

Installation, Start-up and Service Instructions

for use by engineers and heating contractors

VIESSMANN.

Vitotronic 100

Model KW10B

For modulating temperature heating systems

Part No. 7834 238



VITOTRONIC 100



Certified as a component
part for Viessmann boilers

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 Safety 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 Safety and "Important Regulatory and Installation Requirements".*



■ 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.

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Safety



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

Approvals

Viessmann boilers, burners and controls are approved for sale in North America by CSA International.

Codes

The installation of this unit shall be in accordance with local codes. In the absence of local codes, use:

- CSA C22.1 Part 1 and/or local codes in Canada
- National Electrical Code ANSI/NFPA 70 in the U.S.

Always use latest editions of codes.

Working on the equipment

The installation, adjustment, service, and maintenance of this product 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, burner, or control.

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

Technical literature

Literature applicable to all aspects of the Vitotronic 100:

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

- ▶ Please carefully read this manual prior to attempting installation. 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.

- ▶ 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.

	<p>WARNING</p> <p>Turn off electric power supply before servicing. Contact with live electric components can cause shock or loss of life.</p>
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- ▶ 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.

	<p>CAUTION</p> <p>The control is static sensitive. To avoid damage caused by static discharge, follow Electro-Static Discharge safety procedures.</p>
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Important Regulatory and Installation Requirements

Power supply

Install power supply in accordance with the regulations of the authorities having jurisdiction or, in the absence of such requirements, in accordance with National Codes. Viessmann recommends the installation of a disconnect switch to the 120 VAC power supply outside of the boiler room. The installer must provide maximum 15 A over current protection for the 120 VAC power supply (fuse or circuit breaker).

Note on connecting external “potential-free” contacts to the Vitotronic 100 control’s 24 VAC thermostat connections:


Ensure that all contacts have sufficient insulation clearance to live parts and are certified for these applications.

A room thermostat or other potential-free contact (i.e. end switch of a zone valve) must be connected to the Vitotronic 100 thermostat connections.

Working with an open control

No static discharge to the internal componentry must ever occur when working with opened control equipment.


About these Installation Instructions

 Take note of all symbols and notations intended to draw attention to potential hazards or important product information.

 **WARNING**

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

► Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.

 **CAUTION**

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

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

IMPORTANT

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



► This symbol indicates to note additional information



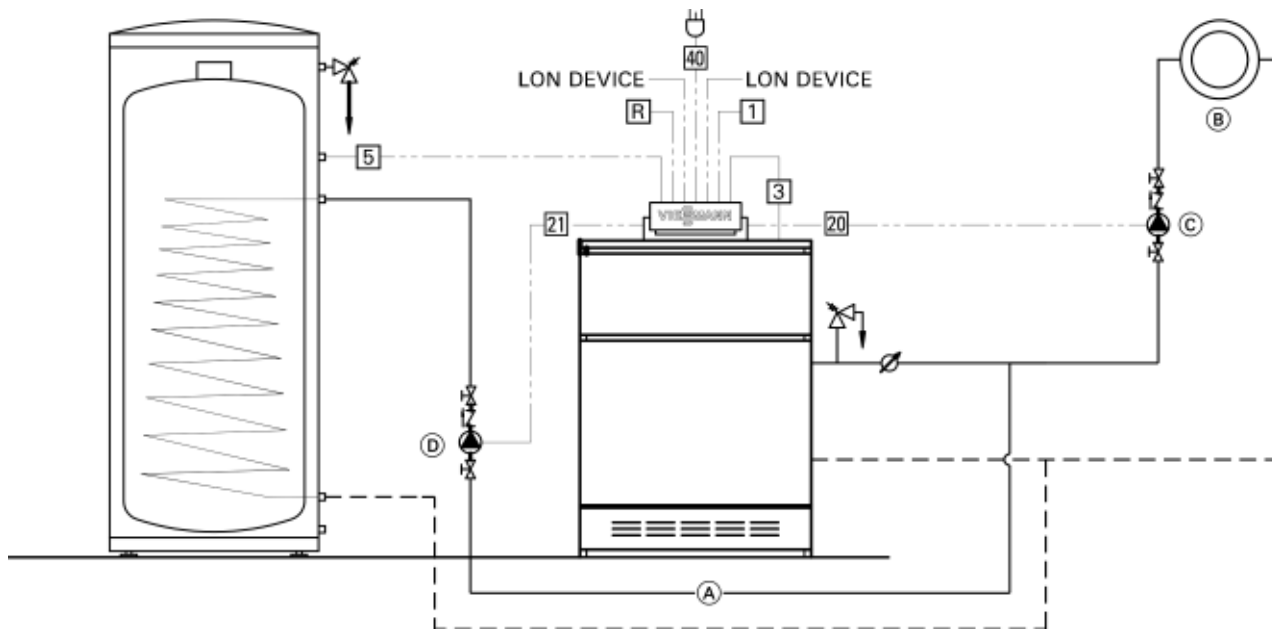
► This symbol indicates that other instructions must be referenced.

Valid for...

Applies to Vitotronic 100, Model KW10B:
 Order No. 7834 238, starting with serial no. V00101
 This control shall only be installed with the Vitola 200,
 Vitorond 100, Vitogas 050, RS Series, or with a Vitogas
 100 hot water heating boiler.

Typical System Layout

One direct-connected heating circuit without mixing valve

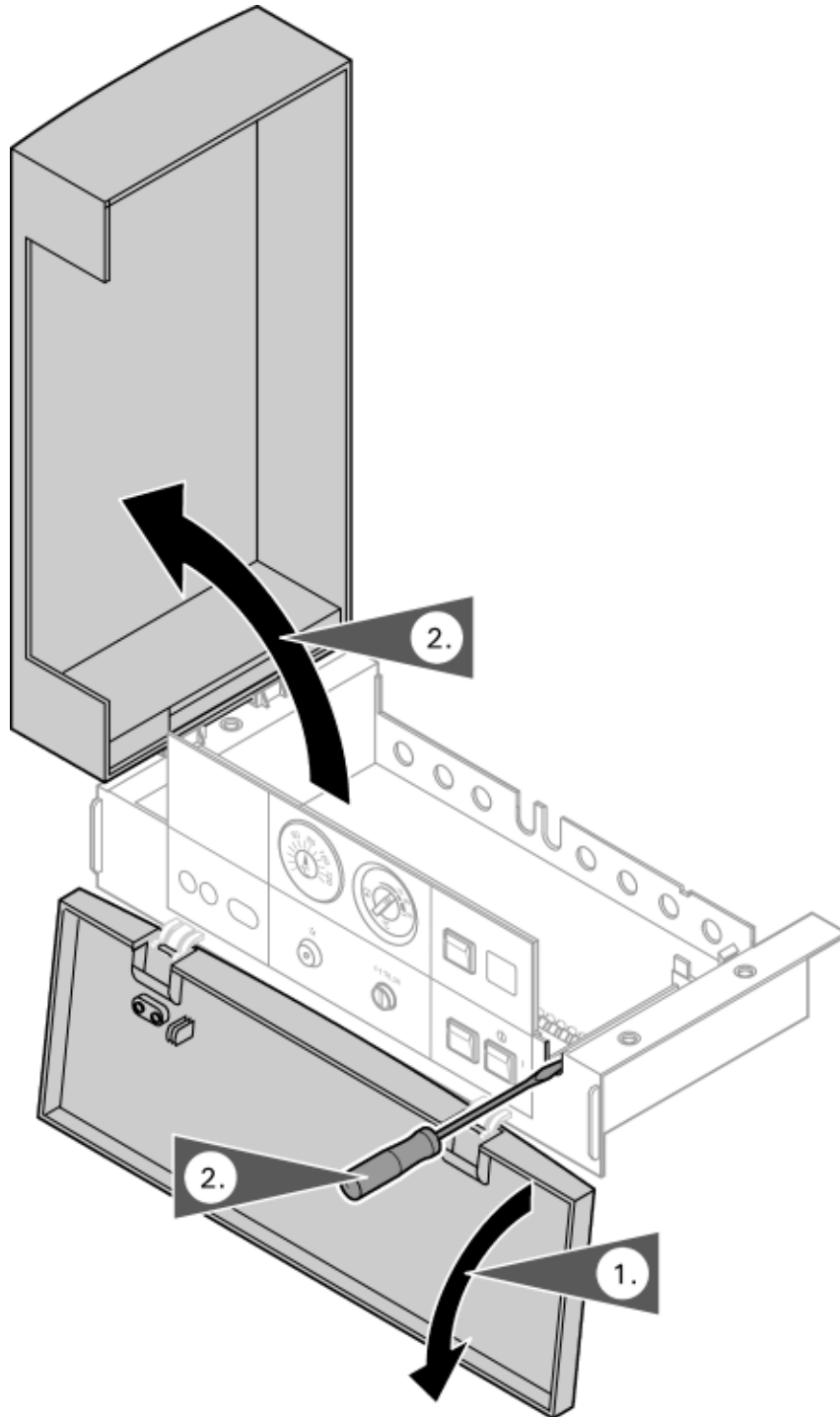


- Ⓐ Boiler with Vitotronic 100, Model KW10B
- Ⓑ Heating circuit
- Ⓒ System pump
- Ⓓ DHW pump
- Ⓡ Room thermostat

- 1 Outdoor temperature sensor
- 3 Boiler temperature sensor
- 5 DHW temperature sensor
- 20 Pump connection (used with: - Vitola 200,
- Vitorond 100,
- Vitogas 050, (RS series, boilers only)
- Vitogas 100
- 21 DHW pump output
- 40 Power supply cord 120 VAC, 60Hz

