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TWSD Series

CE

Original Instructions

Square Drive Hydraulic Torque Wrench



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Torque Wrench Square Drive (TWSD)

Description: The TWSD torque wrench is a ratchet-type torque tool used in conjunction with standard impact sockets to hydraulically tighten nuts and bolts. It is powered using a 690 bar (10,000 psi) hydraulic pump unit. The torque output from the TWSD torque wrench is proportional to the pump-pressure applied.

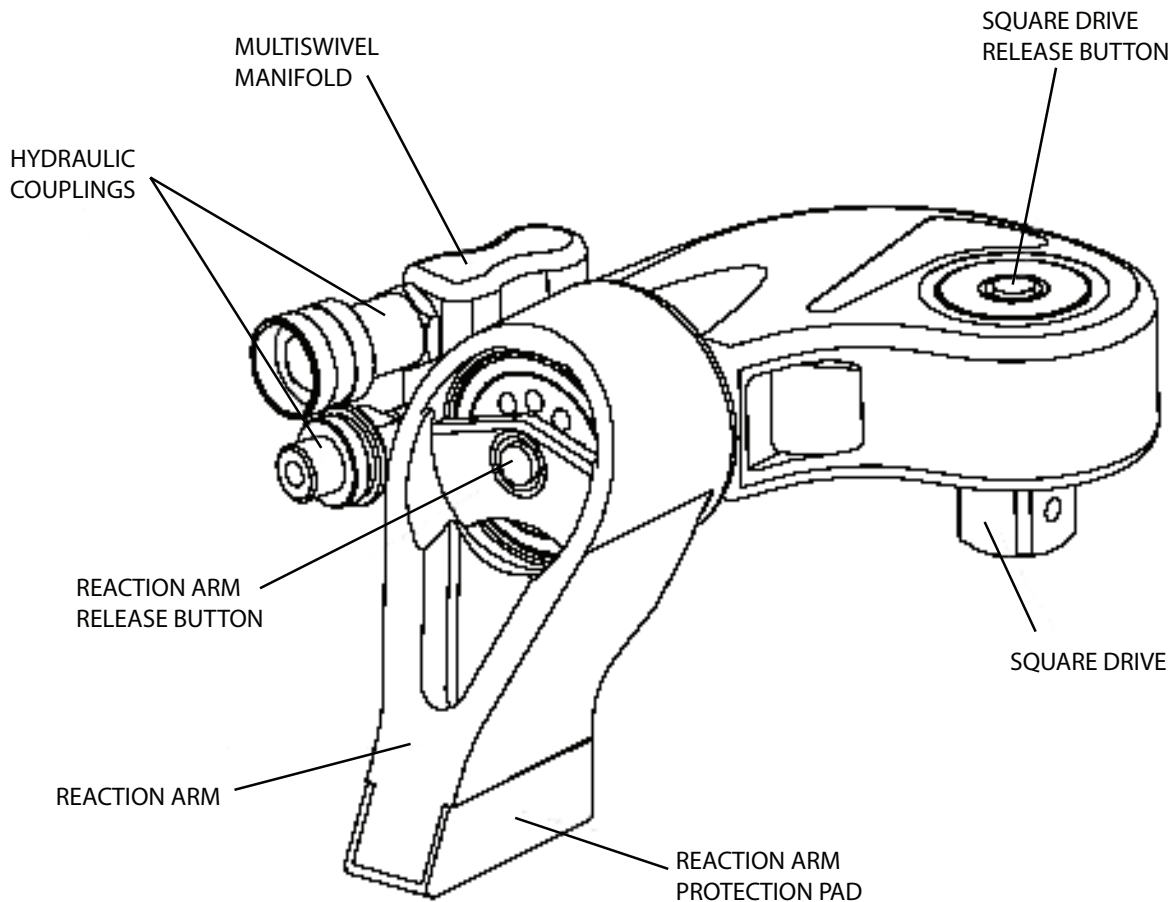


Figure 1. TWSD Hydraulic Torque Wrench

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 immediate 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. Power Team will supply information necessary to help make these decisions. Consult your nearest Power Team facility.



- Safety glasses must be worn at all time 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



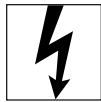
WARNING: To prevent personal injury,

- Do not exceed the hydraulic pressure rating noted 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 overflowing the pump reservoir. An overflow can cause personal injury due to 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 counterclockwise 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 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 also must 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 TWSD 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 cm³/min @ 7 bar (15 ci/min @ 100 psi) to 20 cm³/min @ 690 bar (1.2 ci/min @ 10,000 psi) should be specified; however, for optimum speed and performance, at least 360 cm³/min @ 7 bar (22 ci/min @ 100 psi) to 30 cm³/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—TWSD 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 full pressure/torque is acceptable, but unnecessary continuous use at full pressure will reduce the life of the torque wrench and system.
- 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.

Use of Sockets

Use high-quality, industrial impact sockets at all times. Verify that sockets are rated to accept the full torque output of the torque wrench they are used with. Regularly check the socket for cracks and flaws. If any sign of damage is evident, discard immediately. A damaged socket breaking under load can cause equipment damage or operator injury.

Long-reach or deep sockets are not recommended for use with hydraulic torque tools because they can make the wrench and socket unstable. However, some applications demand the use of long-reach sockets. When long-reach sockets are used, support for both the socket and reaction facility must be provided. The same applies to socket accessories, such as extension bars, knuckle joints (not recommended), etc.

Safety

The TWSD 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 TWLC 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 maximum working pressure of: Advance 690 bar (10,000 psi) and Retract 103 bar (1,500 psi).
- 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. square drive, reaction arm, etc.) are properly attached and secure. Verify the square drive retainer button is properly located.
- Do not strike any of the components, including the socket, 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.
- Verify that any sockets to be used with the hydraulic torque wrench are of impact quality and capable of withstanding the full torque output of the tool.
- 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

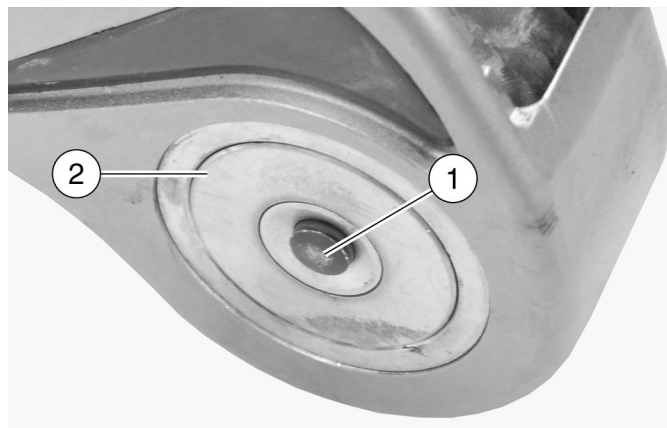
IMPORTANT: For a copy of the calibration certificate for a specific hydraulic torque wrench, e-mail info@spxboltingsystems.com with serial number of the hydraulic torque wrench.

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 socket wrench).

Changing the Drive Direction

To change the drive direction:

1. Press and hold the drive-release button and pull out the square drive. The square drive, retainer cap, and button assembly are now free.
2. To reinstall, insert the square drive into the opposite side of the tool head, aligning the splines, and replace the retainer cap assembly.
3. Pull the square drive to verify that it is locked in position.



