

SKF Static Motor Analyzer Baker WinTATS

Traction armature quality control test system
for motor manufacturing applications

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 SKF Static Motor Analyzer – Baker WinTATS (traction armature test 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 7, 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
- 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



The Baker WinTATS automated traction armature test system for quality control and assurance

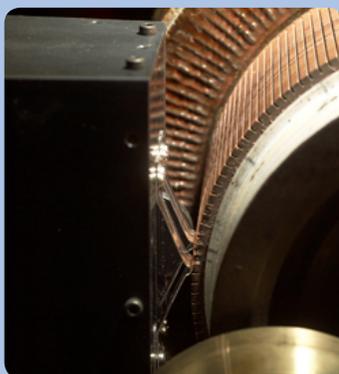
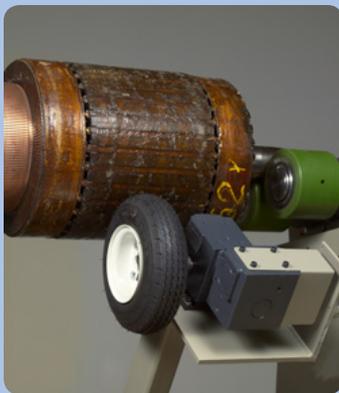
have pass/fail criteria, and any fault is detected automatically. When a fault is detected, testing is aborted and the operator immediately notified.

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 line-to-line method to analyze faults. It compares differences in waveforms and calculates percentage differences relative to the 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.



Baker WinTATs technical specifications

Computer

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

DC hipot

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

AC hipot

Voltage: programmable in 150 to 5 000 V AC in 50 V AC increments, 50/60 Hz, linear ramp up/down
Current: 200 mA maximum, 1 mA resolution, programmable pass/fail in 1 mA increments, arc detection for improved fault detection
Leakage current method: "total or absolute leakage current," or "real or resistive leakage current"

Power requirements

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

Note: The system can be calibrated on-site using ISO procedures. Software coefficient adjustments can be achieved with the system's software.

Resistance

Auto-ranging
3,5-digit resolution
0,4 percent of full-scale accuracy in each range
0,2 percent of full-scale repeatability
Kelvin leads and contacts for bar-to-bar testing
Ambient temperature normally compensated at 25 °C (or user-defined)
Infrared temperature sensing (optional)

Resistance range/current

100 $\mu\Omega$ – 2 $\mu\Omega$ / 20 A
2 $\mu\Omega$ – 20 $\mu\Omega$ / 20 A
20 $\mu\Omega$ – 200 $\mu\Omega$ / 2 A
200 $\mu\Omega$ – 2 Ω / 200 mA
2 Ω – 20 Ω / 20 mA
20 Ω – 200 Ω / 20 mA

Surge (high-voltage impulse)

Voltage: programmable 50 to 1 500 V peak bar-to-bar in 50 V increments
Pulse energy: 11,25 J maximum
Discharge Capacitor: 0,1 μ F
Load: Greater than 1 mH
Digitizing rate: 20 M sample/second
Programmable pass/fail percentage limit based on calculation by error-area ratio (EAR) algorithm

Environmental

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

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. This fixture is designed for years of heavy-duty operation in a manufacturing environment.

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