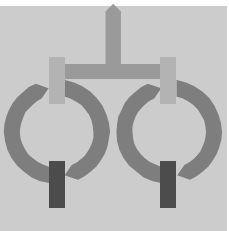
Installation and Operating Supplement

VIESSMANN

Please file in Service Binder

Dekamatik-HK1 Universal
Digital indoor/outdoor heating circuit control unit

for mounting on the mixing valve
with domestic hot water control
and with boiler activation capability
Part No. 9300 700



Dekamatik-HK1 Universal

IMPORTANT

Read and save these instructions for future reference.

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Safety

Safety, Installation and Warranty Requirements

Please ensure that this manual is read and understood before commencing installation. Failure to comply with the issues listed below and details printed in this manual can cause **product/property damage**, and/or **severe personal injury**. 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.
  ► *Please see section entitled "Safety."*

- **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 control in a readily accessible location for reference in the future by service personnel.
  ► *For a listing of applicable literature, please see section entitled "Information."*

- **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.

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Contents

Safety

Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "DANGER," "WARNING," "CAUTION," and "INFORMATION." See page 2 for details.

Approvals
Viessmann boilers, burners and controls are approved for sale in North America by CSA International. All electrical wiring is to be done in accordance with the latest edition of the Canadian Electrical Code CSA C22.1, or the National Electrical Code ANSI/NFPA 70, and/or local codes.

IMPORTANT

Please carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.
We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

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

WARNING

Turn off electric power supply before servicing. Contact with live electric components can cause shock or loss of life.

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

IMPORTANT

Ensure that all contacts have sufficient insulation clearance to live parts and are certified for these applications. Proper consultation with Viessmann Manufacturing Company Inc. should occur when installing components not included in the Viessmann product line.

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

Technical data

Power supply	120 VAC, 15 A max.
DHW pump	120 VAC, 3 FLA
Space heating pump	120 VAC, 3 FLA
Boiler enable dry contact	24 VAC, 1 A max.

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Product Information

Technical Literature

Literature applicable to installation of the Dekamatik-HK 1 Standard:
- Installation Instructions
- Start-up and Service Instructions
- Operating Instructions
- Installation codes mentioned in this manual

Literature applicable to installation of the Dekamatik-HK 1 Universal:
- All manuals listed under Dekamatik-HK 1 Standard
- Installation and Operating Supplement

IMPORTANT

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

Product Description

Digital indoor/outdoor heating circuit control unit for one heating circuit with mixing valve, with mixing valve actuator for mounting on Viessmann mixing valve, with domestic hot water production control, and with boiler activation capability.

