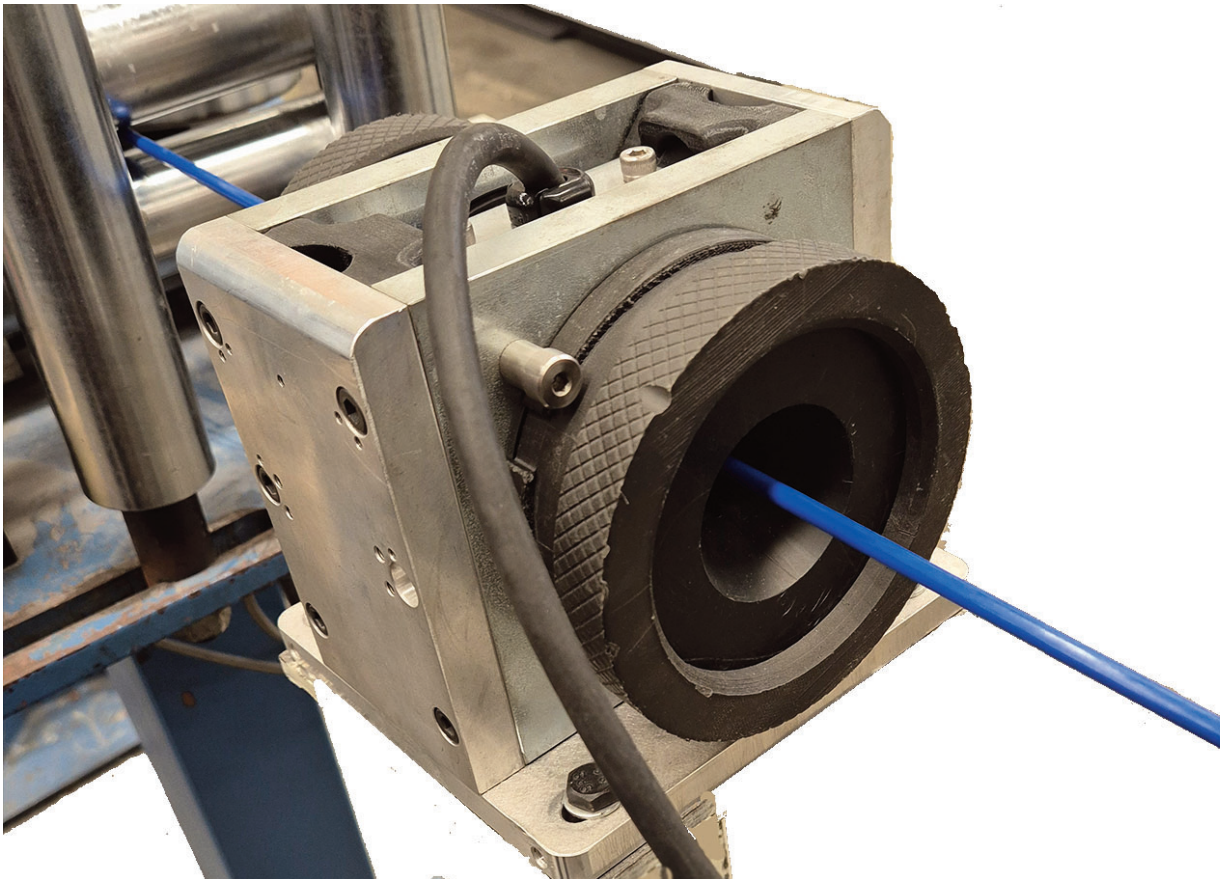
MAC®
Magnetic Analysis Corp.

