

TU Series

OPERATION AND MAINTENANCE

MANUAL

TU Series

Square Drive Hydraulic Torque Wrenches

MODELS TU-2, TU-3, TU-5, TU-7, TU-11, TU-20, TU-27 & TU-60



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NOTICE

Series TU-2, TU-3, TU-5, TU-7, TU-11, TU-20, TU-27 and TU-60 Square Drive Hydraulic Torque Wrenches are designed for installing and removing threaded fasteners requiring precise high torque during bolt makeup and maximum torque during bolt breakout.

TorcUP Inc. is not responsible for customer modification of tools for applications on which TorcUP Inc. was not consulted.

WARNING

**IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.**

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

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

USING THE TOOL

- Always operate, inspect and maintain this tool in accordance with American National Standards Safety Code for Hydraulic Rams and Jacks (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 psi (681 bar) maximum pressure with this tool.
- Use only twin line hydraulic hose rated for 10,000 psi (681 bar) pressure with this tool.
- Do not interchange the male and female swivel inlets on the tool or the connections on one end of the hose. Reversing the inlets will reverse the power stroke cycle and may damage the tool.
- Do not use damaged, frayed or deteriorated hoses and fittings. Make certain there are no cracks, splits or leaks in the hoses.
- Use the quick connect system to attach the hoses to the tool and pump.
- 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.
- Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately.
- Never pressurize uncoupled couplers. Only use hydraulic equipment in a coupled system.
- Always wear eye protection when operating or performing maintenance on this tool.
- Always wear head and hand protection and protective clothing when operating this tool.

The use of other than genuine TorcUP replacement parts may result in safety hazards, decreased tool performance, increased maintenance, and may invalidate all warranties. Repairs should be made only by authorized personnel. Consult your nearest TorcUP Authorized Service Center.

Refer All Communications to the Nearest TorcUP Office or Distributor.

For Technical Support & Information Contact:

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WARNING

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY

Do NOT Exceed Maximum Pressure. See Torque Chart with Tool. Damage May Occur.

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



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



Always wear ear protection when operating this tool.



Do not carry the tool by the hose.



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



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



USING THE TOOL

- Keep hands, loose clothing and long hair away from the reaction arm and working area during operation.
- This tool will exert a strong reaction force. Use proper mechanical support and correct reaction arm positioning to control these forces. Do not position the reaction arm so that it tilts the tool off the axis of the bolt and never use the swivel inlets as a reaction stop.
- Avoid sharp bends and kinks that will cause severe back-up pressure in hoses and lead to premature hose failure.
- Use accessories recommended by TorcUP.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- Use only sockets and accessories that correctly fit the bolt or nut and function without tilting the tool off the axis of the bolt.
- This tool is not insulated against electric shock.
- This equipment must not be operated or serviced unless the operator read the operating instructions and fully understands the purpose, consequences and procedure of each step.
- When operating a larger tool (TU-20, TU-27, or TU-60) above waist height, employ a secondary means of support for safety purposes. A tool sling or chains may be used. Consult your safety department for further suggestions.

Depending on the working environment your local health and safety regulations may require you wear protective gear (i.e. safety shoes, hard hat, gloves, coveralls, etc.). In case external forces are exerted on the equipment, non-compliance with these regulations may result in injury. **EAR PROTECTION MUST BE WORN WHEN OPERATING THIS TOOL.**

PLACING THE TOOL IN SERVICE

CONNECTING THE TOOL

1. Attach the twin line hose to the swivel inlets of the square drive torque wrench using the spring-loaded quick connect ends.
2. Connect the opposite ends of the hose to the pump in the same manner.

ADJUSTMENTS

SETTING THE SQUARE DRIVE FOR ROTATION

The position of the square drive when looking toward the shroud will determine if the tool is set to tighten or loosen the nut. When the square drive extends to the left (when looking at the shroud 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 models TU-2 TU-3, TU-7 and TU-11 simply push the square drive into the housing until the drive projects out the opposite side of the tool. For models TU-5, TU-20, TU-27 and TU-60, loosen and remove the square drive retaining knob and pull the square drive out of the housing. Insert the square drive into the opposite side of the housing and secure it by installing the knob in the splined end of the drive.

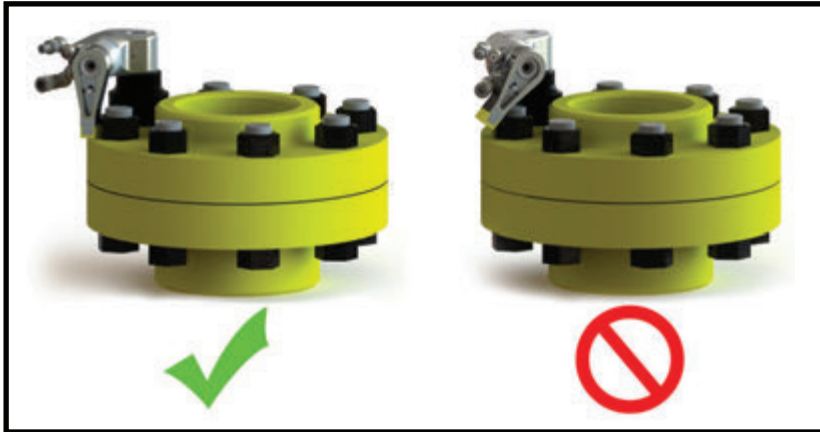
SETTING THE TORQUE

After determining the desired torque, use the calibration certificate provided with the tool to determine the pressure necessary to achieve that torque. You may also refer to the chart engraved on the shroud of the tool or the charts provided on pages 9-16 of this manual.

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

SETTING THE REACTION ARM

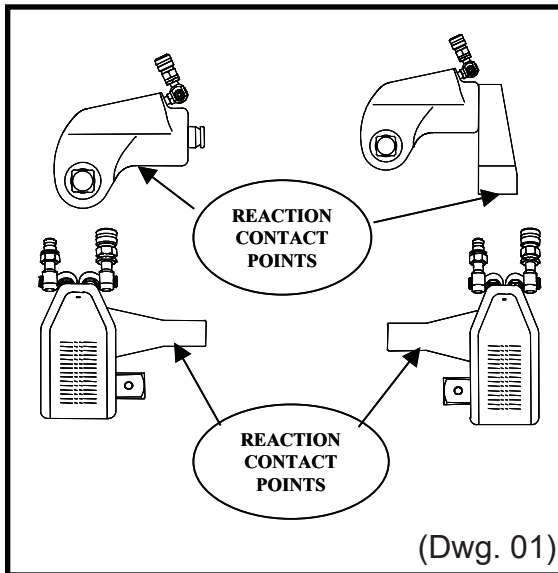
The function of a reaction device is to hold the tool in position against the forces generated to tighten or loosen bolts or nuts. Hydraulic wrenches generate tremendous force.



WARNING

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

Square Drive Hydraulic Wrench Reaction Points (Dwg.01)



Make sure the reaction arm is positioned correctly. (Refer to Dwg. 01).

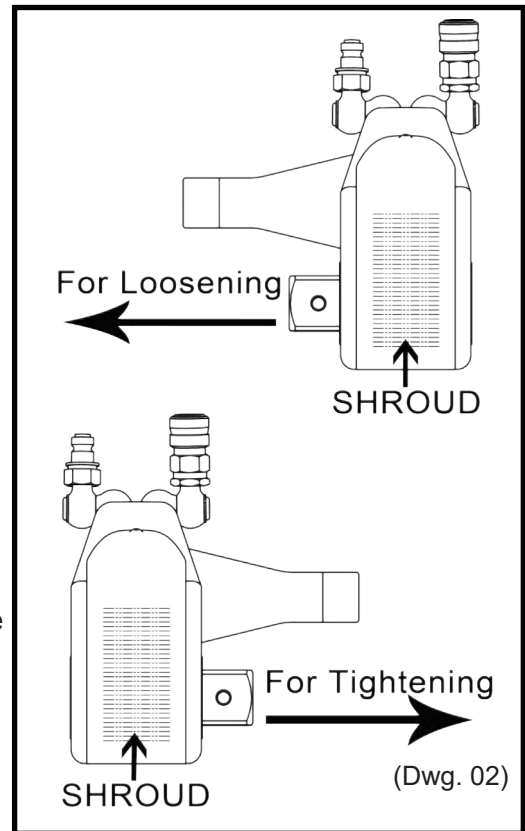
The reaction arm can be positioned numerous places within a 360° circle. However, for the arm to be correctly positioned, it must be set within a 90° quadrant of that circle. That quadrant is the area located between the protruding square drive and at the bottom of the housing away from the swivel inlets. It will always be toward the lower half of the housing and on one side of the housing when tightening and on the other side when loosening.

OPERATING THE WRENCH

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

The position of the square drive relative to the shroud determines whether the action will tighten or loosen the nut. (Refer to Dwg. 02 for application examples). The power stroke of the piston assembly will always turn the square drive toward the shroud.

1. Insert the square drive into the mating socket. Then, insert the safety pin through the socket and seat the included O-ring into the groove to capture the pin. Place the socket onto the nut making sure the socket is the proper size and that all mating parts are fully seated.
2. Position the reaction arm or surface against an adjacent nut, flange or solid system component. Make certain that there is clearance for the hoses, swivels, inlets and end plug. DO NOT allow the tool to react against the hoses, swivels, inlets or end plug.
3. After turning the pump on and presetting the pressure for the correct torque, depress the remote control button to advance the piston assembly.
4. Once 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.
5. When the nut is no longer turning and the pump gauge reaches the preset pressure, release the remote control button. The piston rod will retract when the button is released. 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. Cycle the tool one additional time to ensure full torque.



LUBRICATION

MARINE MOLY GREASE

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

Whenever lubrication is required, lubricate as follows:

1. Remove the drive plate, ratchet, drive segment and sleeves as instructed in the maintenance section and wash the components in a suitable cleaning solution in a well ventilated area.
2. After drying the components, wipe a film of Marine Moly Grease onto the wear surface of both sleeves and the ends of the ratchet.
3. Spread a light film of Marine Moly Grease onto the inner face and both sides of the drive plate. **Do not pack** the teeth of the drive segment or ratchet with lubricant. It can prevent the teeth from engaging properly.
4. Place a daub of Marine Moly Grease in the piston rod recess of the drive plate before linking the piston rod to the drive plate at assembly.

