

ENGLISH

RT390

INSTRUCTION MANUAL
Circuit Analyzer

- INSPECT & CHECK AFCI & GFCI DEVICES
- DETECT & IDENTIFY COMMON WIRING FAULTS
- DISPLAYS LINE VOLTAGE
- 12A, 15A, AND 20A LOAD TESTING TO MEASURE PERCENTAGE VOLTAGE DROP



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Intertek
5001748

CAT III
135V

ENGLISH

GENERAL SPECIFICATIONS

Klein Tools RT390 is a circuit analyzer that tests the wiring condition at an electrical outlet, displays AC line voltage, inspects GFCI and AFCI devices with time to trip device, and performs voltage drop tests at 12A, 15A and 20A current loads. The tester is designed for use with North American 120V AC 3-wire electrical outlets.

- **Environment:** Indoor. Do NOT expose to moisture rain or snow.
- **Operating Altitude:** 6562 ft. (2000m)
- **Relative Humidity:** <85% non-condensing
- **Operating Temp:** 32° to 122°F (0° to 50°C)
- **Storage Temp:** -4° to 140°F (-20° to 60°C)
- **Dimensions:** 7.1" x 2.7" x 1.5" (3.86 x 6.93 x 17.93 cm)
- **Cord:** 14AWG, 15A, 12" (30.5cm) NEMA 5-15P to IEC 320 C13
- **Weight:** 10.92 oz. (311.1 g) including batteries
- **Battery Type:** 3 x 1.5V AAA Alkaline
- **Standards:** Conforms to UL STD.61010-1, 61010-2-030, 1436



Certified to CSA STD C22.2 # 61010-1, 61010-2-030, 160

- **Pollution degree:** 2
- **Drop Protection:** 6.6 ft. (2m)
- **Ingress Protection:** IP40 dust resistant
- **Safety Rating:** CAT III 135V

***CAT III:** Measurement category III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.*

Specifications subject to change.

ELECTRICAL SPECIFICATIONS

FUNCTION	RANGE & RESOLUTION	ACCURACY	REQUIREMENTS
AC Voltage	30.0 to 150.0V AC	2% ±2 digits	50/60Hz
Operating Frequency	45 to 64Hz	N/A	N/A
GFCI Trip Current	6.0 to 9.0mA	1% ± 0.2mA	110V to 125V AC, 50/60Hz
GFCI Trip Time	0.0 to 6.0s	1% ± 10ms	
GFCI (30mA) Trip Current	26.0 to 38.0mA	1% ± 0.2mA	
GFCI (30mA) Trip Time	0.0 to 6.0s	1% ± 10ms	
AFCI Trip Current	106A to 141A	N/A	
AFCI Trip Time	0 to 400ms	2% ± 20ms	
Load Test Voltage Drop	0.1 to 99.9%	3.0% ±2 digits	

WARNINGS

To ensure safe operation and service of the tester, follow these instructions. Failure to observe these warnings can result in severe injury or death.

- RT390 is designed for use with North American 3-wire grounded 120V electrical outlets. **DO NOT** connect to higher voltage electrical supplies.
- Only use the tester with the supplied NEMA-rated cord.
- Prior to use, always verify tester operation by testing on a known live and correctly wired electrical outlet.
- **DO NOT** attempt an AFCI testing event on a circuit with powered ON equipment or devices. Remove or power OFF prior to testing.
- **DO NOT** use if the tester appears damaged in any way.
- The tester is intended for indoor use only.
- To reduce the possibility of erroneous readings:
 - All appliances or equipment on the circuit being tested should be disconnected.
 - Turn off or move away from equipment which cause electromagnetic interference.
- **DO NOT** attempt AFCI, GFCI, 30mA ground fault testing, or load testing on an incorrectly wired outlet. Consult a qualified electrician to resolve wiring problems.
- This tester only detects common wiring problems. ALWAYS consult a qualified electrician to resolve wiring problems. The device:
 - Will not indicate quality of ground.
 - Will not indicate two hot wires in a circuit.
 - Will not detect a combination of multiple wiring faults.
 - Will not indicate reversed ground and neutral.
- AFCI indicators produce characteristics that mimic some forms of arcing. Because of this the indicator may give a false indication that the AFCI is not functioning properly. If this occurs, recheck the operation of the AFCI.

SYMBOLS ON TESTER



Risk of danger. **Important information:** It is important that users of this tester read, understand, and follow all warnings, cautions, safety information, and instructions in this manual before operating or servicing this tester. Failure to follow instructions could result in death or serious injury.



Risk of electric shock.



Read instructions.

