

314
20 JUN 1982
LOCATOR NO. 6A

Locating Earth Faults in Buried Polyethylene Sheathed Cables

(As this Instruction has been completely REVISED, individual paragraphs have not been "starred".)

1 **GENERAL** This Instruction describes the LOCATOR No. 6A and its use for locating earth faults in buried polyethylene sheathed cables, and for locating the cable track. The following items of equipment are also required:-

SPIKE TESTING No. 11A (or equivalent)
OSCILLATOR No. 99A
AMPLIFIER No. 109
SATCHEL No. 4
RECEIVER HEADGEAR No. 16T
SEARCH COIL No. 2B

WARNING The output from the Oscillator No. 99A must never be connected across a pair of wires, or to a single wire in a cable, since the high output power could cause permanent ear damage to anyone who might be listening on the line. Never attempt to identify a pair in a cable using the Oscillator No. 99A.

2 **APPLICATION** The locator performs two functions as follows:-

2.1 Cable track location (by operation of the switch in the handle) and walking with the discs about 80 mm above the ground.

2.2 Earth fault locating (with switch normal), and placing the discs firmly on the ground at intervals along the cable route.

3 **DESCRIPTION** (see Fig 1) The locator comprises a tubular steel 'C' shaped frame with two insulated discs fitted at each end of the lower arm and spaced about 750 mm apart. In the centre of the lower arm there is a plastic housing, into which a Search Coil 2B is fitted. The locator is balanced when held by the plastic grip handle situated on the upper arm, such that the lower arm is parallel with the ground. A change-over switch fitted at the end of the grip handle connects the amplifier either to the search coil when operated, or to the insulated discs in the non-operated position. A lead is also provided from the change-over switch for connexion to the amplifier, which is suspended in its carrying case from the upper arm.

4 **LOCATION OF CABLE TRACK** The cable pair on which there is an earth fault is isolated from the exchange at the cabinet/pillar or other convenient point. The oscillator output is connected between the bunched faulty pair and an earth spike pushed into the ground 5 to 25 metres away from the cable, the tone being transmitted towards the fault. Sometimes it is more convenient to connect the oscillator at the customer's end of the network. In these cases the pair should be disconnected, such that the tone is fed into a section which is isolated from the exchange.

The locator is carried by the grip handle, with the lower arm in line with the cable track, and the switch in the handle operated. With the amplifier switched on and the plates held slightly above the ground, tone will be heard in the Receiver Headgear, and will be a minimum when the search coil is immediately above the cable. Proceed by walking towards the fault, holding the locator in

line with the cable track, and at the same time swing the lower arm gently from side to side to a distance of 200 mm to 500 mm either side of the cable (see Fig 4), where there will be a high level of tone. Between these two positions a NULL will be determined, and this will be the vertical position of the cable track. As progress is made, the NULL position may be chalk marked on solid surfaces, or with pegs pushed into soft ground.

5 LOCATION OF EARTH FAULT Having determined the track, the position of the earth fault may now be located. With the switch in the non-operated position the cable track should be walked, pausing every few metres to listen for the earth leakages, by placing the locator discs firmly on the ground. When listening for earth leakage there will be some tone heard at the point where the tone is connected, which disappears as the track is walked, and is not heard again until the earth fault is approached. The typical pattern of detected tone is shown in Fig 2. The switch should be operated from time to time to ensure that the earth locating discs are immediately above the cable track.

As the earth fault point is approached the tone will steadily increase to a maximum when the leading disc is above the fault. There will also be another maximum tone point when the trailing disc is above the fault, and the position is confirmed by getting a NULL as the two discs straddle the fault, which is now midway between the two discs.

As a final check:-

(i) Reverse the position of the locator so that the trailing disc now leads (ie through 180 degrees), and verify the null point.

(ii) Rotate the frame 90° (right angle) to the cable and verify the null point.

(iii) If the fault is suspected in an inaccessible position (ie flower bed, or under a wall), location can be made by obtaining a null by placing the discs on the circumference of an imaginary circle around the fault. Two such positions will be required. The intersection of the two lines at right angles to the centre of the frame will give the point of earth leakage (see Fig 3).

