

Calibration Verification Kit (CVK)

-for all Exergen DermaTemp 1001 series medical thermometers

What is the purpose of a calibration verification kit?

It allows the calibration of any Exergen DermaTemp 1001 series thermometer to be verified anywhere conveniently, quickly and accurately.

Why is a CVK necessary?

Calibration verification is a commonly required part of routine quality assurance programs, and also is used if a question is raised about the accuracy of a particular thermometer. Actual recalibration of an Exergen thermometer is never required unless it has been physically damaged or experiences component failure, in which case the calibration verification test identifies the problem device, which then is returned to the factory for repair.

What is in the CVK?

A special DermaTemp DT1001 Certified Master (CM) reference thermometer of the same type in use by the institution, a portable hand-held reference blackbody, an AC plug-in adapter for long term use, a 9-volt alkaline battery for portable use, and a rugged storage case.

Who uses the CVK?

The main users are biomedical/clinical engineering, laboratories, and clinicians conducting skin temperature scanning of patients, where regular calibration checks are required.

How is the CVK ordered?

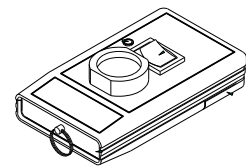
The order must include the model number of any one of the DermaTemp thermometers that will be verified. This identification assures an exact calibration match to the CM reference thermometer.

Does the master reference thermometer need calibration?

The calibration of the CM thermometer should be checked and factory re-certified yearly. This is indicated by the due date on the calibration sticker affixed to the CM thermometer. On or before the due date the CM thermometer should be returned to Exergen for re-certification. The Exergen part number for re-certification is 139000, the cost is \$75.



In Use with DT1001-LN



Handheld Blackbody

Calibration Verification Procedure

Suitable for All DermaTemp Models

All Exergen infrared thermometers are designed to permanently maintain their accuracy, and feature a patented hermetically-sealed optical system which protects the internal optical system against contamination by dirt, dust, moisture, and solvents.

Most reported problems are the result of a dirty lens. As infrared thermometers take an optical measurement, a dirty lens can result in a low reading. Cleaning the lens will result in an immediate return to normal calibration.

Normally, recalibration is never required unless the thermometer has been physically damaged or experiences component failure. Recalibration is done only at the factory, but calibration verification can be conveniently accomplished with a Calibration Verification Kit in biomedical engineering, and other areas requiring frequent accuracy verification of patient thermometry.

Calibration Verification Kit (CVK)

The CVK includes a portable blackbody heat generator providing a stable source of heat in a small cavity. This is used as a target reference to verify the calibration of any of Exergen's medical instruments against an Exergen Certified Master (CM) reference instrument, also included in the kit. The CM instrument must be of the same DermaTemp type as the units to be tested.

The verifier operates with either a 9-volt power supply plugged directly into a 90 to 264 VAC electrical outlet allowing its extended use, or for portable use in patient areas, it can be completely powered by a 9-volt battery. A new alkaline battery can be expected to maintain the blackbody reference temperature up to five hours.



Figure 1. Portable black body is used to verify the calibration of any DermaTemp model vs. a Certified Master, by comparison of readings.

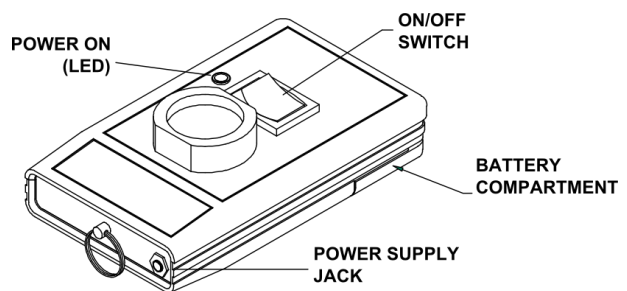


Figure 2. Model PBB-1 Portable Blackbody Calibration Verifier

Calibration Verification:

