How to measure motor parameters

EVAL_100W_DRIVE_CFD2
September 2017

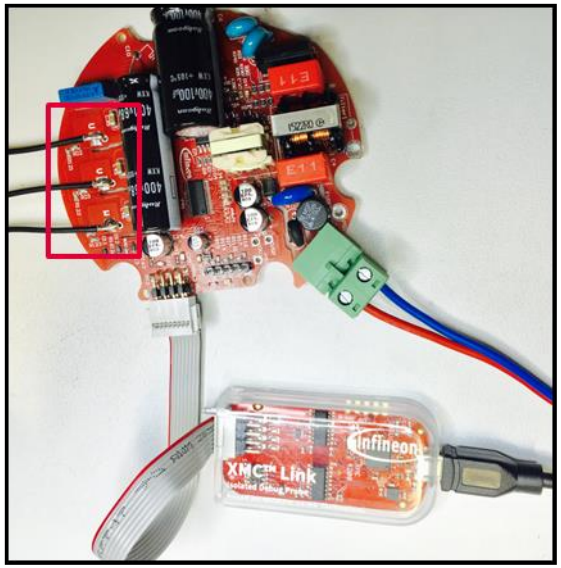
Principal motor parameters – steps and instruments

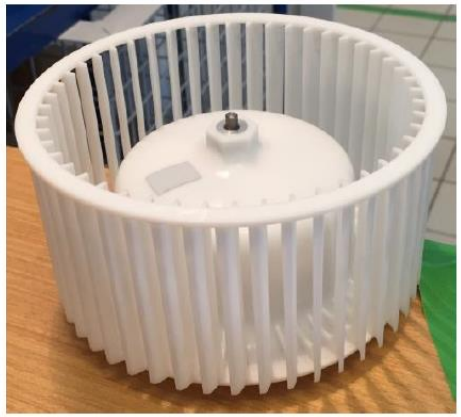
Fundamental parameters are: R, L, pole pairs, BEMF constant

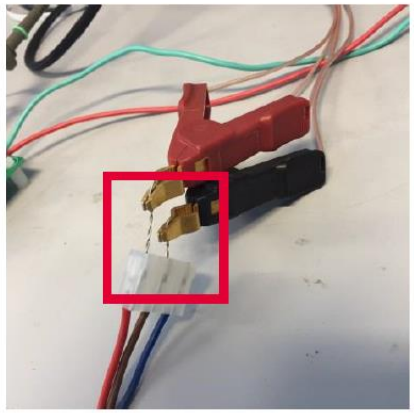
Measure resistance	Measure inductance	Count pole pairs	Measure BEMF
› Detach your motor cables	› Detach your motor cables	› Detach your motor cables	› Detach your motor cables
› Connect a **resistance multimeter** to two phases and leave the third floating	› Connect a **R-L multimeter** to two phases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

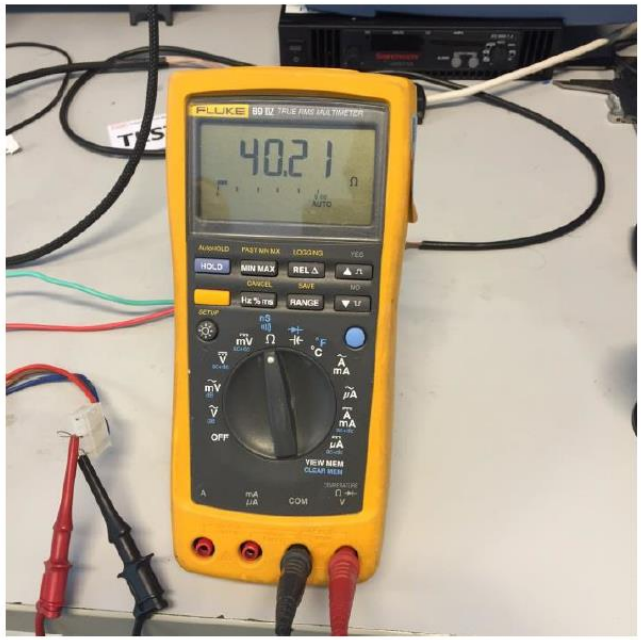
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Measure phase-to-phase resistance





