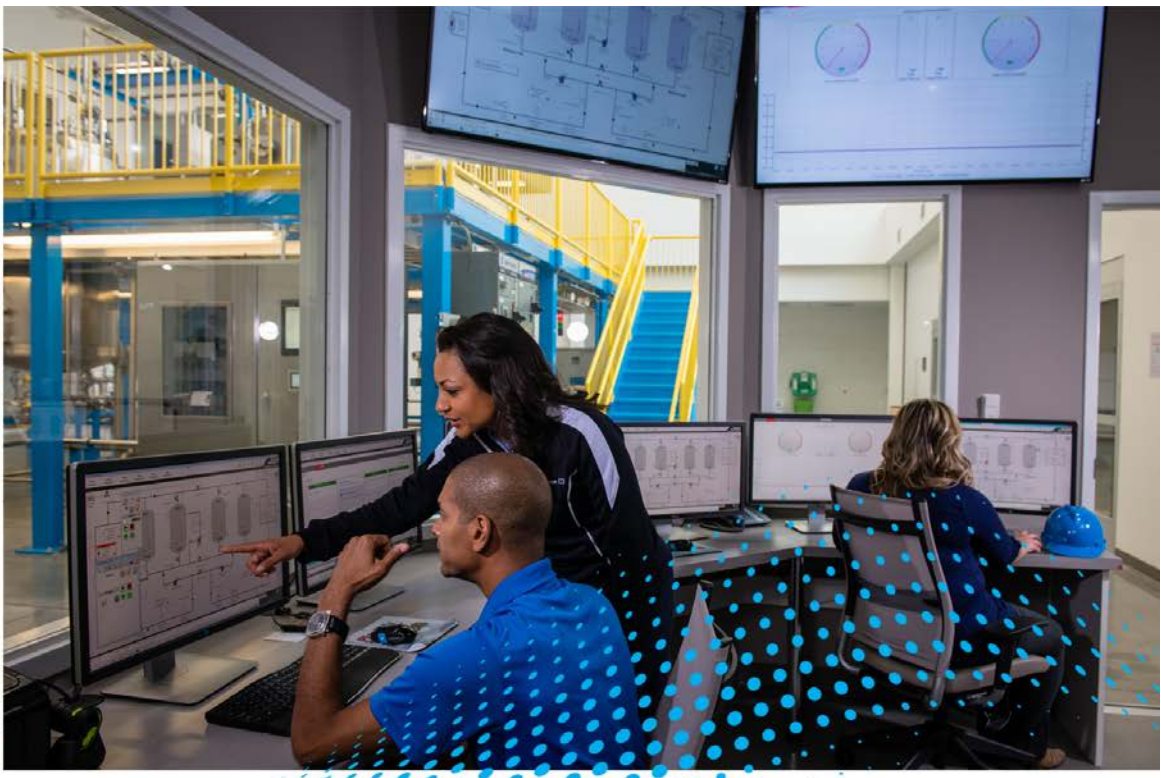
This manual links to Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools for object and visualization parameters, download the spreadsheets now to ensure offline access.







Rockwell Automation Library of Process Objects

System Release 5.0

PlantPAx Distributed Control System

Allen-Bradley by ROCKWELL AUTOMATION

FactoryTalk by ROCKWELL AUTOMATION

Rockwell Automation

Reference Manual

Original Instructions

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.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

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

Summary of Changes 15
Software and Firmware Upgrades 15
Rockwell Automation Services and Support 15

Chapter 1

Rockwell Automation Library of Process Objects

PlantPAx Instructions 18
Process Library 5.0 Add-On Instructions 22
- Organization 24
- Other Libraries 25

Visualization Files 26
- Basic Attributes and Indicators 27
- State Indicators 28
- Status Quality Indicators 28
- Threshold Indicators 29
- Deviation Indicators 30
- Command Source Indicators 30
- Maintenance Bypass Indicator 31

Basic Faceplate Attributes 31
- Operator (Home) Tab 32
- Maintenance Tab 32
- Advanced Properties 33
- Diagnostics Tab 34
- Faults Tab 34
- Trends Display 35
- Alarms Tab 35
- Help Button 36

Quick Display Interaction 37
Install the Library 37
- Import Logic 37
- Import Visualization Files 39
- Import HMI Tags 39

Studio 5000 Logix Designer Project Configuration 41
FactoryTalk Linx Device Shortcuts Configuration 42
FactoryTalk View Language Configuration 43
- Help Files 43

Library Versions 46
PlantPAx Process Library Migration Tool 46

Chapter 2

Graphic Framework Overview

Header Display 47
Process Control Displays 48
- L1 Display 49
- L2 Display 49
- L3 Display 50

Navigation 50

L1 Navigation 50
L2 Navigation 51
L3 Navigation 51
Alarm Navigation 52
Off-Screen Navigation 52
Alarm Indication 53
Alarm Grouping and Supporting Logic 54

Chapter 3

Configure the Graphic Framework

Recommended Application Naming Structure 57
Build Your PlantPAx HMI Application 58
Global Objects 61
APP - Administrative Objects (raP-5-SE) 61
APP - Alarm Objects (raP-5-SE) 61
APP - Header Objects (raP-5-SE) 62
Template Custom Objects (raP-5-SE) 64
Template L1 Navigation (raP-5-SE) 65
Template L2 L3 Navigation (raP-5-SE) 67
Displays 77
Macros 84
Template_ClientStartup 84
Client File Setup (.CLI) 86

Chapter 4

Logix Diagnostic Objects

Logix Change Detector (raP_Dvc_LgxChangeDet) 89
Guidelines 89
Functional Description 89
Required Files 91
Operations 91
Programming Example 92
Logix Controller CPU Utilization (raP_Dvc_LgxCPU_5x80) 95
Guidelines 95
Functional Description 95
Required Files 96
Operations 97
Programming Example 97
Graphic Symbols 100
Faceplates 100
Logix Redundant Controller Monitor (raP_Dvc_LgxRedun) 103
Guidelines 103
Functional Description 104
Required Files 104
Operations 104
Programming Example 106
Graphic Symbols 108
Faceplates 109
Logix Module Status (raP_Dvc_LgxModuleSts) 110
Guidelines 110
Functional Description 110

Required Files 112
Operations 112
Programming Examples 113
Graphic Symbols 115
Faceplates 115
Logix Event (raP_Tec_LgxEvent) 118
Guidelines 118
Functional Description 118
Required Files 119
Operations 120
Programming Examples 120

Chapter 5

Organization and Propagation

Organization 121
Functional Description 121
Required Files 123
Operations 123
Programming - Controller Logic 123
Programming - HMI 124
Configuring a Node 125
Constructing a Nodal Tree 125
Configure the Tree Node at Which to Start this View 130
Configuring Propagation and Navigation 133
Configure Nodal HMI 137
Issue Commands 139
Status Indicators 141
Adding ownership to devices if using the raP_Opr_EMGen 144

Chapter 6

Ownership (raP_Opr_Owner)

Guidelines 145
Functional Description 145
Required Files 146
Controller Files 146
Visualization Files 146
Operations 146
Command Sources 146
Alarms 146
Virtualization 146
Execution 146
Programming Examples 147
Graphic Symbols 148
Faceplates 148

Chapter 7

Arbitration (raP_Opr_Arbitration0)

Guidelines 149
Functional Description 149
Required Files 150
Controller Files 150
Visualization Files 150

Operations 150
Command Sources 150
Alarms 150
Virtualization 150
Execution 151
Programming Examples 151
Graphic Symbols 151
Faceplates 151

Chapter 8

Organizational Scan (raP_Opr_OrgScan)

Guidelines 153
Functional Description 153
Required Files 154
Controller Files 154
Visualization Files 154
Operations 154
Command Sources 154
Alarms 154
Virtualization 154
Execution 154
Programming Examples 155
Graphic Symbols 155
Faceplates 155

Chapter 9

Organizational View (raP_Opr_OrgView)

Guidelines 157
Functional Description 157
Required Files 158
Controller Files 158
Visualization Files 158
Operations 158
Command Sources 158
Alarms 158
Virtualization 158
Execution 158
Programming Examples 159
Graphic Symbols 159
Faceplates 159

Chapter 10

n-Position Device (raP_Dvc_nPos)

Functional Description 162
Required Files 163
Operations 164
Alarms 164
Virtualization 164
Execution 165
Programming Example 165
Graphic Symbols 169
Faceplates 170
Operator 170
Maintenance 171
Advanced Maintenance Tab 171

Engineering Tabs 172
HMI Configuration Tabs 174
Diagnostics Tab 176
Alarms Tab 176

Chapter 11

Mix-proof Valve (raP_Dvc_VlvMP)

Overview 177
Functional Description 177
Required Files 178
Operations 178
Alarms 178
Virtualization 179
Execution 179
Programming Example 180
Graphic Symbols 183
Faceplates 183
Operator 183
Maintenance 184
Advanced Maintenance Tab 184
Engineering Tabs 186
HMI Configuration Tabs 187
Diagnostics Tab 188
Alarms Tab 188

Chapter 12

Discrete 2-, 3-, 4-state Device (raP_Dvc_D4SD)

Functional Description 189
Required Files 190
Operations 190
Alarms 190
Virtualization 190
Execution 191
Programming Example 192
Graphic Symbols 195
Faceplates 198
Operator Tab 198
Maintenance Tab 199
Advanced Maintenance Tab 199
Engineering Tabs 200
HMI Configuration Tabs 201
Diagnostics Tab 202
Alarms Tab 202

Chapter 13

Process Extended Alarms (raP_Opr_ExtddAlm)

Functional Description 204
Required Files 207
Operations 207
Command Sources 207
Alarms 207

Virtualization 207
Execution 207
Programming Examples 208
Implementation by Using the EnableIn False Feature 208
Graphic Symbols 209
Faceplates 209

Chapter 14

Process Area Module (raP_Opr_Area)

Functional Description 214
Command Source Management 214
Required Files 214
Operations 214
Alarms 214
Execution 215
Programming Example 215
Graphic Symbols 215
Faceplates 216
Maintenance Tab 216
Engineering Tab 217
HMI Configuration Tab 217

Chapter 15

Process Unit (raP_Opr_Unit)

Overview 219
Functional Description 220
Command Source Management 220
Required Files 220
Operations 220
Alarms 220
Execution 221
Programming Example 221
Graphic Symbols 221
Faceplates 221
Operator Tab 222
Maintenance Tab 222
Engineering Tab 223
HMI Configuration Tab 224

Chapter 16

General Equipment Module (raP_Opr_EMGen)

Overview 227
Functional Description 228
Required Files 229
Operations 229
Command Source Operations 229
State Model 230
Program Structure 230
Alarms 230
Execution 231
Programming Example 231

Graphic Symbols 231
Faceplates 231
Operator Tab 232
Maintenance Tab 233
Engineering Tab 233
HMI Configuration Tab 235

Chapter 17

General Equipment Phase (raP_Opr_EPGen)

Overview 237
Functional Description 238
Required Files 239
Operations 239
Command Source Operations 239
Phase Manager 240
Program Structure 240
Alarms 241
Execution 241
Programming Example 242
Graphic Symbols 242
Faceplates 242
Operator Tab 243
Manual Control 243
Maintenance Tab 244
Engineering Tab 244
HMI Configuration Tab 246

Chapter 18

Parameter and Reports (raP_Tec_ParRpt)

Overview 249
Functional Description 250
Required Files 251
Operations 251
Modes of Operation 251
Alarms 251
Execution 252
Programming Example 252
Parameter Program Example 252
Reports Program Example 253
Faceplates 254
Parameter Display 254
Report Display 255
Parameter Configuration 256
Report Configuration 257

Chapter 19

Graphic Symbols and Faceplates for PlantPAx Instructions

Process Analog Input (PAI) Graphic Symbols 259
Process Analog Input (PAI) Faceplates 263
Operator Tab 263
Maintenance Tabs 264

Advanced Maintenance 265
Engineering Tabs 266
HMI Configuration 269
Process Analog HART (PAH) Faceplates 270
Smart Device Operator 270
Smart Device Maintenance 270
Smart Device Engineering 271
Smart Device HMI Configuration 271
Smart Device Diagnostics 272
Process Dual Sensor Analog Input (PAID) Graphic Symbols 272
Process Dual Sensor Analog Input (PAID) Faceplates 273
Operator 273
Maintenance 273
Advanced Maintenance 274
Engineering 274
HMI Configuration 275
Process Multi Sensor Analog Input (PAIM) Graphic Symbols 276
Process Multi Sensor Analog Input (PAIM) Faceplates 277
Operator 277
Maintenance 278
Engineering 278
HMI Configuration 280
Process Analog Output (PAO) Graphic Symbols 281
Process Analog Output (PAO) Faceplates 282
Operator 282
Maintenance 282
Advanced Maintenance 283
Engineering 284
HMI Configuration 286
Process Boolean Logic (PBL) Graphic Symbols 287
. 287
Process Boolean Logic (PBL) Faceplates 287
Operator 287
Maintenance 288
Engineering 288
HMI Configuration 289
Logic Gate Configuration 290
View Snapshot 291
Process Command Source (PCMDSRC) 291
Command Source Totem Pole 292
Operator Buttons 292
External Control 293
Maintenance Buttons 293
Advanced Properties 293
Process Deadband Controller (PDBC) Graphic Symbols 294
Process Deadband Controller (PDBC) Faceplates 295
Operator 295
Maintenance 296
Advanced Maintenance 297
Engineering 297

HMI Configuration 298
Process Discrete Input (PDI) Graphic Symbols 299
Process Discrete Input (PDI) Faceplates 300
Operator 300
Maintenance 300
Advanced Maintenance 301
Engineering 301
HMI Configuration 302
Process Discrete Output (PDO) Graphic Symbols 302
Process Discrete Output (PDO) Faceplates 303
Operator 303
Maintenance 303
Advanced Maintenance 304
Engineering 304
HMI Configuration 306
Process Dosing (PDOSE) Graphic Symbols 307
Process Dosing (PDOSE) Faceplates 308
Operator 308
Maintenance 308
Advanced Maintenance 309
Engineering 309
HMI Configuration 311
Process Analog Fanout (PFO) Graphic Symbols 312
Process Analog Fanout (PFO) Faceplates 313
Operator 313
Maintenance 313
Engineering 314
HMI Configuration 315
Process High or Low Selector (PHLS) Graphic Symbols 315
Process High or Low Selector (PHLS) Faceplates 316
Operator 316
Maintenance 316
Engineering 317
HMI Configuration 317
Process Interlock (PINTLK) Graphic Symbols 318
Interlock States 319
Process Interlock (PINTLK) Faceplates 319
Operator 319
Maintenance 320
Engineering 321
HMI Configuration 321
Process Lead/Lag/Standby Motor Group (PLLS) Graphic Symbols . . . 322
Process Lead/Lag/Standby Motor Group (PLLS) Faceplates 323
Operator 323
Manual Mode 323
Maintenance 324
Advanced Maintenance 324
Engineering 325
HMI Configuration 326
Process Motor (Power Discrete) (PMTR) Graphic Symbols 328

Process Motor (Power Discrete) (PMTR) Faceplates 330
Operator 330
Maintenance 331
Advanced Maintenance 331
Engineering 332
HMI Configuration 334
PPID Graphic Symbols 335
PPID Faceplates 340
Operator 340
Ramp Wizard Display 341
Maintenance 341
Advanced Maintenance 342
Tuning 345
Engineering 345
HMI Configuration 349
Process Permissive (PPERM) Graphic Symbols 350
Permissive States 351
Process Permissive (PPERM) Faceplates 351
Operator 351
Maintenance 352
Engineering 353
HMI Configuration 353
Process Pressure/Temperature Compensated Flow (PPTC) Graphic Symbols 354
Process Pressure/Temperature Compensated Flow (PPTC) Faceplates . . 354
Operator 354
Advanced Maintenance 354
Engineering 355
HMI Configuration 355
Process Restart Inhibit (PRI) Graphic Symbols 356
Process Restart Inhibit (PRI) Faceplates 356
Operator 356
HMI Configuration 357
Process Run Time (PRT) Graphic Symbols 357
Process Run Time (PRT) Faceplates 357
Operator 357
HMI Configuration 358
Process Tank Strapping Table (PTST) Graphic Symbols 358
Process Tank Strapping Table (PTST) Faceplates 358
Operator 358
Engineering 359
HMI Configuration 360
Process Valve (PVLV) 360
Process Valve (PVLV) Graphic Symbols (Configured as Hand Operated Valve) 360
Process Valve (PVLV) Faceplates (Configured as Hand Operated Valve) 361
Operator 361
Maintenance 361

Advanced Maintenance 362
Engineering. 362
HMI Configuration 363
Process Valve (PVLV) Graphic Symbols (Configured as Motorized Valve) 365
Process Valve (PVLV) Faceplates (Configured as Motorized Valve) . . 365
Operator. 365
Maintenance 366
Advanced Maintenance 366
Engineering. 367
HMI Configuration 368
Process Valve (PVLV) Graphic Symbols (Configured as Solenoid Operated Valve). 370
Process Valve (PVLV) Faceplates (Configured as Solenoid Operated Valve) 370
Operator. 370
Maintenance 371
Advanced Maintenance 371
Engineering. 372
HMI Configuration 373
Process Variable Speed Drive (PVSD) Graphic Symbols 375
Process Variable Speed Drive (PVSD) Faceplates 378
Operator. 378
Maintenance 378
Advanced Maintenance 379
Engineering. 379
HMI Configuration 381

Appendix A

FactoryTalk View Customization Tool

Overview 385

Appendix B

Command Sources and Device Virtualization

Command Sources 391
Virtualization. 393

Appendix C

Tag Extended Properties and Default Alarm Settings

raP_Opr_Area 396
raP_Opr_Unit 396
raP_Opr_EMGen 397
raP_Opr_EPGen 399
raP_Dvc_D4SD 399
raP_Dvc_VlvMP 400
raP_Dvc_nPos 401
raP_Opr_ExtddAlm 402
raP_Tec_ParRpt 402
raP_Opr_Prompt 402
raP_Opr_Prompt_Core 403
raP_Dvc_LgxTaskMon 403

raP_Dvc_LgxChangeDet 403
raP_Dvc_LgxRedun 403
raP_Dvc_LgxModuleSts 403
raP_Dvc_LgxCPU_5x80 404
raP_Opr_ArbitrationQ 404
raP_Opr_OrgScan 404
raP_Opr_OrgView 404

Appendix D

HMI Navigation

Tag Naming Conventions 405

Appendix E

5094-IF8IH to PAH Configuration Example

Download and install the 5094 HART Analog Add-On Profile 411
Add the 5094 Adapter Module to the Project I/O Configuration 413
Add the 5094-IF8IH Module to the Project I/O Configuration. 414
Add the HART Device to the Project I/O Configuration 415
Configure the Analog Input Channel. 418
Add the PAH (Process Analog HART) and PAI (Process Analog Input) Instruction Instances to the Project. 419
Add the PAH Instruction Instance. 419
Connect PAX_HART_DEVICE:I:0 Member from Input Assembly to Ref_HARTData InOut Parameter. 421
Add the PAI Instruction Instance 421
Connect the PAH Instance to the PAI Instance 424

Appendix F

1756-IF8IH with raP_Tec_HARTChanData_to_PAH Add-On Instruction Configuration Example

Add the 1756-IF8IH Module to the Project I/O Configuration 429
Configure the Channel for the HART Device 431
Import the raP_Tec_HARTChanData_to_PAH Add-On Instruction . 432
Import the I_1756IF8IH Rung into the Project. 433
Add the raP_Tec_HARTChanData_to_PAH Instance to the Project . . 437
Add the PAH and PAI Instances to the Project and Connect PAH and PAI Instances. 441

The PlantPAx® system provides a modern approach to distributed control. The system shares common technology (Integrated Architecture® system) with all other automation disciplines in the plant. This approach creates a seamless information flow across the plant for optimization opportunities and enables a Connected Enterprise.

Our scalable platform provides you with the flexibility to implement a system appropriate for your application. The following table shows the documents that are available to help design and implement your system requirements.

Stage	Publication	Description
Define and Procure	Selection Guide, publication PROCES-SG001	Helps you understand the elements of the PlantPAx system to make sure that you buy the proper components.
Install	Template User Manual, publication 9528-UM001	Provides direction on how to install and deploy PlantPAx virtual templates.
Develop	Configuration and Implementation User Manual, publication PROCES-UM100	Provides system guidelines and instructions to assist with the development of your PlantPAx system.
	Rockwell Automation Library of Process Objects Reference Manual, publication, PROCES-RM200	Describes the Add-On Instructions, PlantPAx instructions, and associated faceplates that are available to develop applications.

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Added Logix Diagnostic Objects chapter	89
Added raP_Opr_Owner chapter	145
Added raP_Opr_ArbitrationQ chapter	149
Added raP_Opr_OrgScan chapter	153
Added raP_Opr_OrgView chapter	157
Added PVLV information	360
Added PVSD information	375
Added Appendix D, HMI Navigation	405
Added Appendix E, 5094-IF8IH to PAH Configuration Example	411
Added Appendix F, Added 1756-IF8IH with raP_Tec_HARTChanData_to_PAH Add-On Instruction Configuration Example	429

Software and Firmware Upgrades

When you update software or firmware revisions, we recommend that you verify the impact on performance and memory utilization before implementing the upgrade on the production system. For FactoryTalk® View or ControlLogix® platforms, we recommend that you review the release notes and verify the impact of the upgrade on performance and memory utilization.

You can also verify the compatibility of the upgrade with the installed software and operating systems in use on your PlantPAx system. See the Product Compatibility and Download Center.

Rockwell Automation Services and Support

System Support offers technical assistance that is tailored for control systems. Some of the features include the following:

- Highly experienced team of engineers with training and systems experience

- Process support at a systems-level that is provided by process engineers
- Use of online remote diagnostic tools
- Access to otherwise restricted TechConnect℠ Knowledgebase content
- 24-hour, 7 days per week, 365 days per year of phone-support coverage upgrade option

For more information, contact your local distributor or Rockwell Automation representative or see http://www.rockwellautomation.com/support.

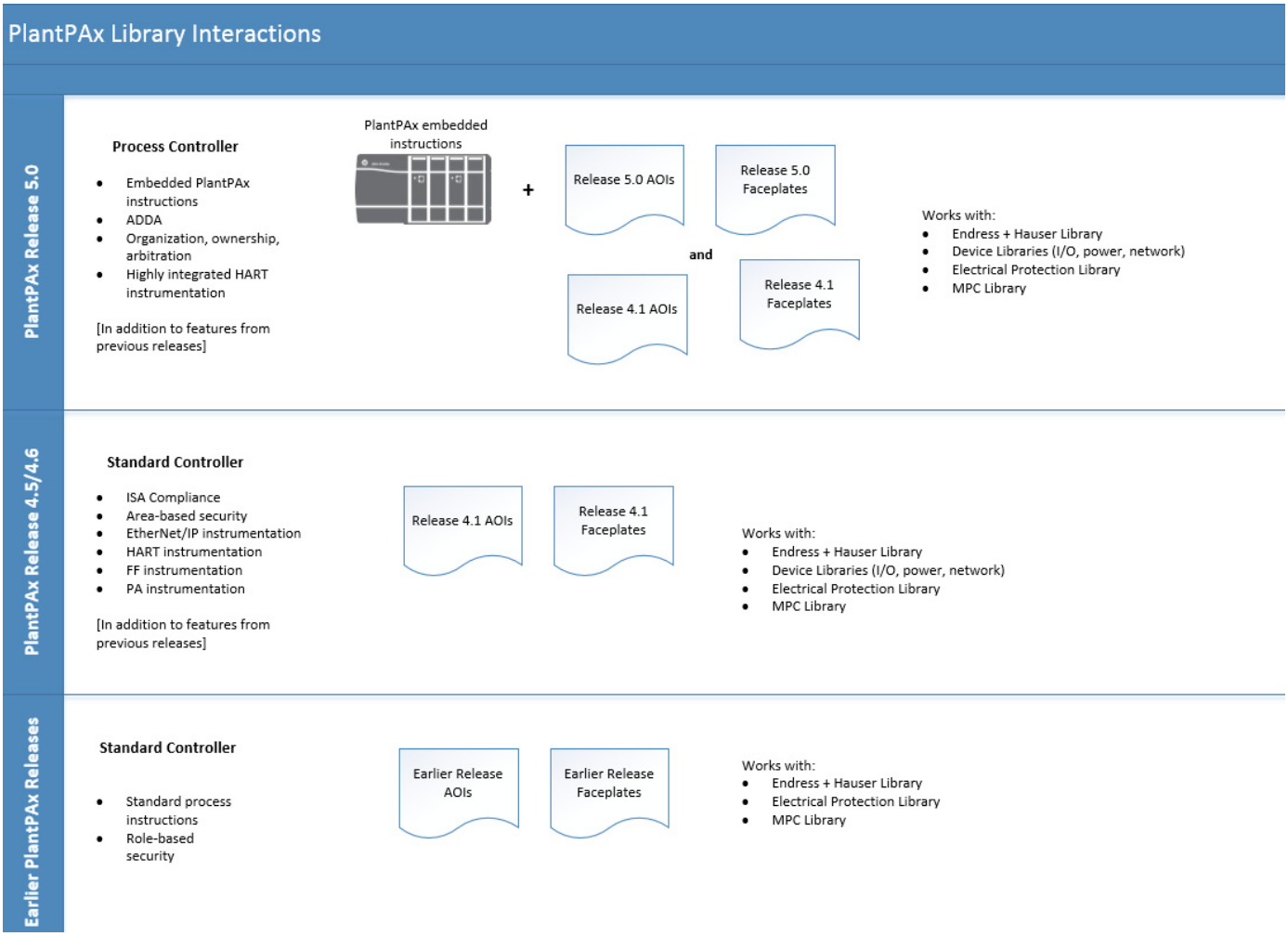
You can view or download publications at http://www.rockwellautomation.com/literature. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Rockwell Automation Library of Process Objects

The PlantPAx® library contains add-on instructions to enable consistent deployment and faster product delivery.

