



Remote Monitoring and Control

DNP-RTM™

Siemens MJ-R^L Integration Guide

9941 W Emerald Street
Boise, ID 83704
208-658-1292 FAX 208-323-5575
support@telemetric.net

v. 1.0

Part No: DNP/MJRL MANUAL

Revision Log

| Date | Revision | Changes |
|---------|----------|-----------------|
| 1/10/03 | 1.0 | Initial version |

Table of Contents

| | |
|---|----|
| <i>Introduction</i> | 5 |
| Overview | 5 |
| Features | 6 |
| <i>Safety Information</i> | 10 |
| <i>Installation</i> | 12 |
| <i>Siemens MJ-R^L Programming</i> | 14 |
| <i>DNP-RTM Programming</i> | 15 |
| <i>Additional Information</i> | 16 |
| <i>Appendix A – ACO Profile</i> | 17 |
| ACO Point List – | 17 |
| <i>Appendix B – Loop Profile</i> | 21 |
| Loop Point List – | 21 |

Introduction

Overview

The Telemetric DNP-Remote Telemetry Module (DNP-RTM™) is a cost-effective communications solution for remote monitoring and control of Intelligent Electronic Devices (IEDs) such as the Siemens MJ-R^L. The DNP-RTM continuously polls the IED through a local serial connection. When a reportable change is detected, the DNP-RTM transmits an event report. This minimizes the cost of communication, yet provides near real-time information. Access to the IED with DNP-RTM can be gained from the utility's SCADA system by using the Telemetric SCADA-Xchange™.

Integrating the Telemetric DNP-RTM with the Siemens MJ-R^L provides immediate control and status indication of operating conditions to improve system operation and protect investments.

This integration provides monitoring and control capability over many of the Siemens MJ-R^L parameters. See Table 1, Table 2 and Table 3 for the monitor and control points provided in this integration.

Make sure you perform the software configuration as detailed in the Siemens MJ-RL Programming section of this document.

Features

Integrating the Telemetric DNP-RTM with the Siemens MJ-R^L provides remote notification of recloser events and internal parameter status, as well as the ability to open or close the recloser remotely. The following monitor and control points are provided in this integration:

Table 1 – Digital Input Points

| Point Number | Point Name | Enabled on RTM | Report on Change | Report Interval | Trigger Time |
|--------------|--------------------------------------|----------------|------------------|-----------------|--------------|
| 0 | Abnormal Operator Conditions | X | X | 24 | 0 |
| 1 | ACR Tripped (open) | X | X | 24 | 0 |
| 2 | ACR Closed | X | X | 24 | 0 |
| 3 | Controller Mode-Local or Remote | X | X | 24 | 0 |
| 4 | Maintenance Required | X | X | 24 | 0 |
| 5 | Hot Line Tag | X | X | 24 | 0 |
| 6 | Protection A Active | X | X | 24 | 0 |
| 7 | Protection B Active | X | X | 24 | 0 |
| 16 | Earth/Ground Protection | X | X | 24 | 0 |
| 18 | Auto Reclose | X | X | 24 | 0 |
| 19 | Cold Load Idle | X | X | 24 | 0 |
| 20 | High Current Lockout | X | X | 24 | 0 |
| 21 | Loss of Phase Protection | X | X | 24 | 0 |
| 24 | Protection Enable | X | X | 24 | 0 |
| 25 | Switchgear Family-Switch/Recloser | X | X | 24 | 0 |
| 26 | Power Flow Direction | X | X | 24 | 0 |
| 29 | Single Shot Protection Valid at Trip | X | X | 24 | 0 |
| 30 | Loss of Phase Trip | X | X | 24 | 0 |
| 31 | Loss of Phase- Phase A | X | X | 24 | 0 |
| 32 | Loss of Phase- Phase B | X | X | 24 | 0 |
| 33 | Loss of Phase- Phase C | X | X | 24 | 0 |
| 35 | Lockout | X | X | 24 | 0 |
| 36 | Operator Trip | X | X | 24 | 0 |
| 53 | Phase Overcurrent Trip | X | X | 24 | 0 |
| 54 | Earth/Ground Over Current Trip | X | X | 24 | 0 |
| 56 | Sequence Advance | X | X | 24 | 0 |
| 57 | Close Isolate | X | X | 24 | 0 |
| 58 | Trip Isolate | X | X | 24 | 0 |
| 60 | ACR Memory Data Invalid | X | X | 24 | 0 |
| 61 | Auxiliary Supply Fail | X | X | 24 | 0 |
| 62 | Switchgear Connection | X | X | 24 | 0 |
| 63 | SF6 Gas Pressure Low or Invalid | X | X | 24 | 0 |
| 64 | Battery Supply (Off High Low) | X | X | 24 | 0 |

