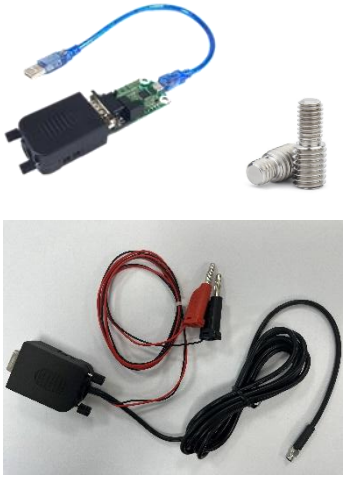
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VIBO® Evaluation Kit User manual

VIBO® Evaluation Kit

2 VIBO®1X00	RS485 to USB convertor M5 to DB9/power supply cable M6/M8 mechanical adaptor	VIBO® Evaluation tool, software supplied by Tronics (Computer not provided)
		

1. Purpose

This user manual is intended for customers who have purchased VIBO®1x00 smart Industrial IoT Edge accelerometer and would like to evaluate it using VIBO® evaluation kit. The following paragraphs explain how to set-up the full evaluation kit and how to configure and use VIBO®1x00.

2. Requirements

2.1. Hardware requirement

The VIBO® Evaluation kit contains:

- 2 VIBO®1x00 modules
- M6/M8/1-4 28" mechanical adaptor
- USB to RS485 converter
- M5 to DB-SUB / power supply cable

2.2. Software requirement

Minimum system configuration:

- Processor 1.6 GHz or faster / 2 GB RAM
- 1280x960 pixels minimal screen resolution
  (The window size of the Tronics software is 1280x680)
- 780 MB free hard disk space for the software installation
  (an additional space is needed during installation only to accommodate the initial setup files)
- USB Port
- Operating Systems: Windows 10 and Windows 11

3. What is VIBO® Evaluation Tool?

VIBO® Evaluation Tool is a software provided by Tronics Microsystems. It allows to easily setup VIBO®1x00 products, perform acquisition and display results. This software combines high-performance with easy-to-use and time-saving features that let the user focus on VIBO®1x00 abilities.

Using VIBO® Evaluation Tool software helps to:

- Read VIBO®1x00 vibration output
- Read VIBO®1x00 temperature output
- Visualize data in time and frequency domains
- Compute key indicators such as RMS or peak values
- Run the Self-Test mode
- Record data acquisitions in text/CSV and TDMS file
- Read and write Temperature Compensation in VIBO®1x00
- Configure VIBO®1x00 range (from 8g to 64g)
- Contact Tronics support team

Note: All the software is based on a specific RS485 to USB converter for Modbus RTU communication. Before running the software, guidance in Installation of the setup must be followed.

Caution: Sensitive hardware, please read instructions before plugging and powering the VIBO® module.

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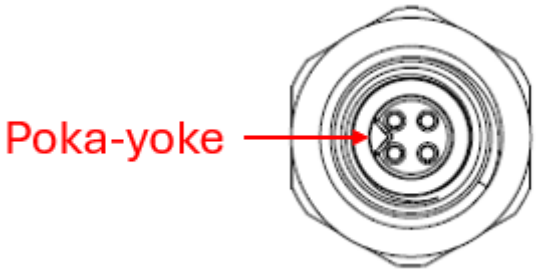
5. Installation of the setup

5.1. Hardware connection to the equipment

In order to mechanically connect the VIBO®1x00 with the equipment to be monitored, a mechanical adaptor must be screwed into the VIBO®1x00 M6 taped hole. Two adaptors, namely threaded rod "M6 to M6" and "M6 to M8", are provided.

1. The mounting surface must be smooth and clean before use.
2. Mechanical grease must be placed between the equipment and VIBO®1x00. At room temperature, a general use silicone grease or equivalent can be used.
3. Screw VIBO®1x00 module using a torque of 2 Nm to 3 Nm using a 24mm wrench.
4. Make sure the housing of the equipment is connected to earth to avoid communication disturbance on the RS485 bus.
5. Connect the M5-4 pins cable with VIBO®1x00 and make sure to properly align the cable connector and the module to avoid damaging the pins*. A shielded cable should be used to improve overall performance.
6. Fix the cable to make sure it does not vibrate or apply a load on the connector which could impact the measurement.
7. Using an external power supply **initially turned off (or without power on the output)**, connect GND (black cable) and VDD (red cable), **do not turn the power supply on at this point.**
8. Make sure that the voltage is set according to the VIBO®1x00 specification (Nom. 24V / Min 12V / Max 30V).
9. Connect the D-SUB9 connector of the Cable to the USB to RS485 converter.
10. Connect the USB to RS485 converter to the computer using the USB cable.
11. **Proceed with next steps before turning power on.**

***Caution**: a wrong connection might result in permanent damage to the sensor or in a broken connector making the sensor unusable. Make sure to properly align with the Poka-yoke before insertion.



