

Vitotronic 200

Model KW2

Weather-responsive indoor/outdoor, digital boiler control
for heating systems with one or more heating circuits
Part No. Z001 230

Please file in Service Binder



VITOTRONIC 200



Safety Instructions


Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation and operation. Failure to comply with the instructions listed below and details printed in these instructions 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).

■ Licensed professional heating contractor

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

❶ Please see sections 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, shut-down procedure, and the need for professional service annually before the heating season begins.

■ 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.

❶ 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 warranty null and void.*




Safety Terminology

The following terms are used throughout this manual to bring attention to the presence of potential hazards or important product information. **Please heed the advice given!**

**DANGER**

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

**WARNING**

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

**CAUTION**

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

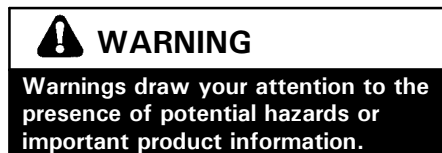
IMPORTANT

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

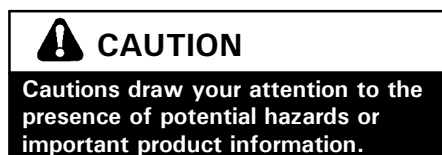
	Page	Index
Safety Instructions	Safety Instructions	2
General Information	About These Instructions	4
	Standard Equipment	4
	Overview of Boiler Coding Cards	5
	Application Example 1	6
	Application Example 2	9
	Application Example 3	12
Start-up	Procedure (Overview)	15
	Steps	16
Scanning of Service Information	Overview	23
	Overview of Service Levels	24
	Codings	25
	Temperatures, Boiler Coding Cards and Scans	28
	Relay Test	30
	Scanning Operating Status Information	31
	Scanning and Resetting the "Service" Display	32
Troubleshooting	Troubleshooting Steps	33
	Diagnosis	34
Control Functions	Boiler Temperature Control	44
	Heating Circuit Control	47
	Tank Temperature Control	53
Additional Information	Overview	58
	Technical Data	59
	System Components	60
	Codings	85
	Component Settings	100
	Wiring Diagram	102
	Parts List	103

About These Instructions

The following symbols and flag words are utilized in these Installation Instructions:



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



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



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



→ This symbol indicates that additional, pertinent information is to be found in column three.



→ This symbol indicates that other instructions must be referenced.

Standard Equipment

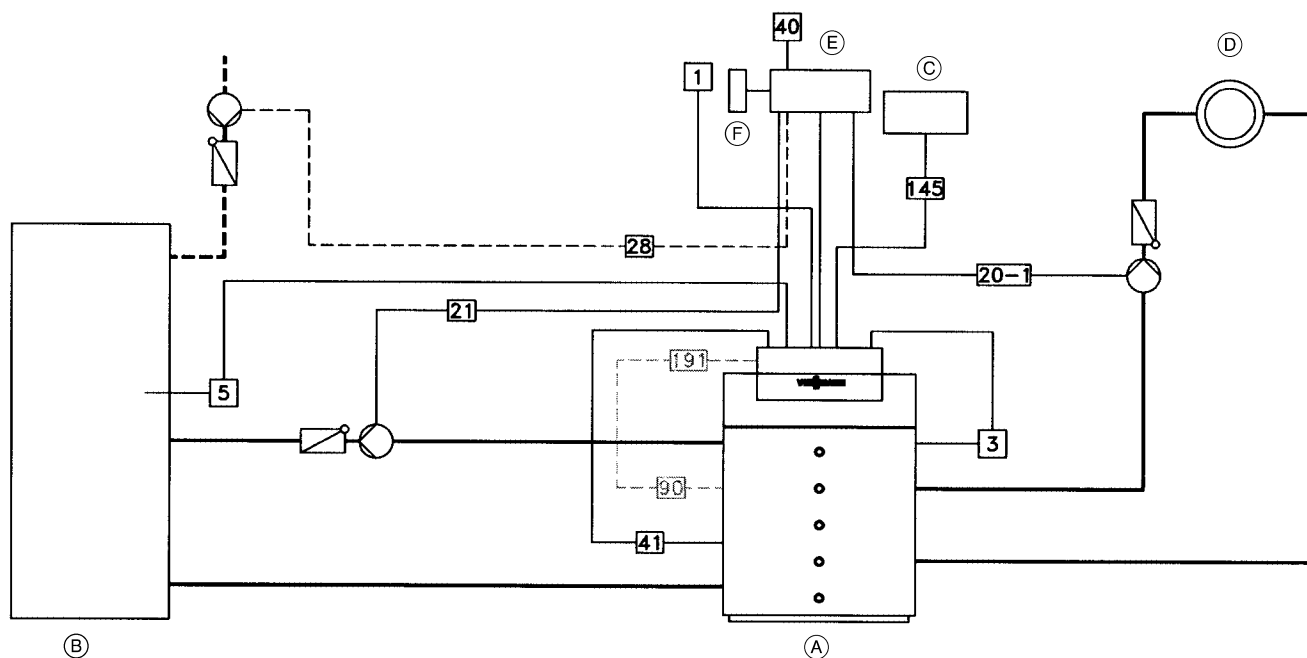
- Control unit
- Control base
- Control base flip-down cover
- Rear control housing
- Accessories pack, comprising:
 - Connector 1 for outdoor temperature sensor
 - Boiler temperature sensor with connector 3
 - DHW tank temperature sensor with connector 5
 - Outdoor temperature sensor
 - Power Pump Module
 - Small parts

Overview of Boiler Coding Cards

Vitotronic 200 in conjunction with	Boiler coding card required
Vitorond 200, VR2 Series	F1
77 to 140 MBH / 23 to 41 kW	C6
161 to 245 MBH / 47 to 72 kW	
Vitola 200, VB2 Series	E1
Vitogas 100, GS1	F0
Vitogas 100, GS10	C6
Vitogas 050, RS	C6

Application Example 1

System with one direct-connected heating circuit without mixing valve



- (A) Boiler with Vitotronic 200
- (B) Domestic hot water tank
- (C) Vitotrol, Switching Module-V or KM-BUS Expansion Module for the connection of several KM-BUS participants
- (D) Heating circuit without mixing valve
- (E) Power/Pump Module
- (F) Low water cut-off device

Connectors

- | | | | |
|---|--|--|--|
| 1 | Outdoor temperature sensor | 20-1 | Heating circuit pump
Boiler circuit |
| 3 | Boiler temperature sensor | 21 | DHW production pump
(accessory) |
| 5 | DHW tank temperature sensor | 28 | DHW recirculation pump
(to be field supplied where
required) |
| 145 | KM-BUS participants | 40 | Power supply connection
(120 VAC, 60 Hz) |
| 191 | Extension for
two-stage/modulating burner | 41 | Burner, single-stage ^{*1} |
| | | 90 | Burner, two-stage/
modulating ^{*1} |

Available System Accessories

- Vitotrol remote control
- Room temperature sensor
- Switching Module-V for expanding the range of control functions
- Sensor/burner fault indication
- KM-BUS Expansion Module
- Flue gas temperature sensor

^{*1}Included in standard boiler equipment.

Application Example 1 (continued)

System with one direct-connected heating circuit without mixing valve (continued)





Function/Component	Coding		Remarks
	Factory default setting	Setting changes	
System type	00: 1	-----	<ul style="list-style-type: none"> ■ System without DHW tank "00: 1" (factory default setting) ■ System with DHW tank "00: 2" (setting changed automatically)
Burner type	02: 0 (single-stage)	02: 1 (two-stage) 02: 2 (modulating)	The two-stage/modulating adaptor is required for two-stage and modulating burners (included in standard boiler equipment).
Fault indication module (accessory)	92: 0	-----	For displaying and transmitting fault messages <ul style="list-style-type: none"> ■ when fixed high limit operates ■ when additional safety equipment operates The fault indication module is automatically recognized. Coding "92: 0" is changed automatically to "92: 1".
KM-BUS Expansion Module (accessory)	-----	-----	Required when more than one KM-BUS cable must be connected
Switching Module-V (accessory)	94: 0	-----	Required for switching heating programs, external burner activation and disabling. The Switching Module-V is automatically recognized. Coding "94: 0" is changed automatically to "94: 2".

Application Example 1 (continued)

System with one direct-connected heating circuit without mixing valve (continued)

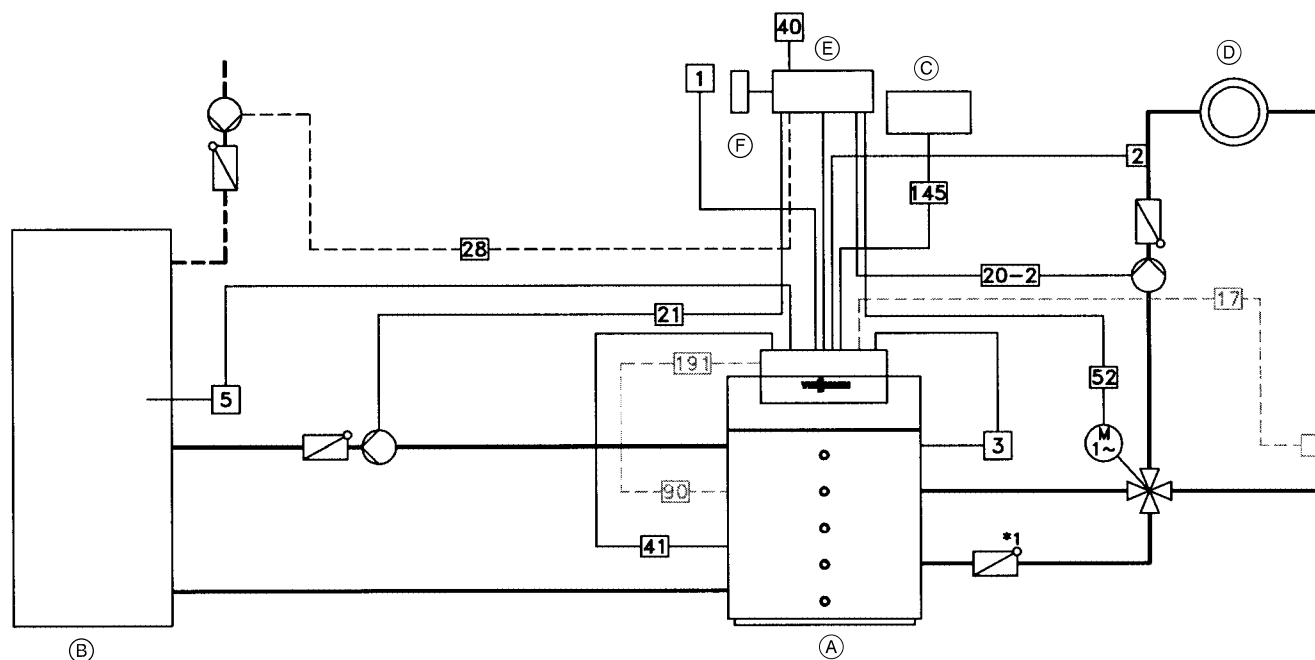
Function/Component	Coding		Remarks
	Factory default setting	Setting changes	
Flue gas temperature sensor (accessory)	-----	-----	For displaying the flue gas temperature and for monitoring limit values. The flue gas temperature sensor is automatically recognized.
Vitotrol 200 (accessory) or Vitotrol 300 (accessory)	A0: 0	-----	Coding "A0: 0" is changed automatically to "A0: 1"
	A0: 0	-----	Coding "A0: 0" is changed automatically to "A0: 2".
Room temperature sensor (accessory), only in conjunction with remote control	-----	-----	For measuring the room temperature when the remote control cannot be placed in a suitable location. The room temperature sensor is activated via a coding switch on the Vitotrol remote control.

Coding switch settings on Vitotrol 200 or Vitotrol 300 (Coding switch on rear of remote control)

Remote control effective for	Vitotrol 200 Coding switch S6	Vitotrol 300 Coding switch S30
Heating circuit ²⁰⁻¹ (boiler circuit, factory default setting)	ON  1 2 3 4	 1 2 3 4 ON
If separate room temperature sensor connected	ON  1 2 3 4	Coding switch 3 to "ON"  1 2 3 4 ON

Application Example 2

System with one heating circuit with mixing valve



- (A) Boiler with Vitotronic 200
- (B) Domestic hot water tank
- (C) Vitotrol, Switching Module-V or KM-BUS Expansion Module for the connection of several KM-BUS participants
- (D) Heating circuit with mixing valve
- (E) Power/Pump Module
- (F) Low water cut-off device

Connectors

- | | | | |
|------------|---|-------------|--|
| <u>1</u> | Outdoor temperature sensor | <u>20-2</u> | Heating circuit pump |
| <u>2</u> | Supply temperature sensor (accessory) | <u>21</u> | Mixing valve circuit |
| <u>3</u> | Boiler temperature sensor | <u>28</u> | DHW production pump (accessory) |
| <u>5</u> | DHW tank temperature sensor | <u>40</u> | DHW recirculation pump (to be field supplied where required) |
| <u>17</u> | Return water temperature sensor (accessory)* ² | <u>41</u> | Power supply connection (120 VAC, 60 Hz) |
| <u>145</u> | KM-BUS participant | <u>52</u> | Burner, single-stage* ³ |
| <u>191</u> | Extension for two-stage/modulating burner | <u>90</u> | Mixing valve motor (accessory) |
| | | | Burner, two-stage/modulating* ³ |

Available System Accessories

- Vitotrol remote control
- Room temperature sensor
- Return water temperature sensor
- Switching Module-V for expanding the range of control functions
- Sensor/Burner fault indication
- KM-BUS Expansion Module
- Flue gas temperature sensor

*¹Flow check valve only required if piping connection is made on one common boiler return.

*²In connection with underfloor heating when control measures supply and return water temperature.

*³Included in standard boiler equipment.

Application Example 2 (continued)

System with one heating circuit with mixing valve (continued)

Function/Component	Coding		Remarks
	Factory default setting	Setting changes	
System type	00: 1	Coding is automatically changed to "00: 5" or "00: 6", must be reset manually to 00: 3 or 00: 4.	<ul style="list-style-type: none"> ■ System without DHW tank "00: 3" ■ System with DHW tank "00: 4"
Burner type	02: 0 (single-stage)	02: 1 (two-stage) 02: 2 (modulating)	The two-stage/modulating adaptor is required for two-stage and modulating burners (included in standard boiler equipment).
Fault indication module (accessory)	92: 0	----	For displaying and transmitting fault messages <ul style="list-style-type: none"> ■ when fixed high limit operates ■ when additional safety equipment operates The fault indication module is automatically recognized. Coding "92: 0" is changed automatically to "92: 1".
KM-BUS Expansion Module (accessory)	----	----	Required when more than one KM-BUS cable must be connected.
Switching Module-V (accessory)	94: 0	----	Required for switching heating programs, external burner activation and disabling. The Switching Module-V is automatically recognized. Coding "94: 0" is changed automatically to "94: 2".

Application Example 2 (continued)

System with one heating circuit with mixing valve (continued)

Function/Component	Coding		Remarks
	Factory default setting	Setting changes	
Flue gas temperature sensor (accessory)	----	----	For displaying the flue gas temperature and for monitoring limit values. The flue gas temperature sensor is automatically recognized.
Return water temperature sensor (accessory)	----	----	For measuring the return water temperature. The return water temperature sensor is automatically recognized.
Vitotrol 200 (accessory) or Vitotrol 300 (accessory)	A0: 0	----	Coding "A0: 0" is changed automatically to "A0: 1".
	A0: 0	----	Coding "A0: 0" is changed automatically to "A0: 2".
Room temperature sensor (accessory), only in conjunction with remote control	----	----	For measuring the room temperature when the remote control cannot be placed in a suitable location. The room temperature sensor is activated via a coding switch on the Vitotrol.

Coding switch settings on Vitotrol 200 or Vitotrol 300

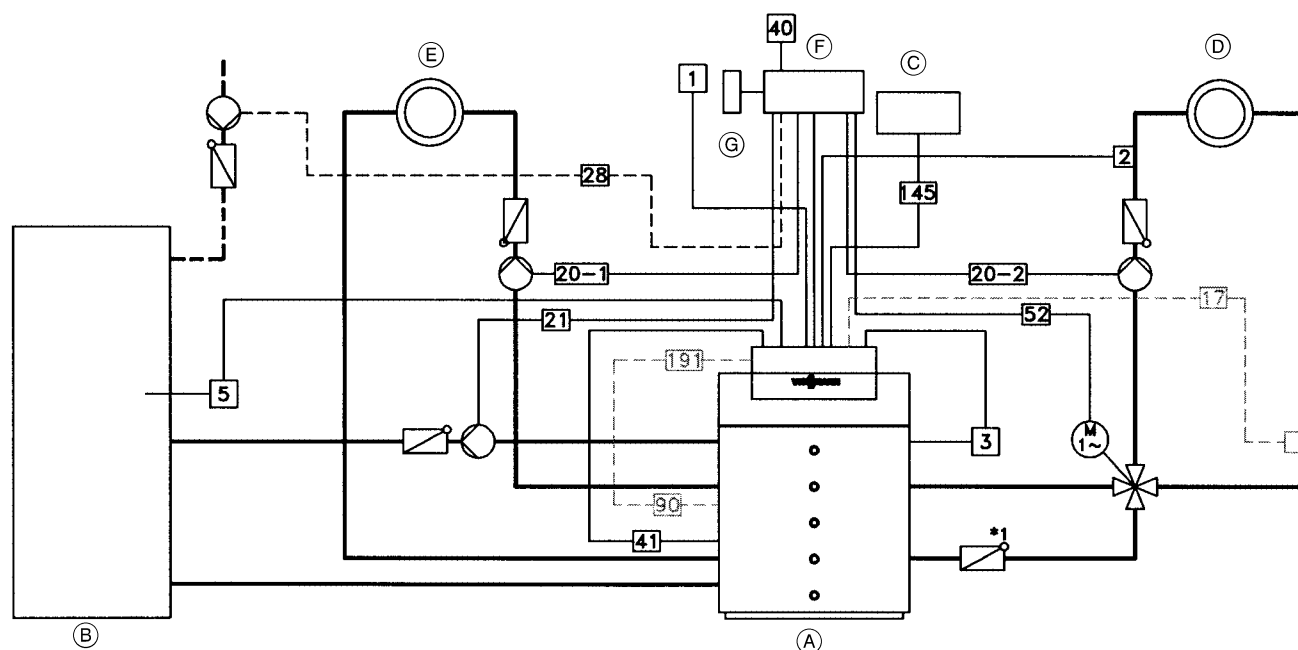
(Coding switch on rear of remote control)

The respective remote control must be assigned to the heating circuit via the coding switches.

Remote control effective for	Vitotrol 200 Coding switch S6	Vitotrol 300 Coding switch S30
Heating circuit 20-2 (mixing valve circuit)	<p>Coding switch 1 to "OFF" Coding switch 2 to "ON"</p>	<p>Coding switch 1 to "OFF" Coding switch 2 to "ON"</p>
If separate room temperature sensor connected	<p>Coding switch 3 to "ON"</p>	<p>Coding switch 3 to "ON"</p>

Application Example 3

System with one direct-connected heating circuit without mixing valve and one heating circuit with mixing valve



- (A) Boiler with Vitotronic 200
- (B) Domestic hot water tank
- (C) Vitotrol, Switching Module-V or KM-BUS Expansion Module for the connection of several KM-BUS participants
- (D) Heating circuit 2 with mixing valve
- (E) Heating circuit 1 without mixing valve
- (F) Power/Pump Module
- (G) Low water cut-off device

Connectors

- | | | | |
|-----|---|------|--|
| 1 | Outdoor temperature sensor | 20-1 | Boiler circuit pump |
| 2 | Supply temperature sensor (accessory) | 20-2 | Mixing valve circuit pump |
| 3 | Boiler temperature sensor | 21 | DHW pump (accessory) |
| 5 | DHW tank temperature sensor | 28 | DHW recirculation pump |
| 17 | Return water temperature sensor (accessory)* ² | 40 | Power supply connection (120 VAC, 60 Hz) |
| 145 | KM-BUS participant | 41 | Burner, single-stage* ³ |
| 191 | Extension for two-stage/modulating burner | 52 | Mixing valve motor (accessory) |
| | | 90 | Burner, two-stage/modulating* ³ |

Available System Accessories

- Vitotrol remote control
- Room temperature sensor
- Return water temperature sensor
- Switching Module-V for expanding the range of control functions
- Sensor/burner fault indication
- KM-BUS Expansion Module
- Flue gas temperature sensor

*¹Flow check valve only required if piping connection is made on one common boiler return.

*²In connection with underfloor heating when control measures supply and return water temperature.

*³Included in standard boiler equipment.

Application Example 3 (continued)

System with one direct-connected heating circuit without mixing valve and one heating circuit with mixing valve (continued)

Function/Component	Coding		Remarks
	Factory default setting	Setting changes	
System type	00: 1	-----	<ul style="list-style-type: none"> ■ System without DHW tank "00: 5" (changed automatically) ■ System with DHW tank "00: 6" (changed automatically)
Single-/multi-family house	7F: 1 The switching times for the DHW pump, the DHW recirculation pump and the holiday program are identical for all heating circuits.	7F: 0 The switching times for the circulation pump for heating the tank, the DHW recirculation pump and the holiday program can be set separately for all heating circuits.	
Burner type	02: 0 (single-stage)	02: 1 (two-stage) 02: 2 (modulating)	The two-stage/modulating adaptor is required for two-stage and modulating burners (included in standard delivery of boiler).
Fault indication module (accessory)	92: 0	-----	For displaying and transmitting fault messages <ul style="list-style-type: none"> ■ when fixed high limit operates ■ when additional safety equipment operates The fault indication module is automatically recognized. Coding "92: 0" is changed automatically to "92: 1".
KM-BUS Expansion Module (accessory)	-----	-----	Required when more than one KM-BUS cable must be connected.
Switching Module-V (accessory)	94: 0	-----	Required for switching heating programs, external burner activation and disabling. The Switching Module-V is automatically recognized. Coding "94: 0" is changed automatically to "94: 2".









Application Example 3 (continued)

One direct-connected heating circuit without mixing valve and one heating circuit with mixing valve (continued)

Function/Component	Coding		Remarks
	Factory default setting	Setting changes	
Flue gas temperature sensor (accessory)	-----	-----	For displaying the flue gas temperature and for monitoring limit values. The flue gas temperature sensor is automatically recognized.
Return water temperature sensor (accessory)	-----	-----	For measuring the return water temperature. The return water temperature sensor is automatically recognized.
Vitotrol 200 (accessory) or Vitotrol 300 (accessory)	A0: 0 A0: 0	----- -----	Coding "A0: 0" is changed automatically to "A0: 1". Coding "A0: 0" is changed automatically to "A0: 2".
Room temperature sensor (accessory), only in conjunction with remote control	-----	-----	For measuring the room temperature when the remote control cannot be placed in a suitable location. The room temperature sensor is activated via a coding switch on the Vitotrol remote control.

Coding switch settings on Vitotrol 200 or Vitotrol 300 (Coding switch on rear of remote control)

The respective remote control must be assigned to the heating circuit via the coding switches.

Remote control effective for	Vitotrol 200 Coding switch S6	Vitotrol 300 Coding switch S30
Heating circuit  (boiler circuit, factory default setting)	ON 	 ON
Heating circuit  (mixing valve circuit)	ON  Coding switch 1 to "OFF" Coding switch 2 to "ON"	 ON Coding switch 1 to "OFF" Coding switch 2 to "ON"
If separate room temperature sensor connected	ON  Coding switch 3 to "ON"	 ON Coding switch 3 to "ON"

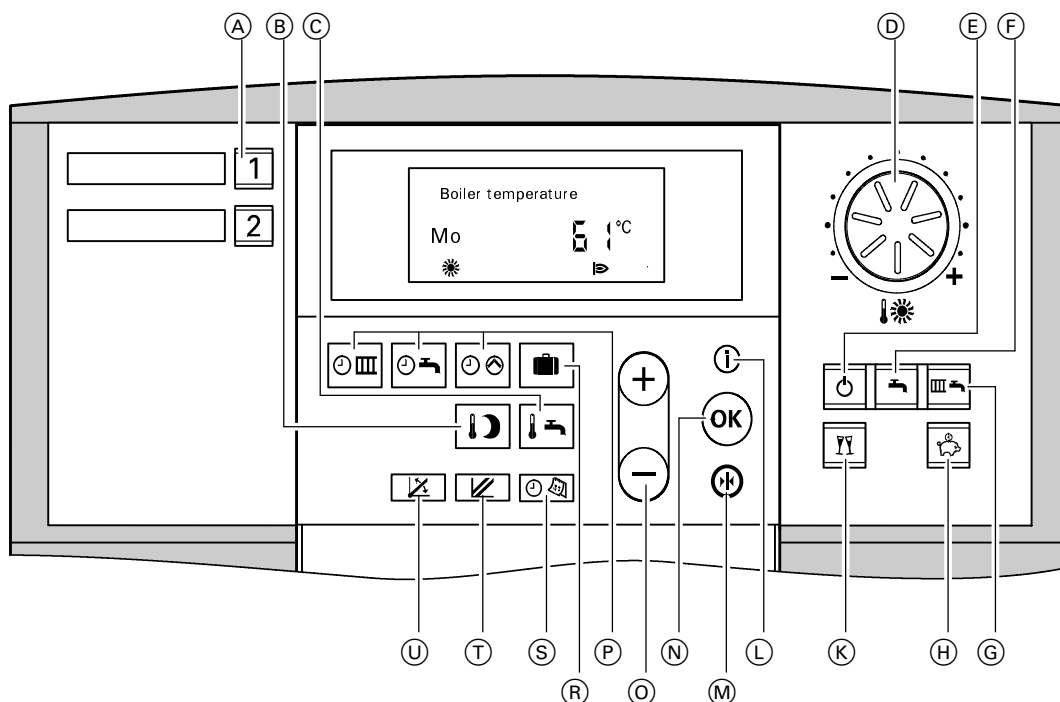
Start-up

Procedure (Overview)

1. Checking electrical connections	Page 16
2. Checking assignment of heating circuits	Page 17
3. Selecting the language (if required)	Page 17
4. Matching coding addresses	Page 17
5. Adjusting the heating curve	Page 18

Steps

Controls and display elements



- Ⓐ Heating circuit selection
- Ⓑ Reduced room temperature
- Ⓒ DHW temperature
- Ⓓ Standard room temperature
- Ⓔ Standby mode
- Ⓕ DHW only

- Ⓖ Heating and DHW
- Ⓗ Economy mode
- Ⓚ Party mode
- Ⓛ Information
- Ⓜ Basic settings
- Ⓝ Acknowledgment/confirmation

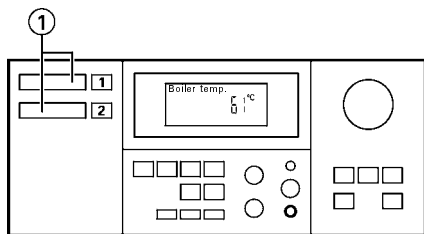
- Ⓞ Adjusting values
- Ⓟ Time programs
- Ⓡ Holiday program
- Ⓢ Time/date
- Ⓣ Heating curve level
- Ⓤ Heating curve slope

1. Checking electrical connections

Refer to subsection "System Components" in section "Additional Information" and check that the electrical connections have been performed correctly for the system type concerned.

Steps

2. Checking assignment of heating circuits

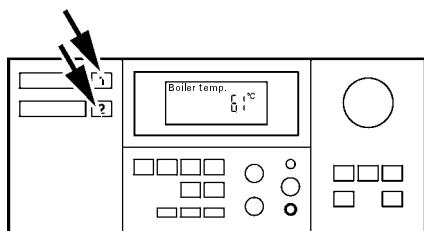


Ensure that labels for heating circuit assignment have been placed in proper field (①) on the programming unit.

On heating systems with two heating circuits, the heating circuit that is to be operated must be selected before any settings are made.

Heating circuit 1: Heating circuit 1 without mixing valve

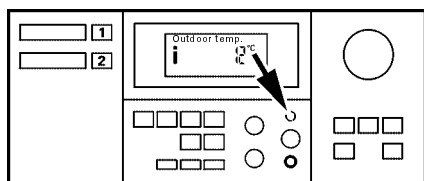
Heating circuit 2: Heating circuit 2 with mixing valve



Press button **1** or **2**.

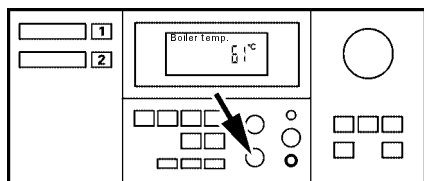
→ The corresponding button is lit.

3. Selecting the language (if required)

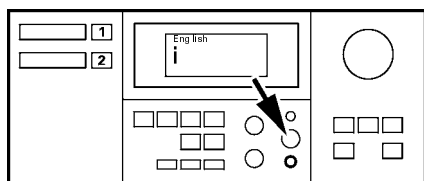


Press **i**.

