

JANDEL ENGINEERING LIMITED

Hand Applied Probe

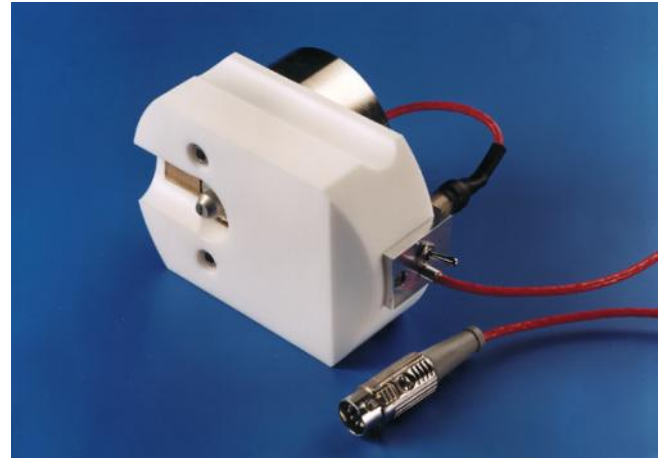
(Incorporating a 4-point cylindrical probe)

PRINCIPAL FEATURES

- ✓ Teflon body
- ✓ 4-point cylindrical probe head can be easily changed
- ✓ shorting switch to prevent sparking
- ✓ easy placement by hand

APPLICATION

1. Measurement of bulk resistivity of large ingots unable to be mounted on a normal probe station.
2. Measurement of sheet resistivity of very large wafers or deposited films on large substrates.



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.

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.

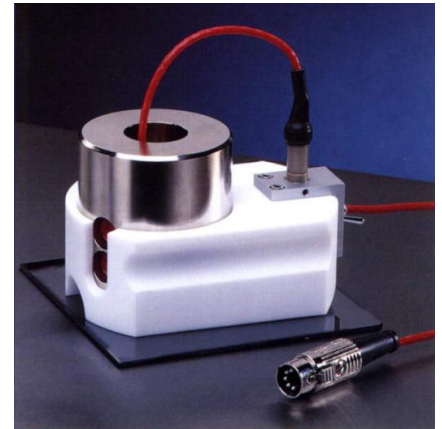
SPECIFICATIONS

Dimensions:	Length:	approximately 125 mm front to rear
	Width:	75 mm
	Height:	approximately 80 mm (Wire from probe head projects additional 30mm upwards)
	Weight:	approximately 1.6kg
Downward force:	approximately 1.1 Kg (sufficient to retract 4 needles with 200g load easily)	
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	

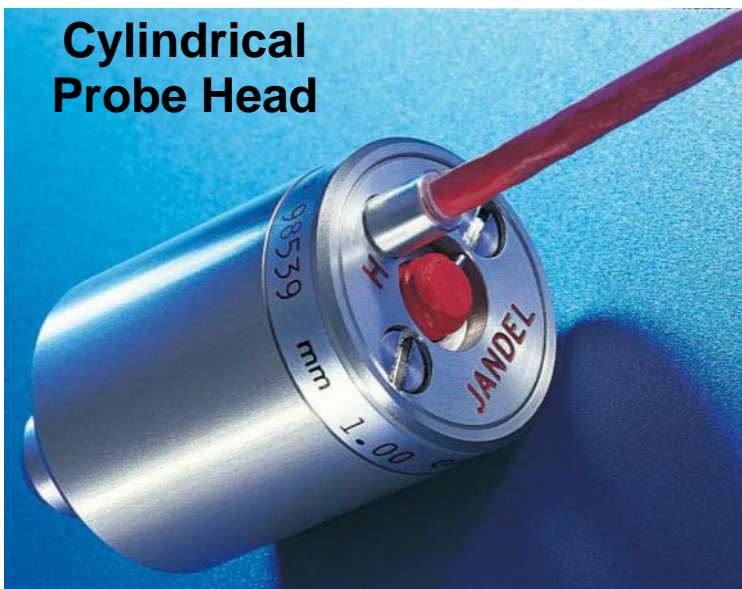
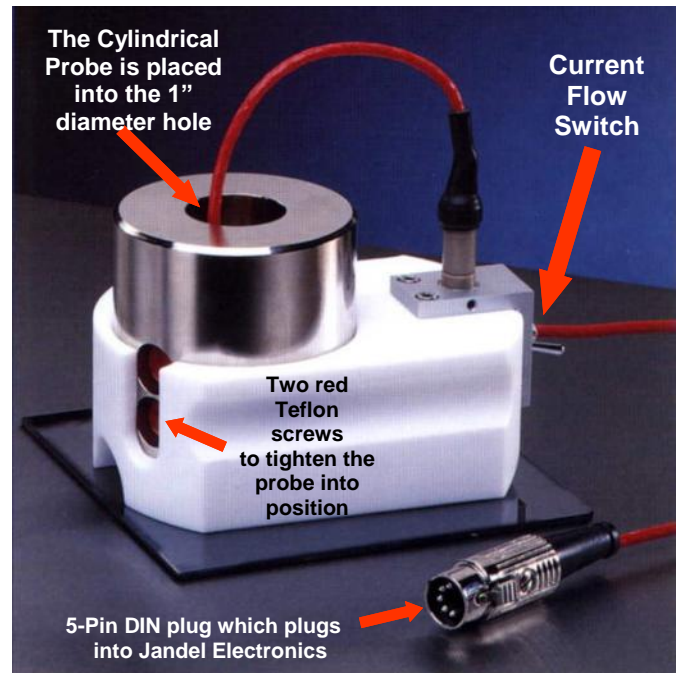
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Parts Identification



