

FUSE, CIRCUIT BREAKER and FAULT FINDER



INSTRUCTION MANUAL

Designed by Toptronic Limited © 2005

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1. Safety Rules

CAUTION



RISK OF ELECTRIC SHOCK

This tester has been designed with your safety in mind. However, no design can completely protect against incorrect use. Electrical circuits can be dangerous and/or lethal when lack of caution or poor safety practices are used.

Do not carry out field measurements on either the power system grounding, during periods of forecast lightning activity, in areas that encompass the station being measured or of the power network connected to the station being measured. In the event that lightning occurs, stop all testing and isolate any temporarily installed test spikes.

Preparations for testing of power system grounding can leave personnel vulnerable to exposure caused by faults at or fed from the system under test, transferred potentials from remote test grounds, and inadvertent line energisations.

While the probability of the occurrence of one of these events is low, personnel safety will, nevertheless, be enhanced by the following:

When working near high tension systems rubber gloves and shoes should be worn.

Work on clean, dry crushed rock or an insulating blanket.

Avoid bare hand to hand contact between the tester and extended test leads.

When using the tester with test leads, ensure that they are safe and properly authorized

Disconnect the tester from any external circuit when checking or changing the Fuse and/or batteries.

CAUTION



READ THE MANUAL

Follow the instructions in the Manual for every measurement. Read and understand the general instructions before attempting to use this tester.

2. Safety Check

Before using the tester check the condition of the test leads, the fuses and general appearance.

The leads must be free of cracks or any damages and must be insulated as when they were new.

Fuse replacement is described later in this user's manual.

When changing the fuse of the transmitter, by removing the cover to access the internal circuitry, always disconnect the leads.

When replacing the fuse use only the type specified, HBC fuse, and insert correctly into the fuse holder.

Always double check the lead connections before making any measurements.

DON'T TOUCH

Don't touch exposed wiring, connections or other "Live" parts of an electrical circuit. If in doubt, check the circuit first for voltage before touching it.

Do not use cracked or broken test leads.

**THIS INSTRUMENT SHOULD ONLY BE USED BY
A COMPETENT, SUITABLY TRAINED PERSON.**

REMEMBER

SAFETY IS NO ACCIDENT



CAUTION RISK OF ELECTRIC SHOCK



CAUTION READ THE MANUAL

3. General Description

It is a Fuse and Fault Finder which comprises of two parts: The Receiver (Rx) and the Transmitter (Tx).

Rx



Tx



The Transmitter (Tx), draws a current from the mains supply circuit to which it is connected to. The Signal Current from the Tx is at about 10kHz. The Transmitter is powered by the mains and requires no batteries.

The 10kHz signal current generated by the Tx is then searched (sniffed) by the Receiver to detect the Fuse, Circuit Breaker or the faulty circuit.

The Receiver (Rx) is a tuned circuit which has its center frequency tuned to about 10Khz. The sensor is located in the tip of the Receiver.

The amplitude of the received signal is shown on a bar-graph type Leds.

The more Leds ON, the stronger the signal.

The Receiver uses one 9V battery.

4. Product Description - Transmitter

The Transmitter connects to the mains socket or fault circuit which need to be traced.

To work correctly, the socket or Circuit to be traced need to be powered or be live!

The connection is simple and use the plug.

Should you want to trace circuits using test leads, select the proper accessory.

Inside, the Transmitter, there is an electronic circuitry which, once connected to the mains voltage, will draw a current at an approximative frequency of 10Khz.

Plug



Plug Shown can be different from country to country.

The 10KHz generated signal current can be detected using the Sniffer (Receiver).

Once the mains voltage is connected to the Transmitter, a Red Led will lit, indicating that Power has been connected to the Tx.

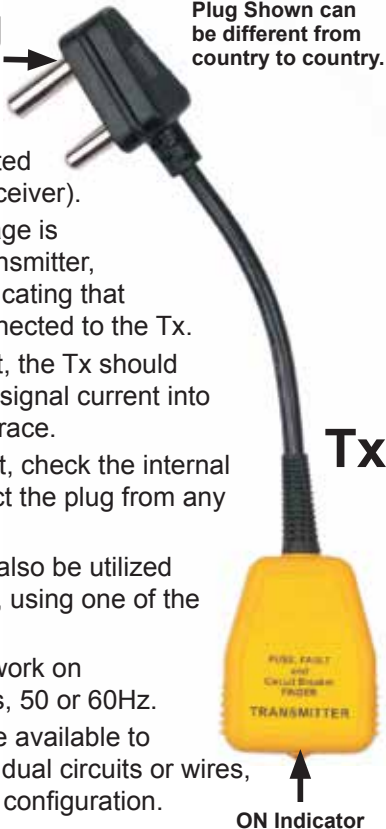
Once the Red Led Lit, the Tx should generate The 10Khz signal current into wire or the circuit to trace.

