

USER HAND BOOK

FOR

ELECTRONIC CABLE FAULT LOCATOR

MODEL NO - 5379

Prepared & Published by

M/S ANDIG SYSTEMS

34/2, 3rd floor, 10th cross, RajajiNagar
1st N Block, Bangalore 560010



WARNINGS & CAUTIONS

CAUTION!

To avoid serious malfunction of equipment, never open the front panel directly with bare hands so that ESD is ruled out. Refer to our company's safety procedures when working with electronic equipment & systems.

WARNING!

Use only the specified AC adapter. Use of another type of AC adapter can damage the instrument and create the danger of fire and electrical shock.

WARNING!

- To avoid the danger of fire and electrical shock:
- Never use a voltage that is different from that for which the AC adapter is rated.
- Do not plug the unit into a power outlet that is shared by other devices.
- Never modify the power cord or excessively bend, twist, or pull it.
- Do not allow the power cord to become damaged. Do not place heavy objects on the power cord or expose it to heat.
- Never touch the AC adapter while your hands are wet.
- Should the power cord become seriously damaged (internal wiring exposed or shorted), contact the manufacturer to request servicing.

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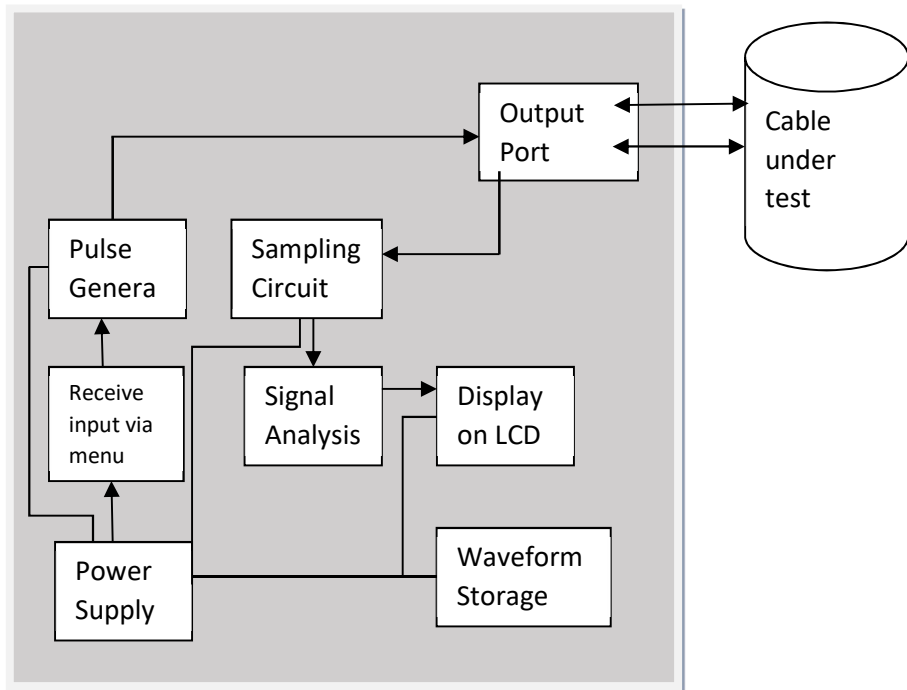
Nominal V/2 values for different types of Cables

S.No	Cable Type	Nominal V/2	Variation in V/2
1	Jelly	90	88 to 95
2	Paper	102	102 to 110
3	Co-axial	123	122 to 130
4	PVC	72	70 to 74

Note:

- 1) Nominal value of V/2 for same type of cable varies depending on the gauge of the conductor and the insulation material.
- 2) For better results V/2 value of cable under test should be determined using a pair of known length in the same cable.
- 3) Preset value of V/2 can be changed either through “Others” in “Setting” mode or directly in Pulse Echo Model to display preset value in “Cable Type” box & then changing it using 67 arrow keys
- 4) V/2 value of 0.9mm drop wire is 69 ± 1 & V/2 value of 1.5mm PVC power cable is 74 ± 1

Block diagram shows signal flow path & processing sequence



Leading Particulars & General Data:

ELECTRONIC Cable Fault Locator is basically a High Resistance Fault Locator to mainly locate Low Insulation & Contact faults in UG Cables. Its simple design, ease of operation, very light in weight makes it an ideal tool for even an inexperienced person to locate the faults. This instrument can also be used to measure distance to fault in case of clear open faults using pulse reflection principle.

