How to Measure Motor Parameters

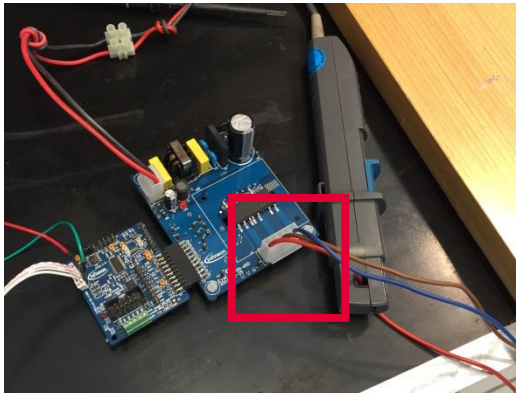
June 2016

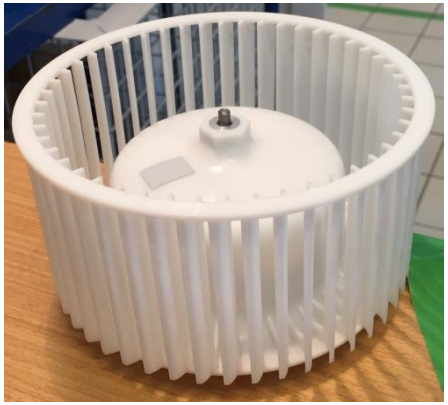
Principal Motor Parameters – Steps and instruments

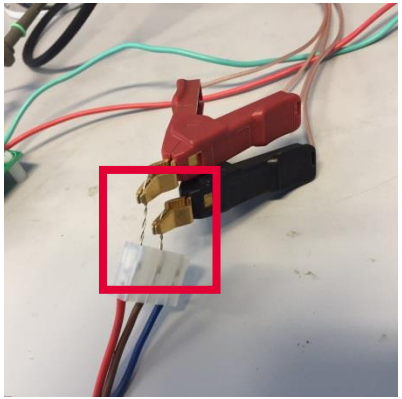
Fundamental Parameters are: R, L, pole pairs, BEMF constant

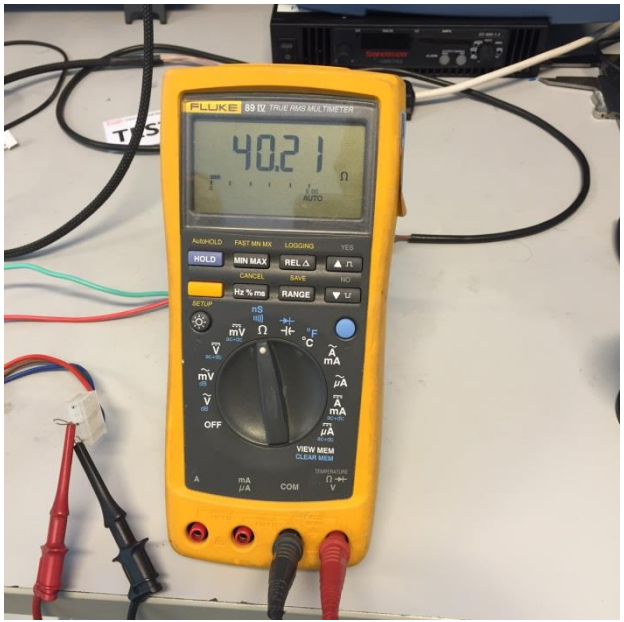
Measure Resistance	Measure Inductance	Count pole pairs	Measure BEMF
› Detach your motor cables › Connect a **resistance multimeter** to 2 phases and leave the third floating	› Detach your motor cables › Connect a **R-L multimeter** to 2 phases and leave the third floating	› Detach your motor cables › Connect an **oscilloscope voltage probe** to two phases and leave the third floating	› Detach your motor cables › Connect an oscilloscope voltage probe to two phases and leave the third floating

