



## WREN HYDRAULIC TORQUE WRENCHES

### LOW SERIES Hex Cassette

# OPERATION AND MAINTENANCE MANUAL

FOR WREN models: 2LOW, 4LOW, 8LOW, 14LOW, 30LOW

## LOW PROFILE HYDRAULIC TORQUE WRENCHES - Hex Cassette

Series 2LOW, 4LOW, 8LOW, 14LOW and 30LOW Low Profile Hydraulic Torque Wrenches are designed for installing and removing large bolts having minimal wrench clearance requiring precise high torque during bolt makeup and maximum torque for bolt breakout.

It is necessary to read and understand this Operation and Maintenance Manual when using WREN Hydraulic Torque Wrenches. The use of other than genuine WREN replacement parts may result in safety hazards, decreased tool performance, increased maintenance and may invalidate warranty.

***Read this manual carefully before operating tool.***



## **IMPORTANT SAFETY INSTRUCTIONS**

### IMPORTANT INSTRUCTIONS ON RECEIPT (OPEN PACKAGE INSPECTION)

Carefully inspect all components for shipping damages. If any shipping damage is found, notify the carrier at once. Shipping damage is NOT covered by warranty. The carrier is responsible for all repair or replacement cost resulting from damage in shipment.

The hydraulic torque wrench is a power tool. Read all the instructions, warnings and cautions before every operation. Comply with the safety precautions to avoid personal injury or equipment damage while operating this tool! Neither WREN, nor its distributors are responsible for damage to the tool caused by unsafe and/or faulty operations.

## **SAFETY FIRST!**

### **▲ WARNING**

To avoid personal injuries and/or equipment damages, be sure that every hydraulic component of the hydraulic torque wrench, hydraulic hose assembly, hydraulic power pack and gauge are rated for 10,000PSI (700kg/cm<sup>2</sup>) operating pressure.

### **▲ WARNING**

To minimize the danger of injury and damage to equipment: Never use a hydraulic torque wrench without a hydraulic gauge to indicate the working pressure. The hydraulic gauge is a window to show what is happening in the hydraulic system.

**► DO NOT exceed the allowable maximum torque of the hydraulic torque wrench.**

### **▲ WARNING**

Immediately replace any worn or damaged parts of the tool with genuine WREN replacement parts.

**▲ CAUTION**

All of the hydraulic torque wrench components of the tool are kept away from excessive heat, flame, moving machine parts, sharp edges and chemicals.

**▲ CAUTION**

Reduce damage to the hydraulic hose assembly by avoiding sharp bends and kinks when routing the hydraulic hose assembly. Using a bent or kinked hydraulic hose assembly will cause severe back-pressure. Also, sharp bends and kinks will internally damage the hose leading to premature failure. A kinked or damaged hydraulic hose assembly should be replaced immediately.

**▲ CAUTION**

**DO NOT** drop heavy objects, crush, or drive over the hydraulic hose assembly. A sharp impact may cause internal damage to the hose wire strands. Applying pressure to a damaged hose may cause it to rupture. A crushed hydraulic hose assembly should be replaced immediately.

**▲ CAUTION**

Avoid high temperature exposure to the hydraulic hose assembly.

**▶ ALWAYS INSPECT THE HYDRAULIC HOSE ASSEMBLY FOR DAMAGE AND WEAR BEFORE IT IS USED.**

**▲ WARNING**

To avoid personal injuries, equipment damage and/or warranty invalidation:

- **DO NOT:**
  - Remove the shroud from the hydraulic torque wrench.
  - Modify any component of the hydraulic torque wrench.
  - Adjust the hydraulic torque wrench safety relief valve located inside the swivel couplings.

**▲ CAUTION**

The incorrect system connection may cause failure and injury. Before connecting the hydraulic torque wrench and hydraulic hose assembly to the assembled power pack, make sure the hydraulic torque wrench swivel couplings, hose couplings and hydraulic power pack couplings are clean and free of debris.

► **LOOSE OR DIRTY COUPLERS WILL CAUSE TOOL NOT TO OPERATE PROPERLY.**

**PROPER SAFETY ATTIRE**

When operating hydraulic equipment, use proper safety equipment and clothing. Consult with your company's safety representative to obtain this information.

**OPERATION SECTION**

**Reference**

*The Operation and Maintenance Manual* of the electric or air powered torque wrench pump.