Item	Description
1	Square drive release button
2	Square drive cap

Figure 2. Square Drive Operation

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. 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. Use the Pressure/Torque Conversion Chart in this manual to obtain the required pump pressure.
11. Verify that the socket to be used is of the correct type and size. A poor fitting or oversized socket can damage nuts, induce inaccurate bolt loads, and may result in operator injury.
12. Place the proper size impact socket on the square drive and secure it properly with the locking ring and pin. Verify that the square drive is fully engaged into the socket.
13. Verify that the reaction arm is placed firmly against a stationary object such as an adjacent nut, flange, equipment housing, etc.

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: TWSD 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.

14. Before applying the hydraulic torque wrench to the application, the pump output pressure must be preset 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

Figure 3 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.

Using the Reaction Arm

See Figure 3. The TWSD hydraulic torque wrench features a 360° adjustable reaction arm. Although the reaction arm can be placed in a multitude of positions, always try to use the torque tool with the reaction arm positioned parallel to the socket (i.e. 90° to the torque tool body).

NOTE: Always verify that the reaction arm is locked onto the body before use, and never attempt to unlock and slide the reaction arm part way off the body to facilitate a reaction point out of reach of its engaged position.

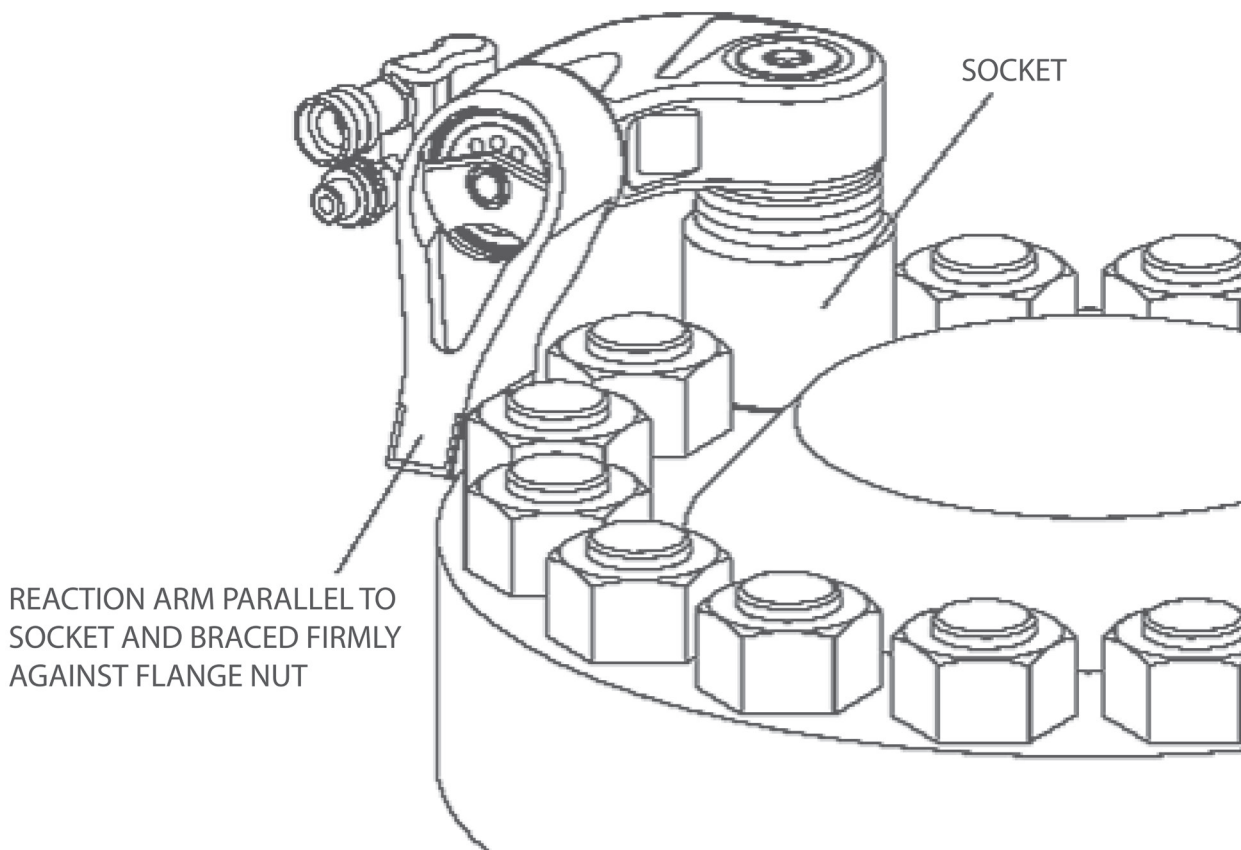


Figure 3. Correct Reaction Arm Positioning

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 and socket to the nut to be tightened, verifying that the reaction arm firmly and squarely contacts 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 socket 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 TWSD 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 pressure of 690 bar (10,000 psi). 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 reached 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 and socket 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 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 TWSD hydraulic torque wrenches:

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

Wrench Ref	Head Size range, mm (in.)	Torque Output, ft-lb		Approximate Weight, kg (lb)
		MIN**	MAX	
TWSD1	19.05 (3/4)	156	1,300	2.3 (5.07)
TWSD3	25.4 (1)	368	3,070	4.5 (9.92)
TWSD6	38.1 (1 1/2)	722	6,020	7.9 (17.42)
TWSD11	38.1 (1 1/2)	1,313	10,940	13.1 (28.88)
TWSD25	63.5 (2 1/2)	2,940	24,500	29.5 (65.04)
** Note that minimum torque can be lower depending upon pump low-pressure capability				

Pressure/Torque Conversion Chart

Pump Pressure		Torque Output									
		TWSD1		TWSD3		TWSD6		TWSD11		TWSD25	
bar	psi	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb
83	1200	211	156	499	368	979	722	1779	1313	3984	2940
97	1400	247	182	582	430	1142	843	2075	1532	4648	3430
110	1600	282	208	666	491	1305	963	2372	1750	5312	3920
124	1800	317	234	749	553	1468	1084	2668	1969	5976	4410
138	2000	352	260	832	614	1631	1204	2965	2188	6640	4900
152	2200	388	286	915	675	1795	1324	3261	2407	7304	5390
165	2400	423	312	998	737	1958	1445	3558	2626	7967	5880
179	2600	458	338	1082	798	2121	1565	3854	2844	8631	6370
193	2800	493	364	1165	860	2284	1686	4151	3063	9295	6860
207	3000	528	390	1248	921	2447	1806	4447	3282	9959	7350
221	3200	564	416	1331	982	2610	1926	4744	3501	10623	7840
234	3400	599	442	1414	1044	2773	2047	5040	3720	11287	8330
248	3600	634	468	1498	1105	2937	2167	5337	3938	11951	8820
262	3800	669	494	1581	1167	3100	2288	5633	4157	12615	9310
276	4000	705	520	1664	1228	3263	2408	5930	4376	13279	9800
290	4200	740	546	1747	1289	3426	2528	6226	4595	13943	10290
303	4400	775	572	1830	1351	3589	2649	6522	4814	14607	10780
317	4600	810	598	1914	1412	3752	2769	6819	5032	15271	11270
331	4800	846	624	1997	1474	3915	2890	7115	5251	15935	11760
345	5000	881	650	2080	1535	4079	3010	7412	5470	16599	12250
359	5200	916	676	2163	1596	4242	3130	7708	5689	17263	12740
372	5400	951	702	2246	1658	4405	3251	8005	5908	17927	13230
386	5600	986	728	2330	1719	4568	3371	8301	6126	18591	13720
400	5800	1022	754	2413	1781	4731	3492	8598	6345	19255	14210
414	6000	1057	780	2496	1842	4894	3612	8894	6564	19919	14700
427	6200	1092	806	2579	1903	5057	3732	9191	6783	20583	15190
441	6400	1127	832	2662	1965	5221	3853	9487	7002	21247	15680
455	6600	1163	858	2746	2026	5384	3973	9784	7220	21911	16170
469	6800	1198	884	2829	2088	5547	4094	10080	7439	22575	16660
483	7000	1233	910	2912	2149	5710	4214	10377	7658	23238	17150
496	7200	1268	936	2995	2210	5873	4334	10673	7877	23902	17640
510	7400	1304	962	3078	2272	6036	4455	10970	8096	24566	18130
524	7600	1339	988	3162	2333	6199	4575	11266	8314	25230	18620
538	7800	1374	1014	3245	2395	6363	4696	11563	8533	25894	19110
552	8000	1409	1040	3328	2456	6526	4816	11859	8752	26558	19600
565	8200	1444	1066	3411	2517	6689	4936	12156	8971	27222	20090
579	8400	1480	1092	3494	2579	6852	5057	12452	9190	27886	20580
593	8600	1515	1118	3578	2640	7015	5177	12749	9408	28550	21070
607	8800	1550	1144	3661	2702	7178	5298	13045	9627	29214	21560
621	9000	1585	1170	3744	2763	7341	5418	13341	9846	29878	22050
634	9200	1621	1196	3827	2824	7505	5538	13638	10065	30542	22540
648	9400	1656	1222	3910	2886	7668	5659	13934	10284	31206	23030
662	9600	1691	1248	3993	2947	7831	5779	14231	10502	31870	23520
676	9800	1726	1274	4077	3009	7994	5900	14527	10721	32534	24010
690	10000	1762	1300	4160	3070	8157	6020	14824	10940	33198	24500