Measure phase to phase Resistance



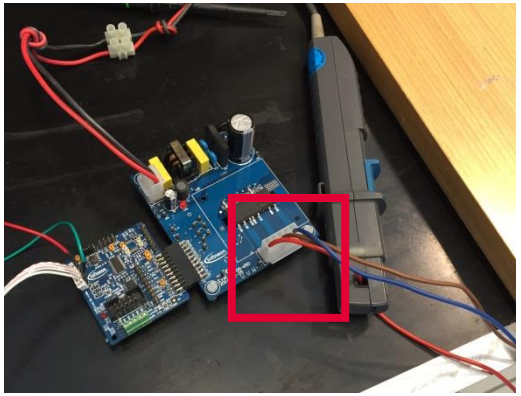


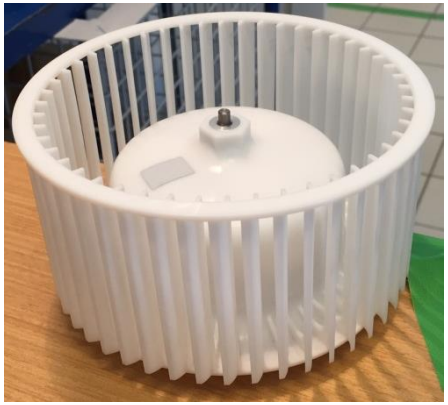


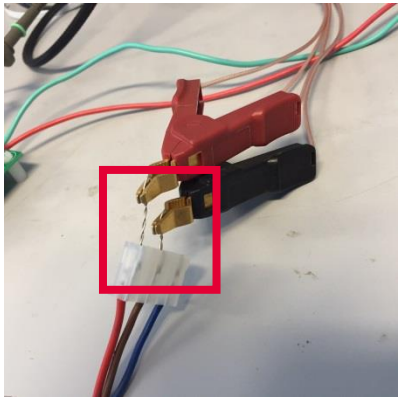


- Detach motor cables
- Connect 2 phases to ohm-meter
- Leave third phase open
- Write down the phase to phase resistance value

Measure phase to phase Inductance

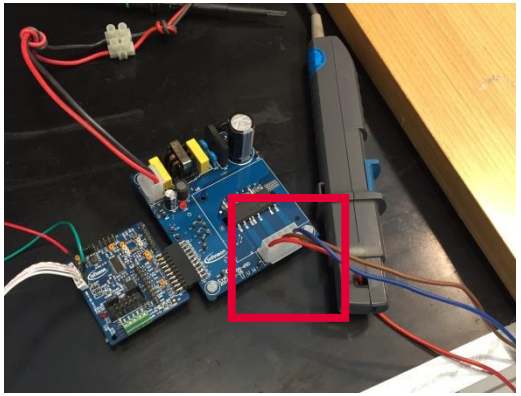


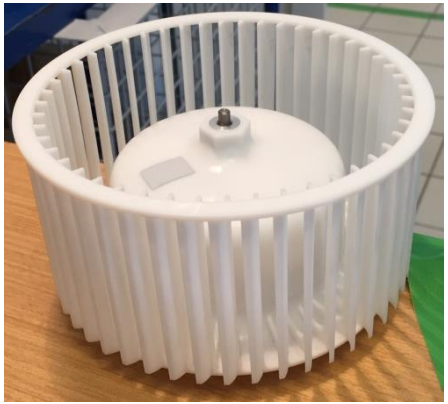


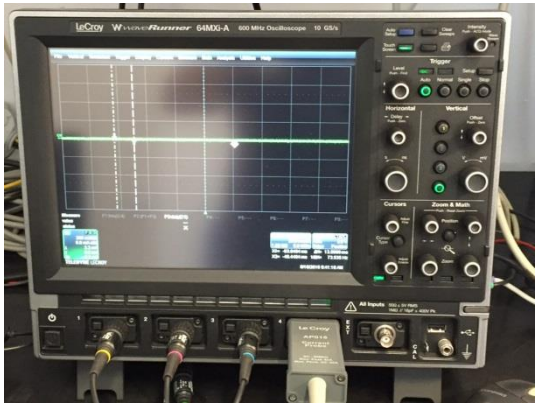


- Detach motor cables
- Connect 2 phases to RCL-meter set at 1kHz
- Leave third phase open
- Write down the phase to phase inductance value

