

Hydraulikk as

kNm 

Torque and tension specialist

S-Series Hydraulic Torque Wrench

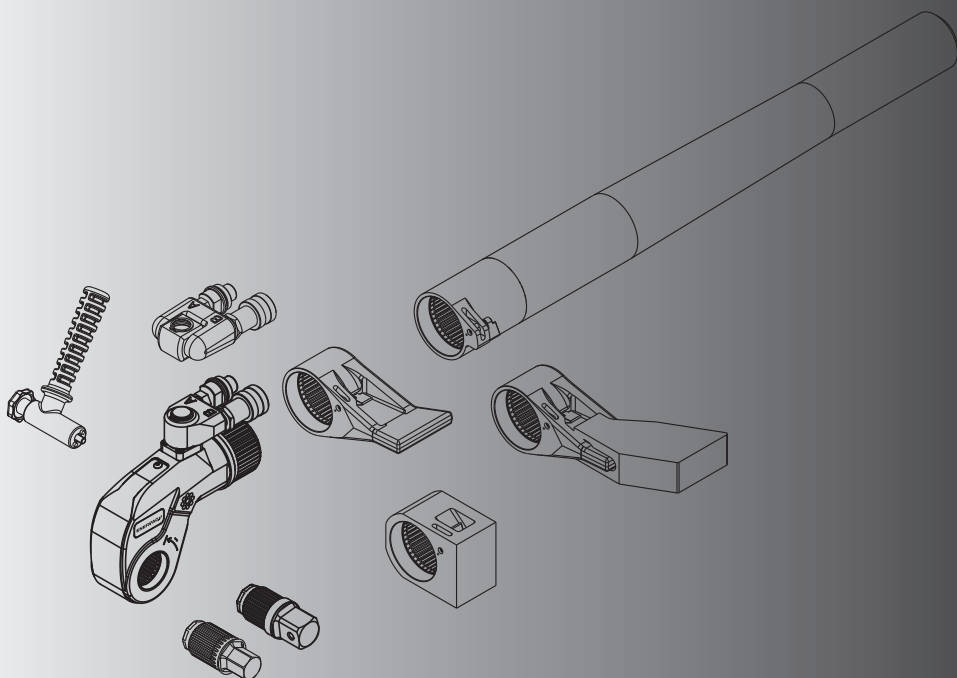
S1500X

S3000X

S6000X

S11000X

S25000X



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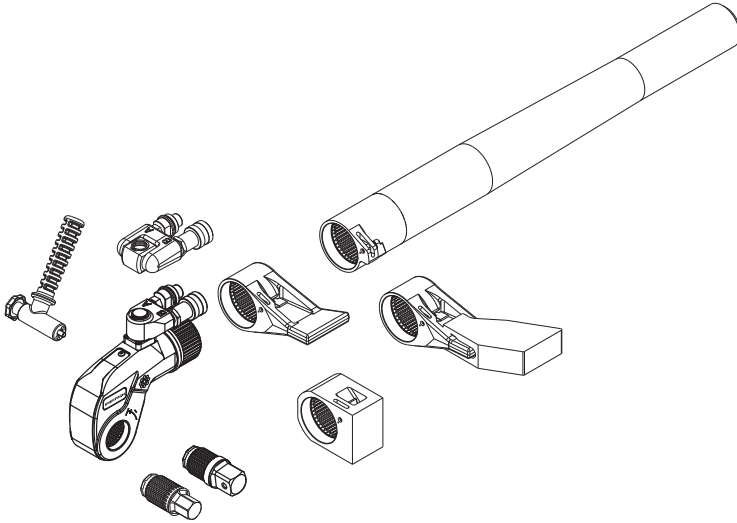
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1 Introduction

Overview

The Enerpac S-Series hydraulic torque wrench is designed for controlled tightening and loosening of fasteners in industrial bolting applications.

The wrench features a removable square drive shaft that is designed to accept a wide variety of interchangeable hex sockets of different sizes (sold separately). The adjustable reaction arm further enhances the flexibility of the tool.

An optional TSP300 Pro Series Swivel provides 360 degree X-axis and 160 degree Y-axis rotation, allowing easier positioning of the wrench and hoses in confined areas.

The S-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 is intended.
- All Enerpac products are guaranteed against defects in workmanship and materials for as long as you own them.

Any misuse or alteration invalidates the warranty.

- Observe all instructions as communicated in this manual.
- When replacement parts are needed, use only genuine Enerpac replacement parts.

EU Declaration of Incorporation

• S1500X • S3000X • S6000X
• S11000X • S25000X



These tools conform with the requirements for CE Marking.

Enerpac declares that the S-Series models listed above meet the applicable standards and directives issued by the European Union.

For additional details, refer to the separate EU Declaration of Incorporation.

2 Safety

Read all instructions carefully. Follow all recommended safety precautions to avoid personal injury as well as damage to the wrench 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 any questions or concerns arise, contact Enerpac or a local Enerpac distributor for clarification.

If you have never been trained on high-pressure hydraulic safety, consult your distributor or service center for a free Enerpac Hydraulic Safety Training Course.

This manual follows a system of safety alert symbols, signal 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 personal 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 relating to property damage). Please note that the Safety Alert Symbol will not be used with this signal word.

2.1 Safety Precautions - S-Series Hydraulic Torque Wrenches

⚠ WARNING

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 headwear, 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 coworkers.

- 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 S-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 nonflammable 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 worksite. 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.

NOTICE

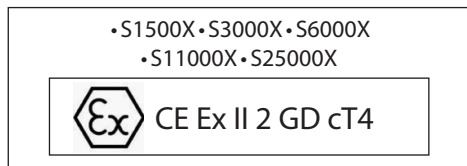
- Always position the wrench for maximum stability. Use the positioning handle to properly position tool during operation.
- Be sure reaction points are adequate for the forces at work during operation of the tool.
- Be sure the reaction point is of a suitable shape. If possible, use an adjacent nut 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 75 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.

Failure to observe and comply with the following precautions could result in property damage and/or void the product warranty.

- 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 (see Section 5).
- Check that the swivel post screws are tight prior to use. (see Section 5)
- If oil leakage is present from wrench, replace seals as required (see Section 5) 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 mark, the Enerpac S-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 S-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 S-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 S-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 S-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 S-Series torque wrench to minimize the possibility of an incendive spark that may be caused by the impact of aluminum components with corroded steel. However, to reduce the chance of an incendive 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 S-Series torque wrench (in accordance with standard EN 13463-1).

-
- Take extreme care to prevent the S-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 S-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 Assembly and Adjustments

3.1 Overview and features (Fig. 1 or 2)

- 1 Drive Shaft
- 2 Drive Shaft Release Button
- 3A Hydraulic Swivel (standard)
- 3B TSP300 Pro Series Swivel (optional)
- 4 Advance hose connection
- 5 Retract hose connection
- 6 Reaction Arm
- 7 Reaction Arm Latch

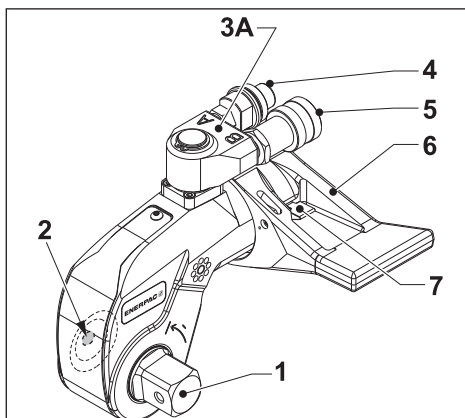


Fig. 1

3.2 Drive Shaft

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

3.2.1 To Attach the Drive Shaft (Fig. 3)

- Insert the drive shaft (1) into the ratchet (8).
- Press and hold the release button (2).
- Push and turn the drive shaft (1) until it locks into place. Then, release the release button (2).

NOTICE Be sure that the drive shaft fits tightly into the ratchet.

3.2.2 To Remove the Drive Shaft (Fig. 3)

- Press and hold the release button (2).
- Pull the drive shaft (1) until it is disengaged from the locking mechanism.
- Remove the drive shaft (1) completely from the ratchet (8).

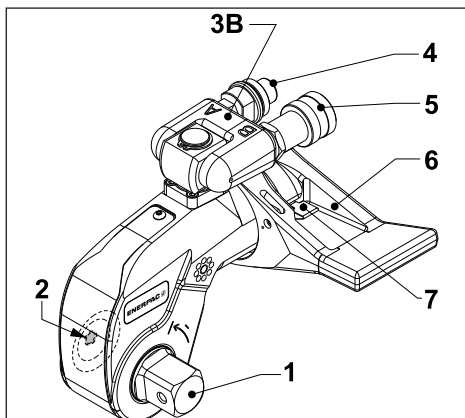


Fig. 2

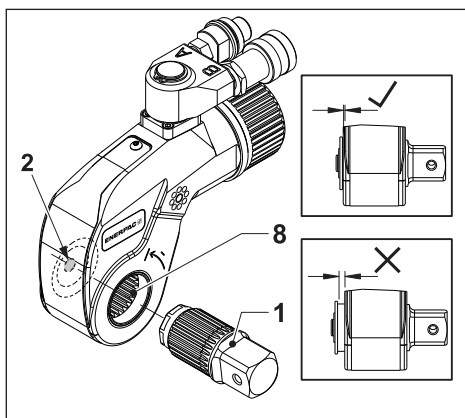


Fig. 3

3.3 To Select the Drive Direction (Fig. 3)

- For tightening bolts, install the drive shaft in the location shown in Figure 4.
- For loosening bolts, install the drive shaft on the opposite side of the wrench.

3.4 Hex Sockets

⚠ WARNING Use only hex sockets designed for use with impact wrenches. Standard hex sockets may shatter. Serious personal injury could result.

3.4.1 To Install a Hex Socket (Fig. 4)

- Position the hex socket (9) onto the drive shaft (1).
- Install the retaining pin (10) and O-ring (11).

3.4.2 To Remove a Hex Socket (Fig. 4)

- Remove the O-ring (11) and retaining pin (10)
- Remove the hex socket (9) from the drive shaft (1).

3.5 To Attach the Positioning Handle (Fig. 5)

- Secure the positioning handle (12) with thumb screw or eyebolt (13 - varies by model). Handle can be installed on either side of wrench (as needed).

3.6 To Mount the Reaction Arm (Fig. 6)

The reaction arm can be rotated incrementally through 360 degrees and can maintain stability against a reaction point up to full torque.

- Position the reaction arm (6) onto the ridged end (14) of the tool.
- Press the latch (7) and slide the arm all the way onto the tool. Release the latch to secure the arm.
- To adjust the angle of the reaction arm (6), press the latch (7) and slide the arm off of the tool. Position the arm as necessary.

