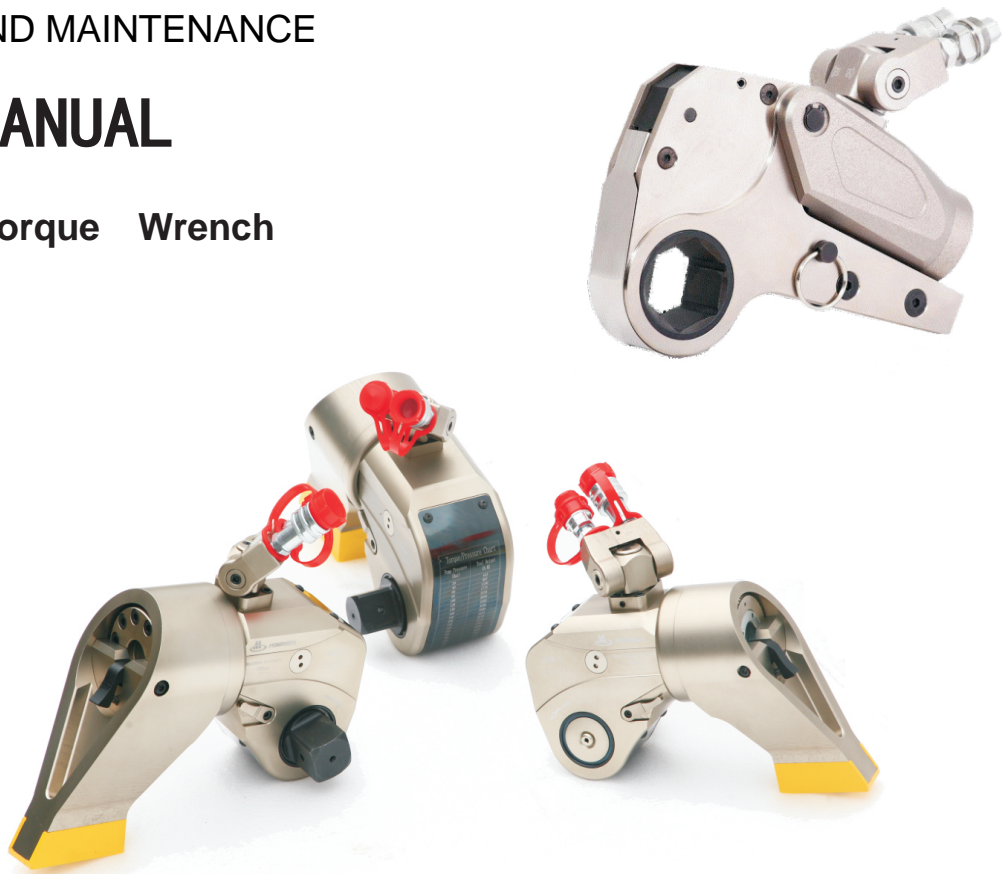




OPERATION AND MAINTENANCE

MANUAL

Hydraulic Torque Wrench



It including hydraulic torque wrench operating instruction, warnings and trouble clearing. Please do read this manual carefully and keep it properly.

NOTICE

Please do operate this wrench correctly and check it regularly

Please read and understand this manual before use the wrench

- ▲ Notes——To prevent direct economic loss or loss of property.
- ▲ Warnings——To prevent personal injury.

Please observe the above two items.

Any exceptional situations during usage, please turn off the power, and take off the plug, and check with manufacturer.

Statement: if the pictures of the goods will be changed because of update of the goods, we won't inform you , please in kind prevail !



OPERATION AND MAINTENANCE MANUAL FOR IBT AND XLCT HYDRAULIC TORQUE WRENCHES

It is operating manual of MDW series and MHW 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.

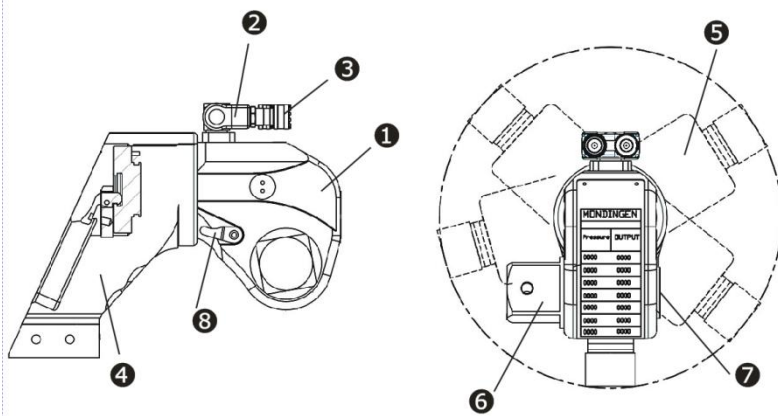
SAFTY FIRST

Hydraulic torque wrench is a power tool.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.MOEDINGEN is not responsible for any damage resulting from the operation of irregularity.

DESCRIPTION

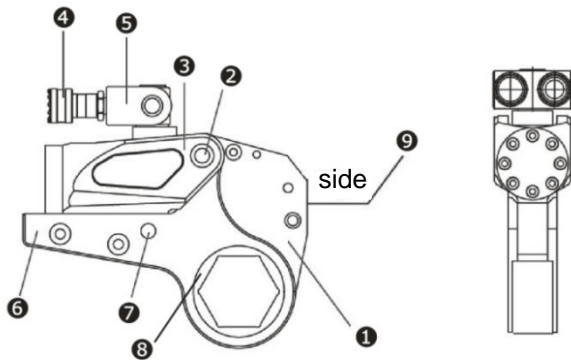
The material of MDW series and MHW series Hydraulic Torque Wrenchs are Aluminium-Titanium alloy and superhigh strength alloy steel for increased strength,intensity and durability of the tool. High repeatability, a precise design is with accuracy $\pm 3\%$. It is manual control and double-acting hydraulic design, It can lock and loosen the blot connection.

MDW series,Square Drive Torque Wrenches:



ITEM	NAME
1	BODY
2	360° × 180° SWIVEL JOINT
3	QUICK COUPLING
4	REACTION ARM
5	360° SWIVEL REACTION ARM
6	SQUARE DRIVE
7	DRIVE RETAINER
8	QUICK RELEASE ARM

MHW series,Low Profile Torque Wrenches:



ITEM	NAME
1	LOW PROFILE CASSETTE
2	FIXED PIN UPPER
3	POWER HEAD
4	QUICK COUPLING
5	360°×180°SWIVEL JOINT
6	REACTION ARM
7	LINK PIN
8	RATCHET
9	QUICK RELEASE ARM

WARNING AND CAUTION

WARNING

To avoid personal injury and equipment damages, be sure that every hydraulic component can Rated for 10,000PSI (700kg/cm) 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 **MOEDINGEN** 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 coupling being clean.After application, the swivel couplings must be put on the dust caps.

Do not use worn socket and square drive.

WARNING

Pls use the socket of good performance.Fasten the socket drive head with the bolt to prevent the socket from falling off.

WARNING SIGN

The warning sign is shown below

Warning sign	Meaning	Place
	Hands are not allowed to touch	REACTION ARM
	The drive shaft is tight on the right and loose on the left	LOW PROFILE CASSETTE
	Fix the reaction arm before use	REACTION ARM

BOLTING TIGHTENING FORCE RECOMMENDED CHART


FORM (1)

Strength Grade	4.8		6.8		8.8		10.9		12.9		
Min breaking strength	392MPa		588MPa		784MPa		941MPa		1176MPa		
Material	Q235 (SS41)		35(S35C)		35CrMo (SCM3)		42CrMo (SCM4)		40GrNiMoA (SNCM)		
Bolting Thread	Torque Value		Torque Value		Torque Value		Torque Value		Torque Value		
	M	mm	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						


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 $4704 \times 80\% = 3763N.m$


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




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




Do not carry the tool by the hose.




Always turn off the pump and disconnect the power before installing, removing, or adjusting any accessory on this tool, or before performing any maintenance on this tool.



Operate at 10,000 psig (700 bar) maximum pressure.



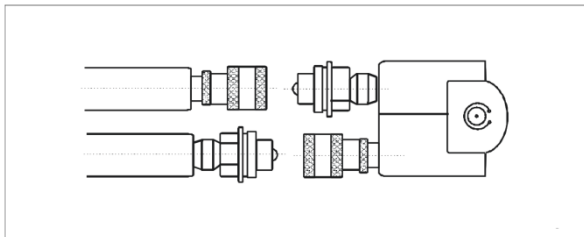
Do not use damaged, frayed or deteriorated hydraulic hoses and fittings.



OPERATION

CONNECTING THE TOOL

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

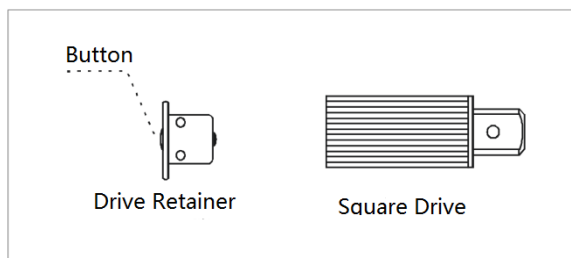


Insure the connectors are fully Engaged and screwed snugly and completely together.

MDW SERIES

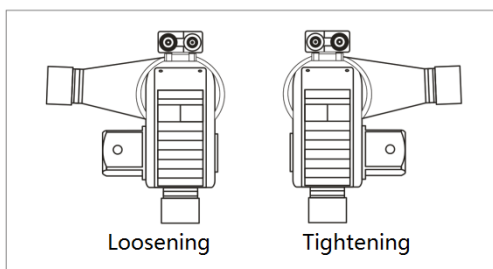
DRIVER DIRECTION CHANGE

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

Hold the tool in position against the forces generated to tighten or loosen bolts or nuts.

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

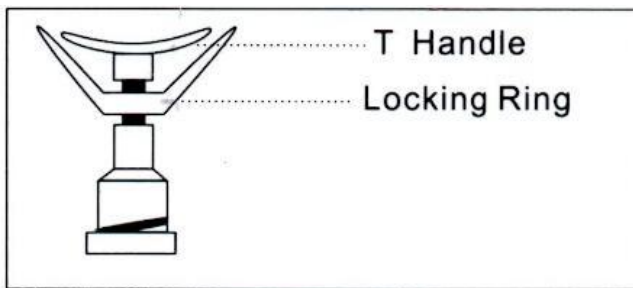
SETTING THE SQUARE DRIVE FOR ROTATION

The position of the square drive when looking toward the shroud will determine if the tool is set to tighten or loosen the nut. When the square drive extends to the left when looking at the shroud with the inlets away from you, the tool is set to loosen the nut. When the square drive extends to the right, the tool is set to tighten the nut. To change the direction of rotation for IBT 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. 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 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.

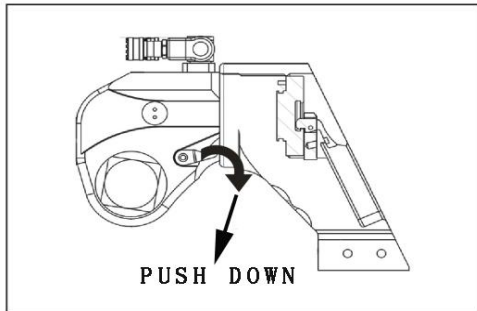


OPERATING THE WRENCH

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 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 reset 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.

CAUTION

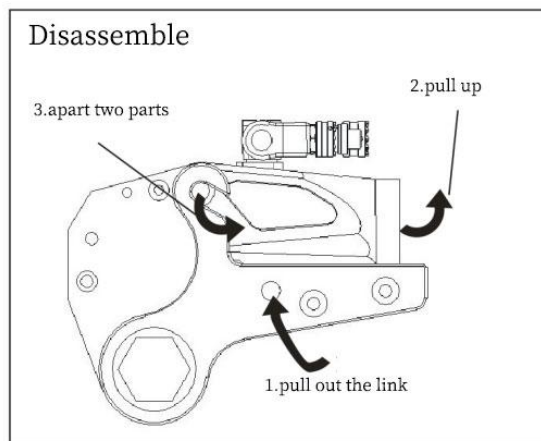
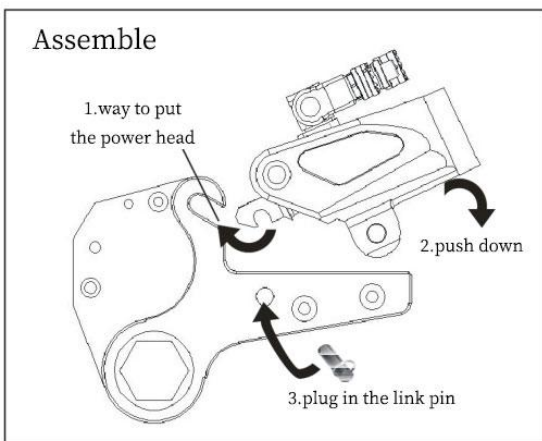
During the operation, if the tool locks onto the nut, press advance button on remote and build pressure –continue to press down on remote while pushing down on the reaction pawl–release remote while continuing to push down on reaction pawl, then the tool will be released from the nut.



