Wideband lambda controller setup

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Introduction

This user manual is an integral part of the dynoKRAFT ADAQ controller hardware.
The LCP80 Controller is a product of IMFsoft, s.r.o. (www.imfsoft.com). The LSU 4.9 Lambda Sensor is a product of Robert Bosch GmbH (www.boschaftermarket.com)

Original User Manual for IMFSoft LCP80 controller used with Bosch LSU4.9 sensor, in combination with dynoKRAFT ADAQ hardware.
This manual the controller and/or software described in it, is furnished under license and may only be used in accordance with the terms of such license.
This manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by dynoKRAFT.

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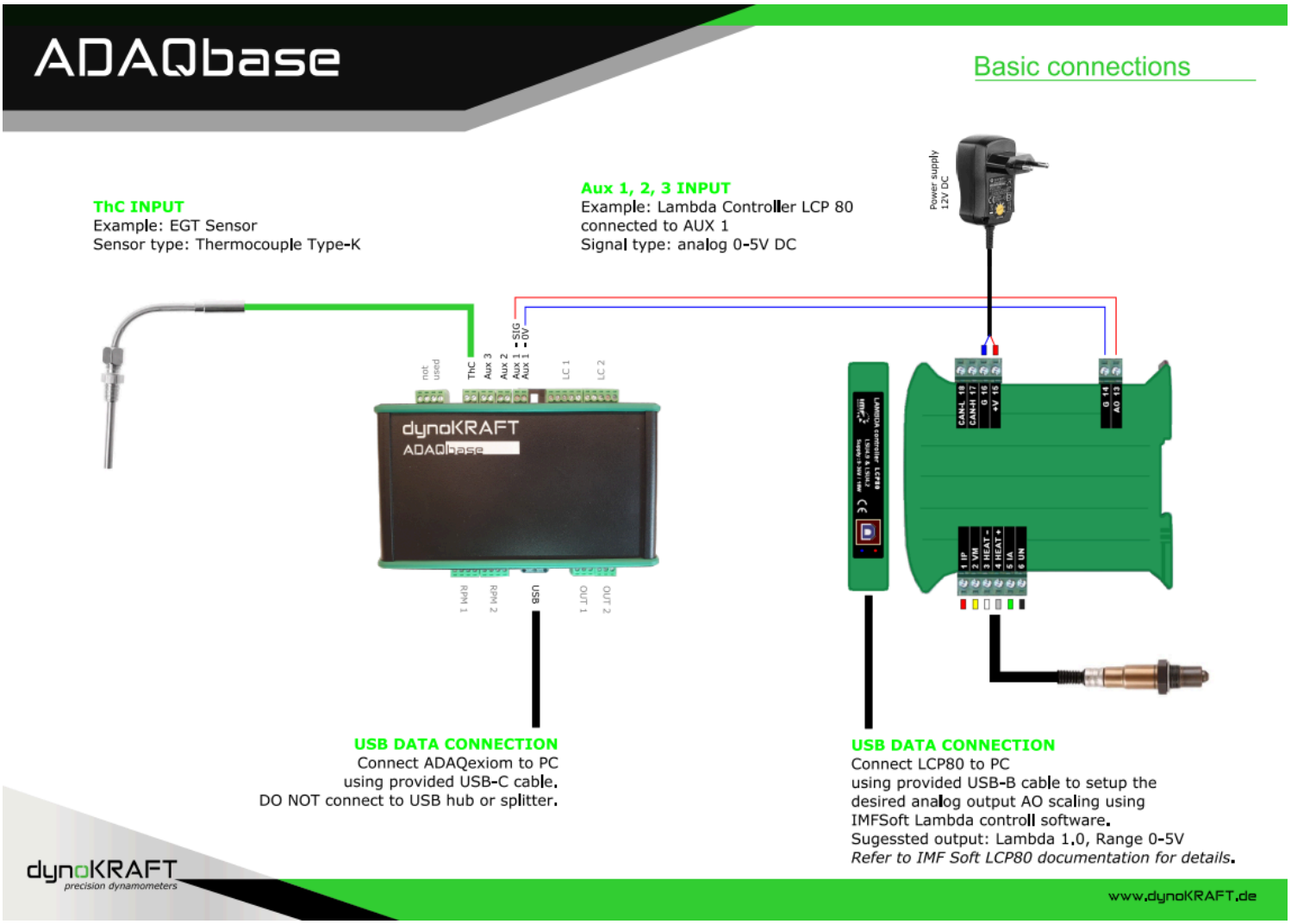
Installation and configuration

Installing LCP80 controller hardware

> **NOTE**
> For best performance please install the Bosch LSU4.9 Wideband Lambda Sensor directly into exhaust system of a vehicle before the catalyst converter or any other exhaust gases filter.
> Using an so-called "tail sniffer" may impact the readings.

Overview of LCP80 - LSU4.9 - ADAQbase connections



Step-by-step instructions

1. Please connect the LCP80 controller using supplied power supply to grid. Alternatively the LCP80 controller can be powered up using 12V DC power directly from vehicle if the battery capacity is sufficient. The LCP80 controller will require approx. 1,5-2A at 12VDC.

2. Connect the analog output AO 13 and ground G 14 from the LCP80 to corresponding analog input AUX1 SIG and ground to AUX1 0V found on ADAQbase.

3. Connect the Bosch LSU4.9 sensor to provided extension cable and 6-way connector on the LCP80 controller.

CAUTION - HOT SURFACE

As soon as the LCP80 controller is powered up with 12VDC power the LSU4.9 sensor will be heated up therefore do not connect the LSU4.9 Sensor to the controller the sensor is not installed into the vehicles exhaust system or an sniffer.

NOTE

To avoid damage to LSU4.9 sensor please heat it up before starting the vehicles engine.