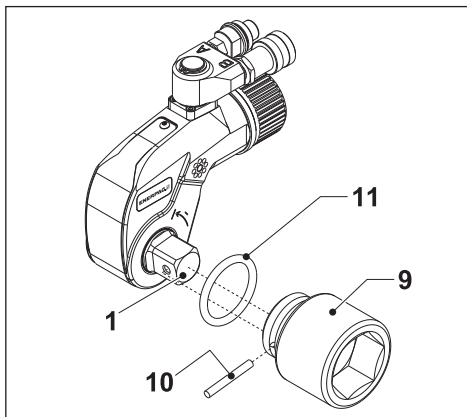


Fig. 4

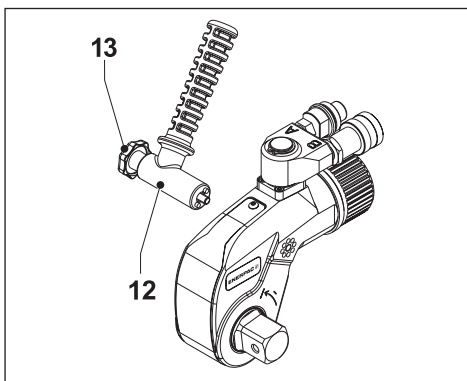


Fig. 5

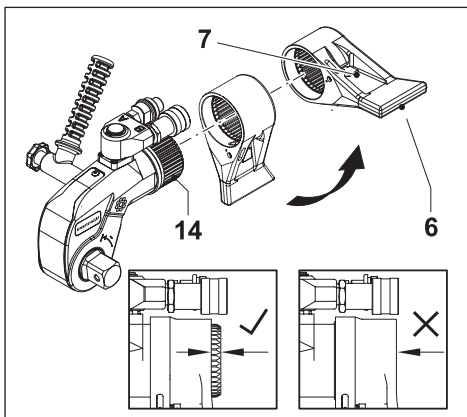


Fig. 6

3.7 To Connect the Hoses (Fig. 7)

⚠ 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 tool is fitted with male and female 1/4 inch NPTF spin-on hydraulic couplings. Use Enerpac twin safety hoses only. Refer to the table below.

Enerpac hose model number	Description
THQ-706T	Two hoses, 19.5 feet [6m] long
THQ-712T	Two hoses, 39 feet [12 m] long

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 (0) psi/bar.
- Remove the hose dust caps.
- Connect the hose with the female coupling (15) to the wrench advance coupling (4).
- Connect the hose with the male coupling (16) to the wrench retract coupling (5).
- 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.

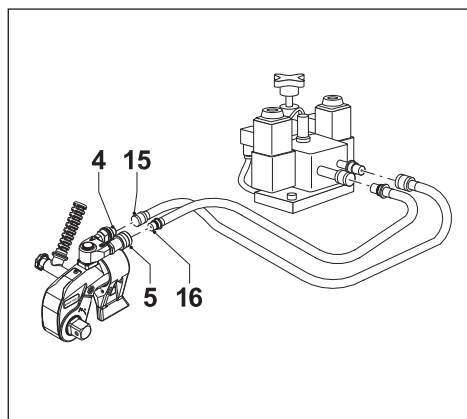


Fig. 7

4 Operation

4.1 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.

- Contact Enerpac for additional guidance if a suitable reaction point is not available.

4.2 Setting the Torque

Adjust the pressure on the pump as necessary to set the torque. Refer to pump manufacturer's instruction manual.

Refer to sections 6.2.1 through 6.2.4 of this manual for pressure-torque conversion information.

4.3 Wrench Operation

⚠ WARNING Never strike the tool with a hammer or other object while it is under load. Catastrophic failure of the wrench could occur, and dislodged parts could become dangerous projectiles. Uncontrolled release of hydraulic oil could also occur. Refer to Section 2 of this manual for additional information.

4.3.1 Tightening a Nut or Bolt

(Fig. 8 and 9)

- If required for your bolting application, apply lubricant to the bolt threads.
- Install hex socket on the anti-clockwise (-) side the wrench.
- Install the reaction arm (6) on the wrench, in the position required for your application
- Position the tool on the nut or bolt with the clockwise (+) side facing outwards.
- Position the foot (17) of the reaction arm (6) against a suitable reaction point (18). The reaction point will counteract the force caused by operating the tool.
- Start the pump.
- Operate the pump until the nut or bolt has been tightened to the required torque.
- Stop the pump immediately after work has finished.

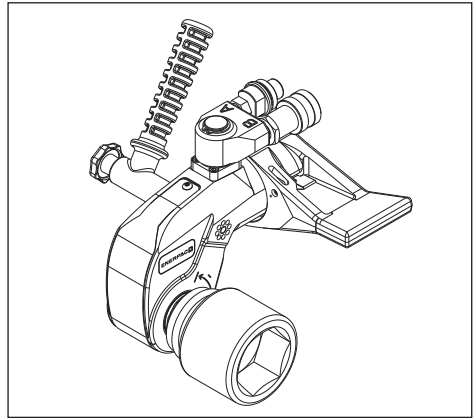


Fig. 8

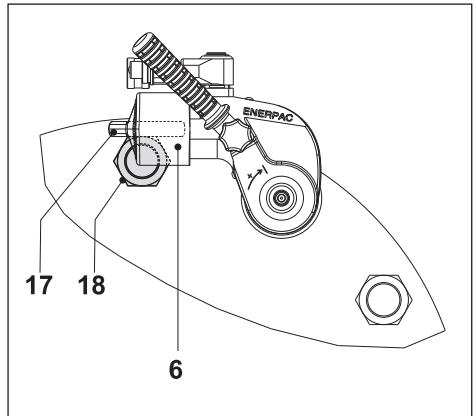


Fig. 9

4.3.2 Using an Extended Reaction Arm (Fig. 10)

- Position the foot (17) of the SRS Series extended reaction arm (19) against a suitable reaction point (18). The reaction point will counteract the force caused by operating the tool.
- Follow instructions in Section 4.3.1.

⚠ WARNING Do not exceed the maximum allowable torque for the SRS reaction arm being used. Catastrophic failure of the reaction arm could occur, and dislodged parts could become dangerous projectiles. Damage to tool could also result. Refer to Section 6.3 for SRS reaction arm maximum allowable torque specifications.

4.3.3 Using a Short Reaction Arm (Fig. 11)

- Position the foot (17) of the SRA Series short reaction arm (20) against a suitable reaction point (18). The reaction point will counteract the force caused by operating the tool.
- Follow instructions in Section 4.3.1.

4.3.4 Using a Reaction Tube Extension (Fig. 12)

- Position the RTE Series reaction tube extension (21) against a suitable reaction point (18). The reaction point will

counteract the force caused by operating the tool.

- Follow instructions in Section 4.3.1.

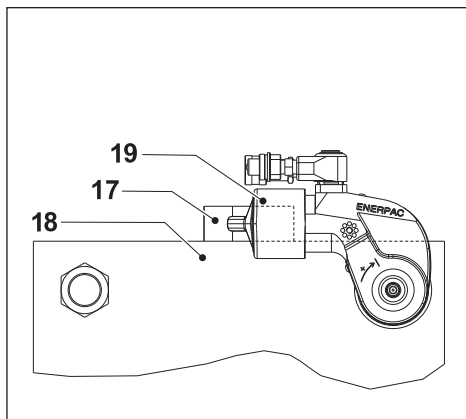


Fig. 10

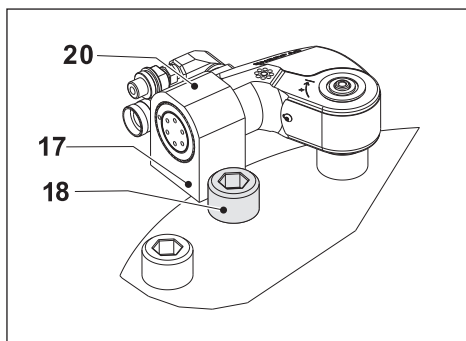


Fig. 11

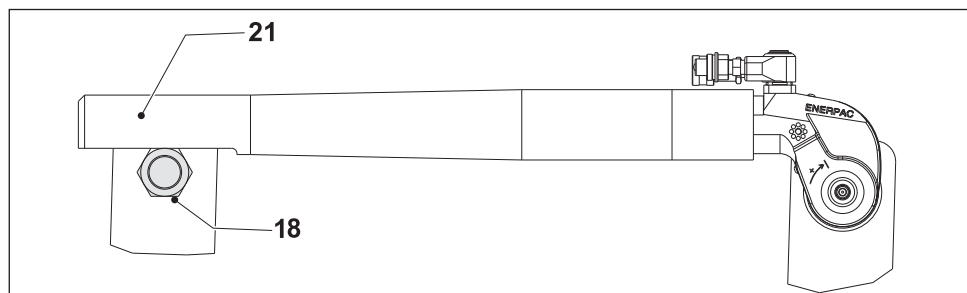


Fig. 12

4.3.5 Using the Angle Of Turn Indicator (Fig. 13, 14 and 15)

The angle of turn indicator allows tightening to be performed using the amount of nut or bolt rotation as a guide. It is an optional accessory for all S-Series wrenches

Use the angle of turn indicator as described in the following steps. Refer to sections 4.3.1 through 4.3.4 for detailed wrench operation instructions and precautions.

- Before placing the wrench on the nut or bolt, complete any pre-torquing procedures in accordance with the standard operating procedures at your worksite.
- Replace the drive shaft release button (2) with the angle of turn indicator (22). Be sure that the drive shaft (1) is locked in place.
- Install the wrench on the nut or bolt, making sure that there is a suitable reaction point.
- Rotate the protractor by hand so that the notch on the tool body aligns with zero (0) degrees on the protractor.

NOTICE In the following step, the protractor will rotate as the wrench drive turns.

- Operate the wrench until the notch on the wrench body is aligned with the correct number of degrees indicated on the protractor. The nut or bolt has now been tightened.

For example, if 120 degrees of tightening is required, operate the wrench until 120 aligns with the notch.

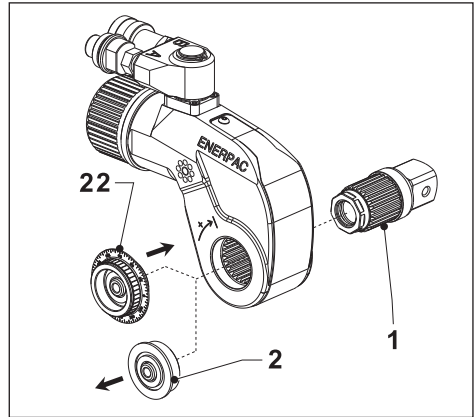


Fig. 13

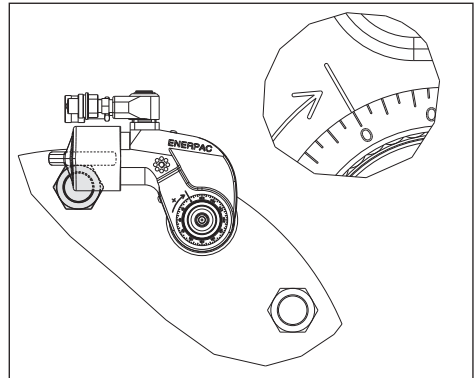


Fig. 14

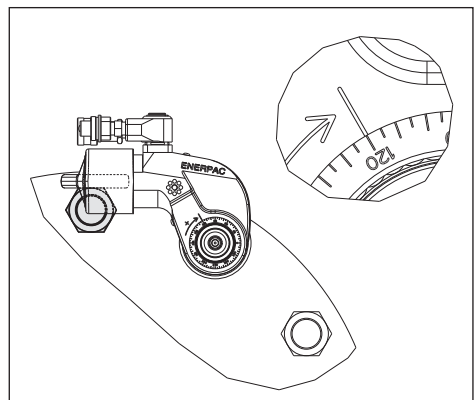


Fig. 15

4.3.3 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 75 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.

