

MIC-10s1, MIC-05s1: New models of insulation resistance meters.

The latest family of instruments for measuring insulation resistance by Sonel has welcomed two additional models that provide insulation resistance measurements up to 5 kV or 10kV.



Sonel insulation test set operating in field conditions.

Sonel has succeeded in reconciling two apparently contradictory features: 1) a very high immunity to external interference voltages and 2) the capability to test objects with the presence of induced voltages, while ensuring maximum safety when making measurements.

Most insulation testers on the market first check for the presence of voltage on the object before commencing the measurement. If no voltage above 25 V is detected the measurement procedure will proceed. The MIC-05s1, and MIC-10s1 meters use a unique algorithm to identify the type of voltage present on the tested object. If mains voltage is detected no measurement can be made. If the induced voltage is determined to be generated by an electromagnetic field the measurement can still proceed and the result will be shown on the display. Previously impossible, this allows measurements to be made in the presence of strong electromagnetic fields.

The MIC-05s1 performs measurements of insulation resistance by using preset voltages at: 100, 250, 500, 1000, 2500 or 5000V, or any voltage chosen by the user in the range 50V-5000V in steps of 10 V or 25 V. The MIC-10s1 can test up to 10 kV. Both offer selected, stepped, and ramp voltage testing. They perform the following measurements:

- Dielectric Absorption Ratio: DAR
- Polarization Index: PI
- Absorption coefficients: Ab1, Ab2
- Step voltage measurements of insulation resistance: SV
- Dielectric discharge ratio: DD

The new functions and features of the meters include:

- Graphic display showing all measured values and settings without toggling between screens.
- Graphs of the measurement plotted over time
- Selectable test current value of 5mA to ensure faster charging of high capacitance objects
- Unique capability of automatically measuring insulation resistance of 3 -, 4 - and 5-core cables by using the AUTOISO-5000 attachment. This adapter eliminates the need to manually disconnect and re-connect test leads to individual conductors to complete measuring the whole multi-core cable.
- Temperature measurement probe for measuring temperature plus insulation; this probe can be immersed in oil for transformers.
- Fault location – the meters incorporate a “burn” mode whereby the instrument sustains a current upon insulation breakdown due to a fault or damage to burn the insulation. The burn damage to the insulation can be identified making it easy to locate the damage.

Toggling the screen from meter values to graphical mode allows the tracking of variations of the resistance and leakage current, or voltage, during the measurement, or to post-analyze the measurement process later. The display can show resistance and leakage current, or resistance and voltage over time. The graphical mode is available for measurements of insulation resistance, burn, stepped voltage SV, and dielectric discharge DD. A moveable vertical cursor displays the measured value along the graph corresponding to the cursor position or selected time.

Sonel offers excellent safety features and high and quality of the meters themselves, and also high quality and safety of the accessories. Test leads are designed with safety in mind with a guaranteed voltage stability up to 11kV, and special safety plugs. The measuring probes and "crocodile" clips meet the stringent requirements of the PN-EN 61010-031 standard. The leads for measurement are available from 3 m / 9.8 ft. (standard) up to 20 m / 65.6 ft. These long test leads can be used with confidence due to the meter's high immunity to interference.

The 5kV and 10kV testers are ruggedly constructed in IP 67 / NEMA 6 rated cases (with lid closed) to operate in tough field conditions. The case lid is removable at the user's option. A clearly labeled rotary test switch test allows the selection of voltages and functions. On-screen menus allow the selection of general measuring parameters and functions. A backlit screen and keypad makes it easier to work in limited visibility. The instruments are powered by a high-capacity re-chargeable battery, or from a mains supply.

They also have high safety ratings: CAT IV 600 V, CAT III 1000 V. Warning LEDs illuminate to notify the operator of the presence of voltage at the terminals during measurements and therefore to observe caution. Importantly for safety, the test object is automatically discharged by the meter after each measurement sequence, whether aborted, or after timeout, or ended manually. The discharge is accompanied by a real-time display of the voltage drop for confirmation.

Measurement ranges: the maximum measured value of insulation resistance is 40T Ω for the 10kV class testers, and 20T Ω for the 5kV class testers. The measurement time may be user defined up to 99 minutes 59 seconds. These meters also measure dielectric absorption ratio: DAR, and polarization index PI, absorption coefficients Ab1, Ab2. The measuring times for calculating the coefficients may be selected by the user – up to 600 s. After the measurement is completed the results may be viewed: resistances measured at specific times, absorption ratio, actual voltage during the measurement, leakage current, capacitance of the object, insulation resistance over time. These values and graphical time-plots (characteristic curves) are saved in memory.

Two- or three-wire insulation resistance measurement can be performed to eliminate the influence of surface leakage currents. In addition, the meters are equipped with hardware and software filters to stabilize the result in unstable measuring conditions.



AUTOISO 5000 Adapter for testing multi-conductor cables



Accessories come in portable case for storage and carrying.

This function allows selectable time intervals to allow the user to choose the filter behavior.

These instruments are also capable of stepped-voltage insulation resistance measurement (SV) whereby the test voltage increases in steps. Stepped-voltage testing reveals insulation damage due to moisture. Each series of SV measurements comprise consecutive tests done within a preset time, with increasing voltage; for example: 2 kV \rightarrow 4 kV \rightarrow 6 kV \rightarrow 8 kV \rightarrow 10 kV. After the measurements are finished the results for the individual voltage steps are saved in the memory.

