

ORIGINAL INSTRUCTIONS



**TWLC LOW CLEARANCE HYDRAULIC
TORQUE WRENCH**

OPERATION MANUAL

BOLTING SYSTEMS

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1. Introduction

The TWLC Low Clearance torque wrench is a ratchet type torque tool for hydraulically tightening nuts and bolts. It comprises quick-change, interchangeable drive heads designed to fit directly around the nut, each head specific to the nut size. It is powered using a 10,000psi hydraulic pump unit, the torque output from the TWLC Low Clearance torque wrench being proportional to the pump pressure applied.

The main components of the TWLC Low Clearance torque wrench are illustrated in Fig.1 below.

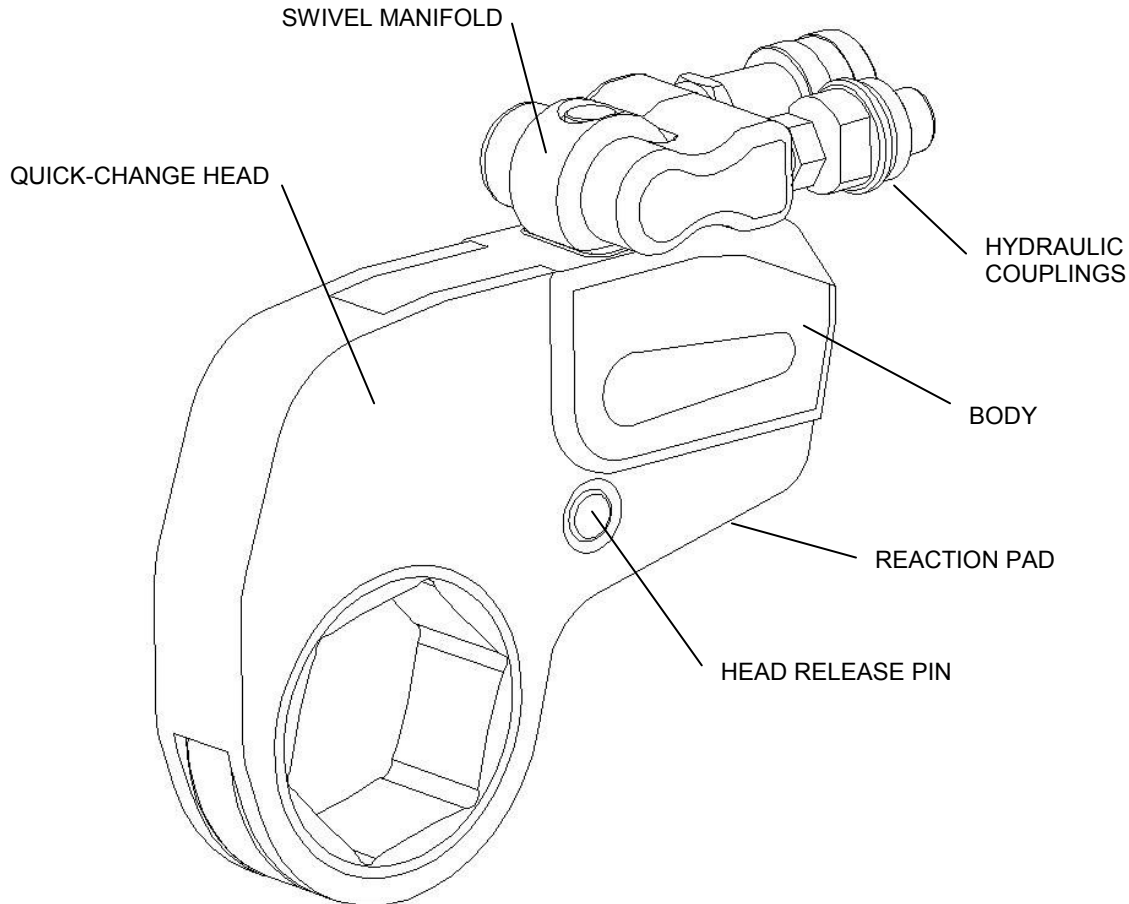


Fig 1. TWLC LOW CLEARANCE Torque Wrench

SAFETY

The TWLC Low Clearance torque wrench is a high power hydraulic tool and we strongly recommend 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 precautions included within this manual could lead to serious Operator injury.

