



SUBSEA

Electrical test applications



www.mktest.com

EASING THE PRESSURE OF SUBSEA TEST REQUIREMENTS

Subsea electrical interconnect systems often carry high current and high voltage.

When deployed to extreme depths, failure of such components can be catastrophic and have massive financial consequences.

Interconnect systems experience extreme pressure and temperature cycling during power on and power off. Our systems can work independently to test continuity and insulation, or work in conjunction with pressure vessels and climate chambers. Our advanced API allows full control from third party software, or our software can be deployed to control third party devices.

We've supplied specialist automated test equipment to some of the world's leading manufacturers in the sector, including TE Seacon and ThyssenKrupp.

This brochure provides an overview of test applications within the subsea sector, and includes our recommended system solutions for every stage of the product's lifecycle.



Our products are compliant to SEPS and NORSOK standards.

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SOME OF OUR SUBSEA CUSTOMERS



APPLICATIONS & RECOMMENDED PRODUCTS

Interconnects and Connectors

Automatic test solutions for submarine interconnects and connectors. Products: Automeg, Portable Automeg

Subsea Tree Systems

Automatic test solutions for subsea tree systems and control modules. Products: Automeg, Portable Automeg

HV / Umbilical Cables

Automatic testing of high voltage / subsea umbilical cables. Products: Automeg, Portable Automeg

Submarine Control Systems

Automatic test solutions for submarines, including control systems. Products: Automeg, Portable Automeg

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 8.

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.

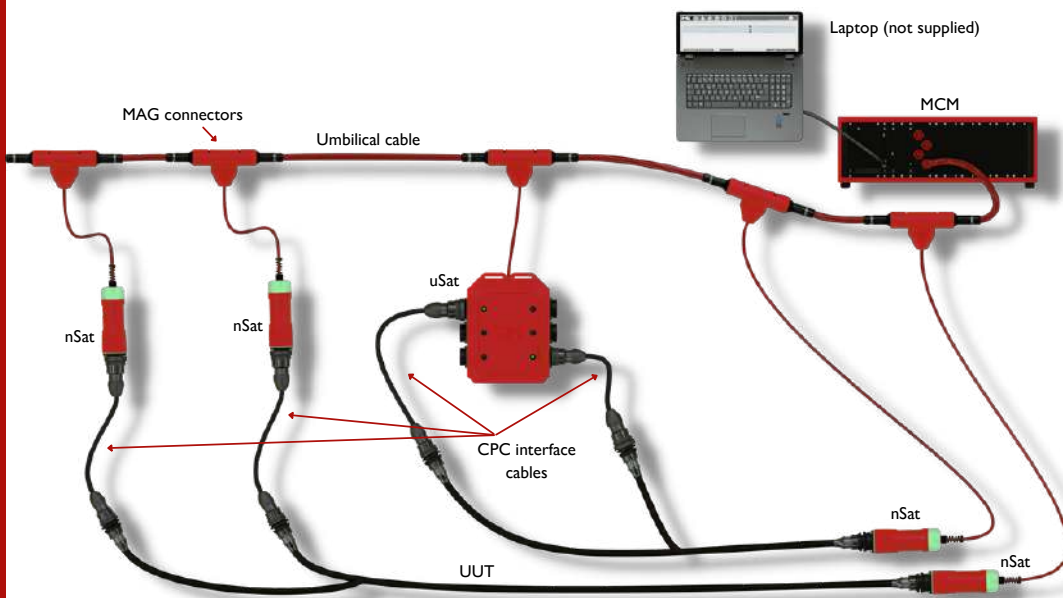
D Series: The D series is our most popular model for standard electrical harness testing. It offers both 2 wire and 4 wire resistance measurements, as well as the ability to mix these modes in a single test program. The D series models can handle a mix of resistance measurements down to $2m\Omega$. The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

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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.



RTS: Separate from the Automeg range, RTS is an entirely different type of wire harness test system.