4. Connect the provided USB cable to LCP80 controller to configure it using IMFSoft PC-Software.

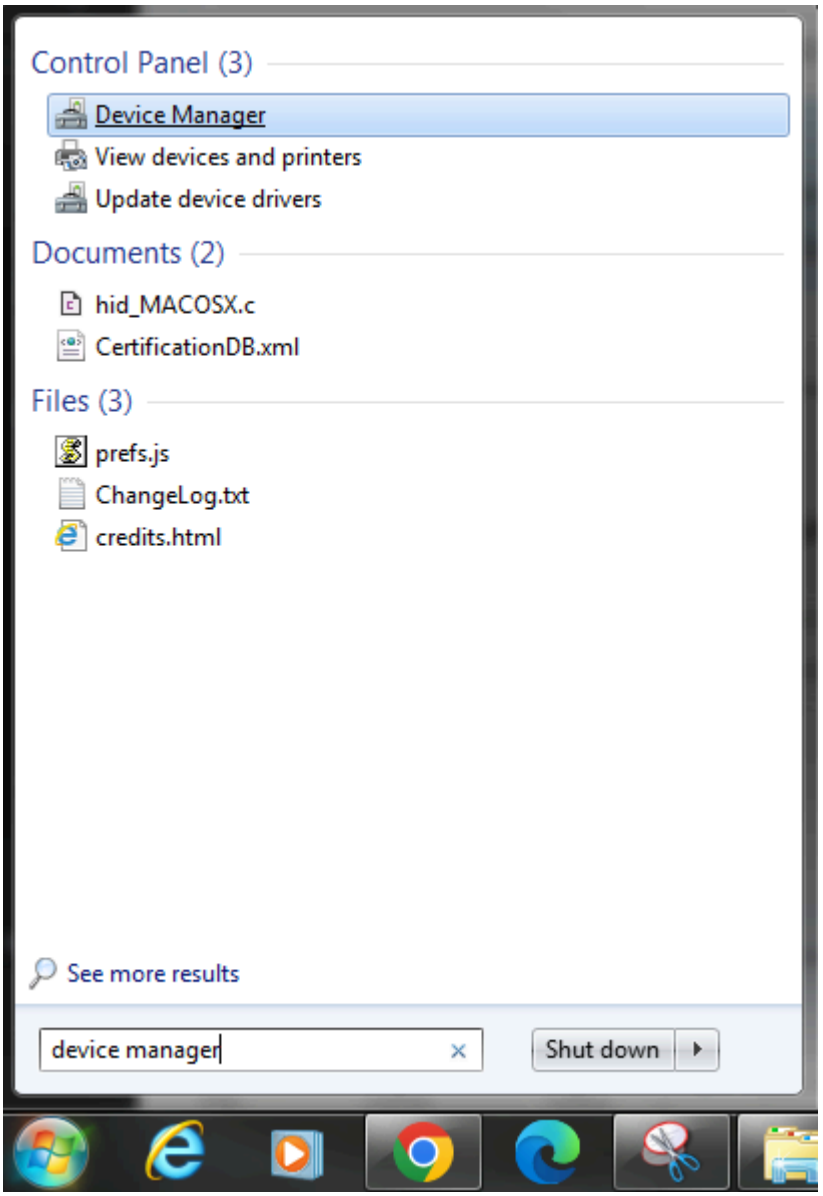
> **NOTE**
> On Windows 10 PC connected to internet the required driver will be installed automatically. On earlier Windows versions the driver must be installed manually.
> Please download it directly from IMFSoft website: https://imfsoft.com/files/master/software/USBdriver_v2.12.24.zip

5. Install the IMFSoft LAMBDA Control software to be able to configure the controller output signal: https://imfsoft.com/files/lambda/software/AppV9.4_LAMBDA_control%20.zip