| Point Number | Point Name | Enabled on RTM | Report on Change | Report Interval | Trigger Time |
|---------------------|--------------------------------------|-----------------------|-------------------------|------------------------|---------------------|
| 65 | Contact Life Low | X | X | 24 | 0 |
| 67 | Capacitor Charge Failure | X | X | 24 | 0 |
| 68 | Mechanism Failure | X | X | 24 | 0 |
| 75 | Source Voltage Status- All 3 phases | X | X | 24 | 0 |
| 76 | Load Voltage Status- all 3 phases | X | X | 24 | 0 |
| 77 | Load Current On (>2.5 amps) | X | X | 24 | 0 |
| 88 | Dummy Circuit Breaker Closed | X | X | 24 | 0 |
| 89 | Automatic Protection Group Selection | X | X | 24 | 0 |
| 91 | Cubicle Door | X | X | 24 | 0 |
| 92 | Phase Current HI Alarm | X | X | 24 | 0 |
| 100 | Auxiliary Supply Fail (Delayed) | X | X | 24 | 0 |
| 101 | Most Recent Trip Phase A Overcurrent | X | X | 24 | 0 |
| 102 | Most Recent Trip Phase B Overcurrent | X | X | 24 | 0 |
| 103 | Most Recent Trip Phase C Overcurrent | X | X | 24 | 0 |
| 104 | Instantaneous Most Recent Trip | X | X | 24 | 0 |
| 110 | Hot Line Tag Trip | X | X | 24 | 0 |
| 125 | Operator Close | X | X | 24 | 0 |
| 127 | Protocol Close | X | X | 24 | 0 |
| 128 | Automatic Close | X | X | 24 | 0 |
| 130 | External Close | X | X | 24 | 0 |

Table 2 – Analog Input Points

| Point Number | Point Name | Enabled On RTM | Report Interval | Low Limit | Mid Limit | High Limit |
|---------------------|--------------------------------------|-----------------------|------------------------|------------------|------------------|-------------------|
| 0 | A Current | X | 0 | N | N | N |
| 1 | B Current | X | 0 | N | N | N |
| 2 | C Current | X | 0 | N | N | N |
| 3 | Earth/Ground Current | X | 0 | N | N | N |
| 4 | System kVA | X | 0 | N | N | N |
| 5 | System KVAr | X | 0 | N | N | N |
| 6 | Operations Counter | X | 0 | N | N | N |
| 7 | A Phase Fault Current | | 0 | N | N | N |
| 8 | B Phase Fault Current | | 0 | N | N | N |
| 9 | C Phase Fault Current | | 0 | N | N | N |
| 10 | Earth/Ground Fault Current | | 0 | N | N | N |
| 11 | Value Increments | | 0 | N | N | N |
| 12 | Protection Group @ Start (A=0 & B=1) | | 0 | N | N | N |
| 13 | Ai Phase - Ground Voltage | X | 0 | N | N | N |
| 14 | Bi Phase- Ground Voltage | X | 0 | N | N | N |
| 15 | Ci Phase- Ground Voltage | X | 0 | N | N | N |
| 16 | Ax Phase- Ground Voltage | | 0 | N | N | N |
| 17 | Bx Phase-Ground Voltage | | 0 | N | N | N |
| 18 | Cx Phase- Ground Voltage | | 0 | N | N | N |
| 25 | System Power (kW) | X | 0 | N | N | N |
| 26 | System Power Factor | X | 0 | N | N | N |
| 28 | Gas Pressure (psi) | X | 0 | N | N | N |
| 29 | Code Version | | 0 | N | N | N |
| 30 | Configuration Number | | 0 | N | N | N |
| 31 | CAPM Serial Number | | 0 | N | N | N |
| 32 | ACR Serial Number | | 0 | N | N | N |
| 33 | I Contact Life % | X | 0 | N | N | N |
| 34 | II Contact Life % | X | 0 | N | N | N |
| 35 | III Contact Life % | X | 0 | N | N | N |
| 36 | Protection Group Setting (A=0 & B=1) | X | 0 | N | N | N |
| 41 | Protection Trip 1 A Fault Current | X | 0 | N | N | N |
| 42 | Protection Trip 1 B Fault Current | X | 0 | N | N | N |
| 43 | Protection Trip 1 C Fault Current | X | 0 | N | N | N |
| 58 | Maximum Average Current Past Day | X | 0 | N | N | N |

