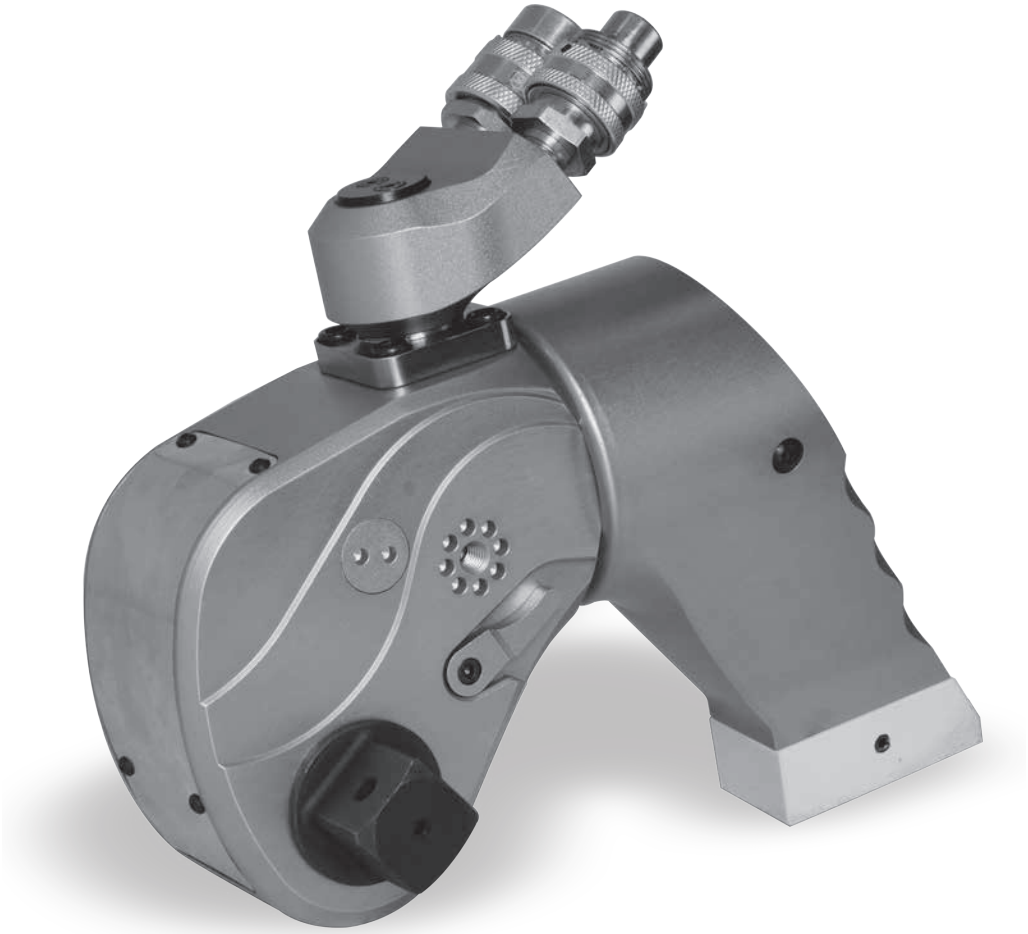


ATWS SERIES

Hydraulic Torque Wrench

Operation and Maintenance Manual

Use the ATWS Series Torque Wrenches to install and remove threaded fasteners requiring precise high torque during bolt makeup and maximum torque during bolt breakout.

Read and understand this Operation and Maintenance Manual before using Torque Wrenches. Use only genuine Manufacturer replacement parts. Other parts may result in safety hazards, decreased tool performance, increased maintenance and an invalidated warranty.

Table of Contents

Important Safety Instructions

UPON RECEIPT OF THIS TOOL, INSPECT THE PACKAGE FOR DAMAGE.

Carefully inspect all components for damage incurred during shipping. If any shipping damage is found, notify the carrier at once. Shipping damage is NOT covered by warranty. The carrier is responsible for all repair or replacement costs resulting from damage in shipment.

The hydraulic torque wrench is a power tool. Read all instructions, warnings and precautions before every operation. Comply with the safety precautions to avoid personal injury or equipment damage while operating this tool.

Neither Manufacturer, nor its distributors are responsible for damages caused by unsafe and/or faulty operations. If a problem arises during use, shut off the power immediately and consult your ATWS distributor.

ALL OF OUR PRODUCTS MAY HAVE UPGRADES AND MODIFICATIONS WITHOUT NOTICE.

Warnings and Cautions: Safety First!

▲ WARNING

Never use a hydraulic torque wrench without a hydraulic gauge to indicate the working pressure.

▲ WARNING

To avoid personal injuries and/or equipment damage, be sure that all hydraulic components are rated for 10,000PSI (700bar) operating pressure.

▲ WARNING

DO NOT exceed the allowable maximum torque of the hydraulic torque wrench.

▲ WARNING

Immediately replace any worn or damaged parts with new manuafactrer parts.

