

ALL-TEST Pro ® AT33EV Electric Motor Tester & Analyzer

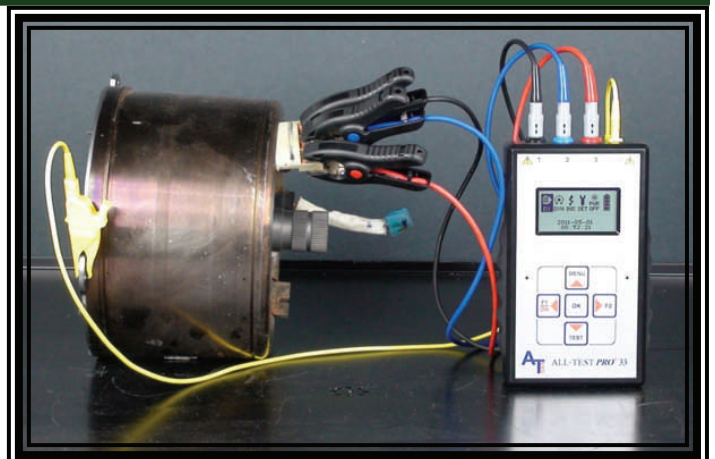
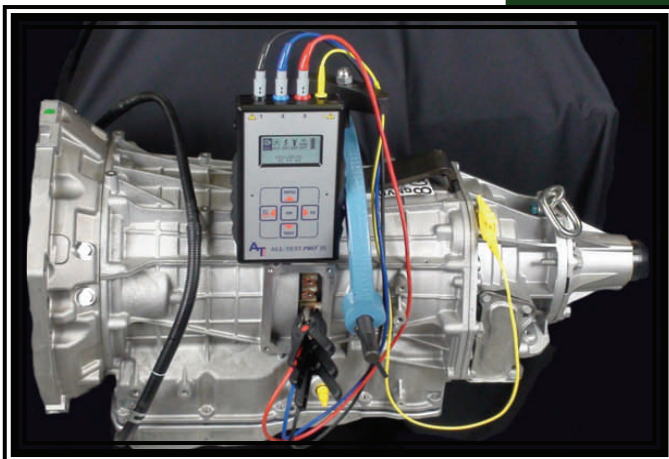
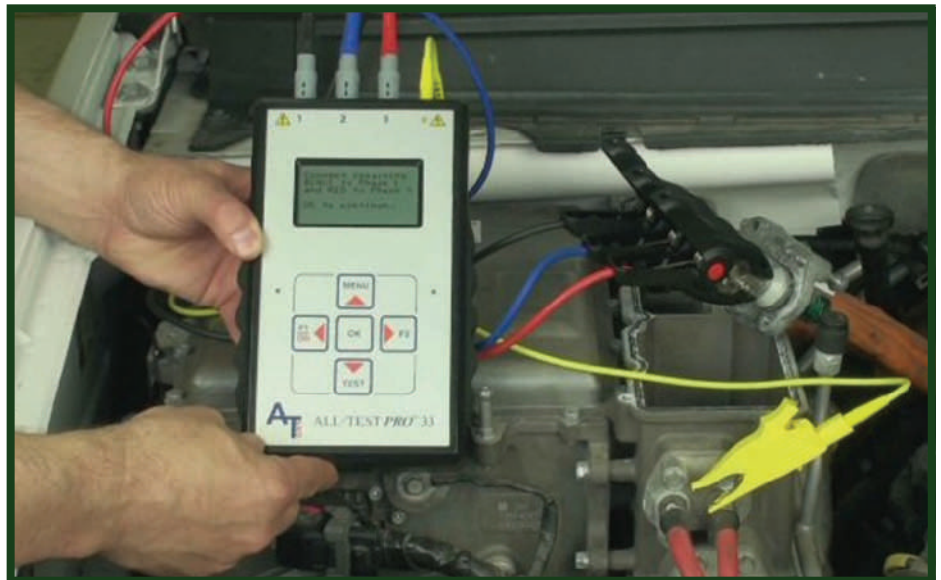


