

Pipe Profiling Sonar

Model 1512USB



1512 SONAR UNDERWATER UNIT



USB Interface Unit



USB Interface Unit
with AC to DC PSU



Float Mount



Tractor Mount

The Model 1512 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 USB interface Unit. To complete the system a "Windows" P.C. with a USB port is required to run the 1512 system software.

The Scanning Unit is a rugged stainless steel cylinder with a pressure balanced μ PVC transducer housing at one end, and the umbilical cable connector at the other. The standard Scanning Unit is rated at 1000m operational depth. Two lead-acid batteries could be used to power the Scanning Unit together with a notebook 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 USB Interface Unit connects to either a USB1.1 or USB2.0 port on a host P.C. running under the "Windows" operating system. (Win'98 upwards is supported). The USB 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 USB Interface is self-powered from the P.C.

FEATURES INCLUDE:

Real Time continuous scanning over a full 360 degrees in 1 sec

"Windows" user-friendly software with USB hardware minimises training time

Direct capture to Hard Disk for high resolution image save and restore

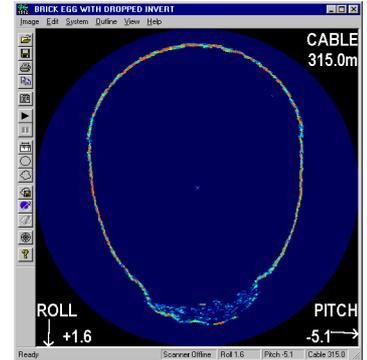
Dual tracking cursor for accurate on-screen measurements

Internal Pitch and Roll sensors

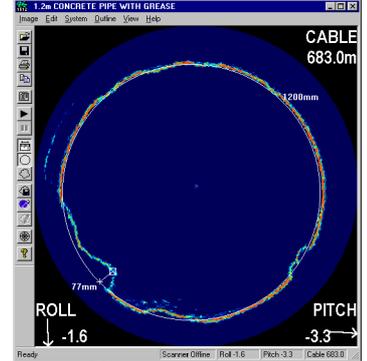
Quadrature and compatible cable counter interfaces built in

500m cable drive as standard, fibre-optic system optional

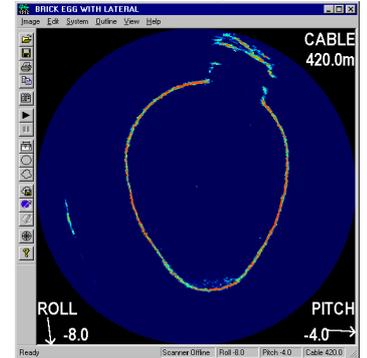
Automatic profile detection and output in ASCII format for import into third party 3D modelling software



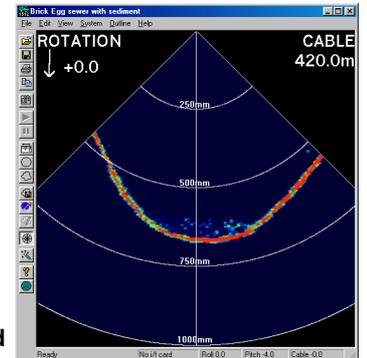
Quantify damage and deformation



Measure sludge build up



Locate Lateral Connections



Expand detail in sector mode



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Pipe Profiling Sonar

Model 1512USB



The resolution and update speed of the Model 1512 Pipe Profiling Sonar is second to none in the field of mechanically scanned sonars. The 2MHz acoustic signal is amplified and logarithmically compressed prior to being digitised by a Flash A/D converter. 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 to arrive at 250 range cells. 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 12mm.

The acoustic beamwidth of 1.1° ensures that the finest detail from the pipe surface is recorded. Pitch and Roll sensors inside the scanner record 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 1512 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>	1/250 of full scale range eg. 0.5mm at 125mm
<i>Angular Resolution:</i>	0.9 degrees
<i>Sample Rate:</i>	Programmable up to 5MHz
<i>Tx Pulse Length:</i>	Variable 4usec to 20usec
<i>Display Resolution:</i>	400 sectors of 250 range cells
<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>AutoStart:</i>	May be used autonomously without keyboard, mouse or display for remote data capture when it is not possible to use a cable
<i>Viewer Program:</i>	A separate viewer program is available to allow clients to post process and print stored images
<i>Operating System:</i>	Windows '98, ME, 2000, NT, XP

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>	Micromachined 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

USB Interface

<i>Protocols:</i>	USB 1.1 and USB 2.0
<i>Cable Payout Input:</i>	+5V quadrature or Pearpoint
<i>Power Requirements:</i>	+5VDC at 200mA typical (self-powered from USB port)
<i>Dimensions:</i>	Width: 110mm Depth: 165mm Height: 35mm

Options Include:

- Miniature probe for pressurised water mains
- Cable drum with slip rings (various lengths)
- Fibre-optic drive modules for extended cable length



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