MAC MASTER®

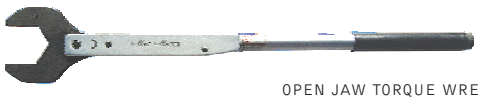
TORQUE WRENCHES

the power of technology

HEAVY DUTY INDUSTRIAL TOOLS

SPECIAL TORQUE WRENCH

RATCHET TYPE TORQUE WRENCH



OPEN JAW TORQUE WRENCH

RING TYPE TORQUE WRENCH

STANDARD TORQUE WRENCH

SPECIAL TORQUE WRENCH

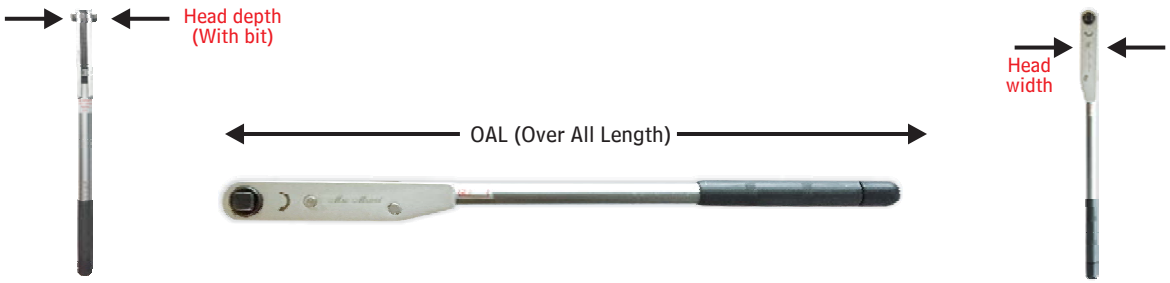
TORQUE SCREW DRIVER

MAC MASTER is the torque equipment manufacturer to be able to offer tool calibration services to the original factory standard. The company has grown from strength to strength and design, development and production of torque tightening equipment. MAC MASTER remain every bit as passionate about providing customers with high quality, value for money products and services.

MAC MASTER quality assurance system has been certified to internationally recognised standards. National Award Winner of Small Scale Industries by Govt. of India was awarded in the 2005. MAC MASTER is an ISO 9001 : 2000 Co. Most importantly, through continuous improvement, MAC MASTER is dedicated to providing products and services that we are proud of.

All Mac Master Torque Wrenches are Calibrated on Electronic Torque Tester to an accuracy of ± 5% as laid down in IS 7145-1973. The Torque tester Calibrated by force providing instrument and the Force Providing Instrument is Certified by 'NABL' . The Mac Master Torque Wrenches are warranted against any manufacturing defects.

The Production Type Torque Wrenches, Open Jaw Torque Wrenches & Special Torque Wrenches can also be supplied against specfic order.



SPECIFICATION OF STANDARD CLICK TYPE TORQUE WRENCH

Model No.	TORQUE RANGE						Square Drive	OAL at Min Capacity	Head Width	Head Depth (with Bit)	Weight Appx. (Kg)
	lbt. ft.		N.m		Kgf. m						
	Range	LC	Range	LC	Range	LC	Inch	mm	mm	mm	
TW 10	2-10	.5	3-14	.5	.3-1.4	.1	3/8	315	25	35	0.5
TW 25	5-25	1	5-35	2	.5-3.5	.2	3/8	340	25	35	0.6
TW 50	8-50	2	12-68	2	1-7	.2	1/2	460	30	42	1.0
TW 100	20-100	2	25-135	5	3-14	.5	1/2	560	32	49	1.60
TW 160	40-160	5	50-220	5	5-23	1	1/2	580	32	52	2.20
TW 250	50-250	5	70-340	10	7-35	1	1/2	785	32	52	2.80
TW 400	100-400	10	135-540	15	14-56	1	3/4	1010	48	62	6.20
TW 500	100-500	10	135-675	15	14-70	2	3/4	1060	48	62	6.20
TW 600	145-605	10	200-815	15	20-84	2	3/4	1060	48	62	6.20
TW 750	350-750	20	475-1015	20	49-105	2	3/4	1250	56	72	11.3
TW 750S	350-750	20	475-1015	20	49-105	2	1	1250	61	82	12.6
TW 1000	400-1000	20	540-1380	40	55-140	5	1	1300	70	83	13.6
TW 1400	750-1400	25	1000-1900	50	105-195	5	1	1420	70	83	15.0
TW 2000	1000-2000	50	1350-2700	50	135-275	5	1	1510	70	83	20.0
TW 2500	1500-2500	50	2030-3430	50	207-347	5	1	1620	70	83	21.5