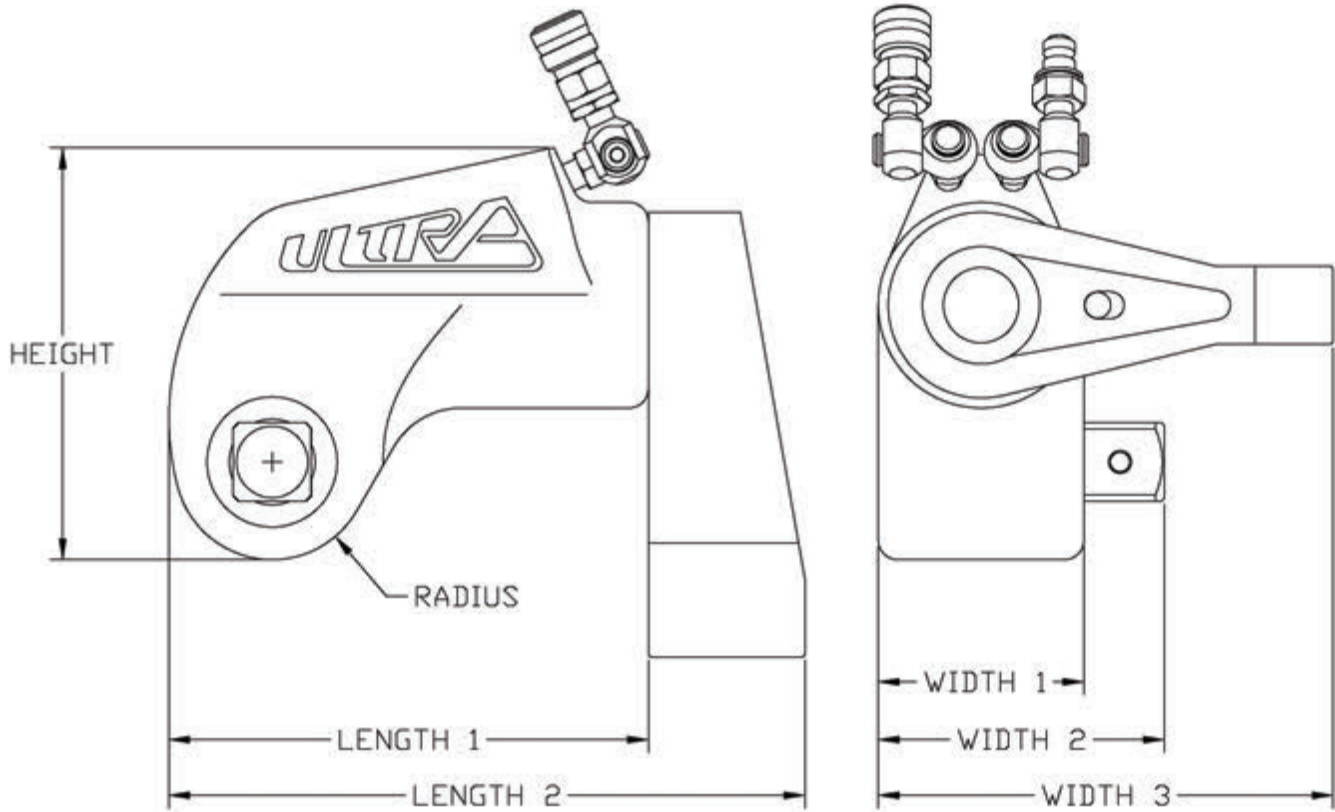
CRITICAL LUBRICATION

It is imperative to lubricate the piston rod recess of the drive plate to piston rod contact area every 80 hours of continuous duty cycling.

Lubricate as follows:

1. Remove shroud screws, shroud, and roll pin.
2. Pry the drive plate assembly forward from the piston rod to expose the recessed contact area in the drive plate.
3. With a rag, wipe clean the area and apply a sizeable amount of Marine Moly Grease.
4. Reassemble as instructed in the maintenance section.

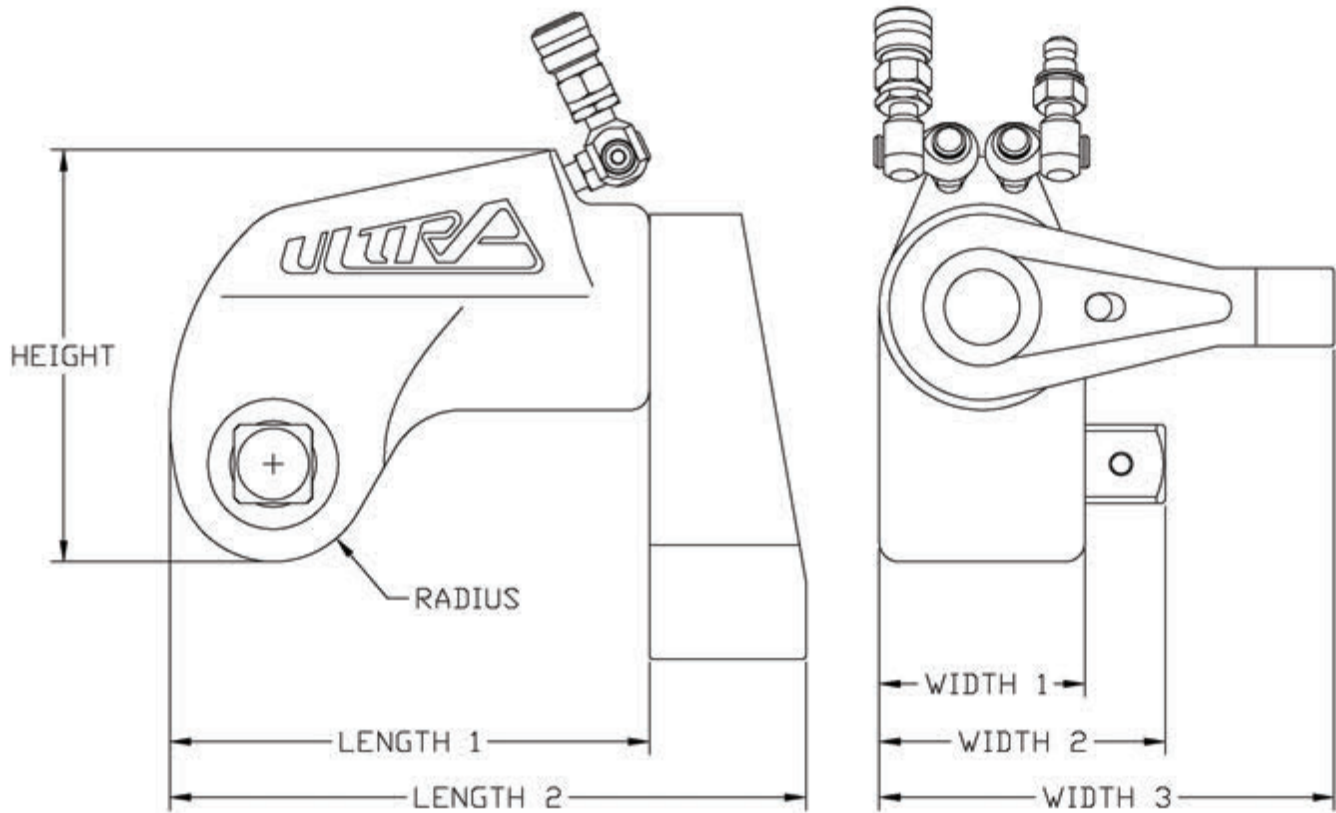
TU Series Wrench Technical & Dimensional Data



Model Number	TU-2	TU-3	TU-5	TU-7
Square drive	3/4"	1"	1 1/2"	1 1/2"
Min. Torque (ft/lbs)	127	330	550	740
Max. Torque (ft/lbs)	1270	3330	5500	7400
Min. Torque (nm)	172	447	745	1003
Max. Torque (nm)	1722	4514	7457	10031
Output Accuracy	+/-3%	+/-3%	+/-3%	+/-3%
Repeatability	100%	100%	100%	100%
Duty Cycle	100%	100%	100%	100%
Tool Weight (lbs/kg)	5.6/2.5	10.9/4.9	18.1/8.2	19.0/8.6
Height (in/mm)	4.20/106.7	5.33/135.3	6.40/162.6	7.17/182.1
Length 1 (in/mm)	4.82/122.4	6.40/162.5	7.91/200.9	8.84/224.5
Length 2 (in/mm)	6.34/161.0	8.43/214.1	10.66/270.7	11.58/294.1
Radius (in/mm)	0.98/24.9	1.31/33.2	1.57/39.8	1.77/44.9
Width 1 (in/mm)	2.00/50.8	2.63/66.8	3.12/79.2	3.61/91.7
Width 2 (in/mm)	2.79/70.9	3.68/93.5	4.64/117.8	5.06/128.5
Width 3 (in/mm)	4.42/112.3	5.81/147.6	7.00/177.8	7.98/202.7

*Reference values only. Consult calibration torque chart provided with tool.

TU Series Wrench Technical & Dimensional Data



Model Number	TU-11	TU-20	TU-27	TU-60
Square drive	1 1/2"	2 1/2"	2 1/2"	2 1/2"
Min. Torque (lbf-ft)	1100	1940	2720	5800
Max. Torque (lbf-ft)	11010	20625	27200	58000
Min. Torque (nm)	1491	2630	3687	7862
Max. Torque (nm)	14925	27964	36872	78625
Output Accuracy	+/-3%	+/-3%	+/-3%	+/-3%
Repeatability	100%	100%	100%	100%
Duty Cycle	100%	100%	100%	100%
Tool Weight (lbs/kg)	29.0/13.1	61.0/27.6	70.0/31.7	130.0/59.8
Height (in/mm)	7.80/198.1	9.22/234.2	10.19/258.8	11.50/292.1
Length 1 (in/mm)	9.23/234.4	9.44/239.7	12.32/312.9	15.38/390.7
Length 2 (in/mm)	12.79/324.8	16.09/408.9	16.33/414.8	20.40/518.2
Radius (in/mm)	2.03/51.5	2.31/58.7	2.46/62.5	3.10/78.7
Width 1 (in/mm)	3.95/100.3	4.87/123.6	5.26/133.6	6.58/167.1
Width 2 (in/mm)	5.43/137.9	7.15/181.7	7.57/192.3	8.89/225.8
Width 3 (in/mm)	8.72/221.5	10.88/276.4	11.63/295.4	14.29/363.0

*Reference values only. Consult calibration torque chart provided with tool.