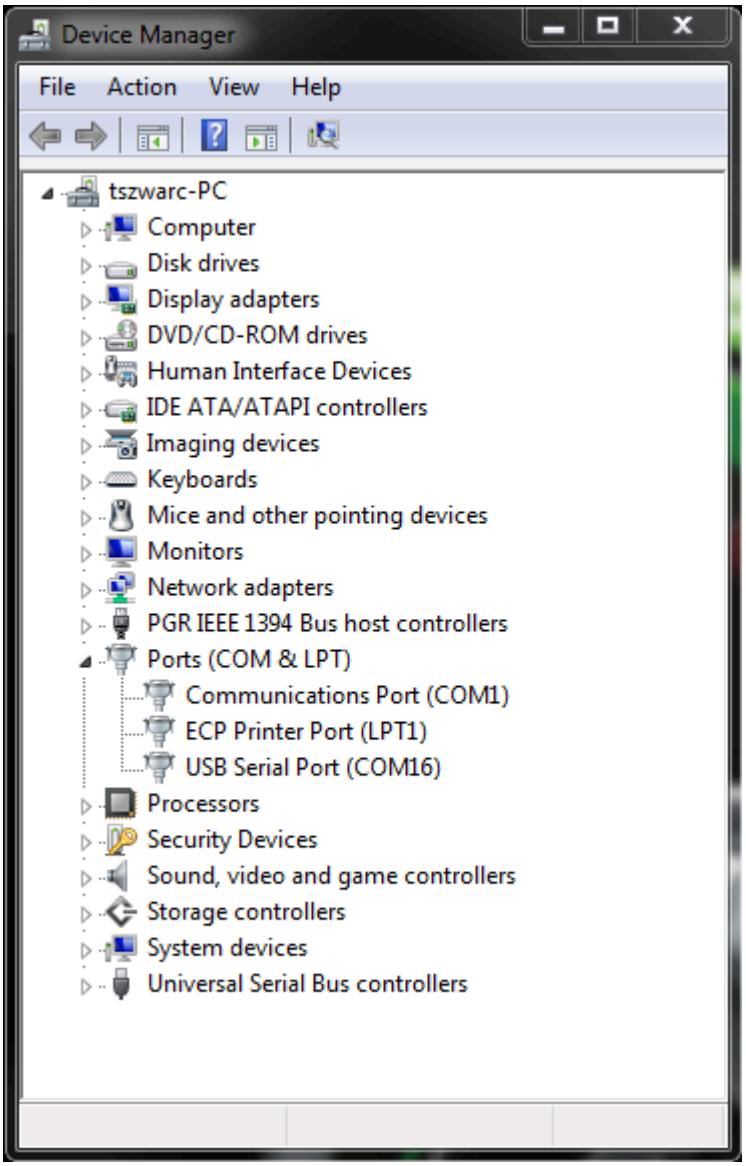
LCP80 controller configuration

When the LCP80 unit is powered-up with 12VDC and connected to PC using provided USB cable, make sure to have both the USB-driver and LAMBDA Control software installed before proceeding.
(See Point 4 and 5 in "Installing LCP80 controller hardware" chapter)

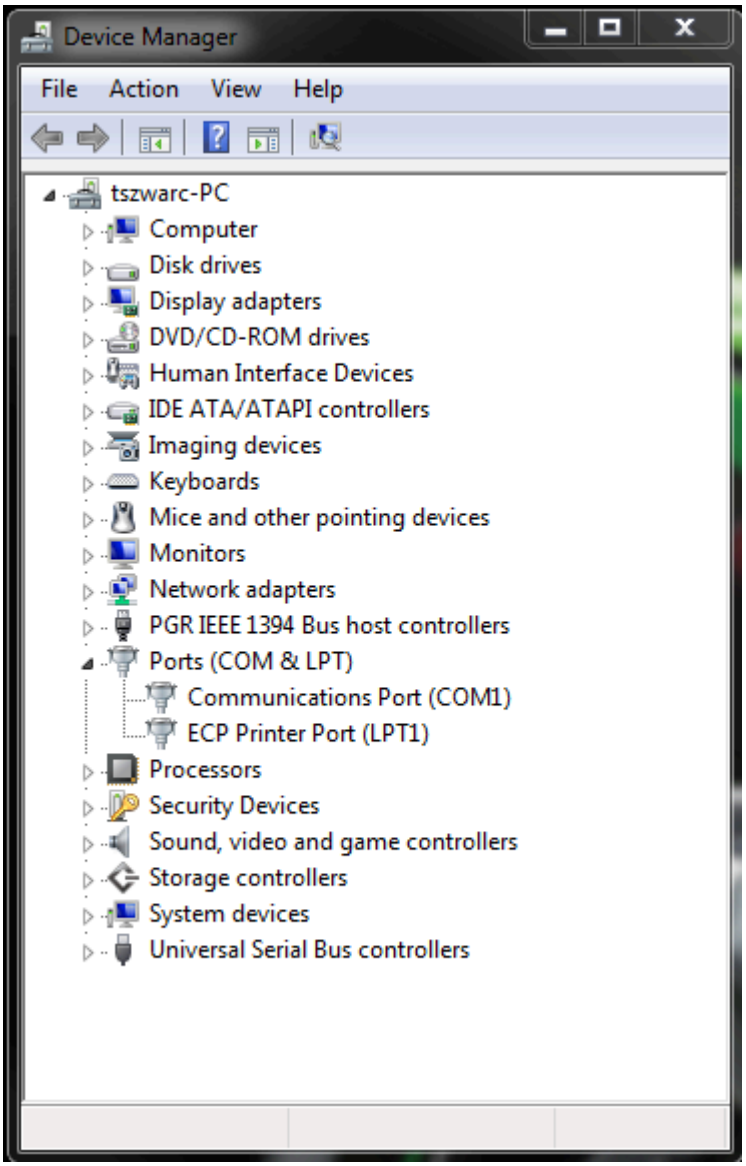
1. To be able to connect to the LCP80 controller and configure it's firmware you must at first determine which COM-Port the device is using for PC-Communication.
To do this please tart the "Device Manager" in Windows OS.



and expand the "Ports (COM & LPT)" section to show all COM-Port devices connected to your PC. Memorize all of them to be able to determine the COM-Port number of the LCP80 controller after disconnecting the USB cable. In example below only COM1 and COM16 are in use.:



