TT3000 Ultrasonic Tension Meter

Digital | Direct Reading

- Non-destructive axial bolt tension tester
- Updated version of TT2000 model
- Enhanced the communication function, usability by touch panel

NEW

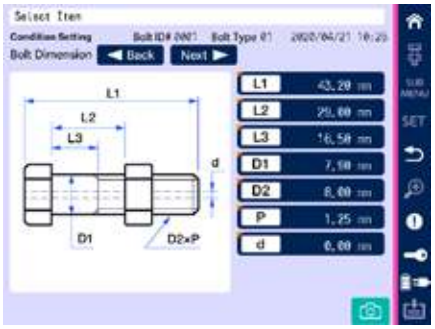
TT3000

Model
TT3000

TT3000 Specifications

Measuring method	Ultrasonic pulse propagation time difference	
Measurement	Bolt axial tension	
Components	Main unit / Ultrasonic sensor / Thermocouple	
Applicable bolt length	5.00~25000.00 mm	
Applicable bolt diameter	More than M5 size	
Ultrasonic wave frequency	1~20 MHz	
Range of speed	500~20,000m/s	
Measuring items #1	Bolt Axial Tension / Bolt Initial Length / Elongation / Stress / Traveling Time	
Measuring items #2	Travelling Time, Length, Wave, Temperature	
Measuring resolution	Axial tension	0.1 kN / 0.01 kN
	Time	0.1 ns
	Elongation	0.0001 mm
Data updating	Measurement	0.04 sec
	Screen	0.2 sec
Capacity of data memory	2000 bolts	
	Upto 50 different type of bolts	
Bolt temperature correction	Key Input System, -100 to +500 C degree	
	Auto, Thermocouple Unit	
Detection method	Full Wave, Positive half wave, Negative half wave, RF Wave	
Display	Color TFT 7.5, 640 x 480 dots	
	Touch panel in a resistance film system	
External interface	Type K thermocouple Input - 1ch	
	USB - 1ch for serial communication	
	SD Card, SD/SDHC/SDXC, up to 64GB - 1ch	
	LAN, TCP/IP 1ch	
	VGA single monitor output - 1ch	
	Photo coupler inlet 4ch/outlet 4ch	
	Analog output 4-20mA 1ch, Max. load resistance 500Ω	
	Encoder input - 1ch	
Power supply	AC Adapter 100 - 240V, Output DC12V 60W	
	Built-in battery 11h usage, 4h battery charge Enable to charge by AC adapter during use.	
Operating temperature	-10 to +60 C degree under AC adapter operation	
	0 to +40 C degree under battery operation	
Dimension	H168 x W250 x D63.5mm	
Weight	1.2 kg, w/o Battery	
Body	ABS	
Waterproof/dust proof	IP 20 when closing battery lid	
Regulation	CE Marking	
	Low voltage directive : 2014/35/EU	
	EMC directive 2014/30/EU	
	EU RoHS 2 directive 2011/65/EU	
Language	English / Japanese	
Standard accessories	Operation manual, Calibration test result, Traceability chart,	
	AC Adapter, ADT-060A12AAB-A, compliance with CE, AC power cable JP	
	Li-Ion battery, RRC2057, compliance with CE	
	USB cable, SD card, Power cable, sensor probe cable, sensor probe	
	Carring handle, Aluminum case	

Note 1. Sensor proble is compatible with TT2000.



Bolt dimension input

B1 Echo confirmation

Waveform before & after giving loading

Measurement result data inquiry

TT3000 Optional Accessories

Model Name
AC Power Cable US
AC Power Cable 220V
Thermo Sensor
Handle Plate
Aluminum Case
Sensor probe cable SCA-TT2000

TT2000 Ultrasonic Tension Meter

Digital | Direct Reading

- Non-destructive axial bolt tension tester
- Input information regarding fastener & materials
- Sound wave lengths are measured and compared.