General Maintenance

Maintenance

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

TWSD Hydraulic Torque Wrench

1. Wipe away any debris that may have accumulated, particularly around the square-drive area, reaction arm, and hydraulic couplings.
2. Inspect the following components:
 - Hydraulic couplings for signs of damage.
 - Swivel manifold to verify the retaining ring is present and fitted correctly.
 - Verify the guard is present and securely attached. Replace/reattach as necessary.
3. Remove the square drive from the torque wrench and inspect for damage, cracks, etc. Lubricate the bearing journals using Revol R5 Moly Anti-Seize, and replace the square drive.

NOTE: The TWSD 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.

4. Lightly spray the hydraulic torque wrench with water repellent spray before placing in storage.

Drive components should be lubricated at regular intervals depending on usage. Refer to the repair procedures section for instructions.

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 ' Equipment Maintenance and Servicing Manual'.

All LDF 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 TTS Ltd 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.	<ol style="list-style-type: none"> 1. Coupling not fully mated. 2. Cylinder seal leakage. 3. Pump unit. 4. Faulty coupling. 	<ol style="list-style-type: none"> 1. Check coupling. 2. Replace seal. 3. Check pump unit. 4. Replace coupling.
Torque wrench operates backwards.	<ol style="list-style-type: none"> 1. Reversed couplings. 	<ol style="list-style-type: none"> 1. Check pump, hose, and torque wrench for cross connection.
Pressure will not build.	<ol style="list-style-type: none"> 1. Cylinder seal leakage. 2. Swivel seal leakage. 3. Defective pump unit. 	<ol style="list-style-type: none"> 1. Change seals. 2. Change seals. 3. Check pump unit.
Pressure builds, but wrench does not move.	<ol style="list-style-type: none"> 1. Hose restriction. 2. Coupling not fully assembled. 	<ol style="list-style-type: none"> 1. Change hose. 2. Fully tighten coupling.
Slow torque wrench operation.	<ol style="list-style-type: none"> 1. Hose restriction. 2. Coupling not fully assembled. 3. Pump flow rate too small. 	<ol style="list-style-type: none"> 1. Change hose. 2. Fully tighten coupling. 3. Use higher flow pump.
Erratic or slow retraction speed.	<ol style="list-style-type: none"> 1. Hose restriction. 2. Coupling not fully assembled. 	<ol style="list-style-type: none"> 1. Change hose. 2. Fully tighten coupling.
Torque wrench does not ratchet.	<ol style="list-style-type: none"> 1. Broken drive shoe. 2. Jammed drive shoe. 3. Damaged ratchet. 	<ol style="list-style-type: none"> 1. Replace drive shoe. 2. Check drive shoe and spring. 3. Check/replace ratchet.
Ratchet jumps while driving.	<ol style="list-style-type: none"> 1. Worn/damaged ratchet. 2. Worn/damaged drive shoe. 3. Wrench incorrectly retracted. 4. Weak/snapped drive shoe spring. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Pressure within hose. 2. Damaged coupling. 	<ol style="list-style-type: none"> 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 TWSD 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 stripdown. The three servicing areas are:

- Drive components and lubrication.
- Multiswivel manifold components.
- Hydraulic cylinder components.

Full servicing indicates that all three areas are serviced.

Drive Component Disassembly

The drive components should be lubricated at regular intervals (typically every three months under normal use). Component lubrication is carried out as follows:

1. Verify the torque wrench is fully retracted. Disconnect the power supply.
2. Attach open-ended couplings to the multiswivel manifold to vent any residual pressure.
3. See Figure 4. Unscrew the endcap using a pin wrench.
4. See Figure 5. Remove the internal circlip.



Figure 4. Endcap Removal



Figure 5. Internal Circlip Removal

5. See Figure 6. Remove the piston plug from the end of the piston by screwing an M6 or M8 screw (depending on the wrench model) into the hole in the back of the piston plug, and pulling to remove.
6. See Figure 7. Remove the shoulder screw from inside the piston.
7. See Figure 8. Remove the guard, unscrewing the guard screws.

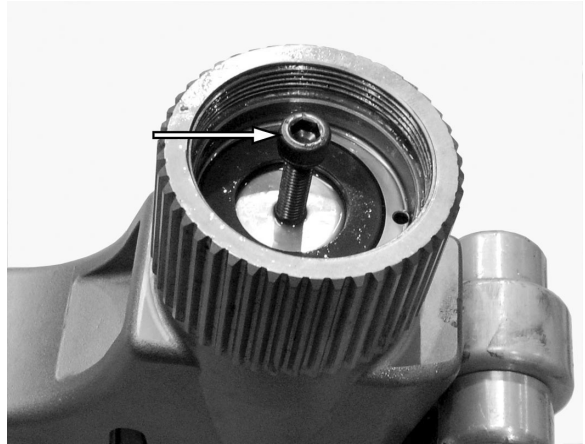


Figure 6. Piston Plug Removal

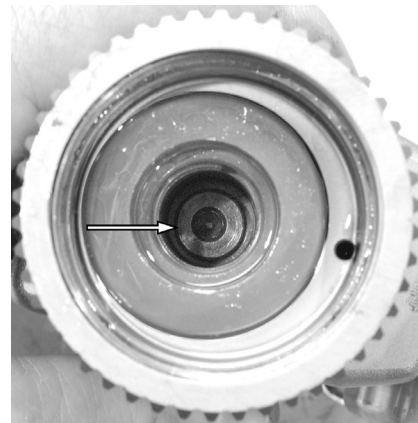
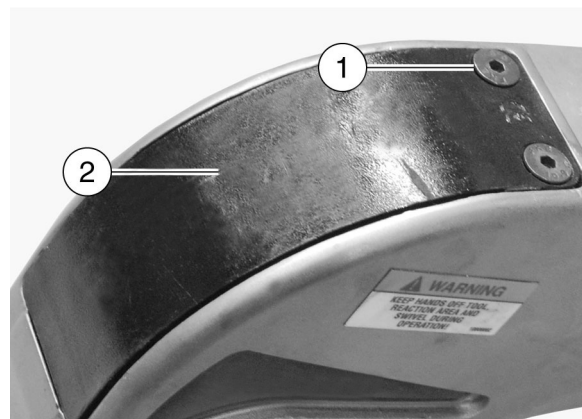


Figure 7. Shoulder Screw Removal



Item	Description
1	Guard screw
2	Guard

Figure 8. Guard Removal

- 8. See Figure 9. Loosen but do not remove the crank pin retaining screw.
- 9. See Figure 10. Using a screwdriver, slide the crank pin out of the crank until it touches the shuttle bore. Gently retighten the crank pin retaining screw to hold the crank pin in the outward position.

