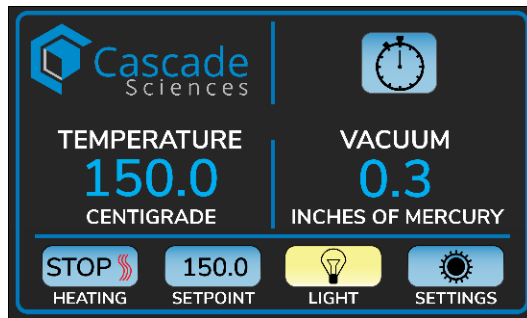
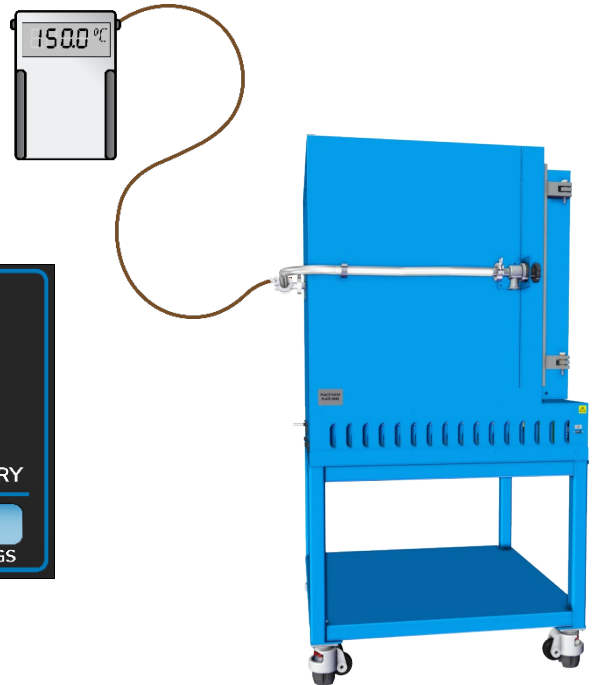


Revision: October 4, 2019



CVO-10 & CVO-5 VACUUM OVENS

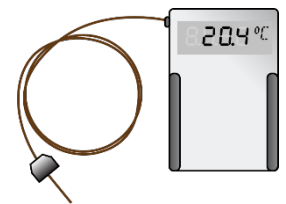
Temperature calibration procedure instructions.



TEMPERATURE REFERENCE SENSOR DEVICE

A temperature reference sensor device **must be purchased separately from the oven.**

- The reference device must be accurate to at least 0.1°C.
- Use a digital device with vacuum-rated thermocouple probes that can be inserted through and seal a KF-25 vacuum port.
- Select probes suitable for the application temperature you will be verifying and calibrating the display at.



Always use thermocouple probes. Alcohol thermometers are insufficient for conducting accurate temperature verifications and calibrations. Do not use a mercury thermometer. **Never place alcohol or mercury thermometers in the oven chamber.**

CALIBRATION

CALIBRATE THE TEMPERATURE DISPLAY

Cascade Sciences CVO ovens do not normally require calibration. Should your SOP or quality program require calibrations, follow this guideline.

Temperature calibrations match the oven temperature display to the actual shelving temperature inside the oven chamber. The actual temperature is supplied by a reference sensor device. Calibrations compensate for long-term drifts in the microprocessor controller as well as those caused by the natural material evolution of the sensor probe in the oven chamber. Calibrate as often as required by your laboratory or production protocol, or regulatory compliance schedule. Always calibrate to the standards and use the calibration setup required by your industry requirements or laboratory protocol.

A Suggested Calibration Set-Up

1. Introduce the reference device vacuum-rated thermocouple probe feedthrough into the KF-25 port on the back of the oven.

- There must be at least 12 inches (305 mm) of wire in the chamber to prevent heat sinking, which would result in a false low temperature reading.

2. Position the sensor probe head at the center of the bottom shelf, with the probe head in direct contact with the shelf surface. Secure the probe head in this position using the polyamide tape.

