MS-2
Circuit Breaker and Overload Relay Test Set

- **Digital memory ammeter**
- **Digital, multirange timer**
- **High-current output**
- **Solid-state output initiate circuit**
- **Portable, high-current test set**

DESCRIPTION

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

Using the latest technology, Model MS-2 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; and ground-fault trip devices.

APPLICATIONS

Model MS-2 is capable of testing the time-delay characteristics of 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 short-duration output of 600 amperes through a typical, 125 ampere, molded-case circuit breaker.

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

FEATURES AND BENEFITS

- **Digital memory ammeter:** High-accuracy, direct-reading instrument has read-and-hold memory for measurement of short-duration currents.
- **Digital, multirange timer:** Crystal-controlled, high-accuracy instrument with autoranging measures operating time to 1 millisecond.
- **High-current output:** Provides instantaneous currents up to 600 amperes through a 125 ampere breaker.
- **Rugged and lightweight:** Unit weighs only 33 lb (15 kg) and is tough enough to withstand daily field or plant use.
- **Solid-state output initiate circuit:** Solid-state circuit eliminates need for contact maintenance.

SPECIFICATIONS

Input

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

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 short-duration 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 600 A through a typical, 125 A, molded-case circuit breaker connected with the test leads provided with the test set.

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
$3^{1}/_{2}$ 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

ContinousAccuracy (overall ammeter system)
±1% of reading, ±1 digit on three high ranges
Regulating: ±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.

Dimensions
9.9 H x 14 W x 11 D in.
(25 H x 35 W x 28 D cm)

Weight
33 lb (15 kg)

ORDERING INFORMATION

Item (Qty)	Cat. No.
Model MS-2	
115 volt input	MS-2-115
230 volt input	MS-2-230
Included Accessories	
Timer control circuit leads, 5 ft (1.5 m) [2]	1282
Test and maintenance record cards	
Green [50]	2239
Buff [50]	2238
No. 4 high-current leads, 5 ft (1.5 m) [2]	2265
Fuses	
5 A, 250 V, MDA [5]	952
0.125 A, 250 V, MDL [5]	981
10 A, 250 V, MDA [5]	984
0.0625 A, 250 V, MDL [5]	987
Instruction manual [1]	8470

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ISO STATEMENT
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