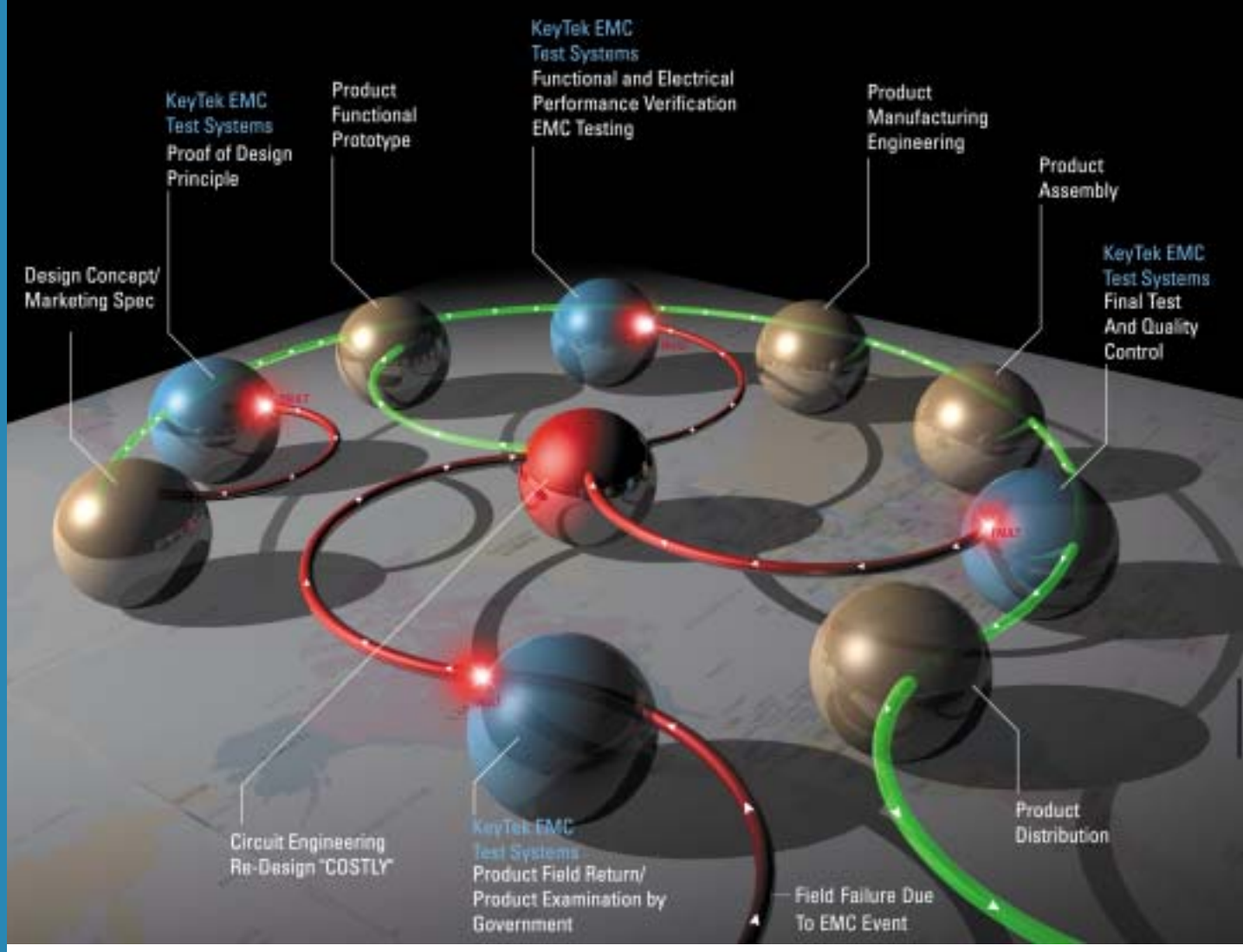
Leading The Global Charge To Achieve EMC & Quality Standards With Modular Precision EMC Test Systems

KeyTek EMC Test Systems

Analyze • Detect • Measure • Control™

Thermo
ELECTRON CORPORATION

Simplified Electronic/Electrical Product Production Scheme



EMC - A Primer

Today's electronic products - computers, communications equipment and other electronic goods - offer unprecedented performance. The speed and data capacity of these products are due in large part to high speed, low voltage digital circuitry used in most sophisticated electronics. As speeds increase, these high performance circuits become increasingly vulnerable to pulsed electromagnetic interference (EMI).

Historically associated only with radio frequency interference, today the definition of EMC has been expanded to include pulsed EMI threats such as ESD, EFT, SURGE and newer Power Quality Failure (PQF™) threats.

