

CP4B



Battery Powered Programmable Thermostat

Installation and Operation Guide

Table of contents

| | |
|---|-----------|
| Installation Instructions | 2 |
| Factory Default Settings | 3 |
| Frost Protection | 3 |
| Specifications | 4 |
| Wiring Diagram | 5 |
| How your programmable thermostat works | 6 |
| Mounting & Installation | 7 |
| Operating Instructions | 10 |
| LCD Symbol Description | 11 |
| Button Description | 12 |
| Resetting the thermostat | 13 |
| Keypad lock and unlock | 13 |
| Setting the date, time, programming mode and daylight saving time | 14 |
| Factory Program Setting | 15 |
| Programming Modes | 16 |
| Adjust the program setting in 5/2 Day mode | 17 |
| Copy Function | 18 |
| Temporary Override | 19 |
| Permanent Override | 19 |
| Boost Function | 20 |

| | |
|-----------------------------------|----|
| Holiday Function | 21 |
| Backlight mode selection | 22 |
| Battery low warning | 22 |
| Replacing the batteries | 23 |
| Installer menu | 24 |
| PO 1 Operating Mode | 25 |
| Normal | 25 |
| Optimum Start | 25 |
| TPI | 28 |
| PO 2 Setting high & low limits | 30 |
| PO 3 Hysteresis H On and H Off | 30 |
| PO 4 Calibrate the thermostat | 31 |
| PO 5 Frost Protection | 31 |
| PO 6 Exit | 31 |
| Installer menu - OpenTherm | |
| PO 6 Setting DHW temperature | 32 |
| PO 7 OpenTherm® Information | 33 |
| PO 8 DHOP | 34 |
| PO 9 Set OpenTherm® parameters | 34 |
| Exit | 36 |
| System Architecture | 37 |



CP4B Room Thermostat **Installation Instructions**

Factory Default Settings



| | |
|----------------------------|----------------------|
| Contacts: | Volt Free |
| Temperature indicator: | °C |
| Switching differential: | 0.4°C |
| In built frost protection: | 5°C - Not adjustable |
| Clock: | 24 hours |
| Keypad lock: | Off |
| Operating mode: | 5/2 day |

Frost Protection



5°C

Frost protection is built into this thermostat.

It is set at 5°C and is not adjustable.

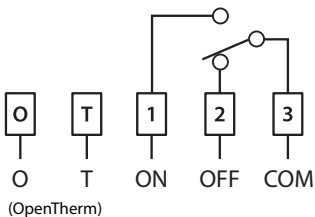
It will only be activated when the thermostat is in the OFF mode and the room temperature falls below 5°C.

Specifications

| | |
|-------------------------|------------------------------|
| Power supply: | 2 x AA Alkaline Batteries |
| Battery replacement: | Once a year |
| Temp. control range: | 5 ... 35°C |
| Ambient temperature: | 0 ... 45°C |
| Contact rating: | 8A 230Vac |
| Switch output: | SPDT Volt Free |
| Dimensions: | 130 x 99 x 25mm |
| Temperature sensor: | NTC 100K Ohm @ 25°C |
| Temperature indication: | °C |
| Switching differential: | 0.4°C |
| Frost protection: | Only operational in Off mode |
| Pollution degree: | Pollution degree 2 |

Wiring Diagram

Internal Wiring Diagram for CP4B



If mains voltage output is required, 230V must be connected to terminal COM.

Important: Do not connect Mains Voltage to OpenTherm® terminals.

How your programmable thermostat works

When the thermostat is in the AUTO mode, it will operate according to the times and temperatures that have been programmed. The user can select from 6 different programs per day, each with a time and a temperature.

There is no OFF time, only a higher and a lower temperature setpoint.

If the user does not want the thermostat to operate, set the temperature for this time to be a low temperature. The thermostat will turn ON if the room temperature is lower than the setpoint for the current period.

Example: If P1 is set to be 21°C at 6am, and if P2 is set to be 10°C at 8am, the thermostat will look for the temperature to be 21°C between 6am and 8am.

