

### **Multi Mode, Computer Based Eddy Current Equipment**

- Operates with encircling, sector, or rotary test sensors
- Differential and/or Absolute mode operation
- Up to 8 test channels
- Broad test frequency selection - 1KHz to 5MHz
- Store & recall setups; print & transfer data
- Inspect tube or bar, magnetic or non-magnetic

### **OVERVIEW**

#### **Coil or Rotary Probe Operation**

MultiMac® lets you configure your eddy current test application the way you want - all with just one compact tester. MultiMac test channels can be individually configured for use with encircling test coils, segmented encircling coils, sector/tangent coils, or rotating test probes - eliminating the need to have several instruments. Yet MultiMac includes all the best features of MAC's separate encircling coil and rotary probe instruments to ensure you get the top performance you need.

#### **Features**

Features include a wide selection of test parameters and special circuits to enhance signal-to-noise, typical of MAC testers. Operator interface is by keyboard and mouse. The MultiMac is a high speed, industrial quality computer with Windows® Operating System and MAC's latest proprietary software. The instrument is packaged in a heavy duty cabinet that includes a built-in monitor, air conditioning, and pull out keyboard. There is no need to access the cabinet interior during setup and operation. MultiMac is also available in other cabinet configurations with output connectors for an optional external monitor.

#### **Magnetic or Non-Magnetic Material**

With these features, MultiMac can operate on a wide variety of non-magnetic products, or use Direct Current saturation systems to inspect magnetic material. Test speeds can range from one foot per minute up to several thousand. Installation can be in-line or at a separate test station. MultiMac end suppression circu-



*MultiMac Main Test Screen, above, shows test parameters, including thresholds, and simultaneous polar and linear view of one channel. Multi Screen (see page 3) shows polar & linear view for up to 8 channels.*

ity with optional optical sensor can be used for testing cut lengths to prevent false signals from leading and trailing ends. User configurable reports containing customer and product information in addition to defect location, time, amplitude and phase can be stored locally or on a network server.

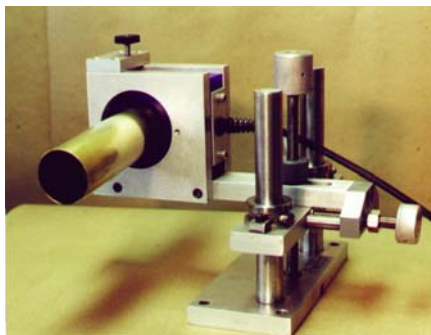
#### **Versatile**

MultiMac's test channels can operate at the same or different frequencies for special applications. One channel can be set as a differential (null) channel to detect short weld line defects, for example, while a second absolute channel simultaneously detects long, continuous surface flaws such as laps and seams. Additional absolute channels can check for long continuous open welds or magnetic inclusions. Up to 8 output modules can be used to operate a variety of devices, based on All Phase, Sector, or Chord thresholds, each of which can be assigned up to 3 threshold output levels.

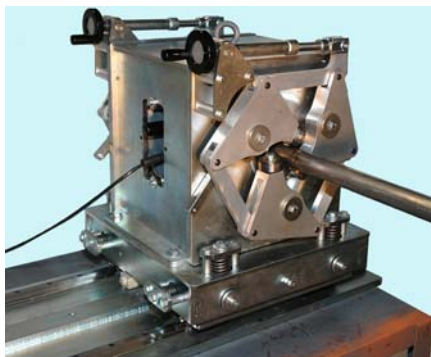
#### **Simple Setup**

The main test display provides all the information needed to set up and operate MultiMac. Polar and linear signal traces can be simultaneously displayed, along with all test parameters.

# MultiMac® for Encircling & Sector Test Coil Inspection



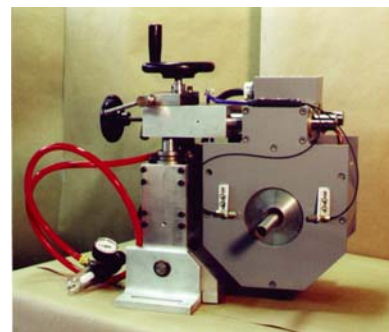
Series 30 Coil Platform Encircling Test Coil



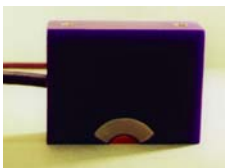
A 65 mm Coil Platform with optional Floating Head allows the coil platform to follow the movement of the tube or bar under test. This feature is useful for tube weld mills, bar and wire drawing benches where the material under test tends to move around.

**ENCIRCLING TEST COILS** can be used for testing non-magnetic or magnetic tube, bar or wire for short, intermittent surface flaws. For non-magnetic material, Coil Platforms, such as the CP-30, shown at left, provide accurate horizontal and vertical adjustment to obtain proper centering of the material in the coil. Test coils and Coil Platforms are available in a range of types and sizes. Standard coil sizes range from 1/8" (3.18 mm) up to 7-3/4" (196.9 mm) ID.

Where the material is magnetic, **Direct Current Saturation** is required to suppress permeability variations which can interfere with the eddy current test. MAC includes suitable DC saturation as part of the Coil Platform. The Series 352 Coil Platform, for example, is supplied with a DC power supply. It is air cooled and is suitable for thin and medium wall carbon steel tubing. Water cooling is utilized for larger, more powerful saturating Coil Platforms. The 65 mm Coil Platform, shown at left, can use standard or segmented encircling test coils, and it does not require water or air cooling.



