Impedans
PLASMA MEASUREMENT

Moduli™ RF Event Detector

Non-invasive Pulse Monitor and Arc Detector

For comprehensive RF pulse monitoring, ARC detection and categorisation

The Moduli RF Event Detector is an advanced, all-in-one diagnostic instrument for plasma arc detection and RF pulse monitoring. The Moduli architecture enables real-time processing of RF measurements with one microsecond resolution. It is designed to detect and characterise arcs while simultaneously monitoring every RF pulse to check that each pulse is within a predefined specification. Arcs and misfiring RF pulses can lead to wafer defects, therefore, the Moduli RF Event Detector is an essential tool for rapid troubleshooting and 24/7 monitoring.

Key Features

- 1 µs resolution for arcs and atypical pulses simultaneously (with adjustable noise filter).
- Configurable arc and pulse classification widgets.
- Monitors ON-time, pulse frequency and duty cycle of every pulse.
- Reports on deviations from user configured acceptance limits.
- ON-OFF and multi-level pulsing (up to 3 levels).
- Max., min. and average voltage and current reported during pulses to monitor “overshoot”.
- “Snapshot” function to view pulse profile at a given time.
- Recipe function to instruct the sensor to adjust settings automatically to follow complex, multi-step plasma processes.

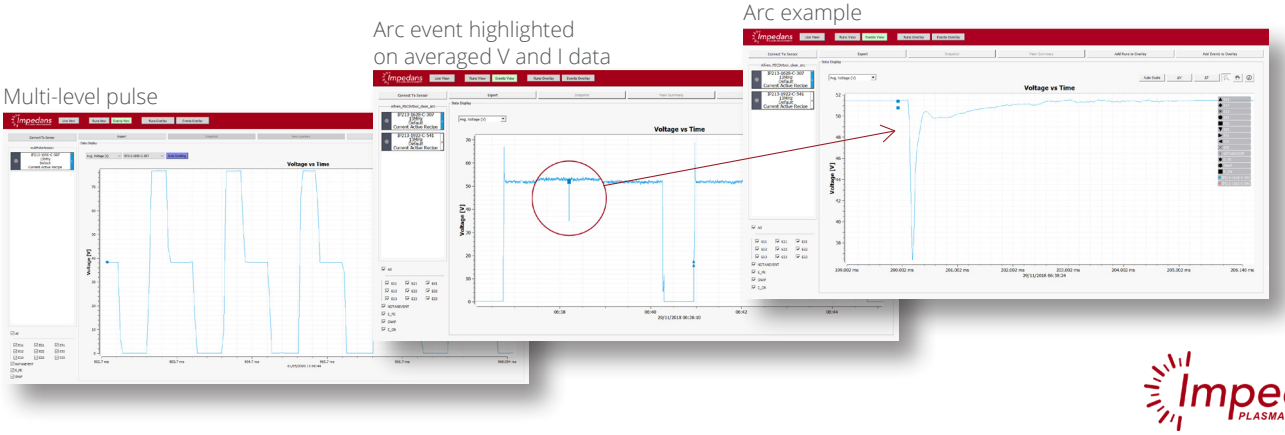
Key Benefits & Applications

- Quickly determine if arcs or atypical pulses are responsible for wafer defects.
- Pulse snapshot feature avoids inconvenient directional coupler-to-oscilloscope setup.
- Monitor average pulse frequency and duty cycle of each process step with the recipe feature.
- Monitor the number of arcs per process, which can lead to undesirable particle creation.
- On-board, intelligent data processing – microsecond data reported when requested.
- On-board memory to store data during network outage.
- Generates summary reports for your process.

Multi-level pulse

Arc event highlighted on averaged V and I data

Arc example



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Model Specifications

Model #	Part	Frequency Range	Notes
02-0493-01	Acquisition Unit	350 kHz - 500 MHz	Compatible with all antennas
02-0255-01	Acquisition Unit	40 kHz - 2 MHz	Compatible with all antennas
02-0330-01	Optical Antenna	40 kHz - 500 MHz	Optical fibre adaptor on request
02-0494-01	RF Antenna - 1x	40 kHz - 500 MHz	E and B Channel
02-0495-01	RF Antenna - 100x	40 kHz - 60 MHz	B Channel only

02-0493-01
02-0255-01

02-0494-01
02-0495-01

General Specifications

Antenna Power	5 Vdc, 4.1 mm jack
Antenna Form Factor	[40 mm x 40 mm x 40 mm] & custom
Antenna Communication	2 x SMA coaxial cables
Acquisition Unit Power Requirements	24 Vdc, 0.5 A, 4.1 mm jack
Acquisition Unit Interfaces	Micro USB, Serial, Ethernet
Acquisition Unit Protocols	HTTP Web Service
Acquisition Unit Form Factor	[122 mm x 70 mm x 41 mm]
Connectivity (Impedans Software)	Ethernet
Communication Protocols (Standard)	HTTP Web Service

Measurement Parameter Specifications

Output Parameters	V & I [Uncalibrated]
Current and Voltage Ranges	Arbitary [Adjustable Gain]
Voltage & Current Accuracy	Uncalibrated

Arc & Pulse Monitoring Specifications

Arc Duration Detection Range	1 µs to 5000 µs
Arc Amplitude Range (vs Moving Average)	1% to 100% change
Arc Categories (customisable)	9 (3 time duration ranges x 3 amplitude ranges)
Pulse Frequency Detection Range	5 Hz to 100 kHz
Pulse Level Monitoring	Up to 3 levels (e.g. high, low, off)
Pulse Timing Resolution	1 µs
Pulse Parameters Reported	Pulse frequency, Duty cycle (of each pulse level), Average, Max & min voltage and Current in each level
Max. Number of Recipe Steps	40 steps

02-0330-01