

PURPOSE/APPLICATION

To provide guidance on the use and care of various Pneumatic and Hydraulic Torque wrenches, they come in different operation types, sizes and manufacturers. This practice is intended to provide some best practices for the use and care of Hydraulic Torque Wrenches. Each time a wrench is used it can create a unique situation and should be evaluated using the HIAC process before starting the task.

PPE

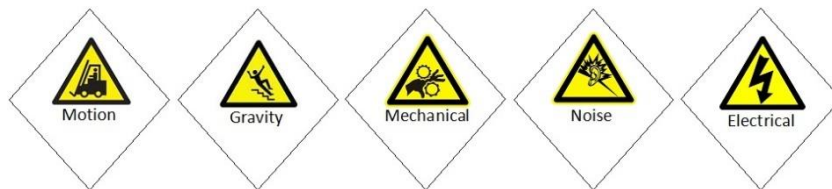
- Strike minimum requirements
- Hand Protection (impact rated)
- Hearing protection

TRAINING

- On the job instruction
- Review of manufacturer's instructions

HAZARDS & CONCERNS

- Personal injury
- Pinch/crush points
- Slipping wrench
- Pneumatic/Hydraulic pressures and forces

**PRECAUTIONS**

This document is a reference guide to provide workers introduction to Hydraulic Torque tools and their use in standard shop, yard and field work application/environments it is not intended to overwrite any OEM manuals or inspection documents, always review the manual for the individual tool you will be using.

Note: communication between workers is incredibly important when using a high torque tool, if the tool is engaged before workers are clear, it could result in serious crush injuries or amputations. Always hold a pre-task meeting and agree on a communication strategy to verify the remote operator knows all workers are ready, and that all workers know the remote-control operator is ready for them to move the head after torquing.

GENERAL DO'S AND DON'TS**THE DO's:**

- DO** Read all instructions, warnings, and precautions provided by the manufacturer before operating.
- DO** Carefully inspect all components for damage incurred during shipping.
- DO** Avoid personal injuries and damage to equipment by ensuring all hydraulic components are rated for the operating pressure (generally up to 10,000 psi).
- DO** Immediately replace any worn or damaged parts.
- DO** Keep all hydraulic torque wrench components away from excessive heat, flame, moving machine parts, sharp edges, and chemicals.
- DO** Avoid any kinks in the hose as this will cause severe back pressure, damaging the lining of the hose, leading to premature failure.

- DO** Inspect the hydraulic hose for damage and wear before use.
- DO** Replace a kinked or damaged hydraulic hose assembly immediately.
- DO** Ensure when two or more workers are operating the equipment that they can maintain the line of site and clear verbal communication, miscommunication could result in serious crush injuries.
- DO** Establish a system of communication with all workers involved, i.e. say "clear" when ready for the operator to push the remote button, the operator to clearly indicate the nut is torqued and ready for the tool/backing wrench to be moved.
- DO** Show all workers your hand is away from the remote's trigger, so they know it is safe to move the tool.
- DO** Confirm all workers hands are clear of the nut and torque head prior to operating the equipment.
- DO** Use an approved backing wrench or tool, verify it is appropriate to the task and level of torque.
- DO** Consider the use back up wrenches which do not need to be held in place by hand.
- DO** Keep the pump as far as reasonably practicable from work area to limit noise exposure and assist with clear communications of verbal commands this will also help keep the area clear of tripping hazards.
- DO** Ensure that when setting up and starting work to route hoses away from workers as much as practical.
- DO** Use hearing protection when required as noise created from the Hi-Torque Wrenches can be over 85 dBI.
- DO** Maintain proper body positioning and ergonomics.
- DO** Position yourself with a stable footing, work platform and area to use the system due to the weight.
- DO** Bleed the system down to zero pressure prior to disconnecting the hoses.

