

# Load-Scaling Setup and Configuration

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The IntelliTeam SG Automatic Restoration System application now supports the ability to scale loads to support cross-voltage IntelliTeam SG systems where different sections of the same IntelliTeam SG system span across multiple line voltages. This functionality is available in version 7.5.x and later software and is only available in the **IntelliTeam SG** mode of operation.

Follow the instructions in this document to set up, configure, and verify an IntelliTeam SG system spanning across multiple line voltages using the IntelliLink® Setup Software and IntelliTeam Designer applications.

### Load-Scaling Support

The IntelliTeam SG Automatic Restoration System now uses various settings available in IntelliNode™ Interface Modules, IntelliRupter® PulseCloser® Fault Interrupters, and 6800 Series Automatic Switch Controls to scale the loading the IntelliTeam SG system uses to calculate team loads, source capacity, and maximum switch capacities.

The following IntelliLink Setup Software settings are used for scaling loads within the IntelliTeam SG system application:

- Line kV to 120 Vac Base Ratio – 6800 Series controls
- Voltage Transformer Wiring – 6800 Series controls
- Normal Operating Frequency – 6800 Series controls
- System Phase-to-Phase Voltage – IntelliRupter fault interrupters and IntelliNode modules
- System Frequency – IntelliRupter fault interrupters and IntelliNode modules

## 6800 Series Controls

Follow these steps to configure an IntelliTeam SG system that spans multiple line voltages on the same circuit using IntelliLink Setup Software:

**STEP 1.** Open the IntelliLink Setup Software and go to the *Setup>General>Site Related* screen shown in Figure 1.

The screenshot shows the '6801 Automatic Switch Control' software interface. The left sidebar contains a tree view with 'Setup' expanded, showing 'General', 'Restoration', 'Communications', 'Point Mapping', 'Security', 'Validate/Apply', 'Metering', 'Diagnostics', 'Communication Tests', and 'Logs'. The main window is titled 'Setup>General>Site-Related' and contains the following settings:

Parameter	Value	Range/Default
Line kV to 120 VAC Base Ratio	100.0:1	(Range: 1.0-999.9 Step: 0.1 Default: 100.0)
Voltage Transformer Wiring	Phase-To-Neutral	(Default: Phase-To-Neutral)
Loss of Voltage Threshold (RMS Volts)	20.0	(Range: 0.0-6.553.5 Step: 0.1 Default: 20.0)
Voltage Sensors Present	Phase A, B and C	(Default: Phase A, B and C)
Nominal Operating Frequency (Hz)	60 Hz	(Default: 60 Hz)
Reverse Current Time Threshold (sec)	10	(Range: 10-43,200 Step: 1 Default: 10)
Reversed Color Lamps (green=closed, red=open)	Disabled	(Default: Disabled)
Detect Faulty Voltage Sensor	No	(Default: No)
Normal Current Direction	Sensor to Non-sensor Side	(Default: Sensor to Non-sensor Side)
<b>Installation Voltage-Current Phase Angle Offsets</b>		
SW1 Phase A (Degrees)	0	(Range: 0-990 Step: 30 Default: 0)
SW1 Phase B (Degrees)	0	(Range: 0-990 Step: 30 Default: 0)
SW1 Phase C (Degrees)	0	(Range: 0-990 Step: 30 Default: 0)

Figure 1. The 6801 control *Setup>General>Site-Related* screen.

**STEP 2.** Configure the **Line kV to 120 VAC Base Ratio**, **Voltage Transformer Wiring**, and **Normal Operating Frequency** settings to match the line voltage, transformer wiring, and operating frequency of the system on which the 6800 Series control is deployed. See Figure 2.

This screenshot is identical to Figure 1, but with three settings highlighted by red rectangular boxes: 'Line kV to 120 VAC Base Ratio' (100.0:1), 'Voltage Transformer Wiring' (Phase-To-Neutral), and 'Nominal Operating Frequency (Hz)' (60 Hz).

Figure 2. The 6801 control System Voltage and Operating Frequency settings.

