LSI LOGICAL SYSTEMS, INC.

ASSOCIATED RESEARCH AN IKONIX BRAND 90 YEAR ANNIVERSARY

Automating Hipot Testing for HVAC Manufacturing

How Logical Systems, Inc. builds more consistent, traceable electrical safety testing into automated end-of-line systems.

Overview

Logical Systems, Inc. (LSI) is an industrial systems integrator that serves HVAC, energy, food and beverage, and consumer products manufacturers. According to Gail Roane, LSI's senior sales and project engineer, the company designs and automates production systems on the plant floor, from control enclosures to end-of-line safety testing.

For its HVAC manufacturing customers, LSI integrates Associated Research electrical safety test equipment into automated end-of-line test systems. Roane notes that most of the plants where LSI works already have electrical safety testing and compliance processes in place. The opportunity is in how those tests are run and documented.

> "Often," says Roane, "our job is to modernize the test process, integrate it into a broader automated manufacturing and testing environment, and make testing easier to control and document."

The Challenge

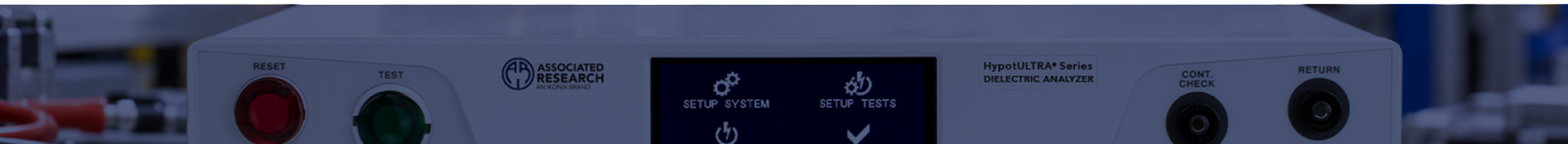
Electrical safety testing, including hipot (dielectric withstand) testing, is a required production step for all HVAC equipment. But the way the test is executed can determine how much confidence a manufacturer has in the result. In older or more manual production environments, an operator may make the connections, initiate the test, and interpret the outcome. In an automated line, manufacturers increasingly want the test to become part of the broader controlled production process.

That is the challenge addressed by systems integrators such as LSI, whose clients include some of the world's largest HVAC manufacturers. To support these applications, LSI incorporates electrical safety test equipment into automated end-of-line, or "run test," stations.

The Solution

In place of manual probing, LSI's automation system controls the Associated Research testers, confirms required connections, captures test data, records pass/fail results, and prompts for calibration and verification checks.

According to Roane, the objective is not automation for its own sake but to make every test verifiable and every result documented. Where included, an early ground continuity check catches an improper connection before a product can falsely pass a dielectric withstand test.



What the Production System Confirms

The tester was connected correctly.	The required test was initiated.	The expected test information was returned.	The result was recorded.

A Controlled Automated Workflow

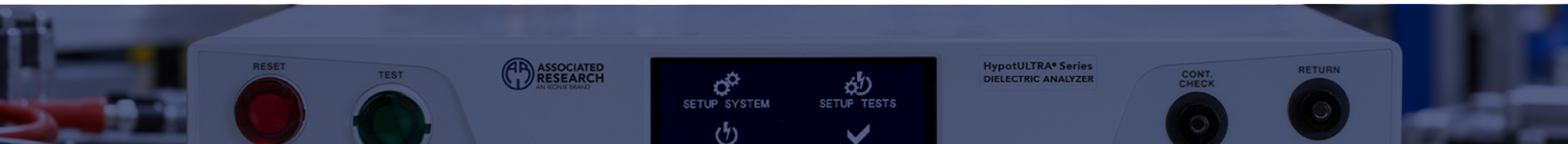
The automated workflow used by LSI integrates Associated Research instruments directly into the end-of-line production process, reducing reliance on manual test execution while creating a consistent, traceable record for each unit tested by the manufacturer. Testing steps include:

