

## Baker WinTATS Traction armature quality control test system



### Surge test

The high-voltage surge test (also known as an “impulse” test) is often the only means of detecting weak turn-to-turn insulation in an armature. A high-voltage surge (or impulse) test discerns if any insulation problems exist between turns, coils and bar-to-bar. The Baker WinTATS uses a waveform comparison method to analyze faults by calculating percentage differences relative to previously-acquired master waveforms.

### Bar-to-bar test

The Baker WinTATS’ bar-to-bar test employs an impedance matching circuit to accurately test low-impedance coils for shorts, opens, imbalances and weak turn-to-turn insulation. This method allows an operator to accurately identify a faulty coil.

### Introduction

Motor manufacturers and rebuilders need motor test equipment they can rely upon to test motors and motor components quickly, efficiently, and with reliable results. The Baker WinTATS traction armature quality control system is a reliable, field-proven system for accurate, rapid testing of motor armatures.

The unit performs the required set of tests motor manufacturing and rebuild shops need for quality assurance. The system has a rack-style cabinet, a computer running Microsoft Windows OS, power supplies and measurement circuitry. The system includes an automatic armature indexing stand.

The Baker WinTATS is a fully-automated motor armature tester with user-programmable pass/fail limits. This system provides the best combination of tests to perform on traction armatures for manufacturing quality assurance and control: AC hipot, DC hipot, resistance and surge.

The system’s ruggedized design enables it to work reliably amid the rigors of daily use in manufacturing and motor rebuild shop environments. The Baker WinTATS improves productivity because it is easily pre-programmed by an operator to automatically perform the tests they require for a given motor or component. Once the system is programmed and set up, it takes less than 18 minutes to test as many as 200 armature bars. In operation, an armature to be tested is loaded onto the RST indexing stand. Test contacts are automatically positioned next to the armature commutator, and testing is initiated with the “start test” command. The standard test sequence involves a specified set of AC and/or DC hipot, resistance and surge tests for each armature. All tests have pass/fail criteria, and any fault is detected automatically. When a fault is detected, testing is aborted and the operator immediately notified.

### AC and DC hipot tests

The Baker WinTATS uses micro-arc detection in both AC and DC hipot tests to detect any breakdowns to ground (the only proven method to accurately detect any such faults). It also performs a hipot test between phases to locate weak phase-to-phase insulation. Its capacitive compensation capability allows it to measure the resistive portion of any current leakage rather than the total leakage current. The Baker WinTATS also performs a DC hipot test to check the integrity of the insulation system with high DC voltage.

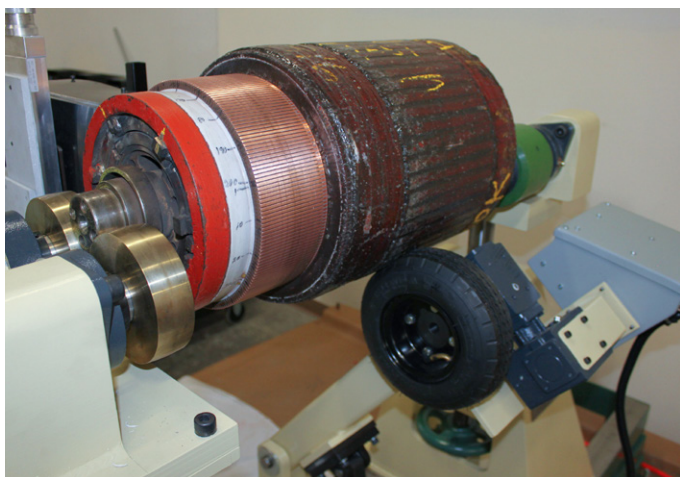
### Resistance measurements

A common fault in the manufacture of armatures is a poor connection between a coil and its commutator (e.g., a weld failure). Resistance tests detect any such misconnections, or the existence of any dead shorts, opens or unbalances. An auto-ranging DC constant-current supply measures the resistance of a winding to detect any weaknesses. Kelvin connections make low-resistance winding tests accurate and repeatable.

