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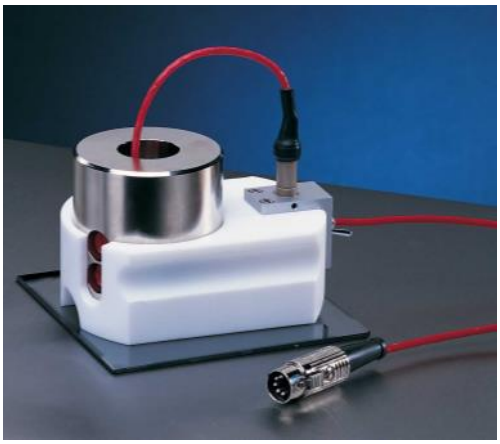
JANDEL ENGINEERING LTD.

Jandel Four Point Probing System

Hand Applied Probe with RM3000 Test Unit



The Hand Applied Probe combined with the RM3000 Test Unit is a high quality four point probe measurement system which incorporates the Jandel Cylindrical probe head. The system can be used to measure a wide range of materials with varying shapes and sizes.

The Hand Applied Probe is ideally suited for use in measuring large substrates and flat panels, however, it can be used to measure wafers and even small samples as well. When measuring small samples, you will sometimes need another piece of the same thickness of material underneath the back side of the probe body so that the entire unit rests on the material in the same plane, i.e., to keep it level. A discussion of using the Hand Applied Probe on small samples can be seen on page four of the following PDF file:
http://www.fourpointprobes.com/jandel-hap.pdf

HAND APPLIED PROBE GENERAL DESCRIPTION
The unit comprises a Teflon body containing a cylindrical brass mass sufficient to cause the probe needles of the 4-point head (loaded up to 200g each) to be completely retracted. The Teflon body incorporates a lead about 1m long to connect to the associated electronic measuring equipment. There is a toggle switch marked ‘S’ (shorted) and ‘R’ (read) which permits the probe head to be raised off the sample, or placed on it, with no sparking. The current source is shorted at position ‘S’ on the hand applied probe independent of the FWD, SBY, REV switch on the power supply. Of course, when the probe head is in position the FWD/REV positions can be used in the usual way to observe forward and reverse readings.

HAND APPLIED PROBE OPERATION
The probe head should be installed so that its acrylic insulating pad (adjacent to the projecting probe needles) lies in the same plane as the lower Teflon surface. Rotate the probe head so that its needles lie at right angles to the longitudinal axis of the Teflon holder, and clamp firmly with the two red screws. To present the probe head to the specimen it is best to make contact with the rear end of the block (where the switch is) and rock the block downwards so that it effectively pivots about the rear. In this way the probe points will retract without scrubbing on the specimen surface. The actual position of the probe points can be seen via the cutaway.

HIGH TEMPERATURE OPTION for the Hand Applied Probe

The Jandel Hand Applied Probe is available in a version that can withstand temperature of up to 200°C in an oven. The "read/standby" switch is removed and the Cylindrical Probe Head is modified to withstand 200°C. A complete four point probing system consists of the **Hand Applied Probe** shown above, combined with any of the four point probe electronics that Jandel Engineering offers.

SPECIFICATIONS

Dimensions:	Length:	approximately 125 mm (4.9") front to rear
	Width:	75 mm (3")
	Height:	approximately 80 mm (3.15"). The wire from probe head projects an additional 30mm (1.18") upwards
	Weight:	approximately 1.6kg (3.5 lbs)
Downward force:	approximately 1.1 Kg (2.4 lbs) - sufficient to easily retract 4 needles with 200g load	
Material:	Virgin Teflon body with nickel plated brass weight to accept Jandel cylindrical probe Ø 25.4mm	
Electrical	4-point probe with Teflon screened lead and Lemo 5-way plug and socket. Toggle shorting switch. Teflon screened lead to 180 degree x 5-way DIN plug.	

Download the Product Brochures for the Hand Applied Probe

Download the Instruction Manual for the Hand Applied Probe

RM3000 Test Unit

The RM3000 Test Unit is a specialty electronics instruments 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:

- 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 (more conductive materials can be measured if in the form of a thin film).
- 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 provides simultaneous readout of input current and either mV, ohms-per-square, or ohms-cm. The ohms-cm readout requires input of the sample thickness for thin films, or tip spacing for bulk samples.
- The RM3000 has onboard non-volatile memory so that up to 50 measurements can be stored internally and then downloaded and saved all at one time using the software. Alternately, each measurement can be saved to a PC as it is made.
- 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.
- 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.
- The RM3000 allows input of correction factor when making sheet resistance or volume resistivity measurements
- The RM3000 interfaces with optional AFPP motorized Z-motion arm

SPECIFICATIONS

Superior Current Source

- 10nA to 100mA (99.999mA) current source selectable in steps to 3 decimal place resolution
- Current set numeric keypad
- 4 default preset current programs (user programmable)

Superior Inbuilt DVM

- Input Impedance 1,000,000,000,000 ohms
- Input Bias current 4pA
- DVM 1300mV range and 130mV range
- 130mV accuracy
- 0.2% +/- 5uV resolution (10uV or 1uV) range
- 1300mV accuracy 0.2%+/-100uV resolution
- 100uV Ohms/Square
- Rapid Zeroing null function for DVM

FEATURES

- 28 Key high quality Keypad
- 16x2 line LCD Display for simultaneous indication of Set Current and either
- Ohms/Sq, Ohms-cm, or mV
- Auto-Ranging capability to determine the optimum input current based upon the material being measured.
- Intuitive operation
- Microprocessor controlled
- Reduced Footprint
- Robust Attractive ABS Case
- Accurately measures down to 10's of milliohms/square without external meter
- 4mm socket facility to connect an external meter
- RS232/USB connectivity for control and for collecting data in CSV format

Click here to see the instruction manual (688K PDF file) for the RM3000 Test Unit

Cylindrical Probe Head

The Cylindrical probe head, one of which is included with the Hand Applied Probe , can withstand temperatures from 77K up to 120C in it's standard configuration. A modification to the Cylindrical probe will allow it to withstand temperatures from 77K up to 200C (in an oven). The Cylindrical probe head is built to high standards of quality and accuracy. A brochure regarding the Cylindrical probe can be found here:
http://www.fourpointprobes.com/jandelcylindrical.pdf

An application note with information regarding the constructions and specifications of the Jandel Cylindrical probe can be seen here: http://www.fourpointprobes.com/cylindrical_app_notes.pdf