▲ WARNING

To avoid personal injuries, equipment damage and/or warranty invalidation:
DO NOT remove the shroud from the hydraulic torque wrench.
DO NOT modify any component of the hydraulic torque wrench.
DO NOT adjust the hydraulic torque wrench safety relief valve located inside the swivel couplings.

▲ WARNING

Only use a high quality socket. The socket must measure up to standard ISO-2725 and ISO-1174 or DIN3129 and DIN3121 or ASME-B107.2/1995. Never use a chrome plated socket.

▲ WARNING

Always use a pin to lock the socket with the square drive in order to avoid the socket from falling off or damaging the square drive.

▲ CAUTION

Keep all hydraulic torque wrench components away from excessive heat, flame, moving machine parts, sharp edges and chemicals.

▲ CAUTION

Avoid sharp bends and kinks when routing the hydraulic hose assembly. A bent or kinked hydraulic hose assembly will cause severe back-pressure. They will also damage the internal lining of the hose leading to premature failure. Replace a kinked or damaged hydraulic hose assembly immediately.

▲ CAUTION

DO NOT drive over, crush or drop heavy objects onto the hydraulic hose assembly. Crush forces may damage hose wire strands and applying pressure to a damaged hose assembly may cause it to rupture. Replace all crushed hydraulic hose assemblies immediately.

▲ CAUTION

DO NOT expose the hydraulic hose assembly to high temperatures.

▲ CAUTION

DO NOT use old or damaged sockets.
DO NOT use the wrong size sockets.

Other Safety Notes

- Loose or dirty couplers will cause tool not to operate properly.
- To avoid personal injuries and/or equipment damage, be sure that all hydraulic components are rated for 10,000PSI (700bar) operating pessure.
- Always inspect the hydraulic hose assembly for damage and wear before using it
- Make sure the hydraulic torque wrench swivel couplings , hose couplings and hydraulic power pack couplings are clean and free of debris prior to connecting the hydraulic torque wrench and hydraulic hose assembly to the assembled power pack.

Personal Protective Equipment (PPE)

When operating hydraulic equipment, use proper safety equipment and clothing. Consult with your company's safety representative for this information.

Operating Precondition

Reference the Operation and Maintenance Manual of the electric or air powered hydraulic power pack before using.

Preparation

Prior to use determine:

- Nut or bolt head size
- Material and strength grade
- Determine the desired torque

Appendix I, presented for reference only, gives typical torque values specified for the most commonly encountered fasteners. You should always abide by established procedures for the job site. Torque sequence may vary from manufacturer to manufacturer and even on job sites depending on the gasket material etc.Refer to your company's engineering department for this information.

Hydraulic System Connecting

1. Inspect the components of the hydraulic torque wrench set.
2. Connect the hydraulic torque wrench,hydraulic hose assembly and the hydraulic power pack to a hydraulic circuit.
3. Ensure all hydraulic connections are securely connected.
4. Verify that the hydraulic hose assembly is not kinked, crushed or damaged.

Torque value

Determine the corresponding pressure of the hydraulic power pack to achieve the required torque value.

You can find this information in the Pressure - Torque Chart provided with the hydraulic torque wrench.

Important

To avoid hydraulic torque wrench malfunction:

- DO NOT reverse connectors.
- DO NOT tamper with the set screw on the swivel assembly. (It is factory preset for safety purposes and adjustments should only be made by trained personnel.)

Connect the hydraulic hose assembly to the swivel as shown below:

Ensure the connectors are fully engaged and screwed snugly together.

