Tailorlux
integrity solutions

Spectrometric Sensor

Tailor-Scan 4.0

INSTRUCTION MANUAL

Version: V1

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All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly as it was designed. Only with written consent from Tailorlux may changes to single components be carried out or components not supplied by Tailorlux be used. This precision device is only transportable if duly packed into the complete original packaging. If necessary, ask for a replacement package.

We aim to develop and produce the best solution for your application in the field of product safety and traceability. To help us to live up to your expectations and improve our products permanently we need your ideas and suggestions. Therefore, please let us know about possible criticism or ideas. We and our international partners are looking forward to hearing from you.

Sections marked by this symbol explain dangers that might result in personal injury. Always read the associated information carefully, before performing the indicated procedure.

Paragraphs preceded by this symbol explain hazards that could damage the instrument and the connected equipment or may cause loss of data, as well as information requiring particular attention.

Content Index

1. General Information

1.1 Intended Use

The Tailor-Scan© 4.0 is a high-end spectrometer that allows spectroscopic scans for users without in-depth knowledge of spectroscopy. Tailor-Scan© 4.0 is a robust device that can be used in industrial environments as well as in laboratories. The optional software package can switch the device from a handheld scanner into a laboratory instrument. The high-resolution measurement stability and calibration are key elements of the monolithic Tailor-Scan© concept. This allows operators at different levels of the supply chain to verify the optical fingerprint in each stage of the manufacturing process.

The Tailor-Scan© will be delivered as a tailored solution that is exactly adjusted to the customer's needs by using pre-installed modes (see chapter 3).

The system may only be operated by persons, who have been trained in its use by Tailorlux employees.

The system can be used at any location provided that the warning and safety instructions are observed.

1.2 Notices and Warnings

The Tailor-Scan® contains light emitting diodes that emits medium intensity optical radiation in the UV-B and visible range. The light-emitting diode is directly activated at the pressing of the button (see Figure 1). The LED is to be activated only when the sensor head has been placed completely on the test object and no emitted light can escape to the outside. The Tailor-Scan® can be operated in a scanning mode which will trigger an ongoing optical emission for several seconds. The sensor must not be lifted from the sample or directed at persons or animals during the scan. If the sensor is abruptly changing the position (i.e., the device is accidentally being dropped) the sensor will stop the light source immediately.

FIGURE 1: SYMBOL "WARNING OF OPTICAL RADIATION"

The Tailor-Scan® does not contain removable parts. Do not open the device or loosen screws. If the device is not working correctly, please contact the Tailorlux support. Any attempt to open the device may cause irreparable damage to the device.

1.4 Structure of the Sensor

FIGURE 2: STRUCTURE OF THE TAILOR-SCAN SENSOR

1 – Measuring head
2 – Aluminium housing
3 – High resolution display
4 – Button
5 - Light entry window
6 – LED Array
7 - USB 3.0 HighSpeed Type-C connection port

2. Software

The Tailor-Scan® 4.0 will be delivered with a software for remote services (Customer Software). This software allows the operator to access the customer profile of the device and observe how it is programmed to operate. It is designed to transfer new customer profiles on a device that have been sent by Tailorlux engineers. The software also allows a download of current customer profiles to be sent and checked by Tailorlux engineers.

The analyst software is designed for trained operators to set up quantification models of samples. The software can store various customer profiles and transfer it on the device. The software allows a Scan2Count mode if the sensor is connected by a USB-C cable. This modus allows to select a specific detection setting (i.e., blue PET fabric) and run a pre-selected number of scans on the fabric. Each scan will be displayed together with a count rate result.

2.1 Software Installation

The Software is compatible with the Windows 10 or higher operating system.

To install the software application, double-click the file "tscan4-customer-1.X.exe", where X is the current version number and confirm the Windows security prompt with "Yes".

