

**TRITORC**

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## **OPERATION AND MAINTENANCE MANUAL FOR TSL AND THL HYDRAULIC TORQUE WRENCHES**

It is operating manual of TSL series and THL series wrenches, please read carefully follow instructions, warnings and cautions before using the tools.

### **IMPORTANT RECEIVING INSTRUCTIONS**

Carefully inspect all components for shipping damage. If any shipping damage is found, please notify 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.

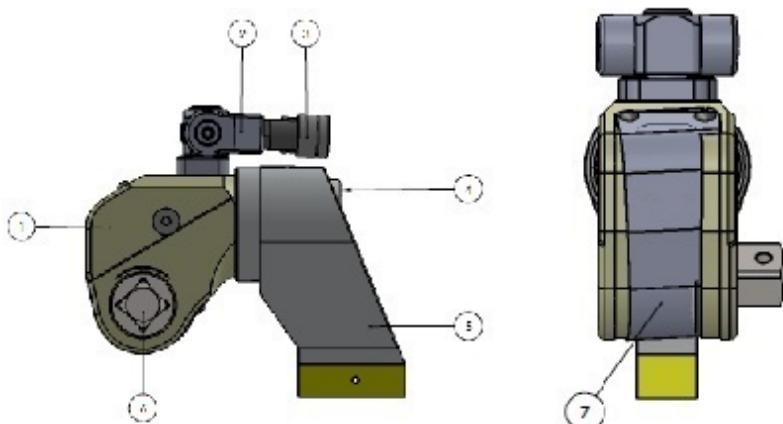
### **SAFTY FIRST**

Please read carefully follow instructions, warning and caution. Please observe the safety precautions so that it can avoid personal and equipment to injury when you operate the equipment. Tristar is not responsible for any damage resulting from the operation of irregularity.

### **DESCRIPTION**

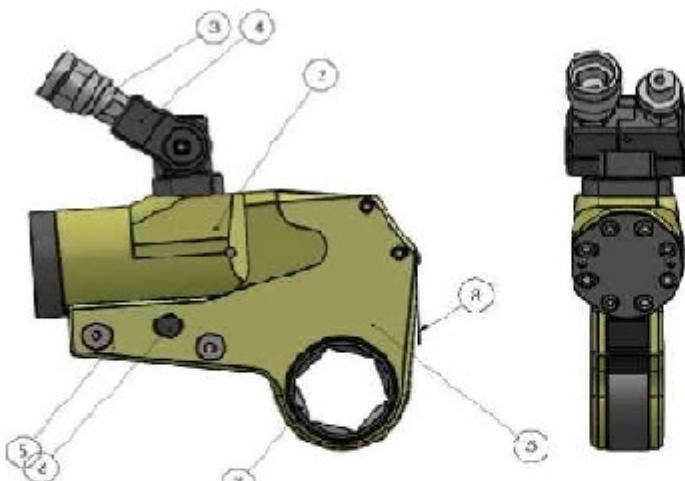
The material of TSL series and THL series Hydraulic Torque Wrenches are Aluminium-Titanium alloy and superhigh strength alloy steel for increased strength, intensity and durability of the tool. High repeatability, a precise design is with accuracy  $\pm 3\%$ .

TSL series, Square Drive Torque Wrenches:



ITEM	NAME
1	BODY
2	360° X180° SWIVEL JOINT
3	QUICK COUPLING
4	END CAP
5	360° REACTION ARM
6	SQUARE DRIVE
7	SAFETY SHROUD

## TH series, Direct Hex type Torque Wrenches:



ITEM	NAME
1	Direct Hex Cassette type
2	Power Head
3	Quick Coupling
4	180 x 360 Swivel Joint
5	Reaction Arm
6	Link Pin
7	Ratchet
8	Shroud Plate

### **WARNING AND CAUTION**

#### **WARNING**

To avoid personal injury and equipment damages, be sure that every hydraulic component can rated for 10,000PSI (700kg/cm<sup>2</sup>) Operating Pressure.

#### **WARNING**

Try to minimum the danger of overload: Using hydraulic gauge to indicate the working pressure. Hydraulic gauge is a window to show what happened in the hydraulic system.

#### **WARNING**

To replace the worn components with the Tristar new components as soon as possible.

#### **CAUTION**

Do not subject the components to potential hazard such as fire, sharp surfaces, extreme heat or cold, or heave impact.

#### **CAUTION**

Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.

Do not let the hose kink, twist, curl or bend so tightly that oil flow within the hose is blocked or reduced.

Do not use the hose to move attached equipment. Stress can damage the hose, causing personal injury.

#### **WARNING**

To avoid personal injuries and equipment damages, do not remove the shroud of the wrench. Do not modify any component of the wrench. Do not change the relief valve which is inside the swivel couplings.

#### **CAUTION**

The incorrect system connection will cause failure and danger. Before connection, make sure the swivel couplings being clean. After application, the swivel couplings must be put on the dust caps.

#### **CAUTION**

Do not use worn socket and square drive.

#### **CAUTION**

Please use the socket of good performance. The quality should be according with the standard of ISO-2725 or ISO-1174 or DIN3129 or DIN3121 or ASME-B107.2/1995.

It is recommended to use Tristar Impact Sockets, Hex Reducers, insert etc. with Tristar Hydraulic Torque Wrench.

