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Operating Manual for:
TWSL Series

CE

Original Instructions

SlimLine Hydraulic Torque Wrench

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Torque Wrench SlimLine (TWSL)

Description: The TWSL torque wrench is a ratchet-type torque tool for tightening nuts and bolts. It uses interchangeable drive links to fit a variety of sizes. It is powered with a 690 bar (10,000 psi) hydraulic pump unit; the torque output from the TWSL torque wrench is proportional to the pump pressure applied.

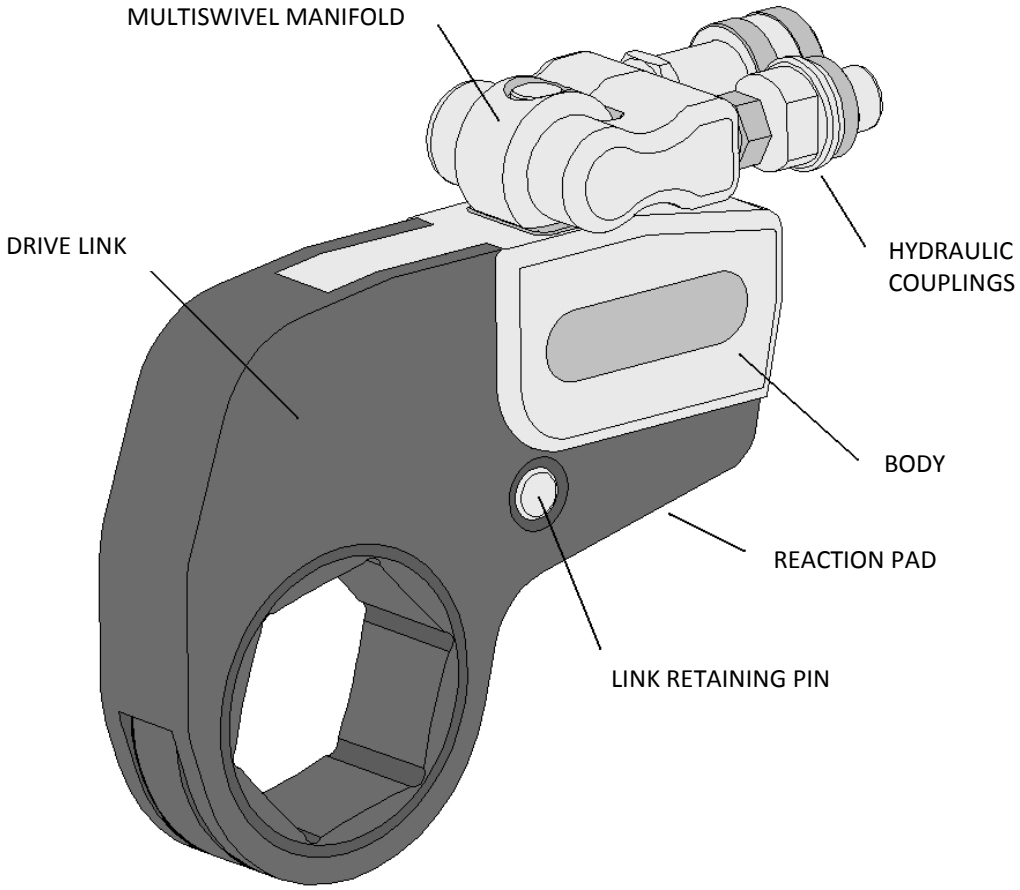


Figure 1. TWSL Hydraulic Torque Wrench

Safety Symbols and Definitions

The safety signal word designates the degree or level of hazard seriousness.

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION: Used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

IMPORTANT: Important is used when action or lack of action can cause equipment failure, either immediately or over a long period of time.

Safety Precautions

WARNING: To prevent personal injury,

- The following procedures must be performed by qualified, trained personnel who are familiar with this equipment. Operators must read and understand all safety precautions and operating instructions included with the device. If the operator cannot read these instructions, operating instructions and safety precautions must be read and discussed in the operator's native language.
- These products are designed for general use in normal environments. These products are not designed for use in special work environments such as: explosive, flammable or corrosive. Only the user can decide the suitability of this product in these conditions or extreme environments. SPX Bolting Systems will supply information necessary to help make these decisions. Consult your nearest SPX Bolting Systems facility.

- Safety glasses must be worn at all times by the operator and anyone within sight of the unit. Additional personal protection equipment may include: face shield, goggles, gloves, apron, hard hat, safety shoes and hearing protection.

- The owner of this tool must verify that safety-related decals are installed, maintained and replaced if they become hard to read.
- Shut OFF the motor before opening any connections in the system.

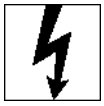
Pump

WARNING: To prevent personal injury,

- Do not exceed the hydraulic pressure rating on the pump nameplate or tamper with the internal high pressure relief valve. Creating pressure beyond rated capacities can result in personal injury.
- Retract the system before adding fluid to prevent overfilling the pump reservoir. An overfill can cause personal injury due to the excess reservoir pressure created when cylinders are retracted.

Electric Motor

WARNING: To prevent personal injury,



- Electrical work must be performed and tested by a qualified electrician per local directives and standards.
- Disconnect the pump from the power supply and relieve pressure before removing the motor case cover or performing maintenance or repair.
- Check the total amperage draw for the electrical circuit you will be using. *For example: Do not connect a pump that may draw 25 amps to a 20 amp fused electrical circuit.*
- Never use an ungrounded power supply with this unit.
- Changing the voltage is an involved and, if incorrectly performed, hazardous procedure. Consult the manufacturer for specific information before attempting rewiring.
- Wire pump motors for counter clockwise rotation when viewed from the shaft end of the motor.

- Do not attempt to increase the power line capacity by replacing a fuse with another fuse of higher value. Overheating the power line may result in a fire.
- Exposing electric pumps to rain or water could result in an electrical hazard.
- Avoid conditions that can cause damage to the power cord, such as abrasion, crushing, sharp cutting edges or corrosive environment. Damage to the power cord can cause an electrical hazard.

Hoses

WARNING: To prevent personal injury,

- Before operating the pump, tighten all hose connections using the correct tools. Do not overtighten. Connections should be only secure and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.

- Should a hydraulic hose rupture, burst or need to be disconnected, immediately shut off the pump and shift the control valve twice to release pressure. Never attempt to grasp a leaking hose under pressure with your hands. The force of escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard, such as fire, sharp surfaces, heavy impact, or extreme heat or cold. Do not allow the hose to kink, twist, curl or bend so tightly that the fluid flow within the hose is blocked or reduced. Periodically inspect the hose for wear because any of these conditions can damage the hose and possibly result in personal injury.
- Do not use the hose to move attached equipment. Stress can damage the hose and possibly cause personal injury.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses must also not come in contact with corrosive material such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials may result in personal injury.

Initial Setup

Each hydraulic torque wrench is supplied completely assembled and ready for use. A hydraulic pump is required to provide the speed and pressure that makes the hydraulic wrench system efficient and accurate.

1. Read and understand all instructions before operating the hydraulic torque wrench. It is the operator's responsibility to read, understand, and follow all safety instructions.
2. Remove the hydraulic torque wrench from the shipping container and visually inspect all components for any shipping damage. If any damage is found, notify the carrier immediately. DO NOT USE TOOL.

Power Requirements

The TWSL hydraulic torque wrench requires a hydraulic pump unit, twin-line connecting hose, and couplings to operate. All components must be capable of operating at the system maximum working pressure of 690 bar (10,000 psi). Note that the system maximum working pressure is dynamic, not static.

Pump unit specification varies between manufacturers; however, for correct torque wrench operation, the pump unit must include the following:

Double Acting—Pump unit must be capable of double acting operation for advancing and retracting the Torque Wrench.

Variable Pressure Output—For torque setting, the pump unit must be able to be easily adjusted by the operator for different pressure outputs.

Retract Pressure—Sometimes termed 'idle' pressure, this is the pressure used for torque wrench retraction and must be fixed at approximately 103 bar (1,500 psi). This pressure must not be operator adjustable.

Remote Handset Controls—The preferred configuration for the handset is such that, upon starting the pump unit, the pump enters retract or idle mode (pressure fixed at 103 bar (1,500 psi)). To advance the torque wrench, the handset advance/pressure button or lever is pressed and held, upon release of the button, retract mode is automatically entered. A separate button or lever is used to stop the pump.

Automatic Pressure Release—The pump must automatically release system pressure when switching between advance and retract modes.

Pump Flow Rate—The speed at which the hydraulic torque wrench operates is proportional to the oil flow rate. In general, 2-stage pump units are preferred for torque wrench use as this allows rapid nut rotation under low loads, with fast wrench retraction. As a minimum, 250 cm^3/min @ 7 bar (15 ci/min @ 100 psi) to 20 cm^3/min @ 690 bar (1.2 ci/min @ 10,000 psi) should be specified; however, for optimum speed and performance, at least 360 cm^3/min @ 7 bar (22 ci/min @ 100 psi) to 30 cm^3/min @ 690 bar (1.8 ci/min @ 10,000 psi) is recommended.

Pressure Gauge—Clarity is important for accurate torque setting; therefore, a pressure gauge of at least 100-mm (4-in.) diameter should be fitted.

Hydraulic Couplings—TWSL hydraulic torque wrenches are fitted with CEJN 230 screw-to-connect couplings (1/4-in. NPT) as standard. Verify any couplings that are used are compatible with these couplings and rated to the same working pressure, e.g. Parker 3000 couplings.

SPX Bolting Systems will not be responsible for torque wrench damage, malfunction or operator injury caused by the use of an incorrect pump unit; therefore, check the compatibility of your pump unit before operating the hydraulic torque wrench.

Torque Wrench Usage

To ensure reasonable life and performance from the torque wrench and system (pump and hoses), these guidelines should be followed:

- Under normal use, the torque wrench should be limited to 75–80% of its maximum achievable torque output.
- Under breakout conditions, because the bolt can suddenly break free and result in shock loads, jumping/jolting, it is recommended to limit the wrench output torque to 60–70% of maximum achievable torque output. It is also a good idea to have torque in reserve for the odd stubborn bolt/ nut.
- Once a corroded bolt has broken free, do not use a torque wrench to wind the nut from the bolt. This can cause the nut to bind and lock onto the bolt and make it impossible to remove. It is preferred that a nut runner or impact wrench be used to remove the nut following initial breakout by hydraulic torque wrench.
- Occasional use of the torque wrench at maximum pressure/torque is acceptable, but unnecessary continuous use at maximum pressure will reduce the life of the torque wrench and system. **Certain TWSL size links cannot be used at the full system pressure of 10,000 psi, these links have the maximum torque/pressure engraved on the links, which must NOT be exceeded.**
- In elevated temperature environments, it is advisable to cool the torque wrench as much as practical to maintain the sealing systems in good order. Depending upon the pressure applied to the wrench, repeated use in temperatures in excess of 40°C (104°F) will affect the life of the hydraulic seals.

  If the temperatures are likely to exceed 40°C (104°F), it is advisable to use a larger capacity wrench so that the pressure to achieve the required torque is reduced. This will result in less temperature buildup and less softening of the seals.

  Seals should be replaced regularly because, at elevated temperatures, the extrusion resistance of the seal is reduced.

Connecting the System

The hydraulic wrench head and power pack are connected by a 690 bar (10,000 psi) twin-line hose assembly. Refer to the power-unit manufacturer's operating instructions for proper use.

Hydraulic Connections

- Never connect or disconnect any hydraulic hoses or fittings without first unloading the wrench and the pump.
- Open all hydraulic controls several times to verify the system has been completely depressurized.
- If the system includes a gauge, double check the gauge to verify pressure has been released.
- When making connections with quick-disconnect coupling, verify the couplings are fully engaged. Threaded connections such as fittings, gauges, etc., must be securely tightened and leak-free.

Safety

The TWSL hydraulic torque wrench is a high-power hydraulic tool. It is strongly recommended that all users are fully trained and competent in the use of hydraulic torque wrench systems. Incorrect use of the equipment or failure to follow any of the safety precaution included herein could lead to serious injury.

NOTE: The TWSL torque wrench is designed for torque tightening of engineering nuts only. Do not use it for any other purpose.

- Never exceed the hydraulic torque wrench Body maximum working pressure of: Advance 690 bar (10,000 psi) and Retract 103 bar (1,500 psi). **Certain TWSL size links cannot be used at the full system pressure of 10,000 psi, these links have the maximum torque/pressure engraved on the links, which must NOT be exceeded. If over pressurisation of the links is evident, the warranty shall be invalid and the Manufacturer shall not be responsible for any injuries or failures as a result.**
- Keep hands and fingers clear of the hydraulic torque wrench head and reaction pad area, before and during operation.
- Keep other personnel clear of the working area and only allow trained personnel to use the equipment.
- Before operation, verify all hoses and equipment are in proper working order. Verify all hydraulic torque wrench components (i.e. link, body etc.) are properly attached and secure. Verify the head retaining pin is properly located.
- Do not strike any of the components, to shock the nut free.
- Verify reaction structures are strong and rigid enough to accept the torque tool reaction forces. Do not use wedges, packing pieces, etc. as temporary reaction structures.
- If backing wrenches are used, keep hands and limbs well clear of the backing wrench.
- Do not tighten any equipment while under pressure. Do not move or rotate the multiswivel manifold while under pressure.
- Some hydraulic torque wrenches weigh in excess of 20 Kg (44 lb). If necessary, lifting equipment can be used.
- In some instances, it may be necessary for the operator to support the hydraulic torque wrench while it is tightening, i.e. upside-down operations. If the hydraulic torque wrench cannot be strapped into position using ropes, etc., the operator must take care to avoid pinch points.
- Verify hoses are in good condition and undamaged. Do not bend hoses beyond their safe bend radius limit or kink the hose.
- Never use the hydraulic torque wrench with just one hose connected to the Advance port (Port A). This will cause the pressure to intensify within the retract chamber possibly leading to tool damage. Always verify that both hoses are correctly connected.
- Take care when handling equipment. Quick connect couplings are especially susceptible to knocks and damage and therefore care must be taken. Note that damaged couplings are difficult to connect. Do not force couplings.
- Do not strike, misuse or abuse any of the equipment. If any abuse or misuse of the equipment is evident, the warranty shall be invalid and the Manufacturer shall not be responsible for any injuries or failures as a result.
- If not in use, and when practical, disconnect the wrench and pump from the power supply to prevent accidental starting.

