



BOLTING TOOLS
**TORQUE
 TIGHTENING**

TLP

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.

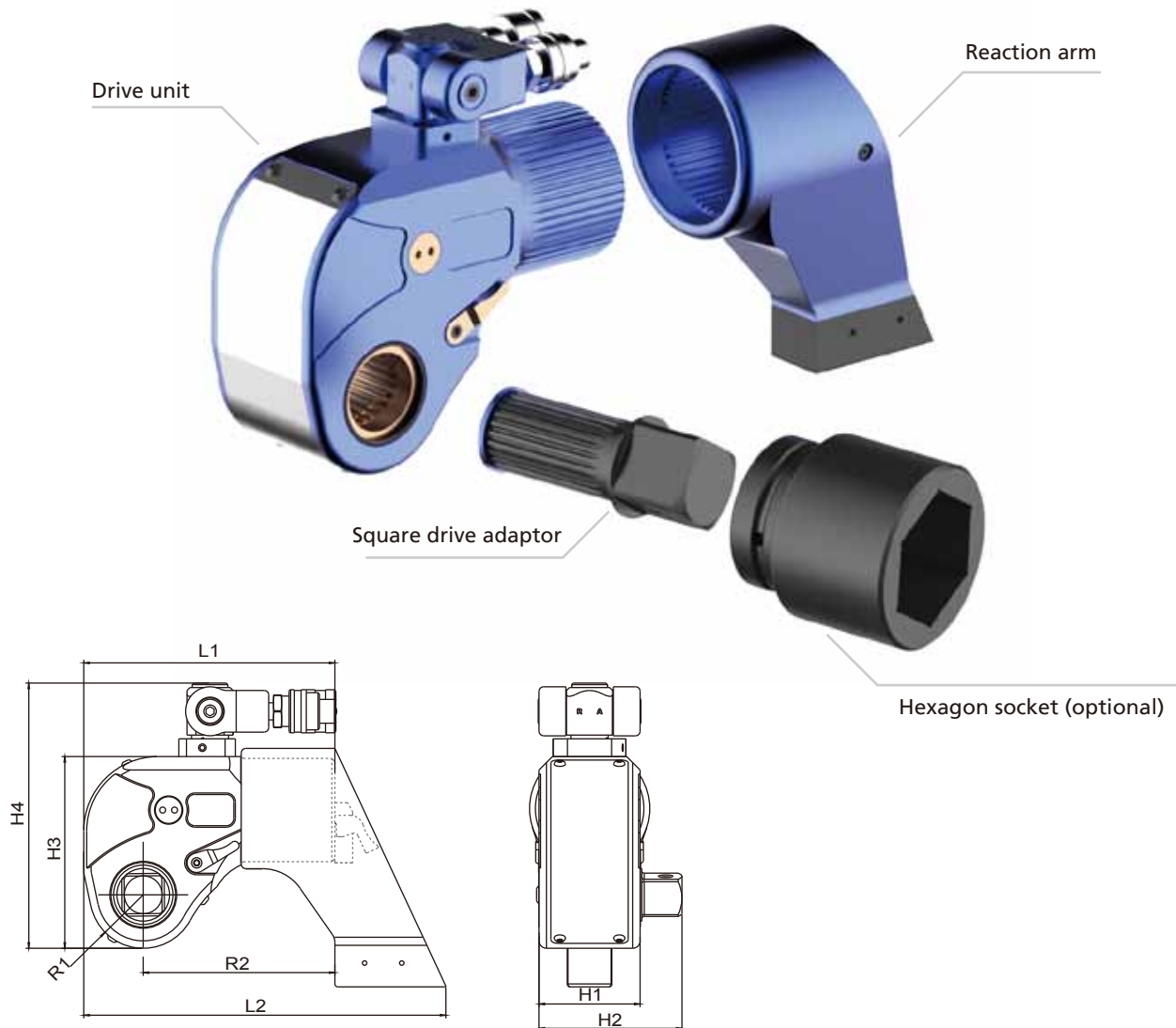


Torque Wrenches Hoses

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



Assembly Diagram of Square Drive Hydraulic Torque Wrench



How to order square drive hydraulic torque wrench:

Taking HHBS-3-M22 for example, HHBS-3 is the model of wrench, M22 is the bolt size.