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TU-2 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	132	69	179
1,200	159	83	216
1,400	185	97	251
1,600	212	110	287
1,800	238	124	323
2,000	265	138	359
2,200	292	152	396
2,400	319	165	433
2,600	346	179	469
2,800	373	193	506
3,000	400	207	542
3,200	427	221	579
3,400	454	234	616
3,600	481	248	652
3,800	508	262	689
4,000	535	276	725
4,200	561	290	761
4,400	588	303	797
4,600	614	317	832
4,800	641	331	869
5,000	667	345	904
5,200	694	359	941
5,400	721	372	978
5,600	747	386	1013
5,800	774	400	1049
6,000	801	414	1086
6,200	828	427	1123
6,400	855	441	1159
6,600	883	455	1197
6,800	910	469	1234
7,000	937	483	1270
7,200	964	496	1307
7,400	990	510	1342
7,600	1017	524	1379
7,800	1043	538	1414
8,000	1070	552	1451
8,200	1098	565	1489
8,400	1126	579	1527
8,600	1153	593	1563
8,800	1181	607	1601
9,000	1209	621	1639
9,200	1236	634	1676
9,400	1263	648	1712
9,600	1291	662	1750
9,800	1318	676	1787
10,000	1345	689	1824

*Reference values only. Consult calibration torque chart provided with tool.



TORCUP

TU-3 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	347	69	470
1,200	414	83	561
1,400	481	97	652
1,600	547	110	742
1,800	614	124	833
2,000	681	138	923
2,200	748	152	1015
2,400	816	165	1106
2,600	883	179	1197
2,800	951	193	1289
3,000	1018	207	1380
3,200	1085	221	1471
3,400	1152	234	1562
3,600	1220	248	1654
3,800	1287	262	1745
4,000	1354	276	1836
4,200	1421	290	1926
4,400	1487	303	2016
4,600	1554	317	2107
4,800	1620	331	2197
5,000	1687	345	2287
5,200	1754	359	2379
5,400	1822	372	2470
5,600	1889	386	2561
5,800	1957	400	2653
6,000	2024	414	2744
6,200	2092	427	2837
6,400	2160	441	2929
6,600	2229	455	3022
6,800	2297	469	3114
7,000	2365	483	3207
7,200	2432	496	3297
7,400	2499	510	3388
7,600	2565	524	3478
7,800	2632	538	3569
8,000	2699	552	3659
8,200	2769	565	3754
8,400	2838	579	3848
8,600	2908	593	3942
8,800	2977	607	4037
9,000	3047	621	4131
9,200	3115	634	4223
9,400	3183	648	4316
9,600	3251	662	4408
9,800	3319	676	4500
10,000	3387	689	4592

*Reference values only. Consult calibration torque chart provided with tool.



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TU-5 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	587	69	796
1,200	705	83	956
1,400	823	97	1116
1,600	940	110	1274
1,800	1058	124	1434
2,000	1176	138	1594
2,200	1294	152	1754
2,400	1413	165	1916
2,600	1531	179	2076
2,800	1650	193	2237
3,000	1768	207	2397
3,200	1885	221	2556
3,400	2002	234	2714
3,600	2120	248	2874
3,800	2237	262	3033
4,000	2354	276	3192
4,200	2474	290	3354
4,400	2595	303	3518
4,600	2715	317	3681
4,800	2836	331	3845
5,000	2956	345	4008
5,200	3076	359	4170
5,400	3196	372	4333
5,600	3315	386	4495
5,800	3435	400	4657
6,000	3555	414	4820
6,200	3673	427	4980
6,400	3791	441	5140
6,600	3909	455	5300
6,800	4027	469	5460
7,000	4145	483	5620
7,200	4265	496	5783
7,400	4386	510	5947
7,600	4506	524	6109
7,800	4627	538	6273
8,000	4747	552	6436
8,200	4864	565	6595
8,400	4982	579	6755
8,600	5099	593	6913
8,800	5217	607	7073
9,000	5334	621	7232
9,200	5452	634	7392
9,400	5569	648	7551
9,600	5687	662	7711
9,800	5804	676	7869
10,000	5922	689	8029

*Reference values only. Consult calibration torque chart provided with tool.



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TU-7 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	790	69	1071
1,200	947	83	1284
1,400	1104	97	1497
1,600	1262	110	1710
1,800	1419	124	1924
2,000	1576	138	2137
2,200	1734	152	2351
2,400	1892	165	2565
2,600	2050	179	2779
2,800	2208	193	2994
3,000	2366	207	3208
3,200	2525	221	3423
3,400	2683	234	3638
3,600	2842	248	3853
3,800	3000	262	4068
4,000	3159	276	4283
4,200	3317	290	4497
4,400	3475	303	4711
4,600	3632	317	4925
4,800	3790	331	5139
5,000	3948	345	5353
5,200	4106	359	5568
5,400	4265	372	5782
5,600	4423	386	5997
5,800	4582	400	6212
6,000	4740	414	6427
6,200	4901	427	6645
6,400	5063	441	6864
6,600	5224	455	7083
6,800	5386	469	7302
7,000	5547	483	7521
7,200	5705	496	7735
7,400	5863	510	7949
7,600	6021	524	8163
7,800	6179	538	8378
8,000	6337	552	8592
8,200	6505	565	8820
8,400	6674	579	9048
8,600	6842	593	9277
8,800	7011	607	9505
9,000	7179	621	9733
9,200	7342	634	9954
9,400	7505	648	10175
9,600	7668	662	10396
9,800	7831	676	10617
10,000	7994	689	10838

*Reference values only. Consult calibration torque chart provided with tool.



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TU-11 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	1198	69	1624
1,200	1433	83	1943
1,400	1668	97	2262
1,600	1904	110	2581
1,800	2139	124	2900
2,000	2374	138	3219
2,200	2612	152	3541
2,400	2850	165	3864
2,600	3088	179	4187
2,800	3326	193	4509
3,000	3564	207	4832
3,200	3802	221	5155
3,400	4041	234	5479
3,600	4279	248	5802
3,800	4518	262	6125
4,000	4756	276	6448
4,200	4990	290	6766
4,400	5225	303	7084
4,600	5459	317	7402
4,800	5694	331	7719
5,000	5928	345	8037
5,200	6164	359	8357
5,400	6400	372	8677
5,600	6635	386	8996
5,800	6871	400	9316
6,000	7107	414	9636
6,200	7348	427	9963
6,400	7589	441	10290
6,600	7831	455	10617
6,800	8072	469	10944
7,000	8313	483	11271
7,200	8547	496	11588
7,400	8781	510	11905
7,600	9015	524	12223
7,800	9249	538	12540
8,000	9483	552	12857
8,200	9727	565	13188
8,400	9971	579	13518
8,600	10214	593	13849
8,800	10458	607	14179
9,000	10702	621	14510
9,200	10943	634	14837
9,400	11184	648	15164
9,600	11426	662	15491
9,800	11667	676	15818
10,000	11908	689	16145

*Reference values only. Consult calibration torque chart provided with tool.



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TU-20 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	2249	69	3049
1,200	2683	83	3638
1,400	3118	97	4227
1,600	3552	110	4816
1,800	3987	124	5405
2,000	4421	138	5994
2,200	4847	152	6572
2,400	5273	165	7150
2,600	5700	179	7728
2,800	6126	193	8305
3,000	6552	207	8883
3,200	6974	221	9455
3,400	7396	234	10028
3,600	7818	248	10600
3,800	8240	262	11172
4,000	8662	276	11744
4,200	9077	290	12306
4,400	9492	303	12869
4,600	9906	317	13431
4,800	10321	331	13994
5,000	10736	345	14556
5,200	11158	359	15128
5,400	11580	372	15700
5,600	12002	386	16273
5,800	12424	400	16845
6,000	12846	414	17417
6,200	13271	427	17993
6,400	13696	441	18569
6,600	14120	455	19145
6,800	14545	469	19721
7,000	14970	483	20297
7,200	15388	496	20863
7,400	15806	510	21430
7,600	16223	524	21996
7,800	16641	538	22562
8,000	17059	552	23129
8,200	17492	565	23716
8,400	17925	579	24302
8,600	18357	593	24889
8,800	18790	607	25476
9,000	19223	621	26063
9,200	19653	634	26645
9,400	20082	648	27228
9,600	20512	662	27810
9,800	20941	676	28393
10,000	21371	689	28975

*Reference values only. Consult calibration torque chart provided with tool.



TORCUP

TU-27 Torque Conversion Chart

Imperial Conversion	
PSI	Ft-lbs
1,000	3032
1,200	3606
1,400	4180
1,600	4755
1,800	5329
2,000	5903
2,200	6469
2,400	7035
2,600	7600
2,800	8166
3,000	8732
3,200	9302
3,400	9873
3,600	10443
3,800	11014
4,000	11584
4,200	12137
4,400	12690
4,600	13242
4,800	13795
5,000	14348
5,200	14911
5,400	15474
5,600	16037
5,800	16600
6,000	17163
6,200	17720
6,400	18278
6,600	18835
6,800	19393
7,000	19950
7,200	20510
7,400	21069
7,600	21629
7,800	22188
8,000	22748
8,200	23308
8,400	23868
8,600	24427
8,800	24987
9,000	25547
9,200	26106
9,400	26665
9,600	27225
9,800	27784
10,000	28343

Metric Conversion	
Bar	Nm
69	4111
83	4889
97	5668
110	6446
124	7225
138	8003
152	8771
165	9538
179	10305
193	11072
207	11839
221	12612
234	13386
248	14159
262	14932
276	15706
290	16455
303	17205
317	17954
331	18704
345	19453
359	20217
372	20980
386	21743
400	22507
414	23270
427	24026
441	24781
455	25537
469	26293
483	27049
496	27807
510	28566
524	29325
538	30083
552	30842
565	31601
579	32360
593	33119
607	33878
621	34637
634	35395
648	36153
662	36912
676	37670
689	38428



