ACOUSTIC CALIBRATION
SYSTEM MODEL 9060
PRODUCT SPECIFICATION

Transducer Calibration from 100 Hz to 5 MHz

Measures:
- Beam Patterns
- Impedance
- Transmitting Sensitivity
- Receiving Sensitivity
- Reciprocity Calibration
- Source Level
- Min. Detectable Level

Compact and Portable

The RESON Acoustic Calibration System 9060 is a unique instrument specifically designed to calibrate acoustic systems and sensors to International Standards. It is used in Research & Development to establish exact sensor or system performance; in Production it provides crucial measurements for quality control; and in Service & Maintenance it ensures that overall system performance remains at the highest possible level.

Equipment frequently calibrated:
- Multibeam Sonar Systems
- General Purpose Projectors
- Hydrophones with and without Preampers
- Super Short Base Line Positioning Equipment
- Active and Passive Sonar Transducers and Hydrophones
- Transponders
- Side Scan Sonars
- Sound Velocimeters
- Mine Hunting Sonars

The ACS 9060 replaces racks of discrete instruments in configurations that are constantly modified, and replaces the ever-changing software with a familiar Windows™ user interface. This greatly increases the quality and efficiency of the calibrations. For added flexibility, the ACS 9060 is designed to accommodate external equipment like high power amplifiers and front end pre-amplifiers.
TECHNICAL SPECIFICATIONS

TRANSMITTER SPECIFICATIONS

**Signal Source:**
100 Hz to 5 MHz sine wave. 1.0 Hz resolution, crystal stability. Uses direct digital synthesis with 12-bit DAC.

**Envelope Modulator:**
Envelope shape formed by 12-bit DAC sampled up to 100 kHz. Envelope risetime (5 \( \mu \text{s} \) to 50 ms). Envelope width (100 \( \mu \text{s} \) to 100 ms). Start of envelope is synchronized to start with sine wave signal.

**Power Amplifiers:**
Output amplitude is adjustable with 12-bit resolution. Power amplifier drive capability is dependent on frequency.

- **High-Voltage Mode:** ±150 mA from 100 Hz to 500 kHz at 200 Vrms differential (no load). Maximum output decreases to 15 Vrms at 5 MHz. 100 ohm output impedance (50 ohms in series with each output lead).
- **High-Current Mode:** ±1 A from 100 Hz to 200 kHz at 50 Vrms. Maximum output decreases to 25 Vrms at 5 MHz. 10 ohm output impedance (5 ohms in series with each output lead).

A single-ended output is available by using one half of the differential output.

MEASURING RECEIVER SPECIFICATIONS

There are three magnitude/phase measurement channels:
- **Channel 1** measures hydrophone voltage.
- **Channel 2** measures transmitter voltage.
- **Channel 3** measures transmitter current.

**Frequency Range:**
100 Hz to 5 MHz

**Hydrophone Input:**
1 M \( \Omega \) input impedance. Input attenuator accommodates signals up to 200 Vrms below 200 kHz. From 200 kHz to 5 MHz maximum input decreases from 200 Vrms to 20 Vrms.

**Magnitude/Phase Meter:**
Synchronous quadrature detectors run at the transmitter’s frequency. Detector bandwidth adjustable from 10 Hz to 100 kHz in 1-2-5 sequence.

**Detected Envelope:**
Quadrature, digitized to 12-bits at up to 100 kHz.

**Receiver Amplitude:**
Measurement accuracy is ±2%, 12-bit resolution.

**Receiver Phase:**
Measurement accuracy is ±2\(^{\circ}\), 12-bit resolution.

±12 VDC hydrophone power and oscilloscope signal monitoring points available on front panel.

OPTIONS

Water Temperature Probe, Sound Velocity Probe, and Customizable Turntable Control.

MEAUREMENT UNIT PHYSICAL DIMENSIONS

- **Width:** 19.0 in. (483 mm)
- **Height:** 10.5 in. (267 mm), 6 U high
- **Depth:** 17.0 in. (432 mm)
- **Weight:** 59.4 lbs (27 kg)
- **Power:** 100, 115, 230 VAC @ 50/60 Hz, 200 W

Representative Output Plots from the Acoustic Calibration System 9060