

# USB-TC Instructions

## Description

The USB Temperature Controller (USB-TC) is a heating device that attaches to the bottom of an Ocean Optics USB Series spectrometer. This add-on option heats the spectrometer's optical bench to a preselected temperature to maintain alignment of the spectrometer's optics. The USB-TC is useful for applications where stable, repeatable measurements such as absorbance are crucial. Typical markets include industrial, environmental and other applications that require temperature stability for predictable measurement results using a USB Series spectrometer.

The USB-TC is available already installed at the factory on a USB spectrometer of your choice, or alone for you to install on an Ocean Optics USB Series spectrometer that you already own. If the USB-TC is purchased already attached to a spectrometer, the spectrometer is calibrated for you at the factory at the preselected setpoint temperature for optimum performance. If the USB-TC is purchased alone, you should recalibrate your spectrometer at the setpoint temperature once you have attached it to the USB-TC.

Available preselected setpoint temperatures are 25, 30, 35, 40, 45, 50 and 55 degrees Celsius. Note that the available settings of 25, 30, and 35 degrees are below human body temperature, and enable handheld operation in typical ambient temperatures for many applications. The USB-TC can be powered directly from your equipment by wiring it to a 12 VDC power source (3 Amp capacity), or by using the power supply provided with the USB-TC.



USB-TC Attached to a USB2000+ Spectrometer

# USB-TC Installation

If you purchased the USB-TC without a spectrometer, you must install it on your own Ocean Optics USB Series spectrometer using the parts provided and the following procedure.

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## Caution

**Be sure to recalibrate your spectrometer at the selected USB-TC temperature setpoint after you have finished the installation. See your spectrometer Installation and Operation Manual for calibration instructions.**

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## Parts Provided

If purchased alone, the USB-TC package contains the following parts:

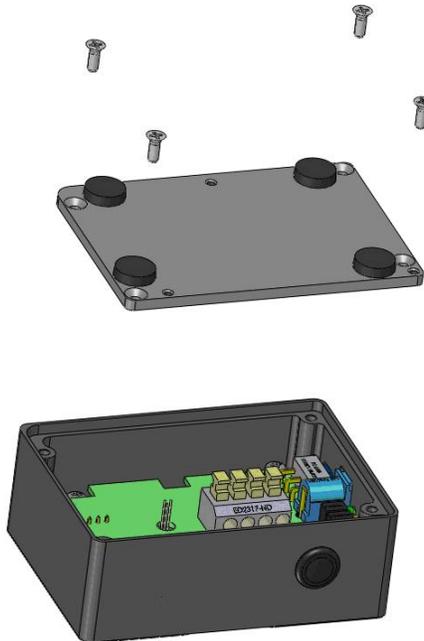
- Three (3) socket head cap screws
- Three (3) lockwashers

## Tools Required

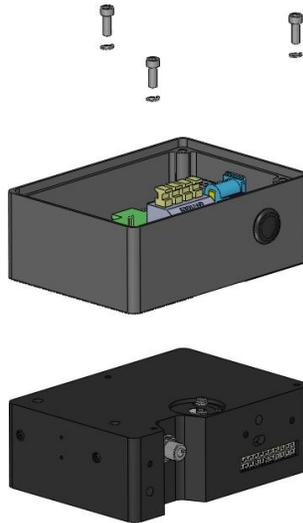
- #1 Phillips head screwdriver
- 3/32 inch Hex wrench

### ► Procedure

1. Remove the bottom cover of the USB-TC by removing the 4 flathead screws. Set the screws aside for reuse later in this procedure.



2. Peel off the rubber feet from the bottom of the spectrometer.
3. Place the mounting surface of the USB-TC against the mounting surface of the spectrometer, being careful to align the large round hole with the turntable adjustment of the spectrometer.
4. Install the 3 socket head cap screws with their lock washers to attach the spectrometer to the USB-TC.



5. Refer to [Set-up](#) for connection information. If needed, make the required power and relay connections to the terminal block before replacing the USB-TC cover in Step 6.
6. Reinstall the cover on the USB-TC with the 4 flat-head screws saved from Step 1.



