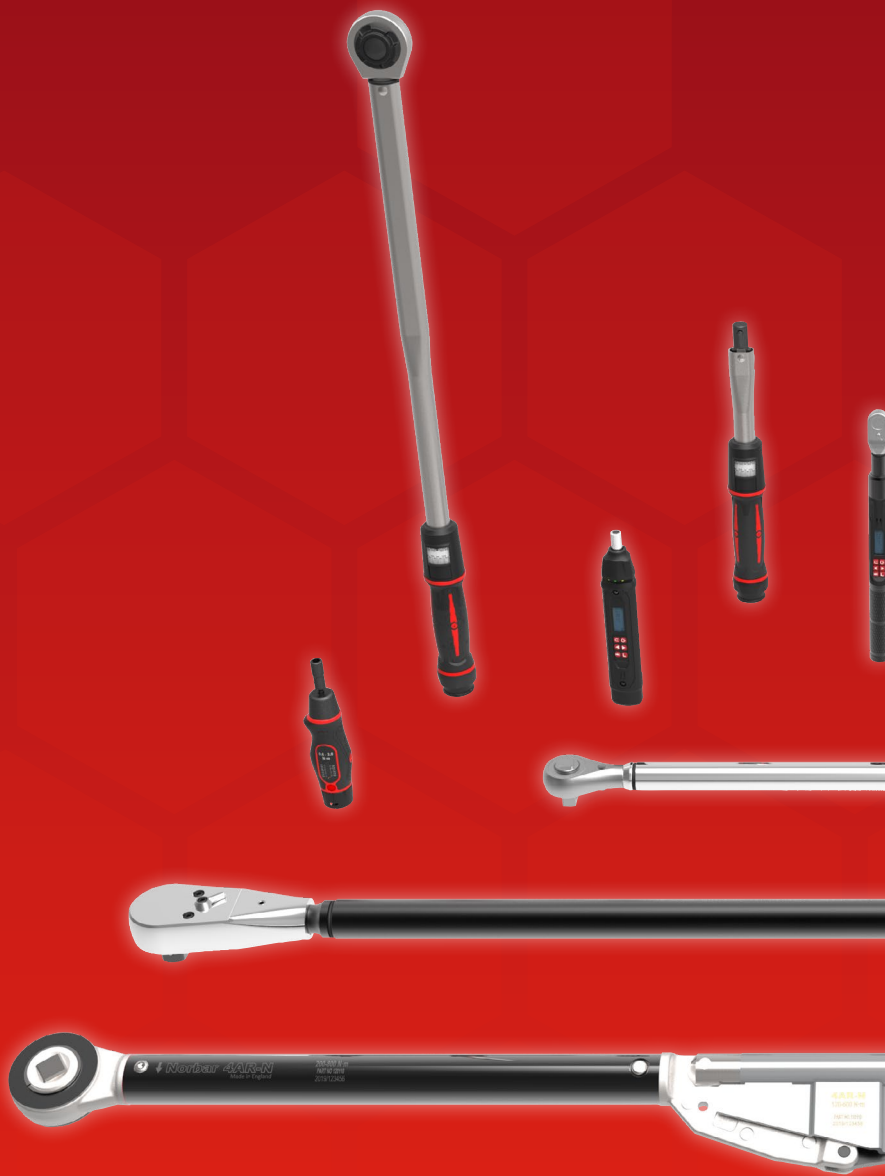


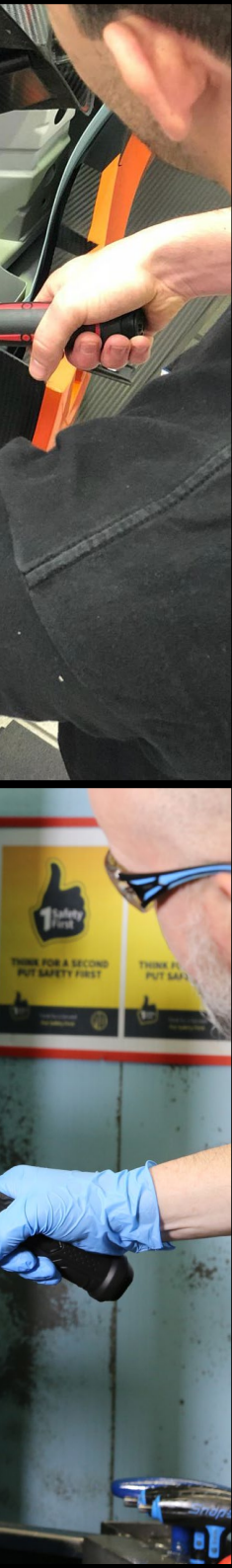


NORBAR TORQUE WRENCH



DIGITAL CATALOGUE





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.....	Introduction
.....	Torque Screwdrivers
.....	Torque Wrenches
.....	Electronic Torque Wrenches
.....	Service & Spares



ISO 9001:2015



ENMS 621748



A GLOBAL, LOCAL BUSINESS

From our humble beginnings over 75 years ago, in a small workshop in North Bar, Banbury, to our latest purpose built factory on Wildmere Road, Norbar has pioneered many of today's solutions for torque control. Our offices around the world are excellent at taking core Banbury product and developing it for your use in your application. From manual torque wrenches to sophisticated control systems we are still dedicated to