



Underfloor heating

user guide

TSL thermostats

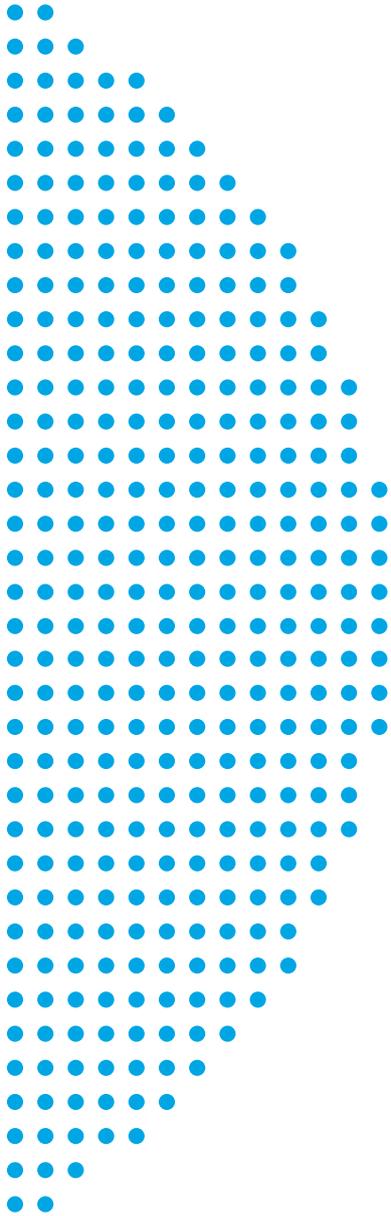




working with you
**before,
during
& after**
your project

**Nu-Heat
Know-How**

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System Ref: _____

Every Nu-Heat system is a custom design. Please record your unique system reference number above for future reference.

Welcome

Congratulations, you are the owner of a Nu-Heat warm water underfloor heating system, designed and supplied by Nu-Heat UK Ltd., the largest supplier of domestic underfloor systems in the UK.

This manual is provided to help you understand how the system operates and the correct settings required to get the most from your heating.

Nu-Heat did not install your system, therefore any installation matters should be referred to the contractor concerned. Please record the installer's details below.

For more information on the operation of your system and also troubleshooting help, please visit the Nu-Heat website at nu-heat.co.uk.

Installer details

Company: _____

Contact name: _____

Contact telephone no.: _____

Address: _____



About the Nu-Heat System

Description

Underfloor heating works by pumping warm water through special plastic tubing embedded in the floor. This warms the floor and maintains the room at a comfortable temperature.

Benefits

In particular, underfloor heating systems:

- Provide a more comfortable heated environment,
- Permit unlimited interior design options,
- Increase the useable space within a property.

Moreover, all these benefits are available from a system which can be significantly less expensive to run than a conventional, radiator-based system.

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, underfloor heating pump/Optiflo manifold assembly(s), thermostats, timeclocks, underfloor heating 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 additional switches located at each underfloor heating wiring box which also need to be on.

Water supply

Ensure that the water is turned on ready for domestic hot water operation, check that a high flow of water is available from the cold taps. If there is poor flow or none at all, check that the stop-cock for the property is fully open.



Operation

Your underfloor system is designed for performance and economy. Each heating zone is controlled by its own wall-mounted thermostat. If a room has no thermostat it will be connected to, and controlled by, an adjacent zone.

UNDERFLOOR HEATING

Your underfloor system is designed for performance and economy. Each heating zone is controlled by its own wall-mounted thermostat. If a room has no thermostat it will be connected to, and controlled by, an adjacent zone.

Unlike traditional dial thermostats controlled by a timeclock, programmable thermostats do not work on the basis of **ON** and **OFF** times. Instead different temperatures are set at different times throughout the day. If the property is to be unoccupied during the day, for example, then the temperature can be set low (setback temperature), whereas during the morning and evening it can be set at the desired comfort temperature.

