

# ***MIGHTY THERM CP***

Gas Fired Commercial  
Pool Heating Boiler

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**Powerful,**

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**Efficient,**

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**Low Nox**

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**Reliable and**

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**Economical**

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**LAARS**   
**Heating Systems Company**

A subsidiary of **BRADFORD WHITE**  
CORPORATION

## Mighty Therm Standard Features

Mighty Therm Model AP energy efficient, compact pool heating boilers are designed for commercial, institutional and large residential pools where economical performance and rapid heat-up are needed. The Mighty Therm AP is available in indoor and outdoor models with twenty-two sizes from 500,000 to 5,000,000 BTU/H to precisely match any heating requirement.

### **Primary/secondary pump and control on Models 500-1825 include the following features:**

- Electronic controller with a solid state sensor and adjustable differential provides accurate temperature control.
- Preheated inlet water eliminates condensation.
- Constant velocity in heat exchanger increases tube life.
- Elimination of diverter valve in pool circulation line results in lower installation and operating costs.
- Inlet and outlet thermometers with  $\pm 1\%$  accuracy allow precise set-up and monitoring of temperature rise.

**Greater energy efficiencies** as high as 82% are achieved through the use of integral finned copper tubes which are rolled directly into the headers. Conformal heat exchanger baffles and an eight-fins-per-inch tubing configuration maximize combustion heat extraction.

**Design certified** to ANSI Z21.56 Standard for Gas-Fired Pool Heaters. Outdoor 500-1825 units are certified for use without the addition of a draft diverter or external vent. Indoor units incorporate a built-in draft diverter and require only vent piping.

**Working pressure** of 160 psi complies with Section IV of the ASME Boiler and Pressure Vessel Code. Units are registered with the National Board of Boiler and Pressure Vessel Inspectors.

**Heat exchanger header covers** are field removable for complete inspection of tubing and header passages. The heat

exchanger is replaceable without disassembly of the burners or combustion chamber.

**Pressure relief valve** is ASME rated and is selected to provide discharge capacity in excess of unit heating input.

**Combustion chamber** is cast refractory with 2000°F (1093°C) working temperature.

**Burners** are atmospheric type constructed of AISI alloy 430 (models 500 - 1825) or AISI 439 (models 2000 - 5000) stainless steel.

**Chassis and jacket parts** are of galvanized steel meeting ASTM Standard for G90 coating. Exterior is finished with acrylic paint, thermoset at 325°F (163°C).

**Salt water models** (500-1825) are available with cupro-nickel alloy heat exchanger tubes and bronze headers and header covers.

**One-year limited warranty** covers the controls, pump, heat exchanger tubes and combustion chamber against defects in materials and workmanship. Refer to the warranty sheet enclosed with each unit for further details.

**Control system** includes automatic temperature control, temperature limit, gas pressure regulator, redundant electric gas valve, water flow sensing, electronic flame safety supervision and manual gas shut-off valve. The standard control system operates on 24 VAC with a 120 VAC power supply. Standard units are intermittent (spark) ignition.

**Integral flow control valve** on models 2000 - 5000 accepts flows up to 300 GPM.

# Model Sizing

## For Indoor Pools

The selection charts below will assist in choosing the correct size boiler for an indoor pool. First, calculate the surface area of the pool in square feet. Second, refer to the selection chart for either an indoor or outdoor boiler. Third, find the closest square footage in the 10°(F) Temperature Difference column, and the boiler model which corresponds to it. For normal conditions Laars recommends using the 10° Temperature Difference columns; this will provide a temperature increase of approximately 6°F per 24 hour period.

