

# Brute® XTR



## Volume Water Heater

BNT2V | Volume Water Heater

Indoor Sizes 399-1500



### Submittal Data

Date:

Project #:

Engineer:

Prepared By:

Bid Date:

Project Name:

Location:

Contractor:

### Standard Features

- High condensing efficiency
- Stainless steel heat exchanger with welded construction
- ASME 160psi (1104Pa) working pressure heat exchanger
- ASME "HLW" stamp
- 125psi (862kPa) ASME rated pressure relief valve
- Modulation down to 10% of full fire (10:1 turndown)
- Low NOx system exceeds the most stringent regulations for air quality
- Meets NSF/ANSI-372 Low Lead Content Certification
- Indoor construction with optional outdoor kit
- Optional pump (sized to model) included for field installation
- Top water and gas connections
- Sealed combustion chamber
- Pre-mix stainless steel burner
- Sophisticated air/gas system allows for consistent combustion control
- Horizontal or vertical direct vent
- Certified for Category II & IV vent
- Category IV vent & air pipe lengths of up to 150 equivalent feet (each)
- Electronic PID modulating control with large touch screen user interface and color display
- Controller cascades with up to eight Brute XTR units
- Modbus RTU & BACnet MSTP on board
- DHW pump control, with delay
- Direct spark ignition
- Indirect water heater priority
- DHW sensor
- Alarm output
- Accepts external (4-20mA or 0-10VDC) modulation signal
- On/Off toggle switch
- Top and rear service panels
- Built-in condensate trap
- Water flow switch
- Vent temperature cutoff
- Air filter
- Temperature & pressure gauge
- Drain valve
- Auto reset high limit
- Manual reset high limit
- Burner sight glass
- Zero clearance to combustibles
- 5-year limited hx warranty

### Boiler Data

Number of Units

Fuel

☐ Natural Gas

Construction

☐ Standard

☐ ASME CSD-1

Options

☐ Pump (5-12 gpg)

☐ Pump (12-15 gpg)

☐ Low Water Cutoff

Alternate PRVs

☐ 125 psi pressure relief valve (std)

☐ 60 psi pressure relief valve

☐ 150 psi pressure relief valve



**Accessories  
for Field  
Mounting**

- ☐ Outdoor kit  
☐ Outdoor pump housing kit  
☐ CSD-1 kit (includes LWCO, gas pressure switches, display, control)  
☐ Pump (5-12 gpg)  
☐ Pump (12-15 gpg)
- ☐ Pump contactor  
☐ Low water cut-off  
☐ High & low gas pressure switches  
☐ Additional auto & manual reset high limits  
☐ Gateway for BACnet IP  
☐ Gateway for LonWorks
- ☐ Alarm bell with silence switch  
☐ Condensate neutralizer  
☐ Condensate neutralizer with pump  
 For 399-500 models:  
☐ Flush-mount vent terminal, 4"  
☐ PVC concentric termination kit  
☐ CPVC concentric termination kit

**Sizing Data**

|                          | Model | Min Input Rate |      | Max Input Rate |     | Min Output Rate |      | Max Ouput Rate |     | AHRI Certified       |
|--------------------------|-------|----------------|------|----------------|-----|-----------------|------|----------------|-----|----------------------|
|                          |       |                |      |                |     |                 |      |                |     | Thermal Efficiency % |
|                          |       | MBH            | kW   | MBH            | kW  | MBH             | kW   | MBH            | kW  |                      |
| <input type="checkbox"/> | 399   | 39.9           | 11.7 | 399            | 117 | 39.1            | 11.5 | 391            | 115 | 98%                  |
| <input type="checkbox"/> | 500   | 50.0           | 14.7 | 500            | 147 | 49.0            | 14.4 | 490            | 144 | 98%                  |
| <input type="checkbox"/> | 650   | 65.0           | 19.0 | 650            | 191 | 63.1            | 18.5 | 631            | 185 | 97%                  |
| <input type="checkbox"/> | 800   | 80.0           | 23.4 | 800            | 235 | 77.6            | 22.7 | 776            | 227 | 97%                  |
| <input type="checkbox"/> | 999   | 99.9           | 29.3 | 999            | 293 | 96.9            | 28.4 | 969            | 284 | 97%                  |
| <input type="checkbox"/> | 1500  | 150.0          | 44.0 | 1500           | 440 | 148.5           | 43.5 | 1485           | 435 | 99%                  |