## BOLTING TIGHTENING FORCE RECOMMENDED CHART

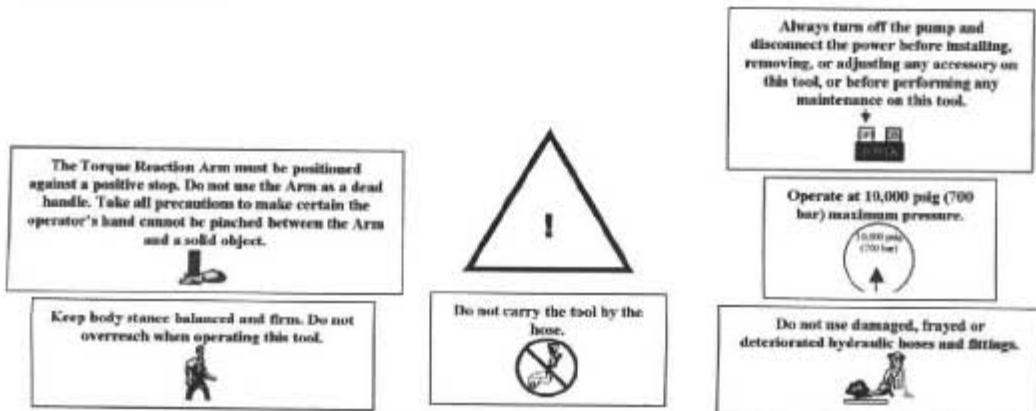
The belows are DIN(For you reference)

FORM 1

Strength Grade	4.8		6.8		8.8		10.9		12.9		
Min breaking strength	392MPa		588MPa		784MPa		941MPa		1176MPa		
Material	Q235(SS41)		35(S35C)		35CrMo(SCM3)		42CrMo(SCM4)		40GrNiMoA(SNCM)		
Bolting Thread	KGM	N.m	KGM	N.m	KGM	N.m	KGM	N.m	KGM	N.m	
M	mm										
14	22	7	69	10	98	14	137	17	165	23	225
16	24	10	98	14	137	21	206	25	247	36	363
18	27	14	137	21	206	29	284	35	341	49	480
20	30	18	176	28	296	41	402	58	569	69	680
22	32	23	225	34	333	55	539	78	765	93	911
24	36	32	314	48	470	70	686	100	981	120	1176
27	41	45	441	65	637	105	1029	150	1472	180	1764
30	46	60	588	90	882	125	1225	200	1962	240	2352
33	50	75	735	115	1127	150	1470	210	2060	250	2450
36	55	100	980	150	1470	180	1764	250	2453	300	2940
39	60	120	1176	180	1764	220	2156	300	2943	370	3626
42	65	155	1519	240	2352	280	2744	390	3826	470	4606
45	70	180	1764	280	2744	320	3136	450	4415	550	5390
48	75	230	2254	350	3430	400	3920	570	5592	680	6664
52	80	280	2744	420	4116	480	4704	670	6573	850	8330
56	85	360	3528	530	5149	610	5978	860	8437	1050	10290
60	90	410	4018	610	5978	790	7742	1100	10791	1350	13230
64	95	510	4998	760	7448	900	8820				
68	100	580	5684	870	8526	1100	10780				
72	105	660	6468	1000	9800	1290	12642				
76	110	750	7350	1100	10780	1500	14701				
80	115	830	8143	1250	12250	1850	18130				
85	120	900	8820	1400	13720	2250	22050				
90	130	1080	10584	1650	16170	2500	24500				
100	145	1400	13720	2050	20090						
110	155	1670	16366	2550	24990						
120	175	2030	19894	3050	29890						

**NOTE:**

The figure of the chart is the Max torque of the bolting, the recommended torque is 90% of chart figure For instance:M48,strength grade is 8.8,the torque is  $400 \times 90\% = 360\text{kgm}$

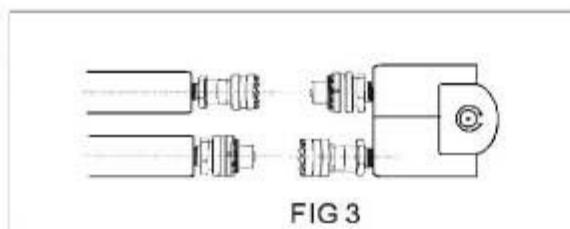


### PLACING THE TOOL IN SERVICE

## OPERATION

### CONNECTING THE TOOL

The wrench and power pump are connected by a 700 BAR operating pressure, twin-line hose assembly. Each end of the hose will have one male and one female connector to assure proper interconnection between pump and wrench.



**Insure the connectors are fully engaged and screwed snugly and completely together.**

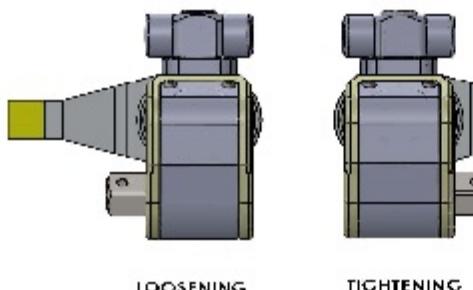
### OPERATING THE WRENCH

The position of the Square Drive relative to the Shroud determines whether the action will tighten or loosen the nut ( Refer Fig.4 for application examples).

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

### WRENCH POSITIONS

Square Drive Positions for Loosening & Tightening



**Right is tight.  
Left is loose.**

FIG 4

### SETTING THE REACTION ARM

All Tristar's Torque wrenches are equipped with a universal reaction arm. These reaction arms are employed to absorb and counteract forces created as the unit operates. The reaction arm should extend in the same direction of the square drive; However, slight adjustments may be made to suit your particular application. 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. 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.

### **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 with the inlets away from you, 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 for TS series wrenches simply push the square drive into the housing until the drive projects out the opposite side of the tool.

### **SETTING THE TORQUE**

After determining the desired torque, use 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 loosing 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.

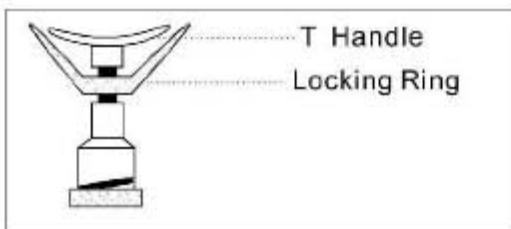


FIG 6

### **OPERATING THE WRENCH**

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 swivel couplings. Do not allow the tool to react against the hoses, or swivel couplings. When reacting directly off the tool body 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.

- 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.
- Continue to cycle the tool until it stalls and the preset psi/torque has been attained.
- Once the nut stops rotating, cycle the tool one last time to achieve total torque

## THL SERIES

### CONNECTING THE POWER HEAD WITH THE TH PROFILE CASSETTE

Both the square drive cartridge link and the TH clearance ratcheting link are inserted and removed from the power head in the same way. The hook described by the link's drive plates 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.

