

KEWTECH

KTD50 Digital RCD Tester User Manual



Tests RCDs,
mains voltage
and polarity

The Kewtech KTD50 RCD Tester is designed for use by suitably qualified personnel familiar with electrical supply systems.



Caution

We strongly advise reading and understanding this guide before the instrument is used. In particular note the safety issues that follow:

- Although fully protected up to 600V AC this tester is for use on 230V AC circuits only.
- Always check the tester on a known, correctly wired, live socket outlet before and after use.
- Before use check your tester for any damage to the plug, lead and cabinet.

 BS EN 61010-1

At Kewtech our engineers constantly look for improvement. If there is any aspect of your Kewtech tester you would like to comment on please visit our website at:

Kewtechcorp.com

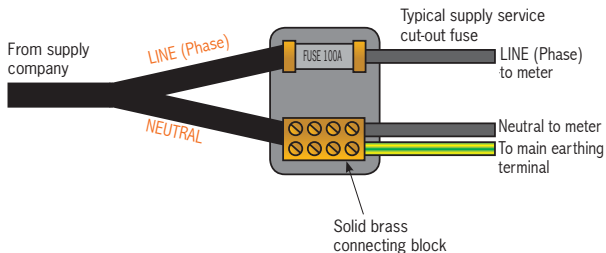
Operation Overview

Your Kewtech tester has a special polarity test function.

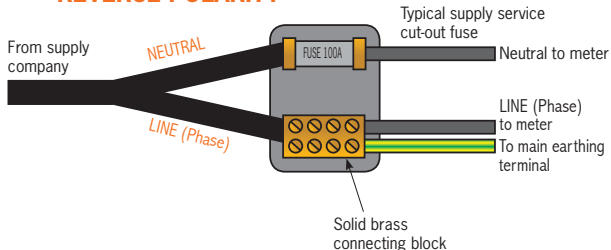
It is a little known fact that a system can be reverse wired with Live (Phase) to earth/neutral and earth/neutral to Live (Phase). The sockets will all work and conventional loop testers will show and test that everything is correct despite this very dangerous wiring condition.

Although extremely rare, this miswire condition can exist so if your test shows this fault do not proceed – if in any doubt advise your customer to contact their supply company immediately.

CORRECT POLARITY



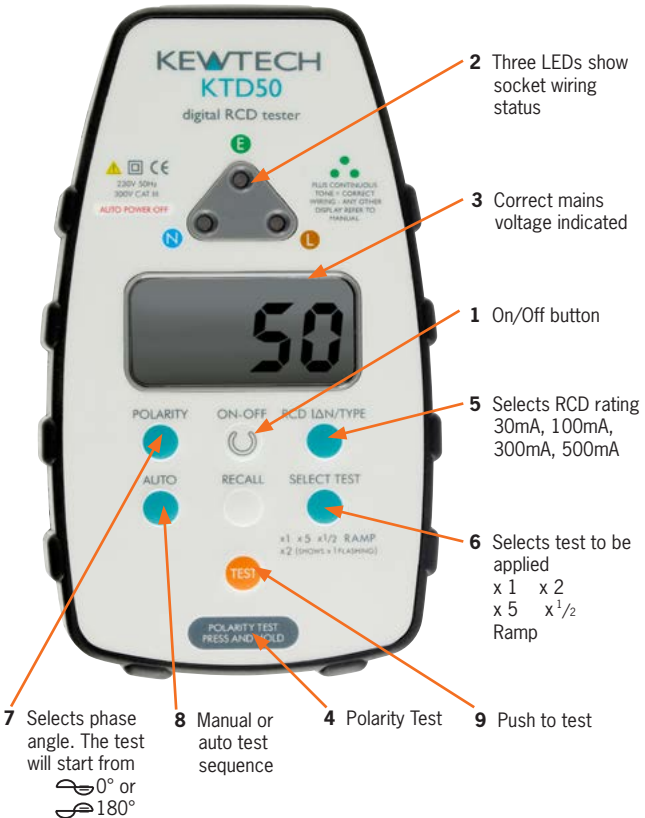
REVERSE POLARITY



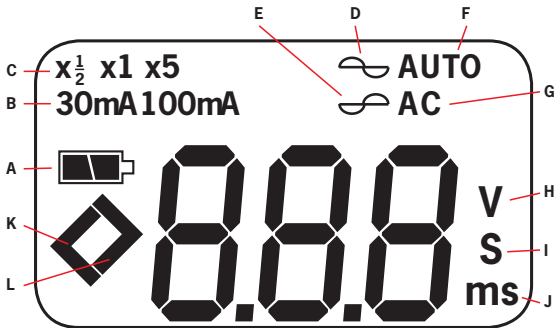
Operation – a Detailed View of the KTD50




Note: Numbers also indicate sequence of test.