The Device Library is a tested, documented, and life cycle managed object library. The Device Library provides pre-configured status and diagnostic faceplates and AOI sets for Rockwell Automation discrete, velocity, and motion automation devices. The Device Objects may be used with Machine Builder, Process, and Packaged Libraries or as standalone components. Device library add-on instructions objects collect, process, and deliver data between hardware devices and application logic.

When you deploy the process controller in PlantPAx 5.0, you gain access to additional PlantPAx instructions. The PlantPAx instructions on the process controller provide objects that are embedded in controller firmware.



PlantPAx Instructions

In PlantPAx 5.0, Rockwell Automation offers device control strategies embedded into the process controller. The following table outlines the PlantPAx instructions in relation to previous releases of PlantPAx Add-On Instructions. For more detailed information, see the online help section of Studio 5000 Logix Designer®.

Input Processing

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Analog Input (PAI)	CM_AIN (GEMS) MSAinSiS (RAMS) P_AIChan (PO) P_AInAdv (PO) P_Ain (PO)	The Process Analog Input (PAI) instruction monitors an analog input and checks for alarm conditions. Use the PAI instruction to process a signal from a channel of an analog input module. Use the PAI instruction with any analog (REAL) signal.
Process Dual Sensor Analog Input (PAID)	P_AInDual (PO)	The Process Dual Sensor Analog Input (PAID) instruction monitors one analog Process Variable (PV) by using two analog input signals, from sources such as dual sensors, dual transmitters, and dual input channels. The PAID instruction monitors conditions of the channels and reports configured PV quality. The PAID instruction has functions for input selection, averaging, and failure detection. Additional functions, such as for filtering and alarming, are done by a downstream PAI block.
Process Multi Sensor Analog Input (PAIM)	P_AInMulti (PO)	The Process Multi Sensor Analog Input (PAIM) instruction monitors one analog process variable (PV) by using up to eight analog input signals from sources such as sensors, transmitters, and input channels. The PAIM instruction has functions for input selection, averaging, and failure detection. Additional functions, such as filtering and alarming, are done by a downstream PAI block.
Process Discrete Input (PDI)	CM_DIN (GEMS) MsDinSiS (RAMS) P_DIn (PO)	The Process Discrete Input (PDI) instruction monitors a discrete (true or false) input, and checks for alarm conditions. Use the PDI instruction to process a signal from a channel of a discrete input module. Use the PDI instruction with any discrete (BOOL) signal.
Process Pressure/Temperature Compensated Flow (PPTC)	P_PTComp (PO)	The Pressure/Temperature Compensated Flow (PPTC) instruction calculates a flow at standard temperature and pressure, essentially a mass flow rate, given a volumetric flow rate or differential pressure measurement. This instruction requires measurements of the actual temperature and pressure of the flowing gas.
Process Tank Strapping Table (PTST)	P_StrapTbl (PO) I_Chrctrztn (GEMS)	The Process Tank Strapping Table (PTST) instruction calculates the volume of product in an upright cylindrical tank, given the level of the product and the tank calibration table.
Process HART (PAH) (+ PAI or PAO)	P_AInHART P_AOutHART	The Process Analog HART (PAH) instruction is used to provide HART digital data for an intelligent analog device alongside the analog input (PAI) or analog output (PAO) instruction for that device.

Device Control

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Analog Output (PAO)	CM_AOUT (GEMS) MSAoSoS (RAMS) P_AOut (PO) P_ValveC (PO)	The Process Analog Output (PAO) instruction drives an analog output and checks for alarm conditions. Use the PAO instruction for a channel of an analog output module. Use the PAO instruction with any analog (REAL) signal.
Process Discrete Output (PDO)	CM_DOUT (GEMS) P_DOut (PO)	The Process Discrete Output (PDO) instruction drives a discrete (true / false) output, monitors discrete inputs serving as feedbacks from a device driven by the discrete output, and checks for alarm conditions. Use the PDO instruction for a channel of a discrete output module. Use the PDO instruction with any discrete (BOOL) signal.

Device Control

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Motor (Power Discrete) (PMTR)	CM_M2S (GEMS) MsMtrFrS (RAMS) P_Motor2Spd (PO) P_MotorHO (PO) P_MotorRev (PO) P_Motor (PO) P_SMC50 (PO) P_SMCFlex (PO)	The Process Motor (PMTR) instruction monitors and controls a fixed single-speed, two-speed, or reversing motor using a full-voltage contactor or intelligent motor controller (soft starter). The motor can be run or jogged, including jogging reverse or jogging fast, as configured by the user. The interface to the hardware motor controller can be through a Device Object Interface or through individual pins. The object is a configurable, built-in combination of the existing PlantPAx P_Motor (single speed), P_Motor2Spd (two speed), P_MotorRev (reversing), and P_MotorHO (hand-operated or monitor-only) Add-on instructions in the Rockwell Automation Library of Process Objects.
Process Valve Library (PVLV)	CM_V2S (GEMS) CM_V3S (GEMS) MsVlv2sS (RAMS) MsVlv3S (RAMS) P_ValveHO (PO) P_ValveMO (PO) P_ValveSO (PO)	The Process Valve (PVLV) instruction operates a two-position, single-solenoid operated valve, a dual-solenoid operated valve, or a motor-operated valve in various modes, monitoring for fault conditions. It also monitors hand-operated two-position valves. It is a built-in analogy of the existing PlantPAx P_ValveSO, P_ValveMO, and P_ValveHO add-on instructions in the Rockwell Automation Library of Process Objects.
Process VSD (Power Velocity) (PVSD)	CM_VFD (GEMS) MsVsdFrs (RAMS) P_PF52x (PO) P_PF6000 (PO) P_PF7000 (PO) P_PF753 (PO) P_PF755 (PO) P_VSD (PO)	The Process Variable Speed Drive (PVSD) instruction monitors and controls a variable speed motor using an AC (variable frequency) or DC drive. Use the instruction to run or jog the motor, forward or reverse. The drive interface can be through a Device Object Interface or through individual pins. The object is a built-in version of the existing P_VSD add-on instruction in the Rockwell Automation Library of Process Objects.

Discrete Monitoring and Control

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Boolean Logic (PBL)	P_Logic (PO)	The Process Boolean Logic with Snapshot (PBL) instruction executes up to eight gates of configurable Boolean logic. Gate types available include AND, OR, XOR (Exclusive-OR), Set/Reset, Select, and Majority. Each gate provides up to four input conditions that are individually invertible using a configuration setting.
Process Interlock (PINTLK)	P_Intlk (PO) P_IntlkAdv (PO) I_Multiplex_04 (GEMS) I_Multiplex_08 (GEMS) I_Multiplex_16 (GEMS) I_Multiplex_32 (GEMS) I_Protective (GEMS)	The Process Interlocks (PINTLK) instruction collects, or sums up, the interlock conditions that stop or de-energize a running or energized piece of equipment. This instruction can also help prevent equipment from starting or being energized. Interlocks are always evaluated to de-energize equipment. For permissive conditions that must be made to start the equipment, but are ignored once the equipment is running, use the Process Permissive (PPERM) instruction.
Process Lead/Lag/Standby Motor Group (PLLS)	P_LLS (PO) MsGrpM8S (RAMS)	The Process Lead Lag Standby Motor Group (PLLS) instruction provides control of a parallel group of motors, such as a set of pumps with a common intake source and discharge destination. The number of motors to run depends on the demand on the system. The group can be configured to consist of as few as two or as many as 30 motors. The minimum demand can be set as low as 0, so that all motors are stopped at minimum demand. The maximum demand can be set as high as the number of pumps in the group.
ProcessPermissive (PPERM)	P_Perm (PO) I_Multiplex_04 (GEMS) I_Multiplex_08 (GEMS) I_Multiplex_16 (GEMS) I_Multiplex_32 (GEMS)	The Process Permissives (PPERM) instruction collects, or sums up, the permissive conditions that allow a piece of equipment to energize. In most cases, permissive conditions must be true to energize equipment. Once the equipment is energized, permissives are ignored.

Discrete Monitoring and Control

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Restart Inhibit (PRI)	P_ResInh (PO)	Use the Process Restart Inhibit instruction for Large Motor (PRI) instruction to prevent large motors from starting repeatedly. The high starting current for a large motor causes heating. Continual starts or start attempts in a short period overheat the motor windings and damage the motor. The PRI instruction provides a rule-based state model for restarts. Do not use the instruction to model or monitor heating and replace sensor-based motor monitoring devices. Use the instruction to avoid over stressing a motor.
Process Run Time (PRT)	P_RunTime (PO)	The Process Run Time and Start Counter (PRT) instruction records the total run time and number of instances the motor or other equipment starts. The PRT is a software implementation of the mechanical hour meter that displays the total motor runtime. Maintenance personnel use the run time and equipment start variables to create a maintenance schedule for the applicable equipment.
Process Valve Stat (PVLVS)	P_ValveStats (PO)	The Process Valve Statistics Object (PVLVS) instruction monitors a two-state (open and close) valve and records statistics for stroke times and stroke counts to aid in planning maintenance or diagnosing valve and actuator problems. The PVLVS instruction is designed to work with the PVLV (solenoid, motor, and hand operated) valve instruction.

Ownership

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Command Source (PCMDSRC)	P_CmdSrc (PO)	The Process Command Source (PCMDSRC) instruction selects the command source for a device.

Procedural Control

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Dosing (PDOSE)	CM_TOT (GEMS) CM_WS (GEMS) MsTotSiS (RAMS) P_DoseFM (PO) P_DoseWS (PO)	The Process Dosing (PDOSE) instruction controls an ingredient addition that uses a flow meter to measure the quantity of ingredient added. The flow meter can be an analog flow meter (signal proportional to flow), a pulse generating flow meter (pulse count proportional to quantity delivered), or a digital flow meter providing flow rate or quantity (totalized flow) information. The instruction also controls an ingredient addition that uses a weigh scale to measure the quantity of ingredient added. The weigh scale can be on the receiving vessel, indicating gain in weight, or on the sourcing vessel, indicating loss in weight. The weigh scale can be connected using an analog input, device network, or other connection.

Regulatory Control

PlantPAx Instruction	Previous Process Library AOIs	Instruction Description
Process Deadband Controller (PDBC)	P_DBC	The Process Deadband Controller (PDBC) provides: • A Raise output, which is activated when the PV is less than the entered Raise threshold, and a Lower output, which is activated when the PV is greater than the entered Lower threshold. • Q and Q-Not outputs. Q is set when the PV falls below the Raise threshold and cleared when the PV rises above the Lower threshold; Q-Not is the inverse of Q. • High and Low Deviation alarms with configurable thresholds and deadbands. These alarms can provide notification that the PV is approaching an out-of-control condition. • Alarms for High PV Rate of Change Increasing and High PV Rate of Change Decreasing. These alarms can provide notification that the PV is changing faster than expected. • Operation in Manual and Automatic Loop Modes. In Automatic Loop Mode, the outputs are triggered by the control algorithm to keep the PV within limits. In Manual Loop Mode, the operator directly manipulates the Raise and Lower outputs from the HMI. • Operation in Operator, Program, Override, and Maintenance command sources.
Process Analog Fanout (PFO)	P_Fanout (PO)	The Analog Fanout (PFO) instruction sends one primary analog output signal to multiple secondary users or devices. Each secondary output has configurable gain, offset, and clamping limits.
Process High or Low Selector (PHLS)	P_HiLoSel (PO)	The Process High or Low Selector (PHLS) instruction selects the highest or the lowest of up to six incoming controlled variables (CVs). The instruction sends the selected CV as output and flags the unselected CVs to track the selected CV.
Process Regulatory Control (PPID)	CM_PIDE (GEMS) CM_PID (GEMS) MSPidBaS (RAMS) MsPidEns (RAMS) P_PIDE (PO)	Use the Process Proportional + Integral + Derivative (PPID) instruction to manipulate the Control Variable (CV) in regulatory control loops in response to Process Variable (PV) readings and Setpoint (SP, the target PV) settings. The CV is typically used as a cascade setpoint for a secondary, or inner, control loop or is sent to an Analog Output channel on an IO card. The PPID instruction integrates functions of the existing PID, PIDE, and P_PIDE AOI into a single built-in instruction and adds additional features.

Process Library 5.0 Add-On Instructions

PlantPAx 5.0 Add-On Instructions in relation to previous releases of PlantPAx Add-On Instructions.

Input Control

PlantPAx 5.0 AOIs Bundled with 5.0 Library Download	Previous Process Library AOI(s)	Description
raP_Tec_HARTChanData_to_PAH	New Instruction	Transfers data from one Library 4.10 HART module Channel Data array member (for one input or output channel) to one (Highly-Integrated HART) PAX_HART_DEVICE:I:0 data structure for use by PAH instruction.
raP_Tec_LgxEvent	New Instruction	Captures any of 16 event bit rising edge transitions and records the lowest-order rising edge bit as the reason for the event.

Device Control

PlantPAx 5.0 AOIs Bundled with 5.0 Library Download	Previous Process Library AOI(s)	Description
raP_Dvc_nPos	P_nPos (PO)	This instruction controls a circular or linear discrete device with up to 30 positions. The instruction provides outputs to select an individual position and outputs to move toward increasing positions ('clockwise' for a circular device) or decreasing positions ('counterclockwise' for a circular device).
raP_Dvc_D4SD	P_D4SD (PO)	This instruction controls and monitors feedback from a discrete 2-state, 3-state, or 4-state device s, monitoring for fault conditions. These devices include multiple-speed motors or multiple position valves. Controls four discrete outputs and monitors four discrete feedback inputs. Each output and input has configurable states of each output in the various device states. The instruction also monitors permissive and interlock conditions; the latter returns the device to its default state.
raP_Dvc_VlvMP	P_ValveMP (PO) CM_VMX (GEMS)	The Mix-proof Valve (P_ValveMP) Add-On Instruction controls one mix-proof valve in a variety of modes and states, and can check position feedback inputs to verify that the valve reached the commanded position. An alarm can be provided on failure to reach a target position.

Controller Diagnostics

PlantPAx 5.0 AOIs Bundled with 5.0 Library Download	Previous Process Library AOI(s)	Description
Logix Change Detector (raP_Dvc_LgxChangeDet)	L_ChangeDet (P0)	The Logix Change Detector (raP_Dvc_LgxChangeDet) Add-On Instruction monitors another Logix controller on the network and checks for changes that impact operation. Changes that can be monitored include downloads, online edits, I/O forcing , and controller mode changes.
Logix Controller CPU Utilization (raP_Dvc_LgxCPU_5x80)	L_CPU_5x80 (P0) (v33)	The Logix Controller CPU Utilization (raP_Dvc_LgxCPU_5x80) Add-On Instruction monitors a Logix controller, and provides information on controller CPU utilization, communication usage, memory usage, task scan times, and other information. Data that is provided by the L_CPU instruction is useful to diagnose communication or control responsiveness issues and in tuning the performance of control tasks for optimum controller performance.The raP_Dvc_LgxCPU_5x80 instruction can be loaded as part of a control application and disabled (default) until needed. The instruction can also be enabled at a slow update rate for general controller monitoring. The update rate can be increased, if necessary, as directed by a Rockwell Automation Technical Support representative to help diagnose controller performance issues. ControlLogix® 5580 Controllers.
Logix Module Status (raP_Dvc_LgxModuleSts)	L_ModuleSts (P0)	The Logix Module Status (raP_Dvc_LgxModuleSts) Add-On Instruction monitors the connection status of one module in the I/O configuration tree of the Logix controller. The instruction provides an I/O fault signal if the connection is not 'running'.
Logix Redundant Controller Monitor (raP_Dvc_LgxRedun)	L_Redun (P0)	The Logix Redundant Controller Monitor (raP_Dvc_LgxRedun) Add-On Instruction monitors one redundant pair of Logix controllers. The instruction checks primary and secondary controller status that can affect the ability of the system to switch to the back-up controller on a failure of the primary.
Logix Task Monitor (raP_Dvc_LgxTaskMon)	L_TaskMon (P0)	The Logix Task Monitor (raP_Dvc_LgxTaskMon) Add-On Instruction monitors one task running in a Logix controller to provide task statistics, such as task scan time and overlap count. The instruction also provides the following : • Task configuration settings, such as priority, rate, and watchdogtimer setting • Task 'plan' execution time • Alarm if the planned execution time is exceeded Maintenance commands are provided for clearing the maximum execution time and the overlap count.

Equipment Control

PlantPAx 5.0 AOIs Bundled with 5.0 Library Download	Previous Process Library AOI(s)	Description
raP_Opr_Area	AREA (GEMS)	The raP_Opr_Area (Area Object) object groups Units together, and provides a propagation mechanism for aggregating status from Unit objects, and broadcasting commands to Unit Modules.
raP_Opr_EMGen	EM_GEN (GEMS)	The raP_Opr_EMGen (Generic Equipment Module) object controls an Equipment Module in a variety of modes and monitors for fault conditions.
raP_Opr_EPGen	EP_GEN (GEMS)	The raP_Opr_EPGen (Generic Equipment Phase Module) object controls a Equipment Phase in a variety of modes and monitors for fault conditions.

Equipment Control

PlantPAx 5.0 AOIs Bundled with 5.0 Library Download	Previous Process Library AOI(s)	Description
raP_Tec_ParRpt	I_ParameterEnum (GEMS) I_ParameterInteger (GEMS) I_ParameterReal (GEMS) I_ParameterString (GEMS)	The raP_Tec_ParRpt (Parameter \ Report)Add-On Instruction is used to implement parameter and report data items. The raP_Tec_ParRpt instruction may be used as follows: • For a read only parameter /report • For a read/write parameter /report • For a parameter /report of type Integer, Real, String or Enumeration • Equipment Module (raP_Opr_EMGen) and Equipment Phase (raP_Opr_EPGen) are designed to work with the raP_Tec_ParRpt instruction, which may be used for Parameter or Report data items
raP_Opr_Unit	UNIT (GEMS)	The UNIT (Unit Object) object controls a Unit in a variety of command sources and monitors for fault conditions.
raP_Opr_Prompt	Prompt (GEMS) P_Prompt (P0)	The P_Prompt (Operator Prompt) Add-On Instruction is a universal mechanism for operator interaction that can be used within a control scheme. The instruction presents an operator with configurable message or data fields and accepts operator response data and confirmation.
Process Extended Alarms (raP_Opr_ExtddAlm)	Extended Alarms (GEMS)	Monitors one input condition and provides one configurable Alarm. The Alarm is provided as a Logix Tag Based Alarm. Use <InstanceTag>.@Alarms members for access.

Organization

Organization is a method by which parent / child relationships can be created and modified among control objects. Organization provides a method to propagate a selected subset of commands (related to command source, alarms, etc.) from the parent down to its children or propagate the aggregate of a selected subset of status (related to command source, alarms, etc.) from the children up to the parent.

PlantPAx 5.0 AOIs Bundled with 5.0 Library Download	Previous Process Library AOI(s)	Description
Ownership (raP_Opr_Owner)	Ownership, Command and Status Propagation (GEMS)	The Add-On Instruction Function to allow ownership of a Bus element.
Organizational View (raP_Opr_OrgView)	Ownership, Command and Status Propagation (GEMS)	The Add-On Instruction Function to create a tree view of the nodal organization in FactoryTalk® View.
Organizational Scan (raP_Opr_OrgScan)	Ownership, Command and Status Propagation (GEMS)	The Add-On Instruction Function to scan and update all Bus elements and tree nodes.
Arbitration Queue (raP_Opr_Arbitration0)	Ownership, Command and Status Propagation (GEMS)	The Arbitration Queue (raP_Opr_Arbitration0) Add-On Instruction Function to add a FIFO to each class of owner in the ownership funtion.

Other Libraries

Item	Description
Process Library	Rockwell Automation Library of Process Objects provides sample projects, application templates, Endress + Hauser library objects, Application Code Manager library objects, and tools and utilities. Includes the following: • Graphics for built-in instructions • HMI images and Help files • Logix diagnostic objects • Process objects • Control strategies • Sequencer objects • PlantPAx Configuration Tools for Tags, Alarms and Historian • Color Change • Historian -- Asset Framework template and objects
I/O Device Library	Provides objects for Rockwell Automation 1756, 1769, 1734, 1794, 1738, 1732E, 1719, 5069, 5094 I/O modules. Provides preconfigured status and diagnostic faceplates sets for Rockwell Automation digital and analog I/O devices. You can use these objects with Machine Builder, Process, and Packaged Libraries, or as standalone components.
IO-Link Device Library	Provides IO-Link master and sensor objects. Provides preconfigured status and diagnostic faceplates.
Electrical Protection Device Library	Provides a standard to represent protection devices within your electrical distribution system
Machine Builder Libraries	Library objects for use with Application Code Manager. • Independent Cart Technology Libraries, includes ICT Libraries for iTRAK® and MagneMotion® • Studio 5000® Application Code Manager • Power Device Library, including objects for E300, ArmorStart®, PowerFlex®, and Kinetix®
Network Device Library	Provides objects for Stratix® switch and Device Level Ring network objects.
Power Device Libraries	Provides objects for discrete and velocity power devices.

Libraries can be accessed from the
Product Compatibility and Download Center.

.

Visualization Files

Each Add-On Instruction has associated visualization files that provide a common user interface. You must import these files in the following order:

- Images (.png files)
- Global Objects(.ggfx file type)
- HMI faceplates (.gfx file type)
- Tags (.csv file type)
- Macros (FactoryTalk View SE software only) (.mcr file type)

File Type Abbreviations	FactoryTalk View SE	Description
Images (.png)	All .png files in the images folder. **IMPORTANT:** FactoryTalk View application renames PNG files when they are imported with a .bmp file extension, but the files retain a .png format.	Common icons that are used in the Global Objects and standard displays for all Process Objects.
Global objects (.ggfx)	(raP-5-SE) precedes name of the Global Objects.	Examples: (raP-5-SE) Common Objects
Standard displays (.gfx)	(raP-5_00-SE) precedes name of the display.	Examples: (raP-5_00-SE) PAI-Faceplate
HMI tags (.csv)	FTViewSE_ProcessLibrary_Tags_5_0_**xx**.csv where **xx** = the service release number.	HMI tags are created in a FactoryTalk View SE application to support security and other features on Process Library faceplates. HMI tags can be imported via the comma-separated values file (.csv file type).
Macros (.mcr file)	Macros used for the general library: • NavToDisplay • ToggleWithRemark Macro used for the PLLS object displays: • NavToPLLS_Motor Macros used for the Organization TreeView and navigation: • DefineShowHWTreeCmd.mcr • DefineShowTreeCmd.mcr • NavToBusDevice • NavToBusDeviceWithSC • NavToBusDisplay • ShowTreeForObject	In a FactoryTalk View SE application, a macro is a series of commands that are stored in a text file.

Images are external graphic files that can be used in displays. They must be downloaded from PCDC to be used by FactoryTalk View software.

Global object files contain Graphic Symbols that are created once and referenced multiple times on multiple displays in an application. When changes are made to a global object, all instances in the application are automatically updated.

Global objects serve two purposes:

- Toolbox files contain common elements that are used to build faceplate displays.
- Graphic Symbols files contain device symbols that you can use to build your application displays. Select the symbol to open the corresponding faceplate display.

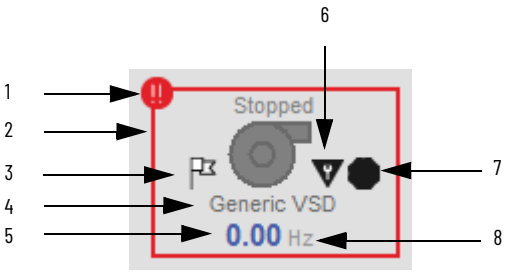
Standard display files, commonly called faceplates, provide a common user interface.

Basic Attributes and Indicators

This section shows examples of visual indicators that are common for graphic symbols in the Rockwell Automation Library of Process Objects. Visual indicators are critical to the daily operation of a plant.

