CP4B

EPH CONTROLS

Battery Powered Programmable Thermostat

Installation and Operation Guide

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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.

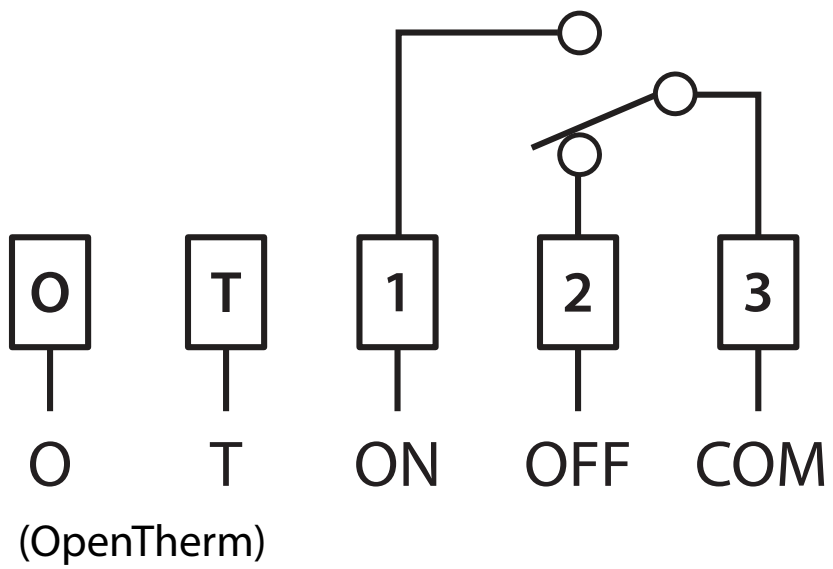
It will only be activated when the thermostat is in the OFF mode and the room temperature falls below 5°C.

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.

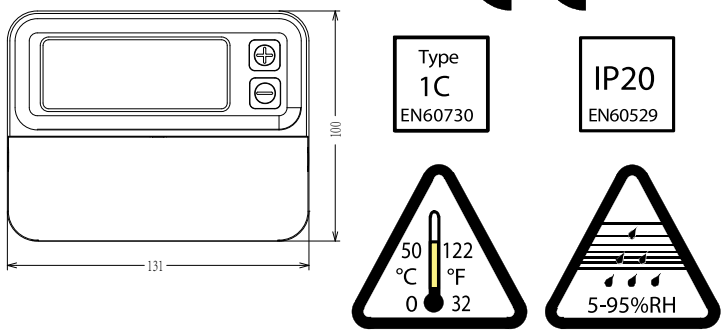
3) Lower the flap at the front of the thermostat. There is a battery compartment located below the buttons. Apply downward pressure to remove the cover.

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



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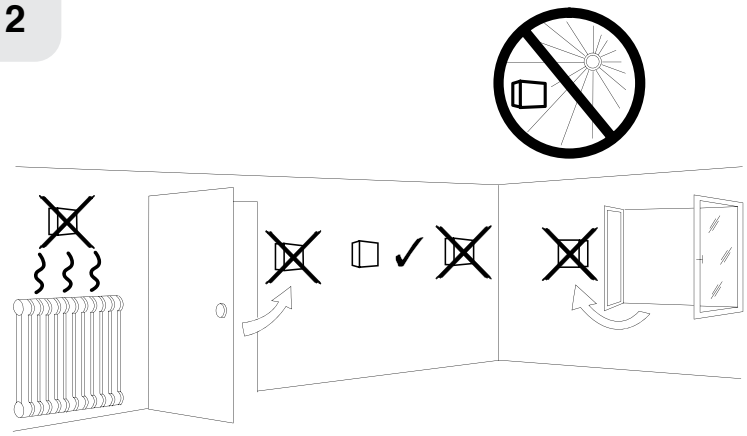

