TORQUE WRENCHES

Torque wrenches are designed to permit an operator to determine applied torque on bolts, nuts and other fasteners. They measure torque in ounce-inches, pound-inches and pound-feet, as well as metric measure. However, many manufacturers express torque in foot-pounds (rather than pound-feet) since this nomenclature is more familiar to the average tool user. Metric measure torque wrenches are available in Newton meters (N.m), are meter kilograms (mkg) and centimeter kilograms (cmkg) with N.m becoming the more modern, universally accepted calibration. Many torque wrenches are available with dual scales for conventional and metric measurements.

Two basic hand torque wrenches are audible signal and visual display. One type signals applied torque by momentarily releasing the wrench for a few degrees of free travel. The release is usually (but not always) accompanied by a click sound thus giving the wrench its popular names: Click Torque wrenches or simply Clickers. Torque value is set to a micrometer scale on the handle or preset by an adjusting screw in the handle cavity (which precludes accidental resetting).

A second type indicates, rather than signals, torque. Applied torque is indicated on a dial or electronic digital display. Some models have memory pointers which remain at the maximum reading attained until manually reset.

For low torque applications, torque screwdrivers are usually used. They are available in either the release (free wheeling) type, or in the indicating type.

The most widely used Torque wrenches have square drives to utilize standard detachable sockets. Both ratcheting and non-ratcheting types are available.

**Torque Multipliers.** Torque multipliers are multi-gearered tools generally used with ratchets or ratcheting torque wrenches as the drive component. Input is multiplied through the gearing four or more times depending on the model used. A reaction bar, which locks into the head of the torque multiplier, must rest securely against an object sturdy enough to withstand the force that will be generated. When driving a torque multiplier with a torque wrench, a torque loss factor at the fastener, caused by frictional losses through the gear train, must be taken into consideration in determining the desired torque at the output side of the torque multiplier. Torque loss factors are available from most torque tool manufacturers. Torque wrenches are available which can be used between the output side of the torque multiplier and the fastener. When used in this manner, the actual torque on the fastener may be read without the need to compensate for frictional loss.

**Proper Uses.** Torque wrenches are used in various operations where proper torquing of nuts, bolts and other fasteners is critical. Such operations include assembly and inspection of gear trains and bearings, setting of clutches and brakes, maintenance repair, overhaul and experimental work.

Always work with clean threads that are free of corrosion. It is important to follow the product manufacturer’s instructions for specific torque loadings—particularly whether recommendations are for dry, oiled or plated threads, and other instructions which apply to a particular tool. Avoid overtightening a nut or bolt with a conventional wrench before applying a torque wrench. When not in use, the adjustable type wrench should be set to the lowest torque.

**Abuse/Misuse.** A Torque wrench is a precision instrument and should not be roughly handled. Never use it as a hammer, a pry or as a conventional wrench-use it only as a torque tool. Avoid dropping.
HARRY SHOULD PRY WITH A CROW BAR-NOT A TORQUE WRENCH.
WRONG

When using adjustable wrenches do not over torque by applying torque past the release point. At low torque setting, the "click" signal might be very soft or missing altogether. Learn the feel of the release, rather than relying on the sound.

Read torque values on indicating torque wrenches by looking at the dial at 90 to its surface (this eliminates parallax error). If this is difficult to do, compensate by observing how much the apparent scale readings change when viewing from different angles.

Most torque wrenches operate accurately only when they are held by their designated grips. Cheater bars should never be used unless specifically permitted (or supplied) by the wrench's manufacturer.

**When to Repair or Replace.** If a torque wrench has been dropped it should be checked on a torque tester for accuracy. Torque wrenches should be periodically checked for calibration accuracy when in frequent or continuous service. Most manufacturers provide repair and calibration service. The manufacturer will advise if the tool can be repaired or should be replaced.