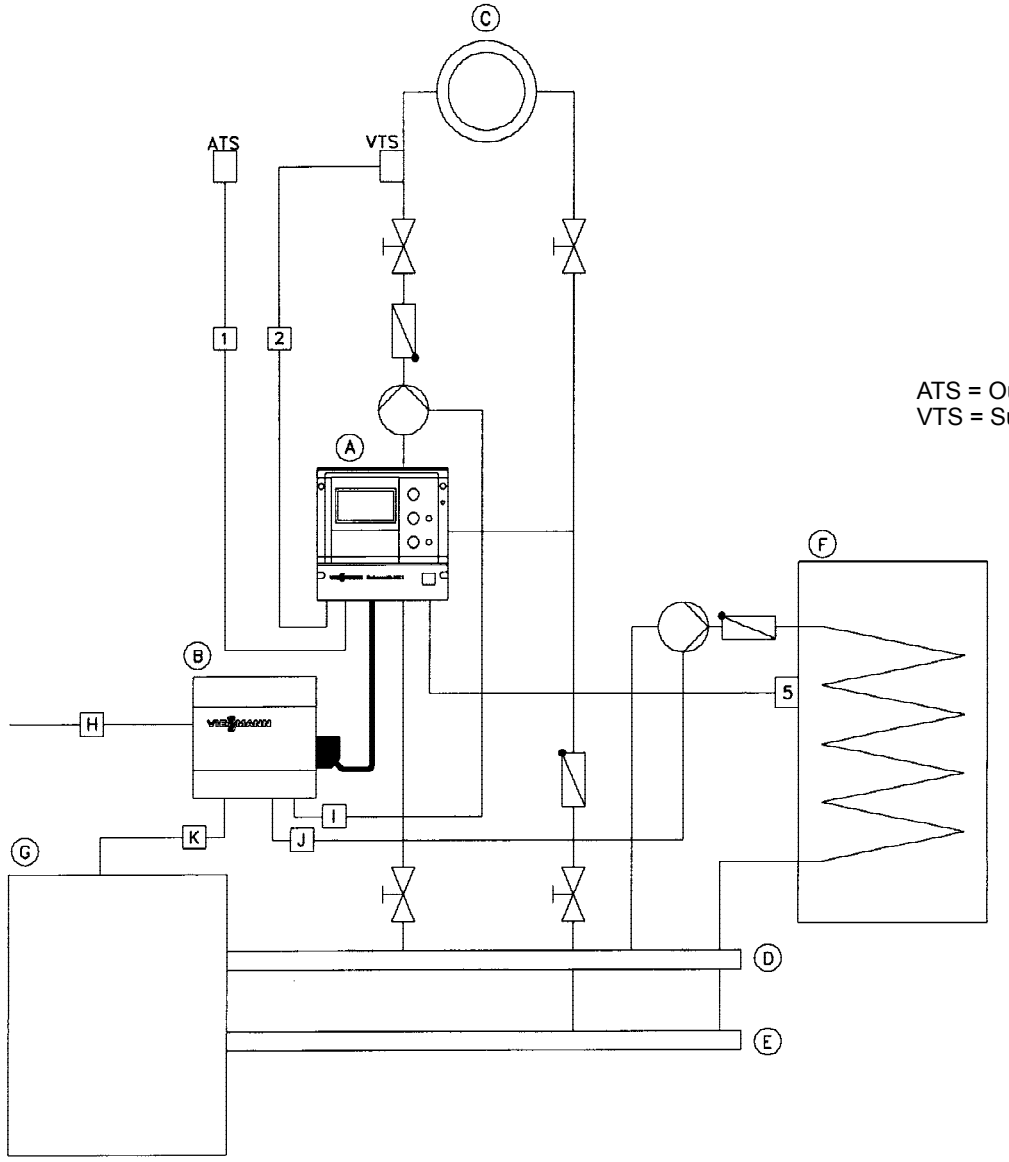
Dekamatik-HK 1 Universal Package, Part No. 9300 700 consists of:

1 Dekamatik-HK 1 control with mixing valve actuator, Part No. 9300 701 with miscellaneous parts:
  1 Indoor/outdoor temperature sensor 1, Part No. 7404 200
  1 Strap-on temperature sensor 2, Part No. 7450 036
  1 DHW temperature sensor 5, Part No. 7450 043
  1 package containing mixing valve mounting hex nuts
  1 package containing miscellaneous plastic strain reliefs

1 Power/Pump Control Module, Part No. 9300 703

Application Example

- One heating circuit with mixing valve
- One boiler to be activated/deactivated
- One indirect-fired domestic hot water tank
- Dekamatik-HK 1 Universal for mounting on the mixing valve
- One power/pump control module



ATS = Outdoor temperature sensor
VTS = Supply temperature sensor

Ⓐ Dekamatik-HK 1 Universal
Ⓑ Power/pump control module
Ⓒ Heating circuit
Ⓓ Supply header
Ⓔ Return header
Ⓕ DHW tank
Ⓖ Boiler

1 Outdoor temperature sensor
2 Supply temperature sensor
5 DHW tank temperature sensor
H Power supply
I Heating circuit pump
J DHW tank pump
K Boiler activation

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Sensor Orientation with 4-Way Mixing Valves

The Dekamatik-HK 1 is equipped with a photoelectric sensor mounted on the bottom of the mixing valve actuator at the back. This sensor may need to be repositioned by the heating contractor based upon whether the boiler supply enters the mixing valve from the right- or the left-hand side.