| Model | Product Weight |     | Operating Weight |     | Shipping Weight |     | Water Content |      |
|-------|----------------|-----|------------------|-----|-----------------|-----|---------------|------|
|       | lbs            | kg  | lbs              | kg  | lbs             | kg  | gal           | l    |
| 399   | 391            | 178 | 427              | 194 | 508             | 231 | 4.4           | 16.5 |
| 500   | 401            | 182 | 441              | 200 | 518             | 235 | 4.8           | 18.1 |
| 650   | 471            | 214 | 525              | 238 | 597             | 271 | 6.4           | 24.4 |
| 800   | 492            | 224 | 554              | 252 | 618             | 281 | 7.4           | 28.2 |
| 999   | 542            | 246 | 616              | 280 | 679             | 309 | 8.9           | 33.9 |
| 1500  | 620            | 282 | 714              | 325 | 757             | 344 | 11.3          | 43.0 |

**Clearances**

|       | Clearance to Combustibles |    | Suggested Service Clearance |    |
|-------|---------------------------|----|-----------------------------|----|
|       | Inches                    | cm | Inches                      | cm |
| Front | 0                         | 0  | 24                          | 61 |
| Back  | 0                         | 0  | 24                          | 61 |
| Left  | 0                         | 0  | 0                           | 0  |
| Right | 0                         | 0  | 0                           | 0  |
| Top   | 0                         | 0  | 24                          | 61 |

## Water Flow Requirements

| Model       | Water Hardness 5 - 12 gpg |           |               | Water Hardness 12 - 15 gpg |           |               |
|-------------|---------------------------|-----------|---------------|----------------------------|-----------|---------------|
|             | Flow<br>gpm               | H/L<br>ft | Delta-T<br>°F | Flow<br>gpm                | H/L<br>ft | Delta-T<br>°F |
| <b>399</b>  | 31                        | 7.0       | 25            | 41                         | 12.3      | 20            |
| <b>500</b>  | 37                        | 7.0       | 25            | 49                         | 12.6      | 20            |
| <b>650</b>  | 49                        | 7.5       | 25            | 66                         | 13.4      | 20            |
| <b>800</b>  | 61                        | 8.5       | 25            | 82                         | 15.1      | 20            |
| <b>999</b>  | 74                        | 8.9       | 25            | 98                         | 15.7      | 20            |
| <b>1500</b> | 80                        | 10.8      | 36            | 106                        | 19.2      | 27            |

| Model       | Water Hardness 5 - 12 gpg |          |               | Water Hardness 12 - 15 gpg |          |               |
|-------------|---------------------------|----------|---------------|----------------------------|----------|---------------|
|             | Flow<br>lpm               | H/L<br>m | Delta-T<br>°C | Flow<br>lpm                | H/L<br>m | Delta-T<br>°C |
| <b>399</b>  | 116                       | 2.1      | 14            | 155                        | 3.7      | 11            |
| <b>500</b>  | 139                       | 2.1      | 14            | 186                        | 3.8      | 11            |
| <b>650</b>  | 186                       | 2.3      | 14            | 248                        | 4.1      | 11            |
| <b>800</b>  | 232                       | 2.6      | 14            | 310                        | 4.6      | 11            |
| <b>999</b>  | 279                       | 2.7      | 14            | 372                        | 4.8      | 11            |
| <b>1500</b> | 302                       | 3.3      | 20            | 403                        | 5.9      | 15            |

