



INSTRUCTION and OPERATIONS MANUAL

for

DC/AC PORTABLE MULTIPLE RELAY TESTER

MODEL NUMBER 14318-00

CAUTION

Be sure to read and become thoroughly familiar with the entire contents of this manual before attempting to operate the “**DC/AC Multiple Portable Relay Tester.**”

DOCUMENT NO. 14318-99 Rev A

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GENERAL DESCRIPTION

The Multiple Portable Relay Tester is an electronic device designed to enable an operator to measure the voltage and current characteristics of both AC and DC relays. The relay tester relies on external power to provide voltage to the relay under test. The relay tester features its own digital multimeter, a polarity switch, and an amp/voltage selector switch. The portable relay tester includes test leads and battery leads, and is housed in a durable, weather resistant, carrying case. The lid is easily removable for operational versatility.

The Portable Relay Tester uses two power rheostats to control the output voltage to the coil of the relay under test. One control is for fine adjustment, and the other is for coarse adjustment. The digital multimeter requires no connection to the relay under test as it is connected through the control switch to the relay terminal on the tester.

CONTROL PANEL

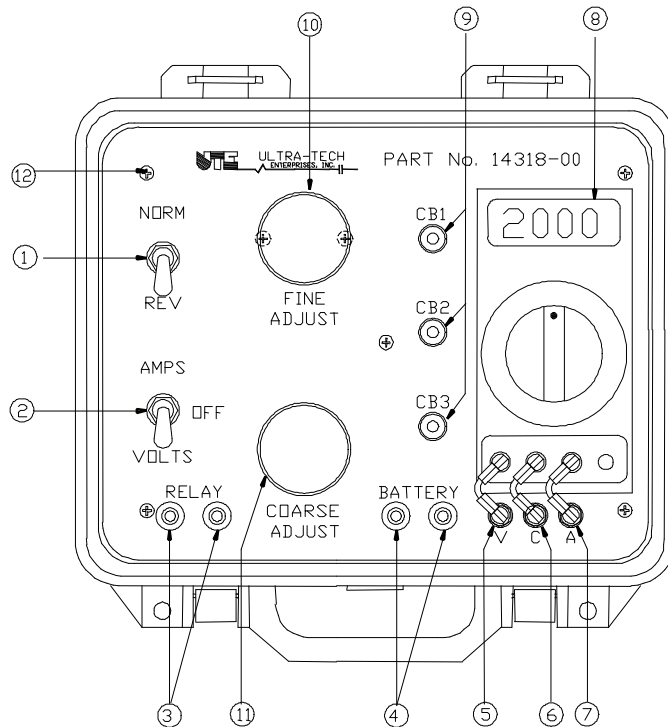


Figure 1

The front panel controls are illustrated in figure 1 and are described as follows:

1. *Normal/Reverse Switch* Reverses the polarity of the relay output jacks (3). With the switch in the *Normal* position, the red post is positive and the black is negative. When switched to the *Reverse* position, black is positive and red is

negative. The meter reads negative values when the switch is in the reverse position.

2. *Amps/Off/Volts Selector Switch* This switch controls the manner in which the digital multimeter is connected to the Relay Terminals (3). In the *Amps* position, the meter is connected in series with the relay terminals for current measurement. In the *Off* position, the meter is disconnected, and in the *Volts* position, the meter is connected across the relay terminals for voltage measurements across the relay coil.
3. *Relay Terminals* The relay terminals are standard banana jacks and are used to connect the relay under test to the relay tester. The polarity of the relay terminals is controlled by the *Normal/Reverse* switch (1).
4. *Battery Terminals* These terminals are standard banana jacks and are used to connect an external battery of AC power source to the relay tester. The red jack is positive and black is negative.
5. *Meter Lead, Volts* This meter lead is connect to the Volt/Ohm input jack of the meter.
6. *Meter Lead, Common* This meter lead is connected to the Common input jack of the meter.
7. *Meter Lead, Amp* This meter lead is connected to the Amp input jack of the meter, and is normally plugged in to the 2 A Max jack on the meter. This is the fused current input of the meter.
8. *Digital Multimeter* The digital multimeter in the relay tester is wired to the tester to eliminate any additional connections from the meter to the relay under test. The connection type is controlled by the *Amps/Off/Volts* Switch (2). The meter must be turned on and the proper measurement function selected to correspond to the measurement mode selected by the *Amps/Off/Volts* selector switch. For complete meter operating instructions and specifications please refer to the meter operations manual which is included with your relay tester.
9. *CB1, CB2 and CB3* CB1 and CB2 are 2 amp circuit breakers which provide input current overload protection for the relay tester, where as CB3 provides output current overload protection. If one of these breakers trips, review the setup and operation procedure for the relay tester to make sure the tester is properly connected. After verification of connections, turn the relay tester off, and push the tripped circuit breaker to reset.
10. *Fine Adjust Control* This control varies the voltage output to the relay coil of the relay under test.

11. *Coarse Adjust Control* This control varies the voltage output to the relay coil of the relay under test.
12. *Panel Access Screws* These five screws hold the front panel into the relay tester case and require removal to replace the meter battery.