being the best at what we do. Norbar is now a member of the Snap-on Incorporated family of companies and is proud to be part of a business which has beliefs, values and a vision closely aligned with those that Norbar was founded on. We still strive to be "The best torque tool company in the world. Respected, profitable and a great place to work."





GLOBAL SERVICE



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FASTORQ
The Speed of Innovation.



+ 1 281 449 6466



esales@fastorq.com



India



+ 91 22 2778 8480



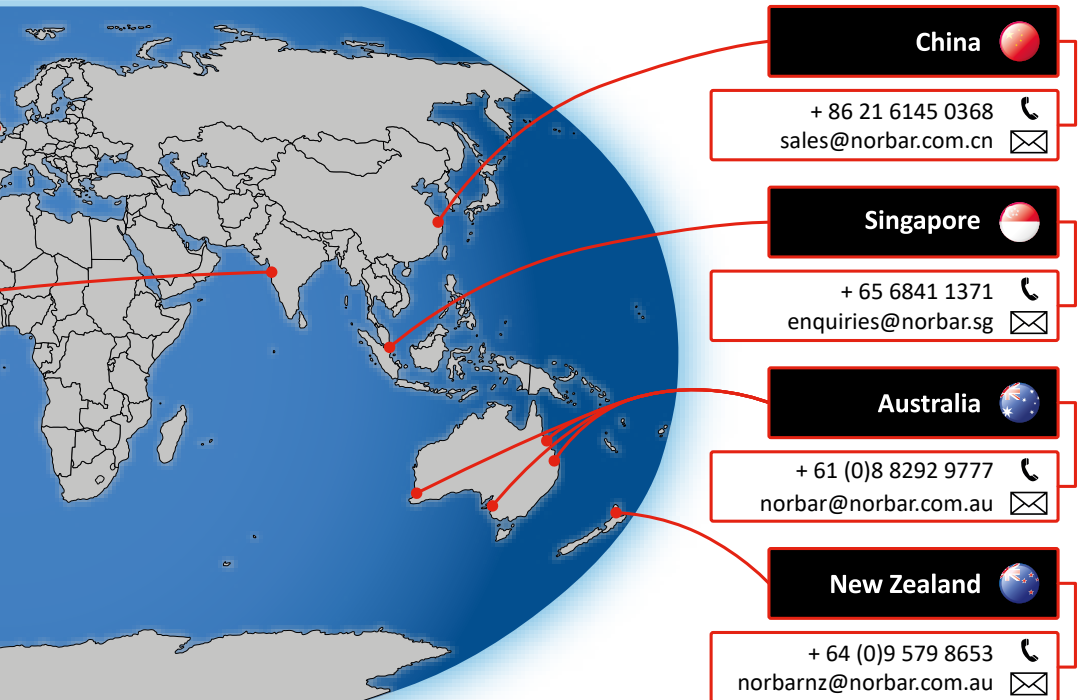
enquiry@norbar.in



We are the world's leading specialist in torque control and we production of torque tightening and measuring equipment.

Our customers include manufacturers and engineering service mining and sub-sea.

