

TECHNICAL AND OPERATION**MANUAL****DC POLLING UNIT****MARINE INDIA**

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1. PREFACE

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2. INTRODUCTION

This document is a Technical and operation manual for DC polling unit.

The document is based on the above system manufactured as per technical specifications. Please note that we on our side have tried to include working of every section of sub components.

We remain at your disposal for any clarification required in this respect. Error due to typographical or compilation may please be written to us. We shall be able to correct the same at the shortest possible time.



MARINE INDIA

3. OUR CONTACT ADDRESS AND OTHER DETAILS

3.1.1 REGISTERED OFFICE:

A3/25b green apartment,
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4. APPLICABLE DOCUMENTS

[A1] The manual of is prepared based on the DC polling unit

5. SYSTEM CONFIGURATION AND SPECIFICATIONS

DC polling unit is designed to alliance dipoles for characterisation of materials such as ferro-electrics. After the DC polling various measurements such as the hysteresis loops, strain measurement, d33 measurement, and magneto electric measurement are performed for these materials.

The complete measurement system consists of the following:

5.1.1 DC polling main unit

5.1.2 Sample holder



6. SYSTEM INSTALLATION

The following must be taken care while installation of the unit.

Extensive care must be taken while interconnecting any cable or connectors. The unit incorporates a high voltage set-up and is extremely dangerous while operating.

Use proper earthing protection and connect proper earthing wires etc.

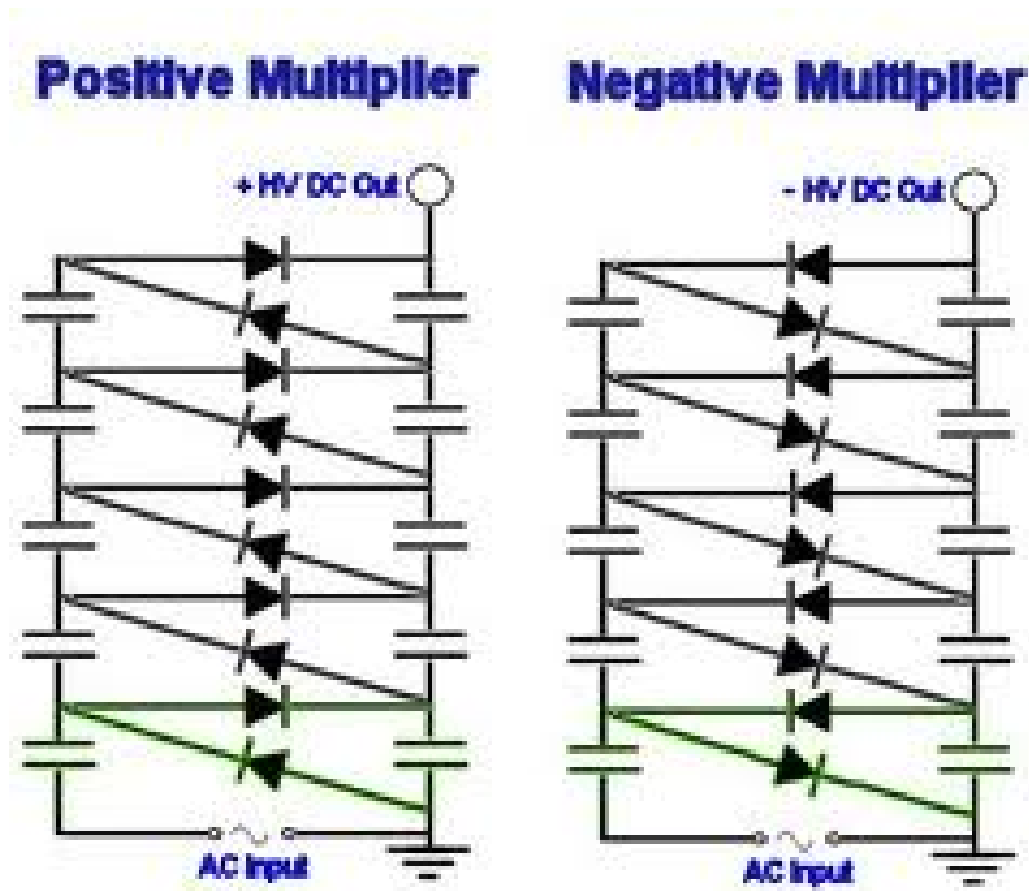
Do not connect the unit to an inverter, generator or a UPS. The unit must be connected to a 50 Hz 220 V AC source. A stabilizer is also not necessary for the machine to work.

7. BASIC THEORY OF OPERATION

DC polling is a process in which a DC direct current electric field with larger than coercive field strength is applied to specimen at high temperature, but below Curie temperature or optionally applying field at room temperature. On the application of DC electric field the spontaneous polarisation within each grain gets oriented towards the direction of applied field. This leads to a net polarisation in the polling direction. All the domain in a ceramic can never get fully assigned along the polling axis this is because of the orientation of the basic PE measurement technique.

8. BASIC ELECTRIC CIRCUIT

AC is produced using simple high voltage transformer and positive and negative multipliers are used for very high voltages. Current protection circuits are used in series with DC high voltage.



9. SYSTEM OPERATION AND OVER VIEW

Extensive care must be taken to use the DC polling unit. The unit has protection against overload circuit or excessive current control, but it is highly recommended that in operation it is warned that never touch the sample leads or sample holder or try to fix if any loose connector of sample holder unit etc.

- The first step is to load the sample. Make sure the unit is off and sufficient oil is present in the sample holder of the unit.
- Load the sample in the sample holder duly coated on both sides. Before loading make sure sample contacts are not short on both sides.
- The second most important aspect is to know how much field is to be applied. Please refer to heading 7 for this.
- Switch on the unit, if overload is shown by the unit press overload.
- For applying the field enter the field value in software/or manually if manual unit
- For your calculation if you apply 1000 volt on a 1 mm sample it will be 10 KV/cm mathematically. Similarly if you apply 1000 volt on a 0.5 mm sample it will be 20 KV/cm mathematically
- Ideally never apply field more than the breakdown of the sample.
- In case the unit shows overload during polling of the sample, please ensure never press overload. Manually switch off the unit and check sample for any short/breakage/ puncture. If not then you may be applying field very high.
- Also while raising the field if you do not see any raise in KV readings in the screen then check sample for any short/breakage/ puncture. It is also possible that sample resistance is very low, it must not be less than 10 M Ohm.

10. SYSTEM CALLIBRATION

SAMPLE SHORT CURRENT

- Short the sample leads and connect DC multi-meter of mA range into the circuit series.
- Increase the potentiometer slowly

Overload current _____ mA

Observe at what level the overload occurs

A 100 K resistance is connected permanently in series with the sample in the measurement circuit. If overload occurs at 0.100 volts implies 1 mA current is set.