



# **POWER & CONTROL**

*Electrical test applications*



[www.mktest.com](http://www.mktest.com)

# EMPOWERING BETTER TESTING.

**Testing and measurement of the performance of power lines, cables and connectors, and essential switching equipment is a vital aspect of both the production process and the transmission and distribution networks of national power systems.**

Every mass transit system has power distribution at its core. Power distribution by its nature has many electrical connections and multiple relays to send power in different directions depending on the control systems requirements.

The combination of high power and the high density of components and wires make testing this system especially challenging.

Our ability to create complex test sequences directly from ECAD data and resolve stacked relay sequences automatically sets us apart. This capability in conjunction with the ability to switch the high voltages of any ATE test system, places our technology in a unique position.

Testing capabilities across our range include: Continuity resistance; short circuit; HV insulation resistance; HiPot (dielectric withstand); functional testing of active components; isolation testing; capacitance; and bond, loop & joint resistance testing.

This brochure provides an overview of test applications within the power & control sector, and includes our recommended system solutions for every stage in the network.

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# OUR ROLE WITHIN YOUR BUSINESS

**MK Test Systems have over 30 years of experience in providing high and low voltage electrical testing equipment, procedures and measurement standards that have supported manufacturers and subcontractors supplying power and control equipment.**

In manufacturing production and servicing environments, for both OEMs and servicing subcontractors, testing needs to be carried out at numerous stages - from component level through to full assembly - to minimise the chance of errors being overlooked.

Equally within the power management environment there is a focus on ensuring the sources of power are not only fully integrated but are part of a fully reliable transmission and distribution system. This ensures that full value is derived from all sources of energy, be it renewable (wind, wave, solar), nuclear, or traditional (oil, gas, coal).

Power and control testing is essential in this sector to ensure stability and operational security.



# POWER & CONTROL CUSTOMERS

HUBER+SUHNER

MOOG



## CUSTOMER CASE STUDIES & TESTIMONIALS



Pandect Precision Components are a globally-recognised slip ring design and manufacturer. Winning a contract for a large quantity of slip rings led to their investment in an F1500 SRT system.

*"The MK tester is very reliable - the repeatability is what makes it valuable."*

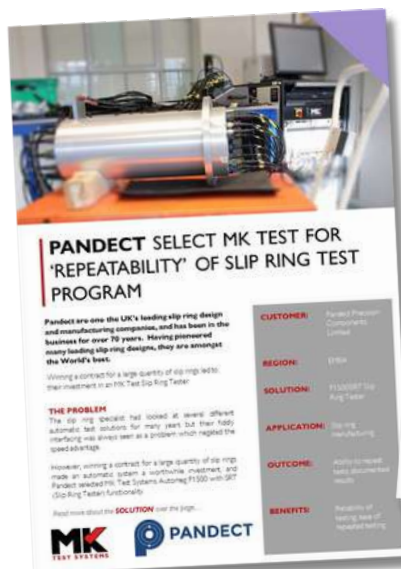
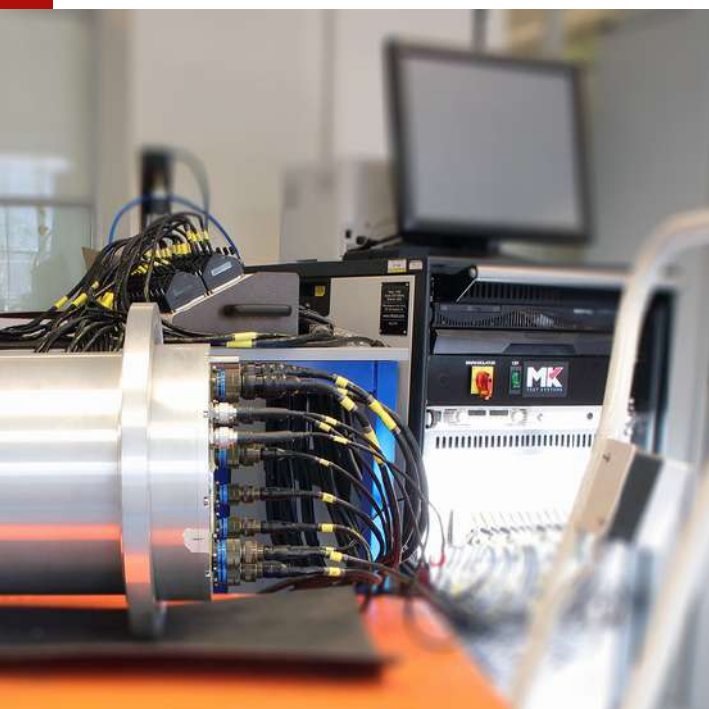
Peter Hicks - Chief Electronics Engineer, Pandect



Santon Switchgear have implemented an F2500 Automeg system into their production process, enabling an "all-in-one" method. What was previously a 1 hour test now takes just 5 minutes; a 91% reduction in test time.