→ The outdoor temperature is displayed.



Press **-** to select required language.



OK to confirm.

4. Matching coding addresses

The control unit must be tuned to the heating system depending on the system equipment.

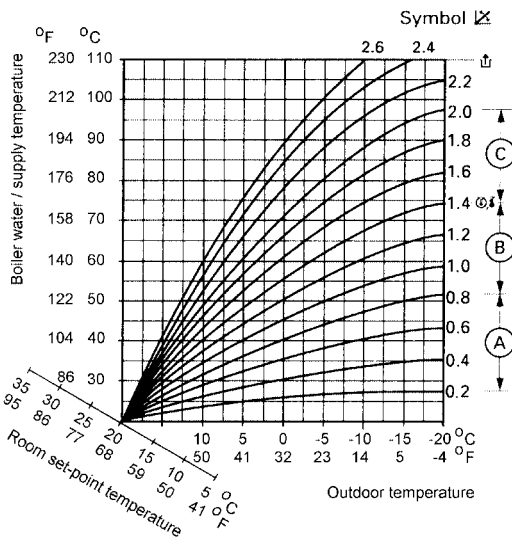
Refer to sections headed "Codings" for coding procedure and overview.

Steps (continued)

5. Adjusting the heating curve

The heating curves represent the relationship between the outdoor temperature and the boiler water or supply temperature.

Put simply: The lower the outdoor temperature, the higher the boiler water or supply temperature. In turn, the room temperature is dependent on the boiler water or supply temperature.



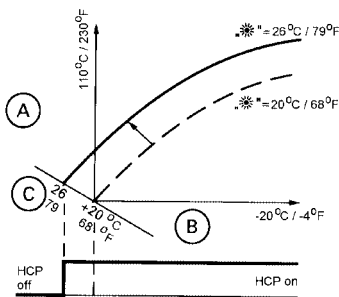
The slope of the heating curve is normally within the marked range

- (A) for underfloor heating systems,
- (B) for modulating heating systems,
- (C) for heating systems with temperatures over 167 °F / 75 °C

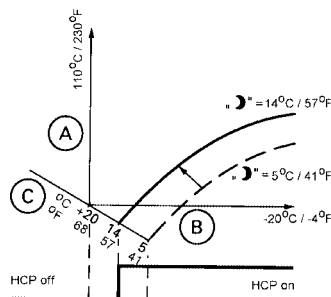
Factory default settings:

- Slope " ∇ " = 1.4
- Shift " ∇ " = 0

1. Adjusting the desired room temperature



Example 1:
Changing normal room temperature from 68 to 79 °F / 20 to 26 °C.

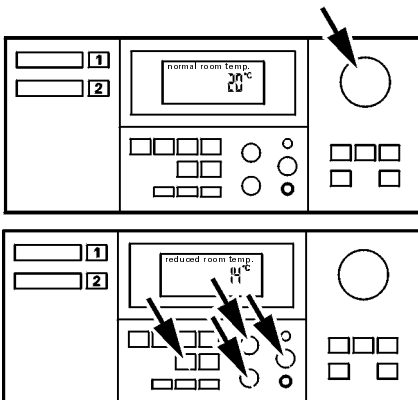


Example 2:
Changing reduced room temperature from 41 to 57 °F / 5 to 14 °C.

IMPORTANT

The desired normal and reduced room temperatures can be adjusted separately for each heating circuit. The heating curve can be adjusted along the desired room temperature axis, resulting in a change of the on/off switching behavior of the heating circuit pumps (HCP), if the heating circuit pump logic function is activated (factory default setting).

- (A) Boiler water temperature/supply temperature in °F / °C
- (B) Outdoor temperature in °F / °C
- (C) Desired room temperature in °F / °C



■ Normal room temperature

Set with the setpoint selector for the desired day temperature.

→ The value is automatically accepted after approx. 2 seconds.

■ Reduced room temperature

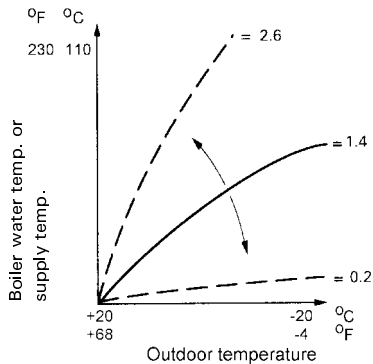
Press **1** to call up the desired night temperature; adjust the desired night temperature with the **+** or **-** button. Press **OK** to confirm the selected value.

→ The display changes and shows the boiler water temperature.

Steps (continued)

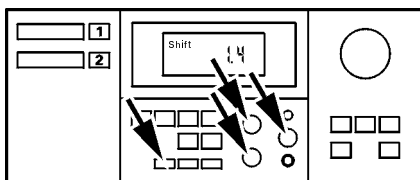
5. Adjusting the heating curve (continued)

2. Changing the slope



IMPORTANT

The slope can be adjusted separately for each heating circuit



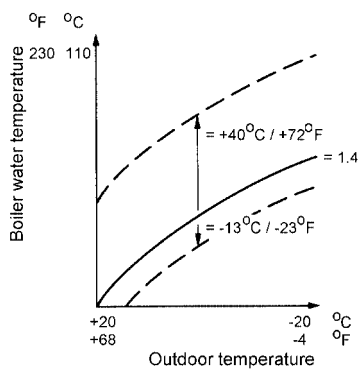
Select the heating circuit with the heating circuit selector buttons.

Press to call up the slope; adjust the value with the or button.

→ Adjustable value 0.2 to 3.5.

Press to confirm the selected value.

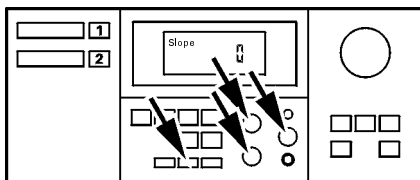
→ The display changes and shows the boiler water temperature.



3. Changing the shift

IMPORTANT

The shift can be adjusted separately for each heating circuit.



Select the heating circuit with the heating circuit selector buttons.

Press to call up the shift; adjust the value with the or button.

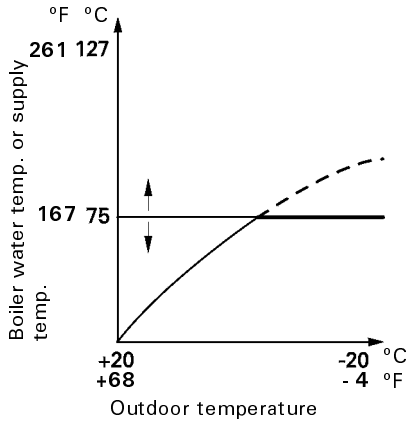
→ Adjustable value -13 to +40.

Press to confirm the selected value.

→ The display changes and shows the boiler water temperature.

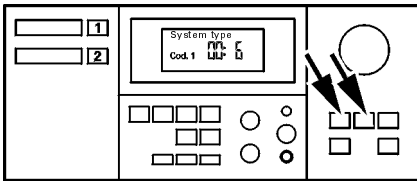
Steps (continued)

5. Adjusting the heating curve (continued)



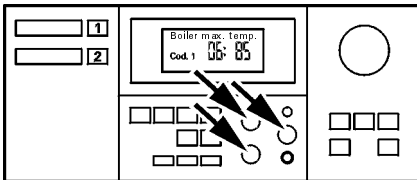
4. Set high limit

- for boiler water temperature
- for supply temperature



Press and simultaneously for approx. 2 seconds.

→ Access coding level 1.



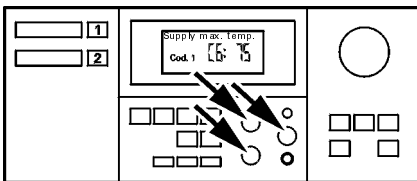
■ Boiler water temperature limit
Call up coding address "06" with the or button;
press to confirm.

Change the value with the or button;
press to confirm.

→ Adjustable value 68 to 266 °F / 20 to 130 °C.

IMPORTANT

In the factory default setting, the boiler water temperature is electronically limited to 185 °F / 85 °C.



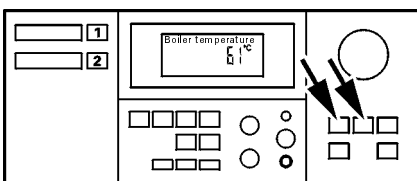
■ Supply temperature limit
Call up coding address "C6" with the or button;
press to confirm.

Change the value with the or button;
press to confirm.

→ Adjustable value 50 to 261 °F / 10 to 127 °C.

IMPORTANT

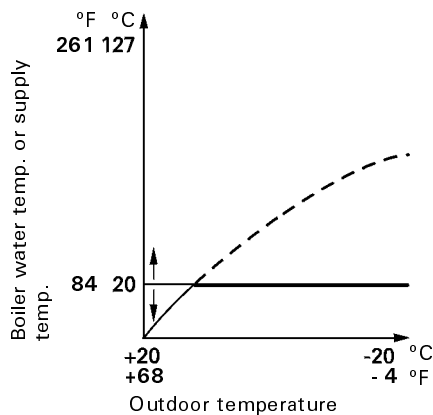
In the factory default setting, the supply temperature is electronically limited to 167 °F / 75 °C.



Press and simultaneously for approx. 1 second.

→ Exit coding level 1.

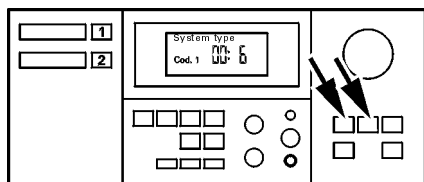
5. Adjusting the heating curve (continued)



5. Adjust the minimum temperature limit for the heating circuit with mixing valve

IMPORTANT

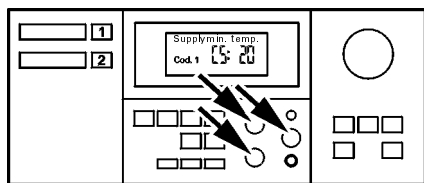
The minimum limit can be adjusted separately for each heating circuit; the setting for the heating circuit without mixing valve is made via coding level 2.



Select the heating circuit with the heating circuit selector buttons.

Press and simultaneously for approx. 2 seconds.

→ Access coding level 1.



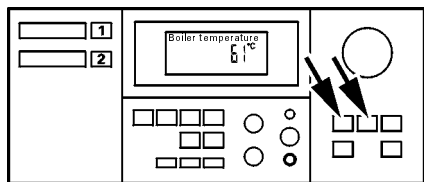
Call up coding address "C5" with the or button; press to confirm.

→ Adjustable value 34 to 261 °F / 1 to 127 °C

Change the value with the or button; press to confirm.

IMPORTANT

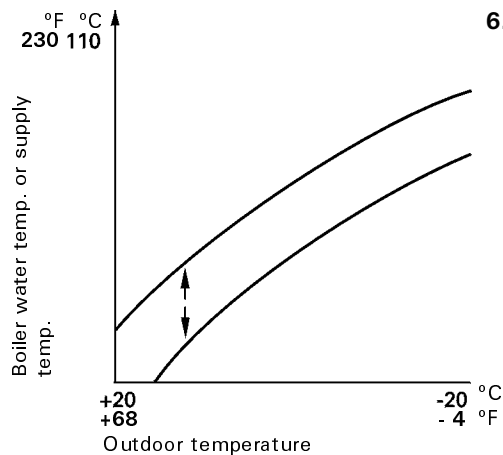
In the factory default setting, the value for both heating circuits is adjusted to 68°F / 20°C.



Press and simultaneously for approx. 1 second.

→ Exit coding level 1.

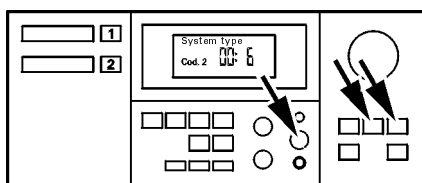
5. Adjusting the heating curve (continued)



6. Adjust the differential temperature

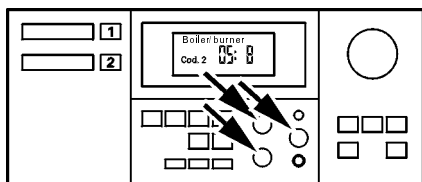
IMPORTANT

The differential temperature is the selected value by which the boiler water temperature is kept above the desired mixing valve circuit supply temperature.



Press and simultaneously for approx. 2 seconds; press to confirm.

→ Access coding level 2.

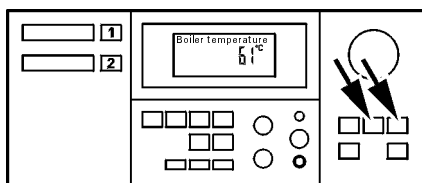


Call up coding address "05" with the or button; press to confirm.

→ Adjustable value 0 to 72 °F / 0 to 40 °C.

IMPORTANT

In the factory default setting, the value is adjusted to 14 °F / 8 °C.

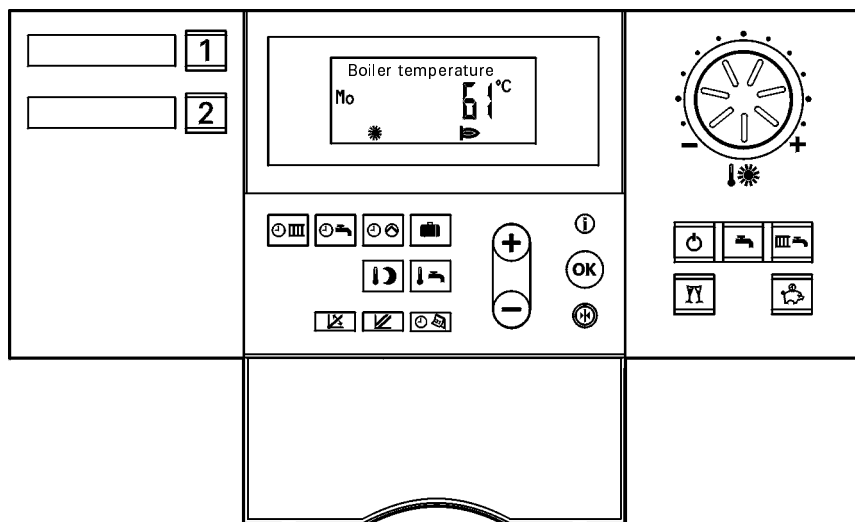


Press and simultaneously for approx. 1 second.

→ Exit coding level 2.

	Page
Overview of Service Levels	24
Codings	
Coding Information	25
Accessing coding level 1	26
Accessing coding level 2	27
Resetting codings to factory default settings.....	27
Temperatures, Boiler Coding Cards and Scans	28
Scan 1 to 5	29
Relay Test	30
Scanning Operating Status Information	31
Scanning and Resetting the "Service" Display	32

Overview of Service Levels

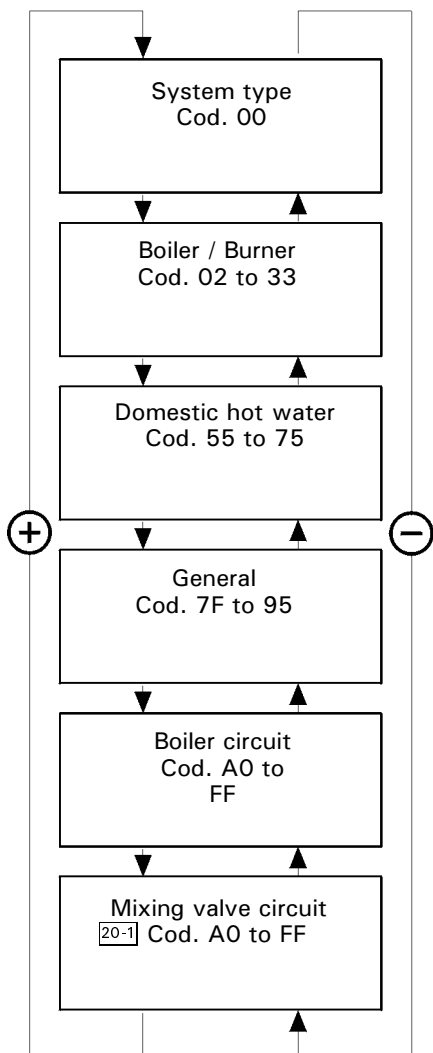


Function	Button combination	Access	Exit
Coding level 1, plain text	and	Press buttons simultaneously for approx. 2 seconds	Press and simultaneously for approx. 1 second
Coding level 2, numerical	and , then		Press and simultaneously for approx. 1 second
Reset codings to factory default settings	and , then		Press the or button to select "Factory default setting? Yes" or "Factory default setting? No" and press to confirm.
Temperatures, boiler coding cards and scans	and		Press
Relay test	and		Press
Error history	and	Immediately	Press
Operating status			Press
Service scan	(if "Service" flashing)		Press
Fault search	(if "Fault" flashing)		Press
Adjust display contrast	and		Display darkens
	and		Display brightens

Coding Information

All possible coding addresses are listed in subsection "Codings" of the Additional Information.

Only coding addresses corresponding to the system type and equipment concerned are shown and can be changed accordingly.

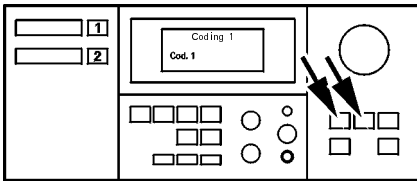


The coding addresses are structured as illustrated on the left.

For Application Example 3 (heating circuit without mixing valve and heating circuit with mixing valve) the possible coding addresses "A0" to "FF" for heating circuit ²⁰⁻¹ are scanned first, then those for heating circuit ²⁰⁻², starting again at coding address "A0".

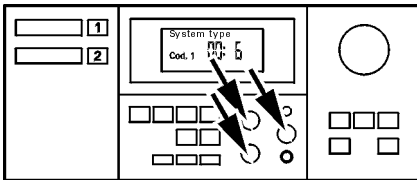
Accessing coding level 1

All main codings can be set in plain text in coding level 1.
See subsection entitled "Codings".



Press and simultaneously for approx. 2 seconds.

→ Access coding level 1.



Call up the required coding address with the or button; press to confirm.

→ Address flashes.

→ Value flashes.

Change the value with the or button; press to confirm.

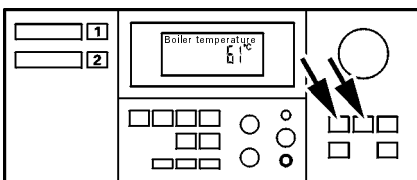
→ "Accepted" appears briefly in the display, then the address flashes again. Further addresses can now be selected with the or button.

The following addresses can be changed in coding level 1:

- System type
- Burner type
- Max. boiler water temperature
- DHW priority
- Summer energy saving mode, boiler circuit
- DHW priority
- Summer energy saving mode, mixing valve circuit
- Supply low limit, mixing valve circuit
- Supply high limit, mixing valve circuit

IMPORTANT

The following list can vary according to the system equipment specifications.

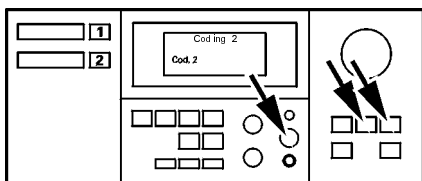


Press and simultaneously for approx. 1 second.

→ Exit coding level 1.

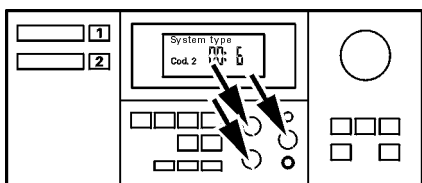
Accessing coding level

All codings can be changed in coding level 2.
See subsection entitled "Codings".



Press and simultaneously for approx. 2 seconds;
press to confirm.

→ Access coding level 2.

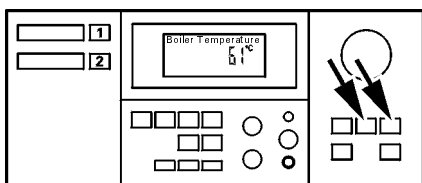


Call up the required coding address with the or button;
press to confirm.

→ Coding address flashes.

Change the value with the or button;
press to confirm.

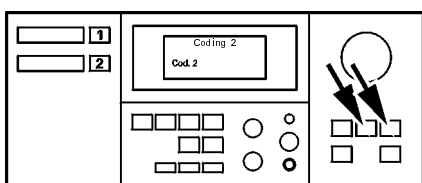
→ "Accepted" appears briefly in the display, then the address flashes again. Further addresses can now be selected with the or button.



Press and simultaneously for approx. 1 second.

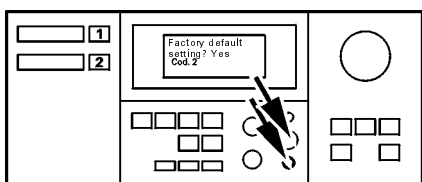
→ Exit coding level 2.

Resetting codings to factory default settings



Press and simultaneously for approx. 2 seconds.

→ Access coding level 2.



Press .

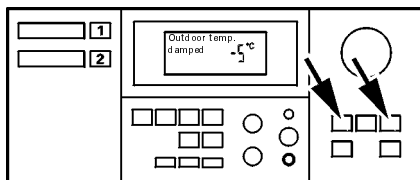
Press to confirm "Factory default setting? Yes".

→ Codings are reset to the factory default settings.
The display changes and shows the boiler water temperature.

IMPORTANT

"Factory default setting? Yes" or "Factory default setting? No" can be selected with the or button.

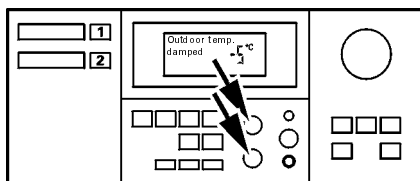
Temperatures, Boiler Coding Cards and Scanning



Select the heating circuit with the heating circuit selector buttons.

Press and simultaneously for approx. 2 seconds.

→ Access diagnosis level.



Select the required data for scanning with the \oplus or \ominus button.

The following values can be scanned:

- Damped outdoor temp.
- Current outdoor temp.

→ The damped outdoor temperature can be reset to the current outdoor temperature by pressing \oplus .

- Desired supply temp.
- Current supply temp.

→ Only displayed if supply temperature sensor connected.

- Desired boiler temp.
- Current boiler temp.

- Desired DHW temp.
- Current DHW temp.

→ Only displayed if tank temperature sensor connected.

- Desired return water temp.
- Current return water temp.

→ Only displayed if return water temperature sensor connected.

- Desired room temp.
- Current room temp.

→ Only displayed if remote control connected.

- Max. flue gas temp.
- Current flue gas temp.

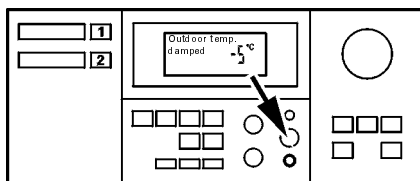
→ Only displayed if flue gas temperature sensor connected.
The max. flue gas temperature can be reset to the current value by pressing \oplus .

- Boiler coding card

→ See section entitled "Overview of Boiler Coding Cards".

- Scan 1
- Scan 2
- Scan 3
- Scan 4

→ For scans 1-4 see following pages.



Press \odot .

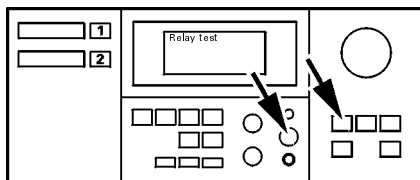
→ Exit diagnosis level.

Brief scan	Brief scan					
1	System design (see coding address "00")		Burner type 0 1-stage 1 2-stage 2 modulating	Number of KM BUS users	N/A	N/A
2	Software version Control unit	Software version Programming unit	N/A	N/A	N/A	Software version Control module V
3	Operating mode Boiler circuit 0 w/o remote control 1 with Vitotrol 200 2 with Vitotrol 300	Software version Remote control Boiler circuit	Operating mode Mixing valve circuit 0 w/o remote control 1 with Vitotrol 200 2 with Vitotrol 300	Software version Remote control Mixing valve circuit	N/A	N/A
4	Variable speed pump Boiler circuit 0 w/o 1 Wilo pump 2 Grundfos pump	Software version Variable speed pump	Variable speed pump Mixing valve circuit 0 w/o 1 Wilo pump 2 Grundfos pump	Software version Variable speed pump	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	Software version Solar control unit

Scan 1 to 5

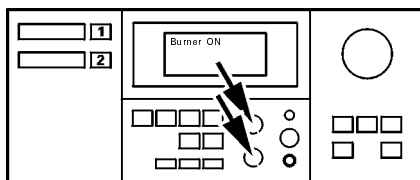
Temperatures, Boiler Coding Cards and Scans (continued)

Relay Test



Press and simultaneously for approx. 2 seconds.

→ *Relay test activated.*



Select relay outputs with the or button.

The following relay outputs can be selected:

- Burner ON
- Burner stage 1 ON
- Burner modulation up
- Burner stage 1 + 2 ON
- Burner modulation stop
- Burner modulation down
- Heating pump ON
- Heating pump ON
- Mixing valve open
- Mixing valve closed
- DHW tank pump ON
- DHW recirculation pump ON
- Compiled fault indicator ON

IMPORTANT

The following list may differ depending on the system equipment and coding.

→ *All LEDs OFF.*

→ *All LEDs OFF.*

→ *All LEDs OFF.*

→ *All LEDs OFF.*

→ *All LEDs OFF.*

→ *All LEDs OFF.*

→ *LED of selector button for heating circuit without mixing valve ON.*

→ *LED of selector button for heating circuit with mixing valve ON.*

→ *LED of selector button ON.*

→ *LED of selector button ON.*

→ *All LEDs OFF.*

→ *All LEDs OFF.*

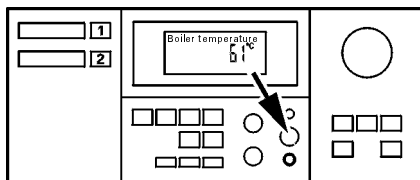
→ *All LEDs OFF.*

Only displayed if Switching Module-V is connected.

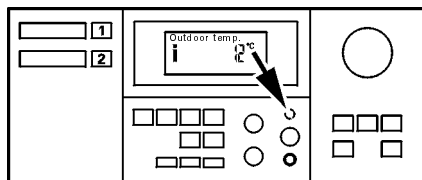
The relay can be switched with a delay of up to 1 minute.

Press .

→ *Relay test terminated.*



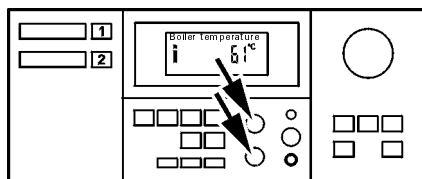
Scanning Operating Status Information



Select the heating circuit with the heating circuit selector buttons.

Press **i**.

→ *Operating status scanning mode is activated.*



Select the required operating status data for scanning with the **+** or **-** button.

The following operating status information can be scanned:

IMPORTANT

The following lists may differ according to system equipment and coding.

Heating circuit

- Holiday program
- Departure date
- Return date
- Current outdoor temperature
- Current supply temperature
(only for heating circuit with mixing valve)
- Current boiler water temperature
- Current domestic hot water temperature
- Current flue gas temperature
- Current return water temperature
(only for heating circuit with mixing valve)
- Current room temperature
- Burner operating hours
- Number of burner starts

→ *The holiday program, date of departure and date of return are only displayed when the holiday program is activated.*

→ *Only displayed if tank temperature sensor is connected.*

→ *Only displayed if flue gas temperature sensor is connected.*

→ *Only displayed if return water temperature sensor is connected and coding address "C7" is not coded to "C7:0".*

→ *Only displayed if Vitotrol is connected.*

→ *Reset burner operating hours, number of burner starts and fuel consumption after maintenance was performed. By pressing **⊕**, the values can be individually reset to zero.*

→ *Only displayed if selected via coding addresses "26" or "29".*

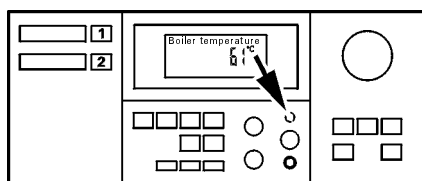
■ Fuel consumption

- Time
- Date
- Operating status of burner
- Operating status of heating circuit pump
- Operating status of DHW pump
- Operating status of DHW recirculation pump
- Operating status of mixing valve (if installed)
- Different languages

→ *Press **⊕** to select the respective language as the permanent language for all displays.*

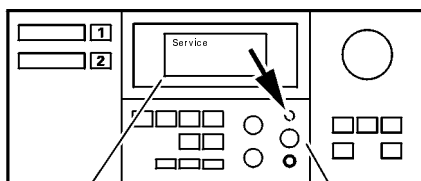
Press **i**.

→ *Exit the operating status scanning mode.*



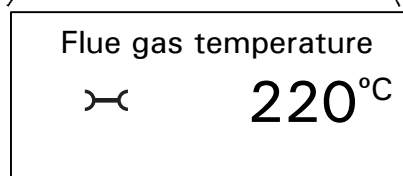
Scanning and Resetting the "Service" Display

When the limit values selected via coding addresses "1F", "21" and "23" are reached, "Service" as well as the red fault indicator will start flashing. If service is performed before "Service" is displayed, set the coding address "24:1" and then coding address "24:0"; the selected service parameters for operating hours and time interval are reset to 0.



