

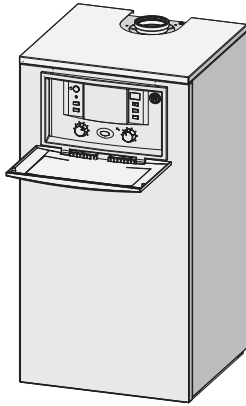
# Bosch Greenstar FS Floor Standing Combi Boiler

Engineering  
Submittal  
Sheet



# BOSCH

## Overview



**KWB28-3: Greenstar FS Combi 100**

**KWB35-3: Greenstar FS Combi 131**

**KWB42-3: Greenstar FS Combi 151**



MA Plumbing Board approved

## Product Details

- ▶ Gas-fired, sealed combustion, modulating combination boilers that condense in both space heating and DHW production, available in three sizes.
- ▶ Certified by AHRI, ASME, CSA
- ▶ Low NOx emissions ahead of 2012 SCAQMD regulations.
- ▶ AFUE Ratings of 95%
- ▶ High strength stainless steel flat plate heat exchanger for endless domestic hot water (DHW)
- ▶ Integral 3.2 gallon boiler expansion tank
- ▶ Hydronic bracket for securing bottom of boiler to wall, union connections and M NPT threads
- ▶ Coated heat exchanger allows service intervals to be extended to 5 years for cleaning
- ▶ Venting solutions include: concentric, one or two pipe venting
  - Approved materials are CPVC, PVC, rigid PP, flexible PP and stainless steel
  - 3" PVC venting can be up to 100' with up to 8 elbows
  - 2" PVC lengths can be up to 81'
- ▶ Control
  - Heatronic III with high limit dials for space heating and DHW for simplicity and ease of operation
  - Digital display for fluid temperature leaving the heat exchanger, service function codes, and operation icons.
  - Outdoor Reset when installed with the FW200 (optional accessory)
- ▶ 5 year parts and labor warranty and 10 year limited lifetime on heat exchanger

## Engineering specification

The boiler shall be a Bosch Greenstar \_\_\_ floor standing combination boiler for space heating and domestic hot water (DHW) production via a stainless steel flat plate heat exchanger 3 way valve and integrated 3.2 gallon expansion tank.

The boiler shall be certified to meet the AHRI, ASME standards and shall be certified by CSA. The boiler shall come equipped for Natural Gas fuel source. A Liquid Propane (LP) conversion kit shall be included in the contents of delivery. The boiler shall be Energy Star rated with an AFUE rating of 95% and qualified for

Federal Tax Credit. It shall meet the 2012 SCAQMD regulations for Low NOx emissions.

The boiler shall be equipped with a high-strength stainless steel flat plate exchanger and burner with double passage - ensuring consistent temperature output based on demand. The domestic hot water temperature shall be limited to 140°F to help prevent scale build-up within the heat exchanger.

Overall dimensions with adjustable legs fully extended shall be 41" x 19-9/16" x 21-7/8" (height x width x depth).