There are sales and service branches as shown above. In addition more than 60 countries around the world.



are engaged solely in the design, development and

s in such diverse sectors as aerospace, energy, oil and gas,

ion, we have distributors of our torque control products in



FASTORQ - THE SPEED OF INNOVATION

We are experts in
now a part of
a global product
a range of
range. FASTORQ
design, manufacturing
and special
challenges
engineers
knowledge



cited to inform you that the well-regarded brand FASTORQ is
t of the Norbar family. Based in New Caney, Texas, FASTORQ are
rovider of precision bolt loading and removal solutions and offer
products well suited to complement Norbar's existing product
FASTORQ are a pioneer in the hydraulic tools industry and today
anufacture and sell a revolutionary line of bolting solutions
alty bolting lubricants delivering timely resolutions to bolting
s of all sizes on land or sea. FASTORQ's highly skilled team of
and bolting technicians have over 100 combined years of bolting
e.

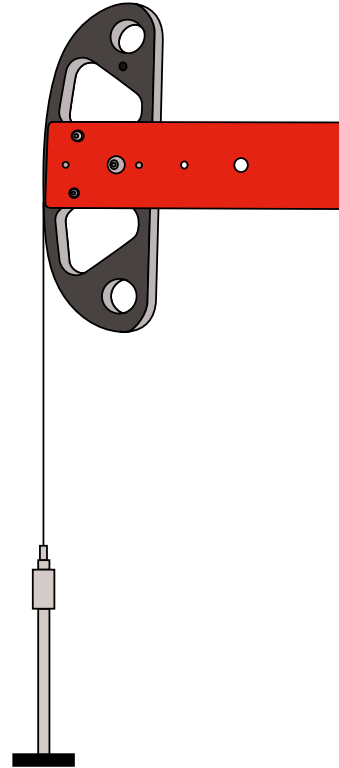


WHAT IS TORQUE

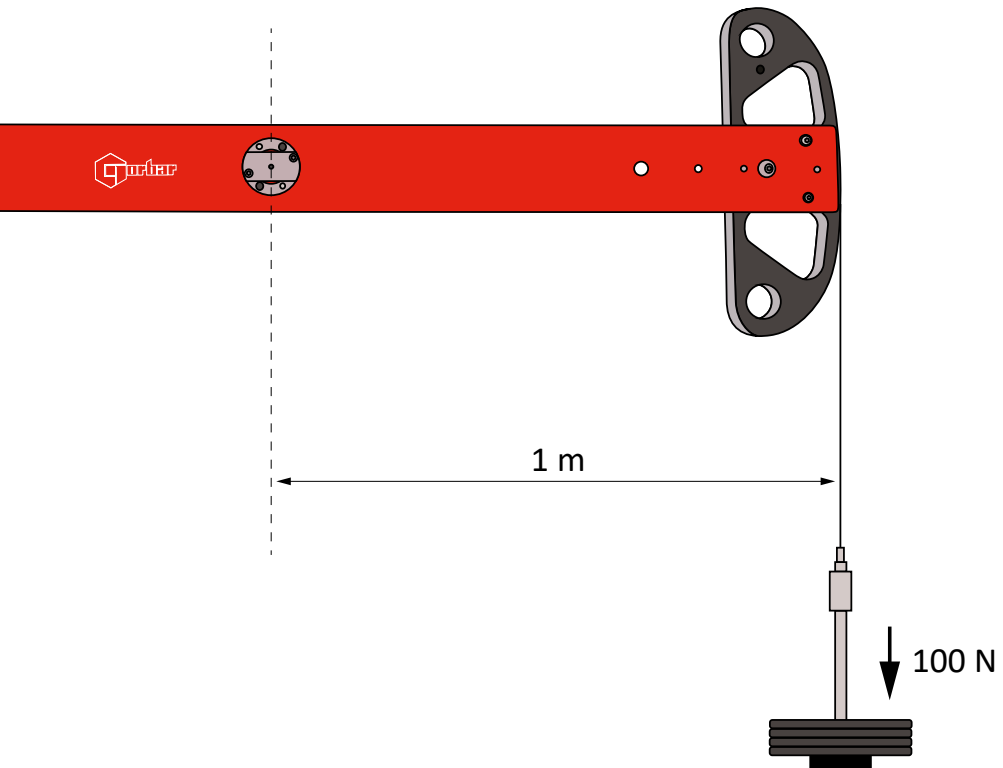
Torque is any force or system of forces that tends to cause rotation about an axis.

