



TECHNICAL FEATURE

TORQUE WRENCH USE AND MAINTENANCE



We hear a lot about aluminum repair and procedures. Many of us have been repairing steel vehicles (and even some composite vehicles) for years. One thing we see overlooked 99 percent of the time is torque wrench usage when installing body and structural components. It seems that most technicians know that a torque wrench is required for steering, suspension and engine repair, but many do not realize the importance of using torque wrenches for body repairs. Aluminum components such as (but not limited to) doors, deck lids, hoods and bumper reinforcements can all be damaged from over-tightening during installation. Following the OEM's torque ratings and procedures is paramount to ensuring the aluminum panels do not become damaged, warped or embedded into steel components, which will cause galvanic corrosion. Many of today's steel-intensive vehicles contain aluminum bumper reinforcements and hood panels. Additionally, many may also have aluminum deck lids and door assemblies, so care must always be taken during the installation process. When you finally decide that the proper thing to do is to use a torque wrench, you will need to understand their operational use and maintenance. Let's take a look at some torque wrench information.

A torque wrench is a precision instrument designed to apply a specific amount of force to a fastener (nut or bolt) to ensure it stays in place and does not back off or become loose. Whether tightening head bolts on an automobile engine, attaching engine accessory components, replacing or adjusting steering and suspension components (or lugs for tire and rim installation), inspecting fastener tolerances on high-performance equipment or fastening aluminum or composite body components, it is extremely important that proper care is used and you adhere to tolerances.

Guidelines noting acceptable torque ranges, the order in which specific fasteners are tightened and the number of times a fastener must be tightened and loosened to ensure uniform torque application are typically provided. In some cases, a fastener may require a torque to angle or a combination of a torque to value/torque to angle followed by another torque to value. Failure to properly torque fasteners can lead to equipment damage, personal injury or – worse – a component failure.

It is important to follow acceptable maintenance and use practices, such as (but not limited to) the following:

- Safety glasses or goggles and gloves should be worn at all times when using any hand tool.
- Always follow the manufacturer's directions regarding torque direction, proper force, torque pattern/sequence, use or non-use of lubrication on fasteners, torque "tighten/release" cycles and torque to angle values.
- Do not exceed the recommended working range of the torque wrench. Reliable measurements are based on a percentage of the working range. In general, most mechanical wrenches have a useable range from 20 percent to 100 percent of full scale. Most electronic wrenches have a useable range from 10 percent to 100 percent of full scale. Read all instructions prior to operating the torque device.
- Do not use accessories or handle extensions unless specifically allowed by the torque wrench manufacturer.
- Always take the time to inspect the tool and check for worn or cracked sockets. Remember to properly lubricate and replace

any worn or inoperative torque wrench components.

- Avoid dropping, sliding or striking a torque wrench. Dropping a torque wrench on a hard surface can cause the instrument to lose reliable calibration. If you suspect that a wrench has been dropped, have the tool inspected by the manufacturer or reputable calibration service. Additionally, never use a torque wrench to "break free" corroded fasteners.
- Always store a torque wrench in a protective case and/or location when not in use.
- Avoid exposure to temperature extremes, high humidity, fluid immersion and corrosive environments. Never clean the tool with caustic fluids such as lacquer thinners or gasoline.
- If using a click-type torque wrench, always store it at the lowest level on the scale to prevent loading the spring.
- Avoid marking, etching or placing labels on torque wrenches.
- Use a torque wrench to apply a specific torque value during the final assembly process. Do not use a torque wrench as the primary means of tightening or loosening fasteners; that's what breaker bars and ratchets are intended for.
- As most torque wrenches are length specific, always grasp the torque wrench in the center of the handle. If two hands need to be used, place one hand on top of the other. Make sure the tool does not slip and cause you to fall off balance and impact your hands.

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■ Apply torque in a slow, methodical manner and avoid sudden, “jerking” type movements or forcing the wrench to tighten a stubborn fastener.

■ When the wrench signals (by clicking, beeping or lights) that a specific torque has been reached, stop applying force immediately.

■ Snap-On warns that “after 5000 cycles or up to one year of use, whichever comes first, have your torque wrench inspected and recalibrate by the manufacturer or reputable calibration service.”

With proper care, a high-quality torque wrench should provide accurate measurements for many years, if you adhere to what is in this article. Remember that torque wrenches are precision instruments; care must be taken not only in their use, but also in their applications, storage and maintenance.

HOT TIPS

■ **Calibration:** Torque wrenches come from the factory calibrated, but almost every manufacturer recommends checking the calibration once every year. There are testers that you can purchase to ensure your torque wrench is accurate.

■ **Storage:** All torque instruments should be stored in their original cases. This will prevent them from becoming damaged and will keep them dry and dust/moisture free. “Clicker” type wrenches must be stored with the lowest possible setting.

■ **Usage:** Inspect the tool visually before and after every use. Look for any signs of corrosion, bends or wear. Also check for any binding or rough operation.

COMMON REASONS FOR FAILURE

■ **Use and abuse:** The more use and wear, the more maintenance that it will require. Dropping the wrench will damage it and change the calibration. Never use a pipe extension or hit the wrench with a hammer.

■ **Improper storage:** Storing the wrench in a drawer without its case will cause other tools to impact it during the opening and closing of the drawer. Additionally, technicians have a tendency to toss some tools in their drawers,

and this could impact the wrench. Moisture is always an issue.

■ **Improper maintenance and care:** Failure to properly store and calibrate your torque wrench will lead to incorrect readings. You should never fail to repair the wrench when it is not operating properly.

We hope this article has explained the proper way to use torque wrenches, maintenance and applications. As always, feel free to contact us if you have any questions.

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Executive Director's Thoughts

As simple as a torque wrench? Not in our industry. Tool maintenance, especially with advanced technology like welders, is an absolute must. Having a calendar reminder for each tool's maintenance schedule will help relieve concerns when a tool may be questioned for failure. Catch it before it's a problem. - Jordan Hender

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Aluminum Outer Body Panel Repair Workshop

This workshop consists of a 1 ½ Hour Presentation on the following:

- ✓ Aluminum Usage
- ✓ Aluminum Intensive and Hybrid Construction
- ✓ Aluminum Series and Alloys
- ✓ Repair vs. Replace Decisions
- ✓ Repair Equipment for Outer Panels
- ✓ Heating Techniques
- ✓ Hammer and Dolly Techniques
- ✓ Dent Removal Equipment and Techniques
- ✓ Reshaping Techniques

The Presentation is followed up by 3 ½ Hours of hands-on aluminum repair on hoods, doors and fender panels.

Cost \$150 per student

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