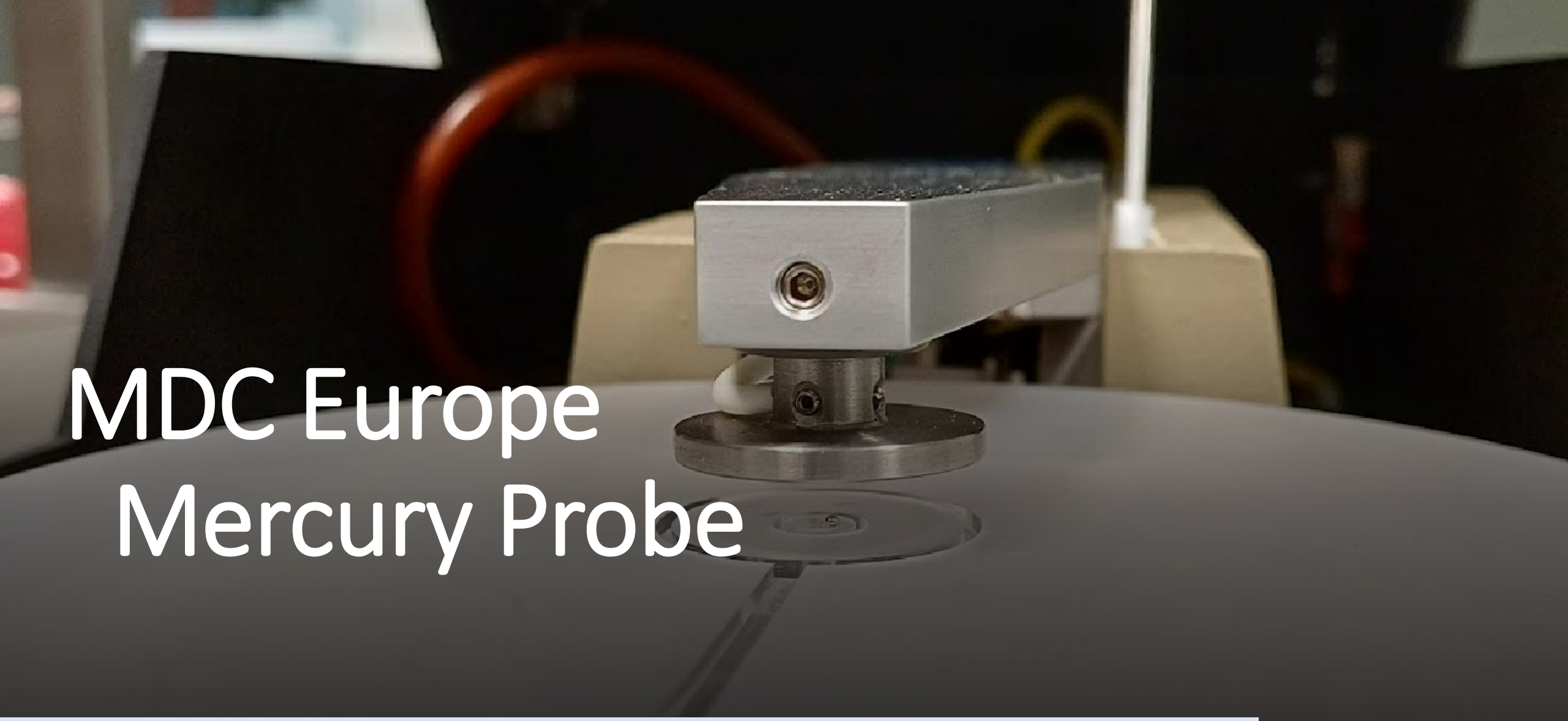


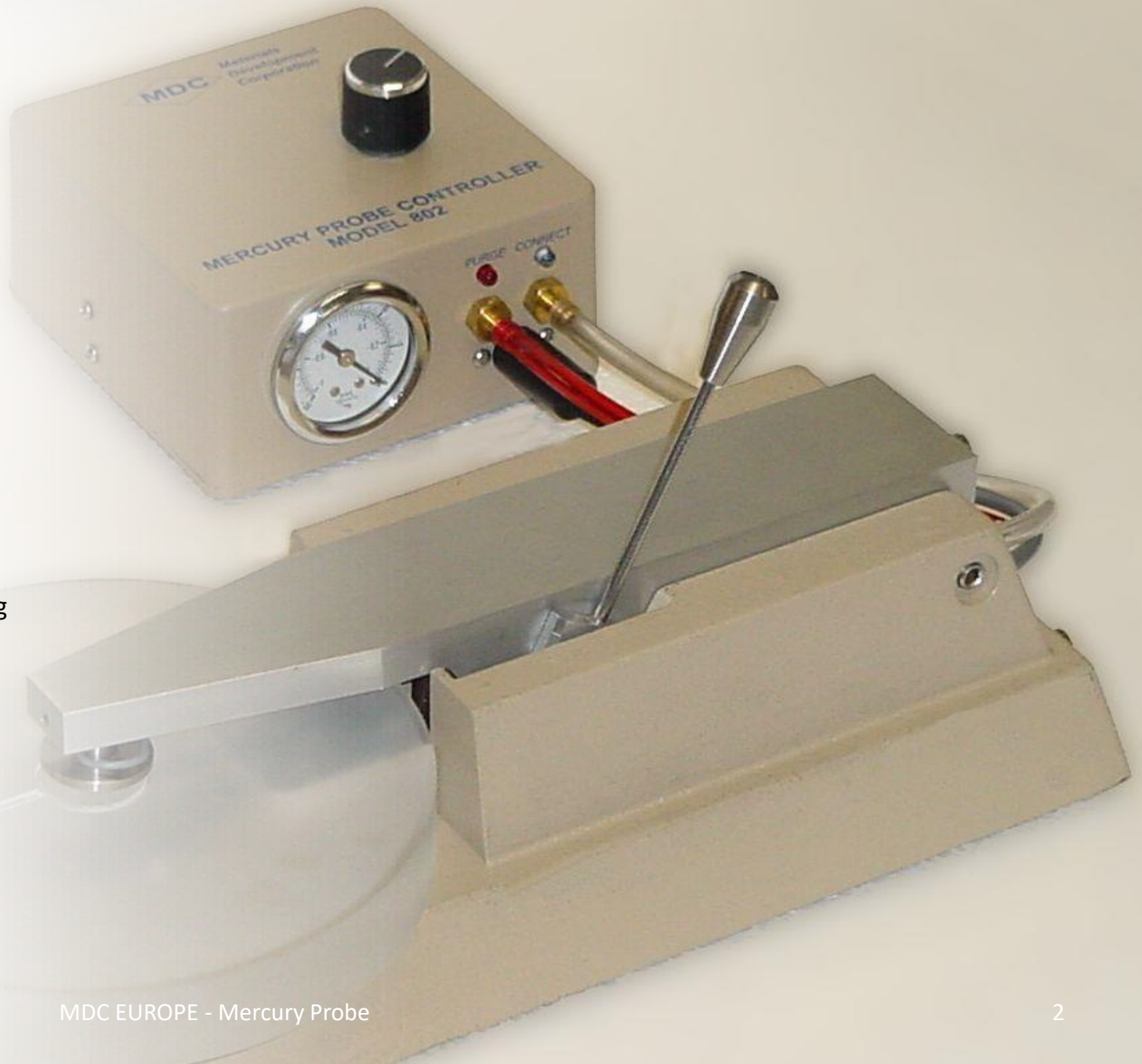
MDC Europe Mercury Probe

Materials Development Corp

Key features – Mercury advantages – Tech specs – Applications – Models – MDC Systems