Type	Torque(Nm)		Bolt Size		Weight (kg)	Dimensions(mm)								Square Drive
	Min	Max	Min	Max		L1	L2	H1	H2	H3	H4	R1	R2	
HHBS-3	451	4512	M22	M48	4	169	242	68	95	127	176.5	34	134	1"
HHBS-5	752	7528	M27	M56	7	202.5	283.5	80	123	149	198.5	39	152	1½"
HHBS-8	1078	10780	M30	M64	9.1	216	309	90	134	167	216.5	47	171	1½"
HHBS-10	1551	15516	M36	M72	13.1	237.5	340.5	100	142	182	231.5	51	174	1½"
HHBS-20	2666	26664	M42	M90	25	299.5	466.5	120	183	220	269.5	59	250.5	2½"
HHBS-25	3472	34725	M48	M100	31	313	461	137	200	247	296.5	66	250.5	2½"
HHBS-35	4866	48666	M64	M120	45	361.5	496.5	153	216	282	331.5	77	271	2½"

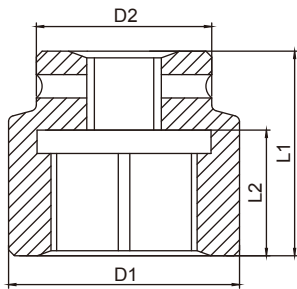
Note: The prescribed wrench models do not include sockets. Please see page 67-68 for the selection chart of sockets.



BOLTING TOOLS TORQUE TIGHTENING

TLP

High Strength Sockets for square drive hydraulic torque wrenches



Non-standard socket can be customized.

Standard sockets selection chart

Model	Bolt Size	Hexagon Nut A/F(mm)	Square drive	L1	L2	D1	D2
HHBS-3	M22	34	1"	59	32	58	58
	M24	36		62	32	59	59
	M27	41		65	38	67	54
	M30	46		65	38	74	54
	M33	50		70	43	79	60
	M36	55		80	52	84	60
	M39	60		85	57	89	60
	M42	65		85	58	98	70
HHBS-5	M48	70	1½"	90	62	104	70
	M27	41		85	44	74	74
	M30	46		85	44	74	74
	M33	50		90	45	79	79
	M36	55		90	45	84	84
	M39	60		100	45	94	94
	M42	65		100	45	98	80
	M45	70		105	50	104	80
	M48	75		110	50	118	85
M52	80	115	55	118	90		
HHBS-8	M56	85	1½"	125	60	128	90
	M30	46		85	44	74	74
	M33	50		90	45	79	79
	M36	55		90	45	84	84
	M39	60		100	45	94	94
	M42	65		100	45	98	80
	M45	70		105	50	104	80
	M48	75		110	50	118	85
	M52	80		115	55	118	90
	M56	85		125	60	128	90
	M60	90		125	60	139	90
M64	95	130	65	139	90		

- Carried over



BOLTING TOOLS TORQUE TIGHTENING



Brought forward -

Model	Bolt Size	Hexagon Nut A/F(mm)	Square drive	L1	L2	D1	D2
HHBS-10	M36	55	1½"	90	45	84	84
	M39	60		100	45	94	94
	M42	65		100	45	98	80
	M45	70		105	50	104	80
	M48	75		110	50	118	85
	M52	80		115	55	118	90
	M56	85		125	60	128	90
	M60	90		125	60	139	90
	M64	95		130	65	139	90
	M68	100		135	70	144	90
M72	105	135	70	149	90		
HHBS-20	M42	65	2½"	100	52	119	119
	M45	70		120	67	128	128
	M48	75		120	67	128	128
	M52	80		130	71	128	128
	M56	85		130	71	129	129
	M60	90		140	73	139	139
	M64	95		140	73	139	139
	M68	100		140	81	148	130
	M72	105		150	89	149	130
	M76	110		150	90	158	130
	M80	115		150	98	168	130
M85	120	150	98	178	130		
M90	130	170	98	188	130		
HHBS-25	M48	75	2½"	120	67	128	128
	M52	80		130	71	128	128
	M56	85		130	71	129	129
	M60	90		140	73	139	139
	M64	95		140	73	139	139
	M68	100		140	81	148	130
	M72	105		150	89	149	130
	M76	110		150	90	158	130
	M80	115		150	98	168	130
	M85	120		150	98	178	130
	M90	130		170	98	188	130
M95	135	170	114	198	130		
M100	145	170	122	210	152		
HHBS-35	M64	95	2½"	140	73	139	139
	M68	100		140	81	148	130
	M72	105		150	89	149	130
	M76	110		150	90	158	130
	M80	115		150	98	168	130
	M85	120		150	98	178	130
	M90	130		170	98	188	130
	M95	135		170	114	198	130
	M100	145		170	122	210	152
	M105	150		190	140	216	152
	M110	155		190	140	229	152
M115	165	190	140	241	152		