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5.2. Software installation

1. Software shall be downloaded through TDK OwnCloud solution using the link received by E-Mail
2. Launch the installer "Vibo-ctl-tool-1.6.0-installer.exe"
3. Read and accept the software license agreement

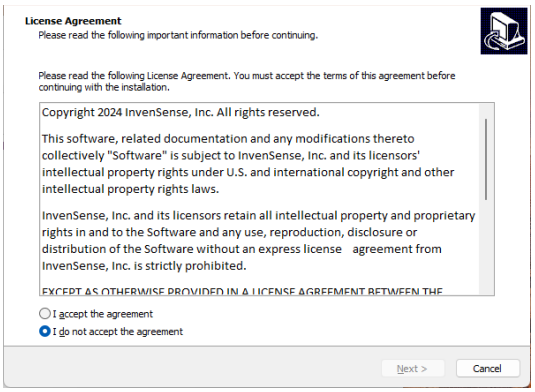


Figure 1 Software license agreement

4. Select installation path

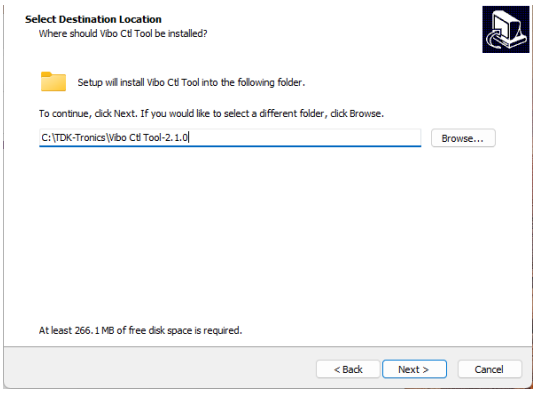


Figure 2 Software installation path selection

5. Click Install button to start the software installation

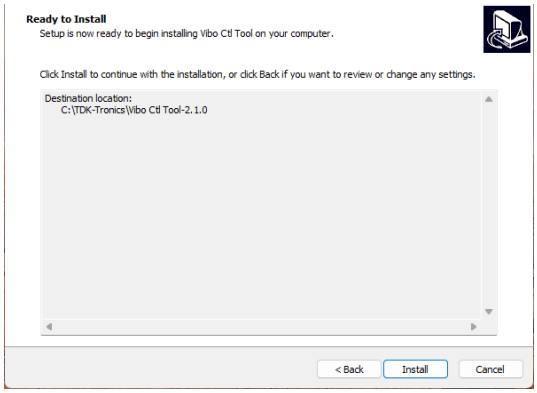


Figure 3 Software ready to install

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6. Wait for installation to finish

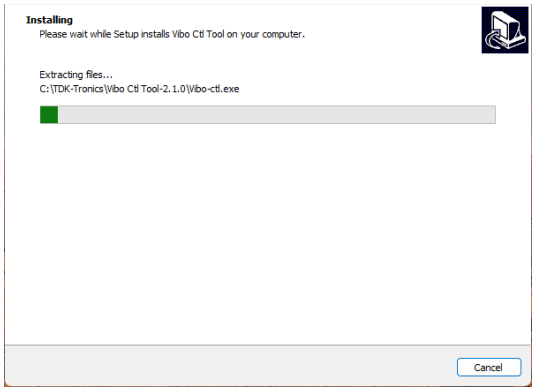


Figure 4 Software installing

7. Once the installation is completed, click Finish button to start using Vibo Ctl Tool

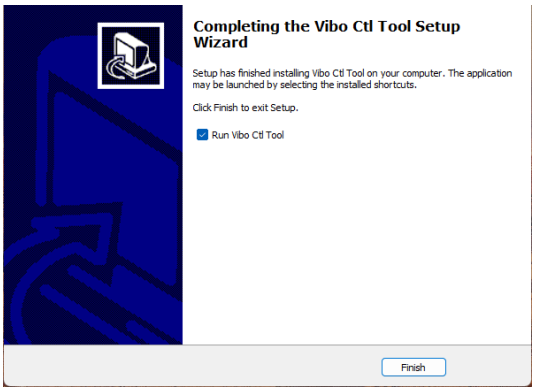


Figure 5 Software installation complete

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6. VIBO® Evaluation Tool software description

6.1. Overview

The VIBO® Evaluation Tool is made of one connection interface and 3 tabs, as shown on Figure :

