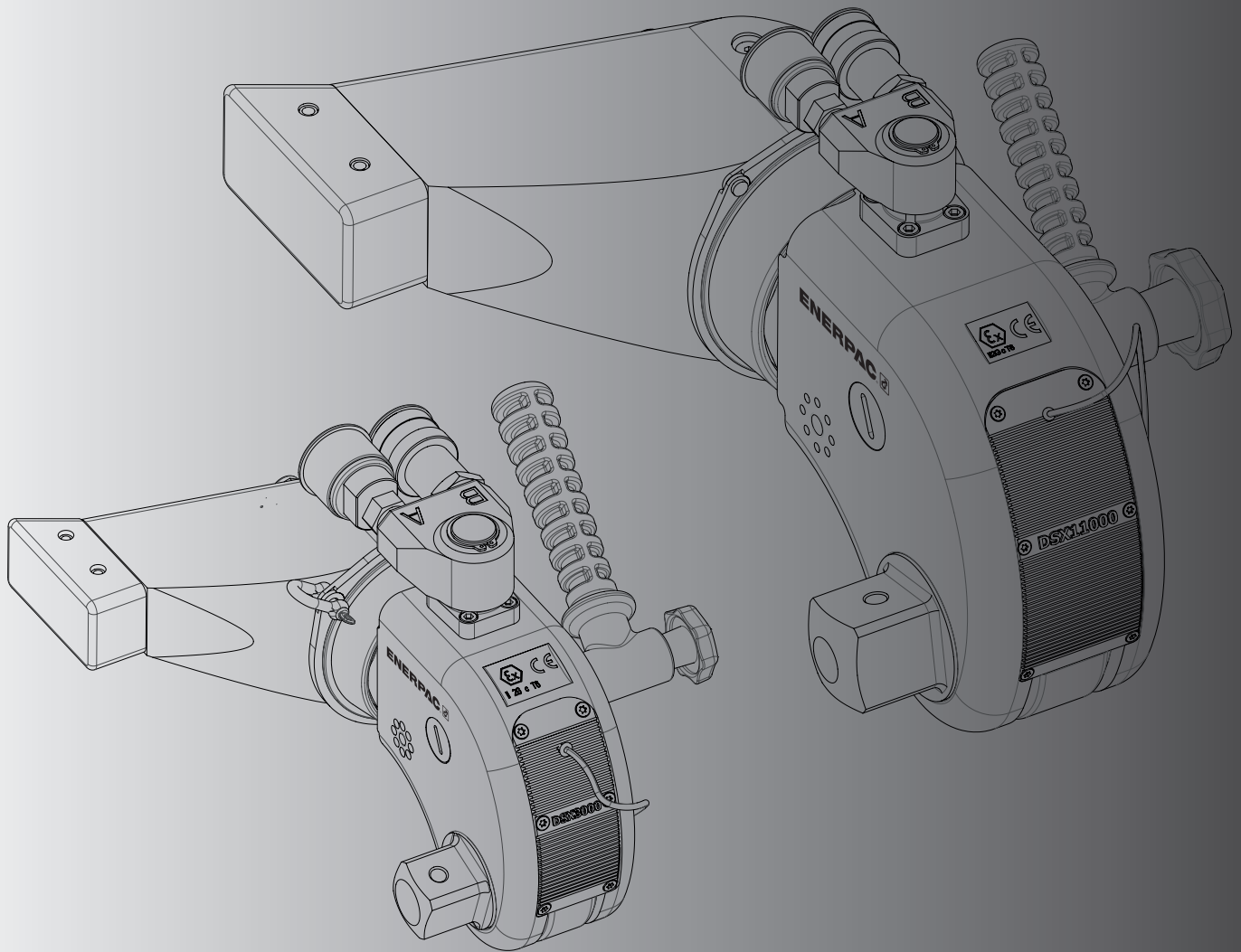


L4442
Rev. E
08/21

Dedicated Square Drive Torque Wrench

DSX1500
DSX3000
DSX5000
DSX11000
DSX25000



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1.0 INTRODUCTION

Overview

The DSX-Series hydraulic torque wrench is designed for controlled tightening and loosening of fasteners in industrial bolting applications. The DSX-Series includes a Tether Ring that allows for safe installation and prevents the torque wrench from dropping unexpectedly.

The DSX-Series can be used with a wide range of Enerpac bolting pumps. Electric, air and hand style pumps are available (sold separately).

Delivery Instructions

Upon delivery, all components must be inspected for damage incurred during shipping. If damage is found, the carrier should be notified at once. Shipping damage is not covered by the Enerpac warranty.

Warranty

- Enerpac guarantees the product only for the purpose for which it is intended.
- Refer to the Enerpac Global Warranty document for terms and conditions of the product warranty.

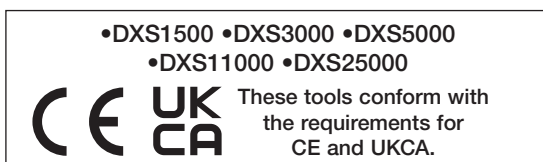
Any misuse or alteration invalidates the warranty.

- Observe all instructions as communicated in this manual.
- Modification to any part of the equipment described in this manual should not be attempted.
- When replacement parts are needed, use only genuine Enerpac replacement parts.

Replacement Parts

Refer to the Repair Parts Sheet (RPS), available at www.enerpac.com, to order replacement parts when required.

Conformance to National and International Standards



Enerpac declares that the product(s) have been tested and conforms to applicable standards and the product(s) are compatible to all EU and UK Requirements.

Copies of the EU Declaration as well as the UK Self-Declaration are enclosed with each shipment.

2.0 SAFETY

Read all instructions carefully. Follow all recommended safety precautions to avoid personal injury as well as damage to the product and / or damage to other property. Enerpac cannot be responsible for any damage or injury from unsafe use, lack of maintenance, or incorrect operation. Do not remove warning labels, tags, or decals. In the event that any questions or concerns arise, contact Enerpac or a local Enerpac distributor for clarification.

Save these instructions for future use.

If you have never been trained on high-pressure hydraulic safety, consult your distributor or service center for information about Enerpac Hydraulic Safety Courses.

This manual follows a system of safety alert symbols, signals, words, and safety messages to warn the user of specific hazards. Failure to comply with these warnings could result in death or serious personal injury, as well as damage to the equipment or other property.



The Safety Alert Symbol appears throughout this manual. It is used to alert you to potential physical injury hazards. Pay close attention to Safety Alert Symbols and obey all safety messages that follow this symbol to avoid the possibility of death or serious injury.

Safety Alert Symbols are used in conjunction with certain Signal Words that call attention to safety messages or property damage messages and designate a degree or level of hazard seriousness. The Signal Words used in this manual are DANGER, WARNING, CAUTION, and NOTICE.

DANGER Indicates a hazardous situation that, if not avoided, will result in death or serious personal injury.

WARNING Indicates a hazardous situation that, if not avoided, could result in death or serious personal injury.

CAUTION Indicates a hazardous situation that, if not avoided, could result in minor or moderate personal injury.

NOTICE Indicates information considered important, but not hazard related (e.g. messages related to property damage). Please note that the Safety Alert Symbol will not be used with the signal word.

2.1 Safety Precautions



Failure to observe and comply with the following precautions could result in death or serious personal injury. Property damage could also occur.

- Always wear protective head-wear, ear protectors, footwear and gloves (at a minimum rigger type gloves) suitable for safe operation of the tool. The protective clothing must not interfere with safe operation of the tool or restrict the ability to communicate with co-workers.
- Be sure your workplace is safe. Follow the instructions in your workplace's standard operating procedures and be sure to observe all communicated safety precautions.
- Do not place any part of the body between the wrench reaction foot and the reaction point.
- Do not place any objects between the wrench reaction foot and the reaction point. Keep the hoses away from the reaction points.
- Do not stand in the line of movement of the tool when it is in operation. If the tool separates from the nut or bolt during operation it will detach in that direction.
- Be aware that a nut or bolt that breaks off during operation of the tool may become a high velocity projectile.
- Be sure appropriate guards are securely in position and free from damage.
- Keep your hands away from the fastener being loosened or tightened. Tightening and loosening nuts and bolts involves little visible movement. However, the pressures and loads are extreme.
- Maximum allowable operating pressure for the DSX-Series torque wrench is 10,000 psi [690 bar]. Do not exceed this pressure setting.
- Always be sure that pump is stopped and all pressure is fully relieved (0 psi/bar) before disconnecting or connecting hydraulic hoses. The sudden and uncontrolled release of pressurized oil could occur if hoses are disconnected while under pressure.
- Never attempt to connect or disconnect hoses while the pump is on and/or the system is pressurized.
- Be certain that all hose couplings are fully connected at both the pump and wrench ends before applying any hydraulic pressure. If the couplings are not fully connected, oil flow will be blocked, and the wrench could be subjected to excessive hydraulic pressures. Catastrophic failure of wrench could result.
- Never apply more hydraulic pressure to any tool, hose, fitting or accessory than the maximum allowable pressure as stated in the manufacturer's specifications. The system operating pressure must not exceed the pressure rating of the lowest rated component in the system.
- Be sure the operator has completed safety induction training, specific to the work surroundings. The operator should be thoroughly familiar with the controls and the proper use of the tool.
- The operator must be of at least the minimum age required by applicable local regulations, laws and the facility standard operating procedures.
- Do not abuse or overstress the hoses in any way. Do not bend the hoses excessively.
- Take every precaution to prevent oil leaks from occurring. High pressure oil leaks can penetrate the skin, resulting in serious injury.
- Never strike the tool while it is pressurized or under load. Components under tension may become dislodged, allowing them to become dangerous projectiles. Uncontrolled release of pressurized hydraulic oil could also occur.
- Avoid striking the tool at any time, even when it is not pressurized or under load. Striking the tool could cause permanent damage to wrench components and may affect the wrench calibration.
- Use only a high quality non-flammable solvent for cleaning and degreasing parts during wrench repair procedures. To reduce the risk of fire or explosion, do not use flammable solvents.
- Be sure to wear proper eye and hand protection when using solvent. Always follow the solvent manufacturer's safety and use instructions and any additional instructions included in the standard operating procedures for your work-site. Be certain there is adequate ventilation when using solvent.

