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### **System Ref:**

### Electrical installation manual – Nu-Heat OneZone<sup>®</sup> warm water underfloor heating with neoStat control

Please read this manual fully before fitting your Nu-Heat OneZone<sup>®</sup> floor heating system. It assumes a basic knowledge of electrical wiring, and of common terms used.

Attention to the advice given in this manual will help to ensure a trouble-free and effective installation. The requirements of the relevant British Standards and other Regulations should always be met.

In line with the company policy of product development, Nu-Heat reserves the right to supply different components to those shown.

Please ensure that this manual remains with the homeowner when installation is complete. It is a companion manual to the *OneZone® Installation Manual*, which shows details of the plumbing components and floor construction.

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## **Electrical components**



#### neoStat thermostat

The neoStat is a mains voltage, hard-wired programmable thermostat with integral smart control functionality. The room/zone is individually programmed for temperature and times of use. This can be independent control or in conjunction with an existing radiator system. For screed and floating floor systems, allowance should be made for the longer warm-up time of underfloor heating. With LoPro®Max systems response time is similar to that of a traditional radiator system.

In order to comply with wiring regulations bathroom zones must have the thermostat fitted outside the room, i.e. next to the door at light-switch height.

Wiring diagrams are shown on pages 8–13.



#### **OneZone® wiring centre**

The wiring centre can either be fitted beside or remotely from the heating components. It can be wired to suit individual system requirements. See pages 9–13 for detailed wiring diagrams.

#### **Free Nu-Heat App**

This free app allows you to control the oneZone heating remotely.

See instructions on page 23.



#### neoHub+ (optional)

Choosing a smart control option gives instant control of heating and hot water from anywhere via Nu-Heat's neoApp. Compatible with Android and Apple devices, using the neoApp can save money and ensures that the home is warm and welcoming when required. And by setting up different profiles for the weekend, work patterns, month or season, the neoApp offers customised control to suit every lifestyle.

Any Nu-Heat underfloor heating system with a neoHub+ smart package is also compatible with Apple HomeKit smart control technology, an easy, secure way to control your home's lights, doors, thermostats and more from your iPhone, iPad or iPod touch.

## **Energy efficiency (ErP)**



The neoStat is rated as Class I under Section 5.2.1.2 Temperature control, of EU Commission Delegated Regulation No. 811/2013.

## **Boiler Plus legislation**

Following a report called *Heat in Buildings*, published in October 2017, *Boiler Plus* legislation came into force in April 2018. It states that:

Time and temperature controls must be installed with any new boiler, if not already present

## **Planning the installation**

- 1 Read this *Installation Manual* carefully.
- 2 Check which control method the heating engineer has used for the OneZone<sup>®</sup> underfloor heating system (see opposite).
- 3 Agree the position for the wiring centre and thermostat with the homeowner.
- 4 1st fix all electrical equipment as per the chosen method of control.

- 5 After the underfloor heating pipework is installed, 2nd fix the electrical components.
- 6 Commission the underfloor heating and test its operation.
- 7 Explain the operation of the OneZone<sup>®</sup> underfloor heating system to the homeowner and hand over this User Guide for reference.

## **System control options**

### There are two ways to connect the system:

#### A – Connection is to the radiator circuit

Pipework is connected directly to the radiator circuit meaning that time settings will correspond to the radiator circuit and set-back operation is not possible. With screed and floating floor constructions, heating operation times for the whole system may have to be altered to allow for the longer warm-up time of underfloor heating compared to radiators. With LoPro<sup>®-</sup> Max systems response time is similar to that of a traditional radiator system.

Refer to pages 9 for wiring details.

OR



## **Thermostat connections**

#### **NEOSTAT TERMINAL CONNECTIONS**



#### **REMOTE TEMPERATURE SENSORS**

All OneZone<sup>®</sup> systems are supplied with a remote floor temperature sensor for use with sensitive floor coverings such as engineered hardwood, vinyls (including Amtico) and linoleums.

A remote air sensor is available from Nu-Heat for use in wet rooms, if desired.

