

OPERATION MANUAL**Hi-Force® TWS-N SERIES****SQUARE DRIVE HYDRAULIC TORQUE WRENCHES****NOTICE**

Series TWS-N Series Square Drive Hydraulic Torque Wrenches are designed for installing and removing threaded fasteners requiring precise high torque during bolt makeup and maximum torque during bolt breakout.

WARNING**IMPORTANT SAFETY INFORMATION ENCLOSED.**

READ THIS MANUAL BEFORE OPERATING TOOL.

IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

PLACING TOOL IN SERVICE

- Always operate, inspect and maintain this tool in accordance with International Standards ISO9001 and ANSI B30.1.
- This tool will function using an air or electric powered hydraulic pump. Adhere to the pump safety requirements and follow instructions when connecting the pump to the tool.
- Use only equipment rated for the same pressure and torque.
- Use only a hydraulic pump capable of generating 10,000 psig (700 bar) maximum pressure with this tool.
- Use only twin line hydraulic hose rated for 10,000 psig (700 bar) pressure with this tool.
- Do not interchange the male and female swivel inlets on the tool or the connections on one end of the hose. Reversing the inlets will reverse the power stroke cycle and may damage the tool.
- Do not use damaged, frayed or deteriorated hoses and fittings. Make certain there are no cracks, splits or leaks in the hoses.
- Use the quick connect system to attach the hoses to the tool and pump. Make certain the spring-loaded retaining rings are fully engaged to prevent the connectors from disengaging under pressure.
- When connecting hoses that have not been preloaded with hydraulic oil, make certain the pump reservoir is not drained of oil during start-up.
- Do not remove any labels. Replace any damaged label.

USING THE TOOL

- Do not handle pressurised hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately.
- Never pressurise uncoupled couplers. Only use hydraulic equipment in a coupled system.
- Always wear eye protection when operating or performing maintenance on this tool.
- Always wear head and hand protection and protective clothing when operating this tool.

NOTICE

The use of other than genuine Hi-Force replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.

Repairs should be made only by authorised personnel. Consult your nearest Hi-Force Authorised Service centre.

Refer All Communications to the Nearest Hi-Force Office or Distributor.

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY

USING THE TOOL

- Keep hands, loose clothing and long hair away from the reaction arm and working area during operation. Do not attempt to support the tool with your hands during operation.
- This tool will exert a strong reaction force. Use proper mechanical support and correct reaction arm positioning to control these forces. Do not position the reaction arm so that it tilts the tool off the axis of the bolt and never use the swivel inlets as a reaction stop.
- Avoid sharp bends and kinks that will cause severe back-up pressure in hoses and lead to premature hose failure.
- Use accessories recommended by Hi-Force.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- Use only sockets and accessories that correctly fit the bolt or nut and function without tilting the tool off the axis of the bolt.
- This tool is not designed for working in explosive atmospheres
- This tool is not insulated against electric shock. When using this tool with a pump having an electrical power source or circuits, follow the pump instructions for proper grounding.


Always wear eye protection when operating or performing maintenance on this tool.




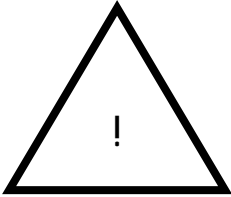
Always wear ear protection when operating this tool.




Always turn off the pump and disconnect the power before installing, removing, or adjusting any accessory on this tool, or before performing any maintenance on this tool.




The Torque Reaction Arm must be positioned against a positive stop. Do not use the Arm as a dead handle. Take all precautions to make certain the operator's hand cannot be pinched between the Arm and a solid object.

Operate at 10,000 psig (700 bar) maximum pressure.




Keep body stance balanced and firm. Do not overreach when operating this tool.



Do not carry the tool by the hose.



Do not use damaged, frayed or deteriorated hydraulic hoses and fittings.



PLACING THE TOOL IN SERVICE

CONNECTING THE TOOL

1. Attach the twin line hose to the uni-swivel coupling of the Square Drive Torque Wrench using the spring-loaded quick connect ends. Make certain that they are fully engaged.
2. Connect the opposite ends of the hose to the Pump in the same manner.

ADJUSTMENTS

SETTING THE SQUARE DRIVE FOR ROTATION

The position of the Square Drive when looking toward the Shroud will determine if the tool is set to tighten or loosen the nut. When the Square Drive extends to the left when looking at the Shroud from the front, the tool is set to loosen the nut. When the Square Drive extends to the right, the tool is set to tighten the nut. To change the direction of rotation press the push button release on the drive retaining plate and pull the Square Drive out of the Housing. Insert the Square Drive into the opposite side of the Housing and secure it by installing the push button release retaining plate into the end of the drive.

SETTING THE TORQUE

After determining the desired torque, use the torque conversion chart on the Shroud or the torque conversion charts on page 5 to determine the pressure that is necessary to achieve that torque.