**Hydraulic Torque Wrench Set Up**

Connect the *LOW* Wrench Head to the selected hex ratchet link. Then, connect the hydraulic power pack with the proper twin line hydraulic hose assembly making sure all connections are proper and snug.

**Preparation**

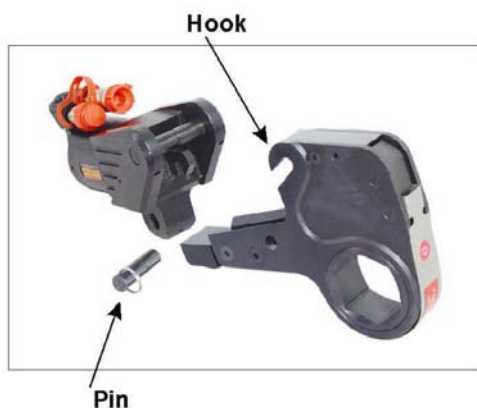
1. Make certain of the size of the nut or bolt head, material, strength grade and determine the desired torque.

Appendix I, which is presented as a guideline for comparison only, gives typical torque values specified for the most commonly encountered fasteners. Torque sequence may vary from manufacturer to manufacturer and even within individual factories, depending on the gasket material etc.

► **Always abide by the manufacturers/engineers procedures.**

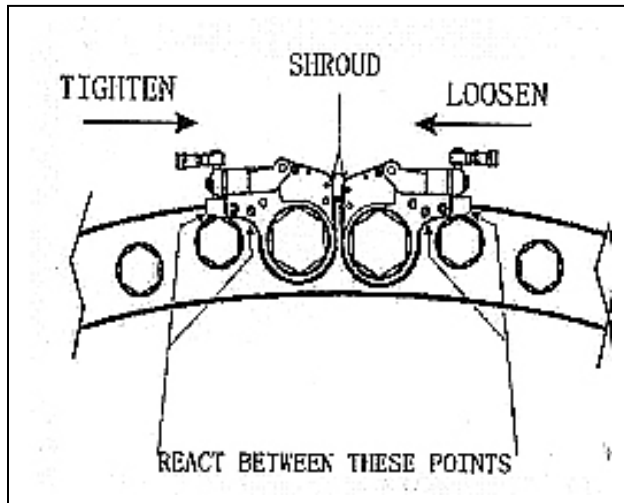
2. Determine the torque value needed and then determine the corresponding pressure of the hydraulic power pack. This can be found in the Pressure -Torque Conversion Chart that was provided with the hydraulic torque wrench. You may also find this chart on the web @ **www.wrentools.com**
3. Inspect the hydraulic torque wrench set. Connect the hydraulic torque wrench, hydraulic hose assembly and the hydraulic power pack in to a hydraulic circuit. Ensure all hydraulic connections are securely connected. Verify that the hydraulic hose assembly is not kinked, crushed or damaged.
4. Insert the hex ratchet links. The low profile hex ratchet links are inserted and removed from the power head as follows:

The “hook” described by the link’s drive plate is inserted around the fixed pin of the power head and the link is swung down to rest along the base of the power head cylinder. At this point, the link pin holes of the power head and link will align. Insert the link pin to secure.



5. Setting for tightening or loosening the nut:

The position of the tool relative to the nut determines whether the action will tighten or loosen the nut. The power stroke of the piston rod will always turn the hex ratchet toward the shroud. The nut turns **clockwise** for tightening and **counterclockwise** for loosening.



6. Connecting the hydraulic torque wrench:

The hydraulic torque wrench and hydraulic power pack are connected by a 10,000 PSI operation pressure twin line hydraulic hose assembly.

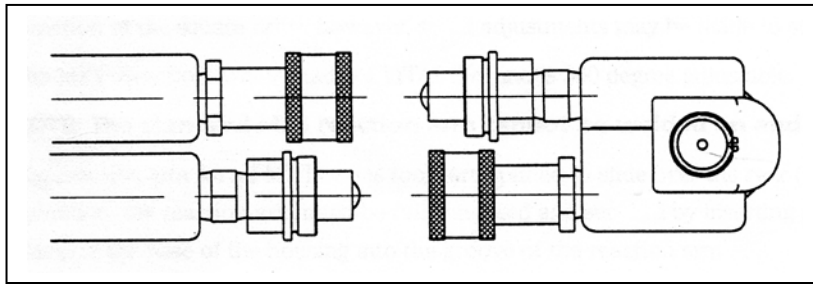
**IMPORTANT**

***To avoid hydraulic torque wrench malfunction:***

► **DO NOT reverse connectors.**

**DO NOT tamper with the set screw in the swivel assembly.** (It is factory preset for safety purposes and adjustments should only be made by trained personnel.)

