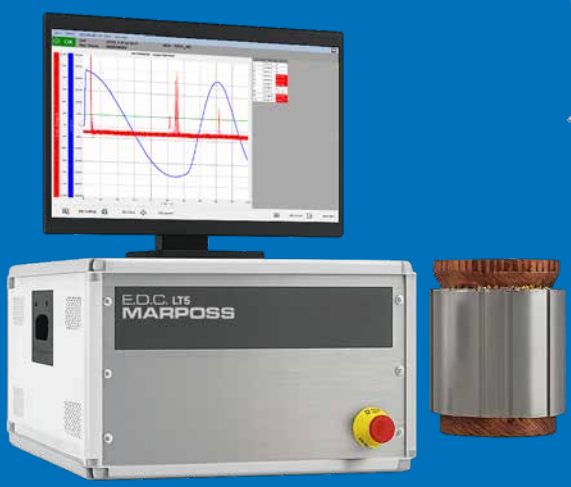
MARPOSS

EDC LT5

Laboratory system for Partial Discharge measurement



LT5 AT A GLANCE

Main technical features of the LT5 and LT5-S versions.

FEATURES	LT5	LT5-S
TESTABLE PRODUCTS	Wound stators · hairpin stators · coils · wound rotors · motorettes · wound wires · insulation samples.	
APPLICATION RANGE	R&D laboratories, quality departments, supplier qualification, process validation, life testing.	
ARCHITECTURE	19-inch 6U cabinet, external Windows 11 notebook.	Floor-standing rack 600×700×H950 mm or bench with plexiglass chamber, industrial PC.
NUMBER OF HV TERMINALS	3 terminals + GND	Configurable, more than 3 terminals on request.
MAIN ELECTRICAL TESTS	AC Hi-Pot with PD measurement · AC PDIV/PDEV with 50/60 Hz sinusoidal source · surge with PD measurement · PDIV · RPDIV/PDIV with impulse generator.	
OPTIONAL TESTS	Winding resistance · inductance · common-mode capacitance · DC insulation.	As LT5 · AC current extension up to 1000 mA · dedicated additional modules.
AC HI-POT TEST VOLTAGE	Up to 3 kV, 50/60 Hz.	Up to 5 kV, optional variable frequency up to 1 kHz.
SURGE VOLTAGE	Up to 5 kV.	Up to 7.5 kV.
SURGE DISCHARGE ENERGY	Low- and high-energy surge modules, 170 or 340 nF, suited respectively to wound stators or hairpin stators.	High-energy surge modules, the highest on the market: capacity up to 680 nF on the 7.5 kV module, set by default to 340 nF to preserve component life.
IMPULSE GENERATOR	Compliant with EN 60034-18-41 (rise time 300 ns ± 200 ns).	
BACKGROUND NOISE	< 0.05 nC with AC source · < 5 mV with impulse source.	
PD-FREE SYSTEM	Guaranteed up to the installed rated voltages.	
SOFTWARE	EDCWin.NET · management of test programs, parameters, sequences, acceptance thresholds.	
ARCHIVING AND REPORTING	CSV saving · SQL Express database · multilingual certificate printing · customizable reports.	
CONNECTIVITY	Ethernet LAN · USB.	
SYSTEM FUNCTIONS	Self-test · software calibration · preventive maintenance · remote assistance.	
STANDARDS COMPLIANCE	EN 60034-18-41 (inverter-fed machines) · IEC 60034-27 (off-line PD) · EN 60270 (general PD).	
POWER SUPPLY	230 V ~ 50 Hz, 16 A (other supply voltages on request).	

QUALITY IS BORN IN THE LABORATORY

In production, a Partial Discharge measurement identifies non-conforming parts and rejects them. In the laboratory the same measurement does much more: it tells which copper supplier produces tougher enamel, whether impregnation works, where the weak point of a new hairpin geometry lies. It is the tool with which materials, processes and designs are qualified before going into series production.

WHAT PARTIAL DISCHARGES MEASURE IN THE LABORATORY

- Supplier qualification and comparison: enamelled copper and aluminum, insulating materials, impregnation resins
- Process validation: impregnation effectiveness, role of the phase separator, winding machine parameters
- Product development: geometry criticalities on new hairpin stators, verification of critical tolerances
- Life and degradation testing: PDIV monitoring during accelerated ageing, early assessment of insulation breakdown
- Definition of the acceptance thresholds to be applied in production for in-line quality control

Since 1998 Marposs E.D.C. has been the first European company to develop Partial Discharge measurement with capacitive coupling technology; today the de facto standard for repeatable and accurate measurements, in the laboratory and on the production line.