#### Note applying to all wiring diagrams:

All new electrical works must comply with IEE Regulations and health and safety requirements, and be tested by a competent person before connection to mains voltage.

# Systems without direct control of the boiler

#### SCHEMATIC



#### WIRING DIAGRAM



- neoStat (see diagram on p.8 for terminal connections)
- 2 5A switched fused spur
- 3 Zone actuator
- Underfloor heating pump

#### Notes:

- a The Nu-Heat underfloor heating programmable thermostat must be set so that heating periods coincide with the availability of hot water in the radiator circuit.
- **b** All new electrical works must comply with IEE Regulations and health and safety requirements, and be tested by a competent person before connection to mains voltage.
- **c** Components shown in outline are not supplied.

KEY		
SL L E N	Switched Live Live Earth Neutral Live voltage marker sleeve	
Notes: Colour of wires may vary from those shown. Earth where required.		

# Systems with direct control of the boiler

#### COMBINATION BOILERS WITH MAINS OR LOW-VOLTAGE SWITCHING

#### SCHEMATIC





**b** For low-voltage switched boilers: Ls and LR must NEVER be connected to mains voltage.

those shown. Earth where required.

#### W-PLAN (3-PORT CONTROL VALVES) 230V AC SWITCHING KEY Pre-wired 2-core flex **SCHEMATIC** 2-core + Earth Note: To ensure there is no flow through the 3-port valve when both the radiator 3-core + Earth and cylinder system are off but the underfloor heating is on, an additional 2-port 4-core + Earth control valve must be fitted as shown. Existing wiring centre OneZone® neoStat wiring centre Existing 3-port 21. zone valve Additional 00\_00 2-port zone valve 0¢ đÔ Differential bypass valve Distributor 9 $\oplus$ ĴĴŢĴ assemblies Cylinder Boiler Pump & blending Я valve assembly Underfloor Boiler pump heating circuit WIRING DIAGRAM Break connection at the wiring centre between terminal 7 and boiler call-for-heat signal wire from the existing heating system. 010 L 020 Ν 030 Е Do not Boiler 040 alter S I 050 existing Nu-Heat $\square$ W-Plan 0<mark>6</mark>0 ก ĭ wiring 070 080 090 N OneZone Wiring Centre 0100 S/L ax. rating 230v - 5A. lay contacts rated at Relay co 3A max. Ν ۲ In Boiler Enable F Out ۲ ۲ S/L YPlan W Plan N Ν F 3 SL Ν Ε 1 neoStat (see diagram on p.8 for Ъ 6 SI KEY terminal connections) SL Switched Live 2 W-Plan wiring centre L Live Neutral 3 Additional 2-port zone valve Е Earth • Boiler and boiler pump Live voltage marker sleeve C 5 Zone actuator Notes: Colour of wires may vary from 6 Underfloor heating pump those shown. Earth where required.

#### 12 For expert advice call us on 01404 549770

#### Y-PLAN (3-PORT CONTROL VALVES) 230V AC SWITCHING



**Note:** To ensure there is no flow through the 3-port valve when both the radiator and cylinder system are off but the underfloor heating is on, an additional 2-port control valve must be fitted as shown.

# KEY Pre-wired 2-core flex 2-core + Earth 3-core + Earth 4-core + Earth

#### WIRING DIAGRAM

X Break connection at the wiring centre between terminal 8 and the boiler call-for-heat signal wire from the existing heating system.



## Systems with neoStat

# neoStat combines the functions of a room thermostat and programmer



A programmer allows you to set ON and OFF periods to suit your own lifestyle.

A room thermostat works by sensing the air temperature, switching on the heating when the air temperature falls below the thermostat setting, and switching it off once this set temperature has been reached.

A programmable room thermostat lets you choose what times you want the heating to be on, and what temperature it should reach while it is on. It will allow you to select different temperatures in your home at different times of the day (and days of the week) to meet your particular needs and preferences.

Setting a programmable room thermostat to a higher temperature will not make the room heat up any faster. How quickly the room heats up depends on the design and size of the heating system.

Similarly reducing the temperature setting does not affect how quickly the room cools down. Setting a programmable room thermostat to a lower temperature will result in the room being controlled at a lower temperature, and saves energy.

