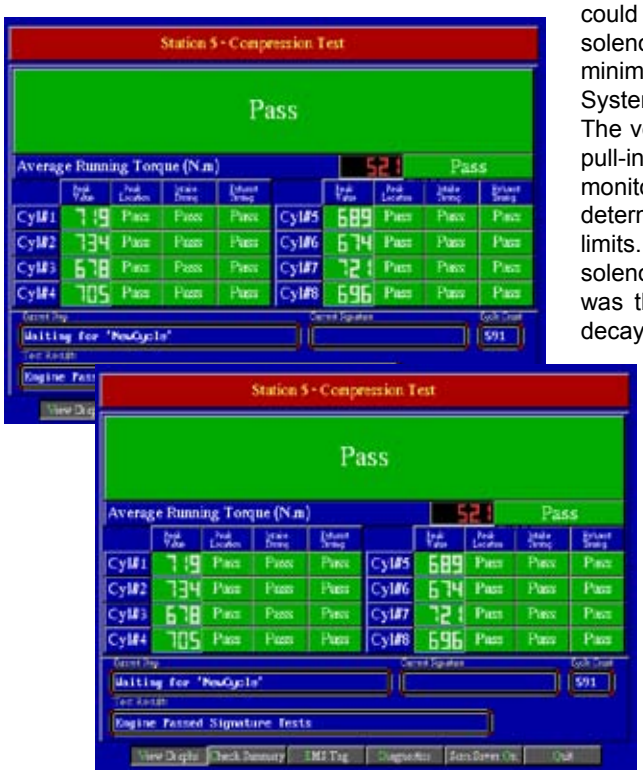
Solenoid Assembly Test: Functional Verification of Air Conditioning Solenoid Assembly

Highlights:

- Defects detectable:
  - Under-voltage solenoid drop-outs
  - Over-voltage solenoid pull-ins
  - Excess vacuum decay
  - Leaking, partially or completely clogged valve
  - Incorrect wiring
  - Air volume under flow
- Simple PASS/FAIL issued to operator
- Multiple tests performed
- Fully automated test sequencing

A company that manufactures automotive parts for a major automotive manufacturer was in need of an accurate method of detecting defects within vehicle solenoid assemblies prior to their installation. The solenoid assembly plays a key role in a vehicle's climate control system by controlling the direction of air flow within the vehicle. Defects such as under-voltage solenoid drop-outs, over-voltage solenoid pull-ins, excess vacuum decay, leaking valves, incorrect wiring, or air volume under flow can lead to poor performance or complete failure altogether. Ultimately this can lead to expensive part replacement and unacceptable vehicle operating conditions.

Prior success with Sciemetric® systems led the supplier to request that a Sciemetric® system be used to verify that the solenoid assemblies were free of defects. Sciemetric®'s Test and Analysis System with InspeXion operating software proved to be the ideal solution. The system was configured to perform a combination of 4 tests on the solenoid assembly and monitor the results. By comparing these results against known acceptable limits for each test, a simple PASS/FAIL could be issued to the operator. Using current and voltage, the solenoid coil resistance was measured and compared against a minimum and maximum value. The Sciemetric Test and Analysis System was configured to control a programmable power supply. The voltage was then ramped up and down so that the solenoid pull-in and drop-out voltage could be determined. Flow was monitored by energizing each solenoid and using a flow-meter to determine if the amount of air allowed to flow met pre-determined limits. Finally, leakage was monitored by creating a vacuum in the solenoid assembly and sealing it. The decay in vacuum over time was then compared against an acceptable maximum pressure decay rate.



InspeXion® Solenoid Assembly Screens showing Test Diagnostics.

The system proved to be tremendously successful, allowing the manufacturer to incorporate a level of quality into the manufacturing process by eliminating defects that had previously gone undetected. This is just one more example of how Sciemetric can bring zero defect solutions to the manufacturing world.

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