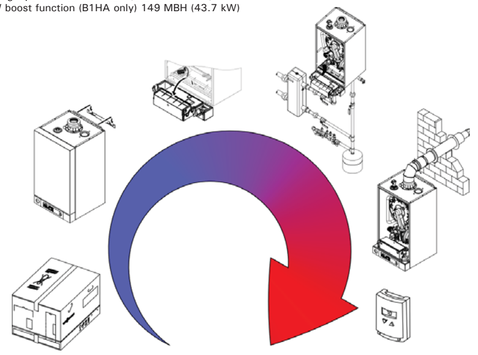
VITODENS 100-W

Installation and Start-up Guide

for use by a licensed professional heating contractor for typical installations

Vitodens 100-W, B1HA/B1KA
Models 94 to 125
Wall-Mounted, gas-fired condensing boilers
On demand domestic hot water with Combi boiler

Heating input: 21 to 125 MBH (6.2 to 36.6 kW)
DHW boost function (B1HA only) 149 MBH (43.7 kW)



Before you install the boiler;

This boiler is configured for Natural Gas from the factory. If conversion to Propane Gas is required, the conversion kit supplied with the boiler must be used.

This guide is designed to provide a quick overview to the licensed professional heating contractor for installing the Vitodens 100-W B1HA/B1KA boiler. It is NOT a substitute for the technical support literature supplied with the boiler and accessories.

The technical support literature for each product contains the necessary safety and national/ local code requirements which, if not followed exactly, may lead to property damages, personal injuries and/or loss of life. Viessmann Manufacturing assumes no responsibility for damage(s) of any kind caused by inappropriate use of this manual and/or failure to read the technical literature provided which may also render the warranty null and void.

Codes

The installation of this unit shall be in accordance with local codes or, in the absence of local codes, use CAN/CSA-B149.1 or .2 Installation Codes for Gas Burning Appliances for Canada. For U.S. installations use the National Fuel Gas Code ANSI Z223.1. Always use latest editions of codes.

In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70. The heating contractor must also comply with both the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, and the Installation Code for Hydronic Heating Systems, CSA B214-01, where required by the authority having jurisdiction.

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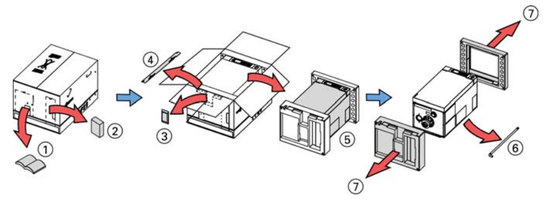
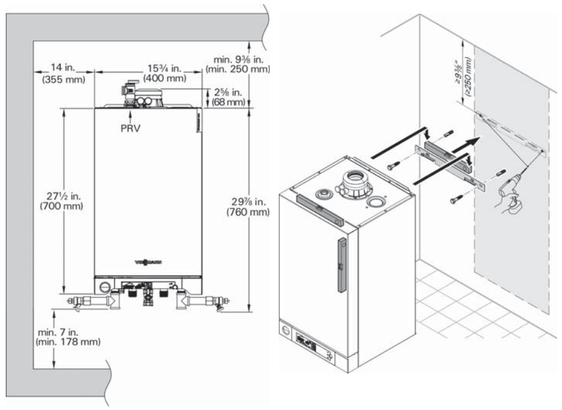
1 Unpacking and Included with Boiler



Legend
① Instruction manuals and fuel conversion kit
② Installation set
③ Mounting hardware
④ Boiler wall mounting bracket
⑤ Boiler
⑥ Flexible condensate discharge tubing
⑦ Packaging

2 Boiler Installation Dimensions and Mounting Details

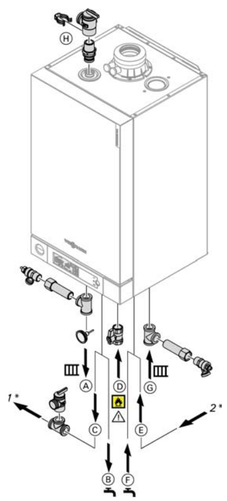


Refer to the "Dimensions and Installation" sections of the B1HA/B1KA Installation and Service Instructions for more detail.