Name	Date modified	Type	Size
tscan4-customer-1.27.0	23/03/2023 12:40	Application	121,063 KB

FIGURE 3: INSTALLER FOR THE INSTALLATION OF THE CUSTOMER SOFTWARE

After the setup has been started you will be prompted to continue with the installation or to quit the installation process. Clicking on "Next" will proceed with the installation tup. The software will then display the installation status via a progress bar (Figure 3).
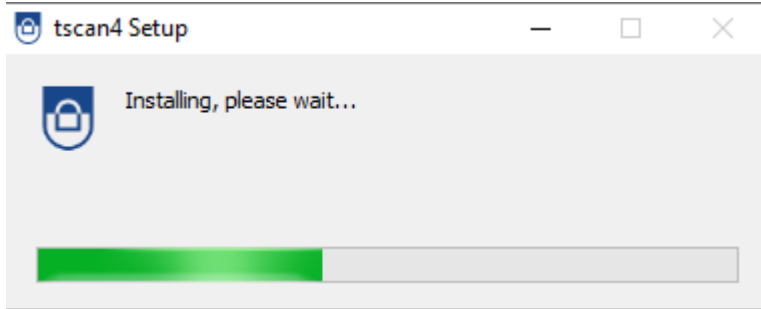
FIGURE 4: CUSTOMER SOFTWARE INSTALLATION PROCESS

After the installation has been completed the program will launch automatically and will be ready to operate with.

FIGURE 5: APPEARANCE OF THE SOFTWARE AFTER THE LAUNCH

3. Use of the Tailorlux Customer Software

3.1 Introduction

Each unit of the Tailor-Scan 4 sensor will be delivered already preloaded with one or more reference datasets.

Each dataset, called "detection setting" contains the spectrometric signal that the sensor identifies as an individual fingerprint. Note that the device can store and process different detection settings at once, and that a given tracer might need different detection settings for a proper identification.

This might be due to background or materials effects which will modify the tracer identification, such as high sample absorbance, high sample reflectance, containing material and more.

The Tailor-Scan can also store different detection settings for different tracers. The above-described conditions still apply to this use-case.

3.2 First steps

In order to connect your Tailor-Scan 4 to a computer connect the device via the USB-C port on the bottom side (see Figure 1). A USB-C cable will be delivered with your device.

Lunch the Customer Software, as described in section 2.1 The program will then be available for operation.

Start the device by pushing the button on the front side of the sensor and wait until the device is fully booted. During a correct booting the device will display the Tailorlux company name, a progress bar and the actual firmware version installed on the device. When the booting is complete, the display will show the battery indicator, the Tailorlux logo and the "Ready to Scan" message (Figure X).
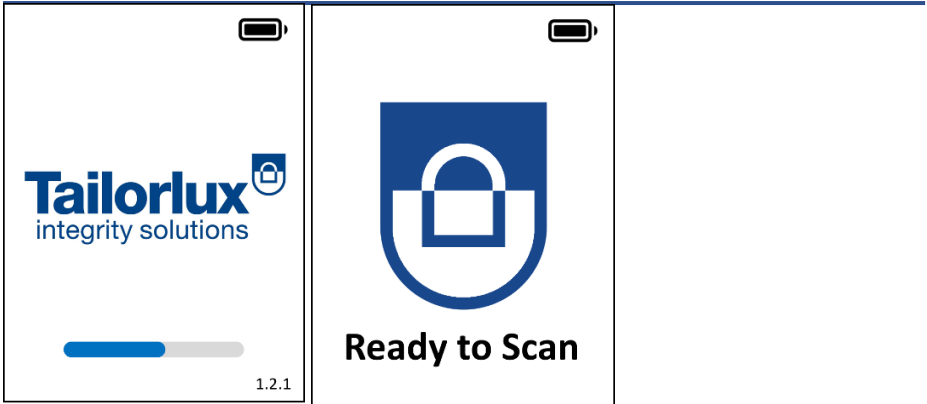
FIGURE 6: APPEARANCE OF THE DISPLAY DURING BOOTING AND AT BOOTING COMPLETED

When the device is fully booted, click the "Scan for Spectrometers" button in the software to scan for the right USB connection and automatically connect your sensor to the program.