Imagine someone tightening a bolt using a socket attached to a meter (m) long bar. If they apply 10 kg of force (kgf) perpendicular to the bar they will produce a torque of 10 kgf·m at the axis (the centre of the bolt).

However, under the S.I. system of measurement, force is expressed in Newtons (N) rather than kgf. The conversion between kgf and N is $\times 9.807$ so the person is applying 98.07 N·m of torque.



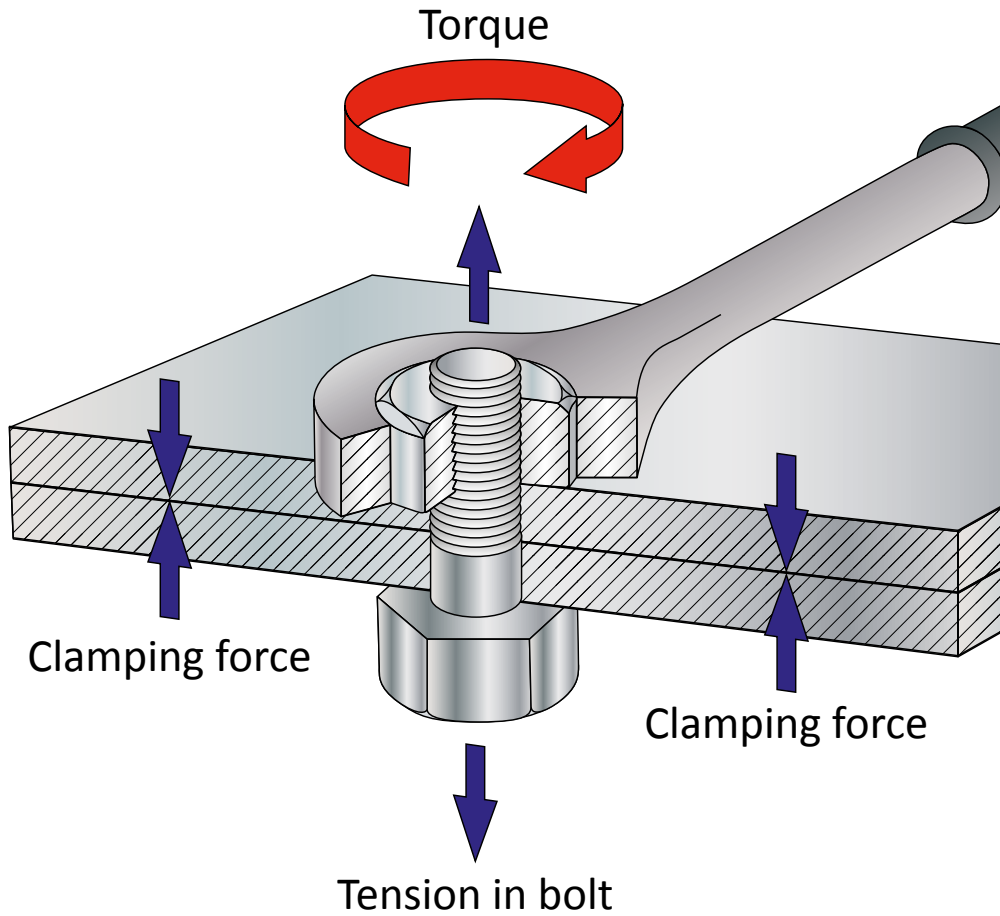
The Importance

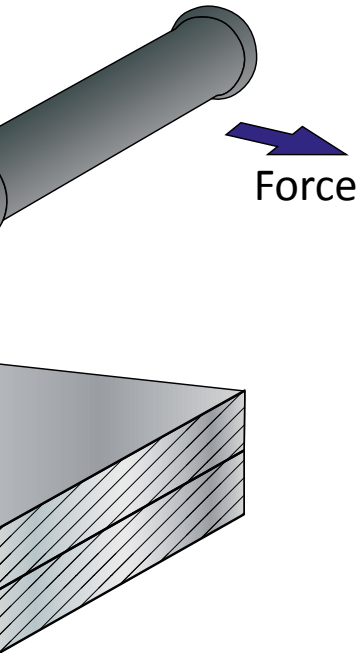


e of Torque Control



BOLT TENSION





When an assembly is clamped by tightening a nut and bolt, the induced tension causes the bolt to stretch. An equal force acts to compress the parts which are thus clamped.