LC = Least Count

SPECIFICATION OF RATCHET TYPE TORQUE WRENCH

Model No.	TORQUE RANGE						Square Drive	OAL at Min Capacity	Head Width	Head Depth (with Bit)	Weight Appx.
	lbt. ft.		Nm		Kgf. m						
	Range	LC	Range	LC	Range	LC	Inch	mm	mm	mm	(Kg)
TW 10R	2-10	.5	3-14	.5	.3-1.4	.1	3/8	345	36	35	0.65
TW 25R	5-25	1	5-35	2	.5-3.5	.2	3/8	375	36	35	0.70
TW 50R	8-50	2	12-68	2	1-7	.2	1/2	495	42	42	1.10
TW 100R	20-100	2	25-135	5	3-14	.5	1/2	590	48	49	1.90
TW 160R	40-160	5	50-220	5	5-23	1	1/2	600	48	52	2.50
TW 250R	50-250	5	70-340	10	7-35	1	1/2	810	48	52	3.00
TW 400R	100-400	10	135-540	15	14-56	1	3/4	1080	72	62	7.30
TW 500R	100-500	10	135-675	15	14-70	2	3/4	1130	72	62	7.30
TW 600R	145-605	10	200-815	15	20-84	2	3/4	1130	72	62	7.30
TW 750R	350-750	20	475-1015	20	49-105	2	3/4	1320	79	72	13.7
TW 1000R	400-1000	20	540-1380	40	55-140	5	1	1400	100	83	17.6
TW 1400R	750-1400	25	1000-1900	50	105-195	5	1	1520	100	83	20.0
TW 2000R	1000-2000	50	1350-2700	50	135-275	5	1	1615	100	83	22.1
TW 2500R	1500-2500	50	2030-3430	50	207-347	5	1	1720	100	83	25.0

LC = Least Count

Note : We at Macmaster Tools also manufacturer Torque Wrench (Both in standard & Ratchet type) in fix type upto capacity 5000 Nm.

TORQUE SCREW DRIVER

Part No.	Lbf. in	Kgs. cm.	Nm	Sq. Drive	OAL	Wt. (kg)
MSD 15	1-15	1-15	0.1-1.5	1/4	156	0.25
MSD 50	10-50	10-50	1-5	1/4	156	0.45

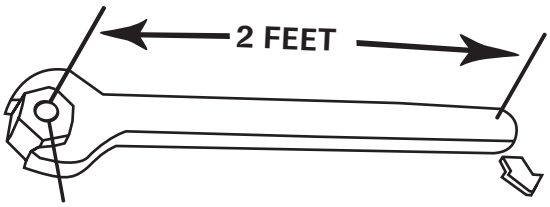
TORQUE FACTS

WHAT IS TORQUE?

According to Webster:

- A twisting or wrenching effect, or moment, exerted by a force acting at a distance on a body, equal to the force multiplied by the perpendicular distance between the line of action of the force, and the center of rotation at which it is exerted.
- A force, which tends to produce rotation. The measurement of torque is based on the fundamental law of the lever.

Basic Torque Formula
L (length) x F (force) = T (torque)



400 ft. lbs. of Torque

200 lbs. Force

Example: A two foot lever at a right angle to the fastener with 200 pounds at the end will produce 400 foot/pounds of torque.

Torque Formula: L x F = T

What are we trying to achieve with a torque wrench?

Answer: Proper Clamping Force

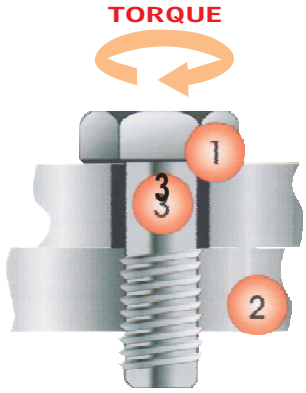
TORQUE AND CLAMPING FORCE

Controlling the torque applied in tightening threaded fasteners is the most commonly used method for the application of clamping force. There are many factors which may affect the relationship between torque and clamping force of threaded fasteners. Some of these are: the type of lubricant used on the threads, the material from which the bolt and nut are made, the type of washers used, the class and finish of threads and various other factors. It is not possible to establish a definite relationship between torque and clamping force which will be applicable for all conditions.

- Torque is expressed in commonly used units of measurement such as:
  - in. lbs. = inch pounds
  - in ozs. = Inch ounces
  - ft. lbs. = foot pounds
  - Nm = Newton meter
  - cNm = Centi Newton Meter

TORQUE VERSUS CLAMPING FORCE

Only a small part of the torque applied to a fastener contributes to clamping force. The remaining, as much as 90% of the total applied torque, is used to overcome friction under the fastener head (or between nut and washer) and friction in thread engagement.