# Bosch Greenstar FS Floor Standing Combi Boiler



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| Technical Data Greenstar FS 100 (KWB28-3) Combi Boiler                           |   |  |                       |
|--|---|--|-----------------------|
| Output at elevation 0 - 2000 feet (0 - 610 m)                                    | Unit                                    | NG                                       | LPG (propane)         |
| Max. input rate 180/79 °F (82/26 °C)   | BTU/hr (kW)                             | 100,800 (29.5)                           | 98,600 (28.9)         |
| Max. output rate 104/86 °F (40/30 °C)  | BTU/hr (kW)                             | 93,800 (27.5)                            | 93,800 (27.5)         |
| Max. output rate 122/86 °F (50/30 °C)  | BTU/hr (kW)                             | 93,100 (27.3)                            | 93,100 (27.3)         |
| Max. output rate 176/140 °F (80/60 °C)   | BTU/hr (kW)                             | 89,400 (26.2)                            | 89,400 (26.2)         |
| Output rate domestic hot water (DHW), 113 °F (45 °C)                             | BTU/hr (kW)                             | 93,600 (27.4)                            | 93,600 (27.4)         |
| Output rate domestic hot water (DHW), 140 °F (60 °C)                             | BTU/hr (kW)                             | 91,400 (26.8)                            | 91,400 (26.8)         |
| Min. input rate 180/79 °F (82/26 °C)   | BTU/hr (kW)                             | 24,600 (7.2)                             | 40,100 (11.7)         |
| Min. output rate 104/86 °F (40/30 °C)  | BTU/hr (kW)                             | 23,900 (7.0)                             | 39,900 (11.7)         |
| Min. output rate 122/86 °F (50/30 °C)  | BTU/hr (kW)                             | 23,900 (7.0)                             | 39,600 (11.6)         |
| Min. output rate 176/140 °F (80/60 °C)   | BTU/hr (kW)                             | 21,800 (6.4)                             | 36,200 (10.6)         |
| Gas supply requirements  |   |  |                       |
| Natural Gas – Hs = 1,010 BTU/ft <sup>3</sup> (37.3MJ/m <sup>3</sup> )            | ft <sup>3</sup> /hr (m <sup>3</sup> /h) | 99 (2.8)                                 | -                     |
| Liquid Propane Gas – HD-S = 2,500 BTU/ft <sup>3</sup> (93.1MJ/m <sup>3</sup> )   | ft <sup>3</sup> /hr (m <sup>3</sup> /h) | -  | 39 (1.1)              |
| NG   | in. W.C. (mbar)                         | 3.5 - 10.5* (8.7 - 26.1)                 | -                     |
| LPG (propane)  | in. W.C. (mbar)                         | -  | 8 - 13* (19.9 - 32.3) |
| Expansion vessel   |   |  |                       |
| Pre-charge pressure  | psi (bar)                               | 10.9 (0.75)                              |                       |
| Total contents   | Gal (L)                                 | 3.17 (12)                                |                       |
| DHW  |   |  |                       |
| Max. DHW flow rate @ 72° rise  | gpm (l/min)                             | 2.64 (10)                                |                       |
| Nominal DHW quantity (at 140 °F (60 °C) outlet temperature)                      | gpm (l/min)                             | 2.03 (7.7)                               |                       |
| Outlet temperature   | °F ( °C)                                | 104 - 140 (40 - 60)                      |                       |
| Max. cold water inlet temperature  | °F ( °C)                                | 140 (60)                                 |                       |
| Max. approved DHW pressure   | psi (bar)                               | 150 (10.3)                               |                       |
| Minimum water pressure   | psi (bar)                               | 4.35 (0.3)                               |                       |
| Flue Gas   |   |  |                       |
| Flue gas mass flow at maximum/minimum nominal output                             | gps                                     | 12.0/3.2                                 | 11.7/4.9              |
| Flue gas temperature 176/140 °F (80/60 °C) at maximum/minimum nominal heat input | °F (°C)                                 | 147/133 (64/56)                          |                       |
| Flue gas temperature 104/86 °F (40/30 °C) at maximum/minimum nominal heat input  | °F (°C)                                 | 117/90 (47/32)                           |                       |
| CO <sub>2</sub> at max. nominal output   | %                                       | 9.4                                      | 11.0                  |
| CO <sub>2</sub> at minimum nominal output  | %                                       | 8.6                                      | 10.4                  |
| General  |   |  |                       |
| Condensate Max. condensate quantity (t <sub>R</sub> = 86 °F (30 °C))             | gph (l/h)                               | 0.6 (2.3)                                |                       |
| pH level, approx.  | %                                       | 4.8                                      |                       |
| Voltage  | VAC                                     | 120                                      |                       |
| Frequency  | Hz                                      | 60                                       |                       |
| Max. power consumption (central heating mode)                                    | W                                       | 205                                      |                       |
| Max. power consumption (Stand-by)  | W                                       | < 6                                      |                       |
| Noise level  | dB(A)                                   | ≤ 39                                     |                       |
| Maximum supply temperature   | °F ( °C)                                | 190 (88)                                 |                       |
| Max. permissible operating pressure (P <sub>MS</sub> ) heating                   | psi (bar)                               | 30 (2.07)                                |                       |
| Permissible ambient temperature  | °F ( °C)                                | 32 - 122 (0 - 50)                        |                       |
| Nominal water capacity (heating)   | Gal (L)                                 | 0.925 (3.5)                              |                       |
| Weight (without packaging)   | lbs. (kg)                               | 136.5(62)                                |                       |
| Gas inlet  | inch (mm)                               | 3/4 (19.05)                              |                       |
| Heating supply   | inch (mm)                               | 1-1/4 (31.75)                            |                       |
| Heating return   | inch (mm)                               | 1-1/4 (31.75)                            |                       |
| DHW inlet  | inch (mm)                               | 3/4 (19.05)                              |                       |
| DHW outlet   | inch (mm)                               | 3/4 (19.05)                              |                       |
| Dimensions, W x H x D  | inch(mm)                                | 19 9/16 x 41 x 21 7/8 (497 x 1042 x 555) |                       |

