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|--|-------------|--|---------------|---------------|----------------------|
|  |             | <b>HYDRAULIC TORQUE WRENCH - SQUARE DRIVE<br/>FOR USE WITH TOOLS: TWS17N, TWS45N,<br/>TWS100N, TWS150N AND TWS370N</b> |               |               | TDS:-<br><b>1288</b> |
| Prepared by:-  | Mark Dalley |  | Approved by:- | Martin Davies | Date: 13/05/15       |
| REV NO:-   | 004         |  | Revised by:   | Martin Davies | Date: 19/11/15       |
| ECO:-  | 3957        |  |               |               |                      |

Hi-Force TWS-N series of lightweight aluminium hydraulic torque wrenches are designed to handle the toughest bolting jobs quickly and accurately. All models provide a torque accuracy of +/- 3%. The reaction arm allows the user to easily position the tool and if necessary react off the tool body in confined situations.

### **SAFETY**

#### **READ THIS MANUAL BEFORE OPERATING THE TOOL FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN SERIOUS BODILY INJURY**

- 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 (700Bar) maximum pressure with this tool.
- Use only twin line hydraulic hose rated for 10,000 psig (700Bar) 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 connects 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.

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### **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 and ear protection when operating or performing maintenance of this tool.
- Always wear head and hand protection and protective clothing when operating this tool.
- 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.
- Do not carry or lift the tool by the hose.

### **CONNECTING THE TOOL**

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.

Connect the opposite ends of the hose to the Pump in the same manner.

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### **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.

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### **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.

Make sure the Reaction Arm is positioned correctly. (Refer to **DRAWING 1**).

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.

**PLEASE NOTE:** Under certain conditions it is possible for the reaction arm location plug to be pushed slightly into the tool body. This can happen as a result of the tool being dropped or hit against a solid object while the arm is not fitted. Once this has occurred the reaction arm may not latch into place correctly.


The problem is very simply cured and in many cases will rectify itself before the operator is even aware it has occurred. To return the plug to its correct position simply connect the tool to a pump and cycle the mechanism backwards and forwards a couple of times. In a lot of cases just switching the pump on will be enough. The reaction arm should then latch on correctly.

### **OPERATING THE WRENCH (Refer to DRAWING 2)**

The position of the Square Drive relative to the Shroud determines whether the action will tighten or loosen the nut. The power stroke of the Piston Assembly will always turn the Square Drive toward the Shroud.

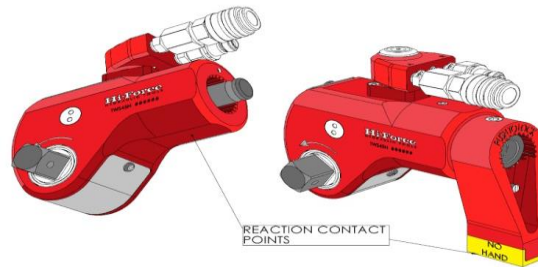
#### **WRENCH POSITIONS**

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 i.e., with reaction arm removed **DO NOT** react off the exposed End Plug Spigot.

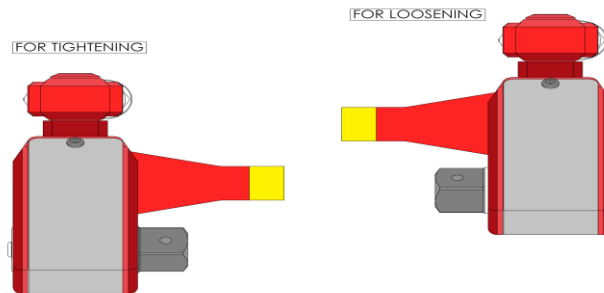
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3. After having turned the Pump on and pre-setting the pressure for the correct torque, depress the remote control advance button to advance the Piston Assembly.
4. When the wrench is started, the reaction surface of the wrench or Reaction Arm will 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 pre-set 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 pre-set psi/torque has been attained.
7. Once the nut stops rotating, cycle the tool one last time to achieve total torque.

**DRAWING 1**



**DRAWING 2**



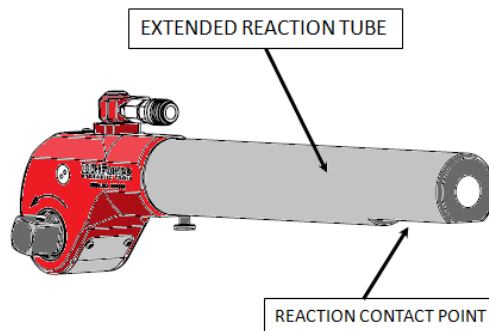
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### **EXTENDED REACTION ARM (Refer to DRAWING 3)**

The extended reaction arm can only be positioned in one orientation i.e. the flat of the reaction contact point to be 90° to the side of the torque wrench body.