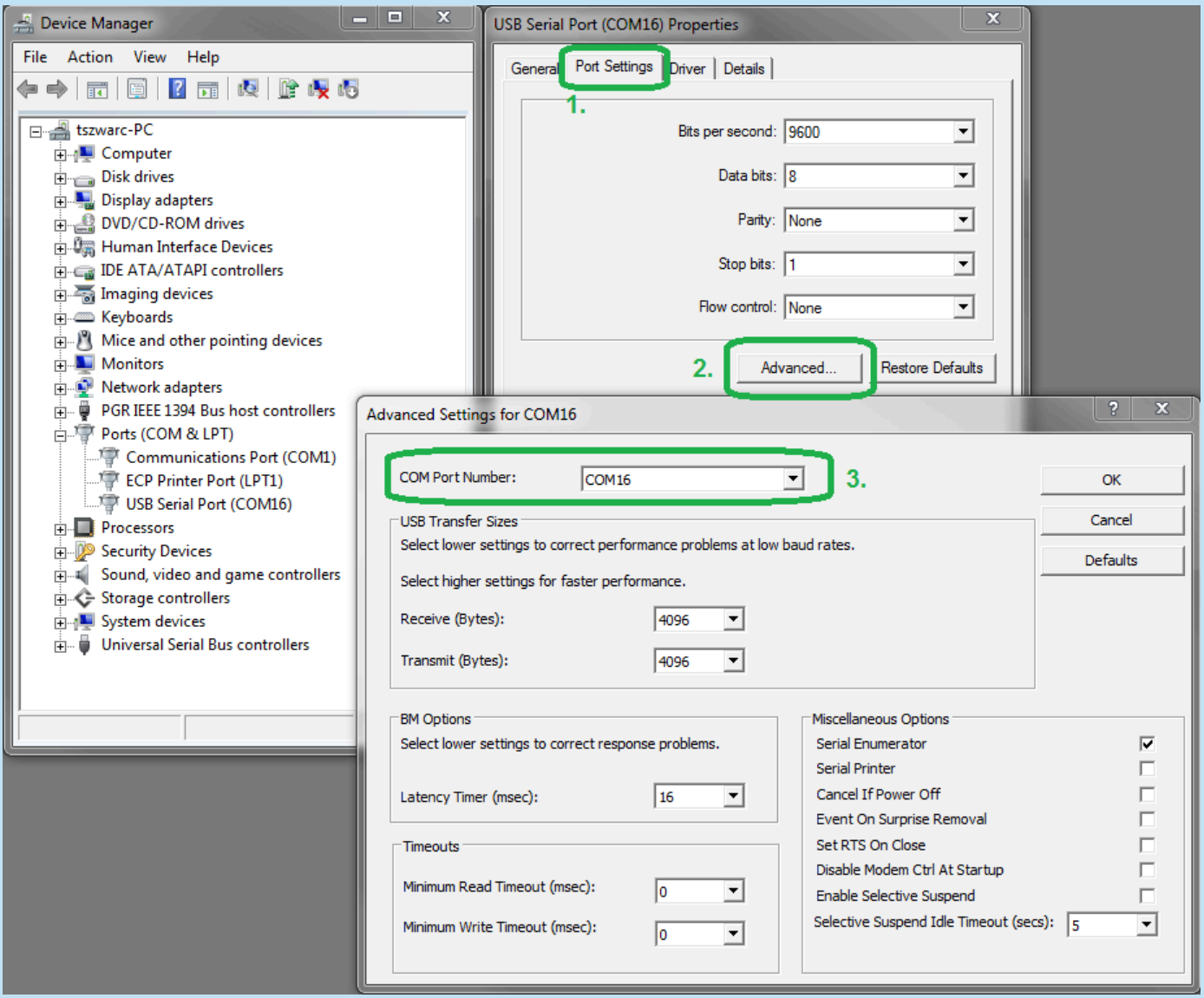
As soon as we disconnect the LCP80 from PC this list will be updated with only active COM-Ports being shown. As you may see the COM16 disappeared - this means that in our case the LCP80 controller is using exactly this COM-Port number (COM16) to communicate to PC:


Device Manager
File
Action
View
Help
tszwarc-PC
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Imaging devices
Keyboards
Mice and other pointing devices
Monitors
Network adapters
PGR IEEE 1394 Bus host controllers
Ports (COM & LPT)
Communications Port (COM1)
ECP Printer Port (LPT1)
Processors
Security Devices
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers

NOTE

In case you have more then one hardware using same COM-Port number you must assign new number to the LCP80 controller to avoid hardware conflict.

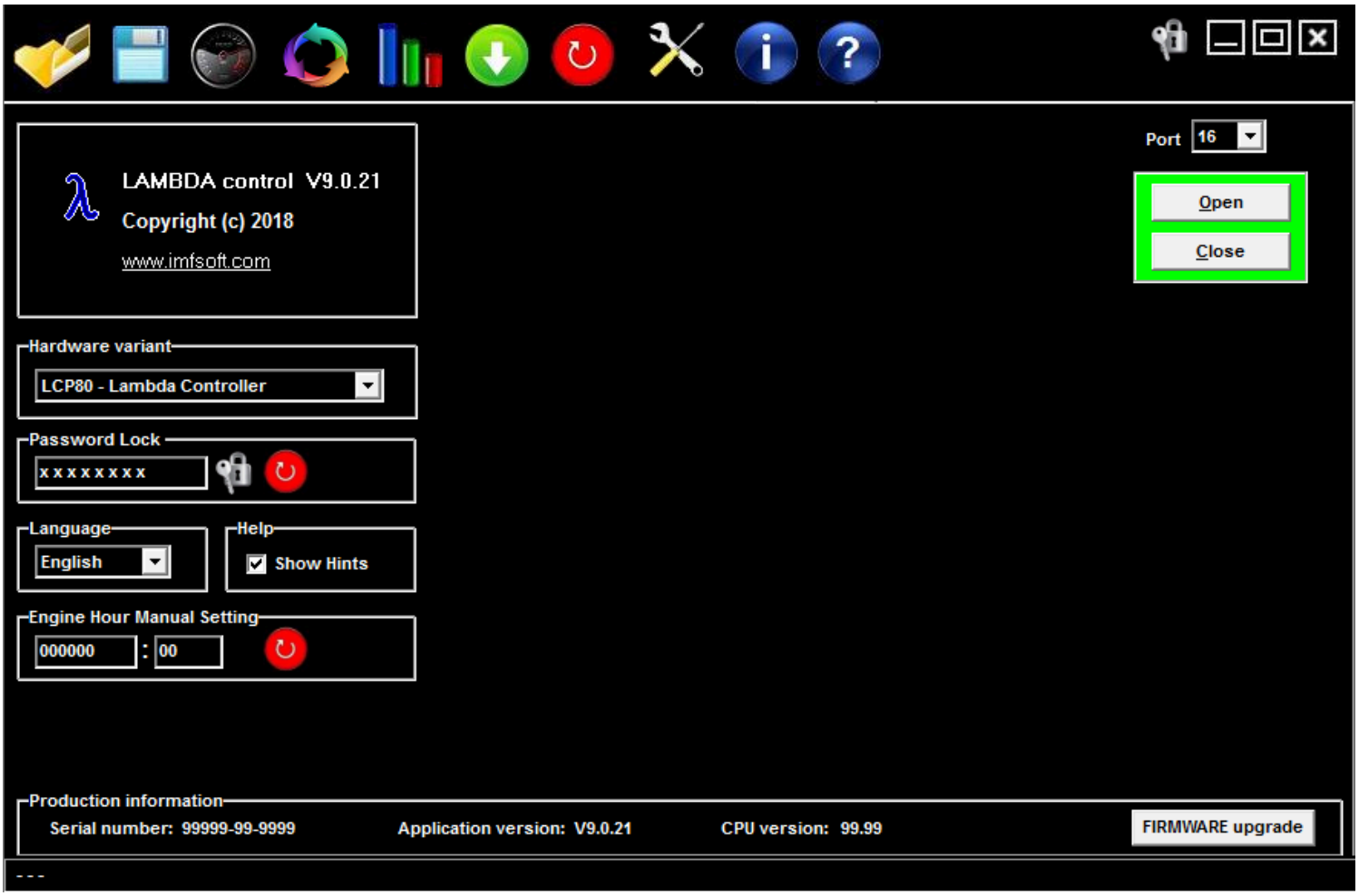
This can be done using COM-Port Properties -> Port Settings tab - > Advanced function.