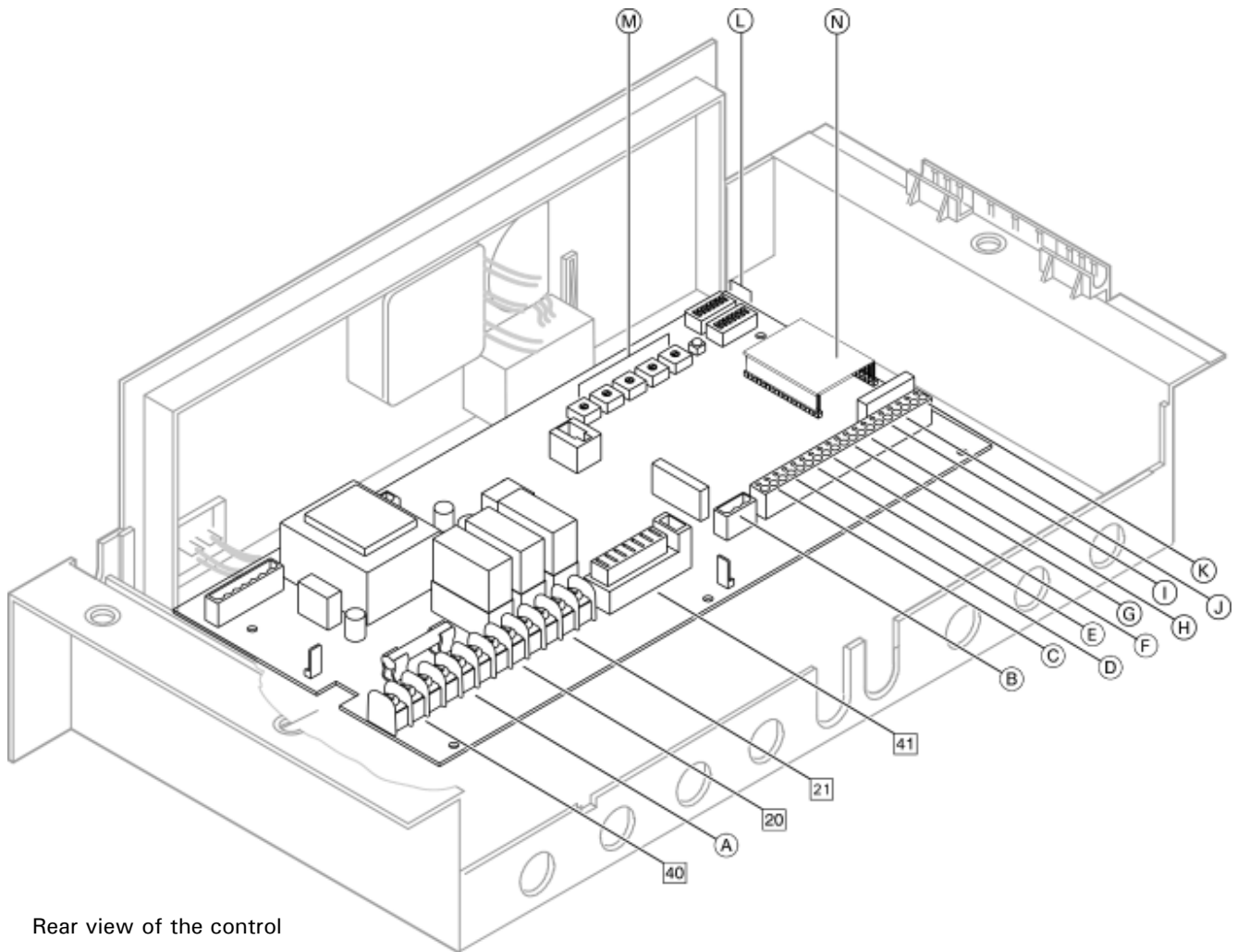
Opening the Control

1. Open front cover.
2. Carefully unlock control top cover using a screw driver and flip open top cover.



Overview

Control PCB

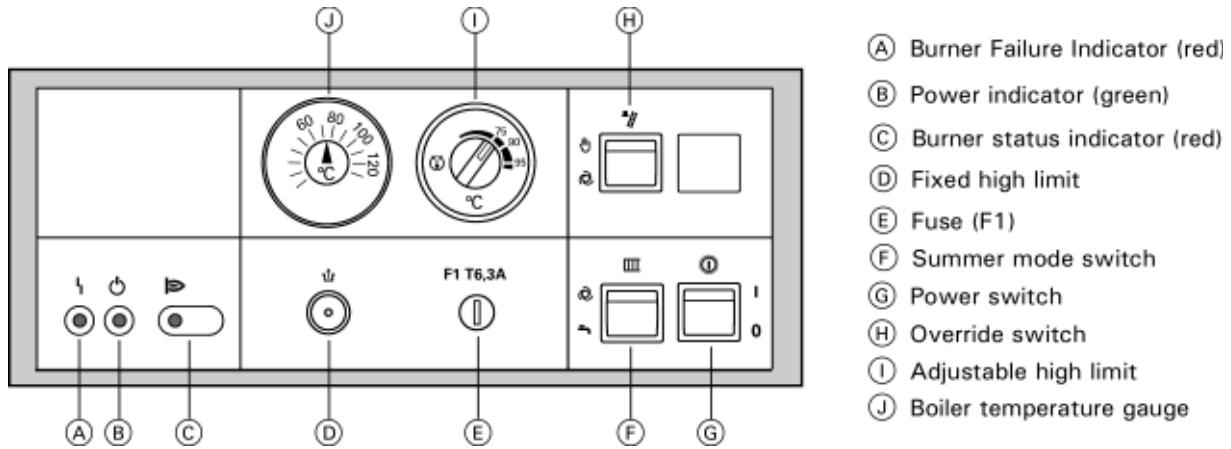


Rear view of the control

- | | | |
|---------------------------------|--------------------------|--|
| 40 Power Supply 120 VAC, 60 Hz | C Stage1/stage2 demand | I Alarm Output
(dry contact, 30VAC / 0.5A max.) |
| 20 Boiler Pump | D Outdoor sensor | J LON connection |
| 21 DHW pump | E Boiler sensor | K LON connection |
| 41 Burner 1 st Stage | F DHW sensor | L Dip switches (S6 & S7) |
| A Low Water Cutoff | G Auxiliary input device | M Dial switches (S1 to S5) |
| B Burner 2 nd Stage | H OpenTherm device | N Optional LON communication card |


Overview *(continued)*


Front panel



Front view of the control


Summer mode switch


The front mounted summer mode switch (F) when in the up (summer/winter) position  will allow the thermostat terminal to call for heat, DHW functionality and outdoor reset when programmed. Outdoor reset operation is based on the Warm weather shut down setting.

When the summer mode switch (F) is in the down (summer/DHW) position , the thermostat terminal to call for heat will be disabled.

Units equipped with an outdoor temperature sensor and programmed for either internal outdoor reset or OpenTherm enabled thermostat will start calculating a boiler water temperature at an outdoor temperature of 37° F (3° C) and below. The boiler pump will be turned on and run continuously.

Override switch

The front mounted override switch (H) when in the up position , turns the boiler pump on and enables stage 1 and 2 call for heat. The boiler operates on the adjustable high limit temperature.

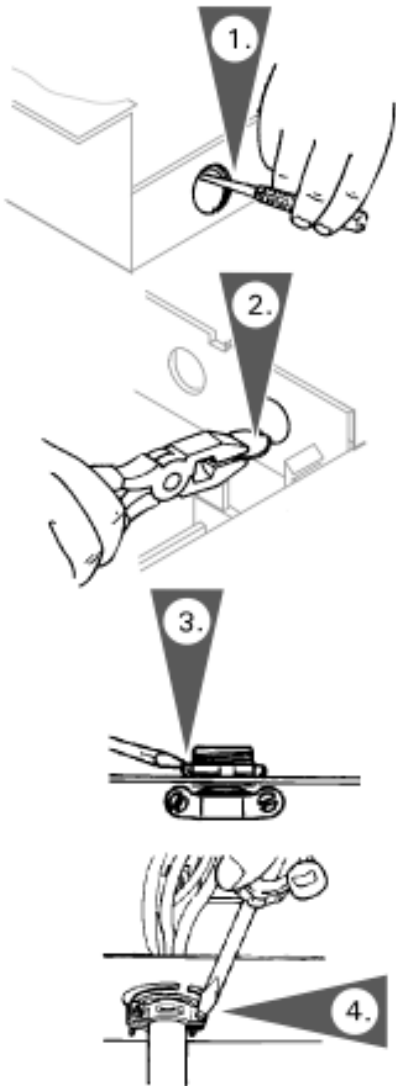
When the override switch (H) is in the down position , the system is in normal operation.

Power switch

The front mounted power switch (G) when in the up position I, the control system is on.

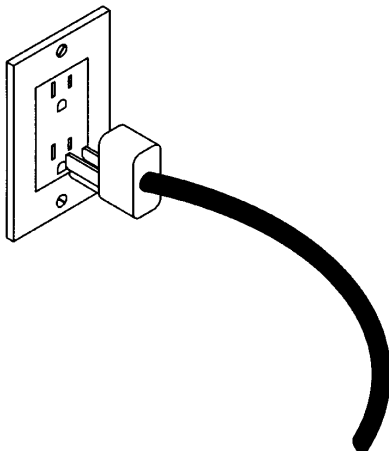
When the power switch (G) in the down position O, the control system is off.

Routing Cables



1. Punch knockouts as required.
2. Remove knockouts.
3. Insert cable clamp into hole and tighten.
4. Insert sufficient cable through the cable clamp and secure.

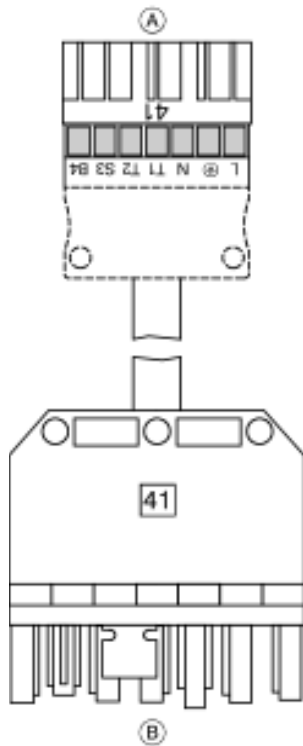
Power Supply



Follow instructions under Important Regulatory and Installation Requirements.

1. Feed the power supply cord with 3-prong molded plug through rear top panel wiring gate of the boiler.
2. Slide cable into the strain relief and secure with strain relief set screw.
3. Plug power supply cord into receptacle. Ensure receptacle is designated for the heating system only.

Burner Connection



- Ⓐ to control (RAST-5 plug)
- Ⓑ to burner or wall vent system (41 plug)

The Vitotronic 100 is prewired with the Viessmann quick-connect plug-in system.

1. Connect the RAST-5 plug to the main circuit board of the control
2. Connect 7-pole plug to the counter plug of the burner

or

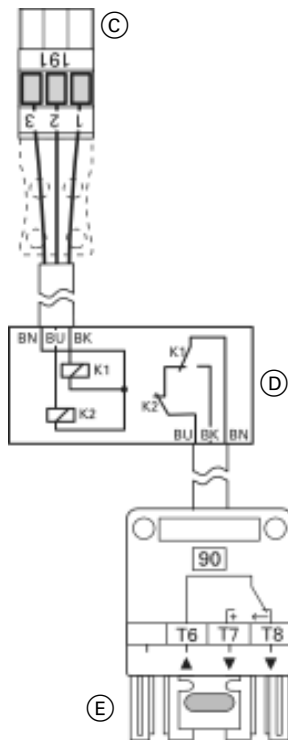
if installing a wall vent system (accessory), connect 7-pole plug to counter plug of wall vent system.



Refer to technical instructions of the burner and/or wall vent system.

! WARNING

Do not connect the 41-plug from the boiler control directly to the burner if installing a wall vent system. See technical instructions of the wall vent system.