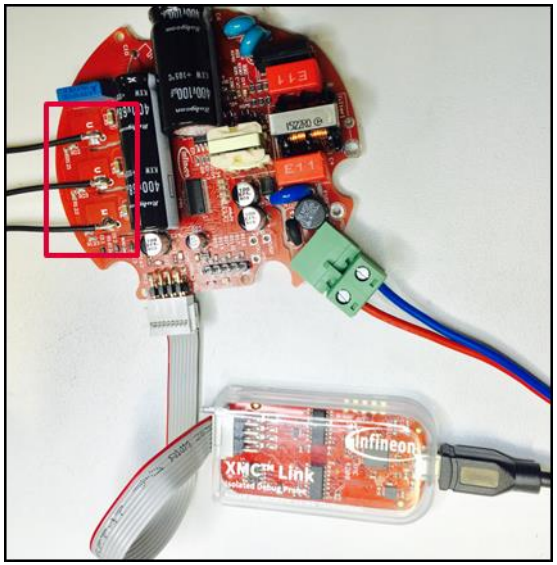


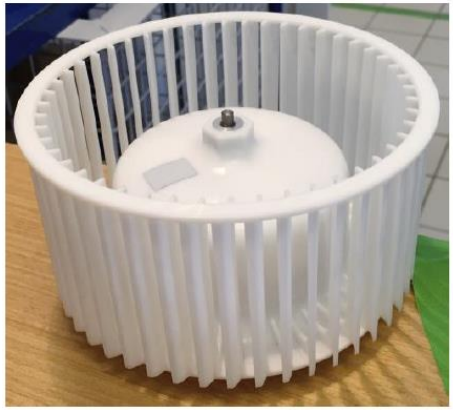


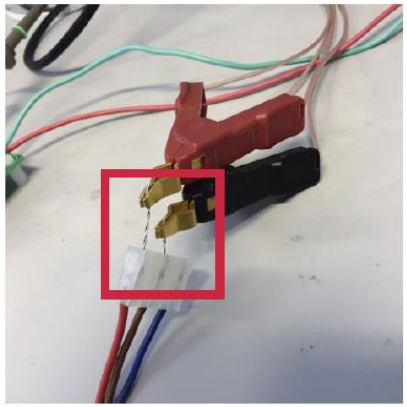
- Detach motor cables
- Connect two phases to Ohm-meter
- Leave third phase open
- Write down the phase-to-phase resistance value

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Measure phase to phase inductance