## For Outdoor Pools

The selection charts below will assist in choosing the correct size boiler for an outdoor pool. First, determine the difference between the desired pool temperature and the average air temperature during the coldest month in which the pool will be used (referred to in the chart below as "Temperature Difference"). Second, calculate the surface area of the pool in square feet. Third, refer to the selection charts. Listed are the maximum pool surface areas for each boiler model with typical temperature differences. Make the appropriate selection from the separate charts for indoor or outdoor installed boiler models.

| <b>Indoor Model I</b>           |       |      |       |      |       |      |       |      |       |      |       |      |       |      |      |      |      |     |
|---------------------------------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|------|------|------|-----|
| Temperature Difference          |       |      |       |      |       |      |       |      |       |      |       |      |       |      |      |      |      |     |
| 10°F                            | 6°C   | 15°F | 8°C   | 20°F | 11°C  | 25°F | 14°C  | 30°F | 17°C  | 35°F | 19°C  | 40°F | 22°C  | 45°F | 25°C | 50°F | 28°C |     |
| Surface Area of Pools (sq. ft.) |       |      |       |      |       |      |       |      |       |      |       |      |       |      |      |      |      |     |
| 500 I                           | 3900  | 362  | 2600  | 242  | 1950  | 181  | 1560  | 145  | 1300  | 121  | 1115  | 104  | 975   | 91   | 870  | 81   | 780  | 72  |
| 600 I                           | 4680  | 435  | 3120  | 290  | 2340  | 217  | 1870  | 174  | 1560  | 145  | 1340  | 124  | 1170  | 109  | 1040 | 97   | 935  | 87  |
| 715 I                           | 5580  | 518  | 3720  | 346  | 2790  | 259  | 2230  | 207  | 1860  | 173  | 1595  | 148  | 1395  | 130  | 1240 | 115  | 1115 | 104 |
| 850 I                           | 6630  | 616  | 4420  | 411  | 3315  | 308  | 2650  | 246  | 2210  | 205  | 1895  | 176  | 1660  | 154  | 1475 | 137  | 1325 | 123 |
| 1010 I                          | 7880  | 732  | 5250  | 488  | 3940  | 366  | 3150  | 293  | 2625  | 244  | 2259  | 210  | 1970  | 183  | 1750 | 163  | 1575 | 146 |
| 1200 I                          | 9360  | 870  | 6240  | 580  | 4680  | 435  | 3745  | 348  | 3120  | 290  | 2675  | 249  | 2340  | 217  | 2080 | 193  | 1870 | 174 |
| 1430 I                          | 11155 | 1036 | 7435  | 691  | 5580  | 518  | 4460  | 414  | 3720  | 346  | 3190  | 296  | 2790  | 259  | 2480 | 230  | 2230 | 207 |
| 1670 I                          | 13025 | 1210 | 8685  | 807  | 6515  | 605  | 5210  | 484  | 4340  | 403  | 3720  | 346  | 3260  | 303  | 2895 | 269  | 2605 | 242 |
| 1825 I                          | 14235 | 1322 | 9490  | 882  | 7120  | 661  | 5695  | 528  | 4745  | 441  | 4070  | 378  | 3560  | 331  | 3165 | 294  | 2850 | 265 |
| 2000 I                          | 16400 | 1524 | 10935 | 1016 | 8200  | 819  | 6560  | 609  | 5465  | 508  | 4685  | 435  | 4100  | 381  | 3645 | 339  | 3280 | 305 |
| 2450 I                          | 20090 | 1866 | 13395 | 1244 | 10045 | 933  | 8035  | 746  | 6695  | 622  | 5740  | 533  | 5025  | 467  | 4465 | 415  | 4020 | 373 |
| 3050 I                          | 25010 | 2323 | 16675 | 1549 | 12505 | 1162 | 10000 | 929  | 8335  | 744  | 7145  | 664  | 6255  | 581  | 5560 | 517  | 5000 | 465 |
| 3500 I                          | 28700 | 2666 | 19135 | 1778 | 14350 | 1333 | 11480 | 1066 | 9565  | 889  | 8200  | 764  | 7175  | 667  | 6380 | 593  | 5740 | 533 |