FIGURE 7: APPEARANCE OF THE CUSTOMER SOFTWARE WITHOUT CONNECTED SENSORS

The device will display the "Software connected" message on the screen. Your device, as well as the relevant device information, will now be shown on the user interface:
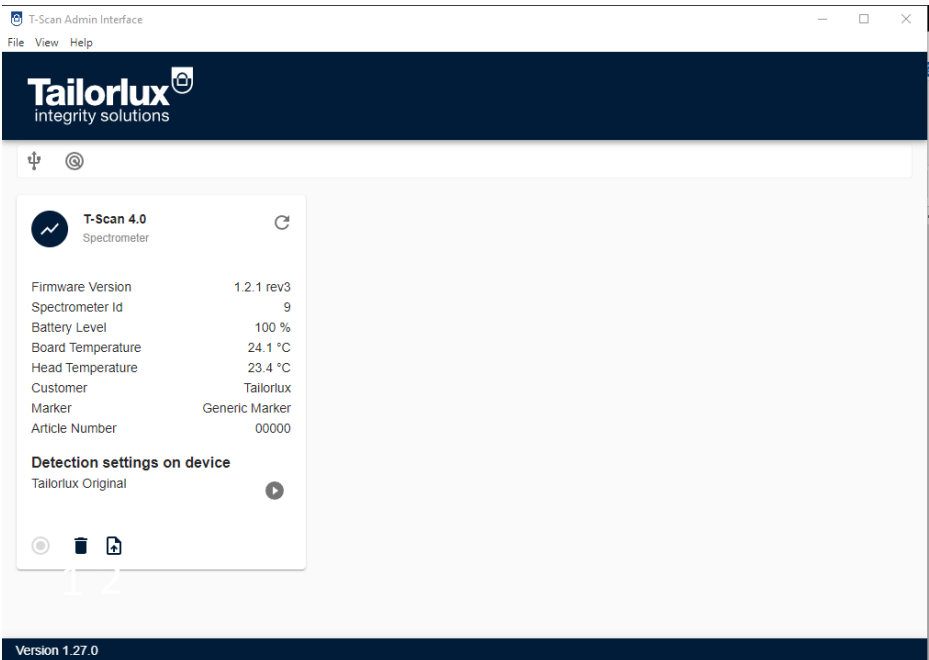

FIGURE 8: SENSOR DEVICE INFORMATION AND SETTINGS SAVED ON DEVICE. THE NUMBERS REPRESENT THE POSSIBLE SOFTWARE OPERATIONS.

From the current interface it is now possible to perform the following operations:

- Delete a customer profile from the device (1)
- Store a customer profile on the device (2)
- Test or tune a peak profile (3)

Via the bin icon (1) it is possible to remove a detection setting from your device. This button will show the "Delete customer profile from device" when hovering on the icon. By clicking it the currently saved customer profile will be deleted from the device.

The paper sheet button (2) allows y new customer profile to be loaded on the device. This button will show the "Store customer profile on device" when hovering on the icon. Following the prompt, select the *.tcp file you want to load, then select "Open".

The program will display a progression bar while the *.tcp file is loading. When the process is successful a green message prompt will appear on screen showing the "SUCCESS: Customer profile successfully stored on device" message and the "Customer", "Marker" and "Article Number" parameters will display the correct values.
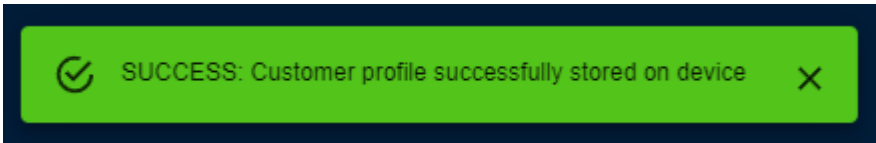
The program will display a progression bar while the "Customer", "Marker" and "Article Number" parameters will first display the "Loading" message. When the progress is successful the "Customer", "Marker" and "Article Number" parameters will display "N/A"

The Play button close to each detection setting (3) allows for a fine tuning of the setting.

