

OCR15D and OCR50D

Automatic Oil Circuit Recloser Test Sets



OCR15D



OCR50D

- **Preprogrammed test sequences for reclosers**
- **Impedance compensation to properly test reclosers with variable impedance characteristics**
- **Accurate duplication of test results**
- **Simple operation and precise test results**
- **Full color, high resolution, TFT LCD touch screen**
- **OCR software runs under PowerDB software suite**
- **View, save and export test reports for printing or importing into PowerDB**
- **Digitized TCC Curves included in the OCR software**
- **Simplified Control Software - easy to learn and use**

DESCRIPTION

The Model OCR15D and Model OCR50D Automatic Oil Circuit Recloser Test Sets are self-contained mobile test sets specifically designed to verify the proper operation of automatic circuit reclosers under simulated overload and fault conditions. This helps to ensure reliable system operation, protection and coordination. A digital control and instrumentation system ensures simple operation with precise test results. Model OCR15D and Model OCR50D provide a variable high-current output with an impedance compensation network to stabilize the output current.

These units include appropriate instrumentation and control circuitry to efficiently, accurately and safely test virtually all single-phase and three-phase direct-acting reclosers produced by manufacturers such as Cooper Power Systems, Inc., McGraw-Edison (Kyle, Line Material), Westinghouse, General Electric, Kearney, and Lexington Switch and Controls.

APPLICATIONS

The automatic Oil Circuit Recloser Test Sets can test reclosers incorporating either oil or vacuum interrupters. Additionally, they can perform primary injection (high-current) testing of electronically controlled reclosers. The following typical tests are performed on reclosers.

Minimum trip current: This test determines the minimum operating (pickup) point. The minimum pickup test is performed by increasing current flow through the operating coil of the recloser until the recloser begins to operate. For mechanical solenoid-operated reclosers the change in impedance at pickup is detected by the digital controller.

The controller unit will detect, measure and display the test current at this point. This is the pickup value and is usually two times the current rating of the coil.

Time-current characteristics: This test determines the operating characteristics of the recloser under simulated fault conditions. The OCR software includes many digitized recloser time-current characteristic curves. These digitized curves assist the user with locating the timing test points and whether they pass the manufacturer's tolerance criteria. Timing and sequence of events tests are performed by subjecting the recloser to simulated overloads using recommended test currents of four to six times the coil rating.

The current, trip time and reclose time for each operation, as well as the total clearing time, are all automatically measured and recorded by the OCR software. The additional capacity of the OCR50D allows for testing of the time-current characteristics at values as high as eight to ten times the coil rating.

Sequence of operation: The units verify the number and sequence of operations to lock out. The software will identify, record and log too many or too few operations.

Operating time: A digital timer measures the elapsed time of each operation.

Reclosing time: A digital timer measures the reclosing interval between each operation.

Total clearing time: A digital timer measures the total elapsed time to lockout.

Similar tests can be performed on electronically controlled reclosers using primary injection testing. Primary injection not only tests the electronic control, but also checks the entire system including the CTs, control cable, auxiliary solenoids and wiring connections.

The OCR test sets can also be used to perform operational lockout tests on sectionalizers. A sectionalizer lockout test is performed by applying a programmed number of current pulses through the device at an appropriate current level. The sectionalizer counts the number of current pulses to determine when to operate. A lockout test is automatically performed by a special programmed test sequence that applies and removes activating current to the sectionalizer. This simulates the upstream operation of a recloser. The sectionalizer should go through its normal sequence to lockout. The number of current pulses required to reach lockout is compared to the sectionalizer setting data. The test set will record the number of pulses and determine whether the sectionalizer passed or failed.

Model OCR15D and Model OCR50D can also be used for other high-current applications such as determining the ratio of current transformers, thermal relay testing, performing heat runs or testing direct-acting circuit breakers.