| 4050 I                          | 33210 | 3085 | 22140 | 2057 | 16605 | 1543 | 13285 | 1234 | 11070 | 1028 | 9490  | 882  | 8300  | 771  | 7380 | 686  | 6640 | 617 |
| 4500 I                          | 36900 | 3428 | 24600 | 2285 | 18450 | 1714 | 14760 | 1371 | 12300 | 1143 | 10545 | 980  | 9225  | 857  | 8200 | 762  | 7380 | 686 |
| 5000 I                          | 41000 | 3809 | 27335 | 2539 | 20500 | 1904 | 16400 | 1524 | 13665 | 1269 | 11715 | 1088 | 10250 | 952  | 9110 | 846  | 8200 | 762 |
| <b>Outdoor Model E</b>          |       |      |       |      |       |      |       |      |       |      |       |      |       |      |      |      |      |     |
| Temperature Difference          |       |      |       |      |       |      |       |      |       |      |       |      |       |      |      |      |      |     |
| 10°F                            | 6°C   | 15°F | 8°C   | 20°F | 11°C  | 25°F | 14°C  | 30°F | 17°C  | 35°F | 19°C  | 40°F | 22°C  | 45°F | 25°C | 50°F | 28°C |     |
| Surface Area of Pools (sq. ft.) |       |      |       |      |       |      |       |      |       |      |       |      |       |      |      |      |      |     |
| 500 E                           | 4000  | 372  | 2665  | 248  | 2000  | 186  | 1600  | 149  | 1330  | 124  | 1140  | 106  | 1000  | 93   | 885  | 82   | 800  | 74  |
| 600 E                           | 4800  | 446  | 3200  | 297  | 2400  | 223  | 1920  | 178  | 1600  | 149  | 1370  | 127  | 1200  | 111  | 1065 | 99   | 960  | 89  |
| 715 E                           | 5720  | 531  | 3810  | 354  | 2860  | 266  | 2285  | 212  | 1905  | 177  | 1630  | 151  | 1430  | 133  | 1270 | 118  | 1140 | 106 |
| 850 E                           | 6800  | 632  | 4530  | 421  | 3400  | 316  | 2720  | 253  | 2265  | 210  | 1940  | 180  | 1700  | 158  | 1510 | 140  | 1360 | 126 |
| 1010 E                          | 8080  | 751  | 5385  | 500  | 4040  | 375  | 3230  | 300  | 2690  | 250  | 2305  | 214  | 2020  | 188  | 1795 | 167  | 1615 | 150 |
| 1200 E                          | 9600  | 892  | 6400  | 595  | 4800  | 446  | 3840  | 357  | 3200  | 297  | 2740  | 255  | 2400  | 223  | 2130 | 198  | 1920 | 178 |
| 1430 E                          | 11440 | 1063 | 7625  | 708  | 5720  | 531  | 4575  | 425  | 3810  | 354  | 3265  | 303  | 2860  | 266  | 2540 | 236  | 2285 | 212 |
| 1670 E                          | 13360 | 1241 | 8905  | 827  | 6680  | 621  | 5344  | 496  | 4450  | 413  | 3815  | 354  | 3340  | 310  | 2965 | 275  | 2670 | 248 |
| 1825 E                          | 14600 | 1356 | 9730  | 904  | 7300  | 678  | 5840  | 543  | 4865  | 452  | 4170  | 387  | 3650  | 339  | 3240 | 301  | 2920 | 271 |
| 2200 E                          | 17861 | 1659 | 11907 | 1106 | 8930  | 830  | 7144  | 664  | 5954  | 553  | 5103  | 474  | 4465  | 415  | 3969 | 369  | 3572 | 332 |
| 2800 E                          | 22235 | 2066 | 14823 | 1377 | 11117 | 1033 | 8894  | 826  | 7412  | 689  | 6353  | 590  | 5559  | 516  | 4941 | 459  | 4447 | 413 |
| 3200 E                          | 25515 | 2370 | 17010 | 1580 | 12758 | 1185 | 10206 | 948  | 8505  | 790  | 7290  | 677  | 6379  | 593  | 5670 | 527  | 5103 | 474 |
| 3600 E                          | 29525 | 2743 | 19683 | 1829 | 14762 | 1371 | 11810 | 1097 | 9842  | 914  | 8436  | 784  | 7381  | 686  | 6561 | 610  | 5905 | 549 |
| 4000 E                          | 32805 | 3048 | 21870 | 2032 | 16403 | 1524 | 13122 | 1219 | 10935 | 1016 | 9373  | 871  | 8201  | 762  | 7290 | 677  | 6561 | 610 |
| 4500 E                          | 36450 | 3386 | 24300 | 2257 | 18225 | 1693 | 14580 | 1354 | 12150 | 1129 | 10414 | 967  | 9113  | 847  | 8100 | 752  | 7290 | 677 |