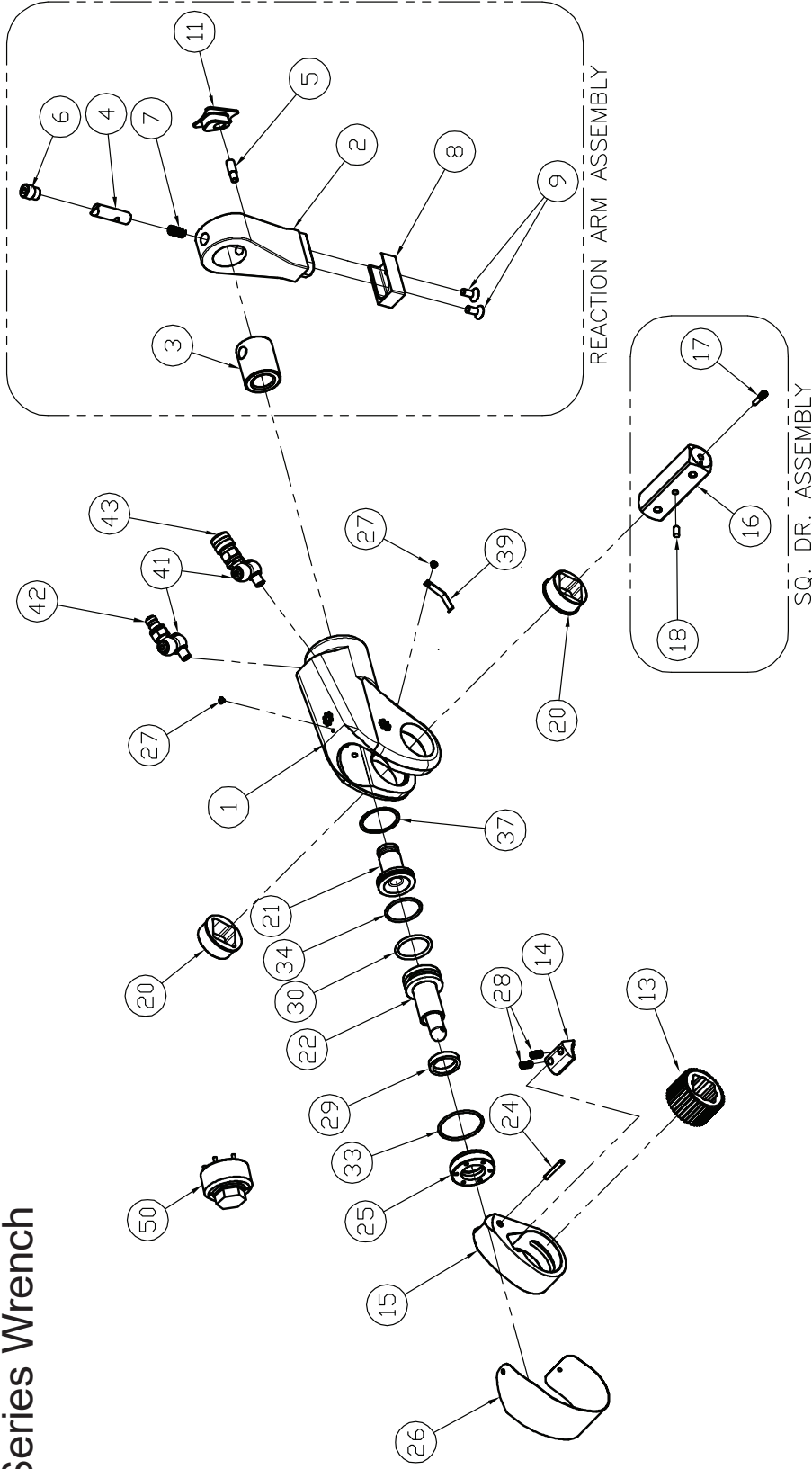
TORCUP

TU-60 Torque Conversion Chart

Imperial Conversion		Metric Conversion	
PSI	Ft-lbs	Bar	Nm
1,000	6202	69	8409
1,200	7422	83	10062
1,400	8641	97	11716
1,600	9861	110	13369
1,800	11080	124	15023
2,000	12300	138	16677
2,200	13477	152	18272
2,400	14654	165	19868
2,600	15831	179	21464
2,800	17008	193	23060
3,000	18185	207	24656
3,200	19378	221	26273
3,400	20571	234	27890
3,600	21763	248	29507
3,800	22956	262	31124
4,000	24149	276	32742
4,200	25344	290	34361
4,400	26538	303	35981
4,600	27733	317	37601
4,800	28927	331	39220
5,000	30122	345	40840
5,200	31317	359	42460
5,400	32511	372	44079
5,600	33706	386	45699
5,800	34900	400	47319
6,000	36095	414	48938
6,200	37293	427	50562
6,400	38491	441	52186
6,600	39688	455	53810
6,800	40886	469	55434
7,000	42084	483	57058
7,200	43282	496	58683
7,400	44480	510	60307
7,600	45678	524	61931
7,800	46876	538	63555
8,000	48074	552	65180
8,200	49272	565	66804
8,400	50470	579	68428
8,600	51667	593	70052
8,800	52865	607	71676
9,000	54063	621	73300
9,200	55260	634	74922
9,400	56456	648	76544
9,600	57653	662	78167
9,800	58849	676	79789
10,000	60046	689	81411

*Reference values only. Consult calibration torque chart provided with tool.

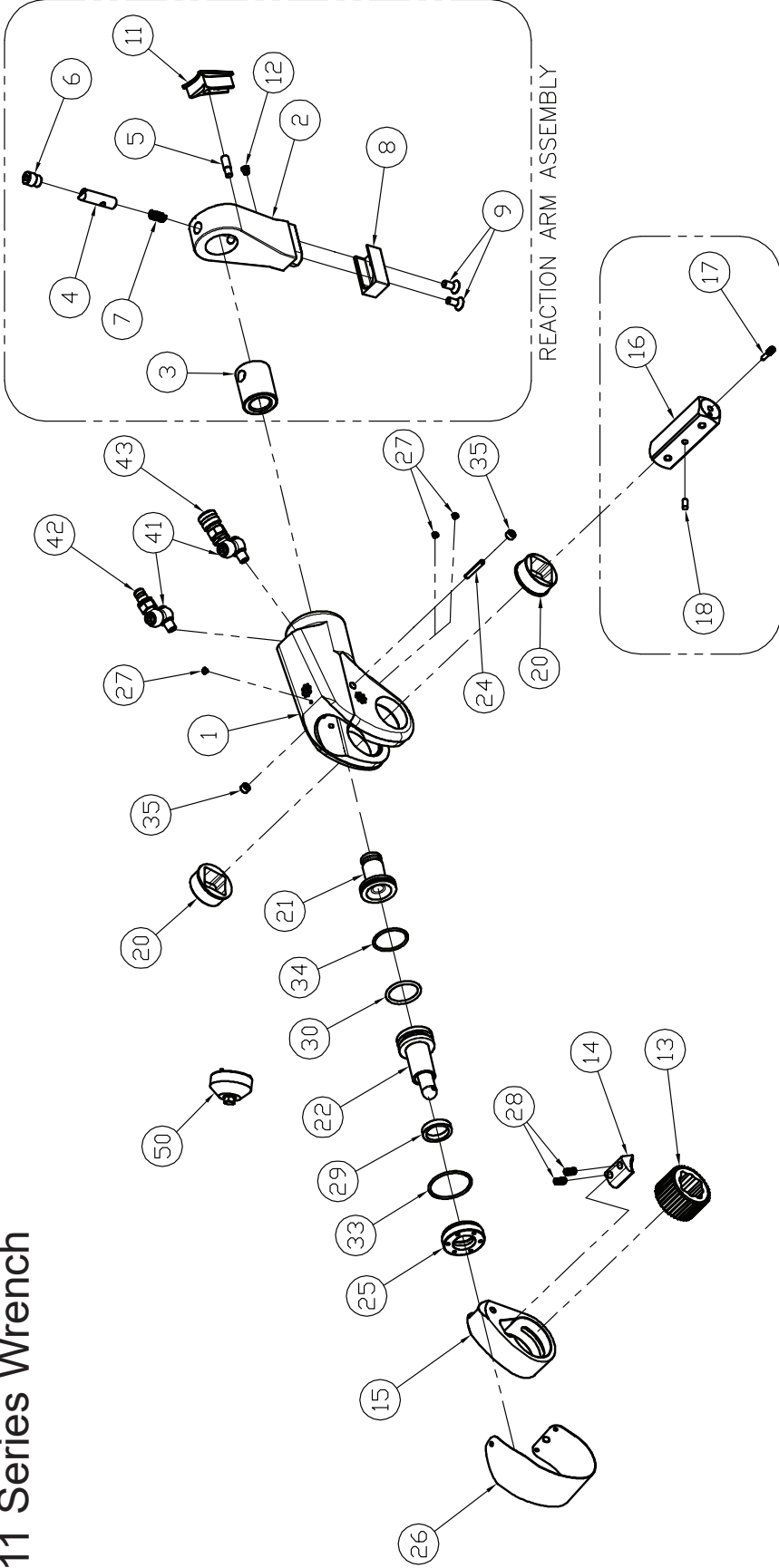
TU-3 Series Wrench



Part Numbers for Ordering

ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.
1 Housing	TU-3-01-U	1	16 Square Drive	TU-3-11-1	1	33 Gland Seal	TU-3-35	1
2 Reaction Arm	SQ-3-03-1	1	17 Sq. Dr. Retaining Screw	TU-3-11-2	1	34 End Plug Seal	TU-3-37	1
3 Spline Sleeve	TU-3-03-2	1	18 Sq. Dr. Pin	TU-3-11-3	1	37 Cylinder Ring	TU-3-43	1
4 Locking Pin	TU-3-03-3	1	20 Sq. Drive Sleeve	TU-3-13-U	2	39 Ratchet Spring	TU-3-53	1
5 Retract Button	TU-3-03-4	1	21 End Plug	TU-3-15	1	41 Swivel Assembly	STU-4M-4M	2
6 Reaction Arm Screw	TU-3-03-5	1	22 Piston Rod Assembly	TU-3-17-U	1	42 Male Coupler	HC-M-100	1
7 Reaction Arm Spring	TU-3-03-6	1	24 Roll Pin	TU-3-19	1	43 Female Coupler	HC-F-400	1
8 Reaction Arm Cover	SQ-3-03-7	1	25 Cylinder Gland	TU-3-21	1	50 Gland Wrench	ATU-3-GW	1
9 Cover Screws	TU-3-03-8	2	26 Shroud	TU-3-23-U	1	Reaction Arm Assembly	SQ-3-03	1
11 Retract Button Cover	SQ-3-03-9	1	27 Shroud Screws	TU-3-25	2	Square Drive Assembly	TU-3-11	1
13 Ratchet	TU-3-05	1	28 Drive Segment Spring	TU-3-27	2	Coupler Set	HC-S-100	1
14 Drive Segment	TU-3-07	1	29 Rod Seal	TU-3-31	1			
15 Drive Plate	TU-3-09-U	1	30 Piston Seal	TU-3-33	1			