- 5712 717 v1.0
- Ⓒ to control unit
- Ⓓ enclosure with potential free burner control output
- Ⓔ to burner

Terminal codes

T6, T7, Control circuit "two stage burner" or "modulation controller" (via two-point controller with two stage operation; via three-point controller with modulating direction)

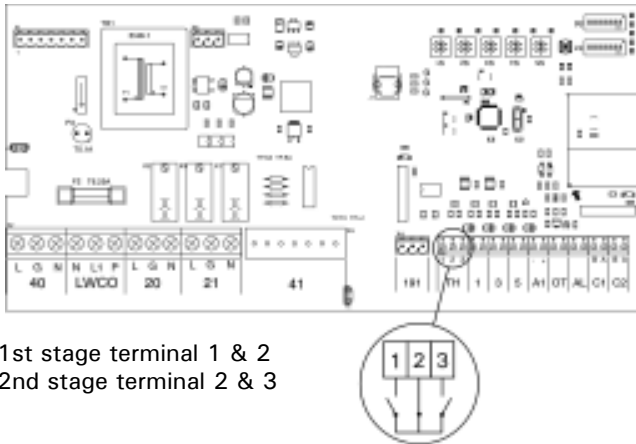
- ▼ Signal direction: Control unit → burner
- ▲ Signal direction: Burner → control unit

The connection is made via the extension for 2-stage/modulating burner.



See Installation Instruction for boiler and extension for 2-stage/modulating burner.

Room Thermostat Connection



1st stage terminal 1 & 2
2nd stage terminal 2 & 3

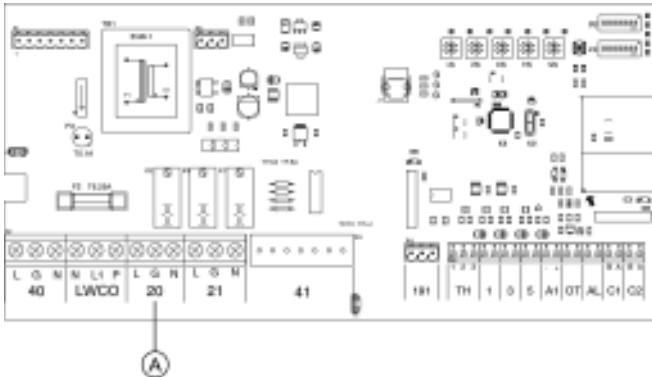
Note: the control board viewed from the rear/top.

A room thermostat or end-switches from zone valves (in multi-zone systems) can be connected to the room thermostat connection. Connection must be potential-free (“dry contact”).

1. Feed the cabling from the room thermostat through rear top panel wiring gate of the boiler. Use 2 conductor AWG 18 copper wire only.
2. Slide cable into the strain relief and secure with strain relief set screw.
3. Connect wires to main circuit board as shown.
4. Set thermostat anticipator to 0.1 A.

Note: Regardless of the programmed control functionality with respect to the dip and rotary switches, the TT function will always have the ability to call on the 1st and/or 2nd stage.

Boiler/Space Heating Pump Connection



(A) Boiler pump connection 20

Note: the control board viewed from the rear/top.

The Vitotronic 100, KW10B incorporates a 120 VAC pump output with a maximum full load of 3A. The operation of the boiler pump is a function of a number of factors based on the control’s DIP switch settings, such as operation based on boiler temperature or based on thermostat terminal demands. Refer to the DIP switch setting information on page 23.

This is also used to minimize the possibility of flue gas condensation with the following boilers:

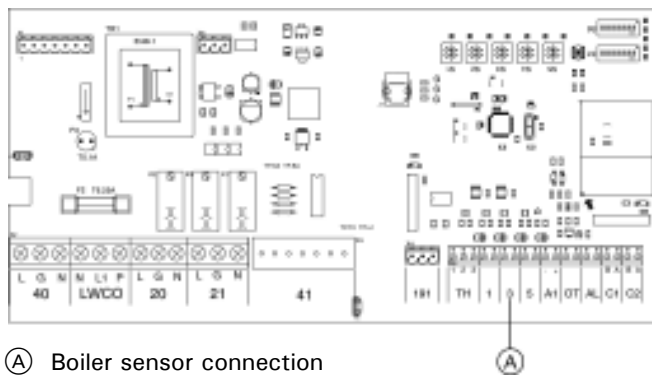
- Vitorond 100, VR1 Series
- Vitogas 050, RS Series
- Vitogas 100, GS1 Series



See Installation Instructions for the Pump Junction Box (junction box not required for KW10B control)

The Vitola 200 boiler has no low limit.

Boiler Sensor Connection



(A) Boiler sensor connection

Note: the control board viewed from the rear/top.

Installation of the boiler sensor

1. Insert the boiler sensor into the boiler sensor well. DO NOT kink any of the surrounding capillaries.
2. Route cabling to boiler control between enclosure panels and insulation jacket.

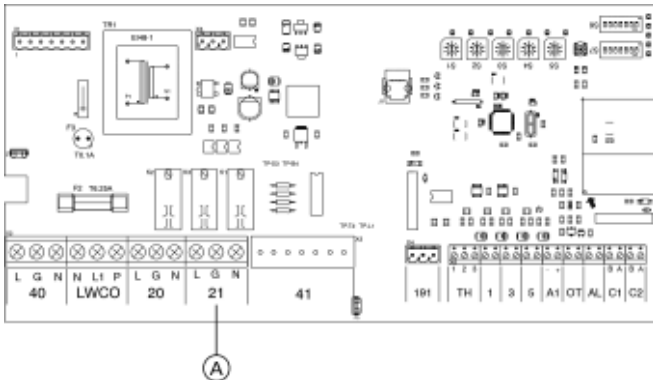
Electrical connections

3. Connect the boiler sensor wires to connector X6 terminal 3.1 and 3.2, (A) as shown.



Refer to the specific boiler installation manual for boiler sensor installation.

DHW Pump Connection



(A) DHW pump connection

Note: the control board viewed from the rear/top.

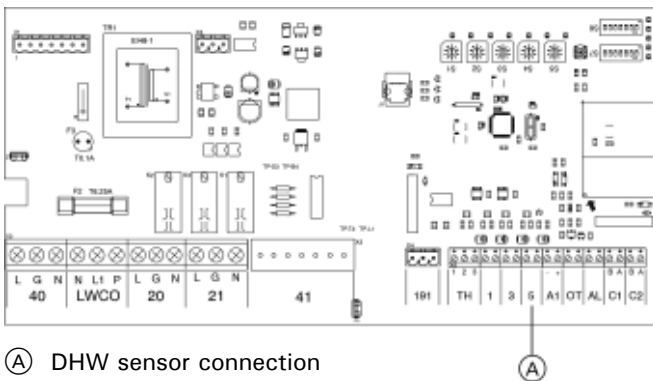
The KW10B is able to control a DHW pump when the OT or the DHW set point functionality is turned on.

The connection of a 120VAC, with a full load of 3A pump is connected to the 21 output of the control at the LGN terminal connections.

Operation of the DHW pump is a function of the DIP and dial switch settings of the control. Refer to the specific settings for various options. See page 22.

A 120VAC pump with a full load of 3A is connected at the LGN terminals of output 21.

DHW Sensor Connection



(A) DHW sensor connection

Note: the control board viewed from the rear/top.

The DHW sensor is connected to terminals 1 and 2 of the #5 connection on the control.

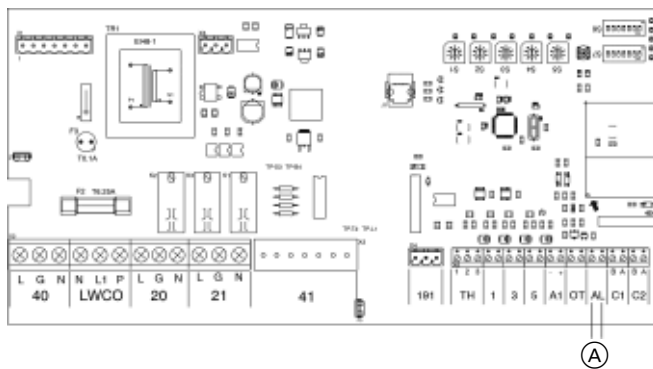
The sensor should be installed into the tank well as per the manufacturers' instructions to provide proper temperature sensing.

To enable the DHW functionality, refer to the start-up section in this manual.

Follow the instructions for boiler sensor connections on page 14.

Connect the DHW sensor wires to control X6, terminals 5.1 and 5.2 (A) as shown.

Alarm Output



(A) Alarm output connection

The KW10B control has a dry contact alarm output.

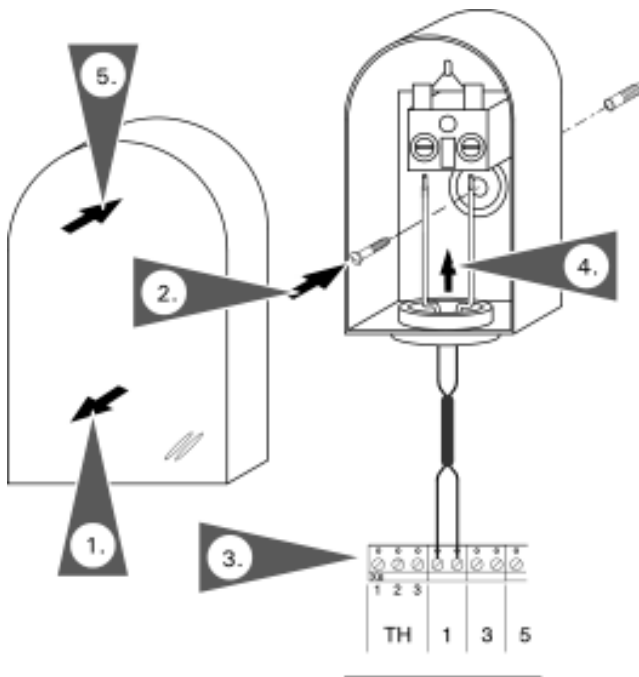
An alarm output is generated whenever there is a fault generated from the following:

- outdoor sensor failure (open)
- outdoor sensor failure (short)
- boiler sensor failure (open)
- boiler sensor failure (short)
- DHW sensor failure (open)
- DHW sensor failure (short)
- burner fault
- LON communication failure (after 20 min.)

The fault will clear automatically once the actual fault is corrected.

Contact rating: 24VAC/DC 1FLA

Outdoor Temperature Sensor Installation



To mount outdoor temperature sensor, experience has shown that the north or north-west outside wall of the building is the best location. If, however, the boiler is intended to supply heat to the south side of the building only (split piping system), the sensor must be mounted on the south side.

The sensor must be mounted so that water cannot infiltrate the sensor housing.

Care must be taken to install the sensor where it will not be affected by heat sources such as windows or ventilation openings. The sensor should be installed far enough above the ground to prevent accidental damage or tampering. Operating temperature range is -60°F to 160°F (-50°C to 70°C). Total cable length from boiler to sensor should not exceed 95 ft. (35 m) if AWG 18 gage wire is used. This sensor cable should not be placed in direct contact with line voltage.

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 ft. to 8.2 ft. (2 m 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. In addition, the outdoor sensor must not be covered with mortar, stucco, paint or any form of coating or siding. If the outside wall is finished after the sensor is installed, the sensor should be removed and placed on the finished wall.