⚠ CAUTION

Failure to observe and comply with the following precautions could result in minor or moderate personal injury. Property damage could also occur.

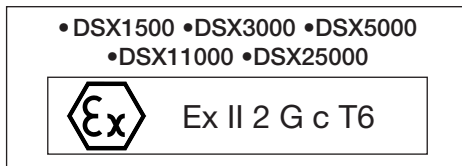
- Always carry the wrench by its housing. Never carry the wrench using the positioning handle. The handle could break and the wrench could drop suddenly. The positioning handle is designed only as an aid to help position the wrench on the bolt or nut.
- Be sure that backup wrench (on the opposite end of nut or bolt being tightened or loosened) is secured so it cannot drop or become disengaged during bolting procedures.
- Be sure that the hex socket size corresponds to the size of the fastener being loosened or tightened. Failure to observe this precaution can result in the wrench becoming unstable and can lead to catastrophic failure of the tool.
- Always position the wrench for maximum stability. Use the positioning handle to properly position tool during operation.
- Be sure reaction points are adequate for the forces at work during operation of the tool.
- Be sure the reaction point is of a suitable shape. If possible, use an adjacent nut or bolt as a reaction point.
- When the hex socket is placed on the nut or bolt a gap may exist between the reaction foot and the reaction point. When the tool is operated the reaction foot and point will make forceful contact. Be sure the wrench is stable before applying hydraulic pressure.
- Provide adequate support in vertical and inverted applications.
- The torque required to loosen a nut is variable and may exceed the torque capacity of the wrench. Never operate the wrench at above 100 percent of its rated maximum torque when loosening a nut or bolt.
- Be sure to minimize torsional and bending stresses in the wrench, the hex socket and any accessories.
- Bolt lubricants and anti-seize compounds will have a rated coefficient of friction. Be sure to know the coefficient of friction for the lubricant or anti-seize compound that is being used. To ensure proper tightening of nuts and bolts, always use this coefficient of friction when calculating required torque values.

NOTICE

- Never carry the wrench by its hoses.
- Always use Enerpac pumps and hoses.
- Always use Enerpac replacement parts.
- The maximum torque output of the wrench must always exceed the torque required to loosen or tighten the nut or bolt.
- Never operate the wrench with a hydraulic supply connection to the advance side only as this may damage the internal parts.
- In severe service conditions, be aware that the wrench must be inspected, cleaned and lubricated more frequently than normal.
- Check that the swivel post screws are tight prior to use.
- If oil leakage is present from wrench, replace seals as required before placing the wrench back into service.
- If the wrench is dropped from a significant height, have the tool inspected and checked for proper operation before placing it back into service.
- Always follow the inspection and maintenance instructions contained in this manual. Perform maintenance and inspection activities at the specified time intervals.

Use of Torque Wrenches in Explosive Atmospheres

In addition to the CE/ UKCA mark, the Enerpac DSX-Series torque wrenches carry the ATEX mark and classification:



This classification indicates that the tool is appropriate for use in a potentially explosive atmosphere.

The testing standards applicable to the DSX-Series torque wrenches are the standard EN 13463-1:2009, Non-electrical equipment for use in potentially explosive atmospheres. Part 1: Basic method and requirements, and also the draft standard of ISO/IEC 80079-36.

Contact Enerpac if there are any questions regarding the ATEX classification or questions regarding application of the DSX-Series torque wrenches in hazardous environments.

Reducing the Risk of Explosion



Failure to observe and comply with the following precautions and instructions could result in explosion and/or fire. Death and/or serious personal injury could occur.

- To help reduce the risk of explosion, be certain to use the DSX-Series torque wrench only in the specific explosive atmospheres for which it has been tested and certified. Refer to the beginning of this section for ATEX classification information.
- The DSX-Series torque wrench is generally not considered as a potential source of ignition. However, proper operation and maintenance of the tool is essential in order to help ensure that no sparks are generated that could cause an ignition of an explosive gas or dust mixture (which might be present in the environment). Complete operation and maintenance instructions must be provided to all personnel in advance of operating or servicing the wrench.
- Hot surfaces can be a major source of ignition. To help prevent the possibility of ignition resulting from excessive surface temperatures, do not use the wrench in an environment with an ambient temperature of above 104°F [40°C].
- Enerpac has designed and constructed the DSX-Series torque wrench to minimize the possibility of an incendiary spark that may be caused by the impact of aluminium components with corroded steel. However, to reduce the chance of an incendiary spark, use of the wrench with corroded steel structures or components should be avoided whenever possible. Be especially careful to avoid accidental impacts with the wrench and corroded steel.

NOTICE To help prevent a mechanical spark hazard, no components containing a magnesium content greater than 7.5 percent have been used in the DSX-Series torque wrench (in accordance with standard EN 13463-1).

- Take extreme care to prevent the DSX-Series torque wrench from being dropped on the floor or onto any other metallic surface that might cause mechanical sparks at impact. Also, take every precaution to prevent other tools (or other metallic objects) from dropping onto the DSX-Series torque wrench.

Electrostatic Discharge

- Electrostatic discharge is a potential source of ignition and can result in electrostatic build-up on isolated conductive parts. Isolated conductive parts create capacitive poles which can become charged. Electrostatic discharge risk is minimized by the hydraulic hoses, which have multiple layers of steel braiding, resulting in electrical continuity between the torque wrench and the grounded hydraulic pump.
- Non-conductive polyester labels could be a site for electrostatic build-up. However, electrostatic build-up is prevented by the close proximity of the grounded torque wrench body.