1. Press **i**.

→ Service scan is activated.



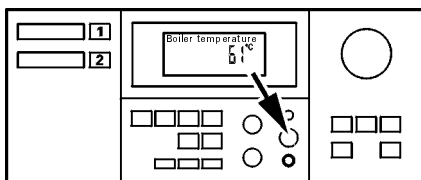
2. Scan the individual service messages (if more than one message is stored) with the **+** or **-** button.

3. Press **OK** and confirm the display "Acknowledge: Yes" by pressing **OK**.

→ The "Service" display is turned off and the red fault indicator continues to flash.

IMPORTANT

An acknowledged service message can be displayed again by pressing **OK** (for approx. 3 seconds).



4. Press **OK**.

→ Service scan is terminated.

5. After maintenance has been performed, reset coding "24:1" to "24:0".

→ Red fault indicator is turned off.

IMPORTANT

If coding address "24" is not reset, the "Service" display will reappear at 07:00 hrs on Monday.

6. After carrying out maintenance
 - Press **i**.
 - Reset burner operating hours, number of burner starts and fuel consumption.
 - Press **i**.

→ Refer to section entitled "Scanning Operating Status Information".

7. After carrying out maintenance
 - Press **+** and **Menu** simultaneously for approx. 4 seconds.
 - Reset "Max. flue gas temp." to the current value by pressing **OK**.
 - Press **OK**.

→ Refer to section "Temperatures, Boiler Coding Cards and Scans".

Troubleshooting

Troubleshooting Steps

Diagnosis

1. Establish fault message or ascertain behavior of system.

2. Look for the corresponding fault cause in the diagnosis tables.

Diagnosis

■ for faults with fault display on the programming unit

Please note:

Retrieval of fault codes from the fault memory

■ for faults without fault display on the programming unit

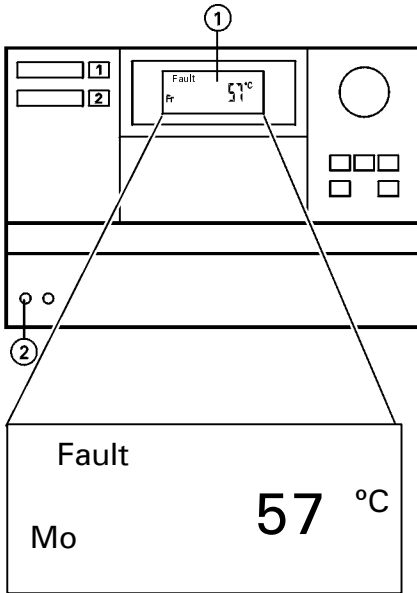
3. Establish the action required in the table.

Correction

4. Correct the fault

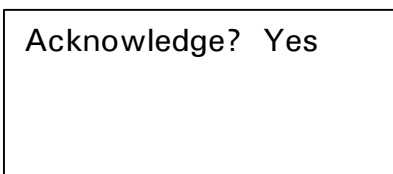
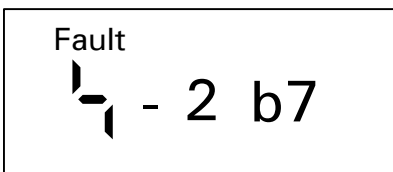
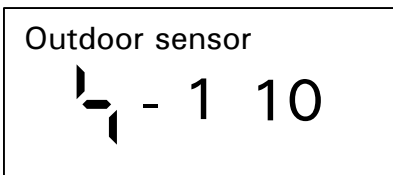
Diagnosis

Faults with fault display on the programming unit



When a fault message is transmitted,
– Fault –
flashes in the display ① of the
programming unit.
The red fault indicator ② flashes.

→ Refer to fault code tables in this
section for fault code analysis.



Search fault

Open the hinged cover on the
programming unit and press **i**.

Other fault codes which are stored can
be called up by pressing the **+** or
- button.

IMPORTANT

The fault can be acknowledged by
pressing **OK**. The fault message in the
display ① disappears; the red fault
indicator ② continues to flash. If an
acknowledged fault is not corrected by
07:00 hrs on the following day, the
fault message will re-appear in the
display.

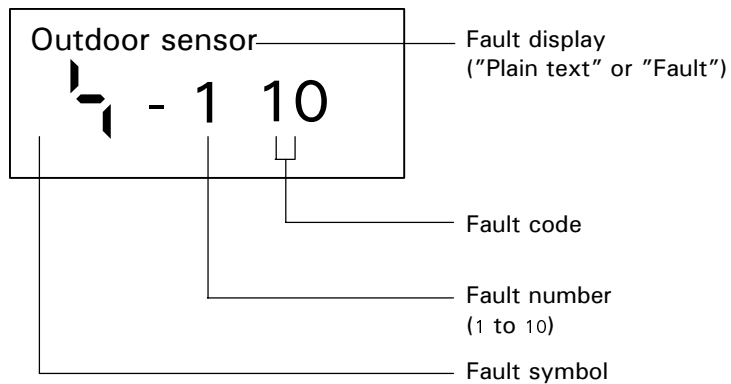
To retrieve an acknowledged fault message

Press **OK** for approx. 3 seconds; select
the acknowledged fault by pressing the
+ or **-** button.

→ Fault is displayed.

Faults with fault display on the programming unit (continued)

Structure of fault display

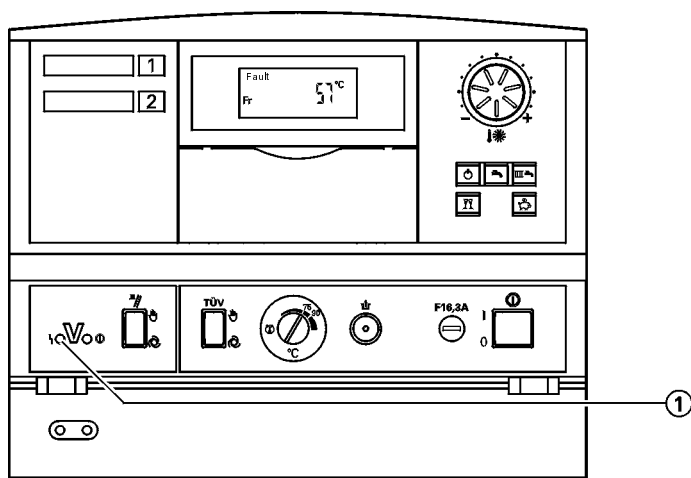


Faults displayed in plain text

The following faults are displayed in plain text:

- Burner
- Fixed high limit^{*1}
- Safety circuit^{*1}
- Outdoor sensor
- Supply sensor
- DHW tank temperature sensor
- Return water temperature sensor
- Room sensor
- Flue gas temperature sensor

Faults with fault display on the programming unit (continued)



IMPORTANT

The red fault indicator ① flashes whenever there is a fault.

Fault code in display	Behavior of system	Cause of fault	Action
0F	Normal operation	Service required	Perform maintenance
10	Operates on basis of 32 °F / 0 °C outdoor temperature	Short circuit Outdoor temperature sensor	Check outdoor temperature sensor
18	Operates on basis of 32 °F / 0 °C outdoor temperature	Open circuit Outdoor temperature sensor	Check outdoor temperature sensor
20	Mixing valve is closed	Short circuit Supply temperature sensor	Check supply temperature sensor
21	Normal operation without influence of return water temperature	Short circuit Return water temp. sensor	Check return water temperature sensor
28	Mixing valve is closed	Open circuit Supply temperature sensor	Check supply temperature sensor
29	Normal operation without influence of return water temperature	Open circuit Return water temp. sensor	Check return water temperature sensor
30	<ul style="list-style-type: none"> ■ With DHW tank: DHW pump ON, boiler is kept at desired tank temperature ■ Without DHW tank: Boiler is controlled on basis of adjustable high limit 	Short circuit Boiler temperature sensor	Check boiler temperature sensor
38	<ul style="list-style-type: none"> ■ With DHW tank: DHW pump ON, boiler is kept at desired tank temperature ■ Without DHW tank: Boiler is controlled on basis of adjustable high limit 	Open circuit Boiler temperature sensor	Check boiler temperature sensor

IMPORTANT

After performing maintenance, set coding address "24" to "24:0".






Faults with fault display on the programming unit (continued)

Fault code in display	Behavior of system	Cause of fault	Action
50	DHW pump ON: Desired boiler temp. = desired tank temp., priority control cancelled	Short circuit Tank temperature sensor	Check tank temperature sensor
58	DHW pump ON: Desired boiler temp. = desired tank temp., priority control cancelled	Open circuit Tank temperature sensor	Check tank temperature sensor
92	DHW Normal operation: Only solar control unit fault codes will be displayed	Short circuit Collector temperature sensor, connects to Vitosolic S1	Check solar control unit sensor
93		Short circuit Tank temperature sensor, connects to Vitosolic S2	
94		Short circuit Temperature sensor, connects to Vitosolic S3	
99		Broken wire Collector temperature sensor, connects to Vitosolic S1	
9b		Broken wire Tank temperature sensor, connects to Vitosolic S2	
9c		Broken wire Temperature sensor, connects to Vitosolic S3	
9f	Normal operation Only solar control unit fault codes will be displayed	Fault Solar control unit; displayed if a fault without fault code occurs at the solar control unit	Check solar control unit
b0	Normal operation	Short circuit Flue gas temperature sensor	Check flue gas temperature sensor
b1	Normal operation	Communication error Programming unit	Check connections, if necessary replace programming unit
b4	Emissions test mode	Internal fault	Check electronics board
b5	Normal operation	Internal fault	Check electronics board
b6	Constant temperature mode	Invalid hardware detection	Check mother board
b7	Boiler controlled on basis of adjustable high limit	Internal fault Boiler coding card	Insert boiler coding card or replace if defective
b8	Normal operation	Open circuit Flue gas temperature sensor	Check flue gas temperature sensor
b9	Normal operation	Internal fault	Acknowledge fault, repeat data input

Faults with fault display on the programming unit (continued)

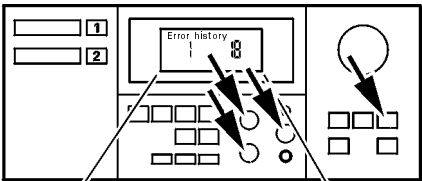
Fault code in display	Behavior of system	Cause of fault	Action
bE	Normal operation without remote control	Communication error Vitotrol remote control, boiler circuit	Check connections, cable and coding address "A0"
bd	Normal operation without remote control	Communication error Vitotrol remote control, mixing valve circuit	Check connections, cable and coding address "A0"
bE	Normal operation	Vitotrol remote control incorrectly coded	Check remote control DIP switch setting
CE		Broken wire KMBUS to the solar control unit	Check KM BUS cable and solar control unit. Without solar control unit: Set code 54 : 0
CE		Communication fault Input extension module 0-10V	Check connections and cables/wires. If required, replace the input extension module. Without module: Set code 9d : 0
CI	Boiler cools down	External safety equipment	Check connections of connector ¹⁵⁰
			<div>IMPORTANT</div> <div>Fault only indicated if fault indication module (accessory) is installed.</div>
CE	Normal operation, max. pump speed	Communication error Variable speed boiler circuit pump	Check setting of coding address "E5"; check coding switch setting of heating circuit pump
CE	Normal operation, max. pump speed	Communication error Variable speed mixing valve circuit pump	Check setting of coding address "E5"; check coding switch setting of heating circuit pump
CE	Normal operation	Heating circuit pump coded incorrectly	Check setting of coding address "E5"; check coding switch setting of heating circuit pump
CE	Normal operation	Fault message input active on Switching Module-V	Check unit at fault message input
CE	Normal operation	Communication error Vitocom 100	Check connections and Vitocom 100
CE	Normal operation	Communication error Switching Module-V	Check connections and Switching Module-V
dI	Boiler cools down	Burner fault	Check burner

Faults with fault display on the programming unit (continued)

Fault code in display	Behavior of system	Cause of fault	Action
	Boiler cools down	Fixed high limit has operated or fault message module not inserted correctly	<p>Check fixed high limit or fault message module</p> <div> IMPORTANT Fault only indicated if fault message module (accessory) is installed. </div>
	Normal operation without room temperature input	Short circuit Room temperature sensor, boiler circuit	Check room temperature sensor for boiler circuit
	Normal operation without room temperature input	Short circuit Room temperature sensor, mixing valve circuit	Check room temperature sensor for mixing valve circuit
	Normal operation without room temperature input	Open circuit Room temperature sensor, boiler circuit	Check room temperature sensor for boiler circuit
	Normal operation without room temperature input	Open circuit Room temperature sensor, mixing valve circuit	Check room temperature sensor for mixing valve circuit

Retrieving fault codes from the fault memory (fault history)



All faults which have occurred are stored and can be scanned. The scanning sequence starts with the most recently stored fault code.





Error history
1 18


⋮

Error history
10 d4

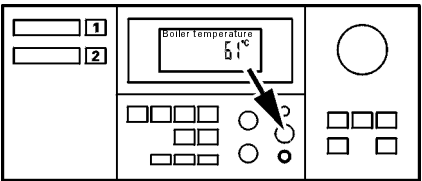
1. Press  and  simultaneously for approx. 2 seconds. → Scanning of error history is activated.


2. Access the individual fault codes by pressing the  or  button.

IMPORTANT

All stored fault codes can be deleted by pressing .





Sequence of stored fault codes	Fault code
1	Last (most recent) fault code
⋮	⋮
10	10th last fault code



3. Press .

→ Scanning of error history is terminated.



Faults without fault display on the programming unit

Behavior of system	Action		
Boiler cold, burner not operating	Turn emissions test switch to 	<p>■ Blank programming unit display, check for power to Power Pump Module, check for low water cut-off device (if installed), check for correct interconnection between Vitotronic and Power Pump Module, check fuse F1 in Vitotronic and replace if necessary.</p> <p>■ Display in programming unit present, but no pump(s) operating, check for correct interconnection between Vitotronic and Power Pump Module. Check for fuses F1 through F4 in Power Pump Module and replace fuse and pump if necessary.</p>	
		■ Display in programming unit, pumps running →	
		Is voltage present at connector  between L1 and N?	<p>If not → Check connector , burner connection cable and fixed high limit as well as any other safety high limits installed (low water cut-off device, pressure gage etc.).</p>
			<p>If so → The error source is probably not in the Vitotronic, but at the burner connection or on the burner itself.</p>
		Is voltage present at terminal on connector when  connected?	<p>If not → Check equipment installed on the burner (fuses, ignition module, venting equipment etc.).</p> <p>If so → Press the TUV TEST button. The burner should start up after a certain period of time (e.g. for oil preheating). If the burner still does not operate, please repeat the above checks. Burner switch-on may be prevented by defective additional equipment installed (e.g. motor-controlled flue gas damper).</p>

Faults without fault display on the programming unit (continued)

Behavior of system	Action
Boiler water temperature is too high or too low	<p>Compare the current and the desired boiler water temperature values</p> <p>Desired value too high or too low → Check settings of timer, heating curves and coding addresses. Check setpoint value selector and remote control (if installed):</p> <ol style="list-style-type: none"> 1. Preselect very high day temperature and very low night temperature. 2. Set time so that operation switches from normal room temp. operation to reduced room temp. operation in minutes ahead. 3. The switchover must result in an obvious change in the boiler water temperature setpoint. <ul style="list-style-type: none"> ■ If no obvious change: Provisionally connect the remote control (with fixture) directly to the Vitotronic and repeat the test. ■ Desired value now satisfactory: Fault cause in connecting cable to remote control ■ Desired value still too high or too low: Repeat check of equipment settings and remote control. Replace remote control if necessary. <p>Desired value OK → Fault cause in temperature measurement</p> <ol style="list-style-type: none"> 1. Determine the boiler water temperature with thermometer in the sensor well. 2. Compare the values of the boiler temperature sensor with the resistance curve. 3. Check the cut-off point of the electro-mechanical adjustable high limit.

Faults without fault display on the programming unit (continued)

Behavior of system	Action		
Boiler is hot enough, but heating circuit pumps not running	Turn emissions test switch to 	Pumps running →	
		Pump is not activated: Check heating curves, desired values, heating circuit pump logic; if applicable, also check external equipment connected (Switching Module-V etc.) or high domestic hot water demand.	
		Pump not running →	
		Is voltage present between L and N on connector  in Power Pump Module?	<p>If so →</p> <ol style="list-style-type: none"> 1. Check pump connection and pump. 2. Check any additional control equipment installed (e.g. high limit aquastat). <p>If not →</p> <p>Check fuse F2 in Vitotronic and fuses F1 through F4 in Power Pump Module.</p> <p>If fuse defective:</p> <ol style="list-style-type: none"> 1. Disconnect all connectors of the pumps and mixing valve motors. 2. Replace respective fuse. 3. In order to identify the defective unit, re-connect one unit after another.

Boiler Temperature Control

Brief description

The boiler water temperature is controlled by switching the burner on and off. The switching differential at delivery is $\pm 3.6\text{ }^{\circ}\text{F} / 2\text{ }^{\circ}\text{C}$, based on the current setpoint value. The desired boiler water temperature value is determined by the desired supply temperature values of the heating circuit without mixing valve,

and of the heating circuit with mixing valve and the desired domestic hot water temperature, and is dependent on the boiler and the heating and control facilities installed. When the domestic hot water tank is heated up, a desired boiler water temperature is selected which is $36\text{ }^{\circ}\text{F} / 20\text{ }^{\circ}\text{C}$ higher than the desired tank

temperature (this value can be changed via coding address "60"). The boiler water temperature control is limited by the adjustable high limit TR. The current boiler water temperature value is required to satisfy the heating circuits and the domestic hot water tank.

Functions

The boiler water temperature is measured by three sensors separately via a multiple sensor well :

- Fixed high limit (liquid expansion)
- Adjustable high limit (liquid expansion)
- Boiler temperature sensor (change in resistance PT 500)

Top end of control range

- Fixed high limit
230 / 212 / 203 $^{\circ}\text{F}$
110 / 100 / 95 $^{\circ}\text{C}$
- Adjustable high limit
167 / 189 $^{\circ}\text{F}$
75 / 87 $^{\circ}\text{C}$
- Electronic high limit
Setting range: 68 to 266 $^{\circ}\text{F} /$
20 to 130 $^{\circ}\text{C}$
The high limit for the boiler water temperature can be changed in coding 1 (plain text) or in coding 2 (coding address "06"). The limit is only effective for space heating (not for DHW tank heating).

Bottom end of control range

- Low temperature boilers:
Frost protection function; the boiler water temperature is kept at a minimum of 59 - 72 $^{\circ}\text{F} / 15 - 22\text{ }^{\circ}\text{C}$ with outdoor temperatures below 34 $^{\circ}\text{F} / 1\text{ }^{\circ}\text{C}$.
- Cast-iron boilers:
The boiler water temperature is kept within the range of 95 - 108 $^{\circ}\text{F} / 35 - 42\text{ }^{\circ}\text{C}$ in normal operation and for frost protection. For possible changes, see coding address "A3"; the frost threshold is variable.

Additional control facilities

- Two-stage/modulating burner:
An adaptor can be connected for controlling a two-stage/modulating burner.
- External control inputs (messages):
The following external control inputs are possible with the Switching Module-V:
separate switching of the heating program for mixing valve circuit and boiler circuit
external disabling of the burner
external switch-on of the burner
external fault message input
compiled fault indication
external switch-on of the DHW recirculation pump (short-term operation)

Control sequence

Switching hysteresis (switching differential)

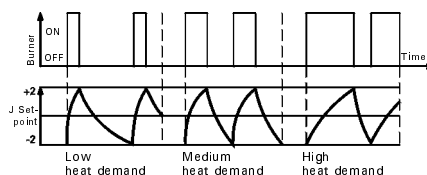
Within the control range the burner is controlled via a selectable switching hysteresis (coding addresses "04"), thereby regulating the boiler water temperature. Separate switching hystereses apply in the range of the boiler water low and high limits.

■ Fixed switching hysteresis

7 °F / 4 °C:

The switching hysteresis for the burner has a fixed setting of 7 °F / 4 °C.

The operating time is load-dependent.

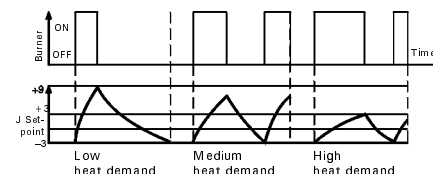


■ Heat demand-controlled switching hysteresis:

The heat demand-controlled switching hysteresis takes into account the boiler water temperature curve and the boiler load. The switching hysteresis, i.e. the burner operating time, is varied in relation to the current heat demand (between 11 and 21 °F / 6 and 12 °C or 11 °F and 36 °F / 6 and 20 °C).

ERB50 FUNCTION

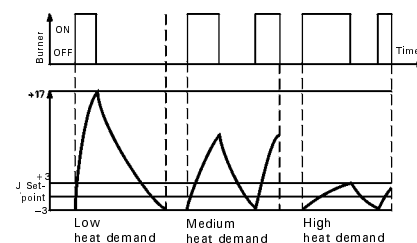
Values between 10.8 and 21.6 °F / 6 and 12 °C are set, depending on the heat demand.



or

ERB80 FUNCTION

Values between 11 °F and 36 °F / 6 and 20 °C are set, depending on the heat demand.



Boiler temperature falls

(setpoint value -3.6 °F / -2 °C)

The burner switch-on signal is set and the burner starts its own monitoring program. Depending on the range of additional control functions and the method of firing, burner switch-on can be delayed by a few minutes.

Boiler temperature rises

(setpoint value +3.6 °F / +2 °C)

The burner switches off.

Boiler Temperature Control (continued)

Possible changes to the boiler temperature control

Function	Factory default setting Address: Value	Possible change Address: Value
Burner type	02 : 0 Operation with single-stage burner	02 : 1 Operation with two-stage burner 02 : 2 Operation with modulating burner For more coding information for the modulating/two-stage burner see section entitled "Codings".
Boiler protection Gas/oil-fired operation	03 : 0 Gas-fired operation	03 : 1 Oil-fired operation <div>IMPORTANT</div> The coding cannot be reset.
Switching hysteresis for the burner	04 : 0 Fixed switching hysteresis 7 °F / 4 °C	04 : 1 Heat demand-controlled switching hysteresis variable between 11 and 22 °F / 6 and 12 °C. 04 : 2 Heat demand-controlled switching hysteresis variable between 11 and 36 °F / 6 and 20 °C.
Maximum temperature limit for the boiler water temperature	06 : 85 Maximum boiler water temperature limit set to 185 °F / 85 °C	06 : 20 Maximum boiler water temperature to 06 : 130 20 and 130 °C <div>IMPORTANT</div> If the boiler water temperature has a maximum limit, the boiler water temperature cannot rise above this limit even if called for by the mixing valve circuit control.
Maximum flue gas temperature for service display	1F : 0 No monitoring of flue gas temperature (only with flue gas temperature sensor connected) for "Service" display	1F : 1 When the flue gas temperature exceeds the preselected limit value 1F : 500 (selectable in the range from 26 - 932 °F / 2 - 500 °C), the "Service" display appears (coding "24: 0" is automatically set to "24: 1").
Maximum operating hours for service display	21 : 0 No monitoring of burner operating hours for "Service" display	21 : 1 The number of burner hours run before the "Service" display appears can be set between 1 and 9999 hours (when the preselected number of burner hours run is exceeded, coding "24: 0" is automatically set to "24: 1"). 21:9999
Time interval for service display	23 : 0 Time interval not active	23 : 1 Time interval variable between 1 and to 23 : 24 24 months (when the preselected time interval is exceeded, coding "24: 0" is automatically set to "24: 1").
Service display	24 : 0 No "Service" display	24 : 1 The "Service" display appears (address is set automatically and must be reset manually after maintenance has been performed)
Burner cycling	28 : 0 No burner cycling	28 : 1 Burner is switched on automatically for 30 seconds every 5 hours

Heating Circuit Control

Brief description

The control unit features control loops for a heating circuit without mixing valve and a heating circuit with mixing valve.

The desired supply temperature value of each heating circuit is determined by the outdoor temperature, the desired room temperature, the operating mode and the heating curve. The supply temperature of the heating circuit without mixing valve corresponds to the boiler water temperature.

The supply temperature of the heating circuit with mixing valve is controlled by opening and closing the mixing valve in steps. The mixing valve motor control varies in actuation and interval times as a function of the control difference (control deviation).

Functions

The heating circuit without mixing valve is dependent on the boiler water temperature and its control range limits. The heating circuit pump is the only control element. The supply temperature of the heating circuit with mixing valve is measured by the supply temperature sensor (contact sensor).

Time program

The timer of the control unit changes the operating mode at the programmed times in the "space heating and domestic hot water" heating program, switching between "space heating at normal room temperature" and "space heating with reduced room temperature". Each operating mode has its own setpoint value. If the timer switches to normal room temperature a "rapid heating" mode can be set via coding address "b6" for use when switching to "space heating with normal room temperature".

Outdoor temperature

To match the control unit to the building and the heating system, a heating curve must be selected. The heating curve determines the desired boiler water temperature value as a function of the outdoor temperature. Control takes place on the basis of the average outdoor temperature. This is derived from the actual and the damped outdoor temperature. The heating curve can be changed via the setpoint or operating mode selector switches.

Domestic hot water temperature

- With priority control:
While the tank is being heated, the desired supply temperature value is set to 32 °F / 0 °C. The mixing valve closes and the heating circuit pumps are switched off.
- Without priority control:
The heating circuit control continues to operate as normal with the setpoint value unchanged.
- With variable priority control (only in conjunction with heating circuit with mixing valve):
The heating circuit pump remains switched on. The desired supply temperature is lowered as long as the desired boiler water temperature is not reached while the tank is being heated. The desired supply temperature is dependent on the difference between the desired and the current boiler water temperature, the outdoor temperature, the heating curve slope and the setting of the coding address "A2".

Room temperature

In conjunction with room temperature dependent control:
Compared with the outdoor temperature, the room temperature has greater influence on the desired boiler water temperature. The magnitude of this influence can be changed via coding address "b2".
In conjunction with heating circuit with mixing valve:
With control differences (i.e. deviations from the current value) of over 3.6 °F / 2 °C room temperature, this influence can be intensified (via coding address "b6", boost heating/setback).

Functions (continued)

Summer energy saving function (heating circuit pump logic)

If the outdoor temperature is higher than the preset room temperature setpoint value, the heating circuit pump is switched off and the desired supply temperature value is set to 32 °F / 0 °C.

The switching threshold can be individually selected via coding address "A5".

Extended summer energy saving function

The heating circuit pump can be switched off

- if the outdoor temperature exceeds a value preselected via coding address "A6"

- if the desired room temperature is reduced via coding address "A9"

- In conjunction with heating circuit with mixing valve:
if the mixing valve has been closed for longer than 12 minutes (mixing valve energy saving function, coding address "A7")

Slab curing function

(only in conjunction with heating circuit with mixing valve)

IMPORTANT

The slab curing function is selectable on the basis of four different temperature/time curves. The curves are activated via coding address "F1".

When the slab curing function is activated, the heating circuit pump of the mixing valve circuit is switched on and the supply temperature is controlled according to the selected curve. When the slab curing time (30 days) has expired, the mixing valve circuit is automatically controlled on the basis of the preset parameters.

Underfloor heating

(only in conjunction with heating circuit with mixing valve)

To achieve optimum control of underfloor heating systems, a return water temperature sensor can be connected additionally. The control unit computes a return water temperature setpoint value. A change is made whenever the current return water temperature differs from the desired return water temperature value.

The temperature difference is set via coding address "C7".

System dynamics – mixing valve circuit

(only in conjunction with heating circuit with mixing valve)

The control behavior of the mixing valve can be influenced via coding address "C4".

Frost protection

A supply temperature of 59 to 72 °F / 15 to 22 °C is guaranteed frost protection with outdoor temperatures below +34 °F / +1 °C.

For possible changes, see coding address "A3"; the frost threshold is variable.

Supply temperature control

Differential temperature:

The differential temperature can be selected via coding address "05", factory default setting: 14 °F / 8 °C.

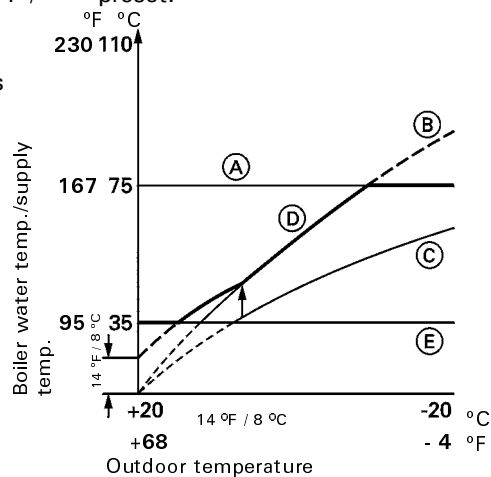
The differential temperature is the minimum difference by which the boiler water temperature should exceed the highest currently required supply temperature of the heating circuit with mixing valve.