Preparing the Torque Wrench for Use

IMPORTANT: For a copy of the calibration certificate for a specific hydraulic torque wrench, e-mail info@spxboltingsystems.com with serial number of the hydraulic torque wrench.

CAUTION: For top performance, frequently inspect wrench, pump, and accessories for visual damage. Always follow instructions for proper wrench and pump maintenance. Do not use other equipment to increase the capability (i.e. hammering on wrench).

Assembling/Removing the Drive Link

See Figure 2. Before the TWSL hydraulic torque wrench can be used, the correct drive link for the nut must be fitted to the TWLC body. No special tools are needed to change the drive link. If a drive link is already assembled, it can be detached by pushing out the link retaining pin, and simply lifting out the body. The drive assembly will auto-disengage.

NOTE: The hydraulic torque wrench must be fully retracted before the link can be removed or attached.

WARNING: Disconnect from the hydraulic supply before attempting to change the torque wrench link. Operating the wrench without the link attached exposes the moving piston drive mechanism, and can result in trapped fingers or other injury.

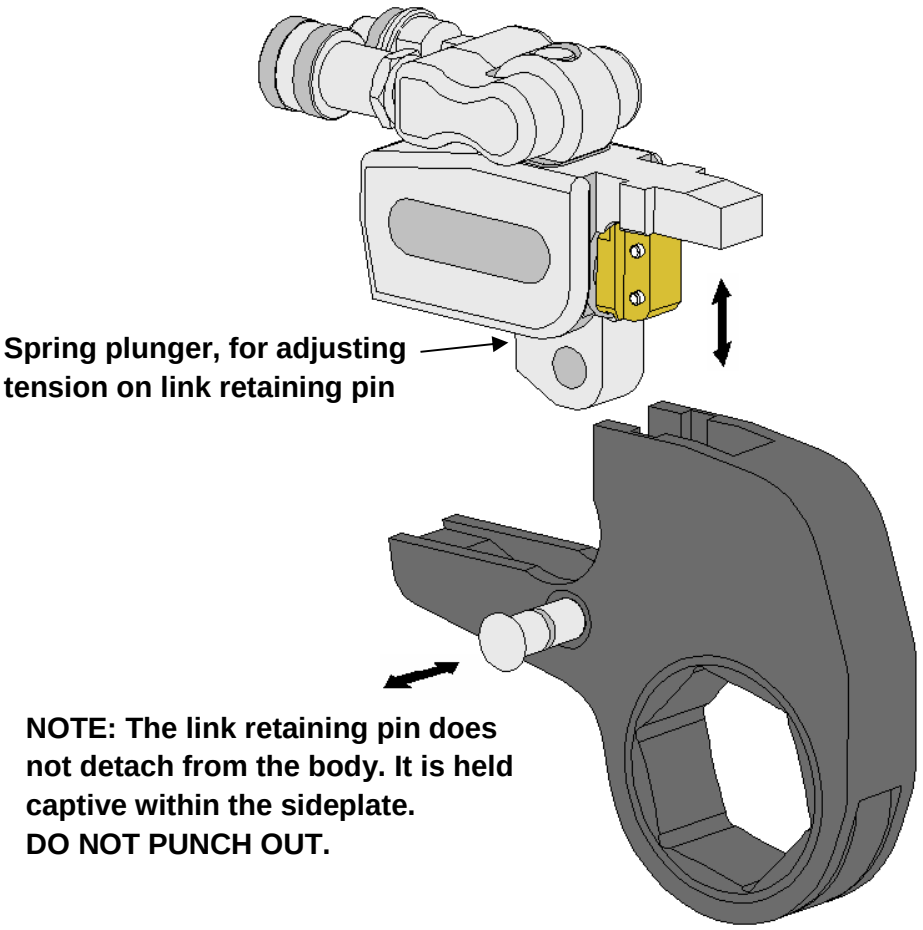


Figure 2. Body and Drive Link Removal and Attachment

See Figure 2. To assemble a link, position the link onto the body, engaging the keyways on the inner surface of the link sideplates with the keys on the body. Slide the link fully onto the body and push the link retaining pin back into position.

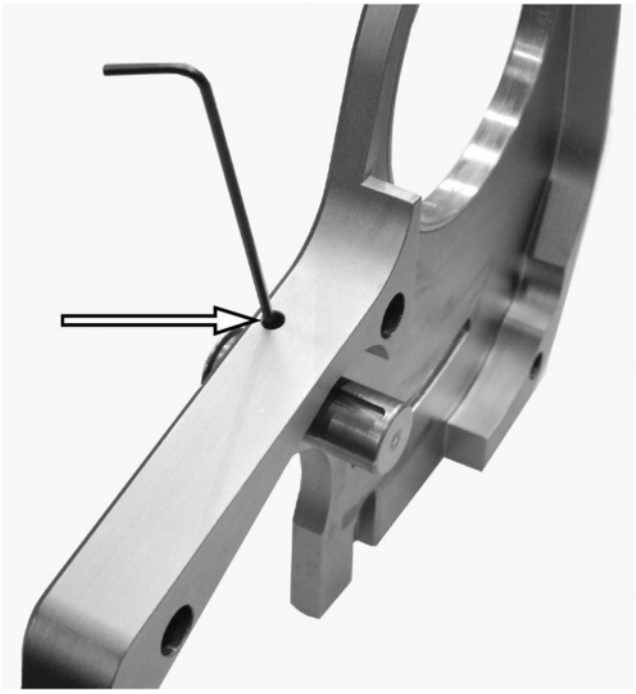


Figure 3. Link Retaining Pin Setscrew

Verify the link retaining pin is fully engaged as damage to the body can occur if operated with a partially engaged pin. Regularly check that the pin is fully engaged during operation as handling and movements of the wrench can cause the pin to dislodge. See figure 3, the setscrew prevents the link retaining pin from coming out completely however the pin can partially disengage during use.
See figure 2. If necessary, the tension on the link retaining pin can be adjusted by rotating the spring plunger located in the wrench body.

Setting Torque

1. Verify the system is fully connected and the proper power supply is available.
2. Refer to the Pressure/Torque Conversion Chart in the Performance Specifications section to determine the required pump pressure. **Certain TWSL size links cannot be used at the full system pressure of 10,000 psi, these links have the maximum torque/pressure engraved on the links, which must NOT be exceeded.** Note that this pressure is set on the pump.
3. Turn on the pump.
4. Press and hold the remote control button.
5. Check the pressure on the gauge.
6. Increase or decrease pressure as required. Refer to pump manufacturer's operating instructions.
7. Before tightening a nut, press the remote control button and confirm the correct pressure has been set.
8. Verify that the bolt threads, nut threads, and nut-to-flange contact faces are liberally coated with anti-seize lubricant of the same friction coefficient used to derive the torque value.

9. Make sure the hydraulic torque wrench is suitable to deliver the required torque. Should the torque value exceed 80% of the hydraulic torque wrench output, consider using a higher capacity hydraulic torque wrench.
10. Verify that the link to be used is of the correct type and size. A poor fitting or oversized link can damage nuts, induce inaccurate bolt loads, and may result in operator injury.

NOTE: When positioning the wrench, verify the hose connection will not hit any stationary object, which can result in snapping a hose connection or breaking the coupler connection.

NOTE: TWSL torque wrenches are equipped with a pressure-release valve built into the multiswivel manifold to protect against retract pressure intensification should the retract port hydraulic coupling not be fully connected or become loose during use. If an intensification occurs, the valve will bleed hydraulic oil externally from the manifold yoke. Oil bleeding from the swivel manifold is not a sign of seal leakage.

11. Before applying the hydraulic torque wrench to the application, the pump output pressure must be pre-set to relieve at the pressure obtained from the Pressure/Torque Conversion Chart. This can be done with the hydraulic torque wrench connected to the pump and resting on the floor or bench. Applying advance pressure to the hydraulic torque wrench will extend the piston until it reaches the end of its stroke whereby the pump pressure will build. Holding the wrench at the end of its stroke will allow the pump pressure to be adjusted. Retract the hydraulic torque wrench piston and advance again making sure that the pump relieves at the desired pressure setting. The pump pressure can also be set by blanking the pump outlets using blank couplings.

NOTE: Allow time for the wrench to retract. If another advance stroke is made before the torque wrench has fully retracted, the ratchet mechanism may not engage correctly, causing it to jump a ratchet tooth, and possibly damaging the ratchet. Before applying another advance stroke, make sure the pump is idling at 103 bar (1,500 psi), which indicates full retraction.

Operating Instructions

Positioning the Hydraulic Torque Wrench on the Nut

The TWSL hydraulic torque wrench fits directly around the nut, with its built in reaction pad designed to brace against an adjacent nut. Figure 4 indicates correct position of the hydraulic torque wrench (shown in tightening mode). Always verify that the reaction pad braces firmly against an adjacent nut or secure reaction structure.

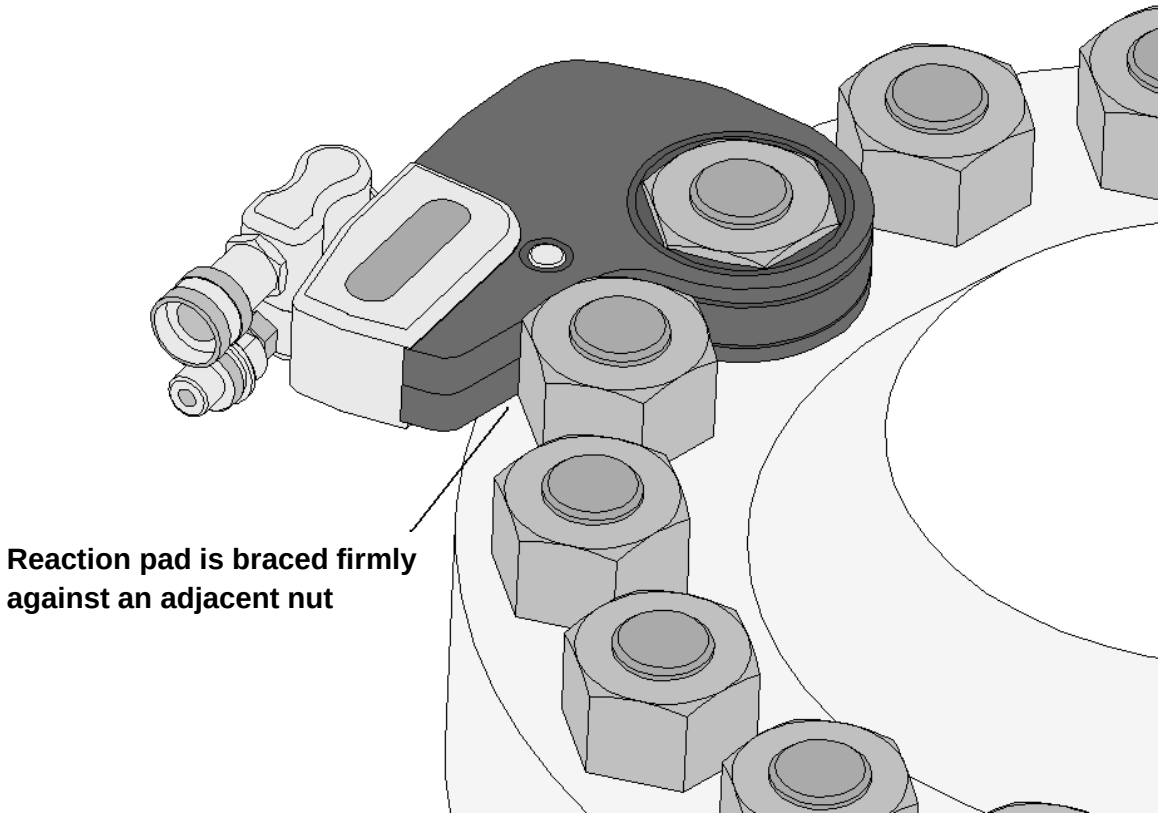


Figure 4. Correct Positioning of the Hydraulic Torque wrench

Reaction Point Safety

Follow these guidelines when selecting appropriate reaction points:

- The reaction structure must be rigid enough to accommodate the forces from the hydraulic torque wrench. Carefully inspect the reaction points for suitability before applying the torque tool. If in doubt, contact the torque wrench supplier for advice.
- Tapered surfaces are generally unsuitable as the torque wrench tends to 'ride up' the taper, causing adverse tool loads. Flat surfaces are preferred.
- Packing pieces, spacers, etc. must never be used as a makeshift reaction point. Reaction accessories are available to increase the access to reaction points.

