



FASTENER TORQUE TENSION ANALYSER MACHINE

**OPERATORS HANDBOOK (PART NO. 34145)
ISSUE 7**

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PART NUMBERS COVERED BY THIS MANUAL: 41900, 41901, 41902,41903

INTRODUCTION

For quality control and basic research into the torque tension relationship in nuts and bolts, the torque tension machine provides a means of analysing the effects of lubrication, surface finishes, washer types, prevailing torque lock nuts, thread locking compounds etc.

The unit incorporates load and torque transducers for simultaneous torque and bolt tension measurements. (An optional angle encoder is available for the measurement of angular rotation).

The torque/tension results may be read directly off 2 display units. The transducer signals can also be fed via the analogue output, into an XY plotter to record test results graphically.

There are four models available covering bolt sizes from M3 to M36 (4BA to 1 1/2" dia).

This handbook is to be used in conjunction with the relevant operators handbook for the display unit, and transducers being used.

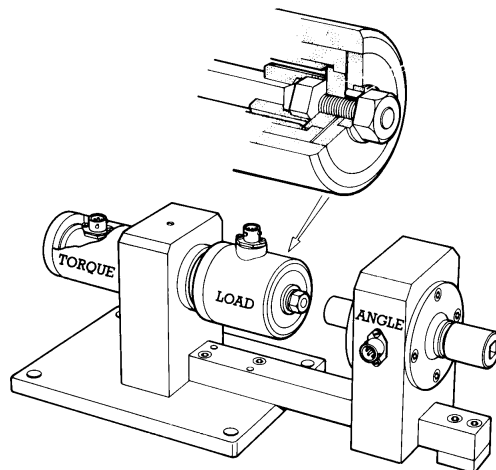


Fig 1: Model 1 TT Machine

The Norbar Torque Tension Machine provides rapid accurate data on the following:

- Fastener Quality Control.
- Torque Tension relationships.
- Torque/Angle/Load measurement.
- Effect of Lubrication.
- Effect of protective finishes.
- Effect of lock nuts/washers etc.
- Test of prevailing torque nuts.

SPECIFICATION FOR TORQUE TENSION MACHINES**TT MODEL 1**

PART NUMBER		41900
DESCRIPTION		TT MACHINE MODEL 1
MAX. CAPACITY		250 N.m/50 KN 250 lbf.ft/10000 lbf.
ACCURACY		AS PER TRANSDUCER
DIMENSIONS	LENGTH	215mm
	HEIGHT	202mm
	WIDTH	152mm

PARTS SUPPLIED AS STANDARD WITH THIS MODEL

42800	TORQUE DRIVE SHAFT	42801	REACTION END CAP
42802	TORQUE DRIVE SQUARE	42803	BARREL HOUSING
42823	MOUNTING BLOCK	42824	BASE PLATE

TT MODEL 2

PART NUMBER		41901
DESCRIPTION		TT MACHINE MODEL 2
MAX. CAPACITY		500 N.m/100 KN 500 lbf.ft/25000 lbf.
ACCURACY		AS PER TRANSDUCER
DIMENSIONS	LENGTH	325mm
	HEIGHT	324mm
	WIDTH	152mm

PARTS SUPPLIED AS STANDARD WITH THIS MODEL

42813	BASE PLATE	42814	BODY FOR 41901
42815	MOUNTING BLOCK	42816	SUPPORT SHAFT
42817	DRIVE SQUARE	42818	REACTION BOSS
42819	FRONT PLATE	42820	BEARING SPACER

SPECIFICATION FOR TORQUE TENSION MACHINES**TT MODEL 3**

PART NUMBER		41902
DESCRIPTION		TORQUE TENSION MODEL 3
MAX. CAPACITY		1000 N.m/500 KN 1000 lbf.ft/100000 lbf.
ACCURACY		AS PER TRANSDUCER
DIMENSIONS	LENGTH	1000mm
	HEIGHT	324mm
	WIDTH	190mm

PARTS SUPPLIED AS STANDARD WITH THIS MODEL

16010	HT1 5:1 GEARBOX	42804	REACTION END PLATE
42805	TORQUE TRANSDUCER HOUSING	42806	END PLATE
42807	BEARING SPACER	42808	SUPPORT SHAFT
42809	DRIVE SQUARE	42810	CLAMPING PLATE
42811	NO. 2 GEARBOX PLATE	42812	NO. 6 GEARBOX REACTION PLATE
42822	BASE		

TT MODEL 4

PART NUMBER		41903
DESCRIPTION		TT MACHINE MODEL 4
MAX. CAPACITY		5000 N.m/50 KN 5000 lbf.ft/250000 lbf.
ACCURACY		AS PER TRANSDUCER
DIMENSIONS	LENGTH	1300mm
	HEIGHT	425mm
	WIDTH	190mm