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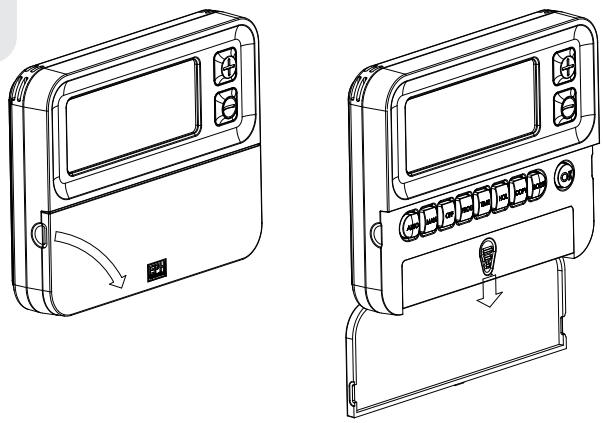

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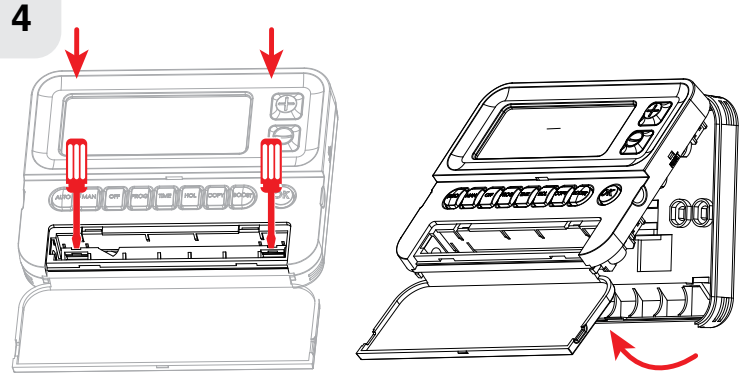

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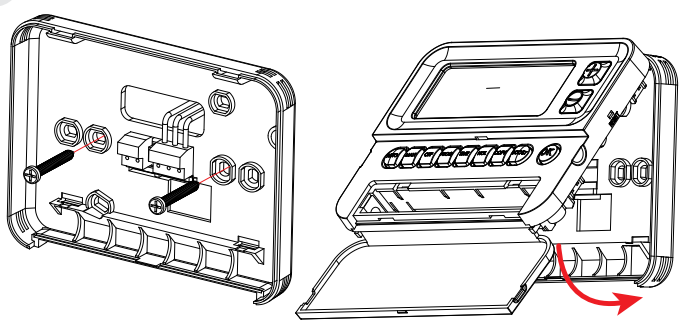