- System with only one heating circuit with mixing valve:

The desired boiler water temperature is automatically controlled at 14 °F / 8 °C above the desired supply temperature value.

- System with heating circuit without mixing valve and with heating circuit with mixing valve:

The desired boiler water temperature is controlled according to its own heating curve. The temperature difference of 14 °F / 8 °C from the desired supply temperature is factory preset.



- (A) Max. boiler water temperature
- (B) Slope = 1.8 Boiler circuit = Heating circuit without mixing valve
- (C) Slope = 1.2 Heating circuit with mixing valve
- (D) Boiler water temperature (with differential temperature = 14 °F / 8 °C)
- (E) Minimum boiler water temperature

Functions (continued)

Top end of control range

Electronic high limit
Setting range: 34 to 262 °F /
1 to 127 °C
Change via coding address "C6".

Bottom end of control range

Electronic low limit
Setting range: 34 to 262 °F /
1 to 127 °C
Change via coding address "C5".

IMPORTANT

The maximum limit does not replace the limit aquastat required for underfloor heating systems.

Limit aquastat for underfloor heating systems:

The limit aquastat switches the heating circuit pump off when the supply temperature rises above the preset value. In this situation, the supply temperature cools down only slowly, i.e. automatic resetting can take several hours.

Control sequence

Heating circuit with mixing valve

The mixing valve motor is not activated within the "neutral zone" (± 1.8 °F / 1 °C).

Supply temperature falls

(Setpoint value -1.8 °F / -1 °C)
The mixing valve motor receives the signal "Open mixing valve".
The greater the control difference, the longer the duration of the signal and the shorter the duration of the intervals.

Supply temperature rises

(Setpoint value $+1.8$ °F / 1 °C):
The mixing valve motor receives the signal "Close mixing valve".
The greater the control difference, the longer the duration of the signal and the shorter the duration of the intervals.

Special features

Restart of control unit:
The mixing valve motor receives the signal "Close mixing valve" and is automatically closed for 150 seconds. Supply temperature control can be resumed afterwards.

Heating Circuit Control (continued)

Possible changes to the heating circuit control

Function	Factory default setting Address: Value	Possible change Address: Value
Differential temperature (only in conjunction with heating circuit with mixing valve)	05 : 8 Differential temperature 14.4 °F / 8 °C.	05 : 0 Differential temperature adjustable to between 0 and 72 °F / 0 and 40 °C 05 : 40
Single-/multi-family house	7F : 1 Single-family house Switching times for tank heating, for the DHW recirc. pump and for the holiday program are applicable to all connected heating circuits	7F : 0 Multi-family house Each connected heating circuit has its own switching times for tank heating, for the DHW recirculation pump and for the holiday program
Tank priority control	A2 : 2 With tank priority over heating circuit pump and mixing valve (heating circuit pump OFF, mixing valve closed)	A2 : 0 Without tank priority (heating circuit pump ON, mixing valve in normal operation)
		A2 : 1*1 With tank priority over mixing valve (heating circuit pump ON, mixing valve closed)
		A2 : 3*1 Reduced tank priority over mixing valve; i.e. the heating circuit is supplied with a reduced amount of heat A2 : 15
Variable frost threshold *2	A3 : 2 The heating circuit pump is switched on at outdoor temperatures below 34 °F / 1 °C. The heating circuit pump is switched off at outdoor temperatures above 37 °F / 3 °C.	Heating circuit pump ON at OFF at A3 : - 9 14 °F/-10 °C 18 °F/- 8 °C A3 : - 8 16 °F/- 9 °C 19 °F/- 7 °C A3 : - 7 18 °F/- 8 °C 21 °F/- 6 °C A3 : - 6 19 °F/- 7 °C 23 °F/- 5 °C A3 : - 5 21 °F/- 6 °C 25 °F/- 4 °C A3 : - 4 23 °F/- 5 °C 27 °F/- 3 °C A3 : - 3 25 °F/- 4 °C 28 °F/- 2 °C A3 : - 2 27 °F/- 3 °C 30 °F/- 1 °C A3 : - 1 28 °F/- 2 °C 32 °F/- 0 °C A3 : 0 30 °F/- 1 °C 34 °F/- 1 °C A3 : 1 32 °F/- 0 °C 36 °F/- 2 °C A3 : 2 34 °F/- 1 °C 37 °F/- 3 °C A3 : 15 57 °F/- 14 °C 61 °F/- 16 °C
Cancel frost protection function *2	A4 : 0 With frost protection	A4 : 1 No frost protection Setting only possible when coding "A3:-9" is set.
Summer energy saving function (heating circuit pump logic function, outdoor temperature-dependent)	A5 : 5 With heating circuit pump logic function (HPL function). The heating circuit pump is switched off when the outdoor temperature (OT) rises by more than 1.8 °F / 1 °C above the desired room temperature (RT _{des.}). OT > RT _{des.} + 1.8 °F / 1 °C	A5 : 0 Without heating circuit pump logic function (HPL function). The heating circuit pump is switched off when A5 : 1 A5 : 2 OT > RT _{des.} + 9 °F / 5 °C A5 : 3 OT > RT _{des.} + 7.2 °F / 4 °C A5 : 4 OT > RT _{des.} + 5.4 °F / 3 °C A5 : 5 OT > RT _{des.} + 3.6 °C / 2 °C A5 : 6 OT > RT _{des.} + 1.8 °F / 1 °C A5 : 7 OT = RT _{des.} . OT > RT _{des.} -1.8 °F / 1 °C . . A5 : 15 .OT > RT _{des.} -16.2 °F / 9 °C

*1 Only selectable for heating circuit with mixing valve.

IMPORTANT

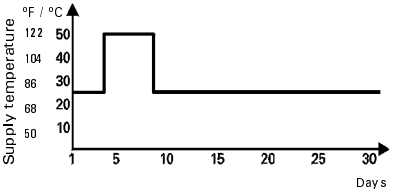
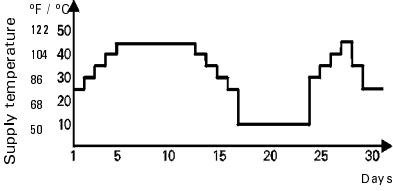
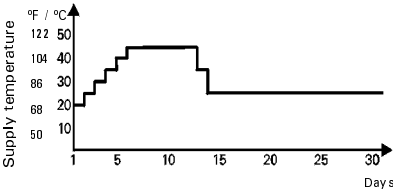
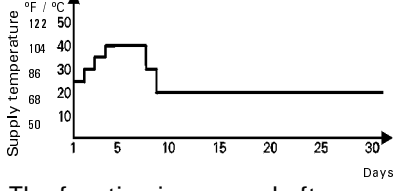

At settings below 34 °F / 1 °C there is a risk that piping outside the insulation of the building may freeze, e.g. pipes in the roof space, to the garage, in radiator alcoves etc. Check the insulation of the entire system in the case of settings below 34 °F / 1 °C. Pay particular attention to the standby mode, e.g. during holiday periods.

Possible changes to the heating circuit control (continued)

Function	Factory default setting Address: Value	Possible change Address: Value
Extended summer energy saving function	A6 : 36 Automatic switching from normal heating to summer operation not active	A6 : 5 Automatic switching from normal heating to summer operation* ¹ at a variable setting value from 41 to 95 °F / 5 to 35 °C plus 34 °F / 1 °C at which the burner and heating circuit pump are switched off and the mixing valve is closed. A6 : 35
Mixing valve energy saving function (only in conjunction with heating circuit with mixing valve)	A7 : 0 Without mixing valve energy saving function	A7 : 1 With mixing valve energy saving function (extended heating circuit pump logic) The heating circuit pump can be switched off additionally when the mixing valve has been closed for longer than 20 minutes. The heating circuit pump is switched on again ■ when the mixing valve goes to its normal operation ■ after the tank has been heated (for 20 minutes) ■ when there is a risk of freezing
Heating circuit pump logic function with change of setpoint	A9 : 0 Without pump off time	A9 : 1 With pump off time: to Heating circuit pump logic function A9 : 15 with change of setpoint (through change of operating mode or changes on the "☼" selector knob or "☾" button).
System dynamics – mixing valve circuit (only in conjunction with heating circuit with mixing valve)	C4 : 1 Mixing valve circuit with 4-way mixing valve	C4 : 0 Mixing valve circuit with 3-way mixing valve C4 : 2 Special case 1 C4 : 3 Special case 2
Minimum supply temperature limit	C5 : 20 Desired supply temperature value 68 °F / 20 °C minimum	C5 : 1 Variable from 34 °F / 1 °C to minimum C5 : to 127 261 °F / 127 °C minimum
Maximum supply temperature limit (only in conjunction with heating circuit with mixing valve)	C6 : 75 Maximum supply temperature limit set to 167 °F / 75 °C.	C6 : 1 Max. supply temperature limit to variable between 34 and 262 °F / 1 and 127 °C C6 : 127
Temperature difference between supply and return water temperature sensor (only in conjunction with heating circuit with mixing valve)	C7 : 0 In conjunction with return water temperature sensor: Without spread	C7 : 1 In conjunction with return water temperature sensor: Spread variable from 1.8 to 5.8 °F / 1 to 31 °C; spread = temperature difference between supply and return at system point 14 °F / -10 °C C7 : 31
Control of underfloor heating system (only in conjunction with heating circuit with mixing valve)	C9 : 0 Underfloor heating system controlled via supply temperature sensor and mixing valve	C9 : 1 Optimized control of an underfloor heating system with supply and return water temp. sensor (effective with coding address "C7")
Time limit for party mode	F2 : 0 No time limit for party mode	F2 : 1 Time limit for party mode between one and twelve hours F2: 12

*²Based on the damped outdoor temperature which is calculated from the current outdoor temperature and a time constant which takes into account the cooling characteristics of an average building.

Possible changes to the heating circuit control
 (continued)

Function	Factory default setting Address: Value	Possible change Address: Value
Slab curing function (only in conjunction with heating circuit with mixing valve)	F1 : 0 Slab curing function not active	<p>Slab curing function selectable on basis of four temperature/ time curves:</p> <p>F1 : 1 Temperature/time curve 1:</p>  <p>F1 : 2 Temperature/time curve 2:</p>  <p>F1 : 3 Temperature/time curve 3:</p>  <p>F1 : 4 Temperature/time curve 4:</p>  <p>The function is resumed after a power failure or after the control unit is switched off. When the slab curing function has terminated or the address is reset manually to 0, the  heating program is switched on.</p>

Tank Temperature Control

Brief description

The tank temperature control is a constant value control. It operates on the basis of switching the circulation pump for heating the tank on and off.

The switching differential is ± 4.5 °F / 2.5 °C.
During heating, a constant high boiler

water temperature is set and space heating is switched off (tank priority control selectable).

Functions

Time program

An automatic or an individual time program can be selected for domestic hot water heating and the DHW recirculation pump.

In the automatic program, domestic hot water heating precedes the heat-up cycle of the space heating circuit by 30 minutes. On systems with two heating circuits, the time program is based on the switching times of the first space heating circuit to be heated.

In the individual time program, up to four switching times per day can be set on the timer for domestic hot water heating and the DHW recirculation pump.

Once started, heating of the tank is always completed regardless of the time program. The switching times for domestic hot water heating and the DHW recirculation pump are effective for all heating circuits. Individual switching times can be assigned to each heating circuit via the coding address "7F".

Frost protection function

If the domestic hot water temperature falls below 50 °F / 10 °C, the domestic hot water tank is heated to 68 °F / 20 °C.

Additional function for domestic hot water heating

This function is activated when a second DHW setpoint value is selected via coding address "58" and the 4th activation period for domestic hot water heating is activated

Desired domestic hot water temperature

The desired domestic hot water temperature can be set in the range of 50 to 140 °F / 10 to 60 °C. The setpoint range can be extended to 203 °F / 95 °C via coding address "56".

The desired domestic hot water temperature can be set on the programming unit of the control unit and on any Vitotrol 300 remote control (if installed).

The setpoint adjustment can be assigned to individual heating circuits via coding address "66".

Domestic hot water recirculation pump

The DHW recirculation pump supplies hot water to the take-off points at selectable times.

Up to four switching times can be set on the timer.

See page 56 regarding functional changes which are possible for the DHW recirculation pump.

Additional control facilities

The domestic hot water heating can be activated and deactivated by switching heating programs.

The DHW recirculation pump can be activated for a short time via an external contact in conjunction with the Switching Module-V. The activation time can be selected via coding address "74".

Control sequence

DHW tank temperature falls

(Setpoint value -4.5°F / 2.5°C , selectable via coding address "59")

The desired boiler water temperature is set 36°F / 20°C higher than the DHW temperature setpoint value (selectable via coding address "60").

Boiler temperature-dependent activation of the DHW pump for heating the tank (Coding "61:00"): The circulation pump is switched on when the boiler water temperature exceeds the domestic hot water temperature by 12.6°F / 7°C .

The circulation pump for heating the tank is switched on immediately (Coding "61:01").

- With priority control: (Coding "A2:2")
The supply temperature setpoint value is set to 32°F / 0°C when the tank is being heated.
The mixing valve is closed and the heating circuit pumps are switched off.
- Without priority control:
The heating circuit control unit continues to operate regularly with the unchanged setpoint value.
- With reduced priority control (only in conjunction with heating circuit with mixing valve):
The heating circuit pump remains switched on. The desired supply temperature is lowered as long as the desired boiler water temperature is not reached while the tank is being heated. The desired supply temperature is dependent on the difference between the desired and the current boiler water temperature, the outdoor temperature, the heating curve slope and the setting of the coding address "A2".

DHW tank temperature rises

(Setpoint value $+4.5^{\circ}\text{F}$ / 2.5°C)

The boiler water temperature setpoint value is reset to the weather-responsive value.

When the tank has been heated up, the DHW pump continues to run (Coding "62:10") until

- the temperature difference between the boiler water and domestic hot water is less than 12.6°F / 7°C , or
- the desired, weather-responsive boiler water temperature is reached, or
- the desired domestic hot water temperature is exceeded by 9°F / 5°C .

The max. switch-off delay is 15 minutes

(selectable via coding address "62").

- DHW pump without switch-off delay (Coding "62:00"):
The circulation pump is switched off immediately.
- With priority control (Coding "A2:2"):
The supply temperature setpoint value is reset to the weather-responsive value. The heating circuit pumps are switched on and the mixing valve goes to normal operation.
- With adaptive tank heating (Coding "55:1"):
Adaptive tank heating takes into account the rate at which the temperature increases during domestic hot water heating. It also takes into account whether the boiler must supply heat for space heating purposes after heating up the tank or whether the residual heat of the boiler is to be transferred to the domestic hot water tank. The control unit determines the switch-off time of the burner and the circulation pump accordingly so that the desired domestic hot water temperature is not substantially exceeded after tank heating is completed.

Tank Temperature Control (continued)

Possible changes to the tank temperature control

Function	Factory default setting Address: Value	Possible change Address: Value
Adaptive tank heating	55 : 0 Tank heating Hysteresis $\pm 4.5^{\circ}\text{F}$ / 2.5°C	55 : 1 Adaptive tank heating active (the rate at which the tank temperature increases during domestic hot water heating is taken into account)
Desired domestic hot water temperature	56 : 0 Setting range for domestic hot water temperature 50 to 140°F / 10 to 60°C	56 : 1 Setting range for domestic hot water temperature 50 to 203°F / 10 to 95°C IMPORTANT ■ Observe max. domestic hot water temperature ■ Adjust adjustable high limit
Second DHW temperature setpoint value	58 : 0 Without additional function for domestic hot water heating	58 : 1 Input of 2nd DHW temperature setpoint value; selectable between 58 : 95 34 to 203°F / 1 and 95°C (see coding address "56"). IMPORTANT The DHW tank is heated to the 2nd setpoint value during the 4th activation period for domestic hot water heating (For Settings see Operating Instructions)
Variable switching point of the desired domestic hot water temperature	59 : 0 Domestic hot water heating: Switch-on point: -4.5°F / 2.5°C Switch-off point: $+4.5^{\circ}\text{F}$ / 2.5°C	59 : 1 Switch-on point variable between to 1.8 and 18°F / 1 and 10°C 59 : 10 below setpoint value IMPORTANT Function only selectable when coding "55: 0" is set.
Desired boiler water temperature for domestic hot water heating	60 : 20 While domestic hot water is being heated, the boiler water temperature is at most 36°F / 20°C higher than the desired domestic hot water temperature	60 : 10 Difference between boiler water temperature and DHW setpoint to 60 : 50 temperature value variable between 18 and 90°F / 10 and 50°C
Activation of DHW pump	61 : 0 The DHW pump is switched on as a function of the boiler temperature	61:1 The DHW pump is switched on immediately
Switch-off delay of DHW pump	62 : 10 Circulation pump with max. switch-off delay of 10 minutes	62:0 Circulation pump without switch-off delay 62:1 Max. switch-off delay variable from 1 to 15 minutes to 62 : 15
Release of tank temperature control and DHW recirculation pump in the party mode	64 : 2 During the party mode: Continuous domestic hot water heating and DHW recirculation pump ON	64:0 During the party mode: No domestic hot water heating, DHW recirculation pump OFF 64:1 During the party mode: Domestic hot water heating and DHW recirculation pump according to preset time program

Tank Temperature Control (continued)

Possible changes to the tank temperature control (continued)

Function	Factory default setting Address: Value	Possible change Address: Value
Access to domestic hot water temperature setpoint value	66 : 4 Adjustment of DHW temperature setpoint value on the programming unit of the control unit and on the Vitotrol 300 remote control (if installed)	66 : 0 Adjustment of DHW temperature setpoint value only on the programming unit of the control unit
		66 : 1 Adjustment of DHW temperature setpoint value on the programming unit of the control unit and the Vitotrol 300 (1st heating circuit)
		66 : 2 Adjustment of DHW temperature setpoint value on the programming unit of the control unit and the Vitotrol 300 (2nd heating circuit)
		66 : 3 Without function
		66 : 5 Adjustment of DHW temperature setpoint value only on the Vitotrol 300 (1st heating circuit)
		66 : 6 Adjustment of DHW temperature setpoint value only on the Vitotrol 300 (2nd heating circuit)
DHW recirculation pump	70 : 0 DHW recirculation pump ON according to preset time program when DHW heating is released	70 : 1 DHW recirculation pump ON according to preset time program
Release of DHW recirculation pump when additional tank temperature control is activated	71 : 0 DHW recirculation pump ON according to preset time program	71 : 1 DHW recirculation pump OFF during domestic hot water heating to the 1st setpoint value
		71 : 2 DHW recirculation pump ON during domestic hot water heating to the 1st setpoint value
Release of DHW recirculation pump when additional function is activated	72 : 0 DHW recirculation pump ON according to preset time program	72 : 1 DHW recirculation pump OFF during domestic hot water heating to the 2nd setpoint value
		72 : 2 DHW recirculation pump ON during domestic hot water heating to the 2nd setpoint value
Release of DHW recirculation pump on basis of time interval	73 : 0 DHW recirculation pump ON according to preset time program	During the time program DHW recirculation pump ON for 5 minutes once per hour
		73 : 1 to 73 : 6 ON for 5 minutes 6 times per hour
		73 : 7 DHW recirculation pump ON continuously
Short-term operation of the DHW recirculation pump	74 : 5 In conjunction with Switching Module-V: The DHW recirculation pump can be switched on for 5 minutes via a potential free contact	74 : 0 to 74 : 15 Switch-on time variable from 0 to 15 minutes
Release of DHW recirculation pump when energy saving mode is activated	75 : 0 DHW recirculation pump ON according to preset time program	75 : 1 DHW recirculation pump OFF during energy saving mode

Tank Temperature Control (continued)

Possible changes to the tank temperature control (continued)

Function	Factory default setting Address: Value	Possible change Address: Value
Single-/multi-family house	7F : 1 Single-family house The switching times for DHW heating, for the DHW recirculation pump and for the holiday program are applicable to all connected heating circuits	7F : 0 Multi-family house Each connected heating circuit has its own switching times for DHW heating, for the DHW recirculation pump and for the holiday program
Tank priority control	A2 : 2 With tank priority over heating circuit pump and mixing valve (heating circuit pump OFF, mixing valve closed)	A2 : 0 Without tank priority (heating circuit pump ON and mixing valve in normal operation)
		A2 : 1 ^{*1} With tank priority over mixing valve (heating circuit pump ON, mixing valve closed)
		A2 : 3 ^{*1} Reduced tank priority over mixing valve; i.e. the heating circuit is supplied with a reduced amount of heat A2 : 15

	Page
Technical Data	59
System Components	
Overview of connections	60
Power Pump Module connections	61
Low water cut-off connections	62
Mother board	63
Electronics board	63
Power supply unit board	63
Mixing valve circuit board	63
Optolink/emissions test switch board	64
Programming unit	64
Cover with heating circuit selector buttons	65
Fault indication module	65
Boiler coding card	65
Fuses	65
Fixed high limit (FHL) test switch	66
Fixed high limit	66
Adjustable high limit	67
Outdoor temperature sensor	68
Boiler temperature sensor	69
DHW tank temperature sensor	70
Flue gas temperature sensor	71
Mixing valve actuator accessory kit	72
Strap-on sensor	72
Mixing valve motor	73
Installation examples	74
Limit aquastat	75
Vitotrol 200	76
Vitotrol 300	77
Connection of two or more remote controls	78
Room temperature sensor	79
Switching Module-V	80
KM-BUS Expansion Module	81
Input extension module 0-10V	82
Burner connection cable	83
Extension for two-stage/modulating burners	84
Codings	
Coding 1	85
Coding 2 (overview of all codings)	86
Component Settings	100

Technical Data

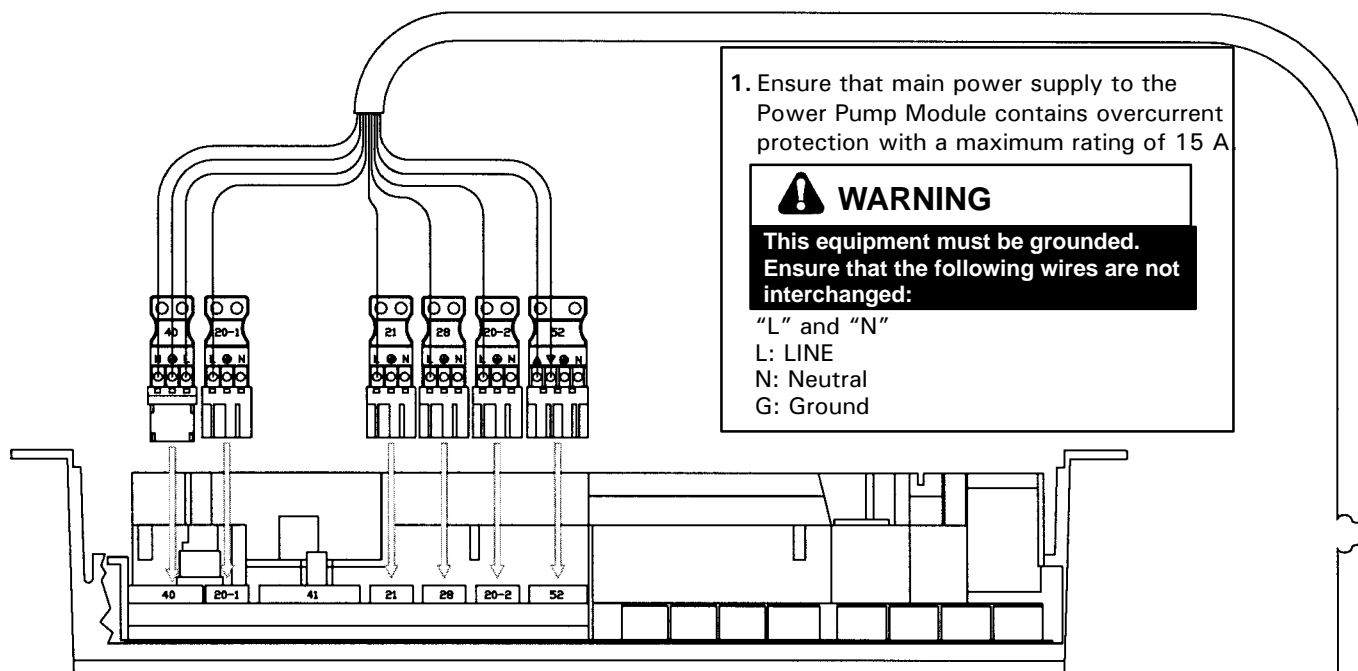
Rated voltage:	120 VAC	Max. ambient temperature		Relay outputs at 120 VAC for	
Rated frequency:	60 Hz	■ during operation:	34 to 104 °F	■ heating circuit pumps <u>20-1</u> :	3 FLA * ¹
Rated current:	6 A		0 to 40 °C	<u>20-2</u>	
Power consumption:	5 W		For use in living accommodation and boiler rooms (normal ambient conditions)	■ DHW pump <u>21</u> :	3 FLA * ¹
Certification:	CSA certified (in conjunction with Viessmann boilers only)	■ during storage and transport:	– 4 to 149 °F –20 to 65 °C	■ DHW recirculation pump <u>28</u> :	3 FLA * ¹
				■ mixing valve motor <u>52</u> :	0.1 FLA * ¹
				■ burner connector <u>41</u> :	2 FLA
				connector <u>90</u> :	
				– two-stage	0.5 FLA
				– modulating	0.05 FLA
				■ Total:	max. 12.5 FLA

