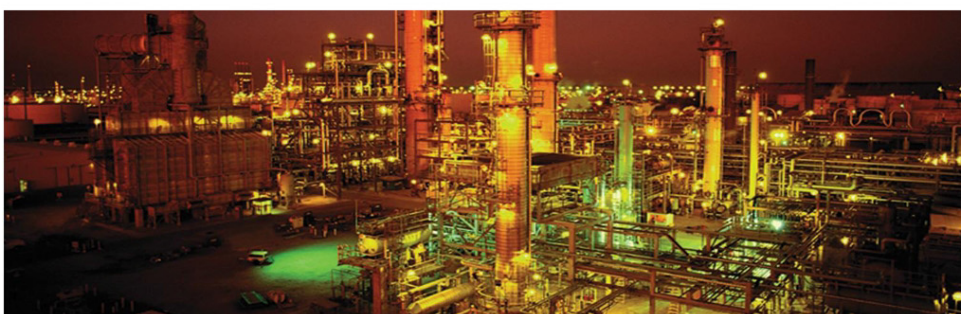
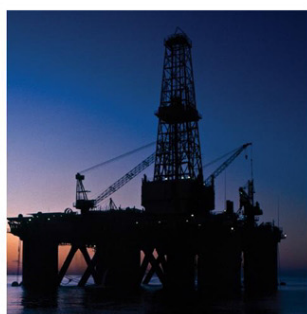
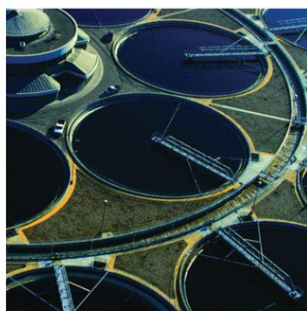


Rockwell Automation Library of Electrical Protection Devices

Version 4.0



Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

	Preface	
	New and Updated Information.....	10
	Additional Resources	10
	Chapter 1	
Introduction	PlantPAx DCS and IEC 61850.....	11
	Required Files.....	13
	Controller Files	13
	Visualization Files	13
	Chapter 2	
Configure the Gateway Module	Set Up the Communication.....	15
	Mapping the Gateway.....	21
	Chapter 3	
Integrate IEC 61850 into a Studio 5000 Project	Gateway Integration.....	27
	Import the Add-On Instructions	30
	Create Your Routine	32
	Chapter 4	
Bulletin 857 Motor/Feeder Protection Object	Controller Code	38
	InOut Structure for ProSoft Add-On Instruction	38
	InOut Structure for Rockwell Automation Library.....	39
	Output Structure for Bulletin 857 Relay	39
	Remote Bit Control Value Structure	39
	Mapping InOut Tags to Add-On Instructions.....	40
	Using Visualization Files.....	44
	Creating a FactoryTalk View SE Parameter File	44
	Linking the Parameter Files to an HMI Display	47
	Faceplates	49
	Operator Tab	50
	Engineering Tab.....	51
	Diagnostic Tab.....	51
	Help Tab	52
	Chapter 5	
Bulletin 865 Transformer Object	Controller Code	54
	InOut Structure for ProSoft Add-On Instruction	54
	InOut Structure for Rockwell Automation Library.....	55
	Output Structure for Bulletin 865 Relay	55
	Remote Bit Control Value Structure	55
	Mapping InOut Tags to Add-On Instructions.....	56
	Using Visualization Files.....	60

Creating a FactoryTalk View SE Parameter File	60
Linking the Parameter Files to an HMI Display	63
Faceplates	65
Operator Tab	66
Engineering Tab.....	67
Diagnostic Tab.....	67
Help Tab	68

Chapter 6

SEL 700G Object

Controller Code	70
InOut Structure for ProSoft Add-On Instruction	70
InOut Structure for Rockwell Automation Library.....	71
Remote Bit Control Value Structure	71
Mapping InOut Tags to Add-On Instructions	72
Associate Controller Tags to ProSoft Add-On Instruction	72
Configure Trip Source Add-On Instruction	75
Using Visualization Files.....	77
Creating a FactoryTalk View SE Parameter File	77
Linking the Parameter Files to an HMI Display	81
Faceplates	83
Operator Tab	84
Automatic-Synchronization Tab.....	85
Engineering Tab.....	86
Diagnostic Tab.....	89
Help Tab	92

Chapter 7

SEL 710 Object

Controller Code	94
InOut Structure for ProSoft Add-On Instruction	94
InOut Structure for Rockwell Automation Library.....	95
Remote Bit Control Value Structure	95
Mapping InOut Tags to Add-On Instructions	96
Associate Controller Tags to ProSoft Add-On Instruction	96
Configure Trip Source Add-On Instruction	99
Using Visualization Files.....	101
Creating a FactoryTalk View SE Parameter File	101
Linking the Parameter Files to an HMI Display	104
Faceplates	106
Operator Tab	107
Engineering Tab.....	108
Diagnostic Tab.....	110
Help Tab	111

Chapter 8

SEL 751A Object

Controller Code	114
InOut Structure for ProSoft Add-On Instruction	114

InOut Structure for Rockwell Automation Library	115
Remote Bit Control Value Structure	115
Mapping InOut Tags to Add-On Instructions	116
Associate Controller Tags to ProSoft Add-On Instruction ...	116
Configure Trip Source Add-On Instruction	118
Using Visualization Files	120
Creating a FactoryTalk View SE Parameter File	120
Linking the Parameter Files to an HMI Display	123
Faceplates	125
Operator Tab	126
Engineering Tab.....	127
Diagnostic Tab.....	128
Help Tab	129

Chapter 9

SEL 787 Object

Controller Code	132
InOut Structure for ProSoft Add-On Instruction	132
InOut Structure for Rockwell Automation Library	133
Remote Bit Control Value Structure	133
Mapping InOut Tags to Add-On Instructions	134
Associate Controller Tags to ProSoft Add-On Instruction ...	134
Configure Trip Source Add-On Instruction	137
Using Visualization Files	139
Creating a FactoryTalk View SE Parameter File	139
Linking the Parameter Files to an HMI Display	142
Faceplates	144
Operator Tab	145
Engineering Tab.....	146
Diagnostic Tab.....	147
Help Tab	148

Chapter 10

ABB EMAX2 Using EtherNet/IP Object

Controller Code	150
InOut Structure for ProSoft Add-On Instruction	150
IInOut Structure for Rockwell Automation Library	150
Adding a Device.....	151
Mapping InOut Tags to Add-On Instructions	153
Associate Controller Tags to ProSoft Add-On Instruction ...	153
Using Visualization Files	154
Creating a New Parameter File	154
Linking the Parameter Files to an HMI Display	157
Faceplates	159
Operator Tab	160
Engineering Tab.....	161
Diagnostic Tab.....	162
Help Tab	163

**ABB EMAX2 Using IEC 61850
Object****Chapter 11**

Controller Code	166
InOut Structure for ProSoft Add-On Instruction	166
InOut Structure for Rockwell Automation Library	166
Remote Command Structure	167
Mapping InOut Tags to Add-On Instructions	167
Associate Controller Tags to ProSoft Add-On Instruction ...	167
Using Visualization Files	171
Creating a FactoryTalk View SE Parameter File	171
Linking the Parameter Files to an HMI Display	174
Faceplates	176
Operator Tab	177
Engineering Tab	178
Diagnostic Tab	179
Help Tab	180

Chapter 12

Controller Code	182
InOut Structure for ProSoft Add-On Instruction	182
InOut Structure for Rockwell Automation Library	182
Remote Bit Control Value Structure	183
Mapping InOut Tags to Add-On Instructions	183
Associate Controller Tags to ProSoft Add-On Instruction ...	184
Configure Rockwell Automation Add-On Instruction	186
Using Visualization Files	189
Creating a FactoryTalk View SE Parameter File	189
Linking the Parameter Files to an HMI Display	192
Faceplates	194
Operator Tab	195
Engineering Tab	196
Diagnostic Tab	197
Help Tab	198

Chapter 13

Controller Code	200
InOut Structure for ProSoft Add-On Instruction	200
InOut Structure for Rockwell Automation Library	200
Remote Bit Control Value Structure	201
Mapping InOut Tags to Add-On Instructions	201
Associate Controller Tags to ProSoft Add-On Instruction ...	201
Configure Rockwell Automation Add-On Instruction	204
Using Visualization Files	206
Creating a FactoryTalk View SE Parameter File	206
Linking the Parameter Files to an HMI Display	209
Faceplates	211
Operator Tab	212

GE Multilin 850 Object

Engineering Tab.....	213
Diagnostic Tab.....	214
Help Tab	215

Chapter 14

GE Multilin 869 Object

Controller Code	218
IInOut Structure for ProSoft Add-On Instruction	218
InOut Structure for Rockwell Automation Library.....	218
Remote Bit Control Value Structure	219
Mapping InOut Tags to Add-On Instructions.....	220
Associate Controller Tags to ProSoft Add-On Instruction ...	220
Configure Rockwell Automation Add-On Instruction.....	222
Using Visualization Files.....	225
Creating a FactoryTalk View SE Parameter File	225
Linking the Parameter Files to an HMI Display	228
Faceplates	230
Operator Tab	231
Engineering Tab.....	232
Diagnostic Tab.....	233
Help Tab	234

Chapter 15

GE Multilin 889 Object

Controller Code	236
IInOut Structure for ProSoft Add-On Instruction	236
InOut Structure for Rockwell Automation Library.....	236
Remote Bit Control Value Structure	237
Mapping InOut Tags to Add-On Instructions.....	237
Associate Controller Tags to ProSoft Add-On Instruction ...	237
Configure Rockwell Automation Add-On Instruction.....	240
Using Visualization Files.....	242
Creating a FactoryTalk View SE Parameter File	242
Linking the Parameter Files to an HMI Display	245
Faceplates	247
Operator Tab	248
Engineering Tab.....	249
Diagnostic Tab.....	251
Help Tab	252

Glossary.....	253
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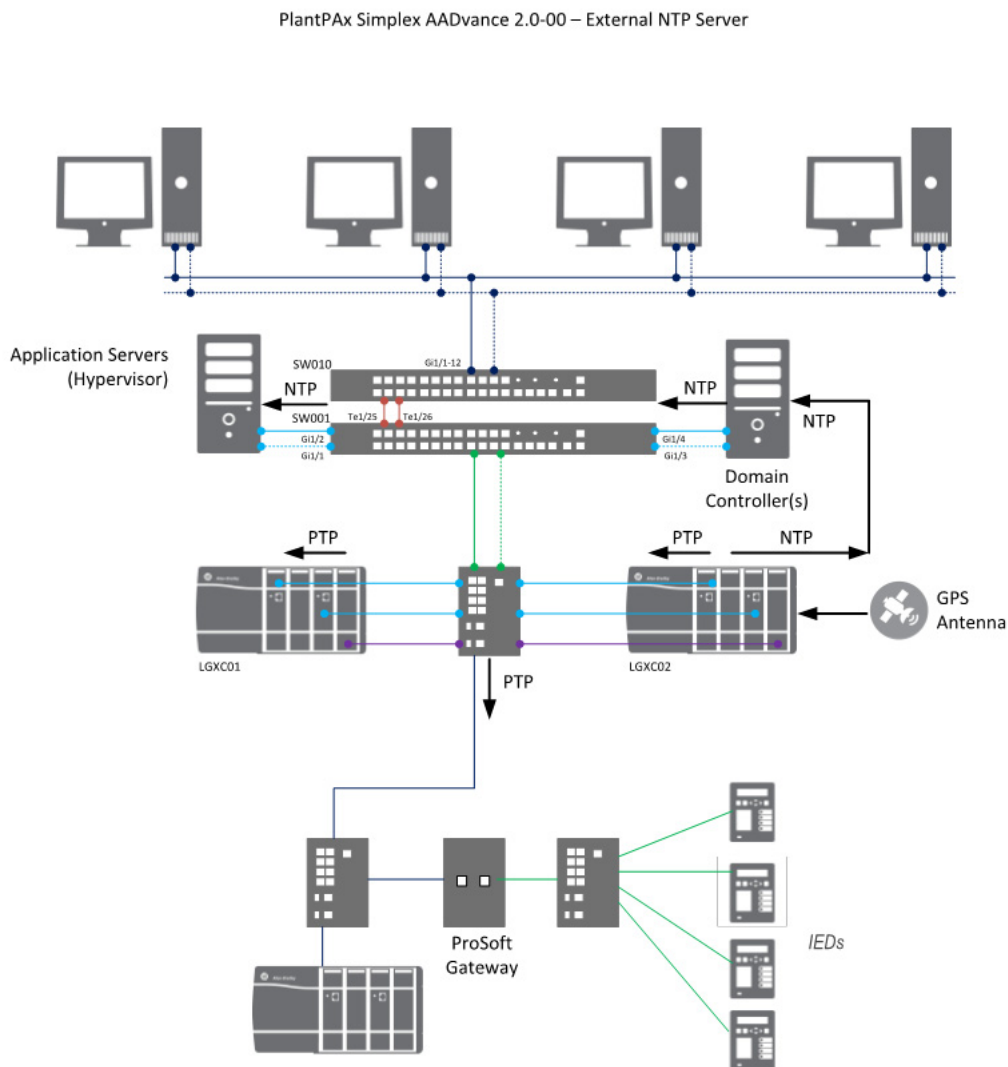
Index.....	261
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Notes:

This manual describes how to configure the Add-On Instructions and visualization objects to integrate electrical protection devices by using IEC 61850 or EtherNet/IP™ connectivity within the PlantPAx® System.

The files that are required to configure the electrical protection devices can be downloaded from the Product Compatibility and Download Center (PCDC) at <http://compatibility.rockwellautomation.com/Pages/home.aspx>.

Figure 1 - PlantPAx System.



See [Chapter 1](#) for more information on the IEC61850 standard.

New and Updated Information

This manual contains new and updated information as indicated in the following table.

Topic	Page
GE Multilin 845 Object chapter added.	181
GE Multilin 850 Object chapter added.	199
GE Multilin 869 Object chapter added.	217
GE Multilin 889 Object chapter added.	235

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
PlantPAx Distributed Control System Selection Guide, publication PROCES-SG001	Provides information to assist with equipment procurement for your PlantPAx system.
PlantPAx Distributed Control System Reference Manual, publication PROCES-RM001	Provides characterized recommendations for implementing your PlantPAx system.
Rockwell Automation Library of Process Objects, publication PROCES-RM002	Provides general considerations for the PlantPAx system library of process objects.
PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM001	Describes procedures for how to configure system components that comprise a PlantPAx modern DCS.
PlantPAx Distributed Control System Application Configuration User Manual, publication PROCES-UM003	Describes the steps necessary to start development of PlantPAx DCS.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.rockwellautomation.com/global/certification/overview.page	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/global/literature-library/overview.page>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Introduction

PlantPAx DCS and IEC 61850

The PlantPAx® distributed control system architecture provides for the integration of electrical protection devices via the IEC 61850 standard and the EtherNet/IP network. The IEC 61850 standard defines a communication interface that monitors and controls electrical distribution systems with one common platform regardless of manufacturer. Substation equipment has evolved from electromechanical to microprocessor-based relays that allow for communication to industrial control systems.

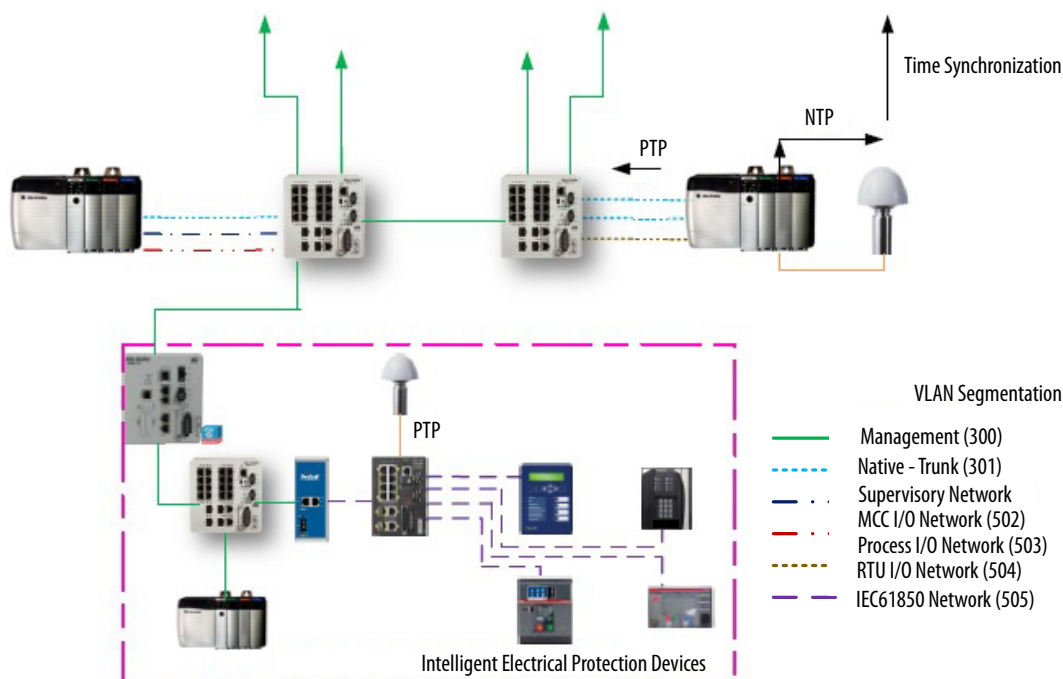
This manual describes how to integrate power infrastructure Add-On Instructions and visualization that are described in this manual. The instructions maximize process control with intelligent devices on The Connected Enterprise.

The IEC 61850 standard includes the following benefits:

- Support of comprehensive substation functions
- Ease of design, specification, setup, and maintenance
- Strong functional support for substation communication and flexibility to support system evolution

Figure 2 - IEC 61850 Standard-integrated Into PlantPAx DCS

Upstream to PlantPAx System as shown in [Figure 1 on page 9](#).



The devices that are shown in [Figure 1](#) include products from Rockwell Automation and Encompass™ partners, such as Schweitzer Engineering Labs (SEL) and ProSoft Technology. Faceplates in this manual are also representative of ABB products.

As the dashed lines show in [Figure 2](#), each physical device shares data across the network. Communication and mapping portions of the IEC 61850 standard define the data flow.

Devices within the electrical distribution system communicate using various standards and protocols. For purposes of the Library of Electrical Devices, the devices represented communicate via IEC 61850 or EtherNet/IP.

The gateway organizes the IEC 61850 data from the devices, and communicates with a controller on an EtherNet/IP network. The ProSoft gateway configuration software creates Add-On Instructions that decode the field device power data within the controller.

The controller then coordinates with upstream PlantPAx System infrastructure (shown by the green arrows in [Figure 2](#)). TripSource Add-On Instructions that monitor the devices for alarm conditions are also provided.

Graphic files in this manual link the devices to an HMI interface and the Add-On Instructions. Faceplates for each device present information, including diagnostics, to operators, engineers, or maintenance personnel.

Required Files

The controller and visualization files are required to create instruction sets for programming logic. This logic is as a supplement to the instruction set provided natively in the ControlLogix® firmware.

Controller Files

The module Add-On Instruction files are included in the following table

Table 1 - Module Add-On Instruction Files

Module Type	Device Name	Process Library Add-On Instruction	Configuration File	Description	Firmware
Power Relays	SEL 751A	SEL751ATripSource.I5x	(RA-LIB) SEL751A.CID	Feeder protection relay with arc flash detection	R418 and above
	SEL 710/710d5	SEL710TripSource.I5x	(RA-LIB) SEL710.CID	Motor protection relay	710-5 standard and above
	SEL 700G	SEL700GTripSource.I5x	(RA-LIB) SEL700G.CID	Generator protection relay	R107 and above
	SEL 787	SEL787TripSource.I5x	(RA-LIB) SEL787.CID	Transformer protection relay	R209 and above
	AB857	AB857TripSource.I5x	(RA-LIB) AB857.CID	Feeder protection relay	Revisions 12.001 and later
	AB865	AB865TripSource.I5x	(RA-LIB) AB865.CID	Generator protection relay	Revisions 12.001 and later
Circuit Breakers	ABB EMAX2 E/IP	EMAXEIPTripSource.I5x	Ekip2_07_12+key.eds	Power circuit breaker with communication via EtherNet/IP	2.08 and above
	ABB EMAX2 IEC 61850	EMAX61850TripSource.I5x	(RA-LIB) ABB EMAX2.CID	Power circuit breaker with communication via IEC 61850	2.10 and above

Visualization Files

The display files (.gfx file type) in [Table 2](#) are the displays that you see at runtime.

Table 2 - Display Files

FactoryTalk View SE Software	FactoryTalk View ME Software	Description
(RA-SEL) SEL_751A-faceplate	(RA-SEL-ME) SEL_751A-faceplate	Faceplate for the feeder protection relay with arc flash detection
(RA-SEL) SEL 710d5-faceplate	(RA-SEL-ME) SEL 710d5-faceplate	Faceplate for the motor protection relay
(RA-SEL) SEL 700G-faceplate	(RA-SEL-ME) SEL 700G-faceplate	Faceplate for the transformer protection relay
(RA-SEL) SEL 787-faceplate	(RA-SEL-ME) SEL 787-faceplate	Faceplate for the generator protection relay
(RA-AB) AB 857 61850-faceplate	(RA-AB-ME) AB 857 61850-faceplate	Faceplate for the feeder protection relay
(RA-AB) AB 865 61850-faceplate	(RA-AB-ME) AB 865 61850-faceplate	Faceplate for the generator protection relay
(RA-ABB) ABB EMAX2 E/IP-faceplate	(RA-SEL-ABB) ABB EMAX2 E/IP-faceplate	Faceplate for the power circuit breaker with communication via EtherNet/IP
(RA-ABB) ABB EMAX2 IEC 61850-faceplate	(RA-SEL-ABB) ABB EMAX2 IEC 61850-faceplate	Faceplate for the power circuit breaker with communication via IEC 61850

HMI Tags are created in a FactoryTalk® View ME application to support tab switching on Process Library faceplates. The HMI tags can be imported via the comma-separated values file (.csv file type) in the following table.

Table 3 - HMI Tags

FactoryTalk View SE Software	FactoryTalk View ME Software	Description
—	FTVME_IEC61850Lib_Tags_3_5_05.CSV where xx = the service release number.	These tags must be imported into the FactoryTalk View ME project to support switching tabs on any Process Object faceplate.

Configure the Gateway Module

This section describes how to configure the ProSoft Technology® EtherNet/IP to the IEC 61850 communication gateway module. This section also describes how to export Add-On-Instructions for use in the Studio 5000 Logix Designer® application to support devices that communicate through IEC 61850 protocol. This third-party Add-On Instruction creates the communication path from the ports on the gateway module to the power relays.

IMPORTANT This manual assumes that you are using the IEC 61850 CID files that are provided on the PCDC. If your application requires additional parameters, use the configuration software from the manufacturer to modify the PCDC CID files for parameters. Do not delete any content from pre-established reports that are labeled measurands, alarms, or PB and target status indicators. Deletion of these reports has an adverse effect on the faceplates.

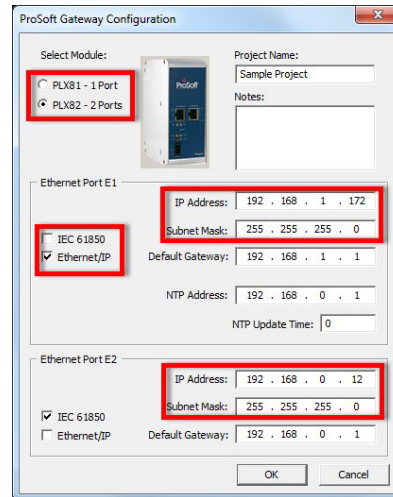
IMPORTANT Use ProSoft firmware revision 2.01 or later when you integrate the PlantPAx® objects for electrical protection.

Set Up the Communication

The following steps configure a gateway module within the ProSoft PLX8x-EIP-61850 Configuration Manager. If you do not already have this software, you can download it from the ProSoft Technology website (www.prosoft-technology.com).

1. Select if the module you are using is a single- or dual-port module (PLX81 or PLX82).

- Assign the IP address to the ProSoft Module for the IEC 61850 Network and EtherNet/IP network.

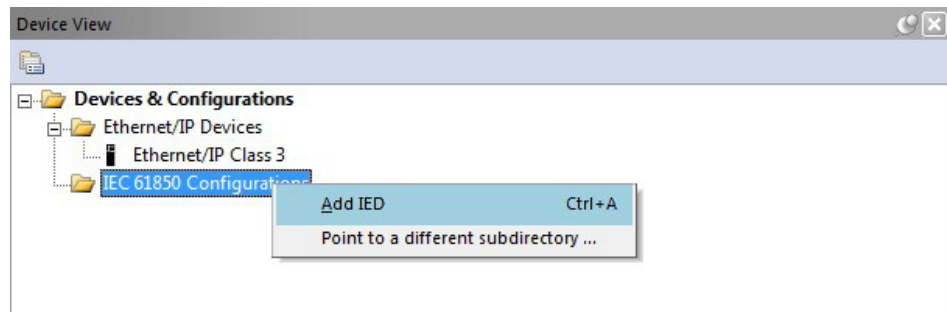


Verify the correct subnet mask and default gateway for each network. If the 2-port module is being used, the IEC 61850 and EtherNet/IP ports must be assigned on separate subnets. Also, verify that you select the correct port for the EtherNet/IP and IEC 61850 services.

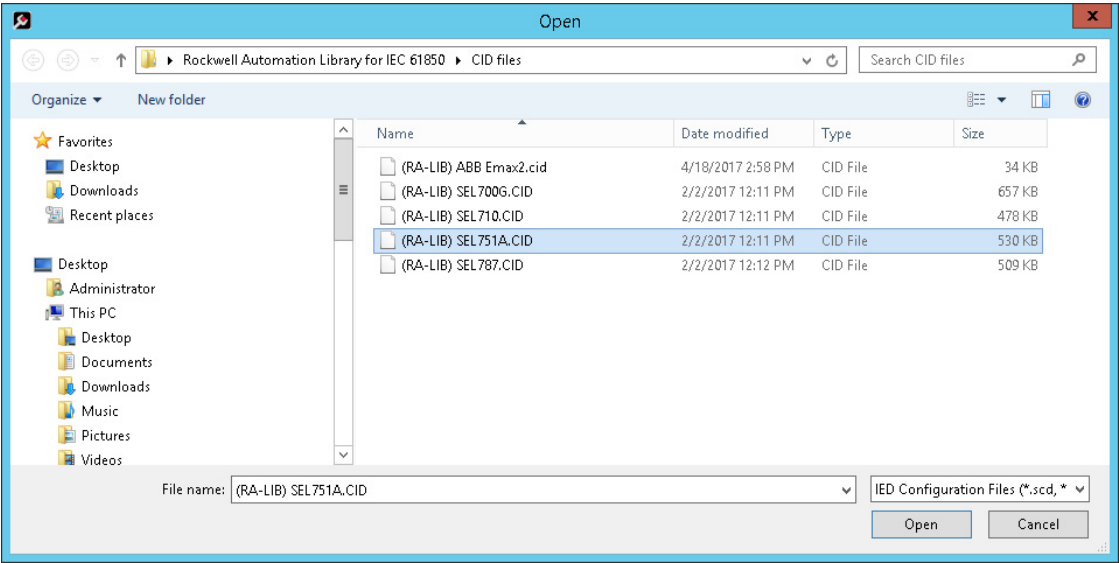
- Click OK.

The software returns to the main canvas.

- From the Device View on the left side, right-click IEC 61850 Configurations and select Add IED (Intelligent Electronic Device).

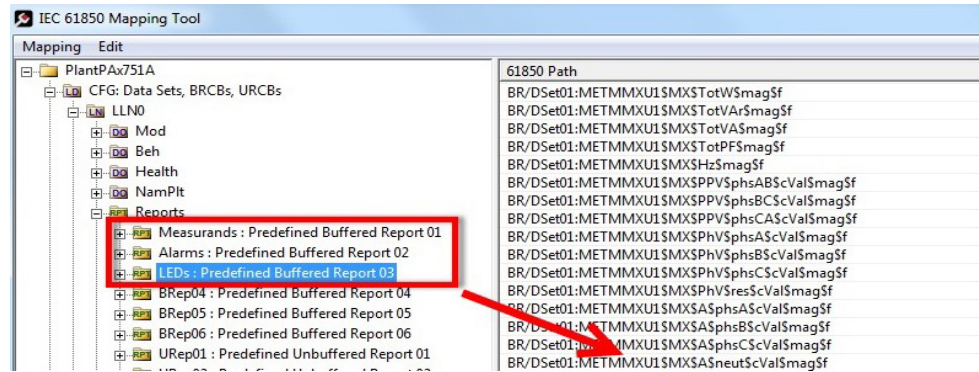


- Select the CID file with the IED Configuration.
- Click Open.

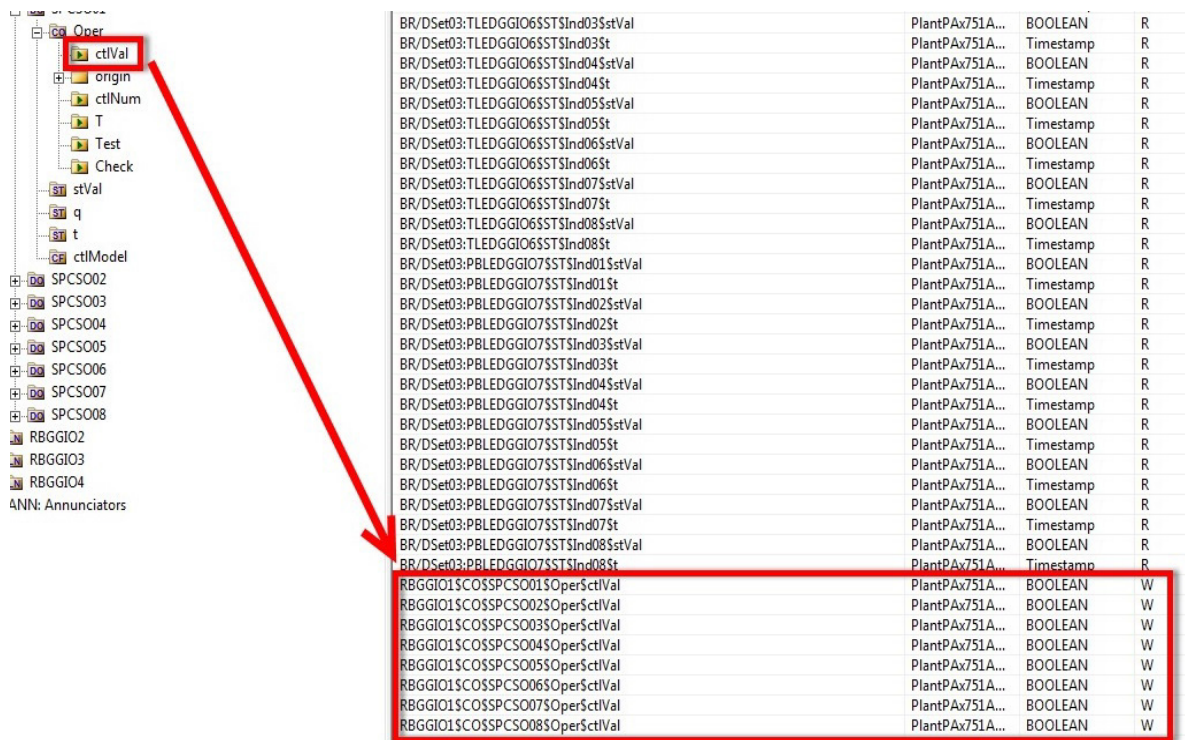


9. Expand the LLN0 folder, and then expand the Reports folder.
10. Drag Measurands (Buffered Report 1), Alarms (Buffered Report 2), and status indicators (Buffered Report 3) to the canvas on the right.

IMPORTANT For each additional report, drag reports into the canvas to move the data to a controller.

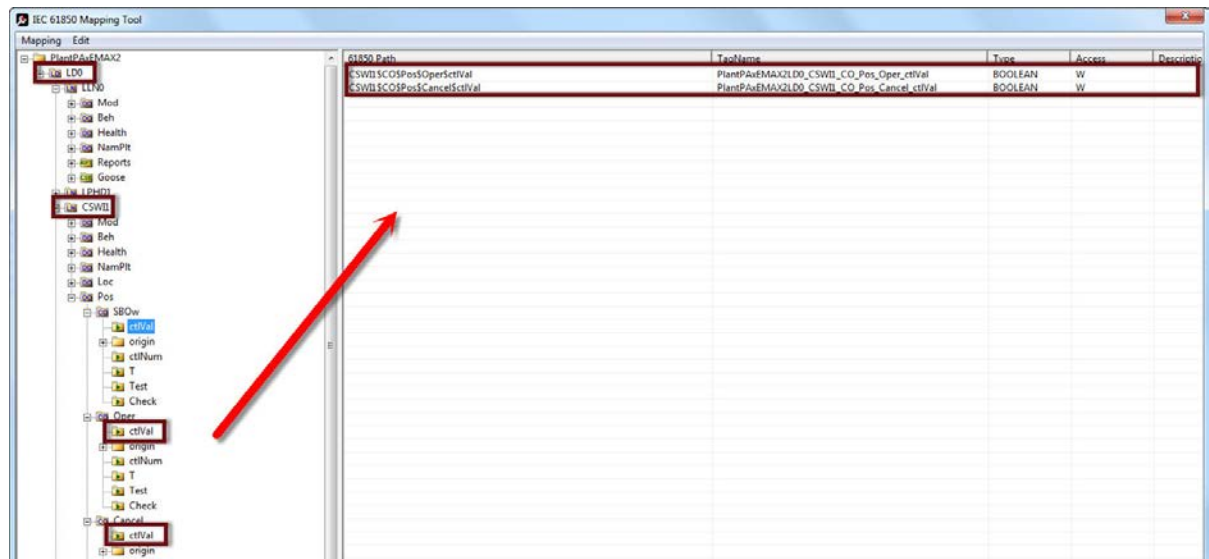


11. For SEL devices, expand the Control folder and RBGGIO1 folder.
12. Expand SPCSO1 through SPCSO8.
13. Expand Oper and select ctlVal. Drag these values to the canvas along with any other commands required for your application.

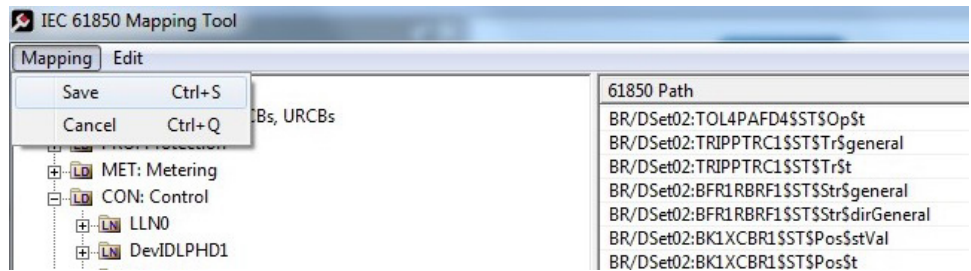


14. For ABB Devices, expand LD0, CS2I1, and Pos folders.

15. Expand Oper and Cancel folders. Drag these values to the canvas along with any other commands required for your application.



16. Select Mapping from the toolbar and select Save.



17. Repeat steps 3...9 for every gateway module being added to the system.

IMPORTANT The faceplates and three pre-defined buffered reports for the devices use the data in [Table 4](#).

Table 4 - Input and Output Data for IEC 61850 Devices

Device	Input Data Bytes	Output Data Bytes	Input Connections Used	Output Connections Used
SEL-700G	1497	8	3	0.02
SEL-710	971	8	1.95	0.02
SEL-751A	908	8	1.82	0.02
SEL-787	920	8	1.84	0.02
AB-857	1352	8	2.68	0.02
AB-865	1037	8	1.84	0.02
EMAX2	654	2	1.31	0.01

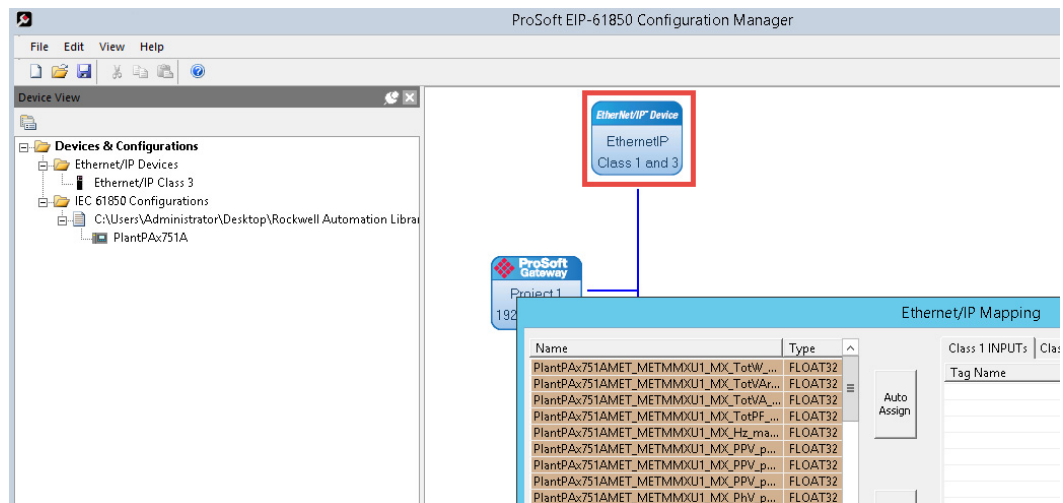
IMPORTANT These conditions apply only when you use the CID files from PCDC and the files are not modified.

Mapping the Gateway

If you are using a ProSoft technology PLX81-EIP-61850 module, a maximum of 10 I/O connections are available. If you are using the PlantPAx faceplates and pre-defined buffered reports, up to 5 relay devices could be supported on one module.

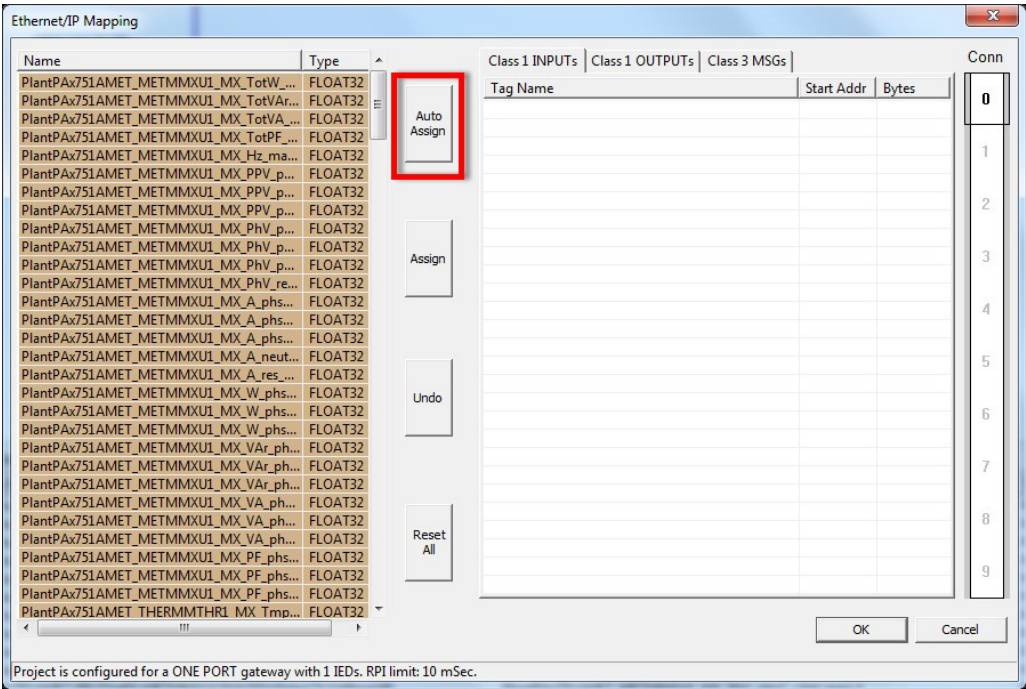
If you are using a PLX82-EIP-61850 module (dual Ethernet port), a maximum of 20 I/O connections are available. Up to 10 relay devices could be used in that project by using PlantPAx faceplates and the pre-defined buffered reports.

1. Once you have added all devices within the system, double-click the EtherNet/IP block in the configuration manager canvas. This action opens the EtherNet/IP Mapping Window.



2. Select the Auto Assign button.

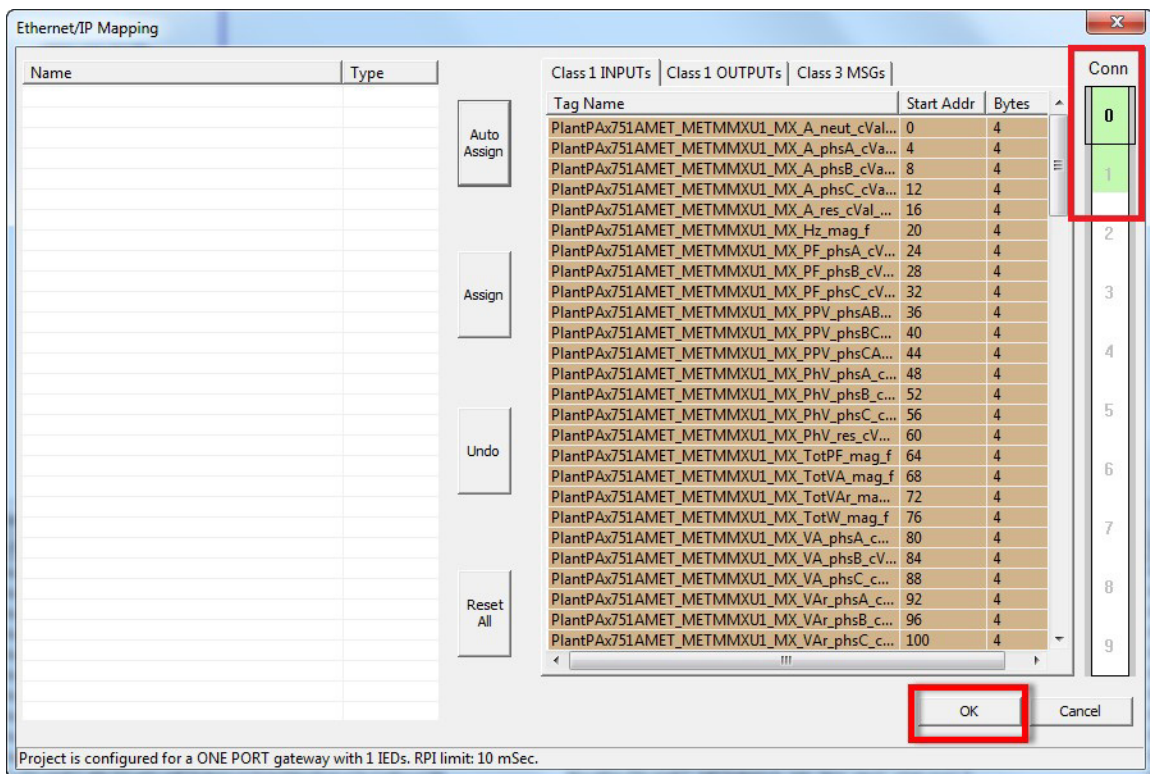
This function automatically assigns the gateway information that is used by the Rockwell Automation® controller on the EtherNet/IP network.



3. Record the number of connections that are used in your project.

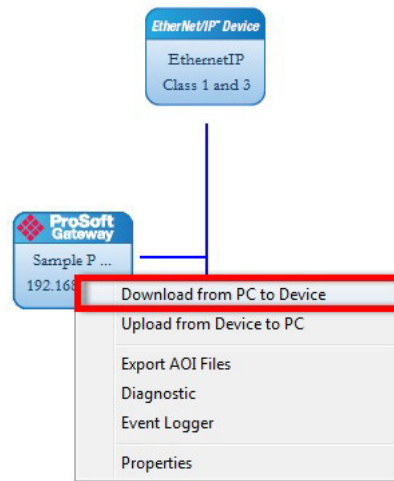
The number of connections is needed for configuring the Studio 5000® project and for defining your EtherNet/IP connections to the ProSoft PLX8x-EIP-61850 module.

4. Click OK to accept the mapping.

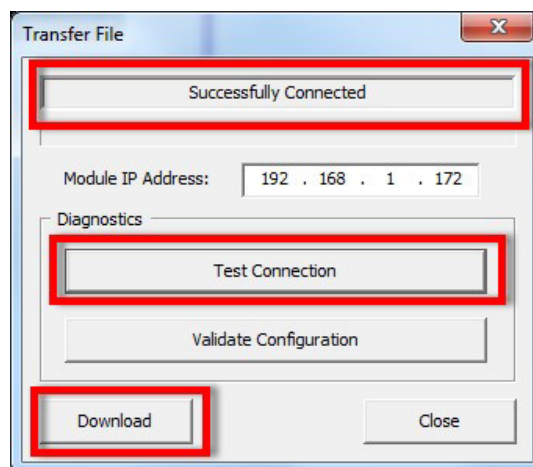


5. Save your work.

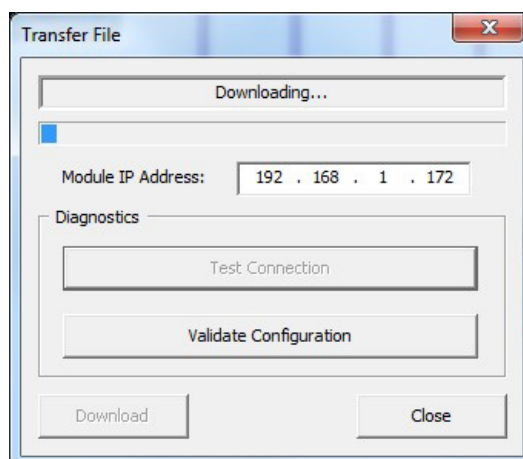
- Right-click the ProSoft module in the canvas and select Download From PC to Device.



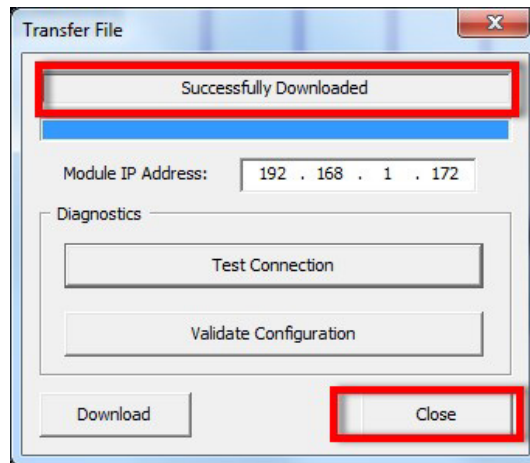
- Choose Test Connection to verify that your computer can communicate with the ProSoft module.
- Click download when you have connected to the module.



- The module automatically reboots during a download.

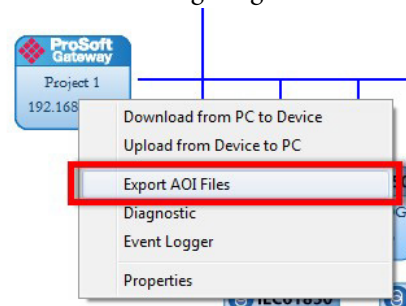


10. Once the download is complete, click Close.

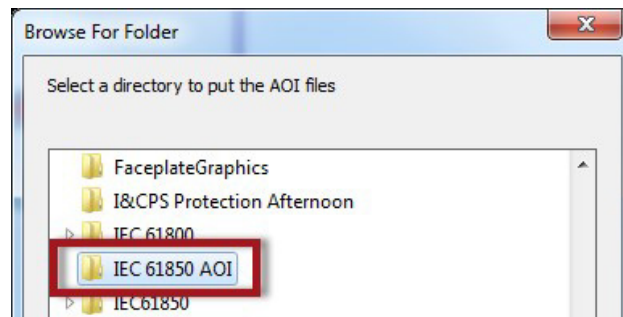


11. Right-click the ProSoft Module Block and select Export AOI Files.

These files are used for configuring the controller.



12. Select the destination folder for the Add-On Instruction.
13. Click OK.



14. Click OK on the Add-On Instruction Successfully Exported Dialog box.

There is one Add-On Instruction that is created for each independent device that is configured within the ProSoft canvas.

TIP For a full list of the device tags that are included, see IEC61850_IED_Tags.xlsx under the tools folder of the download.

Notes:

Integrate IEC 61850 into a Studio 5000 Project

This section describes how to connect the ProSoft gateway module to the Rockwell Automation® Studio 5000® environment. This module provides the communication link between the PlantPAx® system and the IEC 61850 devices.

Topic	Page
Gateway Integration	27
Import the Add-On Instructions	30
Create Your Routine	32

Gateway Integration

If you have a project with a controller already configured, make sure that the project path is set to the correct controller. For the purposes of this document, we refer to this path as the target application.

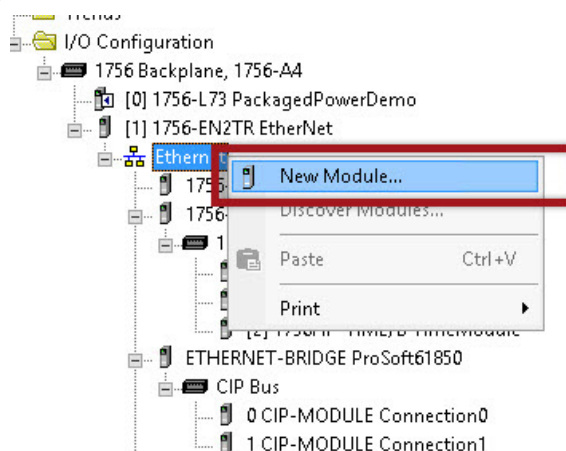
The ProSoft gateway that is created in [Chapter 2](#) must be added into the project I/O configuration.

IMPORTANT The following procedure uses the gateway that you configured in [Chapter 2](#).

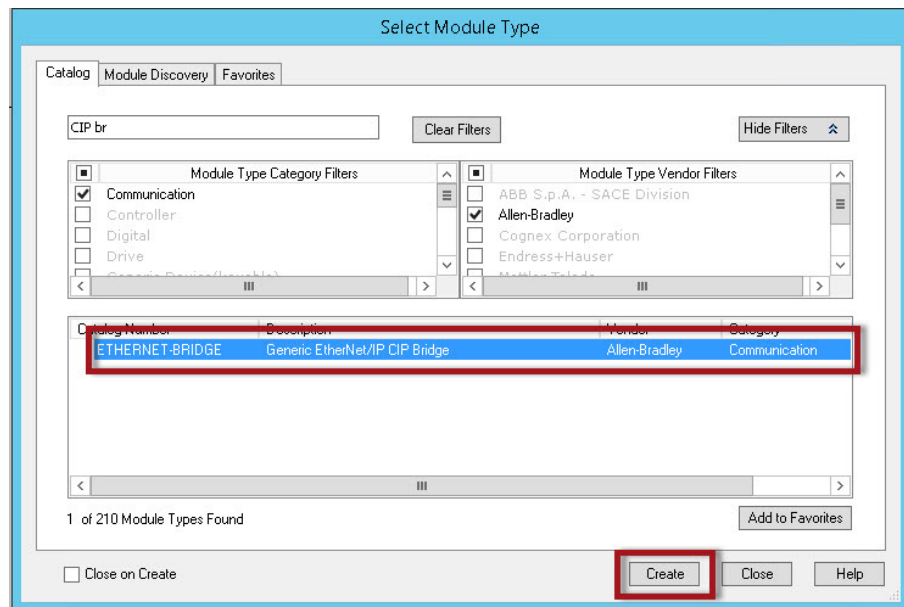
1. Open the Studio 5000® Project file.
2. Verify that the project path is set to the correct controller.

Make sure that the Slot positions of the controller and the Ethernet module are correct.

3. Right-click Ethernet and choose New Module.



4. Select the Ethernet Bridge, then click Create.

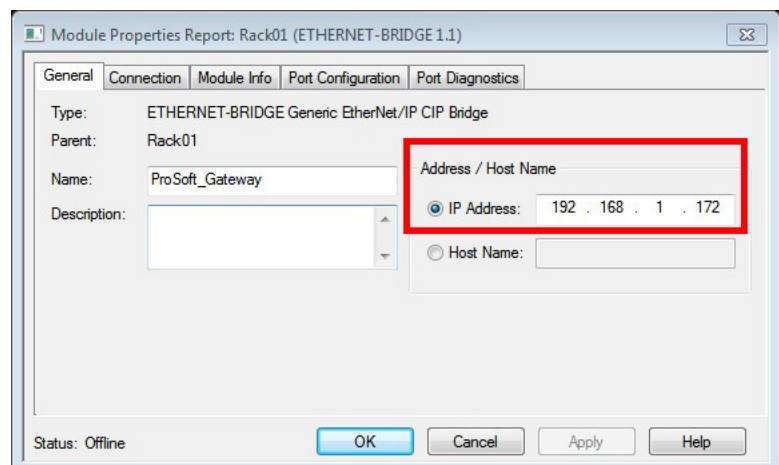


5. Name the module in the Module Properties dialog box.

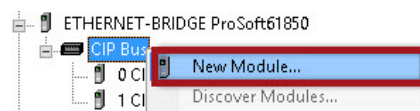
The gateway can be given any name. This example shows Prosoft_Gateway.

6. Assign the IP address for the gateway module.

IMPORTANT Verify that the gateway IP address is an exact match with the IP address that you assigned to the module ports in [step 2 of Chapter 2](#).



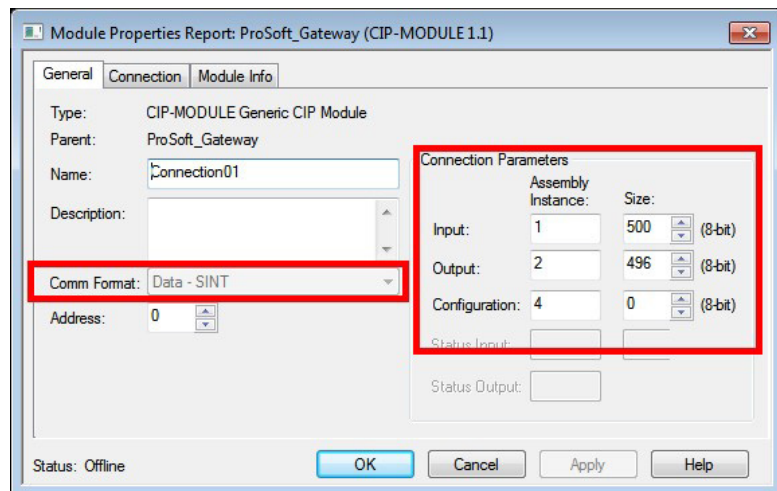
7. Click OK.
8. Right-click CIP Bus and choose New Module.



The Module Properties Report dialog box appears.

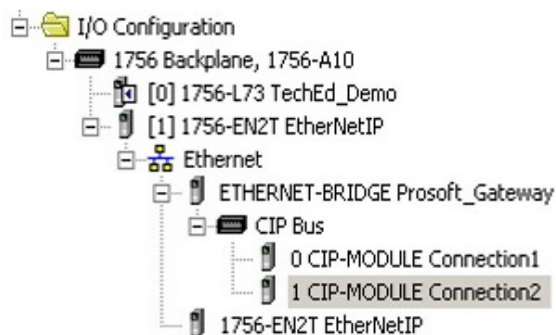
IMPORTANT In [Chapter 2](#), you recorded the number of connections for your project. On this dialog box, you must configure the data tables for CIP connections between the gateway and Studio 5000 environment. The connection parameter values provide the interface from the controller to the devices.

9. Click the Comm Format pull-down arrow and select the Comm Format (Data-SINT).
10. In the Connection Parameters box, type the values exactly as shown in the following Module Properties Report dialog box.



11. Click OK.

Your CIP connection for the bridge is now in the I/O Configuration tree.

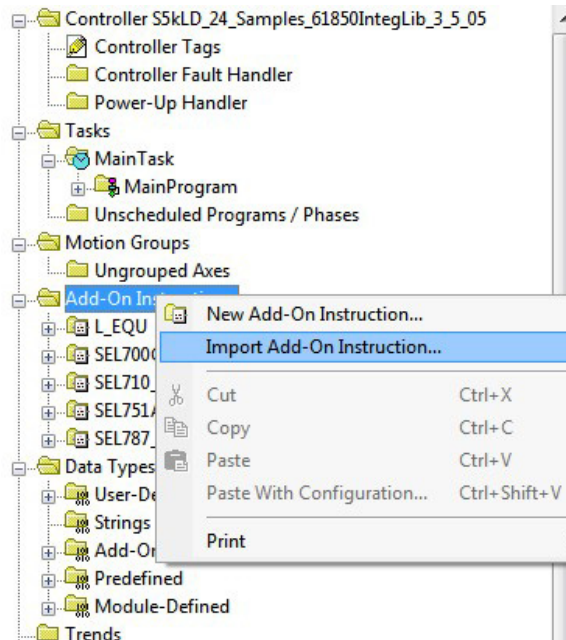


12. Repeat steps 8...11 for each module that you are configuring with CIP connections.

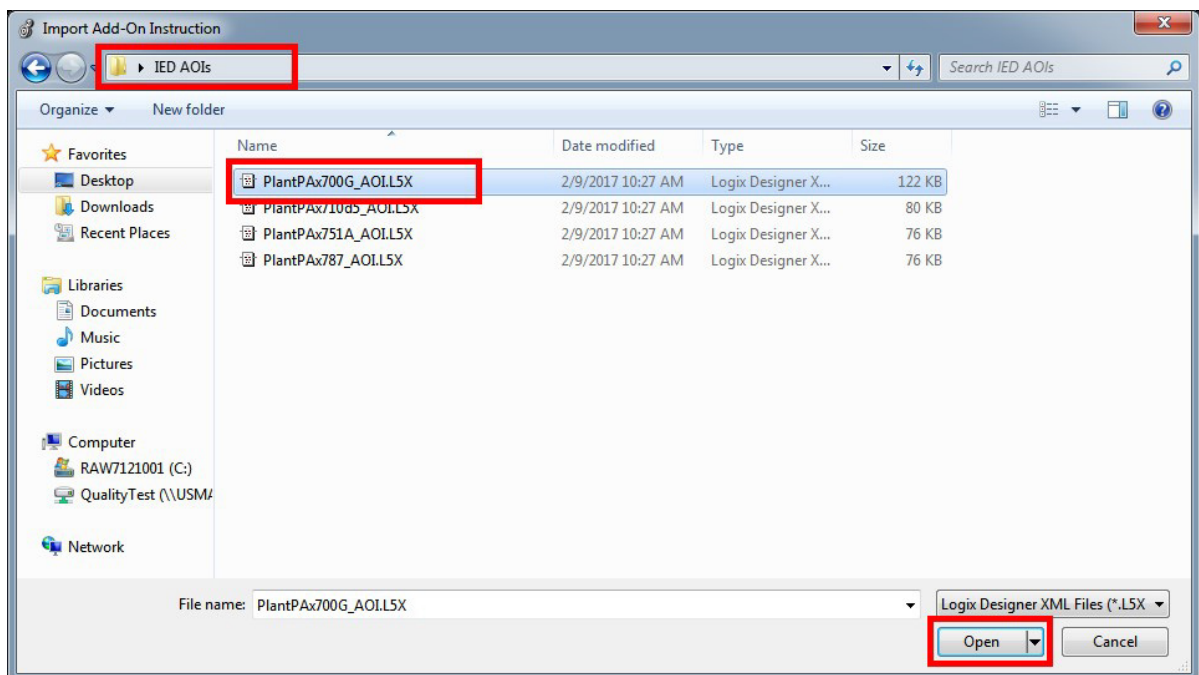
Import the Add-On Instructions

You have successfully configured the ProSoft gateway within your Studio 5000 project. The following steps define how to import the IEC 61850 data via the Add-On Instruction that was exported in [Chapter 2](#).