The way to set and use your programmable room thermostat is to find the lowest temperature settings that you are comfortable with at the different times you have chosen, and then leave it alone to do its job.

The best way to do this is to set the room thermostat to a low temperature – say  $18^{\circ}$ C and then turn it up by  $1^{\circ}$ C each day until you are comfortable with the temperature.

You won't have to adjust the thermostat further. Any adjustment above this setting will waste energy and cost you more money.

You are able to temporarily adjust the heating program by overriding or using the temperature hold feature. These features are explained further on pages 18–19 of this manual.

## System startup

Once your system has been commissioned it should be fully operational. To initially check that your system is turned on and working please follow these simple steps:

#### **Underfloor heating**

Locate the main components of your installation: the boiler, hot water cylinder, OneZone® pump and manifold assembly, thermostat and OneZone® wiring box.

#### **Electricity supply**

Ensure that the electrical installation is complete and that the heating system is turned on. The location of the main supply **ON/OFF** switch may vary but is often positioned next to the boiler. There may be an additional switch located at the OneZone® wiring box which also needs to be on.

## **Settings for underfloor heating**

#### **UNDERFLOOR HEATING**

Consideration should be given to the floor construction and floor finish used in the room with OneZone, as these factors will affect the time the system will take to achieve comfort conditions.

Note that systems without direct boiler control cannot operate at times when the radiator circuit is off.

The temperature chosen as the setback temperature will depend upon the situation:

- For new build properties this will generally be 4-6°C lower than the comfort setting, although again, this can be experimented with.
- Renovated properties with LoPro®Max may work best with a lower setback temperature, in order that the heating remains off outside of the times at which the comfort temperature is selected.
- Less thermally responsive floors, in particular screed floors greater than 65mm thick, will achieve comfort temperatures more quickly when the setback temperature is closer to the comfort temperature.

## Setting up neoStat

#### INSTALLATION PROCEDURE

Programmable room thermostats need a free flow of air to sense the temperature, so they must not be covered by curtains or blocked by furniture. Nearby fires, televisions, wall or table lamps may also prevent the thermostat from working properly.

#### Do

- Mount the neoStat at eye level.
- Read the instructions fully so you get the best from the product.

#### Don't

- Do not install near to a direct heat source as this will affect functionality.
- Do not push hard on the LCD screen as this may cause irreparable damage.



 Using a small screwdriver, slightly loosen the screw from the bottom face of the thermostat. You can then carefully separate the front half from the back plate.



2 Place the thermostat front somewhere safe.

Terminate the neoStat as shown in the diagrams on page 8 of this booklet.



- **3** Screw the neoStat back plate securely into the back box.
- 4 Clip the front of the neoStat onto the back plate, securing it in place with the retaining screw.

## **Thermostat operation**



\*SET = Displayed when changes are being made to the program schedule or current set point.

#### **ERROR CODES**

When used as a thermostat the screen will display an error code if a fault is detected.

E0 = The internal sensor has developed a fault.

E1 = The remote FLOOR probe has not been connected.

The remote FLOOR probe has not been wired correctly.

The remote FLOOR probe is faulty.

E2 = The remote AIR probe has not been connected.

The remote AIR probe has not been wired correctly.

The remote AIR probe is faulty.



#### **Temperature display**

The neoStat V2 can be configured for different sensor options such as built in air sensor, floor sensor or both. The display will clearly indicate which sensor is being used by showing either ROOM TEMP or FLOOR TEMP before the actual temperature value.

When the neoStat is set to use both the air and the floor sensor, the room temperature will be displayed by default.

**1** To view the current floor temperature, press and hold the < and > arrow keys for 5 seconds, the floor temperature will then be displayed.

#### **Setting the clock**

To set the clock, follow these steps.

