**Torqo Calibration White Paper**
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## I. Overview

The Torqo instrument uses two calibrated spring beams and a very precise rotary position encoder to read the applied torque. Calibrating the Torqo machine is done to linearize the response of the spring beams. After calibration is completed the rotary position of the main shaft will correspond to a reading of the applied torque that is accurately referenced to a traceable standard.

## II. Factory and User calibration

Calibration is always done at the factory using NIST traceable standards. The Factory calibration is accurate at the time the instrument is shipped and for 1 year following. Re-calibration may be done by the end user at their own specified interval with their own weights. The user always has the option to apply the results of their own calibration or to switch back to the Factory calibration values.

Factory calibration is typically done at 7 values of applied torque that span the range of the specific instrument. Those values are 0%, 10%, 25%, 50%, 75%, 90% and 100% of the torque range of the instrument.

User calibration is typically done at 4 values of applied torque that span the range of the users instrument. Typical values are 0%, 25%, 50%, 75% and 100% of the torque range of the instrument. Users may add their own calibration points i.e. 12% if desired, provided they have the required weights. Note the 100% weight is usually achieved by hanging the 25% and the 75% weights together. Note the process of user calibration disables factory calibration so the actual vs. ideal curves can be created and compensation is not done twice.

## III. Compensation and Interpolation

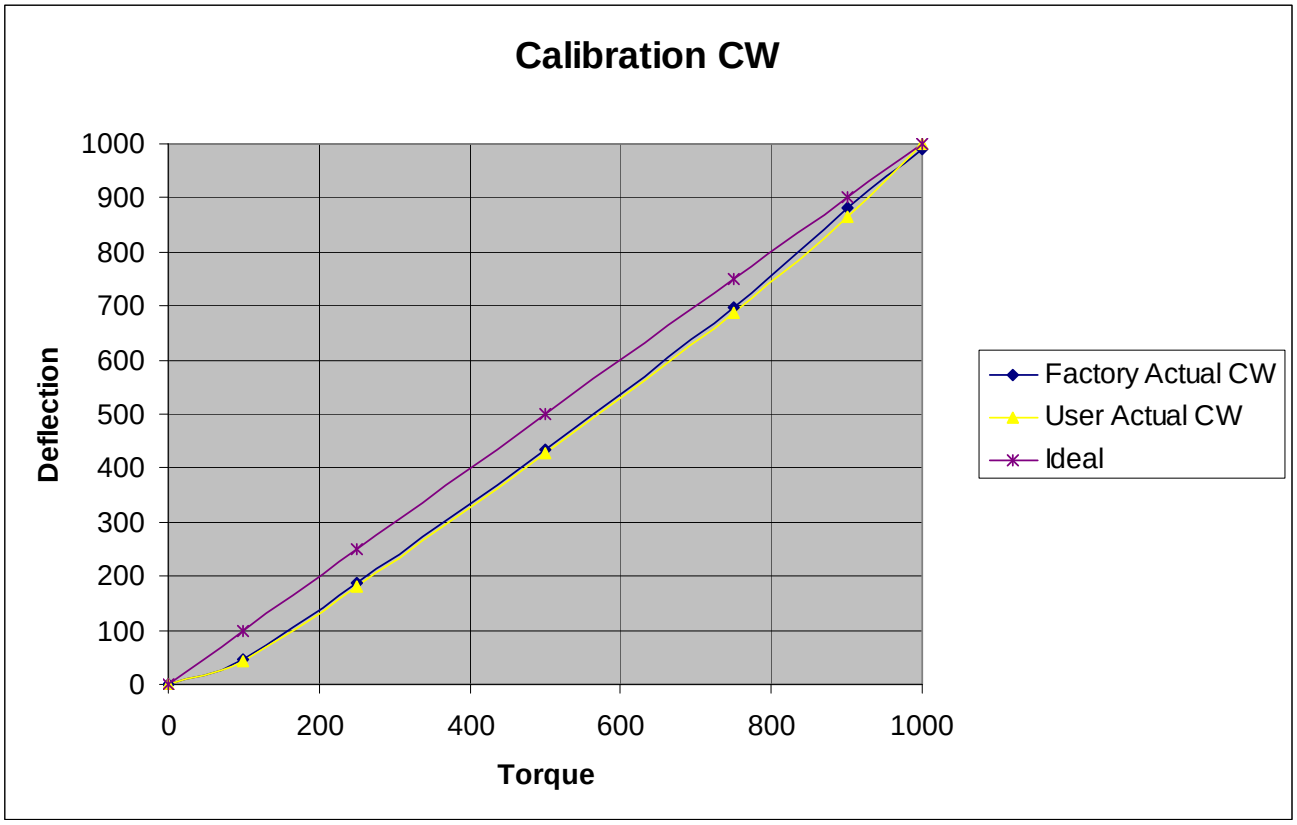
The instrument uses the calibration readings in both directions, clockwise (CW) and counterclockwise (CCW), to create two compensation tables which correct the actual readings and result in accurate torque readings traceable to standards.