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Overview of the Display



- A** Battery condition ( = good)
- B** Indicates RCD rating selected ($I\Delta n$) 30mA or 100mA
- C** This is the test multiplier selected e.g. for a 30mA RCD test will be made at 15mA, 30mA and 150mA
- D/E** Phase angle test will start from  = 0° (positive)
 = 180° (negative)
- F** Shows Auto Test sequence has been selected
- G** Indicates the type of RCD being tested
(AC = standard general purpose RCD)
- H** AC Volts
- I** Seconds
- J** Milliseconds (thousandths of a second)
- K** < Less than
- L** > Greater than

RCD Testing

- 1 ON/OFF – Pressing and releasing this button turns the KTD50 on and off (intelligent Auto Power Off is also incorporated).
- 2 When the KTD50 is first connected to a live socket it will automatically test the socket wiring to establish that the circuit wires have been connected to the correct terminals on the back of the socket. If all three LEDs light green and no sound is emitted the wiring status is correct and you can proceed to the incoming supply polarity test (step 3).

A fault with the socket wiring will be indicated by an audible alternating tone and the LEDs, at least one of which will be red or orange, will flash. If a fault indication is given – DO NOT PROCEED – investigation and remedial action is required before you can conduct an RCD test.

If this happens, placing your thumb on the polarity test pad will now activate the 'fault location' function. With your thumb on the pad check the indication given by the LEDs against the chart on the back cover to identify where the main problem lies.

Note: The colour of the LEDs may change when the pad is touched.

- 3 Check that the mains voltage is in the correct range 207–253V AC.
Note: All tests are inhibited until the mains voltage appears in the display.
- 4 Incoming supply Polarity Test – this important test is discussed in full on page 3 of this manual, please read.

To conduct the test – with all three LEDs lit green, place your thumb on the polarity test pad area. If the supply polarity is correct the LEDs will start to flash green and you can proceed to step 5. If the supply polarity has been reversed the three LEDs will turn red and flash.

If this happens stop testing and notify the supply company immediately.

5 RCD TYPE SELECTION BUTTON

This selects the type and rating of RCD to be tested. 30mA, 100mA, 300mA or 500mA rated type AC (general purpose RCDs) and 100mA or 300mA rated type ACS (Selective).

6 SELECT TEST BUTTON

6a) Current multiplier

This button is used to select the test current multiplier that is applied to the selected rating of RCD type (chosen in step 5) for the test to be carried out.

For example if the 30mA rating was selected in step 5, choosing $\times \frac{1}{2}$ here would apply a test current of 15mA ($\frac{1}{2} \times 30\text{mA}$) when the test is conducted.

Choosing $\times 5$ here would apply a test current of 150mA ($5 \times 30\text{mA}$).

The multipliers available are:

$\times \frac{1}{2}$, $\times 1$, $\times 2$ and $= 5$ for 30mA and 100mA AC type RCDs

$\times \frac{1}{2}$ and $\times 1$ for 300mA & 500mA type AC RCDs and 100mA & 300mA type ACS RCDs

Additionally the Ramp test function (see below) is available for all but the 500mA setting.

Important note: You will see above that the $\times 2$ multiplier is available for use with the 30mA or 100mA type AC setting. Where available, its selection is indicated in the display by the $\times 1$ symbol flashing.

If, when selecting the test to be carried out the $\times 1$ symbol shows continuously lit then the test will be conducted at the current rating selected at step 5 ($\times 1$).

If the $\times 1$ symbol is flashing the test will be conducted at twice the current rating selected ($\times 2$). ie. At the 30mA setting a 60mA test current will be used.

The $\times 2$ setting is accessed by pressing the SELECT TEST button until the multiplier cycles past the ramp test and the $\times 1$ symbol flashes.

When the test result is displayed the multiplier will show as $\times 1$ continuously lit regardless of whether the test was conducted at $\times 1$ or $\times 2$.

6b) Ramp test

The SELECT TEST button is also used to access the Ramp test function. This is a particularly useful diagnostic function that enables the fault current applied to be started at just 3mA and raised automatically in small increments. By doing this you can determine the amount of extra leakage it is necessary to introduce into a circuit to trip the breaker. The result displayed, unlike all of the other tests, will be the current rather than the time taken to open the RCD.

7 TEST POLARITY BUTTON

In manual mode this toggles between 0° phase angle and 180° phase angle.

8 AUTO BUTTON

The KTD50 defaults to manual operation upon powering on and in this mode you control the test with the selections made in step 5 (Type/Rating), step 6 (Multiplier) & step 7 (polarity). A single press of the test button will now initiate the test and display the result.

This is fine for occasional testing but a full test of each RCD will involve six separate tests for a 30mA breaker. Comprising testing at its rated current ($I_{\Delta n}$), at $5 \times (I_{\Delta n})$ and at $\frac{1}{2} \times (I_{\Delta n})$, with each test being conducted at both 0° and 180° . Four of these six tests should require the RCD to be reset, this is where the AUTO test function will save time and effort.

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To use the AUTO function follow the above through to step 5 and select the RCD rating and type. Then instead of selecting the multiplier at step 6, simply press the AUTO button. Confirmation of auto mode is given in the display window (see F page 5).