MHW SERIES

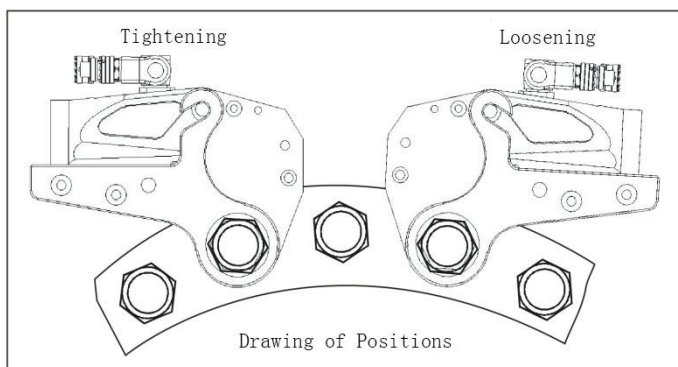
CONNECTING THE POWER HEAD WITH THE LOW PROFILE CASSETTE

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.



MHW 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.



SETTING THE TORQUE

After determining the desired torque, use torque conversion charts on page 5 determine the pressure that is necessary to achieve that torque.

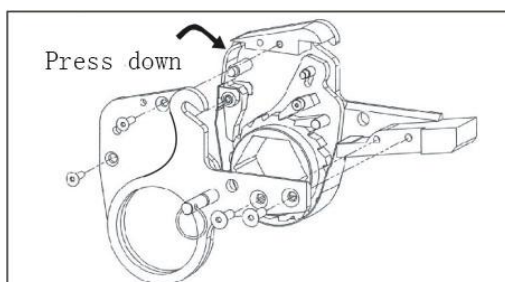
1. Connect the tool to the power supply and turn the pump on.
2. Depress the advance remote control button causing the pressure to be shown on the gauge.
3. Adjust the pressure by first loosening the nut that locks the pressure adjustment handle and then rotate the handle clockwise to increase the pressure 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 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.

CAUTION

During the operation, if the tool locks onto the nut, press advance button on remote and build pressure—continue to press down on remote while pushing down on the reaction pawl—release remote while continuing to push down on reaction pawl, then the tool will be released from the nut.



MDW SERIES HYDRAULIC TORQUE WRENCH PRESSURE –TORQUE CHART

Mpa	Model		MDW-07	MDW-1	MDW-3	MDW-5	MDW-8	MDW-10	MDW-15	MDW-20	MDW-25	MDW-35	MDW-50
	bar	psi	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
7	70	1015	112	183	451	752	1078	1551	2063	2666	3472	4866	7200
8	80	1160	128	209	515	860	1232	1773	2357	3047	3968	5561	8229
9	90	1305	144	236	580	967	1386	1994	2652	3428	4464	6256	9257
10	100	1450	160	262	644	1075	1540	2216	2946	3809	4960	6952	10286
11	110	1595	176	288	709	1182	1694	2438	3241	4190	5456	7647	11314
12	120	1740	192	314	773	1290	1848	2659	3536	4571	5952	8342	12343
13	130	1885	208	341	838	1397	2002	2881	3831	4952	6448	9037	13371
14	140	2030	224	367	902	1505	2156	3103	4125	5332	6945	9733	14400
15	150	2175	240	393	967	1612	2310	3324	4420	5713	7441	10428	15429
16	160	2320	256	419	1031	1720	2464	3546	4714	6094	7937	11123	16457
17	170	2465	272	446	1096	1828	2618	3768	5009	6475	8433	11818	17486
18	180	2610	288	472	1160	1935	2772	3989	5304	6856	8929	12514	18514
19	190	2755	304	498	1225	2043	2926	4211	5599	7237	9425	13209	19543
20	200	2900	320	524	1289	2150	3080	4433	5893	7618	9921	13904	20571
21	210	3045	336	551	1353	2258	3234	4654	6188	7999	10417	14599	21600
22	220	3190	352	577	1418	2365	3388	4876	6482	8380	10913	15295	22629
23	230	3335	368	603	1482	2473	3542	5098	6777	8761	11409	15990	23657
24	240	3480	384	629	1547	2580	3696	5319	7072	9142	11905	16685	24686
25	250	3625	400	656	1611	2688	3850	5541	7367	9523	12401	17380	25714
26	260	3770	416	682	1676	2796	4004	5763	7661	9903	12898	18076	26743
27	270	3915	432	708	1740	2903	4158	5984	7956	10284	13394	18771	27771
28	280	4060	448	734	1805	3011	4312	6206	8250	10665	13890	19466	28800
29	290	4205	464	761	1869	3118	4466	6428	8545	11046	14386	20161	29829
30	300	4350	480	787	1934	3226	4620	6649	8840	11427	14882	20856	30857
31	310	4495	496	813	1998	3333	4774	6871	9135	11808	15378	21552	31886
32	320	4640	512	839	2063	3441	4928	7093	9429	12189	15874	22247	32914
33	330	4785	528	866	2127	3548	5082	7314	9724	12570	16370	22942	33943
34	340	4930	544	892	2191	3656	5236	7536	10018	12951	16866	23637	34971
35	350	5075	560	918	2256	3764	5390	7758	10313	13332	17362	24333	36000
36	360	5220	576	944	2320	3871	5544	7979	10608	13713	17858	25028	37029
37	370	5365	592	971	2385	3979	5698	8201	10903	14094	18354	25723	38057
38	380	5510	608	997	2449	4086	5852	8423	11197	14475	18850	26418	39086
39	390	5655	624	1023	2514	4194	6006	8644	11492	14855	19347	27114	40114
40	400	5800	640	1049	2578	4301	6160	8866	11786	15236	19843	27809	41143
41	410	5945	656	1076	2643	4409	6314	9088	12082	15617	20339	28504	42171
42	420	6090	672	1102	2707	4516	6468	9309	12376	15998	20835	29199	43200
43	430	6235	688	1128	2772	4624	6622	9531	12671	16379	21331	29895	44229
44	440	6380	704	1154	2836	4732	6776	9753	12965	16760	21827	30590	45257
45	450	6525	720	1181	2900	4839	6930	9974	13260	17141	22323	31285	46286
46	460	6670	736	1207	2965	4947	7084	10196	13554	17522	22819	31980	47314
47	470	6815	752	1233	3029	5054	7238	10418	13850	17903	23315	32676	48343
48	480	6960	768	1259	3094	5162	7392	10639	14144	18284	23811	33371	49371
49	490	7105	784	1286	3158	5269	7546	10861	14439	18665	24307	34066	50400
50	500	7250	800	1312	3223	5377	7700	11083	14733	19046	24803	34761	51429
51	510	7395	816	1338	3287	5484	7854	11304	15028	19427	25299	35456	52457
52	520	7540	832	1364	3352	5592	8008	11526	15322	19807	25796	36152	53486
53	530	7685	848	1391	3416	5700	8162	11748	15618	20188	26292	36847	54514
54	540	7830	864	1417	3481	5807	8316	11969	15912	20569	26788	37542	55543
55	550	7975	880	1443	3545	5915	8470	12191	16207	20950	27284	38237	56571
56	560	8120	896	1469	3610	6022	8624	12413	16501	21331	27780	38933	57600
57	570	8265	912	1496	3674	6130	8778	12634	16796	21712	28276	39628	58629
58	580	8410	928	1522	3737	6237	8932	12856	17090	22093	28772	40323	59657
59	590	8555	944	1548	3803	6345	9086	13078	17386	22474	29268	41018	60686
60	600	8700	960	1574	3867	6452	9240	13299	17680	22855	29764	41714	61714
61	610	8845	976	1601	3932	6560	9394	13521	17975	23236	30260	42409	62743
62	620	8990	992	1627	3996	6668	9548	13743	18269	23617	30756	43104	63771
63	630	9135	1008	1653	4061	6775	9702	13964	18564	23998	31252	43799	64800
64	640	9280	1024	1679	4125	6883	9856	14186	18858	24378	31749	44495	65829
65	650	9425	1040	1706	4190	6990	10010	14408	19154	24759	32245	45190	66857
66	660	9570	1056	1732	4254	7098	10164	14629	19448	25140	32741	45885	67886
67	670	9715	1072	1758	4319	7205	10318	14851	19743	25521	33237	46580	68914
68	680	9860	1088	1784	4383	7313	10472	15073	20037	25902	33733	47276	69943
69	690	10005	1104	1811	4448	7420	10626	15294	20332	26283	34229	47971	70971
70	700	10150	1120	1837	4512	7528	10780	15516	20627	26664	34725	48666	72000

