Delfa Systems GmbH | Im Altseiterstal 7 | 66538 Neunkirchen | Germany

info@delfasys.de | +49 (0) 68 21–91 37 100

User Guide

SENSOR EXPERIENCE KIT

_____

1. Table of Contents

2.   Introduction

Purpose: The Sensor Experience Kit enables users to test dielectric elastomer technology in a controlled environment.

Scope of Use: This kit is intended exclusively for evaluation purposes. It is not for integration into end products or resale.

Package Contents:

(1) **USB-Adapter**

(2) **Stretch Sensor**
     mounted on sensor holder

(3) **USB-Stick** *with Software and Documentation*

(4) **USB-Cable**

3.   Safety Instructions

General Information
- For Evaluation Purposes Only: This Sensor Experience Kit is strictly for testing purposes and is not designed for integration into end-user products or resale.
- The kit is just manual and experimental use only. You must not use it for long-term use or safety-critical applications.

Operating Conditions
- Ambient Temperature: Operate the kit only at room temperature.
- Non-Condensing Humidity: Use the kit in environments with relative humidity below 60% to prevent condensation.
- Protection from Moisture: Keep the kit away from water and other liquids to avoid damage.

Mechanical Safety
- Do Not Disassemble: Do not open, modify, or destroy any components of the Sensor Experience Kit, as this may result in malfunction or damage.
- Handle with Care: Avoid shocks, vibrations, or applying mechanical stress to the sensor and electronic components.
- Proper Cable Connections: Ensure all connections are secure to prevent short circuits or damage.

Electrical Safety
- Use Only Supplied Components: Only use the cables and adapters provided with the kit to ensure compatibility and prevent hardware damage.

Software and Data
- USB Stick Use: The provided USB stick contains software and documentation. Use it only on secure systems to avoid potential data loss or security risks.
- Compatibility: The software may not be compatible with all operating systems or computer models. Verify your system meets the listed requirements before use.

Usage Limitations
- Not for Production Applications: The kit is not designed for use in production or industrial environments.
- No Guarantee for Long-Term Stability: The experimental nature of the kit does not guarantee stability or precision over time.

Risk of Misuse
- Improper Usage: Using the kit outside the recommended conditions (e.g., exposure to extreme temperatures or using unauthorized components) is at the user's own risk.

Disposal
- Environmentally Friendly Disposal: Dispose of the kit and its components responsibly in accordance with local electronic waste disposal regulations.

4. Installation

4.1. Hardware Overview
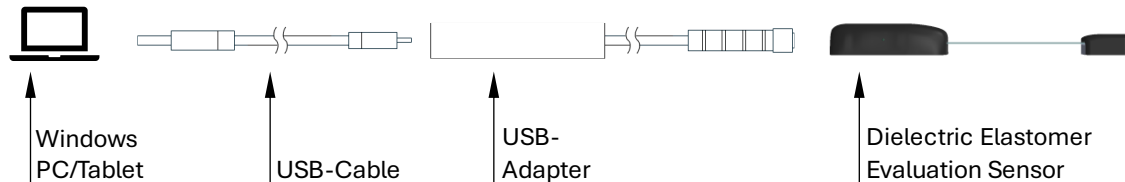
Dielectric Elastomer Evaluation Sensor

The primary component of the Experience Kit, used for testing dielectric elastomer technology.

USB-Adapter

Acts as an interface between the computer and the 50mm Strain Sensor, ensuring proper communication. The side connecting to the computer has a USB-C port. On the side connecting to the sensor, a 30 cm cable is permanently attached, ending in a USB-Mini-B connector.

USB-Cable

Connects the Windows PC/Tablet to the USB-Adapter. Provided as part of the kit. The end connecting to the computer features a USB-A connector, while the end connecting to the USB-Adapter features a USB-C connector. The cable length is 1 meter.

Windows PC/Tablet (not included)

This is the user's own device that will be used to connect and operate the Sensor Experience Kit.

4.2. Hardware Setup

1. **Connect the USB-Adapter to the Dielectric Elastomer Evaluation Sensor.**
   Ensure that the attached 30 cm cable with the USB-Mini-B connector is securely plugged into the sensor.