## Venting System

| Model       | Air Intake       |                                    |                                    | Vent                         |                                                   |                                                   |                                              |
|-------------|------------------|------------------------------------|------------------------------------|------------------------------|---------------------------------------------------|---------------------------------------------------|----------------------------------------------|
|             | Diameter<br>(in) | Min.<br>Equivalent*<br>Length (ft) | Max.<br>Equivalent*<br>Length (ft) | Category IV<br>Diameter (in) | Category IV<br>Min.<br>Equivalent*<br>Length (ft) | Category IV<br>Max.<br>Equivalent*<br>Length (ft) | Typical**<br>Category II<br>Diameter<br>(in) |
| <b>399</b>  | 4                | 0                                  | 150                                | 4                            | 10                                                | 150                                               | 12                                           |
| <b>500</b>  | 4                | 0                                  | 150                                | 4                            | 10                                                | 150                                               | 12                                           |
| <b>650</b>  | 6                | 0                                  | 150                                | 6                            | 10                                                | 150                                               | 12                                           |
| <b>800</b>  | 6                | 0                                  | 150                                | 6                            | 10                                                | 150                                               | 12                                           |
| <b>999</b>  | 6                | 0                                  | 150                                | 6                            | 10                                                | 150                                               | 12                                           |
| <b>1500</b> | 8                | 0                                  | 150                                | 8                            | 10                                                | 150                                               | 12                                           |

\*Equivalent Length: Add 5 feet for each 90° elbow up to the first 6. If more than 6 are needed in either the vent or air intake, or any 45° elbows are required, see the table below for the additional length to be added.

\*\*Category II vent pipe size may vary. Draft must remain between -0.10" and -0.001" w.c.

| Diameter<br>(in) | Elbow Equivalent Lengths (ft) |                               |            |                         |                               |            |
|------------------|-------------------------------|-------------------------------|------------|-------------------------|-------------------------------|------------|
|                  | Air Intake                    |                               |            | Vent                    |                               |            |
|                  | 90° Elbows<br>(up to 6)       | 90° Elbows<br>(after first 6) | 45° Elbows | 90° Elbows<br>(up to 6) | 90° Elbows<br>(after first 6) | 45° Elbows |
| <b>4</b>         | 5                             | 5                             | 3          | 5                       | 5                             | 3          |
| <b>6</b>         | 5                             | 10                            | 5          | 5                       | 10                            | 5          |
| <b>8</b>         | 5                             | 15                            | 8          | 5                       | 15                            | 8          |

## Recovery

| Model | Required Water Temperature Rise (°F) |      |      |      |      |      |      |      |      |
|-------|--------------------------------------|------|------|------|------|------|------|------|------|
|       | 40                                   | 50   | 60   | 70   | 80   | 90   | 100  | 120  | 140  |
|       | gph                                  | gph  | gph  | gph  | gph  | gph  | gph  | gph  | gph  |
| 399   | 1149                                 | 919  | 766  | 657  | 575  | 511  | 460  | 383  | 328  |
| 500   | 1440                                 | 1152 | 960  | 823  | 720  | 640  | 576  | 480  | 411  |
| 650   | 1872                                 | 1498 | 1248 | 1070 | 936  | 832  | 749  | 624  | 535  |
| 800   | 2304                                 | 1843 | 1536 | 1317 | 1152 | 1024 | 922  | 768  | 658  |
| 999   | 2877                                 | 2302 | 1918 | 1644 | 1439 | 1279 | 1151 | 959  | 822  |
| 1500  | 4320                                 | 3456 | 2880 | 2469 | 2160 | 1920 | 1728 | 1440 | 1234 |

| Model | Required Water Temperature Rise (°C) |       |       |      |      |      |      |      |      |
|-------|--------------------------------------|-------|-------|------|------|------|------|------|------|
|       | 22                                   | 28    | 33    | 39   | 44   | 50   | 56   | 67   | 78   |
|       | lph                                  | lph   | lph   | lph  | lph  | lph  | lph  | lph  | lph  |
| 399   | 4350                                 | 3480  | 2900  | 2486 | 2175 | 1933 | 1740 | 1450 | 1243 |
| 500   | 5451                                 | 4361  | 3634  | 3115 | 2725 | 2423 | 2180 | 1817 | 1557 |
| 650   | 7086                                 | 5669  | 4724  | 4049 | 3543 | 3149 | 2835 | 2362 | 2025 |
| 800   | 8722                                 | 6977  | 5814  | 4984 | 4361 | 3876 | 3489 | 2907 | 2492 |
| 999   | 10891                                | 8713  | 7261  | 6223 | 5446 | 4840 | 4356 | 3630 | 3112 |
| 1500  | 16353                                | 13082 | 10902 | 9345 | 8176 | 7268 | 6541 | 5451 | 4672 |

