

# 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



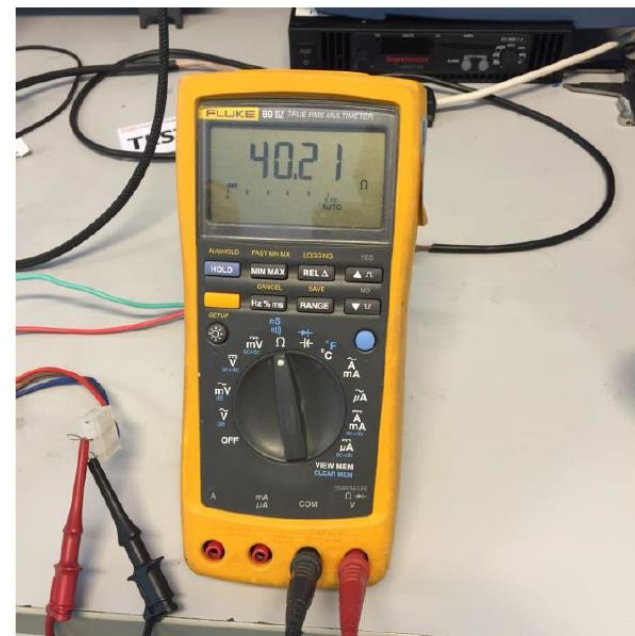
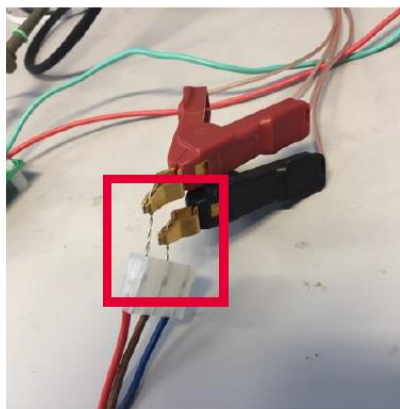
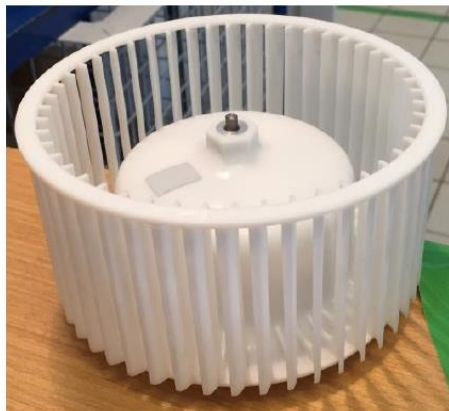
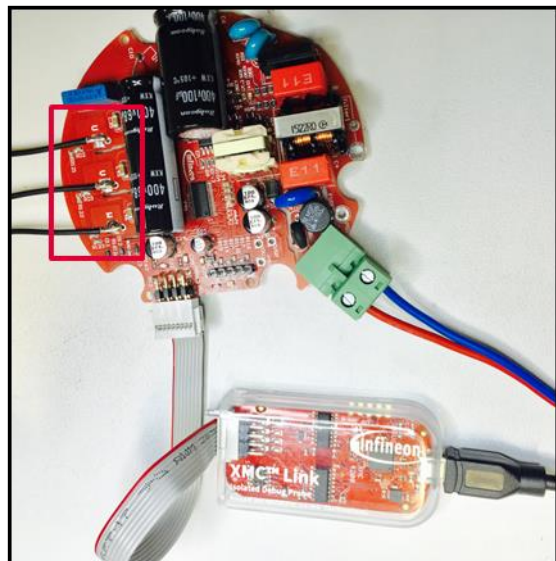
- > Detach your motor cables
- > Connect a **resistance multimeter** to two phases and leave the third floating

- > Detach your motor cables
- > Connect a **R-L multimeter** 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

