

AUTOMEG

Automatic, high voltage test system for wire & cable harnesses and electrical interconnect assemblies



AUTOMEG

Our harness testing powerhouse - modular, accurate, and user-friendly.



Automeg offers powerful, flexible, simple to use and industry-compliant testing capabilities.

The systems ensure the wiring and components are 100% compliant and undamaged. And they record every test measurement, aiding diagnosis of detected faults.

Our wide range of different models mean there's a system suitable for almost every application out there, whatever your test environment.

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"We really value the flexibility of the system and the quality of the results...it delivers exactly what we asked for."

Zander van der Steege, Project Test Engineer, Santon Switchgear

SOME OF OUR AUTOMEG CUSTOMERS



CUSTOMER CASE STUDIES



Automeg F1500 Harness Test System

Automeg D1500 distributed system

IteI Electronics have been designing and manufacturing high performance cable harnesses since 1991. Their customers are primarily in the aerospace, space and defence sectors where reliable quality is crucial.

MK Test Systems were identified by CRRC (then China CNR) as a specialist of high voltage electrical testing equipment capable of providing equipment, training - and crucially local support via MK's Hong Kong office.

Many of IteI's customer projects support life critical applications. It's therefore essential that they are able to validate the quality of their products.

MK Test's existing relationships with rail sector manufacturers and wire harness suppliers provided CRRC with the confidence to commit to a D1500 distributed Automeg system.

IteI use the F1500 to carry out continuity, HiPot and DC IR tests. Installing the Automeg F1500 has resulted in increased production output with the benefit of greater accuracy.

The system continues to provide CRRC's production teams with the certainty of quality assurance in their testing.



"MK are the industry standard for automated test equipment."
 Sam Baker, Sales Manager,
 IteI Electronics

ACCURATE, FAST HARNESS TESTING ENABLES ITEI TO KEEP PACE WITH PRODUCTION REQUIREMENTS

IteI Electronics have been designing and manufacturing high performance cable harnesses since 1991. Their customers are primarily in the aerospace, space and defence sectors where reliable quality is crucial.

THE INEFFICIENCY OF MANUAL TESTING
 Keeping pace with the required production output whilst also maintaining high levels of accuracy during electrical testing of wire harnesses was always a challenge for IteI Electronics.

When wire harnesses have a large number of wire lines and/or are of a significant length, manual test equipment is less accurate, time consuming, and prone to human error. This ultimately leads to a less competitive and potentially inferior solution.

| | |
|---------------------|--|
| CUSTOMER: | IteI Electronics Limited |
| REGION: | EMEA |
| SOLUTION: | Automeg F1500 |
| APPLICATION: | Wire harness testing for the aerospace and defence sectors |
| OUTCOME: | Increased production output, reduced testing time, higher accuracy |
| BENEFITS: | Faster set-up time, testing with quicker error recognition |

MK TEST SYSTEMS

LOCAL SUPPORT WITH GLOBAL INDUSTRY KNOWLEDGE JUST THE TICKET FOR CRRC

MK Test Systems were identified by CRRC (then China CNR) as a specialist of high voltage electrical testing equipment capable of providing equipment, training, and - crucially - local support.

Headquartered in Beijing, CRRC Corporation is the world's largest supplier of rail transit equipment with the most complete product lines and leading technologies. Its main business includes the R&D, design, manufacture, repair, sale, lease and technical services for rolling stock and urban rail transit vehicles.

THE PROBLEM
 CRRC were looking for an automatic high voltage high current test system, including multiple function test capability, over 1200 test points. In addition, they were looking for local support and a company with knowledge of the rail sector.

Read more about the **SOLUTION** over the page...

| | |
|---------------------|---|
| CUSTOMER: | CRRC |
| REGION: | Asia |
| SOLUTION: | D1500-HVAC (High Voltage AC) system with 1200 test points |
| APPLICATION: | High voltage testing of high speed train |
| OUTCOME: | Successful installation with local testing & support facilities, of test system |
| BENEFITS: | Local support & service, assurance of a global network of test system |

MK TEST SYSTEMS

APPLICATION EXAMPLES

CABLE HARNESS TEST

Automeg can be delivered in static bench-top rack format or mobile cabinet format. This is the base application for Automeg, where the system is used to test the wiring integrity of harnesses.

Tests typically include continuity test, short circuit test, capacitance tests, high voltage insulation and hi-pot test, and test of components built into the harness.