Use of Backing Wrenches

Backing wrenches are often used to prevent the non-tightening nut on the opposite side of the joint assembly from turning during the torquing operation. Verify that the backing wrench is the correct size and securely fastened in position (using straps, ropes, etc.). As the torquing operation begins, it is normal for the backing wrench to move/rotate in conjunction with the torqued nut, until the backing wrench contacts an adjacent reaction point. It is important that the operator stand clear of the moving backing wrench to prevent accidental entrapment. The operator must also verify that the reaction point is secure and sufficiently rigid to prevent damage to the structure.

Torque Wrench Selection

To choose the correct capacity Torque Wrench for the application, the estimated break-out torque should be considered, not the tightening torque. Loosening bolts usually requires a higher torque, and if a wrench has been selected on tightening criteria only, it will seldom perform in a break-out situation.

Break-out Considerations

Nuts / Bolts which have been correctly lubricated at the make-up / tightening stage will require approximately 1.5 x tightening torque to loosen following a period of service, PROVIDED THEY HAVE NOT BEEN SUBJECTED TO HEAT.

Corroded / rusted bolts, and bolts without lubrication applied at make-up, will require approximately 2 x tightening torque to loosen. PROVIDED THEY HAVE NOT BEEN SUBJECTED TO HEAT.

Nuts / bolts subjected to heat, seawater corrosion, chemical corrosion, can require 3 to 4 x tightening torque.

Before selecting a torque wrench for the application, ensure that the above has been considered.

Tightening Bolts

1. Apply the torque wrench to the nut to be tightened and verify that the reaction pad is braced firmly and squarely against the selected reaction point.
2. Start the pump and advance the hydraulic torque wrench. As the wrench strokes forward, the reaction pad will press against the reaction point and the nut will rotate. When the hydraulic torque wrench reaches the end of its stroke, the pump pressure will build rapidly. Fully retract the hydraulic torque wrench (the wrench ratchet mechanism will be heard clicking as it retracts), and apply another forward stroke.
3. Several forward strokes are made until the nut ceases to rotate during the stroke (known as stalling), but bear in mind that nut rotation will always cease at the end of the wrench stroke and must not be confused with the wrench stalling. When the wrench stalls, apply another forward stroke and observe the pump pressure gauge. The pump pressure gauge should read the desired preset pressure.
4. Retract the hydraulic torque wrench, stop the pump unit, and remove the wrench from the nut.

Tightening a Flanged Joint

This procedure outlines the basic steps to torque-tighten a flanged joint with a TWSL hydraulic torque wrench. It is important that personal protective equipment (gloves, footwear, safety helmet, eye protection, etc.) is worn at all times by the operator and any other personnel in the work area. The torquing procedure uses a single hydraulic torque wrench to accurately achieve a predetermined residual bolt stress.

WARNING: Before bolt torquing, verify that:

- **The procedure and data to be used is authorized by a responsible engineer.**
- **The joints/pipework being worked on are not live. Joints must be at zero pressure and free from hazardous substances.**
- **The torque value selected must be based upon the lubricant applied.**

Procedure

1. Working in a crisscross pattern, number each bolt in order of torque sequence.
2. Square up the flanged joint using hydraulic torque wrenches, if necessary.
3. Set the pump at its lowest possible output, 103 bar (1,500 psi), and following the numbers on the bolts, apply the minimum torque to the bolts.
4. In the same tightening sequence, apply approximately 25% of the torque value specified in the torque data.
5. In the same tightening sequence, apply approximately 50% of the torque value specified in the torque data.
6. In the same tightening sequence, apply the full torque value specified in the torque data.
7. Working in a clockwise (or counter-clockwise) direction, make a final pass around the flange, tightening each bolt to the full torque value specified in the torque data.
8. Using a hammer, “ring” each nut to verify that each bolt has been correctly loaded and that no slack bolts remain.

Loosening Bolts

Loosening bolts using hydraulic torque wrenches can be unpredictable and often unsuccessful, especially if the nuts and bolts are severely corroded. However, some measures can be carried out to increase the success rate of nut breakout:

- In general, loosening mildly rusted bolts requires up to twice the makeup torque to release the nut. Heavily corroded bolts may take up to three times the makeup torque. Verify that the bolt and nut material is strong enough to accept these higher torques.
- Remove surface rust and scale using a wire brush. Apply releasing oil to the nut, bolt, and bearing face, and allow time for the release oil to soak in and penetrate.
- Only use the hydraulic torque wrench to break the nut free. Using the torque tool to wind the nut from the bolt can induce high torsion and reaction forces. Therefore, it is better to use an impact wrench to completely remove the nut.
- Never strike the torque wrench or nut/bolt in an attempt to 'shock' the nut free. This can cause damage to the hydraulic torque wrench and operator injury. Evidence of torque wrench abuse will void the Manufacturer's Warranty.

NOTE: Should maximum pump pressure be reached, and the nut has not broken free, use a higher capacity hydraulic torque wrench (if the nut/bolt material will accept the higher torques without damage). Do not, under any circumstances, strike the hydraulic torque wrench or nut/bolt in an attempt to 'shock' the nut free.

Procedure

1. Connect the hydraulic torque wrench to the pump unit. Verify that the couplings are fully screwed together; they are self-sealing and will restrict oil flow if not fully connected.
2. Before applying the hydraulic torque wrench to the application, the pump output pressure must be preset to deliver the maximum allowable pressure of the link. **Certain TWSL size links cannot be used at the full system pressure of 10,000 psi, these links have the maximum torque/pressure engraved on the links, which must NOT be exceeded.** This can be done with the torque wrench connected to the pump and resting on the floor or bench. Applying advance pressure to the hydraulic torque wrench will extend the piston until it reaches the end of its stroke whereby the pump pressure will build. Holding the wrench at the end of its stroke will allow the pump pressure to be adjusted. Retract the hydraulic torque wrench piston and advance again making sure that the pump delivered full pressure. The pump pressure can also be set by blanking the pump outlets using blank couplings.
3. Apply the hydraulic torque wrench to the nut to be loosened and verify that the reaction pad is braced firmly and squarely against the selected reaction point.
4. Start the pump and advance the hydraulic torque wrench. As the wrench strokes forward, the reaction pad will press against the reaction point. As the pump pressure builds (and torque is applied to the nut), the nut will break free. Once the nut has been released, remove the nut by hand if loose enough, or alternatively use an impact wrench. Using the hydraulic torque wrench is not recommended.

NOTE: Should the link maximum pump pressure be reached, and the nut has not broken free, use a higher capacity hydraulic torque wrench (if the nut/bolt material will accept the higher torques without damage). Do not, under any circumstances, strike the hydraulic torque wrench or nut/bolt in an attempt to 'shock' the nut free.

5. Retract the hydraulic torque wrench, stop the pump unit, and remove the wrench from the nut.

Performance Specifications

Technical Specifications

The following technical data is applicable to all TWSL hydraulic torque wrenches:

LINK MAXIMUM TORQUE:	See Link table below
BODY MAXIMUM PRESSURE:	Advance - 690 bar (10,000 psi) Retract - 103 bar (1,500 psi)
OPERATING TEMPERATURE LIMITS:	-20°C to +40°C (-4°F to 104°F)
HYDRAULIC OIL TYPE:	Grade 46 hydraulic oil

Body Ref	Link Size Range, mm (in)	Torque, Nm (lb.ft)		Weight, kg (lb)
		Minimum *	Maximum	
TWLC2	27 - 60 (1-1/16 – 2-3/8)	301 (222)	1681 - 2508 (1240 - 1850)	1.0 (2.2)
TWLC4	43 - 80 (1-11/16 - 3-1/8)	685 (505)	3578 - 5708 (2639 - 4210)	2.0 (4.4)
*Note that the minimum torque can be lower depending upon pump low-pressure capability				

TWSL2 Links

Link Ref	Link Size, mm (in)	Max Torque, Nm (lb.ft)	Weight, Kg (lb)
TWSL2-027	27 (1-1/16)	1681 (1240)	1.90 (4.2)
TWSL2-029	29 (1-1/8)		
TWSL2-030	30 (1-3/16)		
TWSL2-032	32 (1-1/4)		
TWSL2-033	33 (1-5/16)	1939 (1430)	1.93 (4.3)
TWSL2-035	35 (1-3/8)		
TWSL2-036	36 (1-7/16)		
TWSL2-038	38 (1-1/2)	2169 (1600)	1.95 (4.3)
TWSL2-040	40 (1-9/16)		
TWSL2-041	41 (1-5/8)		
TWSL2-043	43 (1-11/16)	2508 (1850)	2.00 (4.4)
TWSL2-044	44 (1-3/4)		
TWSL2-046	46 (1-13/16)		
TWSL2-048	48 (1-7/8)	2508 (1850)	2.00 (4.4)
TWSL2-049	49 (1-15/16)		
TWSL2-050	50 (2)		
TWSL2-052	52 (2-1/16)	2508 (1850)	2.04 (4.5)
TWSL2-054	54 (1-1/2)		
TWSL2-055	55 (2-3/16)		
TWSL2-057	57 (1-1/4)	2508 (1850)	2.05 (4.5)
TWSL2-059	59 (2-5/16)		
TWSL2-060	60 (2-3/8)		

TWSL4 Links

Link Ref	Link Size, mm (in)	Max Torque, Nm (lb.ft)	Weight, Kg (lb)
TWSL4-043	43 (1-11/16)	3578 (2639)	3.65 (8.0)
TWSL4-044	44 (1-3/4)		
TWSL4-046	46 (1-13/16)		
TWSL4-048	48 (1-7/8)	4435 (3271)	3.72 (8.2)
TWSL4-049	49 (1-15/16)		
TWSL4-050	50 (2)		
TWSL4-052	52 (2-1/16)	4838 (3568)	3.74 (8.2)
TWSL4-054	54 (1-1/2)		
TWSL4-055	55 (2-3/16)		
TWSL4-057	57 (1-1/4)	5243 (3867)	3.78 (8.3)
TWSL4-059	59 (2-5/16)		
TWSL4-060	60 (2-3/8)		
TWSL4-062	62 (2-7/16)	5708 (4210)	3.79 (8.4)
TWSL4-063	63 (2-1/2)		
TWSL4-065	65 (2-9/16)		
TWSL4-067	67 (2-5/8)	5708 (4210)	3.81 (8.4)
TWSL4-068	68 (2-11/16)		
TWSL4-070	70 (2-3/4)		
TWSL4-071	71 (2-13/16)	5708 (4210)	3.83 (8.4)
TWSL4-073	73 (2-7/8)		
TWSL4-075	75 (2-15/16)		
TWSL4-077	77 (3)	5708 (4210)	3.82 (8.4)
TWSL4-078	78 (3-1/16)		
TWSL4-080	80 (3-1/8)		

TWSL2 Pressure/Torque Conversion Chart

Pump Pressure		Torque Output	
bar	psi	Nm	ft-lb
83	1200	301	222
97	1400	351	259
110	1600	401	296
124	1800	451	333
138	2000	502	370
152	2200	552	407
165	2400	602	444
179	2600	652	481
193	2800	702	518
207	3000	752	555
221	3200	803	592
234	3400	853	629
248	3600	903	666
262	3800	953	703
276	4000	1003	740
290	4200	1053	777
303	4400	1104	814
317	4600	1154	851
331	4800	1204	888
345	5000	1254	925
359	5200	1304	962
372	5400	1354	999
386	5600	1405	1036
400	5800	1455	1073
414	6000	1505	1110
427	6200	1555	1147
441	6400	1605	1184
455	6600	1655	1221
462 (1)	6703 (1)	1681	1240
469	6800	1706	1258
483	7000	1756	1295
496	7200	1806	1332
510	7400	1856	1369
524	7600	1906	1406
533 (2)	7730 (2)	1939	1430
538	7800	1956	1443
552	8000	2007	1480
565	8200	2057	1517
579	8400	2107	1554
593	8600	2157	1591
596 (3)	8649 (3)	2169	1600
607	8800	2207	1628
621	9000	2257	1665
634	9200	2308	1702
648	9400	2358	1739
662	9600	2408	1776
676	9800	2458	1813
690	10000	2508	1850

Link Maximum Pressures

(1) – TWSL2-027 to TWSL2-032

(2) – TWSL2-033 to TWSL2-036

(3) – TWSL2-038 to TWSL2-041

TWSL4 Pressure/Torque Conversion Chart

Pump Pressure		Torque Output	
bar	psi	Nm	ft-lb
83	1200	685	505
97	1400	799	589
110	1600	913	674
124	1800	1027	758
138	2000	1142	842
152	2200	1256	926
165	2400	1370	1010
179	2600	1484	1095
193	2800	1598	1179
207	3000	1712	1263
221	3200	1827	1347
234	3400	1941	1431
248	3600	2055	1516
262	3800	2169	1600
276	4000	2283	1684
290	4200	2397	1768
303	4400	2511	1852
317	4600	2626	1937
331	4800	2740	2021
345	5000	2854	2105
359	5200	2968	2189
372	5400	3082	2273
386	5600	3196	2358
400	5800	3311	2442
414	6000	3425	2526
427 (1)	6200 (1)	3539	2610
441	6400	3653	2694
455	6600	3767	2779
469	6800	3881	2863
483	7000	3996	2947
496	7200	4110	3031
510	7400	4224	3115
524	7600	4338	3200
538 (2)	7800 (2)	4452	3284
552	8000	4566	3368
565	8200	4680	3452
579 (3)	8400 (3)	4795	3536
593	8600	4909	3621
607	8800	5023	3705
621	9000	5137	3789
634 (4)	9200 (4)	5251	3873
648	9400	5365	3957
662	9600	5480	4042
676	9800	5594	4126
690	10000	5708	4210

Link Maximum Pressures

(4) – TWSL4-043 to TWSL4-046

(5) – TWSL4-048 to TWSL4-050

(6) – TWSL4-052 to TWSL4-055

(7) – TWSL4-057 to TWSL4-060

General Maintenance

Maintenance

Maintenance should follow each period of use to keep the TWSL hydraulic torque wrench in good working condition.

