



Quad Plus®

Low Voltage Circuit Breaker Injection Testing

Independent NETA-Certified Testing Services for Reliable Breaker Performance



Reliable Trip Performance Starts with Proven Testing

Low-voltage circuit breakers protect personnel and equipment by interrupting dangerous fault currents. Over time, wear, contamination, or calibration drift can compromise that protection.

Quad Plus provides primary and secondary injection testing to verify that breakers trip exactly when required, ensuring compliance with NFPA 70B, NETA ATS, and manufacturer testing recommendations. Our testing confirms correct performance across the entire tripping chain, from current path to trip unit logic.

Primary Injection Testing The Benchmark for Verifying the Entire Current Path

Primary injection testing drives controlled high current through the breaker's primary conductors, CTs, and trip device to prove that the breaker opens within its published time-current curve.

- ✓ **Full-Path Verification.** Confirms conductor integrity, CT operation, trip calibration, and mechanical performance under simulated fault conditions.
- ✓ **Essential for Thermal-Magnetic Breakers.** These devices lack electronic trip circuitry, so high-current primary testing is the only method that fully validates performance.
- ✓ **Comprehensive Documentation.** Quad Plus records current, time, and trip characteristics for comparison to manufacturer tolerances.
- ✓ **Performed to NETA Standards.** All testing is completed using calibrated equipment traceable to NIST, following NETA ATS and maintenance guidelines from NFPA 70B.

Primary injection testing provides the most complete validation of circuit breaker operation and is required after major repairs, refurbishments, or whenever protective coordination depends on precise time-current performance.

Secondary Injection Testing Fast, Low-Impact Verification for Electronic Trip Breakers

Secondary injection testing applies a controlled signal directly to the breaker's trip unit instead of sending high current through the primary path.

- ✓ **Breaker Remains in Place.** No need to remove heavy equipment from its cubicle. Reduces handling risk and downtime.
- ✓ **Trip Logic Validation.** Confirms pickup, long-time, short-time, and instantaneous functions of microprocessor-based trip units.
- ✓ **Non-Destructive Method.** Uses minimal power, avoiding the stress high-current testing can cause to contacts or bus connections.
- ✓ **Efficient and Repeatable.** Enables frequent functional checks as part of a preventive maintenance program.

For most modern electronic low-voltage breakers, secondary injection testing is the preferred maintenance method. It can be paired with low-current primary verification when full trip-chain confirmation is required.



The Importance of Routine Breaker Testing

- ✓ **Compliance and Insurance Requirements.** Many insurers and Authorities Having Jurisdiction (AHJ) reference NFPA 70B maintenance standards and require documented breaker testing.
- ✓ **Reduced Risk of Failure.** Early detection of deteriorated components prevents costly downtime and equipment damage.
- ✓ **Data for Predictive Maintenance.** Periodic test results reveal performance trends to help schedule replacements before failures occur.
- ✓ **Personnel Safety.** Confirmed trip functionality limits arc-flash energy during fault conditions.

The Quad Plus Testing Approach

Quad Plus technicians perform testing using controlled, documented procedures that include:

1. **Visual and Mechanical Inspection.** Examination for signs of overheating, corrosion, misalignment, and wear.
2. **Insulation and Contact Resistance Tests.** Baseline measurements for power conductors and contact assemblies.
3. **Primary or Secondary Injection Test.** Injection of calibrated current or simulated trip signals to confirm proper breaker timing and operation.
4. **Functional and Mechanical Operation Check.** Verification of close, trip, and interlock mechanisms.
5. **Results Documentation.** Each breaker receives a detailed report with test data, time-current plots, and recommendations for corrective action if necessary.



Why Quad Plus?

Quad Plus technicians combine decades of field experience with precision instrumentation to deliver verifiable, repeatable results. Each test record demonstrates that your protection system performs as designed, helping you meet regulatory requirements and operate with confidence.

- ✓ **NETA-Certified Field Technicians.** Experienced professionals following industry-approved test procedures.
- ✓ **Advanced Test Equipment.** Portable high-current and secondary injection sets are calibrated annually and traceable to NIST.
- ✓ **Manufacturer Expertise.** Extensive experience with ABB, Siemens, GE Magne-Blast, Westinghouse DHP, Square D, Cutler-Hammer, and others.
- ✓ **Detailed Reporting.** Digital results, pass/fail summaries, and recommendations for corrective maintenance.
- ✓ **Turnkey Support.** Integration with breaker refurbishment, retrofitting, and switchgear maintenance programs.

From single low-voltage breakers to complete switchgear lineups, Quad Plus ensures safe, dependable operation through comprehensive injection testing and preventive maintenance programs. Talk to a Quad Plus Circuit Breaker Expert today.

Connect with us



www.quadplus.com

+1 (844) 251-7823