

**UNBRAKO TOTAL SOLUTION BOLT ASSEMBLY (TAMPER-PROOF)**

**PRODUCT RANGE**

- UNBRAKO-TS BOLT: M6 - M24, 1/4" - 1" (UNC)
- UNBRAKO-TS NUT: M6 - M24, 1/4" - 1" (UNC)
- UNBRAKO-TS ROUND WASHER: M6 - M24, 1/4" - 1"
- UNBRAKO-TS SOCKET: M6 - M24
- THE PRODUCT CAN ALSO BE MADE AS PER CUSTOMER SPECIFICATION



Wind Energy



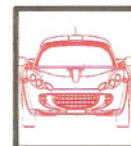
Buildings



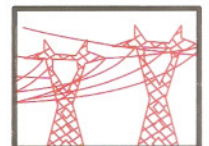
Railways



Tunnels



Auto Mobile



Tower

## INTRODUCTION

Since its inception, the Unbrako brand has become synonymous with quality and innovation. With its continued focus and commitment to best practice manufacturing and quality standards, Unbrako now enjoys a growing international reputation for its **Vibration Resistant TOTAL SOLUTION Security Fastener** product line.

Unbrako has set new standards, in quality and ease of assembly, when it comes to the Unbrako - TS bolt, Unbrako - TS Nut and Unbrako - TS Washer. The use of an **Innovative 6** wedged shaped design acts to convert a radial force into an axial force, increasing the pressure onto the contact surface of the application. Even under extreme vibration, the integrity of the joint is maintained and the **Bolt Does Not Loosen**.

In today's world public transportation, railways, heavy industrial machinery, agricultural equipment, buildings, bridges and other steel structures are all subjected to extreme levels of vibration. The consequences of fastener loosening due to vibration can be significant and costly, in terms of human life, property, and damage to the environment.

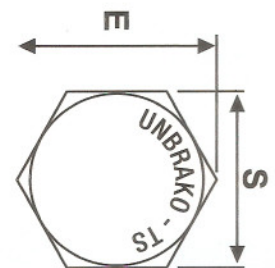
Unbrako's TOTAL SOLUTION security fastener products provide an innovative and **Cost Effective** solution to the problems of vibration, with ease of assembly and security against loosening.

For enhanced security and peace of mind, Unbrako's TS products are also available with **Tamper Proof** features requiring a special socket tool to assemble and disassemble.

## UNBRAKO - TS BOLT

**METRIC SIZES CLASS:** 8.8, 10.9, 12.9 **THREAD:** COARSE & FINE **MATERIAL:** MEDIUM CARBON STEEL, ALLOY STEEL, STAINLESS STEEL DIN 931/933 **HEXAGON HEAD BOLTS**

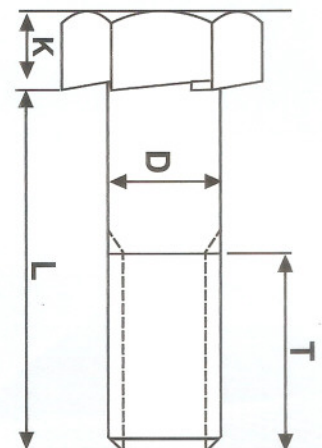
Dimension/ Size	D		S		E	K			T(L<125)	T(125<L<200)
	Min	Max	Min	Max	Min	Min	Max	Nom.	Nom.	
M6	5.82	6.00	9.78	10	11.05	3.85	4.15	18	24	
M8	7.78	8.00	12.73	13	14.38	5.15	5.45	22	28	
M10	9.78	10.00	16.73	17	18.9	6.22	6.58	26	32	
M12	11.73	12.00	18.67	19	21.1	7.32	7.68	30	36	
M16	15.73	16.00	23.67	24	26.75	9.82	10.18	38	44	
M20	19.67	20.00	29.67	30	33.53	12.28	12.72	46	52	
M24	23.67	24.00	35.38	36	39.98	14.78	15.22	54	60	



• ATTENTION:- UNBRAKO - TS BOLT is manufactured according to DIN931/933, however it will comply with UNBRAKO - TS BOLT special design to adjust the head thickness. We can provide customized solution systems as per customer's requirement.

**INCH SIZES CLASS:** G5, G8 **THREAD:** UNC **MATERIAL:** MEDIUM CARBON STEEL, ALLOY STEEL, STAINLESS STEEL ASME B18.2.1 **HEXAGON HEAD CAP SCREWS**