*"We really value the flexibility and the quality of results. The F2500 enables quicker all-in-one testing, with fast error recognition showing the exact switch connection that caused the tests to fail."*

Zander van der Steege - Project Test Engineer, Santon Switchgear



Download these case studies and more from our [website](#)

# APPLICATIONS & RECOMMENDED PRODUCTS

## *Wiring harnesses and looms*

Products: Automeg, RTS.



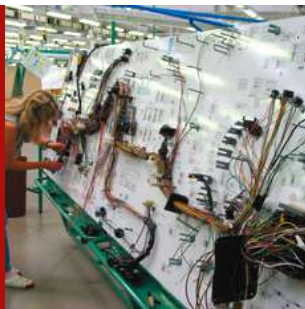
## *Switching equipment*

Products: Automeg, Portable Automeg, RTS.



## *Complex wired assemblies & distribution panels*

Products: Automeg, RTS.



## *Power management & distribution cabinets*

Products: Automeg.



## *Renewable energy installations*

Including solar power and wind energy generation.  
Product: Automeg, Portable Automeg.



## *Electrical assemblies & connectors*

Products: Automeg, RTS.



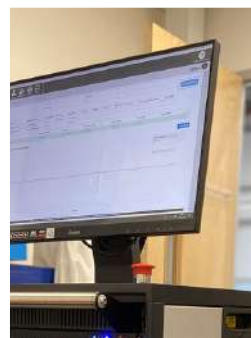
## *Wind power turbines*

Manufacturing & preventative maintenance, specifically function & bond testing. Products: Portable Automeg, BLRT, BLTU4



## *Slip Ring & Commutators*

Manufacturing, and Integration. Products: SRT



*From left to right: Automeg, Portable Automeg, RTS, SRT, BLRT, BLTU4. Automeg is available in a wide range of formats and specifications, including for full functional testing - see page 5. Under MK Test's continuous improvement programme, product specifications and formats are subject to change.*

# WIRE HARNESS TEST SYSTEMS

**We offer an extensive range of electrical harness test systems, and have the modular flexibility to customise all models 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 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 9.

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  $0.1\Omega$ , 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.

**SRT (Slip Ring Tester):** The SRT module is added to our Automeg systems to create an automatic slip ring test system. It offers fast and accurate reporting of noise, contact resistance and insulation resistance. SRT systems have an integrated oscilloscope for dynamic resistance traces per ring, offering complete QA and reporting. The benefits of using an automated slip ring tester include automated, repeatable test programs, low resistive noise and automatic scope trace control. SRT also communicates with third party environmental test systems such as climatic chambers and vibration beds.



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:

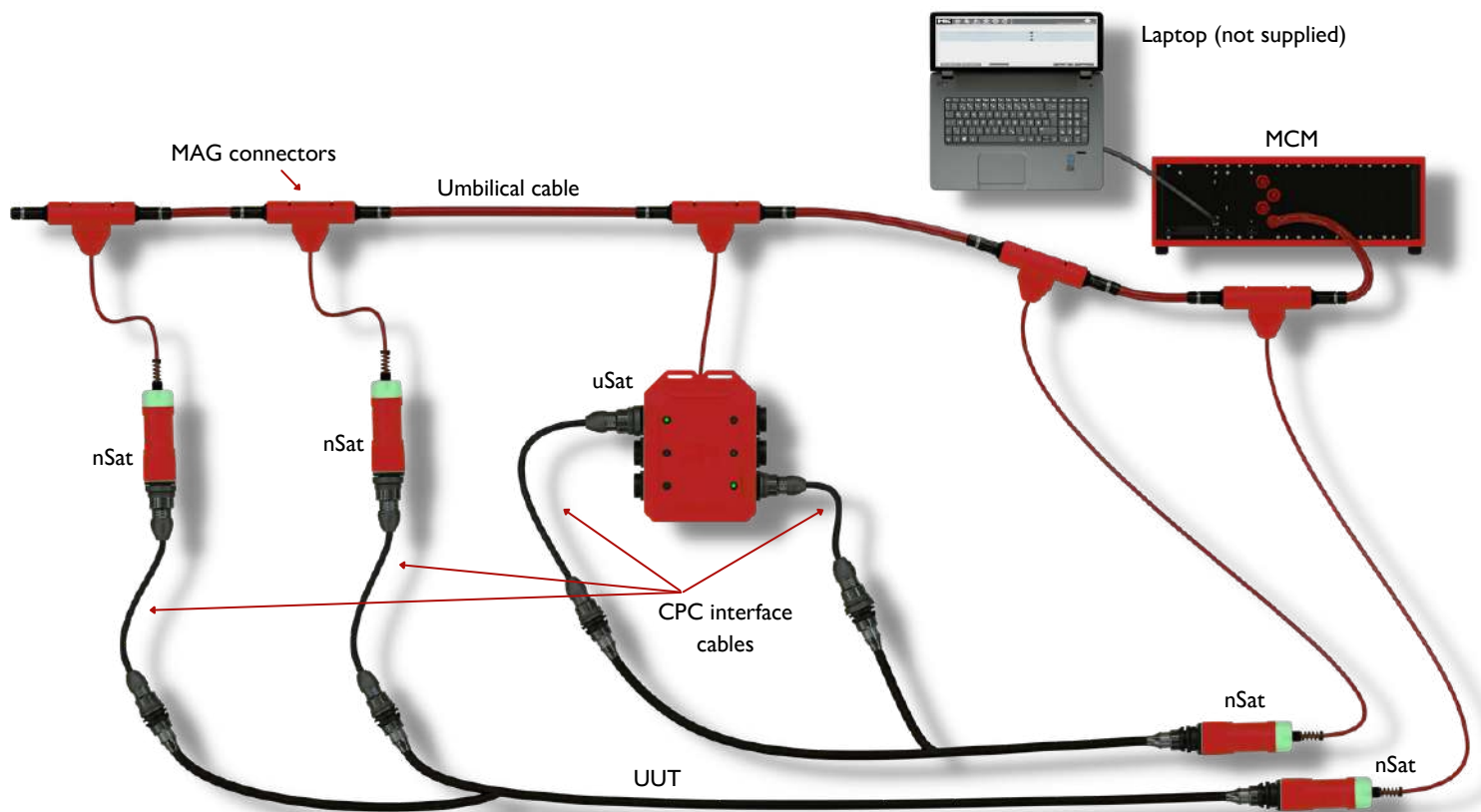
- Number of test points (to test a single 2 wire if required, 4 for kelvin measurements)
- Maximum voltage required for AC and DC insulation tests
- If you require a static, mobile or distributed system
- Your interface requirement – standard or custom
- Is energisation required? If so, what is the maximum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

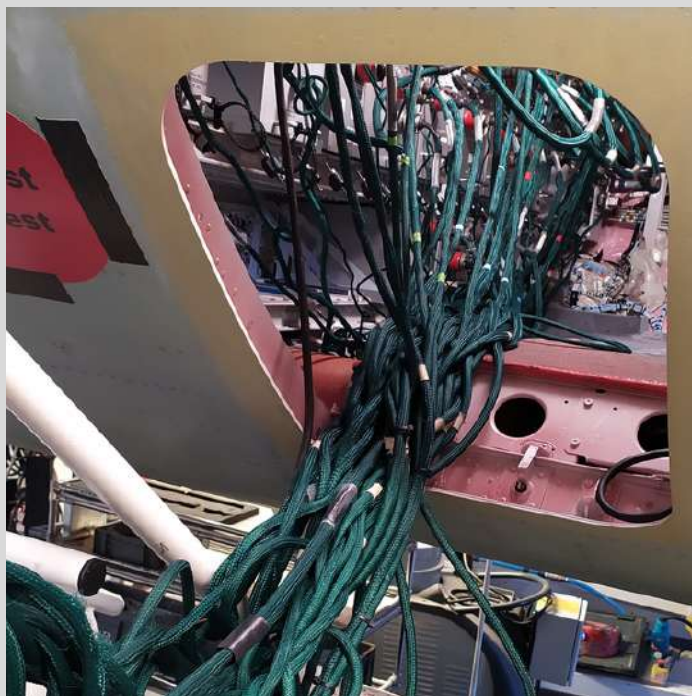
# RTS

Separate from the Automeg range, RTS is an entirely different type of wire harness test system. It's a miniaturised, modular sets of components which work to bring the test points directly to the unit under test, eliminating up to 90% of interface cables typically required with a traditional system.

