

#### 4.4 Storage Conditions

The FD650/R and FD500/T or FD600/T should be kept in warm dry conditions away from direct sources of heat or sunlight, with the battery removed and in such a manner as to preserve the working life of the FD650/R and FD500/T or FD600/T. It is strongly advised that the unit is not kept in a tool box where other tools may damage it.

#### 4.5 Warranty

Faults in manufacture and materials are fully guaranteed for 2 years from date of invoice and will be rectified by us free of charge, provided the unit has not been tampered with, and is returned to us with its housing unopened. Damage due to dropping, abuse or misuse is not covered by the guarantee. Nothing in these instructions reduces your statutory rights.

Other products from Martindale:

- Voltage Indicators
- Socket Testers
- Continuity Testers
- Fuse Finders
- 16th Edition Testers
- Digital Multimeters
- Microwave Leakage Detectors
- Digital Clamp Meters
- PAT Testers
- Motor Maintenance Equipment

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## INSTRUCTIONS



## ELITE FUSE FINDER KIT

**MARTINDALE**  
● ● ● **ELECTRIC**

Trusted by professionals

**SAFETY INFORMATION: Always read before proceeding.**

## **WARNING**





**These instructions contain both information and warnings that are necessary for the safe operation and maintenance of the FD650/R and FD500/T or FD600/T. It is recommended that you read the instructions carefully and ensure that the contents are fully understood. Failure to understand the instructions and to comply with the warnings and instructions contained herein can result in serious injury, damage or even death.**

**In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding 30 V AC rms, 42 V AC peak or 60 V DC.**

**The FD650/R and FD500/T FD600/T must only be used under the conditions and for the purposes for which they have been constructed. Particular attention should be paid to the safety instructions, the technical specifications and the use of the FD650/R and FD500/T or FD600/T in dry surroundings.**

**Always check the FD650/R and FD500/T or FD600/T are in good working order before use and that there are no signs of damage to any unit. Do not use if damaged.**

**Keep these instructions for future reference. Updated instructions and product information are available on our website: [www.martindale-electric.co.uk](http://www.martindale-electric.co.uk)**

<b>Symbols</b>		AC (alternating current)
		Earth ground
		Safety information (refer to the manual)
		Equipment complies with relevant EU directives

## **3.4.2 Locating Live Wiring/Cabling**

Switch the FD650/R to **VAC** and verify the green battery indicator is continuously illuminated.

Hold the tip of the FD650/R to the cabling to be tested. Where multi-core cabling is being tested run the tip of the FD650/R along a short length of the cable to overcome the electrical effects of the natural twist in the conductors.

If the wiring/cabling is live the **VAC** bar graph will display an indication and an audible tone will be emitted from the FD650/R.

## **4. MAINTENANCE**

### **4.1 Battery Replacement**

Remove the rear battery cover of the FD650/R by unscrewing the battery cover retaining screw. The cover will now lift off.

Fit a new 9V, MN1604/PP3 alkaline battery, observing correct polarity.

Replace the battery cover and secure with the battery cover retaining screw.

### **4.2 Cleaning**

The FD650/R and FD500/T or FD600/T may be cleaned using a soft damp cloth and mild detergent.

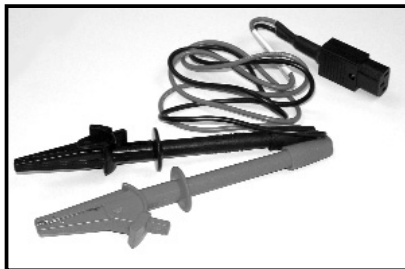
Do not use abrasives or solvents. Allow to completely dry before using.

### **4.3 Repair & Service**

There are no user serviceable parts in this unit. Return to Martindale Electric Company Ltd if faulty. Our service department will promptly quote to repair any faults that occur outside the warranty period.

Optionally TL88 leads can also be used with the FD600/T. Connect the black crocodile clip to neutral and red to live in that order and then plug the TL88 lead into the FD600/T IEC inlet socket. The green crocodile clip should be clipped to earth as a safety measure.

