How to measure motor parameters

EVAL_100W_DRIVE_CFD2
September 2017

# Principal motor parameters – steps and instruments

Fundamental parameters are: R, L, pole pairs, BEMF constant

Measure resistance	Measure inductance	Count pole pairs	Measure BEMF

Measure resistance
- › Detach your motor cables
- › Connect a **resistance multimeter** to two phases and leave the third floating

Measure inductance
- › Detach your motor cables
- › Connect a **R-L multimeter** to two phases and leave the third floating

Count pole pairs
- › Detach your motor cables
- › Connect an **oscilloscope voltage** probe to two phases and leave the third floating

Measure BEMF
- › Detach your motor cables
- › Connect an oscilloscope voltage probe to two phases and leave the third floating
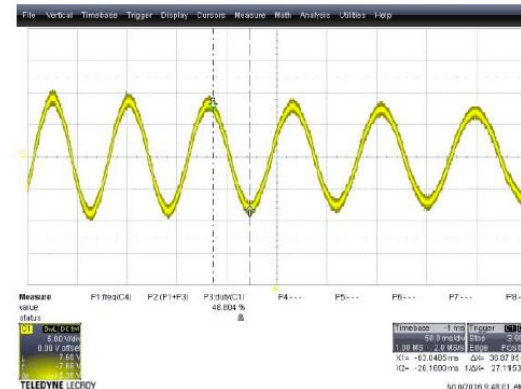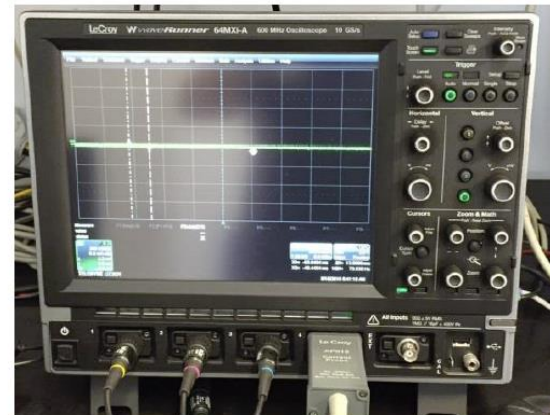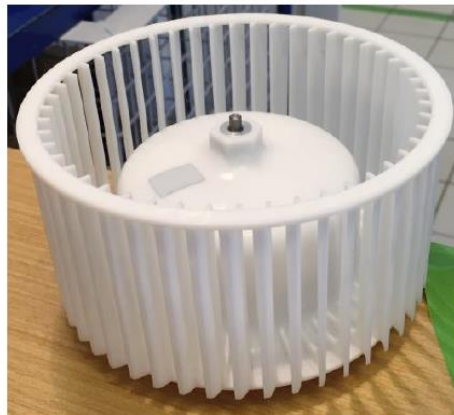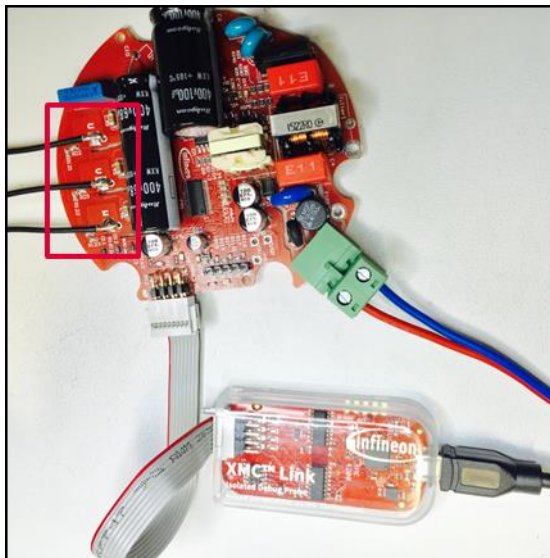
Measure phase-to-phase resistance
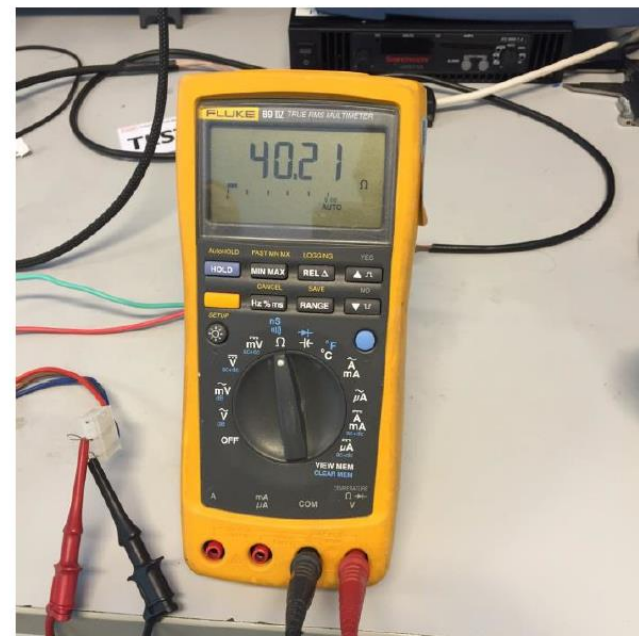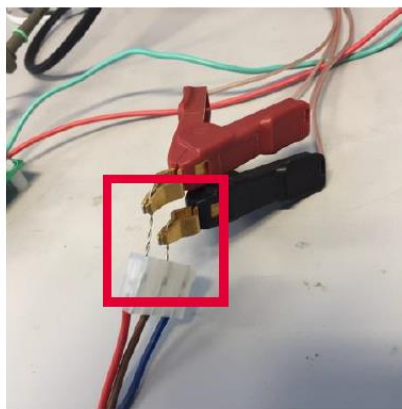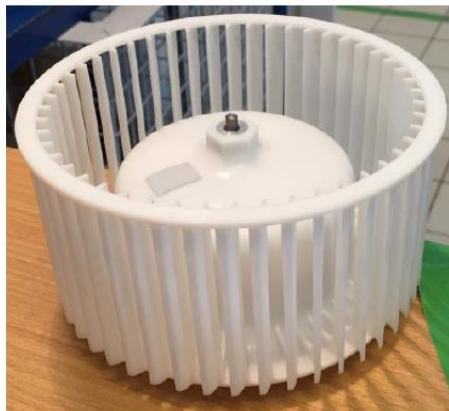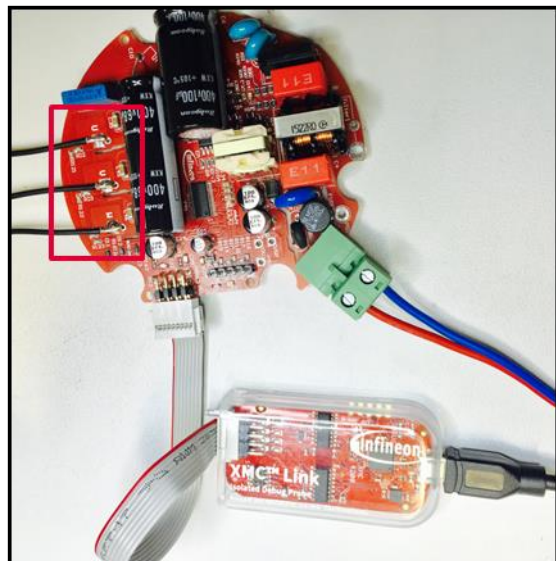
› Detach motor cables

