



Testing & Measuring Equipment

Astronics

Reducing Downtime, Increasing Reliability: The Business Case for Automated HVAC Testing

Astronics brings advanced diagnostics, data logging and predictive analytics to HVAC systems, helping rail operators improve efficiency and reduce repair times, writes Astronics Test Systems' Director, Mass Transit, Bagali Siddaram, and Systems Engineering Manager, Kyle D'Arcangelis.



ATS-500 HVAC Test System

Heating, ventilation and air conditioning (HVAC) systems are essential to passenger and staff comfort when travelling on trains. Whether it's the height of summer or the depths of winter, they keep everyone comfortable by maintaining that perfect on-board temperature balance.

As a key subsystem on a train, HVACs are regularly checked and overhauled as part of an operator's maintenance schedule. This is traditionally done manually, using portable test equipment, which is limited to giving a pass/fail result. If a fault is found, the system must then be moved to the repair shop for in-depth diagnosis.

This can take time because HVAC systems combine various engineering disciplines. Unlike a purely electronic system, you're dealing with motors, compressors, pressure transducers, and more. It's complex because each component interacts. For example, if you get a low-pressure reading, is it genuinely low pressure, or is the sensor defective? That integration makes testing more demanding.

Precision Testing Made Simple

In response to this, Astronics Test Systems has developed a dedicated HVAC bench test equipment (BTE) solution, ATS-500 HVAC Testing, which is part of the ATS-5000 Series. This automates HVAC testing, reducing downtime and maintenance costs. A single BTE can test different types of air conditioning systems used across various train fleets, regardless of the HVAC supplier or model, or whether units have integrated control circuits or are roof-based, and separate from the controller.

The ATS-500 provides a fully automated, universal solution for diagnosing faults across complete HVAC

assemblies and sub-assemblies including evaporator blowers, heaters, condensers and compressors. Rather than offering simple pass/fail results, it pinpoints which component or sub-assembly is faulty, enabling quick replacement and retesting.

With Ethernet and LAN connectivity, it can also diagnose circuit breakers, contactors and sensors, perform system-level software updates, and carry out self-diagnostics down to module level, ensuring precise, end-to-end validation and long-term maintainability of HVAC systems.

Proactive and Reactive Testing

From a maintenance perspective, the BTE supports both reactive and proactive testing. By monitoring data such as compressor current or valve performance, the system can detect early signs of failure, enabling predictive maintenance and avoiding costly breakdowns.

Every test is automatically logged with component serial numbers, allowing operators to review historical data, identify recurring faults and in turn refine their maintenance strategy. With up to ten years of stored results, users can easily analyse trends and build long-term reliability insights.

The BTE's modular, future-proof architecture also ensures longevity. Software and hardware can be independently upgraded, allowing new functions or instruments to be added without redesigning the entire system. This adaptability makes it suitable for evolving HVAC technologies and future fleet requirements.

Finally, the solution's easy-to-use operator interface is a core strength. It simplifies setup and execution, meaning that technicians don't need advanced programming or diagnostic expertise to use the system effectively. Together, all these features make Astronics' HVAC BTE a cost-efficient, scalable and future-ready testing platform.

Proven Success in New York

The ATS-500 is already proving its value in the field, with successful deployments at transit authorities

including New York City Transit (NYCT), and further installations in the works at authorities including the Massachusetts Bay Transportation Authority (MBTA).

The system was installed in NYCT's maintenance depot to test multiple HVAC configurations across different fleets of rolling stock. The operator has reported faster fault isolation, improved consistency in test results and ease of use, noting that the interface was intuitive and did not require deep technical training.

The ability to test multiple HVAC systems with a single platform has also been particularly well received, delivering measurable improvements in depot efficiency and equipment reliability.

Find Out More

In addition to manufacturing the equipment itself, Astronics Test Systems excels at delivering complete logistics support, with installation, training and support engineers deployed to your location. We're here to ensure the long-term success of your BTE, helping you maximise uptime and return on investment.

To find out more about the ATS-500 or the other ways Astronics Test Systems can support your organisation's testing needs, please [visit our website](#) or contact ATSsales@astronics.com.

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