Calibration Manual

EXACT MATCH 2 / MINI

EM2 / EM2 Mini Curing Chambers

EXACT

Table of Contents

Introduction

This manual describes the procedure for calibrating the Exact Match 2 (“EM2”) family of devices including EM2 and EM2 Mini. EM2 Devices include an internal calibration Function triggered by a user from the exact portal. The calibration results and associated certificate are available on the exact portal once the calibration process is completed. If a qualified 3rd party is performing the calibration on a client’s behalf, please refer to the “Contacting Exact” Section below to arrange access to the device web portal for the 3rd party to perform the calibration and access the results.

Contact EXACT

Support is available for our clients 24/7.
We can be reached via:

Phone

Canada: +1-647-812-0248
USA: +1-302-485-0810
Australia: +61-480-088-924

Email

support@exacttechnology.com

Help center

https://help.exacttechnology.com/
Submit a request ticket for support here.

Resources

Visit the EXACT Help Center to access our library of user manuals, datasheets and troubleshooting guides for all our product lines.

Specifications

Hardware datasheets are available on request (see “Contact Exact”), and can be retrieved from the help center under the “Hardware Data Sheets” Section.

Requirements for successful calibration completion:

- Maximum Variance between **expected reading** to **incoming measured reading**
- Maximum Variance between any 2 readings of a single calibration sample during calibration process

Self Test:

- Internal probes connected and reading between 0.1°C and 50°C.
- Calibration samples connected to C1 and C2.
- Fans connected and operating above 600RPM.
- Cooling performance <=-0.15°C per minute.
- Heating performance >= (-0.0326 * T_{start} + 2.27 °C)/minute
  - >= 1.45 °C/min at 25 °C

Required Equipment

EM2 Calibration Kit

The EM2 Calibration kit consists of 8 precision calibration samples numbered 1 to 4, with 2 samples per number.

Each number corresponds to the “test number” displayed on the LCD of the Device under calibration (see “Calibration and Self Test procedure” section).

Kit Contents

Number	Qty	Resistance	Emulated Temperature
1	2	33kΩ +/- 0.05%	-4.2°C
2	2	22kΩ +/- 0.05%	5.1°C
3	2	4.99kΩ +/- 0.05%	44.6°C
4	2	2.2kΩ +/- 0.05%	70.5°C

If NIST traceability is required, contact an exact representative to specify. Additional costs may apply to provide 3rd party certification of calibration samples.

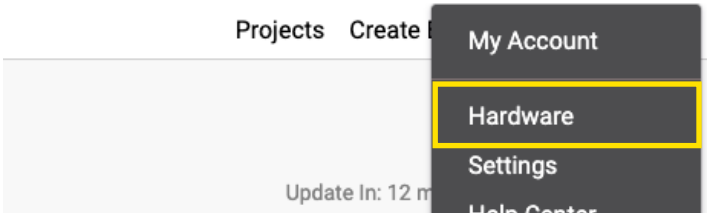
NIST traceable calibration samples (if requested) will be provided a unique serial number and calibration validity date.

Standard calibration samples will be provided to the client “As-is” and can be assumed conforming for a period of 10 years from the date of manufacture provided the samples are stored in a cool dry place and undamaged.

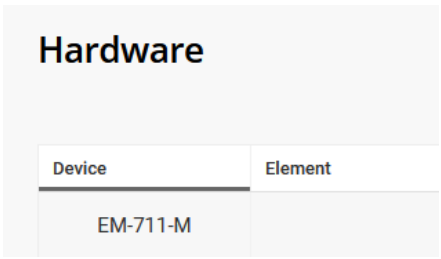
Calibration & Self-test Procedure

1. Login to portal with your username and password if not already done.

2. Access the device hardware page by clicking on your username in the top right corner and selecting ‘Hardware’ From the resulting menu.

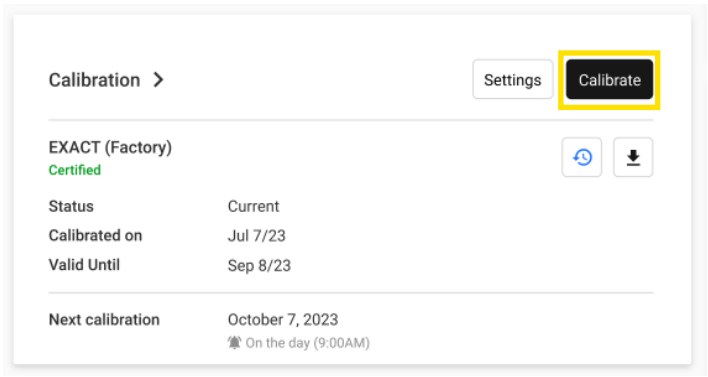


3. Select the Serial number of the device to be calibrated from the list of devices on the account.



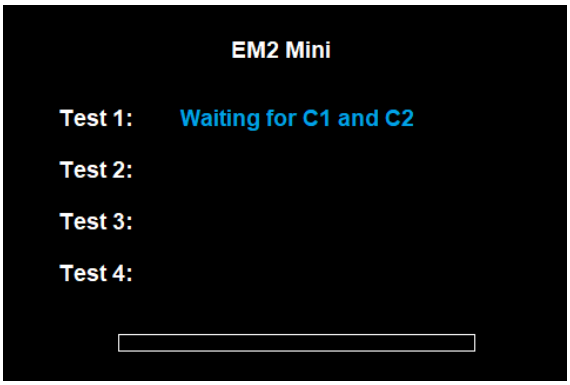
4. Under the ‘calibration’ section, click “calibrate” in the top right corner.

5. Observe the LCD on the Device. “Waiting for C1 and C2”. Should be displayed next to ‘Test 1’.
   - If “Issue with Fans” is displayed instead, refer to the “Contact Exact” section to request technical assistance.