4.3.4 Loosening a Nut or Bolt (Fig. 16 and 17)

- Apply penetrating oil to the threads. Allow the oil to soak.
- Position the tool on the nut or bolt with the anti-clockwise (-) side facing outwards, and the clockwise (+) side facing the joint.
- Position the foot (17) of the reaction arm (6) against a suitable reaction point (18). The reaction point will counteract the force caused by operating the tool.
- Start the pump.
- Operate pump until nut (bolt) is loose. If the nut or bolt will be re-used, avoid excess load when loosening.

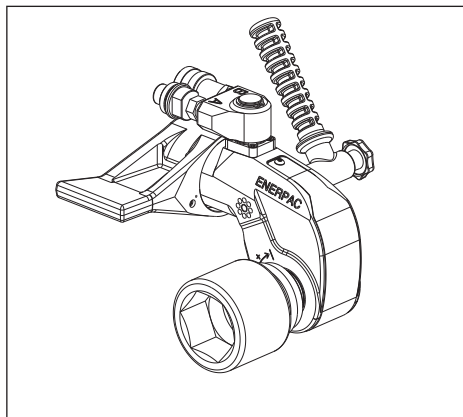


Fig.16

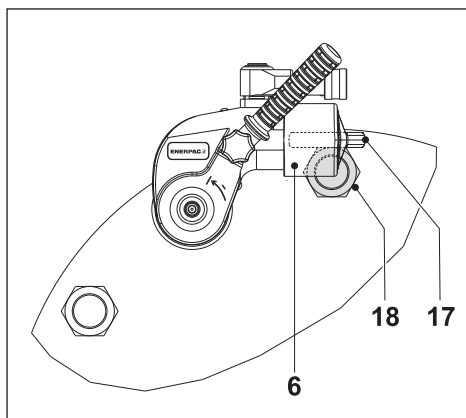


Fig.17

⚠ WARNING During loosening, a nut or bolt may be subjected to stresses beyond its material limits, which could result in a permanent reduction of its strength. This reduction could lead to catastrophic failure of the nut, bolt or joint if the fastener is reinstalled. If there is any doubt as to whether the force used during loosening has caused excessive stress, the removed fastener(s) should be discarded and replaced with new fasteners of the proper specifications.

5 Maintenance and Troubleshooting

5.1 Introduction

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.

Recommended service intervals are:

- 3 months – Heavy Duty use
- 6 months – Normal use
- 12 months – Infrequent use

Non destructive testing must be carried out if the tool has been used under severe conditions.

5.2 Preventative Maintenance

(Fig. 18, 19 and 20)

- Check tightness of swivel post retaining screws and cylinder gland (see Section 5.3).

- Pressurize the wrench to 10,000 psi [690 bar] pressure (in both advance and retract), and check for any signs of leakage.
- Relieve pressure and disconnect hydraulic hoses.
- Clean all exposed components with a mild solvent.
- Remove the drive shaft (H9) and release button assembly (H1).
- Remove the housing guard screws (H3) and remove the housing guard (H10).
- Disengage the ratchet lever pin (H5) from the piston rod hook. Remove the ratchet lever assembly (H4) from the wrench housing (H2).
- Remove the ratchet (H8), drive shoe (H7) and compression springs (H6).
- Remove the ratchet lever pin (H5). Tap out the pin (H5) using a suitable drift.

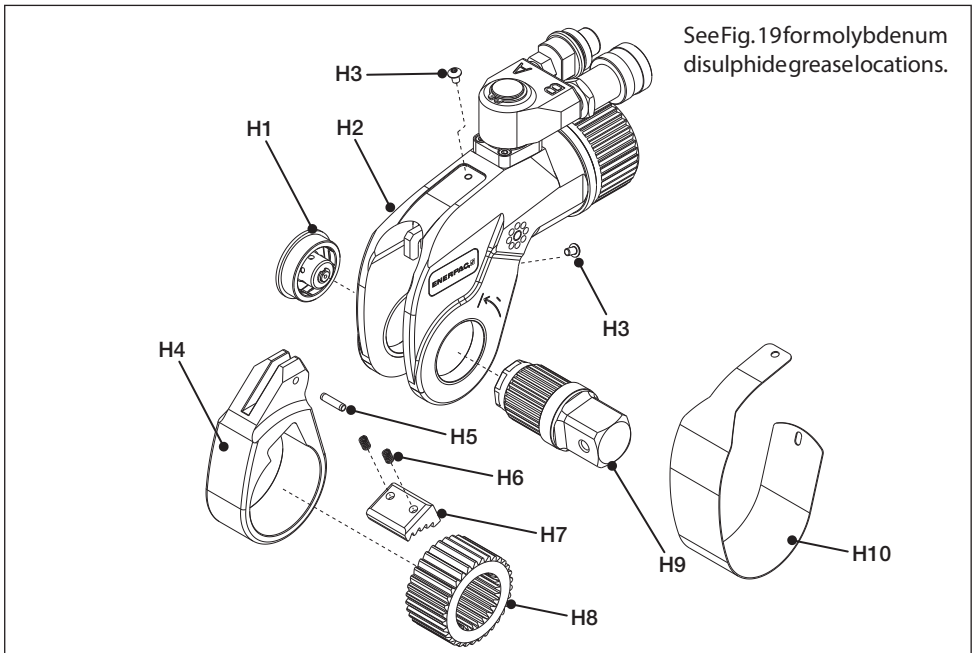


Fig. 18

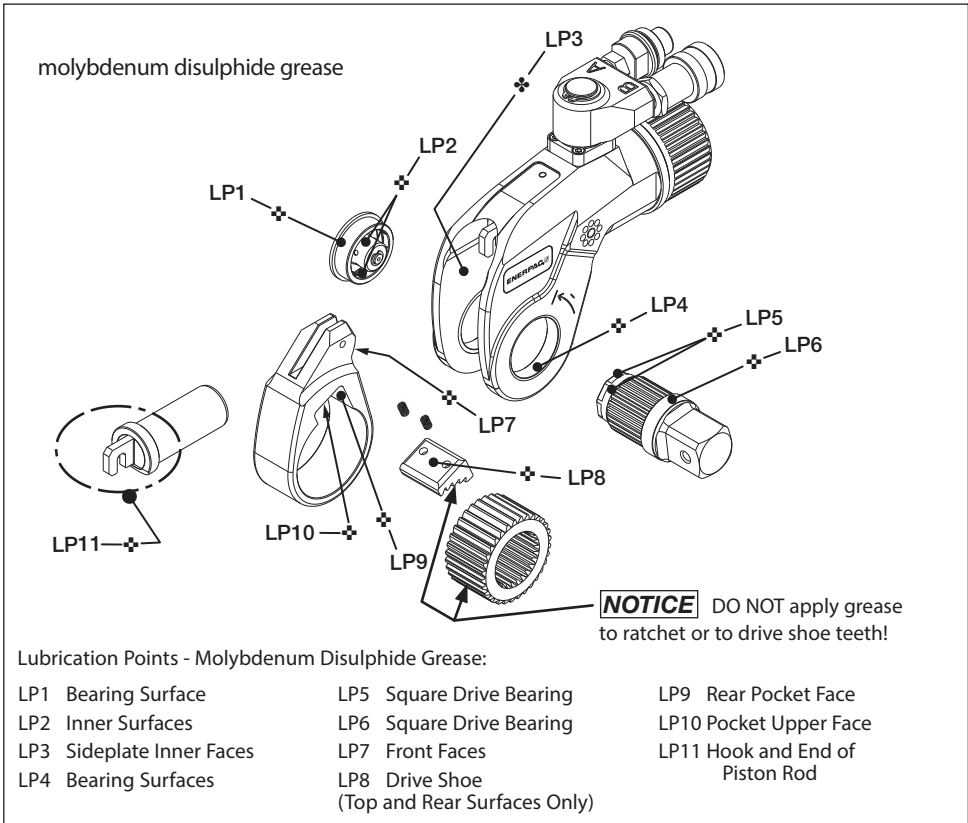


Fig. 19

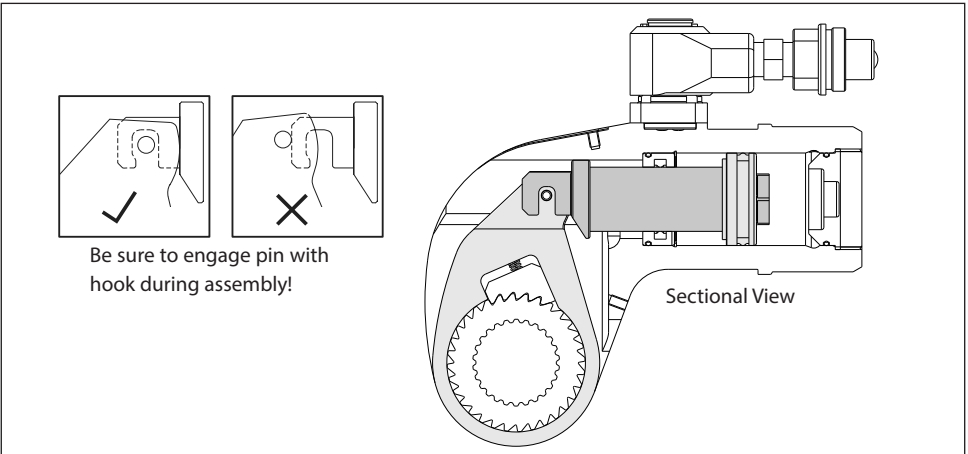


Fig. 20

- Clean all components with a mild solvent.
- Inspect all parts for damage. Any damaged components must be replaced.

NOTICE Do not apply molybdenum disulphide grease to the ratchet lever bore, or to the drive shoe teeth. Application of grease to these areas will cause erratic operation, slippage of drive mechanism and excessive component wear.

- Dry all components. Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 19.

NOTICE Be sure that the ratchet lever, drive shoe, ratchet and ratchet lever pin are correctly installed in the following step. Failure to install these parts correctly will result in component damage. Refer to figures 18 and 20.

- Reassemble the components in reverse order, EXCEPT FOR the housing guard (H10) and screws (H3).
- Connect the wrench to the pump.
- With wrench not on nut or bolt, check operation at a nominal pressure to make sure the piston advances and retracts freely.
- Release the pressure and make sure that the piston fully retracts.
- Attach the housing guard (H10) with screws (H3).

5.3 Full Maintenance

5.3.1 Hydraulic Swivel and Swivel Post Removal (Fig. 21 and 25)

- Remove the circlip (A) from the top of the swivel post (F).
- Using a pair of flat blade screwdrivers, gently pry the swivel assembly (B) from the swivel post (F).
- Remove O-rings (C) from the grooves inside the swivel assembly (B).