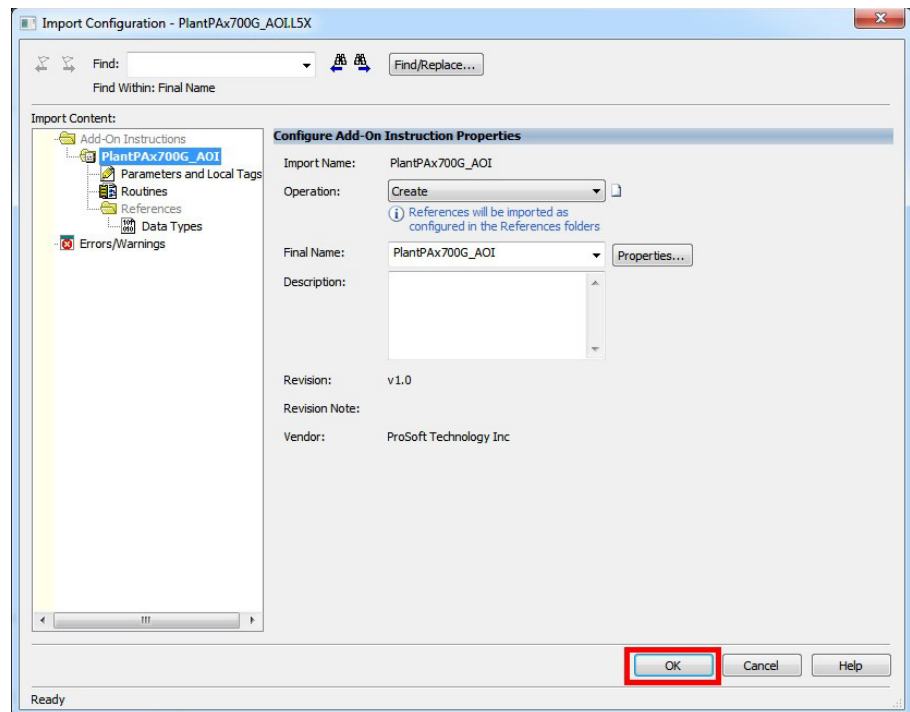
1. In the I/O Configuration tree, right-click Add-On Instruction and choose Import Add-On Instruction.



2. Navigate to the folder that contains the exported device Add-On Instructions from the ProSoft gateway that is configured in [Chapter 2](#).
3. Select the Add-On Instruction and click Open.

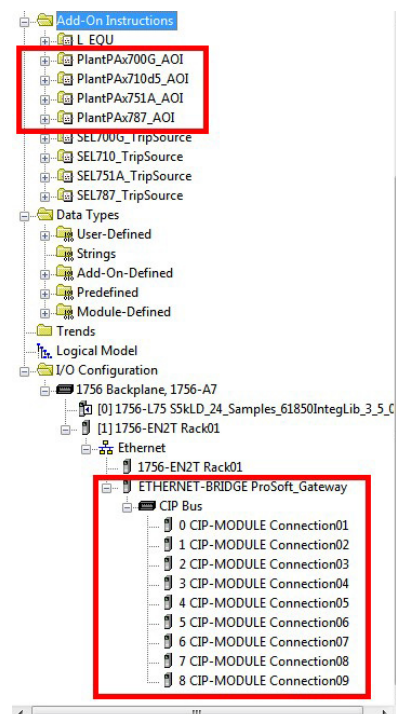


The Import Configuration window appears.



4. Click OK.
5. Repeat steps 1...4 for each device Add-On Instruction created by the ProSoft gateway.

For this example, we have four devices that require the use of four Add-On Instructions and nine CIP connections.

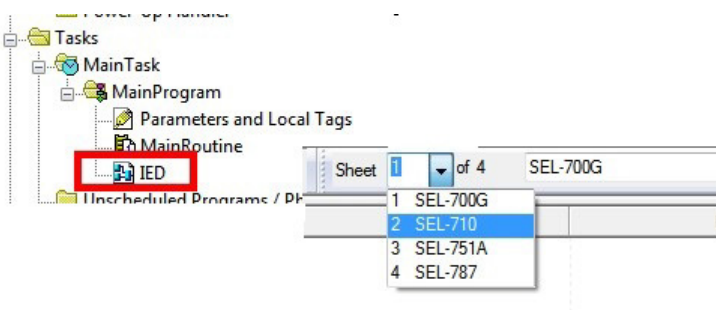


Create Your Routine

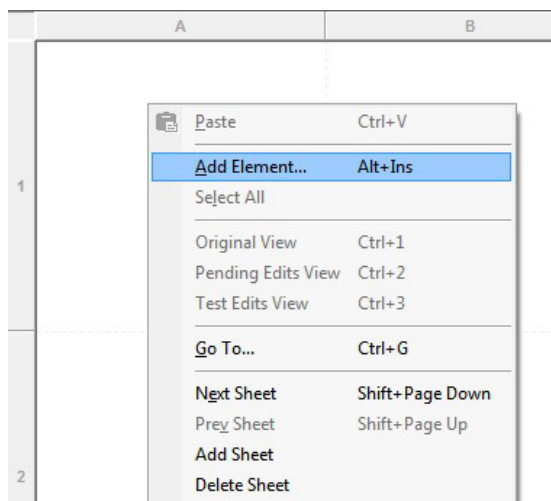
The following steps define how to use the ProSoft gateway Add-On Instructions to create a Studio 5000 project that can be downloaded to a controller.

1. Create a Function Block Diagram (FBD) routine in the Programmable Automation Controller.

This routine is used to instantiate the Add-On Instructions that you imported in the preceding section.

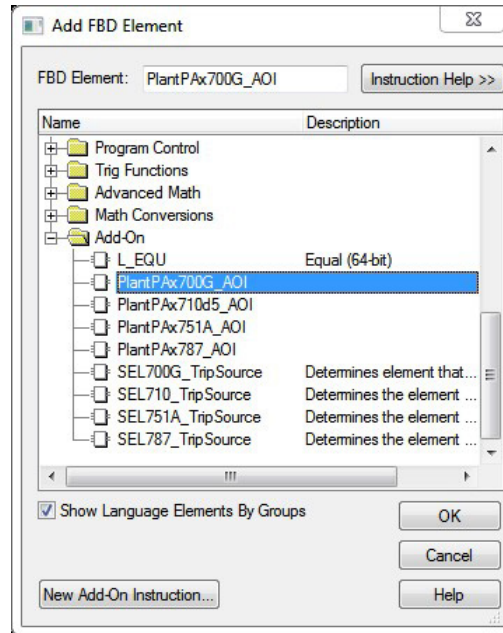


2. Right-click in the workspace and choose Add Element.



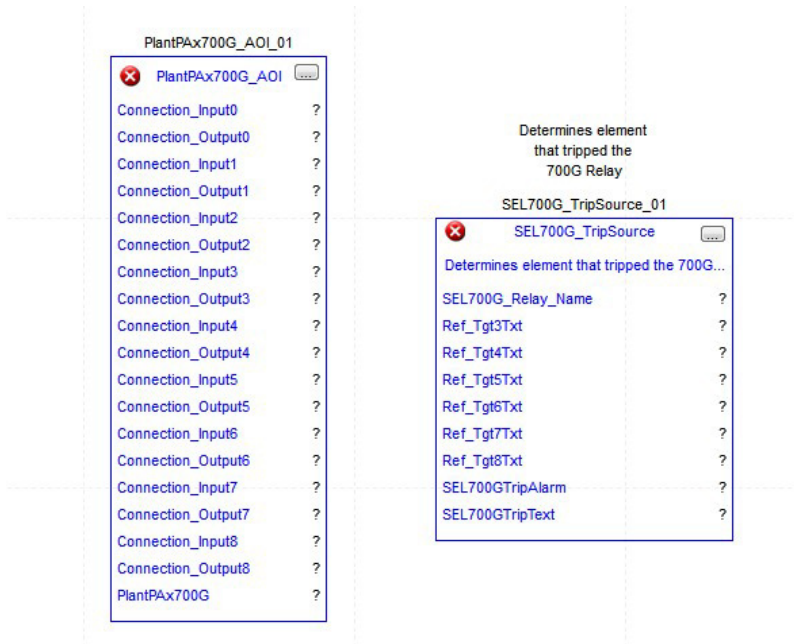
3. The Add FBD Element dialog box appears.

4. Under the Add-On folder, select the appropriate device Add-On Instruction and click OK.

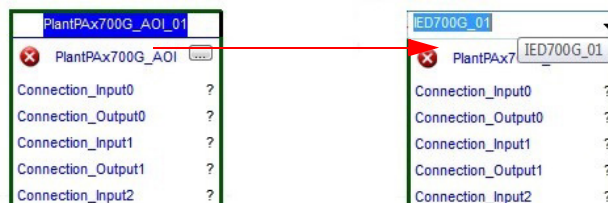


5. Repeat steps 2...3 for the number of TripSource Add-On Instructions.

For each device in your system, you instantiate one device Add-On Instruction and one TripSource Add-On Instruction.

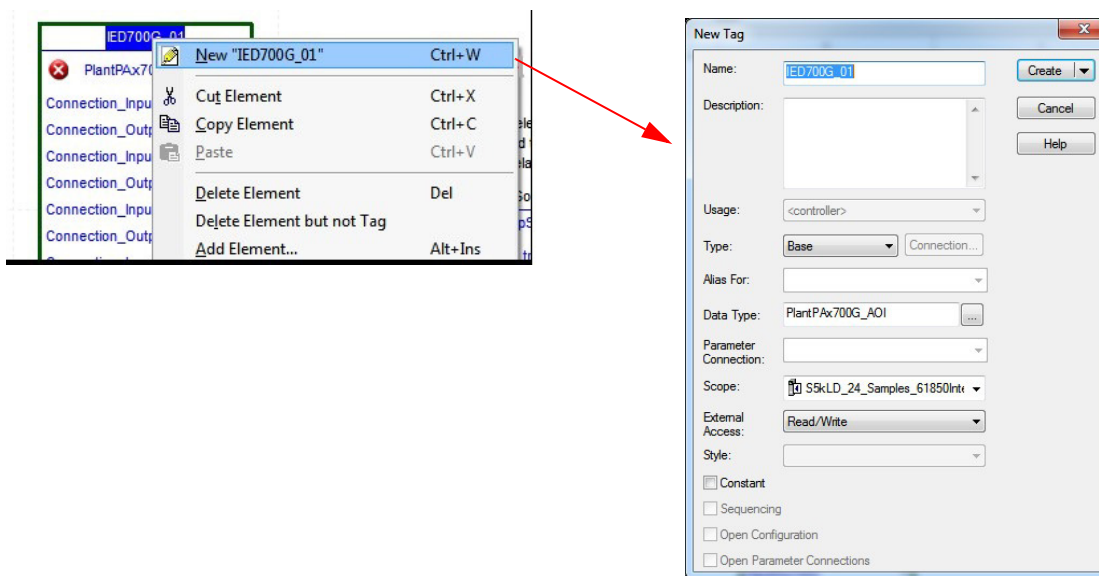


6. Inside the top of the function block, double-click the tag name and type a new name.
7. Click Enter.



8. Right-click the new tag name and choose New <new tag name> (New IED700G_01 in this example).

The New Tag dialog box appears.



By default the New Tag dialog box includes the tag name, data type, and external access (Read/Write)

9. Type an optional description and select a scope from the pull-down menu. Controller scope is selected in our example.
10. Click Create.
11. Repeat steps 5...9 for each function block required.

You have successfully configured the ProSoft gateway module in your Studio 5000 project.

The following chapters discuss each faceplate and its corresponding functionalities.

Two Add-On instructions back each faceplate. The ProSoft module generates one instruction, and the corresponding TripSource instruction is downloaded from the PCDC.

Notes:

Bulletin 857 Motor/Feeder Protection Object



The Bulletin 857 Relay is a combined motor and feeder protection relay that is used for various tasks. These tasks include highly selective protection of rotating machines, line feeders, cable feeders, capacitor banks, reactors, transformers, and busbars.

The relay is used in power distribution substations, power plants, and industrial power systems, marine, and offshore installations. The 857 relay offers extensive customizable control, advanced protection, circuit breaker control and monitoring, power and energy measurements, primary circuit monitoring and communication functionality. The 857 relay also offers a comprehensive range of standard motor and feeder protection functions,.

Topic	Page
Controller Code	38
Mapping InOut Tags to Add-On Instructions	40
Using Visualization Files	44
Faceplates	49

This instruction monitors one 857 relay. Alarms are provided when the physical device experiences a protection-related trip. The instruction also provides capabilities for locking, and to open and close the breaker.

Add-On Instruction

AB857TripSource_01

AB857TripSource

Determines the element that tripped the ...

AB857_Relay_Name	AB857
Ref_Tgt3Txt	BreakerFailure
Ref_Tgt4Txt	Current_Imbalance
Ref_Tgt5Txt	Differential
Ref_Tgt6Txt	GrdNeutOC
Ref_Tgt7Txt	Instantaneous
Ref_Tgt8Txt	Over_Current
AB857TripAlarm	Alarm1
AB857TargetTripText	Alarm6Text

Faceplate

AB 857 IEC 61850

857 Motor/Feeder Relay

☐ Alarm
 ☐ Trip
 ☐ A
 ☐ B
 ☐ C

☐ Enabled
 ☐ Disabled
 ☐ Block Close
 ☐ Breaker Closed
 ☐ ...
 ☐ Breaker Open

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)). The second Add-On Instruction is the TripSource Add-On Instruction, which is available for download from the Rockwell Automation® Library of Electrical Protection Devices from the PCDC.

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 5](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown

Table 5 - Bulletin 857_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device Data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

InOut Structure for Rockwell Automation Library Download

[Table 6](#) shows the InOut parameters that are available from the Rockwell Automation Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown. These tags are representative of the tags that are required for each 857 relay.

Table 6 - Bulletin 857 Device

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]857_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]857	[DeviceName]857	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

Output Structure for Bulletin 857 Relay

These parameters are used to link the Add-On Instruction to the HMI. These tags are representative of the tags that are required for each 857 relay. These parameters are a subset of the full variable list available from the device.

The CID files that are provided with the download provide you with these measurement values from the physical device that is already selected. These measurement values are ready to load into the ProSoft gateway. This selection verifies that all variables that are needed for correct HMI operation are present.

For a full list of the relay variables included, see List_Of_Variables.xls under the tools folder of the download.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the device. Each bit is configurable through the device vendor software. [Table 7](#) has the recommended uses for each bit.

Table 7 - Remote Bit Control - Bulletin 857

Name	Description
VI1GGI0137_CO_SPCSO_ctlVal	Enable/Disable

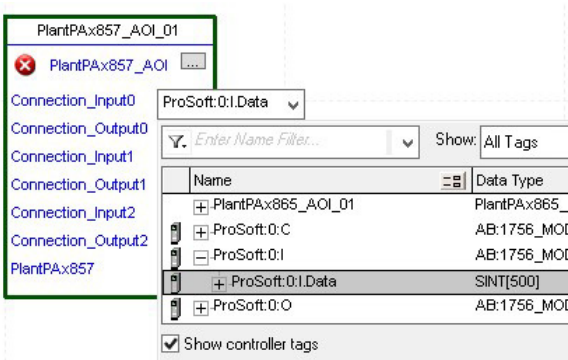
Table 7 - Remote Bit Control - Bulletin 857

Name	Description
VI1GGI0138_CO_SPCSO_ctlVal	Target Reset
VI1GGI0139_CO_SPCSO_ctlVal	Breaker Close
VI1GGI0140_CO_SPCSO_ctlVal	Breaker Open

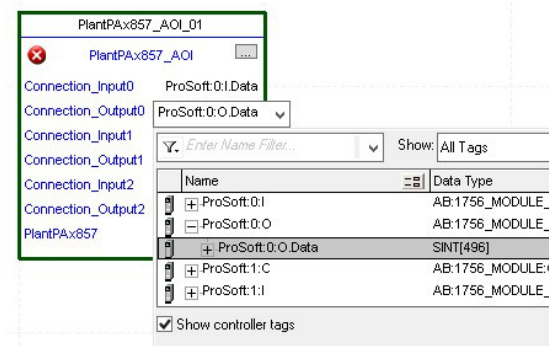
Mapping InOut Tags to Add-On Instructions

Each 857 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation Library of Electronic Protection Devices from the PCDC.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



5. Repeat this process for Connection Input and Output that are included with your Add-On Instructions.

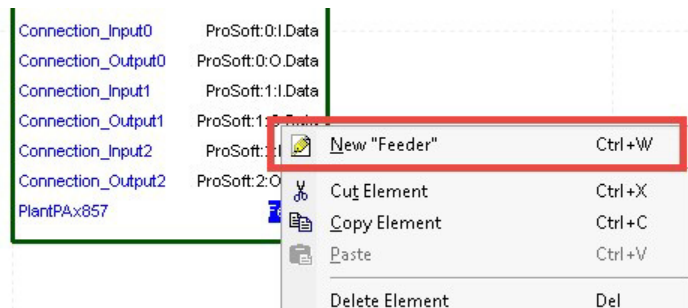
- Click the question mark next to the final tag.

This tag has the same name as the Add-On Instruction and the device as configured in the ProSoft Gateway.

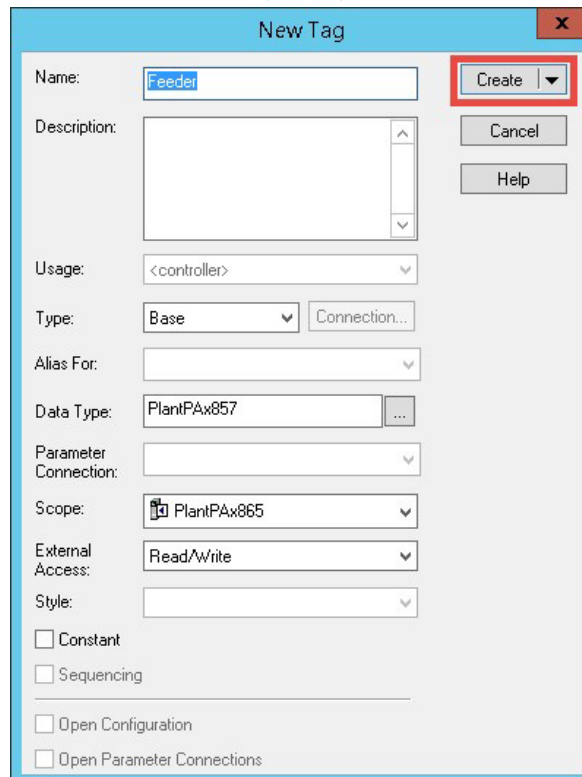
- Type in a name for this tag. In this example, the name is “Feeder”.



- Right-click on the new tag name and select New <tag name>.

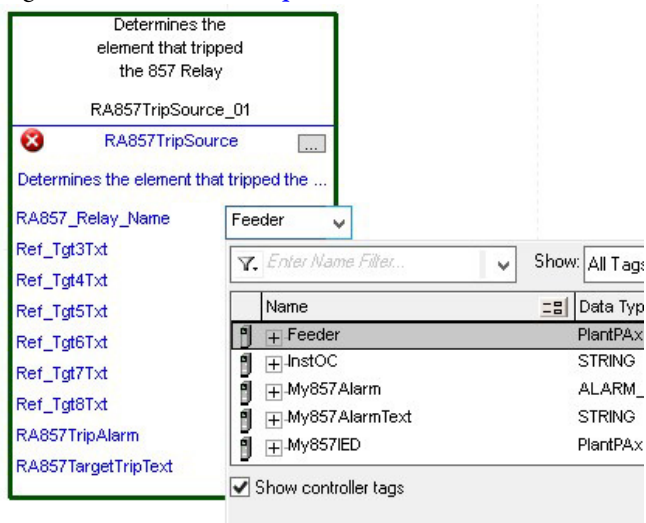


- Click Create on the New Tag dialog box.

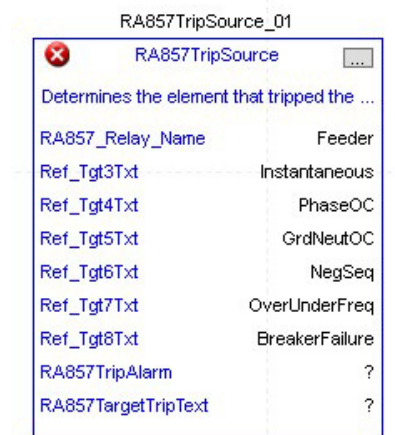


Now configure the Bulletin 857_TripSource Add-On Instruction.

10. Click the question mark next to Bulletin 857_Relay_Name and select the tag that was created in [step 9](#).



11. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
12. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.



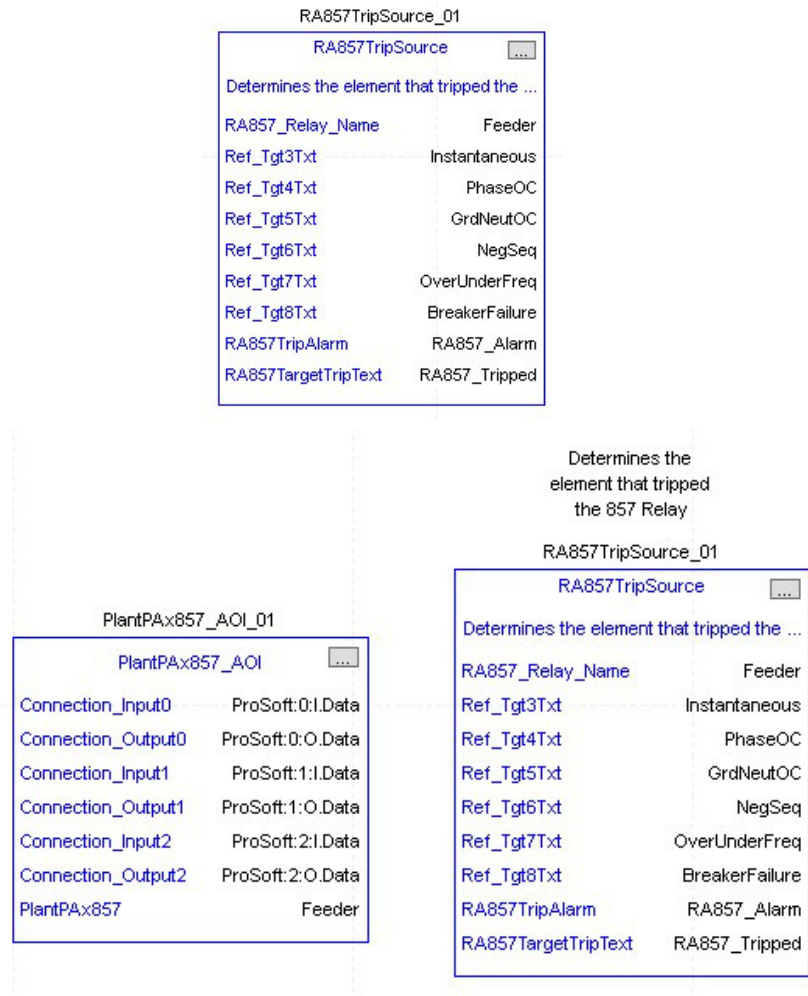
13. Click the question mark next to Bulletin 857TripAlarm and select or create the digital alarm tag to be used.

This tag is used for alarming through the HMI FactoryTalk® Alarms and Events Server.

14. Click the question mark next to Bulletin 857TripText and select or create the tag to be used.

This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Fully Configured Add-On Instruction



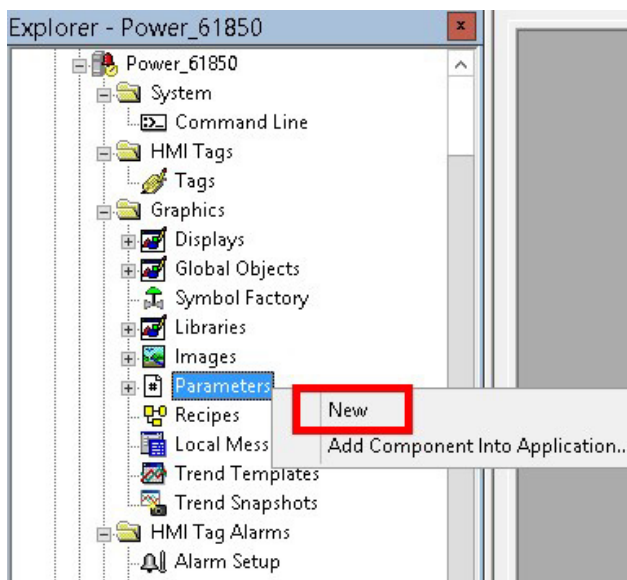
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

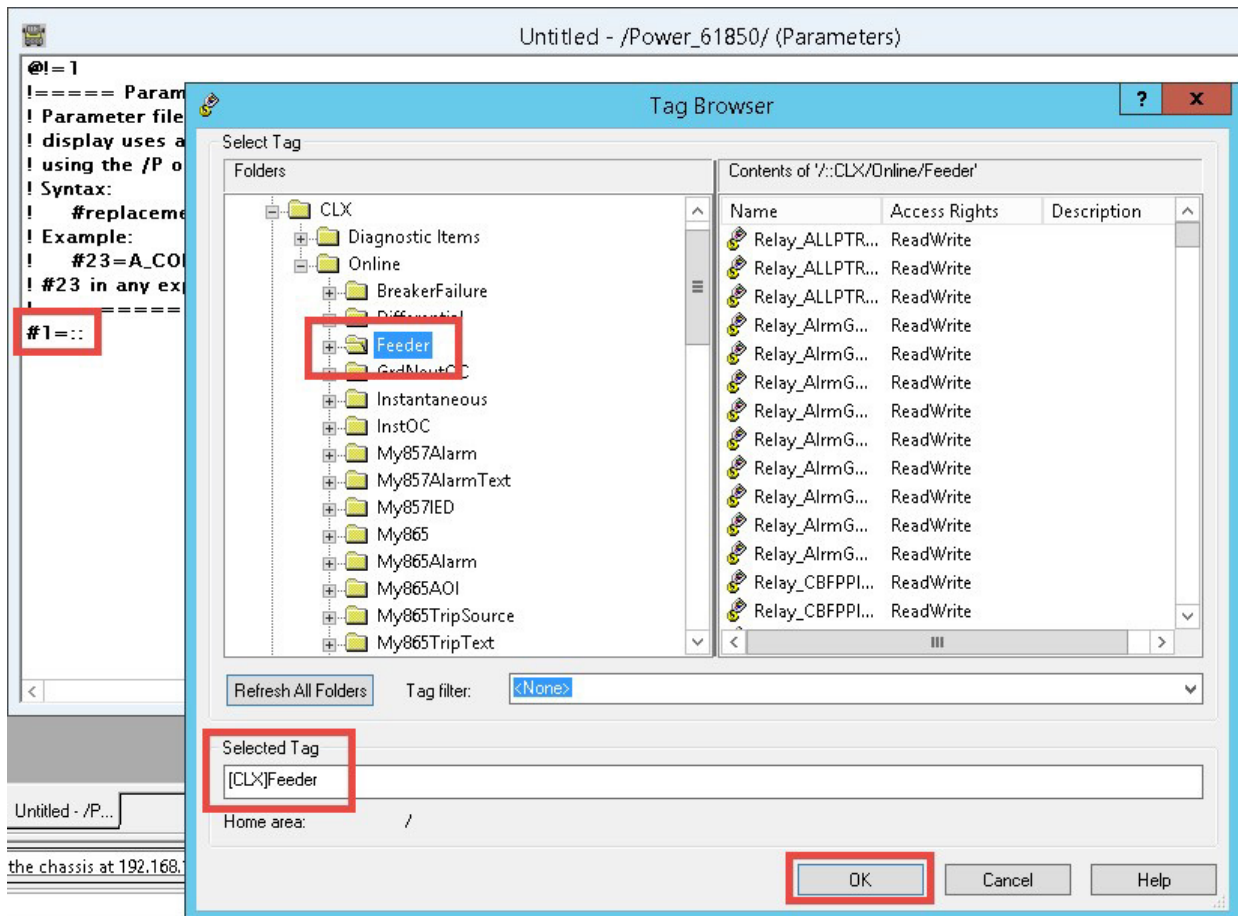
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



2. Type #1= under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.

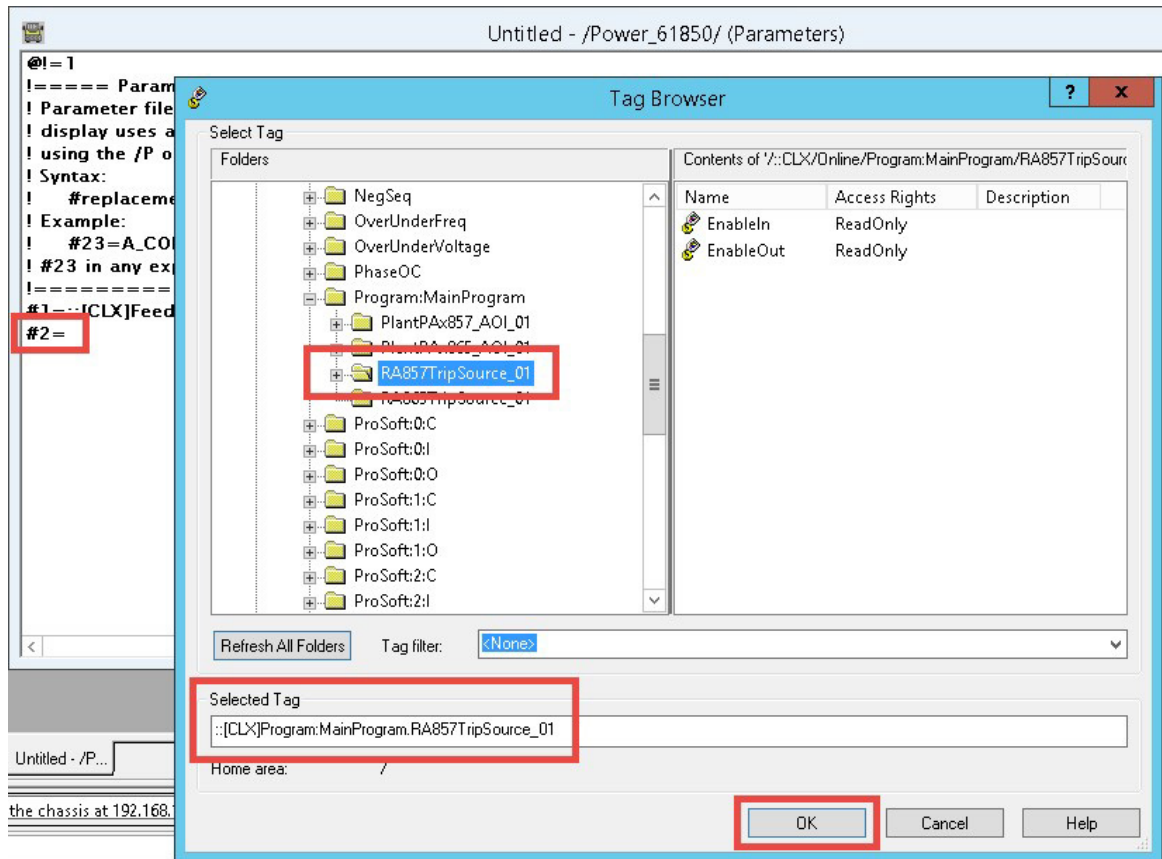
- Expand the folders and select the tag that was created for the device Relay Name. Click OK.



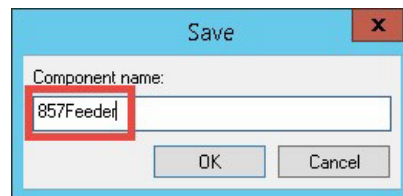
- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =.

The Tag Browser dialog box opens.

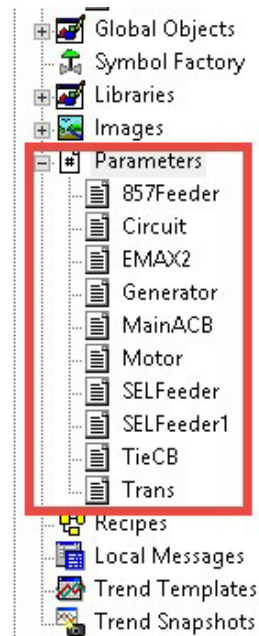
6. Expand the folders and select the tag that was created for the device TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see the parameter file in the list in the Application Window.

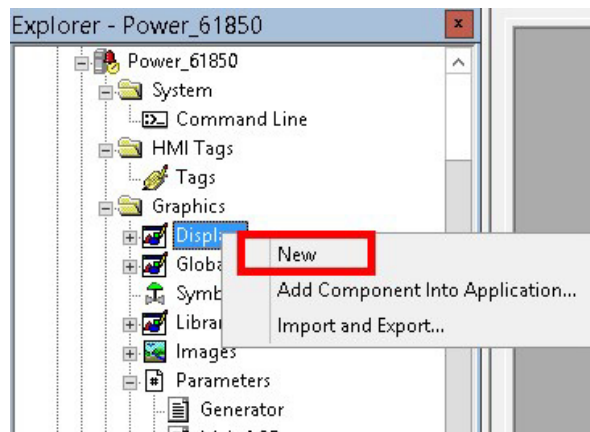


Linking the Parameter Files to an HMI Display

Now that the 857 relay controller tags are linked to the parameter file, you must add components to the display that the operator sees.

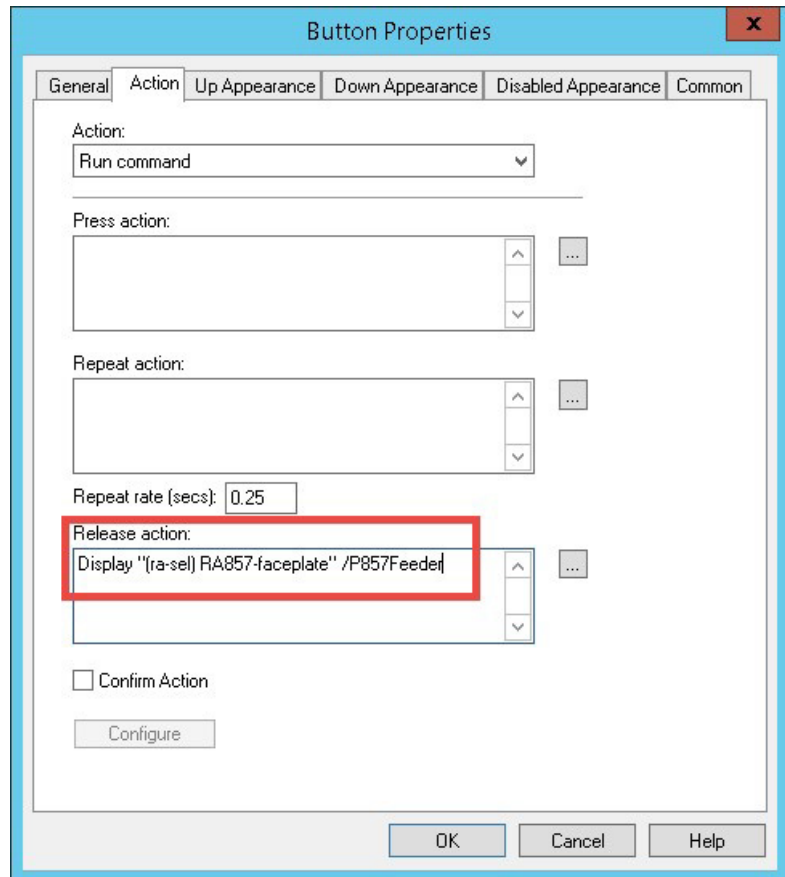
1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.



2. Add the objects to the display that you need for your project. For this example, we are adding a button.
3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 6](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The Bulletin 857_TripSource faceplate consists of six tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.

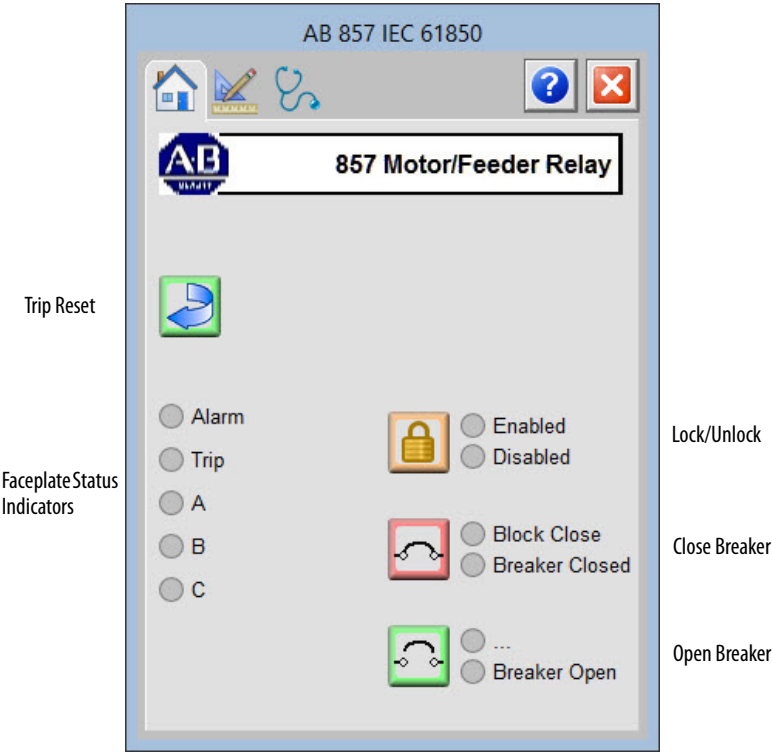


- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.





Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 8 - Operator Tab Description

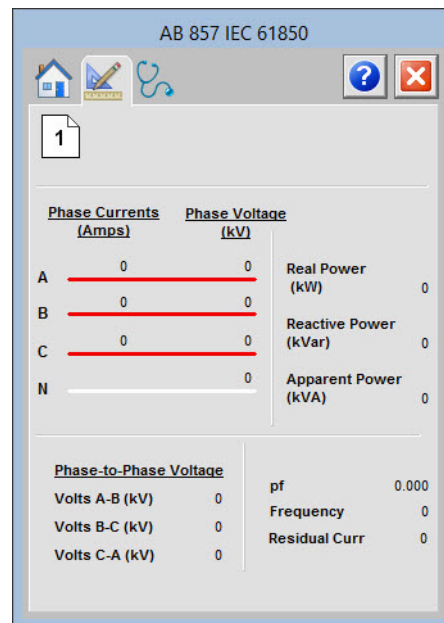
Function	Action
	Click to lock or unlock device. Function locks the device from accepting commands.
	Click to reset the device. The status of the device is indicated on the faceplate.
	Click to close the circuit breaker.
	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

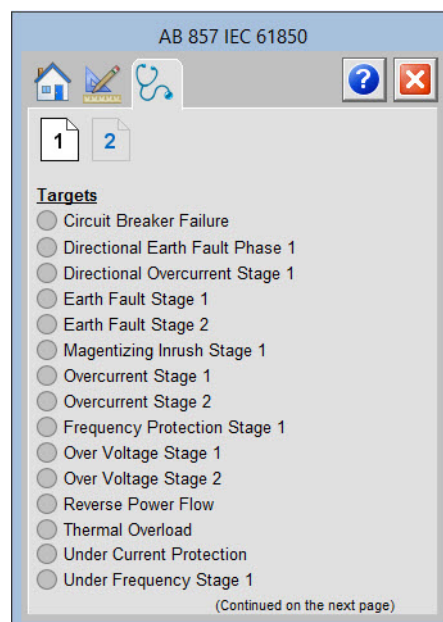
Engineering Page 1

Readout of the measurement values from the 857 relay.



Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



Bulletin 865 Transformer Object



The Allen-Bradley® 865 is a differential protection relay that is used for various tasks. These tasks include selective differential protection of substation transmission lines, medium-voltage overhead and cable feeders, rotating machines, transformer feeders, capacitor banks, generators, reactors, and busbars. The relay is used in power system distribution substations, power plants, industrial power systems, and marine and offshore installations.

The 865 relay offers extensive customizable control, power and energy measurements, circuit breaker control and monitoring, primary circuit monitoring, and communication functionality, and a comprehensive range of standard protection functions.

Topic	Page
Controller Code	54
Mapping InOut Tags to Add-On Instructions	56
Using Visualization Files	60
Faceplates	65

This instruction monitors one 865 relay. Alarms are provided when the physical device experiences a protection-related trip. The instruction also provides capabilities for opening and closing the breaker. It is also possible to switch between the two available breakers.

Add-On Instruction

AB865TripSource_01

AB865TripSource

Determines the element that tripped the ...

AB865_Relay_Name	AB865_Relay
Ref_Tgt3Txt	GrdNeutOC
Ref_Tgt4Txt	BreakerFailure
Ref_Tgt5Txt	Instantaneous
Ref_Tgt6Txt	Over_Current
Ref_Tgt7Txt	OverUnderFreq
Ref_Tgt8Txt	OverUnderVoltage
AB865TargetTripText	Alarm5Text
AB865TripAlarm	Alarm5

Faceplate

AB 865 IEC 61850

865 Differential Relay

☐ Alarm
☐ Trip
☐ A
☐ B
☐ C

☒ Breaker 1
☐ Breaker 2
☐ Brkr 1 Closed
☐ Brkr 2 Closed
☐ Brkr 1 Open
☐ Brkr 2 Open

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)). The second Add-On Instruction is the TripSource Add-On Instruction, which is available for download from the Rockwell Automation® Library of Electrical Protection Devices from the PCDC.

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 9](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown

Table 9 - Bulletin 865_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

InOut Structure for Rockwell Automation Library Download

[Table 10](#) shows the InOut parameters that are available from the Rockwell Automation Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown. These tags are representative of the tags that are required for each 865 relay.

Table 10 - Bulletin 865 Device

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]865	[DeviceName]865	Device Data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

Output Structure for Bulletin 865 Relay

These parameters are used to link the Add-On Instruction to the HMI. These tags are representative of the tags that are required for each 865 relay. These parameters are a subset of the full variable list available from the device.

The CID files that are provided with the download provide you with these measurement values from the physical device that is already selected. These measurement values are ready to load into the ProSoft gateway. This selection verifies that all variables that are needed for correct HMI operation are present.

For a full list of the relay variables included, see List_Of_Variables.xls under the tools folder of the download

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the device. Each bit is configurable through the device vendor software. [Table 11](#) has the recommended uses for each bit.

Table 11 - Remote Bit Control - Bulletin 865 Device

Name	Description
VI1GGI0137_CO_SPCSO_ctlVal	Breaker Select

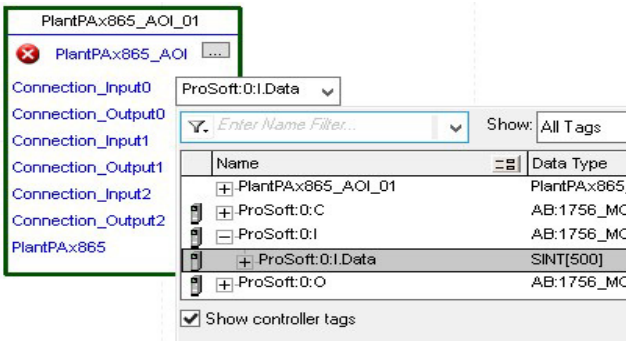
Table 11 - Remote Bit Control - Bulletin 865 Device

Name	Description
VI1GGI0138_CO_SPCSO_ctlVal	Target Reset
VI1GGI0139_CO_SPCSO_ctlVal	Breaker Close
VI1GGI0140_CO_SPCSO_ctlVal	Breaker Open

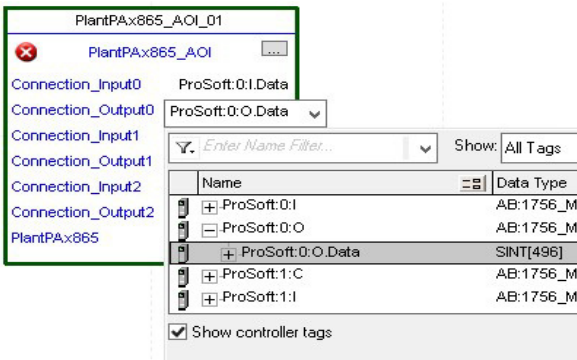
Mapping InOut Tags to Add-On Instructions

Each 865 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation Library of Electronic Protection Devices from the PCDC.

- 1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
- 2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.

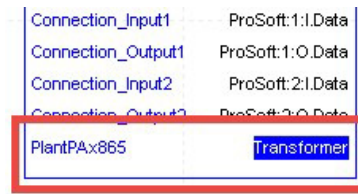


- 3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.

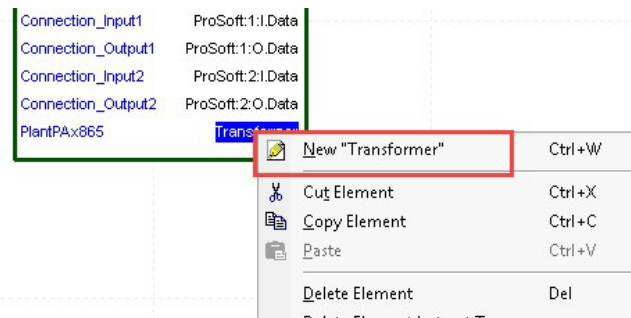


- 4. Repeat this process for Connection Input and Output that are included with your Add-On Instructions.

5. Click the question mark next to the final tag. This tag has the same name as the Add-On Instruction and the device as configured in the ProSoft Gateway.
6. Type in a name for this tag. In this example, the name is “Transformer”.



7. Right-click on the new tag name and select New <tag name>.



8. Click Create on the New Tag dialog box.

New Tag

Name:

Description:

Usage:

Type:

Alias For:

Data Type:

Parameter Connection:

Scope:

External Access:

Style:

☐ Constant

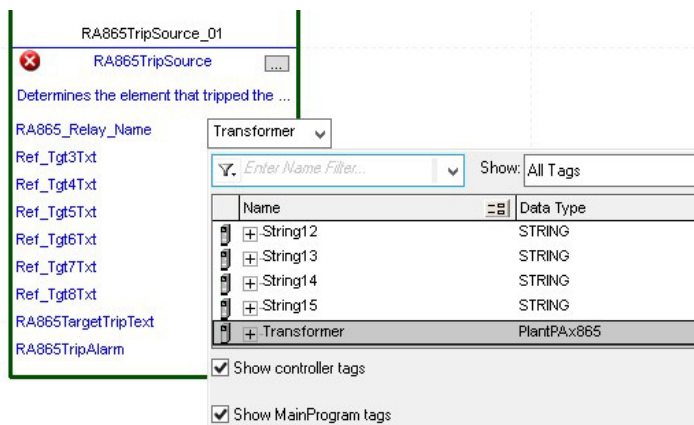
☐ Sequencing

☐ Open Configuration

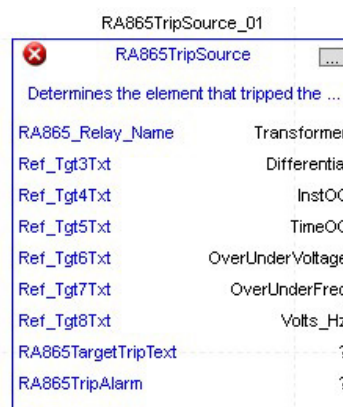
☐ Open Parameter Connections

Now configure the Bulletin 865_TripSource Add-On Instruction.

9. Click the question mark next to Bulletin 865_Relay_Name and select the tag that was created in [step 8](#).



10. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
11. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.



12. Click the question mark next to Bulletin 865TripAlarm and select or create the digital alarm tag to be used.

This tag is used for alarming through the HMI FactoryTalk® Alarms and Events Server.

13. Click the question mark next to Bulletin 865TripText and select or create the tag to be used.

This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Fully Configured Add-On Instruction



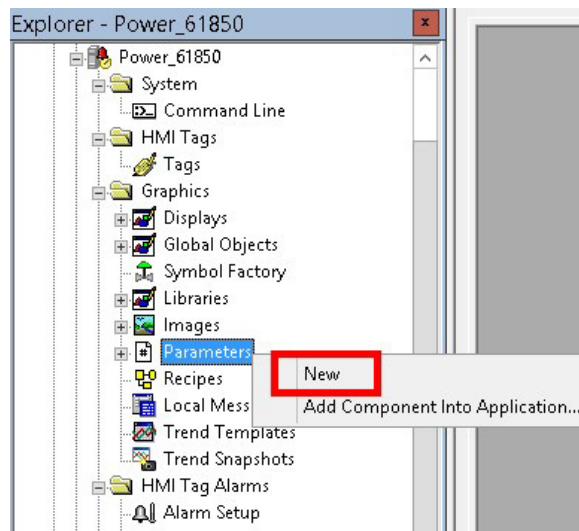
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

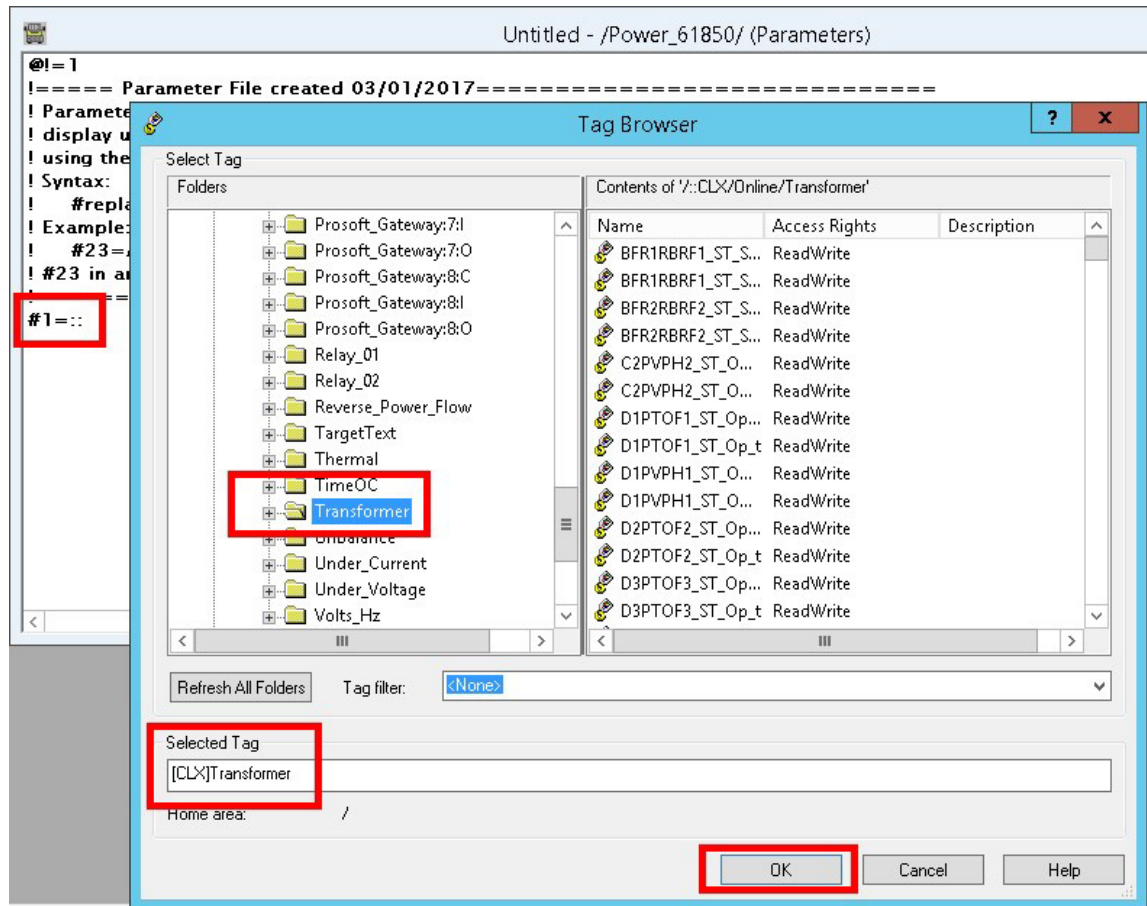
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



2. Type #1= under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.

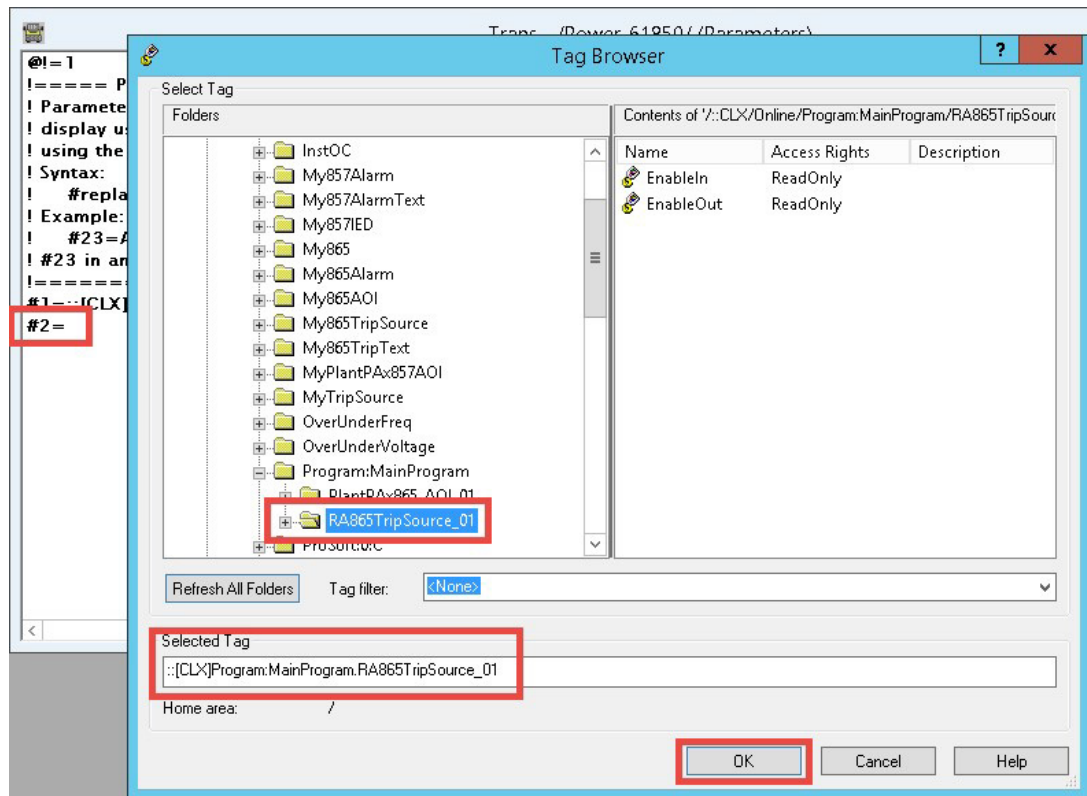
- Expand the folders and select the tag that was created for the device Relay Name. Click OK.



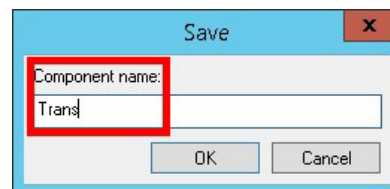
- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =.

The Tag Browser dialog box opens.

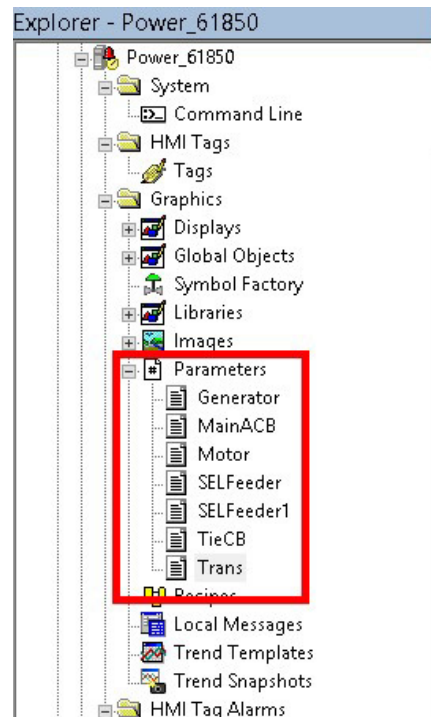
6. Expand the folders and select the tag that was created for the device TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



9. You can see the parameter file in the list in the Application Window.

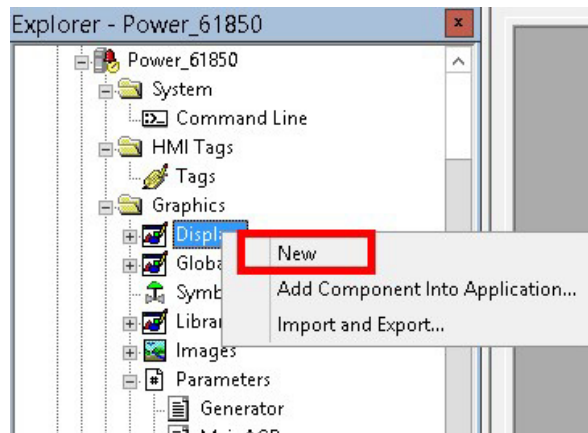


Linking the Parameter Files to an HMI Display

Now that the 865 relay controller tags are linked to the parameter file, you must add components to the display that the operator sees.