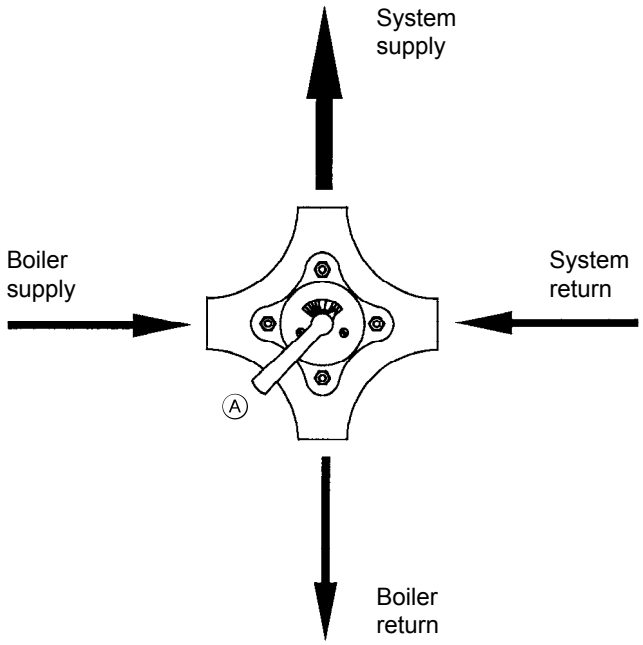

Fig. 1
Sensor position when boiler supply is from left

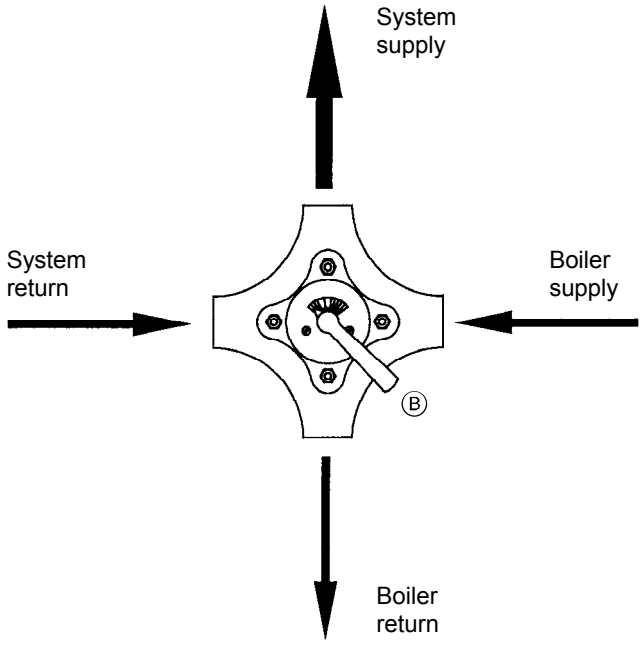

Fig. 2
Sensor position when boiler supply is from right

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IMPORTANT

Figures 1 and 2 show the 2 possible configurations of a 4-way mixing valve on which the Dekamatik-HK 1 may be mounted. There are two feasible locations where the photoelectric sensor may be installed: Ⓐ and Ⓑ.

These diagrams are intended only as a guide to sensor location - they do not show the sensor itself or its mounting characteristics.

Boiler supply from left

If the boiler supply is piped into the mixing valve from the left-hand side (see Fig. 1), mount the photoelectric sensor in position Ⓐ on underside of mixing valve actuator housing.

Boiler supply from right

If the boiler supply is piped into the mixing valve from the right-hand side (see Fig. 2), mount the photoelectric sensor in position Ⓑ on underside of mixing valve actuator housing.

IMPORTANT

The photoelectric sensor should only detect the actuator arm when the valve is in a fully open position to the system.