The best way to find the optimum temperature setting is to set a low comfort temperature (e.g.18°C) and then turn it up by 1°C each day until the temperature is right. Any adjustment above this setting will waste energy and increase fuel cost.

Consideration should be given to the different floor constructions and finishes used in your property, as these factors will affect the time the system will take to achieve comfort conditions. However, the PBL thermostat incorporates Optimum Start, a self-learning feature that enables it to manage when the heating should be switched on, in order to hit the target temperature that has been programmed. This means that the thermostats can be set to the comfort temperature at the times that heating is required. It will then automatically manage the varying floor response times, and bring the heating on in time.

The Optimum Start feature will need to be set up in the thermostat – for details see page 13.

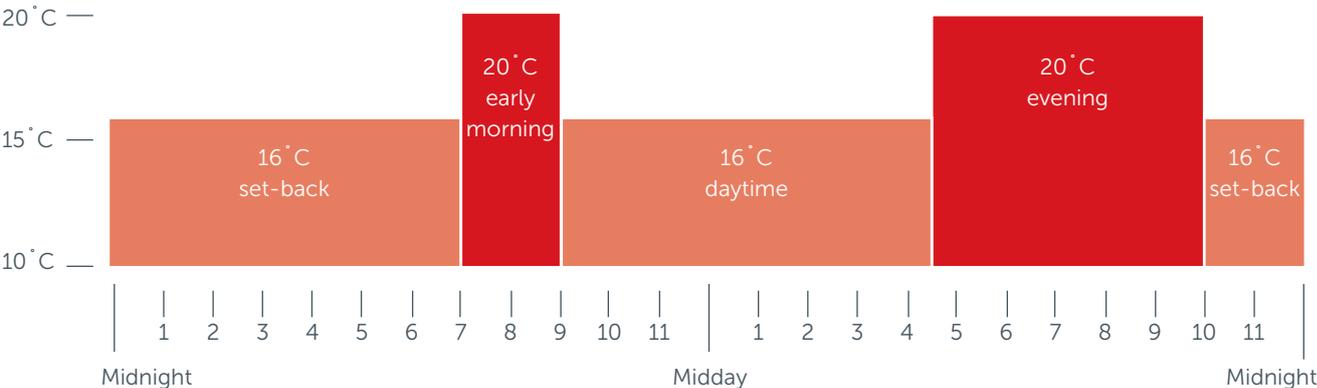
The temperature chosen as the setback temperature will depend upon the situation:

- For new build properties this will generally be 4-6°C lower than the comfort setting, although again, this can be experimented.
- Renovated properties 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. The fast response time of LoProMax™ makes this method particularly suitable.
- 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.

Systems with touch screen thermostats

Programmable room thermostats offer the ideal solution to maintaining different background temperatures at different times. They can easily be set to achieve the desired temperature at all times of day and night.

THE EFFECT OF SETBACK (for illustration only)



Systems with touch screen thermostats

Each room thermostat combines the functions of a room thermostat, timeclock and set-back thermostat.



For enhanced heating performance and efficiency the unit also provides self-learning Optimum Start in the morning.

Four adjustable time/temperature periods are available for the days of the week, and a further four during the weekend as standard, giving enhanced heating control. A 7-day mode is also available.

One thermostat also functions as a domestic hot water (DHW) timeclock. This thermostat can be identified by either **HW ON** or **HW OFF** shown on the display.

OPERATING INSTRUCTIONS FOR THE TOUCH SCREEN THERMOSTAT

Display symbols and functions

-  **HEAT ON ICON** = Visible when the heating is in operation; flashes when optimum start is in operation
-  **FROST ON ICON** = Visible when the heating is switched off and is protecting against frost only
-  **KEYLOCK ICON** = Shown when the keypad is locked
-  **FLOOR TEMPERATURE REACHED** = Visible when the floor temperature is reached

Temperature display

- ROOM TEMP** = Current room temperature.
- SET** = The temperature you are trying to achieve.
-  **FLOOR** = The temperature of the floor. When the thermostat is in floor sensing mode, the thermostat shows a **FLOOR** button. Pressing this allows you to view the current floor temperature – pressing again will return the thermostat to the room temperature display.

