Endurance Field Calibration Procedure (rev. 1.0)

July 2020

1 Introduction

Endurance can be re-calibrated using several instruments and DTMD v6 software.

Before any re-calibration, please use the Endurance software to back up the current data saved in the unit, so that the unit can retrieve the saved parameters if needed. If not backing up, at least make a note of the current offset and gain values.

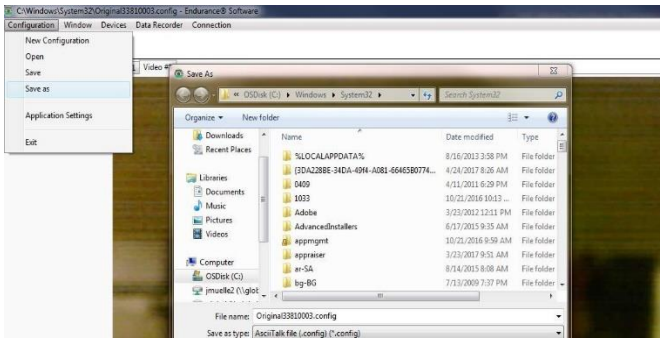

Figure 1. Backup calibration parameters

Note: Leave Endurance unit power on at least 30 minutes to stabilize before calibrating.

2 IR Calibration

Endurance Field Calibration Software provides 2 calibration methods: 1-point calibration (offset only) and 2-point calibration (offset and gain).

Calibration Method	Advantage	Disadvantage
1-point	Fast. Increase the accuracy around the concerned target temperature (around the calibration point).	The accuracy might be decreased at some target temperature other than the calibration point.
2-point	Increase the accuracy between the two calibration points.	The accuracy might be decreased out outside calibrated range.

Table 1. Comparison of IR calibration method

2.1.1 Calibration Geometry

Figure 3 shows the relative positions of black body, aperture and Endurance during calibration.

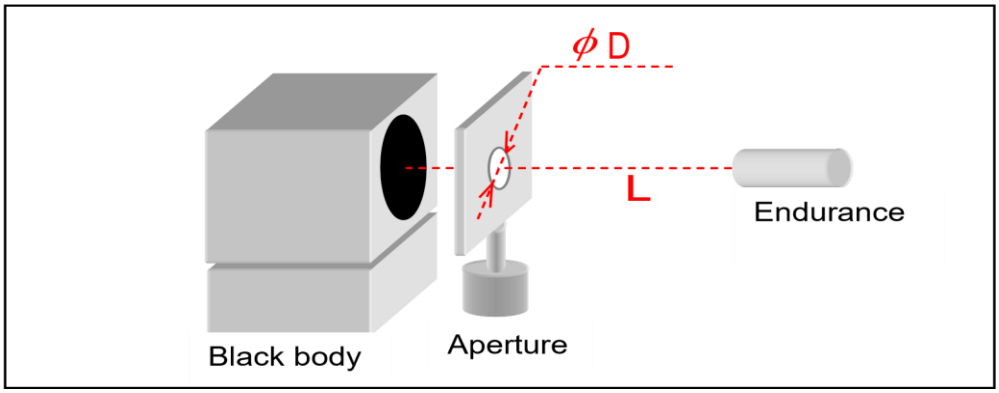

Figure 3.

Figure 4 illustrates how calibration geometry is measured from the face of the Endurance to the back of the blackbody cavity. Refer to your manufacturers dimensions when referencing cavity distances for calibration on your Blackbody.

