Replacing Single-Phase Electromechanical Motor Protection Relays With the SEL-749M Motor Relay

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INTRODUCTION

For many years, single-phase electromechanical relays (EMRs) have been used to provide protection for induction motors. These relays provide a very limited amount of motor protection and trip reporting. Microprocessor-based multifunction protective relays (MMPRs), such as the SEL-749M Motor Relay, can provide far superior motor protection and have trip event reporting capabilities that EMRs do not have.

PROBLEM

Single-phase motor protection relays require significant relay panel space and require costly periodic calibration and preventative maintenance (PM). At times, adjustments to calibrate these relays can be difficult. Most of the time, these EMRs are only overcurrent relays that do not continuously follow the dynamic thermal heating of the motor that causes cumulative stresses on the stator and rotor of the motor. When the EMR does issue a trip, the target only tells the user which phase operated. If metering is required, additional panel meters, which require more panel space, must be installed.

SEL SOLUTION

MMPRs, such as the SEL-749M Motor Relay, incorporate three phases of thermal protection, plus instantaneous phase and ground overcurrent protection, in one unit. Because there are no mechanical adjustments required, the calibration and maintenance time can be eliminated or the PM interval time greatly extended. The MMPR thermal algorithm calculates the motor heating based on motor current and motor parameters, thus providing superior protection for the stator and rotor. When the relay issues a trip or alarm, reports can be obtained from the relay and quickly analyzed to minimize the motor down time. For example, the motor start report shown in Figure 1 can be used to determine actual motor locked rotor current, acceleration time, and thermal heating. Figure 2 shows how an event report can be used to determine the cause of a relay trip. Accurate metering for all three phases and the ground current is also included in the SEL-749M Motor Relay.

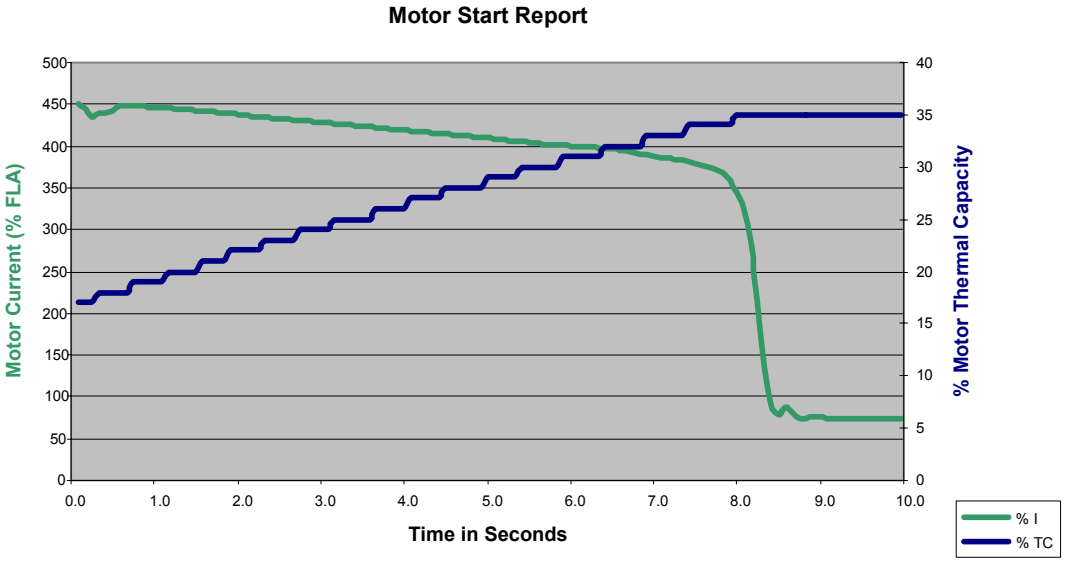

Figure 1 Typical Motor Start Report Showing Motor Current and Thermal Capacity

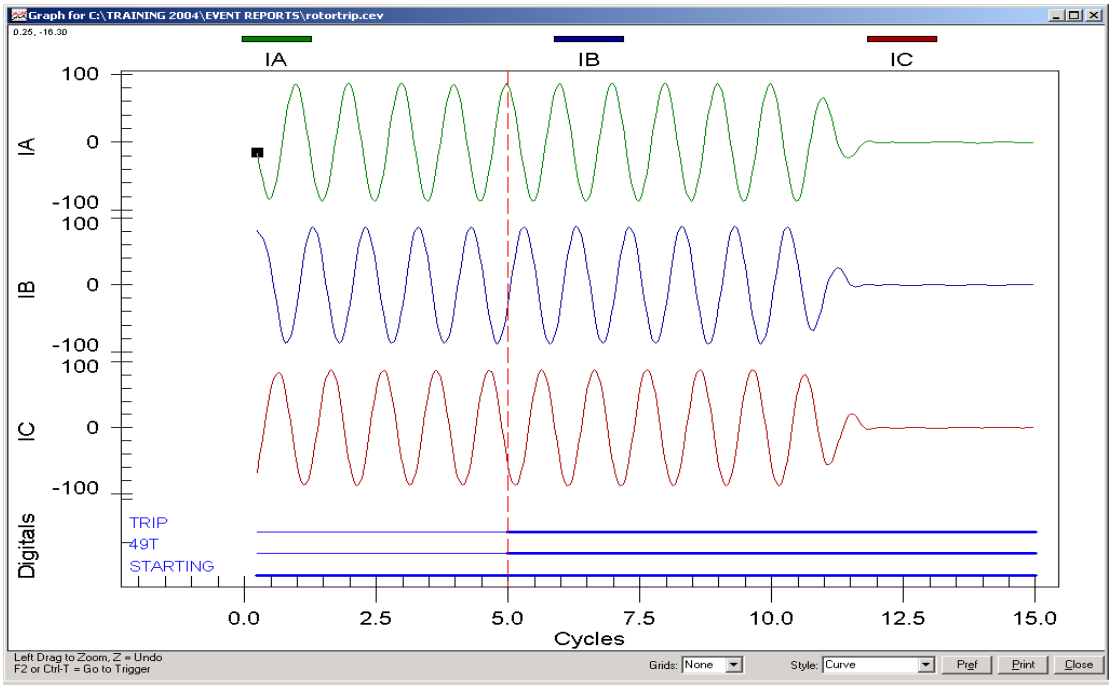

Figure 2 Typical Event Report Showing a Locked Rotor Trip

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LAN2007-01