

Hi-Force HYDRAULIC TOOLS		HYDRAULIC TORQUE WRENCH-HEX DRIVE FOR USE WTH:- TWH27N, TWH54N, TWH120N, TWH210N & TWH430N		TDS:- 1287
Prepared by:-	Mark Dalley	Approved by:-	Matthew Hughes	Date:-17/08/12
REV NO.:-	0003	Revised by:-	Martin Davies	Date:-18/11/15
ECO:-	3903			

Hi-Force TWH-N series of lightweight aluminium (except the TWH430N) hydraulic torque wrenches are designed to handle the toughest bolting jobs quickly and accurately. Hi-Force offer 5 models with output torque capacities from 2700Nm to 48181Nm. Series TWH-N series Low Profile Hydraulic Torque Wrenches are designed for installing and removing large bolts having minimal wrench clearance at offshore platforms, power plants, steel erection sites and other locations requiring precise high torque during bolt make-up and maximum torque for bolt breakdown.

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 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 and ear protection when operating or performing maintenance on this tool.
- Always wear head and hand protection and protective clothing when operating this tool.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- Keep hands, loose clothing and long hair away from the reaction arm and working area during operation. Do not attempt to provide a reaction point for the tool with your hands during operation.
- This tool will exert a very large 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 uni-swivel coupling as a reaction point.
- 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 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 lift or carry the tool by the hose.

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CONNECTING THE TOOL

1. Attach the twin line hose to the uni-swivel coupling of the drive cylinder 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.
3. Ensure drive cylinder is fully retracted by operating pump (refer to pump operating instructions). **See Fig 1.** If this is not done the ratchet head will be difficult or impossible to fit.
4. Push the ratchet head link pin out of the low profile drive cylinder.
5. Ensure that the drive plate in the ratchet head is pushed fully forwards – **see Fig 2.** Failure to do this can result in severe damage to the ratchet head and drive cylinder.
5. Mate the selected ratchet head to the cylinder by inserting the end of the cylinder opposite the swivel inlets between the Side Plates of the ratchet head. **Refer to Fig. 3**
6. Align the holes for the ratchet head retaining pin and insert the pin through the side plates and cylinder to keep the units joined together. NEVER operate the tool without the pin fitted. This can result in tool breakage.
7. Cycle the tool fully several times to check operation, before fitting on a nut.

SETTING THE TORQUE

After determining the desired torque, use the torque conversion charts on pages 5 and 6 to determine the pressure that is necessary to achieve that torque.

1. Connect the pump to the power supply and start the pump. Refer to pump operating instructions or more details.
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 knob and then rotate the knob 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.

OPERATING THE WRENCH

The position of the tool relative to the nut determines whether the action will tighten or loosen the nut.

(Refer to Fig 4 for application examples). The power stroke of the piston assembly will always turn the ratchet hex toward the Shroud.

1. Place the ratchet hex on the nut. Make certain it is the correct size for the nut and that it fully engages the nut.
2. Position the reaction surface against an adjacent nut, flange or solid system component. Make certain that there is clearance for the hoses, and uni-swivel coupling assembly. **DO NOT** allow the tool to react against the hoses, or uni-swivel coupling assembly.
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. If the notch in the piston rod did not engage the retract pin in the ratchet head when the head was joined to the housing, it will engage the pin automatically during the first advance stroke.
4. When the ratchet head is connected to the nut and the wrench is started, the reaction surface of the wrench will move against the contact point and the nut will begin to turn. Once the piston reaches the end of its stroke, the pressure will rise rapidly. On a pump with a two button control pendant, depress the remote control return button to retract the piston. On a pump with a single button pendant, release the button to retract the tool. There is usually a series of audible clicks as the tool retracts.
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.
7. Once the nut stops rotating, cycle the tool one last time to ensure final torque has been achieved.

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LUBRICATION

Use MOLYBDENUM DISULPHIDE grease for lubrication.

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. Whenever lubrication is required, lubricate as follows:

1. Separate the low profile cylinder from the ratchet head if they are joined.
2. After wiping off the old grease, apply grease to the hooking notch in the Piston rod and wipe a film of grease onto the sides and front and rear faces of the two crescent shaped Sliders on the end of the piston.

