



AUTOMATIC TEST SYSTEMS FOR ELECTRICAL CABLES  
Test your cables with efficiency  
Continuity Test - Dielectric Test - Insulation resistance measurement

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### Application

The test system is designed to perform automatically the quality assurance tests usually made on multicore electrical cables at the end of the factory production lines. When a cable has been produced, it is placed into one of the test cages and each conductor is connected to the test system via a patented clamping system. A PLC then controls the tests cycle, and determines whether the cable has any defect. If not, the cable reel is transferred to usual storage places.

In case of a defect, the cable reel is brought to a type test area and the cable may be further tested and cut to remove the defective length.

### Features

The automation of the test process provides large efficiency gains while lowering the tests handling error and giving a considerable test time reduction.

Full quality assurance tests are possible on every cable produced. Moreover, the automation allows reduced operator skill levels, and a real time results feedback. Electrical tests, properly interpreted, provide information for research and development, engineering design, production supervision and quality control .

### The Test System

Precise test parameters and rejection criteria are stored in a PLC for each type of cable, allowing a specific test cycle to be performed for each type of cable. All the results are stored in the PLC which could eventually be connected to a PC equipped with a supervisor software.

Our design is fully customisable to your needs : the size of the installation, the technical characteristics of the HV power supply, the test limits, the information flow, etc. may be adjusted to your specific requirements during the preliminary study. The engineering study of a new test system is always conducted by a dedicated team of engineers with the help of computer-aided engineering tools.

The test system can meet the requirements of the following standards :  
IEC, VDE, ASTM, CSA, UL and also some manufacturers internal recommendation.

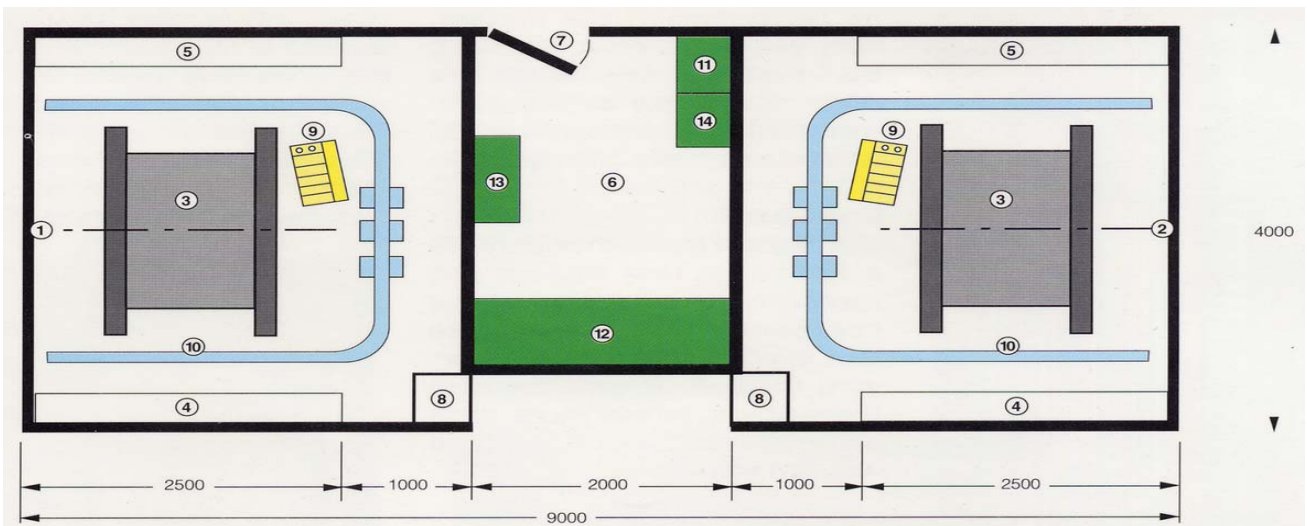
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System Configuration

Usually, a main control and measuring enclosure supervises the two test cages. This enable the worker to prepare one reel in the first cage while a test cycle is automatically performed in the other test cage. Such a configuration increases the efficiency of the test system.  
 The capacity of the test system is adapted to fulfil the speed requirements of the production lines.

An automatic system test would typically consist of :

- the test cages
- the clamping system
- the HV power supply and auxiliaries
- the PLC and the measuring equipments
- the control software
- the motorized grounding switch
- and the safety system



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|--------------------|---|
| 1. Test cage       | 8. Motorized grounding switch                 |
| 2. Test cage       | 9. Clamping system stand (option)             |
| 3. Cable reel      | 10. U-Rails for clamping system               |
| 4. Way in shutter  | 11. HV contactors                             |
| 5. Way out shutter | 12. Control and measuring enclosure           |
| 6. Control room    | 13. HV contactors for switching of test cages |
| 7. Service door    | 14. HV power supply                           |

The test cages

The dimensions of the test cages are depending on the size of your cable reels.

