ED-810 PORTABLE VARIABLE EDDY CURRENT INSTRUMENT

EQUIPMENT SPECIFICATION ES-114

1.0 Description

1.1 The Model ED-810 is a microprocessor based variable frequency eddy current instrument, with a cathode ray tube monitor display, that detects homogeneity and conductivity changes in magnetic and nonmagnetic materials instantaneously. The instrument can operate on internal batteries allowing for use in the manufacturing shop, in the field, and in the laboratory with a wide selection of probes and coils common to standard Centurion NDT instruments (ED-520, ED-530, ED-1100, ED-800, and FW-450).

1.2 The instrument will detect surface and subsurface defects in both magnetic and nonmagnetic materials. Defects cause voltage variations that are amplified and displayed on the CRT in the storage or nonstorage mode. This display provides maximum information on eddy current behavior within the material being tested in terms of phase and amplitude simultaneously. As a matter of convention, liftoff is displayed as the horizontal line of the CRT and the flaw indication is an upward or downward slanted line that meets the horizontal at the right of the extremity of the trace. The severity of the defect is represented by how far the slanted line deflects above or below the horizontal. The phase relationship is the angle between these two lines.

1.3 The ED-810 will sort classes of materials according to hardness alloy, carbon content, tensile strength, and grain structure. Also, it will measure coating thickness, sheet thickness and measure relative conductivity of critical materials. These tests are all accomplished by comparison to known reference standards.

1.4 The electronic Box Gates displayed on the CRT permit simplified discrimination between signals produced by most defects and by those unimportant variations in the part being tested. With the “flying dot” display, changes in phase or amplitude in eddy currents are reflected by movement of a spot on the CRT screen. With the box gates, an illuminated, box-shaped area variable in size and location is presented on the screen. Using a sample part with a known flaw, the box may be positioned on the screen so that the flying dot enters the box area when deflected by the flaw signal.

Entry of the dot triggers the gate, producing a signal that can set off a visual or audible alarm, or trigger automatic rejection of a defective part for later examination. Thus, only defects of a known type or severity will be detected.

2.0 Mechanical and Construction

2.1 The instrument consists of microprocessor based circuitry, printed circuit boards, 5-inch monochrome monitor, and power supply housed in an aluminum case with a cushioned handle.

2.2 Dimensions: 14" (36 cm) W x 5.5" (14.0 cm) H x 15" (38 cm) D.

2.3 Weight: 24 lbs. (11 kg), including battery pack

2.4 The instrument will operate within the temperature range of 0^{o} F to 120^{o} F, at 85% relative humidity, maximum.

2.5 The aluminum die cast handle locks in 14 convenient positions around the instrument from top to bottom. It provides an easy means of carrying the instrument and allows tilt on flat and curved surfaces for convenient viewing of CRT patterns and accessibility to controls. With the handle in the vertical position, the instrument can be hung from an overhead hook.

2.6 Instrument controls are activated through tactile dome membrane switches. All settings are menu driven and easily read on the display.

2.7 The front panel probe connector is a six-pin MS style connector. Adapters are available for most probe styles and pin configurations.

2.8 Outputs, RS-232, display, chart recorder and relay contacts, are available on the rear panel of the instrument.

2.9 Removing the top and bottom covers facilitates servicing the instrument. All circuitry is exposed and the instrument can be operated in the pulled-apart mode.

2.10 There are four rugged feet on the bottom of the instrument that act as shock mounts and protect the unit from debris and other foreign materials that may be present on surfaces on which the instrument is placed.

3.0 Electrical and Performance

3.1 The instrument is powered from an integral rechargeable gel-cell battery pack, or 115/230 volt, 50/60 Hertz, battery eliminator. Batteries are recharged through an external 115/230, 50/60 Hertz battery charger. The power consumption is 20 watts.

3.2 Battery life per charge is approximately 6-1/2 hours. Recharge time is approximately 14 hours.

3.3 The instrument has a variable frequency range from 40 Hz to 6.0 MHz in one hertz increments. It operates with two probes, a test probe and a reference probe (not for testing but serves as an arm in the eddy current bridge to facilitate balancing). Any of the standard Centurion NDT probes of our current instrument line (ED-520 series, ED-530 series, FM-140) with BNC connectors may be used. The Centurion NDT Titan series eddy current probes offer the balancing coil built within the probe itself. In this case, only one probe is necessary for inspections. Adapters are available for most common probes and pin-out configurations.