Introduction:

Electronic Cable Fault Locator Model 5379 works on a proven pulse reflection technique in combination with a Bridge network to detect most common faults quickly. It transmits a pulse of controlled width and amplitude along the cable. The velocity of propagation will majorly depend upon the dielectric surrounding the conductor. Whenever there is a change of dielectric constant due to fault the pulse is partially or wholly reflected back & both incident & reflected pulse are displayed on a 240 x 1218 pixels LCD Display. The time between the incident and reflected pulse is directly proportional to the distance.

The distance to fault is computed internally and displayed on the 5" Graphic LCD display in METERS directly.

Purpose	To locate the Open , Short & Low Insulation type of faults in a cable with direct read out of the fault distance in meters
Pulse Widths	50ns to 2500ns (4 steps)
Pulse Amplitude Output	30 V ($\pm 10\%$)
Output Connector	Banana Sockets – 2nos (L1 & L2)
V.O.P	User settable (62 to 135) Fixed VOP for standard cable also present
Display	5 inch Monochrome (240 x 128) LCD with white Backlight
Max Range	Depending upon the cable type & gauge – Upto 20Kms
Accuracy	$\pm 0.5\%$ of readout
Battery	11.1 V, 4400 mAh Rechargeable Lithium Ion Battery
Adapter	16V / 1 Amp

Operating Time	:	8 Hours continuous without Back light
Environment	:	Operating Temperature: 0 to 50 Degree C
Display	:	5 inch ,monochromatic , 240 *128 Graphic Display with backlight
Maximum Range	:	For Open/Short Faults : 15 Kms For Low Insulation Faults : 15 Kms
Testable Low Insulation	:	2 ME (Max)
Circuit Protection	:	Upto 250 V AC
Self Check	:	Auto Check

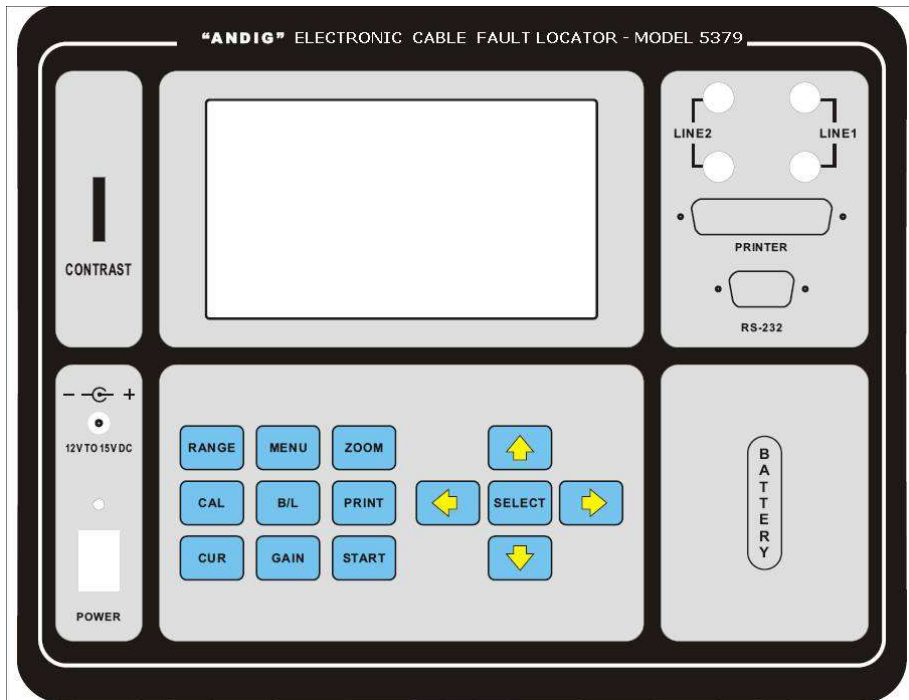
Automatic Noise Filter , Low Battery Indication is provided .