3.3 Fine tuning a detection setting

Clicking the (3) button indicated in section 3.2 will open the Test/Tune peak profile window.
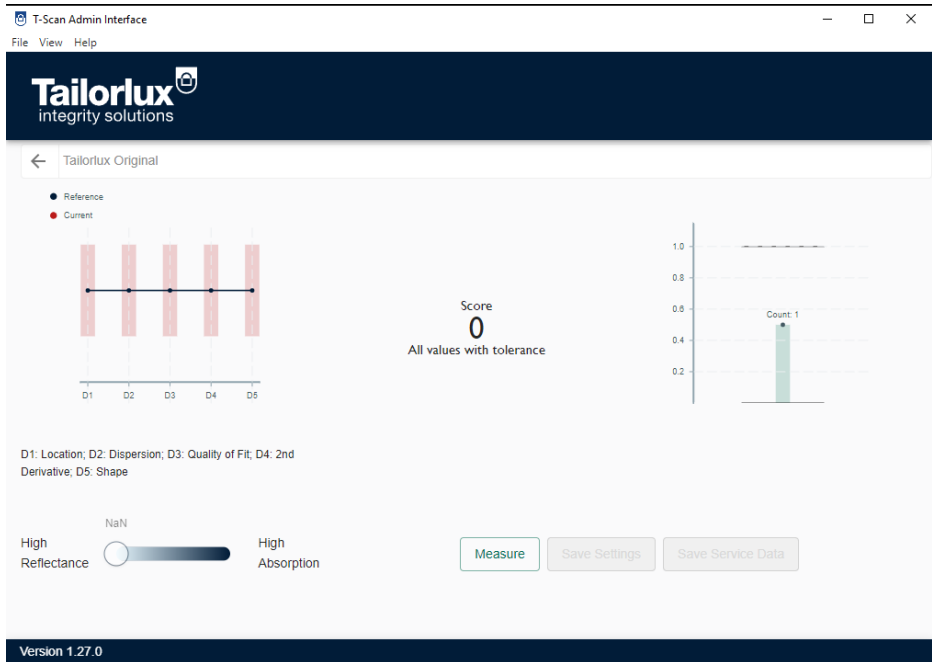
By use of the "measure" button it is possible to perform a sample analysis. The program will then display a score for said analysis together with an indication of signal intensity (count).

If the analysis is positive, a correspondence between the reference and the current measurement will be displayed in the bar chart on the left side of the window.
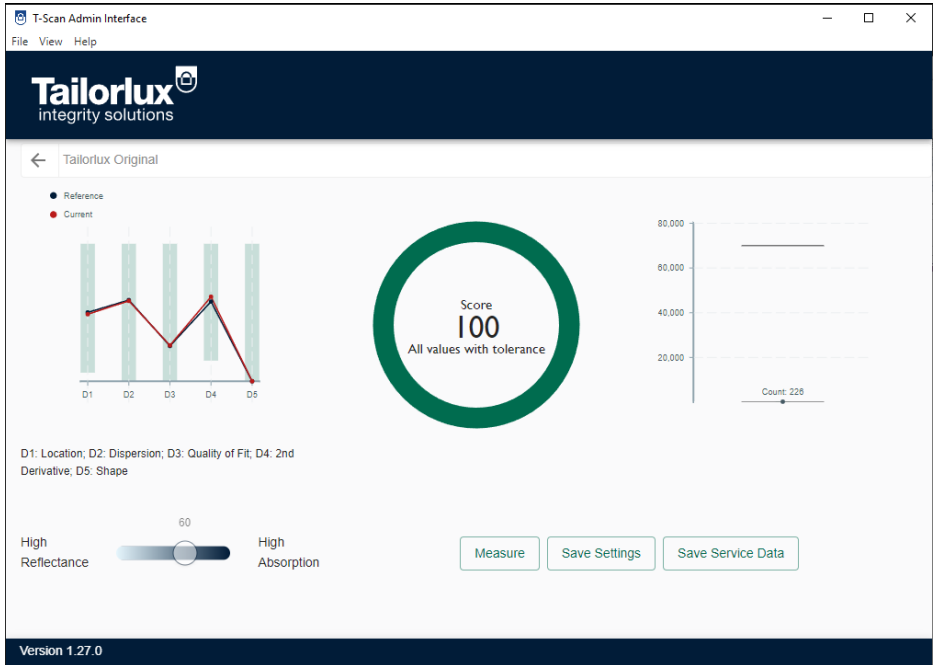
FIGURE 10: SUCCESSFUL MEASURE WITH SCORE AND COUNT VALUE

