7. Specifications

Battery:	9V standard or alkaline
Voltage display:	0 - 15.0kV (kilovolts)
Current display:	0 - 99A (amps)
Low battery indication:	"Lo Bat" is displayed. Replace battery
Operating temperature:	0 deg. C to 50 deg. C @ 90% humidity (non condensing)
Storage temperature:	-20 deg. C to 60 deg. C @ 90 % humidity (non condensing)
Power mode:	Press button to turn on, auto off
Dimensions:	148x66x29mm
Weight:	189g (including battery)
Accuracy (voltage display):	+/- (10% reading + 1 digit)
Accuracy (current display):	+/- (25% reading + 2 digits)

THUNDERBIRD WARRANTY

Thunderbird warrants the fault locator against defective workmanship and faulty materials for 12 months from the date of purchase. We undertake, at our option, to replace or repair free of charge this product, or part thereof, on condition that it is returned to our factory freight prepaid, and found on examination to be suffering from material or constructional defect. We cannot be held responsible for any repair other than those carried out by us or our authorised agent.

A photocopy of your proof of purchase and a request for warranty must also be returned with the item.

This warranty is void if the product is subject to improper use or handling, incorrect power input voltage, damage through contact with chemicals, flooding, fire, explosion, excessive heat, lightning strikes, insect damage, moisture damage or damage to external wiring.

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Thunderbird Fault Locator Instructions

Model 5A

1. Warnings and precautions in using your Thunderbird Fault Locator.

To avoid the possibility of electrical shock it is essential that certain precautions be taken during both storage and use. Some important **do**'s and **don't**s are:

Do always store your Thunderbird Fault Locator in a dry environment and never use this instrument if there is any possibility that water has entered into it.

Don't store your Thunderbird Fault Locator in a place where it may be exposed to corrosive fumes, for example, near an automotive battery or near any chemicals.

Don't use this instrument for measuring any voltage or current other than that of an electrified fence. **Never** attempt to use this instrument to measure live mains voltage.

Don't, under any circumstances, attempt to use this instrument if the case is cracked or otherwise damaged. If the case is damaged, return it to the place of purchase or to an authorized Thunderbird dealer for repair.

2. Battery installation

The Thunderbird fault locator comes with a 9V battery fitted. To replace a battery, first remove the three screws underneath the cover using a Phillips type screwdriver. Disconnect the old battery by pulling it away from the plug which is attached to the battery lead.

The battery terminals and the plug terminals are polarized so that the plug can be connected in only one way. Make sure that the terminals of the plug are correctly orientated to lock with the corresponding terminals of the battery. Do not allow the plug terminals to touch the battery terminals in the reversed orientation.

When you have connected the battery leads to the battery, fit the battery into the battery compartment and replace the cover. Make sure that the cover is securely attached to the case and that battery wires are not protuding from the case.

3. Operation

This fault locator may be used without an earth lead attached when used for finding faults on an electric fence. It is safe to touch the earthing clip, and will provide a more accurate fence voltage if it is touched. The earth lead should be attached and connected to the fence earth if an accurate fence voltage is required. The earth lead must be attached to measure the voltage directly from an energiser's terminals.

Press the "ON" pad to turn the fault locator on. It will stay on for approximately 15 seconds after detecting any fence voltage or current pulse.

There are 2 metal contacts in a groove across the bottom at the front of the fault locator. These contacts are for connecting to the live fence wire. Place the fault locator on the live fence wire so that the wire is in this groove, and rub the contacts on the wire to make good contact.

When voltage and/or current pulses are present on the fence, the pulse will be indicated on the display, and the voltage and current will be displayed. If the current in the fence wire exceeds 4 amps, an arrow will pulse on the display. The arrow points towards the fault in the fence.

4. Normal and fault conditions of a fence

An electric fence in normal (good) condition will usually give a relatively high voltage reading and a relatively low current reading everywhere along the fence. The reverse usually applies to an electric fence in which a fault condition exists. Fault conditions occur in several forms. Some of the most common of these include:

Poor connections - These are often accompanied by rust on fence wires and often arise when improper connecting techniques are used. A poor connection can often be detected by measuring the fence voltage at either side of the connection. If the **voltage** readings are similar then the connection is probably satisfactory but any significant difference in voltage readings indicate a bad connection.

Broken fence wires - A break in a fence wire can be detected by a relatively high voltage reading on the fence at the energizer side of the break, and the absence of any significant voltage on the other side.

