

## THE **MINI-MAX** v2.0 Bolt Tension Monitor

Ultrasonically measures the elongation produced by tightening a threaded fastener.



### Highlights:

- ▶ Precision TCXO timing.
- ▶ Sunlight readable LCD display (240 x 160 pixels) .
- ▶ Adjustable digitizer - Resolution.
- ▶ Pulse-Echo measurement mode.
- ▶ Temperature compensation.
- ▶ Quantities - Elongation, Load, Stress, Strain and Time (nanoseconds). to the loaded waveform.
- ▶ Auto Correlation - transducer placement.
- ▶ Auto Calibration.
- ▶ USB-C connectivity.
- ▶ 4GB internal SD memory.
- ▶ PC & OSX reporting software.
- ▶ 2 year warranty.

# MINI-MAX SPECIFICATIONS

## Physical

**Weight:** 13.5 ounces (with batteries).

**Size:** 2.5W x 6.5H x 1.24D in (63.5 x 165 x 31.5 mm).

**Operating Temperature:** 14° to 140°F (-10° to 60°C).

**Keyboard:** Membrane switch with twelve tactile keys.

**Case:** Extruded aluminum body with nickel plated aluminum end caps (gasket sealed).

**Environmental:** Meets IP65 requirements.

## Connections

**USB:** Direct USB-C 1.1 PC connectivity. Windows & OSX interface software.

**Line Power:** USB-C to PC or AC adaptor.

**Temperature Sensor:** 5 pin Lemo 1.

**Transducer Connector:** Lemo 00.

## Memory

**Log Format:** Grid (Alpha Numeric).

**Capacity:** 4GB internal SD memory.

**Screen Capture:** Tagged interface file (.tif) capture for quick documentation.

**Custom Setups:** 64 user configurations.

## Power Source

**Line Power:** USB to PC or power outlet.

**Batteries:** Three AA cells.  
Alkaline 35 hrs, Nicad 10 hrs, NI-MH 35 hrs.  
Auto power off after 5 minutes idle.  
Battery status icon.

## Transducers

**Transducer types:** Single element - 1 MHz to 10 MHz frequencies, and 1/8" to 1" diameters.

**Glue-On:** Available for short bolts with minimal/short elongations to eliminate transducer placement errors.

**Connectors:** Microdot, Lemo 00, or BNC options depending on the transducer model selected.

**Custom transducers:** Available for special applications.

**Temperature probe:** Automatic temperature compensation.

## Electronics

**Display:** 1/8in VGA grayscale display (240 x 160 pixels); viewable area 2.4 x 1.8in (62 x 45.7mm); EL backlit (on/off/auto invert).

**Screen Refresh Rate:** 30 Hz.

**Timing:** Precision TCXO timing with single shot 100 MHz 8 bit ultra low power digitizer.

**Pulser Type:** Square Wave.

**Pulser Voltage:** Selectable 100, 150 and 200 volts.

**Pulse Width:** Selectable options Spike, Thin, and Wide. 80 to 400 ns.

**Damping:** 50, 75, 100, 300, 600, & 1500 ohms.

**Frequency Band:** Broadband 1.8 - 19 MHz (-3dB) filter.

**Horizontal Linearity:** +/- 0.4% FSW.

**Vertical Linearity:** +/- 1% FSH.

**Amplifier Linearity:** +/- 1 dB.

**Amplitude Measurement:** 0 to 100% FSH, with 1% resolution.

**Delay:** 0 - 999.9 in (25,400 mm) at steel velocity.

**Measurement Gate:** One gate with audible and visual alarm. Amplitude 5-95%, 1% steps.

## Features

**Setups:** 64 custom user defined setups; factory setups can also be edited by the user.

**Auto Set:** Automates the detection, scope, and display setting process for each individual bolt.

**Alarm Limits:** Adjustable Hi/Low tolerances with visual LED's and audible beeper.

**Field Calibration:** Vector or Regression correction curve for increased accuracy using Load & Stress.

## Display Views

**A-Scan:** Rectified +/- (half wave view), or RF (full waveform view).

**Large Digits:** Digital display only.

**Alarm Limits Bar:** Hi & Lo alarm limits for displaying an acceptable tolerance range.

## Measuring

**Units:** English (in), Metric (mm), or Time ( $\mu$ s). Fahrenheit or Centigrade.

**Velocity:** 0.0492 to .5510 in/ $\mu$ s (1250-13995 m/s).

**Measurement Modes:** Pulse-Echo (P-E).

**Measurement Range:** 1 in to 50 ft (25.4 mm to 15.24 M), dependent on material type and consistency.

**Detection:** Zero Crossing.

**Resolution:** +/- 0.00001 in (0.0001 mm).

**Calibration:** Automatic, Fixed, Single or Two-Point zero calibration options.

**Quantities:**

**Time** - Nanoseconds.

**Elongation** - Change in length (inches/millimeters).

**Load** - Force load applied (pounds KIP, or megapascals MPa).

**Stress** - Force for unit area stress applied (inches per inch or millimeters per millimeter).

**%Strain** - Ratio of elongation to effective length.

**Bolt Materials:** Select types from a preset or custom list.

**Repeatability Bar Graph:** Bar graph indicates stability of measurement.

## Certification

Factory calibration traceable to NIST & MIL-STD-45662A.

## Warranty

2 year limited



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