iCOMOX Data Acquisition Kit
User Manual

Document Revision History

Revision	Date	Author	Status and Description
2.0	30/07/2019		Initial version

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1. Introduction

The iCOMOX Data Acquisition (DA) kit serves the purpose of demonstrating the data acquired by the kit's sensors, while performing basic signal processing analysis, as well as displaying data statistics and acquisition plan.

The iCOMOX DA described in Figure 1 is composed of four elements:

1. The iCOMOX, mounted on the monitored equipment.
2. The iCOMOX dongle, connected to a PC USB port, providing wireless communication with the iCOMOX.
3. A USB-C cable connecting the iCOMOX and one of the USB ports of a PC, allowing wired communication, as well as providing the iCOMOX with its power supply (the iCOMOX can also be powered by internal batteries).
4. The iCOMOX Monitor SW, installed and run on a PC, providing a Graphical User Interface (GUI) to communicate with the iCOMOX.
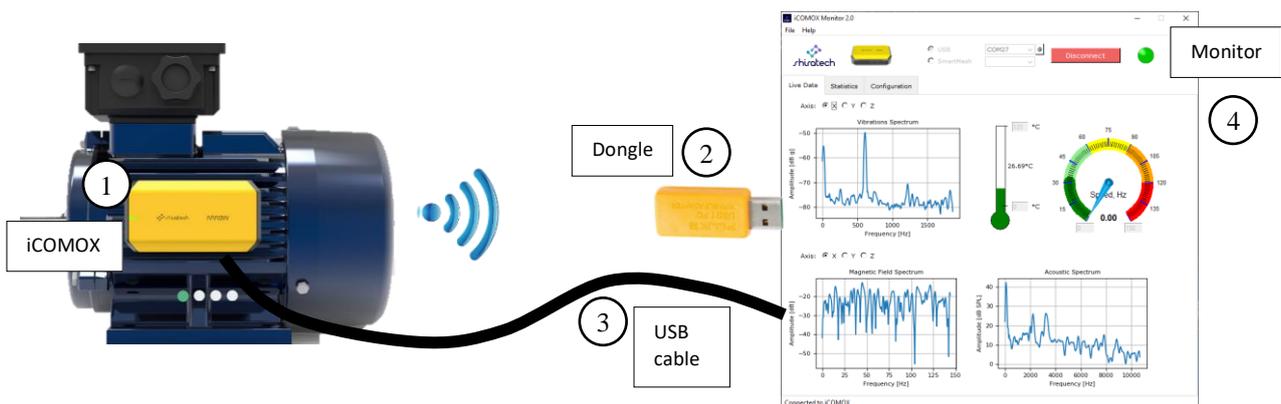

Figure 1 The ICOMOX DA kit. (1) iCOMOX, (2) iCOMOX dongle, (3) USB cable, (4) iCOMOX monitor running on a PC.

After installing the iCOMOX DA Monitor and connecting the iCOMOX to the PC using the USB-C cable or the SmartMesh IP Dongle, live data from the sensors is processed using Fast Fourier Transform and presented on the screen.

In the statistics tab, the moving average of each sensor is computed together with its standard deviation and its maximal and minimal value.

The configuration tab allows the selecting the sensors whose data should be displayed, as well as the scheduling of the acquisition to be either continuous, or at a specified frequency.

2. Quick Start

a. Install the *iCOMOX Monitor* as described in the installation guide.

b. Connect the iCOMOX to a computer via USB-C cable or via the Dongle (see Section 3).

c. Turn on the iCOMOX by sliding the slide switch on the iCOMOX (see Section 3).

d. If the iCOMOX is not recognized by the PC, please refer to Appendix A to install the FTDI driver.

e. The iCOMOX green LED should be continuously active.

f. Launch the *iCOMOX Monitor*. **This may take up to 150 seconds.**

g. Select the desired communication method: USB - wired or SmartMesh - wireless.