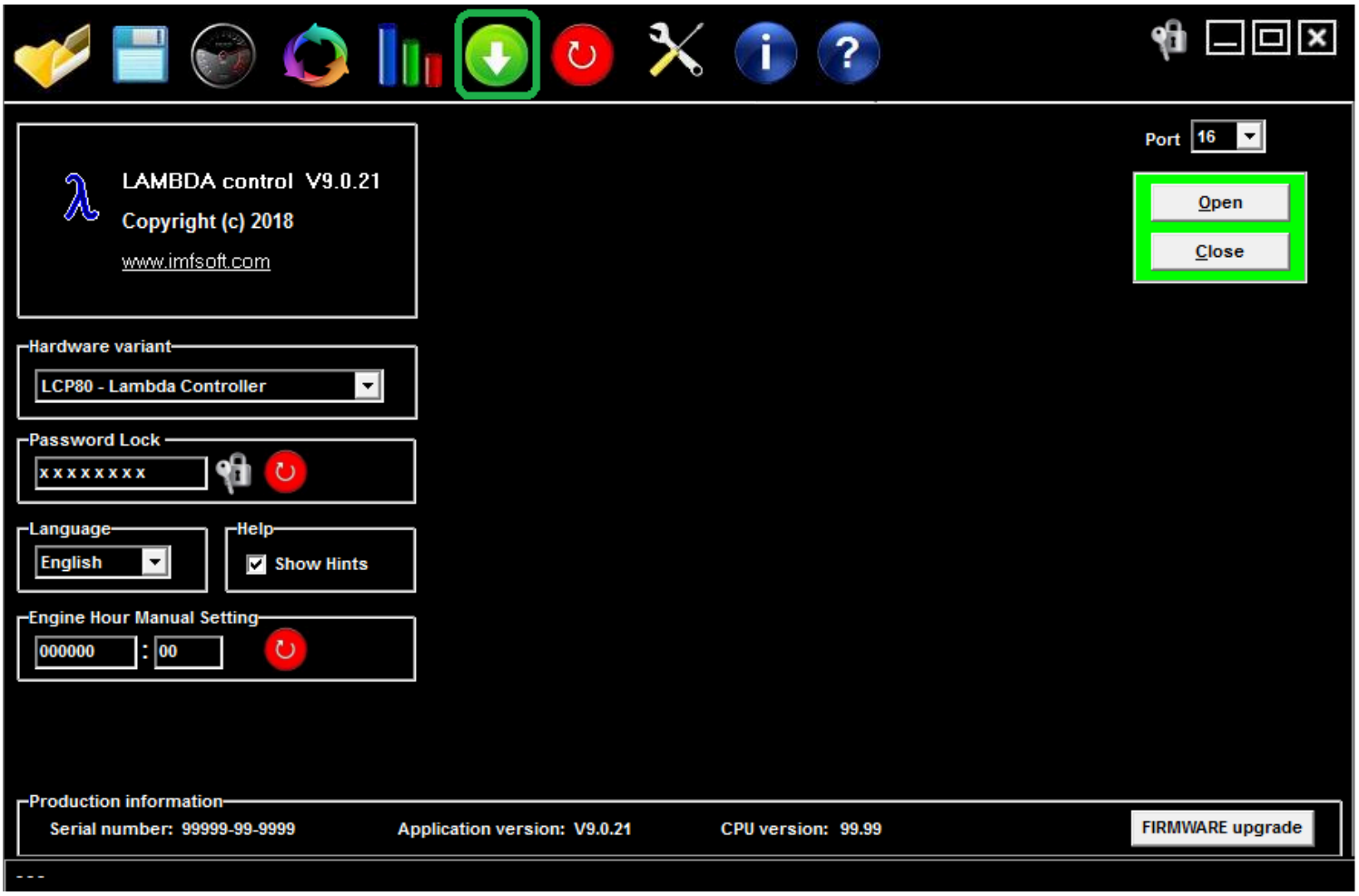
2. Launch the LAMBDA Control software and connect to LCP80 controller.

Press the " i " button, then select the "Hardware variant".

Lastly select the correct COM-Port number and press the "Open" button.