**STEP 3.** Repeat Step 2 for every 6800 Series control in the IntelliTeam SG system.

IntelliRupter® Fault Interrupters

Follow these steps to configure an IntelliTeam SG system that spans multiple line voltages on the same circuit using IntelliLink Setup Software:

**STEP 1.** Open the IntelliLink Setup Software and go to the *Setup>General>Site Related* screen shown in Figure 3.

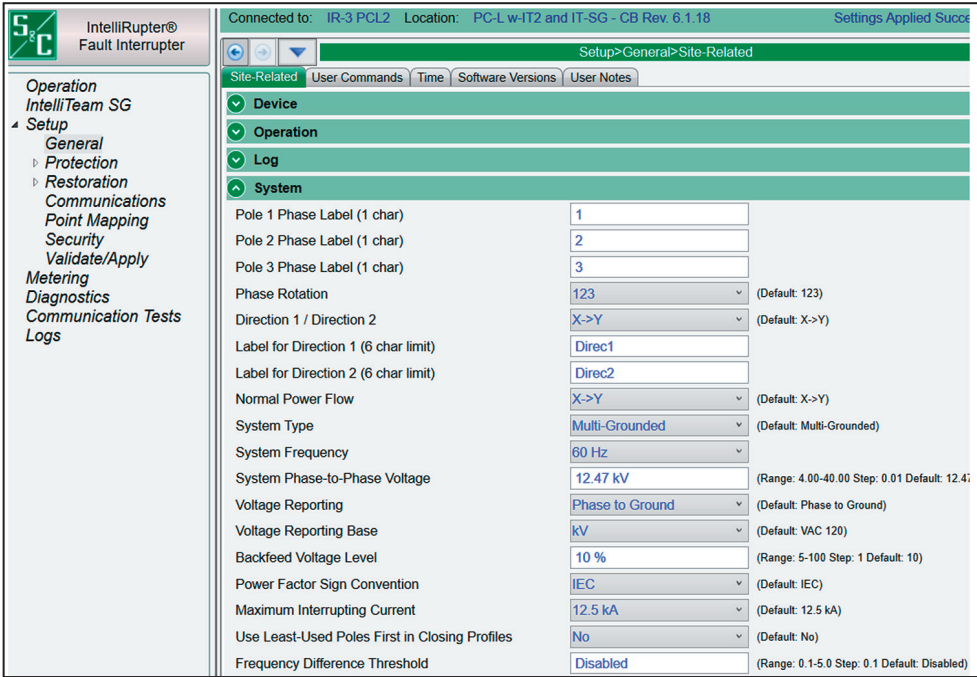


Figure 3. The IntelliRupter fault interrupter *Setup>General>Site-Related* screen.

**STEP 2.** Configure the **System Frequency** and **System Phase-to-Phase Voltage** settings to match the line voltage and operating frequency of the system on which the IntelliRupter fault interrupter is deployed. See Figure 4.

The screenshot shows the IntelliRupter configuration software interface. On the left is a navigation tree with categories like Operation, IntelliTeam SG, Setup, General, Protection, Restoration, Communications, Point Mapping, Security, Validate/Apply, Metering, Diagnostics, Communication Tests, and Logs. The main window displays the 'Setup>General>Site-Related' configuration page. A red box highlights the 'System' section, which includes the following settings:

Setting	Value	Default / Range
Pole 1 Phase Label (1 char)	1	
Pole 2 Phase Label (1 char)	2	
Pole 3 Phase Label (1 char)	3	
Phase Rotation	123	(Default: 123)
Direction 1 / Direction 2	X->Y	(Default: X->Y)
Label for Direction 1 (6 char limit)	Direc1	
Label for Direction 2 (6 char limit)	Direc2	
Normal Power Flow	X->Y	(Default: X->Y)
System Type	Multi-Grounded	(Default: Multi-Grounded)
<b>System Frequency</b>	<b>60 Hz</b>	
<b>System Phase-to-Phase Voltage</b>	<b>12.47 kV</b>	(Range: 4.00-40.00 Step: 0.01 Default: 12.47)
Voltage Reporting	Phase to Ground	(Default: Phase to Ground)
Voltage Reporting Base	kV	(Default: VAC 120)
Backfeed Voltage Level	10 %	(Range: 5-100 Step: 1 Default: 10)
Power Factor Sign Convention	IEC	(Default: IEC)
Maximum Interrupting Current	12.5 kA	(Default: 12.5 kA)
Use Least-Used Poles First in Closing Profiles	No	(Default: No)
Frequency Difference Threshold	Disabled	(Range: 0.1-5.0 Step: 0.1 Default: Disabled)

**Figure 4.** The IntelliRupter fault interrupter **System Frequency** and **System Phase-to-Phase Voltage** settings.

**STEP 3.** Repeat Step 2 for every IntelliRupter fault interrupter in the IntelliTeam SG system.

IntelliNode™ Interface Modules

Follow these steps to configure an IntelliTeam SG system that spans multiple line voltages on the same circuit using IntelliLink Setup Software:

**STEP 1.** Open the IntelliLink Setup Software and go to the *Setup>External Device>Auto Operation* screen shown in Figure 5.