› Connect two phases to Ohm-meter

› Leave third phase open

› Write down the phase-to-phase resistance value

Measure phase to phase inductance
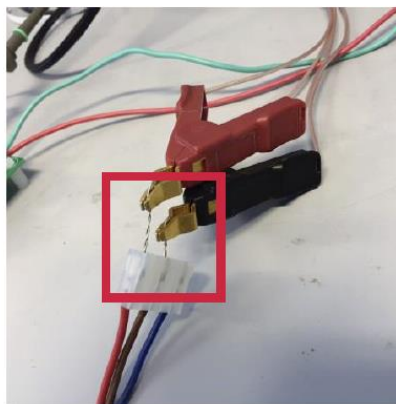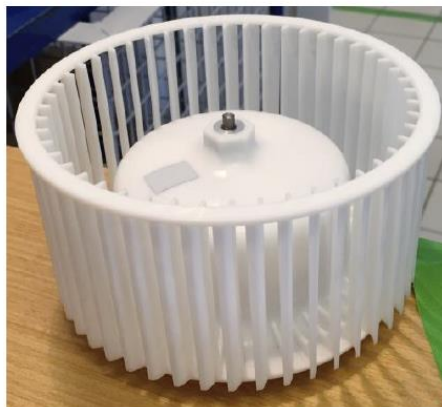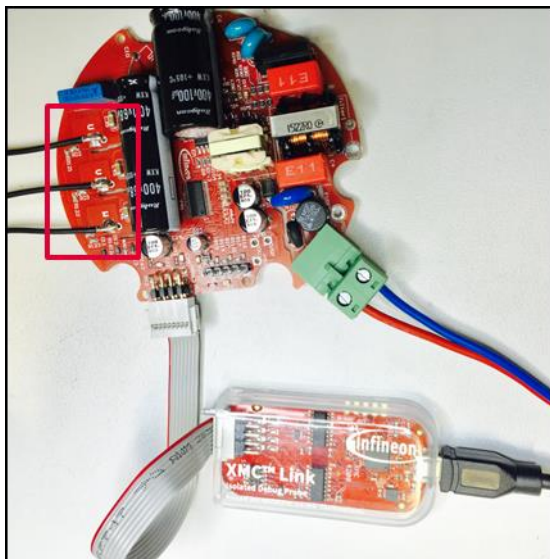
› Detach motor cables