*¹ Total max. 10 FLA

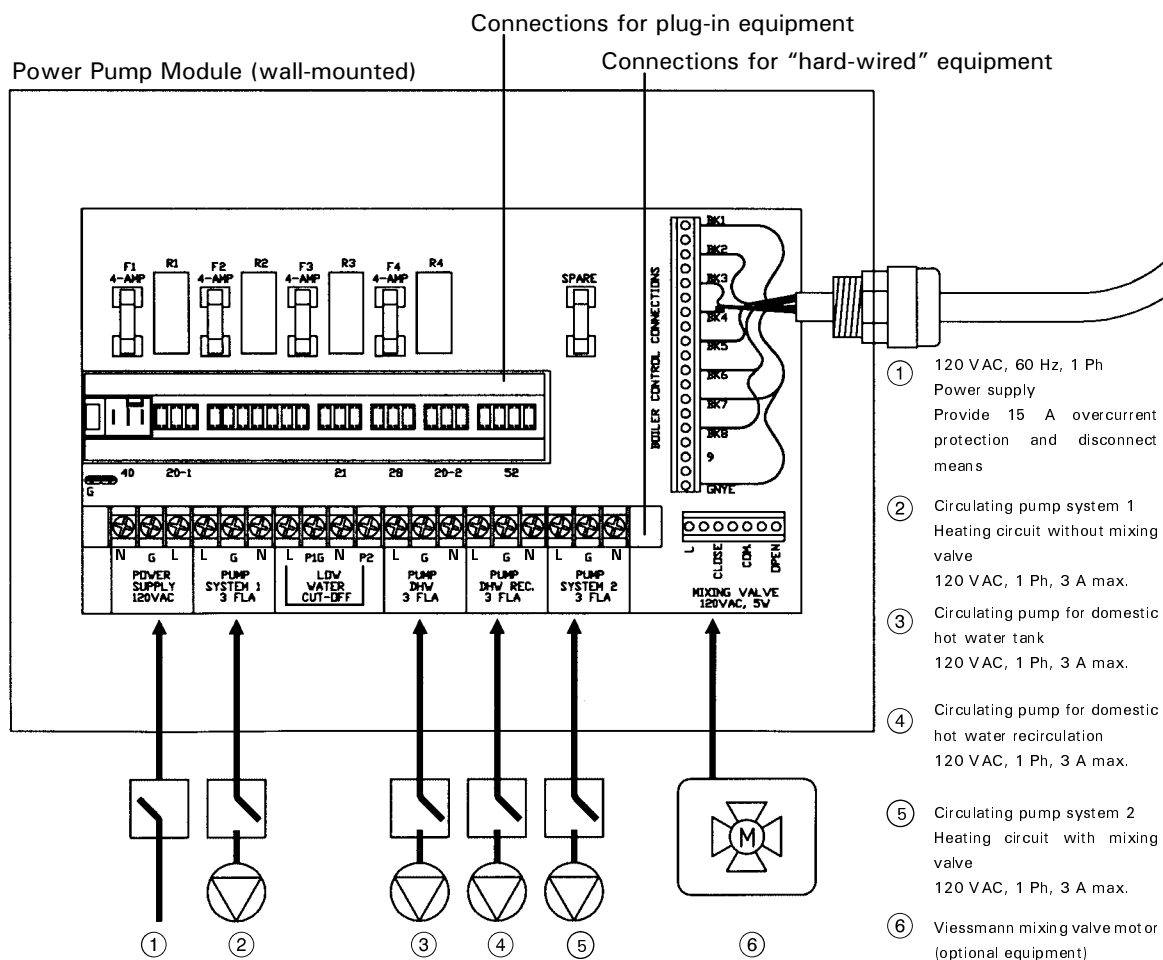
Overview of connections

- 5303 270 v1.3

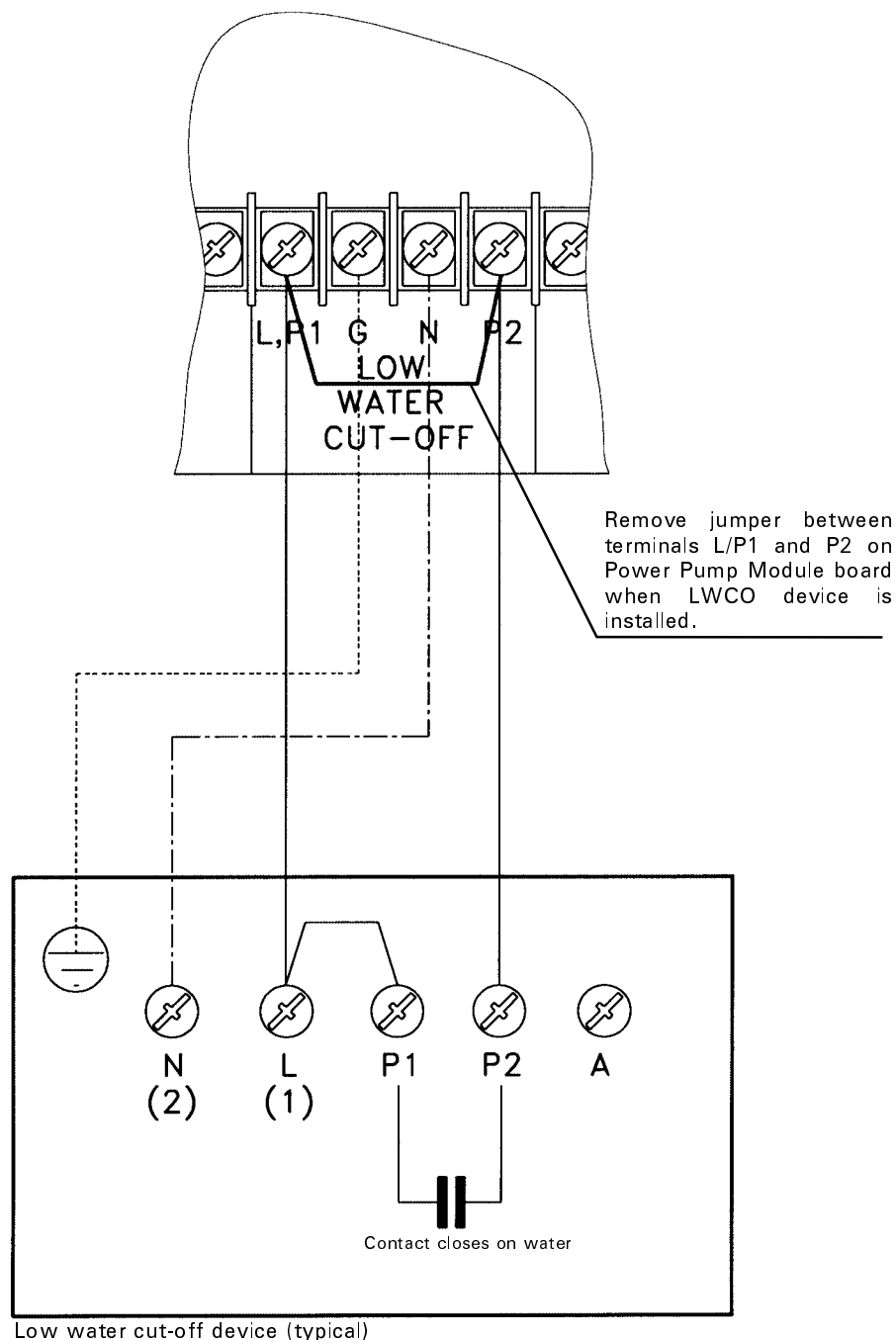
Power Pump Module connections



Vitotronic boiler control (view from rear)



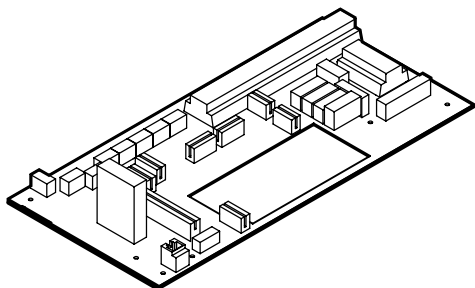
Low water cut-off connections



1. Run 3-conductor cable between low water cut-off device and Power Pump Module.
2. Remove jumper on Power Pump Module board (LWCO connection).
3. Connect wiring as shown in drawing on the left.
3. Check for LWCO function after installation is completed.

System Components (continued)

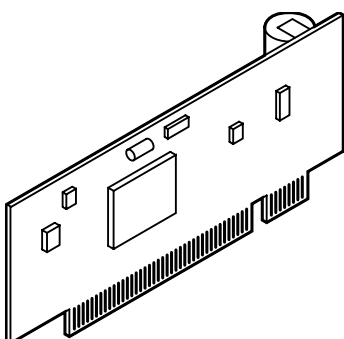
Mother board



The mother board contains

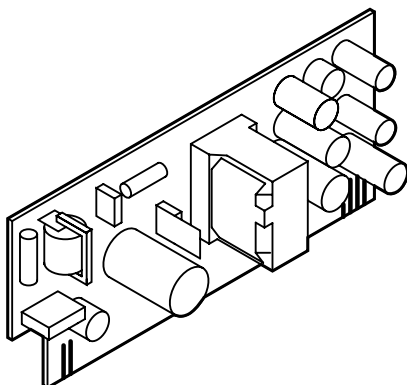
- relays for activating the pumps and the burner
- sockets for connecting the sensors
- sockets for connecting the burner and Power Pump Module
- fuses F2, T4 A

Electronics board



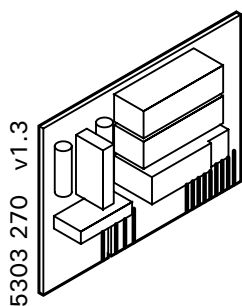
For processing all data and activating the outputs (relays).

Power supply unit board



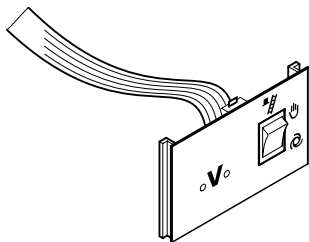
The power supply unit board contains the low-voltage supply for all electronic connections.

Mixing valve circuit board



The board contains the relays for activating the mixing valve motor and the heating circuit pump of the mixing valve circuit.

Optolink/Emissions test switch board



The circuit board contains:

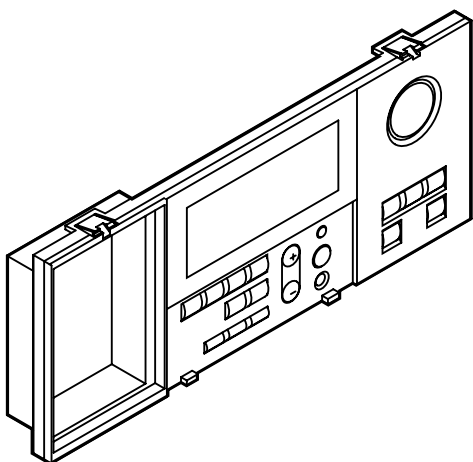
- Operating status display
- Fault display
- Optolink laptop interface
- Emissions test switch

Emissions test switch for flue gas measurements with the boiler operated with constant boiler water temperature for a short time.

The following functions are triggered in the "E" setting:

- the burner is switched on
- all pumps are switched on,
- the mixing valve remains in its control mode,
- the boiler water temperature is controlled by the adjustable high limit "G".

Programming unit



The programming unit is inserted in the control unit.

For setting:

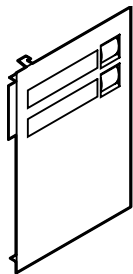
- heating program,
- setpoint values,
- switching times,
- heating curve (shift and slope),
- date,
- time,
- energy saving and party mode

For displaying:

- temperatures,
- operating status information,
- faults.

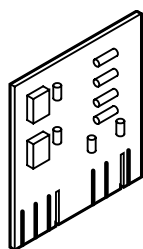
System components (continued)

Cover with heating circuit selector buttons



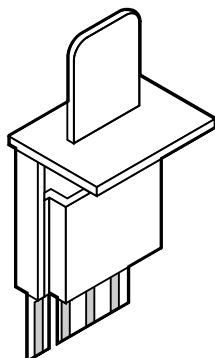
Fault indication module

Accessory



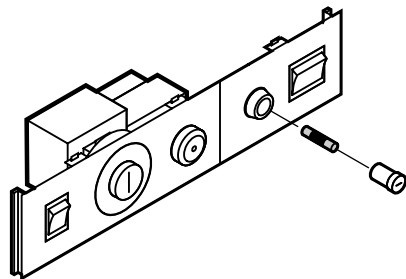
Faults are displayed on the display and the central fault output is activated on the Switching Module-V (accessory).

Boiler coding card



For matching the method of operation of the control unit to the boiler.

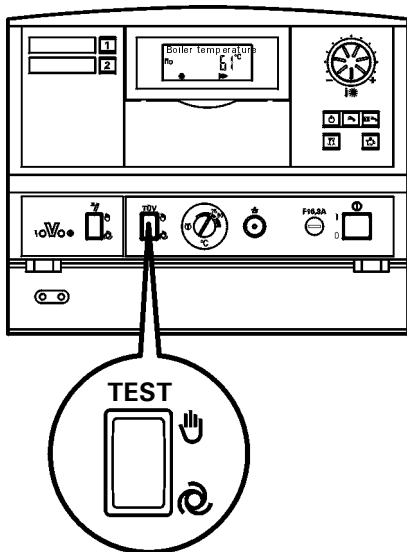
Fuses



F1: T6.3 A, 250 V for protecting the burner and the electronics
Mounting location: see drawing

F2: T4 A, 250 V for protecting the outputs to the Power Pump Module
Mounting location: see "Overview of connections"

Fixed high limit (FHL) test switch



IMPORTANT

Attached low temperature (floor heating) systems, whether connected with or without mixing valves, must be deactivated during the following procedure. Attached DHW tanks must be isolated and proper water expansion to the expansion tank must be guaranteed before the FHL test switch is held in place. Never use tape or other means to hold switch in place. Boiler and burner must be supervised during the entire procedure. Allow boiler water temperature to cool down to 140 °F / 60 °C before activating any attached heat distribution system.

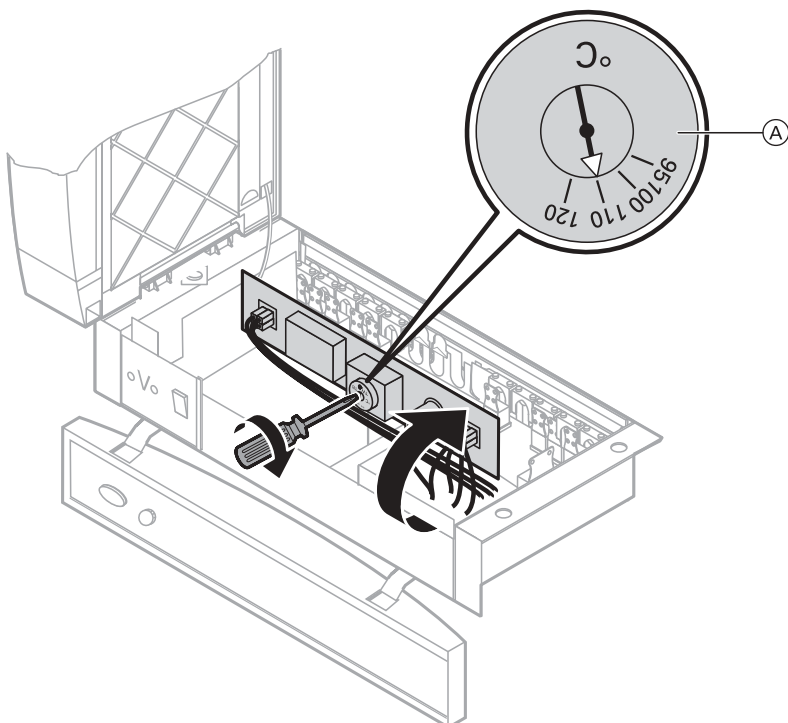
The test switch is used for checking the fixed high limit.

When making the check, keep pressing the test switch.

The adjustable high limit "O" is bypassed. The burner is switched on until the boiler water temperature reaches the safety limit temperature and the fixed high limit operates. When the burner is switched off by the fixed high limit,

- release the FHL test switch,
- wait until the boiler water temperature has fallen 27 to 36 °F / 15 to 20 °C below the selected safety temperature and then reset the fixed high limit by pressing the "u" button.

Fixed high limit



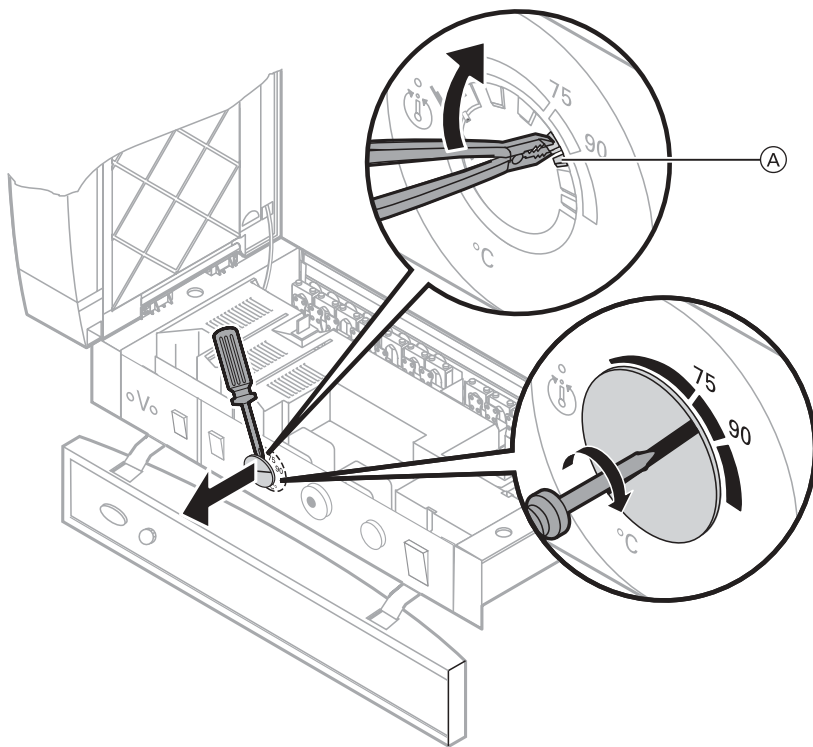
- Electromechanical temperature switch based on the liquid expansion principle with manual reset
- Intrinsically safe; limit opens if the capillary tube is leaking (or if ambient temperatures are below 14 °F / -10 °C)
- Limits the boiler water temperature to the maximum permissible value by switching off the burner circuit. (Factory default setting: 230 °F / 110 °C)
- Can be adjusted at the rear of the unit to 212 °F / 100 °C (cannot be reset to 230 °F / 110 °C once adjusted)

IMPORTANT

If adjusted to 212 °F / 100 °C, do not set the adjustable high limit above 167 °F / 75 °C.

- Reset unit through opening on front if temperature has fallen approx. 27 °F / 15 °C below the switch-off temperature.
- Capillary 63" / 1600 mm long
- Tests:
 - CSA functionality check via FHL test switch

Adjustable high limit



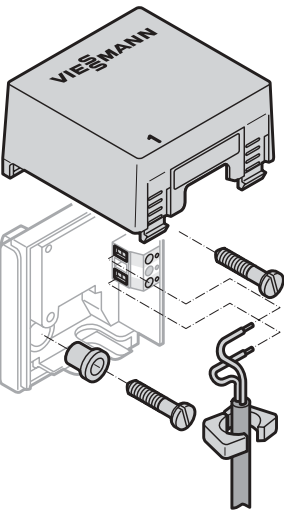
- Electromechanical temperature switch based on the liquid expansion principle
- Controls the maximum boiler water temperature (e.g. in emissions test mode) (factory default setting: 167 °F / 75 °C)
- Can be adjusted to 189, 203, 212 °F / 87, 95, 100 °C by altering the setting of the stop dial or by removing the cams (A)

IMPORTANT

Set lower limit at least 36 °F / 20 °C higher than domestic hot water temperature, upper limit at least 27 °F / 15 °F lower than fixed high limit.

- Adjusting shaft 0.2" / 6 mm, flat topped. Adjusting knob pushed onto shaft from front
- Capillary 63" / 1600 mm long
Sensor 0.1" / 3 mm thick, 7.1" / 180 mm long
- Tests:
CSA functionality check via emissions test mode

Outdoor temperature sensor



The sensor measures the temperature of the external wall of the building (which may be higher or lower than the outside temperature).

Technical data

Max. ambient temperature during operation, storage and transport:
-40 to + 158 °F
-40 to + 70 °C

Electrical connection

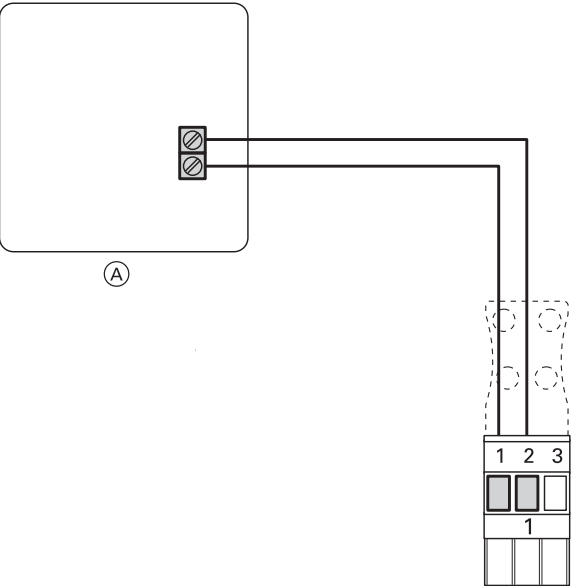
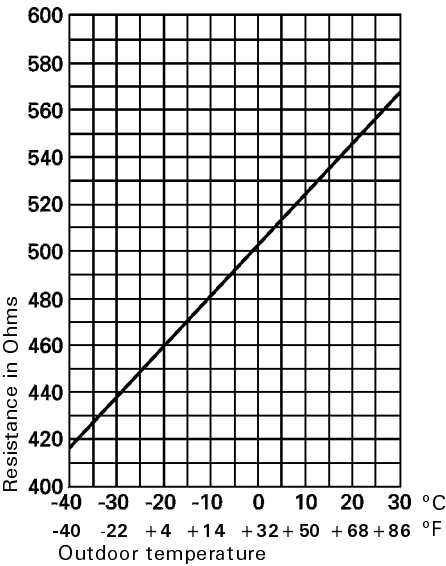
Two-wire cable, max. 115 ft. / 35 m long, with a conductor cross-section of AWG 16 copper.

Check outdoor temperature sensor

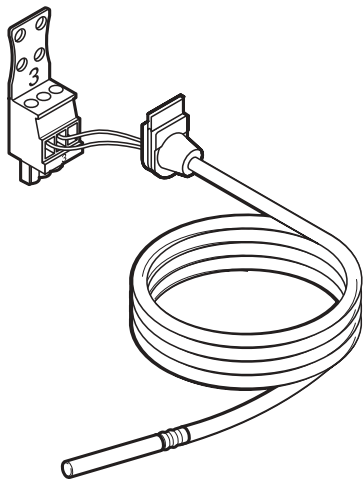
- 1. Disconnect plug 1 in the terminal compartment.
- 2. Measure resistance of sensor at terminals "1" and "2" of plug 1.

Outdoor temperature in °F / °C	Resistance in Ω
14 / -10	480
32 / 0	500
68 / 20	546

- 3. If the resistance value measured differs significantly from the curve, disconnect the wires on the sensor, repeat the measurement on the sensor and compare with the current temperature.
- 4. Depending on the result, replace the cable or the outdoor temperature sensor.
- 5. Call up the current temperature.



Boiler temperature sensor



The sensor measures the boiler water temperature of the boiler.

Technical data

Max. ambient temperature

■ during operation: 32 to 266 °F /
0 to + 130 °C

■ during storage
and transport: 4 to 158 °F /
-20 to + 70 °C

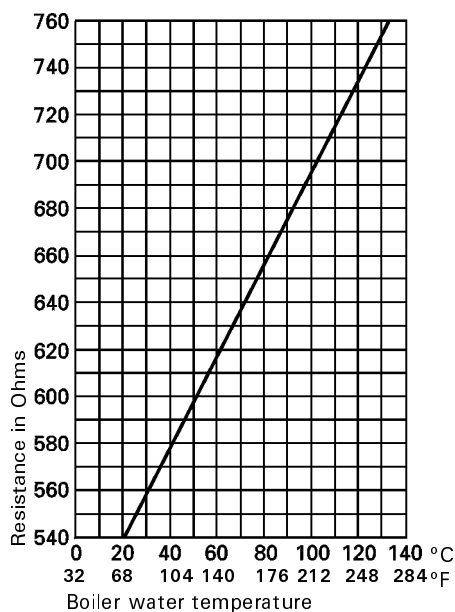
Electrical connection

The sensor is ready to plug in (cable 12 ft. / 3.7 m long) and is inserted in socket "3" on the Vitotronic control unit.

Check boiler temperature sensor

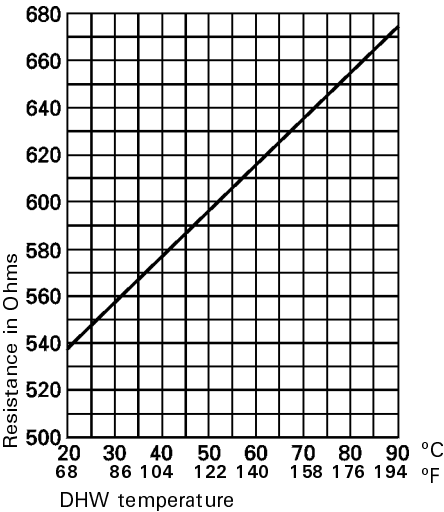
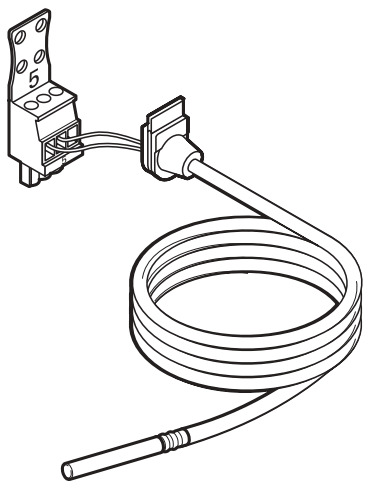
1. Disconnect plug 3 in the terminal compartment.
2. Measure resistance of sensor at terminals "1" and "2" of the plug.

Boiler water temperature in °F / °C	Resistance in Ω
104 / 40	578
122 / 50	597
140 / 60	616



3. Compare the value measured with the current temperature. If the value differs significantly, check installation and, if necessary, replace sensor.

DHW tank temperature sensor



The sensor measures the domestic hot water temperature in the DHW tank.

Technical data

Max. ambient temperature

- during operation: 32 to 48 °F / 0 to 90 °C
- during storage and transport: - 4 to 158 °F / -20 to + 70 °C

Electrical connection

The sensor is ready to plug in (cable 19 ft. / 5.8 m long) and is inserted in socket "5" on the Vitotronic control unit.

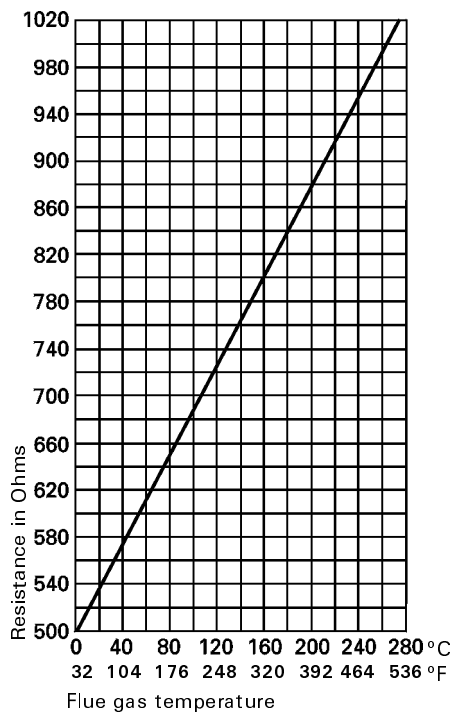
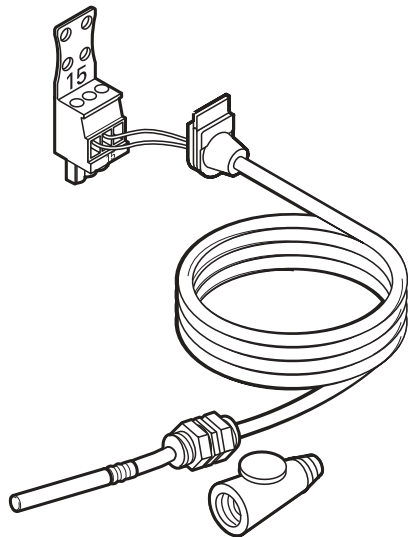
Check DHW tank temperature sensor

1. Disconnect plug 5 in the terminal compartment.
2. Measure resistance of sensor at terminals "1" and "2" of the plug.

Domestic hot water temp. in °F / °C	Resistance in Ω
104 / 40	578
122 / 50	597
140 / 60	616

3. Compare the value measured with the current temperature. If the value differs significantly, check installation and, if necessary, replace sensor.

Flue gas temperature sensor



The sensor measures the flue gas temperature and monitors the selected limit value.

Technical data

Max. ambient temperature


■ during operation: 32 to 1112 °F / 0 to + 600 °C

■ during storage and transport: – 4 to 158 °F / – 20 to + 70 °C

Electrical connection

The sensor is ready to plug in (cable 8.2 ft. / 2.5 m long) and is inserted in socket "15" on the Vitotronic control unit.

Check flue gas temperature sensor

1. Disconnect plug  in the terminal compartment.
2. Measure resistance of sensor at terminals "1" and "2" of the plug.

Flue gas temperature in °F / °C	Resistance in Ω
176 / 80	650
320 / 160	800
392 / 200	880

3. Compare the value measured with the current temperature. If the value differs significantly, check installation and, if necessary, replace sensor.

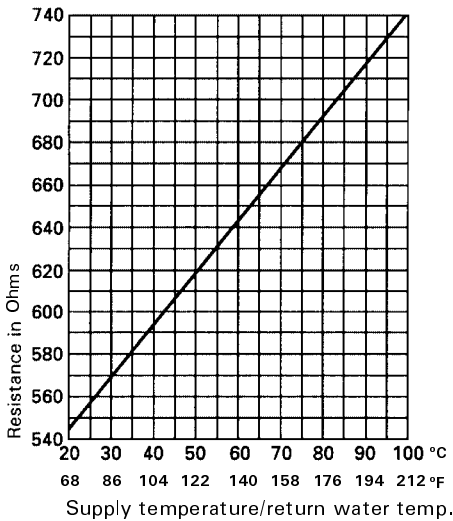
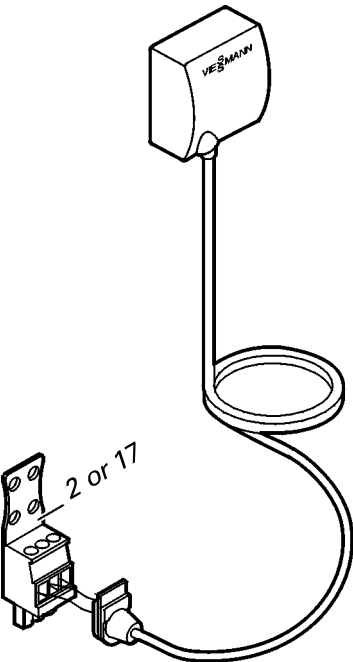
Mixing valve actuator accessory kit

Accessory

Comprising supply temperature sensor as strap-on sensor for measuring the supply temperature and mixing valve motor.
For Technical Data of sensor and mixing valve motor see following subsections.

Strap-on sensor

Accessory



For measuring the supply and return water temperature.

Technical data

Max. ambient temperature

■ during operation: 32 to 212 °F / 0 to + 100 °C

■ during storage and transport: - 4 to 158 °F / -20 to + 70 °C

Electrical connection

The sensor is ready to plug in (cable 19 ft. / 5.8 m long) and is inserted in socket "2" or "17" on the control unit.