2. Technical Specifications

The following technical data is applicable to all TWLC torque wrenches:

MAXIMUM PRESSURE	:	Advance - 690 Bar (10,000psi)
		Retract - 69 Bar (1,000psi)
OPERATING TEMP. LIMITS	:	-20°C to +40°C
HYDRAULIC OIL TYPE	:	Grade 46 hydraulic oil

TWLC LOW CLEARANCE TORQUE WRENCH RANGE

Wrench Ref	Head Size Range	Torque Output		Approx. Weight
		Min**	Max	
TWLC 2	1-1/4" – 2-3/8" (32 – 60)	189 lbft	1,575 lbft	3.5 kg
TWLC 4	1-1/2" – 3-1/8" (40 – 80)	477 lbft	3,975 lbft	7.0 kg
TWLC 8	2-1/4" – 3-7/8" (60 – 100)	954 lbft	7,950 lbft	11.0 kg
TWLC 15	2-9/16" – 4-5/8" (65 – 120)	1,782 lbft	14,850 lbft	19.0 kg
TWLC 30	3-1/8" – 6-1/8" (80 – 155)	3,456 lbft	28,800 lbft	38.0 kg

** Note that minimum torque can be lower depending upon pump low pressure capability.

TWLC SERIES HYDRAULIC TORQUE WRENCH PRESSURE - TORQUE CONVERSION CHART



PUMP PRESSURE		TORQUE OUTPUT <i>lbf.ft / Nm</i>									
PSI	Bar	TWLC2		TWLC4		TWLC8		TWLC15		TWLC30	
1200	83	189	256	477	646	954	1293	1782	2415	3456	4683
1400	97	221	299	557	754	1113	1508	2079	2817	4032	5463
1600	110	252	341	636	862	1272	1724	2376	3220	4608	6244
1800	124	284	384	716	970	1431	1939	2673	3622	5184	7024
2000	138	315	427	795	1077	1590	2154	2970	4024	5760	7805
2200	152	347	470	875	1185	1749	2370	3267	4427	6336	8585
2400	165	378	512	954	1293	1908	2585	3564	4829	6912	9366
2600	179	410	555	1034	1400	2067	2801	3861	5232	7488	10146
2800	193	441	598	1113	1508	2226	3016	4158	5634	8064	10927
3000	207	473	640	1193	1616	2385	3232	4455	6037	8640	11707
3200	221	504	683	1272	1724	2544	3447	4752	6439	9216	12488
3400	234	536	726	1352	1831	2703	3663	5049	6841	9792	13268
3600	248	567	768	1431	1939	2862	3878	5346	7244	10368	14049
3800	262	599	811	1511	2047	3021	4093	5643	7646	10944	14829
4000	276	630	854	1590	2154	3180	4309	5940	8049	11520	15610
4200	290	662	896	1670	2262	3339	4524	6237	8451	12096	16390
4400	303	693	939	1749	2370	3498	4740	6534	8854	12672	17171
4600	317	725	982	1829	2478	3657	4955	6831	9256	13248	17951
4800	331	756	1024	1908	2585	3816	5171	7128	9659	13824	18732
5000	345	788	1067	1988	2693	3975	5386	7425	10061	14400	19512
5200	359	819	1110	2067	2801	4134	5602	7722	10463	14976	20293
5400	372	851	1152	2147	2909	4293	5817	8019	10866	15552	21073
5600	386	882	1195	2226	3016	4452	6033	8316	11268	16128	21854
5800	400	914	1238	2306	3124	4611	6248	8613	11671	16704	22634
6000	414	945	1280	2385	3232	4770	6463	8910	12073	17280	23415
6200	427	977	1323	2465	3339	4929	6679	9207	12476	17856	24195
6400	441	1008	1366	2544	3447	5088	6894	9504	12878	18432	24976
6600	455	1040	1409	2624	3555	5247	7110	9801	13280	19008	25756
6800	469	1071	1451	2703	3663	5406	7325	10098	13683	19584	26537
7000	483	1103	1494	2783	3770	5565	7541	10395	14085	20160	27317
7200	496	1134	1537	2862	3878	5724	7756	10692	14488	20736	28098
7400	510	1166	1579	2942	3986	5883	7972	10989	14890	21312	28878
7600	524	1197	1622	3021	4093	6042	8187	11286	15293	21888	29659
7800	538	1229	1665	3101	4201	6201	8402	11583	15695	22464	30439
8000	552	1260	1707	3180	4309	6360	8618	11880	16098	23040	31220
8200	565	1292	1750	3260	4417	6519	8833	12177	16500	23616	32000
8400	579	1323	1793	3339	4524	6678	9049	12474	16902	24192	32780
8600	593	1355	1835	3419	4632	6837	9264	12771	17305	24768	33561
8800	607	1386	1878	3498	4740	6996	9480	13068	17707	25344	34341
9000	621	1418	1921	3578	4848	7155	9695	13365	18110	25920	35122
9200	634	1449	1963	3657	4955	7314	9911	13662	18512	26496	35902
9400	648	1481	2006	3737	5063	7473	10126	13959	18915	27072	36683
9600	662	1512	2049	3816	5171	7632	10341	14256	19317	27648	37463
9800	676	1544	2091	3896	5278	7791	10557	14553	19720	28224	38244
10000	689	1575	2134	3975	5386	7950	10772	14850	20122	28800	39024