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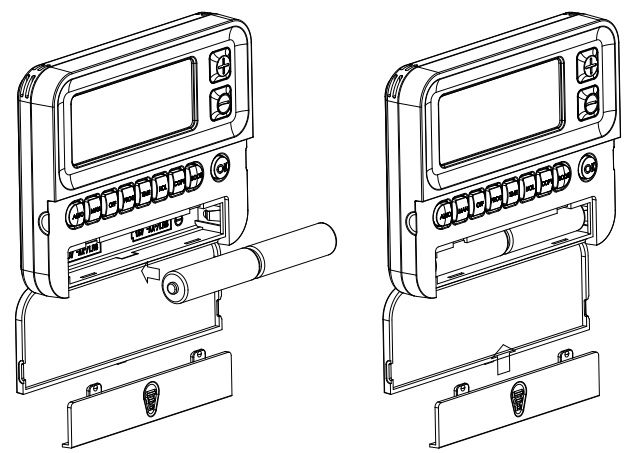
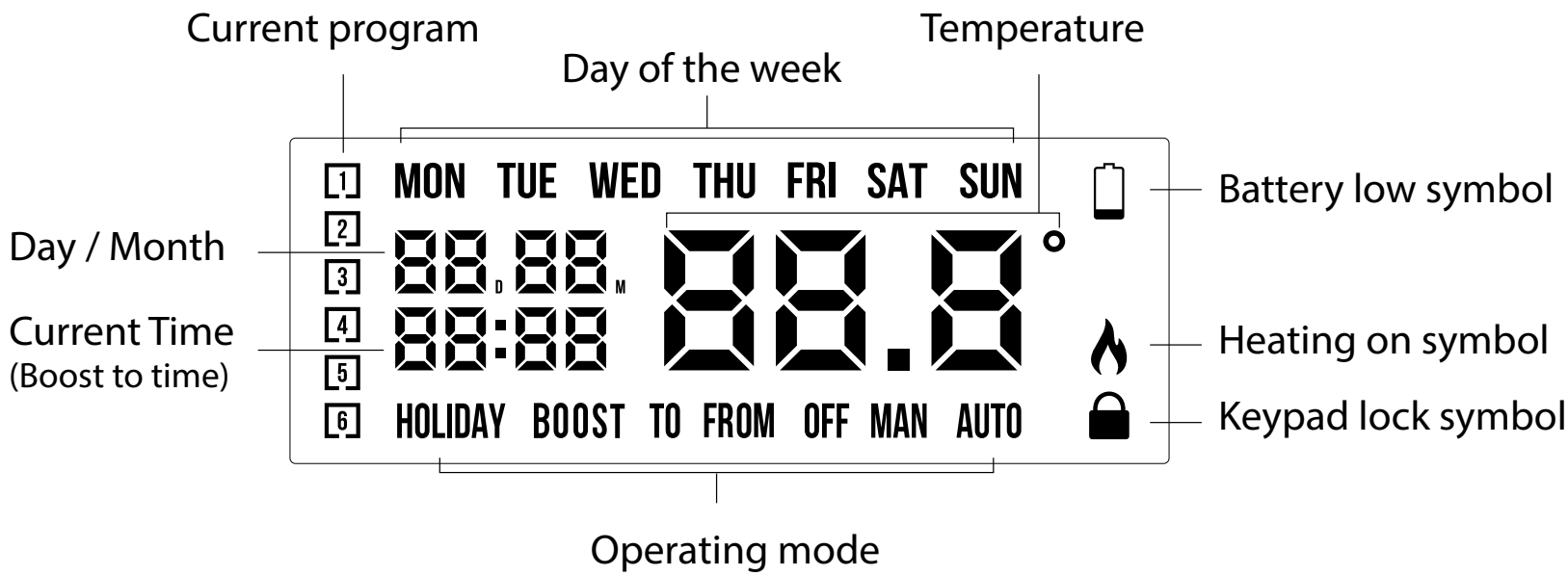