3.0 FEATURES AND COMPONENTS

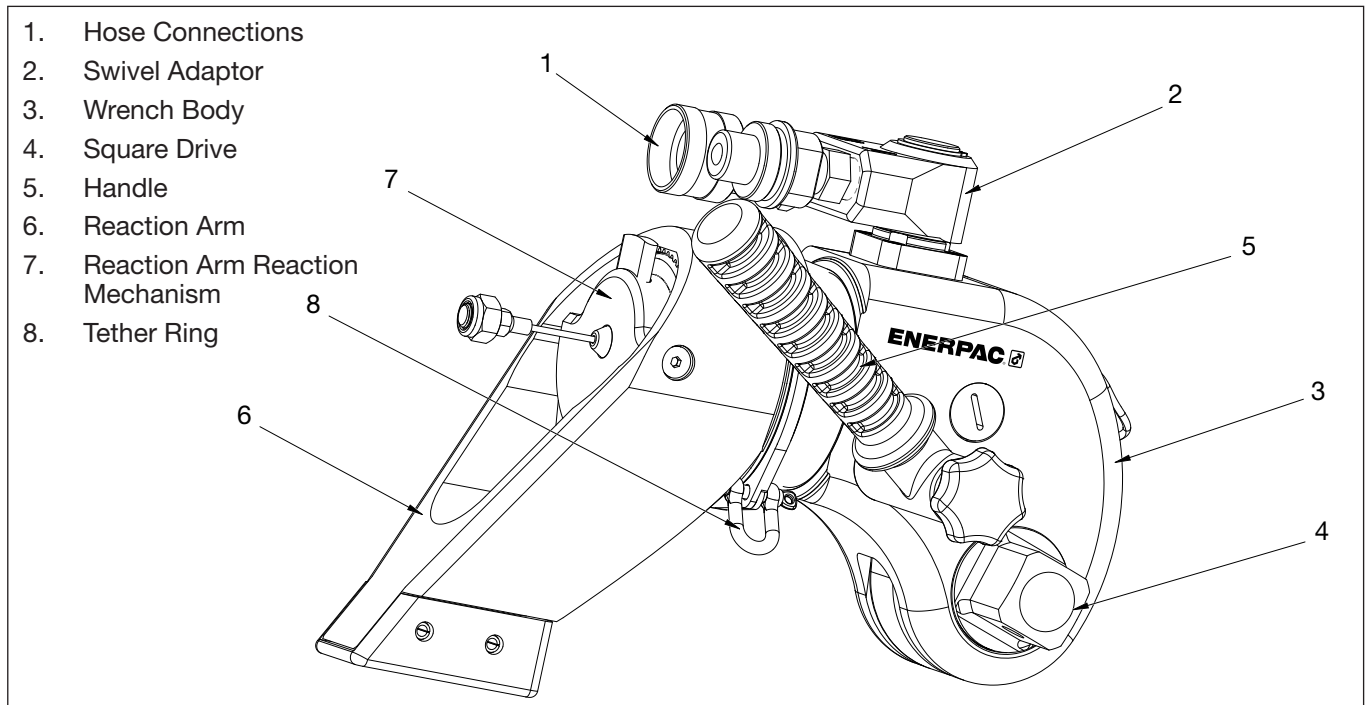


Figure 1: Major features and components of DSX Torque Wrench

4.0 CONNECTING THE TOOL

4.1 Attaching/ Removing Square drive

WARNING Be sure that hydraulic pump is OFF and that hydraulic system is depressurized (0 psi/bar) before removing or attaching the square drive.

To remove the square drive, disengage the drive retainer assembly by depressing the round center button and gently pulling on the square end of the square drive. The square drive will easily slide out.

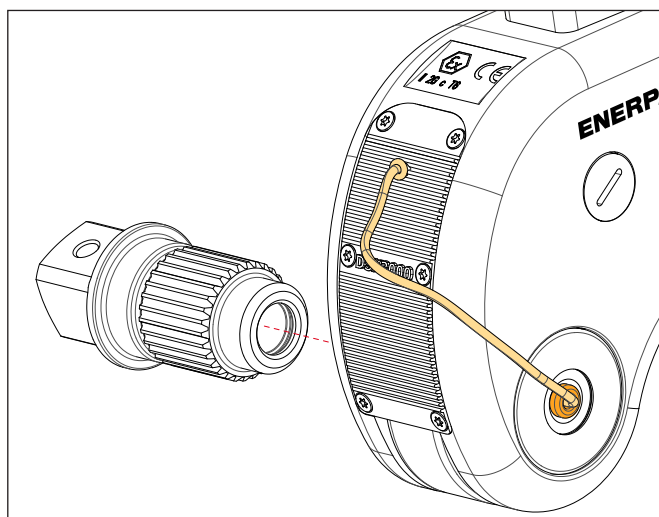


Figure 2: Remove drive retainer

Note: The tether will keep the drive retainer attached to the wrench body when removing and reposition the square drive.

To insert the drive in the tool, place the drive in the desired direction and engage drive; then twist the drive and bushing until ratchet spline can be engaged. Push drive through ratchet. Depress drive retainer button, engage retainer with drive and release button to lock.

WARNING Be sure that the square drive fits tightly into the ratchet.

4.2 Selecting Drive Direction

The following diagram illustrates the direction the square drive should face for loosening and tightening of a standard right hand fastener:

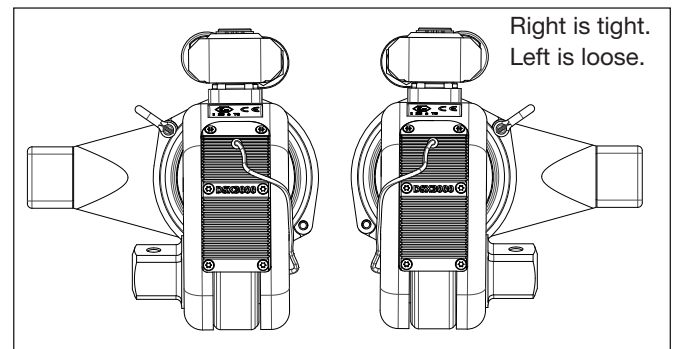


Figure 3: Drive Directions for Loosening/ Tightening

- For tightening bolts, install the square drive in the location shown in Figure 3.
- For loosening bolts, install the square drive on the opposite side of the wrench.

4.3 Adjusting Reaction Arm

The reaction arms are employed to absorb and counteract forces created as the unit operates, which should extend in the same direction of the square drive; however, slight adjustments may be made to suit your particular application.

In operation, the reaction arm must be fully engaged and secured. To engage the reaction arm, depress the spring loaded button located on the rear of the end cap, push to position and release to lock. Ensure the retainer is locked in place prior to using the wrench.

To remove the reaction arm, depress the spring loaded button located on the rear of the end cap and pull to release.

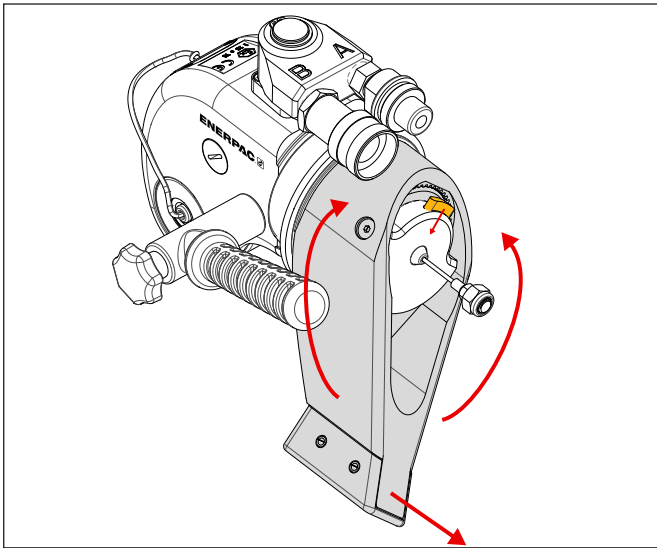


Figure 4: Positioning Reaction Arm

4.4 Attaching Handle

Secure the positioning handle with thumb screw or eyebolt. Handle can be installed on either side of wrench (as needed).

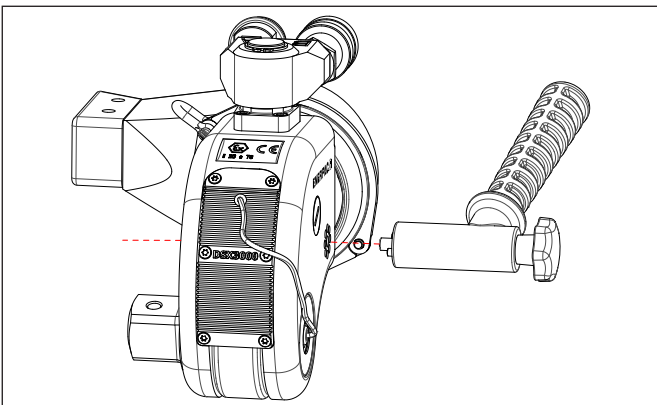


Figure 5: Attaching Handle

4.5 Hose Connection

WARNING Be sure all hoses and fittings are rated for at least 10,000 psi [690 bar] operation. Check that all hydraulic couplings are securely connected before operating the tool. Failure to observe these precautions may result in the hoses bursting or disconnecting under pressure. High pressure oil leakage may also occur. Serious personal injury could result.

The torque wrench and hydraulic pump are connected by a 10,000 psi (700 Bar) twin-line hose assembly. On each twin hydraulic hose, one hose must be MALE-MALE and the other hose must be FEMALE-FEMALE in order to ensure a correct interconnection between the pump and wrench. Ensure the connectors are fully engaged and screwed snugly together.

CAUTION NEVER use two twin hydraulic hoses between the pump and wrench. If so, you have the high pressure on the retract side and your wrench is not able to work properly. To avoid tool malfunction, do not reverse connectors. Do not try to loosen the swivel assembly at any moment.

Connect hoses to wrench as described in the following steps:

- Be sure that all pressure in system is relieved and that pressure gauge indicates zero psi/bar.
- Remove the hose dust caps.
- Connect the hose with the female coupling to the wrench advance coupling.
- Connect the hose with the male coupling to the wrench retract coupling.
- At each connection, pull the collar on the female coupling over the male coupling. Engage threads and hand tighten the collar.
- Connect the hoses to the pump. Refer to the pump instruction manual:

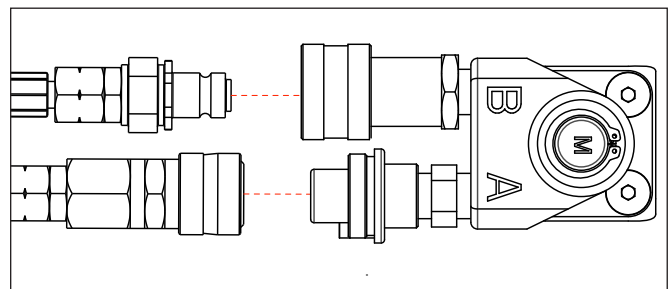


Figure 6: Drive direction change

5.0 SETTING THE TORQUE

1. Connect the tool to the power supply and turn the pump on.
2. Adjust the pressure on the pump as necessary to set the torque. Refer to pump manufacturer's instruction manual.
3. When the desired pressure is reached, cycle the tool again to confirm that the desired pressure setting has been obtained.