We can propose different types of cages, shutters, doors, etc.

A full range of safety elements (photo cells, limit and emergency switches, etc.) ensures the operator's safety.

In order to reduce the number of clamps the test cages can be foreseen with an overhead traveler serving two cages.

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The Clamping System

A patented very safe and efficient clamping system allows the quick connection of the cables to the test system.

Each conductor is inserted into a special clamp, without even removing its own insulation. By pushing on a button, the clamp closes, cuts the insulation and grips the wire with a safe electric contact.

The major common characteristics are the followings :

- The clamps are pneumatically operated ; a pressure of 6 bars is required.
- The clamps are fully insulated which gives a very high security level.
- To allow quick visual control, the front panel is covered with acrylic sheet and a control lamp is lighted when the clamp is closed.
- The status of each clamp is monitored and the information is sent back to the PLC.
- The two main parts of the clamp can be electrically independent which permits a four-wire measuring method.

Many different types of clamps are available, in function of the min. and max. section of the cores in the cable.

The series C 6, for cores with section from 0,15 to 6 mm<sup>2</sup> who can be mounted on a mobile or fixed desk.  
 They have a nominal voltage till 6 kV.



The series C 35, for cores with section from 0,5 to 35 mm<sup>2</sup>.  
 They have a nominal voltage till 8 kV and can be mounted in different positions such as mounted on a desk, pending on a balancer or mounted in star form and pending.

The series C 300, for cores with section from 1 to 300 mm<sup>2</sup> with a nominal voltage till 15 kV. These clamps are mobile and pending on a balancer.

A variant type P 300 is specially designed for cables with max. 4 conductors. In addition to these, for the grounding of the screen, we have developed a special plier type "Crocodile" which is very user friendly.





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The high voltage power supply and auxiliaries

The high voltage power supply consists of the HV transformer, its regulator and, if necessary compensating reactors. Based on the maximum length and the capacitance of the cable under test, the nominal voltage and the power needed are defined according to your specifications. The transformer is protected against over-voltages and continuous overload.

The high voltage contactors are electromechanical or pneumatic depending on the nominal voltage. They are always switched in a zero voltage condition to avoid arcing. All the technical data are available on request.

The tests

All kinds of electrical tests of completed wire and cable can be performed by the system. Here below, the most important test methods are listed, but other sure tests of measurements such as capacitance, DC voltage test, fault location,... are on request.

- Continuity

The system can either perform a go/no go test without any measure, or a precise ohmic resistance test. The precise test is conducted with the four-wire method. It also requires the ambient temperature measurement and a user-supplied adjustment formula.

- Dielectric rigidity (Hipot)

The dielectric test is performed at line frequency according to the IEC standards, although other standards are possible. Our system is able to conduct tests up to around 15 kV AC and/or 20 kV DC.

The voltage level and the duration of the test are adjustable by software parameters for each type of cable.

Tests on groups of wires are possible in order to reduce the test time.

The fault detection method is adapted accordingly.

- Insulation resistance

The insulation resistance test is usually performed at 500 V DC after a stabilization of one minute. Other methods are also possible at your request.

Motorized Grounding Switch

For safety reason, a motorized grounding switch with visible contacts and with a number of poles according to the maximum number of clamping devices is foreseen. After each test the grounding switch is closed making sure that the cable is grounded. The grounding switch is controlled by a reducing gear motor and equipped with limit switches and monitoring.



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The PLC and Measuring Equipments

The control of the functions and the security is performed by an PLC, normally a SIEMENS.  
The software is also tailored to your requirements in order to be very user friendly.  
For standard test systems, the control and measuring enclosure contains the following devices :

- a PLC configured for the purposes
- a control and monitoring unit for the HV supply
- a programmable DC source for the ohmic resistance measurement
- a programmable 500 V DC source for the insulation test
- voltage and current dividers
- bar code pens to collect information from the reels
- as an option, an industrial PC and a printer can be connected to the PLC via an interface network for the process data loading and for the test results storage

Auto-control Procedure

The test system is provided with an auto-control procedure. This procedure is necessary when the test system is switched on and permits to verify the well functioning of the main functions.

The Software

The control software called "Supervisor" pilots the test system. It checks the safety conditions before starting, performs the test cycles, informs the operator about alarms and tests progress, diagnoses the defects and displays the test results.

The software is always customized to your needs.



References

Many cable manufacturers have already adopted our solution for testing cables. Ask our references list.

Distributors network

You certainly have a competent distributor in your area.  
Don't hesitate to ask us for details.