Check supply/return water temperature sensor

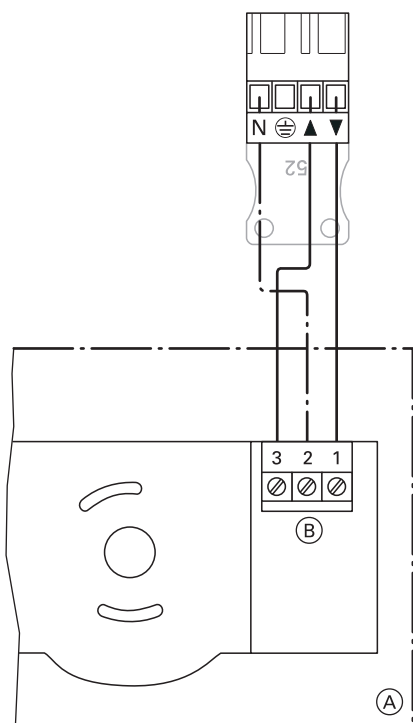
1. Disconnect plug 2 or 17 in the terminal compartment.
2. Measure resistance of sensor at terminals "1" and "2" of the plug.

Supply/return water temperature in °F / °C	Resistance in Ω
86 / 30	569
104 / 40	592
140 / 60	643

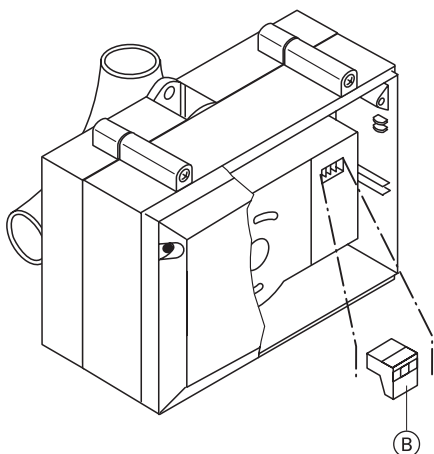
3. Compare the value measured with the current temperature. If the value differs significantly, check installation and, if necessary, replace sensor.

Mixing valve motor

Accessory



- Ⓐ Mixing valve motor
- Ⓑ Plug-in connections in mixing valve motor
- ▲ Mixing valve open
- ▼ Mixing valve closed



- Ⓑ Plug-in connection in the mixing valve motor

The mixing valve motor is a reversible single-cycle synchronous motor with gear system and two limit switches.

Technical data

Rated voltage:	120 VAC
Rated frequency:	60 Hz
Power consumption:	4 W
Torque:	3 Nm
Time for 90° <:	120 sec

To change rotational direction

Unscrew cover and reconnect connector Ⓑ after turning 180°.

Test

The mixing valve is opened and closed during the relay test of the control unit.

Manual adjustment of the mixing valve

Raise the motor lever.

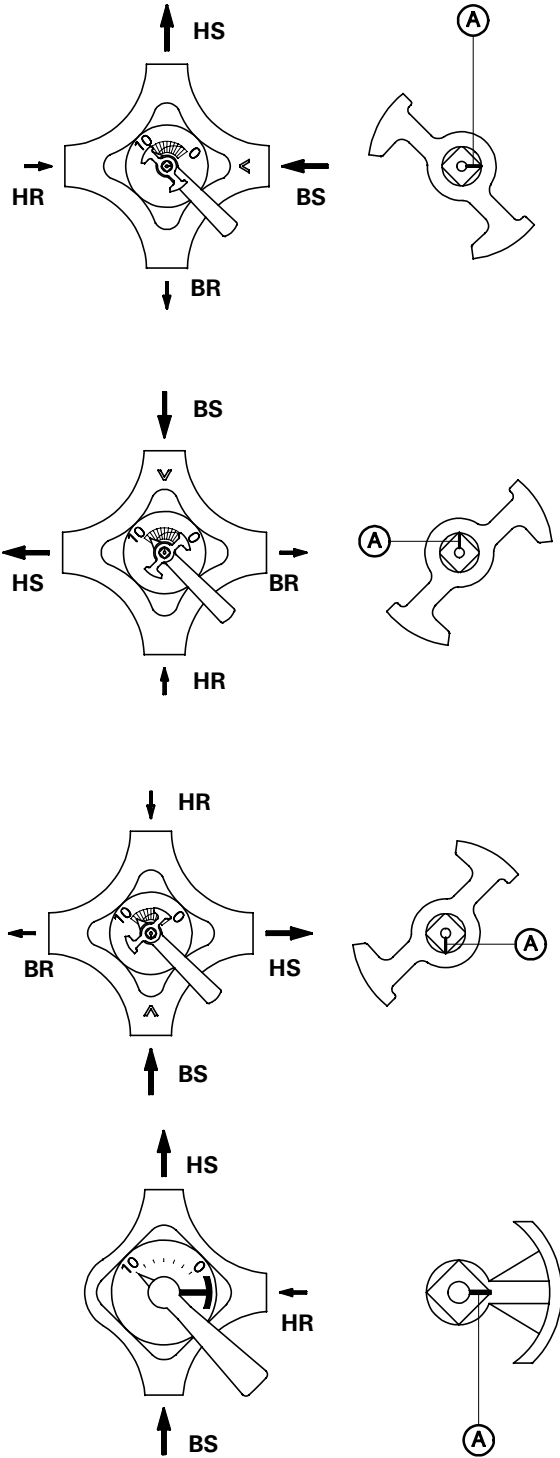
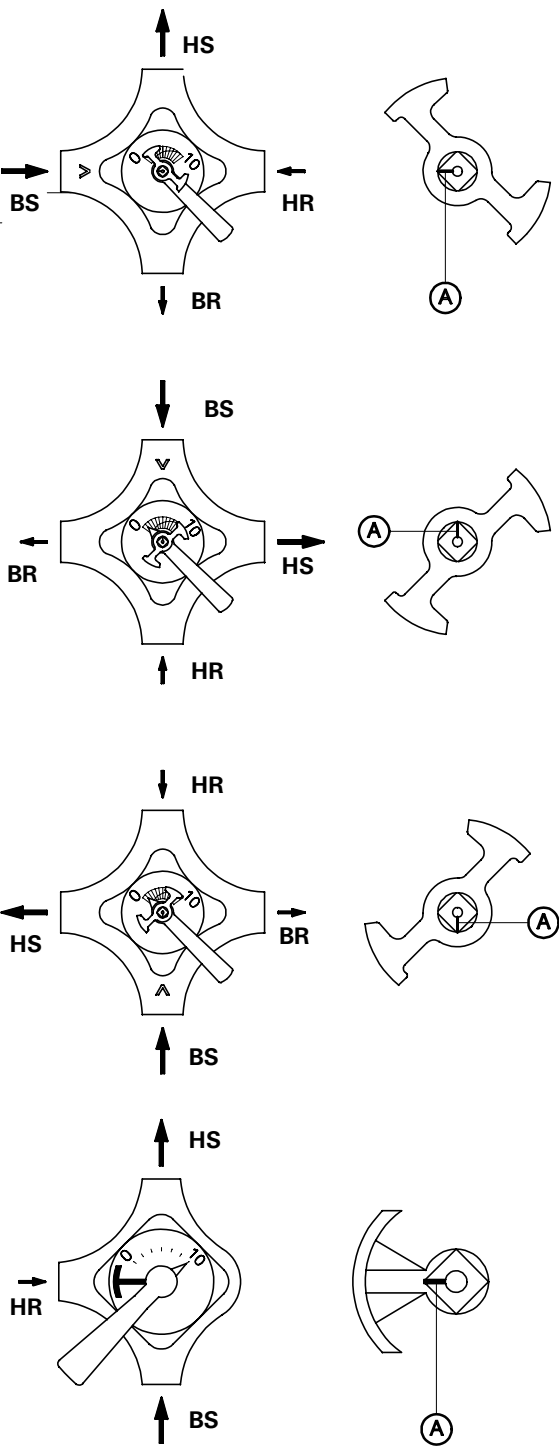
Disengage the mixing valve handle and disconnect the connector Ⓑ.

Altering Rotational Direction of Mixing Valve Motor (continued)

Installation examples

The electrical connections of the mixing valve motor **at time of delivery** are suited for the following installation examples; do not change.

The electrical connections of the mixing valve motor must be changed for the following installation examples (see "To change rotational direction" in section "Mixing valve motor" on previous page).



Ⓐ Marker notch

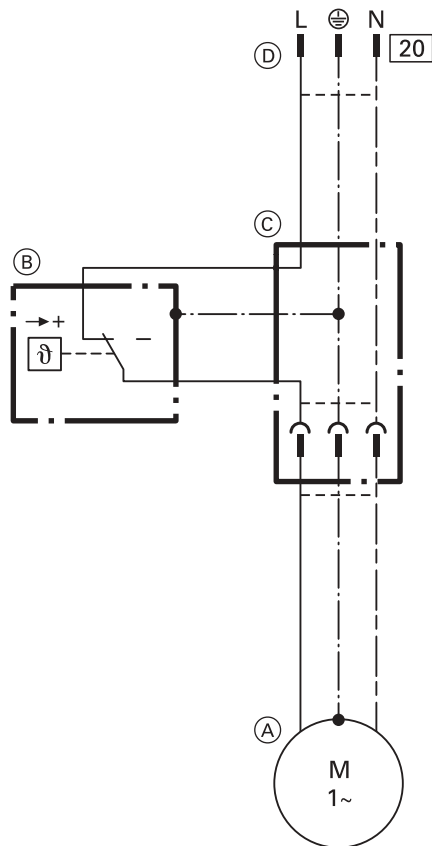
HR Heating return
HS Heating supply

BR Boiler return
BS Boiler supply

Limit aquastat

(Accessory)

Limit aquastat to be field supplied.



- (A) Heating circuit pump
- (B) Limit aquastat

- (C) Junction box for plug 20 of the heating circuit pump
- (D) Wiring connection to pump 20 in Power Pump Module

For protecting the underfloor heating system and the floor covering against excessively high temperatures in the event of malfunctioning.

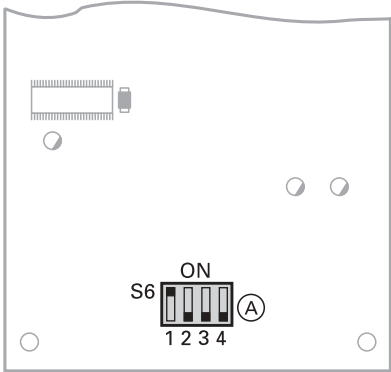
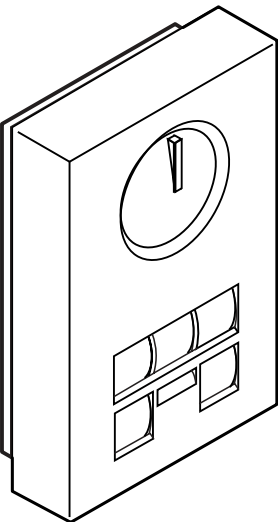
Electromechanical limit aquastat based on the liquid expansion principle. The heating circuit pump is switched off when the preset value is exceeded.

Technical data

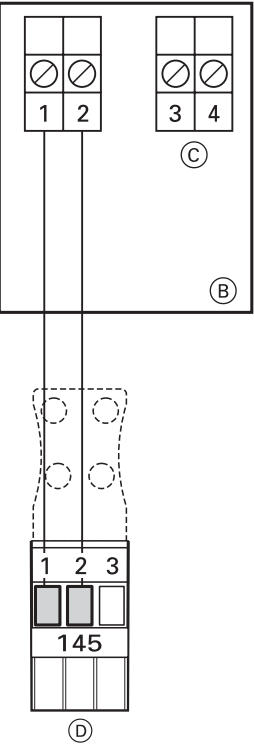
Setting range:	59 to 203 °F / 15 to 95 °C
Connection terminals:	Screw terminals for 0.004 / 0.006 in2 1 / 1.5 mm2
Rated voltage:	24 to 250 VAC
Breaking capacity:	3 FLA, 120 VAC
Switching differential:	14.4 °F / 8 °C
Ambient temperature:	122 °F / 50 °C max.
Sensor temperature:	248 °F / 120 °C max.

Vitotrol 200

The remote control can be used for setting the daytime temperature, the heating program, the energy saving mode and the party mode for one heating circuit. The remote control has a built-in room temperature sensor for room temperature-dependent control in conjunction with a heating circuit with mixing valve. Functional changes can be made via coding addresses "A0", "b0" to "b10", C0" to "C2", "E1" and "E2" (see section entitled "Codings").



A Coding switches on the circuit board (rear of housing top)



- B Wall-mount base of Vitotrol 200 remote control
- C Terminals for connecting a separate room temperature sensor if the remote control cannot be placed in a suitable location
- D To control unit or to KM-BUS Expansion Module

Technical data



Power supply via KM-BUS (low voltage).
Max. ambient temperature
■ during operation: 32 to 104 °F / 0 to + 40 °C
■ during storage and transport: - 4 to 149 °F / -20 to + 65 °C
Room temp. setting range: 50 to 86 °F / 10 to 30 °C;
can be changed to 37 to 73 °F / 3 to 23 °C or 63 to 99 °F / 17 to 37 °C

The desired room temperature setting for reduced operation is made on the control unit.

Electrical connection

Two-wire cable (max. total cable length 164 ft. / 50 m, including where several remote controls are connected).

The remote control must be set to the heating circuit for which it will be effective (coding switch located on circuit board, rear of housing top).

Remote control effective for	Coding switch setting
Heating circuit 1 (boiler circuit, assigned to heating circuit selector switch 1)	Factory default setting ON 
Heating circuit 2 (mixing valve circuit, assigned to heating circuit selector switch 2)	ON 

When connecting a separate room temperature sensor, make the following change to the setting of the coding switch:

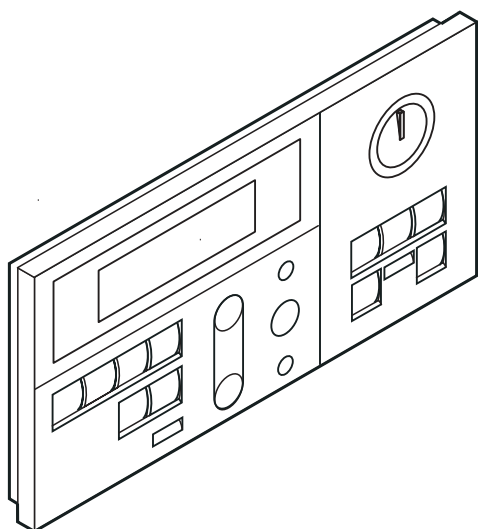


Vitotrol 300

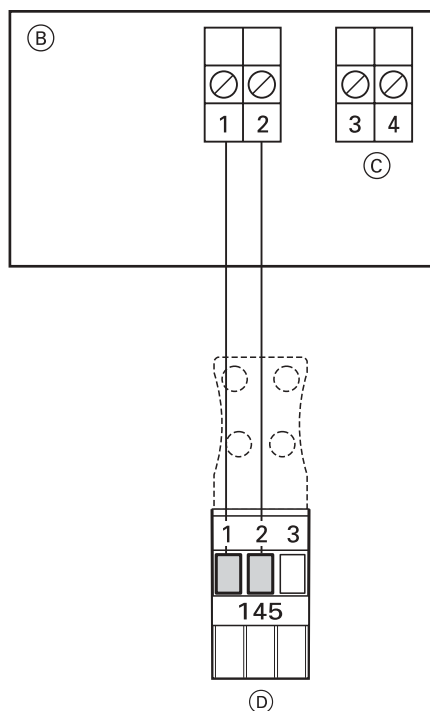
The remote control can be used for setting the day- and nighttime temperatures, the domestic hot water temperature, the heating program, the holiday program, switching times, the energy saving mode and the party mode for one heating circuit.

The remote control has a built-in room temperature sensor for room temperature-dependent control in conjunction with a heating circuit with mixing valve.

Functional changes can be made via coding addresses "A0", "b0" to "b10", "C0" to "C2", "E1" and "E2" (see section entitled "Codings").



(A) Coding switches on the circuit board (rear of housing top)



- (B) Wall-mount base of Vitotrol 300 remote control
- (C) Terminals for connecting a separate room temperature sensor if the remote control cannot be placed in a suitable location
- (D) To control unit or to KM-BUS Expansion Module

Technical data

Power supply via KM-BUS (low voltage).

Max. ambient temp.

■ during operation: 34 to 104 °F / 0 to + 40 °C

■ during storage

and transport: - 4 to + 149 °F / -20 to + 65 °C

Room temp. setting

range: 50 to 86 °F / 10 to 30 °C;

can be changed to

37 to 73 °F / 3 to 23 °C or 62 to 99 °F / 17 to 37 °C

desired reduced

room temperature: 37 to 99 °F / 3 to 37 °C

Electrical connection

Two-wire cable (max. total cable length 164 ft. / 50 m, including where several remote controls are connected).

The remote control must be set to the heating circuit for which it will be effective (coding switch located on circuit board, rear of housing top).

Remote control effective for	Coding switch setting
Heating circuit 1 (boiler circuit, assigned to heating circuit selector switch <input type="checkbox"/> 1)	Factory default setting <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">1 2 3 4</div> <div style="border: 1px solid black; padding: 2px;"> <div style="width: 100%; height: 100%; background-color: white;"></div> </div> <div style="margin-left: 5px;">NO</div> </div>
Heating circuit 2 (mixing valve circuit, assigned to heating circuit selector switch <input type="checkbox"/> 2)	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">1 2 3 4</div> <div style="border: 1px solid black; padding: 2px;"> <div style="width: 100%; height: 100%; background-color: white;"></div> </div> <div style="margin-left: 5px;">NO</div> </div>

When connecting a separate room temperature sensor, make the following change to the setting of the coding switch:



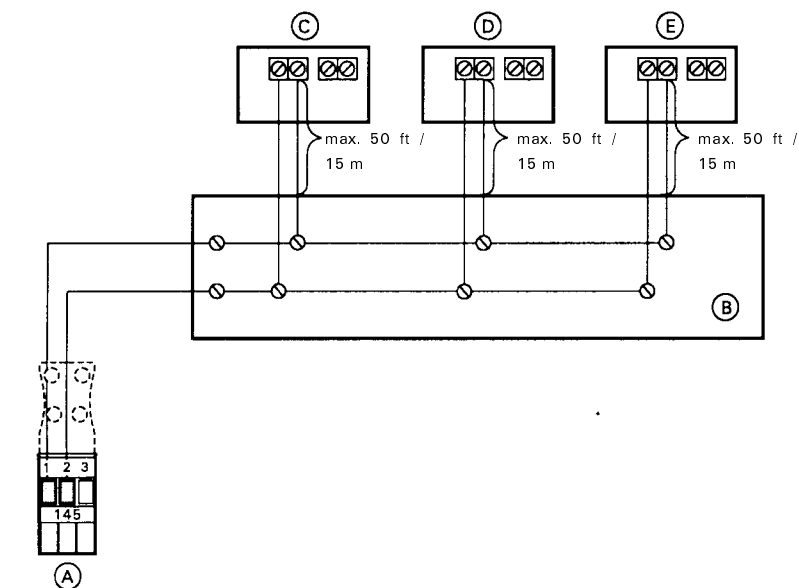
Connecting two or more remote controls

Accessory

When connecting two or more remote controls to the control unit, use the KM-BUS Expansion Module (accessory) or install a junction box on site.

Option 1

- If no other BUS participants are connected apart from the remote controls, insert connector 145 of the respective remote control in the KM-BUS Expansion Module.
- Connection on site via junction box: Perform connection as shown on the left. Max. total cable length 164 ft. / 50 m.

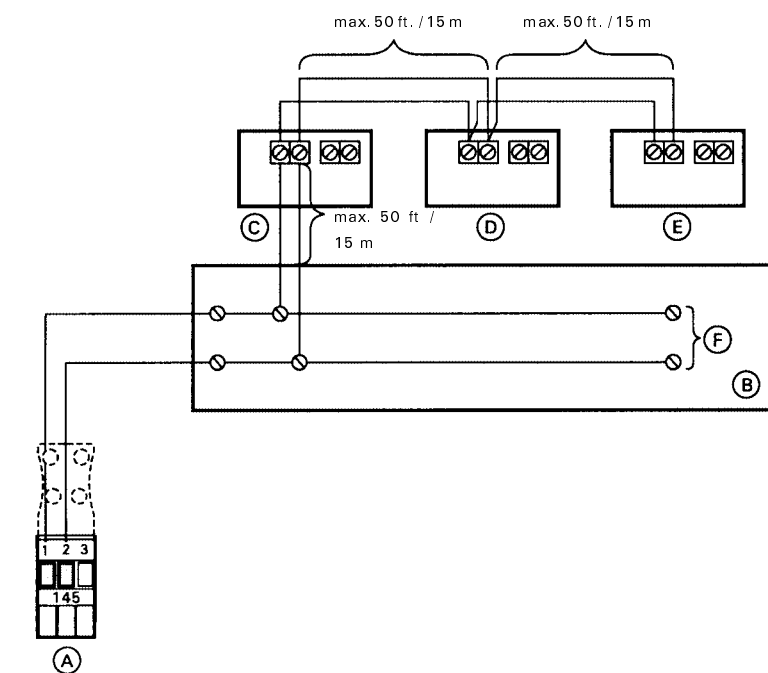


- (A) To control unit
(B) Junction box (field supplied)

- (C) Vitotrol 1
(D) Vitotrol 2
(E) Vitotrol 3

Option 2

- If several remote controls and other BUS participants are connected, connect these accordingly via a junction box (field supplied).
Max. total cable length 164 ft. / 50 m.

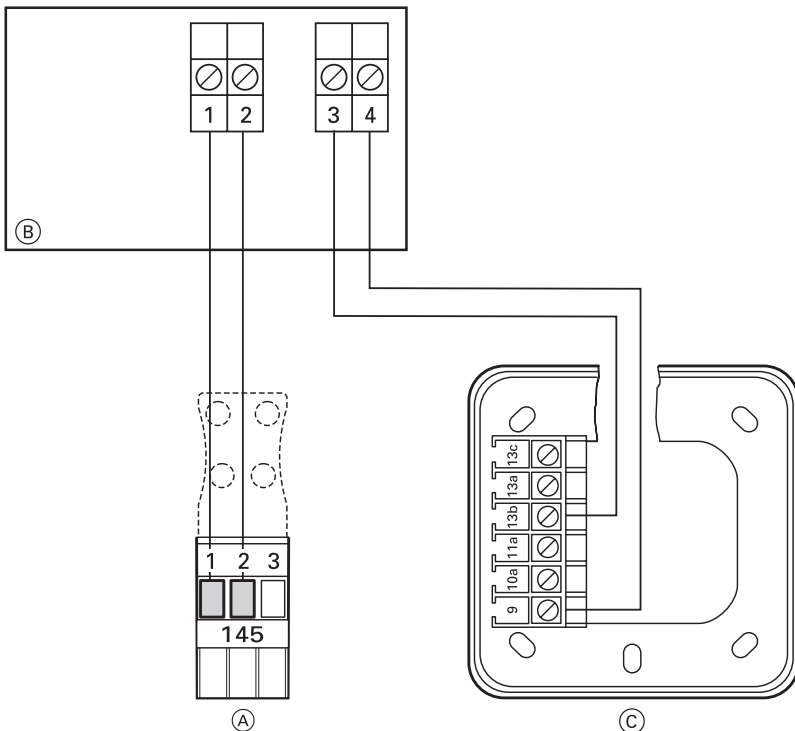
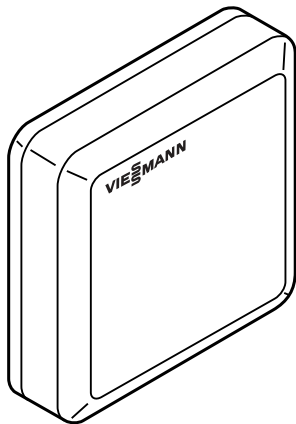


- (A) To control unit
(B) Junction box (field supplied)
(C) Vitotrol 1

- (D) Vitotrol 2
(E) Vitotrol 3
(F) Other BUS users

Room temperature sensor

Accessory



- (A) To control unit
(B) Vitotrol remote control

- (C) Room temperature sensor

The room temperature sensor measures room temperature where the remote control cannot be placed in a suitable location.

Technical data

Max. ambient temperature

■ during operation: 32 to 104 °F /
0 to + 40 °C

■ during storage
and transport: - 4 to 149 °F /
-20 to + 65 °C

Electrical connection

Two-wire cable, max. 115 ft. / 35 m long, with a conductor cross-section of AWG 18 copper.

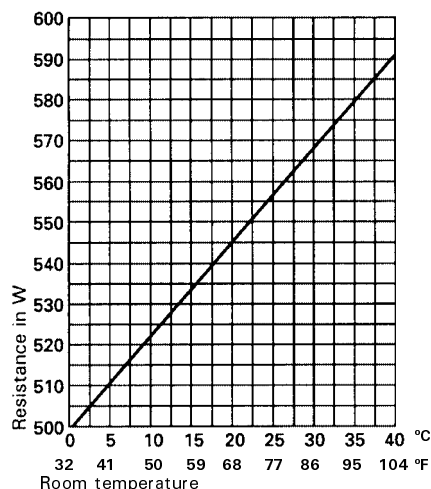
Set coding switch 3 (on rear of remote control housing top) to "ON".

Check room temperature sensor

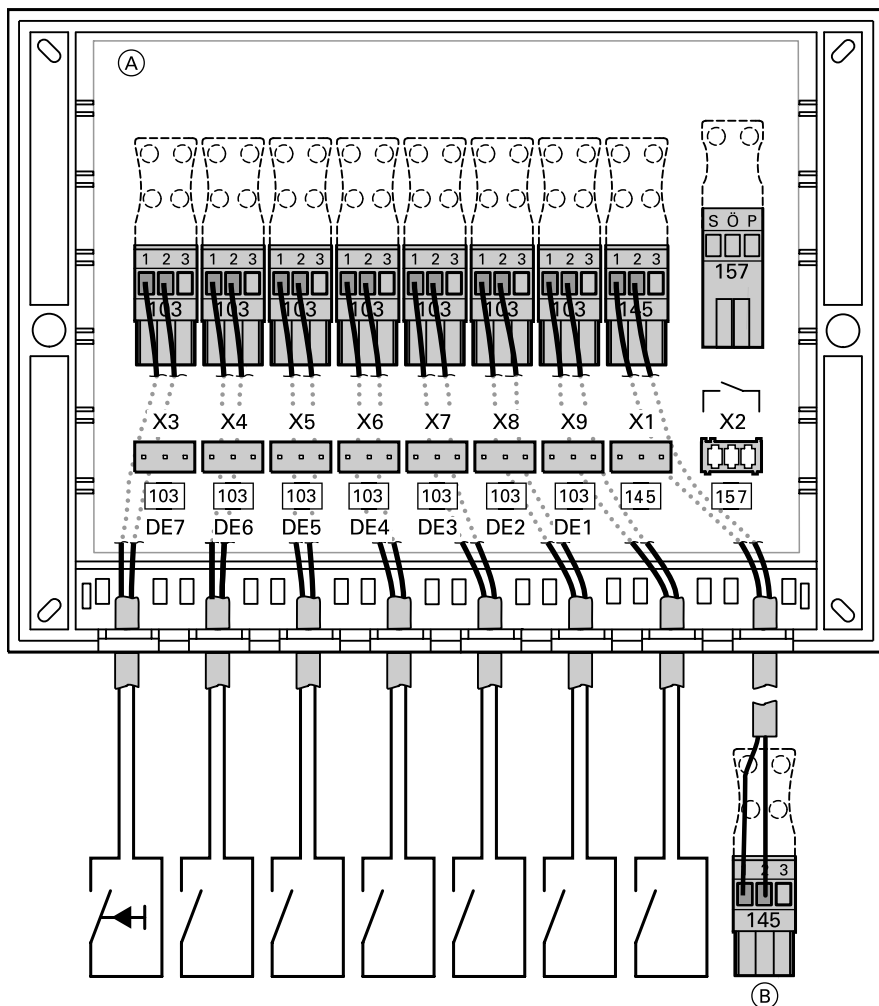
1. Disconnect the wires at the sensor terminals.
2. Measure resistance of sensor at terminals "9" and "13b".

Room temp. in °F / °C	Resistance in Ω
50 / 10	522
59 / 15	534
77 / 25	557

3. Compare the value measured with the current temperature. If the value differs significantly, check installation and, if necessary, replace sensor.



Switching Module-V for expanding the range of control functions.
Coding addresses "32", "33" and "74" (see section entitled "Codings").
The Switching Module-V is automatically recognized by the control unit (coding "94:2").