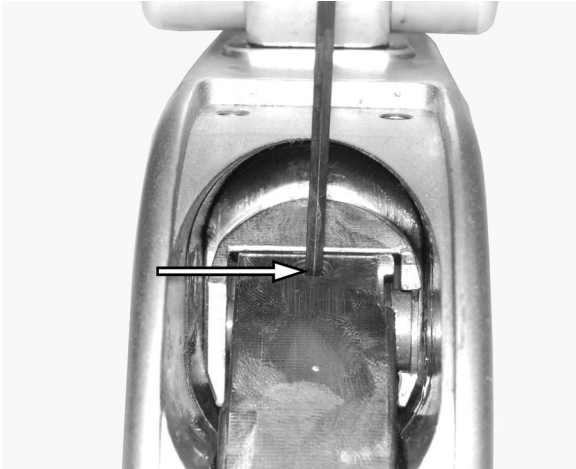
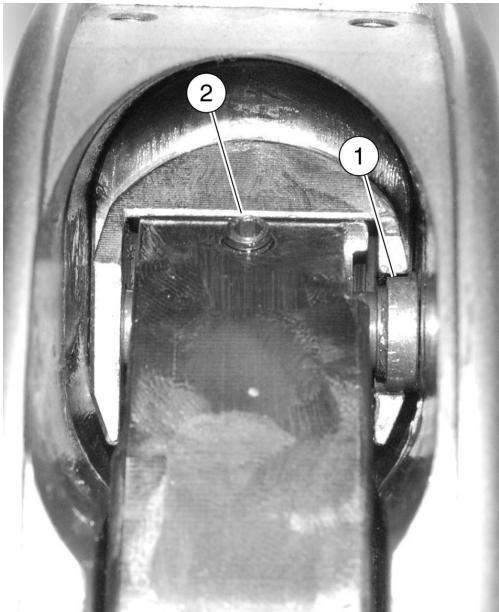


Figure 9. Crank Pin Retaining Screw



Item	Description
1	Crank pin
2	Crank pin retaining screw

Figure 10. Crank Pin Adjustment

10. See Figure 11. Remove the square drive and square drive cap.
11. See Figure 12. Withdraw the crank complete with ratchet drive assembly from the torque wrench.
12. See Figure 13. Remove the shuttle and slider assembly from the body.
13. Remove the ratchet, drive shoe, and springs from the crank.

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.

Drive Component Assembly

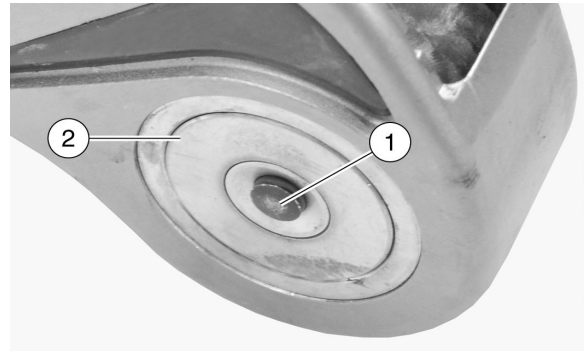
Before assembly, apply a liberal coat of Revol R5 Moly Anti Seize to the following areas:

- Inside surfaces of both sideplates including the shuttle bore.
- Shuttle component (all surfaces except threaded hole).
- Slider component (all surfaces).
- The pocket where the drive shoe is located within the crank (not the crank bore).
- The driving head of the crank that assembles into the slider.
- Body sideplate journals.
- Square drive bearing journals.
- Square drive cap bearing journals.
- Threads of endcap.

IMPORTANT: Do not apply lubricant to the ratchet and drive shoe teeth.

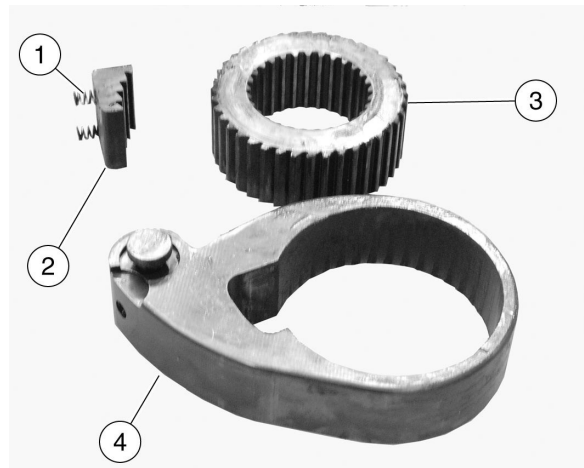
The hydraulic torque wrench drive components must be lubricated using the specified product only. Using alternative lubricants will affect the output and possibly lead to premature component failures.

1. Assemble the slider to the shuttle and verify it slides freely (check that the slider is not installed upside-down). Install the shuttle/slider assembly into the wrench body.



Item	Description
1	Square drive lock button
2	Square drive cap

Figure 11. Square Drive Removal



Item	Description
1	Drive shoe springs
2	Drive shoe
3	Ratchet
4	Crank

Figure 12. Crank Removal

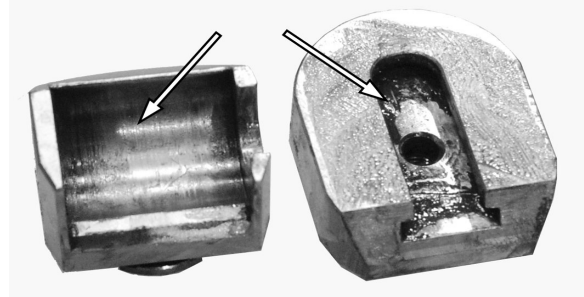


Figure 13. Shuttle and Slider Removal

2. Place the ratchet into the crank bore, and install the drive shoe and springs. Verify that the ratchet teeth are driving in the correct direction and engaged with the drive shoe teeth.
3. Verify that the crank pin is located in the top of the crank and held in its retracted position. If it is not, install the pin and position the face of the small diameter of the pin parallel with the crank surface. Slightly tighten the crank pin retaining screw to hold it in position.
4. Install the crank into the wrench body, and engage the crank driving head into the slider.
5. Loosen the crank pin retaining screw, and using a screwdriver, slide the crank pin into the slider. Tighten the crank pin retainer screw.
6. Slide the square drive into the wrench body and attach the square drive cap.
7. Apply one drop of low-strength thread-locking adhesive to the threads of the shoulder screw, slide it through the piston, and screw it into the shuttle. Tighten the shoulder screw in accordance with the following torque specifications.

Wrench Size	Torque	
	Nm	<i>in-lb</i>
TWSD1	20	178
TWSD3	20	178
TWSD6	30	266
TWSD11	30	266
TWSD25	50	443

8. Inspect the o-ring seal on the piston plug, replace if damaged, and insert into the piston. Install the internal circlip to retain the piston plug in position.
9. Inspect the o-ring seal on the endcap, replace if damaged, and install into the body. Tighten the endcap using a pin wrench.
10. 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 (10,000 psi) advance; 103 bar (1,500 psi) retract), and check for leaks.
11. Replace the torque wrench guard.