Packing Diagram

1. Equipment Accessories

2. Equipment packing

FRONT PANEL DRAWING & DESCRIPTION:



- **POWER ON** will display. : The instrument performs self check & on completion
- **SELECT** : When Pressed selects high lighted menu
- **MENU** : When Pressed Main Menu is displayed
-  : Moves Up & Down the high lighted Menu
Moves Left or Right the selected cursor or / increments ,decrements function selected in multifunction box.

- **RANGE & GAIN** : A combination of Range & Gain is used to increase the pulse width so that the signal can propagate over a longer distance. (Select range using ◀ ▶ arrow keys.)
- **ZOOM** : It displays current zoom status from zoom1-zoom 7, At zoom 7, displays maximum expanded waveform. (Select Zoom level Using ◀ ▶ arrow keys)
- **CUR** : Selects Cursor 1 or Cursor 2
- **CAL** : Not Used
- **GAIN** : Selects Gain level (Default sets to Gain 1) & displays status in multifunction box.
- **START** : When pressed starts testing the Cable Pair under test
- **PRINT** : No Used
- **B/L (BACK LIGHT)** : Switches ON Back Light
- **LINE 1** : Socket pair for connecting faulty pair under test
- **LINE 2** : Socket pair for connecting good reference pair
- **RS 232** : Connector for PC Interface
- **PRINTER** : not used
- **DC Socket** : Socket for front panel for battery charging (12 To 16 VDC)

NOTE: Following keys are used only in Pulse Reflection mode. When pulse (Waveform) is displayed on LCD. RANGE, b) ZOOM, c) GAIN, d) CURSOR.

PRINCIPLE :

HIGH RESISTANCE MEASUREMENT FOR LOW INSULATION FAULTS

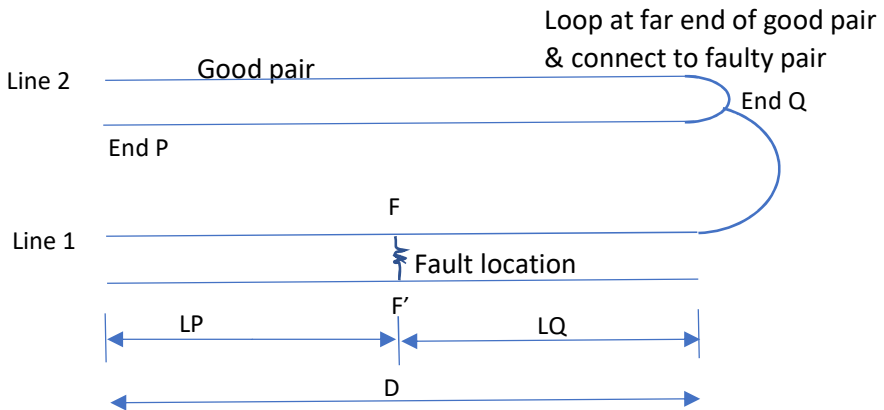


Fig 1A

Fig. 1-A Indicates 2 pairs of isolated cable of length 'D'. The fault F 'F' of resistance 'R' Ohms lies at a distance LP from end P & LQ from Q such that $LP + LQ = D$.