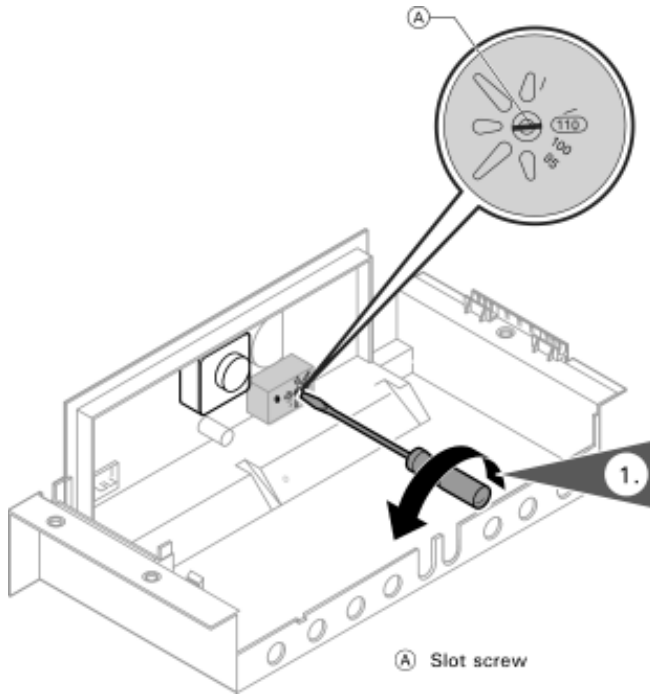
3. Connect the outdoor temperature sensor to connector X6, terminals 1.1 and 1.2 (as shown) on the boiler control board (wires are non-polarized).
Cable specifications: 2-wire cable, max. cable length 95 ft. (35 m) with a wire size of min. AWG 18 copper.

IMPORTANT

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

4. Route cable from the boiler control board to the outdoor sensor. Connect cable to sensor terminals (wires are non-polarized).
5. Place cover on base and snap into place.

Fixed High Limit



The FHL deactivates the burner control circuit if abnormally high temperatures occur.

If tripped, it may be reset by pushing in the pin, labelled with a "⌞" (using a ballpoint pen). If a "click" can be heard, the limit was tripped.

Adjustment to 212° F (100° C)

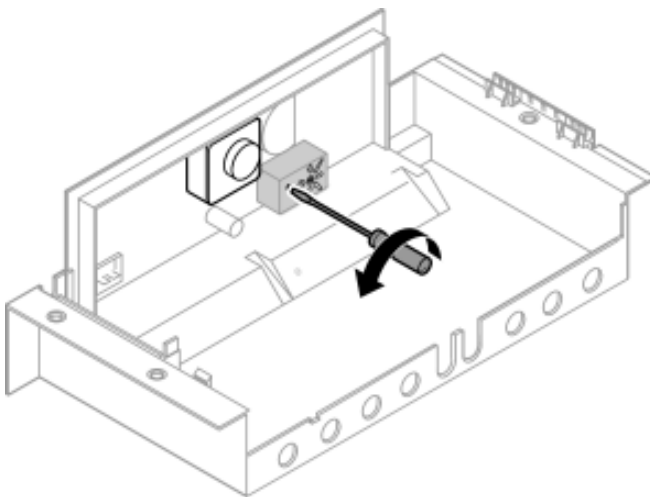
1. Turn indicator screw at rear of FHL to 212° F (100° C) position using a flat-head screwdriver (readjustment to previous position is not possible).
2. Please complete Protocol on page 34.

Note: the default setting of the fixed high limit (FHL) is 230° F (110° C).

CAUTION

If adjusting the fixed high limit to 212° F (100° C), DO NOT set adjustable high limit higher than 167° F (75° C).

Changing the Setting of the Fixed High Limit Safety Cut-out



Adjustment to 100° C for side scales

Turn the screw until the indicator points to 100° C.

- Safety feature: if capillary is not liquid tight (leaks), switch deactivates

IMPORTANT

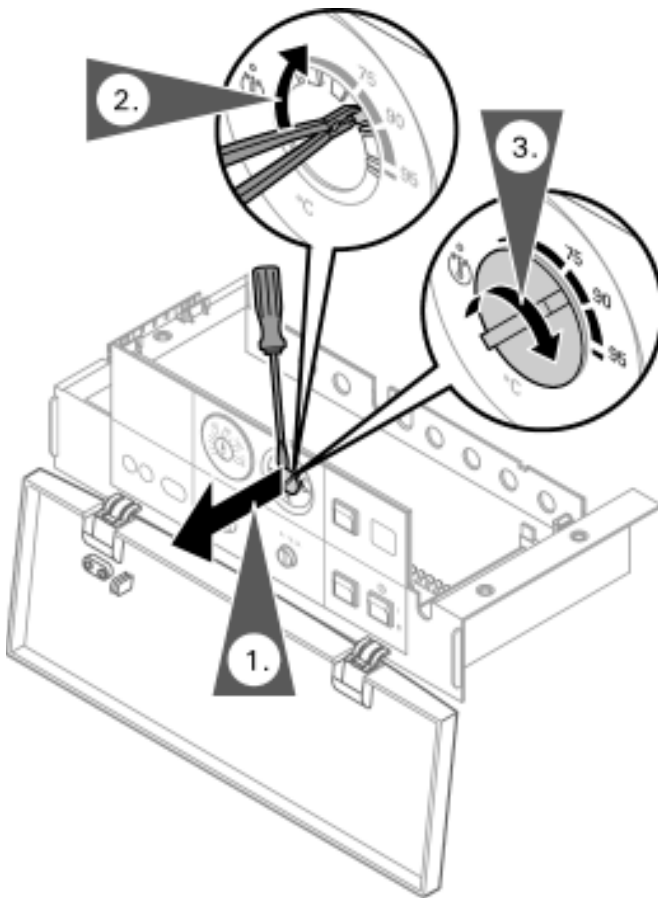
Due to the expansion characteristics of the liquid contained in the capillary, the switch also deactivates (opens) at 14° F (-10° C) thereby shutting down the heating system.

- Sets a maximum limit for boiler water temperature where after the switch deactivates and locks (factory setting 230° F (110° C))
- Adjustable to 212° F (100° C) via slot screw on rear side (readjustment to previous position is not possible)

WARNING

If adjusting to 212° F (100° C), AHL must not be set higher than 167° F (75° C).

Adjustable High Limit



The default setting of the adjustable high limit (AHL) is 167° F (75° C).

The AHL sets the maximum boiler water temperature. It deactivates the burner control circuit when the desired temperature is reached. The AHL resets automatically on a decrease in boiler temperature.

Adjustment to 189° F (87° C)

- Electro-mechanical temperature limit with liquid filled capillary
- Controls maximum boiler water temperature [Factory setting 167° F (75° C)]
- Adjustable to 189° F, 203° F and 212° F (87° C, 95° C and 100° C) by breaking off tabs enabling dial to rotate right to desired maximum temperature.

CAUTION

If adjusting the fixed high limit to 212° F (100° C), DO NOT set adjustable high limit higher than 167° F (75° C).

WARNING

AHL setting must be at least 36° F (20° C) higher than DHW tank temperature.

IMPORTANT

The AHL must not be set higher than 167° F (75° C) if the FHL is set to 212° F (100° C).


Altering the Indoor/Outdoor Control Setting Internal

The adjustable high limit determines the maximum available boiler (supply) temperature. Therefore, it functions as a high limit.


The curve for the outdoor reset function can be adjusted by opening the control top cover.

Factory settings

Heating curve slope (S4)

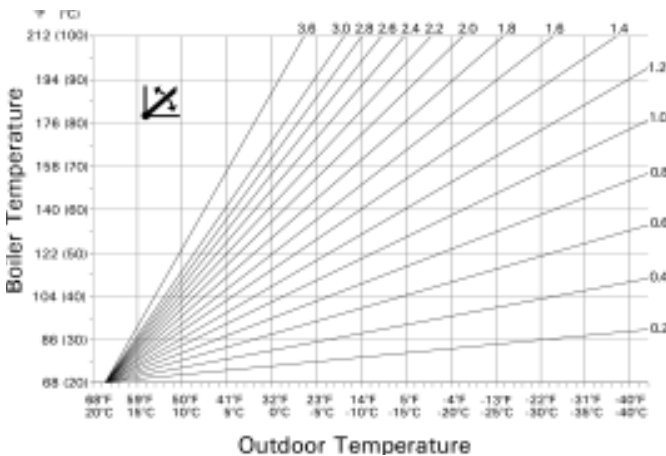
 selection = 1.2

Warm weather shut-down (WWSD) (S5)

 selection = 70 °F (21 °C)

Slope adjustment

As outdoor temperatures drop, heat losses from a space become greater and the heating system supply water temperature must be raised to maintain a constant room temperature. The heating curve value describes how many degrees the supply water temperature is raised for a one degree drop in outdoor temperature. The supply temperature starts to increase when the outdoor temperature falls below the warm weather shut-down (WWSD) setting.



Note: The graph displays various slopes for a single WWSD setpoint of 18° C.

To calculate the correct setting for the heating curve, use the following formula:

heating curve slope =

$$\frac{\text{design supply temp.} - \text{WWSD temp.}}{\text{WWSD temp.} - \text{design outdoor temp.}}$$

Example:

design outdoor temp.: 5 °F (-15 °C)
 WWSD temperature: 70 °F (21 °C)
 design supply temp.: 160 °F (71 °C)

heating curve slope =

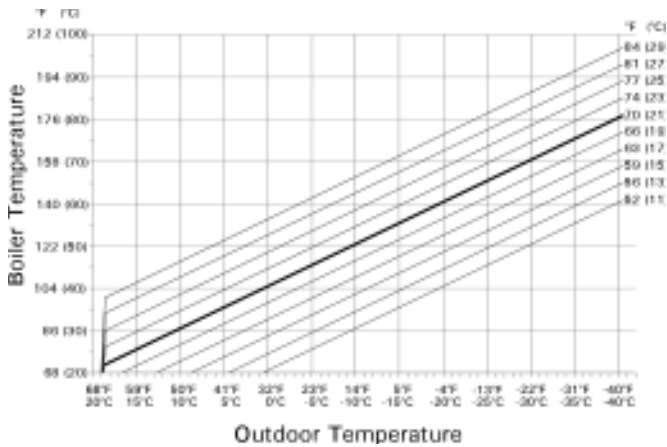
$$\frac{160^{\circ} \text{ F} - 70^{\circ} \text{ F}}{70^{\circ} \text{ F} - 5^{\circ} \text{ F}} = \frac{90^{\circ} \text{ F}}{65^{\circ} \text{ F}} = 1.4$$



For further assistance, please see section entitled "Helpful hints" in the Operating Instructions and User's Information Manual.

Altering the Indoor/Outdoor Control Setting Internal *(continued)*

Warm weather shut-down adjustment



The reset function starts at the warm weather shut-down (WWSD) point and supplies increasingly more heat to a building to make up for the greater heat loss as outdoor temperatures get colder.

