



**S and H Series  
Hydraulic Torque Wrench**

**Operation Manual**

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## OPERATION AND MAINTENANCE MANUAL FOR S AND H HYDRAULIC TORQUE WRENCHES

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

### IMPORTANT RECEIVING INSTRUCTIONS

Carefully inspect all components for shipping damage. If any shipping damage is found, please notify carrier at once. Shipping damage is not covered by warranty. The carrier is responsible for all repair or replacement cost resulting from damage in shipment.

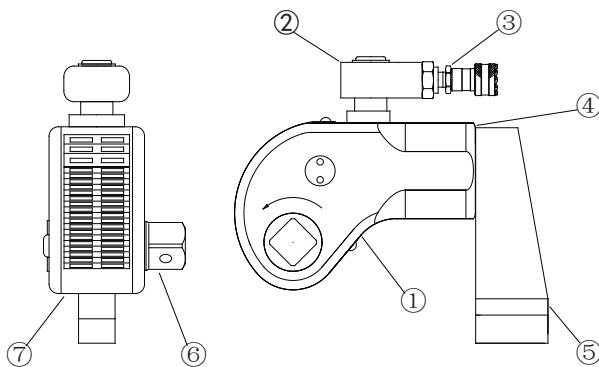
### SAFTY FIRST !!

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

### DESCRIPTION

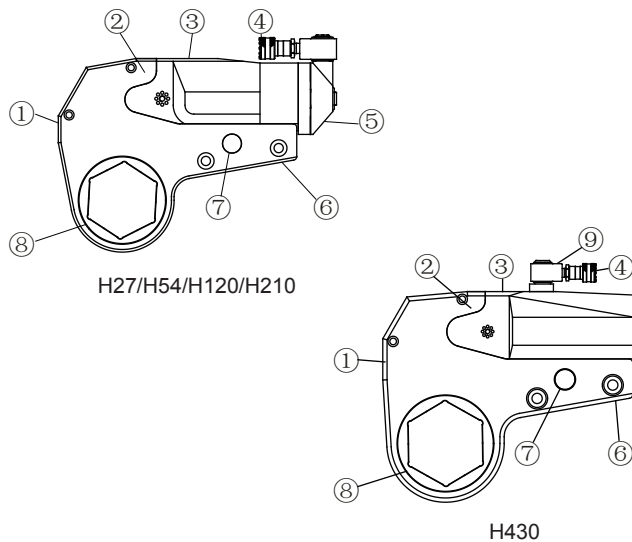
The material of S series and H series Hydraulic Torque Wrenchs are Aluminium-Titanium alloy and superhigh strength alloy steel for increased strength, intensity and durability of the tool. High repeatability, a precise design is with accuracy  $\pm 3\%$ .

S series, Square Drive Torque Wrenches:



ITEM	NAME
①	BODY
②	360° SWIVEL JOINT
③	QUICK COUPLING
④	FIXING HOOK
⑤	360° SWMELREACTION ARM
⑥	SQUARE DRIVE
⑦	DRIVE RETAINER

## H series, Low Profile Torque Wrenches:



ITEM	NAME
①	LOW PROFILE CASSETTE
②	PIN
③	POWER HEAD
④	QUICK COUPLING
⑤	360°×360° SWIVEL JOINT
⑥	REACTION ARM
⑦	LINK PIN
⑧	RATCHET
⑨	360° SWIVEL JOINT

### WARNING AND CAUTION

#### WARNING

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

#### WARNING

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

#### WARNING

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

#### CAUTION

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

#### CAUTION

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

Do not let the hose kink, twist, curl or bend so tightly that oil flow within the hose is blocked or reduced. Do not use the hose to move attached equipment. Stress can damage the hose, causing personal injury.

#### WARNING

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

#### CAUTION

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

#### CAUTION


Do not use worn socket and square drive.

#### CAUTION

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

## Warning Plate

Warning plate is shown in table 1

warning table	Meaning	Affixed Position
	NO HAND	REVERSE LEVER
<p><b>IF DRIVE STICKS OUT RIGHT, IT'S SET FOR TIGHTEN. LEFT IT'S SET FOR LOOSE!</b></p>	IF DRIVE STICKS OUT RIGHT IT'S SET FOR TIGHTEN. LEFT IT'S SET FOR LOOSE!	WORK HEAD
<p><b>LOCK REACTION ARM BEFORE USING TOOL!</b></p>	LOCK REACTION ARM BEFORE USING TOOL!	REVERSE LEVER

# BOLTING TIGHTENING FORCE RECOMMENDED CHART

FORM 1

The belows are DIN(F or you reference)

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

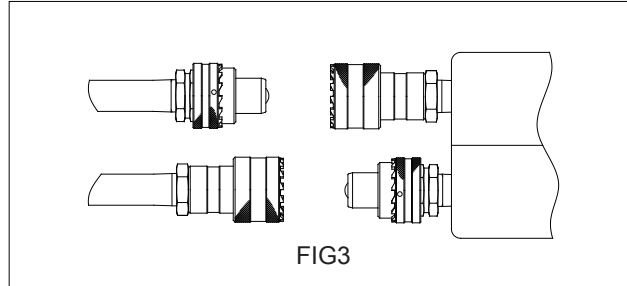
NOTE:

The figure of the chart is the Max torque of the bolting, the recommended torque is 80% of chart figure For instance:M52,strength grade is 8.8,the torque is  $4704 \times 80\% = 3763\text{N.m}$

## OPERATION

### CONNECTING THE TOOL

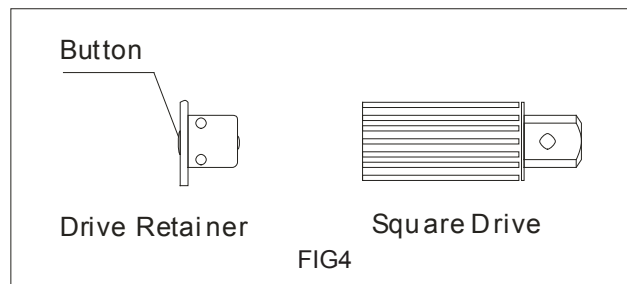
The wrench and power pump are connected by a 700 BAR operating pressure, twin-line hose assembly. Each end of the hose will have one male and one female connector to assure proper interconnection between pump and wrench.



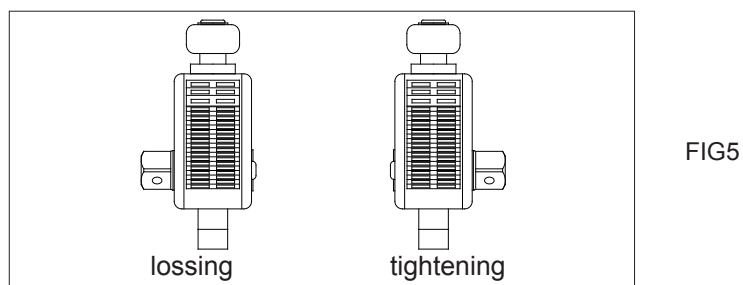
## S SERIES

### DRIVE DIRECTION CHANGE

To remove the square, disengage the drive retainer assembly by depressing the center round button and gently pulling on the square end of the square drive. The square drive will slide easily out.



To insert the drive in the tool, place the drive in the desired direction, engage drive and bushing splines, then twist drive and bushing until ratchet spline can be engaged. Push drive through ratchet. Depress drive retainer button, engage retainer with drive and release button to lock.



### SETTING THE REACTION ARM

All WREN's Torque wrenches are equipped with a universal reaction arm. These reaction arms are employed to absorb and counteract forces created as the unit operates. The reaction arm should extend in the same direction of the square drive; However, slight adjustments may be made to suit your particular application. The function of a reaction device is to hold the tool in position against the forces generated to tighten or loosen bolts or nuts. Hydraulic wrenches generate tremendous force. The reaction arm can be

positioned in numerous places within a 3600 circle. However, for the arm to be correctly positioned, it must be set within a 900 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.

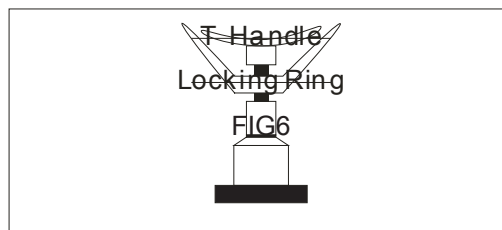
## SETTING THE SQUARE DRIVE FOR ROTATION

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 MXTA 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

## H SERIES

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

Both the square drive cartridge link and the low 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.

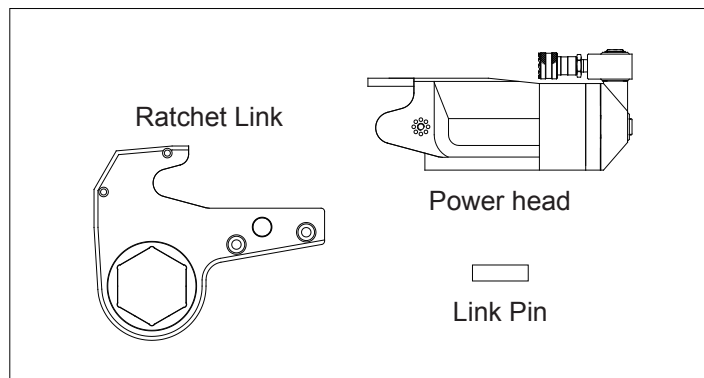


FIG7

### LOW 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 to ward the shroud

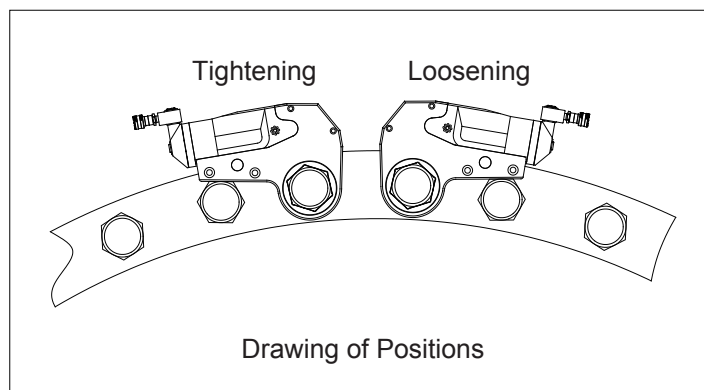


FIG8

## 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 to confirm that the desired pressure setting has been obtained.

## OPERATING THE WRENCH

1. Place the ratchet hex on the nut. Make certain it is the correct size for the nut and that it fully engages the nut.
2. Position the reaction surface against an adjacent nut, flange or solid system component. Make certain that there is clearance for the hoses, swivel, and inlets. Do not allow the tool to react against the hoses, swivels or inlets.
3. After having turned the pump on and presetting the pressure for the correct torque, depress the remote control advance button to advance the piston assembly. If the notch in the piston rod did not engage the retract pin in the ratchet engage the pin automatically during the first advance stroke.
4. When the low profile cassette is connected to the housing and the wrench is started, the reaction surface of the wrench will move against the contact point and the nut will begin to turn. Once the piston reaches the end of its stroke depress the remote control return button to retract the piston.
5. Continue this cycling operation of advance and retract until the nut is no longer turning and the pump gauge reaches the preset pressure. The piston rod will retract when the retract button is pressed and under normal conditions, an audible "Click" will be heard as the tool resets itself.
6. Continue to cycle the tool until it "Stall" and the preset psi/torque has been attained.
7. Once the nut stops rotating, cycle the tool one last time to achieve torque.

## S SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

Model Number	S17	S45	S100	S150	S370
Mpa	N.m	N.m	N.m	N.m	N.m
7	172	452	1006	1497	3699
8	197	517	1150	1711	4227
9	221	581	1293	1925	4756
10	246	646	1437	2139	5284
11	270	710	1581	2352	5813
12	295	775	1725	2566	6341
13	319	839	1868	2780	6870
14	344	904	2012	2994	7398
15	369	969	2156	3208	7926
16	393	1033	2299	3422	8455
17	418	1098	2443	3636	8983
18	442	1162	2587	3849	9512
19	467	1227	2731	4063	10040
20	491	1291	2874	4277	10569
21	516	1356	3018	4491	11097
22	541	1421	3162	4705	11625
23	565	1485	3305	4919	12154
24	590	1550	3449	5133	12682
25	614	1614	3593	5346	13211
26	639	1679	3737	5560	13739
27	663	1743	3880	5774	14268
28	688	1808	4024	5988	14796
29	713	1873	4168	6202	15324
30	737	1937	4311	6416	15853
31	762	2002	4455	6630	16381
32	786	2066	4599	6843	16910
33	811	2131	4743	7057	17438
34	835	2195	4886	7271	17967
35	860	2260	5030	7485	18495
36	885	2325	5174	7699	19023
37	909	2389	5317	7913	19552
38	934	2454	5461	8127	20080
39	958	2518	5605	8340	20609
40	983	2583	5749	8554	21137
41	1007	2647	5892	8768	21666
42	1032	2712	6036	8982	22194
43	1057	2777	6180	9196	22722
44	1081	2841	6323	9410	23251
45	1106	2906	6467	9624	23779
46	1130	2970	6611	9837	24308
47	1155	3035	6755	10051	24836
48	1179	3099	6898	10265	25365
49	1204	3164	7042	10479	25893
50	1229	3229	7186	10693	26421
51	1253	3293	7329	10907	26950
52	1278	3358	7473	11121	27478
53	1302	3422	7617	11334	28007
54	1327	3487	7761	11548	28535
55	1351	3551	7904	11762	29064
56	1376	3616	8048	11976	29592
57	1401	3681	8192	12190	30120
58	1425	3745	8335	12404	30649
59	1450	3810	8479	12618	31177
60	1474	3874	8623	12831	31706
61	1499	3939	8767	13045	32234
62	1523	4003	8910	13259	32763
63	1548	4068	9054	13473	33291
64	1573	4133	9198	13687	33819
65	1597	4197	9341	13901	34348
66	1622	4262	9485	14115	34876
67	1646	4326	9629	14328	35405
68	1671	4391	9773	14542	35933
69	1695	4455	9916	14756	36462
70	1727	4529	10064	14974	36992

## S SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

Model Number	S17	S45	S100	S150	S370
psi	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs
1000	125	329	733	1090	2694
1200	150	395	879	1308	3233
1400	175	461	1026	1527	3772
1600	200	527	1172	1745	4311
1800	226	593	1319	1963	4850
2000	251	658	1465	2181	5388
2200	276	724	1612	2399	5927
2400	301	790	1759	2617	6466
2600	326	856	1905	2835	7005
2800	351	922	2052	3053	7544
3000	376	988	2198	3271	8083
3200	401	1054	2345	3489	8621
3400	426	1119	2491	3707	9160
3600	451	1185	2638	3925	9699
3800	476	1251	2784	4143	10238
4000	501	1317	2931	4361	10777
4200	526	1383	3078	4580	11316
4400	551	1449	3224	4798	11854
4600	576	1514	3371	5016	12393
4800	601	1580	3517	5234	12932
5000	626	1646	3664	5452	13471
5200	651	1712	3810	5670	14010
5400	677	1778	3957	5888	14549
5600	702	1844	4103	6106	15088
5800	727	1909	4250	6324	15626
6000	752	1975	4396	6542	16165
6200	777	2041	4543	6760	16704
6400	802	2107	4690	6978	17243
6600	827	2173	4836	7196	17782
6800	852	2239	4983	7415	18321
7000	877	2305	5129	7633	18859
7200	902	2370	5276	7851	19398
7400	927	2436	5422	8069	19937
7600	952	2502	5569	8287	20476
7800	977	2568	5715	8505	21015
8000	1002	2634	5862	8723	21554
8200	1027	2700	6008	8941	22092
8400	1052	2765	6155	9159	22631
8600	1077	2831	6302	9377	23170
8800	1102	2897	6448	9595	23709
9000	1128	2963	6595	9813	24248
9200	1153	3029	6741	10031	24787
9400	1178	3095	6888	10249	25325
9600	1203	3161	7034	10468	25864
9800	1228	3226	7181	10686	26403
10000	1253	3292	7327	10904	26942