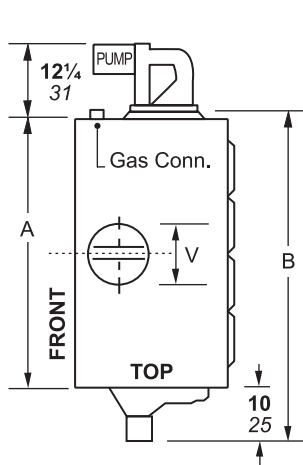
**Notes:** 1. For high altitude pools, reduce the surface area figures shown in the charts by 4% for each 1000 ft. above sea level. (No derating is necessary up to 2000 ft. above sea level.) 2. Laars maintains a policy of continuous improvements and therefore reserves the right to change specifications without notice. 3. Sizing for outdoor pools is based on 3½ mph average wind.

# Dimensional Data

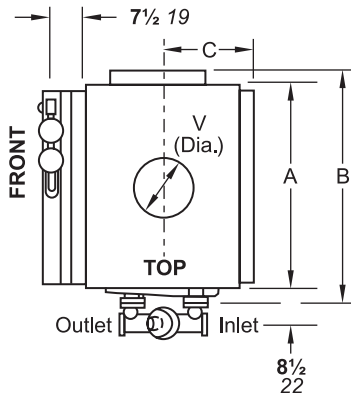
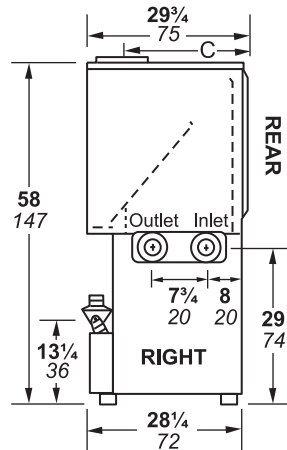
## Indoor Models (I)