6. Connect the calibration samples labeled ‘1’ to each of the cylinder probe ports.

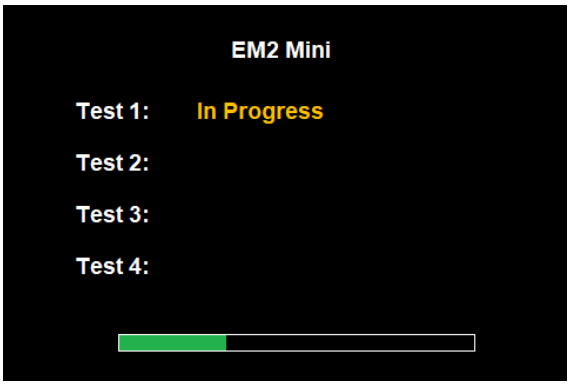
7. The Status of the test will change to “In progress” while the device collects measurements from the calibration sample.



8. Once the Test is complete, Test 1’s status will change to “Complete” and Test 2 Will now Display “Wrong Probe in C1 and C2”.

9. Remove the Test 1 Samples from the ports and connect the Test 2 Samples.

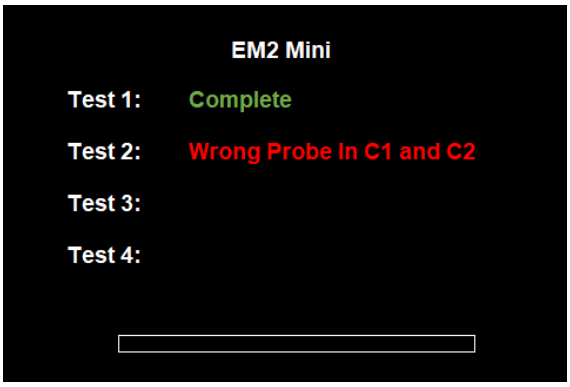
10. Repeat Above steps for each Test until All 4 Tests show “Complete”.



Calibration & Self-test Procedure

11 The calibration is now complete and the results should become available on portal shortly (see “Calibration results”).

- If the calibration is not completed due to an error or failure condition, refer to “Contact Exact” to receive technical support.



12 The device will now proceed to perform a self test for the next 10-15 minutes, it may be left unattended as no further user input is required.

- The completion of a self test is not required to apply the calibration offset, the device may be reset at any time.

13 Observe the self test results on the LCD if desired, then power the device off for 10 seconds before powering back on to resume normal operation of the Calibrated device.

Calibration Adjustment

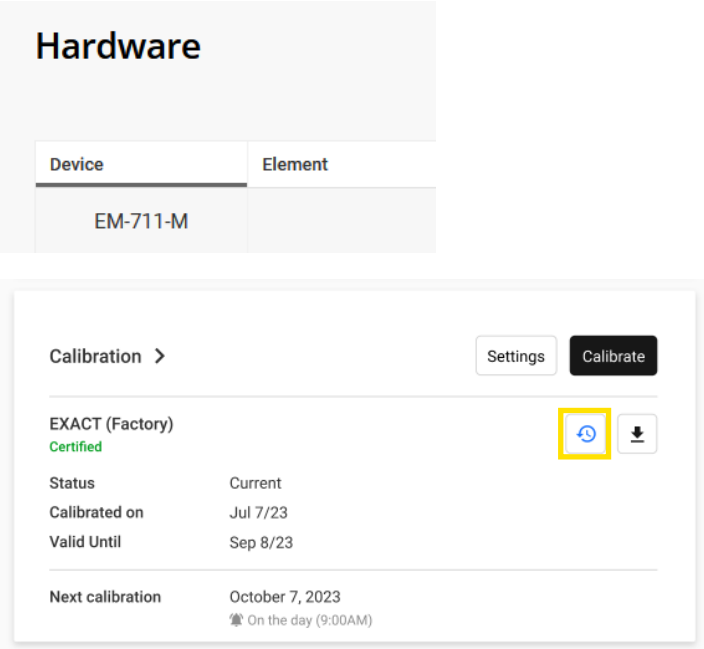
The Resistance of each calibration sample corresponds to the resistance produced by the Thermistors within the EM2 (and within the optional external C1 and C2 probes) at specific temperatures.

The device is calibrated automatically by the device firmware using these known reference sources. The device measures the connected calibration sample, calculates calibration offsets and stores the calibration offsets in nonvolatile memory.

Reading error is consistent across internal and external ports of the device. The calibration offsets calculated using samples connected to the C1 and C2 inputs are valid for and applied to the internal inputs as well.

Factory Calibration is stored in a separate sector of non-volatile memory. The Calibrated device can be reverted to it's original factory calibration by following the below steps:

1. Access the device hardware page by clicking on your username in the top right corner and selecting 'Hardware' From the resulting menu.
2. Select the Serial number of the device to be calibrated from the list of devices on the account.
3. Under the 'calibration' section, Click on the 'Restore' Button next to the 'EXACT (Factory)' Calibration.



The use of the factory calibration offset can be visually confirmed on the unit by the ○ symbol displayed in the top right corner of the LCD.

The use of the most recent User Calibration can be visually confirmed on the unit by the ● symbol displayed in the top right corner of the LCD.

Calibration Results

Calibration results are transmitted to the exact portal and results can be accessed using the following steps:

5 Access the device hardware page by clicking on your username in the top right corner and selecting ‘Hardware’ From the resulting menu.

6 Select the Serial number of the device to be calibrated from the list of devices on the account.

7 Under the ‘calibration’ section, Observe the list of Calibrations performed on the device.

8 Calibration certificates can be downloaded from this view by clicking the download button.