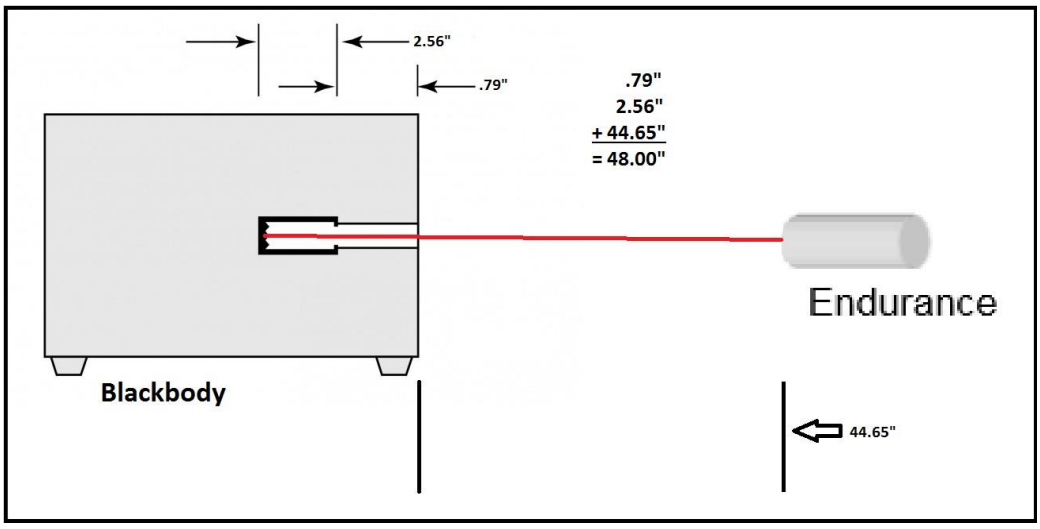

Figure 4.

2.1.2 Alignment of Blackbody and Sensor

You will need to align the unit, aperture and Blackbody. ***Put your unit in 1-color mode for this alignment step.***

While looking through the unit (or using video, LED or laser), roughly align the reticle to the center of the Blackbody aperture by moving the tripod and using the fine adjustment knobs on the tripod.

Close the Blackbody aperture so it is the same size at the reticle when you are looking through the unit.

Adjust the focus ring and sensor alignment so that you obtain the highest reading. Open the aperture to required diameter and set the sensor to 2C mode (if applicable). 2C models allow adjustment of the 1C and 2C reading independently.

The image below in Figure 5 shows how the apperture starts “wide” and will eventually end in a “narrow” circle.

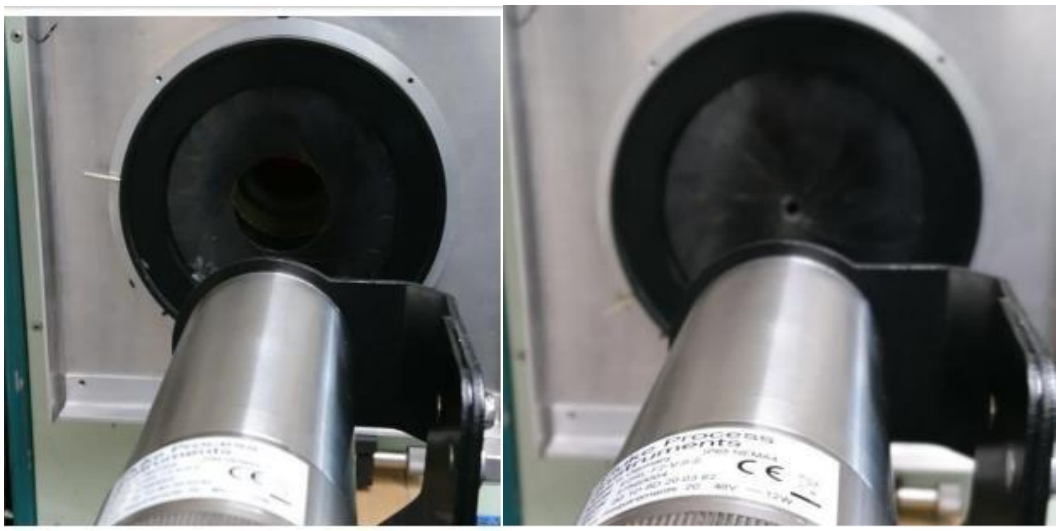

Figure 5.

2.2 2-Point Calibration

2-point calibration calculates the offset and gain value according to the real temperature of two target and the corresponding temperature measured by Endurance unit. Two targets having known surface temperature are used for this process.

Open the Field Calibration software. When prompted to click on the device name, you will select the IP address of the connected Endurance unit and choose “2-Point” as the calibration type. (Figures 5a and 5b).