If the analysis is negative the program will indicate which variables significantly deviate from the reference values:
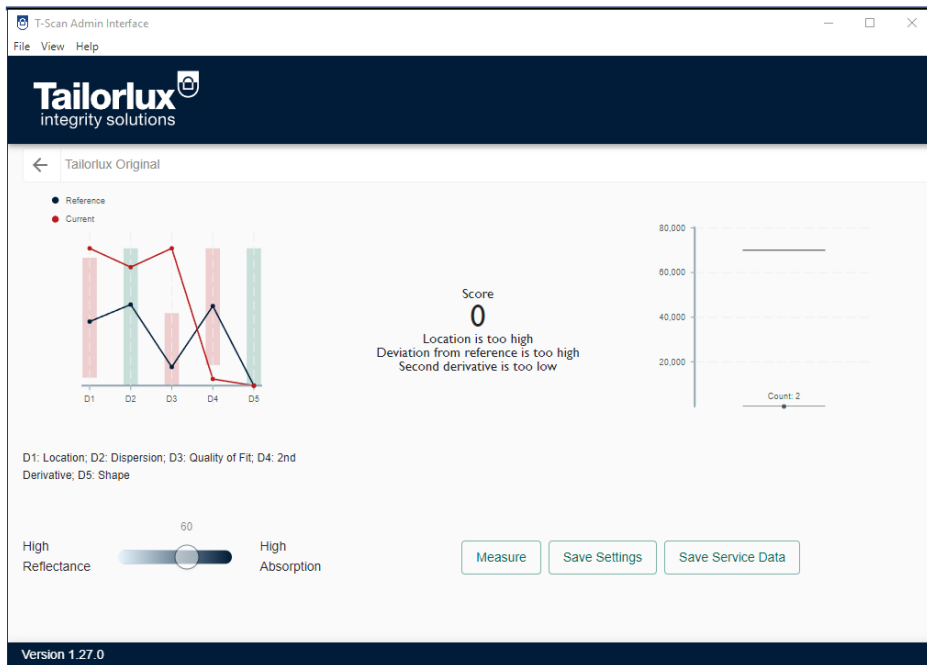
FIGURE 11: UNSUCCESSFUL MEASURE WITH SCORE AND COUNT VALUE.

Using the slider spanning between the "High reflectance" and "High absorption" values it is possible to fine tune the settings saved in the sensor. Once the fine tuning has been completed it is possible to save it clicking on the "Save Settings" button.

FIGURE 12: PROMPT FOR SAVING THE FINE TUNING SENSOR SETTINGS.

You can choose between adding the fine tuned setting under a new name or simply overwrite the old settings with the new one.

In addition to this it is possible to save the current measurement via the "Save service data" button. A window will open allowing you to save the file in the correct TSD format.

> ⚠️ **A TSD file can be sent to a member of Tailorlux´s customer service for assistance with regards to detection or device settings setup.**

3.4 Usage of the sensor

To start using the Tailor-Scan, press on the test button as in Figure 1 for two seconds until the booting information starts to appear on the display (Figure 6).

During the booting sequence you will see the Tailorlux or customer logo followed by information about the customer profile:

The sensor is now ready to perform the pre-programmed scanning mode for the detection of the implemented tracer. While the sensor is performing a scan do not direct it to other persons to avoid accidental exposure to the human eye.

Several scan modalities are possible:

Singlescan

SingleScan is a scan mode to be carried out at a specific spot that is known to contain an optical fingerprint. This is a mode that has been designed for high-security features. The Tailor-Scan® 4.0 will not display any reference names or articles. It is optional that the excitation light can be disguised in this modus.
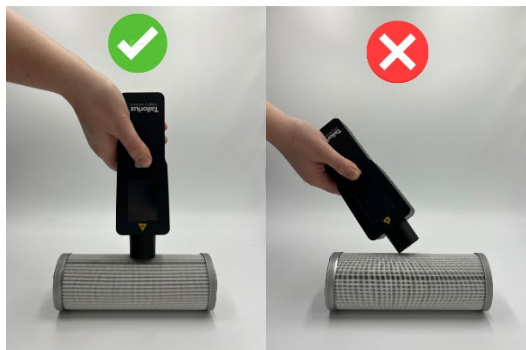
FIGURE 13: CORRECT AND WRONG POSITIONING OF THE SENSOR DURING A SINGLE SCAN.

The sensor will now show the progress of the ongoing scan. Keep on holding the sensor tightly onto the sample until the scan has been completed:

Scanning

FIGURE 14: ANIMATION DURING AN ONGOING SCAN.

If the scan was successful, you will be notified by a green symbol on the display. If the scan was not successful a red symbol will indicate that no tracer or not the correct tracer formulation was found in the material.

