



Underfloor heating

user guide

PBL thermostats



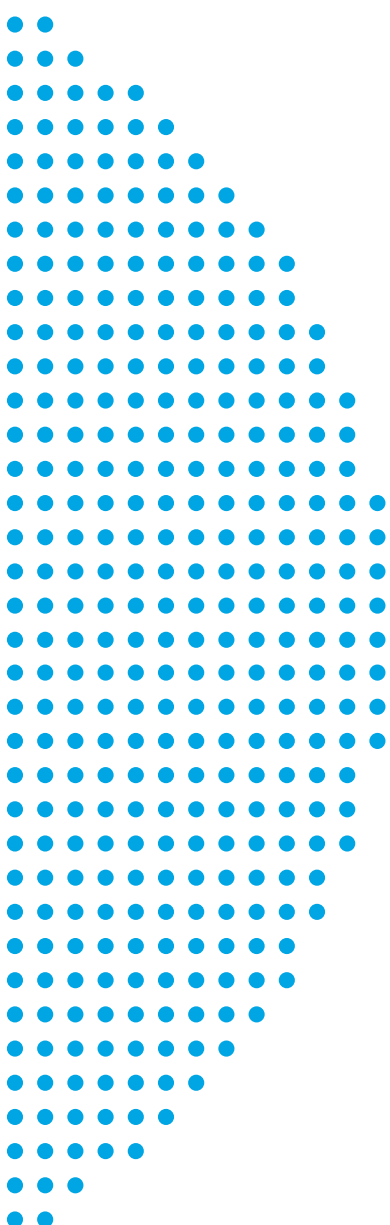


working with you
**before,
during
& after**
your project

**Nu-Heat
Know-How**

Contents

Welcome	04
About the Nu-Heat system	05
System startup	05
Operation	06
Systems with programmable thermostats	07
Systems with low voltage push button thermostats	08
Operating instructions for the low voltage thermostat	09
Error codes	09
Temperature display	10
Temperature over-ride	10
Setting the heating periods and temperatures	10
Temperature hold	10
Setting the clock	11
Viewing the current floor temperature (with floor sensor only)	11
Enabling keylock	11
Holiday mode	11
Frost protection & switching off the thermostat	11
Re-calibrating the thermostat	12
Factory reset	12
Additional operating instructions for the low voltage thermostat with hot water timer	12
Setting the hot water timer periods	12
Hot water over-ride	12
Feature table	13
Adjusting the optional settings	13
General system checks	14
General sequence of operation	15
Manifold components	15
Seasonal adjustments	16
System adjustments	17
Servicing requirements	18
Energy efficiency (ErP)	19
Product support	19



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.

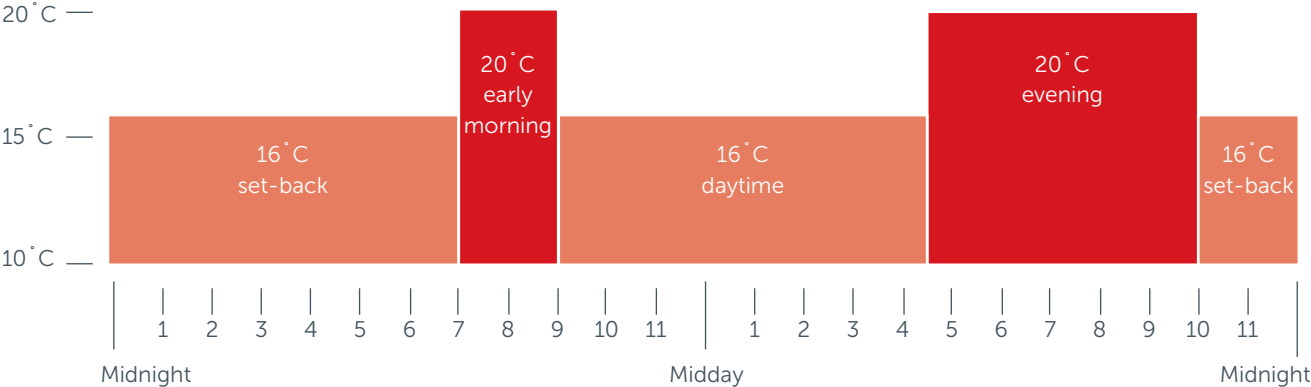
The temperature chosen as the setback temperature will depend upon the situation:

