

C-Measure

Stretch Film Measure System

User Manual — Version 1.0.0

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1. Overview

C-Measure is a desktop application for measuring stretch film tension using Phidget load cell sensors. The system consists of **12 sensors** (6 ports × 2 channels) mounted at heights from **15 cm to 180 cm**, measuring force in **Deka Newton (daN)**.

The application has a Python backend that communicates with the Phidget hardware and an Electron-based frontend for the user interface.

2. Installation

Requirements

- Windows 10 or later
- Phidget22 drivers (the installer will prompt you to install these)
- Microsoft Visual C++ Redistributable 2015–2022 (required for the backend)

Install Steps

1. Run the **C-Measure Setup** installer (.exe)
2. When prompted, install the **Phidget22 drivers** (required for sensor communication)
3. Choose the installation directory and complete the installation
4. Launch C-Measure from the Start Menu or desktop shortcut

First Launch

On first launch, the application will:

- Start the backend server automatically
- Show the Home page with connection status
- Display a calibration warning if no calibration file is found

Important: If you see a “Backend Error” on first launch, ensure that Visual C++ Redistributable is installed. Download it from microsoft.com/download.

3. Getting Started

Connecting to the Sensor Hub

1. Ensure the Phidget VINT Hub is connected and powered on
2. The status bar at the bottom-left shows:

- **C-Measure: active** — Hub is reachable
 - **C-Measure: offline** — Hub is not reachable
 - **C-Measure: simulation** — Running in simulation mode
3. If the hub is offline, click **Connect WiFi** on the Home page to configure the network connection
 4. The connection status shows how many sensors are connected (e.g., "10/12 connected")

Navigation

The sidebar on the left provides access to:

- **Home** — System overview and connection status
- **Measurements** — Live sensor readings and plot
- **Reports** — Compare saved measurements
- **Settings** — Application configuration

4. Home Page

The Home page displays:

- **Connection status** — Number of connected sensors
- **Hub status** — Whether the Phidget hub is reachable
- **System info** — System serial number, paired serial, and last calibration date
- **Last test** — Name of the most recently saved measurement
- **Data directory** — Where measurement and calibration files are stored

Calibration Warning

If no calibration file is found for the current system serial, a warning banner is displayed. See [Section 7: Calibration](#) for how to resolve this.

WiFi Configuration

If the hub is offline, you can:

1. Click **Connect WiFi** to expand the WiFi panel

2. Select a network from the dropdown
3. Enter the password
4. Click **Connect**

5. Measurements

Viewing Measurements

Switch between two views using the **Table / Plot** toggle:

- **Table view** — Shows each sensor's status (Connected/Disconnected) and current value
- **Plot view** — Shows a horizontal area chart with:
 - Y-axis: sensor height (15 cm to 180 cm)
 - X-axis: force in daN (Deka Newton)
 - Colored dots on the left indicating sensor status (green = connected, yellow = disconnected)

Note: Disconnected sensors display a value of 0 daN.

Continuous Measurement

1. Toggle **Measure ON/OFF** in the top bar to start/stop continuous measurement
2. When ON, the display updates every 1.2 seconds

Saving a Measurement

1. (Optional) Enter a name in the **Measurement name** field
2. Click **Store Measurement**
3. The saved measurement appears as a gray "Saved" overlay on the plot
4. Click **Clear** to remove the saved overlay

Zero Set

Click the **Zero** button to zero all sensors. This compensates for any baseline offset.

6. Reports

Reports allow you to view and compare saved measurements.

Viewing a Single Test

1. Select a saved test from either dropdown (A or B)
2. The plot and table automatically display the selected test

Comparing Two Tests

1. Select **Test A** from the first dropdown
2. Select **Test B** from the second dropdown
3. The comparison plot shows both tests:
 - o **Red** = Test A
 - o **Blue** = Test B
4. The table shows values side by side

Loading Files from Disk

Use the **Browse** buttons to load CSV files from disk for comparison.

Exporting to PDF

Click the **PDF** button to export the current report view to a PDF file.

7. Calibration

Calibration is essential for accurate measurements. The calibration data is stored in a CSV file specific to each system's serial number.

Accessing the Calibration Page

The Calibration page is **hidden by default** to prevent accidental changes.

To unlock calibration:

1. Click the **C-Measure** logo/title in the sidebar **10 times**
2. A prompt will appear asking for an access code
3. Enter: `cal` and press OK
4. The Calibration page will appear in the navigation

Calibration Procedure

Step 1: Zero (Set Offsets)

1. Ensure all sensors are **unloaded** (no weight applied)
2. Click the **Zero** button
3. All offset values will be recorded
4. Offset fields will be highlighted to indicate they are set

Step 2: Set Gain (for each sensor)

1. Enter the known reference weight in the **Gain weight** field (in daN)
2. Apply the reference weight to **sensor 1**
3. Click the **Set Gain** button next to sensor 1
4. The row turns green when gain is set

5. Repeat for each sensor (1 through 12)

Step 3: Save Calibration

Click **Save Calibration** to store the calibration data.