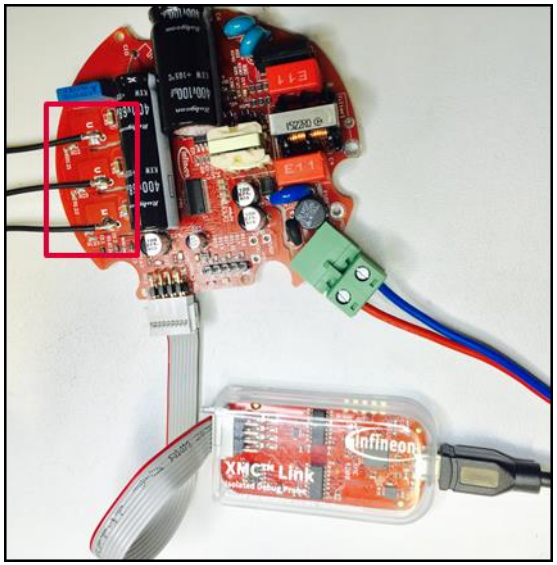


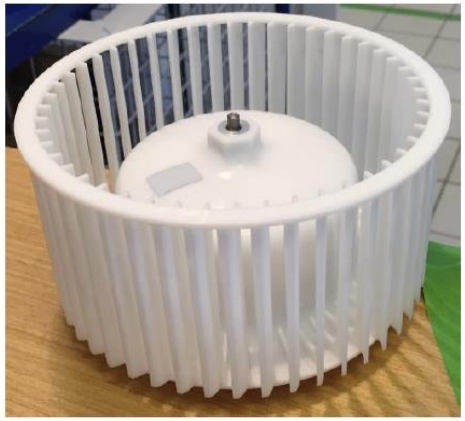


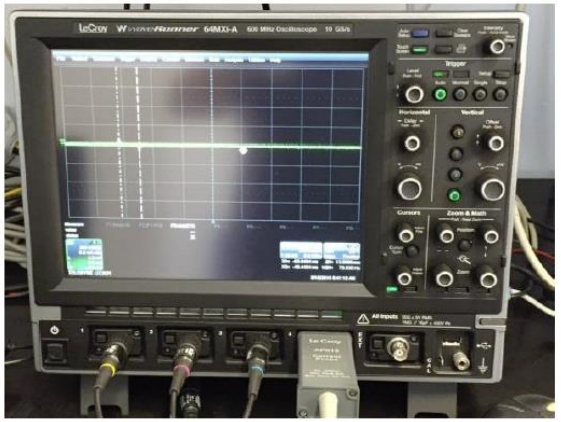
- Detach motor cables
- Connect two phases to RCL-meter set to 1 KHz
- Leave third phase open
- Write down the phase-to-phase inductance value

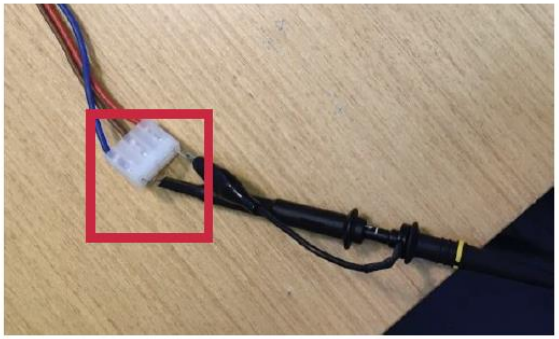
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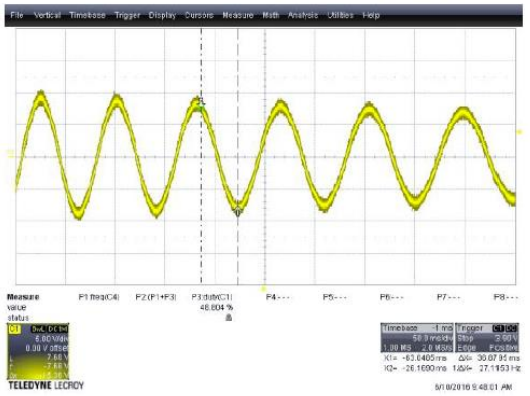
Measure pole pairs number