## H SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

Model Number	H27		H54		H120		H210		H430	
Bolt Size Range	19~46	50~60	27~65	70~80	50~80	85~105	70~100	105~115	80~117	120~175
Mpa	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
7	262	306	537	603	1173	1434	2121	2312	4379	4848
8	299	350	614	689	1341	1639	2424	2642	5005	5541
9	337	393	690	775	1508	1844	2727	2973	5630	6233
10	374	437	767	861	1676	2049	3030	3303	6256	6926
11	412	481	844	948	1843	2253	3333	3633	6881	7618
12	449	525	921	1034	2011	2458	3636	3963	7507	8311
13	487	568	997	1120	2178	2663	3939	4294	8132	9003
14	524	612	1074	1206	2346	2868	4242	4624	8758	9696
15	561	656	1151	1292	2514	3073	4545	4954	9384	10389
16	599	699	1227	1378	2681	3278	4848	5285	10009	11081
17	636	743	1304	1464	2849	3483	5151	5615	10635	11774
18	674	787	1381	1551	3016	3687	5454	5945	11260	12466
19	711	831	1458	1637	3184	3892	5757	6275	11886	13159
20	749	874	1534	1723	3351	4097	6060	6606	12511	13851
21	786	918	1611	1809	3519	4302	6363	6936	13137	14544
22	823	962	1688	1895	3687	4507	6666	7266	13763	15237
23	861	1005	1764	1981	3854	4712	6969	7597	14388	15929
24	898	1049	1841	2067	4022	4917	7272	7927	15014	16622
25	936	1093	1918	2154	4189	5121	7575	8257	15639	17314
26	973	1137	1995	2240	4357	5326	7878	8587	16265	18007
27	1011	1180	2071	2326	4524	5531	8181	8918	16890	18699
28	1048	1224	2148	2412	4692	5736	8484	9248	17516	19392
29	1085	1268	2225	2498	4860	5941	8787	9578	18142	20085
30	1123	1311	2301	2584	5027	6146	9090	9909	18767	20777
31	1160	1355	2378	2670	5195	6351	9393	10239	19393	21470
32	1198	1399	2455	2757	5362	6555	9696	10569	20018	22162
33	1235	1443	2532	2843	5530	6760	9999	10899	20644	22855
34	1273	1486	2608	2929	5697	6965	10302	11230	21269	23547
35	1310	1530	2685	3015	5865	7170	10605	11560	21895	24240
36	1347	1574	2762	3101	6033	7375	10908	11890	22521	24933
37	1385	1617	2838	3187	6200	7580	11211	12221	23146	25625
38	1422	1661	2915	3273	6368	7785	11514	12551	23772	26318
39	1460	1705	2992	3360	6535	7989	11817	12881	24397	27010
40	1497	1749	3069	3446	6703	8194	12120	13211	25023	27703
41	1535	1792	3145	3532	6870	8399	12423	13542	25648	28395
42	1572	1836	3222	3618	7038	8604	12726	13872	26274	29088
43	1609	1880	3299	3704	7206	8809	13029	14202	26900	29781
44	1647	1923	3375	3790	7373	9014	13332	14533	27525	30473
45	1684	1967	3452	3876	7541	9219	13635	14863	28151	31166
46	1722	2011	3529	3963	7708	9423	13938	15193	28776	31858
47	1759	2055	3606	4049	7876	9628	14241	15523	29402	32551
48	1797	2098	3682	4135	8043	9833	14544	15854	30027	33243
49	1834	2142	3759	4221	8211	10038	14847	16184	30653	33936
50	1871	2186	3836	4307	8379	10243	15150	16514	31279	34629
51	1909	2229	3912	4393	8546	10448	15453	16845	31904	35321
52	1946	2273	3989	4479	8714	10653	15756	17175	32530	36014
53	1984	2317	4066	4566	8881	10857	16059	17505	33155	36706
54	2021	2361	4143	4652	9049	11062	16362	17835	33781	37399
55	2059	2404	4219	4738	9216	11267	16665	18166	34406	38091
56	2096	2448	4296	4824	9384	11472	16968	18496	35032	38784
57	2133	2492	4373	4910	9552	11677	17271	18826	35658	39477
58	2171	2535	4449	4996	9719	11882	17574	19157	36283	40169
59	2208	2579	4526	5082	9887	12087	17877	19487	36909	40862
60	2246	2623	4603	5169	10054	12291	18180	19817	37534	41554
61	2283	2667	4680	5255	10222	12496	18483	20147	38160	42247
62	2321	2710	4756	5341	10389	12701	18786	20478	38785	42939
63	2358	2754	4833	5427	10557	12906	19089	20808	39411	43632
64	2395	2798	4910	5513	10725	13111	19392	21138	40037	44325
65	2433	2841	4986	5599	10892	13316	19695	21469	40662	45017
66	2470	2885	5063	5685	11060	13521	19998	21799	41288	45710
67	2508	2929	5140	5772	11227	13725	20301	22129	41913	46402
68	2545	2973	5217	5858	11395	13930	20604	22459	42539	47095
69	2583	3016	5293	5944	11562	14135	20907	22790	43164	47787
70	2625	3068	5372	6037	11737	14349	21216	23124	43792	48481

## H SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

Model Number	H27		H54		H120		H210		H430	
Bolt Size Range	19~46	50~60	27~65	70~80	50~80	85~105	70~100	105~115	80~117	120~175
psi	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs
1000	191	223	391	439	854	1044	1545	1684	3190	3531
1200	229	267	469	527	1025	1253	1854	2021	3827	4237
1400	267	312	548	615	1196	1462	2163	2358	4465	4944
1600	305	357	626	703	1367	1671	2472	2694	5103	5650
1800	343	401	704	791	1538	1880	2781	3031	5741	6356
2000	382	446	782	878	1709	2089	3090	3368	6379	7062
2200	420	490	860	966	1880	2298	3399	3705	7017	7769
2400	458	535	939	1054	2051	2507	3708	4042	7655	8475
2600	496	579	1017	1142	2221	2716	4017	4378	8293	9181
2800	534	624	1095	1230	2392	2925	4326	4715	8931	9887
3000	572	669	1173	1318	2563	3133	4635	5052	9569	10593
3200	611	713	1252	1405	2734	3342	4944	5389	10206	11300
3400	649	758	1330	1493	2905	3551	5253	5726	10844	12006
3600	687	802	1408	1581	3076	3760	5562	6062	11482	12712
3800	725	847	1486	1669	3247	3969	5871	6399	12120	13418
4000	763	892	1565	1757	3418	4178	6180	6736	12758	14125
4200	801	936	1643	1845	3588	4387	6488	7073	13396	14831
4400	840	981	1721	1933	3759	4596	6797	7410	14034	15537
4600	878	1025	1799	2020	3930	4805	7106	7746	14672	16243
4800	916	1070	1877	2108	4101	5014	7415	8083	15310	16949
5000	954	1114	1956	2196	4272	5222	7724	8420	15948	17656
5200	992	1159	2034	2284	4443	5431	8033	8757	16586	18362
5400	1030	1204	2112	2372	4614	5640	8342	9094	17223	19068
5600	1069	1248	2190	2460	4785	5849	8651	9430	17861	19774
5800	1107	1293	2269	2547	4955	6058	8960	9767	18499	20481
6000	1145	1337	2347	2635	5126	6267	9269	10104	19137	21187
6200	1183	1382	2425	2723	5297	6476	9578	10441	19775	21893
6400	1221	1426	2503	2811	5468	6685	9887	10778	20413	22599
6600	1259	1471	2581	2899	5639	6894	10196	11114	21051	23306
6800	1298	1516	2660	2987	5810	7102	10505	11451	21689	24012
7000	1336	1560	2738	3074	5981	7311	10814	11788	22327	24718
7200	1374	1605	2816	3162	6152	7520	11123	12125	22965	25424
7400	1412	1649	2894	3250	6322	7729	11432	12462	23603	26130
7600	1450	1694	2973	3338	6493	7938	11741	12798	24240	26837
7800	1488	1738	3051	3426	6664	8147	12050	13135	24878	27543
8000	1527	1783	3129	3514	6835	8356	12359	13472	25516	28249
8200	1565	1828	3207	3601	7006	8565	12668	13809	26154	28955
8400	1603	1872	3286	3689	7177	8774	12977	14146	26792	29662
8600	1641	1917	3364	3777	7348	8983	13286	14482	27430	30368
8800	1679	1961	3442	3865	7519	9191	13595	14819	28068	31074
9000	1717	2006	3520	3953	7689	9400	13904	15156	28706	31780
9200	1756	2051	3598	4041	7860	9609	14213	15493	29344	32486
9400	1794	2095	3677	4129	8031	9818	14522	15830	29982	33193
9600	1832	2140	3755	4216	8202	10027	14831	16166	30619	33899
9800	1870	2184	3833	4304	8373	10236	15140	16503	31257	34605
10000	1908	2229	3911	4392	8544	10445	15449	16840	31895	35311

## Routine Maintenance and transport of hydraulic torque wrench

### Maintenance of the hydraulic torque wrench.

- 1、 Before and after use, should check the screws are loose or not on the torque wrench, if loose should be tightened. If you do not tighten, it may cause damage to the equipment.
- 2、 Inside of the Torque Wrench, all parts should be regularly smear NLGI # 2, in complex environmental conditions, should be cleaned and lubricated.
- 3、 The coupler should be kept clean after work, tighten the dust cap to prevent dust entering the hydraulic system failure to make the equipment damage.
- 4、 Connecting devices, switch direction control valves, check the pressure with or without exception.
- 5、 Check for leakage, if a similar situation, please identify the reasons and processed.
- 6、 The parts of inside torque wrench are connected, if one part fails, it is bound to affect other parts caused by wear, so regular inspection and maintenance are very important.

### Hydraulic torque wrench noise declaration.

Hydraulic torque wrench noise value:  $\leq 70\text{db}$ .

### Hydraulic torque wrench transport information.

- 1、 Handle with care.
- 2、 The shipment should be vertical upward, as shown in the figure 9-1.

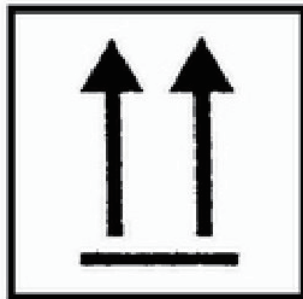


FIG 9-1

- 3、 Product handling, generally using portable, car handling and lifting and moving, as shown in the figure 9-2.

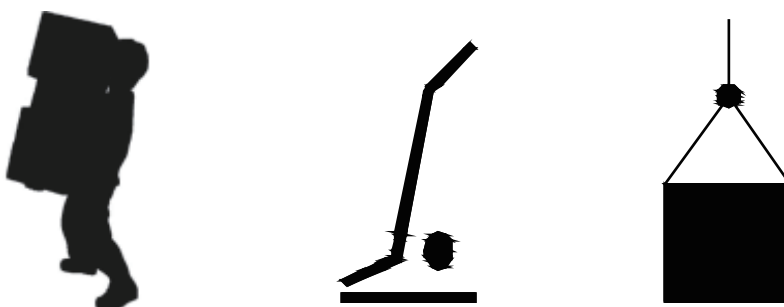


FIG 9-2

## specification & parameter

Model	Torque (N·m)	Square drive (Inch)			
S17	172-1727	3/4			
S45	452-4529	1			
S100	1006-10064	1-1/2			
S150	1497-14974	1-1/2			
S370	3699-36992	2-1/2			
Model	Torque (N·m)	Screw Sizes (mm)	Model	Torque (N·m)	Screw Sizes (mm)
H2719	262-2625	19-46	H2'C70	2121-21216	70-100
H2722	262-2625	19-46	H2'C75	2121-21216	70-100
H2727	262-2625	19-46	H2'C80	2121-21216	70-100
H2730	262-2625	19-46	H2'C85	2121-21216	70-100
H2732	262-2625	19-46	H2'C90	2121-21216	70-100
H2734	262-2625	19-46	H2'C95	2121-21216	70-100
H2736	262-2625	19-46	H2'C100	2121-21216	70-100
H2741	262-2625	19-46	H2'C105	2312-23124	105-115
H2746	262-2625	19-46	H2'C110	2312-23124	105-115
H2750	306-3068	50-60	H2'C115	2312-23124	105-115
H2755	306-3068	50-60	H43C80	4379-43792	80-117
H27R60	306-3068	50-60	H43C85	4379-43792	80-117
H5427	537-5372	27-65	H43C90	4379-43792	80-117
H5430	537-5372	27-65	H43C95	4379-43792	80-117
H5432	537-5372	27-65	H43C100	4379-43792	80-117
H5434	537-5372	27-65	H43C105	4379-43792	80-117
H5436	537-5372	27-65	H43C110	4379-43792	80-117
H5441	537-5372	27-65	H43C115	4379-43792	80-117
H5446	537-5372	27-65	H43C117	4379-43792	80-117
H5150	537-5372	27-65	H43C120	4848-48481	120-175
H5155	537-5372	27-65	H43C125	4848-48481	120-175
H5460	537-5372	27-65	H43C130	4848-48481	120-175
H5465	537-5372	27-65	H43C135	4848-48481	120-175
H5470	603-6037	70-80	H43C140	4848-48481	120-175
H5475	603-6037	70-80	H43C145	4848-48481	120-175
H5480	603-6037	70-80	H43C150	4848-48481	120-175
H12050	1173-11737	50-80	H43C155	4848-48481	120-175
H12055	1173-11737	50-80	H43C160	4848-48481	120-175
H12060	1173-11737	50-80	H43C165	4848-48481	120-175
H12065	1173-11737	50-80	H43C170	4848-48481	120-175
H12070	1173-11737	50-80	H43C175	4848-48481	120-175
H12075	1173-11737	50-80			
H12080	1173-11737	50-80			
H12085	1434-14349	85-105			
H12090	1434-14349	85-105			
H12095	1434-14349	85-105			
H120100	1434-14349	85-105			
H120105	1434-14349	85-105			



**Continuation for chart 1**

Model	Torque(N·m)	Screw Sizes (inch)	Model	Torque(N·m)	Screw Sizes (inch)
H27 3/4"	262-2625	0.75	H54 1"	537-5372	1
H27 1 3/16"	262-2625	1.3/16	H54 1.1 16"	537-5372	1.1/16
H27 1/8"	262-2625	0.8/5	H54 1.3 16"	537-5372	1.3/16
H27 1 5/16"	262-2625	1.5/16	H54 1.1 4"	537-5372	1.1 4
H27 1"	262-2625	1	H54 1.5 16"	537-5372	1.5/16
H27 1 1/16"	262-2625	1.1/16	H54 1.3 8"	537-5372	1.3 8
H27 1 1/8"	262-2625	1.1 8	H54 1.7 16"	537-5372	1.7/16
H27 1 3/16"	262-2625	1.3/16	H51 1.1 2"	537-5372	1.1 2
H27 1 1/4"	262-2625	1.1 4	H51 1.9 16"	537-5372	1.9/16
H27 1 5/16"	262-2625	1.5/16	H51 1.5 8"	537-5372	1.5 8
H27 1 3/8"	262-2625	1.3 8	H54 1.11/16"	537-5372	1.11/16
H27 1 7/16"	262-2625	1.7/16	H54 1.3 4"	537-5372	1.3 4
H27 1 1/2"	262-2625	1.1 2	H54 1.13/16"	537-5372	1.13/16
H27 1 9/16"	262-2625	1.9/16	H54 1.7 8"	537-5372	1.7 8
H27 1 5/8"	262-2625	1.5 8	H54 1.15/16"	537-5372	1.15/16
H27 1.11/16"	262-2625	1.11/16	H54 2"	537-5372	2
H27 1 3/4"	262-2625	1.3 4	H54 2.1 16"	537-5372	2.1/16
H27 1.13/16"	262-2625	1.13/16	H51 2.1 8"	537-5372	2.1 8
H27 1 7/8"	306-3068	1.7 8	H51 2.3 16"	537-5372	2.3/16
H27 1 15/16"	306-3068	1.15/16	H54 2.1 4"	537-5372	2.1 4
H27 2"	306-3068	2	H54 2.5 16"	537-5372	2.5/16
H27 2.1/16"	306-3068	2.1/16	H54 2.3 8"	537-5372	2.3 8
H27 2.1/8"	306-3068	2.1 8	H54 2.7 16"	537-5372	2.7/16
H27 2.3/16"	306-3068	2.3/16	H54 2.1 2"	537-5372	2.1 2
H27 2.1/4"	306-3068	2.1 4	H54 2.9 16"	537-5372	2.9/16
H27 2.5/16"	306-3068	2.5/16	H54 2.5 8"	603-6037	2.5 8
H27 2.3/8"	306-3068	2.3 8	H54 2.11/16"	603-6037	2.11/16
			H51 2.3 4"	603-6037	2.3 4
			H51 2.13/16"	603-6037	2.13/16
			H54 2.7 8"	603-6037	2.7 8
			H54 2.15/16"	603-6037	2.15/16
			H54 3"	603-6037	3
			H54 3.1 16"	603-6037	3.1/16
			H54 3.1 8"	603-6037	3.1 8