Without question, it is far less expensive to design EMC measures into products at the onset of development, than it is to re-design them later.

Pulsed EMI disturbances such as ESD, EFT, SURGE and PQF, both visible and invisible, range in intensity from lightning bolts to normal switch arcing, to small but potentially disastrous electrostatic discharges from the human touch, or even furniture. The blips and bumps caused by these sparks typically involve very high power or extremely fast rise times. Switching operations and faults in the power distribution system may impact the very quality of ac power mains voltage on which virtually all electronic equipment depends.

Thermo's KeyTek EMC test systems feature integrated and upgradable modular architectures that provide the means to address on-going global EMC regulations in a manner that's both technically advanced and economically feasible.

The precision with which pulsed EMI tests are performed by KeyTek EMC testers reduces over-test which may indicate unnecessary re-engineering and increased unit production expense due to over protection. They also eliminate under-test that can leave your equipment open to user rejection when standards are not met.

An Evolution In Product Reliability

Today, product reliability as it relates to electronic and electrical products has moved beyond the threat of lightning and surge events, towards more demanding and subtle problems brought on by the proliferation of micro-based and software-controlled products. As such, issues for EMC and quality engineers have evolved from the challenges of gross failure to product upset from data corruption.

Since 1996, most electrical and electronic products sold in Europe have been required to pass stringent electromagnetic compatibility (EMC) tests, per the European Union's EMC Directive. While this marked the beginning of EMC compliance requirements in Europe, regulatory standards have now spread globally, and continue to evolve in direct response to market pressures and new technologies. This is evidenced in proposed revisions to a number of IEC standards, including IEC 61000-4-4 for Electrical Fast Transients, 61000-4-5 for Surge, 61000-4-11 for Dips & Interrupts and many others, some of which may be in force by the end of 2004.

Addressing IEC Regulations . . . and much more. Our commitment to the EMC test disciplines is focused and intense. We actively participate on global standards committees, and have helped define test methodologies for regulatory standards such as CE Mark requirements.

But the fact is, EMC regulatory changes are not confined to IEC compliance. For example, telecommunications manufacturers now must comply with the new and more stringent Telecordia Protection Coordination requirements related to the GR-1089-CORE (Environmental) standard. There are also FCC, ANSI/IEEE, MIL-STD, UL and ITU (formerly CCITT) mandates, among others. And, very importantly, industry- and company-driven quality standards brought on by consumer demands for value and peak performance.

Thermo has your EMC test solution for each of these important categories. Since 1975, Thermo, and its EMC test technology predecessors, KeyTek and Thermo KeyTek, have been supporting quality and reliability efforts by supplying upgradable test solutions that faithfully reproduce evolving global and industry-defined EMC threats.

Minimize uncertainty. EMC testing can be an arduous process. Defining quality standards and test methodologies. Determining the proper testers and accessories to meet your parameters —both now and in the future. Rapid acquisition of the correct test system. Maximizing throughput critical to your success.

At Thermo, it begins with people of technology working with people of technology. Specialists who understand the challenges you face. Talking the same language. Rolling up our sleeves with you. Questioning everything. And anticipating the consequences of every action we take.

Precision KeyTek EMC test instruments and systems can help you design and produce more reliable products while achieving optimum testing efficiencies. It's what the market demands. And it's a mission we share.

So if you're an EMC quality professional, test engineer, or a component designer or integrator, let us help you achieve your goals with a solution tailored to your specific test requirements. You'll gain better control of your design and manufacturing process. You speed time-to-market cycles. And you take a proactive approach to reducing the risk, cost, and uncertainty of product development.

Best practices. Fulfilling expectations. Today, Thermo has aligned its operations to focus on fully meeting and exceeding customer expectations at every level. And, as technologies and regulatory issues evolve, to address change factors with responsive solutions. You only have to tour our manufacturing facility to understand how this commitment benefits our customers. And you're invited.

What you'll see is people driving technology. Translating "lean manufacturing" into customer-focused product development. And accepting the responsibility to make it happen, both rapidly and cost effectively. Building in quality throughout the process.

Understanding that it's not just what you do, but what you don't do that can mean the difference between success and "lost opportunity." Then, helping ensure your success with a comprehensive suite of performance-driven customer technical support services. Transforming precision EMC test technology into indispensable design and productivity tools that optimize your capabilities, and your return on investment.

One Vendor. Many Solutions. You have expectations for your EMC test systems, and for your success. For the people at Thermo, it's our business to fulfill them.

It's a fact —there's always an appropriate and cost-effective test strategy to achieve EMC test objectives. Rarely, however, does it identify itself. But with the resources and expertise the people of Thermo bring to bear, together we'll find it. And in doing so, help take you to the next level of success.