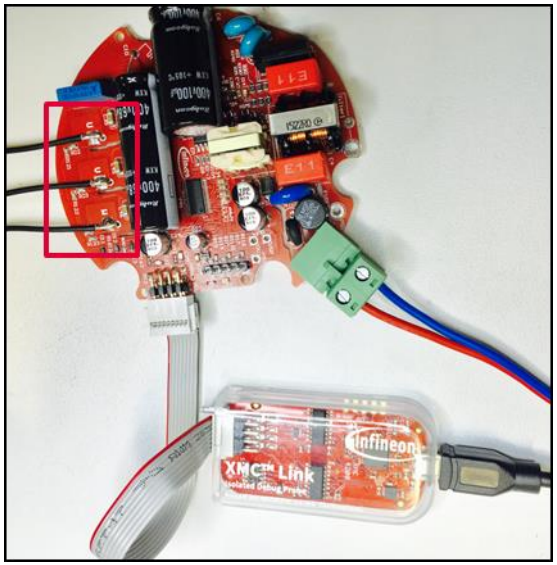


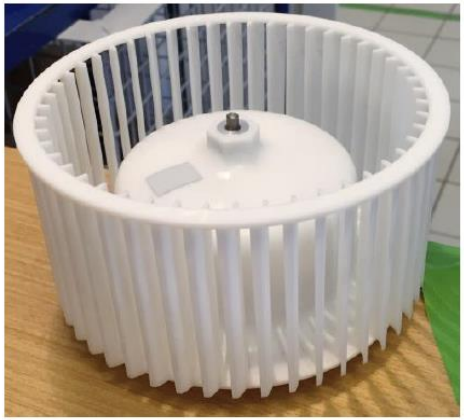


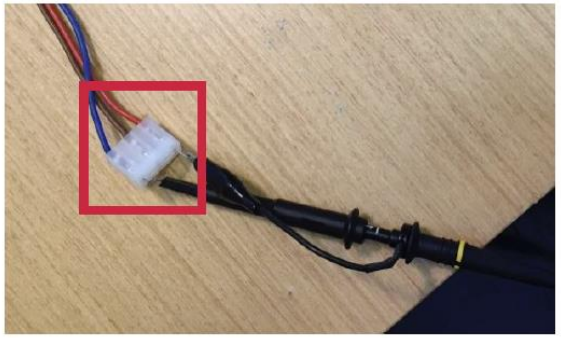
- Detach motor cables
- Connect two phases to oscilloscope voltage probe
- Leave third phase open
- Move the motor by hand and make one mechanical turn
- Count the peaks of the sinusoid

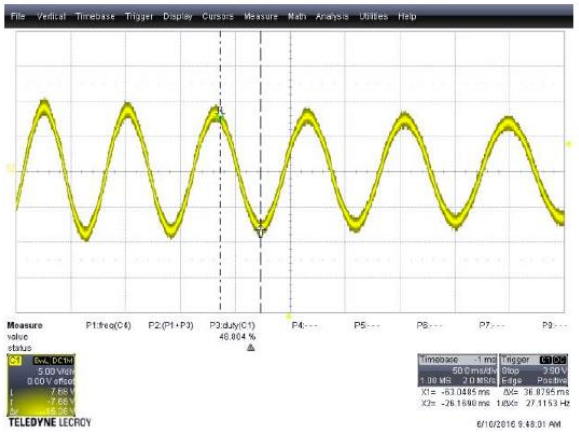
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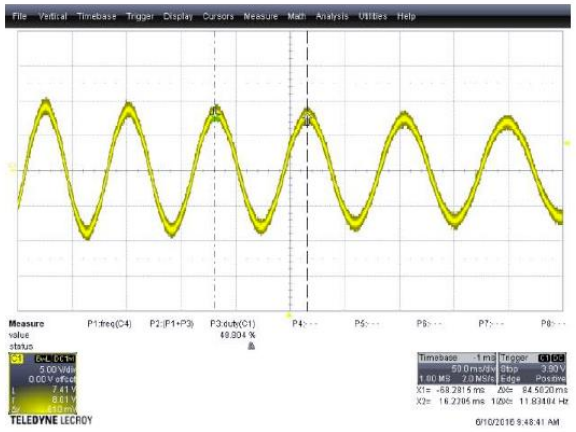
Measure BEMF constant