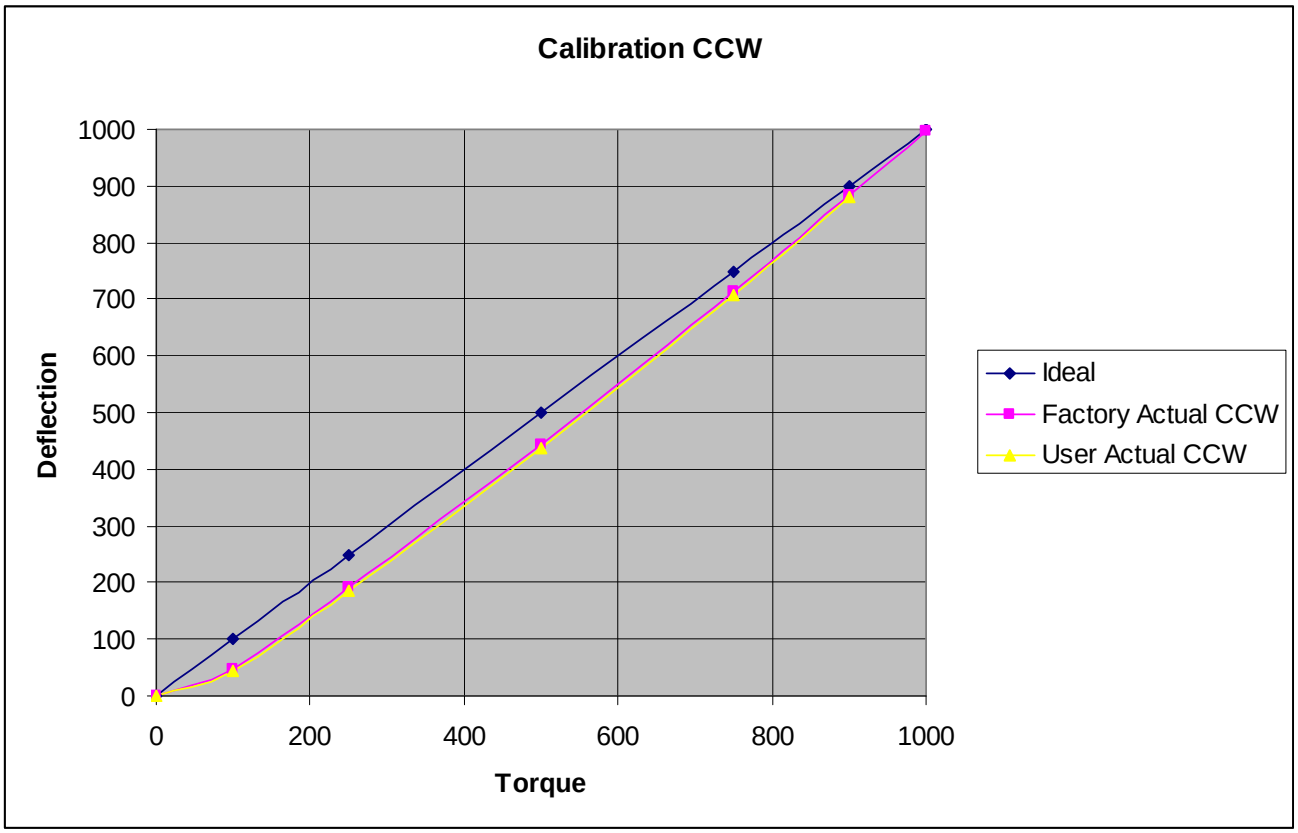
The calibration weights only cover discrete points throughout the range of the instrument. These points are shown as data points in the accompanying graphs.

To calculate the compensation required for measured torques that fall between these discrete points the instrument used linearly interpolated values for the torque compensation which falls at points between the measured calibration values. These interpolated values are shown as thin lines in the accompanying graphs.

## IV. Charts

The charts below show sample compensation data for a customer's machine. The difference between the ideal and actual is stored and used to compensate all readings and results in linear, traceable, accurate torque readings.

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