FEATURES AND BENEFITS

■ **Simple operation and precise test results:**

The digital control and instrumentation system of the test sets ensure simple operation and precise test results. When performing a minimum pickup test, the controller will automatically detect and display the minimum current at which the recloser operates. The number of expected reclose operations is selected prior to the start of the timing test. As the test is in progress, the controller will store current magnitude, trip time and reclose time for each operation of the recloser. Total operating time to lockout is also measured. The test data is then displayed for each operation.

■ **Test Monitoring:**

The digital control monitors the number of operations and alerts the operator if there were insufficient or excessive operations of the recloser. Additionally, the control system will turn off the output of the test set if the recloser exceeds the allowed time to lockout.

■ **Automatic error detection:**

The controller is also programmed to detect and display several types of errors associated with the operation of the test set, such as operator errors or device-related errors. For example, an error indication is displayed in the event that the operator fails to select an appropriate ammeter range or mode of operation.

■ **High-capacity outputs test virtually all reclosers:**

Model OCR50D's output is rated a full 50 kVA. Additionally, it has a short-time overload capacity of up to 150 kVA. Model OCR15D's output is rated a full 15 kVA with a short time overload capacity of 45 kVA.

■ **Overload and short-circuit protection**

■ **Software Capabilities:**

The OCR software provides the user with a complete Test Report that also indicates Pass/Fail status (Figure 1). A test report includes the tests that were conducted on the recloser (e.g. pickup, timing, single shot to lockout). Test reports can be saved internally and/or exported to a USB flash drive. Exported files are saved in a pdbxml file format that can be imported into PowerDB software on other computers. OCR software also supports the ability to save test reports as a PDF file. The control software includes simple test screens to minimize the user learning curve and provide ease of testing (Figure 2 shows a Timing Test screen). A simple Manual Test screen provides manual control of the test set (Figure 3). The OCR control software contains numerous digitized time-current curves for many standard reclosers. The digitized curves are displayed on the timing test screen. Actual test points are shown after the test has been run. These curves and test points are then included in the test report. Megger can help to supply digitized curves for requested reclosers that may not be included in the curve database. The OCR software provides the ability to add new curves without having to wait for a new version of the software.

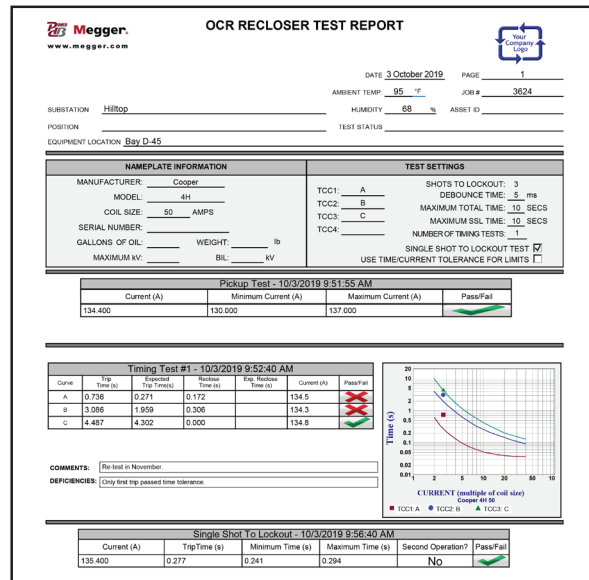


Figure 1. OCR Test Report

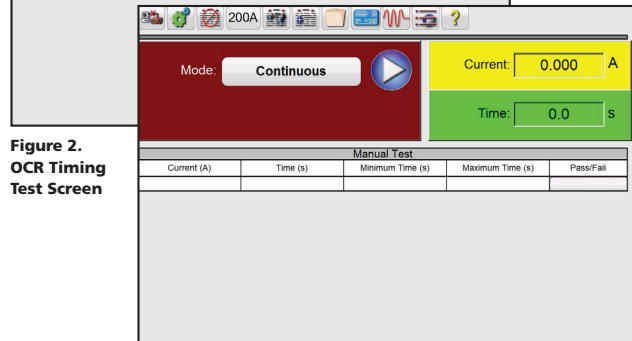
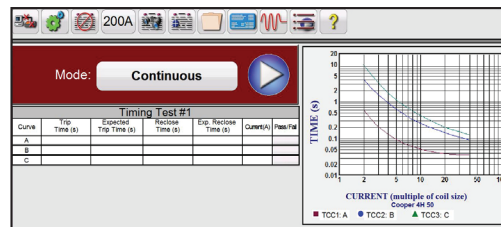