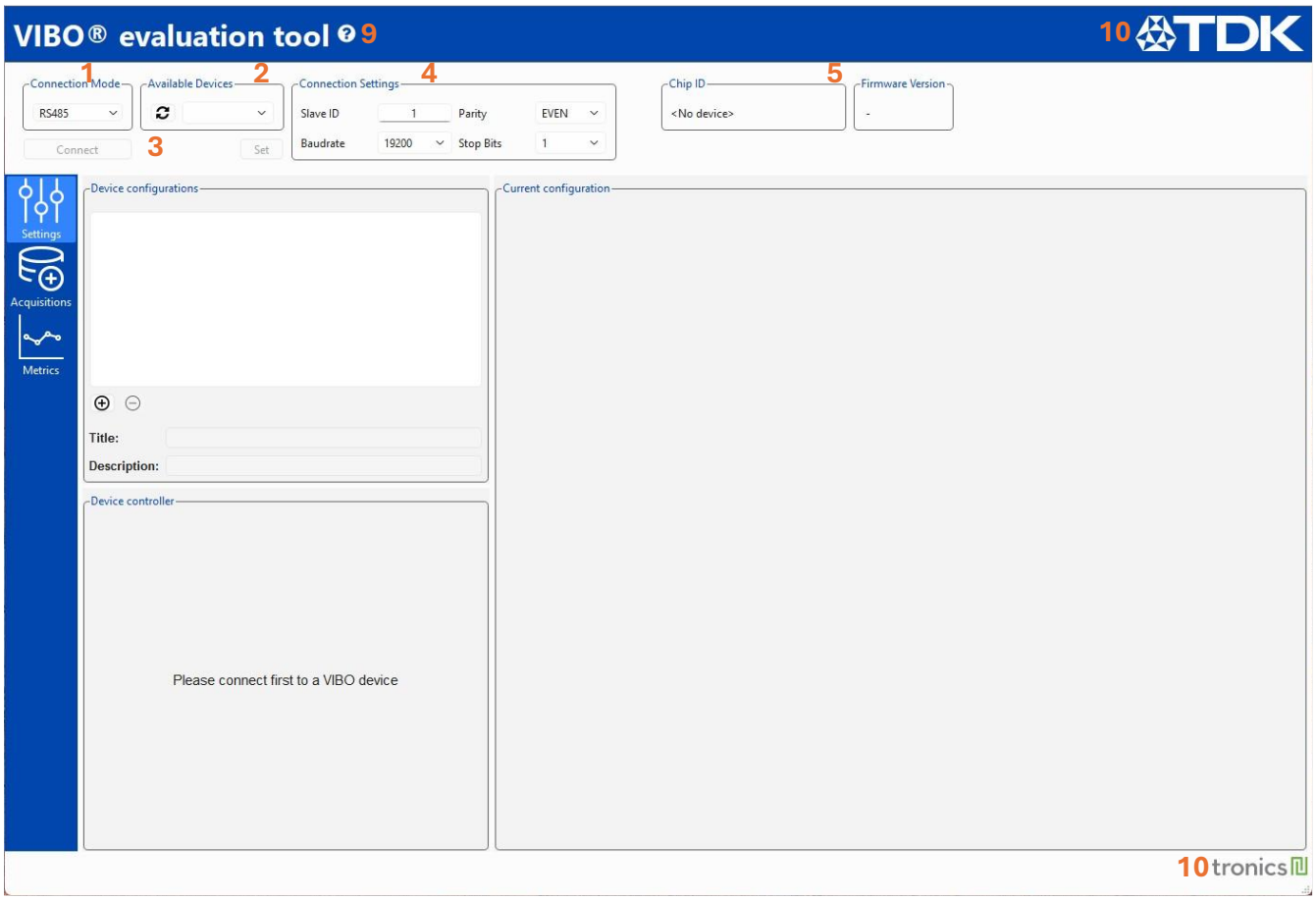


Figure 6 Overview of VIBO® evaluation tool

The numbered elements are:

1. Connection mode: select RS485.
2. Available devices: choose between the available devices. If a new device has been plugged in, the list is updated when clicking the refresh button.
3. Connect button: clicking on it will connect the currently selected device. The Connect button then switches to a Disconnect button.
4. Connection settings: these parameters must be defined to match the configuration used by the sensor. In this example, the default configuration of VIBO is displayed (Slave ID 1, parity Even, baud rate 19200baud, stop bit 1). The Set button can be used to change the settings of the connected VIBO to increase its baud rate for example. When clicking the Set button, a warning message is displayed before applying and saving the new settings in VIBO memory. A reboot command is then automatically sent to VIBO since it is necessary for the new communication settings to effectively be applied. VIBO is automatically disconnected, the user needs to click the Connect button again. A delay of 10 seconds is automatically applied when clicking the Connect button before trying to connect to wait for VIBO to start its application firmware.
5. When a device is connected, the VIBO unique ID (UID) and the firmware version are displayed.
6. The Settings tab displays the page to set the device settings.
7. The Acquisitions tab displays the page to set the acquisition's configuration and launch an acquisition.
8. The Metrics tab displays the page which lists the existing acquisitions with their metrics. It is used to visualize the acquired data.
9. The Question Mark button displays a menu to access application settings, console, full screen mode and software version (About).

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10. TDK and TRONICS clickable logos. Clicking on these logos will open the TRONICS web page in a browser.

6.2. Preference

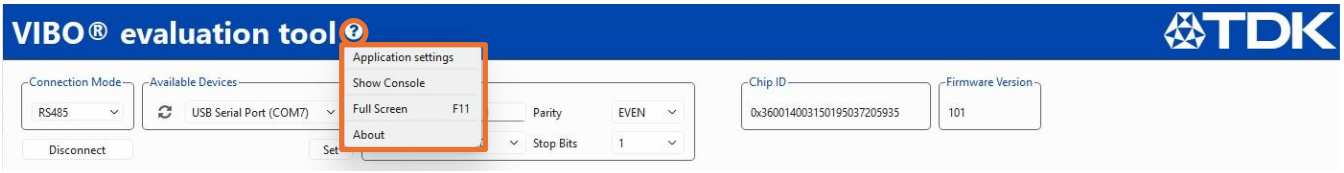


Figure 7 Question mark menu

Click on the question mark and application settings to open the application preference window.

