MAXDRV®

Operation and Maintenance Manual

TorsionX®
EXTREME BOLTING FORCE

http://www.TorsionX.com

Use the MaxDrv Series Square Drive Torque Wrench Model .7, 1, 3, 5 and 10 to install and remove threaded fasteners requiring precise high torque during bolt makeup and maximum torque during bolt breakout.

Read and understand this Operation and Maintenance Manual before using TorsionX MaxDrv Series Square Drive Torque Wrenches. Use only genuine TorsionX replacement parts. Other parts may result in safety hazards, decreased tool performance, increased maintenance and an invalidated warranty.

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Important Safety Instructions

UPON RECEIPT OF THIS TOOL, INSPECT THE PACKAGE FOR DAMAGE.

Carefully inspect all components for damage incurred during shipping. If any shipping damage is found, notify the carrier at once. Shipping damage is NOT covered by warranty. The carrier is responsible for all repair or replacement costs resulting from damage in shipment.

The hydraulic torque wrench is a power tool. Read all instructions, warnings and precautions before every operation. Comply with the safety precautions to avoid personal injury or equipment damage while operating this tool.

Neither TorsionX, nor its distributors are responsible for damage caused by unsafe and/or faulty operations. If a problem arises during use, shut off the power immediately and consult your IBT distributor.

ALL OF OUR PRODUCTS MAY HAVE UPGRADES AND MODIFICATIONS WITHOUT NOTICE.

Warnings and Cautions: Safety First!

▲ WARNING
Never use a hydraulic torque wrench without a hydraulic gauge to indicate the working pressure.

▲ **WARNING**
To avoid personal injuries and/or equipment damage, be sure that all hydraulic components are rated for 10,000PSI (700bar) operating pressure.

▲ Warning
DO NOT exceed the allowable maximum torque of the hydraulic torque wrench.

▲ WARNING
Immediately replace any worn or damaged parts with genuine TorsionX replacement parts.

▲ WARNING
To avoid personal injuries, equipment damage and/or warranty invalidation:
DO NOT remove the shroud from the hydraulic torque wrench.
DO NOT modify any component of the hydraulic torque wrench.
DO NOT adjust the hydraulic torque wrench safety relief valve located inside the swivel couplings.

▲ **WARNING**
Only use a high quality socket. The socket must measure up to standard ISO-2725 and ISO-1174 or DIN3129 and DIN3121 or ASME-B107.2/1995. Never use a chrome plated socket.

▲ WARNING
Always use a pin to lock the socket with the square drive in order to avoid the socket from falling off or damaging the square drive.

▲ **CAUTION**
Keep all hydraulic torque wrench components away from excessive heat, flame, moving machine parts, sharp edges and chemicals.

▲ **CAUTION**
Avoid sharp bends and kinks when routing the hydraulic hose assembly. A bent or kinked hydraulic hose assembly will cause severe back-pressure. They will also damage the internal lining of the hose leading to premature failure. Replace a kinked or damaged hydraulic hose assembly immediately.

▲ **CAUTION**

DO NOT 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. Replace all crushed hydraulic hose assemblies immediately.

▲ **CAUTION**

Do not expose the hydraulic hose assembly to high temperatures.

▲ CAUTION

DO NOT use old or damaged sockets.
DO NOT use the wrong size sockets.

Other Safety Notes

- Loose or dirty couplers will cause tool not to operate properly.
- To avoid personal injuries and/or equipment damage, be sure that all hydraulic components are rated for 10,000PSI (700bar) operating pressure.
- Always inspect the hydraulic hose assembly for damage and wear before using it.
- 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.

Personal Protective Equipment (PPE)

When operating hydraulic equipment, use proper safety equipment and clothing. Consult with your company's safety representative for this information.

Operation

Reference the Operation and Maintenance Manual of the electric or air powered hydraulic power pack before beginning use.

Preparation

Prior to use determine:

- Nut or bolt head size
- Material and strength grade
- Determine the desired torque

Appendix I, presented for reference only, gives typical torque values specified for the most commonly encountered fasteners. You should always abide by established procedures for the job site. Torque sequence may vary from manufacturer to manufacturer and even on job sites depending on the gasket material etc.

Torque value

Determine the corresponding pressure of the hydraulic power pack to achieve the required torque value.

