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**
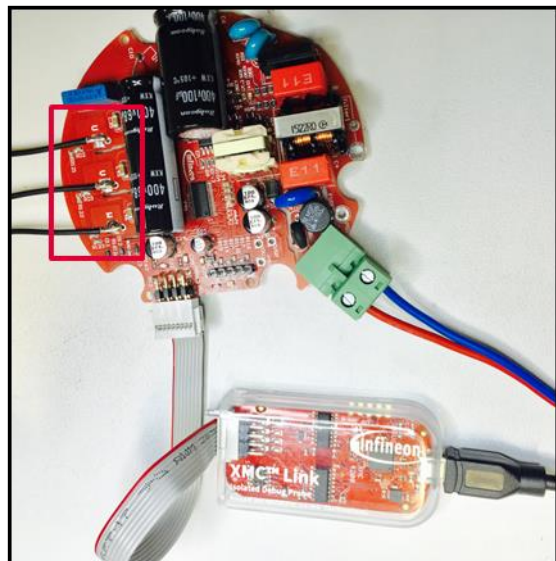
| Measure resistance	Measure inductance	Count pole pairs	Measure BEMF
› Detach your motor cables	› Detach your motor cables	› Detach your motor cables	› Detach your motor cables
› Connect a **resistance multimeter** to two phases and leave the third floating	› Connect a **R-L multimeter** to two phases and leave the third floating	› Connect an **oscilloscope voltage** probe to two phases and leave the third floating	› Connect an oscilloscope voltage probe to two phases and leave the third floating

Measure phase-to-phase resistance
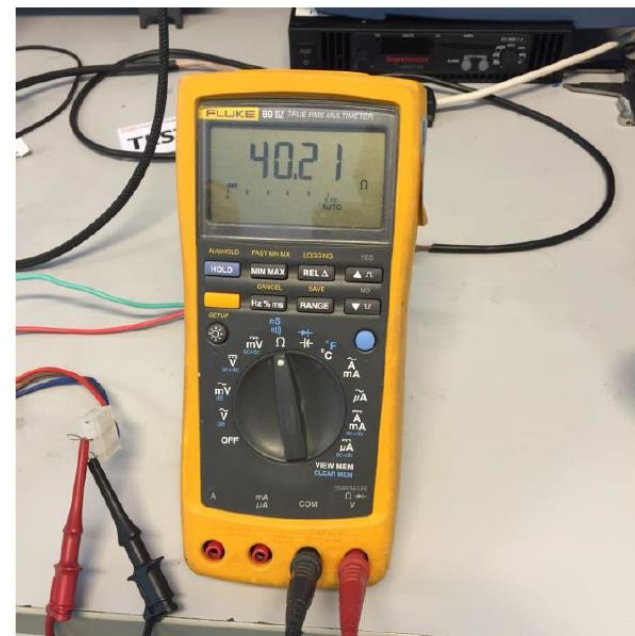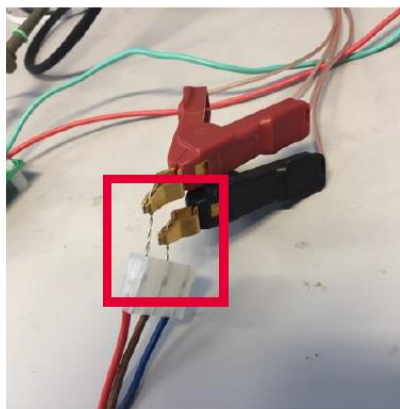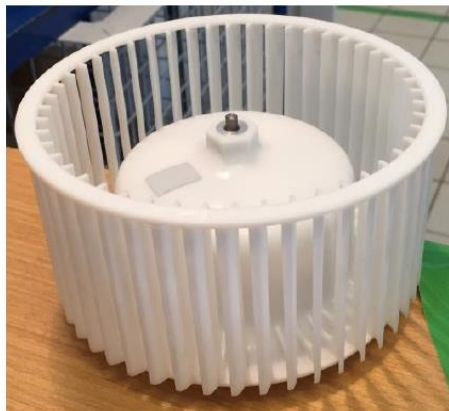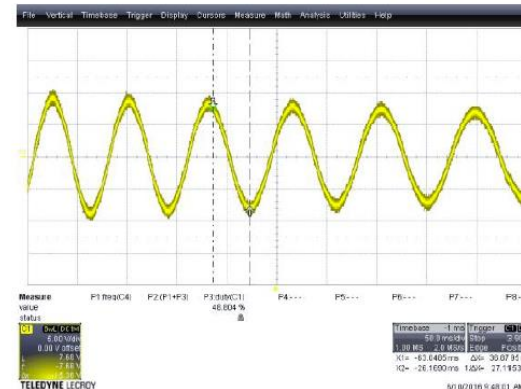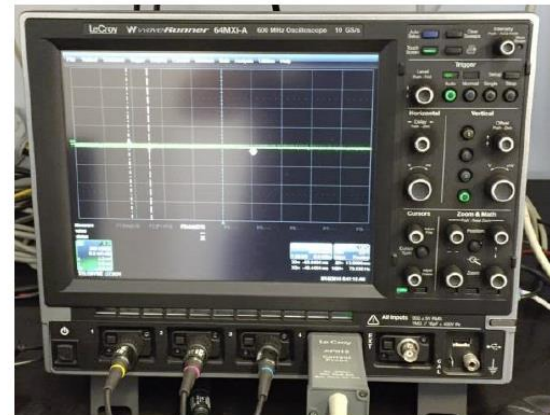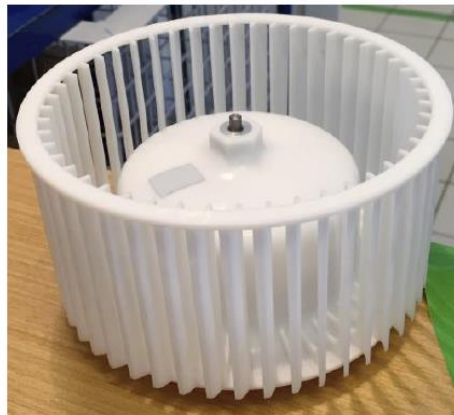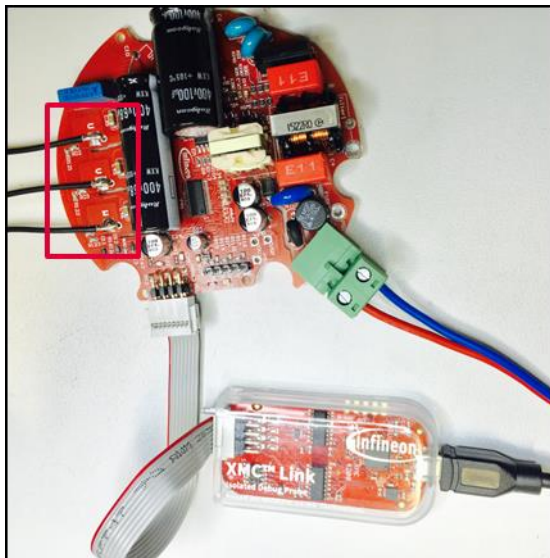