The AT33 for Electric Vehicle (EV) Motor Testing is a new Hand-Held Test Instrument for testing the special motor types encountered in electric and hybrid vehicles. The AT33EV is a complete system solution for stand-alone trouble shooting/ fault localization, as well as trending for early fault detection when combined with PC based host software for trending, in-depth analysis, database and reporting. The AT33EV is designed to be used as a stand-alone unit in the workshop, for ease of use and convenience, with built in real time clock and ample size memory for storage of test and reference data. The instrument is built to exacting standards and rugged to handle the daily use in tough automotive environments. The rechargeable Lithium batteries support more than eight hours of continuous testing and data collection.

The ALL-TEST Pro® 33EV (AT33EV) Electric Motor Tester and Analyzer provides a complete solution for field testing Permanent Magnet or Induction motor-generators (electric machines). The versatility of this unit permits automotive electric machines to be analyzed with Static and Dynamic testing in vehicle or on the bench by a technician with very high degree of accuracy with easy to interpret test data and signatures.

Properly testing electric machines can be complicated. Using the AT33EV multi-dimensional analysis and diagnostic strategy it becomes a simple task.

By simply connecting the AT33EV to each of the 3-Phase cables (motor connections) electric machine analysis can be easily accomplished whether on the vehicle, transmission on the bench, or the electric machine out of the transmission!



AR&D

Technology and Training Since 1987

It All Starts Here.

www.go2hev.com



Electric machines failure modes can come in many flavors. The AT33EV will use Resistance to measure the Stator windings and any high voltage cables connected to the transmission (in milliohms). This unit also uses low voltage ac waveforms and changes amplitudes and frequencies to identify winding turn-to-turn short, winding-to-winding short, phase-to-phase short, phase-to-ground short, an open circuit, leaking/cracked wire insulation, worn Stator slot insulation,

weak or cracked Rotor magnets, or broken/cracked Rotor bars. Each of these failure modes can cause a variety of vehicle driveability symptoms. The ac method testing method combines Resistance, Impedance, Inductance, Capacitance, Dissipation Factor, Phase Angle, Current-to-Frequency Ratio, and High Voltage Insulation testing data to provide the fidelity necessary to determine electric machine state-of-health (SOH).

Static Testing

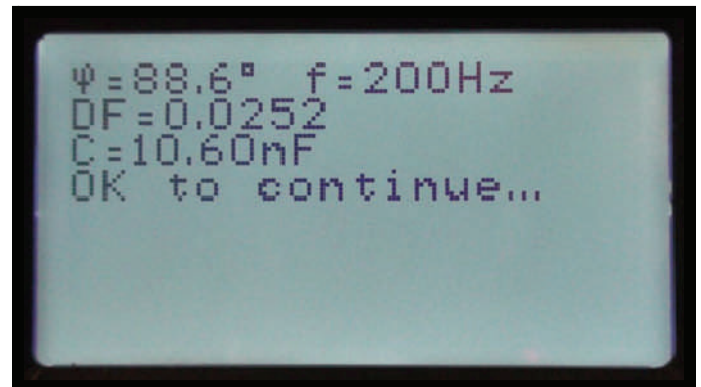
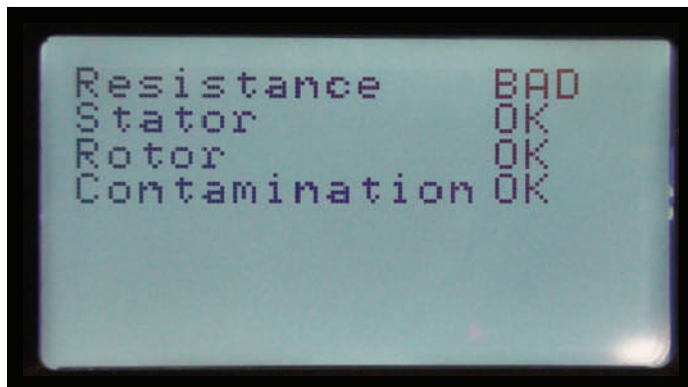
“STATIC” – measuring functions

“Test Value Static / Reference Value Static” (patent pending): Measures a number of parameters in all three phases and calculates a “Test Value Static” which is compared to a baseline “Reference Value Static” and a percent deviation is given.

