

OPERATION & MAINTENANCE MANUAL FOR TSL & 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.

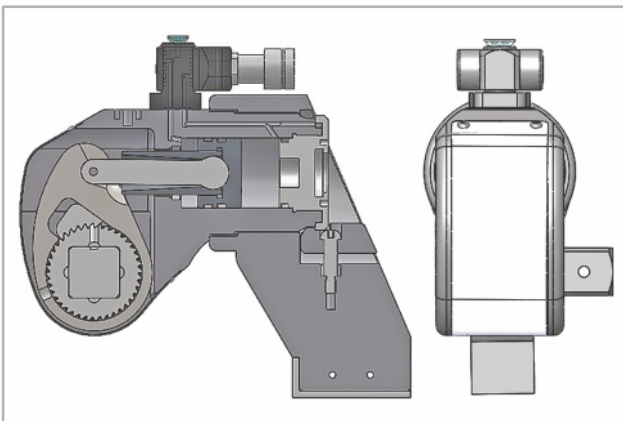
SAFETY FIRST:

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

DESCRIPTION:

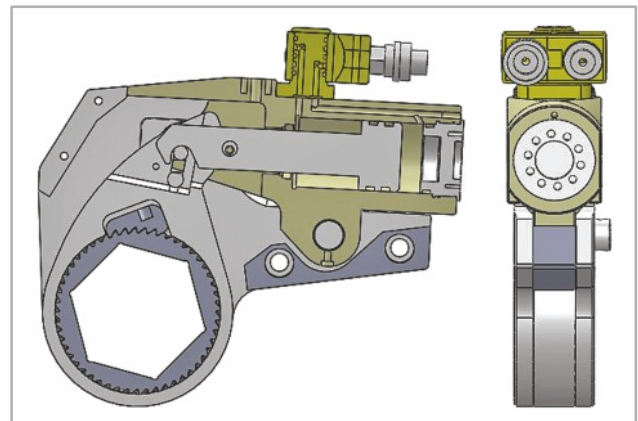
The material of TSL Series and THL Series Hydraulic Torque Wrenches are Aluminium-Titanium Alloy and superhigh strength alloy steel for increased strength, intensity and durability of the tool. High repeatability, a precise design is with accuracy $\pm 3\%$.

TSL SERIES SQUARE DRIVE TORQUE WRENCH



ITEM	NAME
1	Body
2	360° x 180° Swivel Joint
3	Quick Coupling
4	End Cap
5	360° Reaction Arm
6	Square Drive
7	Safety Shroud Plate

THL SERIES DIRECT HEX TYPE TORQUE WRENCH



ITEM	NAME
1	Direct Hex Cassate Type
2	Power Head
3	Quick Coupling
4	360° x 180° Swivel Joint
5	Link Pin
6	Ratchet
7	Safety Shroud Plate

IMPERIAL TO METRIC MEASUREMENT CONVERSION CHART

Imperial	mm	Imperial	mm	Imperial	mm
1/16	1.6	2 3/4	69.9	5 7/16	138.1
1/8	3.2	2 13/16	71.4	5 1/2	139.7
3/16	4.8	2 7/8	73.0	5 9/16	141.3
1/4	6.4	2 15/16	74.6	5 5/8	142.9
5/16	7.9	3	76.2	5 11/16	144.5
3/8	9.5	3 1/16	77.8	5 3/4	146.1
7/16	11.1	3 1/8	79.4	5 13/16	147.6
1/2	12.7	3 3/16	81.0	5 7/8	149.2
9/16	14.3	3 1/4	82.6	5 15/16	150.8
5/8	15.9	3 5/16	84.1	6	152.4
11/16	17.5	3 3/8	85.7	6 1/16	154.0
3/4	19.1	3 7/16	87.3	6 1/8	155.6
13/16	20.6	3 1/2	88.9	6 3/16	157.2
7/8	22.2	3 9/16	90.5	6 1/4	158.8
15/16	23.8	3 5/8	92.1	6 5/16	160.3
1	25.4	3 11/16	93.7	6 3/8	161.9
1 1/16	27.0	3 3/4	95.3	6 7/16	163.5
1 1/8	28.6	3 13/16	96.8	6 1/2	165.1
1 3/16	30.2	3 7/8	98.4	6 9/16	166.7
1 1/4	31.8	3 15/16	100.0	6 5/8	168.3
1 5/16	33.3	4	101.6	6 11/16	169.9
1 3/8	34.9	4 1/16	103.2	6 3/4	171.5
1 7/16	36.5	4 1/8	104.8	6 13/16	173.0
1 1/2	38.1	4 3/16	106.4	6 7/8	174.6
1 9/16	39.7	4 1/4	108.0	6 15/16	176.2
1 5/8	41.3	4 5/16	109.5	7	177.8
1 11/16	42.9	4 3/8	111.1	7 1/16	179.4
1 3/4	44.5	4 7/16	112.7	7 1/8	181.0
1 13/16	46.0	4 1/2	114.3	7 3/16	182.6
1 7/8	47.6	4 9/16	115.9	7 1/4	184.2
1 15/16	49.2	4 5/8	117.5	7 5/16	185.7
2	50.8	4 11/16	119.1	7 3/8	187.3
2 1/16	52.4	4 3/4	120.7	7 7/16	188.9
2 1/8	54.0	4 13/16	122.2	7 1/2	190.5
2 3/16	55.6	4 7/8	123.8	7 9/16	192.1
2 1/4	57.2	4 15/16	125.4	7 5/8	193.7
2 5/16	58.7	5	127.0	7 11/16	195.3
2 3/8	60.3	5 1/16	128.6	7 3/4	196.9
2 7/16	61.9	5 1/8	130.2	7 13/16	198.4
2 1/2	63.5	5 3/16	131.8	7 7/8	200.0
2 9/16	65.1	5 1/4	133.4	7 15/16	201.6
2 5/8	66.7	5 5/16	134.9	8	203.2
2 11/16	68.3	5 3/8	136.5		

For Example: 1 inch = 25.4 mm

2.3/8" = ? mm

$$= \frac{8 \times 2 + 3}{8}$$

$$= \frac{19}{8}$$

$$= 2.375 \times 25.4$$

$$= 60.325$$

Means 2.3/8" (60 mm)

TECHNICAL INFORMATION

PRESSURE AND STRESS

Multiply	By	To Obtain
Atmosphere (14.6959 lb/inch ²)	101,325.	pascal (Pa)
bar	100,000.*	pascal (Pa)
bar	14.50377	pound/inch ²
bar	100,000.*	newton/metre ² (N/m ²)
Kilogram/centimetre ²	14.22334	pound/inch ²
Kilogram/metre ²	9.806650*	newton/metre ² (N/m ²)
Kilogram/metre ²	9.806650*	pascal (Pa)
Kilonewton/metre ²	0.1450377	pound/inch ²
newton/centimetre ²	1.450377	pound/inch ²
newton/metre ²	0.00001*	bar
newton/metre ²	1.0*	pascal (Pa)
newton/metre ²	0.0001450377	pound/inch ²
newton/metre ²	0.1019716	Kilogram/metre ²
newton/millimetre ²	145.0377	pound/inch ²
newton/millimetre ²	0.064749	tons/inch ²
pascal	0.00001*	bar
pascal	0.1019716	Kilogram/metre ²
pascal	1.0*	newton/metre ² (N/m ²)
pascal	0.0001450377	pound/inch ²
pound/inch ²	0.06894757	bar
pound/inch ²	0.07030697	Kilogram/centimetre ²
pound/inch ²	0.6894757	newton/centimetre ²
pound/inch ²	6.894757	Kilonewton/metre ² (N/m ²)
pound/inch ²	6895.757	newton/metre ² (N/m ²)
pound/inch ²	0.006894757	newton/millimetre ² (N/mm ²)
pound/inch ²	6894.757	pascal (Pa)

*EXACT FIGURE

FORCE

Multiply	By	To Obtain
Kilogram-force	0.0009842	tons
Kilogram-force	9.806650*	newton (N)
Kilogram-force	2.2046	pound-force
Kilopond	9.806650	newton (N)
newton	0.1019716	Kilogram-force
newton	0.1019716	Kilopond
newton	0.2248089	pound-force
newton	0.0001004	tons
pound-force	0.0004464	tons
pound-force	0.453597	Kilogram-force
tons	9964	newton (N)
tons	1016	Kilogram-force

*EXACT FIGURE

BENDING MOMENT TORQUE

Multiply	By	To Obtain
Kilogram-metre	9.806650*	Newton-metre (N.m)
newton-metre	0.7375621	pound-foot
newton-metre	0.1019716	Kilogram-metre
pound-foot	1.355818	newton-metre (N.m)

*EXACT FIGURE

TRITORC

WARNING AND CAUTIONS

WARNING

- To avoid personal injury and equipment damage, be sure that every Hydraulic Component can rate for 10,000 PSI (700kg/cm²) Operating Pressure.
- 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.
- To replace the worn components with the TRITORC new components as soon as possible.
- 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

- Do not subject the components so potential hazard such as fire, sharp surfaces, extreme heat or cold, or heavy impact.
- 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.
- 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.
- Do not use worn socket and square drive.
- Please use the socket of good performance. The quality should be according with the Standard of ISO-2775 or ISO-1174 or DIN3129 or DIN3121 or ASME-B107.2/1995.
- It is recommended to use TRITORC Impact Sockets, HEX Reducers, Insert etc. with TRITORC Hydraulic Torque Wrench.

INSTRUCTIONS

CHECKLIST - BOLTING

- ♦ WORK PERMIT STATUS
- ♦ THE FLANGE SIZE AND RATING
- ♦ THE GASKET USED
- ♦ THE BOLT MATERIAL
- ♦ CONDITION OF BOLTS & NUTS
- ♦ ENSURE ALL THE NUTS & BOLTS ARE PROPERLY INSTALLED
- ♦ ENSURE SUFFICIENT THREAD PROTRUSION ON ALL BOLTS TO BE TENSIONED
- ♦ ENSURE THE LUBRICATION IS DONE ON BOLTS & SEATING FACE OF NUTS
- ♦ THE COEFFICIENT OF FRICTION OF THE LUBRICANT USED
- ♦ THE HISTORY OF THE JOINT
- ♦ ENSURE ONLY RECOMMENDED TOOL PRESSURE IS USED
- ♦ CARRY OUT THE BREAK LOOSE TEST ON TENSIONED BOLTS
- ♦ CONDUCT TAP TEST ON ALL BOLTS
- ♦ RECORD THE CORRECT EQUIPMENT / LINE / FLANGE
- ♦ REF. NUMBER FOR THE REPORTS
- ♦ ATTACH FLANGE TAGS WITH ALL DETAILS
- ♦ COMPLETE REPORT WITH ALL DETAILS
- ♦ TAKE SIGNATURE FROM CUSTOMER ON FTR & TIMESHEET

ACCESSORIES FOR TORQUING ON SITE

- ♦ TORQUE WRENCH PUMP
- ♦ TWIN LINE HOSE
- ♦ TORQUE WRENCH TOOL AS PER REQUIRED TORQUE VALVE
- ♦ SOCKET AS PER NUT SIZE
- ♦ HEX LINK AS PER REQUIRED
- ♦ BACK UP WRENCH AND BRASS HAMMER
- ♦ FLANGE TAG WITH WINDING WIRE
- ♦ CARRY HYDRAULIC OIL
- ♦ FLANGE TIGHTING REPORT
- ♦ CUSTOMER TIME SHEET
- ♦ TOOL KIT & REPAIR KIT
- ♦ ALL OF ABOVE THIS DELIVERY CHALLAN

NOTE:

Person Carry Full Personal Protective Equipments (PPE).

