

REVERSE CURRENT CIRCUIT BREAKERS  
AUTOMATIC ELECTRIC INC.  
D-7064, D-7065, D-7066 AND D-7099  
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the Automatic Electric Incorporated D-7064, D-7065, D-7066 and D-7099 reverse current circuit breakers used in automatic power plants and replaces issue 1 of this section.

This section is reissued to incorporate material from the addendum in its proper location.

1.02 Reference shall be made to Section 020-010-711, covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.

1.03 Part 1, "General" and Part 2, "Requirements" form part of the Western

Electric Company, Inc. Installation Department Handbook.

1.04 Requirements are marked with an asterisk (\*) when to check for them would necessitate the dismantling or dismantling of apparatus, or would affect the adjustment involved of other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons or its performance indicates that such a check is advisable.

1.05 When any adjustments are to be made, the necessary precautions should be taken to maintain service.

2. REQUIREMENTS

2.01 Operating Test With the core demagnetized and the operating voltage as given below applied to the shunt coil of the circuit breaker the plunger shall be pulled down and the lower spring brush shall be closed with one unhesitating movement.

When used as a circuit breaker	- 54 volts
When used as a counter e.m.f. cell switch	- 50 volts

2.02 Non-Operating Test With the core demagnetized and the non-operating voltage as given below applied to the shunt coil of the circuit breaker, the lower spring brush shall remain open.

When used as a circuit breaker	- 52 volts
When used as a counter e.m.f. cell switch	- 48 volts

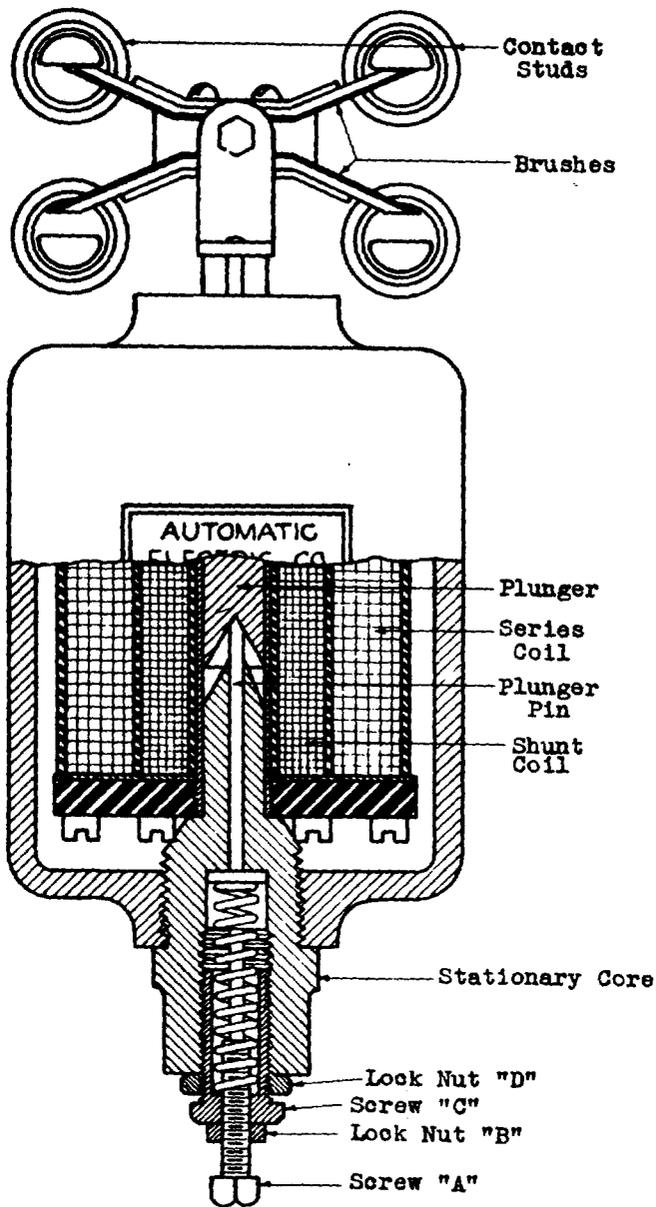


FIG. 1 CIRCUIT BREAKER DETAILS

- 2.03 Reverse Current Test
- When used as a circuit breaker (with the 400 ohm resistance in series with the shunt coil) and a voltage of 50 volts applied to the shunt coil and resistance, the circuit breaker shall "hold in" with no current in the series coil.
  - With the shunt coil energized as in (a) the plunger shall release and open the lower spring brush contacts upon a reverse current in the series winding of not more than 10% of the circuit breaker rated current.
- 2.04 Mounting
- The contact surfaces of the studs for each brush shall be in the same plane and approximately horizontal.
  - The contact area of each brush shall fall entirely within the contact surface of the studs.
  - The contact surfaces shall be  $1-1/16"$   $\pm$   $1/32"$  apart vertically. Use scale.
- \*2.05 Binding The plunger and plunger pin shall not bind in their guides.
- 2.06 Contact Surfaces Contacts shall be clean and free from burrs.
- 2.07 Plunger Stroke At the bottom of its stroke, the plunger pin shall strike the pin on the screw "A" but the plunger shall not strike the stationary core of the solenoid.
- 2.08 Brushes
- With the plunger at the bottom of its stroke, the lower spring brush shall be compressed against the contacts and there shall be an appreciable opening between the upper brush and the associated stationary contacts.
  - With the plunger released and at the top of its stroke, the upper spring brush shall be compressed and there shall be an appreciable opening between the lower brush and its associated contacts.
- 2.09 Lock Nuts The lock nuts "B" and "D" shall be tight.

