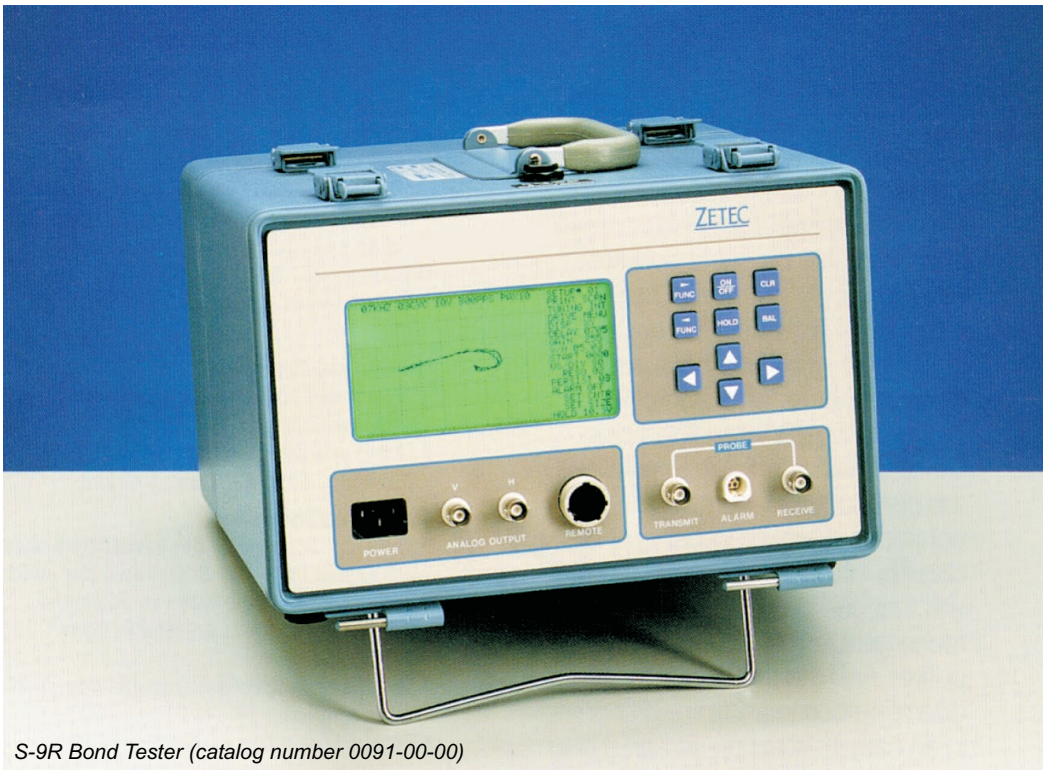
S-9R

Bond Tester with Sondicator and Resonance Modes

The S-9R Bond Tester is a portable instrument designed to test for impact damage and detect disbonds and anomalies in a wide variety of materials and structures. It features significant new technology including selectable frequencies, highly efficient probe designs, and a powerful microprocessor that allows instant capture and display of the received signal's frequency, phase, and amplitude values. These advanced features allow the S-9R to detect and quantify a greater variety of anomalies and structural damage with the greatest sensitivity, speed, precision, and control available.

Dual test modes—sondicator and resonance—combine capabilities from two testers into a single unit. A front-panel menu change easily switches the instrument between test modes. All operating commands are presented in an easy-to-read on-screen menu.

The S-9R's portable case and user-friendly interface have been closely modeled after Zetec's field-proven MIZ®20A/22 testers. Like these, the compact, self-contained S-9R combines signal processing and alarm circuitry into one lightweight, sealed unit that can be operated on either rechargeable Ni-Cad batteries or AC power.



S-9R Bond Tester (catalog number 0091-00-00)

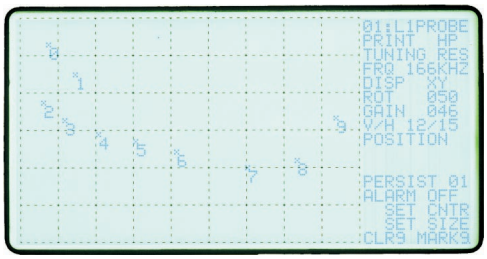
Sondicator Test Mode

In the internal tuning select mode, built-in peaking coils maximize the S-9R's response at seven preset frequencies (7, 14, 25, 40, 54, 84, and 130 kHz). Applications include the detection of far-side disbonds in honeycomb structures, detection of face-sheet disbonding and delamination from the honeycomb structure, detection of metal-to-metal disbonds, quality of bonded repair, and the evaluation of impact or structural damage. For all types of bonded applications, the S-9R's sondicator mode uses dry-coupled contact probes for testing.

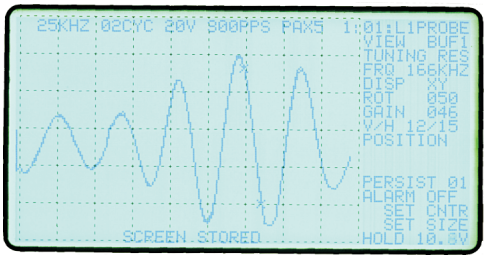
To achieve optimum signal response, the S-9R offers full control over the sample rate (100-500 pulses per second), the number of sine wave cycles in the transmitted pulse (1-10 cycles), adjustable transmit drive voltage (1-20 volts peak-to-peak) instrument gain, vertical and horizontal scaling, and adjustable preamplifier settings (3, 5, 10). By adjusting these variables, the signal response is optimized for the chosen frequency, resulting in improved signal-to-noise ratio.