Following stripdown and/or lubrication, the hydraulic 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. See Figure 14. Remove the multiswivel yoke screw.
3. See Figure 15. Disengage the multiswivel yoke by rotating the advance yoke away from the retract yoke, disengaging the keys. Pull each yoke away from the banjo.



Figure 14. Multiswivel Yoke Screw Removal

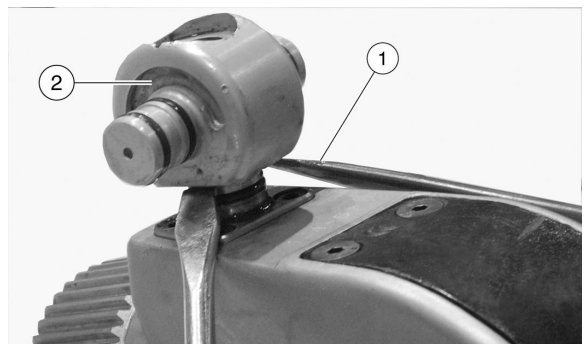


Figure 15. Multiswivel Yoke Disengagement

4. See Figure 16. Remove the banjo circlip.
5. See Figure 17. Remove the banjo from the multiswivel post. Remove and discard the banjo seals. Do not remove the pressure plugs from the banjo.
6. See Figure 18. Unscrew and remove the four off capscrews that attach the post to the wrench body.

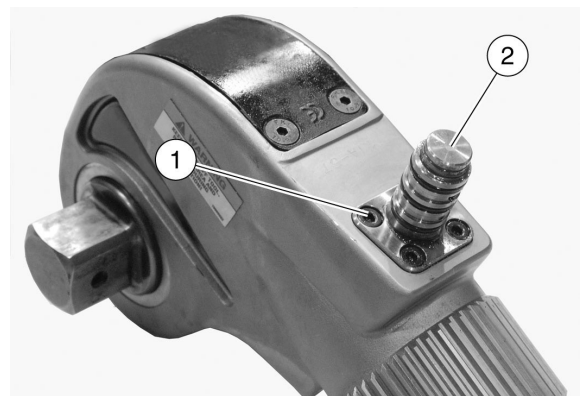


Figure 16. Banjo Circlip Removal



Item	Description
1	Pry bar
2	Multiswivel banjo

Figure 17. Banjo Removal



Item	Description
1	Screw
2	Multiswivel post

Figure 18. Capscrew Removal

7. See Figure 19. Lift out the multiswivel post. Remove and discard the port seals and post seals.

Clean and inspect all components including the hydraulic couplings. If the hydraulic couplings are damaged, remove and replace (multiswivel yoke threads are 1/4-in. NPT). Inspect the components for scoring, pitting, and damage, which could impair the sealing ability, and replace as necessary.

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 o-ring seals into the base of the multiswivel post.
2. Attach the multiswivel post to the hydraulic torque wrench body using the four off screws. Torque the screws to 3.5 Nm (31 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 post, ensuring the seals do not get damaged.
6. See Figure 20. Attach the banjo circlip to the post.
7. Assemble the advance and retract yokes to the banjo.

IMPORTANT: Be sure to install the advance and retract yokes onto the banjo correctly. The banjo is hard stamped with A (advance) and R (retract) to indicate the correct position of the associated 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 yoke keyways engage.
9. Clamp the advance and retract yokes together by installing the yoke screw and torquing to 5 Nm (44 in-lb).
10. Check the operation of the multiswivel manifold by rotating and tilting. Movement should be smooth and free.

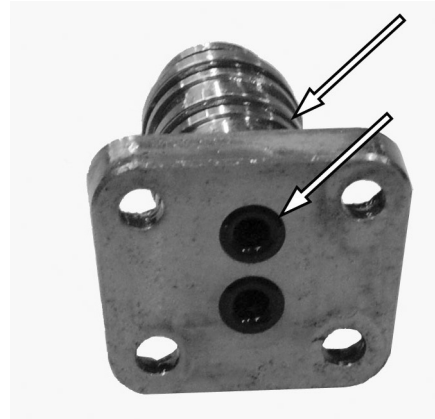


Figure 19. Multiswivel Post Removal

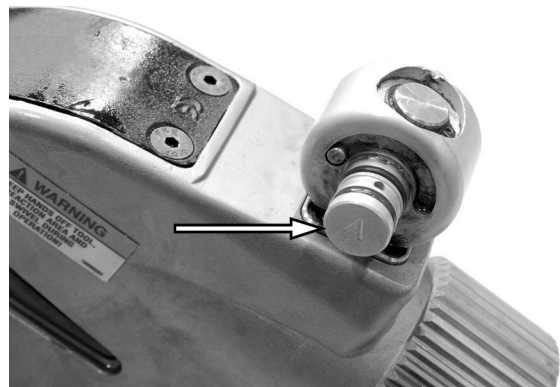


Figure 20. Circlip Installation

11. 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 (10,000 psi) advance; 103 bar (1,500 psi) retract), and check for leaks.

NOTE: If the hydraulic couplings were removed, verify that they are installed into the correct yoke. The male coupling assemblies into the advance yoke and the female coupling assemblies into the retract yoke. Apply hydraulic thread sealant to the hydraulic coupling thread before assembly. It is not advised to use thread sealing tape as debris from the sealing tape can contaminate the system.

Hydraulic Cylinder Disassembly

It is only necessary to remove the hydraulic cylinder/body components if seal replacement is required.

1. Verify the torque wrench is fully retracted. Disconnect the power supply.
2. Attach open-ended couplings to the multiswivel manifold to vent any residual pressure.
3. See Figure 21. Unscrew the endcap using a pin wrench.
4. See Figure 22. Remove the internal circlip.

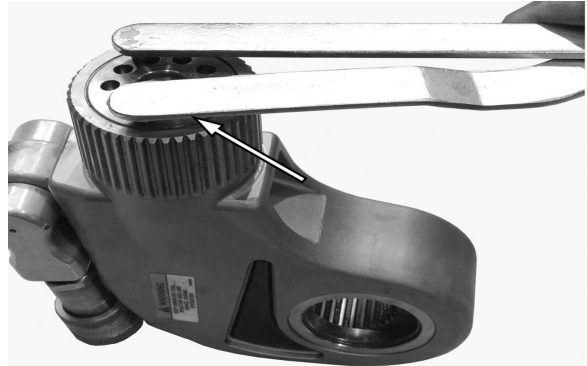


Figure 21. Endcap Removal



Figure 22. Internal Circlip Removal

5. See Figure 23. Remove the piston plug from the end of the piston by screwing an M6 or M8 screw (depending on the wrench model) into the hole in the back of the piston plug, and pulling to remove.
6. See Figure 24. Remove the shoulder screw from inside the piston.
7. It is now possible to withdraw the piston from the cylinder. It may be necessary to temporarily re-install the piston plug and circlip back into the piston and use an M6 or M8 bolt to withdraw the piston in the same manner used to withdraw the piston plug.
8. Remove and discard the piston seal and rod seal located in the center of the body.