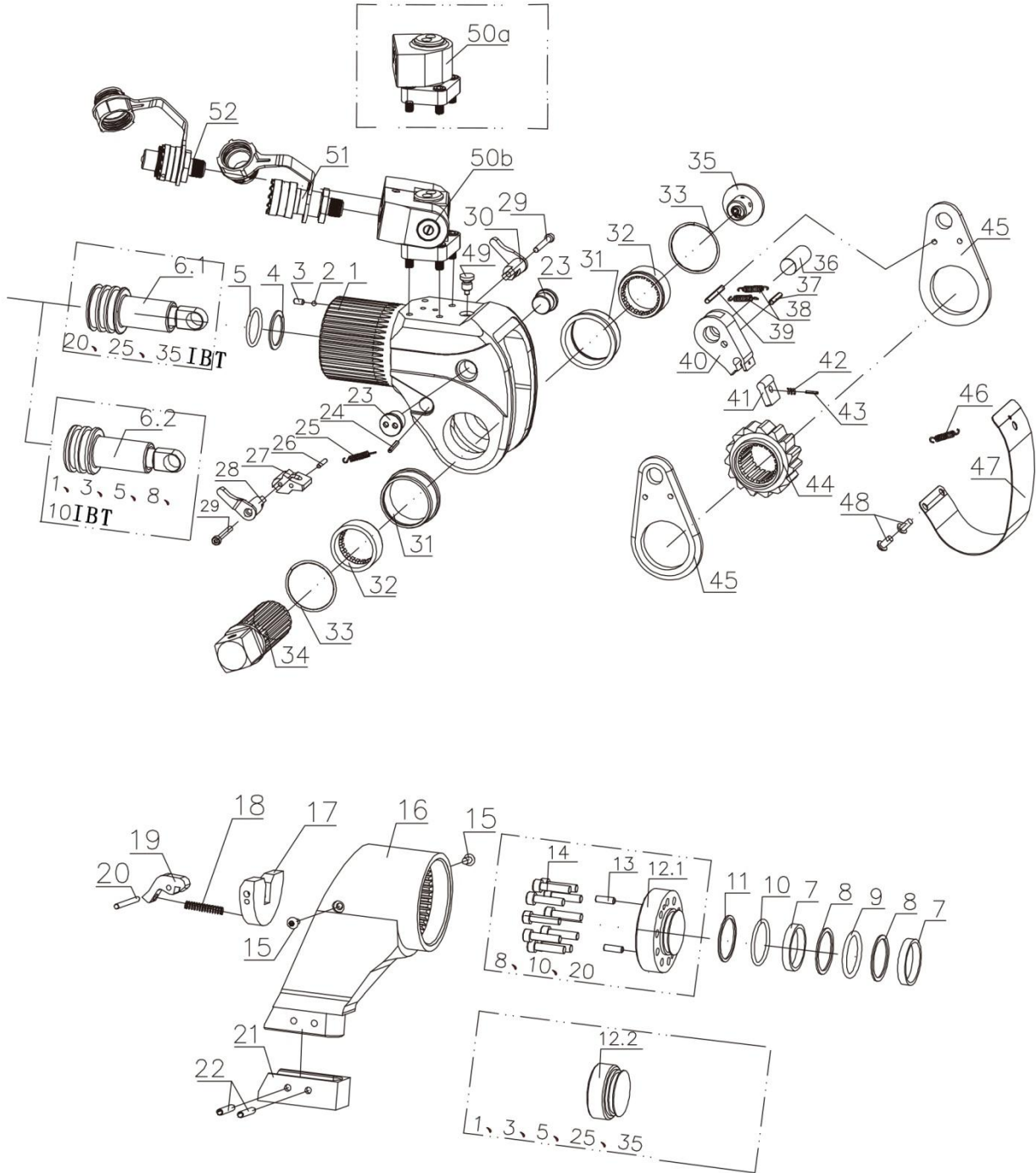
MHW SERIES HYDRAULIC TORQUE WRENCH PRESSURE-TORQUE CHART

Model			MHW-2		MHW-4		MHW-8		MHW-14	MHW-30	
Opposite side of nut			15-55	60	34-65	70-80	41-95	100-105	50-117	110-155	160-175
Mpa	bar	psi	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
7	70	1015	232	241	585	647	1094	1177	1852	4188	4459
8	80	1160	265	275	669	739	1250	1345	2117	4786	5096
9	90	1305	299	310	752	832	1407	1513	2381	5385	5733
10	100	1450	332	344	836	924	1563	1682	2646	5983	6370
11	110	1595	365	379	920	1017	1719	1850	2910	6581	7007
12	120	1740	398	413	1003	1109	1876	2018	3175	7180	7644
13	130	1885	432	448	1087	1202	2032	2186	3440	7778	8281
14	140	2030	465	482	1171	1294	2188	2354	3704	8376	8918
15	150	2175	498	517	1255	1387	2344	2523	3969	8975	9555
16	160	2320	531	551	1338	1479	2501	2691	4233	9573	10192
17	170	2465	565	586	1422	1572	2657	2859	4498	10171	10829
18	180	2610	598	620	1506	1664	2813	3027	4762	10769	11467
19	190	2755	631	655	1589	1757	2970	3195	5027	11368	12104
20	200	2900	665	689	1673	1849	3126	3364	5292	11966	12741
21	210	3045	698	724	1757	1942	3282	3532	5556	12564	13378
22	220	3190	731	758	1840	2043	3439	3700	5821	13163	14015
23	230	3335	764	793	1924	2127	3595	3868	6085	13761	14652
24	240	3480	798	827	2008	2219	3751	4037	6350	14359	15289
25	250	3625	831	862	2092	2312	3907	4205	6615	14958	15926
26	260	3770	864	896	2175	2404	4064	4373	6879	15556	16563
27	270	3915	897	931	2259	2497	4220	4541	7144	16154	17200
28	280	4060	931	965	2343	2589	4376	4709	7408	16753	17837
29	290	4205	964	1000	2426	2682	4533	4878	7673	17351	18474
30	300	4350	997	1034	2510	2774	4689	5046	7938	17949	19111
31	310	4495	1030	1069	2594	2867	4845	5214	8202	18548	19748
32	320	4640	1064	1103	2677	2959	5002	5382	8467	19146	20385
33	330	4785	1097	1138	2761	3052	5158	5550	8731	19744	21022
34	340	4930	1130	1172	2845	3144	5314	5719	8996	20343	21659
35	350	5075	1164	1207	2929	3237	5470	5887	9260	20941	22296
36	360	5220	1197	1241	3012	3329	5627	6055	9525	21539	22933
37	370	5365	1230	1276	3096	3422	5783	6223	9790	22138	23570
38	380	5510	1263	1310	3180	3514	5939	6391	10054	22736	24207
39	390	5655	1297	1345	3263	3607	6096	6560	10319	23334	24845
40	400	5800	1330	1379	3347	3699	6252	6728	10583	23932	25482
41	410	5945	1363	1414	3431	3792	6408	6896	10848	24531	26119
42	420	6090	1396	1448	3514	3884	6565	7064	11113	25129	26756
43	430	6235	1430	1483	3598	3977	6721	7232	11377	25727	27393
44	440	6380	1463	1517	3682	4069	6877	7401	11642	26326	28030
45	450	6525	1496	1552	3766	4162	7033	7569	11906	26924	28667
46	460	6670	1530	1586	3849	4254	7190	7737	12171	27522	29304
47	470	6815	1563	1621	3933	4347	7346	7905	12435	28121	29941
48	480	6960	1596	1655	4017	4439	7502	8073	12700	28719	30578
49	490	7105	1629	1690	4100	4532	7659	8242	12965	29317	31215
50	500	7250	1663	1724	4184	4624	7815	8410	13229	29916	31852
51	510	7395	1696	1759	4268	4717	7971	8578	13494	30514	32489
52	520	7540	1729	1793	4351	4809	8128	8746	13758	31112	33126
53	530	7685	1762	1828	4435	4902	8284	8914	14023	31711	33763
54	540	7830	1796	1862	4519	4994	8440	9083	14288	32309	34400
55	550	7975	1829	1897	4603	5087	8596	9251	14552	32907	35037
56	560	8120	1862	1931	4686	5179	8753	9419	14817	33506	35674
57	570	8265	1895	1966	4770	5272	8909	9587	15081	34104	36311
58	580	8410	1929	2000	4854	5364	9065	9756	15346	34702	36948
59	590	8555	1962	2035	4937	5457	9222	9924	15611	35301	37585
60	600	8700	1995	2069	5021	5549	9378	10092	15875	35899	38222
61	610	8845	2029	2104	5105	5642	9534	10260	16140	36497	38860
62	620	8990	2062	2138	5188	5734	9691	10428	16404	37095	39497
63	630	9135	2095	2173	5272	5827	9847	10597	16669	37694	40134
64	640	9280	2128	2207	5356	5919	10003	10765	16933	38292	40771
65	650	9425	2162	2242	5440	6012	10159	10933	17198	38890	41408
66	660	9570	2195	2276	5523	6104	10316	11101	17463	39489	42045
67	670	9715	2228	2311	5607	6197	10472	11269	17727	40087	42682
68	680	9860	2261	2345	5691	6289	10628	11438	17992	40685	43319
69	690	10005	2295	2380	5774	6382	10785	11606	18256	41284	43956
70	700	10150	2328	2414	5858	6474	10941	11774	18521	41882	44593

MDW SERIES DRAWING AND PARTS LIST

MDW-07,MDW-1,MDW-3,MDW-5,MDW-8,MDW-10,MDW-15 , MDW-20,MDW-35,MDW-50

0904



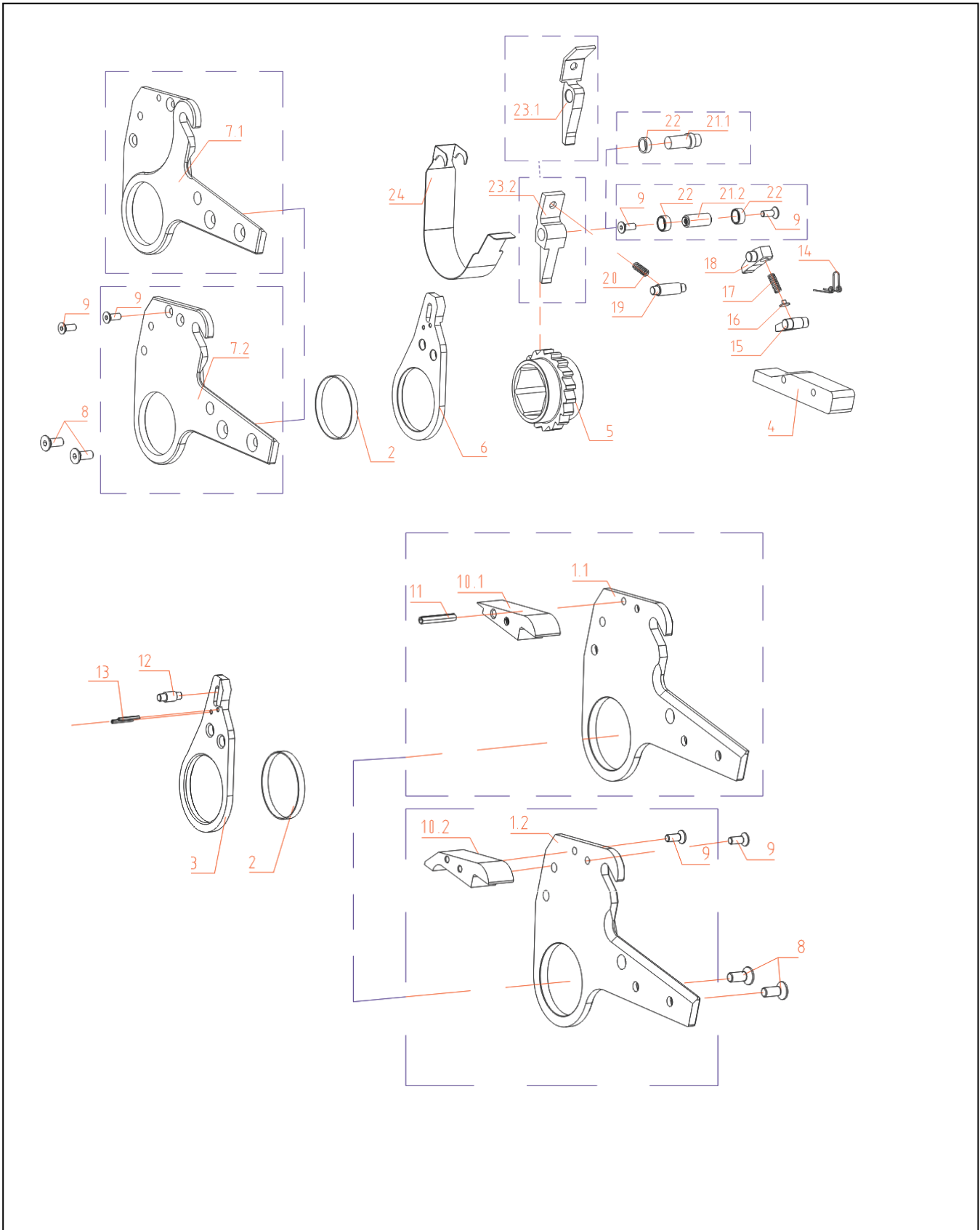
Note: 1. Swivel 50A, and 50 B are spares for your choice, and interchangeable.

MDW SERIES DRAWING AND PARTS LIST

		MDW-1	MDW-3	MDW-5	MDW-8	MDW-10	MDW-20	MDW-25	MDW-35
ITEN	DESCRIPTION	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY
1	BODY	1	1	1	1	1	1	1	1
2	STEEL BALL				1	1	1	1	1
3	SCREW	1	1	1	1	1	1	1	1
4	RETAINING RING FOR BODY	1							
5	O-RING/U-RING (FOR BODY)	1	1	1	1	1	1	1	1
6.1	PISTON ASSEMBLY						1	1	1
6.2		1	1	1	1	1			
7	WEARING RING	1	1	1	1	1	2	2	2
8	RETAINING RING (FOR PISTON)	1	1	1	2	2			
9	O-RING (FOR PISTON)	1	1	1	1	1	1	1	1
10	O-RING (FOR END CAP)	1	1	1	1	1	1	1	1
11	RETAINING RING (FOR WND CAP)	1	1	1	1	1	1	1	1
12.1	END CAP				1	1	1	1	1
12.2		1	1	1					
13	SCREW (FOR END CAP)				2	3	2		
14	SCREW (FOR END CAP)				10	10	10		
15	SCREW (FOR REACTION ARM)	2	2	2	2	2	2	2	2
16	REACTION ARM	1	1	1	1	1	1	1	1
17	REACTION ARM THRUST	1	1	1	1	1	1	1	1
18	COMPRESSED SPRING (FOR REACTION ARM)	1	1	1	1	1	1	1	1
19	REACTION ARM LEVER	1	1	1	1	1	1	1	1
20	PIN (FOR REACTION ARM)	1	1	1	1	1	1	1	1
21	REACTION ARM COVER	1	1	1	1	1	1	1	1
22	PIN (FOR REACTION ARM COVER)	1	1	2	2	2	2	2	2
23	SCREW	2	2	2	2	2	2	2	2
24	PIN FOR BODY	1	1	1	1	1	1	1	1
25	TENSION SPRING (FOR REACTION PAWL)	1	1	1	1	1	1	1	1
26	PIN FOR REACTION PAWL	1	1	1	1	1	1	1	1
27	REACTION PAWL	1	1	1	1	1	1	1	1
28	BUTTON LEVER (LEFT)	1	1	1	1	1	1	1	1
29	SCREW FOR BUTTON LEVER	2	2	2	2	2	2	2	2
30	BUTTON LEVER (RIGHT)	1	1	1	1	1	1	1	1
31	DRIVE BUSHING	2	2	2	2	2	2	2	2
32	DRIVE SLEEVE SPLINE	2	2	2	2	2	2	2	2
33	RETAINING CLIP (CIRCLIP)	2	2	2	2	2	2	2	2
34	SQUARE DRIVE	1	1	1	1	1	1	1	1
35	DRIVE RETAINER	1	1	1	1	1	1	1	1
36	LINK PIN	1	1	1	1	1	1	1	1
37	PIN FOR DRIVE PAWL PRIMARY	1	1	1	1	1	1	1	1
38	COMPRESSED SPRING (FOR DRIVE PAWL PRIMARY)	2	2	2	2	2	2	2	2
39	PIN FOR SQUARE DRIVE PLATE	1	1	1	1	1	1	1	1
40	DRIVE PAWL PRIMARY	1	1	1	1	1	1	1	1
41	DRIVE PAWL SECONDARY	1	1	1	1	1	1	1	1
42	COMPRESSED SPRING FOR DRIVE PAWL SECONDARY	2	1	2	2	1	1	1	1
43	PIN					1	1	1	1
44	RATCHET SPLINE	1	1	1	1	1	1	1	1
45	SQUARE DRIVE PLATE	2	2	2	2	2	2	2	2
46	TENSION SPRING (FOR SHROUD)	1	1	1	1	1	1	1	1
47	SHROUD	1	1	1	1	1	1	1	1
48	SCREW (FOR SHROUD)	2	2	2	2	2	2	4	4
49	SPRING SCREW	1	1	1	1	1	1	1	1
50a	SWIVEL ASSEMBLY	1	1	1	1	1	1	1	1
50b			1	1	1	1	1	1	1
51	COUPLER (FEMALE)	1	1	1	1	1	1	1	1
52	COUPLER (MALE)	1	1	1	1	1	1	1	1