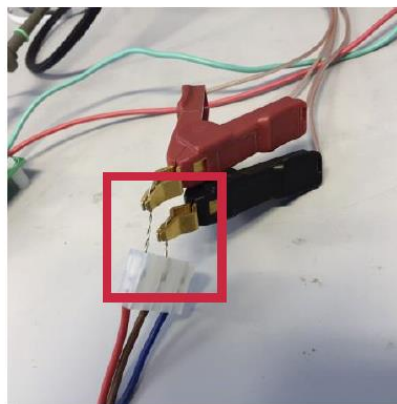
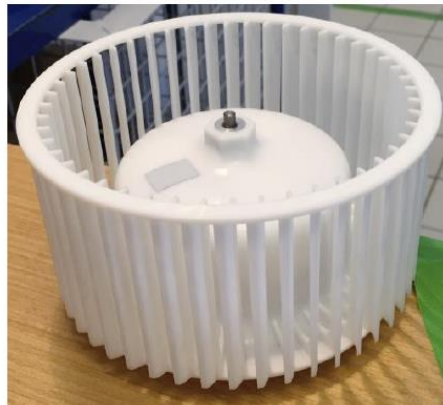
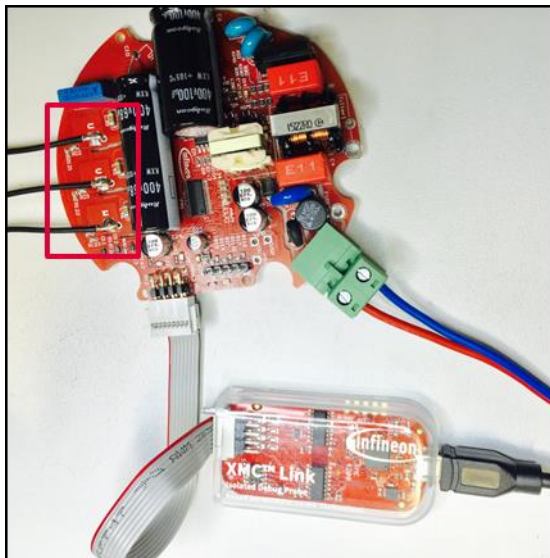
- > Detach your motor cables
- > Connect an oscilloscope voltage probe to two phases and leave the third floating

# Measure phase-to-phase resistance



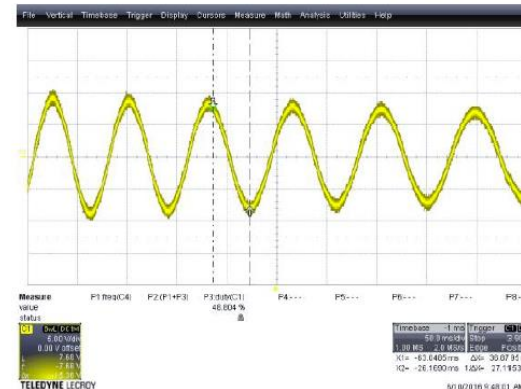
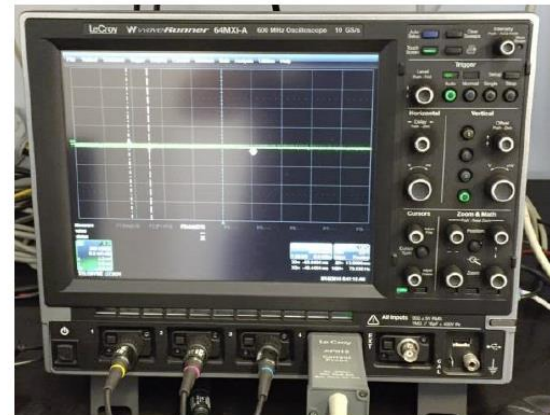
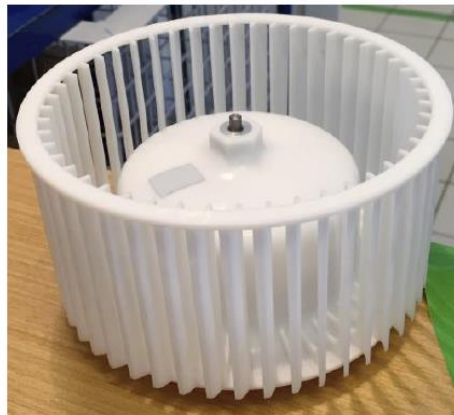
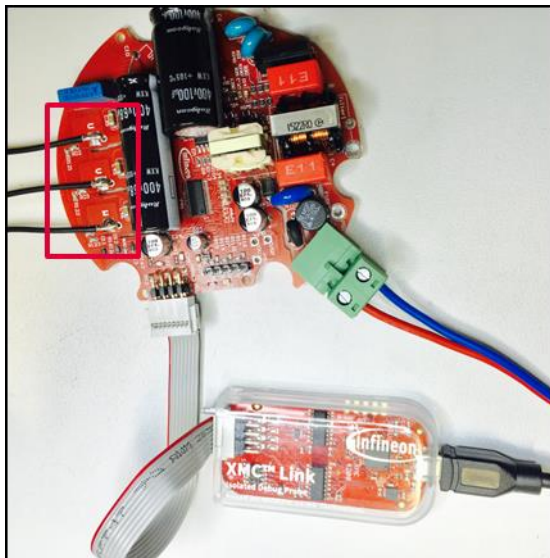
- › Detach motor cables
- › Connect two phases to Ohm-meter
- › Leave third phase open
- › Write down the phase-to-phase resistance value