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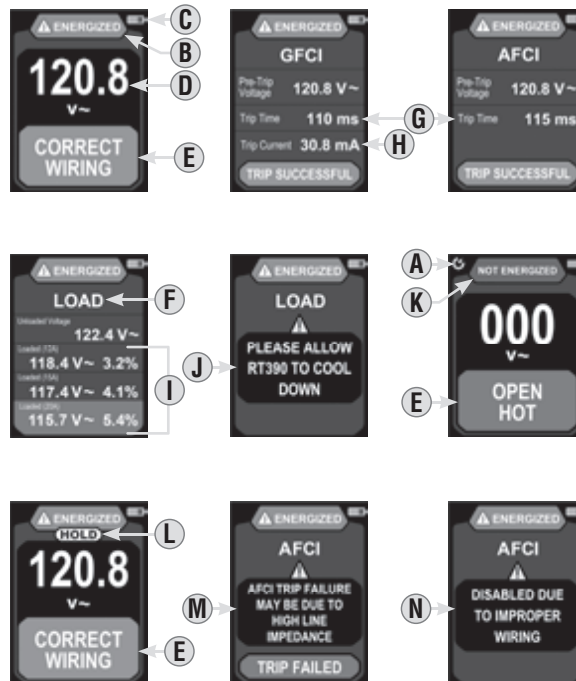
TESTER FEATURE DETAILS

NOTE: There are no user-serviceable parts inside tester.



- 1 Power/Reset button
- 2 LCD Screen
- 3 "ENERGIZED" Indicator
- 4 GFCI Test Button
- 5 AFCI Test Button
- 6 30mA Ground Fault Test Button
- 7 Load Test Button
- 8 Battery Cover
- 9 Plug Connector
- 10 NEMA Rated Cord

LCD FEATURE DETAILS



- A Auto-Power Off Indicator
- B Circuit Energized Indicator
- C Battery Life Indicator
- D AC Line Voltage Indicator
- E Wiring Condition
- F Test Performed
- G Trip Time
- H Trip Current
- I Voltage Drop
- J Allow Unit to Cool Down Message
- K Circuit Not Energized Indicator
- L HOLD Indicator
- M Trip Failure Message
- N Disabled Due To Improper Wiring Message

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OPERATING INSTRUCTIONS

⚠ **RT390 is designed for use with North American 3-wire grounded 120V electrical outlets. DO NOT connect to higher voltage electrical supplies.**

⚠ **Prior to use, always verify tester operation by testing on a known live and correctly wired electrical outlet.**

POWER ON/OFF

Press and hold the Power/Reset button (1) for two seconds to power ON/ OFF the tester. When the tester is powered ON and not connected to a circuit, the LCD (2) will display "000", "Open Hot" condition. **NOTE:** The tester will automatically power OFF after 5 minutes of inactivity to conserve battery life. **NOTE:** Auto-Power Off is disabled if tester is plugged into an energized circuit.

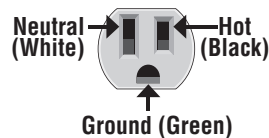
WIRING CONDITION

With the tester powered ON and inserted in the outlet, the "ENERGIZED" Indicator (3) will illuminate, and the Circuit Energized Indicator (B) will appear at the top of the LCD if voltage is detected. The tester will display the wiring condition (E) and the line voltage (D) on the LCD. If removed from the outlet, the tester holds the information on the LCD for 10 seconds and the Hold Indicator (L) will be displayed. During this time, the Wiring Condition Indicator (E) will blink. The LCD will reset once it is plugged into another circuit, or, if no voltage is detected, the Wiring Condition Indicator (E) will blink during the time-out period.

⚠ **If the tester indicates that the outlet is not wired correctly, consult a qualified electrician.**

NOTE: Conditions NOT indicated include, but are not limited to, quality of ground, multiple hot wires, reversal of neutral and ground conductors, and combinations of defects other than dual open neutral and ground.

NOTE: All appliances or equipment on the circuit being tested should be unplugged to help reduce the possibility of erroneous readings.



		LCD WILL DISPLAY					VOLTAGE*	
		"CORRECT WIRING"	"OPEN GROUND"	"OPEN NEUTRAL"	"OPEN HOT"	"HOT & GRD REVERSED"	"HOT & NEU REVERSED"	"OPEN GROUND OPEN NEUTRAL"
WIRING CONDITION	WIRED CORRECTLY							
	OPEN GROUND							
	OPEN NEUTRAL							
	OPEN HOT							
	DUAL OPEN (NEUTRAL & GROUND)							
	REVERSED HOT/GROUND							
	REVERSED HOT/NEUTRAL							
							LINE VOLTAGE	>30V VOLTAGE
							NO VOLTAGE	

*Expected voltage reading on LCD based on the indicated wiring condition.