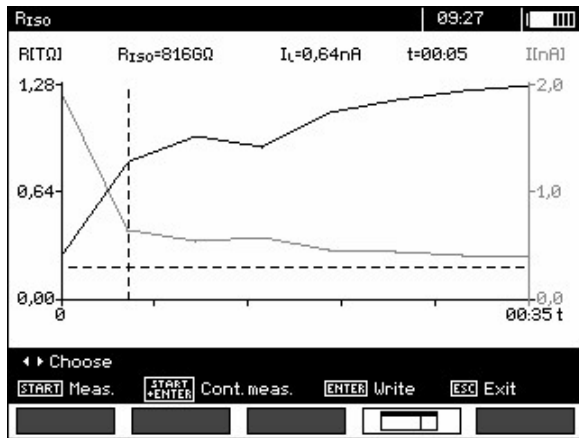
Another function is the measurement of Dielectric Discharge ratio (DD) – an insulation condition indicator independent of test voltage. DD ratio measurements are useful for determining deterioration due to ageing of insulation parameters, moisture, or

delamination. The procedure consists of charging an object, discharging the object for 60 s, and measuring the discharge current to evaluate the condition of the insulation. The presence of a high discharge current after 60s can indicate moisture absorption by the insulator.

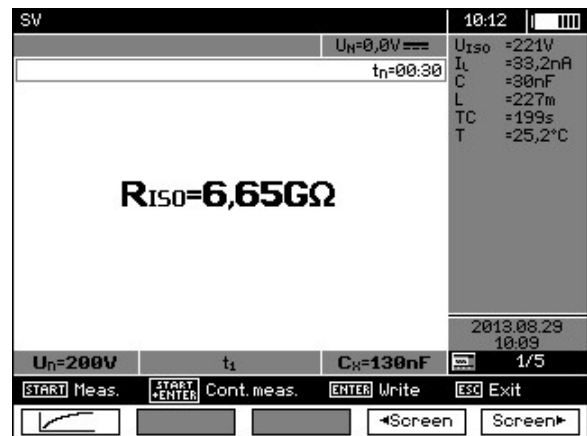
Measurement limits can be set when measuring insulation resistance or continuity. After measurement the display indicates whether the preset limit was exceeded or not. The values of the limit settings and the measurement results are saved in the meter's memory.

To store results, the meters incorporate a tree-structure memory, capable of storing tens of thousands of measurement results, divided according to the structure of the subsequent protocol. Each result can be individually described with an on-screen virtual keyboard, or an additional Bluetooth keyboard. The results can be arranged according to clients and objects; and it is possible to provide a detailed description for each client, including the measuring point, name, and address that can be recalled later.

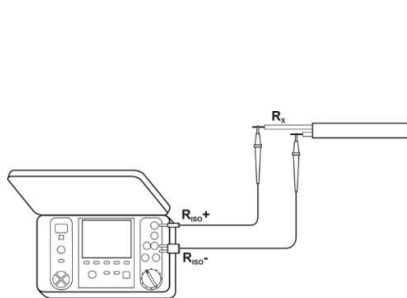
In conclusion, the new 5kV and 10kV class insulation testers represent the latest technology and advanced thinking in test instrument design. Utility and industrial engineers, technicians, and field service personnel need portable, rugged and reliable tools that will give successful results in both indoor, and in more challenging outdoor conditions. Safety is uppermost in the design and operation; the meters incorporate automatic discharge of test object after the measurement, notification of live voltages, and high CAT III and CAT IV safety ratings. The meters are capable of high accuracy and ability to make successful measurements in the presence of electromagnetic fields; a common situation in today's congested electrical infrastructures. Sonel insulation testers are backed up with a 24-month warranty, and a professional sales and support organization.



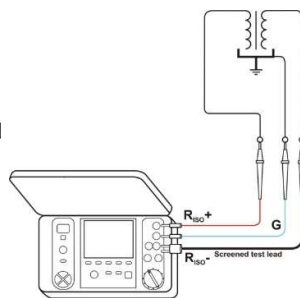
Test result presented as a graph showing resistance and leakage current. Dashed horizontal line shows the value of a limit setting. The vertical dashed cursor line can be moved along the time scale to display measurements at selected times.



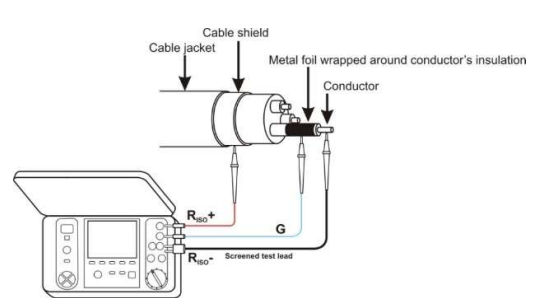
Test result showing insulation resistance along with values of test voltage, leakage current, capacitance, cable length, time, and temperature.



Test setup for insulation resistance.



Test setup for transformer windings.



Test setup for shielded conductor.

For more information, or to request a quote for purchase, or to rent a Sonel insulation tester, go to: <http://soneltest.com>