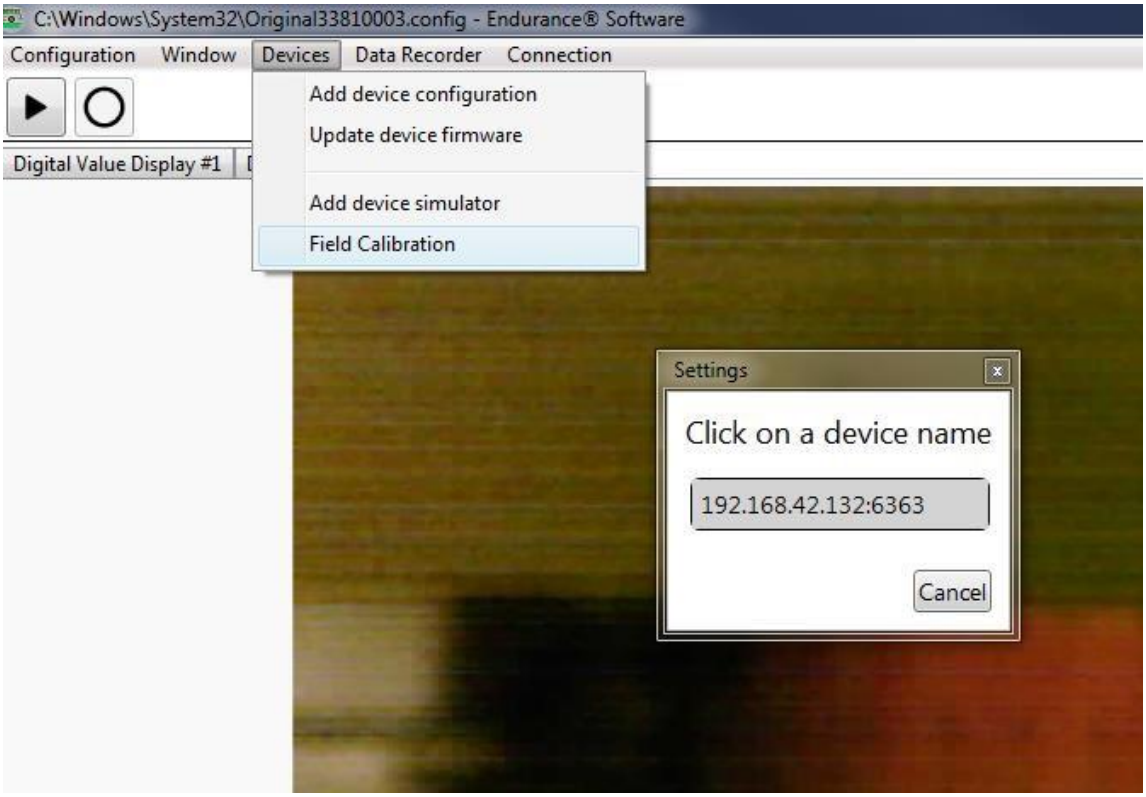

Figure 5a. 2-Point Calibration

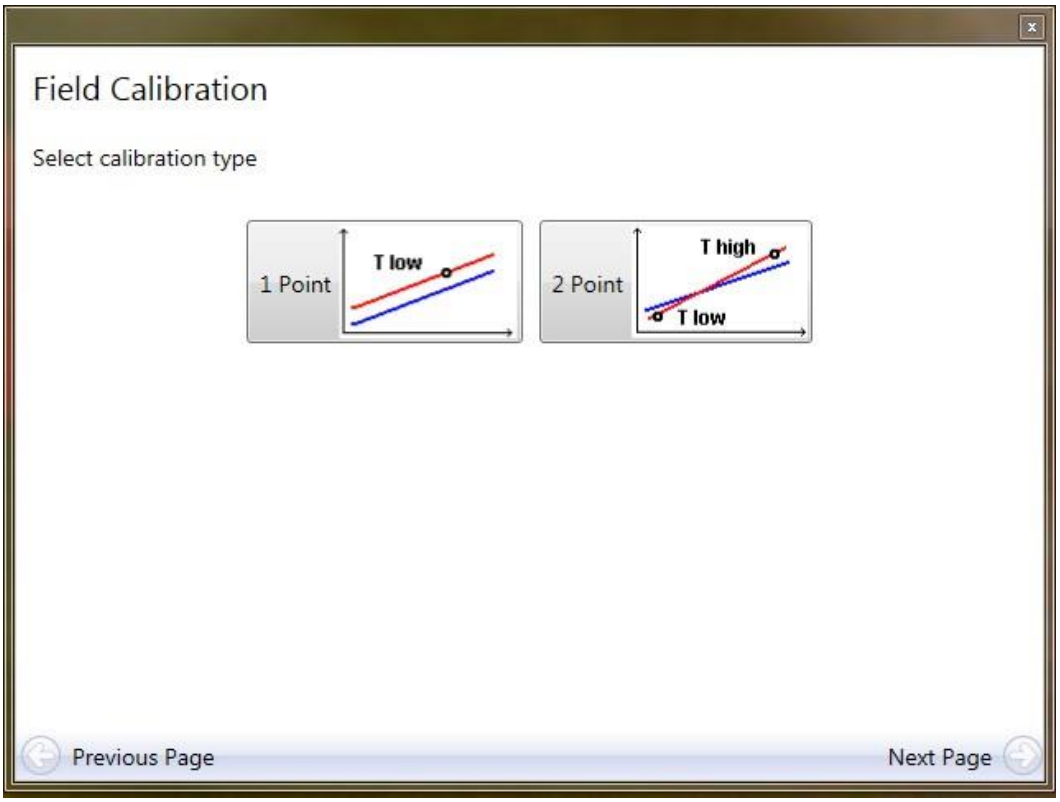

Figure 5b. 2-Point Calibration

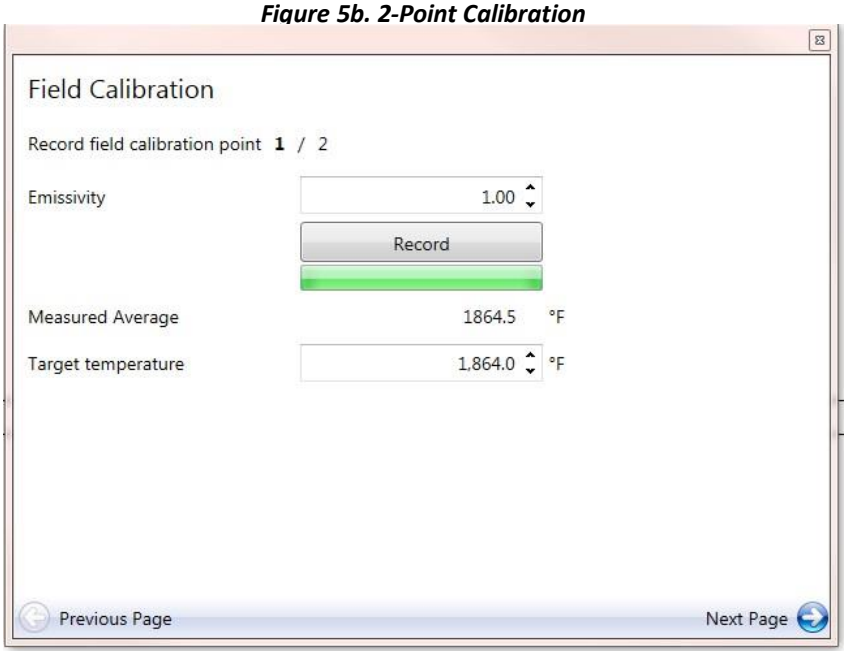

Figure 5c. 2-Point Calibration

Enter 1864°F as target temperature and select record. Make sure that your emissivity on the sensor and Blackbody Match!

After its done select next page at the bottom right corner.

Next you will change your Blackbody over to 3632°F. allow 15 minutes for your Blackbody to stabilize. And then select Record.