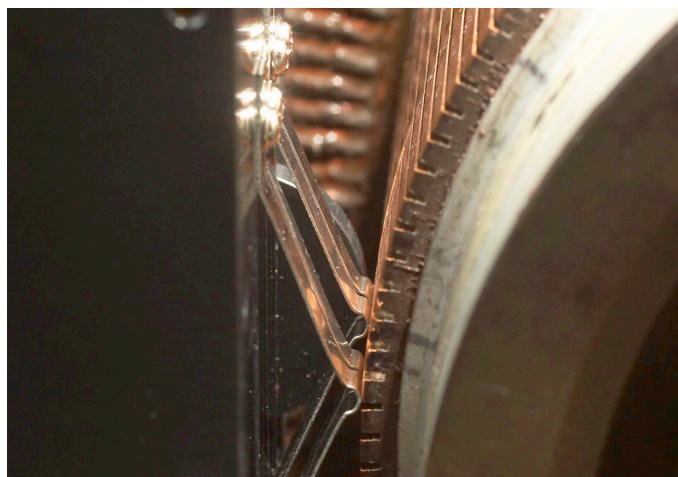
Resistance measurements between 100 micro-Ohms and 200 Ohms are corrected for temperature to the equivalent resistance value at 25°C, or to a customer-specified temperature.

### Armature fixtures

A ruggedized fixture enables quick and safe connection of an armature to the system. The armature is rotated by a rubber drive wheel, which is in contact with the armature and is propelled by a computer-controlled stepper motor using an optical indexing method. This fixture is designed for years of heavy-duty operation in a manufacturing environment.



An armature in the wheel-driven test fixture



The test contacts touching the commutator bars

## Baker WinTATS specifications

### Computer

- Operating system: Microsoft Windows 7
- Ports: Ethernet, USB, serial
- Data storage: hard disk drive, CD-RW (optional)
- Display: high-resolution LCD screen
- Printer: desktop and label (optional)
- Input devices: keyboard and mouse

### Resistance

- Auto-ranging
- 3.5 digit resolution
- 0.4% of full-scale accuracy in each range
- 0.2% of full-scale repeatability
- Kelvin leads and contacts for bar-to-bar testing
- Ambient temperature normally compensated at 25°C (or user-defined)

### DC hipot

- Voltage: programmable 100V to 10,000V DC in 150V DC increments, with 5% accuracy
- Current: 100µA maximum, 1µA resolution, programmable pass/fail in 1µA increments
- Duration: programmable in 1 second increments.

### Resistance range/current

- 100µΩ – 2µΩ / 20A
- 2µΩ – 20µΩ / 20A
- 20µΩ – 200µΩ / 2A
- 200µΩ – 2Ω / 200mA
- 2Ω – 20Ω / 20mA
- 20Ω – 200Ω / 20mA

### AC hipot

- Voltage: programmable in 150V to 5000V AC in 50V AC increments,
- 50/60 Hz, linear ramp up/down
- Current: 200mA maximum, 1mA resolution, programmable pass/fail in 1mA increments, arc detection for improved fault detection
- Leakage current method: "total or absolute leakage current," or "real or resistive leakage current"

### Surge (high-voltage impulse)

- Voltage: programmable 50V to 1500V peak bar-to-bar in 50V increments
- Pulse energy: 11.25 J maximum
- Discharge Capacitor: 0.1µF
- Load: Greater than 1mH
- Digitizing rate: 20M sample/second
- Programmable pass/fail percentage limit based on calculation by error-area ratio (EAR) algorithm

### Power requirements

- Input power: 230V AC at 50/60Hz, 12A
- Two-pole magnetic circuit breaker provides overcurrent protection
- Line surge protection against impulses of up to 6KC, 3KA (IEEE 587 Cat B and IEC 664 Cat IV)

### Environmental

- Operating temperature range: 10 to 40 °C
- Water and dust proof IP55 (NEMA 12) enclosures are available (optional)

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