

DATA  
SHEET  
BT-ECM-1

## Ultrasonic Bolt Load Measurement

# BOLTIGHT<sup>®</sup> echometer

The **echometer** ultrasonically measures the elongation, stress and load in fasteners, quickly and accurately, and displays the result on an easy to read screen.

The measurement is achieved by determining the change in the transit time, of an ultrasonic shock wave along the length of the fastener as the fastener is tightened. The unit works with all bolt tightening systems and is used to monitor the fastener during the tightening process to ensure accurate initial loading. The Retained load in the fastener can then be monitored at any time .

Echometer minimises the requirement for extensive operator training. With built in data recording and reporting through an RS232 interface, the echometer is quick and easy to use and offers a reliable solution to the most difficult bolting problem.

### KEY FEATURES:

- Quick and simple to operate.
- Compact and durable for proven reliability.
- Minimal operator training required.
- Provides elongation, load, stress and strain measurements.
- Accurate and reliable.
- Designed to complement Boltight bolt tensioning.
- Easy measure during tightening and monitoring during plant operation.
- Cost effective.
- Simple data recording and reporting.



**DATA SHEET  
BT-ECM-1****Specification****Physical****Size:**

Width (2.5in/63.5 mm)  
Height (6.5 in/165 mm)  
Depth (1.24 in/31.5 mm)

**Weight:**

0.4kg (with batteries).

**Keyboard:**

Membrane switch pad with twelve tactile keys.

**Operating Temperature:**

14°F to 140°F (-10°C to 60°C)

**Case:**

Extruded aluminum body with nickel-plated aluminum end caps (gasket sealed).

**Data Output:**

Bi-directional RS232 serial port.  
Windows® PC interface software.

**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).

**Ultrasonic Specifications  
Measurement****Modes:**

Pulse-Echo (standard)  
Pulse-Echo w/Gate (fine adjust)

**Pulser:**

Square wave pulser with adjustable pulse width (spike, thin, wide).

**Receiver:**

Manual or Auto Set gain control with 40dB range.

**Power Source**

Three 1.5V alkaline or 1.2V NiCad AA cells.

Typically operates for 150 hours on alkaline and 100 hours on NiCad.

Auto power off if idle 5 min.

Battery status icon.

**Measuring**

**Range:** From 1" to 48" (25.4mm to 1220mm) length bolts.

**Time** - Nanoseconds.

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

**Load** - Force load applied (pounds kip or kilo newtons kN).

**Stress** - Force per unit area stress (pounds kpsi or mega pascals MPa).

**Strain %** - percentage strain applied (inches per inch or millimeters per millimeter)

**Resolution:**

+/- .00001 inches (0.0001 mm)

**Velocity Range:**

.0492 to .3936 in/ms  
1250 to 9999 meters/sec

Fixed, Single, and Two point zero calibration options.

Select bolt material types from a preset or custom list.

**Units:**

Imperial & Metric.

**Display**

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

**Limits Bar (alarm limits) -**

Set Hi & Lo alarm limits for displaying an acceptable tolerance range.

Repeatability Bar Graph - Bar graph indicates stability of measurement.

**Data Logger (Internal)**

Total of 8,000 readings, multiple bolt groups. Stores both waveform views, nanoseconds, elongation, load, stress, and strain for each reading.

**Memory:**

16 megabit non-volatile ram.

**Transducer****Transducer Types:**

Single Element (1 to 10 MHz & 1/8" to 1" diameters).

Locking quick disconnect "00" LEMO connectors.

Standard 10 foot cable.

Custom transducers and cable lengths available on request.

Temperature probe for automatic temperature compensation.

**Alarm Limits:**

Set hi and lo tolerances with audible beeper, viewable scan bar, and visual LEDs.