# Bosch Greenstar FS Floor Standing Combi Boiler



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| Technical Data Greenstar FS 131 (KWB35-3) Combi Boiler                           |   |  |                       |
|--|---|--|-----------------------|
| Output at elevation 0 - 2000 feet (0 - 610 m)                                    | Unit                                    | NG                                       | LPG (propane)         |
| Max. input rate 180/79 °F (82/26 °C)   | BTU/hr (kW)                             | 131,900 (38.6)                           | 129,100 (37.8)        |
| Max. output rate 104/86 °F (40/30 °C)  | BTU/hr (kW)                             | 122,800 (36.0)                           | 122,800 (36.0)        |
| Max. output rate 122/86 °F (50/30 °C)  | BTU/hr (kW)                             | 121,800 (35.7)                           | 121,800 (35.7)        |
| Max. output rate 176/140 °F (80/60 °C)   | BTU/hr (kW)                             | 116,700 (34.2)                           | 116,700 (34.2)        |
| Output rate domestic hot water (DHW), 113 °F (45 °C)                             | BTU/hr (kW)                             | 120,500 (35.3)                           | 120,500 (35.3)        |
| Output rate domestic hot water (DHW), 140 °F (60 °C)                             | BTU/hr (kW)                             | 118,700 (34.8)                           | 118,700 (34.8)        |
| Min. input rate 180/79 °F (82/26 °C)   | BTU/hr (kW)                             | 36,000 (10.5)                            | 46,400 (13.6)         |
| Min. output rate 104/86 °F (40/30 °C)  | BTU/hr (kW)                             | 35,100 (10.3)                            | 46,100 (13.5)         |
| Min. output rate 122/86 °F (50/30 °C)  | BTU/hr (kW)                             | 34,800 (10.2)                            | 45,700 (13.4)         |
| Min. output rate 176/140 °F (80/60 °C)   | BTU/hr (kW)                             | 31,700 (9.3)                             | 42,000 (12.3)         |
| Gas supply requirements  |   |  |                       |
| Natural Gas – Hs = 1,010 BTU/ft <sup>3</sup> (37.3MJ/m <sup>3</sup> )            | ft <sup>3</sup> /hr (m <sup>3</sup> /h) | 130 (3.7)                                | -                     |
| Liquid Propane Gas – HD-S = 2,500 BTU/ft <sup>3</sup> (93.1MJ/m <sup>3</sup> )   | ft <sup>3</sup> /hr (m <sup>3</sup> /h) | -  | 52 (1.5)              |
| NG   | in. W.C. (mbar)                         | 3.5 - 10.5" (8.7 - 26.1)                 | -                     |
| LPG (propane)  | in. W.C. (mbar)                         | -  | 8 - 13" (19.9 - 32.3) |
| Expansion vessel   |   |  |                       |
| Pre-charge pressure  | psi (bar)                               | 10.9 (0.75)                              |                       |
| Total contents   | Gal (L)                                 | 3.17 (12)                                |                       |
| DHW  |   |  |                       |
| Max. DHW flow rate @ 72° rise  | gpm (l/min)                             | 3.17 (12)                                |                       |
| Nominal DHW quantity (at 140 °F (60 °C) outlet temperature)                      | gpm (l/min)                             | 2.6 (10)                                 |                       |
| Outlet temperature   | °F (°C)                                 | 104 - 140 (40 - 60)                      |                       |
| Max. cold water inlet temperature  | °F (°C)                                 | 140 (60)                                 |                       |
| Max. approved DHW pressure   | psi (bar)                               | 150 (10.3)                               |                       |
| Minimum water pressure   | psi (bar)                               | 4.35 (0.3)                               |                       |
| Flue Gas   |   |  |                       |
| Flue gas mass flow at maximum/minimum nominal output                             | gps                                     | 15.7/4.5                                 | 15.2/5.6              |
| Flue gas temperature 176/140 °F (80/60 °C) at maximum/minimum nominal heat input | °F (°C)                                 | 162/135 (72/57)                          |                       |
| Flue gas temperature 104/86 °F (40/30 °C) at maximum/minimum nominal heat input  | °F (°C)                                 | 127/91 (53/33)                           |                       |
| CO <sub>2</sub> at max. nominal output   | %                                       | 9.4                                      | 11.0                  |
| CO <sub>2</sub> at minimum nominal output  | %                                       | 8.6                                      | 10.4                  |
| General  |   |  |                       |
| Condensate Max. condensate quantity (t <sub>R</sub> = 86 °F (30 °C))             | gph (l/h)                               | 0.8 (3.1)                                |                       |
| pH level, approx.  | %                                       | 4.8                                      |                       |
| Voltage  | VAC                                     | 120                                      |                       |
| Frequency  | Hz                                      | 60                                       |                       |
| Max. power consumption (central heating mode)                                    | W                                       | 205                                      |                       |
| Max. power consumption (Stand-by)  | W                                       | < 6                                      |                       |
| Noise level  | dB(A)                                   | ≤ 44                                     |                       |
| Maximum supply temperature   | °F (°C)                                 | 190 (88)                                 |                       |
| Max. permissible operating pressure (P <sub>MS</sub> ) heating                   | psi (bar)                               | 30 (2.07)                                |                       |
| Permissible ambient temperature  | °F (°C)                                 | 32 - 122 (0 - 50)                        |                       |
| Nominal water capacity (heating)   | Gal (L)                                 | 0.925 (3.5)                              |                       |
| Weight (without packaging)   | lbs. (kg)                               | 136.5(62)                                |                       |
| Gas inlet  | inch (mm)                               | 3/4 (19.05)                              |                       |
| Heating supply   | inch (mm)                               | 1-1/4 (31.75)                            |                       |
| Heating return   | inch (mm)                               | 1-1/4 (31.75)                            |                       |
| DHW inlet  | inch (mm)                               | 3/4 (19.05)                              |                       |
| DHW outlet   | inch (mm)                               | 3/4 (19.05)                              |                       |
| Dimensions, W x H x D  | inch(mm)                                | 19 9/16 x 41 x 21 7/8 (497 x 1042 x 555) |                       |