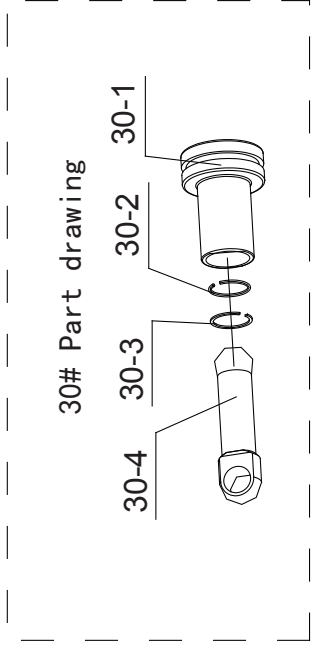
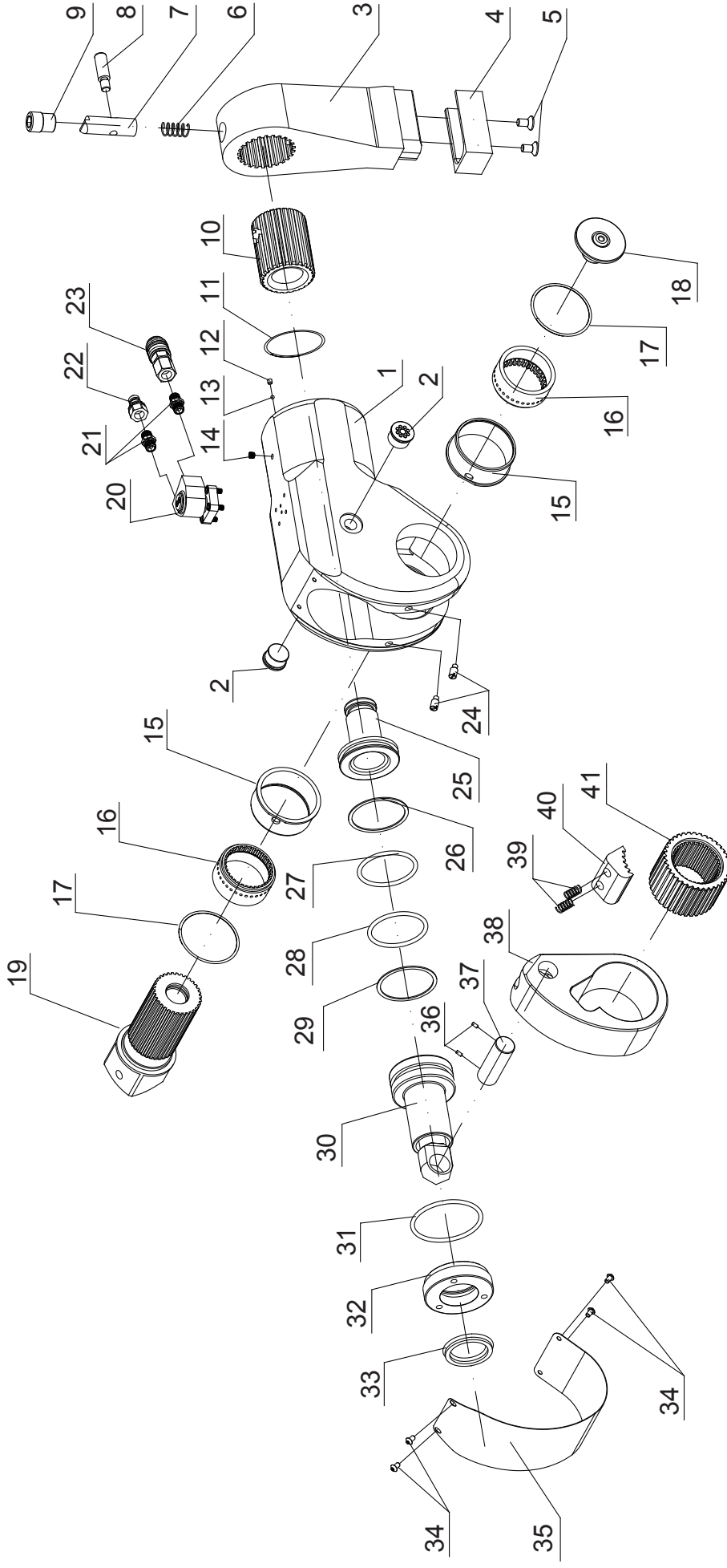
Continuation for chart 1

Model	Torque (N m)	Screw Sizes (inch)	Model	Torque (N m)	Screw Sizes (inch)
H1201.3/8"	1173-11737	1.3/8	H2102.9/16"	2121-21216	2.9/16
H1201.7/16"	1173-11737	1.7/16	H2102.5/8"	2121-21216	2.5/8
H1201.1/2"	1173-11737	1.1/2	H2102.11/16"	2121-21216	2.11/16
H1201.9/16"	1173-11737	1.9/16	H2102.3/4"	2121-21216	2.3/4
H1201.5/8"	1173-11737	1.5/8	H2102.13/16"	2121-21216	2.13/16
H1201.11/16"	1173-11737	1.11/16	H2102.7/8"	2121-21216	2.7/8
H1201.3/4"	1173-11737	1.3/4	H2102.15/16"	2121-21216	2.15/16
H1201.13/16"	1173-11737	1.13/16	H2103"	2121-21216	3
H1201.7/8"	1173-11737	1.7/8	H2103.1/16"	2121-21216	3.1/16
H1201.15/16"	1173-11737	1.15/16	H2103.1/8"	2121-21216	3.1/8
H1202"	1173-11737	2	H2103.3/16"	2121-21216	3.3/16
H1202.1/16"	1173-11737	2.1/16	H2103.1/4"	2121-21216	3.1/4
H1202.1/8"	1173-11737	2.1/8	H2103.5/16"	2121-21216	3.5/16
H1202.3/16"	1173-11737	2.3/16	H2103.3/8"	2121-21216	3.3/8
H1202.1/4"	1173-11737	2.1/4	H2103.7/16"	2121-21216	3.7/16
H1202.5/16"	1173-11737	2.5/16	H2103.1/2"	2121-21216	3.1/2
H1202.3/8"	1173-11737	2.3/8	H2103.9/16"	2121-21216	3.9/16
H1202.7/16"	1173-11737	2.7/16	H2103.5/8"	2121-21216	3.5/8
H1202.1/2"	1173-11737	2.1/2	H2103.11/16"	2121-21216	3.11/16
H1202.9/16"	1173-11737	2.9/16	H2103.3/4"	2121-21216	3.3/4
H1202.5/8"	1173-11737	2.5/8	H2103.13/16"	2121-21216	3.13/16
H1202.11/16"	1173-11737	2.11/16	H2103.7/8"	2121-21216	3.7/8
H1202.3/4"	1173-11737	2.3/4	H2103.15/16"	2121-21216	3.15/16
H1202.13/16"	1173-11737	2.13/16	H2104"	2312-23124	4
H1202.7/8"	1173-11737	2.7/8	H2104.1/16"	2312-23124	4.1/16
H1202.15/16"	1173-11737	2.15/16	H2104.1/8"	2312-23124	4.1/8
H1203"	1173-11737	3	H2104.3/16"	2312-23124	4.3/16
H1203.1/16"	1173-11737	3.1/16	H2104.1/4"	2312-23124	4.1/4
H1203.1/8"	1173-11737	3.1/8	H2104.5/16"	2312-23124	4.5/16
H1203.3/16"	1434-14349	3.3/16	H2104.3/8"	2312-23124	4.3/8
H1203.1/4"	1434-14349	3.1/4	H2104.7/16"	2312-23124	4.7/16
H1203.5/16"	1434-14349	3.5/16	H2104.1/2"	2312-23124	4.1/2
H1203.3/8"	1434-14349	3.3/8	H2104.9/16"	2312-23124	4.9/16
H1203.7/16"	1434-14349	3.7/16	H2104.5/8"	2312-23124	4.5/8
H1203.1/2"	1434-14349	3.1/2			
H1203.9/16"	1434-14349	3.9/16			
H1203.5/8"	1434-14349	3.5/8			
H1203.11/16"	1434-14349	3.11/16			
H1203.3/4"	1434-14349	3.3/4			
H1203.13/16"	1434-14349	3.13/16			
H1203.7/8"	1434-14349	3.7/8			
H1203.15/16"	1434-14349	3.15/16			
H1204"	1434-14349	4			
H1204.1/16"	1434-14349	4.1/16			
H1204.1/8"	1434-14349	4.1/8			

Continuation for chart 1

Model	Torque (N m)	Screw Sizes (inch)	Model	Torque (N m)	Screw Sizes (inch)
H4303"	4379-43792	3	H4305"	4848-48481	5
H4303.1/16"	4379-43792	3.1/16	H4305.1/16"	4848-48481	5.1/16
H4303.1/8"	4379-43792	3.1/8	H4305.1/8"	4848-48481	5.1/8
H4303.3/16"	4379-43792	3.3/16	H4305.3/16"	4848-48481	5.3/16
H4303.1/4"	4379-43792	3.1/4	H4305.1/4"	4848-48481	5.1/4
H4303.5/16"	4379-43792	3.5/16	H4305.5/16"	4848-48481	5.5/16
H4303.3/8"	4379-43792	3.3/8	H4305.3/8"	4848-48481	5.3/8
H4303.7/16"	4379-43792	3.7/16	H4305.7/16"	4848-48481	5.7/16
H4303.1/2"	4379-43792	3.1/2	H4305.1/2"	4848-48481	5.1/2
H4303.9/16"	4379-43792	3.9/16	H4305.9/16"	4848-48481	5.9/16
H4303.5/8"	4379-43792	3.5/8	H4305.5/8"	4848-48481	5.5/8
H4303.11/16"	4379-43792	3.11/16	H4305.11/16"	4848-48481	5.11/16
H4303.3/4"	4379-43792	3.3/4	H4305.3/4"	4848-48481	5.3/4
H4303.13/16"	4379-43792	3.13/16	H4305.13/16"	4848-48481	5.13/16
H4303.7/8"	4379-43792	3.7/8	H4305.7/8"	4848-48481	5.7/8
H4303.15/16"	4379-43792	3.15/16	H4305.15/16"	4848-48481	5.15/16
H4304"	4379-43792	4	H4306"	4848-48481	6
H4304.1/16"	4379-43792	4.1/16	H4306.1/16"	4848-48481	6.1/16
H4304.1/8"	4379-43792	4.1/8	H4306.1/8"	4848-48481	6.1/8
H4304.3/16"	4379-43792	4.3/16	H4306.3/16"	4848-48481	6.3/16
H4304.1/4"	4379-43792	4.1/4	H4306.1/4"	4848-48481	6.1/4
H4304.5/16"	4379-43792	4.5/16	H4306.5/16"	4848-48481	6.5/16
H4304.3/8"	4379-43792	4.3/8	H4306.3/8"	4848-48481	6.3/8
H4304.7/16"	4379-43792	4.7/16	H4306.7/16"	4848-48481	6.7/16
H4304.1/2"	4379-43792	4.1/2	H4306.1/2"	4848-48481	6.1/2
H4304.9/16"	4379-43792	4.9/16	H4306.9/16"	4848-48481	6.9/16
H4304.5/8"	4379-43792	4.5/8	H4306.5/8"	4848-48481	6.5/8
H4304.11/16"	4848-48481	4.11/16	H4306.11/16"	4848-48481	6.11/16
H4304.3/4"	4848-48481	4.3/4	H4306.3/4"	4848-48481	6.3/4
H4304.13/16"	4848-48481	4.13/16	H4306.13/16"	4848-48481	6.13/16
H4304.7/8"	4848-48481	4.7/8	H4306.7/8"	4848-48481	6.7/8
H4304.15/16"	4848-48481	4.15/16			

S series drawing  
 S17, S45, S100, S150, S370 series



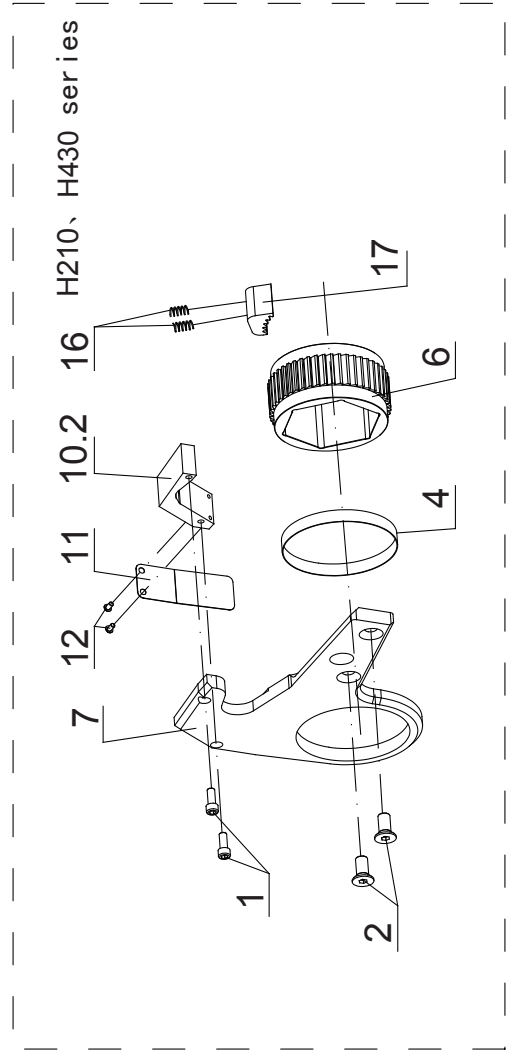
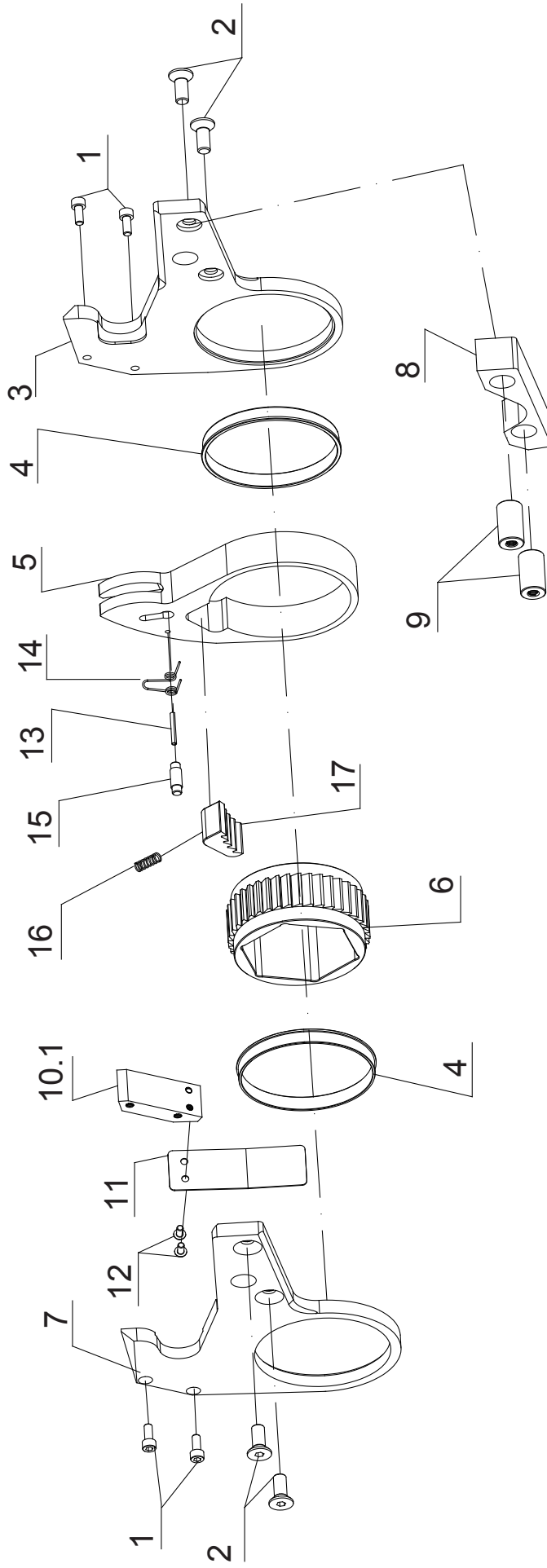
NOTE: 30# can not part from the piston rod assembly