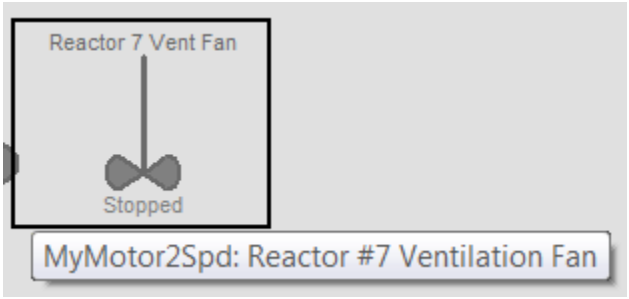
Common attributes of graphic symbols typically include:

- Status/quality/threshold indicator
- Maintenance bypass indicator
- Engineering units
- Label
- Command Source indicator (only for non-analog inputs)
- Alarm border that changes color and blinks on unacknowledged alarm
- Alarm indicator symbol that changes with the severity of an alarm

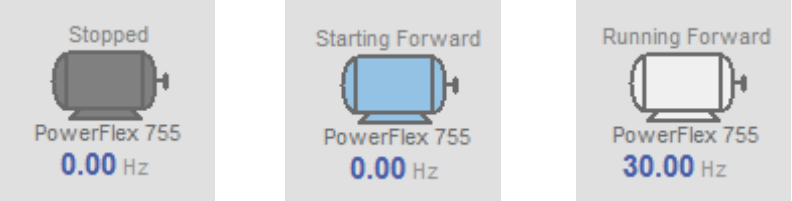


Item	Description
1	Alarm Indicator
2	Alarm Border
3	Command source indicator (In the example the flag indicates not in normal command source)
4	Label
5	Process Variable
6	Maintenance bypass indicator
7	Not Ready indicator
8	Engineering units

Each graphic object includes a touch field over it that opens the faceplate. In addition, there is a tooltip on the graphic symbol that displays the configured tag and description.



State Indicators



The State Indicator text and the color change depending on the state of the drive. The indicators and colors are common across all Add-On Instructions.

Color	State
Dark Gray	Stopped
Light Blue	Starting
Light Blue	Jogging
Light Blue	Stopping
Light Blue	Horn
White	Running

Status Quality Indicators

One of these images appears on the graphic symbol when the described condition is true.

Image	Description	Image	Description
No symbol displayed	I/O communication and quality good, configuration valid		Accelerating
	Invalid Configuration		Decelerating
	Data quality bad / failure		Value is being initialized
	Data Quality degraded: uncertain, test, virtual, substitution, or out of specification		Value has not changed (stuck)
	Device not ready to operate		Value is being replaced
	The input or device has been disabled		Input matches target
	Alarm Inhibit (Suppressed or Bypassed)		input does not match target
	Device in loopback test		Auto loop mode
	At target speed		Manual loop mode
	Speed ref limited to the minimum / maximum		Cascade loop mode
	Value infinite or not a number		Motor not controllable

Image	Description	Image	Description
	value is being held at last good value		Process Variable within setpoint deadband (no control action occurs)
	Input Controlled Variable that is clamped to minimum / maximum		Raise Process Variable output that is energized
	Output Controlled Variable that is clamped to minimum / maximum		Lower Process Variable output that is energized



When the Invalid Configuration indicator appears, you can find what configuration setting is invalid by following the indicators. Select the graphic symbol to open the faceplate. The Invalid Configuration indicator appears next to the appropriate tab at the top of the faceplate to guide you to the configuration error. Once you navigate to the tab, the misconfiguration is flagged with this indicator.

Threshold Indicators

These indicators show that the process variable has exceeded a threshold.

Image	Description
	High-high threshold exceeded
	High threshold exceeded
	Low threshold exceeded
	Low-low threshold exceeded

Deviation Indicators

These indicators warn of exceeding the deviation limits.

Image	Description
	High-high deviation exceeded
	High deviation exceeded
	Low deviation exceeded
	Low-low deviation exceeded

Command Source Indicators

The command source indicator displays by exception only. For example, if the device is operating normally, there is not an indicator. If the device is out of service (OoS), then the OoS indicator is displayed.

Command source indicators are not used for analog inputs.

Image	Description
No symbol displayed	Device is in normal command source operation
	Device is out of service
	Device is not in normal command source operation
	Device is in program command source operation
	Device is in program locked command source
	Device is in maintenance command source operation
	Device is in operator command source operation
	Device is in external command source operation

Image	Description
	Device is in operator locked command source operation
	Device is in override command source operation
	Device is in hand command source operation

Maintenance Bypass Indicator

The maintenance bypass indicator appears to the right of the label to indicate that a maintenance bypass has been activated. The Maintenance bypass indicator appears when the Substitute PV function is enabled. A Maintenance-entered value supersedes the 'live' process variable.

Image	Description
	A maintenance bypass is active
No symbol displayed	No maintenance bypass is active

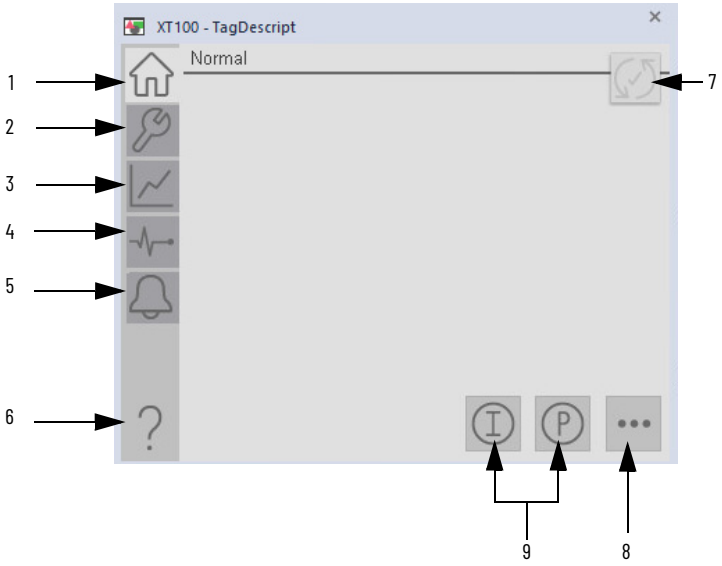


When the Maintenance bypass indicator appears, you can find what condition was bypassed by following the indicators. Select the graphic symbol to open the faceplate. The Maintenance bypass indicator appears next to the appropriate tab at the top of the faceplate to guide you to the bypass. Once you navigate to the tab, the bypassed item is flagged with this indicator.

Basic Faceplate Attributes

Faceplates consist of tabs, and each tab consists of one or more pages. The Operator (Home) tab is displayed when the faceplate is initially opened. The faceplate provides the means for operators, maintenance personnel, engineers, and others to interact with an instruction instance, which includes a view of its status and values. Faceplates also manipulate an instruction through its commands and settings. Select the appropriate icon on the left of the faceplate to access a specific tab. This section provides an overview of the faceplate attributes that are common across the objects. More details are supplied in the individual section for each object.

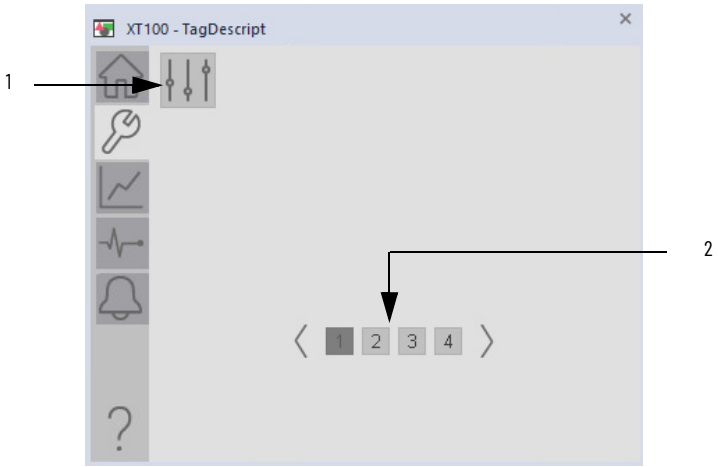
Operator (Home) Tab



Item	Action
1	Select to open the operator tab.
2	Select to open the maintenance tab.
3	Select to open the trends tab.
4	Select to open the diagnostics tab.
5	Select to open the alarm tab.
6	Select to open the help file.
7	Select to reset and acknowledge all alarms.
8	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the object's faceplate.
9	If the object is configured to have permissive and interlock objects (for example, Cfg_HasPermObj (Fast or Slow) or Cfg_HasIntlkObj is true), the permissive and interlock indication become buttons. These buttons open the faceplates of the source objects that are used as a permissive or interlock. Often this object is a P_Perm or P_Intlk object. If the object is not configured in this way, the permissive or interlock symbols are indicators only.

Maintenance Tab

In the maintenance tab, there is a button for Advanced properties. There are also page identifiers at the bottom if there are multiple configuration pages. See the following diagram for common attributes of the maintenance tab.

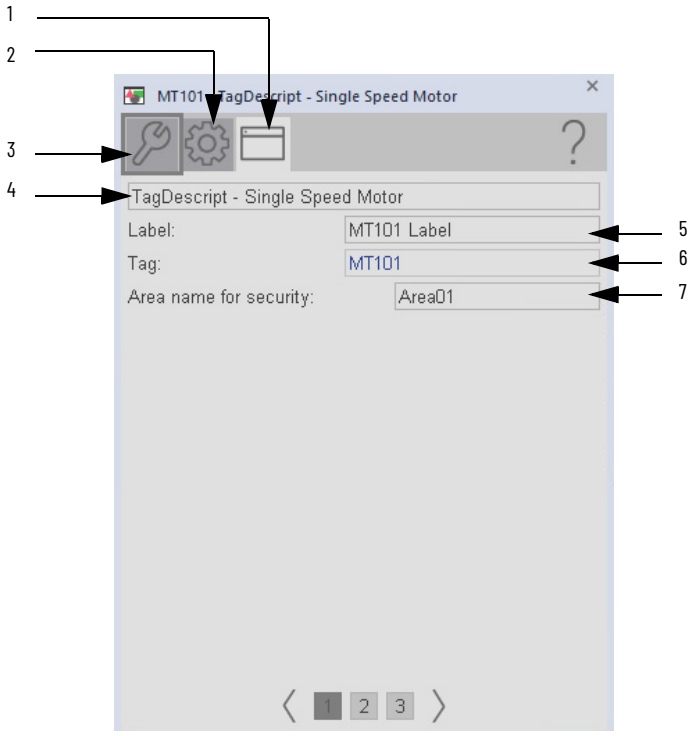


Item	Action
1	Select to open the Advanced Properties.
2	Page identifiers.

Advanced Properties

The advanced maintenance, engineering, HMI configuration, Diagnostics, and Faults tabs for the objects are available in the advanced properties faceplate. The advanced maintenance and engineering tabs have object-specific configurations that are detailed for each object.

The HMI configuration tab has settings that are common to the objects. See the following diagram for common attributes of the HMI configuration tab.

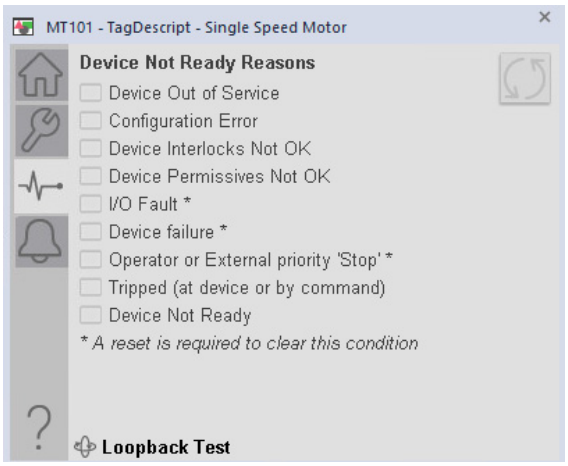


Item	Action
1	Select to open the HMI Configuration tab.
2	Select to open the engineering tab.
3	Select to open the Advanced Maintenance tab.
4	Device description that shows on the faceplate title bar.
5	Label to show on the graphic symbol.
6	Tag name that shows on the faceplate and Tooltip.
7	Area name for security.

Diagnostics Tab

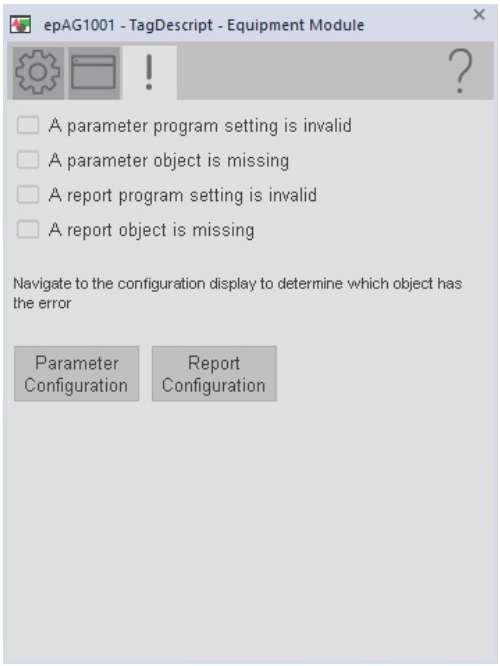
The Diagnostic tab provides indications that are helpful to diagnose or help prevent device problems. These problems can include specific reasons a device is 'Not Ready', device warnings and faults, warning and fault history, and predictive/preventive maintenance data.

The Diagnostics tab displays possible reasons for the device not being ready.



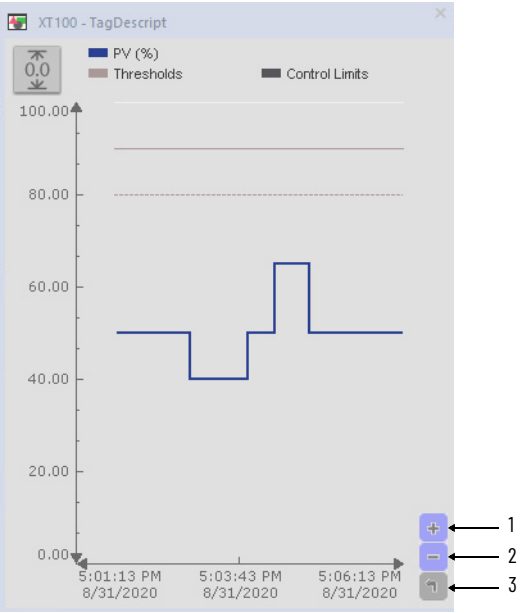
Faults Tab

The faults tab contains specific reasons that the device is not ready.



Trends Display

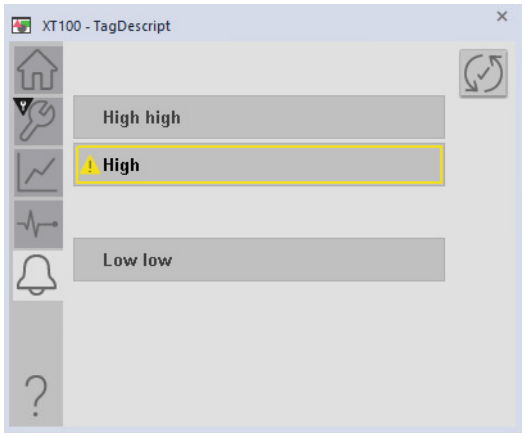
The Trends display shows trend charts of key device data over time. These faceplate trends provide a quick view of current device performance to supplement, but not replace, dedicated historical or live trend displays.



Item	Action
1	Select to zoom in
2	Select to zoom out
3	Select to reset view

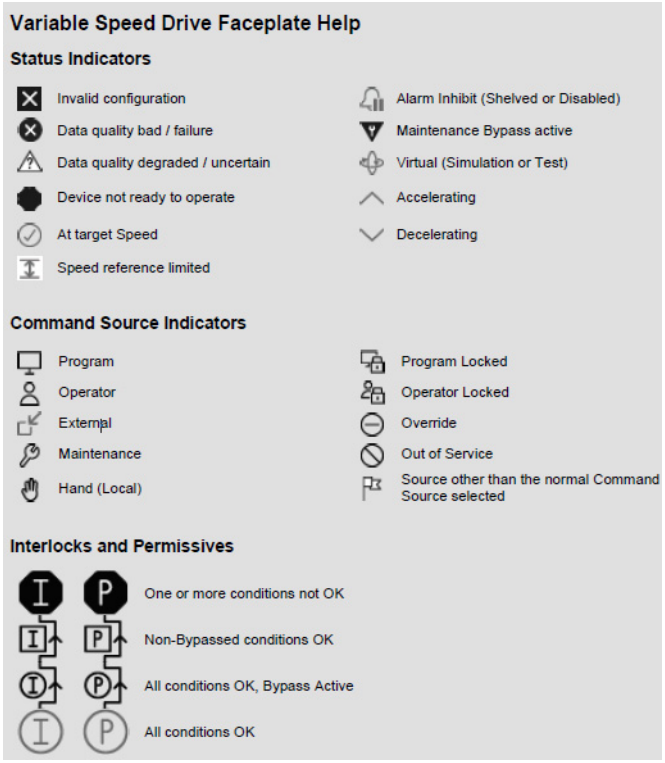
Alarms Tab

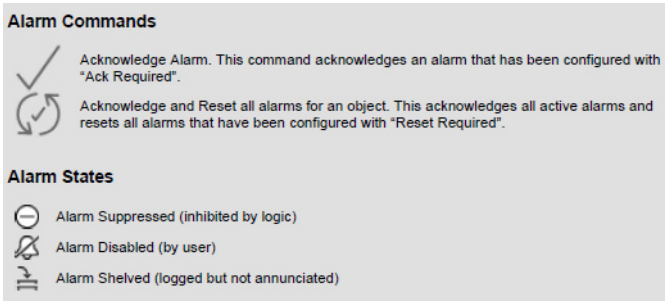
The Alarms tab displays each configured alarm. The icon on the tab for the alarms page has an outline that changes color to show the current active alarm status.

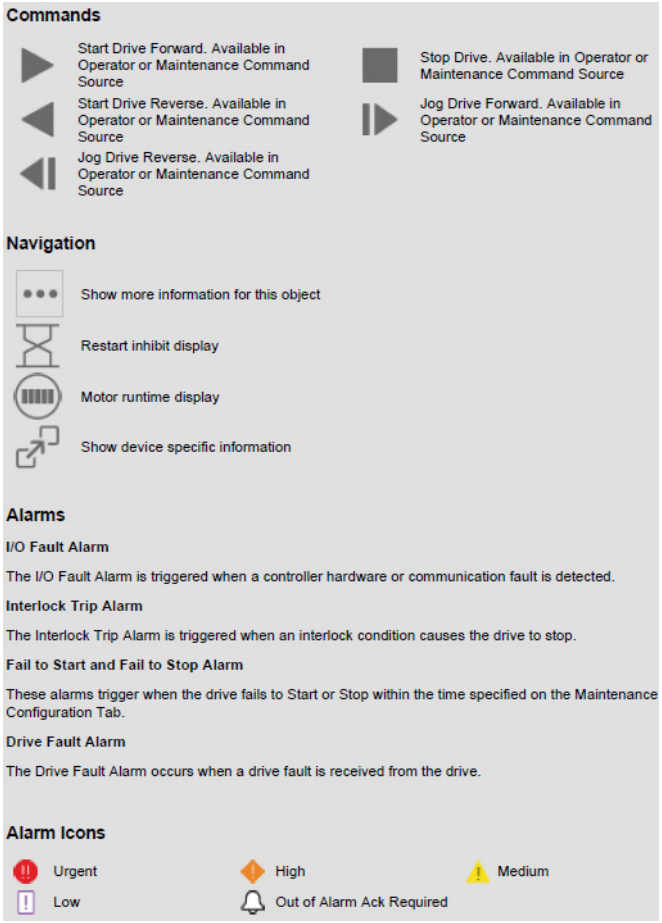


Help Button

Press the help button on the faceplates to access help specific to that faceplate. The help file is in .pdf format and opens in a separate window. See the following example:

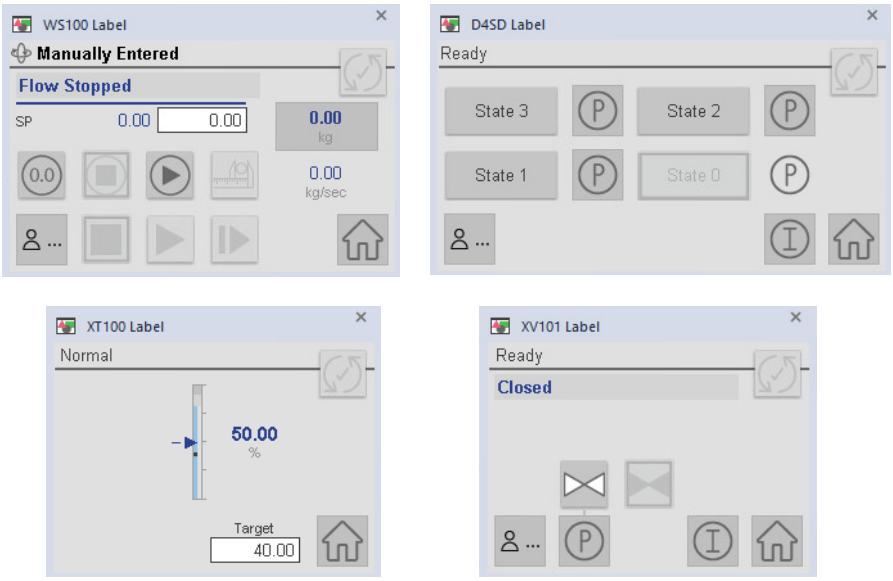






Quick Display Interaction

A Quick Display provides means for operators to perform simple interactions with an instruction that is instance based on a task. From the Quick Display, Select the Home button to navigate to the faceplate for full access for operation, maintenance, and configuration. All other buttons function the same as on the main faceplate. The following figures show examples of quick displays.



Install the Library

For the latest compatible software information and to download the Rockwell Automation Library, see the Product Compatibility and Download Center.

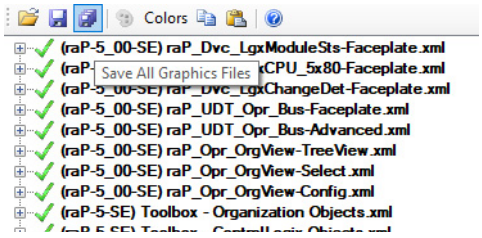
Import Logic

An Add-On Instruction is defined once in each controller project, and can be instantiated multiple times in your application code. To use pre-engineered logic, import each Add-On Instruction into a controller project.

1. In the Studio 5000 Logix Designer application, open a new or existing project.

IMPORTANT Add-On Instruction definitions can be imported, but not updated, online.

2. Select the Add-On Instructions folder in the Controller Organizer and choose Import Add-On Instruction.

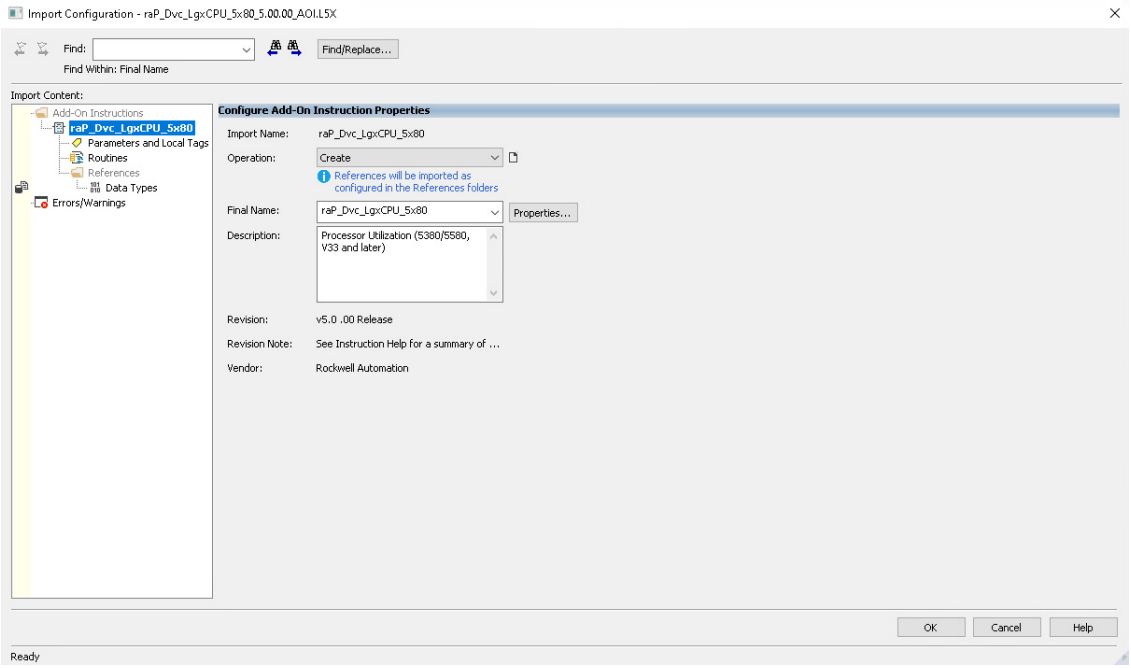


3. Select the Add-On Instruction and Select Import.

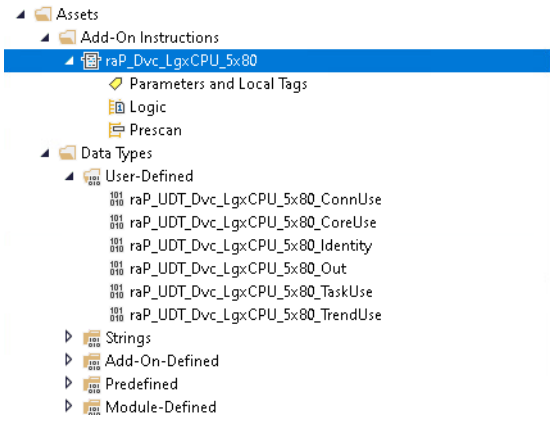
Some Add-On Instructions are provided in RUNG import files.