Original   **No marker detected**

FIGURE 15: EXAMPLES OF A POSITIVE (LEFT) AND A NEGATIVE (RIGHT) ANALYSIS.

The sensor is now ready for a new analysis to be performed as indicated in this section.

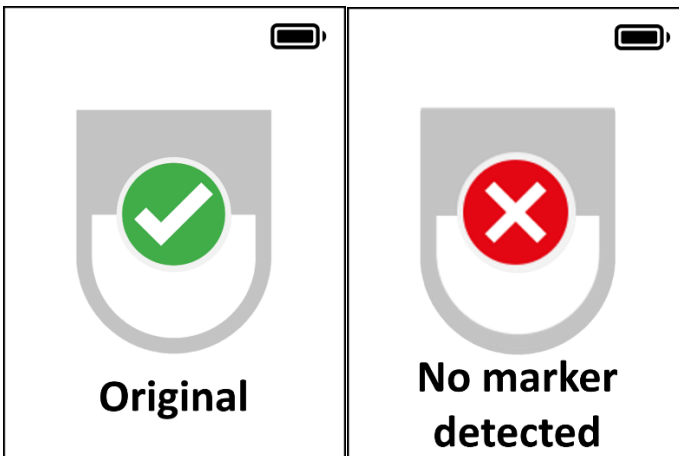(!) Please limit the number of analysis to 4 per minute in order to avoid overheating of the LED array with resulting worsening of the sensor performance.

Scan2Hit

Scan2Hit is a scanning mode that allows the operator to scan fibers, yarn, fabric, or any other textile product. This mode was especially designed for textile applications which have varieties of colors and finishes but use the same tracer reference. The Scan2Hit detection setting is the result of a comprehensive engineering process that qualified the tracer for specific textiles.

(!) **If you try to scan products which are containing the tracer but have finishes or colors that are not stored as a reference the detection might take longer or even fail. If you want to add new references, please contact info@tailorlux.com.**

Please hold the sensor tight to the yarn, fabric or textile that contains the optical fingerprint. Anticipate that you need to scan over the sample for a few centimeters and prepare this spot.

It is advisable to hold yarn bobbins in one hand while performing the scan with the device with the other hand. If a fabric needs to be scanned it is advisable to use a table and unfold the fabric to an even surface. Hold the fabric with one hand when performing the scan.

It is important that ambient light does disturb the scanning process. Make sure that you hold the sensor head in an angle of ideally 90° to the sample to avoid ambient. Do not tilt the device.

If the sensor is in the correct position, press the button shortly to start the scan. The sensor will now initialize all samples and check the scanning situation for ambient light. An acoustic tone will indicate that the operator can begin to move the sensor head slowly and steadily over the textile sample. It is important to keep the sensor head pressed firmly on the sample while moving the device. Move the sensor slowly and steady over the fabric. Sudden moves or lifting the device will lead to an interruption of the scan.

If used correctly the sensor will scan with all pre-programmed detection setting.
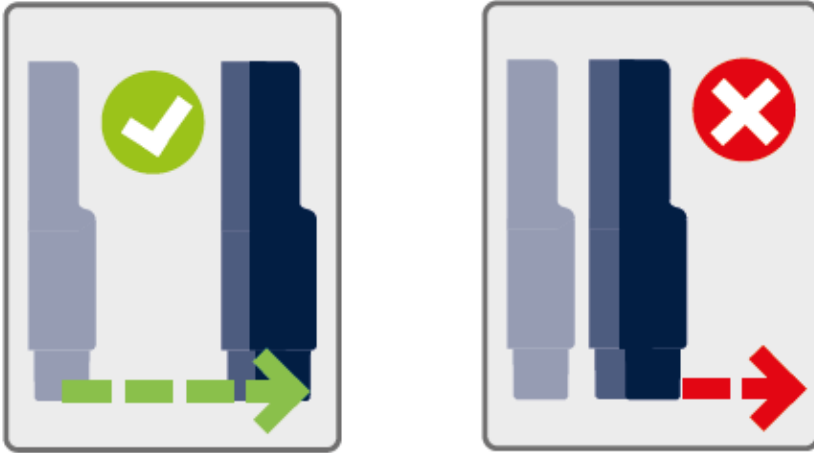
The sensor will indicate with a single acoustic tone that the scan has been completed. The result can now be seen on the display.