You may need to select the COM port (USB) or the iCOMOX number (SmartMesh).
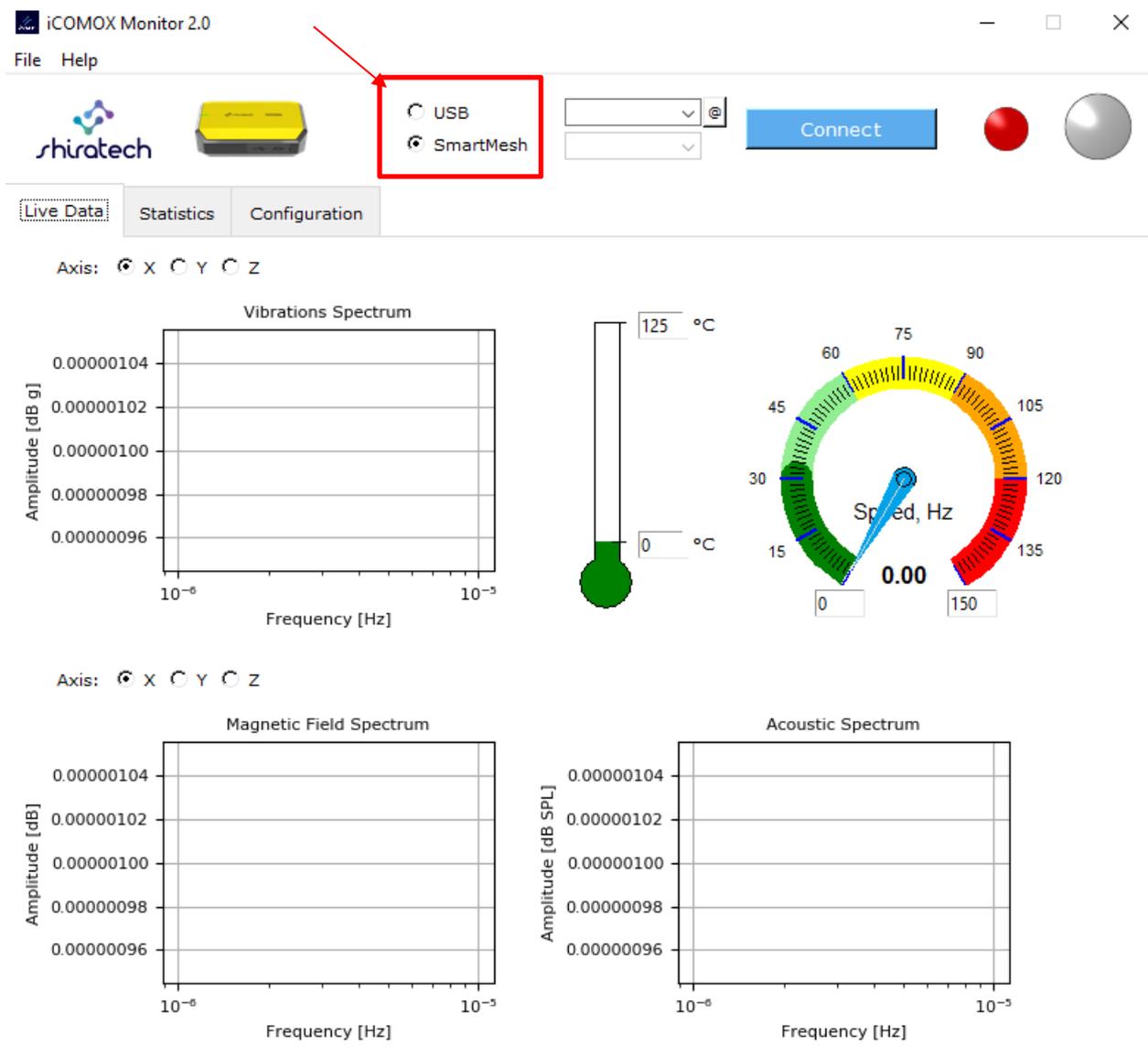
h. Upon pressing the *Connect* button, the Monitor establishes a communication with the iCOMOX. The indicator color is changed as described in the following table according to the selected communication method:

	USB	SmartMesh
🔴	Disconnected	Disconnected
🟡	Connected to the Dongle. Trying to establish wireless communication with the iCOMOX.	Connected to the Dongle. Trying to establish wireless communication with the iCOMOX.
🟢	Wired communication established.	Wireless communication established.

i. 5-10 seconds after the communication indicator turns green, the signals from the sensors appear on the plots. The LED of the iCOMOX lights up green when data is transferred from the iCOMOX to the PC. When data is not transferred the LED of the iCOMOX turns off.