6 INTERPRETATION OF THE TEST The location given will be that position of the cable sheath where the test tone is leaking to earth, and need not necessarily be at the point where the fault is affecting the wire. For example, if water has entered a cable through a damaged sheath and has travelled to a joint, or some other point where the conductor is exposed, the fault will be located to the point of the damaged outer sheath. The test will not locate faults where there is no leakage to earth through the cable sheath, eg leakage to other conductors only.

7 SAFETY Due caution must be exercised when using the locator, where the cable is laid under roads. The Receiver Headgear will effectively block up one ear. Use the other one and your eyes to anticipate the approach of traffic.

Figures follow

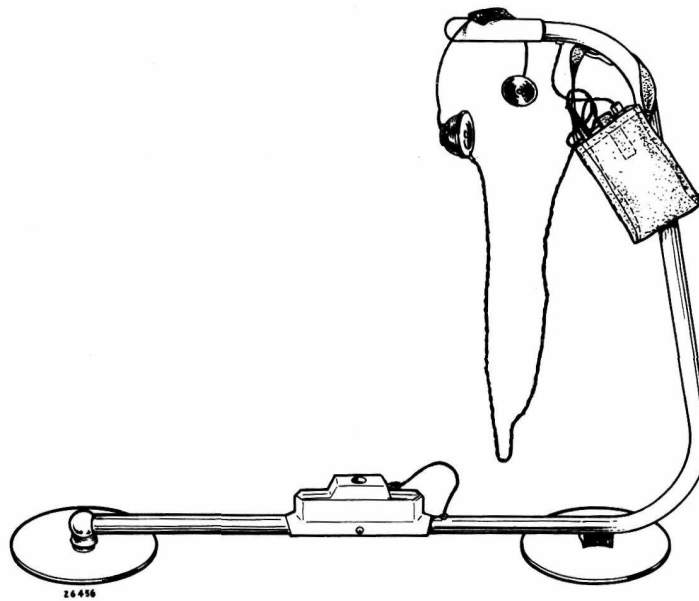


FIG. 1

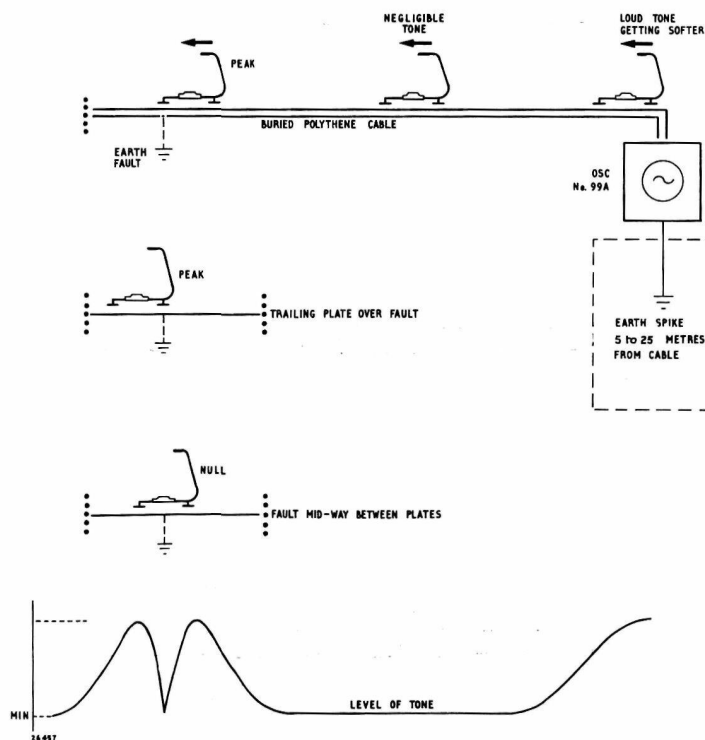


FIG. 2 EARTH FAULT LOCATING, METHOD (1) (SWITCH IN NORMAL POSITION).