Sensor Orientation with 3-Way Mixing Valves

The Dekamatik-HK 1 is equipped with a photoelectric sensor mounted on the bottom of the mixing valve actuator at the back. This sensor may need to be repositioned by the heating contractor based upon whether the system return enters the mixing valve from the right- or the left-hand side.

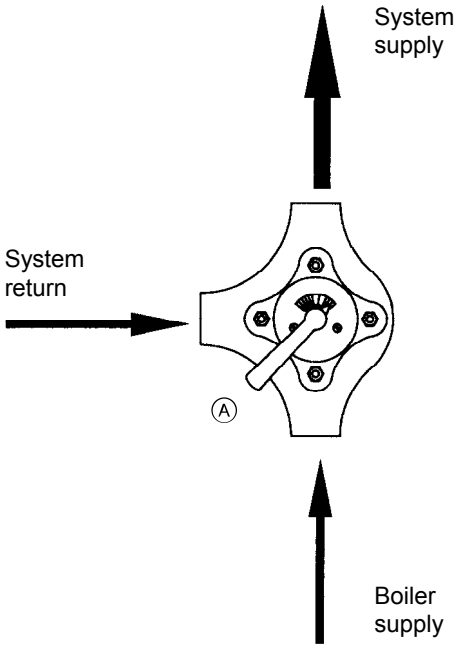

Fig. 3
Sensor position when system return is from left

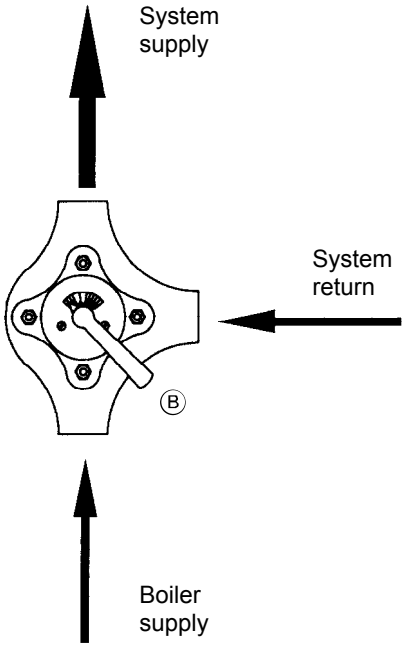

Fig. 4
Sensor position when system return is from right

IMPORTANT

Figures 3 and 4 show the 2 possible configurations of a 3-way mixing valve on which the Dekamatik-HK 1 may be mounted. There are two feasible locations where the photoelectric sensor may be installed: Ⓐ and Ⓑ.

These diagrams are intended only as a guide to sensor location - they do not show the sensor itself or its mounting characteristics.

System return from left

If the system return is piped into the mixing valve from the left-hand side (see Fig. 3), mount the photoelectric sensor in position Ⓐ on underside of mixing valve actuator housing.

System return from right

If the system return is piped into the mixing valve from the right-hand side (see Fig. 4), mount the photoelectric sensor in position Ⓑ on underside of mixing valve actuator housing.

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Installing the Photoelectric Sensor

The mixing valve actuator opens and closes the mixing valve to maintain a calculated setpoint temperature of hot water supplied to the system.

As the mixing valve is opened to its maximum, the actuator arm is detected by the photoelectric sensor (see Fig. 5). Once detected, the boiler enable contacts close, thereby activating the boiler. The system pump circulates hot water into the mixing valve and throughout the heating system. As the supply temperature sensor detects an increase in supply temperature, the HK 1 actuates the valve into the closed position. This action moves the arm away from the photoelectric sensor thereby deactivating the boiler. The system pump continues to operate during this process.