You can find this information in the Pressure -Torque Conversion Chart provided with the MaxDrv hydraulic torque wrench. You may also find this chart on the web @ http://www.TorsionX.com/

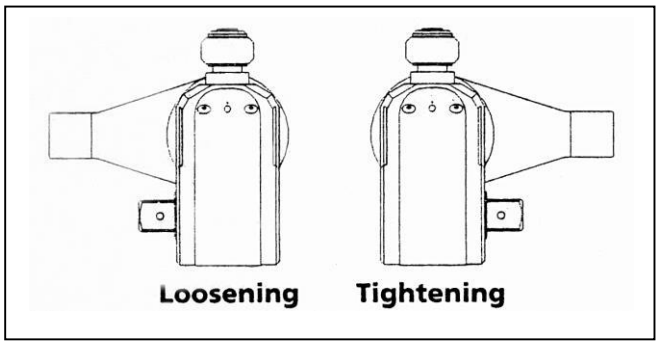
Hydraulic Torque Wrench Set Up

1. Inspect the components of the hydraulic torque wrench set. If everything appears clean and clear of damage, begin assembling the components.
2. Connect the MaxDrv Series Square Drive Torque wrench, hydraulic hose assembly and the hydraulic power pack to a hydraulic circuit.
3. Ensure all hydraulic connections are securely connected.
4. Verify that the hydraulic hose assembly is not kinked, crushed or damaged.

Setting the Square Drive for Rotation:

The position of the square drive when looking at the shroud will determine if the hydraulic torque wrench is set to loosen or tighten.

- ▲ When the square drive extends to the LEFT when looking at the shroud, the hydraulic torque wrench is set to loosen.
- ▲ When the square drive extends to the RIGHT, the hydraulic torque wrench is set to tighten.



LEFT IS LOOSE. RIGHT IS TIGHT.

Removing the square drive:

Disengage the drive retainer assembly by depressing the center round button and gently pulling on the square end of the square drive. The square drive will slide out.

Inserting the drive:

Figure 1

1. Place the drive in the desired direction and engage the drive and bushing splines.

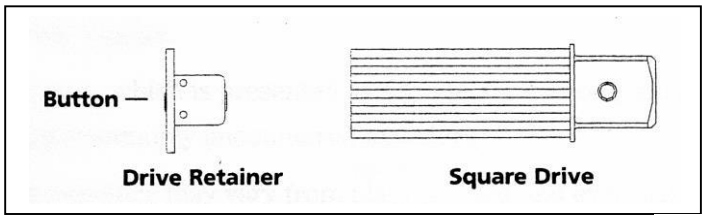


Figure 2

2. Twist the drive and bushing until the ratchet spline can be engaged.
3. Push the drive through the ratchet.
4. Depress drive retainer button, engage retainer with drive and release button to lock.

Connecting the hydraulic torque wrench:

Use a twin-line hydraulic hose assembly with a 10,000 PSI operating pressure to connect the wrench to the hydraulic pump.

Important

To avoid hydraulic torque wrench malfunction:

- DO NOT reverse connectors.
- DO NOT tamper with the set screw on the swivel assembly. (It is factory preset 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.

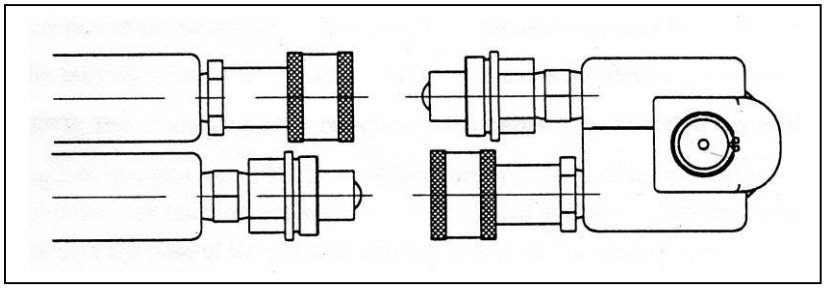


Figure 3

Coupler Placement

Tool Advance Side-Male
Retract Side-Female

Hose Advance Side-Female to Female
Retract Side-Male to Male

Pump Advance Side-Male
Retract Side-Female

Figure 4

Setting the pressure on the hydraulic power pack:

1. Loosen the locking ring below the “T” handle on the hydraulic power pack external pressure regulator.
2. Turn the “T” handle counterclockwise until it turns freely and easily.
3. Turn the hydraulic power pack on.
4. Push the advance switch (or button on the air hydraulic power pack) on the hydraulic power pack remote pendant and hold it.
5. Keep the hydraulic power pack in advance mode and slowly turn the “T” handle clockwise.
6. Observe the hydraulic power pack pressure gauge rise.