- 1 Use the < / > keys to scroll to POWER
- 2 Press and hold  $\checkmark$  to turn off the display
- 3 Use the > key to select CLOCK
- 4 Press ✓ to confirm selection
- 5 Use the **▼**/**▲** keys to set the Year
- 6 Press ✓ to confirm selection
- 7 Repeat the steps to set the Month, Date & Time
- 8 Press ✓ to confirm the new clock settings
- 9 Use arrow to scroll to POWER
- **10** Press 🗸 to turn the display on

#### **Comfort levels explained**

The neoStat offers three program mode options: Weekday/Weekend programming, 7 Day programming and 24 Hour programming. There is also the option to use the thermostat as a Non-Programmable thermostat.

When thermostats are connected to the mesh network, the program mode for the system is configured by using the neoApp.

The thermostat is supplied with comfort levels already programmed, but these can be changed easily. The default times and temperature settings are;

07:00 / 21°C (wake) 09:00 / 16°C (leave the house)

16:30 / 21°C (return home) 22:00 / 16°C (sleep)

If you only want to use 2 levels, you should program the unused levels to --:--.

For Weekday/Weekend programming. the four comfort levels are the same for Mon-Fri, but can be different for Sat-Sun. For 7 Day programming each day of the week can have four different comfort levels.

#### To program the comfort levels:

- 1 Use the < / > keys to scroll to EDIT
- 2 Press ✓ to confirm selection
- 3 Use the < / > keys to select day / period of week (the selection will flash).
- 4 Press ✓ to confirm selection

WAKE will now flash and current time and temperature setting will be shown.

- 5 Press ✓ to alter WAKE settings
- 6 Use the -/ keys to set the hours
- 7 Press ✓ to confirm

- 8 Use the  $\checkmark / \checkmark$  keys to set the minutes
- 9 Press ✓ to confirm
- **10** Use the  $\checkmark / \checkmark$  keys to set the temperature
- **11** Press  $\checkmark$  to confirm the settings
- **12** Press the > arrow key

LEAVE will now flash and the current settings will be displayed.

- **13** Press ✓ to alter LEAVE settings
- **14** Repeat these steps to set all comfort levels.
- **15** For any unused periods set time to --:--
- **16** Use the < / > keys to scroll to DONE and press 🗸

comfort levels. In 24 Hour mode all days are programmed with the same



HOLD HOLIDAY EDIT



#### **Temperature control**

- 1 The ▼/▲ allow you to adjust the set temperature. When you press either key, you will see the word SET and the desired temperature value. Use the ▼/▲ keys to adjust the SET value.
- 2 Press 🗸 to confirm settings and return to the main display.

**Note:** This new temperature is maintained only until the next programmed comfort level. At this time, the thermostat will revert back to the programmed levels.

#### **Temperature hold**

The temperature hold function allows you to manually override the current operating program and set a different temperature for a desired period.

- 1 Use the < / > keys to scroll to HOLD
- 2 Press ✓ to confirm selection
- 3 Use the ▼ / ▲ keys to set the desired Hold period
- Press 🗸 to confirm selection
- Use the  $\checkmark/$  keys to set the desired Hold temperature
- 6 Press ✓ to confirm selection

You will see the HOLD LEFT indication is displayed on screen. The time will countdown the set duration and then revert to the normal program.

To cancel a temperature Hold, with hold selected on the main menu, press the  $\checkmark$  key and then press tick again while Cancel is highlighted.

#### Locking the neoStat

The thermostat has a keypad lock facility. To activate the lock follow these steps:

- **1** Use the < / > keys to scroll to HOLD  $\vartheta$  press  $\checkmark$  for 10 seconds.
- 2 The display will show 00:00 and you will need to set a four digit pin number.
- 3 Use the  $\checkmark / \checkmark$  keys to enter the first two digits
- 4 Press ✓ to confirm
- 5 Use the -/ keys to enter the second two digits
- 6 Press ✓ to confirm

The display will return to the main screen and display the keypad lock indicator **Note:** The keypad lock indicator is only displayed when the lock is active.

#### Unlocking the neoStat

To unlock the neoStat press  $\checkmark$  once. The display will show 00:00 and you will need to enter the four digit pin number you set previously.

- 1 Use the  $\checkmark$  /  $\checkmark$  and  $\checkmark$  keys to enter the first two digits
- 2 Use the ▼/▲ and ✓ keys to enter the second two digits

The display will unlock and return to the main screen.