TWSL Torque wrench

1. Wipe away any debris that may have accumulated, particularly around the swivel manifold and hydraulic couplings.

2. See figure 5. Remove the link from the body. Inspect the following areas (see diagram):
   - Hydraulic Couplings for signs of damage.
   - Shuttle pins. Ensure they are present and spring freely.
   - Link / Body Pin retainer to verify it is undamaged and operates correctly.
   - Multiswivel manifold to verify the retaining ring is present and fitted correctly.

3. See figure 5. Lubricate the areas of the body using Revol R5 Moly Anti Seize.

   NOTE: The TWSL torque wrench drive components must be lubricated using the specified product only. Using alternative lubricants will affect the torque wrench and might lead to premature component failure.

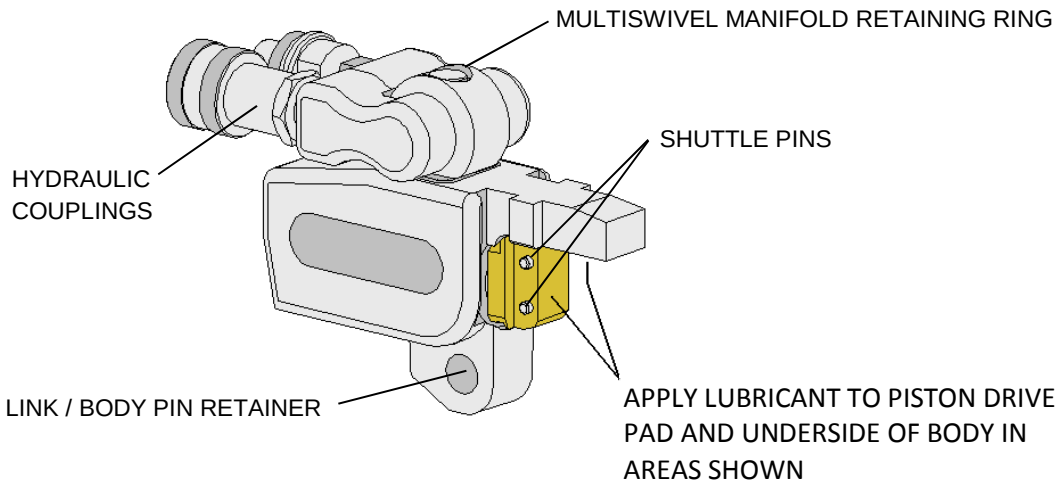


Figure 5. Body Maintenance

4. See figure 6. Unscrew the sideplate retaining bolts and remove the right hand sideplate

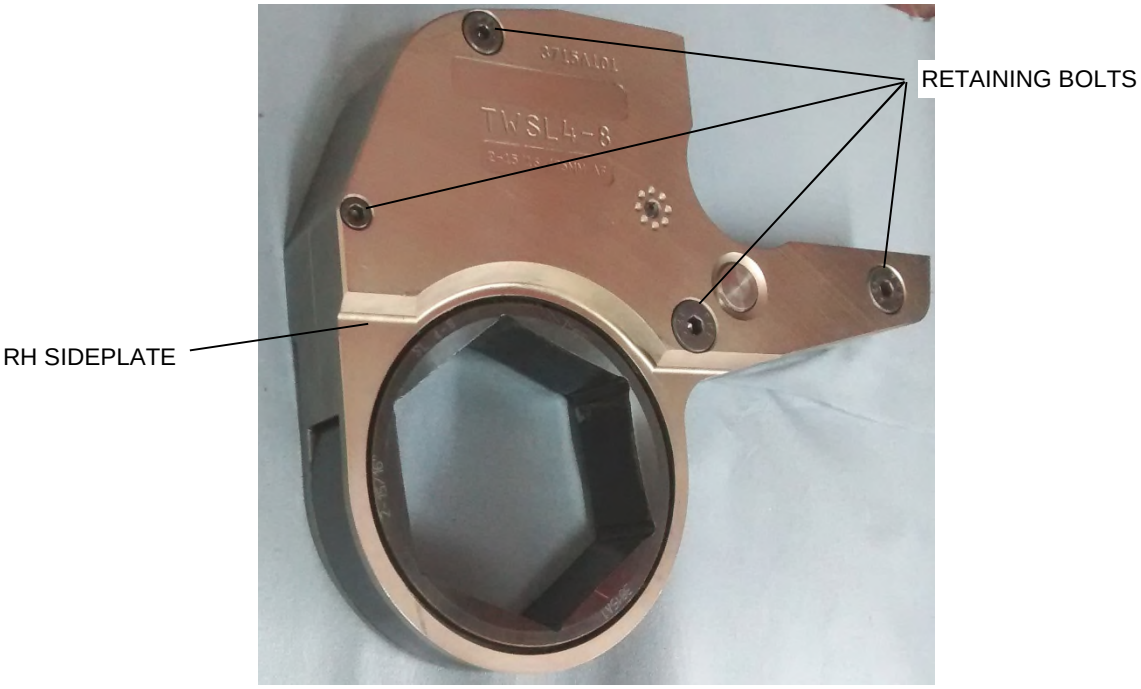


Figure 6. Right Hand Sideplate Removal

5. See figure 7 and parts list. Remove the drive assembly and lubricate the link components using Revol R5 Moly Anti Seize :
   - LH and RH Sideplate recesses, bores and inside faces.
   - Crank spigots.

Figure 7. Link Lubrication

6. Rebuild the link ensuring the slider pin correctly locates in the LH sideplate groove and that the crank is correctly located in the slider.
7. Re-assemble the link onto the body for storage to prevent debris from getting into the drive mechanism. Lightly spray the torque wrench with water repellent spray before placing in storage.

Hoses

1. Clean and inspect each hydraulic hose and quick connect coupling. Check the entire length of the hose for cuts, abrasions and damage. Replace the entire hose if any evidence of damage is present.
2. Coat each quick connect coupling with a water repellent spray.

Maintenance, Service and Warranty

In addition to post-use maintenance, and to ensure that the Product Warranty remains valid, it is recommended that routine maintenance and servicing be carried out by the Manufacturer or Authorised Service Centre.

Maintenance and servicing should be carried out in accordance with the manufacturers 'Servicing / Repair Procedures'.

All TWSL Torque wrenches are supplied under the Manufacturers' standard terms and conditions.

All components shall be guaranteed for a period of twelve months from the date of purchase against material defects and workmanship. All components shall be guaranteed for a period of twelve months from the date of purchase against defects arising from normal use, with the following exclusions:

- Hydraulic seals and back-up rings
- Bushes and bearings
- O-ring seals
- Quick-disconnect couplings
- Labels and decals
- Springs
- Circlips
- Paints and coatings
- Plastic screws and plugs

End of Life and Disposal

In accordance with our End of Life Policy, should the product be no longer required for use, it should be returned to SPX Bolting Systems where it shall be disposed of in a safe and environmentally friendly manner.

Troubleshooting

Fault	Possible Cause	Remedy
Cylinder will not advance. Cylinder will not retract.	1. Coupling not fully mated. 2. Cylinder seal leakage. 3. Pump unit. 4. Faulty coupling.	1. Check coupling. 2. Replace seal. 3. Check pump unit. 4. Replace coupling.
Torque wrench operates backwards.	1. Reversed couplings.	1. Check pump, hose and torque wrench for cross connection.
Pressure will not build.	1. Cylinder seal leakage. 2. Swivel seal leakage. 3. Defective pump unit.	1. Change seals. 2. Change seals. 3. Check pump unit.
Pressure builds, but wrench does not move.	1. Hose restriction. 2. Coupling not fully assembled.	1. Change hose. 2. Fully tighten coupling.
Slow torque wrench operation.	1. Hose restriction. 2. Coupling not fully assembled. 3. Pump flow rate too low.	1. Change hose. 2. Fully tighten coupling. 3. Use higher flow pump.
Erratic or slow retraction speed.	1. Hose restriction. 2. Coupling not fully assembled.	1. Change hose. 2. Fully tighten coupling.
Torque wrench does not ratchet.	1. Replace drive shoe. 2. Check drive shoe and 3. Check/replace ratchet.	1. Replace drive shoe. 2. Check drive shoe and spring. 3. Check/replace ratchet.
Ratchet jumps while driving.	1. Worn/damaged ratchet. 2. Worn/damaged drive shoe. 3. Wrench incorrectly retracted. 4. Weak/snapped drive shoe spring.	1. Replace ratchet and drive shoe. 2. Replace ratchet and drive shoe. 3. Allow time to fully retract. 4. Replace springs.
Difficulty in hose connection.	1. Pressure within hose. 2. Damaged coupling.	1. Vent hose. 2. Replace coupling.

Repair Procedures

It is recommended that full servicing is carried out on an annual basis by the manufacturer or approved service agent (other than maintenance, lubrication, and emergency seal replacement). All components shall be inspected and critical components subjected to nondestructive testing. Hydraulic torque wrenches will be pressure tested and issued with test certification.

Although it is possible to disassemble the TWSL hydraulic torque wrench on site, it is recommended that this operation be carried out in a clean workshop environment, as dirt and debris can severely affect the performance of the seals and other components. Eye protection should be worn at all times during tool assembly and disassembly.

General servicing/repair can be carried out in three specific areas of the hydraulic torque wrench. This allows servicing and lubricating of specific components without complete strip down. The three servicing areas are:

- Link components and lubrication.
- Multiswivel manifold components.
- Hydraulic body/cylinder components.

Full servicing indicates that all three areas are serviced.

Link Disassembly

The link drive components should be lubricated at regular intervals, typically every three months for normal use but monthly or even weekly for frequent/prolonged use. Component lubrication is carried out as follows.

1. Verify the torque wrench is fully retracted. Disconnect the power supply.
2. See figure 8. Unscrew the sideplate retaining bolts and remove the right hand sideplate.

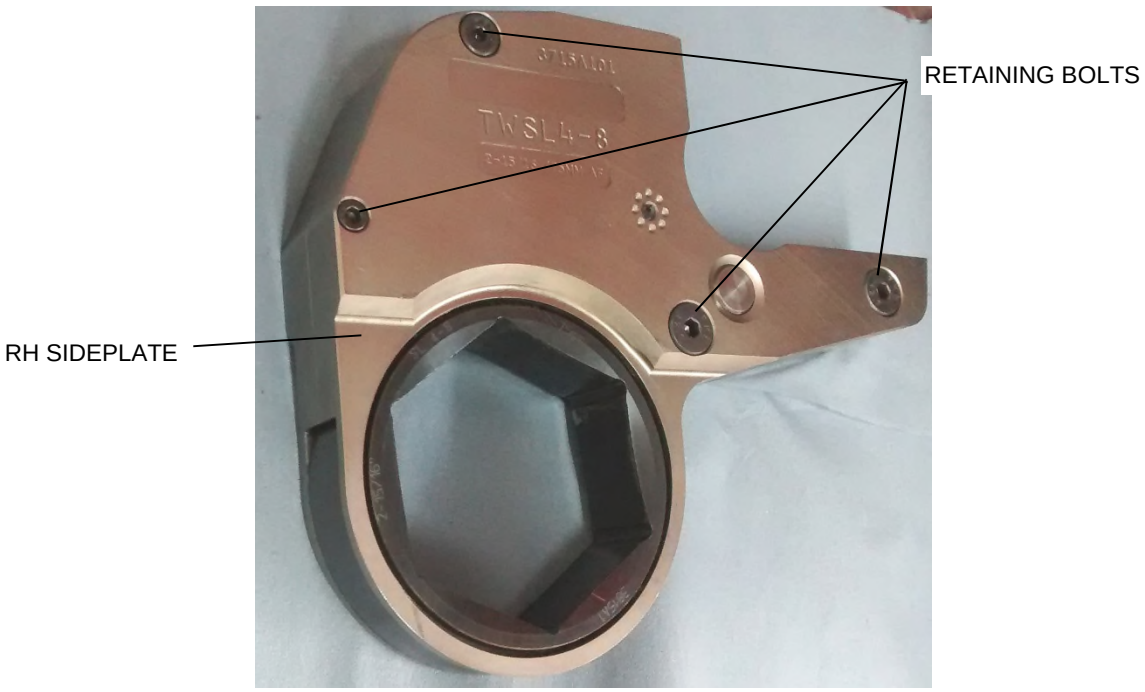


Figure 8. Right Hand Sideplate Removal

3. See the parts list. Remove the crank assembly and remove the slider.
4. Remove the ratchet, drive shoe and springs.
5. Thoroughly clean all components, removing the old lubricant using a mild degreasing agent. Inspect all components for damage and/or excessive wear. Inspect the ratchet and drive shoe

teeth for damage, cracks etc. Any substandard component must be replaced immediately using genuine parts supplied by SPX Bolting Systems.

Link Assembly

See figure 9. Before assembly, apply a liberal coat of Revol R5 Moly Anti Seize to the following areas:

- LH and RH Sideplate bores, recesses and inside faces.
- Crank spigots and side faces, bore, drive shoe pocket and the driving face that assembles into the slider.
- Slider (all surfaces).
- Ratchet bearings.