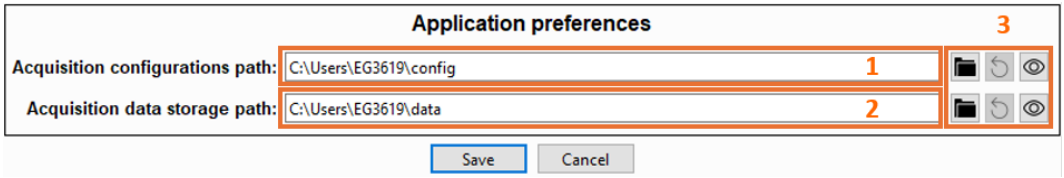


Figure 8 Application preference menu

Opening the preferences panel will allow to:

1. Display the current path where the device and acquisition configurations are stored.
2. Display the current path where the acquisition data are stored.
3. Modify/Reset the path by opening a file selector or opening an explorer at the given path to browse its content.

The configurations edited through the settings and acquisitions tabs are saved in JSON files located in the configuration path. These files should not be manually modified to ensure a correct format.

Note: If the acquisition data storage path is in a cloud platform such as OneDrive, the software might not be able to retrieve the data due to some limitations (IT policy, network access issue). In this case, the previously acquired data might not appear in the Metrics tab of the software. Therefore, it **is recommended to save the data locally** to avoid this kind of issue.

Note: Each action on a configuration will be saved automatically.

6.3. Device connection

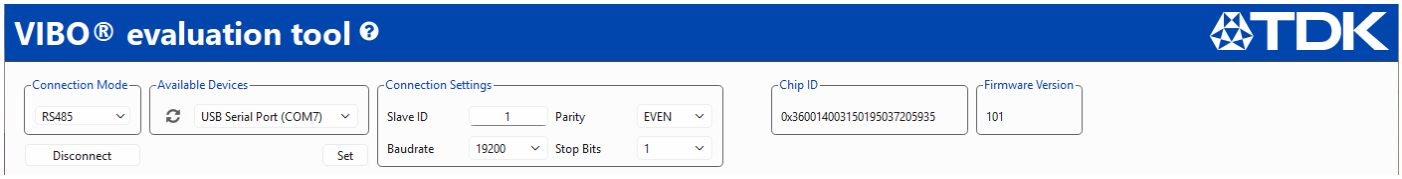


Figure 9 Device connection menu

Once VIBO®1x00 is plugged to the computer, the user can connect VIBO®1x00 using the following procedure:

1. Turn-on the power supply.
2. Wait approximately 10 seconds for the VIBO®1x00 to initialize.
3. Click on refresh button to see the available device, the corresponding device will be detected:
   - USB Serial Port (COMX) should appear.
4. Configure the Connection Settings to match the sensor configuration.
5. Click on Connect. On figure 9, the module is already connected, therefore the button displays the Disconnect option.
6. VIBO®1x00 ID and Firmware version are displayed.

Note: During initialization, the current consumption is around 5mA, when ready (after 10s) the current consumption is around 8mA. This feature can be useful to verify when the VIBO®1x00 is ready.

