

# Pipe Profiling Sonar

## Model 1512E



### 1512E SONAR UNDERWATER UNIT



Ethernet Interface Unit  
with AC to DC PSU



Float Mount



Tractor Mount

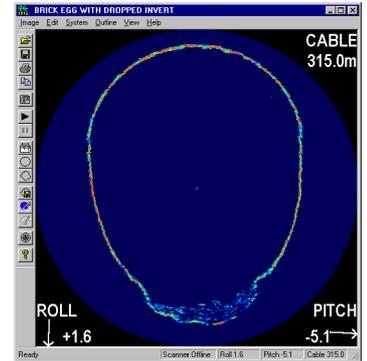
The Model 1512E Pipe Profiling Sonar provides an acoustic method for profiling the interiors of liquid filled pipes or boreholes. This method does not require draining of the pipes as with camera surveys and provides accurate quantified data which can not be obtained from a camera display alone.

The equipment comprises of an underwater Scanning Unit (which may be skid, float, tractor or ROV mounted) and a compact Ethernet interface Unit. To complete the system a "Windows" P.C. with an Ethernet port is required to run the 1512E system software.

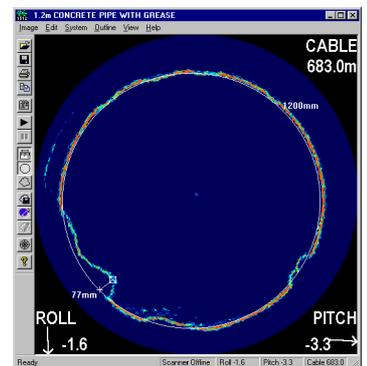
The Scanning Unit is a rugged stainless steel cylinder with a pressure balanced  $\mu$ PVC transducer housing at one end, and the umbilical cable connector at the other. The standard Scanning Unit is rated at 500m operational depth. Two lead-acid batteries could be used to power the Scanning Unit together with a Laptop P.C. for a completely portable solution. Internal Pitch and Roll sensors display in analogue and digital form the orientation of the sonar in the pipe.

The Ethernet Interface Unit connects to the host P.C. running under the "Windows" operating system. ( XP upwards is supported ). The Ethernet Interface has inputs for a cable payout encoder so that the distance travelled may be displayed to 0.1m resolution allowing accurate determination of where flaws exist in the pipe relative to the deployment position. The Ethernet Interface is powered from the AC mains supply and is electrically isolated from the supply generated for the underwater scanner.

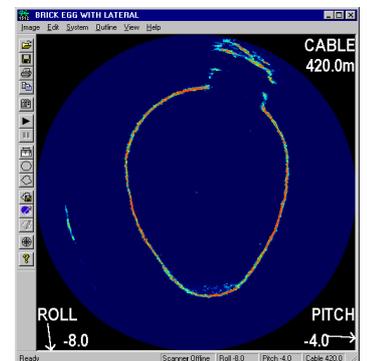
- **FEATURES INCLUDE**
- **Real Time continuous scanning over a full 360 degrees in 1 sec**
- **"Windows" user-friendly software with Ethernet connection minimises training time**
- **Direct capture to Hard Disk for high resolution image save and restore**
- **Dual tracking cursor for accurate on-screen measurements**
- **Internal Pitch and Roll sensors**
- **Quadrature counter interfaces built in**
- **500m cable drive as standard, fibre-optic system optional**
- **Automatic profile detection and output in ASCII format for import into third party 3D modelling software**



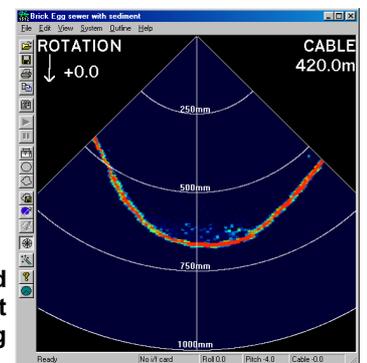
Quantify damage and deformation



Measure sludge build up



Locate Lateral Connections



Expand detail in sector mode



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The resolution and update speed of the Model 1512E Pipe Profiling Sonar is second to none in the field of mechanically scanned sonars. The angular resolution of the system is 0.9° which gives 400 sectors per revolution. For each sector the data is oversampled and peak detected. The digitally generated graphics display uses 256 colours to represent the signal amplitude. At a minimum full-scale range of 125mm this gives a range resolution of 0.5mm and at 3m range the resolution is 5mm.

The acoustic beamwidth of 1.1° ensures that the finest detail from the pipe surface is recorded. A 3 axis accelerometer inside the scanner records the attitude of the sonar to a resolution of 0.1°. The sonar has been engineered for extended operations in hostile environments. The transducer and drive motor are totally enclosed in an oil-filled pressure balanced housing which is hermetically sealed from the stainless steel electronics pod.

The system has many applications other than inside pipes where short range high precision measurements are required with a rapid screen update.

## Marine Electronics Model 1512E Pipe Profiling System

### Software Features

<i>Display Modes:</i>	Polar - full 360 degree coverage Sector - 30° to 270° arc width at 30° to 330° centre angles in 30° steps
<i>Range Settings (mm):</i>	125, 187, 250, 375, 500, 750, 1000 1500, 2000, 3000, 4500, 6000
<i>Range Settings (in):</i>	5, 7.5, 10, 15, 20, 30, 40, 60, 80, 120, 180, 240
<i>Range Resolution:</i>	1/200, 1/400, 1/600 of full scale range
<i>Angular Resolution:</i>	0.9 degrees
<i>Tx Pulse Length:</i>	Variable 2usec to 20usec
<i>Display Resolution:</i>	400 sectors
<i>Colour Control:</i>	8bit multiple palettes with min, max and step control to optimise dynamic range
<i>ASCII Output:</i>	NMEA style profile string via RS232
<i>Operating System:</i>	Windows XP Upwards

### Underwater unit

<i>Acoustic Frequency:</i>	2MHz
<i>Beam Width:</i>	1.1 degrees conical
<i>Receiver:</i>	Logarithmic
<i>Bandwidth:</i>	500kHz
<i>Pitch/Roll Sensors:</i>	3 Axis accelerometers resolution 0.1 degrees
<i>Power Requirements:</i>	+24VDC at 1A maximum
<i>Overall Length:</i>	346mm
<i>Diameter:</i>	70mm
<i>Finish:</i>	Stainless Steel 316 with µPVC transducer housing
<i>Operating Depth:</i>	500m
<i>Operating Temp:</i>	+5 to + 40 degrees C
<i>Storage Temp:</i>	-20 to +70 degrees C
<i>Weight in Water:</i>	1.75 kg
<i>Weight in Air:</i>	3.0 kg

### Ethernet / PSU Interface

<i>Protocols:</i>	10/100 Base-T Ethernet
<i>Power Input:</i>	110v / 230v AC 50/60Hz Switch Selectable
<i>Power Output Variable:</i>	+22v to +34v DC 1 Amp
<i>Cable Payout Input:</i>	+5V quadrature
<i>Dimensions:</i>	Width: 180mm Depth: 180mm Height: 110mm

### Options Include:

- ◆ Underwater Unit with integral Ethernet output
- ◆ Cable drum with slip rings (various lengths)
- ◆ Fibre-optic drive modules for extended cable length



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