

# Installation Instructions

for use by heating contractor



Vitodens 222-F, B2TB

Models 19, 35, 68, 125

Floor mounted, gas-fired condensing storage combi boiler

For operation with natural gas and liquid propane gas

Heating input: 12 to 125 MBH

3.5 to 37 kW



## VITODENS® 222-F



*Product may not be exactly as shown*

### IMPORTANT

**Read and save these instructions for future reference.**

## Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause product/property damage, severe personal injury, and/or loss of life. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

■ **Product documentation**

Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.

► *For a listing of applicable literature, please see section entitled "Important Regulatory and Installation Requirements".*



■ **Warranty**

Information contained in this and related product documentation must be read and followed. Failure to do so renders the warranty null and void.



■ **Licensed professional heating contractor**

The installation, adjustment, service and maintenance of this equipment must be performed by a licensed professional heating contractor.

► *Please see section entitled "Important Regulatory and Installation Requirements".*



■ **Contaminated air**

Air contaminated by chemicals can cause by-products in the combustion process, which are poisonous to inhabitants and destructive to Viessmann equipment.

► *For a listing of chemicals which cannot be stored in or near the boiler room, please see subsection entitled "Mechanical room" in the "Installation Instructions".*



■ **Advice to owner**

Once the installation work is complete, the heating contractor must familiarize the system operator/ultimate owner with all equipment, as well as safety precautions/requirements, shutdown procedure, and the need for professional service annually before the heating season begins.

■ **Carbon monoxide**

Improper installation, adjustment, service and/or maintenance can cause flue products to flow into living space. Flue products contain poisonous carbon monoxide gas.

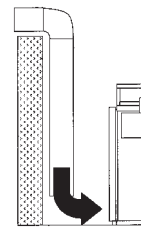
► *For information pertaining to the proper installation, adjustment, service and maintenance of this equipment to avoid formation of carbon monoxide, please see subsection entitled "Mechanical room" and "Venting requirements" in the "Venting System Installation Instructions".*



■ **Fresh air**

This equipment requires fresh air for safe operation and must be installed ensuring provisions for adequate combustion and ventilation air exist.

► *For information pertaining to the fresh air requirements of this product, please see subsection entitled "Mechanical room" in the "Installation Instructions".*



■ **Equipment venting**

Never operate boiler without an installed venting system. An improper venting system can cause carbon monoxide poisoning.

► *For information pertaining to venting and chimney requirements, please see section entitled "Venting Connection". All products of combustion must be safely vented to the outdoors.*



**! WARNING**

Installers must follow local regulations with respect to installation of carbon monoxide detectors. Follow the Viessmann maintenance schedule of the boiler contained in this manual.

**Operating and Service Documentation**

It is recommended that all product documentation such as parts lists, operating and service instructions be handed over to the system user for storage. Documentation is to be stored near boiler in a readily accessible location for reference by service personnel.

**! WARNING**

This boiler requires fresh air for safe operation and must be installed with provisions for adequate combustion and ventilation air (in accordance with local codes and regulations of authorities having jurisdiction).

Do not operate this boiler in areas with contaminated combustion air. High levels of contaminants such as dust, lint or chemicals can be found at construction sites, home renovations, in garages, workshops, in dry cleaning/laundry facilities, near swimming pools and in manufacturing facilities.

Contaminated combustion air will damage the boiler and may lead to substantial property damage, severe personal injury and/or loss of life. Ensure boiler/burner is inspected and serviced by a qualified heating contractor at least once a year in accordance with the Service Instructions of the boiler.

**! WARNING**

Do Not operate the boiler without the front cover in place.

**Safety, Installation and Warranty Requirements** *(continued)*

**Fiberglass wool and ceramic fiber materials**

**! WARNING**

**Inhaling of fiberglass wool and/or ceramic fiber materials is a possible cancer hazard. These materials can also cause respiratory, skin and eye irritation.**

The state of California has listed the airborne fibers of these materials as a possible cancer hazard through inhalation. When handling these materials, special care must be applied.

**Suppliers of ceramic fiber products recommend the following first aid measures:**

- *Respiratory tract (nose and throat) irritation:*  
If respiratory tract irritation develops, move the person to a dust free location.
- *Eye irritation:* If eyes become irritated, flush immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes.
- *Skin irritation:* If skin becomes irritated, remove soiled clothing. Do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful.
- *Gastrointestinal irritation:* If gastrointestinal tract irritation develops, move the person to a dust free environment.

**Suppliers of fiberglass wool products recommend the following precautions be taken when handling these materials:**

- Avoid breathing fiberglass dust and contact with skin and eyes.
- Use NIOSH approved dust/mist respirator.
- Wear long-sleeved, loose fitting clothing, gloves and eye protection.
- Wash work clothes separately from other clothing. Rinse washer thoroughly.
- Operations such as sawing, blowing, tear-out and spraying may generate airborne fiber concentration requiring additional protection.

**First aid measures**

- If eye contact occurs, flush eyes with water to remove dust. If symptoms persist, seek medical attention.
- If skin contact occurs, wash affected areas gently with soap and warm water after handling.

**! WARNING**

**Appliance materials of construction, products of combustion and the fuel contain alumina, silica, heavy metals, carbon monoxide, nitrogen oxides, aldehydes and/or other toxic or harmful substances which can cause serious injury or loss of life and which are known to the State of California to cause cancer, birth defects and other reproductive harm. Always use proper safety clothing, respirators and equipment when servicing or working nearby the appliance.**

**About these Installation Instructions**

**! Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION", and "IMPORTANT". See below.**

**! WARNING**

**Indicates an imminently hazardous situation which, if not avoided, could result in loss of life, serious injury or substantial product/property damage.**

► *Warnings draw your attention to the presence of potential hazards or important product information.*

**! CAUTION**

**Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/property damage.**

► *Cautions draw your attention to the presence of potential hazards or important product information.*

**IMPORTANT**

► *Helpful hints for installation, operation or maintenance which pertain to the product.*

► *This symbol indicates that additional, pertinent information is to be found.*

► *This symbol indicates that other instructions must be referenced.*



**Safety**

**Safety, Installation and Warranty Requirements**.....2  
 Product documentation.....2  
 Warranty.....2  
 Licensed professional heating contractor.....2  
 Contaminated air.....2  
 Advice to owner.....2  
 Carbon monoxide.....2  
 Fresh air.....2  
 Equipment venting.....2  
**About these Installation Instructions**.....3

**General Information**

**Important Regulatory and Installation Requirements**.....6  
 Codes.....6  
 Instructing the system user.....6  
 Initial start-up.....6  
 Working on the equipment.....6  
 Technical literature.....6  
 Flow switch procedure.....7  
**Applicability**.....8  
**Product Information**.....8  
**Mechanical Room**.....9

**Set-up**

**Before Set-up**.....10  
**Minimum Clearances**.....10  
 Recommended minimum service clearances.....10

**Boiler Connections**

**Connections**.....11  
 Boiler venting.....13  
 Connecting power.....13  
 Connecting heating system.....13  
 Proper piping practice.....13  
 Gas shut-off valve connection.....14  
 Gas connection and piping.....14  
 Gas piping pressure test.....15  
 Flue gas connection.....15  
 Removing the front panels.....16  
 Accessing the control unit connections.....17  
 External accessory connection box.....20  
 Boiler control base.....21  
 Condensate connection.....22  
**Vertical Piping Installation**.....23  
**Side Piping Installation**.....26  
 Installing boiler safety devices.....28

	Page
<b>Boiler Connections</b> <i>(continued)</i>	
<b>Safety Connections</b> .....	29
Low water cut-off.....	29
<b>Waterside Flow</b> .....	30
Waterside flow (primary circuit).....	30
<b>Installation Examples</b> .....	31
<b>System Layout 1-8</b> .....	32
<b>Alternative Connection</b> .....	40
<b>Control Connections</b>	
<b>Wiring Diagram</b> .....	41
<b>Electrical Connections</b> .....	43
Power supply connection of accessories.....	43
Connection of accessories.....	43
<b>Accessories Connection</b> .....	44
Connection of accessories.....	44
Low voltage plug X3.....	44
<b>Accessing the X3 Plug</b> .....	45
<b>Connecting the Low-loss Header Sensor</b> .....	45
<b>Connecting the Outdoor Temperature Sensor</b> .....	46
<b>LON Module</b> .....	47
Installing the LON module to the boiler	
control board.....	47
Connecting the LON module cable.....	47
<b>Routing the Connecting Cables</b> .....	48
<b>External 0-10 Volt Signal Connection</b> .....	49
<b>Connecting a 24 VAC Thermostat</b> .....	50
<b>Zone Circuit Thermostat Connections</b> .....	51
<b>Zone Circuit Pump Connection</b> .....	52
Connection to boiler.....	52
Connection at AMI (accessory).....	52
<b>Accessory Kit</b> .....	53
<b>Closing the Boiler</b> .....	53
<b>Closing the External Accessory Connection Box</b> .....	54
<b>Reinstalling the Front Enclosure Panel</b> .....	55
Fitting the front panels.....	55
<b>Technical Data</b> .....	56
<b>Installation Fittings</b> .....	58
<b>Lighting and Operating Instructions</b> .....	59
<b>Additional Information</b>	

## Important Regulatory and Installation Requirements

### 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.

### Instructing the system user

The installer of the system is responsible to ensure the system operator/ultimate owner is made familiar with the system functioning, its activation, and its shut-down.

### Initial start-up

Initial start-up must be performed by a qualified heating contractor. Proper completion of the Maintenance Record by the heating contractor is also required.

### Working on the equipment

The installation, adjustment, service, and maintenance of this boiler must be done by a licensed professional heating contractor who is qualified and experienced in the installation, service, and maintenance of hot water boilers. There are no user serviceable parts on the boiler, burners, or control.

Ensure main power supply to equipment, the heating system, and all external controls has been deactivated. Close main gas supply valve. Take precautions in all instances to avoid accidental activation of power during service work.

### Carbon Monoxide Detectors

The installer must verify that at least one carbon monoxide alarm has been installed within a residential living space or home following the alarm manufacturer's instructions and applicable codes before putting the appliance into operation.

The following topics must be covered:

Proper system operation sequence.

Explain the equipment.

Demonstrate an emergency shut-down, what to do and what not.

Explain that there is no substitute for proper maintenance to help ensure safe operation.

The Maintenance Record is located in the Service Instructions

Please carefully read this manual prior to attempting start-up, maintenance or service. Any warranty is null and void if these instructions are not followed.

For information regarding other Viessmann System Technology componentry, please reference documentation of the respective product.

We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

### Technical literature

Literature for the Vitodens boiler:

- Technical Data Manual
- Installation Instructions
- Service Instructions
- Operating Instructions and User's Information Manual
- Instructions of other Viessmann products utilized and installed
- Installation codes mentioned in this manual

The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. These include low water cut-offs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.

Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.

This product comes with several safety instruction labels attached.

Do not remove!

Contact Viessmann immediately if replacement labels are required.

**Important Regulatory and Installation Requirements** *(continued)*

CSD-1 Field Testing of High Limit Switches for Vitodens boilers – where required by law.

VISSMANN IS NOT RESPONSIBLE FOR ANY DAMAGES THAT THE FOLLOWING TEST PROCEDURE MAY RESULT IN BY OVERHEATING THE SYSTEM.

The Vitodens 200/222 boilers are equipped with flow switches or sensors that when activated enable the burner to operate.

The fixed high limit, when tripped, produces a fault that will require manual reset of the boiler control.

Fixed High Limit fault simulation #1:

- Close the boiler valve and jumper across the flow switch.
- Run the boiler at high fire and it will shut down by the coding card (in B2TB models, set coding address O6 to maximum) but should continue to steady increase the boiler temperature until the fixed high limit is tripped.
- Once the fixed high limit is tripped, slowly open the boiler valve to safely cool the boiler down.

Fixed High Limit fault simulation #2:

- Throttle the boiler valve to a point where the burner will run with as little flow as possible.
- Run the boiler to high fire via relays test.
- When the burner shuts down on the electronic limit, close the ball valve to stop the flow.
- The boiler temperature should continue a steady increase to trip the fixed high limit.
- Once the fixed high limit is tripped, slowly open the boiler valve to safely cool the boiler down.

Fixed High Limit fault simulation #3:

- Remove one of the wires connected to limit switch, this will produce a fault in the boilers control that requires manual reset.

**Flow switch procedure:**

The Vitodens 222 B2TB boilers are equipped with a flow sensing device. Upon detection of an inadequate flow rate, the switch will open and the burner will shut down and will prevent restart until an adequate flow rate is restored. To test the sensing device, throttle down the flow of water to or from the boiler. The boiler will shut down once the flow has dropped below it's safe operating set point.



## Applicability



### CAUTION

The boiler serial number must be provided when ordering replacement parts.

### IMPORTANT

When ordering replacement parts, provide either the 16-digit boiler serial number (on the bar code label) or the 12-digit ASME/NB serial number, located as shown underneath boiler front enclosure panel. Refer to page 16 for instructions on how to remove front enclosure panel.

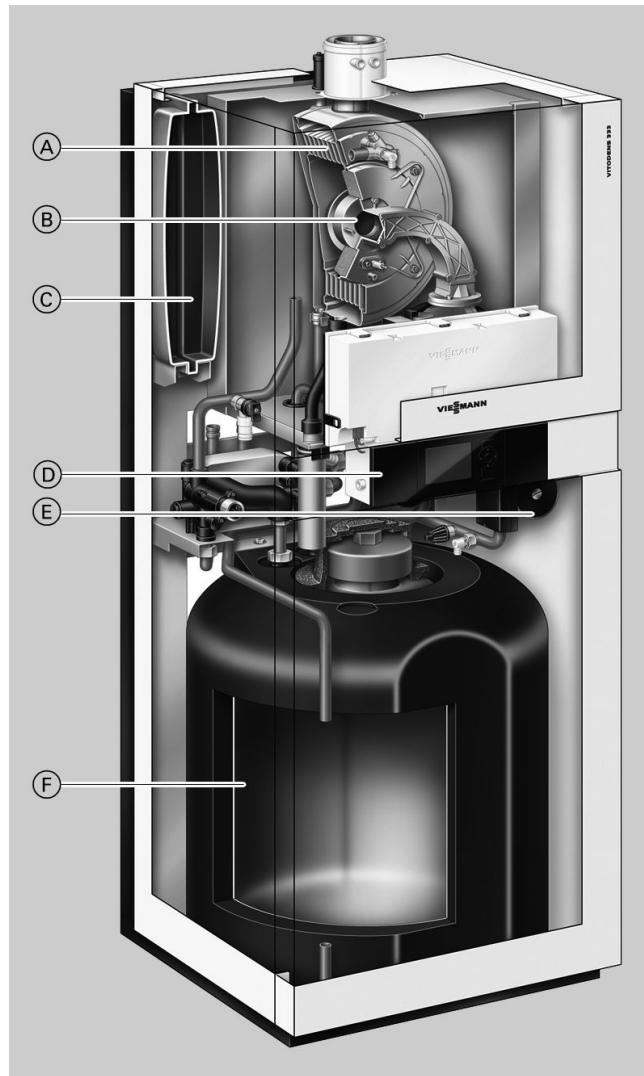
Model No. B2TB 19,68

Serial No. 7542250

Model No. B2TB 35, 125

Serial No. 7542251

- (A) Stainless steel Inox-Radial heat exchanger for high operational reliability, a long service life and high heating output in the smallest space
- (B) Modulating MatriX cylinder gas burner for extremely clean combustion
- (C) Integral diaphragm expansion vessel
- (D) Graphical user interface
- (E) Integral, 3-speed high efficiency circulation pump
- (F) Stainless steel DHW primary storage tank.



## Product Information

Natural gas and liquid propane gas-fired condensing heating boiler for weather-responsive operation in closed loop, forced circulation hot water heating systems for space heating and domestic hot water (DHW) production.

The Vitodens 222-F, B2TB boiler comes factory set for operation with natural gas. For a fuel conversion to liquid propane gas no conversion kit is required.

The integral primary storage tank 26.5 USG (100 L) capacity offers the DHW convenience of a separate DHW tank with approximately twice that volume.

Boiler model must be selected based on an accurate heat loss calculation of the building. Ensure boiler model is compatible with connected radiation.

Vitodens 222-F, B2TB boilers are factory-tested and calibrated. Further gas valve adjustments are not typically required during field start-up.



Follow the Vitodens Venting System Installation Instructions to vent this boiler.



## Mechanical Room

During the early stages of designing a new home, we recommend that proper consideration be given to constructing a separate mechanical room dedicated to the gas- or oil-fired heating equipment and domestic hot water storage tank(s).

The boiler must be located in a heated indoor area, near a floor drain, and as close as possible to a wall. Whenever possible, install the boiler near an outside wall so that it is easy to duct the venting system to the boiler.

Ensure that the boiler location does not interfere with the proper circulation of combustion and ventilation air of other fuel burning equipment within the mechanical room (if applicable).

The maximum room temperature of the mechanical room where the boiler is located must not exceed 104°F (40°C).

### Installation area conditions

#### **WARNING**

**Incorrect ambient conditions can lead to damage to the heating system and put safe operation at risk.**

- Ensure ambient temperatures are higher than 32°F (0°C) and lower than 104°F (40°C).
- Prevent the air from becoming contaminated by halogenated hydrocarbons (e.g. as contained in paint solvents or cleaning fluids) and excessive dust (e.g. through grinding or polishing work). Combustion air for the heating process, and ventilation of the boiler room must be free of corrosive contaminants. To that end, any boiler must be installed in an area that has no chemical exposure. The list to the right indicates the main, currently known sources.
- Avoid continuously high levels of humidity (e.g. through frequent drying of laundry).
- Never close existing ventilation openings.

#### **WARNING**

**If you notice fire coming from the appliance, call the fire department immediately! Do not attempt to extinguish the fire unless qualified to do so.**

### IMPORTANT

The service life of the boiler's exposed metallic surfaces, such as the casing and fan housing, is directly influenced by proximity to damp and salty marine environments. In such areas, higher concentration levels of chlorides from sea spray, coupled with relative humidity, can lead to degradation of the exposed metallic surfaces mentioned above. Therefore, it is imperative that boilers installed in such environments not be installed using direct vent systems which draw outdoor air for combustion. Such boilers must be installed using room air dependent vent systems; i.e. using room air for combustion. The indoor air will have a much lower relative humidity and, hence, potential corrosion will be minimized.

### Sources of combustion and ventilation air contaminants

#### Areas likely to contain contaminants:

- New building construction
- Swimming pools
- Remodelling areas, hobby rooms
- Garages with workshops
- Furniture refinishing areas
- Dry cleaning/laundry areas and establishments
- Auto body shops
- Refrigeration repair shops
- Metal fabrication plants
- Plastic manufacturing plants
- Photo processing plants
- Beauty salons

#### Products containing contaminants:

- Chlorine-type bleaches, detergents and cleaning solvents found in household laundry rooms
- Paint and varnish removers
- Hydrochloric acid, muriatic acid
- Chlorine-based swimming pool chemicals
- Spray cans containing chlorofluorocarbons
- Chlorinated waxes and cleaners
- Cements and glues
- Refrigerant leaks
- Calcium chloride used for thawing
- Sodium chloride used for water softening salt
- Permanent wave solutions
- Adhesives used to fasten building products and other similar items
- Antistatic fabric softeners used in clothes dryers

#### **WARNING**

**Fire causes a risk of burns and explosion!**

- Shut down the boiler
- Close fuel shut-off valves
- Use a tested fire extinguisher, class ABC.

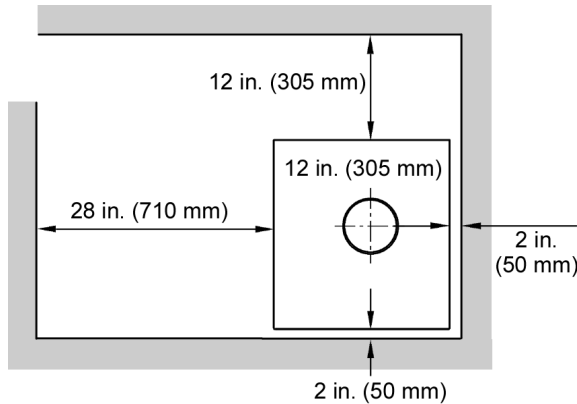
## Before Set-up

Before placing boiler in its installation location, ensure all necessary accessories are installed.

### CAUTION

The boiler must be installed in such a way that gas ignition system components are protected from water (spraying, splashing, etc.) during boiler operation and service.

## Minimum Clearances



**Note:** The Vitodens 222-F, B2TB boiler has passed the zero inches vent clearance to combustibles testing requirements dictated by the boiler Harmonized Standard ANSI Z21.13. CSA 4.9 (latest edition) and therefore is listed for zero clearance to combustibles when vented with a single-wall UL/ULC certified special venting system. The zero inches vent clearance to combustibles for the Vitodens boiler supercedes the clearance to combustibles listing that appears on the special venting system label.

The back or side clearance shall be increased if piping installation is required.



See the Vitodens 222-F B2TB Venting System Installation Instructions for details.

### Recommended minimum service clearances

For typical Vitodens installations, Viessmann recommends installing the boiler with the service clearances shown in the illustration on the left.

**Note:** The 12 in. (305 mm) side clearance specified is only recommended to be able to view the boiler certified rating plate, decal and also accommodate the PRV installation kit.

The 2 in. (50 mm) clearance shown is to connect the discharge pipe on either the left or right side of the boiler for the pressure relief valve or the DHW tank temperature and pressure valve.