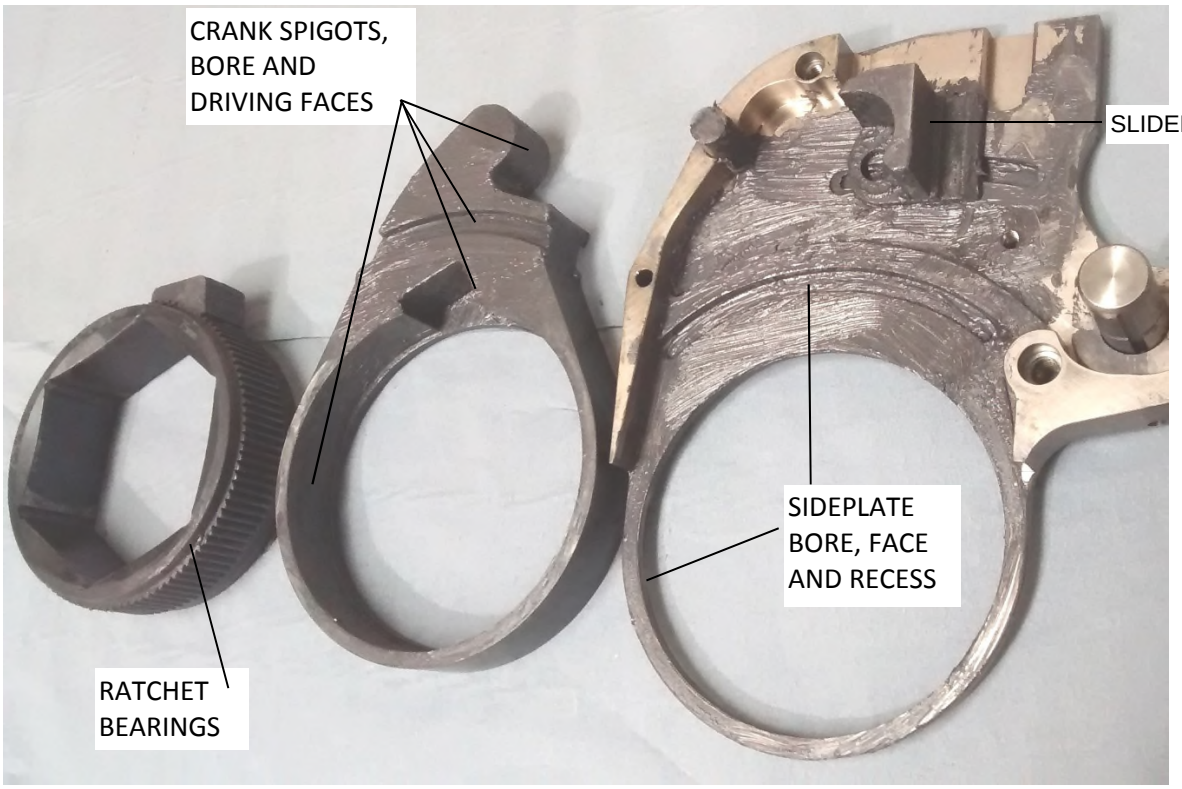


Figure 9. Link Lubrication

The Link drive components must be lubricated using the specified product only. Using alternative lubricants will affect the torque output and possibly lead to premature component failures.

1. See figure 9. Lay the LH sideplate on a flat surface. Place the slider into position and verify the pin on the slider face engages with the groove in the sideplate.
2. See figure 10. Assemble the ratchet into the crank. Insert the longer ratchet bearing into the crank bore first to ensure the ratchet teeth are driving in the correct direction.
3. See parts list and figure 10. Install the drive shoe and springs. Verify that the drive shoe teeth are driving in the correct direction and that they fully engage with the ratchet.
4. Install the drive assembly into the LH sideplate ensuring that the crank engages correctly into the slider and the ratchet bearing locates in the sideplate bore.

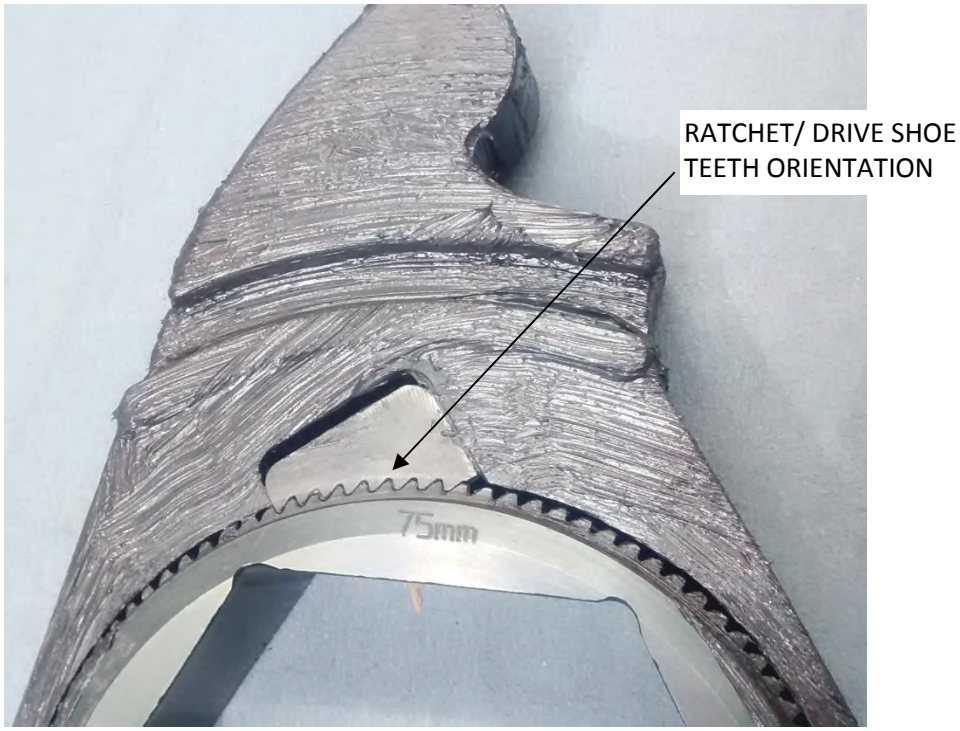


Figure 10. Link Component Assembly

5. See parts list. Assemble the RH sideplate ensuring that the crank stop locates correctly into the RH sideplate.
6. See figure 11. Apply Revol R5 Moly Anti Seize or general grease to the shoulder/shank (not the thread) of the sideplate retaining bolts. Apply Loctite 243 to the thread of the sideplate retaining bolts and tighten in accordance with the following torque specification.

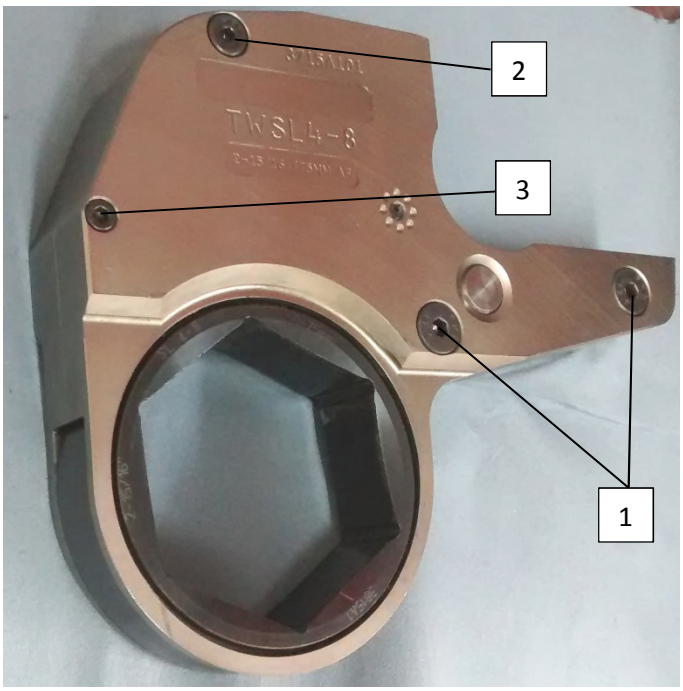


Figure 11. Sideplate retaining bolts

Link Size	Screw 1		Screw 2		Screw 3	
	Nm	Lb-in	Nm	Lb-in	Nm	Lb-in
TWSL2	10.2	90	10.2	90	10.2	90
TWSL4	20	177	10.2	90	10.2	90

7. Manually rotate the ratchet verifying free movement and correct ratcheting.

   Following strip down and/or lubrication, the torque wrench should be calibrated to verify that the torque output is within specified limits.

Multiswivel Manifold Disassembly

The multiswivel manifold should only be removed for seal replacement or during full servicing.

1. Disconnect the hydraulic torque wrench from the power supply.
2. Attach open ended couplings to the multiswivel manifold couplings to vent any residual pressure.
3. See Figure 12. Remove the multiswivel yoke screw.
4. See Figure 13. Disengage the multiswivel yokes by rotating the advance yoke away from the retract yoke, disengaging the keyways.
5. Pull each multiswivel yoke away from the multiswivel banjo, if necessary, use a soft faced mallet to assist removal.
6. See parts list. Remove the multiswivel banjo circlip.
7. Remove the multiswivel banjo from the multiswivel swivel post. Remove and discard the multiswivel banjo seals.
8. Unscrew and remove the four screws that attach the multiswivel swivel post to the wrench body.
9. Lift off the multiswivel post. Remove and discard the multiswivel post seals and port seals.

Clean and inspect all components including the hydraulic couplings. If the hydraulic couplings are damaged, remove and replace (multiswivel yoke threads are ¼-in NPT). Inspect the components for scoring, pitting and damage which could impair the sealing ability and replace as necessary.

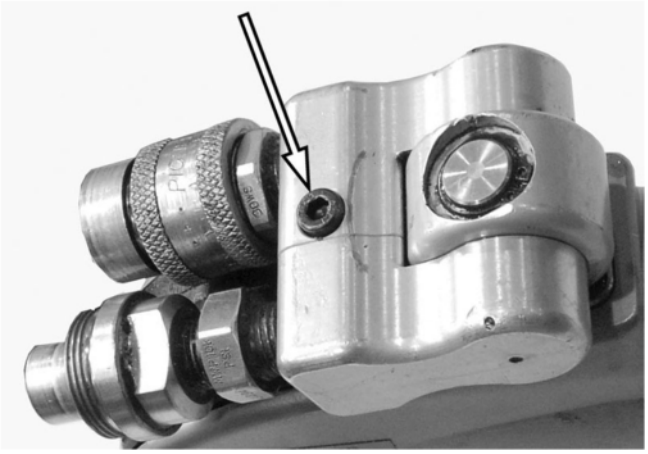


Figure 12. Swivel Yoke Screw Removal

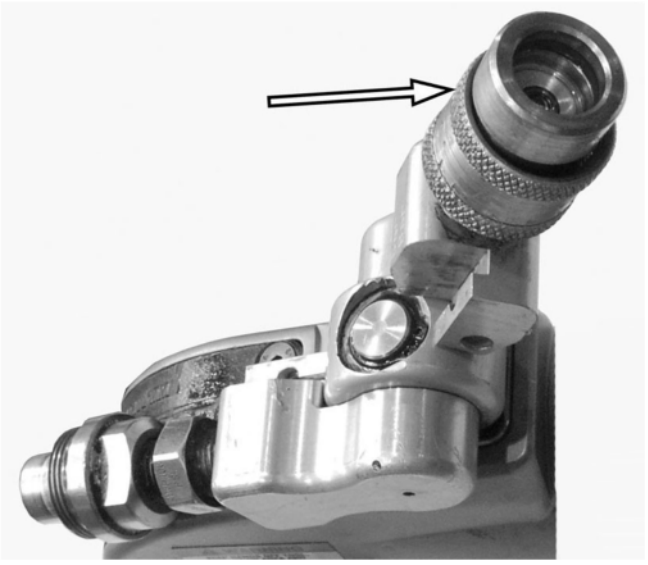


Figure 13. Swivel Yoke Disengagement

Multiswivel Manifold Assembly

NOTE: All seals should be new and lubricated with clean hydraulic oil or seal assembly paste before installation.

1. Install the new port o-ring seals into the base of the multiswivel post.
2. Apply Loctite® 243 or equivalent to the four screws and attach the swivel post to the wrench body. Torque the screws to 5.1 Nm (45 in-lb).
3. Assemble three new o-ring seals to the multiswivel post.
4. Assemble four new o-ring seals to the multiswivel banjo.
5. Carefully push the banjo onto the swivel post ensuring the seals do not get damaged.
6. Attach the banjo circlip to the post.
7. Assemble the advance and retract yokes to the banjo ensuring the seals do not get damaged.

IMPORTANT: Ensure the advance and retract yokes are installed correctly onto the banjo. The banjo and advance yoke are engraved with A (advance) to indicate the correct position of the respective yoke. Reversal of the yokes will cause the torque wrench to malfunction and can lead to damage.

8. Rotate the yokes around the banjo until the keyways engage.
9. Clamp the yokes together by installing the yoke screw and torque to 5.1 Nm(45 lb-in).
10. Check the operation of the multiswivel manifold by rotating and tilting, movement should be free and smooth.
11. Test the operation of the torque wrench by connecting to the appropriate pump unit. Keeping hands clear of the wrench, advance and retract the wrench several times and observe the shuttle mechanism to check for free and correct movement. Apply full pressure to the wrench (690 bar/10,000 psi advance; 103 bar/1500 psi retract), and check for leaks.

CAUTION: Operating the hydraulic torque wrench without the link attached exposes the moving piston drive mechanism. Care should be taken to prevent trapped fingers or other injury.