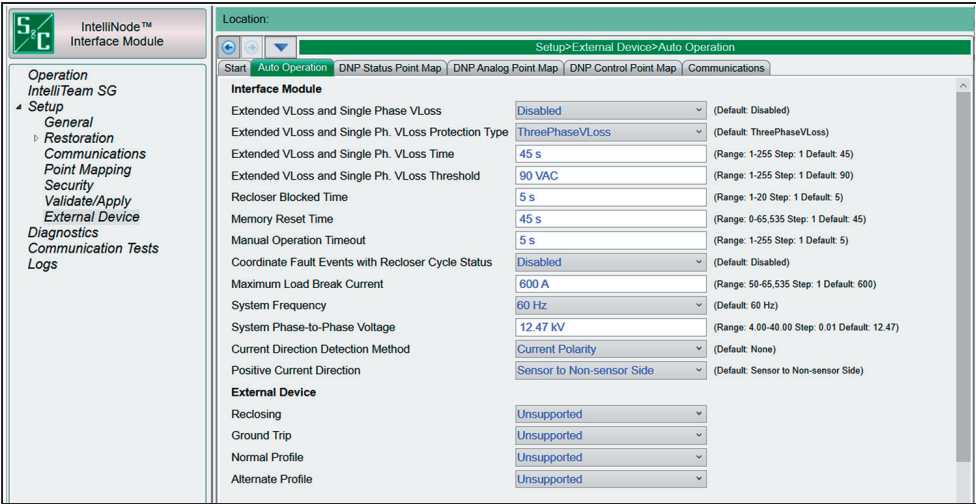


Figure 5. The IntelliNode Interface Module *Setup>External Device>Auto Operation* screen.

**STEP 2.** Configure the **System Frequency** and **System Phase-to-Phase Voltage** settings to match the line voltage and operating frequency of the system on which the IntelliNode module is deployed. See Figure 6.

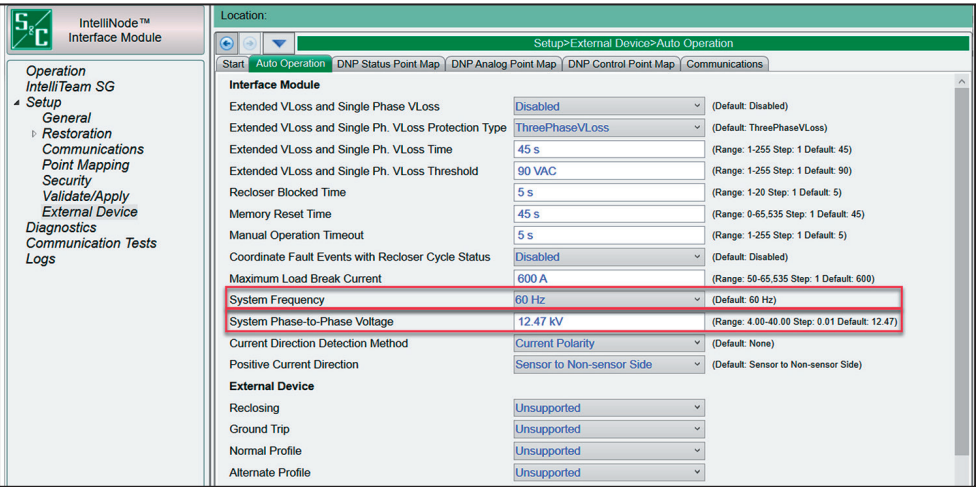


Figure 6. The IntelliNode module **System Frequency** and **System Phase-to-Phase Voltage** settings.

**STEP 3.** Repeat Step 2 for every IntelliNode module in the IntelliTeam SG system.

Follow these steps to configure an IntelliTeam SG system spanning multiple line voltages on the same circuit using IntelliTeam Designer software:

- STEP 1.** Draw a circuit and configure the IntelliTeam SG system using the IntelliTeam Designer application. Refer to S&C Instruction Sheet 1044-570, “IntelliTeam® Designer: *User’s Guide*,” for information about drawing circuits and configuring the IntelliTeam SG system.
- STEP 2.** Validate the circuit drawing and correct any validation errors. Then, save the drawing file.
- STEP 3.** When the circuit is successfully validated, open the Communication Manager and push the netlist to the controls. Refer to S&C Instruction Sheet 1044-570, “IntelliTeam® Designer: *User’s Guide*,” for information about configuring the Communication Manager and pushing the netlist.