ACCESSORIES FOR TENSIONING ON SITE

- ♦ BOLT TENSIONING PUMP
- ♦ AIR HOSE
- ♦ LINK HOSE
- ♦ IC HOSE (INTERCONNECTING)
- ♦ TENSIONERS (AS REQUIRED SIZES)
- ♦ TOMMY BAR
- ♦ BACK UP WRENCH & BRASS HAMMER
- ♦ OPEN COUPLING
- ♦ FLANGE TAG WITH WINDING WIRE
- ♦ CARRY HYDRAULIC OIL
- ♦ FLANGE TIGHTENING REPORT (FTR)
- ♦ CUSTOMER TIME SHEET
- ♦ TOOL KIT & REPAIR KIT
- ♦ ALL OF ABOVE DELIVERY CHALLAN (DC)

NOTE:

Person Carry Full Personal Protective Equipments (PPE).

BOLTING TIGHTENING FORCE RECOMMENDED CHART

The belows are DIN (For your reference)

Bolt & Nut Size (Inch)		Bolt Grade: B7/B16			Strength Grade		4.8		6.8		8.8		10.9		12.9	
		Torque Values (Nm)			Min. Breaking Strength		392MPa		588MPa		784MPa		941MPa		1176MPa	
Bolt Dia.	A/F	μ= 0.10	μ= 0.15	μ= 0.2	Material		Q235(SS41)		35(S35C)		35CrMo(SCM3)		42CrMo(SCM4)		40GrNiMoA(SNCM)	
					Bolt Dia.	Nut A/F	KGM	Nm	KGM	Nm	KGM	Nm	KGM	Nm	KGM	Nm
1/2	7/8	85	106	127	M	mm										
5/8	1 1/16	126	171	215	14	22	7	69	10	98	14	137	17	165	23	225
3/4	1 1/4	226	306	387	16	24	10	98	14	137	21	206	25	247	36	363
7/8	1 7/16	366	496	627	18	27	14	137	21	206	29	284	35	341	49	480
1	1 5/8	549	745	941	20	30	18	176	28	296	41	402	58	569	69	680
1.1/8	1 13/16	816	1107	1398	22	32	23	225	34	333	55	539	78	765	93	911
1.1/4	2	1157	1570	1983	24	36	32	314	48	470	70	686	100	981	120	1176
1.3/8	2 3/16	1582	2147	2712	27	41	45	441	65	637	105	1029	150	1472	180	1764
1.1/2	2 3/8	2100	2850	3600	30	46	60	588	90	882	125	1225	200	1962	240	2352
1.5/8	2 9/16	2720	3692	4663	33	50	75	735	115	1127	150	1470	210	2060	250	2450
1.3/4	2 3/4	3452	4685	5917	36	55	100	980	150	1470	180	1764	250	2453	300	2940
1.7/8	2 15/16	4304	5841	7378	39	60	120	1176	180	1764	220	2156	300	2943	370	3626
2	3 1/8	5285	7173	9060	42	65	155	1519	240	2352	280	2744	390	3826	470	4606
2.1/4	3 1/2	7674	10414	13155	45	70	180	1764	280	2744	320	3136	450	4415	550	5390
2.1/2	3 7/8	10691	14509	18327	48	75	230	2254	350	3430	400	3920	570	5592	680	6664
2.3/4	4 1/4	13038	17694	22350	52	80	280	2744	420	4116	480	4704	670	6537	850	8330
3	4 5/8	17104	23213	29321	56	85	360	3528	530	5149	610	5978	860	8437	1050	10290
3.1/4	5	21938	29774	37609	60	90	410	4018	610	5978	790	7742	1100	10791	1350	13230
3.1/2	5 3/8	27607	37467	47326	64	95	510	4998	760	7448	900	8820				
3.3/4	5 3/4	34176	46382	58588	68	100	580	5684	870	8526	1100	10780				
4	6 1/8	41712	56610	71507	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						

μ=0.10 : Lubricated Bolts

μ=0.15 : Semi Lubricated Bolts

μ=0.2 : Dry Bolts

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 x 90% = 360kgm.

Newton Meter (Nm) to Foot Pounds (ft.lbs)

1 Nm = 0.738 ft.lbs

Kilogram Force Meter to Newton Meter


1 Kgf = 9.80 Nm

Torque Conversion Process (Force to Pressure)


for Example: Tool TSL-3 and 1160 Nm Force

$$\frac{700 \text{ Bar} \times 1160}{4520} = 179.64 \text{ Bar (Approx. 180 Bar)}$$


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.




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.




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.



Operate at 10,000 psi (700 Bar) maximum pressure.



PLACING THE TOOL IN SERVICE

TORQUING SEQUENCE GUIDE

NO. OF BOLTS	ROTATIONAL ORDER
8	1, 5, 3, 7, 2, 6, 4, 8
12	1, 5, 9, 3, 7, 11, 2, 6, 10, 4, 8, 12
16	1, 9, 5, 13, 3, 11, 7, 15, 2, 10, 6, 14, 4, 12, 8, 16
20	1, 13, 5, 17, 9, 3, 15, 7, 19, 11, 2, 14, 6, 18, 10, 4, 16, 8, 20, 12
24	1, 9, 17, 5, 13, 21, 3, 11, 19, 7, 15, 23, 2, 10, 18, 6, 14, 22, 4, 12, 20, 8, 16, 24
28	1, 13, 21, 5, 17, 9, 25, 3, 15, 23, 7, 19, 11, 27, 2, 14, 22, 6, 18, 10, 26, 4, 16, 24, 8, 20, 12, 28
32	1, 17, 9, 25, 5, 21, 13, 29, 3, 19, 11, 27, 7, 23, 15, 31, 2, 18, 10, 26, 6, 22, 14, 30, 4, 20, 12, 28, 8, 24, 16, 32
36	1, 29, 13, 5, 25, 17, 9, 33, 21, 3, 31, 15, 7, 27, 19, 11, 35, 23, 2, 30, 14, 6, 26, 18, 10, 34, 22, 4, 32, 16, 8, 28, 20, 12, 36, 24
40	1, 17, 33, 9, 25, 5, 21, 13, 37, 29, 3, 19, 35, 11, 27, 7, 23, 15, 39, 31, 2, 18, 34, 10, 26, 6, 22, 14, 38, 30, 4, 20, 36, 12, 28, 8, 24, 16, 40, 32
44	1, 29, 13, 37, 5, 21, 25, 9, 33, 17, 41, 3, 31, 15, 39, 7, 23, 27, 11, 35, 19, 43, 2, 30, 14, 38, 6, 22, 26, 10, 34, 18, 42, 4, 32, 16, 40, 8, 24, 28, 12, 36, 20, 44
52	1, 21, 37, 13, 29, 45, 5, 9, 25, 41, 17, 33, 49, 3, 23, 39, 15, 31, 47, 7, 11, 27, 43, 19, 35, 51, 2, 22, 38, 14, 30, 46, 6, 10, 26, 42, 18, 34, 50, 4, 24, 40, 16, 32, 48, 8, 12, 28, 44, 20, 36, 52
56	1, 37, 17, 49, 9, 25, 33, 5, 41, 21, 53, 13, 29, 45, 3, 39, 19, 51, 11, 27, 35, 7, 43, 23, 55, 15, 31, 47, 2, 38, 18, 50, 10, 26, 34, 6, 42, 22, 54, 14, 30, 46, 4, 40, 20, 52, 12, 28, 36, 8, 44, 24, 56, 16, 32, 48
60	1, 29, 45, 13, 21, 37, 53, 5, 9, 33, 49, 17, 25, 41, 57, 3, 31, 47, 15, 23, 39, 55, 7, 11, 35, 51, 19, 27, 43, 59, 2, 30, 46, 14, 22, 38, 54, 6, 10, 34, 50, 18, 26, 42, 58, 4, 32, 48, 16, 24, 40, 56, 8, 12, 36, 52, 20, 28, 44, 60
64	1, 57, 17, 33, 9, 49, 25, 41, 5, 61, 21, 37, 13, 53, 29, 45, 3, 59, 19, 35, 11, 51, 27, 43, 7, 63, 23, 39, 15, 55, 31, 47, 2, 58, 18, 34, 10, 50, 26, 42, 6, 62, 22, 38, 14, 54, 30, 46, 4, 60, 20, 36, 12, 52, 28, 44, 8, 64, 24, 40, 16, 56, 32, 48
68	1, 53, 21, 37, 13, 61, 29, 45, 5, 9, 57, 25, 41, 17, 65, 33, 49, 3, 55, 23, 39, 15, 63, 31, 47, 7, 11, 59, 27, 43, 19, 67, 35, 51, 2, 54, 22, 38, 14, 62, 30, 46, 6, 10, 58, 26, 42, 18, 66, 34, 50, 4, 56, 24, 40, 16, 64, 32, 48, 8, 12, 60, 28, 44, 20, 68, 36, 52
72	1, 57, 33, 41, 9, 17, 65, 25, 49, 5, 61, 37, 45, 13, 21, 69, 29, 53, 3, 59, 35, 43, 11, 19, 67, 27, 51, 7, 63, 39, 47, 15, 23, 71, 31, 55, 2, 58, 34, 42, 10, 18, 66, 26, 50, 6, 62, 38, 46, 14, 22, 70, 30, 54, 4, 60, 36, 44, 12, 20, 68, 28, 52, 8, 64, 40, 48, 16, 24, 72, 32, 56
76	1, 61, 29, 45, 13, 17, 69, 37, 53, 5, 9, 65, 33, 49, 21, 25, 73, 41, 57, 3, 63, 31, 47, 15, 19, 71, 39, 55, 7, 11, 67, 35, 51, 23, 27, 75, 43, 59, 2, 62, 30, 46, 14, 18, 70, 38, 54, 6, 10, 66, 34, 50, 22, 26, 74, 42, 58, 4, 64, 32, 48, 16, 20, 72, 40, 56, 8, 12, 68, 36, 52, 24, 28, 76, 44, 60
80	1, 65, 17, 33, 49, 9, 73, 25, 41, 57, 5, 69, 21, 37, 53, 13, 77, 29, 45, 61, 3, 67, 19, 35, 51, 11, 75, 27, 43, 59, 7, 71, 23, 39, 55, 15, 79, 31, 47, 63, 2, 66, 18, 34, 50, 10, 74, 26, 42, 58, 6, 70, 22, 38, 54, 14, 78, 30, 46, 62, 4, 68, 20, 36, 52, 12, 76, 28, 44, 60, 8, 72, 24, 40, 56, 16, 80, 32, 48, 64
84	1, 69, 21, 37, 53, 13, 77, 29, 45, 61, 5, 9, 73, 25, 41, 57, 17, 81, 33, 49, 65, 3, 71, 23, 39, 55, 15, 79, 31, 47, 63, 7, 11, 75, 27, 43, 59, 19, 83, 35, 51, 67, 2, 70, 22, 38, 54, 14, 78, 30, 46, 62, 6, 10, 74, 26, 42, 58, 18, 82, 34, 50, 66, 4, 72, 24, 40, 56, 16, 80, 32, 48, 64, 8, 12, 76, 28, 44, 60, 20, 84, 36, 52, 68

