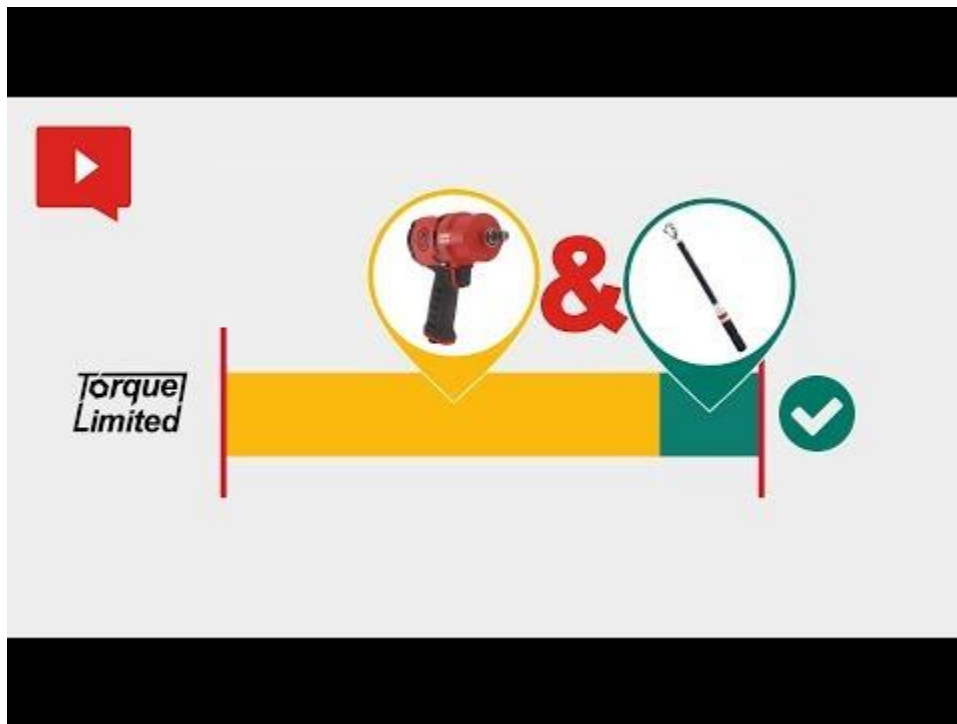


The Nuts and Bolts of Pneumatic Torque Limited Impact Wrenches: How to Prevent Overtightening

Correctly applied torque is vital to maintaining the safety of a vehicle and its passengers. Torque limited tools are essential to helping tighten wheel nuts to the correct torque. But what are torque limited impact wrenches, how do they work, and which is the best tool to use? Learn more about them here to ensure you aren't overtightening wheel nuts.

What is a torque limited impact wrench?

An impact wrench with a torque limited function enables efficient torque level control, with torque limited to the forward direction to prevent overtightening. The tool won't stop running but the torque will increase more slowly, meaning you can be certain that you haven't overtightened the nut.



“Operators should always complete the final tightening with a calibrated torque wrench to ensure that the torque applied is accurate and complies with the vehicle manufacturers’ specifications.”

-Antoine Tourneux, Global Product Marketing Manager, Vehicle Service Tools



How does a torque limited impact wrench work?

There are two types of torque limited technology, both designed to reduce power in the forward direction once a given torque is reached:

1. Mechanic modification (takes place in the wrench's impact mechanism)
2. Air flow modification (occurs in the impact wrench's motor)

Let's take a closer look at both types to understand which one delivers the best performance.

