



GENERAL ELECTRIC VERSATRIP™ CIRCUIT BREAKER TEST SET

I INTRODUCTION

The VersaTrip Test Set is a rugged, light weight, portable instrument designed to test the electronics package used with VersaTrip circuit breakers.

The test set may also be used to test the electronics package used in circuit breakers for Fire Pump Controller Applications. (See Sections VII and VIII).

The VersaTrip Test Set is designed to:

- Test the VersaTrip electronics package as a separate item, independent of the circuit breaker.
- Test the "long time", "instantaneous" and "ground fault" functions by injecting current levels that simulate conditions, which will cause a trip signal to be generated by the electronics package.
- Measure the magnitude of the trip signal to insure that it is sufficient to trip any VersaTrip circuit breaker within manufactured specifications.
- Test the ability of the VersaTrip Electronics Package to continuously carry rated sensor current (full load) WITHOUT causing a trip indication.
- Show that when testing in the "long time" mode, a time delay function is achieved.
- Prove basic operation of the electronics package. (For qualitative testing, the electronic package must be returned to the factory.)

The VersaTrip Test Set IS NOT designed to:

- Test the current sensors or the electromechanical trip mechanism of the circuit breaker.
- Do qualitative testing.

II SAFETY PRECAUTIONS

Before working on the circuit breaker, make certain that the breaker is open and all power is disconnected.

Under no circumstances should any attempt be made to energize or test the VersaTrip electronics package by any means other than the VersaTrip test set.

When reinstalling the VersaTrip electronics package into the circuit breaker, extreme care should be taken to insure that the connector on the electronics package is properly mated with the connector in the breaker. Mating of the connector is NOT a difficult procedure. However it is recommended that arrangements be made so that this procedure is witnessed by responsible personnel.

WARNING: Failure to Heed The Above Precautions Could Ultimately Result In Loss Of Life And/Or Serious Property Damage.

III REMOVING THE VERSATRIP ELECTRONICS PACKAGE FROM THE CIRCUIT BREAKER

Be sure all power is disconnected and the circuit breaker is OPEN

A. Breaker Types TJS and TKS

1. Record the serial numbers on both the VersaTrip electronics package and on the breaker in order that the electronics package can be returned to the same circuit breaker at the completion of testing. This can be important in a system with circuit breakers coordinated to operate in a particular sequence under fault conditions.
2. Remove the pouch cover protecting the VersaTrip electronics package.
3. Remove the two screws that secure the electronics package to the circuit breaker frame.
4. Lift the electronics package from the breaker and disconnect the connector at the bottom of the package by squeezing the spring clips at the connector and gently separating mating halves of the connector.

B. Breaker Types TPSS and THSS

1. Remove four screws holding escutcheon cover over the VersaTrip electronics package. Remove the escutcheon cover.
2. Remove the four remaining screws from the breaker and remove the cover of the breaker.
3. Proceed as in Steps A-1, A-3 and A-4, above.

IV TESTING

A. General

Examine the panel of the test set. The panel has a function selector switch, a phase selector switch, a start push button, a reset push button, an ON-OFF switch, a sensor ampere rating switch, and start and trip indicator lights.

The indicator lights are solid state L.E.D. indicators assuring long trouble-free life.

When the start button is momentarily depressed, the amber "start" light will be initiated, indicating a test signal is being applied to the VersaTrip electronics package.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

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When a trip signal of proper magnitude is received from the electronics package, the red trip light indicator will be initiated and an audible tone will be heard. Simultaneously the start light will be extinguished. The trip light and audible tone will remain until the reset button is momentarily depressed.

It should be noted that the compartment at the left and right sides of the test set contains power resistors that are used in establishing proper test currents. It is normal for this area to be warm, particularly when testing in the "overload" function. Care should be taken to see that air passages at the top and bottom of this compartment are not blocked.