**Fig. 6. TL83 Leads**



**Fig. 7. TL88 Leads**



### 3.4 Using the FD650/R as a Voltage Detector

Ensure you have read the precautions (section 3.1) before proceeding.

#### 3.4.1 Pre-Check of the FD650/R

Switch the FD650/R to **VAC** and verify the green battery indicator is continuously illuminated. If the green battery indicator is flashing the battery is low and should be replaced (see section 4.1).

Press the FD650/R **TEST** button and verify all the segments of the FD650/R **VAC** bar graph are illuminated and an audible tone is present.

Do not use if the pre-check fails.

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**N.B. The unit defaults to Manual Mode when switched on (see sections 3.3.3 and 3.3.4).**

# 1. INTRODUCTION

## 1.1 Description

The FD650/R is a combined AC voltage detector and fuse finder receiver (when used in combination with the FD500/T or FD600/T transmitter).

As a fuse finder the FD650/R can be operated with either manual or automatic setting of its sensitivity threshold to find the fuse or circuit breaker that produces the maximum signal.

In manual mode the press of a push-button will set the sensitivity threshold to bring the detected signal to mid scale on the bar graph.

In automatic mode the FD650/R will automatically set the sensitivity threshold every time a signal of a greater magnitude is detected, to bring it onto the bar graph scale.

In either mode the buzzer will continue to sound when a signal is present, even when the signal is too small to be shown on the bar graph due to the sensitivity setting.

When in the voltage detector mode the FD650/R employs the bar graph to show the detected signal, and at the same time activates the buzzer. The voltage detector function also has a built in test signal to check the operation of its circuitry.

Other features of the FD650/R are Auto Power-down and Low Battery Indication.

A three-position switch sets the FD650/R from OFF to either the Fuse Finder or the Voltage Detector functions. A single push-button switch controls all other operations of the FD650/R.

## 3.3.4 Using in Automatic Threshold Mode

With the selector switch set to **FIND**, hold down the **SET** button for approximately 2 seconds until the red **MODE** indicator is illuminated.

Hold the FD650/R receiver in close proximity to the box suspected of housing the fuse, or circuit breaker, being sought. If the signal is present an audible tone will be emitted from the FD650/R.

Hold the FD650/R against the first fuse or circuit breaker of the box as shown in figure 4. The orientation of the FD650/R in relation to the fuse / breaker must be as shown in figure 4 and it should be held in the centre of the fuse or circuit breaker.

The FD650/R will automatically set the sensitivity threshold to show a signal strength indication on the bar graph. The signal strength indication on the bar graph may be centred to display 3 to 4 segments at any time by pressing the **SET** button.

Be sure to check all the fuses/circuit breakers, and then go back over all the fuses/circuit breakers maintaining uniform proximity during and after each pass to prevent incorrect re-setting of the receiver sensitivity. Only one fuse/circuit breaker should now show a signal strength indication on the bar graph. If this is not the case then repeat the above procedure, until only a single fuse/circuit breaker causes an indication.

Switch off/remove the fuse/circuit breaker that shows the maximum signal strength and check that the FD650/R bar graph is no longer illuminated and the audible tone is no longer present. Go to the transmitter, if the correct fuse/circuit breaker has been switched off/removed then the red **ON** indicator should no longer be illuminated.

## 3.3.5 Connecting the FD600/T using TL83 or TL88 Leads

If you are using the FD600/T with TL83 leads to trace wiring, connect the black crocodile clip to neutral and red to live in that order and then plug the TL83 lead into the FD600/T IEC inlet socket.



**Figure 4. Correct**  
 The receiver must be held in this orientation in relation to the breaker to find the correct fuse/circuit breaker. If the individual breakers were horizontal, the receiver would have to be rotated through 90° (in either direction).