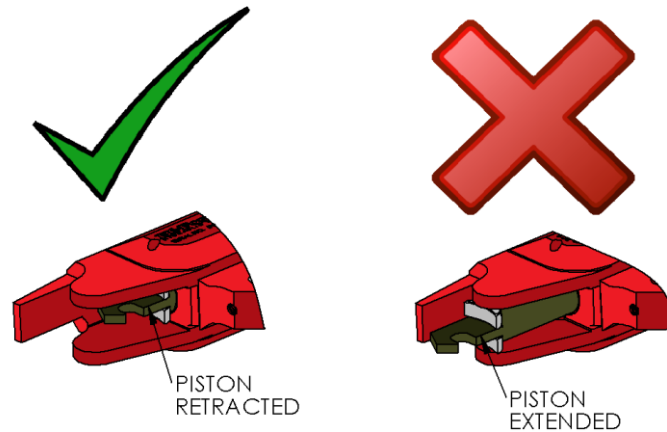


Fig 1: piston positioning

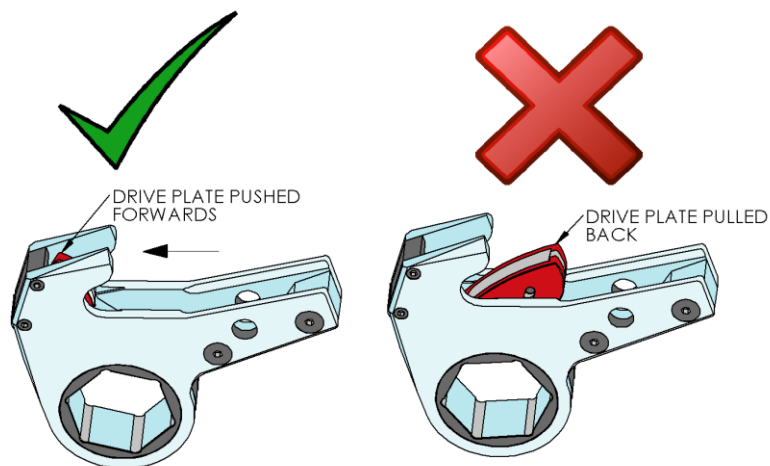


Fig 2: Drive plate positioning

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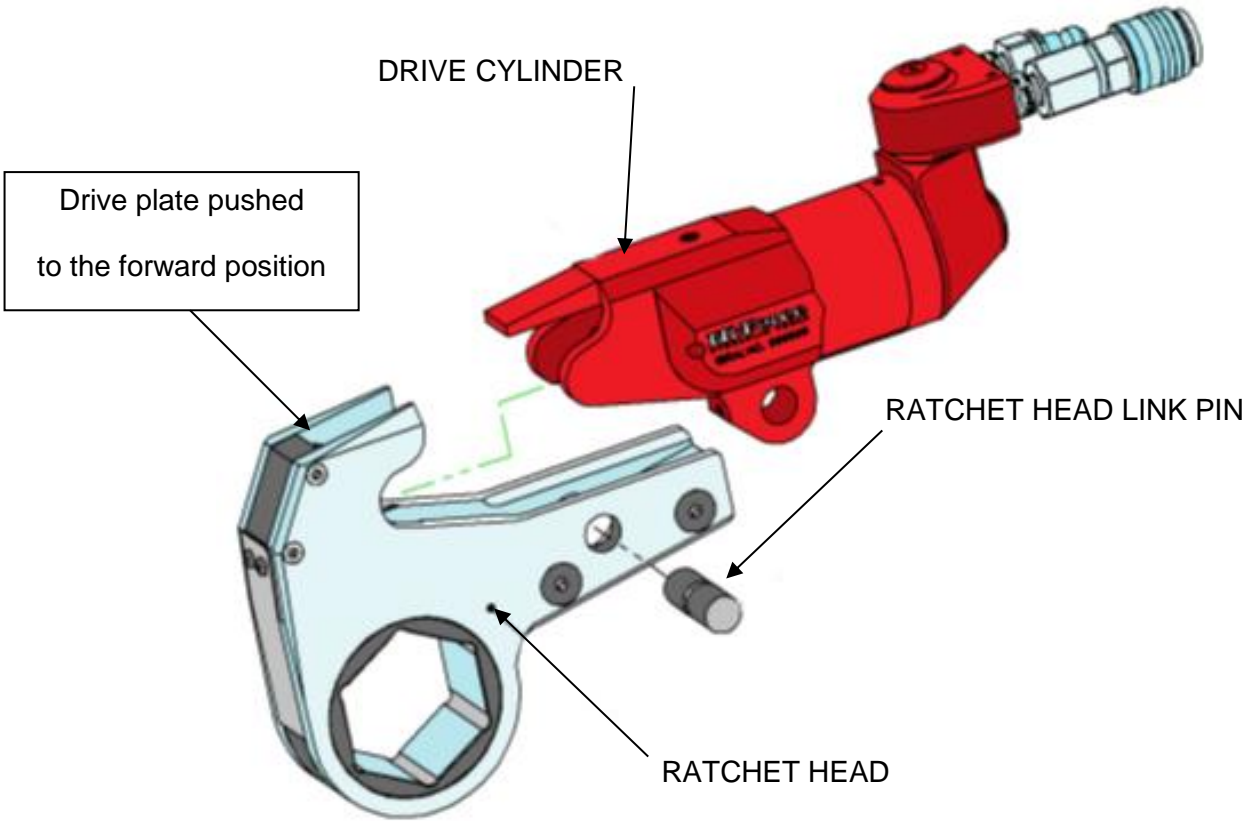