PARTS SUPPLIED AS STANDARD WITH THIS MODEL

16070	HT9 25:1	42828	BASE PLATE
42805	TORQUE TRANSDUCER HOUSING	42829	REACTION PLATE
42807	BEARING SPACER	42830	TRANSDUCER END PLATE
42831	SUPPORT SHAFT	42810	CAMPING PLATE
42832	DRIVE SQUARE	42833	GEARBOX REACTION PLATE
42834	1 ½" – ¾" ADAPTOR	42835	1 ½" – 1" ADAPTOR
42836	1 ½" – 1 ½" ADAPTOR		

OPERATING INSTRUCTIONS

1. Bolt the TT machine to a bench using the four fixing holes located in the base plate.
2. Fit selected torque transducer into the unit, and secure reaction cap, (or reaction plate on Models 3 and 4).
3. Assemble fastener to be tested in load transducer using the appropriate bushing sets (see Fig 2).

Note: *Bolts of longer grip lengths can be accommodated by bushing spacers with or without locking pins.*

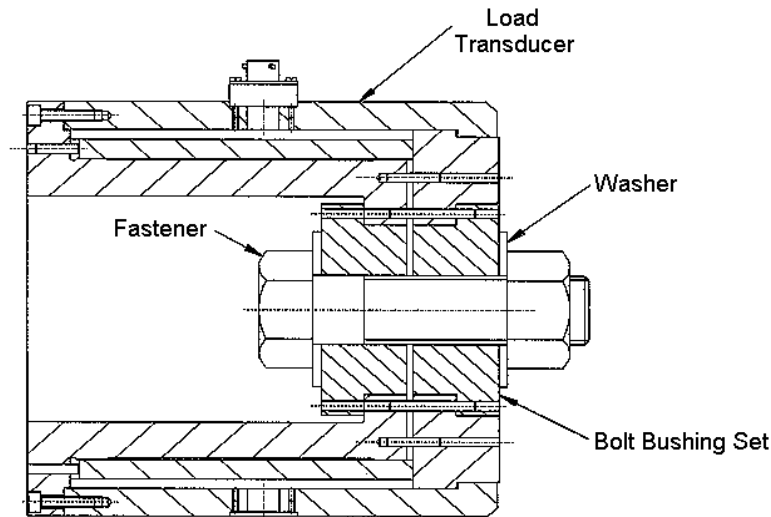


FIG 2

4. Follow the instructions in the relevant operators handbook for display instrument and transducers, to connect cables and set up instrument. Ensure that both transducer signals read zero on the meters before applying the load. Adjust respective zero controls, if necessary.

PLEASE NOTE:

It is recommended that the Instrument used for torque readings is operated in Memory mode. This will retain the torque if relaxation takes place during fastener tightening, ie. caused by ratchet action of a Torque Wrench using several positions of wrench during test.

If testing the fastener to failure the Tension Instrument should ideally also be operated in Memory mode to capture the peak failure point.

WARNING: THE MEMORY MODE CAPTURES PEAK FORCES. IF STRESS RELAXATION IS REQUIRED TO BE INVESTIGATED DO NOT OPERATE IN MEMORY MODE.

5. Fit appropriate drive socket to the fastener under test.
6. The load transducer may now be fitted. (A lifting device ie. pulley set /balancer will be required for the Model 4 Tension Transducer). Rotate until the fastener head locates in the reaction socket drive.

WARNING: THE NO. 4 LOAD CELL IS VERY HEAVY AND SHOULD BE HANDLED IN SUCH A WAY AS TO NOT SUSTAIN CRUSH INJURIES.

7. If used, slide the angle encoder up to the fastener and engage its drive socket.
8. Connect leads and set instruments as per instructions for angle encoder.
9. If required connect plotter, or data logger to the appropriate instrument dependant on whether you wish to record torque/angle, load/angle or load/torque.
10. On Models 3 & 4 slide gearbox along base until drive square is located within the drive socket.
11. The fastener may now be tightened.
12. Once the test has been completed, undo fastener.

MODEL 1 TT MACHINE

		MODEL 1	
SIZE		1/2"	
	CAPACITY	250 Nm - 250 lbf.ft 50 KN - 10000 lbf	WEIGHT
①	FRAME	41900	11.5 Kg
②	TORQUE TRANSDUCER	50006 (1000 lbf.in)	0.5 Kg
		50028 (100 Nm)	
		50008 (100 lbf.ft)	
		50333 (250 Nm)	
		50332 (250 lbf.ft)	
③	LOAD TRANSDUCER	53033 (50 KN)	4.0 Kg
		53002 (5000 lbf)	
		53003 (10000 lbf)	
④	BOLT BUSHING SETS	3mm 55145 + 55144	
		4mm 55119 + 55130	
		5mm 55117 + 55128	
		6mm 55116 + 55127	
		8mm 55115 + 55126	
		10mm 55113 + 55124	
		12mm 55111 + 55122	
		4BA 55120 + 55131	
		2BA 55118 + 55129	
		1/4" 55116 + 55127	
		5/16" 55115 + 55126	
		3/8" 55114 + 55125	
		7/16" 55112 + 55123	
1/2" 55110 + 55121			
⑤	ANGLE ENCODER	60044	6.0 Kg