3. Power Requirements

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

Pump unit specification varies between manufacturers, however, in order 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 - In order 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 1000 psi (69 Bar). 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 69 bar). 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 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 to 20cm³/min @ 690 Bar should be specified, however for optimum speed and performance we would recommend at least 360 cm³/min @ 7 Bar to 30 cm³/min @ 690 Bar.

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

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

Many pump units are available which are suitable to operate the LWLC torque wrench, however, we would strongly recommend that SPX Bolting Systems power packs are used, as they have been rigorously tested both for compatibility and performance.

SPX Bolting Systems will not be responsible for torque wrench damage, malfunction or Operator injury due to the use of an incorrect pump unit, therefore please check the compatibility of your pump unit prior to torque wrench operation.

4. Safety

Always adopt safe working practices when working with pressurized equipment. Protective clothing including eye and head protection must always be worn as well as gloves and safety footwear. Exhibit common sense and most importantly of all, READ AND UNDERSTAND THE OPERATING MANUAL AND PROCEDURES.

- a) Never exceed the torque wrench maximum working pressure (Advance 689 Bar / 10,000 psi, Retract 69 Bar / 1000 psi)
- b) Keep hands and fingers clear of the torque wrench head and reaction pad area, before and during operation. Fingers could be inadvertently trapped if care is not taken.
- c) Keep other personnel clear of the working area and only allow trained personnel to use the equipment. Ideally rope off the working area.
- d) Prior to operation, ensure that all hoses, sockets and ancillary equipment are undamaged and fit for purpose. Ensure that all torque wrench components (i.e. head, body, etc.) are properly attached and secure. Ensure that the head release pin is properly located.
- e) Do not strike any of the components, including the socket, with a hammer in order to shock the nut free.
- f) Check that reaction structures are strong and rigid enough to accept the torque tool reaction forces. Do not use wedges, packing pieces, etc as a temporary reaction.
- g) If backing spanners are used, keep hands and limbs well clear of the backing spanner, as it may rotate during wrench operation.
- h) Take care when handling equipment. Do not manoeuvre or carry the torque wrench by its couplings. 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.
- i) Check that hoses are in good condition and undamaged. When assembling the hydraulic hose, do not unduly bend hoses beyond their safe bend radius limit or kink the hose.
- j) Do not retighten any equipment while under pressure. Do not move or rotate the swivel manifold while under pressure.
- k) Ensure that any sockets or inserts that are to be used with the torque wrench are of impact quality and capable of withstanding the full torque output of the tool.
- l) Some torque wrenches weigh in excess of 20Kg, therefore ensure that lifting equipment is available and used.
- m) 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.
- n) In some instances it may be necessary for the Operator to support the torque wrench while it is tightening, i.e. upside down applications. If the torque tool cannot be strapped into position using ropes, etc, then the operator must take the utmost care to avoid pinch points.
- o) Never use the torque wrench with just one hose connected to the Advance port (port 'A'). This will cause a pressure intensification within the retract chamber possibly leading to tool damage. Always ensure that both hoses are connected.
- p) If not in use, and when practical, disconnect the wrench and pump from the power supply to prevent accidental starting.

