ED-1100 PORTABLE VARIABLE EDDY CURRENT INSTRUMENT

EQUIPMENT SPECIFICATION ES-110

1.0 Description

1.1 The Model ED-1100 is a microprocessor based variable frequency eddy current instrument, with a liquid crystal display readout, that detects homogeneity and conductivity changes in magnetic and nonmagnetic materials instantaneously. The instrument is battery operated, light weight, and can be used 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-400, ED-510XL, ED-520/530 series, ED-800, and ED-810).

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 LCD in the storage or nonstorage mode. This readout 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 on the LCD and the crack indication is an upward or downward slanted line that meets the horizontal at the right 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-1100 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.

2.0 Mechanical and Construction

2.1 The instrument consists of microprocessor based circuitry, a back lit liquid crystal display, and rechargeable battery pack housed in an aluminum case.

2.2 Dimensions: 6.0” (15.2 cm)W x 12.0” (30.4 cm) L and 6.0” (15.2 cm)D with cover closed.

2.3 Weight: 7.5 lbs (3.4 kg)

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

2.5 The front panel probe connector is a six pin LEMO connector. The unit comes with a probe cable, 6-pin LEMO to dual Microdot, and an adapter, 6-pin LEMO to dual BNC. Adapters are available to accommodate other connector styles.

2.6 The bezel surrounding the LCD may be removed, thus allowing replacement of the scratch shield in front on the LCD and cleaning when necessary.

3.0 Electrical and Performance

3.1 The instrument is powered from an integral rechargeable nickel-cadmium battery, or from the power line (110/60/1 or 220/50-60/1) through the charger while the battery is being charged. The power consumption is 7.5 watts.

3.2 Battery life per charge is approximately 12 hours; with the backlight lit this drops to about 6 hours. Recharge time is approximately 14 hours.

3.3 The instrument has a variable frequency range from 100 Hz to 6.0 MHz. It operates with two probes, a test probe and a reference probe. The reference probe serves as an arm in the eddy current bridge to facilitate balancing. Any of the standard Centurion NDT probes from our current instrument line (ED-520 series, ED-530 series, ED-800 and ED-810) may be used. In cases where the probe connector does not match the ED-1100 front panel connector, adapters can be obtained.

3.4 The liquid crystal display (LCD) of the ED-1100 is a storage monitor that shows a flying dot display featuring random access memory with storage locations allocated to the LCD. As such, the instantaneous movement of the dot may be viewed on the display without storage or the dot movement may be stored on the display. 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 display and the instantaneous flying dot can be superimposed on the LCD for matching the known to the unknown.

4.0 Operation

4.1 The *FREQUENCY* keypad is used for establishing a suitable test frequency from 100 Hz to 6 MHz read on the LCD in hertz and special functions as described below.

4.2 The Probe *DRIVE* controls the power to the probe. As the probe drive is increased and the amplifiers go into saturation, the *OVERLOAD* indication will illuminate on the LCD. For optimum performance, the probe drive should then be decreased until the *OVERLOAD* indication goes out.

4.3 The *GAIN* control varies the gain of the instrument over a range of 100:1.

4.4 The *PHASE* control allows rotation of the display from 0^{o} to 360^{o}.

4.5 The *EXPAND* pushbutton amplifies the signal in the Y axis by 3 times.

4.6 The *DOT POSITION* controls adjust the position of the dot on the display in the all modes of operation.

4.7 The *CHARGE* indicator lights when the battery pack is receiving current from the battery charger. The instrument must be off for the battery to receive maximum charge in shortest time.

4.8 The *POWER* pushbutton is used to turn the unit on and off. The embedded LED lights to indicate that power is being supplied.

4.9 The *AUTO* push-button toggles between *AUTO-NULL* and *STD-NULL* as read on the LCD. In *AUTO-NULL*, the dot is set by the dot position controls and will return to that location when the bridge is balanced. In *STD-NULL*, the dot is set by the dot position controls, but will return only when the *NULL* push-button is depressed. The null point can be located anywhere on the LCD using the *DOT POSITION* controls. This new location now becomes the zero point.

4.10 The *NULL* pushbutton is used when in the *STD-NULL* mode to balance the bridge. The dot will be observed returning to the position selected by the dot position controls.

4.11 The *ERASE* pushbutton will remove the stored signals on the LCD.

4.12 The *STORE* pushbutton toggles between *STORE*, *NON-STORE*, and *TIME BASE*. In the *STORE* mode, the eddy current signals will be saved on the LCD until the *ERASE* pushbutton is pushed. In the *NON-STORE* mode, no signal is saved on the LCD. The *TIME BASE* mode is represented as a signal that is swept across the display from left to right. A flaw signal will be represented by a vertical indication.

4.13 The *B'LITE* push-button turns the LCD backlight on and off.

4.14 The *ACCESSORY* connector is available to access analog signals that would be required for a strip chart recorder, reading the horizontal or vertical deflection of the dot, audio or threshold gate, etc.

5.0 Order Reference

5.1 Model ED-1100 Portable Crack Detection and Sorting Instrument, **P/N 225340** in an aluminum enclosure with handle and including:

Probe Cable, 6-pin LEMO to dual Microdot
Adapter, 6-pin LEMO to dual BNC
Power Supply/ Battery Charger (**must** specify 110V or 220V)
Operating Manual

5.2 Standard Accessories

5.2.1 Power Supply/Battery Charger, **P/N 520104**. Fits into top cover and permits operation of instrument on 110VAC, 50/60 hertz, single phase line current.

5.2.2 Power Supply/Battery Charger, **P/N 520127**. Permits operation of instrument on 220VAC, 50/60 hertz, single phase.

5.2.3 Rechargeable Nickel-Cadmium Battery Pack, **P/N 225351**.

5.2.4 Probe Cable, **P/N 225364**. Six pin LEMO connector to dual Microdot cables, 72 inches long.

5.3 Addendum Accessories

5.3.1 Model ED-1100 Starter Kit, **P/N 225383** includes:

1 each **P/N 226020**, Titan Series Probe Cable
1 each **P/N 226030,** Titan Series Pencil Probe, 6.5" long angled
2 each **P/N 207067**, Medium frequency surface probe, 5/16" diameter
2 each **P/N 213263,** Low frequency corrosion probe, 9mm diameter
1 each **P/N 225389,** Multi-functional Test Block

5.3.2 Model TH-1100 Audio/Threshold Gate, **P/N 225390**

5.3.3 Model HS-50 Bolt Hole Scanner, **P/N 222650**

5.3.4 Single Channel Strip Chart Recorder, **P/N 519345**

5.3.5 Aluminum Test Block with single slot .015" deep, **P/N 205156**

5.3.6 Aluminum Test Block with three slots, .008", .020", and .040" deep, **P/N 207066**

5.3.7 Steel Test Block with three slots, .008", .020", and .040" deep, **P/N 220004**

5.3.8 Balancing Load, medium frequency, BNC connector, **P/N 209730**

5.3.9 Balancing Load, high frequency, BNC connector, **P/N 209735**

5.3.10 Consult the probe catalog for the many standard probes and coils available for use with the ED-1100. The ED-1100 design requires a dual coil sensor arrangement for proper instrument operation. If a single probe is required, see the Titan Series Probes, they are a dual coil probe series. Consult factory for furher information.

6.0 References

6.1 Instruction Manual, Form No. 25001

6.2 ES-111 for TH-110 Audio/Threshold Gate

6.3 ES-103 for HS-50 Bolt Hole Scanner

6.4 Price Pages EC-75

Prices available on price list January 2009