Claims

What is claimed is:

1. A method for testing a power generation system, comprising:

measuring current generated by at least one generator comprising a field winding operable to control voltage generated by the at least one generator by controlling voltage applied to the field winding, an output of the at least one generator connected to a load;

measuring voltage output by the at least one generator;

conducting the measured current and the measured voltage to a processor connected to the at least one generator;

causing the processor to vary at least one of output current and the output voltage; and

conducting a field output of the processor to the field winding of the at least one generator; and

determining a response of the power generation system to the varied current and /or voltage outputted to the field windings of the at least one generator, wherein the varied output current or the varied output voltage enables testing of the power generation system's response to a fault condition.

2. The method of claim 1 wherein the fault condition comprises one of voltage dip ride-through, over voltage, under voltage, over excitation of the field winding, under excitation of the field winding, kilovolt-ampere reactive (kVAR) sharing failure, voltage sensing failure and governor stability protection.

3. The method of claim 1 wherein the current measurement is made by an inductive or Hall effect or shunt sensor.

4. The method of claim 1 wherein the voltage measurement is made by a respective transformer coupled to a power output of the at least one generator.

5. The method of claim 1 wherein the processor is in signal communication with a corresponding processor associated with each of a plurality of generators, the signal communication causing each processor to perform either the same variation of the

measured current and measured voltage or a different variation of each of the plurality of generators.

6. A power generation system test apparatus, comprising:

a generator test apparatus coupled to an electric generator in the power generation system, a current sensor coupled to an output of the electric generator, an output of the current sensor coupled to a current signal input of the generator test apparatus, the generator test apparatus comprising a voltage sensor coupled to an output of the electric generator, the generator test apparatus comprising a processor in signal communication with the current sensor and the voltage sensor, the processor having a signal output conducted to an input of an automatic voltage regulator;

wherein the generator test apparatus comprises a signal input to the processor coupled to an output of the automatic voltage regulator and a signal output coupled to a field winding of the electric generator; and

wherein the processor is programmed to cause variations in the current applied to the field winding and to measure a response of the electric generator to the variations.

7. The system test apparatus of claim 6 wherein the generator test apparatus comprises a communication module in signal communication with the processor.

8. The system test apparatus of claim 6 wherein the current sensor comprises an inductive, Hall effect or shunt sensor.

9. The system test apparatus of claim 6 wherein the voltage sensor comprises a voltage transformer.

10. The system test apparatus of claim 6 wherein the variations are configured to measure power generation system response to at least one of voltage dip ride-through, over voltage, under voltage, over excitation of the field winding, under excitation of the field winding, kilovolt-ampere reactive (kVAR) sharing failure, voltage sensing failure and governor stability protection.