If a RUNG import file is provided, import the rung into a ladder diagram routine to get all required additional tags, data types, and message configurations.

4. On the Import Configuration dialog box, Select OK to select the defaults.

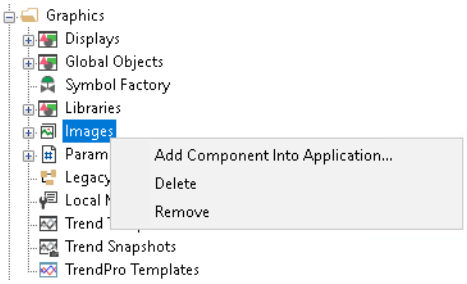


5. Once the import is complete, the Add-On Instructions are visible in the Controller Organizer.



Import Visualization Files

There are several components to import for the visualization files. You import files from the downloaded Rockwell Automation library files via FactoryTalk View SE.



Import files in this order:

1. Import HMI Images files.

   Select all the images and Open.

2. Import Global Object files

   Select the global object (.ggfx) files.

3. Import HMI Faceplates

   Select the faceplate (.gfx) files.

4. Import Macros

   Right-click Macro and select Add Component Into Application.

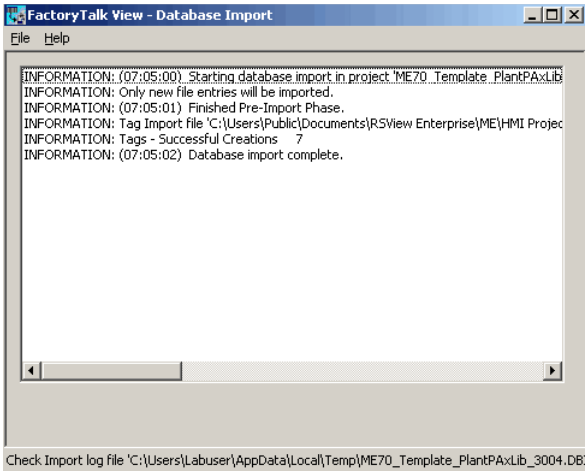
   Select all the macros and Open.

Import HMI Tags

From the Tools pull-down menu, select Tag Import and Export Wizard. Use the following table to complete the wizard.

On this Dialog Box	Action
Select the operation you would like to perform	Select ‘Import FactoryTalk View tag CSV files’
Choose the FactoryTalk view project you want to import into	Browse to the .sed project file that you want the HMI tags imported into
Choose the FactoryTalk View CSV files you want to import	Select the .csv file that is contained within the downloaded Library zipped file
Choose the import options you want	Select ‘Skip existing (fastest)’

When you finish the wizard the FactoryTalk View - Database Import dialog box appears with the information that the import is complete.

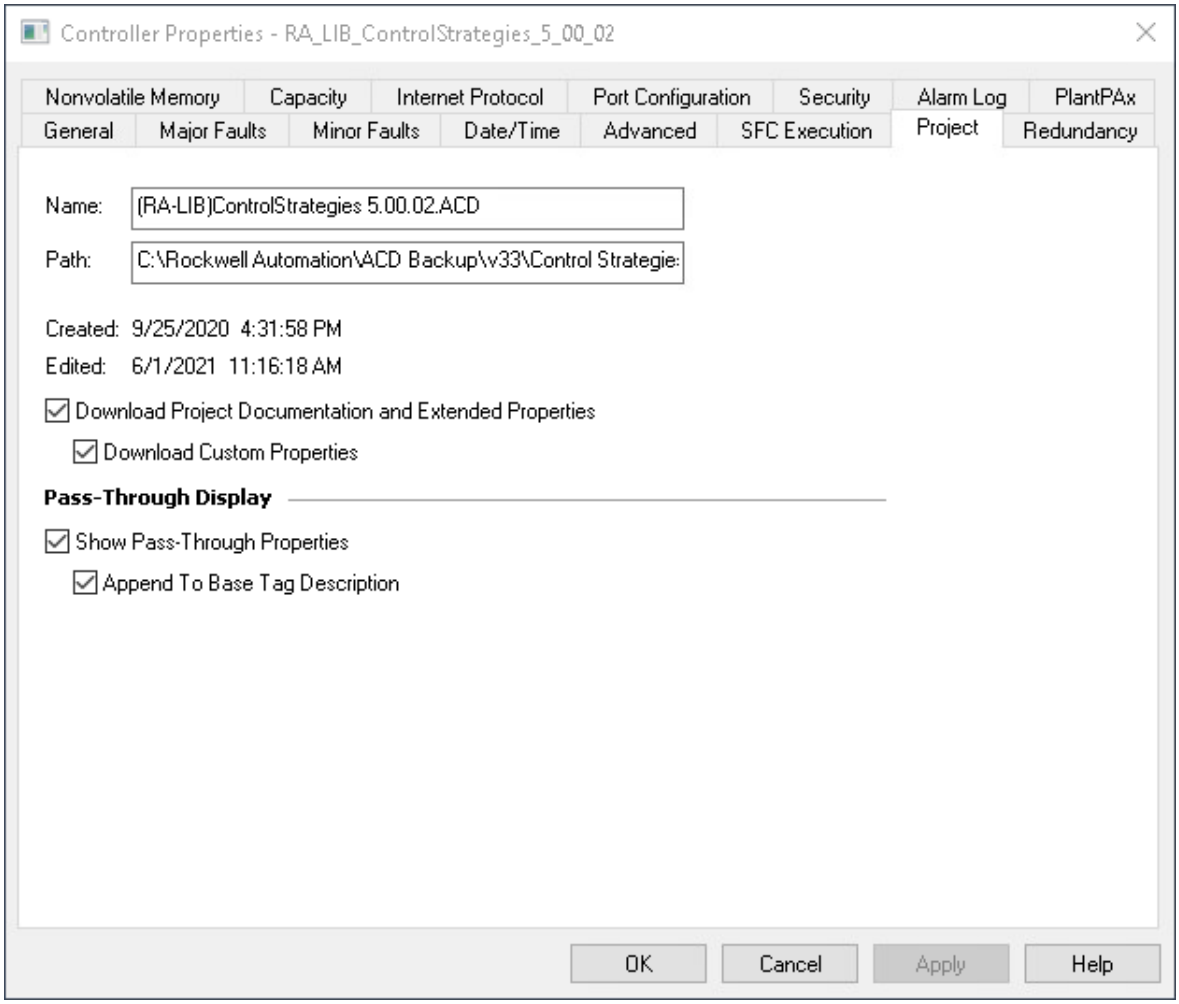


Studio 5000 Logix Designer Project Configuration

The Library of Process Objects 5.0 utilizes the feature Extended Tag Properties inside Studio 5000 Logix Designer. Ensure when configuring Studio 5000 Logix Designer Project file the following boxes are checked (checked by default):

- Show Pass-Through Properties
- Append To Base Tag Description

Note: Configuring these properties incorrectly will result in default values, example .@Library, .@Instruction, .@Area, .@Lables, to return empty field values, causing an "error" when calling up HMI Faceplate.

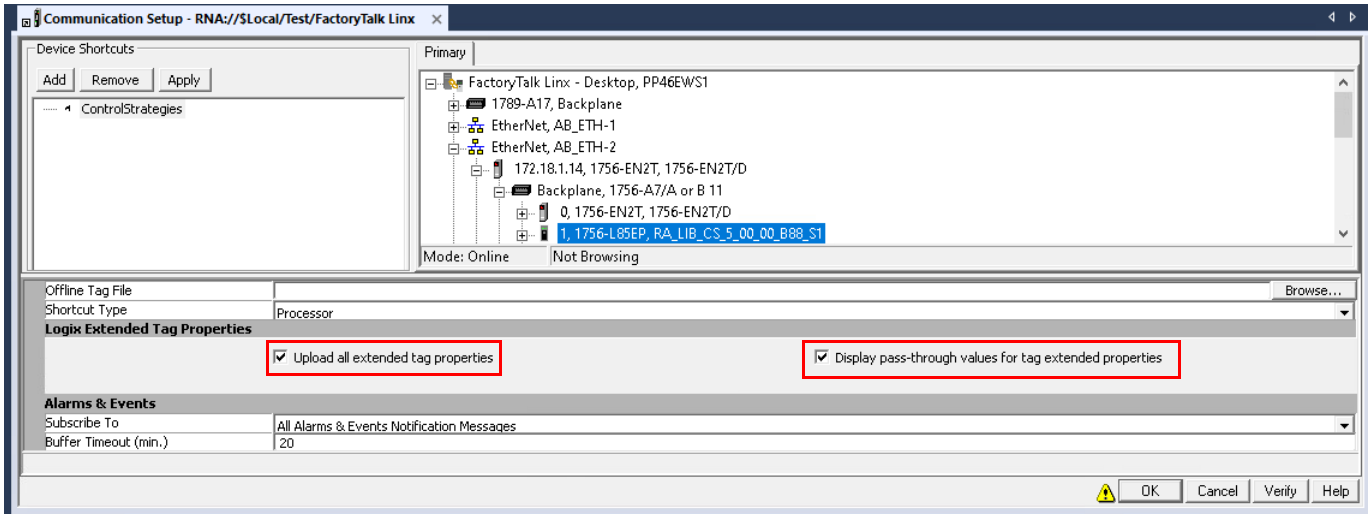


FactoryTalk Linx Device Shortcuts Configuration

The Library of Process Objects 5.0 utilizes the feature Extended Tag Properties inside Studio 5000 Logix Designer. Ensure when configuring FactoryTalk Linx communication setup for device shortcuts the following boxes are checked:

- Upload all extended tag properties
- Display pass-through values for tag extended properties

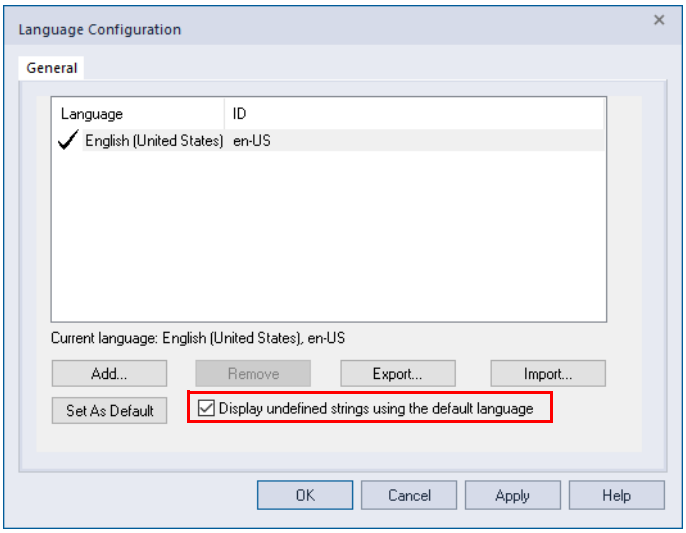
Note: Configuring the shortcuts incorrectly will result in wireframes if extended tag properties are left blank.



FactoryTalk View Language Configuration

The Library of Process Objects 5.0 utilizes the feature Extended Tag Properties inside Studio 5000 Logix Designer. This allows localization of strings in the controller in the HMI Faceplates provided. When configuring languages (FactoryTalk View Studio - View Site Edition > Tools > Language Configuration) ensure the following checkbox is selected:

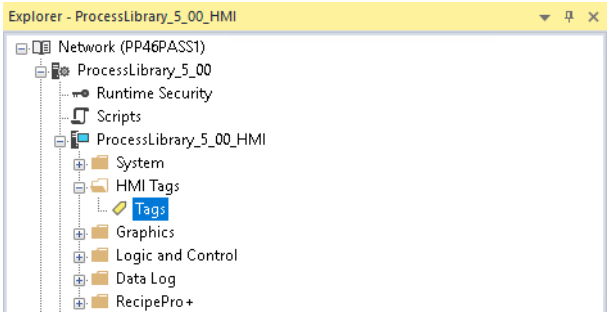
- Display undefined strings using the default language.



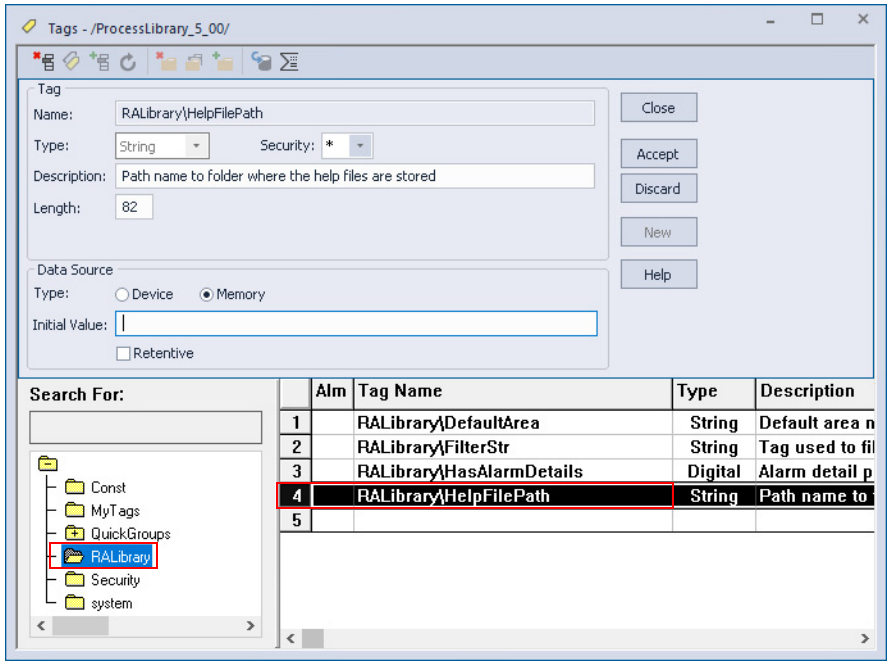
Help Files

The help displays for the Library of Process Objects have been converted to PDF documents. The PDF documents can be displayed from the FactoryTalk View displays by clicking the Help button. The help files are downloaded as part of the Library of Process Objects and are contained in the Documents folder.

1. Copy the Help files to a folder accessible by the FactoryTalk View clients.
   In this example we have copied the files to C:\Users\Rockwell\Desktop\HMI Help Files.
2. Open your project in FactoryTalk View Studio.
3. Open the Tags setting in the Folder Tree.

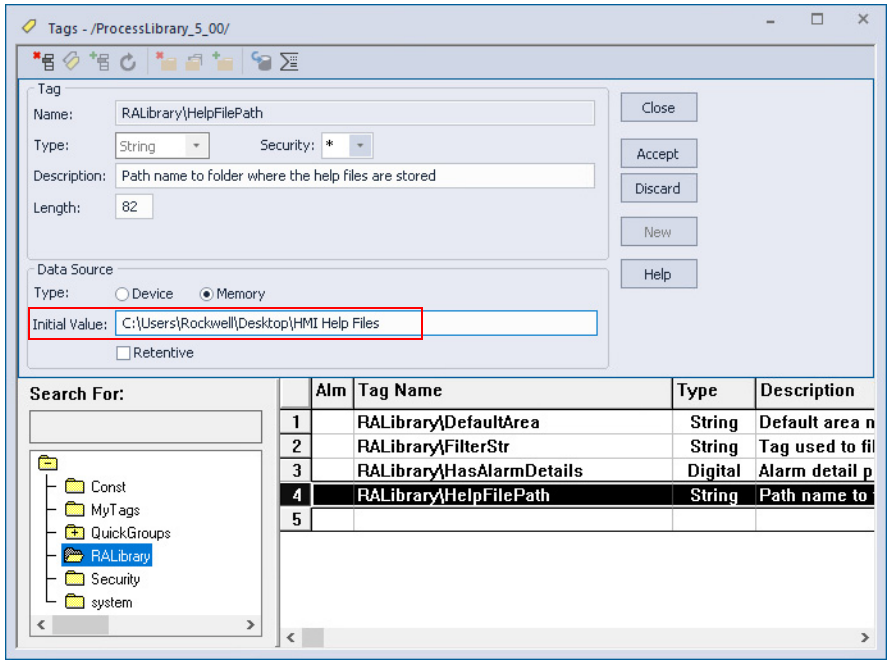


4. Select the RALibrary Folder and then Select RALibrary\HelpFilePath to access the settings for the Help Files.

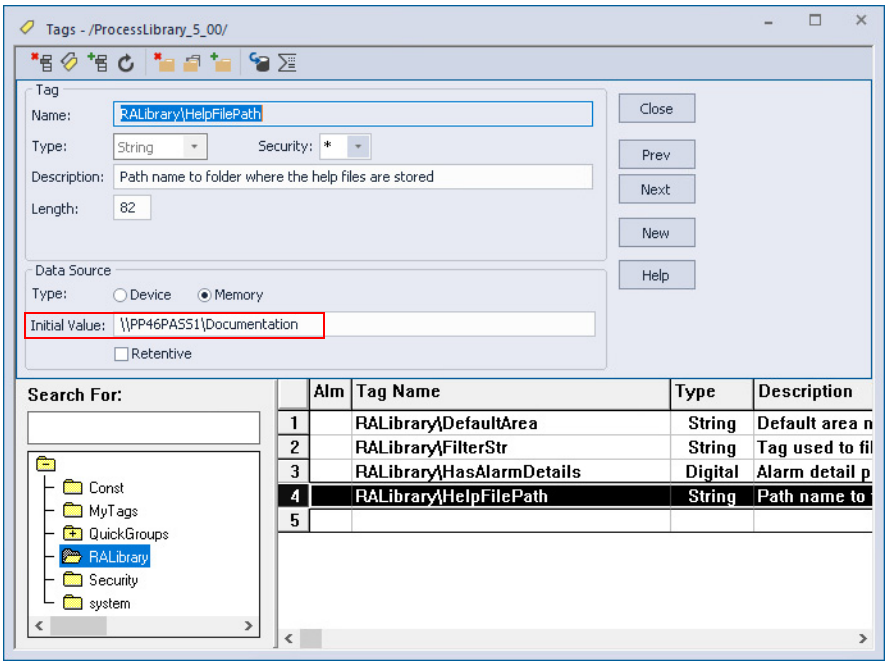


5. Enter the path to the Help Files into the Initial Data Source Field and Select Accept.

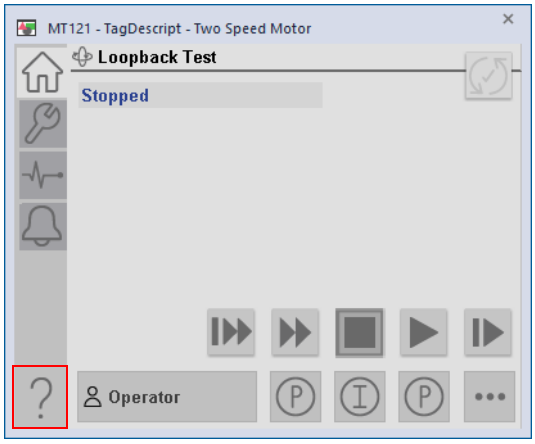
Local Station:



Distributed System Server:

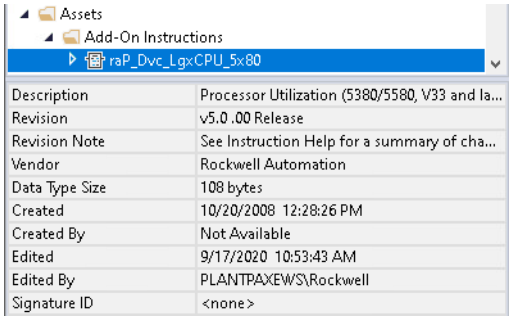
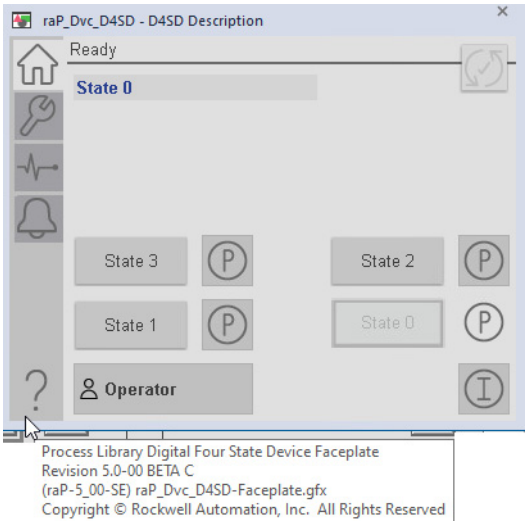


6. Close the settings display.
7. Restart FactoryTalk View Studio for the settings to take effect.
8. The Help Files can now be accessed using the Help button on the HMI Display.



Library Versions

Each library object has a revision x.yy.zz where: x is the Major Revision number, yy is the Minor Revision number, and zz is the Maintenance Release. Each release of the Process Library comes with release notes that describe the changes that were made since the last release.

Component	Example
The Add-On Instruction in Logix Designer application has revision information visible when the instruction is selected in the Controller Organizer.	
The faceplate in FactoryTalk View software has revision information visible when the pointer is paused just inside the lower left corner of the faceplate.	

PlantPAx Process Library Migration Tool

This tool is used to migrate from Process Library version 4.1 to version 5.0. The PlantPAx Process Library Migration Tool provides the following:

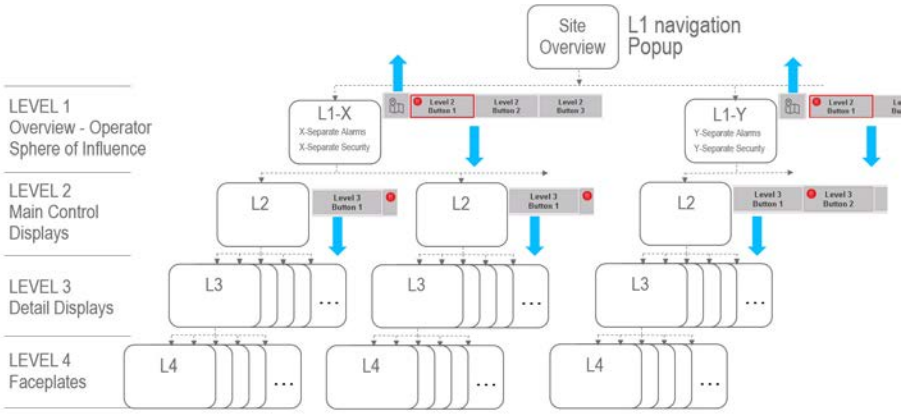
- Updates Logix controller ACD files containing Rockwell Automation Process Library AOI tags to corresponding Process Controller predefined process instruction tags and V5.0 AOI tags.
- Converts FactoryTalk View SE process graphics XML files containing global object references from previous Process Library versions to V5.0 Process Library global objects.
- Migration of Process Library HMI libraries.
- Migration of GEMS Version 4.4 AOIs to corresponding Process Controller predefined process instruction tags and V5 AOI tags.

The tool reduces engineering time and migration errors. Use the tool to keep up with the latest Rockwell Automation software features and increase the life cycle of the PlantPAx DCS.

Graphic Framework Overview

It is important to organize an HMI application in a hierarchical way, to provide the operator and/or end user with a logical progression of complexity from main area overview down to detailed device information. ANSI/ISA-101.01-2015 outlines basic HMI design guidelines and recommends a progressive disclosure methodology with up to four levels of displays. The PlantPAx® Graphic Framework was created to assist the end user by providing a basic structure that can be used to follow the ANSI/ISA-101.01-2015 recommendations.

For more information on HMI philosophy, style guide contents and the various display types/levels, see Rockwell Automation Process HMI Style Guide, PROCES-WP023-EN-P.



The PlantPAx Graphic Framework is made up of four main components, Header, Process Control Displays, Navigation, and Alarm Indication. Note: Template display files are a specific size and defined to open at a specific location. This should not be changed and could result in the Graphic Framework not functioning properly.

Header Display

The Header is a perpetual graphic display that is positioned at the top of each HMI client monitor to provide major navigation, annunciation, and status information for the process and the control system.

The Header is made up of several modular objects that can be selectively used to meet the needs of the end user. The following list indicates the available components in the PlantPAx Graphic Framework that can be used to create the Header display:

- Logo Object

- L1 Navigation Object
- Diagnostics Object
- Home Navigation Object
- Close Client Object
- Login / Logout Object
- Alarm Banner (Default sized Alarm Banner Object – 3 lines)
- Alarm Summary Navigation with Visual Alarm Indication Object
- Alarm Silence Object
- Date / Time Object
- Windows® Navigation Objects
- Help Object
- Language Switching Objects
- Report Navigation Object
- Trend Navigation Object
- Documentations Navigation Object
- L2 Navigation Bar (required)

A separate header must be used for each L1 area, reflecting information within that operator's sphere of influence. The header will typically have a similar look and feel for each L1 area with different configuration to provide information only relevant to the operator of that L1 Area.

Process Control Displays

Process control displays are the main displays in the system that the operator will interact with. The PlantPAx Graphic Framework provides template displays, or default displays, that can be used to build the main graphics. These template displays can be duplicated for customization in each application. All default displays are sized the same and include different navigation and indication to allow operations to quickly assess the process status and take required actions.