# Bosch Greenstar FS Floor Standing Combi Boiler



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| Technical Data Greenstar FS 151 (KWB42-3) Combi Boiler                           |   |  |                       |
|--|---|--|-----------------------|
| Output at elevation 0 - 2000 feet (0 - 610 m)                                    | Unit                                    | NG                                       | LPG (propane)         |
| Max. input rate 180/79 °F (82/26 °C)   | BTU/hr (kW)                             | 151,600 (44.4)                           | 148,300 (43.5)        |
| Max. output rate 104/86 °F (40/30 °C)  | BTU/hr (kW)                             | 137,500 (40.3)                           | 137,500 (40.3)        |
| Max. output rate 122/86 °F (50/30 °C)  | BTU/hr (kW)                             | 137,500 (40.3)                           | 137,500 (40.3)        |
| Max. output rate 176/140 °F (80/60 °C)   | BTU/hr (kW)                             | 134,400 (39.4)                           | 134,400 (39.4)        |
| Output rate domestic hot water (DHW), 113 °F (45 °C)                             | BTU/hr (kW)                             | 137,500 (40.3)                           | 137,500 (40.3)        |
| Output rate domestic hot water (DHW), 140 °F (60 °C)                             | BTU/hr (kW)                             | 135,800 (39.8)                           | 135,800 (39.8)        |
| Min. input rate 180/79 °F (82/26 °C)   | BTU/hr (kW)                             | 36,000 (10.5)                            | 46,400 (13.6)         |
| Min. output rate 104/86 °F (40/30 °C)  | BTU/hr (kW)                             | 35,500 (10.4)                            | 46,400 (13.6)         |
| Min. output rate 122/86 °F (50/30 °C)  | BTU/hr (kW)                             | 35,100 (10.3)                            | 46,100 (13.5)         |
| Min. output rate 176/140 °F (80/60 °C)   | BTU/hr (kW)                             | 31,700 (9.3)                             | 42,000 (12.3)         |
| <b>Gas supply requirements</b>   |   |  |                       |
| Natural Gas – Hs = 1,010 BTU/ft <sup>3</sup> (37.3MJ/m <sup>3</sup> )            | ft <sup>3</sup> /hr (m <sup>3</sup> /h) | 149 (4.2)                                | -                     |
| Liquid Propane Gas – HD-S = 2,500 BTU/ft <sup>3</sup> (93.1MJ/m <sup>3</sup> )   | ft <sup>3</sup> /hr (m <sup>3</sup> /h) | -  | 59 (1.7)              |
| NG   | in. W.C. (mbar)                         | 3.5 - 10.5" (8.7 - 26.1)                 |                       |
| LPG (propane)  | in. W.C. (mbar)                         | -  | 8 - 13" (19.9 - 32.3) |
| <b>Expansion vessel</b>  |   |  |                       |
| Pre-charge pressure  | psi (bar)                               | 10.9 (0.75)                              |                       |
| Total contents   | Gal (L)                                 | 3.17 (12)                                |                       |
| <b>DHW</b>   |   |  |                       |
| Max. DHW flow rate @ 72° rise  | gpm (l/min)                             | 3.96 (15)                                |                       |
| Nominal DHW quantity (at 140 °F (60 °C) outlet temperature)                      | gpm (l/min)                             | 3.61 (11.4)                              |                       |
| Outlet temperature   | °F ( °C)                                | 104 - 140 (40 - 60)                      |                       |
| Max. cold water inlet temperature  | °F ( °C)                                | 140 (60)                                 |                       |
| Max. approved DHW pressure   | psi (bar)                               | 150 (10.3)                               |                       |
