

AT&T Standard Plant Training Course

UNIT 7
DYNATEL 710A FAULT LOCATOR

PTC No. 157 - CABLE REPAIR
MODULE 1
FAULT LOCATING



AT&T Standard Plant Training Course

Trainee Workbook

Unit 7

Dynatel 710A Fault Locator

Issue 1 February 1, 1974

PTC No. 157 - Cable Repair

Module 1

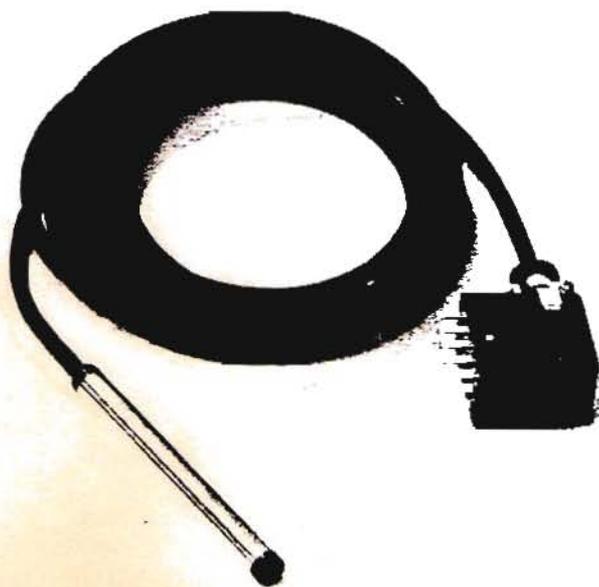
Fault Locating



EXTENSION CABLE



THERMO-CALIBRATOR



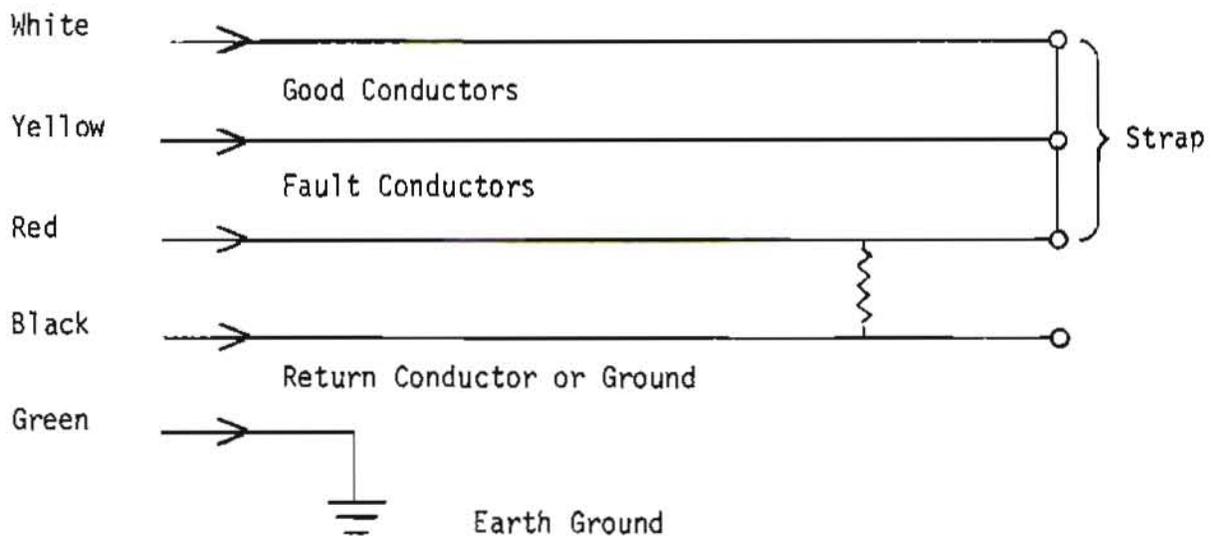
ANSWER THE FOLLOWING QUESTIONS:

1. The 710A is a battery powered BRIDGE type test set.
2. The thermo-calibrator is used to aid in determining:
 - a. the gauge of the conductor.
 - b. the temperature of the cable.
 - c. the distance to the strap.
3. All measurements are read on the digital dial directly in FEET.
4. The "over-range" indicator will flash when:
 - a. the total length of the conductor exceeds the sets limits.
 - b. the total length of the conductor is below the sets limits.
 - c. the total length of the conductor is within the limits of the set.

RESTART THE TAPE TO CHECK YOUR ANSWERS.

SEPARATE GOOD PAIR HOOK-UP: Using an additional good pair.

Test Clip



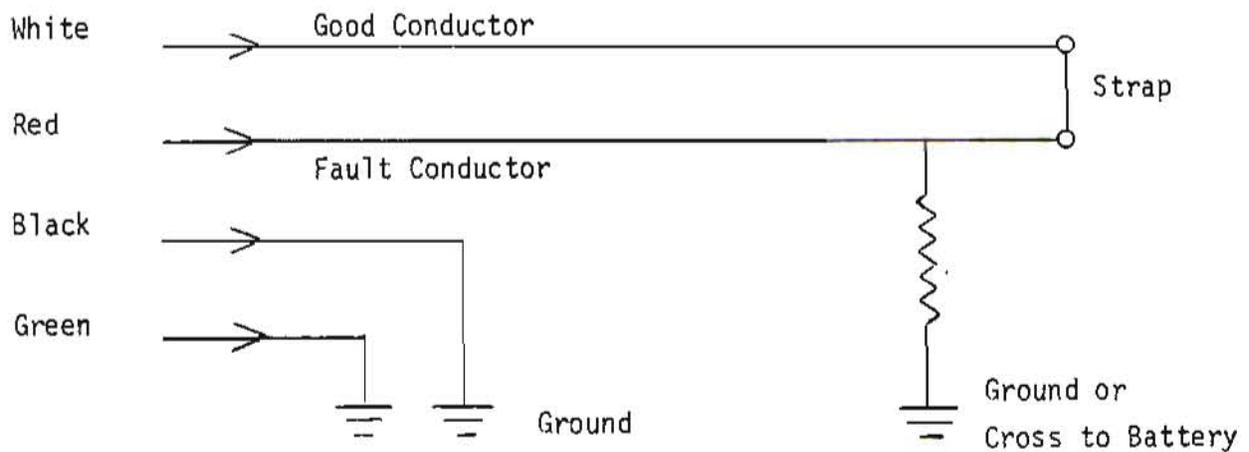
The green test clip is the instrument protective ground and should always be connected to earth ground.

