

How-to use WEB Calibration App

2026 University of Fukui

Supported Browsers

We use the Web Bluetooth API to communicate with the ESP32.

Please note that this API is experimental and may not be supported by all browsers.

Below is a list of compatible browsers.

iOS users must install the "Bluefy" browser to use our web application.

OS	Browsers
Windows, MacOS	Edge, Chrome, Opera
Android	Chrome, Opera
iOS/iPadOS	Bluefy

You can download Bluefy from this link:

<https://bluefy.app/>



BLE Web Calibrator

BLE Web Calibrator

DisconnectedESP: Offline

Connect

1. Calibration Sampling

Export CSV

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Master (°C):Fetch Raw

Analyze 3 ModelsApply Linear to ESP32

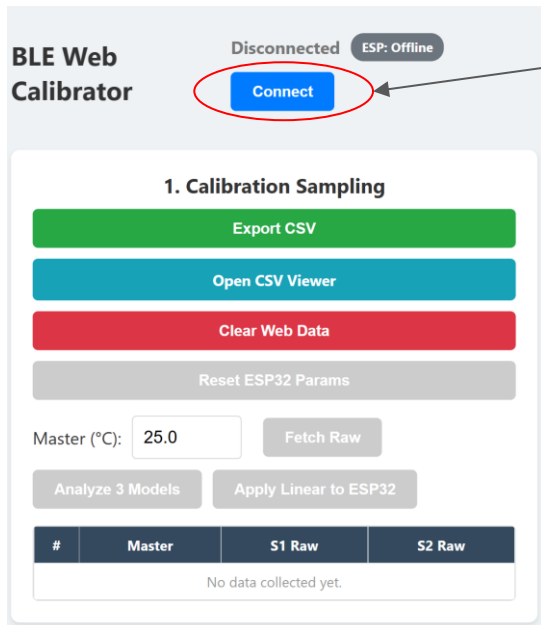
#	Master	S1 Raw	S2 Raw
No data collected yet.			

URL:

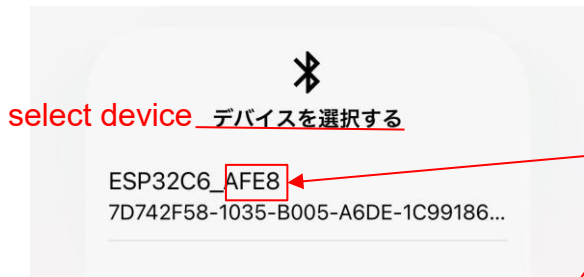
https://www.os.his.u-fukui.ac.jp/abc/web_calibration/



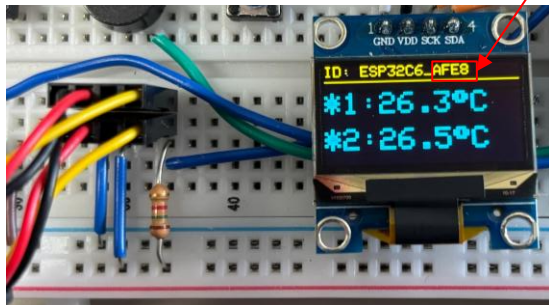
Connect your ESP32(1)



Tap the "Connect" button, then select and pair your ESP32. (Select device)



This is device identifier.
Be careful not to select
wrong device.



Connect your ESP32(2)

BLE Web Calibrator

ESP32C6_AFE8
ESP: Uncalibrated
Disconnect

1. Calibration Sampling

Export CSV

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Master (°C):

Fetch Raw Analyze 3 Models

Apply Linear to ESP32

#	Master	S1 Raw	S2 Raw
No data collected yet.			

Once the connection is established, the device name will be shown here!

NOTE:

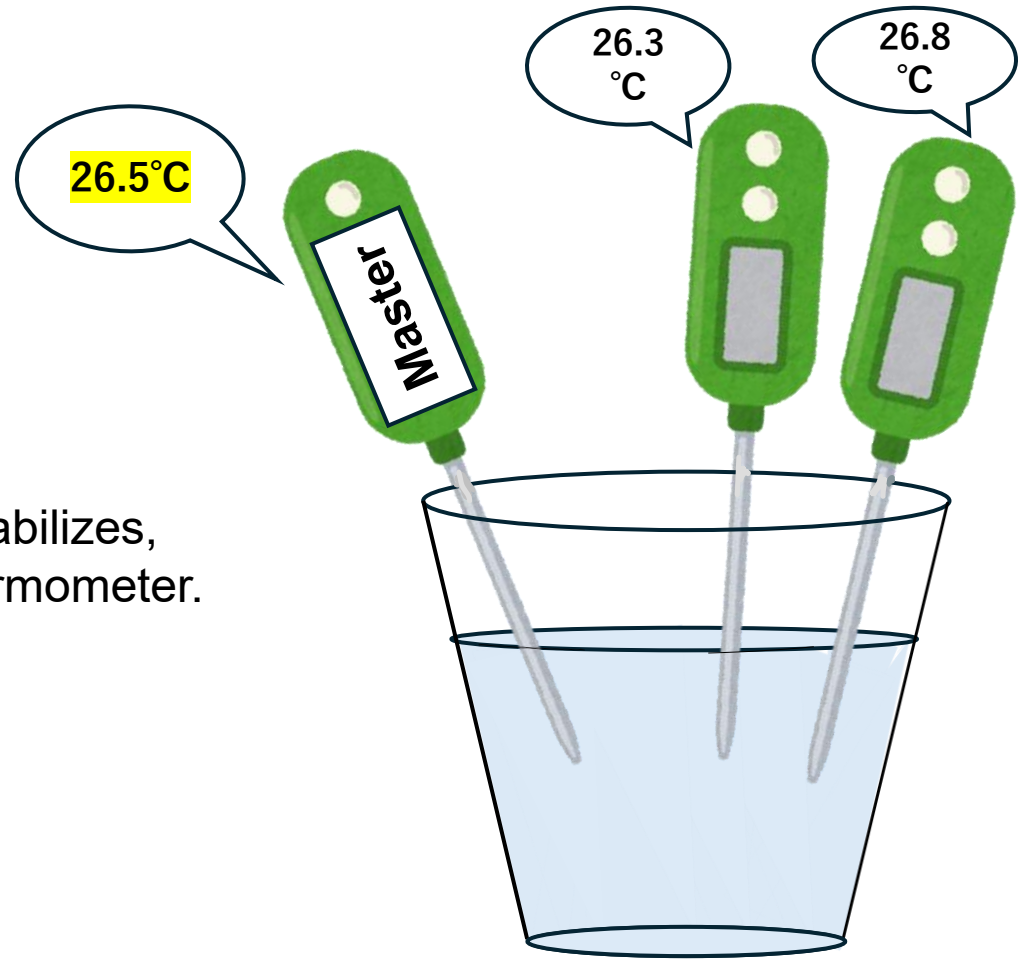
The connection may drop during the experiment.

If this happens, please try reconnecting.

Unless you reload the page or tap “Clear Web Data,” your progress will be saved!

Calibration

- Check your temperature value
(Wait until the value stabilizes)
- Once your temperature reading stabilizes,
check the value on the master thermometer.



Calibration(1)

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Master (°C):

Fetch Raw

Analyze 3 Models

Apply Linear to ESP32

#	Master	S1 Raw	S2 Raw
No data collected yet.			

123 1 2 3 ☆123 ☆→ ¥\$€ %*#

ABC 4 5 6 O*+ +x÷ <=> 空白

あいう 7 8 9 「」: 千々 9 ^|\

()[] 0 ~... ,.-/ ←

Check and enter the Master Sensor's temperature (1).
Then, tap the “Fetch Raw” button (2).
At least 3 data points are required to analyze the data.

Master (°C):

Fetch Raw

Analyze 3 Models

Apply Linear to ESP32

#	Master	S1 Raw	S2 Raw
1	27.50	27.44	27.13

Typed data

Data fetched from ESP32

Calibration(2)

1. Calibration Sampling

Export CSV

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Master (°C):

Fetch Raw

Analyze 3 Models

Apply Linear to ESP32

#	Master	S1 Raw	S2 Raw
1	27.50	27.44	27.13
2	30.00	29.94	29.81
3	31.80	31.69	31.81

Once you have registered 3 points, you can tap “Analyze 3 models.”
You can also add more data points.
Please follow our instructions!

Calibration(3)

Sensor 1 Analysis

[Error Models (x = Raw Temp)]

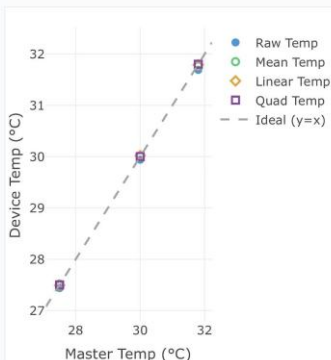
Mean Offset : Error = -0.0767
Linear (1st): Error = $-0.0110x + 0.2487$
Quadratic : Error = $-0.0067x^2 + 0.3857x - 5.5830$

[Temp Calibration Formulas (x = Raw Temp)]

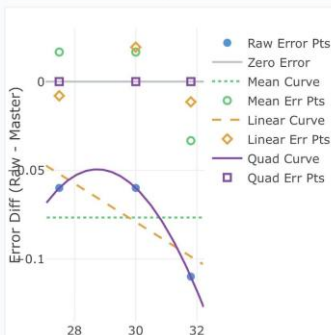
Mean Offset : Temp = $x + 0.0767$
Linear (1st): Temp = $1.0110x - 0.2487$ ← (To be applied to ESP32)
Quadratic : Temp = $0.0067x^2 + 0.6143x + 5.5830$

Method	Mean Err	Variance	Pk-to-Pk
Raw (Before)	-0.0767	0.000556	0.0500
Mean Corrected	-0.0000	0.000556	0.0500
Linear Corrected	-0.0000	0.000190	0.0308
Quad Corrected	0.0000	0.000000	0.0000

Device vs Master Temp



Error Diff



When you tap “Analyze 3 models,” the analysis will be displayed like this.

