

# Ultrasonic Load Monitoring



# Because ensuring a leak-free solution is critical. It has to be Hydratight.

For more than 100 years, Hydratight has provided world-class bolted joint solutions, assessing and managing joints to ensure leak-free start-ups. Today, we continue to set international standards in joint integrity—but we're so much more than just a bolting and on-site machining company.

Because even the tiniest leak can be costly and time consuming to repair, we manage every joint on a project for leak-free start-ups and production, which in turn removes the threat of environmental impact caused by unsafe joints. Safety continues to be the most important aspect of our business. We are a global organization making a real difference to the industries and communities we work in, committed to improving safety, operational efficiency and uptime.

Because you require the support of an innovative partner committed to your success, we not only offer unrivalled service on a global scale, including customer training and software development; but also design and manufacture quality tools and equipment for bolted joint solutions to the highest standards. Our certified teams are dedicated to working closely with you, assessing and managing every joint on your project to prevent leaks from ever occurring, year in, year out.

Because you value safety and reliability, we work to ISO 9001, ISO 14001 and OHSAS 18001 standards in everything we produce, from manufacturing torque and tension bolting equipment to mechanical connectors, from on-site service to creating custom solutions in line with client specifications.

It means that whenever you need a complete joint integrity solution, whichever industry sector you're in, you can rely on us to get it 100% right first time, every time. **This is why it has to be Hydratight.**



## Engineering Driven Safety Focused Solutions



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# Ultrasonic Load Monitoring

Relying on operator skill alone to ensure that the correct load has been applied to a joint can result in a large margin of error; there are instances where a secondary validation should be used. Hydratight's global fleets have been using ultrasonic technology for more than 25 years, and today we provide two great choices for users.

The BoltScope Ultra and the BoltScope Pro ultrasonically measure the actual load in the fastener at point of load and throughout the service life of the fastener.

## Safe and reliable bolt load monitoring

Using BoltScope Pro & BoltScope Ultra to measure any critical application ensures the final loop of joint integrity is captured and recorded.

Using the latest ultrasonic technology, both the BoltScope Pro & BoltScope Ultra units offer an easy and quick method to measure fastener load, stress and elongation. With a clear and easy to read display, the user can quickly and accurately monitor fasteners before, during and after the tightening process. Fasteners can then be monitored throughout their life cycle. The field captured data can easily be uploaded for offline reporting, retention and analysis.

## How it works

The technology of the equipment is based on a well-known and reliable pulse-echo measuring technique. An ultrasonic transducer is placed on one end of the fastener and when voltage is applied to the transducer, a longitudinal ultrasonic wave is generated. That wave travels down the length of the fastener; it then reflects off the other end and returns to the transducer.

This captured signal process is known as "Time of Flight," and the process is measured when the fastener is at zero load and again after the fastener has been tightened. The change in "Time of Flight" between both measurements establishes the resultant fastener stress. The resultant stress is extrapolated to display load, elongation and strain.

## Applications

Hydratight's ultrasonic products are ideally suited for any application requiring accurate fastener tension measurements, including:

- Oil & gas (offshore & onshore)
- Power generation: Nuclear & steam
- Wind
- Petrochemical
- Construction industry
- Automotive
- Aerospace



# BoltScope Ultra

The BoltScope Ultra is a quick and simple to use device that is cost effective and uses the latest technology to measure elongation, stress and load in fasteners. It accurately monitors the fastener from the initial tightening process and thereafter throughout the fastener's service life.



The Ultra is a powerful unit which can monitor almost any length of fastener while maintaining constant signal and strength. The Ultra is designed to verify any application that requires close load tolerances on fasteners. Loaded and un-loaded bolt readings can be displayed on a large color easy to read screen at any time throughout the bolts' active service life. The device can be configured for linear regression or vector readings to assist load measurement optimization.

The Ultra includes 64 custom user configurations and automates the detention, scope, and display setting process for each individual bolt. A powerful auto-set facility automatically optimizes signal detection, strength, and stability. With just one button press, the process optimizes the signal and displays results accordingly, ultimately reducing the need for operator interrogation of reading.

The Ultra has a built-in fastener temperature feature in addition to an automatic temperature probe. Temperatures can now be monitored more efficiently than ever before.

The product comes complete with all necessary accessories in a compact carrying case.



**Features**

- Quantities—Elongation, Load, Stress, Strain and Time (nanoseconds)
- Large viewable screen, easy to navigate via user interface
- Measures from 1" (25.4 mm) up to 999" (25.3 m) fastener lengths
- Measure modes—Pulse-Echo, Echo-Echo, Echo-Echo-Verify (triple echo)
- Auto correlation—Transducer placement
- Custom auto calibration feature
- Fixed, single and two-point zero calibration options
- Automatic temperature compensation
- Readings can be stored offline for joint integrity reporting and analysis, including screen capture for offline documentation
- Ability to import & export files
- 4GB internal & up to 64GB external SD memory
- USB 1.1 connectivity
- Analog, serial & alarm outputs
- Sunlight readable color QVGA display (320x240 pixels)
- Li-Ion pack & 6 AA emergency battery backup option
- Complete with transducer, transducer cable, and automatic temperature probe
- Full two year warranty on parts and labor excluding batteries, transducer



Part Number	Description	Contents
B1300A0000XX	BoltScope Ultra Kit	Includes the BoltScope Ultra Monitor, Transducer Cable Lemo to Microdot 10 Foot, Temp Sensor (c/w 6' Cable), Couplant 4 oz. Bottle, Calibration Bars (Steel Grade 4140 3" & 6" Lengths), Instrument Carrying Case, USB A to USB B Cable, Power Adaptor (12 Volts @ 2 Amps – 6' Cable), and Printed Operation Manual

