

MGV | Volume Water Heater

Indoor / Outdoor, Sizes 1600 - 4000

Date:

Project #:

Engineer:

Prepared By:

Bid Date:

Submittal Data



Project Name:

Location:

Contractor:

## Standard Features

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

## Heater Data

Number of Units

Fuel

- ☐ Natural  
☐ Propane

Voltage

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

## Factory Mounted Options

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



## Accessories for Field Mounting

|                                                                            |                                                                   |                                                                                   |
|----------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <input type="checkbox"/> Gateway for BACnet IP                             | <input type="checkbox"/> Screen for vertical stainless steel vent | <input type="checkbox"/> Screen/adapter for vertical or horizontal PCV ducted air |
| <input type="checkbox"/> Gateway for LonWorks                              | <input type="checkbox"/> Screen for horizontal CPVC vent          | <input type="checkbox"/> Screen for horizontal galvanized or vertical ducted air  |
| <input type="checkbox"/> Condensate neutralizer                            | <input type="checkbox"/> Screen for vertical CPVC vent            | <input type="checkbox"/> Screen for horizontal polypropylene ducted air           |
| <input type="checkbox"/> Condensate neutralizer with pump                  | <input type="checkbox"/> Screen for horizontal polypropylene vent | <input type="checkbox"/> Screen for vertical polypropylene ducted air             |
| <input type="checkbox"/> Vent terminal for outdoor unit                    | <input type="checkbox"/> Screen for vertical polypropylene vent   |                                                                                   |
| <input type="checkbox"/> Screen for outdoor unit air                       |                                                                   |                                                                                   |
| <input type="checkbox"/> Vent terminal for horizontal stainless steel vent |                                                                   |                                                                                   |

## Sizing Data

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

|                          | Model       | Product Weight |      | Operating Weight |      | Shipping Weight |      | Water Content |     |
|--------------------------|-------------|----------------|------|------------------|------|-----------------|------|---------------|-----|
|                          |             | lbs            | kg   | lbs              | kg   | lbs             | kg   | gal           | l   |
| <input type="checkbox"/> | <b>1600</b> | 1390           | 630  | 1562             | 709  | 1590            | 721  | 22            | 83  |
| <input type="checkbox"/> | <b>2000</b> | 1390           | 630  | 1562             | 709  | 1590            | 721  | 22            | 83  |
| <input type="checkbox"/> | <b>2500</b> | 1785           | 810  | 2039             | 925  | 1985            | 900  | 31            | 117 |
| <input type="checkbox"/> | <b>3000</b> | 1785           | 810  | 2039             | 925  | 1985            | 900  | 31            | 117 |
| <input type="checkbox"/> | <b>3500</b> | 2278           | 1033 | 2742             | 1244 | 2478            | 1124 | 56            | 212 |
| <input type="checkbox"/> | <b>4000</b> | 2278           | 1033 | 2742             | 1244 | 2478            | 1124 | 56            | 212 |

## Clearances

|       | Clearance to Combustibles |     | Suggested Service Clearance |    | Suggested Top Service Clearance by Model |    |           |    |           |    |
|-------|---------------------------|-----|-----------------------------|----|------------------------------------------|----|-----------|----|-----------|----|
|       | inches                    | cm  | inches                      | cm | 1600/2000                                |    | 2500/3000 |    | 3500/4000 |    |
| Front | 18                        | 46  | 24                          | 61 | inches                                   | cm | inches    | cm | inches    | cm |
| Back  | 11                        | 28  | 24                          | 61 | 12                                       | 30 | 15        | 38 | 24        | 61 |
| Left  | 4                         | 10  | 8                           | 20 |                                          |    |           |    |           |    |
| Right | 4                         | 10  | 8                           | 20 |                                          |    |           |    |           |    |
| Top   | 1                         | 2.5 |                             |    |                                          |    |           |    |           |    |

## Electrical Data

| Size    | 1600 |         |        | 2000 |         |        |        |     |     |
|---------|------|---------|--------|------|---------|--------|--------|-----|-----|
| Voltage | 120  | 240/220 | 208 1Φ | 120  | 240/220 | 208 1Φ | 208 3Φ | 480 | 600 |
| FLA     | 6.2  | 3.4     | 3.6    | 22.4 | 10.1    | 12.5   | 7.5    | 3.5 | 4.4 |
| MCA     | 7.8  | 4.2     | 4.5    | 28.0 | 12.7    | 15.6   | 9.4    | 4.4 | 5.5 |
| MOP     | 20   | 15      | 15     | 50   | 25      | 25     | 15     | 15  | 15  |

| Size    | 2500/3000 |        |        | 3500/4000 |     |     |
|---------|-----------|--------|--------|-----------|-----|-----|
| Voltage | 208 3Φ    | 480 3Φ | 600 3Φ | 208 3Φ    | 480 | 600 |
| FLA     | 9.5       | 4.4    | 3      | 9.9       | 3.6 | 4.5 |
| MCA     | 12        | 6      | 4      | 12        | 5   | 6   |
| MOP     | 20        | 15     | 15     | 20        | 15  | 15  |

Full Load Amperage  
Minimum Circuit Ampacity  
Max Over-current Protection

## Vent System

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

\*Equivalent Feet: To calculate maximum equivalent length, measure the linear feet of the pipe and add 5 feet (1.5m) for each elbow used.

Category II pipe size may vary. Draft must remain between -0.01 and -0.001" w.c..