3. Connecting the iCOMOX Kit

a. Prerequisites:

   - iCOMOX Kit

   - PC with Windows 10 installed.

   - Free USB port.

b. Connect the iCOMOX to the PC using the USB-C cable. It is recommended to fasten the screws of the USB-C cable to the iCOMOX.

c. Connect the Dongle (if SmartMesh communication is required) to one of the USB ports of your PC.

d. Turn on the iCOMOX by sliding the slide switch on the iCOMOX to the direction of the LED (the opposite direction of the USB-C cable).

e. The LED of the iCOMOX turns green.

Note, the iCOMOX is equipped with batteries. When the USB cable is disconnected, the iCOMOX, when turned on, is powered by the batteries instead of by the USB-C cable. Make sure that the iCOMOX is off when the USB-C cable is disconnected.

4. Overview

Communication pane

Functionalities Tabs

Axis selection for Vibrations

Live Vibrations spectrum

Live temperature Gauge

Live Velocity gauge. Active when the iCOMOX is mounted on an electrical motor

Axis selection for Magnetic field

Live Magnetic field spectrum

Live Acoustic spectrum

Status pane

	Mean	SD	Min	Max
Accelerometer X [g]:	-0.0	0.02	-0.04	0.04
Accelerometer Y [g]:	0.0	0.01	-0.02	0.03
Accelerometer Z [g]:	0.0	0.01	-0.02	0.03
Magnetometer X [µT]:	-52.78	1.18	-57	-49
Magnetometer Y [µT]:	-20.35	1.21	-25	-17
Magnetometer Z [µT]:	4.8	2.28	0	10
Microphone [dB SPL]:	3.78	7.0	-3.85	42.67
Temperature [°C]:	27.31	0.0	27.31	27.31

Communication pane

Functionalities Tabs

Live Statistics table

Status pane

Communication pane

Functionalities Tabs

Sensor Selection

Acquisition plan

Data management

Status pane

5. Mechanical Structure

5.1 The Sensors Pack

The iCOMOX sensors pack contains the following equipment:

1. The indication LED's.
2. Case.
3. SD and on/off switch cover.
4. Gasket.
5. The case's cover.
6. Electronic card.
7. Case - Cover connection screws.
8. Case – Electronic card connection screw.
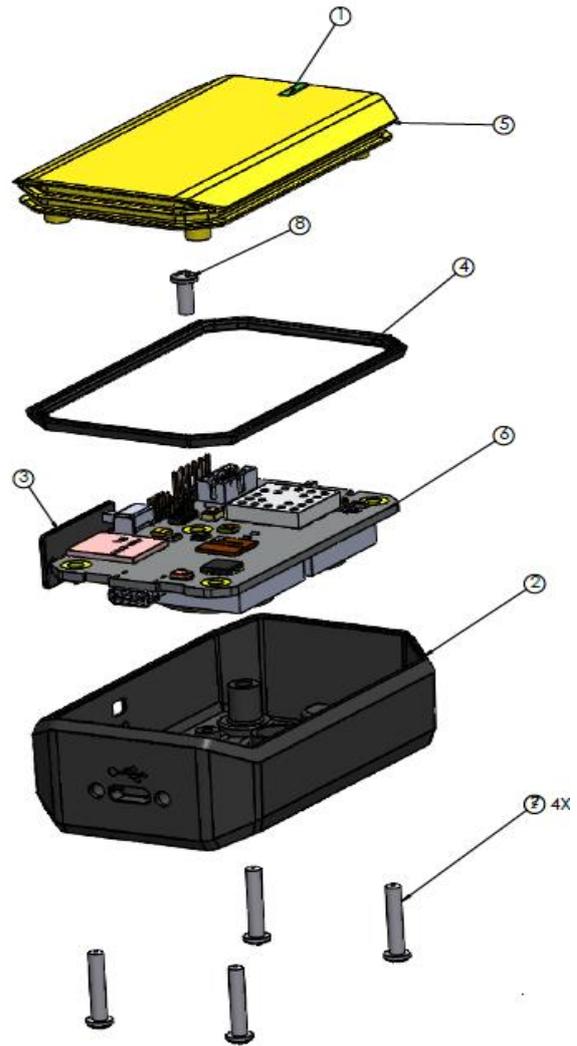
5.2 The Mounting Kit

The Mounting Kit (Figure 2 and Table 1) provides a flexible mounting solution of the iCOMOX sensors pack to the monitored equipment. The Mounting Kit contains:

- An adaptor (3) which is secured to the iCOMOX sensors pack with two screws (4). This adaptor has two holes at its sides, which may fit to several motors such as three-phase, Size 63 Induction Motor.

