

SKF Static Motor Analyzer Baker DX-15

Perform a full spectrum of electric motor tests to 15 kV



Introduction

Insulation failures are the most common reason motors fail electrically. Maintenance professionals benefit from knowledge of the condition of the motors that drive their business because they can execute maintenance strategies that minimize costly unplanned downtime. Motor shop and industrial maintenance professionals world wide rely upon the SKF Static Motor Analyzer – Baker DX-15 to detect insulation problems and take action to avert motor failures.

A full range of test options

The Baker DX-15 extends the capabilities of the Baker DX family to perform insulation and motor circuit tests on AC and DC motors, coils, and generators at test voltages up to 15 kV (40 kV, with accessories). Like the 4-, 6- and 12-kV versions of the Baker DX, this analyzer performs insulation resistance, polarization index, dielectric absorption, step-voltage and surge tests to detect weaknesses or faults in motor winding and ground wall insulation. Motor circuits can be tested with the analyzer's low-voltage resistance, impedance, capacitance, phase angle and dissipation factor/quality factor tests. Low-voltage tests can supply up to 600 mA and frequencies from 50 to 4 000 Hz.

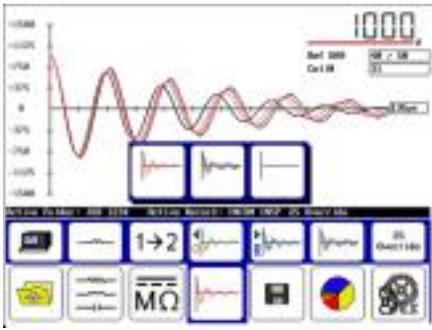
The Baker DX-15 can be configured with sets of tests for an organization's application needs. For example, it can be built to perform DC tests, or with just a combination of high-voltage and low-voltage tests.

A maintenance professional can simply order the Baker DX-15 configured with the specific set of applications they need.

Baker DX-15 features

- Tests motors ranging from fractional HP units to about 5 000 HP motors at voltages up to 15 kV
- Modular design with multiple configuration options to meet specific testing needs
- High- and low-voltage testing capability in a single unit for testing motor circuit quality and insulation integrity
- Full DC motor test capabilities, including bar-to-bar armature tests (with optional Baker ZTX accessory)
- Coil mode quickly analyzes coils and stores up to 400 tests in a single record
- Impulse mode enables an operator to quickly apply voltage when testing coils and DC motors
- Rotor influence check (RIC) test for detection of cracked or broken rotor bars
- Intuitive, easy-to-use touchscreen graphical user interface
- USB printer interface enables easy and fast printouts of test results
- Push to test (PTT) lock conveniently and safely holds voltage during DC tests
- Lightweight portability in a 15 kV analyzer





A coil test screen on the Baker DX-15.

Coil test capabilities

The Baker DX-15 is a comprehensive coil testing instrument with documentation capabilities found in no other product. An impulse test mode enables swift application of voltage to coils, making it possible to accurately test and store records of hundreds of coils faster than ever before. The analyzer stores and displays as many as 400 waveforms in a single record that is easily retrieved for quick analysis of any tested coil's condition.

SKF's error area ratio (EAR) algorithm calculates waveform differences between coils for quick, accurate analysis of coil test data. This reduces operator error by eliminating visual comparisons of waveforms. EAR analysis detects a defective coil when a test result is out of a user-programmed tolerance range of the tested coils.

Users can generate, print and analyze data

in reports with graphical representations of the data. The analyzer also produces convenient, concise summaries of results of any specific coil test.

User interface and operation

The eight-inch diagonal color display is an industrial, ruggedized touch screen built to handle the rigors of daily operation.

An intuitive graphical user interface features large icons for easy touch operation, even when an operator is working with electrical gloves. The interface is designed with a logical flow to minimize the required touches and make it easy to operate. The analyzer automatically prompts an operator to save any data if or when the save button is not selected, which helps minimize the risk of losing test data.



The Baker DX-15 as a coil test analyzer.

Rotor influence check (RIC)

The Baker DX-15 performs RIC (rotor influence check) tests. The RIC test can detect broken or damaged rotor bars that could cause motor failure. Rotor bar issues often reduce motor efficiency, and accelerate insulation degradation. A catastrophic motor failure can occur when a broken bar lifts or moves out of its slot.

