Application Note AN2014-09

Connecting the SEL-849 Motor Management Relay to EtherNet/IP™ Networks

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INTRODUCTION

As the inclusion of intelligent motor protection relays increases in low-voltage motor control centers, process control engineers and maintenance personnel find great value in the data collected to increase productivity and maximize overall equipment effectiveness. This application note discusses how to integrate the SEL-849 Motor Management Relay with a process controller using EtherNet/IP™ communications. Figure 1 depicts a typical motor bucket configuration using the SEL-849.

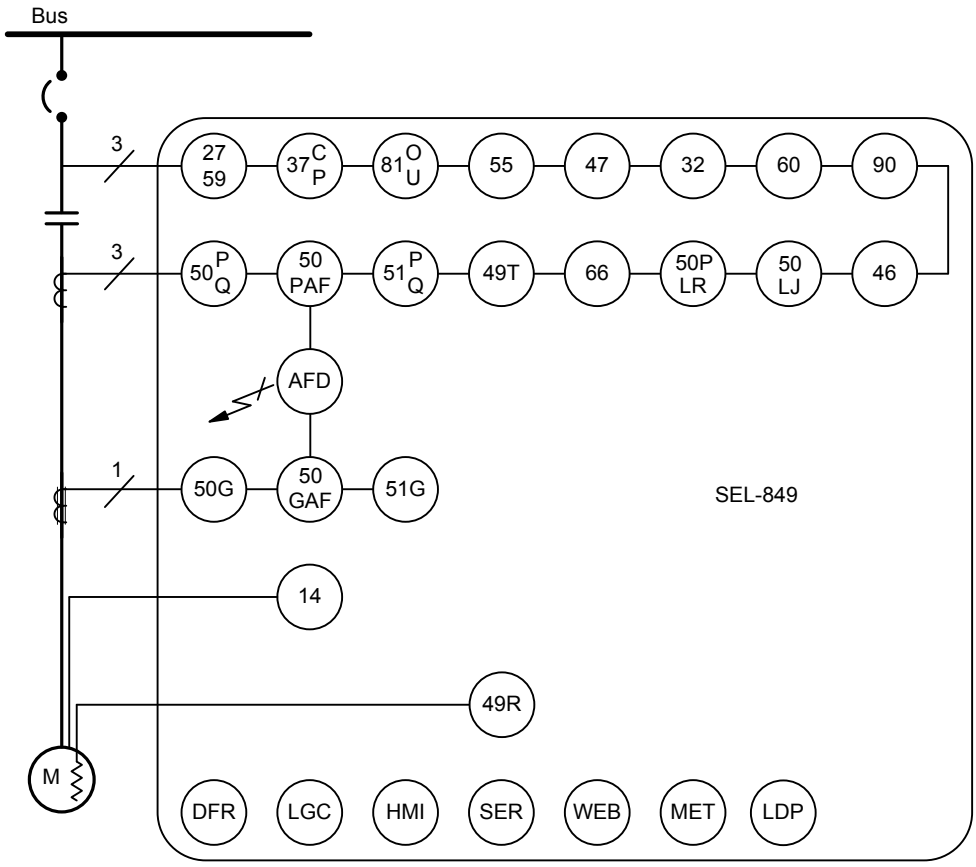

Figure 1 SEL-849 Motor Management Relay Functionality

PROBLEM

Automation engineers are continuously challenged to integrate data from field devices into the algorithms that control the associated manufacturing process. There have been many attempts by various organizations to produce an industry-wide accepted protocol model. While some have enjoyed limited success among both users and vendors, most did not meet the expectations of all parties. The industrial automation market now includes a myriad of connectivity options, with the most popular being those that are sponsored by the equipment providers that enjoy the largest market share. EtherNet/IP is well-accepted by industrial automation engineers. While the SEL-849 provides multiple protocol choices, including Modbus® TCP and Modbus RTU, IEC 61850, and SEL protocols, it does not offer EtherNet/IP as a native communications option.

SEL SOLUTION(S)

The SEL-849 comes standard with a single copper Ethernet communications port and offers an optional second Ethernet communications port. Modbus TCP and IEC 61850, also optional, are the two Ethernet protocols available in the SEL-849. Many automation engineers prefer the IEC 61850 protocol model option due to its flexibility and functionality. The SEL IEC 61850 model provides for both buffered and unbuffered reporting configurations. The IEC 61850 server can be configured to continue gathering and buffering operational data in the case of a failed network connection. When the connection is reinstated, the data are retrievable by the IEC 61850 client. In the case of Modbus communications, all operational data are lost during the network blackout. The IEC 61850 standard was architected using a tag name structure that better associates the characteristics of the application with the controller program file. The IEC 61850 model includes tags for time stamping data as well.