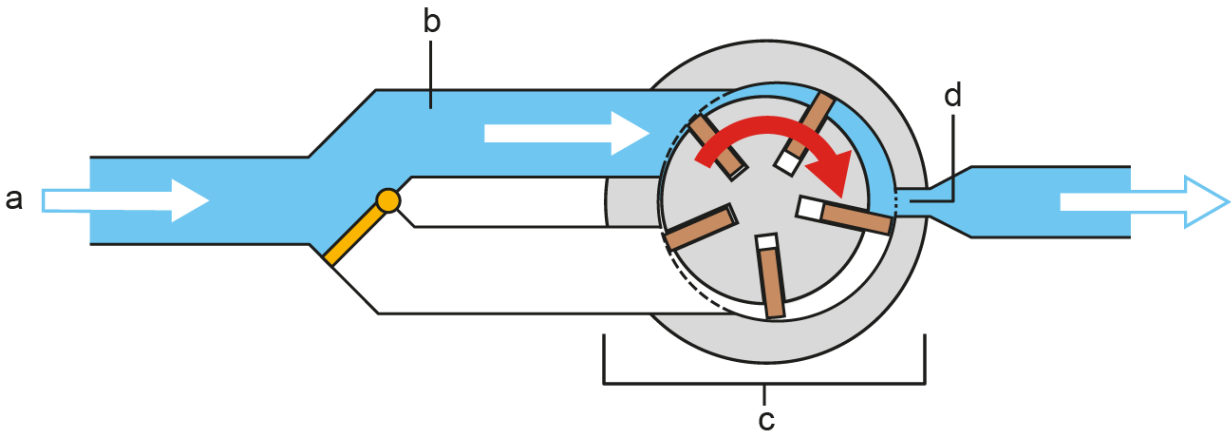
Torque limited impact wrench with mechanical modifications

By biasing either the hammer or the anvil, or both, the two components will 'slide' over each other and the impact will be less powerful, although still present.

Torque limited impact wrench with air flow modification

There are two types of air flow modification, which are both designed to slow the rotor and therefore deliver less power.

In a standard non-torque limited impact wrench that has no air flow modifications, the diameter of the air intake port is the same in forward and in reverse. As a result, it typically delivers the same torque levels in forward and reverse. You can see this in the image below:

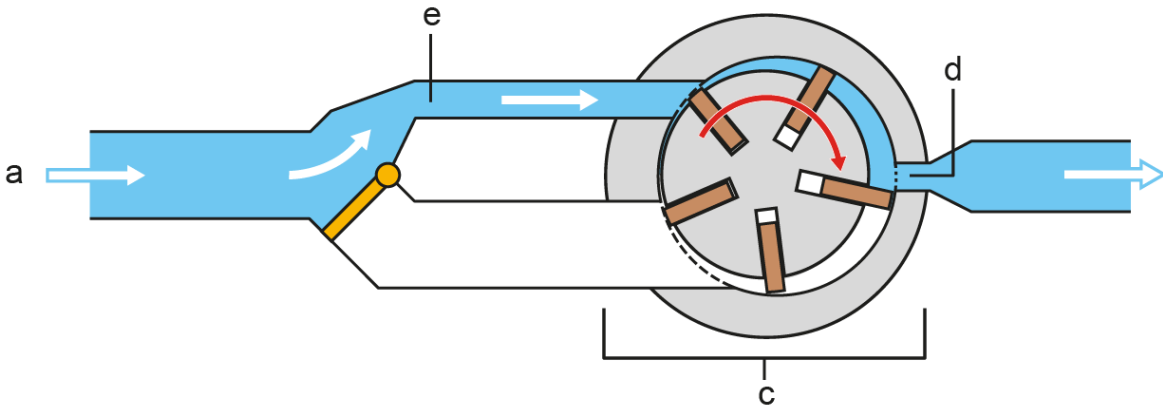


Non-torque limited air motor (in forward position)

- a) air flow
- b) intake port
- c) motor (includes blades, rotor & cylinder)
- d) exhaust port

Torque limited air motor with reduced intake port

The air passes through a smaller inlet port, which reduces the air flow, and in turn provides less air to the rotor, meaning it turns more slowly. As a result, the impact mechanism driven by the rotor is less powerful. See the image below:

