



System 4+ UNO+ Calibration Adjustment Guide

NOTE: This document describes the method for adjusting the calibration of LAND System 4+, UNO+ and VDT+ pyrometers. It is intended for use by trained technicians who are familiar with these products and with non-contact temperature measurement. Incorrect adjustment will reduce the accuracy of your instrument and lead to incorrect temperature measurements.

Connecting to the Web Server

Connect the instrument to a PC as described in Section 4.9 of the UNO user guide or Section 5 of the System 4 user guide.

Primary Page

This webserver involves several pages with their own dedicated purpose. This can be used to calibrate and change the setup of your device.

Service Password: Enter the **first six digits of the serial number** of your product. This can be found on the back of the instrument and inside the case.

After this password is entered, options will appear below. Select the page you wish to proceed to.

← → ↻ 🏠 ⚠ Not secure 10.1.10.50

LAND[®]
AMETEK

Settings

Language ✓

Mode Linear Processor

Range 300-1100C 600-2000F

Emissivity

Window Transmission Enable On Off

Response Time ms

Peak Picker On Off

Service Password

Once a successful password has been entered. A hidden link for the "Calibration Page" will appear.

Enter the serial number here to access the next page.

Setting up for calibration

The pyrometer's calibration can be adjusted so that its reading matches the temperature of an object whose temperature is known accurately. This is typically a calibration source such as the LAND Landcal P550P. For highest accuracy, the temperature of the calibration source should be verified using a calibrated, traceable thermocouple or pyrometer.

Ensure that the window transmission and peak picker function are OFF and that the emissivity is correctly set (e.g. 1.00 for a black body).

Set a longer response time on your instrument, the offset and gradient will take longer to alter the temperature.

Set the pyrometer to be adjusted in front of the calibration source so that its field-of-view is overfilled. Switch on the pyrometer and allow it to warm up, then connect a precision milliammeter to the 4-20 mA output. The measured temperature is calculated as

$$T = M + ((R - M) \times (I - 4) \div 16)$$

Where

- I = measured current in milliamps
- M = instrument's minimum measurable temperature
- R = instrument's maximum measurable temperature

For example, a UNO U2+ with a measurement range of 300 to 1100 °C gives an output of 17.3 mA. This indicates a temperature

$$T = 300 + ((1100 - 300) \times (17.3 - 4) \div 16) = 965 \text{ °C}$$

Calibration password

Enter the calibration password. This is the first six digits of the instrument serial number followed by 'Cal'. For example, if your serial number is 12345622, the calibration password is 123456Cal.

Adjusting the calibration

If adjustments are needed, click the arrows on the calibration screen to alter the values of the offset or gradient. Set the gradient first and then adjust the offset.

Offset Adjustment is used to fine-tune the measurement in the bottom 10% of the measurement range e.g. below 30 °C for an M6+ with measurement range 0 to 300 °C or below 380 °C for an M2+ with measurement range 300 to 1100 °C. The factory calibration has Offset = 0.00.

Note that the offset adjustment has very little effect when measuring temperatures in the upper part of the measuring range.

Gradient adjustment is used to adjust the measurement in the upper 50% of the measuring range. In most cases, you should adjust the calibration at the point of most interest. For example, if an M6+ is used to measure a process operating at 200 °C, use a calibration source at 200 °C and adjust the gain to give a milliamp output corresponding to that temperature. The factory calibration has Gradient = 1.00.

Note that gradient adjustments can be made between 10% and 50% of the measuring range, but these will have a very large effect on measurements made near the top of the range.

Returning to Factory Calibration

If an incorrect calibration adjustment has been applied, you can reset the instrument to its factory calibration by setting

- Offset = 0.00
- Gradient = 1.00

The screenshot shows the 'Calibration' web interface. At the top, there's a navigation bar with a back arrow, a refresh icon, a home icon, and a security warning 'Not secure' followed by the URL '10.1.10.50/calibration.shtml'. The LAND AMETEK logo is in the top left. The main heading is 'Calibration'. Below it, there are two radio buttons for 'Range': '300-1100C' (selected) and '600-2000F'. Under 'Offset', the value is '0' and there are up and down arrows. A note below says 'Note; Range: -100 ... 100, Offset Default Value: 0'. Under 'Gradient', the value is '1.000' and there are up and down arrows. A note below says 'Note; Range: 0.500...1.500, Gradient Default Value: 1.000'. At the bottom, there's a 'Service Password' field with a red arrow pointing to it. A note above the field says 'Calibration password. Serial number followed by Cal.'. Red boxes and arrows highlight the adjustment arrows and the password field.



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