Bolt Quantity, Size and Nut A/F on ANSI Weld Neck Flanges (SERIES-A)

Nominal Pipe Size (Inch)	150 lb			300 lb			400 lb			600 lb			900 lb			1500 lb			2500 lb		
	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F
1/2	4	1/2	7/8	4	1/2	7/8	4	1/2	7/8	4	1/2	7/8	4	3/4	1-1/4	4	3/4	1-1/4	4	3/4	1-1/4
3/4	4	1/2	7/8	4	5/8	1-1/16	4	5/8	1-1/16	4	5/8	1-1/16	4	3/4	1-1/4	4	3/4	1-1/4	4	3/4	1-1/4
1	4	1/2	7/8	4	5/8	1-1/16	4	5/8	1-1/16	4	5/8	1-1/16	4	7/8	1-7/16	4	7/8	1-7/16	4	7/8	1-7/16
1 1/4	4	1/2	7/8	4	5/8	1-1/16	4	5/8	1-1/16	4	5/8	1-1/16	4	7/8	1-7/16	4	7/8	1-7/16	4	1	1-5/8
1 1/2	4	1/2	7/8	4	3/4	1-1/4	4	3/4	1-1/4	4	3/4	1-1/4	4	1	1-5/8	4	1	1-5/8	4	1-1/8	1-13/16
2	4	5/8	1-1/16	8	5/8	1-1/16	8	5/8	1-1/16	8	5/8	1-1/16	8	7/8	1-7/16	8	7/8	1-7/16	8	1	1-5/8
2 1/2	4	5/8	1-1/16	8	3/4	1-1/4	8	3/4	1-1/4	8	1/4	1-1/4	8	1	1-5/8	8	1	1-5/8	8	1-1/8	1-13-16
3	4	5/8	1-1/16	8	3/4	1-1/4	8	3/4	1-1/4	8	1/4	1-1/4	8	7/8	1-7/16	8	1-1/8	1-13/16	8	1-1/4	2
3 1/2	8	5/8	1-1/16	8	3/4	1-1/4	8	7/8	1-7/16	8	7/8	1-7/16									
4	8	5/8	1-1/16	8	3/4	1-1/4	8	7/8	1-7/16	8	7/8	1-7/16	8	1-1/8	1-13/16	8	1-1/4	2	8	1-1/2	2-3/8
5	8	3/4	1-1/4	8	3/4	1-1/4	8	7/8	1-7/16	8	1	1-5/8	8	1-1/4	2	8	1-1/2	2-3/8	8	1-3/4	2-3/4
6	8	3/4	1-1/4	12	3/4	1-1/4	12	7/8	1-7/16	12	1	1-5/8	12	1-1/8	1-13/16	12	1-3/8	2-3/16	8	2	3-1/8
8	8	3/4	1-1/4	12	7/8	1-7/16	12	1	1-5/8	12	1-1/8	1-13/16	12	1-3/8	2-3/16	12	1-5/8	2-9/16	12	2	3-1/8
10	12	7/8	1-7/16	16	1	1-5/8	16	1-1/8	1-13/16	16	1-1/4	2	16	1-1/8	2-3/16	12	1-7/8	2-15/16	12	2-1/2	3-7/8
12	12	7/8	1-7/16	16	1-1/8	1-13/16	16	1-1/4	2	20	1-1/4	2	20	1-1/8	2-3/16	16	2	3-1/8	12	2-3/4	4-1/4
14	12	1	1-5/8	20	1-1/8	1-13/16	20	1-1/4	2	20	1-3/8	2-3/16	20	1-1/2	2-3/8	16	2-1/4	3-1/2			
16	16	1	1-5/8	20	1-1/4	2	20	1-3/8	2-3/16	20	1-1/2	2-3/8	20	1-5/8	2-9/16	16	2-1/2	2-7/8			
18	16	1-1/8	1-13/16	24	1-1/4	2	24	1-3/8	2-3/16	24	1-5/8	2-9/16	20	1-7/8	2-15/16	16	2-3/4	4-1/4			
20	20	1-1/8	1-13/16	24	1-1/4	2	24	1-1/2	2-3/8	24	1-5/8	2-9/16	20	2	3-1/8	16	3	4-5/8			
22	20	1-1/4	2	24	1-1/2	2-3/8	24	1-3/4	2-3/4	24	1-7/8	2-15/16	20	2-1/2	3-7/8	16	3-1/2	5-3/8			

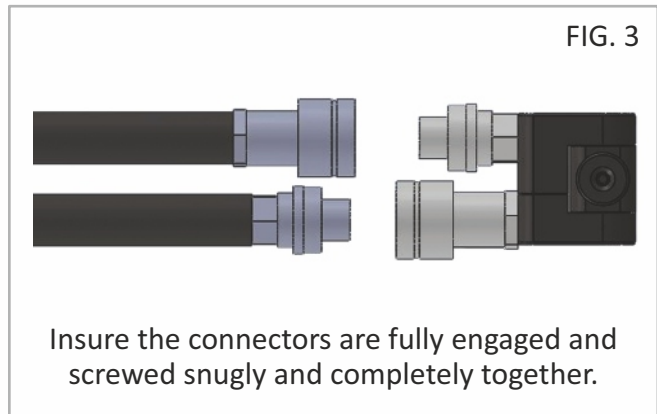
Bolt Quantity, Size and Nut A/F on M.S.S. Sp44 Weld Neck Flanges

Nominal Pipe Size (Inch)	150 lb			300 lb			400 lb			600 lb			900 lb		
	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F	Qty.	Dia.	A/F
24	20	1-1/4	2	24	1-1/2	2-3/8	24	1-5/8	2-9/16	24	1-7/8	2-15/16	20	2-1/2	3-7/8
26	24	1-1/4	2	28	1-5/8	2-9/16	28	1-3/4	2-3/4	28	1-7/8	2-15/16	20	2-3/4	4-1/4
28	28	1-1/4	2	28	1-5/8	2-9/16	28	1-7/8	2-15/16	28	2	3-1/8	20	3	4-5/8
30	28	1-1/4	2	28	1-3/4	2-3/4	28	2	3-1/8	28	2	3-1/8	20	3	4-5/8
32	28	1-1/2	2-3/8	28	1-7/8	2-15/16	28	2	3-1/8	28	2-1/4	3-1/2	20	3-1/4	5
34	32	1-1/2	2-3/8	28	1-7/8	2-15/16	28	2	3-1/8	28	2-1/4	3-1/2	20	3-1/2	5-3/8
36	32	1-1/2	2-3/8	32	2	3-1/8	32	2	3-1/8	28	2-1/2	3-7/8	20	3-1/2	5-3/8
38	32	1-1/2	2-3/8	32	1-1/2	2-3/8	32	1-3/4	2-3/4	28	2-1/4	3-1/2	20	3-1/2	5-3/8
40	36	1-1/2	2-3/8	32	1-5/8	2-9-16	32	1-7/8	2-15/16	32	2-1/4	3-1/2	24	3-1/2	5-3/8
42	36	1-1/2	2-3/8	32	1-5/8	2-9-16	32	1-7/8	2-15/16	28	2-1/2	3-7/8	24	3-1/2	5-3/8
44	40	1-1/2	2-3/8	32	1-3/4	2-3/4	32	2	3-1/8	32	2-1/2	3-7/8	24	3-3/4	5-3/4
46	40	1-1/2	2-3/8	28	1-7/8	2-15/16	36	2	3-1/8	32	2-1/2	3-7/8	24	4	6-1/8
48	44	1-1/2	2-3/8	32	1-7/8	2-15/16	28	2-1/4	3-1/2	32	2-3/4	4-1/4	24	4	6-1/8
50	44	1-3/4	2-3/4	32	2	3-1/8	32	2-1/4	3-1/2	28	3	4-5/8			
52	44	1-3/4	2-3/4	32	2	3-1/8	32	2-1/4	3-1/2	32	3	4-5/8			
54	44	1-3/4	2-3/4	28	2-1/4	3-1/2	28	2-1/2	3-7/8	32	3	4-5/8			
56	48	1-3/4	2-3/4	28	2-1/4	3-1/2	32	2-1/2	3-7/8	32	3-1/4	5			
58	48	1-3/4	2-3/4	32	2-1/4	3-1/2	32	2-1/2	3-7/8	32	3-1/4	5			
60	52	1-3/4	2-3/4	32	2-1/4	3-1/2	32	2-3/4	4-1/4	28	3-1/2	5-3/8			

TSL SERIES

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.



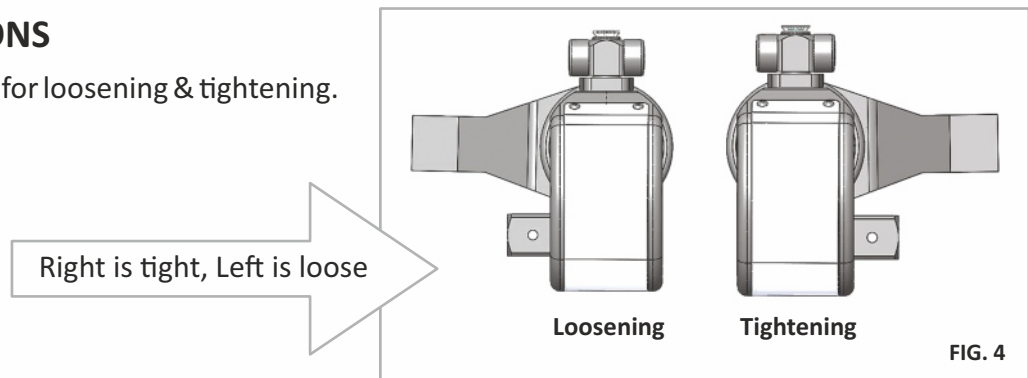
OPERATING THE WRENCH

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.



SETTING THE REACTION ARM

All TRITORC 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 place 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 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.

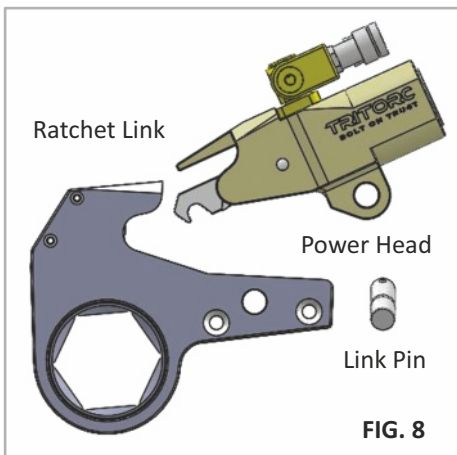


OPERATING THE WRENCH

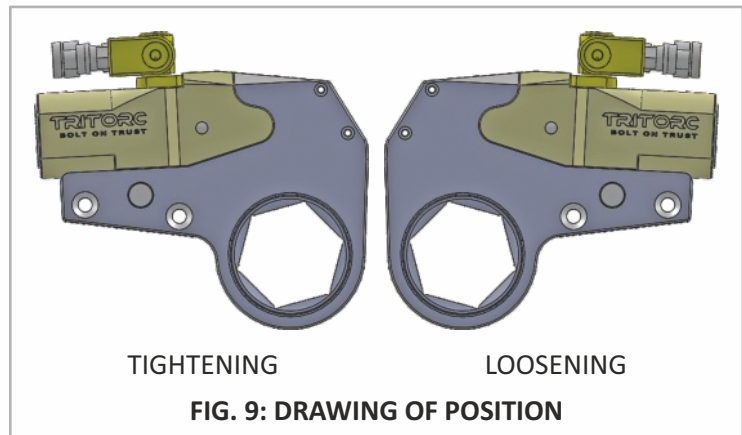
1. Place the Square Drive in the socket, insert the socket retainer ring and pin, and place the socket on the nut. Make certain the Square Drive and socket are the correct size for the nut and that the socket fully engages the nut.
2. Position the reaction arm against an adjacent nut, flange or solid 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.
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.

