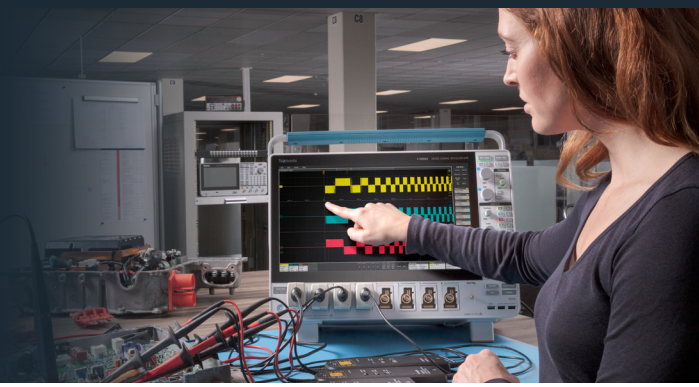
Tektronix®

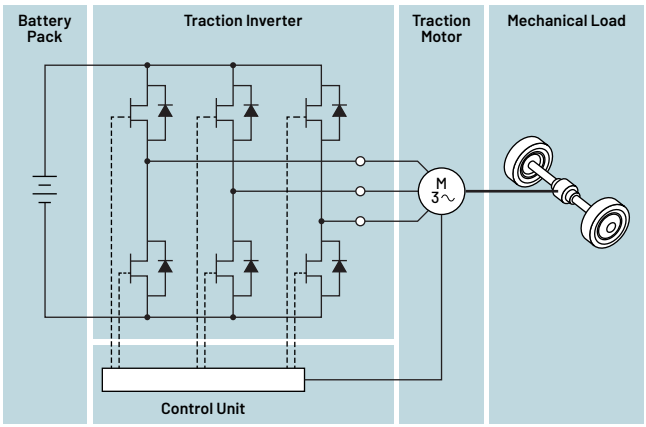
EV Powertrain Analysis and Troubleshooting

Comprehensive visibility into your electric vehicle traction inverters and motor systems



Measurement Challenges

Various measurements at test points within an electric vehicle power train require specialized equipment designed to ensure the highest quality with the fewest trade-offs. The correct instrument may depend on the level of accuracy, number of channels or type of signal being acquired.

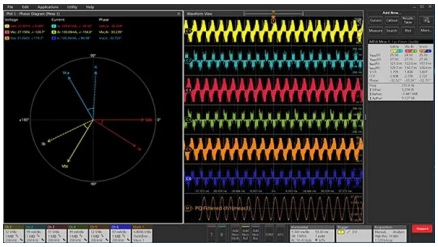


DC Bus	Control System	Traction Inverter	Motor
• Ripple/Noise • Transient Response • Regeneration	• Realtime DQ0 • Timing • Serial Communications • Power Integrity	• Output Phasor • Electrical Efficiency • Switching Loss, Timing • Double Pulse Testing • DC Bus Ripple • THD	• Speed, Acceleration • Torque • Mechanical Power • System-level Efficiency

Reducing the Learning Curve

Oscilloscopes with integrated motor drive analysis software provide detailed measurements with fast sample rates with minimal clicks and button presses.

- Simplified, stable PWM triggering.
- Three-phase autoset configures horizontal, vertical and triggers.
- Vector diagrams provide quick insight into connections.
- Configurable wiring with software delta to wye conversion.
- Motor angle, speed, acceleration, torque, direction with support for Hall sensors, QEI and resolvers.
- Analyze motor start up response using time trend plots.



Achieving High-Quality, Repeatable Measurements

Automated oscilloscope measurements with proven algorithms provide stable, repeatable measurements.

Reliable voltage and current probes deliver low-noise signals from your device under test.