MAJOR ASSEMBLIES & FULL AIRCRAFT OR VEHICLE TEST ON FINAL ASSEMBLY LINE (FAL)

Full vehicle testing is a key application for Automeg. Here the system is supplied in distributed format, with one main control station controlling a number of distributed “satellite” switching units. All Automeg systems can be supplied in distributed format.

The distributed system places the system test points close to the areas of interface and reduces the amount, size, and length of interface cables. The satellite switching units can be in standard rack format, mobile cabinet format, ruggedized housings, and active LRU format.

In Final Assembly applications, Automeg is used to perform a wide range of testing, from point-to-point wiring (continuity), short circuit isolation, high voltage insulation, capacitance and impedance, function testing of passive components, circuit breakers and switches and lights, to function testing of active components such as relays, contactors, and solenoids.

ELECTRICAL MANAGEMENT & POWER DISTRIBUTION PANEL TEST

Automeg is used to test the integrity of the most complex management panels.

The internal harness and circuits are tested using continuity tests, short circuit tests, capacitance tests, high voltage insulation resistance and Hi-pot tests, and the components such as circuit breakers, switches,

LEDs, diodes, zener diodes, relays and contactors are tested either under automatic operator instruction or via the automatic stimulus supply functions.



AIRCRAFT ENGINE “E-TEST” & FUNCTION TEST OF ELECTRO MECHANICAL ASSEMBLIES

Automeg is used to test the integrity and health of the engine’s electrical system. The system is used in both original manufacture and maintenance facilities.

The system is connected to the engine’s harnesses via adaptor cables, and the harness is tested for continuity, short circuits, capacitance, and high voltage insulation resistance and hi-pot. Once the harness has been validated, the test system then energises and exercises the active components in on the engine such as relays, igniters, sensors and solenoids. Within minutes the system delivers a full report of the status of the individual harnesses and components.

In this application Automeg offers extreme benefits in reducing turn around time (TAT) and eliminating failures on wing.

MODULES

Automeg is built to your specification from a range of standard modules:

CONTINUITY TEST & RESISTANCE MEASUREMENT IN 2 & 4 WIRE (KELVIN) MODE

Test for incorrect wiring, mis-wire, loose connections, incorrect wire gauge, failed/incorrect components, bad joints and crimps.

SHORT CIRCUIT TEST & RESISTANCE MEASUREMENT IN 2 & 4 WIRE (KELVIN) MODE

Test for incorrect wiring, crossed wires, failed or incorrect components, any unwanted connection / conductor path.

HV DC INSULATION RESISTANCE TEST

Test for damaged or faulty insulation by measuring specific insulation resistance value of each conductor or group of conductors.

HV DC HI-POT & DIELECTRIC TEST

Test for damaged or faulty insulation by measuring specific current leakage value of each conductor or group of conductors, using high voltage DC.

HV AC HI-POT & DIELECTRIC TEST

Test for damaged or faulty insulation by measuring specific current leakage value of each conductor or group of conductors, using high voltage AC

CAPACITANCE MEASUREMENT

Test for correct capacitance of Shielded cable, coaxial cable, twisted pairs, and components / capacitors. The capacitance module also offers Distance to Fault indication for open and short circuit failures.

COMPONENT TESTING

Test for correct location and characteristic of circuit components – diodes, resistors, zener diodes, transformers, inductors, fuses, transistors, sensors etc.

ACTIVE COMPONENT & FUNCTION TESTING

Test for correct function by automatically stimulating the active component and measuring / detecting the function of that component – relays, contactors, motors, actuators, solenoids, sensors etc. This is achieved by adding the MK EEM Stimulus modules and software controlled power supply units to enable required stimuli and measurement to take place simultaneously.



TIME BASED FUNCTION TESTING

Test function of circuit and circuit components where time and measurement trace is especially important using the Oscilloscope module:

Slip Ring Testing: Testing for resistance and noise throughout the rotation, and deliver a resistance trace record.

SSPC (Solid State Contactors): Measure the function time (μs), inrush current, steady state current and deliver trace record

THE WIDEST CHOICE OF HIGH VOLTAGE TEST ALGORITHMS

The MK Test system utilises a true random switching relay format. This means that each test point can be treated independently and offers the widest range of testing options. Specifically this enables a true '1 to all' HV test demanded by the most stringent aerospace and defence testing specifications.