IMPORTANT

Ensure that the boiler bracket and boiler are securely fastened and level.

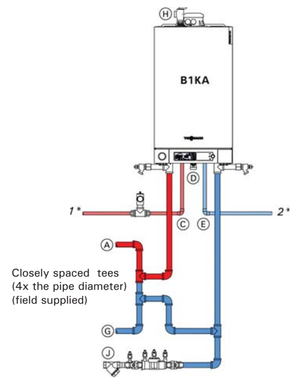
3 Installation Fittings and Typical Piping Connections



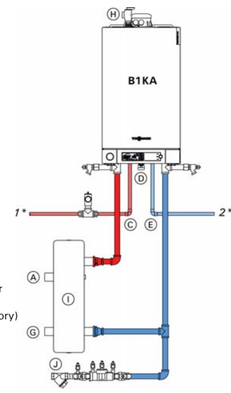
Legend
Ⓐ Boiler heating system supply
Ⓑ B1HA - Tank heating supply
Ⓒ B1KA - DHW connection with pressure relief valve (PRV)
Ⓓ Gas connection
Ⓔ B1KA - DCW connection
Ⓕ B1HA - Tank heating return
Ⓖ Boiler heating system return
Ⓗ Boiler pressure relief valve (PRV)
Ⓘ Low loss header (accessory)
Ⓙ Boiler fill
Ⓚ Indirect DHW tank
Ⓛ Expansion tank

1 Domestic hot water to fixture(s) from B1KA boiler
2 Domestic Cold Water to the B1KA boiler

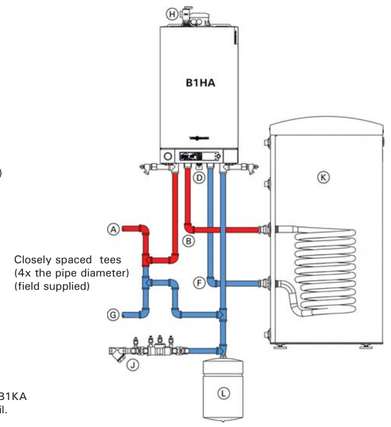
Refer to the "Connections" section of the B1HA/B1KA Installation and Service Instructions for more detail.



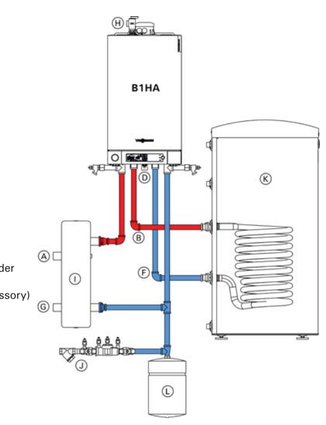
Closely spaced tees (4x the pipe diameter) (field supplied)



Low loss header (Viessmann optional accessory)

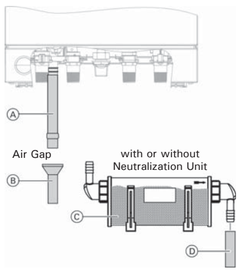


Closely spaced tees (4x the pipe diameter) (field supplied)



Low loss header (Viessmann optional accessory)

4 Boiler Condensate Connection



Install the flexible condensate discharge tube Ⓐ onto the boiler syphon discharge located at the bottom rear of the boiler.

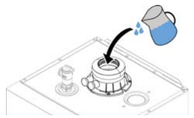
IMPORTANT

Ensure that the condensate line is clear from any blockage and is not exposed to freezing temperatures at any point in time.

Refer to the "Neutralization Unit" Instructions supplied with the neutralization unit.

Legend
Ⓐ Flexible condensate discharge tubing (from boiler).
Ⓑ Condensate discharge tubing with clamps (field supplied) if required. For connection to neutralization unit and / or suitable sewage drain.
Ⓒ Neutralizer unit (optional) **Note:** Consult local codes.
Ⓓ Condensate discharge tubing with clamps (field supplied).