Connect the hydraulic hose assembly to the swivel as shown below:



Insure the connectors are fully engaged and screwed snugly together.

### **Coupler Placement**

**Tool      Advance Side-Male  
             Retract Side-Female**

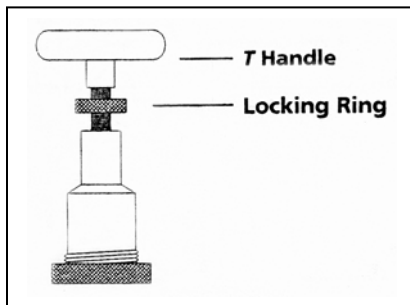
**Hose      Advance Side-Female to Female  
             Retract Side-Male to Male**

**Pump      Advance Side-Male  
             Retract Side-Female**

7. Setting the pressure on the hydraulic power pack:  
To set the pressure on the pump, follow this procedure:
  - a) Loosen the locking ring below the “T” handle on the hydraulic power pack external pressure regulator. Then, turn the “T” handle counterclockwise until it turns freely and easily.
  - b) Turn the hydraulic power pack on. Using the hydraulic power pack remote pendant, push the advance switch (or button on the air hydraulic power pack) and hold it.
  - c) While holding the hydraulic power pack in the advance mode, slowly turn the “T” handle clockwise and observe the hydraulic power pack pressure gauge rise.

***Note: Always adjust the regulator pressure UP - never down.***

- d) When your gauge reaches the predetermined pressure, stop turning the “T” handle and let the gauge settle.
- e) If the pressure continues to rise above the predetermined pressure, release the back pressure slightly by turning the “T” handle counterclockwise. Then, depress the advance switch on the remote and slowly bring pressure up to the predetermined pressure.
- f) When the pressure is correct, turn the pump off and tighten the locking ring which is under the “T” handle. This sets the pump pressure, which determines torque wrench output.
- g) Once your target pressure is set and locked, cycle the hydraulic power pack once more to ensure that your pressure setting did not change as you tightened the locking ring.



### **Operation**

**Before every operation, always read and follow the *Operation Instructions*.**

### **The Tightening Process:**

#### **Operating the Hydraulic Torque Wrench**

- 1) Place the ratchet hex on the nut. Make certain it is the correct size for the nut and that the nut is fully engaged. Remove ratchet link from nut.
- 2) Attach ratchet link to power head and put on nut.



- 3) Position the reaction surface against an adjacent nut, flange or solid system component. Make certain that there is clearance for the hydraulic hose assembly, swivels and couplings.
- 4) **Do not allow the tool to react against the hydraulic hose assembly, swivels or couplings.**
- 5) Turn the hydraulic power pack on and preset the pressure for the correct torque setting, depress the remote control advance button to advance the piston rod. If the piston rod end did not engage the drive pin in the ratchet link when the link was joined to the power head, it will engage the pin automatically during the first advance stroke.
- 6) Before applying pressure to the hydraulic wrench, check to make sure **all body parts are safely out of harm's way. *This tool has massive power and can cause bodily damage.***
- 7) When hydraulic pressure is applied to the hydraulic torque wrench the reaction surface of the wrench will move against the reaction point and the nut will begin to turn. Once the piston reaches the end of its stroke, release the remote button and the tool will automatically retract the piston.
- 8) Continue this cycling operation of advance and retract until the nut is no longer turning and the hydraulic power pack's gauge reaches the preset pressure. The piston rod will automatically retract when the remote control button is released and the operator will hear an audible "click" as the tool resets itself.
- 9) Continue to cycle the tool until it "stalls" and the preset PSI/Torque has been attained.

***IMPORTANT: The reading of full preset pressure after the cylinder is extended DOES NOT INDICATE that this pressure (torque) is applied to the bolt/nut. It only indicates that the cylinder is fully extended and cannot turn the ratchet further until the tool automatically resets itself.***

10) Once the nut stops rotating, cycle the tool one last time to achieve total torque.

