4Q-COGGING TEST SYSTEM (4Q-CTS)

Cogging toque is a natural characteristic of some permanent magnet motor design which is less desirable characteristic for many applications. It's also known as 'detent' or 'no current' torque.

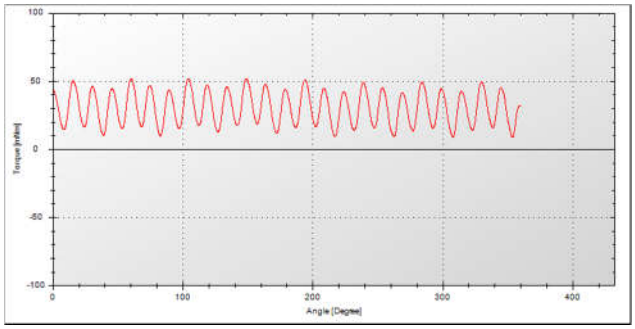
4Q-CTS Vertical Version

Cogging torque is the torque needed to overcome the opposing torque created by the magnetic attractive force between magnets on the rotor and the iron teeth of the stator. There are multiple rotor positions within a revolution where the cogging torque is high.

Cogging torque creates vibration and noise during operation and acts to disturb the motor away from its desired position when used in servo applications. The cogging torque frequency is also closely correlated with the production of rotor losses both with and without current supplied to the armature.

The cogging torque frequency is given by the least common multiple (LCM) of the stator slots and the rotor poles.

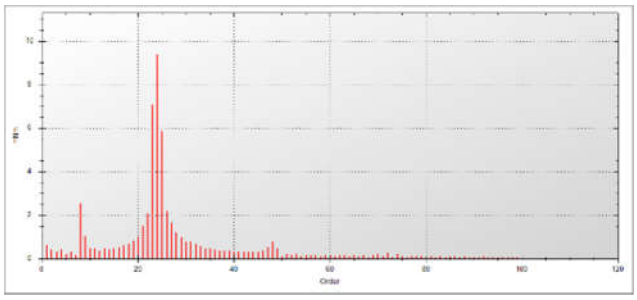
Our **4Q Cogging Test System (CTS)** is a stand-alone system to measure the detent torque of PM and PMSM motors. The detent torque is composed from Friction Torque and Cogging Torque. The 4Q-CTS perform the measurement while rotating the MUT (Motor Under Test) at a very low speed with very high accurate geared motor.



Test Results of BLDC motor

The test system can rotate in a constant accurate speed from 0.5-30rpm. The 4Q-CTS enables stable and highly reproducible measurements. It measures and provides;

- Peak-to-Peak of cogging torque
- Friction torque
- Position repeatability tests - Display up to 10 measurements overlapping for comparison and investigation of same position
- Cogging torque frequency - least common multiple (LCM) of the stator slots and the rotor poles.



Order Analysis Test Results

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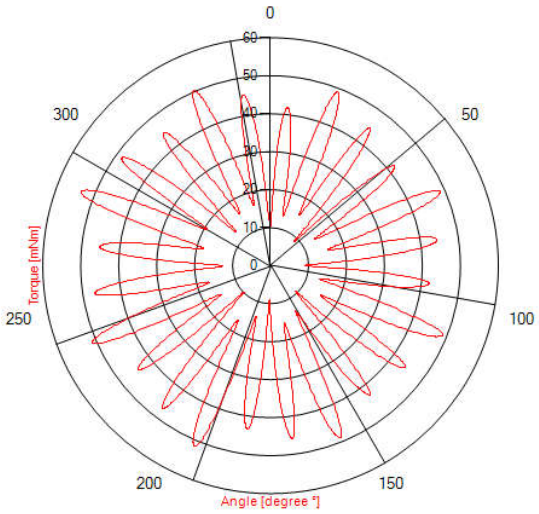
GENERAL SPECIFICATION:

- Speed range – 0.5 to 30 rpm
- Angle - 0.09° (4000PPR)
- Rotation – Both direction (CW & CCW)
- Test results
  - Numeric value of Cogging / Friction
  - Display of Torque Vs. Angle
  - Hormonic analysis - 1-150 order
- Ambient temperature – 0 to 50℃
- Surrounding Humidity - 90%RH or below
- Power input - 230VAC 50/60Hz
- Connection interface – USB-B 2.0



Cogging vs. Angle

4Q-CTS PRODUCT RANGE:

Model Number	4Q-CTS-50	4Q-CTS-100	4Q-CTS-200	4Q-CTS-500
Rated Torque	50 [mNm]	100 [mNm]	200 [mNm]	500 [mNm]
Accuracy Scale	0.1% F.S	0.05% F.S		

The system is scalable to test bigger or smaller motors by adding a torque measurement unit to the system with fast replacement within a minute.

ORDERING INFORMATION				
Ordering No:4Q-CTS-___- 01				
		4Q-CTS-050: 50[mNm		
		4Q-CTS-100: 100[mNm]		
		4Q-CTS-200: 200[mNm]		
		4Q-CTS-500: 500[mNm]		
00	Horizontal			
01	Vertical			
Example	4Q-CTS-200-01 mean cogging torque system with 200mNm range and vertical version.			

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