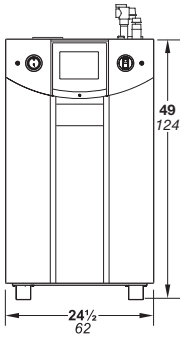
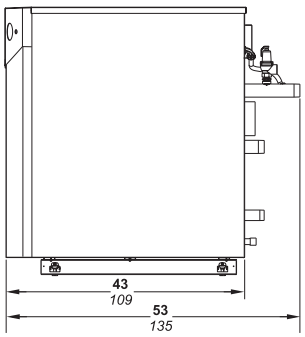
Brute™ Series 1000 & 1200
Commercial Modulating, Condensing Boiler

Brute™ 1000 & 1200 Series is a direct vent, sealed combustion boiler, with very high efficiency (94%). It features an ASME stainless steel heat exchanger, spark ignition system, and low NOx emissions for a package that's easy to use and easy on the environment.

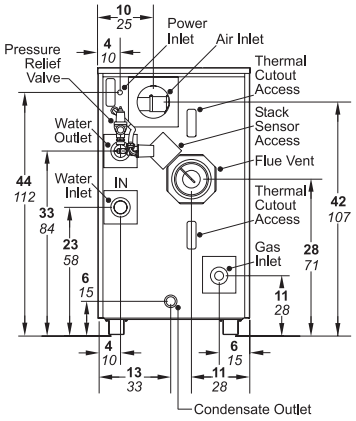
- Large color touch screen
- Stainless steel heat exchanger
- Easy to service
- Integrated Control System
- Communicates with Building Automation Systems
- High-condensing efficiency
- 1,000 and 1,200 MBH
- Modulation down to 10% of full fire (10:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Indoor and outdoor
- Horizontal or vertical direct vent
- Low NOx system (10 ppm) exceeds the most stringent regulations for air quality
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Warranties: 10-Year heat exchanger + 1-Year parts



FRONT VIEW



SIDE VIEW



BACK VIEW

Dimensions shown in **inches** *cm*

Brute™ Series 1000 & 2000 Specifications

SIZING DATA

Model	Input MBTU/hr	Input *kw*	Output MBTU/hr	Output *kw*	Thermal Efficiency %	Comb. Efficiency %	Gas Conn. Size	Water Conn. Size	Product Weight in.	Product Weight *cm*	Shipping Weight in.	Shipping Weight *cm*	Air Inlet in.	Vent in.
BNTH1000	999.9	*293*	942	*276*	94.2	94.2	11/2	2	518	*235*	620	*281*	6	6
BNTH1200	1200	*351*	1136	*333*	95.1	94.7	11/2	2	538	*244*	640	*290*	6	6

WATER FLOW REQUIREMENTS

	Temperature Rise in Degrees																					
	20º F		*11º C*		25º F		*14º C*		30º F		*17º C*		35º F		*19º C*		40º F		*22º C*		45º F		*25º C*	
Model	Flow gpm	H/L feet	*Flow lpm*	*H/L m*	Flow gpm	H/L feet	*Flow lpm*	*H/L m*	Flow gpm	H/L feet	*Flow lpm*	*H/L m*	Flow gpm	H/L feet	*Flow lpm*	*H/L m*	Flow gpm	H/L feet	*Flow lpm*	*H/L m*	Flow gpm	H/L feet	*Flow lpm*	*H/L m*
BNTH1000	95	30	*359*	*9.0*	75	20	*283*	*6.0*	62	15	*234*	*4.5*	54	11	*204*	*3.3*	48	9	*182*	*2.7*	42	7	*159*	*2.1*
BNTH1200	114	37	*432*	*11.3*	91	26	*344*	*7.9*	76	18	*288*	*5.5*	65	13	*246*	*4.0*	57	10	*216*	*3.0*	51	8	*193*	*2.4*

ELECTRICAL DATA

Model	Volts	Phase	Amps Nominal	Amps FLA	Pump Connections Ratings (Boiler, System, and DHW Pumps)
BNTH1000	120	Single	5	12	max 7.4 FLA
BNTH1200	120	Single	17	12	max 7.4 FLA

Dimensions shown in **inches** *cm*

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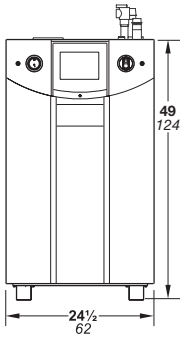
Brute™ Series 1000 & 1200

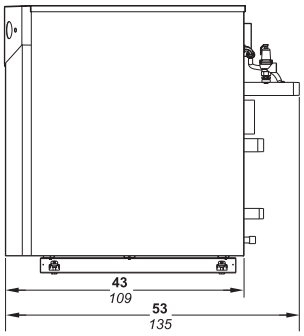
Volume Water Heater

The Brute™ 1000 & 2000 Series is a direct vent, sealed combustion, volume water heater with very high efficiency. It features an ASME stainless steel heat exchanger, spark ignition system, and low NOx emissions for a package that's easy to use and easy on the environment.

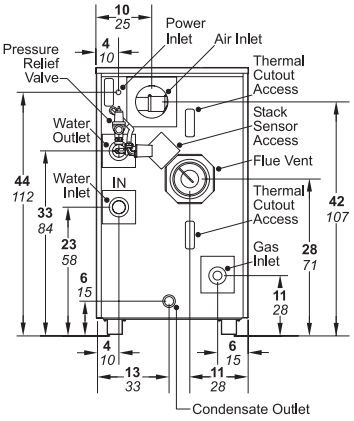
- Large color touch screen
- Stainless steel heat exchanger
- Easy to service
- Integrated Control System
- Communicates with Building Automation Systems
- High-condensing efficiency
- 1,000 and 1,200 MBH
- Modulation down to 10% of full fire (10:1 turndown)
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Indoor and outdoor
- Horizontal or vertical direct vent
- Meets AB1953 low-lead standard
- Low NOx system (10ppm) exceeds the most stringent regulations for air quality
- Vent and air pipe lengths of up to 100 equivalent feet (each)
- Warranties: 8-Year pro-rated heat exchanger + 1-Year parts



FRONT VIEW



SIDE VIEW



BACK VIEW

Dimensions shown in **inches** *cm*

Brute™ Series 1000 & 1200 Specifications

SIZING DATA

Model	Input MBTU/hr	Input kw	Output MBTU/hr	Output kw	Thermal Efficiency %	Gas Conn. Size	Water Conn. Size	Product Weight in.	Product Weight cm	Shipping Weight in.	Shipping Weight cm	Air Inlet in.	Vent in.
BNTV1000	999.9	*293*	952	*278.9*	95	11/2	2	518	*235*	620	*281*	6	6
BNTV1200	1200	*351*	1140	*333*	95	11/2	2	538	*244*	640	*290*	6	6

RECOVERY DATA

Model	Temperature Rise in Degrees: 40º F gpm	*22º C L/h*	50º F gpm	*28º C L/h*	60º F gpm	*33º C L/h*	70º F gpm	*39º C L/h*	80º F gpm	*44º C L/h*	90º F gpm	*50º C L/h*	100º F gpm	*56º C L/h*	120º F gpm	*67º C L/h*	140º F gpm	*78ºC L/h*
BNTV1000	2857	*10799*	2286	*8641*	1905	*7201*	1633	*6173*	1429	*5402*	1270	*4801*	1143	*4321*	952	*3599*	816	*3084*
BNTV1200	3420	*12927*	2736	*10369*	2280	*8641*	1954	*7407*	1710	*6482*	1520	*5761*	1368	*5185*	1140	*4319*	977	*3701*

WATER FLOW REQUIREMENTS

Model	Temperature Rise 20º F Flow gpm	20º F H/L feet	*11º C Flow lpm*	*11º C H/L m*
BNTV1000	95	30	*359*	*9.0*
BNTV1200	114	37	*432*	*11.3*

Maximun water hardness of 10 grains per gallon allowed.

ELECTRICAL DATA

Model	Volts	Phase	Amps Nominal	Amps FLA	Pump Connections Ratings (Boiler, System, and DHW Pumps)
BNTV1000	120	Single	5	12	max 7.4 FLA
BNTV1200	120	Single	12	12	max 7.4 FLA

Dimensions shown in **inches** *cm*

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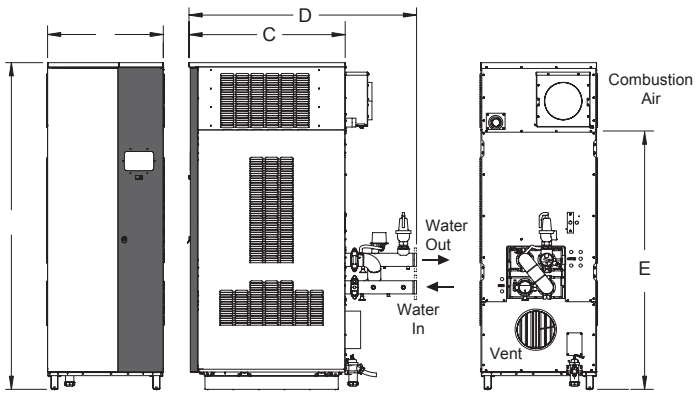
Brute MagnaTech™
Commercial Modulating, Condensing Boiler

The Brute MagnaTech™ Commercial Modulating Condensing Boiler has everything to satisfy large input commercial applications. The unique variable speed boiler pump control optimizes three major variables of boiler operation: combustion, blower, and boiler pump efficiencies.