TT2000

Model
TT2000
TT2000C

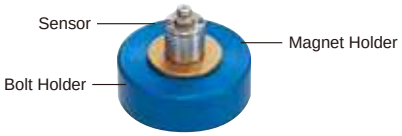
TT2000 Specifications

Measuring Range	5-10,000mm (Steel material)
Applicable Length of Bolt	50-9,000mm
Applicable Nominal Diameter of Bolt	φ6mm dia or more (Applicable for less than φ6mm dia. with an optional sensor)
Ultrasonic Wave Frequency	0.5-15 MHz
Time Axis Resolution	5ns
Result of Measurement	Bolt initial length (mm), Stress (Mpa), Elongation (mm), Propagation rate (μs)
Measuring Resolution	Depends on bolt diameter and length [Ex.] Based on the first echo measurement (steel material) Bolt diameter φ10, Bolt tightening length 50mm ±approx. 1.47kN Bolt diameter φ20, Bolt tightening length 100mm ± approx. 2.94kN
Memory Capacity of Data	2,000pcs. or time pass measurement 300 items (Max. 50 kinds of different bolts can be registered)
Bolt Temperature Correction	Manual input by key, Auto temperature input *1
Display	Color TFT6.4 type (640 × 480dots)
External Output	8 bits serial interface (RS232C) *2 Composite output (NTSC), Alarm output (photo coupler), Encoder input *3
Power Supply	AC85-130V, AC185-265V (50/60Hz) or DC12V *4
Optional Battery	Portable: 2.5h use for 1.5h Charge Built -in case: 8h use for 4.5h charge
Operating Temperature	0-45 °C
Dimensions	Body: H160 × W246 × D60mm Body + Built-in battery: H160 × W246 × D246mm
Weight	Body: 1.2kg Body + built-in battery:4.9kg

Note
1. Optional thermometer can be connected to TT2000C for auto temperature adjustment Input temperature range is from -40˚C to 200˚C. Measurement over 60˚C requires a sensor specially designed for high temperature.
2. RS232C connector is available only with TT2000C.
3. DC12V can be used only when using the optional portable battery or the built-in battery case.

TT2000 Optional Accessories

Model Name
RS232C Junction Cable A
Portable Battery Cable
RS232C Junction Cable B



Ultrasonic Sensor

Part #	Name	Applicable Bolts
607	5C6.4N	More than M8, L1<approx.50mm
608	5C12.7N	More than M14, L1<approx.2m

Note
1. L1 is standard bolt length with material in SCM, S-C, SS for ultrasonic wave reflection measurement n=1.
2. Ultrasonic wave sensor is consisting of 3 parts, Sensor, Magnet Holder and Bolt Holder.
3. Standard 5C6.4N does not include bolt holder.
4. 5C6.4N=[5: Frequency (MHZ)]
   [C: Oscillator Material (C: piezoelectric ceramics)]
   [6.4: Oscillator Diameter, mm]
   [N: Perpendicular (Normal)]

Features of ultrasonic wave sensor

1. The magnetic holder provides stabilized force through the sensor, which provides high repeatability measurement.
2. The bolt holder gives same position of the sensor to support more accurate measurement.

NEW

AFC-20G2

Axial Tension Calibrator

Model
AFC-20G2

Accuracy ±2%+1digit

Axial Tension Measurement Range [kN]	Min. - Max.	20 to 200
	1 digit	0.01
Available Bolt Size (Reference) [mm]		Less than φ20mm, Bolt nominal length 45 to 300
	M10 Standard accessory	45 to 80 (A nut with the same strength as the measurement bolt is required)
	M16 Standard accessory	50 to 85 (A nut with the same strength as the measurement bolt is required)
	M20 Standard accessory	70, 87, 170, 187, Max.300 (A nut with the same strength as the measurement bolt is required)
Dimensions [mm]	Overall Length	451
	Width	438 (Body300)
	Depth	409
Weight Approx. [kg]		55
Power		AC100 to 240V ±10% 50 / 60Hz
Temperature in Use		0 to 40℃ Less than 85%RH (No condensation)

BTM/ B-BTM

Bolt Tension Meter

Dial Indicating | Hydraulic | Bourdon Type

- Bourdon type hydraulic bolt tension meter
- Measure bolt tension to determine optimal torque

BTM400K

B-BTM13K

Accuracy ±3%

S.I. Model	Axial Tension Range [kN] Min.-Max.	Grad.	Metric Model	Axial Tension Range [ton] Min.-Max.	Grad.	American Model	Axial Tension Range [lbf] Min.-Max.	Grad.	Applicable Nominal Diameter of Bolts (Minimum Length) [mm]	Dimensions Overall Length [mm]	Overall Thickness [mm]	Overall Height [mm]	Weight [kg]
BTM400K	100-400	5	40BTM-2	10-40	0.5	40BTM-2-A	23000-90000	1000	Hexagon Bolt M16 (70), M20 (75) M22 (80), M24 (85) Torsia Bolt M16 (65), M20 (70) M22 (75), M24 (80)	260	64	280	12.6
B-BTM13K	1.2-13	0.2	1.3B-BTM	0.12-1.3	0.02	1.3B-BTM-A	300-2800	50	Standard Bolt M5 (20), M6 (21) M7 (22), M8 (23)	106	78	217	7.7
B-BTM40K	4-40	0.5	4B-BTM	0.4-4	0.05	4B-BTM-A	1000-9000	100	Standard Bolt M10 (29), M12 (31) M14 (32)	134	82	241	9.8
B-BTM130K	12-130	2	13B-BTM	1.2-13	0.2	13B-BTM-A	3000-28000	500	Standard Bolt M16 (41), M18 (43) M20 (44), M24 (47)	186	106	287	17.5
B-BTM400K	40-400	5	40B-BTM	4-40	0.5	40B-BTM-A	10000-90000	1000	Standard Bolt M27 (72), M30 (74) M36 (79), M42 (84)	280	126	369	31.0