Should the light not lit, check the internal fuse. (First disconnect the plug from any mains socket.)

The Transmitter can also be utilized with flying Test leads, using one of the optional adaptors.

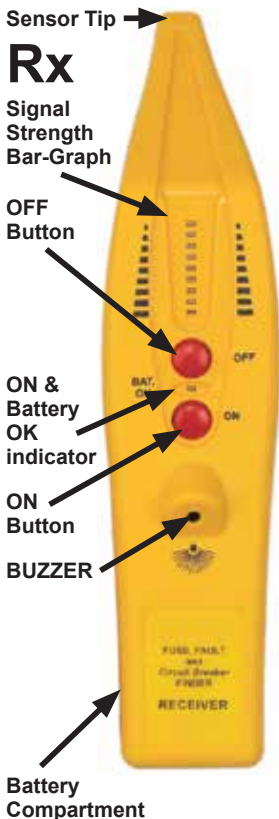
The transmitter can work on 100V or 240V circuits, 50 or 60Hz.

Optional adaptors are available to trace faults and individual circuits or wires, not in a conventional configuration.



5. Product Description - Receiver

The Receiver is using its tip to sense the 10KHz signal which has been generated by the Transmitter.



In the tip, there is an inductor which is part of the tuned circuit. We call it the Sensor tip.

There is a Led Bar-Graph, which indicate the signal strength of the sniffed signal.

There is a Buzz which sounds at different speed according to the signal strength and indicate other information, like low battery (see buzzer Infos)

There is a ON and an OFF Button.

Please note that the sniffer has an auto-off feature too, so if you don't turn it off, it will switch off by itself.

There is a Power On / Battery OK Indicator LED.

There is a battery compartment for the 9V battery. The signal is sensed by the inductor of the tuned circuit (sensor tip), then amplified.

The output of the amplification is then measured and displayed on the bar-graph. This is proportional to the signal strength being sniffed by the receiver.

The strength of the signal is showed on a LED bar-graph. The more LEDs ON, the stronger the signal Strength.

The strength of the signal can also be eard from the buzzer. The faster the buzz, the stronger the signal strength.

The circuit or wire to be found is likely to be the one which shows the highest signal strength.

6. Features - Receiver

ON Key.

The On key is utilized to turn the Sniffer or receiver ON. During the turn-on procedure, the bar-graph is illuminated and the buzzer is buzzing a few times, so that the user can check all the indicators are working properly. This is the Turn-on Test procedure.

OFF

The OFF key is utilized to shut down the Sniffer. As soon as the off key is pressed ,the sniffer will shutdown quickly.

AUTO-OFF

The sniffer has an Enser-Save auto-off timer which run from the time the sniffer has been turned ON. After auto-off, the user will need to switch the Sniffer ON again, if he wants to use it. The auto-off can not be over-riden by the signal strength. The Auto-off timer start counting down since the On key has been depressed.

POWER ON INDICATOR

The Power On indicator Led is a dual Indicator. When the tester is turned ON, this indicates;

- the tester has been turned on.
- the healthy condition of the battery.

BATTERY OK INDICATOR

As for the Power ON Indicator, the same Led indicates that the battery voltage is enough to make tests. Should the battery need replacement, the led will turn off, even if the bar-graph still works.

LED BAR-GRAPH

The Signal Strength is shown on the Leds bar-graph. The more Leds ON, the more the signal strength. The circuit to find is likely to be the one with the most LEDs lightning up.

BUZZER

The buzzer has a High Pitch sound and sounds during start up (Turn-on test procedure) to indicate it's working properly, then it beeps faster and faster when the signal strength is stronger. The stronger the signal strength, the faster it beeps. A weak signal makes the buzzer sound slow.

EnerSave

Sniffer has the popular Toptronic EnerSave Feature by saving energy and battery life by turning itself Off quicker or devices off.

7. Features - Transmitter

Connections

The Transmitter needs to be connected to the power source cable which needs to be traced or to which the circuit breaker needs to be found.

The connection is done by the plug which is attached to the transmitter.

There are optional flying leads adaptors for applications which require other means of connections.

The transmitter is a 2-wire device and is normally connected between Live (Hot) and Neutral.

In case of finding Earth Faults, it can be connected between Live (Hot) and Earth.

Power On - Led Indication

When the Transmitter is connected to the power source, the Led will LIT. This indicates power is present on the transmitter and current signal is being transmitted in the wires.



8. Operating Instructions

- (1) Connect the Transmitter to the socket (power source), supplied by the circuit breaker to find (CBTF). Ensure the Led lit on the transmitter. Start the sniffer and point the tip on the wire which is connected to the socket, in order to verify that the sniffer can detect the transmitter. Switch the sniffer OFF.