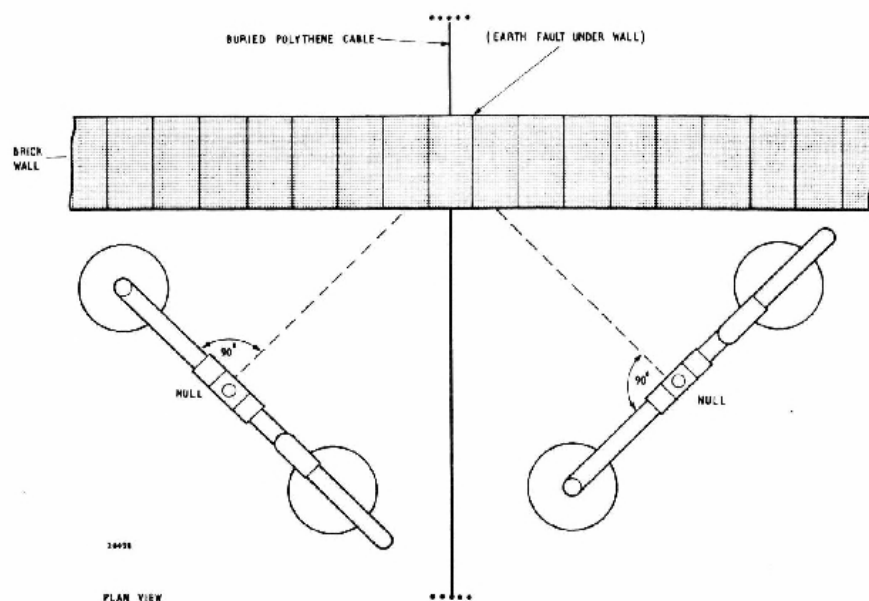
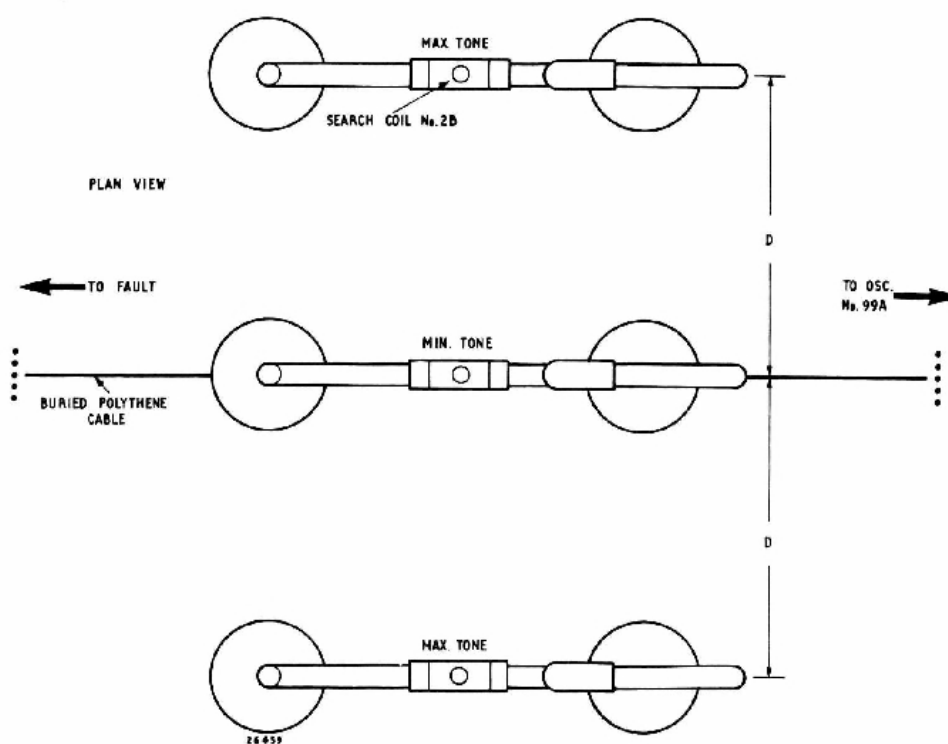


FIG 3- EARTH FAULT LOCATING, METHOD (2) (SWITCH IN NORMAL POSITION)



SWITCH IN THE "ON" POSITION TO LOCATE CABLE TRACK. DISTANCE 'D' WILL BE APPROXIMATELY 200-500 MILLIMETRES