#### **Frost mode**

 Use the < / > keys to scroll to the POWER icon. The FROST icon will toggle ON/OFF each time ✓ is pressed.

In this mode, the neoStat will display the frost icon and will only turn the heating ON should the room temperature drop below the set frost temperature.

If the heating is turned ON whilst in frost mode, the flame symbol will be displayed.

To cancel the frost protect mode, navigate to the **POWER** button again and press **/**.







Thermostat completely OFF



Thermostat powered ON

#### **Power ON/OFF**

The heating is indicated **ON** when the flame icon is displayed.

When the flame icon is absent, there is no requirement for heating to achieve the set temperature but the neoStat remains active.

1 To turn the neoStat off completely, scroll to the POWER icon and hold the ✓ key for approximately 3 seconds until the display goes blank.

The display and heating output will be turned OFF.

2 To turn the thermostat back ON, press the ✓ key once.

#### Holiday

In thermostat mode, the **HOLIDAY** function reduces the set temperature in your home to the frost protection temperature setting.

In time clock mode, the holiday function maintains the timed output as **OFF**. The thermostat will maintain this setting for the duration of the holiday and will then automatically return to the program mode on your return.

In time clock mode, the holiday function maintains the timed output as OFF. To set a date and time for the holiday period to end, use the steps below:

- 1 Use the < / > keys to scroll to HOLIDAY and press  $\checkmark$
- 2 Use the ▼ / ▲ keys to set the Year and press ✓
- 3 Use the  $\checkmark$  /  $\checkmark$  keys to set the Month and press  $\checkmark$
- 4 Repeat the steps to set the Date and Time
- 5 Press ✓ to confirm selection

**Note:** The holiday period will start immediately, and will return to the normal program at the time and date you have configured.

To cancel:

- 6 Use the < / > keys to scroll to HOLIDAY and press  $\checkmark$
- 7 CANCEL will be highlighted, press ✓ to cancel



#### Adjusting the Optional Settings (see table opposite)

To adjust the settings, follow these steps:

- 1 Use the < / > keys to select POWER
- 2 Press and hold the ✓ for 3 seconds
- **3** SETUP will be highlighted, now press ✓ once
- 4 Use the  $\checkmark / \checkmark$  keys to scroll through features
- 5 Use the < / > keys to adjust the setting within each feature
- 6 Press  $\checkmark$  to confirm and exit setup menu

#### **OPTIONAL FEATURES EXPLAINED**

The following settings are optional and in most cases need not be adjusted.

FEATURE	DESCRIPTION	SETTING	EXPLANATION
01	Pairing to neoHub+	Used to add zone to neoHub	Used to connect the thermostat to the neoHub
02	Switching differential	00.5 = 0.5°C 01 = 1.0°C (Default) 02 = 2.0°C 03 = 3.0°C	Allows you to increase the switching differential of the thermostat. The default is 1°C – with a set temperature of 20°C, the thermostat will switch the heating on at 19°C and off at 20°C.
03	Frost protection temp.	07 <sup>°</sup> -17 <sup>°</sup> C (12 <sup>°</sup> C = default)	The temperature maintained when the thermostat is in Frost Mode.
04	Output delay	00 – 15 Minutes; (00 = Default)	To prevent rapid switching, an output delay can be entered. This can be set from 00–15 minutes.
05	Up/Down Temp limit	00° - 10°C; (00 = Default)	Limit the use of the up and down temperature arrow keys. This limit is also applicable when the thermostat is locked and so allows you to give others limited control over the heating system.
06	Sensor selection	00 = Built in Sensor (Default) 01 = Remote Air Sensor 02 = Floor Sensor Only 03 = Built in & Floor Sensor 04 = Remote Air & Floor Sensor	Selects the active sensors. Select between air temperature, floor temperature, or both. When both sensors are enabled, the floor sensor is used as a floor limiting sensor to prevent the floor from overheating.
07	Floor temp limit	20-45°C (28°C default)	Available when feature 06 is set to 03 or 04. Set to the required floor temperature limit (see instructions on page 10)
08	Optimum Start	00 – 05 Hours; (00 = Default)	Delays the start up of the heating system to the latest possible moment to avoid unnecessary heating and ensure the building is warm at the programmed time. The thermostat uses the rate of change information to calculate how long the heating needs to raise the building temperature 1°C and starts the heating accordingly.
09	Rate of change	Minutes to raise by 1°C	This setting is calculated by the thermostat. Number of minutes for 1°C temperature rise.
10	Cool enable	Not used on this model	
11	Cool set temp	Not used on this model	
12	Program mode	00 = Non – Programmable 01 = Weekday/Weekend (Default) 02 = 7 Day Programming 03 = 24 Hour Mode	Weekday/ Weekend – 4 comfort levels for the weekday and 4 different comfort levels for the weekend. 7 Day Program Mode – Each day has 4
			comfort levels that can be programmed independently. 24 Hour Mode – All days are programmed the same and repeat
13	Temperature format	00 = °C, 01 = °F; (00 = Default)	continuously. Select between °C and °F.