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6.4. Device settings

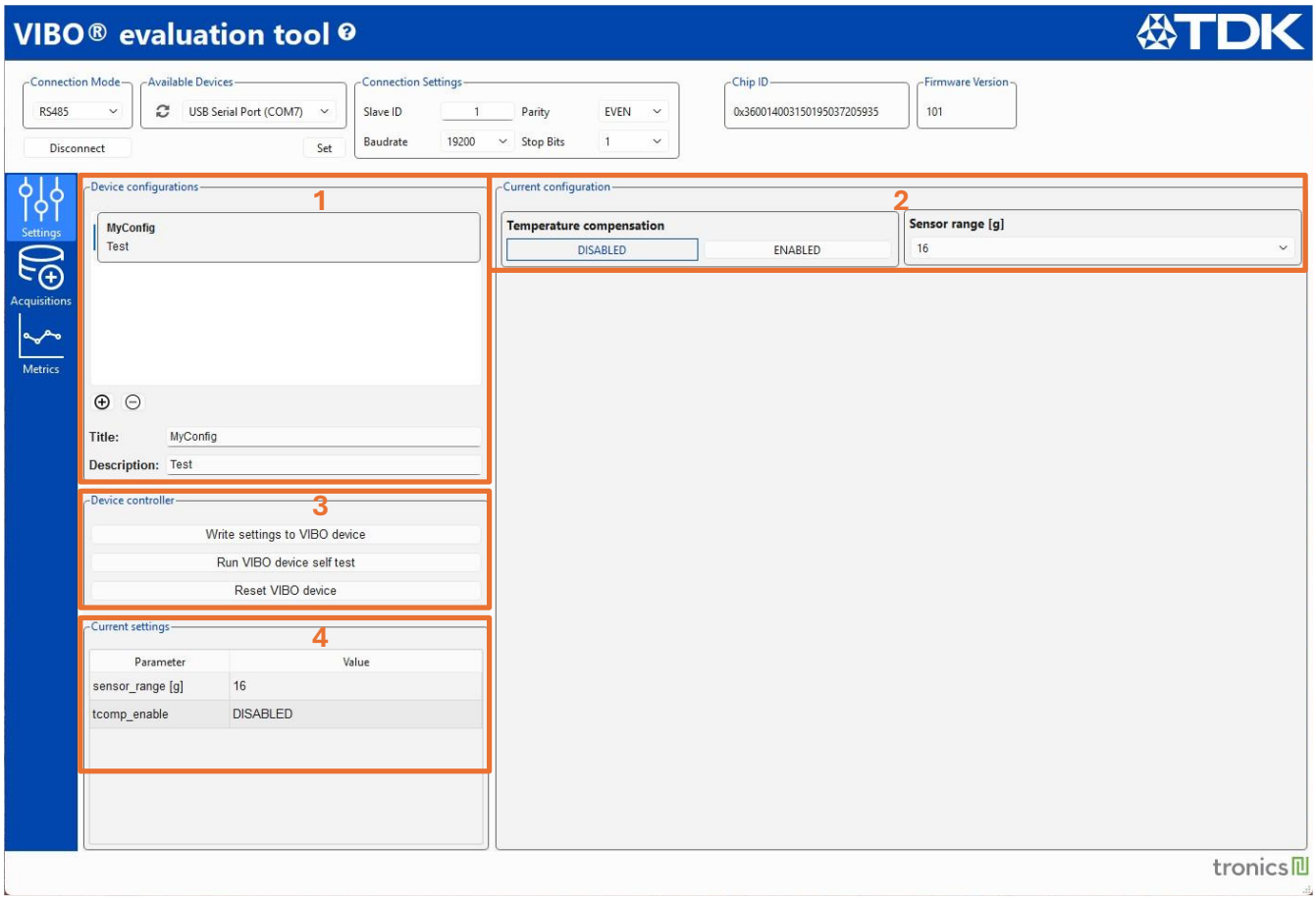


Figure 10 Settings tab overview

The Settings tab shown on Figure 10 exposes four main parts:

1. Device configurations: the user can create, use or delete different device configurations. Use the "+" and "-" buttons to add or delete a configuration.
2. Current configuration: the user can change the different parameters of the configuration file selected:
   - Sensor range (g): Set the range of the VIBO®1x00 according to the selected value.
   - Temperature compensation: Enable/disable the temperature compensation.
3. Device controller:
   - Write settings: write the values defined in Current configuration to VIBO®1x00.
   - Run VIBO device self-test: Run a sequence to check the proper operation of the device.
   - Reset VIBO device: Perform a software reset of the device.
4. Current settings: display the settings currently used by the device.

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6.5. Acquisition management

6.5.1. Overview

The high data rate of VIBO®1x00 does not allow long duration of acquisition as it would generate a too large volume of data.

The tool allows periodic acquisitions for a short duration.

For each acquisition, the data are saved in a separate file whose name contains the date of the start of the acquisition, all files being saved in the directory defined by the user.

The data are the acceleration data, the metrics of the acceleration and the temperature of VIBO®1x00. For more information, please refer to the datasheet of VIBO®1x00.

Note: the velocity, the Hilbert function and their metrics are given for indication only and are not guaranteed. These values should not be used to monitor equipment, only the acceleration and its metrics are calibrated and can safely be used for this purpose.