- DE7 Short-term operation of DHW recirculation pump
 - DE6 External fault message input
 - DE5 External burner activation (2nd stage)
 - DE4 External burner activation (minimum boiler water temperature setpoint value)
 - DE3 External burner disable
 - DE2 External switching of the heating program for heating circuit with mixing valve
 - DE1 External switching of the heating program for heating circuit without mixing valve
 - 145 KM-BUS
 - 157 Compiled fault indicator output
- Rated load capacity of relay:
0.5 A 24 VAC



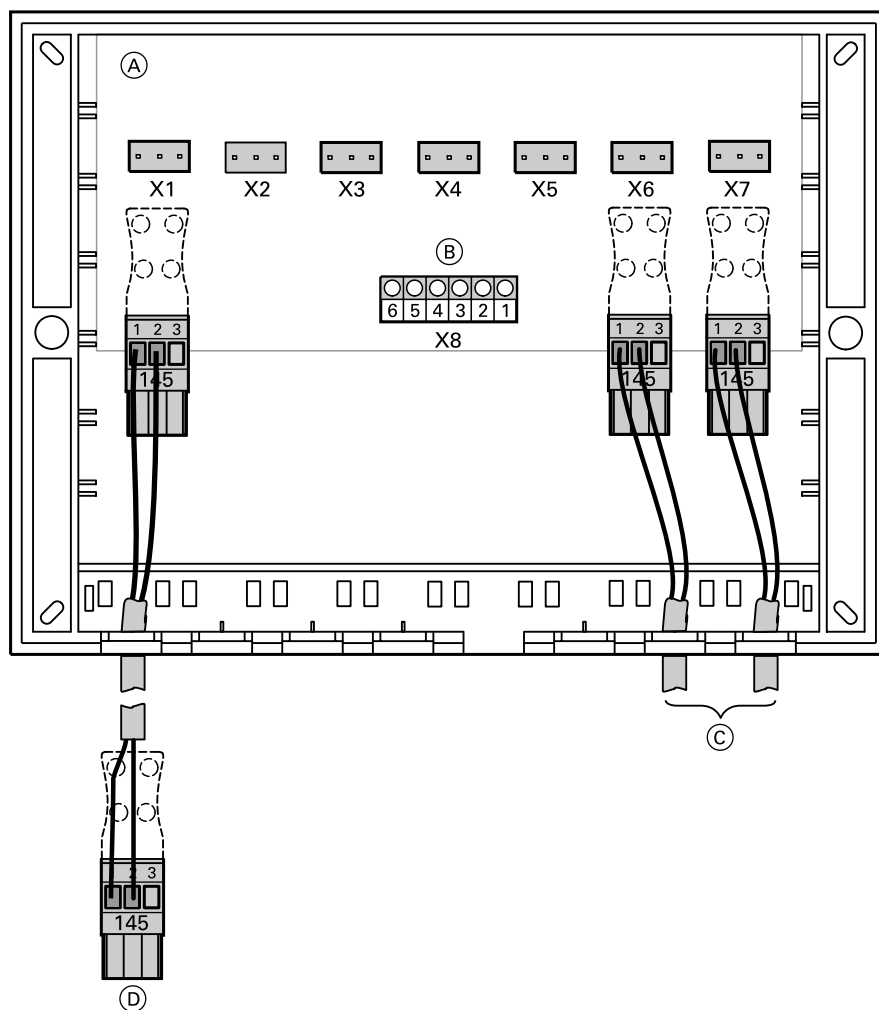
CAUTION

The assignment of the connections to the terminals in the Switching Module-V must not be changed.

Ⓐ Terminal compartment of Switching Module-V

Ⓑ To control unit

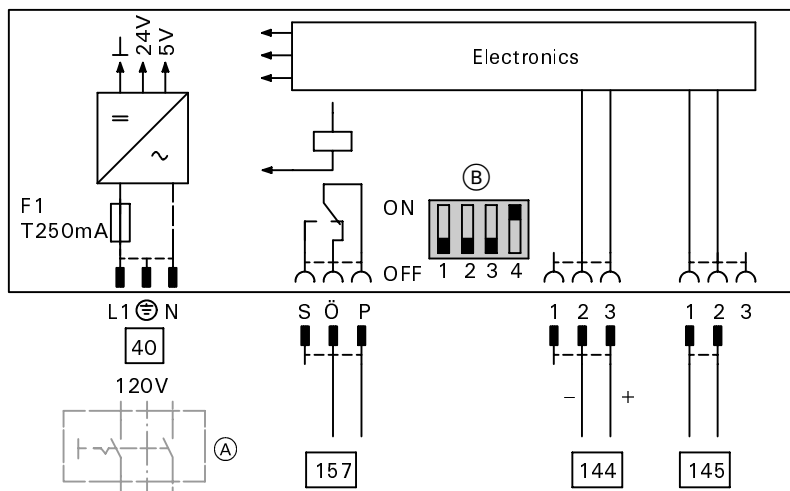
The KM-BUS Expansion Module allows for the connection of remote controls, remote monitoring devices and the Switching Module-V to the Vitotronic control unit.



- Ⓐ Connection compartment of the KM-BUS Expansion Module
- Ⓑ Terminals for connecting other KM-BUS participants

- Ⓒ Connections for accessories (terminals "X2" to "X7")
- Ⓓ To control unit

To signal reduced mode and regulate a heating circuit pump to a lower speed.



- | | |
|-----|--------------------------|
| 40 | Power supply 120 V/60 Hz |
| 144 | 0 to 10 V input |
| 145 | KM BUS to control unit |
| 157 | Zero volt contact |

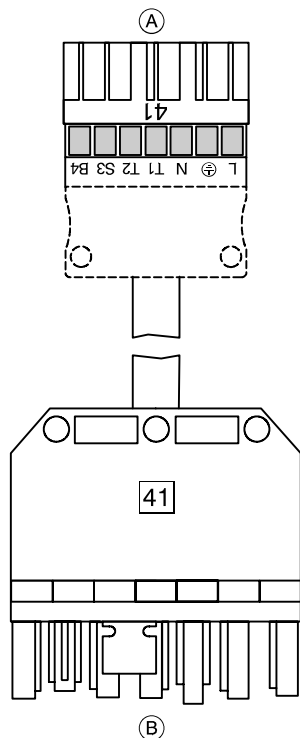
- Ⓐ Mains disconnect (if required)
- Ⓑ DIP switch (see table)

DIP switch		Function
1	ON	Reduced mode – heating circuit A1
2	ON	Reduced mode – mixing valve circuit M2
4	ON	Set value default 10 to 100 °C/ 50 to 212 °F
4	OFF	Set value default 30 to 120 °C / 86 to 248 °F

Out of switches 1 to 3, only **one** switch may be set to ON.

Burner connection cable

Included in standard boiler equipment.



- Ⓐ To control unit
(Rast-5 plug-in connector)
- Ⓑ To burner or venting equipment
(41 plug-in connector)

Terminal codes

L1	Cycle via fixed high limit to the burner
G	Ground conductor to the burner
N	Neutral conductor to the burner
T1, T2	Control circuit
S3	Connection for burner fault
B4	Connection for burner operating hours counter

The Vitotronic 200 is prewired with the Viessmann quick-connect plug-in system.

1. Connect the 41 RAST-5 plug-in connector to the main circuit board of the control.
2. Connect 7-pole 41 plug to the counter plug of the burner.

Or

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



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

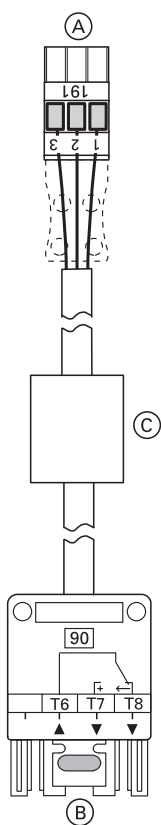
WARNING

Do not connect the 41-plug from the boiler control directly to the burner if a venting system is installed.

See technical instructions of the vent system.

Extension for two-stage / modulating burner

*Included in standard equipment of two-stage boilers only.
Note coding addresses "02", "10" to "16", "18", "1A", "26" and "29" (see section entitled "Codings").*



- Ⓐ To control unit
- Ⓑ To burner
- Ⓒ Junction box with relay K1 and K2

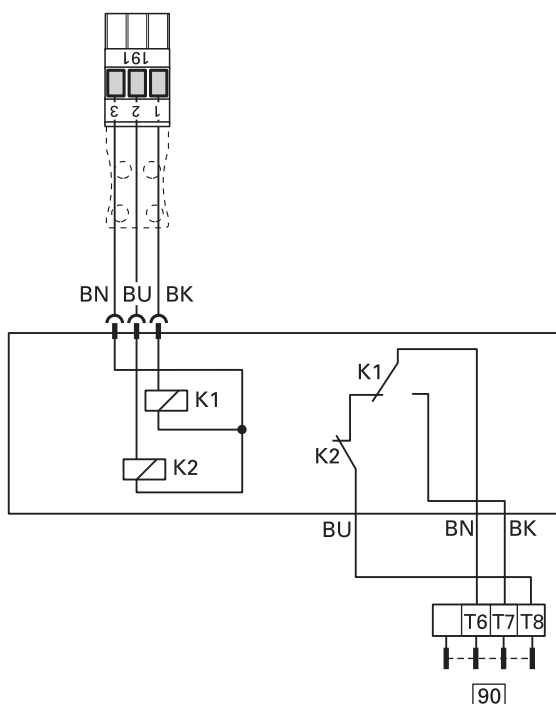
Terminal codes

T6, T7, T8

Control circuit "2nd stage
burner / modulation
controller" (via two-point
controller with two-stage
operation; via three-point
controller with modulating
operation)

T6 From burner
T7 Modulating burner up
T8 Modulating burner down /
2nd stage ON



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



Color codes

BK Black
BN Brown
BU Blue

IMPORTANT

See "Coding 2" for further explanation on respective coding. To access Coding 1, press buttons  and 

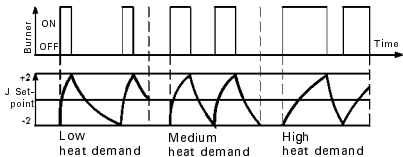
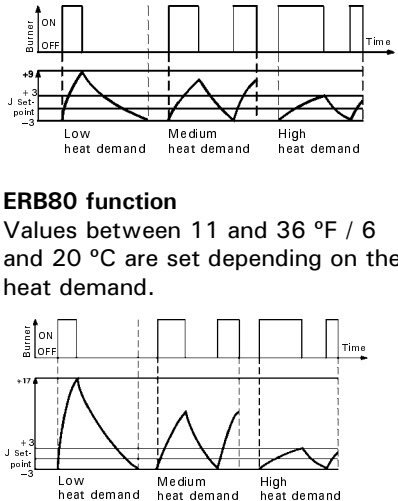
Function	Coding (factory default setting) Address: Value	Possible change
System type	00 : 1 1 heating circuit without mixing valve, without domestic hot water heating (System type 1)	00 : 2 1 heating circuit without mixing valve, with domestic hot water heating
		00 : 3 1 heating circuit with mixing valve
		00 : 4 1 heating circuit with mixing valve and domestic hot water heating
		00 : 5 1 heating circuit without mixing valve and 1 heating circuit with mixing valve
		00 : 6 1 heating circuit without mixing valve and 1 heating circuit with mixing valve and domestic hot water heating
Burner type	02 : 0 Single-stage	02 : 1 Two-stage 02 : 2 Modulating
Max. boiler temp.	06 : 85 Max. boiler water temperature limited to 185 °F / 85 °C	06 : 20 Maximum boiler water temperature to limit variable between 68 to 266 °F / 06 : 130 20 and 130 °C
DHW priority boiler circuit	A2 : 2 Tank priority over heating circuit pump	A2 : 0 Without tank priority over heating circuit pump
		A2 : 1 Without function A2 : 3 to A2 : 15
Summer energy saving function boiler circuit	A5 : 5 With heating circuit pump logic function (HPL function)	A5 : 0 Without heating circuit pump logic function (HPL function)
DHW priority mixing valve circuit	A2 : 2 Tank priority over heating circuit pump and mixing valve	A2 : 0 Without tank priority over heating circuit pump and mixing valve
		A2 : 1 With tank priority only over mixing valve
		A2 : 3 Reduced tank priority to A2 : 15
Summer energy saving function mixing valve circuit	A5 : 5 With heating circuit pump logic function (HPL function)	A5 : 0 Without heating circuit pump logic function (HPL function)
Min. supply temp. mixing valve circuit	C5 : 20 Electronic low limit 68 °F / 20 °C	C5 : 1 Electronic low limit variable to between 34 and 261 °F / 1 and 127 °C C5 : 127
Max. supply temp. mixing valve circuit	C6 : 75 Maximum supply temperature limited to 167 °F / 75 °C	C6 : 1 Maximum supply temperature limit to variable between 34 and 261 °F / C6 : 127 1 and 127 °C

Coding 2 (overview of all codings)

IMPORTANT

To access Coding 2, press buttons



Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
00 : 1	System type System type 1 without domestic hot water heating	00 : 2	System type 1 with domestic hot water heating
		00 : 3	System type 2 without domestic hot water heating
		00 : 4	System type 2 with domestic hot water heating
		00 : 5	System type 3 without domestic hot water heating
		00 : 6	System type 3 with domestic hot water heating
02 : 0	Boiler / burner Operation with single-stage burner	02 : 1 02 : 2	Operation with two-stage burner Operation with modulating burner
03 : 0	Boiler / burner Gas-fired operation	03 : 1	Oil-fired operation (Coding cannot be reset)
04 : 0	Boiler / burner Switching hysteresis 7.2 °F / 4 °C	04 : 1 04 : 2	<p>Switching hysteresis heat demand-controlled</p> <p>ERB50 function Values between 11 and 22 °F / 6 and 12 °C are set depending on the heat demand.</p>  <p>ERB80 function Values between 11 and 36 °F / 6 and 20 °C are set depending on the heat demand.</p>  <p>The heat demand-controlled switching hysteresis takes into account the boiler load. The switching hysteresis, i.e. the burner operating time, is varied in relation to the current heat demand.</p>
05 : 8	Boiler / burner Differential temperature 14 °F / 8 °C (only adjustable with system types 2 and 3)	05 : 0 to 05 : 40	Differential temperature variable from 0 to 72 °F / 0 to 40 °C

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
06 : 85	Boiler / burner High limit of boiler water temperature set to 185 °F / 85 °C	06 : 20 to 06 : 130	Max. limit of the boiler water temperature variable between 68 and 266 °F / 20 and 130 °C
0b : 0	Do not adjust		
10 : 20	Boiler / burner (two-stage) Switch-on delay (integral) = 2560 Cs (Celsius x seconds)	10 : 0 to 10 : 199	Switch-on delay for release of 2nd stage (to 1st stage) during the heating mode variable; 1 increment \cong 128 Cs Range: 0 to 25472 Cs
11 : 20	Boiler / burner (two-stage) Switch-on delay (integral) = 2560 Cs (Celsius x seconds)	11 : 0 to 11 : 199	Switch-on delay for release of 2nd stage (to 1st stage) during DHW heating variable; 1 increment \cong 128 Cs Range: 0 to 25472 Cs
12 : 20	Boiler / burner (staged) Switch-off delay (integral) = 2560 Cs (Celsius x seconds)	12 : 0 to 12 : 199	Switch-off delay for blocking 1st stage (from 2nd stage) variable; 1 increment \cong 128 Cs Range: 0 to 25472 Cs
13 : 6	Boiler / burner (two-stage/mod.) Switch-off differential 10.8 °F / 6 °C The burner is switched off when the boiler water temperature rises above the desired value	13 : 0	Without switch-off differential
		13 : 1 to 13 : 20	Switch-off differential adjustable between 1.8 and 36 °F / 1 and 20 °C.
15 : 15	Boiler / burner (mod.) Operating time of actuator drive 15 seconds	15 : 7 to 15 : 180	Operating time adjustable between 7 and 180 seconds
16 : 6	(Mod.) burner Mod. burner offset 10.8 °F / 6 °C	16 : 0 to 16 : 15	Offset during optimized start-up adjustable from 0 to 27 °F / 0 to 15 °C
17 : 12	(Mod.) burner Control gain 12	17 : 0 to 17 : 255	Setting according to matching of modulating burner to the boiler type concerned
18 : 300	(Mod.) burner Integral time 300	18 : 1 to 18 : 1000	Setting according to matching of modulating burner to the boiler type concerned
1A : 6	(Mod.) burner Optimized start-up 6 minutes	1A : 0 to 1A : 60	Duration of optimized start-up adjustable from 0 to 60 minutes
1C : 120	Boiler / burner Compensation of signal delay for burner operating hours meter. Time from burner start signal initiation at T2 (plug 41) to opening of solenoid valve. At each burner start 120s will be taken off the operating time.	1C : 1 to 1C : 500	Setting range from 1 to 199s Each time the burner starts up, the operating time is reduced by this amount.
1F : 0	Boiler / burner No monitoring of flue gas temperature (only with flue gas temperature sensor connected)	1F : 1 to 1F : 500	When the flue gas temperature exceeds the preselected limit value (selectable in the range from 36 to 932 °F / 2 to 500 °C), "SERVICE" is displayed

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
21 : 0	Boiler / burner No service display for burner	21 : 1 to 21 : 9999	The number of burner operating hours before the "Service" display appears can be set between 1 and 9999 hours
23 : 0	Boiler / burner No time interval for burner maintenance	23 : 1 to 23 : 24	Time interval variable between 1 and 24 months
24 : 0	Boiler / burner No "Service" display	24 : 1	The "Service" display appears (address is set automatically and must be reset manually after maintenance has been performed)
26 : 0	Boiler / burner Fuel consumption of burner (1st stage) not counted	26 : 1 to 26 : 9999	Input from 1 to 9999, whereby each increment \cong 0.1 liter or gallon / hour - Example: 20 \cong 2.0 liters / gallons per hour
28 : 0	Boiler / burner No burner cycling	28 : 1	Burner is automatically switched on for 30 seconds after 5 hours
29 : 0	Boiler / burner Fuel consumption of burner (2nd stage) not counted	29 : 1 to 29 : 9999	Input from 1 to 9999, whereby each increment \cong 0.1 liter or gallon / hour - Example: 20 \cong 2.0 liters / gallons per hour
32 : 70	Boiler / burner Only in conjunction with Switching Module-V: Minimum boiler water temperature setpoint value 158 °F / 70 °C with external burner activation (effective with coding address "94")	32 : 0 to 32 : 127	Minimum boiler water temperature setpoint value variable between 32 and 261 °F / 0 and 127 °C; note adjustment of adjustable high limit "G"
33 : 0	Boiler / burner Only in conjunction with Switching Module-V: Pumps and mixing valve remain in control mode with external burner activation	33 : 1	All pumps OFF Mixing valve closed
54 : 0	General Without solar control unit	54 : 1	With Vitosolic 100; will be recognized automatically
		54 : 2	With Vitosolic 200; will be recognized automatically

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
55 : 0	DHW Tank heating, hysteresis 4.5 °F / 2.5 °C	55 : 1	Adaptive DHW heating active (takes into account the rate at which the tank temperature in- creases during DHW heating)
56 : 0	DHW Setting range of domestic hot water temperature 50 to 140 °F / 10 to 60 °C	56 : 1	Setting range of DHW temperature 50 and 203 °F / 10 to 95 °C IMPORTANT ■ Observe max. DHW temperature ■ Adjust adjustable high limit "⌚"
58 : 0	DHW Without additional function for domestic hot water heating When do- mestic hot water is being heated, the boiler water temperature is a maxi- mum of 36 °F / 20 °C higher than the desired domestic hot water tempera- ture.	58 : 1 to 58 : 95	Input of a 2nd desired DHW tem- perature value; variable between 34 and 203 °F / 1 and 95 °C (note coding address "56") IMPORTANT The DHW tank is heated to the 2nd setpoint value during the 4th activation period for domestic hot water heating. (For settings see Operating Instructions)
59 : 0	DHW Tank heating: Switch-on point - 4.5 °F / - 2.5 °C Switch-off point + 4.5 °F / + 2.5 °C	59 : 1 to 59 : 10	Switch-on point variable between 1.8 and 18 °F / 1 and 10 °C below setpoint value
60 : 20	DHW	60 : 10 to 60 : 50	Differential between boiler water temperature and desired DHW tem- perature adjustable between 18 and 90 °F / 10 and 50 °C
61 : 0	DHW The circulation pump is switched on as a function of the boiler tempera- ture	61 : 1	Circulation pump switches on im- mediately
62 : 10	DHW Circulation pump with switch-off delay of 10 minutes	62 : 0 62 : 1 to 62 : 15	Circulation pump without switch- off delay Switch-off delay variable from 1 to 15 minutes
64 : 2	DHW During the party mode: Continuous domestic hot water heating and DHW recirculation pump ON	64 : 0 64 : 1	During the party mode: No domestic hot water heating, DHW recirculation pump OFF During the party mode: Domestic hot water heating and DHW recirculation pump according to preset time program

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
66 : 4	DHW Adjustment of DHW temperature setpoint value on the programming unit of the control unit and on the remote control (if installed)	66 : 0	Adjustment of DHW temperature setpoint value only on the programming unit of the control unit
		66 : 1	Adjustment of DHW temperature setpoint value on the programming unit of the control unit and the remote control (1st heating circuit)
		66 : 2	Adjustment of DHW temperature setpoint value on the programming unit of the control unit and the remote control (2nd heating circuit)
		66 : 5	Adjustment of DHW temperature setpoint value only on the remote control (1st heating circuit)
		66 : 6	Adjustment of DHW temperature setpoint value only on the remote control (2nd heating circuit)
67 : 40	DHW With Vitosolic: Third set DHW temperature at 40°C / 104°F. Reloading the suppression will be active above the selected temperature. The DHW tank is heated only by solar heating system.	67 : 0	Without a third set DHW temperature
		67 : 1 to 67 : 95	Input of a third set DHW value; adjustable from 1 to 95 °C/ 34 to 203 °F (subject to the setting of coding address 56)
70 : 0	DHW DHW recirculation pump ON according to preset time program when DHW heating is released	70 : 1	DHW recirculation pump ON according to preset time program only
71 : 0	DHW DHW recirculation pump ON according to preset time program	71 : 1	DHW recirculation pump OFF during domestic hot water heating to the 1st setpoint value
		71 : 2	DHW recirculation pump ON during domestic hot water heating to the 1st setpoint value
72 : 0	DHW DHW recirculation pump ON according to preset time program	72 : 1	DHW recirculation pump OFF during domestic hot water heating to the 2nd setpoint value
		72 : 2	DHW recirculation pump ON during domestic hot water heating to the 2nd setpoint value
73 : 0	DHW DHW recirculation pump ON according to preset time program	73 : 1 to 73 : 6	During the time program for the DHW recirculation pump ON for 5 minutes once per hour to ON for 5 minutes 6 times per hour
		73 : 7	DHW recirculation pump ON continuously

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
74 : 5	DHW In conjunction with Switching Module-V: The DHW recirculation pump can be switched on for 5 minutes via a potential free contact	74 : 0 to 74 : 15	Switch-on time adjustable from 0 to 15 minutes
75 : 0	DHW DHW recirculation pump ON according to preset time program	75 : 1	DHW recirculation pump OFF during energy saving mode
7F : 1	General Single-family house	7F : 0	Multi-family house
80 : 1	General With 5 seconds time delay for fault message	80 : 0	Without time delay
		80 : 2 to 80 : 199	Time delay adjustable between 2 and 199 seconds (selected value x 5 seconds)
81 : 1	General Automatic resetting to daylight savings time IMPORTANT Codings "82" to "87" are only possible if address "81: 1" is coded.	81 : 0	Manual resetting to daylight savings time
		81 : 2	n/a
82 : 3	General Start of summer time: March	82 : 1 to 82 : 12	January to December
83 : 5	General Start of summer time: last week of month	83 : 1 to 83 : 4	Week 1 to Week 4 of the selected month
84 : 7	General Start of summer time: last day of week (Sunday)	84 : 1 to 84 : 7	Monday to Sunday
85 : 10	General Start of winter time: October	85 : 1 to 85 : 12	January to December
86 : 5	General Start of winter time: last week of month	86 : 1 to 86 : 4	Week 1 to Week 4 of the selected month
87 : 7	General Start of winter time: last day of week (Sunday)	87 : 1 to 87 : 7	Monday to Sunday
88 : 00	General °C	88 : 01	°F
89 : 1	General Automatic recognition of KM-BUS participants	89 : 0	No participant recognition
8A : 175	General Display conditions active	8A : 176	All codings visible

Codings (continued)

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
8E : 4	General Display and confirmation of faults on the programming unit and remote controls (if installed)	8E : 0	Display and confirmation of faults only on the programming unit
		8E : 1	Display and confirmation of faults on the programming unit of the control unit and remote control (1st heating circuit)
		8E : 2	Display and confirmation of faults on the programming unit of the control unit and remote control (2nd heating circuit)
90 : 128	General Time constant for calculating the outdoor temperature change 21.3 hours (selected value x 10 minutes)	90 : 0 to 90 : 199	Fast matching (lower values) or slow matching (higher values) of the supply temperature to the change in the outdoor temperature according to the selected value
92 : 0	General Without fault indication module	92 : 1	With fault indication module (recognized automatically)
93 : 0	General Compiled fault indication in emissions test mode / service display not effective for compiled fault output	93 : 1	Compiled fault indication in emissions test mode / service display effective for compiled fault output
94 : 0	General Without Switching Module-V	94 : 2	With Switching Module-V (recognized automatically)
95 : 0	General Without communication interface Vitocom 100	95 : 1	With communication interface Vitocom 100 (recognized automatically)
9d : 0	General Without input extension module 0-10V	9d : 1	Without input extension module 0-10V (recognized automatically)
A0 : 0	Boiler circuit / mixing valve-circuit Without remote control	A0 : 1	With Vitotrol 200 remote control
		A0 : 2	With Vitotrol 300 remote control
A2 : 2	Boiler circuit / mixing valve circuit With DHW tank priority control over heating circuit pump and mixing valve	A2 : 0	Without DHW tank priority over heating circuit pump and mixing valve
		A2 : 1 ^{*1}	With tank priority over mixing valve: Mixing valve closed, heating circuit pump ON while the tank is being heated
		A2 : 3 ^{*1} to A2 : 15	Reduced tank priority over mixing valve; i.e. the heating circuit is supplied with a reduced amount of heat

^{*1}Only selectable for the heating circuit with mixing valve.

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
A3 : 2	Boiler circuit / mixing valve circuit The heating circuit pump is switched on at outdoor temperatures below 34 °F / 1 °C. The heating circuit pump is switched off at outdoor temperatures above 37 °F / 3 °C. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> IMPORTANT At settings below 34 °F / 1 °C there is a risk that piping outside the insulation of the building may freeze, e.g. pipes in the roof space, to the garage, in radiator alcoves etc. Pay particular attention to the standby mode, e.g. during holidays. </div>	A3 : -9 A3 : -8 A3 : -7 A3 : -6 A3 : -5 A3 : -4 A3 : -3 A3 : -2 A3 : -1 A3 : 0 A3 : 1 A3 : 2 . A3 : 15	Heating circuit pump ON at 14 °F / -10 °C 16 °F / - 9 °C 18 °F / - 8 °C 19 °F / - 7 °C 21 °F / - 6 °C 23 °F / -5 °C 25 °F / -4 °C 27 °F / -3 °C 28 °F / -2 °C 30 °F / -1 °C 32 °F / 0 °C 34 °F / 1 °C 36 °F / 2 °C 37 °F / 3 °C . 57 °F / 14 °C 61 °F / 16 °C OFF at 18 °F / -8 °C 19 °F / -7 °C 21 °F / -6 °C 23 °F / -5 °C 25 °F / -4 °C 27 °F / -3 °C 28 °F / -2 °C 30 °F / -1 °C 32 °F / 0 °C 34 °F / 1 °C 36 °F / 2 °C 37 °F / 3 °C
A4 : 0	Boiler circuit / mixing valve circuit With frost protection	A4 : 1	No frost protection, setting only possible when coding "A3 : -9" is set <i>See "Important" on previous page.</i>
A5 : 5	Boiler circuit / mixing valve circuit With the heating circuit pump logic function (HPL function), the heating circuit pump is switched off when the outdoor temperature (OT) rises 1 K above the desired room temperature (RT _{des}). $OT > RT_{des} + 1.8\text{ °F} / + 1\text{ °C}$	A5 : 0 . . . A5 : 15	Without heating circuit pump logic function (HPL function). The heating circuit pump is switched off if $OT > RT_{des} + 9\text{ °F} / + 5\text{ °C}$ $OT > RT_{des} + 7.2\text{ °F} / + 4\text{ °C}$ $OT > RT_{des} + 5.4\text{ °F} / + 3\text{ °C}$ $OT > RT_{des} + 3.6\text{ °F} / + 1.8\text{ °C}$ $OT > RT_{des} + 1.8\text{ °F} / + 1\text{ °C}$ $OT = RT_{des}$ $OT > RT_{des} - 1.8\text{ °F} / - 1\text{ °C}$. . . $OT > RT_{des} - 16.2\text{ °F} / - 9\text{ °C}$
A6 : 36	Boiler circuit / mixing valve circuit Automatic switching from normal heating to summer operation not active	A6 : 5 to A6 : 36	Automatic switching from normal heating to summer operation* ¹ at a variable setting value from 41 to 97 °F / 5 to 36 °C plus 1 °F / °C at which the burner and heating circuit pump are switched off and the mixing valve is closed

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
A7 : 0	Mixing valve circuit Without mixing valve energy saving function	A7 : 1	With mixing valve energy saving function (extended heating circuit pump logic) The heating circuit pump can be switched off additionally when the mixing valve has been closed for longer than 20 minutes. The heating circuit pump is switched on again ■ when the mixing valve switches to its control mode ■ after the tank has been heated (for 20 minutes) ■ when there is a risk of freezing
A9 : 0	Boiler circuit / mixing valve circuit Without pump off time	A9 : 1 to A9 : 15	With pump off time: Heating circuit pump logic function with change of setpoint (through changing the operating mode or changes on the "⬇️❄️" selector knob or "⬇️🌀" button).
b0 : 0 ^{*1}	Boiler circuit / mixing valve circuit Weather-responsive operation in normal heating mode and reduced operation	b0 : 1	In conjunction with remote control: Weather-responsive operation in normal heating mode and with room temperature dependent control for reduced operation
		b0 : 2	In conjunction with remote control: Room temperature dependent control for normal heating mode and weather-responsive operation for reduced operation
		b0 : 3	In conjunction with remote control: Room temperature dependent control for normal heating mode and for reduced operation
b1 : 0	Do not change		
b2 : 8 ^{*1}	Boiler circuit / mixing valve circuit Room influence factor: 8 In conjunction with remote control and operation with room influence coded for the heating circuit	b2 : 0	Without room influence
		b2 : 1 to b2 : 31	Room influence factor adjustable from 1 to 31
b3 : 0 ^{*1}	Boiler circuit / mixing valve circuit Basic value: 127 °F / 53 °C In conjunction with the remote control and for the heating circuit operation with room temperature control must be coded	b3 : 1	Basic value: 100 °F / 38 °C

^{*1}Based on the damped outdoor temperature which is calculated from the current outdoor temperature and a time constant which takes into account the cooling characteristics of an average building.

