

Baker DX Series Static Motor Analyzers

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Power on



Baker DX Series Static Electric Motor Analyzers

Introduction

Electric motors will fail, sooner or later. Nearly half of all industrial motor failures result from internal electrical shorts caused by degraded insulation. In order to maximize a motor's uptime and service life, the condition of its winding and groundwall insulation must be tested regularly.

The Baker DX Static Motor Analyzer provides the industry's most comprehensive set of tests to analyze a motor's entire insulation system. Portable, powerful, and configurable to meet the specific needs of motor shops, industrial maintenance teams and motor OEMs, the Baker DX series offers the best value in motor test equipment available today. These analyzers deliver superior test capabilities in an easy-to-use instrument.

Early, reliable problem detection

Baker DX series analyzers detect every common electrical problem with industrial motors. In both random and form wound coils and windings, a Baker DX can identify incorrect numbers of turns, wire gauges or wire material. It also detects open, reversed or unbalanced coils.

These analyzers find early indications of insulation weakness and faults in windings, between phases, coil-to-coil and in groundwall insulation. They can identify if contamination by chemicals, moisture, dust or dirt is impacting insulation strength. Additionally, they detect problems with motor connections such as feed cable insulation weaknesses, imbalances, opens or high resistances.

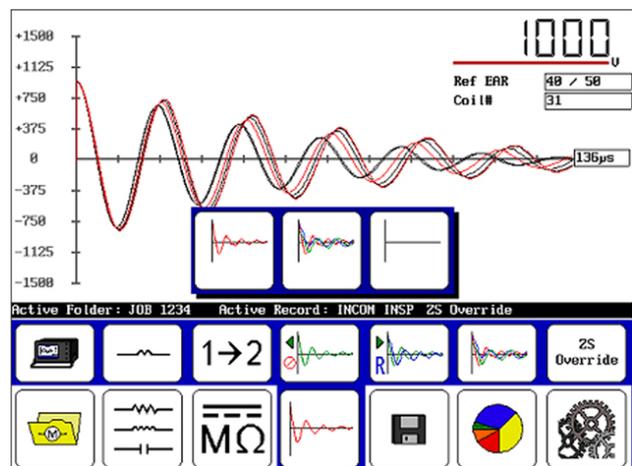
Value-packed versatility

The Baker DX series comes in a wide range of configurations and can be ordered with just the test capabilities needed, including winding insulation tests, groundwall insulation tests, low-voltage winding construction tests, maximum test voltage and number of leads. Additional options include a partial discharge (PD) surge test, low-impedance coil testing and connections which enable high voltage testing with Baker Power Packs, such as the new Power Pack PPX.

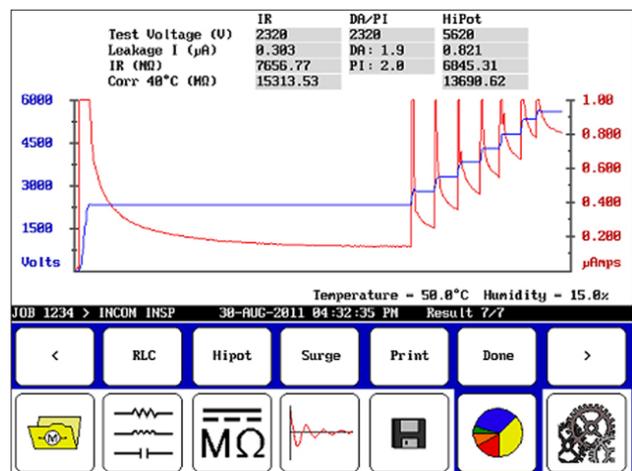
Ease of use

The Baker DX has an intuitive touch-screen user interface that makes it easy to perform any test. The lightweight, portable design enables use in the field as well as the shop. Reports are easy to generate and print via the USB interface.

These analyzers implement a unique coil-test mode that enables rapid testing of hundreds of coils. Up to 400 coil test results can be saved in a single record.