1. Connect the tool to the power supply and turn the pump on.
2. Depress the advance remote control button causing the pressure to be shown on the gauge.
3. Adjust the pressure by first loosening the nut that locks the pressure adjustment handle and then rotate the handle clockwise to increase the pressure and counter clockwise to decrease the pressure.
When decreasing pressure, always lower the pressure below the desired point and then bring the pressure gauge back up to the desired pressure.
4. When the desired pressure is reached, retighten the lock nut and cycle the tool again to confirm that the desired pressure setting has been obtained.

SETTING THE REACTION ARM

The function of a reaction device is to hold the tool in position against the forces generated to tighten or loosen bolts or nuts. Hydraulic wrenches generate tremendous force.

WARNING

An improperly positioned reaction arm may result in operator injury or damaged tooling.

Make sure the Reaction Arm is positioned correctly. (Refer to Drawing 01). The Reaction Arm can be positioned in numerous places within a 360° circle. However, for the Arm to be correctly positioned, it must be set within a 90° quadrant of that circle. That quadrant is the area located between the protruding Square Drive and the bottom of the Housing away from the Swivel Inlets. It will always be toward the lower half of the Housing and on one side of the Housing when tightening and the other side when loosening.

OPERATING THE WRENCH

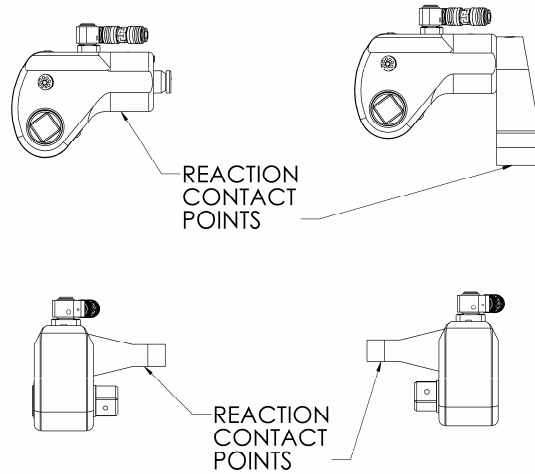
The position of the Square Drive relative to the Shroud determines whether the action will tighten or loosen the nut. (Refer to Dwg. 02 for application examples).

The power stroke of the Piston Assembly will always turn the Square Drive toward the Shroud.

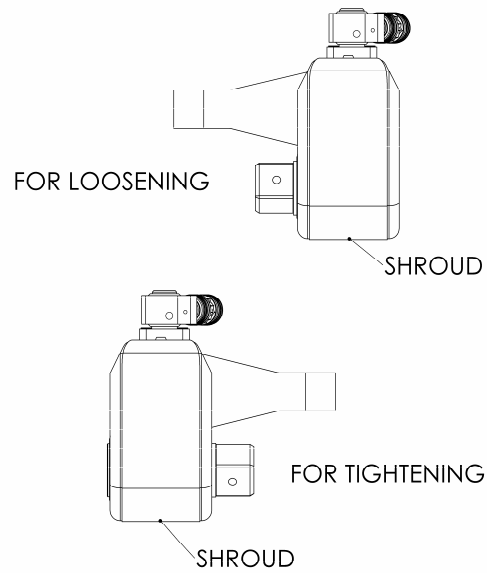
WRENCH POSITIONS

1. Place the Square Drive in the socket, insert the socket retainer ring and pin, and place the socket on the nut. Make certain the Square Drive and socket are the correct size for the nut and that the socket fully engages the nut
2. Position the reaction arm against an adjacent nut, flange or solid system component. Make certain that there is clearance for the hoses and uni-swivel coupling. **DO NOT** allow the tool to react against the hoses, or uni-swivel coupling. When reacting directly off the tool body ie., with reaction arm removed **DO NOT** react off the exposed End Plug Spigot.
3. After having turned the Pump on and presetting the pressure for the correct torque, depress the remote control advance button to advance the Piston Assembly
4. When the wrench is started, the reaction surface of the wrench or Reaction Arm will move against the contact point and the nut will begin to turn. Once the piston reaches the end of its stroke depress the remote control return button to retract the piston.
5. Continue this cycling operation of advance and retract until the nut is no longer turning and the Pump Gauge reaches the preset pressure. The piston rod will retract when the retract button is pressed and under normal conditions, an audible "click" will be heard as the tool resets itself.
6. Continue to cycle the tool until it "stalls" and the preset psi/torque has been attained.
7. Once the nut stops rotating, cycle the tool one last time to achieve total torque.