- Meets the most stringent NOx emission requirements
- Up to 99% thermal efficiency, condensing operation
- Indoor/Outdoor installation
- Large color touch screen allows for easy control and setup
- Variable speed pump control matches system pump with boiler modulation to optimize efficiency
- Small footprint, slim vertical design, and removable top section help it fit into tight spots
- Forward mounted low voltage panel for easy wiring and trouble-shooting
- Unique, sealed condensate trap does not need to be primed at startup
- Single or up to 8 boilers in a cascade installation
- Up to 100 feet of vent
- 439 Stainless Steel Heat Exchanger for increased corrosion resistance
- Advanced control system with temperature control, diagnostics, outdoor reset capability, and easy access for field wiring
- Warranties: 10-Year heat exchanger + 1-Year parts



Brute MagnaTech™ Specifications

DIMENSIONAL

Model	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E "Knock-down" Height in.	E "Knock-down" Height cm	Water Conn. Grove Lock	Gas Conn. (NPT)	Vent Diameter* in.
BMGH-1600	29.3	75	80	203	38.0	96	57.5	147	60.8	154	3"	2"	1"
BMGH-2000	29.3	75	80	203	38.0	96	57.5	147	60.8	154	3"	2"	1"
BMGH-2500	30.8	78	87	221	41.5	105	60.5	154	71.0	180	3"	2"	1"
BMGH-3000	30.8	78	87	221	41.5	105	60.5	178	71.0	180	3"	2"	1"
BMGH-3500	34.5	88	97	246	52.0	132	70.0	178	80.8	205	4"	2"	1"
BMGH-4000	34.5	88	97	246	52.0	132	70.0	178	80.8	205	4"	2"	1"

SIZING DATA

Model	Input Rate MBTU/hr	Input Rate kw	Output Rate MBTU/hr	Output Rate kw	Boiler Thermal Efficiency %	Comb. Efficiency %	Product Weight lbs.	Product Weight kg	Shipping Weight lbs.	Shipping Weight kg	Vent Diameter in.	Vent Diameter cm	Vent Length ft.	Vent Length (m)
BMGH-1600	1600.0	469	1572	443	96	95	1390	630	1590	721	6	(15)	100	(30.5)
BMGH-2000	1999.9	586	1883	552	95	93.6	1390	630	1590	721	8	(20)	100	(30.5)
BMGH-2500	2499.9	732	2374	696	95	93.8	1785	810	1985	900	8	(20)	100	(30.5)
BMGH-3000	3000.0	879	2814	825	95	93.8	1785	810	1985	900	10	(25)	100	(30.5)
BMGH-3500	3500.0	1025	3317	972	95	93.6	2278	1033	2478	1124	10	(25)	100	(30.5)
BMGH-4000	4000.0	1172	3724	1091	95	93.1	2278	1033	2478	1124	12	(30)	100	(30.5)

WATER FLOW REQUIREMENTS

Model	Temperature Rise in Degrees: 30º F Flow gpm	30º F H/L feet	17º C Flow lpm	17º C H/L m	35º F Flow gpm	35º F H/L feet	19º C Flow lpm	19º C H/L m	40º F Flow gpm	40º F H/L feet	22º C Flow lpm	22º C H/L m
BMGH-1600	100	14	379	4.3	87	10	329	3	76	8	288	2.5
BMGH-2000	128	23.5	485	7.2	109	17.1	413	5.2	95	13.6	360	4.2
BMGH-2500	158	23.6	599	7.0	136	17.6	514	5.0	119	13.6	449	4.1
BMGH-3000	190	34.2	719	10.4	164	25.8	621	7.9	142	18.9	538	5.9
BMGH-3500	222	30.6	839	9.0	190	23.6	719	7.0	166	18.6	629	6.0
BMGH-4000	255	38.2	965	11.6	218	28.5	825	8.7	190	22.5	71	6.9

Dimensions shown in **inches** *cm*

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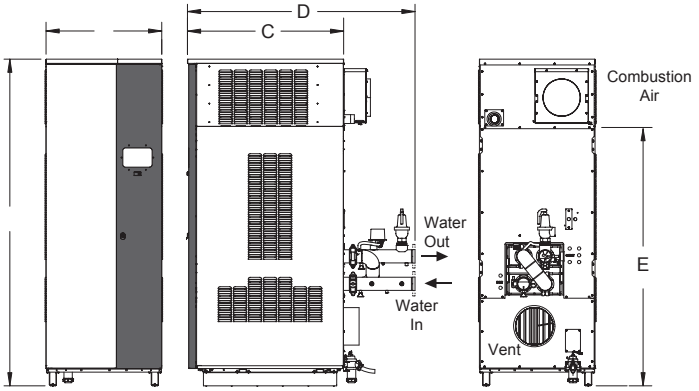
Brute MagnaTech™
Commercial Volume Water Heater

The Brute MagnaTech™ Commercial Volume Water Heater has everything to satisfy large input commercial applications. It has 95%+ efficiency, small footprint, and easy to use controls.

- Meets the most stringent NOx emission requirements
- Up to 99% thermal efficiency, condensing operation
- Indoor/Outdoor installation
- Matches system pump with boiler modulation to optimize efficiency
- Large color touch screen allows for easy control and setup
- Small footprint, slim vertical design, and removable top section help it fit into tight spots
- Forward mounted low voltage panel for easy wiring and troubleshooting
- Unique, sealed condensate trap does not need to be primed at startup
- Single or up to 8 boilers in a cascade installation
- Up to 100 feet of vent
- 439 Stainless Steel Heat Exchanger for increased corrosion resistance
- Advanced control system with temperature control, diagnostics, outdoor reset capability, and easy access for field wiring
- Warranties: 10-Year heat exchanger + 1-Year parts



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Brute MagnaTech™ Specifications

DIMENSIONAL

Model	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E "Knock-down" Height in.	E "Knock-down" Height cm	Water Conn. Grove Lock	Gas Conn. (NPT)	Vent Diameter* in.
BMGV-1600	29.3	75	80	203	38.0	96	57.5	147	60.8	154	3"	2"	1"
BMGV-2000	29.3	75	80	203	38.0	96	57.5	147	60.8	154	3"	2"	1"
BMGV-2500	30.8	78	87	221	41.5	105	60.5	154	71.0	180	3"	2"	1"
BMGV-3000	30.8	78	87	221	41.5	105	60.5	178	71.0	180	3"	2"	1"
BMGV-3500	34.5	88	97	246	52.0	132	70.0	178	80.8	205	4"	2"	1"
BMGV-4000	34.5	88	97	246	52.0	132	70.0	178	80.8	205	4"	2"	1"

SIZING DATA | **WATER FLOW REQUIREMENTS**

Model	Input Rate MBTU/hr	Input Rate kw	Output Rate MBTU/hr	Output Rate kw	Water Heater Thermal Efficiency %	Product Weight lbs	Product Weight kg	Shipping Weight in.	Shipping Weight cm	Vent Diameter in.	Vent Diameter cm	Vent Length ft.	Vent Length (mw)	Flow gpm	Temp Rise °F	H/L feet	Flow lpm	Temp Rise °C	H/L m
BMGV-1600	1600.0	469	1572	443	96	1390	630	1590	721	6	(15)	100	(30.5)	152	20	31.0	525	11.1	10.1
BMGV-2000	1999.9	586	1883	552	95	1390	630	1590	721	8	(20)	100	(30.5)	152	25	33.0	575	14	10.1
BMGV-2500	2499.9	732	2374	696	95	1785	810	1985	900	8	(20)	100	(30.5)	190	25	33.7	719	13.9	10.0
BMGV-3000	3000.0	879	2814	825	95	1785	810	1985	900	10	(25)	100	(30.5)	190	30	36.0	719	17	11
BMGV-3500	3500.0	1025	3317	972	95	2278	1033	2478	1124	10	(25)	100	(30.5)	222	30	30.6	839	17	9.0
BMGV-4000	4000.0	1172	3724	1091	95	2278	1033	2478	1124	12	(30)	100	(30.5)	224	34	30.0	848	19	9.1