It's a miniaturised, modular product which brings the test points directly to the unit under test, thereby eliminating up to 90% of interface cables typically required with a traditional system.



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.

SPECIFICATIONS

TESTS & FEATURES	D1500(P)	D2500	E1500(P)	E2500	E3500	E5000	F1500	F2500	F3500
Test & Measurement									
Continuity: Dual-wire	Y	Y							
Continuity: 4-wire			Y	Y	Y	Y	Y	Y	Y
Continuity: 2-wire			Y	Y	Y	Y			
Shorts	Y	Y	Y	Y	Y	Y	Y	Y	Y
Insulation and Hi-Pot	Y	Y	Y	Y	Y	Y	Y	Y	Y
Capacitance	Y	Y	Y	Y	Y	Y	Y	Y	Y
Inductance	Y	Y	Y	Y	Y	Y	Y	Y	Y
Temperature & Humidity	Y	Y	Y	Y	Y	Y	Y	Y	Y
Function testing			Y	Y	Y	Y			
Layout options									
Rack housing	Y	Y	Y	Y	Y	Y	Y	Y	Y
Single or distributed switching	Y	Y	Y	Y	Y	Y	Y	Y	Y
Static desktop	Y	Y	Y	Y	Y	Y	Y	Y	Y
Portable & ruggedised	Y		Y						
Features									
Maximum insulation test voltage	1500Vdc	2500Vdc	1500Vdc	2500Vdc	3500Vdc	5000Vdc	1500Vdc	2500Vdc	3500Vdc

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

TESTS & FEATURES	M1500	M2500
Test & Measurement		
Continuity: Dual-wire		
Continuity: 4-wire	Y	Y
Continuity: 2-wire	Y	Y
Shorts	Y	Y
Insulation and Hi-Pot	Y	Y
Capacitance	Y	Y
Inductance	Y	Y
Temperature & Humidity	Y	Y
Function testing	Y	Y
Layout options		
Rack housing	Y	Y
Single or distributed switching	Y	Y
Static desktop	Y	Y
Portable & ruggedised		
Features		
Maximum insulation test voltage	1500Vdc	2500Vdc

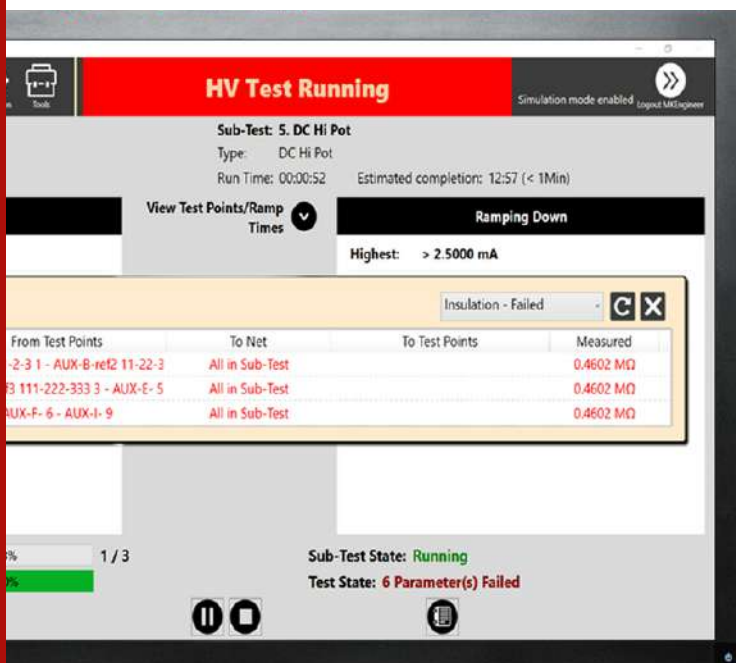


MKAT TEST MANAGEMENT SOFTWARE

"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.