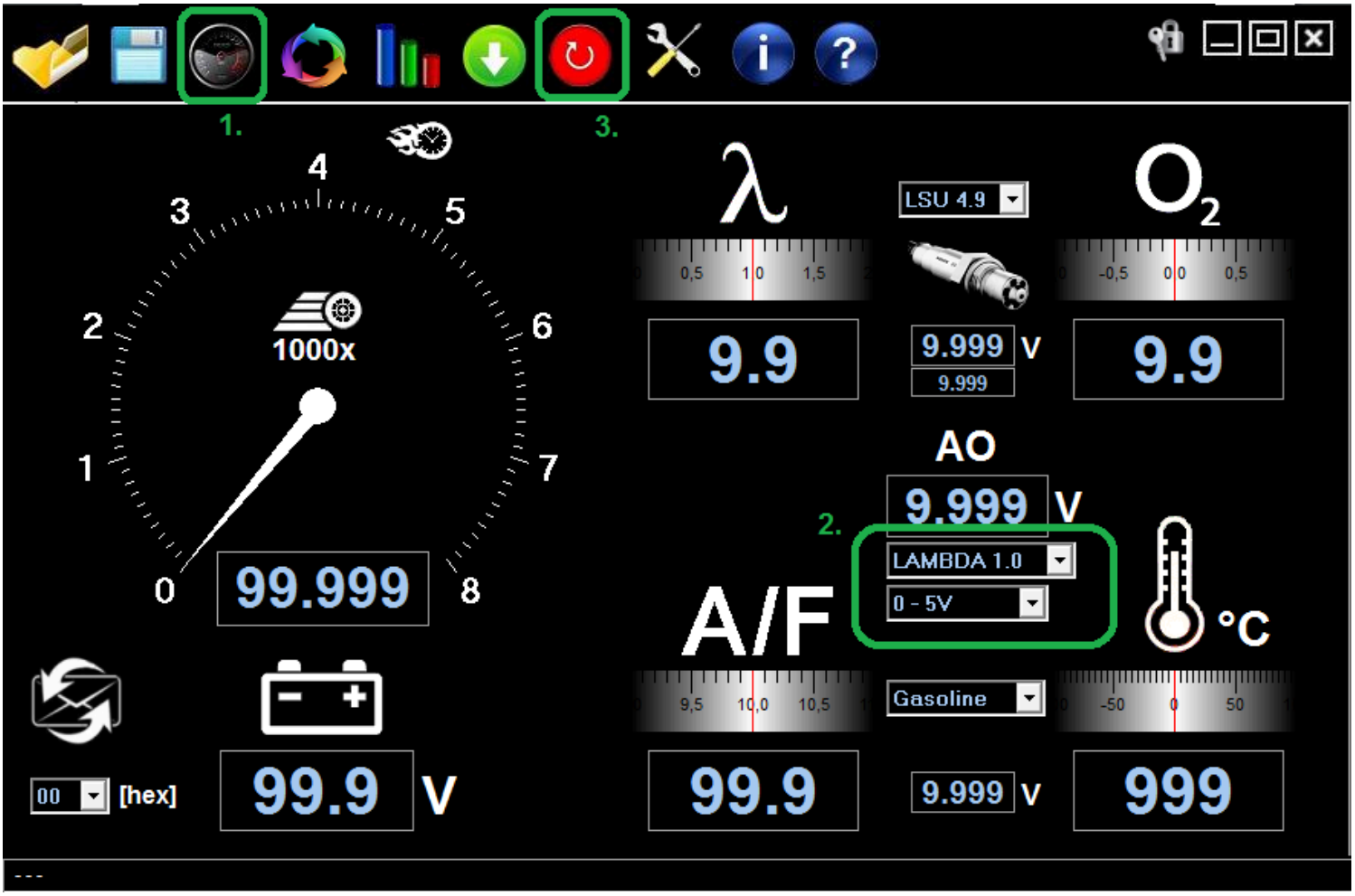


3. Read the Flash Memory from LCP80 device using the green arrow:



4. Switch to "Gauges" view by pressing the gauge-icon.
In this view select the desired Analog Output type to LAMBDA 1.0 and range to 0-5V
The upload this modified configuration back to LCP80 controller by pressing the RED ARROW icon.
The controller is now ready for use with ADAQ Software.
The LCP80 controller will send the measured lambda value as analog signal to ADAQbase controller AUX input.

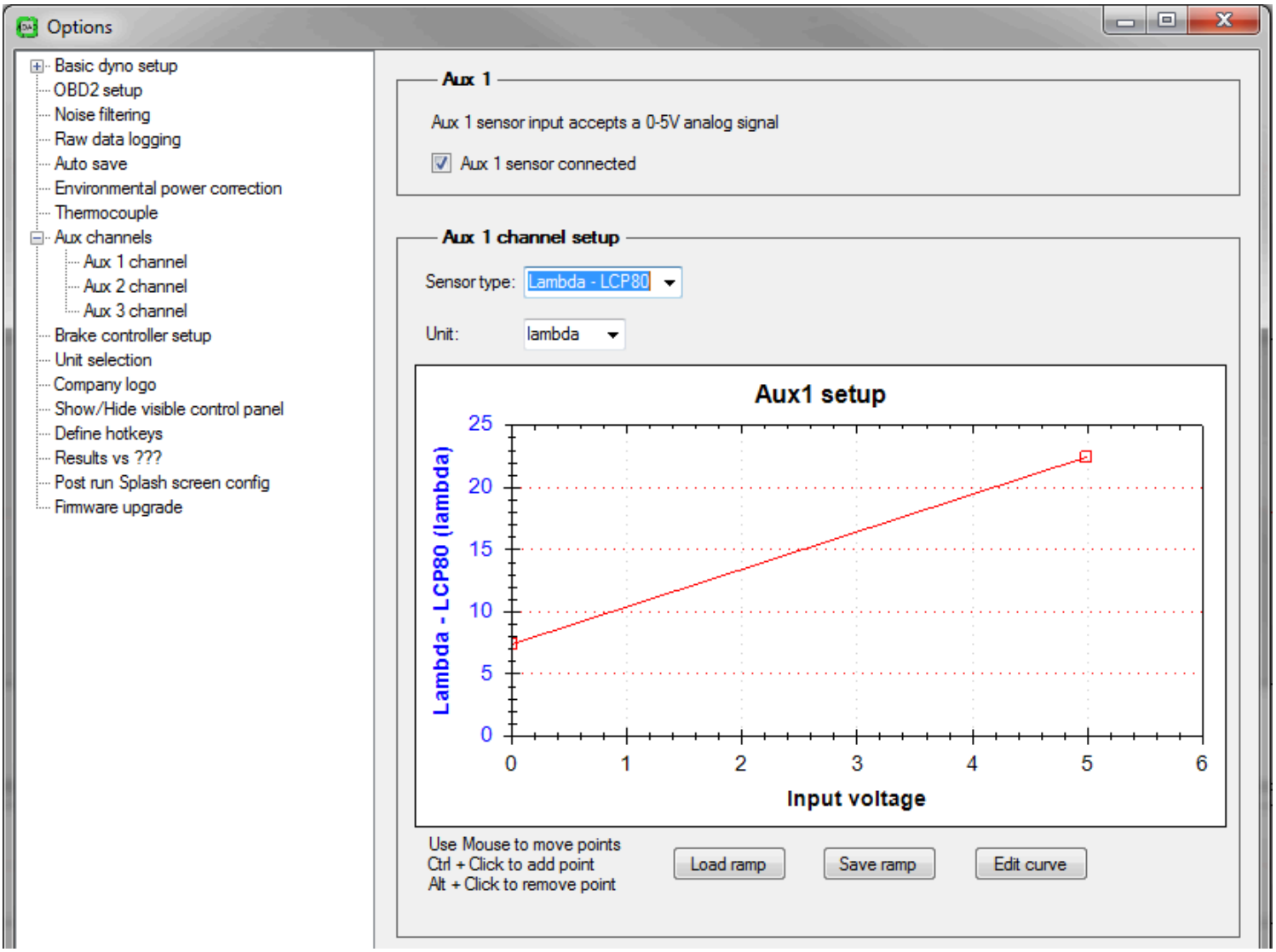
ⓘ **NOTE**
You may use the LAMBDA Control software to easily calculate the AFR values for different fuel types and to monitor other parameters of the Bosch LSU4.9 sensor.
For more details on how to use the LAMBDA Control software please refer to IMFSoft user manual: https://imfsoft.com/files/lambda/LCP80/LambdaController_LCP80_EN.pdf