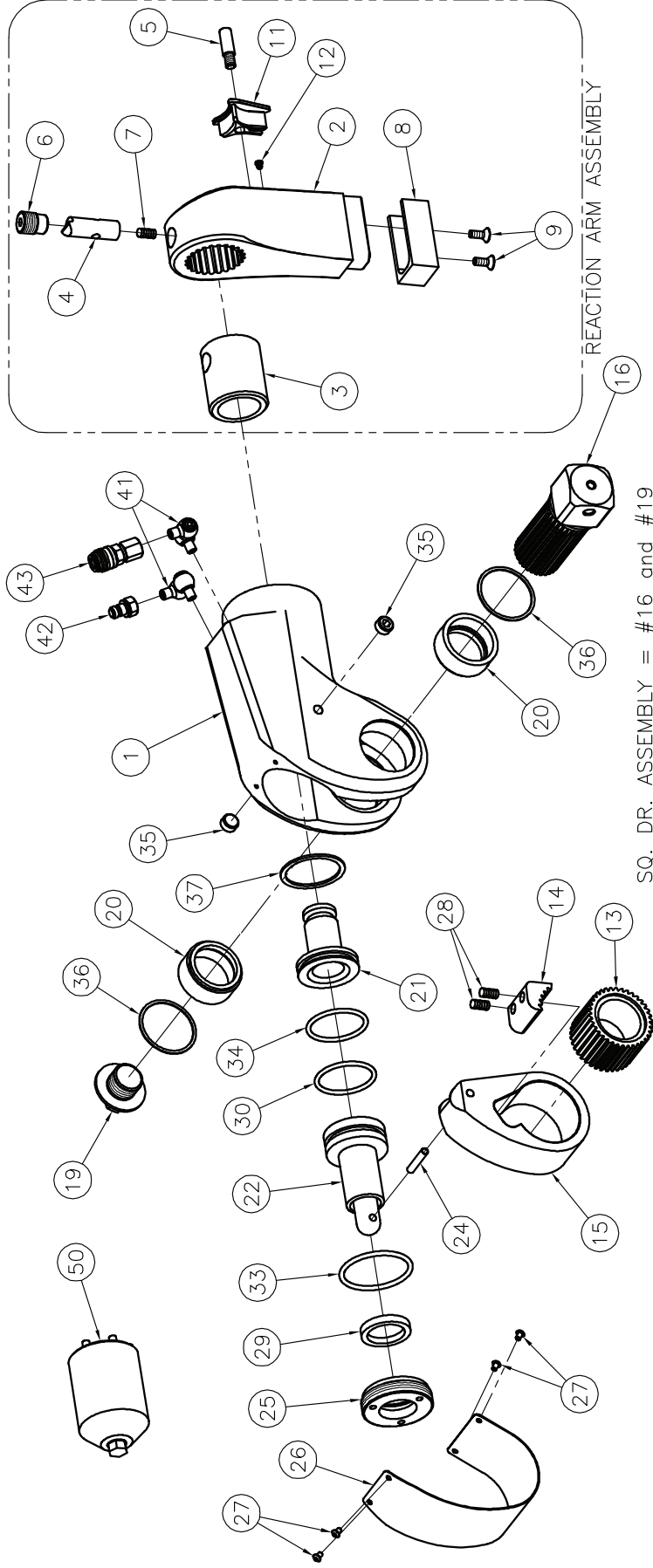
TU-11 Series Wrench



Part Numbers for Ordering

ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.
1 Housing	TU-11-01	1	16 Square Drive	TU-11-11-1	1	34 End Plug Seal	TU-11-37	1
2 Reaction Arm	SQ-10-03-1	1	17 Sq. Dr. Retaining Screw	TU-11-11-2	1	35 Housing Side Plug	TU-11-39	2
3 Spline Sleeve	TU-11-03-2	1	18 Sq. Dr. Pin	TU-11-11-3	1	41 Swivel Assembly	STU-4M-4M	2
4 Locking Pin	TU-11-03-3	1	20 Sq. Drive Sleeve	TU-11-13	2	42 Male Coupler	HC-M-100	1
5 Retract Button	TU-11-03-4	1	21 End Plug	TU-11-15	1	43 Female Coupler	HC-F-400	1
6 Reaction Arm Screw	TU-11-03-5	1	22 Piston Rod Assembly	TU-11-17	1			
7 Reaction Arm Spring	TU-11-03-6	1	24 Roll Pin	TU-11-19	1	50 Gland Wrench	ATU-11-GW	
8 Reaction Arm Cover	TU-11-03-7	1	25 Cylinder Gland	TU-11-21	1			
9 Cover Screws	TU-11-03-8	2	26 Shroud	TU-11-23	1			
11 Retract Button Cover	SQ-10-03-9	1	27 Shroud Screws	TU-11-25	3			
12 Ret. Button Guide Screw	SQ-10-03-10	1	28 Drive Segment Spring	TU-11-27	2			
13 Ratchet	TU-11-05	1	29 Rod Seal	TU-11-31	1	Reaction Arm Assembly	SQ-10-03	
14 Drive Segment	TU-11-07	1	30 Piston Seal	TU-11-33	1	Square Drive Assembly	TU-11-11	
15 Drive Plate	TU-11-09	1	33 Gland Seal	TU-11-35	1	Coupler Set	HC-S-100	

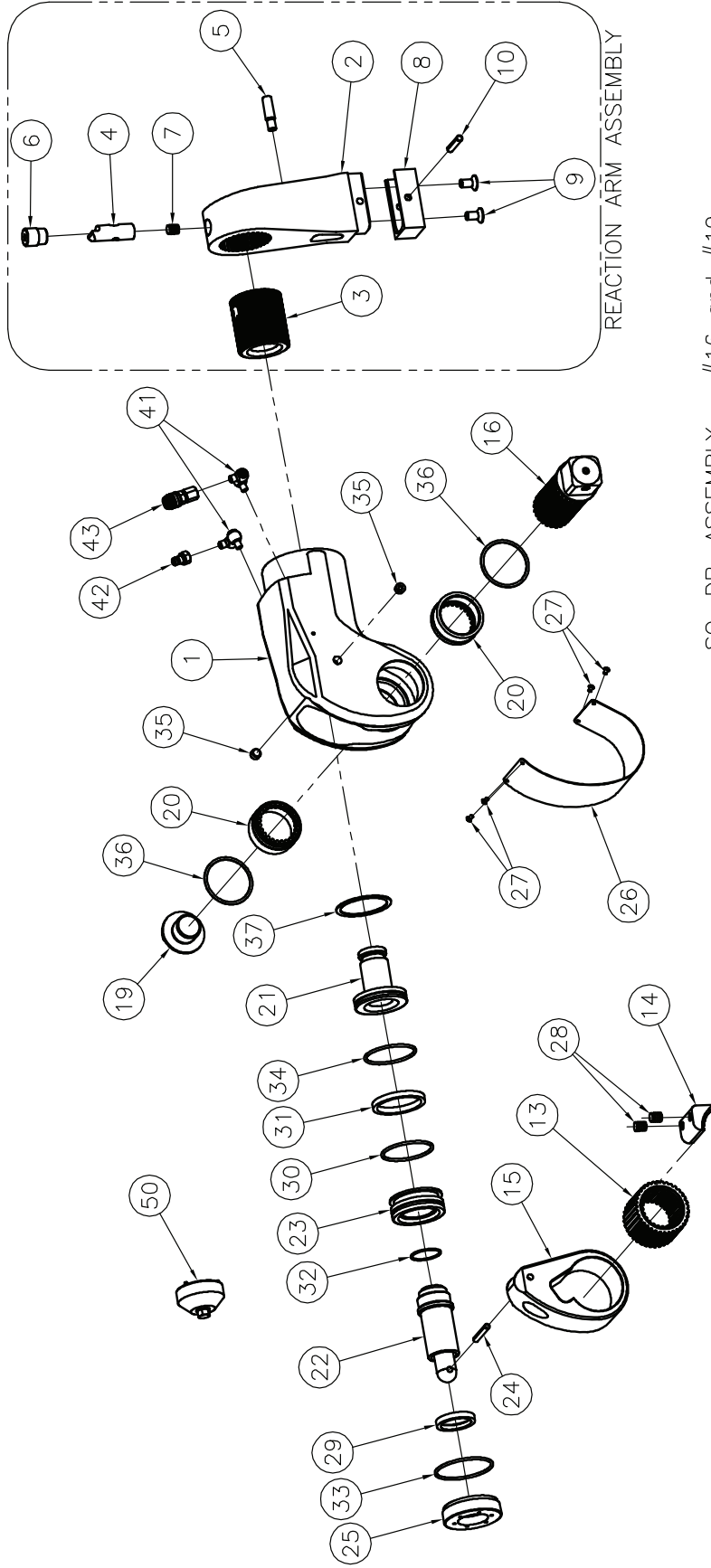
TU-27 Series Wrench



Part Numbers for Ordering

ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.
1 Housing	TU-27-01	1	16 Square Drive	TU-27-11-1	1	35 Housing Side Plug	TU-27-39	2
2 Reaction Arm	TU-27-03-1	1	19 Sq. Dr Retaining Knob	TU-27-11-6	1	36 Sleeve Retaining Ring	TU-27-41	2
3 Splined Sleeve	TU-27-03-2	1	20 Sq. Drive Sleeve	TU-27-13	2	37 Cylinder Ring	TU-27-43	1
4 Locking Pin	TU-27-03-3	1	21 End Plug	TU-27-15	1	41 Swivel Assembly	STU-4M-4M	2
5 Retract Button	TU-27-03-4	1	22 Piston Rod Assembly	TU-27-17	1	42 Male Coupler	HC-M-100	1
6 Reaction Arm Screw	TU-27-03-5	1	24 Roll Pin	TU-27-19	1	43 Female Coupler	HC-F-400	1
7 Reaction Arm Spring	TU-27-03-6	1	25 Cylinder Gland	TU-27-21	1	50 Gland Wrench	ATU-27-GW	1
8 Reaction Arm Cover	TU-27-03-7	1	26 Shroud	TU-27-23	1			
9 Cover Screws	TU-27-03-8	2	27 Shroud Screws	TU-27-25	4			
11 Retract Button Cover	TU-27-03-9	1	28 Drive Segment Spring	TU-27-27	2			
12 Retract Button Screw	TU-27-03-10	1	29 Rod Seal	TU-27-31	1			
13 Ratchet	TU-27-05	1	30 Piston Seal	TU-27-33	1			
14 Drive Segment	TU-27-07	1	33 Gland Seal	TU-27-35	1			
15 Drive Plate	TU-27-09	1	34 End Plug Seal	TU-27-37	1			