**THE SNIFFER
CHECKING THAT IT'S
DETECTING THE CORD
TO PROOF IT'S WORKING CONDITION**

The Bar-Graph shows that the sniffer can detect the cable which is plugged into the socket. That mean that the transmitter is sending the signal and that sniffer can receive it. The bar-graph shows the signal and the buzzer buzz faster too. The battery voltage is ok. Experiment with the distance and the angle of the sniffer to get used to it and to get a feel for the receiver. Always proof the Sniffer.

- (2) Go to the board where the circuit breakers are located.
- (3) Start the Sniffer (see starting the sniffer).



The Bar-Graph shows that the first circuit breaker of the first row has no signal on it. It buzz very slow too. The battery voltage is ok. You can go left and right and change row as you want to.

- (4) Start sniffing the breakers by scanning the breakers using the tip of the sniffer. The tip of the sniffer is touching the body of the circuit breaker. The bar-graph will indicate which circuit breaker has the highest signal strength and the buzzer will buzz faster on the one which has the highest signal strength. Turn off that circuit breaker to confirm that it's OFF. Turn-on again that same circuit breaker to confirm it's ON. This confirms which circuit breaker is supplying the socket which has the Transmitter connected to it.



The Bar-Graph shows that the last circuit breaker of the first row has the signal on it. It buzz faster too. The battery voltage is ok.

TO START THE SNIFFER, PRESS THE ON BUTTON



9. Starting the Receiver

To start the receiver, depress the ON button. The Bar-Graph will lit to show it is in working order.

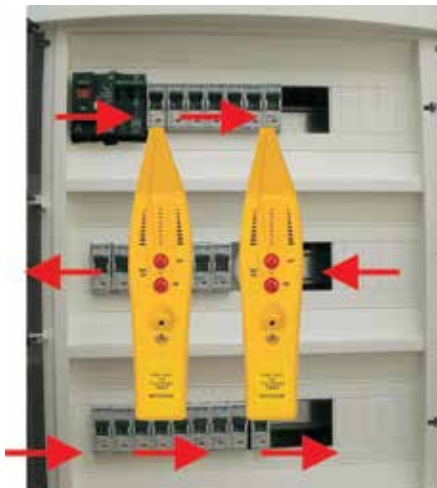
The buzzer will beep, also to indicate it is in good working order.

10. Finding Circuit Breaker

Use the tip of the Sniffer to scan the circuit breakers. Please note that the Sniffer is designed to be held vertically for the vertical circuit breakers and horizontally for the horizontal circuit breakers

MAKE SURE ALL THE CIRCUIT BREAKERS ARE ON

Now, for example, start scanning from the top left row, then go down etc..., But you can scan the breakers in any order. While you are scanning, observe the bar-graph and listen to the buzzer.

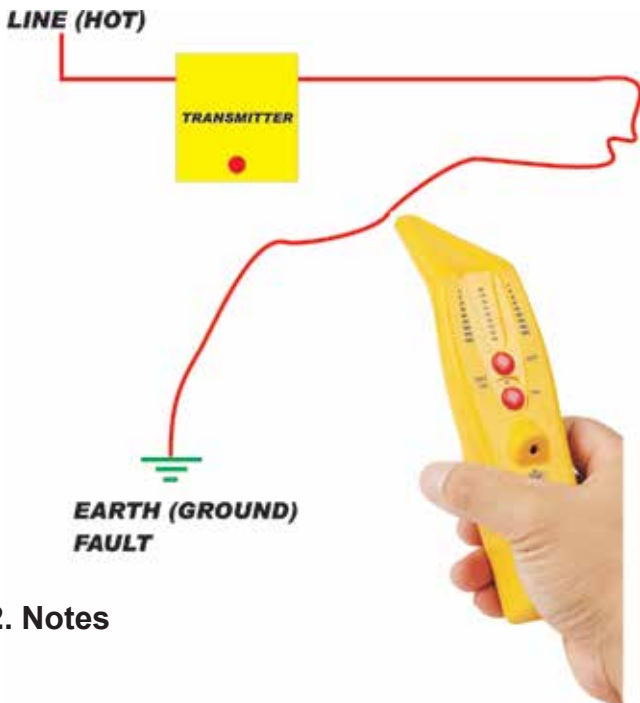


The Circuit breaker which supply the Transmitter circuitry is the one, which, when pointed out by the tip, has the most LEDs lit on the bar-graph and the fastest buzz.

11. Finding Earth Fault

To find an earth fault, or the trace faulty wire, you must connect the transmitter in serie with the fault.

For example, say, you have a short between Line and Earth, but you don't know where the short is. Connect the Transmitter, using an adaptor, in serie, in the line. If the Protection device trips, then you will have to bypass the protection device for the duration of this test. Use the optional leads for this use.



12. Notes

13. Very important features

Finding Neon Lightning Circuits without the transmitter.