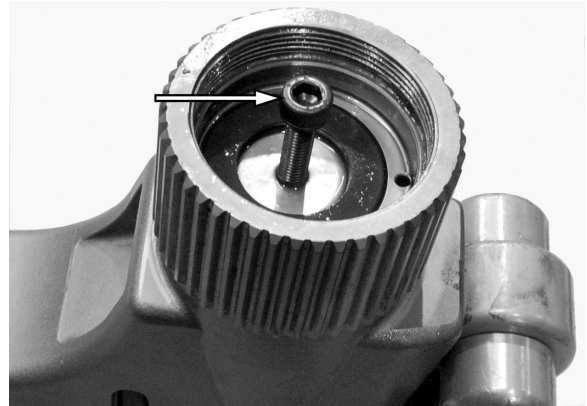


Figure 23. Piston Plug Removal

NOTE: Access to the rod seal will be easier if the drive components are either pushed forward or removed.

9. Clean and inspect the piston and cylinder bore for scoring, pitting, and damage that could impair the sealing ability, and replace/repair as necessary.
10. Inspect the endcap threads for damage.

Hydraulic Cylinder/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 into the body. Assemble a new piston seal onto the piston, and verify that the seal backup rings' joints are rotated 180° apart.
2. With the seals and bores coated in clean hydraulic oil, insert the piston into the body cylinder bore. Take care not to damage the seals or dislodge the backup rings as the piston enters the bore.
3. Apply one drop of low-strength thread-locking adhesive to the threads of the shoulder screw, slide it through the piston, and screw it into the shuttle. Tighten the shoulder screw in accordance with the following torque specifications.

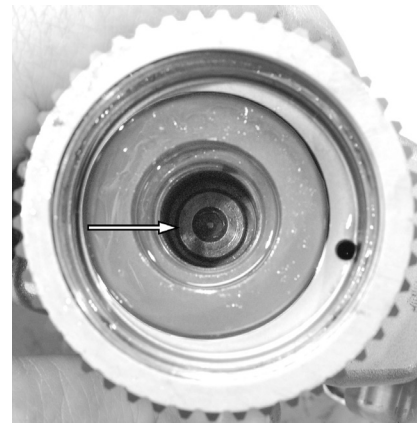


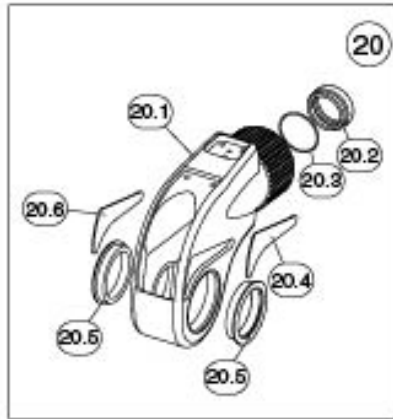
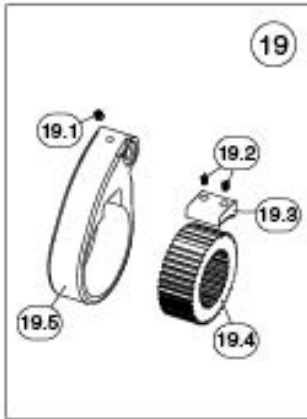
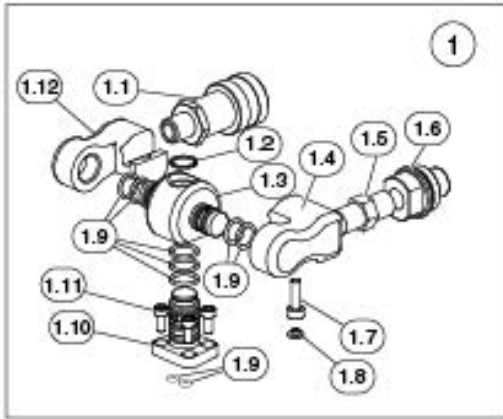
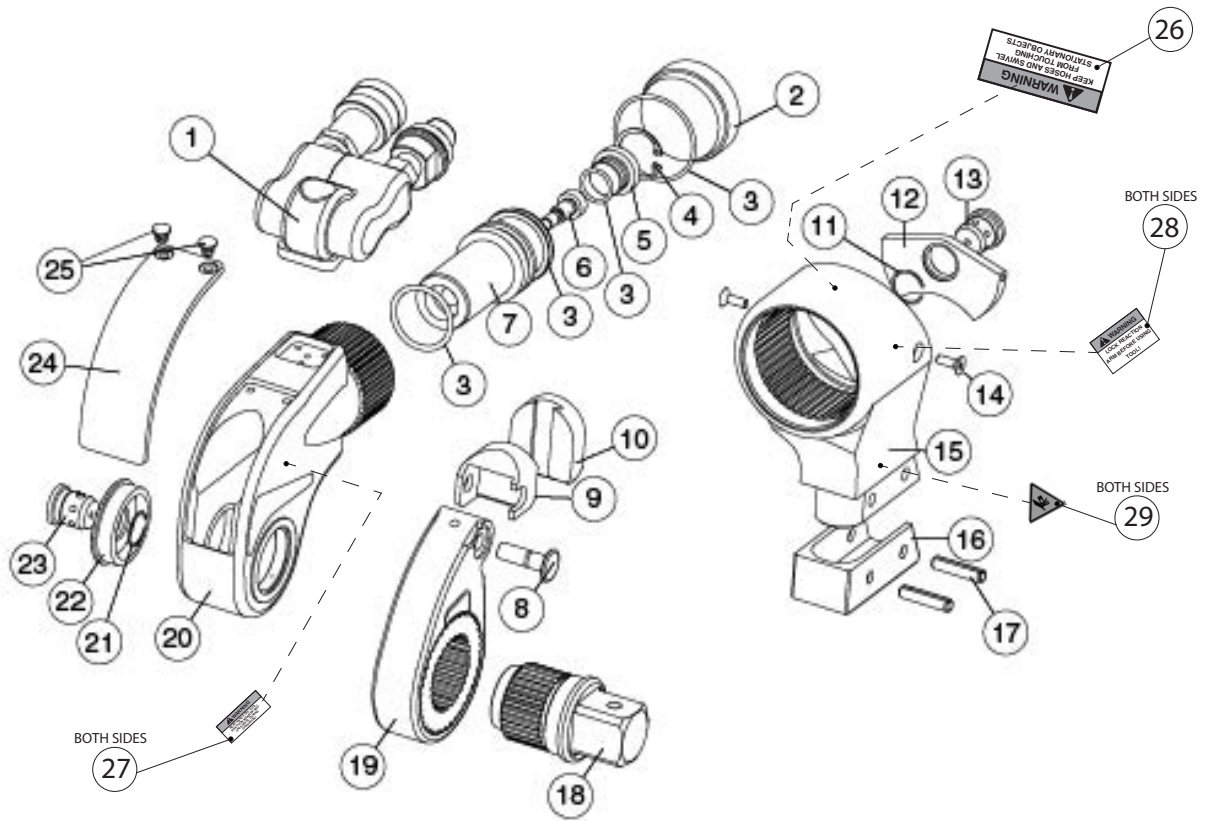
Figure 24. Shoulder Screw Removal

Wrench Size	Torque	
	Nm	<i>in-lb</i>
TWSD1	20	178
TWSD3	20	178
TWSD6	30	266
TWSD11	30	266
TWSD25	50	443

4. Install a new o-ring seal onto the piston plug, and insert it into the piston. Install the internal circlip to retain the piston plug in position.
5. Install a new o-ring seal onto the endcap and instal it into the body. Tighten the endcap using a pin spanner.
6. 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 fee and correct movement. Apply full pressure to the torque wrench (690 bar (10,000 psi) advance; 103 bar (1,500 psi) retract), and check for leaks.
7. Replace the torque wrench guard.