3. After securing the probe head in position, use the KF-25 clamp to secure the feedthrough and seal the port.

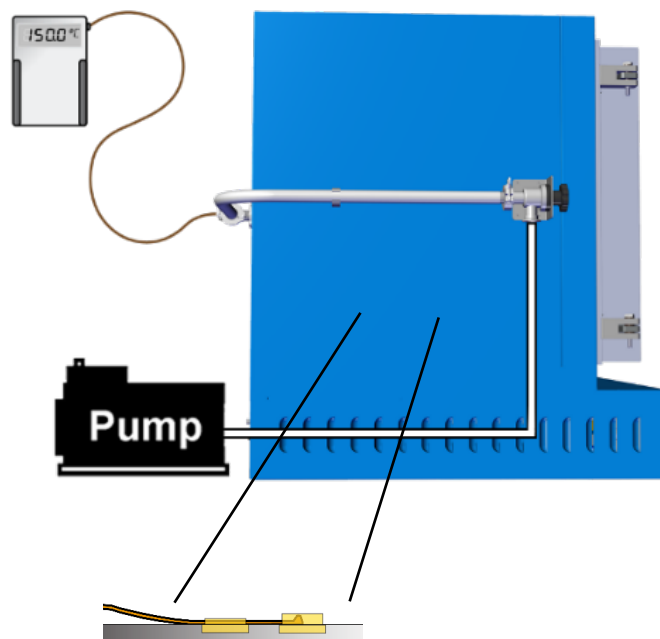
4. The oven door must be closed and latched. Failure to do so will prevent an accurate calibration.

5. Evacuate the chamber to the vacuum level of your application or baking process. The chamber must be under vacuum to perform an accurate calibration.

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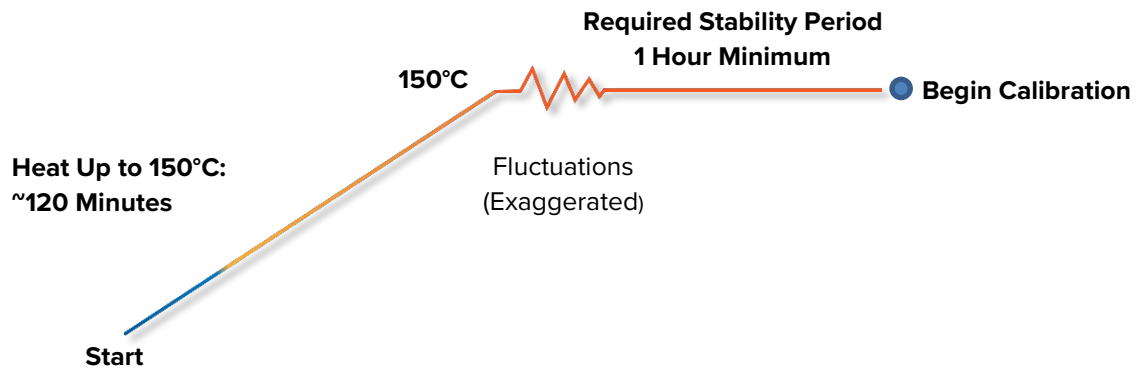
Heat-resistant polyamide tape recommended



CALIBRATION

5. Heat up and stabilization period: The oven shelving temperature must be stable at temperature in a vacuum environment to perform an accurate calibration.

- The temperature is considered stabilized when the oven chamber has operated at your calibration temperature for at least 1 hour with no fluctuations greater than the specified temperature stability of the oven (see the Unit Specifications chapter of the unit Installation and Operation Manual).



Oven Chamber Heat Up and Stabilization Phases

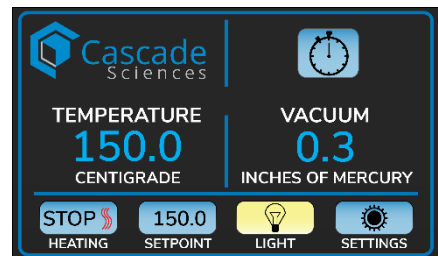
Suggested Calibration Procedure

1. Once the oven temperature has stabilized, compare the reference device and oven temperature display readings.



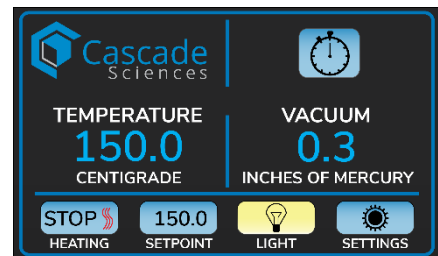
Reference Device

Unit in Calibration



Reference Device

Calibration Required



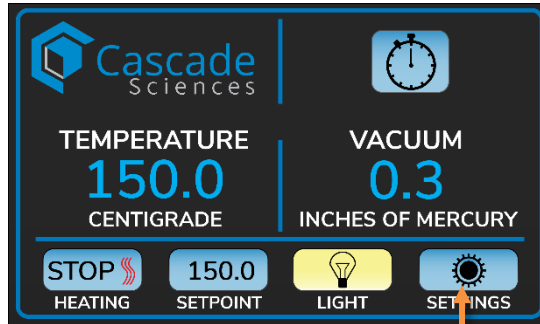
- If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the display is accurately showing the chamber shelf temperature. **The Temperature Calibration procedure is now complete.**
- If the difference falls outside of your protocol range, advance to the next step.