Samplescan (under Development)

This mode has been designed to test the homogeneity of the tracer distribution in printing applications, coatings, adhesives, or pellets. The detection setting is designed to choose the best spectral feature of the optical fingerprint and display the intensity. This mode is perfect for spot checks during continuous productions to ensure the homogeneity of tracers or materials.

Scan2Count

This mode has been designed for quantification purposes. To use this mode, the optional analysis software (see chapter 3.3) and special training of the operator is needed.

The Tailor Scan 4® is not intended as a heavy-duty sensor. Please limit the number of measurements with the Tailor-Spec to about 100 measurements per hour. Exceeding the limit may lead to loss of efficiency of the LED array and irreversible damage!

4. Safety information

The device can be operated in the temperature range of -20 °C to +50 °C. Make sure that the device is not exposed to extreme temperatures, explosive atmospheres, severe vibrations, solvents and/or their vapors. Moreover, permanently high humidity, wetness as well as continuous sunlight exposure must be avoided.

Cleaning agents may not be used on any account, as they can damage the device. Do not expose the device to open flames, water, or moisture. Do not attempt to open the device or perform repairs on the device. Do not attempt to short circuit the device.

The product contains Lithium-ion rechargeable battery cells (Product Name: NCR18650B-HOOBA; Global Code: BJ-A300024AZ).

Transport information

In the case of transportation, avoid exposure to high temperatures and prevent the formation of any condensation. Disposition of the product should occur without falling, dropping and breakage. The product must be handled carefully.

UN regulations

•UN number 3481

•Proper shipping name: "lithium-ion batteries contained in equipment""

•Class 9

•Packing group: II

Regulations on Transportation

•Worldwide, air transportation: IATA-DGR [As non-DANGEROUS GOODS:" packing instructions 966 section II"]

•Worldwide, sea transportation: IMO-IMDG Code [special provision 188]

•Europe, road transportation: ADR [special provision 188]

5. Troubleshooting

5.1 The connected sensor is not detected

Disconnect the sensor from the device and reconnect it. Monitor the status of the device connection with the Windows Device Manager..

5.2 The LED of a connected sensor lights up unexpectedly

- Immediately disconnect the sensor from the device and make sure not to look directly into the LED. Exit the software application. After reconnecting the sensor and restarting the software, normal operation should be possible.
- If the error persists, uninstall the software application, and reinstall it.

5.3 The test is not carried out as expected (false positive or false negative)

- Check that the sensor is positioned as specified for the product or material and that no stray light can affect the measurement.
- Check that you loaded the correct reference file for the product under analysis.

5.4 The software crashes or does not behave as described

- Exit the software application and restart your device.
- Uninstall the software application and reinstall it.

If there are any other questions don't hesitate to contact us under
info@tailorlux.com

6. Warranty

Tailorlux GmbH warrants material and production of the Tailor Spec for a period of 12 months starting with the date of shipment. During this warranty period Tailorlux GmbH will see to defaults by repair or by exchange if these are entitled to warranty. For warranty repairs or service, the unit must be sent back to Tailorlux GmbH. The customer will carry the shipping costs to Tailorlux GmbH, in case of warranty repairs Tailorlux GmbH will carry the shipping costs back to the customer. If no warranty repair is applicable the customer also must carry the costs for back shipment. In case of shipment from outside EU duties, taxes etc. which should arise have to be carried by the customer. Tailorlux GmbH warrants the hard- and/or software determined by Tailorlux GmbH for this unit to operate fault-free if they are handled according to our requirements. However, Tailorlux GmbH does not warrant a fault free and uninterrupted operation of the unit, of the software or firmware for special applications nor this instruction manual to be error free. Tailorlux GmbH is not liable for consequential damages.

6.1 Restriction of Warranty

The previously mentioned warranty does not cover errors and defects being the result of improper treatment, software or interface not supplied by us, modification, misuse, or operation outside the defined ambient stated by us or unauthorized maintenance. Further claims will not be consented to and will not be acknowledged. Tailorlux GmbH does explicitly not warrant the usability or the economical use for certain cases of application. Tailorlux GmbH reserves the right to change this instruction manual or the technical data of the described unit at any time.

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