The proof load of a bolt, normally established by test, is the load which just starts to induce permanent set – also known as the yield point. Typically bolts are tightened to between 75% and 90% of yield.



FRICTION IN THE BOLTED JOINT

When a threaded fastener is tightened, the induced tension is distributed between the head of the bolt and in the threads. It is generally accepted that the applied torque is expended in overcoming friction between the abutting surface and another 30% to 40% is lost to friction in the threads. Only 20% of the applied torque results in useful work to tension the bolt.

results in friction under
d that as much as 50% of
n the bolt head and the
he threads. As little as 10%
t.



More info



TIGHTENING TO YIELD

Bolts tightened to yield provide consistently higher preloads from reduces the fatigue loading to which the bolt is subjected under connecting rods.

In theory, a bolt tightened to its yield point will provide the strong physical limitations of the bolt material and manufacturing process. The downside of this method is the cost of the sophisticated equipment.

Calculated Maximum Torque		Calculated Maximum Load	
N.m.: 0.05		kN: 0.15	
lbf. ft.: 0.04		lbf: 34.7	
Bolt Properties			
Bolt Diameter			1.6
Yield Stress			180
Pitch			0.35
Pitch Diameter			1.373
Root Diameter			1.171
Hex A/f Diameter			3.2
These torque and load values are for guidance only! Always check with the manufacturer.			



Torque Tension

mm smaller diameter bolts. The reduced fastener stiffness
repeated external load reversals, e.g. cylinder heads and

ngest and most fatigue-resistant joint possible, within the
ess.

equipment necessary to determine when the bolt goes into yield.

um Load

Norbar®
Norbar Torque Tools

Standard Parameters

Bolt Type

Bolt Dia.

Grade

Friction Coefficients

Thread

Head

with equipment/bolt manufacturer

ision Calculator



RECOMMENDED MAXIMUM TORQUE VALUES

The information supplied here is intended to be an acceptable guide for normal conditions. For critical applications, further information and research will be necessary. The following basic assumptions have been made:

- a. Bolts are new, standard finish, uncoated and not lubricated (other than the normal protective oil film)
- b. The load will be 90% of the bolt yield strength
- c. The coefficient of friction is 0.14
- d. The final tightening sequence is achieved smoothly and slowly

If lubrication is to be applied to the nut/bolt, multiply the recommended torque by the appropriate factor. Alternatively, use the Torque/Tension Calculator on the Norbar website which enables fastener and friction conditions to be modified with ease.