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

Parts Lists



TWSD1/3 Torque Wrench Parts List

Item No.	Part No.		Qty	Description
	TWSD1	TWSD3		
1	DFTAS010001	DFTAS010001	1	Multiswivel manifold assembly
1.1	STDHC000005	STDHC000005	1	-Female coupling
1.2	STDRC000041	STDRC000041	1	-Clip
1.3	DFTSB010001	DFTSB010001	1	-Multiswivel banjo

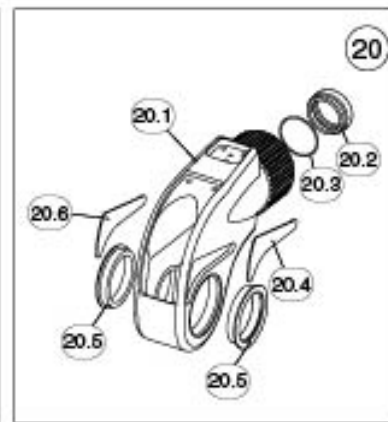
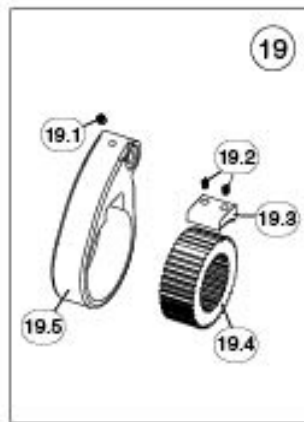
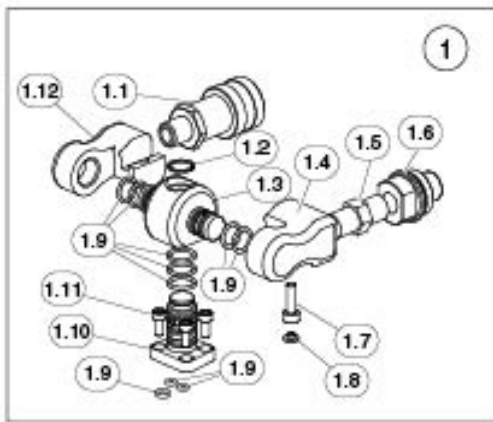
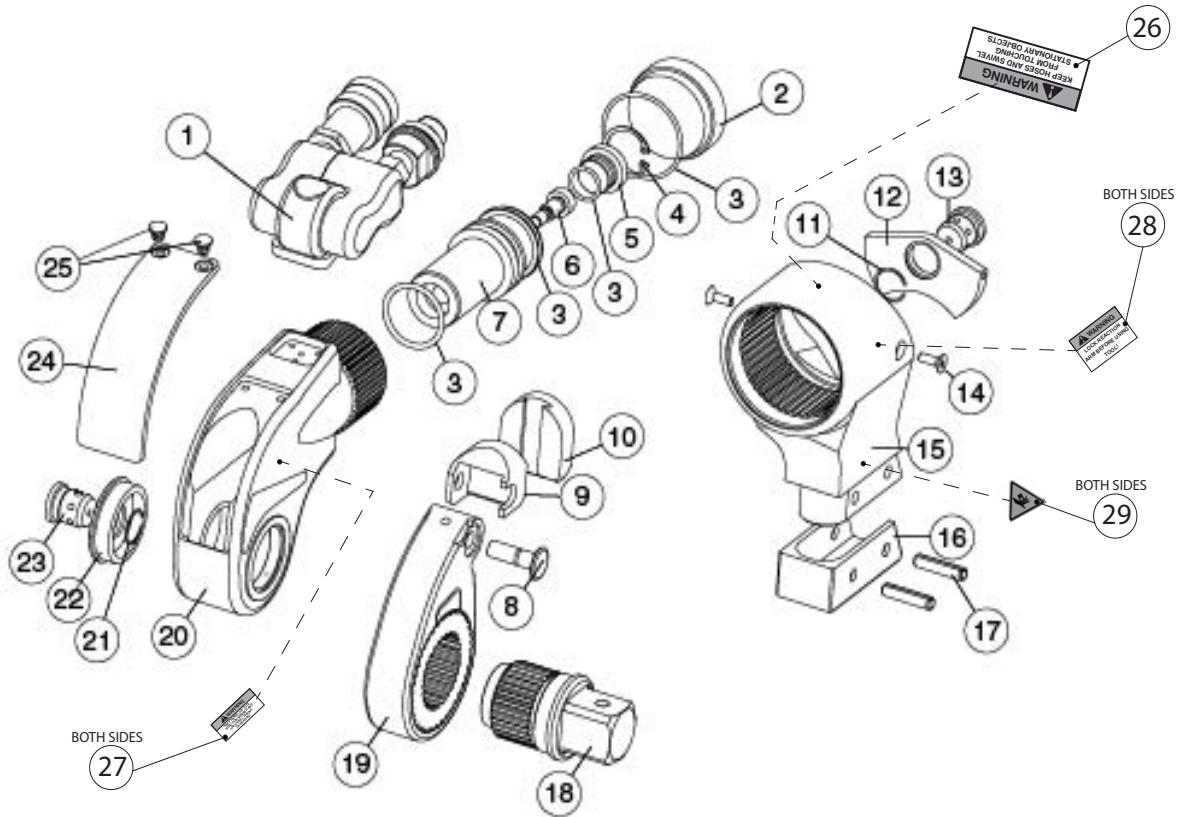
Parts Lists continued

Item No.	Part No.		Qty	Description
	TWSD1	TWSD3		
1.4	DFTAY010001	DFTAY010001	1	–Multiswivel advance yoke
1.5	INTHC000002	INTHC000002	1	–Adaptor
1.6	STDHC000004	STDHC000004	1	–Male coupling
1.7	STDFA000027	STDFA000027	1	–Screw
1.8	STDST000078	STDST000078	1	–Cap
1.9	Multiswivel Seal Kit DFTAS10004	Multiswivel Seal Kit DFTAS10004	4	–Seal
			3	–Seal
			2	–Seal
1.10	DFTSP010001	DFTSP010001	1	–Multiswivel post
1.11	STDFA000025	STDFA000025	4	–Screw
1.12	DFTAS010003	DFTAS010003	1	–Multiswivel retract yoke
2	BSDEC010001	BSDEC030001	1	TWSD endcap
3	Body Seal Kit BSDAS010007	Body Seal Kit BSDAS030007	1	Seal
			1	Seal
			1	Seal
			1	Seal
4	STDR000034	STDR000035	1	Clip
5	BSDPP010001	BSDPP030001	1	TWSD piston plug
6	MODFA000041	STDFA000041	1	Screw
7	BSDPI010001	BSDPI030001	1	TWSD piston
8	BSDCP010001	BSDCP030001	1	TWSD crank retaining pin
9	BSDSL010001	BSDSL030001	1	TWSD slider
10	BSDSH010001	BSDSH030001	1	TWSD shuttle
11	STDR000030	STDR000030	1	Clip
12	BSDBP010001	BSDBP030001	1	TWSD reaction arm button plate
13	BSDAS010008	BSDAS010008	1	TWSD lock button assembly
14	STDFA000010	STDFA000010	2	Screw
15	BSDRA010001	BSDRA030001	1	TWSD reaction arm
16	BSDAP010001	BSDAP030001	1	TWSD reaction arm pad
17	STDST000032	STDST000033	2	Pin
18	BSDSD010001	BSDSD030001	1	TWSD square drive
19	BSDSK010002	BSDSK030002	1	TWSD drive assembly
19.1	STDFA000001	STDFA000001	1	–Screw
19.2	STDST000012	STDST000013	2	–Spring
**19.3	BSDDS010001	BSDDS030002	1	–TWSD drive shoe
**19.4	BSDRT010001	BSDRT030001	1	–TWSD ratchet
19.5	BSDCR010001	BSDCR030002	1	–TWSD crank
20	BSDAS010004	BSDAS030004	1	TWSD body assembly