Table 3 – Digital Output Points

| Point Number | Point Name | Enabled on RTM |
|---------------------|--|-----------------------|
| 0 | Ground Protection | X |
| 2 | Auto Reclose (On or off for single shot) | X |
| 3 | ACR Trip/Close Control | X |
| 4 | Hot Line Tag | X |
| 5 | Cold Load Idle/Max | X |
| 10 | Reset Fault Flags and Currents | X |
| 12 | Power Flow Direction | X |
| 13 | Protection Group A | X |
| 14 | Protection Group B | X |
| 26 | Dummy Circuit Breaker | X |

Points can be enabled or disabled using the Telemetric web site interface or the Telemetric local configuration program provided with the DNP-RTM. The other settings for the DNP points, such as report interval or trigger time, can be changed only by using the local configuration program. See Appendix A in the DNP-RTM Users' Guide for complete instructions on using the local configuration program.

Alternate profiles are available for Automatic Changeover (ACO) and Loop Automation. Refer to the Appendices in this manual for a list of points specific to these modes of operation.

Safety Information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it. We strongly urge that you follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment.

A competent technician has these qualifications:

- *Is thoroughly familiar with these instructions.*
- *Is trained in industry-accepted high-voltage and low-voltage safe operating practices and procedures.*
- *Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.*
- *Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.*

The following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Following are general caution and warning statements that apply to this equipment.

WARNING: *This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage.*

DANGER: *Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high and low voltage lines and equipment.*

WARNING: *Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.*

WARNING: *Power distribution equipment must be selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install, or maintain this equipment can result in death, severe personal injury, and equipment damage.*

Integration Parts List

Please verify that all the parts pictured in Figure 1 and listed in Table 4 are provided in the Integration Kit.

Table 4 - Integration kit parts list. Telemetric part number DNP/MJRL INTG KIT.

| <i>Description</i> | <i>Quantity</i> |
|--|-----------------|
| Plate, Siemens MJRL DNP | 1 |
| Size 4 kepnut | 4 |
| Size 8 kepnut | 2 |
| 25 pin to 9 pin Serial Cable | 1 |
| Mobile Mark RM-900 Antenna with 2' Cable | 1 |
| Wal-nuts | 2 |
| 3/16-inch x 1-1/4-inch Fender Washer | 2 |



Figure 1 - Integration Kit Contents

Installation

Required tools: Nut driver, 1/4-inch socket and 5/16-inch socket.

Use existing 3/4-inch hole on the bottom of the enclosure to mount the antenna on the bottom of the enclosure. You will need to remove the hole plug to install the antenna.

The DNP-RTM comes with a mounting plate, ready for installation within the Siemens MJ-R^L. Follow the instructions below to install the DNP-RTM.