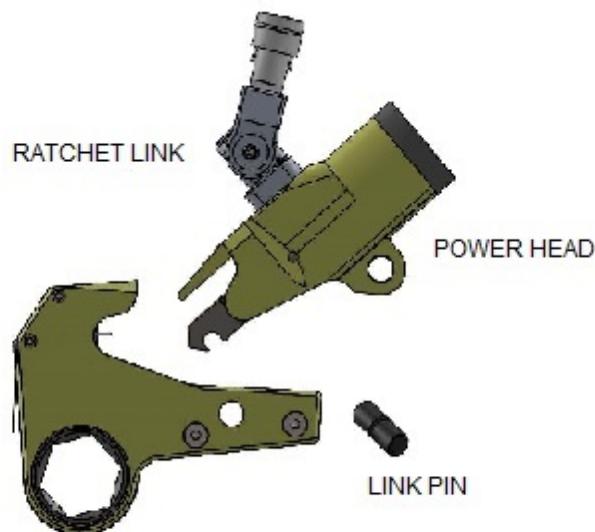


FIG 8

### THL PROFILE WRENCH POSITIONS

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 assembly will always turn the ratchet hex toward the shroud

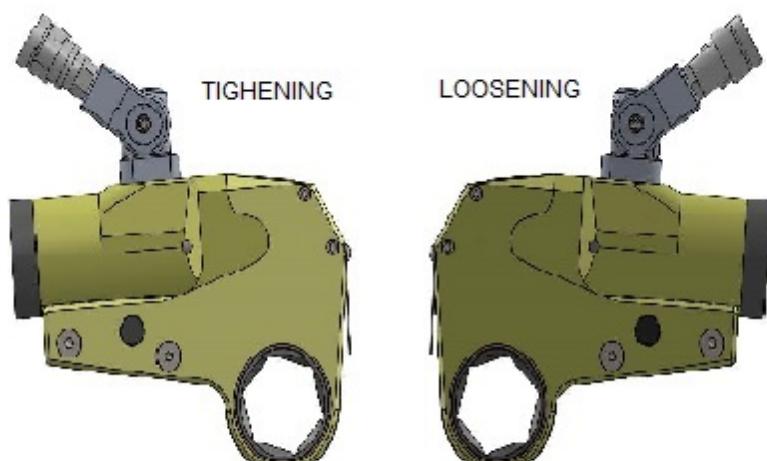


FIG 9

DRAWING OF POSITION

## **SETTING THE TORQUE**

After determining the desired torque, use 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 loosing 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.

## **OPERATING THE WRENCH**

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, swivel, and inlets. Do not allow the tool to react against the hoses, swivels or inlets.
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. If the notch in the piston rod did not engage the retract pin in the ratchet engage the pin automatically during the first advance stroke.
4. When the low profile cassette is connected to the housing 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 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 "stall" and the preset psi/torque has been attained.
7. Once the nut stops rotating, cycle the tool one last time to achieve torque.



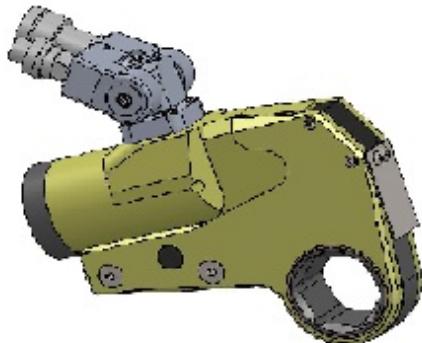
## TSL SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