S series partlist

		S17	S45	S100	S150	S370
ITEM	NAME	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER
1	BODY	1	1	1	1	1
2	SCREW	2		2	2	2
3	REACTION ARM	1	1	1	1	1
4	REACTION ARM COVER	1	1	1	1	1
5	(REACTION ARM) SCREW	2	2	2	2	2
6	(REACTION ARM) SPRING	1	1	1	1	1
7	PIN	1	1	1	1	1
8	SCREW	1	1	1	1	1
9	SCREW	1	1	1	1	1
10	SIDE RATCHET DRIVER	1	1	1	1	1
11	(BODY) REATINING RING	1	1	1		1
12	(BODY) SCREW	1	1	1	1	1
13	STEEL BALL	1	1	1	1	
14	(BODY) SCREW		1	1	1	1
15	BUSHING		2	2	2	2
16	SIDE RATCHET DRIVER	2	2	2	2	2
17	REATINING RING	2	2	2	2	2
18	DRIVE RETAINER	1	1	1	1	1
19	SQUARE DRIVE	1	1	1	1	1
20	SWIVEL JOINT	1	1	1	1	1
21	COUPLER	2	2	2	2	2
22	QUICK COUPLER (MALE)	1	1	1	1	1
23	QUICK COUPLER (FEMALE)	1	1	1	1	1
24	SCREW	2	2	2	2	2
25	PISTON HOUSING	1	1	1	1	1
26	BACK UP RING	1	1	1	1	1
27	O RING	1	1	1	1	1
28	O RING	1	1	1	1	1
29	BACK UP RING	1	1	1	1	1
30	PISTON ASSEMBLY	1	1	1	1	1
31	O RING	1	1	1	1	1
32	RETAINING SCREW	1	1	1	1	1
33	U RING	1	1	1	1	1
34	SCREW	2	2	3	3	4
35	BODY COVER	1	1	1	1	1
36	PIN SCREW	2		2	2	2
37	PIN	1	1	1	1	1
38	RATCHET PLATE	1	1	1	1	1
39	DRIVE PAWL SPRING	2	2	2	2	2
40	DRIVE PAWL	1	1	1	1	1
41	RATCHET	1	1	1	1	1
30-1	PISTON COVER	1	1	1	1	1
30-2	RETAINING RING	1	1	1	1	1
30-3	RETAINING RING	1	1	1	1	1
30-4	PISTON HOOK	1	1	1	1	1

H series drawing

H27, H54, H120 series

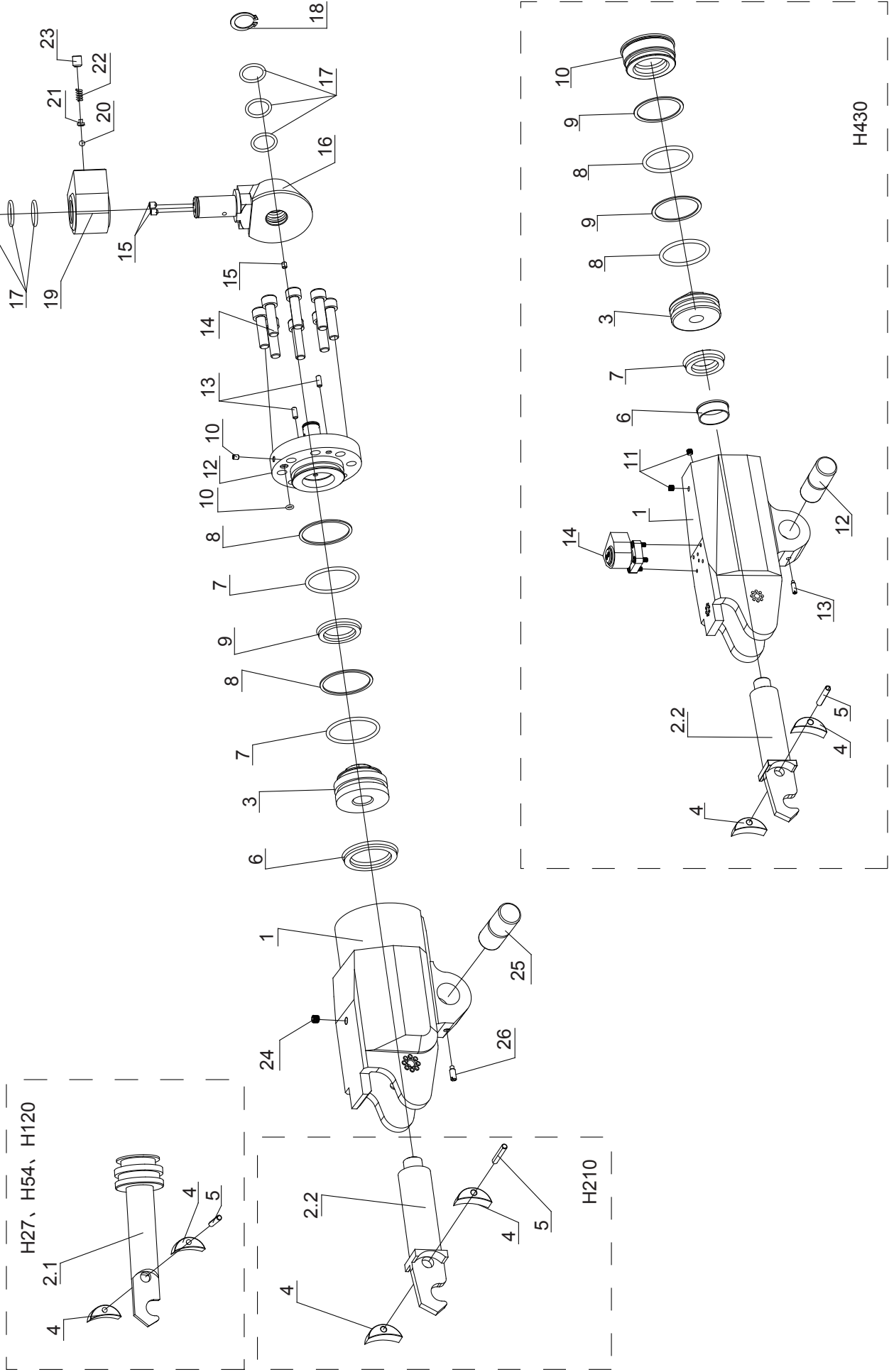


H series work-head partlist

		H27	H45	H120	H210	H430
ITEM	NAME	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER
1	SCREW	4	4	4	4	4
2	SCREW	4	4	4	4	4
3	RIGHT OUTER PLATE	1	1	1	1	1
4	COPPER BELT	2	2	2	2	2
5	DRIVE PLATE	1	1	1	1	1
6	RATCHET	1	1	1	1	1
7	LEFT OUTER PLATE	1	1	1	1	1
8	REACTION ARM	1	1	1	1	1
9	PIN	2	2	2	2	2
10.1	REACTION PAWL	1	1	1		
10.2					1	1
11	SHROULD	1	1	1	1	1
12	SHROULD SCREW	2	2	2	2	2
13	PIN	1	1	1	1	1
14	SPRING	1	1	1	1	1
15	DRIVE PIN	1	1	1	1	1
16	SPRING	1	1	1	1	2
17	RATCHET PAWL	1	1	1	1	1

H series power-head drawing

H27, H54, H120, H210, H430 series





H series power-head partlist

		H27	H54	H120	H210			H430
ITEM	NAME	NUMBER	NUMBER	NUMBER	NUMBER	ITEM		NUMBER
1	BODY	1	1	1	1	1	BODY	1
2.1	PISTON HOOK	1	1	1			PISTON HOOK	
2.2					1	2.2		1
3	PISTON COVER				1	3	PISTON COVER	1
4	SLIDE BLOCK	2	2	2	2	4	SLIDE BLOCK	2
5	PIN	1	1	1	1	5	PIN	1
6	(BODY) U RING	1	1	1	1	6	BUSHING	1
7	O RING	2	2	2	2	7	(BODY) U RING	1
8	RETAINING RING	2	2	2	2	8	(PISTON) O RING	2
9	(PISTON) U RING	1	1	1	1	9	REATINING RING	2
10	O RING	2	1	1	1	10	PISTON HOUSING	1
11	BODY SCREW	4	1	1	1	11	SCREW	2
12	PISTON HOUSING	1	1	1	1	12	PIN	1
13	SCREW		2	2	2	13	SCREW	1
14	SCREW	8	8	8	8	14	HOSE SWIVEL JOINT	1
15	SCREW	6	3	3	3			
16	SWIVEL JOINT	1	1	1	1			
17	O RING	6	6	6	6			
18	REATINING SPRING	2	2	2	2			
19	HOSE SWIVEL JOINT	1	1	1	1			
20	STEEL BALL	1	1	1	1			
21	SPRING SEAT	1	1	1	1			
22	SPRING	1	1	1	1			
23	(SWIVEL JOINT) SCREW	1	1	1	1			
24	(BODY) SCREW		1	1	1			
25	SCREW	1	1	1	1			
26	PIN	1	1	1	1			

## TROUBLE SHOOTING GUIDE

TROUBLE	PROBABLE CAUSE	SOLUTION	
Piston will not advance or retract	Couplers are not securely attached to the tool or pump	Check the coupler connections and make certain that they are connected	
	Coupler is defective	Replace any defective Coupler	
	Defective remote control unit	Replace the button and/or control pendent	
	Dirt in the direction-control valve o the pump unit	Disassemble the pump and clean the direction-control valve	
Piston will not retract	Hose connections reversed	Make certain the advance on the pump is connected to the advance on the tool and retract on the pump is connected to the retract on the tool	
		Retract hose n ot connected	Connect the retract hose securely
		Retract pin and/or spring broken	Replace the broken pin and/or spring
	Cylinder will not build up pressure	Piston Seal and/or End Plug Seal leaking	Replace any defective o-ring
Square Drive will not turn	Coupler is defective	Replace any defective Coupler	
	Grease or dirt build up in the teeth of the Ratchet and Segment Pawl	Disassemble the Ratchet and clean the grease or dirt out of te teeth	
Pump will not build up pressure	Worn or broken teeth on Ratchet an /or Segment Pawl	Replace any worn or damaged parts	
	Defective relief valve	Inspect,adjust or replace the relief valve	
	Electric power source is too low	Make certain the amperage,voltage and any extension aord size comply with the pump manual requirements	
	Defective Gauge	Replace the Gauge	
	Low oil level	Check and fill the pump reservoir	
Nut Returns with retract stroke	Clogged filter	Inspect,clean and/or replace the pump filter	
	Ball Plungers are not engaging the Drive Sleeves	Thread the Ball Pungers to the correct depth in the Housing	



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PAPER





## S系列及H系列液压扭矩扳手操作保养手册

本操作手册内容包含S和H系列的液压扭矩扳手操作规程、警告以及注意事项和事故排除。使用前请仔细阅读本手册，理解其内容并妥善保管。本说明书仅作为最终用户参考。

### 一 收货须知（开箱检查）

仔细检查产品外观有无损伤，是否有运输损坏。运输损坏不包括在保修范围内。如果发现因货运受损，应及时向货运商申报。货运商应支付运输损坏带来的所有维修和更换费用。

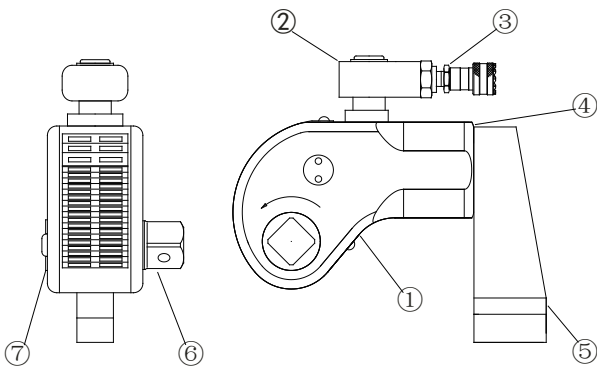
### 安全第一！！

液压扭矩扳手是一种动力工具，使用前应仔细阅读所有的说明、警告和注意事项，遵守安全操作以避免在操作设备发生人身或设备的损伤！对因为不安全操作及错误操作导致的损坏本公司不予负责。

### 产品描述

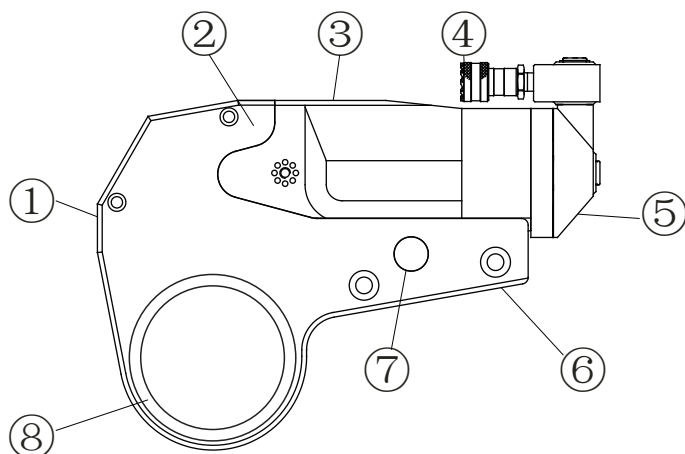
WREN公司的S系列和H系列液压扭矩扳手采用铝钛合金及超高强度合金材料制造，为手动控制，双作用的液压设计，可以锁紧及松开螺栓连接，广泛适用于大力矩螺栓拆卸，扭矩精确可调，误差不超过±3%。

### S系列驱动型液压扭矩扳手：



序号	名称
①	本体
②	360° 旋转接头
③	快速接头
④	销固装置
⑤	360° 旋转反力臂
⑥	四方驱动轴
⑦	驱动轴锁紧器

## H系列中空型液压扭矩扳手



序号	名称
①	工作头
②	勾头
③	动力头
④	快速接头
⑤	360° × 360° 旋转接头
⑥	反作用挡板
⑦	快速组合销
⑧	棘轮

## 二、警告事项和警告标志

### 警告事项

#### 警告

为避免人身伤害及可能的设备损伤，要确保每一个液压元件最高承受700bar的工作压力。

#### 警告

不要超过设备的额定负荷尽量减少超载的危险；在系统中使用压力表以显示操作负载。压力表是显示系统内发生情况的窗口。使用液压扳手时不得超过其允许的最大扭矩。

#### 警告

尽快用WREN原厂零件替换损坏的零件。

#### 注意

避免损坏液压油管，使用中应该避免液压油管严重弯曲和缠绕。使用弯曲或缠绕的油管将产生过大的背压。

严重弯曲和缠绕使油管内部损坏，从而过早报废。

不要将重物掉到或压到油管上。严重冲击可引起油管内部金属线损坏，加压时被损坏的油管可能破裂。不能用液压油管拖拉及吊拿其它液压部件（如：泵、液压扳手、阀等）。

#### 警告

为避免损坏设备及人身伤害，不得拆掉扳手上的护板，不得改动扳手及附件，不得改变旋转接头上的安全阀。

#### 注意

不正确的连接会导致故障及危险。连接前应保持快速接头清洁，使用后旋上防尘帽。

不得使用破旧的套筒和插头。不得用公制套筒扭英制的螺母和螺栓，反之亦然。

#### 注意



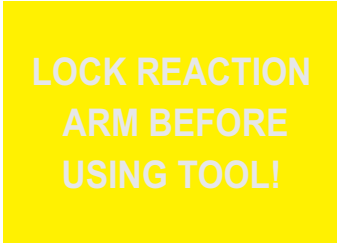
使用WREN原厂高性能的套筒。

#### 注意

用插销将套筒驱动头紧固以避免套筒脱落。

## 警告标志

警告标志如下表所示

警告标志	意义	粘贴位置
	禁止用手触摸	反力臂
	驱动轴右紧左松	工作头
	使用前固定好反力臂	反力臂

### 三、螺栓预紧力推荐表

表1

强度等级		4.8		6.8		8.8		10.9		12.9	
最小破断强度		392MPa		588MPa		784MPa		941MPa		1176MPa	
材质		一般构造用钢		机械构造用钢		铬钼合金钢		镍铬钼合金钢		镍铬钼合金钢	
螺栓	螺母	扭矩值		扭矩值		扭矩值		扭矩值		扭矩值	
M	mm	KGM	N.m	KGM	N.m	KGM	N.m	KGM	N.m	KGM	N.m
14	22	7	69	10	98	14	137	17	165	23	225
16	24	10	98	14	137	21	206	25	247	36	363
18	27	14	137	21	206	29	284	35	341	49	480
20	30	18	176	28	296	41	402	58	569	69	680
22	32	23	225	34	333	55	539	78	765	93	911
24	36	32	314	48	470	70	686	100	981	120	1176
27	41	45	441	65	637	105	1029	150	1472	180	1764
30	46	60	588	90	882	125	1225	200	1962	240	2352
33	50	75	735	115	1127	150	1470	210	2060	250	2450
36	55	100	980	150	1470	180	1764	250	2453	300	2940
39	60	120	1176	180	1764	220	2156	300	2943	370	3626
42	65	155	1519	240	2352	280	2744	390	3826	470	4606
45	70	180	1764	280	2744	320	3136	450	4415	550	5390
48	75	230	2254	350	3430	400	3920	570	5592	680	6664
52	80	280	2744	420	4116	480	4704	670	6573	850	8330
56	85	360	3528	530	5149	610	5978	860	8437	1050	10290
60	90	410	4018	610	5978	790	7742	1100	10791	1350	13230
64	95	510	4998	760	7448	900	8820				
68	100	580	5684	870	8526	1100	10780				
72	105	660	6468	1000	9800	1290	12642				
76	110	750	7350	1100	10780	1500	14701				
80	115	830	8143	1250	12250	1850	18130				
85	120	900	8820	1400	13720	2250	22050				
90	130	1080	10584	1650	16170	2500	24500				
100	145	1400	13720	2050	20090						
110	155	1670	16366	2550	24990						
120	175	2030	19894	3050	29890						

#### 注：

建议锁紧扭矩值为：表中数值×80%


例如：M52，8.8级螺栓，则锁紧力矩为 $4704 \times 80\% = 3763 \text{N.m}$

表中数值为德国工业标准，在螺栓达到屈服极限的80%时所测定的。


拆松力矩为锁紧力矩的1.5~2倍

例如：上例锁紧力矩为3763N.m，则其拆松力矩为 $3763 \times 1.5(2) = 5645(7526) \text{N.m}$

反力臂必须放置在一个绝对停止的位置，请勿把手臂用作固定手柄，做好预防措施确保操作者的手不被夹在手臂和坚固物体中间。




保持身体姿态平衡和稳固。




请勿靠拿管子来移动工具。



在安装、移动或在工具上调节附件，或者给工具做保养前，请先关闭泵和断开电源。



最大操作压力为10000 psi (700bar)



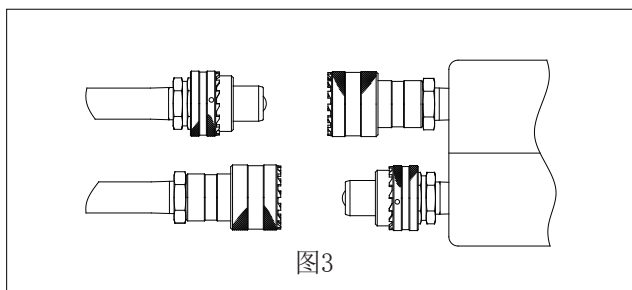
请勿使用损坏的，磨损的或老化的液压油管和装置。



## 注意

### 连接油管

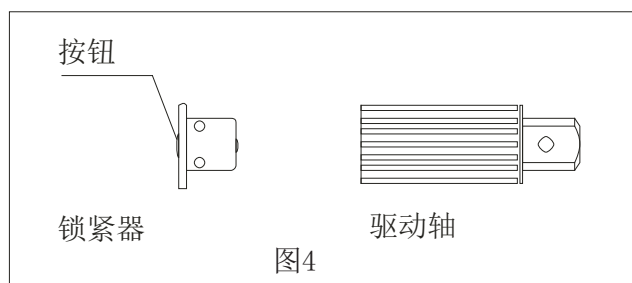
扳手及液压泵之间是由工作压力均为700bar的钢丝编织的复式油管连接的。每根油管的两端均有凹接头以及凸接头，以保证泵与扳手之间的正确连接。不得随意变动旋转接头上的任何螺栓。这是厂家为了安全而设定的。只有受过专业培训者才能去调节。



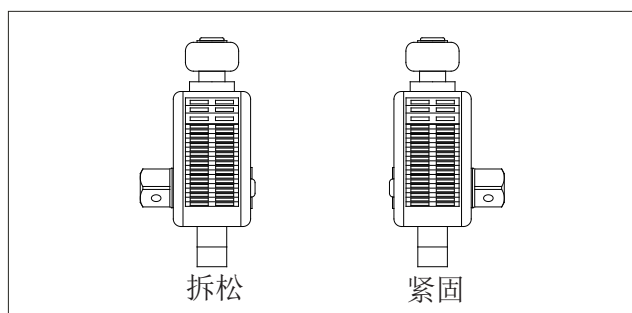
## S系列

### 方型驱动轴换向

按住锁紧器中间的圆型按钮（图4），并轻拉驱动轴，以解开驱动轴与锁紧器的啮合，驱动轴就可以拉出。



将驱动轴放入扳手内，确定方向，使其与花键套完全啮合，然后转动驱动轴使之与花键套以及棘轮槽啮合，通过棘轮推动驱动轴转动。



## 准备

### 确定是拆松，还是锁紧螺母

通过按下驱动轴锁紧器；取出方头驱动轴；按图进行左右换向，装上驱动轴锁紧器，按下反作用力臂上的力臂夹，按合适方位装入反作用力臂。拆锁时方轴方向见图（5）所示。



## 连接泵站

将泵的高压出口（H或A）与液压扳手的高压出口（H或A）、泵的低压出口（L或R）与液压扳手的低压出口（L或R）分别用高压油管连接起来。连接时油管上的快速接头应插到底，然后用手拧紧固定螺母。

## 试运转

将扳手置于空地上。打开泵电源开关，启动泵，检查泵是否运转正常。按线控开关上的按钮，此时方轴开始转动，直到扳手到位停止转动，压力表由“0”急速上升至调定压力，松开按钮，扳手自动回程；待扳手自动回程到位后，压力表由“0”急速上升至7.5Mpa。这时再重新按下按钮，一个新的循环开始。反复几次，使扳手空转数次，观察扳手转向，确定方向后再将扳手放至套筒上。

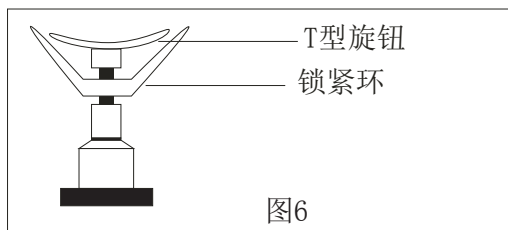
**注意：扳手不用时，应即时关闭油泵电源！**

## 调整压力

扳手与泵连接号放置在空地上，一手将线控开关按钮按下驱动轴开始转动，直到扳手到位停止转动，压力表由“0”急速上升，另一只手调整油泵调压阀，调整压力表中指针至所需压力。

## 拆松

将泵站压力调整到最高，确认扳手转向，确认为拆松方向，将扳手放到螺母上，找好反作用支点，靠稳，反复执行试运转中第三条动作，直至将螺母拆下。



## 使用举例

### 1: 力矩的设定

首先可根据设计要求设定力矩；如无设计力矩，建议按表（1）螺栓预紧力推荐表中数据。具体方法为：  
设定力矩=（表中数矩）×（80%-90%）

例如：M48是螺栓、8.8级，表中建议预紧力为3920N.m，则设定力矩为：3920×80%=3136N.m。

### 2: 泵站压力设定

根据所需的力矩值及所用扳手型号来设定泵站压力。如上述M48螺栓、8.8级设定力矩为3136N.m，选用S45驱动型液压扭矩扳手，则查表中S45—列，查出对应于3158N.m力矩时泵站的压力为49Mpa，所以泵站压力应设定至49Mpa。

3: 确定扳手转向确为锁紧方向，将扳手放在螺母上反复执行试运转中第三条的动作，直至螺母不动为止。

## H系列

### 工作头和动力头的连接与拆分

工作头与动力头的组合与拆分：将动力头上的长销轴卡入工作头的沟槽，然后按下动力头，对齐组合销口，再插入快速组合销定位（图7）。

拉出快速组合销，向上拉起动力头，然后沿着沟槽方向，将动力头和工作头分开。

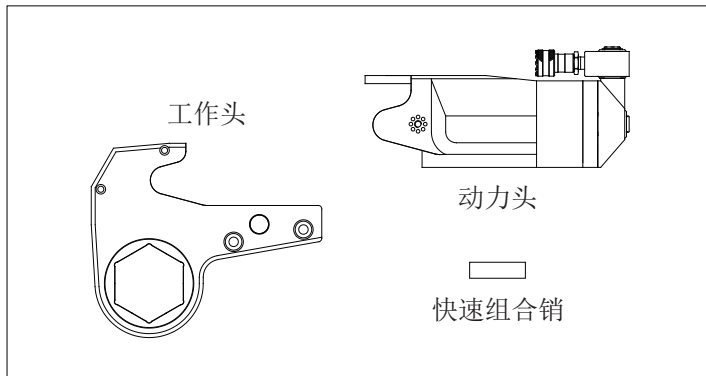


图7

### 中空扳手的使用位置

中空扳手的松紧程序也是左松右紧，工作时一定要确保反作用力臂或直角靠在一个牢靠的反作用支点上。见（图8）

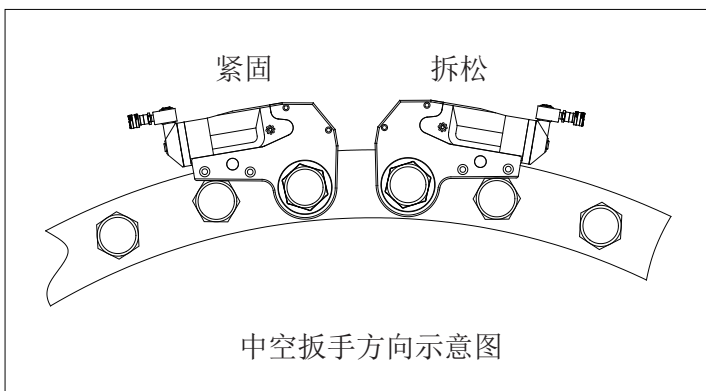


图8

### 中空扳手操作细则

#### 准备

确定要拆松（锁紧）螺母的大小，选择适合的动力头、工作头及变径套附件。连接泵站将泵的高压出口(H或A)与液压扳手的高压出口(H或A)、泵的低压出口(L或R)与液压扳手的低压出口(L或R)分别用高压油管连接起来。连接时油管上的快速接头应插到底，然后用手拧紧固定螺母。

仔细检查油管接头是否连接可靠，泵中是否有油。最后将泵电源插头插入电源。

**警告 严禁无油运转！！**

## 试运转

将扳手置于空地上。打开泵电源开关，启动泵，检查泵是否运转正常。按线控开关上的任意一只按钮，此时棘轮开始转动，当扳手运转到位停止转动，压力表由“0”急速上升至调定压力，松开按钮，扳手自动回程；待扳手自动回程到位，压力表由“0”急速上升至7.5Mpa。重新按下按钮，此时扳手转动，一个新的循环开始。反复几次，使扳手空转数次，观察扳手转向，以确定是拆松还是锁紧螺母，无异常时，才能将扳手放至螺母上。

**注意：扳手不用时，应即时关闭油泵电源！**

## 调整压力

一手将线控开关按钮按下，当扳手到位停止转动，压力表由“0”急速上升，另一只手调整油泵压阀，调整压力表中指针至所需压力。

## 拆松

将泵站压力调整到最高，确认扳手转向，确认为拆松方向，将扳手放到螺母上，找好反作用支点，靠稳，反复执行第二项中第三条动作，直至将螺母拆下。

## 锁紧

### 1、力矩设定

首先可根据设计要求设定力矩；如无设计力矩，建议按螺栓预紧力推荐表中数据来设定力矩。具体方法为：设定力矩=(表中数矩)×(80%-90%)，例如：8.8级、M48是螺栓，表中建议预紧力为3920N.m，则设定力矩为： $3920 \times 80\% = 3136\text{N.m}$ 。

### 2、泵站压力设定

根据所需的力矩值及所用扳手型号来设定泵站压力。如上述8.8级、M48螺栓设定力矩为3136N.m，选用H54型扳手，则查表中H54一列，查出对应于3144N.m力矩时泵站的压力为41Mpa，所以泵站压力应设定至41Mpa。

3、确定扳手转向确为锁紧方向，将扳手放在螺母上反复执行第二项中第三条的动作，直至螺母不动为止。

## 六、S液压扭矩扳手压力--扭矩对照表

表2

型号	S17	S45	S100	S150	S370
Mpa	N.m	N.m	N.m	N.m	N.m
7	172	452	1006	1497	3699
8	197	517	1150	1711	4227
9	221	581	1293	1925	4756
10	246	646	1437	2139	5284
11	270	710	1581	2352	5813
12	295	775	1725	2566	6341
13	319	839	1868	2780	6870
14	344	904	2012	2994	7398
15	369	969	2156	3208	7926
16	393	1033	2299	3422	8455
17	418	1098	2443	3636	8983
18	442	1162	2587	3849	9512
19	467	1227	2731	4063	10040
20	491	1291	2874	4277	10569
21	516	1356	3018	4491	11097
22	541	1421	3162	4705	11625
23	565	1485	3305	4919	12154
24	590	1550	3449	5133	12682
25	614	1614	3593	5346	13211
26	639	1679	3737	5560	13739
27	663	1743	3880	5774	14268
28	688	1808	4024	5988	14796
29	713	1873	4168	6202	15324
30	737	1937	4311	6416	15853
31	762	2002	4455	6630	16381
32	786	2066	4599	6843	16910
33	811	2131	4743	7057	17438
34	835	2195	4886	7271	17967
35	860	2260	5030	7485	18495
36	885	2325	5174	7699	19023
37	909	2389	5317	7913	19552
38	934	2454	5461	8127	20080
39	958	2518	5605	8340	20609
40	983	2583	5749	8554	21137
41	1007	2647	5892	8768	21666
42	1032	2712	6036	8982	22194
43	1057	2777	6180	9196	22722
44	1081	2841	6323	9410	23251
45	1106	2906	6467	9624	23779
46	1130	2970	6611	9837	24308
47	1155	3035	6755	10051	24836
48	1179	3099	6898	10265	25365
49	1204	3164	7042	10479	25893
50	1229	3229	7186	10693	26421
51	1253	3293	7329	10907	26950
52	1278	3358	7473	11121	27478
53	1302	3422	7617	11334	28007
54	1327	3487	7761	11548	28535
55	1351	3551	7904	11762	29064
56	1376	3616	8048	11976	29592
57	1401	3681	8192	12190	30120
58	1425	3745	8335	12404	30649
59	1450	3810	8479	12618	31177
60	1474	3874	8623	12831	31706
61	1499	3939	8767	13045	32234
62	1523	4003	8910	13259	32763
63	1548	4068	9054	13473	33291
64	1573	4133	9198	13687	33819
65	1597	4197	9341	13901	34348
66	1622	4262	9485	14115	34876
67	1646	4326	9629	14328	35405
68	1671	4391	9773	14542	35933
69	1695	4455	9916	14756	36462
70	1727	4529	10064	14974	36992

# S液压扭矩扳手压力--扭矩对照表

表3

型号	S17	S45	S100	S150	S370
psi	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs
1000	125	329	733	1090	2694
1200	150	395	879	1308	3233
1400	175	461	1026	1527	3772
1600	200	527	1172	1745	4311
1800	226	593	1319	1963	4850
2000	251	658	1465	2181	5388
2200	276	724	1612	2399	5927
2400	301	790	1759	2617	6466
2600	326	856	1905	2835	7005
2800	351	922	2052	3053	7544
3000	376	988	2198	3271	8083
3200	401	1054	2345	3489	8621
3400	426	1119	2491	3707	9160
3600	451	1185	2638	3925	9699
3800	476	1251	2784	4143	10238
4000	501	1317	2931	4361	10777
4200	526	1383	3078	4580	11316
4400	551	1449	3224	4798	11854
4600	576	1514	3371	5016	12393
4800	601	1580	3517	5234	12932
5000	626	1646	3664	5452	13471
5200	651	1712	3810	5670	14010
5400	677	1778	3957	5888	14549
5600	702	1844	4103	6106	15088
5800	727	1909	4250	6324	15626
6000	752	1975	4396	6542	16165
6200	777	2041	4543	6760	16704
6400	802	2107	4690	6978	17243
6600	827	2173	4836	7196	17782
6800	852	2239	4983	7415	18321
7000	877	2305	5129	7633	18859
7200	902	2370	5276	7851	19398
7400	927	2436	5422	8069	19937
7600	952	2502	5569	8287	20476
7800	977	2568	5715	8505	21015
8000	1002	2634	5862	8723	21554
8200	1027	2700	6008	8941	22092
8400	1052	2765	6155	9159	22631
8600	1077	2831	6302	9377	23170
8800	1102	2897	6448	9595	23709
9000	1128	2963	6595	9813	24248
9200	1153	3029	6741	10031	24787
9400	1178	3095	6888	10249	25325
9600	1203	3161	7034	10468	25864
9800	1228	3226	7181	10686	26403
10000	1253	3292	7327	10904	26942

## 七、H系列液压扭矩扳手压力--扭矩对照表

表4

型号	H27		H54		H120		H210		H430	
螺母范围	19~46	50~60	27~65	70~80	50~80	85~105	70~100	105~115	80~117	120~175
Mpa	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
7	262	306	537	603	1173	1434	2121	2312	4379	4848
8	299	350	614	689	1341	1639	2424	2642	5005	5541
9	337	393	690	775	1508	1844	2727	2973	5630	6233
10	374	437	767	861	1676	2049	3030	3303	6256	6926
11	412	481	844	948	1843	2253	3333	3633	6881	7618
12	449	525	921	1034	2011	2458	3636	3963	7507	8311
13	487	568	997	1120	2178	2663	3939	4294	8132	9003
14	524	612	1074	1206	2346	2868	4242	4624	8758	9696
15	561	656	1151	1292	2514	3073	4545	4954	9384	10389
16	599	699	1227	1378	2681	3278	4848	5285	10009	11081
17	636	743	1304	1464	2849	3483	5151	5615	10635	11774
18	674	787	1381	1551	3016	3687	5454	5945	11260	12466
19	711	831	1458	1637	3184	3892	5757	6275	11886	13159
20	749	874	1534	1723	3351	4097	6060	6606	12511	13851
21	786	918	1611	1809	3519	4302	6363	6936	13137	14544
22	823	962	1688	1895	3687	4507	6666	7266	13763	15237
23	861	1005	1764	1981	3854	4712	6969	7597	14388	15929
24	898	1049	1841	2067	4022	4917	7272	7927	15014	16622
25	936	1093	1918	2154	4189	5121	7575	8257	15639	17314
26	973	1137	1995	2240	4357	5326	7878	8587	16265	18007
27	1011	1180	2071	2326	4524	5531	8181	8918	16890	18699
28	1048	1224	2148	2412	4692	5736	8484	9248	17516	19392
29	1085	1268	2225	2498	4860	5941	8787	9578	18142	20085
30	1123	1311	2301	2584	5027	6146	9090	9909	18767	20777
31	1160	1355	2378	2670	5195	6351	9393	10239	19393	21470
32	1198	1399	2455	2757	5362	6555	9696	10569	20018	22162
33	1235	1443	2532	2843	5530	6760	9999	10899	20644	22855
34	1273	1486	2608	2929	5697	6965	10302	11230	21269	23547
35	1310	1530	2685	3015	5865	7170	10605	11560	21895	24240
36	1347	1574	2762	3101	6033	7375	10908	11890	22521	24933
37	1385	1617	2838	3187	6200	7580	11211	12221	23146	25625
38	1422	1661	2915	3273	6368	7785	11514	12551	23772	26318
39	1460	1705	2992	3360	6535	7989	11817	12881	24397	27010
40	1497	1749	3069	3446	6703	8194	12120	13211	25023	27703
41	1535	1792	3145	3532	6870	8399	12423	13542	25648	28395
42	1572	1836	3222	3618	7038	8604	12726	13872	26274	29088
43	1609	1880	3299	3704	7206	8809	13029	14202	26900	29781
44	1647	1923	3375	3790	7373	9014	13332	14533	27525	30473
45	1684	1967	3452	3876	7541	9219	13635	14863	28151	31166
46	1722	2011	3529	3963	7708	9423	13938	15193	28776	31858
47	1759	2055	3606	4049	7876	9628	14241	15523	29402	32551
48	1797	2098	3682	4135	8043	9833	14544	15854	30027	33243
49	1834	2142	3759	4221	8211	10038	14847	16184	30653	33936
50	1871	2186	3836	4307	8379	10243	15150	16514	31279	34629
51	1909	2229	3912	4393	8546	10448	15453	16845	31904	35321
52	1946	2273	3989	4479	8714	10653	15756	17175	32530	36014
53	1984	2317	4066	4566	8881	10857	16059	17505	33155	36706
54	2021	2361	4143	4652	9049	11062	16362	17835	33781	37399
55	2059	2404	4219	4738	9216	11267	16665	18166	34406	38091
56	2096	2448	4296	4824	9384	11472	16968	18496	35032	38784
57	2133	2492	4373	4910	9552	11677	17271	18826	35658	39477
58	2171	2535	4449	4996	9719	11882	17574	19157	36283	40169
59	2208	2579	4526	5082	9887	12087	17877	19487	36909	40862
60	2246	2623	4603	5169	10054	12291	18180	19817	37534	41554
61	2283	2667	4680	5255	10222	12496	18483	20147	38160	42247
62	2321	2710	4756	5341	10389	12701	18786	20478	38785	42939
63	2358	2754	4833	5427	10557	12906	19089	20808	39411	43632
64	2395	2798	4910	5513	10725	13111	19392	21138	40037	44325
65	2433	2841	4986	5599	10892	13316	19695	21469	40662	45017
66	2470	2885	5063	5685	11060	13521	19998	21799	41288	45710
67	2508	2929	5140	5772	11227	13725	20301	22129	41913	46402
68	2545	2973	5217	5858	11395	13930	20604	22459	42539	47095
69	2583	3016	5293	5944	11562	14135	20907	22790	43164	47787
70	2625	3068	5372	6037	11737	14349	21216	23124	43792	48481

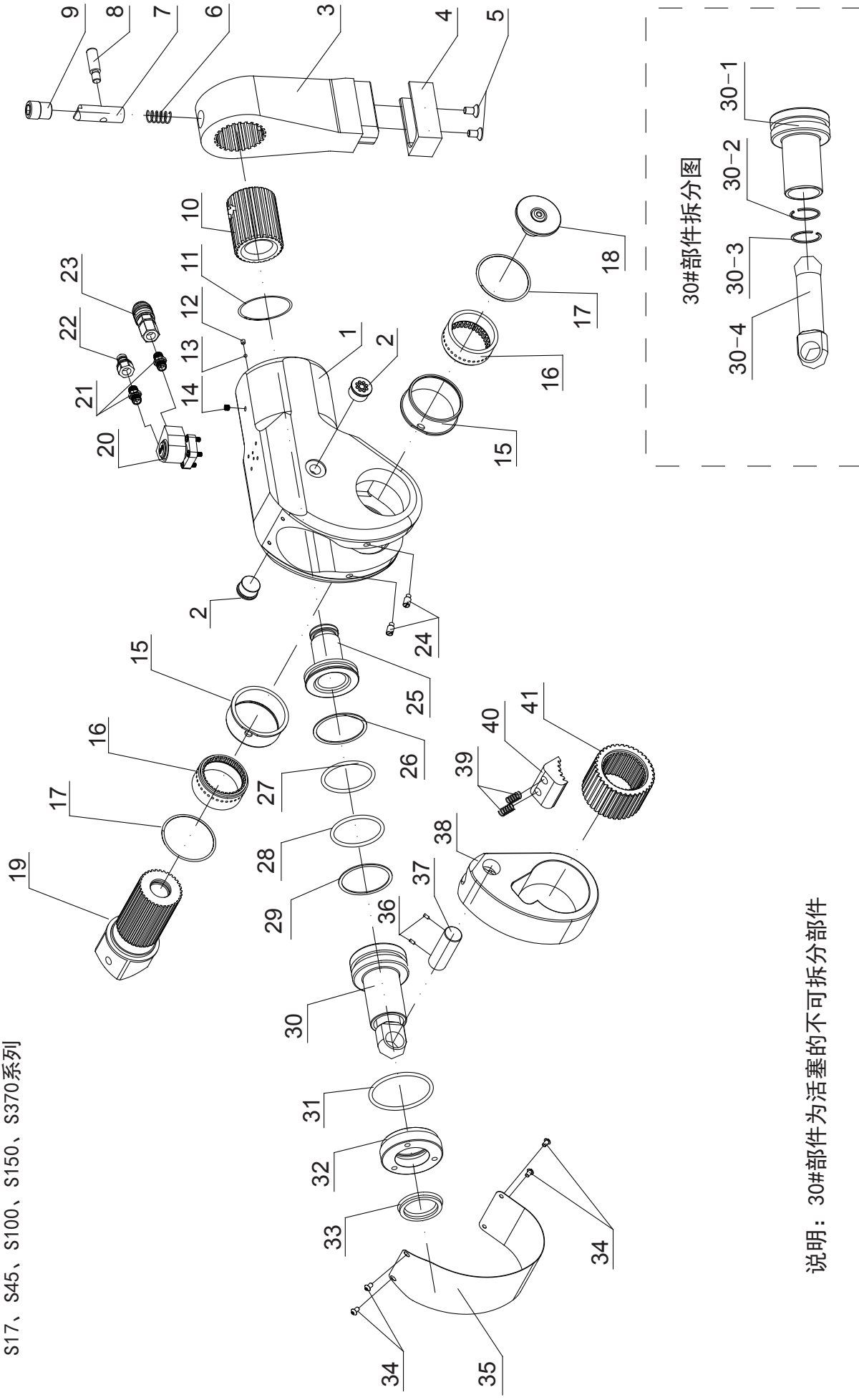
# H系列液压扭矩扳手压力--扭矩对照表

表5

型号	H27		H54		H120		H210		H430	
螺母范围	19~46	50~60	27~65	70~80	50~80	85~105	70~100	105~115	80~117	120~175
psi	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs	ft.lbs
1000	191	223	391	439	854	1044	1545	1684	3190	3531
1200	229	267	469	527	1025	1253	1854	2021	3827	4237
1400	267	312	548	615	1196	1462	2163	2358	4465	4944
1600	305	357	626	703	1367	1671	2472	2694	5103	5650
1800	343	401	704	791	1538	1880	2781	3031	5741	6356
2000	382	446	782	878	1709	2089	3090	3368	6379	7062
2200	420	490	860	966	1880	2298	3399	3705	7017	7769
2400	458	535	939	1054	2051	2507	3708	4042	7655	8475
2600	496	579	1017	1142	2221	2716	4017	4378	8293	9181
2800	534	624	1095	1230	2392	2925	4326	4715	8931	9887
3000	572	669	1173	1318	2563	3133	4635	5052	9569	10593
3200	611	713	1252	1405	2734	3342	4944	5389	10206	11300
3400	649	758	1330	1493	2905	3551	5253	5726	10844	12006
3600	687	802	1408	1581	3076	3760	5562	6062	11482	12712
3800	725	847	1486	1669	3247	3969	5871	6399	12120	13418
4000	763	892	1565	1757	3418	4178	6180	6736	12758	14125
4200	801	936	1643	1845	3588	4387	6488	7073	13396	14831
4400	840	981	1721	1933	3759	4596	6797	7410	14034	15537
4600	878	1025	1799	2020	3930	4805	7106	7746	14672	16243
4800	916	1070	1877	2108	4101	5014	7415	8083	15310	16949
5000	954	1114	1956	2196	4272	5222	7724	8420	15948	17656
5200	992	1159	2034	2284	4443	5431	8033	8757	16586	18362
5400	1030	1204	2112	2372	4614	5640	8342	9094	17223	19068
5600	1069	1248	2190	2460	4785	5849	8651	9430	17861	19774
5800	1107	1293	2269	2547	4955	6058	8960	9767	18499	20481
6000	1145	1337	2347	2635	5126	6267	9269	10104	19137	21187
6200	1183	1382	2425	2723	5297	6476	9578	10441	19775	21893
6400	1221	1426	2503	2811	5468	6685	9887	10778	20413	22599
6600	1259	1471	2581	2899	5639	6894	10196	11114	21051	23306
6800	1298	1516	2660	2987	5810	7102	10505	11451	21689	24012
7000	1336	1560	2738	3074	5981	7311	10814	11788	22327	24718
7200	1374	1605	2816	3162	6152	7520	11123	12125	22965	25424
7400	1412	1649	2894	3250	6322	7729	11432	12462	23603	26130
7600	1450	1694	2973	3338	6493	7938	11741	12798	24240	26837
7800	1488	1738	3051	3426	6664	8147	12050	13135	24878	27543
8000	1527	1783	3129	3514	6835	8356	12359	13472	25516	28249
8200	1565	1828	3207	3601	7006	8565	12668	13809	26154	28955
8400	1603	1872	3286	3689	7177	8774	12977	14146	26792	29662
8600	1641	1917	3364	3777	7348	8983	13286	14482	27430	30368
8800	1679	1961	3442	3865	7519	9191	13595	14819	28068	31074
9000	1717	2006	3520	3953	7689	9400	13904	15156	28706	31780
9200	1756	2051	3598	4041	7860	9609	14213	15493	29344	32486
9400	1794	2095	3677	4129	8031	9818	14522	15830	29982	33193
9600	1832	2140	3755	4216	8202	10027	14831	16166	30619	33899
9800	1870	2184	3833	4304	8373	10236	15140	16503	31257	34605
10000	1908	2229	3911	4392	8544	10445	15449	16840	31895	35311

# 八、S系列液压扭矩扳手装配图

S17、S45、S100、S150、S370系列



说明：30#部件为活塞的不可拆分部件

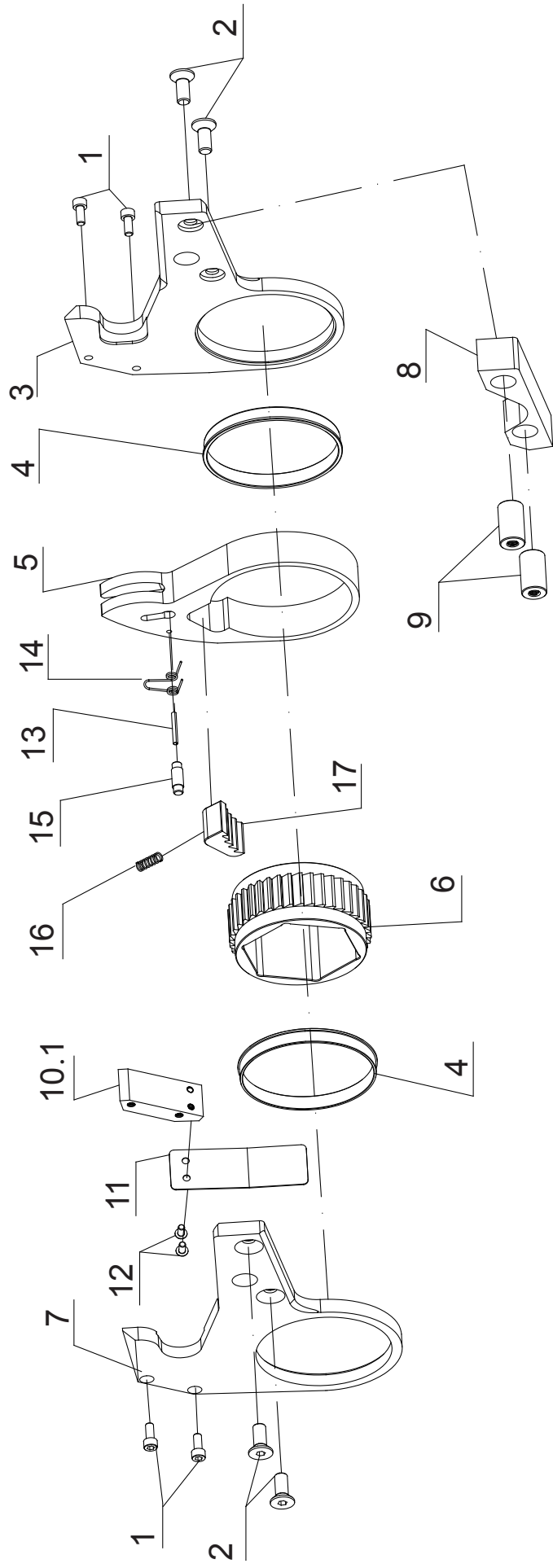


## 九、S系列液压扭矩扳手零件详表

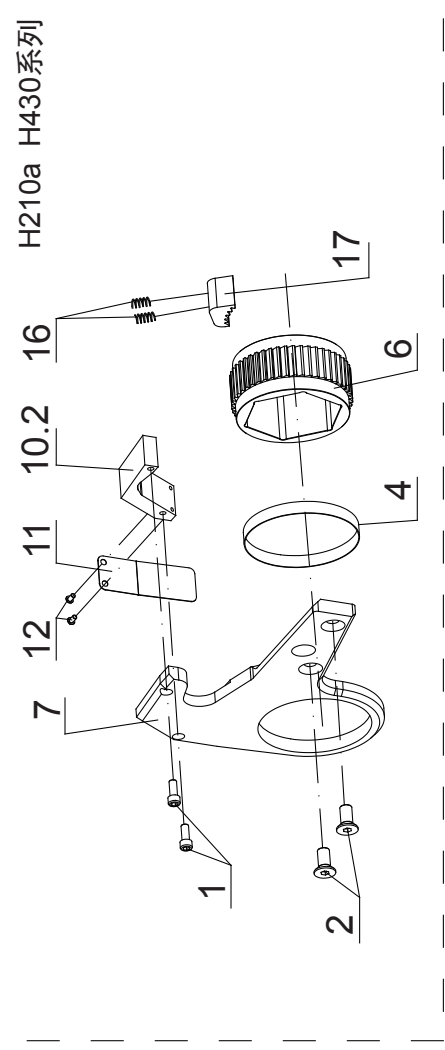
型号		S17	S45	S100	S150	S370
序列	名称	数量	数量	数量	数量	数量
1	本体	1	1	1	1	1
2	螺钉	2		2	2	2
3	反力臂	1	1	1	1	1
4	马掌	1	1	1	1	1
5	(马掌) 螺钉	2	2	2	2	2
6	(反力臂) 压簧	1	1	1	1	1
7	固定销	1	1	1	1	1
8	固定螺钉	1	1	1	1	1
9	螺钉	1	1	1	1	1
10	花键轴	1	1	1	1	1
11	(本体) 卡簧	1	1	1		1
12	(本体前) 堵头	1	1	1	1	1
13	钢球	1	1	1	1	
14	(本体上) 堵头		1	1	1	1
15	钢套		2	2	2	2
16	自由花键套	2	2	2	2	2
17	(钢套) 卡簧	2	2	2	2	2
18	锁紧器	1	1	1	1	1
19	驱动轴	1	1	1	1	1
20	旋转接头	1	1	1	1	1
21	外接头	2	2	2	2	2
22	凸接头	1	1	1	1	1
23	凹接头	1	1	1	1	1
24	碰珠螺钉	2	2	2	2	2
25	缸盖	1	1	1	1	1
26	(缸盖) 挡圈	1	1	1	1	1
27	(缸盖) O型圈	1	1	1	1	1
28	(活塞) O形圈	1	1	1	1	1
29	(活塞) 挡圈	1	1	1	1	1
30	活塞部件	1	1	1	1	1
31	(本体) O型圈	1	1	1	1	1
32	压紧螺母	1	1	1	1	1
33	(压紧螺母) U型圈	1	1	1	1	1
34	(盖板) 螺钉	2	2	3	3	4
35	盖板	1	1	1	1	1
36	(销轴) 螺钉	2		2	2	2
37	销轴	1	1	1	1	1
38	驱动板	1	1	1	1	1
39	(棘爪) 压簧	2	2	2	2	2
40	棘爪	1	1	1	1	1
41	棘轮	1	1	1	1	1
30-1	活塞杆	1	1	1	1	1
30-2	(连杆轴) 卡簧	1	1	1	1	1
30-3	(连杆轴) 钢丝挡圈	1	1	1	1	1
30-4	连杆轴	1	1	1	1	1

# 十、H系列液压扭矩扳手工作头装配图

H27、H54、H120系列



H210a H430系列

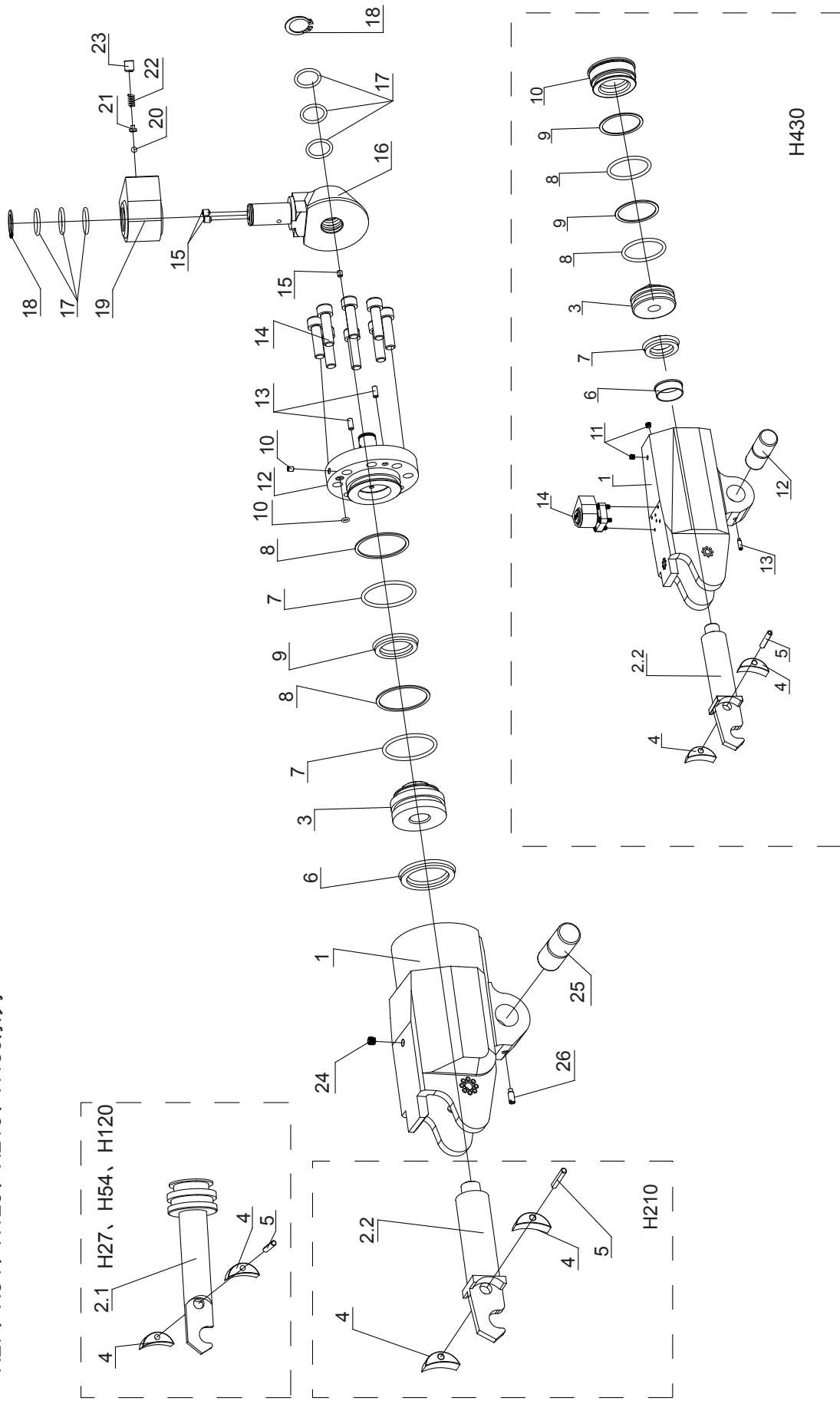


# 十一、H系列液压扭矩扳手工作头零件表

型号		H27	H45	H120	H210	H430
序号	名称	数量	数量	数量	数量	数量
1	(连接垫板) 螺钉	4	4	4	4	4
2	(反力支板) 螺钉	4	4	4	4	4
3	右墙板	1	1	1	1	1
4	铜带	2	2	2	2	2
5	驱动板	1	1	1	1	1
6	棘轮	1	1	1	1	1
7	左墙板	1	1	1	1	1
8	反力支板	1	1	1	1	1
9	定位销	2	2	2	2	2
10.1	连接垫板	1	1	1		
10.2	连接垫板				1	1
11	盖板	1	1	1	1	1
12	(盖板) 螺钉	2	2	2	2	2
13	弹性销	1	1	1	1	1
14	扭簧	1	1	1	1	1
15	驱动销	1	1	1	1	1
16	压簧	1	1	1	1	2
17	棘爪	1	1	1	1	1

## 十二、H系列液压扭矩扳手头装配图

H27、H54、H120、H210、H430系列



H系列液压扭矩扳手动力头零件表

型号		H27	H54	H120	H210	型号		H430
序号	名称	数量	数量	数量	数量	序号		数量
1	本体	1	1	1	1	1	本体	1
2.1	活塞杆	1	1	1			活塞杆	
2.2					1	2.2		1
3	活塞杆后盖				1	3	活塞杆后盖	1
4	滑块	2	2	2	2	4	滑块	2
5	(滑块) 销	1	1	1	1	5	(滑块) 销	1
6	(本体) U形圈	1	1	1	1	6	铜套	1
7	(活塞杆) (油缸盖) O形圈	2	2	2	2	7	(本体) U形圈	1
8	(活塞杆) (油缸盖) 挡圈	2	2	2	2	8	(活塞杆) (油缸盖) O形圈	2
9	(活塞杆) U形圈	1	1	1	1	9	(活塞杆) (油缸盖) 挡圈	2
10	(油缸盖) 小O形圈	2	1	1	1	10	油缸盖	1
11	(油缸盖上) (本体侧) 堵头	4	1	1	1	11	堵头	2
12	油缸盖	1	1	1	1	12	销轴	1
13	(油缸盖) 顶出螺钉		2	2	2	13	碰珠螺钉	1
14	(油缸盖) 螺钉	8	8	8	8	14	旋转接头	1
15	(油缸盖前) (旋转体) 堵头	6	3	3	3			
16	旋转体	1	1	1	1			
17	(旋转体) (接头座) O形圈	6	6	6	6			
18	(旋转体) (接头座) 卡簧	2	2	2	2			
19	接头座	1	1	1	1			
20	钢球	1	1	1	1			
21	弹簧座	1	1	1	1			
22	弹簧	1	1	1	1			
23	(接头座) 堵头	1	1	1	1			
24	(本体) 堵头		1	1	1			
25	碰珠螺钉	1	1	1	1			
26	销轴	1	1	1	1			

## 故障与排除

引起的故障	可能引起的故障	解决方法
活塞不顶升或回缩	快速接头没有连接到位	检查快速接头 确保快速接头连接到底
	快速接头有缺陷	替换任何有缺陷的快速接头
	遥控器有缺陷	替换按钮或者遥控器
	污垢进入泵上的方向控制阀	拆开泵, 把方向控制器擦干净
活塞不回缩	管子接头连接错误	确保泵上的高压接头和扳手上的高压接口相连, 低压接头和低压接口相连
	回油管没有连接好	安全正确连接回油管
	返回销或者弹簧损坏	替换弹簧或销子
油缸不能建立起压力	活塞密封圈放生泄漏	替换有缺陷的密封圈
	接头有缺陷	替换有缺陷的接头
方头驱动轴不转动	油渍和污垢存在与棘轮棘爪间	拆开棘轮部件, 清洁棘轮、棘爪
	棘轮和棘爪破旧损坏	替换任何破旧损坏的部件
泵不能建立起压力	有缺陷的泄压阀	检查、调节或者替换泄压阀
	电压太低	确保电源、电压和其他一些数值符合泵的操作要求
	压力表有缺陷	替换压力表
	油太少	检查加入足够的泵用油
	过滤器堵塞	检查、清洁或者替换用过的过滤器
螺母跟着回程回转	棘轮和止退棘爪未吻合	更换棘爪或者更换棘爪压簧

# 液压扳手的日常保养及运输

## 1、液压扳手的保养

- 1.1、使用前应检查扳手上各螺钉是否松动，发现有松动，应将拧紧，如不及时处理导致脱落可能造成设备严重损坏。
- 1.2、扳手内部所有运动部件都应定期涂上优质的NLGI#2二硫化钼，在混杂的环境条件下，清洗和润滑都应进行。
- 1.3、快速接头应保持清洁，工作结束后拧上防尘帽，禁止灰尘进入液压系统导致内部阀的失效，造成设备损坏。
- 1.4、连接各设备，切换方向控制阀，加压检查有无异常。
- 1.5、检查配管或设备是否有漏油现象，如有此类情况发生，请查明原因并对此进行处理。
- 1.6、扳手内部结构件都是相连的，如果有一个零件出现故障，势必会对其他零部件造成磨损，所以要定期检查，及时保养。