NOTE: If the hydraulic couplings were removed, verify that they are installed into the correct yoke. The male coupling/nipple assembles into the advance yoke (A) and the female coupling assembles into the retract yoke (R). Apply hydraulic thread sealant to the hydraulic coupling thread before assembly. Thread sealing tape should not be used as debris from the sealing tape can contaminate the system.

Hydraulic Body Disassembly

It is only necessary to remove the hydraulic cylinder/ body components if seal replacement is required. Seal replacement is carried out as follows:

1. Verify the body is fully retracted. Disconnect the unit from the power supply. If attached remove the body from the link.
2. Attach open ended couplings to the multiswivel manifold hydraulic couplings.
3. Pull the shuttle forward sufficiently to gain access to the gland. Be prepared to catch fluid spillage from the retract coupling.
4. See Figures 14 and 15. Using a pin wrench, unscrew the gland.

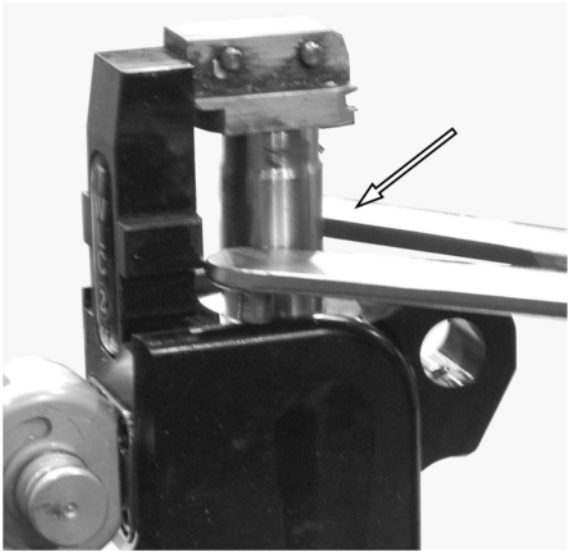
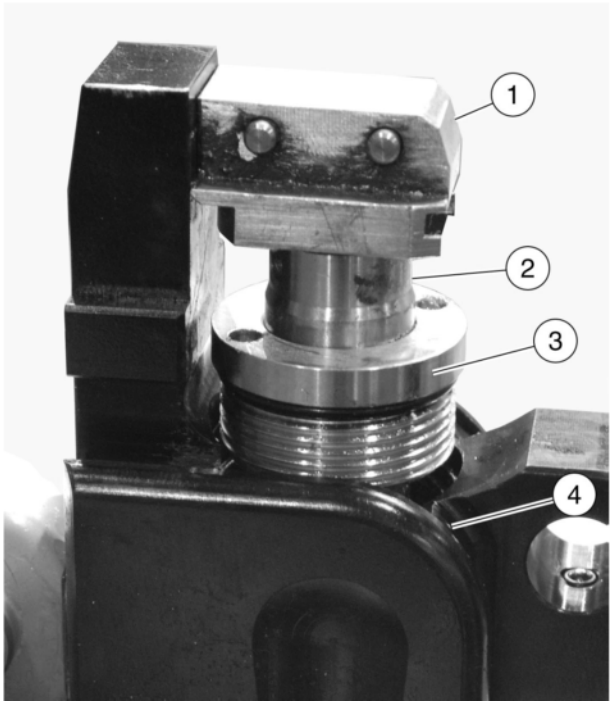


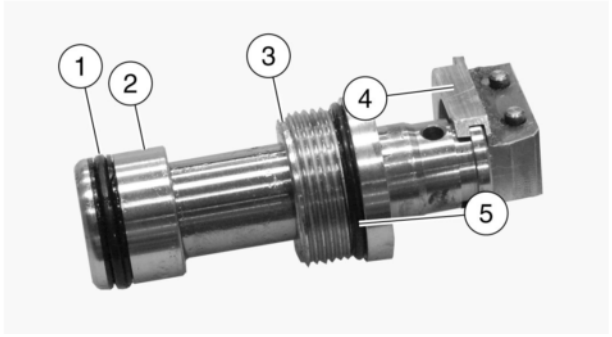
Figure 14. Pin Wrench Unscrewing Gland



Item	Description
1	Shuttle
2	Piston rod
3	Gland
4	Body

Figure 15. Gland Location

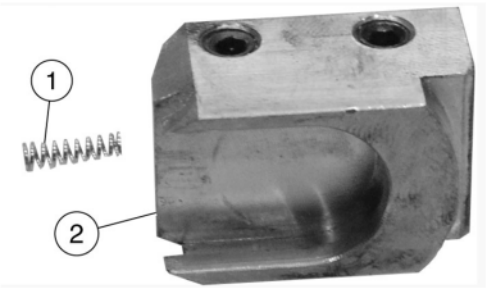
5. See Figure 16. Withdraw the entire piston assembly out of the body.



Item	Description
1	Piston seal
2	Piston
3	Gland
4	Shuttle
5	Gland o-ring seal

Figure 16. Piston Assembly

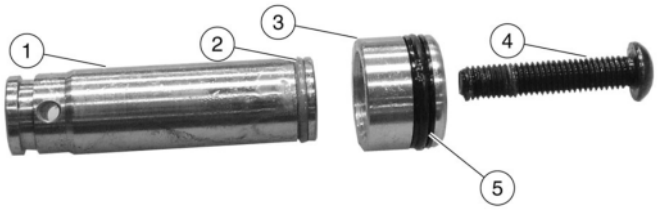
6. See Figure 17. Slide the shuttle from the piston rod. Take care not to lose the shuttle spring located inside the shuttle's T-slot.



Item	Description
1	Spring
2	Shuttle

Figure 17. Shuttle Assembly

7. Slide the gland from the piston rod. Remove and discard the gland rod seal and o-ring seal.
8. See Figure 18. Grip the piston rod in a soft-jawed vice and remove the piston screw. To prevent the piston rod turning, a rod may be inserted through the hole in the end nearest the shuttle.



Item	Description
1	Piston rod
2	Piston rod o-ring seal
3	Piston
4	Screw
5	Piston seal

Figure 18. Piston Disassembled

9. Remove the piston from the piston rod. Remove and discard the piston seal and the piston rod seal.
10. Clean and inspect all components for scoring, pitting and damage, and replace as necessary. Inspect the bore of the body, piston and rod for defects that could impair the sealing ability.
11. Verify that the spring loaded shuttle pins move freely and check the condition of the shuttle pin ends for damage.

Hydraulic Body Assembly

NOTE: All seals should be new and lubricated with clean hydraulic oil or seal assembly paste before installation.

1. Assemble a new rod seal and a new o-ring seal onto the gland. Assemble a new piston seal onto the piston ensuring the seal backup ring scarved joints are rotated 180° apart.
2. Assemble the piston onto the piston rod, taking care not to damage the seal. Grip the piston rod in a soft-jawed vice. To prevent the piston rod from turning, a rod may be inserted through the hole in the end nearest the shuttle. Apply a small amount of Loctite® 243 or equivalent to the piston screw threads and tighten in accordance with the torque specifications.

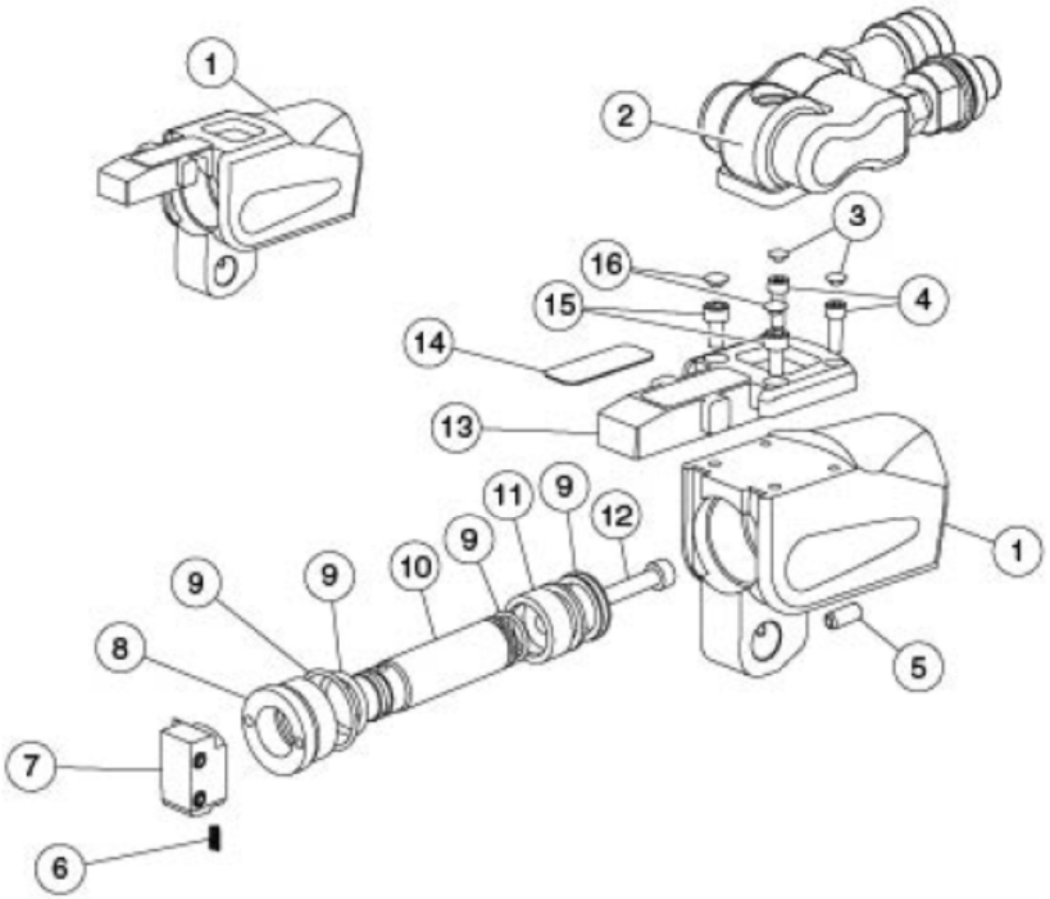
Body Size	Torque, Nm (in-lb)
TWLC2	20 (177)
TWLC4	25 (221)

3. Lubricate the piston rod with clean hydraulic fluid and slide the gland onto the piston rod (threads first).
4. Assemble the shuttle on the piston rod, ensuring that the shuttle spring remains in position.
5. The piston assembly (piston, piston rod, gland and shuttle) is intended to be inserted into the body as one complete unit. Note that the shuttle is designed to be spring loaded up against the underside of the body/top plate and therefore needs to be pressed down toward the piston rod as the assembly is installed.
6. With the seals and bores coated in clean hydraulic fluid, insert the piston assembly into the body cylinder bore. Take care not to damage the seals or dislodge the backup rings as the piston enters the bore. Screw in the gland and tighten using a pin wrench.

   CAUTION: Operating the hydraulic torque wrench without the link attached exposes the moving piston drive mechanism. Care should be taken to prevent trapped fingers or other injury.

7. Test the operation of the hydraulic torque wrench by connecting to the appropriate pump unit. Keeping hands clear of the torque wrench, advance and retract the torque wrench several times and observe the movement of the shuttle mechanism to check for free and correct movement. Apply full pressure to the torque wrench (690 bar/10000 psi advance; 103 bar/1500 psi retract) and check for leaks.

