

WITH THE CTS COGGING TEST SYSTEM, MAGTROL IS PROVIDING A STAND-ALONE TEST SYSTEM TO CONTROL AND MEASURE THE PARAME-TERS OF DETENT TORQUE, COGGING TORQUE AND FRICTION TORQUE.

## **FEATURES**

ng Test Software

- Measure of Detent Torque, Cogging Torque and Friction Torque Torque Detection from <1 mN·m to 1 N·m</p> Rated torque range 50/100/200/500/1000 mN·m (other range available on demand). Accuracy 0.1 % / 0.2 % of rated torque Precise Angle Detection 0.018° (5000 Pulses Per Revolution) Operating speed 1 to (8)10 rpm Operating Direction CW/CCW **USB** Interface
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  - Peak Detection
  - X-Y, Polar and FFT Graphs

The test system includes a precision geared motor, a TS Torque Sensor integrating a 5000 PPR pulses encoder. CTS 100-102 have a built-in security clutches to avoid system overload by mishandling when not in use. The geared motor drives the MUT (Motor Under Test) at low speed of 1 to 10rpm (respectively 8rpm for CTS103-104), while acquiring its cogging torque related to angle position. The torque measurement covers a range up to 1 N·m (depending on the selected torque sensor) with an accuracy of ±0.1 mN·m (for TS100-50 mN·m and TS 101 - 100 mN·m of nominal range). The executable software control the system realizing the measurement and data acquisition. It provides accurate peak-to-peak measurement of cogging torque and displays X-Y or polar graphs as well as FFT analysis. It allows the storage of the measured data enabling to compare performance graphs by overlaying up to 5 graphs. A cursor can be used to read accurate values from measurement points. Measured parameters can be saved under TXT. For better accuracy and function control, the software includes a 0 offset adjustment routine which check transducer signal over a complete turn (Test sample MUT not connected to the system).

As stand-alone system, the CTS only requires a 100-220 VAC power. USB interface allows direct connection to the PC on which the software is installed. It is mounted on a PT-25 grooved base on which the motor fixture can be fitted. Vertical mounting bracket are available as an option, allowing to mount the system in vertical position, which is particularly recommended for very low measuring values.

The models CTS100 to CTS102 can easily be scaled up or down (50/100/200 mN·m), simply by replacing the TS Torque Sensor which is mounted in front of the unit. The software will recognize the torque sensor being in use and will automatically adapt its measuring range.

Need specific Motor Testing? Do not hesitate to challenge us !



## WHAT ABOUT COGGING TESTING?

The drag torque or Detent Torque is an important parameter in permanent magnet (PM) motors, especially in a PM servo motor system. Detent Torque of PM motors is composed of Cogging Torque and Friction Torque. The Cogging Torque is generated by attraction/interaction of the magnetic poles to the teeth (steel structure) within an un-energized motor. It is one of the most important parameters of permanent magnet motors, which causes torque ripple, vibration and noise. Generally the cogging torque varies with rotor position and is defined by its peak to peak (p-p) value. Friction Torque is attributed to mechanical assembly issues, such as bearing resistance, assembly tolerance, or carbon-brush friction for brush PM dc (PMDC) motors. Friction Torque is commonly measured by its average value.





When the magnets are face-to-face (as left), the force is maximized. When the motor is running (as right), the moving magnetic elements will first have to free themselves from the residual magnetism before proceeding to the next step. This resistance to advancement is named cogging.



Example of typical curve for cogging. Friction is an average value calculated from 0 torgue. Cogging value is claculated on the peak torque value.

Example of compilated report, it may use as certificate

COGGING TEST SYSTEM

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## COGGING TEST SYSTEM

- Executable Specific Cogging Test Software
- Multigraphs function with up to 5 curves comparison
- Data Acquisition and Storage in TXT (Export in CSV files possible)