Figure 3. Manual Test Screen

SPECIFICATIONS

Input:

Model No.	Input Voltage (Single-Phase)	Input Frequency
OCR15D-208/60	208 V ±5% at 150 A 230 V ±5% at 150 A 460 V ±5% at 40 A 575 V ±5% at 35 A	50/60 Hz
OCR15D-220/50	220 V ±5% at 150 A 240 V ±5% at 150 A 380 V ±5% at 40 A 415 V ±5% at 35 A	50/60 Hz
OCR50D-460	460 V ±5% at 150 A	50/60 Hz
OCR50D-400	400 V ±5% at 150 A	50/60 Hz

Output

Output Rating

Model OCR15D: 15 kVA

Model OCR50D: 50 kVA

Rated Output Ranges: The output is continuously adjustable through the following ranges to meet a wide variety of test circuit impedances:

Model OCR15D	Model OCR50D
0 to 2000 A at 7.5 V max. 0 to 1500 A at 10 V max. 0 to 1000 A at 15 V max. 0 to 500 A at 30 V max. 0 to 250 A at 60 V max. 0 to 100 A at 150 V max. 0 to 50 A at 300 V max. 0 to 25 A at 600 V max.	0 to 2800 A at 18 V max. 0 to 2000 A at 25 V max. 0 to 1400 A at 36 V max. 0 to 1000 A at 50 V max. 0 to 700 A at 71.5 V max. 0 to 500 A at 100 V max. 0 to 350 A at 143 V max. 0 to 250 A at 200 V max. 0 to 150 A at 334 V max. 0 to 100 A at 500 V max. 0 to 50 A at 1000 V max.

Duty Cycle: The test sets will supply the rated output current indicated above for 30 minutes, followed by 30 minutes off time.

Overload Capability: For testing reclosers or for other applications requiring high current for short durations, the test sets will provide output currents significantly above the nominal current ratings given above.

Where the output voltage is sufficient to push higher than the rated current through the impedance of the load, the test sets can be overloaded as shown below. The actual output current obtained is determined by the impedance of the load circuit and by the resistance selected in the impedance compensation network.

Percent Rated	Maximum On Time	Minimum Off Time
100%	30 minutes	30 minutes
200%	75 seconds	6 minutes
300%	25 seconds	4 minutes

Impedance Compensation Network: This circuit is used to minimize the change in output current that occurs when the trip rod travels through the series trip coil of the recloser, causing the coil impedance to rise appreciably. A reasonably constant output current is provided by inserting resistance in the primary circuit of the output transformer of the test set. This will minimize the effects of changing impedances within the recloser. The appropriate impedance compensation resistance is selected by a switch mounted on the front panel (see Figures 4 and 5).

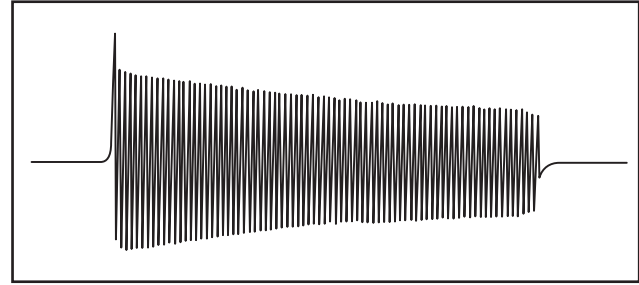


Figure 4. With no impedance compensation network, a recloser with a 50 ampere coil and an initial test current of 210 amperes operated in 2.641 seconds — three times the manufacturer’s specifications.