Parts Lists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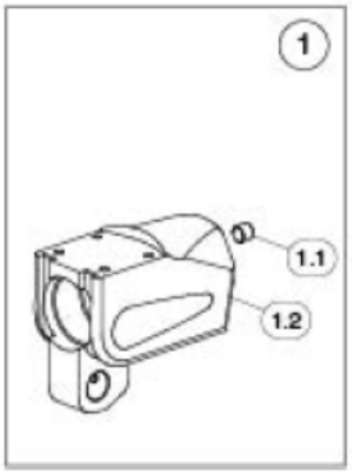
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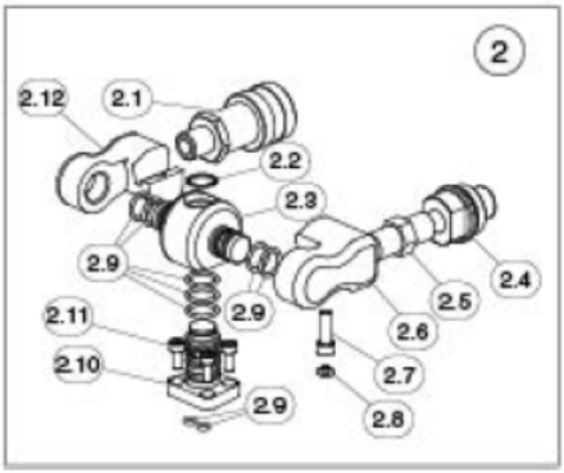
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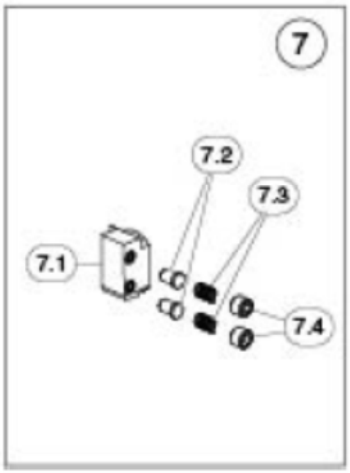
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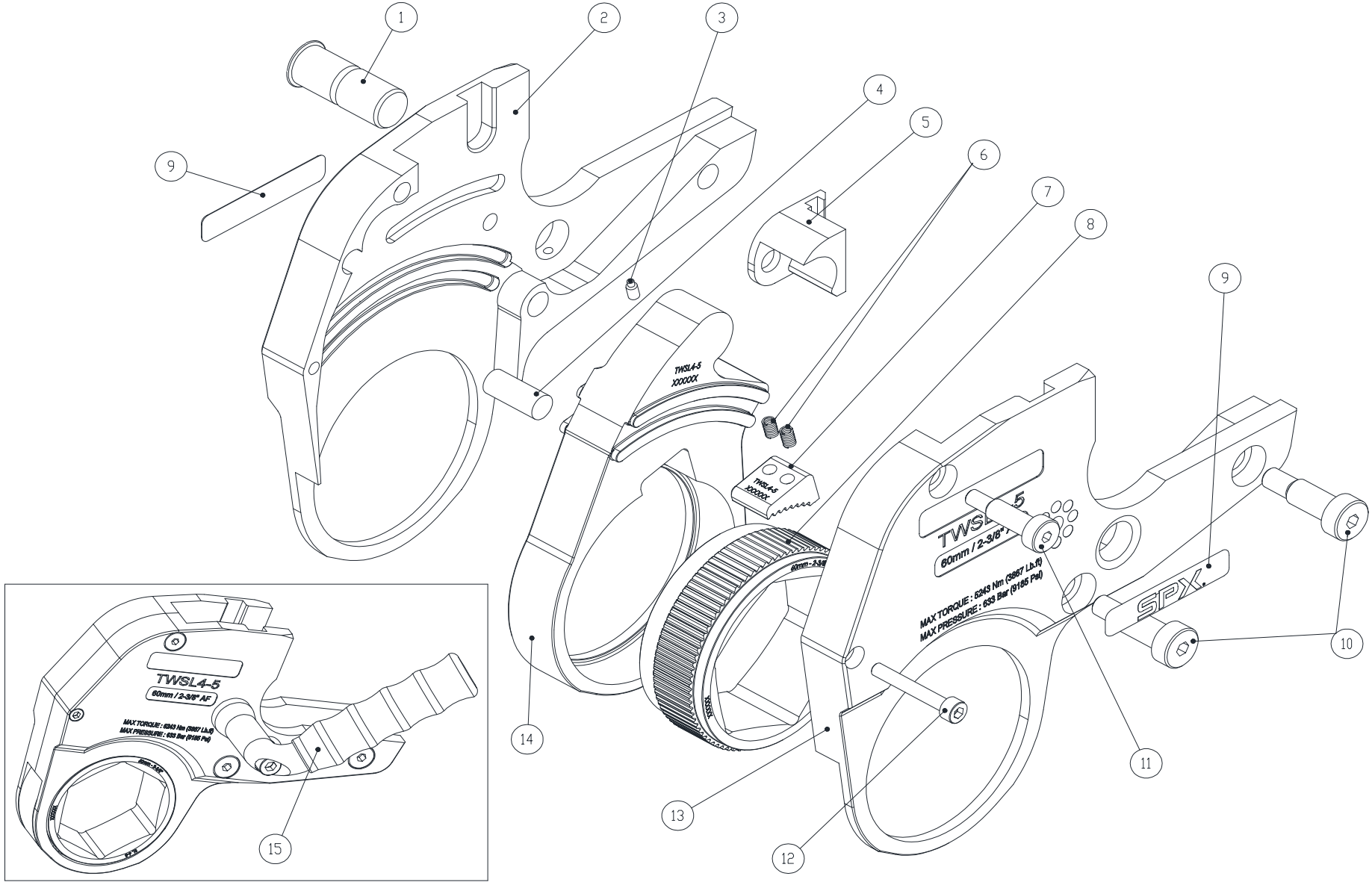
TWLC2 / 4 Torque Wrench Parts List

Item No	Part Number		Qty	Description
	TWLC2	TWLC4		
1	LDFAS020002	LDFAS040002	1	**TWLC Body assembly**
1.1	STDFA000070	STDFA000070	1	- Plug
1.2	LDFBD020001	LDFBD040001	1	- TWLC Body
2	DFTAS010001	DFTAS010001	1	**Multiswivel manifold assembly**
2.1	STDHC000005	STDHC000005	1	- Female coupling
2.2	STDRC000041	STDRC000041	1	- Clip
2.3	DFTSB010001	DFTSB010001	1	- Multiswivel banjo
2.4	STDHC000004	STDHC000004	1	- Male coupling
2.5	INTHC000002	INTHC000002	1	- Adaptor
2.6	DFTAY010001	DFTAY010001	1	- Multiswivel advance yoke
2.7	STDFA000027	STDFA000027	1	- Screw
2.8	STDST000078	STDST000078	1	- Cap
2.9	Multiswivel Seal Kit DFTAS010004	Multiswivel Seal Kit DFTAS010004	4	- Seal
			2	- Seal
			3	- Seal
2.10	DFTSP010001	DFTSP010001	1	- Multiswivel post
2.11	STDFA000025	STDFA000025	4	- Screw
2.12	DFTAS010003	DFTAS010003	1	- Multiswivel retract yoke
3	-	STDST000078	2	Cap
4	-	STDFA000026	2	Screw
5	STDST000040	STDST000040	1	Spring plunger
6	STDST000021	STDST000021	1	Spring
7	DFTAS020003	DFTAS040003	1	**TWLC shuttle assembly**
7.1	DFTSH020001	DFTSH040001	1	- TWLC shuttle
7.2	DFTSP020001	DFTSP040001	2	- TWLC shuttle pin
7.3	STDST000017	STDST000018	2	- Spring
7.4	STDFA000056	STDFA000058	2	- Screw
8	DFTGL020001	DFTGL040001	1	TWLC gland
9	Body Seal Kit DFTAS020005	Body Seal Kit DFTAS040005	1	Seal
			1	Seal
			1	Seal
			1	Seal
10	DFTRD020001	DFTRD040001	1	TWLC piston rod
11	DFTPI020001	DFTPI040001	1	TWLC piston
12	STDFA000024	STDFA000033	1	Screw
13	-	LDFTP040001	1	TWLC top plate
14	LDFLA020001	LDFLA040001	1	TWLC decal
15	-	STDFA000029	2	Screw
16	-	STDST000079	2	Cap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TWSL4-5
XXXXX
TWSL4-5
60mm / 2-3/8" AF
MAX TORQUE : 5343 Nm (3967 Lb.ft)
MAX PRESSURE : 633 Bar (9185 Psi)
SPX

TWSL2 Torque Wrench: Link Parts List

Link Ref: TWSL2-0

TWSL2-032

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020032	1	TWSL2 Left Sideplate 32mm / 1-1/4" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020000	1	TWSL2 Drive Shoe (TWSL2-0)
8**	TWSLRT020032	1	TWSL2 Ratchet 32mm / 1-1/4" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020032	1	TWSL2 Right Sideplate 32mm / 1-1/4" A/F
14	TWSLCR020000	1	TWSL2 Crank (TWSL2-0)

** - Replace as a pair

TWSL2 Handle (Link Part No's TWSL2-xxxH)

Item No.	Part No.	Qty	Description
15	DFTAS000001	1	Handle

xxx – Hex A/F size

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-027

Item No.	Part No.	Qty	Description
2	TWSLPL020027	1	TWSL2 Left Sideplate 27mm / 1-1/16" A/F
8**	TWSLPR020027	1	TWSL2 Ratchet 27mm / 1-1/16" A/F
13	TWSLRT020027	1	TWSL2 Right Sideplate 27mm / 1-1/16" A/F

** - Replace as a pair with Item No. 7

TWSL2-029

Item No.	Part No.	Qty	Description
2	TWSLPL020029	1	TWSL2 Left Sideplate 29mm / 1-1/8" A/F
8**	TWSLRT020029	1	TWSL2 Right Sideplate 29mm / 1-1/8" A/F
13	TWSLPR020029	1	TWSL2 Ratchet 29mm / 1-1/8" A/F

** - Replace as a pair with Item No. 7

TWSL2-030

Item No.	Part No.	Qty	Description
2	TWSLPL020030	1	TWSL2 Left Sideplate 30mm / 1-3/16" A/F
8**	TWSLPR020030	1	TWSL2 Ratchet 30mm / 1-3/16" A/F
13	TWSLRT020030	1	TWSL2 Right Sideplate 30mm / 1-3/16" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL2-1

TWSL2-036

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020036	1	TWSL2 Left Sideplate 36mm / 1-7/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020001	1	TWSL2 Drive Shoe (TWSL2-1)
8**	TWSLRT020036	1	TWSL2 Ratchet 36mm / 1-7/16" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020036	1	TWSL2 Right Sideplate 36mm / 1-7/16" A/F
14	TWSLCR020001	1	TWSL2 Crank (TWSL2-1)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-033

Item No.	Part No.	Qty	Description
2	TWSLPL020033	1	TWSL2 Left Sideplate 33mm / 1-5/16" A/F
8**	TWSLPR020033	1	TWSL2 Ratchet 33mm / 1-5/16" A/F
13	TWSLRT020033	1	TWSL2 Right Sideplate 33mm / 1-5/16" A/F

** - Replace as a pair with Item No. 7

TWSL2-035

Item No.	Part No.	Qty	Description
2	TWSLPL020035	1	TWSL2 Left Sideplate 35mm / 1-3/8" A/F
8**	TWSLRT020035	1	TWSL2 Right Sideplate 35mm / 1-3/8" A/F
13	TWSLPR020035	1	TWSL2 Ratchet 35mm / 1-3/8" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL2-2

TWSL2-041

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020041	1	TWSL2 Left Sideplate 41mm / 1-5/8" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020002	1	TWSL2 Drive Shoe (TWSL2-2)
8**	TWSLRT020041	1	TWSL2 Ratchet 41mm / 1-5/8" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020041	1	TWSL2 Right Sideplate 41mm / 1-5/8" A/F
14	TWSLCR020002	1	TWSL2 Crank (TWSL2-2)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-038

Item No.	Part No.	Qty	Description
2	TWSLPL020038	1	TWSL2 Left Sideplate 38mm / 1-1/2" A/F
8**	TWSLPR020038	1	TWSL2 Ratchet 38mm / 1-1/2" A/F
13	TWSLRT020038	1	TWSL2 Right Sideplate 38mm / 1-1/2" A/F

** - Replace as a pair with Item No. 7

TWSL2-040

Item No.	Part No.	Qty	Description
2	TWSLPL020040	1	TWSL2 Left Sideplate 40mm / 1-9/16" A/F
8**	TWSLRT020040	1	TWSL2 Right Sideplate 40mm / 1-9/16" A/F
13	TWSLPR020040	1	TWSL2 Ratchet 40mm / 1-9/16" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL2-3

TWSL2-046

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020046	1	TWSL2 Left Sideplate 46mm / 1-13/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020003	1	TWSL2 Drive Shoe (TWSL2-3)
8**	TWSLRT020046	1	TWSL2 Ratchet 46mm / 1-13/16" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020046	1	TWSL2 Right Sideplate 46mm / 1-13/16" A/F
14	TWSLCR020003	1	TWSL2 Crank (TWSL2-3)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-043

Item No.	Part No.	Qty	Description
2	TWSLPL020043	1	TWSL2 Left Sideplate 43mm / 1-11/16" A/F
8**	TWSLPR020043	1	TWSL2 Ratchet 43mm / 1-11/16" A/F
13	TWSLRT020043	1	TWSL2 Right Sideplate 43mm / 1-11/16" A/F

** - Replace as a pair with Item No. 7

TWSL2-044

Item No.	Part No.	Qty	Description
2	TWSLPL020044	1	TWSL2 Left Sideplate 44mm / 1-3/4" A/F
8**	TWSLRT020044	1	TWSL2 Right Sideplate 44mm / 1-3/4" A/F
13	TWSLPR020044	1	TWSL2 Ratchet 44mm / 1-3/4" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL2-4

TWSL2-050

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020050	1	TWSL2 Left Sideplate 50mm / 2" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020004	1	TWSL2 Drive Shoe (TWSL2-4)
8**	TWSLRT020050	1	TWSL2 Ratchet 50mm / 2" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020050	1	TWSL2 Right Sideplate 50mm / 2" A/F
14	TWSLCR020004	1	TWSL2 Crank (TWSL2-4)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-048

Item No.	Part No.	Qty	Description
2	TWSLPL020048	1	TWSL2 Left Sideplate 48mm / 1-7/8" A/F
8**	TWSLPR020048	1	TWSL2 Ratchet 48mm / 1-7/8" A/F
13	TWSLRT020048	1	TWSL2 Right Sideplate 48mm / 1-7/8" A/F

** - Replace as a pair with Item No. 7

TWSL2-049

Item No.	Part No.	Qty	Description
2	TWSLPL020049	1	TWSL2 Left Sideplate 49mm / 1-15/16" A/F
8**	TWSLRT020049	1	TWSL2 Right Sideplate 49mm / 1-15/16" A/F
13	TWSLPR020049	1	TWSL2 Ratchet 49mm / 1-15/16" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL2-5

TWSL2-055

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020055	1	TWSL2 Left Sideplate 55mm / 2-3/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020005	1	TWSL2 Drive Shoe (TWSL2-5)
8**	TWSLRT020055	1	TWSL2 Ratchet 55mm / 2-3/16" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020055	1	TWSL2 Right Sideplate 55mm / 2-3/16" A/F
14	TWSLCR020005	1	TWSL2 Crank (TWSL2-5)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-052