B. Preliminary Test Procedure

1. At this point the female connector from the test set to the VersaTrip electronics package should NOT be connected.
2. Connect the power cord to a 105 - 125 VAC 60 Hz source.
3. Switch the power switch to the "ON" position. The indicator should light. If it does not, check the fuse and check to see that the electrical outlet is energized.
4. Set the function switch to the "long time" position.
5. Push the "start" button. The "start" light should light and remain lighted.
6. Turn the function switch to the "instantaneous" position. The "start" light should go out.
7. If this test result does not conform, reread the instructions and repeat the test procedure. If the test result still does not conform, discontinue testing and see Paragraph IV-G.
8. If the test result conforms, continue as follows.
9. Connect the female connector from the test set to the VersaTrip electronics package. Observe that the connectors must be properly oriented in order to mate.
10. Record the position of each of the adjustment knobs on the VersaTrip electronics package in order that these same positions can be assumed at the completion of testing.
11. Adjust the "ampere setting" knob on the Versa-Trip electronics package to 1.0X. The position of this knob can be changed by turning counter-clockwise until it is free, then sliding it to the 1.0X position and turning clockwise until tight.
12. Observe the sensor ampere rating printed on the left side of the face plate of the VersaTrip electronics package and position the test set "Sensor Ampere Rating" switch in the proper position (A or B).

C. Testing The "Full" Load Function

The purpose of this test is to verify that the Versa-Trip can continuously carry rated sensor current

(full load) WITHOUT initiating a trip command. With an input line voltage of 125V a simulated current of 1.0X +0 -5% is applied to the Versa-Trip. At lower voltages the signal will be proportionately less.

TEST PROCEDURE

1. Be sure the "ampere setting" knob on the VersaTrip is set at 1.0X.
2. Follow the test instructions on the panel of the test set, except measure time as indicated in the following paragraph.
3. Observe whether the long time trip band knob on the VersaTrip is in the Min., Int., or Max. band position. If a trip signal is NOT received in 6 minutes on the "Min." time band, 12 minutes on the "Int." time band or 20 minutes on the "Max." time band, it can be assumed that a TRIP MODE WILL NOT BE ACHIEVED and the test for this, "Full Load", function is considered successful.
4. Test other phases if desired.
5. NOTE: This is the only test where a trip command should NOT be received.

D. Testing The "Long Time" Function

The purpose of this test is to prove that a time delay function is obtainable at overload conditions between 1.5 to 2.5 times rated current.

Test Procedure

1. Follow the test instructions on the panel of the test set.
2. A trip indication should be received within the following time limits:

Long Time Trip Band			
Trip Time with Ampere Setting	Min.	Int.	Max.
1.0X	20-80 Seconds	40-160 Seconds	80-320 Seconds

3. The Min., Int. and Max. "long time" trip bands may be checked by comparing the trip time on each band. The Int. band will have approximately twice the time delay of the Min. band; the Max. band will have *approximately* twice the time-delay of the Int. band or *approximately* four times the delay of the Min. band.
4. Test other phases if desired.
5. NOTE: Fluctuations in line voltage will affect timing by a factor inversely proportional to the square of the voltage change, e.g. if the trip time at 120V is 60 seconds, the time at 100V would be $\left(\frac{120}{100}\right)^2 60 = 87 \text{ Sec.}$

Instructions For Testing Circuit Breakers Designed For Fire Pump Controller Applications

VII INTRODUCTION

- A. The VersaTrip test set provides a means of testing the electronics package used in circuit breakers for fire pump controller applications. The test set may be used to demonstrate that:
- 1) Under overload conditions a time delayed trip function is achieved.
 - 2) An instantaneous trip signal is achieved under conditions simulating short circuit conditions.
- B. Circuit breakers designed for use with fire pump controllers are easily recognized by the marking on the red and white face plate of the electronics package.
- C. In the event of conflict between these instructions and the instructions for testing VersaTrip circuit breakers, these instructions shall apply.