Figure 7: Using the Pump

6.0 OPERATING THE WRENCH

6.1 Before Operation

- Be sure the nut or bolt to be fastened is clean and free of loose dust or dirt.
- Be sure the nut threads properly engage with the threads of the bolt, and that cross-threading has not occurred.
- Be sure that the threads and the bearing surface are liberally coated with the correct bolt lubricant or anti-seize compound.
- Make all torque calculations based on the bolt lubricant's (or anti-seize compound's) stated coefficient of friction. Failure to do so may result in the required bolt load not being achieved.
- Be sure that the backup wrench (used to keep the nut or bolt on the opposite end in place) is correctly positioned and secured.

WARNING Be certain that backup wrench is of the correct size and that there is an adequate abutment surface. Personal injury could occur if backup wrench loosens or dislodges during bolting procedures.

6.2 Tightening process

1. Having set your target pressure, cycle the wrench three or four times to target pressure before putting it on the application. Cycling the tool ensures the system is operating properly and removes trapped air, if any.
2. Place the correct size impact socket on the square drive and secure properly with a ring and pin.
3. Place the tool and the socket on the nut, making sure that the socket has fully engaged the nut. Further ensure that the drive retainer is engaged.
4. Make sure the reaction arm is firmly abutted against a stationary object (e.g. an adjacent nut, flange, equipment housing etc.). When positioning the wrench, make sure that the hose connections are well clear of any obstructions, and that all body parts are safely out of harms way.

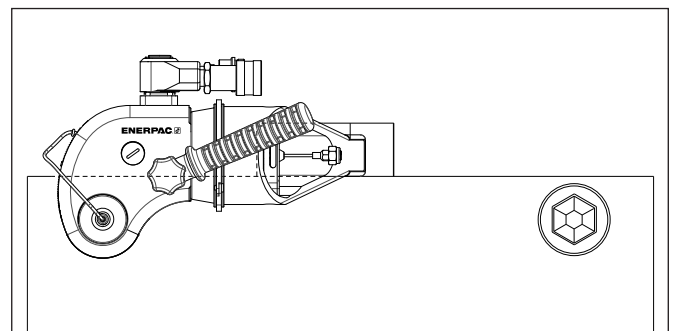


Figure 8: Position tool with a suitable reaction point

5. Apply momentary pressure to the system to ensure proper tool placement. If it doesn't look or act right, stop and readjust the reaction arm.

6.3 In use

1. Start the pump, the rear of the tool will be pushed back until the reaction arm makes contact with its reaction point.
2. Continue as the socket turns until the tool is fully extended and will not turn the socket further; stop the pump. Successive cycles are made until the wrench stalls at the preset torque.
3. Operate the pump until the nut has been tightened.
4. While the pump is in operation there will be a rapid build up of pressure to the point of where the gauge reads what was preset prior to applying the wrench.

NOTICE The reading of full preset pressure after the cylinder is extended does not indicate that this pressure (torque) is applied to the bolt. It only indicates that the cylinder is fully extended and cannot turn the socket further until the wrench automatically resets itself.

5. Always attempt one final cycle to ensure the stall point has been reached.

6.4 Nut and Bolt Loosening Information

- Be aware that more torque is usually required to loosen a fastener than to tighten it.
- Rusted fasteners (humidity corrosion) may require up to twice the torque required for tightening.
- Fasteners that are corroded due to contact with sea water or chemicals will require up to two and a half times the torque required for tightening.
- Heat corrosion requires up to three times the torque required for tightening.

⚠ WARNING Do not apply more than 100 percent of the wrench's maximum torque when loosening nuts or bolts. Avoid making sudden start-stop movements ("shock loading"). Failure to observe these precautions may cause a catastrophic failure of the wrench to occur, and wrench components under high tension could become dangerous projectiles. Serious personal injury could result.

6.5 Loosening Procedure

- Apply penetrating oil to the threads. Allow the oil to soak.
- Set the pump to 10,000 psi (Loosening torque equals about 100% of tightening torque).
- Change the drive and the reaction arm to the loosening mode, ensuring the reaction arm abuts squarely off a solid reaction point.
- Start the pump.
- Operate the pump until the nut has been loosened.

NOTICE If the bolt / nut does not loosen with the above procedure, it is an indication that you require the next larger size DSX to loosen the bolt

7.0 MAINTENANCE

Lubrication frequency depends on factors known only to the user. The amount of contaminants in the working area is one factor. Wrenches used in a clean room environment will obviously require less maintenance than wrenches used outdoors and dropped in loose dirt or sand.

1. When lubrication is required, lubricate all moving parts.
2. Springs are used for the drive pawl assembly. These springs can be replaced if necessary.
3. If the cylinder requires disassembly, it is recommended that the cylinder seals be replaced at the same time. Seal kits are readily available.
4. Hoses should be checked for cracks and leaks before, and after each job. Hydraulic fittings can become plugged with dirt and should be flushed periodically.
5. Fittings should be kept clean and not allowed to be dragged along the ground or floor as even small particles of dirt can cause the internal valves to malfunction.

All structural parts on the tools should be inspected at least once a year to determine if there are any cracks, chips, or deformities.

Preventative maintenance can be performed by the user.

Full maintenance must be performed only by an Enerpac authorized service center or a qualified and experienced technician.

7.1 Preventative Maintenance (Fig.9/ Fig.10)

1. Check tightness of swivel assembly retaining screws (40) and piston sleeve (7) (see Section 7.2).
2. Pressurize the wrench to 10,000 psi [690 bar] pressure (in both advance and retract), and check for any signs of leakage.
3. Relieve pressure and disconnect hydraulic hoses.
4. Clean all exposed components with a mild solvent.
5. Remove the shroud screws (11) and remove the shroud (27). The tether (37) will continue to link the shroud to the drive release assembly. To remove the tether unscrew the round screw, slide off the washer, and remove the tether line.
6. Remove the square drive (8) and drive retaining release assembly (12, 13, 14) along with the two bushes and drive retainer (9, 26).
7. Disengage the two access plugs (21), and slide out the rod end pin (18). The drive plate (3) can now be separated from the wrench body (1).
8. Remove the ratchet (4), pawl (5) and pawl wave springs (6).
9. Clean all components with a mild solvent.
10. Inspect all parts for damage. Any damaged components must be replaced.
11. Dry all components. Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 10.

NOTICE Be sure that the ratchet, drive plate, pawl, pawl wave spring, square drive, and access plugs are correctly installed in the following step. Ensure that the square drive is inserted through the drive plate and rod end of the piston assembly before installing the access plugs. Failure to install these parts correctly will result in component damage. Refer to figures 9 and 10.

12. Connect the wrench to the pump.
13. With wrench not on nut or bolt, check operation at a nominal pressure to make sure the piston advances and retracts freely.
14. Release the pressure and make sure that the piston fully retracts.