# Set-up

## Supplying Power

The USB-TC must receive 12 VDC power to operate. It can be powered from either a 12 VDC power supply (included), or by wiring the device directly to a 12 VDC (3.0 Amps) power source.

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### Caution

**When power is applied, ensure that the unit is not exposed to temperatures over 60 °C, or the over-temperature protection will activate, requiring a return of the unit to the factory to be reset.**

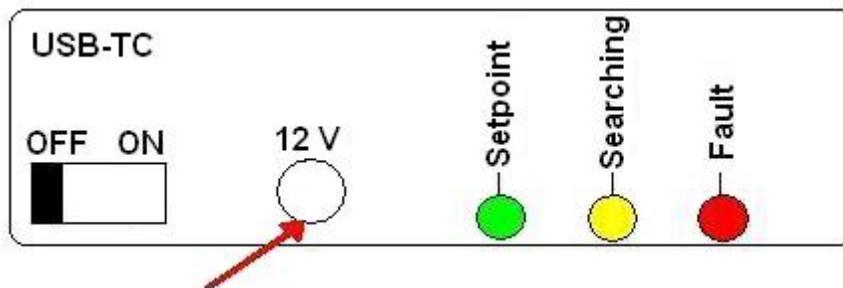
**It is recommended that the unit be left on unless you plan to have it powered off for longer than 24 hours.**