In the image to the right you can see the Hand Applied Probe placed upon a 4.5" x 4.5" square glass plate. There is a 1" diameter hole in the large chrome-plated brass cylindrical into which the Cylindrical Probe is placed. The probe is pressed down until the acrylic nosepiece pad touches the substrate under test. Two red Teflon screws are tightened to hold the probe in position. The weight of the chrome plated cylinder is sufficient to compress the probe tips even when the Cylindrical Probe is equipped with the 200 gram (strongest) springs loads. The red cable that exits the top of the Cylindrical probe head plugs into the Hand Applied Probe as shown. The switch on the back of the probe is used to turn the current flow on or off. The switch positions are labeled "R" for "read" and "S" for short. The "S" (short) switch shorts the current leads so that no current flows and no measurement can be made. The current should be turned off when the tips are brought into contact so that no sparking can occur as the tips touchdown. The Jandel electronics include a "standby" mode in which the current does not flow. The 5-Pin DIN connector plugs into the Jandel four point probe electronics.



Each Jandel **Hand Applied Probe** includes one **Cylindrical Four Point Probe Head**. The Probe head has a 7" cable which terminates with a Lemo plug. The probe head is available in one of three user adjustable pressure ranges which allows the user to change the tip pressure within the chosen range. Further information about the Cylindrical Probe Head can be seen in the following links:

Cylindrical Probe General information and options: <http://www.fourpointprobes.com/jandelcylindrical.pdf>
Hand Applied Probe Operating Instructions: http://www.fourpointprobes.com/hap_instructions.pdf