SPECIAL PROJECT TEST OPTIONS

Fibre Optic Test; Databus Test 1553B, 3910, ARINC, CAN; Digital Logic Test; RF Test; TDR & FDR etc. Integration of external devices and instruments to enable wider testing capability under single software and data management control.

RANGE & SPECIFICATIONS

Our range of Automeg models have the modular flexibility to be customised to suit your exact requirements.

Our sales team can help you configure the perfect spec for your needs, but this guide is a useful starting point. As an overview, all Automeg models offer the following features:

- Continuity resistance measurement, low voltage isolation test (short circuit), and high voltage DC insulation resistance testing as standard.
- Optional high voltage AC HiPot testing, capacitance measurement LCR modules
- Optional function test stimulus switching modules and power supplies to enable actuation and function test. Note: This option is suitable for testing a small number of active components in the assembly under test. For testing larger amounts of active components, we recommend a full function test system from our E or M series.
- Integration with a range of third party sources, scopes and measurement modules.
- MKAT, our test management software which combines ease of use with powerful test program creation and management capabilities. Learn more about MKAT on page 7.

All systems can be configured to suit your operation and application, from static rack cabinets to heavy duty mobile cabinets suitable for harness shop floor or final assembly environments. We also offer distributed and fully portable systems.

Our range of Automeg models break out into the following groups:

T Series: This model is named T for two wire, because our T series applies 2 wire continuity resistance measurement. If your test requirement demands a high test point count and only needs continuity resistance measurement down to 0.1Ω , then the T series is your entry level, lowest cost, automatic test option.

F Series: The F series is our dedicated 4 wire test Kelvin measurement solution. As per the T model range, F stands for four wire. When your continuity and resistance measurements need to be milliohm-accurate, the dedicated 4 wire F system guarantees you the best possible accuracy. This series is therefore ideal for testing critical cables, components, shielding joints and low resistance connections.

D Series: The D series is our most popular model for standard electrical harness testing. It offers both 2 wire and 4 wire resistance measurements, as well as the ability to mix these modes in a single test program. The D series models can handle a mix of resistance measurements down to $2m\Omega$. The result is an extremely flexible system which enables rapid automatic testing of complex assemblies.

Continued over the page...



E Series: The E series is our entry level multibus function test solution. If your product has active components or you might need to function test active assemblies in the future, the E series offers both measurement and function test capability. Each E series relay card can be used as either a measurement card or a functional stimulus switching card. The only restriction with the E series is that the card can be used for either measurement or stimulus switching during a subtest, so you need to plan your test interface to enable a full functional test. The E series is your ideal solution if active component density is low or your designs are stable.

M Series: The M Series offers the highest level of flexibility. These systems can be used in both 2 wire and 4 wire kelvin measurements and they can also deliver functional stimulus from any test at any time. As with the E series, the card can be used for either measurement or stimulus switching during a subtest. The M series simplifies your interface design as each interface channel can be used to both measure and stimulate, so no need for a complex Y cable interface. For example, when testing a contactor the system measures the resistance of a coil and then stimulates the coil using the same test points and same interface wire. It then measures the change in contact resistance concurrently. If your active component density is high, or your active product format is flexible then the M series is your ideal system.

| TESTS & FEATURES | AutoMeg | | | | | | | | | | | MultiBus | | |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|
| | D1500 | D2500 | F1500 | F2500 | F3500 | T1000 | T1500 | T2500 | T3000 | T3500 | T6000 | T8000 | M1500 | M2500 |
| Test & Measurement | | | | | | | | | | | | | | |
| Continuity: Dual-wire | Y | Y | | | | | | | | | | | | |
| Continuity: 4-wire | | | Y | Y | Y | | | | | | | | Y | Y |
| Continuity: 2-wire | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Shorts | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Insulation and Hi-Pot | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Capacitance | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Inductance | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Temperature & Humidity | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Function testing | | | | | | | | | | | | | Y | Y |
| Layout options | | | | | | | | | | | | | | |
| Rack housing | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Single or distributed satellite switching | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Static desktop | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Portable & ruggedised | Y | | | | | | | | | | | | | |
| Features | | | | | | | | | | | | | | |
| Maximum insulation test voltage | 1500Vdc | 2500Vdc | 1500Vdc | 2500Vdc | 3500Vdc | 1000Vdc | 1500Vdc | 2500Vdc | 3000Vdc | 3500Vdc | 6000Vdc | 8000Vdc | 1500Vdc | 2500Vdc |



The key to understanding which system is the right one for you is knowing your test requirements. Ideally, you'll be able to tell us the following details:

- Number of test points (to test a single 2 wire if required, 4 for kelvin measurements)
- Maximum voltage required for AC and DC insulation tests
- If you require a static, mobile or distributed system
- Your interface requirement – standard or custom
- Is energisation required? If so, what is the maximum current and voltage?
- Do you require high current switching (more than 2 Amps)?
- Do you need to test capacitance?