Minimac® II

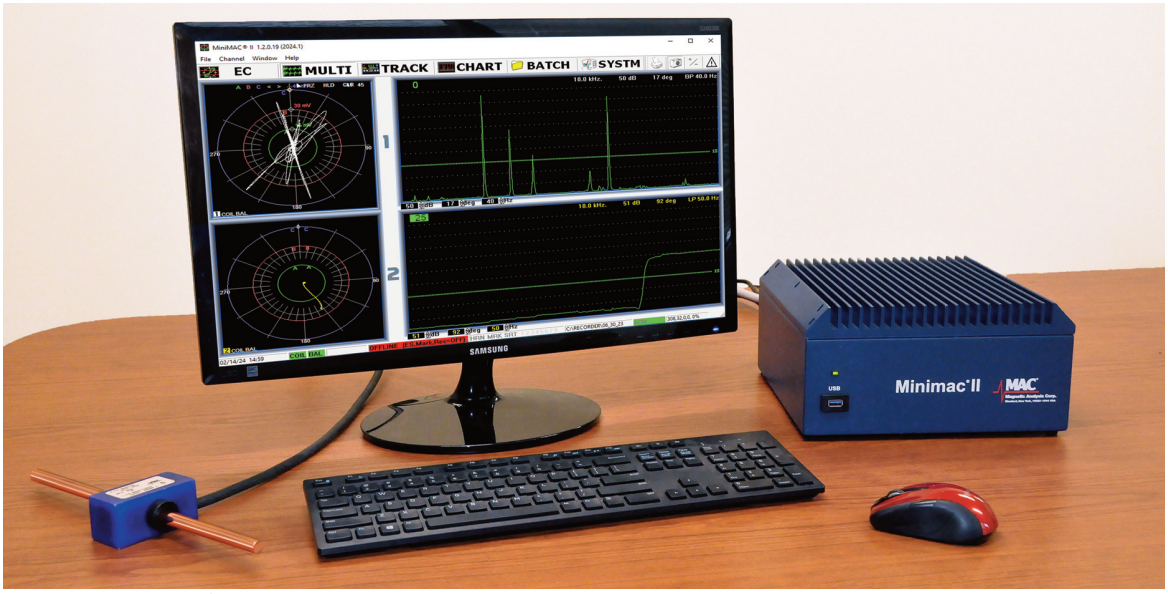
Economic, Full Feature Digital Eddy Current Tester for Tube, Bar, Wire



Minimac® II

Take advantage of eddy current technology's flexible and versatile capabilities to deliver reliable, high performance testing on a broad range of metal products.

The Minimac® II is an economic eddy current test instrument, supplied as a one or two channel unit with a single coil drive. Housed in a compact fan-less computer chassis, it can be used with eddy current coils, or rotary probe systems. The unit is fully digital, with an embedded processor. Minimac® has a full Windows® based user interface, making it easy and intuitive to operate. Settings and control of the instrument are done on screen. A remote monitor and keyboard lets you monitor the instrument and operation from any location in your plant.



Minimac® II testing copper rod for flaws and ferrous inclusions. Polar and linear displays are shown.

Applications

- Detect short surface and some subsurface defects, including laps, slivers and cracks in wire, bar, tube, and parts.
- Detect short ID or OD defects in tube.
- Detect long surface defects using two channel option for rotary spinning probe systems.
- Test magnetic and non magnetic grades.
- Find weld line faults and open seams.
- Detect butt welds, steel crimps, and connectors in wire.
- Operate at speeds up to 4000 f.p.m. with standard test coils.
- Operate at higher speed with wide-spaced coils.
- Check continuity and locate welds in single and multi-conductor insulated wire and cable.
- Test cut length or continuous product, online or offline.
- Detect magnetic inclusions with MID mode and magnetic test coil or saturation coil platform.
- Verify alloy in combination with flaw testing where conductivity differentiation between the two conditions is great enough to allow detection.
- Use single coil drive mixed frequency feature for optimizing signals from ID and OD separately.
- Conduct flaw and MID testing with two channel option on copper and aluminum rod or when detecting inclusions from broken tool parts in finned copper tube's untested transition areas.
- Use a single probe in tight physical locations.
- Network Minimac® II's on multiple test lines.