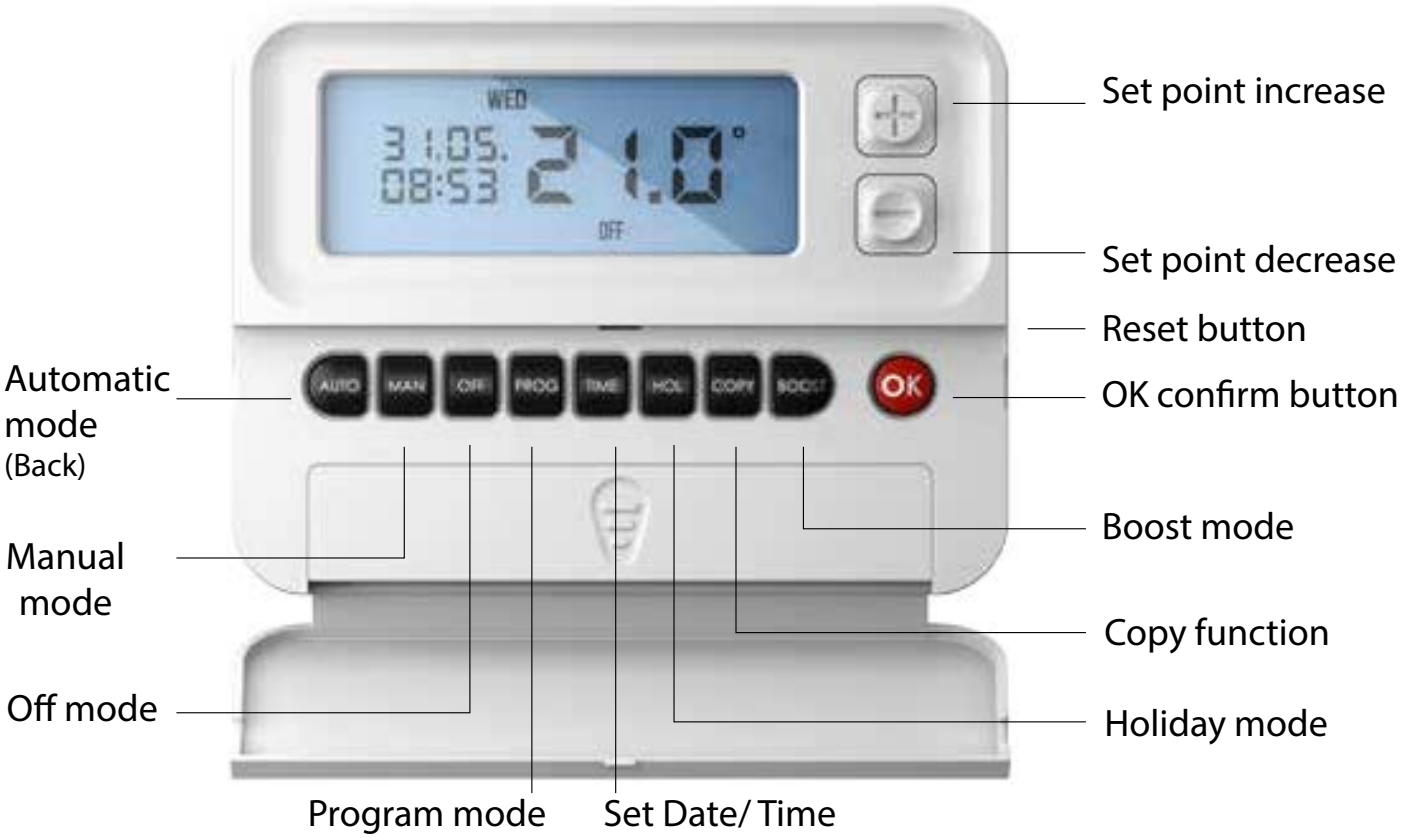
CP4B Room Thermostat

Operating Instructions

LCD Symbol Description



Button Description



AUTO Automatic mode

MAN Manual mode

OFF Off mode

PROG Program mode

TIME Set Date / Time

HOL Holiday mode

COPY Copy function

BOOST Boost mode

Set point increase

Set point decrease

OK Confirm button

RESET Reset button

Resetting the thermostat

Press the RESET 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 OK 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 TIME button once, the year will begin flashing.

Press the ⊕ or ⊖ buttons to adjust the year. Press OK.

Press the ⊕ or ⊖ buttons to adjust the month. Press OK.

Press the ⊕ or ⊖ buttons to adjust the day. Press OK.

Press the ⊕ or ⊖ buttons to adjust the hour. Press OK.

Press the ⊕ or ⊖ buttons to adjust the minute. Press OK.

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 AUTO 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 PROG button once.

Programming for Monday to Friday is now selected.

Press the ⊕ or ⊖ buttons to adjust the P1 time. Press OK.

Press the ⊕ or ⊖ buttons to adjust the P1 temperature. Press OK.

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

Programming for Saturday to Sunday is now selected.

Press the ⊕ or ⊖ buttons to adjust the P1 time. Press OK.

Press the ⊕ or ⊖ buttons to adjust the P1 temperature. Press OK.

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

Press the AUTO button to return to the automatic mode.

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

While in PROG Mode pressing the TIME 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 COPY 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 OK 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 OK or after 5 seconds the thermostat will operate to this temperature setpoint, until the next switching time.

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

Permanent Override

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

Press the ⊕ or ⊖ buttons to adjust the temperature setpoint.