#### **Re-calibrating the thermostat**

Warning: The thermostat must be fixed in a wall. When re-calibrating the thermostat avoid warming it with your hands or breath, as this will cause an inaccurate setting.

To re-calibrate the thermostat, follow these steps:

- 1 Use the < / > keys to scroll to the POWER icon
- 2 Press and hold ✓ to turn the display OFF
- **3** Press and hold the ✓ and ▼ keys together for 10 secs
- 4 The current temperature will appear on the display.
- 5 Use the  $\checkmark$  /  $\checkmark$  keys to configure the new temperature value
- 6 Press the ✓ key to confirm change and the display will go blank
- 7 Press the arrow to highlight the POWER icon
- 8 Press the 🗸 key once to turn the thermostat ON

#### **Factory reset**

To reset the device to factory default settings, follow these steps:

- 1 Use the < / > keys to scroll to the POWER icon
- 2 Press and hold the ✓ key to turn the display OFF
- **3 SETUP** will be highlighted
- 2 Press and hold the ✓ key for 10 seconds. All of the icons on the display will appear for 2 seconds, then the number 1 or 2 will flash.
- **3** Use the < / > keys to scroll between modes (selection will flash)
  - Mode 1 = Thermostat
    - Mode 2 = Time Clock
- 4 Press the ✓ key to confirm selection

The thermostat will revert to the main display screen for the selected mode.

**Note:** Factory reset will cancel all parameters that were entered during the set-up and pairing operations. These processes must be repeated after factory reset is completed.

## Optional control from a SmartPhone (systems with neoHub)

#### **PAIRING THE NEOHUB**

To pair the neoHub with the neoApp, follow these steps:

- **1** Connect the power supply to the neoHub.
- 2 Connect the neoHub to your router with the Ethernet cable provided. The router will automatically assign an IP address to the neoHub, the 'Link' LED will light up once the neoHub has connected to your network.
- **3** Download the FREE Nu-Heat neoApp from the Apple App Store, Google Play Store or Amazon App Store and register an account.

#### **PAIRING THE NEOSTAT THERMOSTAT**

The next step is to pair the neoStat to the neoHub::

- 1 From the neoApp, select ADD NEW STAT, enter a zone title and press ADD ZONE again.
- 2 You now have two minutes to pair the neoStat to the neoHub.
- 3 On the neoStat, use the < / > keys to select POWER and press and hold ✓.

#### Wireless communications coverage

- 4 Once you have registered your account, press the LOGIN button then press the ADD LOCATION option.
- 5 Press the CONNECT button on the neoHub to add the location to your account.
- 6 When successfully connected, enter a title for the new location (e.g. Home) and configure the time zone for the system.
- 4 SETUP will be highlighted, press ✓ once. Feature 01 is displayed on screen.
- 5 Press the ✓ key to pair the neoStat to the neoHub.
- 6 The MESH symbol appears flashing on the display (see p.16).

Where building size or construction results in inadequate wireless coverage, this can be extended by use of a **neoPlug** (available from Nu-Heat).









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