Mounting & Installation

Caution!

- Installation and connection should only be carried out by a qualified person.
- Only qualified electricians or authorised service staff are permitted to open the thermostat.
- If the thermostat is used in a way not specified by the manufacturer, its safety may be impaired.
- Prior to setting the thermostat, it is necessary to complete all required settings described in the section.

This thermostat must be directly mounted on a wall.

Mounting & Installation (Continued)

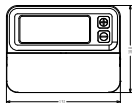
- 1) The mounting height should be 1.5 metres above the floor level.
- 2) The thermostat should be wall mounted in the room where the heating is to be controlled.

The place of installation should be chosen so that the thermostat can measure the room temperature as accurately as possible.

Exposure to direct sunlight or other heating / cooling sources should be avoided when the thermostat is mounted.

- 3) Lower the flap at the front of the thermostat. There is a battery compartment located below the buttons. Apply downward pressure to remove the cover.
- 4) Remove the backplate from the thermostat by inserting a screwdriver into the slots in the battery compartment and pull apart.
- 5) Fix the backplate to the wall and ensure electrical connections are terminated correctly.
- 6) Attach the front housing to the backplate and insert the 2 x AA batteries and the thermostat will turn on. Close the battery compartment.

1



Type
1C
EN60730

IP20
EN60529



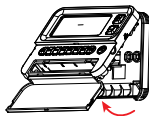
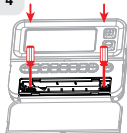
2



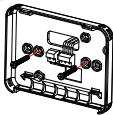
3



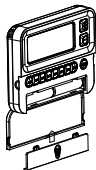
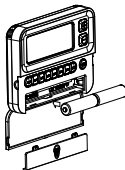
4



5



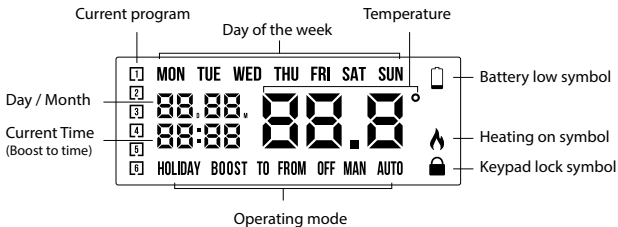
6



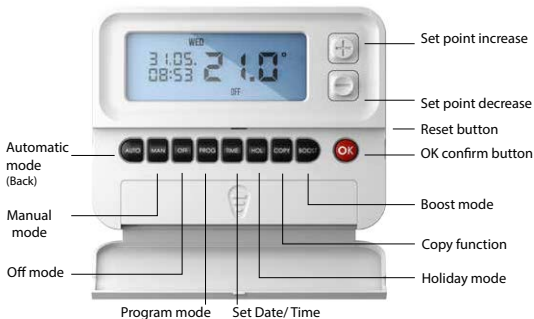


CP4B Room Thermostat
Operating Instructions

LCD Symbol Description



Button Description



Automatic mode



Set Date / Time



Set point increase



Manual mode



Holiday mode



Set point decrease



Off mode



Copy function



Confirm button



Program mode




Boost mode



Reset button

RESET


Resetting the thermostat

Press the  button on the side of the thermostat.

'rst no' will appear on the screen.

Press the  button.

'rst yes' will appear on the screen.



Press the  button to reset the thermostat.


The thermostat will now be reset to the default settings.



Keypad lock and unlock




OFF


To lock the keypad, press and hold the  and  buttons for 10 seconds.




 will appear on the screen. The keypad is now locked.




To unlock the keypad, press and hold the  and  buttons for 10 seconds.




 will disappear from the screen. The keypad is now unlocked.




Setting the date, time, programming mode and Daylight Savings Time




Press the  button once, the year will begin flashing.



Press the  or  buttons to adjust the year. Press .

Press the  or  buttons to adjust the month. Press .


Press the  or  buttons to adjust the day. Press .

Press the  or  buttons to adjust the hour. Press .

Press the  or  buttons to adjust the minute. Press .

