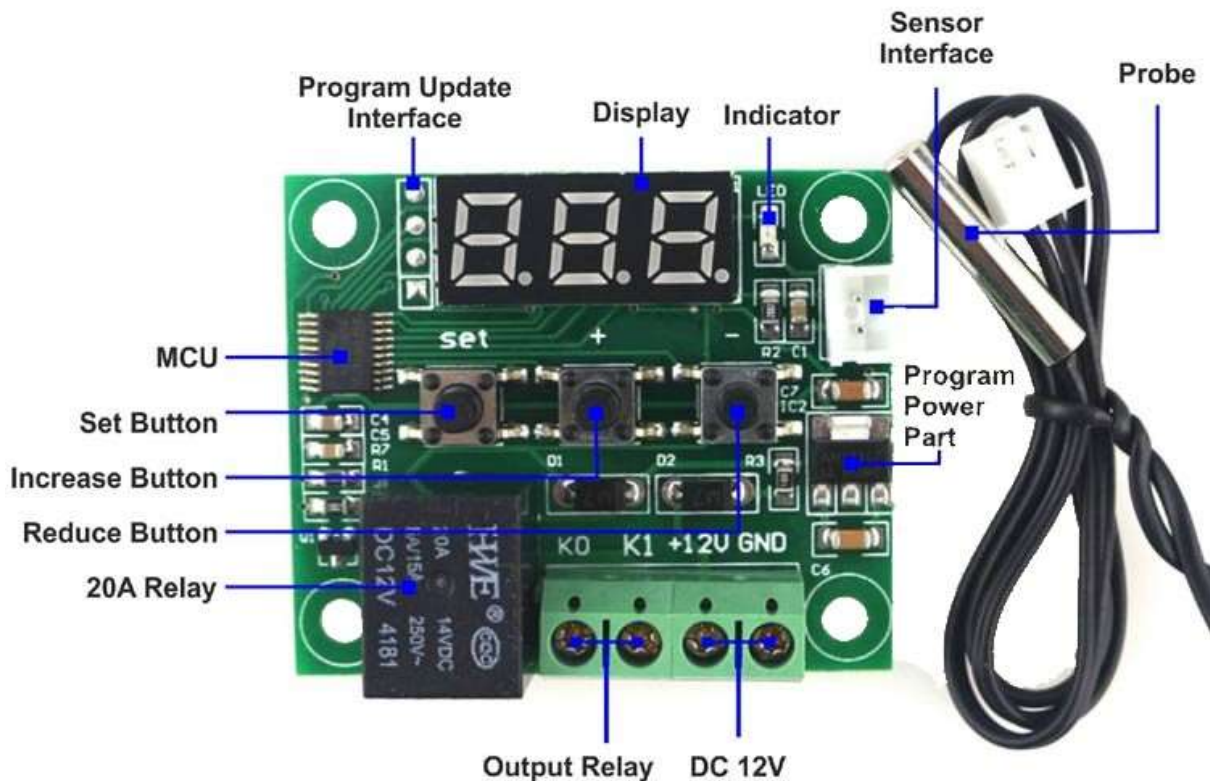


KEY FEATURES OF W1209 TEMPERATURE CONTROLLER MODULE:



- 3-digit display of temperature
- Module can operate in a heating or cooling mode of operation
- Multiple parameters can be set such as temp trip point, hysteresis and delay.
- Waterproof NTC temperature sensor has -30 to +110°C measurement range with 0.1°C accuracy
- Relay switches up to 120VAC @ 10A or 14VDC @ 10A
- 12V module operation

This module measures and displays the temperature and allows you to control power to most types of electrical equipment based on that temperature. A single output relay can be turned ON or turned OFF as temperature rises or lowers past a thermal threshold that you set. You can also set a temperature hysteresis, relay activation delay and thermal limits for the module's operation.

