



DTM

PARTIAL DISCHARGE METER

- * Measurement of partial discharges in pC and RIV in mV.
- * Variable selective filter, 600 kHz to 2400 kHz. Alternatively fixed bandwidth wide band filter, 40 to 220 kHz.
- * Built-in oscilloscope to display PD pulses on elliptical time base and window gating facility to mask unwanted noise.
- * Facility to conduct balance mode PD detection to minimise the background noise.

1. General

The measurement of partial discharges is non-destructive test on electrical apparatus or equipment. The measured quantities are valuable data to determine the quality of an insulation. In high-voltage test technique, special importance is therefore attached to measurement of partial discharges.

The reading of partial discharge intensity is in Pico-coulombs (pC) or, alternatively, radio interference voltage (RIV) in microvolts (mV).

The partial discharge/RIV measuring system consists of,

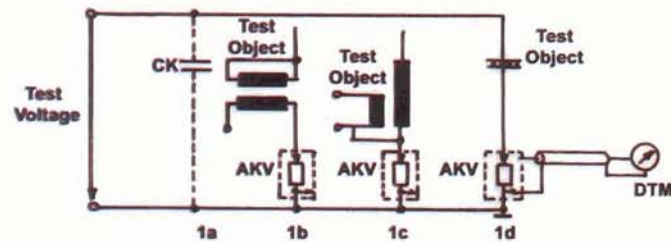
1. Partial discharge meter (Type DTM) which is the basic measuring unit with built-in oscilloscope for Elliptical display and window blanking facility. It has provisions for direct measurement as well as bridge measurement.
2. Filter insert - option for either Narrow band (DTF-1) or Broad Band (Type Eb1)
3. Measuring impedance and coaxial connecting cable.
4. Pulse generator PDG.

5. Accessory

Housing, in case the instruments is not intended for rack-mounting.

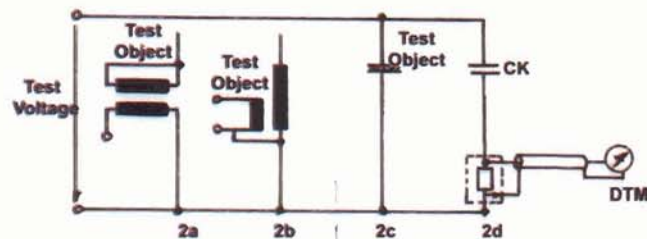
6. DTM-Test Circuits

Fig. 1. Connection of partial discharge meter DTM between test object and ground (Test circuit according to IEC 60270 and IS 6209).



- 1a. A coupling capacitor may be used to improve the transfer characteristics of the test circuit
- 1b. PD measurement during applied potential test of inductive test objects.
- 1c. PD measurement during induced potential test of inductive test objects.
- 1d. PD measurement on capacitive test objects.

Fig. 2. Connection of partial discharge meter DTM between coupling capacitor and ground (Test circuit according to NEMA Publ. 107)



- 2a. PD measurement during applied potential test of inductive test objects.
- 2b. PD measurement during induced potential test of inductive test objects.
- 2c. PD measurement on capacitive test objects
- 2d. Coupling capacitor ($C = 1000 \text{ pF}$) according to NEMA Publ. 107

2. MEASURING PRINCIPLE

Partial discharges in or on the test object cause charge transfers in the high-voltage circuit, giving rise to voltage pulse variations on the measuring impedance (Quadripole). These are evaluated by the partial discharge meter. The filter with adjustable centre frequency allows to select parts of the high-voltage spectre for measurement purposes.

3. DESCRIPTION**3.1 Partial discharge meter DTM**

The measured partial discharge intensity is displayed either in pC or in mV in accordance with IEC 60 270 / IS 6209 or NEMA 107. According to IEC 60 270, the measured quantity shall be multiplied by a correction factor, which considers the circuit characteristics of the complete test arrangement. With built-in correction circuit it is possible to incorporate the correction factor into the display. The actual partial discharge intensity can then be read directly without the usual calculations. At switch position "CORR", the correction factor is displayed directly. The PC pulses are tapped from the analogue output terminal and displayed on the built-in oscilloscope. The power frequency test voltage can be displayed with the partial discharge pulses in an elliptical time-base and periodically recurrent interference pulse can be blanked in the oscilloscope display, automatically eliminating their evaluation in the partial discharge meter.

Built-in provision is available to conduct the bridge type PD detection, which is useful to suppress external noise. The attenuation level is $^{-3}$ 40 db.

3.2 Filter inserts

A selective filter for variable center frequency and a broadband filter can be supplied.

- **Selective filter**

Variable center frequencies from 600 kHz to 2400 kHz
Band width 9 kHz

- **Broad-band filter**

Bandwidth 40 kHz to 220 kHz

The basic noise level of the instrument is less than 0.6 pC in the most sensitive measuring range.

The measuring accuracy and linearity correspond to IEC 60 270 and IS 6209

Measuring ranges

2 pC to 50,000 pC (IEC 60 270)

1 mV to 25,000 mV (VDE, CISPR)

3.3 Measuring impedance

The measuring impedance (quadripole) filters the HF voltage portions from the high-voltage test circuit. It can be continuously loaded with 4 A. Built-in surge diverters protect the instrument against over voltages. Two quadripoles are required for bridge measurements.

4. DIMENSIONS AND WEIGHT

19" rack (6 units of height), 40 Kgs.

5. ACCESSORY

Co-axial cables to connect quadripoles to meter.