› Connect two phases to RCL-meter set to 1 KHz

› Leave third phase open

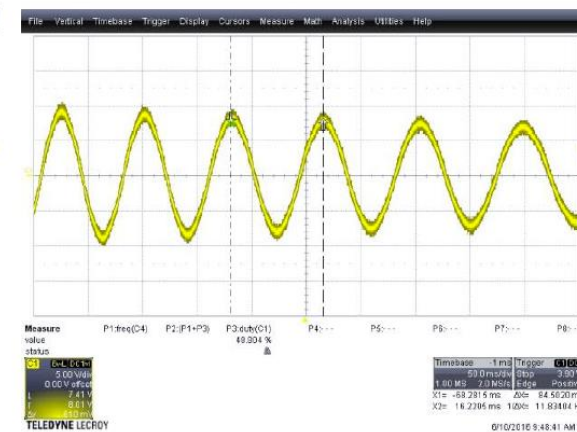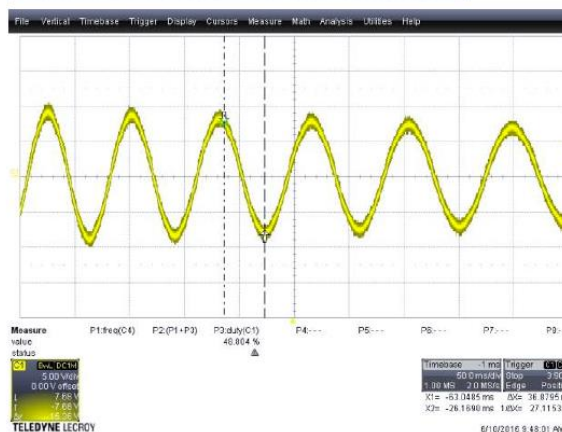› Write down the phase-to-phase inductance value

Measure pole pairs number

› Detach motor cables

› Connect two phases to oscilloscope voltage probe

› Leave third phase open

› Move the motor by hand and make one mechanical turn
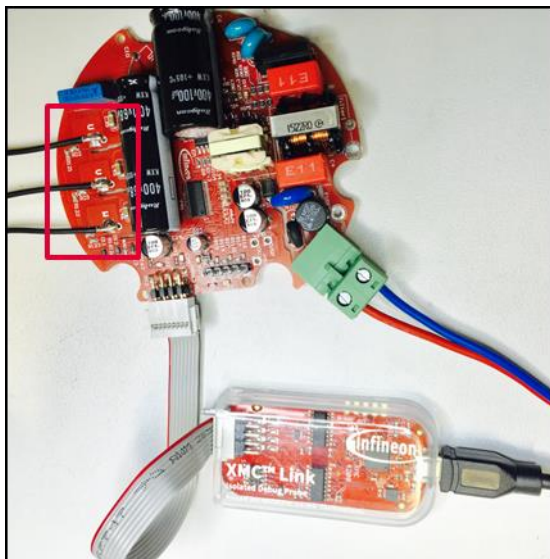
› Count the peaks of the sinusoid

