

## **Wiring of Weather Compensating Controller.**

This document outlines the integration of the weather compensating controller in a Irish or UK heating system. This controller is designed to run the boiler at a cooler temperature. This is **ONLY suitable for a condensing type boiler.**

Running a non- condensing boiler cooler than its design (exhaust gas temperature below the dew point) would result in serious boiler corrosion in a short period of time.

If connecting to a non- condensing or heat source, it is important to use a mixer circuit so that the boiler heat exchanger is hot enough to avoid condensation.

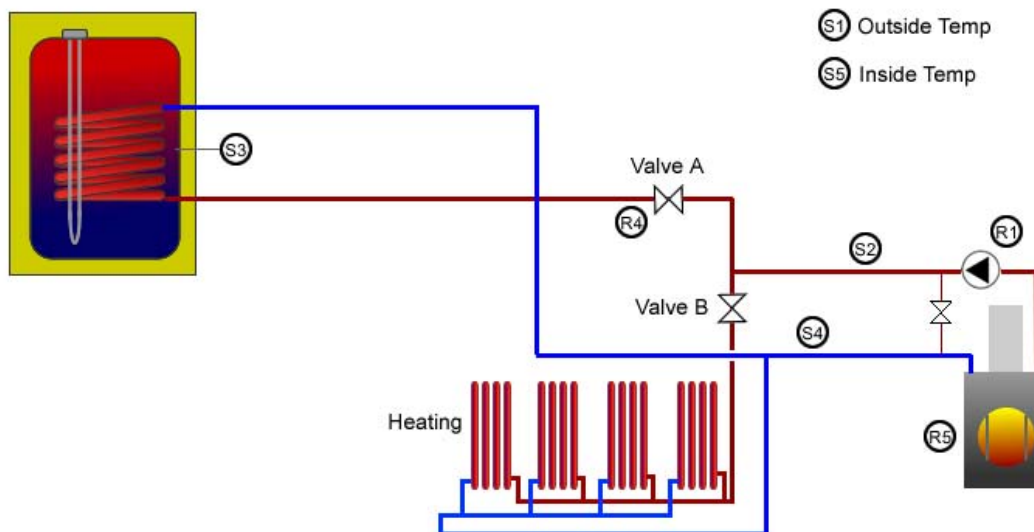
### **The controller saves energy in a number of ways;**

1. It turns off the heating circuits if the outside temperature rises above a pre-set limit (e.g. 18C)
2. It automatically adjust the flow and return temperature to the boiler so that the boiler supplies the correct amount of heat based on the outside and measured room temperatures.
3. It avoids temperature swings within the room, leading to greater comfort at lower temperatures.
4. It eliminates the problem of short cycling.
5. Includes an occupancy detector input option to reduce the heating set-point if the building is unoccupied.
6. Anti-legionella function. This allows the customer to reduce the normal set-point of stored hot water. The legionella function can be programmed to come on at different times (or not at all) each day from Monday to Sunday. This dramatically reduces the hot water storages losses from any cylinder.
7. Faster room heat times, because the boiler is set at max temperature and the controller controls the firing rate based on room temperature and outside temperature, the boiler will operate at maximum possible output to bring a cold room up to temperature quickly and then reduce the boiler output to keep the temperature at the set level. This function means that timers do not need to be set for extended periods before occupants return home.

## Disclaimer

This document has been researched but not tested in the field yet. It remains as a discussion document to be validated.

## Single Zone Heating System using 2 port valves.



Two port valves offer easy to understand wiring.

Normally

Supply on **BROWN** Opens valve

Spring Closes valve

**ORANGE** is live when the valve fully OPENS

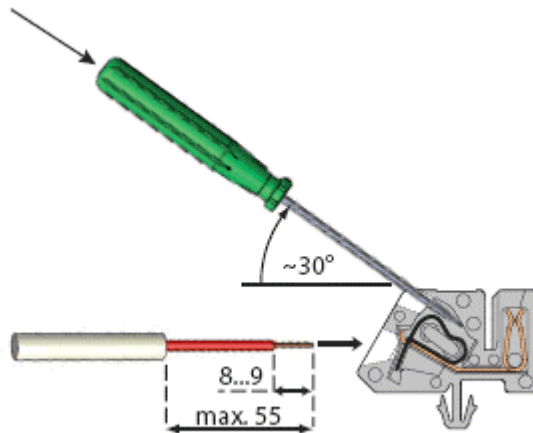
**PINK** (if present) is live when valve is fully CLOSED

**BLUE** is neutral

**YELLOW / GREEN** is earth

## Wiring the HCC5 controller.

Wire the controller as per the instructions below. The terminals are spring loaded to prevent over tightening. Note: A small flat head screwdriver is required to access terminals.