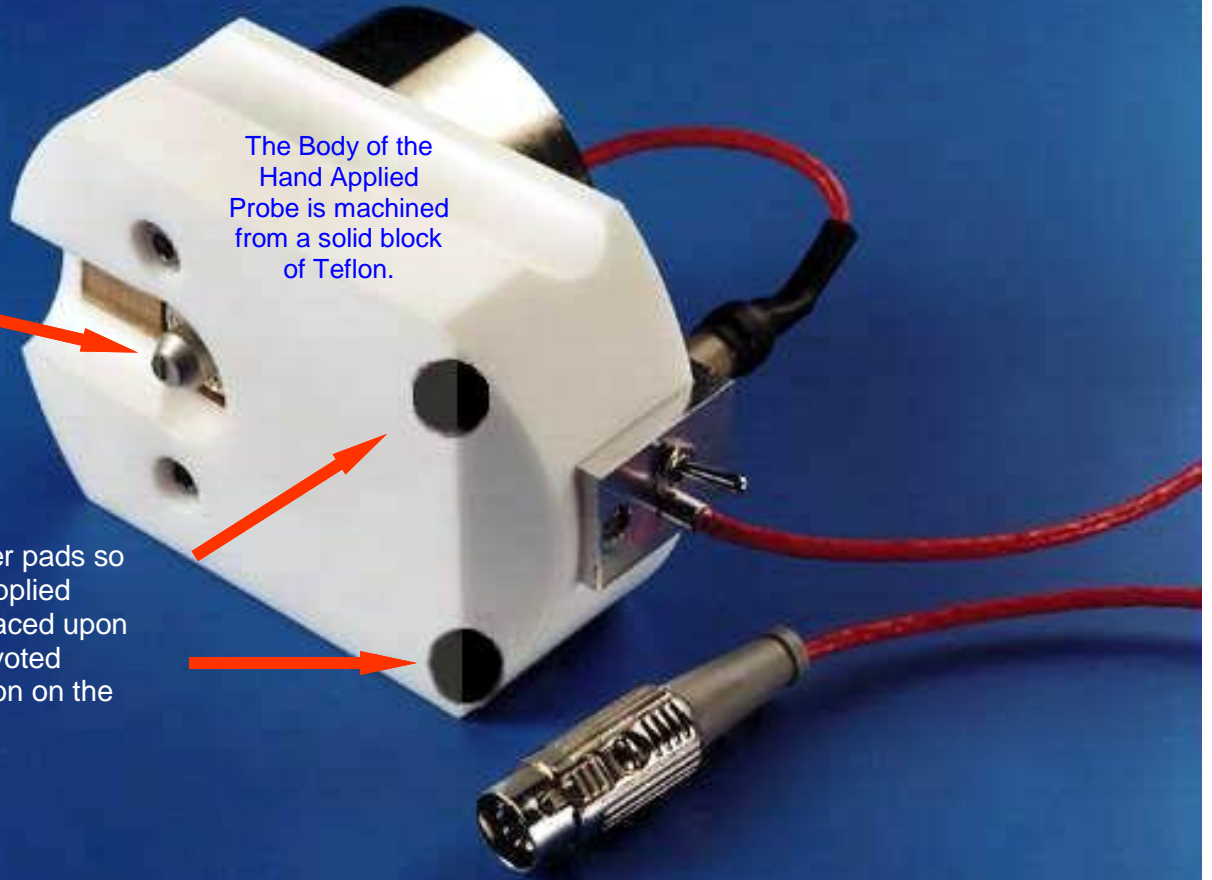
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Hand Applied Probe Bottom View

The Cylindrical Probe nosepiece can be seen here protruding out of the bottom of the Hand Applied Probe where it will make contact to the substrate.

The Body of the Hand Applied Probe is machined from a solid block of Teflon.

These are rubber pads so that the Hand Applied probe can be placed upon the pads and pivoted down into position on the substrate.