 M	BOLT GRADE									 mm
	3.6	4.6	5.6	5.8	6.8	8.8	9.8	10.9	12.9	
	Torque in N·m									
M 1.6	0.05	0.07	0.09	0.11	0.14	0.18	0.21	0.26	0.31	3.2
M 2	0.11	0.14	0.18	0.24	0.28	0.38	0.42	0.53	0.63	4
M 2.5	0.22	0.29	0.36	0.48	0.58	0.78	0.87	1.09	1.31	5
M 3	0.38	0.51	0.63	0.84	1.01	1.35	1.52	1.9	2.27	5.5
M 4	0.71	0.95	1.19	1.59	1.91	2.54	2.86	3.57	4.29	7
M 5	1.71	2.28	2.85	3.8	4.56	6.09	6.85	8.56	10.3	8
M 6	2.94	3.92	4.91	6.54	7.85	10.5	11.8	14.7	17.7	10
M 8	7.11	9.48	11.9	15.8	19	25.3	28.4	35.5	42.7	13
M 10	14.3	19.1	23.8	31.8	38.1	50.8	57.2	71.5	85.8	17
M 12	24.4	32.6	40.7	54.3	65.1	86.9	97.9	122	147	19
M 14	39	52	65	86.6	104	139	156	195	234	22
M 16	59.9	79.9	99.8	133	160	213	240	299	359	24
M 18	82.5	110	138	183	220	293	330	413	495	27
M 20	117	156	195	260	312	416	468	585	702	30
M 22	158	211	264	352	422	563	634	792	950	32
M 24	202	270	337	449	539	719	809	1,011	1,213	36
M 27	298	398	497	663	795	1,060	1,193	1,491	1,789	41
M 30	405	540	675	900	1,080	1,440	1,620	2,025	2,430	46
M 33	550	734	917	1,223	1,467	1,956	2,201	2,751	3,301	50
M 36	708	944	1,180	1,573	1,888	2,517	2,832	3,540	4,248	55
M 39	919	1,226	1,532	2,043	2,452	3,269	3,678	4,597	5,517	60
M 42	1,139	1,518	1,898	2,530	3,036	4,049	4,555	5,693	6,832	65
M 45	1,425	1,900	2,375	3,167	3,800	5,067	5,701	7,126	8,551	70
M 48	1,716	2,288	2,860	3,813	4,576	6,101	6,864	8,580	10,296	75
M 52	2,210	2,947	3,684	4,912	5,895	7,859	8,842	11,052	13,263	80
M 56	2,737	3,650	4,562	6,083	7,300	9,733	10,950	13,687	16,425	85
M 60	3,404	4,538	5,673	7,564	9,076	12,102	13,614	17,018	20,422	90
M 64	4,100	5,466	6,833	9,110	10,932	14,576	16,398	20,498	24,597	95
M 68	4,963	6,617	8,271	11,029	13,234	17,646	19,851	24,814	29,777	100



TORQUE CONVERSION FACTORS

Units to be converted	S.I. Units		Imperial Units			Metric
	cN·m	N·m	ozf·in	lbf·in	lbf·ft	kgf·cm
1 cN·m =	1	0.01	1.416	0.088	0.007	0.102
1 N·m =	100	1	141.6	8.851	0.738	10.20
1 ozf·in =	0.706	0.007	1	0.0625	0.005	0.072
1 lbf·in =	11.3	0.113	16	1	0.083	1.152
1 lbf·ft =	135.6	1.356	192	12	1	13.83
1 kgf·cm =	9.807	0.098	13.89	0.868	0.072	1
1 kgf·m =	980.7	9.807	1389	86.8	7.233	100

Formula for Calculating the Effect of Torque Wrench Extensions

$$M1 = M2 \times L1/L2$$

Where L1 is the normal length and L2 is the extended length, M1 is the set torque and M2 the actual torque applied to the nut.

Example

The required torque on the fastener is 130 N·m (M2)
but what do you set on the torque wrench scale?

L1 = 500 L2 = 650
(units of length not important, this is ratio)

$$M1 = 130 \times 500/650$$

$$M1 = 100$$

Units	FORCE	FLOW
kgf·m	lbf x 4.45 = N N x 0.225 = lbf	l/s x 2.119 = cu·ft/min cu·ft/min x 0.472 = l/s
0.001		
0.102	PRESSURE	POWER
0.0007	lbf/in ² x 0.069 = bar bar x 14.504 = lbf/in ²	hp x 0.746 = kW kW = $\frac{\text{N}\cdot\text{m} \times \text{rev/min}}{9,546}$
0.0115		
0.138		
0.01		
1		

Formulae

Accepted formulae relating torque and tension, based on many tests are:-

For Imperial Sizes

$$M = \frac{P \times D}{60}$$

M = torque lbf·ft
P = bolt tension lbf
D = bolt diameter (ins)

For Metric Sizes

$$M = \frac{P \times D}{5000}$$

M = torque N·m
P = bolt tension Newtons
D = bolt diameter (mm)

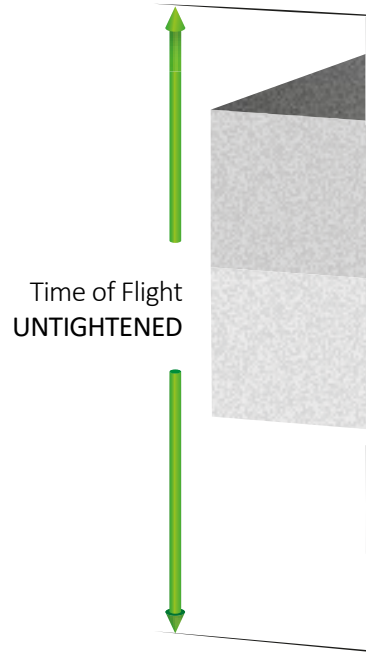
These formulae may be used for bolts outside the range of the tables.