- 1) Make sure proper 12-V radio power is programmed before starting the installation procedure. Passwords may be required to change settings, so make sure you know the Siemens MJ-R^L passwords prior to attempting to change settings. To set the radio voltage:
 - a) Turn the Siemens MJ-R^L panel on by pressing the **Panel ON/OFF** button.
 - b) From the **Pickup Flags** menu, press the right arrow button until the **Radio and Time Set** menu is displayed.
 - c) If the **Radio Supply** value is not **ON**, press the **Select** button to edit the **Radio Supply** parameter.
 - d) Press the arrow button to toggle the value from **OFF** to **ON**.
 - e) If the **Radio Supply** value is not **12V**, press the select button to highlight the **Radio Supply** parameter.
 - f) Press the arrow button to toggle the value between the different voltage outputs until **12V** is displayed.
 - g) Press the **Menu** button to save.
- 2) Remove hole plug on the bottom of the enclosure to expose the 3/4-inch hole for the antenna.
- 3) Remove the nut and lock washer from the antenna and press the O-ring seal into the bottom of the antenna surface into the routed groove.
- 4) Insert the antenna, making sure that the O-ring remains in the groove. Put the lock washer over the antenna threads and screw nut on the antenna threads until the antenna is secure.



Figure 2 - Antenna Installed

- 5) Remove the lower two screw knobs from the accessory plate. Loosen the upper two screw knobs and remove the accessory plate.
- 6) Insert the two RTM mounting plate studs through the accessory plate upper two 7/16-inch holes. Put the two fender washers over the studs on the back of the accessory plate and secure with the two size 8 kepnuts.
- 7) Reattach the accessory plate by sliding the plate back into place over the two upper screw knobs. Position the accessory plate so that the lower screw knobs can be threaded and tighten all four screw knobs to secure the accessory plate.
- 8) Attach the antenna cable onto the DNP-RTM antenna snout. Make sure the threads are properly meshed and screw the antenna cable connector until it is secure.
- 9) Plug in the 25-pin side of the integration kit serial cable to the Siemens MJ-R^L 25-pin connector labeled "RS-232". Plug the other 9-pin end into the DNP-RTM serial port labeled "BOTTOM=IED".
- 10) Insert the Siemens MJ-R^L black wire labeled "GND" into a wal-nut and tug to make sure the connection is secure. Insert the black DNP-RTM wire into another of the wal-nut holes (all four are common) and tug to make sure the connection is secure.
- 11) Using the other wal-nut, insert the Siemens MJ-R^L red wire labeled "AUX+" and tug to make sure the connection is secure. Insert the red DNP-RTM wire into another of the wal-nut holes (all four are common) and tug to make sure the connection is secure.
- 12) Plug the DNP-RTM power connector into the DNP-RTM power receptacle.



Figure 3 - RTM Mounted

Siemens MJ-R^L Programming

To make changes to the Siemens MJ-R^L settings, press the **Panel ON/OFF** button to enable the user interface. All adjustments for this integration will be made under the **Pickup Flags** main menu. This menu should be the first menu displayed after enabling the user interface and pressing the **Menu** button. Press the arrow buttons next to the **Select** button to navigate the menus.

To edit a value, you may need to provide the Siemens MJ-R^L password. Make sure you have the passwords for your system if you need to make setting changes. To edit a selected parameter, press the **Select** button. The selected item will flash when editable. Use the arrow buttons to scroll through possible values. To save the new value, press the **Menu** button.

Make the following changes to the factory defaults using the Siemens MJ-R^L front panel display:

- If remote output control is necessary, change the control type to **Remote Control On** in the **Operator Settings** menu. If you wish to inhibit remote control (such as remote Trip or Close), set this parameter to **Local Control On**.
- The Radio Supply status and Radio Supply voltage values were set in the Installation section on page 12. Verify these values are set to **Radio Supply On** and **Radio Supply 12V** in the **Radio and Time Set** menu.
- The factory default DNP slave address is 5. Confirm this value in the **DNP Transmission Services 2** menu. If it is not 5, either change this value to 5 or change the DNP-RTM Configuration Slave Address to match this setting.
- The factory default settings for **Unsolicited**, and **Master Addr** are **OFF** and **3**, respectively. Make sure **Unsolicited** is **OFF**. If the **Master Addr** is not 3, either change this value to 3 or change the DNP-RTM Configuration Master Address to match this setting.
- The factory default setting for DCD sensing is **DCD Ignore**. Confirm this setting in the **DNP Communications 3** menu.
- Set analog DNP point list to **Analogue Pnts FULL** from the **DNP Database Configuration** menu. Set the DNP analog point data width from this menu also by setting the analog size to **Analogue Size 32bit**.
- Make sure the **Baud** rate is set to **9600** in **DNP Communications 1** menu.