THE DON'Ts:

- DON'T** Use hydraulic torque wrenches without a hydraulic gauge to indicate the working pressure.
- DON'T** Exceed maximum allowable torque of the hydraulic torque wrench.
- DON'T** Adjust the hydraulic torque wrench safety relief valve located inside the swivel couplings, loose or dirty couplers will cause the tool not to operate properly.
- DON'T** Use any worn or damaged parts, or replace with non genuine OEM replacement parts.
- DON'T** Remove the shroud from the hydraulic torque wrench.
- DON'T** Operate the tool without the shroud in place (if internal components fail, they will be expelled as shrapnel).
- DON'T** Have sharp bends and kinks when routing the hydraulic hose assembly. A bent or kinked hydraulic hose assembly will cause severe backpressure. They will also damage the internal lining of the hose leading to premature failure.
- DON'T** Drive over, crush or drop heavy objects onto the hydraulic hose assembly. Crush forces may damage hose wire strands and applying pressure to a damaged hose assembly may cause it to rupture.
- DON'T** Place your hands or fingers in between the torque wrench head or back up wrenches and other nuts/studs, high torque wrenches produce enough pressure to crush body parts.
- DON'T** Use standard chrome sockets, only impact driver rated sockets to prevent unplanned socket failure under torque.

Operation of Tool

Torque Wrench Set Up

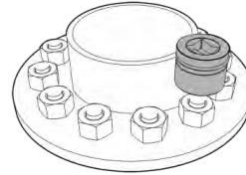
When setting up the torque wrench, the following four steps should be adhered to:

1. Inspect the components of the hydraulic torque wrench and its components. If all appears to be clean and damage free, the assembly process of the components can begin.
2. Connect the hydraulic torque wrench, the hydraulic hose assembly, and the hydraulic power pack to a hydraulic circuit.
3. Ensure all the hydraulic connections are securely connected.
4. Check the hydraulic hose assembly is not kinked or damaged.

Note: that loose or dirty couplers will cause tool not to operate properly. Make sure the hydraulic torque wrench swivel couplings, hose couplings and hydraulic power pack couplings are clean and free of debris prior to connecting the hydraulic torque wrench and hydraulic hose assembly to the assembled power pack.

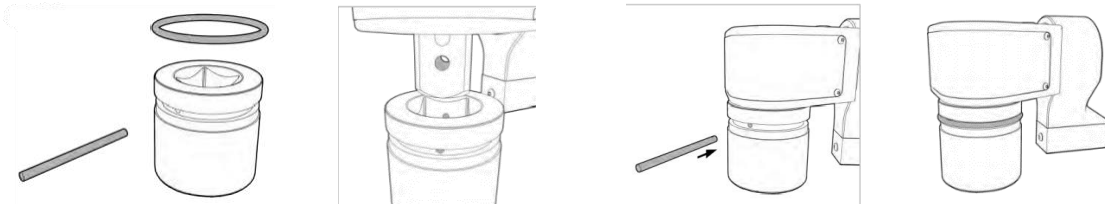
Before the use of any torque equipment, the following points should be determined:

- Verify the correct Nut or Bolt head size
- Material and strength grade (impact rated sockets)
- Set and secure Socket to Drive head on tool
- The desired torque



IMPORTANT NOTE: ENSURE THAT THE SOCKET CLOSELY FITS THE NUT/BOLT, IF NOT, THERE WILL BE SEVERE CORNER LOADING, WHICH WILL ROUND THE CORNERS OF THE NUT/BOLT AND WILL PLACE UNDUE BURSTING LOAD ON THE SOCKET. THE DAMAGE TO THE NUT/BOLT WILL BE OBVIOUS, BUT THE DAMAGE TO THE WRENCH/SOCKET MAY BE A HIDDEN HAIRLINE CRACK THAT MAY LEAD TO FAILURE LATER.