BOLTING TOOLS
**TORQUE
 TIGHTENING**

TLP

Low Profile Hydraulic Torque Wrench

Max working pressure 700bar
 Low profile design fit in restricted access areas
 Drive Unit made of aluminum-titanium alloy
 Replaceable hexagon cassette

Characteristics:

- Repeatability $\pm 3\%$.
- 700 bar maximum operation pressure.
- 4 different models from 230 Nm to 18,500 Nm.
- Designed for tighten and loosen high torque applications.
- 360°x180° uni swivel quick release couplings.
- Maximum torque power with minimum wall thickness.
- Various cassettes, adaptors and reducers are available.
- Durable structure, aluminium-titanium alloy and light body.
- Suitable for continuous operations at maximum pressure.
- Pressure relief valve prevents over pressure.

The reaction pawl officially overcome the possibility of ratchet reversing opposite, enhance the efficiency and precision of torque.

360*180 degree swivel or 360*360 degree swivel allow the wrench free to operation with no space limitation.



More accuracy and easier when the wrench direct operate on the nuts.

Compact design with longer arm fully advances the reliability.



Select the Right Torque

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

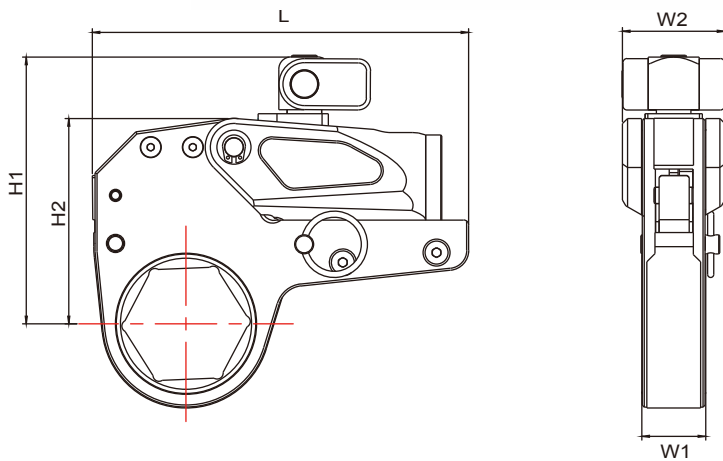
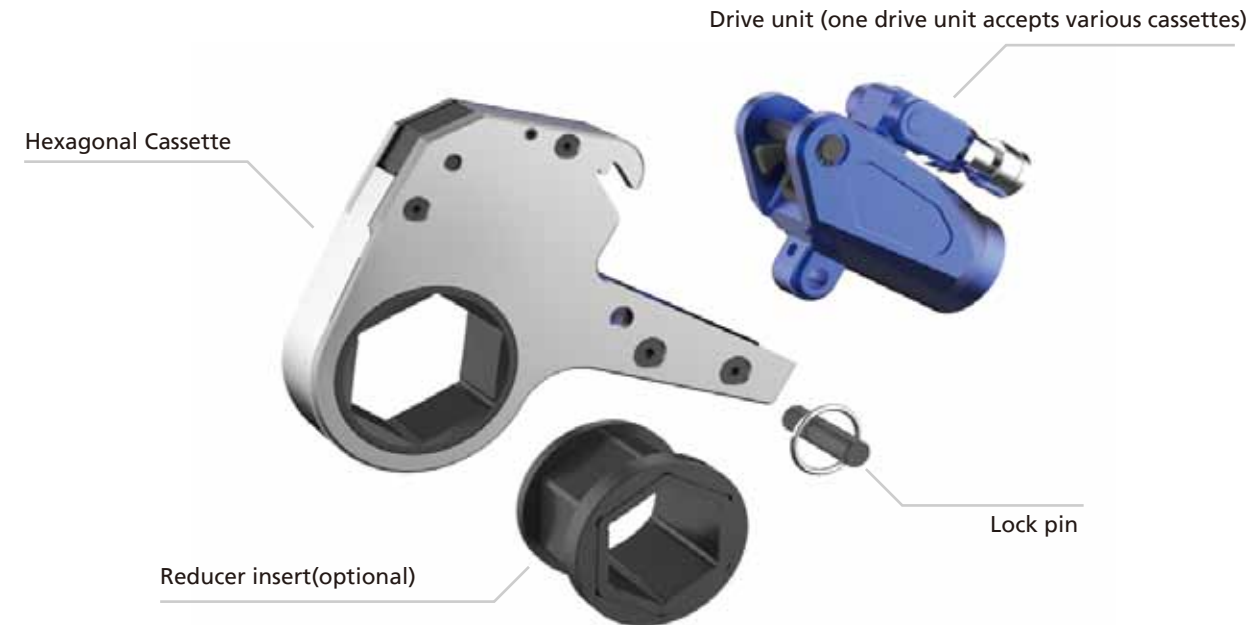