**IMPORTANT: ALWAYS ATTEMPT ONE FINAL CYCLE TO INSURE THE “STALL” POINT HAS BEEN REACHED.**

### **“Locked-On”**

Should the hydraulic torque wrench be “locked-on” after the final cycle, push the remote control advance button once more (to build pressure) and while maintaining this pressure, push the accuracy assurance lever (located on the front of the ratchet link). Release the remote control advance button, while continuing to push down on the accuracy assurance lever (this will allow the hydraulic torque wrench to be removed easily).

### **The Loosening Process:**

1. Set the pump to 10,000 PSI. Change the tool to the loosening mode, assuring the reaction surface abuts squarely on a solid reaction point.
2. Press and hold hydraulic power pack’s remote control advance button. Pressure will decrease as the nut begins to turn. As the cylinder extends fully, you will hear an audible “click”.
3. Release the remote control advance button and the hydraulic torque wrench’s cylinder automatically retracts, at which time you again hear the audible “click”.

4. Repeat this process until the fastener can be removed by hand.

**NOTE: IF THE NUT/BOLT DOES NOT LOOSEN WITH THE ABOVE PROCEDURES, IT IS AN INDICATION THAT YOU REQUIRE A LARGER HYDRAULIC TORQUE WRENCH TO LOOSEN THE NUT/BOLT.**

### **After the operation**

1. Upon completing the project; turn off the power to the hydraulic power pack.
2. Disconnect all the coupler connections between the hydraulic torque wrench and hydraulic hose assembly, and then the hose assembly and hydraulic power pack.
3. Loosen the locking ring below the “T” handle on the hydraulic power pack external pressure regulator. Then, turn the “T” handle counterclockwise until it turns freely and easily.
4. When not in use, tools and accessories should be properly stored to avoid damage.

## **MAINTENANCE SECTION**

### **Preventative Maintenance**

- **Lubrication**

All moving parts should be periodically coated with a good quality lubricant. Under harsh environmental conditions, cleaning and lubricating should be performed more frequently.

- **Hydraulic Hose Assembly**

The hydraulic hose assembly should be inspected for cracks, burns, kinks, crush spots and leaks after each job. Hydraulic fittings can become plugged

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with dirt and should be flushed periodically. If any damage to the hydraulic hose assembly is found, the hydraulic hose assembly should be replaced immediately.

- **Connectors**

Hydraulic coupler fittings should be kept clean and not allowed to be dragged on the ground or floor. Even small particles of dirt can cause the internal valves to malfunction.

- **Cylinder Seals**

If the cylinder requires disassembly, it is recommended that the cylinder seals be replaced at the same time. Seal kits are readily available.

- **Structural Members**

All structural parts on the tool should be inspected periodically to determine if there are any cracks, chips or deformities. If so, immediate replacement is required.

- **Calibration**

Calibration should be performed at least once a year on all hydraulic torque wrenches and gauges.

### **TROUBLE-SHOOTING CHART**

SYSTEM	PROBABLE CAUSE	REMEDY
Cylinder will not advance	1. Couplers loose or damaged 2. Dirt in direction-control valve on pumping unit 3. Couplers not mated securely.	1. Tighten 2. Disassemble and clean 3. Tighten
Cylinder will not retract	See above	See above
Cylinder will not build up pressure	1. Piston seal leaks. 2. Pump coupling is broken not mated properly or coupler is defective 3. Gauge	1. Replace seals 2. Replace coupling 3. Replace gauge
Cylinder leaks	Safety release valve on cylinder	Replace cylinder seals and packing
Cylinder operates backwards	Disconnects are reversed on hoses, pump, or tool	Reverse disconnects on tool

