

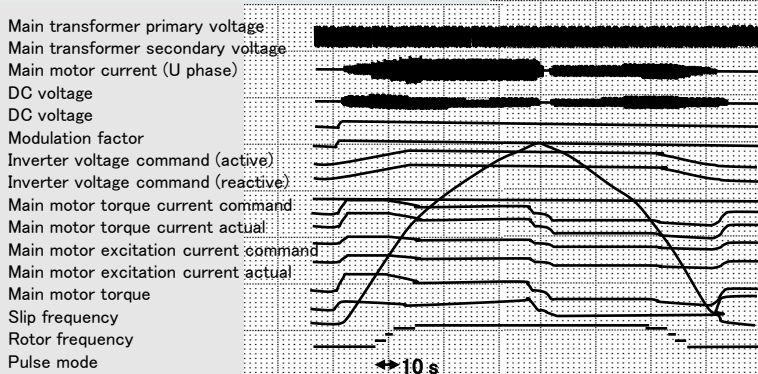
- High-speed train regenerative braking performance - Verifying high-speed train regenerative braking performance

The Omniace is useful for testing regeneration braking in high-speed trains.

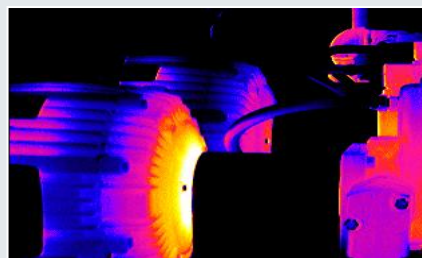
- Vehicles with regenerative braking convert kinetic energy into electric energy during deceleration / stopping with a regenerative inverter to conserve energy. In addition, resonance is induced due to inductance and capacitance originating in harmonic components and active filters prevent equipment failures such as overheating and abnormal sounds. Since the active filter also serves as a reactive power compensation, omission of phase leading capacitor and improvement of device utilization efficiency is possible.
- The main regeneration system for Shinkansen high-speed trains was developed in 1964 with the 0 series. Since then improvement of performance of converter control, inverter control, increased power device frequency (IGBT), improved withstand voltage have led to miniaturization and improved performance. The Omniace III digital oscilloscopic recorder is useful for testing the various aspects of performance.

Acceleration characteristics oscillogram image (high-speed train)

Conventional train regenerative inverter performance test image



- Special high pressure 22 kV system
- High-voltage power distribution 6.6 kV system
- Rectifier transformer 1
- Rectifier transformer 2
- DC bus voltage
- High-voltage power distribution feeder 1
- High-voltage power distribution feeder 2
- Inverter transformer



Thermography can reveal if abnormal heating is wasting energy as heat or if there are signs of potential device failure.



Role and effect of regenerative inverters

Regenerative inverters convert the regenerative power generated by a DC electric vehicle to AC and supply a high voltage distribution load. Results from regenerative inverter performance testing during train and subway movement by digital oscilloscopic recorder show that DC side voltage jumps were reduced below 1650 V and about 1000 kWh were recovered in a day by the high-voltage distribution system, contributing to power savings for railways.

Digital Oscilloscope Recorder

RA2000A Series Omniace III

Did you know?

The RA2300A/RA2800A can simultaneously measure voltage, current, control timing, vibration, rotation, pressure and more directly from sensors. Recorded data can be converted to csv data or used in FFT analysis by using computer software.