The Sniffer is capable to find circuits breakers which are connected to Neons Light circuitry.

This is usefull to check quickly which circuit breaker is connected to a neon circuit. Most neons firing current will induce a signal which can be detected by the sniffer.

EnerSave

The Sniffer is software driven and has an Auto-off feature which turn the receiver off automatically after a certain time. This timer starts when the Sniffer is turned ON and is not reset by anything.

Mutli Voltage and Multi Frequency

The transmitter has been designed to be able to operate on 100V or 240V circuits at 50 or 60Hz.

9V Battery

The sniffer uses a 9V batter. Due to it's very low consumption, any type of 9V battery is suitable.

TIP - SENSOR

The sensor is made out of a SMD inductor. The SMD inductor can touch the circuit breaker housing or the insulation of wires.

Sensor = TIP



14. Principle of How it work Display Results

TRANSMITTER - Tx

Internally, the transmitter has a fuse in line with the line(hot) wire.

The voltage present on these terminals (input wires) is rectified and an internal power supply is created from that voltage. That internal power supply, supply all the internal circuitry.

The transmitter uses an 10kHz, short pulse oscillator to drive a mos-fet transistor which in turn will draw current at an approximative 10KHz frequency.

This is the current which will be utilized to sniff the wires or circuit breakers.



RECEIVER - Rx

The Receiver, or sniffer is a tuned receiver. The tuned circuit comprises of a capacitor and an inductor (LC tank circuit).

The inductor is situated in the tip of the sniffer.

The signal received on the tuned circuit is amplified, then rectified and smoothed to transfer it to a DC level signal.

The microprocessor reads that smoothed signal which is proportional to the detected signal and display it on a bar-graph.

The Sniffer also has a low battery detector and battery ok circuit which lit the Bat LED when the battery is ok.

The buzzer is also driven by the microprocessor, so that the user can listen to the pulses, in conjunction with the bar-graph. The higher the level of the signal, the quicker the pulses and the bigger the number of Leds illuminated.



15. Display Bar-Graph

The bar-graph is made out of LEDs to Show the signal strength.

BARGRAPH



16. Automatic Battery test

On the receiver, while it's testing the battery is constantly monitored the status of the battery is shown on the Battery OK And Tester On indicator Led. While the Led lit, The battery is OK.



BATTERY OK
AND TESTER ON INDICATOR

17. AUTO-OFF

The sniffer has an auto-off feature and the power automatically turn off after approximately 3 minutes of being started.

The Transmitter does not have Auto-off and is ON when connected to a power source.

18. Preparation for Use

Cleaning:

Use a slightly dampened cloth to clean the case. Do not use chemicals.

Check for cracks in any wires and sign of damages.

Verify that there are no cracks or damages on the transmitter lead connection or on any of the optional accessories.

Make sure the housing of the transmitter and receiver are not damaged.

If there is any doubt, consult your nearest service center.

Check the battery

When starting the receiver, ensure the battery is healthy by checking the Battery OK led.

Change the battery if this is not the case.

19. Replacing the battery

This instrument operate well with any type of 9V battery. Due to it's very low consumption, it does not requires alkaline or any other special type.

To replace the Battery, unfasten the small screw situated at the back of the sniffer.

Then remove the battery cover. Make sure not to loose the screw.

Remove the bad battery and replace with a new one. The battery slide inside the battery compartment and can not be inserted wrongly.

Follows the marking inside the battery compartment. Re-insert the battery cover and screw.

BATTERY



SCREW

BATTERY COVER

BATTERY COMPARTMENT

20. Disposing of Batteries

Only dispose of batteries into a purposely dedicated disposal system. Do not dispose to the wrong place. Look after your environment, please.

21. Specifications

Receiver

Tuner Circuit mid frequency.....	10Khz
Battery Voltage.....	9V (6F22.006p)
Bar Graph Leds.....	9
Battery Indicator Led.....	1
On button.....	1
Off Button.....	1
Buzzer.....	1
Auto-off (Min) approx.....	1

Size..... 200 x 50 x 40 (mm)
Material..... Polycarbonate /A BS
Weight..... Approx 112 g
(with battery).

Transmitter

Working Voltage..... 100 to 240Vac 50/ 60Hz
Input current35mA
Frequency of sourced signal..10Khz
Size.....65 x 50 x 30 (mm)
Material.....Polycarbonate /A BS
WeightApprox 134 g
(with battery).
Connection.....Specify type of plug.

22. Environmental

Operating temperature Range : 1 °C to + 55 °C
Storage Temperature : -20 °C to + 70 °C

23. Cleaning

Clean the instrument case with an anti-static cleaner and wipe with dry cloth.

24. Legal Matters and Intellectual Property

Design of Electronic Circuitry, Software, Mechanical Parts and appearance .

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Design Registrations : The sniffer is a Toptronic registered design
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