› Detach motor cables

› Connect two phases to Ohm-meter

› Leave third phase open

› Write down the phase-to-phase resistance value

Measure phase to phase inductance
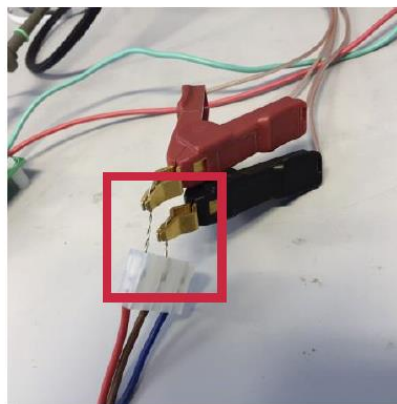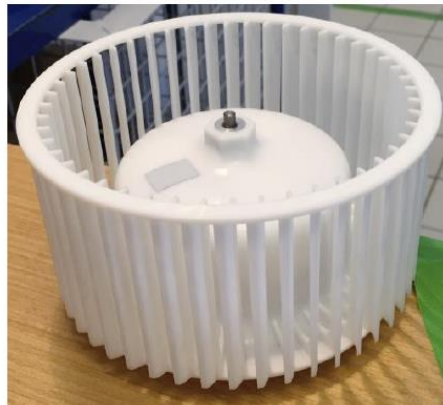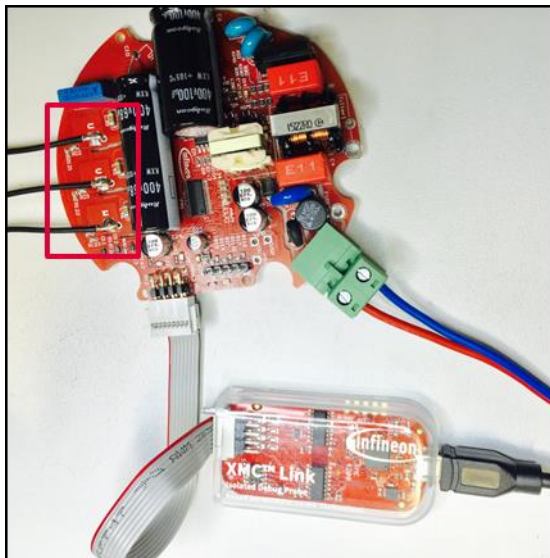
› Detach motor cables