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.



THL PROFILE WRENCH POSITIONS

The position of the tool relative to the nut determines whether the action will tighten or loose the nut. The power stroke of the piston assembly will always turn the ratchet hex toward the shroud.

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 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 too confirm that the desired pressure setting has been obtained.

OPERATING THE WRENCH

1. Place the ratchet hex 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 pressure/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.	TSL-07	TSL-1	TSL-3	TSL-5	TSL-8	TSL-10	TSL-15	TSL-20	TSL-25	TSL-35	TSL-50
PSI	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs
1000	81	134	328	536	783	1054	1654	1976	2523	3535	5030
1200	97	161	394	643	940	1264	1985	2370	3028	4242	6036
1400	114	188	459	751	1096	1475	2317	2766	3532	4949	7042
1600	130	215	525	858	1253	1686	2647	3161	4037	5656	8048
1800	146	242	590	965	1409	1897	2979	3557	4541	6363	9054
2000	162	268	656	1072	1566	2108	3309	3951	5046	7070	10060
2200	179	295	721	1179	1723	2319	3641	4346	5550	7777	11066
2400	195	322	787	1287	1879	2529	3971	4742	6055	8485	12072
2600	211	349	852	1394	2036	2741	4303	5137	6559	9192	13078
2800	228	376	918	1501	2193	2951	4633	5532	7064	9899	14084
3000	244	403	984	1608	2349	3161	4963	5927	7568	10606	15090
3200	260	430	1049	1715	2506	3373	5295	6322	8073	11313	16096
3400	276	457	1115	1823	2662	3583	5625	6718	8577	12020	17102
3600	293	483	1180	1930	2819	3794	5957	7112	9082	12727	18108
3800	309	510	1246	2038	2976	4005	6287	7508	9586	13434	19114
4000	325	537	1311	2144	3132	4216	6619	7903	10091	14141	20120
4200	341	564	1377	2251	3289	4426	6950	8298	10595	14848	21126
4400	358	591	1443	2359	3446	4637	7280	8693	11100	15555	22132
4600	374	618	1508	2466	3602	4848	7612	9088	11604	16262	23138
4800	390	645	1574	2574	3759	5059	7942	9484	12109	16970	24144
5000	407	672	1639	2680	3915	5270	8274	9879	12613	17677	25150
5200	423	698	1705	2787	4072	5480	8604	10273	13118	18384	26156
5400	439	725	1770	2895	4229	5692	8936	10669	13622	19091	27162
5600	455	752	1836	3002	4385	5902	9266	11064	14127	19798	28168
5800	472	779	1901	3110	4542	6113	9598	11460	14631	20505	29174
6000	488	806	1967	3217	4699	6324	9928	11854	15136	21212	30180
6200	504	833	2033	3323	4855	6534	10258	12249	15641	21919	31186
6400	521	860	2098	3431	5012	6745	10590	12645	16145	22626	32192
6600	537	887	2164	3538	5168	6956	10921	13040	16650	23333	33198
6800	553	914	2229	3646	5325	7167	11252	13435	17154	24040	34204
7000	569	940	2295	3753	5482	7377	11583	13830	17659	24747	35210
7200	586	967	2360	3859	5638	7589	11914	14225	18163	25454	36216
7400	602	994	2426	3967	5795	7799	12245	14621	18668	26162	37222
7600	618	1021	2491	4074	5951	8010	12576	15015	19172	26869	38228
7800	635	1048	2557	4182	6108	8221	12907	15411	19677	27576	39234
8000	651	1075	2623	4289	6265	8431	13237	15806	20181	28283	40240
8200	667	1102	2688	4396	6421	8643	13569	16201	20686	28990	41246
8400	683	1129	2754	4503	6578	8853	13899	16596	21190	29697	42252
8600	700	1155	2819	4610	6735	9064	14231	16991	21695	30404	43258
8800	716	1182	2885	4718	6891	9275	14561	17387	22199	31111	44264
9000	732	1209	2950	4825	7048	9486	14893	17782	22704	31818	45270
9200	748	1236	3016	4932	7204	9696	15223	18176	23208	32525	46276
9400	765	1263	3082	5039	7361	9907	15554	18572	23713	33232	47282
9600	781	1290	3147	5146	7518	10118	15885	18967	24217	33939	48288
9800	797	1317	3213	5254	7674	10328	16216	19363	24722	34647	49294
10000	814	1344	3278	5361	7831	10540	16547	19757	25226	35354	50300

TSL SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

Model No.	TSL-07	TSL-1	TSL-3	TSL-5	TSL-8	TSL-10	TSL-15	TSL-20	TSL-25	TSL-35	TSL-50
Bar	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
70	112	183	450	737	1078	1551	2243	2719	3472	4866	6925
80	128	210	514	843	1232	1773	2564	3108	3968	5561	7914
100	160	263	642	1054	1540	2216	3205	3885	4960	6952	9893
120	192	315	771	1264	1848	2659	3846	4662	5952	8342	11871
140	224	368	900	1475	2156	3104	4487	5439	6945	9733	13849
160	256	420	1028	1686	2464	3547	5128	6216	7937	11123	15828
180	288	473	1157	1897	2772	3990	5769	6993	8929	12514	17806
200	320	525	1286	2107	3080	4434	6411	7770	9921	13904	19784
220	352	579	1414	2318	3388	4877	7052	8548	10913	15295	21764
240	384	631	1543	2529	3696	5320	7693	9325	11905	16685	23742
260	416	684	1672	2741	4004	5764	8334	10101	12898	18076	25720
280	448	736	1800	2951	4312	6207	8975	10878	13890	19466	27699
300	480	789	1929	3162	4620	6650	9616	11656	14882	20856	29677
320	512	841	2058	3373	4928	7094	10258	12433	15874	22247	31655
340	544	894	2185	3584	5236	7537	10899	13210	16866	23637	33634
360	576	947	2314	3794	5544	7980	11540	13987	17858	25028	35613
380	608	1000	2443	4005	5852	8424	12182	14765	18850	26418	37592
400	640	1052	2571	4216	6160	8868	12822	15541	19843	27809	39570
420	672	1105	2700	4426	6468	9311	13463	16318	20835	29199	41548
440	704	1157	3053	4638	6776	9755	14104	17095	21827	30590	43527
460	736	1210	2957	4849	7084	10198	14746	17872	22819	31980	45505
480	768	1262	3086	5060	7392	10641	15387	18650	23811	33371	47483
500	800	1316	3215	5270	7700	11085	16029	19427	24803	34761	49463
520	832	1368	3343	5481	8008	11528	16669	20203	25796	36152	51441
540	864	1421	3472	5692	8316	11971	17310	20980	26788	37542	53419
560	896	1473	3601	5903	8624	12415	17952	21758	27780	38933	55398
580	928	1526	3728	6113	8932	12858	18592	22535	28772	40323	57376
600	960	1578	3857	6324	9240	13301	19234	23312	29764	41714	59354
620	992	1632	3986	6536	9548	13745	19876	24089	30756	43104	61333
640	1024	1684	4114	6747	9856	14188	20516	24866	31749	44495	63312
660	1056	1737	4243	6957	10164	14631	21157	25643	32741	45885	65290
680	1088	1789	4372	7168	10472	15076	21798	26420	33733	47276	67269
700	1120	1837	4500	7379	10780	15519	22301	27197	34725	48666	69247