# 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

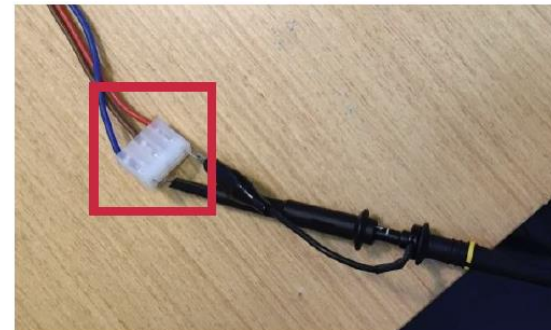
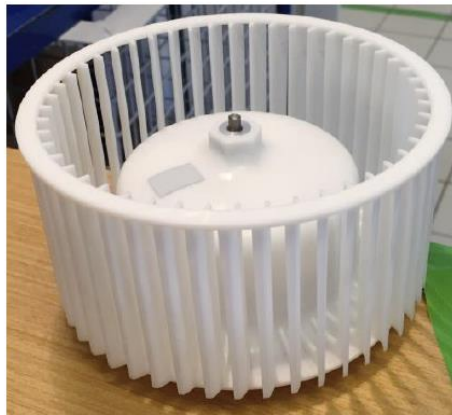
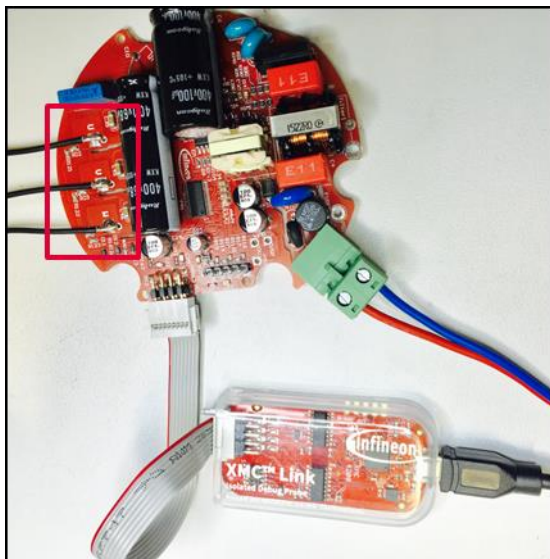
# Measure pole pairs number



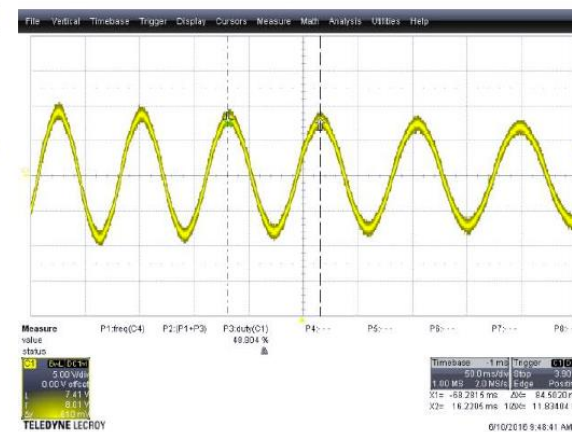
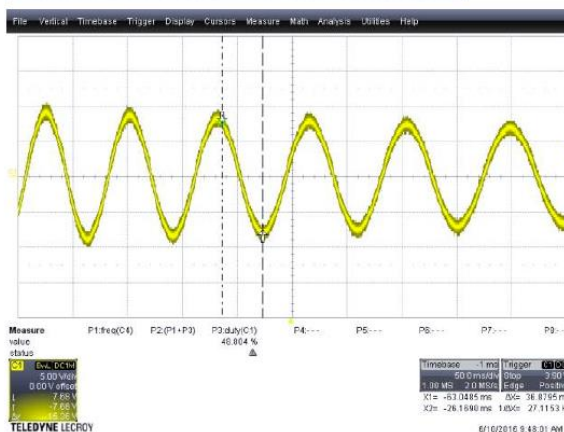
- › Detach motor cables
- › Connect two phases to oscilloscope voltage probe
- › Leave third phase open
- › Move the motor by hand and make one mechanical turn
- › Count the peaks of the sinusoid