The red lead is always connected to the faulted conductor that has been strapped with the good pair on the far end.

The yellow test clip will be left disconnected if only one good conductor is available.

SINGLE PAIR HOOK-UP: Using only the pair in trouble.

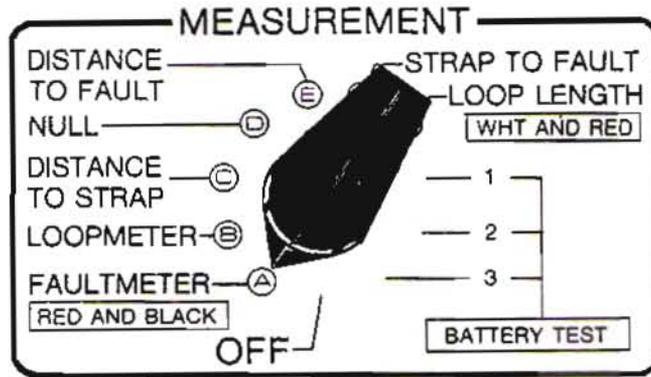
Test Clip



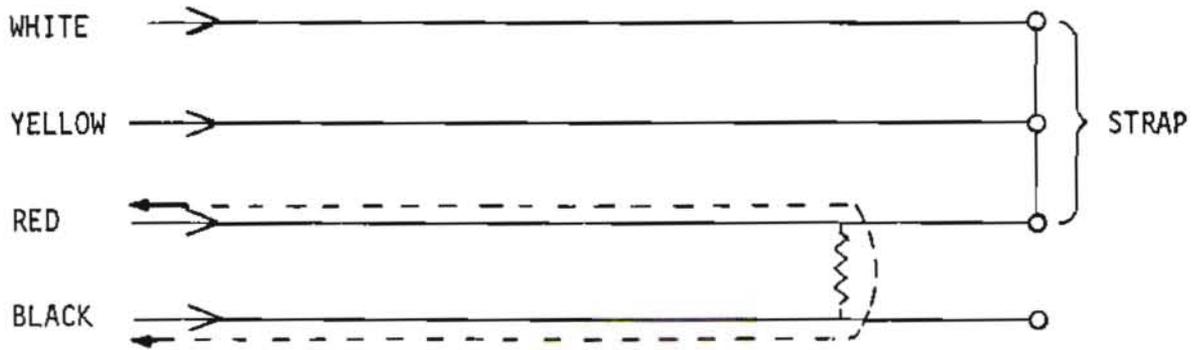
Remember - - -

Always place the red lead on the faulted conductor that has been strapped to the good conductor.

WITH THE MEASUREMENT SWITCH IN THE FAULTMETER POSITION



THE SET READS THE RESISTANCE BETWEEN THE BLACK AND RED TEST LEADS

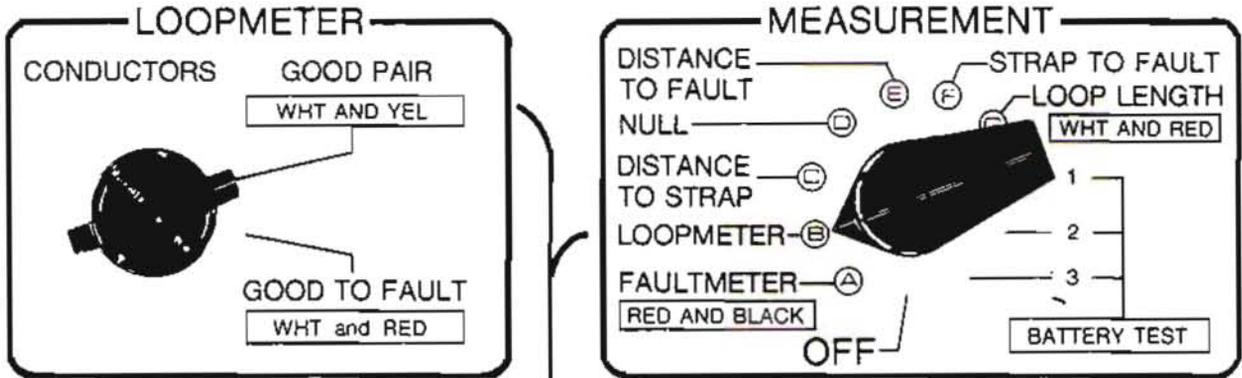


Acting as an ohmmeter

WITH THE MEASUREMENT SWITCH SET TO "LOOPMETER"

AND THE LOOPMETER SWITCH SET TO "GOOD PAIR" POSITION

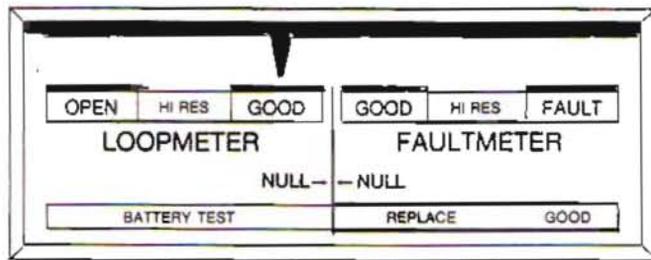
THE SET READS THE RESISTANCE BETWEEN THE WHITE AND YELLOW LEADS.



IF THE GOOD PAIR IS NOT OPEN AND THE FAR-END STRAP HAS A GOOD CONNECTION

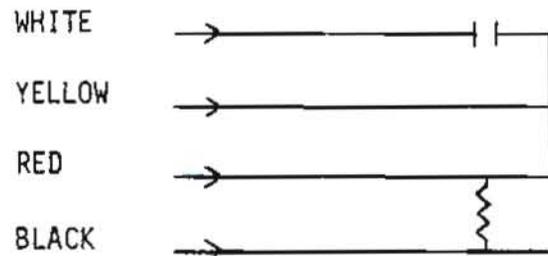


THE NEEDLE WILL STAY IN THE GOOD ZONE OF THE LOOPMETER.