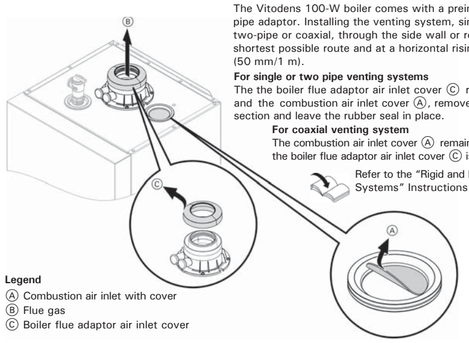
5 Filling the Siphon with Water



Fill the siphon with 10 fl. oz. (0.3 liters) of water into the boiler adaptor before start-up.

Refer to the "Connections" section of the B1HA/ B1KA Installation and Service Instructions for more detail.

6 Preparing for Vent Connection



The Vitodens 100-W boiler comes with a preinstalled vent pipe adaptor. Installing the venting system, single-pipe, two-pipe or coaxial, through the side wall or roof, taking the shortest possible route and at a horizontal rising 2 in./3.3 ft. (50 mm/1 m).

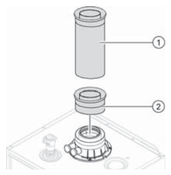
For single or two pipe venting systems
The the boiler flue adaptor air inlet cover Ⓒ remains installed and the combustion air inlet cover Ⓐ, remove the center section and leave the rubber seal in place.

For coaxial venting system
The combustion air inlet cover Ⓐ remains installed and the boiler flue adaptor air inlet cover Ⓒ is removed.

Refer to the "Rigid and Flex Pipe Venting Systems" Instructions supplied.

Legend
Ⓐ Combustion air inlet with cover
Ⓑ Flue gas
Ⓒ Boiler flue adaptor air inlet cover

7 Coaxial Vent System Boiler Connections



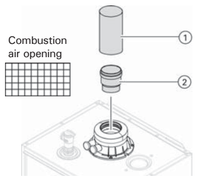
Maximum equivalent vent length			
Size	60/100	80/125	100/150 or 110/160
B1HA, B1KA	82 ft. (25 m)	98 ft. (30 m)	118 ft. (36 m)

#	Component
①	Vent Component
②	Vent adapter (if required)

Type of fitting	Equivalent length
87° elbow / 87° inspection tee	1.6 ft. (0.5 m)
45° elbow	1 ft. (0.3 m)

Refer to the "Rigid and Flex Pipe Venting Systems" Instructions supplied.

8 Flue Connection for Single or Two Pipe Systems



Maximum equivalent vent length			
Size	2 in. (51 mm)	3 in. (76 mm)	4 in. (102 mm)
B1HA, B1KA	98 ft. (30 m)	164 ft. (50 m)	200 ft. (61 m)

#	Component
①	Vent Component (PPs 60 mm, CPVC 2" or SS 2")
②	Vent starter adaptor (CPVC or SS)

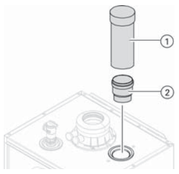
Use only UL1738/ULC S636 certified venting components.

Refer to the "Rigid and Flex Pipe Venting Systems" Instructions supplied.

Standard long sweep elbows

Approved venting material	90° elbow equivalent length	45° elbow equivalent length	87° elbow / 87° inspection tee
Stainless steel	3 ft. (0.91 m)	2 ft. (0.61 m)	-
CPVC plastic pipe	5 ft. (1.52 m)	3 ft. (0.91 m)	-
PP(s)	-	1 ft. (0.30 m)	1.6 ft. (0.50 m)

9 Combustion Air Connection for Two Pipe Systems



Maximum equivalent vent length			
Size	2 in. (51 mm)	3 in. (76 mm)	4 in. (102 mm)
B1HA, B1KA	98 ft. (30 m)	164 ft. (50 m)	200 ft. (61 m)

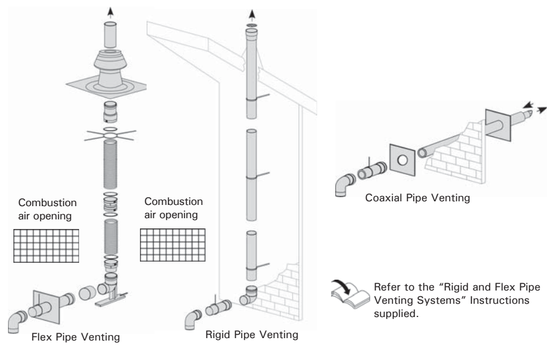
#	Component
①	Air intake component (suitable materials include PVC, CPVC and ABS)
②	Air intake adaptor (required for materials including PVC, CPVC and ABS)

Refer to the "Rigid and Flex Pipe Venting Systems" Instructions supplied.

