



Trust CDI's Factory Service Center for all your CDI torque product repair and calibration work. Use our convenient service website (www.cdifactoryservice.com) to check services available, flat rate repair pricing, and to order and track your repair and calibration requests. The website enables you to order all regular paid repair and calibration services, as well as any warranty work needed.

CDI's torque tool factory and repair facility is located in City of Industry (Los Angeles), California. The factory has been ISO 9001 certified since 1998. The CDI Factory Service center repairs and calibrates with N.I.S.T. (National Institute of Standards and Technology) traceable calibration equipment, and CDI Torque Products meet or exceed ASME and ISO standards. Rely on the CDI Torque Products Factory Service Center to do the job right.

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TORQUE 101

Need help educating your department or shop staff on why applying the correct torque is critical to proper assembly or maintenance operations? CDI's **Torque Wrench 101** is the perfect simple and quick-read reference "textbook" to train staff on what torque is, why it's important, torque wrench applications, proper torque wrench selection, and much more. It's a 4-page laminated reference card, item #T101CDIUSER, and available from your Snap-on Industrial Brands representative.

WHAT IS TORQUE?
Torque is rotational or twisting force.
Torque is measured in length and force. Length means distance from "center of drive" to "center of handle". Force means "pounds", "Newtons" etc.

WHAT IS A TORQUE WRENCH?
• A torque wrench is any device that applies a pre-determined amount of torque to a fastener.
• It may be mechanical or electronic in design.
• A torque wrench has some type of indicating device which tells the operator when the correct torque has been achieved. "click" or "torque-to-break" tools, sounds, lights, gauges or some combination of these.

QUICK FACT: The Micrometal Click Type Wrench (shown) is the most affordable and common torque wrench used today.

TORQUE & ANGLE
Auto manufacturers and makers of other high performance equipment are increasingly specifying fasteners with a combination of torque value followed by additional tightening with "angle", or degrees of wrench turn. Manufacturers can calculate a more exact fluid "clamp load" for their applications, since "torque & angle" minimizes the impact of thread or under-head friction (see "What Does Torque Do" illustration and text below). Note: The CDI "Torque & Angle" electronic wrenches easily handle these applications.

WHAT DOES TORQUE DO?
• Bolts (or threaded fasteners), are designed to create clamping force, also called "clamp load".
• When torque is applied to a threaded fastener, it draws together the joint, (two pieces of material).
• As additional torque is applied to the fastener, the joint is pulled together creating a clamp load as the fastener begins the stretching process, it's this fastener stretch that creates and maintains clamping force, like a stretched bungee cord maintaining tension.
• The actual amount of clamp load is determined by several factors:
- The amount of torque applied to the fastener.
- The material and grade of the fastener.
- The internal friction on the joint = friction under the fastener head, and friction between the threads of the fastener and material it's connected to.

WHY IS APPLYING PROPER TORQUE IMPORTANT?
• Safety & Performance: Applying accurate torque is critical to assembly applications, engines and precision equipment.
• Creating a proper clamp load is the main objective when applying torque to a fastener. Engine cylinder heads, pipe couplings, wheels, all need to be "clamped" uniformly to specific torque values.
• There are three main factors that affect the correct application of torque: (1) Condition of components, (2) Accuracy of torque instrument, (3) Properly applied torque values.
• Applying torque incorrectly can lead to stripped threads, premature loosening or broken fasteners that can cause catastrophic failure. Leaking joints may cause angles or equipment failure.