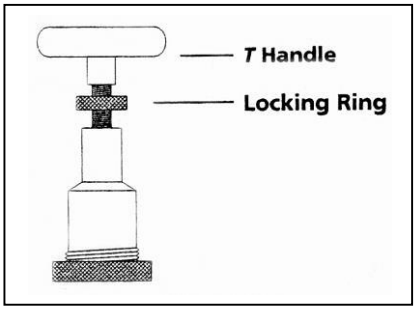


Figure 5

Note: Always adjust the regulator pressure UP - never down.

7. When the gauge reaches the correct predetermined pressure, stop turning the “T” handle.
8. Let the gauge settle.
9. If gauge pressure rises above the predetermined pressure turn the “T” handle counterclockwise to release the back pressure then depress the advance switch on the remote to bring the gauge to the predetermined pressure.
10. When the pressure is correct, turn the pump off and tighten the locking ring under the “T” handle.
11. This sets the pump pressure, controlling the torque wrench output.
12. Cycle the hydraulic power pack to ensure the pressure setting did not change as you tightened the locking ring.

Operating MaxDrv Series Square Drive Torque Wrenches

Before every operation, always read and follow the Operation Instructions.

Applying the Hydraulic Torque Wrench

1. Place the socket on the nut.
2. Ensure it is the correct size and fully engaged.

3. Remove socket from nut.
4. Attach the socket to the square drive and place it on the nut.
5. Cycle the hydraulic torque wrench.
6. Position the reaction surface against an adjacent nut, flange or solid system component.
7. Make certain that there is clearance for the hydraulic hose assembly, swivels and couplings.
8. **Do not** allow the tool to react against the hydraulic hose assembly, swivels or couplings.
9. Depress the remote control advance button to turn the square drive.
10. Check to make sure all body parts are safely out of harm's way before applying pressure to the hydraulic wrench.
    a. **This tool has massive power and can cause physical harm.**
11. The nut will begin to turn when you apply hydraulic pressure to the hydraulic torque wrench and the reaction surface moves against the reaction point.
12. Once the piston reaches the end of its stroke, release the remote button and the tool will automatically retract the piston.
13. The operator will hear an audible "click".
    a. Each "advance and retract" is considered on cycle.
14. Continue cycling the hydraulic torque wrench until it "stalls" and the preset PSI/Torque has been attained.
15. Cycle the tool one last time to ensure total torque.

Important:

The reading of full preset pressure after the cylinder is extended **DOES NOT INDICATE** this pressure (torque) is applied to the bolt/nut. It only indicates that the cylinder is fully extended and cannot turn the socket further until the tool automatically resets itself.

- Releasing the remote control button automatically retracts the cylinder.
- The hydraulic torque wrench will automatically reset itself.
- You will hear an audible "click" indicating that you can again push the remote control button and the socket will turn.
- Each time the cylinder is extended and retracted, it is called a cycle.
- Successive cycles are made until the tool "stalls" at the preset Torque/PSI with an accuracy of +/-3%. Repeatability is +/-1%.
- Cycle the tool one last time to achieve total torque.

“Locked-On”

Should the hydraulic torque wrench be “locked-on” after the final cycle:

1. Push the remote control advance button to build pressure.
2. Maintain this pressure and push the release lever located on the side of the tool.

Figure 6

3. Release the remote control advance button, while continuing to push down on the release lever.
4. Remove the hydraulic torque wrench.

The Loosening Process:

1. Set the hydraulic power pack to 10,000 PSI.
2. Reposition the tool so the reaction surface abuts squarely on a solid reaction point.
3. Press and hold hydraulic power pack’s remote control advance button.
4. Pressure will decrease as the nut begins to turn.
5. When the cylinder is fully extended, you will hear an audible “click”.
6. Release the remote control advance button and the hydraulic torque wrench’s cylinder will automatically retract.
7. Listen again for the audible “click”.
8. Repeat this process until you can remove the fastener by hand.