2. **Connect the USB-Adapter to the USB Cable.**
   Use the USB-C port on the USB-Adapter to attach the USB Cable provided in the kit.

3. **Connect the USB Cable to the Windows PC/Tablet.**
   Plug the USB-A connector of the cable into an available USB port on your Windows PC or tablet.

The user interface has been optimized for HD resolution with a 16:9 aspect ratio (720p HD: 1,280 x 720). To ensure the best possible user experience and image quality on your monitor, make sure to set this resolution on your device.

4.3.   Software Setup

Before proceeding with the software setup, ensure that your Windows PC or tablet meets the following minimum requirements: Windows 10 or higher, an available USB port, at least 1 GB of RAM, and 500 MB of free disk space. Administrative privileges are required for installation.

1. **Connect the included USB-Stick to your computer**
   Ensure that the USB stick is securely connected to an available USB port

2. **Install the required runtime engines**
   To enable the software to visualize sensor data, you must install the runtime engines located in the folder "Runtime Engines" on the USB-Stick
   1. Open "01_runtime-engine_main_offline.iso"
   2. Run and install "Install.exe"
   3. Restart computer
   4. Open "02_runtime-engine_visa_offline.iso"
   5. Run "Install.exe"
   6. Deselect all objects, only select "NI-VISA support for …" and install
   7. Restart your computer

3. <u>Optional:</u> **Copy the folder "Sensor Experience Kit" to your computer**
   Transfer the folder "Sensor Experience Kit" from the USB stick to your desired location on your computer.

4. **The software is ready to use**
   Once all steps are completed, the software is fully installed and ready for operation.

5. Getting Started

1. **Complete the hardware setup as described in the Hardware Setup section.**
    Ensure all components are connected properly according to the instructions.

2. **Install the software as described in the Software Setup section.**
    Follow the steps outlined earlier to ensure the software is installed correctly.

3. **Start the copied executable file (.exe).**
    Double-click the .exe file located in the folder "Sensor Experience Kit" on the USB stick or in your desired location on your computer to launch the program.

4. **Start Communication and Display**
    Press "Connect & Start (F2)" and the software will automatically search for the correct communication port, establish a connection with the sensor, and start displaying the sensor data.

5. **The system is ready for testing.**
    Now you are ready to experience the sensor.

6.   Graphical User Interface

Connect the hardware and start the software as described in the previous sections. All functions are controlled via the start screen shown in Figure 1. Each control element can be activated by clicking with a mouse, using a touchscreen, or pressing the corresponding function key.
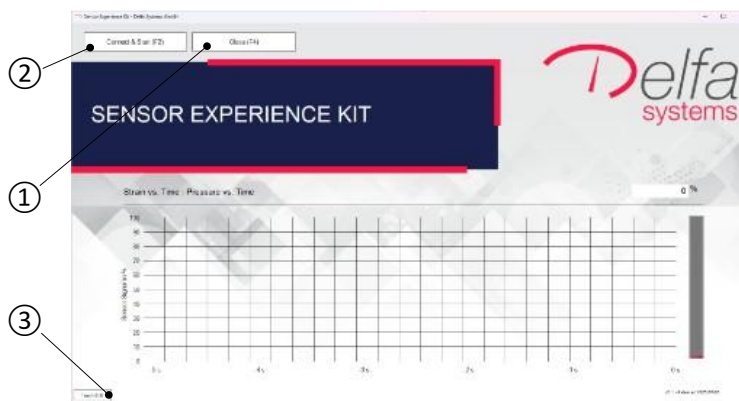

Figure 1: Start screen.

(1) Close (F4)

Closing the program window via the Windows interface ('X' in the upper right) is disabled. To close the program/ window, use (1).

(2) Connect & Start (F2)

Clicking on (2) establishes communication with the sensor. This triggers an initialization process, which takes about four seconds. Afterward, the last five seconds of measured data are displayed and are continuously updated.

- The graph (4) displays the measurement values of the last five seconds.
- The current measurement values are displayed in (5) and (6).

Figure 2: Screen while collecting data.

(7) Pause (F2)

By clicking (7), the data display can be paused. The communication with the sensor continues in the background, and the teach value of the sensor (see teaching section below) remains unchanged. Clicking the button again will continue the data updating.