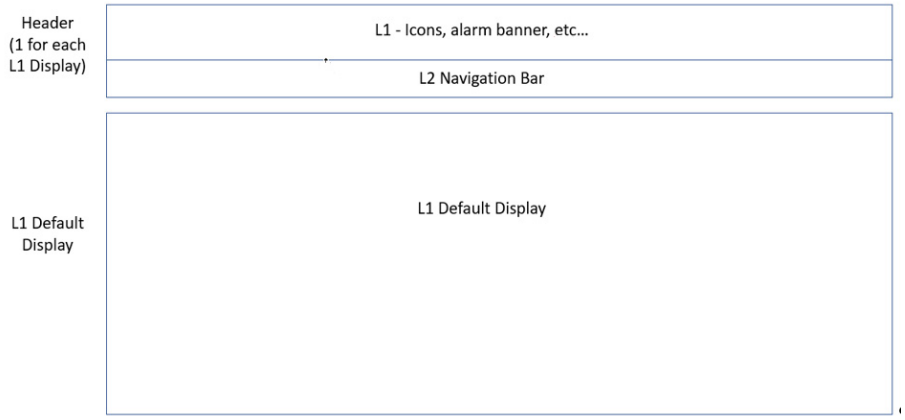
There are three process control displays available as templates:

Display	Description
L1 Default Display Template	• This is an overview of the operator's sphere of influence (Overview Display) • Full graphic displays with L2 Navigation Bar visible • The first display that is populated when the operator refreshes the FactoryTalk® View SE client • Intended to be a high-level process area display typically consisting of key performance indications using trends and display objects (not just lists of numerical data)
L2 Default Display Template	• An operator's main control display designed to support typical operation modes often arranged like a process flow diagram (PFD). • Control for main operation variables and annunciation to prompt operator to access associated L3 display when necessary • Full graphic display with L2 and L3 Navigation Bar present • Typically, there are multiple L2 displays required to cover an operator's sphere of influence represented by the L1 display.
L3 Default Display Template	• A more detailed display designed for troubleshooting and abnormal scenarios. The L3 display design presents data that best matches to current task at hand. • Full graphic display with L2 and L3 Navigation Bar present. Simple L2 areas may not require an L3 display and therefore L3 Navigation Bar may not be required.

Typically, there are multiple L3 displays required to cover the detail represented by a single L2 display. L4 displays provide finer detail and are opened as Faceplate or popup display from L2 and L3 displays. These would include PlantPAx standard faceplates or custom popup displays.

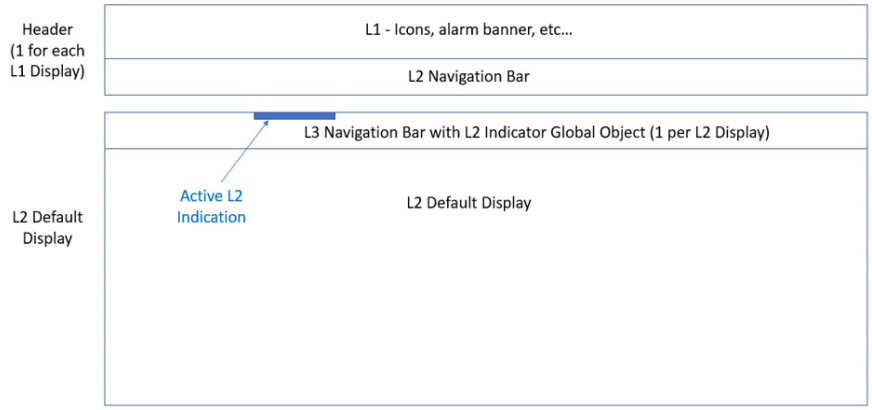
L1 Display

L1 Process Control Display is used as an overview for a single operator's sphere of influence. This is the first screen that the operator sees when the HMI client starts up and contains a high-level overview of the operator's sphere of influence as well as KPI's and indications. There will typically be one L1 Process Control Display for each L1 Area in the project. The display is typically designed to represent the various process units with key indications, trends, and rolled-up alarm status to help drive the operator to the appropriate L2 displays to address the abnormal condition.



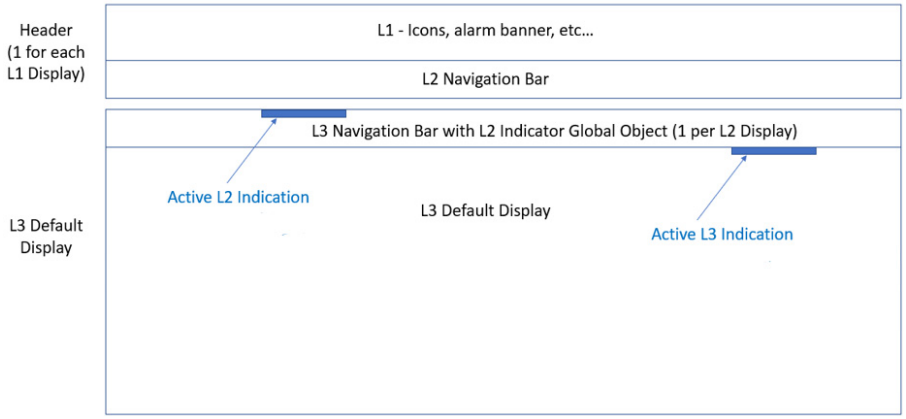
L2 Display

L2 Process Control Displays are used as the operators' main control screens. These displays provide access to the main operating parameters while concurrently providing annunciation when abnormal conditions exist. If required, the operator can access the associated and more detailed L3 displays to address the situation. The L2 display will include the L3 Navigation bar at the top with an indicator of the selected display. There will be one L2 Process Control display for each L2 Navigation button utilized and will be displayed by clicking on the given L2 Navigation button.



L3 Display

L3 Process Control Displays are used to access in-depth equipment details and diagnostics that may not be needed while the process is running normally. These displays are often similar to the traditional P&ID style of displays allowing the operator access to all control and monitoring information for that specific area of the plant. The L3 display will include the L3 Navigation bar at the top with an indicator of the selected display and indicator of associated L2 display.



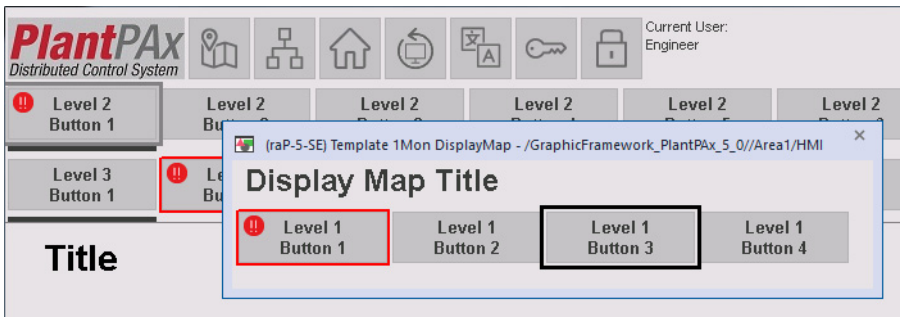
Navigation

The PlantPAx Graphic Framework provides an intuitive and 'easy to configure' navigation strategy. Navigation among displays as part of the Graphic Frameworks can be configured and accessed from:

- L1 Navigation
- L2 Navigation
- L3 Navigation
- Alarm Navigation
- Graphic Off-Screen Connectors

L1 Navigation

L1 Navigation allows operators to navigate to other areas of the facility. This will move the operator to a different sphere of influence. The Display Map Button is used to open a popup display - the Display Map. This is the L1 Navigation display. This display can be expanded to include as many L1 areas as necessary for an application. Four buttons are provided by default.



L2 Navigation

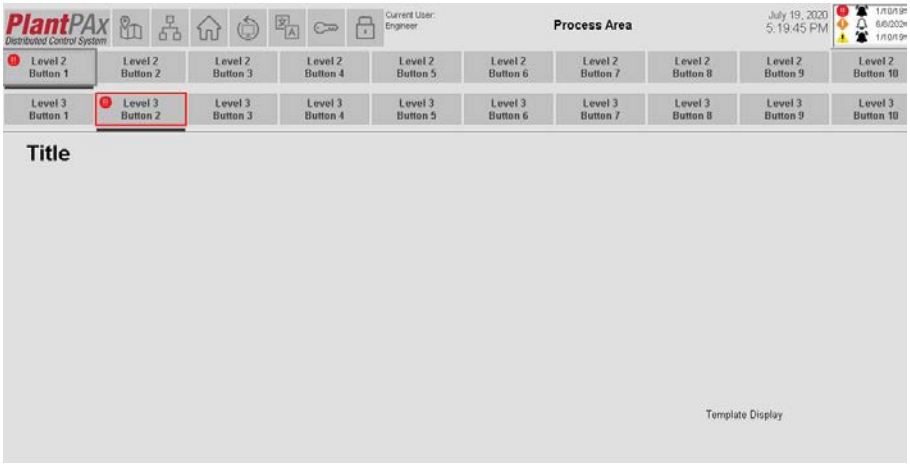
L2 Navigation is the first level of display access within a given L1 area. There is just one L2 Navigation bar used for each L1 area. The L2 Navigation bar resides within the header display and is always visible. The L2 Navigation Bar is made up of 16 buttons and can navigate to up to 16 different displays.



When the operator clicks the desired L2 button, that L2 display will open. On that L2 display, the L3 navigation bar will open. Each L2 button has alarm indication and these are rolled up from the L3 alarms. The L2 Navigation button text can be modified for each specific application.

L3 Navigation

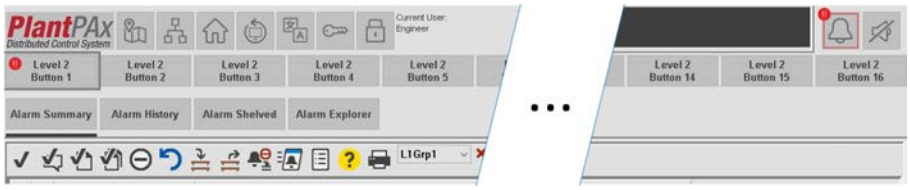
L3 Navigation is the second level of display access within a given L1 area. There are multiple L3 Navigation bars - one for each L2 button used. The L3 Navigation bar resides within the L2 and L3 Displays. Each L3 Navigation Bar is made up of 16 buttons and can navigate to up to 16 different displays. Included in the L3 Navigation bar is an indicator that shows which L2 and L3 area the operator is currently viewing.



When the operator clicks a desired L3 button, that L3 display will open. Each L3 button has alarm indication and these are rolled up into the L2 alarms. The L3 Navigation button text can be modified for each specific application.

Alarm Navigation

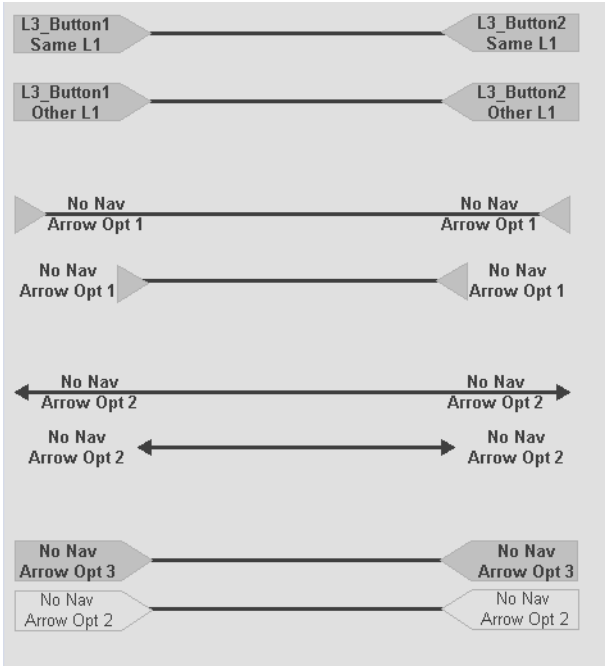
Alarm information is accessed by pressing the Alarm Button on the header. This will open the Alarm Summary display. From the Alarm Summary display, other alarm information displays can be accessed, including the Alarm History, Alarm Shelved, and Alarm Explorer (with proper runtime security). There is a display associated with each of the four alarm buttons - see Global Objects for more information on Alarm Global Objects. See Displays for more information on template Alarm displays.



The Alarm Navigation has an indication below each button to show which alarm display the operator is currently viewing.

Off-Screen Navigation

Graphic Off-Screen Connectors are used to supplement navigation for Operators to follow the process progression (to the left or to the right of the current display) on P&ID style screens. Various style of off-screen navigation can be found in a Toolbox graphic.



There are three different off-screen navigation functionalities available.

Functionality	Description
Navigation to Same L1 area	This is used if the off-screen navigation is within the same L1 area. The button simply opens a new L2/L3 display within that L1 area.
Navigation to Other L1 area	This is used if the off-screen navigation is outside the current L1 area. The button will need to execute a macro that displays the destination L1 area header and the desired L2/L3 display. An additional step of creating a macro specific to this display navigation will need to be completed.
No Navigation (static)	The static off-screen connector does not navigate to any display. It is used as an indicator of a process inflow or outflow with no accompanying graphic - just a static indication. Various styles are offered in the toolbox.

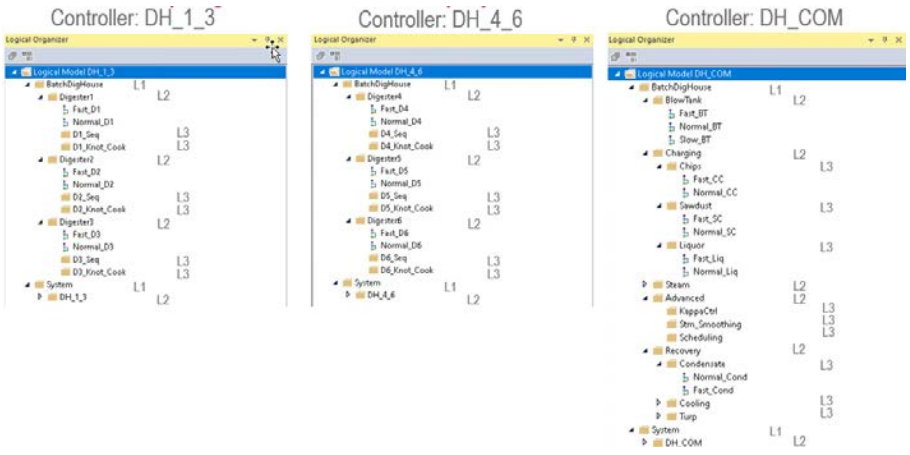
Alarm Indication

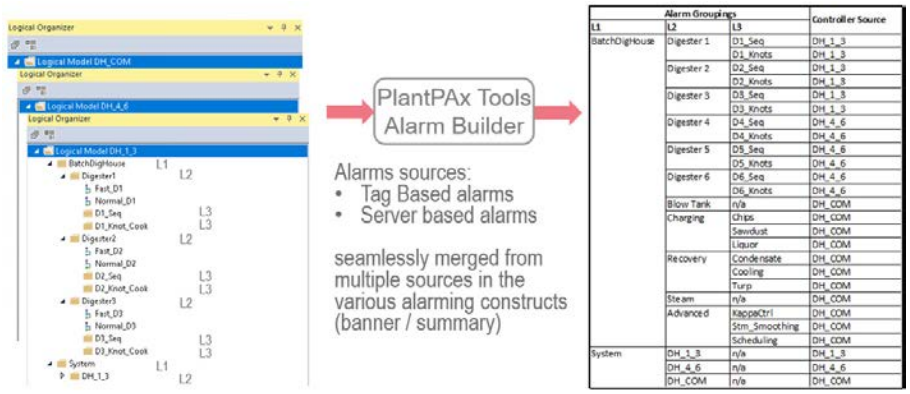
Alarm indication is embedded throughout the PlantPAx Graphic Framework. As mentioned in the L1/L2/L3 Navigation section, each navigation button has alarm indication available, with alarms rolled-up from L3 to L1. The Alarm button on the Header display also indicates to the operator if alarms are active in that L1 area. The following displays give the operator information on specific alarms and alarm configuration.

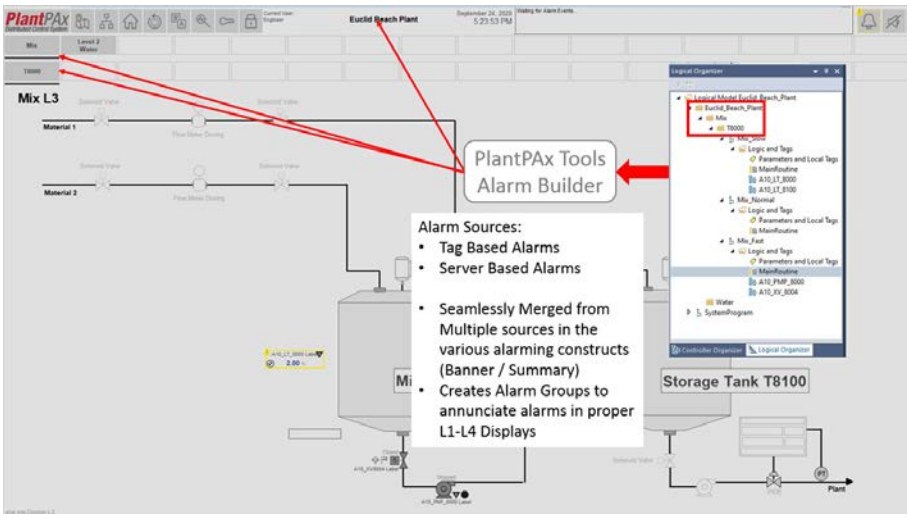
Display	Description
Alarm Banner	There is one Alarm Banner for each L1 area. The Alarm Banner, which resides on the Header display, will show three alarms. 
Alarm Summary	Each L1 area will have a corresponding alarm summary. The purpose of the alarm summary is to indicate alarms within the L1 area (by severity and time) and provide the ability for the operator to interact with these alarms. Navigation to the alarm summary is accomplished by clicking on the Alarm Summary Navigation button from the associated Header. The alarm summary must be configured to subscribe to alarms specific to the L1 area. Filters can be configured for each L2 alarm group for additional alarm functionality.
Alarm History	Alarm History display contains a configured Alarm and Event Log Viewer object that accesses the alarm and events historical data. Note: The alarm and event server must be configured to log the alarm data for this display to work properly. This display filters based on predefined filters.
Alarm Shelved	Alarm Shelved display contains an Alarm and Event Status Explorer object preconfigured to access alarm and event databases within the application with the status of "Shelved". This display can be further filtered based on alarm names. The shelved alarm display will display the alarm grouping tree to allow easy access to each alarm group.
Alarm Explorer	Alarm Explorer display contains an Alarm and Event Status Explorer object preconfigured to access A&E databases within the HMI application. This display can be further filtered based on alarm names. The alarm explorer will display the alarm grouping tree to allow easy access to each alarm group. The button to access this display has security built in. Only users with ability to enable/disable alarms can access this display.

Alarm Grouping and Supporting Logic

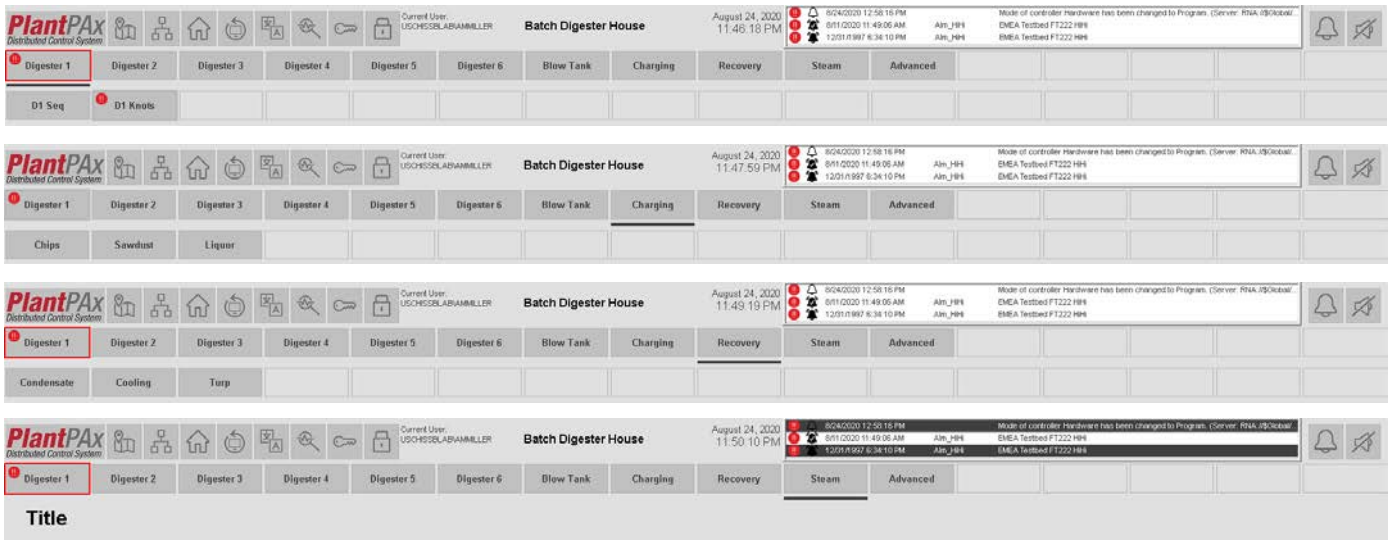
To create alarm groupings that align with the Navigation bars, additional upfront effort must be made in each controller to support this function. This effort requires using the Logical organizer in the controller files to use the same hierarchy as that in the graphical hierarchy. That is, if multiple controllers are used within a single operator's sphere of influence, the same L1 - L2 - L3 architecture must be represented within each controller (the L1 / L2 / L3 folders represent graphical displays in the HMI). Once the folders are created, the Alarm builder tool allows you to merge the alarm groups appropriately so that the process alarm indication displays are control equipment agnostic. In addition, if a single controller contains logic used by multiple operators, the folder structures of each area must be created in the Logical organizer to represent the multiple L1 hierarchies.







The alarm grouping setup in the Logical Organizer should then be reflected on the L2 / L3 navigation as shown below in a few examples, for button naming as well as alarm breadcrumb (alarm groups):



Notes:

Configure the Graphic Framework

The following table defines common terms used in the setup.

Term	Description
Template	The term "Template" within a filename indicates that the file should be duplicated when used in the application. The duplicated file should be re-named to a title that is meaningful for the specific area or sub-area of the facility of your application. The original template file is to be used as a starting point for multiple files in the application and should not be modified.
App	When a file in the application contains the term "APP", the objects in these files can be used directly out of this file - the file name does not need to be duplicated or renamed.

The PlantPAx® Library download provides the following files to use as a starting point to utilize the PlantPAx Graphic Framework. Templates are provided both with and without the PlantPAx Process Object library faceplates included.

- FTVSE_12_0_Template_{version}.APB
  (i.e. FTVSE_12_Template_5_00_00.APB)
- FTVSE_12_0_TemplateWLibrary_{version}.APB
  (i.e. FTVSE_12_TemplateWLibrary_5_00_00.APB)
- FTVSE_12_0_Template_{version}.zip
  (i.e. FTVSE_12_Template_5_00_00.zip)

The PlantPAx Graphic Framework can be utilized in one of two ways:

- Restore the provided Local Station project templates (.APB) using the FactoryTalk® View SE Application Manager.
- Create your own project and import the HMI server or individual files as needed.

For a Distributed or Network Station application, we recommend the HMI Server Import.