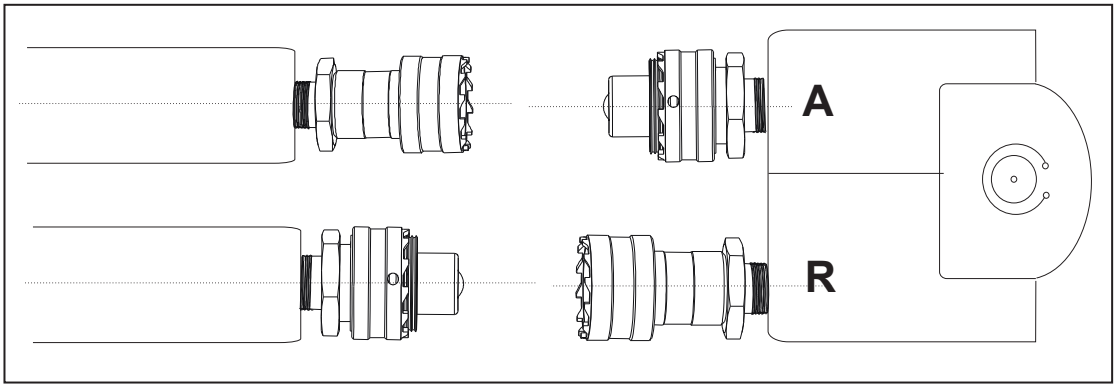


Figure1

CAUTION

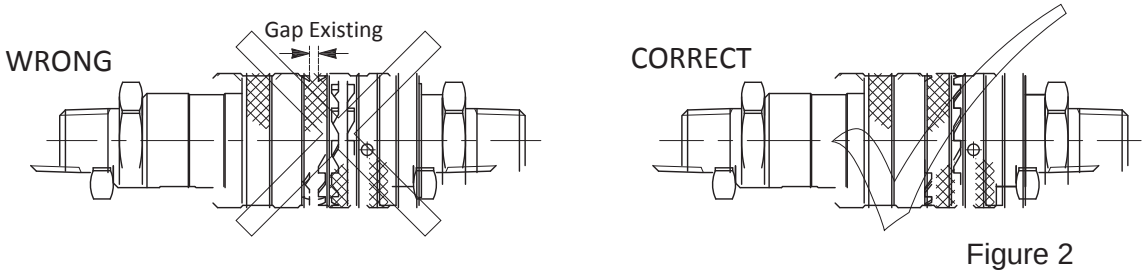


Figure 2

Setting the pressure on the hydraulic power pack:

1. Loosen the locking ring below the “T” handle on the hydraulic power pack external pressure regulator.
2. Turn the “T” handle counterclockwise until it turns freely and easily.
3. Turn the hydraulic power pack on.
4. Push the advance switch (or button on the air hydraulic power pack) on the hydraulic power pack remote pendant and hold it.
5. Keep the hydraulic power pack in advance mode and slowly turn the “T” handle clockwise.
6. Observe the hydraulic power pack pressure gauge rise.

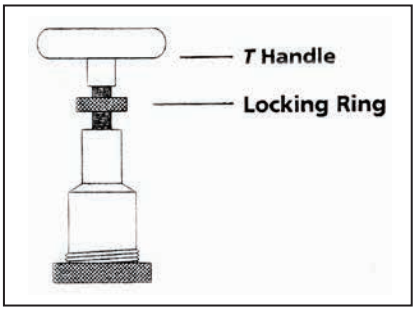


Figure 3

Note: Always adjust the regulator pressure UP-never down.

7. When the gauge reaches the correct predetermined pressure, stop turning the “T” handle.
8. Let the gauge settle.
9. If pressure goes up over predetermined value, please use the "T-Handle" to regulate in counterclockwise to make pressure at predetermined value. Lock regulator by fixed screw. Try operating by pressure up and down and make sure to achieve predetermined value.
10. When the pressure is correct, turn the pump off and tighten the locking ring under the “T” handle.
11. This sets the pump pressure, controlling the torque wrench output.
12. Cycle the hydraulic power pack to ensure the pressure setting did not change as you tightened the locking ring.

Important:

The reading of full preset pressure after the cylinder is extended DOES NOT INDICATE this pressure (torque) is applied to the bolt /nut . It only indicates that the cylinder is fully extended and cannot turn the socket further until the tool automatically resets itself.

- Releasing the remote control button automatically retracts the cylinder.
- The hydraulic torque wrench will automatically reset itself.
- You will hear an audible “click” indicating that you can again push the remote control button and the socket will turn.
- Each time the cylinder is extended and retracted, it is called a cycle.
- Successive cycles are made until the tool “stalls” at the preset Torque/PSI with an accuracy of +/-3%. Repeatability is +/-1%.
- Cycle the tool one last time to achieve total torque.

The Loosening Process:

1. Set the hydraulic power pack to 10,000 PSI.
2. Reposition the tool so the reaction surface abuts squarely on a solid reaction point.
3. Press and hold hydraulic power pack's remote control advance button.
4. Pressure will decrease as the nut begins to turn.
5. When the cylinder is fully extended, you will hear an audible "click".
6. Release the remote control advance button and the hydraulic torque wrench's cylinder will automatically retract
7. Listen again for the audible "click".
8. Repeat this process until you can remove the fastener by hand.

After the operation

1. Upon completing the project; turn off the power to the hydraulic power pack.
2. First disconnect the coupler connections between the hydraulic torque wrench and hydraulic hose assembly.
3. Then disconnect the hose addembly from the hydraulic power pack.
4. Loosen the locking ring below the "T" handle on the hydraulic power pack external pressure regulator.
5. Turn the "T" handle counterclockwise until it turns freely and easily.
6. When not in use, store tools and accessories properly to avoid damage.

Operating For ATWS Series

Before every operating, always read and follow the operation instructions.

Applying the Hydraulic Torque Wrench

1. Place the socket on the nut.
2. Ensure it is the correct size and fully engaged
3. Remove socket from nut.
4. Attach the socket to the square drive and place it on the nut.
5. Cycle the hydraulic torque wrench.
6. Position the reaction surface against an adjacent nut, flange or solid system component.
7. Make certain that there is clearance for the hydraulic hose assembly, swivels and couplings.
8. Do not allow the tool to react against the hydraulic hose assembly , swivels or couplings.
9. Depress the remote control advance button to turn the square drive.
10. Check to make sure all body parts are safely out of harm's way before applying pressure to the hydraulic wrench.
    a. This tool has massive power and can cause physical harm.
11. The nut will beg in to turn when you apply hydraulic pressure to the hydraulic torque wrench and the reaction surface moves against the reaction point.
12. Once the piston reaches the end of its stroke, release the remote button and the tool will automatically retract the piston.
13. The operator will hear an audible "click".
    a. Each "advance and retract" is considered on cycle.
14. Continue cycling the hydraulic torque wrench until it "stalls" and the preset PSI/ Torque has been attained.
15. Cycle the tool one last time to ensure total torque.