Surge test on multiple coils



DC test results



Baker DX 4kV model

A full toolkit of tests

The Baker DX finds all common problems with an industrial motor's insulation or electrical systems. The industry-leading, standards-compliant range of tests includes:

- Winding resistance
- Inductance
- Capacitance
- Impedance
- Phase angle and D/Q
- Insulation resistance
- Dielectric absorption (DA)
- Polarization index (PI)
- Step voltage
- DC hipot
- Surge
- Surge PD (partial discharge)
- Rotor influence check (RIC)

Note that some tests require optional features (see the table on the next page).

These analyzers feature:

- 4 to 40kV max test voltages to perform tests on a full spectrum of motor and coils (fractional horsepower motors up to multi-megawatt generators)
- High- and low-voltage test capability in a single instrument to test motor circuit and insulation systems
- Intuitive graphical user interface with large, glove-friendly touch screen
- USB printer and flash drive interface for easy report printing and data transfer
- Coil mode enables rapid testing of coils and storage of all data

Comprehensive motor analysis with the Baker DX series

The Baker DX analyzer provides a comprehensive array of tests which can expose a wide range of issues with motors. The table below shows which tests are applicable for each type of problem. Some tests require optional modules for the DX analyzer.

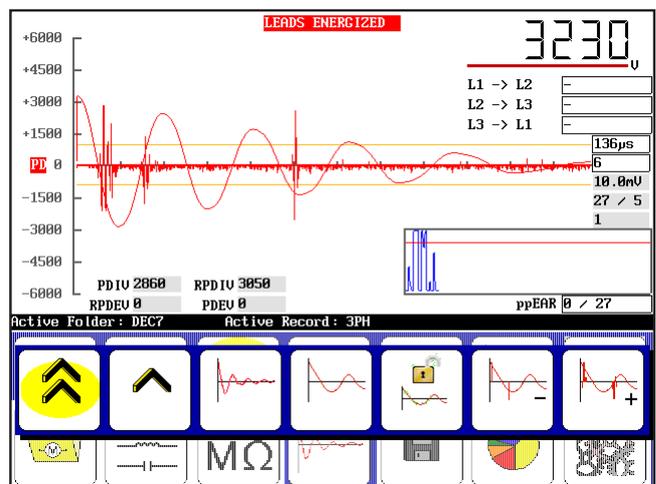
| Failure modes | Winding resistance ¹ | Inductance ² | Capacitance ² | Impedance ² | Phase angle ² | D/Q ² | IR test | DA/PI test | DC step voltage | DC HiPot | Surge | Surge PD ³ | RIC ⁴ |
|-----------------------------|---------------------------------|-------------------------|--------------------------|------------------------|--------------------------|------------------|---------|------------|-----------------|----------|-------|-----------------------|------------------|
| Weak insulation turn-turn | | | | | | | | | | | ■ | ■ | |
| Weak insulation phase-phase | | | | | | ■ | | | | | ■ | ■ | |
| Weak insulation coil-coil | | | | | | ■ | | | | | ■ | ■ | |
| Turn-turn shorts | ■ | ■ | | ■ | ■ | | | | | | ■ | | |
| Phase-phase shorts | ■ | ■ | | ■ | ■ | | | | | | ■ | | |
| Open coils | ■ | ■ | | ■ | ■ | ■ | | | | | ■ | | |
| Reversed coils | | ■ | | ■ | ■ | | | | | | ■ | | |
| Unbalanced phases | ■ | ■ | | ■ | ■ | | | | | | ■ | | |
| Weak ground wall insulation | | | | | | | ■ | ■ | ■ | ■ | | | |
| Dirty windings | | | ■ | | | | ■ | ■ | ■ | ■ | | | |
| Moisture | | | ■ | | | | ■ | ■ | ■ | ■ | | | |
| Feeder cables | | | | | | | ■ | ■ | ■ | ■ | ■ | | |
| Motor lead line connections | ■ | | | ■ | ■ | ■ | | | | | ■ | | |
| Form coil defects | | ■ | | ■ | ■ | ■ | | | | | ■ | ■ | |
| Rotor bar | | | | | | | | | | | | | ■ |

- 1) Requires Winding Resistance option
- 2) Requires Inductance / Capacitance option
- 3) Requires PD (partial discharge) option
- 4) Requires RIC (rotor influence check) option

Partial discharge

High voltage equipment can suffer from partial electrostatic discharge, where localized corona or breakdown discharge can damage insulation, leading to progressive degradation and eventual circuit breakdown.