Dimension/ Size	D		S			E	K			T(L<6")	T(L>6")
	Min(in)	Max(in)	Basic(in)	Min(in)	Max(in)	Min(in)	Basic(in)	Min(in)	Max(in)	min.	min.
1/4	0.2450	0.2500	7/16	0.428	0.438	0.488	5/32	0.150	0.163	0.750	1.000
5/16	0.3065	0.3125	1/2	0.489	0.500	0.557	13/64	0.195	0.211	0.875	1.125
3/8	0.3690	0.3750	9/16	0.551	0.562	0.628	15/64	0.226	0.243	1.000	1.250
1/2	0.4930	0.5000	3/4	0.726	0.750	0.840	5/16	0.302	0.323	1.250	1.500
5/8	0.6170	0.6250	15/16	0.922	0.938	1.051	25/64	0.378	0.403	1.500	1.750
3/4	0.7410	0.7500	1-1/8	1.100	1.125	1.254	15/32	0.455	0.483	1.750	2.000
1	0.9900	1.0000	1-1/2	1.469	1.500	1.675	39/64	0.591	0.627	2.250	2.500



• ATTENTION:- UNBRAKO - TS BOLT is manufactured according to ASME B18.2.1, however it will comply with UNBRAKO - TS special design to adjust the head thickness  
 • We can provide customized solution systems as per customer's requirement.

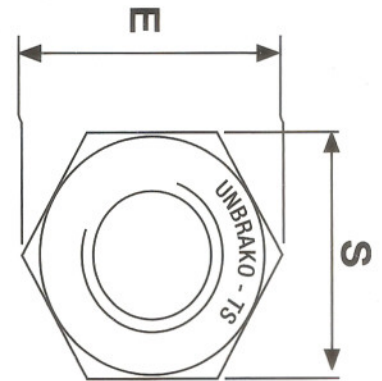


# Unbrako T.S. Bolt Assembly (Tamper Proof)

## DIMENSIONS OF UNBRAKO- TS NUT

METRIC SIZE CLASS : 8-10 THREAD :- COARSE & FINE MATERIAL :- MEDIUM CARBON STEEL, ALLOY STEEL, STAINLESS STEEL DIN 934 HEXAGON HEAD NUTS

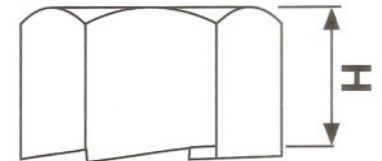
Dimension/ Size	S		E		H
	Min	Max	Min	Max	Max
M6	9.78	10	4.7	11.05	5.0
M8	12.73	13	6.14	14.38	6.5
M10	16.73	17	7.64	18.9	8.0
M12	18.67	19	9.64	21.1	10.0
M16	23.67	24	12.3	26.75	13.0
M20	29.16	30	14.9	32.95	16.0
M24	35	36	17.7	39.55	19.0



- ATTENTION: UNBRAKO - TS NUT (METRIC SERIES) is manufactured according to DIN 934, however it will comply with UNBRAKO - TS special design to adjust the head thickness.
- We can provide customized solution systems as per customer's requirement.

INCH SIZE CLASS :- G5, G8 THREAD :- UNC MATERIAL :- MEDIUM CARBON STEEL, ALLOY STEEL, STAINLESS STEEL ASME B18.2.2 HEXAGON HEAD NUTS

Dimension/ Size	S			E		H		
	Basic (in)	Min (in)	Max (in)	Min (in)	Max (in)	Basic (in)	Min (in)	Max (in)
1/4	7/16	0.428	0.438	0.488	0.505	7/32	0.212	0.226
5/16	1/2	0.489	0.500	0.557	0.577	17/64	0.258	0.273
3/8	9/16	0.551	0.562	0.628	0.650	21/64	0.320	0.337
1/2	3/4	0.736	0.750	0.840	0.866	7/16	0.427	0.448
5/8	15/16	0.922	0.938	1.051	1.083	35/64	0.535	0.559
3/4	1-1/8	1.088	1.125	1.240	1.299	41/64	0.617	0.665
1	1-1/2	1.450	1.500	1.653	1.732	55/64	0.831	0.887



- ATTENTION: UNBRAKO - TS NUT (INCH SERIES) is manufactured according to ASME B18.2.2, however it will comply with UNBRAKO - TS special design to adjust the head thickness.
- We can provide customized solution systems as per customer's requirement.

## UNBRAKO- TS WASHER & SPECIAL SOCKET

### UNBRAKO - TS ROUND WASHER

- MATERIAL :-  
MEDIUM CARBON STEEL, ALLOY STEEL, STAINLESS STEEL
- SPECIFICATION :-  
METRIC SIZE, IMPERIAL SIZE, OUTSIDE DIAMETER 14-54mm



### UNBRAKO - TS SPECIAL SOCKET

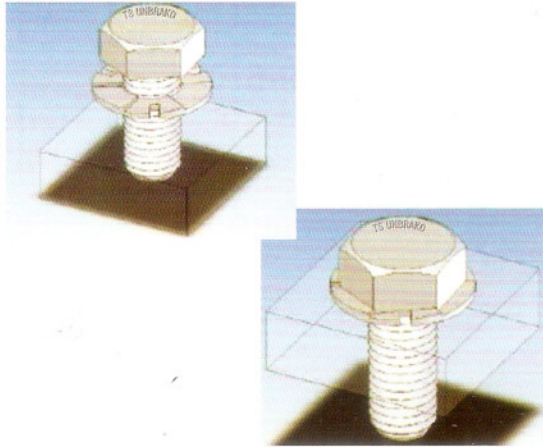
- THE PURPOSE OF UNBRAKO-TS SPECIAL SOCKET IS TO DISASSEMBLE TAMPER-PROOF THE UNBRAKO-TS ROUND WASHER.
- MATERIAL :-  
Cr-V Steel (Chrome Vanadium Steel)
- SPECIFICATION :-  
Special socket spanner for disassembly security fasteners 10mm-36mm