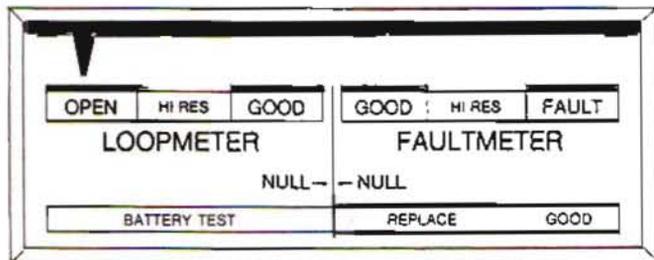


HOWEVER

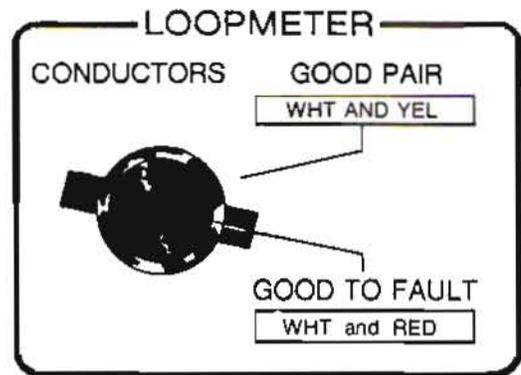
IF THE GOOD PAIR IS OPEN AT ANY LOCATION BETWEEN THE TEST SET AND THE FAR-END STRAP



THE NEEDLE WILL DEFLECT TO THE OPEN ZONE OF THE LOOPMETER



WITH THE LOOPMETER SWITCH PLACED IN THE "GOOD TO FAULT" POSITION

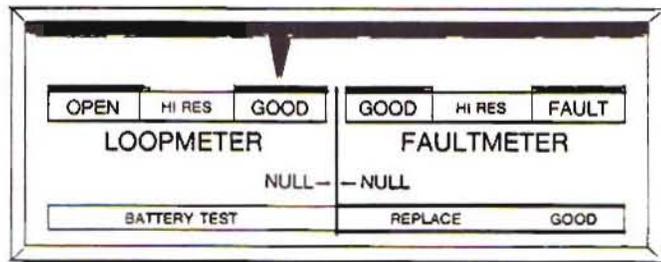


THE SET READS THE CONTINUITY BETWEEN THE RED AND WHITE TEST LEADS . . .



IF THE CONDUCTORS BETWEEN THE WHITE AND RED TEST LEADS ARE NOT OPEN

THE NEEDLE WILL STAY IN THE GOOD ZONE OF THE METER

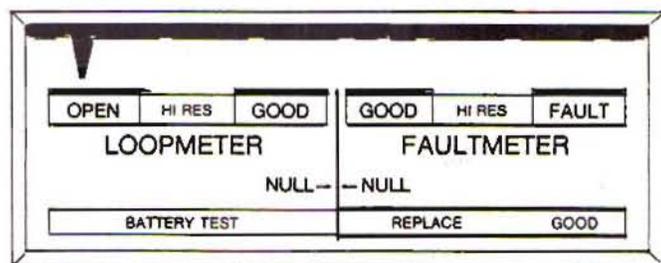


HOWEVER

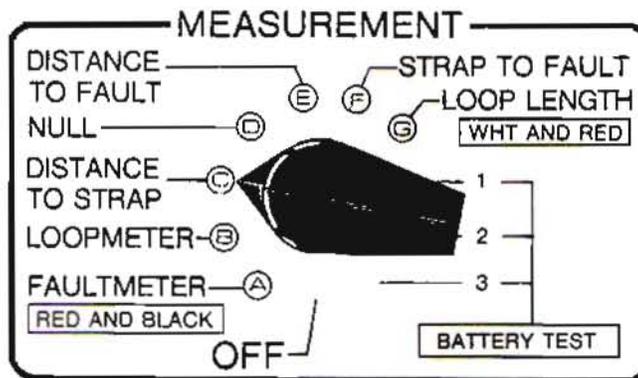
IF A CONDUCTOR OR STRAP IS OPEN . . .



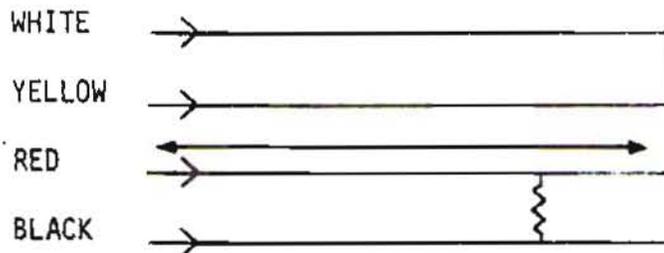
THE NEEDLE WILL DEFLECT TO THE OPEN ZONE



WITH THE "MEASUREMENT" SWITCH SET TO THE "DISTANCE TO STRAP"
 POSITION



THE SET IS READING THE RESISTANCE (LENGTH) OF THE CONDUCTOR CONNECTED TO
 THE RED LEAD



ANSWER THE FOLLOWING QUESTIONS:

1. The "Faultmeter" may be used like an ohmmeter?

True or False

2. If used as an ohmmeter you must use the RED and BLACK colored test leads.

3. With the "Loopmeter" switch in the "Good to Fault" position and the faulted conductor is open between the strap and the fault, the needle will deflect to the OPEN position.

4. Before measuring the "Distance to Strap," the GAUGE and TEMP switches must be placed in their proper positions.

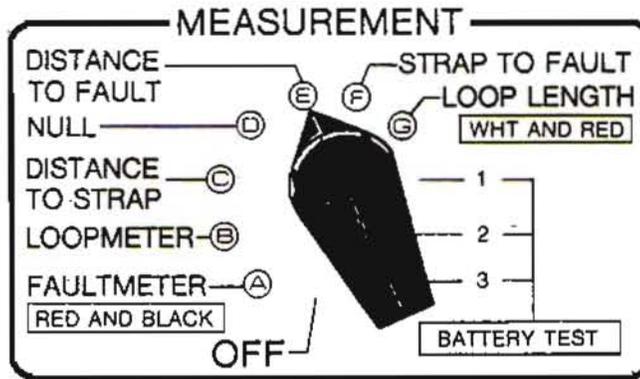
5. The green test clip is always connected to an EARTH GRND.

RESTART THE TAPE TO CHECK YOUR ANSWERS.

STEPS FOR NULLING METER

- STEP 1. Turn the Measurement Switch to the NULL position.
- STEP 2. Rotate the NULL "1" knob until the needle is in the NULL position of the meter.
- STEP 3. Press the "Press for NULL 2" knob down and hold.
- STEP 4. Rotate the NULL 2 knob until the needle is in the NULL position of the meter.