MHW SERIES HEXAGON CASSETTE DRAWING AND PATR LIST

MHW-2, MHW-4, MHW-8, MHW-14, MHW-30

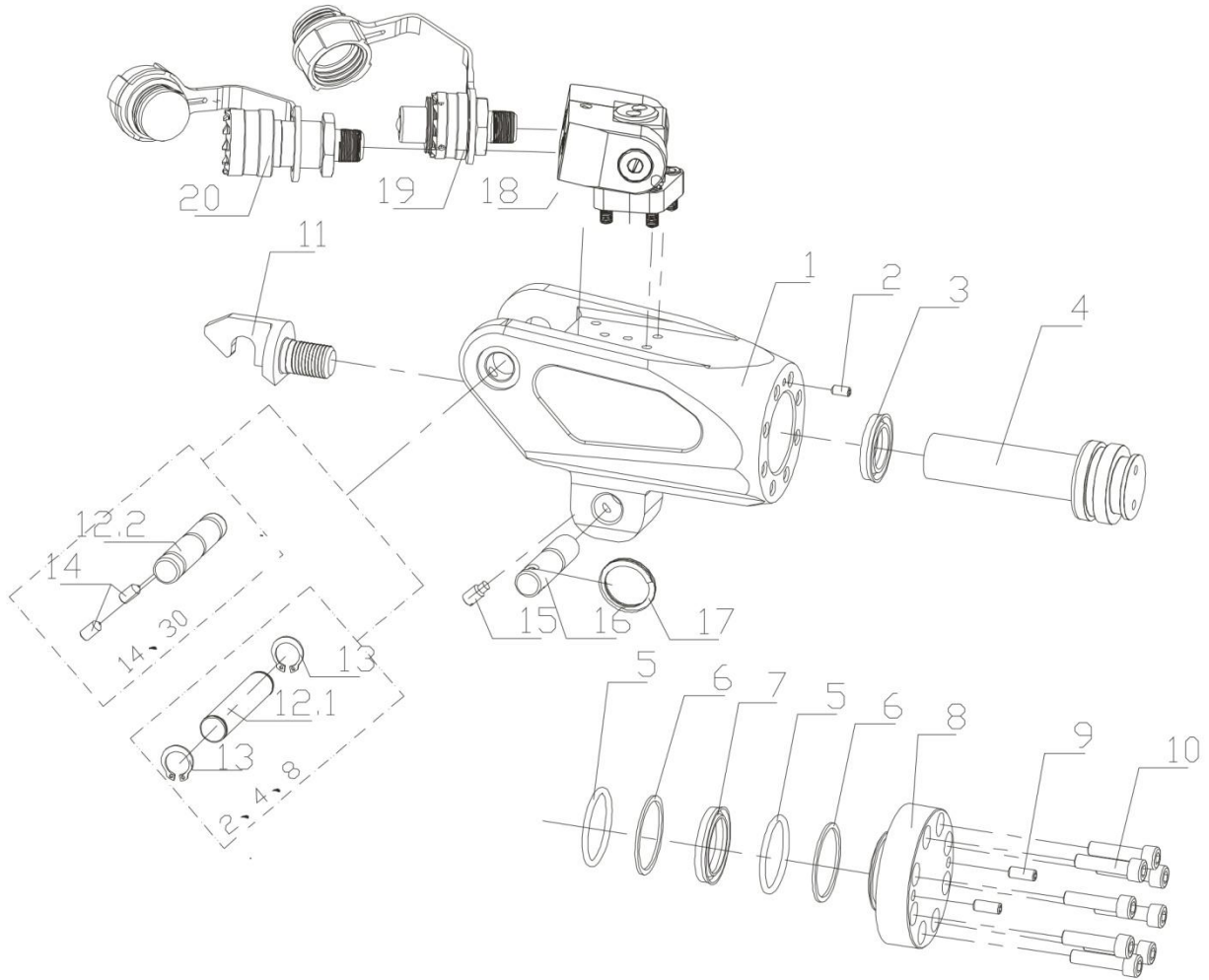


MHW SERIES HEXAGON CASSETTE DRAWING AND PATR LIST

		MHW-2	MHW-4	MHW-8	MHW-14	MHW-30
	NAME	QTY	QTY	QTY	QTY	QTY
1.1	SIDE PLATE (LEFT)		1	1	1	1
1.2		1				
2	COPPER BELT				2	2
3	DRIVE PLATE (LEFT)	1	1	1	1	1
4	REACTION BLOCK	1	1	1	1	1
5	RATCHET SPLINE	1	1	1	1	1
6	DRIVE PLATE (RIGHT)	1	1	1	1	1
7.1	SIDE PLATE (RIGHT)		1	1	1	1
7.2		1				
8	REACTION BLOCK SCREW	4	4	4	4	4
9	SCREW (REACTION PAWL BUSHING) TOP SPACER SCREW	4	4	4	2	2
10.1	TOP SPACER		1	1	1	1
10.2		1				
11	ROLL PIN FOR TOP SPACER		1	1	1	1
12	DRIVE PIN	1	1	1	1	1
13	ROLL PIN FOR DRIVE PLATE	2	2	2	2	2
14	DRIVE PIN SPRING	1	1	1	1	1
15	DRIVE PAWL	1	1	1	1	1
16	SPRING SEAT	1				
17	COMPRESSED SPRING	1	1	1	1	1
18	DRIVE PAWL PRIMARY	1	1	1	1	1
19	PIN FOR SIDE PLATE	1	1	1	1	1
20	COMPRESSED SPRING FOR REACTION PAWL	1	1	1	1	1
21.1	SHAFT OF ROTATION	1			1	1
21.2			1	1		
22	REACTION PAWL BUSHING	1	2	2	1	1
23.1	REACTION PAWL		1	1	1	1
23.2		1				
24	SHROUD	1	1	1	1	1

MHW SERIES-POWER HEAD DRAWING AND PART LIST

MHW-2, MHW-4, MHW-8, MHW-14, MHW-30



Item	Name	MHW-2 Quantity	MHW-4 Quantity	MHW-8 Quantity	MHW-14 Quantity	MHW-30 Quantity
1	Body	1	1	1	1	1
2	Casing Cap of Body	1		1	1	1
3	U-Ring for Body	1	1	1	1	1
4	Piston Rod	1	1	1	1	1
5	O-Ring for Piston Rod O-Ring for End Cap	1 1	1 1	1 1	1 1	1 1
6	Retaining Ring for Piston Rod Retaining Ring for End Cap	1 1	1 1	1 1	1 1	1 1
7	U-Ring for Piston Rod	1	1	1	1	1
8	End Cap	1	1	1	1	1
9	End Cap Screw		2	2	2	2
10	Screw of Body	8	8	8	8	8
11	Rod End	1	1	1	1	1
12.1	Fixed Pin Upper	1	1	1		
12.2					1	1
13	Retaining Ring for Fixed Pin Upper	2	2	2		
14	Screw for Fixed Pin Upper				2	2
15	Screw with Spring	1	1	1	1	1
16	Link Pin	1	1	1	1	1
17	Draw Ring	1	1	1	1	1
18	Swivel	1	1	1	1	1
19	Male Coupler	1	1	1	1	1
20	Female Coupler	1	1	1	1	1

TROUBLE SHOOT 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 to 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 not 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
	Coupler is defective	Replace any defective Coupler
Square Drive will not turn	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 the teeth ,
	Worn or broken teeth on Ratchet an/or Segment Pawl	Replace the Gauge
Pump will not build up pressure	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
	Clogged fitter	Inspect, clean and /or replace the pump filter
Nut Returns with retract stroke	ratchet and Reaction pawl are not engaged	Replace pawl or the compressed spring
	Drive Sleeves	Depth in the Hosing

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.

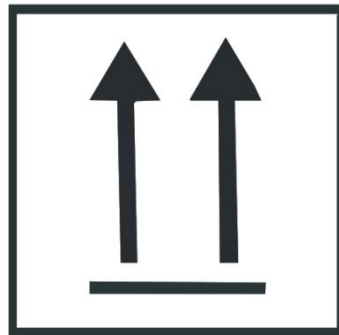


FIG 9-1

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

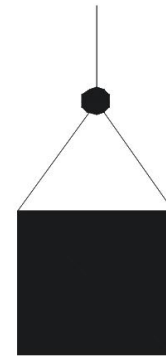


FIG 9-2

液压扭矩扳手操作保养手册

本操作手册内容包括MDW和MHW系列的液压扭矩扳手操作规程、警告和注意事项以及故障排除。使用前，请仔细阅读本手册，彻底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。

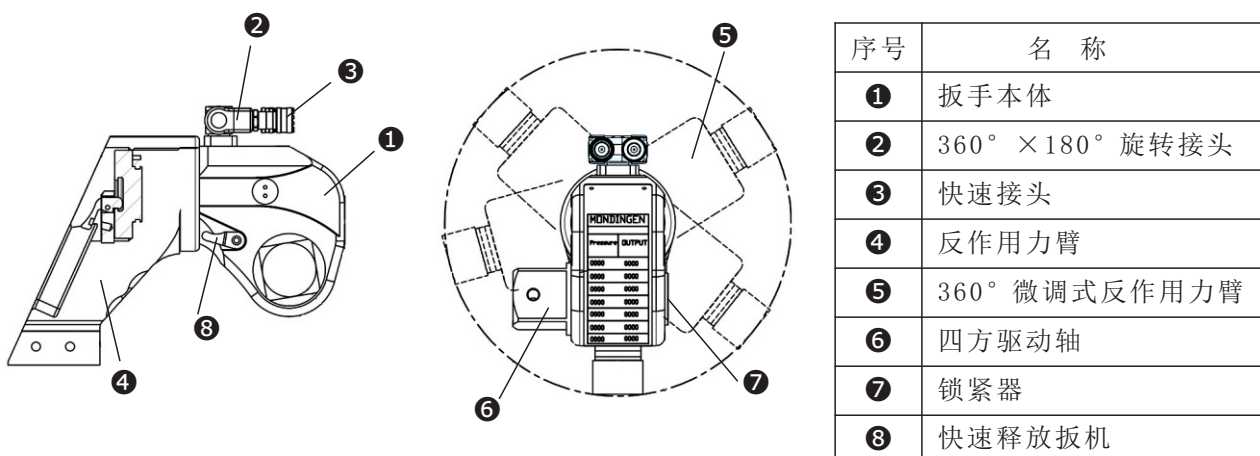
安全第一

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，遵守安全措施以避免在操作设备发生人身或设备的损伤！制造商对因为不安全操作及错误操作导致的损坏不负责任。

二、产品描述

MDW和MHW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，广泛适合于大扭矩螺栓拆卸，扭矩精确可调，误差不超过±3%。

MDW型液压扭矩扳手由：



图（1）

MHW型液压扭矩扳手由：

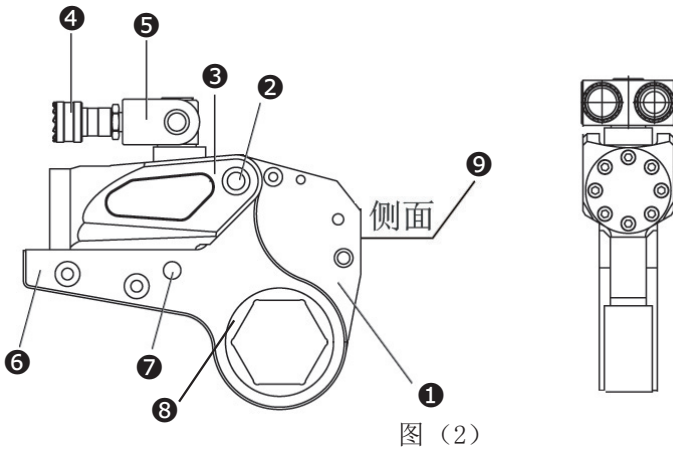


图 (2)