ERROR CODES

E1

If **E1** appears on the display the thermostat is configured for the remote floor sensor but is not able to see the sensor. Check the sensor is connected to RT1 and negative (-). If the sensor is not required adjust [feature 8](#) (p.13).

E2

If **E2** appears on the display the thermostat is configured for the remote air sensor but is not able to see the sensor. Check the sensor is connected to RT2 and negative (-). If the sensor is not required adjust [feature 8](#) (p.13).

Warning: Despite these thermostats being low-voltage, the mains supply to the heating system should be isolated before attempting this. Turn off the heating system or call an engineer to check sensor connections.

Systems with touch screen thermostats cont.

Temperature over-ride

- 1 Use the **▼/▲** keys to temporarily adjust the current temperature. The screen will display **SET** and the new set temperature.
- 2 Press **DONE** to accept and exit.

The selected temperature will be maintained until the start of the next programmed period.

Setting the heating periods and temperatures

The thermostat provides **5/2 day** or **7 Day** programming. Consult the *Configuration Menu* to select the required mode.

The thermostat is supplied with time periods and temperatures already programmed, but these can be easily changed. The default times are:

Weekdays	07:30 / 21 °C (wake)
	09:00 / 16 °C (leave the house)
	16:00 / 22 °C (return home)
	22:00 / 16 °C (sleep)
Weekends	09:00 / 21 °C (wake)
	22:00 / 16 °C (leave the house)
	--:-- / -- °C
	--:-- / -- °C

To set the time and temperature periods:

If you do not want to use one of the periods, set it to --:-- .

- 1 Press **PROG** and select wake.
- 2 Use **▼/▲** below the time to set the first time period.
- 3 Use **▼/▲** below the temperature to set the the first temperature in °C.
- 4 Repeat for the **LEAVE**, **RETURN** and **SLEEP** levels.
- 5 Press **DAY** to select the next day. In 5/2 day mode the thermostat will highlight 'Sat Sun' prompting you to program the temperature levels for the weekend. In 7 day mode, the thermostat will highlight Tuesday.
- 6 When complete, press **DONE** to store and exit.

Viewing and adjusting the floor temperature (with floor sensor only)

- 1 Press the **FLOOR** button to display the floor temperature.
- 2 To return to the room temperature display, press the **FLOOR** button. If no key is pressed the display will automatically return to the room temperature after 30 seconds.

To adjust the floor sensor temperature:

- 1 To access the configuration menu, first press **PROG**, then press **SETUP** for the feature screen.
- 2 Press **▼/▲** and cycle through to Feature 09.
- 3 Use the **▼/▲** keys to change the temperature to the required setting (see floor covering manufacturer's guidance).
- 4 Press **DONE** to accept, the main screen will appear.

Temperature hold

- 1 To over-ride the programmed mode press **HOLD**.
- 2 Use the **▼/▲** keys to enter the required hold time and temperature.
- 3 Press **DONE** to accept.

To cancel a **HOLD** time, reduce the time to 00.00

Setting the clock

- 1 With the thermostat on, press **PROG**.
- 2 Press **CLOCK**.
- 3 Use the **▼/▲** keys to set the correct time.
- 4 Press **DAY** to set the correct day.
- 5 Press **DONE** to accept and store.

Holiday mode

The **HOLIDAY** function reduces the set temperature in your home to the frost temperature setting. The thermostat will maintain this temperature for the duration of the holiday and will then automatically return to the **PROGRAM** mode on your return.

- 1 Press **HOLIDAY**.
- 2 Enter the duration of the holiday.
- 3 Press **DONE** to accept.

To cancel, reduce the holiday duration to 00 days.

Frost protection & switching off the thermostat

- 1 Press the **OFF** button once to switch the thermostat into frost protection mode. In this mode with the ❄️ symbol on the screen the frost protection temperature will be maintained.
- 2 Press the **POWER OFF** button to cancel.