CALIBRATION

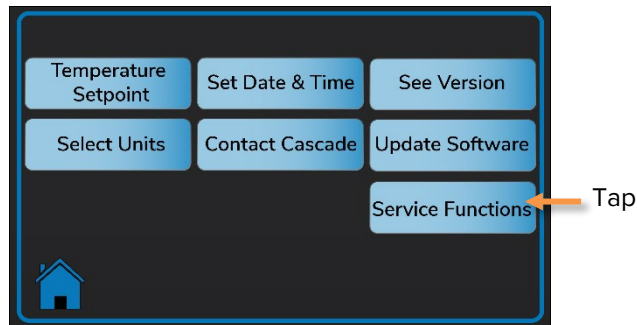
Temperature Calibration Continued



2. Tap the Settings button on the Homepage.

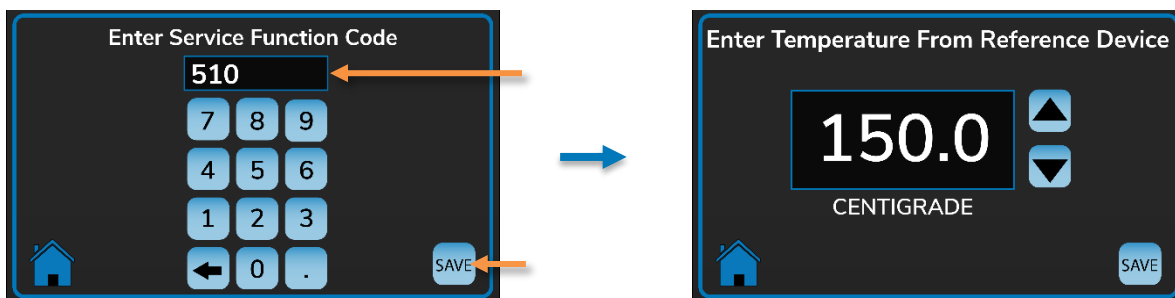


3. Tap the Service Functions button.



4. Enter 510 in the Service Function Code field and then tap the Save button.

- This brings up the Calibration Menu.



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CALIBRATION

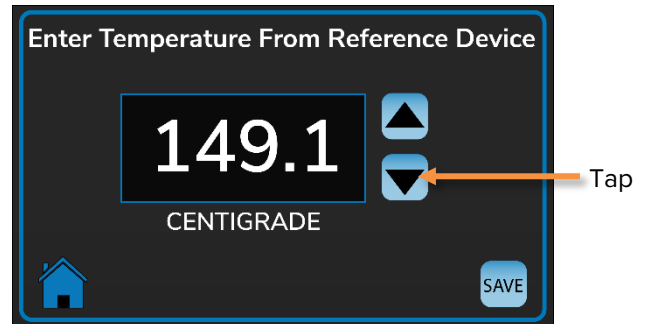
Temperature Calibration Continued

5. Use the arrow buttons to enter the reference device reading.

- The temperature calibration function has a range of approximately $\pm 10^{\circ}\text{C}$ (18°F). For temperature deviations outside these parameters, contact **Technical Support**.



Reference Device



6. Tap the Save button to save the new temperature.

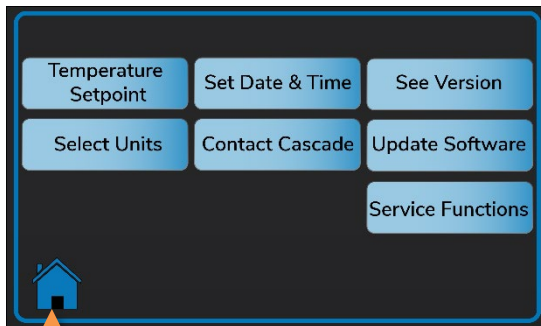


- The display will automatically return to the Settings menu page.