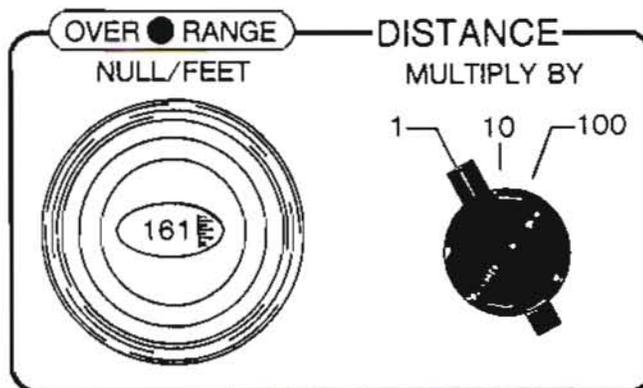
WITH THE MEASUREMENT SWITCH SET TO THE "DISTANCE TO FAULT" POSITION.....



THE SET READS THE RESISTANCE (LENGTH) OF THE CONDUCTOR CONNECTED TO THE RED LEAD. THE DISTANCE TO FAULT IS THE LENGTH OF WIRE FROM THE SET TO FAULT.

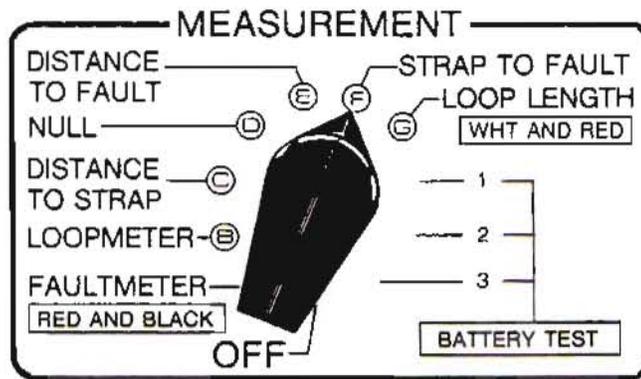


THE MEASUREMENT IS READ ON THE "DIGITAL DIAL" DIRECTLY IN FEET



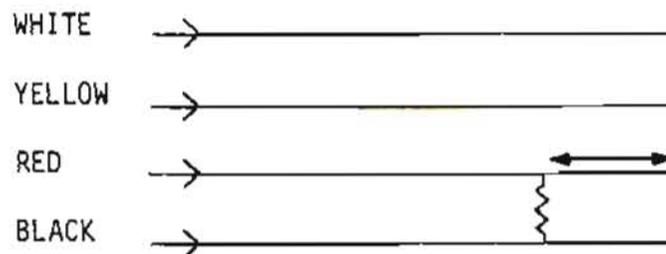
MULTIPLY THE DIAL READING BY THE SETTING OF THE "MULTIPLY BY" KEY

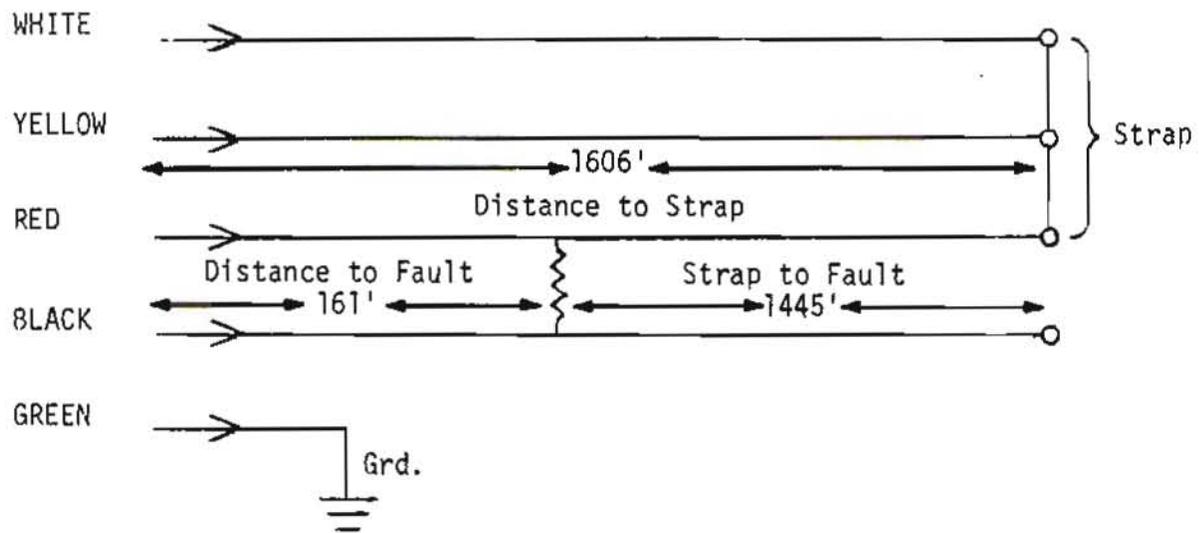
WHEN SET TO THE "STRAP TO FAULT" POSITION



THE SET IS READING THE RESISTANCE FROM THE FAR-END STRAP TO THE FAULT.....

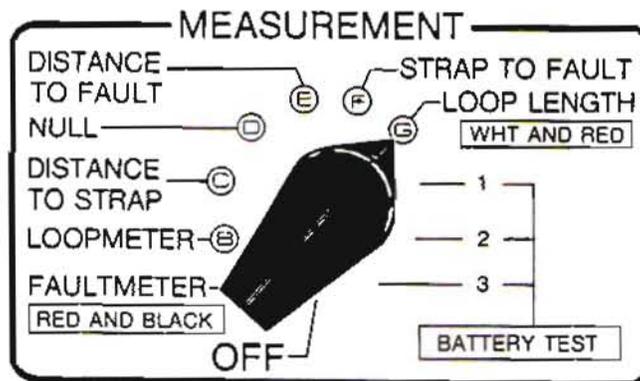
THE "STRAP TO FAULT" DISTANCE IS FROM THE FAR-END STRAP TO THE FAULT ON THE RED LEAD



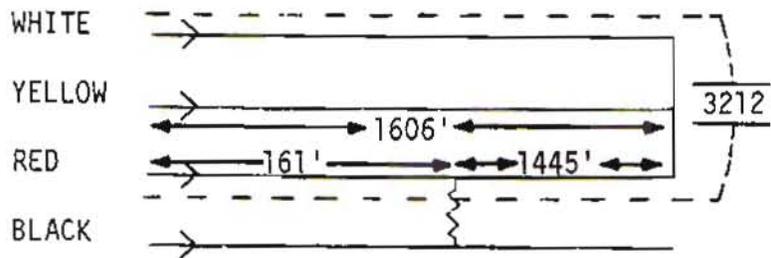


Distance to Strap	1606'
Minus Distance to Fault	-161'
<hr/>	<hr/>
Equals Strap to Fault	1445'