To change the frost setting temperature, see the *Feature Table* on page 13.

To turn the thermostat off completely press and hold the **OFF** button. To turn on again press the **ON** button.

Locking the keypad

All functions can be locked to prevent unwanted adjustment.

To enable keylock:

- 1 Press the bottom right corner of the display and hold for 10 seconds for until the 🔒 (padlock) symbol appears.
- 2 Repeat the sequence to unlock.

Systems with touch screen thermostats cont.

Re-calibrating the thermostat

- 1 Press and hold the **OFF** button to turn the thermostat off.
- 2 Press and hold the **ON** button until the temperature appears on the screen.
- 3 Use the **▼/▲** buttons to set the new temperature.
- 4 Press **DONE** to accept.
- 5 Press the **ON** button once to turn the thermostat back on.

Factory reset

To return all settings to their factory default:

- 1 Turn the thermostat off by pressing the **OFF** button.
- 2 Press and hold the bottom left corner of the LCD screen for 10 seconds. All of the icons will be displayed. When they have disappeared, the thermostat has been reset.

ADDITIONAL OPERATING INSTRUCTIONS FOR THE TOUCH SCREEN THERMOSTAT WITH HOT WATER TIMER

Setting hot water timer periods

- 1 Press **PROG** and select **TIMER. TIME 1** and **ON** will flash.
- 2 Use the **▼/▲** keys to set the on time for the 1st switching time
- 3 Press off then use the **▼/▲** keys to set the off switching time.
- 4 Repeat for times 2-4.
- 5 Press **DAY** to select the next day. In 5/2 day mode the thermostat will highlight 'Sat Sun' prompting you to program the switching times for the weekend. In 7 day mode, the thermostat will highlight 'Tuesday'.
- 6 When complete, press **DONE** to store and exit.

Hot water over-ride

- 1 To over-ride the programmed mode press **HOLD**.
- 2 Press **TIMER**.
- 3 If the hot water is already **ON** – press **OFF**.
- 4 If the hot water is already **OFF** – press **ON**.

The hot water status has been changed and the hot water output indication will flash to show it has been overridden from the programmed setting. The hot water will remain in the override state until the next programmed time. To cancel, repeat the steps above.

FEATURE	DESCRIPTION	SETTING	EXPLANATION
01	Temperature format	00= °C / 01= °F (0 °C= default)	Allows selection of °F or °C
02	Switching differential	01=01 °C (default) / 02=2 °C / 03=3 °C	The number of degrees at which the heating switches on below the set temperature
03	Frost mode	00=Disabled / 01= Enabled (default)	When enabled, thermostat will maintain frost setting temperature even when switched off
04	Frost protection temp.	07 ° -17 °C (12 °C = default)	Set to required frost temperature
05	Output delay	00=Default	Optionally enter number 01–15 (minutes) output delay to prevent rapid switching
06	Comms#	Enter number 01–32	Enter a number unique to this thermostat
07	Temp. up/down limit	Enter 00-10 °C. 00=Default (no limit).	This function allows you to limit the use of the up and down temperature arrow keys
08	Sensor selection	00=Built-in / 01=Remote air / 02=Floor only / 03=Floor + internal air / 04=Floor + remote air	Selects the active sensors Not available on model with hot water timeclock
09	Floor limit setting	20–45 °C (28 °C default)	Set to the required floor temperature limit (see instructions on page 10)
10	Optimum start (preheat)	00=Disabled (default) 01=01hr/02=02hr	Optimum start adjusts the start time within the preheat range to allow for current conditions
11	Rate of change	For information only, not adjustable	This setting is calculated by the thermostat
12	Week/Weekend or 7 day	00=Default / 01=7 day	Week/Weekend allows you to program 4 comfort levels for the weekday and 4 different comfort levels for the weekend. In 7 day program mode, each day has 4 comfort levels that can be programmed independently



← Feature number

← Setting number

Adjusting the optional settings

To adjust the settings, follow these steps:

- 1 With the thermostat turned on press prog.
- 2 Press SETUP.
- 3 Use the ▼/▲ keys at the top of the screen to select the feature number.
- 4 Use the ▼/▲ keys in the centre of the screen to adjust the setting.
- 5 Press **DONE** to accept and store.