## Electrical Data

| Water Heater Only |         |     |     |     |
|-------------------|---------|-----|-----|-----|
| Model             | Voltage | FLA | MCA | MOP |
| 399               | 120     | 2.8 | 3.5 | 15  |
| 500               | 120     | 3.1 | 3.9 | 15  |
| 650               | 120     | 3.1 | 3.9 | 15  |
| 800               | 120     | 3.2 | 4.0 | 15  |
| 999               | 120     | 4.2 | 5.3 | 15  |
| 1500              | 120     | 5.4 | 6.8 | 15  |

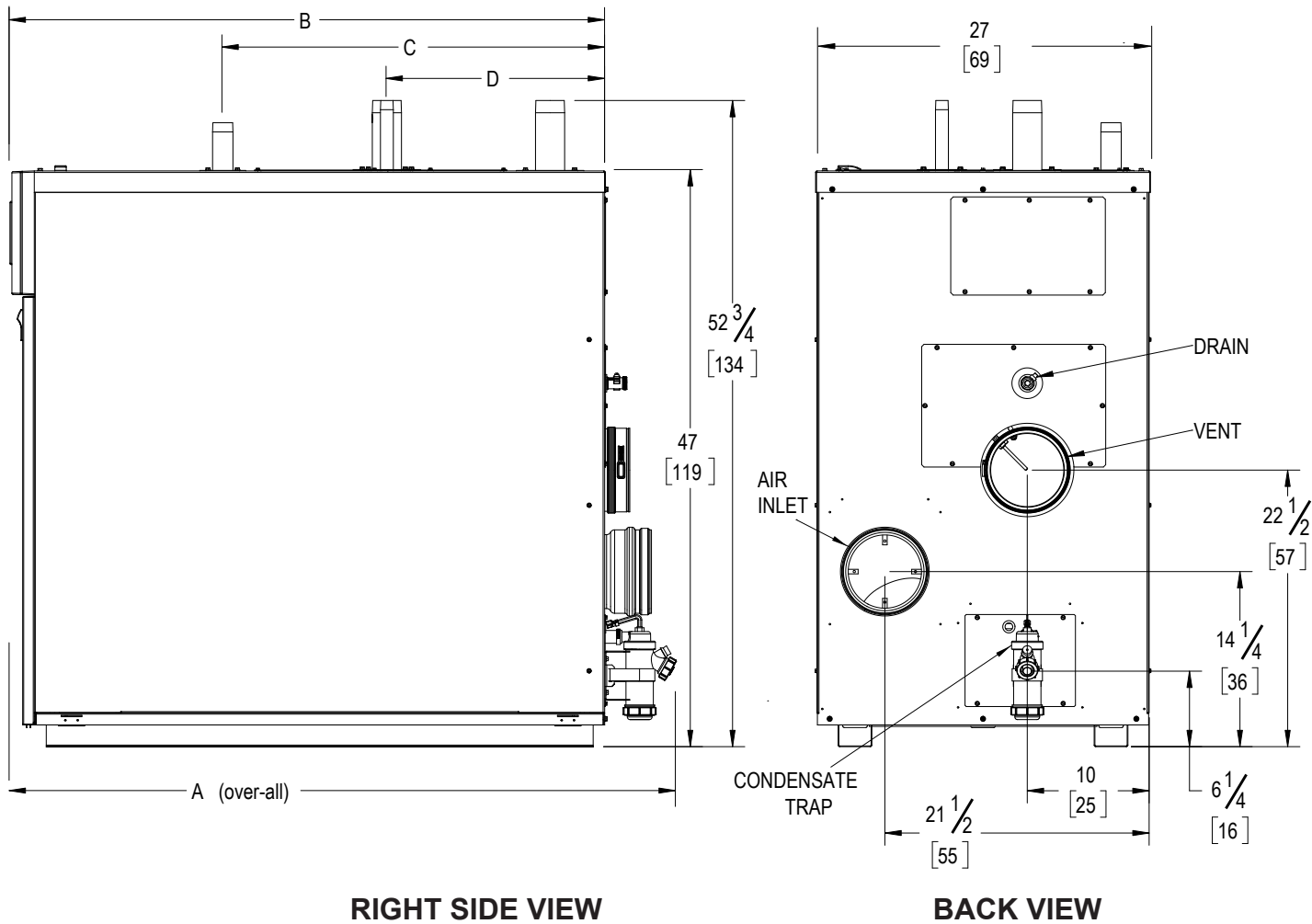
| Water Heater and Pump |                 |      |      |     |                  |      |      |     |
|-----------------------|-----------------|------|------|-----|------------------|------|------|-----|
| Model                 | 5 - 12 gpg Pump |      |      |     | 12 - 15 gpg Pump |      |      |     |
|                       | Voltage         | FLA  | MCA  | MOP | Voltage          | FLA  | MCA  | MOP |
| 399                   | 120             | 4.7  | 5.9  | 15  | 120              | 6.4  | 8.0  | 15  |
| 500                   | 120             | 5.0  | 6.3  | 15  | 120              | 8.0  | 10.0 | 15  |
| 650                   | 120             | 6.7  | 8.4  | 15  | 120              | 8.0  | 10.0 | 15  |
| 800                   | 120             | 6.8  | 8.5  | 15  | 120              | 12.0 | 15.0 | 20  |
| 999                   | 120             | 10.3 | 12.9 | 20  | 120              | -    | -    | -   |
| 1500*                 | 120             | -    | -    | -   | 120              | -    | -    | -   |