All of these benefits are transferred to EtherNet/IP-connected devices through a protocol converter. A protocol converter facilitates communication between devices that do not share a common protocol for the sake of interoperability. Basic models accomplish this task by simply mapping the values of data located at an address on one device to an address on the other device. More powerful protocol converters, such as the SEL-3505 Real-Time Automation Controller, are able to concentrate and manipulate data originating from one device and then provide the result to an address associated with another device using a different protocol.

As shown in Figure 2, the network architecture includes an IEC 61850-enabled SEL-849, a protocol converter, and an EtherNet/IP-connected programmable automation controller (PAC). In this configuration, the ProSoft Technology PLX81-EIP-61850 is incorporated as the protocol converter that translates IEC 61850-based communications data to EtherNet/IP data. The module operates as an EtherNet/IP server and an IEC 61850 client. This configuration permits connectivity of up to 20 SEL-849 devices.

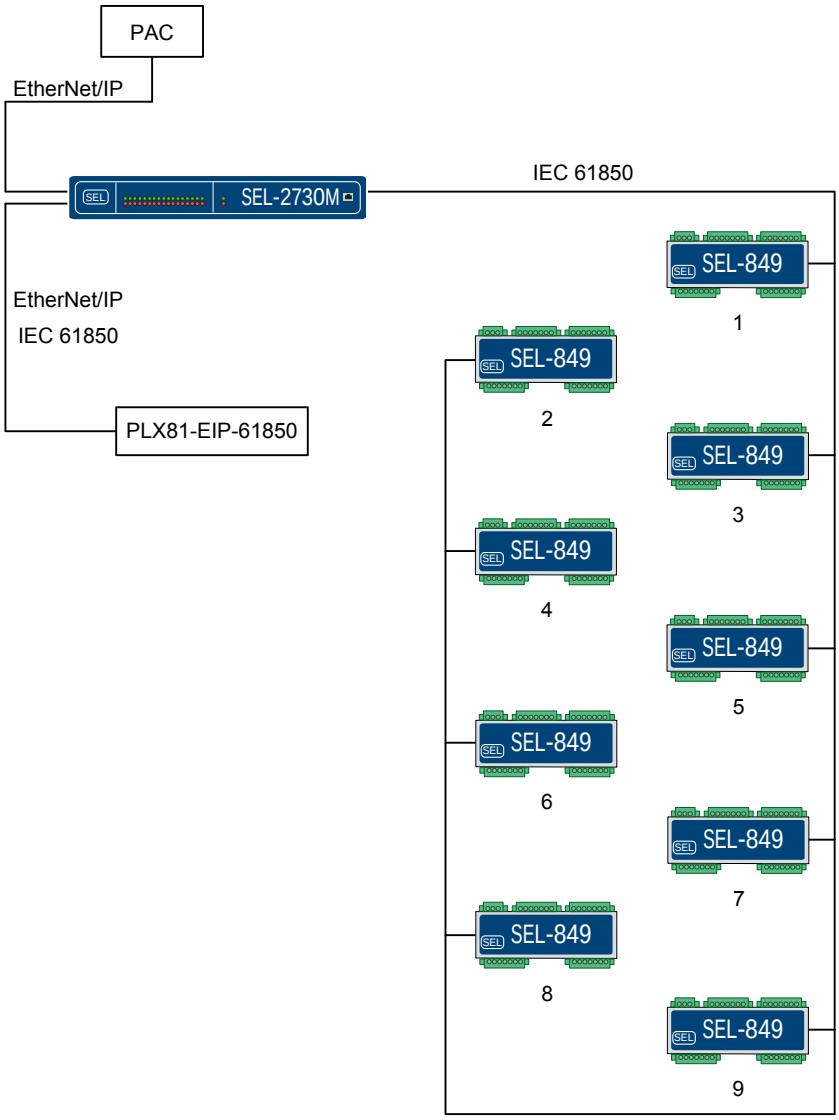

Figure 2 IEC 61850 to EtherNet/IP Network Architecture

CONCLUSION

This application note discusses the integration of the SEL-849 with EtherNet/IP-based clients to collect valuable operational data from the SEL-849 and deliver it to an EtherNet/IP-connected PAC in order to maximize productivity and machine center reliability.

There are many benefits of this configuration, including the following:

- Connect up to 20 SEL-849 devices to an EtherNet/IP-connected PAC.
- Use simple data integration.
- Deliver user access to valuable operational data via a broadly accepted industrial protocol.
- Take advantage of data buffering during network connection failures.

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