Fig 3: attaching the ratchet head

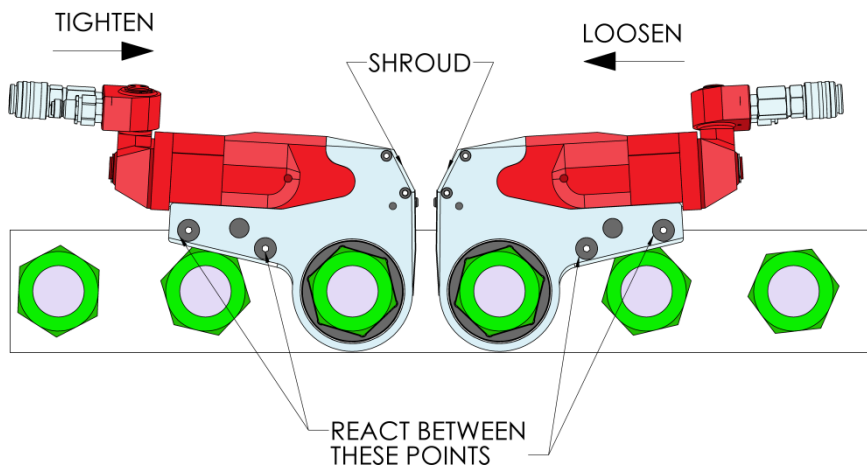


Fig 4: reaction points

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TWH-N SERIES TORQUE CONVERSION CHART (Bar/Nm)