| Pump Only |                 |     |      |     |                  |      |      |     |
|-----------|-----------------|-----|------|-----|------------------|------|------|-----|
| Model     | 5 - 12 gpg Pump |     |      |     | 12 - 15 gpg Pump |      |      |     |
|           | Voltage         | FLA | MCA  | MOP | Voltage          | FLA  | MCA  | MOP |
| 399       | 120             | 1.9 | 2.4  | 15  | 120              | 3.6  | 4.5  | 15  |
| 500       | 120             | 1.9 | 2.4  | 15  | 120              | 4.9  | 6.1  | 15  |
| 650       | 120             | 3.6 | 4.5  | 15  | 120              | 4.9  | 6.1  | 15  |
| 800       | 120             | 3.6 | 4.5  | 15  | 120              | 8.8  | 11.0 | 15  |
| 999       | 120             | 6.1 | 7.6  | 15  | 120              | 12.4 | 15.5 | 20  |
| 1500      | 120             | 8.8 | 11.0 | 15  | 120              | 12.4 | 15.5 | 20  |

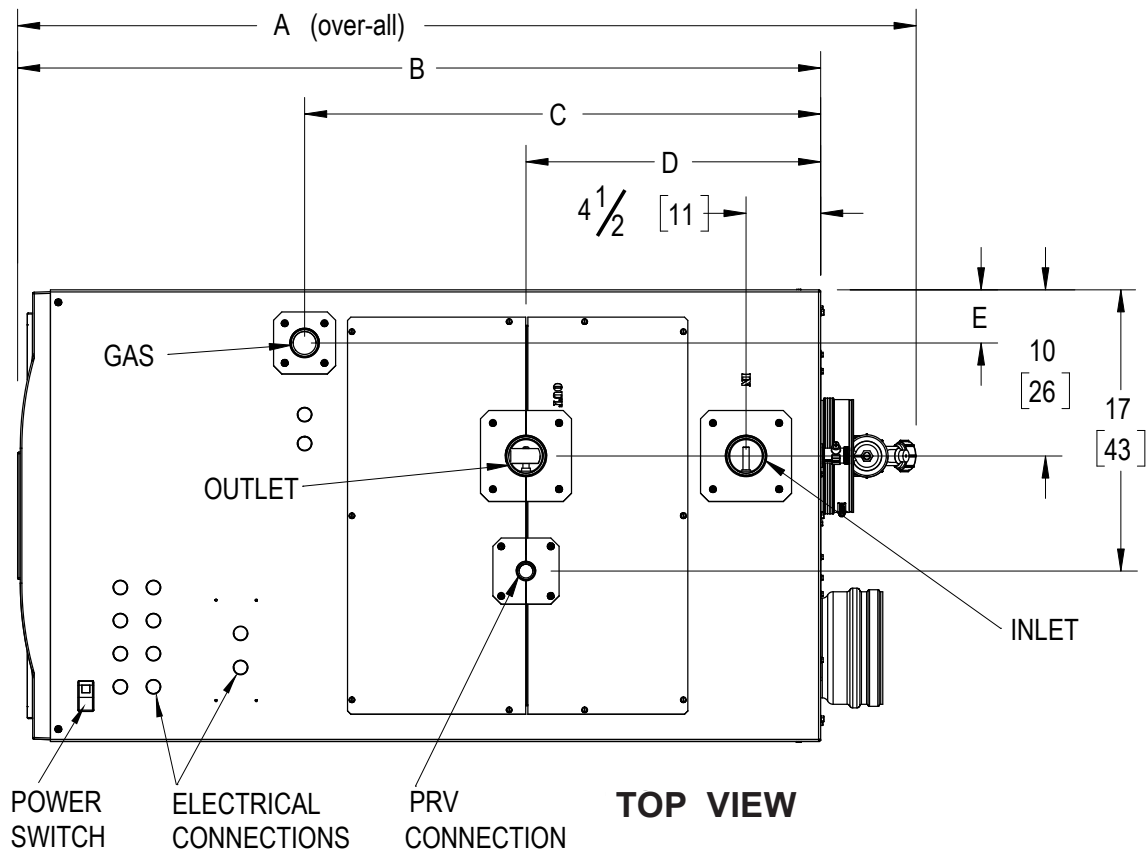
**Dimensional  
Data**

| Model | Dimensions (Inches) |        |        |        |       |           |             |           |      |
|-------|---------------------|--------|--------|--------|-------|-----------|-------------|-----------|------|
|       | A                   | B      | C      | D      | E     | Gas Conn. | Water Conn. | Air Inlet | Vent |
| 399   | 47-1/4              | 41-1/2 | 23-1/4 | 12     | 5     | 1         | 2           | 4         | 4    |
