Motor Protection & Universal Relay Training

Fundamentals of Motor Protection Theory

Day 1 – April 5, 2011

Motor Protection Theory

- Current Transformer selection
- Motor Thermal modeling
- Additional protective elements
  - Short Circuit protection
  - Ground Fault and Ground Fault detection
  - Phase Current Differential
  - Single Phase protection
  - Undervoltage protection
  - Overvoltage protection
  - Motor status protection
  - Mechanical Jam protection
  - Loss of Load detection
  - Acceleration timer
  - Starts per hour
  - Time between starts

SR469

- Introduction
- Hardware overview
- Mechanical installation
- Draw-Out procedure
- Wiring procedures
- EnerVista SR469 Setup Software
- Motor Settings auto-configurator
- Fault Diagnostics

SR369

- Introduction
- Hardware overview
- Wiring procedures
- EnerVista 369 Setup Software
- Motor Settings auto-configurator
- Fault Diagnostics
- Motor Start/Stop Health Report
MM300 Motor Management System

- Introduction
- Hardware overview
- Mechanical installation
- Wiring procedures
- Settings configuration

339 Motor Protection

- Introduction
- Hardware overview
- Mechanical installation
- Draw-Out procedure
- Wiring procedures
- EnerVista SR469 Setup Software
- Motor Settings auto-configurator
- Fault Diagnostics

Universal Relay Platform

Day 2 - April 6, 2011

Universal Relay

- System Overview
- Universal Relay hardware overview
  - Block diagram
  - Specifications and hardware configuration
  - Trip and Close voltage and current monitoring
- Mechanical installation and wiring
- Options and Ordering
- EnerVista UR Setup software
- Settings
  - Password Security
  - Display Properties
  - Communications Overview
  - Real Time clock and IRIG-B
  - Oscillography / Data Logger
  - User programmable LED’s
- System Setup
  - AC Inputs
  - Power Sources
  - Signal Sources
• I/O Configuration
  ▪ Breakers
  ▪ Digital I/O

• Relay Commands
  ▪ Virtual inputs
  ▪ Clear records
  ▪ Set date and time

• Actual Values
  ▪ System and Device Status
  ▪ Metering
  ▪ Front panel interface

• Hands on group labs

Day 3 – April 7, 2011

• Introduction to FlexLogic
  ▪ Gates: AND, NAND, OR, NOR, NOT, XOR, LATCH, positive/negative/dual edge triggered one shots

• Review of protection summary
  ▪ Instantaneous overcurrent
  ▪ Timed overcurrent
  ▪ Under/Over frequency
  ▪ Voltage restraint
  ▪ Under/Over voltage
  ▪ Autoreclosing

• Introduction to Trip Bus

• Hands on group labs
  ▪ Settings groups
  ▪ Digital elements labs
  ▪ Timer lab
  ▪ Counters lab
  ▪ FlexElements

• Oscillography and Event records

• Universal Relay communications
  ▪ Remote I/O
  ▪ Direct I/O
  ▪ GSSE