Key features

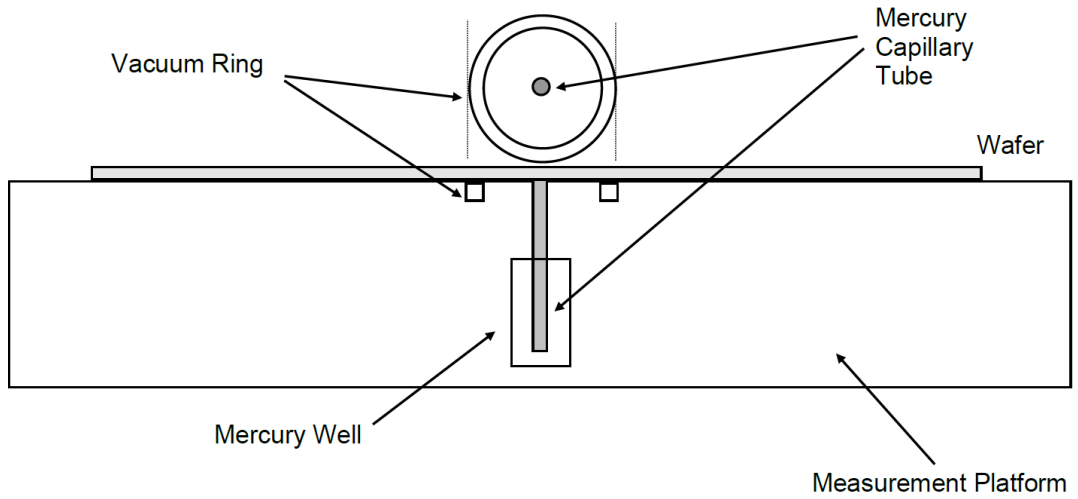
- Allows various C-V and I-V measurements
- Fast and non-destructive
- Allows measurements on non-metallized samples
- On wide range of samples/wafers
  - ✓ Bare semiconductors
  - ✓ Oxidized samples
  - ✓ MOS
  - ✓ Bulk or thin films of any material non-reactive with Hg
- Powerful CSM/Win software with large choice of measurements and analysis functions
- Ease of use for research and production applications
- High customizability
- MDC customer service : 45+ years expertise



How it works & mercury advantages

- Mercury forms well defined contact area
  - ✓ High repeatability
- Little or no sample preparation required
  - ✓ No metallization step, no radiation damages
- Concentric dot and ring mercury electrodes + backside contact
- 3 operating modes:
  - ✓ Front-Front contact
  - ✓ Front-Back contact
  - ✓ Front-Back with guard ring
- Purge control insures clean mercury always contacts wafer
- Vacuum pump in controller
- Novel fail-safe vacuum actuated mercury delivery system
- No hazardous vapors

MDC Mercury Probe Diagram

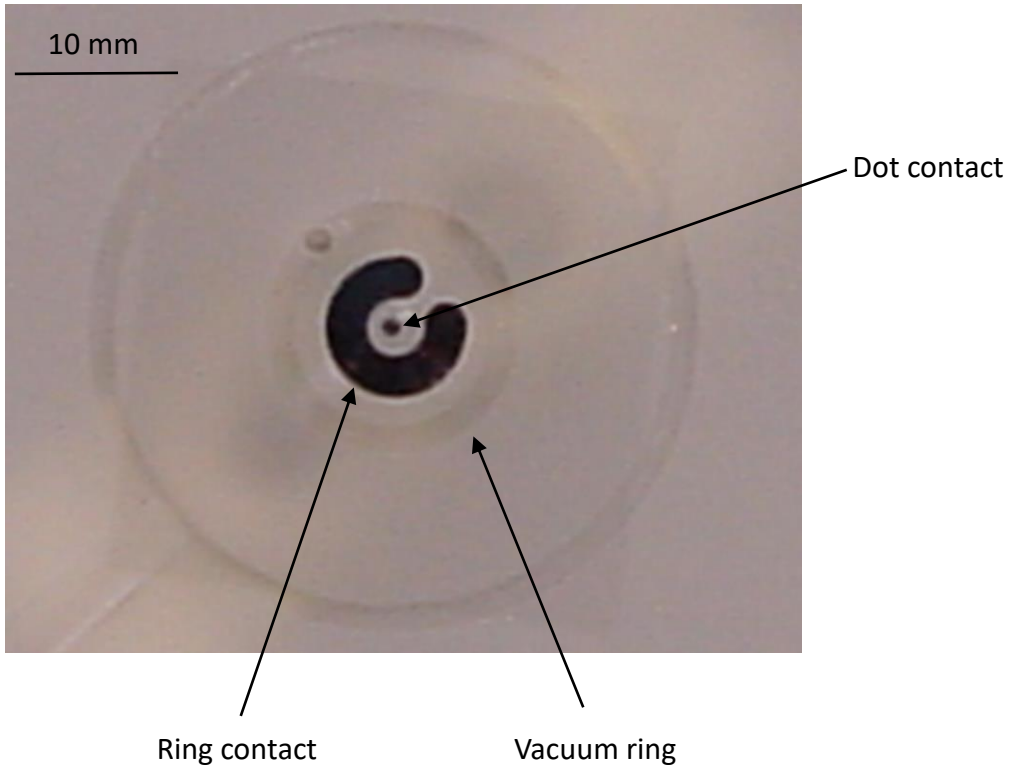


Vacuum is applied at the Vacuum Ring and mercury is drawn from the Mercury Well up the Mercury Capillary tube to contact the wafer. If the wafer is not in place on the Measurement Platform, the "vacuum circuit" is not complete and mercury stays in the well. The mercury in the Capillary Tube forms a well-defined dot where it contacts the wafer so the measurement is very repeatable. Mercury also contacts the wafer with a second ring contact (not shown here, see top view image).