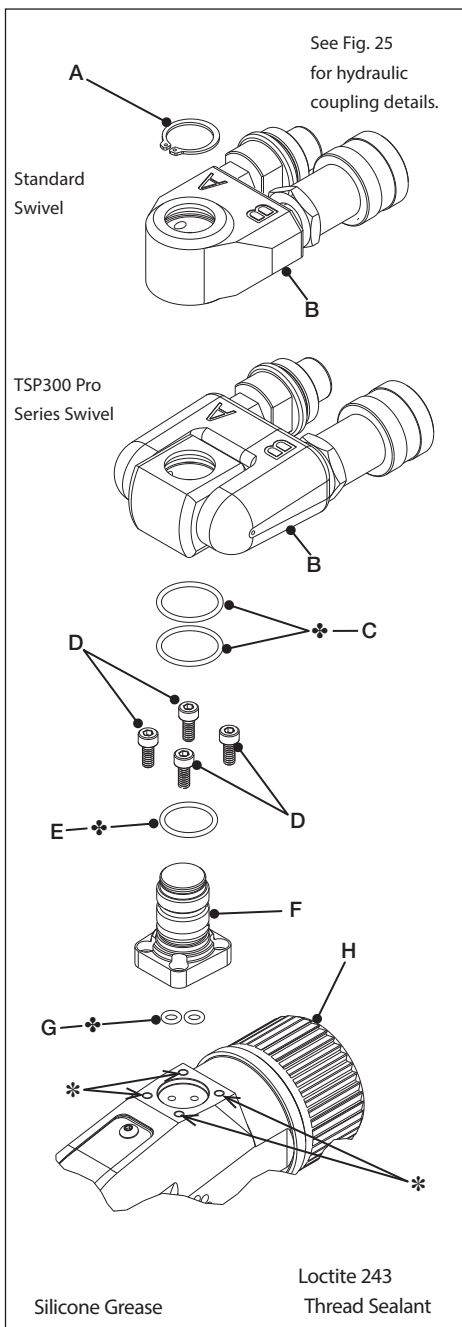
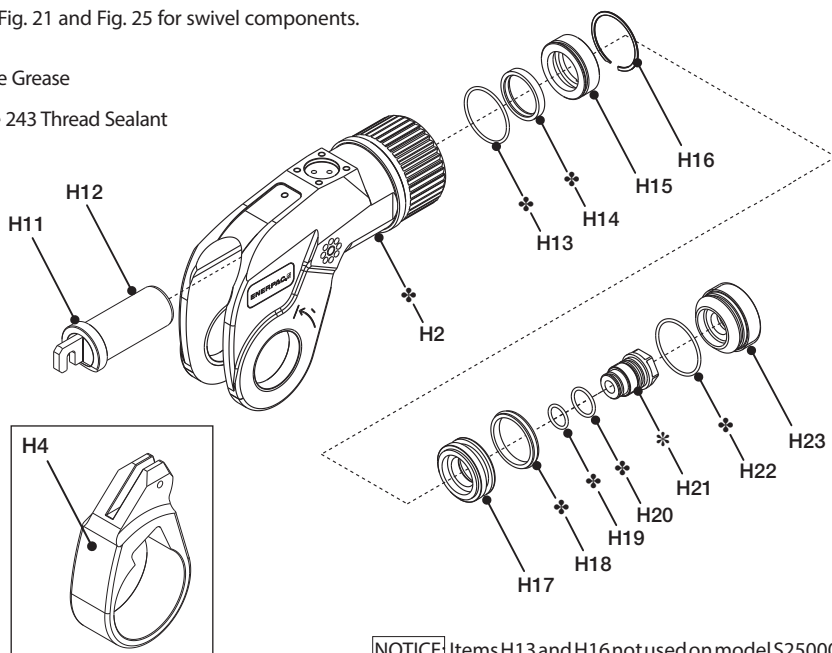


Fig. 21

Refer to Fig. 21 and Fig. 25 for swivel components.

Silicone Grease

Loctite 243 Thread Sealant



NOTICE Items H13 and H16 not used on model S25000X

Fig. 22

- Place the swivel assembly in a vise with soft jaws. Remove the hydraulic couplings (B1, B2 and B3) from the swivel assembly (B).

NOTICE For wrenches equipped with the optional TSP300 Pro Series swivel, refer to Enerpac instruction sheet L4119 for additional swivel disassembly instructions.

- Remove the socket head capscrews (D) and the swivel post (F).
- Remove O-rings (G) from the swivel post hydraulic ports.
- Remove O-ring (E) from the swivel post (F).

5.3.2 Piston Removal and Disassembly (Fig. 22)

- Remove ratchet lever, ratchet, drive shoe and other related parts as described in Section 5.2.

- Firmly hold the wrench housing (H2). Using an appropriate pin spanner, unscrew and remove the cylinder gland (H23). Remove O-ring (H22) from the gland.
- Using an appropriate socket spanner, unscrew and remove the piston locknut (H21). To prevent the piston from rotating, you may temporarily reinstall the ratchet lever (H4).
- Remove O-rings (H19 and H20) from the piston locknut (H21).
- Remove the piston rod (H12) and bushing (H11) as an assembly through the opening in the front of the tool.
- Remove the piston (H17) by pushing a suitable drift through the front of the tool so that it presses against the piston. Tap the piston (H17) rearward through the bore until it can be removed from the rear of the tool.

- Remove the seal (H18) from groove on piston (H17).
- Clean all exposed components with a mild solvent.
- Inspect all parts for damage.
- Piston rod bushing (H11) can remain assembled to piston rod. It should be disassembled and replaced only if worn or damaged.

5.3.3 Cylinder Bushing Removal - S1500X, S3000X, S6000X and S11000X only (Fig. 22, 23 and 24)

NOTICE Remove the cylinder bushing components (H13, H14, H15 and H16) as described in the following procedure only if there is hydraulic fluid leakage in the piston head area.

- To allow access, remove all piston components as described in Section 5.3.2.

NOTICE In the next step, the tapered end of the retaining ring (H16) must be aligned with the slot in the cylinder bushing (H15) to allow a seal pick tool to fit behind the retaining ring. If needed, use a screwdriver to rotate the ring as required. See Fig. 23.

- Press the retaining ring (H16) radially inward using a flat-head screwdriver.

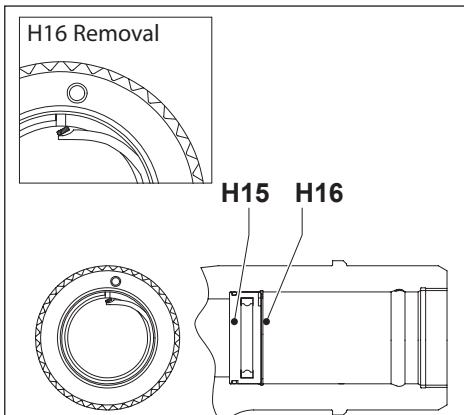


Fig. 23

- Lift the retaining ring (H16) away from the groove and out of the bore using a seal pick.
- Remove the cylinder bushing (H15) by placing a suitable drift through the front of the tool, and pushing against the bushing.
- Remove seal (H14) from groove on inside of bushing (H15).
- Remove O-ring (H13) from groove on outside of bushing (H15).

NOTICE When the bushing (H15) is removed, the O-ring (H13) will be damaged and will need to be replaced. Replacement of seal (H14) is also strongly recommended.

5.3.4 - Non Destructive Testing

- Perform magnetic particle inspection on the following components:
 - Housing (Fig. 18 & 22 item H2)
 - Ratchet Lever (Fig. 18 & 22, item H4)
 - Drive Shoe (Fig. 18, item H7)
 - Ratchet (Fig. 18, item H8)
 - Drive Shaft (Fig. 18, item H9)
 - Piston Rod (Fig. 22, item H12)
 - Reaction Arm (Fig. 26, item J2)

NOTICE Removal of the cylinder bushing (H15) is necessary only if there is hydraulic fluid leakage in the piston head area. Cylinder bushing components (items H13 through H16) can remain installed during magnetic particle inspection. However, to avoid possible seal damage, be careful that inspection fluid does not contact the seals.

5.3.5 Cylinder Bushing Installation, Models S1500X, S3000X, S6000X and S11000X only (Fig. 22, 23 & 24)

NOTICE In the following steps, coat all O-rings and seals with silicone grease as installed. Be careful not to nick or cut O-rings and seals during installation.

- Install new seal (H14) in groove on inside of bushing (H15).
- Install new O-ring (H13) in groove on outside of bushing (H15).

NOTICE In the following step, be certain that side of bushing with O-ring (H13) is inserted first. Refer to Fig. 24 for assembled view.

- Carefully insert the cylinder bushing (H15) into the bore and slide it forward until it reaches the retaining ring groove. Resistance will be felt at this point.
- Using a suitable drift and mallet, tap the cylinder bushing (H15) into the bore until it is fully and evenly seated against the bore shoulder. The retaining ring groove will be visible when the bushing is fully installed in the bore.
- Install retaining ring (H16).

5.3.6 - Piston Reassembly and Installation (Fig. 20 and 22)

- If removed, install cylinder bushing and related components (items H13 through H16). These parts must be installed first. Refer to Section 5.3.5 for instructions.

NOTICE In the following steps, coat all O-rings and seals with silicone grease before installation.

- Install new seal (H18) in groove on outside of piston (H17).
- Install new seals (H19 and H20) in grooves on piston locknut (H21).

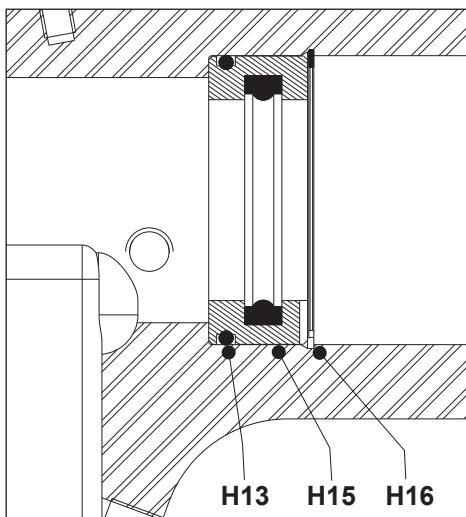


Fig. 24

NOTICE During reassembly in the following steps, be sure that the piston rod (H12) is inserted through the front of the housing (H2).

NOTICE Do not use excessive force when installing the piston rod (H12) or piston (H17) in the following steps. Excessive force may cause damage to these components and also may damage the sealing faces within the wrench.

- Coat the piston rod (H12) with silicone grease. Carefully slide the piston rod and piston rod bushing (H13) as an assembly through the front opening of the wrench housing (H2).
- At the rear of the wrench housing, insert the piston (H17) squarely into the bore, and gently tap it into place, using a suitable drift and mallet.

NOTICE To prevent the piston rod (H12) from rotating during the following steps, temporarily reinstall the ratchet lever (H4) before tightening.

- Apply Loctite 243 thread sealant to the threads of the piston locknut (H21). Install the locknut by hand, making sure that it has engaged the threads of the piston rod (H12).
- Using an appropriate socket spanner, tighten the piston locknut (H21) to the proper torque for your wrench model:

Torque (item H21)

Model	Ft.lbs	Nm
S1500X	30	41
S3000X	40	54
S6000X	60	81
S11000X	60	81
S25000X	60	81

- Install new O-ring (H22) in groove on cylinder gland (H23).
- Screw the cylinder gland (H23) into the wrench housing (H2) by hand, making sure that the O-ring (H22) is not pinched or cut.
- Using an appropriate pin spanner, install and tighten the cylinder gland (H23). Tap the pin spanner with a suitable mallet to ensure that cylinder gland (H23) is securely installed.
- Reassemble the ratchet, ratchet lever and related components in the reverse order of disassembly. Refer to Section 5.2.
- If removed, reinstall the hydraulic swivel and swivel post. Refer to Section 5.3.7.
- Perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 5.3.8.

