

Schneider Electric  
"Counterfeiting Reliability"  
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## **STOP! DON'T USE THAT PART — WHAT YOU NEED TO KNOW ABOUT ELECTRICAL COMPONENTS TO ENSURE YOUR TREATMENT FACILITY'S RELIABILITY**

by Grant Van Hemert, P.E., application engineer, Water and Wastewater Competency Center, Schneider Electric

Frightening trends in counterfeiting, cloning, and reconditioning can jeopardize a water or wastewater plant's reliability, putting facilities' personnel at risk of harm, or death. It's important to be aware of these hazards when dealing with electrical suppliers.

Counterfeiting occurs when a product is produced with the intent of being falsely marketed and sold as a major supplier's product. Counterfeit products appear to be identical to the name brand, often including the product and testing agency labels.

A counterfeit circuit breaker can be one of the most dangerous counterfeit products. They're hard to detect by most people and can produce serious safety and quality problems that endanger more than equipment.

"Counterfeit circuit breakers are of poor quality and often will not perform the basic protection functions expected of a circuit breaker. As such, they can pose serious health and safety hazards to consumers. Anyone near a counterfeit breaker when it fails could also be exposed to a significant safety hazard. Extreme failures can result in excessive heat, sprays of molten metal and a powerful energy blast," says Jim Pauley, Schneider Electric North America's vice president of industry and government relations and member of various National Electric Code committees. "Even if a counterfeit breaker itself does not have a catastrophic failure, it can fail to provide the proper protection of the building's electrical system from an electrical fault, which increases the chance for a dangerous electrical fire."

These same dangers also apply to a treatment plant, where there is additional risk that a failure could prevent a critical process, such as aeration, from operating until the damaged equipment or building could be repaired.

### *Figure 1 Circuit Breaker Failure*

Previous experience with counterfeit breakers from Taiwan, Mexico, and Japan has shown that imitation products often have a short circuit withstand rating that is only 30-50 percent of the 10,000 Amp rating of the actual product. The withstand rate is the maximum amount of current that a breaker can handle before it explodes. Lowering the withstand rate jeopardizes plant reliability and can cause fires. These products are made from inferior materials that may not contain a fault current and also are prone to having their contacts weld shut, preventing the breaker from opening.

## Counterfeit Examples



### Counterfeit QO Circuit Breaker from Taiwan

- 3200A short circuit rating instead of the normal 10,000A
- Contacts weld due to improper materials
- Erratic tripping - no calibration
- Flexible connector inside of the CB is frayed and fails
- No temperature compensation
- Magnetic trip is inoperable
- Does not meet UL standards (or any other standards)



### Counterfeit QO Circuit Breaker from Mexico

- 3000A short circuit rating instead of the normal 10,000A
- No arc chamber insulation
- No thermal adjustment - hand bent bimetal
- Erratic tripping - no calibration
- Low grade phenolic material
- No temperature compensation
- Magnetic trip is inoperable
- Does not meet UL standards (or any other standards)



### Counterfeit QO Circuit Breaker from Japan

- 5000A short circuit rating instead of the normal 10,000A
- Vulnerable to contact welding
- No arc chamber insulation
- No thermal adjustment - hand bent bimetal
- Does not meet UL standards (or any other standards)

Figure 2  
Counterfeit Circuit Breaker Quality Deficiencies.

## CLONED PRODUCTS

Cloning presents its own share of dangers. While counterfeits intend to directly mimic a major supplier, cloned products are very close to a name brand equivalent, but do not cross the legal line in branding. Clones appear to be extremely similar if not identical to the name brand preferred product, and as a result the discrepancies are very difficult for most people to identify. Ultimately, the labeling and physical makeup of the product gives them away as clones.