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Ratchet returns on retract stroke	<ol style="list-style-type: none"> <li>1. Broken reaction pawl</li> <li>2. Defective reaction pawl spring</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Replace</li> </ol>
Ratchet will not make successive strokes	<ol style="list-style-type: none"> <li>1. Defective drive pawl spring</li> <li>2. Defective drive pawl</li> <li>3. Cylinder is not retracting completely</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect, bend to original position or replace</li> <li>2. Replace</li> <li>3. Remove tool from job, cycle freely once or twice, and return to job</li> </ol>
Tool cannot be removed from nut	Reaction pawl is engaged	Begin forward cylinder stroke. While applying pressure, push the reaction pawl release (on ratchet link). While pressing release mechanism, allow the cylinder to retract. Remove tool
No pressure reading on gauge	<ol style="list-style-type: none"> <li>1. Gauge not tight</li> <li>2. Pump coupling broken</li> <li>3. Gauge defective</li> <li>4. Defective cylinder seals</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten coupler</li> <li>2. Replace</li> <li>3. Replace</li> <li>4. Inspect and replace all cylinder seals</li> </ol>
Pump will not build pressure	<ol style="list-style-type: none"> <li>1. Defective relief valve</li> <li>2. Air supply too low or air hose size too small</li> <li>3. Electric power source is too low</li> <li>4. Gauge</li> <li>5. Filter is clogged</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect and replace</li> <li>2. Check for 100 PSI air pressure, 1" ID air hose</li> <li>3. Insure suitable electric power source – 25amps – 12 gauge or larger extension cord</li> <li>4. Replace</li> <li>5. Inspect and clean, or replace</li> </ol>
Pressure reading erratic	Defective gauge	Replace

**Disassembly of the Power Head**

1. Make sure the hydraulic torque wrench is fully retracted.
  
2. Apply pressure to the hydraulic power head until the pressure reaches 2900-4300 psi (200-300kg/cm<sup>2</sup>), then remove the rod end (#11).
  
3. Remove the swivel. Inspect and replace the three O-rings.

4. Remove the eight cylinder end cap screws (#10), tighten the jack screws (#9) to remove the cylinder end cap (#8), inspect the seals and replace.
5. Pull the piston rod (#4) out of the housing (#1), inspect the seals and replace.
6. Remove the U-ring (#3) inside the housing (#1) and replace.

### **Disassembly of the Hex Ratchet Link**

1. Remove the two side plate top screws (#9) and the two side plate bottom screws (#8).
2. Knock the roll pin (#1) and the reaction pawl spring spacer (#19) inside the side plate (#7.2) to remove one side plate (#7.2).
3. Remove the inside moving parts. Remove one drive plate (#6) by knocking the two roll pins (#3) inside the drive plate (#6). Then, remove the primary drive pawl (#18) along with a compressed spring (#17) and the secondary drive pawl (#15). Remove the hex ratchet (#5) and then the drive pin (#9), along with the drive pin spring (#4).
4. Remove the reaction pawl (#23.1), compressed spring (#20) and the reaction pawl spring spacer (#19).

Note: Refer to the exploded view drawing. For assembly, follow the instructions in reverse.