When the outdoor temperature rises above the setting of the WWSD dial, no more heat is required by the control, and the boiler will be shut down. The WWSD dial setting shifts the heating curve up or down in parallel, increasing or decreasing the system supply water temperature (and consequently, the indoor air temperature) at all outdoor temperatures.

If the indoor air temperature is too hot or too cold at all outdoor temperatures, the WWSD setting is probably incorrect and should be checked and adjusted to suit your requirements.



For further assistance, please see section entitled "Helpful hints" in the Operating Instructions and User's Information Manual.

After Installation

Checklist

Please verify the following points (check with a pen) and take corrective actions as necessary:

- Have all limit capillaries and sensors been completely inserted into the boiler 5-point sensor wells?
- Have all electrical connections been made as discussed in the previous section?
- Did all plug-in connectors engage with a “click” ?
- Have the settings of both the fixed high limit and the adjustable high limit been checked and altered as necessary?

Service binder

1. File all technical documentation into the Service Binder.
2. Install a protective service box (optional equipment) near the boiler and store the Service Binder in this location.

Start-up Instructions

1. Check all connections

Based upon the Section entitled “Overview” on page 10, ensure all electrical connections have been made according to the diagram.

2. Ensure settings on fixed high limit and adjustable high limit are correct. See pages 17 to 18.

3. Ensure correct operational settings on control are set

Read Operating Instructions and User’s Information Manual of Vitotronic.

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


Switches

Front panel switches

Power switch	Turns control power ON or OFF
Summer mode switch	Only works if the outdoor temperature is above 37° F (3° C)
Override switch	Overrides call for heat


Note: The dial and DIP switches are found on the main control board (see pages 10 for location) and the front panel switches are on the front of the control (see pages 11 for location and description).

Dial switches

Dial switch	Position 0	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7	Position 8	Position 9
										
S1 Boiler LON address and self binding reset	To work as a single boiler with HK1/3 mixing valve controls	Address boiler on LON to communicate with Viessmann cascade controls				These addresses are used with special custom control panels				Reset control back to self binding mode with service button
S3 DHW set point	Disable DHW	104° F (40° C)	113° F (45° C)	122° F (50° C)	131° F (55° C)	140° F (60° C)	N/A			Set S3-9 for use with Versatronic 200 control
S4 Curve slope	0.4	0.6	0.8	1.0	1.2	1.6	2.0	2.4	3.0	3.6
S5 WWSD set point	52° F (11° C)	55° F (13° C)	59° F (15° C)	63° F (17° C)	66° F (19° C)	70° F (21° C)	73° F (23° C)	77° F (25° C)	81° F (27° C)	84° F (29° C)

Switches *(continued)*

DIP switches

DIP switch 	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7
S6	LON enabled ON or OFF	Boiler pump post purge delay ON - 4 min. OFF - No delay	Boiler pump continuous operation ON - Enabled OFF - Disabled (works on TT only)	Minimum boiler temp. pump operation ON - Enabled OFF - Disabled	OpenTherm thermostat ON - Enabled OFF - Disabled	Internal outdoor reset function ON - Enabled OFF - Disabled	Auxiliary input function ON - 0-10V Boiler set point OFF - Override boiler to 176° F (80° C) External dry contact demand

Boiler pump post purge

When switch S6.2 is turned ON, a boiler pump post purge of 4 minutes is active when a TT demand is removed or when the internal outdoor reset function enters warm weather shut down. In the OFF position, the boiler pump will turn off immediately after the call for heat or entering WWSD based on the outdoor reset function.

Boiler pump continuous operation

When switch S6.3 is turned ON, the boiler pump will operate continuously. If the control is programmed for internal outdoor reset functionality, the pump will shut down when in WWSD for a period of more than 30 minutes. As soon as the outdoor temperature drops below the WWSD setting, the pump will turn back on. The pump will be enabled if the front mounted override switch is turned ON.

Minimum boiler water temperature protection

When switch S6.4 is turned ON, the boiler pump which is connected to the 20 output of the boiler control will be turned off. When a boiler water temperature is below the minimum, the boiler temperature pump operation is sensed. This will assist in the rapid temperature increase of the boiler as well as not allowing a continuous return of low temperature boiler water back to the boiler.

OpenTherm thermostat enable

When switch S6.5 is turned ON, the OpenTherm functionality is turned ON (should the OT thermostat be connected). When switch S6.5 is left in the OFF position, there will be no data exchange between the control and OT thermostat, while the thermostat may have a display present.

Internal outdoor reset function

When switch S6.6 is turned ON, the internal outdoor reset function is enabled. Rotary dials 4 and 5 are used to select the slope and WWSD point respectively. When switch S6.6 is left in the OFF position, the TT demand as well as the A1 auxiliary contact functionality will provide a call for heat.

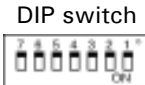
Auxiliary contact function (A1)

When switch S6.7 is turned ON, the boiler temperature set point is a function of the input potential. When switch S6.7 is in the OFF position, a dry contact closure at A1 will generate a boiler temperature set point of 176° F (80° C).

Staging of the boiler will take place. The boiler pump will not be activated with this demand input. See page 25 for additional operation information.

Switches *(continued)*

DIP switches

DIP switch 	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7
S7	DHW priority	DHW pump post-purge timer	DHW pump post-purge timer delay	DHW priority override timer (fixed at 1 hour)	DHW boiler temperature function (delay DHW pump until warm enough)	Electronic minimum boiler water temperature	Minimum temperature selection
	ON - Enabled	ON - Enabled	ON - 60 sec.	ON - Enabled	ON - DHW + 10° C for pump to turn on	ON - 131° F (55° C)	ON - 131° F (55° C)
	OFF - Disabled	OFF - Disabled	OFF - 120 sec.	OFF - Disabled	OFF - DHW pump turns on immediately	OFF - 41° F (15° C)	OFF - 113° F (45° C)

DHW priority

By default, S7.1 is set to the off position. When there is a DHW call, both the DHW pump and space heating pump operate at the same time. When S7.1 is turned to the ON position, the space heating pump will be turned off during a DHW call to allow boiler output to be dedicated to the DHW tank.

DHW pump post purge timer

By default, there is no DHW pump post purge. If S7.2 is turned ON, the post purge will be enabled, allowing the the DHW pump to continue running after the DHW call has finished. The extra pump operation time helps to remove excess heat from the boiler to prevent unwanted tripping of the mechanical limits.

DHW pump post purge timer delay

S7.3 in the OFF position - 120 seconds
S7.3 in the ON position - 60 seconds

DHW priority override timer (Fixed at one hour)

The DHW priority override timer is intended to prevent the continuous operation of the DHW pump in an effort to satisfy DHW loads. When S7.4 is turned ON, if there is a DHW call for more than an hour, the space heating pump will allow to operate, allowing space heating to function. The override timer can only be reset by satisfying the DHWW demand at the current set point or reducing the set point.

DHW boiler temperature function

When there is a DHW call and S7.5 is in the OFF position, the DHW pump will turn ON immediately. Turning S7.5 to the ON position, will delay the operation of the DHW pump until the boiler is 18° F (10° C) hotter than the current tank temperature.

Minimum boiler water temperature protection

When S7.6 is in the OFF position, a minimum boiler water temperature will not be maintained. If a minimum boiler water temperature is required of the boiler, S7.6 must be turned on.

Minimum boiler water temperature selection

S7.7 in the OFF position - 113° F (45° C)
S7.7 in the ON position - 131° F (55° C)

Pump Priority Sequences

Boiler pump priority sequence

Sequence #	Condition	True Condition
0	Default (start of sequence)	OFF
1	Continuous operation enabled [SW6-3 ON]	ON
2	Warm Weather Shut Down in effect: Summer mode switch enabled and outdoor air temperature > 37° F (3° C) or OAT above WWSD setpoint [S5] for 30 minutes	OFF
3	OpenTherm request boiler pump	ON
4	Thermostat call (post purge for 4 minutes if [SW6-2] enabled)	ON
5	Delay pump until boiler temperature of at least 131° F (55° C) [SW6-4 ON]	OFF
6	DHW priority enabled [SW7-1] and DHW demand	OFF
7	Boiler sensor fault	ON
8	Override switch enabled	ON

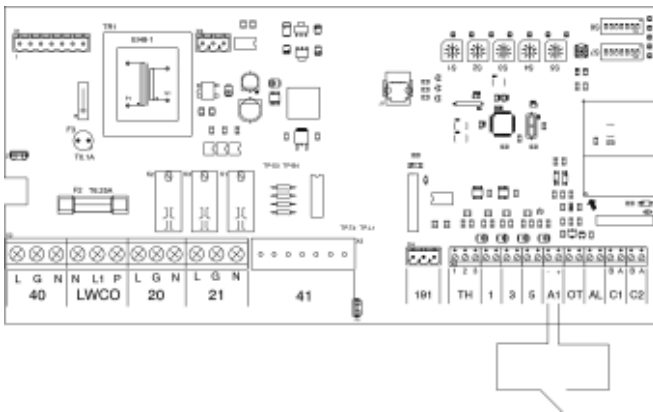
DHW pump priority sequence

Sequence #	Condition	True Condition
0	Default (start of sequence)	OFF
1	If DHW tank temperature falls below approx. 3.6° F (2° C) of DHW setpoint	ON
2	Delay pump until boiler temperature is approx. 18° F (10° C) above DHW temperature [SW7-5]	OFF
3	Disable DHW pump after one hour of continuous DHW pump operation	OFF

Note: Higher priority overrides the previous setting

Alternate Control Function

A1 Auxiliary input - heat demand



This auxiliary input A1 can be used for one of two functions based on the DIP switch setting (S6.7). Refer to the altering settings on page 23 of this manual.

By default (with S6.7 in the OFF position), the control comes set to allow a dry contact to provide a demand to the control. A typical application for this kind of demand may be a call from zone valve, snow melting demand, external heat demand or any other kind of demand that is required over and above the outdoor reset function.

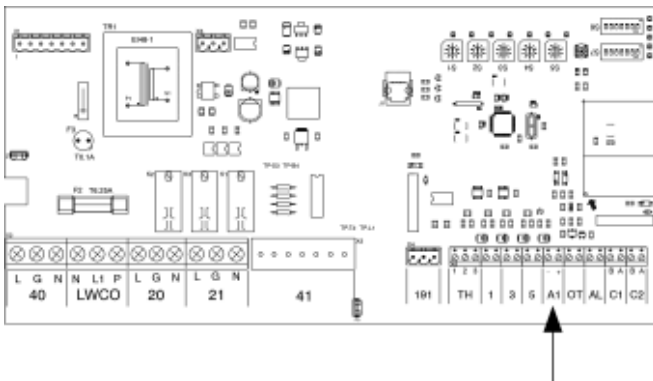
When the control senses a closed contact, the internal control set point is set to 176° F (80° C). The stages will be fired to satisfy the new boiler set point.