Recommended Application Naming Structure

Template Display Name	Suggested Name Structure	Example:
(raP-5-SE) Template 1Mon Display Map	[App_Name]_DisplayMap	ABC-Chem_DisplayMap
(raP-5-SE) Template Diagnostic-Summary	[App_Name]_Diagnostic-Summary	ABC-Chem_Diagnostic-Summary
(raP-5-SE) Template Language-Select	[App_Name]_Language-Select	ABC-Chem_Language-Select
(raP-5-SE) Template 1Mon Header	[L1_Name]_Header	Mixing_Header
(raP-5-SE) Template Display L1	[L1_Name]	Mixing
(raP-5-SE) Template Display L2	[L1_Name]_[L2_Name]	Mixing_IngredAdd
(raP-5-SE) Template Display L2 no L3	[L1_Name]_[L2_Name]	Mixing_Agitate
(raP-5-SE) Template Display L3	[L1_Name]_[L2_Name]_[L3_Name]	Mixing_IngredAdd_Weigh
(raP-5-SE) Template Alarm-Explorer	[L1_Name]_Alarm-Explorer	Mixing_Alarm-Explorer

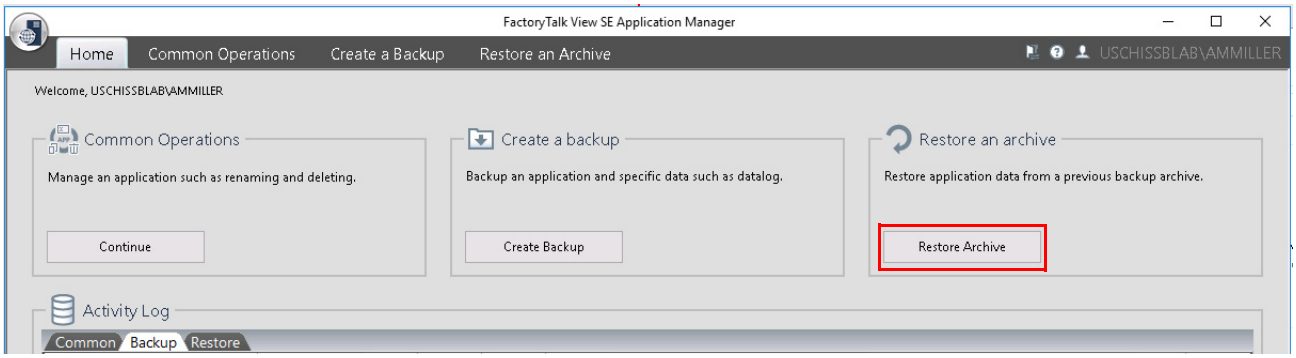
Template Display Name	Suggested Name Structure	Example:
(raP-5-SE) Template Alarm-History	[L1_Name]_Alarm-History	Mixing_Alarm-History
(raP-5-SE) Template Alarm-Shelved	[L1_Name]_Alarm-Shelved	Mixing_Alarm-Shelved
(raP-5-SE) Template Alarm-Summary	[L1_Name]_Alarm-Summary	Mixing_Alarm-Summary

Global Object Files	Suggested Name Structure	Example:
(raP-5-SE) APP - Administrative Objects	N/A	Use file as is
(raP-5-SE) APP - Alarm Objects	N/A	Use file as is
(raP-5-SE) APP - Header Objects	N/A	Use file as is
(raP-5-SE) Template Custom Objects	[App_Name]_CustomObjects	ABC-Chem_CustomObjects
(raP-5-SE) Template L1 Navigation	[App_Name]_L1Navigation	ABC-Chem_L1Navigation
(raP-5-SE) Template L2 L3 Navigation	[L1_Name]_L2L3Navigation	Mixing_L2L3Navigation

Macro File	Suggested Name Structure	Example:
Template_ClientStartup	[L1_Name]_ClientStartup	Mixing_ClientStartup
Template_Repaint	[L1_Name]_Repaint	Mixing_Repaint

Build Your PlantPAx HMI Application

1. Go to FactoryTalk View SE Application Manager > Local Station and select Restore Archive.



2. Browse to the APB file.
3. Name the new application and select Restore.

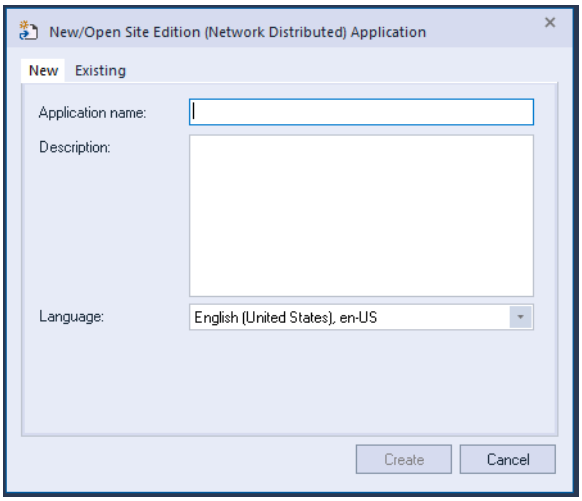
You can now open Factory Talk View SE Local Station and build out the application using the PlantPAx Graphic Framework.

The HMI Server backup can be used for Distributed or Network Station applications. The following assumes that the server system is configured correctly and to PlantPAx recommendations. The following also assumes that the FactoryTalk Directory is setup and all applicable images are joined to the directory.

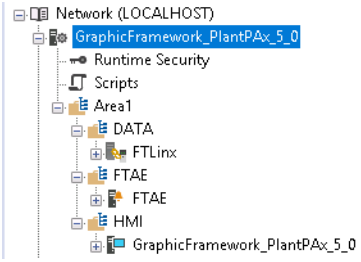
IMPORTANT This should be used as a rough guide only. Reference PlantPAx and FactoryTalk View documentation for best practice and proper system configuration.

1. Go to FactoryTalk View Studio and select either Distributed or Network Station.

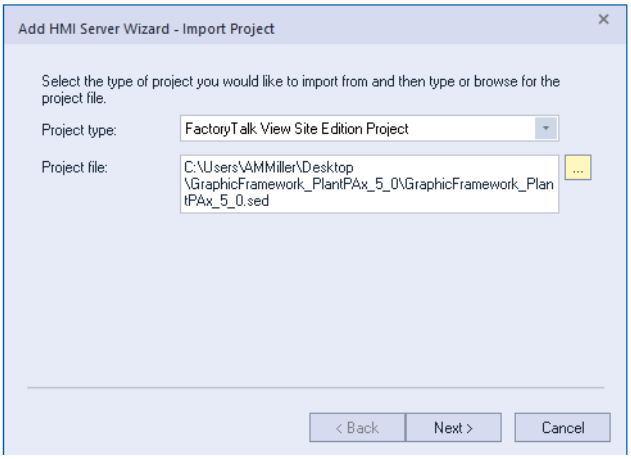
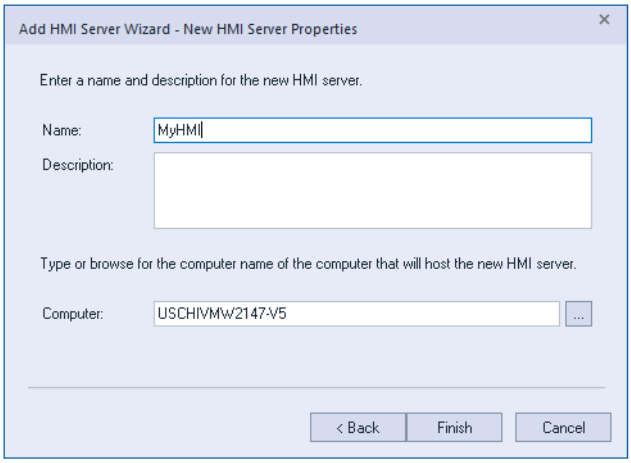
2. Create a new application.



3. Build out the Area folder structure. Place only one server in each area folder



4. Right click on the HMI area folder. Select Add New Server > HMI Server. The Add HMI Server Wizard will open. Select Import a project and click Next.

On this Page	Action
Warning Popup	Select OK
Import Project	• Select FactoryTalk View Site Edition Project. • Navigate to the provided HMI server backup and select the SED file for the project file. 
New HMI Server Properties	• Name the HMI server • Select the computer that will host the new HMI server 

The HMI server will take a few minutes to import. Once the import is complete, the application is ready to build out with the PlantPAx Graphic Framework.

Global Objects

The following section outlines each of the global object files available in the PlantPAx Graphic Framework and how each object should be used and configured.

APP - Administrative Objects (raP-5-SE)

The following objects are used for administrative control.

Object	Graphic	Description	Configuration		
			Parameter Number	Description	Explanation
Close Client		The purpose of the Close Client object is to shut down the client.	No configuration required. This object can be placed on the Header or on a separate administrator display.		

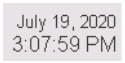
APP - Alarm Objects (raP-5-SE)

The following objects are used for alarm navigation and annunciation.

Object	Graphic	Description	Configuration		
			Parameter Number	Description	Explanation
Alarm Summary Navigation		The purpose of the Alarm Summary Navigation object is to visually alert operators of current active alarms in their L1 process area and to provide navigation to the Alarm Summary. This object will navigate to a different Alarm Summary screen in each L1 area. This button should already be populated on the template Header display. The global object parameter values will need to be updated on the Header display.	101	Alarm Summary Display Name	Enter full Alarm Summary display name
			102	Alarm Group Name (Level 1)	Enter the L1 area alarm group name (for indication)
Alarm Silence Button		The purpose of the Alarm Silence Button object is to silence any active audible alarms assigned to that L1 area for that specific client. This button should already be populated on the Header display. The global object parameter values will need to be updated on the Header display.	101	Alarm and Event Banner Display Name	Enter the associated L1 Header display name that contains the alarm banner. "Invoke #101.FactoryTalkAlarmandEventBanner.SilenceAll"
Alarm Group Annunciation		The alarm annunciation objects are available for L1, L2, or L3 alarm groups. These annunciation objects are built into template objects for L1, L2, and L3 navigation objects, but can be added to additional buttons if desired. There are also larger objects available for L1 Overview display.	101	Alarm Group Name (Level 1)	L1 Group name in FTAE and/or FTLinx (required for L1, L2, and L3 annunciation objects)
			102	Alarm SubGroup Name (Level 2)	L2 Group name in FTAE and/or FTLinx (required for L2 and L3 annunciation objects)
			103	Alarm SubSubGroup Name (Level 3)	L3 Group name in FTAE and/or FTLinx (required for L3 annunciation objects)

APP - Header Objects (raP-5-SE)

The following objects are recommended to be placed on the Header display and provide information and specific navigation.

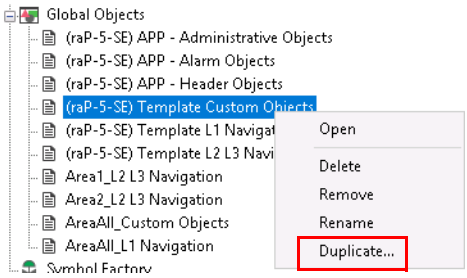
Object	Graphic	Description	Configuration		
			Parameter Number	Description	Explanation
PlantPAx Logo		The logo object is pre-built using the PlantPAx logo. The logo object is populated in the Header display by default but can be removed to free up space on the Header. If users prefer to add their own logo, See Template Custom Objects (raP-5-SE) for more information.	No configuration required.		
Time Date		The Time-Date object indicates the current time and date. This object is populated in the Header display by default.	No configuration required.		
System Status		The System Status object is used for navigation to the control system status display (custom display created by the customer). There is an optional System Status breadcrumb that can be added to the System Status button (see Displaysfor Template Toolbox display).). There is also an L1 alarm breadcrumb that could be used for this button (see APP - Alarm Objects (raP-5-SE) for Alarm Group annunciation). The system status screen is a custom display developed to show diagnostics and hardware information. It is recommended that the PlantPAx Hardware Tree be placed on this display for each controller. See PlantPAx manuals for more information on the Hardware Tree and Tree View. Alarm bread crumb objects - L1 for the System Status header button and L2 for each individual Hardware Tree button - are provided in the alarm global object file that fit on top of the buttons for System Status. See APP - Alarm Objects (raP-5-SE) for alarm group annunciation details. It is recommended that an L1 alarm group be for overall system diagnostics and that L2 subgroups be created for each controller and hardware under that controller.	101	System Status Display Name	Enter the whole display name into the parameter. Display "#101"
			The system status breadcrumb is configured as follows: Replace "[MyCLX]" with the shortcut defined for your application. If you have multiple processors, duplicate the function for each processor and use a logical "or" to combine the expressions. The system status breadcrumb should be placed on top of the System Status Button in the Header bar.		
Repaint Screen		The Repaint Screen object is used to refresh the display client. The button will call up a macro that closes all displays and reopens the header and the main overview display.	101	Level 1 Macro Name - Repaint Macro	Enter the macro used to repaint the display (See Macros for more information.) "#101"
Home Navigation		The purpose of the Home Navigation object is to provide a link allowing an operator to go to their "Home" area or sphere of influence. Navigates to Client Home display (not the current L1 home display).	No configuration required. See Macros to verify that the "Client Startup" macro is setup properly.		
L1 Navigation		The purpose of the L1 Navigation object is to link to a popup display that provides access to other L1 Process Areas within the facility. This object configured the same for all L1 Headers (it will always call up the same popup, regardless which L1 area is being displayed).	101	Display Map Display Name	Enter the whole display name for the Display Map display popup. Display "#101" /cc See Displays for more details on configuring the display map popup.

Object	Graphic	Description	Configuration		
			Parameter Number	Description	Explanation
Administrator		The Administrator Button can be used to navigate to a custom administrator display.	101	Administrator Display Name	Enter the whole display name for the Administrator display Display "#101"
Trend Navigation		The purpose of the Trend Navigation Button object is to navigate to a display prepopulated with navigation buttons to various prebuilt trends or generic trend display to allow building of ad hoc trend displays.	101	Trends Display Name	Enter the whole display name for the Trends display Display "#101"
Diagnostic Events Summary		The Diagnostics Events Summary object is used as a navigation button to access the ADDA event summary.	101	Diagnostic Display Name	Enter the whole display name for the Diagnostic display Display "#101"
Language Switching		The purpose of the Language Switching Button object is to provide ability for the user to change the HMI text to use their preferred (previously configured) language. The selection is client based and each client can choose a different language provided that the data sources are configured with the selected language. The dynamic text is provided by the controller and the static text is provided by the HMI Server (both sources can provide information in multiple languages concurrently).	101	Language Select Display Name	Enter the whole display name for the Language Selection display Display "#101" /RP
Help Button		The purpose of the Help Button object is to provide access to a User defined Help display or PDF file. There are two separate buttons available depending on if you want to use a Help display (FTView-based) or PDF. These buttons can be added to the Header display or any other display.	Display: 101	Help Display Name	Enter the whole display name for the help display. Display #101
			PDF: 101	Help File Full file path For example: C:\Users\public\documents\help.pdf or \\PRC-PASS\Shared\help.pdf	Enter the file path to the Help PDF. The file can reside on the OWS that the client is run on or located on a shared file directory. AppStart #101
Windows Navigation Button		The purpose of the Windows Navigation Button objects is to provide Windows like navigation capability within the HMI. Note: For multi-monitor applications, the display history is shared with all the configured monitors. Therefore, this navigation should be concerned as a common group monitor history.	None. Buttons are ready to use and only need to be added to the Header display.		
Login / Logout		The Login / Logout object is used to allow logging in and out of various users and includes an indication of the current user. Logging out will log in as a View Only User.	This object is already populated on the default Header display. Note: For log out to the view only user to work correctly, the view only user must be configured in security. The log out button is setup for user "default" password "default".		

Template Custom Objects (raP-5-SE)

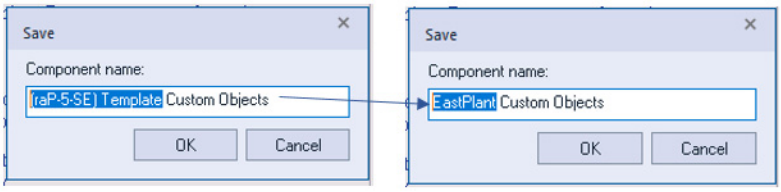
The following objects are customizable to customer's specific needs. Prior to customizing, duplicate and rename the file to preserve the original template file.

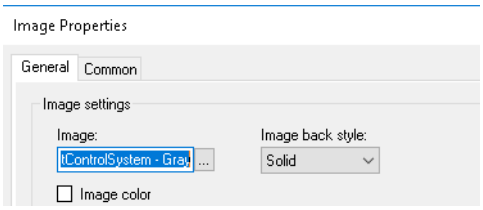
1. Go to file > Duplicate.



2. Name the new global object file.

   Use a filename that represents the application/facility. Replace only the '(raP-5-SE) Template' portion of the filename. This creates a file for your specific application and preserves the original template file.

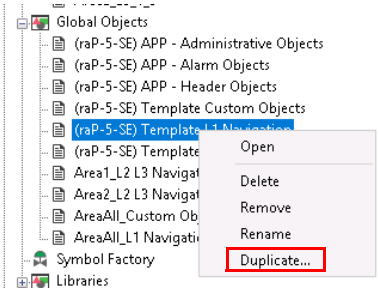


Object	Graphic	Description	Configuration
Custom Company Logo	PlantPAx Distributed Control System	The logo object is in the Custom Objects files can be replaced with the customer's logo. The customer logo must first be imported into the application Images folder. Once the image is imported, open the object in Custom Objects file and replace with customer logo. 	Once the image file is correct, copy the updated global object and paste it onto the header after deleting the default PlantPAx logo.
Report Navigation		The purpose of the Report Navigation Button object is to navigate to a display with pre-populated navigation buttons to access various prebuilt reports.	Copy and paste the button on the Header display (or any other display) in the desired location. Update the navigation as necessary.

Template L1 Navigation (raP-5-SE)

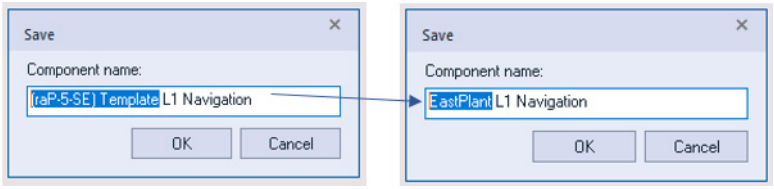
This global object file is a template. The template file for L1 Navigation will only need to be utilized once for each application. This file defines the navigation to each L1 Area - one button per each L1 area. To utilize this file, use the following steps:

1. Go to file > Duplicate.



2. Name the new global object file.

   Use a filename that represents the application/facility. Replace only the '(raP-5-SE) Template' portion of the filename. This creates a file for your specific application and preserves the original template file.



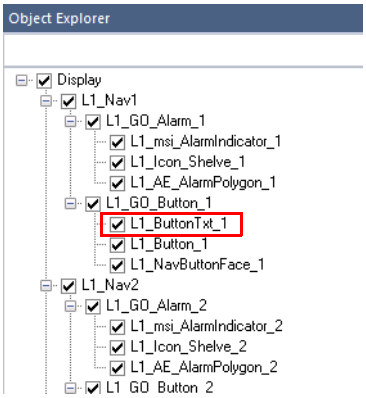
3. Duplicate the buttons as required (one for each L1 area).

   Four buttons are provided by default - not all buttons need to be used.



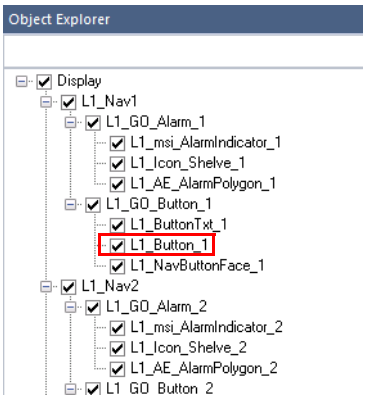
4. To update the text on the button, go to Object Explorer and select the L1_ButtonTxt_# object and modify as required.

   Repeat for each button.

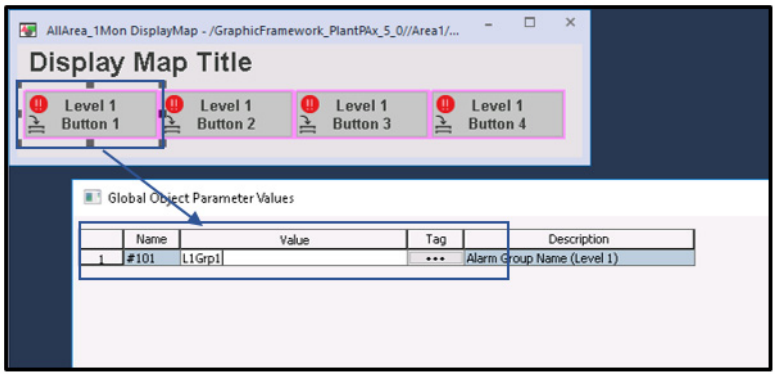


5. To update the navigation for each button, go to the L1_Button_# object > Action tab and replace the Release Action with the macro command for that L1 area. See Macros for more information on configuration. Repeat for each button used.

   Repeat for each button used.



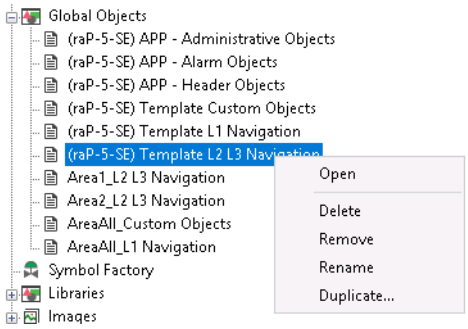
6. After you finish updating all the button text and actions, select the updated buttons in the L1 Navigation global object file and copy them to the application specific (raP-5-SE) Template 1Mon DisplayMap.
7. Go to the application specific display developed from the template file (raP-5-SE) Template 1Mon DisplayMap, delete any existing L1 button objects, and paste the new ones.
8. For all buttons, enter the L1 alarm group parameters in the global object parameters. See Alarm Grouping and Supporting Logic for more information on alarm grouping.



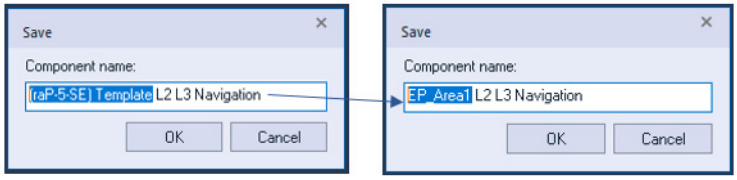
Template L2 L3 Navigation (raP-5-SE)

This global object file is a template. Utilize the template file for L2 / L3 Navigation once for every L1 area. This file defines the navigation to each L2 and L3 display within a given L1 Area. To utilize this file, use the following steps:

1. Go to file > Duplicate.



2. Name the new global object file. Use a filename that represents the specific L1 area. Replace only the '(raP-5-SE) Template' portion of the filename. This creates a file for your specific L1 area and preserves the original template file.



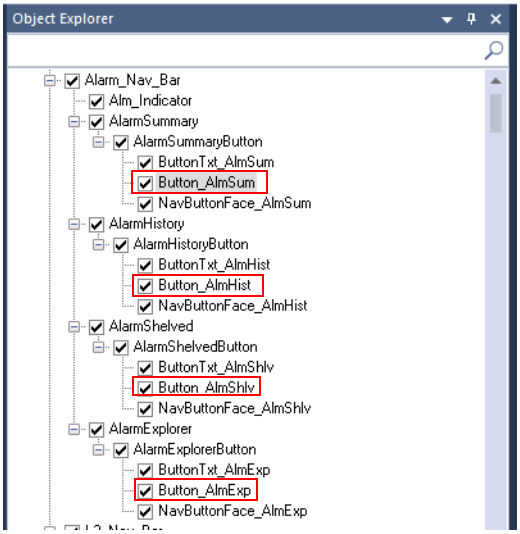
There are three sets of buttons to update for each L1 Area:

- Alarm Navigation Bar
- L2 Navigation Bar
- L3 Navigation Bars

Alarm Navigation Bar

Only one Alarm Navigation bar is needed for each L1 area. For the Alarm Navigation, the button text does not need to be updated. Only the navigation needs to be updated.

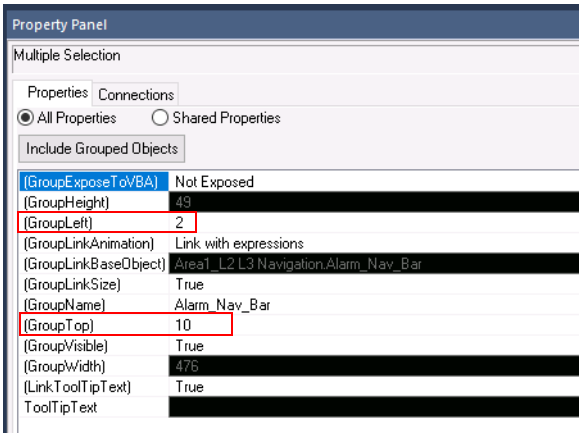
1. To update the navigation for each button, go to the alarm button > Action tab and update the display names for each of the alarm screens.



2. This should match the Alarm Displays created for this L1 area (see Displays for more information on the alarm template displays).

Note: If the alarm display names match the recommended naming convention, you can do a "Tag Substitution" and simply replace "(raP-5-SE) Template" on the whole Alarm Navigation bar instead of updating each button individually.

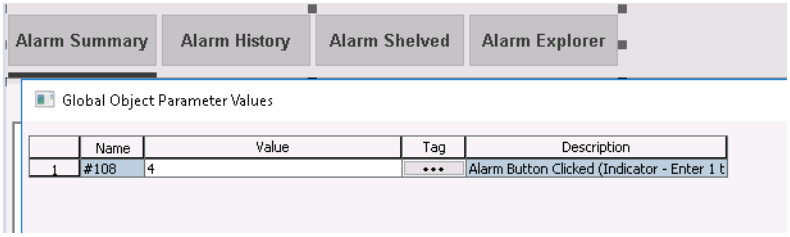
3. Copy the button bar and paste the bar in each of the four alarm displays:
   - [L1Area] Alarm-Summary
   - [L1Area] Alarm-History
   - [L1Area] Alarm-Shelved
   - [L1Area] Alarm-Explorer
4. To update the location for the alarm displays, go to the Alarm Navigation bar and place all of the Alarm Navigation bars in this location on each of the four alarm displays: Left - 2, Top - 10.



