insulation fault locator
MINIPALM

MINIPALM is intended to locate position of insulation faults on telecommunication cables. It also measures loop resistances. insulation resistances and resistance unbalances (ΔR).

MINIPALM uses the conventional impedance or impedance ratio principle of measurements.

- Automatic location of insulation faults on cables
- Small size and light weight
- Ease of use

France Télécom approved N7

Site operation
- self-contained unit using rechargeable batteries,
- small size,
- usable with the carrying case, it can be suspended in front of the user for "hands-free" use (weight less than 1.5 kg),
- data and results are readable on an alphanumeric liquid crystal display with back lighting,
- connection is made via terminals either by using leads equipped with standard 4 mm-banana plugs or by tightening bare wires or lugs.

Ease of use
- all the basic functions are called using one key of the keyboard,
- the "question and answer" type screen prompts allow the user to program the functions and read the results with ease,
- autorange when measuring resistance,
- computation of the fault position in meters either on homogeneous or non homogeneous cable,
- short operating mode fitted in the cover of the carrying case.

Accurate location on cables disturbed by electrical noises.

Choice of language
The screen prompts are readable in seven different languages: French, English, German, Italian, Spanish, Swedish, Dutch.

Storage of measurements
The unit stores in memory values of the last ten measurements for each function.

measuring loop resistance

Measurement range: from 0.02 Ω to 10 000 Ω.
Measurement current < 500 µA.
Resolution depending on the value measured and according to the table below.
R : reading.
Temperature coefficient: 10% of accuracy by degree Celsius (if local calibration, possible reduction of temperature coefficient to 2% of accuracy by degree Celsius).

Resistance value	Resolution	Accuracy
0 to 150 Ω	0.02 Ω	0.2 % R + 0.02 Ω
150 to 400 Ω	0.05 Ω	0.2 % R + 0.05 Ω
400 to 600 Ω	0.1 Ω	0.2 % R + 0.1 Ω
600 to 1 000 Ω	0.2 Ω	0.2 % R + 0.2 Ω
1 000 to 1 700 Ω	0.5 Ω	0.2 % R + 0.5 Ω
1 700 to 2 000 Ω	1 Ω	0.2 % R + 1 Ω
2 000 to 2 600 Ω	1 Ω	0.01% R^2 + 1 Ω
2 600 to 4 200 Ω	2 Ω	0.01% R^2 + 2 Ω
4 200 to 6 500 Ω	5 Ω	0.01% R^2 + 5 Ω
6 500 to 8 000 Ω	10 Ω	0.01% R^2 + 10 Ω
8 000 to 10 000 Ω	20 Ω	0.01% R^2 + 20 Ω

measuring insulation resistance

Measurement range: from 0.2 MΩ to 5 000 MΩ.
Measuring voltage: 150 V- or 500 V-.

Accuracy
± 5% R from 200 kΩ to 100 MΩ,
± 10% R from 100 MΩ to 1 500 MΩ under 500 V,
± 20% R from 100 MΩ to 1 500 MΩ under 150 V.

measuring resistance unbalance ΔR

Measurement range: from 0 to 100% of the loop resistance.
Accuracy: minimum error equal to
$\pm \left(\frac{\delta RB}{RB} \times \Delta R + \varepsilon RB + 1 \text{ count}\right)$

εRB = measurement error on the loop resistance.

Resistance value	Resolution in ΔR
0 to 200 Ω	0.01 Ω
200 to 400 Ω	0.02 Ω
400 to 900 Ω	0.05 Ω
900 to 1 800 Ω	0.1 Ω
1 800 to 4 300 Ω	0.2 Ω
4 300 to 6 000 Ω	0.5 Ω
6 000 to 8 000 Ω	1 Ω
8 000 to 10 000 Ω	2 Ω

locating insulation faults

The type of faults which be located by MINIPALM is comprised between 0 Ω and 50 MΩ.
The principle is based:
• either on the Murray method (also called "SIMPLE MURRAY") when the insulation of the healthy wire is at least 1 000 times greater than the insulation of the faulty wire,
• or the Fabe method (also called "MURRAY OPEN"-"MURRAY LOOPED") when the insulation of the healthy wire is at least twice the insulation of the faulty wire.
The "FABE" method allows accurate locations, even if a really sound wire cannot be found in the cable, in case of a "drowned" cable for instance.

Measurement range: 0.00 to 100.00% of faulty wire resistance.

Display .....
The unit reads out the fault position in % which is the ratio of the resistance taken between the MINIPALM and the fault, and the whole resistance of the faulty wire.
If the resistance of the faulty wire is equal to the resistance of the healthy wire, this is the ratio of resistance taken between the MINIPALM and the fault, and the half resistance of the loop.
With an homogeneous cable, it is equal to ratio of distance taken between the MINIPALM and the fault, and the cable length.

Test voltage < 150 V or < 500 V.
Accuracy using Murray method:
± 0.1% of the faulty wire resistance,
± 20 mΩ, with following values: loop resistance > 50 Ω and insulation fault < 5 MΩ with 500 V test voltage, or
< 1.5 MΩ with 150 V test voltage.
Temperature coefficient: 10% of accuracy by degree Celsius.

When both healthy and faulty wires have different resistances, the unit can automatically correct the result by taking ratio between the faulty wire resistance and the healthy wire resistance.

Reading the fault position in meters .....
When the user has programmed all the parameters of the tested cable sections (such as: length, lineic resistance and if requested temperature, number of Pupin coils) the unit displays the distance in meters computed either from the cable length or the loop resistance.
It displays also the resistance to fault in ohms.

Resolution: 0.1 m or 1 m according to the cable length.
Number of sections: 1 to 9.
Possibility of Pupin coils correction.

Other features .....
- The instrument is practically insensitive to noise and stray voltages of frequency higher than 10 Hz. If the measurements are disturbed by low frequency voltages (from 1 to 10 Hz), an internal filter may be used to improve the results.
- The 500 V testing voltage may be eliminated if it is prohibited by local standards.

The device automatically discharges the line capacitances when the measurement is ended.

specifications

Operating conditions .....
Reference range: 23 ± 5°C, relative humidity (RH): 45 to 75%.
Operating nominal range:
0 to 50°C, RH 20 to 80%.
Operating limit range:
-10°C to + 55°C, RH 10 to 80%.
Limit range for storage: -30 to + 60°C.

Presentation.....
The unit is made of plastic moulded material and comes in a carrying case with a strap allowing "hands-free" operation.
- 16-character liquid crystal display with built-in lighting.
- 24-key control and program keyboard.
- Dust protection.
- Weight: 1.5 kg.
- Dimensions: 285 x 170 x 100 mm with carrying case.
Supplied with the unit:
• A carrying case and a short operating mode in English and in French,
• A looping box,
• A battery charger,
• An instruction manual.

Power supply .....
6 Ni-Cd rechargeable batteries.
Life: above one day under usual conditions of operation and more than 3 hours under maximum permanent conditions of consumption
External charger: 220 V, 50/60 Hz or 240 V, 50/60 Hz or 115 V, 60 Hz.

accessory

Remote looping device ATL 101 .....
The remote looping device ATL 101 has been designed to remote control opening and closing of the loop directly by only one operator from the MINIPALM.
- Power supply: 9 V battery, type LR61 or 6LF22.
- Autonomy: more than 3000 hours.
- Operating limit range: -10 to + 50°C (10 to 80% HR).
- Max distance 30 Km.

ordering instructions

Insulation fault locator MINIPALM

Accessory .....
Remote looping device ATL101

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Specifications subject to modification without prior notice