

Cavity Profiling Sonar Systems Marine Electronics Mk1 & Mk2



FEATURES/BENEFITS

- Rugged down-hole probes
- Directional or omni-directional surveying
- Surveying through cavity lining tubes
- Robust 1000m digital data telemetry
- High Resolution SVGA display
- Dual tracking cursor for on-screen measurements
- Save and restore raw data at full resolution
- Winch interface for auto depth logging
- Data download for external processing

Marine Electronics currently manufactures two different types of cavity profiling sonar probes. Both probes are designed to meet the robust requirements needed for surveying fluid filled cavities and are rated at 1000m operational depth. The probes are constructed from 316 Stainless Steel, acrylic and polyurethane so that they are inert to a wide range range of chemicals.

The **Mk1 probe** is only 50mm in diameter and has a fixed transducer with an omni-directional beam pattern in the horizontal plane and a narrow beamwidth in the vertical plane. The probe is used to obtain quantitative measurements about an underground cavities minimum and maximum dimensions as it is lowered through the cavity, usually taking readings every metre or so.

The Mk1 probe is designed to operate through the metal lining tubes of the cavity. To optimise the acoustic signal for variations in the number of lining tubes, and their condition, the operating frequency of the probe is tuneable and the transmit power variable. For each depth at which readings are taken the probe produces a number of echo returns from around the cavity which are grouped into amplitude bands with range to indicate the boundaries of the cavity.

The Mk1 probe interfaces to a surface computer via a seven core steel armoured down-hole logging cable of up to 1000m in length. The surface computer is based around the P.C. format mounted in a rugged 19" rack unit together with the DC power supply for the probe.

The **Mk2 probe** is 100mm in diameter and has three rotating highly directional transducers driven by a powerful geared DC motor. The Mk2 probe is designed to be used when the lining tubes are withdrawn from the cavity so that accurate directional ranges may be obtained.

The Mk2 probe has three transducers mounted at angles of 0°, +45° and -45° which enables profiles to be taken even when near the roof or floor of the cavity. The transducers operate at 700kHz and have a narrow conical beam pattern. The transducer head is coupled via slip-rings so may freely rotate through 360°. Normally a sweep is taken every 1m or so in depth with 400 transmit/receive cycles (0.9° angular increments) per revolution. The time taken to gather the data for one sweep is range dependant but is typically only one minute at a 50m range.

The Mk2 probe has a built in flux-gate compass which is linked into the head positioning software such that the graphical display of the cavity cross-section is oriented relative to magnetic North.

The probe connects to a PC interface card in a similar manner to the Mk1 probe via a four core armoured logging cable.



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SPECIFICATIONS

Mk1 Omni-Directional Cavity Probe

Dimensions:	<ul style="list-style-type: none">Length: 1700mmDiameter: 50mm
Weight:	<ul style="list-style-type: none">20kg
Material:	<ul style="list-style-type: none">316 Stainless Steel and Acrylic
Temperature:	<ul style="list-style-type: none">Operating: 0°C to +40°C Storage: -20°C to +65°C
Operating Depth:	<ul style="list-style-type: none">1000m
Operating Frequency:	<ul style="list-style-type: none">Variable 28kHz to 41.5kHz
Transducer:	<ul style="list-style-type: none">Cylindrical in oil filled pressure balanced Acrylic housing
Vertical Beamwidth:	<ul style="list-style-type: none">7° at 33kHz and VoS 1800m/s
Horizontal Beamwidth:	<ul style="list-style-type: none">360°
Transmit Pulse Length:	<ul style="list-style-type: none">Variable 100µsec to 2msec
Transmit Power:	<ul style="list-style-type: none">Variable up to 400W
Receiver Gain:	<ul style="list-style-type: none">Variable with 16 levels
Power Supply:	<ul style="list-style-type: none">+/-40v DC at 250mA
Cable Requirements:	<ul style="list-style-type: none">7 core + armoured screen

Mk2 Directional Cavity Probe

Dimensions:	<ul style="list-style-type: none">Length: 1424mmDiameter: 100mm
Weight:	<ul style="list-style-type: none">35kg
Material:	<ul style="list-style-type: none">316 Stainless Steel and Polyurethane
Temperature:	<ul style="list-style-type: none">Operating: 0°C to +40°CStorage: -20°C to +65°C
Operating Depth:	<ul style="list-style-type: none">1000m
Operating Frequency:	<ul style="list-style-type: none">700kHz
Transducer:	<ul style="list-style-type: none">3 off discs at -45°, 0°, +45°
Beamwidth:	<ul style="list-style-type: none">1.8° (+/-3dB) at VoS 1800m/s
Transmit Pulse Length:	<ul style="list-style-type: none">Variable 100µsec to 2msec
Receiver Gain:	<ul style="list-style-type: none">Variable with 16 levels
Power Supply:	<ul style="list-style-type: none">+55v DC at 1A
Cable Requirements:	<ul style="list-style-type: none">4 core + armoured screen