**Physical Description**

Width	8.5"	216 mm
Height	6.5"	165.1 mm
Depth	2.5"	70 mm
Weight including batteries	4.5 lbs	2.04 kg

**Display**

Display Views	RF (full wave view), +/- Rectified (half wave view), Digits, or split screen combination (wave plus large digits)	
Capacity	4 GB internal & up to 64 GB external	
Offline Data Transfer	SD card or USB direct	
Pixel Density (w x h)	320 x 240	
Viewing Area (w x h)	4.54" x 3.40"	115.2 x 86.4 mm

**Power Supply**

Lithium Ion Pack	10.8v, 2 amp hrs, typical operation 18 hrs
Batteries Required	Emergency battery backup: Six 1.5V alkaline, 1.2V AA Nicad cells, 1.2V AA NI-MH, or other equivalent power source
Operating Time	(continuous use): Alkaline (12 hrs), Nicad (5 hrs), and NI-MH (12 hrs), with default settings

# BoltScope Pro

The BoltScope Pro compliments the Ultra as the smallest of Hydratight's range of ultrasonic monitoring devices; the smaller, lighter unit provides increased mobility and ease of use for operators working in difficult to reach locations.



The pocket sized BoltScope Pro enhances existing technologies and is packaged to work on the harshest and most complex applications, producing the highest levels of accuracy required to complete a joint integrity solution.

The Pro incorporates most of the Ultra functions into its compact design. Captured data can be uploaded for offline storage, analysis and reporting just as the Ultra.

BoltScope Pro has a tough aluminium body with sealed end-caps for long service in tough conditions.

## Features

- Mobile and compact design makes it suitable for the most difficult to reach bolt locations
- Compact screen, easy to navigate via user interface
- Quantities—Elongation, Load, Stress, Strain and Time (nanoseconds)
- Measures from 1" (25.4 mm) up to 48" (1.2 m) fastener lengths
- Measure mode—Pulse Echo
- Auto correlation—Transducer placement
- Custom auto calibration feature
- Fixed, single and two-point zero calibration options
- Stores up to 8,000 readings with WAVEFORMS in multiple groups
- Automatic temperature compensation
- Readings can be stored offline for joint integrity reporting and analysis
- Create up to 64 custom defined applications
- Serial to USB 1.1 connectivity
- Complete with transducer, transducer cable, and automatic temperature probe
- Full two year warranty on parts and labor excluding batteries, transducer



Part Number	Description	Contents
B0500A0000XX	BoltScope Pro Kit	Includes the BoltScope Pro Monitor, Transducer Cable Lemo to Microdot 10', Temp Sensor (c/w 6' Cable), Couplant 4oz. Bottle, Calibration Bars (Steel Grade 4140 3" & 6" Lengths), Instrument Case, Data Cable – 6', USB A to Serial Port 9 Pin Adaptor, Universal Power Cord, and Printed Operation Manual

## Physical Description

Width	2.5"	63.5 mm
Height	6.5"	165.1 mm
Depth	1.24"	31.5 mm
Weight including batteries	0.84 lbs	381 g

## Display

VGA Grayscale Display	1/8" (3.2 mm) VGA	
Viewing Area (w x h)	1.8" x 2.4"	45.7 mm x 62.0 mm
Pixel Density (w x h)	160 x 240	
EL Backlit	on/off/auto	

## Power Supply

Batteries Required	3 x 1.5V alkaline or 1.2V NiCad 'AA' batteries
Operating Time	150 hours on alkaline and 100 hours on NiCad (charger not included)

# Device Comparison

Hydratight has set the benchmark of accuracy in fastener load monitoring, and our BoltScope products are established and recognized as the market standard. To remove ambiguity and improve infrastructure reliability, compare our two commonly used systems to choose the product that best applies for your specific application.

The BoltScope Ultra is the latest addition to our bolting products. It integrates all of the great features of the BoltScope Pro product, with added benefits in terms of features, hardware, speed, and display. The BoltScope Pro is smaller, lighter and easy to use in difficult to reach locations.

The following chart provides an organized side-by-side comparison of the leading features for the BoltScope Ultra and BoltScope Pro to assist in determining which product has the greatest advantages for the in-application environment in which it will be utilized.

## BoltScope Product Comparison

Choose which device works for you.

Features	BoltScope Ultra B1300A0000XX	BoltScope Pro B0500A0000XX
Measurement range	1"-999" (2.54 cm–25.37 m)	1"–48" (2.54–121.92 cm)
Measurement modes	Pulse Echo, Echo Echo, Echo Echo Verify	Pulse Echo
Screen Size	4.54" x 3.4" (11.53 x 8.64 cm)	2.4" x 1.8" (6.10 x 4.57 cm)
Screen Display	Color	Monochrome
Screen Readable In Direct Sunlight	Yes	—
Screen Capture For Offline Documentation	TIF format	—
Monitor Size (W x H x D)	8.5" x 6.5" x 2.5" (21.59 x 16.51 x 6.35 cm)	2.5" x 6.5" x 1.24" (6.35 x 16.51 x 3.15 cm)
Weight	4.5 lbs (2.04 kg)	0.84 lbs (381 g)
Internal Memory Capacity	4GB	16MB
Offline Data Transfer	SD Card or USB Direct	RS232 Serial to USB
Battery Use (Alkaline)	12 hrs	150 hrs

If you'd like to discuss your application in more detail, or want more information about any of these products, please contact your local Hydratight representative today, email us at [solutions@hydratight.com](mailto:solutions@hydratight.com), or visit [hydratight.com](http://hydratight.com) for more information.



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