Measure BEMF constant
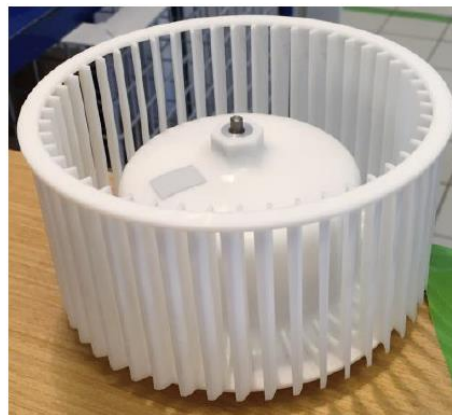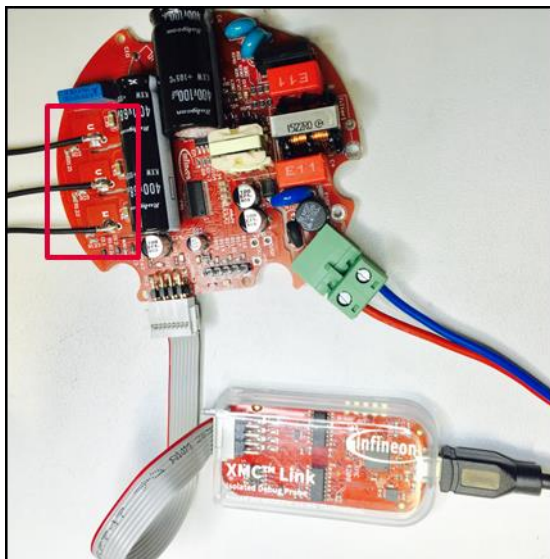
› Detach motor cables
› Connect two phases to oscilloscope voltage probe
› Leave third phase open
› Move the motor by hand
› Write down the frequency and the peak-to-peak value of the sinusoid
› Use equation in slide 9

Measure BEMF constant

› Detach motor cables
› Connect two phases to oscilloscope voltage probe
› Leave third phase open
› Move the motor by hand
› Write down the frequency and the peak-to-peak value of the sinusoid
› Use equation in slide 9
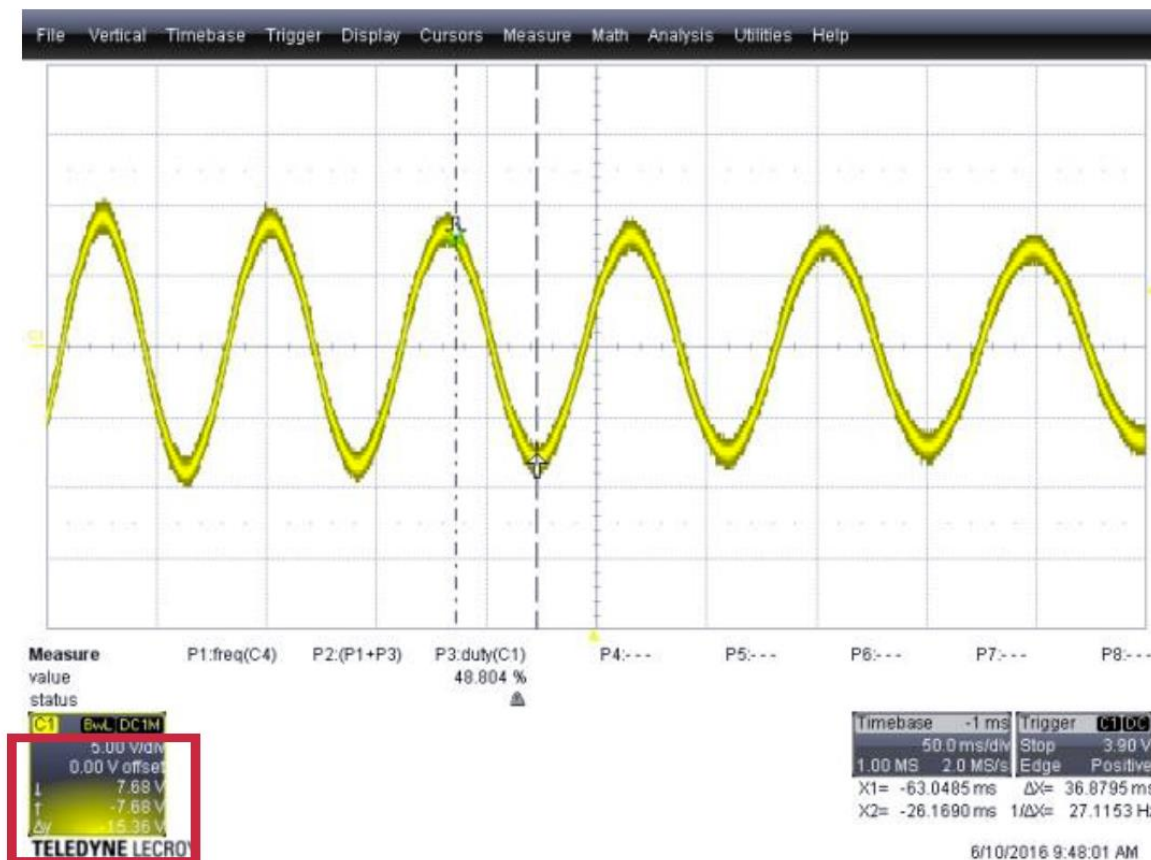
Formula to get BEMF at 1kRPM l/n rms