Standard long sweep elbows

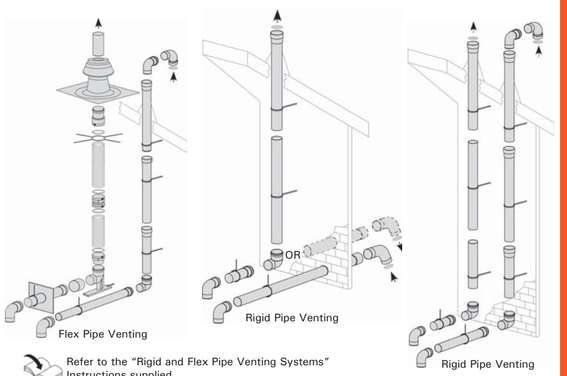
Material	90° elbow equivalent length	45° elbow equivalent length
Plastic pipe	5 ft. (1.52 m)	3 ft. (0.91 m)

10 Typical Single Pipe and Coaxial Pipe Venting Layouts



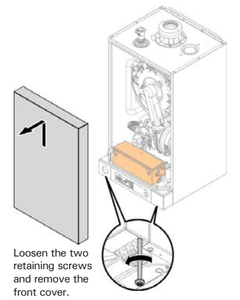
Refer to the "Rigid and Flex Pipe Venting Systems" Instructions supplied.

11 Typical Two Pipe Venting Layouts

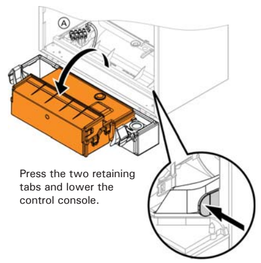


Refer to the "Rigid and Flex Pipe Venting Systems" Instructions supplied.

12 Accessing the Electrical Connections



Loosen the two retaining screws and remove the front cover.

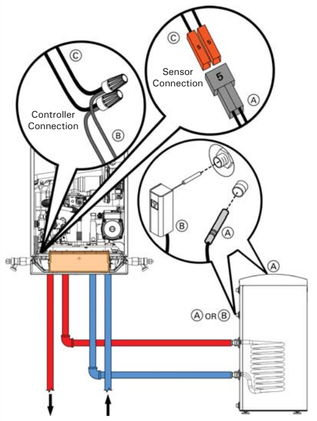


Press the two retaining tabs and lower the control console.

Refer to the "Control Connections" section of the B1HA/B1KA Installation and Service Instructions for more detail.

Terminal block Ⓐ room thermostat(s) and outdoor temperature sensor.
Connectors for DHW tank temperature sensor.
Note: this terminal block may be removed for ease of connection.

13 Connecting DHW Tank Temperature Sensor (B1HA) Optional



Tank Temperature Sensor (Supplied)
Install the supplied tank temperature sensor Ⓐ into the tank (in one of two locations). Attach the (factory installed) tank temperature sensor connectors Ⓒ into the (supplied) temperature sensor 5 connector Ⓐ (as shown).

Refer to the "Control Connections" section of the B1HA/B1KA Installation and Service Instructions.

Tank Temperature Controller (Field Supplied)
To connect the field supplied Tank Temperature Controller (e.g. Aquastat), cut and strip the two red connectors Ⓒ. Connect the Tank Temperature Controller wiring Ⓑ and the stripped wiring Ⓒ with wire connectors.

1. Press MODE. Tap ▼/▲ until CONFI flashes.
2. Confirm with OK. In the left hand display P appears.
3. The right hand display flashes. Select ▼/▲ until 12 appears and confirm with OK.
4. 1 flashes in the left hand display. Select using ▼/▲ to select 14 and confirm with OK. Select 1 for Tank Temperature Controller using ▼/▲ and confirm with OK.