Setting the Square Drive for Rotation

The position of the square drive when looking at the shroud will determine if the hydraulic torque wrench is set to loosen or tighten

.

▲ When the square drive extends to the LEFT when looking at the shroud, the hydraulic torque wrench is set to loosen.

▲ When the square drive extends to the RIGHT, the hydraulic torque wrench is set to tighten.

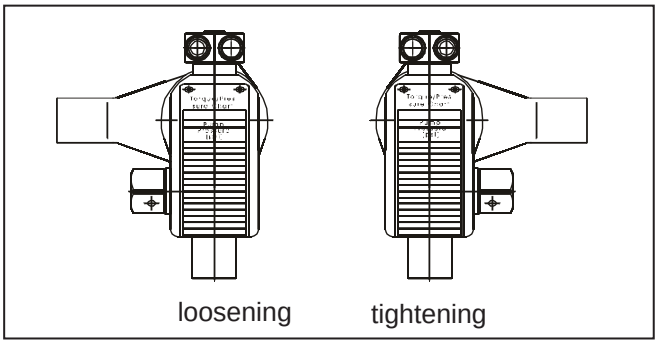


Figure 4

LEFT IS LOOSE. RIGHT IS TIGHT.

Removing the square drive:

Disengage the drive retainer assembly by depressing the center round button and by gently pulling on the square end of the square drive. The square drive will the square drive. The square drive will slide out.

Inserting the square drive:

1. Place the drive in the desired direction and engage the drive and bushing splines.

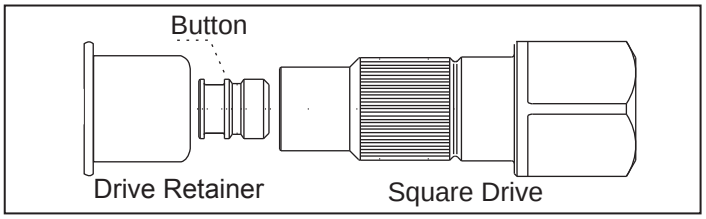


Figure 5

2. Twist the drive and bushing until the ratchet spline can be engaged.
3. Push the drive through the ratchet.
4. Depress drive retainer button, engage retainer with drive and release button to lock.

"Locked-On"

Should the hydraulic torque wrench be "locked-on" after the final cycle:

1. Push the remote control advance button to build pressure.
2. Maintain this pressure and push the release lever located on the side of the tool.
3. Release the remote control advance button, while continuing to push down on the release lever.
4. Remove the hydraulic torque wrench.