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#### ► Procedure

To attach the 12 VDC power supply,

1. Insert the power supply cable into the 12 V connector on the front panel of the USB-TC.

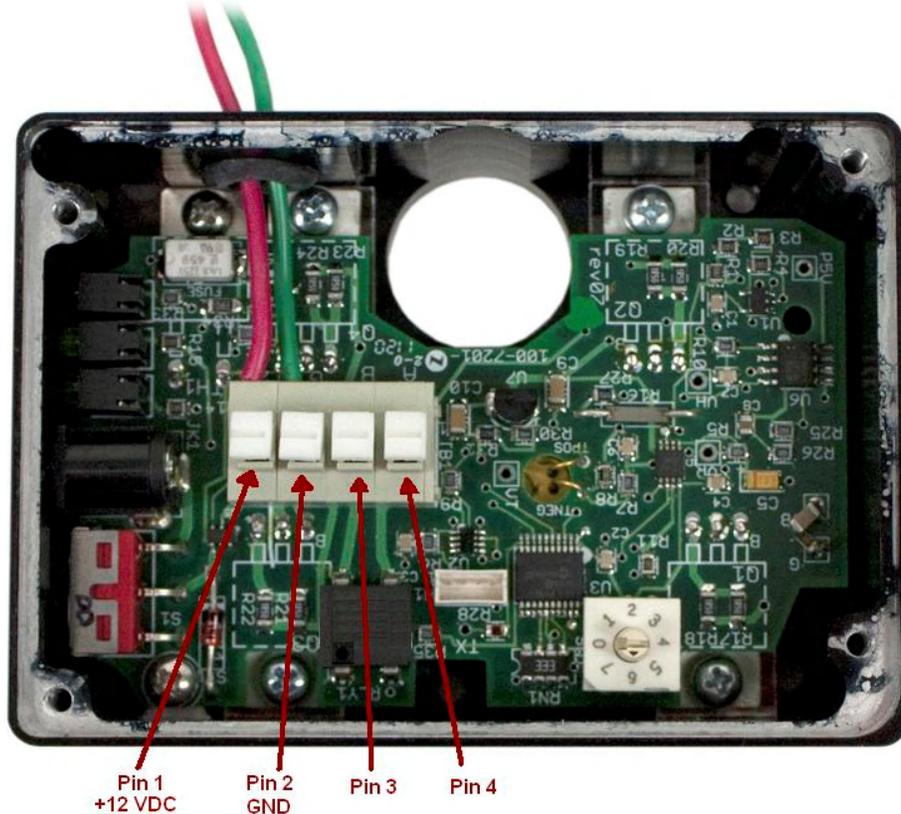


2. Plug the power supply into the appropriate electrical outlets.

#### ► Procedure

To wire the USB-TC directly to a 12 VDC power supply,

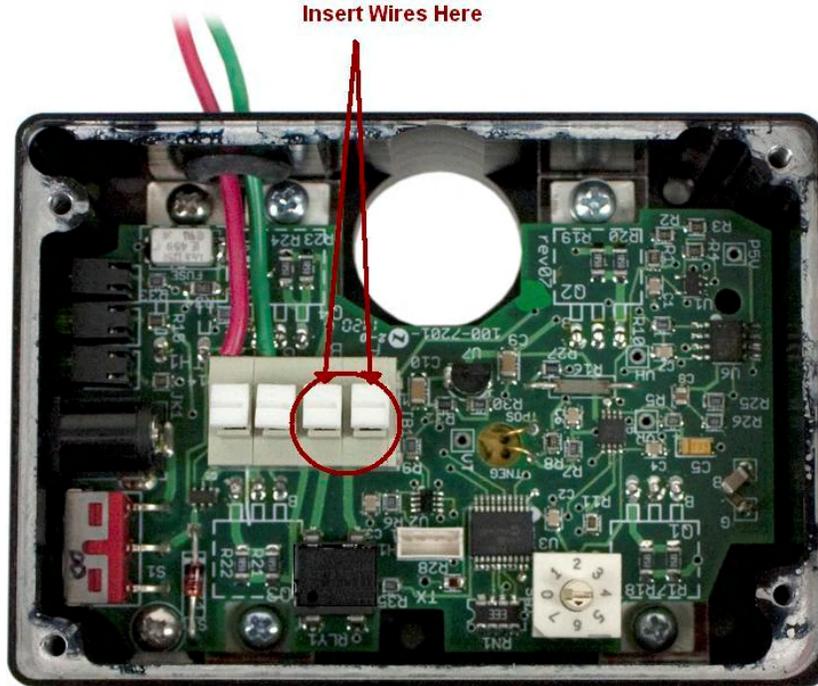
1. Connect the +12 VDC wire to Pin 1 and the common wire to Pin 2 in the push terminal connector inside the USB-TC.



2. Connect the other end of the wires to a 12 VDC power source, being careful to maintain correct polarity.

## Status Output Relay

An isolated dry-contact relay inside the USB-TC is provided to indicate when the unit has reached the setpoint temperature. Connect two wires to Pins 3 and 4 as shown below to use this feature. Circuit continuity (contacts closed) indicates stable temperature.



## Operation

After applying power to the USB-TC, slide the ON/OFF switch to **ON**.

### Caution

**Be sure to wait for the green Setpoint LED to light (indicating that the setpoint temperature has been reached) before taking measurements with the spectrometer. Otherwise, your spectrometer readings could be in error.**

The front panel LEDs indicate the status of the USB-TC as follows:

LED Name	Color	Meaning
Setpoint	green	Spectrometer is stabilized at the setpoint temperature. You can start to take measurements.
Searching	yellow	Spectrometer is being heated to the setpoint temperature. Wait until the Setpoint LED lights to take measurements.
Fault	red	An error condition exists. Return the unit to the factory.

If none of the LEDs are lit, the USB-TC is not receiving power.

# Specifications

Specification	Value
Size	6.35 cm x 8.9 cm x 3.18 cm (2.5 x in. x 3.5 in. x 1.25 in.)
Weight	227 g (8 oz.) without spectrometer
Power Required	12 VDC $\pm$ 5%
Over-Temperature Threshold	65 $\pm$ 5 °C
Temperature Accuracy	Selected temperature $\pm$ 2 °C
Ambient Temperature Range	Controls spectrometer to selected temperature when ambient temperature is between 5 °C and 40 °C below selected temperature (for example, if the selected temperature is 50 °C, then the ambient temperature must be between 10 and 45 °C)
Temperature Stabilization Time	With constant ambient temperature, stabilizes to within 0.1 °C of the final temperature within 30 minutes of power-up
Input Current	$\leq$ 3.0 Amps
Relay Contact Rating	2A, 60V, 0.20 Ohm on-resistance
Pixel Stability	$\pm$ 0.025 pixel/°C