THL SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

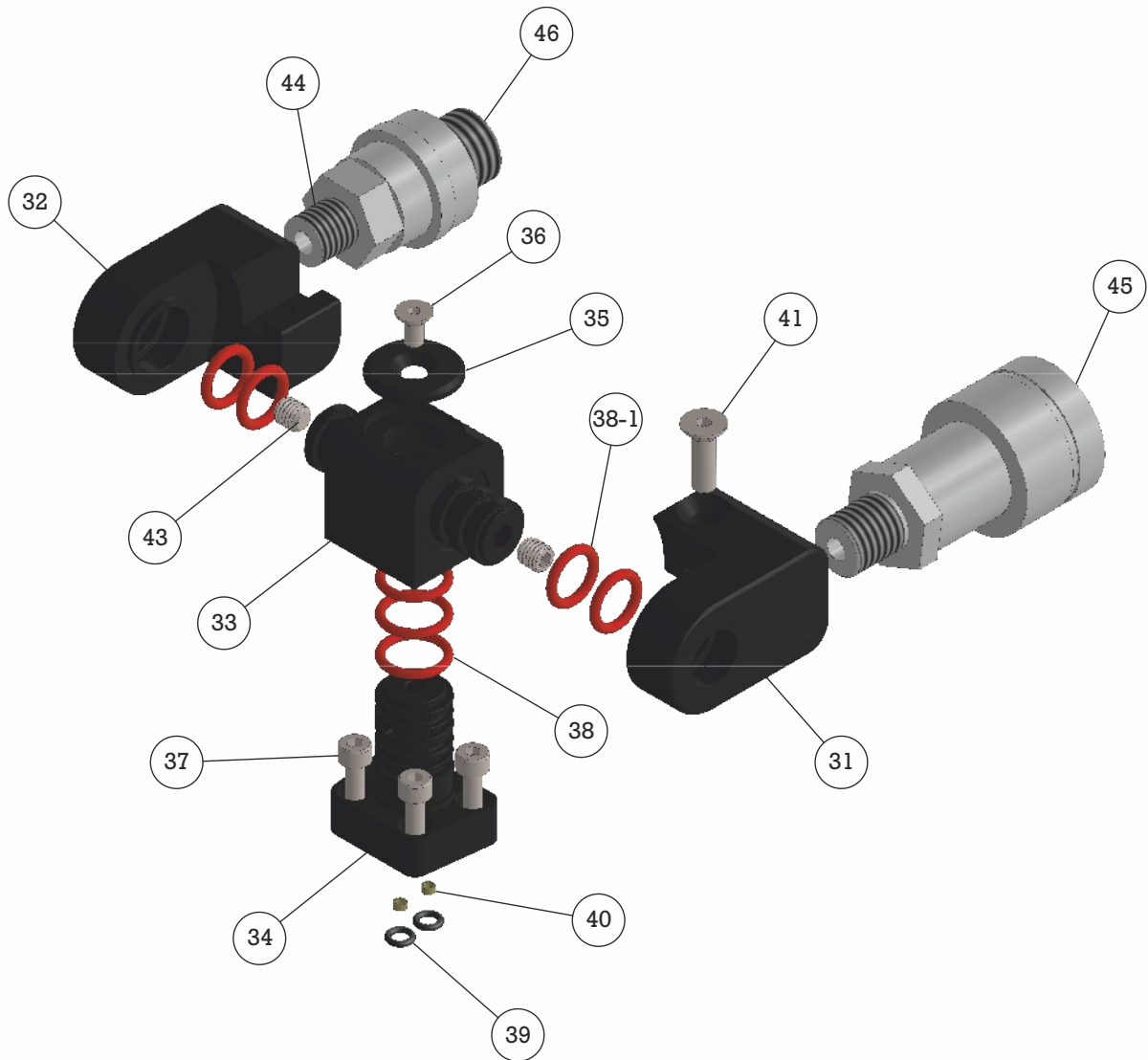
MODEL	THL-2		THL-4		THL-8		THL-16		THL-32	
Nut A/F	3/4"- 1.7/8"	1.15/16"- 2.3/8"	1.5/16"- 2.3/16"	2.1/4"- 3.1/8"	1.5/8"- 3.1/8"	3.3/16"- 4.1/8"	2"- 3.7/8"	3.15/16"- 4.3/4"	3.9/16"- 5.11/16"	5.3/4"- 6.7/8"
PSI	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs
1000	201	232	426	499	906	1112	1599	1772	3628	3829
1200	238	262	504	590	1071	1315	1890	2095	4289	4526
1400	278	306	588	689	1249	1534	2205	2444	5004	5280
1600	317	350	672	787	1428	1753	2520	2793	5718	6035
1800	357	393	756	886	1606	1973	2835	3142	6433	6789
2000	397	437	840	984	1785	2192	3150	3492	7148	7543
2200	436	481	924	1082	1963	2411	3465	3841	7863	8298
2400	476	525	1008	1181	2142	2630	3780	4190	8578	9052
2600	516	568	1092	1279	2320	2849	4095	4539	9292	9806
2800	555	612	1176	1378	2499	3068	4411	4888	10007	10560
3000	595	656	1260	1476	2677	3288	4726	5237	10722	11315
3200	635	699	1344	1574	2856	3507	5041	5587	11437	12069
3400	675	743	1428	1673	3034	3726	5356	5936	12152	12823
3600	714	787	1512	1771	3213	3945	5671	6285	12866	13578
3800	754	831	1596	1870	3391	4164	5986	6634	13581	14332
4000	794	874	1680	1968	3570	4383	6301	6983	14296	15086
4200	833	918	1764	2066	3748	4603	6616	7332	15011	15841
4400	873	962	1848	2165	3926	4822	6931	7682	15725	16595
4600	913	1006	1932	2263	4105	5041	7246	8031	16440	17349
4800	952	1049	2016	2362	4283	5260	7561	8380	17155	18104
5000	992	1093	2100	2460	4462	5479	7876	8729	17870	18858
5200	1032	1137	2184	2558	4640	5698	8191	9078	18585	19612
5400	1071	1180	2268	2657	4819	5918	8506	9427	19299	20367
5600	1111	1224	2352	2755	4997	6137	8821	9777	20014	21121
5800	1151	1268	2436	2854	5176	6356	9136	10126	20729	21875
6000	1190	1312	2520	2952	5354	6575	9451	10475	21444	22630
6200	1230	1355	2604	3050	5533	6794	9766	10824	22159	23384
6400	1270	1399	2688	3149	5711	7014	10081	11173	22873	24138
6600	1309	1443	2772	3247	5890	7233	10396	11522	23588	24893
6800	1349	1486	2856	3346	6068	7452	10711	11872	24303	25647
7000	1389	1530	2940	3444	6247	7671	11026	12221	25018	26401
7200	1428	1574	3024	3542	6425	7890	11341	12570	25733	27155
7400	1468	1618	3108	3641	6604	8109	11656	12919	26447	27910
7600	1508	1661	3192	3739	6782	8329	11971	13268	27162	28664
7800	1547	1705	3276	3838	6961	8548	12286	13617	27877	29418
8000	1587	1749	3360	3936	7139	8767	12602	13967	28592	30173
8200	1627	1792	3444	4034	7318	8986	12917	14316	29307	30927
8400	1666	1836	3528	4133	7496	9205	13232	14665	30021	31681
8600	1706	1880	3612	4231	7675	9424	13547	15014	30736	32436
8800	1746	1924	3696	4330	7853	9644	13862	15363	31451	33190
9000	1786	1967	3780	4428	8031	9863	14177	15712	32166	33944
9200	1825	2011	3864	4526	8210	10082	14492	16062	32881	34699
9400	1865	2055	3948	4625	8388	10301	14807	16411	33595	35453
9600	1905	2098	4032	4723	8567	10520	15122	16760	34310	36207
9800	1944	2142	4116	4822	8745	10739	15437	17109	35025	36962
10000	2012	2219	4264	4966	9058	11121	15987	17718	36282	38286

THL SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

MODEL	THL-2		THL-4		THL-8		THL-16		THL-32	
Nut A/F	19-48mm	49-60mm	33-56mm	57-80mm	41-80mm	81-105mm	50-99mm	100-120mm	90-145mm	146-175mm
BAR	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
70	273	315	578	677	1228	1508	2168	2402	4919	5191
80	312	360	661	774	1404	1723	2477	2745	5622	5932
100	390	465	826	968	1754	2154	3096	3432	7027	7416
120	468	540	991	1161	2105	2585	3716	4118	8433	8899
140	546	630	1156	1355	2456	3016	4335	4804	9838	10382
160	623	720	1321	1548	2807	3446	4954	5491	11244	11865
180	701	810	1487	1742	3158	3877	5574	6177	12649	13348
200	779	880	1652	1935	3509	4308	6193	6863	14055	14831
220	857	968	1817	2129	3860	4739	6812	7550	15460	16314
240	935	1056	1982	2322	4211	5169	7431	8236	16866	17797
260	1013	1144	2147	2516	4562	5600	8051	8922	18271	19281
280	1091	1231	2312	2709	4912	6031	8670	9609	19677	20764
300	1169	1304	2478	2903	5263	6462	9289	10295	21082	22247
320	1247	1391	2643	3096	5614	6893	9909	10981	22488	23730
340	1325	1478	2808	3290	5965	7323	10528	11668	23893	25213
360	1403	1565	2973	3483	6316	7754	11147	12354	25299	26696
380	1481	1652	3138	3677	6667	8185	11766	13040	26704	28179
400	1559	1739	3304	3870	7018	8616	12386	13727	28110	29662
420	1637	1826	3469	4064	7369	9047	13005	14413	29515	31146
440	1715	1913	3634	4257	7720	9477	13624	15099	30921	32629
460	1793	2000	3799	4451	8070	9908	14244	15786	32326	34112
480	1870	2087	3964	4645	8421	10339	14863	16472	33732	35595
500	1948	2149	4129	4838	8772	10770	15482	17158	35137	37078
520	2026	2234	4295	5032	9123	11201	16101	17845	36543	38561
540	2104	2320	4460	5225	9474	11631	16721	18531	37948	40044
560	2182	2406	4625	5419	9825	12062	17340	19217	39354	41527
580	2260	2492	4790	5612	10176	12493	17959	19904	40759	43011
600	2338	2578	4955	5806	10527	12924	18579	20590	42164	44494
620	2416	2664	5121	5999	10878	13355	19198	21276	43570	45977
640	2494	2750	5286	6193	11228	13785	19817	21963	44975	47460
660	2572	2836	5451	6386	11579	14216	20436	22649	46381	48943
680	2650	2922	5616	6580	11930	14647	21056	23335	47786	50426
700	2728	3008	5781	6773	12281	15078	21675	24022	49192	51909



SMALL SWIVEL SET

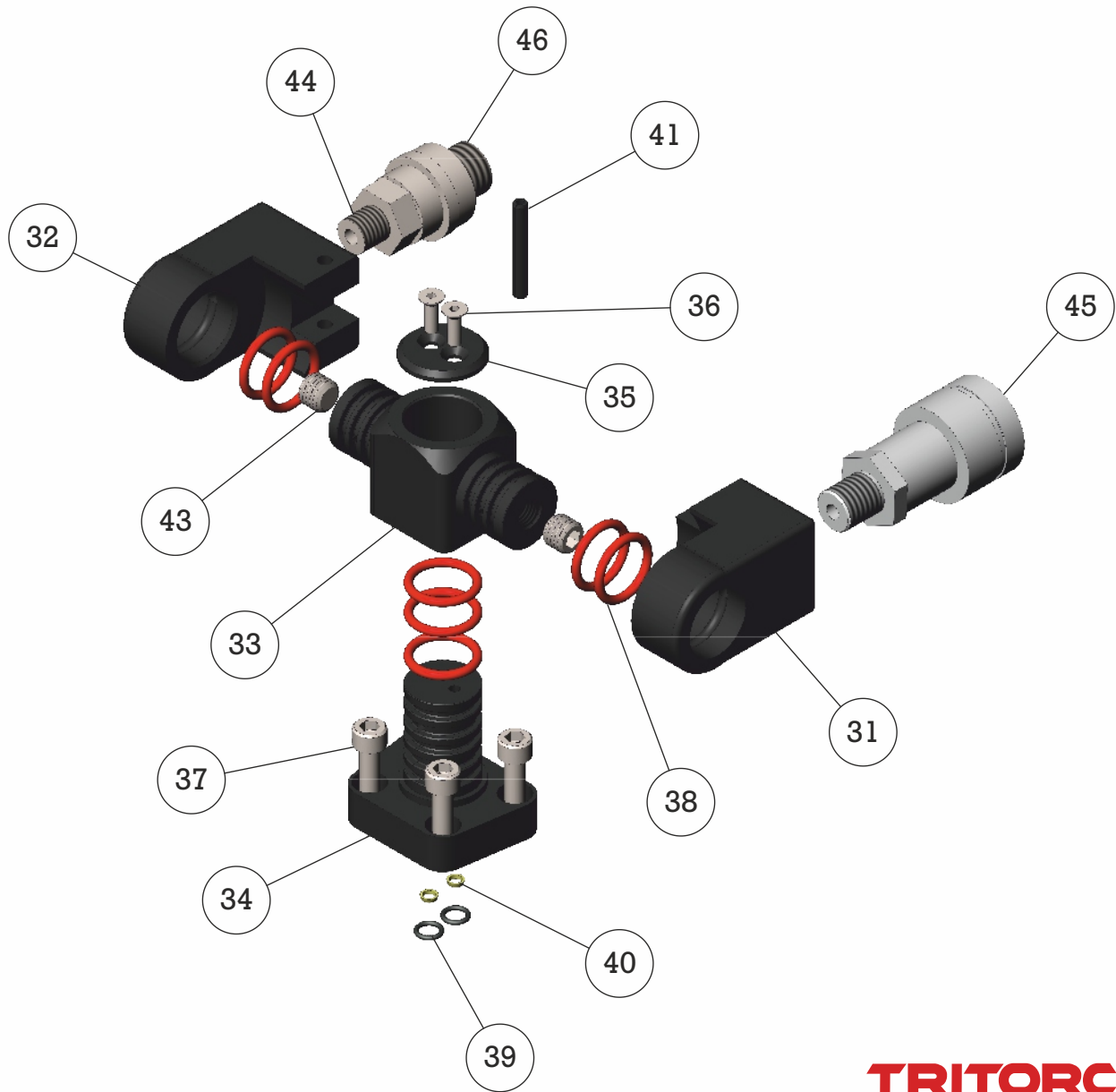


TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.
31	SWL-S-31	SWIVEL RIGHT	1
32	SWL-S-32	SWIVEL LEFT	1
33	SWL-S-33	SWIVEL MIDDLE	1
34	SWL-S-34	SWIVEL NOBE	1
35	SWL-S-35	SWIVEL HEAD CAP	1
36	SWL-S-36	CSK FOR SWIVEL HEAD CAP	1
37	SWL-S-37	ALLEN SCREW FOR SWIVEL	4
38	SWL-S-38	SWIVEL O-RING FOR NOBE	3