Here,
Error = (raw data) - (master data),

We want to find formulas that minimize the error for all points.

We offer 3 methods in this application.

Calibration(4)

Sensor 1 Analysis

[Error Models (x = Raw Temp)]

Mean Offset : Error = -0.0767
Linear (1st): Error = $-0.0110x + 0.2487$
Quadratic : Error = $-0.0067x^2 + 0.3857x - 5.5830$

[Temp Calibration Formulas (x = Raw Temp)]

Mean Offset : Temp = $x + 0.0767$
Linear (1st): Temp = $1.0110x - 0.2487$ ← (To be applied to ESP32)
Quadratic : Temp = $0.0067x^2 + 0.6143x + 5.5830$

Method	Mean Err	Variance	Pk-to-Pk
Raw (Before)	-0.0767	0.000556	0.0500
Mean Corrected	-0.0000	0.000556	0.0500
Linear Corrected	-0.0000	0.000190	0.0308
Quad Corrected	0.0000	0.000000	0.0000

Mean Offset

Calculates the mean of the error and subtracts it from the raw value.

Linear and Quadratic

Calculates a fitting curve for the error using the “least squares method” and subtracts it from the raw value.

Note:

Pk-to-Pk (Peak to Peak) represents the error range.
(Pk-to-Pk) = $\max(\text{error}) - \min(\text{error})$.

Calibration(5)



This is the Peak-to-Peak value for the Linear Fit method.

Calibration(6)

Method	Mean Err	Variance	Pk-to-Pk
Raw (Before)	-0.0767	0.000556	0.0500
Mean Corrected	-0.0000	0.000556	0.0500
Linear Corrected	-0.0000	0.000190	0.0308
Quad Corrected	0.0000	0.000000	0.0000

As we increase the dimensions of the fitting curves,
the Variance and Pk-to-Pk values decrease.
Should we then increase the dimensions even further?

Apply Calibration Parameter

1. Calibration Sampling

Export CSV

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Master (°C):

Fetch Raw

Analyze 3 Models

Apply Linear to ESP32

Once you analyze the 3 models, you can tap “Apply Linear to ESP32.” This applies the calculated parameters to the ESP32



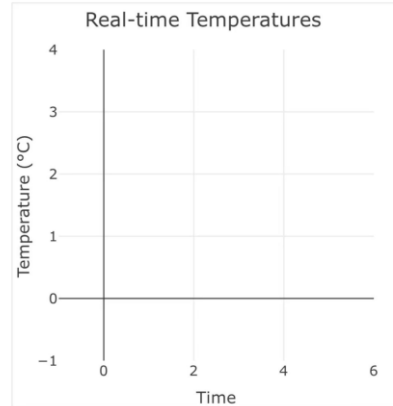
An “*” indicates that the value has been corrected.
You can delete the parameters by tapping “Reset ESP32 Params.”

Real time preview

3. Continuous Monitor (1 sec interval)

Start Plot

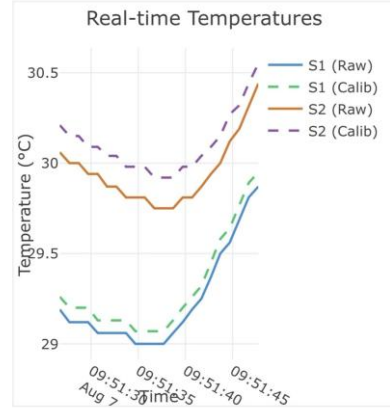
Clear Plot



3. Continuous Monitor (1 sec interval)

Stop Plot

Clear Plot



You can start, stop, or clear the plot.

If you don't apply the calibration parameters, the “Calib” data will not be plotted.

Export CSV

1. Calibration Sampling

Export CSV

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Tap this button to export the data.

The exported CSV file can be opened in Excel or Google Sheets.

Index	Master Temp	S1 Raw	S2 Raw	S1 Error(Raw)	S1 Mean Calib T	S1 Linear Calib	S1 Quad Calib T	S2 Error(Raw)	S2 Mean Calib T	S2 Linear Calib	S2 Quad Calib Temp
1	27.5	27.44	27.13	-0.06	27.5167	27.492	27.5	-0.37	27.3133	27.5106	27.5
2	30	29.94	29.81	-0.06	30.0167	30.0194	30	-0.19	29.9933	29.9751	30
3	31.8	31.69	31.81	-0.11	31.7667	31.7886	31.8	0.01	31.9933	31.8143	31.8

Viewer and Importing CSV

1. Calibration Sampling

Export CSV

Open CSV Viewer

Clear Web Data

Reset ESP32 Params

Tap this button to open the viewer.