序号	名称
①	工作头
②	长销轴
③	动力头
④	快速接头
⑤	360° × 180° 旋转接头
⑥	反作用挡板
⑦	快速组合销
⑧	棘轮
⑨	快速释放扳机

三、警告事项及警告标志

一、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能够承受不超过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 尽快用原厂零件替换破旧的零件。



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。严重冲击可引起有关内部金属线损坏，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：液压泵、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。



注意 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。



警告 使用原厂高性能的套筒。



警告 用插销将套筒驱动头紧固以避免套筒脱落。

二、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
<p>IF DRIVE STICKS OUT RIGHT, IT'S SET FOR TIGHTEN. LEFT. IT'S SET FOR LOOSE!</p>	驱动轴右紧左松	工作头
<p>LOCK REACTION ARM BEFORE USING TOOL!</p>	使用前固定好反力臂	反力臂

四、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		铬铝合金钢		镍铬铝合金钢		镍铬铝合金钢	
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
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：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。

建议锁紧扭矩为：表中数值×80%

例如：M52，8.8级螺栓，则锁紧力矩为4704×80%=3763N.m

拆松力矩为锁紧力矩的1.5~2倍

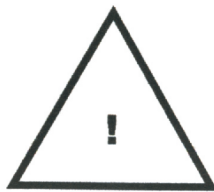
例如：上例锁紧力矩为3763N.m，则其拆松力矩为

3763×1.5 (2) =5645 (7526) 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。



五、操作使用

连接 扳手及液压泵是由工作压力均为700bar的钢丝编织的复式油管连接的。每副油管的底端均有凹接头以及凸接头，以保证液压泵与液压扭矩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。

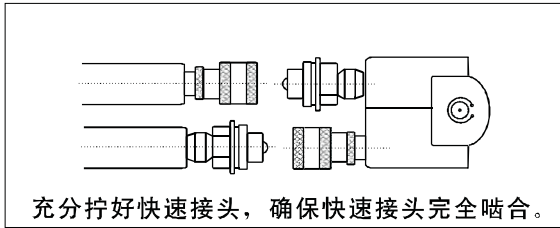
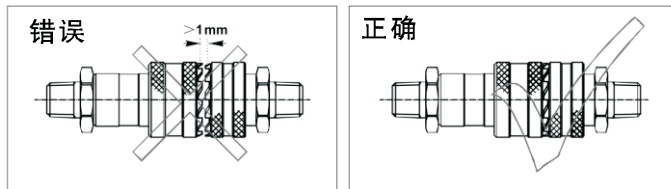
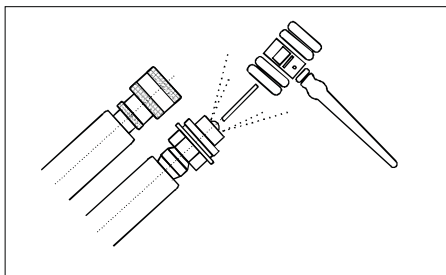


图 (3)

快速接头互连时，必须保证啮合后间隙之间距离 $<1\text{mm}$ (图4)，只有这样才能确保接头内单向阀打开，使油路畅通。否则，连接后，接头内钢珠没有相顶，接头内单向阀无法打开，致使油路不通过后，接头内将充满压力，会出现扳手无法运转、从扳手旋转体上的自动泄油口出油等现象。

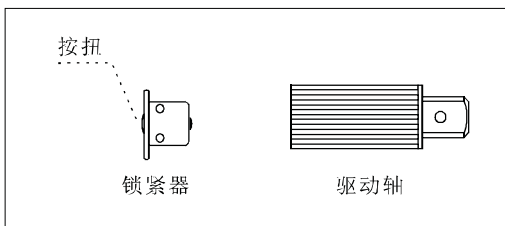


此时需要拆开所有油管接头，检查所有快速接头内包括扳手接头内钢珠，用手是否可以按动钢珠，有弹性。如果不能按动，此时需要找锤去敲打接头内的钢珠 (图5)，释放接头里的压力，请注意敲击钢珠时会有液压油喷出，虽然没有危险，但会弄脏您的衣服！直至用手可以按动接头内的钢珠为止。再重新连接。

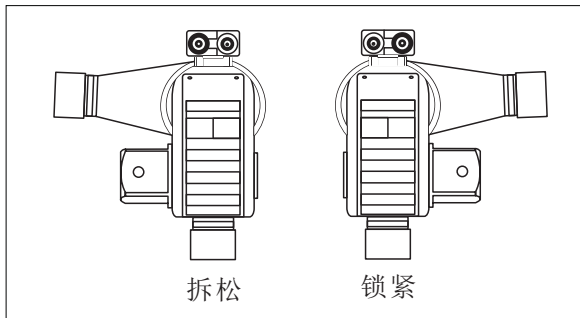


MDW系列

驱动换向 按住锁紧器中间的圆形按钮 (图6)，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 (图7)，使其与花键套完全啮合，然后转动驱动轴使之于花键套以及棘轮槽啮合，通过棘轮推动驱动轴转动。



左松右紧
图(7)

准备 确定是拆松，还是锁紧螺母

通过按下锁紧器；取出驱动轴；按图进行左右换向，装上锁紧器，拉下反作用力臂上的力臂夹，按合适方位装入反作用力臂。拆锁时驱动轴方向见MDW系列液压扭矩扳手选向如图(7)所示。

连接液压泵

将液压泵的高压出口(H或A)与液压扳手的高压出口(H或A)、液压泵的低压出口(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，液压泵中是否有油。

将液压泵电源插头插入电源。

警告 严禁油量不足运转！

试运转

将扳手置于空地上，用油管将液压扭矩扳手与液压泵正确连接。

打开液压泵电源开关，按下自锁按钮，启动液压泵，检查液压泵是否运转正常。

按线控开关上的复位按钮，此时驱动轴开始转动，当听到“啪”的一声，复位扳机跳下，扳手到位停止转动，压力表由“0”急速上升至调定压力，松开复位按钮，扳手自动回程；当又听到“啪”的一声，扳手自动回程到位，压力表由“0”急速上升至8MPa。重新按下复位按钮，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，才能将扳手放置套筒上。

注意：扳手不用时，应能及时关闭液压泵电源！

操作

调整压力

一手将线控开关复位按钮按下，当听到扳手“啪”一声，复位扳机跳下，扳手到位停止转动，压力表由“0”急速上升，另一只手调整液压泵压力调节阀，调整压力表中指针至所需压力。

拆松

将液压泵压力调整到所需要压力值，可参考表(1)中注解，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。

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，建议按表(1)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=(表中数据)×(80%~90%)

例如：M48螺栓、8.8级，表中建议预紧力为3920N.m，则设定力矩为：

$3920 \times 80\% = 3136 \text{ N.m}$ 。

2、液压泵压力设定

根据所需的力矩值及所用扳手型号来设定液压泵压力。

如上述M48螺栓、8.8级设定力矩为3136N.m,选用 MDW-3 型扳手,则查表中 MDW-3 一列,查出对应于3158N.m力矩时液压泵的压力为49MPa,所以液压泵压力应设定至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。

使用中扳手卡紧取不下时:

在操作中,螺栓锁紧后,取扳手时如扳手卡紧取不下来,切忌用锤打,而应将线控开关中的复位按钮按下不松,同时按下快速释放杆并保持着(图8),然后放开按钮,此时扳手会自动松开,取下扳手。或将液压泵压力再提高一些,将螺栓再拧紧,放松即可。

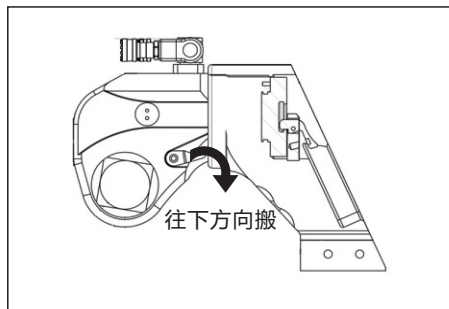


图 (8)

MHW系列

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头,然后按下动力头,对齐组合销口,再插入快速组合销定位(图9)。

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10)。

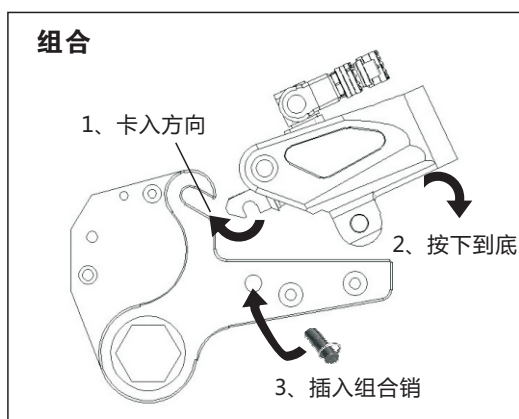


图 (9)

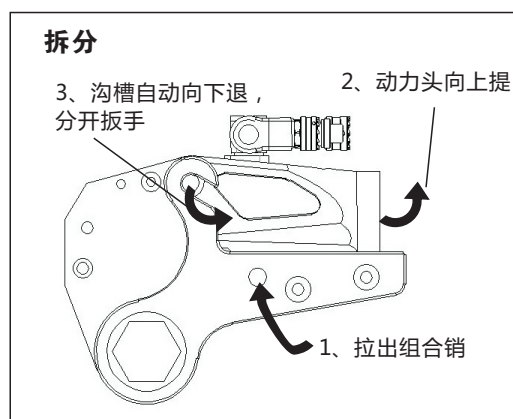


图 (10)

方向位置

中空扳手的松紧程序也是左松右紧,工作时移动要确保反作用力臂或直角靠在一个牢固的反作用支点上。

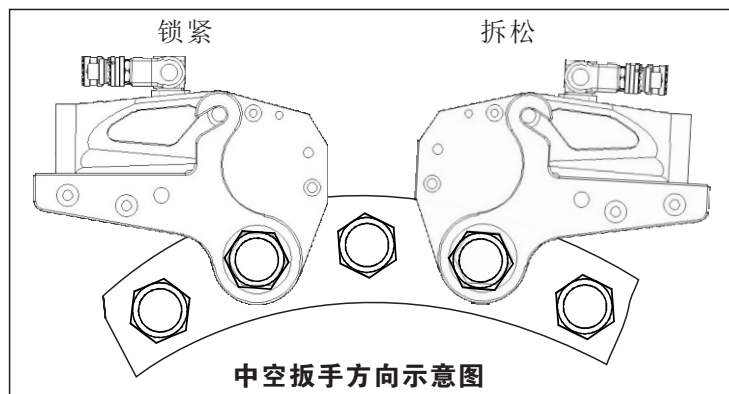


图 (11)

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。

连接液压泵

将液压泵的高压出口（H或A）与液压扳手的高压出口（H或A）、液压泵的低压出口（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，液压泵中是否有油。

将液压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，用油管将液压扭矩扳手与液压泵正确连接。

打开液压泵电源开关，按下自锁按钮，启动液压泵，检查液压泵是否运转正常。

按线控开关上的复位按钮，此时驱动轴开始转动，当听到“啪”的一声，复位扳机跳下，扳手到位停止转动，压力表由“0”急速上升至调定压力，松开复位按钮，扳手自动回程；当又听到“啪”的一声，扳手自动回程到位，压力表由“0”急速上升至8MPa。重新按下复位按钮，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，才能将扳手放置螺母上。

注意： 扳手不用时，应即及时关闭液压泵电源！

操作

调整压力

一手将线控开关复位按钮按下，当听到扳手“啪”一声，复位扳机跳下，扳手到位停止转动，压力表由“0”急速上升，另一只手调整液压泵的压力调节阀，调整压力表中指针至所需压力。

拆松

将液压泵压力调整到所需要压力值，可参考表(1)中注解，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。

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，建议按表（1）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=（表中数据）×（80%~90%）