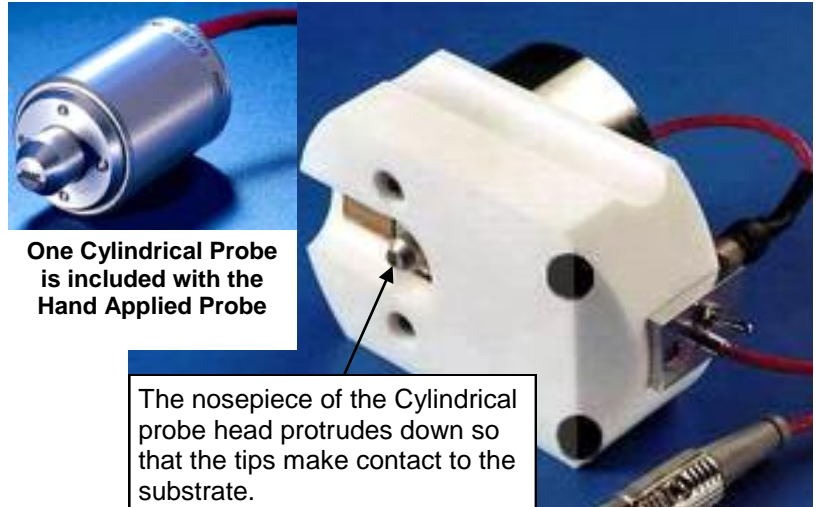


Using the Hand Applied Probe to Measure Small Samples

The Jandel Engineering Hand Applied Probe is ideally suited for large substrates and flat panels, however, it can also be used on small samples. The rear beveled edge of the Hand Applied Probe is placed either on the substrate (in the case of a large sample) or upon the table that a smaller substrate is placed upon. The Hand Applied Probe is lowered down into position as it pivots on the beveled edge that has the two rubber pads. If the sample is small, then additional pieces of the same thickness of material can be placed under the flat portion of the base so that the entire unit stays level. If the substrate is so small that it can fit within the 1" (25.4mm) diameter hole in the heavy cylinder into which the Cylindrical probe head fits, then the probe can be removed from the Hand Applied Probe prior to positioning the large cylinder over the sample. In the image shown below, a 5mm x 10mm sample is placed such that it is entirely within the 1" diameter hole. The Cylindrical probe is positioned in the hole so that the four tips touch the material, and then it is pressed down until the four needles retract and the nosepiece touches the substrate. The two red Teflon screws can then be tightened to hold the Cylindrical probe into position.

A system that Jandel offers especially for small samples is the Microposition Probe which can be seen here: <http://www.fourpointprobes.com/janmp.html>

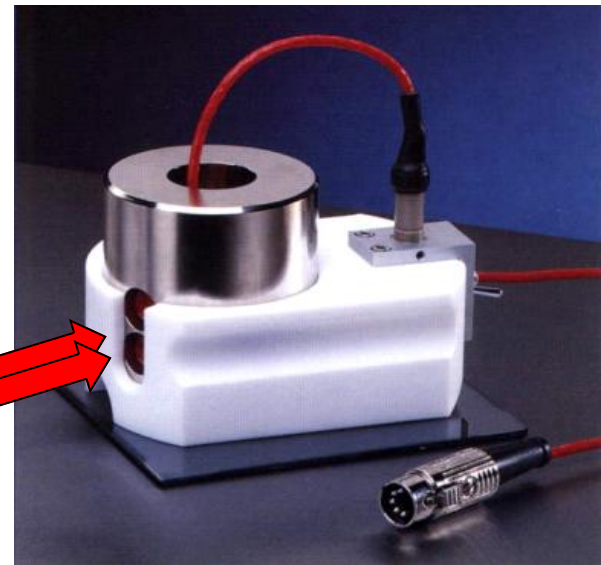
Please note that thin film samples as small as 5mm x 10mm must have a significant correction factor applied to arrive at a true value in sheet resistance. Information about correction factors can be seen here: <http://www.fourpointprobes.com/correct.html>



One Cylindrical Probe is included with the Hand Applied Probe

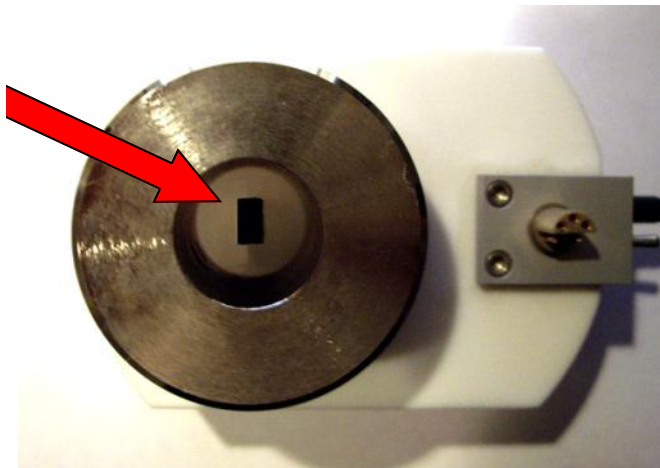
The nosepiece of the Cylindrical probe head protrudes down so that the tips make contact to the substrate.

Screws for holding the probe head down into position so that the tips are retracted into the probe head and the factory set load is applied.



Sample size of 5mm x 10mm.

With samples this small it is NOT necessary to have additional pieces of material to keep the Hand Applied Probe body level since the sample fits entirely within the 1" diameter hole of the Hand Applied Probe.



If the material will fit within the 25mm diameter hole in the Hand Applied Probe, then the unit can be placed over the material and the probe can be positioned down through the top so that the tips rest on the material. Pressing down on the probe until the nosepiece pad touches the substrate will compress the needle springs such that the factory set load is achieved. The red Teflon screws shown above can then be tightened so that the needles will remain retracted with the factory set tip pressure applied to the material.

The Cylindrical probe head should be brought down into contact until the acrylic nosepiece pad touches the substrate. This is the point at which the factory set load is achieved.