| 500   | 47-1/4              | 41-1/2 | 24-1/2 | 13-1/2 | 5     | 1         | 2           | 4         | 4    |
| 650   | 54-1/4              | 48-1/2 | 31-1/4 | 17-3/4 | 3-1/4 | 1-1/4     | 2           | 6         | 6    |
| 800   | 54-1/4              | 48-1/2 | 34     | 20-3/4 | 3-1/4 | 1-1/4     | 2           | 6         | 6    |
| 999   | 57-3/4              | 52     | 35     | 25-1/2 | 4     | 1-1/2     | 2-1/2       | 6         | 6    |
| 1500  | 66-3/4              | 61     | 42-1/2 | 33     | 4     | 1-1/2     | 2-1/2       | 8         | 8    |

| Model | Dimensions (cm) |     |     |    |    |
|-------|-----------------|-----|-----|----|----|
|       | A               | B   | C   | D  | E  |
| 399   | 120             | 105 | 59  | 31 | 13 |
| 500   | 120             | 105 | 62  | 34 | 13 |
| 650   | 138             | 123 | 79  | 45 | 8  |
| 800   | 138             | 123 | 86  | 53 | 8  |
| 999   | 147             | 132 | 89  | 65 | 10 |
| 1500  | 169             | 155 | 108 | 84 | 10 |



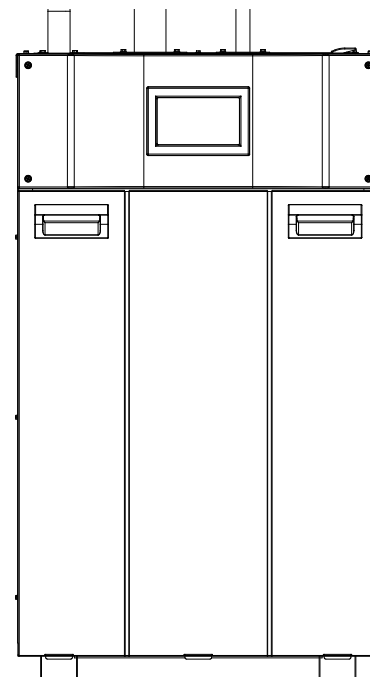
**Dimensional  
Data** (continued)



FLA = Full Load Amperage  
MCA = Minimum Circuit Ampacity  
MOP = Maximum Over-current Protection

\*On 1500 models with factory supplied pumps, it is necessary to use two circuits; one to supply power for the boiler or water heater and another to power the pump.

**FRONT VIEW**



Bradford White Corporation reserves the right to change specifications, components, features, or to discontinue products without notice.