NOTE: If the nut/bolt does not loosen with the above procedures, the job will require a larger hydraulic torque wrench to loosen the nut/bolt.

After the operation

1. Upon completing the project; turn off the power to the hydraulic power pack.
2. First disconnect the coupler connections between the hydraulic torque wrench and hydraulic hose assembly.
3. Then disconnect the hose assembly from the hydraulic power pack.
4. Loosen the locking ring below the “T” handle on the hydraulic power pack external pressure regulator.
5. Turn the “T” handle counterclockwise until it turns freely and easily.
6. When not in use, store tools and accessories properly to avoid damage.

Maintenance

Lubrication:

- Periodically coat all moving parts with a good quality lubricant.
- Under harsh environmental conditions perform cleaning and lubricating more frequently.

Hydraulic Hose Assembly:

- Inspect the hydraulic hose assembly for cracks, burns, kinks, crush spots and leaks after each job.
- Flush hydraulic fittings periodically as they can become plugged with dirt.
- Replace the hydraulic hose assembly immediately if you find any damage.

Connectors:

- Keep hydraulic coupler fittings clean and do not allow them to drag on the floor or ground.
- Even small particles of dirt can cause the internal valves to malfunction.

Cylinder Seals:

- If the cylinder requires disassembly, replace cylinder seals at the same time.
- Seal kits are readily available.
    - Unless you have a qualified technician on staff, you should consider shipping the tool to a certified repair technician.

Structural Members:

- Inspect all structural parts on the tool periodically for cracks, chips or deformities.
- If present replace the part immediately.

Calibration:

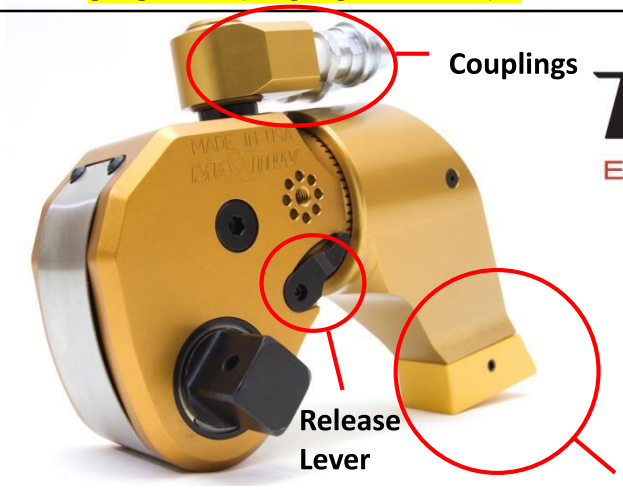
- Calibrate all hydraulic torque wrenches and gauges annually.

MaxDrv Series Square Drive
Torque Wrench Cheat Sheet

1. Connect hose assembly to wrench and pump.
   a. Make sure couplings are tight.
2. Connect power to pump.
3. Adjust pressure to desired torque:
   a. Hold the advance button on the remote control
   b. Adjust the regulator on the pump to the desired pressure.
   c. Do this with the tool **off** the nut.
4. Adjust the reaction arm while pump is turned **OFF.**
5. Ensure a clean reaction point.
   a. Ensure reaction point is free of all obstructions.
   b. Ensure hands are clear of tool.
6. Advance wrench with the remote control.
   a. Release the remote advance button at end of stroke.
   b. Allow the cylinder to reset.
   c. Repeat until nut no longer turns.
7. Turn off pump with remote control.
8. Move to next bolt.
9. Repeat step number 5.

Notes

- If the tool quits ratcheting, check hydraulic couplings. Even a slightly loose connection will cause the hydraulic system to fail.
- If the tool is locked on the nut, press the advance button on the remote control. Hold the advance button down and push back on the release lever. Release the advance button on the remote and the tool will free up.
- If you are using an extension cord to power the hydraulic pump, use a heavy gauge cord (10 gauge or better).