| Indoor Size | Input <sup>1</sup> |      | Output <sup>1</sup> |      | Gas Connection <sup>2</sup> |       | Water Conn. <sup>2</sup> | Dimensions <sup>2</sup> - inches cm |                 |         |     |        |    |    |     | Shipping Weight <sup>3</sup> |      |
|-------------|--------------------|------|---------------------|------|-----------------------------|-------|--------------------------|-------------------------------------|-----------------|---------|-----|--------|----|----|-----|------------------------------|------|
|             | MBTU/h             | kW   | MBTU/h              | kW   | Size - inches               | NPT   |                          | Natural <sup>4</sup>                | LP <sup>4</sup> | NPT     | A   | B      | C  | V  | lbs | kgs                          |      |
| 500I        | 500                | 147  | 405                 | 119  | 1                           | 3/4   | 2 1/2                    | 33 3/4                              | 86              | 45 1/4  | 115 | 23 3/4 | 60 | 10 | 25  | 808                          | 367  |
| 600I        | 600                | 176  | 486                 | 143  | 1                           | 3/4   | 2 1/2                    | 38 3/4                              | 98              | 50 1/4  | 128 | 22 3/4 | 58 | 12 | 30  | 819                          | 372  |
| 715I        | 715                | 210  | 579                 | 170  | 1                           | 3/4   | 2 1/2                    | 44 1/4                              | 112             | 55 3/4  | 142 | 22 3/4 | 58 | 12 | 30  | 873                          | 396  |
| 850I        | 850                | 249  | 689                 | 202  | 1                           | 3/4   | 2 1/2                    | 50 3/4                              | 129             | 62 1/4  | 158 | 21 3/4 | 55 | 14 | 36  | 945                          | 429  |
| 1010I       | 1010               | 296  | 818                 | 240  | 1 1/4                       | 1     | 2 1/2                    | 58                                  | 147             | 69 1/2  | 177 | 20 3/4 | 53 | 16 | 41  | 1041                         | 473  |
| 1200I       | 1200               | 352  | 972                 | 285  | 1 1/4                       | 1     | 2 1/2                    | 66 1/4                              | 168             | 77 3/4  | 197 | 20 3/4 | 53 | 16 | 41  | 1199                         | 544  |
| 1430I       | 1430               | 419  | 1158                | 339  | 1 1/4                       | 1 1/4 | 2 1/2                    | 76                                  | 193             | 87 1/2  | 222 | 19 3/4 | 50 | 18 | 46  | 1280                         | 581  |
| 1670I       | 1670               | 489  | 1353                | 396  | 1 1/2                       | 1 1/4 | 2 1/2                    | 85 1/2                              | 217             | 97      | 246 | 19 3/4 | 50 | 18 | 46  | 1445                         | 656  |
| 1825I       | 1825               | 535  | 1478                | 433  | 1 1/2                       | 1 1/4 | 2 1/2                    | 92 1/2                              | 235             | 103 3/4 | 264 | 19 3/4 | 50 | 18 | 46  | 1570                         | 713  |
| 2000I       | 2000               | 586  | 1639                | 480  | 1 1/2                       | 1 1/4 | 4                        | 55 1/2                              | 141             | 73      | 185 | 24 1/2 | 62 | 22 | 56  | 1950                         | 885  |
| 2450I       | 2450               | 718  | 2009                | 589  | 1 1/2                       | 1 1/2 | 4                        | 65 1/2                              | 166             | 83      | 211 | 24 1/2 | 62 | 24 | 61  | 2100                         | 913  |
| 3050I       | 3050               | 894  | 2501                | 733  | 2                           | 1 1/2 | 4                        | 78                                  | 198             | 95 1/2  | 243 | 24 1/2 | 62 | 26 | 66  | 2250                         | 1022 |
| 3500I       | 3500               | 1025 | 2870                | 841  | 2                           | 1 1/2 | 4                        | 88                                  | 224             | 105 1/2 | 268 | 24 1/2 | 62 | 28 | 71  | 2510                         | 1140 |
| 4050I       | 4050               | 1186 | 3321                | 973  | 2                           | 2     | 4                        | 100 1/2                             | 255             | 118     | 300 | 24 1/2 | 62 | 30 | 76  | 2750                         | 1249 |
| 4500I       | 4500               | 1318 | 3690                | 1081 | 2 1/2                       | 2     | 4                        | 110 1/2                             | 281             | 128     | 325 | 24 1/2 | 62 | 32 | 81  | 2900                         | 1317 |
| 5000I       | 5000               | 1465 | 4100                | 1201 | 2 1/2                       | 2     | 4                        | 123                                 | 312             | 140 1/2 | 357 | 24 1/2 | 62 | 34 | 86  | 3200                         | 1453 |

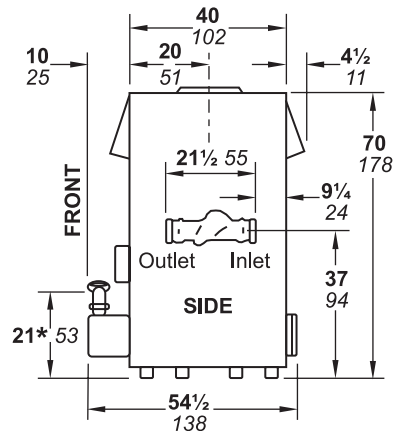
Notes: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.  
 2. Dimensions are nominal. 3. Integral pump included on sizes 500 - 1825.



**Indoor**  
 Sizes 500 - 1825



**Indoor**  
 Sizes 2000 - 5000



Dimensions shown in inches cm.  
 All specifications subject to change.  
 \* 29" for sizes 3500-5000.