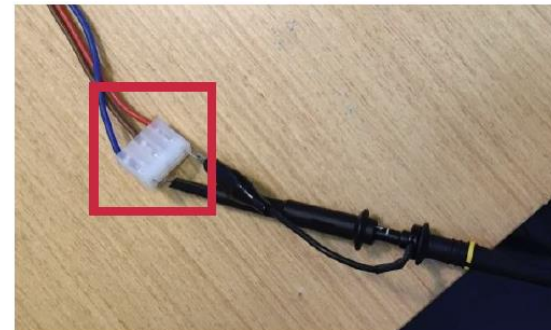› Connect two phases to RCL-meter set to 1 KHz

› Leave third phase open
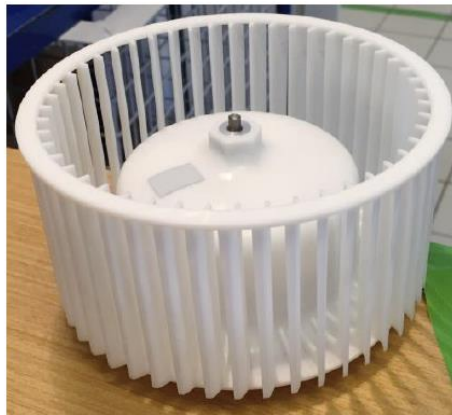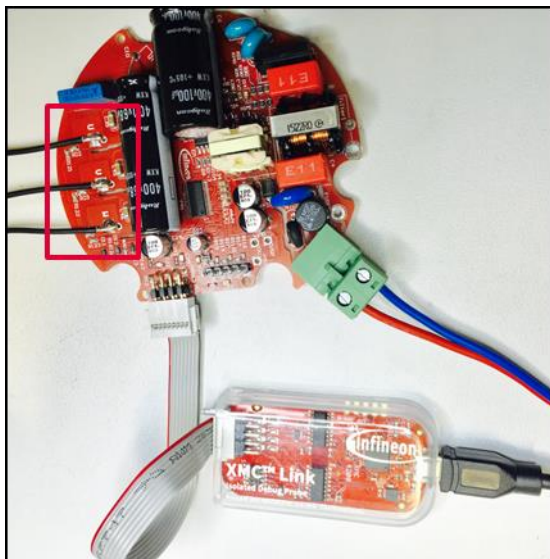
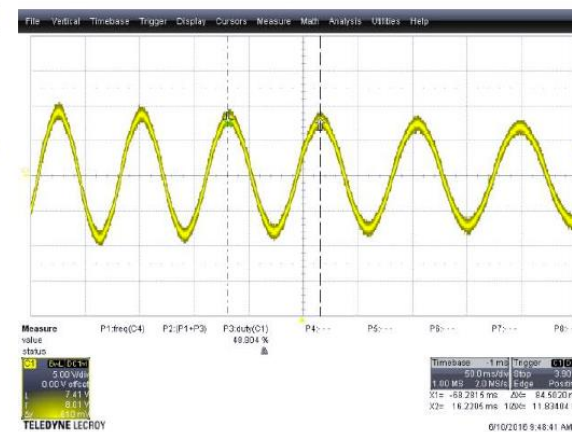› Write down the phase-to-phase inductance value