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
b5 : 0* ¹	Boiler circuit / mixing valve circuit / No room temperature controlled heating circuit pump logic function	b5 : 1	In conjunction with remote control: <ul style="list-style-type: none"> ■ Heating circuit pump OFF if actual room temperature (RT_{act}) is 5.4 °F / 3 °C higher than desired room temperature (RT_{des}) $RT_{act} > RT_{des} + 5.4 \text{ °F} / 3 \text{ °C}$ ■ Heating circuit pump ON if actual room temperature (RT_{act}) is 1.8 °F / 1 °C higher than desired room temperature (RT_{des}) $RT_{act} > RT_{des} + 1.8 \text{ °F} / 1 \text{ °C}$
b6 : 0* ¹	Boiler circuit / mixing valve circuit / Without boost heating / rapid setback	b6 : 1	In conjunction with remote control: With boost heating / rapid setback Rapid setback: Only possible with weather-responsive operation with the room temperature sensor or with pure room temperature dependent control. The desired room temperature value must be reduced by at least 3.6 °F / 2 °C by <ul style="list-style-type: none"> ■ pressing the energy saving button "S" ■ switching from normal heating to reduced operation ■ optimized switch-off. Fast setback is ended when the desired room temperature is reached. Boost heating: Only possible with weather-responsive operation with the room temperature sensor or with pure room temperature dependent control. The desired room temperature value must be increased by at least 3.6 °F / 2 °C by <ul style="list-style-type: none"> ■ pressing the party button ■ switching from reduced operation to normal heating ■ optimized switch-on. Boost heating is ended when the desired room temperature is reached.

*¹Change the coding for the boiler circuit only on boilers without a low limit or for the heating circuit with mixing valve if the remote control is effective for this heating circuit.

Codings (continued)

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
b7 : 0	Boiler circuit / mixing valve circuit / In conjunction with remote control in room sensing mode: Without optimized switch-on time	b7 : 1 b7 : 2	With optimized switch-on time (max. time shift 2 hours 30 min.) With optimized switch-on time (max. time shift 15 hours 50 min.)
b8 : 10	Boiler circuit / mixing valve circuit / Heating gradient: Optimized switch-on time 10 minutes / Celsius	b8 : 11 to b8 : 255	Heating gradient for optimized switch-on time variable between 11 and 255 minutes / Celsius
b9 : 0	Boiler circuit / mixing valve circuit / Without learning optimized switch-on time	b9 : 1	With learning optimized switch-on time
C0 : 0	Boiler circuit / mixing valve circuit / In conjunction with remote control: Without optimized switch-off time	C0 : 1 C0 : 2	In conjunction with remote control: With optimized switch-off time (max. time shift 1 hour) In conjunction with remote control: With optimized switch-off time (max. time shift 2 hours)
C1 : 0	Boiler circuit / mixing valve circuit / In conjunction with remote control: Without optimized switch-off time	C1 : 1 to C1 : 12	In conjunction with remote control: With optimized switch-off time (max. time shift from 10 to 120 min.)
C2 : 0	Boiler circuit / mixing valve circuit / Without learning optimized switch-off time	C2 : 1	With learning optimized switch-off time
C4 : 1	Mixing valve circuit / Mixing valve circuit with 4-way mixing valve	C4 : 0 C4 : 2 C4 : 3	Mixing valve circuit with three-way mixing valve Special case 1 Special case 2
C5 : 20	Boiler circuit / mixing valve circuit / Electronic low limit 68 °F / 20 °C	C5 : 1 to C5 : 127	Electronic minimum limit variable between 34 and 261 °F / 1 and 127 °C
C6 : 75	Mixing valve circuit / Maximum supply temperature limit set to 167 °F / 75 °C	C6 : 1 to C6 : 127	Max. supply temperature limit variable between 34 to 261 °F / 1 and 127 °C
C7 : 0	Mixing valve circuit / In conjunction with return water temperature sensor: Without influence of return water temperature sensor	C7 : 1 to C7 : 31	In conjunction with return water temperature sensor: Spread variable from 1.8 to 56 °F / 1 to 31 °C Spread = temperature difference between supply and return at system point 14 °F / -10 °C
C8 : 31 ^{*1}	Boiler circuit / mixing valve circuit / Without limit on room influence	C8 : 1 to C8 : 30	In conjunction with remote control: Limit on room influence variable from 1.8 to 54 °F / 1 to 30 °C

^{*1}Change the coding for the boiler circuit only on boilers without a low limit or for the heating circuit with mixing valve if the remote control is effective for this heating circuit.

Coding 2 (overview of all codings) (continued)

Coding(factory default setting) Address: Value	Function		New coding Address: Value	Possible change
C9 : 0	Mixing valve circuit	Underfloor heating system controlled by supply and return water temperature sensor. Without heating period	C9 : 1	Control of an underfloor heating system with supply and return water temperature sensor. With optimization in the heating cycle (effective with coding address "C7")
d3 : 14	Boiler circuit / mixing valve circuit	Do not adjust		
d4 : 0				
d5 : 0	Boiler circuit / mixing valve circuit	The heating program changes to constant operation with reduced room temperature	d5 : 1	The heating program changes to constant central heating with standard room temperature
E1 : 1	Boiler circuit / mixing valve circuit	Day setpoint value variable from 50 to 86 °F / 10 to 30 °C	E1 : 0	In conjunction with remote control: Day setpoint value variable from 37 to 73 °F / 3 to 23 °C
			E1 : 2	In conjunction with remote control: Day setpoint value variable from 63 to 99 °F / 17 to 37 °C
E2 : 50	Boiler circuit / mixing valve circuit	No display correction for current room temperature value	E2 : 0 to E2 : 49	In conjunction with remote control: Display correction – 9 °F / – 5 °C to Display correction – 0.2 °F / – 0.1 °C
			E2 : 51 to E2 : 99	In conjunction with remote control: Display correction + 0.2 °F / + 0.1 °C to Display correction + 9 °F / + 4.9 °C
E5 : 0	Boiler circuit / mixing valve circuit	Without variable speed heating circuit pump	E5 : 1	With variable speed heating circuit pump (recognized automatically)
E6 : 100	Boiler circuit / mixing valve circuit	Maximum speed of variable speed pump 100% of max. speed in normal operation	E6 : 0 to E6 : 100	Maximum speed variable between 0 and 100% of max. speed
E7 : 20	Boiler circuit / mixing valve circuit	Minimum speed of variable speed pump 20% of max. speed	E7 : 0 to E7 : 100	Minimum speed variable between 0 and 100% of max. speed
E8 : 0	Boiler circuit / mixing valve circuit	Minimum speed according to setting in coding address "E7"	E8 : 1	Speed according to setting in coding address "E9"
E9 : 20	Boiler circuit / mixing valve circuit	Speed of variable speed pump 20% of max. speed of reduced operation	E9 : 0 to E9 : 100	Speed variable between 0 and 100% of max. speed

*1 Change the coding for the boiler circuit only on boilers without a low limit or for the heating circuit with mixing valve if the remote control is effective for this heating circuit.

Coding 2 (overview of all codings) (continued)

Coding (factory default setting) Address: Value	Function	New coding Address: Value	Possible change
F0 : 0			Without function, do not change
F1 : 0	Mixing valve circuit	Slab curing function not active	<p>The commissioning/service report to be completed by the heating contractor must contain the following data:</p> <ul style="list-style-type: none"> ■ Heating data for the corresponding supply temperatures ■ Max. supply temperature reached ■ Operating status and outdoor temperature at time of installation <p>Slab curing function selectable on basis of four temperature/time curves:</p> <p>F1 : 1 Temperature/time curve 1:</p> <p>F1 : 2 Temperature/time curve 2:</p> <p>F1 : 3 Temperature/time curve 3:</p> <p>F1 : 4 Temperature/time curve 4:</p> <p>The function is resumed after a power failure or after the control unit is switched off. When the slab curing function has terminated or the address is reset manually to 0, the "III" heating program is switched on.</p>
F2 : 0	Boiler circuit / mixing valve circuit	No time limit for party mode	<p>F2 : 1 F2 : 12</p> <p>Time limit for party mode variable between 1 and 12 hours</p>

Coding 2 (overview of all codings) (continued)

Coding(factory default setting) Address: Value	Function	New coding Address: Value	Possible change
F8 : -5	Boiler circuit / mixing valve circuit	For operation in reduced room temperature mode, the set room temperature will be raised (up to the temperature limit set by coding address F9) to a value subject to the outdoor temperature, if the outdoor temperature falls below 23 °F / -5 °C. Observe the setting of coding address A3	F8 : + 10 to F8: -60 Temperature limit for cancelling reduced mode, adjustable from + 50 to -76 °F/ + 10 to -60 °C
		F8: -61	Function disabled
F9 : -14	Boiler circuit / mixing valve circuit	Below an outdoor temperature of + 7 °F / -14 °C , the set room temperature will be raised to the value selected as set room temperature, if the system is in standard room temperature mode	F9 : + 10 to F9 :-60 Limit for raising the set room temperature to the value selected for standard mode, adjustable from + 50 to -76 °F/ + 10 to -60 °C
FA: 20	Boiler circuit / mixing valve circuit	Raising the set supply temperature for the transition from reduced temperature mode to standard room temperature mode by about 20%	FA : 0 to F9 : 50 Raising the set supply temperature for the transition from reduced temperature mode to standard room temperature mode adjustable from 0 to 50%
Fb: 30	Boiler circuit / mixing valve circuit	Duration for raising the set supply temperature (see coding address FA): 60min.	Fb : 0 to Fb : 150 Duration for raising the set supply temperature adjustable from 0 to 300 min; 1 setting step = 2 min

Component Settings

Please check box to indicate modified functions.

Factory preset function	Modified function
■ Fixed high limit "⬆" set to 230 °F / 110 °C	<input type="checkbox"/> Changed to 212 °F / 100 °C
■ Adjustable high limit "⬆" set to 167 °F / 75 °C	<input type="checkbox"/> Changed to 189 °F / 87 °C
■ Electronic high limit for heating circuit 1 without mixing valve is set to 185 °F / 85 °C	<input type="checkbox"/> Changed to °F / °C
■ Electronic high limit for heating circuit 2 with mixing valve is set to 167 °F / 75 °C	<input type="checkbox"/> Changed to °F / °C
■ Electronic min. limit for heating circuit 2 with mixing valve is set to 68 °F / 20 °C	<input type="checkbox"/> Changed to °F / °C
Heating curves ■ Heating curves are factory preset to – Slope = 1.4 – Shift = 0 ■ Differential temp. preset at the factory to 14.4 °F / 8 °C	Heating curves for: <input type="checkbox"/> Heating circuit 1 without mixing valve: Changed to – Slope – Shift <input type="checkbox"/> Heating circuit 2 with mixing valve: Changed to – Slope – Shift <input type="checkbox"/> Changed to
Heating circuit pumps: ■ The heating circuit pumps are switched off in the "⬆" heating program if the outdoor temperature rises more than 1.8 °F / 1 °C above the desired room temperature. In the "⬆" heating program – the heating circuit pumps are only switched on when there is a risk of freezing, – the mixing valve (if installed) remains closed (goes to control mode when there is a risk of freezing).	<input type="checkbox"/> The heating circuit pump for heating circuit 1 remains switched on <input type="checkbox"/> The heating circuit pump for heating circuit 2 remains switched on <input type="checkbox"/> The heating circuit pumps are switched off before the desired room temperature is reached <input type="checkbox"/> The heating circuit pump for heating circuit 1 or heating circuit 2 is switched off if the current room temperature exceeds the desired room temperature by 5.4 °F / 3 °C <input type="checkbox"/> The heating circuit pump for heating circuit 2 is switched off when 20 minutes of "Close" mixing valve pulses are reached
Remote control ■ Control unit without remote control	With remote control <input type="checkbox"/> Vitotrol 200 connected to heating circuit 1 <input type="checkbox"/> Vitotrol 200 connected to heating circuit 2 <input type="checkbox"/> Vitotrol 300 connected to heating circuit 1 <input type="checkbox"/> Vitotrol 300 connected to heating circuit 2
Heating circuit 1 without mixing valve ■ for normal heating operation and reduced operation weather-responsive	<input type="checkbox"/> weather-responsive control in normal heating mode room temperature dependent control in reduced operation <input type="checkbox"/> room temperature dependent control in normal heating mode weather-responsive control in reduced operation <input type="checkbox"/> room temperature dependent control in normal heating mode and in reduced operation
Heating circuit 2 with mixing valve ■ for normal heating operation and reduced operation weather-responsive	<input type="checkbox"/> weather-responsive control in normal heating mode room temperature dependent control in reduced operation <input type="checkbox"/> room temperature dependent control in normal heating mode weather-responsive control in reduced operation <input type="checkbox"/> room temperature dependent control in normal heating mode and in reduced operation
Frost protection ■ Frost protection active from 34 °F / 1 °C	<input type="checkbox"/> Frost protection cancelled <input type="checkbox"/> Frost protection changed to °F / °C

Component Settings (continued)

Factory preset function	Modified function
<p>Switching hysteresis</p> <ul style="list-style-type: none"> ■ The switching hysteresis for the burner is 7.2 °F / 4 °C 	<p>ERB50 function</p> <ul style="list-style-type: none"> <input type="checkbox"/> The switching hysteresis adjusts itself automatically to the boiler load; values are set between 10.8 and 21.6 °F / 6 and 12 °C. <p>ERB80 function</p> <ul style="list-style-type: none"> <input type="checkbox"/> The switching hysteresis adjusts itself automatically to the boiler load; values are set between 10.8 and 36 °F / 6 and 20 °C.
<p>Heating system with domestic hot water heating:</p> <ul style="list-style-type: none"> ■ Domestic hot water is heated during the preset timer periods when domestic hot water heating is released. ■ With tank priority control: The heating circuit pumps are switched off during domestic hot water heating; they are switched on again when the DHW pump for heating the tank is switched off. The mixing valve is closed when domestic hot water is being heated; the mixing valve is activated to its control function when the DHW pump for heating the tank is switched off. ■ Setting range of domestic hot water temperature 50 to 140 °F / 10 to 60 °C ■ When heat is requested by the tank, the DHW pump for heating the tank is switched on when the boiler water temperature is 12.6 °F / 7 °C higher than the current domestic hot water temperature. ■ When the tank has been heated up, the DHW pump for heating the tank continues to run until <ul style="list-style-type: none"> – the desired domestic hot water temperature is exceeded by 9 °F / 5 °C or – the temperature difference between the boiler water and DHW temperature is less than 12.6 °F / 7 °C or – the boiler water temperature has fallen to the value of the weather-responsive control. The max. switch-off delay is 10 minutes. ■ Without adaptive tank control ■ The DHW recirculation pump is only activated when tank heating is activated. ■ Without additional function for domestic hot water heating 	<ul style="list-style-type: none"> <input type="checkbox"/> Without tank priority control: The heating circuit pumps remain switched on during domestic hot water heating (see also the following changes). The mixing valve remains in its control mode during domestic hot water heating. <input type="checkbox"/> Setting range of domestic hot water temperature 50 to 203 °F / 10 to 95 °C <input type="checkbox"/> When heat is requested by the DHW tank, the DHW pump is switched on immediately. <input type="checkbox"/> When the tank is heated, the DHW pump for heating the tank switches off immediately the desired tank temperature is reached. <input type="checkbox"/> With adaptive tank control <input type="checkbox"/> The DHW recirculation pump is controlled in accordance with its own time program. <input type="checkbox"/> With additional function for domestic hot water heating Input of a 2nd setpoint value of °F / °C.
	<p>Additional equipment connected</p> <ul style="list-style-type: none"> <input type="checkbox"/> Switching Module-V <input type="checkbox"/> KM-BUS Expansion Module <input type="checkbox"/> Limit aquastat for underfloor heating <input type="checkbox"/> Fault indication module <input type="checkbox"/> Extension for two-stage / modulating burner

Wiring diagram

- A1 Mother board
A2 Power supply board
A3 Electronics board
A4 Heating circuit selector button board
A5 Programming unit
A6 Boiler coding card
A7 Fault indication module (accessory)
A10 Mixing valve relay board
A11 Optolink / Emissions test switch board
F1, F2 Fuses
F6 Fixed high limit "u" 230 °F (212 °F) / 110 °C (100 °C)
F7 Adjustable high limit "u" 167 °F (203 °F, 212 °F, 230 °F) / 75 °C (95 °C, 100 °C, 110 °C)
K1-K4 Relays
S1 Power on / off switch "u"
S2 FHL test switch

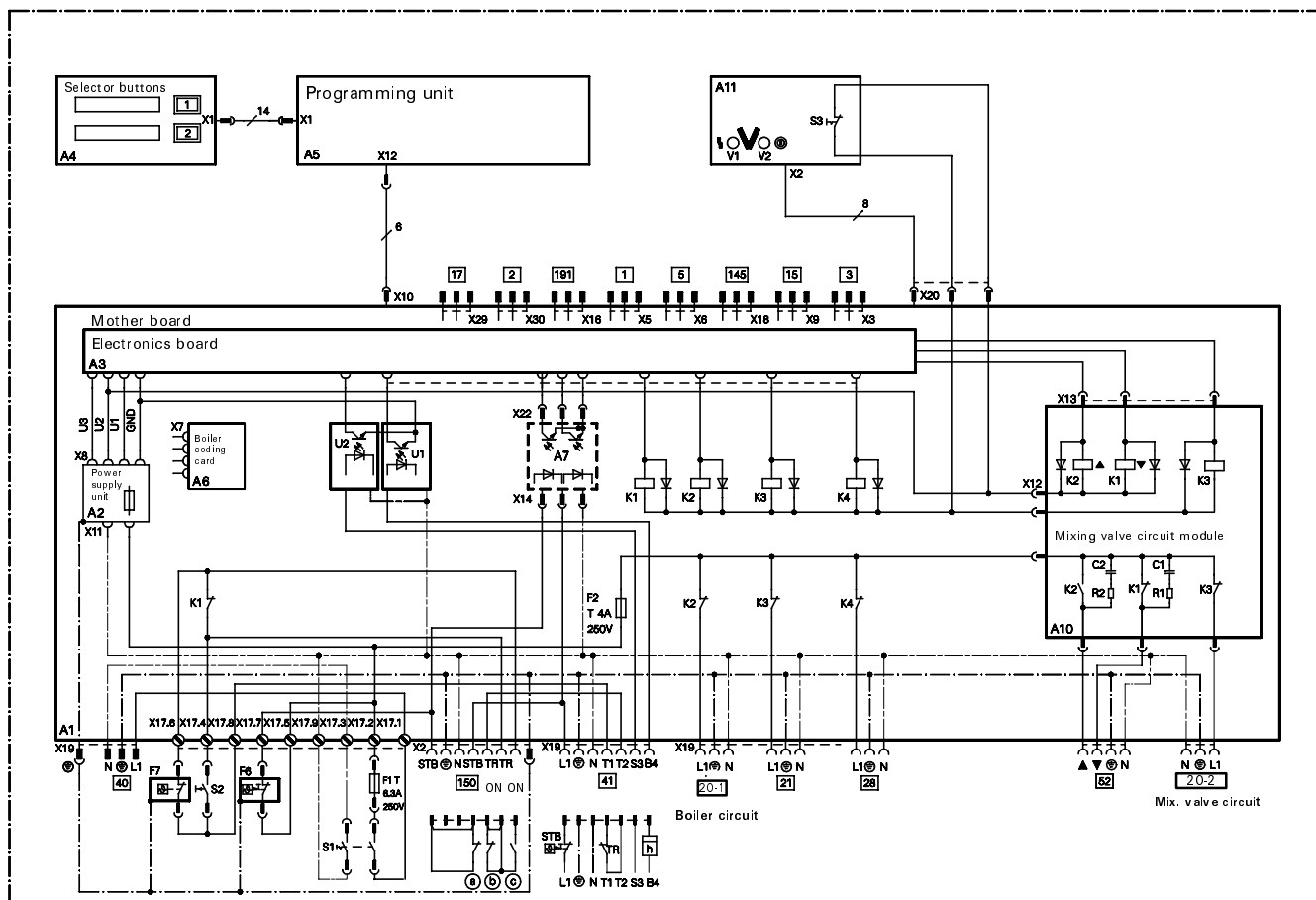
- S3 Emissions test switch "u"
V1 Fault indicator (red)
V20 operating status indicator (green)

120 VAC connectors

- 20-1 20-2 21 28 Interconnections
Power Pump Module
41 Oil/ Gas burner connection
52 Mixing valve motor (accessory)
40 Power supply connection, 60 Hz
150 External equipment:
a External safety devices (remove jumper when connecting)
b External control switch-off (remove jumper when connecting)
c External burner activation (1st stage)Low voltage connectors
1 Outdoor temperature sensor
2 Mixing valve supply temperature sensor (accessory)

- 3 Boiler temperature sensor
5 DHW tank temperature sensor (only connect if DHW tank installed)
15 Flue gas temperature sensor (accessory)
17 Return water temperature sensor (accessory)
145 KM-BUS participant, e.g. Vitotrol remote control
191 2nd stage burner / burner modulation

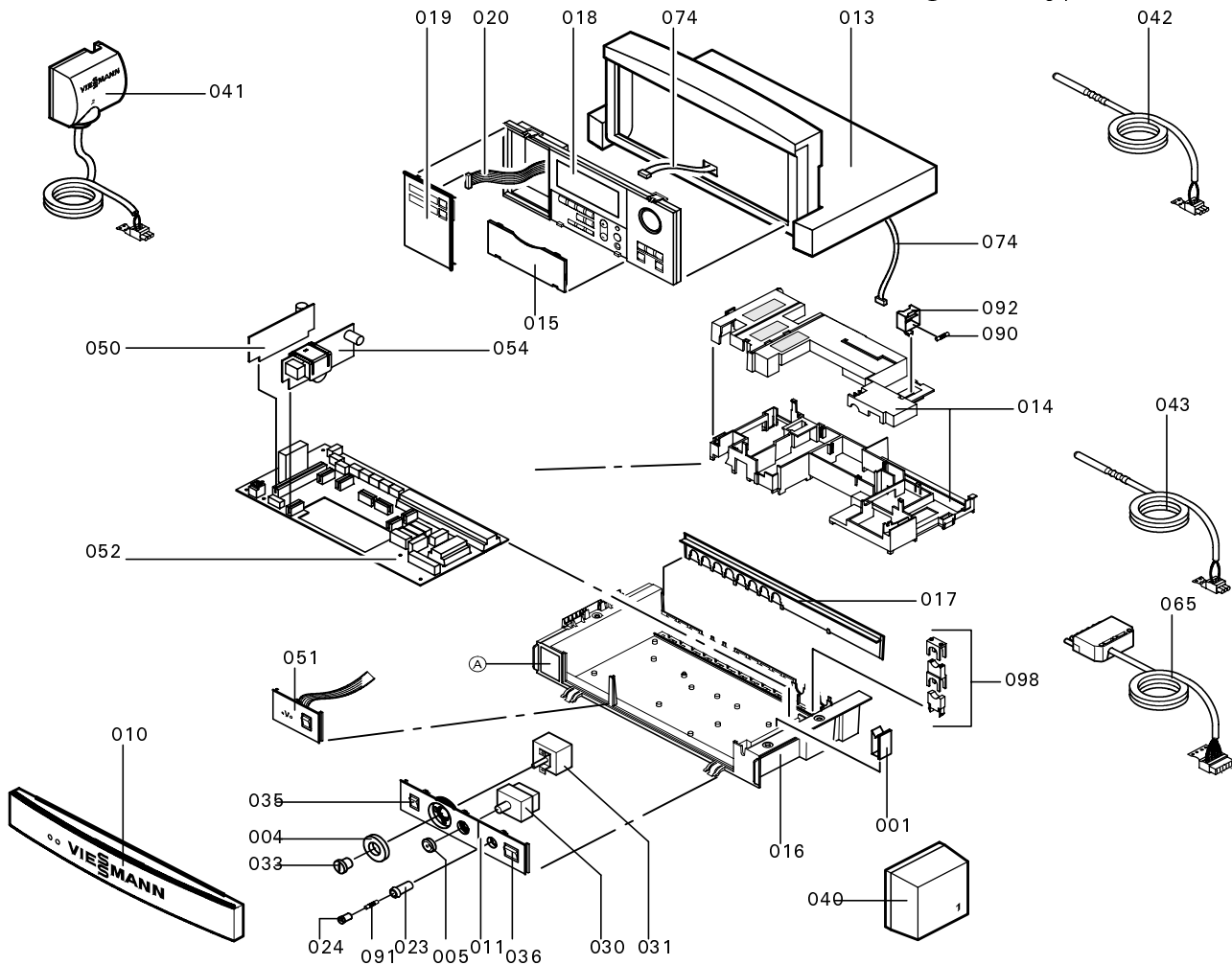
This wiring diagram applies only when Viessmann products are used.



Parts List

Ordering Replacement Parts:
Please provide Model and Serial Number from rating plate (A) when ordering replacement parts. Order replacement components from your Viessmann distributor.

Parts		
001	Cable clip	024 Fuse holder cover
004	Adjustable high limit dial "Ⓔ"	030 Fixed high limit "Ⓐ"
005	Cover for fixed high limit "Ⓐ"	031 Adjustable high limit "Ⓔ"
010	Front flip-down cover	033 Adjustable high limit rotary knob "Ⓔ"
011	Control panel, bottom right	035 Switch, 1-pole (FHL test switch)
013	Housing, top (drawer)	036 Switch, 2-pole (ON/OFF switch "Ⓔ")
014	Circuit board cover assembly	040 Outdoor temperature sensor <u>1</u>
015	Flip-down cover of programming unit	041 Supply temperature sensor with plug-in connector <u>2</u>
016	Housing, bottom	042 Boiler temperature sensor with plug-in connector <u>3</u>
017	Control housing, rear	043 DHW tank temperature sensor with plug-in connector <u>5</u>
018	Programming unit	050 Circuit board control (software)
019	Front cover for heating circuit selector buttons	
020	Flat cable, 14-pole	
023	Fuse holder	
		051 Optolink circuit board
		052 Motherboard
		054 Power supply circuit board
		065 Control cable <u>41</u>
		074 Connecting cable
		090 Fuse T 4 A / 250 VAC
		091 Fuse T 6.3 A / 250 VAC
		092 Fuse holder
		098 Pack of strain relief clamp parts
		Other Parts (not illustrated)
		099 Pack of mounting screws
		120 Power/Pump Module
		121 Installation Instructions
		122 Service Instructions
		123 Operating Instructions
		124 Parts List
		Ⓐ Rating plate



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

Printed on environment
(recycled and recycled)



Technical information subject to change without notice.

Viessmann Manufacturing Company (U.S.) Inc.
45 Access Road
Warwick, Rhode Island • 02886 • USA
Tel. (401) 732-0667 • Fax (401) 732-0590
www.viessmann-us.com • info@viessmann-us.com

Viessmann Manufacturing Company Inc.
750 McMurray Road
Waterloo, Ontario • N2V 2G5 • Canada
Tel. (519) 885-6300 • Fax (519) 885-0887
www.viessmann.ca • info@viessmann.ca

5303 268v1.3 03/2007