Shorts - Often a fallen object causes an active fence wire to short-circuit to an earth wire or to ground, causing a marked drop in voltage on **both** sides of the fault. In these cases, the voltage readings (if any) do not usually differ significantly on either side of the fault. However, the **current** readings may differ greatly. In such cases the higher current reading will occur on the side of the fault nearer the energizer.

Excessive vegetative growth around fence, especially during wet weather - The effect of excessive vegetative growth is usually distributed over a much wider distance and the fall in voltage is usually not as great. It is therefore much more difficult to pinpoint exactly where the fault occurs. The fault locator will most likely show a slightly lower fence voltage and an increase in fence current. Ensure that any lush vegetation is kept clear of the active wires.

Resistance and Capacitance – Under normal conditions voltage readings are relatively high over most or all of a fence and the current readings are low. However if the fence is very long, or if the live wire(s) runs close to an earthed wire or fence, the voltage readings can be somewhat less than might be expected and the current readings may be higher. The electrical **resistance** of the fence wires is cumulative with length of fence, which diminishes the power available with distance from the source of power. The **capacitance** acts somewhat like a resistance in **parallel** with the fence wire(s) and increases the **current** that might otherwise flow in the fence. In general, the longer the fence, the greater the overall capacitance, and the greater the current flowing in the fence due to that capacitance. In this respect, the effect of capacitance is similar to that of vegetative growth, for example, and can often be mistaken for a fault condition in a fence even when the fence appears to be otherwise in perfect condition.

5. Interpretation of readings

The **voltage** reading is the peak value of any voltage pulses that may exist on the fence. The reading is given in units of kV (1 kV = 1,000 volts). The highest voltage that can be displayed is 15.0 kV. Typically a voltage reading will be from 6 kV to 8 kV for a fence in good condition. The reading may be somewhat less if there is a fault on the fence.

The **current or amps** reading indicates current flowing along the wire. The current may be due to capacitance of the fence, especially if the fence is a long one. Current may also flow along the fence due to a **load** across the fence. The load may be an animal touching the fence, or some other object or it may be due to vegetative growth touching the fence.

When a fault occurs in a fence that results in an abnormally high current reading, the direction of the fault will be indicated by the arrow displayed. Thus if the right arrow lights then the fault will be in the direction to the right. Conversely, if the left arrow lights then the fault will be in the opposite direction. The unit needs a reasonable value of both voltage and current to determine the direction, otherwise the direction indication may not be accurate.

The best approach to locate a fault (if the fault causes an abnormally high current reading) is to start somewhere near the energiser. Don't start closer than about 10 m because many energisers generate magnetic fields which may cause the fault locator to give a misleading amps reading and direction indication. Follow the direction indicated by the directional indicator lamps.

As you move closer to the fault you may find that the voltage reading diminishes but the current reading remains roughly the same. Don't rely on the direction indication if the voltage is very low, use the current as a guide. If the current reading suddenly drops it indicates that you have gone past the fault. In that case retrace your steps to locate the cause of the fault.

The current into the load depends upon the **voltage** on the fence as well as the resistance of the load according to the formula:

current (A) = voltage (V) / resistance (ohms)

For example, suppose that **voltage = 5,000 (5,000 volts = 5.0kV)** and that **resistance = 500 (ohms)**. In this example, the current is:

current = 5000 / 500 = 10A

So, if the voltage and current readings are 5 (kV) and 10 (A) respectively, these readings would indicate that a load of about 500 ohms is present across the fence. A load of 2,000 ohms to 10,000 ohms is relatively light. It might be caused by dry vegetative growth alongside the fence. 500 ohms to 2,000 ohms is moderate. It might be caused by an animal or green grass growing alongside the fence. A load of 100 ohms to 500 ohms is heavy. It might be caused by a tree fallen onto a fence or by thick wet grass growing alongside the fence. Anything less than 100 ohms is extreme.

6. Care and maintenance

Always store your Thunderbird Fault Locator in a dry place, away from corrosive chemical substances. Examine the unit each time before use to make sure that the case has not been damaged. Do not use if a crack develops in the case because such use could result in a possible electrical shock.

Never attempt to use the Thunderbird Fault Locator for any purpose other than as described in these instructions as to do so may result in the severe hazard of a possible electrical shock.

If the battery is flat, remove the battery from the unit to prevent the danger of corrosion due to leaking battery terminals. Likewise, please remove the battery if you do not expect to use the unit for some significant period of time (e.g. six months or longer).

To clean the unit, use only a slightly damp cloth and allow to dry before using. Never use cleaning fluids.