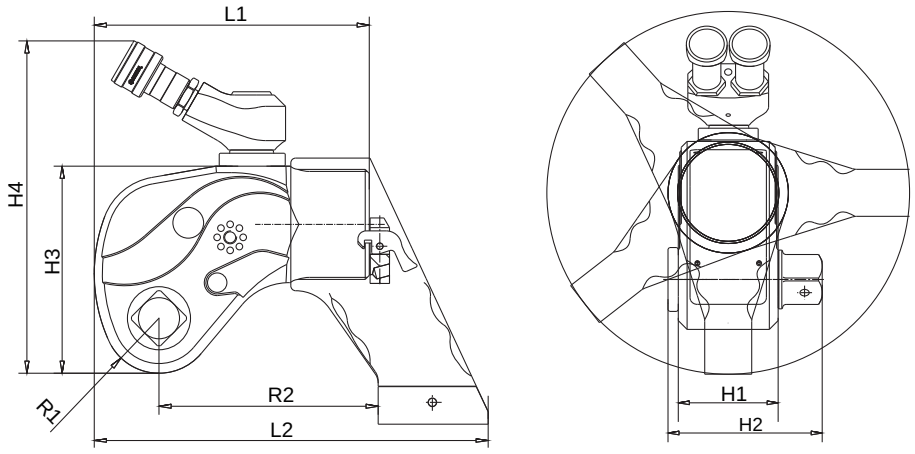
Figure 6

Trouble Shooting Chart For ATWS Series Torque Wrench

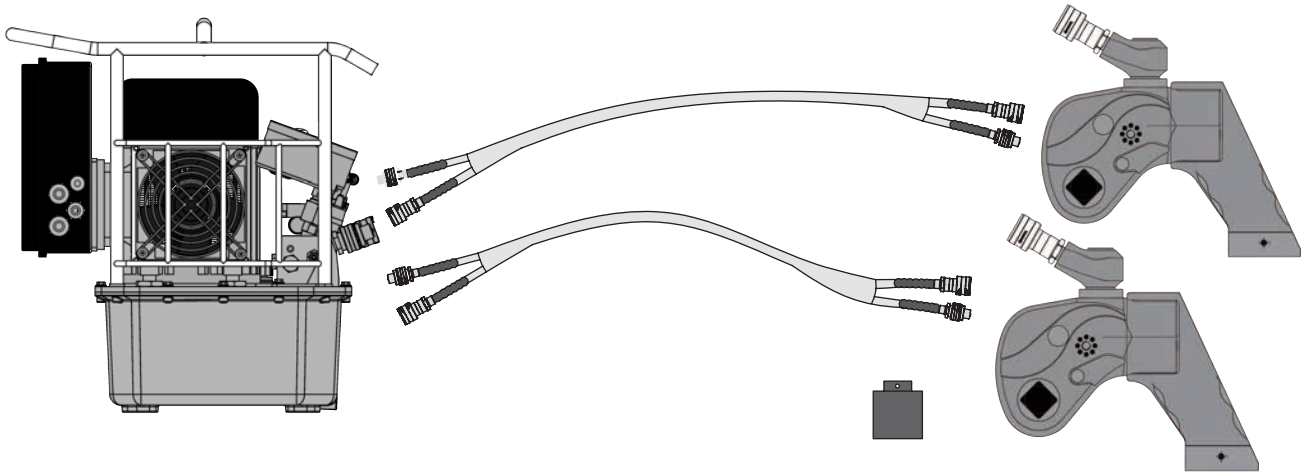
SYSTEM	PROBLEM CAUSE	REMEDY
Cylinder will not advance	Coupler loose or damaged Direction-control valve on pump Coupler not mated securely	Tighten/Replace Disassemble and clean /replace Tighten
Cylinder will not retract	See above	See above
Cylinder will not build up pressure	Piston seal leak Coupling is not mated properly or is defective Gauge	Replace seals Replace coupling Replace gauge
Cylinder leaks	Leaking seals	Replace housing seals
Cylinder operates backwards	Couplers are reversed on hoses, pump , or tool	Reverse couplers
Ratchet returns on retract stroke	Broken reaction pawl Defective reaction pawl spring	Replace Replace
Ratchet will notmake successive strokes	Defective drive pawl spring Defective drive pawl Cylinder is not retracting completely	Replace Replace Remove and cycle tool freely and return to job
Tool cannot be removed from nut	Reaction pawl is engaged	Begin forward cylinder stroke. While applying pressure, push down on release lever (on side of tool). While holding release, allow the cylinder to retract. Remove tool
No pressure reading on gauge	Gauge not tight Pump coupling broken Gauge defective Defective cylinder seals	Tighten coupler Replace Replace Inspect and replace all cylinder seals
Pump will not build pressure	Defective relief valve Air supply too low or air hose size too small Electric power source is too low Gauge Filter is clogged	Inspect and replace Check for 100 PSI air pressure, 1 ID air hose Insure suitable electric power source–25amps–12 gauge or larger extension cord Replace Inspect and clean, or replace
Pressure reading erratic	Defective gauge Differential control valve bad	Replace Replace

ATWS Series Square Drive Torque Wrench Specification Sheet

Model	1ATWS	3ATWS	5ATWS	8ATWS	10ATWS	20ATW	25ATWS	35ATWS
Torque	184-1837	441-4414	753-7528	1078-10780	1540-15400	2666-26664	3473-34725	4867-48666
(Ft-Lbs.)	3.96 lbs.	11 lbs.	17.6 lbs.	24.2 lbs.	33 lbs.	58.3 lbs.	77.2 lbs.	110.2 lbs.
Drive	.75"	1.00"	1.50"	1.50"	1.50"	2.50"	2.50"	2.50"
L1 (inch)	5.34	6.70	8.04	8.67	9.50	11.94	12.40	19.49
L2 (inch)	7.31	9.59	11.23	12.33	13.79	17.73	18.23	19.49
H1 (inch)	1.97	2.68	3.15	3.55	4.04	4.73	5.39	6.02
H2 (inch)	2.84	4.14	5.20	5.59	6.09	7.43	8.19	8.98
H3 (inch)	3.76	5.04	5.99	6.58	7.25	8.75	9.76	11.10
H4 (inch)	6.34	8.10	9.06	9.61	10.28	11.82	12.80	14.17
R1 (inch)	1.02	1.34	1.62	1.83	2.01	2.40	2.64	3.03
R2 (inch)	3.90	5.34	5.91	6.90	7.05	10.03	9.88	10.67