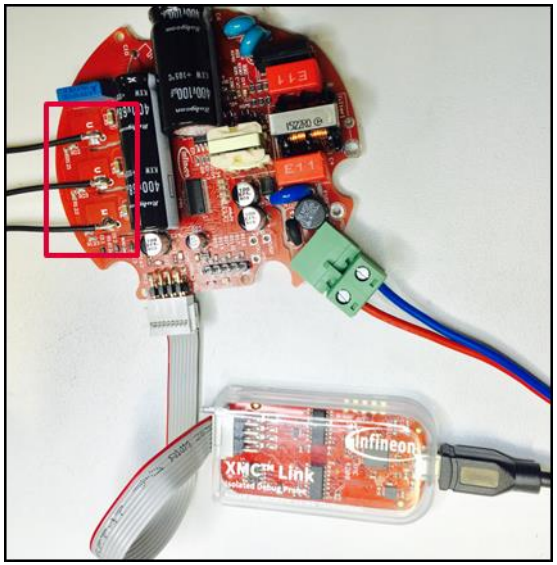


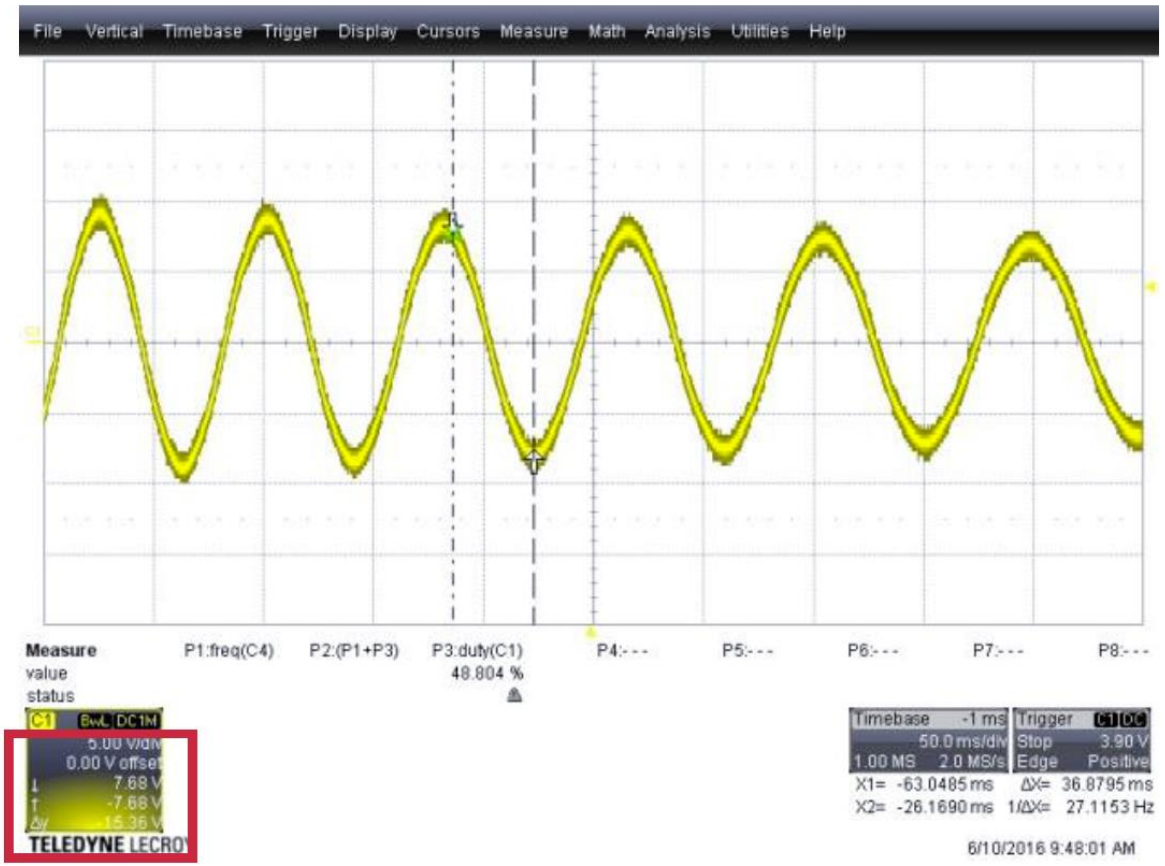


- Detach motor cables
- Connect two phases to oscilloscope voltage probe
- Leave third phase open
- Move the motor by hand
- Write down the frequency and the peak-to-peak value of the sinusoid
- Use equation in slide 9

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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