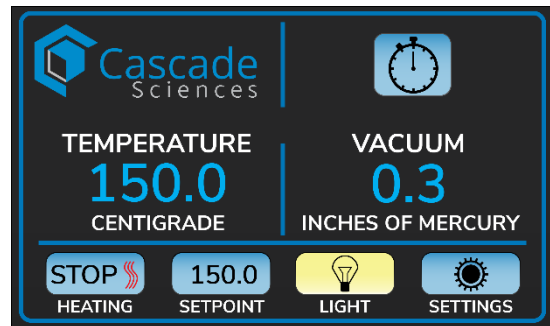
7. Tap the Home button to return to the Homepage from the Settings menu.



- The unit will begin heating or passively cooling to achieve the setpoint temperature.
- Note:** The Homepage will not immediately show the corrected display temperature. See the next page for how to change this.



Tap



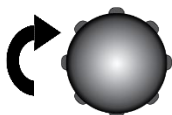
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CALIBRATION

Temperature Calibration Continued

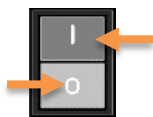
8. Isolate the oven chamber and cycle the oven power off and on.

Turning on the oven off and then on again resets the display, so that it shows the corrected temperature. Otherwise, the oven will take about 10 minutes to adjust the display to the corrected temperature.



A. Close the oven Vacuum Valve

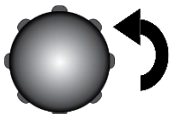
- This prevents external atmosphere from backfilling through the vacuum pump if cycling interrupts power to the pump.
- Cycling the power on a CVO-10 oven that has a vacuum pump plugged into the outlet on the oven will interrupt power to the pump.



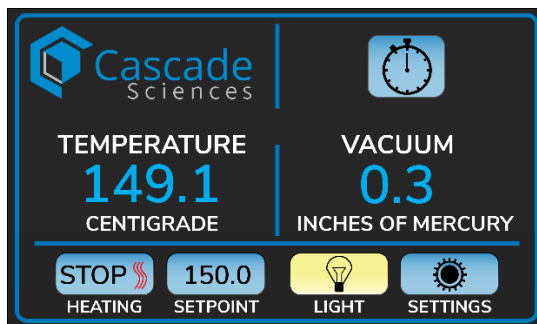
B. Cycle the oven power off and back on.

- The oven should now display the corrected temperature.

C. Verify the vacuum pump is running.



D. If the pump is running, open the Vacuum Valve to resume evacuating the oven chamber.

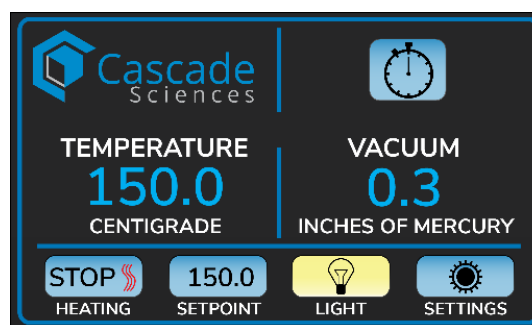


9. Allow 1 hour for the oven to stabilize after it has reached the corrected setpoint temperature.

- Failure to wait until the oven is fully stabilized will result in an inaccurate reading.



Wait 1 Hour



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CALIBRATION

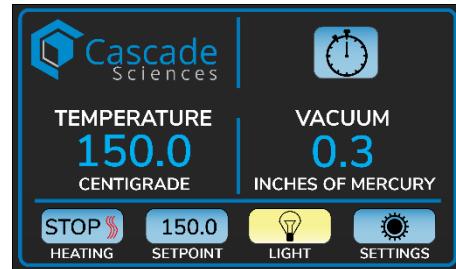
Temperature Calibration Continued

10. Compare the reference device and the corrected oven temperature display readings again.



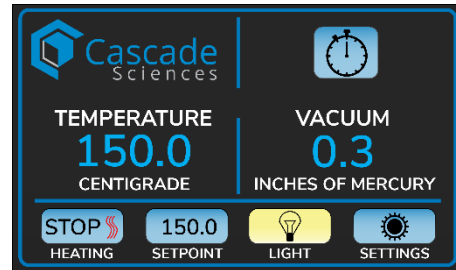
Reference Device

Unit in Calibration



Reference Device

Further Calibration Required



- If the reference device and the chamber temperature display readings are now the same or the difference falls within the range of your protocol, **the oven is now calibrated for temperature.**
- If the difference still falls outside the acceptable range of your protocol, repeat calibration steps 2 – 10 up to two more times.

If the temperature readings of the oven temperature display and the reference device still fall outside your protocol after 3 calibration attempts, contact **Technical Support** for assistance.

End of Procedure