NOTE: If the detected voltage is either low (30-85V AC) or high (135-150V AC), the voltage displayed on the LCD will change from white to red. It is possible to have the voltage displaying in red (indicating low or high voltage) and the green "CORRECT WIRING" message (E) simultaneously.

OPERATING INSTRUCTIONS

GFCI, AFCI, AND 30mA GROUND FAULT FUNCTIONS

NOTE: Refer to the GFCI, AFCI, or 30mA Ground Fault devices' user manual for information on installation and operation prior to using this tester.

Power ON the tester and plug into the outlet to be tested, noting the wiring conditions. The wiring conditions (E) should indicate "CORRECT WIRING", the "ENERGIZED" Indicator (3) should be illuminated, and the Circuit Energized Indicator (B) should appear at the top of the LCD.

⚠ If the tester indicates that the outlet is not wired correctly, DO NOT attempt to initiate an electrical testing event. Consult a qualified electrician.

Press the following buttons to initiate an electrical fault:

- The GFCI button (4) will create 6mA to 9mA ground fault to trip the GFCI device.
- The AFCI button (5) will simulate a parallel arc condition to trip the AFCI device.
- 30mA Ground Fault Test button (6) will create a 30mA ground fault to trip a 30mA GFCI device.

NOTE: 30mA ground fault protection is not inherent in all models of GFCI circuit breakers.

If the Circuit Not Energized Indicator (K) is displayed on LCD, and the "ENERGIZED" Indicator (3) is not illuminated, reset the AFCI, GFCI, or 30mA Ground Fault device by pressing its reset button. After reset, the wiring conditions (E) should indicate "CORRECT WIRING", the "ENERGIZED" Indicator (3) should be illuminated, and the Circuit Energized Indicator (B) should appear at the top of the LCD.

If the circuit remains Energized, or any other condition is indicated other than Not Energized, the device being tested may be miswired, may not be installed correctly, or may not be functioning appropriately. **Consult a qualified electrician.**

NOTE: The GFCI (4), AFCI (5), and 30mA (6) buttons will be deactivated if the wiring is not correct. An error message (N) will appear on the LCD.

NOTE: Allow 20 seconds between successive AFCI testing events.

NOTE: In AFCI testing, an error message that the tester needs to cool down (J) may appear on the LCD. A successive AFCI test cannot be initiated until the unit cools down and the message is off the LCD.

NOTE: Some models of AFCI devices may not trip if the cable run from test location to breaker is longer than 100 ft. (30.48 m).

NOTE: If the test is successful, the AFCI test fails to trip, the RT390 will perform a Load Test in the background to determine if high line impedance may be the reason for the failed trip. An error message (M) will appear on the LCD.

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TEST LOAD FUNCTION

Power On the tester and plug into the outlet to be tested, noting the wiring conditions. The wiring condition (E) should indicate "CORRECT WIRING", the "ENERGIZED" Indicator (3) should be illuminated, and the Circuit Energized Indicator (B) should be displayed.

⚠ If the tester indicates that the outlet is not wired correctly, DO NOT attempt to initiate an electrical testing event. Consult a qualified electrician.

Press the Load Test button (7), and the 12A, 15A, and 20A test load voltage and percentage voltage drop will appear on the screen. **NOTE: If the voltage drop is greater than 5%, the background color will change to red to indicate a large voltage drop.**

NOTE: The Load Test button (7) will be deactivated if the tester detects that the electrical outlet is not wired correctly.

NOTE: During a Load test, a message may display that the tester needs to cool down (J). A successive Load test cannot be initiated until the unit cools down and the message is no longer displayed.

BATTERY REPLACEMENT

When the Battery Life Indicator (C) turns red, the batteries must be replaced.

1. Loosen screw from battery cover (8).
2. Replace 3 x AAA batteries (note proper polarity).
3. Replace battery door and fasten securely with screw.

⚠ To avoid risk of electric shock, unplug from any voltage source before removing battery door.

⚠ To avoid risk of electric shock, do not operate tester while battery door is removed.

CLEANING

Be sure tester is turned off and wipe with a clean, dry lint-free cloth. **Do not use abrasive cleaners or solvents.**

STORAGE

Remove the batteries when tester is not in use for a prolonged period of time. Do not expose to high temperatures or humidity. After a period of storage in extreme conditions exceeding the limits mentioned in the General Specifications section, allow the tester to return to normal operating conditions before using.

WARRANTY

DISPOSAL / RECYCLE



Do not place equipment and its accessories in the trash. Items must be properly disposed of in accordance with local regulations. Please see www.epa.gov/recycle for additional information.

CUSTOMER SERVICE