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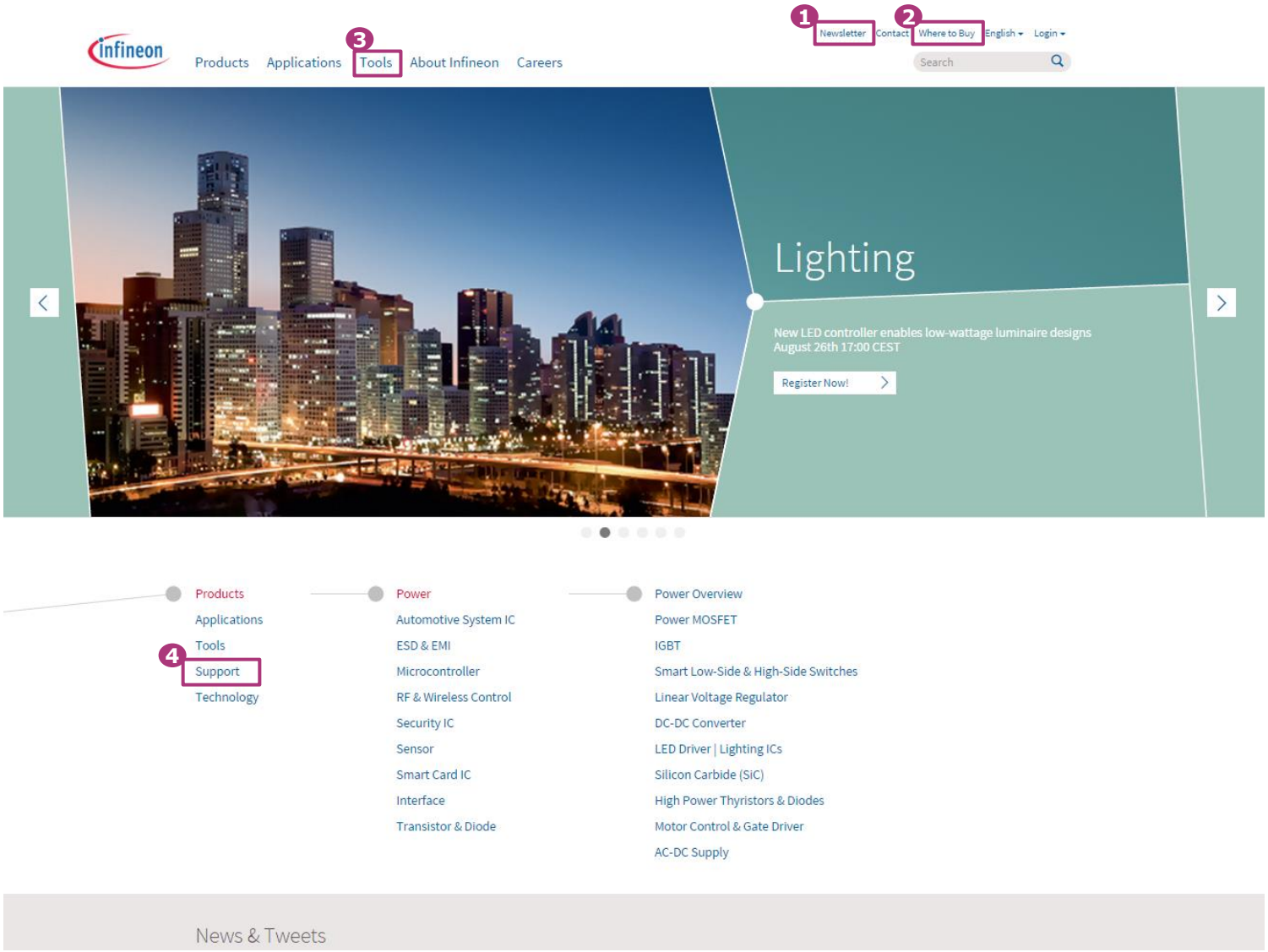
Formula to get BEMF at 1kRPM l/n rms

- Use this formula to get the BEMF constant

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

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