Flexible, modular design

The Baker DX-15 can be built specifically to fit your needs. The unit can be configured to only perform the surge and DC tests, or with the resistance test. If a user wants all available tests, the analyzer can be configured accordingly with the inductance, impedance, phase angle and capacitance tests to create one of the most comprehensive motor test instruments available on the market.

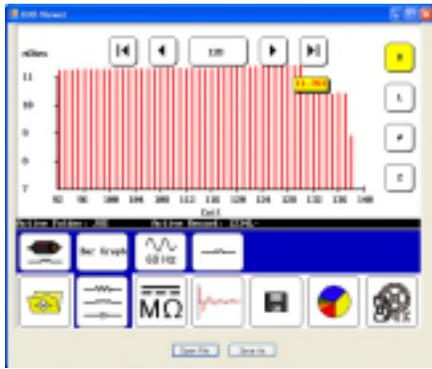
The Baker DX-15 can also be configured as a host for a Baker 24, 30 or 40 kV power pack. DC motors can also be tested with the Baker DX-15 by coupling with the Baker ZTX accessory or by adding an accessory span testing fixture.

Multi-language support

The Baker DX-15's embedded software can be configured by a user to run in one of a number of languages, including English, German, French, Portuguese and Spanish (contact SKF CMC-Fort Collins for information on specific languages not listed).

Tests and capabilities of the Baker DX-15

Failure Modes	Winding resistance test	IR test	DA/PI test	DC step voltage	DC hipot	Surge	Inductance	Capacitance	Impedance	Phase angle	D/Q	RIC
Weak insulation, turn-turn						X						
Weak insulation, phase-phase						X						
Weak insulation, coil-coil						X						
Turn-turn shorts	X					X	X		X	X	X	
Phase-phase shorts	X					X	X		X	X	X	
Open coils	X					X	X		X	X	X	
Reversed coils						X	X		X	X	X	
Unbalanced phases	X					X	X		X	X	X	
Weak ground wall insulation		X	X	X	X							
Dirty windings		X	X	X	X			X				
Moisture		X	X	X	X			X				
Feeder cables		X	X	X	X	X						
Motor lead line connections	X											
Broken/cracked rotor bars												X
Static eccentricity												X
Dynamic eccentricity												X



The Baker DX-15 RLV test screen.

DC motor testing and analysis

For decades, motor maintenance, repair and manufacturing professionals have struggled with the need to perform reliable, accurate and documentable DC motor tests. With the Baker DX-15, they can overcome the difficulties involved in armature testing and test documentation.

This analyzer performs inductance, impedance and phase angle measurements all in a single test to detect such problems as hard-welded shorts between turns, opens, errant turn counts and inconsistent wire sizes.

The Baker DX-15 automatically records and displays DC test readings for easy analysis. A view of analysis from each of the four measurements can be viewed at the touch of a single button. A given test bar chart allows an operator to quickly identify good and bad conditions. Screen controls also make it easy to quickly retest armature bars as needed.

Bar-to-bar and span tests can be conducted for a thorough analysis of an armature for shorts, opens, unbalances, turn to turn weak insulation, unbalances in coils, and damaged or misconnected equalizers. Baker DX-15 bar-to-bar tests are performed using the optional Baker ZTX armature test accessory.

The Baker ZTX's impedance matching transformer is the best, most reliable method available for analysis of low-impedance coils in DC motors.

For span tests, a number of bars can be spanned with the optional Baker ATF02 test fixture. With the Baker DX-15 placed in impulse mode, the armature can be tested with the simple touch of the start button. When using the ATF02 or Baker ZTX accessories to test armatures, the Baker DX-15 automatically indicates to the user when a problem such as turn-to-turn fault exists.



The Baker DX-15 as the host for a Baker 40 power pack unit.

Storage and reports

Storage of data at incoming inspection, during winding and at final assembly is easy with the Baker DX-15's multi-test file storage capabilities. The Baker DX-15 has the ability to store multiple test results within one folder, and it automatically attaches a time and date stamp to the test result. The scroll button makes it easy to review the data quickly and easily.

Nameplate data is entered via the touch screen, and may be printed on a compatible printer via the analyzer's USB port. Company logos can be loaded in the Baker DX-15 so every report has a logo at the top of the page.