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

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

Boost Function

Press the BOOST button, one two or three times.

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

Press the OK button.

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

Press the OK 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 BOOST 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 HOL button, '**HOLIDAY FROM**' will appear on screen.

Press the ⊕ or ⊖ buttons to adjust the year. Press OK .

Press the ⊕ or ⊖ buttons to adjust the month. Press OK .

Press the ⊕ or ⊖ buttons to adjust the day. Press OK .

Press the ⊕ or ⊖ buttons to adjust the hour. Press OK .

'**HOLIDAY TO**' will appear on screen.

Press the ⊕ or ⊖ buttons to adjust the year. Press OK .

Press the ⊕ or ⊖ buttons to adjust the month. Press OK .

Press the ⊕ or ⊖ buttons to adjust the day. Press OK .

Press the ⊕ or ⊖ buttons to adjust the hour. Press OK .

The thermostat will now return to the mode it was in before the Holiday settings were entered. To cancel Holiday mode, press the HOL 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 OK button for 5 seconds.

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

Press the OK 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

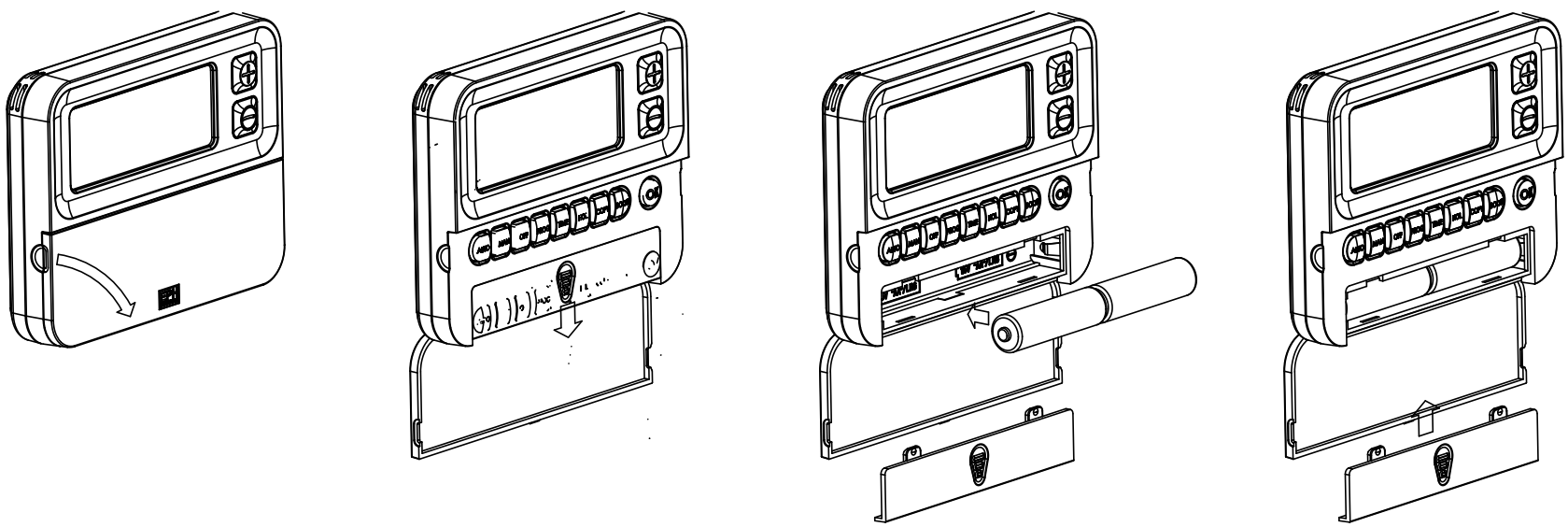
Lower the flap on the front of the thermostat.

