Closed-Loop Operation

Overview

The IntelliTeam® SG Automatic Restoration System allows 6801 Automatic Switch Controls to operate in a closed-loop configuration. The functionality only applies to 6801 Automatic Switch Controls. In this system, a Scada-Mate® Switching System with six voltage sensors is treated the same as one with three voltage sensors. Unlike earlier versions of IntelliTeam software, the IntelliTeam SG system does not need a switch to serve as a network sectionalizer. When the IntelliTeam SG system begins to operate, it dynamically updates switch functions based on load flow and determines the approximate center point, which is the logical place to sectionalize during an event.

Note: When the center switch trips open on a single count of voltage loss, a situation could arise where the fault is temporary and both breakers close because of a good voltage condition. At this point, the center switch now has a method of reclosing on its own to restore the closed-loop circuit. For a switch to reclose itself following a temporary fault, the following must be true:

- The memory time has expired.
- No team reconfiguration event has taken place.
- All other switches on the closed loop are still closed.
- All available voltage sensors indicate good voltage.
- Team indications on both sides show they are energized.

This function is always enabled for **Closed-Loop** logic, and there is presently no way to disable it.

With a closed-loop system, only one of the two sources is listed in the FeederNet when it is configured. See Figure 1. If a normally closed switch is inserted in a series of normally closed switches, only one FeederNet and its associated field devices will need to be updated.

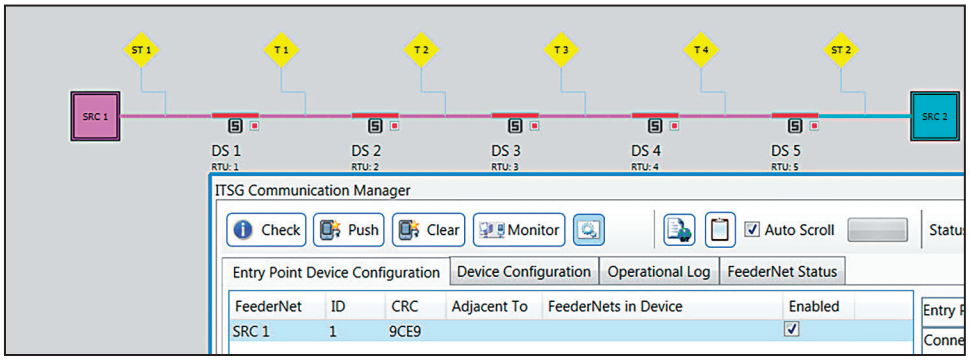

Figure 1. A single FeederNet in a closed-loop system.

Circuit Configurations

The closed-loop functionality can be used in simple closed-loop circuits, as shown in Figure 2. This configuration requires the participating devices to have gold licenses.

The closed-loop functionality can also be used with branched circuits, as shown in Figure 3. When configured as a closed loop, all team members will be defined as "Source-Load/Tie" for their normal switch function. The IntelliTeam SG system will then update these during normal operation.

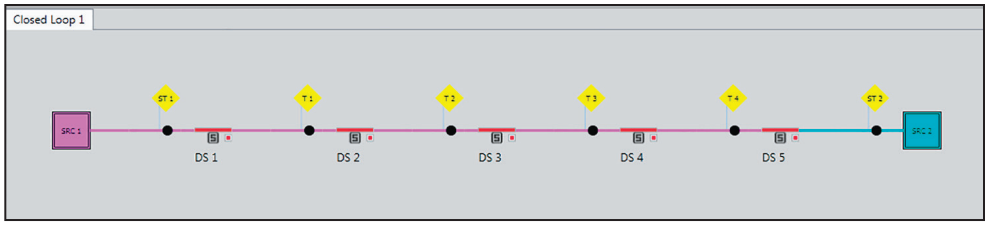

Figure 2. A two-source closed-loop system.

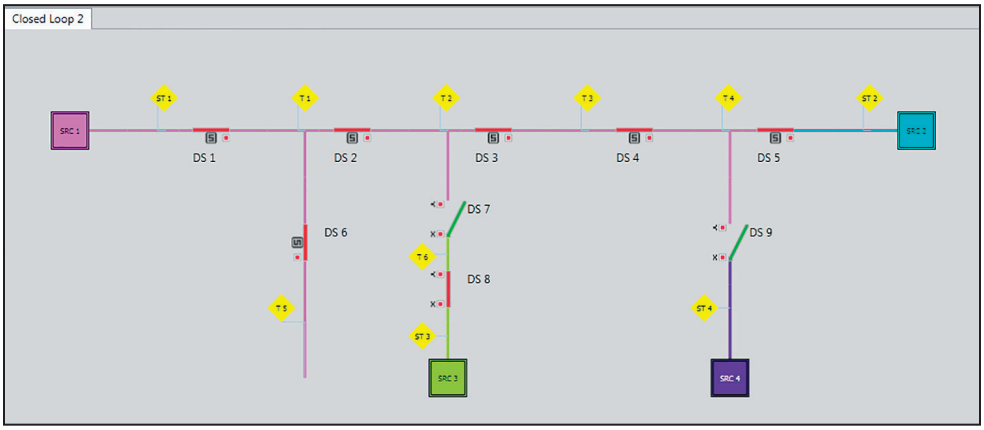

Figure 3. A multi-source branched closed-loop system.