Modular, full capability EMC test systems & instruments for EFT, Surge & PQF™

Thermo's flagship EMC test system, the KeyTek ECAT® is a modular, full capability test system for measuring and analyzing the vulnerability of electronic equipment and components to pulsed EMI hazards, including EFT, Surge, & PQF™ (Power Quality Failure) to virtually all applicable national and international standards, including:

- IEC/EN
- ITU
- UL
- FCC
- Telcordia
- ANSI

A powerful design and production tool, the KeyTek ECAT features a totally integrated modular architecture that enables manufacturers and designers of communications equipment, computers, and other electronic and electrical products to easily and rapidly test for pulsed EMI threats including pre-compliance, production sampling and final compliance.

It's the only EMC test system you'll ever need.

Features

Flexible, Ready-To-Use Test Options. The KeyTek ECAT® gives you the option to purchase a complete integrated system for all pulsed EMI tests, or individual test modules that can be used as stand-alone testers. If you need to test for additional threats, or as standards change, the KeyTek ECAT can be easily expanded or upgraded, reducing costly equipment obsolescence.

KeyTek ECAT systems and modules are delivered ready for immediate EMC testing and provide an unprecedented level of operating ease, accuracy and safety.

- **Proprietary Windows-based Software Applications Package.** Eliminates need to spend hours programming in order to run meaningful, accurate compliance tests. Its flexibility allows users to quickly implement routines to meet both international and national compliance requirements.

- **Virtual Front Panel™.** Retains all key operating parameters on screen during set-up and testing for manual operation.

- **FiberCom™ Interconnect.** Non-metallic fiber-optic interconnect eliminates risk of incorrect test results from detrimental field effects in the test area. Most importantly, it safely isolates the computer and the operator from the potentially hazardous test environment.

- **Multi-Level System Interlock Architecture.** Secure interlock system provides maximum safety via traditional hardwired external interlock, internal door and remote interlock control (for use on test chamber doors, etc.). Activation results in the removal of hazardous high voltage and EUT ac power supply. System is also capable of interrupting the power to the EUT in a flashover condition.

- **Single Output Port/Instant Mode Switching.** An EUT is connected to a single output port for all pulsed EMI tests in certain sequences. Certain sequences will restrict sequence options. The need for re-booting the EUT or re-cabling to perform different tests is eliminated, providing the user with enormous flexibility and savings in test time.

- **AC Mains Current Monitoring.** System can monitor instantaneous, peak and rms values of EUT power mains input current before and after application of test pulses for valuable diagnostic and safety data.

- **Accurate, Automatic Report Generation.** Hardware/software structure enables the KeyTek ECAT to automatically generate complete, detailed test documentation, saving time and reducing the possibility of error.

- **Flexible, Economically Upgradable Modular System.** Stand-alone KeyTek ECAT instruments can be upgraded with additional capabilities at any time with the addition of economical modules; eliminates costly equipment obsolescence and redundancies.

KeyTek ECAT® Components & Modules

KeyTek SURGE Simulators. Thermo's KeyTek Series E500 Surge simulators provide repeatable surge pulses with real waveform integrity.

- Surge waveforms meet all present mainstream standards including:
  - IEC 61000-4-5
  - ANSI C62.41
  - Telcordia GR-1089-CORE (telecom & broadband)
  - UL 1449
  - FCC
  - ITU (formerly CCITT)
  - British Telecom
- Peak voltage and current measurements accurate at the EUT
- Automatically switches coupling modes on AC/DC lines
- Surges can be placed at any point with respect to the ac voltage phase to insure repeatable, worst case scenario testing

Series E400 EFT Simulators. The KeyTek Series E400 EFT simulators subject the EUT to EFT tests on the AC/DC mains, as well as input and output cables.

- Accurately generates EFT pulse bursts with the correct exponential waveforms and test pulse durations to meet national and international standards including:
  - IEC 61000-4-4 Edition 2 to 4.4 kV and 8 kV
  - ANSI C62.41
- Full control of pulse frequency within each burst and of burst repetition rate provides unparalleled coverage of EUT sensitivity
- Unique Chirp™ and 2 MHz burst frequency options simulate real world EFT events beyond the requirements of the standards

Series PQF™ Power Simulators. KeyTek Series PQF test instruments simulate and measure power mains voltage dips, interrupts, notches and swells.