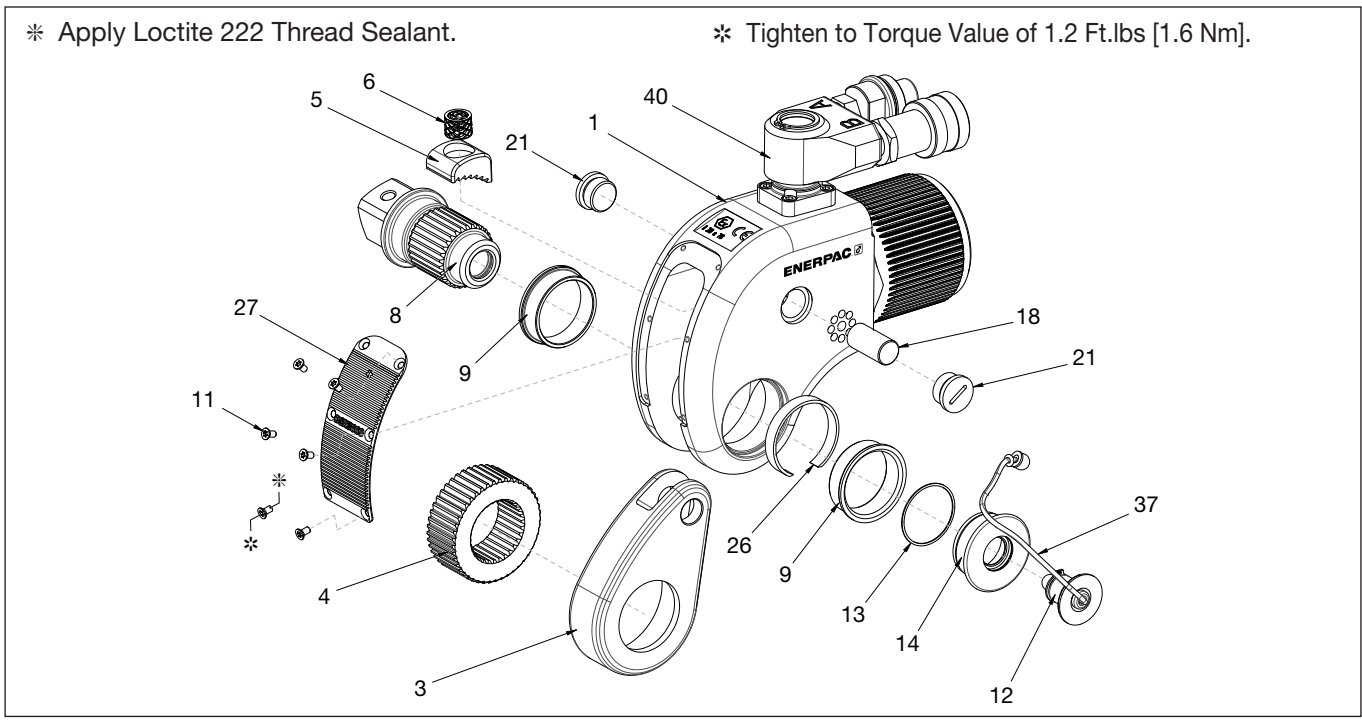


Figure 9: Exploded Torque Wrench Head

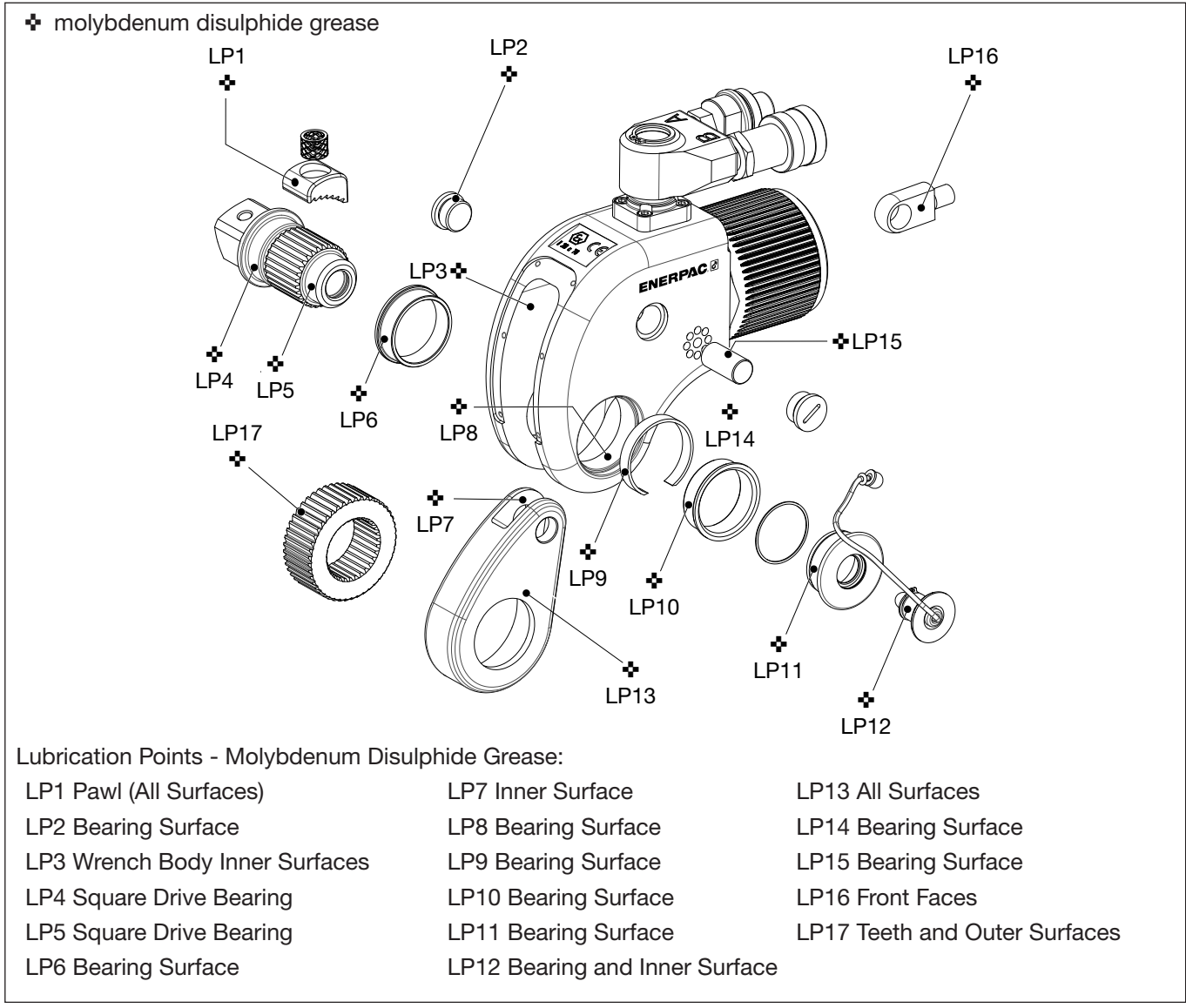


Figure 10: Torque Wrench Head Lubrication Points

7.2 Full Maintenance

7.2.1 Hydraulic Swivel Assembly (Fig.11 + Fig.12)

NOTICE Only applicable to **silver coloured** DSX tools. For **blue coloured** DSX please refer to bolting support.

Disassembly of Swivel Post and Swivel Assembly Attachment

1. Remove the circlip (A) from the top of the swivel post (E).
2. Using a pair of flat blade screwdrivers, gently pry the swivel assembly (B) from the swivel post (E).
3. Remove O-ring (D) from the swivel post (E).
4. Remove the socket head capscrews (C) and the swivel post (E).
5. Remove O-rings (F) from the swivel post hydraulic ports.
6. Place the swivel assembly in a vise with soft jaws. Remove the hydraulic couplings (B1, B2 and B3) from the swivel assembly (B).

Hydraulic Swivel and Swivel Post Reassembly and Reinstallation

Hydraulic Fittings:

NOTICE If removed, reinstall the couplings (B1 and B3) and adapter (B2) before installing the swivel (B) on the swivel post (F). Use a vise with soft jaws to hold the swivel as couplings and adapter are installed.

1. Apply Loctite 577 sealant to threads on female coupling (B3) and adapter (B2). See Fig. 12 for locations.
2. Tighten the couplings (B1 and B3) and adapter (B2) by hand, until they are each finger tight. Then, wrench tighten these parts an additional 2 to 3 turns beyond finger tight.

NOTICE To allow the sealant sufficient time to cure, wait a minimum period of 3 hours at 68 to 104°F [20 to 40°C], or 6 hours at 40 to 68°F [5 to 20°C] before pressurizing the wrench.

Swivel Post:

1. Apply a small amount of Loctite 243 thread sealant to the threaded mounting holes in the wrench housing. See Fig. 11 for locations.
2. Install two new O-rings (F) into the ports on the base of the swivel post (E).
3. Place the swivel post (E) onto the wrench (G), making sure that hydraulic ports are aligned. Be careful that O-rings (F) do not drop out or become pinched or cut.
4. • Install the degreased socket head capscrews (D) and tighten to 3.7 Ft.lbs [5.1 Nm].