Dimensions shown in **inches** *cm*

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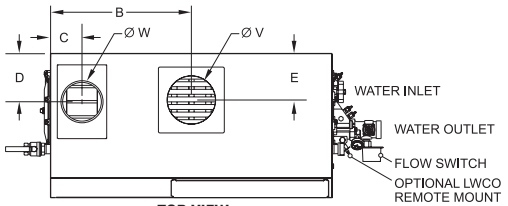
Brute™ Deluxe
Commercial Hydronic Boiler

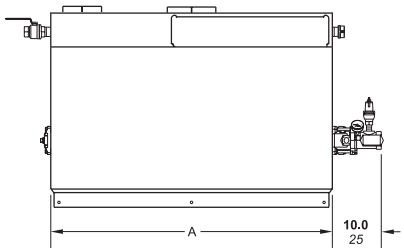
- Glass-lined cast iron or bronze headers and non-ferrous waterways
- 10 finned tube heat exchanger design for quick and efficient heat transfer
- 85% Combustion efficiency
- NOx below 10 ppm
- 2-stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet

The Brute™ Deluxe boiler has been specifically designed to meet the needs of the replacement market by offering simple and straightforward controls with 2-stage firing. It features modular construction that separates the burner trays, gas train, and blower assembly.

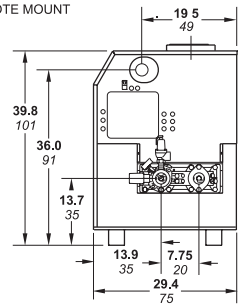
- Ambient temperatures from -40°F to +140°F
- Tolerant of glycol systems
- Waterways able to operate in a maximum water hardness of 17 gpg
- Hydronic models supply temps from 130°F to 240°F
- Heat exchanger is removable from top, back, or front
- Washable air filter
- Gas supply right or left side (field convertible)
- Maintains efficiency and low NOx levels at low and high fire
- Fan-assisted combustion system
- Warranties: 10-Year heat exchanger + 1-Year parts



TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW

Dimensions shown in **inches** *cm*

Brute™ Deluxe Specifications

Model	Dimensions A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	Input MBTU/hr	Output MBTU/hr	Combustion Efficiency %	Thermal Efficiency %	Gas Connection Sizes inches	Water Connection Sizes inches	Air Conn. W	Air Conn. W cm	Vent Conn. V	Vent Conn. V cm	Approx. Shipping Weight* lbs.	Approx. Shipping Weight* kg
BMT2H0500	33¾	85	16¾	43	6½	17	10	25	8	20	500	425	85.0	85.0	1¼	2	6	15	8	20	425	193
BMT2H0750	45¾	116	22¾	53	6½	17	10	25	9½	24	750	638	85.0	85.0	1¼	2	8	20	10	25	505	229
BMT2H1000	57¾	147	28¾	73	6½	17	10	25	9½	24	999	849	85.0	85.0	1¼	2½	8	20	10	25	615	279
BMT2H1250	68¼	173	34	87	10¼	26	10	25	9	23	1250	1064	85.1	85.2	2	2½	12	30	12	30	675	306
BMT2H1500	78¾	200	39½	100	10¼	26	10	25	9	23	1500	1277	85.1	85.2	2	2½	12	30	12	30	760	345
BMT2H1750	89¼	227	44¾	113	10¼	26	10	25	9	23	1750	1489	85.1	85.2	2	2½	12	30	14	36	825	375
BMT2H2000	99¾	253	49¾	127	10¼	26	10	25	9	23	1999	1701	85.1	85.2	2	2½	12	30	14	36	955	434

Model	Temperature Rise in Degrees 20° F Flow gpm	20° F H/L feet	11° C Flow lpm	11° C H/L m	25° F Flow gpm	25° F H/L feet	14° C Flow lpm	14° C H/L m	30° F Flow gpm	30° F H/L feet	17° C Flow lpm	17° C H/L m	35° F Flow gpm	35° F H/L feet	19° C Flow l pm	19° C H/L m
BMT2H0500	43	1.7	161	0.5	34	1.1	129	0.3	28	0.9	107	0.3	24	0.7	92	0.2
BMT2H0750	64	3.3	242	1.0	51	2.3	193	0.7	43	1.7	161	0.5	36	1.2	138	0.4
BMT2H1000	85	5.0	321	1.5	68	3.6	257	1.1	57	3.1	214	0.9	49	2.2	184	0.7
BMT2H1250	106	8.1	402	2.5	85	6.1	322	1.9	71	4.7	268	1.4	61	3.4	230	1.0
BMT2H1500	128	10.0	483	3.0	102	7.2	386	2.2	85	5.5	322	1.7	73	4.2	276	1.3
BMT2H1750	N/R	N/R	N/R	N/R	119	10.5	451	3.2	99	8.4	375	2.6	85	5.8	322	1.8
BMT2H2000	N/R	N/R	N/R	N/R	136	12.5	515	3.8	113	10.4	429	3.2	97	8.3	368	2.5

*Weight is without Pump.
Dimensions shown in **inches** *cm*

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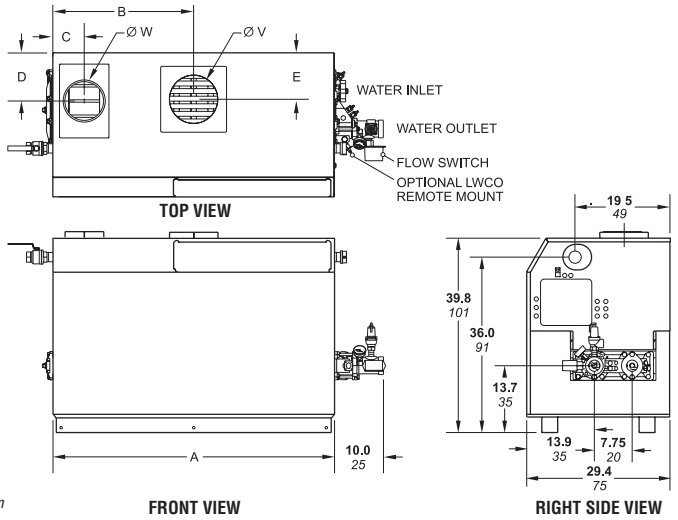
Brute™ Deluxe
Commercial Volume Water Heater

- 84% Thermal efficiency
- NOx below 10 ppm
- 2-stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet
- Ambient temperatures from -40°F to +140°F
- Tolerant of glycol systems

The Brute™ Deluxe volume water heater has been specifically designed to meet the needs of the replacement market by offering simple and straightforward controls with 2-stage firing. It features modular construction that separates the burner trays, gas train, and blower assembly.

- Waterways able to operate in a maximum water hardness of 17 gpg
- Volume water heater models supply temps from 130°F to 200°F
- Heat exchanger is removable from top, back, or front
- Washable air filter
- Gas supply right or left side (field convertible)
- Maintains efficiency and low NOx levels at low and high fire
- Fan-assisted combustion system
- 10-Year heat exchanger + 1-Year parts



Dimensions shown in **inches** *cm*

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Brute™ Deluxe Specifications

Model	Dimensions A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	Input MBTU/hr	Output MBTU/hr	Combustion Efficiency %	Thermal Efficiency %	Gas Connection Sizes inches	Water Connection Sizes inches	Air Conn. W	Air Conn. W cm	Vent Conn. V	Vent Conn. V cm	Approx. Shipping Weight* lbs.	Approx. Shipping Weight* kg
BMT2V0500	33¾	85	16¾	43	6½	17	10	25	8	20	500	425	85.0	85	1¼	2	6	15	8	20	425	193
BMT2V0750	45¾	116	22¾	53	6½	17	10	25	9½	24	750	638	85.0	85	1¼	2	8	20	10	25	505	229
BMT2V1000	57¾	147	28¾	73	6½	17	10	25	9½	24	999	849	85.0	85	1¼	2½	8	20	10	25	615	279
BMT2V1250	68¼	173	34	87	10¼	26	10	25	9	23	1250	1064	85.1	85	2	2½	12	30	12	30	675	306
BMT2V1500	78¾	200	39½	100	10¼	26	10	25	9	23	1500	1277	85.1	85	2	2½	12	30	12	30	760	345
BMT2V1750	89¼	227	44¾	113	10¼	26	10	25	9	23	1750	1489	85.1	85	2	2½	12	30	14	36	825	375
BMT2V2000	99¾	253	49¾	127	10¼	26	10	25	9	23	2000	1701	85.1	85	2	2½	12	30	14	36	955	434