TIP: BEFORE CONNECTING THE SOCKET, TEST IT ON THE FASTENER TO ENSURE A SECURE FIT



Always secure the socket to the square drive to prevent the socket from slipping off. Use the proper sized socket (S-wrench) or cassette (W-wrench) on the nut

- | | |
|------------------|------------------------|
| 1) Drive Unit | 4) Socket |
| 2) Square Drive | 5) Retainer Pin |
| 3) Quick Release | 6) O-Ring Pin Retainer |

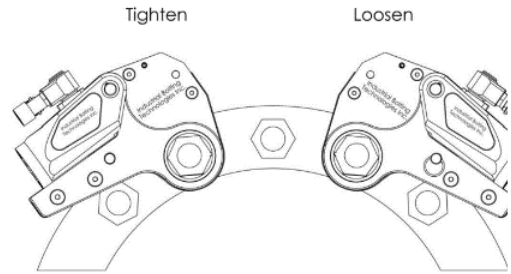
Damaged or worn sockets should be removed from use and tagged "DO NOT USE".

When connecting the hydraulic hose assembly to the swivel, always ensure the connectors are fully engaged and screwed tightly together, ensuring that there are no gaps

Periodically you should coat all moving parts with a good quality lubricant; under harsh environments, cleaning and lubrication should be performed more frequently, if you are unsure when the last maintenance on the equipment was performed ask your supervisor

Hydraulic Torque Power Function

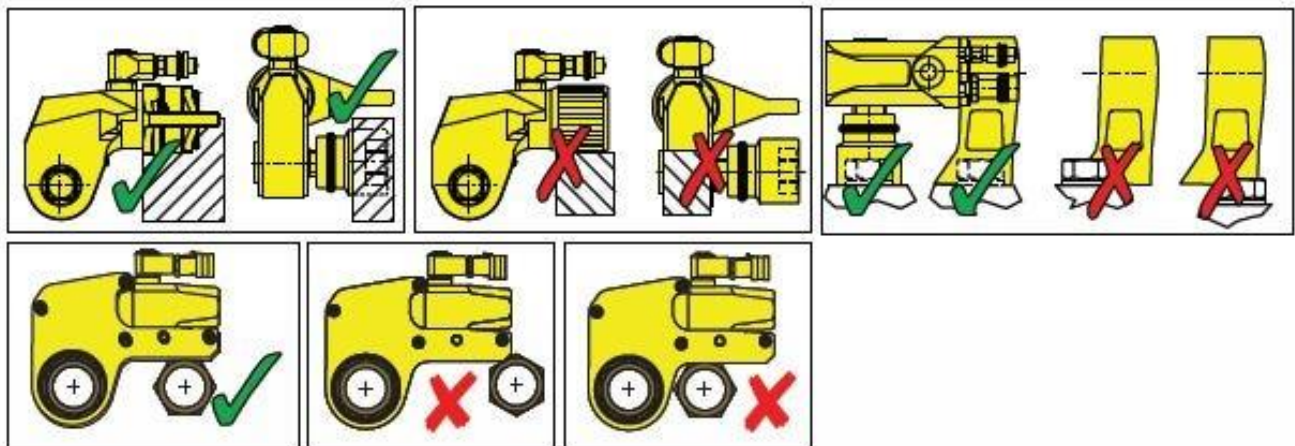
When setting up hydraulic torque tool look at tool function indicator or rotation movement to identify proper placement to loosening and tightening the nut. Position the tool relative to the nut so it matches turning clockwise for tightening and anticlockwise for loosening.



Note: This may vary by machine

Hydraulic Torque Wrench Placement

The torque wrench must be properly positioned manually to make sure that the reaction force is safely transmitted via their reaction arm and not via other torque wrench parts. Never use the torque wrench without the reaction arm.