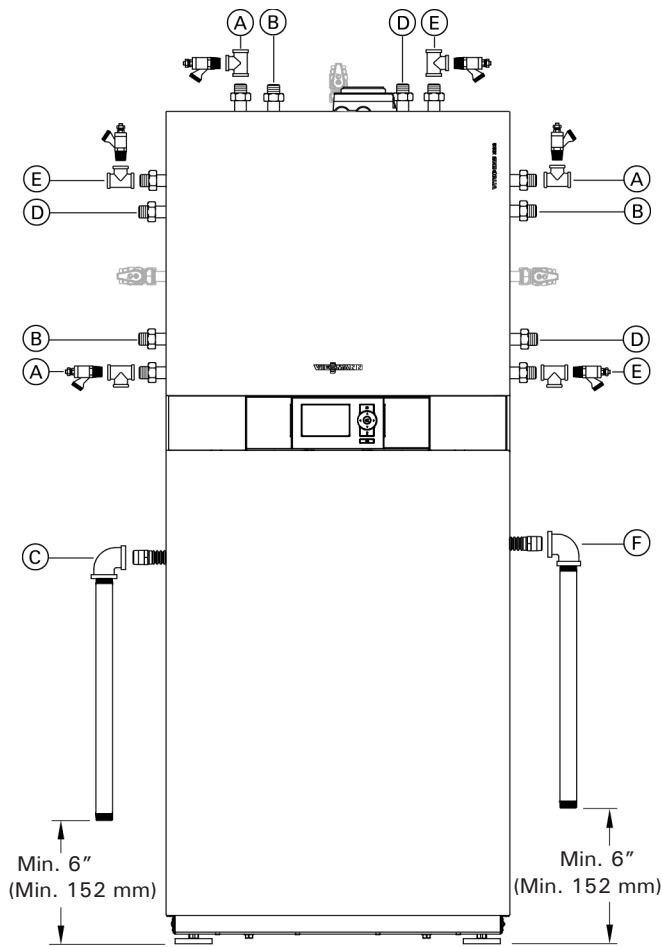
This reduced clearance is also used in Vitodens multiple boiler installation system as described in the multiple boiler installation instructions.

The Vitodens 222-F, B2TB boilers are approved for closet and alcove installation with the clearances to combustibles listed.

### Minimum clearances to combustibles

Boiler model B2TB	19, 68	35, 125
Top	0	0
Sides (left and right)	0	0
Vent pipe	0	0
Front (alcove or closet)	0	0
Rear	0	0
Floor	combustible	combustible

**Connections**



**Boiler water connection and piping**

Use an approved pipe sealant or teflon tape when connecting the following installation fittings.

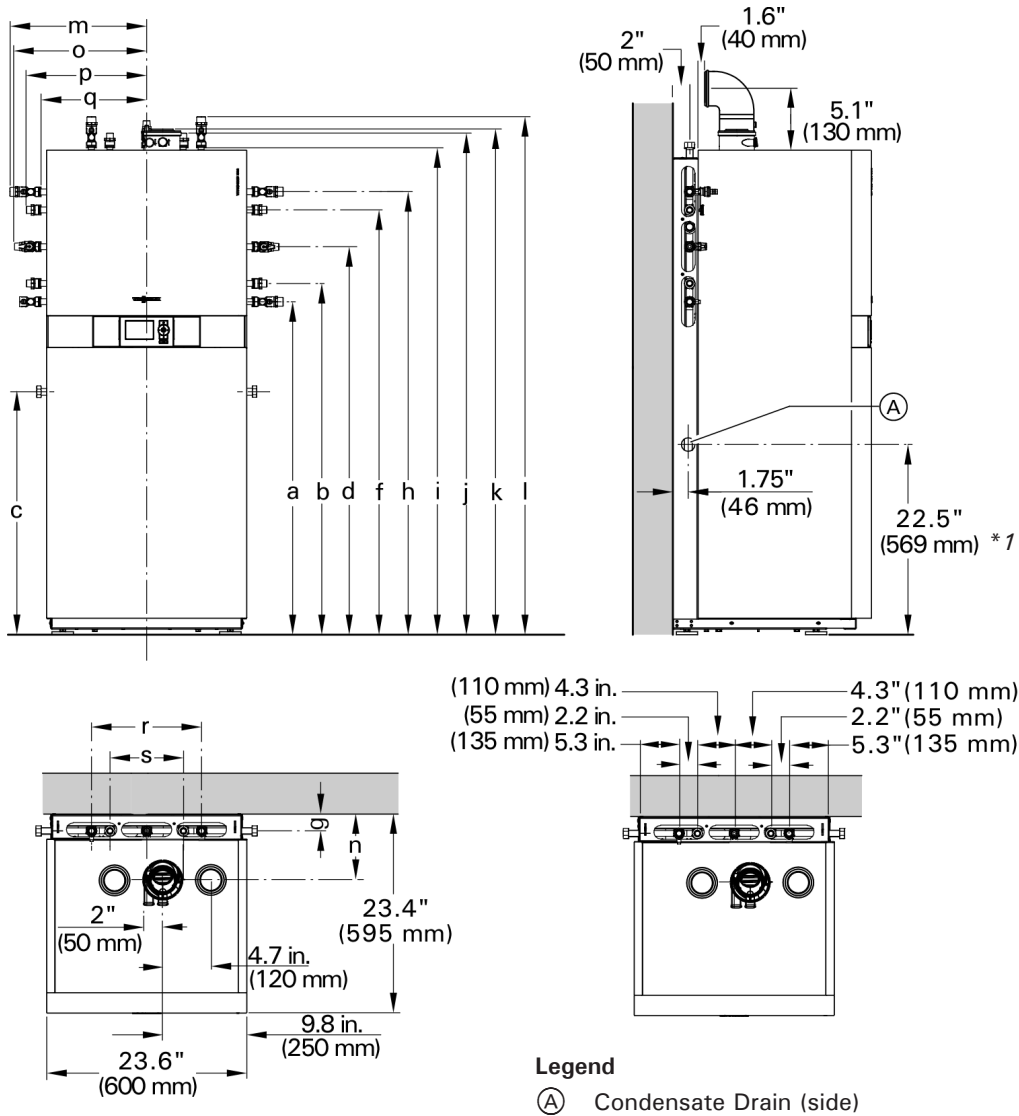
This section constitutes an overview only! Refer to subsequent sections for detailed information on individual piping connections.

**Note:** See installation fitting sets on page 58.

**Legend**

- Ⓐ Heating supply NPT 3/4 in.
- Ⓑ DHW NPT 3/4 in.
- Ⓒ Pressure relief valve discharge pipe NPT 3/4 in.
- Ⓓ DCW NPT 3/4 in.
- Ⓔ Heating return NPT 3/4 in.
- Ⓕ Temperature and pressure relief valve discharge pipe NPT 3/4 in.

**Connections** *(continued)*



**Note:** The dimensional drawing shows example fittings for upward connection and connection to the left/right. Order the connection sets separately as accessories. For the dimensions of the individual connection sets, see the design information.

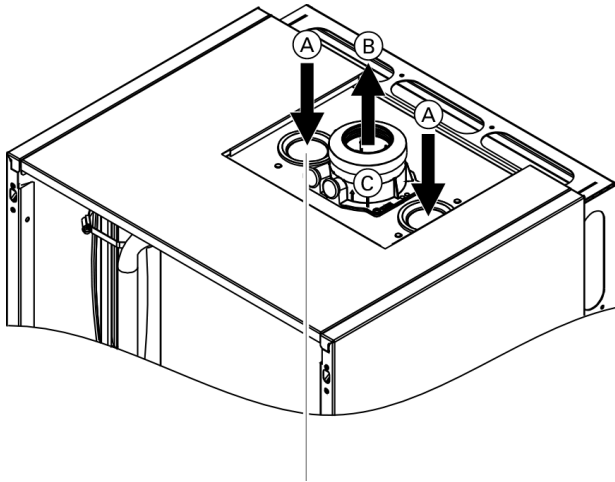
Model B2TB 19, 35, 68, 125			Model B2TB 19, 35, 68, 125		
a * 1	in. (mm)	46.1 (1172)	k * 1	in. (mm)	65.6 (1665)
b * 1	in. (mm)	48.3 (1227)	l * 1	in. (mm)	68.0 (1726)
c * 1	in. (mm)	28 (710) approx.	m	in. (mm)	16.1 (410)
d * 1	in. (mm)	52.6 (1337)	n	in. (mm)	8.8 (224)
f * 1	in. (mm)	57.0 (1447)	o	in. (mm)	15.3 (389)
g	in. (mm)	2.0 (50)	p	in. (mm)	14.2 (361)
h * 1	in. (mm)	59.1 (1502)	q	in. (mm)	12.6 (320)
i * 1	in. (mm)	64.2 (1630)	r	in. (mm)	13.0 (330)
j * 1	in. (mm)	65.6 (1666)	s	in. (mm)	8.7 (220)

**Note:** All height dimensions of the boiler have a tolerance of +.6 in. (+ 15 mm) due to the factory installed adjustable feet

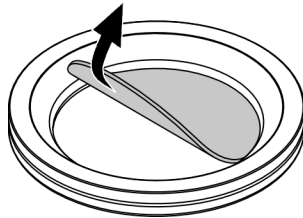
\* 1 Add 1 5/8 in. (40 mm) when using the optional accessory seismic bracket kit.

**Note:** All height dimensions of the boiler have a tolerance of +.5 in. (+ 13 mm) due to the seismic bracket adjustable feet.

**Connections** *(continued)*



When utilizing the combustion air inlet seal (A) for Vitodens 222 B2TB boilers, remove the inlet seal (A), tear out center section and install the remaining rubber seal back into the air inlet opening.



**Legend**

- (A) Combustion air
- (B) Flue gas exhaust



Refer to the Vitodens Venting System Installation Instructions

**Boiler venting**

The Vitodens 222-F B2TB boiler comes with a pre-installed vent pipe adaptor (C).

Run venting system, single-wall or coaxial, through the side wall or the roof, taking the shortest possible route and at a rising angle (min. 3°).

**! WARNING**

Remove outer gasket from vent pipe adaptor (C) if single wall (boiler room air dependant) venting system is used.

**! CAUTION**

Under certain climatic conditions some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (e.g. aluminum sheeting) may be required to prevent staining or deterioration. The protective material should be attached and sealed (if necessary) to the building before attaching the vent termination. It is strongly recommended to install the vent termination on the leeward side of the building.

**Connecting power**

The Vitodens 222-F boiler has a external accessories connection box installed, which requires a 120VAC power supply from a wall receptacle. Refer to the wiring diagram (see page 41).

**Connecting heating system**

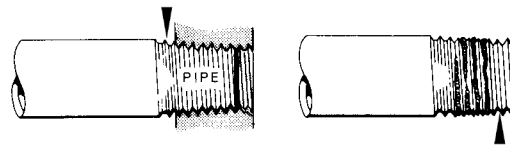
Flush heating system thoroughly prior to connecting boiler

**Proper piping practice**

Support piping by proper suspension method. Piping must not rest on or be supported by boiler. Use moderate amount of dope.

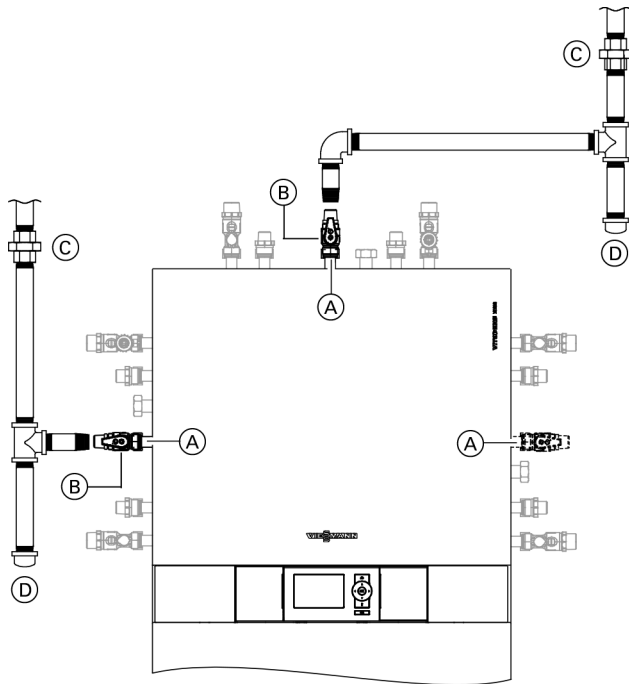
Use an approved pipe sealant or teflon tape when connecting the following installation fittings.

2 imperfect threads



Leave 2 threads bare

**Connections** *(continued)*



**Legend**

- (A) Gas connection  $\varnothing$  3/4 in. (NPT)
- (B) Accessible manual gas shutoff valve
- (C) Ground joint union
- (D) Drip leg

**Gas connection and piping**

1. Refer to current CAN/CSA B149.1 and .2 or National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes for gas piping requirements and sizing. Pipe size to the boiler must be determined based on:
  - pipe length
  - number of fittings
  - type of gas
  - maximum input requirements of all gas appliances in the residence.

**IMPORTANT**

Design piping layout in such a way that piping does not interfere with serviceable components.

**IMPORTANT**

The Vitodens 222-F B2TB has a factory pre-installed flexible gas line for left, right or vertical installation.

2. Before connecting boiler to gas line, install ground joint union, capped drip leg and a manual equipment shutoff valve as shown. Valves must be listed by a nationally recognized testing agency. Make boiler gas connection as shown (choose one of three locations).
3. Perform gas piping pressure test as described in the following subsection.

**IMPORTANT**

**Max. gas supply pressure: 14 "w.c.**

4. Identify shutoff valves as such with a tab and familiarize operator / ultimate owner of boiler with these valves.



See Vitodens 222-F B2TB Service Instructions for applicable system coding information.

**WARNING**

The gas supply piping must be leak tested before placing the boiler in operation.

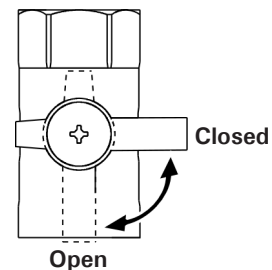
**CAUTION**

Ensure that gas piping is large enough for all appliances in the residence. No noticeable gas pressure drop in the gas line must occur when any unit (or combination of units) lights or runs.

**Gas shut-off valve connection**

1. Make gas connections in accordance with codes CAN/CSA B149.1 and .2 or National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes.
2. Connect gas shutoff valve to the boiler gas connection.
3. Once connected close gas shutoff valve on boiler.

**Manual gas shutoff**



**Connections** *(continued)***Gas piping pressure test**

When performing the gas piping pressure test, ensure the following requirements are met.

**WARNING**

Never check for gas leaks with an open flame.

**WARNING**

Exposing boiler gas pressure regulator and gas valve to extreme pressures renders warranty null and void.

**IMPORTANT**

$\frac{1}{2}$  psig = 14 "w.c.

1. Isolate the boiler from the gas supply piping system using the individual manual shutoff valve during pressure tests equal to or less than  $\frac{1}{2}$  psig (14 "w.c.)
2. The boiler and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of  $\frac{1}{2}$  psig (14 "w.c.)
3. Perform leak test.  
Use approved liquid spray solution for bubble test. Ensure that no liquid is sprayed on any electrical components, wires or connectors. Do not allow leak detection fluid to contact gas valve regulator or regulator vent opening.
4. Correct any and all deficiencies.
5. Remove air from gas line.

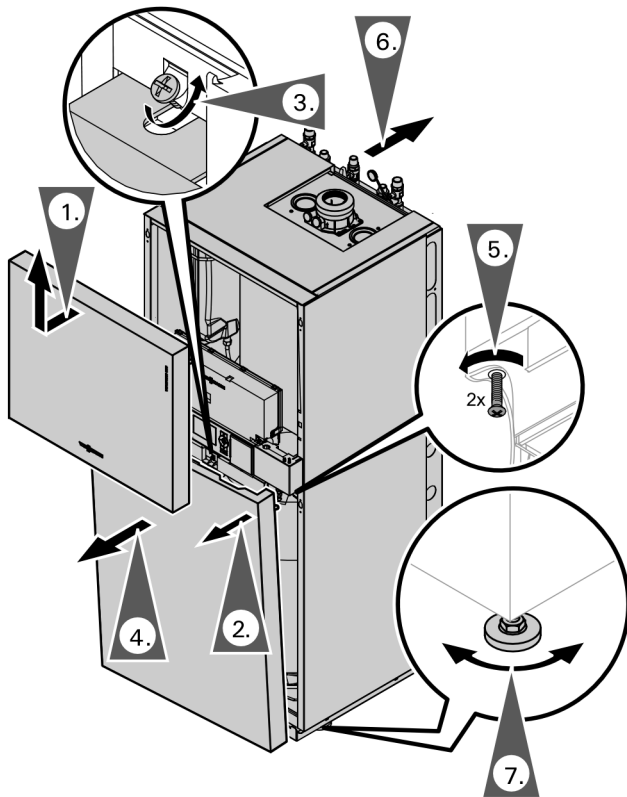
**Flue gas connection**

Connect the balanced flue.



See Venting Installation Instructions.



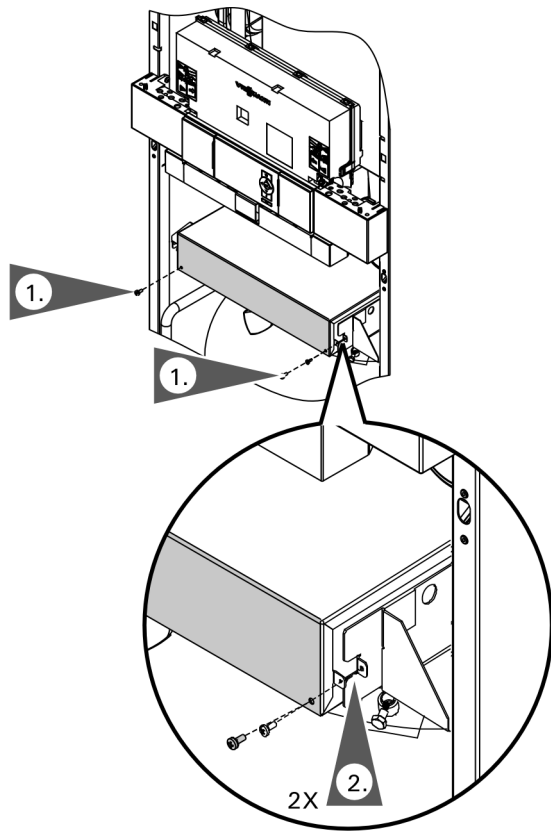
**Connections** *(continued)***Removing the front panels**

1. Remove the front upper panel.
2. Tilt the lower front panel.
3. Remove the retaining screw and set aside.
4. Lift up and out to remove the lower front panel.
5. Loosen the screws at the bottom of the boiler as shown (do not remove completely).
6. Move the boiler to the location where it is to be installed.
7. Using the adjustable legs level the unit.

**CAUTION**

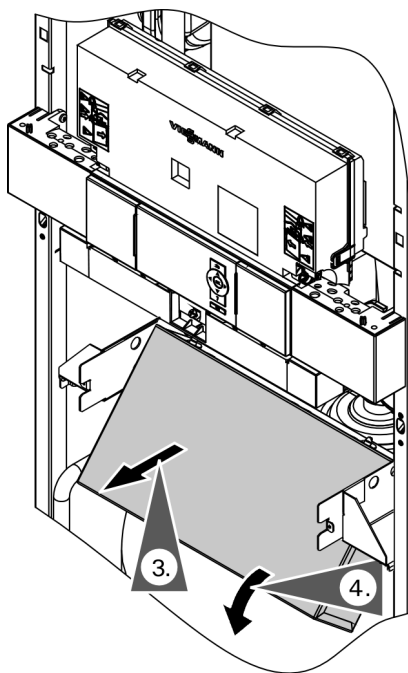
The boiler must be level both vertically and horizontally to ensure proper draining of the condensate.

**Connections** *(continued)*



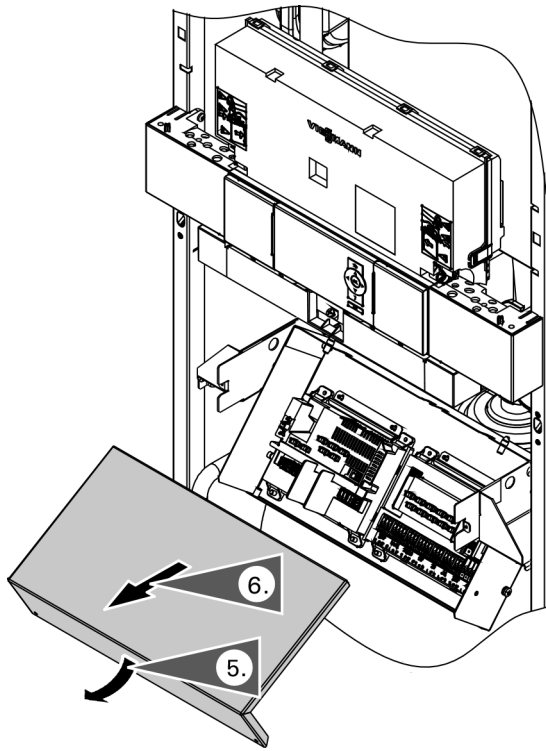
**Accessing the control unit connections**

1. Remove both screws from the external accessory connection box front plate and set aside.
2. Remove both retaining screws as shown and set aside.