## APPLICATION VARIATIONS OF UNBRAKO - TS BOLT ASSEMBLY

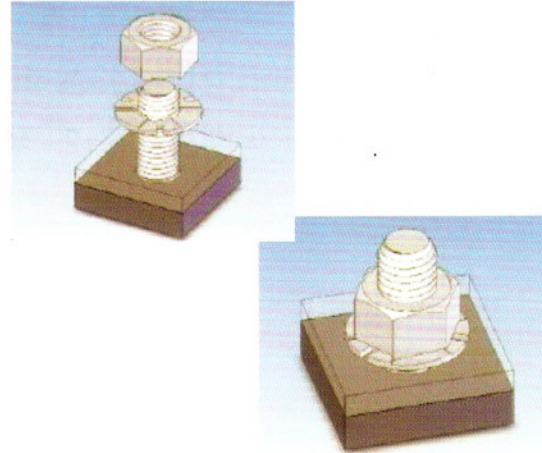
### 1. UNBRAKO-TS BOLT\*1 + UNBRAKO-TS ROUND WASHER \*1

It is used on the contact surface having a hole with thread. The installation is as same the standard product. Usage of special socket is not necessary.



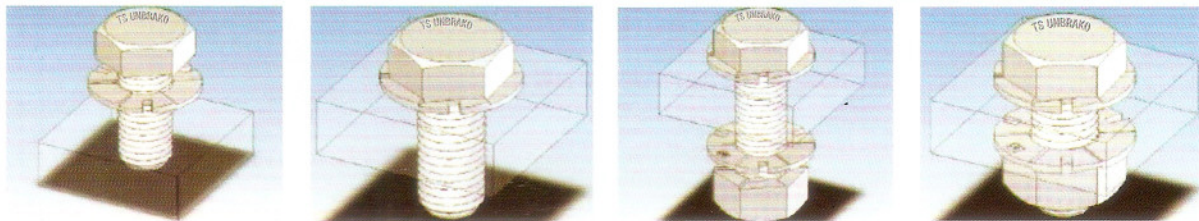
### 2. UNBRAKO-TS NUT\*1 + UNBRAKO-TS ROUND WASHER \*1

It is used on the contact surface having hole without thread. A standard bolt (which is to be fixed and not required to rotate) is fastened with a UNBRAKO- TS nut and a UNBRAKO- TS washer, achieving a cost effective solution to avoid/prevent loosening from vibration.



### 3. UNBRAKO-TS BOLT \*1 + UNBRAKO-TS ROUND WASHER\*2 + UNBRAKO-TS NUT\*1

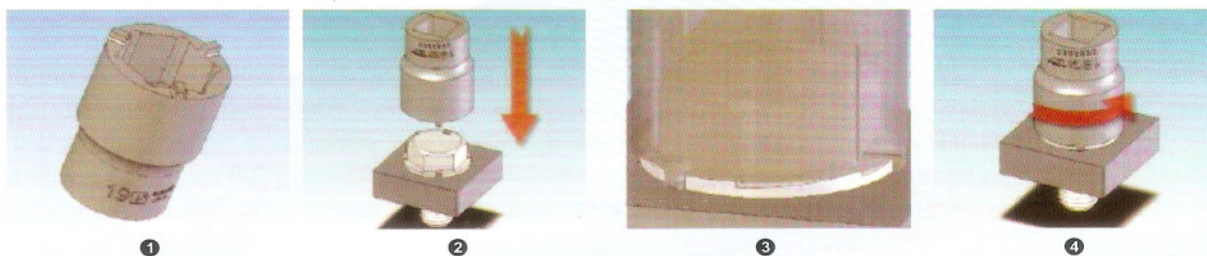
This is a complete UNBRAKO - TS security fastener system. Providing the maximum protection against loosening due to vibration UNBRAKO - TS Fastener system is put together with UNBRAKO - TS Round Washer. It should be disassembled with UNBRAKO - TS special socket spanner to avoid any damage to the joints and materials.



#### • **NOTE :-**

The system can be easily assembled or disassembled with a standard wrench or socket. however UNBRAKO-TS Round Washer requires UNBRAKO-TS Special Socket for disassembly. Thus, the round washer not only prevents the fasteners from loosening, but also has a tamper proof function .

#### Disassemble With UNBRAKO- TS Special Socket



Please ensure that the raised point under UNBRAKO - TS special socket spanner correctly fits with the slots of UNBRAKO - TS round washer. Finally, turn the socket anti clockwise to disassemble the system.