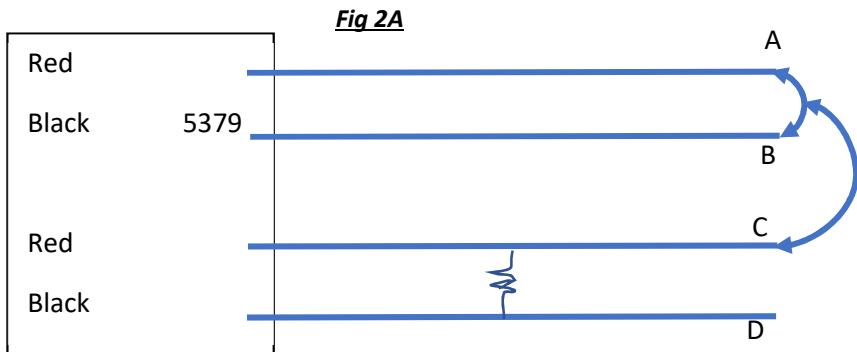
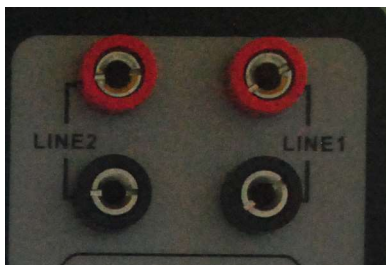


Fig 2A

Fig 2-A shows schematically the test procedure adopted. At the remote end Q the terminals Good Pair i.e A and B are looped and extended that loop to point D of faulty pair by means of a short jumper. At testing point at P-END Low Insulation Fault Locator is connected. Connect the good pair to LINE 2 and Faulty Pair to LINE 1. The extended loop of good pair must be connected to the Faulty limb and connect that limb to Black connector of Instrument as shown in Fig 2-A.

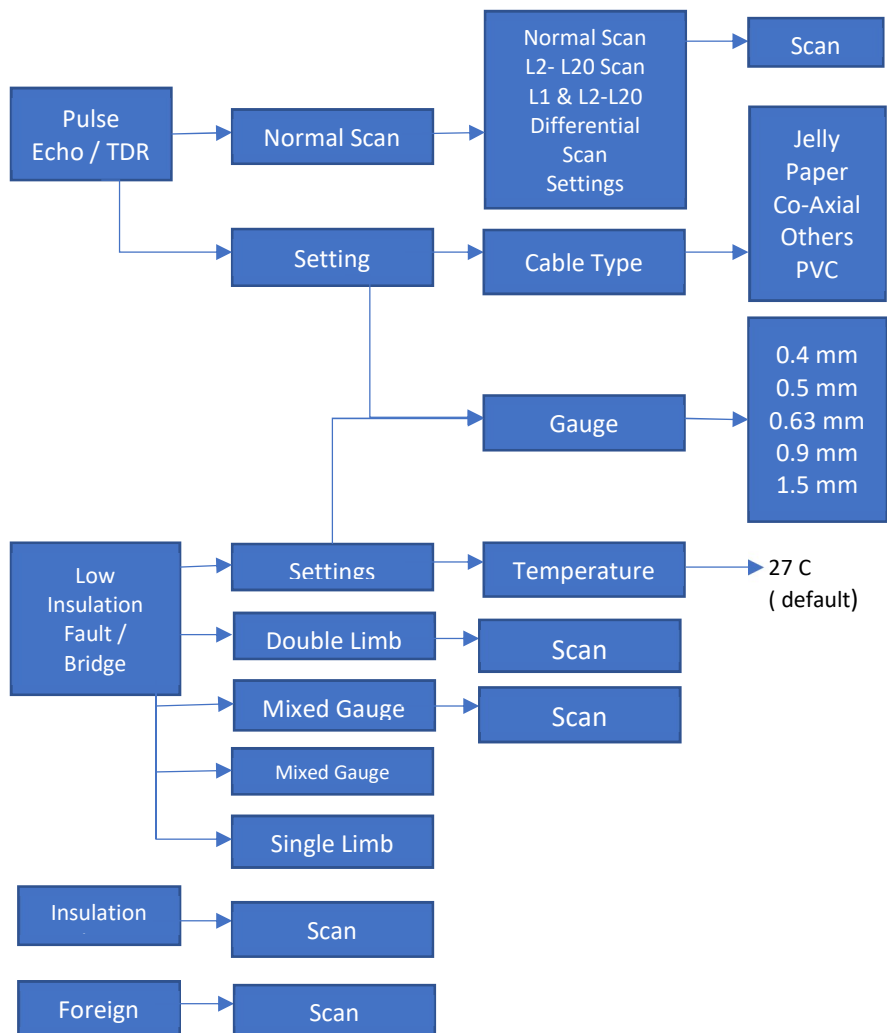
PHOTO OF CONNECTORS :