**APPENDIX I**

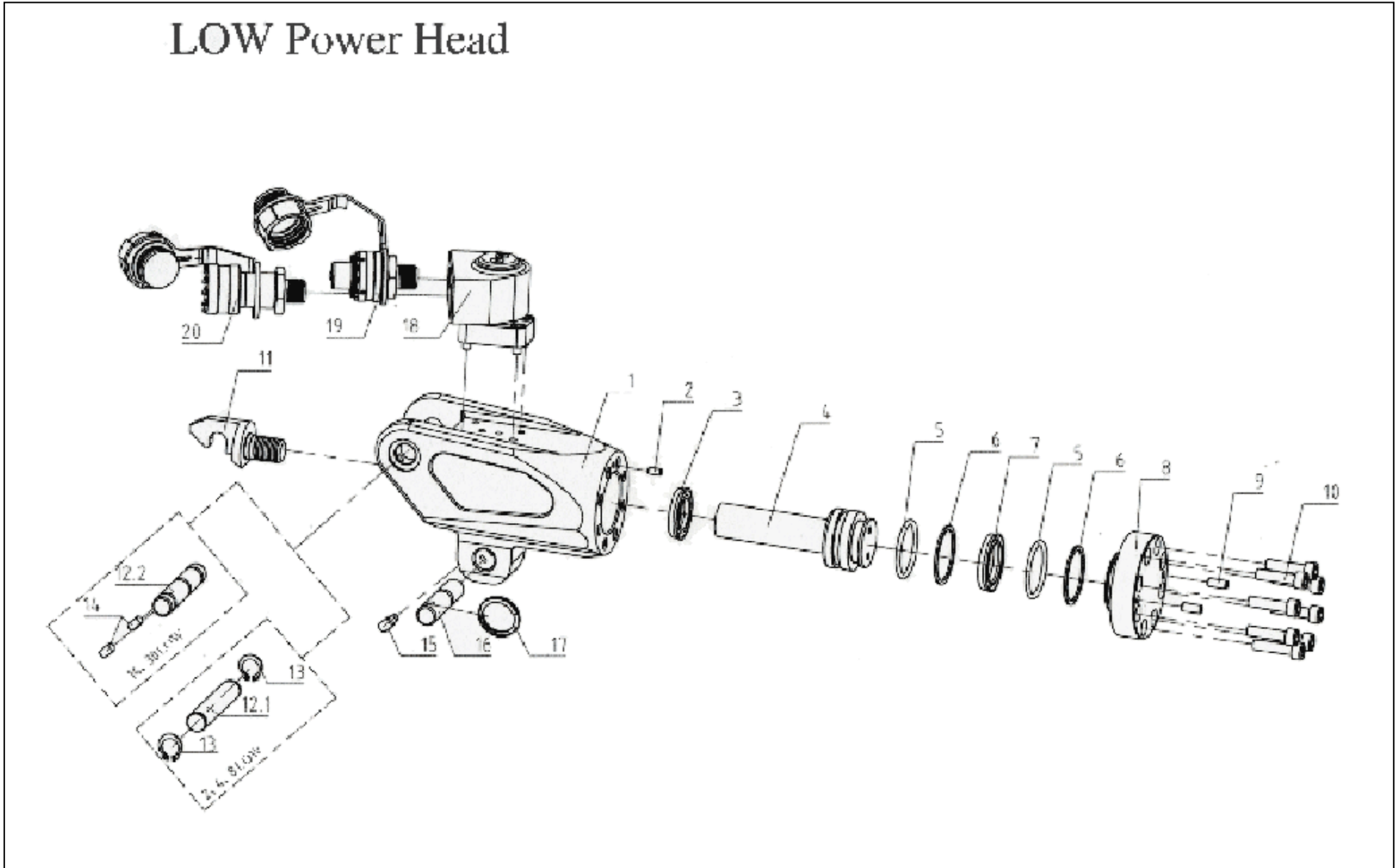
*Recommended Torque For B7 Studs (ASTM A193)*

*Based Upon 50% Yield*

<b>Bolt diameter</b>	<b>Heavy hex nut size (A.F.)</b>	<b>Lubricated torque using copper, graphite or comparable lubricant with a coefficient of friction F-.100 (both nut face and threads should be well lubricated)</b>	<b>Dry steel on steel, no lubricant, coefficient of friction F-.400</b>
3/4"	1-1/4"	157	559
7/8"	1-7/16"	250	893
1"	1-5/8"	373	1332
1-1/8"	1-13/16"	538	1994
1-1/4"	2"	746	2720
1-3/8"	2-3/16"	1000	3678
1-1/2"	2-3/8"	1307	4837
1-5/8"	2-9/16"	1682	6260
1-3/4"	2-3/4"	2109	7888
1-7/8"	2-15/16"	2602	9775
2"	3-1/8"	3167	11942
2-1/8"	3-5/16"	3809	14408
2-1/4"	3-1/2"	4531	17191
2-3/8"	3-11/16"	5339	20310
2-1/2"	3-7/8"	6238	23786
2-3/4"	4-1/4"	7533	28846
3"	4-5/8"	9803	37670
3-1/4"	5"	12488	48129
3-1/2"	5-3/8"	15622	60365
3-3/4"	5-3/4"	19241	74516
4"	6-1/8"	22162	86146
4-1/4"	6-1/2"	23337	90720
4-1/2"	6-7/8"	26332	102513
4-3/4"	7-1/4"	30994	120831
5"	7-5/8"	36176	141210

