

Industrial / Commercial VFD Burn-In Testing

For many years a burn-in test was used to try to raise the quality level of printed wiring boards. This test consisted of an extended time period, on the order of magnitude of 24-48 hours, during which the boards were cycled from very low to high temperatures. Since all of the boards in this generation used through-hole discrete components, the goal was primarily to eliminate poor solder joints and to some degree thermally stress the components. Typically the test was run with the power supplies connected to the boards, but with no active signals being input or outputted to determine proper operation. A limited functional test was run at the end of burn-in to see if the board worked.

For all current production, Industrial and Commercial Drive products, the testing process has evolved making the longer burn-in testing once installed in enclosures counterproductive as the testing during assembly and statistical analysis has improved the quality and robustness of the VFD.

Various tests are performed during production which includes the following:

Board Level Testing

1. In Circuit Test – administered on power, control and HMI board(s) checking for missing parts, bad solder connections, trace damage and other circuit related errors.
2. Active Circuit Test – administered on the power and control board(s) functionally testing all circuits with live power.

Assembled Unit Testing

1. Insulation Test – administered on the final assembly at 500VDC
2. HIPOT testing – administered on the final assembly at 2550VDC per EN61800-5-1
3. Earth Continuity Testing – administered per UL508C and EN61800-5-1
4. Run Up Testing – administered on the final assembly to verify proper assembly and markings.
5. Burn In Testing – administered on a statistical sample of drives for 2 hours at varying load and at a temperature of 50C.

When the VFD is assembled into a final unit the plant will administer a final assembled burn in test from 20 minutes to 2 hours at rated load and elevated temperatures.

Today the typical component used on a printed wiring board is a pre-tested surface mount device, be it active or passive. These components are usually placed on the board by put and place machinery utilizing a solder paste to hold the component in place during assembly prior to melting the paste in an oven to firmly connect the component to the printed wiring. The reliability of these components is significantly greater than the through the hole devices. As a result of this most manufacturers no longer perform a burn-in test on the boards as stand-alone devices preferring instead to run a functional test of the assembled board using actual input and output signals. The boards are then assembled into a drive for a full test and total equipment burn-in under real operating conditions.

Due to these extensive test both prior to assembly as well as after assembly the defect parts per million have been reduced over the 24 hour burn in of old making that older burn in test antiquated not necessary.



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Additional Help

In the US or Canada: please contact the Technical Resource Center at 1-877-ETN-CARE or 1-877-326-2273 option 2, option 6.

All other supporting documentation is located on the Eaton web site at www.eaton.com/Drives