PRINCIPAL : Open /Short fault location using Pulse Echo Principle.

The Instrument works on a proven pulse reflection technique. A defined pulse is transmitted on a Cable Pair under test. The Pulse travels along the pair length at a fixed velocity of propagation depending on the dielectric of the cable. A part of the Pulse energy reflects back from the point where the characteristic impedance of Cable changes due to fault occurrences. The time taken by the pulse to reach the fault location & return to the source multiplied by the velocity of propagation gives twice the distance to fault. This is computed internally & distance to fault is

MENU FLOW :



PURPOSE:

This section provides information on description & operation of “ANDIG” Model 5379 ELECTRONIC Cable Fault Locator.

DESCRIPTION:


“ANDIG” Model 5379 is a “Low Insulation Fault Locator” that digitally displays distance to fault of all types. It is designed for use on UG Telephone Cable for Installation, Maintenance & Cable Repair by Technicians. Its simple operation helps even inexperienced field technician to successfully locate Low Insulation Faults (Ground Fault & Crosses) even in the presence of foreign potentials. In TDR mode it locates open /short faults in all types of cables.

LOW INSULATION FAULT LOCATION OPERATION:

“ANDIG” Model 5379 is pre-calibrated at factory. No field calibration is required.


OPERATING INSTRUCTIONS

STEP BY STEP PROCEDURE

1. Power ON : The instrument performs self check & on completion will display Menu.
2. Main Menu
Software version 1.1/010803
 1. Pulse Echo Reflection : for Open & Short Faults
 2. Low Insulation Faults : for Low Insulation Faults
 3. Insulation Resistance : for measuring Insulation Resistance
 4. Foreign Potential : for measuring Foreign Voltage on Cables
3. Using  up –down key move highlight bar to the proper function,
Ex: - Open/short faults select Pulse Echo Reflection mode, for Low


Insulation Faults select Low Insulation fault mode etc.

4. PURPOSE: Check faulty pair for type of fault.

1. Connect faulty pair (Limb A & B) under test to Line 1.
2. Using  arrow keys select Low Insulation Resistance.
3. Press Select for Normal Scan. (Display <5000Kohms indicates Low Resistance Fault, Display >5000Kohms indicates Break Fault or good pair. Display = 0 K ohms indicates Short / Loop Fault.
4. Repeat above test for fault between Limb A & Earth, Limb B & Earth
5. PURPOSE: To Locate Open/Short faults in U/G Telecom cables

a. Select Pulse Echo Reflection it displays

PULSE ECHO REFLECTION

1. Normal Scan
 2. Reference Scan
 3. Settings
- 1) By default instrument sets to 0.5mm gauge and cable type jelly filled
 - 2) To change gauge & type of the cable go to settings and do necessary changes.
 - 3) Using  up-down key highlight Setting (Refer Menu Diag.) and Press Select Key.