ADAQ Software configuration

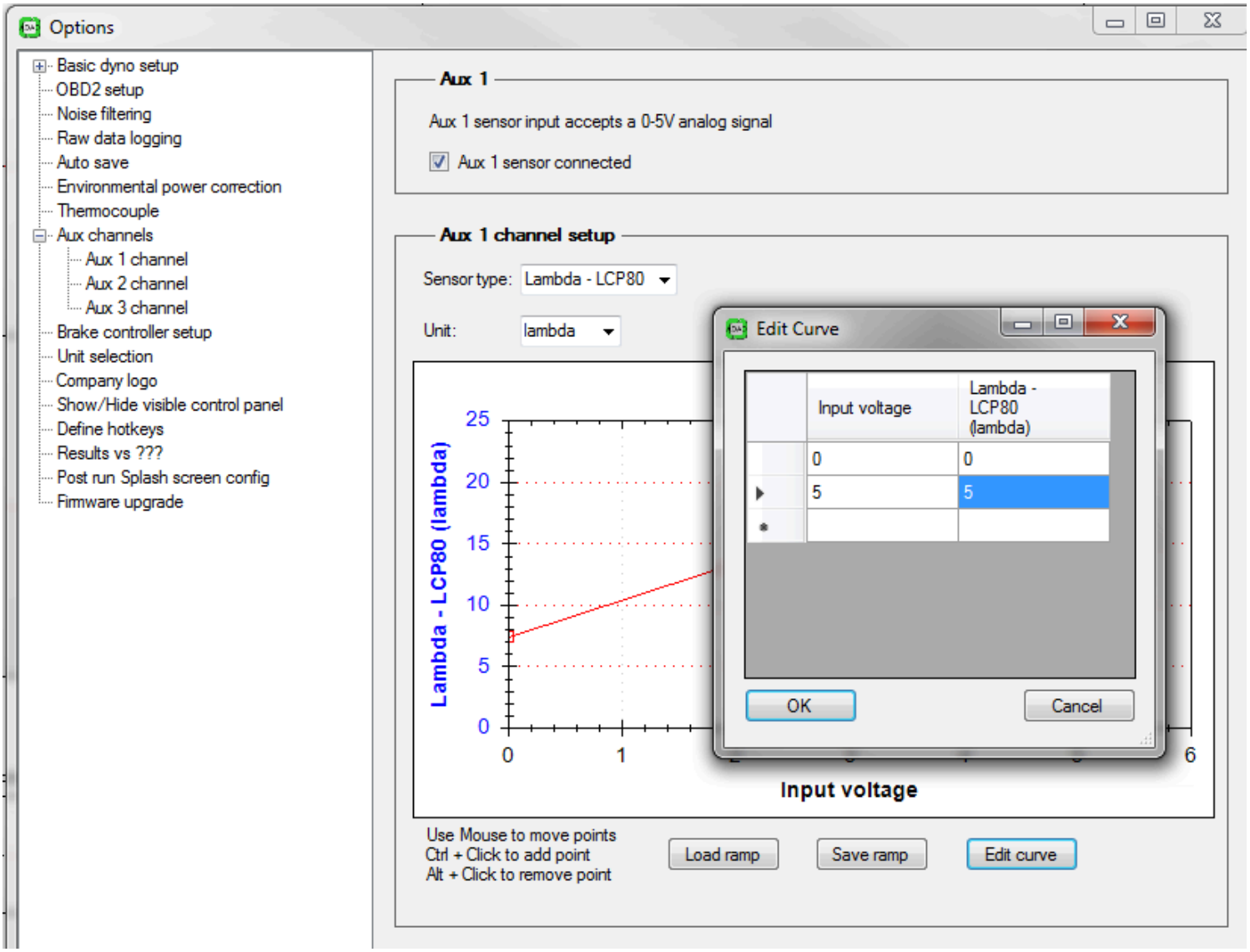
To be able to correctly record the lambda values from LCP80 controller the ADAQ Software must be configured as follow.