## 2、液压扳手噪音/振动声明

液压扳手使用噪声值为： $\leq 70\text{db}$

## 3、液压扳手运输信息

- 3.1、搬运时注意轻拿轻放。
- 3.2、装运时应将产品立式向上，如图9-1所示。

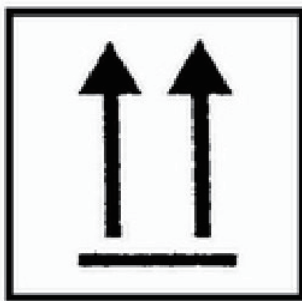


图9-1

- 3.3、产品搬运一般采用手提式或小车搬运移动、吊装移动，如图9-2所示。

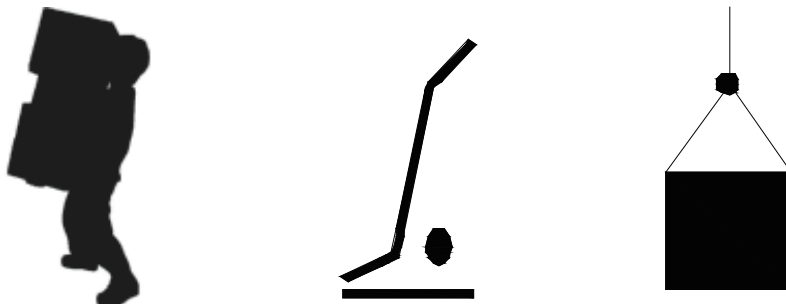


图9-2

S/H系列液压扭矩扳手型号参数表

型号	扭矩 (N·m)	驱动轴( inch )			
S17	172-1727	3/4			
S45	452-4529	1			
S100	1006-10064	1-1/2			
S150	1497-14974	1-1/2			
S370	3699-36992	2-1/2			
型号	扭矩 (N.m)	螺栓范围 (mm)	型号	扭矩 (N.m)	螺栓范围 (mm)
H27 19	262-2625	19-46	H210 70	2121-21216	70-100
H27 22	262-2625	19-46	H210 75	2121-21216	70-100
H27 27	262-2625	19-46	H210 80	2121-21216	70-100
H27 30	262-2625	19-46	H210 85	2121-21216	70-100
H27 32	262-2625	19-46	H210 90	2121-21216	70-100
H27 34	262-2625	19-46	H210 95	2121-21216	70-100
H27 36	262-2625	19-46	H210 100	2121-21216	70-100
H27 41	262-2625	19-46	H210 105	2312-23124	105-115
H27 46	262-2625	19-46	H210 110	2312-23124	105-115
H27 50	306-3068	50-60	H210 115	2312-23124	105-115
H27 55	306-3068	50-60	H430 80	4379-43792	80-117
H27R 60	306-3068	50-60	H430 85	4379-43792	80-117
H54 27	537-5372	27-65	H430 90	4379-43792	80-117
H54 30	537-5372	27-65	H430 95	4379-43792	80-117
H54 32	537-5372	27-65	H430 100	4379-43792	80-117
H54 34	537-5372	27-65	H430 105	4379-43792	80-117
H54 36	537-5372	27-65	H430 110	4379-43792	80-117
H54 41	537-5372	27-65	H430 115	4379-43792	80-117
H54 46	537-5372	27-65	H430 117	4379-43792	80-117
H54 50	537-5372	27-65	H430 120	4848-48481	120-175
H54 55	537-5372	27-65	H430 125	4848-48481	120-175
H54 60	537-5372	27-65	H430 130	4848-48481	120-175
H54 65	537-5372	27-65	H430 135	4848-48481	120-175
H54 70	603-6037	70-80	H430 140	4848-48481	120-175
H54 75	603-6037	70-80	H430 145	4848-48481	120-175
H54 80	603-6037	70-80	H430 150	4848-48481	120-175
H120 50	1173-11737	50-80	H430 155	4848-48481	120-175
H120 55	1173-11737	50-80	H430 160	4848-48481	120-175
H120 60	1173-11737	50-80	H430 165	4848-48481	120-175
H120 65	1173-11737	50-80	H430 170	4848-48481	120-175
H120 70	1173-11737	50-80	H430 175	4848-48481	120-175
H120 75	1173-11737	50-80			
H120 80	1173-11737	50-80			
H120 85	1434-14349	85-105			
H120 90	1434-14349	85-105			
H120 95	1434-14349	85-105			
H120 100	1434-14349	85-105			
H120 105	1434-14349	85-105			



S/H系列液压扭矩扳手型号参数表

型号	扭矩 ( N.m)	螺栓范围 (inch)	型号	扭矩 ( N.m)	螺栓范围 (inch)
H27 3/4"	262-2625	0.75	H54 1"	537-5372	1
H27 13/16"	262-2625	13/16	H54 1.1/16"	537-5372	1.1/16
H27 7/8"	262-2625	0.875	H54 1.3/16"	537-5372	1.3/16
H27 15/16"	262-2625	15/16	H54 1.1/4"	537-5372	1.1/4
H27 1"	262-2625	1	H54 1.5/16"	537-5372	1.5/16
H27 1.1/16"	262-2625	1.1/16	H54 1.3/8"	537-5372	1.3/8
H27 1.1/8"	262-2625	1.1/8	H54 1.7/16"	537-5372	1.7/16
H27 1.3/16"	262-2625	1.3/16	H54 1.1/2"	537-5372	1.1/2
H27 1.1/4"	262-2625	1.1/4	H54 1.9/16"	537-5372	1.9/16
H27 1.5/16"	262-2625	1.5/16	H54 1.5/8"	537-5372	1.5/8
H27 1.3/8"	262-2625	1.3/8	H54 1.11/16"	537-5372	1.11/16
H27 1.7/16"	262-2625	1.7/16	H54 1.3/4"	537-5372	1.3/4
H27 1.1/2"	262-2625	1.1/2	H54 1.13/16"	537-5372	1.13/16
H27 1.9/16"	262-2625	1.9/16	H54 1.7/8"	537-5372	1.7/8
H27 1.5/8"	262-2625	1.5/8	H54 1.15/16"	537-5372	1.15/16
H27 1.11/16"	262-2625	1.11/16	H54 2"	537-5372	2
H27 1.3/4"	262-2625	1.3/4	H54 2.1/16"	537-5372	2.1/16
H27 1.13/16"	262-2625	1.13/16	H54 2.1/8"	537-5372	2.1/8
H27 1.7/8	306-3068	1.7/8	H54 2.3/16"	537-5372	2.3/16
H27 1.15/16	306-3068	1.15/16	H54 2.1/4"	537-5372	2.1/4
H27 2"	306-3068	2	H54 2.5/16"	537-5372	2.5/16
H27 2.1/16"	306-3068	2.1/16	H54 2.3/8"	537-5372	2.3/8
H27 2.1/8"	306-3068	2.1/8	H54 2.7/16"	537-5372	2.7/16
H27 2.3/16"	306-3068	2.3/16	H54 2.1/2"	537-5372	2.1/2
H27 2.1/4"	306-3068	2.1/4	H54 2.9/16"	537-5372	2.9/16
H27 2.5/16"	306-3068	2.5/16	H54 2.5/8"	603-6037	2.5/8
H27 2.3/8"	306-3068	2.3/8	H54 2.11/16"	603-6037	2.11/16
			H54 2.3/4"	603-6037	2.3/4
			H54 2.13/16"	603-6037	2.13/16
			H54 2.7/8"	603-6037	2.7/8
			H54 2.15/16"	603-6037	2.15/16
			H54 3"	603-6037	3
			H54 3.1/16"	603-6037	3.1/16
			H54 3.1/8"	603-6037	3.1/8

S/H系列液压扭矩扳手型号参数表

型号	扭矩 ( N.m)	螺栓范围 (inch)	型号	扭矩 ( N.m)	螺栓范围 (inch)
H120 1.3/8"	1173-11737	1.3/8	H210 2.9/16"	2121-21216	2.9/16
H120 1.7/16"	1173-11737	1.7/16	H210 2.5/8"	2121-21216	2.5/8
H120 1.1/2"	1173-11737	1.1/2	H210 2.11/16"	2121-21216	2.11/16
H120 1.9/16"	1173-11737	1.9/16	H210 2.3/4"	2121-21216	2.3/4
H120 1.5/8"	1173-11737	1.5/8	H210 2.13/16"	2121-21216	2.13/16
H120 1.11/16"	1173-11737	1.11/16	H210 2.7/8"	2121-21216	2.7/8
H120 1.3/4"	1173-11737	1.3/4	H210 2.15/16"	2121-21216	2.15/16
H120 1.13/16"	1173-11737	1.13/16	H210 3"	2121-21216	3
H120 1.7/8"	1173-11737	1.7/8	H210 3.1/16"	2121-21216	3.1/16
H120 1.15/16"	1173-11737	1.15/16	H210 3.1/8"	2121-21216	3.1/8
H120 2"	1173-11737	2	H210 3.3/16"	2121-21216	3.3/16
H120 2.1/16"	1173-11737	2.1/16	H210 3.1/4"	2121-21216	3.1/4
H120 2.1/8"	1173-11737	2.1/8	H210 3.5/16"	2121-21216	3.5/16
H120 2.3/16"	1173-11737	2.3/16	H210 3.3/8"	2121-21216	3.3/8
H120 2.1/4"	1173-11737	2.1/4	H210 3.7/16"	2121-21216	3.7/16
H120 2.5/16"	1173-11737	2.5/16	H210 3.1/2"	2121-21216	3.1/2
H120 2.3/8"	1173-11737	2.3/8	H210 3.9/16"	2121-21216	3.9/16
H120 2.7/16"	1173-11737	2.7/16	H210 3.5/8"	2121-21216	3.5/8
H120 2.1/2"	1173-11737	2.1/2	H210 3.11/16"	2121-21216	3.11/16
H120 2.9/16"	1173-11737	2.9/16	H210 3.3/4"	2121-21216	3.3/4
H120 2.5/8"	1173-11737	2.5/8	H210 3.13/16"	2121-21216	3.13/16
H120 2.11/16"	1173-11737	2.11/16	H210 3.7/8"	2121-21216	3.7/8
H120 2.3/4"	1173-11737	2.3/4	H210 3.15/16"	2121-21216	3.15/16
H120 2.13/16"	1173-11737	2.13/16	H210 4"	2312-23124	4
H120 2.7/8"	1173-11737	2.7/8	H210 4.1/16"	2312-23124	4.1/16
H120 2.15/16"	1173-11737	2.15/16	H210 4.1/8"	2312-23124	4.1/8
H120 3"	1173-11737	3	H210 4.3/16"	2312-23124	4.3/16
H120 3.1/16"	1173-11737	3.1/16	H210 4.1/4"	2312-23124	4.1/4
H120 3.1/8"	1173-11737	3.1/8	H210 4.5/16"	2312-23124	4.5/16
H120 3.3/16"	1434-14349	3.3/16	H210 4.3/8"	2312-23124	4.3/8
H120 3.1/4"	1434-14349	3.1/4	H210 4.7/16"	2312-23124	4.7/16
H120 3.5/16"	1434-14349	3.5/16	H210 4.1/2"	2312-23124	4.1/2
H120 3.3/8"	1434-14349	3.3/8	H210 4.9/16"	2312-23124	4.9/16
H120 3.7/16"	1434-14349	3.7/16	H210 4.5/8"	2312-23124	4.5/8
H120 3.1/2"	1434-14349	3.1/2			
H120 3.9/16"	1434-14349	3.9/16			
H120 3.5/8"	1434-14349	3.5/8			
H120 3.11/16"	1434-14349	3.11/16			
H120 3.3/4"	1434-14349	3.3/4			
H120 3.13/16"	1434-14349	3.13/16			
H120 3.7/8"	1434-14349	3.7/8			
H120 3.15/16"	1434-14349	3.15/16			
H120 4"	1434-14349	4			
H120 4.1/16"	1434-14349	4.1/16			
H120 4.1/8"	1434-14349	4.1/8			

S/H系列液压扭矩扳手型号参数表

型号	扭矩 ( N.m)	螺栓范围 (inch)	型号	扭矩 ( N.m)	螺栓范围 (inch)
H430 3"	4379-43792	3	H430 5"	4848-48481	5
H430 3.1/16"	4379-43792	3.1/16	H430 5.1/16"	4848-48481	5.1/16
H430 3.1/8"	4379-43792	3.1/8	H430 5.1/8"	4848-48481	5.1/8
H430 3.3/16"	4379-43792	3.3/16	H430 5.3/16"	4848-48481	5.3/16
H430 3.1/4"	4379-43792	3.1/4	H430 5.1/4"	4848-48481	5.1/4
H430 3.5/16"	4379-43792	3.5/16	H430 5.5/16"	4848-48481	5.5/16
H430 3.3/8"	4379-43792	3.3/8	H430 5.3/8"	4848-48481	5.3/8
H430 3.7/16"	4379-43792	3.7/16	H430 5.7/16"	4848-48481	5.7/16
H430 3.1/2"	4379-43792	3.1/2	H430 5.1/2"	4848-48481	5.1/2
H430 3.9/16"	4379-43792	3.9/16	H430 5.9/16"	4848-48481	5.9/16
H430 3.5/8"	4379-43792	3.5/8	H430 5.5/8"	4848-48481	5.5/8
H430 3.11/16"	4379-43792	3.11/16	H430 5.11/16"	4848-48481	5.11/16
H430 3.3/4"	4379-43792	3.3/4	H430 5.3/4"	4848-48481	5.3/4
H430 3.13/16"	4379-43792	3.13/16	H430 5.13/16"	4848-48481	5.13/16
H430 3.7/8"	4379-43792	3.7/8	H430 5.7/8"	4848-48481	5.7/8
H430 3.15/16"	4379-43792	3.15/16	H430 5.15/16"	4848-48481	5.15/16
H430 4"	4379-43792	4	H430 6"	4848-48481	6
H430 4.1/16"	4379-43792	4.1/16	H430 6.1/16"	4848-48481	6.1/16
H430 4.1/8"	4379-43792	4.1/8	H430 6.1/8"	4848-48481	6.1/8
H430 4.3/16"	4379-43792	4.3/16	H430 6.3/16"	4848-48481	6.3/16
H430 4.1/4"	4379-43792	4.1/4	H430 6.1/4"	4848-48481	6.1/4
H430 4.5/16"	4379-43792	4.5/16	H430 6.5/16"	4848-48481	6.5/16
H430 4.3/8"	4379-43792	4.3/8	H430 6.3/8"	4848-48481	6.3/8
H430 4.7/16"	4379-43792	4.7/16	H430 6.7/16"	4848-48481	6.7/16
H430 4.1/2"	4379-43792	4.1/2	H430 6.1/2"	4848-48481	6.1/2
H430 4.9/16"	4379-43792	4.9/16	H430 6.9/16"	4848-48481	6.9/16
H430 4.5/8"	4379-43792	4.5/8	H430 6.5/8"	4848-48481	6.5/8
H430 4.11/16"	4848-48481	4.11/16	H430 6.11/16"	4848-48481	6.11/16
H430 4.3/4"	4848-48481	4.3/4	H430 6.3/4"	4848-48481	6.3/4
H430 4.13/16"	4848-48481	4.13/16	H430 6.13/16"	4848-48481	6.13/16
H430 4.7/8"	4848-48481	4.7/8	H430 6.7/8"	4848-48481	6.7/8
H430 4.15/16"	4848-48481	4.15/16			



**EC-ATTESTATION CERTIFICATE  
OF MACHINE SAFETY**

**Date/Place of Issue** : 29.08.2012 / ISTANBUL  
**Valid Until** : 28.08.2017  
**Name of Applicant** : HANGZHOU WREN HYDRAULIC EQUIPMENT MANUFACTURING CO., LTD  
**Address of Applicant** : NO. 24, XINGXING ROAD, XINGQIAO, YUHANG DISTRICT,  
HANGZHOU, CHINA  
**Name of Manufacturer** : HANGZHOU WREN HYDRAULIC EQUIPMENT MANUFACTURING CO., LTD  
**Address of Manufacturer** : NO. 24, XINGXING ROAD, XINGQIAO, YUHANG DISTRICT,  
HANGZHOU, CHINA  
**Description of Product** : HYDRAULIC TORQUE WRENCH  
**Model(s)** : # IBT SERIES; LOW SERIES; XLCT SERIES, #  
# MXTA SERIES; S SERIES; H SERIES. #  
**Assessment Performed** : CONFORMITY TO ANNEX I's APPLICABLE PARAGRAPHS OF 2006/42/EC  
MACHINERY DIRECTIVE.  
**Standard(s)** : # EN ISO 12100: 2010; EN ISO 4413: 2010.#  
**Conditions Subject to Issue** : ACCEPTANCE OF INFORMATION DETAILED IN TECHNICAL FILE  
TCF-120813-205 AND REFERENCED AGAINST JOB FILE IS1250-0782.  
**Declaration** : IN THE OPINION OF SGS THE SUBMITTED TECHNICAL FILE  
TCF-120813-205 SATISFIES THE REQUIREMENTS OF THE  
MACHINERY DIRECTIVE 2006/42/EC ANNEX-VII.  
**Assessor ID No.** : TR-IND-S20  
**Date/Place of Assessment** : 06.08.2012 / YUHANG - CHINA

Test reports in technical file TCF-120813-205 and referenced against job file IS1250-0782 are reviewed and found to be acceptable. The certificate is valid as long as the relevant directives and harmonised standards written above are current. The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.



This EC-Attestation Certificate is only valid for the equipment and configuration described in conjunction with the data detailed above. It refers only to the sample submitted to SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş. for testing and certification. Any modifications made to the product shall immediately be reported to SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş. office in order to examine whether this certificate remains valid. This certificate shall not be reproduced except in full without the written approval of SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş.

For and on behalf of  
SGS Supervise Gözetme Etüd  
Kontrol Servisleri A.Ş.

SGS Supervise Gözetme Etüd Kontrol Servisleri A.Ş.  
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Ali Osman ÖZVEREN  
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