**Figure 5. Wrong**

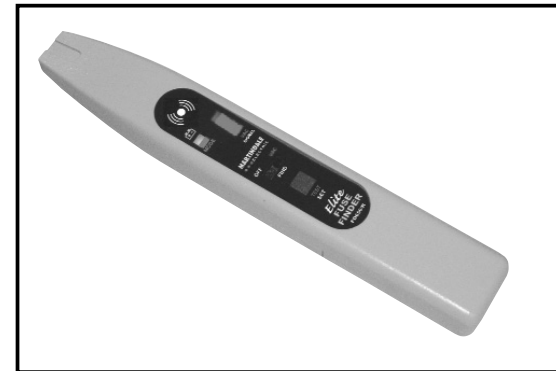
**Fig. 1. FD500/T**



**Fig. 2. FD600/T with EX332 Mains Lead**



**Fig. 3. FD650/R**



## 1.2 Unpacking and Inspection

Before unpacking the FD650/R and FD500/T or FD600/T, examine the shipping carton for any sign of damage. Unpack and inspect the FD650/R and FD500/T or FD600/T for any damage. If there is any damage then consult your distributor immediately.

## 1.3 Battery Installation

Refer to Section 4.1 for battery installation instructions for the FD650/R.

## 2. TECHNICAL SPECIFICATION

### 2.1 Transmitter (FD500/T & FD600/T)

Nominal supply voltage:	230 V.
Frequency range:	30 - 70 Hz.
Switching frequency:	Approx 5 Hz.
Temperature Range:	-10 to 40C non-condensing.
Dimensions:	Approx 65 x 65 x 50mm.
Weight:	Approx 60g.
Earth leakage:	Nil.
Power supply:	From mains.
Power consumption:	Approx 1 W.
Fuse rating	500 mA.
Overvoltage category:	Cat III/300V.
Pollution degree:	2.
Protection class:	IP20.
Safety:	Complies to BS EN 61010-1:1993

### 2.2 Receiver (FD650/R)

#### Fuse Finder Function

Tracing depth for fuse assignment:	Up to 10cm, depending on local conditions.
Sensitivity threshold setting:	Automatic, or manual push button.

#### Voltage Detector Function

Voltage range:	40V - 600 V AC.
Frequency range:	50 Hz - 1 kHz.
Voltage sensitivity:	Table 1 below gives the typical distance at which the FD650 will illuminate the first bar graph segment and activate the buzzer.

### 3.3.3 Using in Manual Threshold Mode

Hold the FD650/R receiver in close proximity to the box suspected of housing the fuse or circuit breaker being sought. If the signal is present an audible tone will be emitted from the FD650/R.

Hold the FD650/R against the first fuse or circuit breaker of the box as shown in figure 4. The orientation of the FD650/R in relation to the fuse / breaker must be as shown in figure 4 and it should be held in the centre of the fuse or circuit breaker.

Depending on the signal strength the bar graph may be activated. Press the **SET** button to set the sensitivity and the lower 3 to 4 segments of the bar graph will be illuminated.

Move along the row of fuses/circuit breakers, stopping at the centre of each fuse/circuit breaker and noting the signal strength on the bar graph display. Every time this signal causes the bar graph to exceed 3 to 4 segments, press the **SET** button to set the new sensitivity threshold.

Be sure to check all the fuses/circuit breakers, and then go back over all the fuses/circuit breakers. Only one fuse/circuit breaker should now show a signal strength indication on the bar graph. If this is not the case then repeat the above procedure, until only a single fuse/circuit breaker causes an indication.

Switch off/remove the fuse/circuit breaker that shows the maximum signal strength and check that the FD650/R bar graph is no longer illuminated and the audible tone is no longer present when the fuse / circuit breaker location is re-checked.

Go to the transmitter, if the correct fuse/circuit breaker has been switched off/removed then the red **ON** indicator should no longer be illuminated.

### 3.3 Using the FD650/R and FD500/T or FD600/T as a Fuse Finder

Ensure you have read the precautions (Section 3.1) before proceeding.

#### 3.3.1 Pre-Check of the FD650/R and FD500/T or FD600/T

Plug the FD500/T or FD600/T transmitter into a known socket and ensure the red **ON** indicator is illuminated.

Switch the FD650/R receiver to **FIND** and verify the green battery indicator is continuously illuminated. If the green battery indicator is flashing the battery is low and should be replaced (see section 4.1).

Hold the FD650/R in close proximity to the transmitter and verify illumination of the FD650/R **SIGNAL** bar graph and that an audible tone is present. The number of illuminated segments of the bar graph will depend on the FD650/R position and orientation with respect to the transmitter.

Do not use if the pre-check fails.