- 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 programmable 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 low voltage push button thermostats

These units are supplied with low voltage power from the heating system and do not require batteries



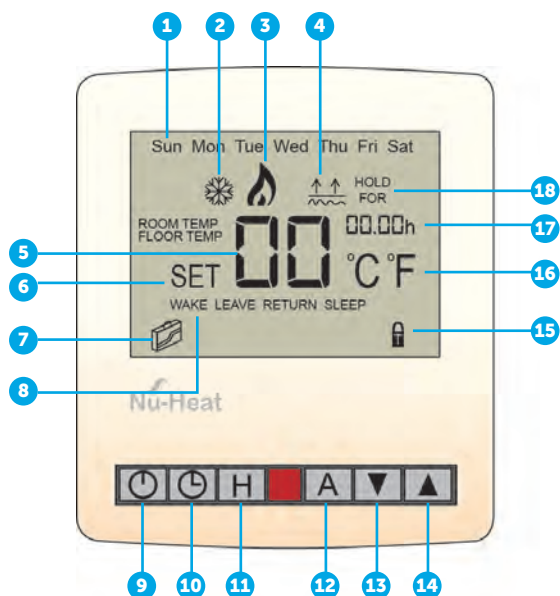
Each low voltage room thermostat combines the functions of a room thermostat, timeclock and set-back thermostat. For enhanced heating performance and efficiency the unit also provides self-learning Optimum Start in the morning.

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 will also include a domestic hot water (DHW) timer. This is identified by the presence of 'timer on/timer off' on the LCD screen.

OPERATING INSTRUCTIONS FOR THE LOW VOLTAGE THERMOSTAT

Display symbols and functions



- 1 Day
- 2 Frost indicator
- 3 Heat active indicator (Flashing = optimum start mode active)
- 4 Floor temperature limit icon
- 5 Current room/floor temp.
- 6 Indicates changes being made
- 7 Holiday indicator
- 8 Program cycle indicator
- 9 Power on/off
- 10 Clock
- 11 H button
- 12 A button
- 13 Down button
- 14 Up button
- 15 Keylock on
- 16 Units of temperature
- 17 Clock
- 18 Temperature hold

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 low voltage push button thermostats cont.



Temperature display

- 1 When **ROOM TEMP** is indicated, the current room temperature is displayed.
- 2 **SET** indicates the room temperature to be achieved.

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 **A** 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 has four periods for weekdays and four periods for weekends. Each period may be set to a different temperature.

For example:

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

To set the heating periods:

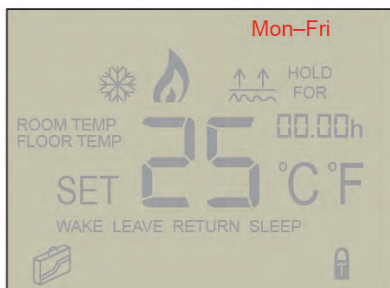
(If you do not want to use one of the periods, set it to **--:--** by pressing **▼** past 00:00).

- 1 Press **⌚** once (or for the DHW timer thermostat, twice). Days **MON-FRI** will be displayed indicating that the settings will be applied to weekdays.
- 2 Use the **▼/▲** keys to select the start time for the first weekday period.
- 3 Press **H** to accept the start time.
- 4 Use the **▼/▲** keys to select the temperature for the first weekday period.
- 5 Press **H** to accept the temperature.
- 6 Repeat for periods 2 to 4.
- 7 Days **SAT-SUN** will now be displayed indicating that the next settings will be applied to weekends.
- 8 Enter the settings for the four weekend periods in turn, as for the previous weekdays.
- 9 Press **A** to store and exit.

Temperature hold

- 1 To over-ride the programmed mode press **H**.
- 2 Use the **▼/▲** keys to enter the required hold time, then press **H**.
- 3 Use the **▼/▲** keys to enter the required temperature, then press **A**.

