

## JANDEL ENGINEERING LTD.

# Jandel Four Point Probing System Hand Applied Probe with RM3-AR Test Unit



**The Hand Applied Probe combined with the RM3-AR 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 either the [RM3-AR Test Unit](#) or the [HM21 Hand Held Meter](#)

### 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](#)

## The RM3-AR Test Unit

- **The RM3-AR 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 RM3-AR Test Unit:  
The measurement range of the RM3-AR Test Unit is from 1 milliohm-per-square ( $10^{-3}$ ) up to  $5 \times 10^8$  ohms-per-square with 0.3% accuracy. The volume resistivity range is from 1 milliohm-cm ( $10^{-3}$ ) up to  $10^6$  ohms-cm.
- The RM3-AR 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 RM3-AR reads-out directly in ohms-per-square (or toggle to millivolts) without requiring the use of the software or a PC.
- The RM3-AR 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 RM3-AR 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 RM3-AR 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. More about reversing the input current: [reversing current.pdf](#)
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## SPECIFICATIONS:

- Superior Current Source
- 10nA to 100mA (99.999mA) current source selectable in steps to 5 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 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
- Automatic compliance voltage limit protects your sample which reduces maximum voltage as higher currents are set 5-40V
- Warning messages when compliance limit is reached, or DVM input exceeded
- Self test facility
- Flash upgradeable software
- CE Marked
- AD/DA converters and amplifiers for the DVM and setting the Current source and DVM, are Burr Brown 110V or 240V operation (selectable)

[Click here to see the instruction manual \(688K PDF file\) for the RM3-AR 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](http://www.fourpointprobes.com/cylindrical_app_notes.pdf)



Screw allows pressure to be user adjusted