TESTING OF HEATER ELEMENTS

Standards

- IEC 60079-30-1. (2007-11) - Electrical Resistance trace heating - General testing requirements

Customer’s Challenge

Heater element production is highly automated mass production. To fulfill the high quality standards of the production each heater element has to pass several tests before they can leave the production line. Firstly, all electrical safety must be tested according to the relevant norms – like e.g. EN60335. Additionally functional parameters must tested to be sure that each and every delivered element is within the tolerance limits.

Main functional parameters are nominal connection voltage and the power of the element. To measure the nominal power, adjustable and stabilized test voltage is needed. Power measurement is time consuming and requires complex test equipment due to risk of electrical shock and fire. The element being tested may heat up quickly in case of test line malfunction and if there is no cooling.

To avoid these problems a nominal cold resistance of the element can be measured fast by using low-test voltage. This eliminates electrical shock and risk of fire and is also a faster and more accurate method.

Typically these types of test lines are realized by using a safety tester and a separate power measuring system or ohmmeter. In most cases instruments are needed from several different vendors. This makes building of systems more cumbersome because the system engineer needs to program several different kind of devices with their equipment specific instructions sets. Also in case of a test system failure it might take unnecessary long time to replace the test and measurement equipment and let the production continue. This may cause disturbing stops in the production line and losses in the reduced productivity.
**Finero’s Solution**

Finero uses standard FST-200 4 S Analyzer test and measurement equipment to test heater elements used in panel heaters, kitchen stoves, washing machines and in similar appliance products. FST-200 can be used also for testing of ready-made heater type appliances, such as cable heating sets, small kitchen cookers and stoves and so on.

The tests included are high standard electrical safety tests (High voltage, GB, Insulation resistance) and heater element resistance test as a functional test. All the tests are processed as sequence with a single contacting. FST-200 can run as a stand-alone instrument with a stored test sequence and acceptance parameters or under PC-control with multiple test sequences stored in the memory and test data collection.

Using of FST-200 has many benefits; using only one device for testing saves cabling costs and space within a 19” standard rack. The unit can also be bench mounted. It enables easier programming and training, as the user only needs to be familiar with one product from one company. FST-200 is simple to use and provides reliability that a volume production quality control requires. FST-200 is fully compatible with Finero’s HV Relay Matrix and SafeTest 100 software as well as with LabVIEW.

**Advantages**

- Only one vendor and one instrument is needed to process safety and functional test
- Building of test systems becomes much more easier because only one unit programming is needed
- Very fast and accurate high voltage and resistance tests, down to 1s test time each
- Guaranteed test parameters and acceptance limits in each partial test
- All tests, HV-, insulation resistance and element resistance, made with one connection
- Low voltage functional test, no dangerous mains power needed
- Can run as a stand alone instrument or fully controlled with PC-computer
- Storing possibility for unlimited number of different test sequences
- Test data storing under each product type and serial number
- Uses standard economically priced standard computers, printers and barcode readers
- Easy to interface LAN, software and hardware updates are easily available.