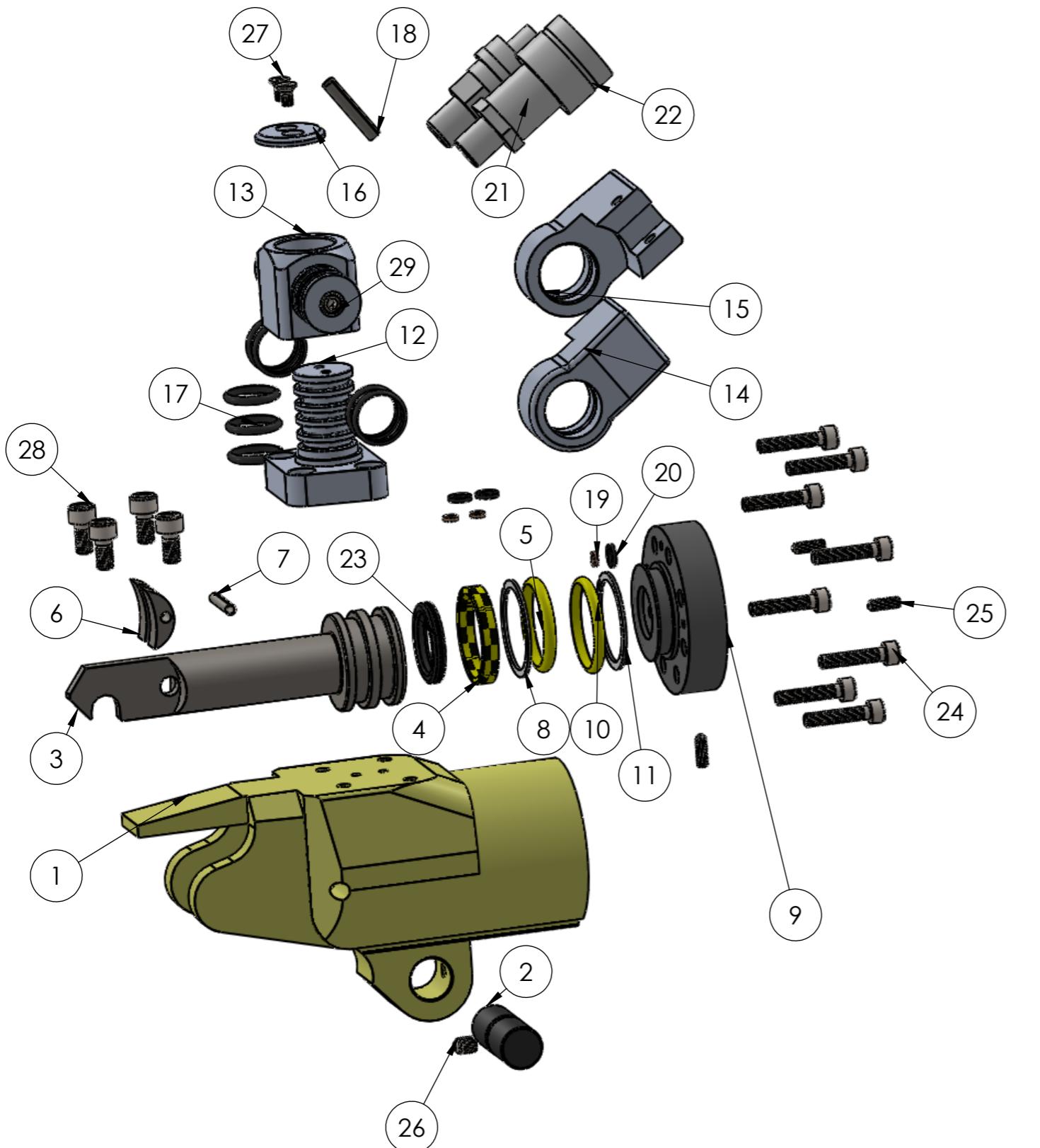
Model No.	TS-07	TS-1	TS-3	TS-5	TS-8	TS-10	TS-20	TS-25	TS-35	TS-50
psi	ft.lbs									
1000	80	135	331	553	775	1106	1913	2551	341	5230
1200	97	161	394	656	940	1352	2324	3028	4242	6276
1400	114	188	459	766	1096	1578	2712	3532	4949	7322
1600	130	215	525	875	1253	1803	3099	4087	5656	8368
1800	146	242	590	985	1409	2029	3487	4541	6363	9414
2000	162	268	656	1094	1566	2254	3874	5046	7070	10460
2200	179	295	721	1203	1723	2480	4261	5550	7777	11506
2400	195	322	787	1313	1879	2705	4649	6055	8485	12552
2600	211	349	852	1422	2036	2931	5036	6559	9192	12598
2800	228	376	918	1532	2193	3156	5424	7064	9899	14644
3000	244	403	984	1641	2349	3381	5811	7568	10606	15690
3200	260	430	1049	1750	2506	3607	6198	8073	11313	16736
3400	276	457	1115	1860	2662	3832	6586	8577	12020	17782
3600	293	483	1180	1969	2819	4058	6973	9082	12727	18828
3800	309	510	1246	2079	2976	4283	7361	9586	12434	19874
4000	325	537	1311	2188	3132	4509	7748	10091	14141	20920
4200	341	564	1377	2297	3289	4734	8135	10595	14848	21966
4400	358	591	1443	2407	3446	4959	8523	11100	15555	23012
4600	374	618	1508	2516	3602	5185	8910	11604	16262	24058
4800	390	645	1574	2626	3759	5410	9298	12109	16870	25104
5000	407	672	1639	2735	3915	5636	9685	12613	17677	26150
5200	423	698	1705	2844	4072	5861	10072	13118	18384	27196
5400	439	725	1770	2954	4229	6087	10460	13622	19091	28242
5600	455	752	1836	3063	4385	6312	10847	14127	19789	29288
5800	472	779	1901	3173	4542	6538	11235	14631	20505	30334
6000	488	806	1967	3282	4699	6763	11622	15136	21212	31380
6200	504	833	2033	3391	4855	6988	12009	15641	21919	32426
6400	521	860	2098	3501	5012	7214	12397	16145	22626	33472
6600	537	887	2164	3610	5168	7439	12784	16650	23333	34518
6800	553	914	2229	3720	5325	7665	13172	17154	24040	35564
7000	569	940	2295	3829	5482	7890	13559	17659	24747	36610
7200	586	967	2360	3938	5638	8116	13946	18163	25454	37656
7400	602	994	2426	4048	5795	8341	14334	18668	26162	38702
7600	618	1021	2491	4157	5951	8567	14721	19172	26869	39748
7800	635	1048	2557	4267	6108	8792	15109	19677	27576	40794
8000	651	1075	2623	4376	6265	9017	15496	20181	28283	41840
8200	667	1102	2688	4485	6421	9243	15883	20686	28990	42886
8400	683	1129	2754	4595	6578	9468	16271	21190	29697	43932
8600	700	1155	2819	4704	6735	9694	16658	21695	30404	44978
8800	716	1182	2885	4814	6891	9919	17046	22199	31111	46024
9000	732	1209	2950	4923	7048	10145	17433	22704	31818	47070
9200	748	1236	3016	5032	7204	10370	17820	23208	32525	48116
9400	765	1263	3082	5142	7361	10595	18208	23713	33232	49162
9600	781	1290	3147	5251	7518	10821	18595	24217	33939	50208
9800	797	1317	3213	5361	7674	11046	18983	24722	34647	51254
10000	830	1357	3333	5553	7965	11450	19675	25630	36113	52300