Opening the contact will reset the boiler to the current set point that is being calculated either from DHW or outdoor reset.

! WARNING

Ensure that only dry contacts are applied here as damage to the PCB may occur otherwise.

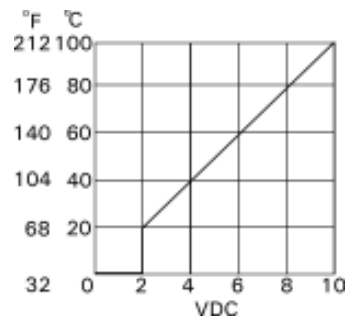
A1 Auxiliary input - 0-10VDC



The second function of the A1 auxiliary input (with S6.7 ON) is the ability to provide the control with a 0-10VDC input signal to generate a boiler temperature set point.

Once the DIP switch is set correctly (see details on page 23), the signal can be applied to the control on the + and - terminals. The signal is scaled from 2VDC to 10VDC to equate to set point of 68° F (20° C) to 212° F (100° C) respectively.

Signal below 1.9VDC will generate a 32° F (0° C) set point.



Diagnostics (for qualified service personnel only)

Failure, cause, correction

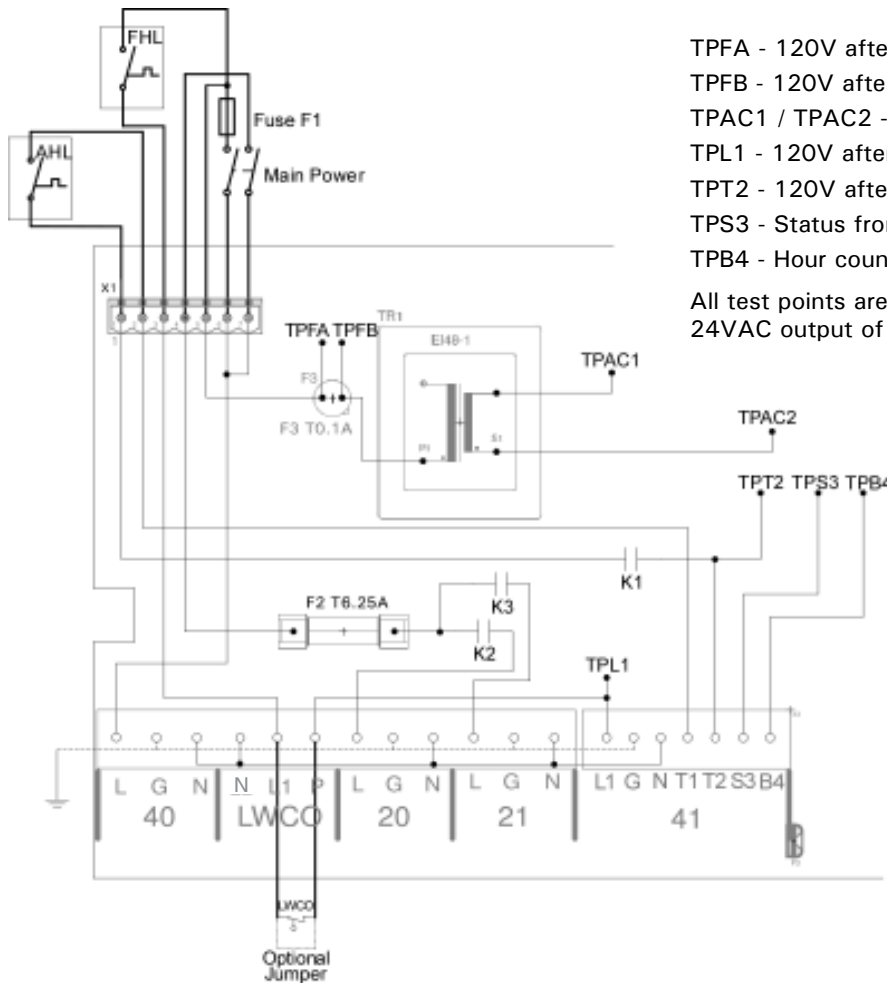
- Are all controls operating properly (i.e. thermostats, low water cut-off, etc.)?
- Are all wire connections tight and secure?

Symptom/Condition	Cause	Correction
Boiler control is not active (GREEN power LED is not illuminated)	Power switch "ⓘ" is in "○" position	Ensure power switch "ⓘ" is in "I" position.
	Main power to boiler control and heating system has not been activated	Activate main power; ensure 120 VAC is supplied to control (receptacle).
	Fuse on Vitotronic boiler control has deactivated heating system	Replace fuse in control with same type and rating (F1: T 6.3 A / 250 V, slow blow).
Burner does not activate, or activates intermittently (RED fault LED flashes)	Burner is not electrically connected	Ensure 7-pole 41 plug-in connection to burner and/or power venter is/are made.
	Fixed high limit (FHL) tripped	Reset FHL by pushing in the pin, labelled with a "↑" (using a ballpoint pen). If a "click" can be heard, the limit was tripped.
	No fuel *1	<i>with oil:</i> Ensure sufficient supply of oil <i>with gas:</i> Open main gas supply valve or contact your local gas utility
Pumps on continuously	F1 fuse blown	Replace fuse
Burner does not activate	Control calls for heat but burner does not respond *1	Attempt to reset burner using reset button on the burner (underneath burner hood). Service burner if necessary. Refer to troubleshooting section in burner manual.
	Control calls for heat but burner does not respond	Power venter has to have separate 120 VAC power supply to motor (see power venter instructions). Refer to troubleshooting section in power venter manual. Air proving switch, blower wheel or timer/relay inside power vent may be defective.
	Other accessory defect	Ensure proper operation of all accessories; replace if necessary. Refer to technical literature supplied with accessories.
	F1 fuse blown	Replace fuse
Continuous burner call	F3 Fuse blown	Replace fuse
	Override switch on	Turn off override

*1 Red LED does not flash when Honeywell S8600 ignition control module is used with boiler.

Diagnostics (for qualified service personnel only) *(continued)*

Test points



- TPFA - 120V after F1 before F3
- TPFB - 120V after F3 before primary of transformer
- TPAC1 / TPAC2 - 24VAC output of transformer
- TPL1 - 120V after F1, FHL and LWCO
- TPT2 - 120V after AHL and K1
- TPS3 - Status from burner
- TPB4 - Hour counter from burner

All test points are with respect to neutral except for 24VAC output of transformer.

120V power flow

The controls connected power cord is fastened to terminal 40 L/G/N of the control. This provides 120VAC voltage to the PCB on the X2 terminal strip. The 120VAC is routed to the X1 quick disconnect plug where the main power switch is terminated.

The power switch, switches two legs of the 120VAC voltage power supply. One leg of the 120VAC is fed through the power switch to the F2 fuse inside of the control which fuses the two pump outputs 20 and 21. The second leg of the power switch routes 120VAC to the main F1 fuse.

From the F1 fuse, 120VAC is supplied to the fixed high limit (FHL) as well as the fuse for the transformer located inside of the control F3.

The FHL, if closed, allows the 120VAC signal to be routed through the PCB to the L1 connection on X2 for the LWCO. The LWCO, if closed will allow the 120VAC to be present at P of the X2 terminal strip.


The 120VAC signal will be present at L1 of the 41 burner plug, which can be verified at TPL1. The burner connection allows the signal to be re-routed to the T1 of the 41 burner plug, The 120VAC signal is then routed through x1.2 to the adjustable high limit (AHL).

The AHL connection routes the 120VAC signal back onto X1.1 terminal on the PCB.

When there is a call for heat signal present in the control, the 120VAC signal shall be present on the contacts of the K1 relay which can be measured at TP-T2 and confirmed with the burner firing. As soon as the call for heat is no longer present, the burner call for heat will stop.

Diagnostics (for qualified service personnel only) *(continued)*

Dial switch

Dial switch 	Position 0	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7	Position 8	Position 9
S2 Relay test	Normal operation	All relays off	Pump 20 relay test	Pump 21 relay test	Burner 1 stage test	Burner 1 stage test	Alarm output relay test	N/A		

IMPORTANT

The relay test will supercede all other control functions.
The dial must be in the "0" position for normal operation.

Front panel LEDs

Burner failure indicator (red)	- Blinking if LWCO or FHL is tripped - Blinking if S3 status is on (burner failure)
Power indicator (green)	- Steady on for power (no faults) - Blinks once if outdoor sensor fault - Blinks twice LON communication fault - Blinks three times if boiler sensor fault - Blinks five times if DHW sensor fault
Burner status indicator (red)	- Steady on for burner status (no faults) - Steady on if call for heat is on (T2 status)

Note: The dial switch is found on the main control board and the front panel switch and LEDs are on the front of the control (see pages 9 and 10 for location).

Temperature sensors

Failure	Description
Missing, open or short outdoor temperature sensor	- Only a fault if the outdoor reset is enabled (SW6-6) - Without sensor, the outdoor temperature is set to -4° F (-20° C)
Missing, open or short boiler temperature sensor	- Boiler temperature is 32° F (0° C)
Missing, open or short DHW temperature sensor	- No fault when S3 is set to 0 (DHW disabled) - DHW temperature is set to 212° F (100° C), effectively disabling DHW

Outdoor temperature sensor resistance chart

To verify the operation of the outdoor temperature sensor use the chart below.

Temperature		Resistance	Temperature		Resistance
°F	°C	Ω	°F	°C	Ω
-76	-60	698961	86	30	4028
-58	-50	333908	104	40	2662
-40	-40	167835	122	50	1801
-22	-30	88340	140	60	1244
-4	-20	48487	158	70	876
14	-10	27648	176	80	628
32	0	16325	194	90	458
50	10	9952	212	100	339
68	20	6247	230	110	255
77	25	5000	248	120	194

5712 717 v1.0

Diagnostics (for qualified service personnel only) *(continued)*

Boiler and DHW temperature sensor resistance chart

To verify the operation of the boiler and DHW temperature sensor use the chart below.

Temperature		Resistance	Temperature		Resistance
°F	°C	Ω	°F	°C	Ω
-40	-40	336,050	113	45	4,367
-31	-35	242,397	122	50	3,601
-22	-30	176,785	131	55	2,985
-13	-25	130,295	140	60	2,487
-4	-20	96,999	149	65	2,082
5	-15	72,906	158	70	1,752
14	-10	55,301	167	75	1,480
23	-5	42,315	176	80	1,256
32	0	32,650	185	85	1,070
41	5	25,394	194	90	916
50	10	19,903	203	95	787
59	15	15,714	212	100	678
68	20	12,493	221	105	587
77	25	10,000	230	110	510
86	30	8,056	239	115	444
95	35	6,530	248	120	388
104	40	5,325	257	125	341

Testing the FHL

CAUTION
 Connected low temperature (floor heating) systems, whether connected with or without mixing valves, must be deactivated during this procedure. Attached DHW tanks must be isolated and proper water expansion to the expansion tank must be guaranteed before performing this test.

CAUTION
 FHL test connection is a 120 VAC circuit!