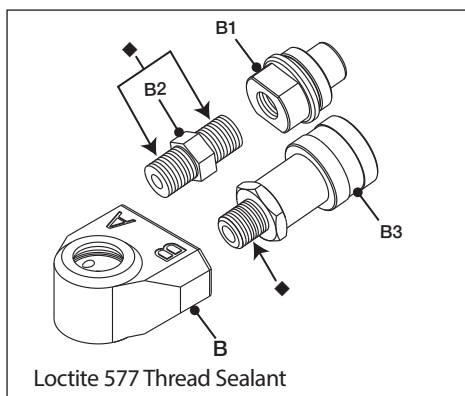


Fig. 25

5.3.7 - Hydraulic Swivel and Swivel Post Reassembly and Reinstallation (Fig. 21 and 25)

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.

- Apply Loctite 577 sealant to threads on female coupling (B3) and adapter (B2). See () in Figure 25 for locations.
- 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:

- Apply a small amount of Loctite 243 thread sealant to the threaded mounting holes in the wrench housing. See () in Figure 21 for locations.

- Install two new O-rings (G) into the ports on the base of the swivel post (F).
- Place the swivel post (F) on the wrench (H), making sure that hydraulic ports are aligned. Be careful that O-rings (G) do not drop out or become pinched or cut.
- Install the degreased socket head capscrews (D) and tighten them as follows:
 - a) S1500X and S3000X:
(M4 capscrews) – 3.7 Ft.lbs [5.1 Nm]
 - b) S6000X, S11000X, S25000X:
(M5 capscrews) – 7.5 Ft.lbs [10.2 Nm]

Swivel Assembly:

- Install a new O-ring (E) into the groove on the swivel post (F).
- Install new O-rings (C) into the grooves inside the swivel assembly (B).
- Coat O-rings (E and C) with a small amount of silicone grease. Then, carefully slide the swivel assembly (B) onto the swivel post (F).
- Reinstall the circlip retainer ring (A).
- Perform hydraulic pressure testing before placing the wrench into service. Refer to the procedure in Section 5.3.8.

5.3.8 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.

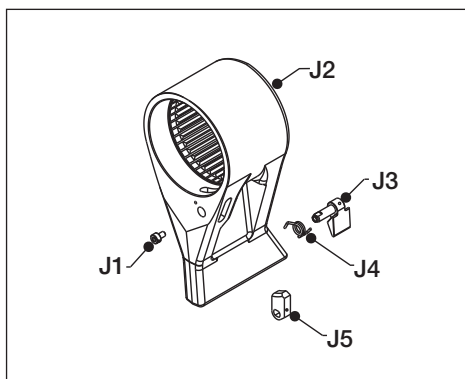


Fig. 26

5.3.9 Reaction Arm Latch - Disassembly and Reassembly (Fig. 26)

NOTICE Disassemble the reaction arm latch only if the latch is not operating properly or if it is worn or damaged.

- Loosen the socket head cap screw (J1)
- Slide out the retainer lever (J3) and torsion spring (J4). Retainer (J5) will drop out.
- Clean all exposed components with a mild solvent.
- Inspect all components. Replace any worn or damaged parts.
- Position retainer (J5) on the reaction arm.
- Place torsion spring (J4) over retainer lever (J3). Slide retainer lever (J3) through hole in reaction arm (J2) until it engages with retainer (J5).
- Reinstall and securely tighten socket head cap screw (J1).

5.3.10 Drive Shaft Release Button Disassembly and Reassembly (Fig. 27)

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

- Remove circlip (H1C).
- Separate the button mechanism (H1A) from the retaining bushing (H1B).
- Clean all parts with a mild solvent. Dry all parts after cleaning.
- Inspect all parts for damage.
- Reassemble retaining button assembly (H1A) and bushing (H1B) and secure with circlip (H1C).
- Apply a thin coat of molybdenum disulphide grease in the areas shown in Figure 19.

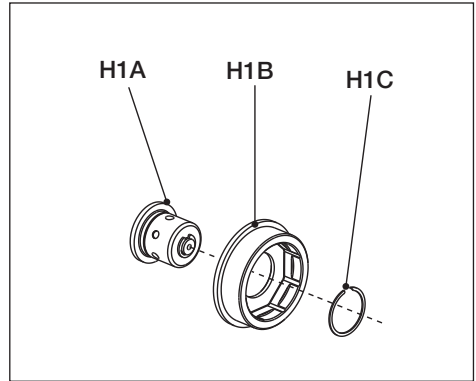


Fig. 27

5.4 Troubleshooting

Symptom	Cause	Remedy
Wrench does not advance or retract.	Hydraulic coupling is damaged.	Replace the coupling.
	Hydraulic coupling is not connected.	Be sure that advance and retract hoses are connected at both pump and wrench. Check that all hose couplings are fully installed.
	Worn or damaged directional control valve on the hydraulic pump.	Take pump to authorized service center. Make repairs as required.
Wrench does not build up pressure.	Piston seal leaks.	Replace the seals.
	Pump does not build pressure.	Adjust the pressure.
	Pump is defective.	Refer to the pump manual.
Wrench leaks oil.	Seal failure.	Replace the seals.
Wrench operates backwards.	Hose connections are reversed.	Reconnect the hoses properly.
Ratchet returns on retract stroke.	Hydraulic coupling is damaged.	Replace the coupling.
	Hydraulic coupling is not connected.	Reconnect the hoses and couplings securely.
	Worn or damaged directional control valve on the hydraulic pump.	Take pump to authorized service center. Make repairs as required.
Ratchet does not take successive strokes.	Worn or broken drive shoe.	Replace the drive shoe.
	Broken ratchet lever or ratchet.	Replace ratchet lever and/or ratchet (as required).
	Lubricant on the ratchet and/or drive shoe splines.	Disassemble the cassette and remove the lubricant from splines.

6 Technical specifications

6.1 Capacities, Dimensions and Additional Product Data (Fig. 28)

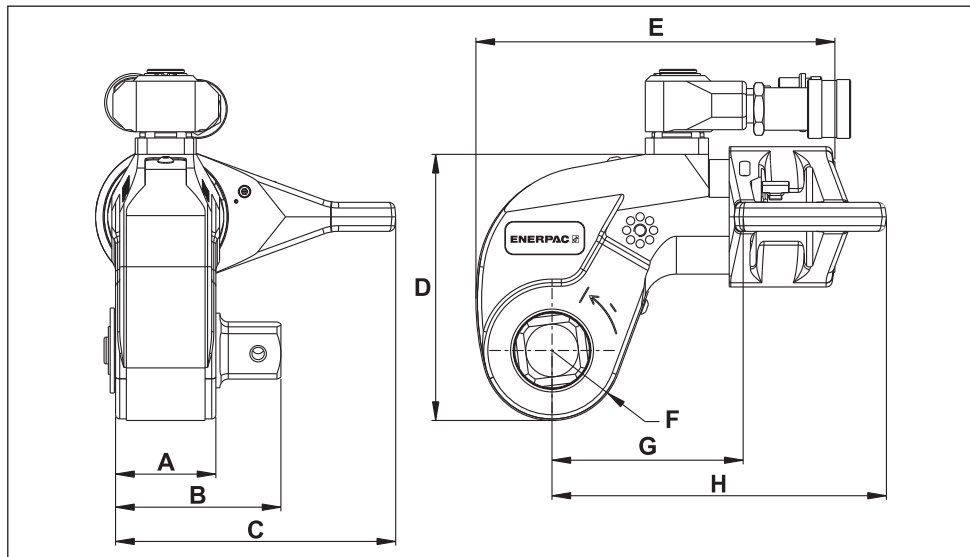



Fig. 28

			Model Number				
			S1500X	S3000X	S6000X	S11000X	S25000X
Drive Shaft		inch	3/4	1	1 1/2	1 1/2	2 1/2
Socket Size Range (smallest to largest)		inch	5/8 - 1 7/8	7/8 - 3 7/8	1 5/18 - 6 1/4	1 5/18 - 6 1/4	2 3/8 - 10
		mm	15 - 50	20 - 100	41 - 155	41 - 155	60 - 255
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	1,440	3,225	6,150	11,175	26,150
	at 690 bar	Nm	1,952	4,373	8,338	15,151	35,455
Minimum Torque		Ft.lbs	144	323	615	1,118	2,615
		Nm	195	438	834	1,516	3,545
Weight		lbs	7.0	12.3	20.2	34.7	70.8
		kg	3.2	5.6	9.2	15.8	32.2
Dimensions	A	inch [mm]	1.54 [39.0]	1.89 [48.0]	2.17 [55.0]	2.83 [72.0]	3.50 [89.0]
	B	inch [mm]	2.56 [65.0]	3.07 [78.0]	3.62 [92.0]	4.49 [114.0]	5.63 [143.0]
	C	inch [mm]	4.25 [108.0]	5.31 [135.0]	6.65 [169.0]	7.76 [197.0]	9.69 [246.0]
	D	inch [mm]	3.82 [97.0]	5.04 [128.0]	6.18 [157.0]	7.48 [190.0]	9.61 [244.0]
	E	inch [mm]	5.35 [136.0]	6.81 [173.0]	7.56 [192.0]	8.98 [228.0]	11.30 [287.0]
	F	inch [mm]	0.98 [25.0]	1.30 [33.0]	1.57 [40.0]	1.97 [50.0]	2.52 [64.0]
	G	inch [mm]	2.76 [70.0]	3.54 [90.0]	4.33 [110.0]	5.24 [133.0]	7.17 [182.0]
	H	inch [mm]	5.08 [129.0]	6.34 [161.0]	7.40 [188.0]	9.02 [229.0]	11.61 [295.0]

NOTICE Wrenches equipped with a factory installed TSP300 Pro Series swivel have model numbers ending in "PX".

Dimensions C and H are for wrench with standard reaction arm. Weight includes weight of wrench and standard reaction arm.

Refer to sections 6.3, 6.4, and 6.5 for additional specifications applicable to optional reaction arms and reaction tubes.