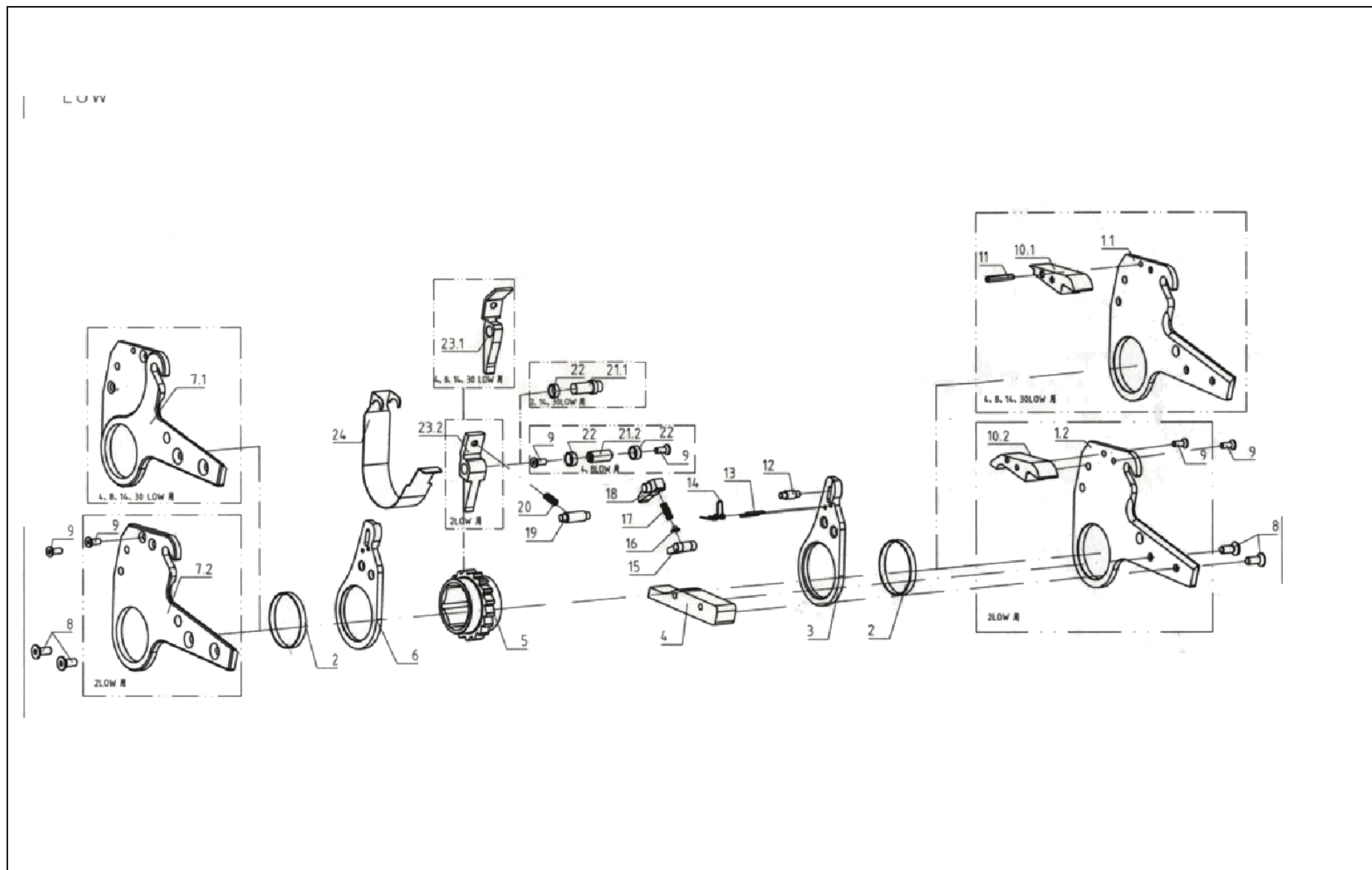
**LOW EXPLODED VIEW DRAWING**

# LOW Power Head



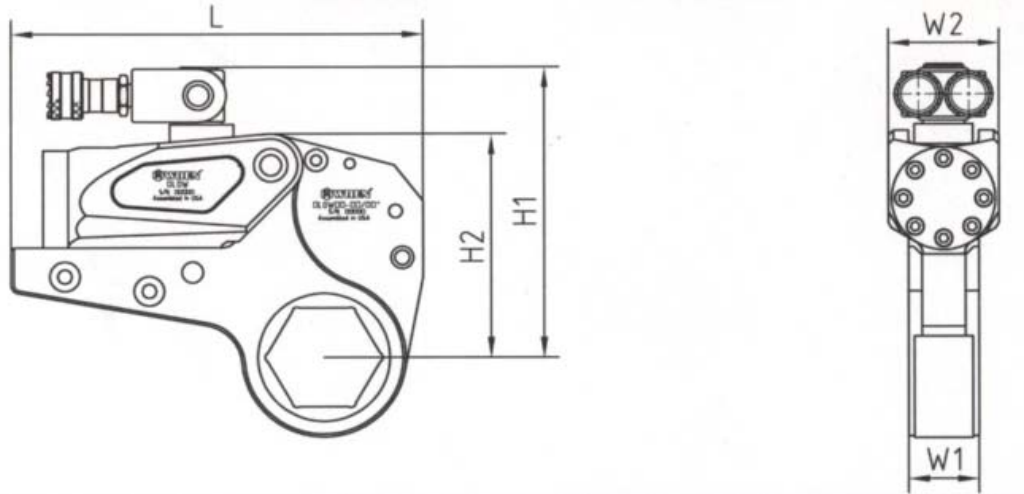


**LOW RATCHET LINK EXPLODED VIEW DRAWING**



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**LOW SPEC SHEET**



Model	2 LOW		4 LOW		8 LOW		14 LOW	30 LOW	
<b>Torque (Ft-lbs.)</b>	170 - 1,700		430 - 4,320		800 - 8,000		1366 - 13,660	3050 - 30,500	
<b>Bolt (inches)</b>	3/4" - 2-3/16"	2-1/4" - 2-3/8"	1-5/16" - 2-9/16"	2-5/8" - 3-1/8"	1-9/16" - 3-3/4"	3-13/16" - 4-1/8"	2" - 4-5/8"	3-1/8" - 6-1/8"	6-5/16" - 6-7/8"
<b>Power Head (lbs)</b>	2.25	2.25	4.4	4.4	7.25	7.25	12.10	25	25
<b>Ratchet Link (lbs)</b>	3.5	3.75	9.75	10	18	19	25	64	66
<b>L (inch)</b>	7.73	7.73	9.65	9.7	11.81	11.85	14.21	16.93	17.36
<b>H1 (inch)</b>	4.96	5.06	6.97	7.36	8.15	8.50	9.41	11.93	12.40
<b>H2 (inch)</b>	4.03	4.13	5.34	5.74	6.65	7.01	8.03	10.71	11.22
<b>W1 (inch)</b>	1.25	1.25	1.65	1.65	2.08	2.08	2.52	3.35	3.35
<b>W2 (inch)</b>	2.00	2.00	2.60	2.6	3.27	3.27	3.89	5.16	5.16

**LOW POWERHEAD DRAWING BREAKDOWN**

Drawing Number	Description
1	Housing
2	Set Screw
3	Cup Seal
4	Piston Rod