Test results can also be exported to a USB memory device for motor owners who would like test data and reports provided in digitized formats.



A Baker DX-15 testing individual stator coils.

The Baker DX-15 can store up to 400 surge test results per folder for quick, easy analysis and reporting. The data is also stored in a chart for accurate and easy armature analysis. All interpoles and field coils can be easily analyzed and stored in the analyzer's multi-result file management system.

Safety features

SKF built the Baker DX-15 unit with user safety in mind. The analyzer successfully passes all safety requirements to achieve CE certification. LEDs on the analyzer indicate to an operator when any of the test leads are energized. The analyzer uses 40 kV test leads to provide the most accurate readings as well as for operator protection. The Baker DX-15 can also be configured with optional safety lights to warn any personnel in the area that tests are being performed and the analyzer is in operation.



The Baker ZTX test accessory.

Baker DX-15 specifications

Resistance

Source voltage, maximum	3,9 V
Source current, maximum	600 mA
100 to 10 000 Ω	3% accuracy
0,2 to 100 Ω	2% accuracy
0,002 to 0,2 Ω	4%, ±1 mΩ accuracy

Capacitance

Source voltage, maximum	3,9 V
Source current, maximum	600 mA
Source frequency	4 000 Hz
0,04 to 2,6 μF @ 4 000 Hz	3% accuracy
2,6 to 26 μF @ 4 000 Hz	5% accuracy

Inductance

Source voltage, maximum	3,9 V
Source current, maximum	600 mA
Source frequency	50 to 4 000 Hz
160 to 5 000 mH @ 60 Hz	3% accuracy
0,5 to 160 mH @ 60 Hz	2% accuracy
0,05 to 0,5 mH @ 60 Hz	3% accuracy

Impedance

Source voltage, maximum	3,9 V
Source current, maximum	600 mA
Source frequency	50 to 4 000 Hz
0,15 to 10 000 Ω @ 60 Hz	3% accuracy
0,01 to 0,15 Ω @ 60 Hz	3% accuracy
Phase accuracy @ 60 Hz	< 2 degrees

DC tests

Voltage accuracy	3%
Maximum resistance	> 100 GΩ
Current accuracy	5%
Minimum resistance	1,0 MΩ
Maximum output current	5 mA
Over-current trip	1,2 mA
Automatic arc detection	yes

Surge

Capacitor size (nF)	100
Surge energy	11 J
Short circuit current	~ 700 A
65 μH load voltage	15 kV
Surge voltage accuracy	12%

Note: Surge voltage accuracy meets (based upon) Z540 Standard, four times measurement uncertainty (calibrated within 3 percent)

Model

Model	Description
99-DX-15-DS1	DC test, surge, single-lead
99-DX-15-DS3	DC test, surge, three-lead
99-DX-15-RDS1	DC test, resistance, surge, single-lead
99-DX-15-RDS3	DC test, resistance, surge, three-lead
99-DX-15-ZDS1	DC test, RLC, surge, single-lead
99-DX-15-ZDS3	DC test, RLC, surge, three-lead

Physical specifications

- Weight: 22,7 kg (50 lbs.)
- Dimensions 406 x 357 x 203 mm (16 x 14 x 8 in.)
- Power requirements: 100 to 240 V AC, 50/60 Hz, 2,5 A
- Internal memory: 2 GB
- Printer interface: USB printer connection
- External connectors: RLC leads, foot switch, remote E-stop safety lights, SKF power pack, ground
- User interface: Color touch screen

Configurations

Standard equipment bundled in this analyzer includes:

- Resistance (medium Kelvin clip) leads
- 2 GB USB flash drive
 - Baker DX user manual
 - 30-day trial version of Surveyor DX desktop report generation software
 - Language management software utility

Optional Baker DX-15 equipment (order separately) includes:

- Baker ZTX
- Footswitch
- Armature span test fixture
- Surveyor DX desktop report generation software
- Power pack interface board
- Baker 24, 30, 40, 85 power packs
- Resistance (large Kelvin clip) leads 22.51 bb
 - List - level 1 - blank before
- RIC test
- Soft padded case
- Color laser printer

Baker Instrument Company, an SKF Group Company

4812 McMurry Avenue, Fort Collins, CO 80525 USA

T: +1 970-282-1200 – +1 800-752-8272 F: +1 970-282-1010

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