1. **Getting started.** Turn on the verifier device, making sure the LED is illuminated. If not, check the battery to assure it is installed correctly. If using the power supply, simply insert the plug into the power supply jack, and plug the power supply into any 90 to 264 VAC electrical outlet.
2. **Assure lens is clean.** Make sure the lens at the tip of the probe of all instruments, including the Master Reference, is clean. To clean, use an alcohol dampened cotton tipped applicator (Q-tip) which is required to get directly on the lens.
3. **Allow device to stabilize.** Once turned on, allow approximately 5 minutes for warm-up and stabilization time. If on battery power the LED should be on and bright. If it dims or goes out, the battery will no longer be able to maintain the stable reference temperature of the blackbody. Do not use the portable blackbody for comparative measurements if the LED is not on and bright.
4. **Allow both the Certified Master and instruments to be tested to acclimate to the same ambient temperature.** Allow to equilibrate to room temperature for at least 10 minutes. Allow extra time if the master thermometer or the thermometers to be verified have recently been brought from either very cold or very warm ambient temperature conditions.
5. **Using disposable sheaths when checking the DermaTemp thermometer calibration with the CVK:** Some Dermatemp DT1001 thermometers are labeled with a 'Requires Disposable Sheath' label; these models should be checked with the disposable sheath installed on the thermometer. Failure to use a disposable sheath on these models will result in an erroneous higher temperature indication. Do not use disposable sheaths for verifying calibration accuracy unless indicated on the DermaTemp thermometer.
6. **Conversion of Master thermometer from F to C:** The CM thermometer can be converted from Fahrenheit to Celsius and back by means of a switch, which is accessible in the battery compartment. While the thermometer is off, insert the end of a paper clip or similar object, and lightly press against a switch beneath the red filter. While holding the switch depressed, press the red power button and the display will toggle from F to C. Repeat the process to toggle back.



F/C Switch

7. **Measure the blackbody target** with both the master thermometer and thermometer being verified by pointing sensor head to the black heated target as indicated below. When measuring the blackbody target with any DermaTemp instrument, for best results do not allow the nosepiece or RS probe tip to contact the conical surface of the blackbody target. This will prevent the transfer of heat into the nosepiece or RS probe tip, which could introduce some thermal drift errors in the displayed temperature indications. Insert the tip of the nosepiece just below the white plastic ring for best results. (Note: the earlier style shorter nosepiece will not contact the blackbody target surface when inserted into the blackbody target.)



8. **Compare CM Reference Thermometer readings to test thermometer.** Alternately insert the CM thermometer and the thermometer being verified into the portable blackbody calibration verifier opening, comparing readings to the CM. One measurement reading using the CM thermometer should be adequate if multiple thermometers are to be verified. If larger quantities of thermometers are to be verified, it is recommended to measure the blackbody target with the CM thermometer once for every ten (approximately) thermometers being verified. This is done to prevent possible drift errors that could be induced into the CM thermometer.
9. **Accuracy Limits:** Comparison between CM and tested thermometer readings should be within $\pm 0.4^{\circ}\text{F}$ (0.2°C) for acceptable field limits the DermaTemp series of professional thermometers. If not, repeat the process. In the event they still differ by more than the acceptable limits, call Exergen Corporation for replacement of the failed instrument.
10. **Reminder:** Comparisons between the CM and the instrument being tested should always be conducted under the same ambient temperature conditions.

Verifier Specifications:

- **Power Source:** 9-volt alkaline battery or 9-volt power supply with adapter blades for North American, European, United Kingdom, Australian and Chinese power outlets.
- **Battery Life:** approximately 5 hr.
- **Low Voltage Indicator:** red LED shuts off when battery voltage drops below ~5.4 volts. Blackbody target temperature is not stable for comparative measurements in this condition.
- **Temperature:** temperature setpoint is nominally set to 96 +/-1°F (35.6 +/-0.5°C).
- **Cleaning:** wipe down with alcohol or mild cleaning solution; do not immerse in any liquid.
- **Recertification:** Certification is for one year. Please call Exergen to arrange for recertification.

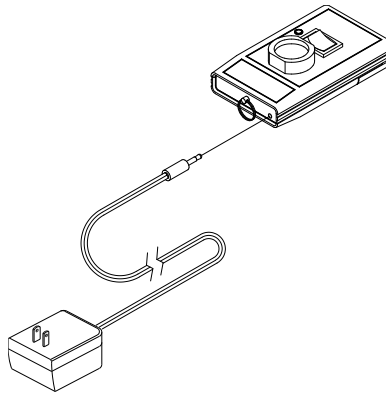


Figure 3. Power supply for PBB-1

If you have any questions about the calibration or operation of the Exergen Infrared Thermometers, please email medical@exergen.com, or call Exergen Medical Division.



EXERGEN CORPORATION, 400 PLEASANT STREET, WATERTOWN, MA, 02472 PHONE: 617.923.9900 FAX: 617.923.9911
www.exergen.com email: medical@exergen.com