DNP-RTM Programming

The DNP-RTM should already be factory programmed with the default points necessary for the Siemens MJ-R^L. If changes from the factory default configuration are necessary, consult the DNP-RTM Users' Guide for directions on customizing the configuration.

You will need to use the DNP-RTM local programming utility to properly set the device baud rate and the master/slave addresses. On the Siemens MJ-R^L, find and record the Baud and Slave Address as described below. Make the following changes in the DNP-RTM Configuration program:

- Set the **Master** address to 5.
- Set the **Slave** address to 3.
- Set the **Baud Rate** to 9600.

The Master and Slave addresses above are the factory defaults for the Siemens MJ-R^L. These values can be changed to match the Siemens MJ-R^L if they are not set to the default values.

The local programming utility is included on the Telemetric CD provided with the DNP-RTM device. Reference the DNP-RTM Users' Guide for instructions on interfacing to a device locally.

Additional Information

Product manuals, installation manuals, application notes, application guides and technical specifications are available for download at the Telemetric web site.

http://www.telemetric.net/front_end/documentation.htm

For more information, questions or feedback, please feel free to contact Telemetric technical support.

Telemetric
9941 W. Emerald Street
Boise, ID 83704
208-658-1292 x21 FAX 208-323-5575
support@telemetric.net

Appendix A – ACO Profile

Alternate profiles are available for Automatic Changeover (ACO) and Loop Automation operation. These profiles contain points that are specific to these operation modes. The following tables list the DNP points that are available in the ACO point list.

ACO Point List –

Table 5 – Digital Input Points

| Point Number | Point Name | Enabled on RTM | Report on Change | Report Interval | Trigger Time |
|--------------|--------------------------------------|----------------|------------------|-----------------|--------------|
| 0 | Abnormal Operator Conditions | X | X | 24 | 0 |
| 1 | ACR Tripped (open) | X | X | 24 | 0 |
| 2 | ACR Closed | X | X | 24 | 0 |
| 3 | Controller Mode-Local or Remote | X | X | 24 | 0 |
| 4 | Maintenance Required | X | X | 24 | 0 |
| 5 | Hot Line Tag | X | X | 24 | 0 |
| 6 | Protection A Active | X | X | 24 | 0 |
| 7 | Protection B Active | X | X | 24 | 0 |
| 16 | Earth/Ground Protection | X | X | 24 | 0 |
| 18 | Auto Reclose | X | X | 24 | 0 |
| 19 | Cold Load Idle | X | X | 24 | 0 |
| 21 | Loss of Phase Protection | X | X | 24 | 0 |
| 26 | Power Flow Direction | X | X | 24 | 0 |
| 29 | Single Shot Protection Valid at Trip | X | X | 24 | 0 |
| 30 | Loss of Phase Trip | X | X | 24 | 0 |
| 31 | Loss of Phase- Phase A | X | X | 24 | 0 |
| 32 | Loss of Phase- Phase B | X | X | 24 | 0 |
| 33 | Loss of Phase- Phase C | X | X | 24 | 0 |
| 35 | Lockout | X | X | 24 | 0 |
| 36 | Operator Trip | X | X | 24 | 0 |
| 53 | Phase Overcurrent Trip | X | X | 24 | 0 |
| 54 | Earth/Ground Over Current Trip | X | X | 24 | 0 |
| 56 | Sequence Advance | X | X | 24 | 0 |
| 57 | Close Isolate | X | X | 24 | 0 |
| 58 | Trip Isolate | X | X | 24 | 0 |
| 60 | ACR Memory Data Invalid | X | X | 24 | 0 |
| 61 | Auxiliary Supply Fail | X | X | 24 | 0 |
| 62 | Switchgear Connection | X | X | 24 | 0 |
| 63 | SF6 Gas Pressure Low or Invalid | X | X | 24 | 0 |
| 64 | Battery Supply (Off High Low) | X | X | 24 | 0 |
| 65 | Contact Life Low | X | X | 24 | 0 |
| 67 | Capacitor Charge Failure | X | X | 24 | 0 |
| 68 | Mechanism Failure | X | X | 24 | 0 |

