

Calibration Monitoring (SQI)

The **Calibration Monitoring** feature provides a real-time evaluation of the trustworthiness of measurement readings by means of a **Spectral Quality Index (SQI)**. The SQI indicates how well the calibration fits to the current water matrix. The lower the SQI value the better the calibration will fit to the water matrix. A calibration with a SQI above the **threshold value of 4** leads to a lower measurement accuracy. The feature enables the determination of the **Validity of the Calibration** and allows for the **Automatic Selection of the most Suitable Calibration**. With this unique feature for all of our UV/Vis Spectrometer Systems, it is possible to obtain an on-line quality detection of the spectrometer results and ensure the proper operability of the system.



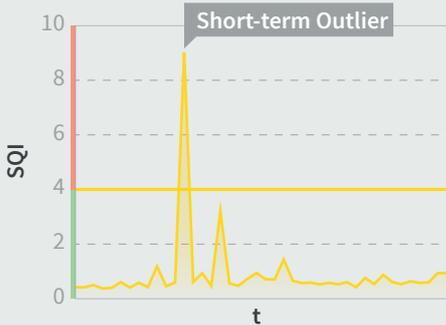
Available for the Following Products

- ISA - UV/Vis Spectrometer
- BlueScan - UV/Vis Spectrometer

Validity of the Calibration

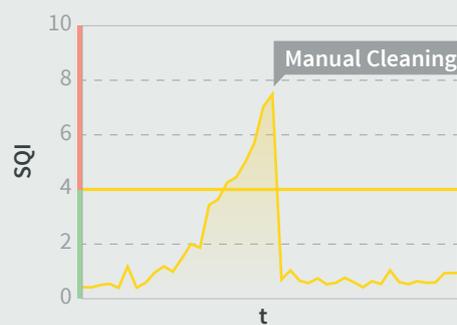
The SQI serves as a quality index that allows to determine how likely it is that the calibration is correct. Based on this information it is possible to distinguish between the occurrence of 3 potential cases and to assess whether action is required.

Short-term Measurement Error



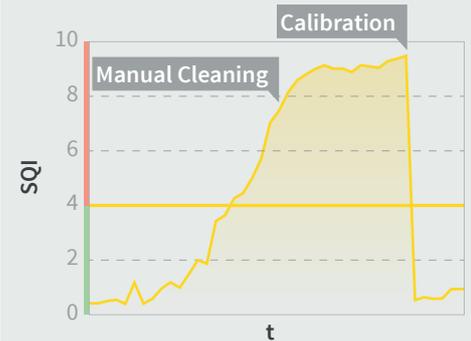
A **temporary spike** in the SQI can occur as a result of **air or particles caught in the measurement path**. The Calibration Monitoring feature allows to effortlessly identify short-term outliers and gives the opportunity to ignore measurements exhibiting a higher SQI.

Contamination



A **prolonged exceedance** of the SQI threshold value may be an indication for a **contamination of the measuring head**. In these instances, it is advisable to perform a **manual cleaning** of the measurement head. If the cleaning resolves the issue the SQI should drop back down to a lower level.

Changing Water Matrix

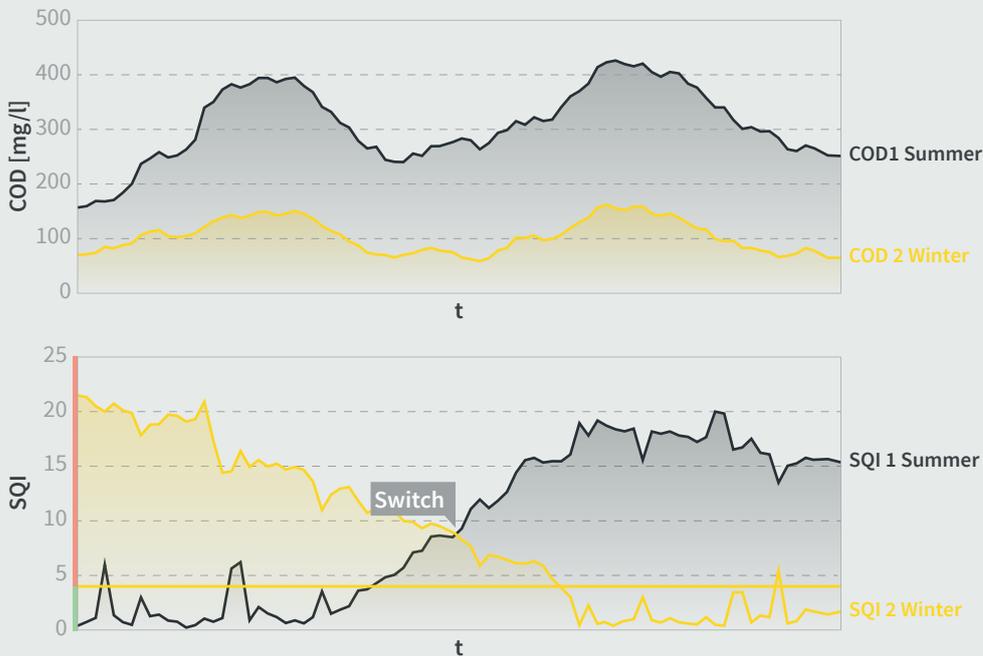


If the SQI remains at an elevated level, even after a **manual cleaning**, it may be an indication that the current calibration does not cover the water matrix anymore. The issue can be resolved either by **improving the existing calibration** through the **addition of reference values** or by **creating a new calibration**.

Automatic Selection of the most Suitable Calibration

Based on the SQI it is possible to set up an automatic selection of the best suitable calibration settings. Thus, ensuring the optimal adaption of the system to changing conditions, by enabling the intelligent switch between different calibrations for different water matrices.

Calibration Monitoring for COD Measurement



In this example, the UV/Vis Spectrometer simultaneously measures the COD using two calibrations. The measurement values of the COD1 Summer calibration are shown in grey and the values of the COD2 Winter calibration are shown in yellow.

The system also tracks the SQI for both calibrations and is able to automatically determine the most suitable calibration for the current water matrix. In the example, the automatic switch occurs once SQI 1 Summer exceeds the value of SQI 2 Winter.

Configuration of the Automatic Switch

The associated software offers the opportunity to set up individual decision rules to configure the switch between the stored calibrations. Hereby, it is possible to automate the selection of the best fitting calibration. The decision rules can be defined according to the desired specifications by using simple formulas. The formulas can, for example, be based on the simple exceedance or number of instances and may include time delays, set events, etc.

Example: Simple Exceedance

```
COD_1_Summer = [ISA011073];
SQI_1_Summer = [ISA011073.SQI];
```

```
COD_2_Winter = [ISA011074];
SQI_2_Winter = [ISA011074.SQI];
COD_opt = 0;
```

```
if (SQI_1_Summer < SQI_2_Winter) COD_opt = [ISA011073];
if (SQI_1_Summer > SQI_2_Winter) COD_opt = [ISA011074];
```

```
COD_opt;
```