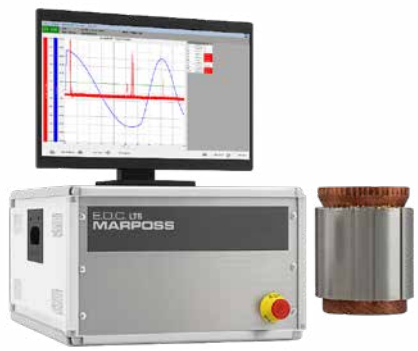
ONE PLATFORM, TWO CONFIGURATIONS

LT5 and LT5-S share the measurement principle, the EDCWin.NET software and compliance with EN 60034-18-41 and EN 60270. They differ in scale, capability and field of use.

LT5 — COMPACT SYSTEM

19-inch cabinet, managed by an external notebook with Windows 11, three output terminals plus GND.

- **For whom:** R&D and quality labs working mainly on three-phase stators, motors and coils, needing portability between departments
- **Voltages:** AC Hi-Pot up to 3 kV, surge up to 5 kV
- **Architecture:** compact and mobile, trolley option



LT5-S — EXTENDED SYSTEM

Industrial PC, floor-standing rack or bench with plexiglass chamber. Fixed station of broader capability.

- **For whom:** multi-product labs and high voltages, high-volume quality, shared set-up among operators
- **Voltages:** AC Hi-Pot up to 5 kV (freq. up to 1 kHz), surge up to 7.5 kV
- **Extended capability:** >3 HV terminals, phase R / L / C / DC insulation modules

Configured to its full capability, LT5-S performs a range of electrical and functional tests that no other system on the market covers in a single platform.

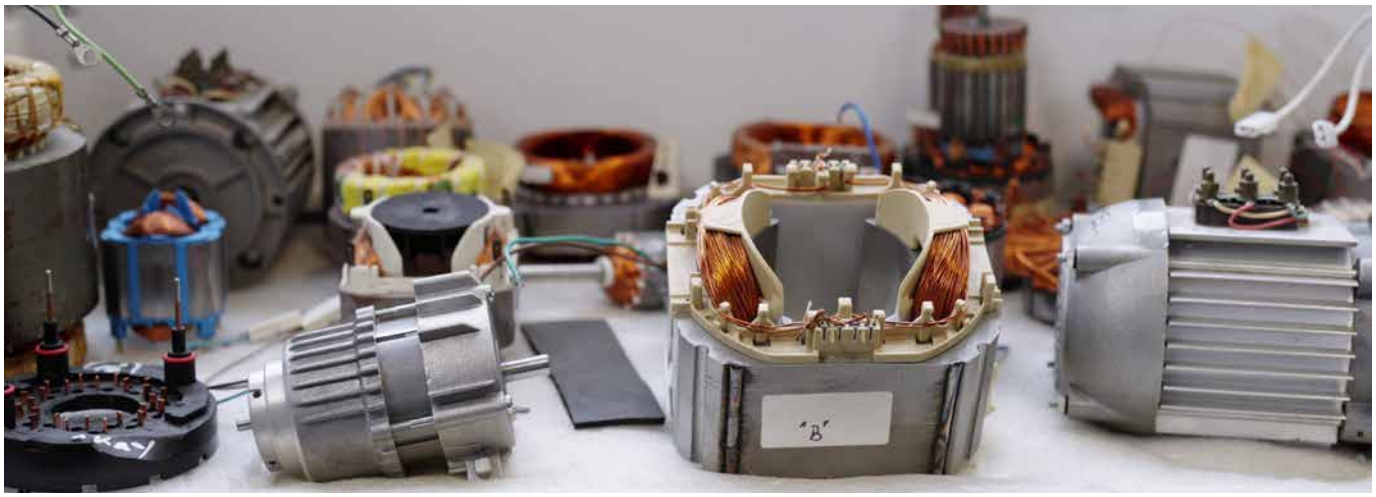
THE TOOL FOR THOSE WHO QUALIFY MATERIALS, PROCESSES AND PRODUCTS

LABORATORY APPLICATIONS

- **Supplier qualification and comparison.** Measuring PDIV on samples wound with wire from different suppliers allows the optimal supplier to be chosen objectively, independently of the declared datasheet.
- **Impregnation process validation.** By measuring the same stator before and after impregnation, and comparing resin recipes, the actual insulation gain is quantified.
- **Insulating material testing.** Objectively assess the effectiveness of enamels, resins and phase separators under voltage stress, in conditions that reproduce in-service use.
- **Latent defect identification.** Filter out defects that dielectric strength and surge tests miss; essential to define the control plan that will go in-line.
- **Life and accelerated ageing testing.** Monitoring PDIV during life tests anticipates insulation degradation assessment by weeks or months.