1. **Identifying the unit:** A production unit enters the end-of-line test station and is scanned or otherwise identified.
2. **Verifying conditions and connections:** The automation verifies required test conditions and connections, including ground continuity where appropriate, before initiating the test.
3. **Running the tests:** The control system commands the tester to perform the required electrical safety tests.
4. **Recording the results:** The software records the test results in the production database, providing traceability and helping distinguish setup or operator issues from actual product-test failures.
5. **Confirming readiness:** Periodic verification checks and recalibration reminders can be incorporated into the workflow to help maintain test-station readiness.

> "The automated workflow guarantees that the operation is taking place," notes Roane. "It's kind of an audit to make sure the testing environment is up and running."

Turning Test Results into Traceability

Automating the test is only part of the value, says Roane. LSI also captures what happened during the test. Each scanned unit can produce a database record that shows whether it passed or failed. Over time, those records become useful production history for quality review and failure analysis.



A failed-test record may point to a setup condition such as a missing return connection or clamp, an emergency-stop event, or a true hipot failure. Instead of treating every failed test as the same problem, the manufacturer can review the failure type and investigate with more context.

> "Any time you scan a unit and it goes into a test and comes out of that test," explains Roane, "you obtain critical information that needs to be readily accessible to the manufacturer so they can make adjustments quickly."

Verification and Calibration Discipline

The automated system can also reinforce test-station discipline. LSI has built software prompts for recalibration and periodic checks using a known test condition. If the expected value is not returned, the station can flag the issue for attention before normal production testing continues.

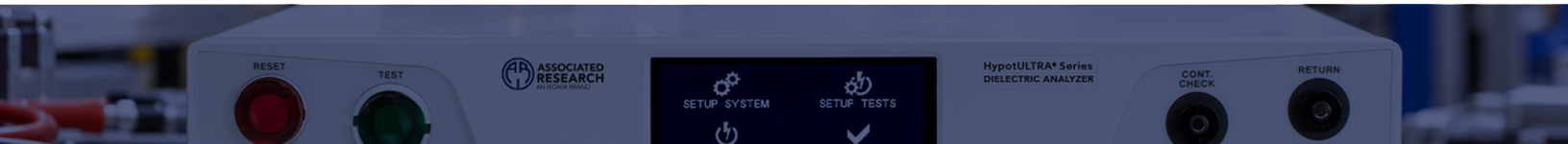
This does not replace the manufacturer's calibration or quality assurance program. It gives the production system another way to confirm that the electrical safety test operation is functioning as expected between formal service intervals.

Characteristics of a Good Tester

Roane believes it is critical that an electrical safety tester fit into LSI's clients' larger automation architecture, communicate useful information, remain dependable in a production environment, and be supported when questions arise. For LSI, Associated Research equipment gets high marks in each of these areas.

> "**The Associated Research team is always responsive,** the product quality is there, and in many of the plants we visit, it is the hipot of choice," says Roane.

The broader lesson for HVAC manufacturers is straightforward, concludes Roane. "When hipot and related electrical safety tests become part of the production system rather than an isolated operator task, the test can provide more useful information to manufacturing, quality, and troubleshooting teams."



Key Takeaway

By integrating electrical safety testing into the automated end-of-line compliance process, manufacturers gain a more controlled way to execute the test, document the result, and investigate failures.

About Logical Systems, Inc.

Logical Systems, Inc. (LSI) is an industrial systems integrator providing on-site plant design, control enclosures, automation, safety testing, and plant-floor security for industries including HVAC, energy, food and beverage, and consumer products. **www.logicalsysinc.com**

About Associated Research

Since 1936, Associated Research has designed and manufactured electrical safety test instruments, including hipot, ground bond, insulation resistance, and leakage current testers for production-line and laboratory use. **www.arisafety.com**

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