6.5.2. Settings

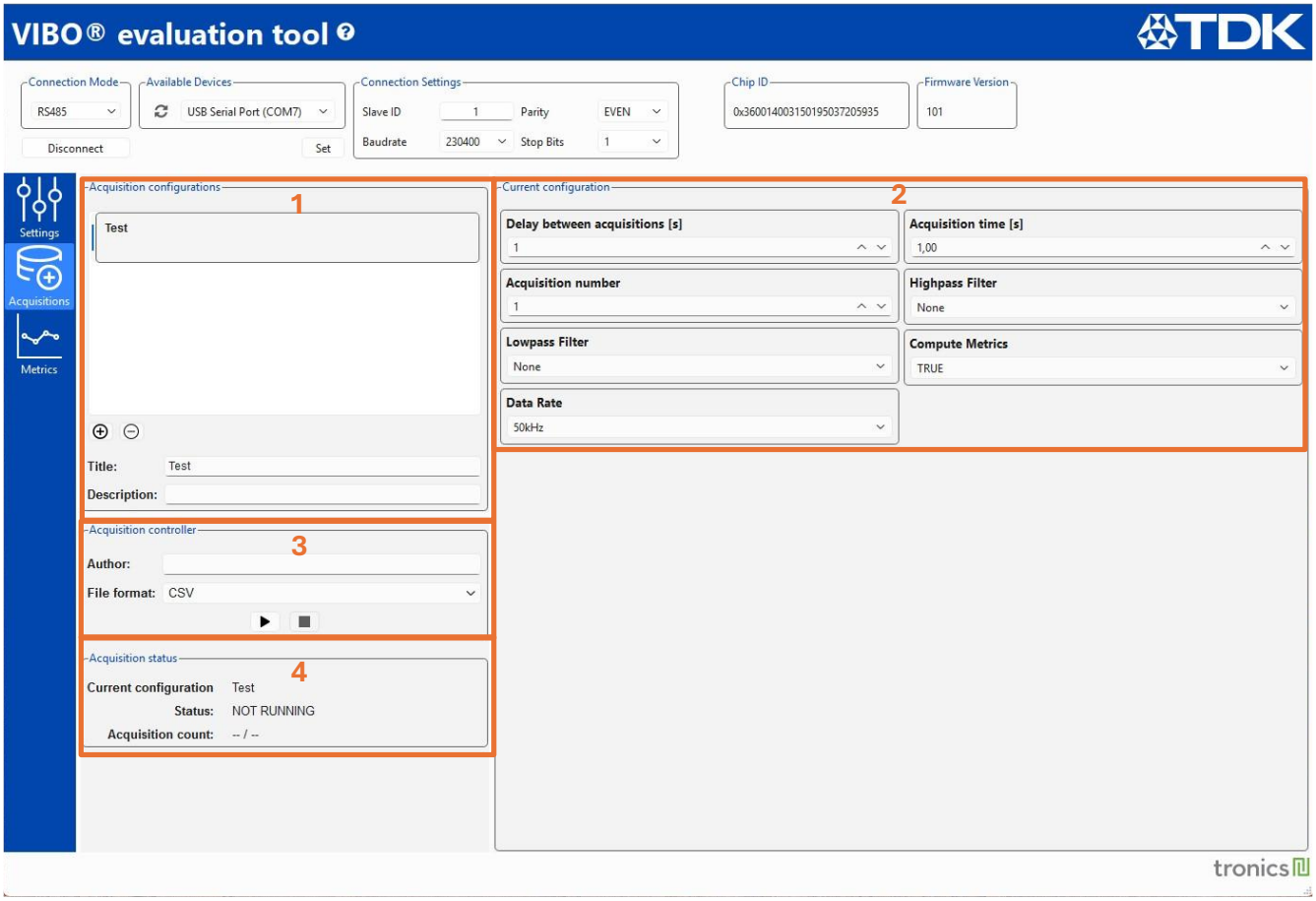


Figure 11 Acquisition tab overview

Once the user has completed VIBO®1x00 setting, the acquisition settings can be configured. There are 4 main tabs, as shown on Figure 11:

1. Acquisition configuration: the user can create, use, or delete different acquisition configurations.
2. Current configuration: the user can change the different parameters of the configuration file selected, as shown on Figure 11:
   - Delay between acquisitions (s): Delay between two acquisitions **D**, in seconds.
   - Acquisition time (s): Time of the acquisition **T**, in seconds (Tmax = 1,2s / 2,4s for a data rate of 50 / 25 kHz).
   - Acquisition number: number of acquisitions **N** to be performed.
   - High-pass filter (HPF): defines the low cut-off frequency of the bandpass filter.
   - Low-pass filter (LPF): defines the high cut-off frequency of the bandpass filter.

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- Compute metrics: if True is selected, VIBO sensor transfers acceleration data as well as computed metrics. If False is selected, the VIBO sensor does not transfer other data than the acceleration data.
- Data rate: allow to change between 50 and 25kHz depending on the duration of acquisition needed.

Note: after starting the acquisition, the tool will do **N** acquisitions of data for **T** seconds to which a data transfer delay must be added. Once the data transfer is completed, a delay of **D** seconds is applied.

3. Acquisition controller
   - Author: the user can write the author of the measurement.
   - File format: the user can choose between 3 file formats
     - Txt: text file.
     - CSV: comma separated values.
     - Tdms: National Instrument format.
   - RUN/STOP button: allow to run an acquisition with the current selected set of parameters or stop a running acquisition.
4. Acquisition status:
   - Current configuration: Display the current running acquisition configuration or the current selected configuration if an acquisition is not running.
   - Status: display the status of the acquisition (RUNNING or NOT RUNNING).
   - Acquisition count: index of the running acquisition over the acquisition number.

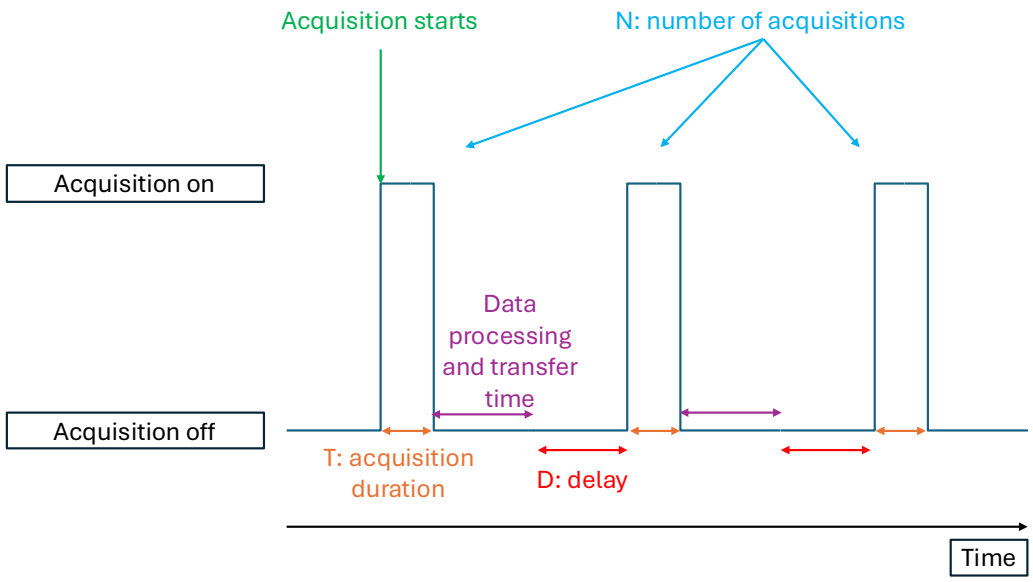


Figure 12 Overview of acquisition settings

Note: For long acquisitions, the computer sleep mode should be disabled to avoid communication loss.