A built in STM8S or similar MCU allows you to configure the module using the display and 3 pushbuttons. All settings are saved into non-volatile memory and are preserved during a power cycle.

The temperature is sensed by a high accuracy waterproof NTC 10K Thermistor that has a range of -30°C to 110°C (-22°F to 230°F). The sensor cable is about 18" long, but it is possible to splice wire to lengthen the cable if needed.

The relay is rated for up to 120VAC @ 10A and 14VDC @ 10A. When the relay is energized a red LED is lit. It is also possible to use the relay on this module to switch higher power relays if you want to control a lot of power.

Module Power

The module has a 3-digit display composed of 0.28" high red 7-segment displays.

The module will always display the current temperature measurement by default. Once you stop pushing buttons, after about 5 seconds the display will default back to displaying the temperature. XH-W1219 Temperature Controller - LLL Display



If you apply power to the module without the sensor attached, it will display 'LLL'. If you plug in the sensor, the current temperature will be displayed which is generally in the 20-25C range.

Buttons

There are 3 buttons on the module that you can fiddle with.

- SET = Momentary press sets trigger temperature. Long press enters parameter setting mode
- '+' = Increment setting
- '-' = Decrement setting
-

Setting Trigger Temperature

To set the trigger temperature which is the temperature that you want something to happen, press the SET button and the display will start flashing. The value being displayed is the trigger temperature. As shipped, this will be set to 28C.

Using the +/- buttons, the value can be incremented or decremented in 0.1C steps. Holding one of these buttons down will fast increment/decrement the value.

Pressing the SET button saves the value that you have set and returns to the temperature display. Alternatively, if you stop pressing buttons rather than pressing SET, after a 5-8 second delay the value will be saved, and the display will revert back to the temperature display on its own.

Setting Parameters

Because the user interface is limited to a 3-digit display and 3 pushbuttons, setting parameters can seem a little daunting at first, but it is quite easy to use as explained in this section.

To enter the parameter setting mode, you long press the SET button for about 3 seconds. When the button is released, the display will show 'P0' which is the first parameter setting. You may find that you need to long press the button twice before P0 is displayed. Once in parameter setting mode, pressing the +/- keys allows you to scroll between each of the parameters that can be set. You may find it easiest to long press and hold the SET button while pressing the +/- keys to get to the parameter you want.

There are 7 parameters that can be programmed into the module:

- P0 = (Heat / Cool) sets whether the relay is energized or de-energized when trigger temperature is reached.
- P1 = (Hysteresis) sets difference in degrees between the Trigger temp and when relay changes state
- P2 = (Max Temp) sets the maximum Trigger temp that can be set
- P3 = (Min Temp) sets the minimum Trigger temp that can be set
- P4 = (Temp Correction) sets an offset to use for the displayed value
- P5 = (Delay) sets a time delay between when the Trigger temp is reached and when the relay is switched
- P6 = (Alarm) sets a high temperature 'alarm' trip point

P0 (Heat / Cool)

Sets whether the relay is energized or de-energized when the trigger temperature has been reached.

Long press SET to enter P0 parameter setting mode

Pressing SET now cycles between C and H.

C (default) = Cool Mode. The relay will energize when the temperature is reached. This is typically used to turn on a cooling device such as a fan.

H = Heat Mode. The relay will de-energize when the temperature is reached. This is typically used to turn off a heating device such as a heater.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

P1 (Hysteresis)

Hysteresis refers to how much change in temperature must occur before the relay will change again state. For instance, if a heater is turned OFF at 30°C and the hysteresis is set to 2°C, the temperature must fall to 28°C before the relay is re-energized and the heater is turned back on.

This can be useful to avoid constantly triggering the device on and off (oscillating) right around the trigger temperature. This is how home thermostats typically work since it is hard on home heating and cooling systems to be constantly cycled on and off. On the other hand, something like an aquarium heater is fine to be operated with no hysteresis in order to hold as constant of a temperature as possible.