WITH THE SET PLACED IN THE "LOOP LENGTH" POSITION



IT READS THE RESISTANCE FROM THE WHITE LEAD TO THE RED LEAD



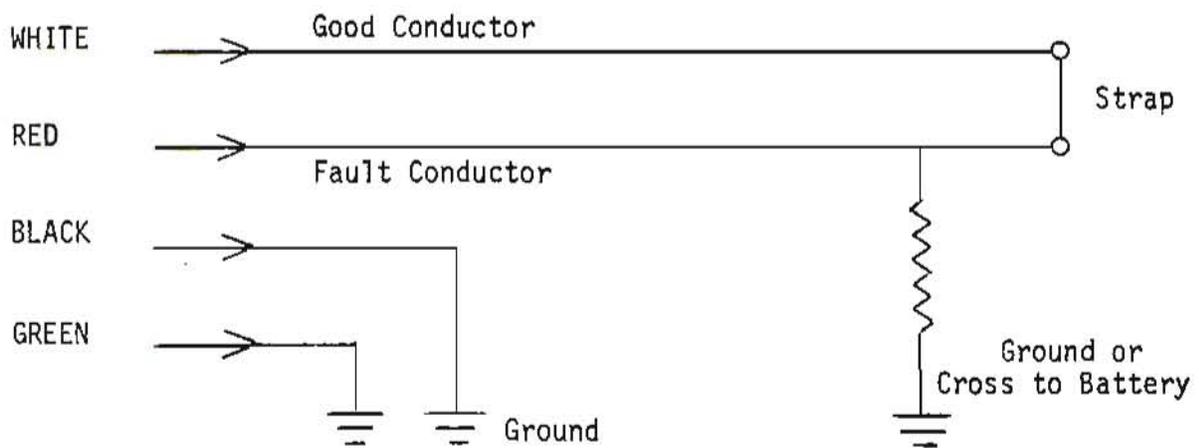
LOOP LENGTH- THE TOTAL CONDUCTOR LENGTH FROM THE WHITE TEST LEAD TO THE RED TEST LEAD. (+) or (-) 1% of digital dial reading.

NOTE ...

THE WHITE LEAD IS CONNECTED TO ONE SIDE OF THE GOOD PAIR AND THE GOOD PAIR IS NOT ALWAYS THE SAME LENGTH AS THE FAULTED PAIR.

SINGLE PAIR HOOK-UP: Using only the pair in trouble.

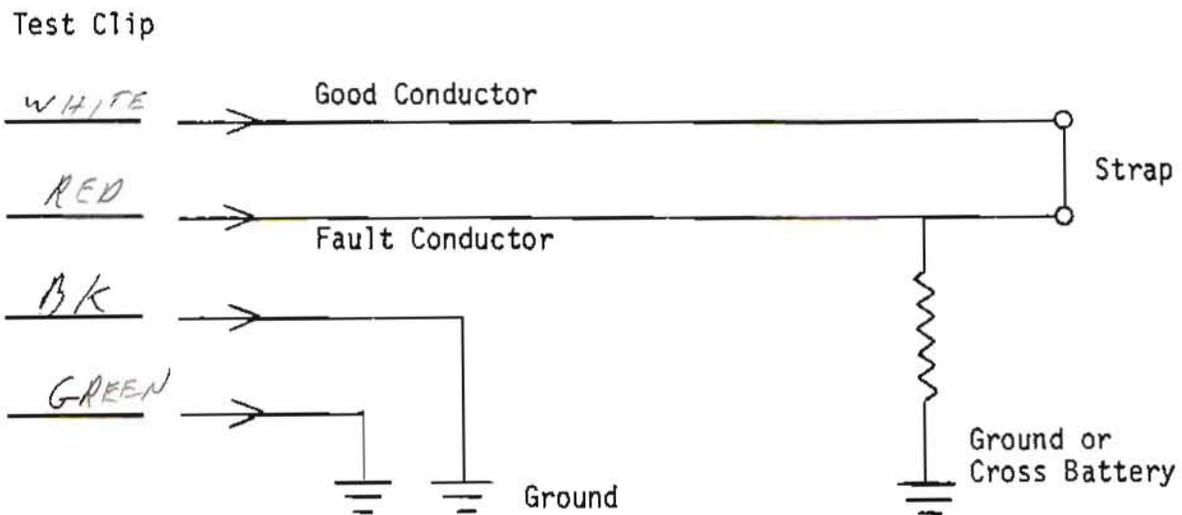
Test Clip

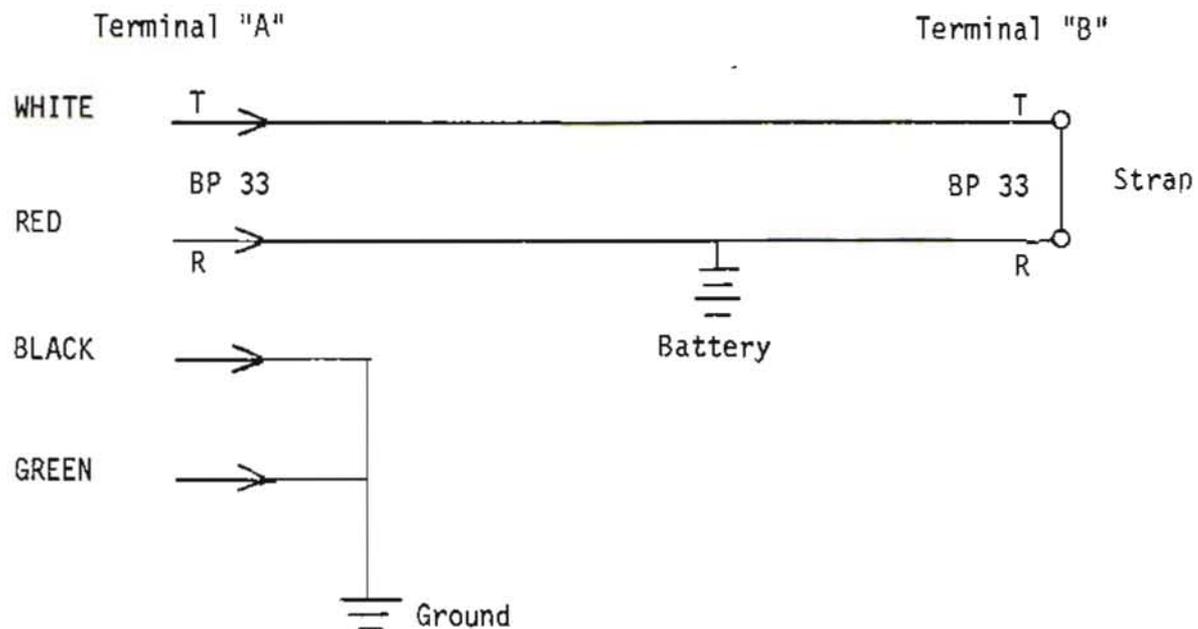


USE 19 GAUGE COPPER WIRE FOR STRAP AT FAR END.

