

FM-140XL DIGITAL CONDUCTIVITY METER

EQUIPMENT SPECIFICATION ES-109

1.0 Description

- 1.1** The Model FM-140XL Digital Conductivity Meter is a microprocessor based electronic testing instrument which utilizes induced eddy currents to measure directly the electrical conductivity of nonmagnetic metals such as copper, aluminum, brass, molybdenum, nickel, tin or zinc, in units of percent International Annealed Copper Standard (%IACS). It can also provide an indirect measurement of properties directly related to conductivity, such as heat treat condition or precipitation hardening of aluminum alloys, phosphorous content and thermal conductivity of copper.
- 1.2** The shielded probe, energized by 60 KHz alternating current, induces circulating currents in the part to be measured. These induced currents which are a function of conductivity, react back on the probe. This reaction is then amplified and displayed. A threshold gate can be set from the front panel to allow simple go/no go sorting. Two conductivity samples are permanently mounted to the top of the unit for ease of set-up. A 9-pin connector is available on the rear of the unit to allow for RS-232 type communications.

2.0 Mechanical and Construction

- 2.1** Dimensions: 2.75" (7 cm) high x 8.5" (21.6 cm) wide x 9" (22.9 cm) deep
- 2.2** Weight: 5.0 lbs. (2.27 kg)
- 2.3** Readout: 3-½ digits, .43" (1.09 cm) seven segment LED display
- 2.4** The FM-140XL is housed in a compact lightweight and shock resistant case for long life and durability. A protective carrying case with storage pouch for probe and line cord is available.

3.0 Electrical and Performance

- 3.1** The FM-140XL is state-of-art design employing high reliability microprocessor and integrated circuits.
- 3.2** Frequency: 60 KHz
- 3.3** Range: 10% to 110% IACS
- 3.4** Accuracy is $\pm 0.5\%$ IACS at 68°F (20°C)
- 3.5** Power Requirements: The FM-140XL operates from two internal nickel cadmium battery packs of 6 volts each or from 115 or 220 volts, AC, 50/60 Hz power.
- 3.6** The battery charger is a wall mounted transformer type capable of operating at 110-240 VAC.

- 3.7 The batteries are rated for approximately 10 hours continuous operation from the fully charged state, at 70° F, before recharging is necessary. The recharge time required is 10 to 14 hours.
- 3.8 RS-232 port at rear of the unit. A simple instruction set enables conductivity values to be loaded into separate computer, micro-controller, etc.

4.0 **Operation**

- 4.1 For initial calibration, the ON button is push to energize the unit. The high calibration is set by placing the probe on the high calibration conductivity sample and pressing the up/down arrow until the unit readout and the value of the sample are the same. This procedure is then repeated for the low sample. The unit is then ready to use. An internal timer warns the operator to verify the calibration of the unit every fifteen minutes. If the unit is left on and no readings are taken in that fifteen minute interval, the unit will shut off to conserve battery life. The calibration information is saved in memory.
- 4.2 For gate operation, the procedure is very much the same. The unit is turned on and calibrated. The GATE ON and SET buttons are pushed. To set the low threshold, push the LOW button and then the up/down arrows to the desired level. The same is done on the high end. The GATE SET button is again pushed. Now when the probe is placed on a sample of material whose conductivity value is within the set high and low limits, the green LED on the front panel will light. If the value is outside the limits set, the red LED will light.

5.0 **Order Reference**

- 5.1 Model *FM-140XL* Digital Conductivity Unit, including calibration samples, charger, and operating manual to operate on 110-240/50-600/1, **P/N 220220A**

5.2 **Standard Accessories**

- 5.2.1 Calibration Samples: Copper, **P/N 518542**
Brass, **P/N 518543**

- 5.2.2 Battery Charger, **P/N 520239**

- 5.2.3 Standard Probe, **P/N 220245**

5.3 **Addendum Accessories**

- 5.3.1 Carrying/Shipping Case, **P/N 520363**

6.0 **References**

- 6.1 Instruction Manual, Form No. 220220, effective July 1, 2009

6.2 Technical paper “Factors Affecting Accuracy of Conductivity Measurement by the Eddy Current Method” by David E. Dier

6.3 Price Pages EC-10

Prices available on price list

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