A single press of the test button will now automatically select the appropriate multiplier and polarity for each test and run the full test sequence for you – all you have to do is reset the breaker each time it trips.

As soon as the RCD is reset the tester recognises that power has been restored and automatically conducts the next test in the sequence.

Upon returning to the tester, pressing the recall button displays the results in sequence of each test conducted. The LCD screen changes to show which test the result refers to and an audible tone is given to alert you of any failures.

The same procedure is used for RCDs with a rating higher than 30mA but the two tests at $5 \times$ the rated current are not required for these.



Example for a 30mA RCD



Select 30mA by pressing the RCD / $I_{\Delta n}$ TYPE button until 30mA is displayed.



Press AUTO button – the display should now show $\times 1$ 30mA AUTO (as well as the voltage).



Press test button 9.

A 30mA test will be carried out and the result displayed.

As soon as the breaker is reset the display will change from  to  indicate that the next test will be at 180° phase angle, the test will automatically be conducted and the result displayed.

As soon as the breaker is reset the display will change from  to  and from $\times 1$ to $\times 5$ to indicate that the next test will be at 0° phase angle, at 150mA (5×30 mA). The test will automatically be conducted and the result displayed.

As soon as the breaker is reset the display will change from  to  to indicate that the next test will be at 180° phase angle, the test will automatically be conducted and the result displayed.

When the breaker is reset the display will change from $\times 5$ to $\times \frac{1}{2}$ and from  to  to indicate that the next test will be at 15mA ($\frac{1}{2} \times 30\text{mA}$) and at 0° phase angle and the test will run.

The display should now show >2.00s to indicate that the RCD did not trip within 2 seconds when tested at $\frac{1}{2}$ of its rated current.

The tester will automatically repeat this test at 180° phase angle and if all is well will display the same >2.00s reading.

The auto test sequence is now complete and the results can be recalled by using the recall button.

Specifications

Features

Type AC & ACS breakers

30mA breakers $\times \frac{1}{2}$, $\times 1$, $\times 2$, $\times 5$ test currents

100mA, 300mA, 500mA breakers $\times \frac{1}{2}$, $\times 1$ test currents

Unlimited number of RCD tests

RCD test polarity change

Auto / Manual test on all breakers

Full socket test and mains polarity test

Complies with EN61557 parts 1 and 6 (performance)

Complies with EN61010 (safety)

Complies with EN61326 (EMC)

RCD Test Range (to EN61557-6)

Supply voltage	195V – 253V AC 50Hz
Test current accuracy	($\frac{1}{2}$ I) -0% to -10%
Test current accuracy	(I, 5I) +0% to +10%
Trip time accuracy	Up to 1 second $\pm(1\% + 1\text{ms})$ Over 1 second $\pm(1\% + 10\text{ms})$

Voltage measurement

Range 5V to 440V $\pm(2\% + 1\text{V})$ over the working frequency range of 50Hz $\pm 0.5\%$

Socket test

Detects opens, shorts, wrong wiring, phantom conditions, phase reversal, out of limits voltage.

Fault Touch Voltage

Test terminated if $> 50\text{V}$

Power

4 \times AA batteries 'Alkaline' recommended

Battery life 10,000 tests

Fitted fuse 32mm 0.25A (F) HBC

Survives 440V over voltage test rated for 1 minute.

Environmental

Operating Temperature Range	0°C to 40°C
Storage Temperature Range	-10°C to +60°C
Operating Humidity	93% RH @ 40°C
Size	157mm \times 89mm \times 39mm
Weight	400g

Condition number	Wiring condition	Supply terminal			LED display	Buzzer
		N	E	L		
		Socket Wiring				
1	Correct	N	E	L		Continuous
2	L-E reverse	N	L	E		Warble
3	L-NE miswire	E	L	N		Warble
4	L-N reverse	L	E	N		Warble
5	L-NE miswire	L	N	E		Warble
6	Faulty N / L-E miswire	NC	L	N		Warble
7	Faulty N / E miswire	NC	N	L		Warble
8	Faulty N	NC	E	L		Warble
9	Faulty N / L-E reverse	NC	L	E		Warble
10	Faulty E / L-N reverse	L	NC	N		Warble
11	Faulty E	N	NC	L		Warble
12	Faulty E / N miswire	E	NC	L		Warble
13	Faulty E / L-N miswire	L	NC	E		Warble
14	Faulty L / N-E miswire	L	N	NC		Warble
15	Faulty L / E miswire	N	L	NC		Warble
16	Faulty L / N-E miswire	E	L	NC		Warble
17	Faulty L / N miswire	L	E	NC		Warble
18	No mains	NC	NC	NC		None

Above is the indication given when touching the touch pad.
LEDs will flash to indicate fault condition.
NC = no connection.



KEWTECH

T: **01494 792 212** F: 01494 791 826 E: sales@kewtechcorp.com

kewtechcorp.com