## Design Advantages

Natural or propane

Electronic ignition

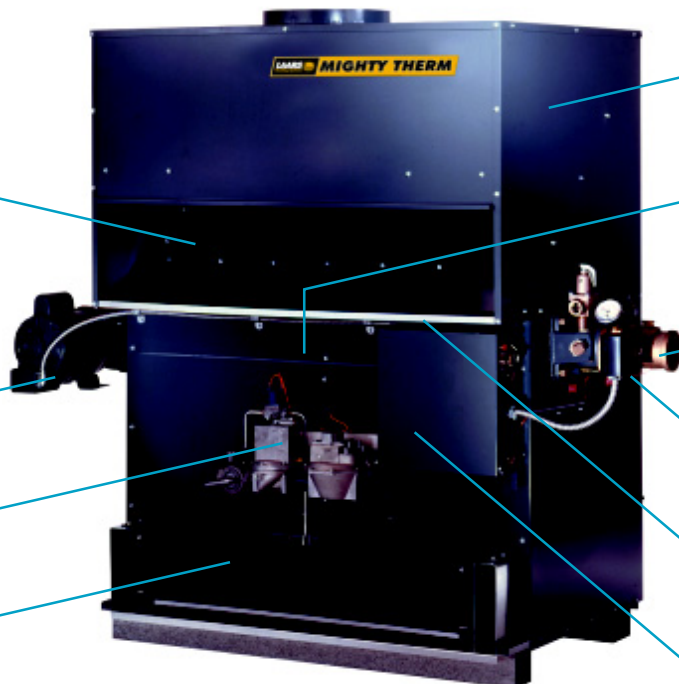
Built-in draft diverter  
(indoor models) to  
simplify installation

Flow switch standard  
on all models

Integral pump assures  
proper water flow  
(Models 500 - 1825)

Automatic gas valve

Stainless steel burners,  
with slide-out burner  
tray for easy  
maintenance, assures  
long life  
(Models 500 - 1825)



Electronic flame  
supervision

Galvanized steel jacket  
with acrylic finish for  
strength and long life

High temperature  
refractory firebox  
liner - to 2000°F for  
greater efficiency

Integral header flanges  
for easier serviceability

Glass-lined or bronze  
headers for  
corrosion resistance

Integral lined copper  
tube heat exchanger  
for higher efficiency

Electronic temperature  
control for accuracy  
(Models 500 - 1825)

Model configuration varies slightly by size.