**PLEASE NOTE:** The extended reaction arm is purchased separately as an accessory. For further information please contact your nearest Hi-Force distributor.

### **DRAWING 3**




### **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 outdoors 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.


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| TWS-N SERIES TORQUE CONVERSION CHART |                  |                  |                   |                   |                   |            |              |              |               |               |               |
|--------------------------------------|------------------|------------------|-------------------|-------------------|-------------------|------------|--------------|--------------|---------------|---------------|---------------|
| PSI / lbf.ft                         |                  |                  |                   |                   |                   | BAR / Nm   |              |              |               |               |               |
| PSI                                  | TWS17N<br>lbf.ft | TWS45N<br>lbf.ft | TWS100N<br>lbf.ft | TWS150N<br>lbf.ft | TWS370N<br>lbf.ft | BAR        | TWS17N<br>Nm | TWS45N<br>Nm | TWS100N<br>Nm | TWS150N<br>Nm | TWS370N<br>Nm |
| <b>1000</b>                          | 125              | 329              | 731               | 1,087             | 2,686             | <b>100</b> | 247          | 647          | 1,438         | 2,139         | 5,285         |
| <b>1500</b>                          | 188              | 493              | 1,096             | 1,631             | 4,029             | <b>150</b> | 370          | 971          | 2,157         | 3,209         | 7,927         |
| <b>2000</b>                          | 251              | 658              | 1,462             | 2,175             | 5,372             | <b>200</b> | 493          | 1,294        | 2,875         | 4,178         | 10,569        |
| <b>2500</b>                          | 314              | 822              | 1,827             | 2,718             | 6,715             | <b>250</b> | 617          | 1,618        | 3,594         | 5,348         | 13,221        |
| <b>3000</b>                          | 376              | 987              | 2,192             | 3,262             | 8,058             | <b>300</b> | 740          | 1,941        | 4,313         | 6,417         | 15,854        |
| <b>3500</b>                          | 439              | 1,151            | 2,558             | 3,806             | 9,401             | <b>350</b> | 863          | 2,265        | 5,032         | 7,487         | 18,496        |
| <b>4000</b>                          | 502              | 1,316            | 2,923             | 4,349             | 10,744            | <b>400</b> | 987          | 2,588        | 5,751         | 8,556         | 21,138        |
| <b>4500</b>                          | 564              | 1,480            | 3,289             | 4,893             | 12,087            | <b>450</b> | 1,110        | 2,912        | 6,470         | 9,626         | 23,780        |
| <b>5000</b>                          | 627              | 1,645            | 3,654             | 5,437             | 13,430            | <b>500</b> | 1,234        | 3,235        | 7,189         | 10,696        | 26,423        |
| <b>5500</b>                          | 690              | 1,809            | 4,019             | 5,980             | 14,773            | <b>550</b> | 1,357        | 3,559        | 7,907         | 11,765        | 29,065        |
| <b>6000</b>                          | 752              | 1,973            | 4,385             | 6,524             | 16,116            | <b>600</b> | 1,480        | 3,882        | 8,626         | 12,835        | 31,707        |
| <b>6500</b>                          | 815              | 2,138            | 4,750             | 7,067             | 17,459            | <b>650</b> | 1,604        | 4,206        | 9,345         | 13,904        | 34,349        |
| <b>7000</b>                          | 878              | 2,302            | 5,116             | 7,611             | 18,802            | <b>700</b> | 1,727        | 4,529        | 10,064        | 14,974        | 36,992        |
| <b>7500</b>                          | 941              | 2,467            | 5,481             | 8,155             | 20,145            |            |              |              |               |               |               |
| <b>8000</b>                          | 1,003            | 2,631            | 5,846             | 8,698             | 21,488            |            |              |              |               |               |               |
| <b>8500</b>                          | 1,066            | 2,796            | 6,212             | 9,242             | 22,831            |            |              |              |               |               |               |
| <b>9000</b>                          | 1,129            | 2,960            | 6,577             | 9,786             | 24,174            |            |              |              |               |               |               |
| <b>9500</b>                          | 1,191            | 3,125            | 6,943             | 10,329            | 25,517            |            |              |              |               |               |               |
| <b>10,000</b>                        | 1,254            | 3,289            | 7,308             | 10,873            | 26,860            |            |              |              |               |               |               |


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| 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 pendant  |
|                                     | 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 and/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 recommendation   |
|                                     | 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  |




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