

PARTIAL DISCHARGE TESTER

DAC-PD-7

Partial Discharge measurement is non-destructive tests having higher detection sensitivity than withstanding or high resistance tests, and can be used to find insulation defects and early failures of solid insulations. DAC-PD-7 is ideal for quantitative diagnosis at production and inspection of electrical parts, such as EV motor, Photo-coupler, IGBT, and insulation materials etc.

Test Materials

- Magnet wires
- Photo-coupler
- IGBT
- Relay, Circuit Board
- High Frequency Transformer
- Insulation Materials



Features

- **AII-IN-ONE UNIT.**
The tester contains 3000V high voltage source, coupling capacitor, detector and calibrator.
- **EASY TO USE.**
No need cumbersome wirings.
- **AUTOMATIC CALIBRATION FUNCTION**
Depending on the calibration pulse level, the scale is adjusted and adequate range is selected automatically.
- **LCD DISPLAY TO OBSERVE LIVE DISCHARGE WAVEFORM**
Measurement can be conducted while observing discharge waveform. The applied voltage profile can be observed simultaneously.
- **APPLICABLE TO IEC 60270, IEC 60664-1, IEC 61730-2**
Software is included as standard accessory.

Conformity

- IEC 60270 High-voltage test techniques – Partial discharge measurements
- IEC 60664-1 Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests
- IEC 61730-2 Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing

What is partial discharge?

Fig.1 is a general partial discharge occurrence model, and showing an insulation sandwiched by electrodes. In the insulation, there are voids (impurities).

Dielectric constant of the voids is usually lower than that in the surrounding dielectric. Therefore when AC voltage is applied to the insulation, voltage in the voids becomes larger, and as a result, the voids short itself out, while the insulations is not shorted.

The short circuit in the voids leads to small charge-transfers, and this is called partial discharge.

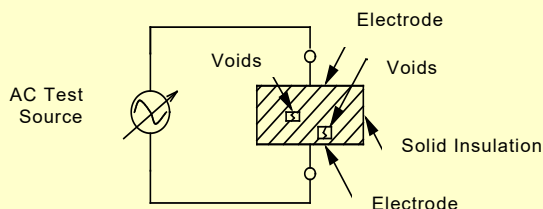


Fig. 1

Points

1. Partial discharge occurs within voids (impurities) due to the lower insulating strength.
2. Electric field tends to concentrate on the voids, because dielectric constant of voids is lower than that of main insulations. As a result, local insulation breakdown in the voids occurs.
3. The insulation strength of voids depends on the type of gas, gas pressure in the void and void dimension.
5. Partial discharge precedes insulator breakdown.
6. Partial discharge is described by the maximum discharged charge (Q-max pC).

Why is Partial Discharge Test important?

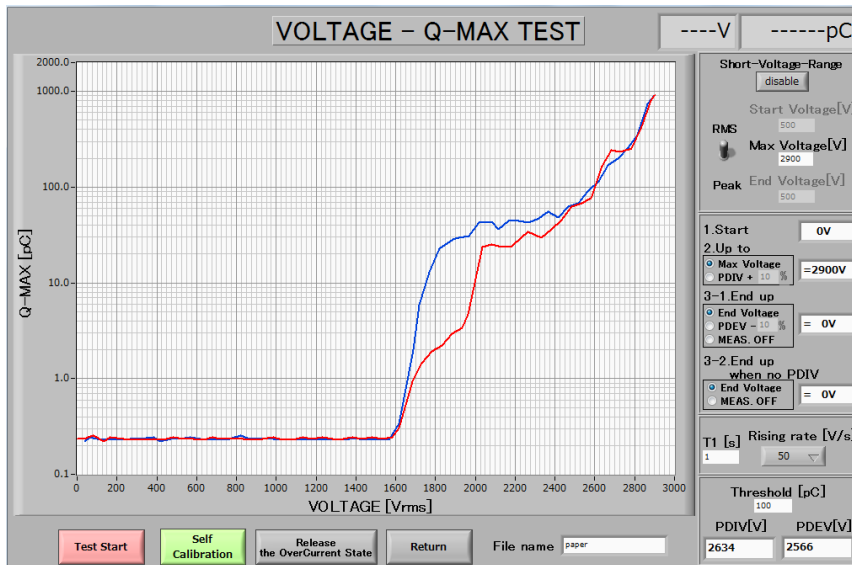
Even with a stringent manufacturing process, it is not always possible to manufacture solid insulations without creating voids (impurities). Generally, the void in solid insulation is filled with a gas, and it has lower breakdown strength than the main material. In addition, the permittivity of the void is invariably lower than that of main insulation, and electric field tends to concentrate on the void. Thus, even under normal working stress, the voltage across the void may exceed the breakdown value and partial discharge occurs. When partial discharge begins and repeats, it can damage the materials and may lead to failure of the whole high voltage power equipment. To secure safety of electrical appliances, quality of insulations must be regarded as the most important matter. Partial discharge measurements are desirable test to find insulation defects and early failures in insulation materials. Periodic diagnosis enhances safety of electrical appliances, and can help to find symptoms before becoming a failure.