THE LWLC TORQUE WRENCH IS DESIGNED FOR THE TORQUE TIGHTENING OF ENGINEERING NUTS ONLY. DO NOT USE IT FOR ANY OTHER PURPOSE

5. Preparing the Torque Wrench for Use

Assembling / Removing the Drive Head

Before the LWLC torque wrench can be used the correct drive head for the nut must be fitted to the LWLC body. Note that no special tools or spanners are needed to change the drive head.

DISCONNECT FROM THE HYDRAULIC SUPPLY BEFORE ATTEMPTING TO CHANGE THE TORQUE WRENCH HEAD. OPERATING THE WRENCH WITHOUT THE HEAD ATTACHED EXPOSES THE MOVING PISTON DRIVE MECHANISM, AND COULD RESULT IN TRAPPED FINGERS OR OTHER INJURY.

If a drive head is already assembled, it can be detached by pushing out the head retainer pin, and simply lifting out the body. The drive assembly will auto-disengage.

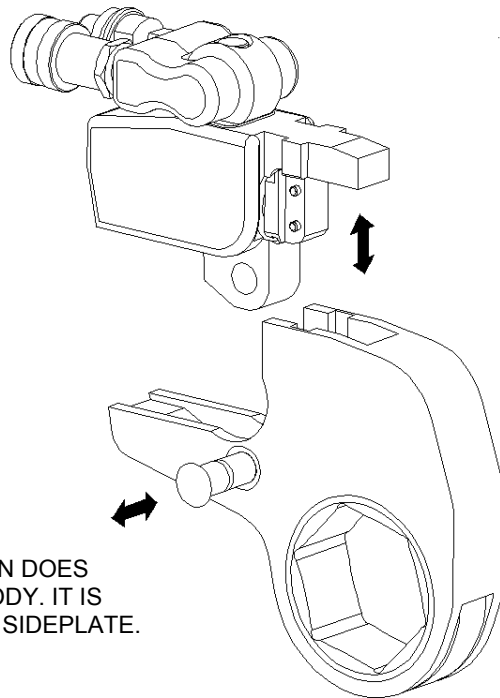
NOTE : THE HEAD RETAINER PIN IS HELD CAPTIVE WITHIN THE HEAD SIDEPLATE, IT CANNOT BE COMPLETELY REMOVED

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

ENSURE THAT THE PIN IS FULLY ENGAGED, OTHERWISE DAMAGE TO THE BODY COULD OCCUR IF OPERATED WITH A PART ENGAGED PIN. CONTINUALLY CHECK DURING OPERATION THAT THE PIN IS FULLY ENGAGED AS MOVEMENTS OF THE WRENCH, AND HANDLING, CAN CAUSE THE PIN TO DISLODGE.

Note that the body to head drive mechanism will auto engage during the drive head assembly process. If it does not, it will automatically attach during the first power stroke of the torque wrench.

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



NOTE : HEAD RETAINING PIN DOES NOT DETACH FROM THE BODY. IT IS HELD CAPTIVE WITHIN THE SIDEPLATE. DO NOT PUNCH OUT !!

Fig 2. BODY AND DRIVE HEAD REMOVAL AND ATTACHMENT

Positioning the Torque Tool onto the Nut

The LWLC torque wrench locates directly around the nut, with its built-in reaction pad designed to react against an adjacent nut. Fig. 3 below indicates correct positioning of the torque tool (shown in tightening mode). Always ensure that the reaction pad butts firmly against an adjacent nut or secure reaction structure.