Clone companies will state that their products are “equivalent” to a name brand device. Legally, the word “equivalent” carries a different definition than “equal.” “Equivalent” means that two products are very similar, but not identical. Usually the differences are due to materials of construction, which usually results in decreased performance. Furthermore, many clone companies are not as concerned about quality as the name brand company they are emulating. Thus, all the dangers present in counterfeit products can exist here. Even if a product has a testing agency’s label, the quality can not be trusted if the product is not properly labeled with the brand name.



*Figure 3*

*Circuit Breaker Clones. Note "Square C" label compared to "Square D."  
Also note variances in testing agency symbols*

Not all third party equipment is cloned. Many industrial electrical solution suppliers use third parties to augment their product lines. Due to the wide variety of configurations, authorization of third parties is very common in the area of automation. If using a third party module in a programmable automation controller (PAC), check with the manufacturer of the PAC to see if the vendor is authorized.

### **RECONDITIONED OR REMANUFACTURED PRODUCTS**

There also are risks with reconditioned or remanufactured equipment. These devices have been put into service, rebuilt, and then sold on the open market. Before reconditioning, these devices were genuine brand products purchased through the supplier. As a result, they still have the manufacturer's trademarks, labels, and ratings, even though they are now reconditioned.

Reconditioning is not the same as repairing. In a repair process, a part is removed and replaced with a duplicate of the old part. In reconditioning, components integral to the product are rebuilt and put back into service.

This difference is most apparent in power distribution equipment. For instance, a repair of a motor control center (MCC) may involve removing a circuit breaker and replacing it with an exact duplicate. Remanufacturing may involve removing and replacing the bus work, interconnection devices, metal wire ways, sheet metal framing, etc. In a repair, the quality of the original product can be maintained and is typically done by a maintenance staff person or electrical contractor.

The quality of reconditioned equipment is completely dependent on the company performing the work and can vary widely. Since equipment for devices such as programmable controllers, operator interface, power supplies, instruments and VFDs often are remanufactured or resold, it is crucial to examine these devices to ensure quality. One of the best methods is determining who owns the reconditioning company. If it's owned by one of the major industrial electronic solution manufacturers, then the parent company has a vested legal and financial interest in guaranteeing the repair facility delivers a quality product.

Devices such as circuit breakers, switchgear, MCCs, distribution transformers, and other distribution devices are too critical to be remanufactured or resold. Companies that resell or remanufacture these devices may not be able to ensure proper quality. Switchgear, transformers, and MCCs are custom-engineered for a specific facility. When these devices are resold or remanufactured they may not fit the facility's unique engineering requirements. Thus, these devices may work in day-to-day operation, but fail during a high electrical stress situation like a ground fault. This failure can have dramatic, detrimental effects on a facility.

The nature of water and wastewater projects means that many avenues exist for counterfeit, cloned, or reconditioned parts to enter a facility. They may arrive through maintenance staff, or

from panels supplied by water process equipment manufacturers or system integrators when new systems are commissioned.

Municipalities should consider including a quality form in bid documents. This would require each electronic equipment supplier to vouch for the genuine nature of the devices in the equipment. For instance, the form could ask for the distributor name of each component or other form of verification. In addition, suppliers would have to verify on the document that each component is not counterfeit or cloned.

The reliability of a water and wastewater treatment facility is directly linked to the quality of devices in its electrical distribution equipment and control panels. When a new part arrives, or a part is replaced, it's critical to know that the device is suitable for the task. The best means is to know the supplier or repair facility, and ensure the replacement part is in compliance with all applicable standards.

### **About the Author**

Grant Van Hemert is an automation and control applications engineer for the Schneider Electric Water Wastewater Competency Center. Mr. Van Hemert has over 12 years of water and wastewater experience. Previously he was a design and implementation engineer where he designed and commissioned automation and instrumentation systems dealing with aeration, screening, and clarification. Van Hemert, a licensed professional engineer in the state of North Carolina, can be reached at [Grant.VanHemert@us.schneider-electric.com](mailto:Grant.VanHemert@us.schneider-electric.com).

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