TU-60 Series Wrench

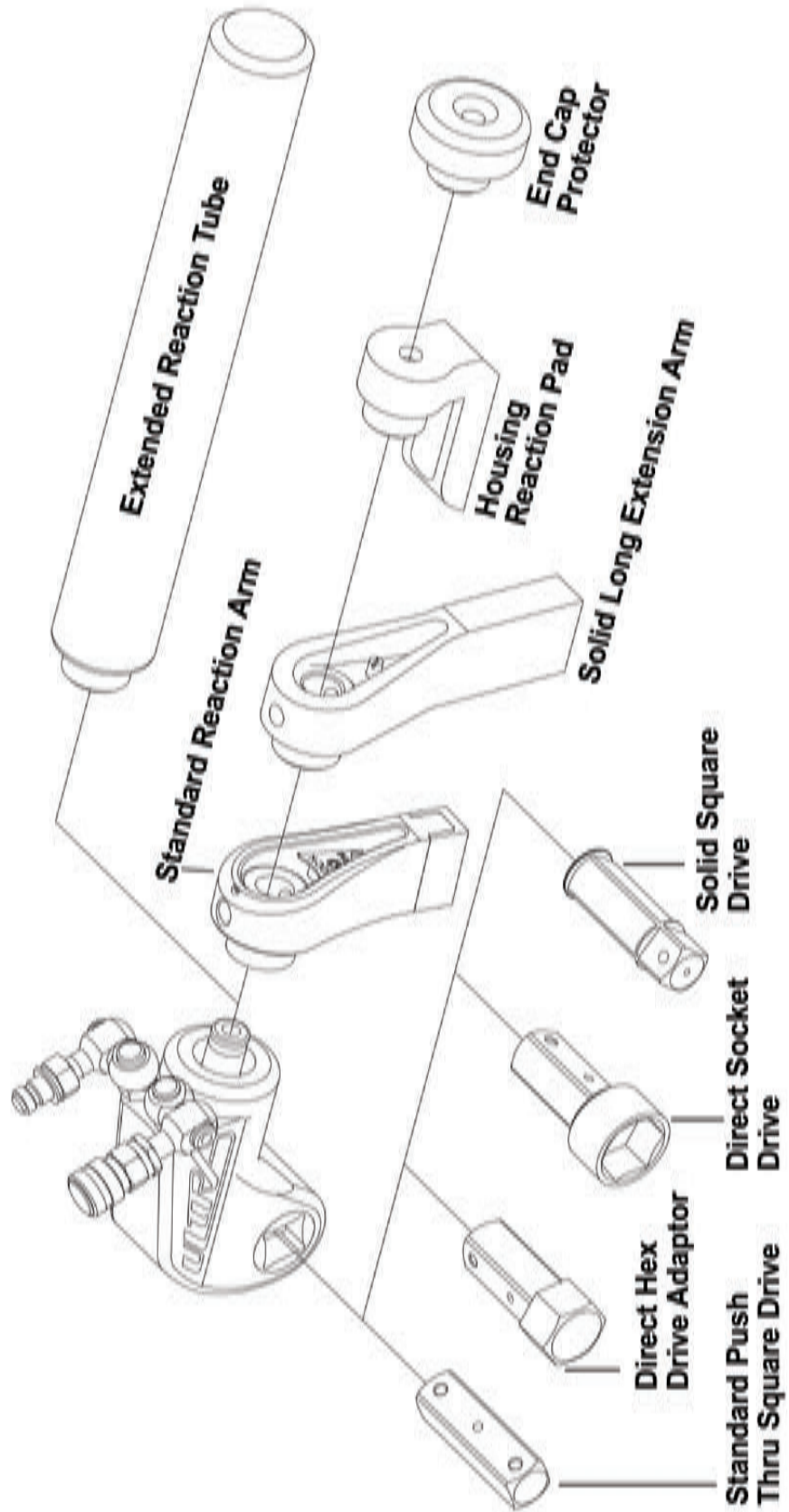


SQ. DR. ASSEMBLY = #16 and #19

Part Numbers for Ordering

ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.	ITEM NAME	PART #	QTY.
1 Housing	TU-60-01	1	19 Sq. Dr Retaining Knob	TU-60-11-6	1	33 Gland Seal	TU-60-35	1
2 Reaction Arm	TU-60-03-1	1	20 Sq. Drive Sleeve	TU-60-13	2	34 End Plug Seal	TU-60-37	1
3 Spline Sleeve	TU-60-03-2	1	21 End Plug	TU-60-15	1	35 Housing Side Plug	TU-60-39	2
4 Locking Pin	TU-60-03-3	1	22 Piston Rod Assembly	TU-60-17	1	36 Sleeve Retaining Ring	TU-60-41	2
5 Retract Button	TU-60-03-4	1	23 Piston	TU-60-17-5	1	37 Cylinder Ring	TU-60-43	1
6 Reaction Arm Screw	TU-60-03-5	1	24 Roll Pin	TU-60-19	1	41 Swivel Assembly	STU-4M-4M	2
7 Reaction Arm Spring	TU-60-03-6	1	25 Cylinder Gland	TU-60-21	1	42 Male Coupler	HC-M-100	1
8 Reaction Arm Cover	TU-60-03-7	1	26 Shroud	TU-60-23	1	43 Female Coupler	HC-F-400	1
9 Cover Screws	TU-60-03-8	2	27 Shroud Screws	TU-60-25	4			
10 Cover Roll Pin	TU-60-03-9	1	28 Drive Segment Spring	TU-60-27	2	50 Gland Wrench	ATU-60-GW	
13 Ratchet	TU-60-05	1	29 Rod Seal	TU-60-31	1			
14 Drive Segment	TU-60-07	1	30 Piston Seal	TU-60-32	1	Reaction Arm Assembly	TU-60-03	
15 Drive Plate	TU-60-09	1	31 Piston U-cup Seal	TU-60-33	1	Square Drive Assembly	TU-60-11	
16 Square Drive	TU-60-11-1	1	32 Piston Inner Seal	TU-60-34	1	Coupler Set	HC-S-100	

TU Series Wrench Available Accessories



MAINTENANCE SECTION

WARNING

Always turn off the power supply. Bleed off hydraulic fluid from the hose connections on the cylinder assembly and disconnect the hoses before attempting to repair or perform maintenance on this tool. Always wear eye protection when operating or performing maintenance on this tool.

With the release of the SQ, TU wrenches will feature SQ style reaction arms. Below are maintenance instructions for both TU and SQ style reaction arms.

DISASSEMBLY

GENERAL INSTRUCTIONS

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. Use extra care not to score, nick or damage surfaces that will contain hydraulic oil under pressure.
3. Whenever grasping a tool in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
4. Do not remove any part that is press fit in or on an assembly unless the removal of that part is necessary for repairs or replacement.
5. Do not disassemble the hydraulic cylinder assembly unless you have a complete set of seals and O-rings for replacement.
6. Use only British Standard fractional size tools when disassembling these tools.

DISASSEMBLY OF THE REACTION ARM ASSEMBLY

1. Push the reaction arm retract button cover (10) toward the reaction arm cover (8) and separate the reaction arm assembly from the housing (1).
2. While holding the button down, unscrew and remove the reaction arm spline screw (6).
3. Apply some downward pressure to the reaction arm locking pin (4) and unscrew the reaction arm retract button (5) from the locking pin (4).
4. Remove the locking pin (4) by sliding it out of the top of the reaction arm (2).
5. Remove retract button cover (11).
6. **For SQ-10 model only:** Remove retract button guide screw (12).
7. Pull the reaction arm splined sleeve (3) out of the reaction arm (2).
8. Use a hooked tool through the reaction arm screw opening, pull the reaction arm spring (7) out of the reaction arm (2).
9. To remove the reaction arm cover (8), use a hex wrench to unscrew the cover screws (9) and pull the cover off the reaction arm. **Note: For TU-20 and TU-60 models:** Remove the cover roll pin (10) prior to removing the reaction arm cover.

MAINTENANCE SECTION

CAUTION

In the following step, the shroud will spring to a straightened position when the screws at one end are removed. Hold the shroud in position until the screws are removed and control the flex of the loose end.

DISASSEMBLY OF THE TU-2, TU-3, TU-7, AND TU-11 CYLINDER ASSEMBLIES

1. Clamp the housing (1) in copper-covered or leather-covered vise jaws with the swivel assemblies upward and using a 1/4" hex wrench, unscrew and remove the two swivels (41) with their attached couplers (42&43).
2. Remove the housing assembly from the vise jaws and turn over a container to catch any oil remaining inside the cylinder.
3. Use a hex wrench to unscrew and remove the shroud mounting screws (27). Remove the shroud (26). **Note: For TU-3 models**, the drive side shroud screw holds the ratchet spring (39) in place, which will come out with the removal of the shroud.
4. **For TU-7 and TU-11 models**, use a hex wrench to unscrew and remove the side housing plugs (35) from each side of the housing (1).
5. If the piston assembly (22) is not fully retracted, use a brass drift or brass hammer to tap the assembly inward until the roll pin (24) aligns with the cross holes in the housing. **Note:** Covering the inlets with a cloth will contain any oil that may expel from the housing.
6. Use a small drift to tap the roll pin (24) out of the piston rod assembly (22) and drive plate (15).
7. Insert a hex wrench through the larger opening in the square drive (16) and loosen the square drive locking pin (17) until the square drive slides out of the tool. **Note: Use caution when removing the square drive.** The square drive pin (18) loosely fits in the square drive and can fall out when the drive is removed.
8. Remove the drive plate (15), assembled with the ratchet (13), drive segment (14) and segment springs (28).
9. Using finger pressure, push the sleeves (20) inward to remove them from the housing (1).
10. Being careful not to let the springs (29) eject from the assembly, slide the ratchet (13), drive segment (14) and segment springs (28) out of the drive plate (15).