Long press SET to enter parameter setting mode, then +/- to reach P1.

Pressing SET now displays the hysteresis in °C. Default setting is 2.0°C

Press the +/- buttons to set the desired hysteresis or 0.0 if no hysteresis is wanted.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

P2 (MAX Temp)

This parameter limits the maximum Trigger temperature that can be set. It can be used as a safety stop to avoid an excessively high temperature from being set by a user of the module. If you are controlling an frog terrarium heater for your kid for instance, setting this to something like 30°C may just save Kermits life if buttons get randomly pushed.

Long press SET to enter parameter setting mode, then +/- to reach P2.

Pressing SET now displays the maximum temperature that can be set in °C. Default setting is 110°C.

Press the +/- buttons to set the desired maximum temperature setting or leave at 110°C for maximum range.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

P3 (MIN Temp)

This parameter limits the minimum Trigger temperature that can be set. It can be used as a safety stop to avoid an excessively low temperature from being set by a user of the module.

Long press SET to enter parameter setting mode, then +/- to reach P3.

Pressing SET now displays the minimum temperature that can be set in °C. Default setting is -30°C.

Press the +/- buttons to set the desired maximum temperature setting or leave at -30°C for maximum range.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

P4 (Temp Correction)

This parameter provides an offset (either positive or negative) to the displayed temperature value. This feature can be used to match the reading to another device or if you need to make a correction due to an error induced by lengthening the sensor cable.

Long press SET to enter parameter setting mode, then +/- to reach P4.

Pressing SET now displays the current offset in °C. Default offset is 0.0°C.

Press the +/- buttons to set the desired offset in temperature to be used.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

P5 (Delay)

This parameter provides a delay between when the Trigger temperature is reached and when the relay is energized or de-energized. This setting can range from 0-10 minutes in 1-minute increments.

Long press SET to enter parameter setting mode, then +/- to reach P5.

Pressing SET now displays the current delay. Default is 0.

Press the +/- buttons to set the desired delay to be used.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

P6 (Alarm)

This parameter provides a high temperature alarm. When the set temperature is reached, the relay is deactivated and the display shows 'HHH' until the temperature goes below the alarm set-point.

Long press SET to enter parameter setting mode, then +/- to reach P6.

Pressing SET now displays the current alarm setting. Default is OFF.

Press the +/- buttons to turn the alarm ON or OFF.

Pressing the SET button again now enters the alarm temperature setting mode. Default is '00'. Range is 0-110.

Press the +/- buttons to enter the desired alarm temperature.

After no button pushes for 5-8 seconds, the setting is saved, and the display reverts back to displaying the current temperature.

Module Connections

1×2 XH2.54 White Connector

The temperature sensor plugs into the white connector. It is keyed and will only go in one way though the orientation does not matter.

1 x 4 Screw Terminal Block

- GND = Ground for the module. Connect to 12VDC supply ground
- +12V= Power for the module. Connect to 12VDC.
- K1 = Relay switch contact 1
- K0 = Relay switch contact 2

The relay switch contacts are interchangeable. One side should connect to the power for the load which can either be AC or DC and the other side should connect to the load itself.

There is an available to house the W1209 module which provides some electrical and mechanical protection.

Technical Specifications

- Temperature Range -30 ~ 110°C
- Resolution -9.9 to 99.9°C 0.1°C
- Other temperatures 1°C
- Accuracy 0.1°C
- Thermal Sensor NTC 10K Thermistor
- Relay Maximum Ratings
- VAC 120VAC10A
- 240VAC5A
- VDC 0-14VDC 10A
- Operating Ratings
- DC Power Input 12VDC
- Operating Current Relay inactive <30mA
- Relay activated < 80mA
- Dimensions L x W x H 48 x 41 x 16mm (1.9 x 1.6 x 0.6")
- Temperature probe length 45cm (18")
- Acrylic enclosure