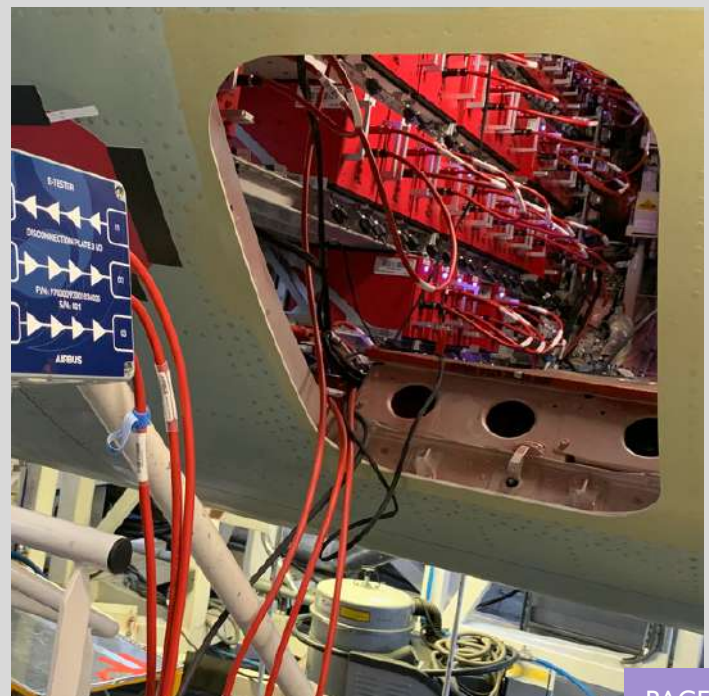
The diagram below shows the component parts of the RTS system, which include our unique magnetic connectors combined with active xRef for fast hook-up. Ideal for high pin count assemblies, RTS uses low voltage and can therefore be live during installation for instant results. It can also be used in conjunction with Automeg for additional high voltage testing.



*Before RTS*



*Using RTS*





# BOND & LOOP RESISTANCE TESTING

Our range of bond and loop resistance testing tools are lightweight and operator-friendly, with built-in instructions. Predominantly used in the aerospace sector, these tools are also suitable for use during maintenance of wind turbines and other large format structures and slip rings.

Whether you need a simple loop resistance tester or need to carry out full Bond, Loop & Joint testing, we have a suitable tool for you. The comparison table below shows the differences between our models and the 'yellow box' LRT.



	LRT (THE YELLOW ONE)	BLRT / BLTU4 (THE ORANGE ONES)	EXLRT (THE RED ONE)
<b>IS CLASSIFICATION</b>	Class 1 Division 2 (Flammable gases not likely to exist)	N/A	Class I, Division 1 (Flammable gases exist all the time)
<b>OPERATORS</b>	2	1	1
<b>TEST MODES</b>	Manual	Manual & automatic	Manual & automatic
<b>PROGRAMMABLE</b>	No	Yes	No
<b>USER INSTRUCTIONS</b>	No	Full graphics in auto mode	Text instructions in auto mode
<b>RESULTS</b>	None	Auto save to tool & network	Auto save to tool & network
<b>CALIBRATION</b>	Turn-around time 2 months	Turn-around time 1 week	Turn-around time 1 week
<b>WEIGHT</b>	17kg / 37.5lbs	7kg / 15.5lbs	3kg / 6.6lbs
<b>BOND / LOOP / JOINT</b>	No / Yes / Yes	BLRT/BLTU4 - Yes / Yes / Yes	No / Yes / Yes
<b>APPROVAL</b>	Boeing	Airbus & Boeing	Airbus (via equivalency) & Boeing

# 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

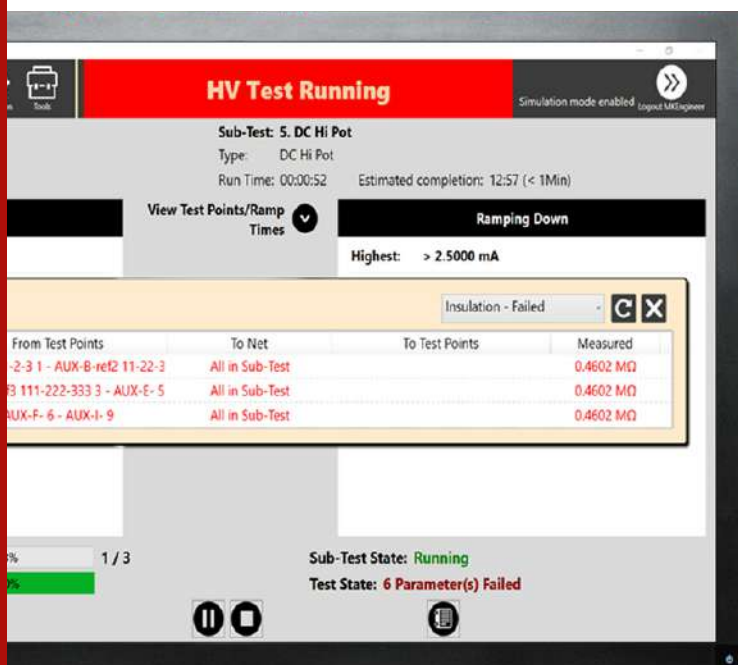
Automatic Program Generation (APG) is included in the MKAT test management software as standard.

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.

For your local contact details, please visit our website, [www.mktest.com](http://www.mktest.com).

## FOLLOW US

