

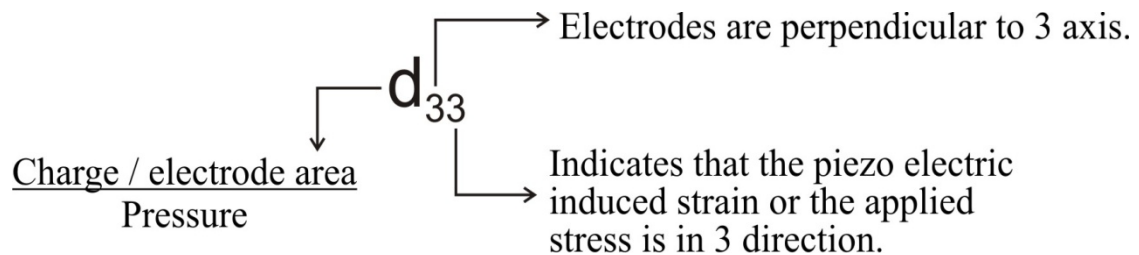
Quotation 2017-18

Dear Sir,

May we refer to your enquiry for D33 meter following is our quotation and technical literature.

Piezoelectric constants can be measured by the method as under:

1. Static method – (Static Measurement set-up)
2. Quazistatic Method – (d meter)
3. Resonance Method – (Piezo Test Set-up)



$$\text{Therefore } d_{33} = \frac{Q/A}{F/A} = \frac{Q}{F} \text{ C/N} \quad \text{Since } Q = C \times V$$
$$d_{33} = \frac{C \times V}{F} \text{ C/N}$$

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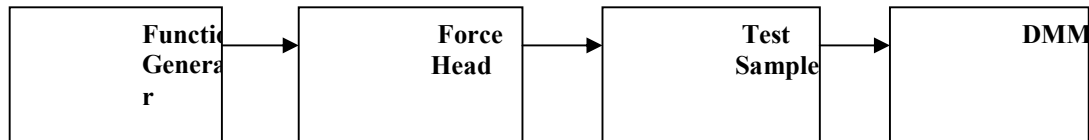
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Principle of operation:

The d_{33} meter is based on the Berlincourt principle for the determination of the piezo-electric strain constant d_{33} .

Block diagram of the Concord d meter is as under:



The oscillator provide ac voltage to the electromagnetic driver fixed in the Force Head. Thus a force is exerted on the test sample and the output in terms of d_{33} value is read by DMM.

The Force Head is so designed that it facilitate measurement of d_{33} on a variety of piezo-electric element, size & shapes, including discs, blocks, rings, tubes etc. Different types of probes are provided for different geometries.

PRICE DETAILS

- **Complete D33 meter with above specifications Rs.5,12,600/-**
- GST @18% extra in above price
- Warranty 1 year from date of installation
- Delivery: 30 days from receipt of order
- Payment: 50% advance and balance 50% at the time of supply.
- Factory Inspection at Delhi
- Proprietary certificate included
- Intimation of readiness of material

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System Installation & Operation:

Step 1.

The equipment should be connected to $230\pm 10V$, 50Hz supply preferably through an isolation transformer/UPS.

Step 2.

Electronic Driver:

Switch on and allow warm up for 10 minutes.

Keep the Cal. Knob in IV range & fine tuning knob in the middle. Adjust the frequency to 80 Hz Sine Wave.

d₃₃ display unit:

Switch on and allow a warm up for 10 minutes.

Force Head:

Keep the slider switch in the middle.

Step 3:

Connect the cable marked E.D. to the Electronic Driver and Force Head.

Connect the output of the Force Head to the input of d₃₃ display unit.

Step 4:

Place the test specimen between the upper brace probe and the lower probe and apply a clamping force corresponding to dial gauge reading of 0.02mm.

Shift slider switch to R and adjust the d₃₃ readout to $335\pm 5pC/N$ through Cal. Knob in the Electronic Driver.

Shift slider switch to T (Test specimen) & note down the value of test sample.

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Three different type of probes have been provided for ease of measurement. For measurement of d_{33} of large samples probe with flat surface is recommended.

Step 5:

When measuring a large capacitance sample ($>10\text{nf}$) the meter read out value should be modified. The following equation can be used to calculate the d_{33} value.

$$d_{33} \text{ (modified)} = \left(\frac{10 + C_T}{10} \right) \times d_{33} \text{ read out}$$

Where C_T is the capacitance of the sample.

The equipment should be handled with care. Rough handling may affect accuracy of the instrument.

g_{33} can be calculated as under

$$g_{33} = \left(\frac{d_{33} \times \epsilon_r}{\epsilon_0} \right)$$

Calibration procedure:

The calibration procedure is carried out with at least one of the two primary calibration elements provided. The driver is set at 80 Hz with amplitude such that DMM (d_{33} read out) connected to the test o/p reads in mV RMS – a value equal to $1/100^{\text{th}}$ of the value of $d_{33} \times 10^{-12}$ C/N of the primary calibration element. For example if the value of calibration sample is 480 pC/N, d_{33} display unit will show a value of 4.80 mV RMS.

Warranty:

We provides warranty to the customer (“customer”) that the d meter (“Product”) including Force Head & Instruments, shall be free from defects in material & workmanship for the duration stated below begins on the date of purchase by the customer.

Warranty Period: One year.

This warranty covers those defects that arise as a result of a normal use of this product as outlined in this User’s Manual instruction or failure to follow normal use guidelines will void the warranty.

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Maintenance:

This system is maintenance free. In case of malfunction, please contact:

sales@marineindia.com

Accessories:

Standard Samples	-	4 Nos.
Probes	-	3 Nos.
Power Cord	-	2 Nos.
Operating Manual	-	1 No.



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SPECIFICATIONS:

D33 range: X 1 Range: 10 to 2000 PC/N
X 0.1 Range: 1 to 200 PC/N

Accuracy:

X 1 range ± 2.0 % In 100 to 2000 PC/N , ± 5.0 % In 10 to 200 PC/N with feasible care

X 0.1 range ± 2.0 % In 10 to 200 PC/N , ± 5.0 % In 1 to 20 PC/N with feasible care

Resolution: X 1 range: 1 PC/N

X 0.1 range: 0.1 PC/N

Frequency: ~ 110 HZ

Amplitude: 0.25 N

Polarity indication: indicates polarity on upper face of test element in compression

Shunt capacitance: 1p F (for x 1 range)
: 0.1p F (for x 0.1 range)

Dimensions : force head : 110 x 140 mm

Chassis: 280 x 200x90 mm

Weight: force head : 3 kgs , chassis : 2 kg

Power: 110 / 220V , 50/60Hz 20W

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