3.4 The display monitor of the ED-810 is a storage monitor that shows a flying dot display featuring random access memory with storage locations allocated to the tube face. As such, the instantaneous movement of the dot may be viewed on the tube face without storage, or the dot movement may be stored on the tube face. When a suitable pattern, representing the limits of a given test, has been established and stored, the instrument can be switched back to the instantaneous mode. As the test is being made, the stored information remains on the tube face and the instantaneous flying dot can be superimposed on the tube face for matching the known to the unknown.

3.5 The box gates may be adjusted to any rectangular size and moved to any position on the CRT.

3.6 The ED-810 can have any function controlled through the front panel membrane switches, or alternatively through the serial port by a remote device. The remote device communicates with the ED-810 through an RS-232C serial port accessible on the back of the unit. A standard DB-25 female connector is used.

3.7 There are 100 registers available for saving test variables. Each register holds data representing the complete operating status of the ED-810.

4.0 Operation

4.1 The *FREQ* is set by entering the data via the keypad. The frequency range is 40 Hz to 6 MHz in 1 hertz increments.

4.2 The *GAIN* control varies the gain of the instrument over a 90dB range adjustable in 0.5 dB increments.

4.3 The *PHASE* control allows rotation of the display from 0 to 360^{o} in 1^{o} increments.

4.4 The Probe *DRIVE* controls the power to the probe and is coupled to an Overload indicator that turns on when the setting is too high for optimum performance.

4.5 The *SAVE* control is used to store the test parameters. The locations may be from 1 to 100. These memory locations are non-volatile.

5.2 The *RCL* is used to recall a particular test set-up.

4.7 The *FLTR* control is used to independently adjust the high pass and low pass filters. The range of the high pass filter is 0-2000 Hz in 1 Hz increments and the low pass filter ranges from 10- 2000 Hz in 1 Hz increments.

4.8 The two box gates that are available are displayed independently. The controls vary the size and location of the box gate on the display. The box gates blink on and off when the flying dot enters the box.

4.9 The *STRG* pushbutton enables the display storage mode. Any trace or position of the flying dot will persist on the screen. The saved trace or flying dot position will persist, even after the storage mode is disabled, until the *ERASE* pushbutton is pressed.

5.0 Order Reference

5.1 Model ED-810 Microprocessor Controlled Phase Analysis Portable Eddy Current Instrument, **P/N 222810** in metal enclosure with handle and including:

+ Probe Cable, ED-810 (6-pin MS) to LEMO, **P/N 226019**
+ Titan Series Probe, 6-inch long, 30^{o} cranked, **P/N 226030**
+ Operating Manual

5.2 Accessories

5.2.10 Carrying Case, reinforced lined Cordovan material with storage pouch, **P/N 219888**.

5.2.2 Aluminum Test Block w/ 3 Slots: 0.008", 0.020" and 0.040" deep, **P/N 207066**.

5.2.3 Line Cord, for battery eliminator, **P/N 216214**.

5.2.4 Probe Cable, ED-810 to dual microdot, **P/N 209703**.

5.2.5 Adapter, ED-810 to dual BNC, **P/N 209534**.

5.2.6 HS-50 Bolt Hole Scanner, **P/N 222650**.

5.2.7 General Purpose Probe Kit, **P/N 213208**.

5.2.8 Balancing Load, medium frequency, **P/N 209730**

5.2.9 Balancing Load, high frequency, **P/N 209735**

Consult the probe catalog for the many standard probes and coils available for use with the ED-810. The ED-810 design requires that **two** probes or **two** coils must be connected to the instrument for proper operation. It will not work properly with only one probe or coil. In some cases, an adapter is required between the end of the probe cable and the instrument connector. Consult factory to determine if a balance load is available for the desired probe.

5.2.10 Strip Chart Recorder, **P/N 519354**, for permanent record of X and Y axis output.

5.2.11 Strip Chart Recorder Cable, **P/N 225962**, to connect ED-810 to strip chart recorder.

5.2.12 Video Printer, **P/N 520241**, to capture and print ED-810 screen. This printer can also transfer image to computer in bitmap format.

5.2.13 Remote Control accessory, **P/N 222840**, to remotely ERASE or NULL the ED-810.

5.3 Required Accessory

Power Supply Option (select either):

+ Battery Eliminator (for AC operation), **P/N 219876**

or

+ Battery Pack, **P/N 219880** and Battery Charger, **P/N 219885**

6.0 References

6.1 Operating Manual, Form No. 20996B

6.2 ES-103 for HS-50 Bolt Hole Scanner

6.3 Price Pages EC-80

Prices available on price list April, 2003