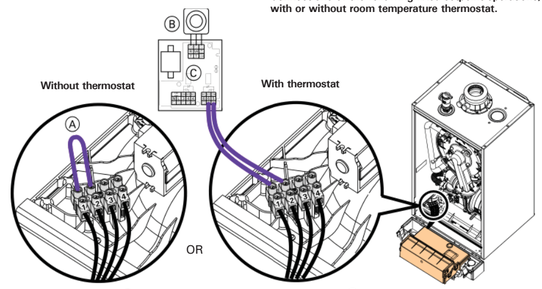
Refer to the "Tank Temperature Controller" manufacturer's Instructions for more detail.

14 Fixed Setpoint With or Without Room Temperature Thermostat

Refer to the "Control Connections" section of the B1HA/B1KA Installation and Service Instructions for more detail.

IMPORTANT

Connect one of the following fixed setpoint operations, with or without room temperature thermostat.



Connect jumper Ⓐ to terminals 1 and 2.

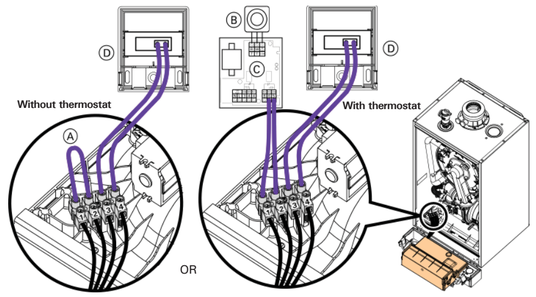
Connect switching relay Ⓒ with a 24VAC thermostat Ⓑ to terminals 1 and 2.

15 Weather-compensated With or Without Room Temp. Thermostat

Refer to the "Control Connections" section of the B1HA/B1KA Installation and Service Instructions for more detail.

IMPORTANT

Connect one of the following weather-compensated operations, with or without room temperature thermostat.

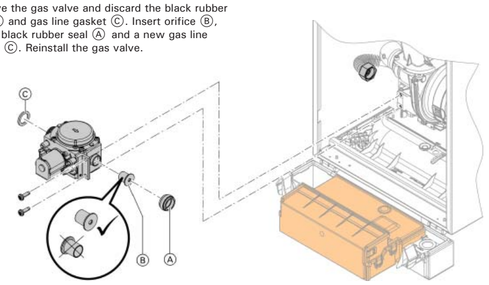


Connect jumper Ⓐ to terminals 1 and 2. Connect outdoor temperature sensor Ⓓ to terminals 3 and 4.

Connect switching relay Ⓒ with a 24VAC thermostat Ⓑ to terminals 1 and 2. Connect outdoor temperature sensor Ⓓ to terminals 3 and 4.

16 Converting from Natural Gas (NG) to Liquid Propane Gas (LPG)

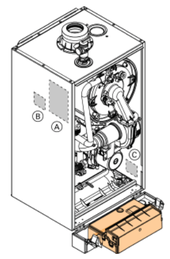
Remove the gas valve and discard the black rubber seal Ⓐ and gas line gasket Ⓒ. Insert orifice Ⓑ, a new black rubber seal Ⓐ and a new gas line gasket Ⓒ. Reinstall the gas valve.



1. Turn on power.
2. Tap MODE.
3. Tap ▼/▲ until CONFI flashes.
4. Tap OK to acknowledge. There is a "P" in the left hand field. The right hand field flashes.
5. Tap ▼/▲ until "12" is set.
6. Tap OK to acknowledge. "1" flashes in the left hand field.
7. Tap ▼/▲ until "5" is set.
8. Tap OK to acknowledge. "0" or "1" flashes in the right hand field.
9. Tap ▼/▲ to set the gas type, "1" (Liquid Propane) and "0" (Natural Gas).
10. Tap OK to acknowledge.
11. Turn OFF power then turn power ON. The parameters set are now saved.

Refer to the "Fuel Conversion and Labelling Instructions" supplied with the conversion kit.