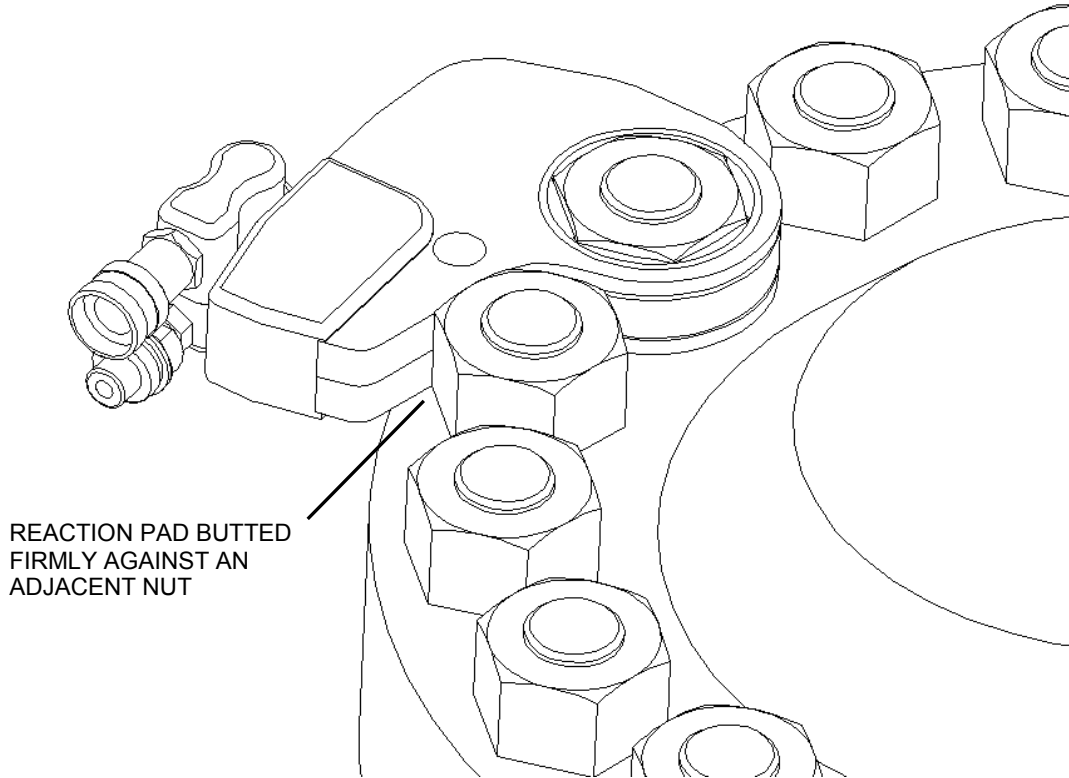


Fig 3. CORRECT POSITIONING OF TORQUE WRENCH

Reaction Point Safety

Extreme care must be taken when selecting appropriate reaction points and the following must be borne in mind at all times.

- The reaction structure must be rigid enough to accommodate the reaction forces from the torque wrench, which can be extreme at times. Carefully assess the reaction points for suitability before applying the torque tool. If in doubt, contact the torque wrench supplier for advice.
- Ensure that the reaction structure is suitably shaped to accommodate the reaction pad, Tapered surfaces are generally unsuitable as the torque wrench tends to 'ride up' the taper, causing adverse tool loads. Flat surfaces are most preferred.
- If in any doubt over the suitability of the reaction point, contact your torque wrench Supplier as various reaction accessories are available which may prove more suitable.
- Don't improvise. Packing pieces, spacers, etc. are dangerous and must never be used as a makeshift reaction point.

Use of Backing Spanners

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

6. Operating the Torque Wrench

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.

Torque Wrench Usage

In order 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 break-out conditions, because the bolt can suddenly break free, resulting 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 which can arise.
- Once that 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 making 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 will affect the life of the hydraulic seals.