| Minimum water pressure   | psi (bar)                               | 4.35 (0.3)                               |                       |
| <b>Flue Gas</b>  |   |  |                       |
| Flue gas mass flow at maximum/minimum nominal output                             | gps                                     | 18.0/4.5                                 | 17.5/5.6              |
| Flue gas temperature 176/140 °F (80/60 °C) at maximum/minimum nominal heat input | °F (°C)                                 | 171/135 (77/57)                          |                       |
| Flue gas temperature 104/86 °F (40/30 °C) at maximum/minimum nominal heat input  | °F (°C)                                 | 133/91 (56/33)                           |                       |
| CO <sub>2</sub> at max. nominal output   | %                                       | 9.4                                      | 11.0                  |
| CO <sub>2</sub> at minimum nominal output  | %                                       | 8.6                                      | 10.4                  |
| <b>General</b>   |   |  |                       |
| Condensate Max. condensate quantity (t <sub>R</sub> = 86 °F (30 °C))             | gph (l/h)                               | 0.9 (3.5)                                |                       |
| pH level, approx   | %                                       | 4.8                                      |                       |
| Voltage  | VAC                                     | 120                                      |                       |
| Frequency  | Hz                                      | 60                                       |                       |
| Max. power consumption (central heating mode)                                    | W                                       | 205                                      |                       |
| Max. power consumption (Stand-by)  | W                                       | < 6                                      |                       |
| Noise level  | dB(A)                                   | ≤ 45                                     |                       |
| Maximum supply temperature   | °F ( °C)                                | 190 (88)                                 |                       |
| Max. permissible operating pressure (P <sub>MS</sub> ) heating                   | psi (bar)                               | 30 (2.07)                                |                       |
| Permissible ambient temperature  | °F ( °C)                                | 32 - 122 (0 - 50)                        |                       |
| Nominal water capacity (heating)   | Gal (L)                                 | 0.925 (3.5)                              |                       |
| Weight (without packaging)   | lbs. (kg)                               | 136.5 (62)                               |                       |
| Gas inlet  | inch (mm)                               | 3/4 (19.05)                              |                       |
| Heating supply   | inch (mm)                               | 1-1/4 (31.75)                            |                       |
| Heating return   | inch (mm)                               | 1-1/4 (31.75)                            |                       |
| DHW inlet  | inch (mm)                               | 3/4 (19.05)                              |                       |
| DHW outlet   | inch (mm)                               | 3/4 (19.05)                              |                       |
| Dimensions, W x H x D  | inch(mm)                                | 19 9/16 x 41 x 21 7/8 (497 x 1042 x 555) |                       |