Winding insulation defects of this type can be found early with the optional Baker DX Surge PD capability, which captures inception, repetitive inception, repetitive extinction and extinction voltages of partial discharge (PD) in accordance with the IEC 61934 standard. PD waveforms and data are included in reports generated by the Baker DX and the Surveyor DX desktop PC software application.



Partial Discharge (PD) test results. The spiky trace that accompanies the surge waveform indicates that partial discharge is occurring.

DC motor testing



Performing armature tests is easy with the ATF5000 and Baker ZTX low-impedance component test accessories

DC motor testing is quick and accurate using the Baker DX. The tester includes an armature test mode user interface and reporting function. Interpole and field coil test results are specially labelled. Bar-to-bar and span tests can be performed on a DC armature to thoroughly analyze for shorts, open circuits, weak turn-to-turn insulation, unbalances in the coils, and damaged or misconnected commutator risers and equalizers. For the best armature diagnostics, the Baker DX can be used with the Baker ZTX low-impedance test accessory, which enables bar-to-bar testing on most DC armatures. The Baker ZTX lowers the maximum surge test voltage and increases the available surge current for testing very low impedance coils.

The Baker DX-15A features integrated ZTX technology built into the instrument.





Fully document test results

Storage of test results data is easy with the Baker DX series' multi-test storage capabilities. The instrument has the ability to store multiple test results within a single folder. The scroll function button makes it easy to quickly review all data.

Reports, including motor nameplate data, can be printed on compatible printers via the USB port. Company logos can be imported and saved in the Baker DX software so every report has a logo of the user's choice at the top of the page. Test results are exportable to USB flash memory for data transfers, and for report generation or data storage on a PC using the optional Surveyor DX software.

Worldwide support

Megger provides world-class global technical support for its motor test and monitoring equipment. Whether it is for routine calibration, or repairs and upgrades for static or dynamic analyzers, our experienced technicians will return your equipment in excellent condition with fast turn-around and courteous service.

Contact Megger Baker Instruments product service at +1 800-523-7514 (in the U.S.), or +1 858-496-3627 from outside the U.S., or email our service department at baker.service@megger.com.

Maximize value with training

Want to get the most out of your investment in your Baker analyzer? Megger provides training on static motor test and monitoring methods at its training center in Fort Collins, Colorado, USA, or at customer locations around the globe. Training courses include introductory and advanced seminars on static motor testing that allow you to get the most out of your static motor analyzer.

For more information, or for reservations, send an email to baker.sales@megger.com, or call +1 970-282-1200.

Sustained performance

Keep your Baker DX analyzer in top condition and extend its service life with Megger Product Support Plans (PSPs). These plans assure worry-free use through calibration and maintenance of your Megger electric motor analyzer. They also provide real-time online and phone support. For more information about PSPs for electric motor test equipment, contact your local Megger Baker sales representative.

For customers in the United States, call +1 970-282-1200; for global contacts, visit Megger's electric motor test and monitoring solutions website at www.megger.com/baker.

Baker DX series specifications

| Model-specific tests | 4 and 6kV models | 6kV HO model | 12kV model | 12kV HO model | 15kV models |
|-------------------------------------|------------------|--------------|------------|---------------|----------------|
| DC tests | | | | | |
| Voltage accuracy | 3% | 3% | 3% | 3% | 3% |
| Maximum resistance ¹ | > 25 / 50 GΩ | > 50 GΩ | > 75 GΩ | > 75 GΩ | > 100 GΩ |
| Current accuracy | 5% | 5% | 5% | 5% | 5% |
| Minimum resistance | 1 MΩ | 1 MΩ | 5 MΩ | 5 MΩ | 5 MΩ |
| Maximum output current | 5 mA | 5 mA | 5 mA | 10 mA | 8.3 mA |
| Over-current trip | 1.2 mA | 1.2 mA | 1.2 mA | 1.2 mA | 1.2 mA |
| Surge | | | | | |
| Capacitor size | 40 nF | 100 nF | 40 nF | 100 nF | 100 nF |
| Surge energy | 0.32 J / 0.72 J | 1.8 J | 2.88 J | 7.2 J | 11.25 J |
| Short circuit current | 280 A / 340 A | 450 A | 600 A | 800 A | 700 A / 2000 A |
| 65 μH load voltage | 4 kV / 6 kV | 6 kV | 12 kV | 12 kV | 15 kV / 1.5 kV |
| Surge voltage accuracy ² | 12% | 12% | 12% | 12% | 12% |