RECOVERY DATA

Model	Temperature Rise in Degrees 40° F gpm	22° C L/h	50° F gpm	28° C L/h	60° F gpm	33° C L/h	70° F gpm	39° C L/h	80° F gpm	44° C L/h	90° F gpm	50° C L/h	100° F gpm	56° C L/h	120° F gpm	67° C L/h	140° F gpm	78°C L/h
BMT2V0500	1276	4821	1020	3857	850	3214	729	2755	638	2411	567	2143	510	1929	425	1607	364	1378
BMT2V0750	1915	7238	1532	5790	1277	4825	1094	4136	957	3619	851	3217	766	2895	638	2413	547	2068
BMT2V1000	2548	9632	2038	7705	1699	6421	1456	5504	1274	4816	1132	4281	1019	3853	849	3211	728	2752
BMT2V1250	3189	12054	2551	9643	2126	8036	1822	6888	1594	6027	1417	5357	1276	4821	1063	4018	911	3444
BMT2V1500	3827	14464	3061	11571	2551	9643	2187	8265	1913	7232	1701	6429	1531	5786	1276	4821	1093	4133
BMT2V1750	4464	16875	3571	13500	2976	11250	2551	9643	2232	8438	1984	7500	1786	6750	1488	5625	1276	4821
BMT2V2000	5099	19274	4079	15419	3399	12850	2914	11014	2550	9637	2266	8566	2040	7710	1700	6425	1457	5507

*Weight is without Pump.
Dimensions shown in **inches** *cm*

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Copper Brute™ II
Commercial Boiler

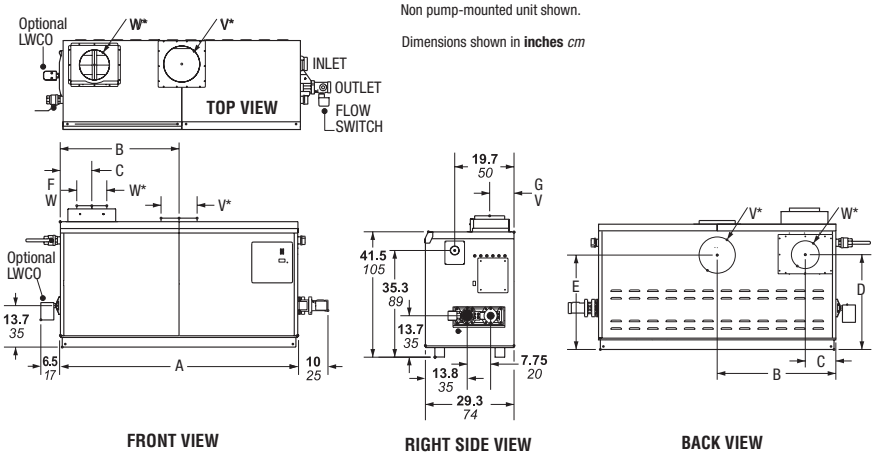
- 85% efficiency
- NOx below 10 ppm
- 2-stage, 3-stage, and 4-stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet
- Ambient temperatures from -40°F to +140°F
- Tolerant of glycol systems

The Copper Brute™ II line of fan-assisted, modular boilers ranks among the industry's most versatile and environmentally friendly systems for hydronic applications. Available in 7 sizes from 500 to 2000 MBTU/hr, Copper Brute™ II boilers deliver efficiency levels up to 85%.

- Waterways able to operate in a maximum water hardness of 17 gpg
- Hydronic Models supply temps from 125°F to 220°F
- Modular construction: burner trays, gas train, blower assembly
- Glass-lined cast iron or bronze headers
- Heat exchanger uses efficient 10 finned-tube design
- Lightweight insulation
- Warranties: 10-Year heat exchanger + 1-Year parts

Non pump-mounted unit shown.

Dimensions shown in **inches** *cm*



Copper Brute™ II Specifications

Model	Dimensions A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	Input[1,3]	Output[1,3]	Combustion Efficiency %	Thermal Efficiency %	Gas Connection Sizes inches	Water Connection Sizes inches	Air Conn. W	Air Conn. W cm	Vent Conn. V	Vent Conn. V cm	Horiz. Conn. V	Horiz. Conn. V cm	Shipping Weight[2] lbs.	Shipping Weight[2] kg
BWCH0500	33½	85	15¾	40	5¾	15	29¾	76	33¾	86	7¾	20	8¾	22	500	425	85.0	85.0	1¼	2	6	15	8	20	6	15	425	193
BWCH0750	45½	116	21¾	55	5¾	15	29¾	76	33¾	86	7¾	20	8¾	22	750	638	85.0	85.0	1¼	2	8	20	10	25	8	20	505	229
BWCH1000	57½	146	28¾	73	5¾	15	29¾	76	33¾	86	7¾	20	7	18	999	849	85.0	85.0	1¼	2½	8	20	10	25	8	20	615	279
BWCH1250	68	172	34	86	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1250	1064	85.1	85.2	2	2½	12	30	12	30	10	25	675	306
BWCH1500	78½	199	39¾	101	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1500	1266	85.1	85.2	2	2½	12	30	12	30	10	25	760	345
BWCH1750	89	226	44½	113	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1750	1489	85.1	85.2	2	2½	12	30	14	36	12	30	825	375
BWCH2000	99½	253	49¾	126	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1999	1701	85.1	85.2	2	2½	12	30	14	36	12	30	955	434

NOTES: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
2. Units with pumps: Add 55 lbs. (25kg).
3. For other boiler ratings:
Boiler Horsepower: HP = Output / 33,475 Radiation Surface: EDR sq. ft. = Output / 150 IBR sq. ft. = Net IBR Rating / 150

Model	Temperature Rise 20° F Flow gpm	20° F H/L feet	11° C Flow lpm	11° C H/L m	25° F Flow gpm	25° F H/L feet	14° C Flow lpm	14° C H/L m	30° F Flow gpm	30° F H/L feet	17° C Flow lpm	17° C H/L m	35° F Flow gpm	35° F H/L feet	19° C Flow lpm	19° C H/L m
BWCH0500	43	1.7	161	0.5	34	1.1	129	0.3	28	0.9	107	0.3	24	0.7	92	0.2
BWCH0750	64	3.3	242	1.0	51	2.3	193	0.7	43	1.7	161	0.5	36	1.2	138	0.4
BWCH1000	85	5.0	321	1.5	68	3.6	257	1.1	57	3.1	214	0.9	48	2.2	184	0.7
BWCH1250	106	8.1	402	2.5	85	6.1	322	1.9	71	4.7	269	1.4	61	3.4	231	1.0
BWCH1500	128	10.0	483	3.0	102	7.2	356	2.2	85	5.5	322	1.7	73	4.2	276	1.3
BWCH1750	N/R	N/R	N/R	N/R	119	10.5	451	3.2	99	8.4	375	2.6	85	5.8	322	1.8
BWCH2000	N/R	N/R	N/R	N/R	136	12.5	515	3.2	113	10.4	429	3.2	97	8.3	368	2.5

Dimensions shown in **inches** *cm*

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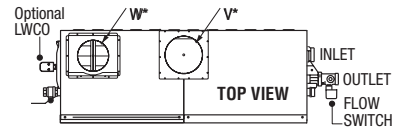
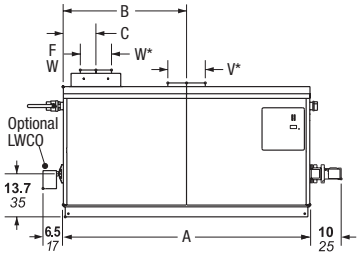
Copper Brute™ II
Commercial Volume Water Heater

The Copper Brute™ II line of fan-assisted, volume water heaters ranks among the industry's most versatile systems for hot water applications. Available in 7 sizes from 500 to 2000 MBTU/hr, Copper Brute™ II water heaters run and deliver efficiency levels up to 85%.