17 Boiler Conversion Liquid Propane Gas Labels and Programming



Apply new labels as shown.

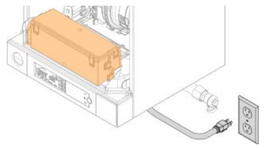
IMPORTANT

The boiler control MUST be programmed for Liquid Propane Gas (LPG). Once the gas valve fuel conversion and system installation is completed.

Refer to the "Fuel Conversion and Labelling Instructions" supplied with the conversion kit.

Legend
Ⓐ CSA Rating Plate
Ⓑ Field Conversion Label
Ⓒ Gas Type Label

18 Boiler Power Supply

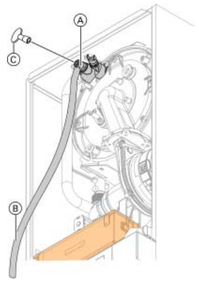


120/1/60 12A Power Supply with disconnect and protection. The Vitodens 100-W comes with a pre-installed power cord with 3 prong plug for simplified installation.

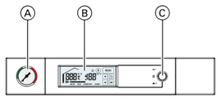
Note: the pre-installed power cord can be cut in order to be hard wired.

Refer to the "Control Connections" section of the B1HA/B1KA Installation and Service Instructions for more detail.

19 Filling and Bleeding the Heating System



Legend
Ⓐ Bleeding port (installed)
Ⓑ Bleeding tube (supplied)
Ⓒ Bleeding port key (supplied)



Legend
Ⓐ Pressure gauge
Ⓑ Touch screen user interface
Ⓒ Power switch ON/OFF

Prior to filling, thoroughly flush the entire heating system. Use only potable quality water.
Fill and remove air from the heat exchanger.

Attach bleeding tube Ⓑ to bleeding port Ⓐ. Use the key Ⓒ to bleed the air. Once complete, close bleeding port Ⓐ and remove bleeding tube Ⓑ.

Activating boiler pump (bleeding program)

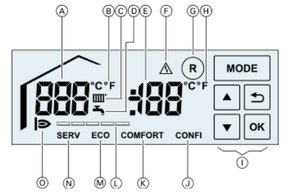
1. Close the gas shut-off valve.
2. Switch ON the power supply.
3. Tap MODE.
4. ▼/▲ until CONFI flashes.
5. OK to confirm.
   "P" appears in the left hand display area.
   The right hand display area flashes.
6. Use ▼/▲ to select "12".
7. OK to confirm.
   "1" flashes in the left hand display area.
8. OK to confirm.
   "0" flashes in the right hand display area.
9. Use ▼/▲ to select "1".
10. OK to confirm.
    Filling is activated.
    The boiler circuit pump is running, the 3-way diverter valve moves to its centre position.
    This function terminates automatically after 30 min. or when the ON/OFF switch is switched off.

Check the pressure of your heating system on the pressure gauge.
Minimum system pressure 12 psi (0.8 bar).
Turn ON the power switch.

Refer to the "Start-up , Inspection and Maintenance" section of the B1HA/B1KA Installation and Service Instructions for more detail.

20 Touch Screen User Interface

Touch Screen User Interface



Control and display elements

The control unit is preset at the factory for standard operation. Your heating system is ready for use. The factory presets may be individually adjusted to suit your specific requirements.

On-screen buttons for operation

MODE	Selecting/terminating functions
▲	Changing or selecting values
▼	Changing or selecting values
OK	Accepting values/confirming selection
⮌	1 step back

Legend
Ⓐ Display value or "F" (fault)
Ⓑ Temperature in °F/°C (in conjunction with the display value)
Ⓒ Heating mode
Ⓓ DHW heating
Ⓔ Display value or fault code
Ⓕ Fault indicator
Ⓖ Burner fault reset
Ⓗ Temperature in °F/°C (in conjunction with the display value)
Ⓘ On-screen buttons
Ⓙ Commissioning setting active (contractors only)
Ⓚ DHW comfort function active (only for B1KA)
Ⓛ Current burner output (each bar = 20%)
Ⓜ DHW comfort function not active (only for B1KA)
Ⓝ Service setting active (contractors only)
Ⓞ Burner in operation

21 Fault Display

In case of a fault, the display will flash ⚠ and the fault code appears. Once faults have been cleared, perform combustion analysis.