Notes:

1. Installations in the U.S. require exhaust vent pipe that is CPVC complying with ANSI/ASTM D1785 F441, stainless steel complying with UL1738, or polypropylene complying with ULC S636.
2. Installations in Canada require exhaust vent pipe that is certified to ULC S636.
3. Intake (air) pipe must be PVC or CPVC that complies with ANSI/ASTM D1785 F441, ABS that complies with ANSI/ASTM D1527, stainless steel, or galvanized material.

## Water Flow Requirements

| Water Hardness<br>1-10 grains per gallon |           |           |           |           |           |           |
|------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Model                                    | Flow Rate | Temp Rise | Headloss* | Flow Rate | Temp Rise | Headloss* |
|                                          | GPM       | °F        | Ft        | LPM       | °C        | m         |
| 1600                                     | 152       | 20        | 31.0      | 525       | 11.1      | 10.1      |
| 2000                                     | 152       | 25        | 33.0      | 575       | 14        | 10.1      |
| 2500                                     | 190       | 25        | 33.7      | 719       | 13.9      | 10.0      |
| 3000                                     | 190       | 30        | 36.0      | 719       | 17        | 11.0      |
| 3500                                     | 222       | 30        | 30.6      | 839       | 17        | 9.0       |
| 4000                                     | 224       | 34        | 30.0      | 848       | 19        | 9.1       |

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

| Water Hardness<br>11-15 grains per gallon |           |           |           |           |           |           |
|-------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Model                                     | Flow Rate | Temp Rise | Headloss* | Flow Rate | Temp Rise | Headloss* |
|                                           | GPM       | °F        | Ft        | LPM       | °C        | m         |
| 1600                                      | 177       | 17        | 41.0      | 670       | 9.4       | 12.5      |
| 2000                                      | 177       | 21        | 43.9      | 670       | 12        | 13.4      |
| 2500                                      | 220       | 21        | 46.0      | 833       | 11.7      | 14        |
| 3000                                      | 220       | 26        | 46.0      | 833       | 14        | 14        |
| 3500                                      | 266       | 25        | 40.6      | 1007      | 14        | 12        |
| 4000                                      | 266       | 29        | 41.2      | 1007      | 16        | 12.6      |

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

## Recovery Data

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

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

## Dimensional Data

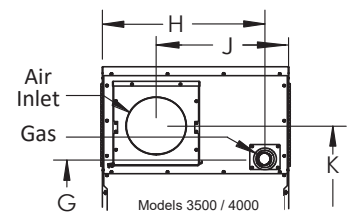
| Model | A         | B          | C          | D          | E          | G          | H         | J         |
|-------|-----------|------------|------------|------------|------------|------------|-----------|-----------|
| 1600  | 29.3 (75) | 79.8 (203) | 38.0 (96)  | 57.5 (147) | 49.8 (126) | 60.8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

inches (cm)

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

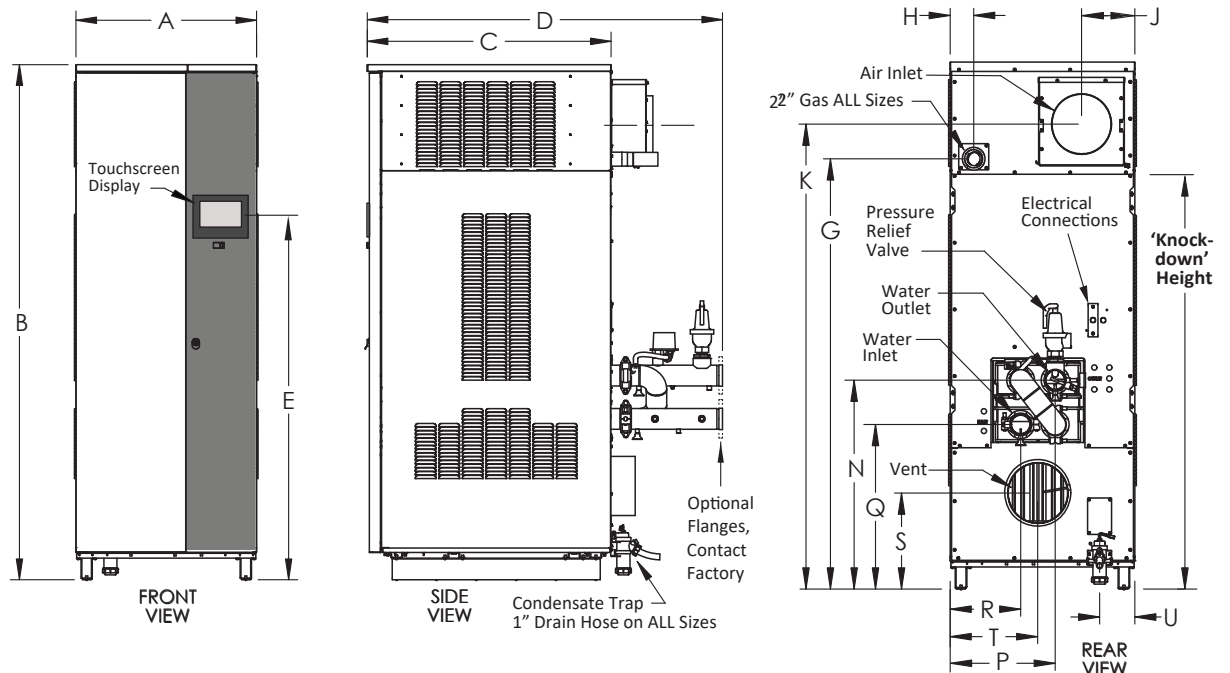
inches (cm)

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



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

**MAGNATHERM®**



Laars Heating Systems Company reserves the right to change specifications, components, features, or to discontinue products without notice.