6800 Series Automatic Switch Control Configuration

The **Automatic Operation** mode of 6800 Series Automatic Switch Controls must be configured correctly for closed-loop operations with the IntelliTeam SG system. The first settings are located in IntelliLink® Setup Software on the *Setup>General>Automatic Op.* screen. See Figure 4.

Follow these steps to configure the control for closed-loop operation:

STEP 1. Configure these settings:

(a) The **Number of Shots Required for Lockout** setpoint must be set to the value 1.

(b) The **Overcurrent Required before Shots-to-Lockout Operation** mode must be set to the **Disabled** state.

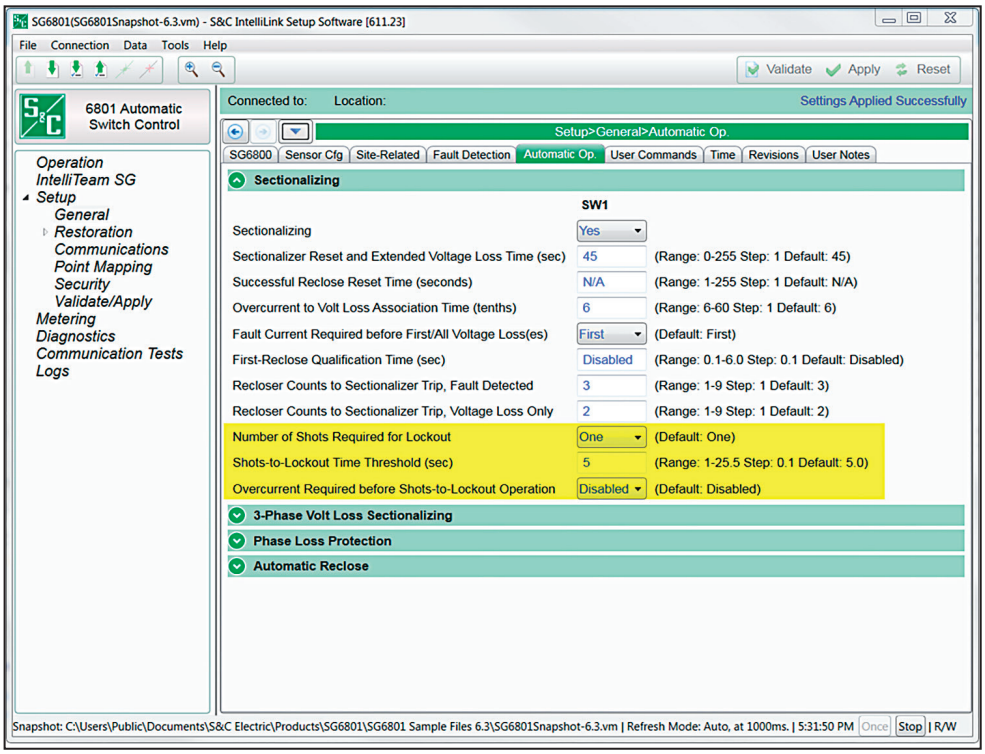

Figure 4. The 6800 Series *Setup>General>Automatic Op.* screen.

STEP 2. Review these settings in the *Setup>General>Automatic Op* screen and adjust them if necessary:

(a) The **Sectionalizing** mode must be set to the **Yes** state.

(b) The **Recloser Counts to Sectionalizer Trip, Fault Detected** setpoint must be set to a value greater than 1, and this value should be coordinated with the total number of recloser shots to lockout for the source breakers.

(c) The **Recloser Counts to Sectionalizer Trip, Voltage Loss Only** setpoint must be set to a value greater than 1 and should be set to a value one lower than the **Recloser Counts to Sectionalizer Trip, Fault Detected** setting.

(d) The **Shots-to-Lockout Time Threshold** setpoint should be set to the default value of 5 seconds.

Functional Limitations

When deploying a closed-loop circuit with the **Return-to-Normal** mode enabled, do not use the **Open Transition** mode.

Rapid Self Healing mode and **Phase-Loss Isolation** mode will not work on a two-source closed-loop circuit, and they may not work in all cases when deployed with a branched closed-loop system. If either of these features is needed for a branched closed-loop system, a factory acceptance test will be required to prove compatibility of these features with the actual system circuit.