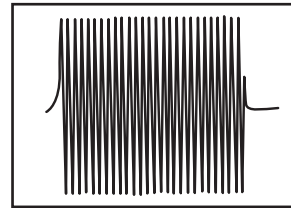


Figure 5. With an impedance compensation network, a recloser with a 50 ampere coil and an initial test current of 210 amperes operated in 0.783 of a second with no significant current decay. The result was well within the manufacturer’s specifications.

TIMER MEASUREMENTS

An autoranging, electronic timing system with digital display is incorporated to provide individual indication of the elapsed time of each sequence of the recloser’s operation. Operating (trip) times, reclosing intervals and total time to lockout are indicated.

Timer Ranges (autoranging)

0.000 to 999.9 s

Timer Accuracy

Seconds Mode: ±1 digit or 0.005% of reading, whichever is greater

CURRENT MEASUREMENTS

The digital control unit provides the timing and current measurement functions during each operation of the recloser. The digital control automatically detects, measures and displays the minimum pickup current. The digital control unit is also specifically designed to accurately measure short-duration currents.

Ranges (user-selected)

- 0 to 19.99 A
- 0 to 199.9 A
- 0 to 1.999 kA
- 0 to 19.99 kA

Each range has an over-range capability of 10%. In the event a current measurement exceeds the range in use, measurements can be made of currents up to 10% over that range’s full-scale rating.

OVERALL METERING ACCURACY

Instrument: ±0.5% of reading ±0.1% of full scale ± last digit

Current Transducer: ±1% of reading

USER INTERFACE

The control panel for both models incorporates a large touch-sensitive display panel. The touch-screen panel provides the user interface for operator safety and convenience. The touch screen allows for user selection of the built-in recloser time curves, selection of the appropriate test, displays pertinent test information, provides for control of the test set and displays the test results.

ACCESSORY OUTLET

A ground-fault-protected, 120 volt outlet with a capacity of 1.2 kVA is provided for convenient connection of accessory equipment.

OPERATOR SAFETY INTERLOCK SYSTEM

A safety interlock system, in conjunction with a foot switch, is incorporated to prevent the operator from leaving the control area of the test set. This helps to prevent accidental contact between the operator and the output section.

OUTPUT CONNECTIONS

Busbar connections are provided for high-current ranges and terminals are provided for high-voltage ranges.

PROTECTION

Appropriate protective devices are incorporated to protect the test sets from overloads and short circuits.

ENCLOSURE

For safety and mobility, each test set is housed in a single, rugged, sheet-metal enclosure with a low center of gravity, tow ring, lifting eyes and large locking swivel casters with brakes. To increase the maneuverability, all four casters swivel; however, they can also be easily locked into a fixed position when desired. Controls and instrumentation are positioned so the operator can simultaneously observe the recloser under test.

DIMENSIONS

Model OCR15D:

45 H x 53 W x 26 D in. (114 H x 135 W x 66 D cm)

Model OCR50D:


45 H x 60 W x 28 D in. (114 H x 152 W x 71 D cm)

WEIGHT

Model OCR15D: 1100 lb (500 kg)

Model OCR50D: 1620 lb (729 kg)

ORDERING INFORMATION

Item (Qty)	Cat. No.	Included Accessories Item (Qty)	Cat. No.
Model OCR15D		Input cables, 4/0, 15 ft (4.5 m) [2]	17163
208 Volt	OCR15D-208	Output cables	
220 Volt	OCR15D-220	Single 4/0 [1 pr]	1531
Model OCR50D		Double 4/0 [1 pr]	1532
460 Volt	OCR50D-460	Extra Long Timer leads (Non-sleeved, 1 red, 1 black) Black, 360 cm (12 ft), 600V, 32A, CAT II	2003-172
400 Volt	OCR50D-400	Red, 360 cm (12 ft), 600V, 32A, CAT II	2003-173
			
		Alligator Clips (1 red, 1 black) Black, for use with leads up to 1000V, 32A, CAT III	684006
		Red, for use with leads up to 1000V, 32 A, CAT III	684007
		