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

P0 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)

BOILER PLUS

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

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

OS (Optimum Start Mode) BOILER PLUS (Continued)

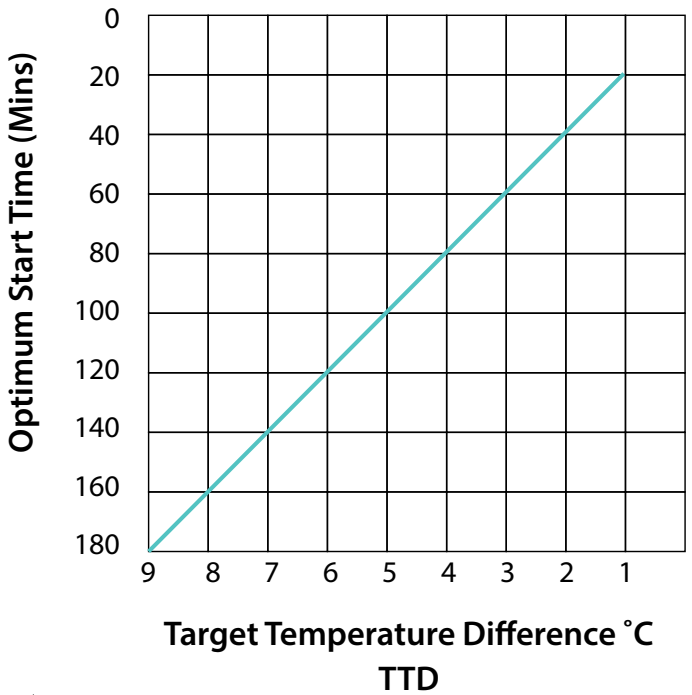
To achieve the target temperature when the program starts, the thermostat will read:

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 Ti = 20



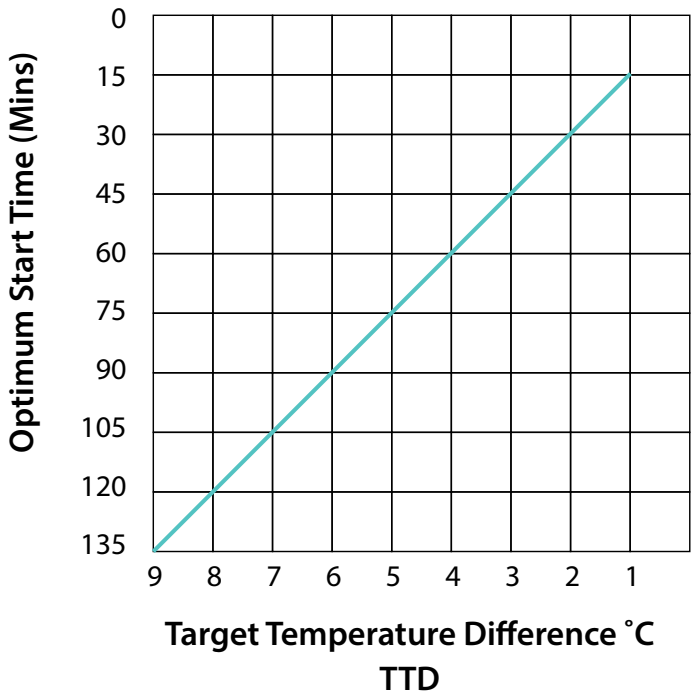
Example when Ti = 20

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 @ Ti=20.