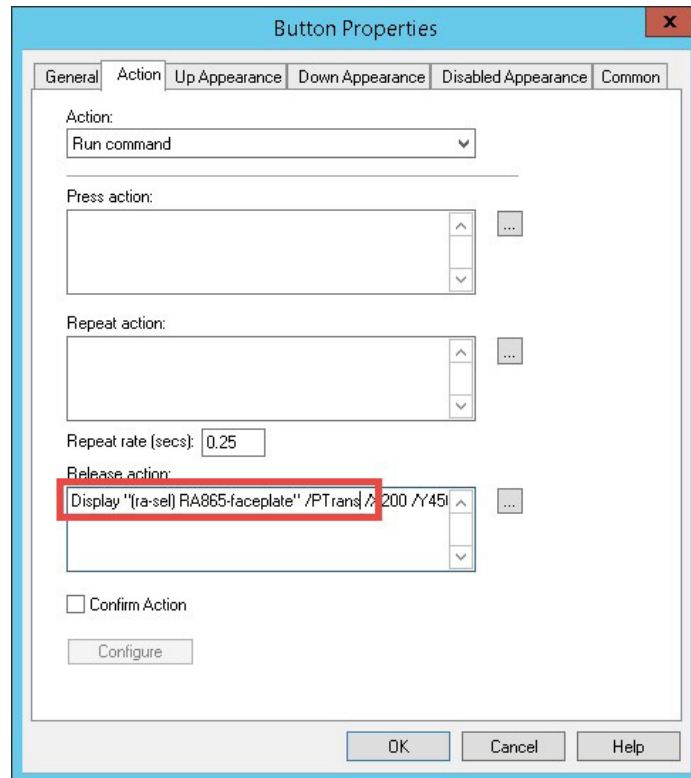
1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.



2. Add the objects to the display that you need for your project. For this example, we are adding a button.
3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 8](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The Bulletin 865_TripSource faceplate consists of six tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.

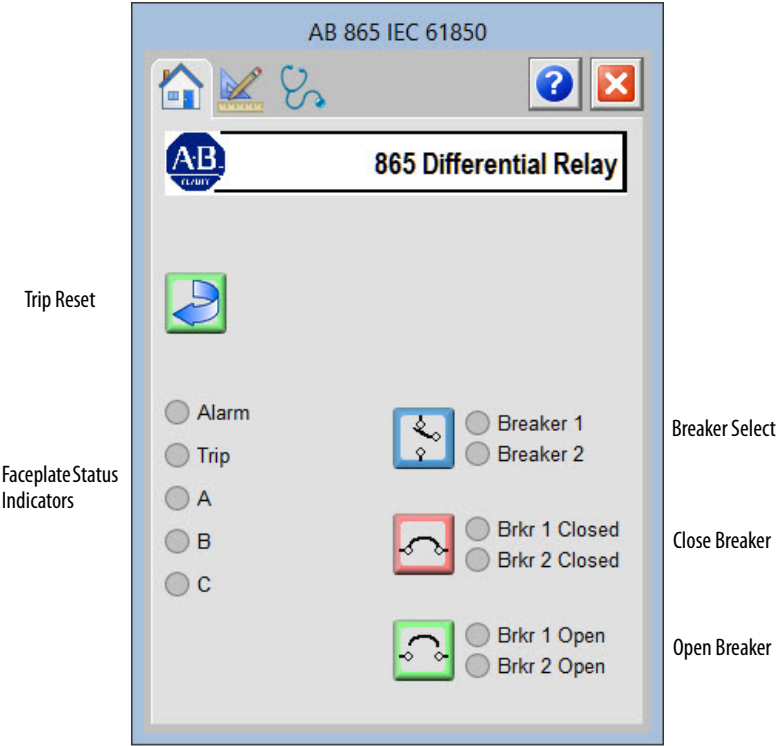


- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.





Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 12 - Operator Tab Description

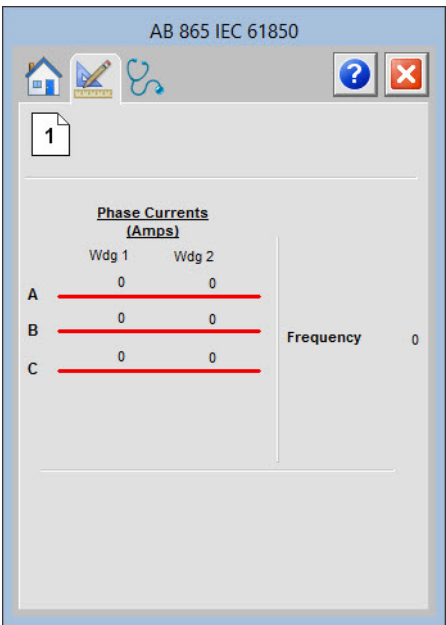
Function	Action
	Click to reset the device. The status of the device is indicated on the faceplate.
	Click to toggle control between breaker 1 and breaker 2.
	Click to close the circuit breaker.
	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

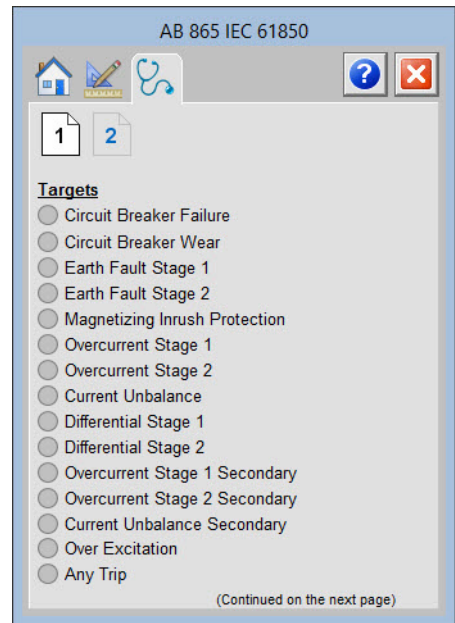
Engineering Page 1

Readout of the measurement values from the 865 relay.

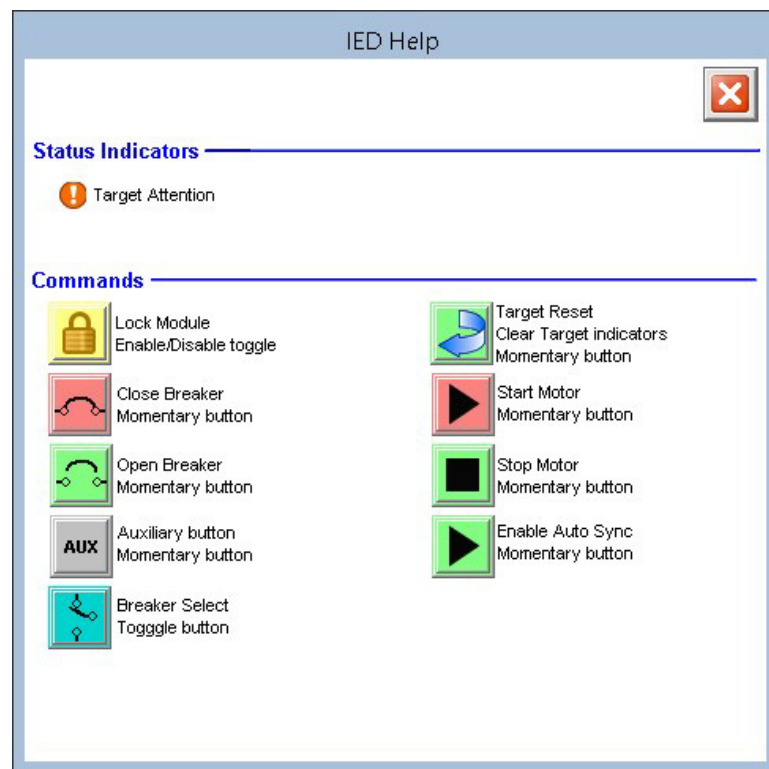


Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



SEL 700G Object



The Schweitzer Engineering Labs (SEL) 700G is a generator protection relay. This device helps protect primary and backup generation. The device can also auto-synchronize when bringing the generator online with the system. The device also provides multiple fundamental metering data including, voltage, current, frequency, power, and so on.

Topic	Page
Controller Code	70
Mapping InOut Tags to Add-On Instructions	72
Using Visualization Files	77
Faceplates	83

The following instruction monitors one SEL700G relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for locking, and to open and close the breaker. Synchronization control of the device is also permitted through the instruction.

Add-On Instruction

SEL700G_TripSource

Determines element that tripped the 700G...

SEL700G_Relay_Name	?
Ref_Tgt3Txt	?
Ref_Tgt4Txt	?
Ref_Tgt5Txt	?
Ref_Tgt6Txt	?
Ref_Tgt7Txt	?
Ref_Tgt8Txt	?
SEL700GTripAlarm	?
SEL700GTripText	?

Faceplate

SEL 700G

SEL SCHWEITZER ENGINEERING LABORATORIES GENERATOR PROTECTION RELAY

Enabled

☐ Trip

☐ Differential

☐ Overcurrent

☐ Over/Under Freq

☐ Volts/Hertz

☐ Loss of Field

☐ Stator/Field Grd

Enabled

...

Gen Brkr Clsd

Block Close

Gen Brkr Open

...

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 13](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each SEL-700G relay, which is configured in your system.

Table 13 - SEL700G_Relay

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]	[DeviceName]	Device Data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

InOut parameters in [Table 14](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each SEL-700G relay, which is configured in your system in [Chapter 2](#).

Table 14 - SEL700G_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 15](#) has recommended uses for each bit.

Table 15 - Remote Bit Control - SEL700G Relay

Name	Description
CON_RBGGIO1_CO_SPCS001_Oper_ctlVal	Lock/Unlock
CON_RBGGIO1_CO_SPCS002_Oper_ctlVal	Target Reset
CON_RBGGIO1_CO_SPCS003_Oper_ctlVal	Breaker Close
CON_RBGGIO1_CO_SPCS004_Oper_ctlVal	Breaker Open
CON_RBGGIO1_CO_SPCS005_Oper_ctlVal	AUX
CON_RBGGIO1_CO_SPCS006_Oper_ctlVal	Enable SYNC
CON_RBGGIO1_CO_SPCS007_Oper_ctlVal	Frequency SYNC
CON_RBGGIO1_CO_SPCS008_Oper_ctlVal	Voltage SYNC

IMPORTANT The bits shown in [Table 15](#) are dependent on the use of the IEC 61850 CID files and your gateway is configured as described in [Chapter 2](#). The IEC 61850 CID files are provided on the PCDC. If your application requires additional parameters, use the configuration software of the manufacturer to modify the PCDC CID files.

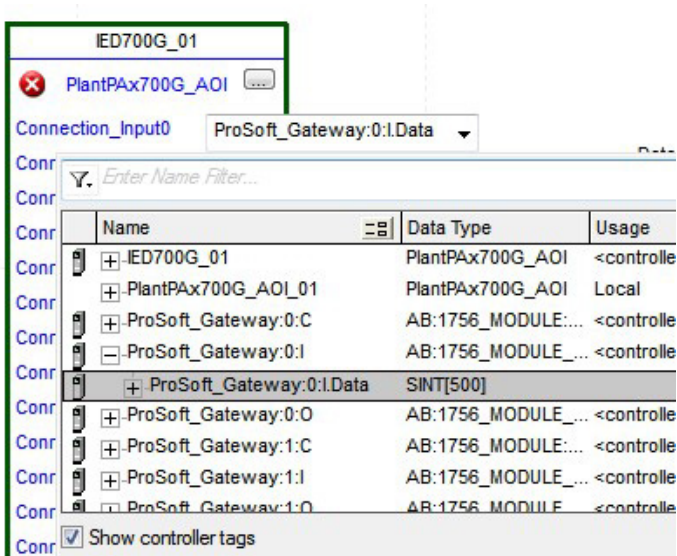
Mapping InOut Tags to Add-On Instructions

Each SEL700G relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation® Library of Electronic Protection Devices from the PCDC.

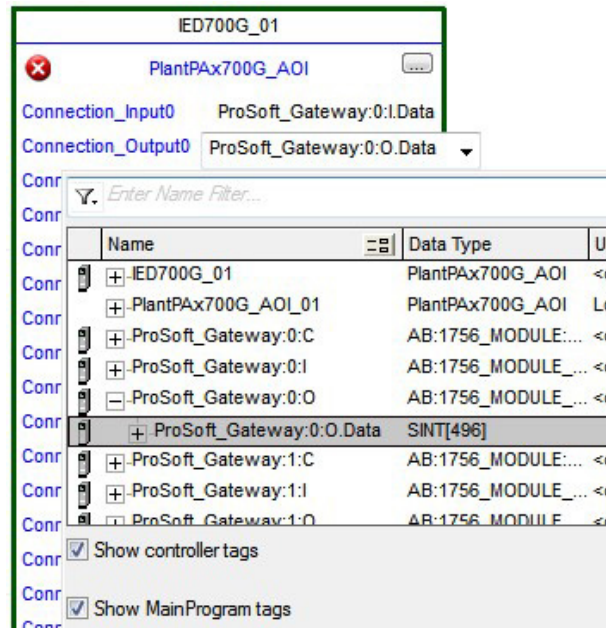
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click.



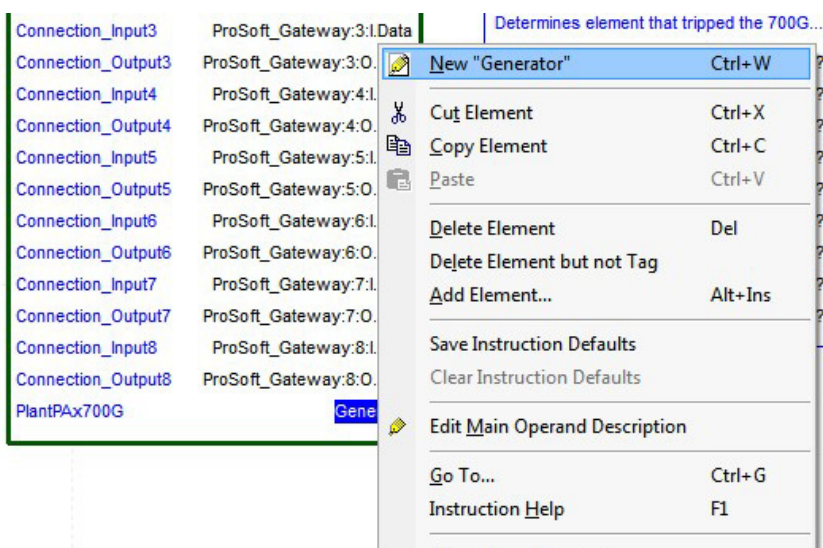
3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click.



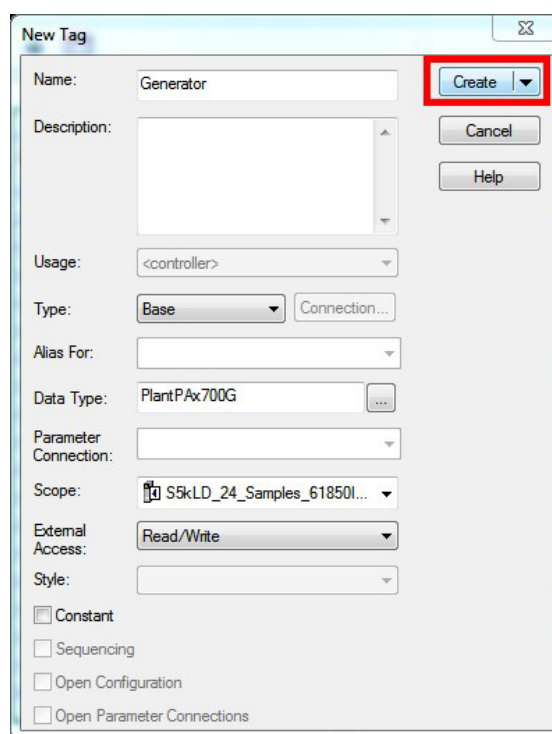
5. Repeat this process for each connection input and output that are included with your Add-On Instructions.
6. Click the question mark next to the final tag. Enter a clear engineering name to this tag that represents your device within your Studio 5000 project. In this example, the name is "Generator".



7. Right-click on the new tag name and select New "<tag name>".



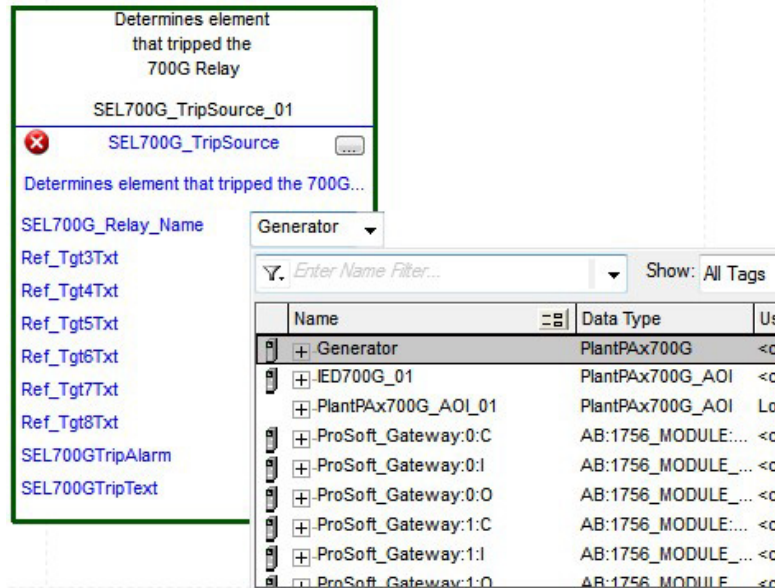
8. Click create on New Tag dialog box.



Configure Trip Source Add-On Instruction

Now that the SEL700G Add-On Instruction has been configured, you must configure the SEL700G trip source Add-On Instruction for alarming.

1. Click the question mark next to SEL00G_Relay_Name and select the tag that was created in [step 8](#).



2. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if needed, right-click and create a tag if that the tag is not already configured in the controller.



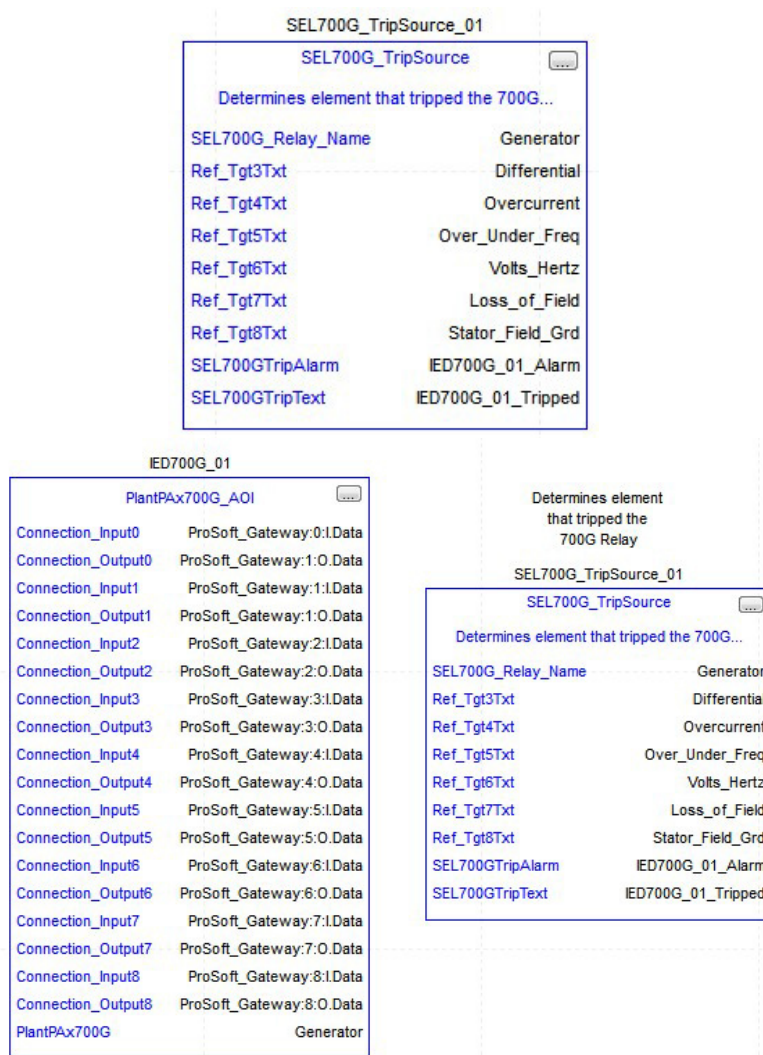
4. Click the question mark next to SEL700GTripAlarm and select or create the digital alarm tag to be used.

This tag is used for alarming through the HMI FactoryTalk® Alarms and Events Server.

- Click the question mark next to SEL700GTripText and select or create the tag to be used.

This tag is used for the alarm message through the HMI FactoryTalk Alarms and Events Server.

Fully Configured Add-On Instruction



- Save and download your project to the controller.

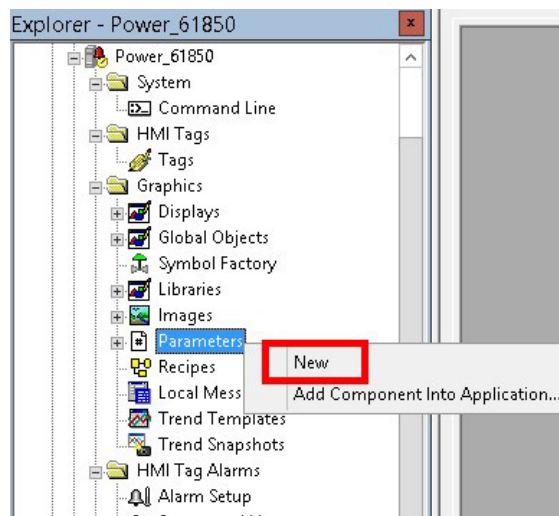
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

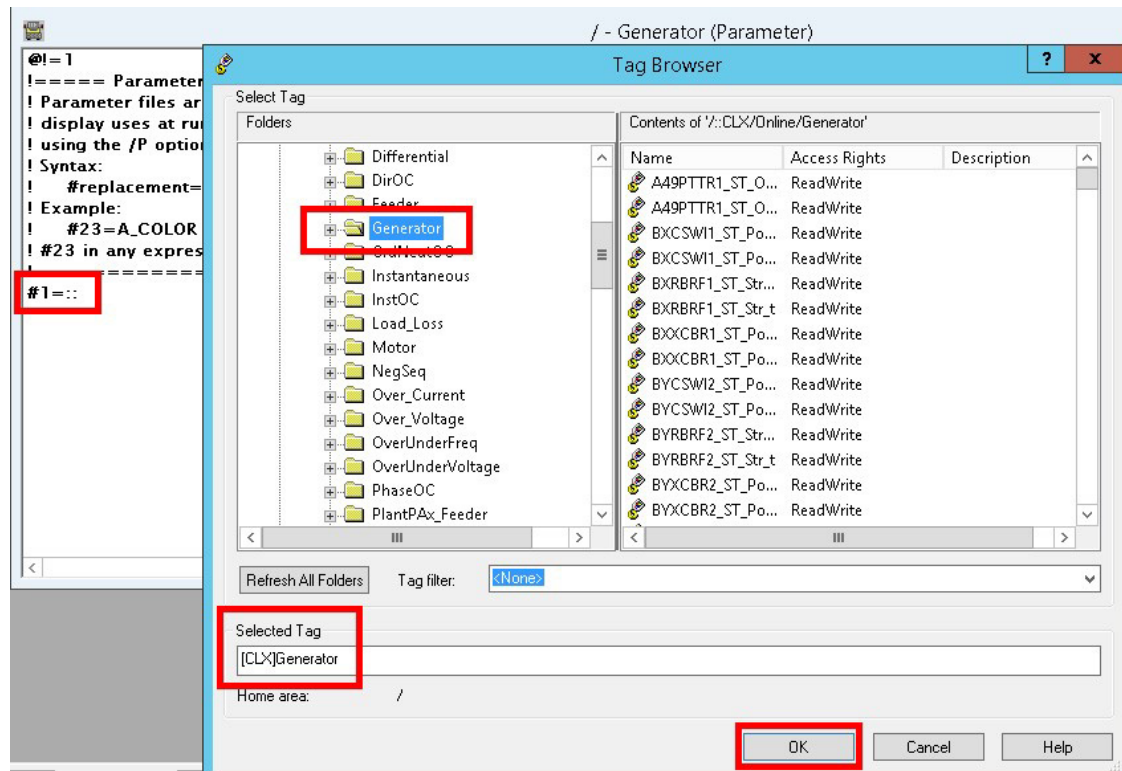
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



2. Type #1= under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.

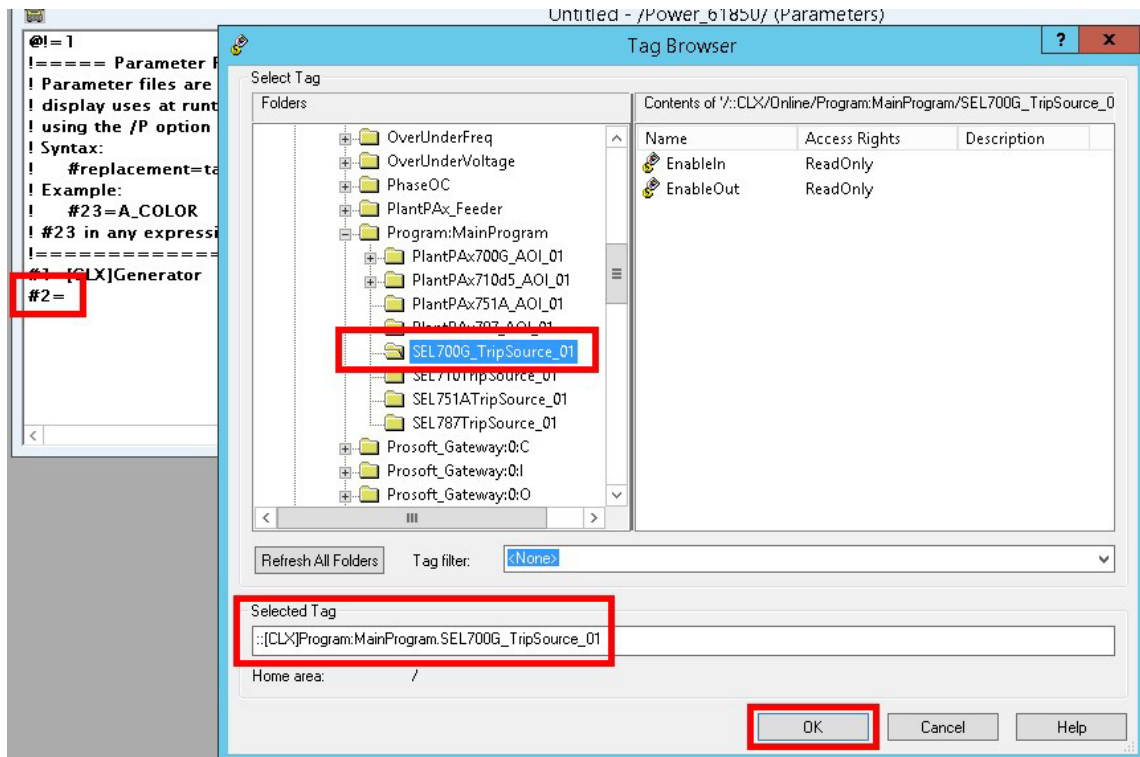
- Expand the folders and select the tag that was created for the device Relay Name. Click OK.



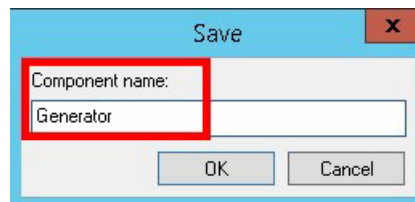
- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =.

The Tag Browser dialog box opens.

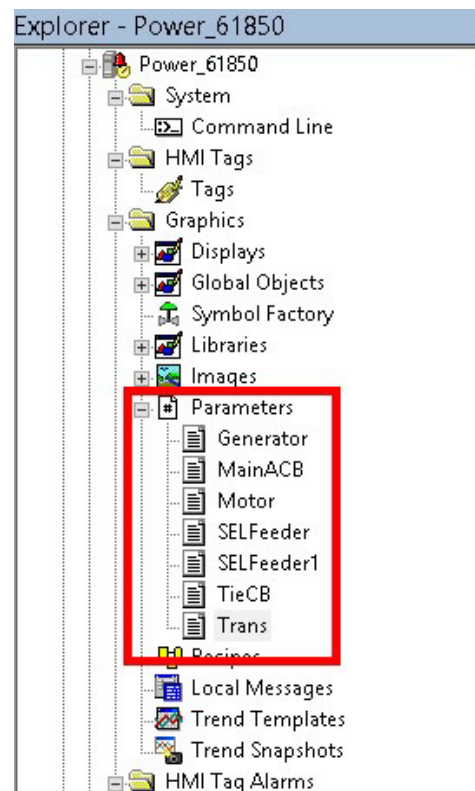
- Expand the folders and select the tag that was created for the SEL700G TripSource Add-On Instruction. Click OK.



- Click the save icon and name the parameter file.
- Click OK.



You can see the parameter file in the list in the Application Window.

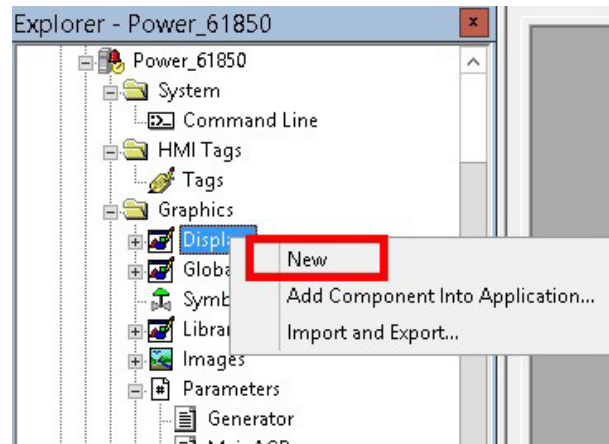


Linking the Parameter Files to an HMI Display

Now that the SEL700G controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

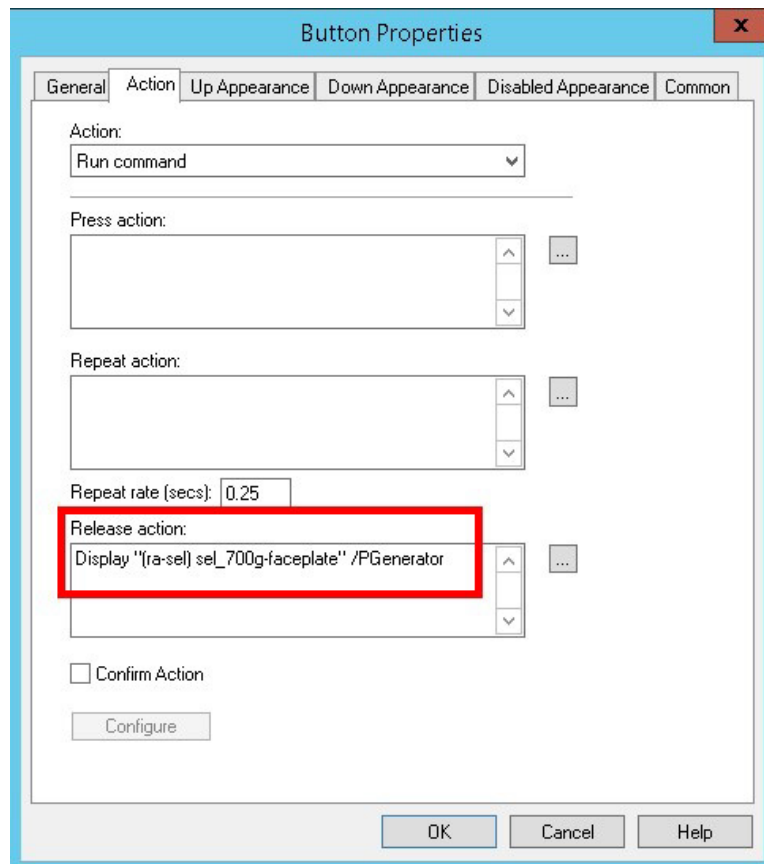


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 8](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



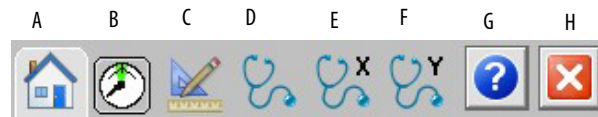
The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The SEL700G faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.

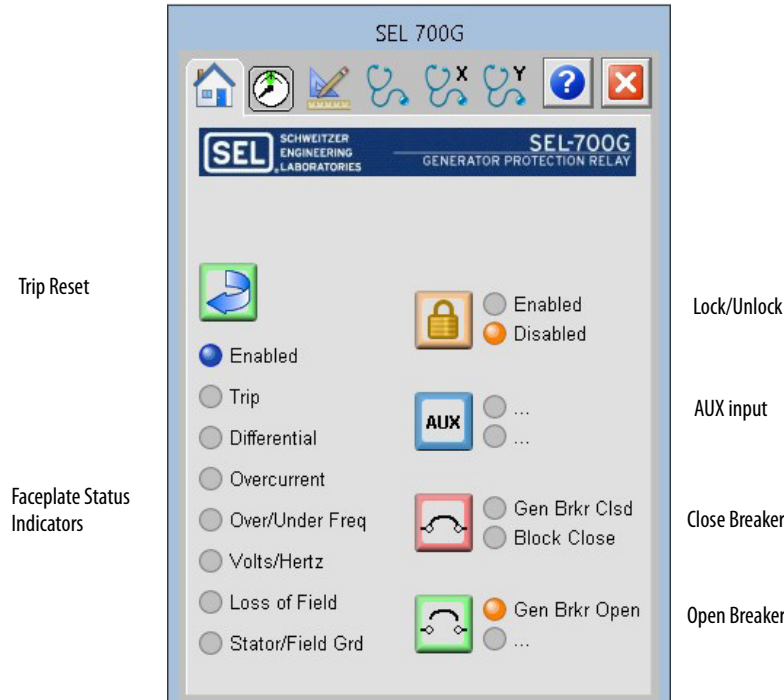


- A - Operator
- B - Sync
- C - Engineering
- D - Diagnostics
- E - X-side Diagnostics
- F - Y-side Diagnostics
- G - Help
- H - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. Here, they can view the status and values of the instruction instance and manipulate it through its commands and settings.






Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



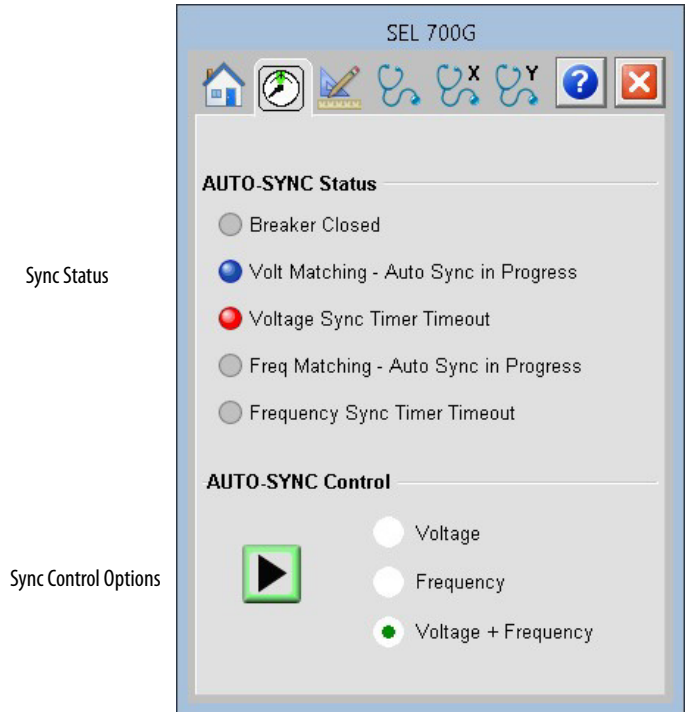
The following table shows the functions that are included on the Operator tab.

Table 16 - Operator Tab Description

Function	Action
	To issue the commands to the device, unlock the device. If the device is locked, you can only monitor data from the device.
	Click to reset the device. The status of the device is indicated on the faceplate.
	Click to toggle the AUX input to the device. This input is configurable in the device vendor software. This button provides a configurable interface to provide a user chosen command.
	Click to close the circuit breaker.
	Click to open the circuit breaker.


Automatic-Synchronization Tab

The Automatic-synchronization tab allows the operator to initiate and monitor the status of the device synchronization. You can select the type of synchronization, voltage, or frequency and initiate the process by clicking the Start button.



The following table shows the functions that are included on the Operator tab.

Table 17 - SYNC Tab Description

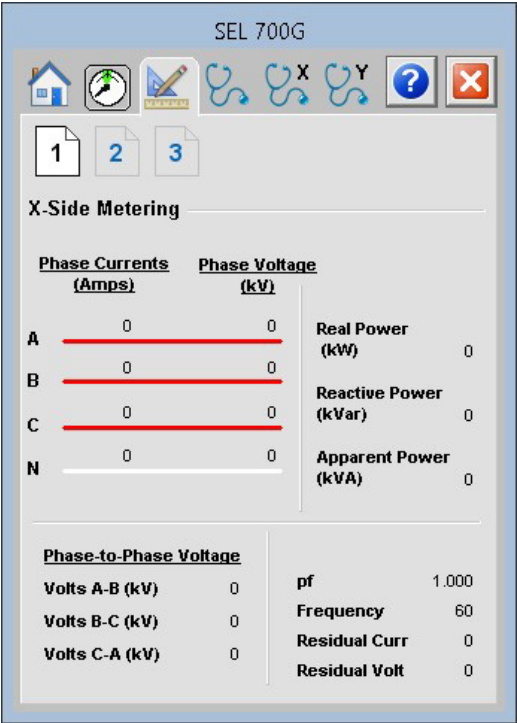
Function	Action
	Click to initiate Auto-Sync.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

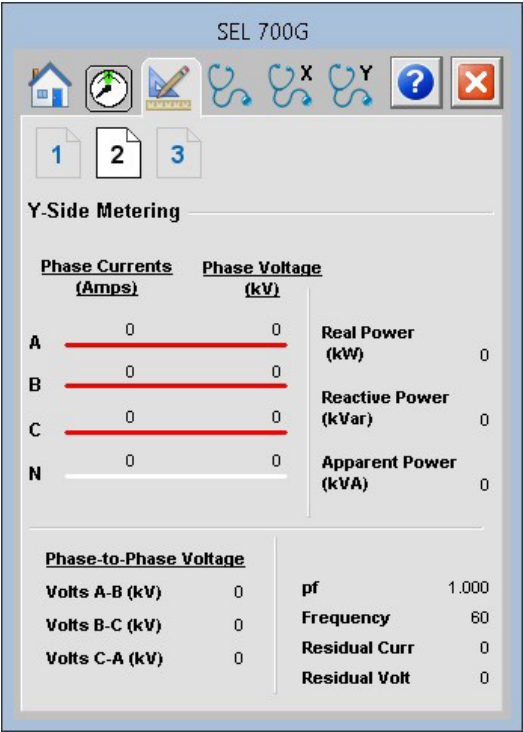
Engineering Page 1

Readout of the X-side measurement values from the SEL-700G. This readout displays fundamental metering data that is associated with the X-side of the generator.



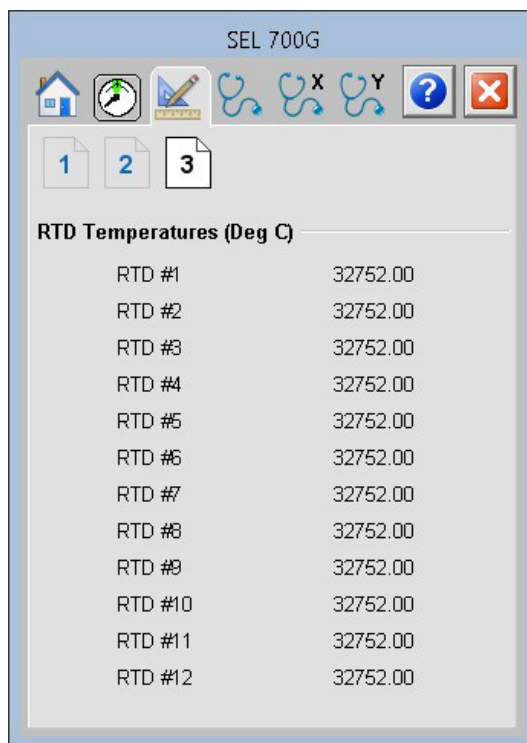
Engineering Page 2

Readout of the Y-side measurement values from the SEL-700G. This readout displays fundamental metering data that is associated with the Y-side of the generator.



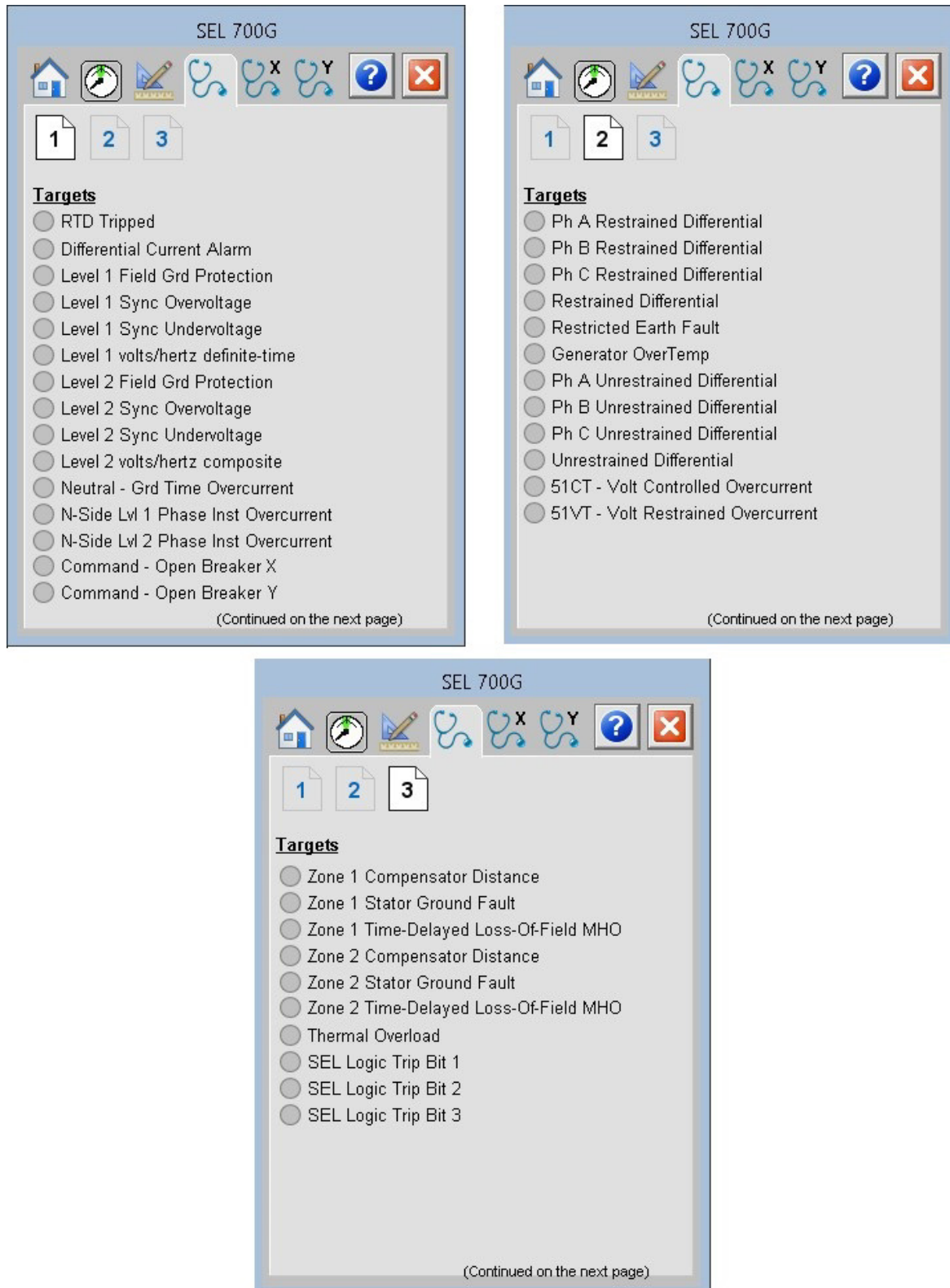
Engineering Page 3

Readout of the temperatures from the 12 RTD inputs that are available in the SEL-700G.

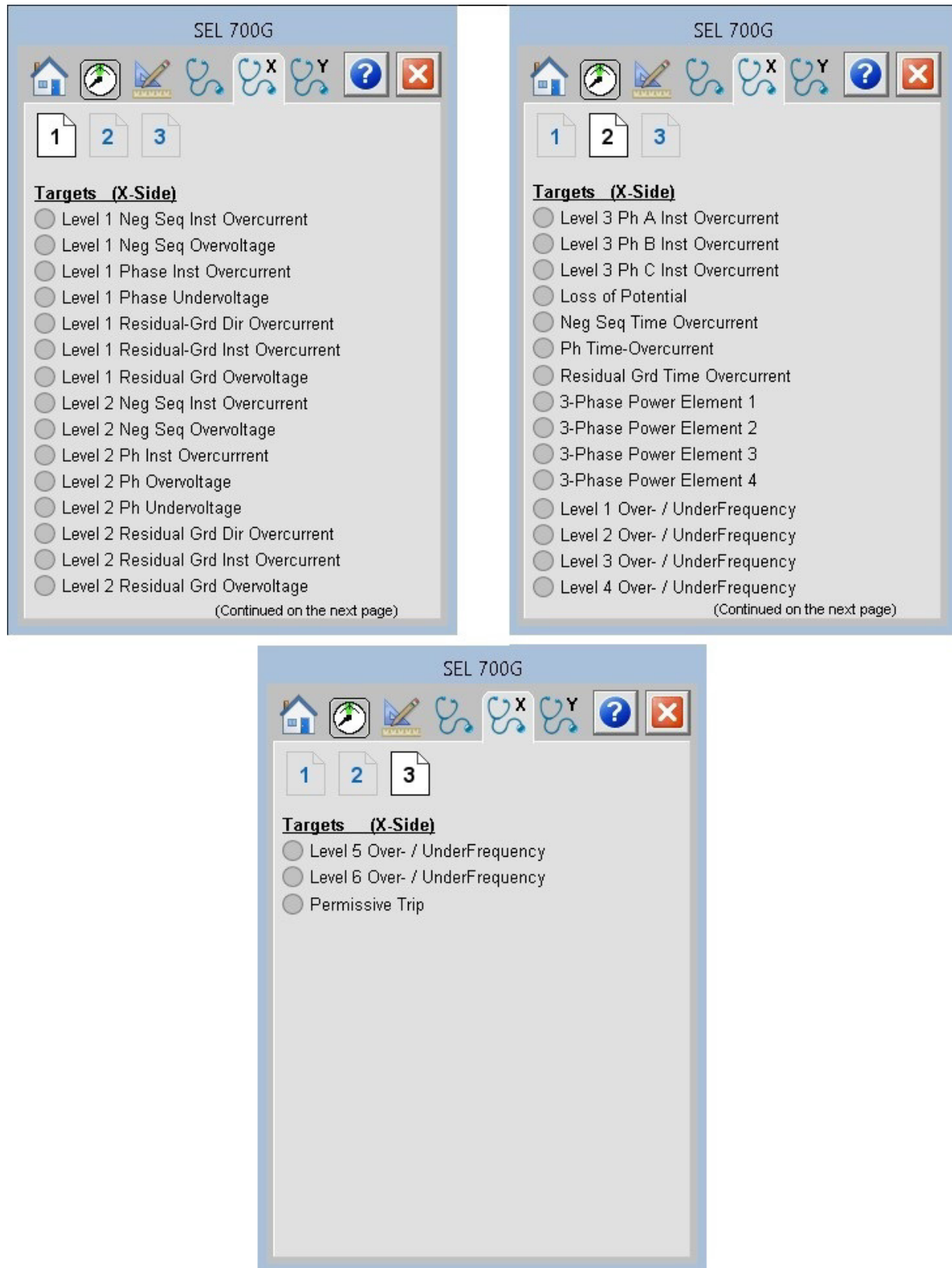


Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device. The first tab shows general diagnostics for the entire generator. There are separate tabs for the X-Side and Y-Side conditions.

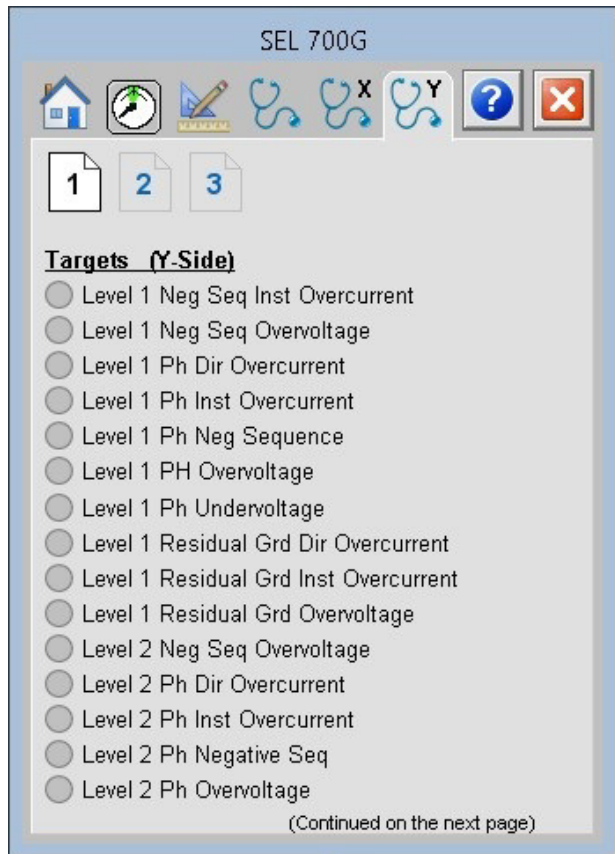


X-Side Diagnostic Tab



Y-Side Diagnostic Tab

SEL 700G



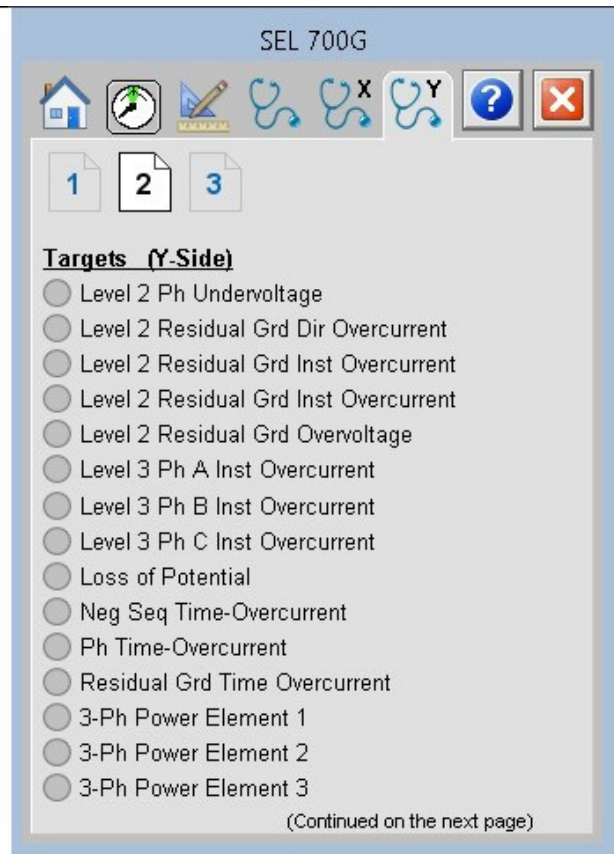
1 2 3

Targets (Y-Side)

- ☐ Level 1 Neg Seq Inst Overcurrent
- ☐ Level 1 Neg Seq Overvoltage
- ☐ Level 1 Ph Dir Overcurrent
- ☐ Level 1 Ph Inst Overcurrent
- ☐ Level 1 Ph Neg Sequence
- ☐ Level 1 PH Overvoltage
- ☐ Level 1 Ph Undervoltage
- ☐ Level 1 Residual Grd Dir Overcurrent
- ☐ Level 1 Residual Grd Inst Overcurrent
- ☐ Level 1 Residual Grd Overvoltage
- ☐ Level 2 Neg Seq Overvoltage
- ☐ Level 2 Ph Dir Overcurrent
- ☐ Level 2 Ph Inst Overcurrent
- ☐ Level 2 Ph Negative Seq
- ☐ Level 2 Ph Overvoltage

(Continued on the next page)

SEL 700G



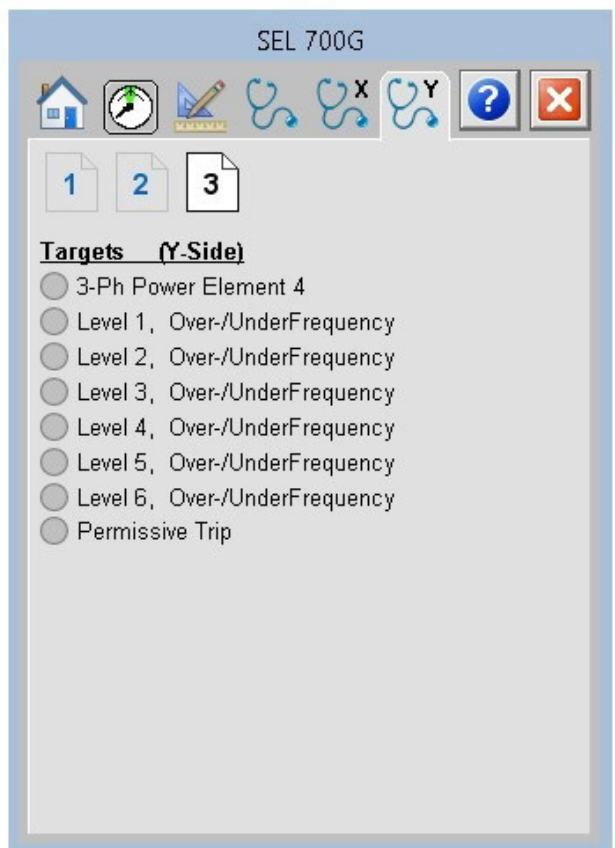
1 2 3

Targets (Y-Side)

- ☐ Level 2 Ph Undervoltage
- ☐ Level 2 Residual Grd Dir Overcurrent
- ☐ Level 2 Residual Grd Inst Overcurrent
- ☐ Level 2 Residual Grd Overvoltage
- ☐ Level 3 Ph A Inst Overcurrent
- ☐ Level 3 Ph B Inst Overcurrent
- ☐ Level 3 Ph C Inst Overcurrent
- ☐ Loss of Potential
- ☐ Neg Seq Time-Overcurrent
- ☐ Ph Time-Overcurrent
- ☐ Residual Grd Time Overcurrent
- ☐ 3-Ph Power Element 1
- ☐ 3-Ph Power Element 2
- ☐ 3-Ph Power Element 3

(Continued on the next page)

SEL 700G



1 2 3

Targets (Y-Side)

- ☐ 3-Ph Power Element 4
- ☐ Level 1, Over-/UnderFrequency
- ☐ Level 2, Over-/UnderFrequency
- ☐ Level 3, Over-/UnderFrequency
- ☐ Level 4, Over-/UnderFrequency
- ☐ Level 5, Over-/UnderFrequency
- ☐ Level 6, Over-/UnderFrequency
- ☐ Permissive Trip

Help Tab



SEL 710 Object



The Schweitzer Engineering Labs 710 / 710d5 is a motor protection relay. This device helps protect rotating load assets within the system. It is equipped with a thermal model and metering data that allows a configurable starting sequence of the motor. The device also provides multiple fundamental metering data including, voltage, current, frequency, power, and so on. The SEL 710d5 model version is equipped with synchronous machine protection capabilities.

Topic	Page
Controller Code	94
Mapping InOut Tags to Add-On Instructions	96
Using Visualization Files	101
Faceplates	106

The following instruction monitors one SEL710 relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for starting and stopping the motor and two auxiliary inputs.

Add-On Instruction

SEL710TripSource_02

SEL710TripSource

Determines the element that tripped the ...

SEL710_Relay_Name	?
Ref_Tgt3Txt	?
Ref_Tgt4Txt	?
Ref_Tgt5Txt	?
Ref_Tgt6Txt	?
Ref_Tgt7Txt	?
Ref_Tgt8Txt	?
SEL710TripAlarm	?
SEL710TargetTripText	?

Faceplate

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 18](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each SEL-710 relay, which is configured in your system.

Table 18 - SEL710_Relay

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]710_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

InOut parameters in [Table 19](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each SEL-710 relay, which is configured in your system in [Chapter 2](#).

Table 19 - SEL710_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 20](#) has recommended uses for each bit.

Table 20 - Remote Bit Control - SEL710 Relay

Name	Description
CON_RBGGIO1_CO_SPCS001_Oper_ctlVal	Lock/Unlock
CON_RBGGIO1_CO_SPCS002_Oper_ctlVal	Target Reset
CON_RBGGIO1_CO_SPCS003_Oper_ctlVal	Motor Start
CON_RBGGIO1_CO_SPCS004_Oper_ctlVal	Motor Stop
CON_RBGGIO1_CO_SPCS005_Oper_ctlVal	AUX1

Table 20 - Remote Bit Control - SEL710 Relay

Name	Description
CON_RBGGI01_CO_SPCS006_Oper_ctlVal	AUX2
CON_RBGGI01_CO_SPCS007_Oper_ctlVal	Not Used
CON_RBGGI01_CO_SPCS008_Oper_ctlVal	Not Used

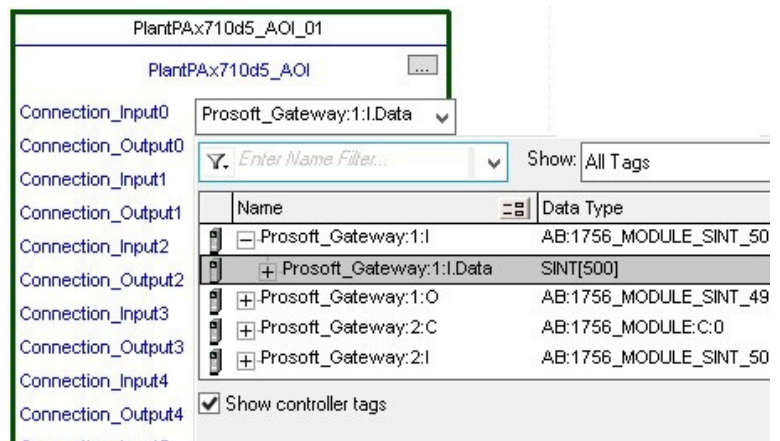
Mapping InOut Tags to Add-On Instructions

Each SEL710 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation® Library of Electronic Protection Devices from the PCDC.