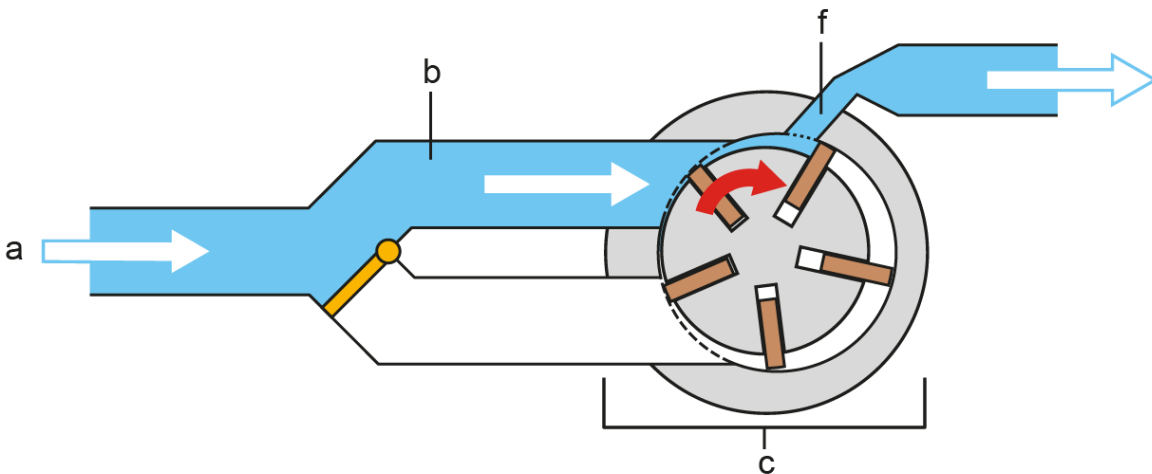


Torque limited air motor with reduced air intake port (in forward position)

- a) air flow
- b) motor (includes blades, rotor & cylinder)
- c) exhaust port
- d) reduced intake port (smaller compared to a non-torque limited tool)

Torque limited air motor with biased exhaust port

In this case, the rotor has less distance to travel from the start of the rotation to the exhaust, and therefore turns the rotor more slowly. See image below:



Torque limited air motor with biased exhaust port (in forward position)

- a) air flow
- b) intake port
- c) blade rotor motor
- d) biased exhaust port

Evaluation of the two torque-limiting technologies

Since torque limited impact wrenches with mechanical modifications rely on a hammer and anvil making physical contact, they are inherently prone to vibration. They will also experience more

friction at the contact point, which results in heat, and acts as a source of potential failure. This is where opting for tools with air flow modifications can be a big advantage. Tools with a reduced inlet air flow consume less air and have a significant benefit of reduced vibration compared to tools with mechanical modifications. Depending on the make and manufacturer, tools with air flow modifications can also reduce vibration in the forward direction compared to tools with a non-torque limiting design.

This helps to protect workers from The Hand Arm Vibration Syndrome (HAVS), a common yet debilitating musculoskeletal disorder, which is often permanent, but easily preventable, and caused by intensive and repeated vibration exposure. No matter which technology the tool employs, both mechanical and air flow modifications ensure that once the optimal level of torque is achieved, it is not exceeded. This helps avoid the risks associated with overtightening.



Reminder: Airline installation

In order to get the most out of your pneumatic tools, remember to ensure that the airline is correctly installed and maintained. It's important to note that all manufacturer recommendations are based on an air inlet pressure of 6.3 bars / 91 psi. You can read our guide to find out how optimizing overall equipment efficiency (OEE) can

help you maintain productivity, ensure workplace safety and deliver the best return on your investment.

Is torque limited the same as shut-off tools?

Shut-off tools include a shut-off function which monitors the torque in the forward direction to prevent overtightening. The tool will stop running when the given torque is reached. On the contrary, the torque limited impact wrench will NOT stop running, the torque will just stop increasing.

For more information please visit our Expert Corner : <https://www.cp.com/en-us/tools/expert-corner>

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