

## Recording the AKD Feedback Analog Signal Amplitude for Resolver and Sine Encoder

Updated 10/22/19  
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The F402 fault in the AKD indicates a voltage level out of range on the feedback signals. This document addresses Resolver and Sine Encoder feedback types, including Endat 2.1 equivalent and BiSS mode B (analog).

Use the FPGA data register number 0x2000186e.s16 (or 0x2000186e.u16) to read the signal amplitude. (The s16 is for signed 16bit and u16 is for unsigned 16bit. Either can be used, since the value is always positive.)

Allowable value ranges:

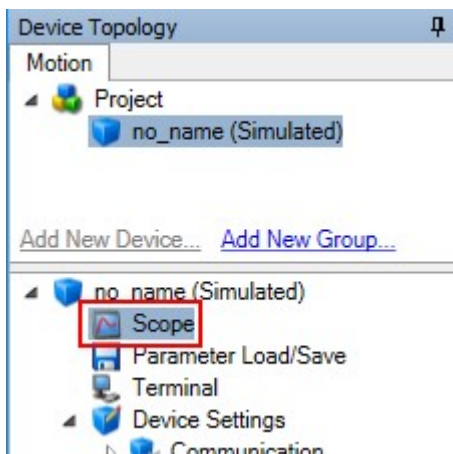
Resolver: 6124 (2.25 Vrms) - 11778 (4.375 Vrms)

Sine Cosine: 5347 (0.25 V0-p) - 12832 (0.600 V0-p)

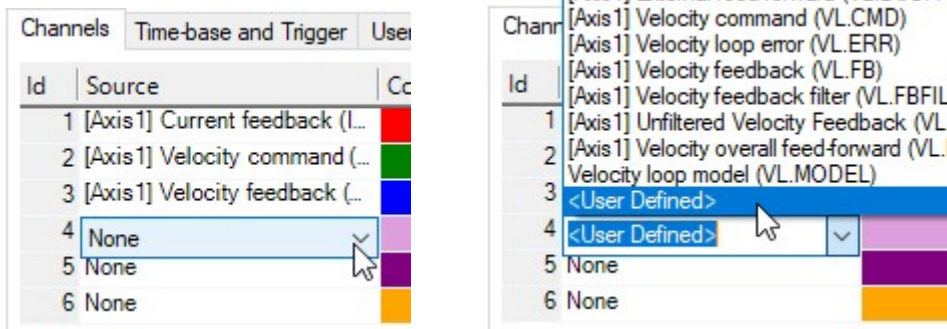
Enter the register number into the user defined scope channel selection and record a scope plot.

Procedure:

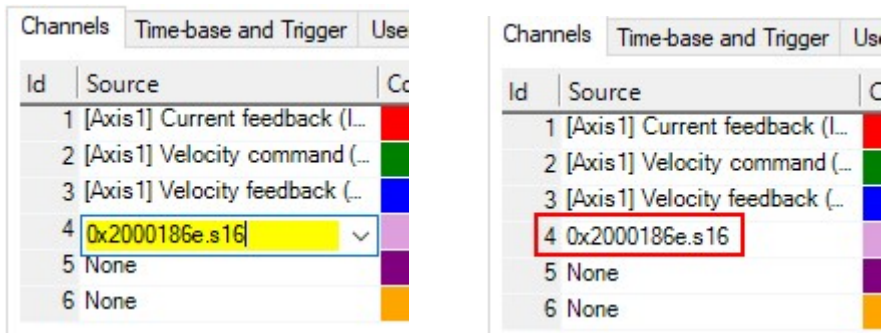
1. Open Workbench.
2. Open or create a project, and/or connect to the AKD drive.
3. Select "Scope" in the navigation tree.