Press the  or  buttons to adjust from 5/2d to 7d or 24h mode.

Press the  or  buttons to turn DST (Day Light Saving time) On or Off.

Press the  button or wait 5 seconds and the thermostat will return to normal operation.

Factory Program Setting



5/2d



5/2 Day

| | P1 | P2 | P3 | P4 | P5 | P6 |
|---------|-------|-------|-------|-------|-------|-------|
| Mon-Fri | 06:30 | 08:00 | 12:00 | 14:00 | 17:30 | 22:00 |
| | 21°C | 10°C | 10°C | 10°C | 21°C | 10°C |
| Sat-Sun | 08:00 | 10:00 | 12:00 | 14:00 | 17:30 | 23:00 |
| | 21°C | 10°C | 10°C | 10°C | 21°C | 10°C |

7 Day

| | P1 | P2 | P3 | P4 | P5 | P6 |
|---------|-------|-------|-------|-------|-------|-------|
| Mon-Fri | 06:30 | 08:00 | 12:00 | 14:00 | 17:30 | 22:00 |
| | 21°C | 10°C | 10°C | 10°C | 21°C | 10°C |
| Sat-Sun | 08:00 | 10:00 | 12:00 | 14:00 | 17:30 | 23:00 |
| | 21°C | 10°C | 10°C | 10°C | 21°C | 10°C |

24 Hour

| | P1 | P2 | P3 | P4 | P5 | P6 |
|----------|-------|-------|-------|-------|-------|-------|
| Everyday | 06:30 | 08:00 | 12:00 | 14:00 | 17:30 | 22:00 |
| | 21°C | 10°C | 10°C | 10°C | 21°C | 10°C |

Programming Modes

The CP4B Room Thermostat has the following programming modes available:

5/2 Day mode

Programming Monday to Friday as one block and Saturday and Sunday as a second block.

Each block can have 6 different times and temperatures.

7 Day mode

Programming all 7 days individually with six different times and temperatures per day.




24 Hour mode




Programming all 7 days as one block with the same six times and temperatures.


Adjust the program setting in 5/2 Day mode

Press the  button once.




Programming for Monday to Friday is now selected.




Press the  or  buttons to adjust the P1 time. Press .

Press the  or  buttons to adjust the P1 temperature. Press .


Repeat this process to adjust P2 to P6 times and temperatures. Press .


Programming for Saturday to Sunday is now selected.


Press the  or  buttons to adjust the P1 time. Press .

Press the  or  buttons to adjust the P1 temperature. Press .

Repeat this process to adjust P2 to P6 times and temperatures.

Press the  button to return to the automatic mode.


While in PROG Mode pressing the  button will jump from P1-P2 etc without changing the temperature.

While in PROG Mode pressing the  button will jump to the next day or block of days.

Copy Function


Copy function may only be used if the thermostat is in the 7d mode.


Set the times and temperatures for the day that you wish to copy from in the programming mode.


When still on the day press the  button.

The day of the week that you have selected will be shown with 'COPY' below it.

The next day will begin to flash on the top of the screen.



Press the  button to copy the times and temperatures to that day.


Press the  button to skip that day.



You can copy to multiple days using the  button.

Press the  button when copying has been completed.


Temporary Override



When in AUTO mode, press the  or  buttons to adjust the temperature setpoint. 'OvEr' will appear on the screen.


Press  or after 5 seconds the thermostat will operate to this temperature setpoint, until the next switching time.



To cancel temporary override, press the  button and then press the  button to return to the automatic mode.

Permanent Override


Press the  button to enter the manual mode (Permanent Override), 'MAN' will appear on the screen.

Press the  or  buttons to adjust the temperature setpoint.


Press  or after 5 seconds the thermostat will operate in this mode.



To cancel permanent override, press the  button to turn the thermostat off or press the  button to return to the automatic mode.


Boost Function

Press the  button, one two or three times.


The time that the thermostat will boost to will flash on the screen.

Press the  button.