PC Software

- PD tests according to the international standard IEC 60270 are available with attached PC Software.
- Measurement results are plotted continuously and PASS or FAIL judgment comes soon after the test completes.
- Measured data are saved in CSV format.



V-Q Measurement

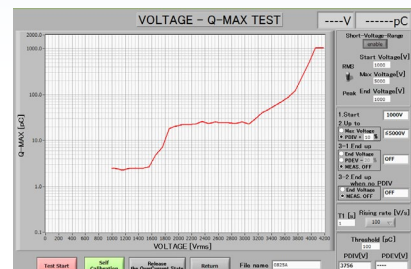


PD test is performed by raising and lowering the voltage according to the set test condition. Automatic measurement of Q-max (max discharge charge amount), PDIV and PDEV are possible,

[Rising rate]

Select from 10V/s, 25V/s, 50V/s and 100V/s.

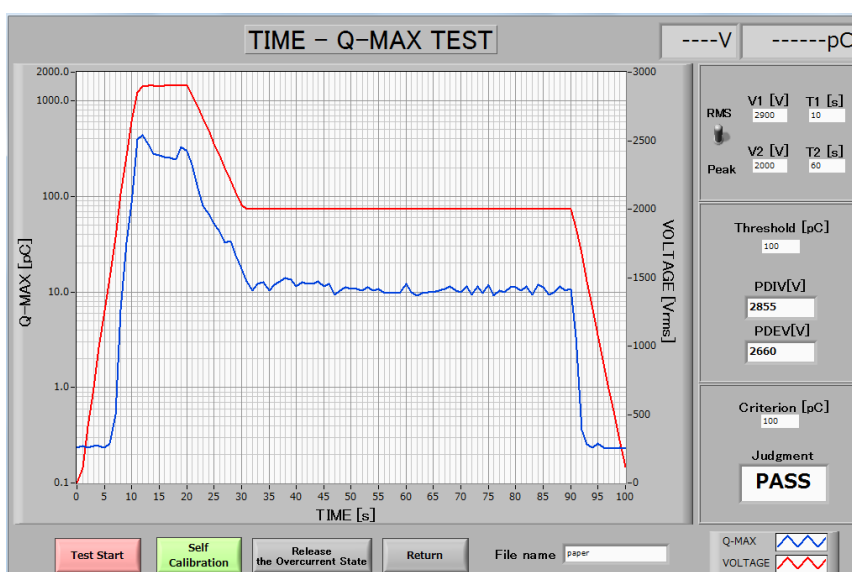
For efficient testing, it is possible to specify the start voltage, omit the PDEV test, or shorten the voltage lowering test.



(Voltage increasing test only.)



T-Q Measurement



Specifying 2 points of test voltage and each holding time to perform partial discharge measurement based on IEC standards.

Rise speed: 10 sec (between 0 – V1(V), V1-V2(V), V2-0(V))

Voltage holding time: 0 – 120 sec (T1, T2)

Pass or fail judgment is made according to the Threshold value (pC) set in the program.

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Specifications

Input Voltage	AC100V/115V/220V/240V \pm 10%, 50/60Hz
Output Voltage	AC 0 – 5000V rms
Voltage Ramp Rate	25V/s, 50V/s (10V/s, 25V/s, 50V/s and 100V/s with software)
PD Resolution	0.01pC (Partial discharge in device <1pC at AC3000V)
Frequency	50Hz, 60Hz
Waveform	Sine wave (not depend on waveform of Input Power)
Distortion of waveform	<3%
Fluctuation of Voltage	<1%
Maximum Load Current	10mA
Maximum Capacitance Load	5000pF
Gain	0~80dB
Range	1000pC, 10000pC, 100000pC
Response Occurrence Frequency	10 - 9000PPS (Rate)
Calibrator Charge	100pC, 1000pC
Calibration Pulse Injection Capacitor	50pF
Calibration Pulse Voltage	2V, 20V
Calibration Pulse Generation Frequency	50PPS
Internal Coupling Capacitor	1000pF
Interface	RS232C
Size	430x380x200(WxDxH) Weight 15kg
Standard accessory	Measurement cable, Power code, PC software, serial cable
Option	Shield Case, Electrode, USB-RS232C converter

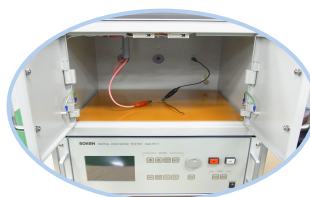
Options

Partial discharge measurements can be affected by a background noise if appropriate measures are not taken. Depending on the test environment and judgment PD level, a faraday room or a shielded box is required. SOKEN recommends a chamber integrated into a rack along with PD-7.

Option test chamber rack-in type:

The measuring cables are arranged inside the chamber. Power cable, grounding cable, RS232C cable are pull out from a cable incoming hole on the bottom of the rack. Door interlock ensure safe operation. You can start PD test without additional measures.

Rack size: W520xD600xH550mm (+H30)
Chamber size: W400xD340xH220mm
Weight: about 45kg (including DAC-PD-7)



Inside the chamber



Dimensions and design are subject to be changed.

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