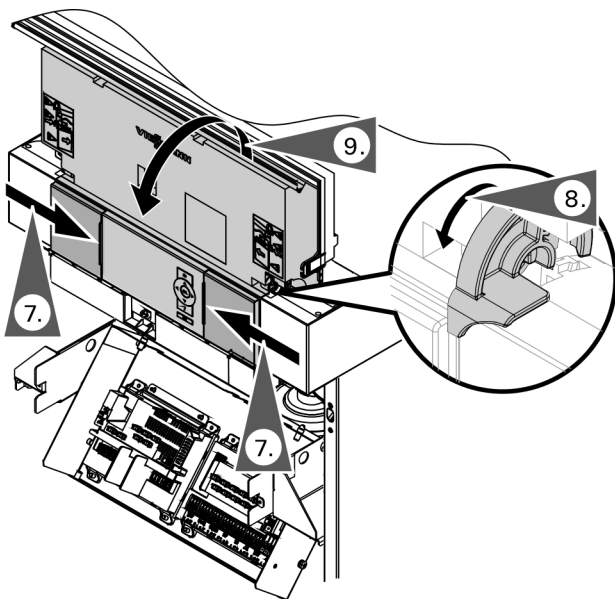


3. Pull the external accessory connection box forward.
4. Swing the external accessory connection box down.

**Connections** *(continued)*

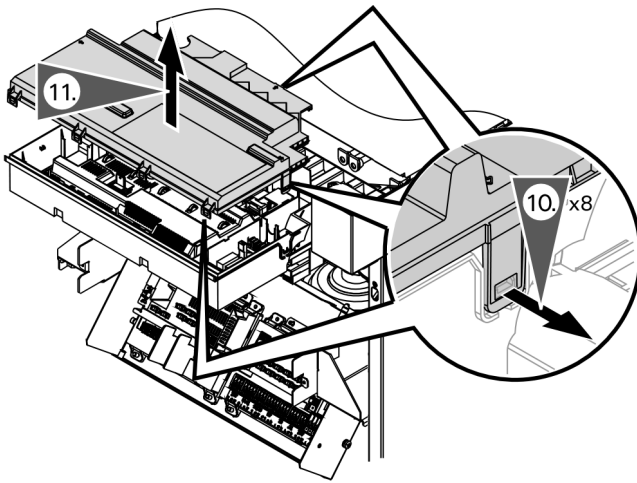


5. Tilt the bottom of the external accessory connection box cover forward.
6. Pull the cover up to clear the locating pins and out to remove, then set aside.

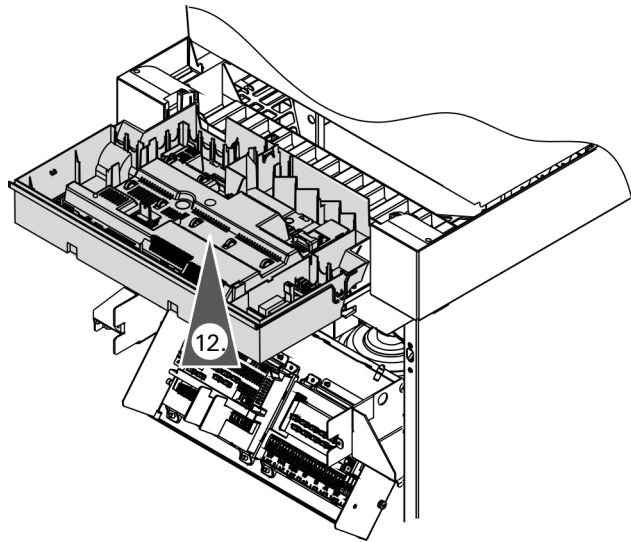


7. Slide both sides of the programming unit cover closed.
8. Release the hinged hooks located on both sides of the control console.
9. To open hinged cover, lift cover and then fold down the control console.

**Connections** *(continued)*



- 10. Release locking tabs as shown.
- 11. Remove cover.



- 12. Route all connecting cables to the appropriate areas and secure the cables to the control base using existing strain reliefs as shown.

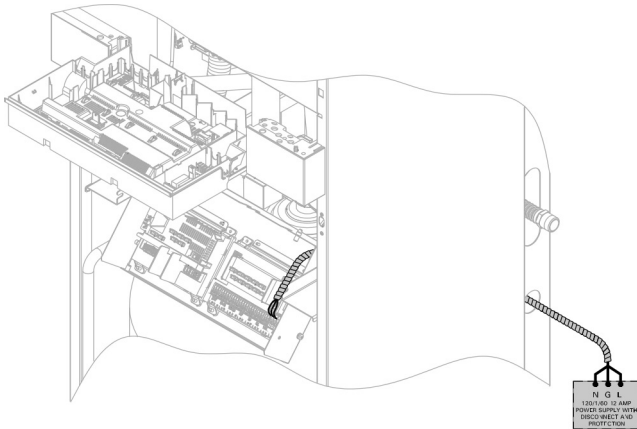
**! CAUTION**

When running and securing connecting cables on site, ensure that the maximum permissible temperatures of the cables are not exceeded.



Electronic modules can be damaged by electrostatic discharges. Before commencing work, touch grounded objects (such as heating or water pipes) to discharge static loads.

**Connections** *(continued)*



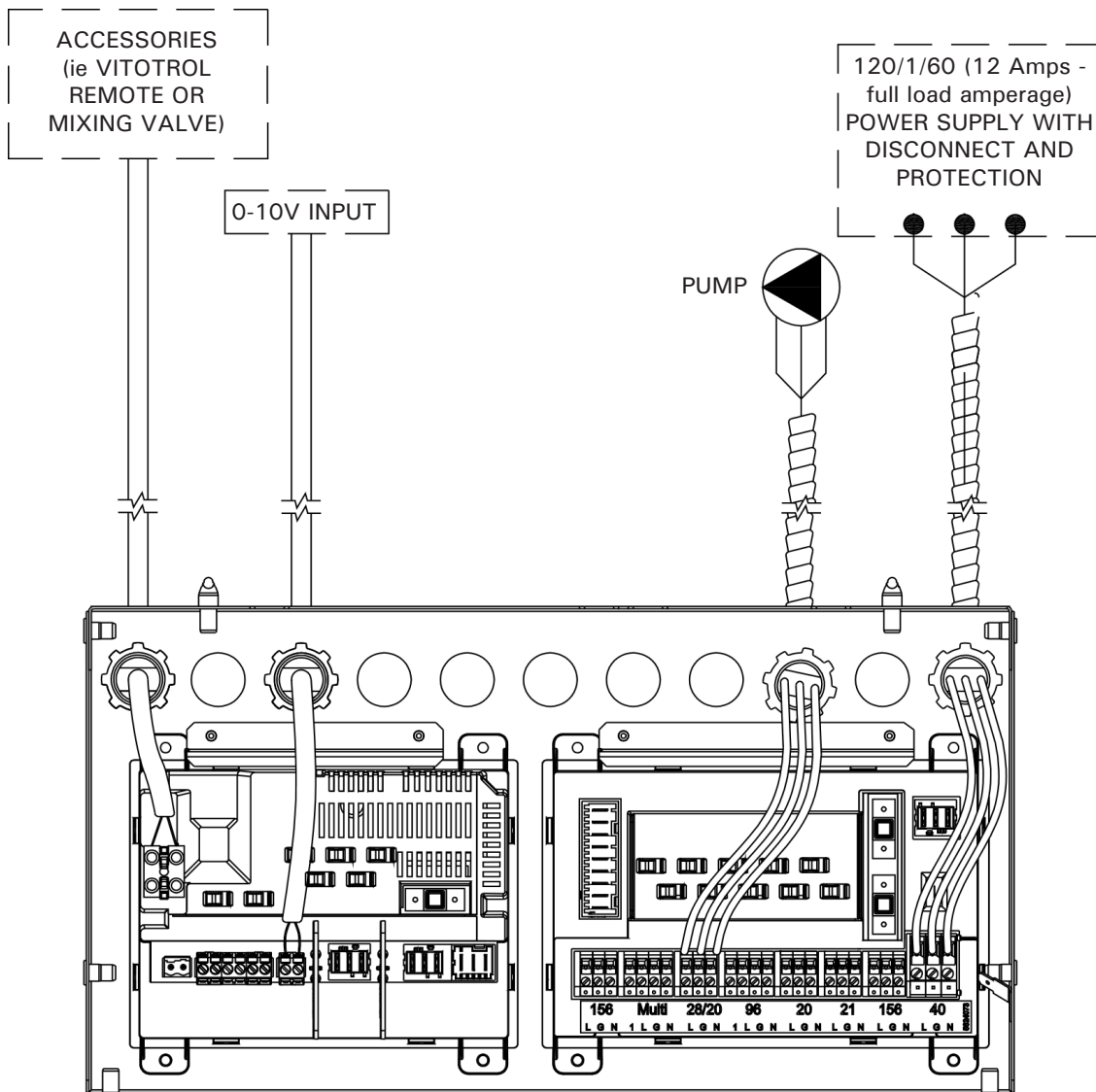
**External accessory connection box**

**Note:** See wiring diagram on page 41 for connection to the control base.

**IMPORTANT**

Electrical installations must comply with the latest edition of:

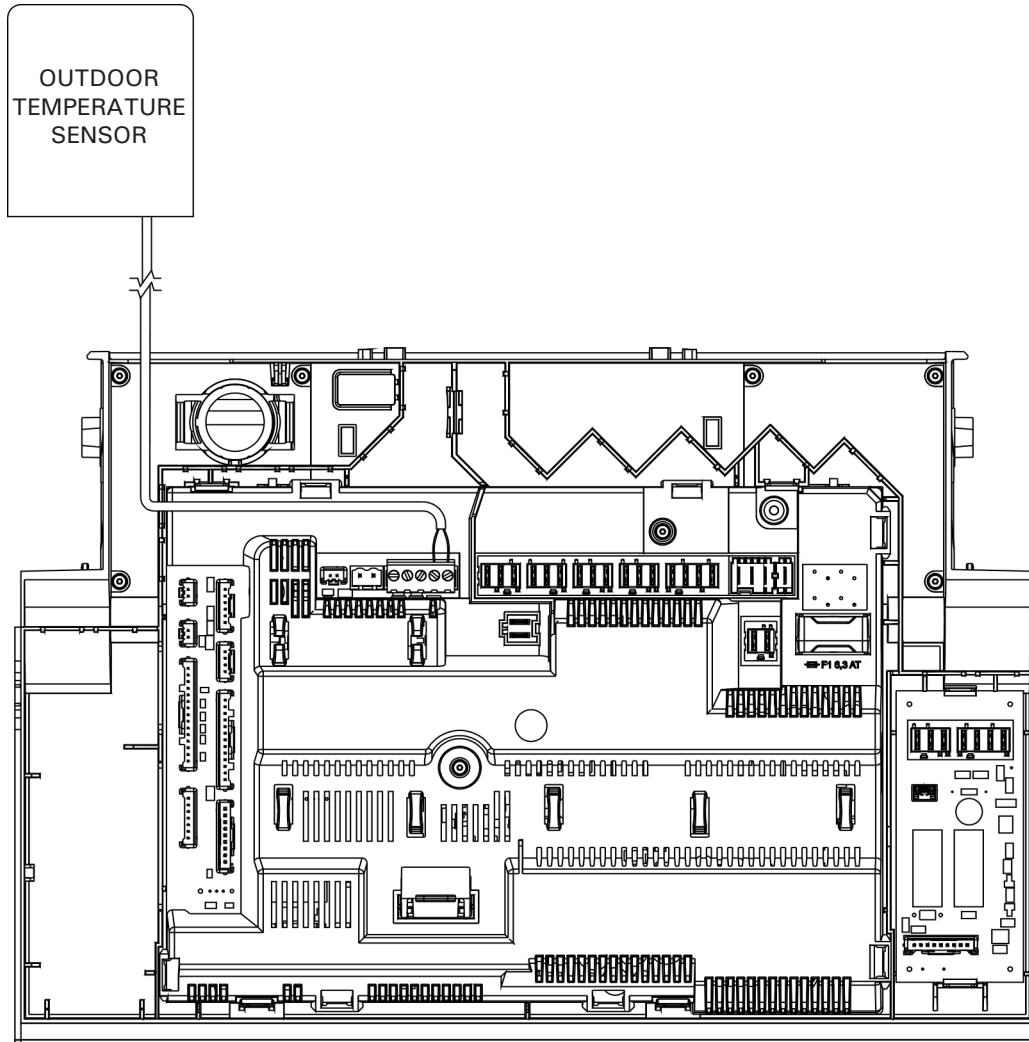
- In the U.S.A., the National Electrical Code (NEC), ANSI/NFPA 70 and any other state, local codes and/or regulations.
- In Canada, the Canadian Electrical Code (CEC), CSA C22.1 Part 1 and any other province, territory, local codes and/or regulations.



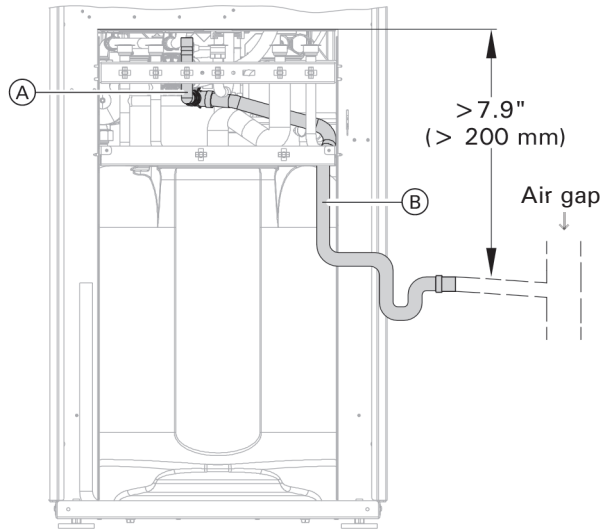
**Connections** *(continued)*

**Boiler control base**

**Note:** See wiring diagram on page 20 for connection to the external accessory connection box.



**Preparing for Installation**



**Condensate connection**

The Vitodens 222-F B2TB boiler comes with a built-in condensate trap. An external trap is not required when connecting the field drain to flexible discharge tubing. Discharge tubing (field supplied) must be of 1 in. (25 mm) diameter.

Use CPVC, PVC or other material approved by codes listed below.

The drain pipe and fittings must conform to ANSI standards and ASTM D1785 or D2846. CPVC or PVC cement and primer must conform to ASTM D2564 or F493. In Canada use CSA or ULC listed schedule 40 CPVC or PVC drain pipe, fittings and cement.

If the condensate outlet of the Vitodens 222-F B2TB boiler is lower than the drain, a condensate pump must be installed. Select a pump which is approved for condensing boiler applications. To avoid condensate spillage, select a pump with an overflow switch. The drain connection must terminate into an open or vented drain as close to the boiler as possible to prevent siphoning of the boiler drain.

1. Install the condensate drain pipe with a suitable gradient. Pull the condensate hose far out of the boiler that no unnecessary bends are created inside the boiler. Check tightness of siphon connection (A).

**IMPORTANT**

As shipped, the flexible discharge tubing (B) will be found to be pushed up inside the boiler housing. Ensure the condensate drain pipe is pulled down and positioned to allow the condensate to properly drain.

2. Discharge condensate from the boiler into the drainage system, either directly or (if required) via a neutralization unit (accessory).



Installation Instructions of Neutralization Unit (if applicable)

**IMPORTANT**

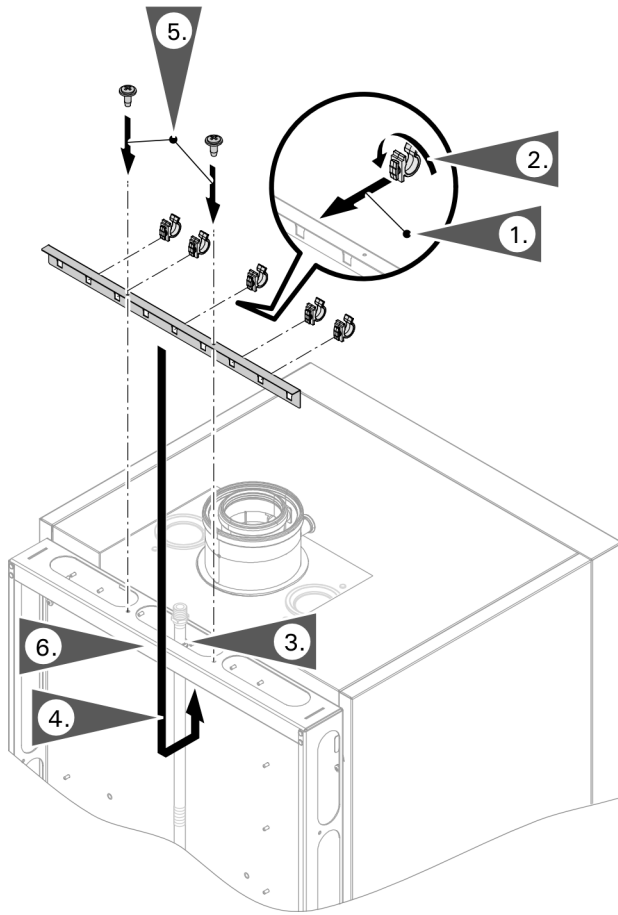
Pipe ventilation must take place between the siphon trap and the neutralization unit (if applicable).

**IMPORTANT**

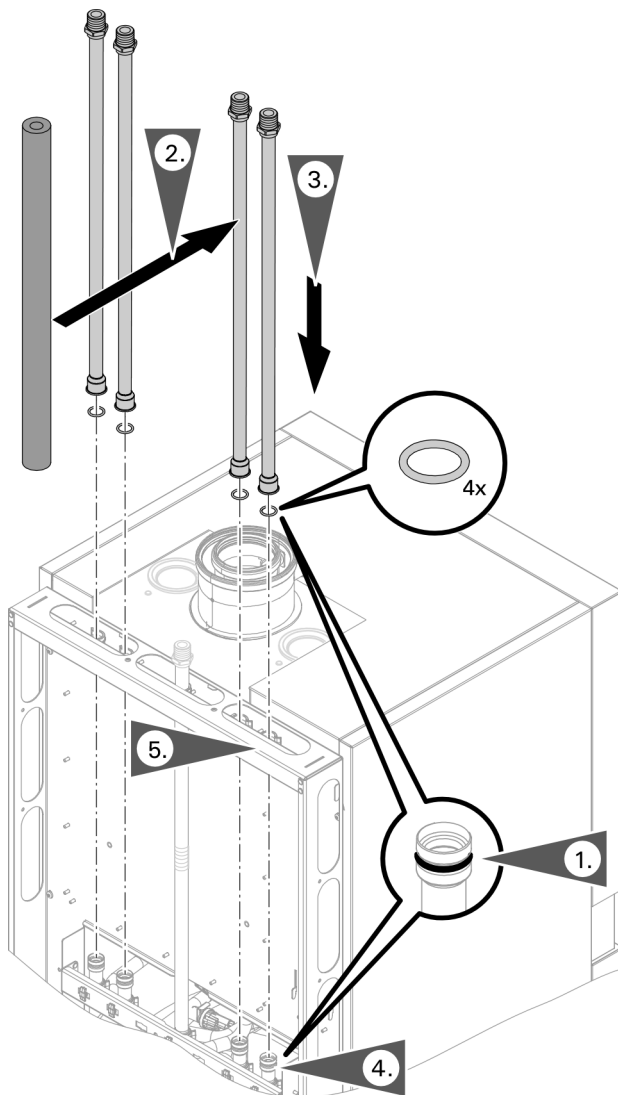
Do not connect the drain pipe from any other appliance, such as water softener backwash pipe, to Vitodens condensate drain pipe.



## Vertical Piping Installation

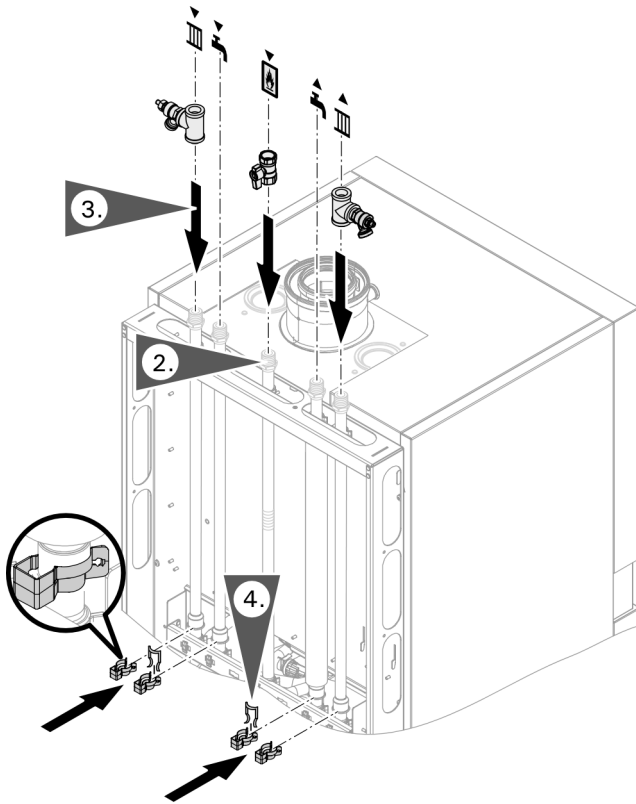


1. Install the restraining rings to the restraining bar (note their position).
2. Rotate the restraining rings  $\frac{1}{4}$  turn to lock into place (the ring opening should be facing to the side).
3. Remove the tie-wrap holding the factory installed gas line.
4. Place the restraining bar (with rings) under the rear boiler frame.
5. Align the mounting holes in the boiler frame and restraining bar and secure in place with screws provided.
6. Remove the tie wrap and lock the top of the gas line into the centre restraining ring.

**Vertical Piping Installation** *(continued)*

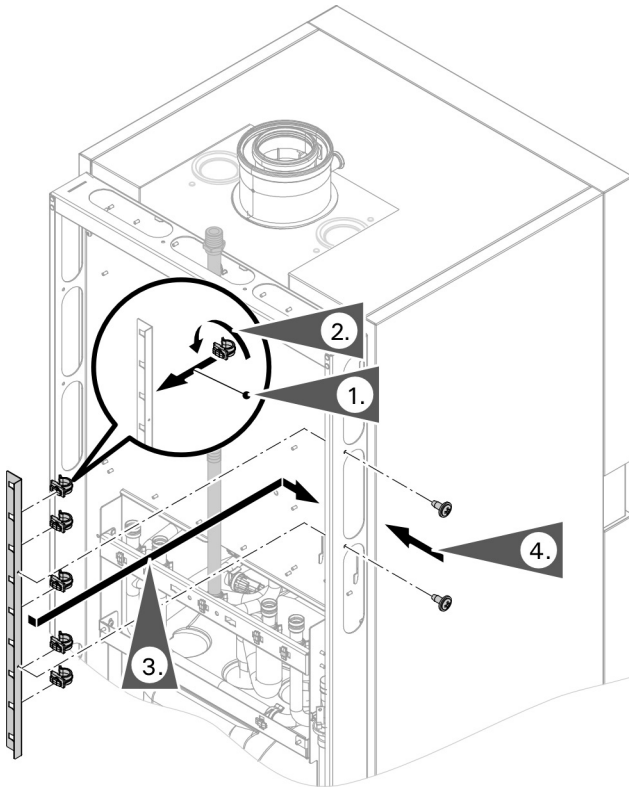
1. Install the O-rings over the male connection boiler fittings. Ensure that the O-rings are properly seated in the groove.
2. Slide the insulation sleeve over the DHW pipe (as shown).
3. Install the pipes through the top cutouts of the boiler.
4. Align the pipes to the boiler fittings and push from the top until snug.
5. Secure the ends of the pipes into the appropriate restraining rings.

