

ED-400M PORTABLE EDDY CURRENT UNIT

EQUIPMENT SPECIFICATION ES-115

- 1 -

1.0 Description

- 1.1** The Model ED-400M is an eddy current test device which will locate surface and near-surface discontinuities in magnetic materials. Nonmagnetic metals may also be inspected for many types of defects. In magnetic steel products, cracks as small a 0.005" deep may be detected with ease, when open and normal to the surface.
- 1.2** The ED-400M instrument utilizes the eddy current principle, wherein the induced currents in the test part are affected by changes in homogeneity and uniformity. Variations in material conductivity, permeability, and thickness are ignored because of the special design features incorporated in the system. Discontinuities such as cracks, laps, or seams will disrupt the eddy current pattern induced in the material, and cause localized magnetic field changes near the probe which unbalance the instrument and create meter deflections.
- 1.3** Initially, the *Meter Balance* controls are adjusted with the probe in air to zero the meter. As the probe is then scanned across the test object, discontinuities will be indicated as changes in the meter reading. The *Sensitivity* control is adjusted to give the desired amount of deflection for the defects to be located. The *Threshold* control may be adjusted to activate the *Alarm* LED and audio annunciator for a given meter deflection.
- 1.4** The state-of-art ED-400M is virtually insensitive to the background magnetic permeability changes. Thus, no lift-off adjustments are required when searching for defects through rust, oxide scale, paint and other coatings. Slight rocking of the probe during testing does not seriously affect the meter reading. The differential probe forms two legs of a bridge circuit contained within the instrument.

2.0 Mechanical and Construction

- 2.1** Dimensions: 6" x 9" x 5" (15.2 cm x 22.9 cm x 12.7 cm) Cover included.
- 2.2** Weight: 5.3 lb (2.4 kg)
- 2.3** Readout: Rectangular meter, 3.5" (6.4 cm) wide. Scale numbered from 0 to 500 in 50 divisions.

EQUIPMENT SPECIFICATION ES-115

- 2 -

2.4 The ED-400M is housed in a lightweight, aluminum case fitted with a removable cover and positive action latches. The cover contains an accessory storage pocket for quick storage of probe cable(s), probe(s) and test samples.

3.0 Electrical and Performance

3.1 The instrument is solid-state construction throughout and utilizes integrated circuits.

3.2 Frequency: Fixed at 100 KHz.

3.3 Power Requirements: Five "C" cell self-contained nickel-cadmium battery pack

3.4 The standard probe, included with the instrument, is 7/16" diameter with integral alarm LED. Probes are interchangeable.

3.5 Meter indicates probe unbalance as it passes over a flaw. Instrument shows full scale deflection for 0.008" (20.3 mm) deep mill slot in machined magnetic material (Steel Test Block, P/N 220055).

4.0 Operation

4.1 The *Sensitivity* control determines the overall instrument gain and, therefore, the meter deflection for a given depth of defect.

4.2 The four-position power switch provides battery functions, *CHarGe* and *BATTery TEST*, as well as power to the instrument.

4.3 The *Meter Balance* controls null or zero the meter in air and are used in conjunction with one another.

4.4 The ED-400M provides two types of alarm indications, an audio and visual. The visual *ALARM* is always active and is set with the *THRES* control. The LED indicators on both the probe and front panel will change from green to red as the threshold is triggered. The slide switch is used to activate the audio signal. In the *THRES*hold position, the audio signal will be heard when earphones are plugged into the *PHONES* socket. In the *TONE* position, a varying tone is heard which coincides with the front panel meter movement.

ED-400M PORTABLE EDDY CURRENT INSTRUMENT

EQUIPMENT SPECIFICATION ES-115

- 3 -

4.5 The *PROBE* socket is a miniature 4-pin screw-on for attachment of test probes.

5.0 Order Reference

5.1 Model ED-400M Portable Eddy Current Instrument, **P/N 220040**, including steel test block, standard probe, line cord, and operating manual.

5.2 Standard Accessories

5.2.1 Standard Crack Detection Probe with integral alarm LED, 7/16" (1.1 cm) diameter x 1.5" (3.8 cm) long, 60" (1.5 m) long cable attached, **P/N 220066**

5.2.2 Steel Test Block, 2.25" (5.7 cm) long x .75" (1.9 cm) wide x .093" (.23cm) high, with .008" (20mm) deep slot, **P/N 220055**

5.2.3 Line cord, **P/N 214216**

5.3 Addendum Accessories

5.3.1 Earphones, **P/N 520181**

5.3.2 Flat Probe with integral alarm LED, **P/N 220049**

5.3.3 Wedge/Chisel Point Probe for weld inspections with integral alarm LED, **P/N 220067**

5.3.4 Pencil Probe, 1/8" coil, 6" long, .5" mitered drop, 30° crank, **P/N 220092** (cable required)

5.3.5 Probe Cable, 60" (1.5 m) long, **P/N 220083**

5.3.6 Bolt Hole Probe for 5/16" (.8 cm) to 3/8" (.9 cm) hole, approximately 4" (10.2 cm) long, **P/N 208294**

5.3.7 Bolt Hole Probe for 3/8" (.9 cm) to 1/2" (1.3 cm) hole, approximately 4" (10.2 cm) long, **P/N 208331**

EQUIPMENT SPECIFICATION ES-115

- 4 -

- 5.3.8** Bolt Hole Probe for 1/2" (1.3 cm) to 5/8" (1.6 cm) hole, approximately 5" (12.7 cm) long, **P/N 208329**
- 5.3.9** Bolt Hole Probe for 5/8" (1.6 cm) to 3/4" (1.9 cm) hole, approximately 5" (12.7 cm) long, **P/N 208330**
- 5.3.10** Bolt Hole Probe for 3/4" (1.9 cm) to 1" (2.5 cm) hole approximately 6" (15.2 cm) long, **P/N 208290**
- 5.3.11** Pancake Probe, 5/16" (.8 cm) high, 6" (15.2 cm) long with attached cable, **P/N 220082**
- 5.3.12** Mini-Swivel Probe, 1/4" (.6 cm) tip diameter, 9.25" (23.5 cm) long (cable required), **P/N 220079**
- 5.3.13** Swivel Probe, 3/8" (.8 cm) tip diameter, 12" (30.5 cm) long with attached cable, **P/N 209005**
- 5.3.14** Spherical Probe, 5/16" (.8 cm) diameter, 1.5" (3.8 cm) long with attached cable, **P/N 220085**
- 5.3.15** Wedge Probe, 5/16" (.8 cm) diameter, 1.75" (4.4 cm) long with attached cable, **P/N 209400**
- 5.3.16** Encircling Coil, 1" (2.5 cm) ID, 3" (7.6 cm) square, cable required, **P/N 220084**

Additional probes and coils may be designed to meet customers' requirements. Contact factory with desired specifications.

6.0 References

- 6.1** Instruction Manual, Form No. 19962B, effective October 1, 2003
- 6.2** Technical paper "A Solution to the Permeability and Lift-Off Problems in Electromagnetic Flaw Detection" by R.H. Kenton (1970)
- 6.3** Price Pages EC- 35

Prices available on price list

October, 2003