| Point Number | Point Name | Enabled on RTM | Report on Change | Report Interval | Trigger Time |
|---------------------|--------------------------------------|-----------------------|-------------------------|------------------------|---------------------|
| 75 | Source Voltage Status- All 3 phases | X | X | 24 | 0 |
| 76 | Load Voltage Status- All 3 phases | X | X | 24 | 0 |
| 77 | Load Current On (>2.5 amps) | X | X | 24 | 0 |
| 88 | Dummy Circuit Breaker | X | X | 24 | 0 |
| 89 | Automatic Protection Group Selection | X | X | 24 | 0 |
| 91 | Cubicle Door | X | X | 24 | 0 |
| 92 | Phase Current HI Alarm | X | X | 24 | 0 |
| 100 | Auxiliary Supply Fail (Delayed) | X | X | 24 | 0 |
| 101 | Most Recent Trip Phase A Overcurrent | X | X | 24 | 0 |
| 102 | Most Recent Trip Phase B Overcurrent | X | X | 24 | 0 |
| 103 | Most Recent Trip Phase C Overcurrent | X | X | 24 | 0 |
| 104 | Instantaneous Most Recent Trip | X | X | 24 | 0 |
| 110 | Hot Line Tag Trip | X | X | 24 | 0 |
| 125 | Operator Close | X | X | 24 | 0 |
| 127 | Protocol Close | X | X | 24 | 0 |
| 128 | Automatic Close | X | X | 24 | 0 |
| 130 | External Close | X | X | 24 | 0 |
| 131 | ACO Autorestore | X | X | 24 | 0 |
| 132 | Auto Changeover | X | X | 24 | 0 |
| 133 | Auto Changeover Mode | X | X | 24 | 0 |
| 134 | ACO Rank | X | X | 24 | 0 |

Table 6 – Analog Input Points

| Point Number | Point Name | Enabled On RTM | Report Interval | Low Limit | Mid Limit | High Limit |
|---------------------|--------------------------------------|-----------------------|------------------------|------------------|------------------|-------------------|
| 0 | A Current | X | 0 | N | N | N |
| 1 | B Current | X | 0 | N | N | N |
| 2 | C Current | X | 0 | N | N | N |
| 3 | Earth/Ground Current | X | 0 | N | N | N |
| 4 | System Kva | X | 0 | N | N | N |
| 5 | System KVAr | X | 0 | N | N | N |
| 6 | Operations Counter | X | 0 | N | N | N |
| 7 | A Phase Fault Current | | 0 | N | N | N |
| 8 | B Phase Fault Current | | 0 | N | N | N |
| 9 | C Phase Fault Current | | 0 | N | N | N |
| 10 | Earth/Ground Fault Current | | 0 | N | N | N |
| 11 | Value Increments | | 0 | N | N | N |
| 12 | Protection Group @ Start (A=0 & B=1) | | 0 | N | N | N |
| 13 | Ai Phase - Ground Voltage | X | 0 | N | N | N |
| 14 | Bi Phase- Ground Voltage | X | 0 | N | N | N |
| 15 | Ci Phase- Ground Voltage | X | 0 | N | N | N |
| 16 | Ax Phase- Ground Voltage | | 0 | N | N | N |
| 17 | Bx Phase-Ground Voltage | | 0 | N | N | N |
| 18 | Cx Phase- Ground Voltage | | 0 | N | N | N |
| 28 | Gas Pressure (psi) | X | 0 | N | N | N |
| 29 | Code Version | | 0 | N | N | N |
| 30 | Configuration Number | | 0 | N | N | N |
| 31 | CAPM Serial Number | | 0 | N | N | N |
| 32 | ACR Serial Number | | 0 | N | N | N |
| 33 | I Contact Life % | X | 0 | N | N | N |
| 34 | II Contact Life % | X | 0 | N | N | N |
| 35 | III Contact Life % | X | 0 | N | N | N |
| 36 | Protection Group Setting (A=0 & B=1) | X | 0 | N | N | N |
| 58 | Maximum Average Current Past Day | X | 0 | N | N | N |
| 60 | Auto-Changeover Status | X | 0 | N | N | N |

