ALAT UJI
Products, Solution, Services

Magnetic Analysis Corporation

PC-VI
Production Comparator

- *Low frequency tester for ferromagnetic materials*
- *Detect variations in alloy, heat treatment, or case depth*
- *Rapid NDT sorting of ferromagnetic parts*
- *New Polar (Vector) Screen*
- *Inspect tube or bar at production line speeds*
- *Choice of any one of 10 pre-set frequencies from 10 Hz to 150 Hz*
- *New optional 8 channel multi frequency software*
- *Setup & monitor on site, or through computer network*

Multi Frequency Polar display includes chord and all phase thresholds. Strip chart linear format display is at bottom of the screen.

DESCRIPTION

The Production Comparator VI is a Windows® based test instrument that uses low frequency electromagnetic techniques to inspect magnetic materials for variations in physical characteristics such as alloy, heat treatment and case depth. It operates with a pair of test coils, a keyboard, mouse, and monitor that may be supplied by the customer, or MAC.

The PC VI analyzes signals from the fundamental frequency to its 13th order harmonic to provide a rapid NDT method for rapid sorting of ferromagnetic parts into groups. Any one of ten pre-set frequencies between 10 and 150 Hz is standard. The new multi-frequency option allows use of 8 frequencies, simultaneously.

Features include a monitor presentation that provides simultaneous display of the “standard” piece and test piece wave forms for easy comparison. Test parameters, including filter, sensitivity, index gate and visible threshold levels, are selected using the keyboard or mouse while observing the effects on the display monitor. All functions and test setup parameters in software can also be accessed through a computer LAN network. Unlimited test setups can be stored on the hard drive for easy recall. A built-in end suppression with adjustable In and Out time based delays with easy one click auto balance and built in self-diagnostics, are also included. Two adjustable thresholds allow parts to be sorted into three quality levels. All setup parameters can be individually locked out to prevent unauthorized changes.

Test setups and results are shown in the new Polar (Vector) screen familiar to users of MAC’s line of eddy current instruments, or in the standard Lissajou screen used in previous Production Comparator models.

MULTI-FREQUENCY OPTION

New optional multi-frequency software allows simultaneous analysis of 8 frequencies for a more complex test where pieces may have random conditions that do not show up on the selected test frequency, or where you wish to test for several different conditions at the same time. Start frequencies range from 10 Hz to 150 Hz with 8 steps at 2:1 intervals.

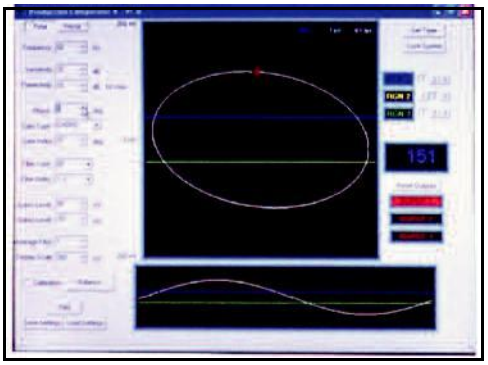
POLAR (VECTOR) SCREEN

The Polar screen displays flaw signals as a vector excursion from a balanced center point. The peak point of the excursion shows on the screen as a dot. The distance

from the center represents the signal amplitude and the angle of the signal with respect to the vertical axis represents the signal phase. Two chord threshold gates as well as Split All Phase gates create three sorting regions. A linear “Strip Chart” display appears in the lower portion of the screen.

LISSAJOU SCREEN

The Lissajou screen displays signals in a Lissajou pattern as it is swept with a reference SINE signal. A synchronized Linear display appears in the lower portion of the screen. The gate index control is accessible only in this screen.



Lissajou screen with synchronized linear display at bottom. The red “plus” sign is the Index gate

OPERATION

Initial set-up procedures begin by placing a typical production lot piece in one coil (the “reference” coil). A known “good” piece is then placed in the other coil (the “test” coil). The equipment is then balanced, by clicking the Balance button. The balanced “good” piece wave form is stored and continuously displayed. A test piece that is known to be different from the “good” piece is then substituted in the test coil and the difference is observed. Using the phase settings on the Polar screen, or the index point setting on the Lissajou screen, the operator selects the setting where the difference is maximized. Sensitivity is then adjusted to expand the signal or wave form beyond the visual threshold and trigger an output. To maximize the difference between pieces and minimize extraneous readings, the coil current can be adjusted, and one of three filter settings can be selected.

- All Pass filter - the selected fundamental frequency and all its harmonics
- Band Pass filter - only the selected fundamental, or only its harmonics
- Notch Filter - everything except the selected fundamental frequency

Once the optimum settings have been selected and stored, they can be easily recalled for automatic operation.

MAC’s Production Comparators can measure hardness and case depth with less interference from varying surface conditions and often with a less accurate fit (lower “fill” factor) between the test coil and test piece.

SPECIFICATIONS

Platform	Industrial computer with Windows® XP platform
Controls	Computer Mouse or Keyboard with easy to use graphic user interface
Frequency	Any one of: 10, 15, 20, 30, 45, 60, 80, 100, 125, 150 Hz
	Optional 8 Frequency Groups with base frequency of 10, 15, 20, 30, 45, 60, 80, 100, 125 or 150 Hz
Sensitivity	Standard: 0 - 99 dB in 1 dB steps. Multi-frequency option: With equalizer for each frequency +/- 10 dB
Phase	Standard: 0 - 360 degrees. Calibrated in 1 degree steps. Multi-frequency option: With one button phase equalizer control
Filter	All Pass, Band Pass and Notch. The band pass and notch filters can vary the indices from fundamental to the 13th order harmonics.
Index	0 - 360 degrees representing the gate location in the periodic cycle.
Balance	Automatic “one click” AC balancing
Display	**Polar (Vector) Screen Mode** - the more traditional eddy current polar presentation and linear strip chart are displayed. Each frequency is displayed in a different color.
	Lissajou Screen Mode - the Time domain signal is displayed in synchronization with the fundamental frequency with the Index point superimposed. A separate linear display shows the vertical value of the SINE swept Lissajou signal.
Thresholds	Dual Level chord or Split All Phase
Suppression Input	Optical Sensor or Switch (Open to test)
Lockout	Password protected lockout for desired parameters
Outputs	Three TTL and Relays
Dimensions &	Cabinet - 19 1/2” W x 7.5” H x 24” D (49.5 x 19.1 x 61 cm)
Weight	65 Lbs (32 Kg) approximate
Power	115VAC @ 15 A or 230 VAC at 7.5 A, (specify voltage when ordering)

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