- Complete capabilities for PQF immunity to national and international standards such as IEC 61000-4-11 Edition 2
- Built-in automatic inrush line qualification for determining the ability of the ac mains to supply high inrush currents, in accordance with IEC 61000-4-11
- No external equipment, such as variacs, is required
- Supports real world inrush currents and switch times, eliminating invalid test results

KeyTek ECAT® Specifications, Options & Accessories

Please refer to the KeyTek ECAT data sheet for test module technical specifications, and to the KeyTek EMC Test System Options and Accessories data sheet for available options and accessories.

KeyTek ECAT®

Modular, full capability test system for measuring & analyzing vulnerability to pulsed EMI hazards to virtually all applicable national & international standards.

Advanced EMC Immunity Test System

The KeyTek EMCPro® PLUS EMC test system is the newly-configured second generation of the field-proven KeyTek EMCPro® test system. It features resident capabilities for compliance testing to 6 IEC standards in accordance with European Norm requirements, including the revision of IEC 61000-4-4 EFT (Electrical Fast Transients) and PQF expected to be in force by the end of 2004.

The answer to manufacturers' demand for a mid-range, multi-capability EMC immunity tester, the KeyTek EMCPro PLUS is easily configured to meet today's immunity standards required for CE Marking and compliance requirements. It operates via our easy to use Windows-based PC software or from the front panel.

Portable and low cost, the KeyTek EMCPro PLUS is ideal for companies who require flexibility, versatility, and the highest test level-to-cost ratio instrument on the market.

A true, total immunity test system. CE Mark qualification is, and will remain a mandate for manufacturers. However, now many test beyond levels dictated by the EMC Directive, and have implemented aggressive company- and market-driven test programs to ensure quality and reliability in the field.

In addition, demanding national and international standards such as ANSI/IEEE, ITU, ETSI, and UL are also currently being addressed by many companies.

In response to these needs, Thermo has designed the testing capabilities of EMCPro PLUS to go well beyond those required for the CE Mark. Users can configure EMCPro PLUS to meet specific test requirements using the full line of options and accessories, including mains and I/O line coupler/decouplers, magnetic field monitors, coils and more. All accessories and options have been specifically designed to maximize the capabilities of EMCPro PLUS, and are available directly from Thermo. This ensures test compatibility and instrument reliability, and eliminates the problems that can arise from third party sourcing.

Breaking the 4.4kV voltage barrier for combination Wave, Telecom & Ring Wave Surge testing. The KeyTek EMCPro PLUS features surge testing to 6kV with the combination, telecom and ring waves. It is the only combination tester on the market to offer the combination wave with one of two additional built-in surge waveforms. As a result, manufacturers can eliminate dependence on test houses, as well as the need to purchase various pieces of expensive test equipment.

In addition, the EMCPro PLUS offers a number of unique features not available in other combination test systems. For example, the KeyTek EMCPro PLUS is the only system to monitor surge voltage and current at the output terminals. It monitors at the output of the coupling unit, and will automatically switch connections according to the coupling mode instead of measuring at the generator, which can lead to large errors. For example, if the coupling is L2 to PE, the voltage monitor is switched to L2 to PE. This results in the most accurate monitoring possible with an internal attenuator.

Highest test levels. Widest test selection. Lowest test costs. With the highest test levels, the widest selection of test capabilities and the lowest cost, the KeyTek EMCPro PLUS meets and exceeds the requirements for a wide range of engineering and manufacturing test challenges. When test requirements change, or as standards evolve, upgrading is a simple matter of adding appropriate options or accessories. This makes the KeyTek EMCPro PLUS an excellent short-and long-term testing solution.

KeyTek EMCPro® PLUS Standards

The KeyTek EMCPro® PLUS tests products for full compliance to 6 IEC standards:

- IEC 61000-4-2 ESD
- IEC 61000-4-4 Edition 2 EFT
- IEC 61000-4-5 Combination & Telecom Wave Surge
- IEC 61000-4-8 Power Frequency Magnetic Field
- IEC 61000-4-9 Pulse Magnetic Field
- IEC 61000-4-11 Edition 2 Dips and Interrupts

In addition, the KeyTek EMCPro PLUS tests beyond the test levels dictated by the EMC Directive for IEC 61000-4-5 to 6kV for both combination wave and telecom wave, as well as:

- ANSI/IEEE C62.41 (Category A & B)
- ITU Rec. K.17, K.20, K.21 (formerly CCITT)
- ETSI
- UL 864 (Ring Wave)
- UL 1449 (3kA Combination Wave)
- FCC Part 68 (Type B waveform)

Features

- **Model PRO-BASE Base Unit.** The KeyTek EMCPro PLUS base unit can be configured with multiple test capabilities in a single unit. In addition, it can be configured with one of three output receptacles:BS 1361 (British), CEE7 (Schuko) Australia/China 16A, NEMA 5-15 (US)