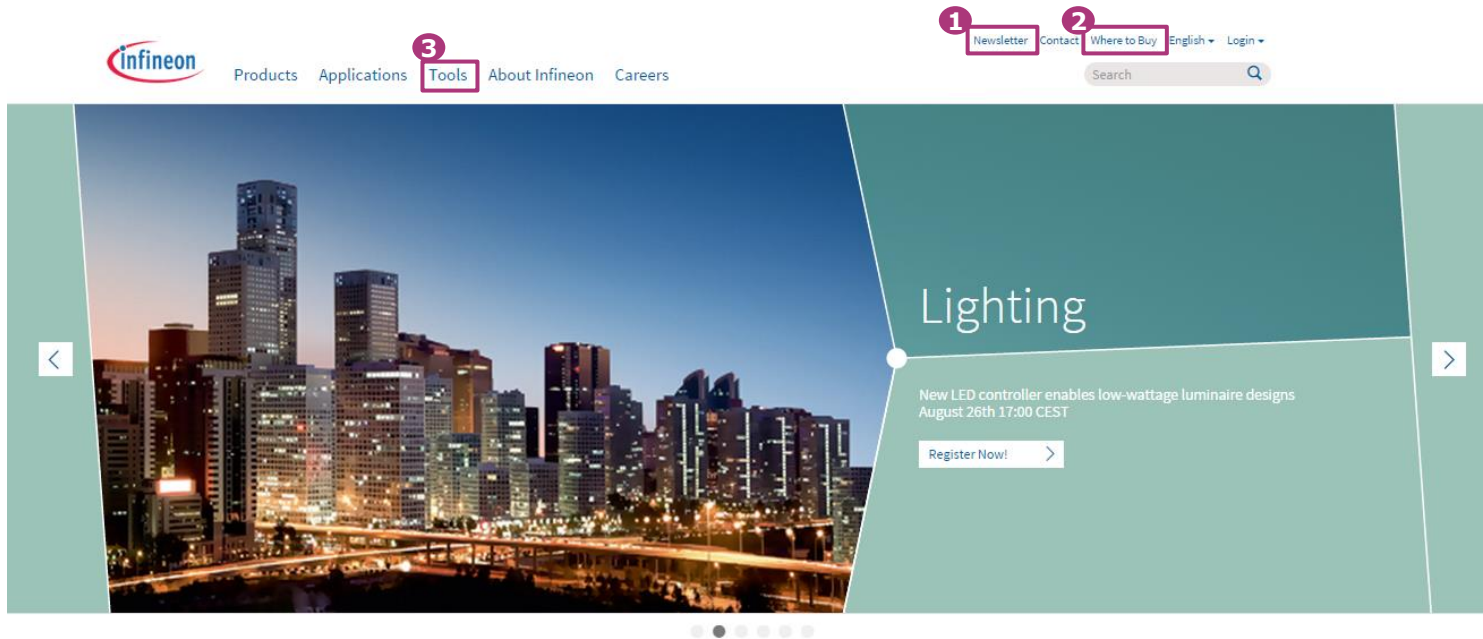› Use this formula to get the BEMF constant

$$Ke_{1kRPM \ln rms} = \frac{V_{pp}}{2 \times \sqrt{2} \times \sqrt{3}} \times \frac{16,67 \times N_{polepairs}}{f_{measured}} = \frac{V_{pp}}{f_{measured}} \times N_{polepairs} \times 3,40$$

Support
Online tools and services

1 **Subscribe to Newsletter**

2 **Where to Buy**

3 **Tools, Finders and Selectors**

4 **Support**

Part of your life. Part of tomorrow.

infineon