Table 7 – Digital Output Points

| Point Number | Point Name | Enabled on RTM |
|---------------------|--|-----------------------|
| 0 | Ground Protection | X |
| 2 | Auto Reclose (On or off for single shot) | X |
| 3 | ACR Trip/Close Control | X |
| 4 | Hot Line Tag | X |
| 5 | Cold Load Idle/Max | X |
| 10 | Reset Fault Flags and Currents | X |
| 12 | Power Flow Direction | X |
| 13 | Protection Group A | X |
| 14 | Protection Group B | X |
| 24 | Dummy Circuit Breaker | X |
| 40 | ACO Auto Restore | X |
| 41 | ACO Enable | X |
| 44 | ACO Rank | X |

Appendix B – Loop Profile

Alternate profiles are available for Automatic Changeover (ACO) and Loop Automation operation. These profiles contain points that are specific to these operation modes. The following tables list the DNP points that are available in the Loop Automation point list.

Loop Point List –

Table 8 – Digital Input Points

| Point Number | Point Name | Enabled on RTM | Report on Change | Report Interval | Trigger Time |
|--------------|-------------------------------------|----------------|------------------|-----------------|--------------|
| 0 | Abnormal Operator Conditions | X | X | 24 | 0 |
| 1 | ACR Tripped (open) | X | X | 24 | 0 |
| 2 | ACR Closed | X | X | 24 | 0 |
| 3 | Controller Mode-Local or Remote | X | X | 24 | 0 |
| 4 | Maintenance Required | X | X | 24 | 0 |
| 5 | Hot Line Tag | X | X | 24 | 0 |
| 6 | Protection A Active | X | X | 24 | 0 |
| 7 | Protection B Active | X | X | 24 | 0 |
| 8 | Protection C Active | X | X | 24 | 0 |
| 9 | Protection D Active | X | X | 24 | 0 |
| 10 | Protection E Active | X | X | 24 | 0 |
| 11 | Protection F Active | X | X | 24 | 0 |
| 12 | Protection G Active | X | X | 24 | 0 |
| 13 | Protection H Active | X | X | 24 | 0 |
| 14 | Protection I Active | X | X | 24 | 0 |
| 15 | Protection J Active | X | X | 24 | 0 |
| 16 | Earth/Ground Protection | X | X | 24 | 0 |
| 18 | Auto Reclose | X | X | 24 | 0 |
| 19 | Cold Load Idle | X | X | 24 | 0 |
| 30 | Loss of Phase Trip | X | X | 24 | 0 |
| 31 | Loss of Phase- Phase A | X | X | 24 | 0 |
| 32 | Loss of Phase- Phase B | X | X | 24 | 0 |
| 33 | Loss of Phase- Phase C | X | X | 24 | 0 |
| 35 | Lockout | X | X | 24 | 0 |
| 38 | Ground Fault Trip | X | X | 24 | 0 |
| 57 | Close Isolate | X | X | 24 | 0 |
| 58 | Trip Isolate | X | X | 24 | 0 |
| 59 | Mechanically or Electrically Locked | X | X | 24 | 0 |
| 63 | SF6 Gas Pressure Low or Invalid | X | X | 24 | 0 |
| 64 | Battery Supply (Off High Low) | X | X | 24 | 0 |
| 65 | Contact Life Low | X | X | 24 | 0 |
| 67 | Capacitor Charge Failure | X | X | 24 | 0 |
| 68 | Mechanism Failure | X | X | 24 | 0 |
| 69 | Source Phase A | X | X | 24 | 0 |