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Performance

- With MAC's proprietary MultiMac® II software, sensitivity, frequency, phase, filters, and threshold outputs ean be easily set on screen while viewing full color polar and linear display of real time, true waveform signals.
- Up to two channels of Flaw and/or Absolute mode using a single coil drive.
- Optional analog output capability.
- Embedded processor allows operation with or without a host computer running, making the tester highly reliable.
- Defect signal report includes data on location, time, amplitude and phase.
- Broad frequency range - 1 KHz to 6MHz.
- Store, annotate and recall unlimited number of settings from local or networked drive.
- Networked, multiple instruments can share the same library, thereby assuring correct settings in multiple test lines.
- Record linear strip charts and complete test data.
- Complete networking capability with remote command set.
- Simple optional upgrade from one to two channels with one coil drive.
- Lockout mode to prevent unauthorized changes in settings.
- Quadrature or single encoder and end sensor/s connections are standard. Encoder and end sensor devices are optional.

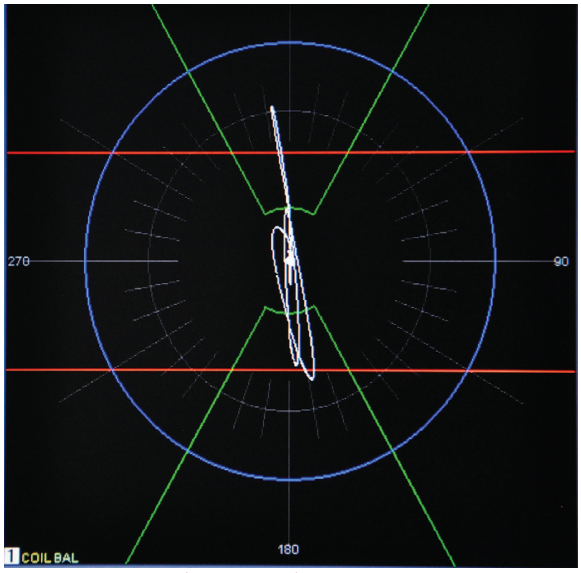
Powerful Signal Processing

Multiple threshold analysis can be individually and independently configured as all phase, sector or chord. This provides an effective tool to separate different types of defects, or distinguish defect signals from acceptable surface conditions.

When testing is difficult, several signal enhancements can be used including, A+, V+H-, V++H-. These special signal settings designate certain characteristics to be enhanced while other types of signals typically associated with noise are suppressed.

Reporting

Reporting is increasingly important in nondestructive testing systems. Minimac® II has strong capabilities for configurable reports. These reports can store test results and settings in different formats to fulfill customer requirements. The report can be stored locally or on a networked server.



Polar Display Screen

Minimac® II EC screen polar view of thresholds with a test signal for a drilled hole in a copper tube.

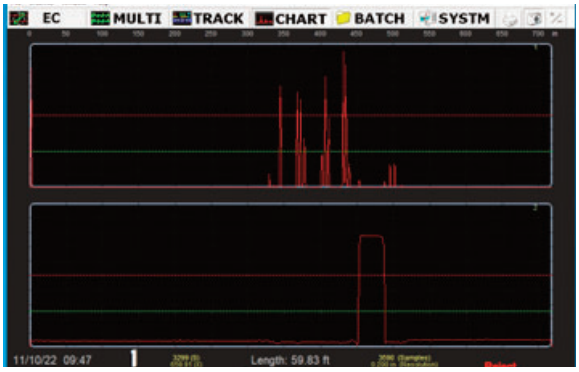
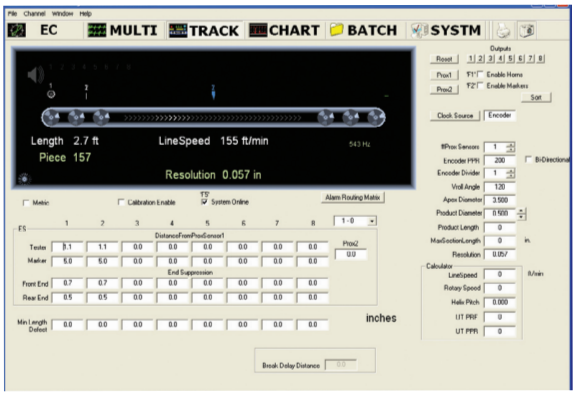