1. **Head Friction**
2. **Thread Friction**
3. **Clamping Force**

TORQUE

Head Friction: 45% - 55%

Thread Friction: 35% - 45%

Clamping Force: 10%

COMMON TORQUE ABBREVIATIONS

Foot Pounds - ft. lbs.

Inch Pounds - in. lbs.

Inch Ounces - in.ozs.

Newton Meter - Nm

Centi-Newton Meter - cNm

Meter Kilogram - Mkg

EASY-TO-USE TORQUE CONVERSION TABLE

To Convert From	To	Multiply by
in. oz.	in. lb.	0.0625
in. lb.	in. oz.	16
in. lb.	ft. lb.	0.08333
in. lb.	cmkg	1.1519
in. lb.	mkg	0.011519
in. lb.	Nm	0.113
in. lb.	dNm	1.13
ft. lb.	in. lb.	12
ft. lb.	mkg	0.1382
ft. lb.	Nm	1.356
dNm	in.lb	0.885

To Convert From	To	Multiply by
dNm	Nm	0.10
Nm	dNm	10
Nm	cmkg	10.2
Nm	mkg	0.102
Nm	in.lb	8.85
Nm	ft. lb.	0.7376
cmkg	in. lb.	0.8681
cmkg	Nm	0.09807
mkg	in. lb.	86.81
mkg	ft. lb.	7.236
mkg	Nm	9.807

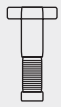
Torque Specifications

Maximum recommended tightening Torque

Metric Sizes

Bolt Size	A/F	Tightening Force = P(N) Torque = M_A (Nm)					
		8.8		10.9		12.9	
M	mm	P	M_A	P	M_A	P	M_A
		N	Nm	N	Nm	N	Nm
M 2	4	863	0.373	1216	0.520	1461	0.628
M 2.3	4.5	1245	0.598	1755	0.843	2099	1.010
M 2.6	5	1598	0.863	2246	1.206	2697	1.451
M 3	5.5	2206	1.344	3109	1.883	3727	2.256
M 3.5	6	2962	2.060	4168	2.893	5001	3.481
M 4	7	3825	3.040	5374	4.315	6453	5.148
M 5	8-9	6257	6.031	8806	8.483	10591	10.200
M 6	10	8836	10.300	12405	14.710	14906	17.625
M 7	11-12	12945	17.162	18191	24.517	21771	28.439
M 8	13-14	16230	25.497	22751	35.304	27360	42.168
M 10	15-17	25791	50.014	36284	70.608	43541	85.317
M 12	19-21	37657	87.279	52956	122.60	63547	147.10
M 14	22-23	51681	138.30	72667	194.20	87279	235.40
M 16	24-26	71196	210.80	100027	299.10	120131	357.90
M 18	27	86494	289.30	121602	411.90	146118	490.30
M 20	30	111305	411.90	156415	578.60	187796	696.30
M 22	32	139254	559.00	195642	784.50	234378	941.40
M 24	36	160338	711.00	225552	1000	270662	1196
M 27	41	210842	1049	296159	1481	355980	1775
M 30	46	255952	1422	359902	2010	432471	2403
M 33	50	319695	1932	449142	2716	539363	3266
M 36	55	374612	2481	527595	3491	632526	4197
M 39	60	451104	3226	633506	4531	760992	5443
M 42	65	515827	3991	725688	5609	870826	6727
M 45	70	604087	4992	850232	7012	1019886	8414
M 48	75	679597	6021	956144	8473	1147372	10150
M 52	80	815909	7747	1147372	10885	1377827	13092
M 56	85	940453	9650	1323891	13582	1588669	16279
M 60	90	1098339	11964	1544540	16867	1853447	20202
M 64	95	1245438	14416	1750478	20300	2098612	24320
M 68	100	1425787	17615	2005013	24771	2406016	29725
M 72	105	1620036	21081	2278175	29645	2733810	35575
M 76	110	1826672	24973	2568758	35118	3082510	42141
M 80	115	2045697	29314	2876762	41222	3452115	49467
M 90	130	2647453	42525	3722982	59801	4467578	71761
M 100	145	3326624	59200	4678066	83250	5613679	99900