## THL SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

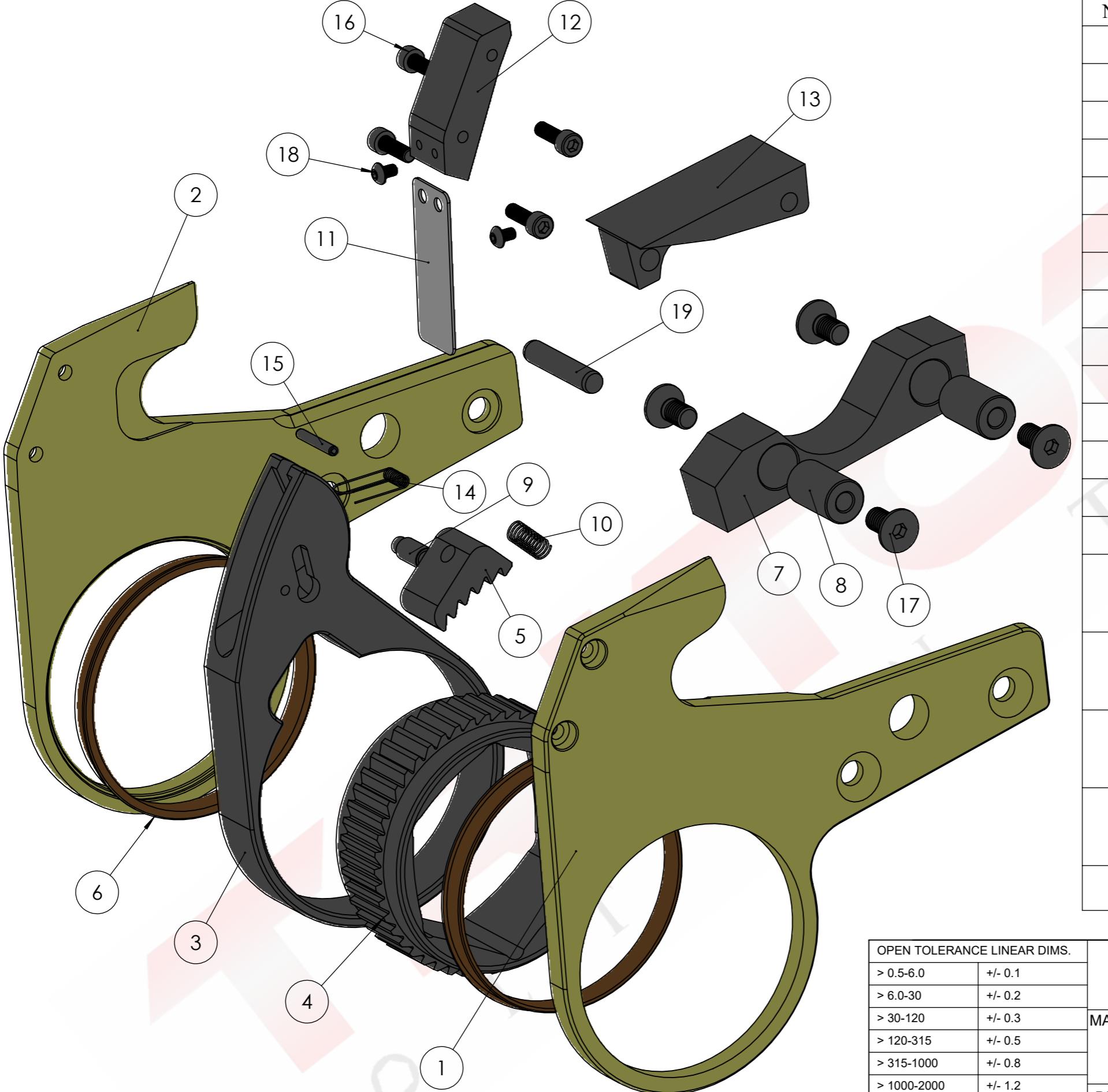
Model No.	THL -2		THL -4		THL -8		THL -14	THL -32	
Bolt Size Range	19-55	60	34-65	70-80	41-95	100-105	50-117	110-155	160-175
psi	ft. bs	ft. bs	ft. bs	ft. bs					
1000	180	176	400	474	777	860	1370	3038	3297
1200	203	210	511	564	954	1026	1615	3652	3888
1400	237	245	596	658	1113	1197	1884	4260	4536
1600	270	280	681	752	1272	1368	2153	4869	5184
1800	304	315	766	846	1431	1539	2422	5477	5832
2000	338	350	852	940	1590	1710	2692	6086	6480
2200	372	385	937	1084	1749	1881	2961	6694	7127
2400	406	421	1022	1128	1908	2062	3230	7303	7775
2600	440	456	1107	1222	2067	2223	3499	7911	8423
2800	473	491	1192	1317	2226	2395	3768	8620	9071
3000	507	526	1277	1411	2385	2566	4087	9128	9719
3200	541	561	1362	1505	2544	2737	4306	9737	10367
3400	575	596	1447	1599	2703	2908	4575	10345	11015
3600	609	631	1533	1693	2861	3079	4844	10954	11663
3800	642	666	1618	1787	3020	3250	5113	11562	12311
4000	676	701	1703	1881	3179	3421	5383	12171	12959
4200	710	736	1788	1975	3338	3592	5662	12779	13606
4400	744	771	1873	2069	3497	3763	5921	13388	14254
4600	778	806	1958	2163	3656	3934	6190	13996	14902
4800	812	842	2043	2257	3815	4105	6459	14605	15550
5000	845	877	2128	2351	3974	4276	6728	15213	16198
5200	879	912	2214	2445	4133	4447	6997	15822	16846
5400	913	947	2299	2539	4292	4618	7266	16430	17494
5600	947	982	2384	2633	4451	4789	7535	17039	18142
5800	981	1017	2469	2727	4610	4960	7804	17647	18790
600	1015	1052	2554	2822	4769	5132	8074	18256	19438
6200	1048	1087	2639	2916	4928	5303	8343	18865	20085
6400	1082	1122	2724	3010	5087	5474	8612	19473	20733
6600	1116	1157	2809	3104	5246	5645	8881	20082	21381
6800	1150	1192	2894	3198	5405	5816	9150	20890	22029
7000	1184	1227	2980	3292	5564	5987	9419	21299	22677
7200	1217	1262	3065	3386	5723	6158	9688	21907	23325
7400	1251	1298	3150	3480	5882	6329	9957	22516	23973
7600	1285	1333	3235	3574	6041	6500	10226	23124	24621
7800	1319	1368	3320	3668	6200	6671	10495	23733	25269
8000	1353	1403	3405	3762	6359	6842	10765	24341	25917
8200	1387	1438	3490	3856	6518	7013	11034	24950	26564
8400	1420	1473	3575	3950	6677	7184	11303	25558	27212
8600	1454	1508	3661	4044	6835	7355	11572	26167	27860
8800	1488	1543	3746	4138	6994	7526	11841	26775	28508
9000	1522	1578	3831	4232	7153	7697	12110	27384	29156
9200	1556	1613	3916	4326	7312	7868	12379	27992	29804
9400	1589	1648	4001	4421	7471	8040	12648	28601	30452
9600	1623	1683	4086	4515	7630	8211	12917	29209	31100
9800	1657	1719	4171	4609	7789	8382	13186	29818	31748
10000	1850	1784	4500	4800	8111	8726	13722	31030	33038