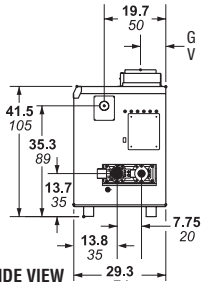
- Tolerant of glycol systems
- Waterways able to operate in a maximum water hardness of 17 gpg
- Volume water heater models supply temps from 125°F to 210°F
- Modular construction: burner trays, gas train, blower assembly
- Glass-lined cast iron or bronze headers
- Heat exchanger uses efficient 10 finned-tube design
- Lightweight insulation
- Warranties: 10-Year heat exchanger + 1-Year parts

- Up to 85% efficiency
- NOx below 10 ppm
- 2-stage, 3-stage, and 4-stage firing
- Immune to thermal shock down to 30°F
- Operates in altitudes up to 10,000 feet
- Ambient temperatures from -40°F to +140°F

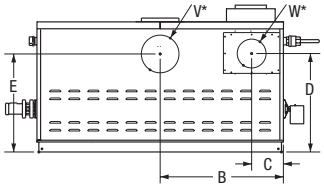




FRONT VIEW



SIDE VIEW



BACK VIEW

Copper Brute™ II Specifications

Model	Dimensions A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	Input[1,3] MBTU/hr	Output[1,3] MBTU/hr	Thermal Efficiency %	Gas Connection Sizes inches	Water Connection Sizes inches	Air Conn. W	Vent Conn. V	Horiz. Conn. V	Shipping Weight[2] lbs.	kg
BWCV0500	33½	85	15¾	40	5¾	15	29¾	76	33¾	86	7¾	20	8¾	22	500	425	85	1¼	2	6 15	8 20	6 15	425	193
BWCV0750	45½	116	21¾	55	5¾	15	29¾	76	33¾	86	7¾	20	8¾	22	750	638	85	1¼	2	8 20	10 25	8 20	505	229
BWCV1000	57½	146	28¾	73	5¾	15	29¾	76	33¾	86	7¾	20	7	18	999	849	85	1¼	2½	8 20	10 25	8 20	615	279
BWCV1250	68	172	34	86	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1250	1064	85	2	2½	12 30	12 30	10 25	675	306
BWCV1500	78½	199	39¾	101	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1500	1266	85	2	2½	12 30	12 30	10 25	760	345
BWCV1750	89	226	44½	113	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	1750	1489	85	2	2½	12 30	14 36	12 30	825	375
BWCV2000	99½	253	49¾	126	10⅛	26	30¾	78	31⅛	79	8¾	22	8¾	22	2000	1701	85	2	2½	12 30	14 36	12 30	955	434

NOTES: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
2. Units with pumps: Add 55 lbs. (25kg).
3. For other boiler ratings:
Boiler Horsepower: HP = Output / 33,475 Radiation Surface: EDR sq. ft. = Output / 150 IBR sq. ft. = Net IBR Rating / 150

RECOVERY DATA

Model	Temperature Rise in Degrees: 40° F gpm	22° C L/h	50° F gpm	28° C L/h	60° F gpm	33° C L/h	70° F gpm	39° C L/h	80° F gpm	44° C L/h	90° F gpm	50° C L/h	100° F gpm	56° C L/h	120° F gpm	67° C L/h	140° F gpm	78°C L/h
BWCV0500	1276	4821	1120	3857	850	3214	729	2755	638	2411	567	2143	510	1929	425	1607	364	1378
BWCV0750	1913	7232	1531	5786	1276	4821	1093	4133	957	3616	850	3214	765	2893	638	2411	547	2066
BWCV1000	2548	9633	2039	7707	1699	6422	1456	5505	1274	4817	1133	4281	1019	3853	849	3211	728	2752
BWCV1250	3189	12054	2551	9643	2126	8036	1822	6888	1594	6027	1417	5357	1276	4821	1063	4018	911	3444
BWCV1500	3827	14464	3061	11571	2551	9643	2187	8265	1913	7232	1701	6429	1531	5786	1276	4821	1093	4133
BWCV1750	4464	16875	3571	13500	2976	11250	2551	9643	2232	8438	1984	7500	1786	6750	1488	5625	1276	4821
BWCV2000	5099	19276	4080	15421	3400	12851	2914	11015	2550	9638	2266	8567	2040	7710	1700	6425	1457	5507

Dimensions shown in **inches**

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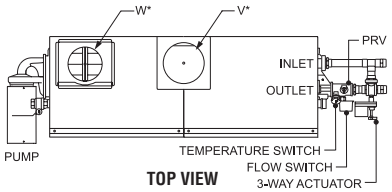
Low Temp Copper Brute™ II
Low Temperature Boiler

The Low Temp Copper Brute™ II commercial boiler eliminate the problem of condensation shortening the life of the heat exchanger. A factory mounted three-way valve and an automatic bypass system help to maintain a minimum boiler return temperature.

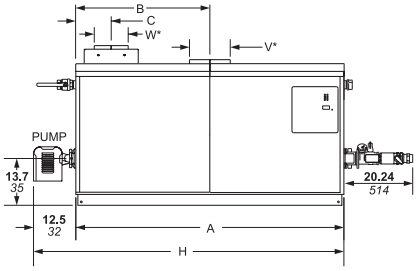
- Boiler operating control of 120°F (49°C).
- Heat exchanger condensation is prevented
- Long boiler life, even with rapid swings in the return water temperature
- Operates successfully with return water temperatures as low as 70°F (21°C)

- Seven sizes available from 500 – 2,000 MBH
- Perfect for backup to heat pump systems, radiant floor heating, snow melting systems, and low-temp baseboard systems

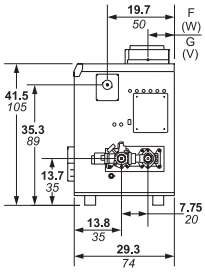
- Warranties: 10-Year heat exchanger + 1-Year parts



TOP VIEW

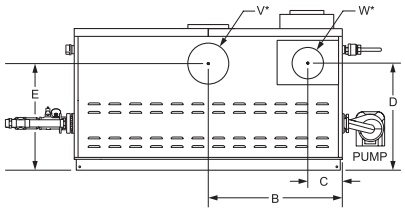


FRONT VIEW



SIDE VIEW

Dimensions shown in **inches** *cm*



BACK VIEW

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Low Temp Copper Brute™ II Specifications

Model	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	H in.	H cm	Air Conn. W* in.	Air Conn. W* cm	Vent Conn. V* in.	Vent Conn. V* cm	Horiz Vent Pipe in.	Horiz Vent Pipe cm
BWCH0500	33½	85	15¾	40	5¾	15	29¾	76	33¾	86	7¾	20	83/4	22	46	117	6	15	8	20	6	15
BWCH0750	45½	116	21¾	55	5¾	15	29¾	76	33¾	86	7¾	20	8¾	22	58	147	8	20	10	25	8	20
BWCH1000	571/2	146	28¾	73	5¾	15	29¾	76	33¾	86	7¾	20	7	18	70	178	8	20	10	25	8	20
BWCH1250	68	172	34	86	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	80	203	12	30	12	30	10	25
BWCH1500	78½	199	39¾	101	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	91	231	12	30	12	30	10	25
BWCH1750	89	226	44½	113	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	101	256	12	30	14	36	12	30
BWCH2000	99½	253	49¾	126	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	112	284	12	30	14	36	12	30

*Air and vent connections may be on top or back of the Low Temp Copper Brute™, and are field convertible.

Model	Input[1] MBTU/hr	Output[1] MBTU/hr	BWCH Combustion Efficiency %	BWCV Thermal Efficiency %	BWCH Thermal Efficiency %	Gas Connection Size Inches	Heater Water Connection Size Inches	Shipping Weight[2] in.	Shipping Weight[2] kg
BWCH0500	500	425	85	85.0	85.0	1¼	2	440	200
BWCH0750	750	638	85	85.0	85.0	1¼	2	520	236
BWCH1000	999	849	85	85.0	85.0	1½	2	630	286
BWCH1250	1250	1064	85.1	85.0	85.2	2	2	675	306
BWCH1500	1500	1266	85.1	85.0	85.2	2	2	775	352
BWCH1750	1750	1489	85.1	85.0	85.2	2	2	823	375
BWCH2000	1999*	1701	85.1	85.0	85.2	2	2	970	440

*The Input MBTU/hr for the 2000 is 1999.0 (BWCH)

NOTES: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
2. Units with pumps: Add 55 lbs. (25kg).
3. For other boiler ratings:
Boiler Horsepower: HP = Output / 33,475 Radiation Surface: EDR sq. ft. = Output / 150 IBR sq. ft. = Net IBR Rating / 150

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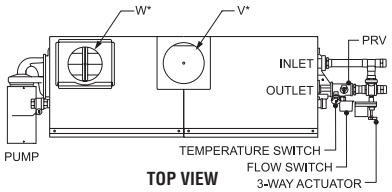
Low Temp Copper Brute™ II
Low Temperature Volume Water Heaters

The Low Temp Copper Brute™ II volume water heaters eliminate the problem of condensation shortening the life of the heat exchanger. A factory mounted three-way valve and an automatic bypass system help to maintain a minimum boiler return temperature.

