

## SCOPE

This test procedure covers the testing and maintenance of Westinghouse RC relays. The Westinghouse Protective Relay Division was purchased by ABB, and new relays carry the ABB label. Refer to IL 41-661.1 for testing support information and component level identification.

## SAFETY

The RC reclosing relay has many moving parts and multiple voltage levels, including ac and dc. The ac voltage can be as high as 240 volts. Use caution when testing the relay while in-service.

## INTRODUCTION

The RC relay is a reclosing relay that automatically initiates reclosing impulses to a circuit breaker that has been tripped by a protective relay. The RC relay also blocks instantaneous trips after the first trip to implement a fuse saving scheme. The easiest (and most effective) way to test is to take the breaker out of service and test the RC with the operational breaker. Otherwise the RC relay is bench tested.

**NOTE:** If the RC relay is being bench tested or maintained with the breaker still in service, instantaneous tripping on one or more overcurrent relays may be interrupted (while the RC relay is removed from the case). Verify with actual substation prints and clear with the dispatcher.

## TOOLS, EQUIPMENT, AND MATERIALS

Stopwatch.

Test leads

## INSPECTION

1. Take the cover off the relay, taking care to not shake or jar the relay or other relays around it.
2. Open the relay test switches to disable trip and close circuits. The order of opening switches is not critical with the RC relay.
3. Lift the relay out of the case.
4. Visually check the relay for any obvious problems.
5. Clean the relay thoroughly.

6. Burnish the surfaces of all contacts, making sure to remove any tarnish.
7. Check that all relay connections are tight.
8. Check that the resistor leads for the X and Y coil and motor are in the proper configuration. The resistors are in series for 240 VAC operation and bypassed for 120 VAC operation.
9. Check that the drum speed setting dial is correct per the setting sheet. To adjust loosen the clamp screw and rotate the gear unit located behind the steel plate with your hand. Retighten the clamp screw.

#### ADJUSTING THE INSTANTANEOUS TRIP SUPERVISION

1. The drum can be manually rotated by pushing the center button to disengage the clutch. Rotate the drum slowly and adjust the Y13, 14 cam (cam 14, furthest cam back) so Y13, 14 (instantaneous trip supervision) make up half way between the lockout and start drum positions. Ensure that these contacts have adequate wipe by the time the drum reaches the start position.

#### ADJUSTING THE RECLOSING IMPULSES

1. Cam 3 provides reclosing. Verify the desired reclosing sequence and timing from the setting sheet. If a fast reclose is desired check that cam 3 closes 1 click of drum rotation after the breaker opens. Experience has found that the very small delay provides successful recloses by giving the breaker latch check switch time to close.
2. Verify that the plunger arm reset operates (controlled by the mounting screws in cam 5) before any additional recloses on cam 3 are attempted.

#### BENCH TESTING THE RC RELAY

The RC will be bench tested if the breaker cannot be removed from service. The best method is to use the actual field prints to test wire the relay. A double pole double throw switch is used to simulate the a and b contacts.

#### TESTING THE RC RELAY USING THE OUT OF SERVICE BREAKER (PREFERRED)

1. Return the relay to the case if the breaker is out of service with the drum in mid position. Close all switches.
2. With the breaker closed the drum will rotate to the start position. Monitor the instantaneous trip supervision circuit (1 to 10) and observe that it makes up half way between lockout and start.

3. Trip the breaker using an instantaneous protective relay contact that is in the supervised path. Start the stopwatch at the same time. The breaker will reclose after a very slight pause.
4. Observe the proper operation the anti pump scheme, especially the Y coil including plunger latch and plunger reset.
5. Attempt to trip the breaker using an instantaneous protective relay contact that is in the supervised path again. This time the instantaneous trip will be blocked. Trip the breaker using the induction disk contact.
6. Observe the time of the second reclose (if applicable). Observe the anti pump scheme in the same manner.
7. Repeat if needed until no additional recloses are in the sequence. The drum will stop at lockout with the breaker open.
8. Close the breaker. The drum will rotate to start. Replace cover and return the breaker into service.