VIII TEST PROCEDURE

- A. Read Paragraphs I, II, III, and IV.
- B. Perform the preliminary test procedure of paragraph IV B, 1 through 9:
- C. Test the "long time" Function.
The purpose of this test is to prove that a time delay trip function is obtained under overload conditions:

PROCEDURE

- 1) Record the position of the adjustable knob that indicates the motor full load current setting.
- 2) Adjust the knob to the maximum motor full load current setting.
- 3) Set the "sensor ampere rating" switch to the position indicated in the following tabulation:

Circuit Breaker Max. Motor Full Load Current Settings (Amperes)	"Sensor Ampere Rating" Switch Position (A or B)	Permissible Time Delay Range (Seconds) *
40	A	4-13
90	B	5-16
195	A	7-20
325	B	4-13
520	B	12-35
620	B	9-28

*This time delay range allows for line voltage variations to the test set (105-125VAC). The time delay is based on current levels available from the test set and is not necessarily a measurement of the delay at 6 times the motor full load current setting.

- 4) Follow the test instructions on the panel of the test set.
- 5) Compare the time delay to trip with the permissible time delay range indicated in the above tabulation.
- 6) Return the motor full load current setting knob to the position recorded in Step 1.

D. Testing The "Instantaneous" Function

- 1) Set the "sensor ampere rating" switch to Position A.
- 2) Test per Paragraph IV E.

NOTE: Circuit breakers for fire pump controller applications have a nominal fixed instantaneous trip level of 10 times the motor full load current setting.

- E. If the test result does not conform, refer to Paragraph IV G.

E. Testing The "Instantaneous" Function

The purpose of this test is to see that a trip signal is achieved under conditions simulating short circuit conditions. Under these conditions, a trip indication should be received immediately after the start button is depressed, regardless of the instantaneous trip point setting. If a trip signal is not received in less than 0.1 seconds, the test signal is automatically removed; the trip light will not be energized.

TEST PROCEDURE

1. Follow the test instructions on the panel of the test set. Because a trip signal will be received instantaneously, measurement of the trip time will not be practical.
2. A trip indication must be received.
3. NOTE: A fixed instantaneous trip, set at 15 times the current sensor rating is provided on some units that do not have an adjustable instantaneous trip function.
4. Test all three phases.

F. Testing The "Ground Fault" Function

The purpose of this test is to see that a trip signal is achieved when tested in a ground fault mode.

TEST PROCEDURE

1. Follow the test instructions on the panel of the test set.
2. A trip indication should be received regardless of the ground fault trip point setting.
3. Demonstration of the functionality of the ground fault delay bands can be achieved by carefully observing the time delay between initiation of the start light and the initiation of the trip light. The delay times are .2, .3, and .4 seconds respectively for the Min., Int. and Max. delay bands.
4. Test all three phases.

G. When Test Results Do Not Conform

If test results do not conform:

1. Check to see that the voltage applied to the test set is 105 - 125 VAC, 60 Hz.
2. Check fuse.
3. Check preliminary test procedure Paragraph IV-B.
4. Read all instructions carefully and repeat tests.
5. If test results are still non conforming, do not reinstall the electronic package in the circuit breaker, contact:

Manager of Quality Control
General Electric Company
Circuit Protective Devices Product Dept.
Plainville, Conn. 06062
Tel. Area Code 203 747-1671

V COMPLETION OF TESTS

- A. Remove the test set connector from the VersaTrip electronics package.
- B. Be sure all adjustment knobs on the VersaTrip are returned to the original positions recorded during Step IV-B-10 and that they are securely tightened BY HAND.

VI INSTALLATION OF THE VERSATRIP ELECTRONICS PACKAGE INTO THE CIRCUIT BREAKER

- A. Install the VersaTrip electronics package in the circuit breaker by following the reverse procedure of Paragraph III.
- B. CAUTION: Extreme care should be taken to insure that the connector on the electronics package is properly mated with the connector in the breaker. *It is recommended that this procedure be witnessed.*
- C. Follow the Safety precautions of Paragraph II.

**For Instructions For Testing Circuit
Breakers Designed For Fire Pump
Controller Applications, See Page 4.**