Bosch Greenstar FS  
Floor Standing Combi Boiler



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**Technical Data Greenstar FS 151 (KWB42-3) Combi Boiler Continued**

**Output at elevation 2000 - 4500 feet (611 - 1372 m) above sea level**

|  |             |                |                |
|--|-------------|----------------|----------------|
| Max. input rate 180/79 °F (82/26 °C)                 | BTU/hr (kW) | 136,440 (40.0) | 139,402 (40.9) |
| Max. output rate 104/86 °F (40/30 °C)                | BTU/hr (kW) | 123,750 (36.3) | 129,250 (37.9) |
| Max. output rate 122/86 °F (50/30 °C)                | BTU/hr (kW) | 123,750 (36.3) | 129,250 (37.9) |
| Max. output rate 176/140 °F (80/60 °C)               | BTU/hr (kW) | 120,960 (35.5) | 126,336 (37.0) |
| Output rate domestic hot water (DHW), 113 °F (45 °C) | BTU/hr (kW) | 123,750 (36.3) | 129,250 (37.9) |
| Output rate domestic hot water (DHW), 140 °F (60 °C) | BTU/hr (kW) | 122,220 (35.8) | 127,652 (37.4) |

**Output at elevation 4500 - 7000 feet (1373 - 2134 m) above sea level**

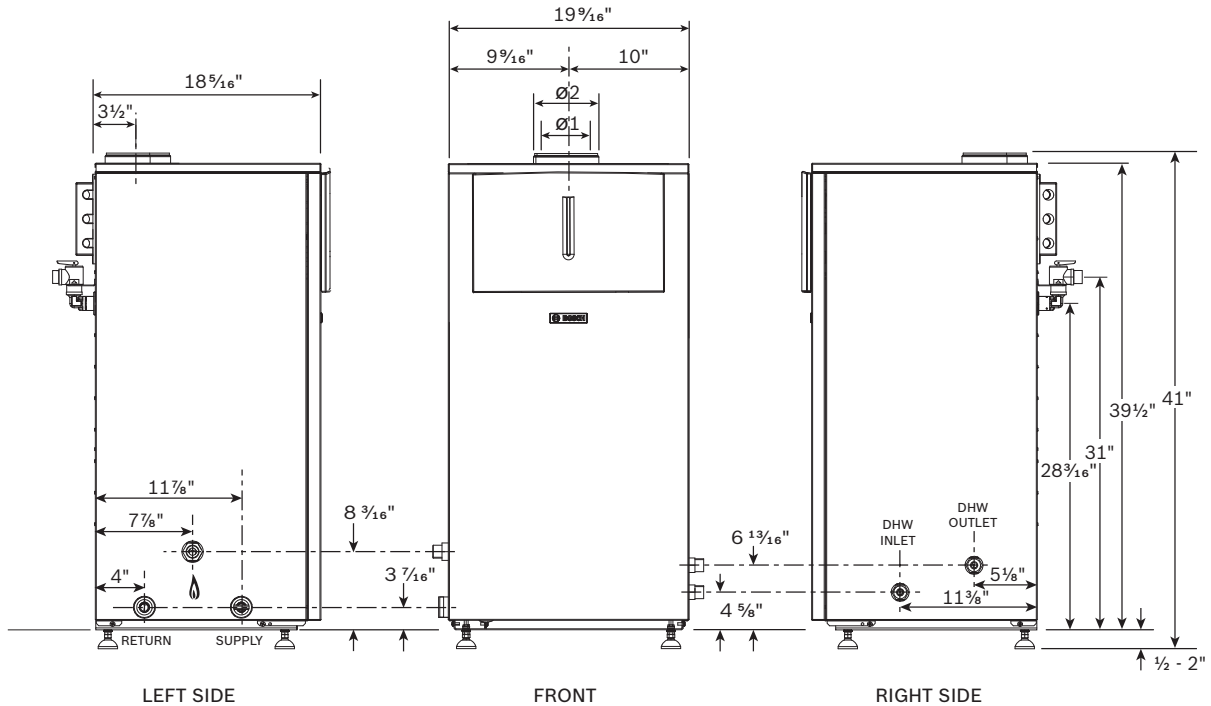
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|--|-------------|----------------|----------------|