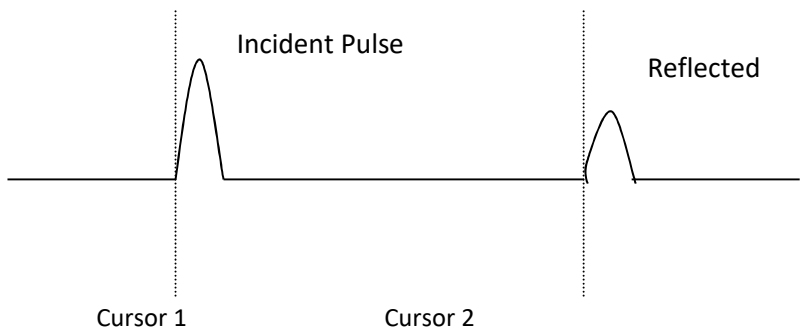
5.1 Connect pair under test to LINE1 Terminals

Select Pulse Echo Reflection & Select Normal Scan

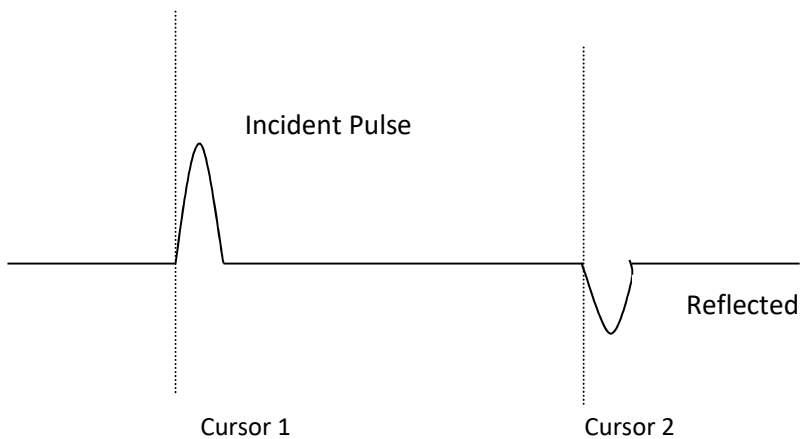
It will display the Waveform, both incident and reflected pulse appears on screen. If the fault is at less than 1 km distance, use Zoom 4, Zoom 3 to check whether reflected pulse appears within the screen along with incident pulse.

Example:

For Open Fault



For Short Fault



Note: Press Cursor key CUR 1 or CUR 2 appears in the multifunction box. Use arrow keys ◀ ▶ to move & align cursor 1 to starting point of incident pulse.

Press Cursor key again so that Cursor 2 appears in the multifunction box. Use arrow keys ◀ ▶ to move align cursor 2 to the starting point of reflected pulse.

If reflected pulse is not displayed clearly in zoom 5, zoom 4, zoom 3 then

5.2 Press Range & Gain : Using ◀ ▶ Keys Select range depending on the distance to fault.

Range & Gain Table (indicative table)

Sl.No	Range	Gain	Distance covered (in mtrs for 0.9 sq mm wire)
1	1	1	Upto 1000 mtrs
2	1	2	Upto 2000 mtrs
3	2	1	Upto 3000 mtrs
4	2	2	Upto 5000 mtrs
5	3	1	Upto 7000 mtrs
6	3	2	Upto 10,000 mtrs
7	4	1	Upto 11,000 mtrs

5.3 Press Start : Both incident & reflected Pulse appears on screen. If reflected pulse is not seen press range & select next range.

5.4 Press Gain : Select Gain 1, Gain 2, for amplifying reflected pulse & Press Start

5.5 Press Cursor : Displays Cursor 1 or Cursor 2 in the multifunction box.

5.6 Using ◀ ▶ : adjust cursor 1 to the starting point of incident pulse (The Point from Where incident pulse starts rising) Cursor 2 to starting point of reflected pulse.

5.7 After aligning cursors to the incident and reflected pulse distance to faulty is displayed in distance box.

Note:

For better accuracy at different fault distances select Range, Zoom & Gain positions. For faster cursor movements you can use zoom facilities.

6 PURPOSE: To Locate Low insulation faults in U/G Telecom cables

Basic requirement to conduct this test.

- a) Good (Reference) pair preferably in the same cable in which faulty pair is to be tested.
- b) Looping of both limbs of good pair to the faulty limb at the far end of the cable under test (Refer Fig - 1).
- c) Faulty pair should have less than 2Mohms Insulation Resistance.