Note: See a list of Fault Codes in step 26.

Refer to the "Troubleshooting" section of the B1HA/B1KA Installation and Service Instructions for more detail.

22 Setting the Central Heating Temperature Fixed Set Point

Note: Set the central heating temperature using these steps when not using a outdoor temperature sensor.

Display shows current boiler water temperature

Refer to the "Operation" section of the B1HA/B1KA Operating Instructions for more detail.

Operation with or without room temperature thermostat.

In the delivered condition, the heating water temperature is set to 158°F (70°C).

Setting the heating water temperature

Tap the following on-screen buttons:

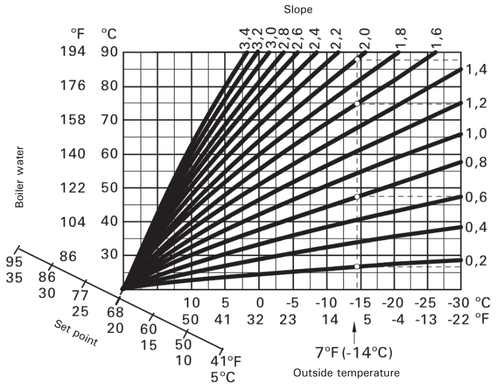
1. ▼/▲ the set heating water temperature flashes and is displayed.
2. ▼/▲ until the required heating water temperature is displayed.
3. OK to confirm.

23 Setting the Central Heating Temperature Weather-compensated

Weather-compensated operation with or without room temperature thermostat.

In the delivered condition, the slope of the heating curve is set to 1.4, the shift of the heating curve is set to 20 (or 68 if display has been set to °F).

Left side of the display shows current boiler water temperature. Right side displays current outdoor temperature.



Example:
For outdoor temperature 7°F (-14°C):

Legend

Underfloor heating system, slope 0.2 to 0.8 (displayed as 02 and 08)

Low temperature heating system, slope 0.8 to 1.6 (displayed as 08 and 16)

Heating system with a boiler water temperature in excess of 167°F (75°C), slope 1.6 to 2.0 (displayed as 16 and 20)

Refer to the "Operation" section of the B1HA/B1KA Operating Instructions for more detail.

24 Adjusting the Heating Curve Slope

Heating curve slope

Default setting is 14.

1. Tap MODE.
2. Tap ▼/▲ until CONFI flashes.

3. Tap OK to confirm.
   "P" is displayed in left hand display area.
   The right hand display area flashes.
   Enter 12 with ▼/▲.

4. OK to confirm. "1" flashes in left hand display area.
5. Use ▼/▲ to select "15".
6. OK to confirm (the right hand display flashes). Here, the heating curve slope can be adjusted. 02 represents the heating curve 0.2, adjustable to 35 (heating curve slope 3.5).
7. Tap ▼/▲ to select heating curve slope.
8. OK to confirm.
   The selected value is adopted.

Typical Radiant = 6 slope & 68 curve set point

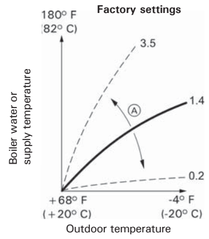
Typical Baseboard = 24 slope & 68 curve set point

Typical Fan Coil = 8 slope & 95 curve set point

Note: See step 25 to adjust the heating curve set point.

Slope = 1.4 and set point 68 (20)

Factory settings



Legend

Ⓐ Changing the slope:
The gradient of the heating curves changes.

Refer to the "Operation" section of the B1HA/B1KA Operating Instructions for more detail.

25 Adjusting the Heating Curve Set Point

Heating curve set point

Temperature parameter default setting is 20 (or 68 if the display is converted to °F).

Displays current set point temperature parameter.

Refer to the "Operation" section of the B1HA/B1KA Operating Instructions for more detail.

Setting the set point

1. Tap ▼/▲.
   The set parameter flashes and will be displayed.
2. Use ▼/▲ to select the parameter.
3. OK to confirm.

Note: When adjusting this setting, bear in mind that your heating system requires some time to heat the home to the required temperature.