例如：M48螺栓、8.8级，表中建议预紧力为3920N.m，则设定力矩为：

$3920 \times 80\% = 3136 \text{ N.m}$ 。

2、液压泵压力设定

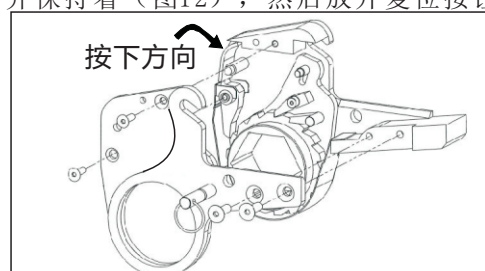
根据所需的力矩值及所用扳手型号来设定液压泵压力。

如上述M48螺栓、8.8级设定力矩为3136N.m，选用MHW-4/S75型扳手，则查表MHW-4中(70-80)一列，查出对应于3144N.m力矩时液压泵的压力为34MPa，所以液压泵压力应设定至34MPa。

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。

使用中扳手卡紧取不下时：

在操作中，螺栓锁紧后，取扳手时如扳手卡紧取不下来，切忌用锤打，而应将线控开关复位按钮按下不松，同时按下快速释放杆并保持着（图12），然后放开复位按钮，此时扳手会自动松开，取下扳手。



图（12）

六、MDW液压扭矩扳手压力--扭矩对照表

表(3)

型号			MDW-07	MDW-1	MDW-3	MDW-5	MDW-8	MDW-10	MDW-15	MDW-20	MDW-25	MDW-35	MDW-50
Mpa	bar	psi	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
7	70	1015	112	183	451	752	1078	1551	2063	2666	3472	4866	7200
8	80	1160	128	209	515	860	1232	1773	2357	3047	3968	5561	8229
9	90	1305	144	236	580	967	1386	1994	2652	3428	4464	6256	9257
10	100	1450	160	262	644	1075	1540	2216	2946	3809	4960	6952	10286
11	110	1595	176	288	709	1182	1694	2438	3241	4190	5456	7647	11314
12	120	1740	192	314	773	1290	1848	2659	3536	4571	5952	8342	12343
13	130	1885	208	341	838	1397	2002	2881	3831	4952	6448	9037	13371
14	140	2030	224	367	902	1505	2156	3103	4125	5332	6945	9733	14400
15	150	2175	240	393	967	1612	2310	3324	4420	5713	7441	10428	15429
16	160	2320	256	419	1031	1720	2464	3546	4714	6094	7937	11123	16457
17	170	2465	272	446	1096	1828	2618	3768	5009	6475	8433	11818	17486
18	180	2610	288	472	1160	1935	2772	3989	5304	6856	8929	12514	18514
19	190	2755	304	498	1225	2043	2926	4211	5599	7237	9425	13209	19543
20	200	2900	320	524	1289	2150	3080	4433	5893	7618	9921	13904	20571
21	210	3045	336	551	1353	2258	3234	4654	6188	7999	10417	14599	21600
22	220	3190	352	577	1418	2365	3388	4876	6482	8380	10913	15295	22629
23	230	3335	368	603	1482	2473	3542	5098	6777	8761	11409	15990	23657
24	240	3480	384	629	1547	2580	3696	5319	7072	9142	11905	16685	24686
25	250	3625	400	656	1611	2688	3850	5541	7367	9523	12401	17380	25714
26	260	3770	416	682	1676	2796	4004	5763	7661	9903	12898	18076	26743
27	270	3915	432	708	1740	2903	4158	5984	7956	10284	13394	18771	27771
28	280	4060	448	734	1805	3011	4312	6206	8250	10665	13890	19466	28800
29	290	4205	464	761	1869	3118	4466	6428	8545	11046	14386	20161	29829
30	300	4350	480	787	1934	3226	4620	6649	8840	11427	14882	20856	30857
31	310	4495	496	813	1998	3333	4774	6871	9135	11808	15378	21552	31886
32	320	4640	512	839	2063	3441	4928	7093	9429	12189	15874	22247	32914
33	330	4785	528	866	2127	3548	5082	7314	9724	12570	16370	22942	33943
34	340	4930	544	892	2191	3656	5236	7536	10018	12951	16866	23637	34971
35	350	5075	560	918	2256	3764	5390	7758	10313	13332	17362	24333	36000
36	360	5220	576	944	2320	3871	5544	7979	10608	13713	17858	25028	37029
37	370	5365	592	971	2385	3979	5698	8201	10903	14094	18354	25723	38057
38	380	5510	608	997	2449	4086	5852	8423	11197	14475	18850	26418	39086
39	390	5655	624	1023	2514	4194	6006	8644	11492	14855	19347	27114	40114
40	400	5800	640	1049	2578	4301	6160	8866	11786	15236	19843	27809	41143
41	410	5945	656	1076	2643	4409	6314	9088	12082	15617	20339	28504	42171
42	420	6090	672	1102	2707	4516	6468	9309	12376	15998	20835	29199	43200
43	430	6235	688	1128	2772	4624	6622	9531	12671	16379	21331	29895	44229
44	440	6380	704	1154	2836	4732	6776	9753	12965	16760	21827	30590	45257
45	450	6525	720	1181	2900	4839	6930	9974	13260	17141	22323	31285	46286
46	460	6670	736	1207	2965	4947	7084	10196	13554	17522	22819	31980	47314
47	470	6815	752	1233	3029	5054	7238	10418	13850	17903	23315	32676	48343
48	480	6960	768	1259	3094	5162	7392	10639	14144	18284	23811	33371	49371
49	490	7105	784	1286	3158	5269	7546	10861	14439	18665	24307	34066	50400
50	500	7250	800	1312	3223	5377	7700	11083	14733	19046	24803	34761	51429
51	510	7395	816	1338	3287	5484	7854	11304	15028	19427	25299	35456	52457
52	520	7540	832	1364	3352	5592	8008	11526	15322	19807	25796	36152	53486
53	530	7685	848	1391	3416	5700	8162	11748	15618	20188	26292	36847	54514
54	540	7830	864	1417	3481	5807	8316	11969	15912	20569	26788	37542	55543
55	550	7975	880	1443	3545	5915	8470	12191	16207	20950	27284	38237	56571
56	560	8120	896	1469	3610	6022	8624	12413	16501	21331	27780	38933	57600
57	570	8265	912	1496	3674	6130	8778	12634	16796	21712	28276	39628	58629
58	580	8410	928	1522	3737	6237	8932	12856	17090	22093	28772	40323	59657
59	590	8555	944	1548	3803	6345	9086	13078	17386	22474	29268	41018	60686
60	600	8700	960	1574	3867	6452	9240	13299	17680	22855	29764	41714	61714
61	610	8845	976	1601	3932	6560	9394	13521	17975	23236	30260	42409	62743
62	620	8990	992	1627	3996	6668	9548	13743	18269	23617	30756	43104	63771
63	630	9135	1008	1653	4061	6775	9702	13964	18564	23998	31252	43799	64800
64	640	9280	1024	1679	4125	6883	9856	14186	18858	24378	31749	44495	65829
65	650	9425	1040	1706	4190	6990	10010	14408	19154	24759	32245	45190	66857
66	660	9570	1056	1732	4254	7098	10164	14629	19448	25140	32741	45885	67886
67	670	9715	1072	1758	4319	7205	10318	14851	19743	25521	33237	46580	68914
68	680	9860	1088	1784	4383	7313	10472	15073	20037	25902	33733	47276	69943
69	690	10005	1104	1811	4448	7420	10626	15294	20332	26283	34229	47971	70971
70	700	10150	1120	1837	4512	7528	10780	15516	20627	26664	34725	48666	72000

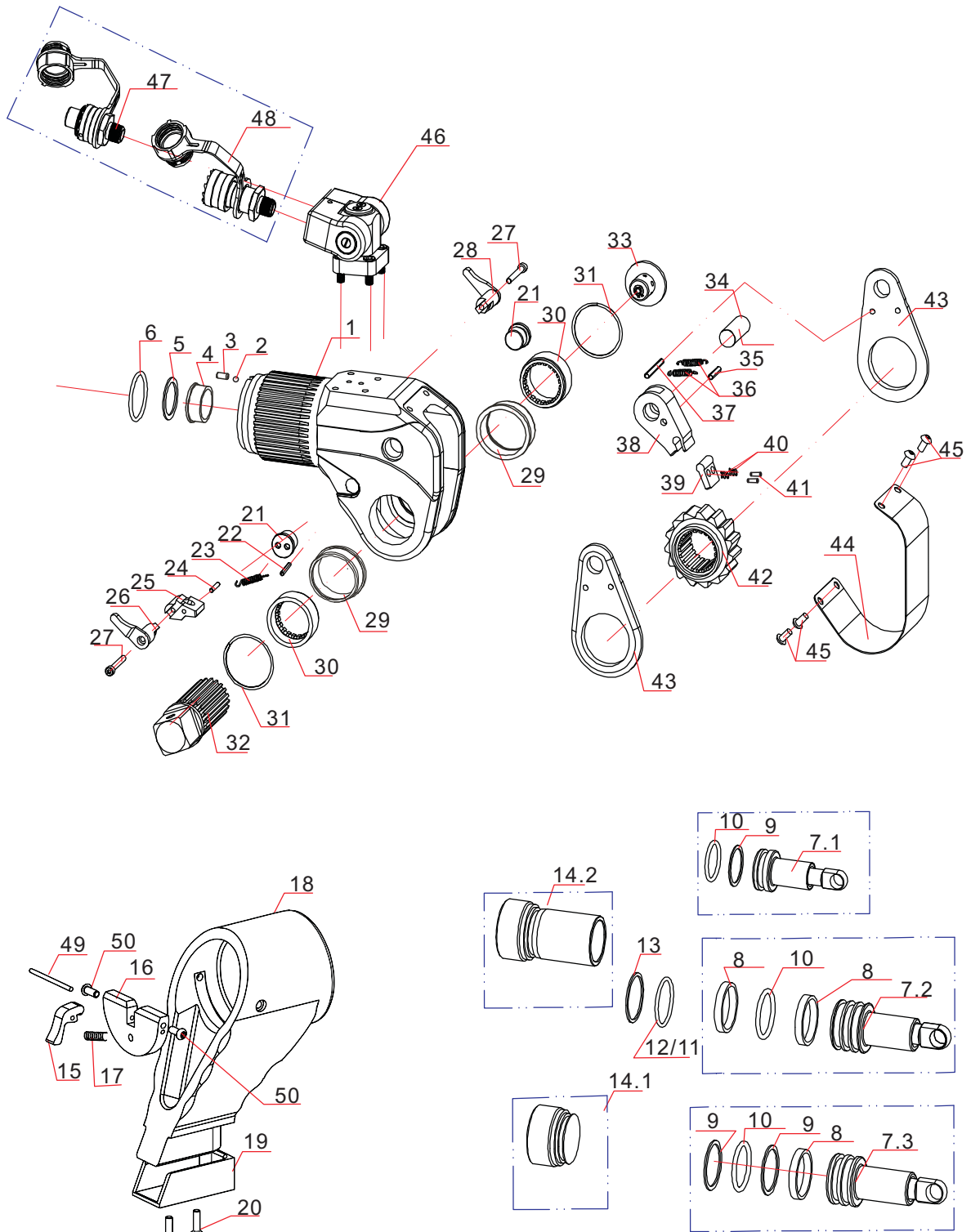
七、MHW液压扭矩扳手压力--扭矩对照表

表(5)

型号			MHW-2		MHW-4		MHW-8		MHW-14	MHW-30	
螺母对边			15-55	60	34-65	70-80	41-95	100-105	50-117	110-155	160-175
Mpa	bar	psi	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
7	70	1015	232	241	585	647	1094	1177	1852	4188	4459
8	80	1160	265	275	669	739	1250	1345	2117	4786	5096
9	90	1305	299	310	752	832	1407	1513	2381	5385	5733
10	100	1450	332	344	836	924	1563	1682	2646	5983	6370
11	110	1595	365	379	920	1017	1719	1850	2910	6581	7007
12	120	1740	398	413	1003	1109	1876	2018	3175	7180	7644
13	130	1885	432	448	1087	1202	2032	2186	3440	7778	8281
14	140	2030	465	482	1171	1294	2188	2354	3704	8376	8918
15	150	2175	498	517	1255	1387	2344	2523	3969	8975	9555
16	160	2320	531	551	1338	1479	2501	2691	4233	9573	10192
17	170	2465	565	586	1422	1572	2657	2859	4498	10171	10829
18	180	2610	598	620	1506	1664	2813	3027	4762	10769	11467
19	190	2755	631	655	1589	1757	2970	3195	5027	11368	12104
20	200	2900	665	689	1673	1849	3126	3364	5292	11966	12741
21	210	3045	698	724	1757	1942	3282	3532	5556	12564	13378
22	220	3190	731	758	1840	2043	3439	3700	5821	13163	14015
23	230	3335	764	793	1924	2127	3595	3868	6085	13761	14652
24	240	3480	798	827	2008	2219	3751	4037	6350	14359	15289
25	250	3625	831	862	2092	2312	3907	4205	6615	14958	15926
26	260	3770	864	896	2175	2404	4064	4373	6879	15556	16563
27	270	3915	897	931	2259	2497	4220	4541	7144	16154	17200
28	280	4060	931	965	2343	2589	4376	4709	7408	16753	17837
29	290	4205	964	1000	2426	2682	4533	4878	7673	17351	18474
30	300	4350	997	1034	2510	2774	4689	5046	7938	17949	19111
31	310	4495	1030	1069	2594	2867	4845	5214	8202	18548	19748
32	320	4640	1064	1103	2677	2959	5002	5382	8467	19146	20385
33	330	4785	1097	1138	2761	3052	5158	5550	8731	19744	21022
34	340	4930	1130	1172	2845	3144	5314	5719	8996	20343	21659
35	350	5075	1164	1207	2929	3237	5470	5887	9260	20941	22296
36	360	5220	1197	1241	3012	3329	5627	6055	9525	21539	22933
37	370	5365	1230	1276	3096	3422	5783	6223	9790	22138	23570
38	380	5510	1263	1310	3180	3514	5939	6391	10054	22736	24207
39	390	5655	1297	1345	3263	3607	6096	6560	10319	23334	24845
40	400	5800	1330	1379	3347	3699	6252	6728	10583	23932	25482
41	410	5945	1363	1414	3431	3792	6408	6896	10848	24531	26119
42	420	6090	1396	1448	3514	3884	6565	7064	11113	25129	26756
43	430	6235	1430	1483	3598	3977	6721	7232	11377	25727	27393
44	440	6380	1463	1517	3682	4069	6877	7401	11642	26326	28030
45	450	6525	1496	1552	3766	4162	7033	7569	11906	26924	28667
46	460	6670	1530	1586	3849	4254	7190	7737	12171	27522	29304
47	470	6815	1563	1621	3933	4347	7346	7905	12435	28121	29941
48	480	6960	1596	1655	4017	4439	7502	8073	12700	28719	30578
49	490	7105	1629	1690	4100	4532	7659	8242	12965	29317	31215
50	500	7250	1663	1724	4184	4624	7815	8410	13229	29916	31852
51	510	7395	1696	1759	4268	4717	7971	8578	13494	30514	32489
52	520	7540	1729	1793	4351	4809	8128	8746	13758	31112	33126
53	530	7685	1762	1828	4435	4902	8284	8914	14023	31711	33763
54	540	7830	1796	1862	4519	4994	8440	9083	14288	32309	34400
55	550	7975	1829	1897	4603	5087	8596	9251	14552	32907	35037
56	560	8120	1862	1931	4686	5179	8753	9419	14817	33506	35674
57	570	8265	1895	1966	4770	5272	8909	9587	15081	34104	36311
58	580	8410	1929	2000	4854	5364	9065	9756	15346	34702	36948
59	590	8555	1962	2035	4937	5457	9222	9924	15611	35301	37585
60	600	8700	1995	2069	5021	5549	9378	10092	15875	35899	38222
61	610	8845	2029	2104	5105	5642	9534	10260	16140	36497	38860
62	620	8990	2062	2138	5188	5734	9691	10428	16404	37095	39497
63	630	9135	2095	2173	5272	5827	9847	10597	16669	37694	40134
64	640	9280	2128	2207	5356	5919	10003	10765	16933	38292	40771
65	650	9425	2162	2242	5440	6012	10159	10933	17198	38890	41408
66	660	9570	2195	2276	5523	6104	10316	11101	17463	39489	42045
67	670	9715	2228	2311	5607	6197	10472	11269	17727	40087	42682
68	680	9860	2261	2345	5691	6289	10628	11438	17992	40685	43319
69	690	10005	2295	2380	5774	6382	10785	11606	18256	41284	43956
70	700	10150	2328	2414	5858	6474	10941	11774	18521	41882	44593

八、MDW装配图

MDW-07,MDW-1,MDW-3,MDW-5,MDW-8,MDW-10,MDW-15 , MDW-20,MDW-35,MDW-50系列



图(13)

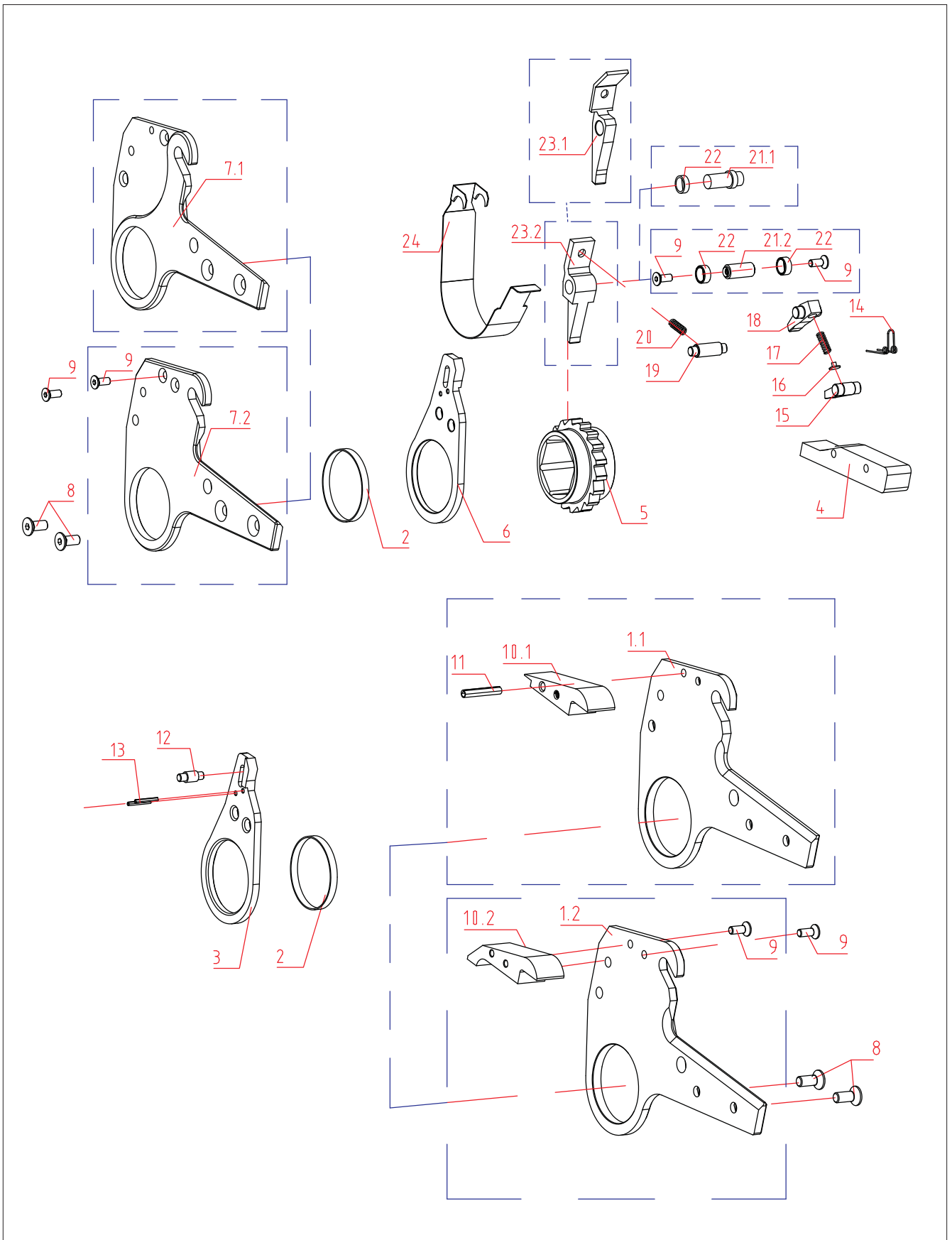
说明: 1、7.1仅适用于07型, 7.2适用于20、25、35、50型, 7.3适用于1、3、5、8、10、15型
2、7#部件为活塞部件的不可拆分部分。

九、MDW系列零件详表

序号	名称	MDW-07 数量	MDW-1 数量	MDW-3 数量	MDW-5 数量	MDW-8 数量	MDW-10 数量	MDW-15 数量	MDW-20 数量	MDW-25 数量	MDW-35 数量	MDW-50 数量
1	本体	1	1	1	1	1	1	1	1	1	1	1
2	钢球					1	1	1	1	1	1	1
3	(堵头)螺钉	1	1	1	1	1	1	1	1	1	1	1
4	(本体)铜套			1	1	1	1	1	1	1	1	1
5	本体挡圈	1	1									
6	本体O型圈/U型圈	1	1	1	1	1	1	1	1	1	1	1
7.1	活塞部件	1										
7.2								1	1	1	1	1
7.3			1	1	1	1	1					
8	活塞耐磨环		1	1	1	1	1	2	2	2	2	2
9	活塞挡圈	1	1	1	1	2	2	2				
10	活塞O型圈/格莱圈	1	1	1	1	1	1	1	1	1	1	1
11	缸套O型圈			1	1							
12	缸盖O型圈	1	1	1	1	1	1	1	1	1	1	1
13	缸盖挡圈		1	1	1	1	1	1	1	1	1	1
14.1	缸盖	1	1	1	1	1	1	1	1	1	1	1
14.2	缸套			1	1							
15	定位钩	1	1	1	1	1	1	1	1	1	1	1
16	定位块	1	1	1	1	1	1	1	1	1	1	1
17	反力臂压簧	1	1	1	1	1	1	1	1	1	1	1
18	反力臂	1	1	1	1	1	1	1	1	1	1	1
19	马掌	1	1	1	1	1	1	1	1	1	1	1
20	马掌螺钉	1	2	2	2	2	2	2	2	2	2	2
21	螺钉	2	2	2	2	2	2	2	2	2	2	2
22	圆柱销	1	1	1	1	1	1	1	1	1	1	1
23	止退棘爪拉簧	1	1	1	1	1	1	1	1	1	1	1
24	止退棘爪销	1	1	1	1	1	1	1	1	1	1	1
25	止退棘爪	1	1	1	1	1	1	1	1	1	1	1
26	左复位扳机	1	1	1	1	1	1	1	1	1	1	1
27	复位扳机螺钉	2	2	2	2	2	2	2	2	2	2	2
28	右复位扳机	1	1	1	1	1	1	1	1	1	1	1
29	钢套	2	2	2	2	2	2	2	2	2	2	
30	自由花键套	2	2	2	2	2	2	2	2	2	2	2
31	卡簧	2	2	2	2	2	2	2	2	2	2	2
32	驱动轴	1	1	1	1	1	1	1	1	1	1	1
33	锁紧器	1	1	1	1	1	1	1	1	1	1	1
34	销轴	1	1	1	1	1	1	1	1	1	1	1
35	大棘爪销	1	1	1	1	1	1	1	1	1	1	1
36	大棘爪拉簧	2	2	2	2	2	2	2	2	2	2	2
37	驱动板销	1	1	1	1	1	1	1	1	1	1	1
38	大棘爪	1	1	1	1	1	1	1	1	1	1	1
39	小棘爪	1	1	1	1	1	1	1	1	1	1	1
40	小棘爪压簧	1	2	1	2	2	1	1	1	1	1	1
41	小棘爪压簧销	1					1	1	1	1	1	1
42	棘轮	1	1	1	1	1	1	1	1	1	1	1
43	驱动板	2	2	2	2	2	2	2	2	2	2	2
44	盖板	1	1	1	1	1	1	1	1	1	1	1
45	盖板螺钉	4	4	4	4	4	4	4	4	4	4	4
46	旋转接头	1	1	1	1	1	1	1	1	1	1	1
47	凸接头	1	1	1	1	1	1	1	1	1	1	1
48	凹接头	1	1	1	1	1	1	1	1	1	1	1
49	定位销	1	1	1	1	1	1	1	1	1	1	1
50	定位螺钉	2	2	2	2	2	2	2	2	2	2	2

十、MHW系列工作头装配图

MHW-2,MHW-4,MHW-8,MHW-14,MHW-30系列

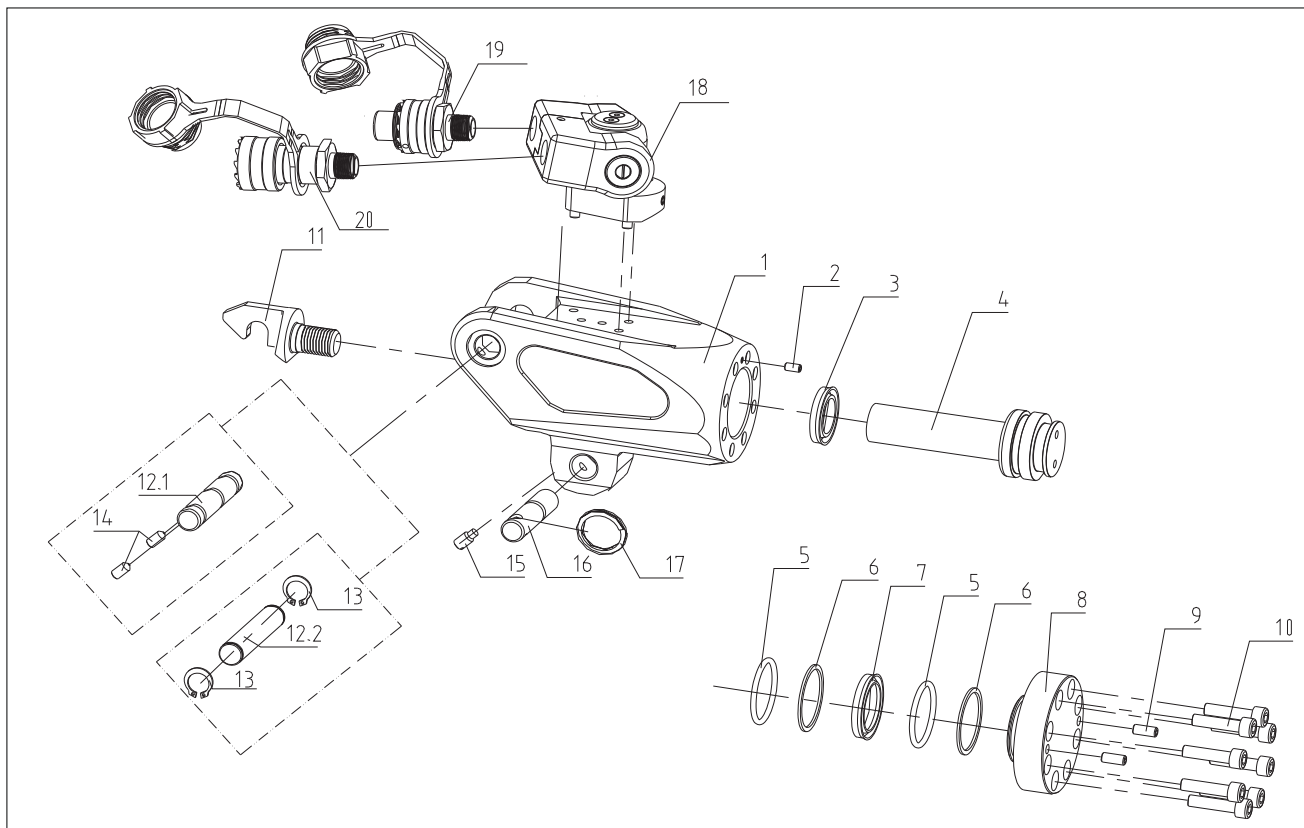


十一、MHW系列工作头零件详表

型号		MHW-2	MHW-4	MHW-8	MHW-14	MHW-30
序号	名称	数量	数量	数量	数量	数量
1.1	左墙板		1	1	1	1
1.2		1				
2	铜带				2	2
3	左驱动板	1	1	1	1	1
4	反力支板	1	1	1	1	1
5	棘轮	1	1	1	1	1
6	右驱动板	1	1	1	1	1
7.1	右墙板		1	1	1	1
7.2		1				
8	(反力支板)螺钉	4	4	4	4	4
9	(轴套、连接垫板)螺钉	4	4	4	2	2
10.1	连接垫板		1	1	1	1
10.2		1				
11	(连接垫板)弹性销		1	1	1	1
12	(驱动板)驱动销	1	1	1	1	1
13	(驱动板)弹性销	2	2	2	2	2
14	扭簧	1	1	1	1	1
15	短棘爪	1	1	1	1	1
16	弹簧垫	1				
17	(大棘爪)压簧	1	1	1	1	1
18	长棘爪	1	1	1	1	1
19	(墙板)销轴	1	1	1	1	1
20	(止退棘爪)压簧	1	1	1	1	1
21.1	转轴(轴)	1			1	1
21.2			1	1		
22	轴套	1	2	2	1	1
23.1	止退棘爪		1	1	1	1
23.2		1				
24	盖板	1	1	1	1	1

十二、MHW系列动力头装配图及零件详表

MHW-2,MHW-4,MHW-8,MHW-14,MHW-30系列



序号	名称	MHW-2 数量	MHW-4 数量	MHW-8 数量	MHW-14 数量	MHW-30 数量
1	本体	1	1	1	1	1
2	堵头(本体)	1		1	1	1
3	(本体)U型圈	1	1	1	1	1
4	活塞杆	1	1	1	1	1
5	(活塞)O型圈	1	1	1	1	1
	(缸盖)O型圈	1	1	1	1	1
6	(活塞杆)挡圈		1	1	1	1
	(缸盖)挡圈	1	1	1	1	1
7	(活塞)U型圈	1	1	1	1	1
8	油缸盖	1	1	1	1	1
9	(缸盖)顶出螺钉	2	2	2	2	2
10	(本体)螺钉	8	8	8	8	8
11	勾头	1	1	1	1	1
12.1	长销轴				1	1
12.2		1	1	1		
13	(长销轴)挡圈	2	2	2		
14	(长销轴)螺钉				2	2
15	碰珠螺钉	1	1	1	1	1
16	组合销	1	1	1	1	1
17	钥匙圈	1	1	1	1	1
18	旋转接头	1	1	1	1	1
19	凸接头	1	1	1	1	1
20	凹接头	1	1	1	1	1

十三、故障与排除

表 (4)

引起的故障	可能引起故障的原因	解决方法
活塞不顶升	快速接头没有被连接到位	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	替换按钮或控制器
	污垢进入液压泵上的方向控制阀	拆开液压泵，把方向控制阀擦干净
活塞不回缩	管子接头连接错误	确保液压泵上的高压接口与工具上的高压接口相连接以及泵上的低压接口与工具上的低压接口相连接
	回油管没有连接好	安全正确的连接回油管
	驱动销或弹簧损坏	替换弹簧或者驱动销
液压泵压力正常时，油缸不能建立起压力	活塞密封发生泄漏	替换任何有缺陷的密封圈
	接头有缺陷	替换任何有缺陷的接头
油缸压力正常时，液压泵不能建立起压力	有缺陷的压力调节阀	检查，调节或替换压力调节阀
	电压太低	确保电流，电压和其他一些数值符合液压泵的操作要求
	压力表有缺陷	替换压力表
	油太少	检查和加入足够的液压泵用油
	过滤器堵塞	检查，擦干净或替换过滤器
螺母随着回程回转	棘轮和止退棘爪未吻合	更换止退棘爪或更换棘爪的压簧

十四、液压扳手的日常保养及运输

一、液压扳手的保养

1. 使用前应检查扳手上各螺钉是否松动，发现有松动，应将其拧紧，如不及时处理导致脱落可能造成设备严重损坏。
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，在恶劣的环境下，清洗和润滑都应定期进行。
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。
4. 连接各设备，切换方向控制阀，加压检查有无异常。
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。
6. 扳手内部结构件都是相连的，如果有一个零件出现故障，势必会对其他零件造成磨损，所以要定期检查，及时保养和更换。

二、液压扳手噪音/振动声明

液压扳手使用噪声值为： ≤ 70 db

三、液压扳手运输信息

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

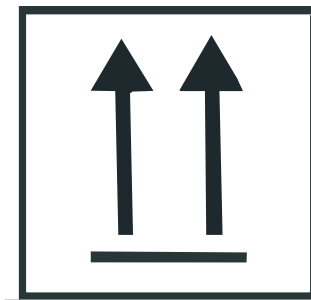


图9-1

- 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。

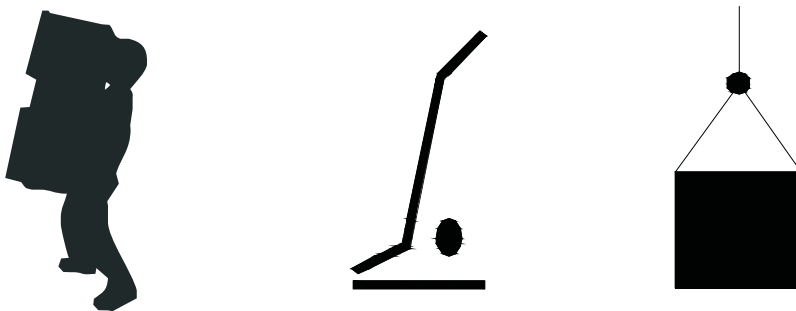


图9-2

十五、液压扳手规格参数表

型号	扭矩(N. m)	螺栓规格(mm)	驱动轴(inch)		
MDW-07	112-1120	14-30	3/4		
MDW-1	183-1837	16-36	3/4		
MDW-3	451-4512	22-48	1		
MDW-5	752-7528	27-56	1-1/2		
MDW-8	1078-10780	30-64	1-1/2		
MDW-10	1551-15516	36-72	1-1/2		
MDW-15	2063-20627	39-80	2-1/2		
MDW-20	2666-26664	42-90	2-1/2		
MDW-25	3472-34725	48-100	2-1/2		
MDW-35	4866-48666	64-120	2-1/2		
MDW-50	7200-72000	72-125	2-1/2		
型号	扭矩(N. m)	螺母范围(mm)	型号	扭矩(N. m)	螺母范围(mm)
MHW-2/S19	232-2328	19	MHW-14/S50	1852-18521	50
MHW-2/S22	232-2328	19-22	MHW-14/S55	1852-18521	50-55
MHW-2/S27	232-2328	19-27	MHW-14/S60	1852-18521	50-60
MHW-2/S30	232-2328	19-30	MHW-14/S65	1852-18521	50-65
MHW-2/S32	232-2328	19-32	MHW-14/S70	1852-18521	50-70
MHW-2/S34	232-2328	19-34	MHW-14/S75	1852-18521	50-75
MHW-2/S36	232-2328	19-36	MHW-14/S80	1852-18521	50-80
MHW-2/S41	232-2328	19-41	MHW-14/S85	1852-18521	50-85
MHW-2/S46	232-2328	19-46	MHW-14/S90	1852-18521	50-90
MHW-2/S50	232-2328	19-50	MHW-14/S95	1852-18521	50-95
MHW-2/S55	232-2328	19-55	MHW-14/S100	1852-18521	50-100
MHW-2/S60	241-2414	19-60	MHW-14/S105	1852-18521	50-105
MHW-4/S34	285-2510	34	MHW-14/S110	1852-18521	50-110
MHW-4/S36	285-2510	34-36	MHW-14/S115	1852-18521	50-115
MHW-4/S41	585-5021	34-41	MHW-14/S117	1852-18521	50-117
MHW-4/S46	585-5858	34-46	MHW-30/S85	4188-41882	85
MHW-4/S50	585-5858	34-50	MHW-30/S90	4188-41882	85-90
MHW-4/S55	585-5858	34-55	MHW-30/S95	4188-41882	85-95
MHW-4/S60	585-5858	34-60	MHW-30/S100	4188-41882	85-100
MHW-4/S65	585-5858	34-65	MHW-30/S105	4188-41882	85-105
MHW-4/S70	647-6474	34-70	MHW-30/S110	4188-41882	85-110
MHW-4/S75	647-6474	34-75	MHW-30/S115	4188-41882	85-115
MHW-4/S80	647-6474	34-80	MHW-30/S117	4188-41882	85-117
MHW-8/S41	1097-10941	41	MHW-30/S120	4188-41882	85-120
MHW-8/S46	1097-10941	41-46	MHW-30/S125	4188-41882	85-125
MHW-8/S50	1097-10941	41-50	MHW-30/S130	4188-41882	85-130
MHW-8/S55	1097-10941	41-55	MHW-30/S135	4188-41882	85-135
MHW-8/S60	1097-10941	41-60	MHW-30/S140	4188-41882	85-140
MHW-8/S65	1097-10941	41-65	MHW-30/S145	4188-41882	85-145
MHW-8/S70	1097-10941	41-70	MHW-30/S150	4188-41882	85-150
MHW-8/S75	1097-10941	41-75	MHW-30/S155	4188-41882	85-155
MHW-8/S80	1097-10941	41-80	MHW-30/S160	4459-44593	85-160
MHW-8/S85	1097-10941	41-85	MHW-30/S165	4459-44593	85-165
MHW-8/S90	1097-10941	41-90	MHW-30/S170	4459-44593	85-170
MHW-8/S95	1097-10941	41-95	MHW-30/S175	4459-44593	85-175
MHW-8/S100	1177-11774	100-105			
MHW-8/S105	1177-11774	100-105			