NOTE: ITEMS 4 & 5 ARE OPTIONAL EXTRA'S

MODEL 2 TT MACHINE

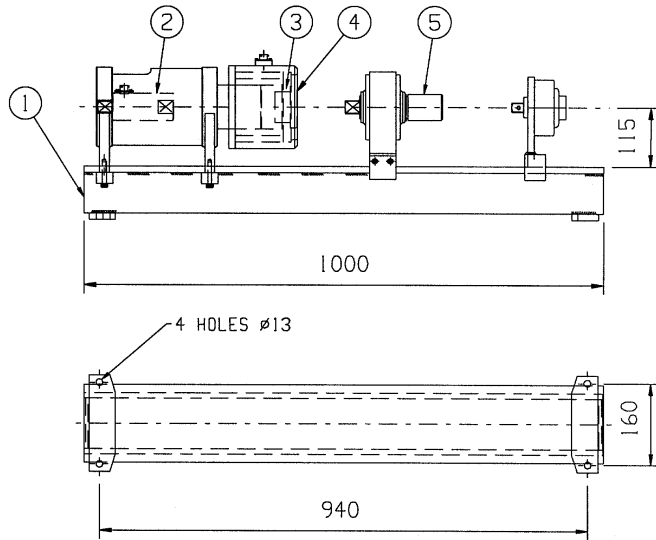
		2	
SIZE		3/4"	
	CAPACITY	500 Nm - 500 lbf.ft 100 KN - 25000 lbf	WEIGHT
①	FRAME	41901	12.0 Kg
②	TORQUE TRANSDUCER	50029 (250 Nm)	0.5 Kg
		50010 (250 lbf.ft)	
		50030 (500 Nm)	
		50011 (500 lbf.ft)	
③	LOAD TRANSDUCER	53026 (100 KN)	4.5 Kg
		53035 (25000 lbf)	
④	BOLT BUSHING SETS	5mm 55079 + 55090	
		6mm 55080 + 55091	
		8mm 55081 + 55092	
		10mm 55082 + 55093	
		12mm 55083 + 55094	
		14mm 55084 + 55095	
		16mm 55085 + 55096	
		2BA 55086 + 55097	
		1/4" 55080 + 55091	
		5/16" 55081 + 55092	
		3/8" 55087 + 55098	
		7/16" 55088 + 55099	
		1/2" 55089 + 55100	
9/16" 55084 + 55095			
5/8" 55085 + 55096			
⑤	ANGLE ENCODER	60044	6.0 Kg

NOTE: ITEMS 4 & 5 ARE OPTIONAL EXTRA'S

MODEL 3 TT MACHINE

SIZE		MODEL 3	
CAPACITY		1000 Nm - 1000 lbf.ft	WEIGHT
		500 KN - 100000 lbf	
FRAME		41902	75 Kg
TORQUE TRANSDUCER		50031 (1000 Nm) 50012 (1000 lbf.ft)	1.6 Kg
LOAD TRANSDUCER		53015 (500 KN) 53036 (100000 lbf)	11.0 Kg
BOLT BUSHING SETS		12mm 2 x 55032 14mm 2 x 55030 16mm 2 x 55029 18mm 2 x 55028 20mm 2 x 55026 22mm 2 x 55025 24mm 2 x 55024 27mm 2 x 55033 30mm 2 x 55035 1/2" 2 x 55031 9/16" 2 x 55030 5/8" 2 x 55029 3/4" 2 x 55027 7/8" 2 x 55025 1" 2 x 55023 1 1/8" 2 x 55034	
ANGLE ENCODER		60060	6.0 Kg

NOTE: ITEMS 4 & 5 ARE OPTIONAL EXTRA'S



MODEL 4 TT MACHINE

SIZE		4	
CAPACITY		5000 Nm - 7000 lbf.ft	WEIGHT
		50 KN - 10000 lbf	
FRAME		41903	110 Kg
TORQUE TRANSDUCER		50292 (2500 Nm) 50043 (5000 Nm) 50013 (5000 lbf.ft) 50117 (7000 lbf.ft)	4.2 Kg
LOAD TRANSDUCER		53034 (1000 KN) 53037 (250000 lbf)	33.0 Kg
BOLT BUSHING SETS		20mm 2 x 55050 22mm 2 x 55049 24mm 2 x 55048 27mm 2 x 55046 30mm 2 x 55044 33mm 2 x 55042 36mm 2 x 55041 3/4" 2 x 55051 7/8" 2 x 55049 1" 2 x 55047 1 1/8" 2 x 55045 1 1/4" 2 x 55043 1 3/8" 2 x 55041 1 1/2" 2 x 55040 1 7/8" 2 x 55151 5/8" 2 x 55150	
ANGLE ENCODER		60061	6.0 Kg

NOTE: ITEMS 4 & 5 ARE OPTIONAL EXTRA'S