**Vertical Piping Installation** *(continued)*



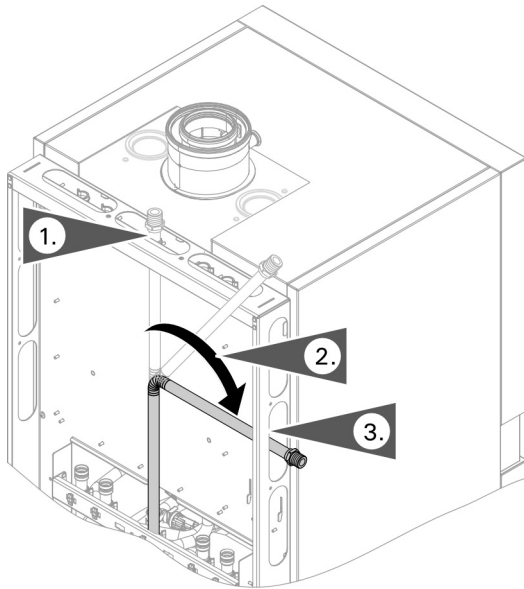
1. Install the supplied locking clips over the bottom boiler connection and pipes.
2. Remove the cap from the factory installed gas line.
3. Install the supplied tees, drain valves and gas valve as shown.
4. Install security clips to the DHW pipe retaining clips.

## Side Piping Installation



1. Install the restraining rings to the restraining bar (note their position).
2. Rotate the restraining rings  $\frac{1}{4}$  turn to lock into place (the ring opening should be facing down).
3. Place the restraining bar (with rings) to the side boiler frame.
4. Align the mounting holes in the boiler frame and restraining bar and secure in place with screws provided.

**Side Piping Installation** *(continued)*

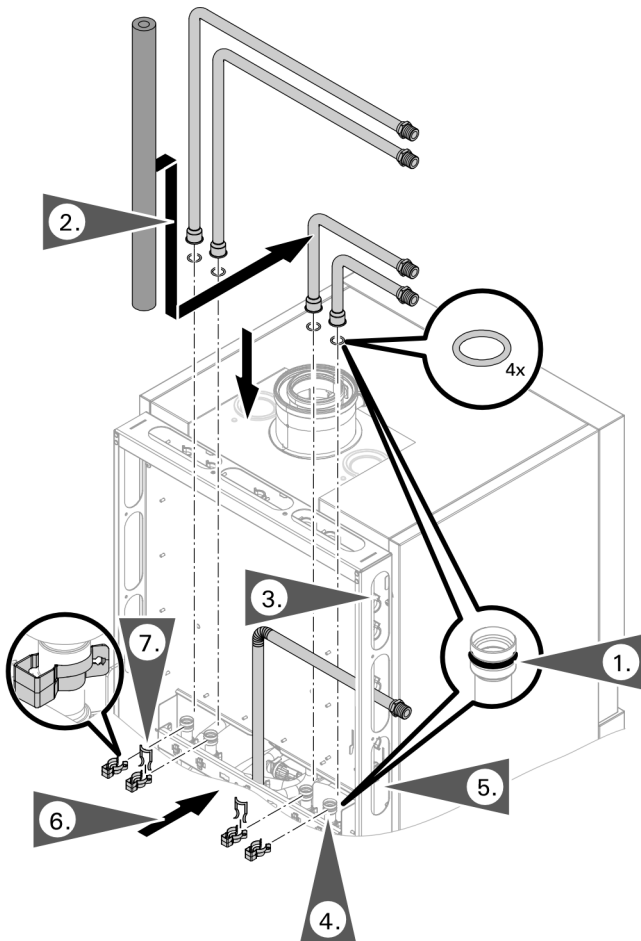


1. Remove the tie-wrap holding the factory installed gas line.
2. Gently form the flexible gas line by bending the gas line at the middle to the desired side .

**IMPORTANT**

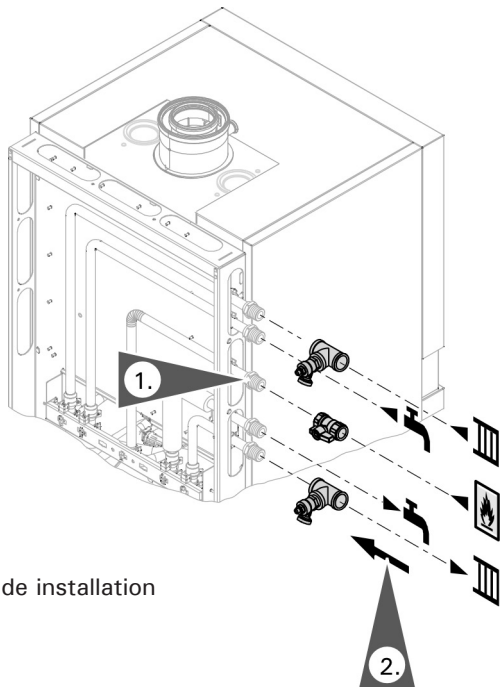
Ensure not to kink the gas line during bending.

3. Secure the gas line to the centre restraining ring.



1. Install the O-rings over the male connection boiler fittings. Ensure that the O-rings are properly seated in the groove.
2. Slide the insulation sleeve over the DHW pipe (as shown).
3. Install the pipes through the side cutouts of the boiler.
4. Align the pipes to the boiler fittings and push from the top until snug.
5. Secure the ends of the pipes into the appropriate restraining rings.
6. Install the supplied locking clips over the bottom boiler connection and pipes.
7. Install security clips to the DHW pipe retaining clips.

**Side Piping Installation** *(continued)*

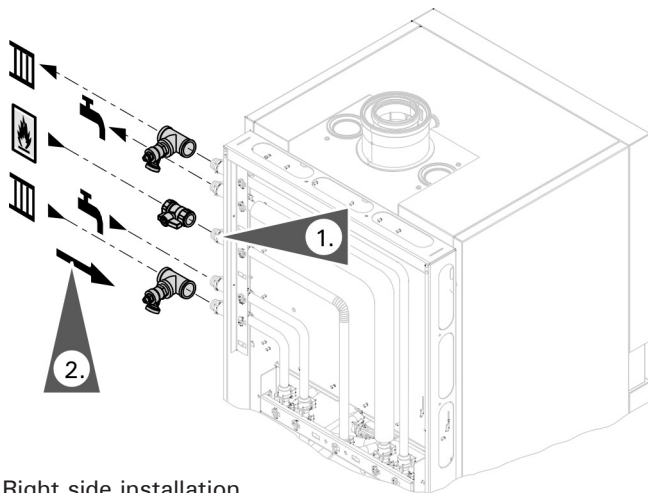


Left side installation

1. Remove the cap from the factory installed gas line.
2. Install the supplied tees, drain valves and gas valve as shown.

**Installing boiler safety devices**

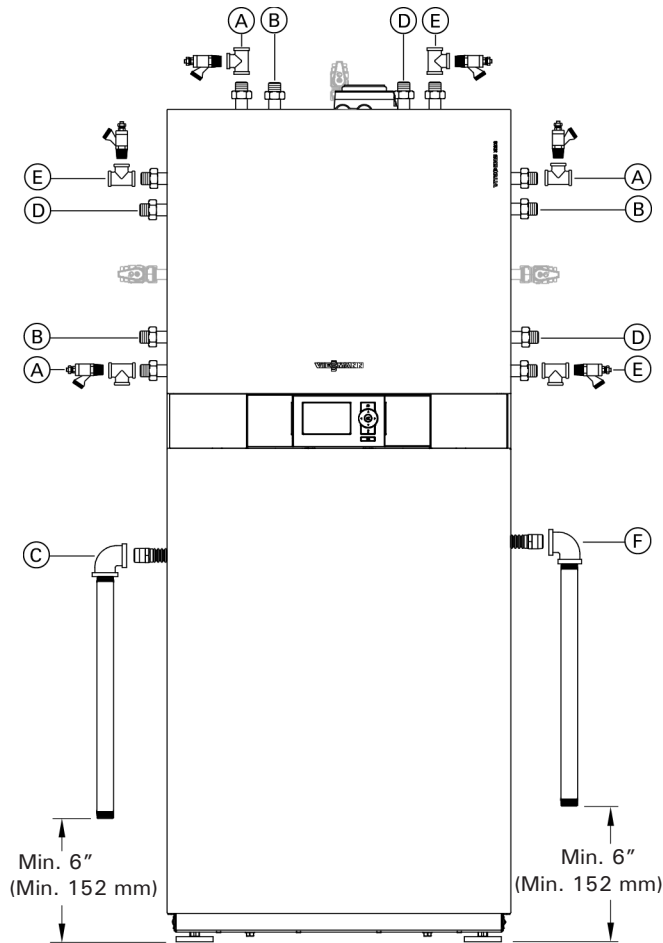
1. Remove the pressure relief valve, drain valve and fittings from the box.
2. Apply sufficient amount of pipe sealant to both ends of all pipe fittings and install onto tees.
3. Install pressure relief valve and Isolation valve and tighten them.
4. Install discharge pipe on pressure relief valve in such a way that...
  - the end of the pipe is not threaded.
  - the pressure relief discharge pipe extends to a floor drain and ends approximately 6 in. (150 mm) above the drain.
 Ensure that...
  - there is no shutoff valve installed in the discharge pipe.
  - discharge pipe diameter is not reduced.
  - discharge is not piped to outdoors.



Right side installation

1. Remove the cap from the factory installed gas line.
2. Install the supplied tees, drain valves and gas valve as shown.

# Safety Connections



### Low water cut-off

A low water cut-off may be required by local codes. Do not install an isolation valve between boiler and low water cut-off.

## **WARNING**

Exposing the boiler to pressures and temperatures in excess of those listed will result in damages, and will render warranty null and void.

Operating pressure.....2 bar (30 psig)  
 Max. allowable working pressure (MAWP)..3 bar (45 psig)  
 Max. boiler water temperature.....210°F (99°C)

### Legend

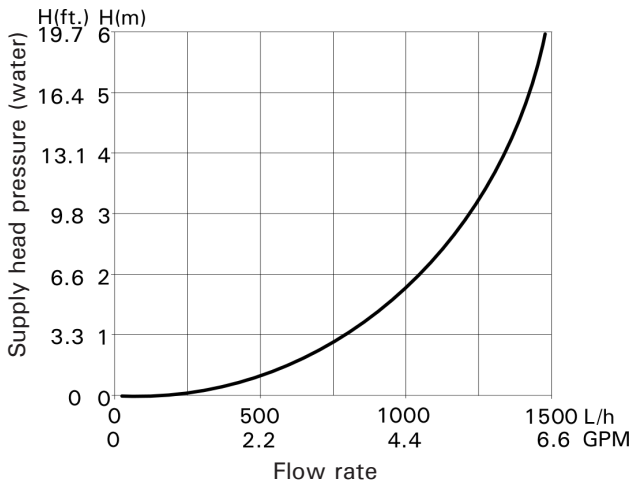
- (A) Heating supply NPT ¼ in.
- (B) DHW NPT ¼ in.
- (C) Pressure relief valve discharge pipe NPT ¼ in.
- (D) DCW NPT ¼ in.
- (E) Heating return NPT ¼ in.
- (F) Temperature and pressure relief valve discharge pipe NPT ¼ in.

## **WARNING**

Do not install an isolation valve between boiler and pressure relief valve.  
 The discharge pipe for the pressure relief valve must be oriented to prevent scalding of attendants.  
 Pipe pressure relief valve discharge pipe close to floor drain. Never pipe discharge pipe to the outdoors.



**Waterside Flow**



Pressure drop (primary circuit) for Vitodens 222-F, B2TB 19, 35, 68, 125

**Waterside flow (primary circuit)**

The Vitodens 222-F, B2TB is designed for closed loop, forced circulation hot water heating systems only.

Use standard friction loss method for pipe sizing. Observe boiler maximum and minimum flow rate limitations. If system flow rate exceeds boiler maximum flow rate (as stated above), falls below the minimum flow rate or if system flow rate is unknown, Viessmann strongly recommends the installation of a low-loss header.

Once the low-loss header is connected, the built-in low-loss header logic of the Vitodens 222-F boiler ensures the required  $\Delta t$  across the system through the sensory communication between the low-loss header and the boiler.

An alternative method may be used, such as primary secondary piping using closely spaced tees. A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann therefore strongly recommends and prefers the use of a low-loss header over closely spaced tees. Refer to the Technical Data manual for low-loss header information.

Boiler maximum flow rate 6.2 GPM (1400 L/h)

<b>Model B2TB 19, 68</b>		<b>1 boiler</b>
Output (NG/LPG)		
	MBH	64
System $\Delta t$ for NG/LPG		
20°F (11°C) rise	GPM (L/h)	6.4 (1453)
25°F (14°C) rise	GPM (L/h)	5.1 (1163)
30°F (17°C) rise	GPM (L/h)	4.3 (969)
35°F (19.5°C) rise	GPM (L/h)	3.7 (830)
40°F (22°C) rise	GPM (L/h)	3.2 (727)

Boiler maximum flow rate 6.2 GPM (1400 L/h)

<b>Model B2TB 35, 125</b>		<b>1 boiler</b>
Output (NG/LPG)		
	MBH	117
System $\Delta t$ for NG/LPG		
20°F (11°C) rise	GPM (L/h)	11.7 (2657)
25°F (14°C) rise	GPM (L/h)	9.4 (2126)
30°F (17°C) rise	GPM (L/h)	7.8 (1771)
35°F (19.5°C) rise	GPM (L/h)	6.7 (1518)
40°F (22°C) rise	GPM (L/h)	5.9 (1328)

## Installation Examples

Please note that in the following piping layout examples all pumps external to the boiler are field supplied.

### IMPORTANT

DHW tank, heat exchanger, diverting valve and DHW circulating pump are installed in the unit with all the connections between components.

DHW connecting fittings inlet and outlet are  $\frac{3}{4}$  in. NPT.

DHW tank is protected with temperature pressure relief valve at 150 psi and discharge outlet of the valve is  $\frac{3}{4}$  in. NPT.

Operation of the DHW system is controlled by the boiler control.

### IMPORTANT

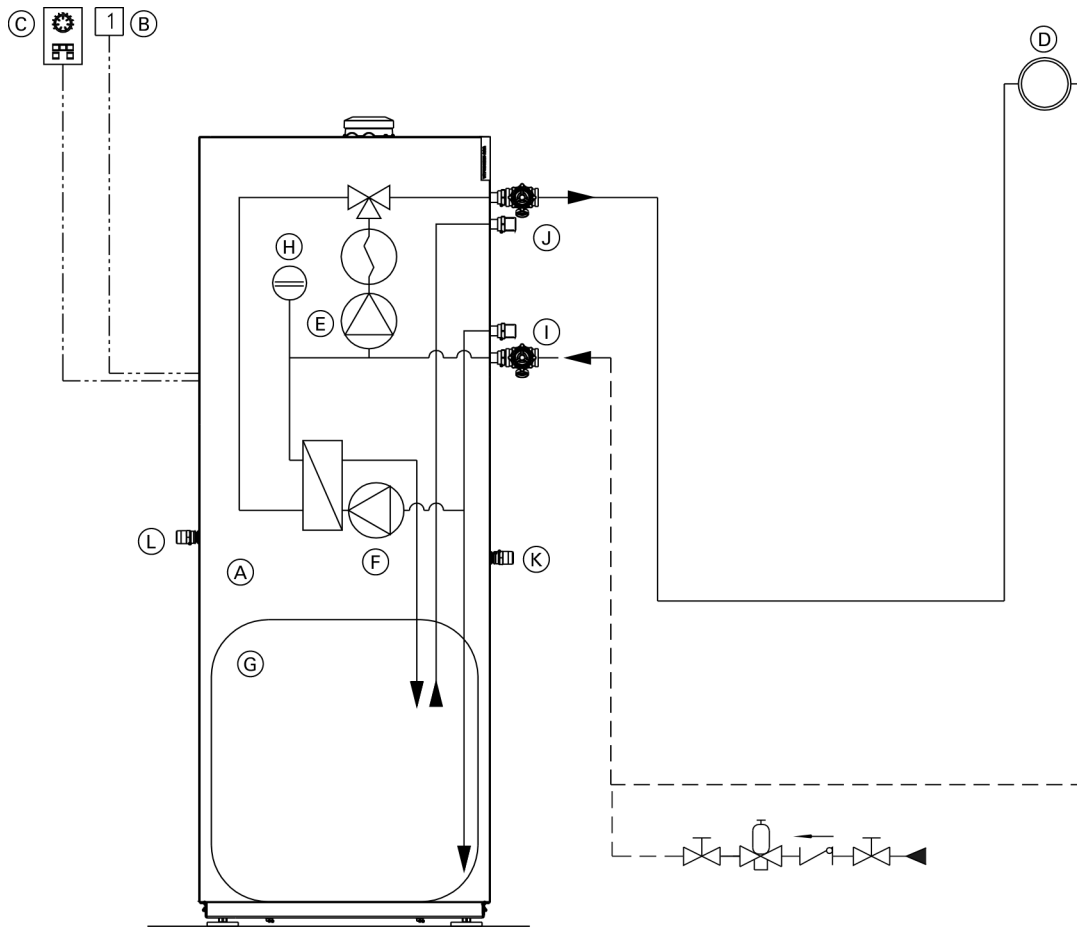
The examples on the following pages depict possible piping layouts of the Vitodens 222-F boiler equipped with Viessmann System Technology.

Please note that the following examples are simplified conceptual drawings only!

Piping and necessary componentry must be field verified. A low water cut-off (LWCO) must be installed where required by local codes.

Proper installation and functionality in the field is the responsibility of the heating contractor.

Vitodens 222-F, B2TB with a direct-connected heating circuit with integrated DHW production



**Legend**

- Ⓐ Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- Ⓑ Outdoor temperature sensor 1
- Ⓒ Vitotrol remote (optional)
- Ⓓ Heating circuit
- Ⓔ Boiler pump 20
- Ⓕ DHW circulating pump 21
- Ⓖ DHW storage tank
- Ⓗ Integral expansion tank
- Ⓙ DCW inlet
- ⓵ DHW outlet
- Ⓚ Temperature and pressure relief valve outlet
- Ⓛ Pressure relief valve outlet

Installation of ...

- radiator heating circuit (high-temp. circuit)
- DHW production

... with the following flow conditions:

The flow rate of the heating circuit is less than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler (see page 30 for maximum water flow rate of boiler).

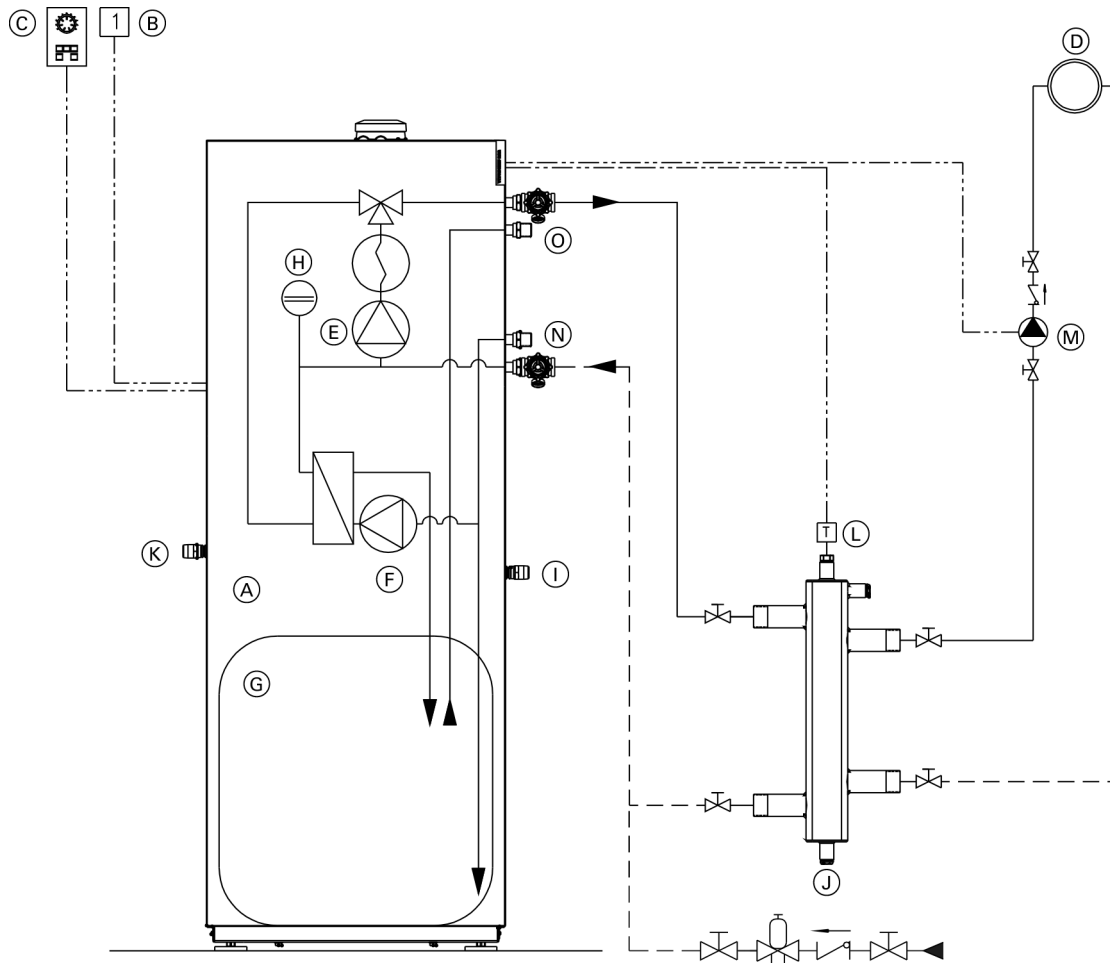
The use of a low-loss header is strongly recommended if the maximum water flow rate in the application concerned exceeds the values shown in the applicable table on page 30, or if the system flow rates are unknown.