5	O-Ring
6	Retaining Ring
7	Cup Seal
8	End Cap
9	Set Screw
10	Socket Head Screw
11	Rod End
12	Fixed Upper Pin
13	Retaining Ring for Fixed Upper Pin
14	Set Screw - Fixed Pin
15	Screw With Spring
16	Short Link Pin
16A	Short Link Pin Assembly Includes drawing numbers 16 & 17
17	Ring for Short Link Pin
18	Swivel Assembly
19	Male Coupler
20	Female Coupler
4A	Piston Rod Assembly Includes drawing numbers 4, 5, 6 & 7
8A	End Cap Assembly Includes drawing numbers 5, 6, 8 & 10
18.1	Swivel Top

**LOW RATCHET LINK DRAWING BREAKDOWN**

Drawing Number	Description
1	Right Side Plate
2	Brass Side Plate Bushing
3	Left Drive Plate
4	Reaction Block Extension
5	Hex Ratchet
6	Right Drive Plate
7	Left Side Plate
8	Screw - Lower Side Plate
9	Screw - Upper Side Plate
10	Top Spacer
11	Spring Lock Roll Pin - Top Spacer
12	Drive Pin
13	Spring Lock Roll Pin
14	Drive Pin Spring
15	Secondary Drive Pawl
16	Spring Mat
17	Drive Pawl Tension Spring
18	Primary Drive Pawl
19	Reaction Pawl Spring Spacer
20	Reaction Pawl & Drive Pawl Tension Spring
21	Reaction Pawl Rotor
22	Reaction Pawl Spacer
23	Reaction Pawl
24	Shroud