Our sales team can advise on the best system for you and recommend any additional modules.

MKAT TEST MANAGEMENT SOFTWARE

"From creation of test programs through to fault diagnostics, MKAT supports your business needs whilst giving engineers control over testing."

In our 2022 survey, 87% of our customers said MKAT software was easy to use.

"When combined with our Multibus test module, the Active APG tool provides world leading function test capability."

All MK Test systems run on MKAT, our test management software combining our renowned ease of use with highly advanced technology. It's all driven by our goal of simplifying the test process for our customers.

SIMPLIFYING THE TESTING PROCESS AT EVERY STAGE

Whilst we pride ourselves on the robustness and reliability of our hardware, it is our software which makes our systems stand out from our competitors.

We've spent years developing and refining our software to make it simple to use yet powerful.

CREATING THE TEST PROGRAM

Create a test program without having to learn a programming language. We use standard wiring input of Netlist, connection tables and interface adaptor tables to create test programs.

Test parameters such as current, voltage, resistance and dwell can be set by test, group or connection. Tests are enabled or disabled by simple click of a button.

APG

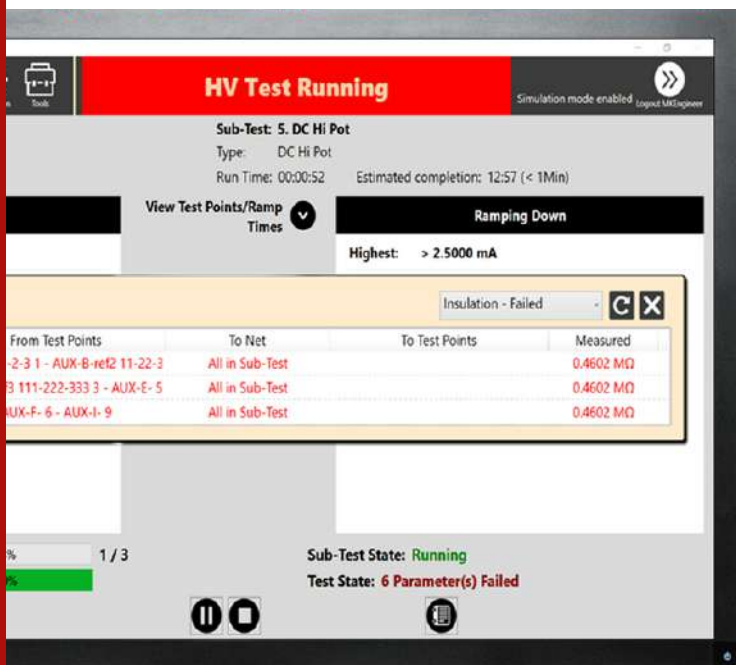
Automatic Program Generation (APG) is included in the MKAT test management software as standard.

Our APG toolset allows the user to re-map fields and use their existing data formats.

EASE OF USE

Creation of the test program is only the start – our software makes the test process simple.

Operator instructions and prompts can be easily added to any program, and automatic test reports and fault diagnosis tools inform the operator of the nature of the failure and how to fix or retest the fault.



ABOUT US

We've been designing and manufacturing automatic electrical test equipment for 30 years. In that time, we've provided systems to customers around the world, in the following industries:



- Aerospace
- Automotive
- Defence (US DoD CAGE code 8EGR1)
- Industrial, Power & Control
- Subsea
- Trains

Our range of products enable rapid, automatic testing of engines, wiring harnesses, slip rings and other vital components.

We can work with you wherever testing is undertaken, at any stage of the product lifecycle. This may be at component manufacture stage - providing quality assurance to subcontractors - or at the final assembly stage, ensuring complete confidence in the final product. Beyond this, we also provide testing solutions for MRO and servicing.

TALK TO US

Our UK head office is supported by satellite locations in the US and Hong Kong. With our large global network of reps and distributors, you can be assured of local support, sales and training.

FOLLOW US



For your local contact details, please visit our website, www.mktest.com.