Series 352 Air Cooled Saturation Coil Platform with test coil



Tangent (sector) Coil

Where only the weld zone or a similar localized area requires inspection, **TANGENT (Sector) COILS** can be used. A tangent coil often improves the signal-to-noise ratio of the test by limiting the area of the tube or bar under inspection. Coil Platforms for tangent coil testing of non-magnetic and magnetic material are available.

# MultiMac® for Rotary Test Inspection

## TEST PROBES MOUNTED ON ROTATING HEADPLATES

are used to inspect non-magnetic and magnetic tube, wire and bar for long, surface seam type defects.

Rotary probe technology is the method of choice to detect this type of defect which may not be detected by encircling coils. Changes in speed, even dead stops, do not affect the test because the probes continually spin around the material.

Headplate designs are available for surface or air ride configuration to handle different surface conditions and test specifications. Continuous or cut length material can also be handled.



MAC's Rotomac® E-Rotary test head, shown above, tests tube, bar or rod in continuous operations such as drawing, parts forming, or straight and cut. The inspection can operate automatically as defective pieces can be identified, then marked or rejected further down line, after the cutting and forming operation. Models for small diameter rod and wire are also available.



Shown above is the Model 750 Rotomac® rotary test head for inspecting 7-1/2" (190.5 mm) diameter cut lengths, often in-line with straighteners or installed in a separate test station. Installations can be completely automatic, including marking and sorting devices. The rotary is usually mounted in conjunction with MAC Slide/Elevating and Drive Mechanisms to position the rotary housing and move the material accurately through the test head.



## SPECIFICATIONS

<b>CHANNELS</b>	Up to 8 test channels Flaw (Differential), Absolute, or Rotary.
<b>TEST FREQUENCY</b>	1KHz to 5 MHz. 20 pre-selected frequencies, or user selection of any frequency.
<b>FLAW BANDWIDTH</b>	Variable up to 5 KHz.
<b>FILTER</b>	High Pass, Low Pass, Band Pass, BP-Auto and Out are available. Fixed filter positions adjustable from 0.1 Hz to 5000 Hz flaw frequency. The bandwidth of the BP filter can be selected through a "Q" factor dictating the ratio of high to low pass filters.  Auto Speed Filter is operated from Line Speed utilizing optional encoder for coil applications, and from RPM meter and material diameter for rotary applications.
<b>PHASE</b>	0 - 359°, calibrated in 1° steps.
<b>SENSITIVITY</b>	0 - 99 dB, calibrated in 1dB steps.
<b>THRESHOLDS</b>	All Phase, Sector and Chord thresholds available for flaw tester, all assignable with up to three levels. The sector can be rotated to any phase angle. There are counters for active thresholds. Only active thresholds will be displayed on the screen.
<b>CALIBRATION</b>	Internally generated signal provides a system check for repeatability of all parameters.
<b>BALANCE</b>	Auto tracking continuous AC self-balance in the entire frequency range.
<b>DISPLAY</b>	Polar, linear and running charts are simultaneously displayed on the EC setup screen along with testing parameters and status indication for the current channel. MULTI screen simultaneously displays up to 8 channels polar and linear /chart display. Other screens include TRACK, CHART, BATCH, and SYSTEM  <b>Built-In Display Model:</b> Includes built-in 17" TFT display.  For cabinetry that does not include the built-in display, a back panel output connector is provided for optional external monitor.
<b>CONTROLS</b>	Software controls for all functions, set through keyboard and mouse.
<b>SYSTEM STATUS INDICATOR</b>	Software displayed in system status section of display, including indicators for Coil, Balance, Threshold and System Ready conditions.
<b>END SUPPRESSION</b>	Optional external switch end sensor and optional encoder to suppress end signals.
<b>OUTPUTS</b>	CE Units - four 24 V DC output modules are provided, each with a relay and an opto-isolated output. Outputs can be routed to accept any thresholds. Combined current draw for all outputs cannot exceed 2 amps.  Standard Non CE units come with four DC and four 120 V AC outputs.
<b>STORE &amp; RECALL SETUPS</b>	An unlimited number of setups can be stored and recalled
<b>REPORT</b>	Test data report is managed in the BATCH screen. The report contains user and product information as well as defect location, time of the occurrence, amplitude and phase.
<b>DATA STORAGE</b>	Record linear strip charts
<b>MODE</b>	A Lockout Mode prevents unauthorized changes in equipment settings.
<b>COILS &amp; COIL DRIVE</b>	All Standard MAC coil types. Adjustable Primary/ Bridge drive up to 20 V pp.
<b>COIL CONNECTOR:</b>	Standard 7 pin for coil and 11 pin for rotary applications
<b>CABINET DIMENSIONS</b>	25" W x 22" H x 26" D (63.5 cm x 55.8 cm x 86.4 cm) for cabinet Air conditioner adds an additional 8" (20.3 cm) to depth
<b>CABINET WEIGHT</b>	230.5 lbs. (104.54 kg.) for cabinet. Air conditioner is an additional 48 lbs. (21.8 kg) Other cabinetry options are available
<b>POWER REQUIREMENT</b>	120 /240 VAC, 50/60 Hz, single phase, 5 amps (not including the air conditioner).

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MultiMac 8.10

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