Calibration File Format

The calibration file is a CSV with the following columns:

Column	Description
LoadCell	Sensor index (0–11)
Offset	Zero offset value
Gain	Gain multiplier
CalibratedAt	Timestamp of calibration

File naming convention: `caldata_<SERIAL>.csv`

Example: `caldata_SN12345.csv`

Importing a Calibration File

You can import an existing calibration file in the **Settings** page:

1. Go to **Settings**
2. In the **Import Calibration** section, click **Browse** and select a `.csv` file
3. Click **Import**
4. If the file's serial number doesn't match the system, you will be prompted to confirm
5. If a calibration file already exists, a backup is automatically created (with `_1`, `_2`, etc.)

8. Settings

Data Directory

The folder where measurements and calibration data are stored.

Default: `C:\Users\<username>\AppData\Roaming\C-Measure\data`

Plot Max (X axis)

Sets the maximum value for the X-axis on plots (in daN).

- Leave empty for auto-scaling
- Set a fixed value (e.g., 20) for consistent plot scaling

Simulation Mode

Toggle simulation mode ON/OFF.

- When ON, the backend generates simulated sensor values (no hardware required)
- Useful for testing and demonstration purposes

Note: Simulation mode changes require an **application restart** to take effect.

Import Calibration

Import a calibration CSV file from another system or backup. See [Section 7](#) for details.

System Info

Displays:

- **Version** — Application version
- **Backend** — Live or Simulation mode
- **Data folder** — Current data directory path

9. Moving the System to Another PC

When transferring C-Measure to a new computer, follow these steps:

What You Need

1. The **C-Measure installer** (.exe)
2. The **calibration file** for your system

Step 1: Export the Calibration File

On the **old PC**, locate and copy the calibration file:

1. Open C-Measure and go to **Settings**
2. Note the **Data folder** path shown in the System section
3. Navigate to that folder (e.g., `C:\Users\<user>\AppData\Roaming\C-Measure\data`)
4. Copy the file named `caldata_<SERIAL>.csv`
5. Save it to a USB drive or network location

Important: Without the calibration file, all measurements will be uncalibrated (raw sensor values).
Always keep a backup of your calibration file!

Step 2: Install on the New PC

1. Run the C-Measure installer on the new PC
2. Install the Phidget22 drivers when prompted
3. Ensure Visual C++ Redistributable is installed

Step 3: Import the Calibration File

1. Launch C-Measure on the new PC
2. Go to **Settings**

3. Use **Import Calibration** to browse and select your `caldata_<SERIAL>.csv` file
4. Click **Import**
5. Verify that the calibration warning disappears from the Home page
6. Go to the Home page and confirm that "Last calibration" shows the correct date

Verifying the Transfer

1. Connect the sensor hub
2. Go to **Measurements** and check that all sensors show "Connected"
3. Verify that sensor values look correct (compare with known reference if available)

10. Troubleshooting

Backend Error on Startup

Symptom: "Could not start the backend server" with error code 4294967295

Solution: Install Microsoft Visual C++ Redistributable 2015–2022.

Download: https://aka.ms/vs/17/release/vc_redist.x86.exe

Hub Offline / Cannot Connect

Symptom: Status shows "C-Measure: offline"

Solutions:

- Verify the Phidget hub is powered on
 - Check WiFi/network connection to the hub
 - Try the **Connect WiFi** option on the Home page
 - Ensure Phidget22 drivers are installed
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Sensors Show Yellow (Disconnected)

Symptom: Some sensors show yellow dots with 0 daN value

Solutions:

- Check physical connections to the sensors
 - Verify the sensor cables are properly seated
 - Restart the application
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Calibration Warning

Symptom: "Calibration missing" warning on Home page

Solutions:

- Import a calibration file via Settings > Import Calibration
 - Or perform a new calibration (see [Section 7](#))
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404 Error in Browser

Symptom: Accessing 127.0.0.1:8123 shows "Error 404"

Explanation: The backend server is designed to be accessed through the C-Measure application, not directly via a browser. Always launch C-Measure from the Start Menu or shortcut.

Measurements Not Saving

Symptom: Stored measurements are not appearing in Reports

Solutions:

- Check the Data directory in Settings
 - Ensure the data folder exists and is writable
 - Try restarting the application
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