General system checks



The expansion vessel and filling loop is usually positioned near the boiler.



Adjust the temperature of the boiler water by turning the boiler control thermostat.



Never set the boiler water temperature lower than the cylinder thermostat.

System pressure

The majority of heating systems are sealed and include an expansion vessel which maintains the system pressure. This red vessel would normally be found positioned near to the boiler.

If you have a combination boiler or system boiler the main pump and expansion vessel will be inside the boiler. The best way to identify this is that the boiler will have a pressure gauge on its panel.

You will need to check the system pressure regularly as it is normal for a system to lose a small amount of pressure. The gauge should read

approximately between 1 and 2 bar depending on whether the system is cold or hot.

If the pressure is below 1 bar, top the pressure up to 1 bar by opening the valve on the filling loop connected to the red vessel (or boiler if no red vessel is fitted). Only top up when the system is cold. If your system rapidly loses pressure you need to consult a heating engineer.

If there is no red expansion vessel or gauge on the boiler then your system is not sealed but open vented and will be topped up automatically by a feed tank and ballcock in the loft.

Boiler thermostat

The temperature of water generated by your boiler is altered by adjusting the boiler control thermostat dial.

If you have a hot water cylinder it is important that the boiler water temperature is always at least 5 °C above the temperature of your cylinder thermostat.

General sequence of operation

Every time heat is required in a room the following sequence is initiated:

If the heating is in an on period and the room requires heating, the room thermostat will call for heat :-

- 1 A flame symbol will appear on the display.

The floor pump, either on the Optiflo manifold serving that zone, or on the remote-mounted pump module will be switched on.

The actuator on the Optiflo manifold circuit connected to the

zone will open, indicated by the button on top of the actuator head rising.

The flow gauge on this circuit will indicate flow and the flow pipe will get warm.

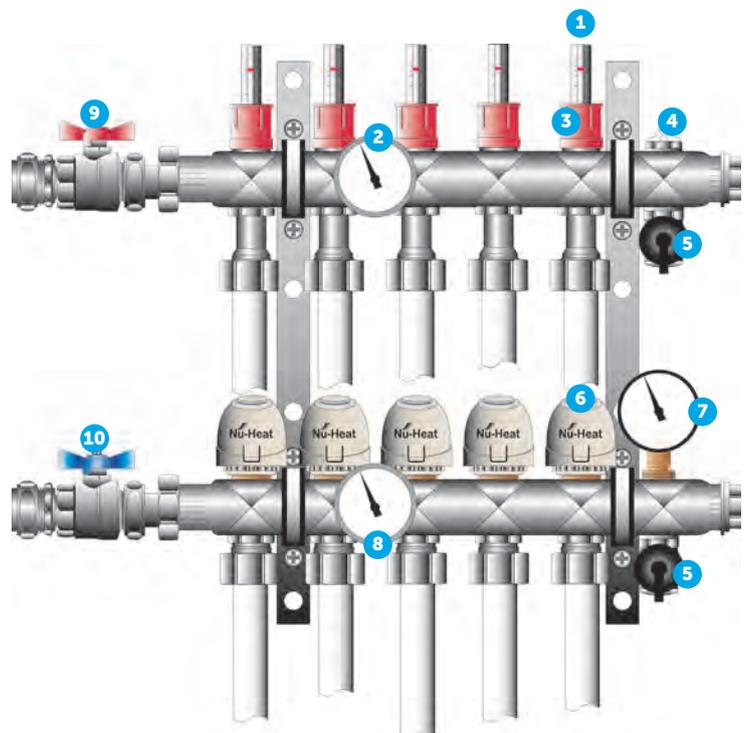
Over a period of time as the room comes up to temperature, the return pipe will warm up as well.