| Max. input rate 180/79 °F (82/26 °C)                 | BTU/hr (kW) | 125,828 (36.9) | 129,021 (37.8) |
| Max. output rate 104/86 °F (40/30 °C)                | BTU/hr (kW) | 114,125 (33.5) | 119,625 (35.1) |
| Max. output rate 122/86 °F (50/30 °C)                | BTU/hr (kW) | 114,125 (33.5) | 119,625 (35.1) |
| Max. output rate 176/140 °F (80/60 °C)               | BTU/hr (kW) | 111,552 (32.7) | 116,928 (34.3) |
| Output rate domestic hot water (DHW), 113 °F (45 °C) | BTU/hr (kW) | 114,125 (33.5) | 119,625 (35.1) |
| Output rate domestic hot water (DHW), 140 °F (60 °C) | BTU/hr (kW) | 112,714 (33.0) | 118,146 (34.6) |

# Bosch Greenstar FS Floor Standing Combi Boiler

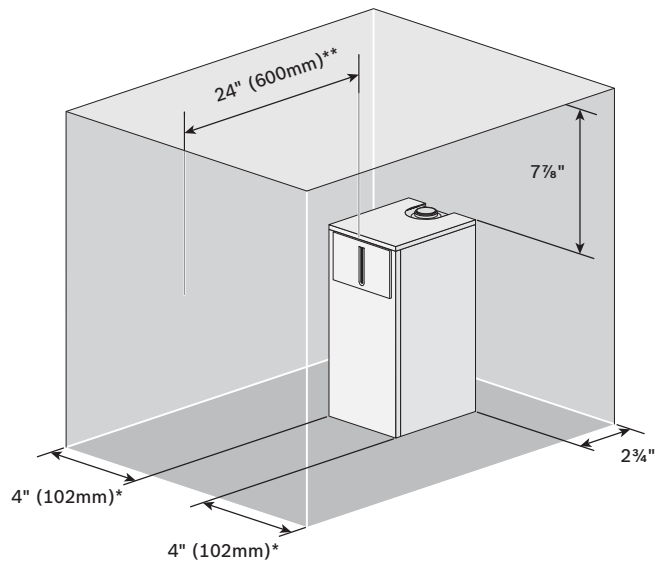


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## Greenstar FS (KWB) Combi Boiler Dimensions



## Greenstar FS (KWB) Combi Boiler Minimum Clearances



**NOTES:**

\* Zero clearance from combustible is permitted, but  $4$ " ( $102\text{mm}$ ) is recommended for serviceability

\*\*  $1$ " ( $25\text{mm}$ ) distance to door, if installed inside a closet, with at least  $24$ " ( $600\text{mm}$ ) available in front of boiler with closet door open for serviceability