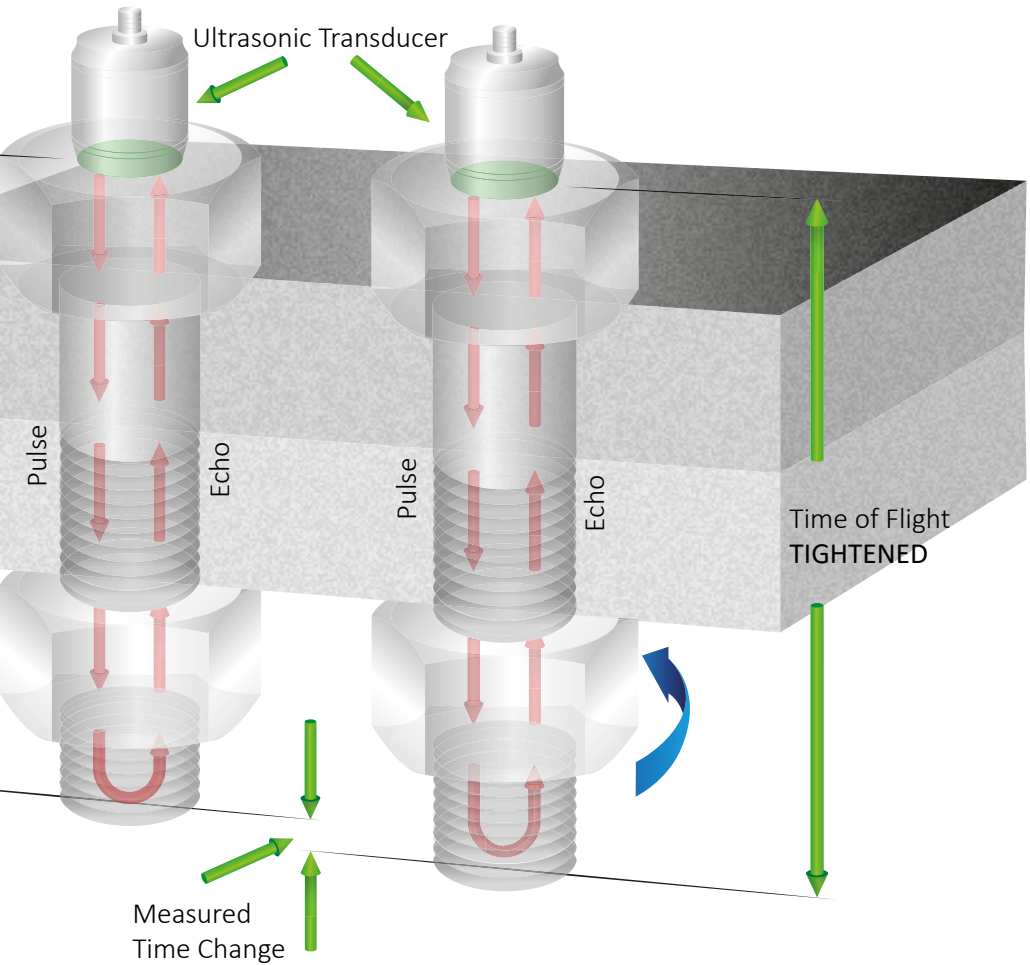


WHEN TORQUE DOESN'T EQUAL TIGHT

As we have established, it is the tension in a fastener rather than the torque that is the critical factor. Torque is an indirect means of establishing tension and in a correctly engineered joint and with a controlled tightening process, it is a satisfactory method under the majority of circumstances.

However, in joints that are highly critical due to safety or the cost and implications of machine down-time, a more direct means of establishing tension is needed. Various methods exist including several types of load indicating bolts or washers. However, one of the most versatile methods is to measure the extension of the bolt due to the tightening process using ultrasound.