**RC RELAY, Y UNIT CONTACT SCHEDULE**

**Table 1**

**Y UNIT CONTACT POSITIONS**

<b>Plunger Position</b>	<b>Contact Position</b>			
	<b>Y5</b>	<b>Y6</b>	<b>Y7</b>	<b>Y13</b>
<b>Reset</b>	Closed	Open	Open	Closed
<b>Latched and De-energized (Intermediate)</b>	Open	Open	Closed	Open
<b>Energized</b>	Open	Closed	Closed	Open

RC RELAY, FRONT VIEW

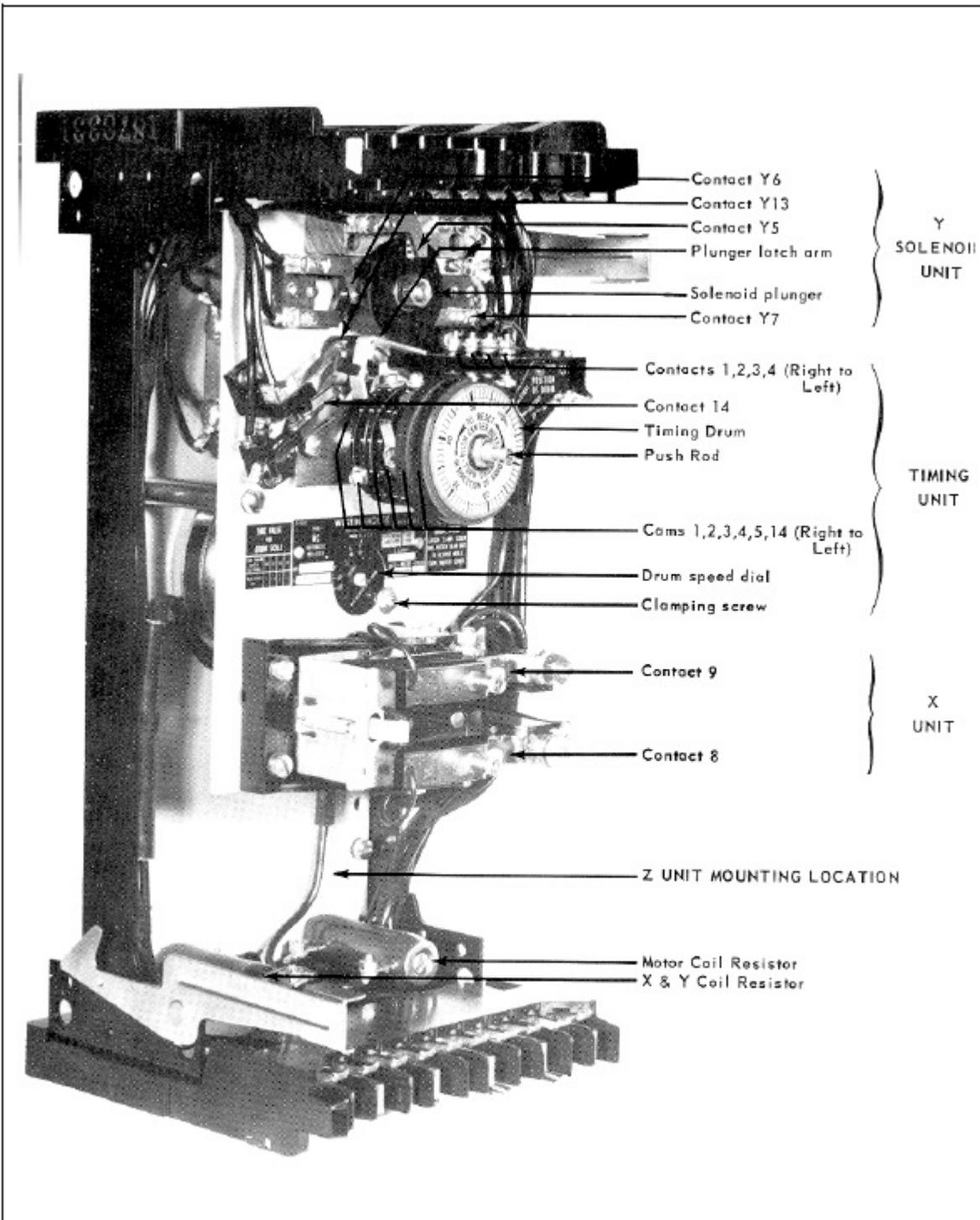


Figure 1. Type RC Relay, without Z Unit, without Case

# RC RELAY, INTERNAL SCHEMATIC

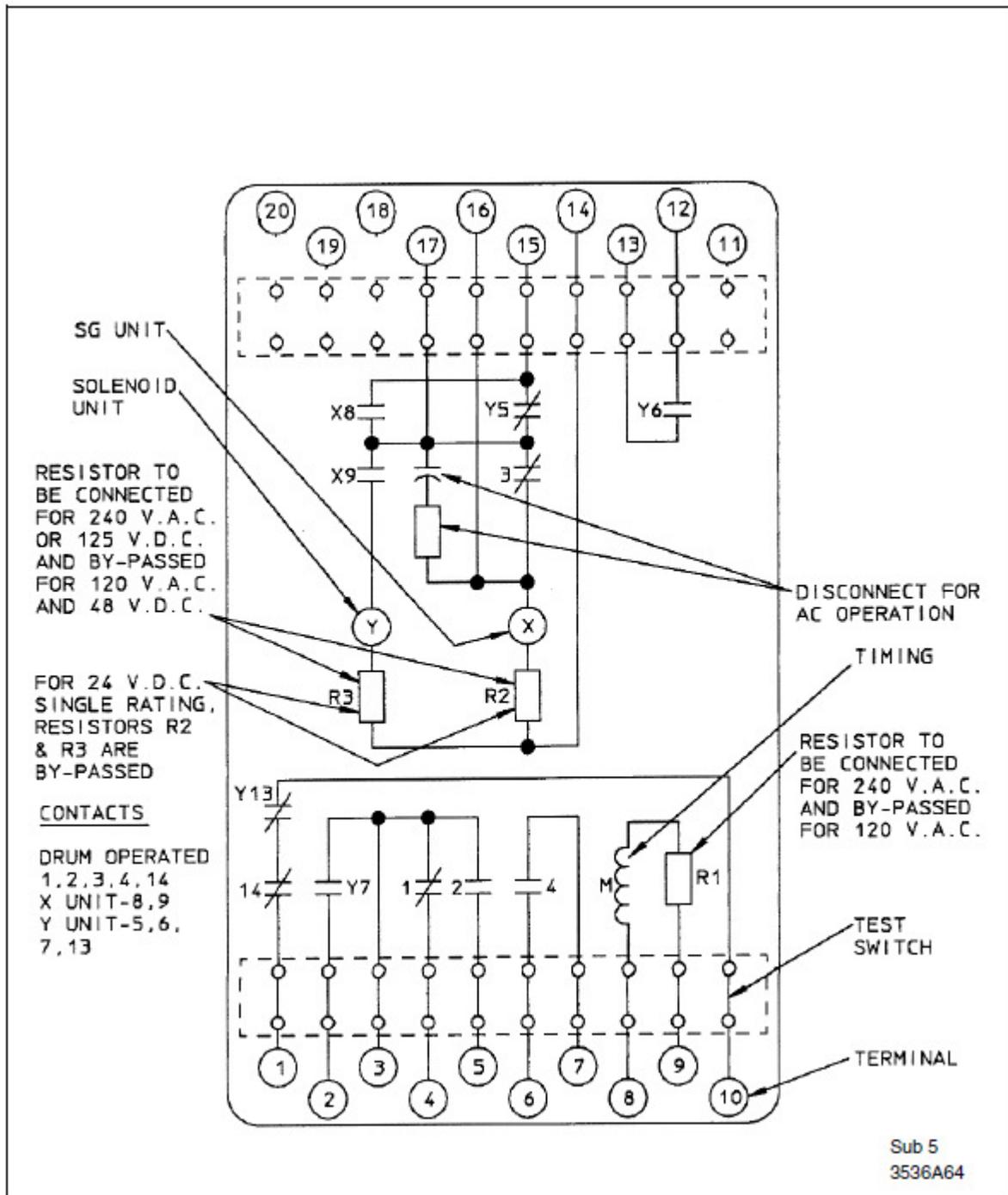


Figure 2. Internal Schematic of the RC Relay, without Z Unit, in Type FT-32 Case