Sensor Mounting Instructions

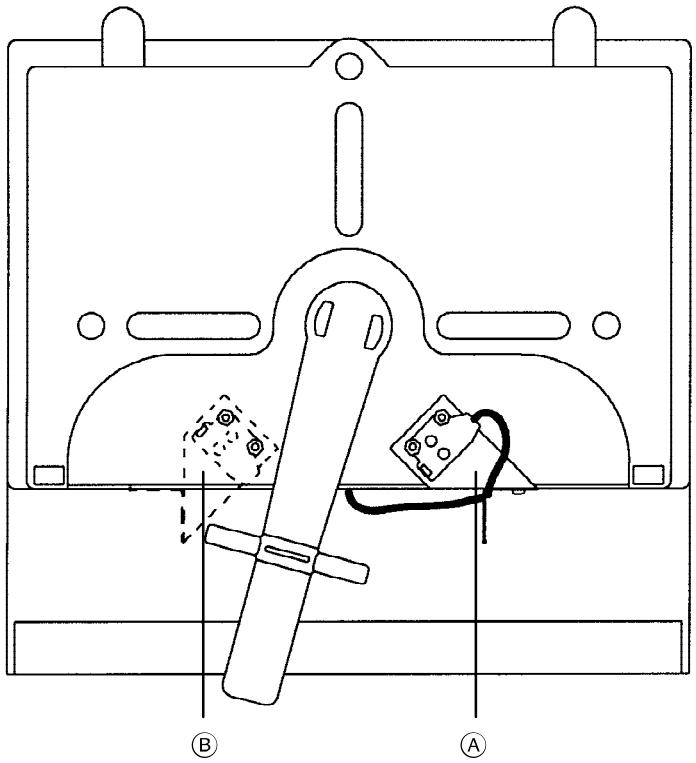

Fig. 5
Mounting sensor in required position (rear view)

The Dekamatik-HK 1 photoelectric sensor is installed in position Ⓐ at the factory. Please see Fig. 5.

If necessary, relocate the sensor to position Ⓑ as follows:

1. Remove two Phillips screws fastening bracket to HK 1 body.
2. Move sensor to opposite side while rotating bracket 90°.
3. Refasten sensor using two Phillips screws.
   Do **not** overtighten screws.
4. Continue with installation of HK 1 on the mixing valve as found in the Installation Instructions (Standard).

Installing the Power/Pump Control Module

The Dekamatik-HK 1 utilizes a Viessmann power/pump control module (PPCM). The PPCM serves to provide the HK 1 with a power source, pump control and the ability to enable the boiler.

Mounting PPCM

Fig. 6
Installing the PPCM

1. Remove cover of PPCM by loosening two cover screws ① on either side.

2. Find suitable location for PPCM on a wall within 6 ft / 1.8 m of Dekamatik-HK 1. The wall must have adequate backing.
   Do **not** mount PPCM with nails.
   Do **not** mount PPCM to any surface exceeding room temperature.
   Ensure minimum clearance of 1 ft / 30 cm from PPCM to any vent pipe or draft hood surface.
   Ensure proper service access.