Chart Screen

This screen shows the recorded linear trace. The channel can record up to three charts based on the type of thresholds selected.

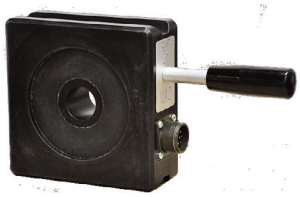


Track Screen

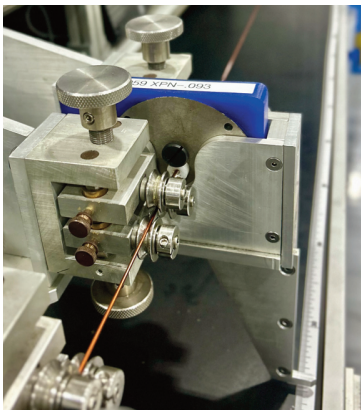
The track screen shows a visual representation of the product, end sensors etc. It is useful for setting up end suppression, flaw tracking, and output (alarm) routing.

Minimac® II Test Accessory Equipment

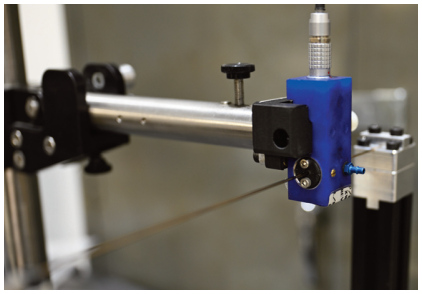
Selecting the most appropriate coil platform and encircling coil or probe sensor for testing is essential to achieving high quality test results. MAC has a full range of sizes and types that fit your application. For non-ferrous materials such as copper, aluminum, and most stainless steels where there are minimal or no permeability variations in the product that could interfere with the eddy current test, a non-saturating coil platform is the correct choice. To test fine wire, standard coils and platforms are available for .008" (0.20mm) up to 7.25" (18.42mm). MAC test coils can also be used without a coil platform where the producer needs to integrate the coil into their own custom system for feeding and handling the wire.



XESST 26 eddy current test coil

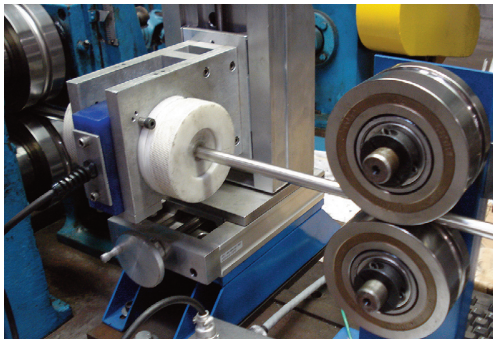


XPN 0.093 wiretester coil inspecting superconductor wire approximately 0.071" diamaeter

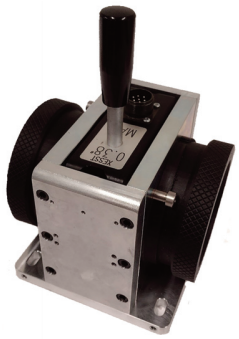


XSB (extra small body) coil testing nitinol wire as small as 0.081" diameter

65 CP nonsaturating coil platform with a 4" x 5" test coil inserted



Eddy current encircling test coil with bushing inspecting stainless steel tube.