The temperature will now flash. Adjust the boost temperature setpoint by pressing the  or  buttons.

Press the  button or wait for 5 seconds for the boost to activate.

'**BOOST TO**' will now be displayed on the screen with the time that the thermostat is activated to, displayed above the text.




Press the  button again to deactivate the boost.




If you do not press any button after pressing the boost button, the boost will activate to a default boost setting of 21C.




Holiday Function




This will switch your heating system off between the start and end times you select .

Press the  button, 'HOLIDAY FROM' will appear on screen.




Press the  or  buttons to adjust the year. Press  .




Press the  or  buttons to adjust the month. Press  .




Press the  or  buttons to adjust the day. Press  .




Press the  or  buttons to adjust the hour. Press  .


'HOLIDAY TO' will appear on screen.

Press the  or  buttons to adjust the year. Press  .

Press the  or  buttons to adjust the month. Press  .

Press the  or  buttons to adjust the day. Press  .

Press the  or  buttons to adjust the hour. Press  .

The thermostat will now return to the mode it was in before the Holiday settings were entered. To cancel Holiday mode, press the  button.


Backlight mode selection AUTO



There are two settings for selection. The factory default setting is AUTO.


OFF The backlight is permanently OFF.

AUTO On pressing any button the backlight stays on for 5 seconds.


To adjust the backlight setting, lower the cover on the front of the unit.

Press the  button for 5 seconds.

Press either the  or  buttons to select the OFF or AUTO mode.

Press the  button.

Battery low warning

When the batteries are almost empty, the  symbol will appear on the screen.

The batteries must now be replaced or the unit will shut down.

Replacing the batteries

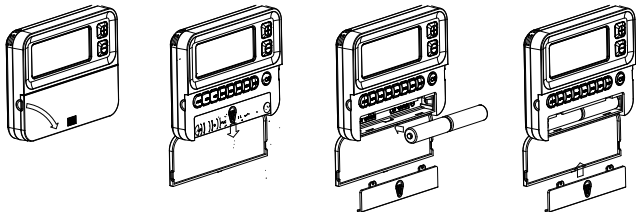
Lower the flap on the front of the thermostat.

There is a battery compartment located below the buttons.

Apply downward pressure to remove the cover.

Insert the 2 x AA batteries and the thermostat will turn on.

Close the battery compartment.



Installer menu

To access the installer menu, you must hold Prog and OK for 5 seconds.

When in the installer menu, use the ,  and  to navigate and select.

Use ,  or  to go back a step.

P0 1: Mode (Normal / Optimum Start / TPI)

P0 2: Hi Lo (Limiting the Thermostat)

P0 3: Hysteresis (Differential)

P0 4: Calibration

P0 5: Frost Protection

P0 6: Exit

Installer menu **OpenTherm®** Instructions

(Only for use with OT boilers)

P0 6: Setting DHW Temperature

P0 7: OpenTherm® Information

P0 8: DHOP

P0 9: Set OpenTherm® Parameters

Exit

PO 1 Operating Mode (Normal / Optimum Start / TPI)

Nor (Normal Mode)


When the thermostat is in Normal mode, the thermostat will try to reach the target temperature after the program changes.

Example: Program 1 on the thermostat is 21°C for 06:30am and the room temperature is 18°C. The thermostat will start the heating at 06:30am and the room temperature will start to increase then.

OS (Optimum Start Mode)



When the thermostat is in Optimum Start mode, the thermostat will try to reach the target temperature by the start time of the next switching time. This is done by setting the Ti (time interval) on the thermostat in this menu to 10, 15, 20, 25 or 30. This will allow the thermostat 10, 15, 20, 25 or 30 minutes to increase the room temperature by 1°C.

Ti can be set when OS is selected in the installer menu.  20°C

PO 1 Operating Mode (Normal / Optimum Start / TPI)

OS (Optimum Start Mode)



(Continued)

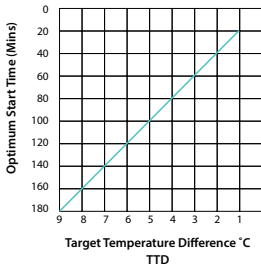
To achieve the target temperature when the program starts, the thermostat will read:

1. The Room Temperature (RT)
2. The Setpoint Temperature (ST)
3. The Target Temperature Difference (TTD) is the difference between the setpoint temperature and the room temperature .