**Square Drive Hydraulic Wrench
Reaction Points (Dwg. 01)**



**Square Drive Position for Loosening and Tightening
(Dwg. 02)**



PLACING THE TOOL IN SERVICE

LUBRICATION

Marine Grade Moly Lube

Lubrication frequency is dependent on factors known only to the user. The amount of contaminants in the work area is one factor. Tools used in a clean room environment will obviously require less service than a tool used out-doors and dropped in loose dirt or sand. Marine Grade Moly Lube is formulated not to wash out of the tool in areas where lubrication is critical.

Whenever lubrication is required, lubricate as follows:

1. Remove the Drive Plate, Ratchet, Segment Pawl and Drive Sleeves and wash the components in a suitable cleaning solution in a well-ventilated area.
2. After drying the components, wipe a film of Moly Lube (Marine Grade) onto the wear surface of both Drive Sleeves and the ends of the Ratchet.
3. Spread a light film of Moly Lube (Marine Grade) onto the inner face and both sides of the Drive Plate.
Do not pack the teeth of the Segment Pawl or Ratchet with lube. It can prevent the teeth from engaging properly.



TWS-N SERIES TORQUE CONVERSION CHART											
PSI / lbf.ft						BAR / Nm					
<i>PSI</i>	TWS17N lbf.ft	TWS45N lbf.ft	TWS100N lbf.ft	TWS150N lbf.ft	TWS370N lbf.ft	<i>BAR</i>	TWS17N Nm	TWS45N Nm	TWS100N Nm	TWS150N Nm	TWS370N Nm
1000	125	332	738	1,106	2,729	100	246	652	1,449	2,174	5,362
1500	188	498	1,106	1,659	4,094	150	370	978	2,174	3,261	8,043
2000	251	664	1,475	2,213	5,458	200	493	1,304	2,899	4,348	10,725
2500	314	830	1,844	2,766	6,823	250	616	1,630	3,623	5,435	13,406
3000	376	996	2,213	3,319	8,187	300	739	1,957	4,348	6,522	16,087
3500	439	1,162	2,581	3,872	9,552	350	862	2,283	5,072	7,609	18,768
4000	502	1,328	2,950	4,425	10,916	400	986	2,609	5,797	8,696	21,449
4500	564	1,494	3,319	4,978	12,281	450	1,109	2,935	6,522	9,783	24,130
5000	627	1,660	3,688	5,532	13,645	500	1,232	3,261	7,246	10,870	26,812
5500	690	1,826	4,056	6,085	15,010	550	1,355	3,587	7,971	11,957	29,493
6000	752	1,992	4,425	6,638	16,374	600	1,478	3,913	8,696	13,043	32,174
6500	815	2,158	4,794	7,191	17,739	650	1,601	4,239	9,420	14,130	34,855
7000	878	2,324	5,163	7,744	19,103	690	1,700	4,500	10,000	15,000	37,000
7500	941	2,490	5,531	8,297	20,468						
8000	1,003	2,656	5,900	8,850	21,832						
8500	1,066	2,822	6,269	9,404	23,197						
9000	1,129	2,988	6,638	9,957	24,561						
9500	1,191	3,154	7,006	10,510	25,926						
10,000	1,254	3,320	7,375	11,063	27,290						

Troubleshooting Guide		
Trouble	Probable Cause	Solution
Piston will not advance or retract	Couplers are not securely attached to the tool or pump	Check the Coupler connections and make certain that they are connected.
	Coupler is defective	Replace any defective Coupler.
	Defective remote control unit	Replace the button and/or control pendent
	Dirt in the direction-control valve of the pump unit	Disassemble the pump and clean the direction-control valve.
Piston will not retract	Hose connections reversed	Make certain the advance on the pump is connected to the advance on the tool and retract on the pump is connected to the retract on the tool.
	Retract hose not connected	Connect the retract hose securely
	Retract pin broken	Replace the broken pin and/or spring
Cylinder will not build up pressure	Piston Seal and/or End Plug Seal leaking	Replace any defective O-rings
	Coupler is defective	Replace any defective Coupler
Square Drive will not turn	Grease or dirt build up in the teeth of the Ratchet and Segment Pawl	Disassemble the Ratchet and clean the grease or dirt out of the teeth
	Worn or broken teeth on Ratchet an/or Segment Pawl	Replace any worn or damaged parts
Pump will not build up pressure	Defective relief valve	Inspect, adjust or replace the relief valve
	Air supply too low or air hose too small	Make certain the air supply and hose size comply with the pump manual recommendations.
	Electric power source is too low	Make certain the amperage, voltage and any extension cord size comply with the pump manual requirements
	Defective Gauge	Replace the Gauge
	Low oil level	Check and fill the pump reservoir
	Clogged filter	Inspect, clean and/or replace the pump filter
Pressure reading erratic	Defective Gauge	Replace the Gauge
Nut Returns with retract stroke	Ball Plungers are not engaging the Drive Sleeves	Thread the Ball Plungers to the correct depth in the Housing.

NOTICE**SAVE THESE INSTRUCTIONS. DO NOT DESTROY.**