Terminal	Function
S1	Outdoor sensor – Pt1000
S2	Heating Circuit Flow
S3	Hot Water Temperature
S4	Heating circuit return
S5	Room sensor
S6	Enable Signal. External Time-clock or Occupancy detection system
R1	Circulation Pump
R2	Mixer open (used for non condensing boiler)
R3	Mixer close (used for non condensing boiler)
R4	DHW Charging (Connect to Brown Wire of Valve B).  Connect Pink wire of DHW valve (A) to Brown Wire of Valve B. This opens Heating circuit when DHW is satisfied.  Alternative: Use switch over relay using R4 to feed coil.
R5	230 v
R5i	Control signal to boiler



Left-hand terminal compartment only for low voltage if max. 12VAC/DC



jumper terminal block S-



Right-hand terminal compartment only for mains voltages of 230VAC 50-60Hz



jumper terminal block N

A 3Amp switched fused spur should be used to connect mains to the controller. Internally the controller should be wired as per the picture below. The terminals are spring loaded to prevent over tightening. **Note:** A small flat head screwdriver is required.

### Programming the HCC5 controller

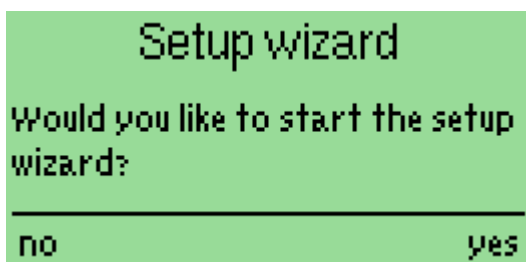
When the programmer is first turned on, it needs some basic settings. These settings can all easily be changed/adjusted later



Choose The language



Input the time, note the time will stay accurate for 24hours if mains power is disconnected, after this period the clock must be reset.



Follow start-up menu

## Commissioning

You will now be guided through the required settings.

Continue

5.1. S/W day **18°C**

Daytime outdoor temp. for summer/winter time changeover  
Range: 0...30 (18)

- + Confirm

If the **heating timer** is active and the outside temperature is greater than this value, the heating circuit is deactivated.

5.2. S/W night **12°C**

Night mode outdoor temp. for summer/winter time changeover  
Range: 0...30 (12)

- + Confirm

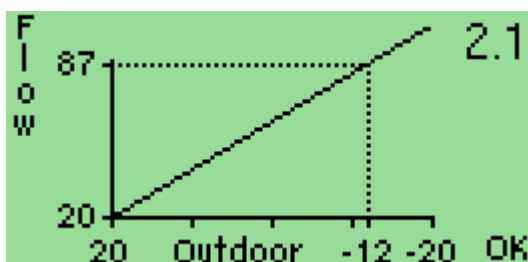
If the heating timer is NOT active (i.e. heating on reduced mode), the heating circuit is disabled if the outside temperature is lower than this value.

5.3. Curve **simple**

Response curve for reference flow to outdoor temp., simple or split slope

- + Diagram

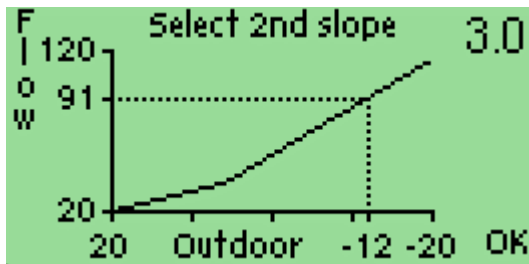
A simple or split curve is used to calculate the heating circuit flow temperature target depending on the outside temperature.



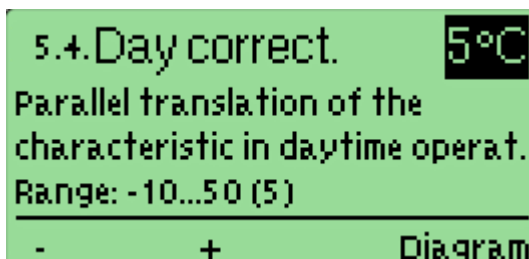
For radiator heating a heating curve around 2.0 may be appropriate.  
For underfloor heating a curve with a slope of 0.8 would work better.