26 Fault Codes

Diagnostics table: Faults with fault display on control unit

Fault code in display window	System characteristics *1	Cause	Corrective measures
08	Burner blocked	CO limiter (if installed) has responded. CO concentration too high.	Check the heating system. Remove the cause of escaping CO.
		Gas pressure switch (if installed) has responded. Gas pressure too low.	Check the gas supply.
06	Burner blocked	Low water, pump or flow switch defective	Check water pressure, circulation pump, flow switch
0C	Burner blocked	Mains voltage too low	Check the power supply.
45	Constant mode	Outdoor temperature sensor shorted out	Check the optional outdoor temperature sensor and wiring.
48	Constant mode	Outdoor temperature sensor wire broken	Check the outdoor temperature sensor and wiring.
30	Burner blocked	Boiler water temperature sensor shorted out	Check the boiler water temperature sensor.
38	Burner blocked	Boiler water temperature sensor wire broken	Check the boiler water temperature sensor.
50	No DHW heating	Tank temperature sensor shorted out	Check sensor.
51	No DHW heating	Outlet temperature sensor shorted out	Check sensor.
52	Burner blocked	Flow sensor shorted out	Check connections and wire; replace sensor if required.
58	No DHW heating	Tank temperature sensor wire broken	Check sensor.
59	No DHW heating	Outlet temperature sensor wire broken	Check the sensor.
58	Burner blocked	Flow sensor wire broken	Check connections and wire; replace sensor if required.
83	Burner blocked	Flue gas temperature sensor incorrectly positioned. No flame formation during sensor test.	Position flue gas temperature sensor correctly. It may be necessary to repeat the sensor test several times.

26 Fault Codes *(continued)*

Diagnostics table: Faults with fault display on control unit *(continued)*

Fault code in display window	System characteristics *1	Cause	Corrective measures
F2	Burner in fault mode	Fixed high limit tripped	Check the heating system water level. Check the circulation pump. Bleed the system. Check the fixed high limit and connecting cables. Reset control.
F3	Burner in fault mode	Flame signal is already present at burner start	Check the ionization electrode and connecting cable. Reset control.
F4	Burner in fault mode	No flame signal is present	Check ignition electrodes and wires. Measure the ionization current, check the gas pressure, check the gas valve, ignition, ignition module and condensate drain. Reset control. Check ignition cable resistance (4.5K to 5K ohms).
F8	Burner in fault mode	The combination gas valve closes too late	Check the gas valve. Check both air and gas flow paths. Reset control.
F9	Burner in fault mode	Blower speed too low at burner start	Check the blower, check the blower cables and supply; check the blower control. Reset control.
FA	Burner in fault mode	Blower not at stand-still	Check the blower, blower connecting cables and blower control. Reset control.
FC	Burner blocked	Electrical fan control (control unit) faulty	Check fan connecting cable; if required replace cable or replace control unit. Reset control.
Fd	Burner blocked	Burner control unit fault	Check ignition electrodes and connecting cables. Check whether a strong interference (EMC) field exists near the equipment (correct if applicable). Reset control. Replace control unit if the fault persists.
FF	Burner blocked	Burner control unit fault	Check ignition electrodes and connecting cables. Check whether a strong interference (EMC) field exists near the equipment (correct if applicable). Reset control. Replace control if the fault persists.
89	Regulated operation without OpenTherm device	Communication fault OpenTherm device	Check connections and wire; replace OpenTherm device if required.
60	Burner blocked	Flue gas temperature sensor shorted out	Check sensor.
67	Emergency mode	Burner control unit fault	Reset boiler control.
68	Burner blocked	Flue gas temp. sensor wire broken	Check sensor.
E3	Burner in fault mode	Fault in safety chain	Check the fixed high limit and connecting cables. Check the control unit, and replace if required.
E5	Burner blocked	Internal fault	Check the ionization electrode and connecting cable. Press reset.
F0	Burner blocked	Internal fault	Replace the control unit.
F1	Burner in fault mode	Maximum flue gas temperature exceeded	Check the heating system fill level, circulation pump and bleed system. Reset control.

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