NOTICE

The cylinder gland is staked into the housing to prevent it from loosening due to vibration or turbulence in the hydraulic oil flow. The stake point must be drilled out before attempting to remove the cylinder gland.

11. Locate the stake point on the threads of the cylinder gland (25) and housing. Using a 1/16" drill bit centered on the stake point, drill approximately 3/32" deep in one continuous motion to remove the thread and interference at that point.
12. Engage the pins of the cylinder gland wrench (50) with the holes in the cylinder gland (25) and using a socket on the hex of the wrench unscrew and remove the cylinder gland. If the gland does not rotate freely after initial breakout, additional drilling, in small increments, may be required to remove the obstruction.
13. Clamp the housing (1) in the vise with the end plug (21) upward and a catch cloth draped between the jaws.
14. Insert a flat face drift into the hole in the center of the end plug (21). Tap the end plug and piston assembly (22) lightly until both the piston assembly and end plug slip through the housing (1) and into the catch cloth.
15. While using caution as to avoid scratching the cylinder, remove the cylinder ring (37) by using a thin blade screwdriver to work it out of the groove within the housing.

MAINTENANCE SECTION

CAUTION

In the following step, the shroud will spring to a straightened position when the screws at one end are removed. Hold the shroud in position until the screws are removed and control the flex of the loose end.

DISASSEMBLY OF THE TU-5, TU-20, TU-27, AND TU-60 CYLINDER ASSEMBLIES

1. Clamp the housing (1) in copper-covered or leather-covered vise jaws with the inlet end upward. Use a 1/4" hex wrench to unscrew and remove the two swivels (41) with their attached couplers (42&43).
2. Remove the housing assembly from the vise jaws, and turn over a container to catch any oil remaining inside the cylinder.
3. Use a hex wrench to unscrew and remove the shroud mounting screws (27). Remove the shroud (26).
4. Use a hex wrench to unscrew and remove the side housing plugs (35) from each side of the housing.
5. If the piston assembly (22) is not fully retracted, use a brass drift or brass hammer to tap the assembly inward until the roll pin (24) aligns with the cross holes in the housing (1). **Note:** Covering the inlets with a cloth will contain any oil that may expel from the housing.
6. Use a small drift to tap the roll pin (24) out of the piston rod assembly (22) and drive plate (15). **Note: For TU-20 models,** retract screws are used in the place of the roll pin. Use a hex wrench to remove the retract screws from the drive plate.
7. Unscrew the square drive retaining knob (19). Pull out the square drive (16).
8. Remove the drive plate (15), assembled with the ratchet (13), drive segment (14) and segment springs (28).
9. Using finger pressure, push the sleeves (20) inward to remove them from the housing (1). Remove the sleeve retainers (36).
10. Being careful not to let the segment springs (28) eject from the assembly, slide the ratchet (13), drive segment (14), and segment springs (28) out of the drive plate (15).
11. Locate the stake point on the threads of the cylinder gland (25) and housing. Using a 1/16" drill bit centered on the stake point, drill approximately 3/32" deep in one continuous motion to remove the thread and interference at that point.
12. Engage the pins of the cylinder gland wrench (50) with the holes in the cylinder gland (25). Use a socket on the hex of the wrench to unscrew and remove the cylinder gland. If the gland does not rotate freely after initial breakout, additional drilling, in small increments, may be required to remove the obstruction.
13. Clamp the housing (1) in the vise with the end plug (21) upward and a catch cloth draped between the jaws.
14. **For TU-20 models,** use a 1" square drive extension and an adjustable wrench to unscrew the end plug (21) from the spline sleeve (3). Pull the spline sleeve from the housing.
15. Insert a flat face drift into the hole in the center of the end plug (21). Tap the end plug and piston assembly (22) lightly until both the piston and end plug slip through the housing (1) and into the catch cloth.
16. While using caution as to avoid scratching the cylinder, remove the cylinder ring (37) using a thin blade screwdriver to work it out of the groove within the housing.

MAINTENANCE SECTION

ASSEMBLY

GENERAL INSTRUCTIONS

1. Use extra care not to score, nick, or damage surfaces that will contain hydraulic oil under pressure.
2. Whenever grasping a tool in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
3. Apply O-ring lubricant to all O-rings before final assembly.

NOTICE

Inspect all parts prior to assembly. Replace any worn or damaged parts.

ASSEMBLY OF THE TU-2, TU-3, TU-7, AND TU-11 CYLINDER ASSEMBLIES

1. Install the cylinder ring (37) into the groove at the inlet end of the housing (1).
2. Clamp the housing (1) in copper-covered or leather-covered vise jaws with the inlet end facing downward.
3. Insert the end plug (21), small end leading, into the bore of the housing. Using a brass drift, tap the end plug into the cylinder approximately 1/2".
4. Insert the piston rod assembly (22), shaft trailing, into the bore of the housing. Using a brass drift, tap the piston rod assembly into the housing (1) until the end plug bottoms out against the cylinder ring (37).
5. Thread the cylinder gland (25) into the housing (1). Tighten with the gland wrench (50) and a socket until flush with the housing.
6. Reposition the housing in the vice with the inlet end upward.
7. Wrap the swivel (41) threads with Teflon tape. Install the swivel with the male coupler into the port marked 'A' (on the right when looking at the inlets) and the swivel with the female coupler into the port marked 'R' (on the left when looking at the inlets).
8. Connect the tool to a pump and cycle several times to check for leaks.
9. **If leaks are present**, disconnect the hoses and take the necessary steps to correct the problem. **If no leaks are detected**, disconnect the hoses and re-clamp the tool in the vise with the inlet end downward.
10. Stake the thread of the gland (25) and housing (1). Make certain the stake point deforms both the housing and gland.
11. Wipe a thin film of marine moly grease on the sides of the drive plate (15) as well as the inner race and piston rod recess of the drive plate.
12. Insert the ratchet (13) into the drive plate (15).
13. Position the drive segment (14) at the cavity ensuring the ratchet (13) and drive segment engage properly. If they will not engage properly, reverse the ratchet in the drive plate.
14. Insert the segment springs (28) into the holes of the drive segment (14) and compress the springs while installing the drive segment into the drive plate (15).
15. Wipe a thin film of marine moly grease around the outside of the drive sleeves (20) and install, with the shoulder trailing, into the bores on each side of the housing, from the inside.
16. Insert the drive plate assembly into the housing (1) with the pocket for the piston rod toward the piston, ensuring alignment of the holes in the drive plate and piston.
17. Insert the roll pin (24) into the hole in the drive plate through the hole in the housing (1). Use a drift and hammer to tap the pin into the plate making certain the pin does not protrude beyond either side of the drive plate.

MAINTENANCE SECTION

18. Use a hex wrench to loosen the square drive locking pin (17) enough so that the square drive pin is flush with the square drive.
19. Insert the square drive into the housing (1) through the drive sleeves (20) and tighten the drive locking pin so that the square drive can slide freely without sliding out.
20. Place one end of the shroud (26) on the housing (1) and, using a hex wrench, thread the shroud screws (27) part way in.
21. Bend the shroud (26) around the housing (1) and install the remaining screws, going back and tightening the screws from the previous step.

NOTICE

Inspect all parts prior to assembly. Replace any worn or damaged parts.

ASSEMBLY OF THE TU-5, TU-20, TU-27, AND TU-60 CYLINDER ASSEMBLIES

1. Install the cylinder ring (37) into the groove at the inlet end of the housing (1).
2. Clamp the housing (1) in copper-covered or leather-covered vise jaws with the inlet end downward.
3. Insert the end plug (21), small end leading, into the bore of the housing (1). Using a brass drift, tap the end plug into the cylinder approximately 1/2".
4. Insert the piston rod assembly (22), shaft trailing, into the bore of the housing (1). Using a brass drift, tap the piston rod assembly into the housing until the end plug bottoms out against the cylinder ring.
5. Thread the cylinder gland (25) into the housing (1). Tighten with the gland wrench (50) and a socket until flush with the housing.
6. Reposition the housing (1) in the vice with the inlet end upward.
7. Wrap the swivel (41) threads with Teflon tape. Install the swivel with the male coupler into the port marked 'A' (on the right when looking at the inlets) and the swivel with the female coupler into the port marked 'R' (on the left when looking at the inlets).
8. Connect the tool to a pump and cycle several times to check for leaks.
9. **If leaks are present**, disconnect the hoses and take the necessary steps to correct the problem.
If no leaks are detected, disconnect the hoses and re-clamp the tool in the vise with the inlet end downward.
10. Stake the thread of the gland (25) and housing (1). Make certain the stake point deforms both the housing and gland.
11. Wipe a thin film of marine moly grease on the sides of the drive plate (15) as well as the inner race and piston rod recess of the drive plate.
12. Insert the ratchet (13) into the drive plate (15).
13. Position the drive segment (14) at the cavity, ensuring the ratchet (13) and drive segment engage properly. If they will not engage properly, reverse the ratchet in the drive plate.
14. Insert the segment springs (28) into the holes of the drive segment and compress while installing the drive segment into the drive plate.
15. Insert the drive plate assembly into the housing (1) with the pocket for the piston rod toward the piston, ensuring alignment of the holes in the drive plate and piston.