The **HOLD** indication will countdown the hold duration. To cancel, reduce the **HOLD** time to 00 hours.





Setting the clock

- 1 With the thermostat on, press twice (or for the DHW timer thermostat, three times) and use the / keys to set the minutes.
- 2 Press **H** to accept. Use the / keys to set the hours. Press **H** to accept.
- 3 Use the / keys to set the day. Press **A** to store and exit. The clock is now set.

The unit has a battery which maintains the settings in the event of a power failure. All settings are stored in the memory for 10 years.



Viewing the current floor temperature (with floor sensor only)

- 1 Press the **A** button for 3 seconds, the floor temperature will be displayed.
- 2 To return to the room temperature display, press the **H** 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 switch the thermostat off – press and hold **on/off**, then press and hold until the feature screen appears.
- 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 **A** to accept then press **on/off** to switch the thermostat on again.



Enabling keylock

All buttons can be locked to prevent unwanted adjustment.

To enable keylock:

- 1 Press the **A** button and button together for 10 seconds until the (padlock) symbol appears.
- 2 Repeat the sequence to unlock.



Holiday mode

This allows you to enter a holiday setting. During a holiday, the thermostat will maintain the frost set temperature. At the end of your holiday, the thermostat will revert back to the programmed setting ensuring that your home is warm on your arrival.

- 1 Press **H** 3 times (until you see the suitcase symbol).
- 2 Press / to enter the number of days holiday.
- 3 Press **A** to accept.

The screen will show a suitcase indicating the thermostat is in holiday mode. To cancel, reduce the holiday duration to 00 days.



Frost protection & switching off the thermostat

- 1 Press the Power **ON/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 **ON/OFF** button to cancel again.

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



Systems with low voltage push button thermostats cont.

Re-calibrating the thermostat

- 1 Press and hold the **POWER** button to turn the thermostat off.
- 2 Press and hold BOTH the **POWER** and **▼** buttons until the temperature appears on the screen.
- 3 Use the **▼/▲** buttons to set the new temperature.
- 4 Press **A** to accept.
- 5 Press the **POWER** 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 and holding the **off** button.
- 2 Press and hold the **POWER** and **▲** arrow key until the LCD powers up. All of the icons will be displayed. When they have disappeared, the thermostat has been reset.

ADDITIONAL OPERATING INSTRUCTIONS FOR THE LOW VOLTAGE THERMOSTAT WITH HOT WATER TIMER

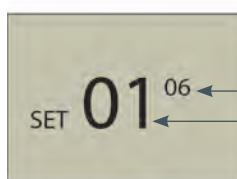
Setting hot water timer periods

- 1 To begin programming the hot water levels press **⌚** once – you will see **MON-FRI** displayed.
- 2 Use the **▼/▲** keys to select the start time for the first weekday period.
- 3 Press **H** to accept the start time.
- 4 Use the **▼/▲** keys to select the end time for the first weekday period.
- 5 Repeat for switching times 2 to 4.
- 6 Days **SAT-SUN** will now be displayed indicating that the next settings will be applied to weekends.
- 7 Enter the settings for the four weekend periods in turn, as for the previous weekdays.
- 8 Press **A** to store and exit.

Hot water over-ride




- 1 To over-ride the programmed mode press the **A** button once. For example if the Hot Water Timer is off, then pressing **A** will bring it on, and **TIMER ON** will flash to show that the over-ride has been effected. This will be maintained until the next programmed period.

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 11)
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

- 1 To access the configuration menu, first switch the thermostat off (if it isn't already) – press and hold **on/off**, then press and hold  until the feature screen appears.
- 2 Press  and to cycle through the features.
- 3 Use the **▼/▲** keys to adjust the setting of that feature.
- 4 Press  to cycle through to any other features that require adjusting, changing the setting using the **▼/▲** keys.
- 5 Once all features are set press **A** to accept.
- 6 Press **on/off** to switch the thermostat on again.

Note: If no buttons are pressed whilst in feature mode then the thermostat will switch off, although any changes will be stored.