Parts Lists continued

Item No.	Part No.		Qty	Description
	TWSD1	TWSD3		
20.1	BSDBD010001A	BSDBD030001A	1	-TWSD body
20.2	—	BSDBB030001	1	-TWSD body bush
20.3	—	STDSE000073	1	-Seal
20.4	BSDLA010003	BSDLA030003	1	-Body decal (LH)
20.5	BSDSJ010001	BSDSJ030001	2	-TWSD sideplate journal
20.6	BSDLA010004	BSDLA030004	1	-Body decal (RH)
21	STDRC000030	STDRC000030	1	Cip
22	BSDSC010001	BSDSC030001	1	TWSD square drive cap
23	BSDAS010008	BSDAS010008	1	TWSD lock button assembly
24	BSDGD010001	BSDGD030001	1	TWSD guard
25	STDFA000009	STDFA000011	2	Screw
26	1000079	1000079	1	Decal, Warning
27	1000082	1000082	2	Decal, Warning
28	1000083	1000083	2	Decal, Warning
29	251057	251057	2	Decal, Pinch Point

**Replace as a pair.



TWSD6/11/25 Torque Wrench Parts List

Item No.	Part No.			Qty	Description
	TWSD6	TWSD11	TWSD25		
1	DFTAS020006	DFTAS020006	DFTAS020006	1	Multiswivel manifold assembly
1.1	STDHC000005	STDHC000005	STDHC000005	1	Female coupling
1.2	STDR0000042	STDR0000042	STDR0000042	1	Clip
1.3	DFTSB020001	DFTSB020001	DFTSB020001	1	Multiswivel banjo

Parts Lists continued

Item No.	Part No.			Qty	Description
	TWSD6	TWSD11	TWSD25		
1.4	DFTAY020001	DFTAY020001	DFTAY020001	1	Multiswivel advance yoke
1.5	INTHC000002	INTHC000002	INTHC000002	1	Adaptor
1.6	STDHC000004	STDHC000004	STDHC000004	1	Male coupling
1.7	STDFA000027	STDFA000027	STDFA000027	1	Screw
1.8	STDST000078	STDST000078	STDST000078	1	Cap
1.9	Multiswivel Seal Kit DFTAS20009	Multiswivel Seal Kit DFTAS20009	Multiswivel Seal Kit DFTAS20009	4	Seal
				3	Seal
				2	Seal
				1	Seal
1.10	DFTSP020001	DFTSP020001	DFTSP020001	1	Multiswivel post
1.11	STDFA000025	STDFA000025	STDFA000025	4	Screw
1.12	DFTAS020008	DFTAS020008	DFTAS020008	1	Multiswivel retract yoke
2	BSDEC060001	BSDEC110001	BSDEC250001	1	TWSD endcap
3	Body Seal Kit BSDAS060007	Body Seal Kit BSDAS110007	Body Seal Kit BSDAS250007	1	Seal
				1	Seal
				1	Seal
				1	Seal
4	STDR000036	STDR000038	STDR000039	1	Clip
5	BSDPP060001	BSDPP110001	BSDPP250001	1	TWSD piston plug
6	STDFA000044	STDFA000044	STDFA000049	1	Screw
7	BSDPI060001	BSDPI110001	BSDPI250001	1	TWSD piston
8	BSDCP060001	BSDCP110001	BSDCP250001	1	TWSD crank retaining pin
9	BSDSL060001	BSDSL110001	BSDSL250001	1	TWSD slider
10	BSDSH060001	BSDSH110001	BSDSH250001	1	TWSD shuttle
11	STDR000031	STDR000032	STDR000033	1	Clip
12	BSDBP060001	BSDBP110001	BSDBP250001	1	TWSD reaction arm button plate
13	BSDAS060008	BSDAS110008	BSDAS250008	1	TWSD lock button assembly
14	STDFA000013	STDFA000013	STDFA000015	2	Screw
15	BSDRA060001	BSDRA110001	BSDRA250001	1	TWSD reaction arm
16	BSDAP060001	BSDAP110001	BSDAP250001	1	TWSD reaction arm pad
17	STDST000034	STDST000035	STDST000036	2	Pin
18	BSDSD060001	BSDSD110001	BSDSD250001	1	TWSD square drive
19	BSDSK060002	BSDSK110002	BSDSK250002	1	TWSD drive assembly
19.1	STDFA000064	STDFA000064	STDFA000064	1	Screw
19.2	STDST000069	STDST000014	STDST000016	2	Spring
**19.3	BSDDS060001	BSDDS110001	BSDDS250001	1	TWSD drive shoe

Parts Lists continued

Item No.	Part No.			Qty	Description
	TWSD6	TWSD11	TWSD25		
**19.4	BSDRT060001	BSDRT110001	BSDRT250001	1	TWSD ratchet
19.5	BSDCR060001	BSDCR110001	BSDCR250001	1	TWSD crank
20	BSDAS060004	BSDAS110004	BSDAS250004	1	TWSD body assembly
20.1	BSDBD060002A	BSDBD110001A	BSDBD250001A	1	TWSD body
20.2	BSDBB060001	BSDBB110001	BSDBB250001	1	TWSD body bush
20.3	STDSE000006	STDSE000079	STDSE000072	1	Seal
20.4	BSDLA060003	BSDLA110003	BSDLA250003	1	Body decal (LH)
20.5	BSDSJ060001	BSDSJ110001	BSDSJ250001	2	TWSD sideplate journal
20.6	BSDLA060004	BSDLA110004	BSDLA250004	1	Body decal (RH)
21	STDRC000031	STDRC000032	STDRC000033	1	Cip
22	BSDSC060001	BSDSC110001	BSDSC250001	1	TWSD square drive cap
23	BSDAS060008	BSDAS110008	BSDAS250008	1	TWSD lock button assembly
24	BSDGD060001	BSDGD110001	BSDGD250001	1	TWSD guard
25	STDFA000011	STDFA000012	STDFA000012	2	Screw
26	100079	100079	100079	1	Decal, Warning
27	100082	100082	100082	2	Decal, Warning
28	100083	100083	100083	2	Decal, Warning
29	251057	251057	251057	2	Decal, Pinch Point

**Replace as a pair.

Declaration of Incorporation



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We declare that this product complies with the appropriate ESR's of the following directives,

- 2006/42/EC

Where appropriate the requirements of the following standards have been invoked,

- EN 292/2/91

Product description: HYDRAULIC TORQUE WRENCH.

Model type: TWSD1, 3, 6, 11, 25 SQUARE DRIVE TORQUE WRENCH.


In addition, the goods supplied have been classified as falling into the Sound Engineering Practice (SEP) category according to the EC Pressure Equipment Directive (PED) 97/23/EC.

SPX Bolting Systems is the person authorised to compile the technical file.

SPX Bolting Systems, the manufacturer / supplier, undertake to transmit and / or make available in response to reasoned request, technical file details and other relative information to EEC National Authorities, in electronic or hard copy format

Installation and operation of this equipment must be in accordance with the installation and operating instructions provided. This product must not be put into service until the machinery into which it is incorporated has been declared in conformity with the provisions of the above directives.

The Company Directors are the equally responsible persons. The person named below is empowered to act as signatory on behalf of the Company Directors

Signed: 

Printed: DAVID CAMPBELL

Date: 29th December 2009