Associate Controller Tags to ProSoft Add-On Instruction

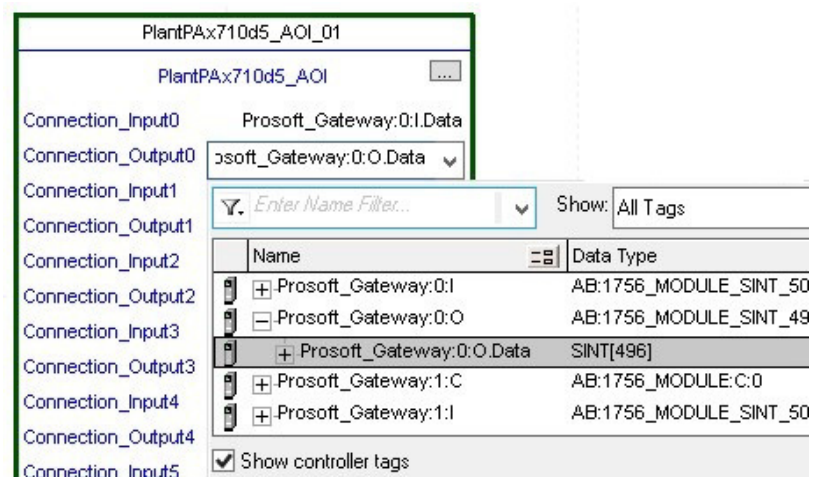
Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.

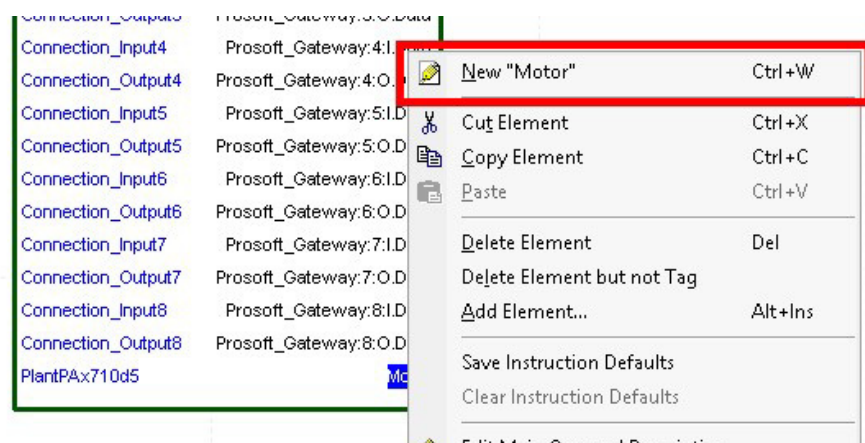
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



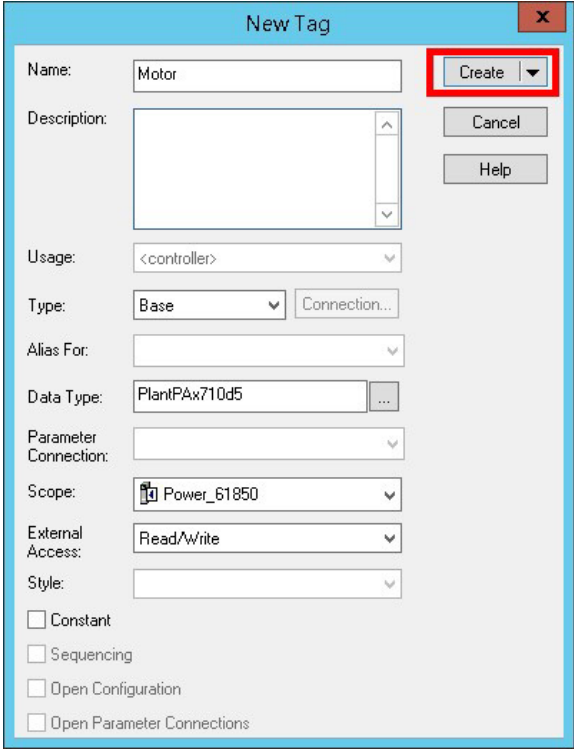
5. Repeat this process for each Connection Input and Output that are included with your Add-On Instructions.
6. Click the question mark next to the final tag. Enter a clear engineering name to this tag that represents your device within your Studio 5000 project. In our example "Motor".



7. Right-click on the new tag name and select New "<tag name>".



8. Click Create on the New Tag dialog box.

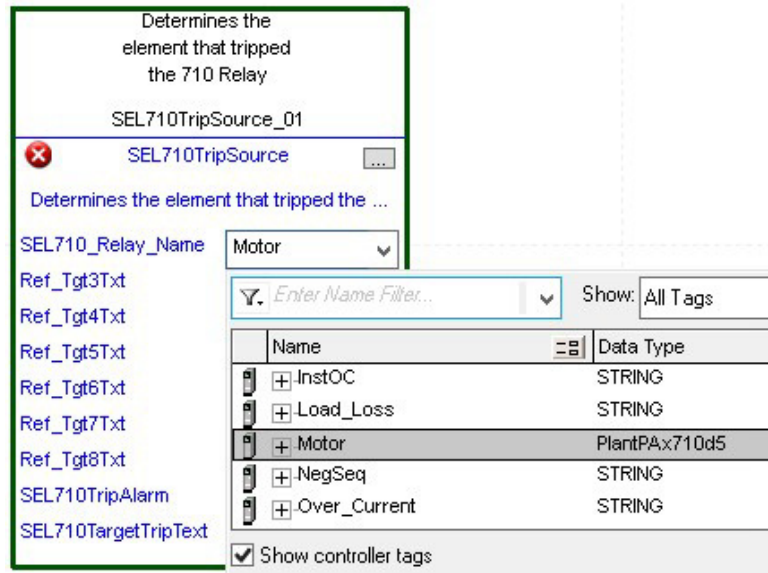


The image shows a 'New Tag' dialog box with a light blue border and a red 'X' close button in the top right corner. The dialog contains several input fields and buttons. The 'Name' field is set to 'Motor'. The 'Description' field is empty. The 'Usage' dropdown is set to '<controller>'. The 'Type' dropdown is set to 'Base', with a 'Connection...' button next to it. The 'Alias For' field is empty. The 'Data Type' dropdown is set to 'PlantPAx710d5'. The 'Parameter Connection' dropdown is empty. The 'Scope' dropdown is set to 'Power_61850'. The 'External Access' dropdown is set to 'Read/Write'. The 'Style' dropdown is empty. At the bottom, there are four unchecked checkboxes: 'Constant', 'Sequencing', 'Open Configuration', and 'Open Parameter Connections'. On the right side, there are three buttons: 'Create' (highlighted with a red rectangle), 'Cancel', and 'Help'.

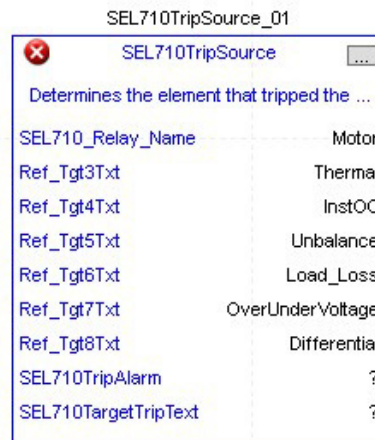
Configure Trip Source Add-On Instruction

Now that the SEL710 Add-On Instruction has been configured, you must configure the SEL710 trip source Add-On Instruction for alarming.

1. Click the question mark next to SEL00G_Relay_Name and select the tag that was created in [step 8](#).



2. Next click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.



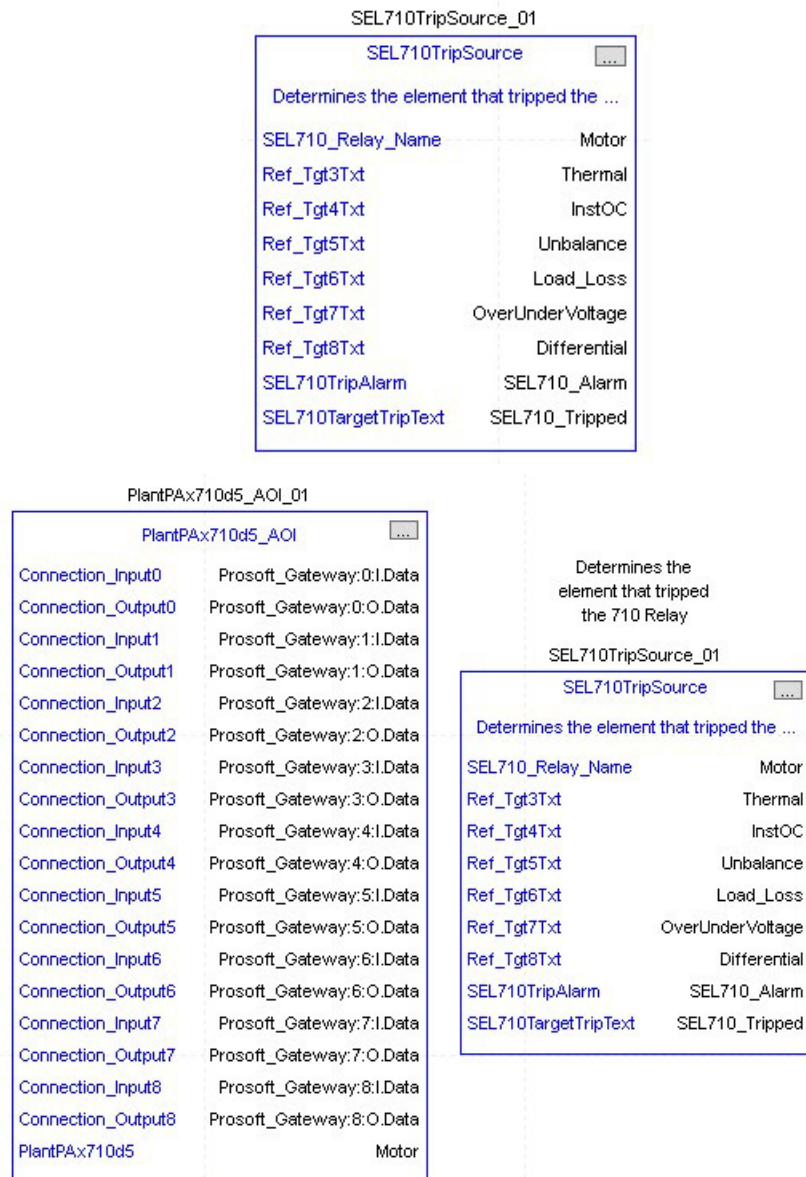
4. Click the question mark next to SEL710TripAlarm and select or create the digital alarm tag to be used.

This tag is used for alarming through the HMI FactoryTalk® Alarms and Events Server.

- Click the question mark next to SEL710TripText and select or create the tag to be used.

This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Fully Configured Add-On Instruction



- Save and download your project to the controller.

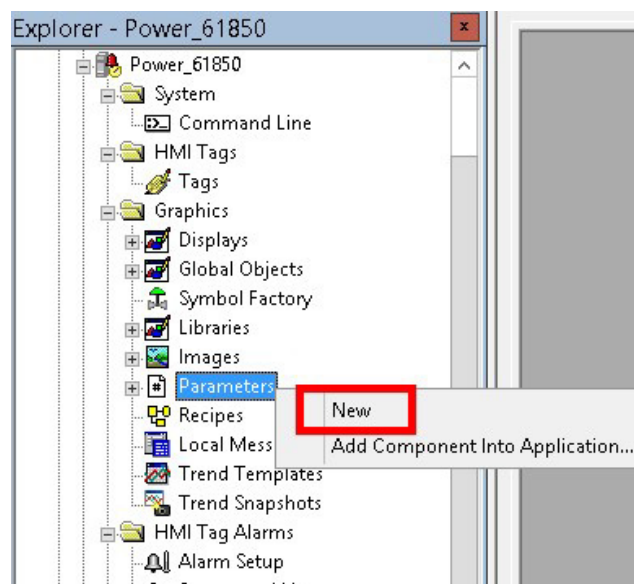
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

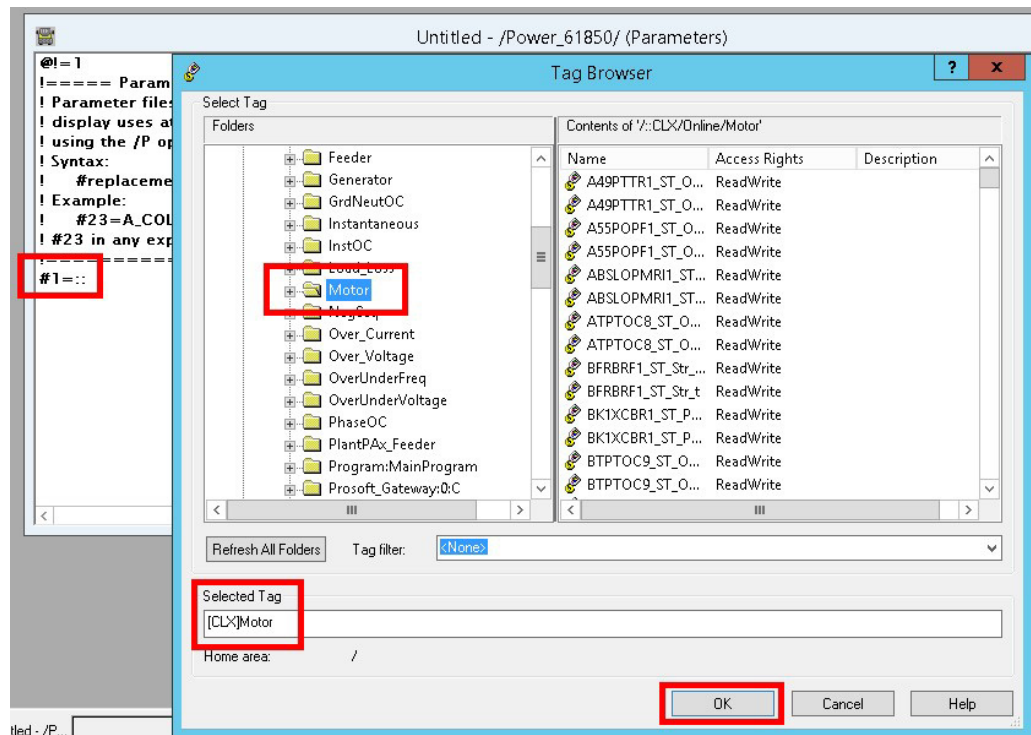
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click Parameters and select New.



2. Type #1= under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.

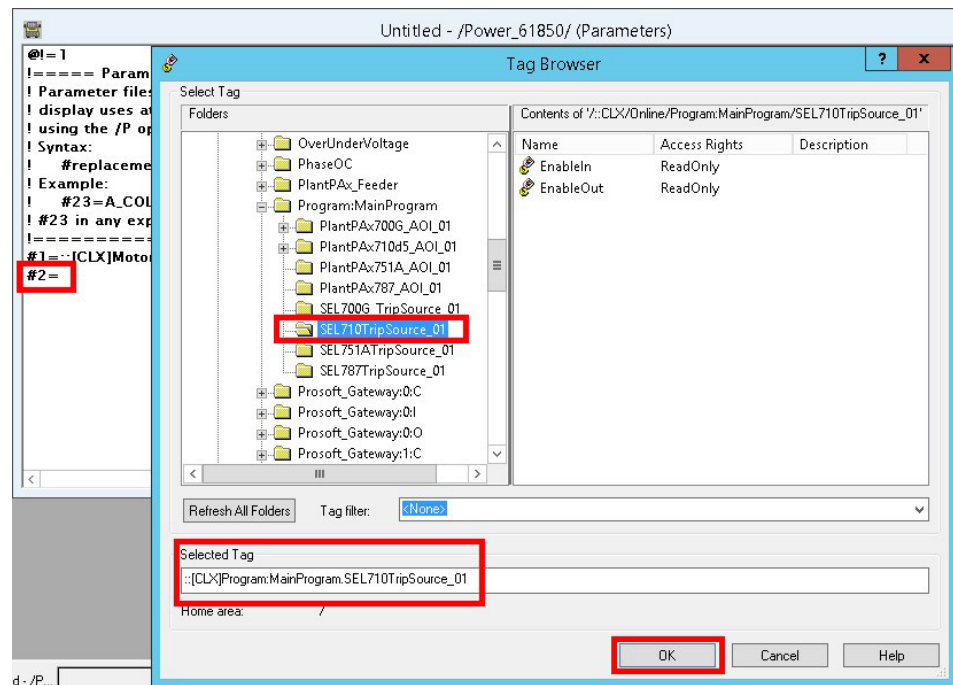
- Expand the folders and select the tag that was created for the device Relay Name. Then click OK.



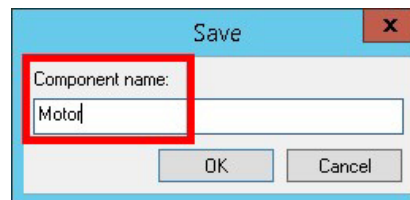
- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =.

The Tag Browser dialog box opens.

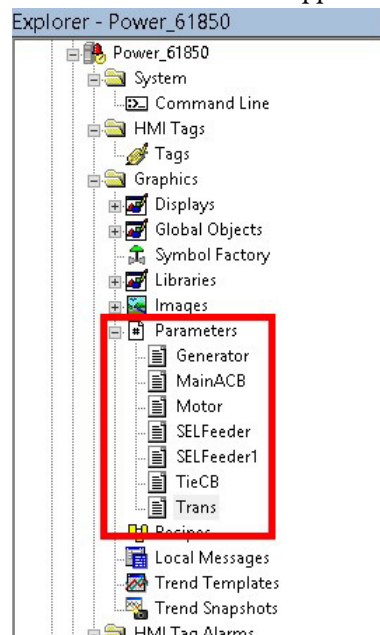
6. Expand the folders and select the tag that was created for the SEL710 TripSource Add-On Instruction. Click OK



7. Click the save icon and name the parameter file. Click OK when you are finished.



You can see the parameter file in the list in the Application Window.

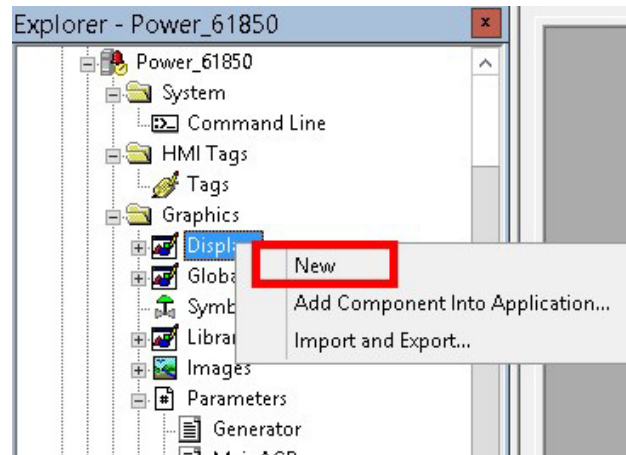


Linking the Parameter Files to an HMI Display

Now that the SEL710 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

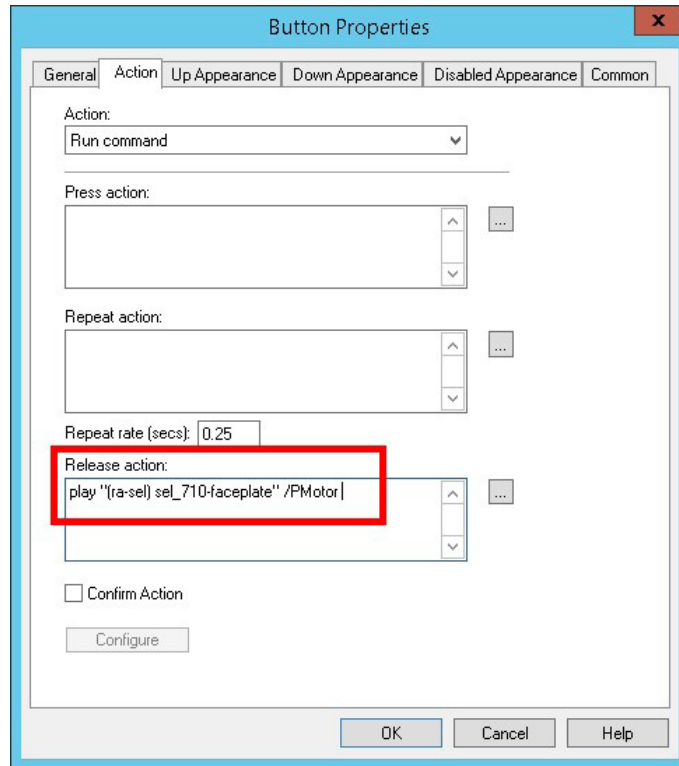


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 8](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The SEL710 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.



- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.






Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 21 - Operator Tab Description

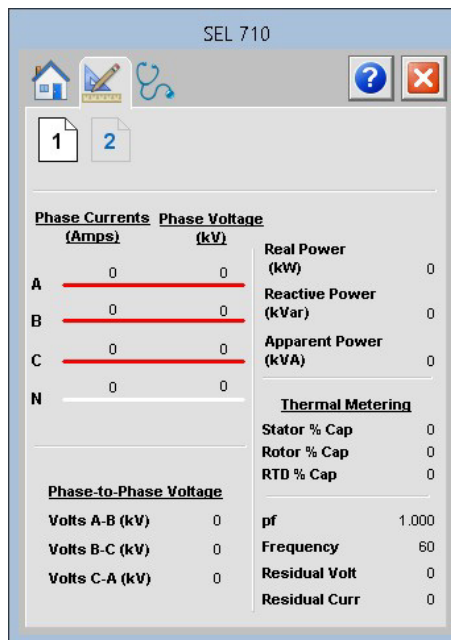
Function	Action
	Click to reset the device. The status of the device is indicated on the faceplate.
	Click to toggle the AUX input to the device. This input is configurable in the device vendor software.
	Click to toggle the AUX input to the device. This input is configurable in the device vendor software.
	Click to start the motor.
	Click to stop the motor.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

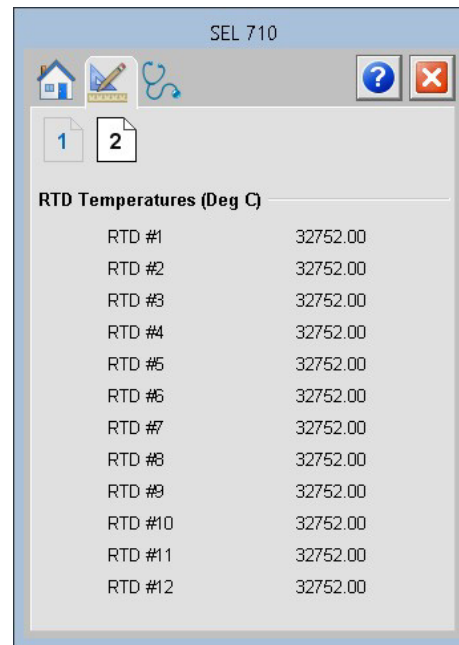
Engineering Page 1

Readout of measurement values from the SEL-710.



Engineering Page 2

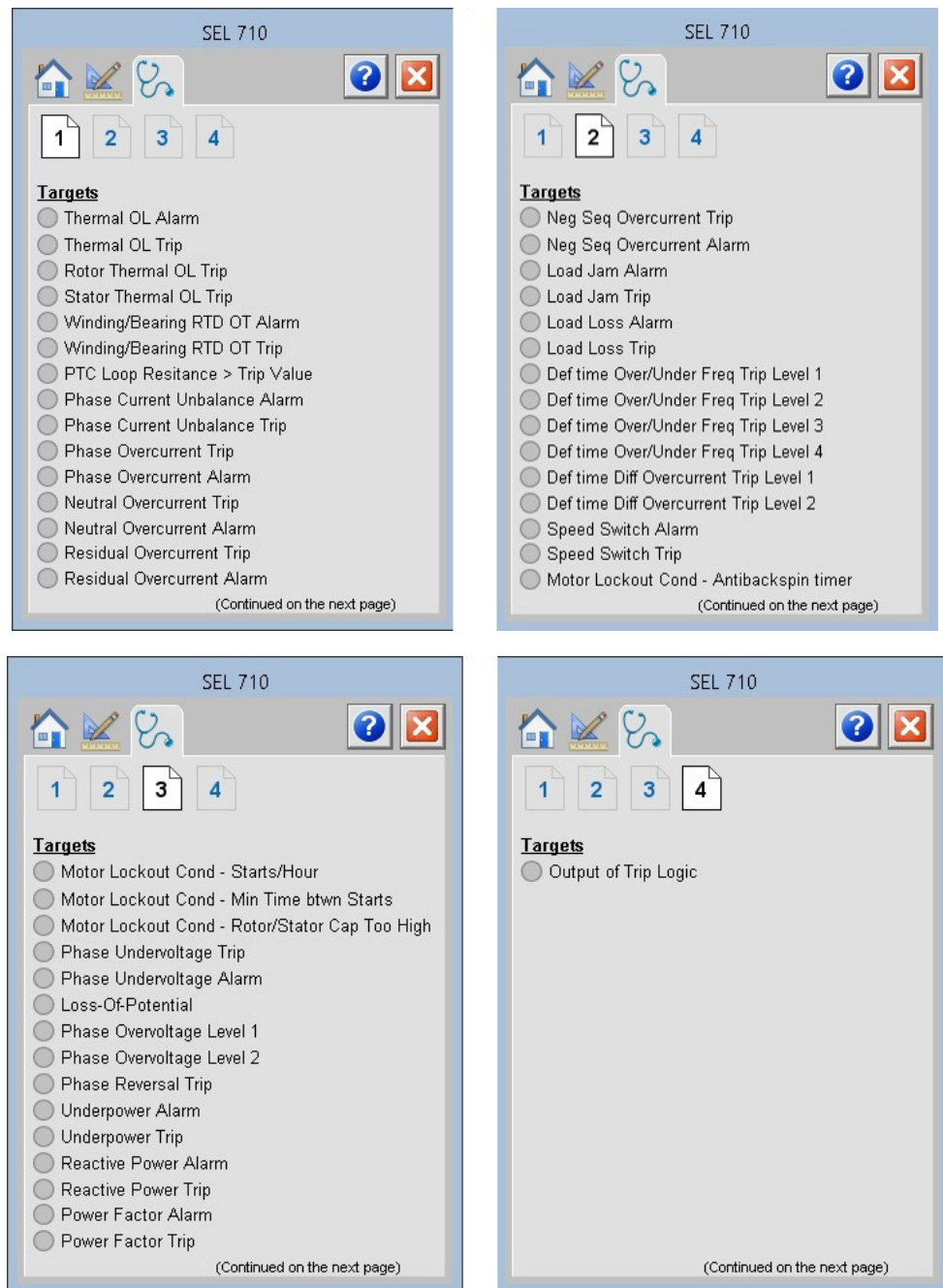
Readout of the temperatures from the 12 RTD inputs that are available in the SEL-710.



RTD Temperatures (Deg C)	
RTD #1	32752.00
RTD #2	32752.00
RTD #3	32752.00
RTD #4	32752.00
RTD #5	32752.00
RTD #6	32752.00
RTD #7	32752.00
RTD #8	32752.00
RTD #9	32752.00
RTD #10	32752.00
RTD #11	32752.00
RTD #12	32752.00

Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



Notes:

SEL 751A Object



The Schweitzer Engineering Labs 751A is a feeder protection relay with arc flash protection. This device is used to help protect an electrical bus from conditions of over current, over voltage, under voltage, and so on. The device also provides multiple fundamental metering data including, voltage, current, frequency, and power. When retrofitted with RTD capability, the SEL 751A can also provide various temperature measurements at locations on the electrical bus.

Topic	Page
Controller Code	114
Mapping InOut Tags to Add-On Instructions	116
Using Visualization Files	120
Faceplates	125

This instruction monitors one SEL751A relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for locking, and to open and close the breaker.

Add-On Instruction

SEL751ATripSource1_01

SEL751ATripSource1

Determines the element that tripped the ...

SEL751A_Relay_Name ?

Ref_Tgt3Txt ?

Ref_Tgt4Txt ?

Ref_Tgt5Txt ?

Ref_Tgt6Txt ?

Ref_Tgt7Txt ?

Ref_Tgt8Txt ?

SEL751ATripAlarm ?

SEL751ATargetTripText ?

Faceplate

SEL 751A IEC 61850

SCHWEITZER ENGINEERING LABORATORIES SEL-751A FEEDER PROTECTION RELAY

Enabled

Trip

Instantaneous

Phase Overcurrent

Gnd/Neu Overcurrent

Neg Seq Overcurrent

Over/Under Freq

Breaker Failure

AUX

Enabled

Block Close

Breaker Closed

Breaker Open

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 22](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each SEL-751A relay, which is configured in your system.

Table 22 - SEL751A Relay

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

[Table 23](#) shows the InOut parameters that are available from the Rockwell Automation Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown.

Table 23 - SEL751A_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 24](#) has recommended uses for each bit.

Table 24 - Remote Bit Control - SEL751A Relay

Name	Description
CON_RBGGIO1_CO_SPCS001_Oper_ctlVal	Lock/Unlock
CON_RBGGIO1_CO_SPCS002_Oper_ctlVal	Target Reset
CON_RBGGIO1_CO_SPCS003_Oper_ctlVal	Breaker Close
CON_RBGGIO1_CO_SPCS004_Oper_ctlVal	Breaker Open
CON_RBGGIO1_CO_SPCS005_Oper_ctlVal	AUX
CON_RBGGIO1_CO_SPCS006_Oper_ctlVal	User Programmable
CON_RBGGIO1_CO_SPCS007_Oper_ctlVal	User Programmable
CON_RBGGIO1_CO_SPCS008_Oper_ctlVal	User Programmable

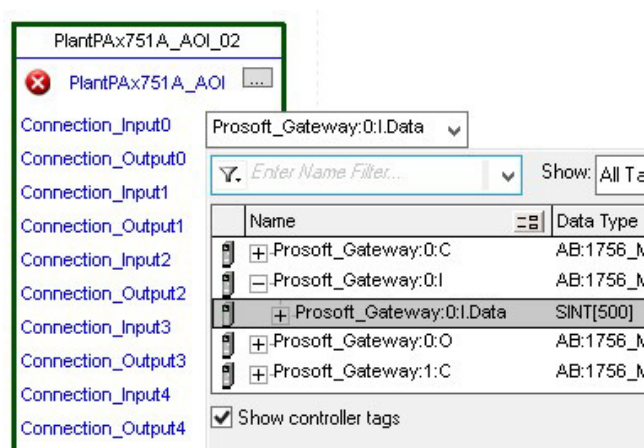
Mapping InOut Tags to Add-On Instructions

Each SEL751A relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation Library of Electronic Protection Devices from the PCDC.

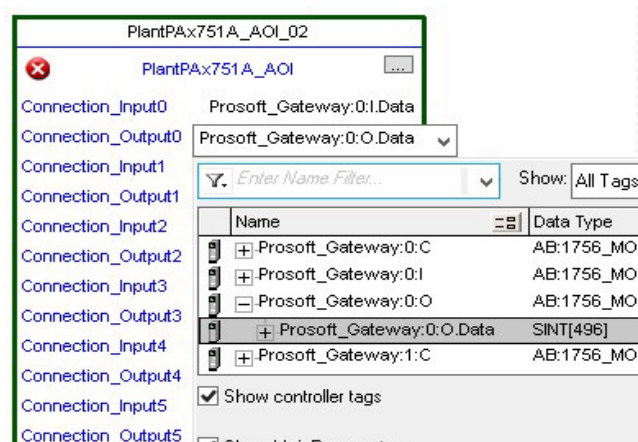
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.

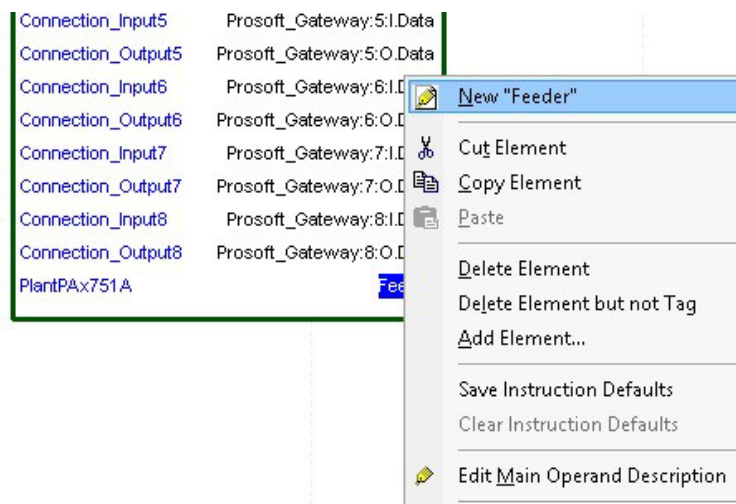


5. Repeat this process for each Connection Input and Output that are included with your Add-On Instructions.

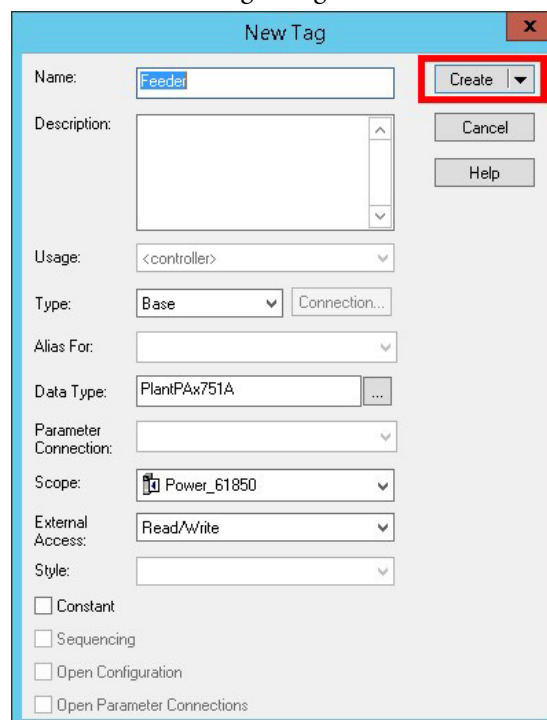
- Click the question mark next to the final tag. Type a tag name that represents your physical device within your Studio 5000 project. In this example, the name is “Feeder”.



- Right-click the new tag name and select New “<tag name>”.



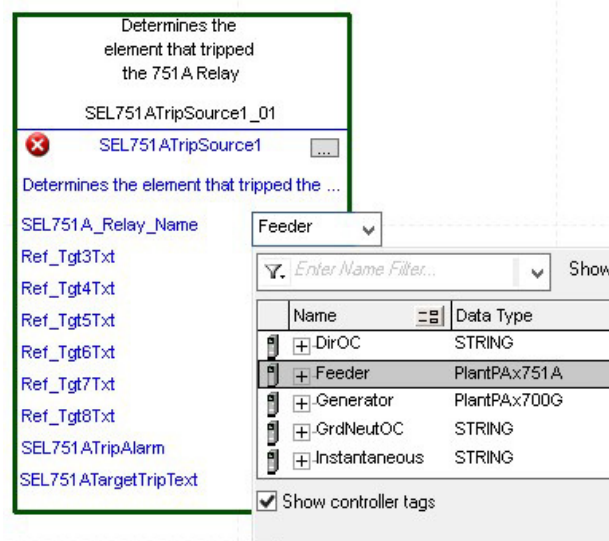
- Click Create on the New Tag dialog box.



Configure Trip Source Add-On Instruction

Now that the SEL751A Add-On Instruction has been configured, you must configure the SEL751A trip source Add-On Instruction for alarming.

1. Click the question mark next to SEL751A_Relay_Name and select the tag that was created in [step 8](#).



2. Next click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.



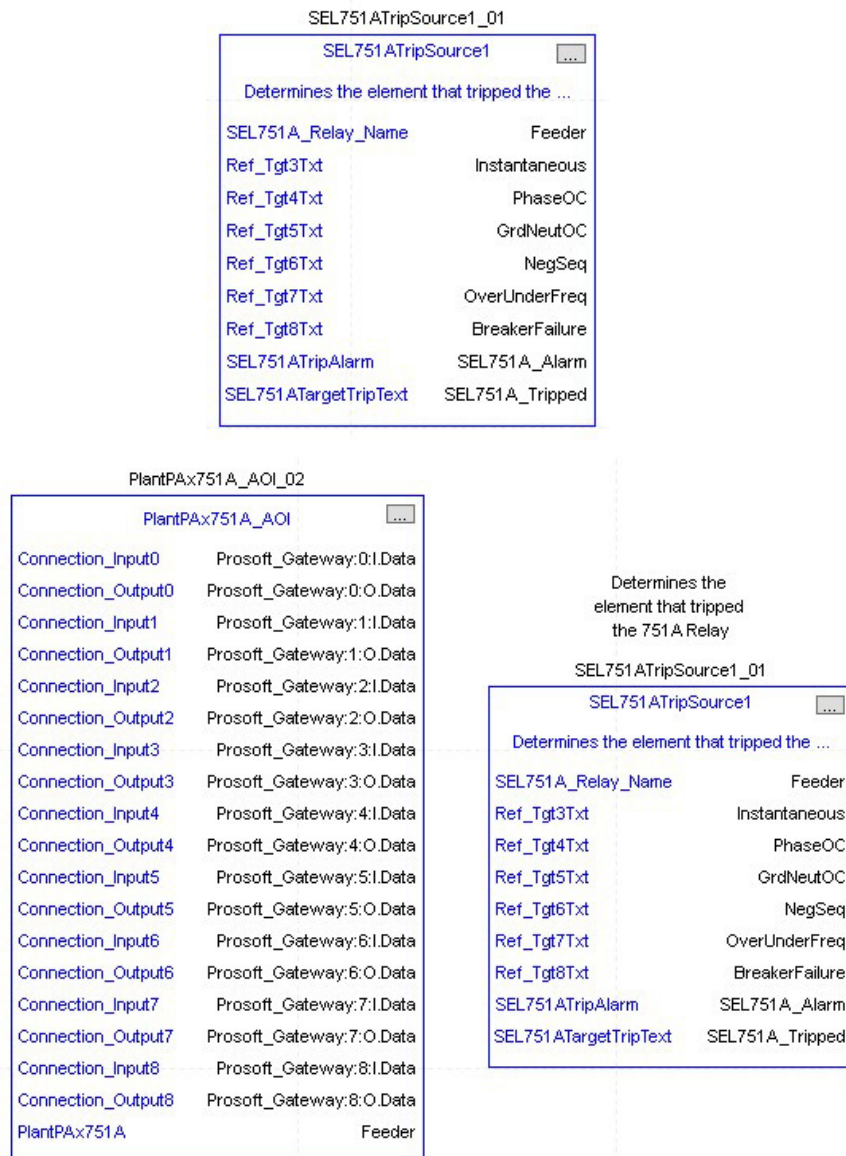
4. Click the question mark next to SEL751ATripAlarm and select or create the digital alarm tag to be used.

This tag is used for alarming through the HMI FactoryTalk® Alarms and Events Server.

- Click the question mark next to SEL751ATripText and select or create the tag to be used.

This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Fully Configured Add-On Instruction



- Save and download your project to the controller.

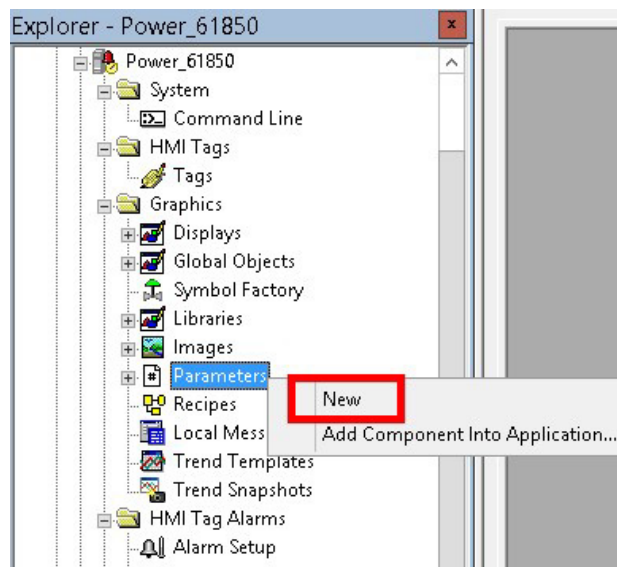
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

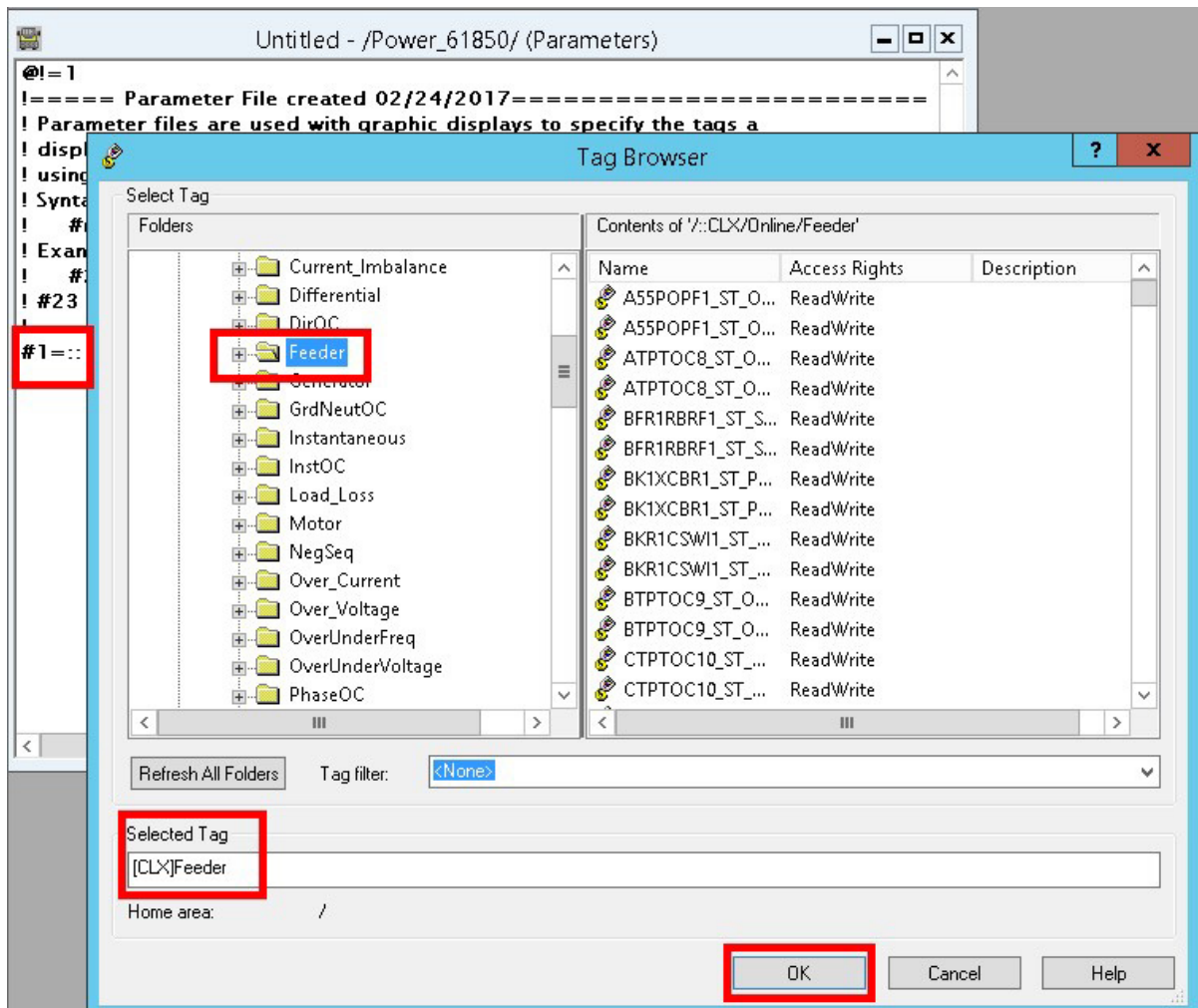
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



2. Type #1= under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.

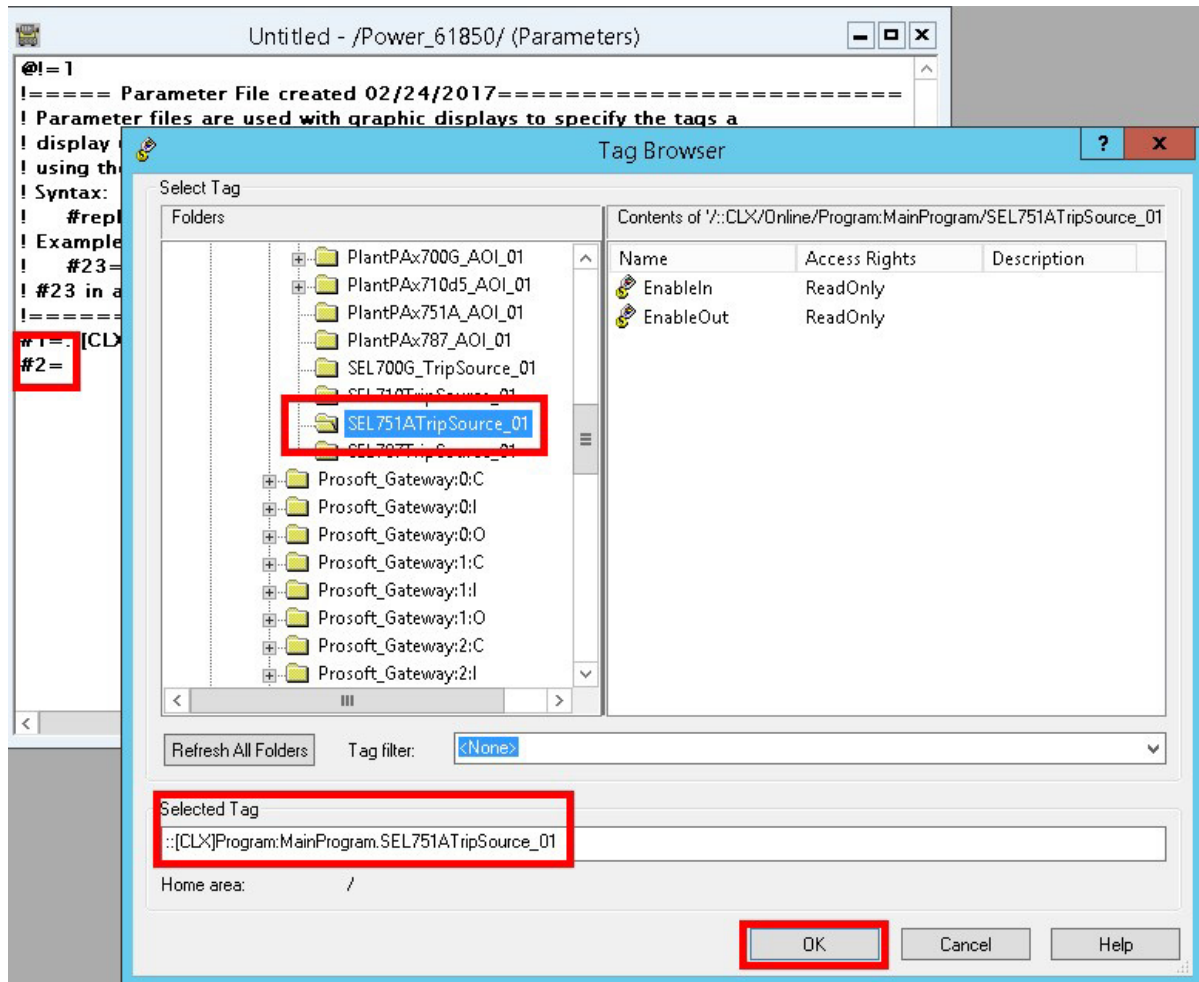
- Expand the folders and select the tag that was created for the device Relay Name. Click OK.



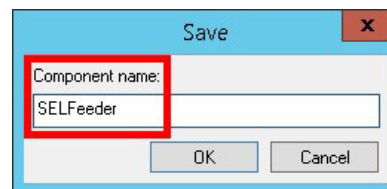
- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =.

The Tag Browser dialog box opens.

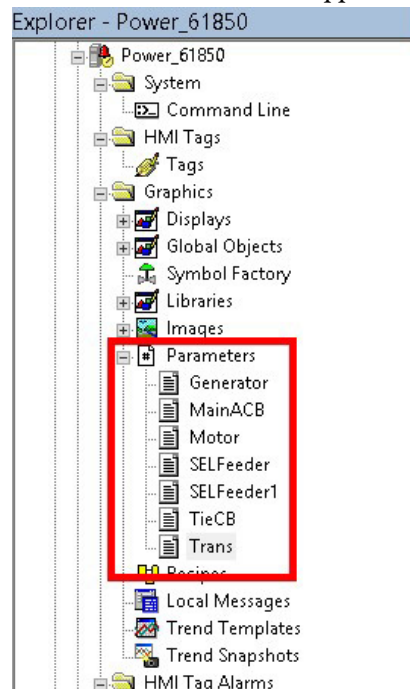
6. Expand the folders and select the tag that was created for the SEL751A TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see the parameter file in the list in the Application Window.

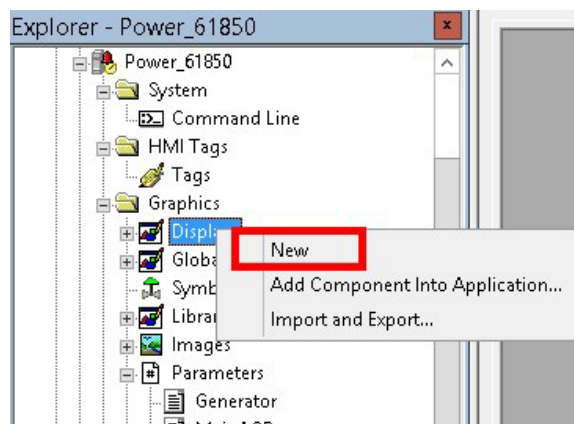


Linking the Parameter Files to an HMI Display

Now that the SEL751A controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

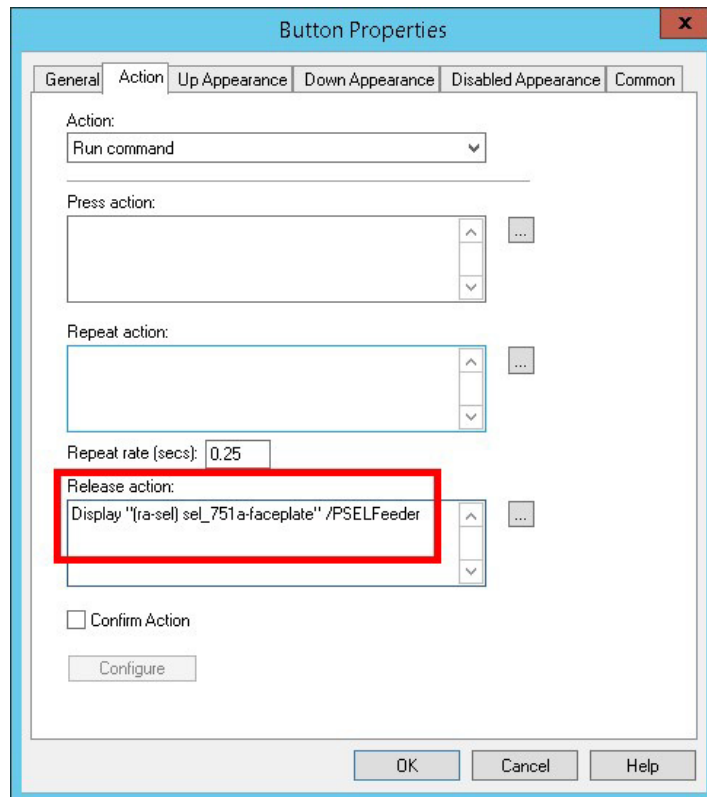


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 6](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The SEL751A faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.



- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.






Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 25 - Operator Tab Description

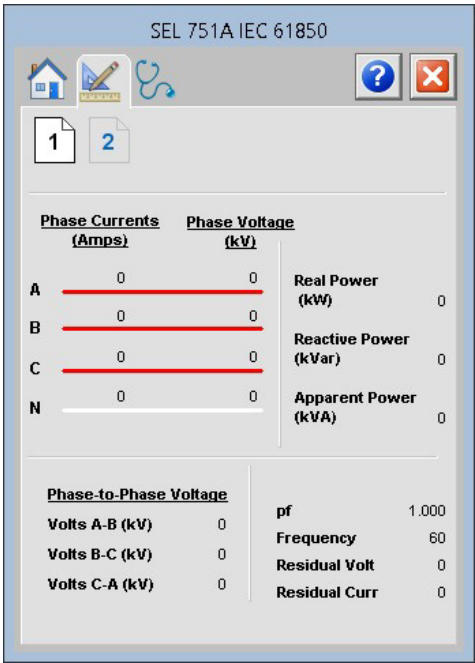
Function	Action
	Click to lock or unlock device. Function locks the device from accepting commands.
	Click to reset the device. The status of the device is indicated on the faceplate.
	Click to toggle the AUX input to the device. This input is configurable in the device vendor software.
	Click to close the circuit breaker.
	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

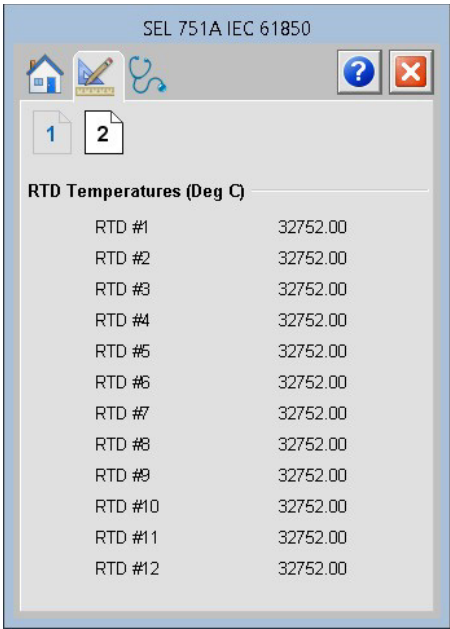
Engineering Page 1

Readout of the measurement values from the SEL-751A.



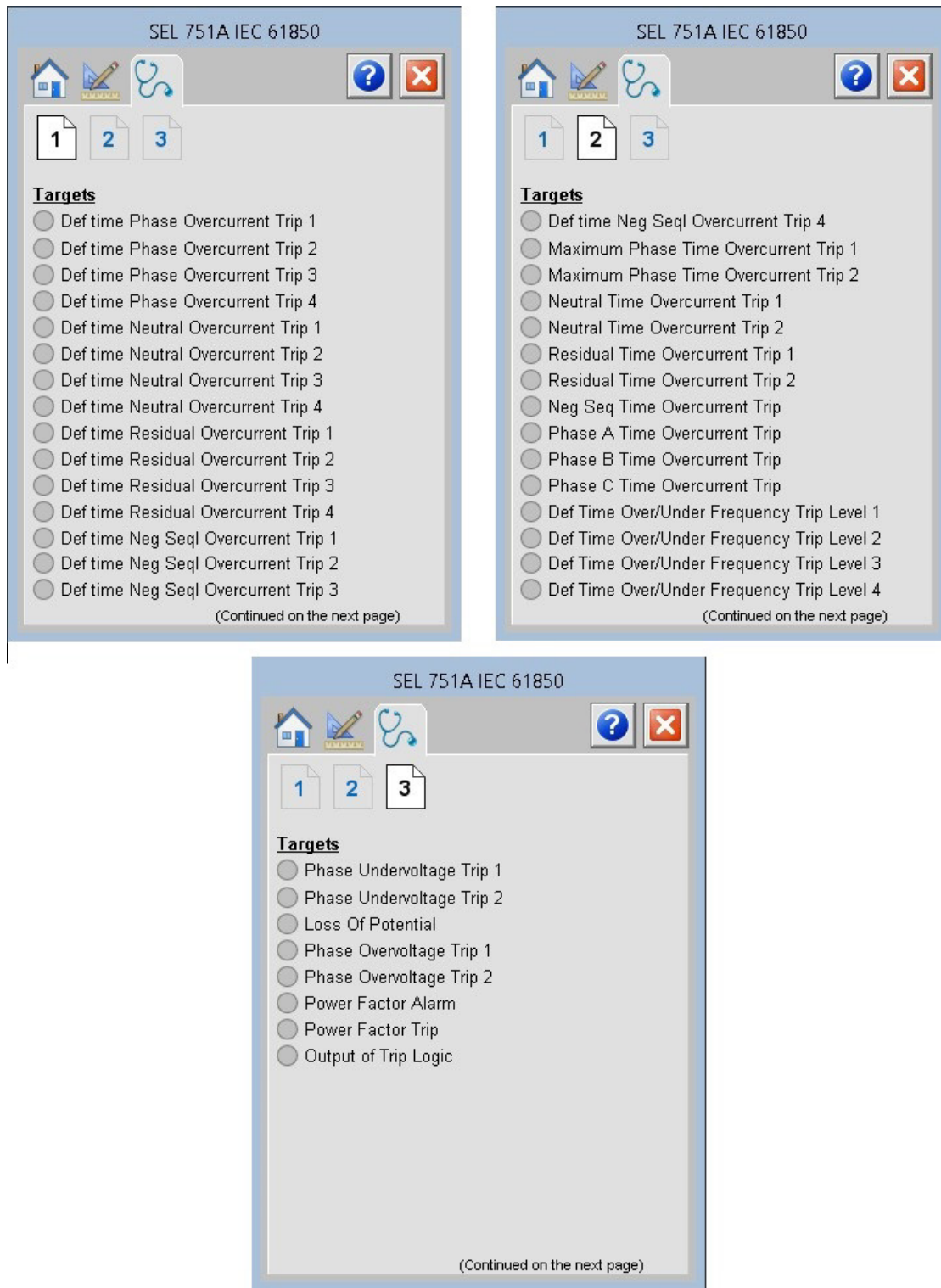
Engineering Page 2

Readout of the temperatures from the 12 RTD inputs that are available in the SEL-751A.



Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab

IED Help

Status Indicators

 Target Attention


Commands

 Lock Module
Enable/Disable toggle

 Close Breaker
Momentary button

 Open Breaker
Momentary button

 Auxiliary button
Momentary button

 Breaker Select
Toggle button

 Target Reset
Clear Target indicators
Momentary button

 Start Motor
Momentary button

 Stop Motor
Momentary button

 Enable Auto Sync
Momentary button

Rockwell Automation Publication PROCES-RM011B-EN-P - November 2018

129

Notes:

SEL 787 Object



The Schweitzer Engineering Labs 787 is a transformer protection relay. This device provides comprehensive transformer protection for a three winding transformer. This device is able to provide indications of differential faults, winding overcurrent, over/under frequency, and more. The device also provides multiple fundamental metering data including, voltage, current, frequency, power, and so on.

Topic	Page
Controller Code	132
Mapping InOut Tags to Add-On Instructions	137
Using Visualization Files	139
Faceplates	144

This instruction monitors one SEL787 relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for locking, and to open and close the breaker. It is also possible to switch between the two available breakers.

Add-On Instruction

SEL787TripSource_02

SEL787TripSource

Determines the element that tripped the ...

SEL787_Relay_Name	?
Ref_Tgt3Ttxt	?
Ref_Tgt4Ttxt	?
Ref_Tgt5Ttxt	?
Ref_Tgt6Ttxt	?
Ref_Tgt7Ttxt	?
Ref_Tgt8Ttxt	?
SEL787TripAlarm	?
SEL787TargetTripText	?

Faceplate

SEL 787

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 26](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each SEL-787 relay, which is configured in your system.

Table 26 - SEL787 Relay

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

[Table 27](#) shows the InOut parameters that are available from the Rockwell Automation® Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown.

Table 27 - SEL787 TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 28](#) has recommended uses for each bit.

Name	Description
CON_RBGGIO1_CO_SPCS001_Oper_ctlVal	Lock/Unlock
CON_RBGGIO1_CO_SPCS002_Oper_ctlVal	Target Reset
CON_RBGGIO1_CO_SPCS003_Oper_ctlVal	Breaker Close
CON_RBGGIO1_CO_SPCS004_Oper_ctlVal	Breaker Open
CON_RBGGIO1_CO_SPCS005_Oper_ctlVal	Breaker Select
CON_RBGGIO1_CO_SPCS006_Oper_ctlVal	User Programmable
CON_RBGGIO1_CO_SPCS007_Oper_ctlVal	User Programmable
CON_RBGGIO1_CO_SPCS008_Oper_ctlVal	User Programmable

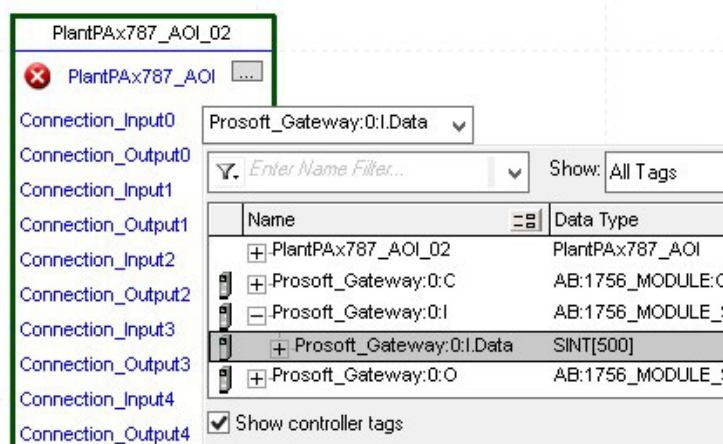
Mapping InOut Tags to Add-On Instructions

Each SEL787 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation Library of Electronic Protection Devices from the PCDC.

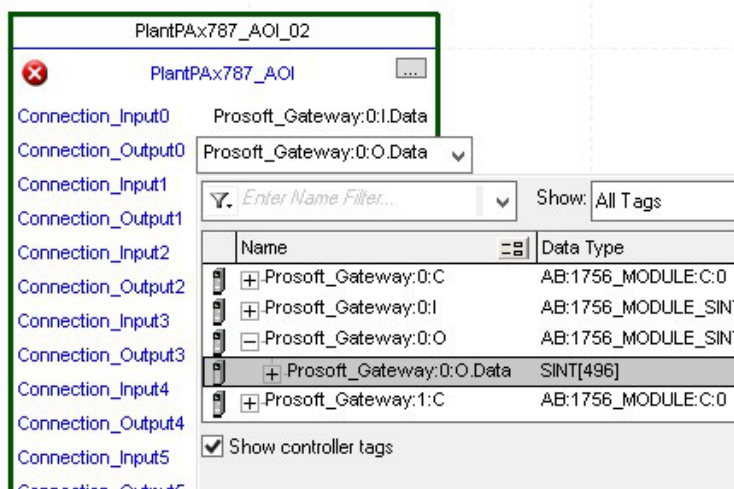
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



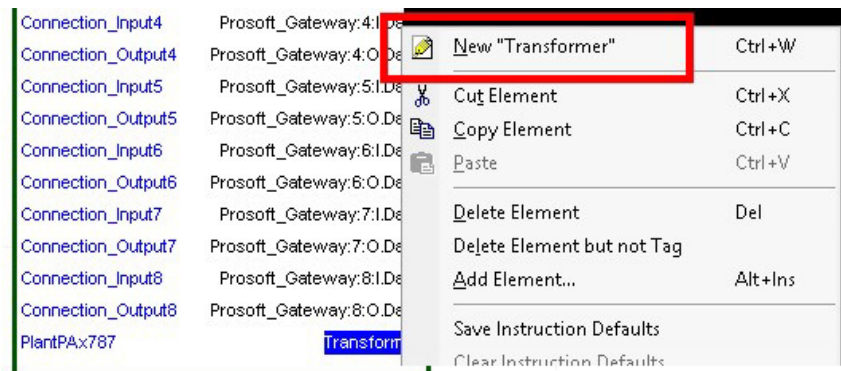
3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



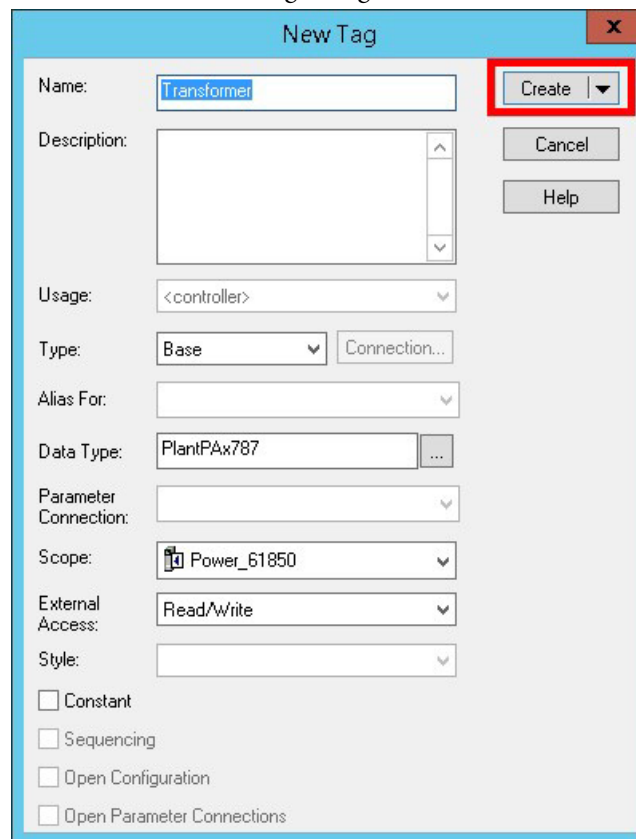
5. Repeat this process for each Connection Input and Output that are included with your Add-On Instructions.
6. Click the question mark next to the final tag. Enter a clear engineering name to this tag that represents your device within your Studio 5000® project. In this example “Transformer”.

Connection_Output3	Prosoft_Gateway:3:O.Data
Connection_Input6	Prosoft_Gateway:6:I.Data
Connection_Output6	Prosoft_Gateway:6:O.Data
Connection_Input7	Prosoft_Gateway:7:I.Data
Connection_Output7	Prosoft_Gateway:7:O.Data
Connection_Input8	Prosoft_Gateway:8:I.Data
Connection_Output8	Prosoft_Gateway:8:O.Data
PlantPAx787	Transformer

7. Right-click the new tag name and select New “<tag name>”.



8. Click Create on the New Tag dialog box.



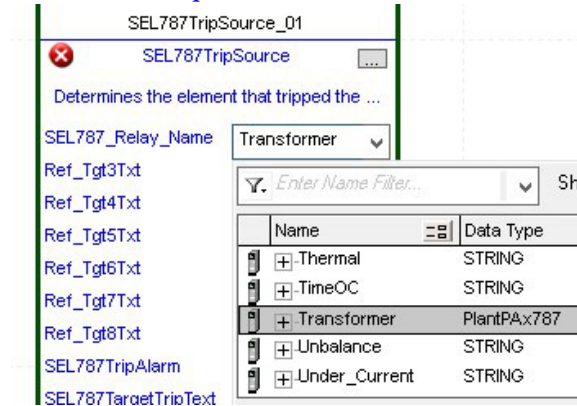
The image shows a 'New Tag' dialog box with a blue title bar and a red 'X' close button. The dialog contains several fields and options:

- Name:** A text box containing 'Transformer'.
- Description:** A large text area.
- Usage:** A dropdown menu showing '<controller>'.
- Type:** A dropdown menu showing 'Base' and a 'Connection...' button.
- Alias For:** A dropdown menu.
- Data Type:** A dropdown menu showing 'PlantPAx787' and an ellipsis button.
- Parameter Connection:** A dropdown menu.
- Scope:** A dropdown menu showing 'Power_61850'.
- External Access:** A dropdown menu showing 'Read/Write'.
- Style:** A dropdown menu.
- Buttons:** 'Create' (highlighted with a red box), 'Cancel', and 'Help'.
- Checkboxes:** 'Constant', 'Sequencing', 'Open Configuration', and 'Open Parameter Connections'.

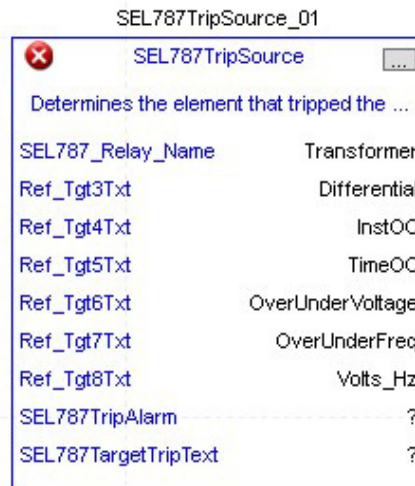
Configure Trip Source Add-On Instruction

Now that the SEL787 Add-On Instruction has been configured, you must configure the SEL787 trip source Add-On Instruction for alarming.

1. Click the question mark next to SEL787_Relay_Name and select the tag that was created in [step 8](#).



2. Next click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.

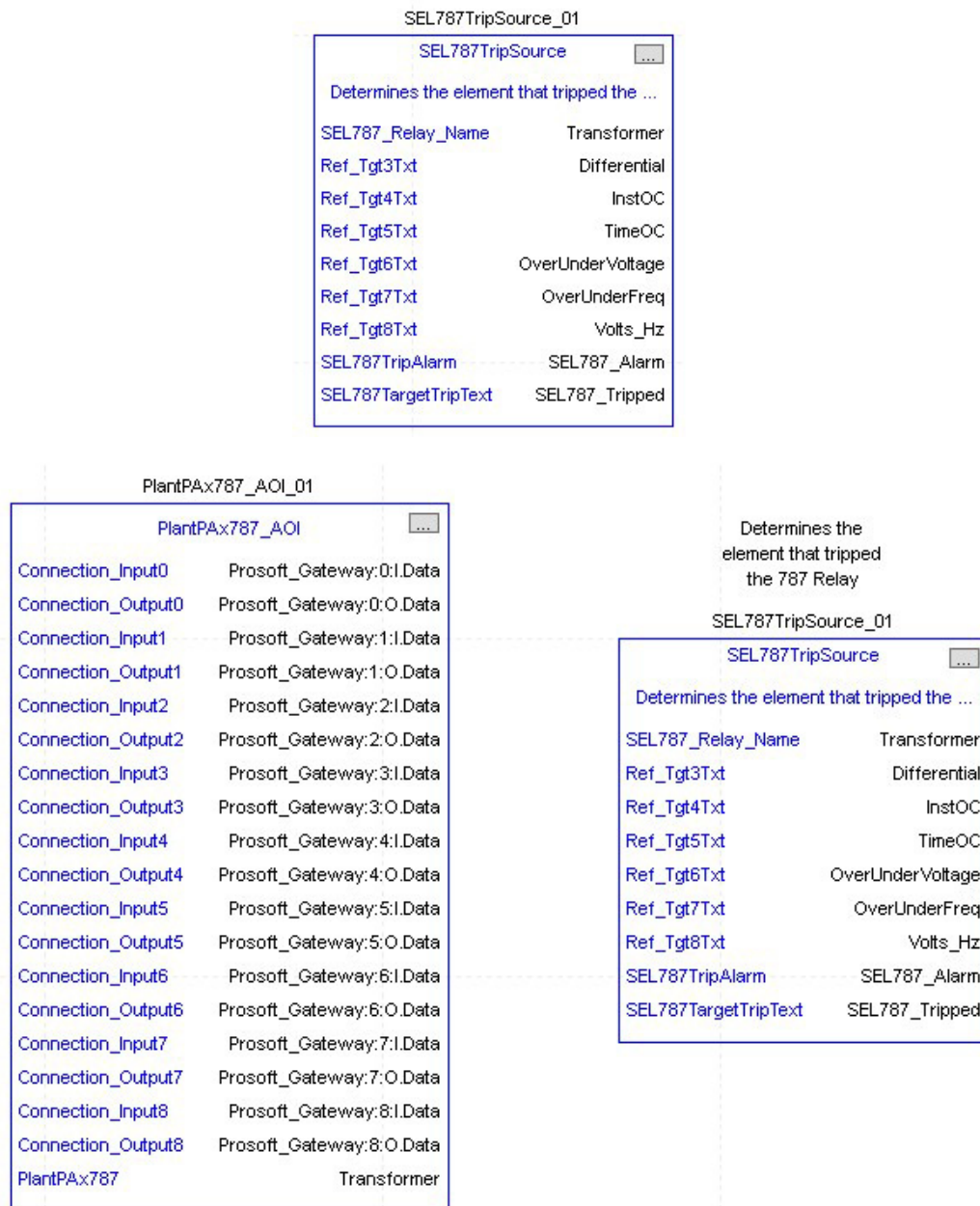


3. Click the question mark next to SEL787TripAlarm and select or create the digital alarm tag to be used. This tag is used for alarming through the HMI FactoryTalk® Alarms and Events Server.

- Click the question mark next to SEL787TripText and select or create the tag to be used.

This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Fully Configured Add-On Instruction



- Save and download your project to the controller.

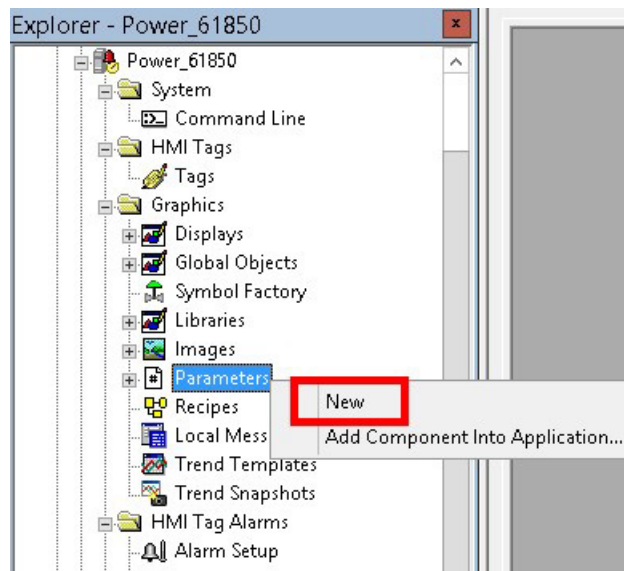
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

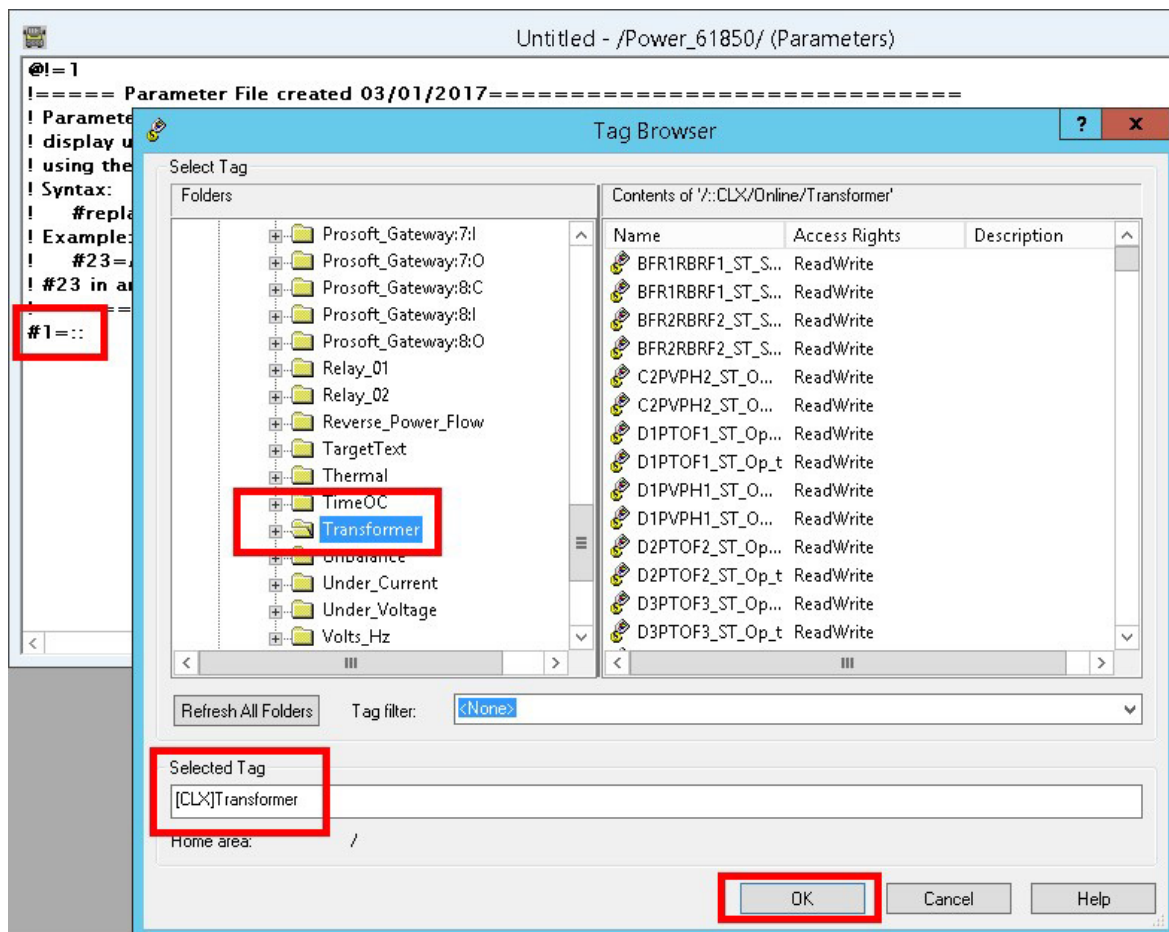
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



2. Type #1= under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.

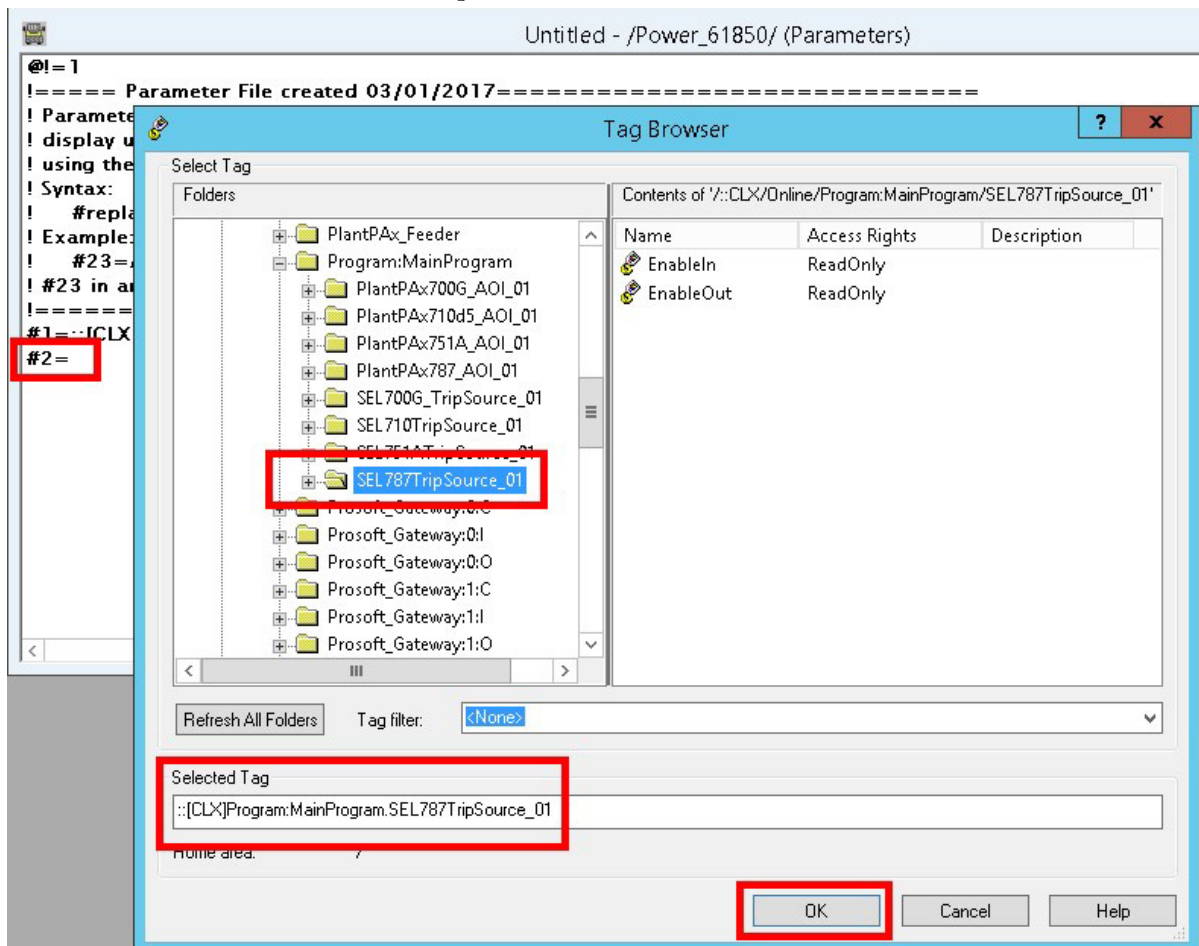
- Expand the folders and select the tag that was created for the device Relay Name. Click OK.



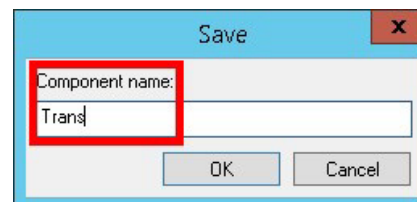
- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =.

The Tag Browser dialog box opens.

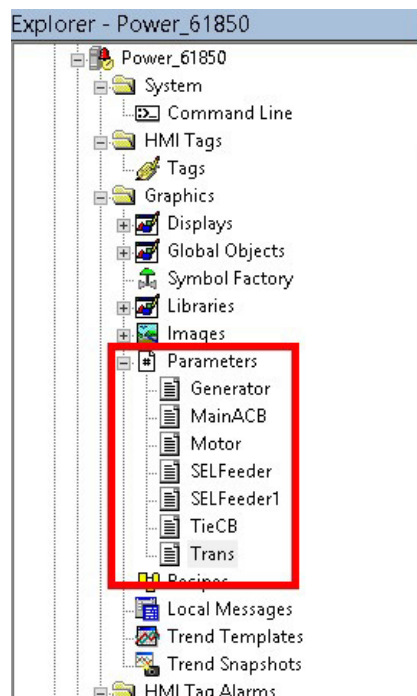
- Expand the folders and select the tag that was created for the device TripSource Add-On Instruction. Click OK.



- Click the save icon and name the parameter file.
- Click OK.



You can see the parameter file in the list in the Application Window.

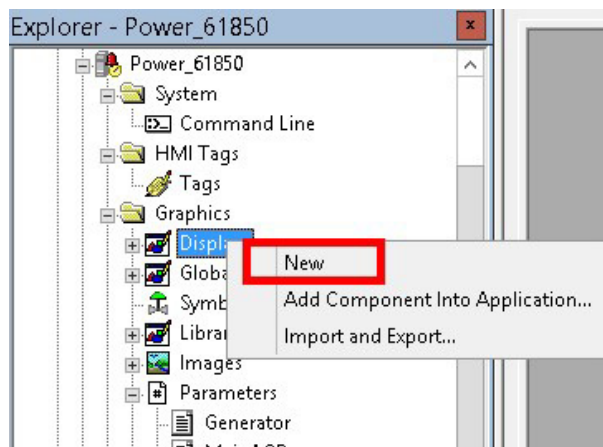


Linking the Parameter Files to an HMI Display

Now that the SEL787 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

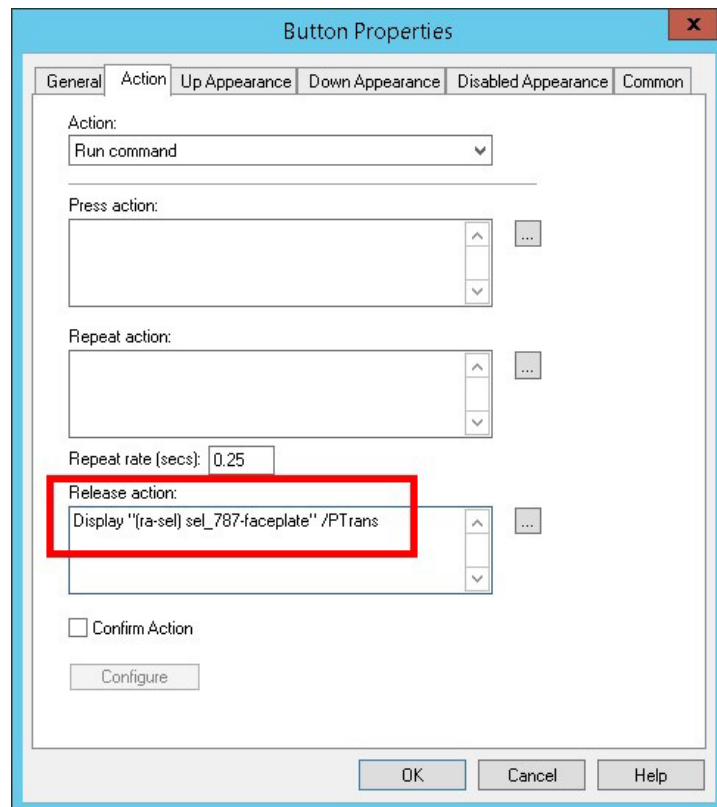


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 8](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The SEL787 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.

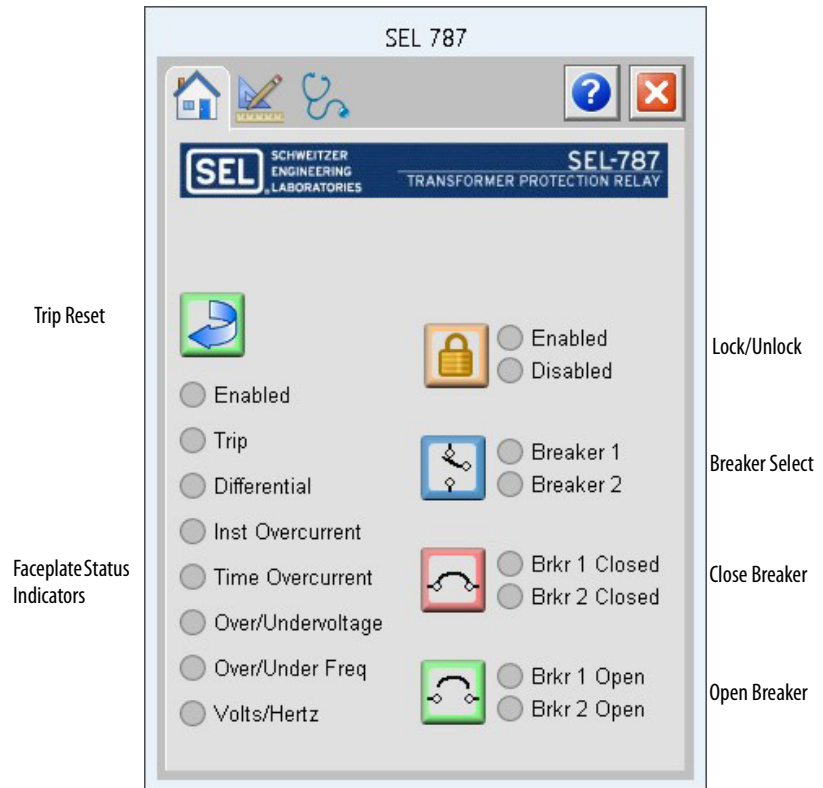


- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.






Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 28 - Operator Tab Description

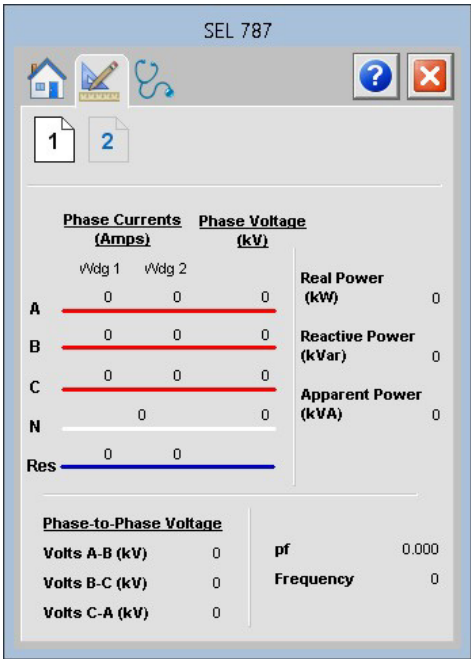
Function	Action
	Click to lock or unlock device. Function locks the device from accepting commands.
	Click to reset the device. The status of the device is indicated on the faceplate.
	Click to toggle control between breaker 1 and breaker 2.
	Click to close the circuit breaker.
	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the device.

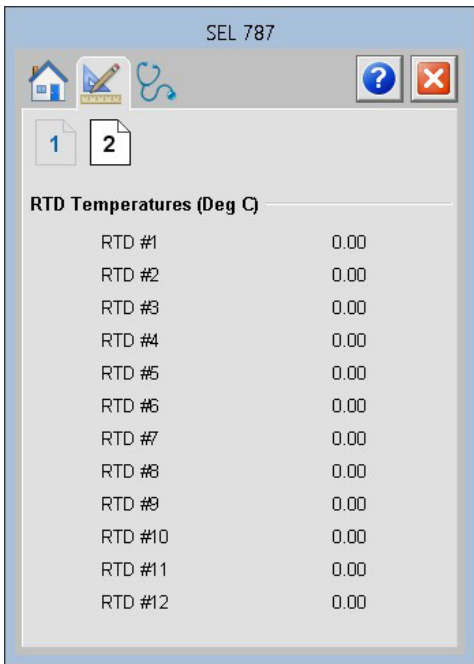
Engineering Page 1

Readout of the measurement values from the SEL-787.



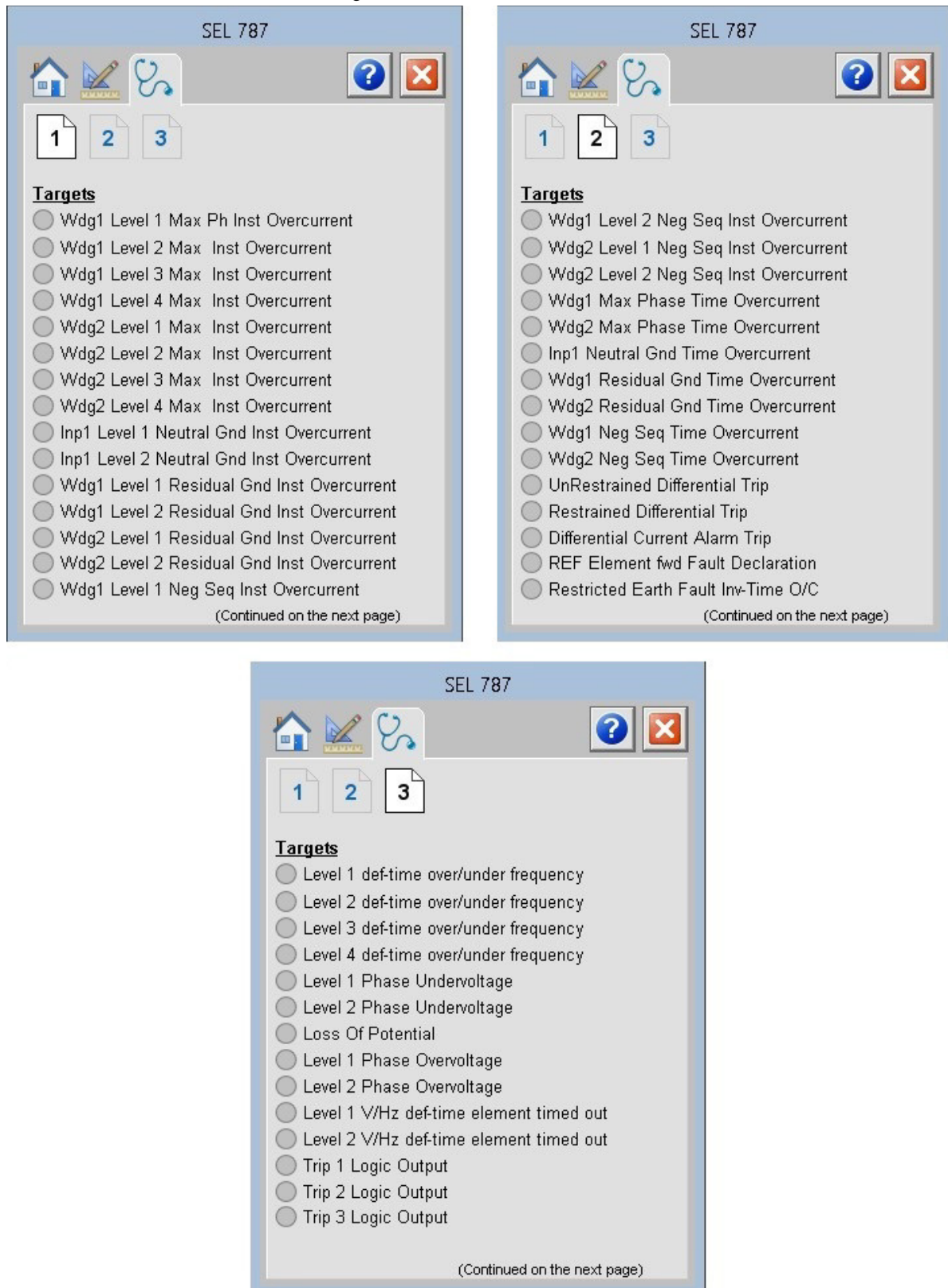
Engineering Page 2

Readout of the 12 RTD inputs that are available in the SEL-787.



Diagnostic Tab

The diagnostic tab shows which alarms are active from the device.



Help Tab

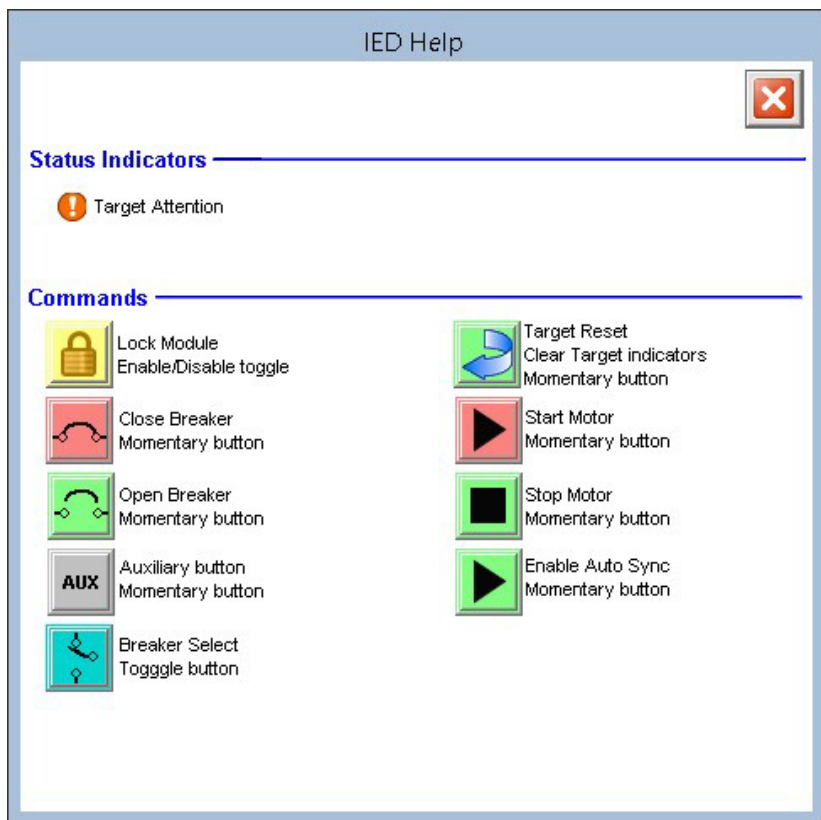


ABB EMAX2 Using EtherNet/IP Object



The ABB EMAX2 is a power/ air circuit breaker that has been configured with an electronic trip unit. This device can communicate on various industrial and electrical distribution networks including, EtherNet/IP, and IEC 61850. The device can be controlled via remote command with proper credentials. Additionally, the device also provides multiple fundamental metering data including, voltage, current, frequency, power, and more.

Topic	Page
Controller Code	150
Mapping InOut Tags to Add-On Instructions	153
Using Visualization Files	154
Faceplates	159

This instruction monitors one ABB EMAX2 breaker communication via the EtherNet/IP ABB. Alarms are provided when the device experiences a protection-related trip. The instruction also provides the capability to open and close the breaker.

Add-On Instruction

EMAX2EIPTripSource_01

EMAX2EIPTripSource

EMAX2CB

EMAX2CBOuput

Faceplate

EMAX2 EtherNet/IP

Enabled

Any Trip

Any Warning

Any Alarm

Any Timing

Ready to Close

Remote Mode

CB In Test

Wink

Wink Active

Breaker Closed

Breaker Open

Rockwell Automation Publication PROCES-RM011B-EN-P - November 2018

149

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 29](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each ABB EMAX2 breaker, which is configured in your system.

Table 29 - EMAX2 Breaker

Name	Data Type	Description
CBWink	BOOL	Diagnostic to blink status indicator for CB location
CBClose	BOOL	Close Circuit Breaker
CBOpen	BOOL	Open Circuit Breaker

InOut Structure for Rockwell Automation Library Download

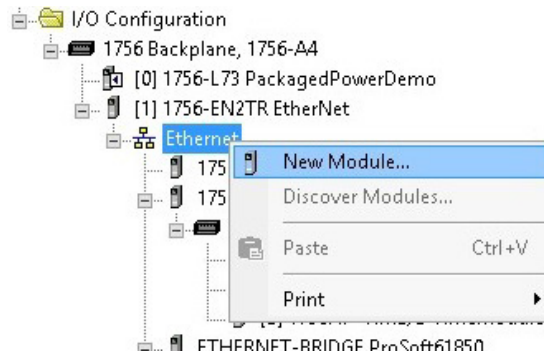
[Table 30](#) shows the InOut parameters that are available from the Rockwell Automation® Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown.

Table 30 - EMAX2 TripSource

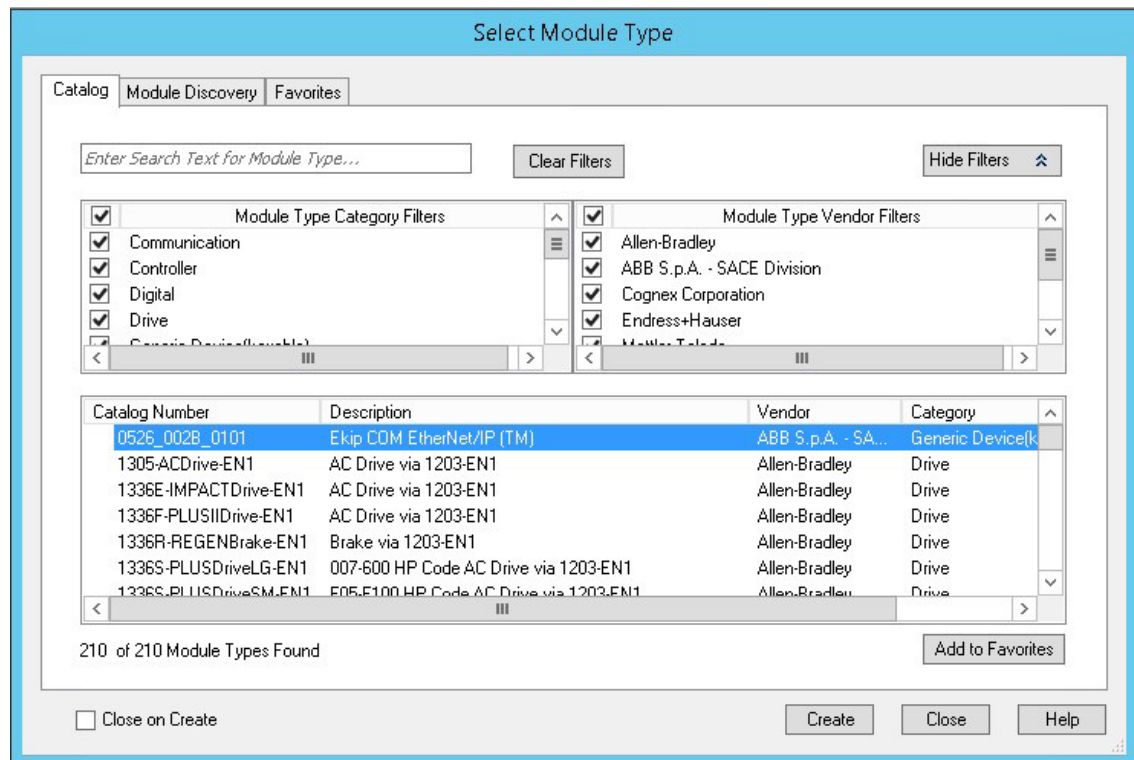
Name	Data Type	Description
EMAX2CB	_0526:002B_0101_82C511B0:I:0	Device Input Data Structure
EMAX2CB	_0526:002B_0101_82C511B0:O:0	Device Output Data Structure

Adding a Device

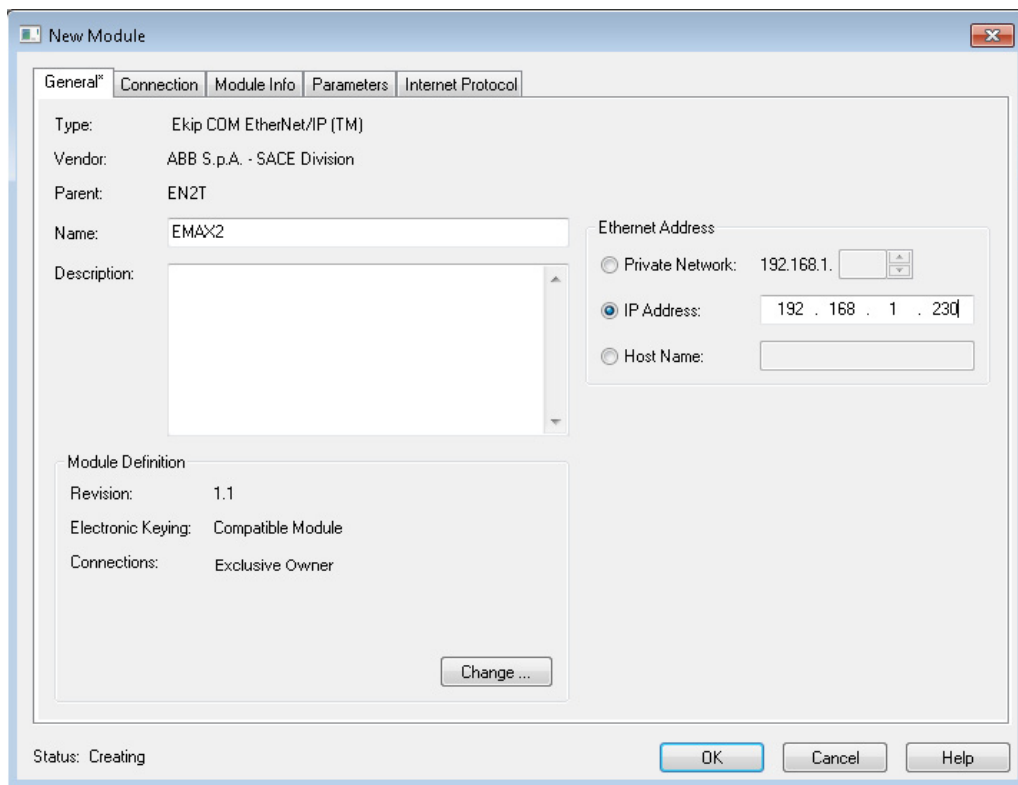
1. Open your Studio 5000® project.
2. Right-click on the Ethernet network and select New Module.



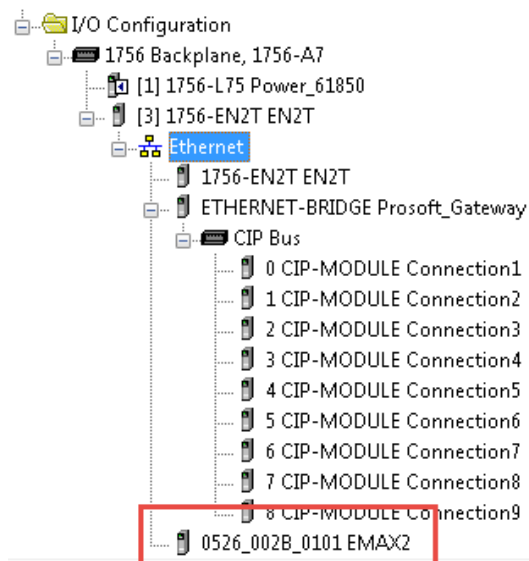
3. Select the ABB Ekip COM EtherNet/IP module from the module list and click Create.



4. Enter the name and IP address for the ABB EMAX2 circuit breaker.
Click OK.



5. Now you can see the circuit breaker in your project tree and tags in the controller tags.



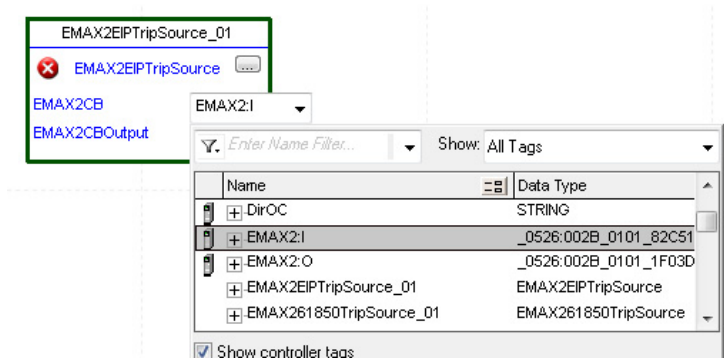
Mapping InOut Tags to Add-On Instructions

Each EMAX2 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation® Library of Electronic Protection Devices from the PCDC.

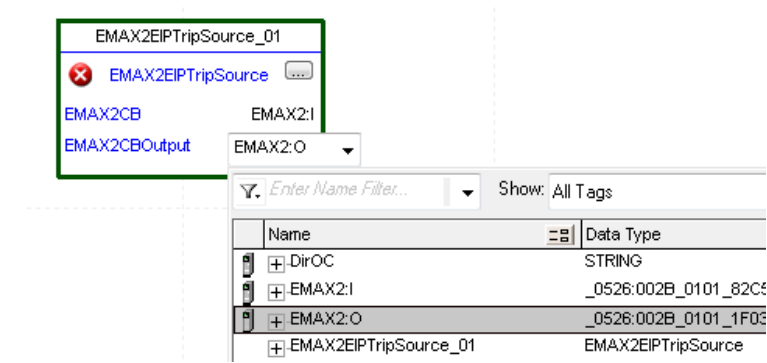
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

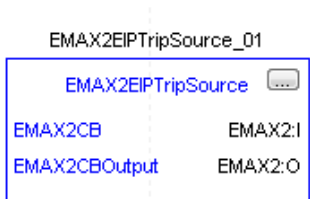
1. Double-click the question mark next to EMAX2CB of the Add-On Instruction.
2. Click the down arrow on the drop box and select the EtherNet/IP EMAX2 input tag and double-click to choose it.



3. Double-click the question mark next to EtherNet/IP EMAX2 of the Add-On Instruction.
4. Click the down arrow on the drop box and select the EMAX2 output tag and double-click to choose it.



Fully Configured Add-On Instruction

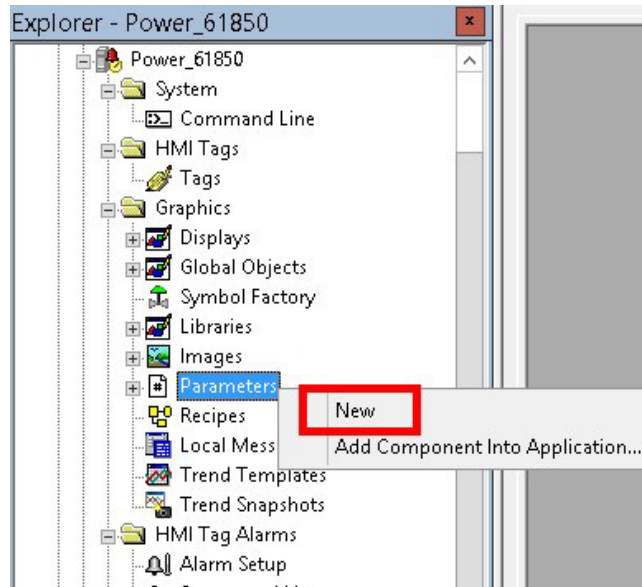


Using Visualization Files

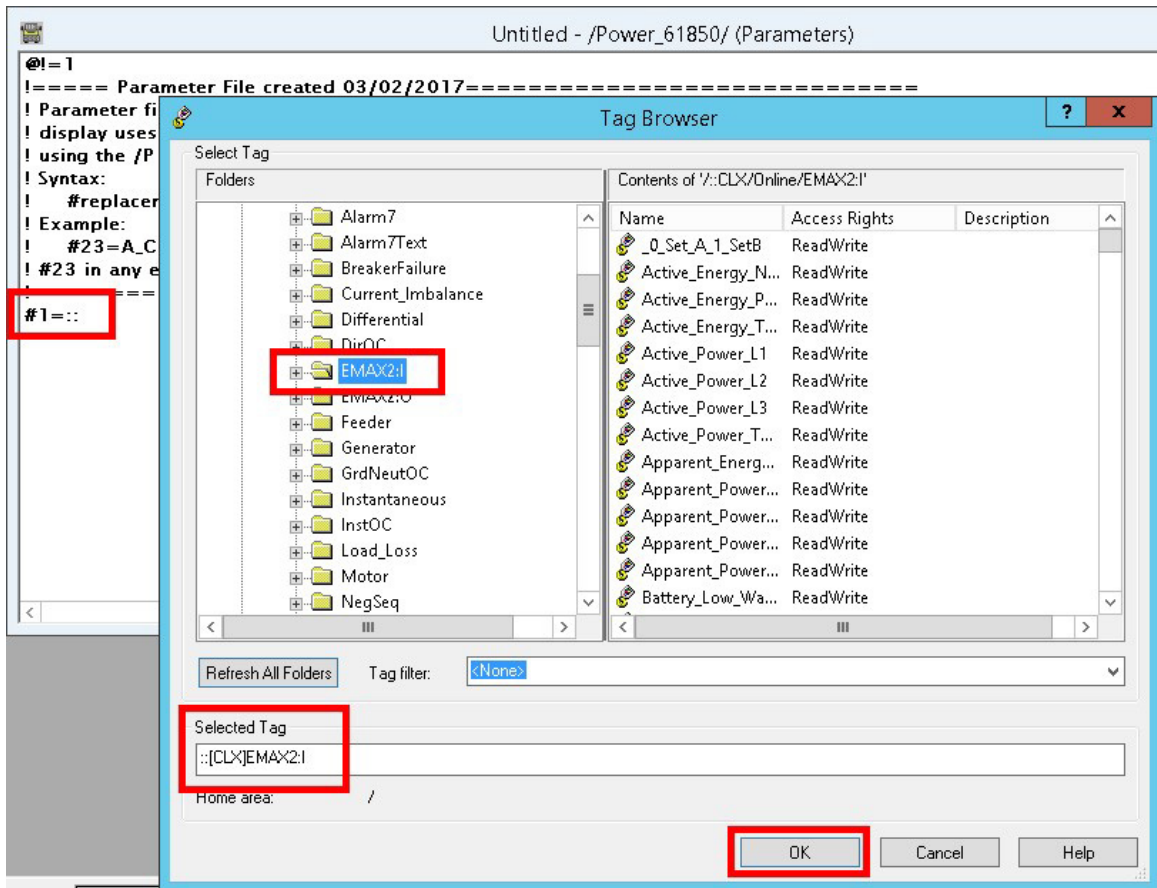
The ABB EMAX2 EtherNet/IP breaker visualization in FactoryTalk® View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each device requires a parameter file to be created.

Creating a New Parameter File

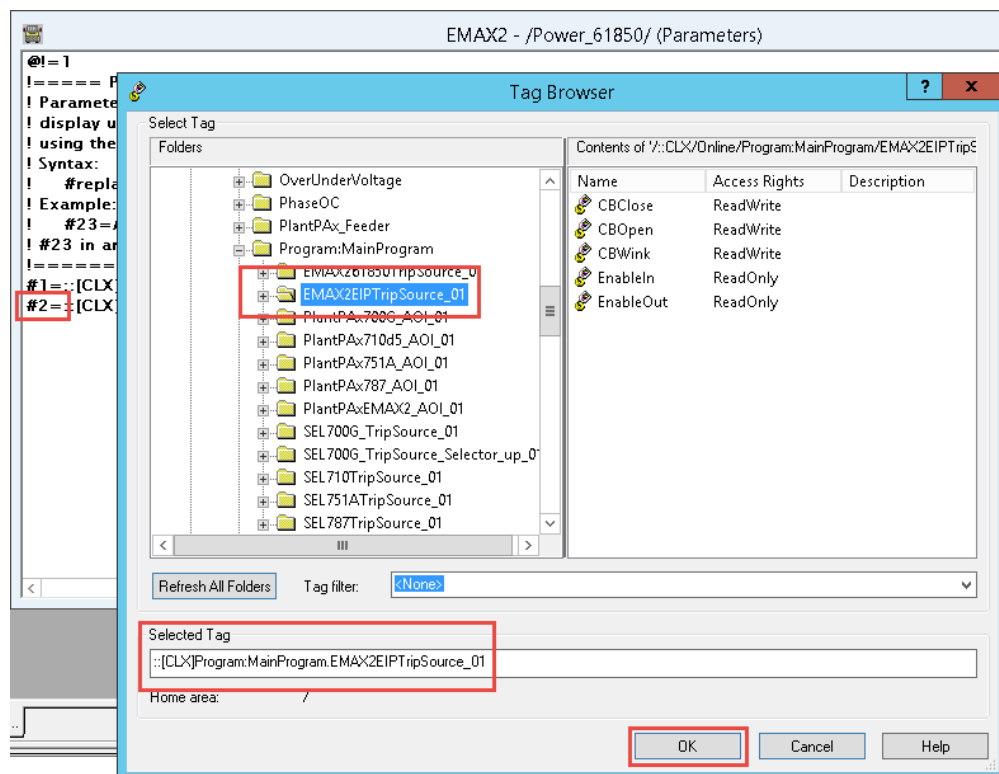
1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



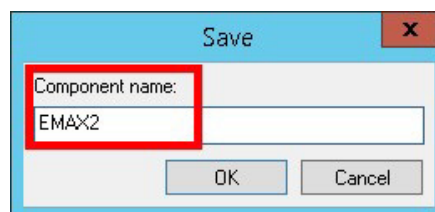
2. Type #1= under the comment box.
3. To open the Tag Browser dialog box, double-click to the right of the equal sign.
4. Expand the folders and select the tag that was used for EMAX2CB. Click OK.



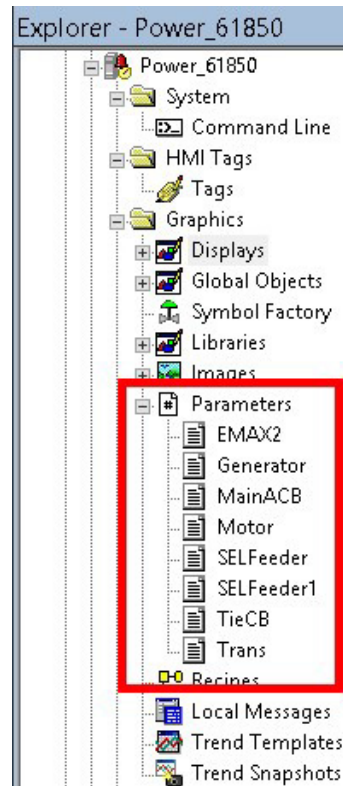
5. Press Enter to go to the next line of the parameter file.
6. To open the Tag Browser dialog box, type #2= and double-click to the right of the equal sign.
7. Expand the folders and select the tag that was used for EMAX2CBOOutput. Click OK.