At  $-12^{\circ}\text{C}$ , target temp= $87^{\circ}\text{C}$ . e.g. At  $10^{\circ}\text{C}$  Target Temp =  $50^{\circ}\text{C}$

The curve needs to be adjusted taking into account radiator size and the building insulation.

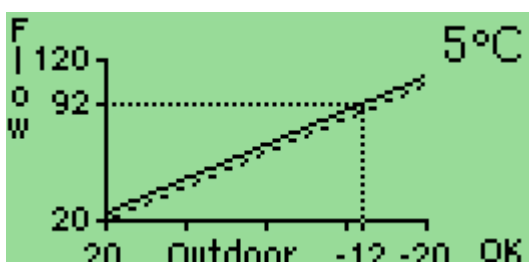


A split curve is also available. During cold weather (e.g.  $6^{\circ}\text{C}$  or below) it is possible to change the slope of the curve so that the heating responds more aggressively below this outside temperature. This can be especially helpful in older houses with poor insulation.



A default level of  $5^{\circ}\text{C}$  is added to the curves predicted output during periods when the heating timer is active. This helps increase the heating response time. This helps the heating response time.

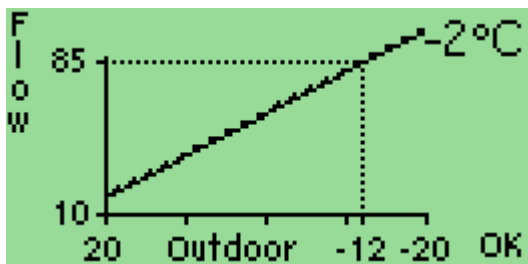
Note: an additional **ROOM CONTROLLER** function in **SPECIAL FUNCTIONS** is used to increase the flow temperature if the room is below the set-point. It is not on the commissioning setting, but must be set-up later.



5.5. Night correct. -2°C  
 Parallel translation of the  
 characteristic in nighttime oper.  
 Range: -30...30 (-2)  


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 -                      +                      Diagram



To Save energy during periods when the heating timer is not active, the curve temperature can be set-back. The Default value is 2C.

5.6. Comfort temp. boost 0°C  
 Additional parallel translation  
 of the day HC characteristic  
 Range: 0...15 (0)  


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 -                      +                      Confirm

This menu allows one period in the day to have a higher than normal temperature set-point. E.g. during early morning. Setting at zero means this function is de-activated.

5.7. Reference/actual - -2°C  
 Target undershoot for heating  
 Range: -10...10 (-2)  


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 -                      +                      Confirm

Hysteresis Negative, turn on boiler ONLY when the temperature measured at S4 is below the targeted temperature by this amount. (NOTE: there is a 5 minute delay on boiler firing to overcome boiler hunting)

5.8. Reference/actual + **2°C**  
Target overshoot at S4 for  
heating switch off  
Range: 1...10 (2)

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- + Confirm

Turn boiler off (R5) when S4 temperature is above the target temperature by this amount.

6.1. Seizing protection **on**  
Daily seizing protection at noon

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- + Confirm

Turn on boiler pump and exercise valves at 12:00 for 5 seconds every day to prevent seizing from periods of inactivity.

6.2. Frost protection **on**  
Frost protection operates the  
heating circuit at minimum flow  
temperature

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- + Confirm

The heating pump (R1) is activated if the outside temperature is less than 1C.

6.3. min. flow **15°C**  
Minimum flow temperature in  
heating operation  
Range: 5...30 (15)

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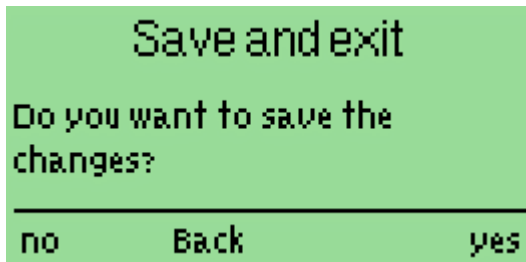
- + Confirm

6.4. max. flow **80°C**  
maximum flow temperature  
Range: 30...105 (45)

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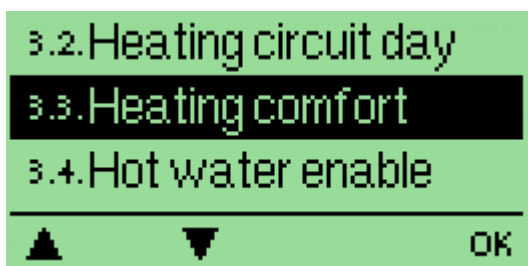
- + Confirm





Commissioning finished.