CP 65 nonsaturating coil platform with XESST test coil and bushings installed

Quality Grading Software

The Product Quality Grading Software add-on provides a convenient, efficient means of categorizing and automatically reporting the quality level of entire coils or individual segments of metal wire, rod and bar during production.

Using the Minimac® II eddy current instrument, each coil produced can be graded according to a customer-specified grading policy. Customers can designate the defect types, each based on a specific threshold gate, specify the maximum number of defects for each grade level, and configure reports. Surface defects as well as undesired metal inclusions can be detected and categorized.

Report
Config
Browse
Cancel Coil
Coil ID
Print

Coil ID	Len. ft	Grade	SD	MD	LD	SF	MF	LF
14339	2853276	E	0	0	1	0	2	2
14338	41104.0	+	3	0	0	0	0	0
14337	24662.6	+	0	0	0	0	0	0
14336	24666.6	E	0	1	4	0	0	0
14335	24666.6	+	1	0	0	0	0	0
14334	24537.3	+	0	0	0	0	0	0
14333	24366.6	+	0	0	0	0	0	0
14332	24150.6	+	1	0	0	0	0	0
14331	24026.6	B	2	1	2	0	0	0
14330	24838.6	E	15	8	2	0	0	0
14329	578425.1	+	0	0	0	0	0	0
14328	578425.3	E	53	70	97	1	0	0
14329	2056.00	+	0	0	0	0	0	0
14328	144760.	+	0	0	0	0	0	0

Color coded grading of continuos cast copper rod.

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Minimac® II Instrument Technical Data

HOST OS	Windows IoT.
PLATFORM	Embedded electronics with Gbit Ethernet.
FUNCTION	Up to 2 channels of any combination Flaw/Absolute/Rotary with a single coil drive.
STORED SETUPS	Unlimited.
TEST FREQUENCY	1KHz to 6 MHz. 20 pre-selected frequencies.
FLAW BANDWIDTH	Variable up to 5 KHz.
SENSITIVITY	0 - 99 dB, calibrated in 1dB steps.
PHASE	0 - 359º, calibrated in 1º steps.
FILTERS	High Pass, Low Pass, Band Pass, BP Auto and Out. Fixed filter positions adjustable from 0.1 Hz to 5000 Hz flaw frequency. The auto filter is operated from Line speed for non rotary and from RPM meter and material diameter for rotary applications. The bandwidth of the BP filter can be selected through a “Q” factor dictating the ratio of high to low pass filters.
MODE	A lockout menu will be provided to prevent unauthorized changes in equipment settings.
THRESHOLD SELECTION	Chord, Allphase and Sector thresholds are available for flaw testing, any of which can be assigned up to three levels. Phase, Sector, Chord, and Half Chord, all assignable with up to three levels. The sector threshold can be rotated to any phase angle. There are counters for active thresholds. Only active thresholds display on the screen.
SYSTEM STATUS INDICATOR	Software displayed in system status section of display, including Coil Indicator, Balance Indicator, Threshold Indicator and System Ready Indicator.
OUTPUTS	4 output modules are provided, each with a 24 VDC relay and an opto-isolated output. The outputs are driven from embedded processors with or without host computer running.
CONTROLS	Software controls for all functions.
REPORT	Defect 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.
DATA STORAGE	Recordable linear strip charts.
COIL CONNECTOR	Standard 7-pin for coil or 11-pin for rotary.
COIL DRIVE	Adjustable/Primary Bridge Drive up to 20 V pp.
CALIBRATION	Internal electronic calibration signal.
OPERATOR INTERFACE	Control of all functions is set through keyboard entry and/or mouse.
END SUPPRESSION	External switch end sensor and encoder to suppress end signals and outputs.
OPERATING TEMP	113º F (45º C)
CABINET DIMENSIONS	10.5” Wide x 5.5” High x 10.5” Deep (267mm x 139mm x 267mm)
WEIGHT	13.2 LBS (6KG) approx.
POWER INPUT	120/240 VAC, 50/60 Hz, single phase, 2 amps.