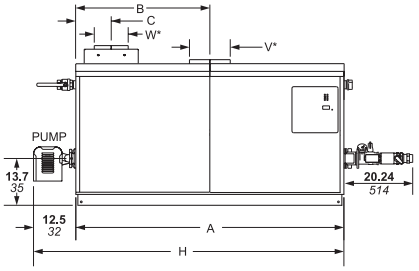
- Boiler operating control of 120°F (49°C).
- Heat exchanger condensation is prevented
- Long boiler life, even with rapid swings in the return water temperature
- Operates successfully with return water temperatures as low as 70°F (21°C)

- Seven sizes available from 500 – 2,000 MBH
- Perfect for backup to heat pump systems, radiant floor heating, snow melting systems, and low-temp baseboard systems

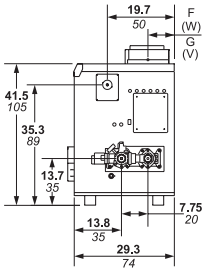
- Warranties: 10-Year heat exchanger + 1-Year parts



TOP VIEW

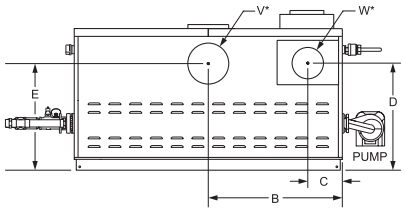


FRONT VIEW



SIDE VIEW

Dimensions shown in **inches** *cm*



BACK VIEW

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Low Temp Copper Brute™ II Specifications

Model	A in.	A cm	B in.	B cm	C in.	C cm	D in.	D cm	E in.	E cm	F in.	F cm	G in.	G cm	H in.	H cm	Air Conn. W* in.	Air Conn. W* cm	Vent Conn. V* in.	Vent Conn. V* cm	Horiz Vent Pipe in.	Horiz Vent Pipe cm
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BWCV1000	571/2	146	28¾	73	5¾	15	29¾	76	33¾	86	7¾	20	7	18	70	178	8	20	10	25	8	20
BWCV1250	68	172	34	86	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	80	203	12	30	12	30	10	25
BWCV1500	78½	199	39¾	101	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	91	231	12	30	12	30	10	25
BWCV1750	89	226	44½	113	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	101	256	12	30	14	36	12	30
BWCV2000	99½	253	49¾	126	10¼	26	30¾	78	31⅛	79	8¾	22	8¾	22	112	284	12	30	14	36	12	30

*Air and vent connections may be on top or back of the Low Temp Copper Brute™, and are field convertible.

Model	Input[1] MBTU/hr	Output[1] MBTU/hr	BWCH Combustion Efficiency %	BWCV Thermal Efficiency %	BWCH Thermal Efficiency %	Gas Connection Size Inches	Heater Water Connection Size Inches	Shipping Weight[2] in.	Shipping Weight[2] kg
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BWCV1500	1500	1266	85.1	85.0	85.2	2	2	775	352
BWCV1750	1750	1489	85.1	85.0	85.2	2	2	823	375
BWCV2000	1999*	1701	85.1	85.0	85.2	2	2	970	440

*The Input MBTU/hr for the 2000 is 2000.0 (BWCV)

NOTES: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.
2. Units with pumps: Add 55 lbs. (25kg).
3. For other boiler ratings:
Boiler Horsepower: HP = Output / 33,475 Radiation Surface: EDR sq. ft. = Output / 150 IBR sq. ft. = Net IBR Rating / 150

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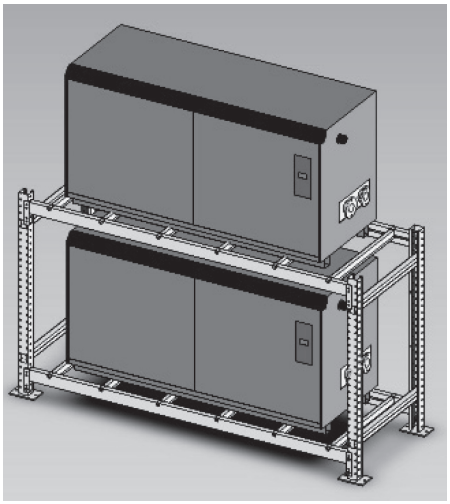
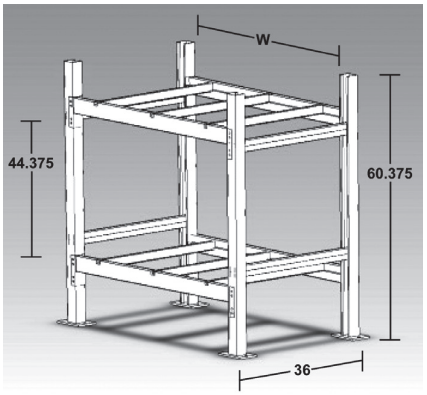
Racks for Copper Brute™ II



This solidly constructed rack system allows the stacking of two Copper Brute™ II units in-line without offset, and it accommodates venting and piping configurations. Copper Brute™ II models with pumps mounted can be applied and will overhang on sides of rack.

- Maximizes floor space
- Doubles the heating capacity per square foot of floor space
- Easy to assemble
- Works with Copper Brute™ II Hydronic Boilers or Volume Water Heaters
- Stack two units in-line without offset
- Accommodates venting and piping configurations
- Construction meets or exceeds California requirements and is Seismic Approved and Certified



W is inside dimension.

Dimensions shown in inches

Racks for Copper Brute™ II Specifications

Model	Input[1] MBTU/hr Width	Used on Non-Pump Size(s)	Used on Pump-Mounted Size(s)	Weight lbs.
CA000700	42"	500	——	183
CA000800	54"	750	500	195
CA000900	66"	1000	750	214
CA001000	84"	1250	1000	230
CA001100	98"	1500, 1750	1250	265
CA001200	108"	2000	1500, 1750	275
CA001300	126"	——	2000	289

Note: Models with pumps mounted can be applied and will overhang on sides of rack.

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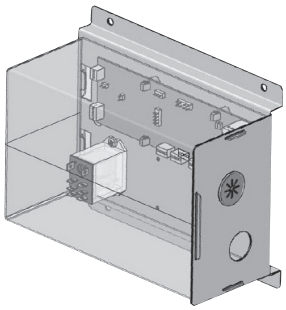
Variable Speed Pump Control System
For Brute™ Series and Brute MagnaTech™



The Control System features a variable pump control that, when used with a variable speed pump, maintains a user-chosen temperature rise between the inlet and outlet of the boiler.

- Maintains user chosen temperature rise between boiler inlet and outlet.
- Operates in degrees, Fahrenheit or Celsius, user selectable.
- User selectable Delta T settings.
- Protective enclosure.
- Proprietary Boiler System Algorithm: This control system will operate the boiler pump at maximum flow during boiler startup to ensure stable operation is reached before introducing variable water flow. This key feature keeps the boiler's combustion and variable speed pump's flow in phase with each other, protecting the heat exchanger from potential low flow conditions.
- Comes standard on the Brute MagnaTech™ condensing modulating boilers
- Available as an optional package on the Brute™ Series condensing boiler line.
- In conjunction with a variable speed pump, the installation will track the heating profile curve and dramatically reduce the electrical usage of the boiler pump.
- The control logic operates in tandem with modulating boiler combustion controls and the variable speed pumps and drivers that are available on the market today.
- Based on today's energy costs vs. the cost of installing, a variable speed pump system can provide an expected payback within one to two years, depending on size of system, heating profile, and regional energy costs.

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Variable Speed Pump Control System Specifications

Delta T Settings	15°F (8°C), 20°F (10°C), 25°F (13°C), 30°F (16°C), 35°F (18°C), 40°F (20°C)
Output Types	0-10VDC or 4-20mA
Dimensions	7 ¾" x 6 ¼" x 3 ¾"
Power Voltage	24 VAC
Max Operating Temp	150°F (65°C)

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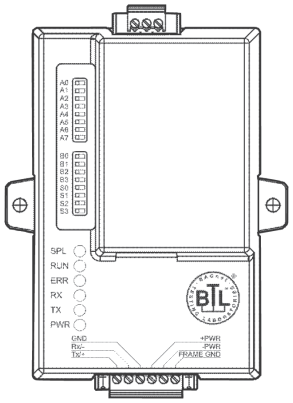
Integrated Boiler Control System



The integrated boiler control system is an external, high performance Building Automation multi-protocol gateway that has been preprogrammed for Brute™ Series and Brute™ Series 1000 & 1200 to support BACnet®1MS/TP, BACnet/IP, Metasys®2 N2 by JCI, Modbus TCP, and LonWorks®3.