ITEM NO.	PART NUMBER	DESCRIPTION	Material	QTY.
1	TI-THL-04-01	HOUSING TX-04	7075-T6 (SN)	1
2	TI-THL-04-02	LOCK PIN TX-4	1.2767	1
3	TI-THL-04-03	PISTON TX4	EN24	1
4	TI-THL-04-04	Support Seal_Piston	BRTAPE	1
5	TI-THL-04-05	Piston O-ring	NBR	1
6	TI-THL-04-06	SLIDER-TX-04	1.2767	2
7	TI-THL-04-07	Pin_Slider	STD.	1
8	TI-THL-04-08	BackUp Seal Piston	PTFE	1
9	TI-THL-04-09	END CAP TX-04	7075-T6 (SN)	1
10	TI-THL-04-10	O-Ring End Cap	NBR	1
11	TI-THL-04-11	BackUp Seal End Cap	PTFE	1
12	TI-TS-03-13	SWIVEL KNOB-TS-03	7075-T6 (SN)	1
13	TI-TS-03-14	SWIVEL-2-TS-03	7075-T6 (SN)	1
14	TI-TS-03-15	SWIVEL MALE-TS-03	7075-T6 (SN)	1
15	TI-TS-03-16	SWIVEL FEMALE-TS-03	7075-T6 (SN)	1
16	TI-TS-03-17	SWIVEL WASHER-TS-03	7075-T6 (SN)	1
17	TI-THL-04-21	O-Ring Swivel	POLYURETHANE (11671)	7
18	TI-THL-04-22	Roll Pin Swivel	AISI 4340 Steel, normalized	1
19	TI-THL-04-23	Spacer	Phosphor bronze 10% D, UNS C52400	3
20	TI-THL-04-24	O-Ring Spacer	NBR	3
21	TI-THL-04-42	Couller MALE	STD.	1
22	TI-THL-04-43	Couller_FEMALE	STD.	1
23	TI-THL-04-45	U-Cup Seal	NBR	1
24	socket head cap screw 4762_din	SWIVEL HOU SCREW	STD.	8
25	socket set screw cup point_din	END CAP SCREW 2	STD.	3
26	socket set screw cup point_din	END CAP SCREW 2	STD.	1
27	socket csink head cap screw 10642_din	SWIVEL WASHER SCREW	STD.	2
28	socket head cap screw 4762_din	SWIVEL HOU SCREW	STD.	4
29	socket set screw flat point_din	Side Swivel Screw	STD.	2

ALL DIMENSIONS IN MM UNLESS SPECIFIED OTHERWISE  
DIM L FOR OPEN ANGULAR TOLERANCES IS THE SHORTER SIDE OF ANGLE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	HL41E	LHS PLATE	1
2	HL42E	RHS PLATE	1
3	HL43E	DRIVE PLATE	1
4	HL44E70	RATCHET	1
5	HL45E	PAWL	1
6	HL46E	DRIVE BUSH	2
7	HL47	LOWER SPACE	1
8	HL48	LOWER SPACER PIN	2
9	HL49	DUMBLE PIN	1
10	HL410	PAWL SPRING	1
11	HL412	SHROUD PLATE	1
12	HL413	UPPER SPACER	1
13	HL1614	UPPER SPECER	1
14	HL415	DUMBLE PIN SPRING	1
15	Dia 3.5 x 22	DRIVE PLATE ROLL PIN	1
16	M5 x 15	UPPER SPACER ALLEN SCREW	4
17	CSK M8 x 16	LOWER SPACER CSK SCREW	4
18	CAP M4 x 6	SHROUD PLATE CAP SCREW	2
19	DIN EN 28734 - 8 x 40 - A - St	UPPER SPACER DOWEL PIN	1

OPEN TOLERANCE LINEAR DIMS.	
> 0.5-6.0	+/- 0.1
> 6.0-30	+/- 0.2
> 30-120	+/- 0.3
> 120-315	+/- 0.5
> 315-1000	+/- 0.8
> 1000-2000	+/- 1.2
> 2000-4000	+/- 2.0
OPEN TOLERANCE ANG. DIMS.	
L > 0.0-10	+/- 1°
L > 10-50	+/- 30'
L > 50-120	+/- 20'
L > 120	+/- 10'

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B O I L T O N T R U S T EQUIPMENTS PVT. LTD

MATERIAL - N/A	WEIGHT (gm) - N/A	DRG.	APK	DATE	03-03-2018
		CHK.	APK	DATE	03-03-2018
		APP.	MSP	DATE	03-03-2018
DESCRIPTION - <b>THL-04-LINK70-0A</b>		HARDNESS:- N/A	PROJECTION -		
DWG. NO. - <b>HEX LINK ASSEMBLY</b>		SCALE - 1:5	REV. NO. - R0		

