

# Testing Times

A newsletter for the electrical construction and maintenance industry

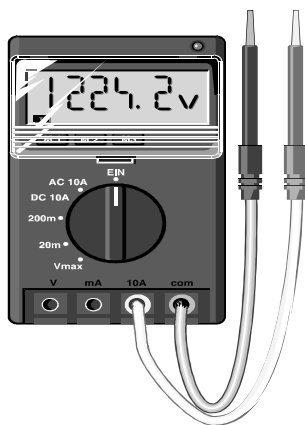
Volume 5 No. 2

## Tested at the factory?

New equipment arrives on the job site and it's time for start-up testing. Comments we often hear include "I don't understand why I have to have this equipment tested. It's brand new", or "This was already tested at the factory". The fact is very few individual components or assemblies are tested at the factories these days. For the purpose of this article, we will focus on low voltage circuit breakers and ground fault systems, but the comments here apply to most electrical products.

To verify the situation, we contacted the major electrical equipment manufacturers (Cutler-Hammer, General Electric, Siemens, and Square D), and the answer was an extremely mixed bag. Two of the manufacturers state that they do perform primary current injection testing on 100% of their circuit breakers. This testing applies to molded case thermal magnetic, solid state, and power circuit breakers. The other two manufacturers said that they performed "batch testing", i.e., a sample breaker from each batch is tested. If that breaker passes, then the entire lot is shipped with no further tests. If that sample breaker fails, then further testing on the batch is performed.

When it comes to ground fault testing, we did not have any manufacturer that claimed to primary current injection test the ground fault system. This lack of testing is significant where the ground fault system is external to



***Tested at the factory has different meaning with different manufacturers; some do more than others.***

the main device (i.e., a fusible switch) or in a complex ground fault scheme as in a main-tie-main arrangement.

But let's assume for the sake of argument that every component and every assembled product is completely tested at the factory. Now everything should be O.K. when the equipment is installed

at the jobsite, right? WRONG! Even if everything left the factory or assembly plant in perfect condition, before it is energized it must survive loading, shipping, unloading, storage, installation, wiring, and sometimes, close encounters with forklifts.

The list of problems that we've witnessed at jobsites seems almost endless. On ground fault systems, the ground fault sensors are installed incorrectly, the incoming neutral is attached in the wrong location on the neutral bus bar, or

***Even if equipment is completely tested at the factory, the list of potential problems at the jobsite is long.***

the control power switch is turned off. On circuit breakers, breakers equipped with removable rating plugs are shipped without rating plugs or the incorrect size per the plans, CTs are incorrect, the contact resistance is out of tolerance, electronic panel meters or programmable logic controlled switching operations don't function properly, and the list goes on.

A classic case of potential problems is a main-tie-main switchboard with ground fault protection. We have seen more of these systems that don't work properly than do. This can be due to miswiring at the

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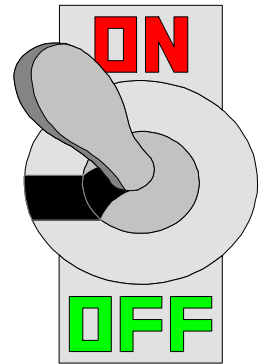


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**Tested at the factory** (continued from page 1)

factory, miswiring at the jobsite, and a host of other problems. The fact remains that until equipment is completely inspected and tested in its final installed location it cannot be considered tested at all. ❖

**Are you sure you're ready to throw that switch? Play it safe and require on-site testing.**



Looking for electrical products or services on the Internet? Look no further than [electricnet.com](http://electricnet.com). This "electrical mall" gives you access to company information nationwide. Check it out!

## FaxBack

We are pleased to offer back issues of our Testing Times to our readers. If you see any topic(s) on the list below that you have missed, please check it and fax this page to us. We will mail you a copy for your files.

- \_\_\_\_\_ Fall/Winter 1994: Building Safety (City of Atlanta GF Ordinance)
- \_\_\_\_\_ Spring 1995: Who is H-P&D/ Before The Lights Go On(Start-up testing)
- \_\_\_\_\_ Fall 1995: Testing 1,2,3...(Maintenance testing)/Infrared Surveys
- \_\_\_\_\_ Winter 1996: Mystery Unveiled - Ground Faults/How to Choose a Testing Firm
- \_\_\_\_\_ Spring 1996: Short Circuit Study/ One-Line Update
- \_\_\_\_\_ Summer 1996: Coordination - Selectivity & Protection/Electrical Testing Specifications
- \_\_\_\_\_ Fall 1996: Maintenance Testing - How much?/Cable Testing for Maintenance
- \_\_\_\_\_ Winter 1997: Routine Torquing - a good practice?/Ground Fault Protection - a necessity
- \_\_\_\_\_ Spring 1997: Grounding - Why Ground?/Testing Grounding Systems
- \_\_\_\_\_ Summer 1997: Zone Selective Interlocking/Commissioning
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**inside:**

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