The low-loss header is available as accessory part.

See following pages for installation examples with a low-loss header.

## System Layout 2

Vitodens 222-F, B2TB with one heating circuit, low-loss header and integrated DHW production



### Legend

- (A) Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- (B) Outdoor temperature sensor 1
- (C) Vitotrol remote (optional)
- (D) Heating circuit
- (E) Boiler pump 20
- (F) DHW circulating pump 21
- (G) DHW storage tank
- (H) Integral expansion tank
- (I) Temperature and pressure relief valve outlet
- (J) Low-loss header
- (K) Pressure relief valve outlet
- (L) Viessmann temperature sensor for low-loss header 2
- (M) Heating circuit pump 28/20
- (N) DCW inlet
- (O) DHW outlet

### Installation of ...

- radiator heating circuit (high-temp. circuit)
- DHW production

... with the following flow conditions:

The flow rate of the heating circuit is greater than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler (see page 30 for maximum water flow rate of boiler).

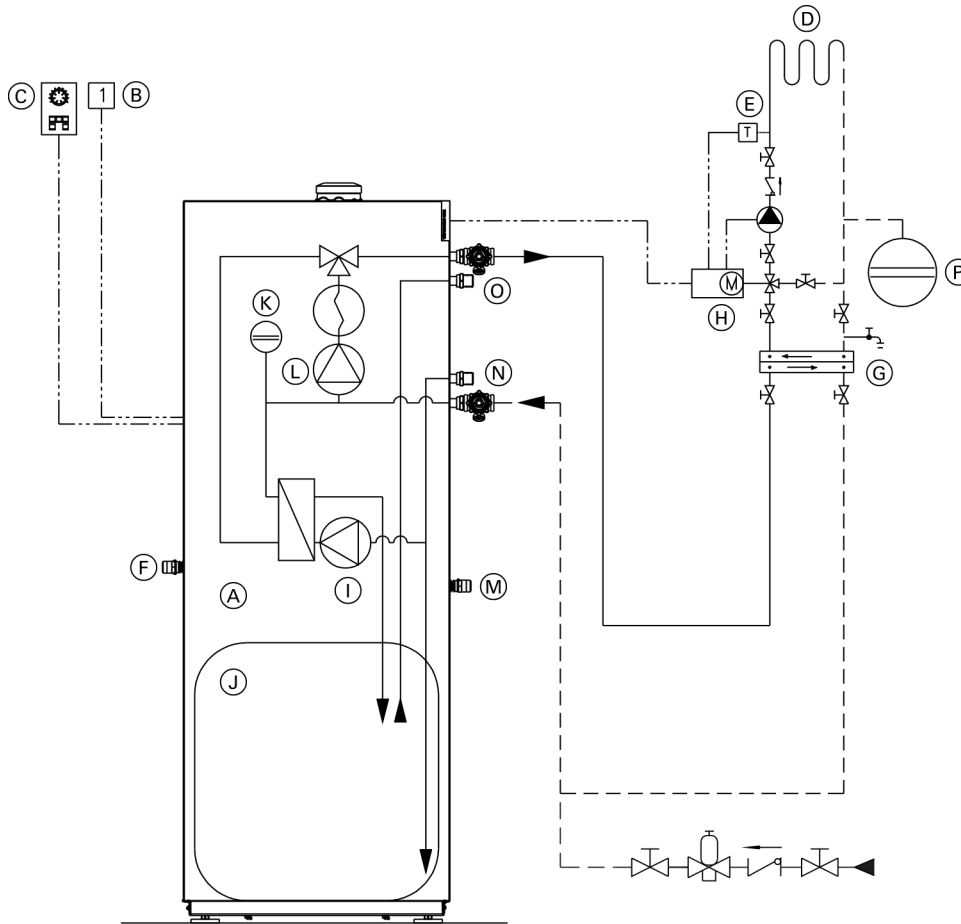
The use of a low-loss header is strongly recommended if the maximum water flow rate in the application concerned exceeds the values shown on page 30, or if the system flow rates are unknown.

The low-loss header is available as accessory part.

# System Layout 3

Vitodens 222-F, B2TB with...

- Integrated DHW production
- one heating circuit with mixing valve and system separation



**Legend**

- (A) Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- (B) Outdoor temperature sensor [1]
- (C) Vitotrol remote (optional)
- (D) Underfloor heating circuit
- (E) Mixing valve temperature sensor [2]
- (F) Pressure relief valve outlet
- (G) Plate heat exchanger for system separation
- (H) Accessory kit for heating circuit with mixing valve
- (I) DHW circulating pump [21]
- (J) DHW storage tank
- (K) Integral expansion tank
- (L) Boiler pump [20]
- (M) Temperature and pressure relief valve outlet
- (N) DCW inlet
- (O) DHW outlet
- (P) Expansion tank

Installation of ...

- underfloor heating circuit with 3-way mixing valve and system separation (low-temp. circuit)
- DHW production

... with the following flow conditions:

The flow rate of the heating circuit is less than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler.

See page 30 for maximum water flow rate of the Vitodens 222-F B2TB boilers. The use of a low-loss header is recommended if the system water flow rate is unknown. The low-loss header is available as accessory part.

See following pages for installation examples with a low-loss header.

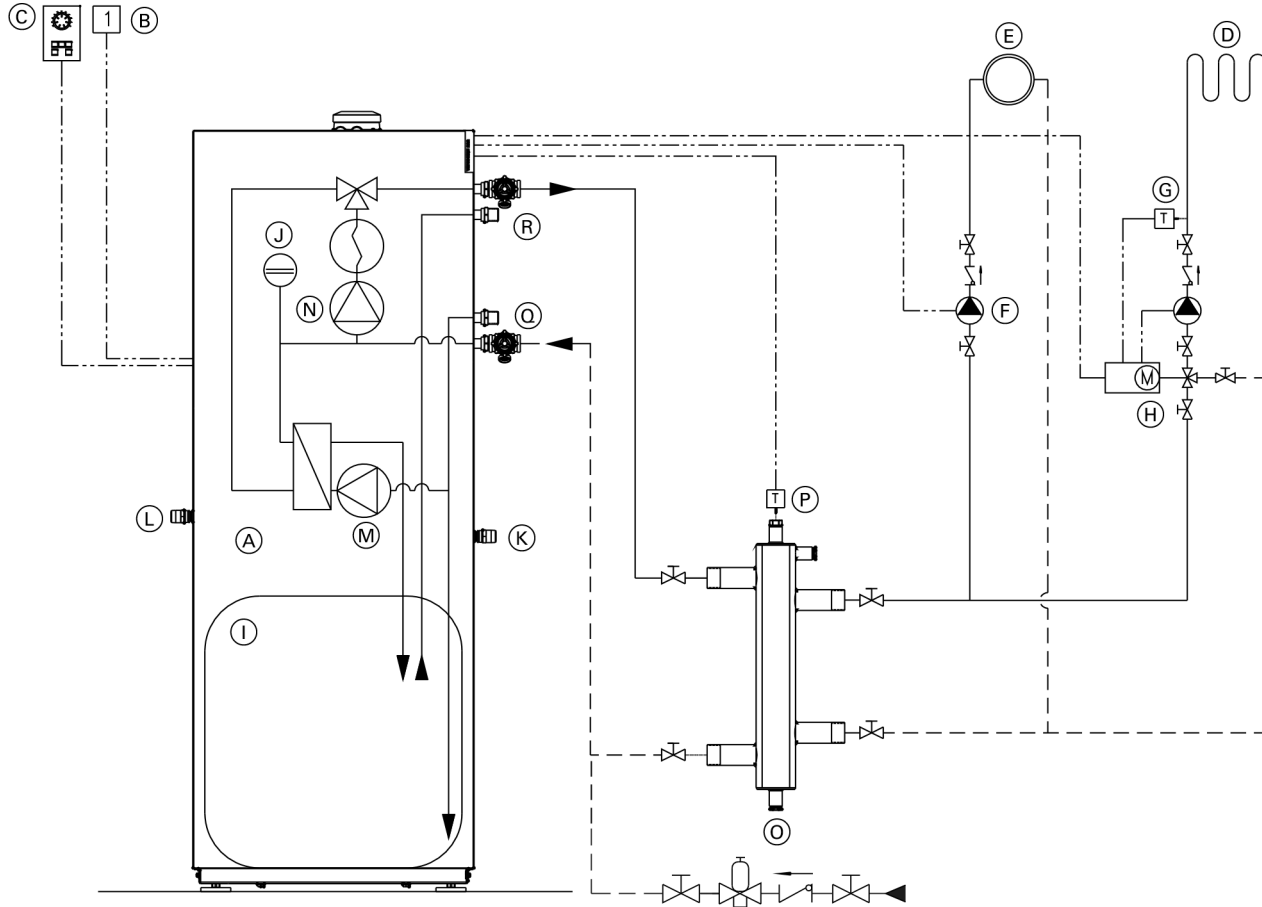
**IMPORTANT**

**System separation is required of underfloor heating systems employing non-oxygen diffusion barrier tubing. All components on the secondary side of the heat exchanger must be made of corrosion-resistant materials.**

# System Layout 4

Vitodens 222-F, B2TB with...

- Integrated DHW production
- one direct-connected heating circuit
- one heating circuit with a mixing valve



**Legend**

- (A) Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- (B) Outdoor temperature sensor 1
- (C) Vitotrol remote (optional)
- (D) Under floor heating circuit
- (E) Radiator heating circuit
- (F) Heating circuit pump 28/20
- (G) Mixing valve temperature sensor 2
- (H) Accessory kit for heating circuit with mixing valve
- (I) Domestic hot water storage tank
- (J) Integral expansion tank
- (K) Temperature and pressure relief valve outlet
- (L) Pressure relief valve outlet
- (M) DHW circulating pump 21
- (N) Boiler pump 20
- (O) Low-loss header
- (P) Low-loss header sensor 2
- (Q) DCW inlet
- (R) DHW outlet

**Installation of different heating circuits...**

- radiator heating circuit (high-temp. circuit)
- under floor heating circuit with 3-way mixing valve (low-temp. circuit)
- DHW production

... with the following flow conditions:

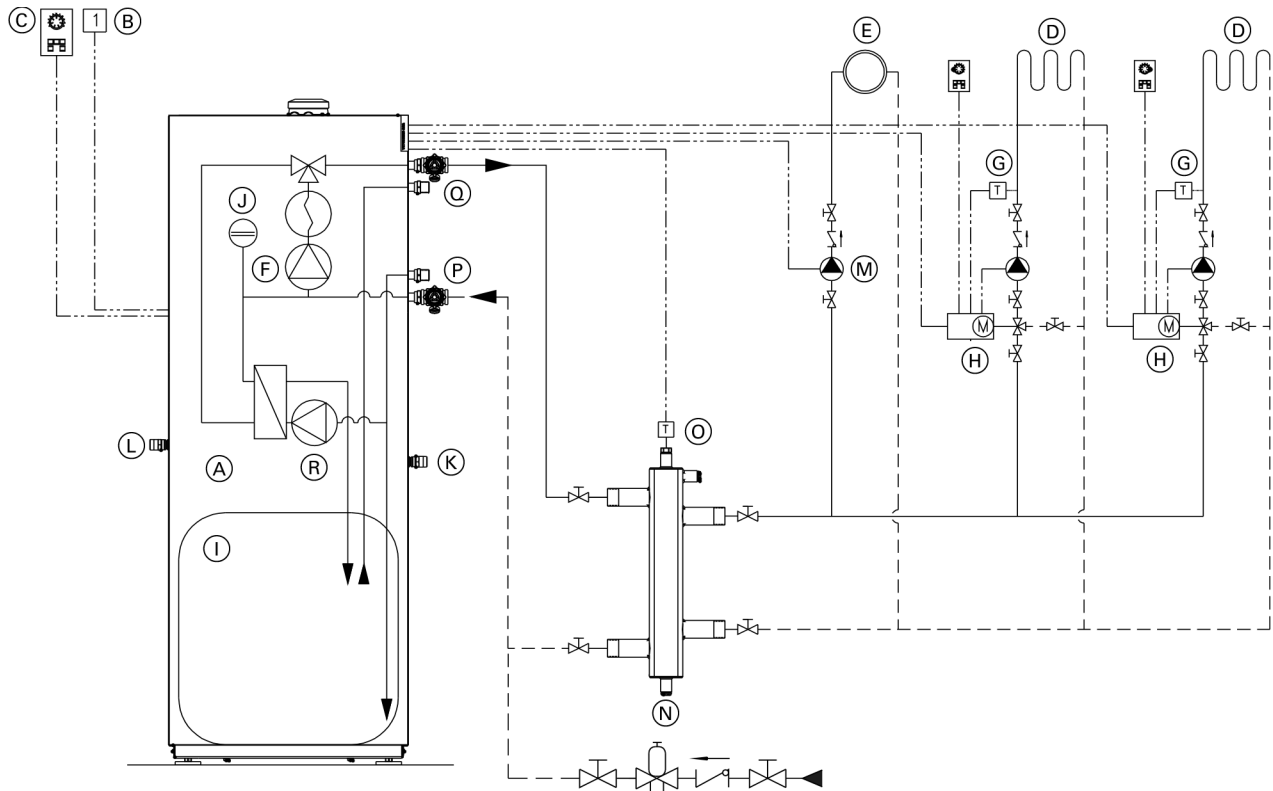
1. The water flow rate (output) of the radiator heating circuit is at least 30% greater than that of the under floor heating circuit.
2. The total flow rate of the two heating circuits is less than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler (see page 30 for max. water flow rate).  
The use of a low-loss header is strongly recommended if the maximum water flow rate in the application concerned exceeds the values shown on page 30, or if the system flow rates are unknown. The low-loss header is available as accessory part.

The 3-way mixing valve, built-in to achieve the low-temperature level of the under floor heating circuit, is controlled by an accessory kit for a heating circuit with mixing valve.

# System Layout 5

Vitodens 222-F, B2TB with...

- Integrated DHW production
- one heating circuit with mixing valve
- one heating circuit without mixing valve and low-loss header



### Legend

- (A) Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- (B) Outdoor temperature sensor [1]
- (C) Vitotrol remote (optional)
- (D) Under floor heating circuit
- (E) Radiator heating circuit
- (F) Boiler pump [20]
- (G) Mixing valve temperature sensor [2]
- (H) Kit for heating circuit with mixing valve
- (I) Domestic hot water storage tank
- (J) Integral expansion tank
- (K) Temperature and pressure relief valve outlet
- (L) Pressure relief valve outlet
- (M) Heating pump [28/20]
- (N) Low-loss header
- (O) Viessmann temperature sensor for low-loss header [2]
- (P) DCW inlet
- (Q) DHW outlet
- (R) DHW circulating pump [21]

### Installation of different heating circuits...

- radiator heating circuit (high-temp. circuit)
- under floor heating circuit with 3-way mixing valve (low-temp. circuit)
- DHW production

... with the following flow conditions:

The total flow rate of the two heating circuits is greater than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler (see page 30 for maximum water flow rate of boiler).

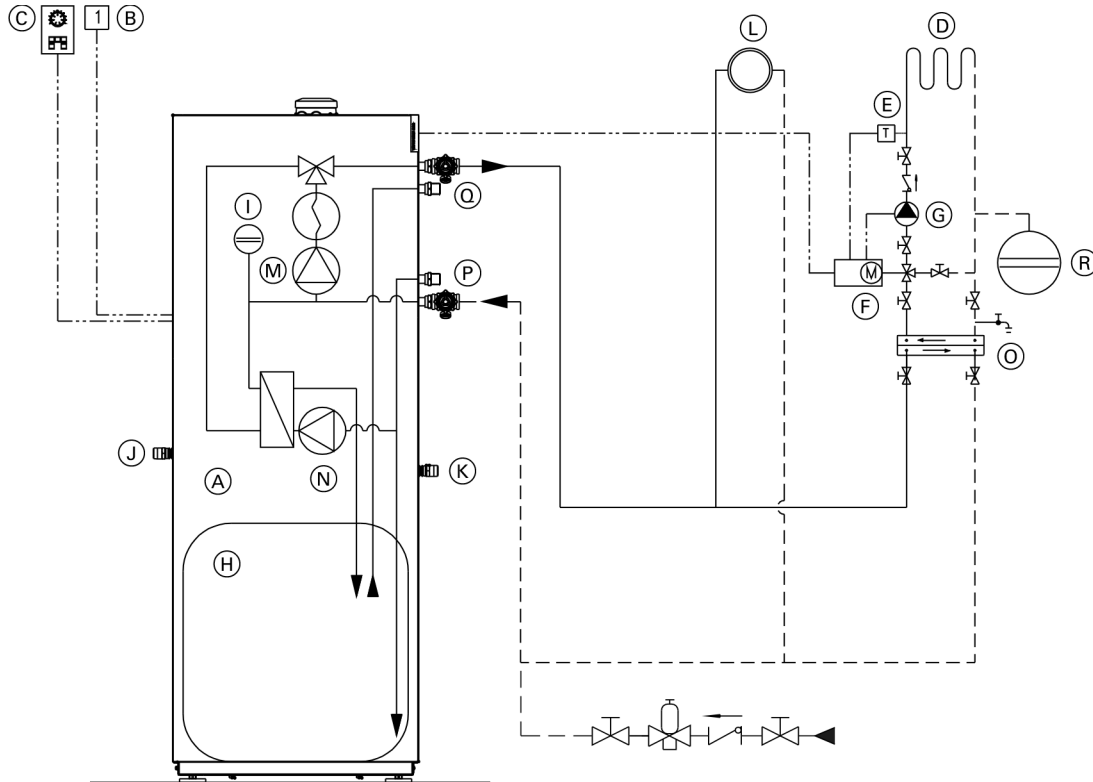
The use of a low-loss header is strongly recommended. The low-loss header is available as accessory part.

The 3-way mixing valve, built-in to achieve the low-temperature level of the under floor heating circuit, is controlled by an accessory kit for a heating circuit with mixing valve.

## System Layout 6

Vitodens 222-F, B2TB with...

- Integrated DHW production
- one direct-connected heating circuit
- one heating circuit with system separation



### Legend

- (A) Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- (B) Outdoor temperature sensor [1]
- (C) Vitotrol remote (optional)
- (D) Under floor heating circuit
- (E) Mixing valve temperature sensor [2]
- (F) Accessory kit for heating circuit with mixing valve
- (G) Heating circuit pumps
- (H) DHW storage tank
- (I) Integral expansion tank
- (J) Pressure relief valve outlet
- (K) Temperature and pressure relief valve outlet
- (L) Radiator heating circuit
- (M) Boiler pump [20]
- (N) DHW circulating pump [21]
- (O) Plate exchanger for system separation
- (P) DCW inlet
- (Q) DHW outlet
- (R) Expansion tank

### Installation of different heating circuits...

- two heating circuits with 3-way mixing valve (low-temp. circuit)
- DHW production

... with the following flow conditions:

The total flow rate of the two heating circuits is greater than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler (see page 30 for maximum water flow rate of boiler).

The use of a low-loss header is strongly recommended. The low-loss header is available as accessory part.

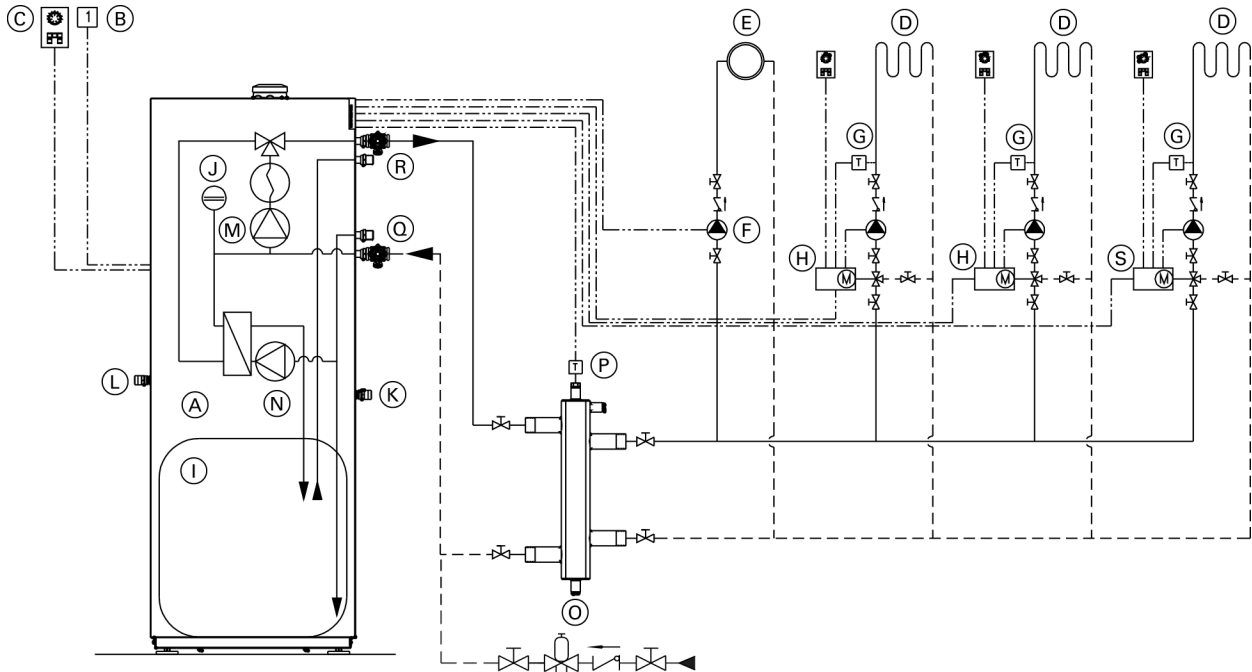
The 3-way mixing valve, built-in to achieve the low-temperature level of the under floor heating circuit, is controlled by an accessory kit for a heating circuit with a mixing valve.