To verify an IntelliTeam SG system has been properly configured for multiple line voltages, perform the following checks:

**STEP 1.** Verify there are no **System Voltage Unrecognized** DNP status points active in any device in the system. If any are active, go to the *Setup>General>Site-Related* or *Setup>External Device>Auto Operation* screen of the applicable device and check the entered configuration settings. See Figure 7.

Status Point	Code-Description	Class
153	154: External Interface Maintenance Mode Applied	Class 1
154	155: External Interface Ground Trip Applied	Class 1
155	156: Hot Line Tag External Trip	Class 1
156	156: Hot Line Tag External Trip	No Event
157	167: Transfer Declined Excess Load	No Event
158	168: Transfer Declined Segment Limit	No Event
159	169: System Voltage Unrecognized	No Event
160	170: Xfer Trip PR Initiated (DG POI)	No Event
161	171: NET: Missing Runners in Adjacent FeederNet	No Event
162	172: Transfer Trip Sent	No Event
163	173: External Port Open Latched	No Event
164	174: External Port Trip Latched	No Event

Figure 7. The System Voltage Unrecognized status point.

**STEP 2.** When a restoration event occurs involving an open tie-switch with different voltage classes on each side, go to the *Logs>Historic Log* screen and verify there is a “System Voltage Classification Difference Detected” log entry. When there is no entry, go to the *Setup>General>Site Related* or *Setup>External Device>Auto Operation* screen of the devices in the system and review the entered configuration settings. See Figure 8.

Event Description	Cat	Time Stamp	Data1	Data2	Data3	Data4
COS Reported by IT	NET	07/29/2021 10:35:51.412	200	2	4020	1
NETV: Network Config. Changed	NET	07/29/2021 10:35:51.418	4	2	NETVIEWVALID	2
Cosch Arrived	DAT	07/29/2021 10:35:53.546	2	4793	25	1
Old or Duplicate Task Discarded	DAT	07/29/2021 10:35:53.548	2	94	1	1
Old or Duplicate Task Discarded	DAT	07/29/2021 10:35:53.548	2	94	2	2
Old or Duplicate Task Discarded	DAT	07/29/2021 10:35:53.548	2	5	255	1
Cosch Collect Data	DAT	07/29/2021 10:35:53.549	2	Member4	0	0
Cosch Has Departed	DAT	07/29/2021 10:35:53.549	2	4	25	3
COS Reported by IT	NET	07/29/2021 10:35:53.622	4	32	0	1
Cosch Arrived	DAT	07/29/2021 10:35:53.952	2	4796	28	2
Old or Duplicate Task Discarded	DAT	07/29/2021 10:35:53.954	2	21	1	1
Old or Duplicate Task Discarded	DAT	07/29/2021 10:35:53.954	2	5	255	2
Member Requested	DAT	07/29/2021 10:35:53.955	2	1	0	0
Transfer State Change	DAT	07/29/2021 10:35:53.957	7	0	2	100
Sys Voltage Classification Diff Detected	DAT	07/29/2021 10:35:59.029	V12000	V23900	OneDiffFound	0
Calculated all source capacity	DAT	07/29/2021 10:35:59.047	000	101	100	000
Transfer Approved	DAT	07/29/2021 10:35:59.047	2	CloseSwOK	499	24
Next Action	DAT	07/29/2021 10:35:59.047	CtrlReq	Forward	1	0
Next Action	DAT	07/29/2021 10:35:59.048		Forward	1	0
Cosch is Held by Team Member	DAT	07/29/2021 10:35:59.057	7	63	0	0
Cosch is Held by Team Member	DAT	07/29/2021 10:35:59.072	2	63	0	0
Start Sending Transfer Trip	DAT	07/29/2021 10:35:59.399	7	3	3017	1
Transfer in Progress on Any Team	DAT	07/29/2021 10:35:59.848	1	1	0	0
Event Buffer Overflow	DNP	07/29/2021 10:35:59.938	Binary	0	0	0
DNPDiag Test Suspended	DNP	07/29/2021 10:38:00.143	0	0	0	0
COS Reported by IT	NET	07/29/2021 10:38:00.218	200	2	2024	1
COS Reported by IT	NET	07/29/2021 10:38:00.218	200	2	2024	2
NETV: Network Config. Changed	NET	07/29/2021 10:38:00.224	4	2	NETVIEWVALID	2
Event Buffer Overflow	DNP	07/29/2021 10:38:00.957	Binary	0	0	0
Old or Duplicate Task Discarded	DAT	07/29/2021 10:38:01.945	2	63	1	108

Figure 8. The System Voltage Classification Difference Detected log entry.