Torque Wrenches Hoses

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



Assembly Diagram of Low Profile Hydraulic Torque Wrench



How to order low profile hydraulic torque wrench:

Taking HHBS-K250 for example, K2 is the model of Drive Unit, K250 is the model of hexagon cassette for M50 bolt.

Model No. of drive unit	Torque(Nm)		Hexagon Nut A/F(mm)	Weight of drive unit(kg)	Weight of hexagon cassette(kg)	Dimensions(mm)				
	Min	Max				L	H1	H2	W1	W2
HHBS-K2	232	2328	19~55	1	1.6	196.4	125.9	102.3	32	51
	241	2414	60	1	1.7	196.4	128.5	105	32	51
HHBS-K4	585	5858	34~65	2	4.4	245	177	135.7	42	66
	647	6474	70~80	2	4.6	246	187	145.7	42	66
HHBS-K8	1094	10941	41~95	3.3	8	300	207	169	53	83
	1177	11774	100~105	3.3	8.4	301	216	178	53	83
HHBS-K14	1852	18521	50~117	5.5	11.6	361	239	204	64	99

Note: The models in above table are Drive Units. For selection chart of hexagon cassette see Page 71.



BOLTING TOOLS

TORQUE

TIGHTENING

TLP

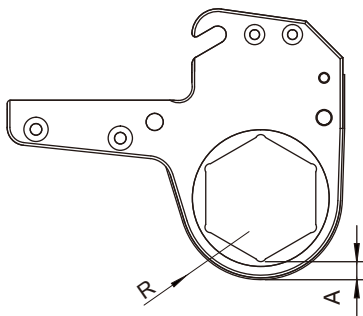
Hexagon Cassettes for Low Profile Hydraulic Torque Wrenches



Every model of low profile hydraulic torque wrench has a choice of cassettes that cover all nut sizes.

Before ordering a hexagon cassette, it is important to consider the nut-to-nut or nut-to-wall distance. Please make sure is big enough to accept the cassette.

The value of R and A in below diagram can help you to select the right cassette.



Reducer inserts



Reducer inserts are designed to work with hexagon cassettes. One cassette with various reducer inserts greatly increase the adaptability.

See page 72 for details of reducer inserts.