# System Layout 7

Vitodens 222-F, B2TB with...

- one direct-connected heating circuit
- three heating circuits with mixing valve and integrated DHW production



**Legend**

- (A) Vitodens 222-F B2TB boiler with Vitotronic 200, HO1B outdoor reset control
- (B) Outdoor temperature sensor [1]
- (C) Vitotrol remote (optional)
- (D) Under floor heating circuit
- (E) Radiator heating circuit
- (F) Heating circuit pump [28/20]
- (G) Mixing valve temperature sensor [2]
- (H) Accessory kit for heating circuit with mixing valve
- (I) DHW storage tank
- (J) Integral expansion tank
- (K) Temperature and pressure relief valve outlet
- (L) Pressure relief valve outlet
- (M) Boiler pump [20]
- (N) DHW circulating pump [21]
- (O) Low-loss header
- (P) Low-loss header sensor [2]
- (Q) DCW inlet
- (R) DHW outlet
- (S) Vitotronic 200-H HK1B

Installation of different heating circuits...

- radiator heating circuit (high-temp. circuit)
- under floor heating circuit with 3-way mixing valve (low-temp. circuit)
- DHW production

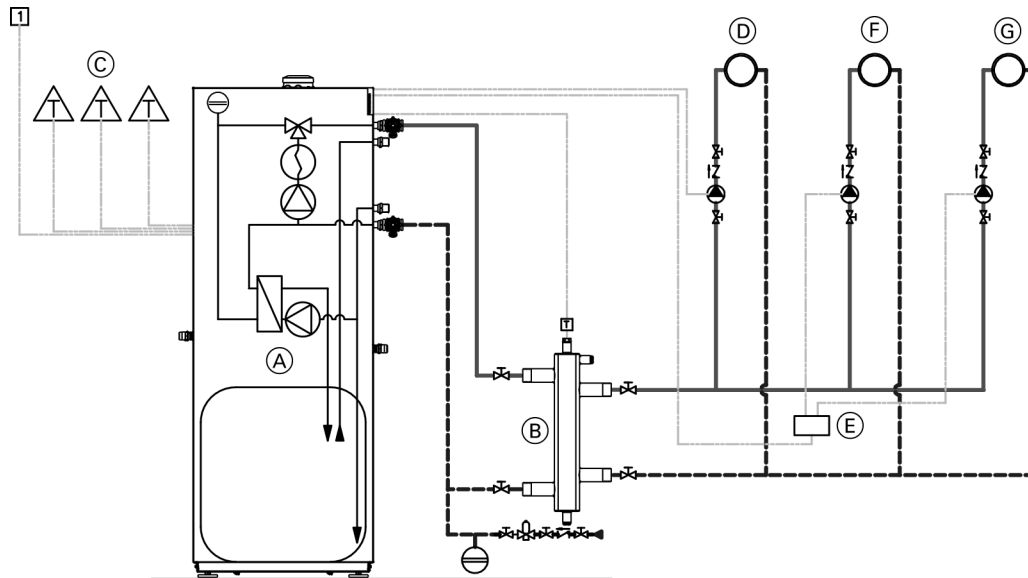
... with the following flow conditions:

The total flow rate of the two heating circuits is less than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler (see page 30 for maximum water flow rate of boiler).

The use of a low-loss header is strongly recommended if the maximum water flow rate in the application concerned exceeds the max. boiler flow rate, or if the system flow rates are unknown. The low-loss header is available as accessory part.

## System Layout 8

- Vitodens 222-F, B2TB with...
- Integrated DHW production
  - three zone circuits



### Legend

- (A) Vitodens 222-F boilers
- (B) Low-loss header
- (C) Thermostat zone circuits 1, 2, 3
- (D) Zone circuit 1 [output 157]
- (E) AM1 extension module (accessory)
- (F) Zone circuit 2 [output A1 - AM1 extension module]
- (G) Zone circuit 3 [output A2 - AM1 extension module]

### Installation of different heating circuits...

- DHW production
- 3 zone circuits

... with the following flow conditions:

The total flow rate of the two heating circuits is greater than the maximum possible water flow rate of the Vitodens 222-F B2TB boiler.

The use of a low-loss header is strongly recommended. The low-loss header is available as accessory part.

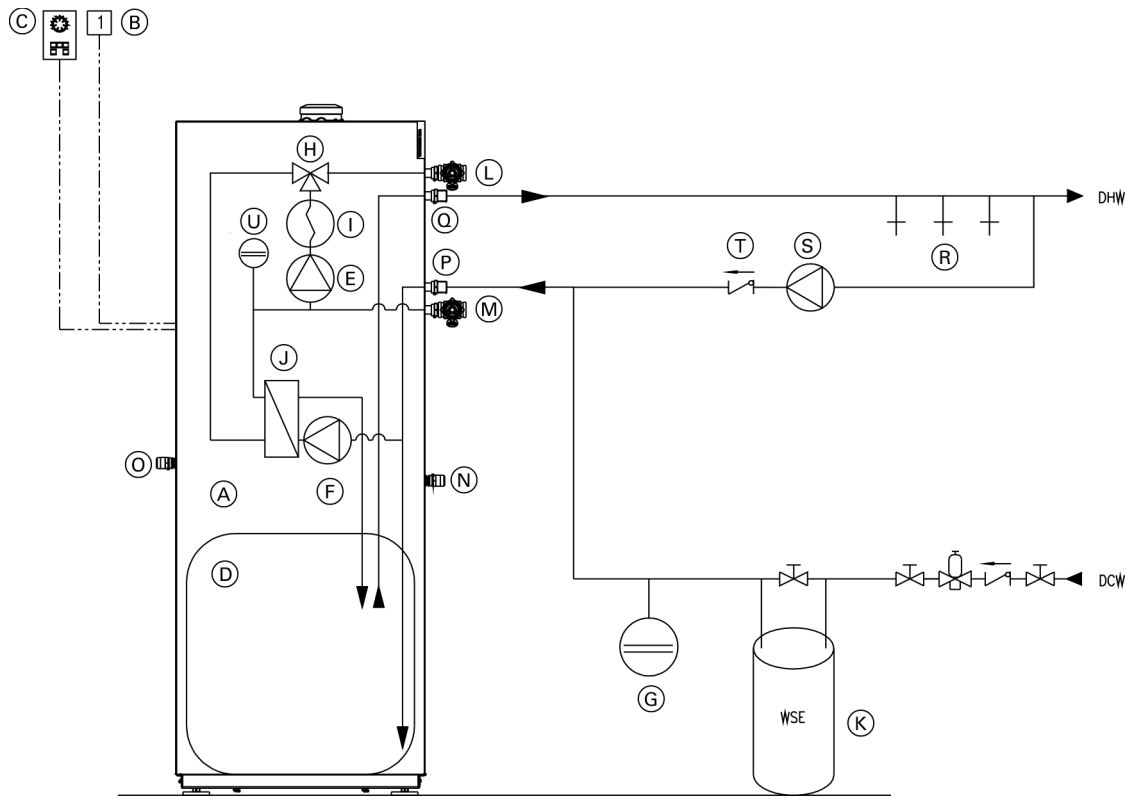
A 3-way mixing valve, built-in to achieve the low-temperature level of the under floor heating circuit, is controlled by an accessory kit for a heating circuit with mixing valve.

## IMPORTANT

**System separation is required of underfloor heating systems employing non-oxygen diffusion barrier tubing. All components on the secondary side of the heat exchanger must be made of corrosion-resistant materials.**

**Alternative Connection**

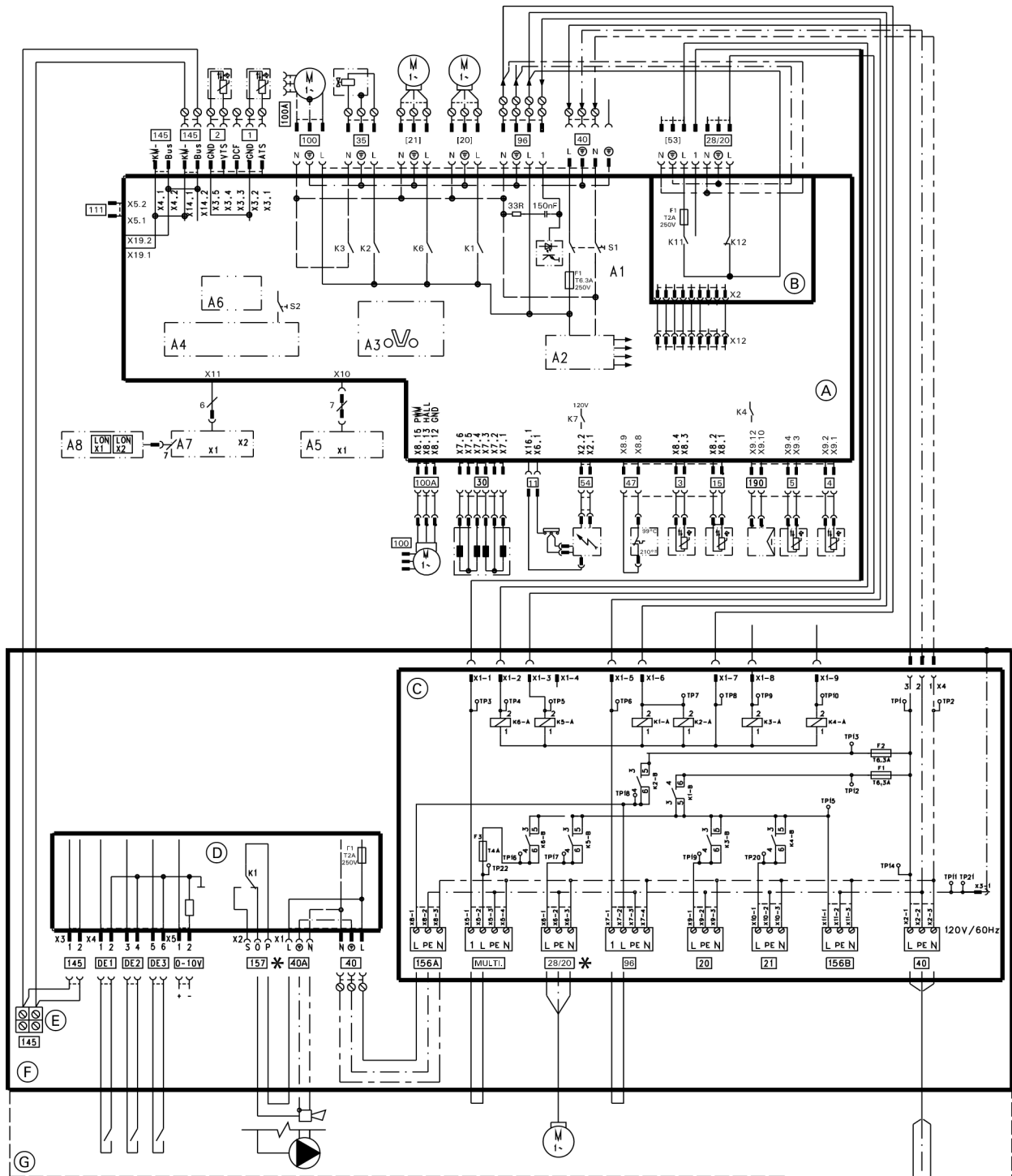
The following piping diagram reflects the connection for the DHW system to boiler.



**Legend**

- (A) Boiler
- (B) Outdoor temperature sensor [1]
- (C) Vitotrol remote (optional)
- (D) DHW storage tank
- (E) Boiler pump [20]
- (F) DHW circulating pump [21]
- (G) Expansion tank
- (H) Diverting valve
- (I) Boiler heat exchanger
- (J) DHW heat exchanger
- (K) Water softener
- (L) Boiler supply
- (M) Boiler return
- (N) Temperature and pressure relief valve outlet
- (O) Pressure relief valve outlet
- (P) DCW inlet
- (Q) DHW outlet
- (R) DHW users
- (S) DHW recirculation pump
- (T) Flow check valve
- (U) Integral expansion tank

Wiring Diagram

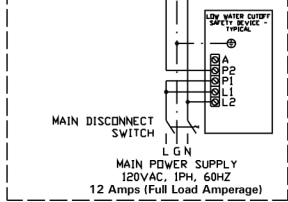


**WARNING**  
**DISCONNECT POWER BEFORE SERVICING BOILER.**

If any of the original wires as supplied with the appliance must be replaced, it must be replaced with the exact equivalent.

**CAUTION**  
 Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

\* Only one function/connection may be assigned to each connection.



**Wiring Diagram** *(continued)***Legend**

1	Outdoor Temperature Sensor
2	Supply Temperature Sensor/Low Loss Header
3	Boiler Temperature Sensor
4	DHW Supply Temperature Sensor
5	DHW Tank Temperature Sensor
11	Ionization Electrode
15	Flue Gas Temperature Sensor
20	No Function
[20]	Boiler Pump Connection (Internal)
21	No Function
[21]	DHW Pump Connection (Internal)
28/20	Heat Circuit A1 Pump Connection / zone circuit pump output*
30	Diverting Valve Stepper Motor
33	Flow Switch
35	Gas Valve
40	Power Supply
40A	Accessory Power Output
47	Fixed High Limit
[53]	Powered Accessory Connection
54	Ignition Transformer
96	Powered Accessory Connection
100	Fan Motor
100A	Fan Motor Control
111	Not Used
145	KM BUS
Multi	Powered Accessory Connection
156A	Switched Output F2
156B	Switched Output F1
DE1	Digital Input 1 (Dry Contact)
DE2	Digital Input 2 (Dry Contact)
DE3	Digital Input 3 (Dry Contact)
0-10V	0-10VDC Input
157	Fault Alarm/DHW Recirc. Pump / zone circuit pump output*
190	Gas Modulation Coil

\* Only one function/connection may be assigned to each connection.

- (A) Boiler Control
- (B) External Accessory Connection Board
- (C) Pump Connection Interface
- (D) Extension Module EA1
- (E) KM-BUS for External Devices
- (F) Electrical Junction Box
- (G) Field Wiring Connections
- A1 Main Board
- A2 Internal Power Supply Unit
- A3 Optolink
- A4 Burner Control Unit
- A5 Programming Unit
- A6 Coding Card
- A7 Connection Adaptor
- A8 LON Communication Module
- S1 ON/OFF Switch
- S2 Reset Button
- X.. Electrical Interface

**IMPORTANT**

Electrical installations must comply with the latest edition of:

- In the U.S.A., the National Electrical Code (NEC), ANSI/NFPA 70 and any other state, local codes and/or regulations.
- In Canada, the Canadian Electrical Code (CEC), CSA C22.1 Part 1 and any other province, territory, local codes and/or regulations.

## Electrical Connections

### Power supply connection of accessories

The power supply connection of accessories can be made directly at the control. The connection is activated and deactivated with the system on/off switch.

The Vitotronic 200-H, HK1B mixing valve control, the mixing valve accessory kit and the Solartronic control require a separate 120VAC power supply from the wall receptacle.

**Note:** The programming unit can also be used in a wall mounting base (accessory) near the boiler

Cabling required for:

- outdoor temperature sensor
- Vitotronic 200-H, HK1B mixing valve control
- accessory kit for heating circuit with mixing valve
- remote switching of operating mode
- remote disable
- alarm output
- wall-mount base
- system circulating pump

### IMPORTANT

It is essential to route cables as illustrated to ensure freedom of movement of control unit.

### IMPORTANT

When running and securing connecting cables on site, ensure that the maximum permissible temperatures of the cables are not exceeded.

### IMPORTANT

Cables in the vicinity of the control unit must not be secured to the control unit bracket.

### Connection of accessories



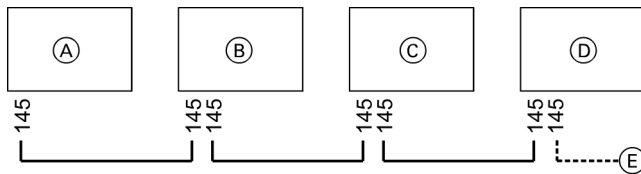
For details regarding other installation steps required, please reference the Installation Instructions supplied with the respective accessory part.

**Note:** Only one accessory part or one switch contact can be connected to the contacts of a plug at a time.

## Accessories Connection

If the current flowing to the connected working parts (e.g. circulation pumps) is higher than the safety level of the accessory, the output concerned should only be used to control an on-site relay.

Accessories	Internal fuse protection
Extension kit for heating circuit with mixing valve	2 A
Extension AM1	4 A
Extension EA1	2 A



### Legend

- (A) Boiler control unit
- (B) Extension kit for heating circuit with mixing valve M2
- (C) Extension kit for heating circuit with mixing valve M3
- (D) Extensions AM1 or EA1
- (E) Accessory modules

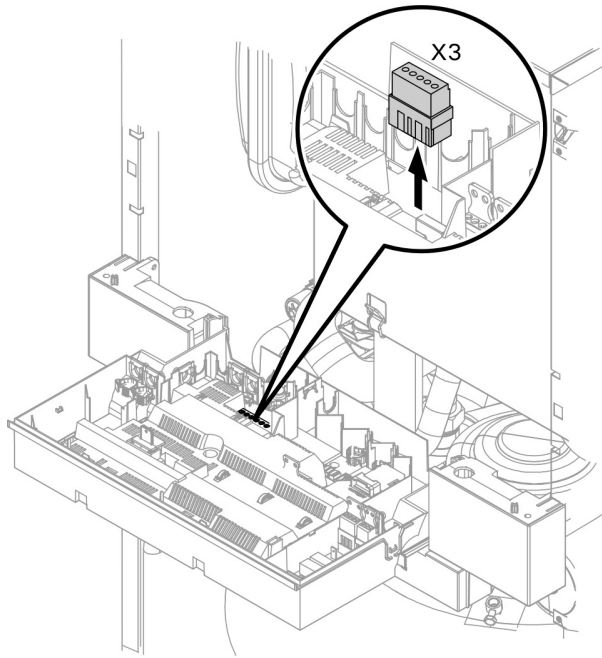
### Connection of accessories

- Install a disconnect switch in the power supply line that simultaneously isolates all live conductors from the mains.  
We additionally recommend installing a GFCI receptacle switch.
- Max. fuse rating 15 A.

### Low voltage plug X3

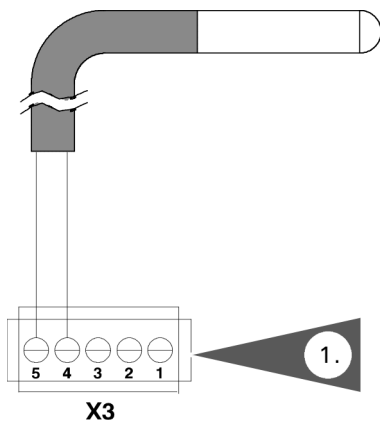
- 1 Outside temperature sensor:
  - North or north-western wall, 6.5 ft. (2 m) to 8 ft. (2.5 m) above ground level; in multi storey buildings, in the upper half of the second floor
  - Not above windows, doors or ventilation outlets
  - Not immediately below balconies or gutters
  - Never render over
  - Cable length max. 115 ft. (35 m) with a cross-section of 15 AWG (1.5 mm<sup>2</sup>)
- 2 Supply temperature sensor for low loss header (accessories)
- 5 DHW tank temperature sensor (factory installed)
- 145 KM BUS participant (accessory)
  - Vitotrol 200A or 300A remote control
  - Vitocom 100
  - Extension kit for one heating circuit with mixing valve
  - Extension EA1 or AM1

## Accessing the X3 Plug



1. Remove the control unit cover (see page 19).
2. Remove the X3 plug from the control board. Attach sensors and reinsert the X3 plug. Refer to the following sensor information.
3. Reinstall the control cover.

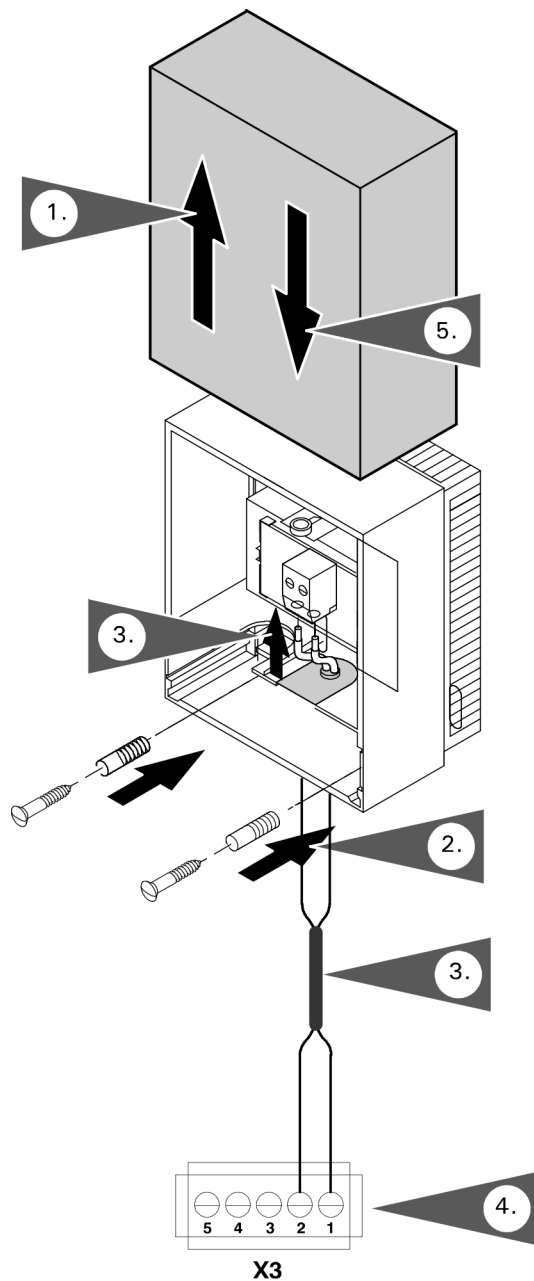
## Connecting the Low-loss Header Sensor



1. Connect the low-loss header sensor (if used) to terminals X3.4/X3.5 on the boiler control board.



## Connecting the Outdoor Temperature Sensor



1. Remove cover of outdoor temperature sensor.
2. Mount wall-mount base (cable entry must point downward).

### IMPORTANT

The outdoor temperature sensor should be mounted 6.6 to 8.2 ft. (2 to 2.5 m) above ground level on the north or northwest wall of the building. In case of a multi-storey building, mount outdoor temperature sensor in the upper half of the second floor.