Item No.	PART NO.	DESCRIPTION	QTY.
38-1	SWL-S-38-1	SWIVEL O-RING FOR MIDDLE	4
39	SWL-S-39	SWIVEL SPACER SEAL	2
40	SWL-S-40	SWIVEL SPACER BRASS	2
41	SWL-S-41	SWIVEL CONNECTING CSK	1
43	SWL-S-43	SWIVEL NOBE GRUB SCREW	2
44	ADP-N-1/8-M-44	ADAPTOR 1/8" NPT	1
45	CPLR-1/8-F-45	FEMALE COUPLER	1
46	CPLR-1/8-M-46	MALE COUPLER	1

BIG SWIVEL SET

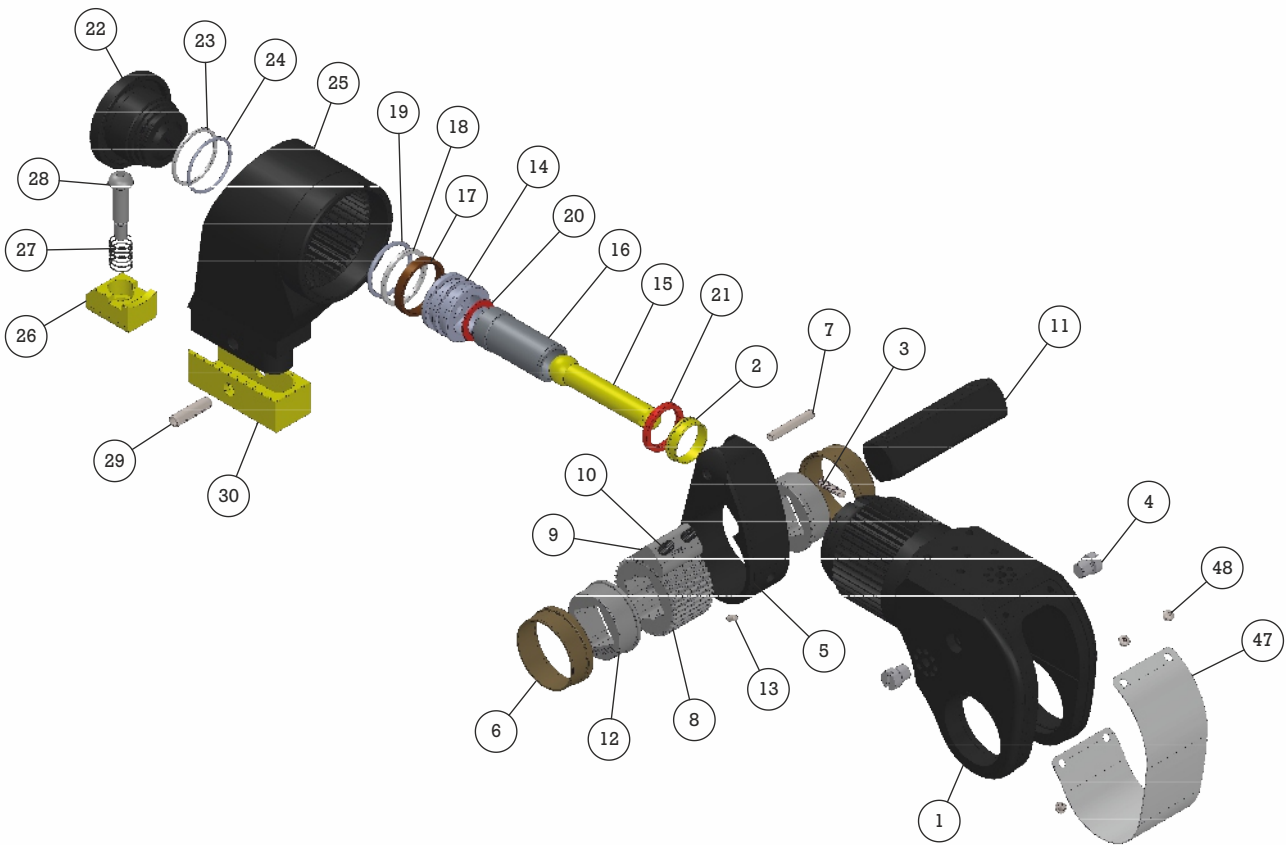


TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.
31	SWL-L-31	SWIVEL RIGHT	1
32	SWL-L-32	SWIVEL LEFT	1
33	SWL-L-33	SWIVEL MIDDLE	1
34	SWL-L-34	SWIVEL NOBE	1
35	SWL-L-35	SWIVEL HEAD CAP	1
36	SWL-L-36	CSK FOR SWIVEL HEAD CAP	2
37	SWL-L-37	ALLEN SCREW FOR SWIVEL	4
38	SWL-L-38	SWIVEL O-RING	7

Item No.	PART NO.	DESCRIPTION	QTY.
39	SWL-L-39	SWIVEL SPACER SEAL	2
40	SWL-L-40	SWIVEL SPACER BRASS	2
41	SWL-L-41	SWIVEL CONNECTING ROLL PIN	1
43	SWL-L-43	SWIVEL NOBE GRUB SCREW	2
44	ADP-N-1/4-M-44	ADAPTOR 1/4" NPT	1
45	CPLR-1/4-F-45	FEMALE COUPLER	1
46	CPLR-1/4-M-46	MALE COUPLER	1

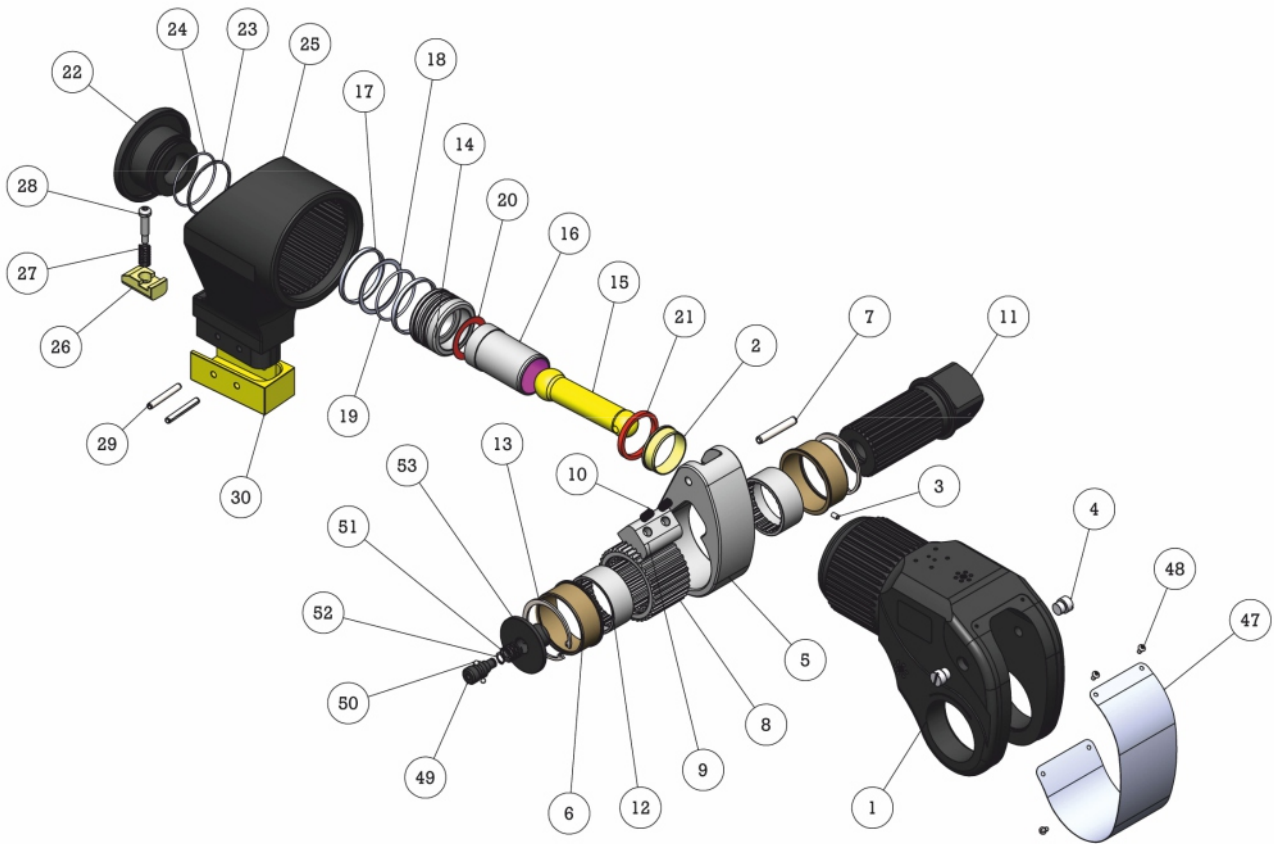
TSL-1 to TSL-10 EXPLODED VIEW



TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.	Item No.	PART NO.	DESCRIPTION	QTY.
1	TSL-X-01	HOUSING	1	18	TSL-X-18	PISTON BACKUP SEAL	1
2	TSL-X-02	HOUSING BUSH	1	19	TSL-X-19	PISTON O-RING	1
3	TSL-X-03	HOUSING OIL GRUB SCREW	1	20	TSL-X-20	PISTON INTERNAL SEAL	1
4	TSL-X-04	HOUSING SCREW	2	21	TSL-X-21	HOUSING U-CUP SEAL	1
5	TSL-X-05	DRIVE PLATE	1	22	TSL-X-22	END CAP	1
6	TSL-X-06	DRIVE BUSH	2	23	TSL-X-23	END CAP BACKUP SEAL	1
7	TSL-X-07	DRIVE PLATE ROLL PIN	1	24	TSL-X-24	END CAP O-RING	1
8	TSL-X-08	RATCHET	1	25	TSL-X-25	REACTION ARM	1
9	TSL-X-09	PAWL	1	26	TSL-X-26	REACTION ARM FIXER	1
10	TSL-X-10	PAWL SPRING	2	27	TSL-X-27	REACTION ARM SPRING	1
11	TSL-X-11	SQUARE DRIVE	1	28	TSL-X-28	REACTION ARM SCREW	1
12	TSL-X-12	SQUARE DRIVE BUSH	2	29	TSL-X-29	REACTION ARM BOOT ROLL PIN	1
13	TSL-X-13	SQUARE DRIVE GRUB SCREW	1	30	TSL-X-30	REACTION ARM BOOT	1
14	TSL-X-14	PISTON HEAD	1	31 to 46		SWIVEL SET	
15	TSL-X-15	PISTON CONNECTING ROD	1	47	TSL-X-47	SHROUD PLATE	1
16	TSL-X-16	PISTON PIPE	1	48	TSL-X-48	SHROUD PLATE SCREW	4
17	TSL-X-17	PISTON SUPPORT SEAL	1				