5. Update the global object parameter for the Alarm Button indication.

   This shows the operator what alarm display is currently being viewed. Update the global object parameter for each alarm display:

   - Alarm Summary = 1
   - Alarm History = 2
   - Alarm Shelved = 3
   - Alarm Explorer =4

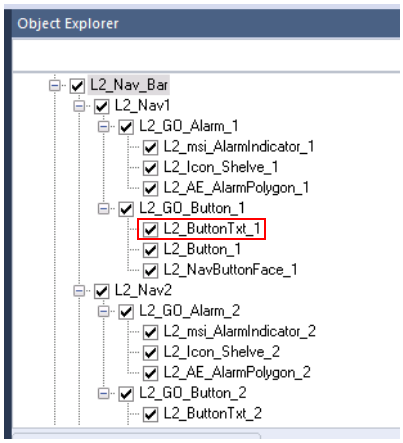


L2 Navigation Bar

Only one L2 Navigation bar is needed for each L1 area. Update the text on the buttons that are being used.

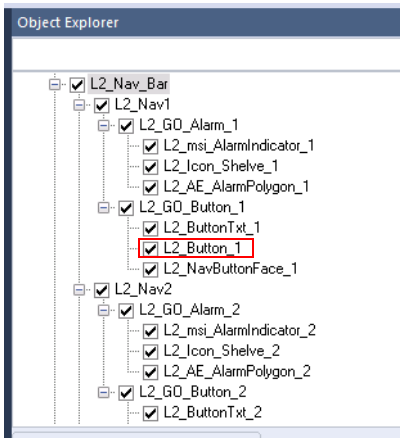
1. To update the text on the button, got to Object Explorer and select the L2_ButtonTxt_# object.

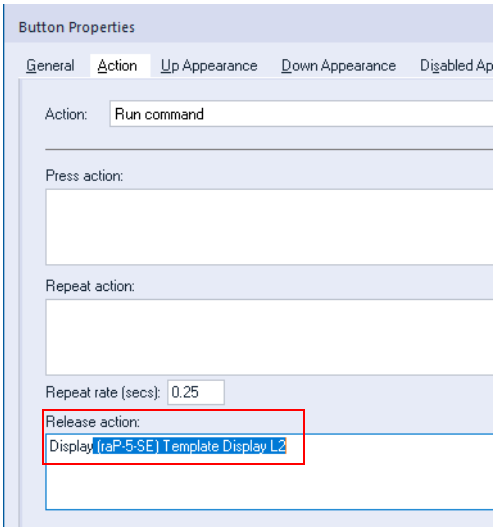
   Repeat for each button.



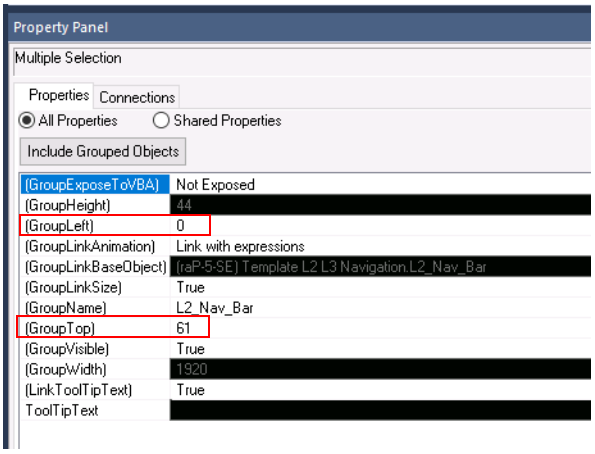
2. To update the navigation for each button, go to the L2_Button_# object > Action tab and replace the Release Action to point to the correct L2 display.

Repeat for each button used.



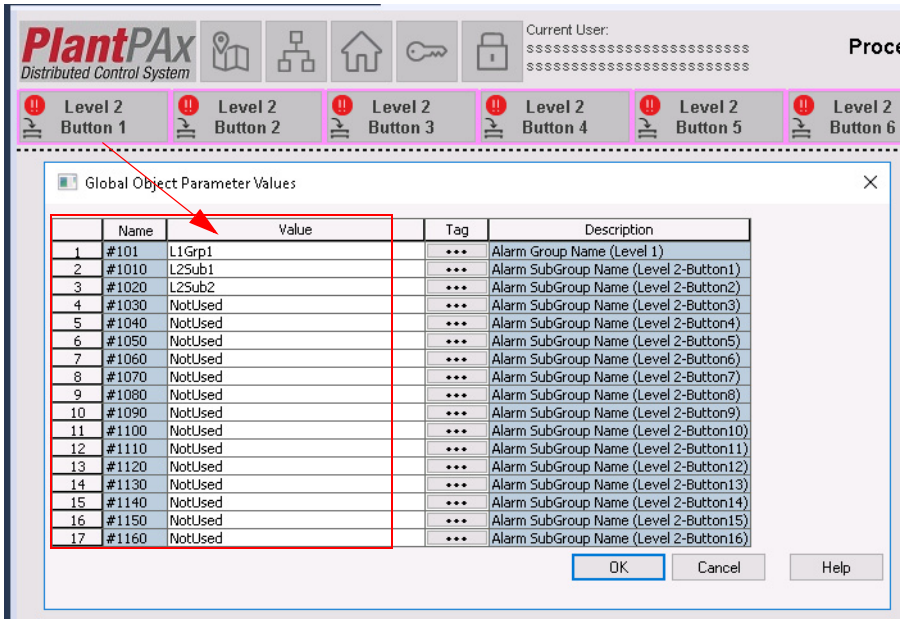


3. After you finish updating all the button text and actions, select the updated button bar and copy.
4. Go to the application specific display developed from the template file (raP-5-SE) Template 1Mon Header, delete the existing L2 Navigation bar, and paste the new one.
5. Go to the L2 Navigation bar and place the bar in this location on the L1 Header display: Left - 0, Top - 61.



6. For all buttons (used or not used), Enter the L1 and L2 alarm group parameter in the global object parameters. See In the wizard, set the following: for more information.

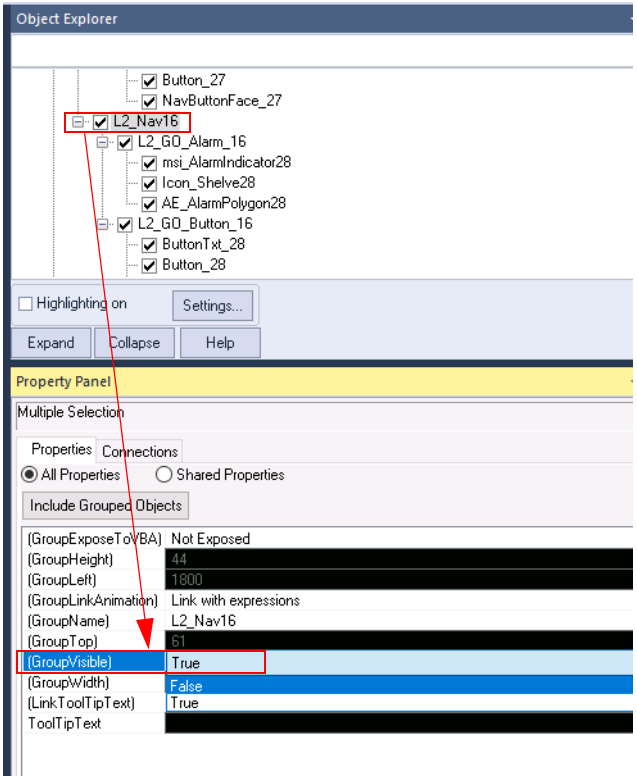
These fields MUST be filled in with text or errors will populate in FactoryTalk Diagnostics. Fill in the appropriate alarm group name for the buttons used. If button is not used, simply enter “NotUsed” as shown below. This will act as a dummy alarm group.



	Name	Value	Tag	Description
1	#101	L1Grp1	•••	Alarm Group Name (Level 1)
2	#1010	L2Sub1	•••	Alarm SubGroup Name (Level 2-Button1)
3	#1020	L2Sub2	•••	Alarm SubGroup Name (Level 2-Button2)
4	#1030	NotUsed	•••	Alarm SubGroup Name (Level 2-Button3)
5	#1040	NotUsed	•••	Alarm SubGroup Name (Level 2-Button4)
6	#1050	NotUsed	•••	Alarm SubGroup Name (Level 2-Button5)
7	#1060	NotUsed	•••	Alarm SubGroup Name (Level 2-Button6)
8	#1070	NotUsed	•••	Alarm SubGroup Name (Level 2-Button7)
9	#1080	NotUsed	•••	Alarm SubGroup Name (Level 2-Button8)
10	#1090	NotUsed	•••	Alarm SubGroup Name (Level 2-Button9)
11	#1100	NotUsed	•••	Alarm SubGroup Name (Level 2-Button10)
12	#1110	NotUsed	•••	Alarm SubGroup Name (Level 2-Button11)
13	#1120	NotUsed	•••	Alarm SubGroup Name (Level 2-Button12)
14	#1130	NotUsed	•••	Alarm SubGroup Name (Level 2-Button13)
15	#1140	NotUsed	•••	Alarm SubGroup Name (Level 2-Button14)
16	#1150	NotUsed	•••	Alarm SubGroup Name (Level 2-Button15)
17	#1160	NotUsed	•••	Alarm SubGroup Name (Level 2-Button16)

7. To make a button that is not used invisible, go to the Header graphic Object Explorer, select the button, and modify the Group Visible parameter.

   Repeat for each button that should be invisible.



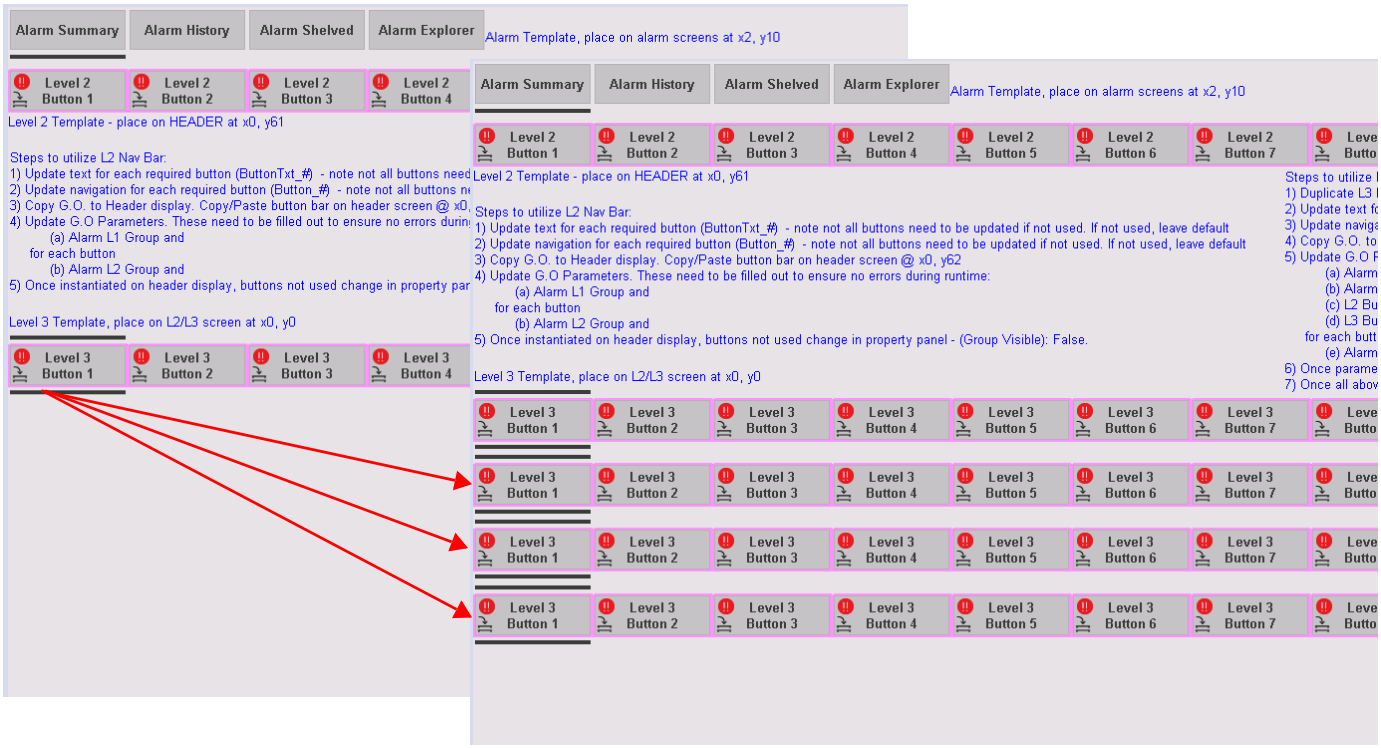
L3 Navigation Bar

One L3 Navigation bar is needed for each L2 Navigation button that is used (or up to 16 L3 Navigation bars per L2 Navigation bar). Update and configure each of the L3 Navigation bars.

1. Go to the L3 Navigation bar in the global object file and copy and paste as many L3 Navigation bars as needed.

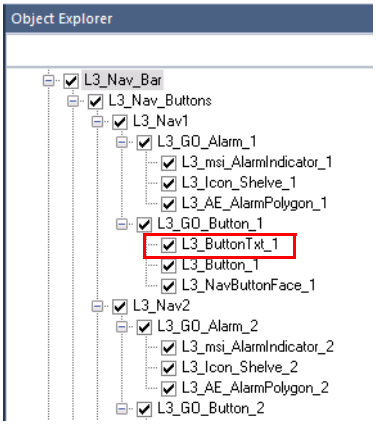
   The first L3 Navigation bar correlates to the first L2 Navigation button; the copy correlates to the second L2 Navigation button and so on for additional copies.

   There can be as many as 16 L3 Navigation bars in the global object file for the L1. This example shows four L3 Navigation bars (only four L2 buttons used in this example).



2. To update the text on the button, got to Object Explorer and select the L3_ButtonTxt_# object.

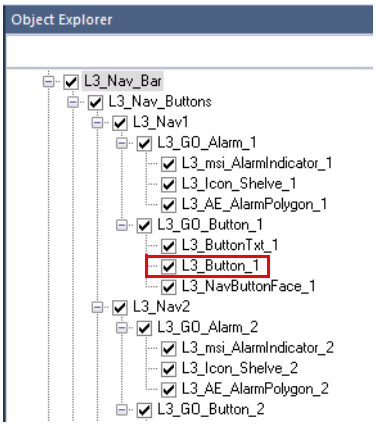
Repeat for each button.

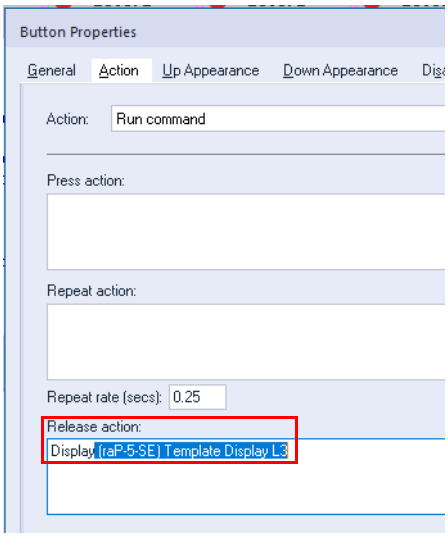


Note: The object names in the L3 Navigation bars that are copied from the first L3 Navigation Bar do not populate new button numbers in order. Take care when configuring buttons that the correct one is selected.

3. To update the navigation for each button, go to the L3_Button_# object > Action tab and replace the Release Action to point to the correct L2 display.

   Repeat for each button used.



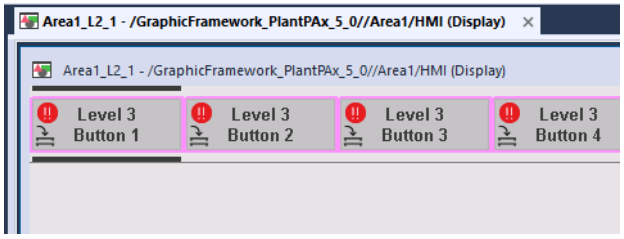


Note: The object names in the L3 Navigation bars that are copied from the first L3 Navigation Bar do not populate new button numbers in order. Take care when configuring buttons that the correct one is selected.

4. Select the updated button bar and copy.

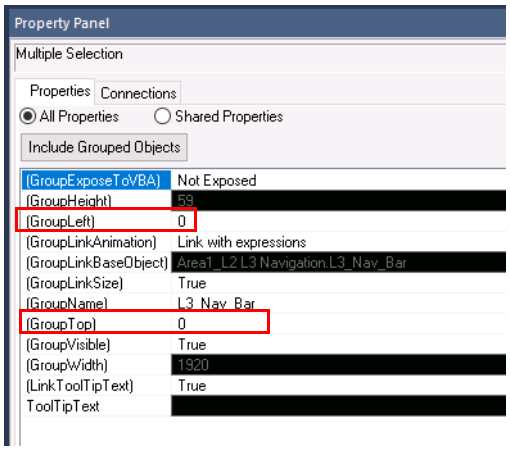
   The object names in the L3 Navigation bars that are copied from the first L3 Navigation Bar do not populate new button numbers in order. Take care when configuring buttons that you select the correct bar.

5. Go to the application specific display developed from the template file (raP-5-SE) Template Display L2 for this L2 area in this L1 area, delete the existing L3 navigation bar, and paste the new L3 navigation bar.



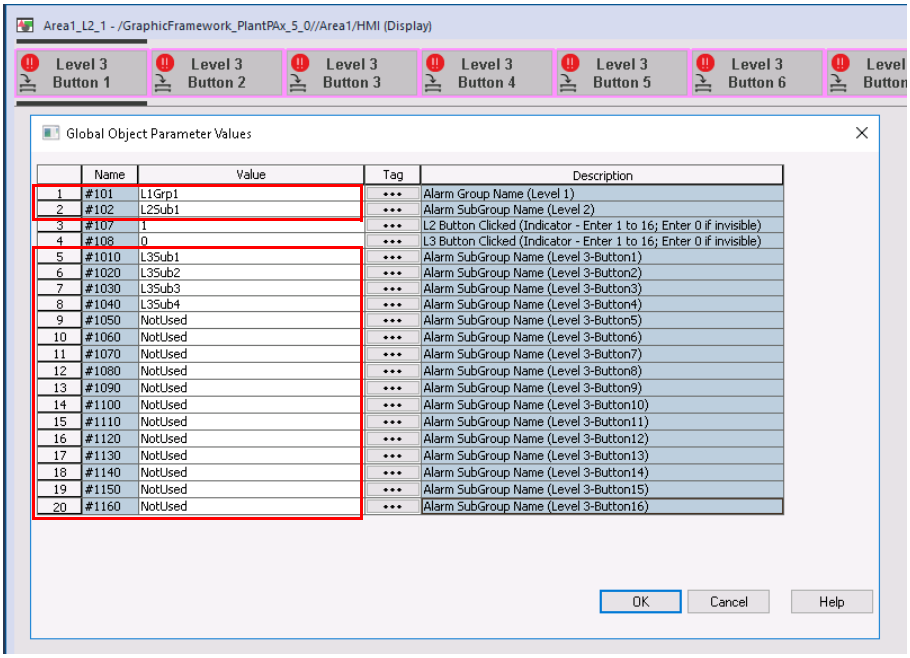
6. Place the button bar in this location on the L2 and L3 displays: Left-0, Top-0.

   You can update the location on the property panel for the L3 Navigation bar while in the Header display.



7. For all buttons (used or not used), the L1, L2, and L3 alarm group parameter will need to be entered in the global object parameters. See In the wizard, set the following: for more information.

   These fields MUST be filled in with text or errors will populate in FactoryTalk Diagnostics. Fill in the appropriate alarm group name for the buttons used. If button is not used, simply enter "NotUsed" as shown in the following display. This will act a dummy alarm group.

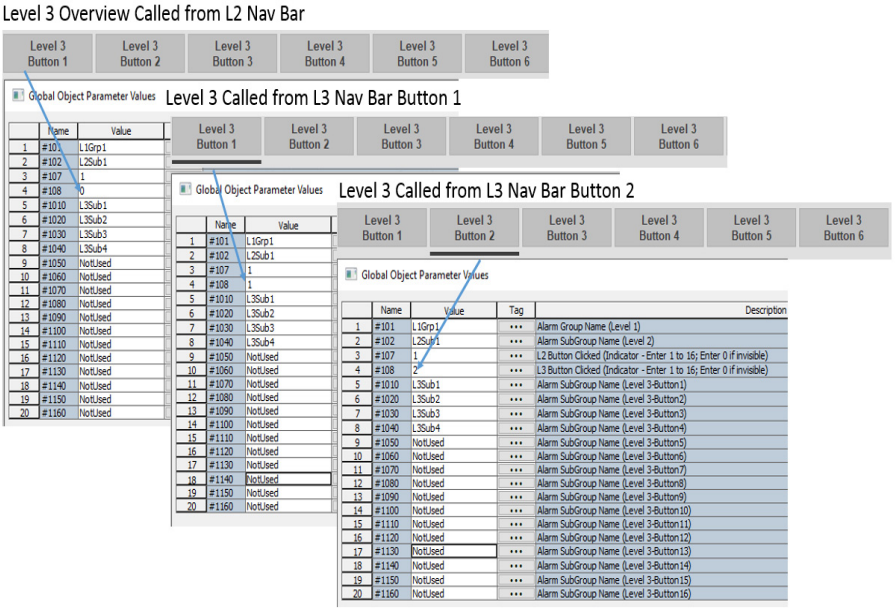


	Name	Value	Tag	Description
1	#101	L1Grp1	•••	Alarm Group Name (Level 1)
2	#102	L2Sub1	•••	Alarm SubGroup Name (Level 2)
3	#107	1	•••	L2 Button Clicked (Indicator - Enter 1 to 16; Enter 0 if invisible)
4	#108	0	•••	L3 Button Clicked (Indicator - Enter 1 to 16; Enter 0 if invisible)
5	#1010	L3Sub1	•••	Alarm SubGroup Name (Level 3-Button1)
6	#1020	L3Sub2	•••	Alarm SubGroup Name (Level 3-Button2)
7	#1030	L3Sub3	•••	Alarm SubGroup Name (Level 3-Button3)
8	#1040	L3Sub4	•••	Alarm SubGroup Name (Level 3-Button4)
9	#1050	NotUsed	•••	Alarm SubGroup Name (Level 3-Button5)
10	#1060	NotUsed	•••	Alarm SubGroup Name (Level 3-Button6)
11	#1070	NotUsed	•••	Alarm SubGroup Name (Level 3-Button7)
12	#1080	NotUsed	•••	Alarm SubGroup Name (Level 3-Button8)
13	#1090	NotUsed	•••	Alarm SubGroup Name (Level 3-Button9)
14	#1100	NotUsed	•••	Alarm SubGroup Name (Level 3-Button10)
15	#1110	NotUsed	•••	Alarm SubGroup Name (Level 3-Button11)
16	#1120	NotUsed	•••	Alarm SubGroup Name (Level 3-Button12)
17	#1130	NotUsed	•••	Alarm SubGroup Name (Level 3-Button13)
18	#1140	NotUsed	•••	Alarm SubGroup Name (Level 3-Button14)
19	#1150	NotUsed	•••	Alarm SubGroup Name (Level 3-Button15)
20	#1160	NotUsed	•••	Alarm SubGroup Name (Level 3-Button16)

8. Edit parameters 107 and 108. Parameters #107 and #108 are used for active display indication. The indicators are horizontal dark grey lines that appear beneath the L2 and L3 navigation bars to indicate the active display.

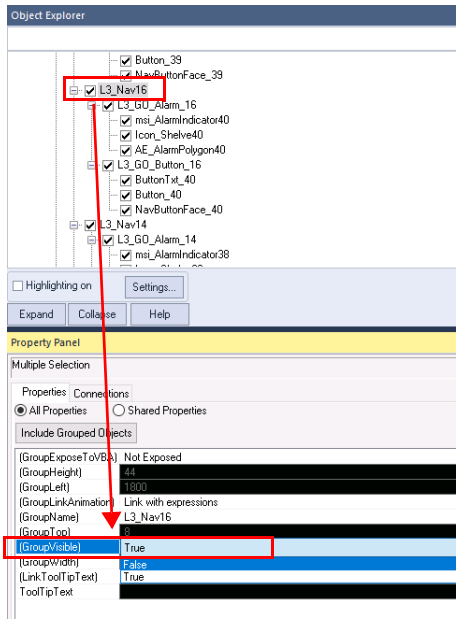
Parameter	Description
107	Parameter #107 is a component of the L2/L3 display and is used to position the indicator for the active L2 display (It appears below the L2 Navigation bar). Valid values for #107 range from 0 to 16: **L2 or L3 Display Active** #107 = 0: no indication #107 = 1 to 16: locates the indicator in position 1 to 16 (left to right) to indicate the active L2 selection or the L2 associated with the active L3 display.
108	Parameter #108 is a component of the L2/L3 display and is used to position the indicator forthe active L3 display (it appears under the L3 Navigation bar). Valid values for #108 range from 0 to 16: **L2 Display Active** #108 = 0: no indicator appears as no L3 display is yet selected **L3 Display Active** #108 = 1 to 16: locates the indicator in position 1 to 16 (left to right) to indicate the active L3 selection.

- The indicator uses horizontal animation with the parameter to indicate the button selected.



9. If a button on the L3 Navigation bar is not used, the button can be made invisible. While in the L2 graphic, select the populated L3 Navigation bar. In the Object Explorer, select the button to be made invisible. In the Property Panel, modify the "Group Visible" parameter from True to False.