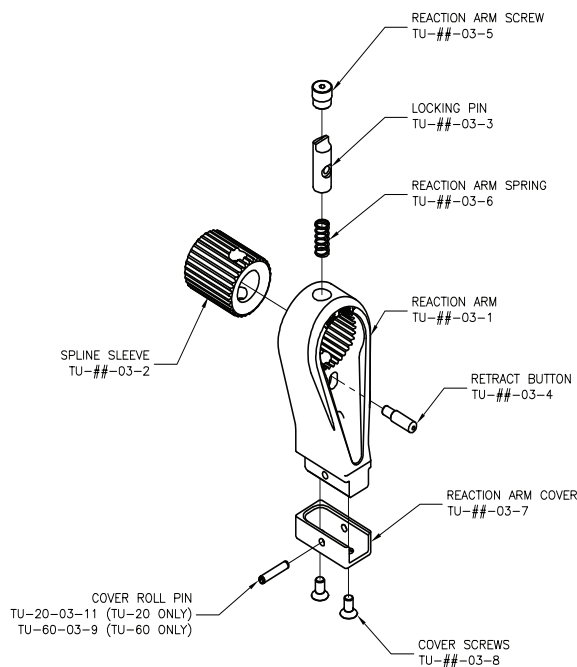
MAINTENANCE SECTION

17. Install the square drive sleeves (20) with the small hub end leading. The small hub must engage the recess in the drive plate assembly. Install the sleeve retaining rings (36).
18. Insert the square drive (16) into the housing through the drive sleeves (20). Install the square drive retaining knob (19) in the end of the square drive and tighten.
19. Insert the roll pin (24) into the hole in the drive plate (15) through the hole in the housing (1). Use a drift and hammer to tap the pin into the plate making certain the pin does not protrude beyond either side of the drive plate. **Note: For TU-20 models**, retract screws (24) are used in the place of the retract pin. Use a hex wrench to install into the drive plate.
20. Place one end of the shroud (26) on the housing (1) and, using a hex wrench, thread the shroud screws (27) part way in.
21. Bend the shroud (26) around the housing (1) and install the remaining screws, going back and tightening the screws from the previous step.

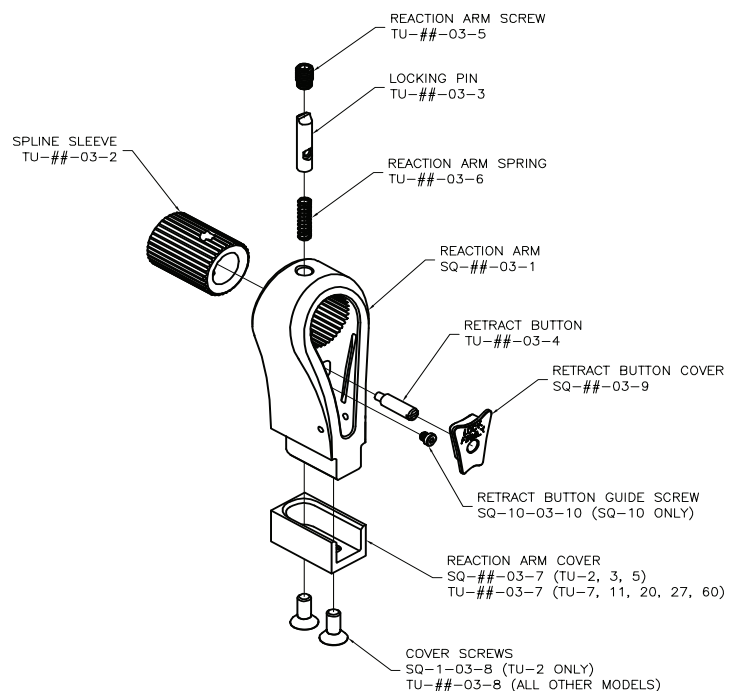
MAINTENANCE SECTION

ASSEMBLY OF THE TU/SQ REACTION ARM

1. If the reaction arm cover was removed, push it onto the end of the reaction arm and secure it with the cover screws.
2. **For TU-60 model only:** Install the cover roll pin into the reaction arm and cover.
3. Insert the reaction arm spring into the blind hole below the bore for the spline sleeve.
4. Push the spline sleeve into the reaction arm so that the holes in the sleeve align with the reaction arm screw hole. The sleeve should protrude from the back of the arm.
5. **For SQ-10 model only:** Install the retract button guide screw, applying a small amount of serviceable thread locking compound to the threads.
6. **For SQ style arms only:** Install the retract button cover in the slots in the inside pocket of the reaction arm.
7. Insert the locking pin into the reaction arm through the reaction arm screw opening, while ensuring the screw hole is accessible through the slot in the reaction arm.
8. Apply some downward pressure to the locking pin and thread the retract button into the locking pin through the slot in the reaction arm. Use a small amount of serviceable thread locking compound on the threads and tighten.
9. Thread the reaction arm screw into the reaction arm and tighten until the unthreaded end enters the hole in the spline sleeve and the threads bottom out.



TU Style Reaction Arm

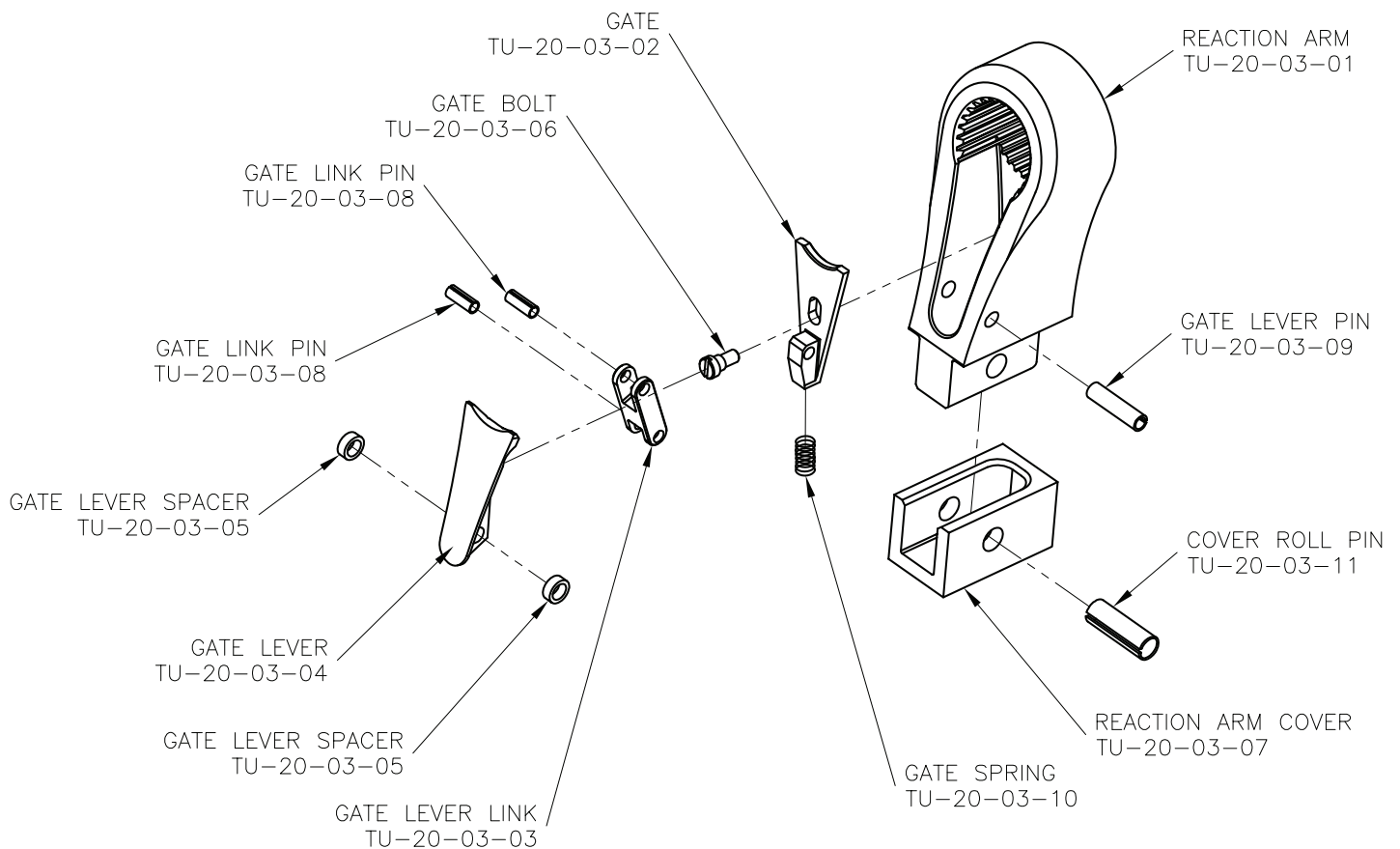


SQ Style Reaction Arm

MAINTENANCE SECTION

ASSEMBLY OF THE OLD-STYLE TU-20 REACTION ARM

1. If the reaction arm cover was removed, push it onto the end of the reaction arm and insert the cover roll pin to retain the cover using a hammer.
2. Assemble the gate lever to the gate lever link using the gate link pin.
3. Assemble the gate to the gate lever link using the second gate link pin.
4. Insert the gate spring into the gate.
5. Hold the gate in the reaction arm and thread the gate bolt through the gate into the reaction arm. Use a small amount of serviceable thread locking compound on the threads. Tighten with a screwdriver.
6. Place the gate lever spacers over the gate lever.
7. Swing the gate lever and the link into the reaction arm with the gate lever spacers.
8. Insert the gate lever pin into the reaction arm through the gate lever and the gate lever spacers.



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 switch	Replace the switch 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 that the retract on the pump is connected to the retract on the tool.
	Retract hose not connected	Connect the retract hose securely.
	Retract pin broken	Replace the broken pin and/or spring.
Cylinder will not build up pressure	Piston seal and/or end plug Seal leaking	Replace any defective O-rings.
	Coupler is defective	Replace any defective coupler.
Square drive will not turn	Grease or dirt build up in the teeth of the ratchet and drive segment	Disassemble the ratchet and clean the grease or dirt out of the teeth.
	Worn or broken teeth on ratchet an/or drive segment	Replace any worn or damaged parts.
Tool tightens immediately when turned on	Hose connections are reversed	Depress the advance button to release the tool; shut the pump off in the advance position and reverse the hose connection.
Pump will not build up pressure	Defective relief valve	Inspect, adjust or replace the relief valve.
	Clogged Filter	Inspect, clean and/or replace the pump filter.
	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.
Pressure reading erratic	Defective gauge	Replace the gauge.

SAVE THESE INSTRUCTIONS DO NOT DESTROY

NOTES:



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