



BOLTING TOOLS

BOLTING

THEORY



Function of Bolts and Nuts

Threaded fasteners are used across industry to assemble products ranging from pipelines to heavy-duty earth movers and from cranes to bridges and many more. Their principle function is to create a clamping force across the joint which is able to sustain the operating conditions without loosening.

Correctly tightened bolts make use of their elastic properties, to work well they must behave like springs. When load is applied, the bolt stretches and tries to return to its original length. This creates compressive force across the joint members.

Behavior of Bolts and Nuts

Elasticity is defined in Hooke's Law of physics: The stress in a bolt is directly proportional to its strain. The stress-strain of a bolt has an elastic range and a plastic range. In the elastic range Hooke's Law is true.

All of the elongation applied within the elastic range is relieved when the load is removed. The amount of elongation increases when more load is applied. When a bolt is stressed beyond its proof load (maximum load under which a bolt will behave in an elastic manner), the elastic elongation changes to plastic deformation and the strain will no longer be proportional to the stress.

Tightening Methods

Principally there are two modes of tightening: "Uncontrolled" and "Controlled".

Uncontrolled tightening

Uses equipment and/or procedures that cannot be measured. Preload is applied to a bolt and nut assembly using a hammer and spanner or other types of impact tools.

Controlled tightening

Employs calibrated and measurable equipment, follows prescribed procedures and is carried out by trained personnel.

There are two main techniques:

1. Torque tightening

Achieves preload in a bolt and nut assembly via the nut in a controlled manner using a tool.

2. Bolt tensioning

Achieves preload in a bolt and nut assembly by stretching the bolt axially using a tool.

Tensioning requires longer bolts, and a seating area on the assembly around the nut.



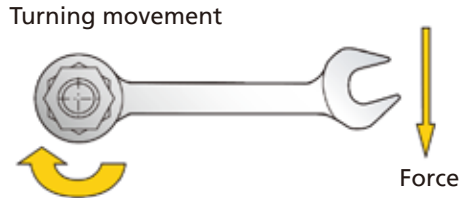
Manufacturer's rating of pressure and torque are maximum safe limits. Good practice encourages using only 80% of these ratings!





Torque Tightening

Torque tightening is the application of preload to a fastener by the turning of the fastener's nut. The force required to cause the nut to rotate is called the torque. It needs to overcome the friction in bolt and nut threads during tightening.



Torque Tightening and Preload

The amount of preload created when torqueing is largely dependant on the effects of friction.

Principally there are three different "torque components":

- Torque to stretch the bolt
- Torque to overcome the friction in bolt and nut threads
- Torque to overcome friction at the nut spot face (bearing contact surface)

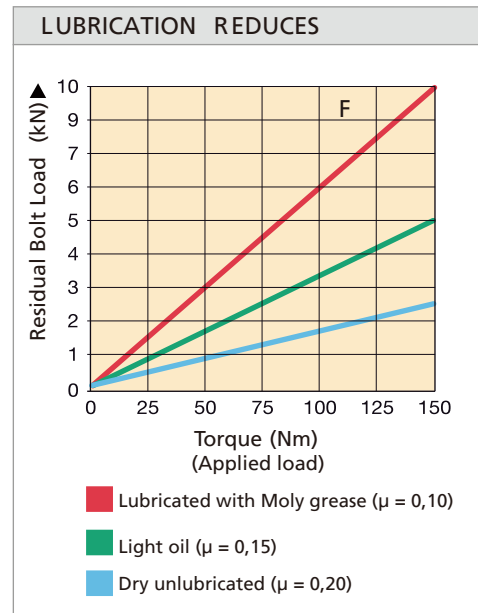
$$\text{Preload(Residual load)} = \text{Applied Torque} - \text{Frictional Losses}$$

Lubrication Reduces Friction

Lubrication reduces the friction during tightening, decreases bolt failure during installation and increases bolt service life. Variation in friction coefficients affect the amount of preload achieved at a specific torque. Higher friction results in less conversion of torque to preload. The value for the friction coefficient provided by the lubricant manufacturer must be known to accurately establish the required torque value.

Lubricant or anti-seizure compounds should be applied to both the nut bearing surface and the male threads.

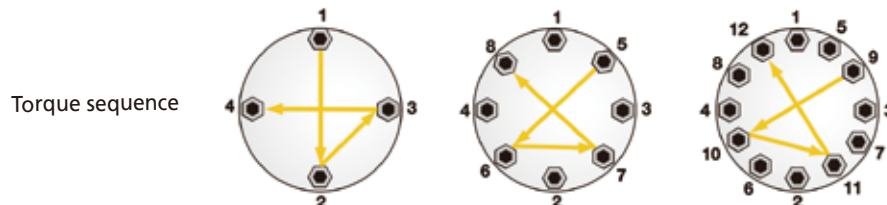
RICTION



Example of how a lubricant can reduce the effect of friction and convert more torque to bolt preload.

Torque procedure

When torqueing it is common to tighten only one bolt at a time, which can result in point loading and load scatter. To avoid this situation, torque is applied in stages following a prescribed pattern:



Breakout Torque

When loosening bolts a torque value higher than the tightening torque is normally required. This is mainly due to corrosion and deformations in the bolt and nut threads.

Breakout torque cannot be accurately calculated, however, depending on conditions it can take up to 2-1/2 times the input torque to breakout.



BOLTING TOOLS

TORQUE TIGHTENING



Square Drive Hydraulic Torque Wrench

Max working pressure : 700bar
 Aluminum-titanium alloy material , compact structure
 Conventional high power torque wrench

Characteristics:

- Working pressure 700 bar max.
- Designed to tighten and loosen nuts requiring high torque.
- 7 different models from 450 Nm up to 48600 Nm torque power.
- Constantly repeated accuracy $\pm 3\%$ across the full stroke.
- 360°×180° multi-positional swivel quick release couplings.
- Easy replaceable square and hexagon drive adapters.
- Body shroud engraved with torque pressure chart.
- Suitable for continuous operation at maximum pressure.
- High resistance with aluminium-titanium and light body.
- 360° adjustable reaction arm with safety lock feature.

The 360°×180 degree swivel is free to operation with no space limitation

The new locking coupler ensures the oil keep free access

Laser with the pressure-torque table enables convenient operation

Compact design with the raw material of advanced aluminum-titanium alloy, which intensifies the strength and toughness of the fuselage comprehensively

The reaction arm with 360 degree trimming style allows placing in any support point



Select the Right Torque

Choose the right torque wrench using the rule of thumb: Loosening torque equals about 250% of tightening torque.



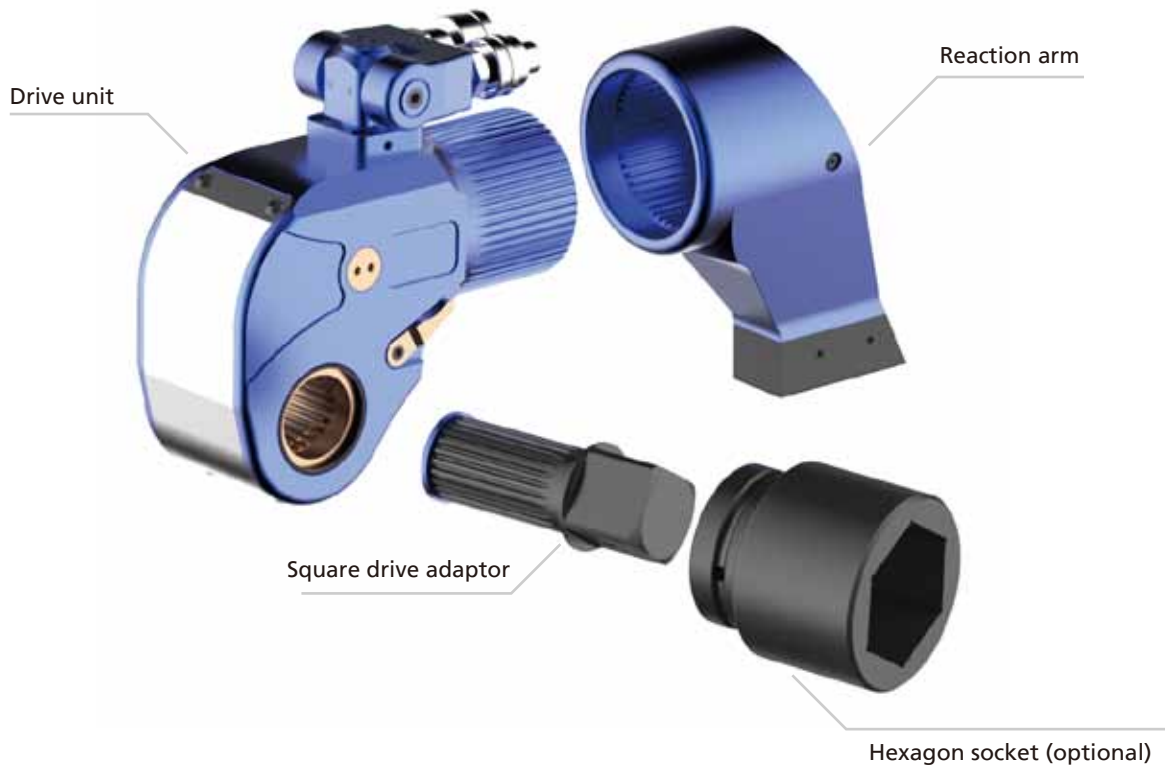
Torque Wrenches Hoses

Use Torque Wrench Pumps, Twin Hoses and Couplers to ensure the integrity of your hydraulic system.

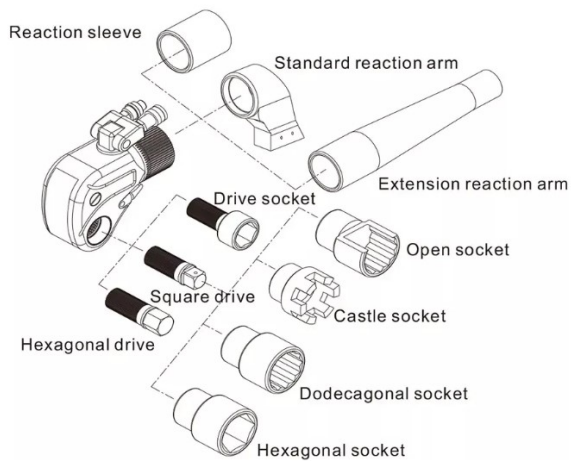




Assembly Diagram of Square Drive Hydraulic Torque Wrench

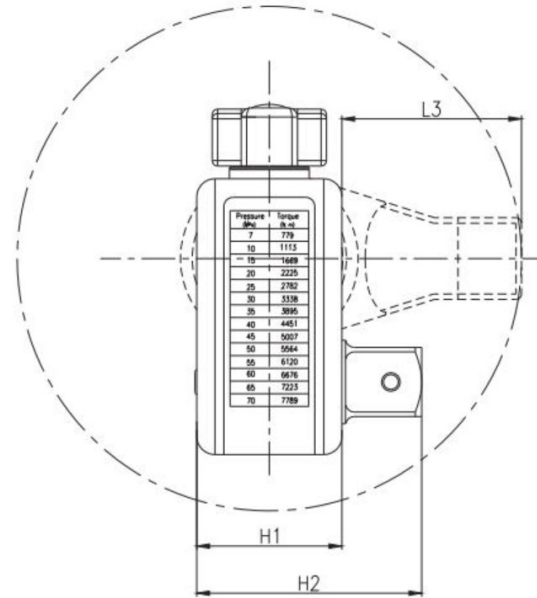
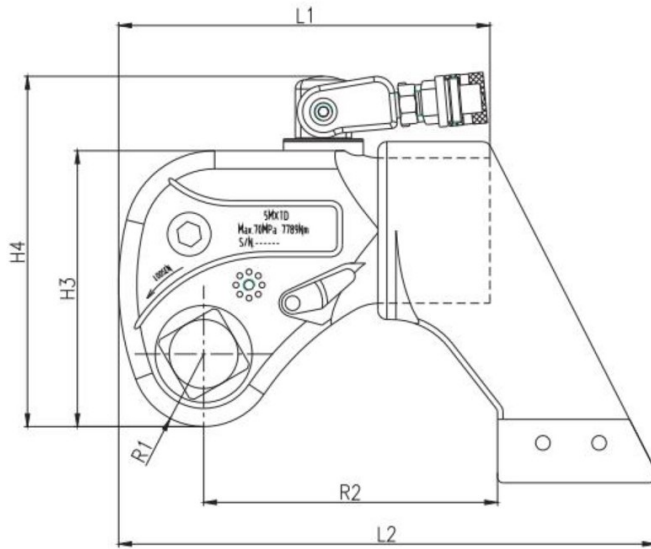


Dimensional Drawing



Optional CEJN self-locking quick coupler C701EL





Specification Table

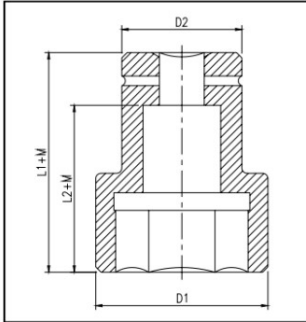
Model	1MX1TD	3MX1TD	5MX1TD	8MX1TD	10MX1TD	15MX1TD	20MX1TD	25MX1TD	35MX1TD	45MX1TD	50MX1TD	65MX1TD	75MX1TD	95MX1TD
Torque (Nm)	185	436	779	1072	1553	2050	2617	3493	4963	5912	7032	8451	10512	14085
	1852	4364	7789	10715	15528	20501	26171	34928	49627	59123	70315	84512	105120	140848
Weight (Kg)	2.7	4.8	8.8	12	14.5	19	25	37.5	44	63	89	66	81	220
L1 (mm)	138	168	207	226	250	281	304	331	390	412	418	471	507	520
L2 (mm)	194	244	296	326	366	402	442	483	558	570	596	660	729	758
L3 (mm)	63	79	99	110	120	132	146	158	177	188	195	204	240	246
H1 (mm)	50	70	80	90	100	112	120	138	150	163	166	182	190	210
H2 (mm)	73	99	124	133	146	165	183	202	219	229	236	263	291	307
H3 (mm)	96	125	152	170	186	208	226	250	282	288	300	348	392	415
H4 (mm)	140	165	193	211	227	249	267	291	323	332	366	407	447	473
R1 (mm)	26	34	40	46	50	56	60	66	77	80	82	95	108	115
R2 (mm)	107	132	162	178	199	218	240	260	298	303	325	345	380	400
Square Drive	3/4"	1"	1 1/2"	1 1/2"	1 1/2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	3"	3"	3 1/2"	4"



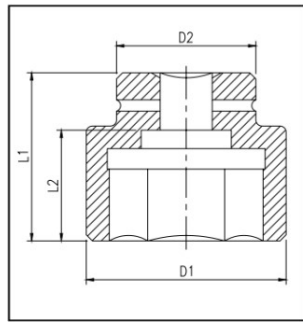
BOLTING TOOLS TORQUE TIGHTENING



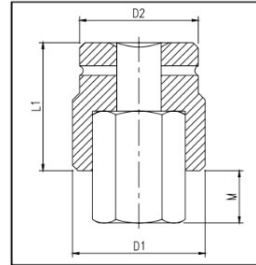
High Strength Sockets for square drive hydraulic torque wrenches



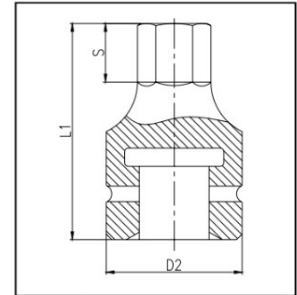
Double cap socket



Single cap socket



Outer hexagonal socket LFB



Outer hexagonal socket F

Specification Table

Bolt specification		3/4" (19×19)				1" (25.4×25.4)				1-1/2" (38×38)				2" (51×51)				2-1/2" (64×64)				
Diameter	A/F	D1	D2	L1	L2	D1	D2	L1	L2	D1	D2	L1	L2	D1	D2	L1	L2	D1	D2	L1	L2	
M16	24	42	42	50	27																	
M20	30	48	44	54	31																	
M22	34	52	44	54	31	52	52	58	30													
M24	36	54	44	57	34	55	55	61	33	74	74	76	34									
M27	41	60	44	60	37	63	55	64	36	74	74	79	37									
M30	46	66	44	68	45	70	58	68	40	74	74	82	40									
M33	50	71	44	70	47	75	64	71	43	81	81	85	43									
M36	55					81	66	76	48	87	87	90	48	100	100	97	48	115	115	118	54	
M39	60					87	66	79	51	87	87	93	51	103	103	100	51	115	115	118	54	
M42	65					92	68	82	54	97	87	96	54	105	105	104	54	120	120	118	54	
M45	70					97	75	85	57	102	87	99	57	112	112	107	57	120	120	121	57	
M48	75					102	75	91	63	112	87	105	63	119	119	113	63	128	128	127	63	
M52	80					108	75	95	67	118	95	109	67	123	123	117	67	130	130	131	67	
M56	85					116	78	99	71	123	95	114	72	127	127	122	72	132	132	136	72	
M60	90									128	98	118	76	132	115	126	76	139	139	140	76	
M64	95									133	98	124	82	138	115	132	82	145	145	145	82	
M68	100									139	102	128	86	138	115	136	86	153	142	150	86	
M72	105									145	102	132	90	148	115	140	90	160	142	154	90	
M76	110									150	105	136	94	154	120	146	96	166	142	160	96	
M80	115									155	110	150	105	159	120	150	100	173	142	164	100	
M85	120													165	125	155	105	180	142	169	105	
M90	130													177	125	160	110	190	160	174	110	
M95	135													182	130	165	115	195	160	179	115	
M100	145													194	135	175	125	210	160	189	125	
M105	150																	215	170	200	130	
M110	155																	223	170	210	135	
M115	165																	230	170	220	140	
M120	175																	240	170	235	155	





BOLTING TOOLS
**TORQUE
 TIGHTENING**



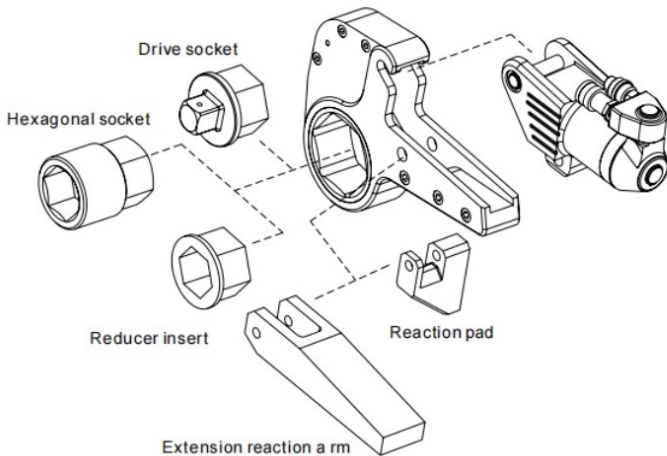
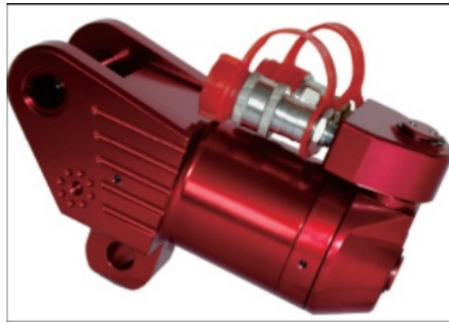
Low Profile Hydraulic Torque Wrench

360°x180° swivel joint allows free operation with no space limitation.

The design of ratchet pawl overcomes the possibility of ratchet reversing, which improves work efficiency and torque accuracy.

Integral lengthening design, longer arm and higher reliability.

Hollow design, the wrench works on nut directly, more accurate torque.

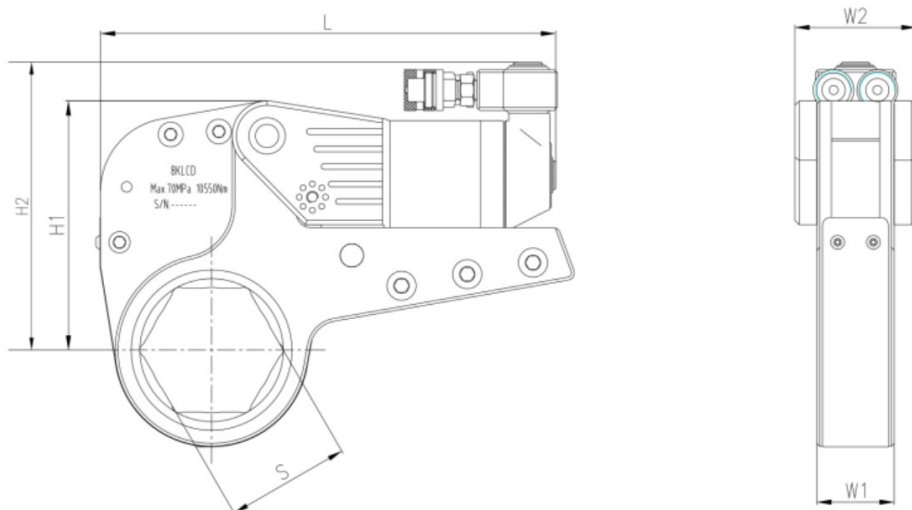


Optional CEJN self-locking quick coupler C701EL





Dimensional Drawing



Specification Table

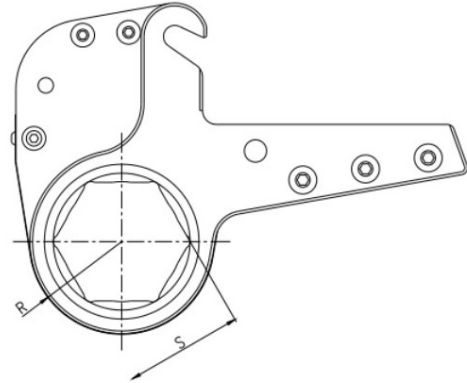
Model	3KLCD	4KLCD	8KLCD	14KLCD	18KLCD	20KLCD	30KLCD	40KLCD	45KLCD	65KLCD
Torque (Nm)	345	546	1055	1848	2481	2909	4231	5209	6285	9000
	3446	5458	10550	18484	24814	29089	42311	52088	62851	89996
A/F (mm)	36-60	46-80	70-105	80-115	85-120	90-130	95-145	120-145	130-155	135-180
Power head										
Weight (kg)	0.8	1.9	4.2	6.8	8.1	10.5	12.7	15.2	16.3	23
Cassette weight (kg)	1.7	3.6	7.6	12.2	19.3	22.3	32.3	47.5	58.7	75
L (mm)	218	266	324	382	404	427	479	479	486	514
H1 (mm)	118	139	171	205	229	240	268	285	311	336
H2 (mm)	156	167	198	231	255	265	289	302	352	375
W1 (mm)	32	42	53	64	68	70	85	98	105	117
W2 (mm)	50	66	83	99	105	110	132	148	160	177
R (mm)	31-46	42-62	58-78	67-87	73-93	77-102	83-128	101-130	-	-



BOLTING TOOLS TORQUE TIGHTENING



Hexagon Cassettes for Low Profile Hydraulic Torque Wrenches

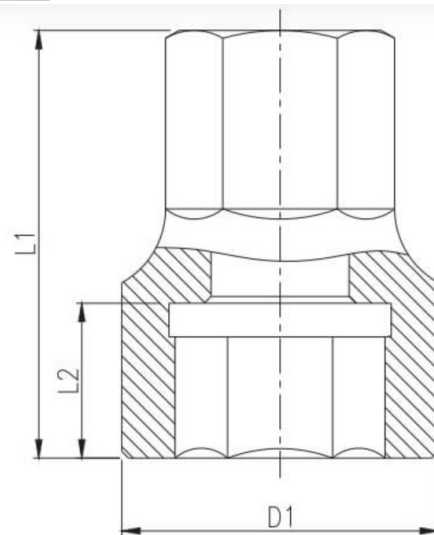
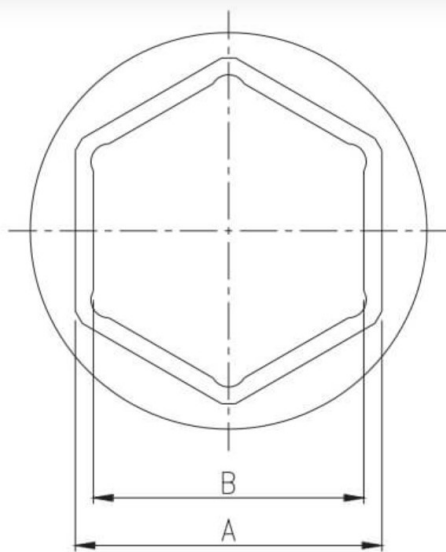


Wrench model	Cassette model	Bolt size	AF(mm)	Radius(mm)	Wrench model	Cassette model	Bolt size	AF(mm)	Radius(mm)	
3KLCD	3KLCD-36	M24	S36	31	18KLCD	18KLCD-85	M56	S85	73	
	3KLCD-41	M27	S41	34		18KLCD-90	M60	S90	75	
	3KLCD-46	M30	S46	37		18KLCD-95	M64	S95	77	
	3KLCD-50	M33	S50	40		18KLCD-100	M68	S100	77	
	3KLCD-55	M36	S55	43		18KLCD-105	M72	S105	83	
	3KLCD-60	M39	S60	46		18KLCD-110	M76	S110	83	
4KLCD	4KLCD-46	M30	S46	42		18KLCD-115	M80	S115	88	
	4KLCD-50	M33	S50	44		18KLCD-120	M85	S120	93	
	4KLCD-55	M36	S55	46		20KLCD	20KLCD-90	M60	S90	77
	4KLCD-60	M39	S60	50			20KLCD-95	M64	S95	80
	4KLCD-65	M42	S65	53			20KLCD-100	M68	S100	80
	4KLCD-70	M45	S70	56			20KLCD-105	M72	S105	85
	4KLCD-75	M48	S75	59	20KLCD-110		M76	S110	85	
	4KLCD-80	M52	S80	62	20KLCD-115		M80	S115	90	
8KLCD	8KLCD-70	M45	S70	58	20KLCD-120		M85	S120	95	
	8KLCD-75	M48	S75	60	20KLCD-130		M90	S130	102	
	8KLCD-80	M52	S80	63	30KLCD	30KLCD-95	M64	S95	83	
	8KLCD-85	M56	S85	65		30KLCD-100	M68	S100	83	
	8KLCD-90	M60	S90	68		30KLCD-105	M72	S105	89	
	8KLCD-95	M64	S95	71		30KLCD-110	M76	S110	89	
	8KLCD-100	M68	S100	75		30KLCD-115	M80	S115	94	
	8KLCD-105	M72	S105	78		30KLCD-120	M85	S120	98	
14KLCD	14KLCD-80	M52	S80	67		30KLCD-130	M90	S130	104	
	14KLCD-85	M56	S85	69		30KLCD-145	M100	S145	114	
	14KLCD-90	M60	S90	72	30KLCD-150	M105	S150	116		
	14KLCD-95	M64	S95	76	30KLCD-155	M110	S155	116		
	14KLCD-100	M68	S100	78	30KLCD-165	M115	S165	128		
	14KLCD-105	M72	S105	81						
	14KLCD-110	M76	S110	85						
	14KLCD-115	M80	S115	87						





High Strength Reducer Inserts



Specification Table

Wrench model	Working head type	A/F	Specification and type of variable sockets							
			Model	A/B	Model	A/B	Model	A/B	Model	A/B
3KLCD	3KLCD-36	S=36	3K3630	36/30	3K3627	36/27	3K3624	36/24		
	3KLCD-41	S=41	3K4136	41/36	3K4134	41/34	3K4130	41/30	3K4127	41/27
	3KLCD-46	S=46	3K4641	46/41	3K4636	46/36	3K4634	46/34	3K4630	46/30
	3KLCD-50	S=50	3K5046	50/46	3K5041	50/41	3K5036	50/36	3K5034	50/34
	3KLCD-55	S=55	3K5550	55/50	3K5546	55/46	3K5541	55/41	3K5536	55/36
	3KLCD-60	S=60	3K6055	60/55	3K6055	60/50	3K6055	60/46	3K6055	60/41
4KLCD	4KLCD-46	S=46	4K4641	46/41	4K4636	46/36	4K4634	46/34		
	4KLCD-50	S=50	4K5041	50/41	4K5036	50/36	4K5034	50/34		
	4KLCD-55	S=55	4K5546	55/46	4K5541	55/41	4K5536	55/36	4K5534	55/34
	4KLCD-60	S=60	4K6050	60/50	4K6046	60/46	4K6041	60/41	4K6036	60/36
	4KLCD-65	S=65	4K6555	65/55	4K6550	65/50	4K6546	65/46	4K6541	65/41
	4KLCD-70	S=70	4K7060	70/60	4K7055	70/55	4K7050	70/50	4K7046	70/46
	4KLCD-75	S=75	4K7565	75/65	4K7560	75/60	4K7555	75/55	4K7550	75/50
	4KLCD-80	S=80	4K8070	80/70	4K8065	80/65	4K8060	80/60	4K8055	80/55



8KLCD	8KLCD-70	S=70	8K7060	70/60	8K7055	70/55	8K7050	70/50		
	8KLCD-75	S=75	8K7565	75/65	8K7560	75/60	8K7555	75/55	8K7550	75/50
	8KLCD-80	S=80	8K8070	80/70	8K8065	80/65	8K8060	80/60	8K8055	80/55
	8KLCD-85	S=85	8K8575	85/75	8K8570	85/70	8K8565	85/65	8K8560	85/60
	8KLCD-90	S=90	8K9080	90/80	8K9075	90/75	8K9070	90/70	8K9065	90/65
	8KLCD-95	S=95	8K9585	95/85	8K9580	95/80	8K9575	95/75	8K9570	95/70
	8KLCD-100	S=100	8K10090	100/90	8K10085	100/85	8K10080	100/80	8K10075	100/75
	8KLCD-105	S=105	8K10595	105/95	8K10590	105/90	8K10585	105/85	8K10580	105/80
14KLCD	14KLCD-80	S=80	14K8070	80/70	14K8065	80/65	14K8060	80/60		
	14KLCD-85	S=85	14K8575	85/75	14K8570	85/70	14K8565	85/65	14K8560	85/60
	14KLCD-90	S=90	14K9080	90/80	14K9075	90/75	14K9070	90/70	14K9065	90/65
	14KLCD-95	S=95	14K9585	95/85	14K9580	95/80	14K9575	95/75	14K9570	95/70
	14KLCD-100	S=100	14K10090	100/90	14K10085	100/85	14K10080	100/80	14K10075	100/75
	14KLCD-105	S=105	14K10595	105/95	14K10590	105/90	14K10585	105/85	14K10580	105/80
	14KLCD-110	S=110	14K110100	110/100	14K11095	110/95	14K11090	110/90	14K11085	110/85
	14KLCD-115	S=115	14K115105	115/105	14K115100	115/100	14K11595	115/95	14K11590	115/90
18KLCD	18KLCD-85	S=85	18K8575	85/75	18K8570	85/70	18K8565	85/65		
	18KLCD-90	S=90	18K9080	90/80	18K9075	90/75	18K9070	90/70	18K9065	90/65
	18KLCD-95	S=95	18K9585	95/85	18K9580	95/80	18K9575	95/75	18K9570	95/70
	18KLCD-100	S=100	18K10090	100/90	18K10085	100/85	18K10080	100/80	18K10075	100/75
	18KLCD-105	S=105	18K10595	105/95	18K10590	105/90	18K10585	105/85	18K10580	105/80
	18KLCD-110	S=110	18K110100	110/100	18K11095	110/95	18K11090	110/90	18K11085	110/85
	18KLCD-115	S=115	18K115105	115/105	18K115100	115/100	18K11595	115/95	18K11590	115/90
	18KLCD-120	S=120	18K120110	120/110	18K120105	120/105	18K120100	120/100	18K12095	120/95
20KLCD	KLCD30-90	S=90	30K9080	90/80	30K9075	90/75	30K9070	90/70		
	KLCD30-95	S=95	30K9585	95/85	30K9580	95/80	30K9575	95/75	30K9570	95/70
	KLCD30-100	S=100	30K10090	100/90	30K10085	100/85	30K10080	100/80	30K10075	100/75
	KLCD30-105	S=105	30K10595	105/95	30K10590	105/90	30K10585	105/85	30K10580	105/80
	KLCD30-110	S=110	30K110100	110/100	30K11095	110/95	30K11090	110/90	30K11085	110/85
	KLCD30-115	S=115	30K115105	115/105	30K115100	115/100	30K11595	115/95	30K11590	115/90
	KLCD30-120	S=120	30K120110	120/110	30K120105	120/105	30K120100	120/100	30K120105	120/105
	KLCD30-130	S=130	30K130120	130/120	30K30115	130/115	30K130110	130/110	30K130105	130/105
30KLCD	KLCD40-95	S=95	40K9585	95/85	40K9580	95/80	40K9575	95/75		
	KLCD40-100	S=100	40K10090	100/90	40K10085	100/85	40K10080	100/80	40K10075	100/75
	KLCD40-105	S=105	40K10595	105/95	40K10590	105/90	40K10585	105/85	40K10580	105/80
	KLCD40-110	S=110	40K110100	110/100	40K11095	110/95	40K11090	110/90	40K11085	110/85
	KLCD40-115	S=115	40K115105	115/105	40K115100	115/100	40K11595	115/95	40K11590	115/90
	KLCD40-120	S=120	40K120110	120/110	40K120105	120/105	40K120100	120/100	40K12095	120/95
	KLCD40-130	S=130	40K130120	130/120	40K130115	130/115	40K130110	130/110	40K130105	130/105
	KLCD40-145	S=145	40K145135	145/135	40K145130	145/130	40K145120	145/120	40K145115	145/115
	KLCD40-150	S=150	40K150135	150/135	40K150130	150/130	40K150120	150/120	40K150115	150/115
KLCD40-155	S=155	40K155145	155/145	40K155135	155/135	40K155130	155/130	40K155120	155/120	



BOLTING TOOLS

TORQUE

TIGHTENING



The Choosing Of Hydraulic Torque Wrench

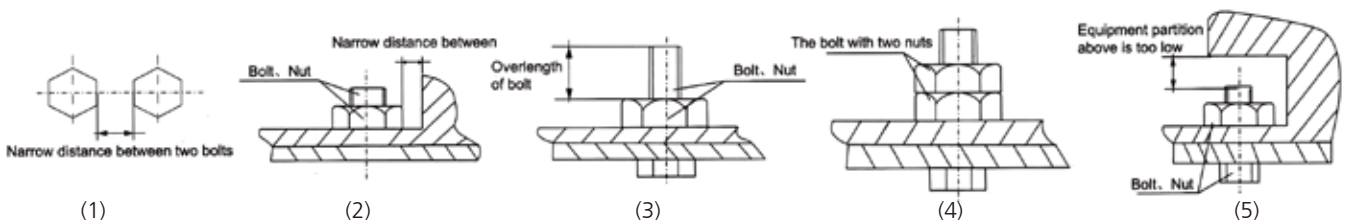
The bolt and nut pretightening force recommended chart

Strength Grade		4.8		6.8		8.8		10.9		12.9	
Minmum Breaking Strength		392Mpa		588Mpa		784Mpa		941 Mpa		1176Mpa	
Material		Q235(S541)		35(S35C)		35CrMo(SCM3)		42CMo(SCM4)		40GrNiMoA(SNCM)	
Bolt	Diameter	Torque		Torque		Torque		Torque		Torque	
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	39	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						

- This is Germany standard (DIN) above, the figure in the form is the max torque of the bolt, and the recommended torque is 80% of chart figure
- The recommended tightening torque equals the figure in the form*(80~90%). For instance :M52, strength grade is 8.8, the torque is $4704 * 90\% = 4233.6 \text{N.m}$
- It is recommended that loosening torque equals about 150% of tightening torque. For instance, the tightening torque is $4233.6 * (1.5 \sim 2) = 6350.4 \sim 8467.2 \text{N.m}$

The Space

Because of the space restriction, please notice the location. For example:



If you meet the above conditions, the square driven Torque Wrench cannot be used., you may use the Low Profile Wrench.





Electric Hydraulic Torque Wrench Pump

Characteristics:

- Compact 3-stage pump for operation with hydraulic wrenches.
- One pump drives two hydraulic wrenches (standard setup).
- Aluminum tank and oil level indicator.
- Oil cooler for continuous operation.
- Infinitely variable pressure adjustment between 40-800 bar.

Aluminum frame for easy carrying and protecting the elements

Oil cooler permits 24 hours' uninterrupted running

Solenoid valve

Oil level indicator

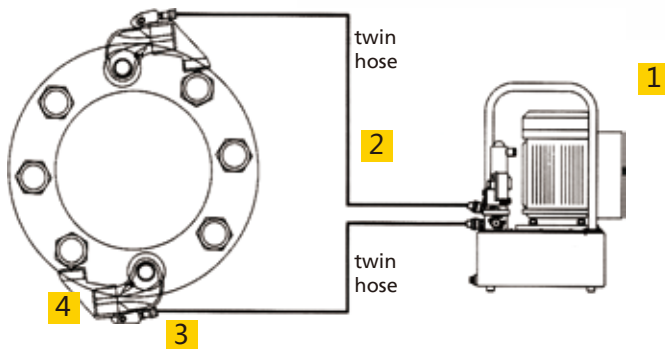
External pressure adjustor
Built-in pressure relief valve

Long hose enables remote control

Aluminum tank for reduced weight and added portability



Pump and Torque Wrench setup



6 meter twin hoses with couplers

1. Hydraulic torque wrench pump 2. Hydraulic twin hose 3. Quick couplings (male + female) 4. Hydraulic wrench

Benefits Compact and lightweight design.
Convenient external pressure adjustor
Proven high quality solenoid valve and plunger piston

Model	Working pressure	Power rating	Flow at low pressure stage	Flow at high pressure stage	Voltage	Frequency	Oil Capacity	Packing size (mm)	G.W
WPE-2T-1	700 bar	1.5KW	6L/min	1.1 L/min	220 V	50 hz	8 Liters	53x47x70 cm	63 kg
WPE-2T-2	700 bar	1.5KW	6L/min	1.1 L/min	220 V	50 hz	8 Liters	53x47x70 cm	67 kg



Electric Hydraulic Torque Wrench Pump, HHB-6LC

Characteristics:

- Compact 3-stage pump for operation with hydraulic wrenches.
- One pump drives two hydraulic wrenches (standard setup).
- Aluminum tank and oil level indicator.
- Oil cooler for continuous operation.
- Infinitely variable pressure adjustment between 40-800 bar.

Aluminum frame for easy carrying and protecting the elements

Oil cooler permits 24 hours' uninterrupted running

External pressure adjustor
Built-in pressure relief valve

Solenoid valve

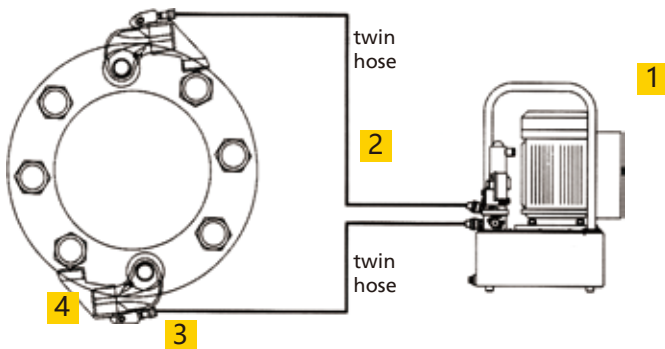
Oil level indicator

Long hose enables remote control

Aluminum tank for reduced weight and added portability



Pump and Torque Wrench setup



6 meter twin hoses with couplers

1. Hydraulic torque wrench pump 2. Hydraulic twin hose 3. Quick couplings (male + female) 4. Hydraulic wrench

Benefits Compact and lightweight design.
Convenient external pressure adjustor
Proven high quality solenoid valve and plunger piston

Model	Working pressure	Power rating	Flow at low pressure stage	Flow at high pressure stage	Voltage	Frequency	Oil Capacity	Packing size(mm)	G.W
HHB-6LC	700 bar	1.1KW	8L/min	0.8 L/min	220 V	50 hz	5 Liters	45×35×50 cm	25 kg



BOLTING TOOLS

TENSION

TIGHTENING



Tension Tightening

Tensioning is axially stretching the bolt to achieve preload. Inaccuracies created through friction are eliminated. Massive mechanical effort to create torque is replaced with simple hydraulic pressure. A uniform load can be applied by tensioning multiple studs simultaneously. Tensioning requires longer bolts, and a seating area on the assembly around the nut.

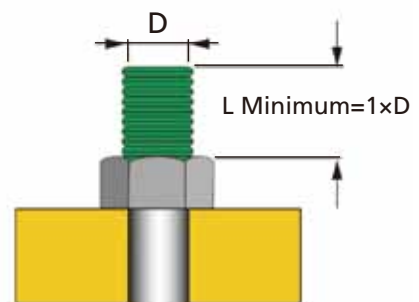
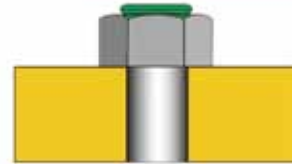
$$\text{Preload (residual load)} = \text{Applied Load} - \text{Load Losses}$$

What is Load Loss?

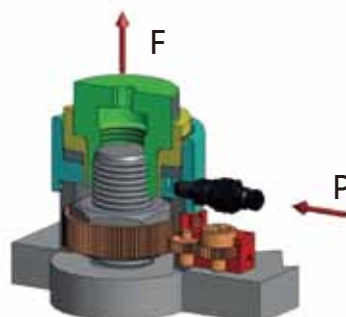
Load loss is a loss of bolt elongation depending on factors such as thread deflections, radial expansion of the nut, and embedding of the nut into the contact area of the joint. Load loss is accounted for in calculation and is added to the preload value to determine the initial Applied Load.

Tensioning Operation

Tensioning permits the simultaneous tightening of multiple bolts; the tools are connected in sequence via a high-pressure hose assembly to a single pump unit. This ensures each tool develops the exact same load and provides a uniform clamping force across the joint. This is especially important for pressure containing vessels requiring even gasket compression to affect a seal.



The change bushing of the bolt tensioning cylinder is threaded onto the projecting thread. The turning sleeve encloses the nut.



The desired pressure is generated by an external high pressure pump. This creates an elongation in the bolt. The pressure is calculated beforehand using the initial tensioning force of the bolt and the effective piston surface.



When the pressure has been achieved, the nut is threaded onto the support surface without friction by the turning sleeve. The bolt tensioning cylinder can be removed once the pressure is released.



Manufacturer's rating of pressure and torque are maximum safe limits. Good practice encourages using only 80% of these ratings!





Two-stage Bolt Tensioners



HHLS-TT36

Max working pressure: 1500bar
Specially designed for wind generator set
Two-stage cylinder design with smaller outside diameter

Characteristics:

- Two-stage cylinder design increases the tensioning length.
- Made of special high strength steel, rust-proof and corrosion resistant surface treatment.
- Smaller outside diameter permits use in narrow space .
- Spring return and overtravel protection suits frequent operation.
- Operated by ultra-high pressure hand pump or electric pump.



Model	Max working pressure (Bar)	Load capacity (KN)	Stroke (mm)	Effective area (cm ²)	Number of load cells	Thread size	A/F	Closed height (mm)	Outside diameter (mm)
HHLS-TT36	1500	728	8	49.5	2	M36×4	55	379	88
HHLS-TT42	1500	878	10	59.7	2	M42×4.5	65	273	98
HHLS-TT48	1500	1148	10	78.2	2	M48×5	75	299	111

P.S.: The above bolt tensioners were tailored to customer's needs for bolt quality 10.9. The specifications are for your reference only. Please contact TLP if you need Bolt Tensioner suits to your needs.

Ultra-high Pressure Hand Pumps



Max working pressure: 2000bar
Hydraulic bolt tensioner pumps

Characteristics:

- Lightweight and portable high-pressure hand pump.
- Two-speed operation displaces a larger volume of oil per stroke, reducing cycle times for many testing applications.
- Built-in pressure relief valve to prevent overpressurization.
- Includes a pressure gauge, coupler and 2-meter long high pressure hose.

Model	Working pressure(bar)		Oil displacement per stroke(cc)		Output connector	Pressure gauge connector	Oil capacity (cc)	G.W. (Kg)	Packing size (cm)
	1 st stage	2 nd stage	1 st stage	2 nd stage					
HHB-180	15	1800	32	1.3	1/4BSP	1/2BSP	2200	11	59×12×17
HHB-280	20	2800	32	1.3	1/4BSP	1/2BSP	2200	11	59×12×17



BOLTING TOOLS

TENSION

TIGHTENING



Electric Tensioner Pumps

Hydraulic bolt tensioner pumps
 Oil reservoir: 5L
 Hydraulic flow at rated pressure: 0.08-0.11L/Min
 Motor: 850W
 Rated pressure: 21750PSI-36250PSI (1500bar-2500bar)
 Weight without oil: 39.7lb (18Kg)

Characteristics:

- 2-stage piston pump without booster
- Servo motor, lower noisy level and free maintenance
- Internal safety valve, 5% over rated pressure release automatically
- Adjustable overflow valve, easy operation to control pressure
- Ball valve system, pressure holding in limited time
- Aluminum oil tank and frame, low weight
- Double outlet quick joints from CEJN



Please contact TLP to order ultra-high pressure hoses and couplers to work with the Electric Tensioner Pumps.

Model	Rated pressure		Flow at 0 bar (L/Min)	Flow at rated pressure(L/Min)	Power supply	Noisy lever (dB)	Oil available(L)	Weight without oil(Kg)
	Bar	PSI						
HHB-150P	1500	21750	3.0	0.11	220VAC	75	5.0	18
HHB-200P	2000	29000	2.6	0.10	220VAC	75	5.0	18
HHB-250P	2500	36250	2.2	0.08	220VAC	75	5.0	18