- A second adaptor (1) is supplied with slots instead of holes, providing additional flexibility. If adaptor (3) fits your equipment, you may avoid using adaptor (1).
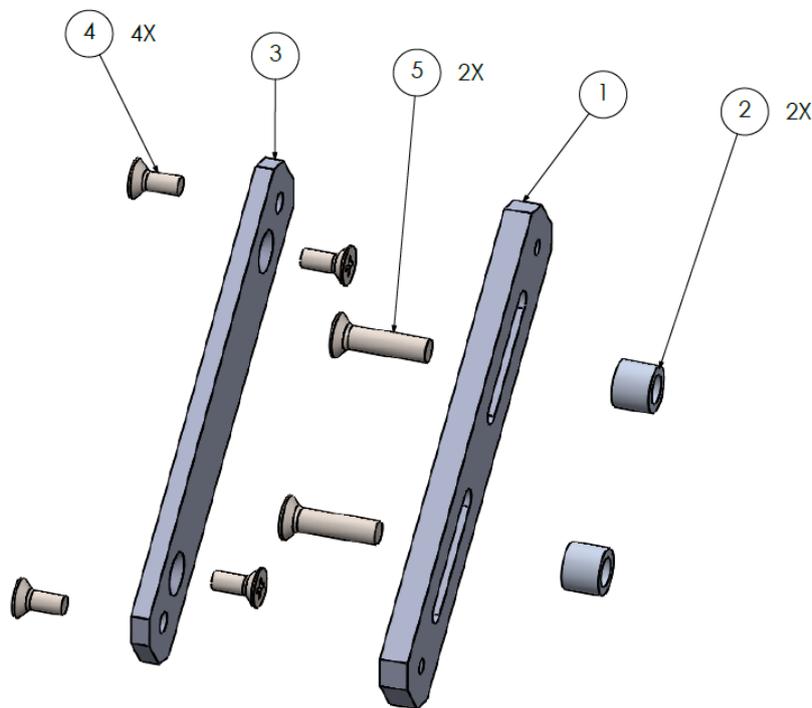

Figure 2 The Mounting Kit to connect the iCOMOX Sensors Pack to the equipment.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	0009-00-00-0004		1
2	0009-00-00-0001		2
3	0009-00-00-0008		1
4	DIN EN ISO 7046-1 - M4 x 10 - Z - 10N		4
5	DIN EN ISO 7046-1 - M5 x 20 - Z - 20N		2

Table 1 The components of the Mounting Kit

5.2 Do-It-Yourself Mounting Adaptor

In any case the supplied adaptors do not fit your equipment, you may make an adaptor of your own as per the dimensions of the supplied adaptor in Figure 3.

Note that only the 73mm distant holes are to be considered during the design. They are made to accommodate m4 screws.

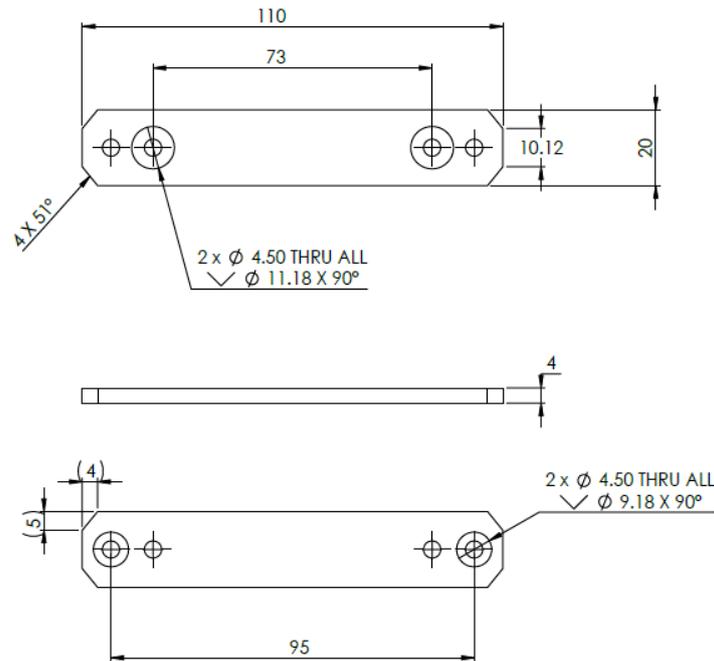For more information/support, please contact support@shiratech-solutions.com .