The “Reference Value Static” can be saved from the first baseline test record or can contain reference data originating from the car manufacturer.

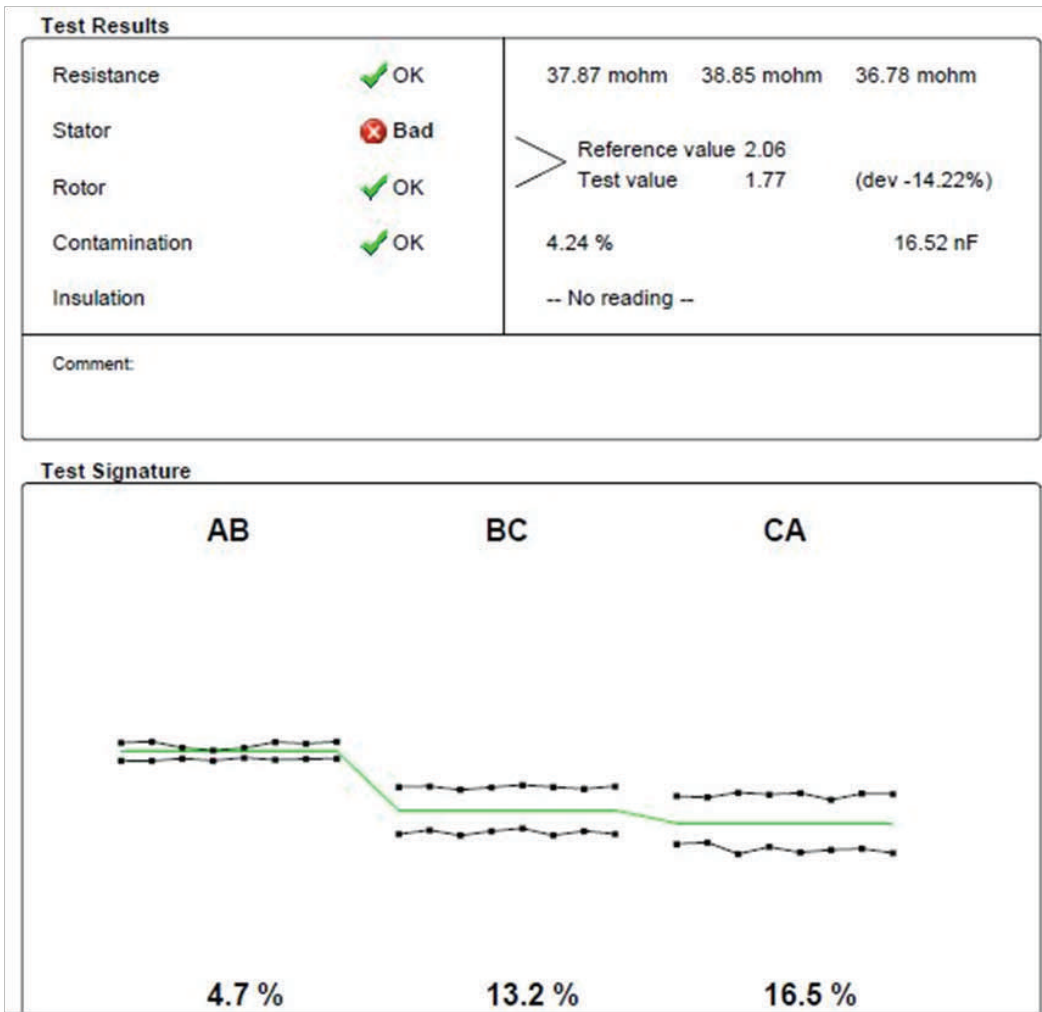
Contamination: measures the dissipation factor DF / phase angle and the capacitance between the stator and frame

Resistance: 0-999Ω, resolution: 0.01mΩ (automatic compensation for thermoelectric offset voltages). True 4-wire Kelvin measurement for accurate low resistance results.