CAUTION
 Boiler and burner must be supervised during entire procedure. Allow boiler water temperature to cool down to 140° F (60° C) before activating any attached heat distribution system.

A test can be performed to ensure proper operation of the FHL. Make sure all of the necessary safety precautions are taken before the test is started.

Power down the control by using the power switch located on the front of the control. Disconnect the 120V power supply to the control.

Locate the AHL from within the control and remove the two wires connected to it, leaving the third green ground wire connected to the limit. Locate the AHL jumper in the accessory bag. Insert the one end of the jumper into one of the connectors removed from the AHL in the previous step. The other end of the jumper will be inserted into the other connector removed from the AHL.

Once the jumper is correctly installed, reconnect the 120V power supply to the control, turn the control ON with the power switch which was previously turned OFF. A thermostat terminal call for heat is required to generate a continuous heat demand to allow the boiler to fire above the FHL setting.

Once the FHL temperature is exceeded, the burner will shut down. The boiler will need to cool down sufficiently to allow the FHL to reset. Press the center of the FHL with a pen or small screwdriver. A click may be heard or felt once it has completely reset.

When the test is completed, disconnect the 120V power supply to the control, turn the power switch off. Disconnect the wires from the AHL jumper connector and reinstall the wires to the back of the AHL.

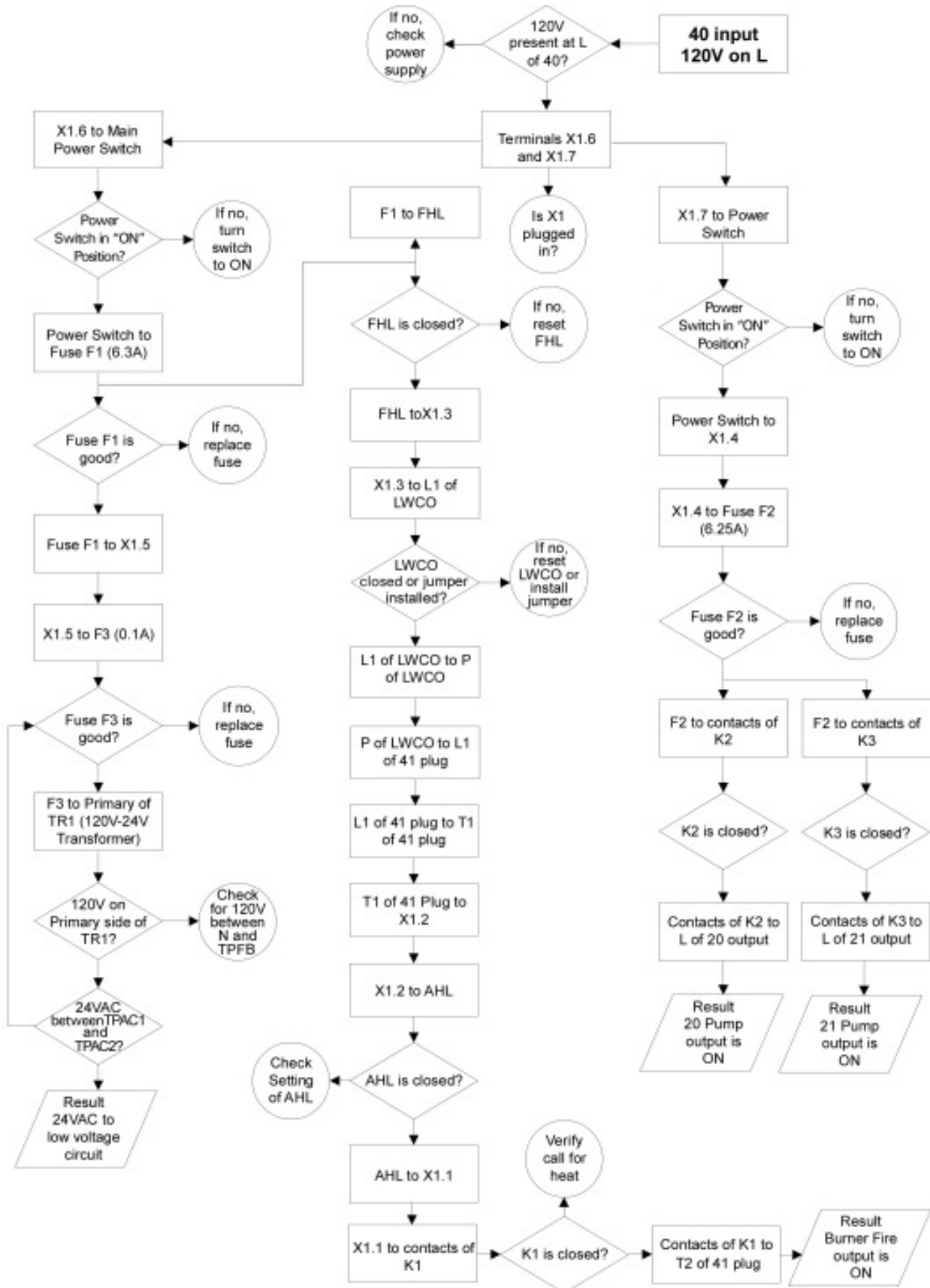
Once the wires have been returned to their original location on the AHL, reconnect the 120V power supply to the control, turn the control ON with the power switch.

Remove the thermostat terminal call for heat to verify the burner shuts down.

Return AHL jumper back to the accessory bag.

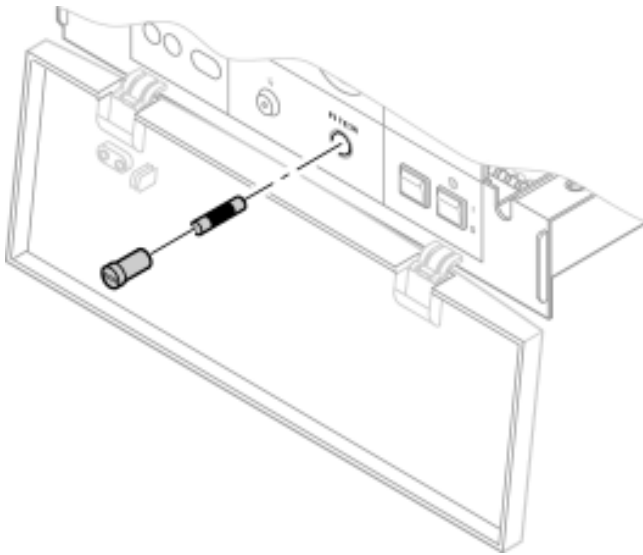
Diagnostics (for qualified service personnel only) *(continued)*

Flow chart



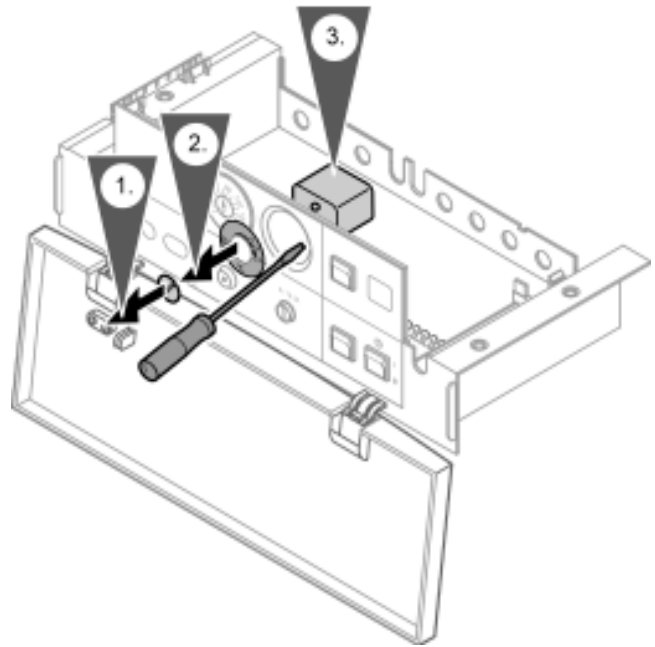
Replacement Components (for qualified service personnel only)

Fuse

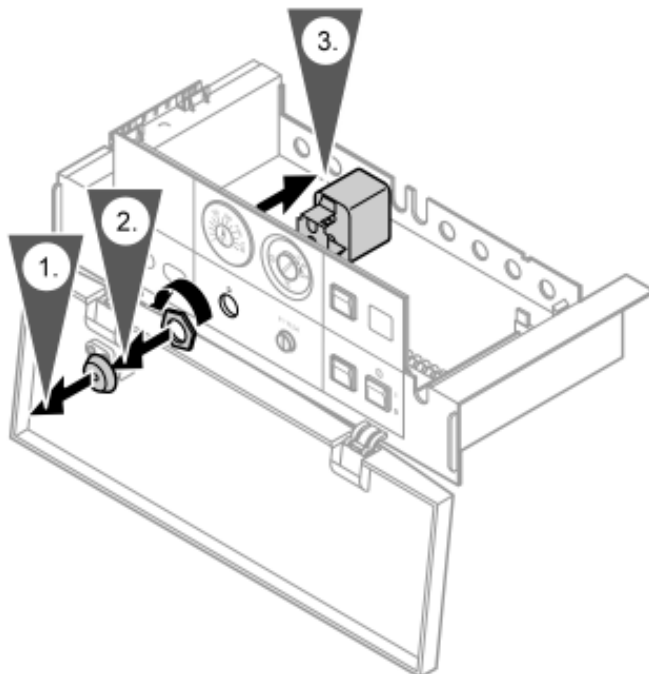


F1: T 6.3 A / 250 V, slow blow for control operation

Adjustable high limit



Fixed high limit



1. Remove the front cap using a flat-head screwdriver.
2. Remove the dial.
3. Remove the two screws holding the adjustable high limit and remove.