6.2 Torque Settings

6.2.1 Metric System Torque Factor Calculation

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

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

	S1500X	S3000X	S6000X	S11000X	S25000X
Torque Factor					
Metric System:	2.8295	6.3370	12.0845	21.9584	49.4186

6.2.2 Metric System Pressure/Torque Conversion Table

	S1500X	S3000X	S6000X	S11000X	S25000X
Pump					
Pressure (bar)	Torque (Nm)	Torque (Nm)	Torque (Nm)	Torque (Nm)	Torque (Nm)
60	170	380	725	1,318	2,965
90	255	570	1,088	1,976	4,448
120	340	760	1,450	2,635	5,930
150	424	951	1,813	3,294	7,413
180	509	1,141	2,175	3,953	8,895
210	594	1,331	2,538	4,611	10,378
240	679	1,521	2,900	5,270	11,860
270	764	1,711	3,263	5,929	13,343
300	849	1,901	3,625	6,588	14,826
330	934	2,091	3,988	7,246	16,308
360	1,019	2,281	4,350	7,905	17,791
390	1,104	2,471	4,713	8,564	19,273
420	1,188	2,662	5,075	9,223	20,756
450	1,273	2,852	5,438	9,881	22,238
480	1,358	3,042	5,801	10,540	23,720
510	1,443	3,232	6,163	11,199	25,203
540	1,528	3,422	6,526	11,858	26,686
570	1,613	3,612	6,888	12,516	28,169
600	1,698	3,802	7,251	13,175	29,651
630	1,783	3,992	7,613	13,834	31,134
660	1,867	4,182	7,976	14,493	32,616
690	1,952	4,373	8,338	15,151	34,099

NOTICE Torque values are rounded to the nearest whole unit.

6.2.3 Imperial System Torque Factor Calculation

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

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

	S1500X	S3000X	S6000X	S11000X	S25000X
Torque Factor					
Imperial System:	0.144	0.3225	0.615	1.1175	2.515

6.2.4 Imperial System Pressure/Torque Conversion Table

	S1500X	S3000X	S6000X	S11000X	S25000X
Pump pressure (psi)	Torque (Ft.lbs)	Torque (Ft.lbs)	Torque (Ft.lbs)	Torque (Ft.lbs)	Torque (Ft.lbs)
1,000	144	323	615	1,118	2,515
1,500	216	484	923	1,676	3,773
2,000	288	645	1,230	2,235	5,030
2,500	360	806	1,538	2,794	6,288
3,000	432	968	1,845	3,353	7,545
3,500	504	1,129	2,153	3,911	8,803
4,000	576	1,290	2,460	4,470	10,060
4,500	648	1,451	2,768	5,029	11,318
5,000	720	1,613	3,075	5,588	12,575
5,500	792	1,774	3,383	6,146	13,833
6,000	864	1,935	3,690	6,705	15,090
6,500	936	2,096	3,998	7,264	16,348
7,000	1,008	2,258	4,305	7,823	17,605
7,500	1,080	2,419	4,613	8,381	18,863
8,000	1,152	2,580	4,920	8,940	20,120
8,500	1,224	2,741	5,228	9,499	21,378
9,000	1,296	2,903	5,535	10,058	22,635
9,500	1,368	3,064	5,843	10,616	23,893
10,000	1,440	3,225	6,150	11,175	26,150

NOTICE Torque values are rounded to the nearest whole unit.

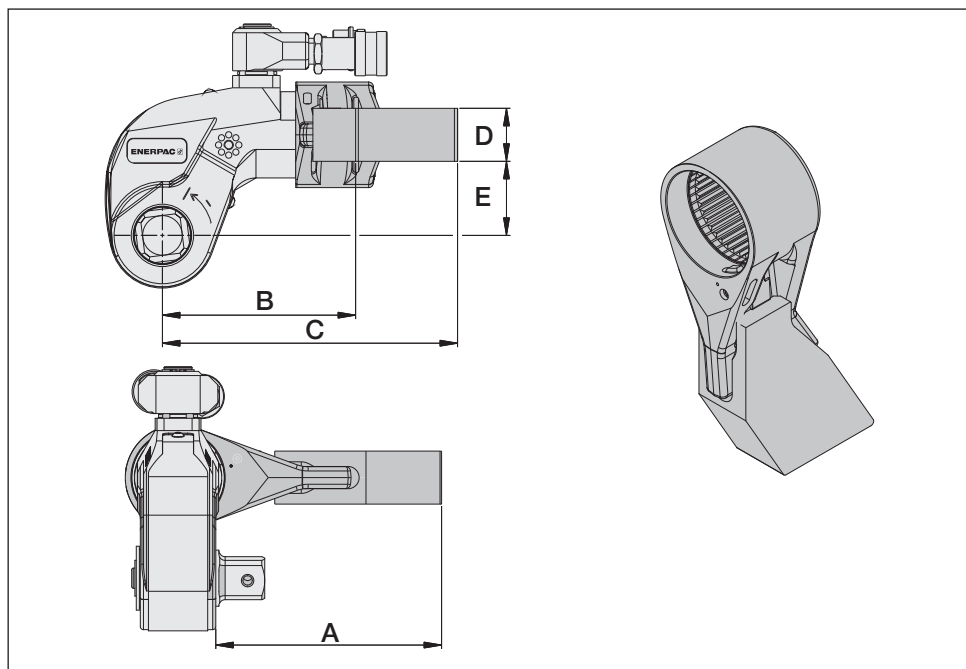



Fig. 29

6.3 Dimensions and Specifications, SRS Series Extended Reaction Arm (Fig. 29)

Wrench Model Number	Max. Torque		SRS Model Number	Dimensions in inch (mm)					 lbs (kg)*
	Ft.lbs	Nm		A	B	C	D	E	
S1500X	1,328	1,801	SRS151X	3.70 [94]	3.39 [86]	5.00 [127]	0.94 [24]	1.34 [34]	1.8 [0.8]
	1,210	1,641	SRS152X	4.69 [119]	3.82 [97]	5.43 [138]	0.94 [24]	1.34 [34]	2.2 [1.0]
	1,131	1,533	SRS153X	5.71 [145]	4.29 [109]	5.83 [148]	0.94 [24]	1.34 [34]	2.6 [1.2]
S3000X	2,890	3,918	SRS301X	4.37 [111]	4.17 [106]	6.61 [168]	1.34 [34]	1.89 [48]	3.5 [1.6]
	2,739	3,712	SRS302X	5.39 [137]	4.61 [117]	7.17 [182]	1.34 [34]	1.89 [48]	4.4 [2.0]
	2,638	3,574	SRS303X	6.38 [162]	5.20 [132]	7.80 [198]	1.34 [34]	1.89 [48]	5.5 [2.5]
S6000X	5,784	7,842	SRS601X	5.43 [138]	5.04 [128]	7.56 [192]	1.54 [39]	2.44 [62]	5.1 [2.3]
	5,501	7,454	SRS602X	6.42 [163]	5.67 [144]	8.15 [207]	1.54 [39]	2.44 [62]	6.0 [2.7]
	5,295	7,175	SRS603X	7.44 [189]	6.26 [159]	8.74 [222]	1.54 [39]	2.44 [62]	7.5 [3.4]
S11000X	10,812	14,650	SRS1101X	5.87 [149]	6.18 [157]	9.13 [232]	1.81 [46]	2.99 [76]	9.7 [4.4]
	10,300	13,957	SRS1102X	6.89 [175]	6.77 [172]	9.72 [247]	1.81 [46]	2.99 [76]	11.2 [5.1]
	9,883	13,391	SRS1103X	7.87 [200]	7.36 [187]	10.28 [261]	1.81 [46]	2.99 [76]	12.8 [5.8]
S25000X	24,751	33,538	SRS2501X	7.20 [183]	8.23 [209]	11.61 [295]	1.97 [50]	3.94 [100]	16.8 [7.6]
	23,652	32,049	SRS2502X	8.19 [208]	8.74 [222]	12.20 [310]	1.97 [50]	3.94 [100]	18.5 [8.4]
	22,694	30,750	SRS2503X	9.17 [233]	9.29 [236]	12.83 [326]	1.97 [50]	3.94 [100]	22.0 [10.0]

* Weights indicated are for the accessories only and do not include the wrench.

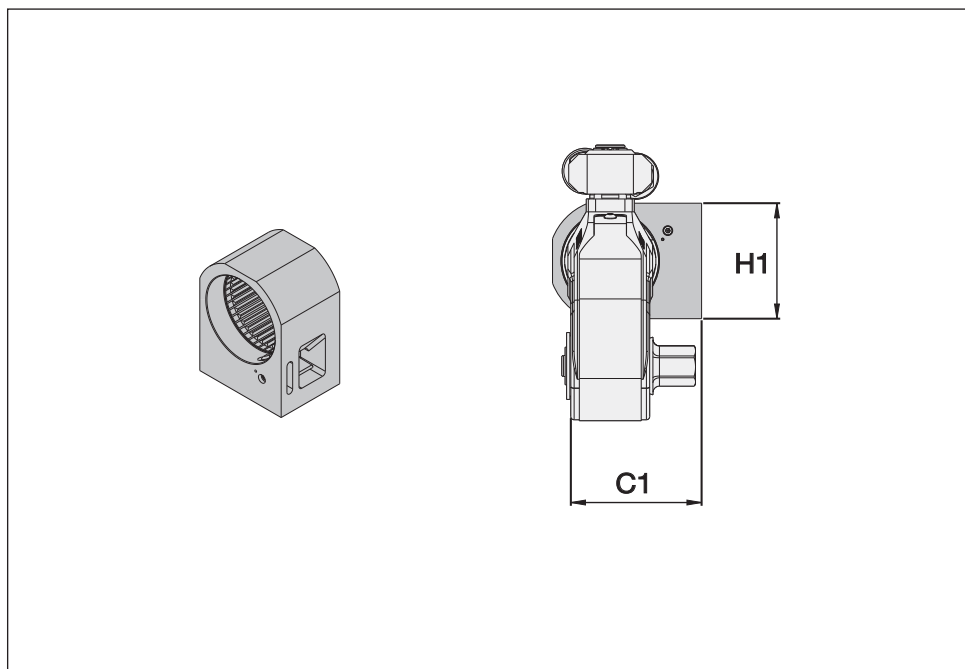



Fig. 30

6.4 Dimensions and Specifications, SRA Series Short Reaction Arms (Fig. 30)

Wrench Model Number		S1500X	S3000X	S6000X	S11000X	S25000X	
SRA Reaction Arm Model Number		SRA15X	SRA30X	SRA60X	SRA110X	SRA250X	
Dimensions	C1	inch [mm]	2.66 [67.5]	3.15 [80.0]	3.60 [91.5]	5.02 [127.5]	6.24 [158.5]
	H1	inch [mm]	2.91 [74.0]	2.91 [74.0]	3.50 [89.0]	4.17 [106.0]	5.31 [135.0]
Weight** (Reaction arm only)		kg	0.30	0.49	0.86	1.75	3.4
		lbs	0.66	1.1	1.9	3.9	7.5

* Weights indicated are for the accessories only and do not include the wrench.