Item	Name	TS-07 Quantity	TS-1 Quantity	TS-3 Quantity	TS-5 Quantity	TS-8 Quantity	TS-10 Quantity	TS-20 Quantity	TS-25 Quantity	TS-35 Quantity	TS-50 Quantity
1	Body	1	1	1	1	1	1	1	1	1	1
2	Steel Ball						1	1	1	1	
3	Casing Cap		1	1	1	1	1	1	1	1	1
4	Copper Sleeve for Body										1
5	Retaining Ring of Body		1								
6	O-Ring U-Ring for Body	1	1	1	1	1	1	1	1	1	1
7.1	Piston Rod Assembly	1									
7.2								1	1	1	1
7.3			1	1	1	1	1				
8	Wearable Ring for Piston Rod		1	1	1	1	1	2	2	2	2
9	Retaining Ring	1	1	1	1	2	2				
10	O-Ring for Piston Rod	1	1	1	1	1	1	1	1	1	1
11	O-Ring for Piston Housing	1									
12	O-Ring for End Cap	1	1	1	1	1	1	1	1	1	1
13	Retaining Ring for End Cap		1	1	1	1	1	1	1	1	1
14.1	End Cap		1	1	1	1	1	1	1	1	1
14.2	Piston Housing	1									
15	Screw	1	1	1	1	1	1	1	1	1	1
16	Reaction Am Fixer	1	1	1	1	1	1	1	1	1	1
17	Compressed Spring for Reaction Am	1	1	1	1	1	1	1	1	1	1
18	Reaction Am	1	1	1	1	1	1	1	1	1	1
19	Reaction Am Cover	1	1	1	1	1	1	1	1	1	1
20	Pin for Reaction Am Cover	1	1	1	2	2	2	2	2	2	2
21	Screw	2	2	2	2	2	2	2	2	2	2
22	Pin for Body	1	1	1	1	1	1	1	1	1	1
23	Tension Spring for Reaction Pawl	1	1	1	1	1	1	1	1	1	1
24	Reaction Pawl IP in	1	1	1	1	1	1	1	1	1	1
25	Reaction Pawl	1	1	1	1	1	1	1	1	1	1
26	Button Lever Left	1	1	1	1	1	1	1	1	1	1
27	Screw for Button Lever	2	2	2	2	2	2	2	2	2	2
28	Reaction Pawl (Right)	1	1	1	1	1	1	1	1	1	1
29	Drive Bushing	2	2	2	2	2	2	2	2	2	2
30	Drive Sleeve Spline	2	2	2	2	2	2	2	2	2	2
31	Cir clip	2	2	2	2	2	2	2	2	2	2
32	Square Drive	1	1	1	1	1	1	1	1	1	1
33	Drive Retainer	1	1	1	1	1	1	1	1	1	1
34	Drive Pin	1	1	1	1	1	1	1	1	1	1
35	Roll Pin for Drive Pawl Primary	1	1	1	1	1	1	1	1	1	1
36	Tension Spacing	2	2	2	2	2	2	2	2	2	2
37	Drive Plate Pin	1	1	1	1	1	1	1	1	1	1
38	Drive Pawl I Primary	1	1	1	1	1	1	1	1	1	1
39	Drive Pawl I Secondary	1	1	1	1	1	1	1	1	1	1
40	Compressed Spring for Drive Pawl I Secondary	1	2	1	2	2	1	1	1	1	1
41	Pin	1					1	1	1	1	1
42	Ratchet Spline	1	1	1	1	1	1	1	1	1	1
43	Drive Plate	2	2	2	2	2	2	2	2	2	2
44	Shroud	1	1	1	1	1	1	1	1	1	1
45	Screw for Cover Plate	4	4	4	4	4	4	4	4	4	4
46a	Swivel Assembly	1	1	1	1	1	1	1	1	1	1
46b				1	1	1	1	1	1	1	1
47	Male Coupler	1	1	1	1	1	1	1	1	1	1
48	Female Coupler	1	1	1	1	1	1	1	1	1	

Item	Name	TH-2 Quantity	TH-4 Quantity	TH-8 Quantity	TH-14 Quantity	TH-32 Quantity
1.1	Side Plate Left		1	1	1	1
1.2						
2	Copper Belt				2	2
3	Drive Plate (Right)	1	1	1	1	1
4	Reaction Block	1	1	1	1	1
			1	1	1	1
			1			1
						1
5	Ratchet Spline	1	1	1	1	1
6	Drive Plate (Left)	1	1	1	1	1
7.1	Side Plate (Right)		1	1	1	1
7.2		1				
8	Reaction Block Screw	4	4	4	4	4
9	Screw (Reaction Pawl Bushing)		2	2		
	Top Spacer Screw	4	2	2	2	2
10.1	Top Spacer		1	1	1	1
10.2		1				
11	Roll Pin for Top Spacer		1	1	1	1
12	Drive Pin	1	1	1	1	1
13	Roll Pin for Drive Plate	2	2	2	2	2
14	Drive Pin Spring	1	1	1	1	1
15	Drive Pawl	1	1	1	1	1
			1			
			1			
16	Spring Seat	1				
17	Compressed Spring	1	1	1	1	1
18	Drive Pawl Primary	1	1	1	1	1
			1			
			1			
19	Pin for Side Plate	1	1	1	1	1
				1		
				1		
20	Compressed Spring for Reaction Pawl	1	1	1	1	1
21.1	Shaft of Rotation	1			1	1
21.2			1	1		
22	Reaction Pawl Bushing	1	2	2	1	1
23.1	Reaction Pawl		1	1	1	1
23.2		1				
24	Shroud	1	1	1	1	1

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 B O L T O N T R U S T  
**HYDRAULIC TORQUE WRENCHES GENERAL TROUBLESHOOTING**