1) Test current must be greater than 100 nA, and test voltage must be less than 75% of maximum voltage

2) Surge voltage accuracy meets / based on Z540 Standard, four times measurement uncertainty (calibrated within 3%)

| Tests (all models) | | | |
|--|---|---|---|
| Surge PD (option) | | | |
| Inception and extinction voltages (PDIV, PDEV) | | Measured per IEC 61934 | |
| Repetitive inception and extinction voltages (RIPDV, REPDV) | | Measured per IEC 61934 | |
| Programmable PD threshold range | | 1.0 mV – 999 mV | |
| PD time resolution (per pixel) | | 10 nS – 50 μs | |
| Resistance | | Inductance | |
| Source voltage, maximum | 3.9 V | Source voltage, maximum | 3.9 V |
| Source current, maximum | 600 mA | Source current, maximum | 600 mA |
| 100 to 10 000 Ω | 3% accuracy | Source frequency | 40 to 4 000 Hz |
| 0.2 to 100 Ω | 2 % accuracy | 1 000 to 5 000 mH at 120 Hz | 15% accuracy |
| 0.002 to 0.2 Ω | 4% ± 1 mΩ | 100 to 1 000 mH at 120 Hz | 8% accuracy |
| | | 0.05 to 100 mH at 1 kHz | 5% accuracy |
| Capacitance | | Impedance | |
| Source voltage, maximum | 3.9 V | Source voltage, maximum | 3.9 V |
| Source current, maximum | 600 mA | Source current, maximum | 600 mA |
| Source frequency | 4 000 Hz | Source frequency | 50 to 4 000 Hz |
| 0.04 to 2.6 μF at 4 000 Hz | 3% accuracy | 0.15 to 10 000 Ω at 60 Hz | 3% accuracy |
| 2.6 to 26 μF at 4 000 Hz | 5% accuracy | 0.01 to 0.15 Ω at 60 Hz | 3% accuracy |
| | | Phase accuracy at 60 Hz | < 2 degrees |
| Physical specifications | 4/6/12 kV, 6/12 kV HO models | DX-15 model | DX-15A model |
| Dimensions | 42 cm x 20 cm x 45 cm (16.5 in x 8 in x 17.7 in) | 47 cm x 20 cm x 56 cm (18.5 in x 8 in x 22 in) | 47 cm x 20 cm x 56 cm (18.5 in x 8 in x 22 in) |
| Weight | 15.4 kg (34 lbs) | 22.7 kg (50 lbs) | 25 kg (55 lbs) |
| Compliant with IEEE 43, 96, 118, 522; also with IEC 34, 60034, 61934 (as applicable) | | | |



Baker DX with the Baker PPX Power Pack

Baker DX Physical specifications

- Internal memory: 2 GB
- Internal storage: 16 GB SD card
- Printer interface: USB/PCL 3 type printer
- External connectors: RLC leads, foot switch, remote E-stop safety lights, Baker power pack, ground
- User interface: 8-in color VGA touch screen

What's in the box

- Power cord
- USB flash drive with trial Surveyor DX desktop PC software
- User manual (on USB flash drive)
- Test leads

Optional accessories

- Surveyor DX report generation software (for use on personal computers)
- Baker PPX 30, 30A and 40 power packs
- Baker ZTX low-impedance test accessory
- ATF5000 bar-to-bar armature test fixture
- Foot switch
- Extension leads
- USB compatible printer
- Durable fabric backpack case
- Safety lights

Megger Baker Instruments
4812 McMurry Avenue, Fort Collins, CO 80525, USA
Tel: +1 970-282-1200

baker.sales@megger.com

www.megger.com/baker

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