Imperial Sizes

Bolt Size	A/F	Tightening Force = P(N) Torque = M_A (Nm)					
		P		S		T	
M	Inches	P	M_A	P	M_A	P	M_A
		N	Nm	N	Nm	N	Nm
1/4"	7/16"	4379	5.43	8320	10.3	8980	11.1
5/16"	1/2"	7344	11.2	13954	21.3	15061	23.0
3/8"	9/16"	10951	19.9	20807	37.7	22458	40.9
7/16"	5/8"	15065	31.9	28623	60.7	30894	65.5
1/2"	3/4"	20244	48.8	38463	92.7	41516	100
9/16"	7/8"	26075	70.4	49542	134	53474	144
5/8"	15/16"	32452	97.4	61658	185	66552	200
3/4"	1.1/8"	49781	178	94584	338	102091	364
7/8"	1.5/16"	67157	279	127599	530	137725	572
1"	1.1/2"	88221	418	167620	795	180923	858
1.1/8"	1.11/16"	111007	593	210913	1126	227652	1216
1.1/4"	1.7/8"	142135	837	270091	1591	291527	1717
1.3/8"	2.1/16"	168641	1096	320417	2083	345847	2248
1.1/2"	2.1/4"	206578	1456	392498	2767	423648	2987
UNF							
1/4"	7./16"	5232	6.28	9941	11.9	10730	12.9
5/16"	1/2"	8410	12.5	15979	23.8	17247	25.7
3/8"	9/16"	12911	22.7	24531	43.2	26478	46.6
7/16"	5/8"	17416	35.9	33091	68.2	35717	73.6
1/2"	3/4"	23685	55.4	45002	105	48574	114
9/16"	7/8"	30075	79.0	57143	150	61678	162
5/8"	15/16"	38156	111	72496	210	78250	227
3/4"	1.1/8"	56078	195	106549	370	115005	399
7/8"	1.5/16"	76297	309	144965	587	156470	634
1"	1.1/2"	99200	459	188480	873	203439	942
1.1/8"	1.11/16"	128738	667	244602	1267	264015	1368
1.1/4"	1.7/8"	161358	925	306580	1757	330911	1896
1.3/8"	2.1/16"	199331	1252	378728	2378	408786	2567
1.1/2"	2.1/4"	240377	1642	456717	3119	492965	3367

Newton - Meter Nm to Foot-Pounds Lbf. ft. (1Nm = 0.738 Ibf. ft.)
Kilogram - Force Meter to Newton - Meter (1 Kgm = 9.80 Nm)

MAC MASTER INDUSTRIAL HAND TOOLS

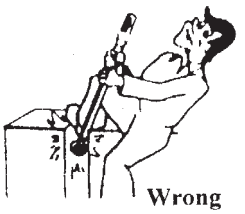
Mac Master industrial tools are designed to meet the requirements of Heavy Industries, Thermal Power Plants, Oil Industries, Petroleum, Automobiles, Railways, General Engineering Industries.

Mac Master offers a wide selection of tools and equipment to fill the majority of your tool requirements. In addition to our standard product line, Mac Master will also design and manufacture special tools to help solve your special tool problems.

HOW TO USE MAC MASTER TORQUE WRENCHES

Mac Master Torque wrenches are used in various operations where proper torquing of nuts, bolts and other fasteners is critical. Such operations include assembly and inspection of gear trains and bearings, setting of clutches and brakes, maintenance, repair, overhaul and experimental work.

Mr. John should try with a crow Bar-Not a torque wrench.



Always work with clean threads that are free of corrosion. It is important to follow the product manufacturer's instructions for specific torque loadings - particularly whether recommendations are for dry, oiled or plated threads, and other instructions which apply to a particular tool. Avoid over tightening a nut or bolt with a conventional wrench before applying a torque wrench. When not in use, the adjustable type wrench should be set to the lowest torque.

ABUSE/MISUSE

A Torque wrench is a precision instrument and should not be roughly handled. Never use it as a hammer, a pry or as a conventional wrench-use it only as a torque tool. Avoid dropping. When using adjustable wrenches do not over torque by applying torque past the release point. At low torque setting, the "click" Signal might be very soft. Learn the feel of the release, rather than relying on the sound.

Read torque values on indicating torque wrenches by looking at the dial at 90° to its surface (this eliminates parallax error). If this is difficult to do, compensate by observing how much the apparent scale readings change when viewing from different angles.

Mac Master torque wrenches operate accurately when they are held by their designated grips. Cheater bars should never be used unless specifically permitted (or supplied) by the wrench manufacturer.

Mac Master torque wrenches are manufactured to the highest quality standard and subject to rigorous quality control and inspection procedures.

MAC MASTER TOOLS PVT. LTD.

E -66, Industrial Focal Point, Derabassi - 140507
Phone : (+91-1762) 284241 M. 94170 48285, 96537 07000
www.macmasterindia.com
contact@macmasterindia.com

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Printed at : Sematic34@yahoo.co.in

NOTE : Design & Specifications (weight, dimension etc,) of MAC MASTER TOOL can be changed without any information for its better performance and use