

## MS-2A

### Circuit Breaker and Overcurrent Relay Test Set

# Megger<sup>®</sup>



- **Light Weight, Portable Primary Injection Test Instrument**
- **Overcurrent Relay Testing**
- **Ground Fault Performance Testing for NEC 230.95**
- **Circuit Breaker Testing**

#### DESCRIPTION

The Megger MS-2A test set is used around the world by several thousand utility companies, industrial plants and electrical service organizations.

Model MS-2A is a self-contained test set that incorporates a variable high-current output and appropriate control circuitry and instrumentation for testing thermal, magnetic or solid-state motor overload relays, molded-case circuit breakers, ground-fault trip devices and overcurrent relays.

#### APPLICATIONS

Model MS-2A is capable of testing the time-delay characteristics of overcurrent relays, motor overload relays and molded-case circuit breakers rated up to 125 amperes, when following the recommended test procedure of testing the time delay of these devices at three times their rating.

Higher currents are available for the short durations required to test an instantaneous trip element. For example, the test set will provide a maximum shortduration output of 750 amperes through a typical, 125 ampere, molded-case circuit breaker.

The MS-2A is ideal for testing ground fault protection devices with window CT's. The NEC 230.95C requires specific ground fault devices be performance tested when initially installed.

The MS-2A is commonly used by many utilities and service organizations as a economical light weight overcurrent relay test system.

Additional applications include verifying the ratio of current transformers and testing panelboard ammeters and voltmeters.

#### FEATURES AND BENEFITS

- **Rugged and lightweight:** Unit weighs only 33 lb (15 kg) and is tough enough to withstand daily field or plant use.
- **Digital memory ammeter:** High accuracy, direct-reading instrument has read-and-hold memory for measurement of short-duration currents. Ideal for testing ground fault devices, overcurrent relays and molded-case circuit breakers.
- **Digital, multirange timer:** Crystal-controlled, high-accuracy instrument with autoranging measures operating time to 1 millisecond.
- **High-current output:** Provides instantaneous currents up to 750 amperes through a 125 ampere breaker in a small 33lb (15kg) package.

#### SPECIFICATIONS

##### Input

**Input Voltage (specify one):** 120 V OR 240 V, 50/60 Hz, 1 $\phi$

##### Output

**Output Ranges:** The output is continuously adjustable in four ranges to accommodate a variety of test-circuit impedances:

- 0 to 5 A at 120 V max.
- 0 to 25 A at 24 V max.
- 0 to 120 A at 6 V max.
- 0 to 240 A at 3 V max.

**Output Capacity:** The output circuit is designed to permit shortduration overloads and the output ranges will provide several times their current rating, provided the output voltage is sufficient to push the desired current through the impedance of the test circuit.

The test set is capable of testing the time-delay characteristics of devices rated up to 125 A using a test current of three times their rating (375 A). Additionally, to perform an instantaneous trip test, it will provide 750 A through a typical, 125 A, molded-case circuit breaker connected with the test leads provided with the test set.

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**Overload Capability:** To increase use of the test set, it is designed so that the current ratings may be exceeded for short durations. Because the magnitude of the output current is determined by the impedance of the load circuit, the voltage rating must be sufficient to push the desired current through the device under test and the connecting test leads.

| Percent Rated Current | Maximum Time On | Minimum Time Off |
|-----------------------|-----------------|------------------|
| 100 (1x)              | 30 min          | 30 min           |
| 200 (2x)              | 3 min           | 8 min            |
| 300 (3x)              | 30 s            | 4 min            |

**Output Initiate Circuit:** The test set uses a solid-state output initiating circuit. To increase reliability and eliminate contact maintenance, this circuit uses a triac instead of a contactor to initiate the output. The initiating circuit provides momentary and maintained modes to control output duration. The momentary mode is used whenever the output is to be on for a short duration, such as when performing instantaneous trip tests, or to avoid damage or overheating of the device under test while setting the test current. In the maintained mode, the output remains energized until manually turned off or, when performing timing tests, until the device under test operates — which both stops the timer and de-energizes the output.

## INSTRUMENTATION

### Ammeter

#### Operating Modes (switch-selected)

Memory  
Normal

### Display

3½ digit, extra-bright LED display with 0.3 in. (7.62mm) numerals

#### Ranges (switch-selected)

0 to 1.999/19.99/199.9/750 A

#### Continuous Accuracy (overall ammeter system)

±1% of reading, ±1 digit on three high ranges  
±1% of range, ±1 digit on low range

### Timer

#### Display

5-digit, extra-bright, LED display with 0.3 in. (7.62mm) numerals

#### Ranges (switch-selected)

0 to 99.999 s  
0 to 999.99 s  
0 to 99999 cycles

#### Accuracy

±0.005% of reading, ±1 digit

### Timer Control Circuit

This circuit automatically starts the timer when the output is energized and automatically stops the timer and de-energizes the output when the device under test operates. This circuit accommodates the following test conditions by simple switch selection of the appropriate mode:

**Current Actuated:** Used to test a device that has no auxiliary contacts to monitor, such as a single-pole circuit breaker. The timer stops when the output current is interrupted.

**Normally Closed:** Used to test a device with normally closed contacts. The timer stops and the output is de-energized when the contacts open.

**Normally Open:** Used to test a device with normally open contacts. The timer stops and the output is de-energized when the contacts close.

### Enclosure

The test set is housed in a high strength, molded, suitcase-type enclosure with carrying handle and removable cover. Storage space is provided for test leads.

### Standards

CE  
EN 61326-2-1  
EN 61010-1  
EN 61010-031

### Dimensions

18 W X 9.5H X 13.5 D in.  
(457.2 W x 241.3 H x 342.9 mm)

### Weight

33 lb (15 kg)

## ORDERING INFORMATION

| Item (Qty)                  | Cat. No.  | Item (Qty)                                 | Cat. No. |
|-----------------------------|-----------|--------------------------------------------|----------|
| Model MS-2A                 |           | Test and maintenance record cards          |          |
| 115 volt input              | MS-2A-115 | Green [50]                                 | 2239     |
| 230 volt input              | MS-2A-230 | Buff [50]                                  | 2238     |
| <b>Included Accessories</b> |           | No. 2 high-current leads, 2 ft (0.6 m) [2] | 620155   |
| Test Lead, red, 200cm, [2]  | 620143    | <b>Fuses</b>                               |          |
| Test Lead, black, 200cm [2] | 620144    | 0.125 A, 250 V, MDL [5]                    | 981      |
| Alligator clip, red, [2]    | 684006    | Instruction manual [1]                     | 750026   |
| Alligator clip, black, [2]  | 684007    |                                            |          |

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