8. Click the save icon and name the parameter file.
9. Click OK.



You can see the parameter file in the list in the Application Window.

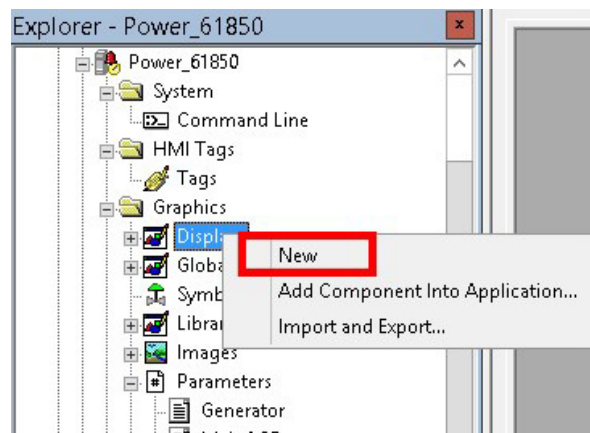


Linking the Parameter Files to an HMI Display

Now that the EMAX2 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

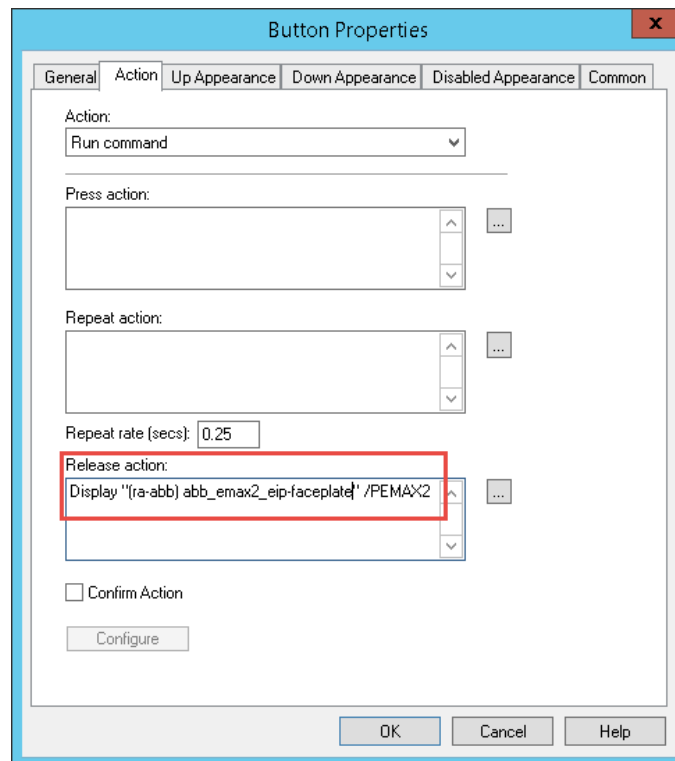


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 8](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The ABB EMAX2 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.

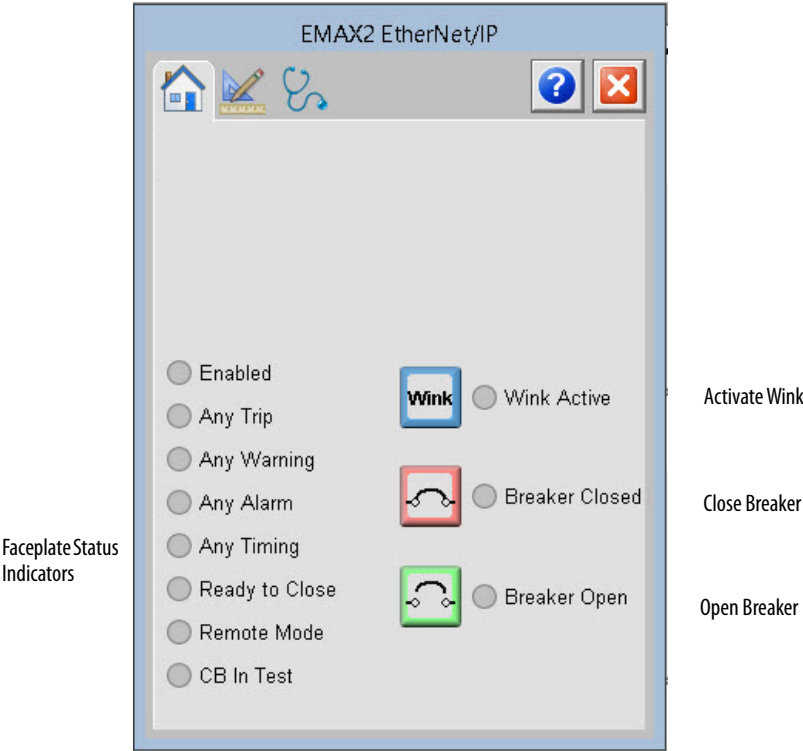


- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.




Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator mode.



The following table shows the functions that are included on the Operator tab.

Table 31 - Operator Tab Description

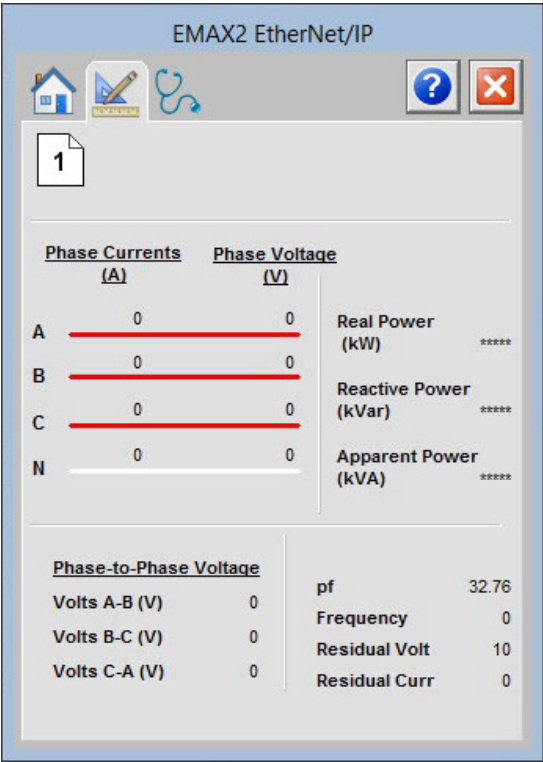
Function	Action
	Wink is an ABB diagnostic function that allows for blinking of status indicator to locate which device you're communicating with. Activate the diagnostic wink function of the circuit breaker. This activation allows for discovery of the breaker.
	Click to close the circuit breaker.
	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

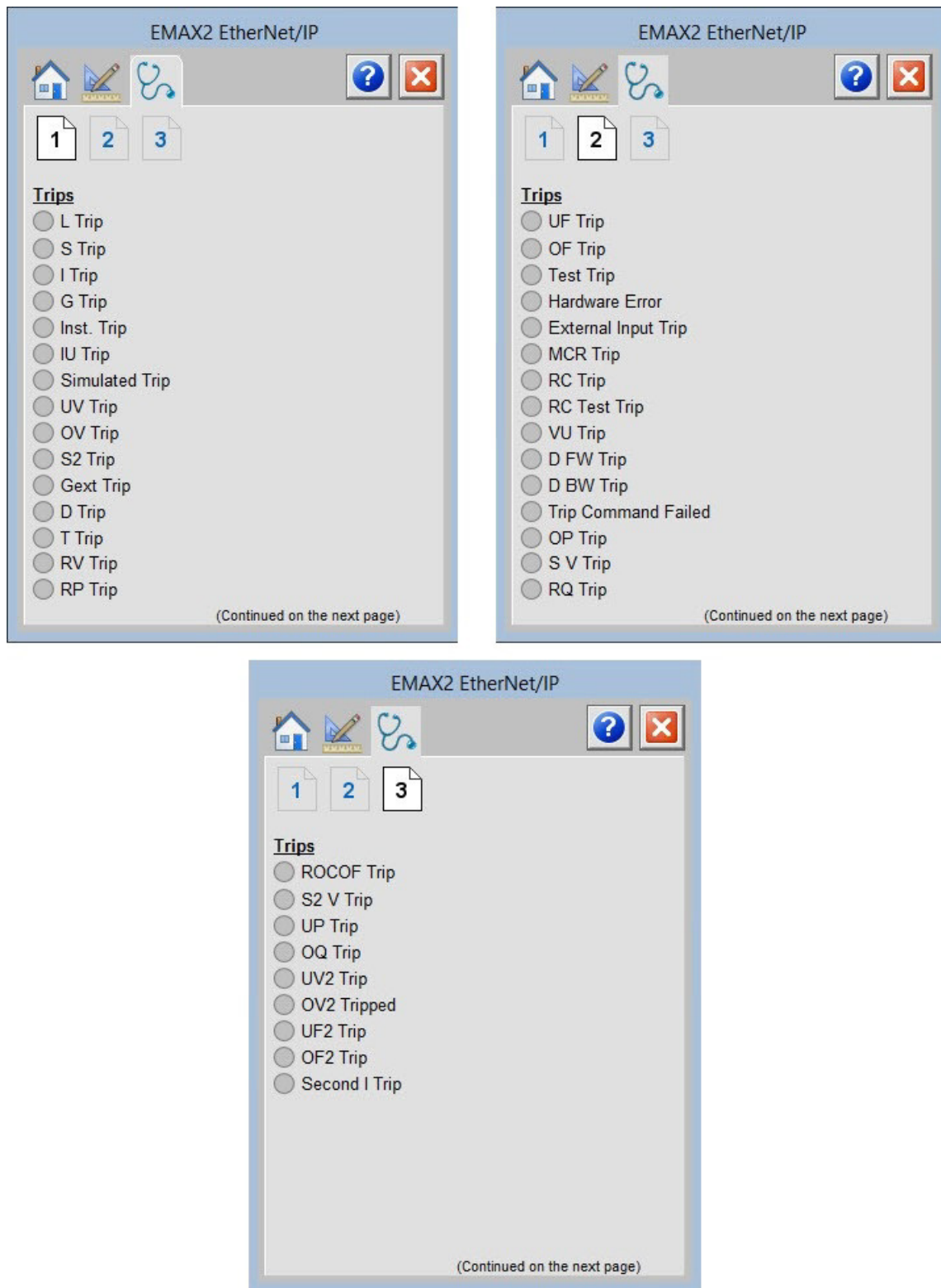
Engineering Page

Readout of the measurement values from the EMAX2.



Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab

IED Help

Status Indicators

!

Target Attention

Commands

Lock Module
Enable/Disable toggle

Close Breaker
Momentary button

Open Breaker
Momentary button

AUX

Auxiliary button
Momentary button

Breaker Select
Toggle button

Target Reset
Clear Target indicators
Momentary button

Start Motor
Momentary button

Stop Motor
Momentary button

Enable Auto Sync
Momentary button

Rockwell Automation Publication PROCES-RM011B-EN-P - November 2018

163

Notes:

ABB EMAX2 Using IEC 61850 Object



The ABB EMAX2 power circuit breaker provides a user the benefits of a power circuit breaker that is combined with the intelligence of a device. The ABB EMAX2 contains an electronic trip unit that can communicate with upstream control systems via a number of protocols and standards. When equipping the ABB EMAX2 with IEC 61850 communications, you can configure various MMS and GOOSE communications that allow SCADA/monitoring communications. Those communications also allow high speed interlocking. This chapter discusses how to integrate the EMAX2 that communicates via IEC 61850 for SCADA purposes to the PlantPax® system.

Topic	Page
Controller Code	166
Mapping InOut Tags to Add-On Instructions	167
Using Visualization Files	171
Faceplates	176

This instruction monitors one ABB EMAX2 breaker communication via the EtherNet/IP ABB. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for opening, and to close the breaker.

Add-On Instruction

EMAX261850TripSource_01

EMAX261850TripSource

CircuitBreaker

Faceplate

EMAX2 IEC 61850

☐ Enabled

☐ Any Trip

AUX

Breaker Closed

Breaker Open

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown.

Name	Data Type	Description
CircuitBreaker	<Defined by device AOI>	Device data from the device Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

InOut parameters are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each IEC 61850ABB EMAX2 that is configured in your system.

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters vary depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters vary depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

Remote Command Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. The following table has recommended uses for each bit.

Table 32 - Remote Command Structure for IEC 61850

Control Bit	Function
PlantPAxEMAX2LD0_CSW11_CO_Pos_Oper_ctlVal	Issue Open/ Command via Toggle
PlantPAxEMAX2LD0_CSW11_CO_Pos_Cancel_ctlVal	Issue Command Canceled

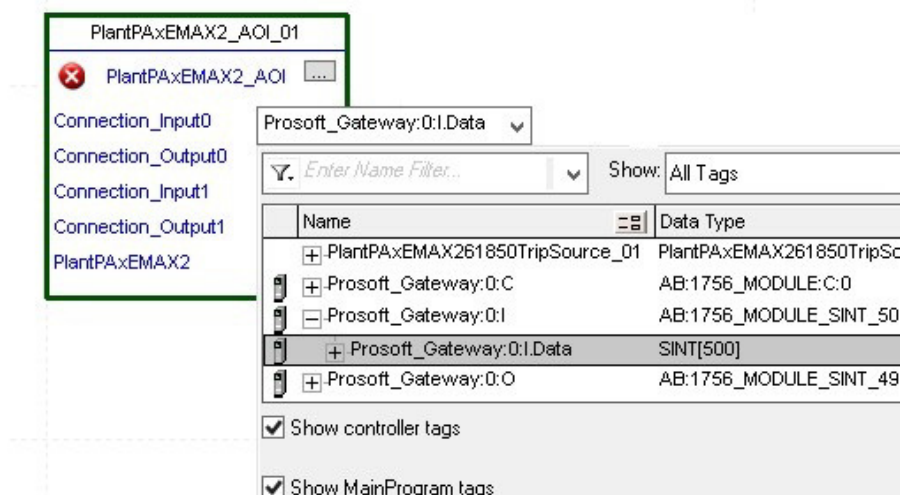
Mapping InOut Tags to Add-On Instructions

Each 61850 EMAX2 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation Library of Electronic Protection Devices from the PCDC.

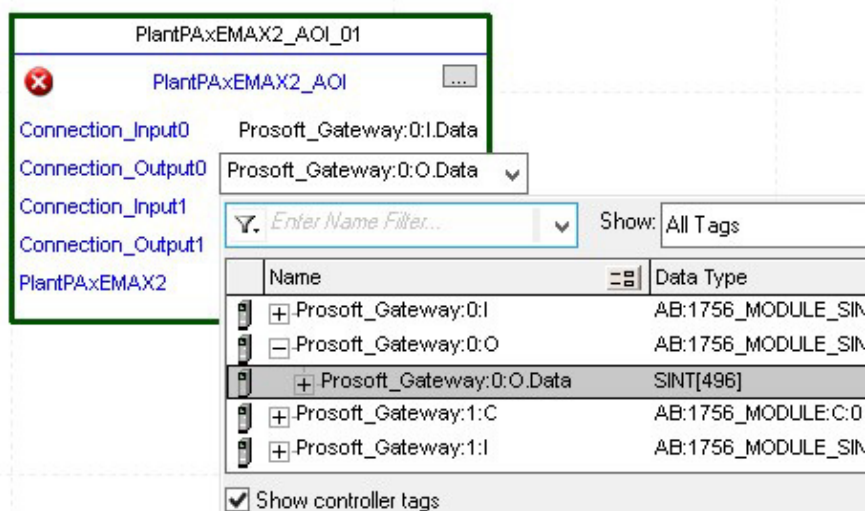
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



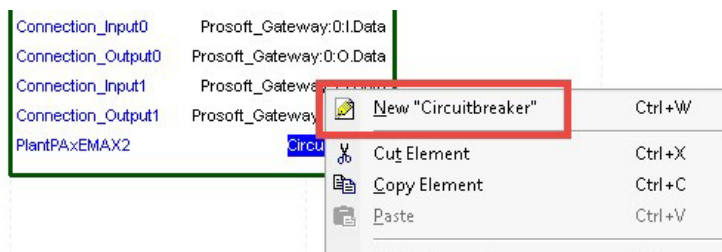
- Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
- Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



- Repeat this process for Connection Input and Output that are included with your Add-On Instructions.
- Click the question mark next to the final tag. This tag has the same name as the Add-On Instruction and the device as configured in the ProSoft Gateway. Type in a name for this tag. In this example, the name is Circuitbreaker.



- Right-click on the new tag name and select New "<tag name>".



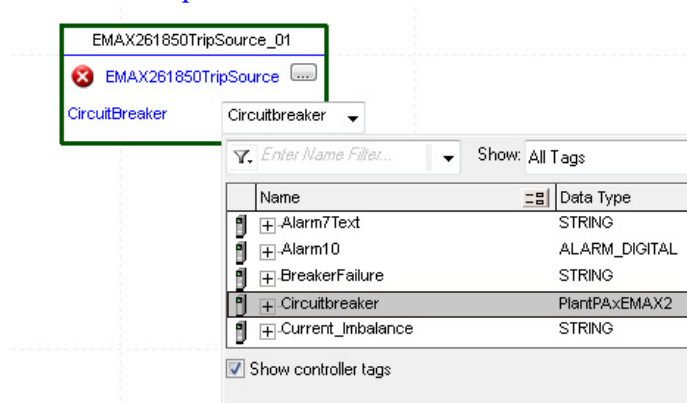
8. Click Create on the New Tag dialog box.

The 'New Tag' dialog box is shown with the following fields and options:

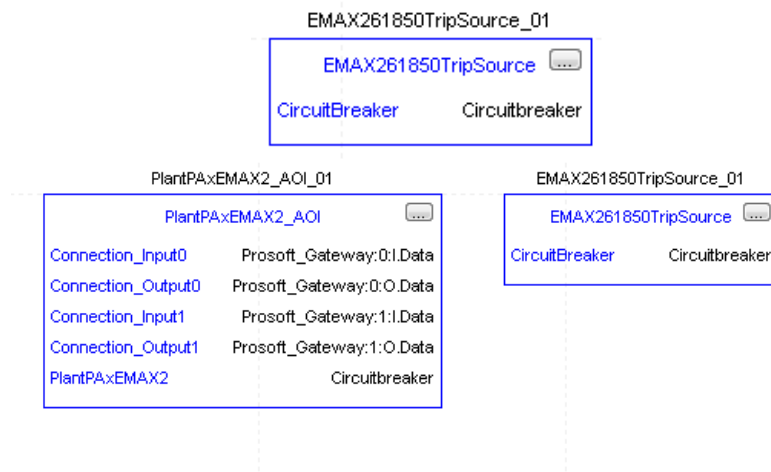
- Name:** Circuitbreaker
- Description:** (Empty text box)
- Usage:** <controller>
- Type:** Base (with a 'Connection...' button)
- Alias For:** (Empty dropdown)
- Data Type:** PlantPAxEMAX2 (with an ellipsis button)
- Parameter Connection:** (Empty dropdown)
- Scope:** Power_61850
- External Access:** Read/Write
- Style:** (Empty dropdown)
- ☐ Constant
- ☐ Sequencing
- ☐ Open Configuration
- ☐ Open Parameter Connections

Buttons on the right: **Create** (highlighted), Cancel, Help.

9. Now you can configure the ABB EMAX2_TripSource Add-On Instruction.
10. Click the question mark next to Circuitbreaker and select the tag that was created in [step 8](#).



Fully Configured Add-On Instruction



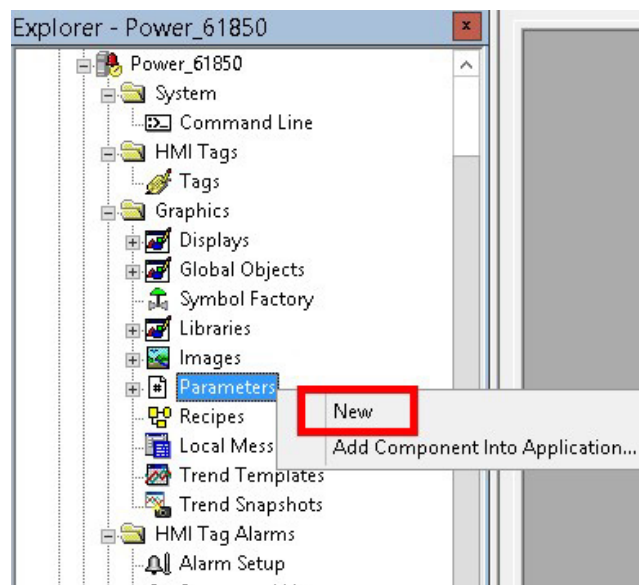
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk® View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

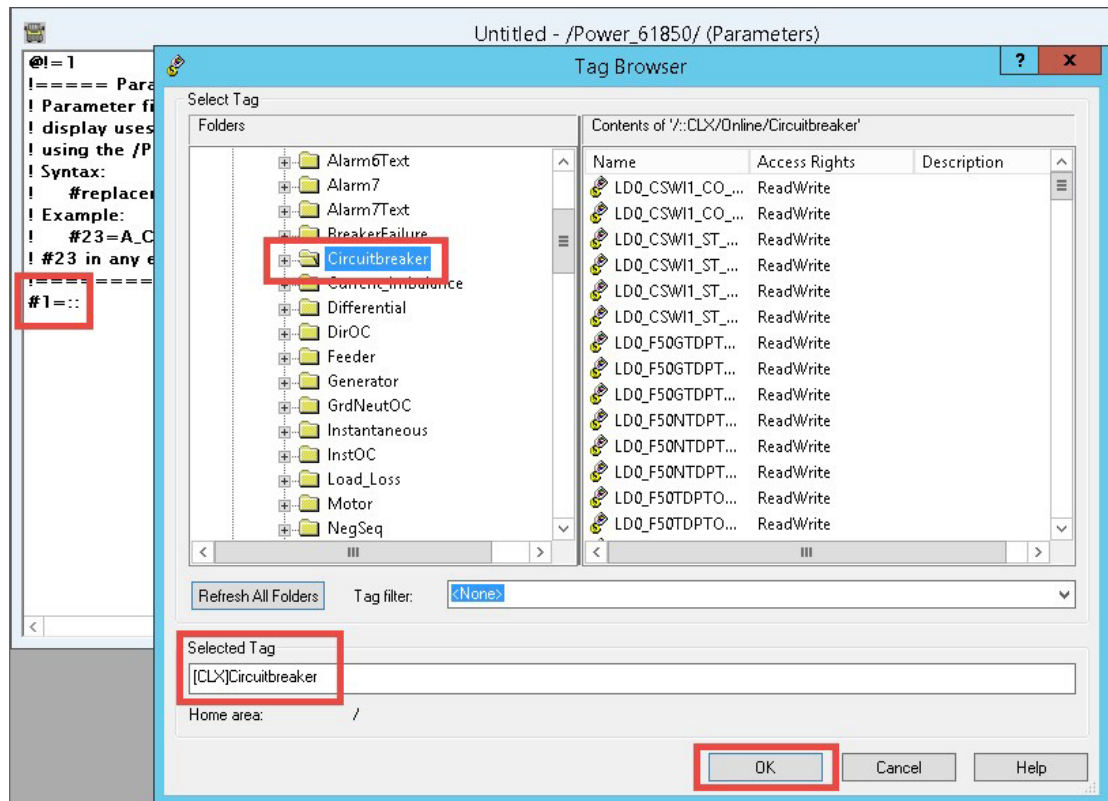
Creating a FactoryTalk View SE Parameter File

Complete these steps to create a parameter file within your FactoryTalk View SE project file.

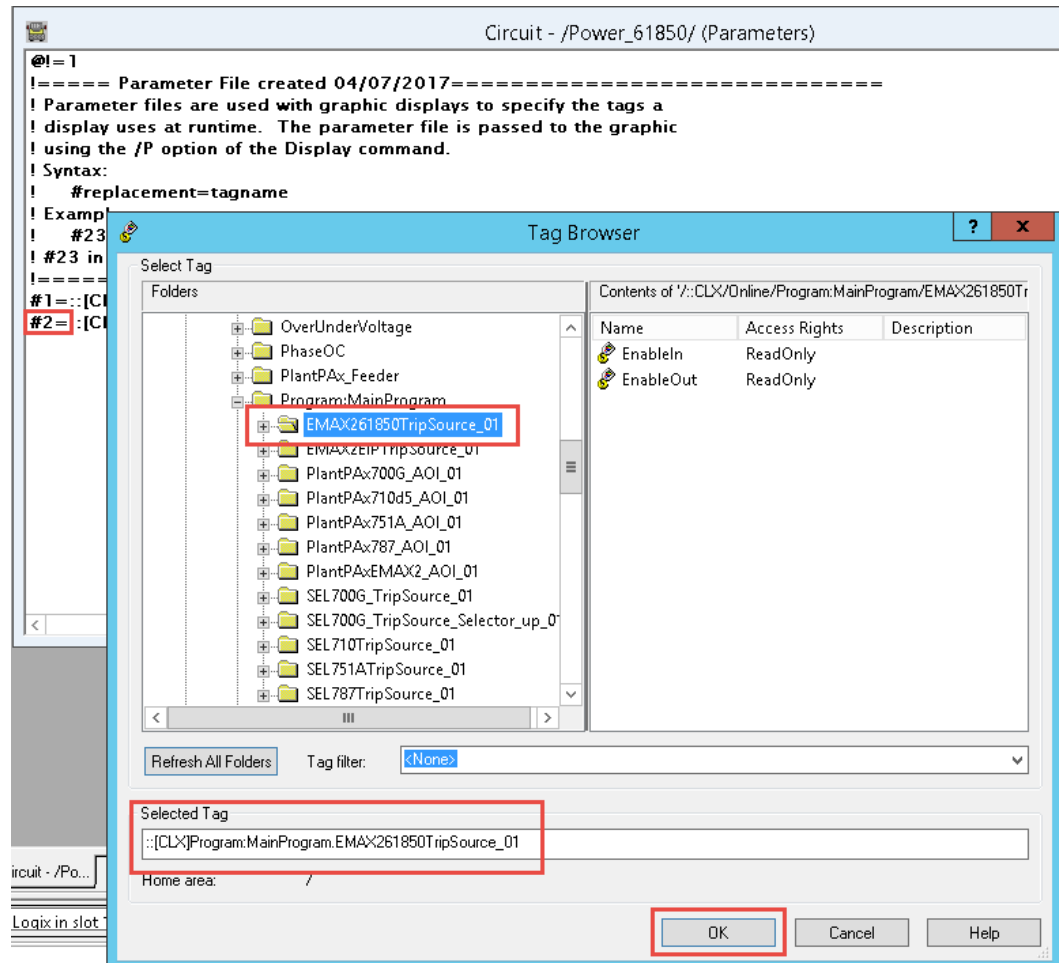
1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



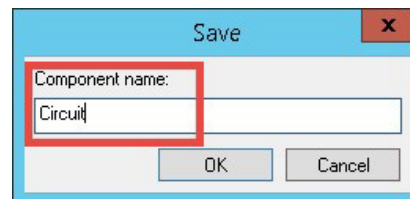
2. Type #1=:: under the comment box. Then double-click to the right of the = to open the Tag Browser dialog box.
3. Expand the folders and select the tag that was created for the device Relay Name. Click OK.



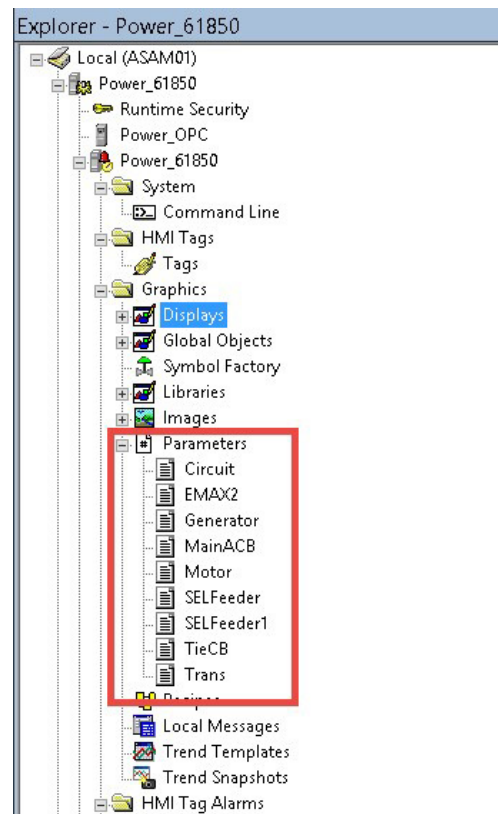
4. Press Enter to go to the next line of the parameter file.
5. Type #2= and double-click to the right of the = to open the Tag Browser dialog box.
6. Expand the folders and select the tag that was created for the device TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see the parameter file in the list in the Application Window.



Linking the Parameter Files to an HMI Display

Now that the 61850 EMAX2 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

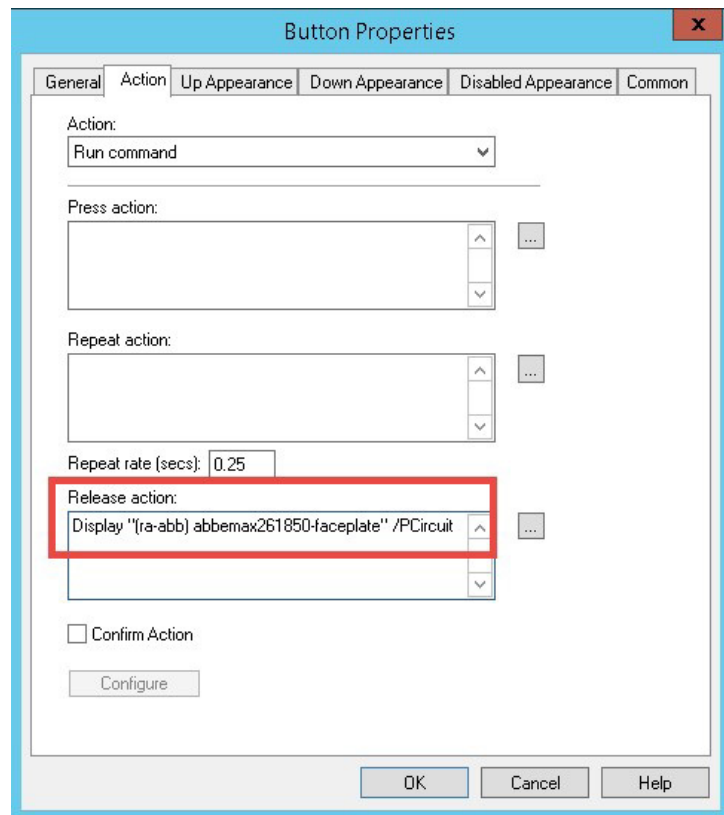
If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the release action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 8](#). For example, if your system contains multiple relays you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The 61850 EMAX2 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.

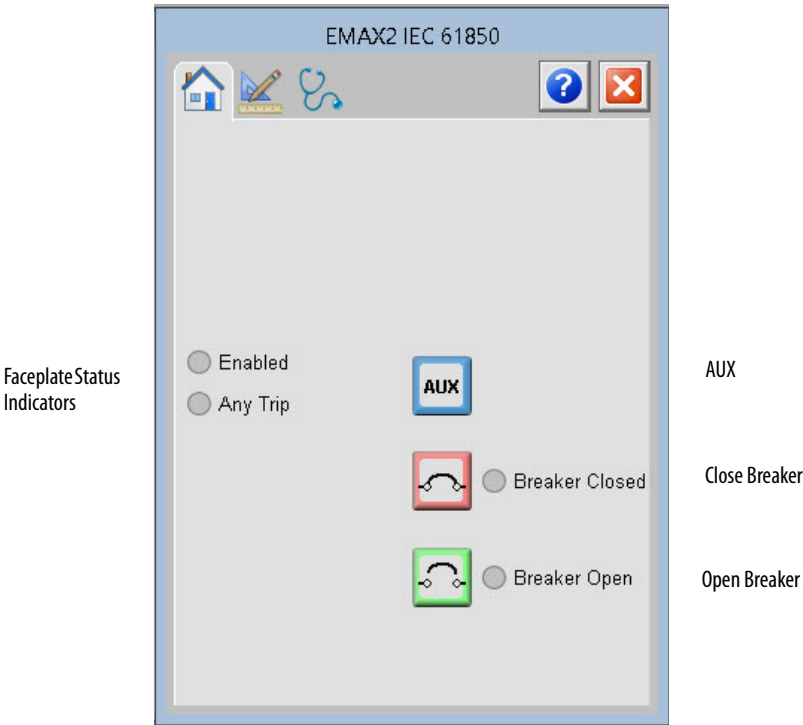


- A - Operator
- B - Engineering
- C - Diagnostics
- D - Help
- E - Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.




Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator mode.



The following table shows the functions that are included on the Operator tab.

Table 33 - Operator Tab Description

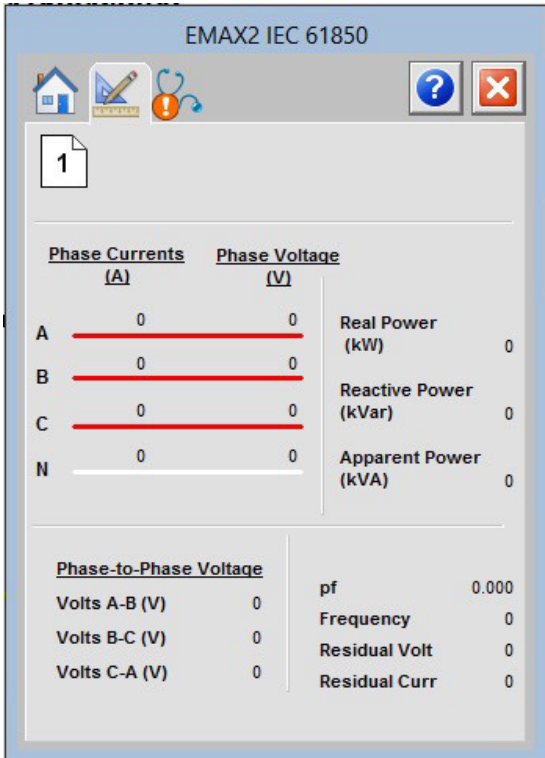
Function	Action
	Click to control AUX input.
	Click to close the circuit breaker.
	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

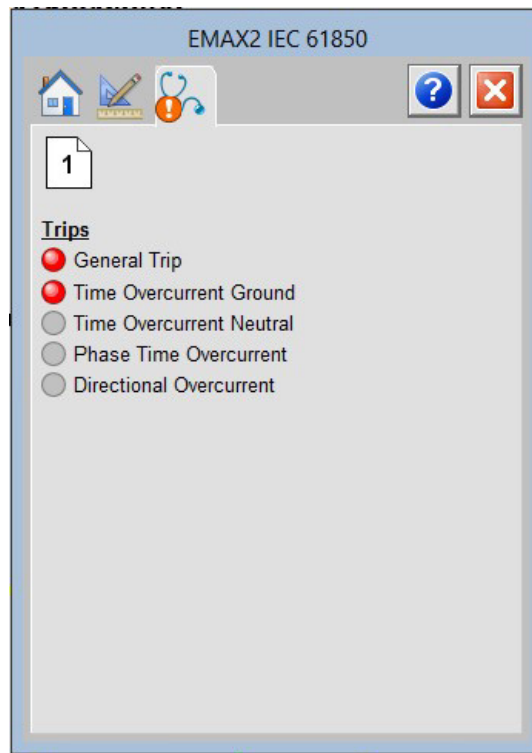
Engineering Page

Readout of the measurement values from the ABB EMAX2.

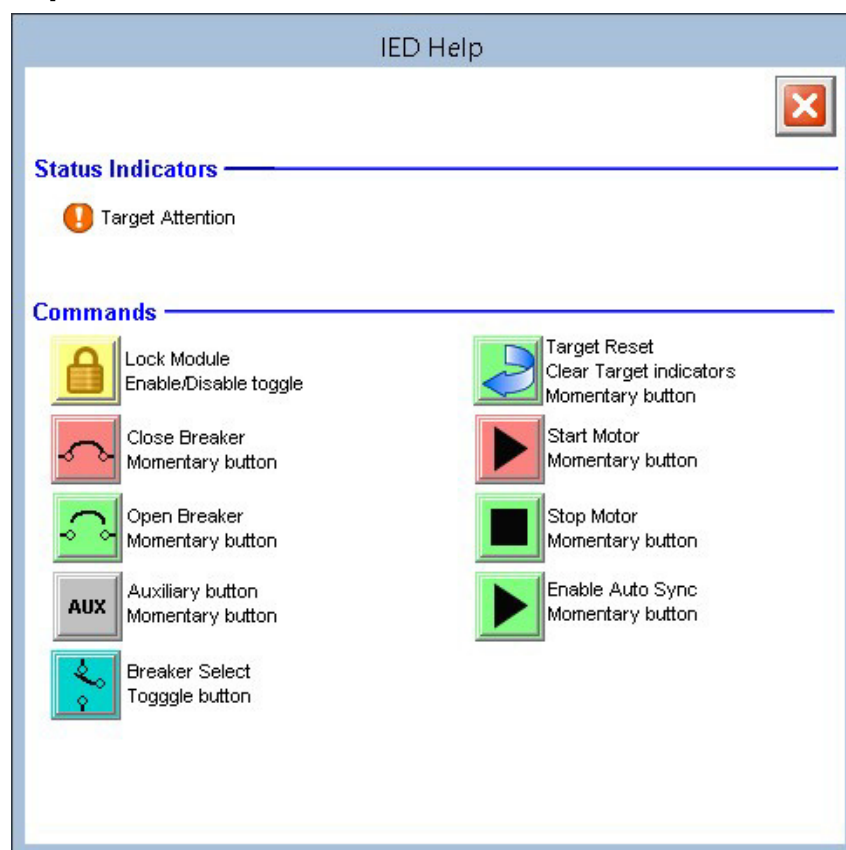


Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



GE Multilin 845 Object



Images courtesy of General Electric. Multilin and the monogram are copyright of the General Electric Company © 2018.

The General Electric (GE) 845 is a transformer differential protection relay with arc flash protection. This device provides comprehensive protection for multi-winding transformers. The GE 845 relay can provide indications of differential faults, winding overcurrent, over frequency, underfrequency, overvoltage, and various other protection features. The device also provides fundamental metering data, including (but not limited to) voltage, current, frequency, and power. The GE 845 can also provide various environmental measurements at its respective physical install location.

Topic	Page
Controller Code	182
Mapping InOut Tags to Add-On Instructions	183
Using Visualization Files	189
Faceplates	194

This Add-On Instruction monitors one GE 845 transformer protection relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for opening and closing the breaker feature of the relay. The GE 845 provides two available breakers to switch between.

Add-On Instruction

PlantPaxGE845_AOI

PlantPaxGE845_AOI	?
Connection_Input0	?
Connection_Output0	?
Connection_Input1	?
Connection_Output1	?
PlantPaxGE845	?

Faceplate

GE 845 IEC 61850

Multilin 845
Transformer Protection System

In Service

Trip

Alarm

Pickup

Test Mode

Message

Local Mode

XFMR Overload

Breaker 1

Breaker 2

Brkr 1 Closed

Brkr 2 Closed

Brkr 1 Open

Brkr 2 Open

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software-generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 34](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown in the following table. These tags are representative of the tags that are required for each GE 845 relay, which is configured in your system.

Table 34 - GE 845 Add-On Instruction

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

[Table 35](#) shows the InOut parameters that are available from the Rockwell Automation® Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown.

Table 35 - GE 845_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.

Name	Data Type	Description
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt9Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt10Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt11Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt12Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt13Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt14Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 36](#) has recommended uses for each bit.

Table 36 - Remote Bit Control - GE 845 Relay

Control Bit	Function
GGI03_CO_SPCS01_Oper_ctlVal	Enable Relay Configuration
GGI03_CO_SPCS02_Oper_ctlVal	Reset Relay
GGI03_CO_SPCS03_Oper_ctlVal	Breaker Close
GGI03_CO_SPCS04_Oper_ctlVal	Breaker Open
GGI03_CO_SPCS05_Oper_ctlVal	Breaker Select

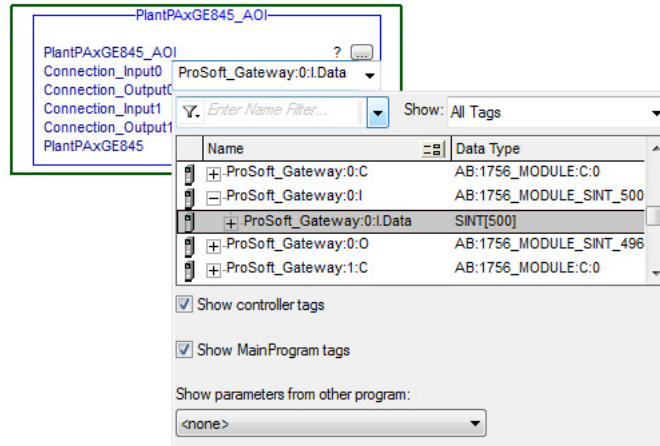
Mapping InOut Tags to Add-On Instructions

Each GE 845 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation Library of Electrical Protection Devices from the PCDC.

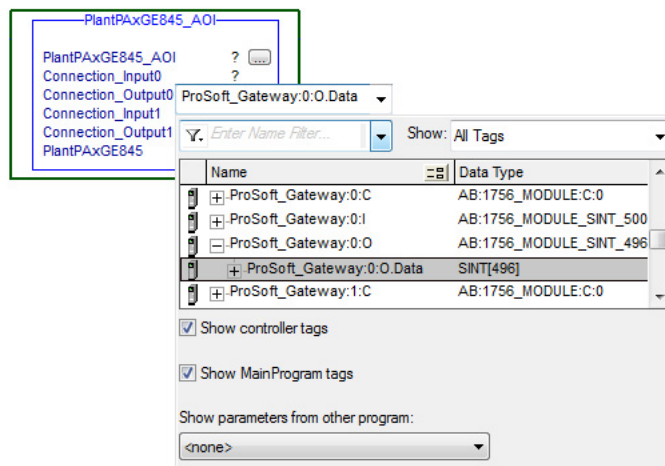
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.

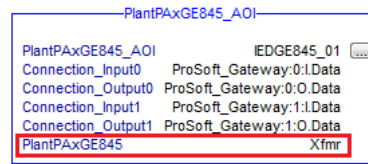


3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.

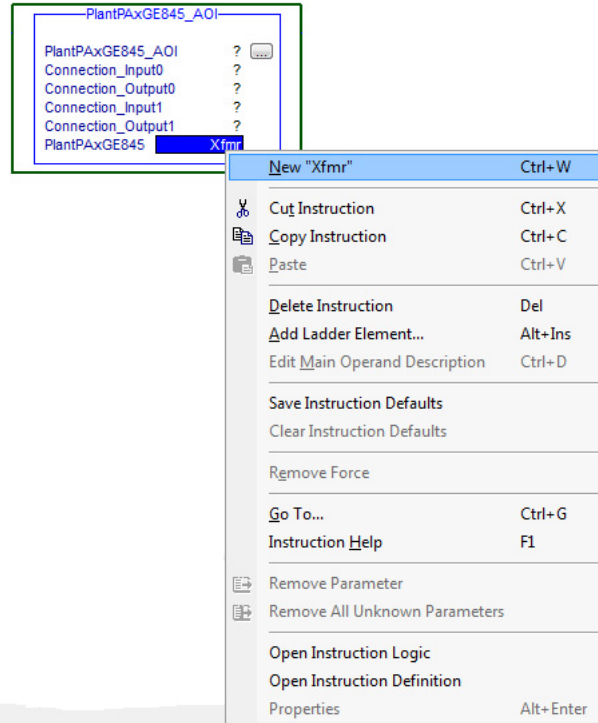


5. Repeat this process for each Connection Input and Output that is included with your Add-On Instructions.

6. Click the question mark next to the final tag. Type a tag name that represents your physical device within your Studio 5000® project. In this example, the name is “Xfmr”.

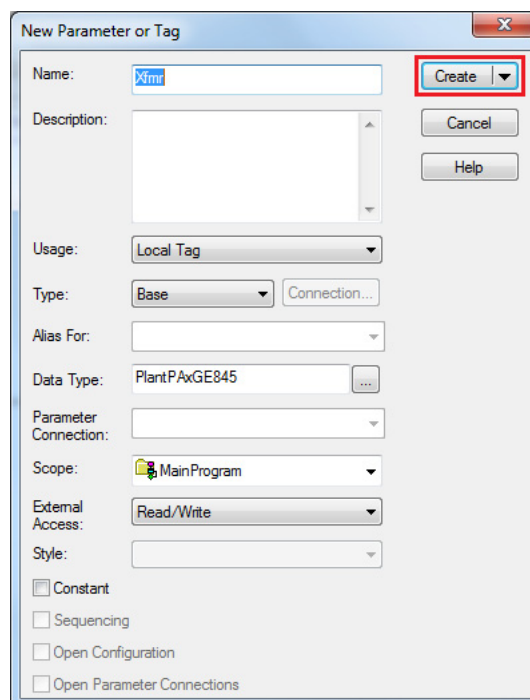


7. Right-click on the new tag name and select New “<tag name>”.



8. Click Create on the New Tag dialog box.

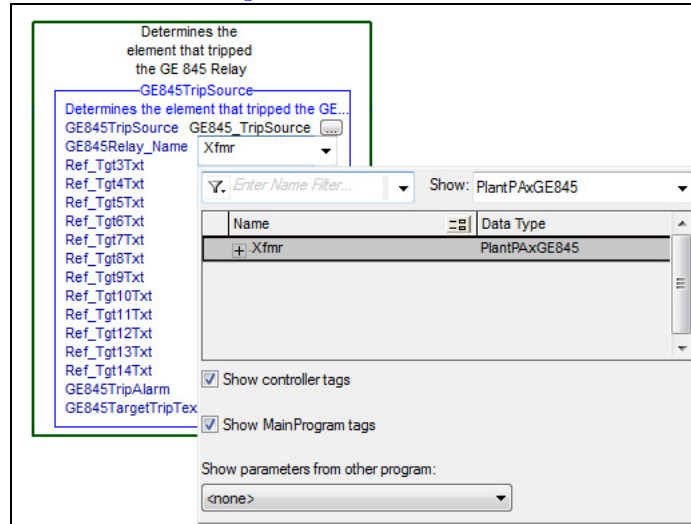
IMPORTANT Verify that Data Type matches intended device configuration.



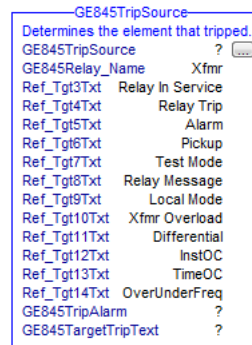
Configure Rockwell Automation Add-On Instruction

This section describes how to configure the Rockwell Automation Add-On Instruction. The functionality allows the ProSoft Add-On Instruction to work with the Rockwell Automation tags.

1. Click the question mark next to GE845Relay_Name and select the tag that was created in [step 8](#).

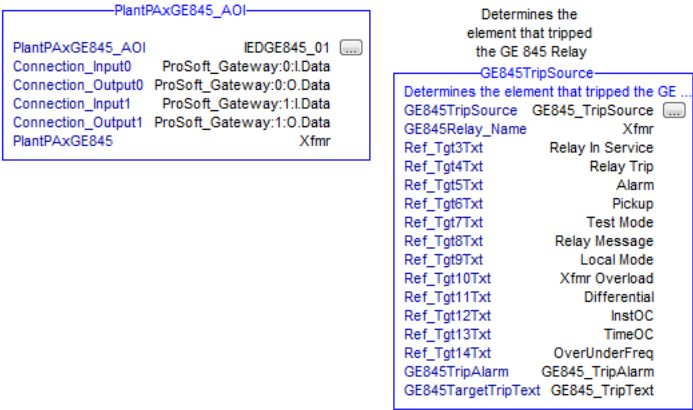


2. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.



4. Click the question mark next to GE845TripAlarm and select or create the digital alarm tag to be used.
This tag is used for alarming through the Human Machine Interface (HMI) FactoryTalk® Alarms and Events Server.
5. Click the question mark next to GE845TargetTripText and select or create the tag to be used.
This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Figure 3 - Fully Configured Add-On Instructions



- 6. Save and download your project to the controller.

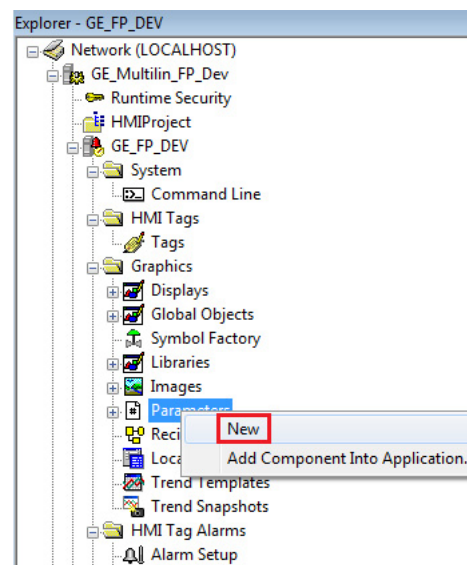
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires that a parameter file is created.

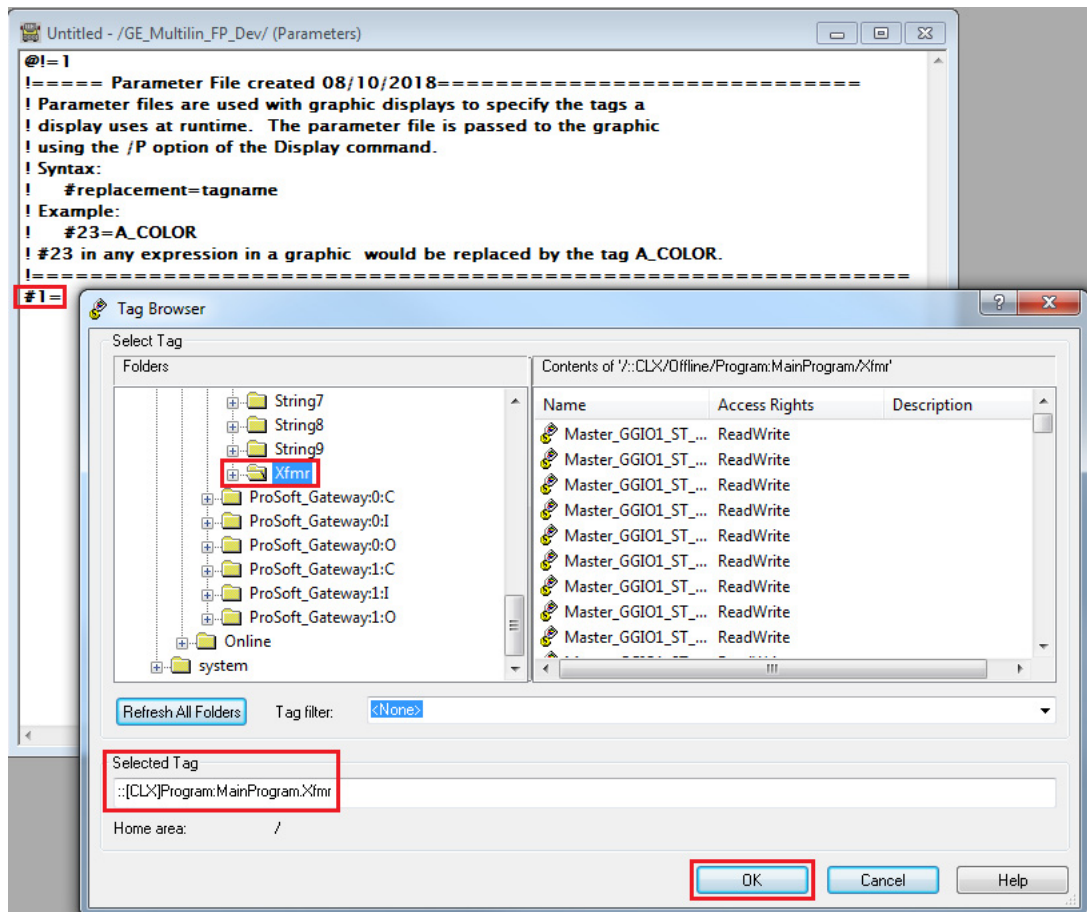
Creating a FactoryTalk View SE Parameter File

Complete these steps to create a parameter file within your FactoryTalk View SE project file.

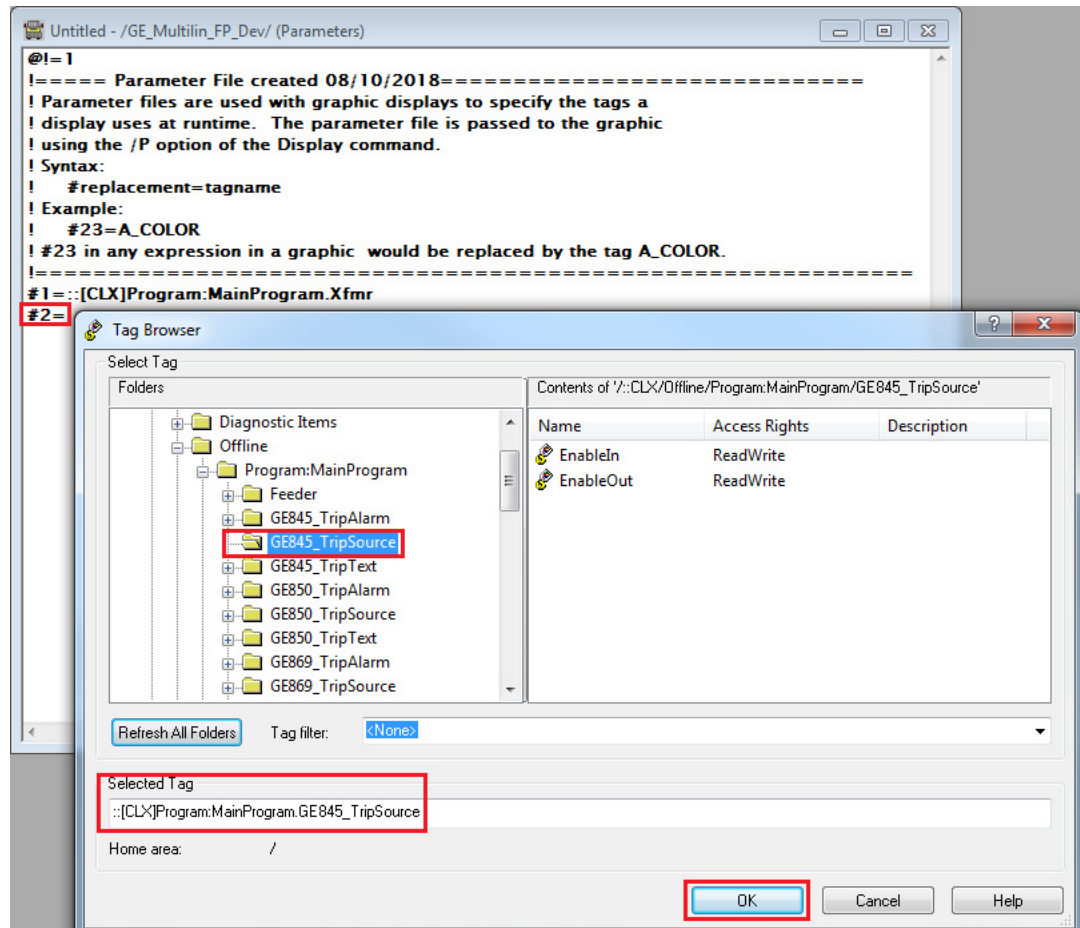
1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



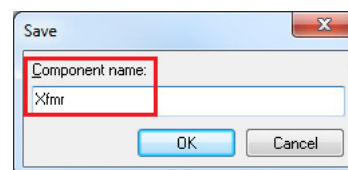
2. Type #1= under the comment box. Then double-click to the right of the =. The Tag Browser dialog box appears.
3. Expand the folders and select the tag that was created for the device Relay Name. Click OK.



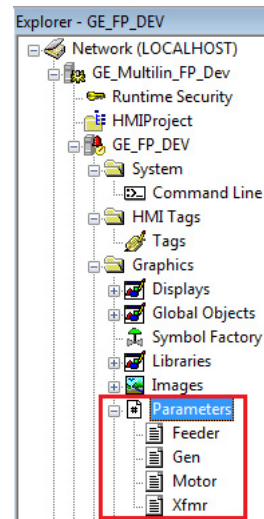
4. Press Enter to go to the next line of the parameter file.
5. Type #2= and double-click to the right of the =. The Tag Browser dialog box appears.
6. Expand the folders and select the tag that was created for the GE 845 TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see one or more parameter files in the list in the Application Window.

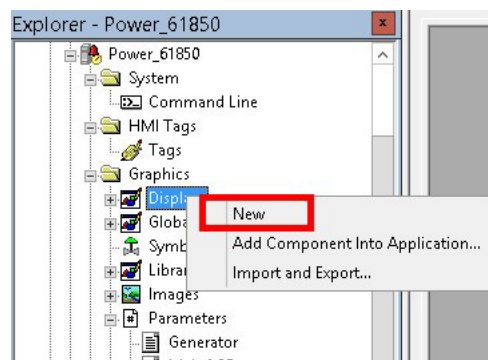


Linking the Parameter Files to an HMI Display

Now that the GE 845 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

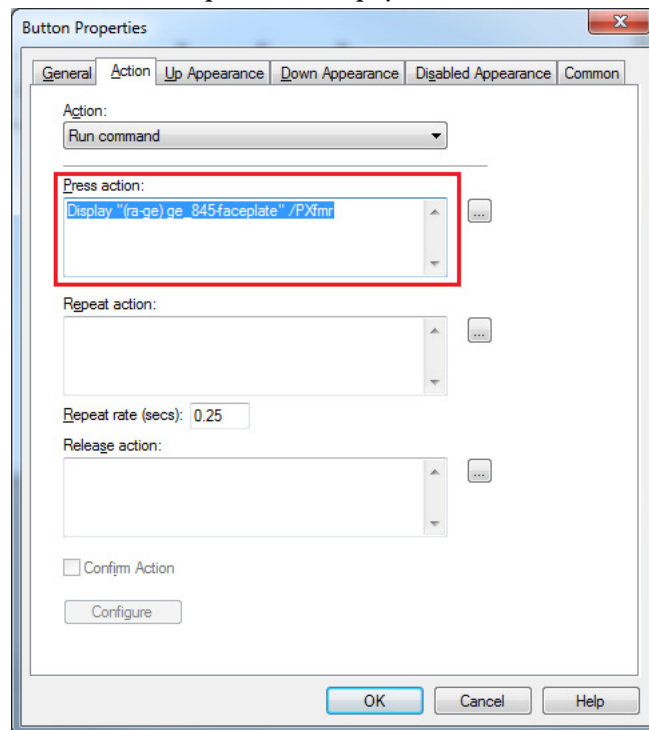


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the press action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the corresponding button. The name after /P must match the parameter file name that was created in [step 6](#). For example, if your system contains multiple relays, you must select the corresponding parameter file that represents each physical device.