1. The single pair hook-up may be used only in cases of battery crosses and GRNDS.
2. The best material to use for establishing a good strap is 19 gauge copper wire.
3. Place the correct color lead in the blank spaces beside the correct conductor in the following illustration.

A. SINGLE PAIR HOOK-UP: Using only the pair in trouble.

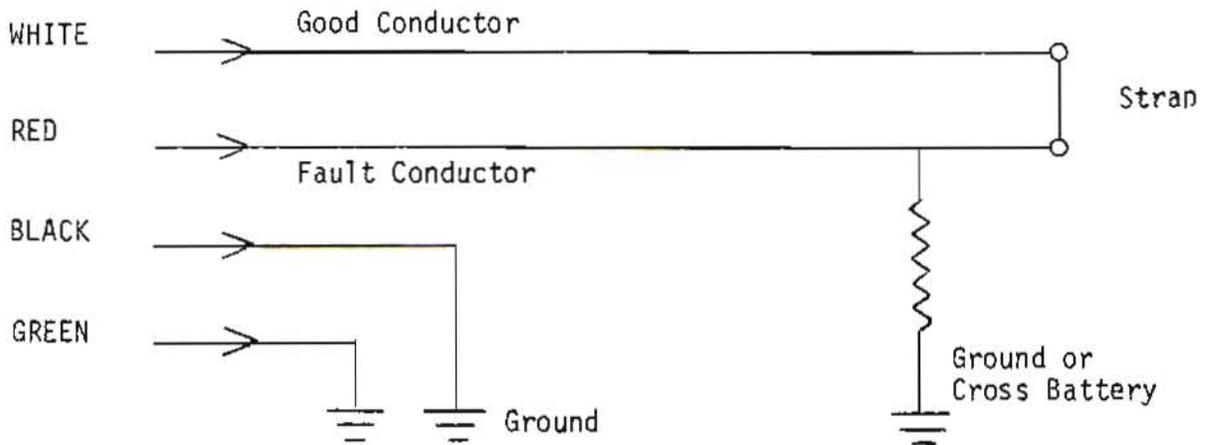




- STEP 1. Connect test set leads at Terminal "A"
- STEP 2. Connect strap at Terminal "B"
- STEP 3. Set temperature to 70°
- STEP 4. Set gauge switch to 24
- STEP 5. Turn Meas. Switch to Faultmeter to verify fault
- STEP 6. Turn Meas. Switch to Loopmeter to verify strap continuity
- STEP 7. Turn Meas. Switch to Distance to Strap and record distance
- STEP 8. Turn Meas. Switch to NULL
 - a. Perform NULL 1
 - b. Perform NULL 2
- STEP 9. Turn Meas. Switch to Distance to Fault and record distance
- STEP 10. Turn Meas. Switch to Strap to Fault and record distance
- STEP 11. Turn Meas. Switch to Loop Length and record distance

SINGLE PAIR HOOK-UP: Using only the pair in trouble.

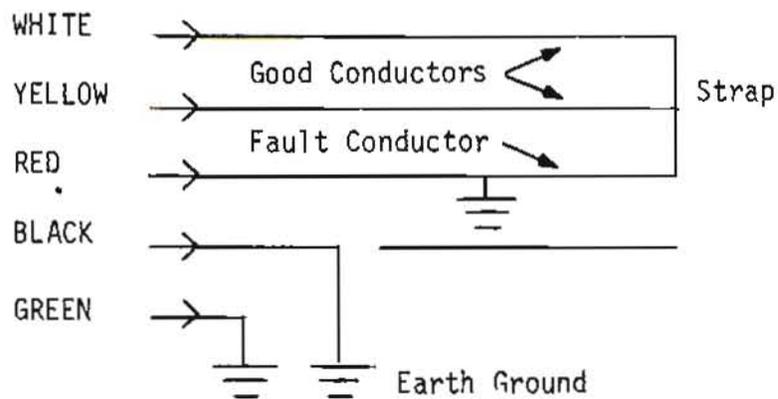
Test Clip



Black lead connected to ground when faulted conductor touches ground or battery.

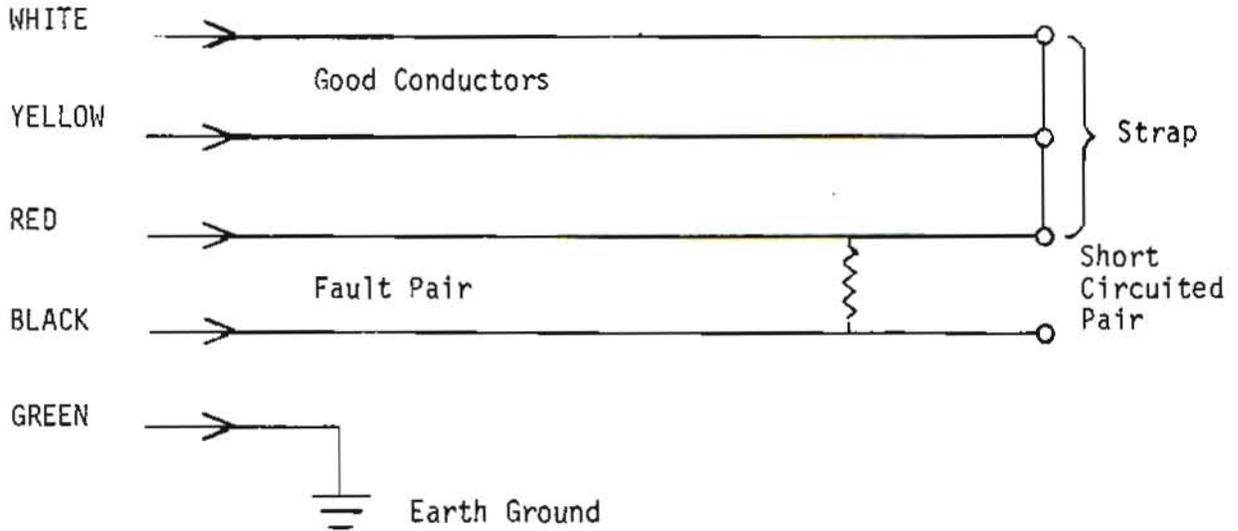
SEPARATE GOOD PAIR HOOK-UP: Using an additional good pair.