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Trouble Shooting Chart

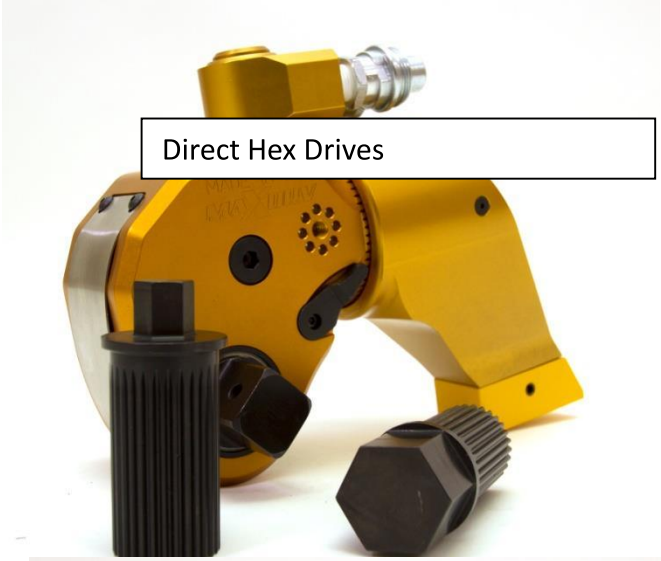
SYSTEM	PROBABLE CAUSE	REMEDY
Cylinder will not advance	Coupler loose or damaged Direction-control valve on pump Coupler not mated securely	Tighten/Replace Disassemble and clean/replace Tighten
Cylinder will not retract	See above	See above
Cylinder will not build up pressure	Piston seal leak Coupling is not mated properly or is defective Gauge	Replace seals Replace coupling Replace gauge
Cylinder leaks	Leaking seals	Replace housing seals
Cylinder operates backwards	Couplers are reversed on hoses, pump, or tool	Reverse couplers
Ratchet returns on retract stroke	Broken reaction pawl Defective reaction pawl spring	Replace Replace
Ratchet will not make successive strokes	Defective drive pawl spring Defective drive pawl Cylinder is not retracting completely	Replace Replace Remove and cycle tool freely and return to job
Tool cannot be removed from nut	Reaction pawl is engaged	Begin forward cylinder stroke. While applying pressure, push down on release lever (on side of tool). While holding release, allow the cylinder to retract. Remove tool
No pressure reading on gauge	Gauge not tight Pump coupling broken Gauge defective Defective cylinder seals	Tighten coupler Replace Replace Inspect and replace all cylinder seals

Pump will not build pressure	Defective relief valve Air supply too low or air hose size too small Electric power source is too low Gauge Filter is clogged	Inspect and replace Check for 100 PSI air pressure, 1” ID air hose Insure suitable electric power source – 25amps – 12 gauge or larger extension cord Replace Inspect and clean, or replace
Pressure reading erratic	Defective gauge Differential control valve bad	Replace Replace

Accessories

Hydraulic Wrench Tool Handle Part # 9001TH

#MD – 2EXT Extended Reaction Arm



Direct Hex Drives

#MD – SLV Sleeve Reaction Arm

#MD – ALC Alco Reaction Arm

Appendix

Recommended Torque For B7 Studs (ASTM A193)

Based Upon 50% Yield

Bolt diameter	Heavy hex nut size (A.F.)	Lubricated torque using copper, graphite or comparable lubricant with a coefficient of friction F-.100 (both nut face and threads should be well lubricated)	Dry steel on steel, no lubricant, coefficient of friction F-.400
3/4"	1-1/4"	157	559
7/8"	1-7/16"	250	893
1"	1-5/8"	373	1332
1-1/8"	1-13/16"	538	1994
1-1/4"	2"	746	2720
1-3/8"	2-3/16"	1000	3678
1-1/2"	2-3/8"	1307	4837
1-5/8"	2-9/16"	1682	6260
1-3/4"	2-3/4"	2109	7888
1-7/8"	2-15/16"	2602	9775
2"	3-1/8"	3167	11942
2-1/8"	3-5/16"	3809	14408
2-1/4"	3-1/2"	4531	17191
2-3/8"	3-11/16"	5339	20310
2-1/2"	3-7/8"	6238	23786
2-3/4"	4-1/4"	7533	28846
3"	4-5/8"	9803	37670
3-1/4"	5"	12488	48129
3-1/2"	5-3/8"	15622	60365
3-3/4"	5-3/4"	19241	74516
4"	6-1/8"	22162	86146
4-1/4"	6-1/2"	23337	90720
4-1/2"	6-7/8"	26332	102513
4-3/4"	7-1/4"	30994	120831
5"	7-5/8"	36176	141210