For standard systems with conventional boilers/cylinders or combination boilers the boiler and boiler pump are turned on to supply and circulate heat.

MANIFOLD COMPONENTS

- 1 Flow gauges
- 2 Flow temperature gauge
- 3 Flow adjustment
- 4 Manual air vent
- 5 Filling/drain off valve
- 6 Actuators
- 7 Pressure gauge
- 8 Return temperature gauge
- 9 Main isolating valve (flow)
- 10 Main isolating valve (return)

Note: Pump may be mounted directly.



Seasonal adjustments

Underfloor heating can be left active all year round as it is thermostatically controlled by the room temperature. In warm weather it will simply not come on.



If you require to turn the heating off (for example when servicing) always use the main heating isolation switch.

Leaving the property unoccupied in winter

Rather than turning the heating system off, it is possible to leave background heating on as frost protection.

Each room/zone can be set to frost protection individually. Please refer to the instructions (*Frost Protection* on page 11), which detail how the thermostat can be put into a hold mode and the required frost protection temperature adjusted.

Instant hot water and heated towel rail

Hot water and heated towel rails will be available all year round regardless of your requirement for underfloor heating.

System adjustments

If additional heat is required in a selected room or rooms the water flow rate(s) serving these areas can be increased.



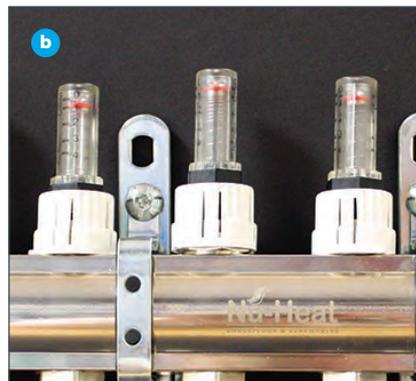
To do this:-

When the system is operating, turn the thermostat up in that room.

Identify from the pipe markings at the manifold which actuator head serves the zone you want to change.

Note: If the zones are not clearly marked turn off all the other room stats. The zone that is operating will be shown by a raised button on the top of the actuator (a) and the flow gauge will indicate a flow reading (b).

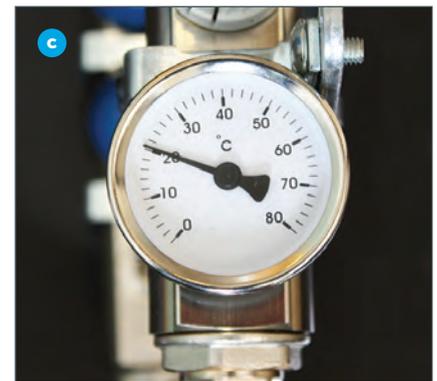
Please note that the button can take up to 3 minutes to respond.



Turn the flow gauge – anti-clockwise for more flow, clockwise for less.

The red flow indicator will drop further the greater the flow rate.

Note: Adjust a little at a time to suit your requirements. Increasing the flow to one zone may decrease the flow to others. There is a limit to how much extra flow can be achieved and if, after adjusting one or several zones, further action is required the flow temperature can be increased.



To do this:-

With the system running note the water flow temperature on the gauge (c) on the top rail of the manifold. This temperature can be increased by turning the control valve head clockwise on the remote mounted pump module (d1), or anticlockwise on the direct mounted pump module (d2).

Note: Adjust a little at a time to suit your requirements.



Servicing requirements

MONTHLY

Check the expansion vessel water pressure as displayed on the gauge, the pressure should normally be between 1 bar and 2 bar depending on whether the system is cold or hot.

Please refer to the *System Checks* section (page 14) for further-information.

ANNUALLY

Underfloor heating

Whilst there is no requirement for annual servicing it is important that the level of central heating inhibitor is sufficient to protect the system.

Energy efficiency (ErP)

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



Product support

For further information on the operation of your underfloor heating system and also troubleshooting help, please visit the Nu-Heat website at nu-heat.co.uk.

Nu-Heat

UNDERFLOOR & RENEWABLES



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