(8) Stop & Disconnect (F5)

Clicking (8) ends communication with the sensor and returns you to the start screen. Note that the teaching values going to be set to the standard values during the next initialization of the sensor.

(3) Teach (F3)

At any time, you can open a window shown in Figure 3. This allows you to adjust the graph's scaling and views live measurement data. You can close it again by clicking (3).

Figure 3: Teach window

<u>Scaling</u>

- Stretch the sensor to a desired minimum value, corresponding to 0% value on the graph. Activate the process by clicking (10).
- Stretch the sensor to a desired maximum value, corresponding to 100% value on the graph. Activate the process by clicking (9).

Once the teach window is closed via (3), the graph will be scaled according to the desired values.

- If the pause button is used, the scaling remains active.
- If Stop & Disconnect is used, the scaling is reset to its initial value.

Error Messages

- **Error Initializing**
  If an error occurs during the initialization process, an error message will appear, and the program will return to the home screen. Check all cables for proper connection.
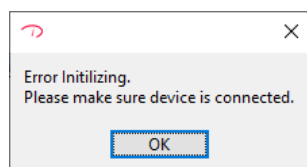
- **No Sensor Available**
  If the sensor connection is lost while measuring or while the pause button is active, an error message will appear, and the program will return to the home screen. Reconnect the Sensor.
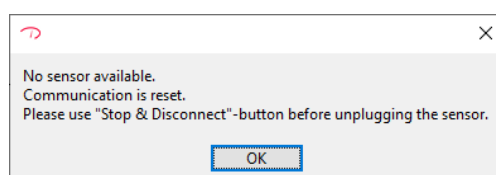
7.   Troubleshooting

Software Malfunction

Close Window via Button

- o   First, attempt to close the program using the "Close" Button at the graphical user interface.
- o   After closing, verify all hardware connections and restart the program as described in the "Getting Started" section.

Closing via Task Manager, *if the software cannot be closed using the "Close" Button*

- o   Open the Task Manager (Ctrl + Shift + Esc) and end the process for the program.

- o   After using the Task Manager to close the software, restart your computer to ensure proper configuration.

- o   Once restarted, verify the hardware connections and restart the program.

Unresponsive Hardware

- Ensure that the USB-Adapter and connection cables are securely attached.

- Check the USB connection to your PC or tablet and confirm the USB port is functioning properly.

- If the issue persists, try reconnecting the sensor and restarting the program.

No Sensor Response

- Verify the power supply and confirm that the sensor is connected correctly the USB-Adapter.

- Ensure the software has established a connection with the sensor by checking the communication port in the software.

8. Legal Information

This Sensor Experience Kit and the accompanying software are provided as tools for evaluation and demonstration purposes only. They are not intended for use in production environments or in applications where their failure could result in personal injury, property damage, or financial loss.

License Disclaimer

The software provided with this Sensor Experience Kit is a complimentary addition and is intended solely for evaluating the technology and demonstrating its functionality.

The software is provided "as is" without any warranties, express or implied, including but not limited to warranties of merchantability, fitness for a particular purpose, or non-infringement. The software may only be used in conjunction with the Sensor Experience Kit and is not licensed for commercial use, redistribution, or modification. Any such use is strictly prohibited without prior written consent from the manufacturer.

Warranty Disclaimer

The Sensor Experience Kit is provided "as is" without any warranties, express or implied, regarding its performance, accuracy, reliability, or suitability for any particular purpose. The manufacturer makes no guarantees that the kit or software will meet the user's requirements or expectations.

The user assumes all risks associated with the use of the Sensor Experience Kit and software.

Limitation of Liability

The manufacturer shall not be liable for any damages, including but not limited to incidental, consequential, or special damages, arising from the use or inability to use the Sensor Experience Kit or software. This includes, but is not limited to, damages to property, loss of data, or financial losses.

By using this Sensor Experience Kit and software, the user acknowledges and agrees to these terms. The manufacturer's liability is limited to the maximum extent permitted by applicable law and excludes liability for gross negligence or willful misconduct where such exclusions are not allowed by law.