#### 3.3.2 Locating a Fuse or Circuit Breaker

Plug the FD500/T or FD600/T into a socket of the circuit to be traced and ensure the red **ON** indicator is illuminated. If you are using the FD600/T with TL83 or TL88 leads refer to section 3.3.5.

Switch the FD650/R to **FIND** and verify the green battery indicator is continuously illuminated.

When switched to **FIND**, the FD650/R defaults to the manual threshold mode (see section 3.3.3). The FD650/R can alternatively be operated in the automatic threshold mode (see section 3.3.4).

**N.B. The unit defaults to Manual Mode when switched on (see sections 3.3.3 and 3.3.4).**

Table 1. Typical Sensing Distance of Energised Cable

Cable Type	115V, 50Hz	230V, 50Hz
Flat 1mm <sup>2</sup> Twin & Earth	3mm	23mm
2.5mm <sup>2</sup> Twin & Earth	3mm	23mm
Round 1.5mm <sup>2</sup>	2mm	18mm

#### General

Temperature Range:	-10 to 40C, non-condensing.
Dimensions:	202 x 32 x 22mm.
Weight:	Approx 135g (including battery).
Protection class:	IP20.
Power supply:	9V battery, MN1604/PP3, IEC 6LA61 (alkaline only).
Low battery level:	Approx 6.9V.
Auto power down current drain:	Typically 20 $\mu$ A.

## 3. OPERATION

### 3.1 Precautions

**Warning** Before use check the FD650/R and FD500/T or FD600/T for cracks or any other damage, and make sure the units are free from dust, grease and moisture.

**Warning** Hold the FD650/R by the bottom of the unit. Do not allow your fingers to go beyond the LED indicators.

**Warning** Do not use if the battery cover is not fitted.

**Warning** Always perform a pre-check on the FD650/R and FD500/T or FD600/T (see sections 3.3.1 and 3.4.1) before use.

**Caution** Where users have a Martindale kit that includes an E-Ze Check Xtra or an E-Ze Test, do not have these or similar types of unit plugged in when fuse finding.

**Caution** Avoid severe mechanical shock or vibration and extreme temperature.

**Caution** Remove the batteries from the FD650/R when not in use for an extended period to avoid corrosion from leaking batteries.

### 3.2 Description of Functions and Indicators

**Auto Power Down:-** The power down is activated after approximately 5 minutes without a valid signal. The power down mode can only be reset by switching the unit **OFF** and then on again. In power down mode the typical current drawn is 20 $\mu$ A.

The power down function can be deactivated by holding down the press button when switching the unit on.

**Buzzer:-** An internal buzzer is used to inform the user when a signal has been detected. In the fuse finder function the buzzer will continue to sound even if the LED's are not illuminated, provided that a signal is present.

**Function Selection:-** The required function is selected by sliding the three-position slide switch from **OFF** to **FIND** (Fuse Finder) or **VAC** (Voltage indicator).

**1.1. LED's:-** There are two status LED's on the LHS of the unit. The top one is green and shows battery status. Continuous illumination means that the battery level is acceptable. Flashing means that the battery should be replaced.

**1.2.** The red LED is only used for the **FIND** function and indicates that the unit is in automatic sensitivity mode.

A bar graph of 6 red LED's on the RHS of the unit is used in both **FIND** and **VAC** functions to display the signal strength.

**1.3. Low Battery:-** If the battery voltage is lower than a pre-set level of 6.9V the Green status LED flashes every 500ms. The battery should be replaced (see section 4.1).

**1.4. Push -button Switch:-** Used to activate the following functions:-

**1.5.** Activation of test signal in **VAC** function.

**1.6.** Automatic threshold mode – in **FIND** function hold down push-button for 2 seconds.

Auto mode bar graph centring – momentarily press to set the bar graph indication to the centre of the scale when using the **FIND** function.

Deactivation of battery power down – hold down while switching from **OFF** to **FIND** or **VAC**.

Manual mode threshold – momentarily press to set a new threshold when using the **FIND** function in presence of signal.

Resetting sensitivity threshold - When out of signal range momentarily press to set the sensitivity threshold to the power-up default level when using the **FIND** function.