Ensure that sensor is not located above windows, doors and air vents, or immediately underneath a balcony or gutter.

The outdoor temperature sensor must not be covered by plaster. If mounting on an unplastered wall, make allowances for thickness of plaster or remove sensor before plastering wall.

3. Route cable from the boiler control board to the outdoor sensor. Connect cable to sensor terminals (wires are interchangeable).  
Cable specifications:  
2-wire cable, max. cable length 95 ft. (35 m) with a wire size of min. AWG 16 copper.
4. Connect the outdoor temperature sensor to terminals X 3.1/X3.2 on the boiler control board (wires are not polarity sensitive).
5. Place cover on base and snap into place.

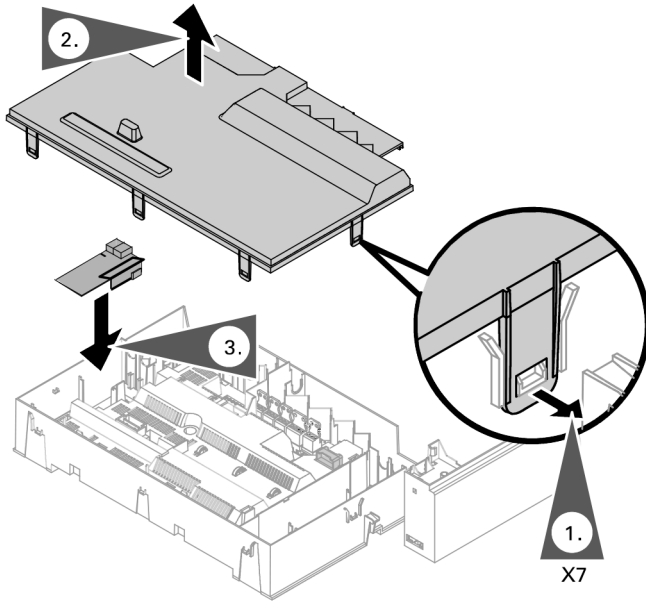
### IMPORTANT

Cable to the outdoor sensor must not be laid near line voltage wiring (120/240V).

# LON Module

## Installing the LON module to the boiler control board

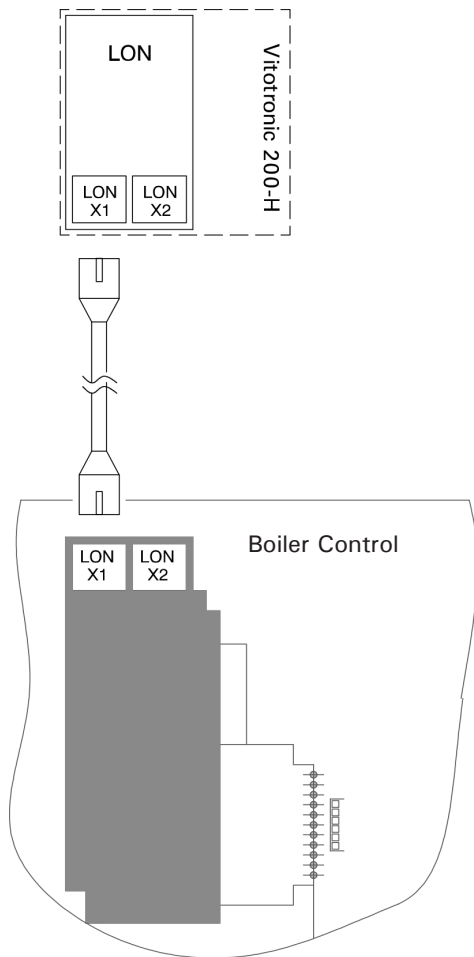
1. Remove the control cover (see page 19).
2. Insert the LON module into the boiler control board.
3. Connect the LON connector cable to the LON module.



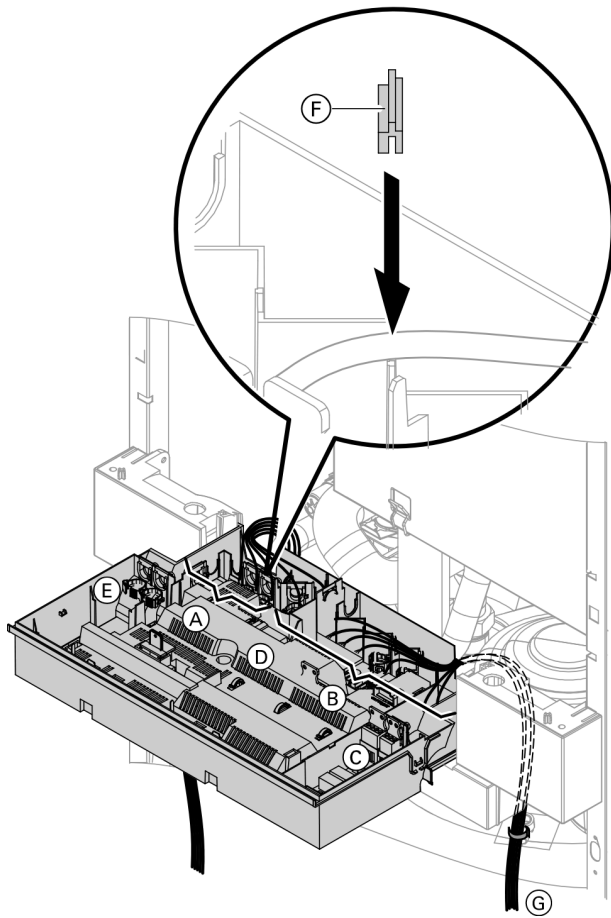
## Connecting the LON module cable



See the Vitotronic 200-H HK1B Installation Instructions.



## Routing the Connecting Cables



**Note:** If connecting cables touch hot components they will be damaged.

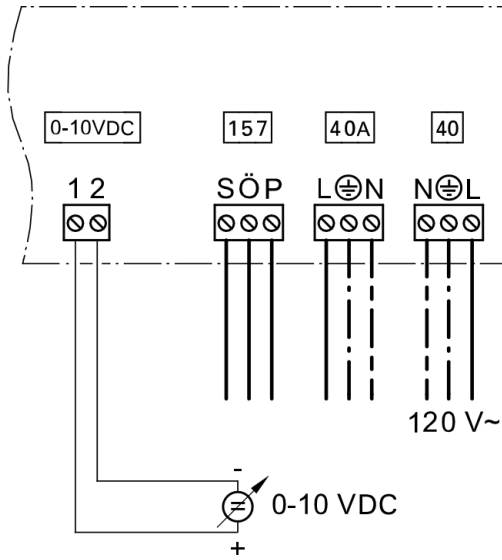
When routing and securing connecting cables on site, ensure that the maximum permissible temperatures for these cables are not exceeded.

Remove the existing cable grommet when using larger cross-sections [up to 9/16 in. ( $\varnothing$  14 mm)]. Secure the cable with the cable grommet plugged into the lower casing section (orange).

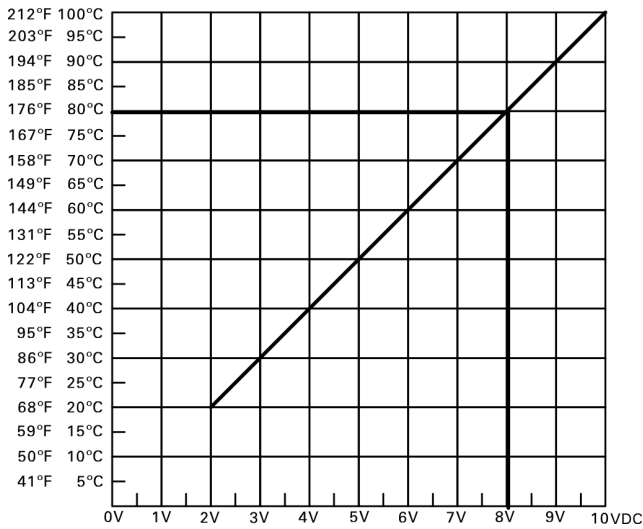
### Legend

- (A) Low voltage connections
- (B) 120V connections
- (C) Internal extension
- (D) Main PCB
- (E) Communication module (accessories)
- (F) Cable grommet for power cable
- (G) 120V from external accessories connection box

### External 0-10 Volt DC Signal Connection



1. Connect the external 0-10VDC signal to plug 0-10VDC located in the external connection accessory box.
2. Ensure correct polarity.
3. See chart for maximum possible boiler water temperature and required signal.



## Connecting a 24 VAC Thermostat

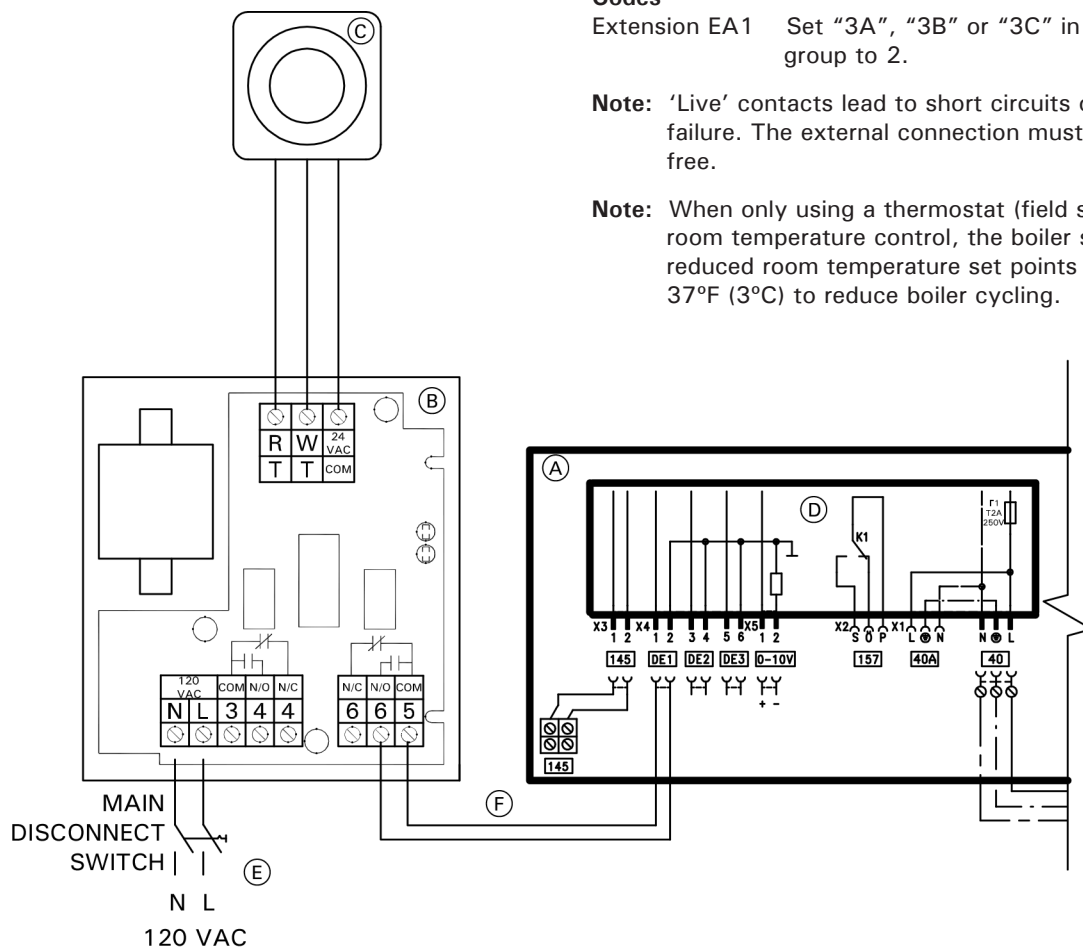
1. Connect normally open dry contact of the switching relay ('T-T' contact) to terminal DE1, DE2 or DE3 of the EA1 module located in the boiler electrical junction box.
2. Connect switching relay to thermostat and power supply as per manufacturers instructions. When the thermostat contact is closed, burner operation is load-dependent. The supply water is heated to the value set in the coding address "9b" in the "General" group of the boiler. The supply water temperature is limited by this set value and the electronic supply temperature maximum limit.

### Codes

Extension EA1 Set "3A", "3B" or "3C" in the "General" group to 2.

**Note:** 'Live' contacts lead to short circuits or phase failure. The external connection must be potential-free.

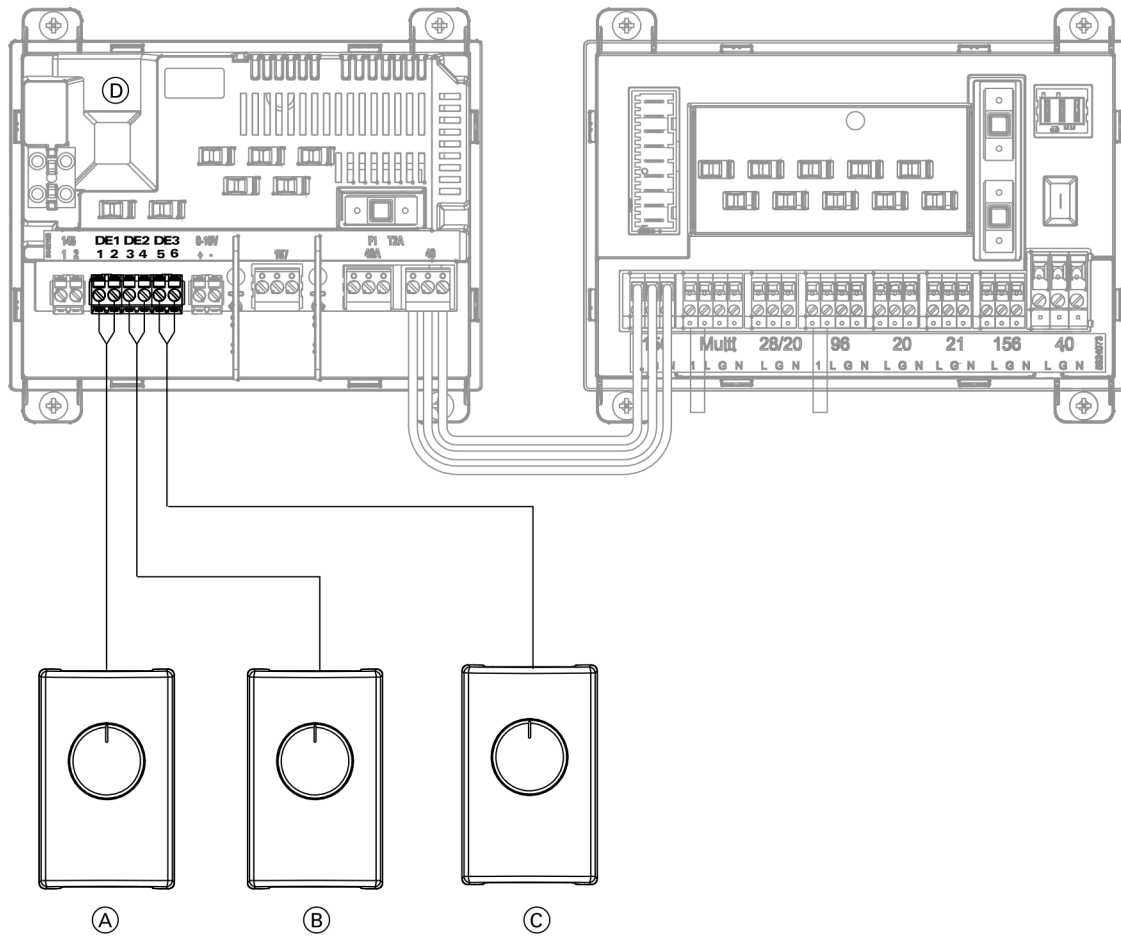
**Note:** When only using a thermostat (field supplied) for room temperature control, the boiler standard and reduced room temperature set points may be set to 37°F (3°C) to reduce boiler cycling.



### Legend

- (A) Boiler electrical junction box
- (B) Switch relay (ie Taco SR501, Honeywell RA889A-1001, field supplied)
- (C) 24VAC room thermostat (field supplied)
- (D) Internal EA1 module
- (E) 120VAC power supply for switching relay (refer to manufacturers instructions)
- (F) Dry contact connection from switching relay (to boiler 'T-T')

## Zone Circuit Thermostat Connections



### Legend

- (A) Room thermostat (dry contact) zone circuit 1
- (B) Room thermostat (dry contact) zone circuit 2
- (C) Room thermostat (dry contact) zone circuit 3
- (D) EA1 module (integrated into the boiler)

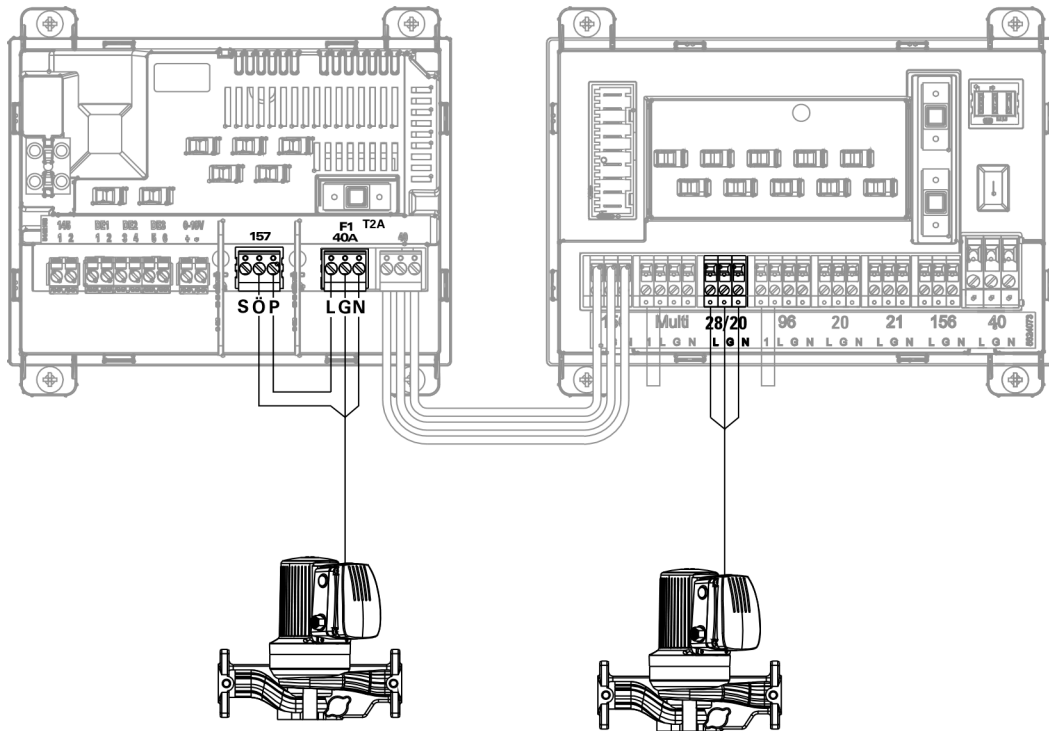
## Zone Circuit Pump Connection

### Connection to boiler

Pump output assignment is done using the set-up wizard. A maximum of 2 zone circuit pumps can be connected to the boiler additional pumps will require the use of an AM1 extension module.



Refer to the boiler Service Instructions for start-up instructions.



### Connection at AM1 (accessory)

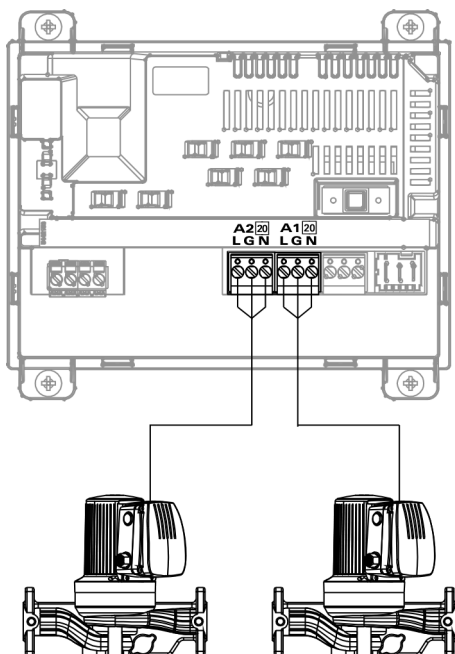
Pump output assignment is done using the set-up wizard.