Item No.	Part No.	Qty	Description
2	TWSLPL020052	1	TWSL2 Left Sideplate 52mm / 2-1/16" A/F
8**	TWSLPR020052	1	TWSL2 Ratchet 52mm / 2-1/16" A/F
13	TWSLRT020052	1	TWSL2 Right Sideplate 52mm / 2-1/16" A/F

** - Replace as a pair with Item No. 7

TWSL2-054

Item No.	Part No.	Qty	Description
2	TWSLPL020054	1	TWSL2 Left Sideplate 54mm / 2-1/8" A/F
8**	TWSLRT020054	1	TWSL2 Right Sideplate 54mm / 2-1/8" A/F
13	TWSLPR020054	1	TWSL2 Ratchet 54mm / 2-1/8" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL2-6

TWSL2-060

Item No.	Part No.	Qty	Description
1	DFTHP020001	1	TWL/LDF2 Head Pin
2	TWSLPL020060	1	TWSL2 Left Sideplate 60mm / 2-3/8" A/F
3	STDFA000062	1	Screw
4	TWSLCS020001	1	TWSL2 Crank Stop
5	DFTSL020001	1	TWL/LDF2 Slider
6	STDST000012	2	Spring
7**	TWSLDS020006	1	TWSL2 Drive Shoe (TWSL2-6)
8**	TWSLRT020060	1	TWSL2 Ratchet 60mm / 2-3/8" A/F
9	DFTLA020004	2	TWL Decal
10	STDFA000042	3	Screw
11			
12	STDFA000200	1	Screw
13	TWSLPR020060	1	TWSL2 Right Sideplate 60mm / 2-3/8" A/F
14	TWSLCR020006	1	TWSL2 Crank (TWSL2-6)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL2-057

Item No.	Part No.	Qty	Description
2	TWSLPL020057	1	TWSL2 Left Sideplate 57mm / 2-1/4" A/F
8**	TWSLPR020057	1	TWSL2 Ratchet 57mm / 2-1/4" A/F
13	TWSLRT020057	1	TWSL2 Right Sideplate 57mm / 2-1/4" A/F

** - Replace as a pair with Item No. 7

TWSL2-059

Item No.	Part No.	Qty	Description
2	TWSLPL020059	1	TWSL2 Left Sideplate 59mm / 2-5/16" A/F
8**	TWSLRT020059	1	TWSL2 Right Sideplate 59mm / 2-5/16" A/F
13	TWSLPR020059	1	TWSL2 Ratchet 59mm / 2-5/16" A/F

** - Replace as a pair with Item No. 7

TWSL4 Torque Wrench: Link Parts List

Link Ref: TWSL4-2

TWSL4-046

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040046	1	TWSL4 Left Sideplate 46mm / 1-13/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040002	1	TWSL4 Drive Shoe (TWSL4-2)
8**	TWSLRT040046	1	TWSL4 Ratchet 46mm / 1-13/16" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040046	1	TWSL4 Right Sideplate 46mm / 1-13/16" A/F
14	TWSLCR040002	1	TWSL4 Crank (TWSL4-2)

** - Replace as a pair

TWSL4 Handle (Link Part No's TWSL4-xxxH)

Item No.	Part No.	Qty	Description
15	DFTAS000002	1	Handle

xxx – Hex A/F size

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-043

Item No.	Part No.	Qty	Description
2	TWSLPL040043	1	TWSL4 Left Sideplate 43mm / 1-11/16" A/F
8**	TWSLRT040043	1	TWSL4 Ratchet 43mm / 1-11/16" A/F
13	TWSLPR040043	1	TWSL4 Right Sideplate 43mm / 1-11/16" A/F

** - Replace as a pair with Item No. 7

TWSL4-044

Item No.	Part No.	Qty	Description
2	TWSLPL040044	1	TWSL4 Left Sideplate 44mm / 1-3/4" A/F
8**	TWSLRT040044	1	TWSL4 Ratchet 44mm / 1-3/4" A/F
13	TWSLPR040044	1	TWSL4 Right Sideplate 44mm / 1-3/4" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-3

TWSL4-050

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040050	1	TWSL4 Left Sideplate 50mm / 2" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040003	1	TWSL4 Drive Shoe (TWSL4-3)
8**	TWSLRT040050	1	TWSL4 Ratchet 50mm / 2" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040050	1	TWSL4 Right Sideplate 50mm / 2" A/F
14	TWSLCR040003	1	TWSL4 Crank (TWSL4-3)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-048

Item No.	Part No.	Qty	Description
2	TWSLPL040048	1	TWSL4 Left Sideplate 48mm / 1-7/8" A/F
8**	TWSLRT040048	1	TWSL4 Ratchet 48mm / 1-7/8" A/F
13	TWSLPR040048	1	TWSL4 Right Sideplate 48mm / 1-7/8" A/F

** - Replace as a pair with Item No. 7

TWSL4-049

Item No.	Part No.	Qty	Description
2	TWSLPL040049	1	TWSL4 Left Sideplate 49mm / 1-15/16" A/F
8**	TWSLRT040049	1	TWSL4 Ratchet 49mm / 1-15/16" A/F
13	TWSLPR040049	1	TWSL4 Right Sideplate 49mm / 1-15/16" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-4

TWSL4-055

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040055	1	TWSL4 Left Sideplate 55mm / 2-3/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040004	1	TWSL4 Drive Shoe (TWSL4-4)
8**	TWSLRT040055	1	TWSL4 Ratchet 55mm / 2-3/16" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040055	1	TWSL4 Right Sideplate 55mm / 2-3/16" A/F
14	TWSLCR040004	1	TWSL4 Crank (TWSL4-4)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-052

Item No.	Part No.	Qty	Description
2	TWSLPL040052	1	TWSL4 Left Sideplate 52mm / 2-1/16" A/F
8**	TWSLRT040052	1	TWSL4 Ratchet 52mm / 2-1/16" A/F
13	TWSLPR040052	1	TWSL4 Right Sideplate 52mm / 2-1/16" A/F

** - Replace as a pair with Item No. 7

TWSL4-054

Item No.	Part No.	Qty	Description
2	TWSLPL040054	1	TWSL4 Left Sideplate 54mm / 2-1/8" A/F
8**	TWSLRT040054	1	TWSL4 Ratchet 54mm / 2-1/8" A/F
13	TWSLPR040054	1	TWSL4 Right Sideplate 54mm / 2-1/8" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-5

TWSL4-060

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040060	1	TWSL4 Left Sideplate 60mm / 2-3/8" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040005	1	TWSL4 Drive Shoe (TWSL4-5)
8**	TWSLRT040060	1	TWSL4 Ratchet 60mm / 2-3/8" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040060	1	TWSL4 Right Sideplate 60mm / 2-3/8" A/F
14	TWSLCR040005	1	TWSL4 Crank (TWSL4-5)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-057

Item No.	Part No.	Qty	Description
2	TWSLPL040057	1	TWSL4 Left Sideplate 57mm / 2-1/4" A/F
8**	TWSLRT040057	1	TWSL4 Ratchet 57mm / 2-1/4" A/F
13	TWSLPR040057	1	TWSL4 Right Sideplate 57mm / 2-1/4" A/F

** - Replace as a pair with Item No. 7

TWSL4-059

Item No.	Part No.	Qty	Description
2	TWSLPL040059	1	TWSL4 Left Sideplate 59mm / 2-5/16" A/F
8**	TWSLRT040059	1	TWSL4 Ratchet 59mm / 2-5/16" A/F
13	TWSLPR040059	1	TWSL4 Right Sideplate 59mm / 2-5/16" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-6

TWSL4-065

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040065	1	TWSL4 Left Sideplate 65mm / 2-9/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040006	1	TWSL4 Drive Shoe (TWSL4-6)
8**	TWSLRT040065	1	TWSL4 Ratchet 65mm / 2-9/16" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040065	1	TWSL4 Right Sideplate 65mm / 2-9/16" A/F
14	TWSLCR040006	1	TWSL4 Crank (TWSL4-6)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-062

Item No.	Part No.	Qty	Description
2	TWSLPL040062	1	TWSL4 Left Sideplate 62mm / 2-7/16" A/F
8**	TWSLRT040062	1	TWSL4 Ratchet 62mm / 2-7/16" A/F
13	TWSLPR040062	1	TWSL4 Right Sideplate 62mm / 2-7/16" A/F

** - Replace as a pair with Item No. 7

TWSL4-063

Item No.	Part No.	Qty	Description
2	TWSLPL040063	1	TWSL4 Left Sideplate 63mm / 2-1/2" A/F
8**	TWSLRT040063	1	TWSL4 Ratchet 63mm / 2-1/2" A/F
13	TWSLPR040063	1	TWSL4 Right Sideplate 63mm / 2-1/2" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-7

TWSL4-070

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040070	1	TWSL4 Left Sideplate 70mm / 2-3/4" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040007	1	TWSL4 Drive Shoe (TWSL4-7)
8**	TWSLRT040070	1	TWSL4 Ratchet 70mm / 2-3/4" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040070	1	TWSL4 Right Sideplate 70mm / 2-3/4" A/F
14	TWSLCR040007	1	TWSL4 Crank (TWSL4-7)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-067

Item No.	Part No.	Qty	Description
2	TWSLPL040067	1	TWSL4 Left Sideplate 67mm / 2-5/8" A/F
8**	TWSLRT040067	1	TWSL4 Ratchet 67mm / 2-5/8" A/F
13	TWSLPR040067	1	TWSL4 Right Sideplate 67mm / 2-5/8" A/F

** - Replace as a pair with Item No. 7

TWSL4-068

Item No.	Part No.	Qty	Description
2	TWSLPL040068	1	TWSL4 Left Sideplate 68mm / 2-11/16" A/F
8**	TWSLRT040068	1	TWSL4 Ratchet 68mm / 2-11/16" A/F
13	TWSLPR040068	1	TWSL4 Right Sideplate 68mm / 2-11/16" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-8

TWSL4-075

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040075	1	TWSL4 Left Sideplate 75mm / 2-15/16" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040008	1	TWSL4 Drive Shoe (TWSL4-8)
8**	TWSLRT040075	1	TWSL4 Ratchet 75mm / 2-15/16" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040075	1	TWSL4 Right Sideplate 75mm / 2-15/16" A/F
14	TWSLCR040008	1	TWSL4 Crank (TWSL4-8)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-071

Item No.	Part No.	Qty	Description
2	TWSLPL040071	1	TWSL4 Left Sideplate 71mm / 2-13/16" A/F
8**	TWSLRT040071	1	TWSL4 Ratchet 71mm / 2-13/16" A/F
13	TWSLPR040071	1	TWSL4 Right Sideplate 71mm / 2-13/16" A/F

** - Replace as a pair with Item No. 7

TWSL4-073

Item No.	Part No.	Qty	Description
2	TWSLPL040073	1	TWSL4 Left Sideplate 73mm / 2-7/8" A/F
8**	TWSLRT040073	1	TWSL4 Ratchet 73mm / 2-7/8" A/F
13	TWSLPR040073	1	TWSL4 Right Sideplate 73mm / 2-7/8" A/F

** - Replace as a pair with Item No. 7

Link Ref: TWSL4-9

TWSL4-080

Item No.	Part No.	Qty	Description
1	DFTHP040001	1	TWL4 Head Pin
2	TWSLPL040080	1	TWSL4 Left Sideplate 80mm / 3-1/8" A/F
3	STDFA000062	1	Screw
4	TWSLCS040001	1	TWSL4 Crank Stop
5	DFTSL040001	1	TWL4 Slider
6	STDST000013	2	Spring
7**	TWSLDS040009	1	TWSL4 Drive Shoe (TWSL4-9)
8**	TWSLRT040080	1	TWSL4 Ratchet 80mm / 3-1/8" A/F
9	DFTLA040004	2	TWL Decal
10	STDFA000045	2	Screw
11	STDFA000043	1	Screw
12	STDFA000170	1	Screw
13	TWSLPR040080	1	TWSL4 Right Sideplate 80mm / 3-1/8" A/F
14	TWSLCR040009	1	TWSL4 Crank (TWSL4-9)

** - Replace as a pair

For Links below, substitute the Ratchet, LH sideplate and RH Sideplate for Item No's indicated.

TWSL4-077

Item No.	Part No.	Qty	Description
2	TWSLPL040077	1	TWSL4 Left Sideplate 77mm / 3" A/F
8**	TWSLRT040077	1	TWSL4 Ratchet 77mm / 3" A/F
13	TWSLPR040077	1	TWSL4 Right Sideplate 77mm / 3" A/F

** - Replace as a pair with Item No. 7

TWSL4-078

Item No.	Part No.	Qty	Description
2	TWSLPL040078	1	TWSL4 Left Sideplate 78mm / 3-1/16" A/F
8**	TWSLRT040078	1	TWSL4 Ratchet 78mm / 3-1/16" A/F
13	TWSLPR040078	1	TWSL4 Right Sideplate 78mm / 3-1/16" A/F

** - Replace as a pair with Item No. 7

English Original

EC DECLARATION OF CONFORMITY

We declare under our sole responsibility that our SlimLine Torque Wrench Model:

TWSL series

to which this declaration relates are in conformity with the following:

EN, EN-ISO, ISO standards	**Title**
Per the provisions of the Machinery Safety Directive	**2006/42 EC**
EN_ISO 12100:2011	Safety of machinery, basic concepts, general principles for design, risk assessment & risk reduction
EN 4413:2010	Hydraulic Fluid Power – general rules and safety requirements for systems & their components

We hereby declare that the equipment specified conforms to the above European Communities Directive(s) and Standard(s).

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