Multilin 8 Series – Application Note

GE's Multilin 850 Feeder Protection System is part of the Multilin 8 Series platform of protection relays that share common hardware, firmware and PC Setup Software. Other relays in this platform include the Multilin 869 Motor Protection System, Multilin 845 Transformer Protection System, Multilin 889 Generator Protection System, and will include other protection devices in the future.

Power Quality and System Disturbance Analytics

The Multilin 850 Feeder Protection System offers high accuracy power quality monitoring for fault and system disturbance analysis.

The Multilin 8 Series delivers unmatched power system analytics through the following advanced features and monitoring and recording tools:

- **Harmonics measurement up to 25th harmonic** for both currents and voltages including THD
- **The length of the Transient Recorder** record ranges from 31 cycles to 1549 cycles, depending on the user specified configuration. This gives the user ability to capture long disturbance records which is critical for some applications.
- **32 digital points and 16 analog values**, assigned by the user, can be captured in the ComTrade™ format by the transient recorder.
- **Comprehensive data logger** provides the recording of 16 analog values selected from any analog values calculated by the relay. Capture rates range from 16 ms, 20ms, 1 second, 30 seconds, 1 minute, 30 minutes, or 1 hour rate. This data capture flexibility allows the operator to measure power factor or reactive power flow (for example), for several hours or even days, enabling detailed analysis and corrective action to be taken, if required.
- **Detailed Fault Report** allows the user to identify the fault location, fault type and element(s) that triggered the Multilin 850 to trip. It carries other useful information, such as pre-fault and fault phasors, relay name and model, firmware revision and other details. The Multilin 850 stores fault reports for the last 16 events.
- **1024 Event Recorder** chronologically lists all triggered elements with an accurate time stamp over a long period of time. The Multilin 850 stores the last 1024 events locally in the relay.

Transient current during capacitor bank switching is illustrated in the figure below, where the captured currents are compared with the original transient. It demonstrates that the recorded current in Multilin 850 Relay accurately represents the inrush current. Conversely, the high frequency harmonics are not observed in the recorded current by the relay capable of sampling at 16 samples per cycle.

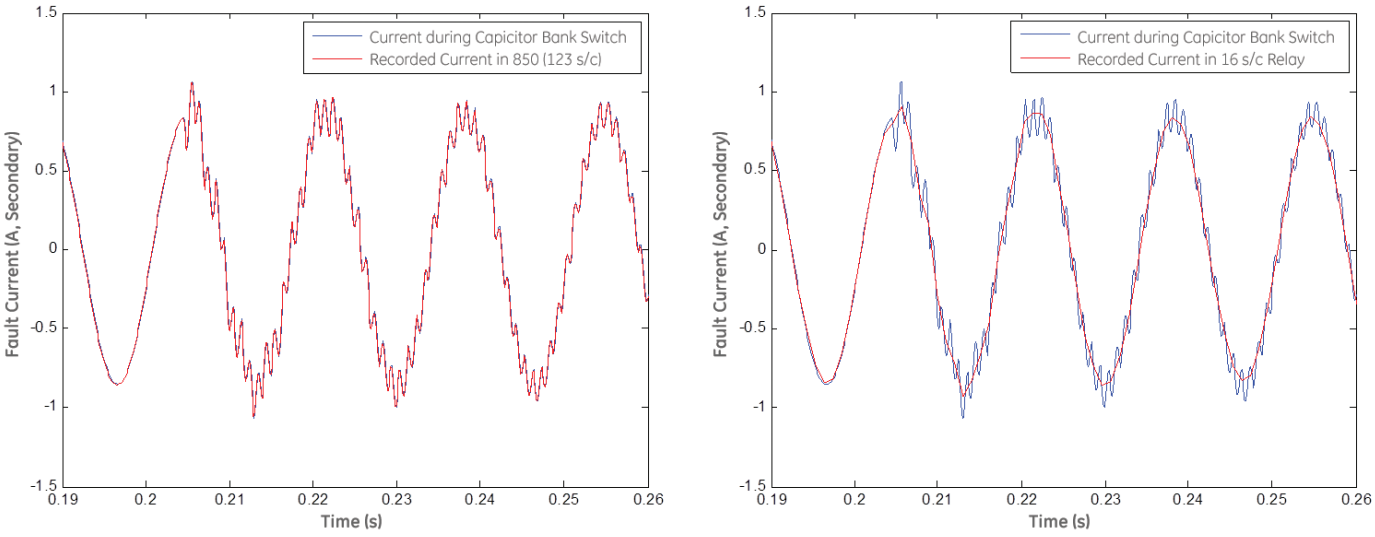


Figure 1.
Comparison of system transients recorded at 128 s/c and 16 s/c.