Measure pole pairs number
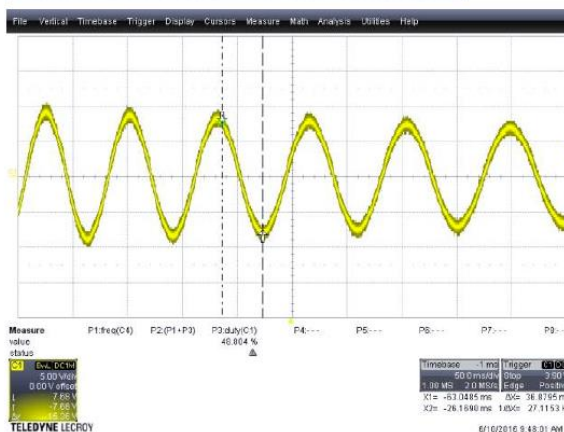

› Detach motor cables

› Connect two phases to oscilloscope voltage probe

› Leave third phase open

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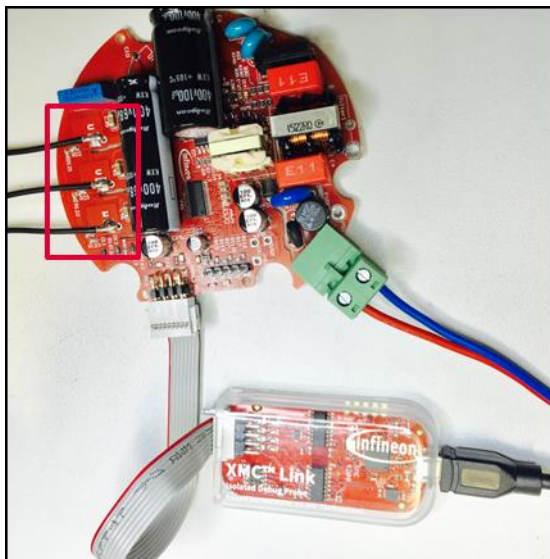
› Count the peaks of the sinusoid
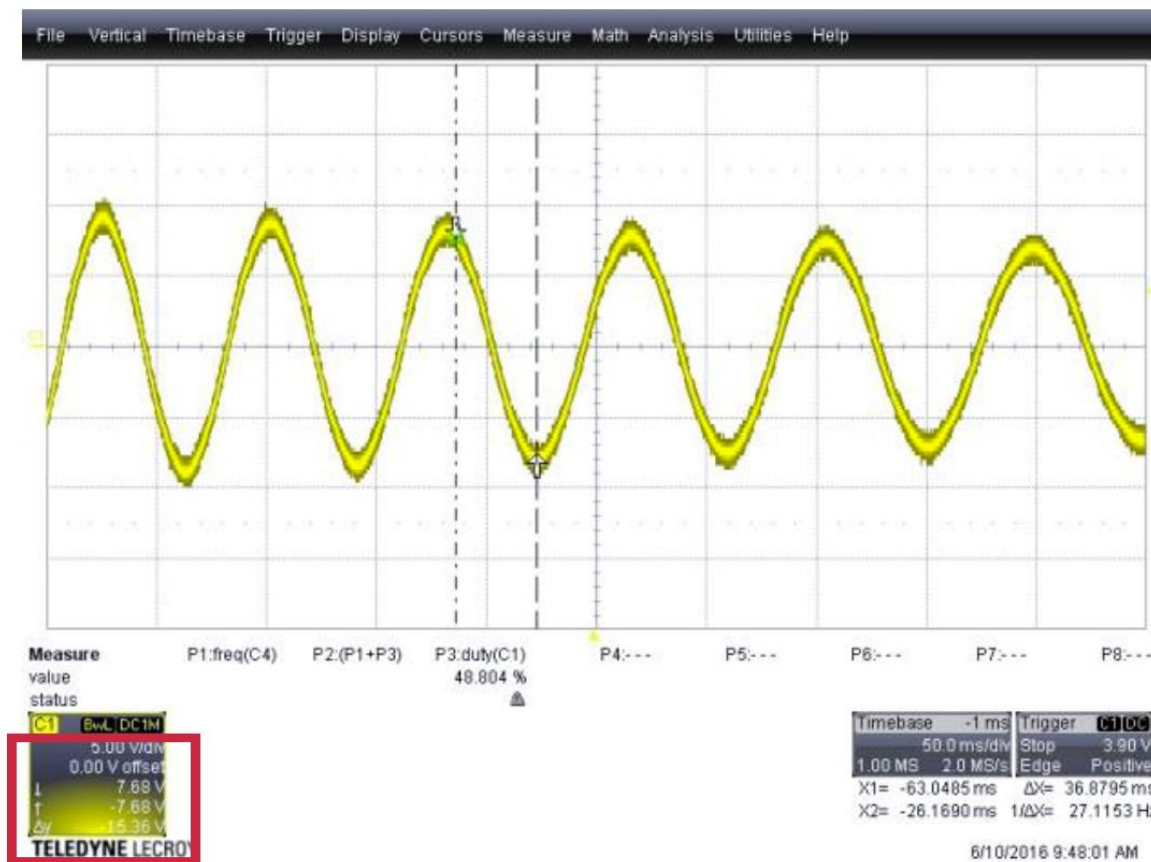
Measure BEMF constant

- › 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

› Use this formula to get the BEMF constant

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

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