The time (in minutes) that it will take to overcome (TTD) is called Optimum Start Time (OST) and its maximum value is 3 hours = 180 mins. This is subtracted from the start time.

As the temperature increases the thermostat will recalculate the OST if the temperature is increasing too quickly.

Optimum Start Control Graph with $T_i = 20$



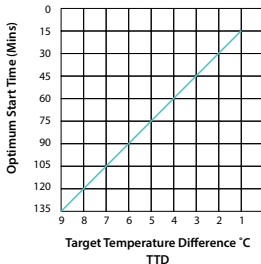
Example when $T_i = 20$

Program 1 on the thermostat is 21°C for 06:30am and the room temperature is 18°C. The thermostat will start the heating at 05:30am to reach 21°C for 06:30am @ $T_i=20$.

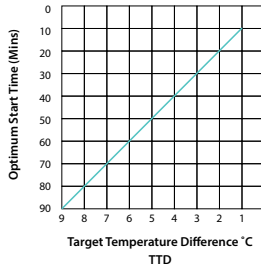
Example when $T_i = 10$ ►

Program 1 on the thermostat is 21°C for 06:30am and the room temperature is 18°C. The thermostat will start the heating at 06:00am to reach 21°C for 06:30am @ $T_i=10$.

Optimum Start Control Graph with $T_i = 15$



Optimum Start Control Graph with $T_i = 10$




PO 1 Operating Mode (Normal / Optimum Start / TPI)


TPI (Time Proportional & Integral Mode)

When the thermostat is in TPI mode and the temperature is rising in the zone and falls into the Proportional Bandwidth section, TPI will start to affect the thermostats operation. The thermostat will turn on and off as it gains heat so that it doesn't overshoot the setpoint by too much. It will also turn on if the temperature is falling so it doesn't undershoot the setpoint which will leave the user with a more comfortable level of heat.

There are 2 settings that will affect the thermostats operation:

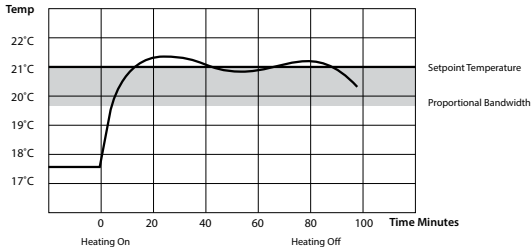
1. CYC - No. of Heating Cycles per Hour:  6 Cycles

This value will decide how often the thermostat will cycle the heating on and off when trying to achieve the setpoint temperature. You can select 2/3/6 or 12.

2. Pb - Proportional Bandwidth:  2°C

This value refers to the temperature below the setpoint at which the thermostat will start to operate in TPI Control. You can set this temperature from 1.5°C to 3.0°C in 0.1°C increments.

TPI Control



Example: Program 1 on the thermostat is 21°C for 06:30am and the room temperature is 18°C. The thermostat will start the heating at 06:30am and the room temperature will start to increase then but will switch itself off before it reaches temperature and allow the room temperature to increase naturally – this cycle may begin again if the thermostat isn't reaching temperature.

PO 2 Setting high & low limits



High 35°C and Low 5°C

This menu allows the installer to change the minimum and maximum temperature range that the thermostat can be set at.



PO 3 Hysteresis HOn and HOff

This menu allows the installer to change the switching differential of the thermostat when the temperature is rising and falling.

HOn is the fall in temperature – Default – 0.4°C. This will allow a fall of 0.4°C from the setpoint before the thermostat turns on again.

Hoff is the rise in temperature – Default – 0.0°C. This will allow the temperature to rise 0°C above its setpoint.