Swivel Assembly:

1. Install a new O-rings (D) into the grooves on the swivel post (E).
2. Coat O-rings (D) with a small amount of silicone grease. Then, carefully slide the swivel assembly (B) onto the swivel post (E).
3. Reinstall the circlip retainer ring (A).
4. Perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 7.2.3

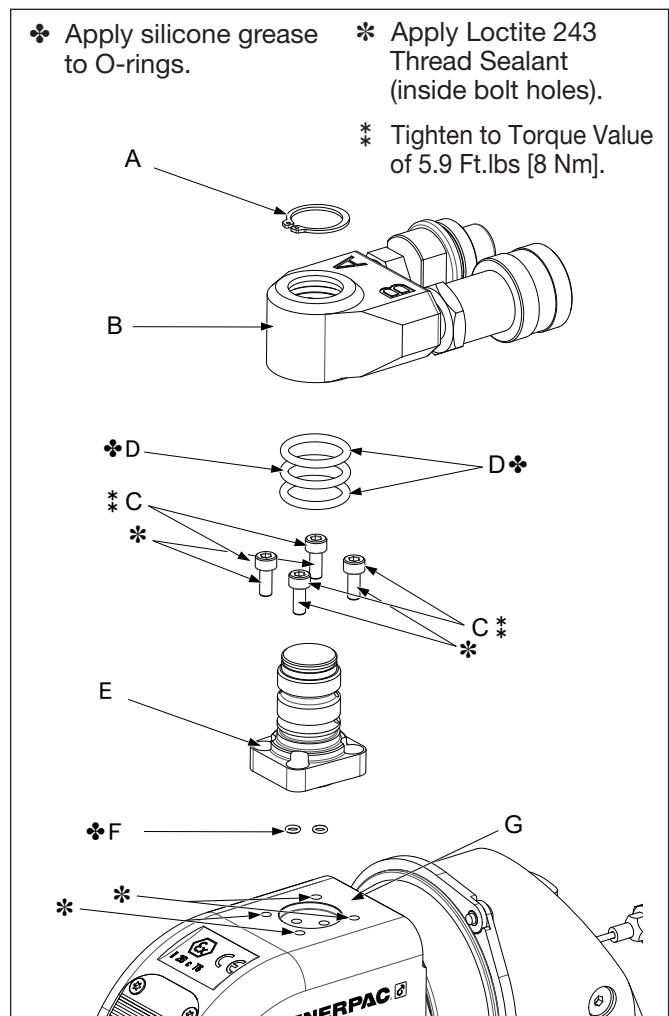


Figure 11: Removing Swivel Post and Swivel Assembly

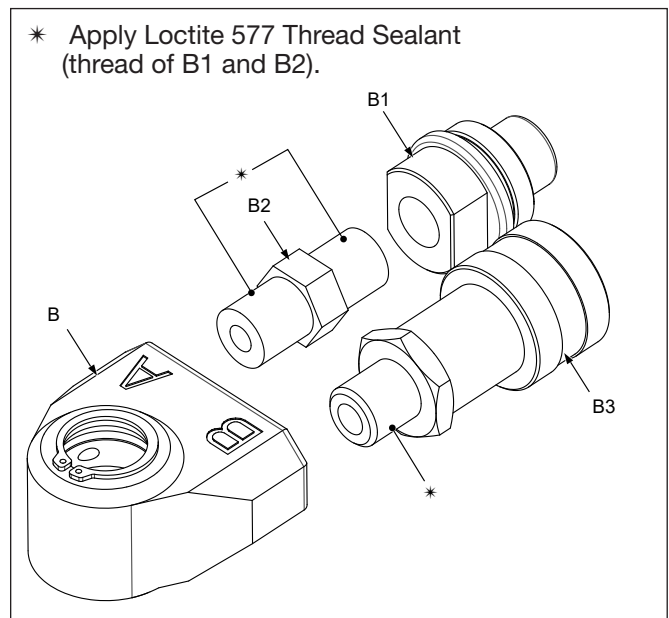


Figure 12: Removing Swivel Post and Swivel Assembly

7.2.2 Piston Assembly (Fig. 13/ Fig.14)

• Disassembly

1. To separate the reaction arm from the wrench body (1) unscrew and remove the wire assembly first by unscrewing the nut followed by the rest of the assembly (36).
2. Remove drive plate, pawl, ratchet, rod end pin, access plugs and other related parts as described in sections 7.1.
3. Firmly hold the wrench body (1). Using an appropriate pin spanner, unscrew and remove the piston sleeve (7), followed by the freed piston assembly. Remove the O-ring (32) from the piston sleeve.
4. **DSX11000/ DSX25000 only** - remove the grub screw (39) and ball bearing (38) from the wrench body for inspection and cleaning. Reassembly after Loctite 577 has been applied. Loctite must be fully cured before testing.
5. Remove seal from piston head (22) separate rod end (17) from piston rod (20) separate piston head (22) from piston (19) remove internal O-Ring from piston head.
6. Remove the rod seal (28) and piston bush (23) if they are still present in the wrench body.
7. Clean all exposed components with a mild solvent.
8. Inspect all parts for damage.

• Reassembly and Installation (Fig. 13/ Fig.14)

NOTICE Do not use excessive force when installing the piston rod (20) or piston (19) in the following steps. Excessive force may cause damage to these components and also may damage the sealing faces within the wrench.

NOTICE In the following steps, lubricate all O-rings with ISO 10 grade oil:

1. Fit piston head o-ring (31) into the piston head (22).
2. Slide Piston Rod (20) into the piston (19). Apply Threadlock to the external threads of the piston (19) and screw onto piston head (22), encapsulating the piston rod (20) within and tighten.
3. Apply threadlock to the Rod End (17) threads and install into the Piston Rod (20), holding the Piston Rod with a spanner to prevent rotation.
4. Install Piston O-ring (30) into the external groove of the piston head (22).

• Reassembly (DSX1500/ DSX3000/ DSX5000)

5. Insert Piston Bush (23) into the body, followed by the Rod Seal (28) and Piston O-ring (29).
6. Install Piston Sleeve O-ring (32) into the external groove of the Piston Sleeve (7).

• Reassembly (DSX11000/ DSX25000)

5. Insert Piston Bush (23) into the body(1), followed by the Rod Seal (28).
6. Install Back Cap O-ring (32) into the groove on the Back Cap (7).
7. Install the Back Cap Thread O-Ring (29) into the groove in the body (1).

NOTE: Ensure the grub screw (39) and ball bearing (38) have been installed after Loctite 577 has been applied. Loctite must be fully cured before testing.