TTS TORQUE SCREWDRIVERS

Versatile, accurate and easy torquing for smaller fasteners and restricted spaces



Key Features



**ADJUSTABLE N·m**

13850	TTs1.5, ¼", 0.3 - 1.5 N·m
13851	TTs3.0, ¼", 0.6 - 3 N·m
13852	TTs6.0, ¼", 1.2 - 6 N·m

ADJUSTABLE lbf·in

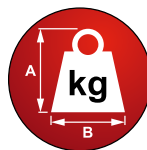
13853	TTs13, ¼", 2.5 - 13 lbf·in
13854	TTs26, ¼", 5 - 26 lbf·in
13855	TTs53, ¼", 10 - 53 lbf·in

PRODUCTION 'P' TYPE

13856	TTs1.5, ¼", 0.3 - 1.5 N·m, 2.5 - 13 lbf·in
13857	TTs3.0, ¼", 0.6 - 3 N·m, 5 - 26 lbf·in
13858	TTs6.0, ¼", 1.2 - 6 N·m, 10 - 53 lbf·in
SQ2222	Pre-set, etch and certify (Allow 3 days delivery for this service)

ADJUSTABLE N·m KIT

13700	TTs0.3 - 1.5 N·m Kit with 12 piece bit set and case
13701	TTs0.6 - 3 N·m Kit with 12 piece bit set and case
13702	TTs1.2 - 6 N·m Kit with 12 piece bit set and case
28937	12 Piece ¼", Hex bit set







CONTENTS

.....	TT Torque Wrenches
.....	TTi Non-Magnetic Torque Wrenches
.....	NorTorque®
.....	NorTorque® Tethered Torque Wrenches
.....	Slimline™ Torque Wrenches
.....	Professional Torque Wrenches Model 5
.....	Professional Torque Wrenches
.....	Professional ‘P’ Type Torque Wrenches
.....	Professional Torque Wrenches NLD Series
.....	Industrial Torque Wrenches- New Generation
.....	Industrial Torque Wrench- Bi-Square
.....	Electrode Wrenches
.....	Open End Fittings for 16 mm Torque Handles
.....	Ring End Fittings for 16 mm Torque Handles
.....	Flare End Fittings for 16 mm Torque Handles
.....	Spigot Accessories
.....	Manufactured to Order Large End Fittings



TORQUE WRENCHES

Norbar Torque Tools manufacture an extensive range of high quality torque wrenches to cover torque values from 1 N·m to 2000 N·m. They are designed and manufactured to meet international standards for accuracy.

In addition to the normal 'adjustable' torque wrenches, Norbar offer Production 'P' Type versions which can be pre-set and dedicated to a particular application. This setting system is designed to discourage unauthorised alteration.

All Norbar torque wrenches are offered as standard with a quality ratchet. For applications where interchangeable end fittings are required, 'Torque Handles' are also available in various models up to 650 N·m.



ISO 6789:2017

TORQUE WRENCHES





TT TORQUE WRENCHES



For no-nonsense torquing
- comfortable, accurate and
easy to use



Key Features



TORQUE WRENCHES





TT TORQUE WRENCHES

RATCHET ADJUSTABLE - DUAL SCALE

13830	TTi20, ¼", 4 - 20 N·m, 35 - 180 lbf·in
13831	TTi20, ⅜", 4 - 20 N·m, 35 - 180 lbf·in
13841	TTi50, ⅜", 10 - 50 N·m, 8 - 35 lbf·ft
13842	TTi50, ½", 10 - 50 N·m, 8 - 35 lbf·ft

RATCHET ADJUSTABLE

13832	TTi20, ¼", 4 - 20
13833	TTi20, ⅜", 4 - 20
13843	TTi50, ⅜", 10 - 5
13844	TTi50, ½", 10 - 5





- N·m ONLY

0 N·m

0 N·m

50 N·m

50 N·m

FEMALE TORQUE HANDLE ADJUSTABLE

13839	TTfth 20, 9 x 12 mm, 4 - 20 N·m, 35 - 180 lbf·in
13847	TTfth 50, 9 x 12 mm, 10 - 50 N·m, 8 - 35 lbf·ft
13840	TTfth 20, 9 x 12 mm, 4 - 20 N·m (N·m ONLY)
13848	TTfth 50, 9 x 12 mm, 10 - 50 N·m (N·m ONLY)



TTi Reversible Ratchet



TTfth Torque Handle