Base unit contains:
- Front panel for local control and operation
- Pre-programmed test routines and sequences
- The ability to customize testing via optional software
- An integrated EFT and Surge coupler/decoupler for single-phase EUT mains connection
- Coupler/decoupler features surge voltage and current monitors that automatically switch connections according to the coupling mode
- Mains voltage and current monitoring for PQF tests

- **Model PRO-ESD —ESD (Electrostatic Discharge) for compliant testing per IEC 61000-4-2 and EN 61000-4-2**. Integrated software-controlled ESD test capability reduces test errors and results in repeatable, reproducible tests with accurate control of discharge events and polarity.

- **Model PRO-EFT —EFT (Electrical Fast Transients) for compliant testing per IEC 61000-4-4 Edition 2, EN 61000-4-4 and ANSI C62.41.** Designed to meet both current and future testing needs, the EFT capability of the EMCPro® PLUS meets today's testing requirements, including the proposed revision to IEC 61000-4-4 expected to be in force by the end of 2004. It's also in compliance with proposed amendments for enhanced control of waveform parameters and higher frequency burst testing.

- **Model PRO-SURGE —Combination Wave Surge for compliant testing per IEC 61000-4-5, EN 61000-4-5, ANSI C62.41 Category B and UL 1449.** An affordable way to test to 6kV for those needing to meet multiple surgewave test requirements. Features an accurate method of monitoring surges at the output of the coupling network, and monitoring is automatically switched according to the coupling mode.

- **Model PRO-RING —Ring Wave Surge for testing per ANSI C62.41 Category A, B and UL 864.** The 100kHz ring wave replicates the surge waveform expected at the AC wall socket inside a building or residence. Although the lightning or switching surge is initially an impulse, building wiring causes the voltage to "ring." This waveform is commonly used for testing electronic products connected to the AC mains. It enables users to test to a range of ANSI and UL standards, as well as the mains testing requirement for the 100kHz ring wave.

- **Model PRO-TELECOM —Telecom Surge for compliant testing per IEC 61000-4-5, EN 61000-4-5 and ITU K.17; K.20; K.21, FCC Part 68.** The telecom surge wave simulates the type of surge expected in bundled telecommunications cables as the result of lightning. Primary arresters throughout the telecom system typically limit surges; voltages to several kV, however, can be expected in unprotected environments. The telecom wave provides the user with the ability to test to forthcoming telecom requirements specified in European Norms, ETSI and other standards.

- **Model PRO-HPOWER —Power Frequency Magnetic Field for compliant testing per IEC 61000-4-8 and EN 61000-4-8.** Electronic products are often subjected to magnetic fields at AC mains frequencies. These fields are produced in the vicinity of power transformers and can cause problems with CRTs and other electronics sensitive to magnetic fields. Generates either 50Hz or 60Hz, allowing user to test for magnetic field problems at either frequency in any laboratory.

- **Model PRO-HPULSE —Pulse Magnetic Field for compliant testing per IEC 61000-4-9 and EN 61000-4-9.** Pulse magnetic fields are produced as a result of a large current impulse through a conductor. An example is lightning current flowing through a grounding conductor at a power sub-station or in heavy industrial areas where very large current impulses are used in a manufacturing process. Test system allows users to program exact surge current test levels, and enables inexpensive testing for possible pulsed immunity problems before shipping product into harsh environments.

- **Model PRO-PQF — Dips & Interrupts for compliant testing per IEC 61000-4-11 Edition 2 and EN 61000-4-11.** System includes a built-in transformer for supplying the required 40%, 70%, and 80% dip levels, as well as the ability to switch to external voltage sources. This capability provides users with a truly complete solution, while retaining flexibility for performing custom test requirements.

- **Model PRO-SW — CEWare™ Software.** The system's Windows-based control application software provides simple, straightforward pre-programmed test sequences ideal for the novice and advanced user alike. It enables them to develop and save custom test sequences for future testing. Features include pull down windows and automatic generation of standard and custom compliance test reports. Users may program custom "pause and prompt" messages, which are then incorporated into the test sequence, as well as enter time-stamped comments without interrupting the test; both message types appear in the final, automatically-generated report. A unique fiber optic interface isolates EMCPro PLUS from the computer to safeguard it against interference from the simulator, thereby avoiding a system crash or loss of data.

KeyTek EMCPro® PLUS Specifications, Options & Accessories

Please refer to the KeyTek EMCPro PLUS data sheet and the KeyTek EMC Accessories data sheet for technical specifications, as well as available options and accessories.