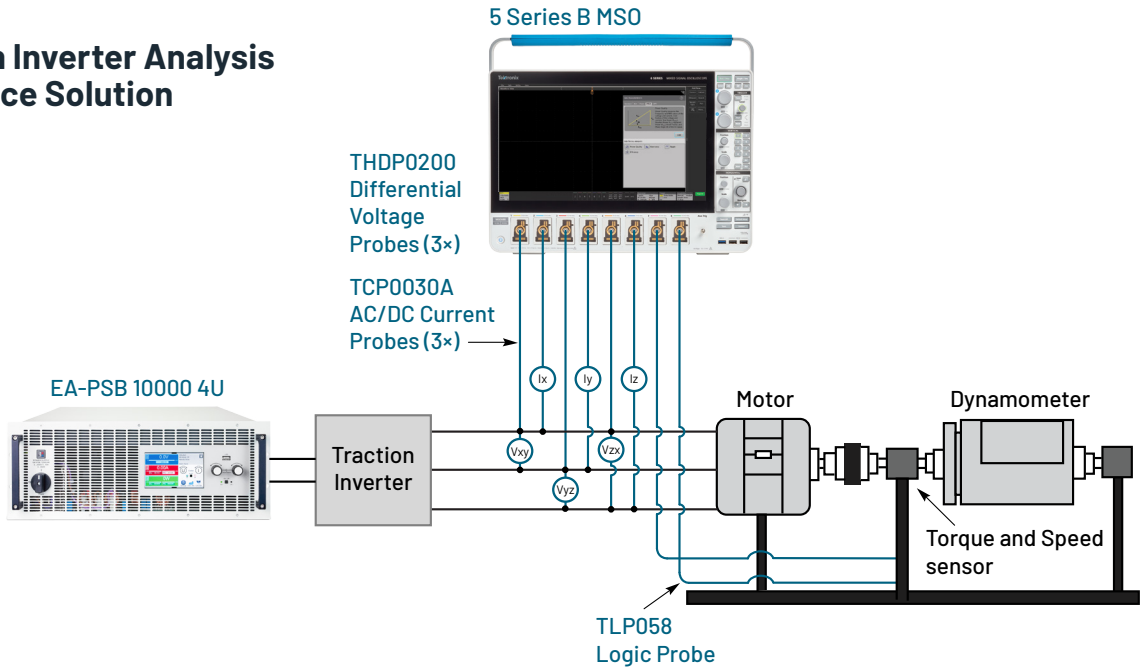
Delivering Scalable, Sustainable Power

Elektro-Automatik (EA) power supplies and battery simulators deliver efficient power in compact supplies.

- Bidirectional power supplies with regeneration.
- Battery simulators.

Solutions for EV Traction Inverter Analysis

Traction Inverter Analysis Reference Solution



Using an oscilloscope offers significant advantages over a power analyzer for designing and debugging drive and motor systems. Unlike power analyzers, oscilloscopes provide detailed, **real-time visibility** into both electrical and mechanical signals, allowing engineers to capture rapid, **transient events** critical for diagnosing issues in motor startup, switching behaviors and control feedback loops. Oscilloscopes can measure multiple types of signals, including not only current and voltage but also torque and speed. **Advanced triggering** and waveform analysis help you isolate specific events. This flexibility and depth of insight make oscilloscopes more versatile for understanding complex interactions and refining control systems in motor and drive applications.

Model	Description
EA 10000 Series	Programmable bidirectional power supplies and regenerative electronic loads
MSO58B-BW1000*	1 GHz, 8-channel oscilloscope
Opt. 5-IMDA Opt. 5-IMDA-DQ0 Opt. 5-IMDA-MECH	Inverter, motor and drive software analysis with DQ0 and mechanical measurements
Opt. 5-PS2	Power Solution Bundle • Opt. 5-PWR Advanced Power Analysis • TCP0030A Current Probe • THDP0200 Differential Voltage Probe • 067-1686-xx Deskew Fixture
THDP0200 x 2	200 MHz, ±750 V, high voltage differential probe
TCP0030A x 2	120 MHz, 30 Arms, clamp-on AC/DC current probe
TLP058	8-channel logic probe

Optimize efficiency with switching loss and magnetics analysis with advanced power analysis (Opt. 4/5/6-PWR)

- Switching timing and losses.
- In-circuit inductor and transformer measurements, including B-H curves.
- DC/DC converter efficiency measurements.

Accurate, repeatable double pulse testing on switching devices (Opt. 4/5/6-WBT-DPT)

- 13+ measurements per JEDEC and IEC standards for switching, timing and reverse recovery.
- Quick, easy setup through the intuitive 4, 5 or 6 Series MSO controls.
- Configurable setting to test beyond specifications and understand margins.

Learn more at tek.com.

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