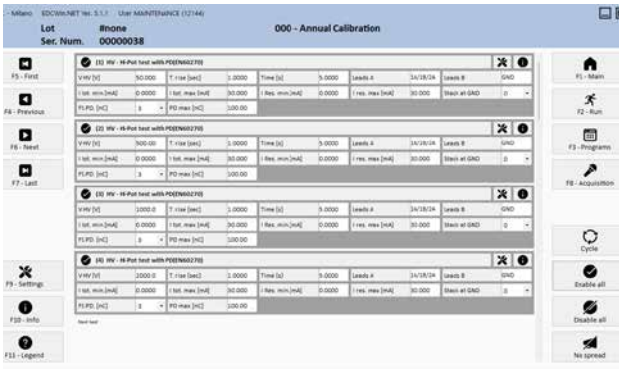
GUARANTEED MEASUREMENT PERFORMANCE

- **Background noise:** below 0.05 nC with AC source, below 5 mV with impulse source.
- **PD-free system:** guaranteed up to the installed rated voltages.
- **High-energy surge generator:** discharge capacity up to 680 nF on the 7.5 kV module, the highest on the market.



EDCWIN.NET SOFTWARE

EDCWin.NET is the single software of the Marposs E.D.C. family: it runs on LT5 laboratory systems and on AST5 automatic production systems (100% in-line quality control on stators and coils). It manages programs, parameters, sequences and thresholds; archives results and produces reports; saves to CSV or SQL Express database. Software continuity between laboratory and line is the bridge between development and production: the PDIV parameters identified on LT5 migrate in-line without rework.



THE TEST THAT SEES WHAT OTHERS MISS

A Partial Discharge is a localized electrical discharge that only partially bridges the insulation between two conductors. It is not a short circuit, it is its precursor. Every discharge leaves a micro-erosion in the dielectric; repeated over time under voltage stress, it leads to failure. In the laboratory it serves three purposes: choosing materials and suppliers objectively, validating processes before production, anticipating degradation before it becomes failure.

CONCRETE PROOF: THREE DEFECTS, THREE TESTS THAT MISS THEM, ONE MEASUREMENT THAT CATCHES THEM ALL

Marposs E.D.C. laboratory tests on a sample stator and rotor simulate three realistic defects. Each defect leaves the results of standard tests unchanged (Resistance, Hi-Pot, insulation, surge): the part would pass inspection. Only the PDIV measurement records a sharp drop.

Type of simulated defect	PDIV without defect	PDIV with defect
Insulated wire in contact with the core	1108 V	693 V
Insulation loss on the rotor	1212 V	668 V
Defect between turns of the same winding	2221 V	1199 V

Three defects that, if allowed through to production, drastically reduce motor service life under PWM drive. Three measurements that, already in the laboratory, define the thresholds production systems then use to check every part at end of line.

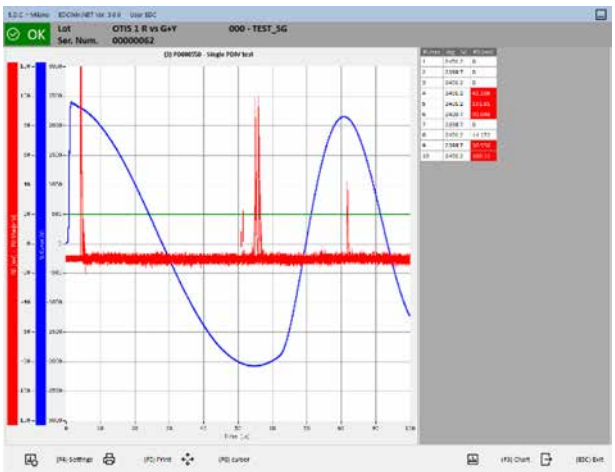
THE MARPOSS E.D.C. METHOD: CAPACITIVE COUPLING

Two ways to detect the Partial Discharges of a winding: pick them up via antenna near the part or read them from the supply circuit through a coupling capacitor. Marposs E.D.C. chose the second from the start.

- **Antenna:** also picks up ambient electromagnetic noise, requiring controlled environments to be repeatable.
- **Capacitive coupling:** electrically connected to the part, natively filters out noise. More sensitive and more repeatable, reliable both in the lab and on the shop floor.

FOUR PRODUCT-LIFE PHASES, ONE PLATFORM

- **In development**
  objective comparison between copper/aluminum suppliers, insulating materials, resins.
- **In industrialization**
  process parameter optimization: winding machine, hairpin bending, phase separator.
- **In control-plan definition**
  definition of the PDIV thresholds for series production.
- **In quality control and life testing**
  early assessment of insulation degradation before failure.



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For a full list of address locations, please consult the Marposs official website