# Dimensional Data

## Outdoor Models (E)

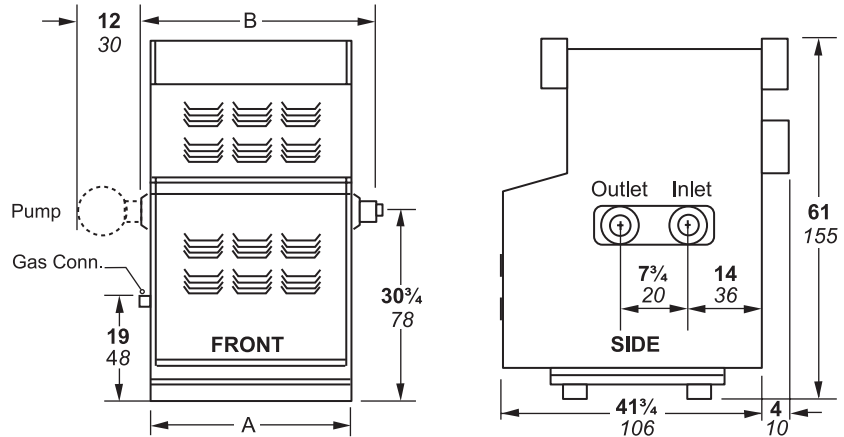
| Outdoor Size | Input <sup>1</sup> |      | Output <sup>1</sup> |      | Gas Connection <sup>2</sup> Size inches NPT |                 | Water Conn. <sup>2</sup> Size in. NPT | Dimensions <sup>2</sup> - inches cm |     |         |     |        |    |        |    |        |    |
|--------------|--------------------|------|---------------------|------|---|-----------------|---------------------------------------|-------------------------------------|-----|---------|-----|--------|----|--------|----|--------|----|
|              | MBTU/h             | kW   | MBTU/h              | kW   | Nat <sup>4</sup>                            | LP <sup>4</sup> |                                       | A                                   | B   | C       | D   | E      | F  | V      |    |        |    |
| 500 E        | 500                | 147  | 410                 | 120  | 1   | 3/4             | 2 1/2                                 | 33 3/4                              | 86  | 45 1/4  | 115 | —      | —  | —      | —  | —      | —  |
| 600 E        | 600                | 176  | 492                 | 144  | 1   | 3/4             | 2 1/2                                 | 38 3/4                              | 98  | 50 1/4  | 128 | —      | —  | —      | —  | —      | —  |
| 715 E        | 715                | 210  | 586                 | 172  | 1   | 3/4             | 2 1/2                                 | 44 1/4                              | 112 | 55 3/4  | 142 | —      | —  | —      | —  | —      | —  |
| 850 E        | 850                | 249  | 697                 | 204  | 1   | 3/4             | 2 1/2                                 | 50 3/4                              | 129 | 62 1/4  | 158 | —      | —  | —      | —  | —      | —  |
| 1010 E       | 1010               | 296  | 828                 | 243  | 1 1/4                                       | 1               | 2 1/2                                 | 58                                  | 147 | 69 1/2  | 177 | —      | —  | —      | —  | —      | —  |
| 1200 E       | 1200               | 352  | 984                 | 288  | 1 1/4                                       | 1               | 2 1/2                                 | 66 1/4                              | 168 | 77 3/4  | 197 | —      | —  | —      | —  | —      | —  |
| 1430 E       | 1430               | 419  | 1173                | 344  | 1 1/4                                       | 1 1/4           | 2 1/2                                 | 76                                  | 193 | 87 1/2  | 222 | —      | —  | —      | —  | —      | —  |
| 1670 E       | 1670               | 489  | 1370                | 401  | 1 1/2                                       | 1 1/4           | 2 1/2                                 | 85 1/2                              | 217 | 97      | 246 | —      | —  | —      | —  | —      | —  |
| 1825 E       | 1825               | 535  | 1497                | 439  | 1 1/2                                       | 1 1/4           | 2 1/2                                 | 92 1/2                              | 235 | 103 3/4 | 264 | —      | —  | —      | —  | —      | —  |
| 2200 E       | 2205               | 646  | 1786                | 523  | 1 1/2                                       | 1 1/4           | 4                                     | 65 1/2                              | 166 | 83      | 211 | 16     | 41 | 28 1/4 | 72 | 15     | 38 |
| 2800 E       | 2745               | 804  | 2223                | 651  | 1 1/2                                       | 1 1/2           | 4                                     | 78                                  | 198 | 95 1/2  | 243 | 20     | 51 | 28 1/4 | 72 | 15     | 38 |
| 3200 E       | 3150               | 923  | 2552                | 748  | 2   | 1 1/2           | 4                                     | 88                                  | 224 | 105 1/2 | 268 | 23     | 58 | 31 1/2 | 80 | 16 1/2 | 42 |
| 3600 E       | 3645               | 1068 | 2952                | 865  | 2   | 2               | 4                                     | 100 1/2                             | 255 | 118     | 300 | 29     | 74 | 31 1/2 | 80 | 16 1/2 | 42 |
| 4000 E       | 4050               | 1187 | 3281                | 961  | 2 1/2                                       | 2               | 4                                     | 110 1/2                             | 281 | 128     | 325 | 30 1/2 | 77 | 34 1/2 | 88 | 18     | 46 |
| 4500 E       | 4500               | 1319 | 3645                | 1068 | 2 1/2                                       | 2               | 4                                     | 123                                 | 312 | 140 1/2 | 357 | 34     | 86 | 37 3/4 | 96 | 19 1/2 | 50 |

- Notes: 1. Input and output must be derated 4% per 1000 feet above sea level when installed above 2000 feet altitude.  
 2. Dimensions are nominal. 3. Integral pump included on sizes 500 - 1825.

Dimensions shown in inches cm. All specifications subject to change.

| Outdoor Size | Shipping Weight <sup>3</sup> |      |
|--------------|------------------------------|------|
|              | lbs                          | kgs  |
| 500          | 855                          | 388  |
| 600          | 949                          | 431  |
| 715          | 1050                         | 477  |
| 850          | 1100                         | 499  |
| 1010         | 1240                         | 563  |
| 1200         | 1410                         | 640  |
| 1430         | 1570                         | 713  |
| 1670         | 1622                         | 736  |
| 1825         | 1725                         | 783  |
| 2200         | 2320                         | 1053 |
| 2800         | 2500                         | 1135 |
| 3200         | 2840                         | 1289 |
| 3600         | 3175                         | 1142 |
| 4000         | 3940                         | 1789 |
| 4500         | 3790                         | 1721 |

**Outdoor**  
Sizes 500 - 1825



**Outdoor**  
Sizes 2200 - 4500