3. Securely mount PPCM on wall using four screws of suitable size and strength (with plastic anchors if necessary).

Electrical Connections

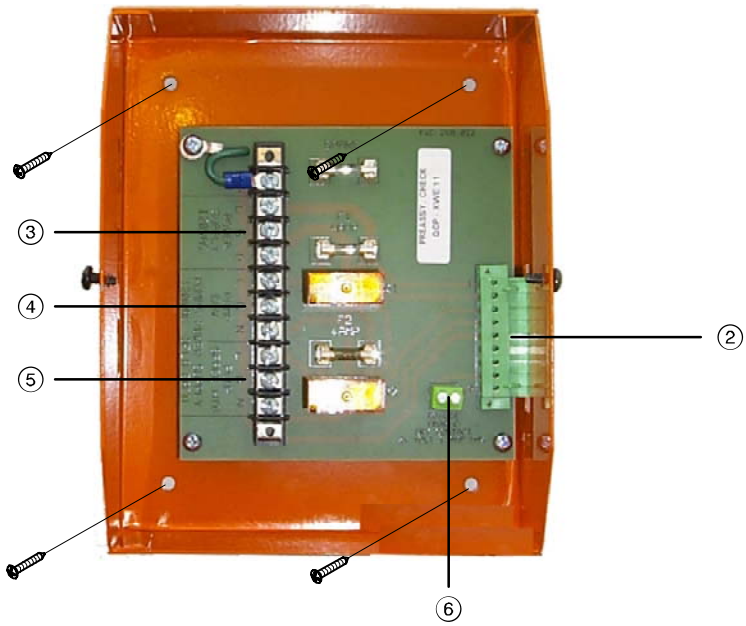

Fig. 7
Mounting the PPCM on the wall and making electrical connections

1. Connect main electrical plug (green) from Dekamatik-HK 1 to PPCM②. Tighten plug screws.

⚠ CAUTION

Ensure green plug is inserted correctly; do not use force! 45° notch of plug should be at lower right. Incorrect insertion will damage PC board!

2. Secure plastic cable clamp of main electrical plug to wall to help support cable.

4. Knock out openings for wire connections as necessary:

   ③ Power supply . 120 VAC, 15 A max.
   ④ DHW pump ..... 120 VAC, 3 FLA
   ⑤ Space heating pump ..... 120 VAC, 3 FLA
   ⑥ Boiler enable dry contact ..... 24 VAC, 1 A max.

5. Make electrical connections to appropriate devices listed under **4.**

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Installing the Sensors

The outdoor temperature sensor is used together with readings supplied by the supply temperature sensor to calculate the setpoint temperature of the hot water supplied to the system (for space heating). The setpoint temperature is maintained by the mixing valve actuator by opening and closing the mixing valve as necessary.

The DHW tank temperature sensor mounted in the tank senses temperature drops below 122°F / 50°C and activates the boiler and the DHW pump. The system pump (for space heating) is deactivated and the mixing valve closed fully. DHW production is therefore fully prioritized. Once DHW production is satisfied, the boiler is deactivated, the DHW pump deactivated, and the system pump is reactivated. The mixing valve will again open to maintain the calculated setpoint (for space heating).

1. Install outdoor temperature sensor 1 as described in Installation Instructions, Dekamatik-HK 1 Standard.

2. Install supply temperature sensor 2 as described in Installation Instructions, Dekamatik-HK 1 Standard.

System without DHW production
Save DHW tank temperature sensor for possible future retrofit of DHW tank.

System with DHW production
If mounting the temperature sensor on a DHW tank of another manufacturer, ensure it is pressed firmly against inside wall of the sensor well.

The DHW production feature must be activated if utilized. This must be done by accessing the coding level 2.
- ▶ Open Comfortrol flip-down cover.
- ▶ Press **D** button for *System* menu
- ▶ Press **C** button for *Installer Set-up* menu
- ▶ Enter the *Installer Set-up* code **B C C B**
- ▶ Press **C** button for Coding 2
- ▶ Press **A** button until address 26 appears
- ▶ Turn knob and change setting from 000 to 002.
- ▶ Press **D** to transfer information - ensure you see the word *Transferred*.

3. Install DHW tank temperature sensor 5 (Fig. 8) by fully inserting sensor into sensor well of DHW tank. Fasten accordingly. Do **not** wrap insulating materials around sensor. Connect plug 5 into X3 socket of the HK 1 PC board; see “Overview” under Electrical Connections of HK 1 Standard Installation Instructions.
4. Mount strain reliefs in appropriate locations for all cabling exiting HK 1 control.

⚠ CAUTION

Precautions must be taken to ensure that the maximum DHW water temperature is not exceeded. If necessary, a safety high limit can be installed.
If the sensor cable length is insufficient, an extension (max. 40 ft / 12 m) must be installed.