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6.6. Metrics tab

Selecting the metrics button in the left vertical bar will open the metrics tab. On this tab, the user can visualize the data of previous acquisitions and computed indicators as described in the next section. There is no need to connect a VIBO®1x00 to access charts and metrics visualization. Apart from acquisitions, all processing can be made offline.

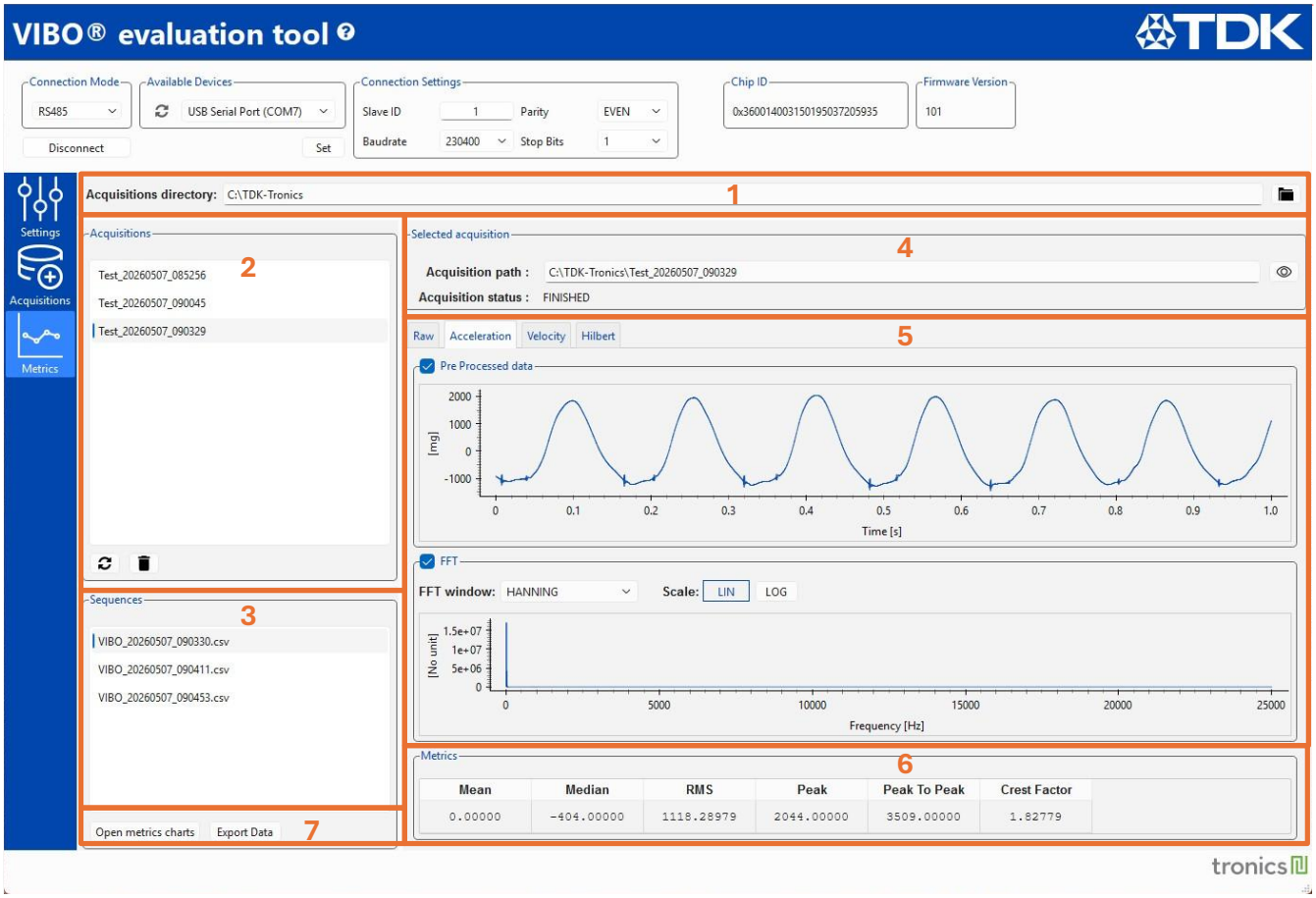


Figure 13 Metrics tab overview

On this tab, the user can find the following elements:

1. Acquisitions directory: The user can choose the directory of the acquisition file to be analyzed.
2. Acquisitions: Contains all the acquisitions of the Acquisition directory.
3. Sequences: Contains all the files of each acquisition. Selecting a sequence in that list will display its data on the right part of the tab (5).
4. Selected acquisition: display the acquisitions path and its status, click the browse button to access the different files.
5. Raw / Acceleration: display the time domain and frequency domain (Fast Fourier Transform) plots of the selected data
   - Pre Processed data button: display or hide the time domain plot
   - FFT button: display or hide the frequency domain plot.
   - FFT window menu: select the type of filter to be applied.
   - Scale buttons: plot Y axis using linear or logarithmic scale.
6. Metrics: display the main indicators of the selected sequence (units are LSB for Raw and mg for acceleration):
   - Mean: return the average value.
   - Median: return the median value.
   - RMS: return the root mean square value.
   - Peak: return the max value.
   - Peak to peak: return the max amplitude value.
   - Crest Factor: return the ratio between peak and RMS values.