OPERATION

The basic function of the Multiple Portable Relay Tester is to make voltage and current measurements of the coil of the relay under test. To make a basic test of a relay, follow the steps below. For a detailed test procedure, please refer to the recommended test procedure in Ultra-Tech Document No. 14318-98. **Caution: Do not operate the relay tester with both the fine and coarse adjustments rotated fully clockwise for long duration, or damage may result to the unit.**

1. Place the Amps/Off/Volts switch in the center or OFF position.
2. Place the Normal/Reverse switch in the NORMAL position.
3. Turn the Fine Adjust control fully counter clockwise.
4. Turn the Coarse Adjust control fully counter clockwise.
5. Using the adapter leads provided, connect the relay coil of the relay to be tested to the Relay terminals, observing proper polarity. **Note:** Disconnect all other resistors, capacitors, diodes, etc. from the relay coil to preclude them from loading the relay tester. Accurate measurements are possible only when nothing other than the relay coil is connected to the tester. Using the adapter leads provided, connect the power source to the "Battery" terminals. If Dc is used, it is important that positive terminal is connected to the red battery terminal.
6. Place the rotary selector switch on the digital multimeter in the DC or AC Volts position.
7. Place the Amps/Off/Volts selector switch in Volts position.
8. Rotate the Fine Adjust control fully clockwise.
9. While observing the meter, slowly rotate the Coarse Adjust control clockwise until the relay "picks up" and then slowly rotate the Fine Adjust control counter clockwise until the relay "drops away." Slowly rotate the Fine Adjust control clockwise until the relay "picks up" and note the voltage.

10. Slowly rotate the Fine Adjust control counter clockwise until the relay “drops away” and note the voltage.
11. Place the Amps/Off/Volts switch in the center of OFF position.
12. Turn the Fine Adjust control fully counter clockwise.
13. Turn the Coarse Adjust control fully counter clockwise.
14. Place the rotary selector switch on the digital multimeter in the DC or AC Amps position.
15. Place the Amps/Off/Volts selector switch in *Amps* position.
16. Rotate the Fine Adjust control fully clockwise.
17. While observing the meter, slowly rotate the Coarse Adjust control clockwise until the relay “picks up” and then slowly rotate the Fine Adjust control counter clockwise until the relay “drops away.” Slowly rotate the Fine Adjust control clockwise until the relay “picks up” and note the current.
18. Slowly rotate the Fine Adjust control counter clockwise until the relay “drops away” and note the current.

DIGITAL MULTIMETER BATTERY REPLACEMENT INSTRUCTIONS

1. Disconnect all cables from the battery terminal, relay terminals, and the three (3) meter jumper leads, and place the Amps/Off/Volts switch in the OFF position. Turn the meter off.
2. Remove the five countersunk screws from the front panel (see figure 1, reference #12).
3. Remove the panel from the case and place on a soft surface being careful not to scratch the front panel.
4. Removed the two (2) nylon lock nuts from the meter bracket (the bracket opposite the three (3) banana jacks) and remove the bracket.
5. Slide the meter out from the remaining bracket.

6. Replace the battery with a Neda type 1604 or equivalent 9-volt alkaline battery.
7. Replace the meter in the relay tester panel, re-install the meter bracket, and replace the two (2) nylon lock nuts.
8. Replace the front panel and fasten down with the five (5) Phillips head screws.
9. Re-attach meter leads, battery leads, and relay leads if applicable.

Specifications

Physical

Height	6.0"	Width:	11.5"
Length:	13.5"	Weight:	9.7 lbs.

Electrical

Output Current Relay Terminals:
 0.8 Amp continuous
 1.9 Amp Intermittent

Note: The relay tester has a solid state over current detector circuit designed to trip the circuit breakers before the 2 Amp meter fuse blows. If an over current condition occurs, either F1 or F2 will trip.

Environmental

Operating Temperature:	-20 to +50 degrees C
Relative Humidity:	0 to 80%
Storage Temperature:	-40 to 70 degrees C
Relative Humidity:	0 to 95%

* See meter manual for complete meter specifications.

WARRANTY

Ultra-Tech Enterprises, Inc. (the "Company"), will repair or replace, at the Company's option, its products free of charge if such products are found to be defective in material or workmanship, for the period of one year from the date of purchase, except as follows:

Transportation charges to the Company's designated repair station for defective and replacement parts or service are the responsibility of the purchaser. This warranty does not apply, if: (i) the product has been damaged by improper connection or disconnection with any electrical device; (ii) the product has been damaged in shipping; (iv) the product has been damaged due to an act of God, accident, misuse, abuse, negligence or any other use than the product's intended use as set forth in the specifications; or (v) the device has suffered damage from an external blow or trauma. This warranty does not cover cosmetic damage and may not be transferred to any person or entity. The Company will provide warranty service as provided herein as soon, as is commercially reasonable.

THE SOLE REMEDY UNDER THIS WARRANTY IS THE REPAIR OR REPLACEMENT OF THE PRODUCT AS PROVIDED HEREIN. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR ANY INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. IN ANY EVENT, IF DAMAGES ARE AWARDED, THEY WILL BE LIMITED TO THE COST OF THIS PRODUCT.

EXCEPT TO THE EXTENT PROHIBITED BY ANY APPLICABLE STATE OF FEDERAL LAW, ALL IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.

Some states do not allow the exclusion or limitation of incidental, indirect, or consequential damages, or allow limitations to the length of an implied warranty, in which case the foregoing warranty shall be extended to conform to the minimum requirement of such applicable law.

To obtain service under this warranty, it is necessary to obtain a Return Merchandise Authorization (RMA) from the Company prior to returning equipment for service. RMA numbers must be clearly marked on the outside of the shipping package in which the merchandise is returned. Failure to follow the Company's RMA procedure may result in delays in obtaining requested service and or refusal of the Company to accept packages not marked clearly with the appropriate RMA number.