JANDEL ENGINEERING LTD.
ResTest Four Point Probe Meter

The Jandel ResTest Meter is a specialty electronics instrument designed specifically for the four point probe measurement. It features high accuracy, an excellent range, and many features which simplify the four point probing measurement.

MEASUREMENT RANGE
10 milliohms-per-square to 10^6 ohms-per-square

FEATURES
- Displays either sheet resistance or volume resistivity
- Saves data using a PC connection
- Up to 99 measurements can be stored internally, or thousands saved to the included USB memory stick, or saved to a PC using the included software
- Settings for either linear or square array probes and 6 choices of probe tip spacings

SUPPORTS FOUR MEASUREMENT TYPES
- Sheet Resistance - Primary measurement value displayed in Ohms/Square
- Wafer Resistivity - Primary measurement value displayed in Ohms/Cm
- Volume Resistivity - Primary measurement value displayed in Ohms/Cm
- Ohms Resistance - Primary measurement value displayed in Ohms

Three available current ranges:
0.5mA to 10mA
10uA to 100uA
1uA to 10uA

Includes PC (USB) interface software
Interfaces with Jandel four point probing units
Includes USB connection software for data logging
Can be controlled by a remote PC using command set

See next page for a comparison of the ResTest to the RM3000 Test Unit

Comparison of the Jandel ResTest Meter to the Jandel RM3000 Test Unit.

The Jandel **ResTest Meter** is a specialty electronics instrument designed specifically for the four point probe measurement. It features high accuracy, an excellent range, and many features which simplify the four point probing measurement. The following are features of the features ResTest Meter:

1) The measurement range of the ResTest Meter is from 10 milliohms-per-square up to 1 megohm-per-square with better than 0.1% accuracy. The volume resistivity range is from 10 milliohms-cm up to 5 Kohms-cm, however, the resistivity range refers to measuring a bulk material directly as opposed to measuring a thin film and converting to volume resistivity using the software. For example, a thin layer of copper up to about 1.6 microns can be measured and the bulk resistivity can be determined if one knows the thickness, which can be entered into the software to calculate the volume resistivity.

2) The ResTest includes PC control software which can be used for data logging (storing data in the CSV format) and measurement conversion to ohms-per-square or ohms-cm. The ResTest can also be controlled via a remote PC by issuing commands via USB or RS-232

3) The ResTest reads-out directly in ohms-per-square, ohms-cm, or ohms on its display (or one can toggle to reading out in millivolts) without requiring the use of the software or a PC. The ohms-cm value can be for a thin film / wafer if one enters the sample thickness, or for a bulk sample if the tip spacing is entered.

4) The ResTest has onboard non-volatile memory so that up to 99 measurements can be stored internally and then downloaded and saved using the software. Alternately, each measurement can be saved to a PC as it is made, in which case the amount of saved data depends on the disk drive space.

5) Measured values can be stored directly to the included USB memory stick which can store thousands of measurements

6) The ResTest has a "zero" button as well as "forward" (FWD) and "reverse" (REV) buttons as the RM3000 has, however, the zero function it is not really needed as it zeros itself prior to any measurements (fast enough to not be noticed). The zero was added in case there WERE offset measurements just to check that the offset was definitely being caused by something external (such as light sensitivity or poor contact). For this reason it is also not necessary to check forward and reverse readings too often although it is a useful function to have confidence in the readings.

7) The ResTest allows the input of correction factor for samples that need to be corrected for size.

8) The ResTest has a date and time stamp feature

9) The ResTest has a large color display

The Jandel **RM3000 Test Unit** is a specialty electronics instrument designed specifically for the four point probe measurement. It features high accuracy, an excellent range, and many features which simplify the four point probing measurement. The following are features of the RM3000 Test Unit:

1) The measurement range of the RM3000 Test Unit is from 1 milliohm-per-square (10^{-3}) up to 5 x 10^8 ohms-per-square with 0.3% accuracy. The volume resistivity range is from 1 milliohm-cm (10^{-3}) up to 10^6 ohms-cm, however, the resistivity range refers to measuring a bulk material directly as opposed to measuring a thin film and converting to volume resistivity using the software. For example, a thin layer of copper up to about 16 microns thick can be measured and the bulk resistivity can be determined if one knows the thickness, which can be entered into the software to calculate the volume resistivity.

2) The RM3000 includes PC control software which can be used for data logging (storing data in the CSV format) and measurement conversion to ohms-per-square or ohms-cm. The RM3000 can also be controlled via a remote PC by issuing commands via USB or RS-232

3) The RM3000 reads-out directly in ohms-per-square or ohms-cm on its display (or one can toggle to reading out in millivolts) without requiring the use of the software or a PC. The ohms-cm value can be for a thin film / wafer if one enters the sample thickness, or for a bulk sample if the tip spacing is entered.

4) The RM3000 has onboard non-volatile memory so that up to 50 measurements can be stored internally and then downloaded and saved using the software. Alternately, each measurement can be saved to a PC as it is made, in which case the amount of saved data depends on the disk drive space.

5) The RM3000 has an auto-range button that can be used to automatically determine the optimum input current for a given material without using the trial and error method.

6) The RM3000 has forward (FWD) and reverse (REV) buttons to reverse the direction of current flow. A common way to determine if a measurement is valid is to reverse the direction of current flow and then check to see if the forward and reverse voltage readings correlate well, i.e., the values should be similar, but with the reverse current voltage being a negative value.

7) The RM3000 allows the input of correction factor for samples that need to be corrected for size.

8) The RM3000 has a date and time stamp feature

9) The RM3000 interfaces with optional AFPP motorized Z-motion arm which is an available option on some Jandel models.

Comparing the ResTest to the RM3000:
The ResTest can store internally 99 measurements instead of 50
The ResTest has a large color screen
The ResTest has settings for linear & square array so when using a square array probe you read values corrected
The ResTest has a somewhat easier to use dial control which also acts as a pushbutton.
The ResTest can save data to a USB thumb-drive
The ResTest performs measurements somewhat quicker
The ResTest automatically "zeros" itself before each measurement
The ResTest is lower in cost
In additional to reading out in ohms-per-square, ohms-cm, and mV, the ResTest will read-out in ohms.

Comparing the RM3000 to the ResTest:
The RM3000 has a greater measurement range on both ends of the spectrum
The RM3000 can control Jandel's AFPP motorized Z motion probe arm (optional for some Jandel Probe models)
The RM3000 has an auto-range feature to determine the best choice of input current for a given material
The RM3000 has four preset buttons for storing commonly use input currents

More details can be found in the ResTest user manual which is online here:
http://www.fourpointprobes.com/restest-user-manual.pdf