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

Because at elevated temperature, the extrusion resistance of the seal is reduced, it is recommended that seals are replaced regularly.

Setting up prior to operation

Setting up the equipment only takes a few minutes and some simple checks during set up will aid in the success of the torquing operation.

- Obtain the torque value that is to be used for the tightening operation.
- Ensure that the bolt threads, nut threads and nut to flange contact faces are liberally coated with anti-seize lubricant of known friction co-efficient. Ensure that the lubricant friction co-efficient matches that which has been used to derive the torque value.
- Ensure the torque wrench is suitable to deliver the required torque. Should the torque value exceed 75-80% of the torque wrench output, consider using a higher capacity torque wrench..
- Use the 'Pressure – Torque Conversion Chart' for the particular torque wrench to be used (supplied with the torque wrench) to obtain the required pump pressure.
- Make sure that the head to be used is of the correct type and size. A poor fitting or oversize head will damage nuts, induce inaccurate bolt loads, and possible cause operator injury.

Tightening Bolts

1. Connect the torque wrench to the pump unit. Ensure that the couplings are fully screwed together as they are self-sealing and will restrict oil flow if not fully connected.

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

2. Prior to applying the 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 torque wrench connected to the pump and resting on the floor or bench. Applying advance pressure to the 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 torque wrench piston and advance again making sure that the pump relieves at the desired pressure setting.

Blanking the pump outlets using blank couplings can also be done to carry out the pump pressure setting.

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 (probably damaging the ratchet). Before applying another advance stroke, make sure that the pump is idling at 69 Bar (1000psi), which indicates full retraction.

3. Apply the torque wrench to the nut to be tightened, ensuring that the reaction pad butts firmly and squarely against the selected reaction point.
4. Start the pump and advance the torque wrench. As the wrench strokes forward the reaction pad will press against the reaction point and the nut / socket will rotate. When the torque wrench reaches the end of its stroke, the pump pressure will build rapidly. Retract the torque wrench (the wrench ratchet mechanism will be heard clicking as it retracts), and apply another forward stroke.

5. 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, which should read the desired pre-set pressure.
6. Retract the torque wrench, stop the pump unit, and remove from the nut.

Loosening Bolts

1. Connect the torque wrench to the pump unit. Ensure that the couplings are fully screwed together as they are self-sealing and will restrict oil flow if not fully connected.
2. Prior to applying the torque wrench to the application, the pump output pressure must be pre-set to deliver the maximum pressure of 690 Bar (10,000psi). This can be done with the torque wrench connected to the pump and resting on the floor or bench. Applying advance pressure to the 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 torque wrench piston and advance again making sure that the pump delivers full pressure.

Blanking the pump outlets using blank couplings can also be done to carry out the pump pressure setting.

3. Apply the torque wrench and socket to the nut to be loosened, ensuring that the reaction pad butts firmly and squarely against the selected reaction point.
4. Start the pump and advance the torque wrench. As the wrench strokes forward the reaction arm will press against the reaction point. As the pump pressure builds (and thus torque 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, it is not recommended to use the torque wrench.

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

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

Notes on Loosening Bolts

Loosening of bolts using torque tools 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.

- 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 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 will cause damage to the torque wrench, and could result in operator injury. Evidence of torque wrench abuse will invalidate the Manufacturer's Warranty.

7. General Torquing Procedure

The following procedure is for use with LWLC torque wrenches and outlines the basic steps in order to carry out the torque tightening of a flanged joint. It is important that personal protective clothing (gloves, footwear, safety helmet, eye protection) is worn at all times not only by the Operator, but also by any personnel within the work area.

The torquing procedure is compiled around using a single torque wrench, the object of the procedure being to accurately achieve a pre-determined residual bolt stress.

SAFETY: Prior to commencement of bolt torquing ensure that:

- All necessary safety precautions have been carried out
- Personnel involved in torquing are competent and fully trained in the use of hydraulic torque tools and tightening techniques.
- The procedure and data to be used is authorized by a responsible Engineer.
- The joints / pipework to be worked on are not 'live'. Joints must be at zero pressure and free from hazardous substances.
- Torque value selected must be based upon the lubricant applied.