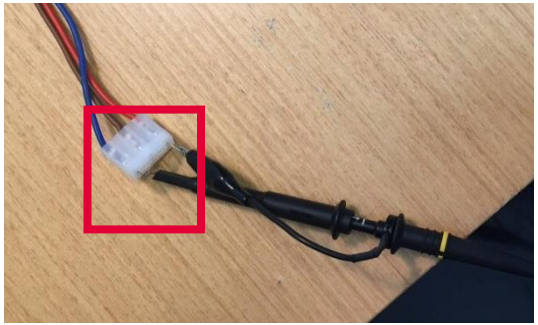
Measure pole pairs number

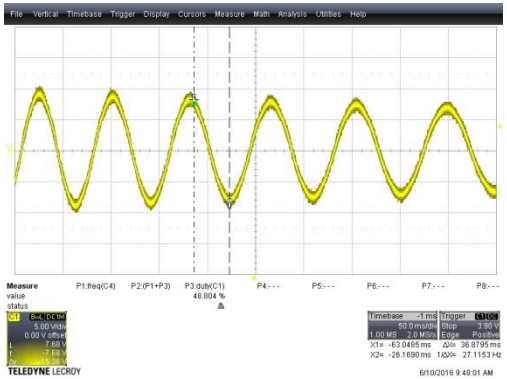




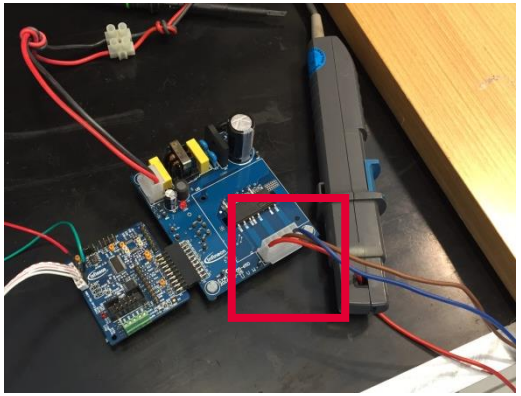


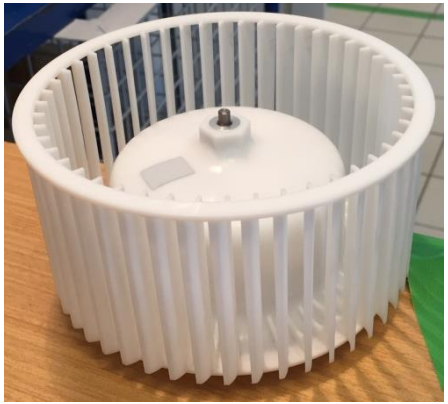
- Detach motor cables
- Connect 2 phases to oscilloscope voltage probe
- Leave third phase open
- Move the motor by hand and make one mechanical turn
- Count the peaks of sinusoid