Features

- BTL Marked and LonMark Certified
- Field programmable

Standard Equipment

- LER Model Protocol: LonWorks
- RER Model protocols: BACnet MS/TP, BACnet IP, Metasys N2, and Modbus TCP
- RER is based on an ARM9 processor for fast performance and includes two serial ports, one RS-485, and one Ethernet port. BACnet BTL marked (B-ASC)
- LER includes a LonWorks port plus Ethernet and RS-485 ports. LonMark certified
- Able to interface with up to eight controls on Brute™ Series and Brute MagnaTech™ product lines
- Interfaces with RS-485, Ethernet, or LonWorks
- DIP switches to select baud rate on RS-485 protocol (9600, 19200, 38400, 57600, or 76800)
- Serial or Ethernet versions support a total of 2400 Host and Field Protocol memory points
- LonWorks versions support a total of 1500 Host and Field Protocol memory points. Voltage Input Multi-mode power adapter: 9-30VDC or 12 – 24VAC

Integrated Boiler Control System Specifications

Power Consumption @ 12V	RER = 150mA LER = 279mA
Operating Temperature	-40°F to 167°F (-40°C to 75 °C)
Operating Humidity	5-90% RH, non-condensing
Connections	RS-485 Port for BACnet MP/TS or Metasys N2 Ethernet Port for BACnet IP LonWorks Port
Weight	0.4 lbs (0.2 kg)
Dimensions	4.5 L x 3.2 W x 1.6 H inches (11.5 x 8.2 x 4.0 cm)
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT
Approvals	BACnet Testing Labs (BTL) B-ASC-RER Series LonMark 3.4 Certified-LER Series CE (EN55022; EN55024; EN60950) TUV approved to UL 916 standard and CSA C22-2 FCC Class A Part 15 CSA 205 Approved RoHS Compliant DNP3 Conformance Tested OPC Self Certified to Compliance
BACnet Support	BTL Listed BACnet COV's Support up to 2,000 Host & Field points DIP switches are for setting MAC Address, Node-ID, Baud Rate on the RS-485 Field protocol
LonMark Certification	SPID: 80:00:95:46:00:84:04:07 Profiles: 0000-Node object (1), 0001 0001-Open Loop Sensor Object (5) 0003-Open Loop Actuator Object (5)
Warranty	Two years from date of purchase, return to factory

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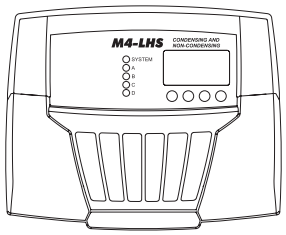
M4-LHS

Control for Condensing, Non-Condensing, Modulation & Stage-Fired Boilers



M4-LHS — Multiple boiler sequencing control with outdoor reset for up to four modulating boilers. Includes system water sensor and well, outdoor air sensor, and clip.

Standard Equipment

- Multiple boiler control, used to lead-lag modulating, stage-fired, condensing, and non-condensing boilers
- Controls up to four stages (one modulating boiler is one stage)
- Ready to use with X-BAC BACnet interface module
- Ready to use with up to two M4EXT extension modules for control of up to 16 modulating stages
- Ready to use with XSIG module to accept external 4-20mA control signal
- Outdoor reset or setpoint control
- System water temperature sensor
- System water temperature sensor well
- Outdoor air temperature sensor
- Outdoor air temperature sensor clip

Features

- Operates two groups of boilers — condensing and non-condensing — each with independent configuration — to achieve the highest system efficiency
- Chooses condensing or noncondensing groups based on system temperature
- Controller works with either stagefired or modulated boilers
- Controls 0-5V, 1-5V, 0-10V, 2-10V and 4-20mA boilers, or stage-fired boilers, in any combination
- Lo/Hi/Lo/Hi sequencing fires lag boiler after the lead boiler reaches full fire capacity — Lo/Lo/Hi/Hi sequencing provides an opportunity for higher boiler efficiency to bring on the lowest firings stages of all the boiler before moving any of them to higher firing rates
- Parallel or normal modulation provides efficient, smooth, and adjustable modulation that can fit most applications whether the boilers are to sequence normally (one after another) or in parallel
- Each boiler can be set for one of three rotation modes: timed (one hour to sixty days), manual, or last-on/last-off
- Each boiler can be set individually to be automatically operated, fully on, manually adjusted, off, or be considered a standby boiler. The standby boiler is used as a backup with an adjustable standby delay. This feature is great for using less efficient boilers (with lower initial purchase cost) for periods of high demand only
- Soft-off feature, lag delay and last stage hold assist in minimizing boiler short-cycling
- Adjustable ignition start point and modulation start point
- Adjustable purge delay, feature to match the boiler's pre-purge time
- Adjustable minimum and maximum system temperature protect boilers or system
- Communicates with EMS (energy management system) by adding the XSIG 4-20mA interface module, and has shutdown and prove inputs for the EMS

M4-LHS Specifications

Voltage Input	120 VAC 60 Hz
Power Consumption	12 VA Max
Operating Temperature	20°F to 130°F
Operating Humidity	20% to 80%
Storage Temperature	-4°F to 180°F
Dimensions	11-3/8" wide x 9-1/4" high x 3-314" deep
Weight	2.5 pounds
Lead Boiler Rotation	Time (1 to 1440 hours [60 days]), manual, last-on
Stage Modes	Auto, standby, manual, on, off
Ignition Start Point	1% to 50%
Modulation Start Point	0% to 100%
Switch Between Boiler Group Modes	System/Return Temp
Standby Time (PID only)	1 to 60 minutes
Purge Delay	0.0 to10.0 mintues Switch between boiler group modes: Outdoor Temp or System/Return Temp
Lag Delay	0 to 60 minutes
Modulating Signals Available	0-5 V, 1·5 V, 0·10 V, 2-10 V and 4-20 mA
Output Relay Ratings	1 Amp inductive, 6 Amp resistive at 120 VAC 60 Hz, 15 A total for all circuits
Pump Outlet	1 N.O. SPST

Temperature Display	Fahrenheit or Celsius
Display	Graphical alphanumeric (7 rows x 21characters each)
Temperature Sensor Ranges	-35°F to 250°F
Outdoor Cutoff	Range 20°F to 100°F, On and Off
SetPoint	70°F to 250°F
External Setpoint	-10°F to 240°F using XSIG 4-20mA interface (optional)
Sequencing Modes	Lo/Hi/Lo/Hi or Lo/Lo/Hi/Hi
Domestic Water	With or without priority
Reset Ratio Range (Outdoor Reset only)	(1:4) to (4:1) (outdoor: system water), and custom ratio
Offset Adjustment (Outdoor Reset only)	-40°F to 40°F
Minimum Target (Outdoor Reset only)	70°F to 170°F
Maximum Target (Outdoor Reset only)	90°F to 240°F
Last Stage Hold (PID only)	0°F to 30°F
Pump Run-On	0 to 360 minutes
Night Setback	0°F to 75°F
Schedules	1 Day and 1 Night (setback) settings per day
Power Backup	Lithium coin battery,100 days minimum 5 year replacement (maintains clock in power outage)
External Inputs	Shutdown input and prove input (dry contacts only)
Season	Winter and Summer
Modulation Modes	Normal or parallel

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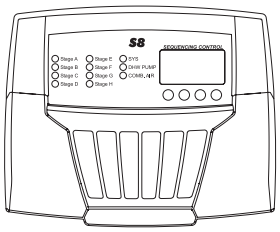
S8
Control for Multiple Stage-Fired Boilers



S8 — Multiple boiler sequencing control with outdoor reset for up to eight boiler stages — will control on/off, two-stage, and four-stage units.

Standard Equipment
- Multiple boiler control, for up to eight boiler stages
- Ready to use with up to two S8EXT extension modules for control of up to twenty-four boiler stages
- Outdoor reset or setpoint control
- Ready to use with XSIG module to accept external 4-20mA control signal
- System water temperature sensor

Features
- System water temperature sensor well
- Outdoor air temperature sensor
- Outdoor air temperature sensor clip
- Graphics that display in plain English
- Brightly lit LCD, visible with no ambient light
- Can be used with on/off, two-stage and four-stage units
- Each boiler can be set individually to be automatically operated, fully on, manually adjusted, off, or standby.
- Communicates with EMS (energy management systems) by adding the XSIG 4-20mA interface module
- Can be configured for indirect domestic hot water pump control with the additional DHW sensor, or by using a dry contact closure, for a variety of domestic water priority and control options
- Settings are pre-configured, but adjustable
- Three rotation options – timed, manual, or first-on/first-off
- Minimum boiler return feature with optional return sensor
- Adjustable day and night schedule
- PID Lo/Hi/Lo/Hi or Lo/Lo/Hi/Hi sequencing or over-sized-system sequencing with features such as last stage hold, reaction time, or minimum runtime, to minimize short-cycling
- System output relay for system pump with adjustable run-on delay, or combustion air damper with prove for air damper
- Adjustable outdoor temperature cutoff and customizable reset curves
- Internal programming switch protected by locking cover for security against unexpected changes to program
- UL Listed, tested per standard 916
- Boost feature
- Summer shutdown option with domestic water override
- Memory and backup with lithium battery to store information for 100 days