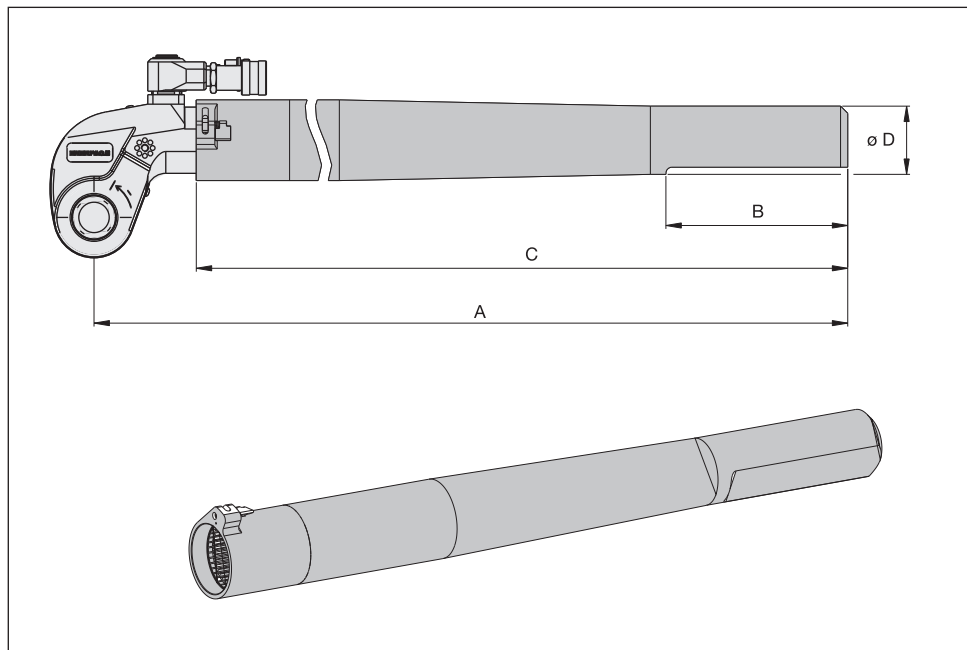



Fig. 31

6.5 Dimensions and Specifications, RTE Series Reaction Tube Extensions (Fig. 31)

Wrench Model Number	RTE Model Number	Dimensions in inch [mm]				 Weight lbs [kg]*
		A	B	C	D	
S1500X	RTE15X	27.80 [706]	5.98 [152]	25.04 [636]	2.28 [58]	10.1 [4.6]
S3000X	RTE30X	28.86 [733]	5.98 [152]	25.47 [647]	2.24 [57]	12.1 [5.5]
S6000X	RTE60X	29.41 [747]	5.98 [152]	25.94 [659]	2.56 [65]	17.0 [7.7]
S11000X	RTE110X	30.28 [769]	5.98 [152]	26.57 [675]	2.99 [76]	24.7 [11.2]
S25000X	RTE250X	32.01 [813]	5.98 [152]	26.97 [685]	3.94 [100]	38.1 [17.3]

* Weights indicated are for the accessories only and do not include the wrench.

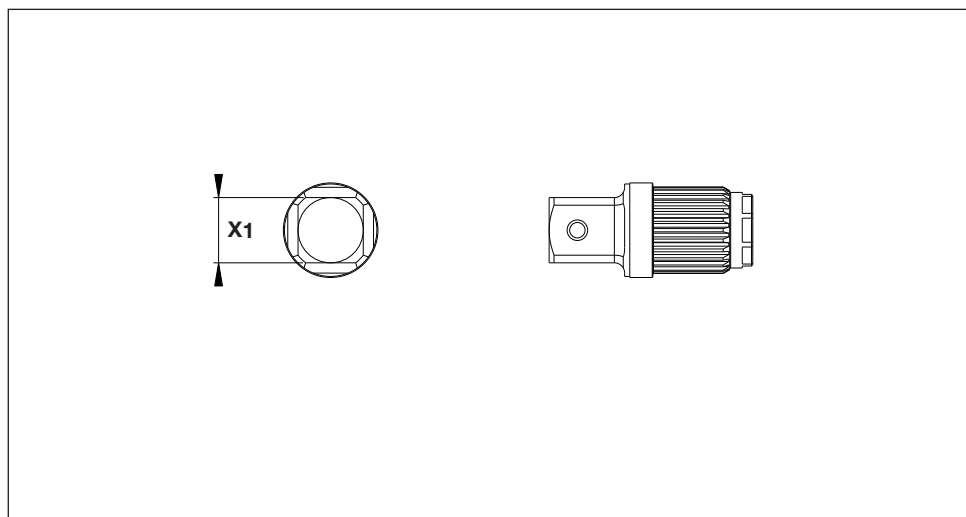


Fig. 32

6.6 Dimensions, SD Series Imperial Square Drives (Fig. 32)

Wrench Model Number	S1500X	S3000X	S6000X	S11000X	S25000X
SWH Square Drive Model Number	SD15-012	SD30-100	SD60-108	SD110-108	SD250-208
Square Drive Dimension X1 (in inches)	3/4	1	1 1/2	1 1/2	2 1/2

6.7 Dimensions, BSH Series Hex Sockets (Fig. 33)

Metric Hex Sockets for S1500X		Metric Hex Sockets for S3000X		Metric Hex Sockets for S6000X and S11000X		Metric Hex Sockets for S25000X	
Model Number	A/F	Model Number	A/F	Model Number	A/F	Model Number	A/F
BSH7519	19	BSH1019	19	BSH1536	36	BSH2565	65
BSH7524	24	BSH1024	24	BSH15163	41	BSH2570	70
BSH7527	27	BSH1027	27	BSH1546	46	BSH2575	75
BSH7530	30	BSH1030	30	BSH1550	50	BSH2580	80
BSH7532	32	BSH1032	32	BSH1555	55	BSH2585	85
BSH7536	36	BSH1036	36	BSH1560	60	BSH2590	90
BSH75163	41	BSH10163	41	BSH1565	65	BSH2595	95
BSH7546	46	BSH1046	46	BSH1570	70	BSH25100	100
BSH7550	50	BSH1050	50	BSH1575	75	BSH25105	105
		BSH1055	55	BSH1580	80	BSH25110	110
		BSH1060	60	BSH1585	85	BSH25115	115
		BSH1065	65	BSH1590	90	BSH25120	120
		BSH1070	70	BSH1595	95	BSH25125	125
		BSH1075	75	BSH15100	100	BSH25135	135
		BSH1080	80	BSH15105	105	BSH25140	140
		BSH1085	85	BSH15110	110	BSH25145	145
		BSH1090	90	BSH15115	115	BSH25150	150
		BSH1095	95			BSH25155	155
		BSH10100	100				

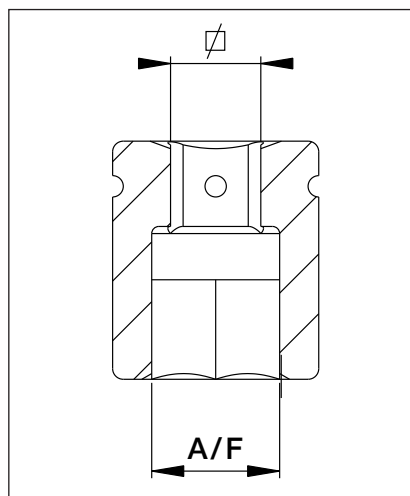


Fig. 33

Imperial Hex Sockets for S1500X			
Model Number	A/F (inch)	Model Number	A/F (inch)
BSH7519	3/4	BSH7538	1 1/2
BSH75088	7/8	BSH75156	1 9/16
BSH75094	15/16	BSH75163	1 5/8
BSH7527	1 1/16	BSH7543	1 11/16
BSH7530	1 3/16	BSH75175	1 3/4
BSH75125	1 1/4	BSH7546	1 13/16
BSH75131	1 5/16	BSH75188	1 7/8
BSH7535	1 3/8	BSH75194	1 15/16
BSH75144	1 7/16	BSH75200	2

6.7 Dimensions, BSH Series Hex Sockets (Fig. 33 - Continued)

Imperial Hex Sockets for S3000X			
Model Number	A/F	Model Number	A/F
BSH1019	3/4	BSH10231	2 5/16
BSH10088	7/8	BSH10238	2 3/8
BSH10094	15/16	BSH10244	2 7/16
BSH1027	1 1/16	BSH10250	2 1/2
BSH1030	1 3/16	BSH1065	2 9/16
BSH10125	1 1/4	BSH10263	2 5/8
BSH10131	1 5/16	BSH10269	2 11/16
BSH1035	1 3/8	BSH1070	2 3/4
BSH10144	1 7/16	BSH10281	2 13/16
BSH1038	1 1/2	BSH10288	2 7/8
BSH10156	1 9/16	BSH1075	2 15/16
BSH10163	1 5/8	BSH10300	3
BSH1043	1 11/16	BSH10306	3 1/16
BSH10175	1 3/4	BSH10313	3 1/8
BSH1046	1 13/16	BSH10319	3 3/16
BSH10188	1 7/8	BSH10325	3 1/4
BSH10194	1 15/16	BSH10338	3 3/8
BSH10200	2	BSH10350	3 1/2
BSH10206	2 1/16	BSH10363	3 5/8
BSH10213	2 1/8	BSH1095	3 3/4
BSH10219	2 13/16	BSH10388	3 7/8
BSH10225	2 1/4		

Imperial Hex Sockets for S6000X and S11000X			
Model Number	A/F	Model Number	A/F
BSH15144	1 7/16	BSH15281	2 13/16
BSH1538	1 1/2	BSH15288	2 7/8
BSH15156	1 9/16	BSH1575	2 15/16
BSH15163	1 5/8	BSH15300	3
BSH1543	1 11/16	BSH15306	3 1/16
BSH15175	1 3/4	BSH15313	3 1/8
BSH1546	1 13/16	BSH15319	3 3/16
BSH15188	1 7/8	BSH15325	3 1/4
BSH15194	1 15/16	BSH15338	3 3/8
BSH15200	2	BSH15350	3 1/2
BSH15206	2 1/16	BSH15363	3 5/8
BSH15213	2 1/8	BSH1595	3 3/4
BSH15219	2 3/16	BSH15388	3 7/8
BSH15225	2 1/4	BSH15100	3 15/16
BSH15231	2 5/16	BSH15400	4
BSH15238	2 3/8	BSH15105	4 1/8
BSH15244	2 7/16	BSH15419	4 3/16
BSH15250	2 1/2	BSH15425	4 1/4
BSH1565	2 9/16	BSH15110	4 5/16
BSH15263	2 5/8	BSH15438	4 3/8
BSH15269	2 11/16	BSH15450	4 1/2
BSH1570	2 3/4	BSH15463	4 5/8

Imperial Hex Sockets for S25000X					
Model Number	A/F	Model Number	A/F	Model Number	A/F
BSH25244	2 7/16	BSH25338	3 3/8	BSH25475	4 3/4
BSH25250	2 1/2	BSH25350	3 1/2	BSH25488	4 7/8
BSH2565	2 13/16	BSH25363	3 5/8	BSH25500	5
BSH25263	2 5/8	BSH2595	3 3/4	BSH25513	5 1/8
BSH25269	2 11/16	BSH25388	3 7/8	BSH25519	5 3/16
BSH2570	2 3/4	BSH25100	3 15/16	BSH25525	5 1/4
BSH25281	2 11/16	BSH25400	4	BSH25538	5 3/8
BSH25288	2 7/8	BSH25105	4 1/8	BSH25140	5 1/2
BSH2575	2 15/16	BSH25419	4 13/16	BSH25575	5 3/4
BSH25300	3	BSH25425	4 1/4	BSH25150	5 7/8
BSH25306	3 1/16	BSH25110	4 5/16	BSH25600	6
BSH25313	3 1/8	BSH25438	4 3/8	BSH25613	6 1/8
BSH25319	3 3/16	BSH25450	4 1/2		
BSH25325	3 1/4	BSH25463	4 5/8		