1. Remove cap using a flat-head screwdriver.
2. Unscrew nut from high limit shaft.
3. Pull out high limit and remove.

Parts List

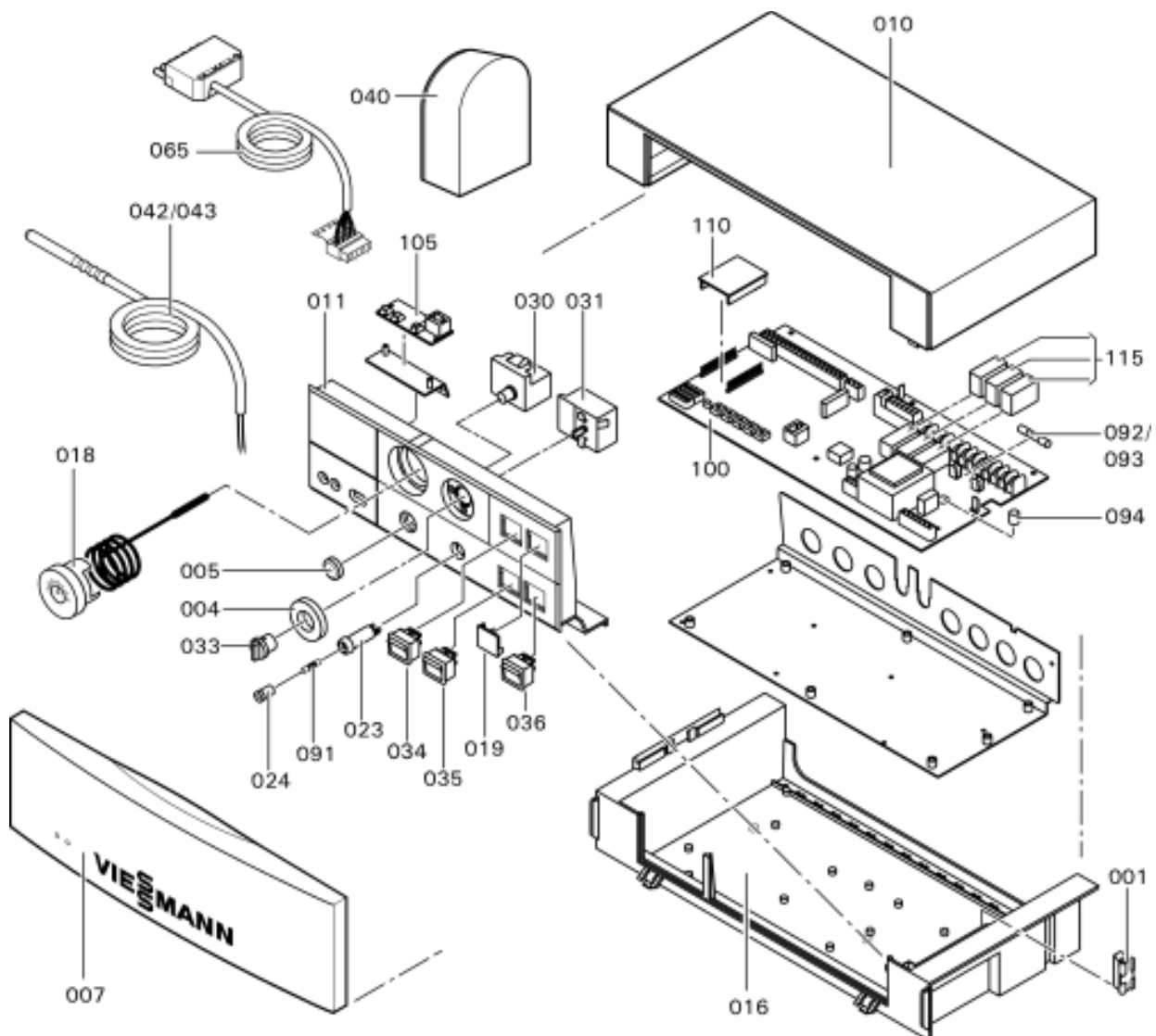
Model: KW10B

Ordering Replacement Parts

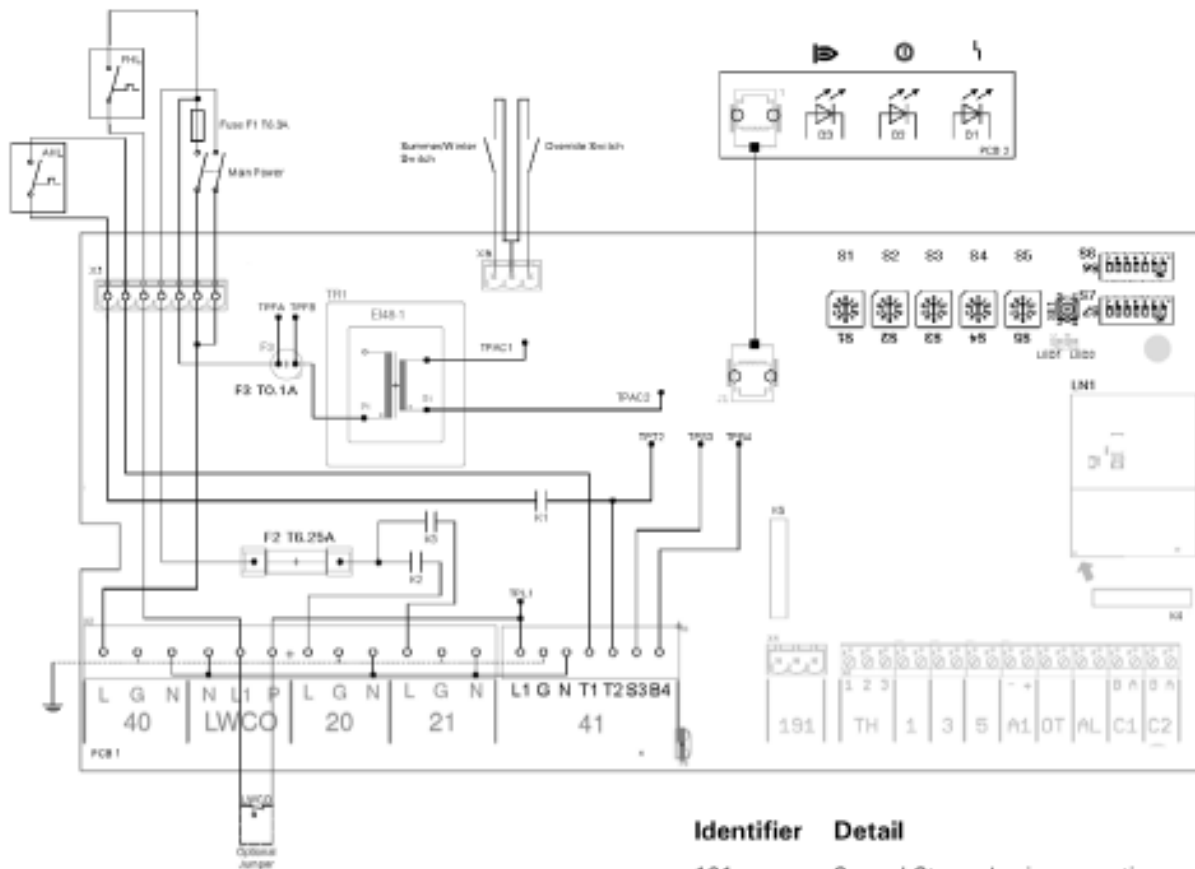
Please provide control Model No., Serial Number from rating plate, as well as the position number of the part (see Parts List) when ordering replacement parts. Order replacement components from your Viessmann distributor.

Parts

001 Cable clip	031 Adjustable high limit, 1 = 1750 mm	110 LON communication module
004 Adjustable high limit dial	033 AHL knob	115 Relay 24 VAC DPDT
005 Fixed high limit cover	034 Override switch	Wear Parts
007 Flip-down cover	035 Space heating circuit switch	091 Fuse 6.3A / 250V (package of 10)
010 Control housing cover, top	036 On/Off switch	092 Fuse 6.25A / US style (package of 5)
011 Control housing, front	040 Sensor for outdoor, 5K	094 Fuse 0.1A / 250V (package of 5)
016 Control housing, bottom	042 Sensor #3 for boiler, 10K	Other Parts (not illustrated)
018 Thermometer, °C/°F	043 Sensor #5 for DHW, 10K	120 Interconnector 1/4
019 Switch knockout	065 Control cable w/ # 41 plug *1	200 Installation Instructions
023 Fuse holder	093 Fuse cover	201 Operating Instructions
024 Fuse holder cover	100 Motherboard	202 Parts list
030 Fixed high limit, 190 x 1760 mm	105 Circuit board, LED	*1 Shipped with burner or boiler.



Wiring Diagram



Identifier	Detail
PCB1	KW10B Motherboard
PCB2	KW10B Diode Board
F1	Main Control Fuse (front panel)
F2	Pump Fuse
F3	Transformer Fuse
AHL	Adjustable High Limit
FHL	Fixed High Limit
Main Power	Front mounted power switch
Summer/Winter Sw	Control mode selection
Override Switch	Manual Override Selection
K1	Call for heat relay contact
K2	Boiler pump relay contact
K3	DHW pump relay contact
K4	Alarm dry contact
K5	Second stage relay
40	Power supply 120VAC, 60Hz
LWCO	Low Water Cut Off connections
20	Boiler pump connections L/G/N
21	DHW pump connections
41	Burner plug-in connection

Identifier	Detail
191	Second Stage plug-in connection
TH	Room thermostat 1st and 2nd stage
1	Outdoor Sensor connection
3	Boiler Sensor connection
5	DHW Sensor connection
A1	Auxiliary Input Connection
OT	OpenTherm Thermostat Connection
C1	LON Communication connection 1
C2	LON Communication connection 2
S1	LON Addressing dial switch
S2	Relay test dial switch
S3	DHW Set point
S4	Heating curve selection dial
S5	WWSD Selection dial
S6	Control operation DIP mode selection
S7	DHW operation DIP mode selection
D1	Fault Indicator
D2	Power ON Indicator
D3	Burner Call-for-heat Indicator
LED1	Internal low voltage power indicator
LED2	LON Service Button Indicator
SE1	LON Service Button

Technical Data

Power: 120 VAC, 1 Phase, 60 Hz, 15A pre-fuse

Burner switching capacity: 120 VAC, 2.5A (full load)

Room thermostat: 24 VAC

Anticipator setting: 0.1 A

Fixed high limit: 230° F (110° C) max. (fixed)

Adjustable high limit: 167° F to 239° F max.
75° C to 115° C max. (adjustable)

Boiler & DHW Pump output: 120 VAC, 1 Phase, 60 Hz,
3A (full load)

Outdoor temperature sensor: 5k Ohms at 77° F (25° C)
max. wire length up to
95 ft. (35 m)

Boiler temperature sensor: 10K



DHW temperature sensor: 10K

Allowable ambient temperature

- *operation:* 32° F to 104° F (0° C to 40° C)
- *storage and transport:* -4° F to 149° F (-20° C to 65° C)

Protocol

Please indicate settings which have been altered ...

Factory default settings	Altered settings
<ul style="list-style-type: none"> ■ Fixed high limit “” set to 230° F (110° C) 	<input type="checkbox"/> Altered to 212° F (100° C)
<ul style="list-style-type: none"> ■ Adjustable high limit “” set to 167° F (75° C) 	<input type="checkbox"/> Altered to 189° F (87° C)

Quick Reference

°C	°F
-40	-40
-35	-31
-25	-13
-20	-4
-18	0
-16	+3
-14	+7
-12	+10
-10	+14
-9	+16
-8	+18
-7	+19
-6	+21
-5	+23
-4	+25
-3	+27
-2	+28
-1	+30
0	+32
+1	+34
+2	+36
+3	+37
+4	+39
+5	+41
+6	+43
+7	+45
+8	+46
+9	+48
+10	+50
+12	+54
+14	+57
+16	+61
+18	+64
+20	+68
+25	+77
+30	+86
+35	+95
+40	+104
+50	+122
+60	+140
+70	+158
+80	+176
+90	+194
+100	+212
+110	+230

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