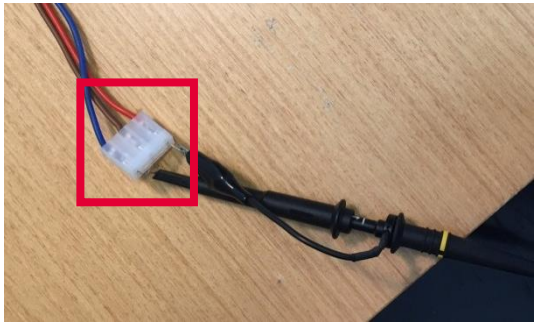




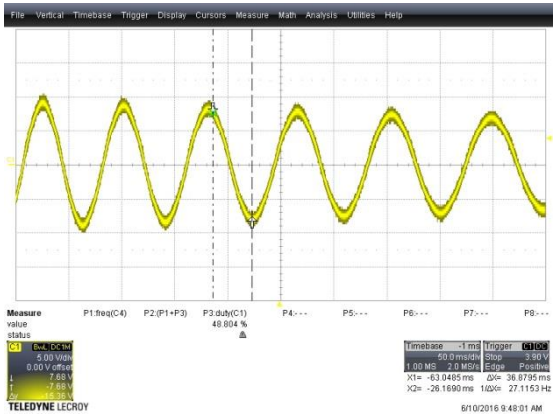
Measure BEMF constant

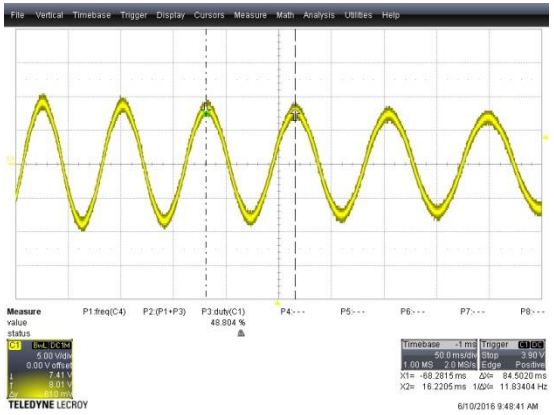






- Detach motor cables
- Connect 2 phases to oscilloscope voltage probe
- Leave third phase open
- Move the motor by hand
- Write down the frequency and the peak to peak value of the sinusoid
- Use next slide equation





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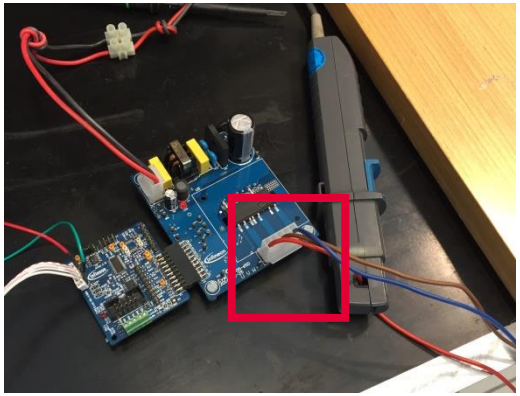

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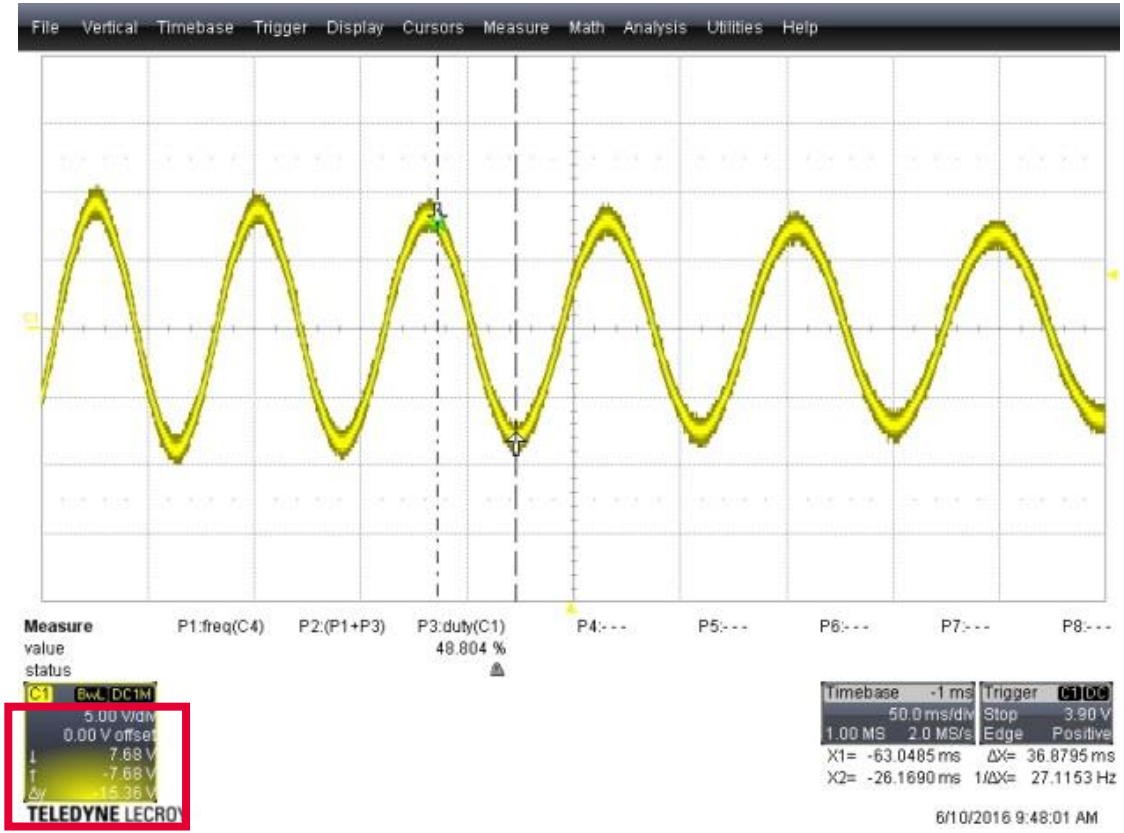