6.8 Dimensions and Specifications, Metric SDA Series Allen Key Drives (Fig. 34)

Wrench Model Number	Allen Key Drive Model Number	Hex Size Dimension X2	Nominal Torque		Dimension B1		Use with Short Reaction Arm Model Number: (see Section 6.4)
		mm	Nm	Ft.lbs	mm	inch	
S1500X	SDA15-14	14	644	475	66	2.60	SRA15X
	SDA15-17	17	1,152	850	68	2.68	
	SDA15-19	19	1,607	1,185	70	2.76	
	SDA15-22	22	1,952	1,440	73	2.87	
	SDA15-24	24	1,952	1,440	74	2.91	
S3000X	SDA30-17	17	1,152	850	77	3.03	SRA30X
	SDA30-19	19	1,607	1,185	79	3.11	
	SDA30-22	22	2,488	1,835	82	3.23	
	SDA30-24	24	3,234	2,385	84	3.31	
	SDA30-27	27	4,373	3,225	85	3.35	
	SDA30-30	30	4,373	3,225	87	3.43	
	SDA30-32	32	4,373	3,225	88	3.46	
S6000X	SDA60-17	17	1,152	850	86	3.39	SRA60X
	SDA60-19	19	1,607	1,185	88	3.46	
	SDA60-22	22	2,488	1,835	91	3.58	
	SDA60-24	24	3,234	2,385	93	3.66	
	SDA60-27	27	4,603	3,395	94	3.70	
	SDA60-30	30	6,311	4,655	96	3.78	
	SDA60-32	32	7,660	5,650	97	3.82	
S11000X	SDA110-30	30	6,311	4,655	112	4.41	SRA110X
	SDA110-32	32	7,660	5,650	114	4.49	
	SDA110-36	36	10,901	8,040	117	4.61	
	SDA110-41	41	15,151	11,175	121	4.76	
	SDA110-46	46	15,151	11,175	127	5.00	
S25000X	SDA250-36	36	10,901	8,040	140	5.51	SRA250X
	SDA250-41	41	16,107	11,880	144	5.67	
	SDA250-46	46	22,744	16,755	148	5.83	
	SDA250-50	50	29,211	21,545	151	5.94	
	SDA250-55	55	35,455	26,150	154	6.06	
	SDA250-60	60	35,455	26,150	158	6.22	
	SDA250-65	65	35,455	26,150	161	6.34	
	SDA250-70	70	35,455	26,150	164	6.46	
	SDA250-75	75	35,455	26,150	168	6.61	
SDA250-85	85	35,455	26,150	175	6.89		

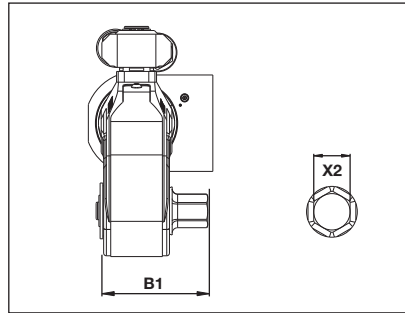


Fig. 34

6.9 Dimensions and Specifications, Imperial SDA Series Allen Key Drives (Fig. 34)

Wrench Model Number	Allen Key Drive Model Number	Hex Size Dimension X2	Nominal Torque		Dimension B1		Use with Short Reaction Arm Model Number: (see Section 6.4)
		inch	Nm	Ft.lbs	mm	inch	
S1500X	SDA15-008	1/2	481	475	66	2.6	SRA15X
	SDA15-010	5/8	936	690	67	2.7	
	SDA15-012	3/4	1,620	1,195	71	2.8	
	SDA15-014	7/8	1,952	1,440	74	2.9	
	SDA15-100	1	1,952	1,440	77	3.0	
S3000X	SDA30-010	5/8	936	690	77	3.0	SRA30X
	SDA30-012	3/4	1,620	1,195	80	3.1	
	SDA30-014	7/8	2,569	1,895	83	3.3	
	SDA30-100	1	3,830	2,825	86	3.4	
	SDA30-102	1 1/8	4,373	3,225	88	3.5	
S6000X	SDA30-104	1 1/4	4,373	3,225	89	3.5	SRA60X
	SDA60-010	5/8	936	850	85	3.3	
	SDA60-012	3/4	1,620	1,195	89	3.5	
	SDA60-014	7/8	2,569	1,895	92	3.6	
	SDA60-100	1	3,830	2,825	95	3.7	
	SDA60-102	1 1/8	5,457	4,025	97	3.8	
S11000X	SDA60-104	1 1/4	7,484	5,520	98	3.9	SRA110X
	SDA110-104	1 1/4	7,484	5,520	115	4.5	
	SDA110-106	1 3/8	9,958	7,032	117	4.6	
	SDA110-108	1 1/2	12,928	9,535	118	4.6	
	SDA110-110	1 5/8	15,151	11,175	122	4.8	
S25000X	SDA110-112	1 3/4	15,151	11,175	125	4.9	SRA250X
	SDA250-108	1 1/2	12,928	9,535	141	5.5	
	SDA250-110	1 5/8	16,433	12,120	145	5.7	
	SDA250-112	1 3/4	20,520	15,135	148	5.8	
	SDA250-114	1 7/8	25,245	18,620	149	5.9	
	SDA250-200	2	30,635	22,595	151	6.9	
SDA250-204	2 1/4	35,455	26,150	154	6.0		

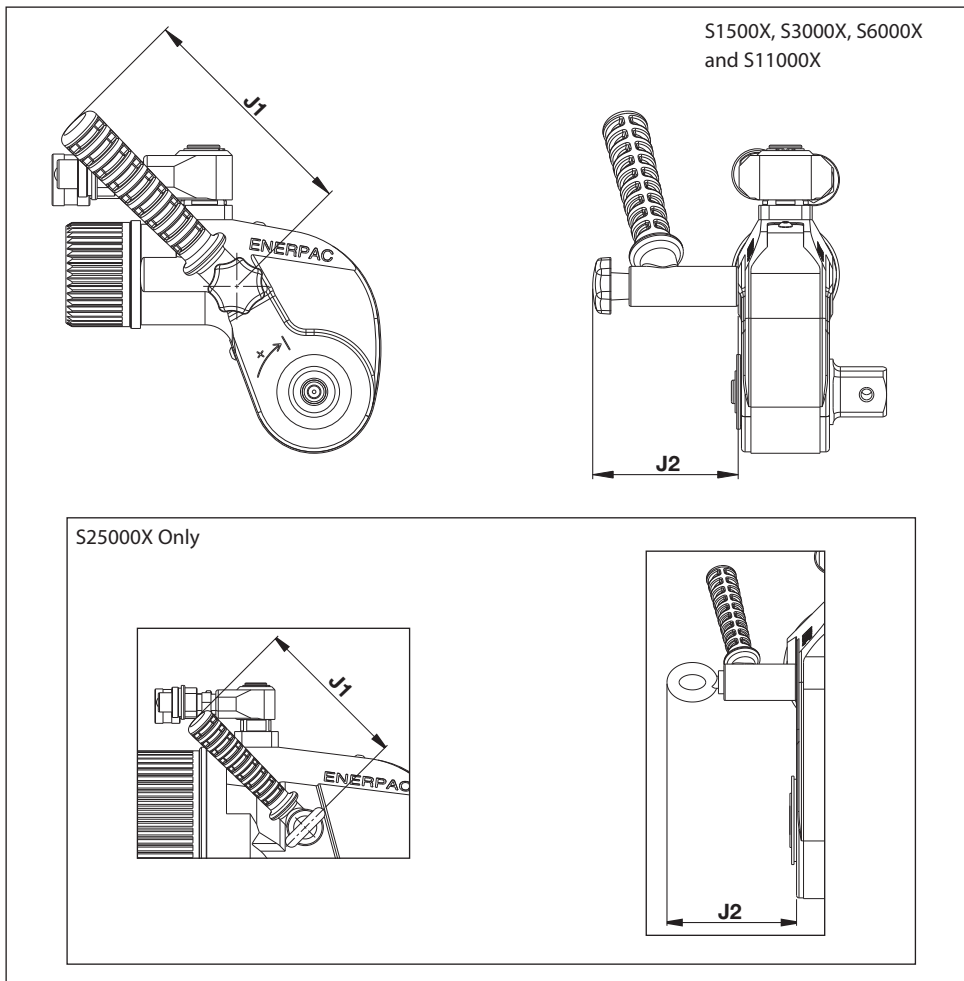



Fig. 35

6.10 Dimensions and Specifications, SWH Series Angled Positioning Handle (Fig. 35)

Wrench Model Number		S1500X	S3000X	S6000X	S11000X	S25000X
SWH Handle Model Number		SWH6A	SWH6A	SWH10A	SWH10A	SWH10EA
Dimensions	J1	inch [mm]	5.04 [128]	5.04 [128]	5.04 [128]	5.04 [128]
	J2	inch [mm]	3.15 [80]	3.15 [80]	3.62 [92]	4.21 [107]
Weight* (handle only)		kg	0.10	0.10	0.18	0.18
		lbs	0.22	0.22	0.40	0.40

* Weights indicated are for the accessories only and do not include the wrench.

7 Replacement Parts and Required Tools

7.1 Ordering Replacement Parts

For replacement parts information, refer to the Enerpac repair parts sheet for your wrench model.

Repair parts sheets are available on the internet at www.enerpac.com.

Have the following information ready when ordering replacement parts:

- Wrench model and serial numbers (for both drive unit and cassette).
- Approximate date of purchase.
- Part number and description of each part being ordered.

7.2 Required Tools - S-Series Torque Wrenches

Tool	Wrench Model Number				
	S1500X	S3000X	S6000X	S11000X	S25000X
7/8 inch A/F Spanner	•	•	•	•	•
3/4 inch A/F Spanner	•	•	•	•	•
5/8 inch A/F Spanner	•	•	•	•	•
Circlip Pliers	•	•	•	•	•
Seal Extraction Tool (seal pick)	•	•	•	•	•
14 mm A/F Socket	•	---	---	---	---
20 mm A/F Socket	---	•	---	---	---
22 mm A/F Socket	---	---	•	---	---
26 mm A/F Socket	---	---	---	•	---
36 mm A/F Socket	---	---	---	---	•
ø 4 mm x 5 mm LG x 20 mm PCD Pin Spanner	•	---	---	---	---
ø 4 mm x 5 mm LG x 25 mm PCD Pin Spanner	---	•	---	---	---
ø 4 mm x 5 mm LG x 30 mm PCD Pin Spanner	---	---	•	---	---
ø 4 mm x 5 mm LG x 40 mm PCD Pin Spanner	---	---	---	•	---
ø 5 mm x 5 mm LG x 60 mm PCD Pin Spanner	---	---	---	---	•
1.5 mm A/F Allen Key	•	•	•	•	•
2.0 mm A/F Allen Key	•	---	---	---	---
2.5 mm A/F Allen Key	•	•	•	---	---
3.0 mm A/F Allen Key	•	•	---	•	•
4.0 mm A/F Allen Key	---	---	•	•	•

NOTICE Tools shown above for your wrench model are required to help maintain and repair the wrench. This should not be considered as an all-inclusive list. Additional tools, supplies and shop equipment may be required, depending on the maintenance or repair operation being performed.

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