Test Clip



SEPARATE GOOD PAIR HOOK-UP: Using an additional good pair.

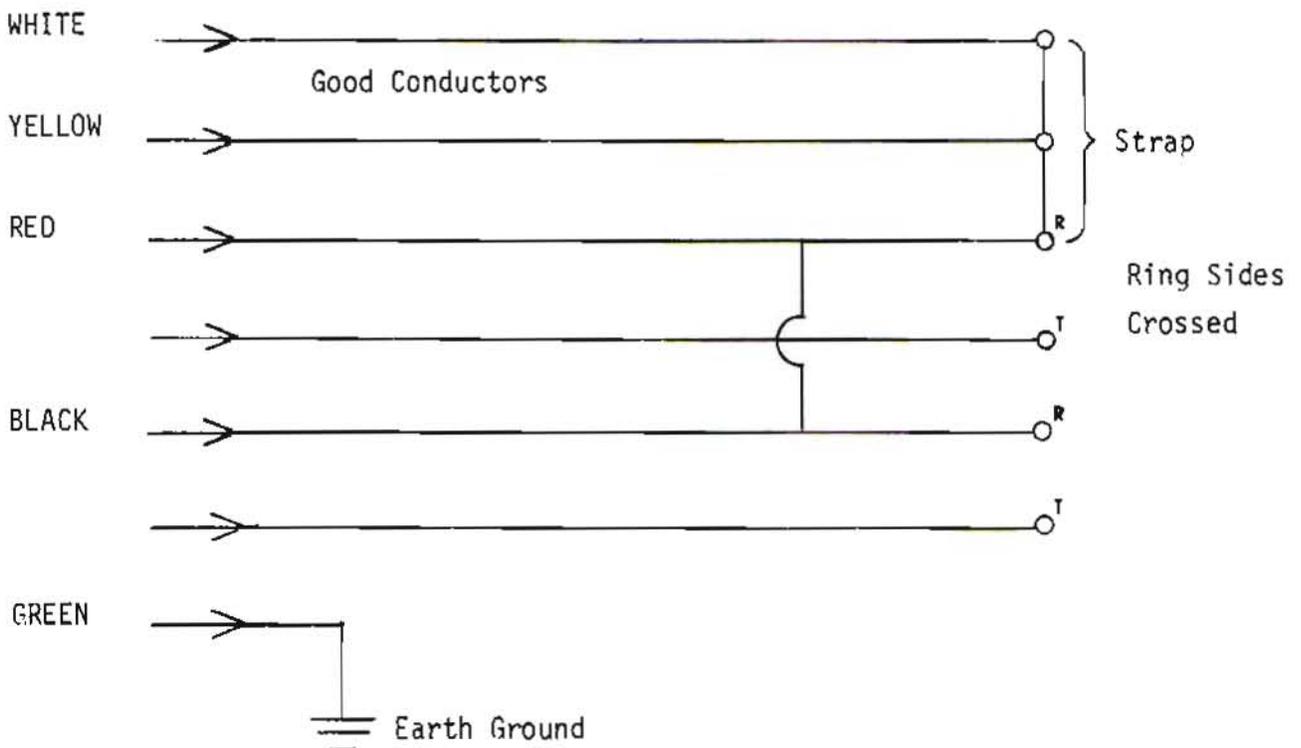
Test Clip



Red lead to fault and Black lead to other conductor involved in fault.

SEPARATE GOOD PAIR HOOK-UP: Using an additional good pair.

Test Clip



SEPARATE GOOD PAIR HOOK-UP: Using an additional good pair.

CONDUCTOR OPEN BEYOND FAULT

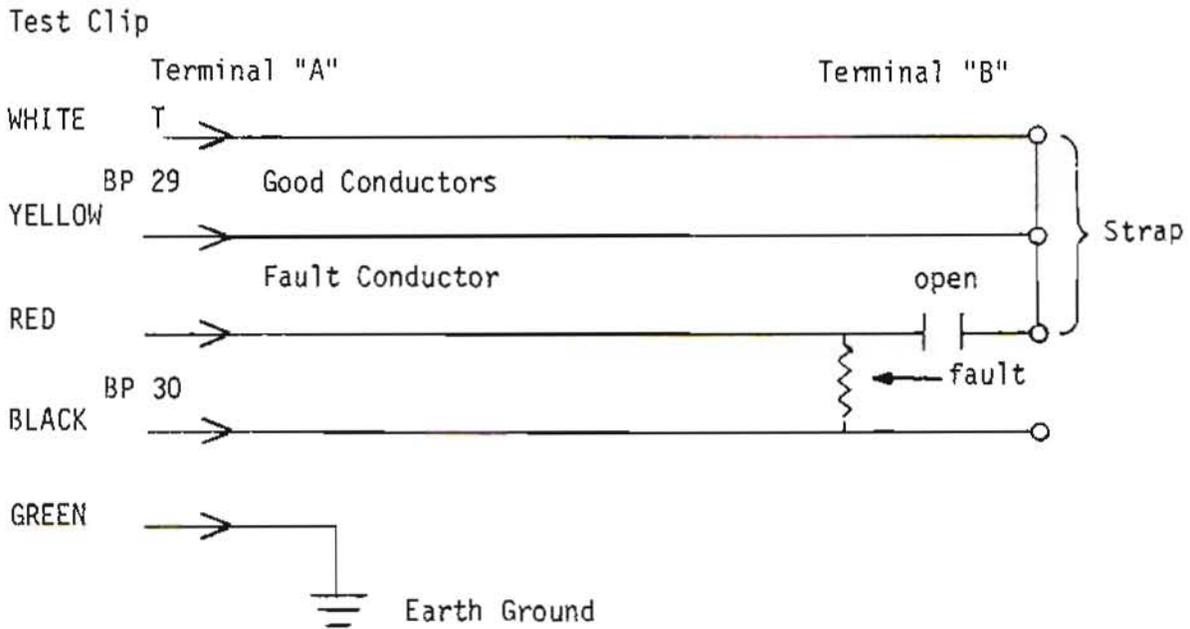
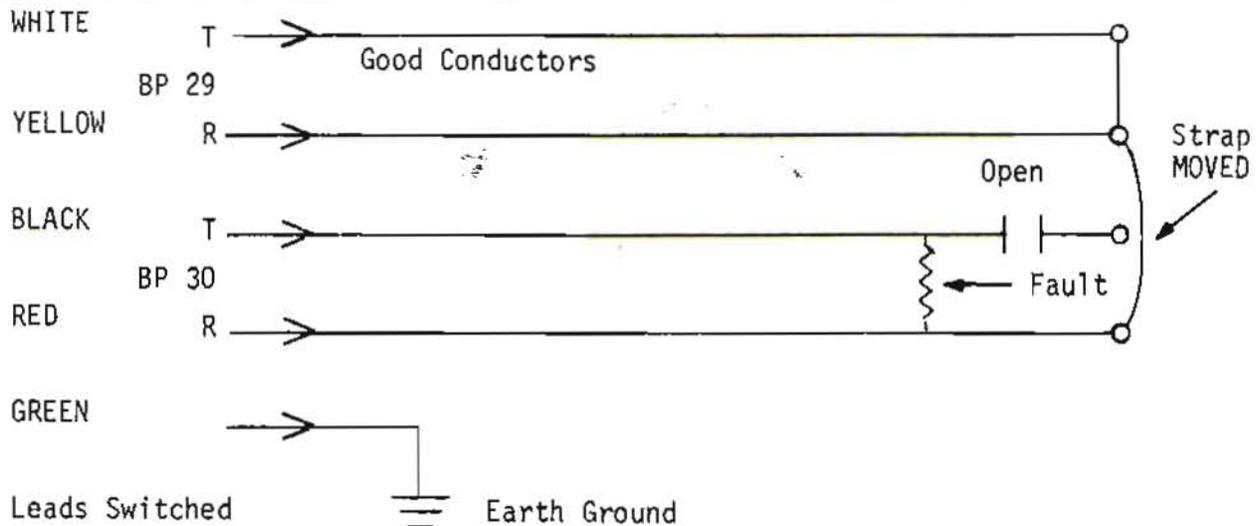