Figure 3 The mounting adaptor supplied with the iCOMOX

6. Battery Replacement

a. The iCOMOX contains two CR2450N batteries.

b. Using a Phillips screwdriver, disconnect the iCOMOX from the motor.

c. Disconnect the USB cable from the iCOMOX, remove the four screws at the back side of the iCOMOX.

d. Remove the yellow cover. Attention. Avoid detaching the SmartMesh antenna connected to the card.

e. Remove the screw at the middle of the electronic card to disconnect the electronic card from the cover.

f. Replace the two batteries with CR2450N.

g. Assemble the iCOMOX, then reinstall the iCOMOX onto the motor.

7. Troubleshooting

Problem	Possible reason	Solution
PC doesn't recognize the iCOMOX	Missing driver for the FTDI.	Please follow the instructions in Appendix A.
Monitor does not connect to the iCOMOX. The communication indicator on the monitor is red instead of green after pressing the "Connect" button.	iCOMOX is not operating.	Turn the iCOMOX off and on again. Verify that the LED turns on red.
-"-	USB cable is not connected properly.	Verify that the USB is connected properly. Close the Monitor turn the iCOMOX off and on again. Re-launch the Monitor.
-"-	USB cable is damaged.	Replace the USB cable. Close the Monitor, turn the iCOMOX off and on again. Verify that the LED is flashing. Re-launch the Monitor.
The plots on the Monitor are not updated.	Communication is lost.	1. Try to reconnect by pressing Disconnect and then Connect on the Monitor. 2. Close the Monitor turn the iCOMOX off and on again. Re-launch the Monitor.
Monitor does not appear on the screen.	The monitor is heavy to the PC.	Wait. It might take up to 60 sseconds (!) seconds to appear at the first time.
Monitor cannot be closed.	Bug in the Monitor.	Close the Monitor using Ctrl+Alt+Del -> task manager.

8. Appendix A: FTDI D2XX driver

D2XX drivers allow the iCOMOX monitor (and other applications as well) direct access to the USB device through a DLL. To install the driver from FTDI website:

1. Go to https://www.ftdichip.com/Drivers/D2XX.htm

2. Press the setup executable which is often found on the top-right side of the table (see Figure 4).

Currently Supported D2XX Drivers:							
				Processor Architecture			
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	ARM	MIPS	SH4	Comments
Windows*	2017-08-30	2.12.28	2.12.28	-	-	-	WHQL Certified. Includes VCP and D2XX. Available as a setup executable Please read the Release Notes and Installation Guides.
Windows RT	2014-07-04	1.0.2	-	1.0.2	-	-	A guide to support the driver (AN_271) is available here
Linux	2018-06-22	1.4.8	1.4.8	1.4.8 ARMv5 soft-float 1.4.8 ARMv5 soft-float uClibc 1.4.8 ARMv6 hard-float (suits Raspberry Pi) 1.4.8 ARMv7 hard-float 1.4.8 ARMv8 hard-float	1.4.8 MIPS32 soft-float 1.4.8 MIPS32 hard-float 1.4.8 MIPS openwrt-uclibc		If unsure which ARM version to use, compare the output of readelf and file commands on a system binary with the content of release/build/libftd2xx.txt in each package. ReadMe Video Install Guide
Mac OS X							If using a device with standard FTDI vendor and product identifiers, install D2xxHelper to prevent OS X 10.11 (El Capitan) claiming the device as a serial port (locking out D2XX programs).

Figure 4 Setup executable FTDI D2XX driver in https://www.ftdichip.com/Drivers/D2XX.htm