PO 4 Calibrate the thermostat




This menu allows the installer to re-calibrate the thermostat. The current temperature will be displayed on the screen and can be adjusted by pressing the  or  buttons .

PO 5 Frost Protection 5°C

This menu allows the installer to activate or de-activate frost protection. When frost protection is activated the thermostat will switch on the boiler when the temperature drops below 5°C.

PO 6 Exit

This menu allows the installer to return to the main interface.

It is also possible to exit the installer menu by pressing  ,  or  whilst in the installer menu.

PO 6 Setting DHW Temperature

This menu allows the installer to change the DHW temperature of the boiler. The temperature can be set in 0.5°C increments by pressing the



buttons.

Press the  button to select the desired temperature.

This menu is only available when the thermostat is connected to OpenTherm® and DHOP is ON (P08 OT installer menu).

PO 7 OpenTherm® Information

This menu allows the installer to view information received from the OpenTherm® boiler. It may take a few seconds to load information relating to each parameter. The information that can be shown from the boiler is outlined in the table below.



| Displayed on screen | Description | Remark |
|---------------------|-----------------------|--|
| tSEt | Target water temp | |
| tFLO | Outlet water temp | |
| trEt | Return water temp | |
| tdH | DHW temperature | This is only visible if DHOP is On (P08 OT Installer menu) |
| tFLU | Flue gas temperature | Dependent on boiler |
| tESt | Outdoor temperature | Dependent on boiler |
| nOdU | Modulation percentage | |
| FLOr | Water flow | This is only visible if DHOP is On (P08 OT Installer menu) |
| PrES | Water pressure | Dependent on boiler |


PO 8 DHOP

This menu allows the installer to activate or de-activate DHW target temperature control from the thermostat. This menu is only available when the thermostat is connected to OpenTherm®

PO 9 Set OpenTherm® Parameters

This menu allows the installer to configure the OpenTherm® parameters.

To access the menu please enter the password "08" with the  or  buttons.

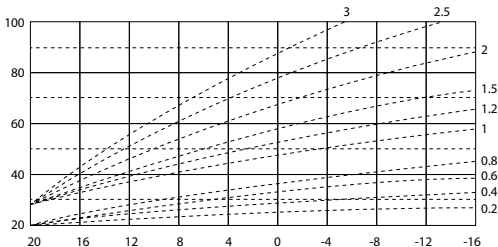
Press  to confirm.

The parameters that can be set are outlined in the table below.

| Parameter | Description | Range | Default |
|-----------|--|-------------------------------|---------|
| HHCH t-1 | Maximum set point heating | 45 - 85°C | 85°C |
| LLCH t-2 | Minimum set point heating | 10 - HHCH°C | 45°C |
| CLI t-3 | This allows users to select different climatic curves for weather compensation. This only applies to boilers with an outside sensor connected. | 0.2 - 3.0 | 1.2 |
| InFL t-4 | Influence of room sensor on modulation of the boiler. Recommended value is 10. | 0 - 20 | 10 |
| HHbO t-5 | Maximum allowable CH water setpoint. (°C) | ID49 Max ≥ ID57 ≥ ID49 Min | 85°C |
| Exit | Press OK button to turn back to main interface. | | |

PO 9 Set OpenTherm® parameters

Climatic Curve



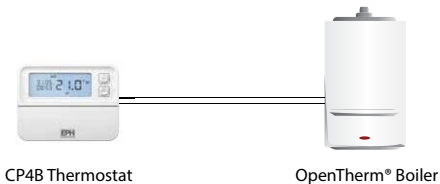
Exit

This menu allows the installer to return to the main interface.

It is also possible to exit the installer menu by pressing AUTO, MAN or OFF whilst in the installer menu.

System architecture

Example A 1 no. Thermostat controlling OT Boiler



EPH Controls IE

technical@ephcontrols.com

www.ephcontrols.com/contact-us

+353 21 471 8440

Cork, T12 W665



EPH Controls UK

technical@ephcontrols.co.uk

www.ephcontrols.com/contact-us

+44 1933 322 072

Harrow, HA1 1BD