Note
1. BTM400K comes with a plate and bushing for torsia bolt M20 and M22. Other size are optional.
2. "Hexagon Bolt" in the above list stands for the high-tensile hexagon bolt for friction bonding.

Standard Accessories: Plate, Bushing, Spanner for plate, Bolt for plate, Storage Case, Calibration Certificate

BTM Optional Accessories

Bushing for Hexagon Bolt

Part #	Applicable Nominal Diameter of Bolts
650	M16
651	M20
652	M22
653	M24

Bushing for Torsia Bolt

Part #	Applicable Nominal Diameter of Bolts
665	M16
666	M20
667	M22
668	M24

Plate for Torsia Bolt/Hexagon Bolt

Part #	Applicable Nominal Diameter of Bolts
669	M16
670	M20
671	M22
672	M24

Fcon

Bolt Tension Stabilization

RoHS

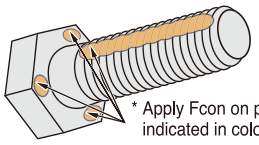
- Creates consistent bolt tension
- Applied to fasteners and nuts
- Acquisition of patent in EU.

Fcon

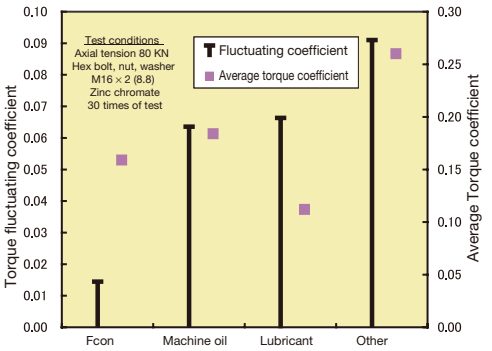
Model
Fcon

Sales Unit: 10pcs/case
Content: 90g/bottle

How to apply Fcon on the bolt (in case of M10 bolt)
Follow the illustration below. Apply some along the screw thread (2 mm width more or less), and on the bearing surface at 3 different spots evenly. Use appropriate amount depending on the size of the bolt.



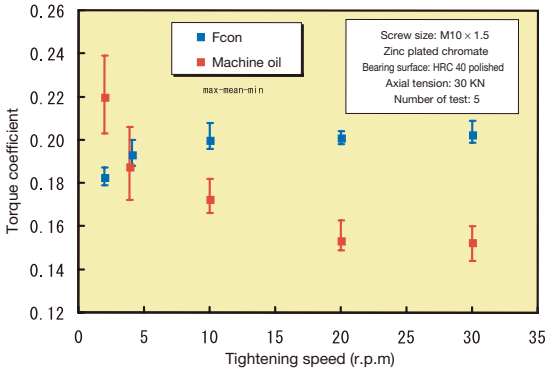
Axial Tension Stability Characteristics



Characteristic of axial tension stabilization

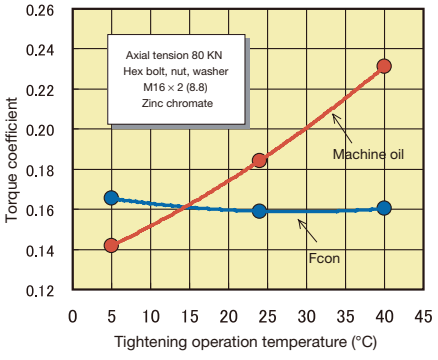
Torque coefficient calculated by formula K = t/(d × f)
T = tightening torque, d = nominal size of screw,
F = axial tension
Torque fluctuating coefficient =
torque coefficient standard deviation/average torque coefficient

Influence of Tightening Speed



Influence of tightening speed on torque coefficient

Influence of Temperature



Influence of temperature on torque coefficient