	TWH27N		TWH54N		TWH120N		TWH210N		TWH430N	
Ratchet Hex Sizes	1.1/16"- 1.13/16"	2"- 2.3/8"	1.7/16"- 2.9/16	2.3/4"- 3.1/8"	2.3/16"- 3.1/8"	3.1/2"- 3.7/8"	2.3/4"- 3.7/8"	4.1/4"- 4.5/8"	3.1/8"- 4.5/8"	5"- 6.7/8"
	24-46mm	50- 60mm	38-65mm	70- 80mm	50-80mm	85- 100mm	70- 100mm	105- 115mm	80- 115mm	130- 145mm
Pressure (Bar)	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
50	188	219	384	431	838	1,025	1,515	1,652	3,128	3,442
100	375	438	767	862	1,677	2,050	3,031	3,303	6,256	6,883
150	563	657	1,151	1,294	2,515	3,075	4,546	4,955	9,384	10,325
200	750	877	1,535	1,725	3,353	4,100	6,062	6,602	12,512	13,766
250	938	1,096	1,919	2,156	4,192	5,125	7,577	8,259	15,640	17,208
300	1,125	1,315	2,302	2,587	5,030	6,150	9,093	9,910	18,768	20,649
350	1,313	1,534	2,686	3,018	5,858	7,174	10,608	11,562	21,896	24,091
400	1,500	1,753	3,070	3,450	6,707	8,199	12,123	13,214	25,024	27,532
450	1,688	1,972	3,453	3,881	7,545	9,224	13,639	14,865	28,152	30,974
500	1,875	2,192	3,837	4,312	8,384	10,249	15,154	16,517	31,280	34,415
550	2,063	2,411	4,221	4,743	9,222	11,274	16,670	18,169	34,408	37,857
600	2,250	2,630	4,604	5,174	10,060	12,299	18,185	19,821	37,536	41,298
650	2,438	2,849	4,988	5,606	10,899	13,324	19,701	21,472	40,664	44,740
700	2,625	3,068	5,372	6,037	11,737	14,349	21,216	23,124	43,792	48,181



**HYDRAULIC TORQUE WRENCH-HEX DRIVE
FOR USE WITH:- TWH27N, TWH54N,
TWH120N, TWH210N & TWH430N**

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	1.1/16"- 1.13/16"	2"- 2.3/8"	1.7/16"- 2.9/16"	2.3/4"- 3.1/8"	2.3/16"- 3.1/8"	3.1/2"- 3.7/8"	2.3/4"- 3.7/8"	4.1/4"- 4.5/8"	3.1/8"- 4.5/8"	5"-6.7/8"
	24-46mm	50- 60mm	38-65mm	70- 80mm	50-80mm	85- 100mm	70- 100mm	105- 115mm	80- 115mm	130- 145mm
Pressure (PSI)	lbf.ft	lbf.ft	lbf.ft	lbf.ft	lbf.ft	lbf.ft	lbf.ft	lbf.ft	lbf.ft	lbf.ft
1,000	191	223	398	438	852	1,042	1,541	1,679	3,180	3,499
1,500	286	334	597	658	1,278	1,563	2,311	2,519	4,770	5,248
2,000	381	446	797	877	1,704	2,084	3,081	3,358	6,360	6,997
2,500	477	557	996	1,096	2,131	2,605	3,851	4,198	7,950	8,746
3,000	572	668	1,195	1,315	2,557	3,126	4,622	5,037	9,539	10,496
3,500	667	780	1,394	1,534	2,983	3,647	5,392	5,877	11,129	12,245
4,000	762	891	1,593	1,754	3,409	4,168	6,162	6,716	12,719	13,994
4,500	858	1,003	1,792	1,973	3,835	4,689	6,932	7,556	14,309	15,743
5,000	953	1,114	1,992	2,192	4,261	5,210	7,703	8,396	15,899	17,493
5,500	1,048	1,225	2,191	2,411	4,687	5,730	8,473	9,235	17,489	19,242
6,000	1,144	1,337	2,390	2,630	5,113	6,251	9,243	10,075	19,079	20,991
6,500	1,239	1,448	2,589	2,850	5,539	6,772	10,013	10,914	20,669	22,740
7,000	1,334	1,560	2,788	3,069	5,965	7,293	10,784	11,754	22,259	24,490
7,500	1,430	1,671	2,987	3,288	6,392	7,814	11,554	12,593	23,849	26,239
8,000	1,525	1,782	3,186	3,507	6,818	8,335	12,324	13,433	25,438	27,988
8,500	1,620	1,894	3,386	3,726	7,244	8,856	13,094	14,272	27,028	29,737
9,000	1,715	2,005	3,585	3,946	7,670	9,377	13,865	15,112	28,618	31,487
9,500	1,811	2,117	3,784	4,165	8,096	9,898	14,635	15,951	30,208	33,236
10,000	1,906	2,228	3,983	4,384	8,522	10,419	15,405	16,791	31,798	34,985

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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 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 and/or Spring 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
	Retaining screws sheared	Replace any broken screws.
	Coupler is defective	Replace any defective coupler
Ratchet 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 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

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