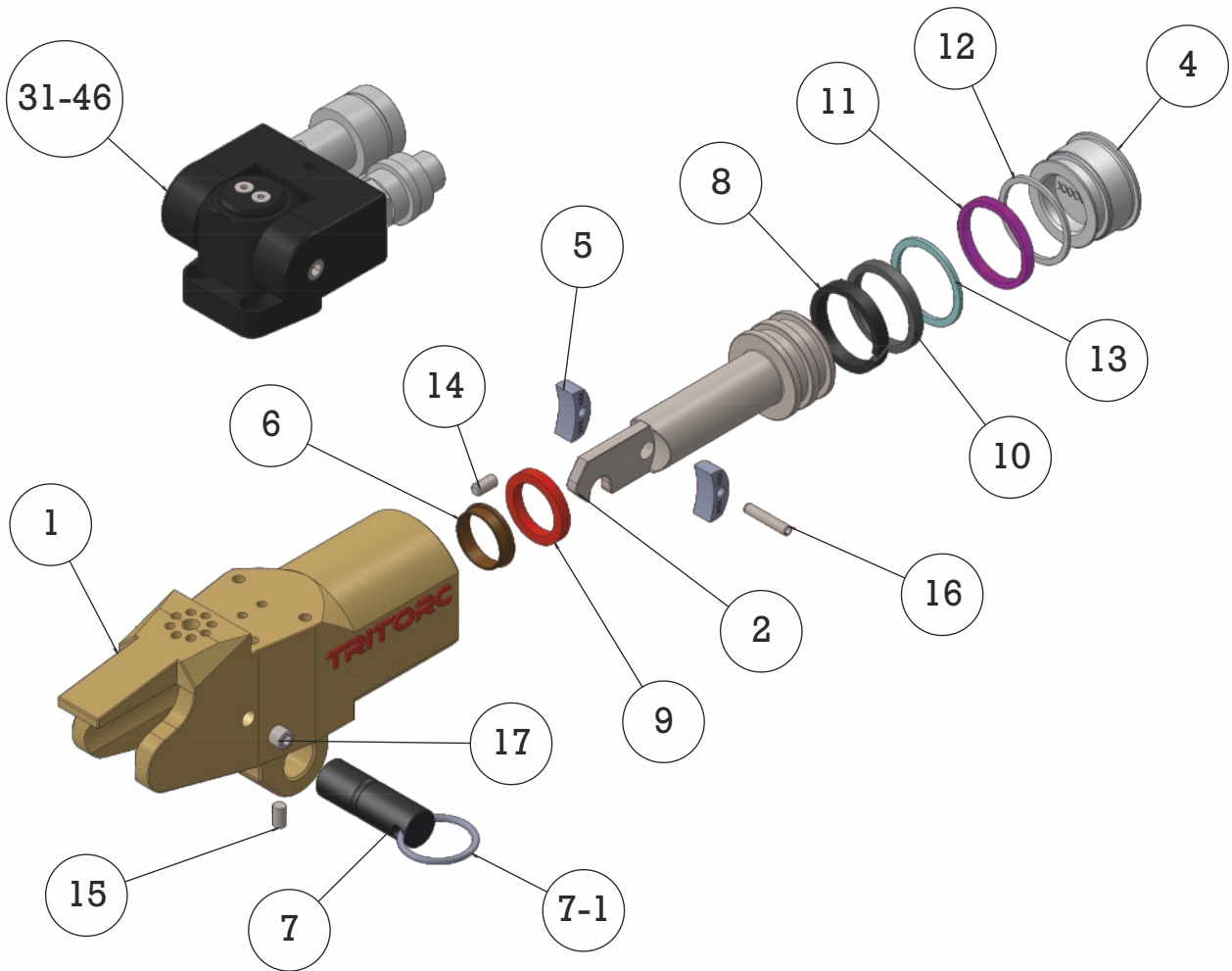
TSL-15 to TSL-50 EXPLODED VIEW



TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.	Item No.	PART NO.	DESCRIPTION	QTY.
1	TSL-XX-01	HOUSING	1	20	TSL-XX-20	PISTON INTERNAL SEAL	1
2	TSL-XX-02	HOUSING BUSH	1	21	TSL-XX-21	HOUSING U-CUP SEAL	1
3	TSL-XX-03	HOUSING OIL GRUB SCREW	1	22	TSL-XX-22	END CAP	1
4	TSL-XX-04	HOUSING SCREW	2	23	TSL-XX-23	END CAP BACKUP SEAL	1
5	TSL-XX-05	DRIVE PLATE	1	24	TSL-XX-24	END CAP O-RING	1
6	TSL-XX-06	DRIVE BUSH	2	25	TSL-XX-25	REACTION ARM	1
7	TSL-XX-07	DRIVE PLATE ROLL PIN	1	26	TSL-XX-26	REACTION ARM FIXTURE BUTTON	1
8	TSL-XX-08	RATCHET	1	27	TSL-XX-27	REACTION ARM SPRING	1
9	TSL-XX-09	PAWL	1	28	TSL-XX-28	REACTION ARM FIXER SCREW	1
10	TSL-XX-10	PAWL SPRING	2	29	TSL-XX-29	REACTION ARM BOOT ROLL PIN	2
11	TSL-XX-11	SQUARE DRIVE	1	30	TSL-XX-30	REACTION ARM BOOT	1
12	TSL-XX-12	SPLINE DRIVE BUSH	2	31 to 46		SWIVEL SET	
13	TSL-XX-13	INTERNAL SPIRAL RETAINING RING	2	47	TSL-XX-47	SHROUD PLATE	1
14	TSL-XX-14	PISTON HEAD	1	48	TSL-XX-48	SHROUD PLATE SCREW	4
15	TSL-XX-15	PISTON CONNECTING ROD	1	49	TSL-XX-49	SQ. DRIVE RETAINER KNOB	1
16	TSL-XX-16	PISTON PIPE	1	50	TSL-XX-50	SQUARE DRIVE LOCK BALL	3
17	TSL-XX-17	PISTON SUPPORT SEAL	2	51	TSL-XX-51	SQUARE DRIVE LOCK SPRING	1
18	TSL-XX-18	PISTON BACKUP SEAL	1	52	TSL-XX-52	KNOB EXTERNAL SNAP RING	1
19	TSL-XX-19	PISTON O-RING	1	53	TSL-XX-53	SQUARE DRIVE RETAINER	1

THL SERIES

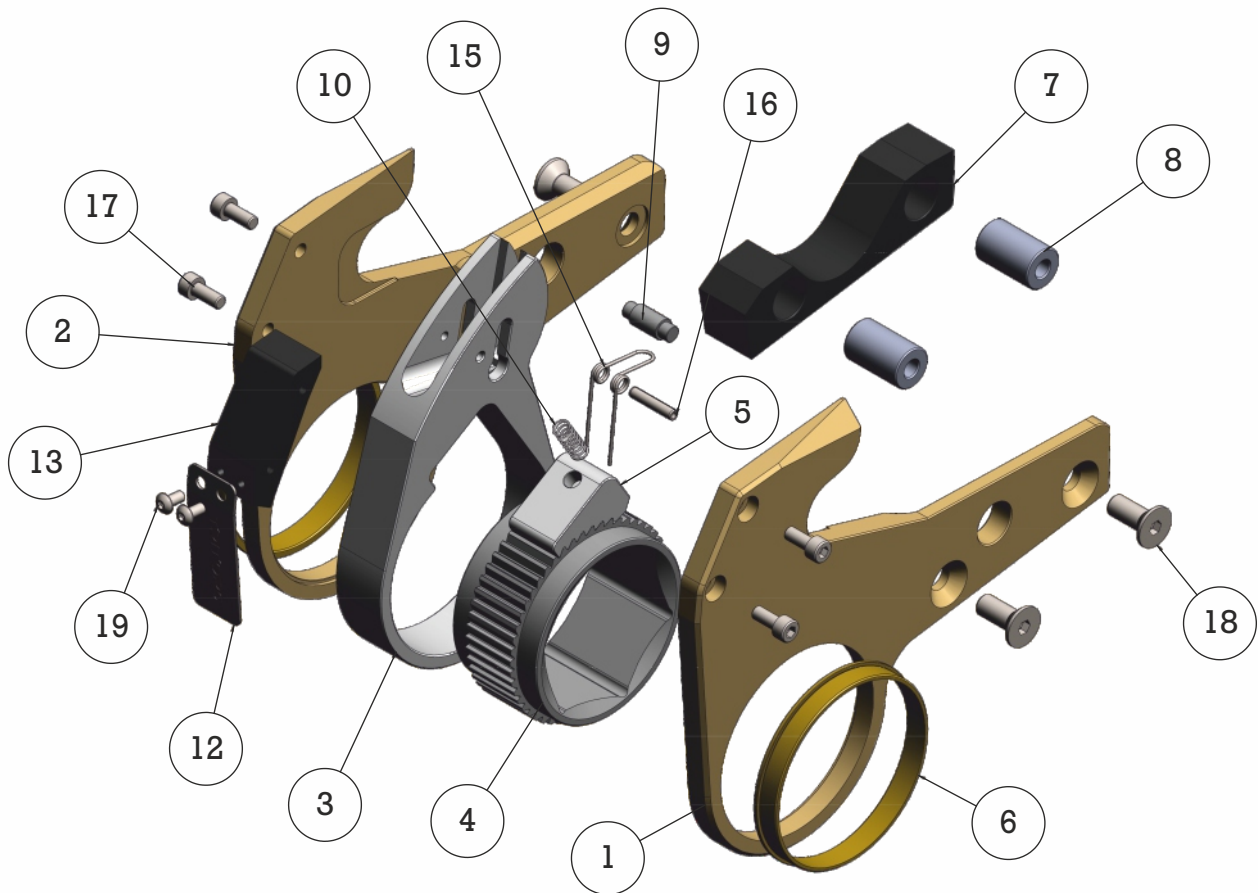


TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.
1	THL-X-1	HOUSING	1
2	THL-X-2	PISTON	1
4	THL-X-4	END CAP	1
5	THL-X-5	SLIDER	2
6	THL-X-6	HOUSING BUSH	1
7	THL-X-7	LOCK PIN	1
7-1	THL-X-7-1	LOCK PIN RING	1
8	THL-X-8	PISTON SUPPORT SEAL	1
9	THL-X-9	U-CUP SEAL	1

Item No.	PART NO.	DESCRIPTION	QTY.
10	THL-X-10	PISTON O-RING	1
11	THL-X-11	END CAP O-RING	1
12	THL-X-12	END CAP BACKUP SEAL	1
13	THL-X-13	PISTON BACKUP SEAL	1
14	THL-X-14	HOUSING GRUB SCREW	1
15	THL-X-15	HOUSING BALL GRUB SCREW	1
16	THL-X-16	SLIDER ROLL PIN	1
17	THL-X-17	HOUSING SIDE GRUB SCREW	2
31 to 46		SWIVEL SET	1