| Point Number | Point Name | Enabled on RTM | Report on Change | Report Interval | Trigger Time |
|---------------------|--------------------------------------|-----------------------|-------------------------|------------------------|---------------------|
| 70 | Source Phase B | X | X | 24 | 0 |
| 71 | Source Phase C | X | X | 24 | 0 |
| 72 | Load Phase A | X | X | 24 | 0 |
| 73 | Load Phase B | X | X | 24 | 0 |
| 74 | Load Phase C | X | X | 24 | 0 |
| 78 | Loop Automation | X | X | 24 | 0 |
| 79 | Loop Automation Restore | X | X | 24 | 0 |
| 80 | Loop Automation Tie Restore | X | X | 24 | 0 |
| 81 | Loop Automation Type Feeder | X | X | 24 | 0 |
| 82 | Loop Automation Type Midpoint | X | X | 24 | 0 |
| 83 | Loop Automation Type Tie | X | X | 24 | 0 |
| 86 | Loop Automation Trip Request | X | X | 24 | 0 |
| 87 | Loop Automation Close Request | X | X | 24 | 0 |
| 89 | Automatic Protection Group Selection | X | X | 24 | 0 |
| 92 | Phase Current HI Alarm | X | X | 24 | 0 |
| 100 | Auxiliary Supply Fail (Delayed) | X | X | 24 | 0 |
| 101 | Phase A Fault | X | X | 24 | 0 |
| 102 | Phase B Fault | X | X | 24 | 0 |
| 103 | Phase C Fault | X | X | 24 | 0 |
| 104 | Instantaneous Current Exceeded | X | X | 24 | 0 |
| 109 | Source Dead Lockout | X | X | 24 | 0 |

Table 9 – Analog Input Points

| Point Number | Point Name | Enabled On RTM | Report Interval | Low Limit | Mid Limit | High Limit |
|---------------------|--------------------------------------|-----------------------|------------------------|------------------|------------------|-------------------|
| 0 | A Current | X | 0 | N | N | N |
| 1 | B Current | X | 0 | N | N | N |
| 2 | C Current | X | 0 | N | N | N |
| 3 | Earth/Ground Current | X | 0 | N | N | N |
| 4 | System kVA | X | 0 | N | N | N |
| 5 | System KVAr | X | 0 | N | N | N |
| 6 | Operations Counter | X | 0 | N | N | N |
| 7 | A Phase Fault Current | | 0 | N | N | N |
| 8 | B Phase Fault Current | | 0 | N | N | N |
| 9 | C Phase Fault Current | | 0 | N | N | N |
| 10 | Earth/Ground Fault Current | | 0 | N | N | N |
| 13 | Value Increments | X | 0 | N | N | N |
| 14 | Protection Group @ Start (A=0 & B=1) | X | 0 | N | N | N |
| 15 | Ai Phase - Ground Voltage | X | 0 | N | N | N |
| 16 | Bi Phase- Ground Voltage | | 0 | N | N | N |
| 17 | Ci Phase- Ground Voltage | | 0 | N | N | N |
| 18 | Ax Phase- Ground Voltage | | 0 | N | N | N |
| 25 | Bx Phase-Ground Voltage | X | 0 | N | N | N |
| 28 | Cx Phase- Ground Voltage | X | 0 | N | N | N |
| 29 | System Power (kW) | | 0 | N | N | N |
| 30 | System Power Factor | | 0 | N | N | N |
| 31 | Gas Pressure (psi) | | 0 | N | N | N |
| 32 | Code Version | | 0 | N | N | N |
| 41 | Configuration Number | | 0 | N | N | N |
| 42 | CAPM Serial Number | | 0 | N | N | N |
| 43 | ACR Serial Number | | 0 | N | N | N |
| 44 | I Contact Life % | | 0 | N | N | N |
| 58 | II Contact Life % | X | 0 | N | N | N |

Table 10 – Digital Output Points

| Point Number | Point Name | Enabled on RTM |
|---------------------|--|-----------------------|
| 0 | Ground Protection | X |
| 2 | Auto Reclose (On or off for single shot) | X |
| 3 | ACR Trip/Close Control | X |
| 4 | Hot Line Tag | X |
| 10 | Reset Fault Flags and Currents | X |
| 13 | Protection Group A | X |
| 14 | Protection Group B | X |
| 15 | Protection Group C | X |
| 16 | Protection Group D | X |
| 17 | Protection Group E | X |
| 18 | Protection Group F | X |
| 19 | Protection Group G | X |
| 20 | Protection Group H | X |
| 21 | Protection Group I | X |
| 22 | Protection Group J | X |
| 23 | Loop Automation Control | X |