**3. ADJUSTING PROCEDURES****TOOLS**

File, Smooth Cut, 10", Flat  
 Steel Scale, 6"  
 Wrench, Double End, Flat, 5/16" and 3/8"  
 Openings Across Flats  
 Wrench, Double End, Flat, 1/2" and 19/32"  
 Openings Across Flats  
 Wrench, Double End, Flat, 5/8" and 3/4"  
 Openings Across Flats

**MATERIALS**

Petroleum Spirits  
 Cheesecloth or Equivalent  
 Crocus Cloth

**TEST APPARATUS**

Ammeter, Weston, DC, Model 280, Scale to  
 Suit Installation  
 Voltmeter, Weston, DC, Model 280, 3-60-150  
 Volts

- 3.001 The voltages for the operating and non-operating tests may be obtained by manually operating the field rheostat of the associated generator with the set running.
- 3.002 Demagnetize the solenoid after each application of test voltage by momentarily applying a similar voltage of opposite polarity in checking requirements as outlined in paragraph 2.01 and 2.02.
- 3.003 During the operating and non-operating tests on the circuit breaker used as a counter e.m.f. cell switch, the open contacts shall be insulated and the closed contacts shall be shunted.

**3.01 OPERATING TEST (Rq.2.01)**

M-1 If the circuit breaker does not operate with the specified voltage applied to the coil, check the mechanical requirements as outlined in paragraphs 2.04, 2.05, 2.07, 2.08 and 2.09 before making adjustments. Check the operating voltage at the coil terminals of the circuit breaker.

M-2 If the circuit breaker does not operate, test for open circuit using a voltmeter. Connect the voltmeter in multiple with the shunt coil. If the voltmeter shows no reading when voltage is applied, the circuit is open and should be checked. If the circuit

is not open, connect the voltmeter in series with the coil. No reading on the voltmeter indicates the coil is open and should be replaced.

M-3 Should the plunger not function when the operating voltage is impressed on the shunt coil, loosen lock nut "D" and turn out screw "C" to relieve the compression on the spring supporting the plunger.

**3.02 NON-OPERATING TEST (Rq.2.02)**

M-1 Should the plunger operate when the non-operating voltage is impressed on the shunt coil, loosen lock nut "D" and turn in screw "C" to increase the compression on the spring supporting the plunger. When the operate and non-operate requirements are met with the same setting of the screw "C", tighten lock nut "D".

**3.03 REVERSE CURRENT TEST (Rq.2.03)**

M-1 Connect an ammeter in the charging circuit so that the ammeter will read the reverse current. Start the charging set in the usual manner. With the circuit breaker closed, open the line switch to the driving motor and note the reversal of the current in the ammeter. If the reverse current circuit breaker does not open with a reverse current of less than the specified value, replace the circuit breaker.

**3.04 MOUNTING (Rq.2.04)**

M-1 Loosen the nut holding the stud that is out of alignment, realign the stud to the correct position, and retighten the nut.

**3.05 BINDING (Rq.2.05)**

M-1 Should the plunger bind in the solenoid, remove the brush assembly, withdraw the plunger, and wipe the plunger with clean cheesecloth moistened with petroleum spirits. If the plunger pin binds, loosen lock nut "D", remove screw "C", take out the plunger pin and wipe the plunger pin with clean cheesecloth moistened with petroleum spirits. Replace the plunger and plunger pin. If the binding continues it will be necessary to replace the circuit breaker.

3.06 CONTACT SURFACES (Rq.2.06)

M-1 Clean contacts only when necessary and then by wiping with a clean cloth, moistened with petroleum spirits. Pitted stationary contacts should have the burrs removed by using a fine file or crocus cloth.

3.07 PLUNGER STROKE (Rq.2.07)

M-1 To prevent the plunger striking the stationary core, loosen the lock nut "B", and turn in screw "A" until the plunger strikes the pin and not the core. A finger placed against the stationary core can detect the impact of the plunger striking the core. When placed against the screw "A", it

can detect the impact of the plunger striking the pin.

3.08 BRUSHES (Rq.2.08)

M-1 Loosen the lock nut "B" and adjust the screw "A" to give the desired action. If this requirement cannot be met without having the plunger strike the core, it will be necessary to replace the circuit breaker.

3.09 LOCK NUTS (Rq.2.09)

M-1 Tighten lock nuts "B" and "D" taking care not to change the settings of the screws "A" and "C".