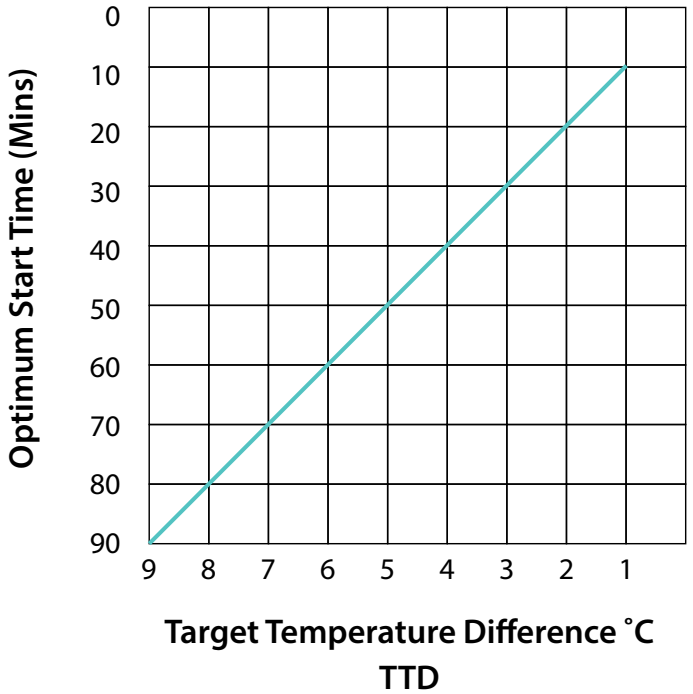
Example when Ti = 10

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 @ Ti=10.

Optimum Start Control Graph with Ti = 15



Optimum Start Control Graph with Ti = 10



P0 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.

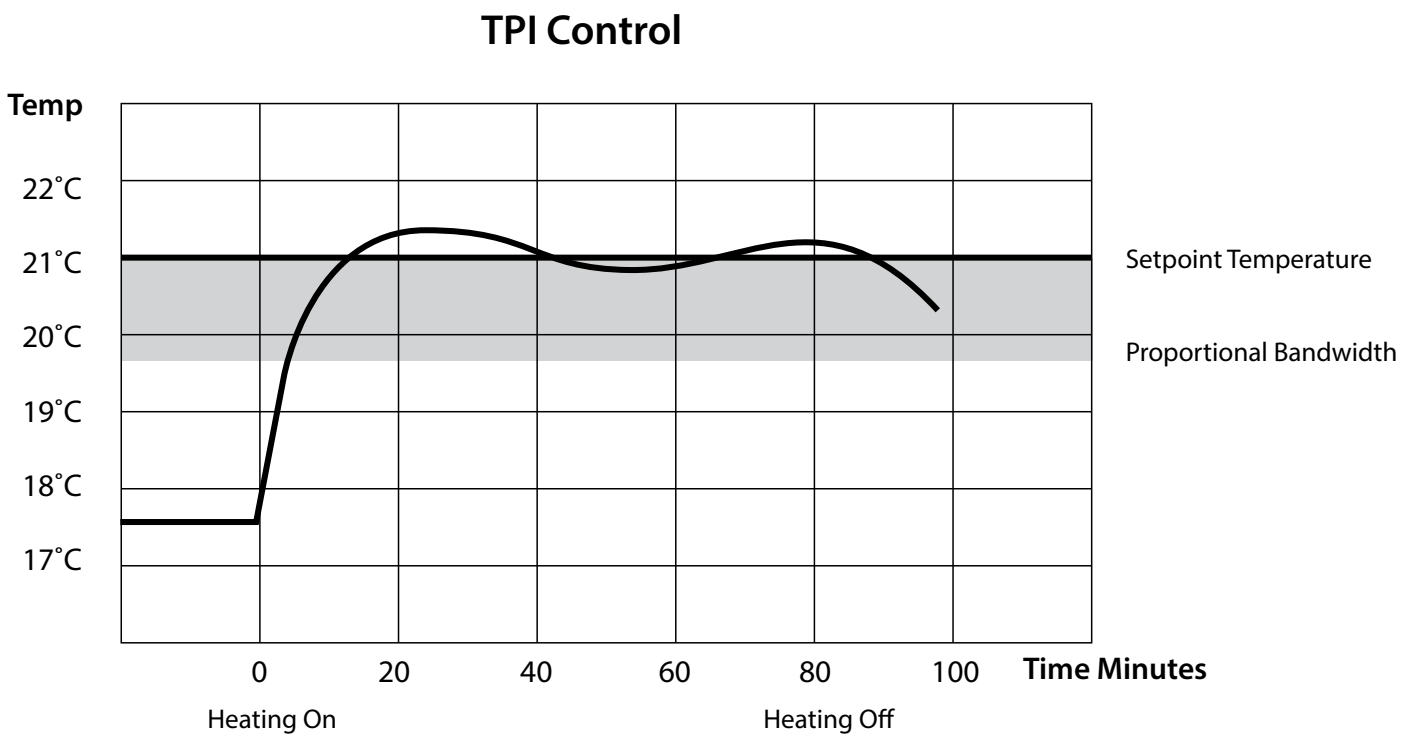
There are 2 settings that will affect the thermostats operation:

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.