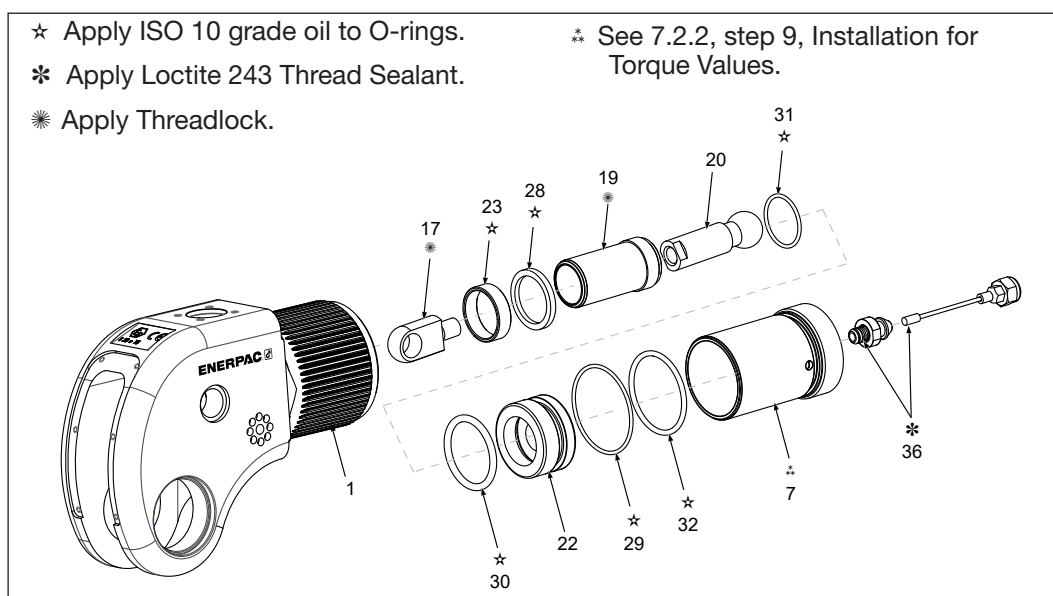


Figure 13: Exploded DSX1500, DSX3000, DSX5000 Pistons

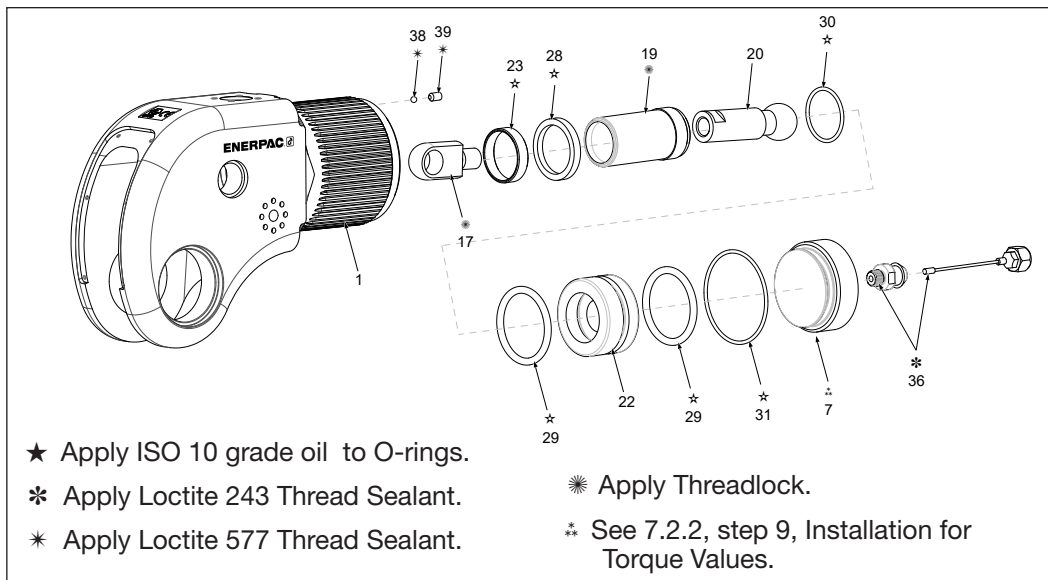


Figure 14: Exploded DSX11000, DSX25000 Pistons

• **Installing**

8. To Insert the completed piston assembly, first ensure that the ratchet system is in place. The assembly can be secured by inserting the rod end plug (18) and access plugs (21).
9. Tighten Piston Sleeve / Back Cap to the following Torque values:
 - DSX1500 : 60Nm
 - DSX3000 : 60Nm
 - DSX5000 : 150Nm
 - DSX11000 : 160Nm
 - DSX25000 : 200Nm
10. Reassemble drive plate (3), pawl (5), ratchet (4), rod end pin (18), access plugs (21) and other related components in the reverse order of disassembly. Refer to Section 7.1.
11. If removed, reinstall the hydraulic swivel and swivel post. Refer to Section 7.2.1.
12. Reinstall the reaction arm assembly.
13. Perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 7.2.4.

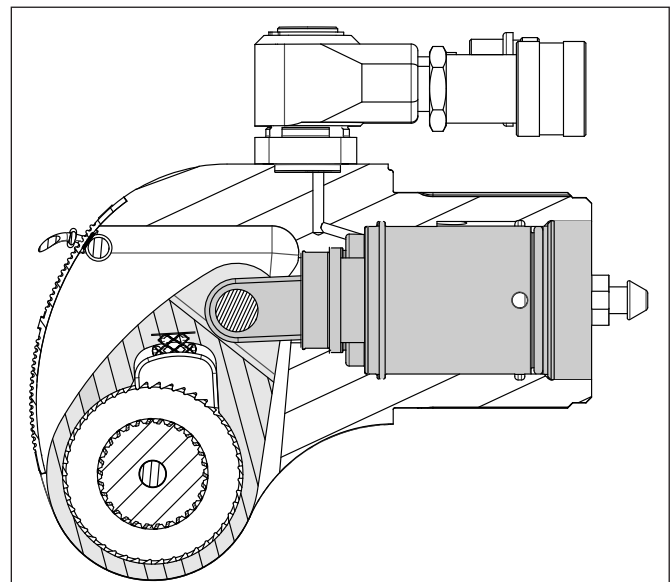


Figure 15: Sectional View Positioning Piston and Drive Plate

7.2.3 Hydraulic Pressure Testing

- Connect hydraulic hoses and cycle the wrench at 1,000 psi [69 bar] to check for oil leaks.
- If there are no leaks, cycle the wrench at 10,000 psi [690 bar] and check again for leaks.
- If leaks are present, determine the cause and make repairs as required before placing the wrench into service.

⚠ WARNING Pressurized hydraulic oil can penetrate the skin and could cause serious personal injury. Always repair any oil leaks before using the wrench.

7.2.4 Reaction Arm - Disassembly and Reassembly (Fig. 16)

• Disassembly

1. To remove the wire assembly (36) that is securing the reaction arm to the wrench body, first unscrew the wire assembly nut followed by the rest of the assembly (36).
2. Remove the reaction arm assembly, including the retaining plate (24), and shackle ring (38).
3. Unscrew the two plate screws (35) and remove retainer (24).
4. Remove the grub screw (10), followed by the retainer tab (15) and spring (16).
5. If required, the shackle ring can be removed from the reaction arm body by removing the eyebolt assembly and separating the shackle ring arms.
6. Clean all exposed components with a mild solvent.
7. Inspect all parts for damage. Replace any worn or damaged parts.

• Reassembly and Installation

1. Apply silicon lubricate to all components, except the two plate screws (35).
2. Re-assemble the spring (16), retainer tab (15), and grub screw (10), applying a small amount of Loctite 222 thread sealant on to the grub screw before installing the assembly into the retainer plate (24).
3. Fit the retainer plate (24) into the reaction arm body (2), apply a small amount of Loctite 243 thread sealant to the threaded mounting holes before inserting plate screws (35).
4. If removed, reattach the shackle ring (38), secured into place with the eyebolt. Loctite 222 should be applied to the thread of the eyebolt during assembly.
5. Install the wire assembly (36) into the rear of the piston sleeve. Slide the reaction arm (2) onto the wrench body (1), threading the end of the wire assembly (36) through the retainer plate (24) and secure by screwing the hex nut onto the end of the wire assembly (36).

7.2.5 Square drive Release Button Disassembly and Reassembly (Fig. 17)

NOTICE Disassemble the square drive release button only if it is not operating properly or if it is worn or damaged.

1. Remove circlip (13).
2. Separate the button mechanism (12) from the retaining block (14).
3. Clean all parts with a mild solvent. Dry all parts after cleaning.
4. Inspect all parts for damage.
5. Reassemble retaining button assembly (12) and bushing (14) and secure with circlip (13).
6. Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 10.

* Apply Loctite 222 Thread Sealant.

* Apply Loctite 243 Thread Sealant.

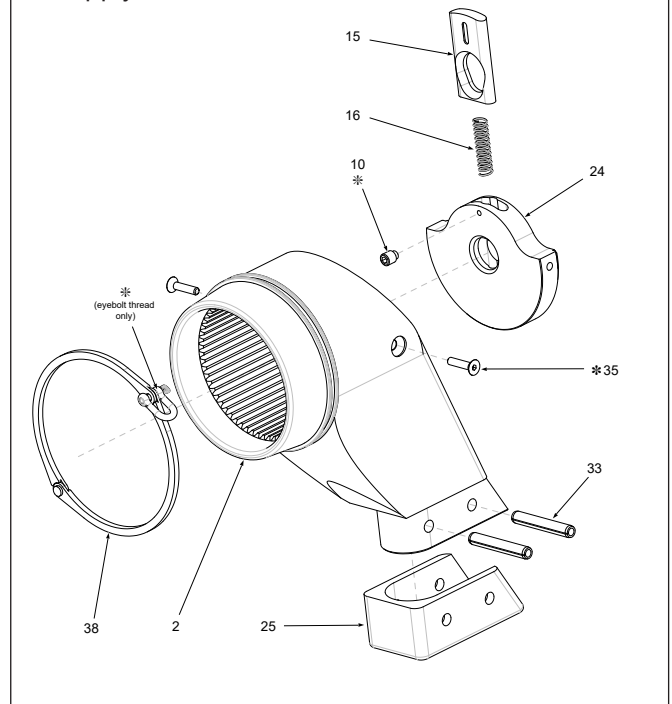


Figure 16: Exploded Reaction Arm

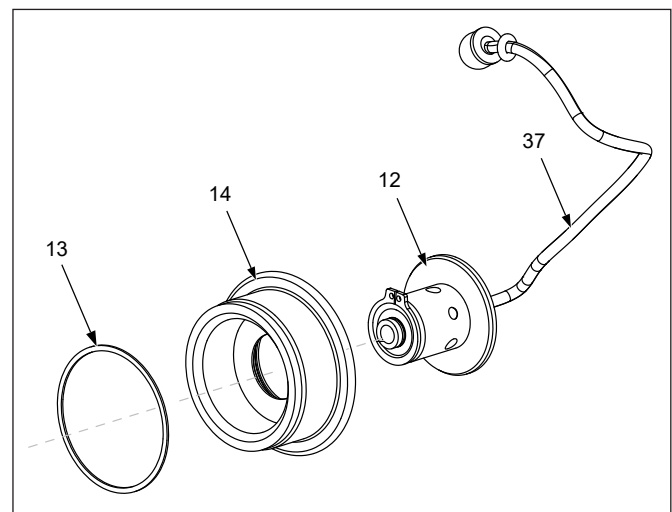


Figure 17: Exploded Square drive

NOTICE If a fault develops with the retaining button assembly (12), the whole assembly will need to be replaced. It is not recommended that this item be disassembled.