Precautions

- Avoid tilting the wrench.
- Do not use extensions.
- If this is unavoidable due to the reaction point, the torque must be reduced.
- An extra support must be used to minimize tilting and friction. When in doubt, contact manufacture.
- Don't let the reaction arm contact the flange "works" but it isn't a square surface and can slip off as well as leaves little marks in the flange

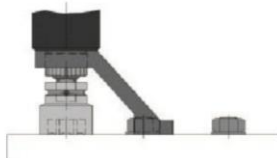
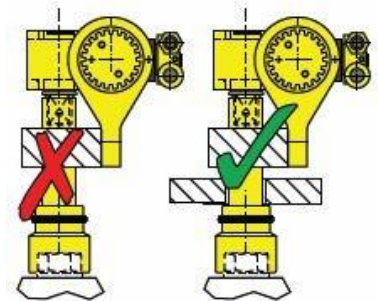


Fig: 1

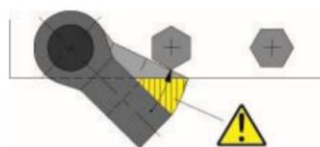


Fig: 2



Example of a Hands-Free Backing Tool

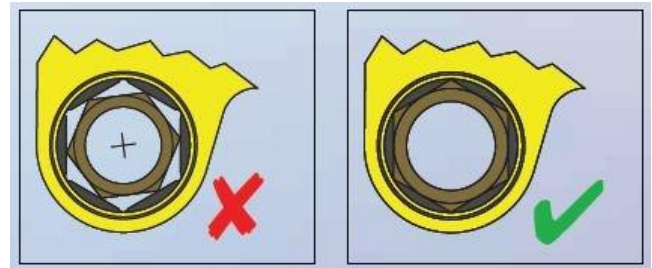


Examples of various High Torque Wrenches

Note: to avoid personal injury during system operation, workers are to review any cautions, warnings, and/or instructions included with or attached to the piece of equipment

Examples included below include position or pinch point warning:

WARNING: Use only heavy-duty impact sockets for power driven machine wrenches, according to ISO-2725 and ISO-1174; DIN 3129 and DIN 3121, or ASME-B107.2/1995. Do not use worn or damaged sockets drives. They must fit precisely on the nut or bolt being tightened. Do not use metric size sockets or Allen-Key drives on imperial nuts or bolts or the reverse. Always secure the socket to the square drive to prevent the socket from slipping off.



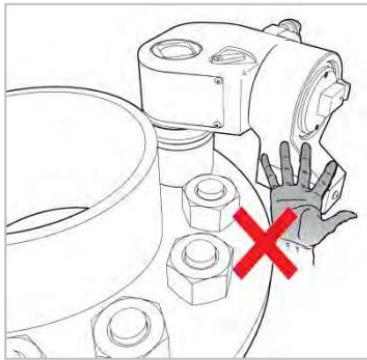


FIGURE 5 – Reaction Pinch Points



WARNING: ENSURE HANDS, LOOSE CLOTHING AND LONG HAIR ARE KEPT AWAY FROM THE WORKING AREA. BE AWARE OF PINCH POINTS THAT CAN TRAP HANDS, SEE FIGURE 5.

Hose Connection Precautions

WARNING: Before connecting any hoses, ensure all equipment in the hydraulic system have matching capacity/pressure ratings. Do not exceed 10,000 psi with these tools.

IMPORTANT: To ensure the tool works accurately, only use gauges that have been calibrated.

DO Transport and store hoses and units in with in operational ranges, if extreme temperatures are expected (-25 C or colder and +30 C or warmer) ensure with OEM operation limits and if alternative hydraulic fluids are required.

DO allow units to acclimatize to ambient temperatures and allow hoses to adjust prior to placing under full operating pressures.

DON'T reverse connectors.