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.

P0 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.

P0 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.

P0 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 .

P0 5 Frost Protection 5˚C

This menu allows the installer to activate or de-activate frost protection. Frost protection can be set from 5…15°C

When frost protection is activated the thermostat will switch on the boiler when the temperature drops below 5˚C.

P0 6 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.

P0 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 or 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).

P0 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

P0 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®

P0 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.

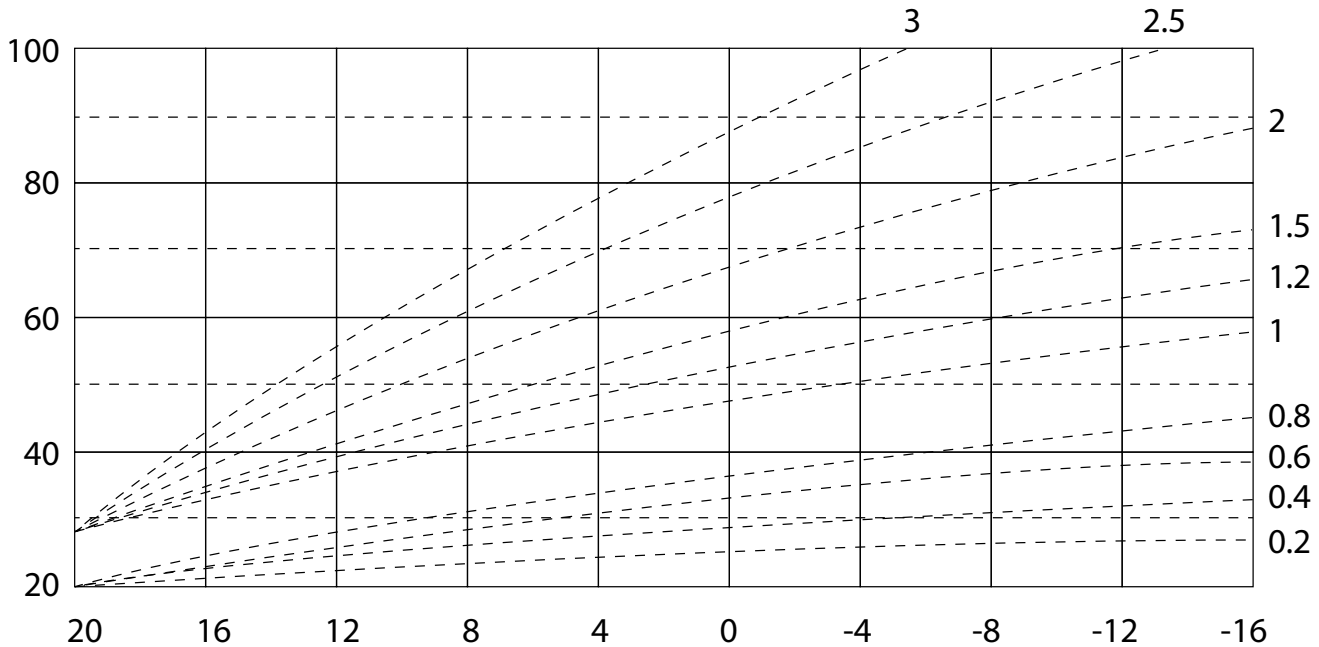
Press OK to confirm.

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.		

P0 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

CP4B Thermostat

OpenTherm® Boiler

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