- STAGE 1** Number each bolt consecutively, 1, 2, 3 etc
- STAGE 2** Using torque wrenches (if necessary), square up the flanged joint.
- STAGE 3** Working in a diametrical sequence (tightening opposite bolts) apply the minimum torque available. i.e. set pump to lowest possible output (1000psi). Note the sequence used.
- STAGE 4** Repeating the above noted tightening sequence, apply approximately 25% of the torque value specified in the torque data.
- STAGE 5** Using the same noted tightening sequence, apply approximately 50% of the torque value specified in the torque data.
- STAGE 6** Using the same noted tightening sequence, apply the full torque value specified in the torque data.
- STAGE 7** Working in a clockwise (or anti-clockwise) direction, make a final pass around the flange, tightening each bolt to the full torque value specified in the torque data.
- STAGE 8** Following completion of Stage 7, using a hammer, "ring" each nut to ensure that each bolt has been correctly loaded and that no slack bolts remain.

8. Maintenance and Servicing

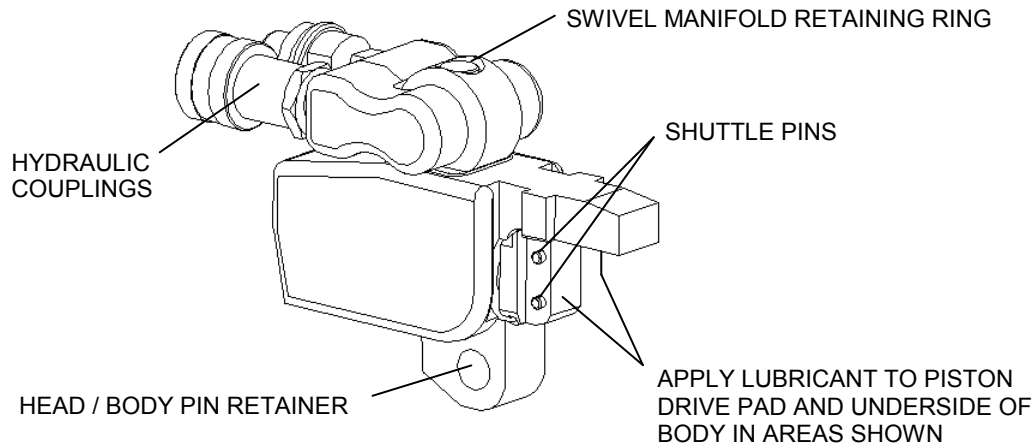
Post-Use Maintenance

In order to keep the LWLC torque wrench in good working condition, it is recommended that simple post-use maintenance be carried following each period of use.

LWLC Torque wrench

1. Wipe away any debris that may have accumulated, particularly around the swivel manifold and hydraulic couplings.
2. Remove the drive head from the body. Check the following areas (see diagram) :
 - Hydraulic Couplings for signs of damage – replace if evident.
 - Shuttle pins. Ensure they are present and spring freely.
 - Head / Body Pin retainer. Ensure it is undamaged and operates correctly.
 - Swivel Manifold. Ensure the retaining ring / circlip is present and fitted correctly.

Re-lubricate the areas of the body as shown below using '**Revol R5 Moly Anti Seize**'. It is recommended that the drive head is re-assembled onto the body for storage to prevent ingress of dirt into the drive mechanism.



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

3. It is preferable to lightly spray the torque wrench with water repellent spray (WD40), prior to placing back into storage.

Hoses and Ancillaries

1. Clean and inspect each hydraulic hose and quick connect coupling. Check the entire length of the hose for cuts, abrasions and damage. Any evidence of hose damage and the entire hose must be replaced.
2. Coat each quick connect coupling with a water repellent spray (WD40).

Maintenance, Servicing 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 Authorized Service Centre.

Maintenance and servicing should be carried out in accordance with the manufacturers ' Equipment Maintenance and Servicing Manual'.

All LWLC 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.

9. Fault finding

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