ILLUSTRATION A

Loopmeter switch set to "Good to Fault" indicates an open.

SEPARATE GOOD PAIR HOOK-UP: Using an additional good pair.



Strap is moved to the conductor that is not open - red and black leads are switched.

ILLUSTRATION B

UNIT TEST

Use the Faultmeter as an ohmmeter to establish the type fault on each pair. Fill in all the blanks. All faults are 24 gauge at 70°. When you are finished remove this sheet from your workbook and give it to the administrator for checking. When he returns your test paper, you will recheck anything you missed.

Binding Post	Type Fault	Measurements
Good Pair 42		Distance to Strap _____
Fault 40	_____	Distance to Fault _____
		Strap to Fault _____
Good Pair 26		Distance to Strap _____
Fault 32	_____	Distance to Fault _____
		Strap to Fault _____
Fault 49	_____	Distance to Strap _____
		Distance to Fault _____
		Strap to Fault _____

Answer the questions:

1. The 710A is a battery powered _____ type test set.
2. All measurements are read directly in _____.
3. The red lead is always connected to the faulted conductor that is _____ with the good conductors.
4. Loop-length measurement is the total conductor length from the _____ test lead to the _____ test lead of the set.
5. The _____ test lead is always connected to a good conductor when using any type hook-up.

Be sure you remove any straps you have placed -

After you have rechecked anything you missed, rewind the tape, then return the test set, the cassette tape and all apparatus to the administrator.

(Leave the recorder and earphones for use in your next unit.)

DYNATEL 710A INITIAL CHECK-OUT

This check-out procedure provides the craftsman with a quick and accurate means of completely testing the operation and performance of the Dynatel 710A test set, the test cable and the extension cable.

The test cable furnished with the 710A has an artificial line built into the top of the plug and is terminated with four terminals colored white, yellow, red and black. This artificial line represents a cable that is 1000 feet \pm 1 foot long with 26 gauge copper conductors at a conductor temperature of 70°F and has a fault located at a distance of 100 \pm 2 feet from the test set.

CHECK-OUT PROCEDURE		✓
<u>STEP 1:</u> Plug the test cable into the 710A and connect the clips to the terminals of the same color on the top of the test cable plug.		
<u>STEP 2:</u> With the MEASUREMENT switch set to OFF, the meter pointer should be exactly at null. If the meter pointer is not at null, it should be adjusted to null by inserting a screwdriver with a very small tip into the adjusting screw located at the left edge of the meter face and adjusted as required.		
<u>STEP 3:</u> Rotate the MEASUREMENT switch to BATTERY TEST positions 1, 2 and 3. The meter should indicate BATTERY TEST GOOD for each of these positions. If any of the batteries indicate REPLACE, refer to BATTERY TEST 1-20 and BATTERY REPLACEMENT 3-3 in the 710A instruction manual.		
<u>STEP 4:</u> Rotate the MEASUREMENT switch back to FAULTMETER. The meter should indicate FAULT. This means that a fault exists between the RED and BLACK clip leads which are normally connected to the FAULT CONDUCTOR and the RETURN.		
<u>STEP 5:</u> Set the MEASUREMENT switch to LOOPMETER and the LOOPMETER switch to GOOD PAIR. The meter should indicate a little to the left of the null line (between null and the good zone). This checks the continuity of the good pair and the strap. Now set the LOOPMETER switch to GOOD TO FAULT and the meter should again indicate between null and the good zone. This checks the continuity of the good conductor, the fault conductor and the strap.		
<u>STEP 6:</u> Set the GAUGE switch to 26 gauge, the digital FEET dial to 000 fully clockwise, the MULTIPLY BY switch to 1 and the MEASUREMENT switch to DISTANCE TO STRAP. Now adjust the TEMPERATURE control to produce a null indication on the meter. The temperature dial should indicate 70° \pm 5°F. This procedure checks the calibration of the 710A by measuring the distance to strap of the 1000 foot artificial line. <u>NOTE 1:</u> The digital FEET dial can be turned left to 000 which is read as 0 feet or it can be turned right (clockwise) to 000 which is read as 1000 feet. The correct setting for this test is right to 1000 feet. <u>NOTE 2:</u> If the OVER-RANGE light flashes, refer to FUSE (3-4) in the instruction manual.		