KeyTek EMCPro® PLUS

EMC test system with resident capabilities for compliance testing to 6 IEC/EN standards. Fully compliant with IEC 61000-4-4 and 61000-4-11 Edition 2

Direct, Indirect & Diagnostic ESD Tester Meets Mandatory Requirements For A Company-Wide ESD Test Program

ESD is the most common cause of failure in computer-based equipment. Each year it accounts for hundreds of millions of dollars in downtime and repair costs. Fortunately, catastrophic failures are preventable, and many manufacturers have R&D and manufacturing programs to assure that their products are ESD-resistant when shipped.

However, the process of installing, interconnecting and networking of computers and peripheral equipment often produces new ESD susceptibilities leading to "hard" as well as "soft" failures such as lost data bits, check sum errors, hang-ups, etc. These can easily result in the all-too-common "no trouble found" field service reports.

The diagnosis and remedy for these failures require additional test procedures that are developed in R&D, but implemented by QC, manufacturing and field service engineers.

The KeyTek MiniZap® ESD simulator and options are designed specifically for these demanding applications.

Repeatable, real world pulses. MiniZap generates simulation pulses that are real world, repeatable and correlatable. We believe these to be mandatory performance criteria for equipment used in implementing a company-wide ESD test program.

Thermo's TRUE-ESD® innovation ensures that the KeyTek MiniZap meets these minimum criteria. Furthermore, the KeyTek MiniZap meets the IEC 61000-4-2 standards, and generates the required ESD contact-mode current risetime lying between 0.7 and 1.0 ns, as measured on a 1 GHz (or 0.35 ns risetime) oscilloscope. (Real and reasonable worst-case ESD risetimes are less than 200 ps - which is displayed as 0.35 to 0.4 ns on the same 1 GHz scope.)

By simply interchanging plug-in tips, the KeyTek MiniZap allows you to meet both the standard's 0.7 to 1.0 ns risetime, and to do "reality tests" – generating the real, <200 ps ESD risetime, to see how well your products will actually survive in their intended environment.

Rugged reliability. The KeyTek MiniZap puts high performance in a rugged, innovative unit packaged for the manufacturing floor and the field, as well as the lab. The simulator is totally integrated into one lightweight unit that is hand-held during operation and easily stored in any standard tool kit.

The KeyTek MiniZap system includes the hand held tester, ball and point tips, IEC ground cable, AC adapter/battery charger, set of four built-in long life rechargeable batteries, and instruction manual, all fitted into a soft carry case.

Features

- **Meets exact requirements of IEC 61000-4-2** – for air discharge and contact-mode testing methods requiring self-contained simulator for contact testing
- **Digital tip voltage indicator** – digital LCD voltage display directly samples and accurately indicates the actual tip voltage
- **Intuitive operation** – controls are clearly labeled and their purposes are obvious
- **Built-in safety features** – tip can never be "hot" when instrument is lying on the bench; grounding alert monitor incorporates LED display to warn operators when the ground cable is not plugged into the simulator
- **Portable & self-contained** – simulator requires no separate HV power supply/controller or HV cables
- **Field configurable** – plug-in, modular Contact Mode relay and RC network may be changed in the field
- **Battery or AC powered** – operates via AC or built-in rechargeable batteries
- **Full year warranty** – designed to survive long term use, and provide durable value even in rugged industrial and field environments

KeyTek MiniZap Specifications, Options & Accessories

Please refer to the KeyTek MiniZap data sheet for technical specifications, as well as available options and accessories, including E&H Field diagnostics, vertical & horizontal coupling planes for indirect ESD testing, plus Real, Direct & Indirect furniture simulation.

KeyTek MiniZap®

Ruggedly reliable self-contained direct, indirect & diagnostic ESD tester ideal for lab & field service.

Versatile Hand-held or Tripod-Mounted ESD Simulation System

The KeyTek Series 2000 ESD Simulation System provides a unique combination of performance features. Physically, it is housed in two interconnected units:

- **The ESD-1 Discharger (or gun).** May be either hand-held or tripod-mounted. The Discharger is made up of the basic handle, polarity switch, high-voltage set knob, Digital Stored Voltage Monitor (DVM), and audible discharge monitor that informs user when discharge has occurred.

- **Power Supply/Control/Unit PSC-1.** The Power Supply/Control Unit includes selectors for repetition rate, charge rate and burst/normal modes.

Interchangeable Discharge Networks, Current Injection Adapters and Tips all plug directly into the Discharger's barrel. The Discharge Network is also remotable via an optional cable, to provide a lighter, hand-held probe for extended testing without a tripod. In this latter mode, the Discharger may be mounted on the Power Supply/Control Unit via tripod mounting hardware, which is included.