1. Open the ADAQ Software and navigate to Options. Expand the "Aux channels" section and select "Aux 1 channel" configuration:



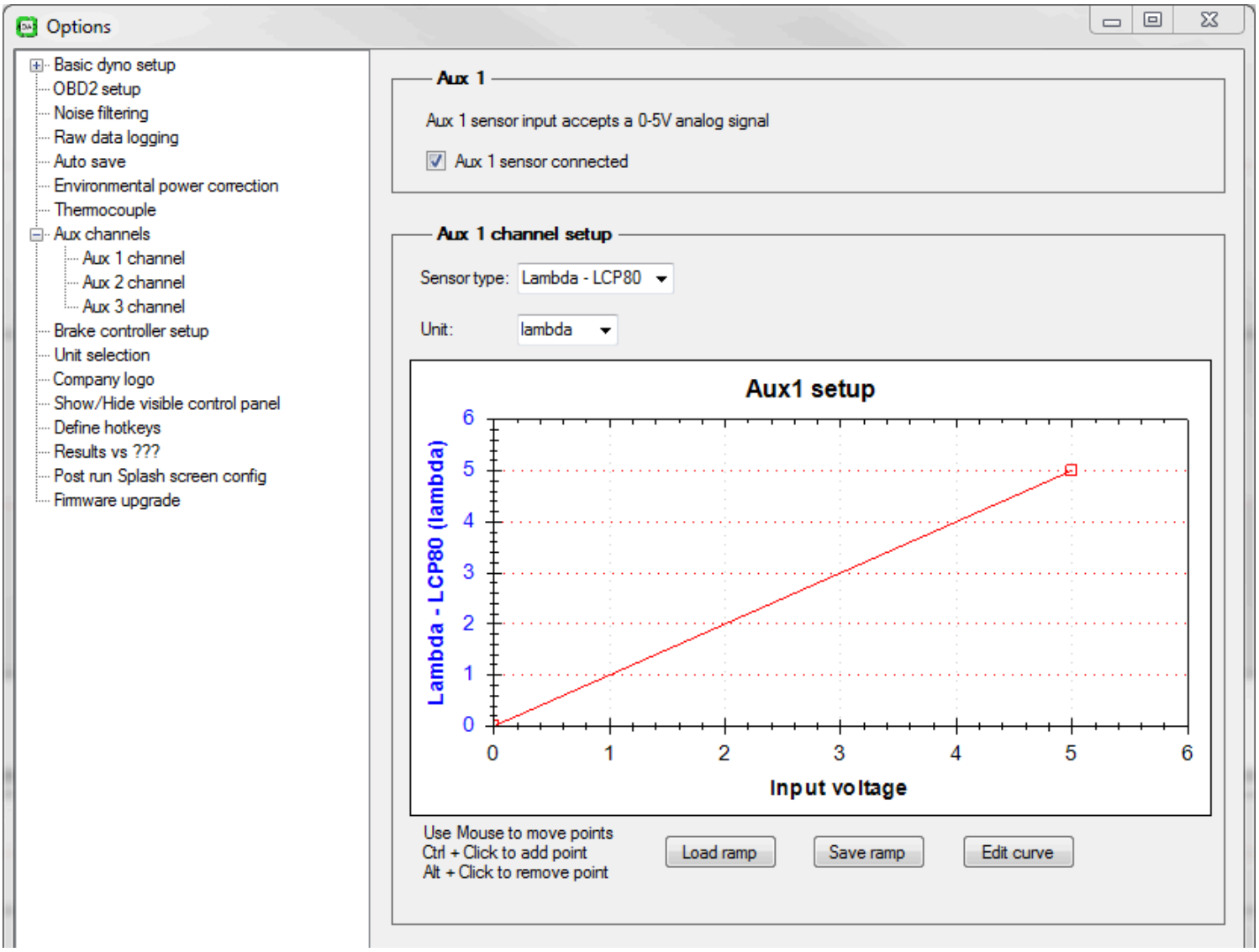
2. Make sure the check-box "Aux 1 sensor connected" is active.
Write desired channel name and unit in the "Sensor type" and "Unit" boxes. Simply click with mouse cursor on this field to edit it.

3. Adjust the input voltage curve using "Edit curve" button.
Because the LCP80 controller output is configured in LAMBDA 1.0 mode with 0-5V range the actual voltage signal equals lambda value:
0V = Lambda 0,0
5V = Lambda 5,0



Confirm the changes by pressing OK button in "Edit Curve" window.

The new Input Curve now looks as follow:

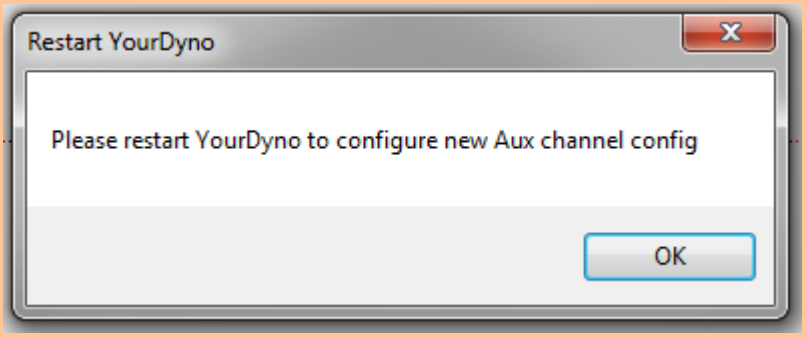


Close the Options window to save these settings.

① IMPORTANT

Please note the upon changing configuration of any Analog Input channel or changing the software units the ADAQ Software must be restarted.

Press OK and manually restart the ADAQ Software.



4. To show the Lambda - LCP80 channel in the main window of the ADAQ Software please press "V" key on keyboard and select the corresponding channel to display: