

# KEPLER 4 K FACTOR VERIFICATION MODULE

**The additional module to verify the K Factor of every calibration of torque wrenches and torque screwdrivers to BS EN ISO 6789:2017 Part 2, or your own in-house standards.**



A new feature of Kepler 4: The inclusion of functions to validate the K Factor, required to calculate the expanded uncertainty of a torque tool during calibration (ISO 6789:2017 Part 2), as per the UKAS document M3003 Appendices B and C, using an external spreadsheet module to calculate an adjusted K factor.

## KEY FEATURES INCLUDE

- Automatic calculation of the K factor for up to three calibration settings for situations where the resolution contribution is dominant and/or there are unreliable input parameters as per UKAS M3003 Appendix B (Unreliable Inputs) and Appendix C (Dominant Uncertainty Contributions).
- Applicable to ISO 6789:2017 Part 2 or In-House Calibrations.
- Calibration data from Kepler 4 automatically populates the module with a single button press.
- Coverage factor K calculation for probability of 95.45%
- Resolution (r) is assumed by experience and prior knowledge to be the dominant uncertainty.
- Where preset tools without scales are concerned (Type 2 Classes B, C, E and F), the Dominant Uncertainty Contributions verification is ignored as the resolution is zero (no scale fitted).
- Removes the difficulty of verifying the K Factor by hand or other spreadsheet means.
- The K Factor Module requires MS Excel to be installed on the computer running Kepler 4.
- K factor verification module sold separately to Kepler 4.

The screenshot displays the software interface for the K Factor verification module. It is divided into two main sections: 'Readings Values' and 'Send Readings Values to Calculate Coverage Factor (k)'. The 'Readings Values' section contains a list of input parameters with their corresponding values, such as 'Works Order: Screenshot1606', 'Tool Type: Type 1', 'Tool Class: A', 'Number of Readings: 5', 'Mean Value (kbar) S1: 10.066', 'Uncertainty Expanded (W) S1: 1.98%', 'Mean Value (kbar) S2: 50.118', 'Uncertainty Expanded (W) S2: 0.415%', 'Mean Value (kbar) S3: 50.161', 'Uncertainty Expanded (W) S3: 0.279%', 'Resolution (r): 0.010', 'Reproducibility Variation (brep): 0.107', 'Output Drive Variation (bod): 0.139', 'Interface Variation (bint): 0.032', 'Force Loading Point Variation (bl): 0.069', 'Repeatability Variation (br) S1: 0.010', 'Repeatability Variation (br) S2: 0.020', 'Repeatability Variation (br) S3: 0.027', and 'Standard Expanded Measuring Device Uncertainty (Wstd): 0.150%'. The 'Send Readings Values to Calculate Coverage Factor (k)' section includes fields for 'Workbook: Screenshot1606' and 'Worksheet: K4 K', a 'Calculate k Values' button, and three 'Assign Calculated k Values' buttons for 'Setting 1 Coverage Factor (k): 2.00', 'Setting 2 Coverage Factor (k): 2.00', and 'Setting 3 Coverage Factor (k): 2.00'. A 'Please note' section explains that the K Factor is verified using the M3003 document, the GUM, Appendix B (Unreliable inputs) and Appendix C (Dominant Uncertainty Contributions), and that resolution (r) is assumed to be the dominant uncertainty. A 'Please note' section also states that where preset tools without scales are concerned (Type 2 Classes B, C, E and F), the Dominant Uncertainty Contributions verification is ignored as the resolution is zero. Coverage probability is taken as 95.45%. The calculated k value at each setting is taken as the worst case of the two methods covered under the above appendices. The 'Exit Options' section includes buttons for 'Calculate k Values', 'Cancel - Make No Changes', and 'Assign Calculated k Values'.

## SYSTEM REQUIREMENTS FOR MODULE:

Latest version of Kepler 4 Calibration or Combined Software.  
Microsoft Excel must be installed on the computer with Kepler 4.

*Disclaimer: This datasheet may not reflect the latest version of the software. For more information, visit our website: [www.awstorque.co.uk](http://www.awstorque.co.uk).*

**ALSO AVAILABLE: KEPLER 4 FOR CONFORMITY, AND KEPLER 4 COMBINED**

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