Technical specifications

- Minimal sample diameter = 18mm
  - Identical to vacuum ring diameter
- Small sample adaptation : min sample diameter = 10mm
- Nominal dot contact diameter = 760µm
- Repeatability of contact area = 1.1%
- Ring contact to dot contact area ratio = 48.1 : 1
- Back contact = stainless steel
- Coaxial connexions
- Customizable contact areas!

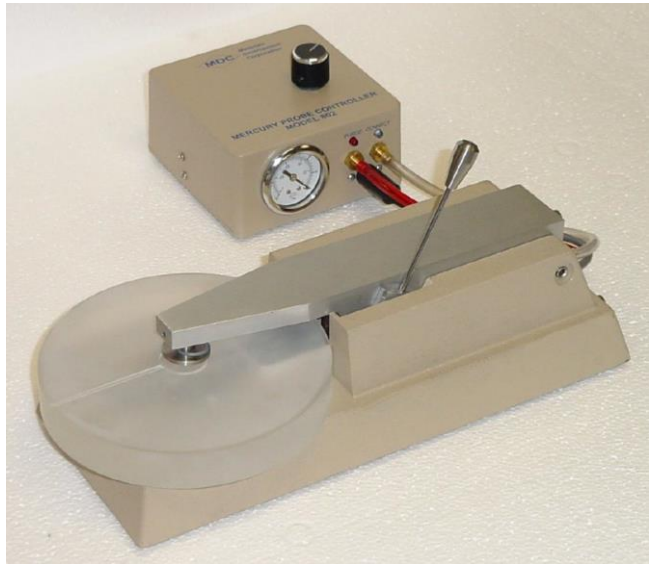
Top view of dot and ring contact



Models

- Model 802B-150
  - 150mm (6'') platform
- Model 802B-200
  - 200mm (8'') platform

- 8xxC : USB control for automatic operation with CSM/Win System
  - Increased repeatability
- Platform size is customizable!



Model 802x-150

Models 802x-custom 802x-200

Application examples

Oxidized semiconductor samples

- Form an MOS test structure for rapid insulator and substrate characterization trough C-V or I-V measurements
- Permittivity, flatband voltage, threshold voltage, interface trap density, substrate doping, oxide integrity, minority carrier lifetime, and low -dose ion implant doping profiles

Front-front measurements of MOS samples

- Avoid any backside contact problem

Bare semiconductors

- Form a Schottky barrier and allow C-V measurements and doping profile analysis
- Wafer inspection, process control of ion implants, epitaxy and diffusions

MOS measurements with all 3 contacts

- Ring contact as guard ring
- Facilitates minority carrier lifetime measurements
- Form deep depletion MOS structure

MDC Systems

MDC software features the largest choice of proven measurement and analysis functions

- MDC Mercury probe systems consist of :
  - ✓ Mercury probe / Best suited meter (Agilent, Keysight, Keithley) / CSM-Win Windows software / Computer / Cables / Dark Box for light sensitive measurements / Calibration wafers / Mercury spill kit / Maintenance kit
- Powerful and comprehensive CSM/Win software has been optimised for 30 years to allow all possible measurements and calculations
- Customized software options available
- Different system set-up
  - ✓ single frequency, multiple frequency, quasistatic
  - ✓ 100 Hz to 10 MHz
  - ✓ High voltage up to kV

Other MDC Europe products

MDC QuietCHUCK (Hot Chuck System)

- Advanced MOS device measurements
- Noise-free measurements
- Precise temperature setting
- Easy and fast mobile ion measurements using CVBT or TVS techniques for contamination monitoring of furnaces
- Computer controlled lamp for inversion stabilization
- Wide choice and customizability of chuck sizes, dark boxes, and probe configurations
- Powerful CSM/Win software with large choice of measurements and analysis functions
- Computer control of all functions allows easy use for research and production applications

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