When clicked, the button displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The GE 845 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.



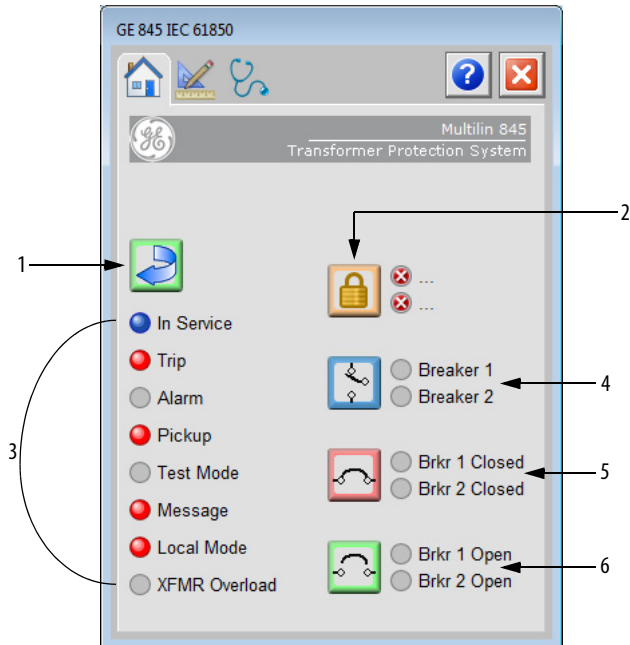
Table 37 - Faceplate Icon Descriptions

Item	Description
1	Operator
2	Engineering
3	Diagnostics
4	Help
5	Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. Here, the status and values of the instruction instance can be viewed and manipulated through its commands and settings.

Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 38 - Operator Tab Description

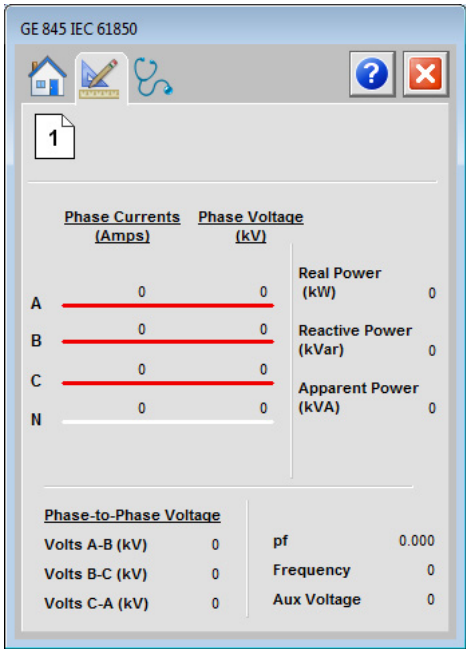
Item	Description
1	Trip reset. Click to reset the device. The status of the device is indicated on the faceplate.
2	Lock/Unlock button - not applicable to this device.
3	Faceplate Status Indicators
4	Breaker Select button. Click to toggle between breaker 1 and breaker 2.
5	Close Breaker button. Click to close the circuit breaker.
6	Open Breaker button. Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

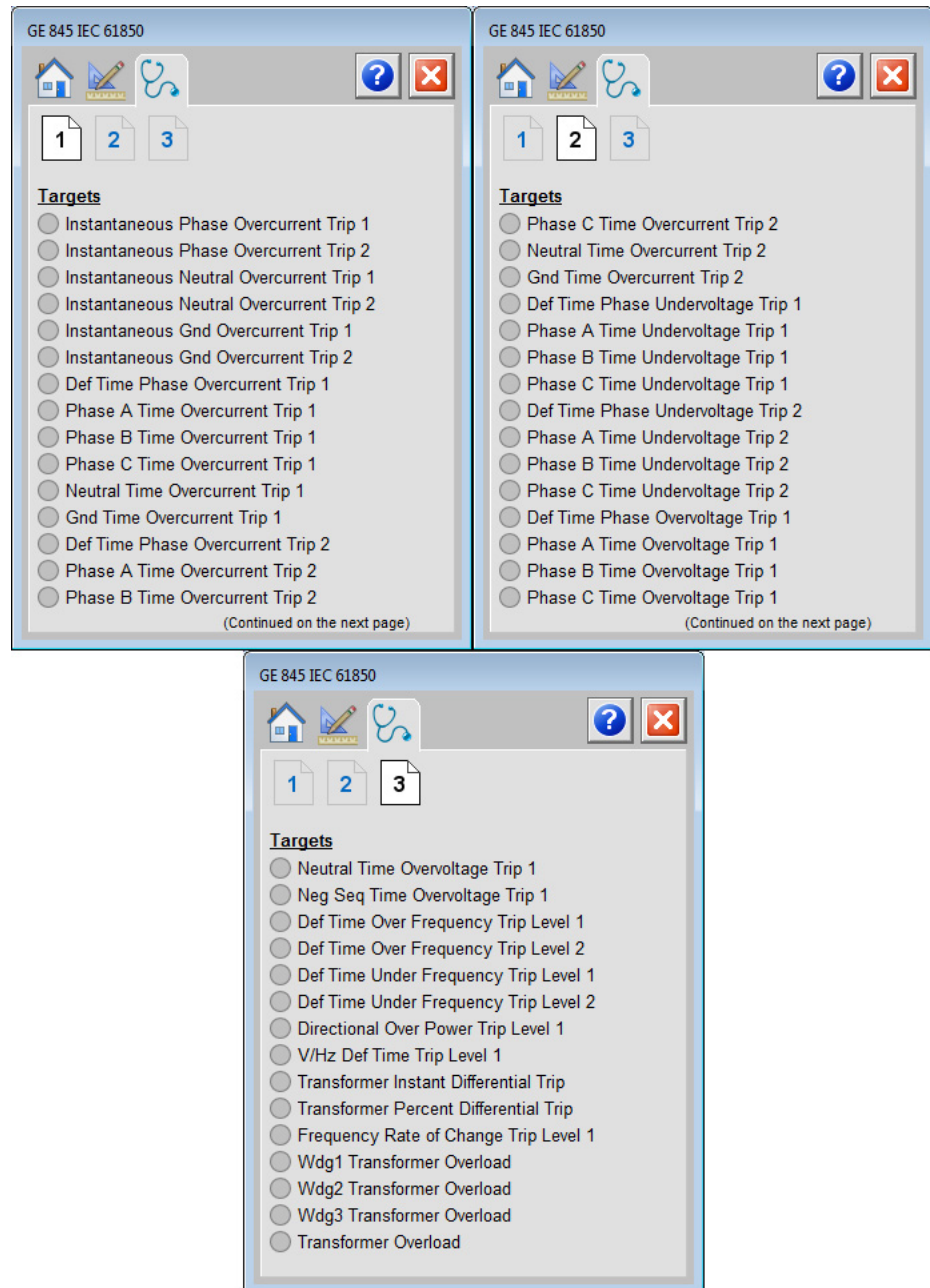
Engineering Page 1

Readout of the measurement values from the GE 845.

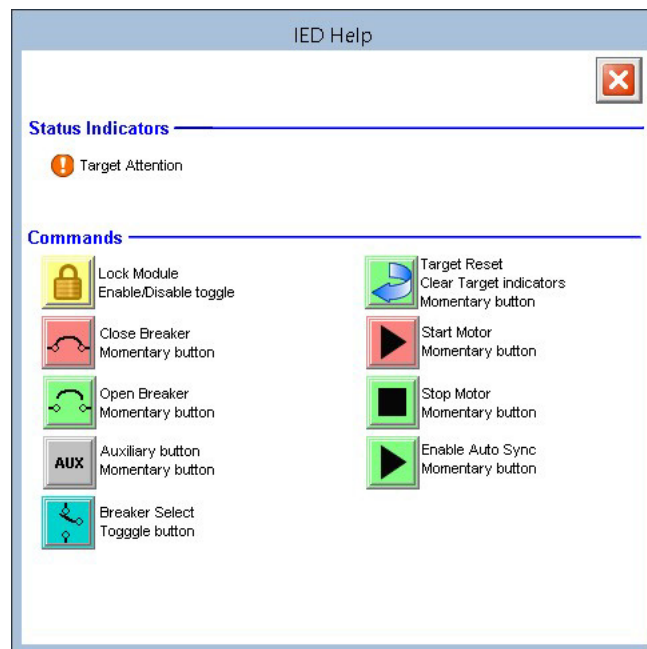


Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



GE Multilin 850 Object



Images courtesy of General Electric. Multilin and the monogram are copyright of the General Electric Company © 2018.


The General Electric (GE) 850 is a feeder protection relay with arc flash protection. This device is used to help protect an electrical bus from conditions of overcurrent, overvoltage, undervoltage, and other various protection features. The device also provides fundamental metering data, including (but not limited to) voltage, current, frequency, and power. The GE 850 can also provide various environmental measurements at its respective physical install location.

Topic	Page
Controller Code	200
Mapping InOut Tags to Add-On Instructions	201
Using Visualization Files	206
Faceplates	211

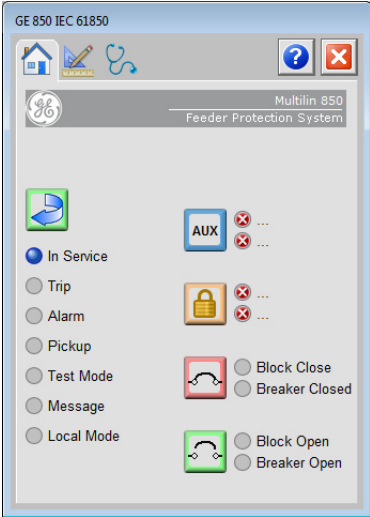
This Add-On Instruction monitors one GE 850 feeder protection relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for opening and closing the breaker feature of the relay.

Add-On Instruction

PlantPaxGE850_AOI

PlantPaxGE850_AOI	?	
Connection_Input0	?	
Connection_Output0	?	
Connection_Input1	?	
Connection_Output1	?	
PlantPaxGE850	?	

Faceplate



Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown in the following table. These tags are representative of the tags that are required for each GE 850 relay, which is configured in your system.

Table 39 - GE 850 Add-On Instruction

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

[Table 40](#) shows the InOut parameters that are available for download from the Rockwell Automation Library of Electrical Protection Devices in the PCDC. These external tags must be of the data type shown.

Table 40 - GE 850_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.

Name	Data Type	Description
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt9Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. The following table has recommended uses for each bit.

Table 41 - Remote Bit Control - GE 850 Relay

Control Bit	Function
GGIO3_CO_SPCS01_Oper_ctlVal	Enable Relay Configuration
GGIO3_CO_SPCS02_Oper_ctlVal	Reset Relay
GGIO3_CO_SPCS03_Oper_ctlVal	Breaker Close
GGIO3_CO_SPCS04_Oper_ctlVal	Breaker Open

Mapping InOut Tags to Add-On Instructions

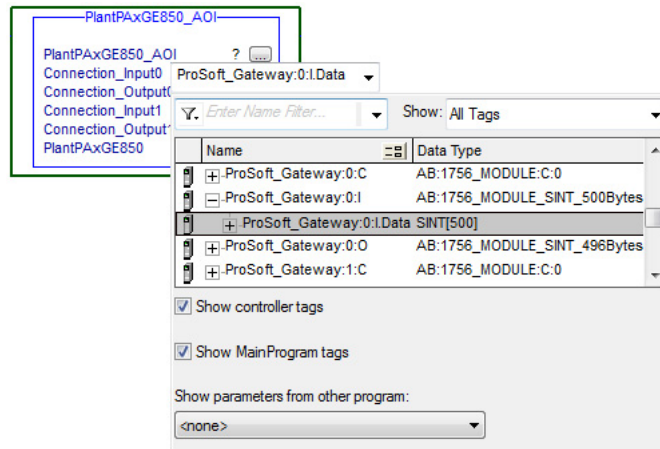
Each GE 850 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation® Library of Electrical Protection Devices from the PCDC.

Associate Controller Tags to ProSoft Add-On Instruction

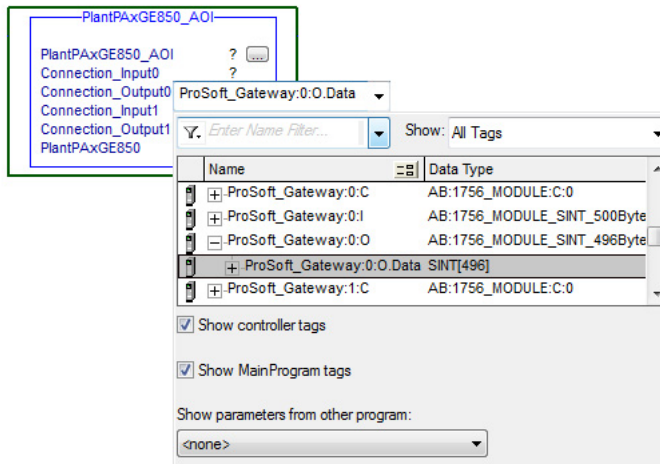
Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.

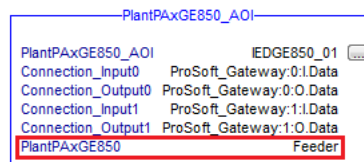
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



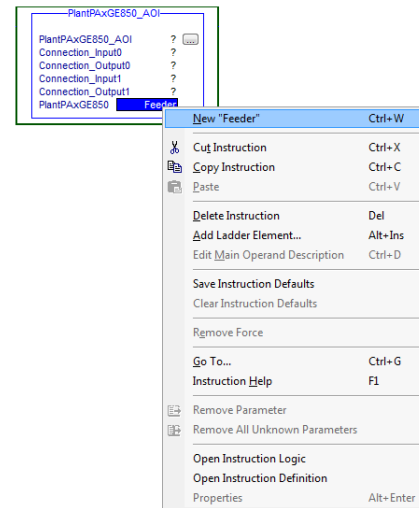
3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



5. Repeat this process for each Connection Input and Output that is included with your Add-On Instructions.
6. Click the question mark next to the final tag. Type a tag name that represents your physical device within your Studio 5000® project. In this example, the name is "Feeder".

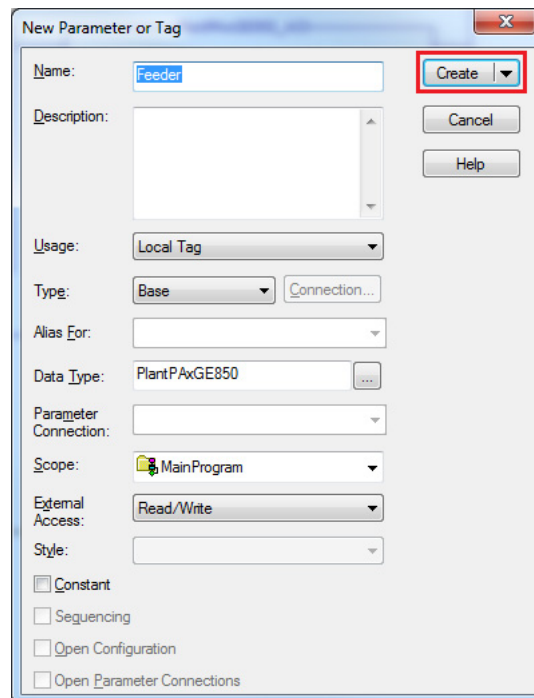


7. Right-click on the new tag name and select New "<tag name>".



8. Click Create on the New Tag dialog box.

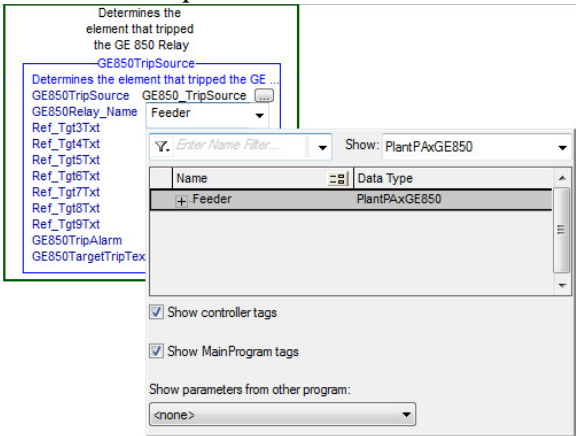
IMPORTANT Verify that Data Type matches intended device configuration.



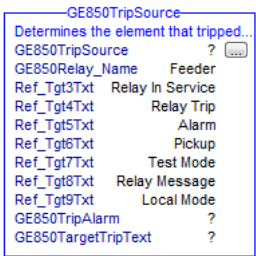
Configure Rockwell Automation Add-On Instruction

This section describes how to configure the Rockwell Automation Add-On Instruction. The functionality allows the ProSoft Add-On Instruction to work with the Rockwell Automation tags.

1. Click the question mark next to GE 850 Relay_Name and select the tag that was created in the previous section.



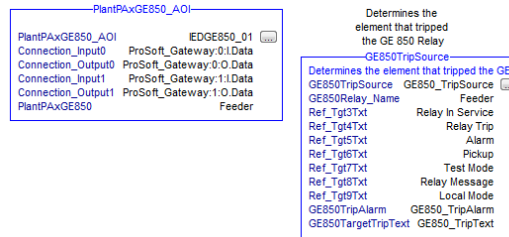
2. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.



4. Click the question mark next to GE850TripAlarm and select or create the digital alarm tag to be used.
This tag is used for alarming through the Human Machine Interface (HMI) FactoryTalk® Alarms and Events Server.

5. Click the question mark next to GE850TargetTripText and select or create the tag to be used.
This tag is used to alarm through the HMI FactoryTalk Alarms and Events Server.

Figure 4 - Fully Configured Add-On Instructions



6. Save and download your project to the controller.

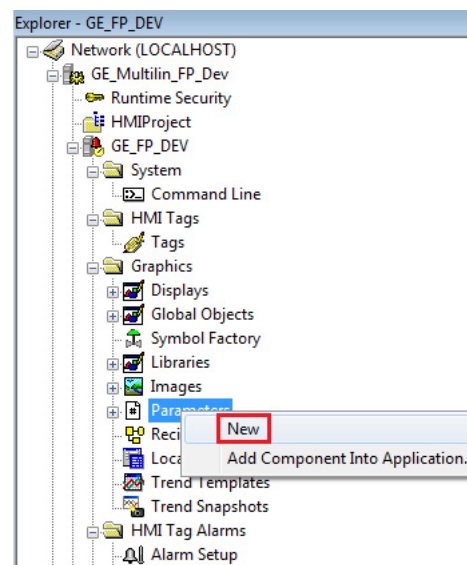
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

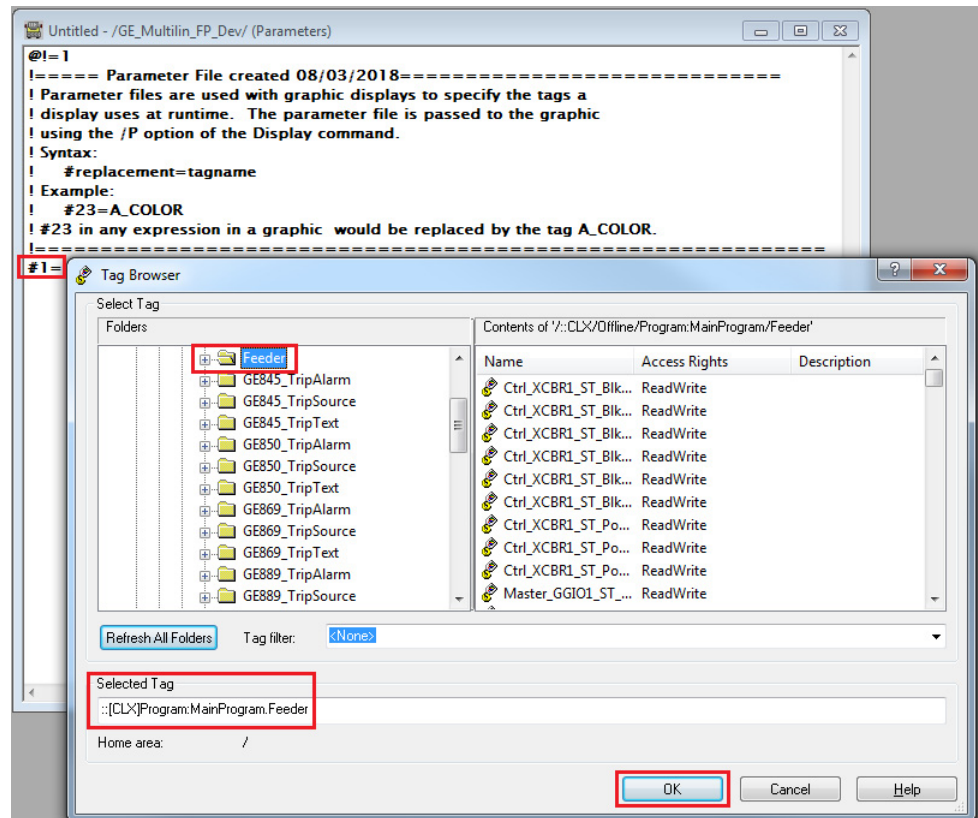
Creating a FactoryTalk View SE Parameter File

Complete these steps to create a parameter file within your FactoryTalk View SE project file.

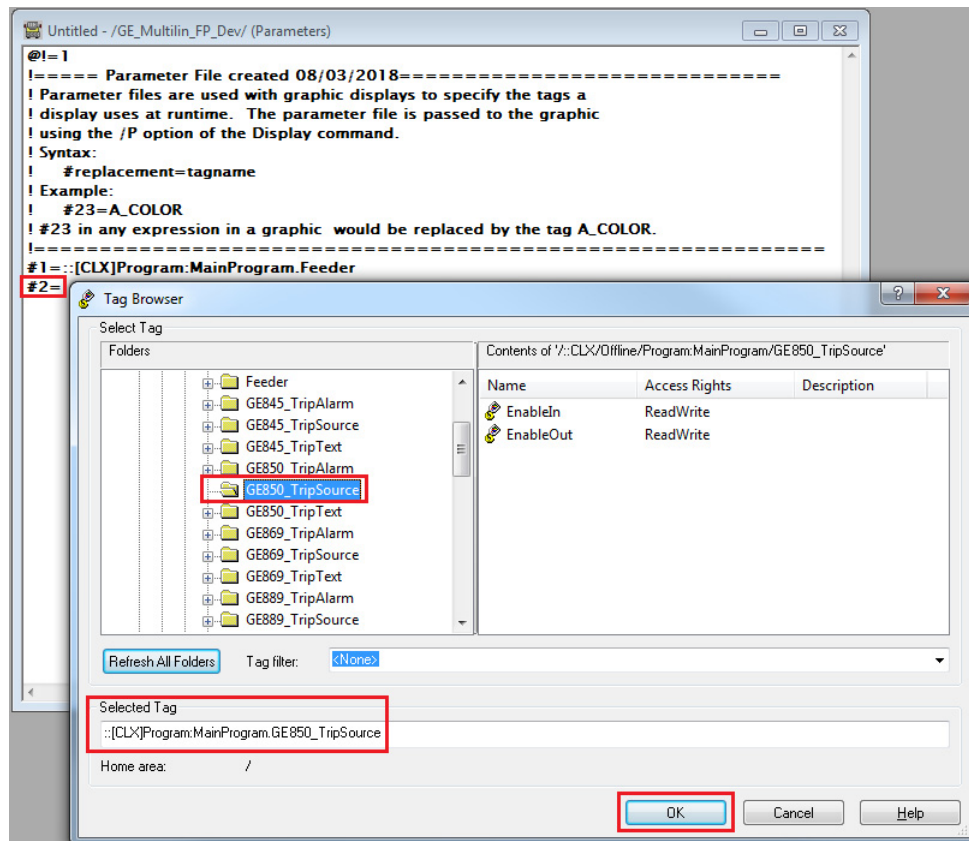
1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



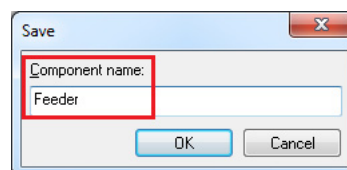
2. Type #1= under the comment box. Then double-click to the right of the =, and the Tag Browser dialog box appears.
3. Expand the folders and select the tag that was created for the device Relay Name. Click OK.



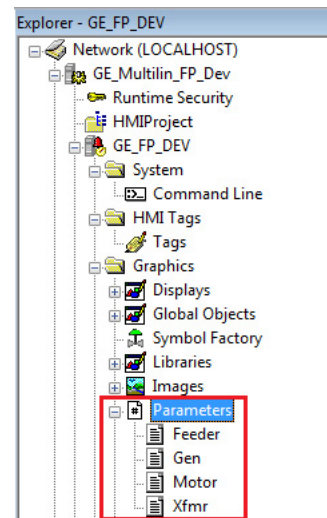
4. Press Enter to go to the next line of the parameter file.
5. Type #2= and double-click to the right of the =, and the Tag Browser dialog box appears.
6. Expand the folders and select the tag that was created for the GE 850 TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see the parameter file in the list in the Application Window.

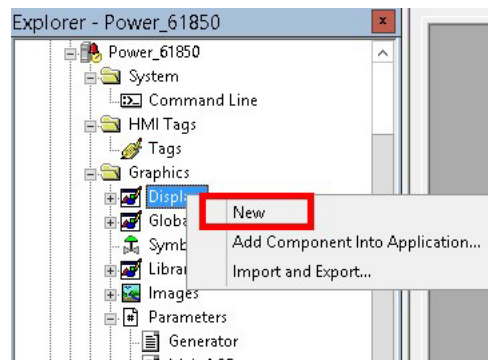


Linking the Parameter Files to an HMI Display

Now that the GE 850 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.

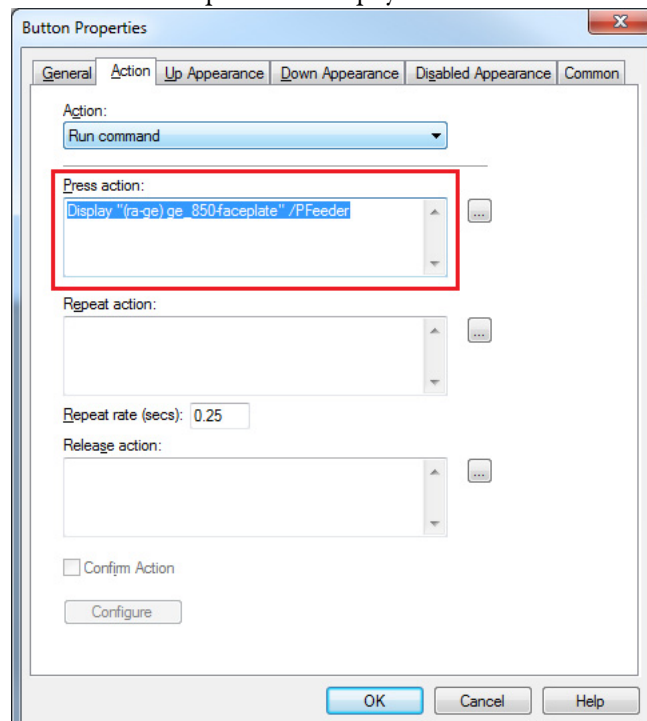


2. Add the objects to the display that you need for your project.

For this example, we are adding a button.

3. In the Button Properties, set the press action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the button. The name after /P must match the parameter file name that was created in [step 6](#). For example, if your system contains multiple relays, you must select the corresponding parameter file that represents each physical device.



The button, when clicked, displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The GE 850 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.



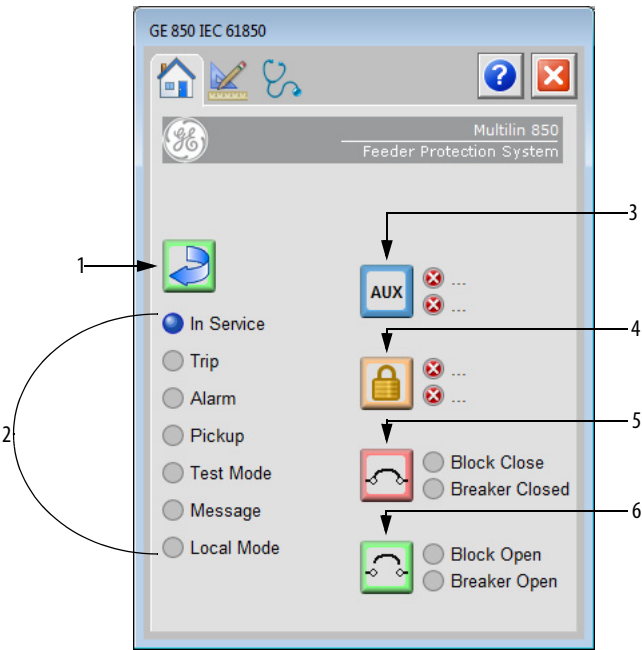
Table 42 - Faceplate Icon Descriptions

Item	Description
1	Operator
2	Engineering
3	Diagnostics
4	Help
5	Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.

Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status.



The following table shows the functions that are included on the Operator tab.

Table 43 - Operator Tab Description

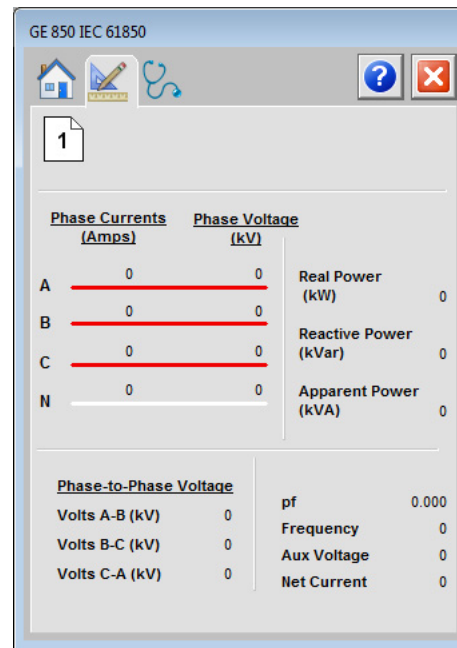
Item	Description
1	Trip Reset. Click to reset the device. The status of the device is indicated on the faceplate.
2	Faceplate Status Indicators indicate the status of the device.
3	AUX Input, not applicable to this device.
4	Lock/Unlock, not applicable to this device.
5	Click to close the circuit breaker.
6	Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

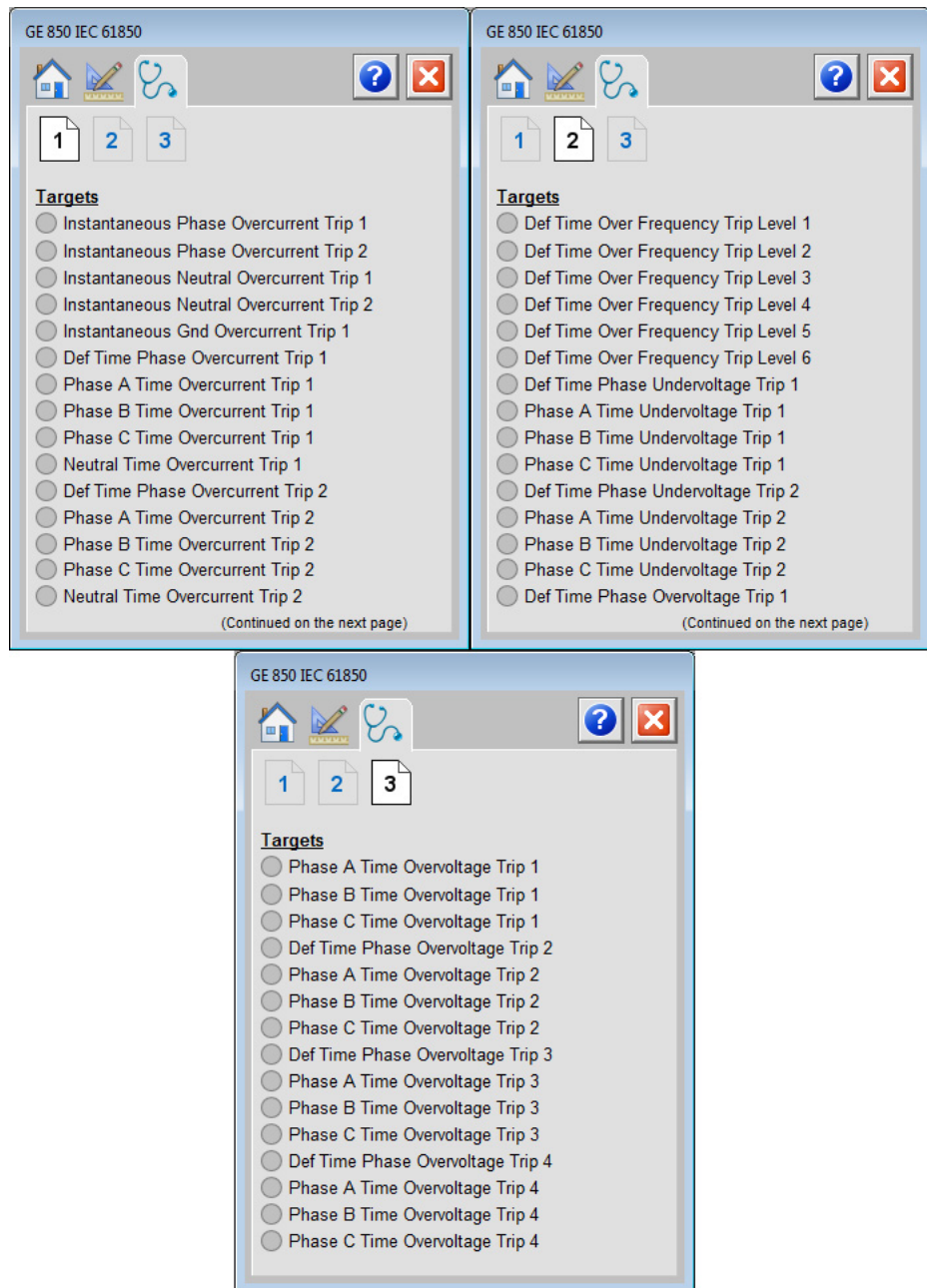
Engineering Page

Readout of the measurement values from the GE 850.

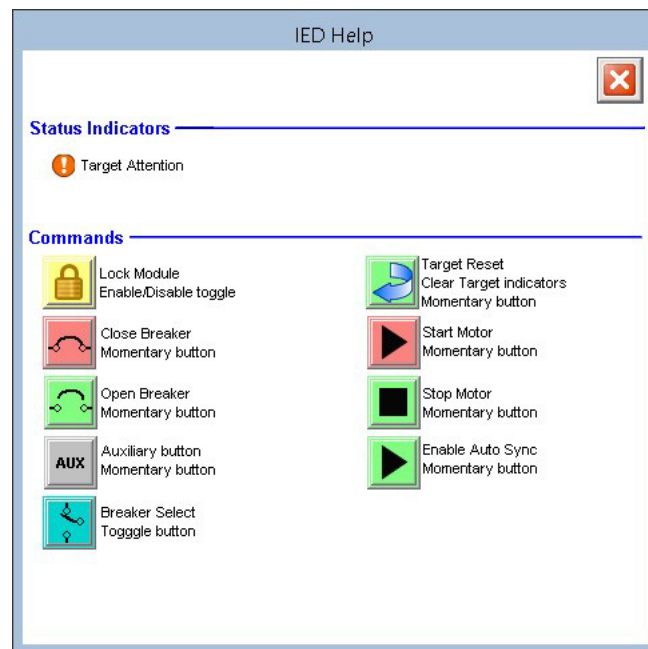


Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



Notes:

GE Multilin 869 Object



Images courtesy of General Electric. Multilin and the monogram are copyright of the General Electric Company © 2018.

The General Electric (GE) 869 is a motor protection relay with arc flash protection. This device is designed for the protection, control, and management of medium- and large-induction and synchronous motors. The GE 869 relay provides advanced condition-based monitoring and diagnostics with high-end fault and disturbance recording. The device also provides fundamental metering data, including (but not limited to) voltage, current, frequency, and power. The GE 869 can also provide various environmental measurements at its respective physical install location.

Topic	Page
Controller Code	218
Mapping InOut Tags to Add-On Instructions	220
Using Visualization Files	225
Faceplates	230

This Add-On Instruction monitors one GE 869 motor protection relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for starting and stopping the motor feature of the relay.

Add-On Instruction

PlantPaxGE869_AOI

PlantPaxGE869_AOI ?

Connection_Input0 ?

Connection_Output0 ?

Connection_Input1 ?

Connection_Output1 ?

PlantPaxGE869 ?

Faceplate

GE 869 IEC 61850

Multilin 869
Motor Protection System

In Service

Trip

Alarm

Pickup

Test Mode

Message

Local Mode

Overload

AUX1

AUX2

Motor Starting

Motor Running

Motor Stopped

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 44](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each GE 869 relay, which is configured in your system.

Table 44 - GE 869 Add-On Instruction

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

[Table 45](#) shows the InOut parameters that are available from the Rockwell Automation

Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown.

Table 45 - GE 869_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt9Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt10Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt11Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 46](#) has recommended uses for each bit.

Table 46 - Remote Bit Control - GE 869 Relay

Control Bit	Function
GGI03_CO_SPCS01_Oper_ctlVal	Reset Relay
GGI03_CO_SPCS02_Oper_ctlVal	Motor Start
GGI03_CO_SPCS03_Oper_ctlVal	Motor Stop

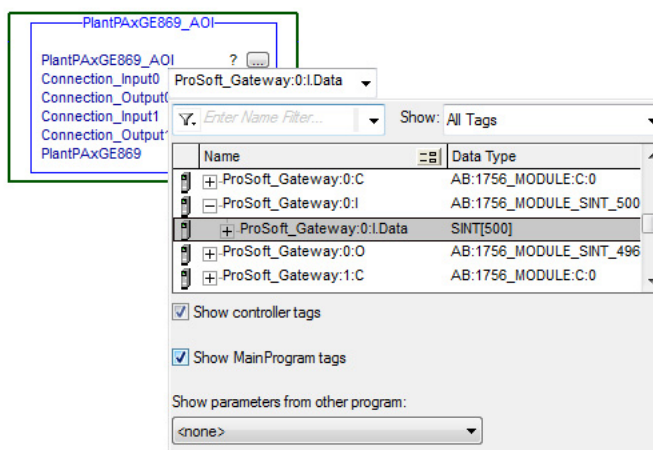
Mapping InOut Tags to Add-On Instructions

Each GE 869 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation® Library of Electrical Protection Devices from the PCDC.

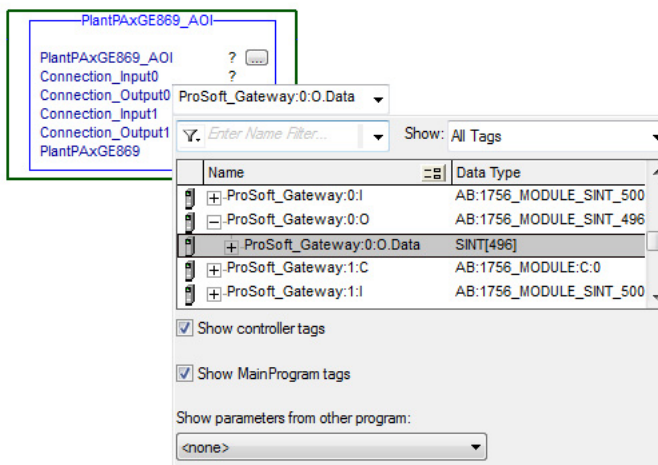
Associate Controller Tags to ProSoft Add-On Instruction

Complete these steps to map the ProSoft instruction to Studio 5000® tags.

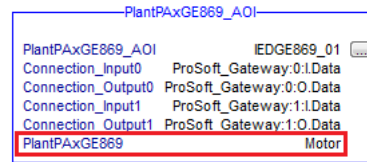
1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.
2. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



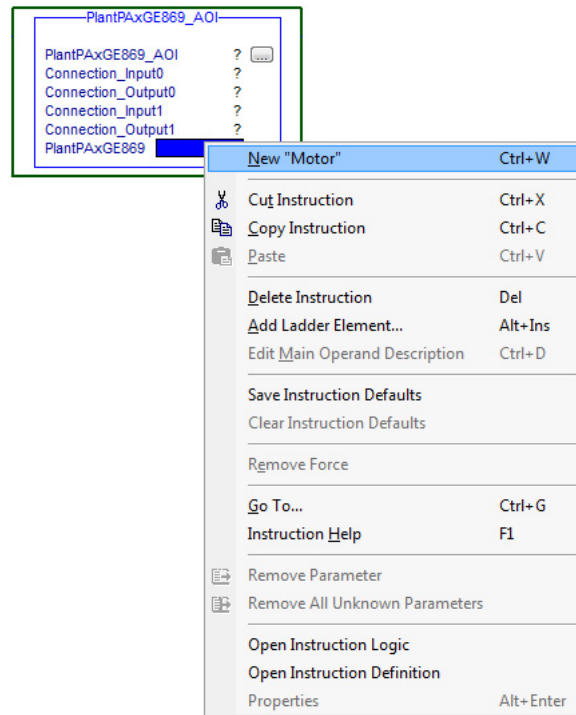
3. Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
4. Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



5. Repeat this process for each Connection Input and Output that is included with your Add-On Instructions.
6. Click the question mark next to the final tag. Type a tag name that represents your physical device within your Studio 5000® project. In this example, the name is “Motor”.

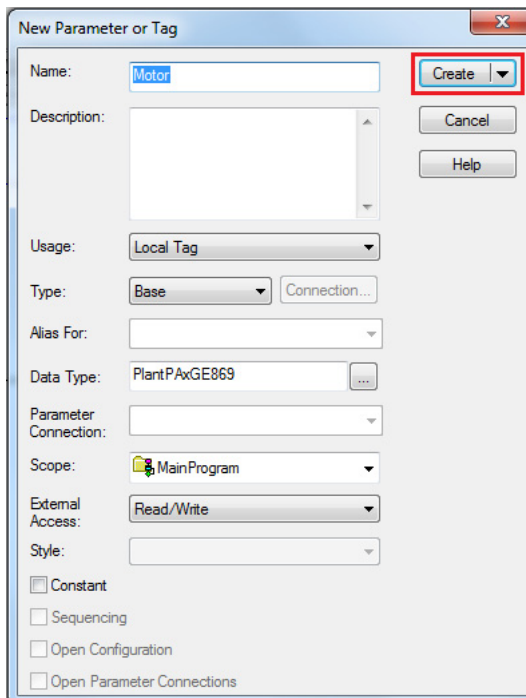


7. Right-click on the new tag name and select New “<tag name>”.



8. Click Create on the New Tag dialog box.

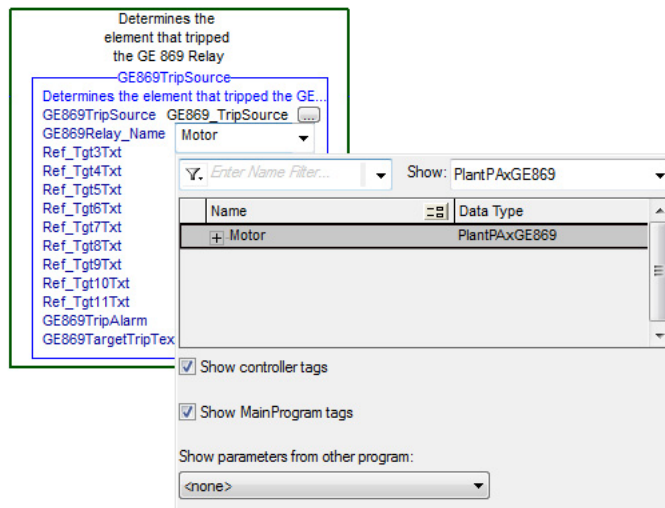
IMPORTANT Verify that Data Type matches intended device configuration.



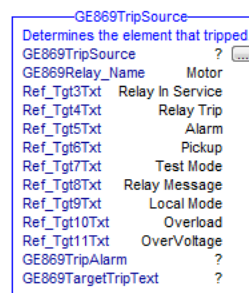
Configure Rockwell Automation Add-On Instruction

This section describes how to configure the Rockwell Automation Add-On Instruction. The functionality allows the ProSoft Add-On Instruction to work with the Rockwell Automation tags.

1. Click the question mark next to GE869Relay_Name and select the tag that was created in [step 8](#).



2. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if the tag is not already configured in the controller, you must right-click and create a tag.

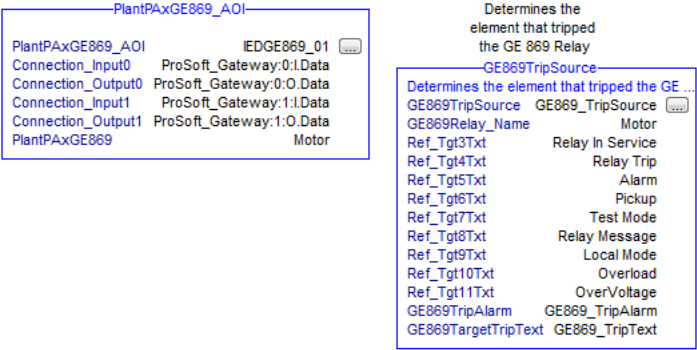


4. Click the question mark next to GE869TripAlarm and select or create the digital alarm tag to be used.

This tag is used for alarming through the Human Machine Interface (HMI) FactoryTalk® Alarms and Events Server.

5. Click the question mark next to GE869TargetTripText and select or create the tag to be used.
This tag is used for alarming through the HMI FactoryTalk Alarms and Events Server.

Figure 5 - Fully Configured Add-On Instructions



6. Save and download your project to the controller.

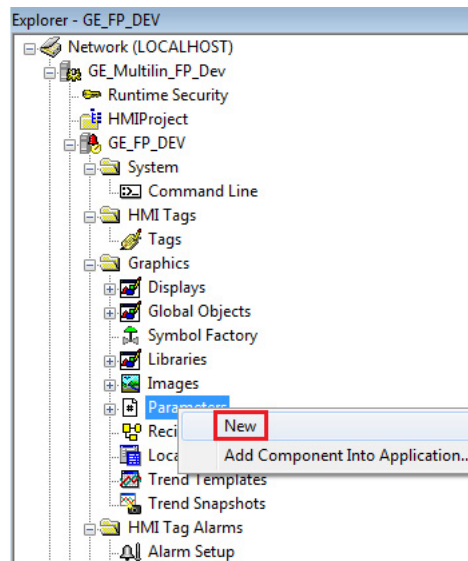
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

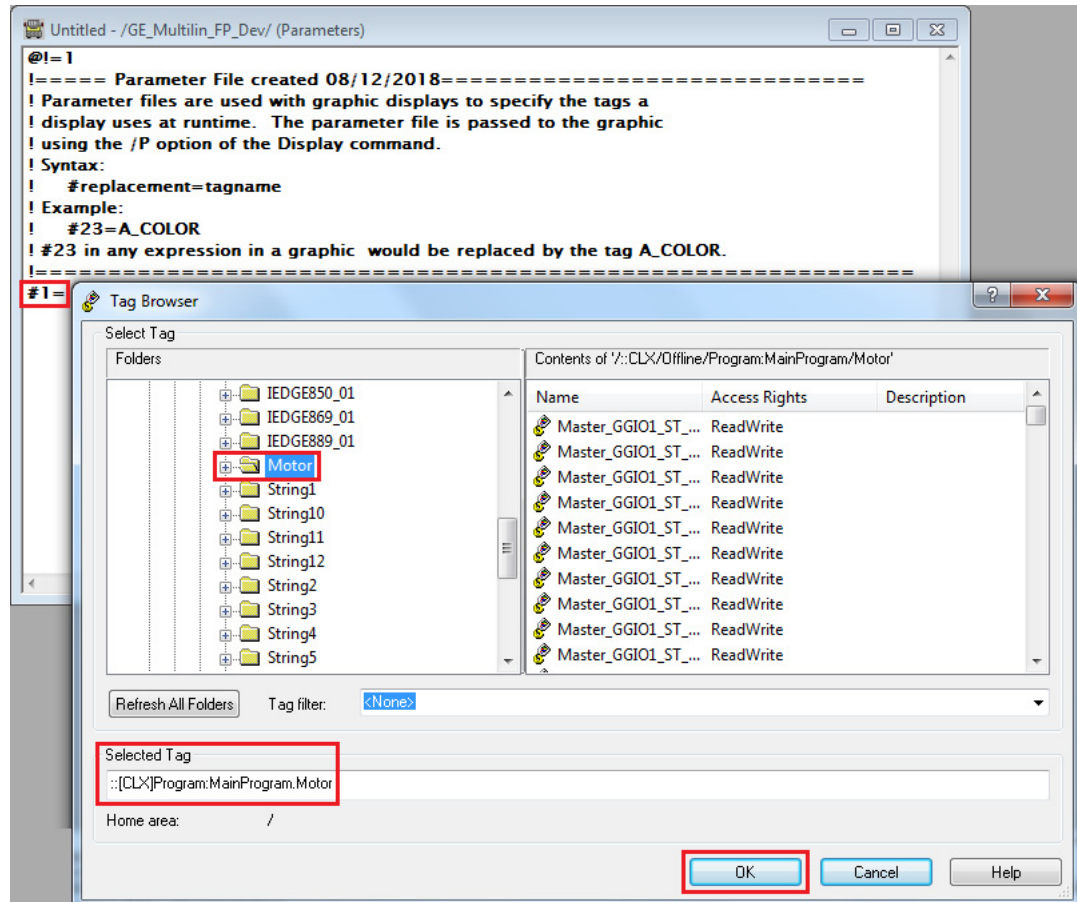
Creating a FactoryTalk View SE Parameter File

Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.

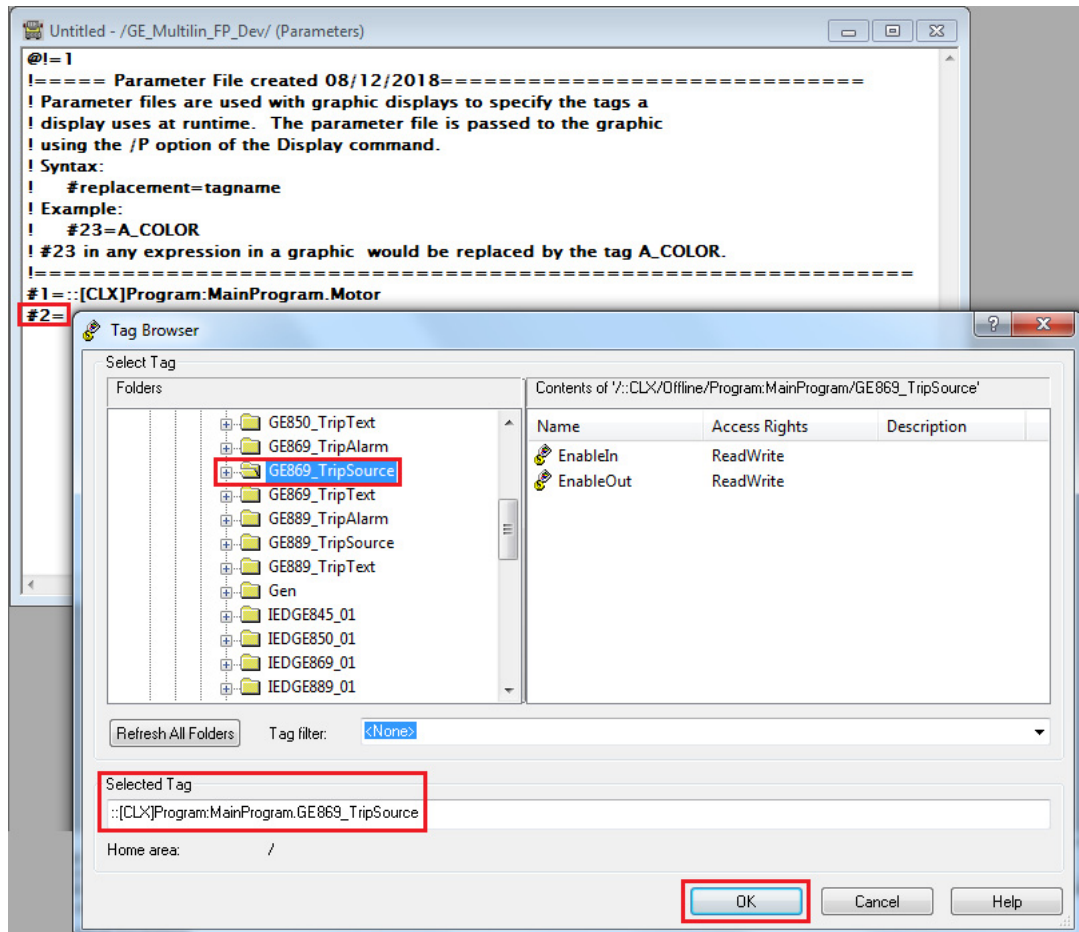


2. Type #1= under the comment box. Then double-click to the right of the =. The Tag Browser dialog box appears.
3. Expand the folders and select the tag that was created for the device Relay Name. Click OK.

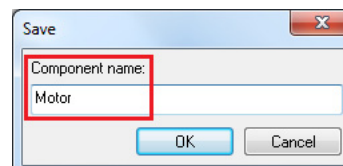


4. Press Enter to go to the next line of the parameter file.

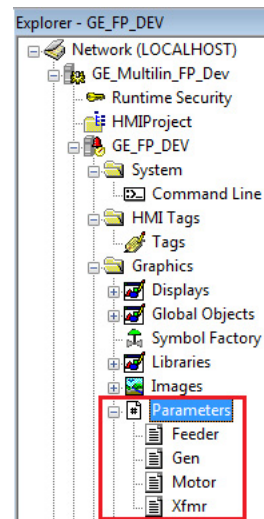
5. Type #2= and double-click to the right of the =. The Tag Browser dialog box appears.
6. Expand the folders and select the tag that was created for the GE 869 TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see one or more parameter files in the list in the Application Window.

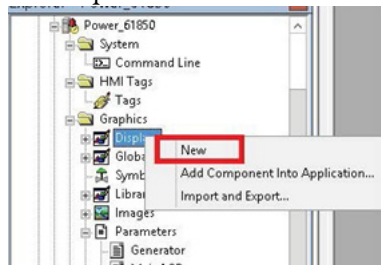


Linking the Parameter Files to an HMI Display

Now that the GE 869 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

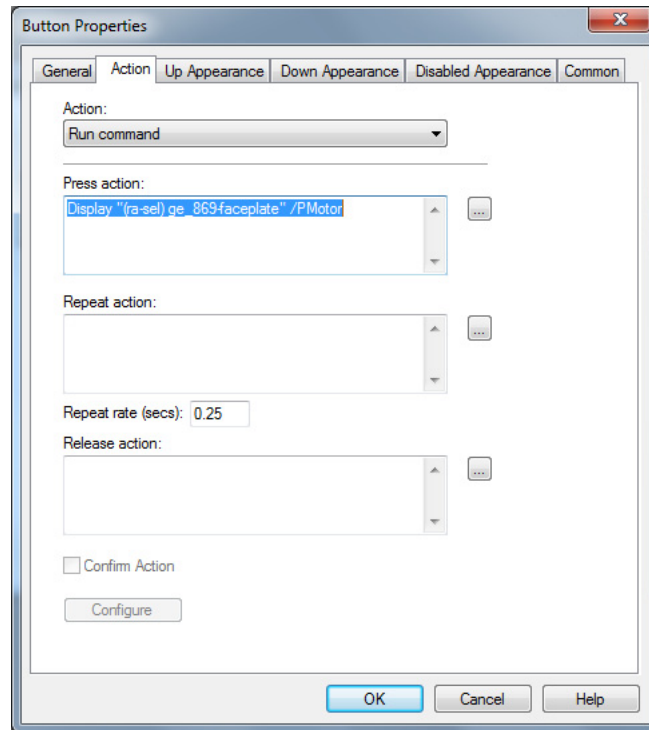
If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.



2. Add the objects to the display that you need for your project. For this example, we are adding a button.

3. In the Button Properties, set the press action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the corresponding button. The name after /P must match the parameter file name that was created in [step 6](#). For example, if your system contains multiple relays, you must select the corresponding parameter file that represents each physical device.



When clicked, the button displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The GE 869 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.



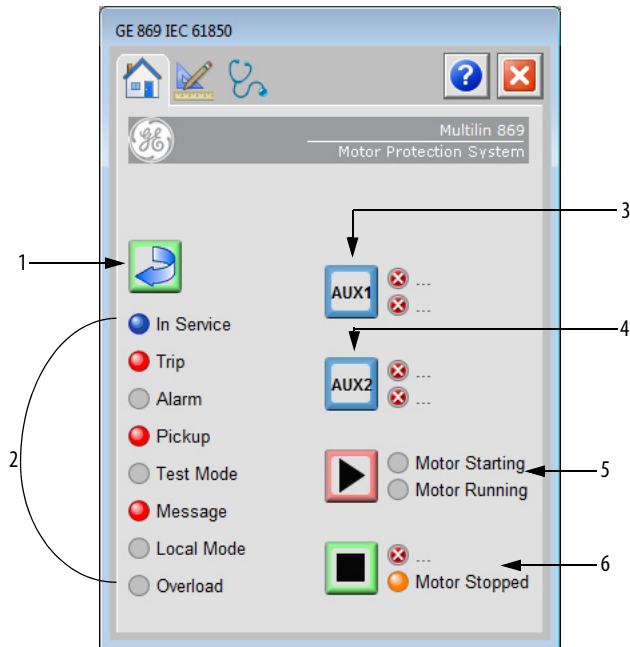
Table 47 - Faceplate Icon Descriptions

Item	Description
1	Operator
2	Engineering
3	Diagnostics
4	Help
5	Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.

Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 48 - Operator Tab Description

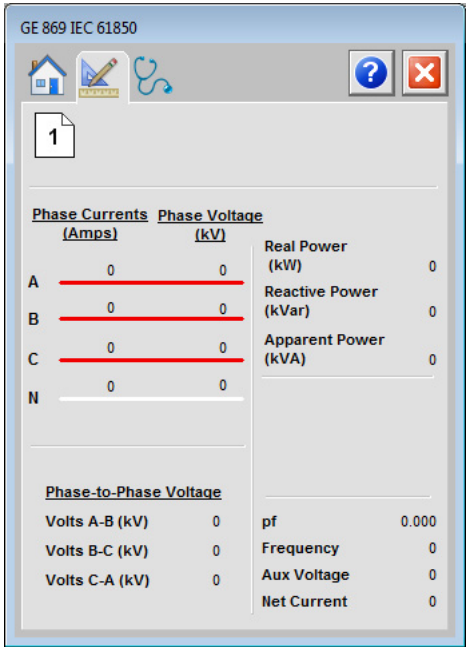
Item	Description
1	Trip Reset. Click to reset the device. The status of the device is indicated on the faceplate.
2	Faceplate Status Indicators
3	Auxiliary 1 button - not applicable to this device.
4	Auxiliary 2 button - not applicable to this device.
5	Start Motor button. Click to start the motor.
6	Stop Motor button. Click to stop the motor.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

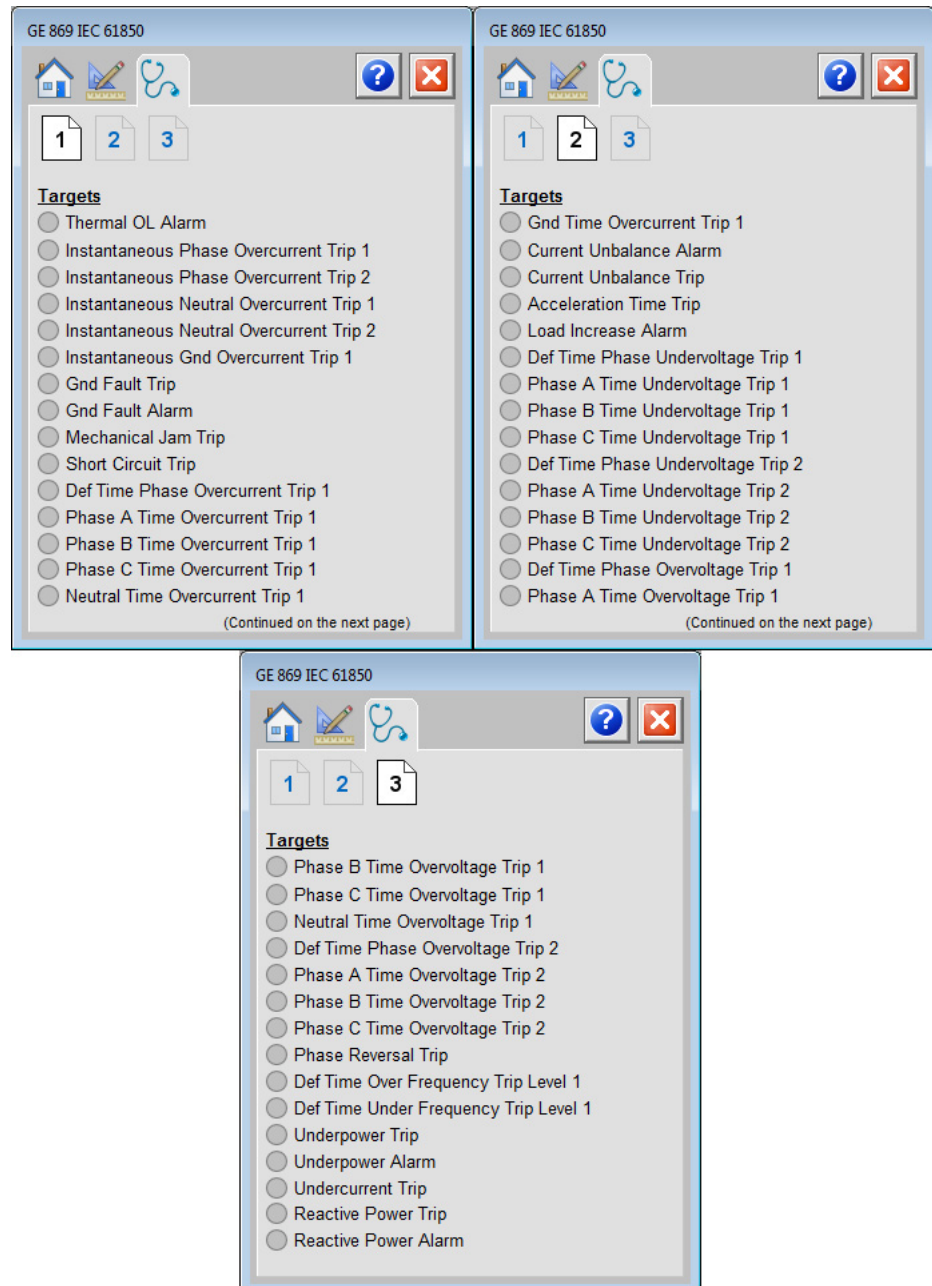
Engineering Page

Readout of the measurement values from the GE 869.

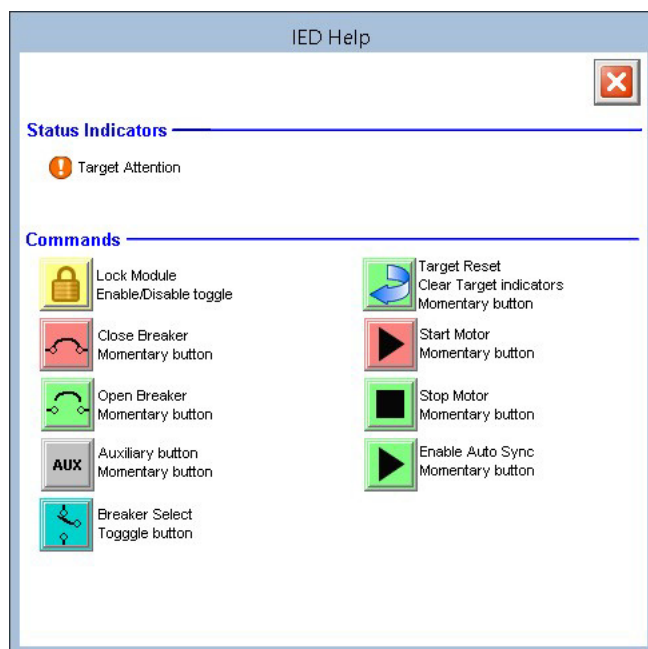


Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



GE Multilin 889 Object



Images courtesy of General Electric. Multilin and the monogram are copyright of the General Electric Company © 2018.

The General Electric (GE) 889 is a generator protection relay with arc flash protection. This device is designed to provide subcycle differential protection, control, and monitoring of primary and back-up generation equipment. The device also provides fundamental metering data including (but not limited to) voltage, current, frequency, and power. The GE 889 can also provide various environmental measurements at its respective physical install location.

Topic	Page
Controller Code	236
Mapping InOut Tags to Add-On Instructions	237
Using Visualization Files	242
Faceplates	247

This Add-On Instruction monitors one GE 889 generator protection relay. Alarms are provided when the device experiences a protection-related trip. The instruction also provides capabilities for opening and closing the breaker feature of the relay.

Add-On Instruction

PlantPAxGE889_AOI

PlantPAxGE889_AOI ?

Connection_Input0 ?

Connection_Output0 ?

Connection_Input1 ?

Connection_Output1 ?

PlantPAxGE889 ?

Faceplate

GE 889 IEC 61850

Multilin 889
Generator Protection System

In Service

Trip

Alarm

Pickup

Test Mode

Message

Local Mode

Loss of Excitation

...

...

Gen Brkr Clsd

Gen Brkr Open

Controller Code

Two Add-On Instructions represent each physical device. You must configure the InOut parameters of each Add-On Instruction per physical device.

The first Add-On Instruction is the ProSoft software generated Add-On Instruction (see [Chapter 2](#)), which maps data to the controller. The second Add-On Instruction is the TripSource Add-On Instruction, available for download from the library resources from the PCDC, which is for faceplate management

InOut Structure for ProSoft Add-On Instruction

InOut parameters in [Table 49](#) are used to link the Add-On Instruction to external tags that contain necessary data for the instruction to operate. These external tags must be of the data type shown. These tags are representative of the tags that are required for each GE 889 relay, which is configured in your system.

Table 49 - GE 889 Add-On Instruction

Name	Data Type	Description
[DeviceName]_AOI	[DeviceName]_AOI	Add-On Instruction tag. Matches naming from ProSoft Configuration Manager.
Connection_Input0	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output0	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
Connection_Input1	SINT[500]	CIP Connection Input data. The number of these parameters varies depending on system sizing.
Connection_Output1	SINT[496]	CIP Connection Output data. The number of these parameters varies depending on system sizing.
[DeviceName]	[DeviceName]	Device data that is collected from the CIP connections and organized into understandable tags. This data type changes to match each device tag in the ProSoft Gateway.

InOut Structure for Rockwell Automation Library Download

[Table 50](#) shows the InOut parameters that are available from the Rockwell Automation® Library of Electrical Protection Devices Folder in the PCDC. These external tags must be of the data type shown.

Table 50 - GE 889_TripSource

Name	Data Type	Description
[DeviceName]_Relay_Name	<Defined by device AOI>	Device data from the Add-On Instruction. This data type changes to match each device tag in the ProSoft Gateway.
Ref_Tgt3Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt4Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.

Name	Data Type	Description
Ref_Tgt5Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt6Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt7Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt8Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt9Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
Ref_Tgt10Txt	STRING	Alarm description for device front-plate status indicators, which is configurable through device vendor software.
[DeviceName]TripAlarm	ALARM_DIGITAL	Digital Alarm tag
[DeviceName]TripText	STRING	Alarm text to be displayed when active.

Remote Bit Control Value Structure

Remote Bit Control Value parameters are used to link the Add-On Instruction to configurable input points in the physical device. Each bit is configurable via the vendor software of each device. [Table 51](#) has recommended uses for each bit.

Table 51 - Remote Bit Control - GE 889 Relay

Control Bit	Function
GGI03_CO_SPCS01_Oper_ctlVal	Enable Relay Configuration
GGI03_CO_SPCS02_Oper_ctlVal	Reset Relay
GGI03_CO_SPCS03_Oper_ctlVal	Breaker Close
GGI03_CO_SPCS03_Oper_ctlVal	Breaker Open

Mapping InOut Tags to Add-On Instructions

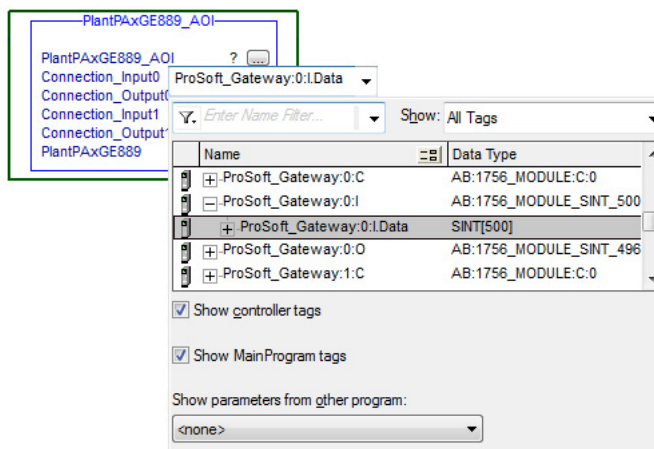
Each GE 889 relay requires two Add-On Instructions to monitor and visualize the relay. The ProSoft Software instruction is created in [Chapter 2](#). The Add-On Instruction is downloaded from the Rockwell Automation® Library of Electrical Protection Devices from the PCDC.

Associate Controller Tags to ProSoft Add-On Instruction

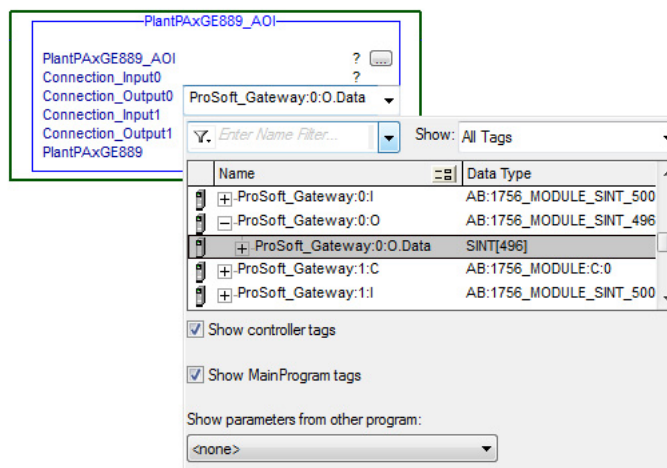
Complete these steps to map the ProSoft instruction to Studio 5000® tags.

1. Double-click the question mark next to Connection_Input0 of the device Add-On Instruction.

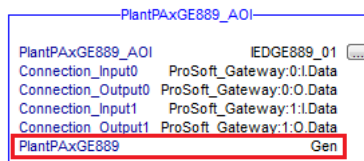
- Click the down arrow on the drop box and expand the ProSoft_Gateway:0:I. Select the ProSoft_Gateway:0:I.Data and double-click to choose it.



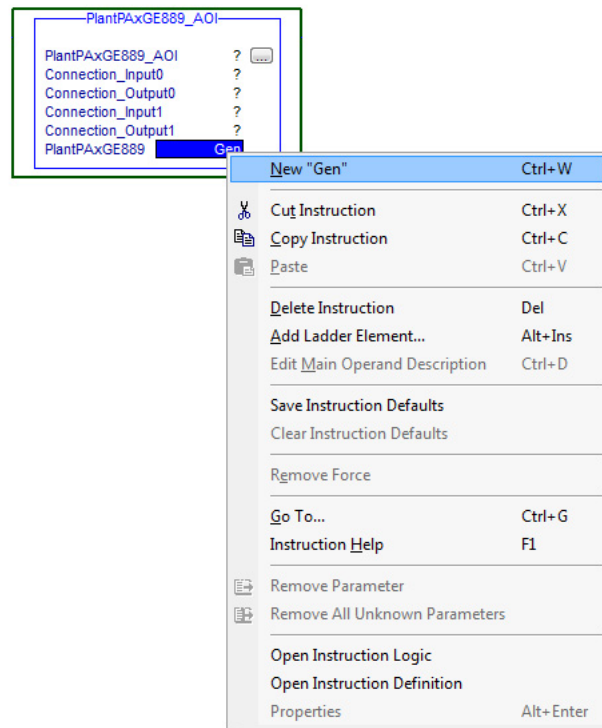
- Double-click the question mark next to Connection_Output0 of the device Add-On Instruction.
- Click the down arrow on the drop box and expand the ProSoft_Gateway:0:O. Select the ProSoft_Gateway:0:O.Data and double-click to choose it.



- Repeat this process for each Connection Input and Output that is included with your Add-On Instructions.
- Click the question mark next to the final tag. Type a tag name that represents your physical device within your Studio 5000® project. In this example, the name is "Gen".

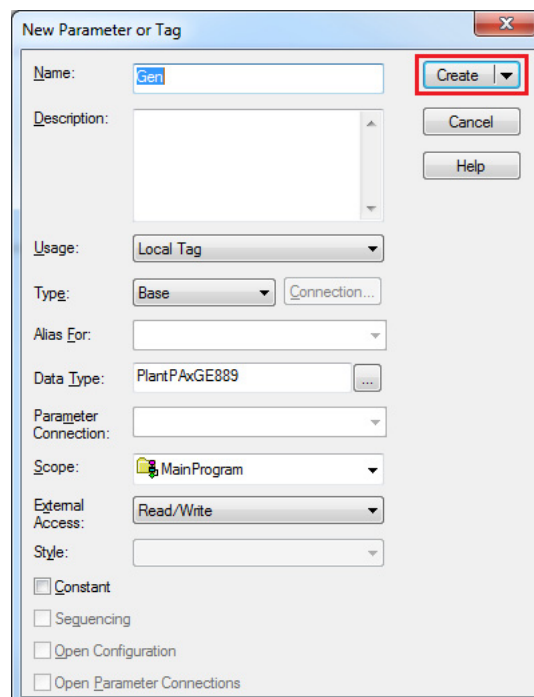


7. Right-click on the new tag name and select New "<tag name>".



8. Click Create on the New Tag dialog box.

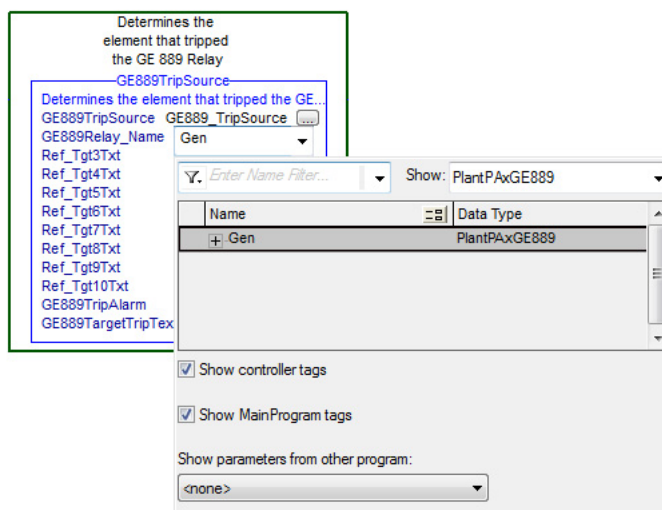
IMPORTANT Verify that Data Type matches intended device configuration.



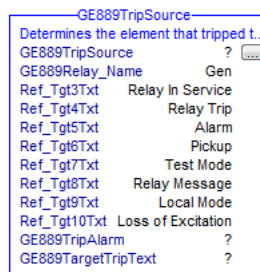
Configure Rockwell Automation Add-On Instruction

This section describes how to configure the Rockwell Automation Add-On Instruction. The functionality allows the ProSoft Add-On Instruction to work with the Rockwell Automation tags.

1. Click the question mark next to GE889Relay_Name and select the tag that was created in [step 8](#).



2. Click the question mark next to each Ref_Tgt#Txt and enter a string tag. These tags are intended to match the status indicators on the front panel of the device.
3. Once you type the tag name, if the tag is not already configured in the controller, you have to right-click and create a tag.

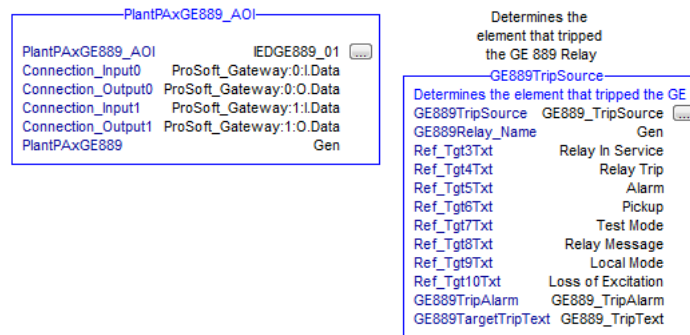


4. Click the question mark next to GE889TripAlarm and select or create the digital alarm tag to be used.
This tag is used for alarming through the Human Machine Interface (HMI) FactoryTalk® Alarms and Events Server.

5. Click the question mark next to GE889TargetTripText and select or create the tag to be used.

This tag is used for alarm message through the HMI FactoryTalk Alarms and Events Server.

Figure 6 - Fully Configured Add-On Instructions



6. Save and download your project to the controller.

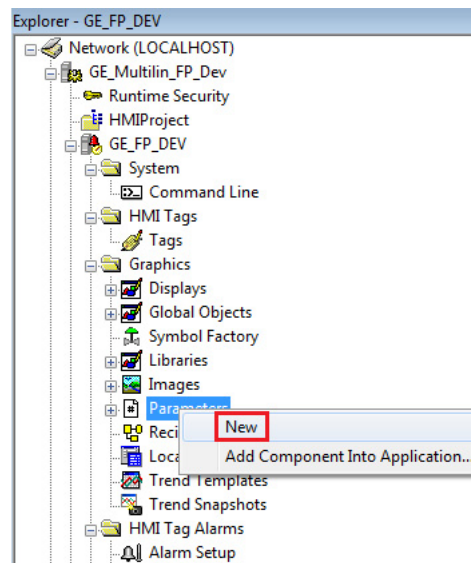
Using Visualization Files

The IEC 61850 object visualization in FactoryTalk View is accomplished with the use of parameter files. These files link the device controller tags to the faceplate tag placeholders. Each physical device requires a parameter file to be created.

Creating a FactoryTalk View SE Parameter File

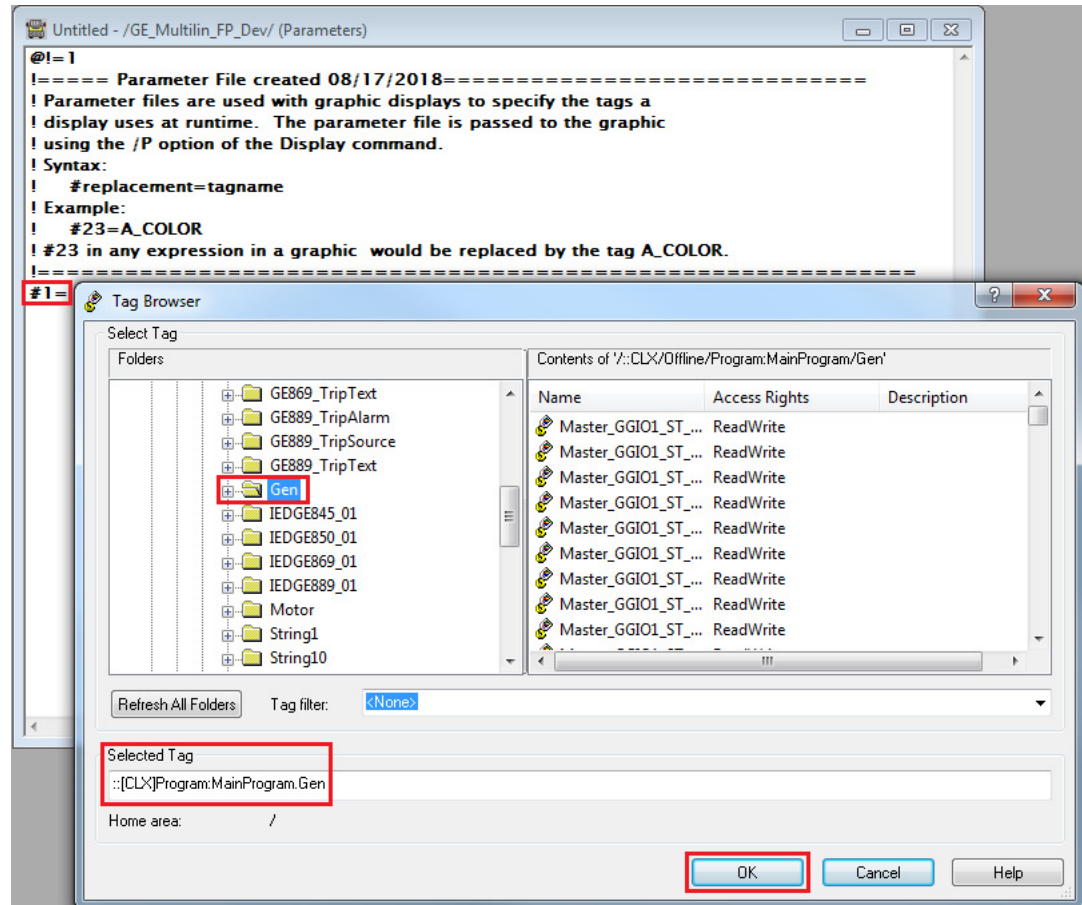
Complete these steps to create a parameter file within your FactoryTalk View SE project file.

1. In the FactoryTalk View Studio application tab, right-click on Parameters and select New.



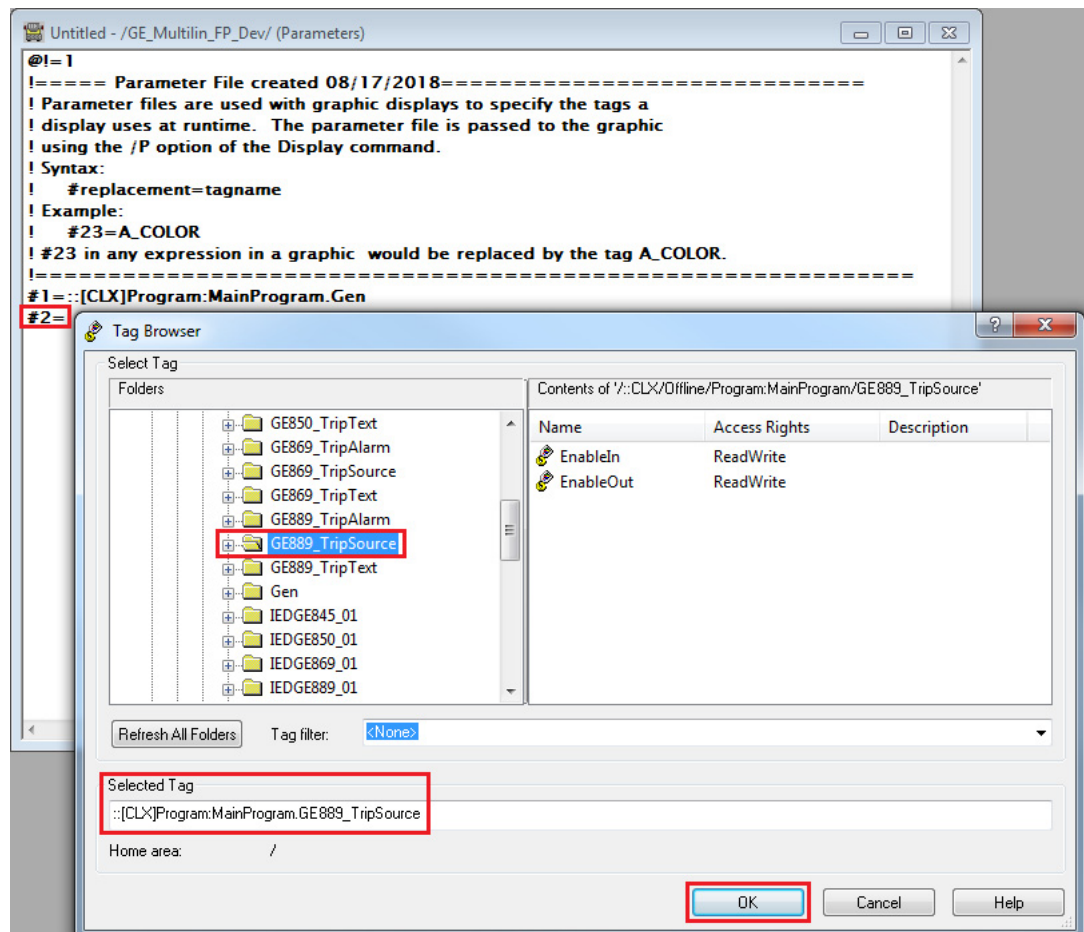
2. Type #1= under the comment box. Then double-click to the right of the = and the Tag Browser dialog box appears.

- Expand the folders and select the tag that was created for the device Relay Name. Click OK.

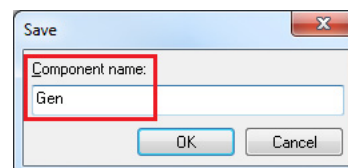


- Press Enter to go to the next line of the parameter file.
- Type #2= and double-click to the right of the =. The Tag Browser dialog box appears.

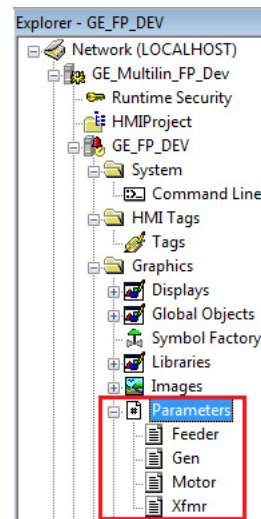
6. Expand the folders and select the tag that was created for the GE 889 TripSource Add-On Instruction. Click OK.



7. Click the save icon and name the parameter file.
8. Click OK.



You can see one or more parameter files in the list in the Application Window.

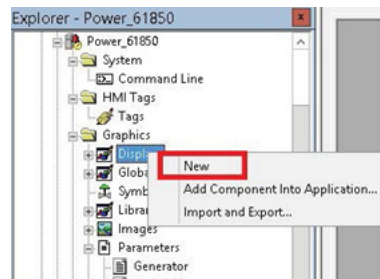


Linking the Parameter Files to an HMI Display

Now that the GE 889 controller tags are linked to the parameter file, you must add components to the display that the operator sees.

1. Right-click Displays in the FactoryTalk View Studio application window and select New.

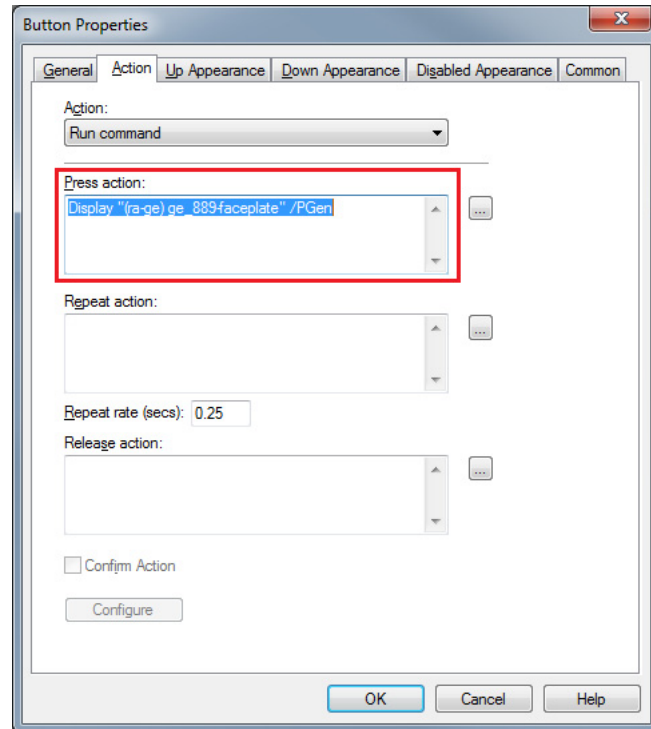
If you already have a display that was created with the device objects, simply expand the Display tree and double-click the display name to open it.



2. Add the objects to the display that you need for your project. For this example, we are adding a button.

3. In the Button Properties, set the press action of the button as shown in the following image.

The faceplate name changes according to the physical device being represented linked to the corresponding button. The name after /P must match the parameter file name that was created in [step 6](#). For example, if your system contains multiple relays, you must select the corresponding parameter file that represents each physical device.



When clicked, the button displays the faceplate and links the associated parameter file.

4. Save and type a name for the display.
5. Click OK.

Faceplates

The faceplates for each physical device are contained in the Accessory File that is part of the Rockwell Automation Library of Process Objects. The GE 889 faceplate consists of three tabs and each tab consists of one or more pages.

The Operator tab is displayed when the faceplate is initially opened. Click the appropriate icon at the top of the faceplate to access a specific tab.



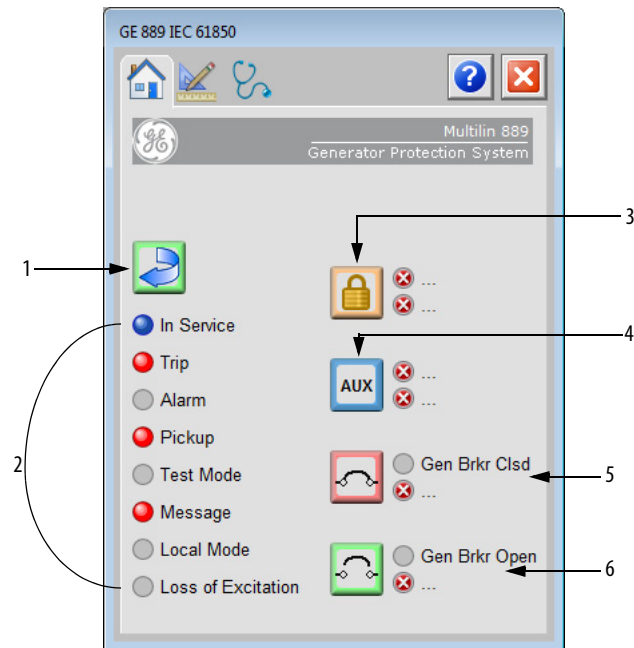
Table 52 - Faceplate Icon Descriptions

Item	Description
1	Operator
2	Engineering
3	Diagnostics
4	Help
5	Exit

The faceplate provides the means for operators, maintenance workers, engineers, and others to interact with the instruction instance. This interaction provides a view of the status and values of the instruction instance and an ability to manipulate it through its commands and settings.

Operator Tab

The Faceplate initially opens to the Operator tab, sometimes called the Home tab. From here, an operator can monitor the device status and manually operate the device.



The following table shows the functions that are included on the Operator tab.

Table 53 - Operator Tab Description

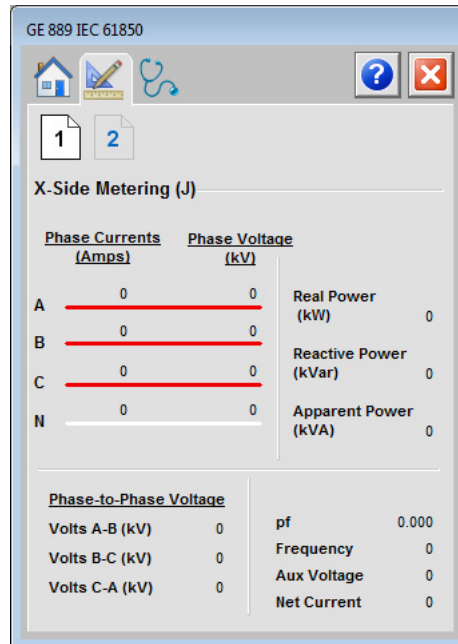
Item	Description
1	Click to reset the device. The status of the device is indicated on the faceplate.
2	Faceplate Statue Indicators
3	Lock/Unlock button - not applicable to this device.
4	Auxiliary button - not applicable to this device.
5	Generator Breaker Closed button. Click to close the circuit breaker.
6	Generator Breaker Open button. Click to open the circuit breaker.

Engineering Tab

The engineering tab allows the operator to see the measurement values from the physical device.

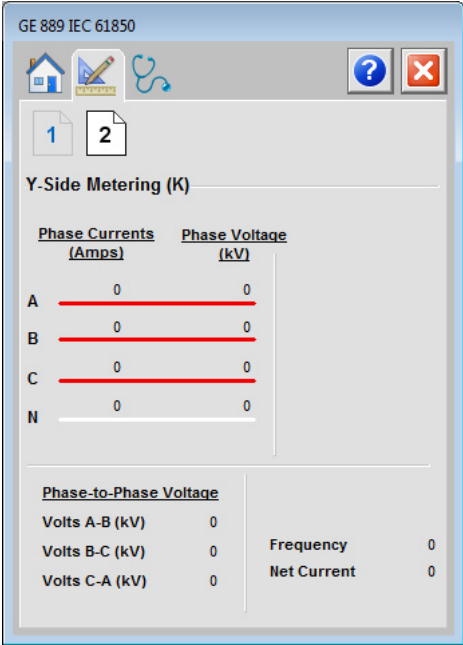
Engineering Page 1

Readout of the X-side measurement values from the GE 889. This readout displays fundamental metering data that is associated with the X-side of the generator.



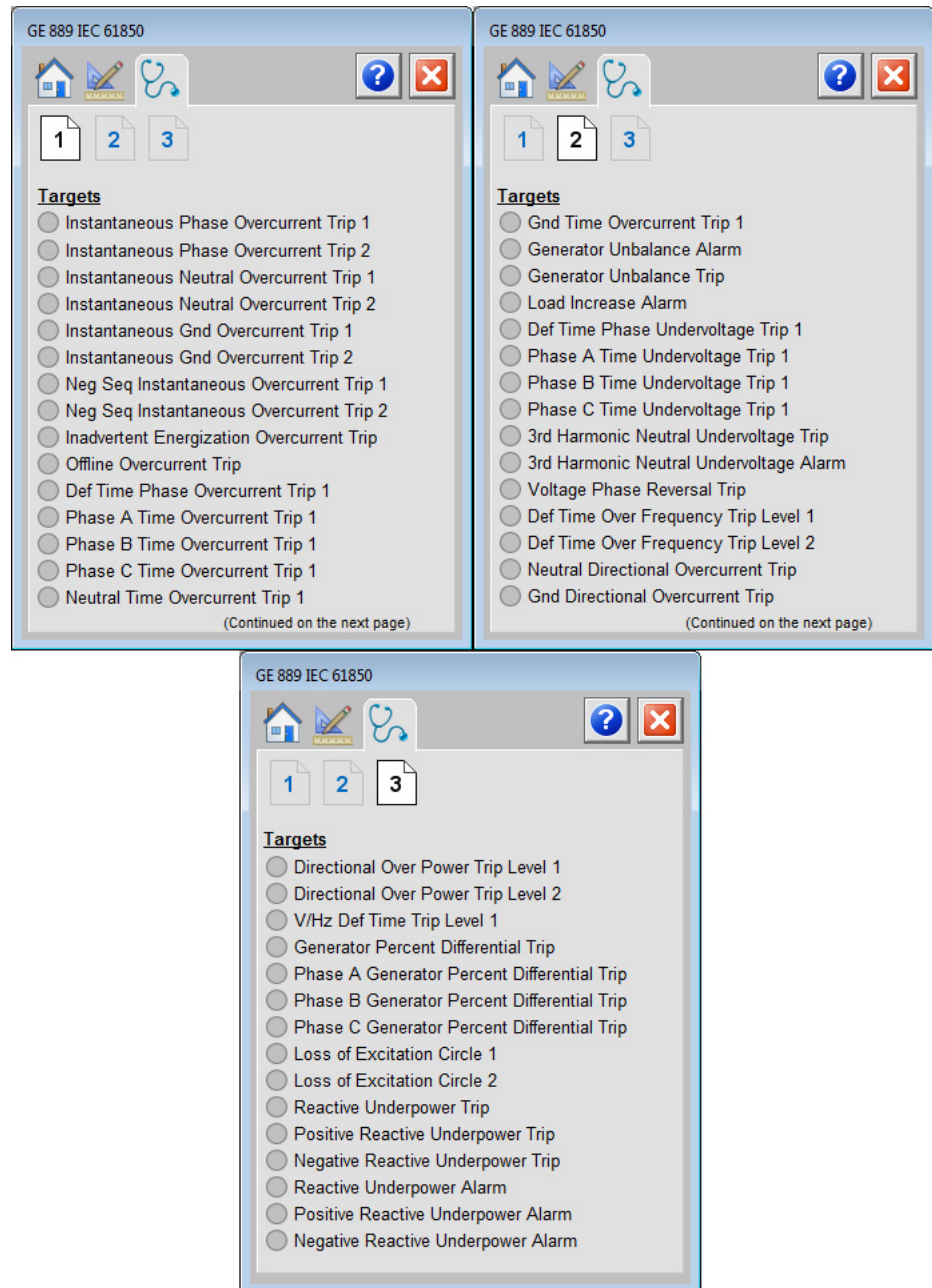
Engineering Page 2

Readout of the Y-side measurement values from the GE 889. This readout displays fundamental metering data that is associated with the Y-side of the generator.



Diagnostic Tab

The diagnostic tab shows which alarms are active from the physical device.



Help Tab



For definitions of terms not listed here, refer to the Allen-Bradley® Industrial Automation Glossary, publication [AG-7.1](#).

Add-On Instruction	Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline the implementation of your system. The objects let you create your own instruction set for programming logic as a supplement to the instruction set provided natively in the ControlLogix® firmware. An Add-On Instruction is defined once in each controller project, and can be instantiated multiple times in your application code as needed.
address conflict detection (ACD)	Allows a device to detect if another device is using its IP address. This ACD is not to be confused with the .acd file extension, which is associated with the RSLogix 5000® software tool. The .acd file stores a programming project.
Address Resolution Protocol (ARP)	A broadcast message that asks who has this IP address; enables a network to learn and adapt to changes.
alarm	An audible or visible means of indicating to the operator an equipment malfunction, process deviation, or abnormal condition that requires a response.
alarm event	A push notification from the alarm object to the alarm subscriber that indicates a change in alarm state.
alarm management	The processes and practices to determine, document, design, operate, monitor, and maintain alarm systems.
alarm object	The alarm system element that owns the alarm; it is responsible to identify an alarm, manage its state, and generate an alarm event.
alarm priority	An attribute of In-Alarm event that informs you of the salience of the event.
alarm system	The collection of hardware and software that detects an alarm state, communicates the indication of that state to the operator, and records changes in the alarm state.
application objects	These objects define how device data is represented and accessed.
application server (AppServ)	The application server (AppServ) is also the Process Automation System Server (PASS) that is typically a FactoryTalk® Directory client of the PASS. Examples are AppServ-Batch for a FactoryTalk Batch application or AppServ-History for a Historian application.
architecture	An architecture is a representation of a control and software system, and the process and discipline for effectively implementing the designs for such a system. An architecture conveys the information content of the related elements that comprise a system, the relationships among those elements, and the rules that govern those relationships.

Automatic Device Configuration (ADC) A Studio 5000 environment feature that supports the automatic download of configuration data into a Logix controller. The download establishes an EtherNet/IP network connection to a device.

Automatic Device Replacement (ADR) A Studio 5000 environment feature that automatically commissions the original node address and downloads the original configured device parameters into the new device.

characterization A characterization is the operation and collection of performance data for a representative process system to determine scalability, stability, and usability of a specific system configuration. A characterization:

- Aims to define a complete system
- Is used to determine if the system is performing at specified level
- Is used to identify usability issues
- Is used to check and create rules, relationships, limits, and recommendations for system elements

CIP connection Transfers data from an application that runs on one end node (transmitter) to an application that runs on another end node (receiver); uses explicit or implicit message types; connected message types are used to transfer data; connected message type can use implicit or explicit messages; unconnected messages are used temporarily and only use explicit messages.

CIP Sync™ Time synchronization service for CIP. Synchronizes clocks across devices on the network; an individual time master with multiple slaves.

client A client is hardware (personal computer) and software that provides an interface with a link into a system server application. In the Rockwell Automation® architecture, a client is a computer that is loaded with runtime software.

Common Industrial Protocol (CIP) Open, message-based, application-layer protocol.

control strategy A control strategy is a system footprint to show the complexity of the following:

- Data servers
- Information storage
- Operator interface (graphics, faceplates)
- Control code (sequence, procedure, phases)
- I/O

Control strategies are used to determine a set of comprehensive process system footprints that establish a representative system loading. The representative system loading can be measured to identify a process system's boundaries and limitations (implementation rules).

Configured IED Description (CID) An XML file that defines all information that can be communicated from the Intelligent Electronic Device (IED).

Converged Plant-wide Ethernet (CPwE)	An architecture that provides standard network services to application devices and equipment in an Industrial Automation and Control System (IACS) application; integrates the devices and equipment into the wider enterprise.
critical system attribute (CSA)	<p>A critical system attribute (CSA) is a customer-facing characteristic that defines or identifies whether the system is performing as expected. CSAs are specific, visible indicators of overall system performance and usability.</p> <p>CSAs have specified parameters that must be maintained and that set the base operational requirements for the system. These parameters determine pass or fail (follow up) of a system test. For example, screen paint time < 2 seconds and screen refresh < 1 second.</p> <p>There are many other attributes that are associated with system elements such as controller loading, computer loading, and network settings that must be configured properly to maintain system CSAs.</p>
datastore	Represents a storage location for virtual machine files. A storage location can be a virtual machine file system volume, a local file system path, or a directory on Network Attached Storage.
development software	Development software is a program application that is used to configure various system components and not required at runtime. For example, Studio 5000 Logix Designer®, FactoryTalk View Studio software.
Device Level Ring (DLR)	An individual, fault-tolerant network for interconnection of automatic devices; Layer 2 protocol.
DHCP port-based allocation	Assigned automatically per physical switch port.
display object	A display object is a functional group of display elements with animations.
distributed control system (DCS)	A specially designed control system for complex and large applications in industrial processes wherein the control elements of the system are distributed geographically throughout the plant. In a DCS, a hierarchy of controllers is connected by communication networks for command and monitoring.
Domain Name System (DNS)	A name resolution protocol that enables identification of devices by name instead of IP address.
Dynamic Host Configuration Protocol (DHCP)	A server assigns IP addresses from a pool of addresses.
Electronic data sheet (EDS)	An ASCII text file that describes the features of an EtherNet/IP device and is used by software tools for device and network configuration.

engineering workstation (EWS)	The engineering workstation (EWS) provides system configuration, development, and maintenance functions of the PlantPAx® system. The EWS contains development software, including FactoryTalk View SE Studio and Studio 5000 Logix Designer.
ESXi hypervisor	Also called a 'bare metal' hypervisor, this virtual software is on top of the resources of a host server when the server does not have an operating system installed.
FactoryTalk Directory software	FactoryTalk Directory software defines where system data is stored for access. FactoryTalk Directory software provides a common address book of factory resources that are shared among FactoryTalk-enabled products.
FactoryTalk Services Platform	The FactoryTalk Services Platform (FTSP) is a service-oriented architecture (see SOA) that delivers value through FactoryTalk-enabled products. This platform reduces the customer learning curve and project engineering time through commonality and reuse. For example, activation, FactoryTalk Directory, security, diagnostics, audit, live data, and alarms and events.
flowchart	A formalized graphic representation of a logic sequence, work, or manufacturing process, organization chart, or similar formalized structure.
full-duplex mode	A data transmission mode that is deterministic, collision-free, and can transmit and receive simultaneously.
function block diagram	A graphical language for programmable logic controller design that describes the function between input variables and output variables.
gateway	Connects individual networks to a system of networks.
Generic Object-Oriented Substation Event (GOOSE)	A control strategy to collect and control devices remotely in a distributed system.
global object	An object that is created once and can be referenced multiple times on multiple displays in an application.
half-duplex mode	A data transmission that is non-deterministic, and transmits and receives at different times; collisions occur if a transmission and reception is attempted simultaneously.
historian	Historian is a data collection system with the following components: collection, storage, compression, retrieval, reports, and analysis. Historian functions include raw sampling, compression, storage, retrieval, reconstitute, analyze, summarize, and present (reports and displays).
hypervisor	A program that lets multiple operating systems share resources from an individual hardware host; also called a virtual machine manager. The hypervisor manages the host processor and resources, to allocate what is needed to each virtual machine to make sure they cannot negatively impact each other.

hypervisor client	A program that lets you remotely connect to a host server with a hypervisor from any workstation. From the hypervisor client, you can create, deploy, copy, and edit your virtual machines. When a hypervisor client connects to a vCenter server, additional features include management of your virtual machines.
IEEE-1588	Standard for Precision Clock Synchronization Protocol for Networked Measurement and Control Systems (Precision Time Protocol or PTP).
implicit connection	Time critical in nature. For example, I/O and produced/consumed tags.
Integrated Architecture (IA)	Integrated Architecture (IA) is the identifying name of Rockwell Automation group of products that use Rockwell Automation core-enabling technologies. The PlantPAx system is a defined set of IA products configured in a prescribed way to provide optimal performance as a distributed control system.
International Electrotechnical Commission (IEC)	A global standards body.
Internet Group Management Protocol (IGMP)	A protocol that manages the membership of IP multicast groups.
IP address	Identifies each node on the IP network or system of connected networks.
Knowledgebase	A Rockwell Automation online database of hardware and software solutions based on actual customer-support requests.
linear topology	End-user devices that are daisy-chained together; limited number of nodes are supported.
Manufacturing Message Specification (MMS)	A SCADA-like communication within the IEC 61850 standard.
Network Address Translation (NAT)	A service that translates one IP address to another IP address via a NAT-configured switch. NAT makes it possible for devices that share one IP address on a private subnet to be segmented into multiple identical private subnets while maintaining unique identities on the public subnet.
old computer name	The term 'old computer name' is used to refer to the computer name of the virtual machine before your changes. It could be the factory default computer name of the virtual machines or a computer name set by your organization. Once the computer name is changed, the previous computer name becomes the old computer name.
OPC	A set of industry-standard specifications that define interfaces for communicating with automation devices and services.
operator workstation (OWS)	The operator workstation (OWS) provides the graphical view and interface into the process. The workstation is a client of either a PASS or AppServ-HMI.

PlantPAx Distributed Control System The PlantPAx system has all core capabilities that are expected in a world-class distributed control system (DCS). The system is built on a standards-based architecture by using Integrated Architecture® components that enable multi-disciplined control and premier integration with the Rockwell Automation® intelligent motor control portfolio.

Process Automation System Server (PASS) The Process Automation System Server (PASS) is the core PlantPAx system server that allows central administration throughout the PlantPAx system. The PASS is a required component.

redundant star topology Dual connections.

server Software component that serves data to an application (for example, data server). Typically, server software components are installed on server-class computers.

SFC A programming language in which individual machine operations within a process are organized into steps and transitions.

star topology End-user devices are connected to each other via a switch.

static A device that is hard-coded with an IP address.

subnet mask Determines which of the 32 bits of the IP address are part of the network ID and which are part of the unique node identification.

Supervisory Control and Data Acquisition (SCADA) A control strategy to collect and control devices remotely in a distributed system.

system attribute A system attribute is an operational functionality that can be manipulated or measured and is used to establish the operational boundaries or system capability. For example workstation memory, number of parameters on a screen, and number of control loops. A system attribute can be independent or dependent.

system element A system element is a distinctive system entity that is made up of a combination of hardware and software products that support an identifiable system function or role. A system element can be manipulated to vary system operation or capability. For example, engineering workstation (EWS), operator workstation (OWS), process automation system server (PASS), and controller.

system infrastructure System infrastructure is the commercial hardware and software that is required to enable system elements to work together as a system. For example, network switches, computers.

system server A system server expands the scope of a system as it provides support for additional system capacity or optional system functions. For example, the Process Automation System Server (PASS) is a required component for all centralized and distributed process systems. The PASS provides central name resolution and system-wide, FactoryTalk services. The PASS provides the

capability to distribute information to the OWS and add to optional application servers to increase the scope of the process system.

TCP/IP Abbreviation for Transmission Control Protocol/Internet Protocol. A transport-layer protocol (TCP) and a network-layer protocol (IP) used by Rockwell Automation Ethernet modules to support explicit messaging.

User -defined Data Type (UDT) Tag types that you create once and reuse in multiple tag templates, multiple times.

virtual LAN (VLAN) A display object is a functional group of display elements with animations.

virtual machine A virtual machine is a software implementation of a computer or workstation that executes programs like a physical computer or workstation. A virtual machine is the collection of dedicated resources a computer needs (for example, RAM, HDD, CPU). These resources are allocated to a virtual machine with the help of a hypervisor.

virtualization A switched network segment on a functional or organizational basis rather than physical or geographical.

workstation A workstation is a computer that runs development, configuration, and optional maintenance software. A workstation is not a server.

Notes:

A**ABB EMAX2 using EtherNet/IP**

object 149

ABB EMAX2 using IEC 61850

object 165

ABB EMAX2 with EtherNet/IP

controller code 150

adding a device 151

InOut structure 150

input structure 150

faceplates

diagnostic tab 162

engineering tab 161

help tab 163

operator tab 160

using visualization files 154

ABB EMAX2 with IEC 61850

controller code 166, 182

Add-On Instructions 167, 183, 201,
220, 237

InOut structure 166, 236

remote command structure 167

faceplates 176

diagnostic tab 179

engineering tab 178

help tab 180

operator tab 177

using visualization files 171

additional resources 10**Add-On Instruction**

definition 253

address conflict detection

definition 253

address resolution protocol

definition 253

ADR

definition 254

alarm

definition 253

event

definition 253

management

definition 253

object

definition 253

priority

definition 253

system

definition 253

application

server

definition 253

application objects

definition 253

AppServ

definition 253

architecture

definition 253

automatic device configuration

definition 254

B**Bulletin 857**

controller code 38

InOut structure 38, 54

output structure 39

remote bit control value structure 39

faceplates 49

engineering tab 51

help tab 52

operator tab 50

mapping InOut tags to add-on instructions
40

visualization file 44

link to a display 47

Bulletin 865 53

controller code 54

output structure 55

remote bit control value structure 55

faceplates 65

diagnostic tab 67

engineering tab 67

help tab 68

operator tab 66

mapping InOut tags to add-on-instructions
56

using visualization files 60

visualization file 60

C**characterization**

definition 254

CIP

connection

definition 254

definition 254

sync

definition 254

client

definition 254

common industrial protocol

definition 254

connected enterprise 11**control**

strategy

definition 254

controller

files 13

controller files 13**controller tags**

GE Multilin 845 184

GE Multilin 850 201

GE Multilin 869 220

GE Multilin 889 237

Converged Plant-wide Ethernet

definition 255

CPwE

definition 255

critical

system attribute

definition 255

D

- datastore**
 - definition 255
- DCS**
 - definition 255
- development software**
 - definition 255
- Device Level Ring**
 - definition 255
- DHCP**
 - definition 255
 - port-allocation
 - definition 255
- display files** 13
- display object**
 - definition 255, 259
- distributed control system**
 - definition 255
- DLR**
 - definition 255
- DNS**
 - definition 255
- domain**
 - name system
 - definition 255
- dynamic host configuration protocol**
 - definition 255

E

- EDS**
 - definition 255
- Electronic Data Sheet**
 - definition 255
- EMAXEIP**
 - controller code
 - input structure 150
 - faceplates 159
 - help tab 163
- Encompass partners** 12
- engineering workstation**
 - definition 256
- ESXI**
 - hypervisor
 - definition 256

F

- FactoryTalk**
 - directory software
 - definition 256
 - services platform
 - definition 256
- files**
 - controller 13
- flowchart**
 - definition 256
- full-duplex mode**
 - definition 256

function block diagram

- definition 256

G

- gateway**
 - definition 256
- gateway integration** 27
- gateway module** 15
- GE Multilin 845**
 - associate ProSoft tags 184
 - Configure Rockwell Automation Add-On Instruction 186
 - controller code 200
 - Creating a FactoryTalk View SE Parameter File 189
 - faceplates 194
 - diagnostic tab 197
 - engineering tab 196
 - help tab 198
 - operator tab 195
 - Linking parameter files to an HMI display 192
 - object 181
 - ProSoft Add-On Instruction 182
 - remote bit control value 183
 - Rockwell Automation Library 182
- GE Multilin 850**
 - associate ProSoft tags 201
 - Configure Rockwell Automation Add-On Instruction 204
 - controller code
 - remote command structure 201
 - Creating a FactoryTalk View SE Parameter File 206
 - faceplates 211
 - diagnostic tab 214
 - engineering tab 213
 - help tab 215
 - operator tab 212
 - Linking parameter files to an HMI display 209
 - object 199
 - ProSoft Add-On Instruction 200
 - Rockwell Automation Library 200
- GE Multilin 869**
 - associate ProSoft tags 220
 - Configure Rockwell Automation Add-On Instruction 222
 - controller code 218, 236
 - remote command structure 219
 - Creating a FactoryTalk View SE Parameter File 225
 - faceplates 230
 - diagnostic tab 233
 - engineering tab 232
 - help tab 234
 - operator tab 231
 - Linking parameter files to an HMI display 228
 - object 217
 - ProSoft Add-On Instruction 218

GE Multilin 889

- associate ProSoft tags 237
- Configure Rockwell Automation Add-On Instruction 240
- controller code
 - remote command structure 237
- faceplates 247
 - diagnostic tab 251
 - engineering tab 249
 - help tab 252
 - operator tab 248
- Linking parameter files to an HMI display 245

- object 235

global object

- definition 256

glossary 253**H****half-duplex mode**

- definition 256

historian

- definition 256

HMI tags 14**hypervisor client**

- definition 257

I**IEC 61850 standard 11****IEEE-1588**

- definition 257

IGMP

- definition 257

implicit connection

- definition 257

integrated architecture

- definition 257

Internet Group Management Protocol

- definition 257

IP address

- definition 257

K**knowledgebase**

- definition 257

L**linear topology**

- definition 257

N**network address translation (NAT)**

- definition 257

O**object**

- ABB EMAX2 using EtherNet/IP 149
- ABB EMAX2 using IEC 61850 165
- GE Multilin 845 181
- GE Multilin 850 199
- GE Multilin 869 217
- GE Multilin 889 235
- SEL700G 69
- SEL710 93
- SEL751A 113
- SEL787 131

old computer name

- definition 257

OPC

- definition 257

operator workshop

- definition 257

P**PASS**

- definition 258

PCDC 9**PlantPAx**

- system definition 258

R**redundant star topology**

- definition 258

required files 13**S****SEL700G**

- faceplates

- auto-sync tab 85
 - diagnostic tab 89
 - engineering tab 86
 - help tab 92
 - operator tab 84
 - x-side diagnostic tab 90
 - y-side diagnostic tab 91
- mapping InOut tags to add-on instructions 96

- object 69

- using visualization files 77

SEL710

- controller code 94
- output structure 95
- remote bit 95

- faceplates 106

- diagnostic tab 110
 - engineering tab 108
 - help tab 111
 - operator tab 107

- object 93

- using visualization files 101

SEL751A

- controller code 114
 - InOut structure for SEL751A from Pro-Soft Gateway 70, 94, 114, 132
- remote bit 115
- faceplates 125
 - diagnostic tab 128
 - engineering tab 127
 - help tab 129
 - operator tab 126
- object 113
- using visualization files 120
 - link to display 123

SEL787

- controller code 132
 - remote bit 133
- faceplates 144
 - diagnostic tab 51, 147
 - engineering tab 146
 - help tab 148
 - operator tab 145
- object 131
- using visualization files 139

server

- definition 258

SFC

- definition 258

star topology

- definition 258

static

- definition 258

subnet mask

- definition 258

system

- attribute definition 258
- element definition 258
- infrastructure definition 258
- server definition 258

T**TCP/IP**

- definition 259

U**UDT**

- definition 259

user-defined tag

- definition 259

V**virtual LAN**

- definition 259

virtual machine

- definition 259

visualization files 13

- display files 13
- HMI tags 14

VLAN

- definition 259

VM

- definition 259

W**workstation**

- definition 259

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Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	https://rockwellautomation.custhelp.com/
Local Technical Support Phone Numbers	Locate the phone number for your country.	http://www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	http://www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	http://www.rockwellautomation.com/global/literature-library/overview.page
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