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:

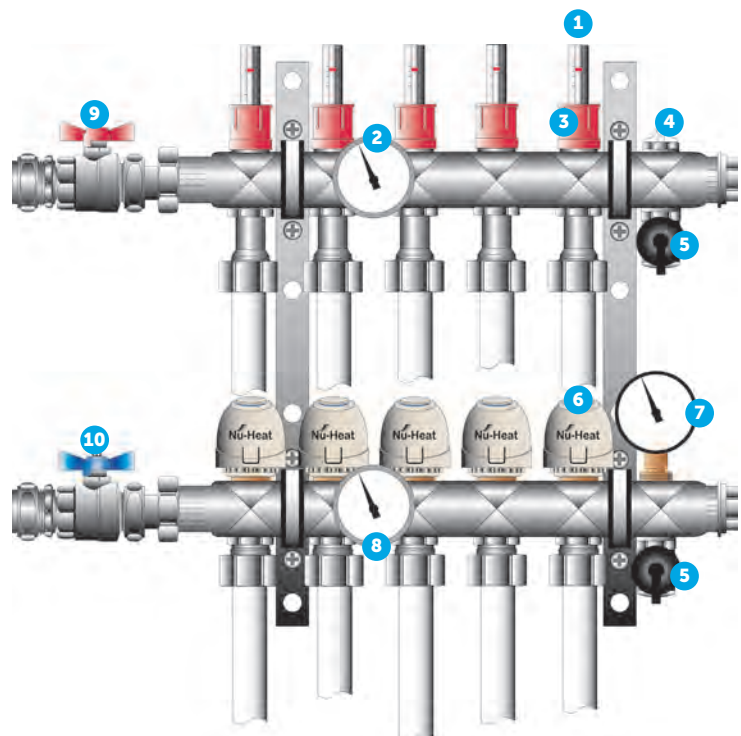
If the heating is in an on period and the room requires heating, the room thermostat will call for heat :-

- 1 A flame symbol will appear on the display.
- 2 The floor pump, either on the Optiflo manifold serving that zone, or on the remote-mounted pump module will be switched on.
- 3 The actuator on the Optiflo manifold circuit connected to the zone will open, indicated by the button on top of the actuator head rising.
- 4 The flow gauge on this circuit will indicate flow and the flow pipe will get warm.
- 5 Over a period of time as the room comes up to temperature, the return pipe will warm up as well.
- 6 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.



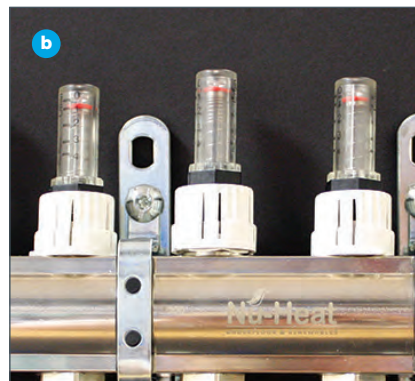
To do this:-

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).

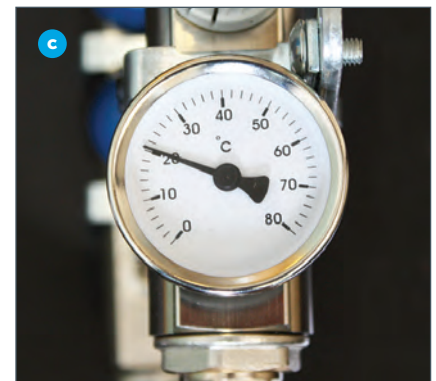
Please note that the button can take up to 3 minutes to respond.



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 10) 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 PbL 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



Online
www.nu-heat.co.uk



Follow us
[@nuheatuk](https://twitter.com/nuheatuk)



See our videos
[/nuheatuk](https://www.youtube.com/channel/UCnuheatuk)



Freephone
0800 731 1976 or 01404 549770

Nu-Heat UK Ltd | Heathpark House | Devonshire Road | Heathpark Industrial Estate | Honiton | Devon EX14 1SD