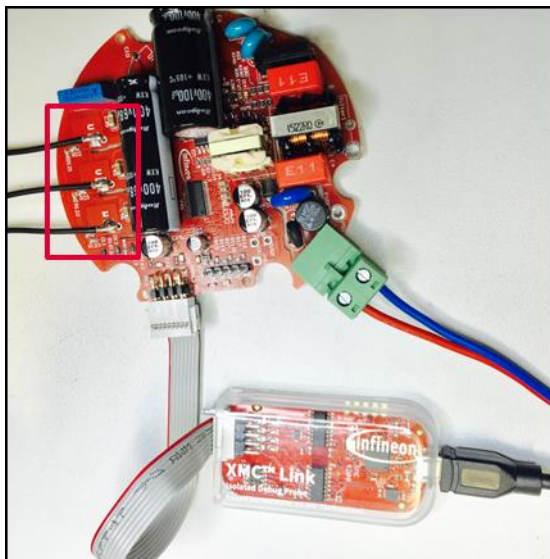
# Measure BEMF constant



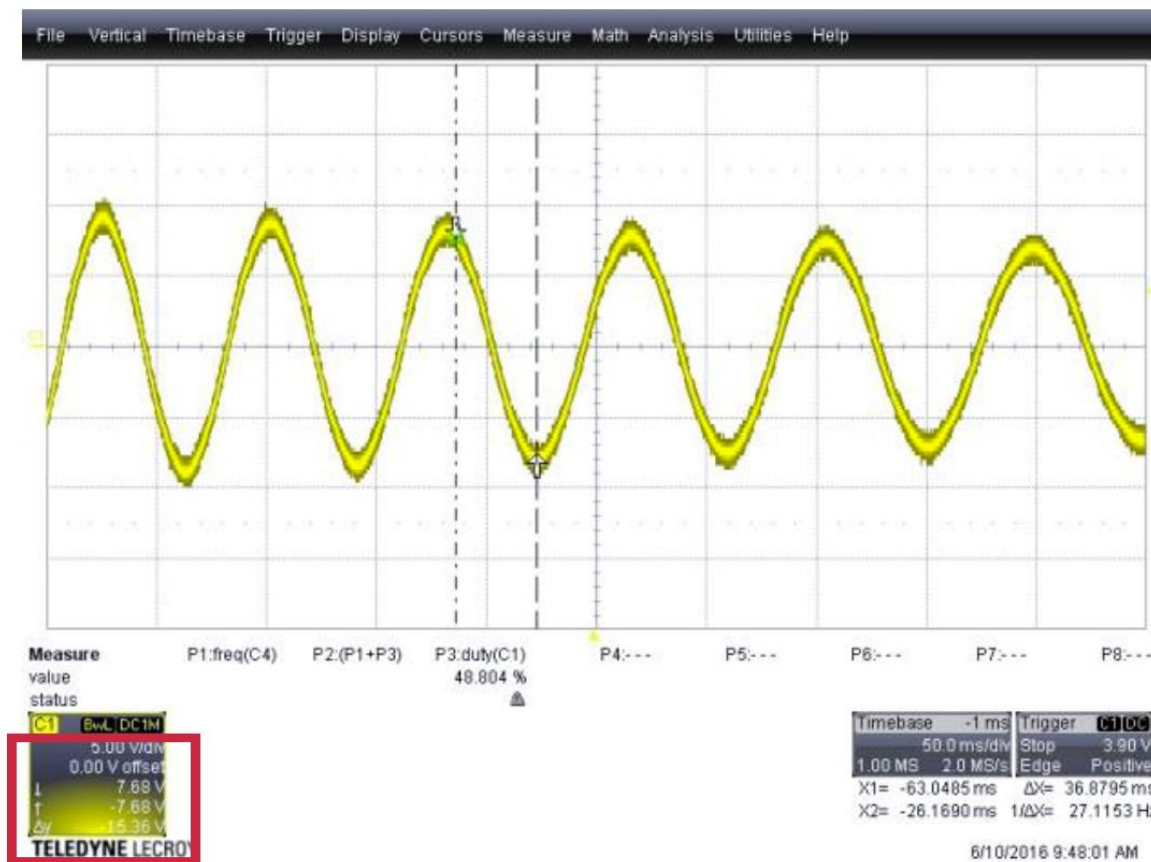
- › Detach motor cables
- › Connect two phases to oscilloscope voltage probe
- › Leave third phase open
- › Move the motor by hand
- › Write down the frequency and the peak-to-peak value of the sinusoid
- › Use equation in slide 9



# 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 I/n rms

- › Use this formula to get the BEMF constant

$$K_{e_{1kRPM\ I/n\ rms}} = \frac{V_{pp}}{2 \times \sqrt{2} \times \sqrt{3}} \times \frac{16,67 \times N_{polepairs}}{f_{measured}} = \frac{V_{pp}}{f_{measured}} \times N_{polepairs} \times 3,40$$



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