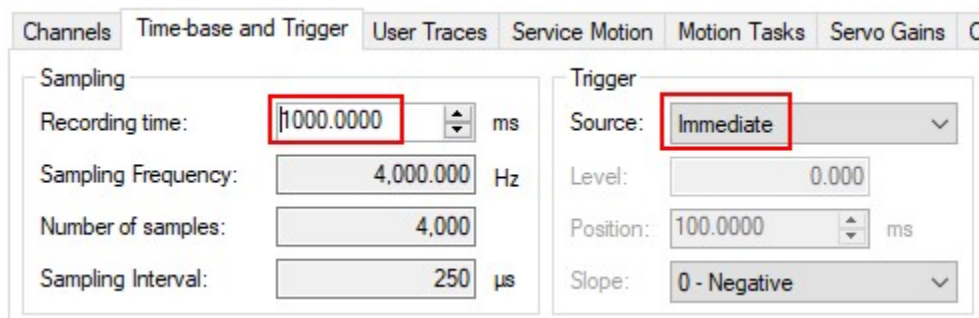
- Click on the Channels tab and select "<User Defined>" from the drop-down list for any channel. (<User Defined> is at the very bottom of the list.)



- Replace "<User Defined>" with "0x2000186e.s16", and press Enter.



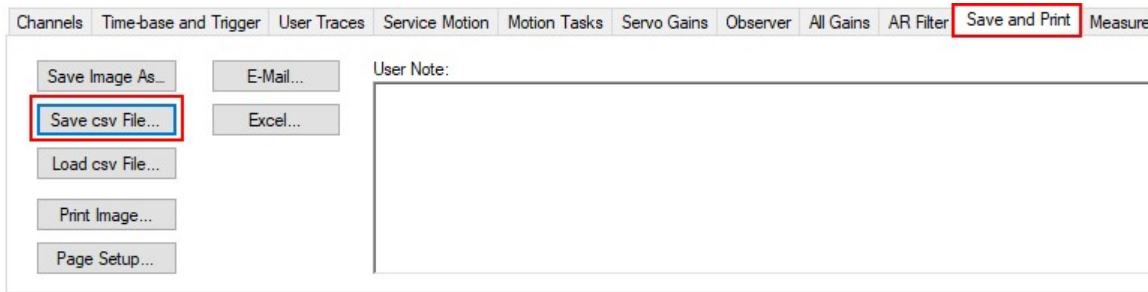
- Click on the "Time-base and Trigger" tab and set it up as shown below. A longer recording time can be used, but that will lower the sampling frequency. If the sampling frequency is too low, it is possible to not see a spike in the plot. So use a long time until you figure out when the issue is occurring, and then narrow in on it with a short recording time to get more data points.



- When you are ready to plot the feedback signal, click on the “Start Recording” button. You can move the motor while it is recording to get a variety of feedback signal levels.



- After the recording is complete, click on the “Save and Print” tab, and save the plot as a csv file.




The results are in counts, not volts. The signal is  $(\sin^2 + \cos^2)^{0.5}$ . For a properly operating system, the register value should be within the allowable range.

For Resolver: range = 6124 (2.25 Vrms) - 11778 (4.375 Vrms)  
 For Sine Encoder: range = 5347 (0.25 V0-p) - 12832 (0.600 V0-p) (or 15000, depending on firmware version)

Typically, it will be around 10000.  
 If it's below or above this range, an F402 fault will be generated.

Check the Range Limits:  
 It may be a good idea to check the range limits to make sure the firmware that is currently being used has the correct range. Enter the following in the Workbench Terminal:

Type "DRV.MEMADDR 0x20001818.u16" and press enter to read the upper limit.  
 Type "DRV.MEMDATA" and press enter. It will output a value.  
 Type "DRV.MEMADDR 0x20001816.u16" and press enter to read the lower limit.  
 Type "DRV.MEMDATA" and press enter. It will output a value.



### Terminal

A command line interface to the device. Type a cor

```
-->DRV.MEMADDR 0x20001818.u16
-->DRV.MEMDATA
15000
-->DRV.MEMADDR 0x20001816.u16
-->DRV.MEMDATA
5347
-->
```

The value returned by DRV.MEMDATA is the limit currently being used in the firmware.