Hexagon cassette selection chart

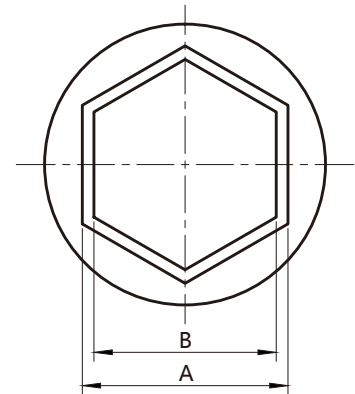
Hexagon cassette for HHBS-K2				Hexagon cassette for HHBS-K4				Hexagon cassette for HHBS-K8				Hexagon cassette for HHBS-K14			
Model No.	R	A	Max Torque	Model No.	R	A	Max Torque	Model No.	R	A	Max Torque	Model No.	R	A	Max Torque
K219	27	16	2328	K434	36	16	5858	K841	46	22	10941	K1450	60	31	18521
K222	27	14	2328	K436	36	15	5858	K846	46	19	10941	K1455	60	28	18521
K227	27	11	2328	K441	39	15	5858	K850	46	17	10941	K1460	60	25	18521
K230	29	12	2328	K446	42	15	5858	K855	50	18	10941	K1465	60	22	18521
K232	29	11	2328	K450	44	15	5858	K860	52	17	10941	K1470	60	19	18521
K234	31	11	2328	K455	46	14	5858	K865	55	17	10941	K1475	63	19	18521
K236	31	10	2328	K460	50	15	5858	K870	58	17	10941	K1480	66	19	18521
K241	34	10	2328	K465	53	15	5858	K875	60	17	10941	K1485	69	19	18521
K246	37	10	2328	K470	56	15	6474	K880	63	16	10941	K1490	72	20	18521
K250	40	11	2328	K475	59	15	6474	K885	66	16	10941	K1495	74	19	18521
K255	43	11	2328	K480	61	15	6474	K890	69	7	10941	K14100	77	19	18521
K260	46	11	2414					K895	71	16	10941	K14105	80	19	18521
								K8100	75	17	11774	K14110	83	19	18521
								K8105	78	17	11774	K14115	87	20	18521
												K14117	87	19	18521



High Strength Reducer Inserts



Non-standard reducer insert can be customized



Standard reducer inserts selection chart

Model No. of drive unit	Model No. of Hexagon Cassette	Edge (S)	Reducer Inserts						Lock Ring Model No.
			Model No.	A/B (mm)	Model No.	A/B (mm)	Model No.	A/B (mm)	
HHBS-K2	K250	50	K25041	50/41	K25036	50/36	K25032	50/32	SH-50
	K246	46	K24636	46/36	K24632	46/32	K24630	46/30	SH-46
	K241	41	K24132	41/32	K24130	41/30	K24127	41/27	SH-41
	K236	36	K23630	36/30	K23627	36/27			SH-36
	K232	32	K23227	32/27					SH-32
HHBS-K4	K465	65	K46555	65/55	K46550	65/50	K46546	65/46	SH-56
	K460	60	K46050	60/50	K46046	60/46	K46041	60/41	SH-60
	K455	55	K45546	55/46	K45541	55/41	K45536	55/36	SH-55
	K450	50	K45041	50/41	K45036	50/36	K45032	50/32	SH-50
	K446	46	K44636	46/36	K44632	46/32	K44630	46/30	SH-46
	K441	41	K44132	41/32	K44130	41/30	K44127	41/27	SH-41
	K436	36	K43630	36/30	K43627	36/27			SH-36
HHBS-K8	K890	90	K89080	90/80	K89075	90/75	K89070	90/70	SH-90
	K885	85	K88575	85/75	K88570	85/70	K88565	85/65	SH-85
	K880	80	K88070	80/70	K88065	80/65	K88060	80/60	SH-80
	K875	75	K87565	75/65	K87560	75/60	K87555	75/55	SH-75
	K870	70	K87060	70/60	K87055	70/55	K87050	70/50	SH-70
	K865	65	K86555	65/55	K86550	65/50	K86545	65/45	SH-65
	K860	60	K86050	60/50	K86046	60/46			SH-60
	K855	55	K85546	55/46	K85541	55/41			SH-55
HHBS-K14	K14115	115	K14115105	115/105	K14115100	115/100	K1411595	115/95	SH-115
	K14110	110	K14110100	110/100	K1411095	110/95	K1411090	110/90	SH-110
	K14105	105	K1410595	105/95	K1410590	105/90	K1410585	105/85	SH-105
	K14100	100	K1410090	100/90	K1410085	100/85	K1410080	100/80	SH-100
	K1495	95	K149585	95/85	K149580	95/80	K149575	95/75	SH-95
	K1490	90	K149080	90/80	K149075	90/75	K149070	90/70	SH-90
	K1485	85	K148575	85/75	K148570	85/70	K148565	85/65	SH-85
	K1480	80	K148070	80/70	K148065	80/65			SH-80
	K1475	75	K147565	75/65					SH-75