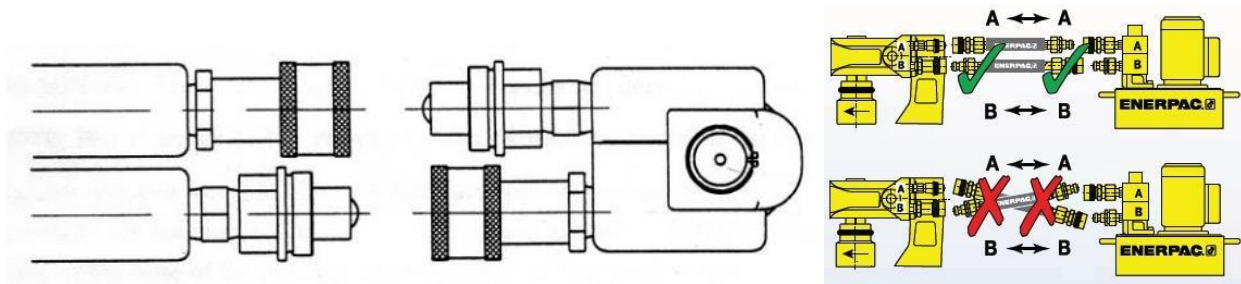
DON'T tamper with the set screw in the swivel assembly. It is factory pre-set for safety purposes and adjustments should only be made by trained personnel.

Connect the hydraulic hose assembly to the swivel as shown below:



Ensure the connectors are fully engaged and screwed snugly together.

In various models make sure all couplers and hoses are fully connected and that oil can flow freely from (male to female connections). Incorrectly mounted couplers can still be closed, with the result that oil on the wrenches retract side, which can be pressurized by the pumps' advance side. The safety relief valve on the wrenches retract side will open and prevent over pressurization



Bleeding Air from The System

During first-time operation, the hydraulic hoses and wrench can be full of air. Air must be removed from the system for safe and proper operation. **Remove the air by following the OEM instructions:**

1. Air removal by connecting the hose set to the valve on the hydraulic pump
2. Connect the couplers on the other end of the hose together completing the hydraulic circuit
3. Cycle the pump and valve several times by using the remote-control pendant. This will force any air into the reservoir and out to the atmosphere
4. Next, connect the torque wrench to the hose set. As before, cycle the pump and valve several times by using the remote-control pendant.
5. This will force any air into the reservoir and out to the atmosphere.

After any residual air has been bled from the system, connect hoses to the tool. If the hoses have not been preloaded with hydraulic oil, ensure that the hydraulic pump reservoir is not drained of hydraulic oil during start up.

Specific Operation or Maintenance

Refer to the instruction booklet supplied with torque wrench system for proper operating instructions and procedures.

IMPORTANT

- To take care not to work in-line with the nuts and bolts you are tightening
- Be careful to avoid pinch points between the reaction arm and the nuts and bolts you are tightening
- Some manufacturers have recommended specialized loosening liquids or sprays, to use for removal of rusted or frozen nuts
- Ensure connections are tight and there are no leaks as this can keep the high torque from getting to the desired pressure and can hinder the equipment from operating properly
- Ensure hydraulic fluid is changed per the manufacturer's spec as this will also cause stress on the equipment potentially keeping it from operating as intended and runs the risk of down time and the need for the equipment to be sent out for service

REFERENCES / ADDITIONAL INFORMATION

https://www.norbar.com/Portals/0/NorbarProducts/operators_handbook/34416EN.pdf

<https://www.hi-force.com/Admin/Content/TWP-Operating-Manual542016232154.pdf>

<http://torsionx.com/wp-content/uploads/2018/04/Hexpro-Manual-2015-v.2.pdf>

<https://library.hytorc.com/posts/534>

REGULATIONS

Alberta OHS Code

- Part 25 Tools, Equipment and Machinery

British Columbia OHS Regulation

- Part 4 General Conditions
- Part 12 Tools, Machinery and Equipment

Saskatchewan OHS Regulation

- Part 10 – Machine Safety

Manitoba Workplace Safety and Health Act and Regulation

- PART 16 Machines, Tools and Robots

Developed by: 1. Allen Monk 2. Frank Jenson Jr. Date: June 18, 2021
3. Dustin Jackson 4. Brian McConnell
5. Mitch McColm 6. Vern Hardie
7. Ryan Obleman 8. Jim Mast

Approved by: 1. HSE Committee Date: June 29, 2021