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7. If there are several sequences available on the acquisition folder, the "Open metrics charts" button is available when selecting Acceleration in Tab (5). It allows the user to plot all the metrics of the sequence on one graph and see the evolution of these indicators, as shown below. The Export data button allows the user to export this data in an .csv file stored at the same location as the acquisition data.

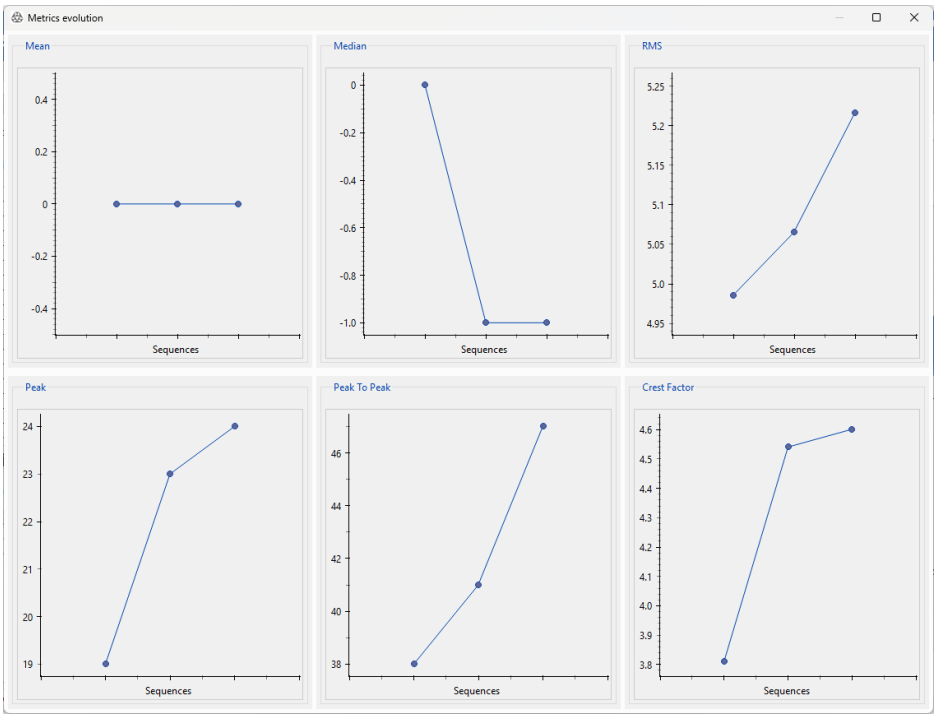


Figure 14 Metrics evolution

Note: additional commands to make the use of graphics more efficient:

- Left click and drag to use region zoom (window).
- Right click and drag to zoom on the plot both horizontally and vertically.
- Left double click to reset the view.
- Ctrl + Left click to open the graph on an external window (not applicable to Metrics charts), the same commands apply to the external window.

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7. Available Tools and Resources

The following tools and resources are available upon request:

Item	Description
Documentation & technical notes	
	VIBO®1200 – Datasheet MCD079
Evaluation kit	
	VIBO® Evaluation Kit – user manual MCD093
	VIBO® Evaluation Tools – Software download link
Technical support	
	support.tronics@tdk.com

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8. Revision History

Item	Version
	MCD093-A
General	Initial version

Table 1: Revision history

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9. Important Notes

The following applies to all products named in this publication:

1. Some parts of this publication contain statements about the suitability of our products for certain areas of application. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application. As a rule, we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.

2. We also point out that in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.

3. The warnings, cautions and product-specific notes must be observed.

4. In order to satisfy certain technical requirements, some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous). Useful information on this will be found in our Material Data Sheets on the Internet (www.tdk-electronics.tdk.com/material). Should you have any more detailed questions, please contact our sales offices.

5. We constantly strive to improve our products. Consequently, the products described in this publication may change from time to time. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

We also reserve the right to discontinue production and delivery of products. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

6. Unless otherwise agreed in individual contracts, all orders are subject to our General Terms and Conditions of Supply.

7. Our manufacturing sites serving the aeronautic business apply the EN9100 standard.

The EN9100 certifications confirm our compliance with requirements regarding the quality management system in the aeronautic industry. Referring to customer requirements and customer specific requirements ("CSR"), TDK always has and will continue to have the policy of respecting individual agreements. Even if EN9100 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that only requirements mutually agreed upon can and will be implemented in our Quality Management System. For clarification purposes, we like to point out that obligations from EN9100 shall only become legally binding if individually agreed upon.

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