BOLTING TOOLS TORQUE TIGHTENING

TLP

The Choosing Of Hydraulic Torque Wrench

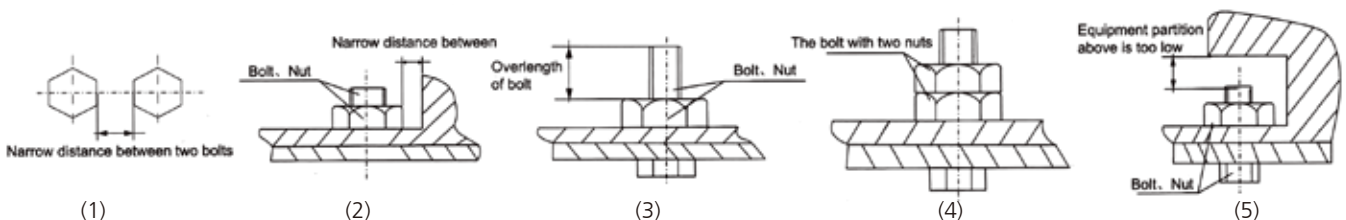
The bolt and nut pretightening force recommended chart

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.



BOLTING TOOLS TORQUE TIGHTENING



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

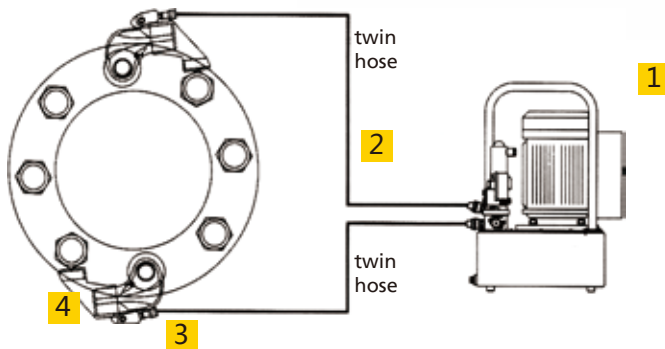
External pressure adjustor
Built-in pressure relief valve

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
HHB-6L	700 bar	1.3KW	8L/min	1.1 L/min	220 V	50 hz	6 Liters	40×55×50 cm	30 kg



BOLTING TOOLS

TENSION

TIGHTENING

TLP

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.

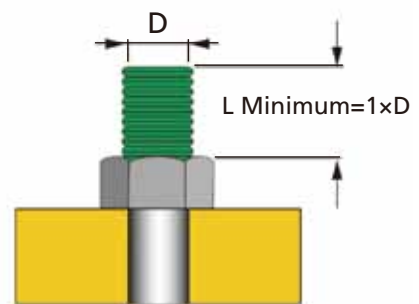
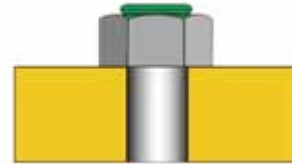
$$\text{Preload (residual load)} = \text{Applied Load} - \text{Load Losses}$$

What is Load Loss?

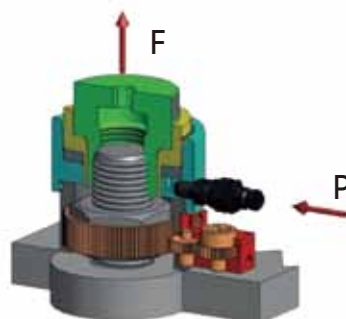
Load loss is a loss of bolt elongation depending on factors such as thread deflections, radial expansion of the nut, and embedding of the nut into the contact area of the joint. Load loss is accounted for in calculation and is added to the preload value to determine the initial Applied Load.

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!



BOLTING TOOLS TENSION TIGHTENING



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

TLP

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