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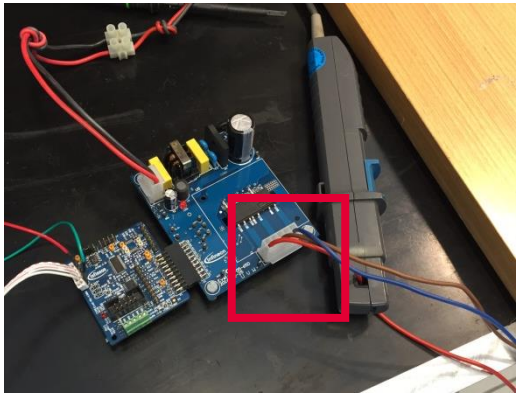

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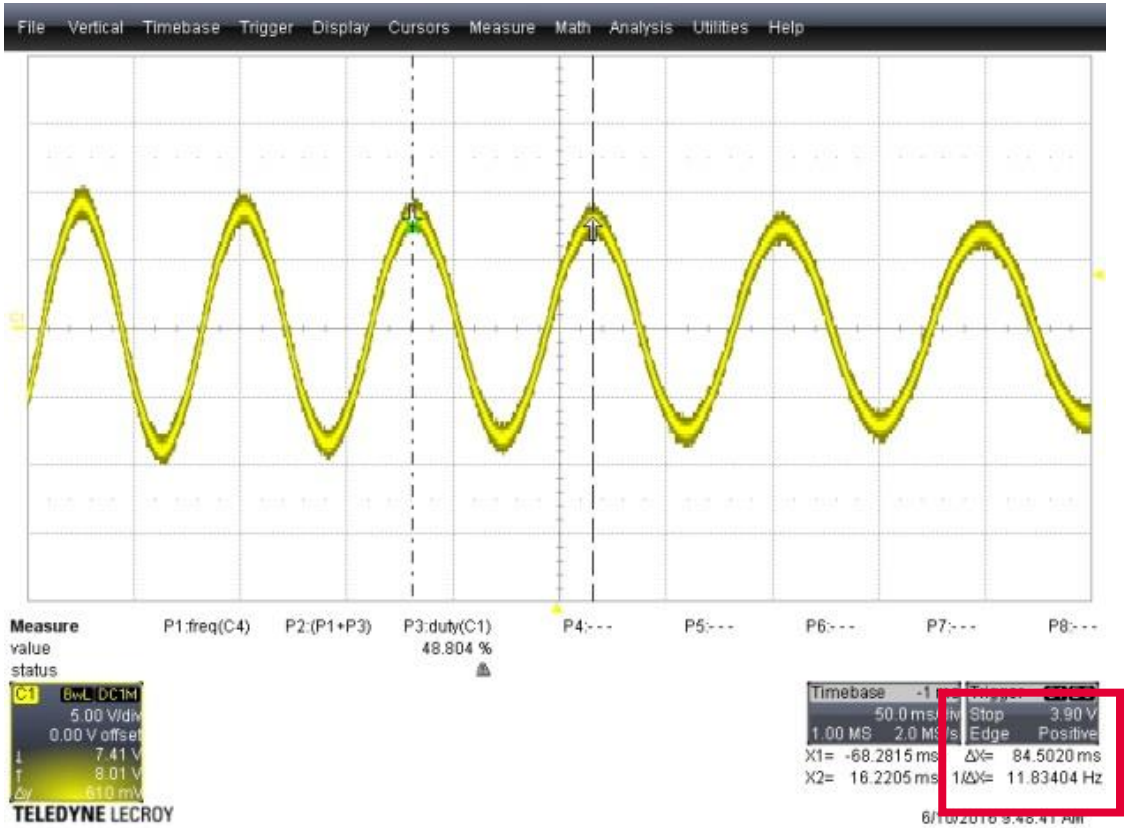

Formula to get BEMF at 1kRPM l/n rms

Use this formula to get the BEMF constant (used in IRMCK099M)

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

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