Features

Voltage Range
- 1 to 25 kV with Ball Tip (and without Extender Cable EC-1)
- 1 to 20 kV with Point and Wedge Tips (DT-2, DT-3)
- 1 to 20 kV with Extender Cable EC-1 and any tip

Polarity
Operator-selectable (plus or minus)

Operating Modes
Single-shot and repetitive

Repetition Rates
One shot per approximately 1, 3, or 10 seconds. Fast repetition rate of nominally 20/second, for discharge distances well within breakdown voltage settings, is also available, in momentary (not lock-on) mode

Built-In Digital Voltmeter
High Voltage Trigger On: Measures and displays actual high voltage at the ESD Simulator's tip (± 5% of reading ± .2 kV)

High Voltage Trigger Off: Before tip voltage has decayed to below 300-500 V, continues to measure and display tip high voltage (± 5% of reading ± .2kV); after tip voltage has decayed to below 300-500 V, displays "Program Voltage" – the voltage that will appear at the tip when the high-voltage trigger is depressed

Display Indicators
Actual V: Indicates that the DVM is displaying actual tip High Voltage (independent of trigger position – stays on till tip voltage has decayed below 300-500 V)
Program V: Indicates that the DVM is displaying Programmed Voltage. Can be illuminated only when tip voltage is less than 300-500 V

Program Voltage Adjust
Multi-turn, long-life potentiometer, mounted in thumb accessible position on ESD gun handle

Discharge Ground Strap
Equivalent inductance to IEC-specified strap, but with insulation adequate for 25 kV; length ~ 2000 mm, or 6.5 feet

Normal/Slow Ramp Selector
Slow Ramp Position: In Slow Ramp mode, for repetition rates of one shot per 3 seconds and one shot per 10 seconds, the high-voltage ramps up slowly enough to permit the digital voltmeter to display the voltage at which the simulated ESD breakdown occurs. (Useful for applications in which the ESD gun location is fixed.)
Normal Ramp Position: Preferred for most other work. The high voltage ramps up rapidly, thereby minimizing stress on internal high-voltage components, with consequently prolonged instrument life and reliability

Normal (single-shot) Burst Selector
In Burst position, allows realistic simulation of multiple discharges even when ESWD tester is on a tripod or fixed location. Requires Discharge Network