The drawing for a pump with two ATWS series torque wrench



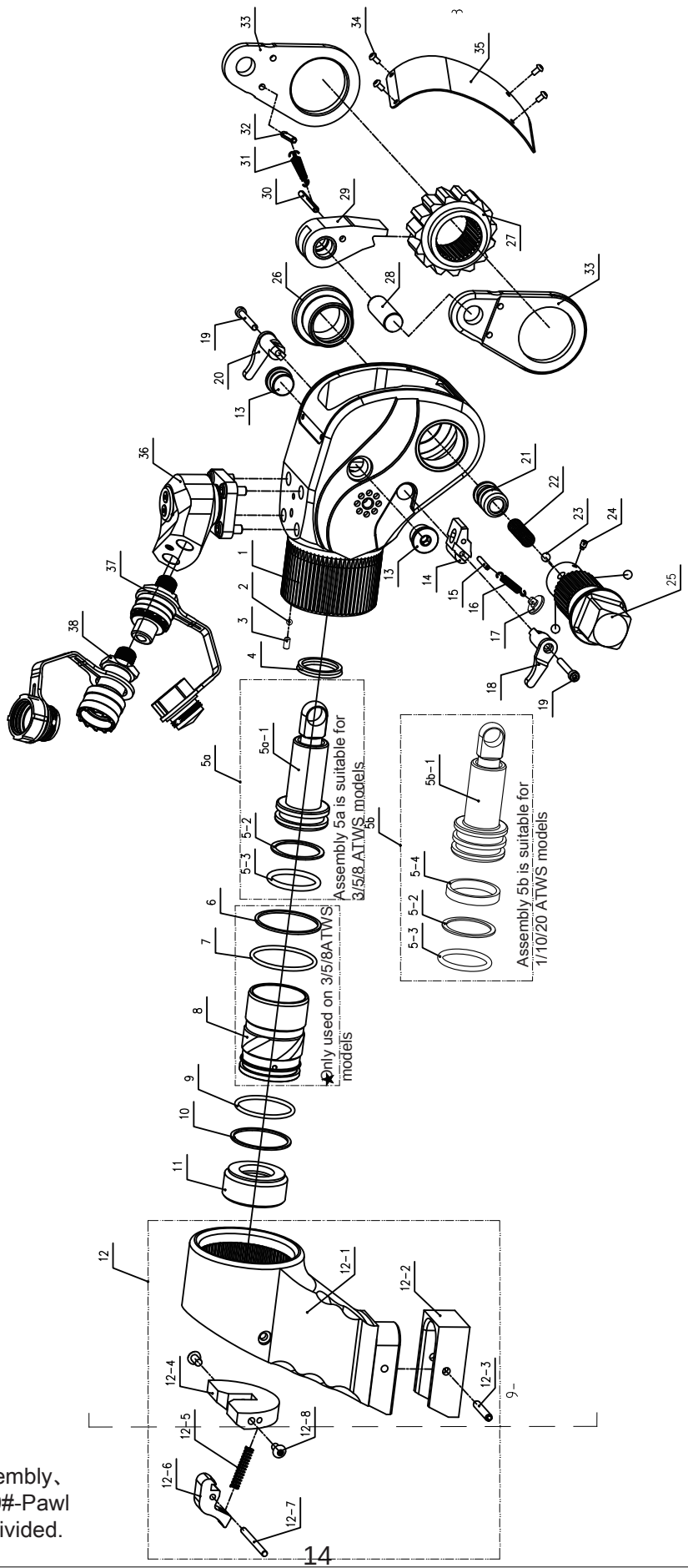
ATW SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

表（2）

MODEL			1ATWS	3ATWS	5ATWS	8ATWS	10ATWS	20ATWS	25ATWS	35ATWS
Psi	Bar	mpa	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
1015	70	7	184	441	753	1078	1540	2666	3473	4867
1160	80	8	210	504	860	1232	1760	3047	3969	5562
1305	90	9	236	568	968	1386	1980	3428	4465	6257
1450	100	10	262	631	1075	1540	2200	3809	4961	6952
1595	110	11	289	694	1183	1694	2420	4190	5457	7648
1740	120	12	315	757	1291	1848	2640	4571	5953	8343
1885	130	13	341	820	1398	2002	2860	4952	6449	9038
2030	140	14	367	883	1506	2156	3080	5333	6945	9733
2175	150	15	394	946	1613	2310	3300	5714	7441	10428
2320	160	16	420	1009	1721	2464	3520	6095	7937	11124
2465	170	17	446	1072	1828	2618	3740	6476	8433	11819
2610	180	18	472	1135	1936	2772	3960	6856	8929	12514
2755	190	19	499	1198	2043	2926	4180	7237	9425	13209
2900	200	20	525	1261	2151	3080	4400	7618	9921	13905
3045	210	21	551	1324	2258	3234	4620	7999	10418	14600
3190	220	22	577	1387	2366	3388	4840	8380	10914	15295
3335	230	23	604	1450	2473	3542	5060	8761	11410	15990
3480	240	24	630	1513	2581	3696	5280	9142	11906	16685
3625	250	25	656	1576	2689	3850	5500	9523	12402	17381
3770	260	26	682	1639	2796	4004	5720	9904	12898	18076
3915	270	27	709	1703	2904	4158	5940	10285	13394	18771
4060	280	28	735	1766	3011	4312	6160	10666	13890	19466
4205	290	29	761	1829	3119	4466	6380	11047	14386	20162
4350	300	30	787	1892	3226	4620	6600	11427	14882	20857
4495	310	31	814	1955	3334	4774	6820	11808	15378	21552
4640	320	32	840	2018	3441	4928	7040	12189	15874	22247
4785	330	33	866	2081	3549	5082	7260	12570	16370	22943
4930	340	34	892	2144	3656	5236	7480	12951	16866	23638
5075	350	35	919	2207	3764	5390	7700	13332	17363	24333
5220	360	36	945	2270	3872	5544	7920	13713	17859	25028
5365	370	37	971	2333	3979	5698	8140	14094	18355	25723
5510	380	38	997	2396	4087	5852	8360	14475	18851	26419
5655	390	39	1023	2459	4194	6006	8580	14856	19347	27114
5800	400	40	1050	2522	4302	6160	8800	15237	19843	27809
5945	410	41	1076	2585	4409	6314	9020	15617	20339	28504
6090	420	42	1102	2648	4517	6468	9240	15998	20835	29200
6235	430	43	1128	2711	4624	6622	9460	16379	21331	29895
6380	440	44	1155	2775	4732	6776	9680	16760	21827	30590
6525	450	45	1181	2838	4839	6930	9900	17141	22323	31285
6670	460	46	1207	2901	4947	7084	10120	17522	22819	31981
6815	470	47	1233	2964	5055	7238	10340	17903	23315	32676
6960	480	48	1260	3027	5162	7392	10560	18284	23811	33371
7105	490	49	1286	3090	5270	7546	10780	18665	24308	34066
7250	500	50	1312	3153	5377	7700	11000	19046	24804	34761
7395	510	51	1338	3216	5485	7854	11220	19427	25300	35457
7540	520	52	1365	3279	5592	8008	11440	19808	25796	36152
7685	530	53	1391	3342	5700	8162	11660	20188	26292	36847
7830	540	54	1417	3405	5807	8316	11880	20569	26788	37542
7975	550	55	1443	3468	5915	8470	12100	20950	27284	38238
8120	560	56	1470	3531	6022	8624	12320	21331	27780	38933
8265	570	57	1496	3594	6130	8778	12540	21712	28276	39628
8410	580	58	1522	3657	6237	8932	12760	22093	28772	40323
8555	590	59	1548	3720	6345	9086	12980	22474	29268	41018
8700	600	60	1575	3783	6453	9240	13200	22855	29764	41714
8845	610	61	1601	3846	6560	9394	13420	23236	30260	42409
8990	620	62	1627	3910	6668	9548	13640	23617	30756	43104
9135	630	63	1653	3973	6775	9702	13860	23998	31253	43799
9280	640	64	1680	4036	6883	9856	14080	24379	31749	44495
9425	650	65	1706	4099	6990	10010	14300	24759	32245	45190
9570	660	66	1732	4162	7098	10164	14520	25140	32741	45885
9715	670	67	1758	4225	7205	10318	14740	25521	33237	46580
9860	680	68	1785	4288	7313	10472	14960	25902	33733	47276
10005	690	69	1811	4351	7420	10626	15180	26283	34229	47971
10150	700	70	1837	4414	7528	10780	15400	26664	34725	48666

ATWS Series Square Drive Torque Wrench Exploded View Drawing

1ATWS、3ATWS、5ATWS、8ATWS、10ATWS、20ATWS SERIES



Remak：1#-Body Assembly、5#-Piston Assembly,29#-Pawl Assembly can not be divided.

PARTS LIST--ATWS SERIES

Item	Name	1ATWS	3ATWS	5ATWS	8ATWS	10ATWS	20ATWS	25ATWS	35ATWS
1	Body	1	1	1	1	1	1	1	1
2	Steel Ball(Body)	1	—	—	—	1	1	1	1
3	Screw(Body)	1	—	—	—	1	1	1	1
4	U Ring(Body)	1	1	1	1	1	1	1	1
5a	Piston Rod Assembly	—	1	1	1	—	—	—	—
5b		1	—	—	—	1	1	1	1
5a-1	Piston	—	1	1	1	—	—	—	—
5b-1		1	—	—	—	1	1	1	1
5-2	Retaining Ring(Piston)	1	1	1	1	1	1	1	1
5-3	O Ring(Piston)	1	1	1	1	1	1	1	1
5-4	Wearable Ring(Piston)	1	—	—	—	1	1	1	1
6	Retaining Ring(Cylinder)	—	1	1	1	—	—	—	—
7	O Ring(Cylinder)	—	1	1	1	—	—	—	—
8	Cylinder	—	1	1	1	—	—	—	—
9	O Ring(Body)	1	1	1	1	1	1	1	1
10	Retaining Ring(Body)	1	1	1	1	1	1	1	1
11	End Cap	1	1	1	1	1	1	1	1
12	Reaction Arm Assembly	1	1	1	1	1	1	1	1
12-1	Reaction Arm	1	1	1	1	1	1	1	1
12-2	Reaction Arm Cover	1	1	1	1	1	1	1	1
12-3	Pin(Reaction Arm Cover)	1	1	1	1	2	2	2	2
12-4	Reaction Arm Fixer	1	1	1	1	1	1	1	1
12-5	Compressed Spring(Reaction Arm)	1	1	1	1	1	1	1	1
12-6	Fixed Hook	1	1	1	1	1	1	1	1
12-7	Pin(Fixed Hook)	1	1	1	1	1	1	1	1
12-8	Screw(Fixer)	2	2	2	2	2	2	2	2
13	Screw	2	2	2	2	2	2	2	2
14	Reaction Pawl	1	1	1	1	1	1	1	1
15	Pin(Reaction Pawl)	1	1	1	1	1	1	1	1
16	Tension Spring(Reaction Pawl)	1	1	1	1	1	1	1	1
17	Drag Hook	1	1	1	1	1	1	1	1
18	Button Lever(Left)	1	1	1	1	1	1	1	1
19	Screw(Button Lever)	2	2	2	2	2	2	2	2
20	Button Lever(Right)	1	1	1	1	1	1	1	1
21	Push Button	1	1	1	1	1	1	1	1
22	Compressed Spring(Square Drive)	1	1	1	1	1	1	1	1
23	Steel Ball(Square Drive)	3	3	3	3	3	3	3	3
24	Screw(Square Drive)	1	1	1	1	1	1	1	1
25	Square Drive	1	1	1	1	1	1	1	1
26	Drive Retainer	1	1	1	1	1	1	1	1
27	Ratchet Spline	1	1	1	1	1	1	1	1
28	Drive Pin	1	1	1	1	1	1	1	1
29	Pawl Assembly(Incluing Bush)	1	1	1	1	1	1	1	1
30	Pin(Pawl)	1	1	1	1	1	1	1	1
31	Tension Spring(Pawl)	2	2	2	2	2	2	2	2
32	Pin(Drive Plate)	1	1	1	1	1	1	1	1
33	Drive Plate	1	1	1	1	1	1	1	1
34	Screw(Shroud)	4	4	4	4	4	4	4	4
35	Shroud	1	1	1	1	1	1	1	1
36	Swivel Joint	1	1	1	1	1	1	1	1
37	Male Coupler(High Pressure)	1	1	1	1	1	1	1	1
38	Female Coupler(Low Pressure)	1	1	1	1	1	1	1	1
Rema	1#-Body Assembly、5#-Piston Assembly。29#-Pawl Assembly can not be divided.								

Maintenance

Lubrication:

- Periodically coat all moving parts with a good quality lubricant.
- Under harsh environmental conditions perform cleaning and lubricating more frequently.

Hydraulic Hose Assembly:

- Inspect the hydraulic hose assembly for cracks, burns, kinks, crush spots and leaks after each job.
- Flush hydraulic fittings periodically as they can become plugged with dirt.
- Replace the hydraulic hose assembly immediately if you find any damage.

Connectors:

- Keep hydraulic coupler fittings clean and do not allow them to drag on the floor or ground.
- Even small particles of dirt can cause the internal valves to malfunction.

Cylinder Seals:

- If the cylinder requires disassembly, replace cylinder seals at the same time.
- Seal kits are readily available.

  Unless you have a qualified technician on staff, you should consider shipping the tool to a certified repair technician.

Structural Members:

- Inspect all structural parts on the tool periodically for cracks, chips or deformities.
- If present replace the part immediately.

Calibration:

- Calibrate all hydraulic torque wrenches and gauges annually.

Appendix

Recommended Torque For B7 Studs (ASTM A193)

Based Upon 50% Yield

Bolt diameter	Heavy hex nut size (A.F.)	Lubricated torque using copper,graphite or comparable lubricant with a coefficient of friction F-.100(both nut face and threads should be well lubricated	Dry steel on steel,no lubricant,coefficient offriction F-.400
3/4”	1-1/4”	157	559
7/8”	1-7/16”	250	893
1”	1-5/8”	373	1332
1-1/8”	1-13/16”	538	1994
1-1/4”	2”	746	2720
1-3/8”	2-3/16”	1000	3678
1-1/2”	2-3/8”	1307	4837
1-5/8”	2-9/16”	1682	6260
1-3/4”	2-3/4”	2109	7888
1-7/8”	2-15/16”	2602	9775
2	3-1/8”	3167	11942
2-1/8”	3-5/16”	3809	14408
2-1/4”	3-1/2”	4531	17191
2-3/8”	3-11/16”	5339	20310
2-1/2”	3-7/8”	6238	23786
2-3/4”	3-1/4”	7533	28846
3”	4-5/8”	9803	37670
3-1/4”	5”	12488	48129
3-1/2”	5-3/8”	15622	60365
3-3/4”	5-3/4”	19241	74516
4”	6-1/8”	22162	86146
4-1/4”	6-1/2”	23337	90720
4-1/2”	6-7/8”	26332	102513
4-3/4”	7-1/4”	30994	120831
5”	7-5/8”	36176	141210