8.0 TROUBLESHOOTING

Fault	Possible Cause	Corrective Action
Wrench pressure will not build	Piston seal and/or end plug seal leaking	Replace any defective o-rings.
	Coupler is defective	Replace any defective couplers.
Cylinder / Tool Leaks	Blown o-ring in cylinder	Replace seal kit.
	Defective piston rod seal	Return to Enerpac for repair.
Tool operates backwards	Couplings/ hose connections reversed	Check couplings and correct.
Ratchet returns with retract stroke	Broken or otherwise inoperable drive segment	Replace drive segment and/or spring. Return to Enerpac.
Ratchet will not take successive strokes	Broken or otherwise inoperative drive segment or spring	Replace drive segment and/or spring. Return to Enerpac.
	Cylinder not retracting completely	Remove tool from nut and cycle freely for several strokes. Allow adequate time for cylinder to retract fully. If problem persists, check pawls.
	Linkage between piston rod and drive plate is broken	Replace parts as necessary - return to Enerpac.
Cylinder will not retract	Voltage to electric pump is too low to line drop or inadequate amperage is available	Get shorter extension cord. If shop power is adequate, draw power from welding machine or cal. rod transformer.
	Linkage between piston rod and drive arms are broken	Replace part as necessary.
Tool locks on to nut	Drive segment is loaded when the tool is maxed out in torque	Pressure advance on remote and build pressure - continue to press down on remote while pulling back on one of the accuracy assurance levers - release remote while continuing to hold back on levers.
	Tool is operating backwards	Push advance button down - tool should immediately fall free.
	Tool is wedged under a fixed object	Remove shroud from around ratchet. Pry the drive segment out of the ratchet and at the same time pull back on the accuracy assurance levers. Tool should swing free, if not, the socket or obstruction should be cut away.
Tool operates backwards	Multiple hoses in even numbers	Configure hoses in odd multiples only.

Refer to the Pump Instruction Sheet for troubleshooting required for the pump unit.

9.0 TECHNICAL SPECIFICATIONS

9.1 Capacities and Dimensions

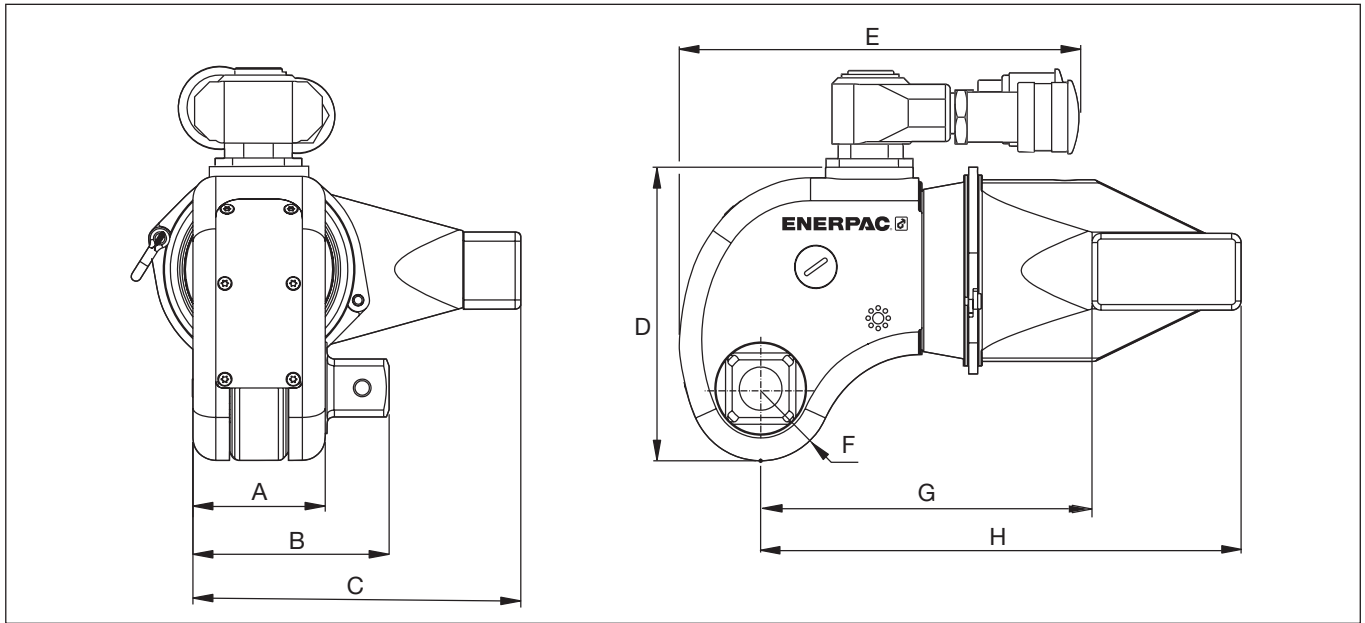


Figure 18: DSX Dimensions

			Model Number				
			DSX1500	DSX3000	DSX5000	DSX11000	DSX25000
Square drive	inch		$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$
Maximum Operating Pressure	psi		10,000	10,000	10,000	10,000	10,000
	bar		690	690	690	690	690
Nominal Torque	at 10,000 psi	Ft.lbs	1411	3233	5635	11,524	24,057
	at 690 bar	Nm	1913	4383	7640	15,624	32,617
Minimum Torque		Ft.lbs	141	323	563	1152	2406
		Nm	191	438	764	1562	3262
Weight		lbs	4.85	10.58	17.86	31.75	71.65
		kg	2.2	4.8	8.1	14.4	32.5
Dimensions	A	inch [mm]	1.73 [44]	2.28 [58]	2.72 [69]	3.43 [87]	4.61 [117]
	B	inch [mm]	2.64 [67]	3.39 [86]	4.41 [112]	5.08 [129]	6.93 [176]
	C	inch [mm]	4.21 [107]	5.67 [144]	6.81 [173]	8.46 [215]	11.34 [288]
	D	inch [mm]	3.78 [96]	5.08 [129]	5.83 [148]	7.13 [181]	9.61 [244]
	E	inch [mm]	5.9 [150]	6.73 [171]	7.28 [185]	8.66 [220]	10.23 [260]
	F	inch [mm]	0.94 [24]	1.26 [32]	1.5 [38]	1.89 [48]	2.25 [64]
	G	inch [mm]	4.49 [114]	5.83 [148]	7.09 [180]	8.94 [227]	11.06 [281]
	H	inch [mm]	6.42 [163]	8.46 [215]	10.24 [260]	12.8 [325]	16.77 [426]

9.2 Torque Settings

9.2.1 Imperial System Torque Factor Calculation

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure (psi)} = \text{Torque (Ft.lbs)} / \text{Torque factor}$$

	DSX1500	DSX3000	DSX5000	DSX11000	DSX25000
Torque factor Imperial system:	0.1411	0.3233	0.5635	1.1524	2.4057

9.2.2 Imperial System Pressure/Torque Table

Pump Pressure (psi)	DSX1500 Torque (ft.lbs)	DSX3000 Torque (ft.lbs)	DSX5000 Torque (ft.lbs)	DSX11000 Torque (ft.lbs)	DSX25000 Torque (ft.lbs)
1000	141	323	564	1152	2406
1500	212	485	845	1729	3609
2000	282	647	1127	2305	4811
2500	353	808	1409	2881	6014
3000	423	970	1691	3457	7217
3500	494	1132	1972	4033	8420
4000	564	1293	2254	4610	9623
4500	635	1455	2536	5186	10826
5000	706	1617	2818	5762	12029
5500	776	1778	3099	6338	13231
6000	847	1940	3381	6914	14434
6500	917	2101	3663	7491	15637
7000	988	2263	3945	8067	16840
7500	1058	2425	4226	8643	18043
8000	1129	2586	4508	9219	19246
8500	1199	2748	4790	9795	20448
9000	1270	2910	5072	10372	21651
9500	1340	3071	5353	10948	22854
10000	1411	3233	5635	11524	24057

NOTICE Torque values are rounded to the nearest whole unit.

9.2.3 Metric System Torque Factor Calculation

To set the torque, adjust the pump pressure according to the following calculation:

$$\text{Pump pressure (bar)} = \text{Torque (Nm)} / \text{Torque factor}$$

	DSX1500	DSX3000	DSX5000	DSX11000	DSX25000
Torque factor Metric system:	2.7724	6.3521	11.0724	22.6434	47.2710

9.2.4 Metric System Pressure/Torque Table

Pump Pressure (bar)	DSX1500 Torque (Nm)	DSX3000 Torque (Nm)	DSX5000 Torque (Nm)	DSX11000 Torque (Nm)	DSX25000 Torque (Nm)
60	166	381	664	1359	2836
90	250	572	997	2038	4254
120	333	762	1329	2717	5673
150	416	953	1661	3397	7091
180	499	1143	1993	4076	8509
210	582	1334	2325	4755	9927
240	665	1525	2657	5434	11345
270	749	1715	2990	6114	12763
300	832	1906	3322	6792	14181
330	915	2096	3654	7472	15599
360	998	2287	3986	8152	17018
390	1081	2477	4318	8831	18436
420	1164	2668	4650	9510	19854
450	1248	2858	4983	10190	21272
480	1331	3049	5315	10869	22690
510	1414	3240	5647	11548	24108
540	1497	3430	5979	12227	25526
570	1580	3621	6311	12907	26944
600	1663	3811	6643	13586	28363
630	1747	4002	6976	14265	29781
660	1830	4192	7308	14945	31199
690	1913	4383	7640	15624	32617

NOTICE Torque values are rounded to the nearest whole unit.