Basic requirement of good pair

- a) Insulation Resistance (Megger Value) between Limb A & B and between any Limb to Earth should be more than 5Mohms.

Check Test for Good pair

Select **Insulation Resistance Menu**

- a) Connect Limb A & Limb B to Line 1 & select Scan
After few seconds it display resistance value in K ohms: -----
- b) Connect Limb A & Ground to Line 1 & Press Start
After few seconds it display resistance value in K ohms: -----
- c) Connect Limb B & Ground to Line 1 & Press Start
After few seconds it display resistance value in K ohms: -----

In all the cases Insulation resistance should be more than 5000 K ohms for a good pair.

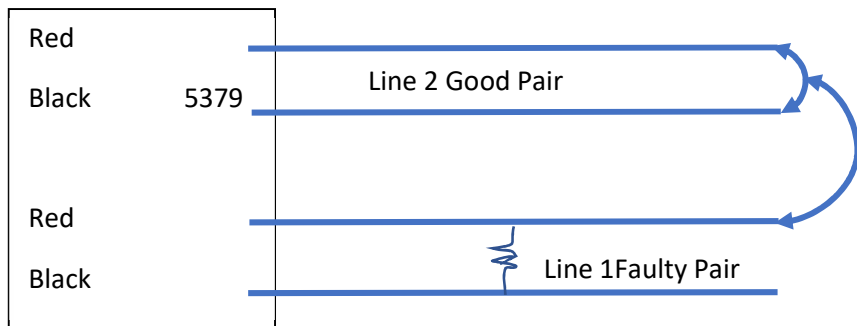
Check Test for Faulty Pair

- a) Connect Limb A & Limb B to Line 1 & select Scan in **Insulation Resistance Mode**. After few seconds it display resistance value in K ohms, less than 2 M ohms for fault between limbs.
- b) Connect Limb A & Earth to Line 1 & Press Start
After few seconds it display resistance value in K ohms, less than 2 M ohms for fault between limb A to Earth.
- c) Connect Limb B & Earth to Line 1 & Press Start
After few second it display resistance value in K ohms, less than 2 M ohms for fault between limb B to Earth.

If Insulation resistance is less than 2000 K ohms, the fault can be located in the pair.

SET UP CABLE NETWORK.

Case I: Limb To Limb Fault



1. Please check the resistance between limb to limb of good pair using multi meter to ensure it is properly looped at the far end (say it reads 500 Ohms).
2. Please check the resistance between any one limb of good pair to faulty pair limb it should read the same resistance as good pair.
3. The faulty limb, which is looped to good pair, should be connected to black terminal of Line 1 Only, Connect Red terminal of Line 1 to 2nd Limb of faulty pair for fault between Limb to Limb
4. If Fault is between Limb to Earth, connect Red terminal of Line 1 to earth

6.2 Select Low insulation faults

- a) Using \blacktriangle up –down key highlight ‘Setting’ (Refer Menu Diag.) and Press Select Key.
- b) Select the ambient Temperature and Gauge of cable under test.
(By default instrument sets to temp 27 Degree Centigrade and gauge 0.5 mm)

6.3 Connect good pair to LINE2 and faulty pair to LINE1

6.4 Loop the good pair limbs at the far end & extend the loop to one limb of faulty pair.

6.5 Faulty limb which is looped to good pair at the far end must be connected to the Black terminal of Line 1 only.

6.6 Press – Normal Scan Final Display after one minute shows

Distance to loop _____ mts

Distance to fault _____ mts

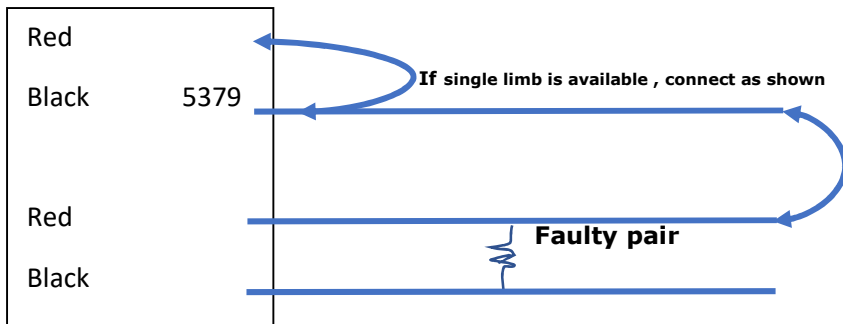
To repeat the test press Start.

