

Iris Power PDAIert™ Bantam

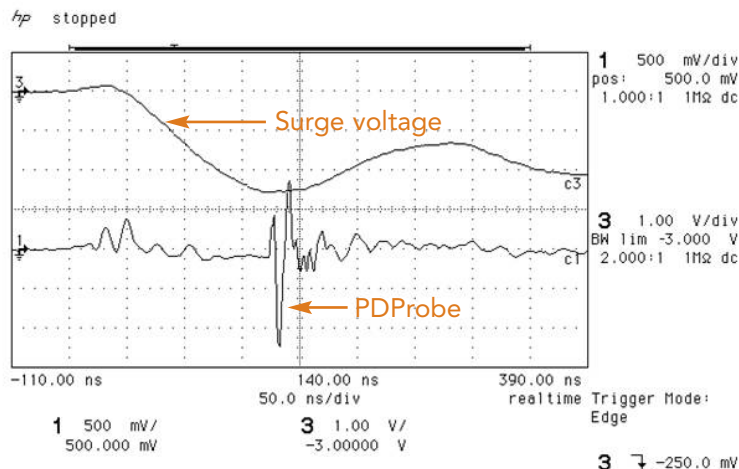
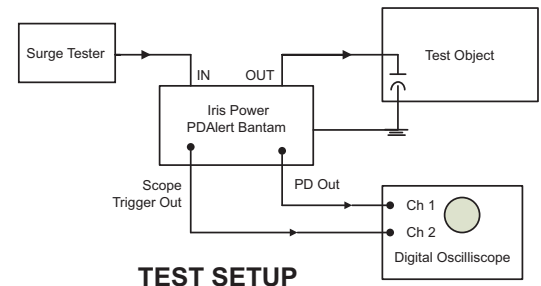
PD Detection During Short Risetime Voltage Surges



The Iris Power PDAIert Bantam instrument enables the measurement of partial discharge (PD) current pulses in insulation systems energized by voltage impulses from "surge testers" that have impulse risetimes as short as 100 ns. Conventional power frequency PD detectors cannot be used for such PD measurements since the interference from the impulse will overwhelm any PD current pulses. The Iris Power PDAIert Bantam instrument was specifically engineered to measure PD in motor stator windings, wind turbine generator rotor windings, filter inductors, transformers and inverter drive output modules that can experience short risetime voltage impulses from inverters. The Iris Power PDAIert Bantam instrument is a PD detector that uses a directional electromagnetic coupling technique to sense PD while strongly suppressing the voltage impulse. It is classed as an "antenna-type" of PD detection system by IEC Technical Specification 61934. The Iris Power PDAIert Bantam instrument is a passive device, requiring no 50/60 Hz power supply.

TYPICAL MEASURING SYSTEM

The Iris Power PDAIert Bantam instrument is used with a "surge tester" and a digital oscilloscope. The surge tester is usually of the type required for surge testing motor windings in IEEE 522 or IEC 60034-15. Such surge testers produce a voltage impulse with a risetime from 100 to 300 ns, and a fall time that is much longer than this. To replicate the type of switching impulses created by inverters, the surge tester should be a modern type, using an IGBT switching element and must have no partial discharges. The oscilloscope is the display device and should have two channels (one to display the PD and the other channel to display an attenuated version



of the voltage impulse that is derived from the Iris Power PDAIert Bantam instrument). The Iris Power PDAIert Bantam instrument is connected between the surge tester and the test object with as-short-as-possible leads.

The oscilloscope is set-up to trigger on the risetime of each voltage impulse from the surge tester. Ideally, the oscilloscope should have a bandwidth of 500 MHz. The Iris Power PDAIert Bantam instrument is used to measure the test object's PD inception voltage (PDIV), PD extinction voltage (PDEV) and the PD magnitude (in millivolts) at any desired test voltage. These measurement quantities are described in IEC 61934.

IRIS POWER PDAIert Bantam

SPECIFICATIONS

ENCLOSURE

- Metal enclosure with locking carrying handle
- Mass: 7 kg
- Dimensions: 16 cm x 35 cm x 42 cm
- Impulse voltage input and output: "banana" plug connectors on the rear panel
- BNC connections for the scope trigger and PD outputs on the front panel

PARTIAL DISCHARGE DEVICE

- PDAIert PDIV >5000 V
PDIV >7000 V (optional)
- Minimum sensitivity: 10 mV

MAXIMUM VOLTAGE INPUTS

- Impulse: 5 kV, 7 kV and 10 kV (optional)
- 50/60 Hz AC: 690 V

SIGNAL OUTPUTS

- Scope Trigger : actual voltage impulse divided by 2000, into a 50 Ω load
- PD output : drives 50 Ω load

WHY MEASURE PD DURING VOLTAGE IMPULSES

The introduction of modern voltage source, pulse width modulated inverters using IGBTs/IGCTs in the early 1990s created a new stator winding failure mechanism in motors rated as low as 440 V. In "random wound" motor stator windings typical of motors rated less than 1000 V, partial discharges were found to occur due to the short risetimes of the voltage impulses. The PD eventually eroded the electrical insulation, leading to premature winding faults.

This new failure process has led motor manufacturers to develop special tests to qualify the stator winding insulation in variable speed drive motors. The tests have been embodied in a new IEC technical specification (IEC 60034-18-41). A critical feature of some of the tests is the ability to measure PD during the voltage impulses created by modern drives. More specifically, the winding PDIV is required to be above the maximum voltage impulse experienced in service. To meet the demand for a PD detector that can be used with short risetime, high voltage pulses, Iris Power developed the PDAIert Bantam instrument. The Iris Power PDAIert Bantam instrument is not only used to help motor manufacturers develop winding designs and manufacturing processes that are partial discharge free in operation, but some motor manufacturers now use the Iris Power PDAIert Bantam instrument as a quality assurance test on normal production to ensure winding impregnation processes are in control.

More recently, manufacturers of transformers, inductive reactors and inverters have used the Iris Power PDAIert Bantam instrument to ensure designs are PD free at specified voltages.

ORDER

| Part Nr. | Description |
|----------|--|
| A2100 | PDAIert Bantam instrument to measure partial discharges off-line from fast risetime surges. PDIV > 5 kV. |
| A2105 | PDAIert Bantam instrument to measure partial discharges off-line from fast risetime surges. PDIV > 7 kV. |

For other options contact your sales representative.

Iris Power PDAIert is a trademark of Qualitrol-Iris Power.

QUALITROL-IRIS POWER HAS BEEN THE WORLD LEADER IN MOTOR AND GENERATOR WINDING DIAGNOSTICS SINCE 1990, PROVIDING A FULL LINE OF ON-LINE AND OFF-LINE TOOLS, AS WELL AS COMMISSIONING AND CONSULTING SERVICES.



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