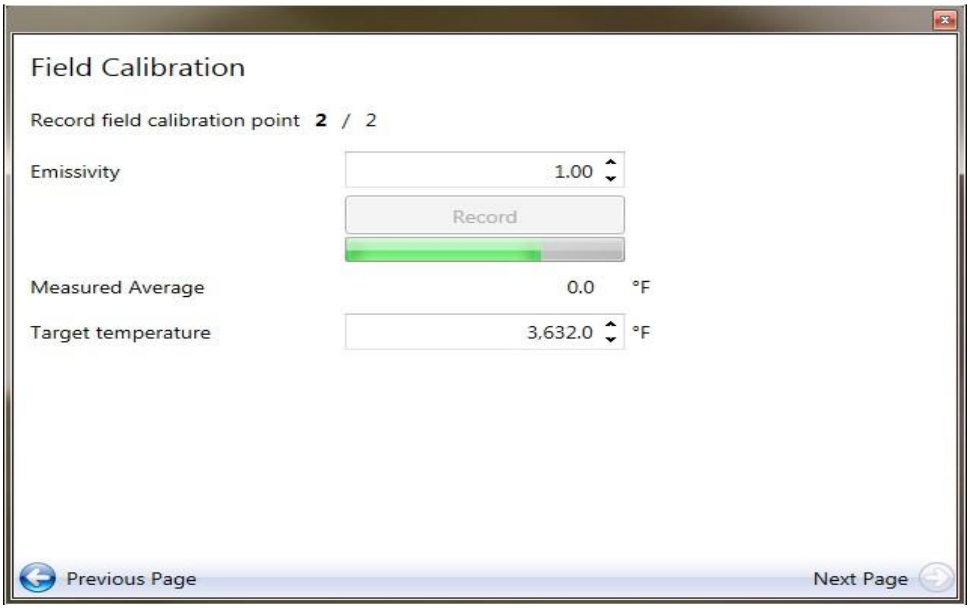

Figure 5d. 2-Point Calibration

After completion you will see a screen like figure 3e. Select transfer data to device and then exit out of the program. If your unit does not pass and you see an error like in figure 3f, then you should redo your calibration from the beginning and try again.

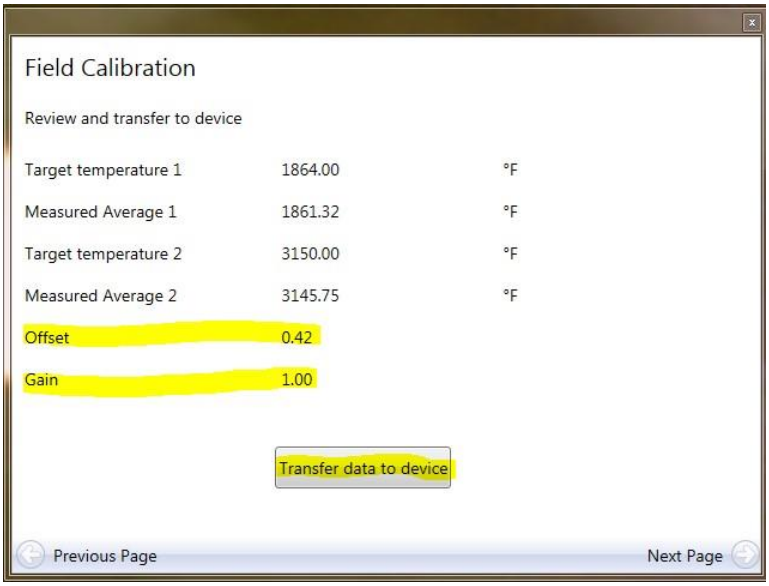

Figure 3e. 2-Point Calibration

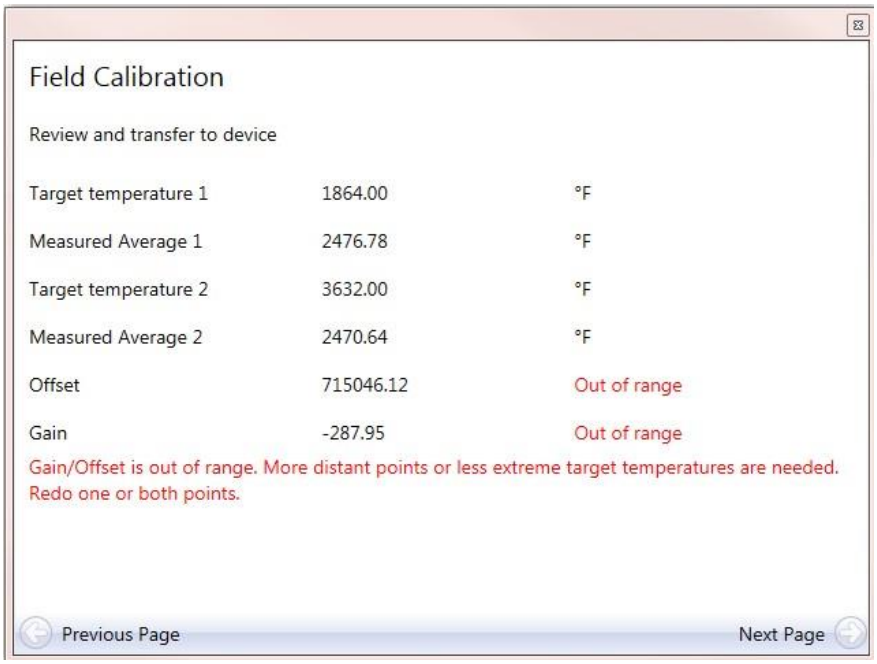

Figure 3f. 2-Point Calibration