

Pipe Profiling Sonar System Austeck Marine Electronics Model 1512USB



The **Model 1512 Pipe Profiling Sonar** provides an acoustic method for profiling the interiors of liquid filled pipes, chambers 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 an underwater scanning unit (which may be skid, float, tractor or ROV mounted), an Acoustic Processor unit and a high resolution colour monitor. The Acoustic Processor unit and monitor are housed in rugged aluminium cases which may be used free standing or mounted in a 19" rack unit. The underwater scanning unit is housed in a stainless steel pressure vessel which is rated at 1000m working depth.

The Acoustic Processor unit is fitted with a hard disk drive, an LS120 floptical drive and a CD/RW drive for storing still frame images from the display screen at full resolution. The stored images can be loaded back into the system, cursors can be positioned and measurements taken to allow post analysis of the data. There is a PAL or NTSC compatible composite video output so that the entire survey may be logged onto a standard VHS or S-VHS video recorder. As the scanner is moved through the pipe an indication of the distance travelled is shown on the screen to a resolution of 0.1m allowing for accurate determination of the location of defects in the pipe. Internal sensors monitor the attitude of the scanning unit and display Pitch and Roll indicators in analogue and digital form on the screen to show the orientation of the unit.

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 the 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 internal surface of the pipe 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 housing which is hermetically sealed from the electronics pod.

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

FEATURES/BENEFITS

- Real Time continuous scanning over a full 360° in under 1 second
- 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 Pearpoint compatible cable counter interfaces built in
- 600m cable drive as standard, fibre-optic system optional
- Automatic profile detection and output in ASCII format for import in third party 3D modelling software

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SPECIFICATIONS

Software

Display Modes	<ul style="list-style-type: none">• Polar - full 360 degree coverage Sector - 30° to 270° arc width at 30° to 330° centre angles in 30° steps
Range Settings	<ul style="list-style-type: none">• 125, 187, 250, 375, 500, 750, 1000 1500, 2000, 3000, 4500, 6000
Range Resolution	<ul style="list-style-type: none">• 1/250 of full scale range eg. 0.5mm at 125mm
Angular Resolution	<ul style="list-style-type: none">• 0.9 degrees
Sample Rate	<ul style="list-style-type: none">• Programmable up to 5MHz
Tx Pulse Legth	<ul style="list-style-type: none">• Variable 4µsec to 20µsec
Display Resolution	<ul style="list-style-type: none">• 400 sectors of 250 range cells
Colour Control	<ul style="list-style-type: none">• 8bit multiple palettes with min, max and step control to optimise dynamic range
ASCII Output	<ul style="list-style-type: none">• NMEA style profile string via RS232 or to file
Autostart	<ul style="list-style-type: none">• May be used autonomously without keyboard, mouse or display for remote data capture when it is not possible to use a cable
Viewer Program	<ul style="list-style-type: none">• A separate viewer program is available to allow clients to post process and print stored images
Operating System	<ul style="list-style-type: none">• Windows '98, ME, 2000, NT, XP

Under Water Unit

Acoustic Frequency	<ul style="list-style-type: none">• 2MHz
Beam Width	<ul style="list-style-type: none">• 1.1 degrees conical
Receiver	<ul style="list-style-type: none">• Logarithmic
Bandwidth	<ul style="list-style-type: none">• 500kHz
Pitch/Roll Sensors	<ul style="list-style-type: none">• Micromachined accelerometers resolution 0.1 degrees
Power Requirements	<ul style="list-style-type: none">• +24VDC at 1A maximum
Overall Length	<ul style="list-style-type: none">• 346mm
Diameter	<ul style="list-style-type: none">• 70mm
Finish	<ul style="list-style-type: none">• Stainless Steel 316 with µPVC transducer housing
Operating Depth	<ul style="list-style-type: none">• 500m
Operating Temp	<ul style="list-style-type: none">• 0 to + 40 degrees C
Storage Temp	<ul style="list-style-type: none">• -20 to +70 degrees C
Weight in Water	<ul style="list-style-type: none">• 1.75 kg
Weight In Air	<ul style="list-style-type: none">• 3.0 kg

USB Interface

Protocols	<ul style="list-style-type: none">• USB 1.1 and USB 2.0
Cable Payout Input	<ul style="list-style-type: none">• +5V quadrature or Pearpoint
Power Requirements	<ul style="list-style-type: none">• +5VDC at 200mA typical (self-powered from USB port)
Dimensions	<ul style="list-style-type: none">• 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 long sea-outfalls