Dynamic Testing

Dynamic Testing is simply rotating the vehicle wheel/tire or, motor shaft. This can be performed if the transmission is in the vehicle or on the bench. This will test the Stator windings and the Rotor (permanent magnet or induction motor). When the Dynamic test is initiated the technician will slowly rotate the vehicle tire or (about 10 rpm) or transmission output (spider) gear (about 10 rpm) to capture the multi-dimensional data.



The three electric machine phase data results are then compared against each other to identify any problems. Dynamic testing is very similar to completing major engine systems tests (cylinder balance, ignition, and fuel system) to identify any weak or non-functioning cylinders. After the Dynamic test is completed the data and signature test results can be uploaded to a laptop computer. After completing a short training course the data and signatures are very easy to interpret ..easier than interpreting an oscilloscope ignition waveform pattern!

Contact us for a Quote Today:

Pacific West Coast Region:

Bill Steen @ Training for Tomorrow's Technology
Ph: 530.477.8657 Email: bill@go2hev.com

Mountain West Coast Region:

Paul Pate ph: 702.596.8895 (or) paul@go2hev.com

Midwest Region:

Jeff Minter @ Advanced Vehicle Specialists,
Ph: 608.516.5727 Email: jeff@go2hev.com

Automotive Research and Design, LLC
34337 Fontana Drive
Sterling Heights, MI 48312

Phone: 586.718.9469
Email: arandd@ix.netcom.com
www.go2hev.com



Register @ go2hev.com for our **Complimentary** 3-Part Webinar Series on Diagnosing Hybrid Electric Machine Failures using the AT33EV Motor Circuit Analysis Tool:

- Part 1 Nov. 9, 2011 7-8 p.m. ET
- Part 2 Dec. 5, 2011 7-8 p.m. ET
- Part 3 Jan. 18, 2012 7-8 p.m. ET

If you prefer extensive Hands-on Training, we offer two (2) courses in which the AT33EV instrument is covered:

- 3-day Predictive Maintenance
- 5-day Hybrid & Electric Vehicle Systems

When visiting our website, sign-up to receive our technical e-Newsletter and register as a member.

AT33EV (preliminary) Specifications:

Safety

According to IEC 61010-1 Cat.III 1000V

Approvals

CE

Calibration Certificate

Optional (contact nearest distributor for more information)

Connections

3 x Motor input/output - Professional grade push-pull connectors 4-pole

Meg-Ohm High Voltage output - 4mm dia. safety jack

PC communication - USB type B connector

Charger input - 2.5mm diameter center pin DC-jack

Keyboard

Sealed tactile touch, XL size keys

Display

Graphic LCD, monochrome 128 x 64 pixel (3.1")
View Area=69 x 36.5mm, white LED backlight.

Temperature range

-20 °C to +60 °C (-4 °F to +140 °F)

Temperature range operating

-10 °C to +50 °C (+14 °F to +122 °F)

Humidity

0-80% relative humidity, non-condensing

EMC

- EN61000-6-4 (Emission)
- EN61000-6-2 (Susceptibility)

Batteries

2 x LiION cells with 2100 - 2300 mAh capacity

Enclosure

Material - Polycarbonate, UL94-V2

Size

126 x 218 x 51 mm (WxLxH) (basic enclosure size without minor protrusions)

Weight

< 1 kg. / 2 lbs

Accessories

PC based host software "ALL-TEST PRO 33" for further analysis, routing, trending, database, report generating

3x Test Leads with custom Kelvin Clips and professional medical grade push-pull connectors

1x Test Lead with 4mm safety plug and "Dolphin" clip

1x USB cable

Charging adapter, Universal input type 85-260VAC, output 9V @ 1A