THL-2 TO THL-8 LINK EXPLODED VIEW

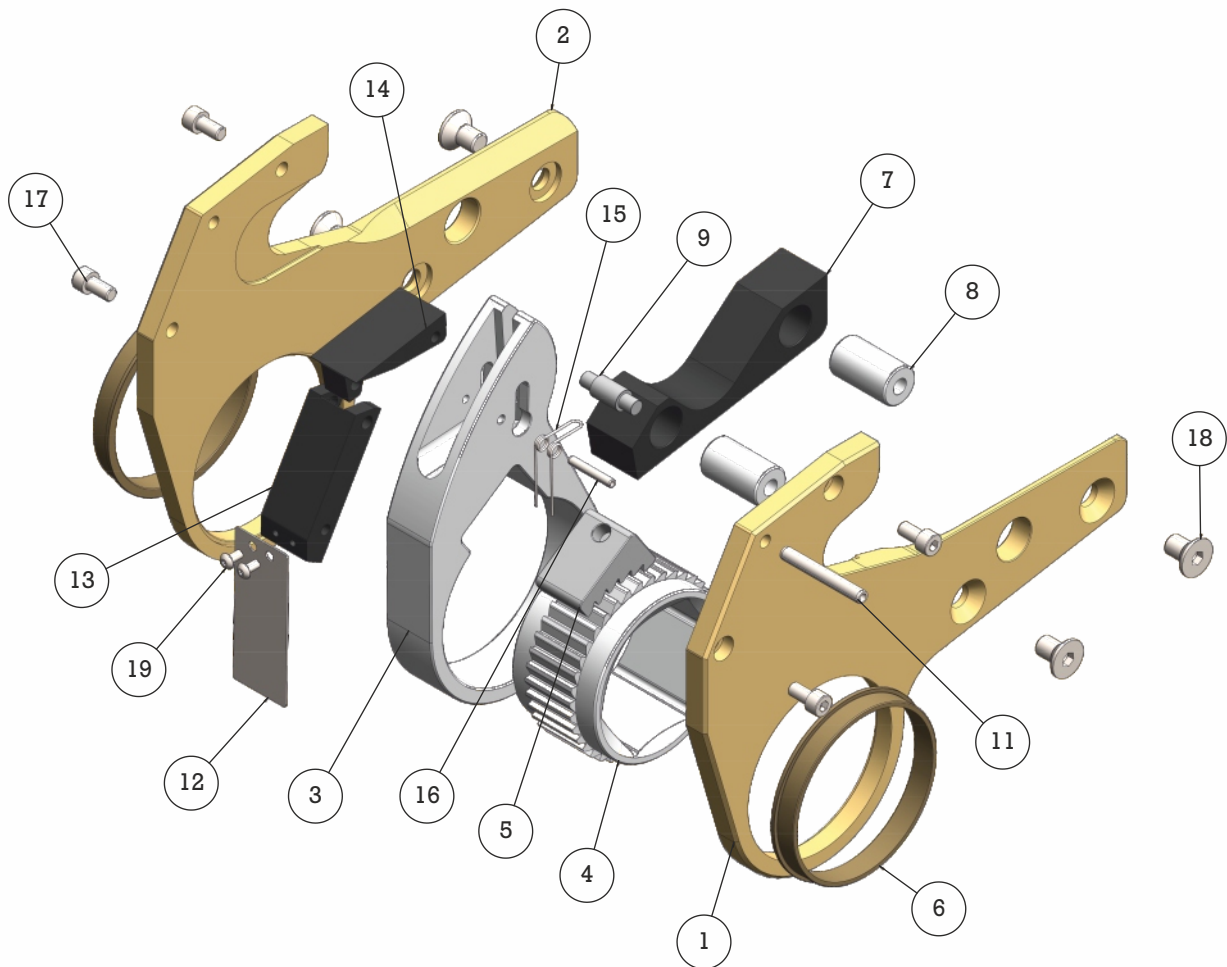


TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.
1	HL-X-1	LEFT SIDE PLATE	1
2	HL-X-2	RIGHT SIDE PLATE	1
3	HL-X-3	DRIVE PLATE	1
4	HL-X-4	RATCHET	1
5	HL-X-5	PAWL	1
6	HL-X-6	DRIVE BUSH	2
7	HL-X-7	LOWER SPACE	1
8	HL-X-8	LOWER SPACER PIN	2
9	HL-X-9	DUMBLE PIN	1

Item No.	PART NO.	DESCRIPTION	QTY.
10	HL-X-10	PAWL SPRING	1
12	HL-X-12	SHROUD PLATE	1
13	HL-X-13	UPPER SPACER	1
15	HL-X-15	DUMBLE SPRING	1
16	HL-X-16	DRIVE PLATE ROLL PIN	1
17	HL-X-17	UPPER SPACER ALLEN SCREW	4
18	HL-X-18	LOWER SPACER CSK SCREW	4
19	HL-X-19	SHROUD PLATE CAP SCREW	2

THL-16 TO THL-32 LINK EXPLODED VIEW

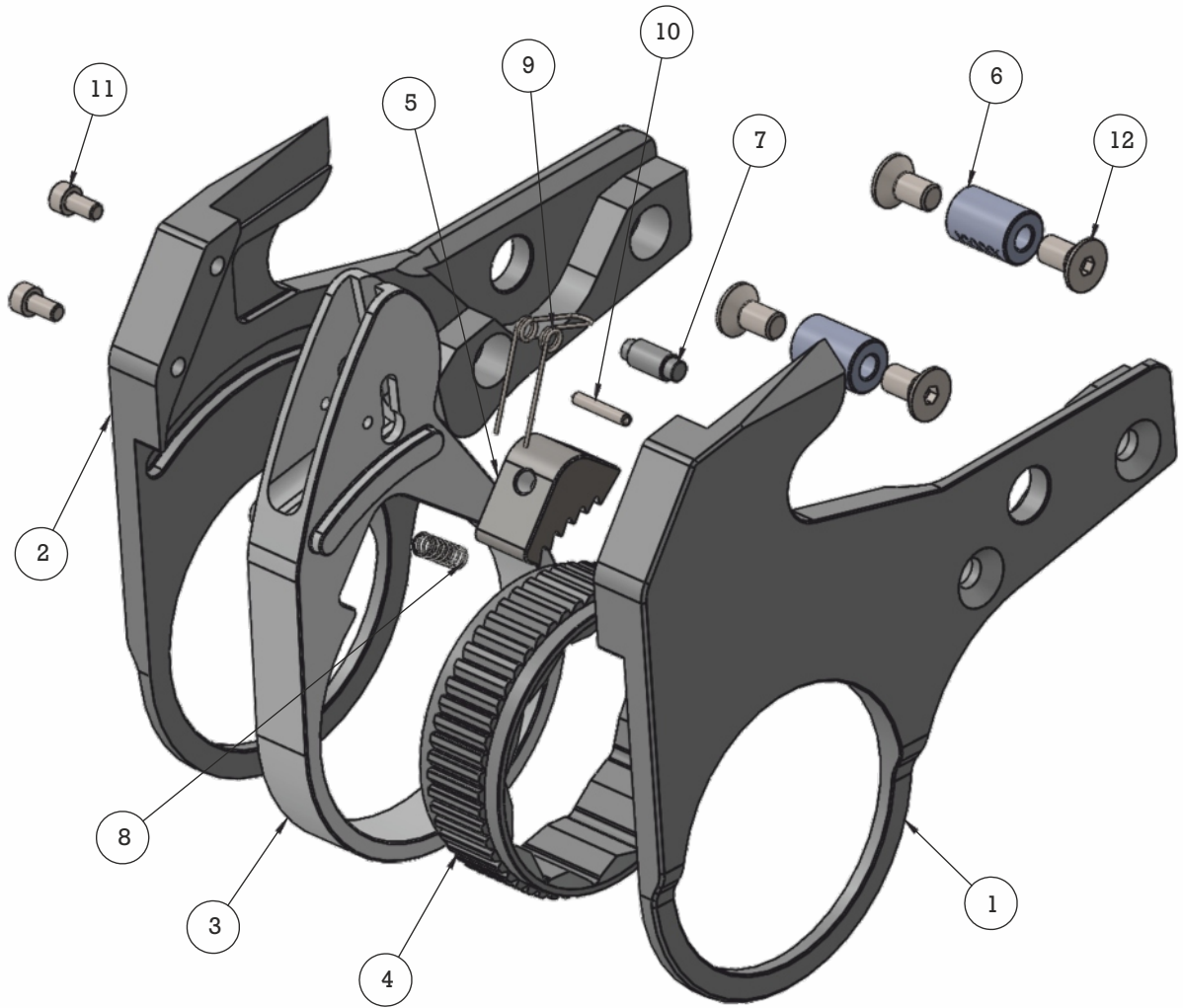


TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.
1	HL-X-1	LEFT SIDE PLATE	1
2	HL-X-2	RIGHT SIDE PLATE	1
3	HL-X-3	DRIVE PLATE	1
4	HL-X-4	RATCHET	1
5	HL-X-5	PAWL	1
6	HL-X-6	DRIVE BUSH	2
7	HL-X-7	LOWER SPACER	1
8	HL-X-8	LOWER SPACER PIN	2
9	HL-X-9	DRIVE PIN	1
10	HL-X-10	PAWL SPRING	1

Item No.	PART NO.	DESCRIPTION	QTY.
11	HL-X-11	UPPER SPACER ROLL PIN	1
12	HL-X-12	SHROUD PLATE	1
13	HL-X-13	UPPER SPACER	1
14	HL-X-14	UPPER SPECER 2	1
15	HL-X-15	DUMBLE SPRING	1
16	HL-X-16	DRIVE PLATE ROLL PIN	1
17	HL-X-17	UPPER SPACER ALLEN SCREW	4
18	HL-X-18	LOWER SPACER CSK SCREW	4
19	HL-X-19	SHROUD PLATE CAP SCREW	2

SLIM LINK EXPLODED VIEW



TRITORC

Item No.	PART NO.	DESCRIPTION	QTY.
1	HSL-X-1	LHS PLATE	1
2	HSL-X-2	RHS PLATE	1
3	HSL-X-3	DRIVE PLATE	1
4	HSL-X-4	RATCHET	1
5	HSL-X-5	PAWL	1
6	HSL-X-8	LOWER SPACER PIN	2

Item No.	PART NO.	DESCRIPTION	QTY.
7	HSL-X-9	SLIM LINK DUMBLE PIN	1
8	HL-X-10	PAWL SPRING	1
9	HL-X-15	DUMBLE SPRING	1
10	HL-X-16	ROLL PIN	1
11	HL-X-17	ALLEN SCREW	2
12	HL-X-18	CSK SCREW	4

HYDRAULIC TORQUE WRENCHES GENERAL TROUBLESHOOTING

No.	SYMPTOMS	PROBABLE CAUSE	REQUIRED ACTION
01	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
02	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
03	Tool tightens immediately when turned ON	Hose Connections are Reversed	Swap the Hose Connections properly and tighten Couplers securely
04	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
05	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
		Dirt accumulated in the Swivel	Clean the Swivel
06	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
07	Erratic Pressure Reading	Check Gauge Calibration date	Calibrate, if required
		Defective Gauge	Replace the Gauge

TRITORC

We are also present in

INDIA | UAE | KSA | QATAR | NIGERIA | OMAN | KUWAIT | AUSTRALIA