Note: If loop is not extended to one limb of faulty pair Display will indicate

Distance to loop 0 mts

Distance to fault 0 mts

Purpose: To locate Low Insulation faults using only one good Limb



Procedure: (Refer Fig above)

- Verify good Limb for more than 5M ohms insulation resistance.
- Short Red & Black terminal of Line 2 & connect to good Limb.
- Loop good Limb to faulty limb at the far end.
- Connect Black terminal of Line 1 to faulty Limb, which is looped to good Limb.

- e. Connect Red terminal of Line 1 to 2nd Limb of faulty pair if the fault is between Limb to Limb.
- f. Connect Red terminal of Line 1 to Earth if the fault is between Limb to Earth.
- g. Select Low Insulation Fault & then Select Single Limb Scan from Menu. (Available in Software version 1.1/171103)
- h. If the Menu for Single Limb Scan is not available then the fault distance displayed should
- i. be multiplied by 2 for actual distance to fault.

PURPOSE: To measure Insulation Resistance in U/G Telecom cables

8.0 Select Insulation Resistance

8.1 Connect pair under test to Line1 terminals

8.2 Press Start Display will appear “ Insulation Resistance in K Ohms”

PURPOSE: To measure Foreign potential in U/G Telecom cables

9.0 Select Foreign Potential

9.1 Connect pair under test to Line1 terminals

9.2 Press start Display will appear “ Foreign Potential in Volts”

PURPOSE: Instrument charging procedure

10.0 Connect external supply (15VDC) and switch ON the instrument.

10.1 Observe for charging enabled on the screen after few seconds.

10.2 Please do not charge the instrument more then 14 hours.

CALIBRATION: Andig Model 5379 is pre calibrated for various types of cables. No need to calibrate in the field. However for unknown type of cable option to calibrate is in menu driver.

TROUBLE SHOOTING

S.No	Nature of Fault	Probable Reason	Action
1	No Display	<p>Faulty in DC-DC converters check output voltages +5, -5, +12V:</p> <p>If output not present check Fuse & ON / OFF Switch</p> <p>If out put is still not ok, disconnect output supplyConnector & check voltages</p> <p>If voltage are ok. Problem may be in Mother Board.</p>	<p>Replace Fuse/Switches</p> <p>Return to Manufacturer</p>
2	Irratic Display	Problem in Mother Board	Return to Manufacturer
3	Low Battery Indication	Battery either not charged. If problem persists	Charge Battery/Replace Battery
4	Distance to fault Not accurate	Select proper Cable Parameter & check again if fault persists	Return to Supplier

Note: There are no replaceable components in the field except Battery. Do not tamper or touch Mother Board Components. Warranty Void if found Mother Board Tampered.

Warranty

ANDIG SYSTEMS warrants this instrument to be free of defects in parts and workmanship for one year from date of shipment (a six month limited warranty applies to sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period.

Kindly contact us 080 -23378976.

A Return Authorization (RA) number must be issued before any product is returned to Andig Systems. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification.

Andig Systems specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages.

Andig Systems' total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

The minimum turn around time for repairs is 15 working days.

Calibration and Repair Services

Andig Systems offers repair and calibration services for the products we sell. Andig Systems also provides NABL tracability for the calibration certification for most products. Call the Customer Service Department for information on calibration services available for this product.

Andig Systems recommends that annual calibrations be performed to verify meter performance and accuracy.