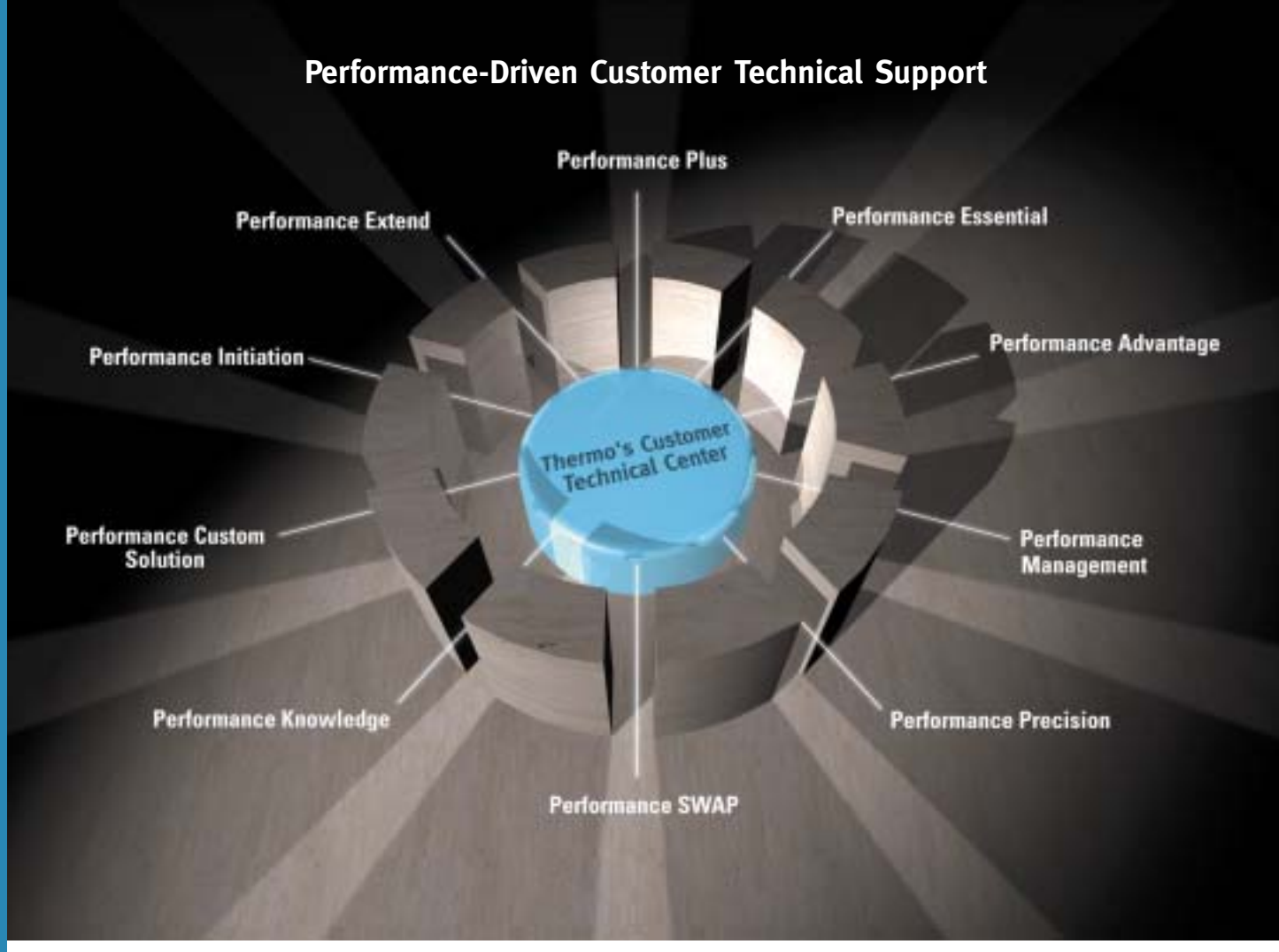
Bundled Convenience & Economy

Specific KeyTek Series 2000 Model Groups (bundles) have been identified to help users select the ESD test capabilities most appropriate to their immediate needs – please inquire or see KeyTek Series 2000 Product Specifications & Bundles data sheet. Expansions and additions can be made at any time to bundled offerings, including discharge tips and allied accessories to test to IEC, ANSI, SAE and MIL-STD specifications.

KeyTek Series 2000

Hand-held or tripod-mounted 25kV ESD test system featuring interchangeable plug-in discharge networks, current injection adapters & tips.

Performance-Driven Customer Technical Support



Thermo's Customer Technical Center

People of technology working with people of technology. At Thermo, helping you achieve your technical objectives doesn't stop once your precision test systems are shipped. The fact is, ongoing technology and regulatory changes alone require diligent follow-up and support to ensure you're addressing critical technical issues with maximum efficiency and economy.

As a Thermo customer, you can depend upon us to provide lifelong technical service. Value-added service you'll only find when people of technology work in partnership with people of technology. It's one of the reasons you'll find a test engineer at the helm of Thermo's Customer Technical Center. And why our service offerings give you direct line access to engineering and allied technical professionals who speak your language, and talk your talk. So you don't need a translator to get the technical answers you need. Or for that matter, for the questions you ask.

Performance drives success. Thermo's commitment to technical customer support is manifest in the name of its service offerings: Performance.

More than a notion of "customer service," Thermo's Performance plans mean action. Action that empowers you to solve problems. Maximize resources. Meet customer deadlines. Address regulatory mandates. Project expenses. Contain unforeseen costs. And help make you more successful.

We also understand "success" means different things to different people. So with this in mind, we developed the Performance technical services suite to offer you flexibility to tailor a plan specific to your needs. And then, to complement your plan with sound technical thinking and problem-solving assistance.

You'll also find services such as scheduled maintenance and calibration services to help keep your instruments in peak operating condition, while sustaining a substantial return on investment.

In short, access to Thermo's Customer Technical Center can enhance the performance of virtually every aspect of your test operations. And as a Thermo customer, you're always welcome.

Single Source Total EMC Test Solutions

Experience the many benefits of working with recognized experts in the field of EMC (Electromagnetic Compatibility) testing. Our commitment to the discipline is wide ranging; we actively participate on global standards committees, and have helped define test methodologies to achieve regulatory standards such as CE Mark requirements, as well as company- and market-driven product quality objectives.

Our goal is to support you with lifelong service — from applications support, calibration services and preventative maintenance scheduling to full tactical field support.

Thermo can help you reach the next level of success.

Please also see the KeyTek EMC Test System Options & Accessories data sheet for additional KeyTek ECAT test system options, including probes, couplers/decouplers, docking bays, stands, and accessories.

Specialists who understand the challenges you face. Innovative ideas. Leading technologies. Breadth of EMC test equipment. Thermo—your EMC test solutions partner. Contact us today for details.

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