

# GAME CHANGING TEST INSTRUMENTS



European manufacturer Sonel has lifted the bar once more two more game-changing test instruments comprising:

- Battery powered 10A Micro-ohmmeter with winding resistance capability
- Handheld Power Analyser with full widescreen colour graphics

## 10 AMP MICRO-OHMMETER

Traditionally micro-ohmmeters were divided into two categories:

1. General purpose for joints, contacts, continuity resistance measurement for non or low inductive applications
2. Specialist winding ohmmeters for high inductive measurements such as transformer, motor or generator winding resistance

The price difference between the two types is usually significant due to the need to include discharge and de-magnetisation into the winding ohmmeters.

## Two Instruments in One

Sonel has re-written the rule book with the new MMR-650 by merging both applications into a single compact 3.5kg instrument but keeping the price around the same as a traditional high quality general purpose micro-ohmmeter.

The MMR-650 can be used to measure the resistance of any device from a busbar, cable joint or breaker contact to the windings of a power transformer, motor or generator.

Winding discharge and de-magnetisation of the test object are built-in.

Another first is the use of Li-Ion battery power eliminating the need to monitor battery charging to suit the characteristics of old NiMh batteries thus avoiding the irrecoverable deep-discharge syndrome.

The next notable difference is "no switches". The MMR-650 is controlled totally from the full colour touch screen which we are all familiar with on our smart phones and tablets.

## Multiple Functions

All functions are represented by icons on the home screen where operations such as test current, inductive or non-inductive testing, demagnetisation, temperature compensation or heat run analysis are set from the touch screen.

## Comprehensive Kit

Unique to the MMR-650 is that it is supplied with both Kelvin Spike and Kelvin Clip leads eliminating the need to option the alternative lead as is common with many competitors. Also included is the charger, carry bag, calibration certificate and software all ready for immediate use.



SONEL MMR-650  
Micro-ohmmeter.



### POWER QUALITY ANALYSER

Power Quality Analysers generally fall into two categories:

1. Large memory with basic on-screen information designed for long term recording and later analysis by PC, and
2. Full-screen display for maximum real-time information but with memory when recording is required.

Sonel is well established with the first type with its PQM-702 & 703 but the new PQM-707 is Sonel's solution for the second application. The new addition features an industry leading 180mm full colour touch screen with the capacity to display up to 8 channels simultaneously.

Display choices include 8-channel oscilloscope, 8-channel recorder, digital display of all measured parameters, vector diagram of 3 voltages & 3 currents with phase angles and indicator of inductive or capacitive plus harmonic bar-graph with the ability to select display of voltage, current and phase.

#### Touch Screen Control

As with the MMR-650 the PQM-707 is fully controlled by the touch screen, eliminating the typical complex key entry or PC set-up of most other power analysers.

#### Suitable for All Networks

The PQM-707 can measure and record on all networks including single phase, 2-phase, 3-phases star or delta (with or without neutral) and DC.

### 5 Voltage & 4 Current Inputs

Voltage inputs comprise A, B, C, N & E enabling measurement between phases or phase to N or to ground. Voltages up to 760V AC or 1,150 DC can be measured directly and recorded.

Current up to 3,000A AC is measured by the standard Rogowski Coils and up to 1,400A DC with the optional Hall-effect probe. For small AC currents 10A and 100A probes are available.

### Measure & Record all Parameters

The PQM-707 measures and records all parameters including:

- Active, reactive, distortion and apparent power
- Active, reactive and apparent energy
- Power factor, cos and tan
- Voltage & Current harmonics to 40th
- Short & Long term flicker
- Inrush current
- Voltage sags & surges

### Sonel Analysis Software

The PQM-707 includes Sonel Analysis software which is common to all Sonel power analysers and can be upgraded free from the internet for the life of the instrument.

### Power Supply

The built-in Li-Ion battery will typically power the PQM-707 for 6 hours or the instrument can be powered from the mains or any 12V DC source, such as a vehicle battery.

### Expandable Memory

Standard memory is a removable 4GB micro SD-card to allow easy exchange or memory upgrade.

### SONEL RELIABILITY & SUPPORT

All new products are covered by Sonel's 2-year warranty with the added comfort of Sonel's Australian service and calibration support exclusively through Pacific Test Equipment.

### Wide Distribution

Sonel products are available from Pacific Test Equipment, Sydney & Melbourne or interstate distributors Unitest - WA, Electrical Supply Solutions - NT, Bennis - NQ and Electrical Agencies - Tas.



Measuring transformer winding resistance with the SONEL MMR-650.

For more information, please contact



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# 20 YEARS OF EARTH TESTING IN AUSTRALIA

*In 1996, measuring Earth Resistance had just been revolutionised with the introduction into Australia of the Austrian designed and manufactured Norma GEO-X with the new concept of Selective and Stakeless methods of in-service testing.*

*By Keith Bensley, Pacific Test Equipment*

In November 1996 I penned the first lines on the latest advances in Earth Testing for the first edition of Power Transmission & Distribution magazine.

Twenty years on the concept has been refined and developed greatly improving the dynamics and substantially reducing the time needed for testing.

Prior to the arrival of the GEO-X, all earth systems had to be isolated before testing which often meant taking the substation off-line. While not a major problem on distribution substations in those days when they could be taken out of service with a minimum of formalities, it wasn't so easy with SWER subs.

The other unique capability of the GEO-X was the extending of the selective method to simplify the measurement of the earth resistance of transmission towers, a task that previously was extremely laborious and time consuming.

## TESTING OF SWER SUBSTATIONS

Prior to the arrival of the GEO-X, the testing of SWER substations and transmission towers was particularly onerous and frequently avoided but with increasing expectations to observe due diligence, testing could no longer be regarded as "too hard".

The GEO-X was an instant success, particularly for power utilities with large numbers of substations to test and under increasing pressure to minimise planned outages. Almost every power utility in Australia invested in the GEO-X, particularly those with vast SWER networks. That many are still in service today is a testimony to the quality of the original design and quality of manufacture.

Following the success with utilities, major contractors to the utilities saw the potential of faster, more efficient and more accurate earth testing and became the second largest user.

Sadly Norma which later became LEM-Norma hasn't survived as long as its instruments. When LEM-Norma ceased to exist, further development of this leading technology looked like stagnating.

## GAP EMERGING IN THE MARKET

Fortunately the world's oldest instrument manufacturer, Chauvin Arnoux of France, saw the gap emerging in the market and developed the 6471, sold under the AEMC brand in Pacific-rim countries, including Australia and New Zealand.

The AEMC 6471 took the concept of the GEO-X to the next level by increasing the measurement range particularly in stakeless mode, improving the performance in poorer soil conditions, automating the calculation of soil resistivity, adding a memory to store test results and improving the robustness of construction.

## SUMMARY

The result was a far more capable and user friendly instrument; however the big leap forward came in measuring the earth resistance of transmission towers with the advent of the GroundFlex option.

Whereas the GEO-X used a rigid and fragile 320mm split-core CT which had to be fitted around each leg of the tower in turn (if they

actually fitted), the GroundFlex utilises four 5m flexible Rogowski coils which can be placed around all four legs simultaneously and the readings automatically summated displaying the earth resistance of the tower within seconds of pressing the start key!

The AEMC GroundFlex is distributed exclusively in Australia and New Zealand by Pacific Test Equipment.



*From the original article "Selective Earth Testing", published in our Launch Edition in November 1996 showing the Norma GEO-X.*



*The latest AEMC Ground Flex Kit.*