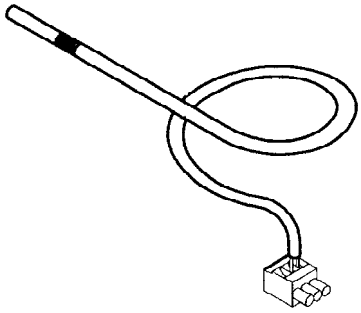

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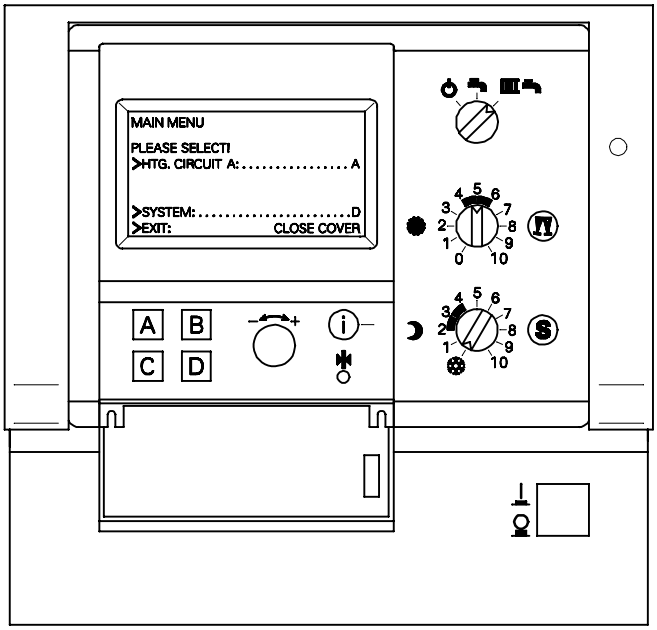
Fig. 8
DHW tank temperature sensor

Instructions

Powering of the Dekamatik-HK 1 and Testing



1. Push power button to activate HK 1.

If the HK 1 detects a sensor fault, the word ”Failure” will flash in the Comfortrol programming unit when the flip-down cover is closed.

2. To ensure proper operation after installation, perform the following test:

- ► Open Comfortrol flip-down cover
- ► Press **D** button for *System* menu
- ► Press **C** button for *Installer Set-up* menu
- ► Enter the *Installer Set-up* code **B C C B**
- ► Press **A** button for *Diagnostics* menu
- ► Press **B** button for *Relay* tests.

The first test energizes the heating system pump20.

Press **A** to continue to the next test.

Mixing Valve Closed - this will activate the mixing valve output to close the valve. If the valve is already in its closed position, the actuator will not move.

Press **A** to continue to the next test.

Mixing Valve Open - this will activate the mixing valve output to open the valve. Allow the mixing valve actuator to fully deflect until the actuator arm covers the sensor. Once the sensor is completely covered, the boiler enable contact will close. The boiler should be enabled.

Press **A** until the Compiled Fault appears.

Compiled Fault - The DHW pump will be enabled along with the boiler.

3. To exit testing, close the Comfortrol flip-down cover.

4. For an overview of the remaining HK 1 features, please refer to the Operating Instructions.

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Domestic Hot Water Settings

Changing DHW Tank Setpoint

The factory programmed DHW setpoint temperature is 122°F / 50°C. This can be changed by accessing the coding level 2. Address 42 will change the setpoint. Turn the knob to left or right to set a new setpoint.

- ► Open Comfortrol flip-down cover.
- ► Press **D** button for *System* menu
- ► Press **C** button for *Installer Set-up* menu
- ► Enter the *Installer Set-up* code **B C C B**
- ► Press **C** button for Coding 2
- ► Press **A** button until address 42 appears
- ► Turn knob to change setpoint
- ► Press **D** to transfer information - ensure you see the word *Transferred*.

CAUTION

Do not exceed 140°F / 60° C as a setpoint temperature. Higher temperatures may cause serious injury.

Viewing the Actual DHW Temperature

- ► The viewing of the actual DHW temperature is accomplished the same way as changing the setpoint.
- ► Access coding 2 and go to address 41
- ► The value found at address 41 is the actual temperature in degrees Celsius.

Quick Reference

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

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