Resonance Test Mode

The resonance test method is a variable-frequency ultrasonic test that electronically monitors the impedance changes of the contact transducer's piezoelectric element. These changes are caused by small variations in the structure that changes the mechanical loading (particle vibration) on



▲ *Resonance mode shown with reference point marking feature*



▲ *YT display in sondicator test mode*

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Bond Tester with Sondicator and Resonance Modes

the transducer face. In turn, this affects the transducers electrical impedance.

In an adhesive bond interface, changes in the thickness caused by disbonds affect the phase and amplitude of the signal at the resonant frequency of the transducer. In structures that are multilayered, the phase presentation will be related to the depth of the disbond.

Probes

Advanced new probe designs enhance the S-9R's performance. The new probes contain highly efficient transmit and receive transducers designed for manual contact scanning. Piezoelectric elements in the transducers are used to generate and sense the sonic energy.

S-9R probes support various applications. Our spring-loaded probe design maintains uniform pressure during scanning. The narrow-tip probe design enhances the detection of smaller defects in contoured surfaces. Additional probes and optional adapter cables connect directly to tester's front panel.

All S-9R probe elements and contact tips can be replaced in the field. Probe options include a visual alarm that can be set to activate when an anomaly is detected.

If you have questions or want more information about the S-9R Bond Tester, contact Zetec by phone or fax.

Features

- Easy-to-use scroll-through menu and user interface ensure fast, simple operation
- PC compatibility using RS-232 interface
- Alphanumeric labels clearly identify setups
- Built-in peaking coils increase instrument sensitivity at pre-selected frequencies
- Variable sample rate, sine wave cycle, drive voltage, and optimization of preamplifier gain enable signal according to specific test applications
- Visual and audible alarms
- New probe technology for highly efficient transducers that enhance instrument performance
- High-speed, 16-bit microprocessor allows real-time data display
- Numerical display readout of the frequency, phase, and amplitude of the received signal

Specifications

Memory

- Non-volatile (data retained with power off):
  — stores 100 test setups
  — stores 10 screen images for review
  — stores up to 10 reference points (resonance mode)

Display

- High-resolution liquid crystal display (LCD) presents received impulses in YT (AC) mode, or in XY (DC) mode, as amplitude and phase vector changes within the waveform
- Screen size: 2.25" x 4.50"
- All instrument settings are continuously displayed

Operating Variables

- Repetition rate of the transmitted signals is adjustable from 100-500 pulses per second
- Sine wave cycles in the transmitted pulse are adjustable from 1-10 cycles
- Transmit drive is adjustable from 1-20 volts peak-to-peak
- Analog amplifier gain adjustable from 0255

Alarm Circuit

- Alarm box size and position are independently adjustable
- In XY display mode, alarm can trigger either inside or outside of the gated area
- In YT display mode, alarm can trigger in either phase or amplitude
- Alarm area is shown on the display
- Audio, visual, and TTL output alarms are provided
- Optional probe alarm lights up when user-specified parameters are exceeded

Outputs

- X and Y analog outputs are available on BNC connectors for chart recorders and other instruments
- Remote connector provides RS-232 data bus for external PC control and transfer of test data to a PC
- Printer port for HP or Epson emulation printers
- Maximum vertical analog output voltage swing is ± 2.0 volts DC peak-to-peak
- Maximum horizontal analog output voltage swing is +3.4/-3.8 volts DC peak-to-peak

Frequency Selection

- Sondicator mode—total frequency range is 5-200 kHz (external tuning) or 7 pre-selected frequencies of 7, 14, 25, 40, 54, 84, and 130 kHz (internal tuning)
- Resonance mode—5-500 kHz selectable

Power Requirements

- AC input, 115/230 VAC, 50/60 Hz

Battery Pack

- Operates on nine Ni-Cad D-cell batteries with built-in charger for on-the-spot recharging
- Battery pack powers unit up to eight hours

Physical Specifications

- Size: 6.5" × 10.5" × 14.5" (16.5 × 26.7 × 36.7 cm)
- Weight: 20 pounds (9.1 kg)

Environmental Specifications

- Operating temperature range: 20 to 125°F (-6.7 to 51.7°C)
- Storage temperature range: 0 to 140°F (-17.7 to 60°C)
- Humidity: 1 to 100%
- Lighting:
  — internal back light allows operation in total darkness
  — display maintains full contrast in brightest sunlight

Accessories

- S-9RT-XXX Transducer (specify frequency) C/N 935-0150-000
- Bondascope 2100 Transducer Adapter Cable C/N 0091-03-01
- Stavley Bondmaster Transducer Adapter Cable C/N 0091-03-02

▲*We offer a wide variety of sondicator probe designs. And, Zetec supports your investment in other manufacturers resonance transducers with adapters for our S-9R.*