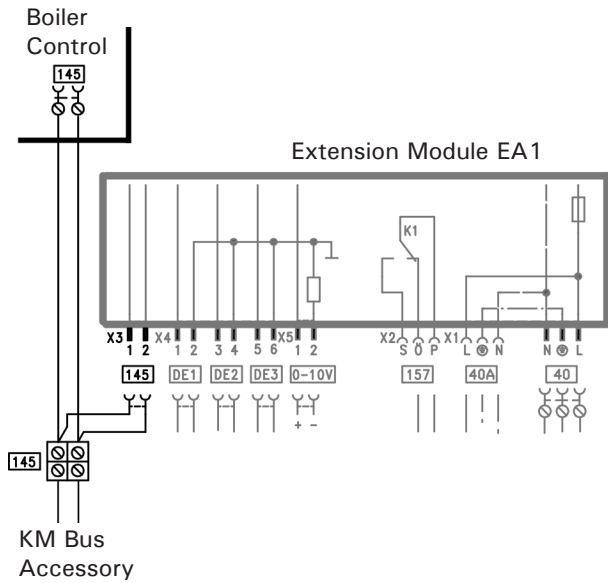
Refer to the boiler Service Instructions for start-up instructions.



Refer to the AM1 extension module Installation Instructions for additional details.



## Accessory Kit



The mixing valve controller kit can only be used with wall-mounted gas-fired hot water heating boilers and a weather-responsive control; it can be used as an alternative for a Vitotronic control.

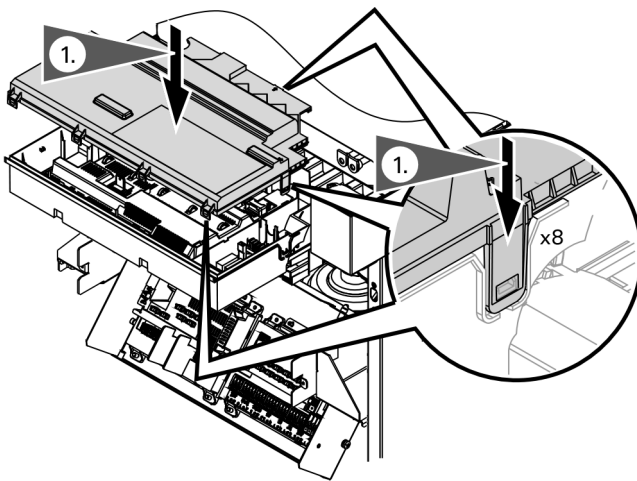


For details on coding and connection to the control, refer to the Vitodens 222-F B2TB Service Instructions.



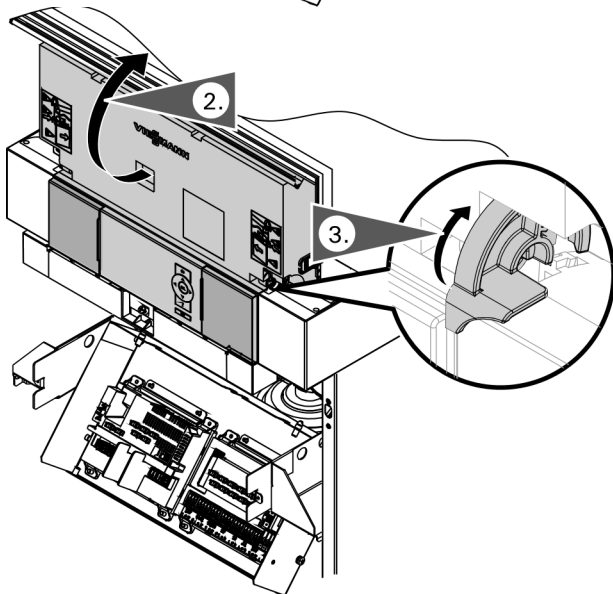
For details on installation, refer to the accessory kit Installation Instructions.

## Closing the Boiler



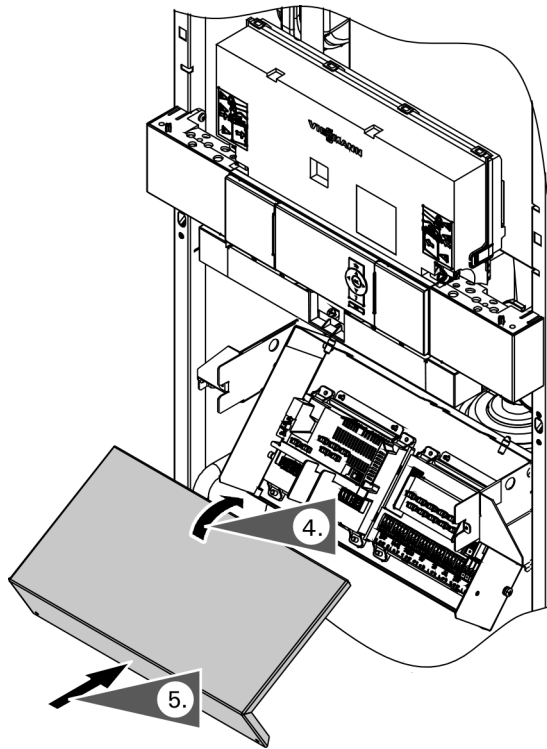
### Closing the control cover

1. Install the cover onto the control board.
2. Flip the control console back into position.
3. Secure the locking tabs as shown.

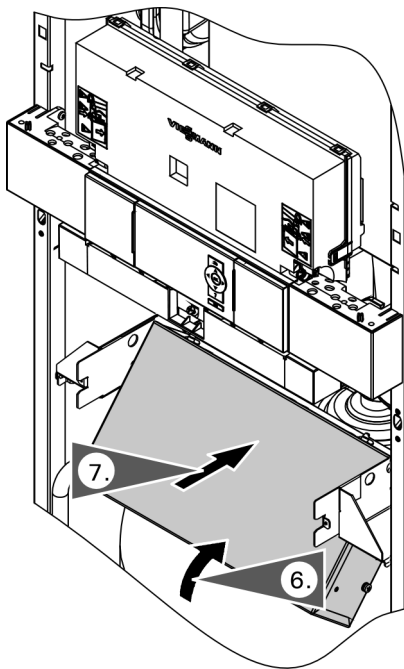




## Closing the External Accessory Connection Box

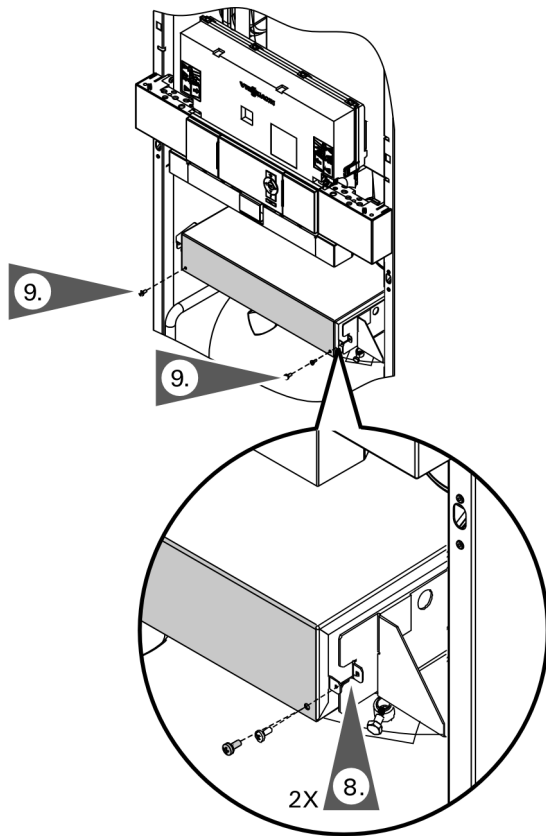


4. Tilt the top of the external accessory connection box cover forward.
5. Drop down over the locating pins and set the cover in place.



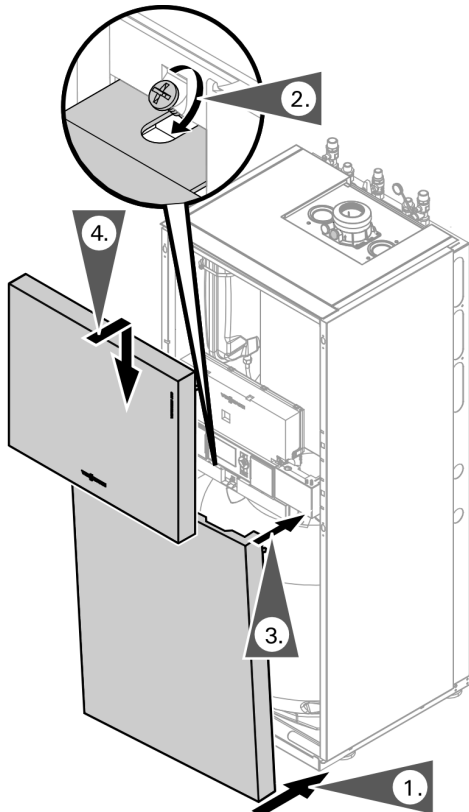
6. Swing the external accessory connection box up.
7. Push the external accessory connection box in until the holding screw is in place.

**Closing the External Accessory Connection Box** *(continued)*



8. Tighten the external accessory connection box retaining screw.
9. Install the external accessory connection box cover screws.

**Reinstalling the Front Enclosure Panel**



**Fitting the front panels**

1. Set in lower front panel.
2. Insert and tighten the retaining screw.
3. Install lower front panel.
4. Install upper front panel.

**IMPORTANT**

Read and follow, where applicable, the safety instructions of all labels and stickers attached to boiler surfaces. Do not remove any of these instructions. Contact Viessmann if any replacement labels are required.

**! WARNING**

Do Not operate the boiler without the front cover in place.

## Technical Data

Boiler Model No. 222-F B2TB		19, 68	35, 125
<b>CSA input Natural Gas (NG)</b>	MBH (kW)	12-68 (3.5-20)	19-125 (5.5-37)
<b>CSA input Liquid Propane Gas (LPG)</b>	MBH (kW)	12-68 (3.5-20)	31-125 (9-37)
<b>CSA output/DOE *1 heating capacity NG</b>	MBH (kW)	11-64 (3.2-19)	18-117 (5-34)
<b>CSA output/DOE *1 heating capacity LPG</b>	MBH (kW)	11-64 (3.2-19)	29.5-117 (8.6-34)
<b>Net AHRI rating *2</b>	MBH (kW)	55 (16)	102 (30)
<b>Heat exchanger surface area</b>	ft. <sup>2</sup> m <sup>2</sup>	12.96 1.2	12.96 1.2
<b>Min. gas supply pressure</b>			
Natural gas	"w.c.	4	4
Liquid propane gas	"w.c.	10	10
<b>Max. gas supply pressure *3</b>			
Natural gas	"w.c.	14	14
Liquid propane gas	"w.c.	14	14
<b>A.F.U.E.</b>	%	95	95
<b>Weight (including installation fittings)</b>	lbs (kg)	302 (137)	302 (137)
<b>Boiler water content</b>	USG (L)	1.02 (3.88)	1.02 (3.88)
<b>Boiler max. flow rate *4</b>	GPM (L/h)	6.2 (1400)	6.2 (1400)
<b>Expansion tank *5 (for heating system side)</b>			
Precharge pressure	psig	12	12
Capacity	USG (L)	3.2 (12)	3.2 (12)
<b>Max. operating pressure at 210°F (99°C)</b>	psig bar	45 3	45 3
<b>Boiler water temperature</b>			
- Adjustable high limit (AHL) range space heating (steady state)	°F (°C)	68 to 180 (20 to 82)	68 to 180 (20 to 82)
- Fixed high limit (FHL)	°F (°C)	210 (99)	210 (99)
<b>Boiler connections</b>			
Boiler heating supply and return	NPTM"	3/4"	3/4"
Pressure relief valve	NPTF"	3/4"	3/4"
Drain valve	(male thread)	3/4"	3/4"
Boiler supply/return for indirect-fired DHW storage tank (field supplied)	NPT"	3/4"	3/4"
Gas valve connection	NPTF"	3/4"	3/4"

\*1 Output based on 140°F (60°C), 120°F (49°C) system supply/return temperature.

\*2 Net AHRI rating based on piping and pick-up allowance of 1.15.

\*3 If the gas supply pressure exceeds the maximum gas supply pressure value, a separate gas pressure regulator must be installed upstream of the heating system.

\*4 See "Waterside Flow" starting on page 30 in this manual.

\*5 Determine the required size of the expansion tank to be installed in the heating system.  
If the integral expansion tank is insufficient, install a suitably sized expansion tank on site.

**Technical Data** *(continued)*

<b>Boiler Model No. 222-F B2TB</b>		<b>19, 68</b>	<b>35, 125</b>
<b>Dimensions</b>			
Overall depth	inches (mm)	23½ (595)	23½ (595)
Overall width	inches (mm)	23⅝ (600)	23⅝ (600)
Overall height *12	inches (mm)	64 (1625)	64 (1625)
<b>Flue gas *6</b>			
Temperature (at boiler return temperature of 86°F (30°C))			
- at rated full load	°F (°C)	113 (45)	113 (45)
- at rated partial load	°F (°C)	95 (35)	95 (35)
Temperature (at boiler return temperature of 140°F (60°C))			
	°F (°C)	154 (68)	154 (68)
<b>Average condensate flow rate *7</b>			
with natural gas and T <sub>S</sub> /T <sub>R</sub> = 122/86°F (50/30°C)			
	USG/h (L/h)	2.6-3.4 (10 - 12)	4-4.5 (15 - 17)
<b>Condensate connection *8</b>			
	hose nozzle Ø in.	¾-1"	¾-1"
<b>Boiler flue gas connection *9</b>			
	Ø in. (mm)	2⅜" (60)	2⅜" (60)
<b>Combustion air supply connection (coaxial)</b>			
	outer Ø in. (mm)	4" (100)	4" (100)
<b>Sound Rating</b>			
- at maximum input	dB	41	51
- at minimum input	dB	35	36
<b>DHW storage tank</b>			
DHW storage tank capacity	USG (L)	26.5 (100)	26.5 (100)
Temperature and pressure relief valve (factory installed)	psig/temp	150/210°F (99°C)	150/210°F (99°C)
Max. allowable operating pressure (DHW)	psig	150	150
Storage tank test pressure	psig	300	300
Continuous DHW output	MBH (kW)	61 (17.8)	114 (33.4)
Continuous DHW output draw rate *10	GPM (L/min.)	1.8 (6.6)	3.3 (12.3)
Max. DHW draw rate (over 10 min. period) *10	USG (L)	44 (166)	60 (227)
<b>Standby losses *11</b>			
	BTU/24h	4435	4435
	BTU/h	184	184
	° F/h	0.8	0.8

\*6 Measured flue gas temperature with a combustion air temperature of 68°F (20°C).

\*7 Based on typical boiler cycles, including partial load conditions.

\*8 Requires 1 inch (25 mm) tubing. See the Installation Instructions of the Vitodens 222-F, B2TB for details.

\*9 For side wall vent installations (coaxial system):

Do not exceed max. equivalent length specified in the Installation Instructions of the Vitodens 222-F, B2TB Venting System.

Do not attempt to common-vent Vitodens 222-F, B2TB with any other appliance.

Side wall coaxial vent installation must include Viessmann protective screen!

For details refer to the Installation Instructions for the Vitodens 222-F, B2TB Venting System.

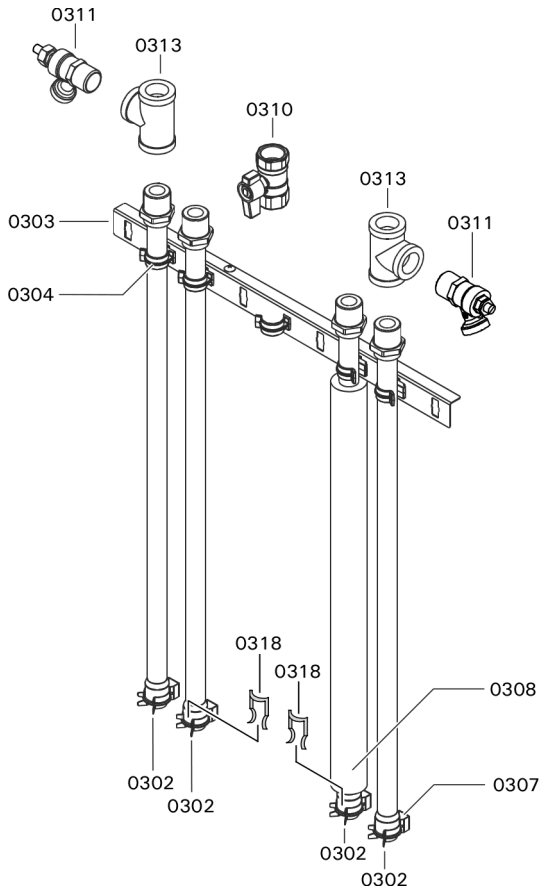
\*10 Based on a temperature rise of 70°F (21°C), 50°F to 120°F (10°C to 49°C).

\*11 Measured values are based on room temperature of 68°F (20°C) and a domestic hot water temperature of 149°F (65°C).

\*12 Add 1⅝ in. (40 mm) when using the optional accessory seismic bracket kit.

For information regarding other Viessmann System Technology componentry, please reference documentation of respective product.

**Note:** For high altitude installation at 10,000 ft. (3050 m) the input for 222-F, B2TB 19, 35, 68, 125 will have an altitude de-ration of 21%.



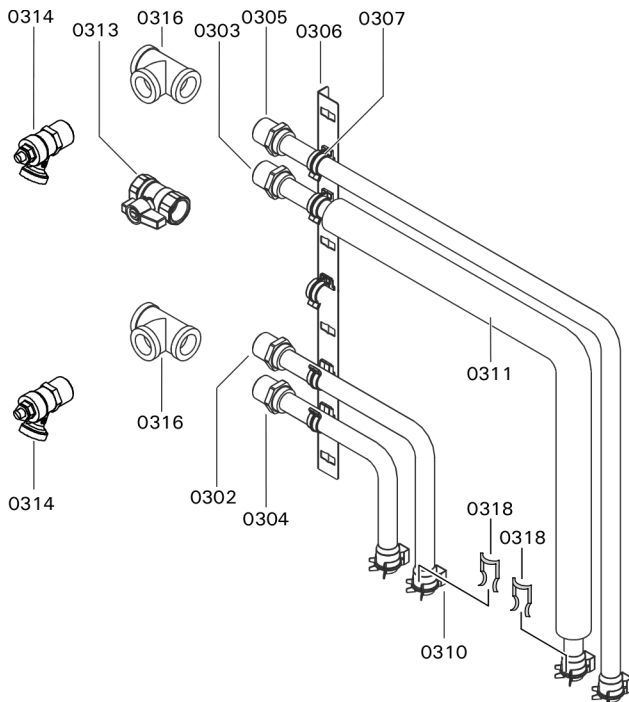
**Parts for Top Connection**

- 0302 Connecting pipe, DHW/heating
- 0303 Support bracket with pipe clips
- 0304 Pipe clip (each)
- 0307 Connector retaining clip (Set of 2) \*1
- 0308 Pipe insulation, 19x9x740 mm
- 0310 Gas ball valve, 3/4 in. brass
- 0311 Sediment faucet, 3/4 in. NPT
- 0313 Tee, 3/4 in. brass
- 0318 Security clips (set of 5) \*1, \*2

**Other Parts (not illustrated)**

- 0301 Flex pipe (NG/LP), full-length \*3
- 0305 O-Ring, 18x3 mm for supply/return
- 0306 Gasket, 17x24x2 mm for gas connection pipe \*3
- 0312 Outdoor temperature sensor, NTC
- 0314 Air bleed key
- 0326 Parts List for Installation Set, top
- 0350 Temperature gauge, 2 in. 30-250°F \*4
- 0351 Temperature sensor (immersion) for low-loss header, NTC (if used)

- \*1 Please ensure security clip (0318) is always installed on connector retaining clip (0307) of the domestic water piping.
- \*2 Ships affixed to rear of boiler.
- \*3 The NG/LPG flex pipe (0301) and it's gasket (0306) shipped preinstalled on the Vitodens 222-F boiler.
- \*4 Install anywhere in the supply piping near the boiler.



**Parts for Left/Right Side Connection**

- 0302 Connecting pipe 90°, DHW short
- 0303 Connecting pipe 90°, DHW long
- 0304 Connecting pipe 90°, heating short
- 0305 Connecting pipe 90°, heating long
- 0306 Support bracket with pipe clips
- 0307 Pipe clip (each)
- 0310 Connector retaining clip (Set of 2) \*1
- 0311 Pipe insulation, 19x9x740 mm
- 0313 Gas ball valve, 3/4 in. brass
- 0314 Sediment faucet, 3/4 in. NPT
- 0316 Tee, 3/4 in. brass
- 0318 Security clips (set of 5) \*1, \*2

**Other Parts (not illustrated)**

- 0301 Flex pipe (NG/LP), full-length \*3
- 0308 O-Ring, 18x3 mm for supply/return
- 0309 Gasket, 17x24x2 mm for gas connection pipe \*3
- 0315 Outdoor temperature sensor, NTC
- 0317 Air bleed key
- 0325 Parts List for Installation Set, left/right
- 0350 Temperature gauge, 2 in. 30-250°F \*4
- 0351 LLH temperature sensor, immersion NTC (if used)

- \*1 Please ensure security clip (0318) is always installed on connector retaining clip (0310) of the domestic water piping.
- \*2 Ships affixed to rear of boiler.
- \*3 The NG/LPG flex pipe (0301) and it's gasket (0309) shipped preinstalled on the Vitodens 222-F boiler.
- \*4 Install anywhere in the supply piping near the boiler.

## Lighting and Operating Instructions

### FOR YOUR SAFETY READ BEFORE OPERATING

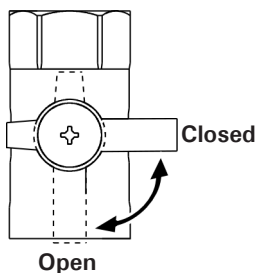
**W A R N I N G:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.  
**WHAT TO DO IF YOU SMELL GAS**
  - Do not try to light any appliance.
  - Do not touch any electric switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

### OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set thermostat or other operating control to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Close main gas shut-off valve.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Open main gas shut-off valve.
8. Turn on all electric power to the appliance.
9. Set thermostat or other operating control to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

Manual gas shutoff



### TO TURN OFF GAS TO APPLIANCE

1. Set thermostat or other operating control to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Close main gas shut-off valve.