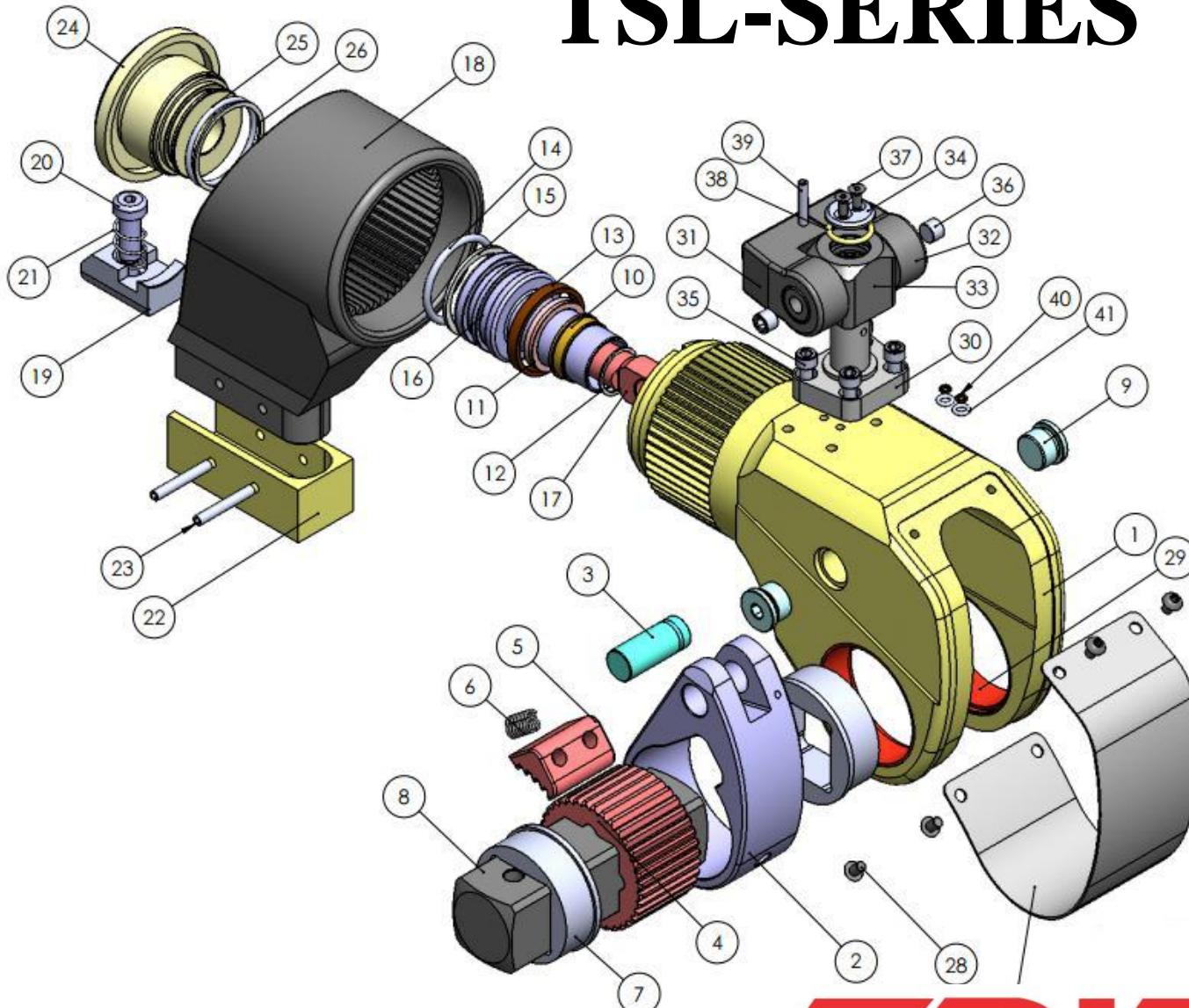
NO	SYMPTOM	PROBABLE CAUSE	REQUIRED ACTION
1	No movement in square drive	Worn or broken teeth on ratchet or pawl	Replace the damaged parts
		Drive pin breakage	Replace the drive pin
		Grease or dirt is present in the ratchet and pawl	Disassemble the ratchet and clean the ratchet and pawl
		Cylinder will not build up pressure	Refer point 6, for troubleshooting cylinder pressure issue
2	Pump will not build up pressure	Low oil level	Check and fill the pump reservoir
		Electric power source Voltage is Low.	Check the power requirement i.e. 240V single phase
		defective relief valve	Inspect, adjust or replace the valve
		Clogged filter for air pump	Inspect, clean or replace the pump filter
		Defective gauge	Replace the gauge
3	Tool tightens immediately when turned ON	Hose connections are reversed	Swap the hose connections properly and tighten couplers securely
4	Piston will not retract to original position	Dirt accumulated in the female swivel/coupler	Clean the female swivel/coupler
		Retract hose not connected	Connect the retract hose properly
		Backward pressure not developed	Repair the pump
		Pin Broken	Replace the roll pin
5	THL-Series (No movement in piston)	Air trapped inside coupler	Press the ball in the coupler with blunt Object to allow oil dripping for few drop to remove trapped air
		Piston seal damage	Replace the piston seal
		Couplers are not securely attached to the pump/tool	Check the coupler connections and ensure they are connected properly
		Dirt in the solenoid valve and manifold unit of the pump unit	Disassemble the pump, and clean the solenoid valve and the manifold unit
		Coupler is defective	Replace the defective coupler
		Defective remote switch	Replace the defective control switch

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		Dirt accumulated in the swivel	Clean the swivel
6	Pressure not building up in the tool cylinder	Coupler is not attached securely	Check the coupler connections
		Electric power source Voltage is Low.	Check the power requirement i.e. 240V single phase
		Piston seal/end cap seal damage	Replace the piston seal/end cap seal
		coupler is defective	Replace the coupler
		Twin hose blocked	Make sure that torquing hose is used/Couplers connected securely/Replace the twin hose
7	Erratic Pressure reading	Check gauge calibration date	Calibrate, if required
		defective gauge	replace the gauge

# TSL-SERIES



Sr.No.	DESCRIPTION	MATERIAL	QTY.
1	HOUSING	AI-7075	01
2	DRIVE PLATE	Vaxamax-300	01
3	DRIVE PIN	EN-24	01
4	RATCHET	Vaxamax-300	01
5	PAWL	Vaxamax-300	01
6	SPRING FOR PAWL	SPR STEEL-A	02
7	DRIVE BUSH	EN-24	02
8	SQUARE DRIVE	Vaxamax-300	01
9	SCREW FOR HOUSING	ALUMINIUM	02
10	BUSH FOR HOUSING	PB	01
11	'U' CUP SEAL	PU	01
12	SNAP RING		01
13	SUPPORTING SEAL FOR PISTON		01
14	'O' RING FOR PISTON	NBR	01
15	BACKUP SEAL FOR PISTON		01
16	PISTON	EN-24	01
17	PISTON ROD	EN-24	01
18	REACTION ARM	AI-7075	01
19	REACTION ARM FIXER	ALUMINUM	01
20	SCREW FOR REACTION ARM	SPR STEEL-A	01
21	SPRING FOR REACTION ARM		01
22	REACTION ARM BOOT	EN-24	01
23	ROLL PIN FOR BOOT ( $\varnothing 5 \times 30L$ )		01
24	END CAP	EN-24	01
25	'O' RING FOR END CAP	NBR	01
26	BACKUP SEAL FOR END CAP		01
27	SAFETY SHROUD	STEEL	01
28	CAP SC FOR SHROUD (M5x8L)		04
29	PB BUSH FOR HOUSING	PB	01
30	SWIVEL	ALUMINIUM	01
31	SWIVEL 01	ALUMINIUM	01
32	SWIVEL 02	ALUMINIUM	01
33	SWIVEL 03	ALUMINIUM	01
34	WASHER	ALUMINIUM	01
35	ALLEN SC FOR SWIVEL (M6x16L)		04
36	SCREW FOR SWIVEL		02
37	CSK SC FOR WASHER (M4x10L)		02
38	'O' RING FOR SWIVEL		07
39	ROLL PIN FOR SWIVEL ( $\varnothing 4.5 \times 25L$ )	SPR STEEL-A	01
40	SPACER	PB	02
41	'O' RING FOR SPACER		02

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