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S8 Specifications

Voltage Input	20 VAC 60 Hz
Power Consumption	12 VA Max
Operating Temperature	20°F to 120°F
Operating Humidity	20% to 80%
Dimensions	11-3/8" wide x 9-1/4" high x 3-3/4" deep
Weight	2.5 pounds
Lead Stage Rotation	Time (1 to 999 hours [41 days]) manual, first-on/first-off
Stage Modes	Auto, standby, on, off
Standby Time (PID only)	1 to 60 minutes
Output Relay Ratings	2 Amp inductive at 120 VAC 60 Hz
Add-on Extension Panels	Up to two S8EXT panels using included RS485
Temperature Display	Fahrenheit or Celsius
Display	Graphical alphanumeric (7 rows of 21 characters)
Temperature Sensor Ranges	-35°F to 250°F
Outdoor Cutoff Range	20°F to 100°F, On and Off
Set Point	-10°F to 240°F
External Set Point	-10°F to 240°F using XSIG 4-20mA interface (optional)
Reset Ratio Range (outdoor reset only)	(1:4) to (8:1) (outdoor : system water) and custom ratio

Offset Adjustment (outdoor reset only)	-40°F to 40°F
Minimum Target (outdoor reset only)	70°F to 170°F
Maximum Target (outdoor reset only)	90°F to 240°F
Reaction Time (PID only)	1 to 10 minutes
Min. Run-Time (PID only)	80°F to 140°F
Purge Delay (PID only)	0.0 to 10.0 minutes
Last Stage Hold (PID only)	0°F to 30°F
Throttle Range (OSS only)	2°F to 20°F
Domestic Hot Water Priority Options	Parallel piping w/ or w/out priority
Pump Run-On	0 to 60 minutes
Pump Exercise	Yes or no
Schedules	1 day and 1 night (setback) setting
Night Setback	0°F to 80°F
Power Backup	Lithium coin battery, 100 days min (maintains clock in power outage)
External Inputs	Shutdown input and prove input (dry contacts only)
Seasons	Winter and Summer

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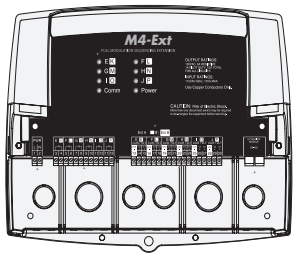
M4 EXT
Extension Module for M4-Lhs Controls



Extension module for M4-LHS control, to add six more boilers to the control system. Includes RS485 connection cable. Up to two M4 EXT modules can be used with one M4 control, for control of up to 16 boilers from the same system.

- Easily connects to any M4-LHS and additional M4 EXT panels or XSIG interface modules
- Additional stages easily added by using the included RS485 cable
- Six N.O. Boiler startup relay outputs. Each is wired in series with each boiler's limit circuit.
- UL listed, tested per standard 916
- LED indicators display associated relay status for easy diagnostics.
- The M4 EXT can operate up to six 0-10 V, 4-20 mA (or split signal) modulating boilers, in any combination
- M4 EXT can be used in Hybrid Systems with condensing, non-condensing, modulating, and/or stage-fired boilers

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M4 EXT Specifications

Voltage Input	120 VAC 60 Hz
Power Consumption	12 VA Max
Operating Temperature	20°F/-6°C to 130°F/54°C
Operating Humidity	20% to 80% non-condensing
Dimensions	11" W x 9" H x 3 ¾" D
Weight	2.5 pounds
Switch Between Boiler Groups Mode	Using Outdoor Temperature or System/Return Temperature
Lead State Rotation	Time (1 to 1440 Hours (60 days)), Manual, Last-On
Pump Output	1 N.O. S.P.S.T.
Modulating Boiler Modes	Auto, Manual, Standby, On, Off
Staging Boiler Modes	Auto, Standby, On, Off
Standby Time	1 to 60 minutes
Modulating Output Types	4-20 mA, 0-5 V, 0-10 V, 1-5 V, 2-10 V
Sequencing Output Types	On/Off, 2-Stage, 3-Stage, or 4-Stage
Output Relay Ratings	1 Amp inductive, 6 Amp resistive at 120 VAC 60 Hz, 15A total for all circuits
Add-On M4-Extension Panels	up two M4-Extension Panels using RS485
Ignition Point %	1 to 50%
Modulation Start Point %	0 to 100%
Modulation Modes	Normal or Parallel
Sequencing Modes	Lo/Hi/Lo/Hi or Lo/Lo/Hi/Hi
Temperature Display	Fahrenheit or Celsius
Display	Graphical Alphanumeric (up to 7 rows x 21 char. Each)
LED	1 System Output relay, 4 Boiler Output relays
Sensor Ranges	Outdoor temperature sensor — minus 35°F/-37°C to 250°F/121°C Heating system sensor-minus 35°F/-37°C to 250°F/121°C
Outdoor Cutoff Range	20°F/-6°C to 100°F, On and Off
Reset Ratio Range	(1:4) to (4:1) (Outdoor: System Water)
Minimum Water Temperature	70°F/21°C to 170°F/77°C
Maximum Water Temperature	90°F/32°C to 240°F/116°C
Domestic Hot Water	with Priority or without Priority
Pump Run-On	0 to 360 minutes
Purge Delay	0.0 to 10.0 minutes
Lag Delay	0 to 60 minutes
Last Stage Hold	0 to 30°F
Schedules	1 Day and 1 Night (Setback) setting per day
Night Setback	0F°/0C° to 75F°/42C°
Power Backup	Lithium coin battery, 100 days minimum 5 year replacement (Maintains Clock in power outages)
External Inputs	Shutdown, Tstat, and Setback Input, and Prove and DHW Call Input (dry contacts only)
Season	Winter and Summer

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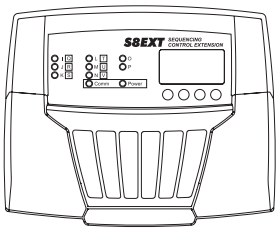
S8 EXT
Extension Module for S8 Control



Standard Equipment
- Extension module for up to eight additional boiler stages
- Ready to use with RS485 cable (included)

Features
- Easily connects to S8, another S8EXT, and XSIG with RS485 cables
- Can be used with on/off, two-stage and four-stage units
- A-B switch for identification when two S8 EXT units are used
- UL Listed, tested per standard 916

S8 EXT Specifications

Extension Numbering	Toggle switch A or B
LED	1 power: (dual color green (A)/red (B)),1 comm: 8 stage output relays (dual color green (A)/red (B))
Stage Outputs	8 N.O. SPST
Output Relay Ratings	2 Amp inductive at 120 VAC 60 Hz
Connection to S8 and Another S8EXT	Two RS485
Operating Temperature	20°F to 120°F
Operating Humidity	20% to 80%
Dimensions	11-3/8" wide x 9-1/4" high x 3-3/4" deep
Weight	2.5 pounds

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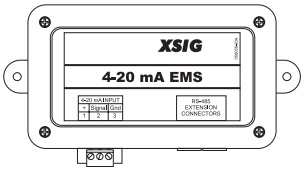
XSIG
4-20MA Interface Module



The XSIG Interface provides the M4 and S8 series controls with the capability of receiving an external set point as a 4-20mA signal through an Energy Management or Building Management Systems (EMS/BMS).

- Module easily connects with the S8 or M4 controls and extensions.
- Connects to the M4 or S8 via included RS485 connection cable.
- The M4 and the S8 controls can be shutdown by the EMS/BMS system.
- The control, XSIG Interface and two Extensions can be connected in series using the RS485.
- The XSIG Interface can source the current for the 4-20mA input signal, providing an excitation DC current.

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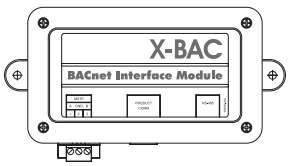
X-BAC
BACnet Interface Module



X-BAC interface module allows a BACnet system to have communication with M4-LHS multiple boiler controls and easily connects to M4-LHS with RJ45 (ethernet) cables.

Available to the BACnet system from the M4-LHS, through the X-BAC:

- Operation mode
- Outdoor temperature
- System temperature
- Output status
- Control status
- Season
- Reset ratio
- Offset
- Outdoor cutoff
- Minimum water temperature
- Maximum water temperature
- Setback
- Purge delay
- System run-on
- Rotation time
- Standby time
- Last stage hold
- Condensing unit lead stage
- Non-condensing unit lead stage
- Reaction time
- Minimum run time
- Gain
- Lag delay
- Soft off
- Set time
- Day schedule
- Night schedule

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