### Setting the Time Clock

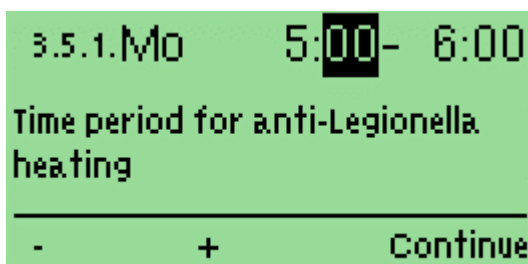


Heating – day time (normal heat timing)

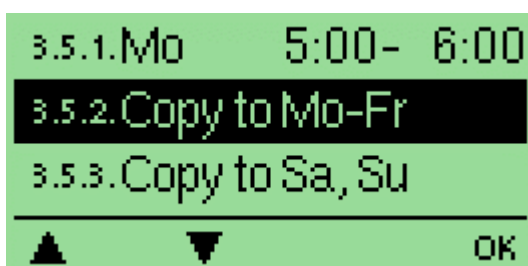
Heating – comfort (elevated heat timing)

Hot Water – timer (Hot water heating shuts off when target temperature reached or when timer is not active)

Hot Water – Anti-legionella. (Identical to other timers except that the target temperature is set in the anti-legionella menu).



Use the (-) (+) buttons to set the time period, note that a 24 hour clock is used.



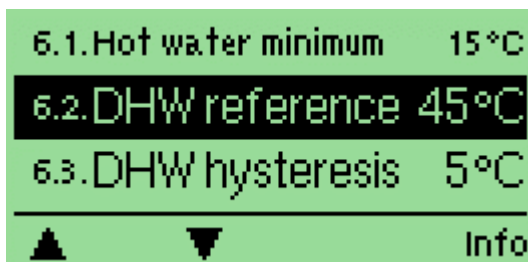
There are three time periods per day available for all timers and it is easy to copy a single day's set-up to the whole week. It is also possible to then edit each day individually.



An overview of the times is given when the time settings are saved.

### Setting the Water Temperature

Scroll down to Menu item 6. (DHW settings). Press OK to change settings.

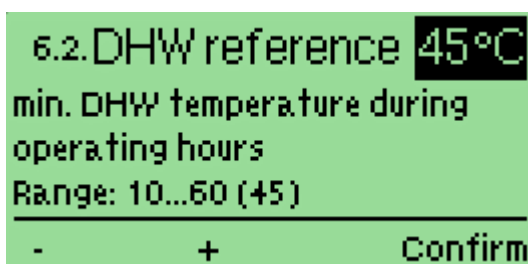


If the temperature in the cylinder drops below the “hot water minimum” then the boiler and hot water circuit is turned on regardless of the state of the timer.

While the hot water timer is active, if the DHW reference falls below this value (e.g. 45C) then the boiler and hot water circuit are turned on.

If is turned off again when the temperature reaches the hysteresis value above the set-point. (e.g. 45C + 5C = 50C)

Highlighting the value and pressing “Info” allows the user to edit the setting.



## Setting the Anti-legionella temperature



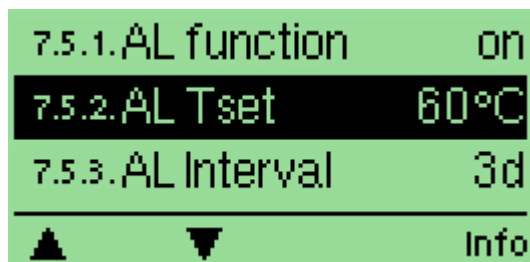
Choose OK



Highlight and choose OK



Choose info and select function "ON"



The Anti-legionella temperature and the interval can be set.



### Adjusting the room temperature component of the output.

A cold room will require hotter radiators to heat up quickly. The **Room controller** component is used to increase the boiler flow set-point while the room is under temperature. Contained in **Special Functions** menu



#### Example:

Assume that the calculated Flow temperature from boiler at current outside temperature equals 40C

Room Controller setting = 10%  
Current Room temperature = 15C

Room controller component of 10% at 40C equals 4C

Room Temperature = 15C (5C below the 20C set-point).

Output flow temperature is adjusted by 4C x 5C. or 20C

The adjusted flow temperature is now 40C + 20C = 60C.

**Note:**

Care should be exercised using this function, setting the value too high may result in the room temperature from “over-shooting” the room set-point.