A large list of measured values is available for the user and operator to select from. Each of these measured values can be viewed on the large color HMI on the relay or through the EnerVista™Multilin 8 Series Setup Software application. The list of analog values known as FlexAnalog values, includes currents and voltage phasors, real and reactive power, energy, frequency, frequency rate of change, power factor, harmonics and many others. This allows system operators to monitor and/or alarm on system parameters which can cause undesired system consequences.

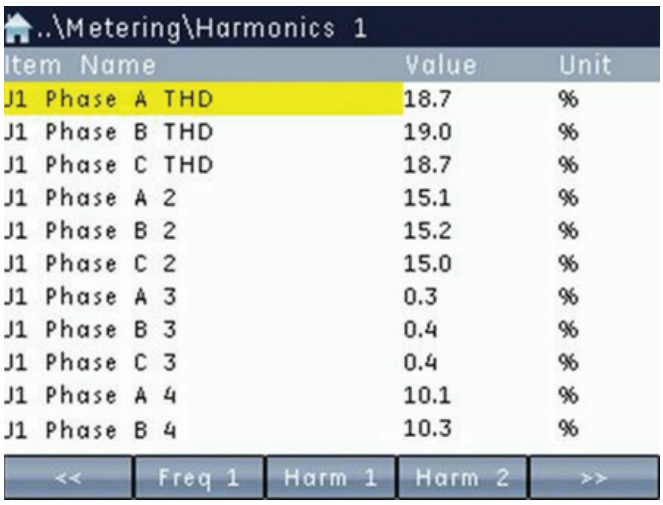
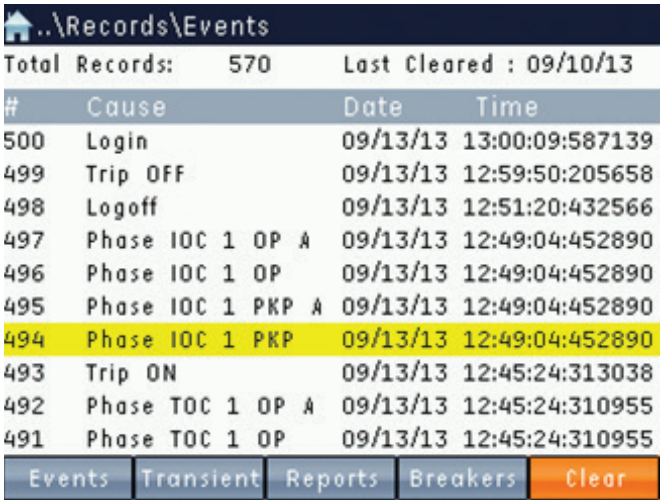


Figure 2.
Harmonics measurements are available from display or PC program.

Power quality is important not only to plant and process operations, system equipment and machinery only, but also for computers and other electronic devices as well. International Committee for Information Technology Standards is imposing requirements for the safe operation of the computers through the well-known CBEMA curve (CBEMA-Computer and Business Equipment Manufacturers' Association). The Multilin 850 Feeder Protection System is the right tool to monitor power systems to ensure system power quality meets this standard.



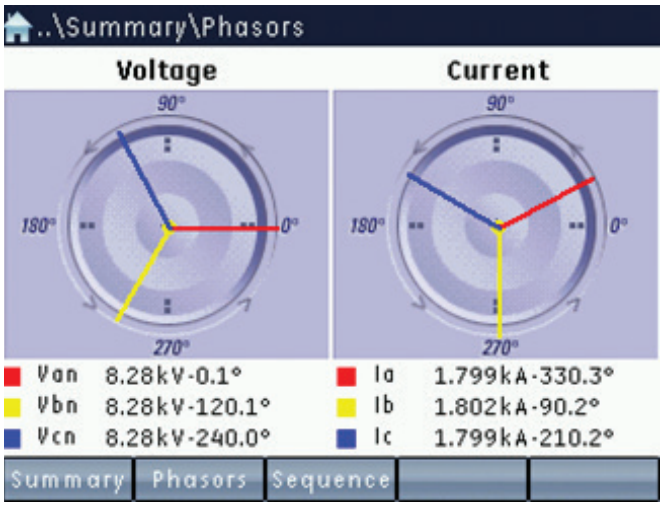


Figure 3.
Multilin 850 Event Recorder (1024 last events stored) and Phasor viewer.