   Repeat for each button that should be invisible.



10. While in the L2 graphic, select the L3 Navigation bar and copy.
    a. In the L2 area, open all the L3 graphics associated with this L2 area, delete the L3 Navigation bar in each of the L3 graphics and paste the updated L3 Navigation bar.
    b. Update the global object parameter #108 for each L3 graphic.

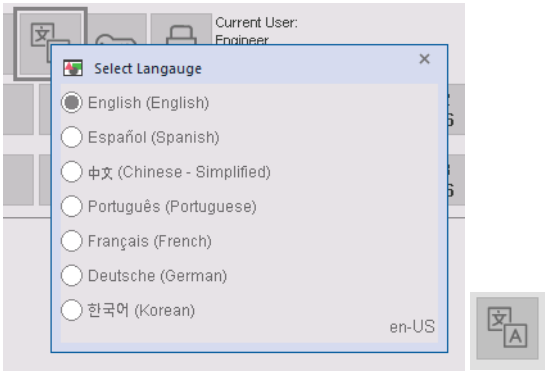
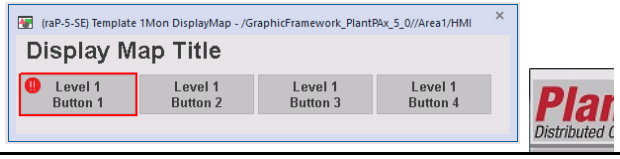
    Repeat this section for each L3 Navigation bar in the global object file.

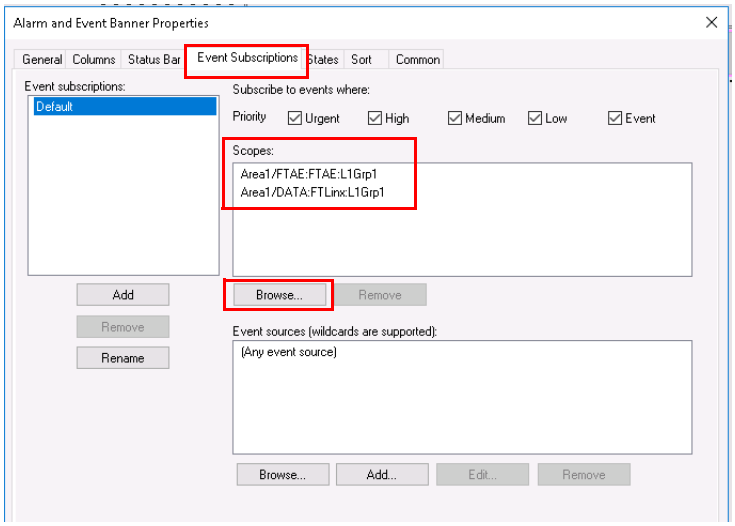
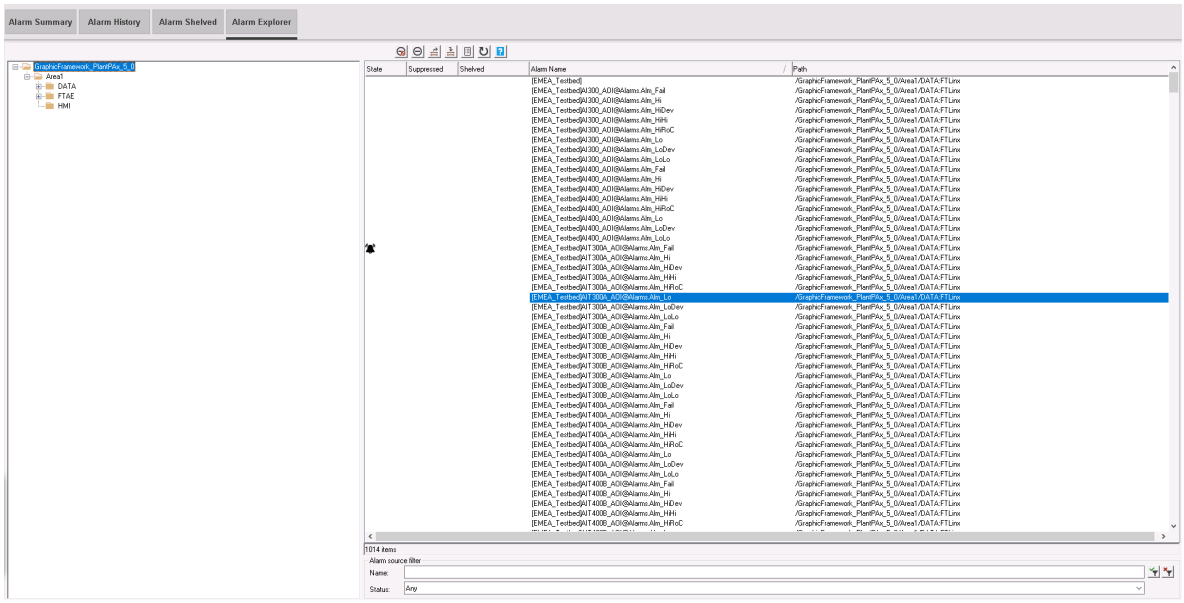
L2 Indication Only

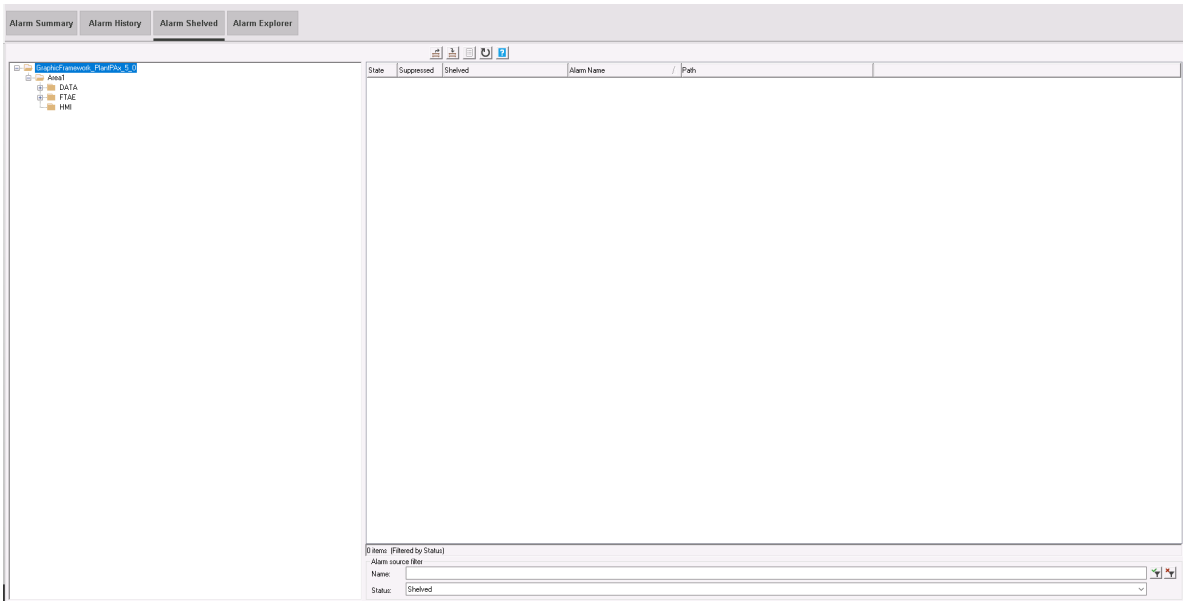
On displays where the L3 navigation bar is not utilized, a single indicator for the selected L2 screen will be used. This is placed by default on the display "(raP-5-SE) Template Display L2 No L3". No configuration is required in the global object file. See Displays for configuration on the default display

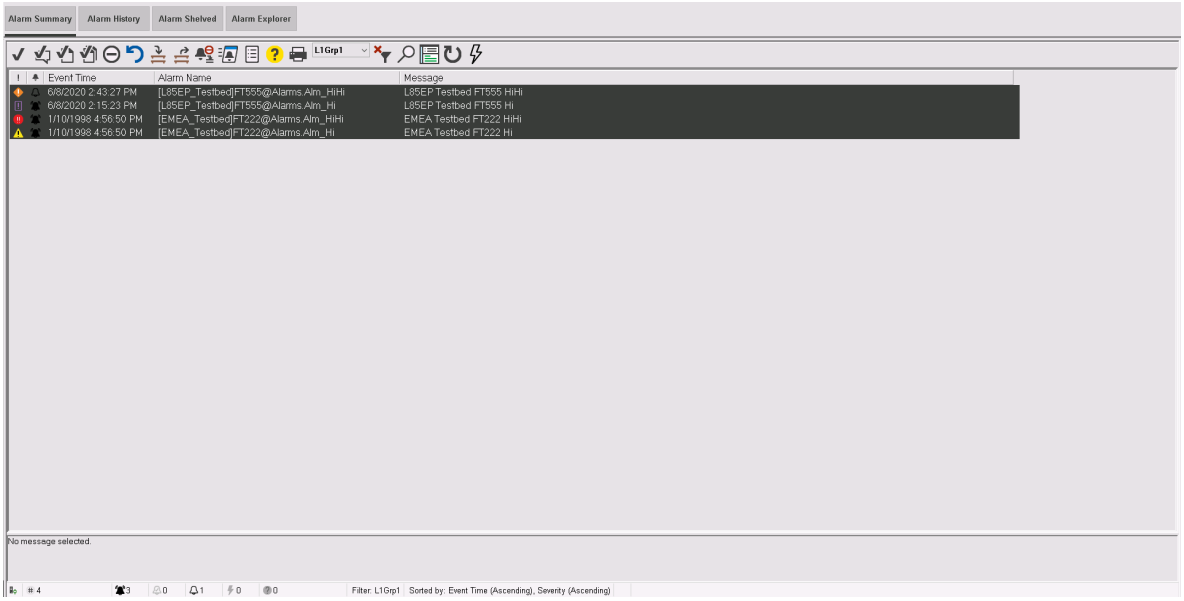
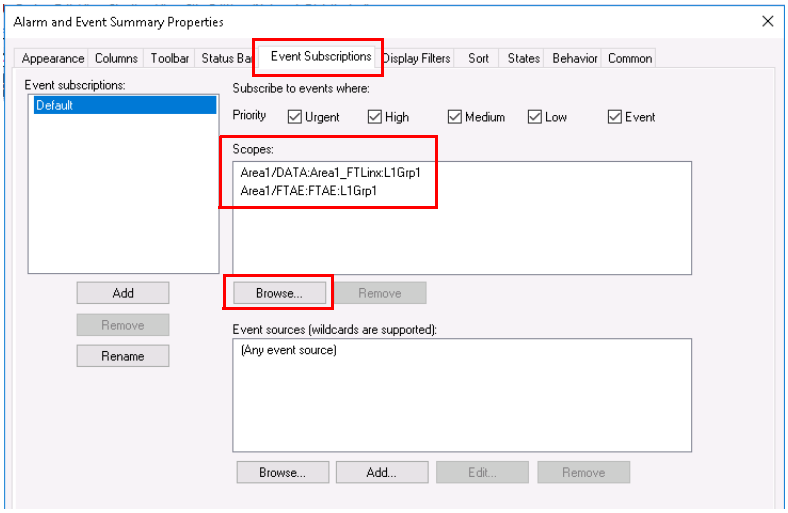
Displays

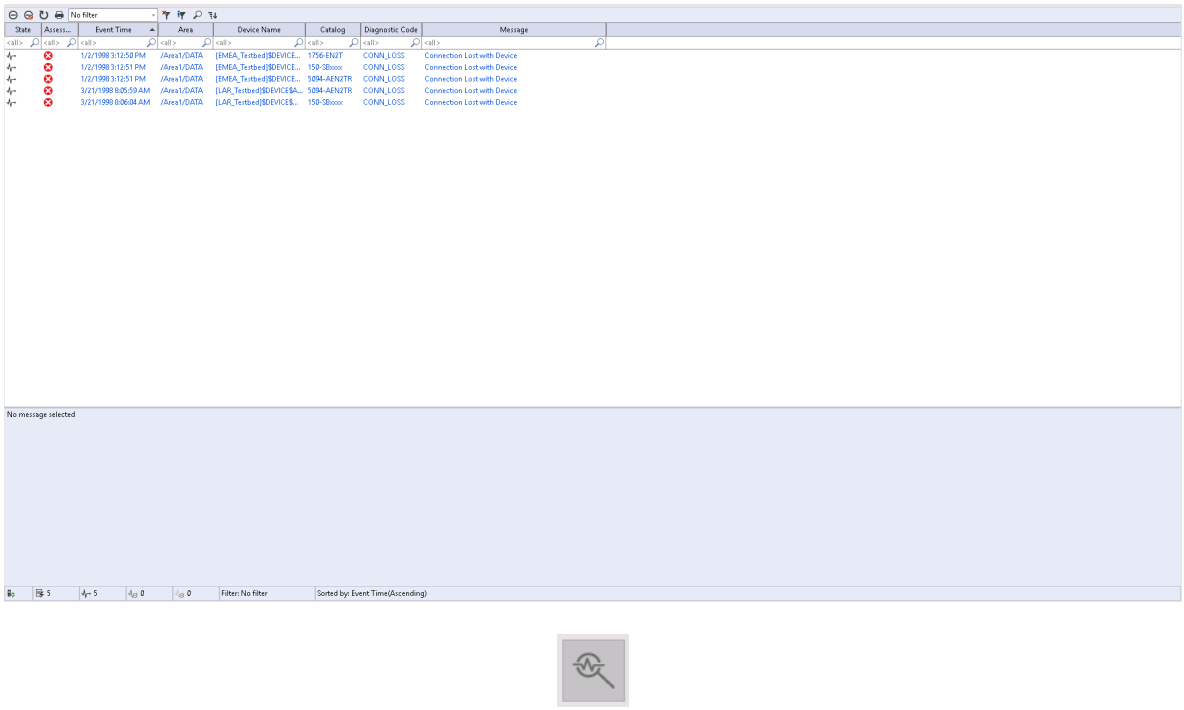
Each display is a template. The template display should be duplicated and the prefix "(raP-5-SE) Template" or "(raC-5-SE) Template" replaced with meaningful name for each L1 area in the application. This preserves the original template to use as a starting point on additional screens. See Recommended Application Naming Structure for more information on naming structure.

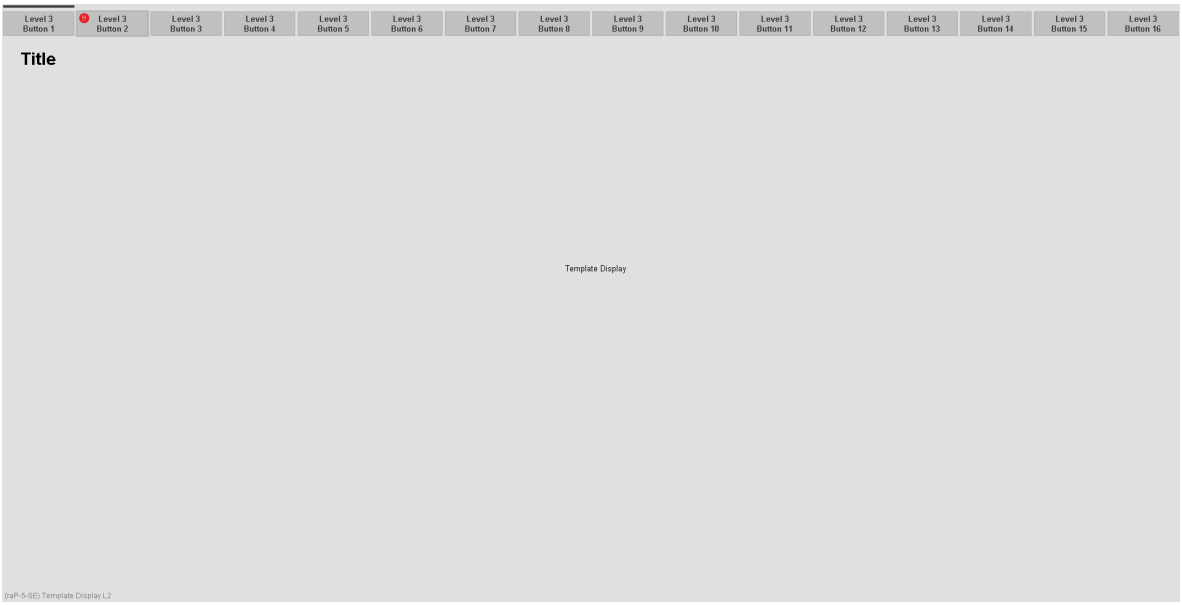
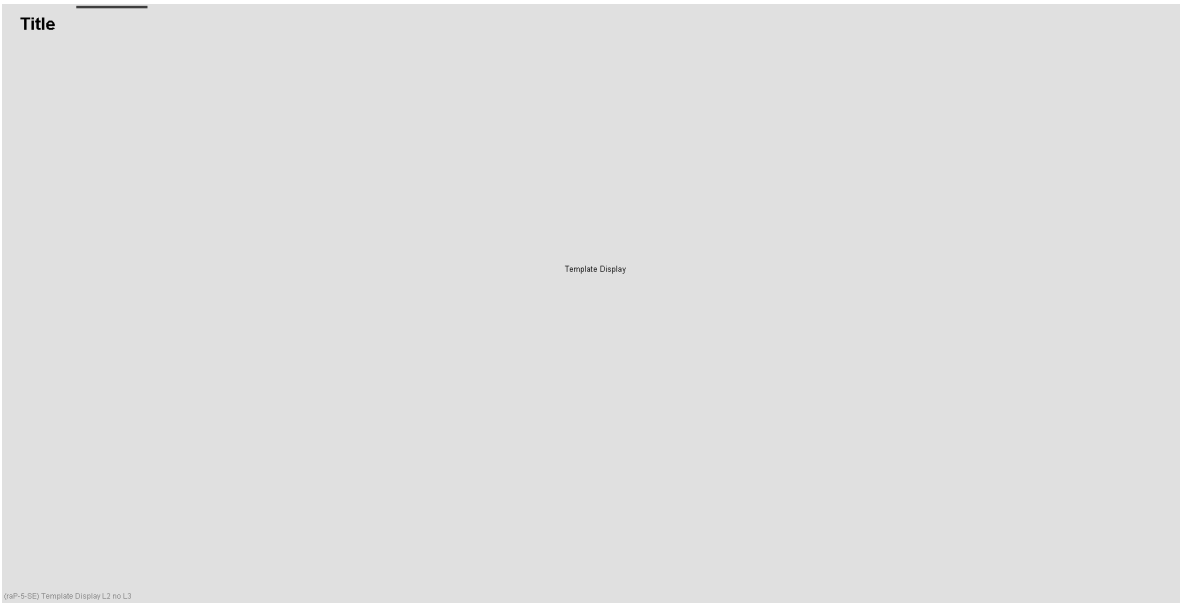
Display	Graphic	Description
(raC-5-SE) Template Language-Select		This template can be used if language switching is used in the application. Only one per application is required. This should be used in conjunction with the Header button for Language Switching. The display is pre-populated with typical languages used but can be modified for application specific needs. Link this display to the Language Switching Header button. Languages that are not used for this application can be removed if desired.
(raP-5-SE) Template 1Mon DisplayMap		This template is used for navigation between different L1 areas. Only one per application is required. This should be used in conjunction with the Header button for Navigation. Link this display to Navigation Header button. Updated the Display title for the specific application. See Global Objects for more information on configuring the buttons on this display.

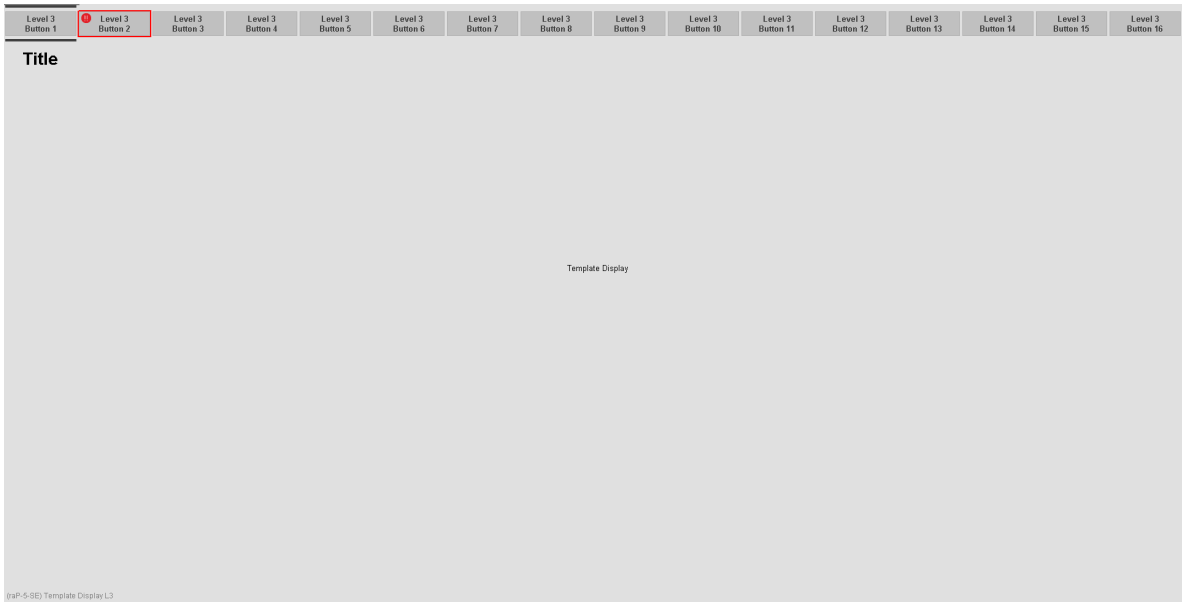
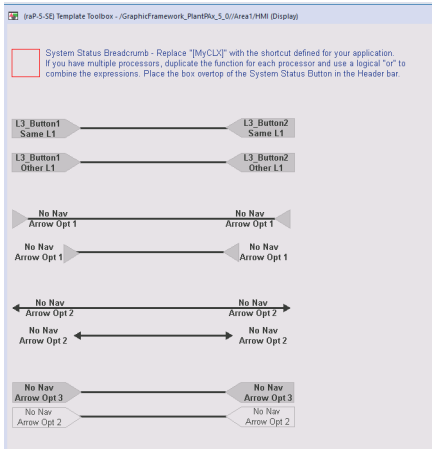
Display	Graphic	Description
(raP-5-SE) Template 1Mon Header		This template is used for Headers for each L1 area. This template should be used once for each L1 area. The buttons on the header can be modified using objects provided in the global object files. The L2 Navigation bar resides on this screen and is always visible. The alarm banner object will need to be configured for alarms in that L1 area. Open the Alarm and Event Banner Properties and select the Event Subscriptions tab. Then select the "Browse" button under "Scopes" box. Select the L1 area group(s) that correlates with that Header. Note: If there are alarms that are both controller based and server based, both subscriptions will need to be added. Every Alarm or Data server that has alarms for this L1 area needs to be added to the scope of the alarm banner.  The L2 Navigation bar will need to be configured properly - see Global Objects to configure the L2 Navigation.
(raP-5-SE) Template Alarm-Explorer		This template is used for Alarm Explorer for each L1 area. This template should be used once for each L1 area. The Alarm Navigation bar will need to be configured - see Global Objects for more information.

Display	Graphic	Description
(raP-5-SE) Template Alarm-History		This template is used for Alarm History for each L1 area. This template should be used once for each L1 area. The Alarm Navigation bar will need to be configured - see Global Objects for more information. Filters can be added to the Alarm History object if desired from the Alarm History properties.
(raP-5-SE) Template Alarm-Shelved		This template is used for Shelved Alarms for each L1 area. This template should be used once for each L1 area. The Alarm Navigation bar will need to be configured - see Global Objects for more information.

Display	Graphic	Description
(raP-5-SE) Template Alarm-Summary	 	This template is used for Alarm Summary for each L1 area. This template should be used once for each L1 area. Link this display to the Alarm Header button. The Alarm Navigation bar will need to be configured - see Global Objects for more information. Display filters can be added if desired in the Alarm and Event Summary properties. The alarm summary object will need to be configured for alarms in that L1 area. Open the Alarm and Event Summary Properties and select the Event Subscriptions tab. Then select the "Browse" button under "Scopes" box. Select the L1 area group(s) that correlates with that Header. Note: If there are alarms that are both controller based and server based, both subscriptions will need to be added. 

Display	Graphic	Description
(raP-5-SE) Template Diagnostic-Summary		This template is used for Automatic Diagnostic Event Summary. This template can be used either one for the whole facility or one for each L1 area. If a display is created for each L1 area, then the event subscription scope will need to adjusted for each L1 display. Otherwise, no configuration is required. Link this display to the Diagnostic Events Summary Button.
(raP-5-SE) Template Display L1		This template is used for each L1 Display. There will be one L1 display for every L1 area. Typically, this display will have an overview of that L1 area and is the first display that the operator will see when the client starts up. This display is flexible - alarm indicators can be added if desired. Link this display to the appropriate macros for client startup and screen repaint - see Macros for information.

Display	Graphic	Description
(raP-5-SE) Template Display L2		This template is used for L2 Displays that have L3 displays associated. There will be one L2 display for every L2 Navigation button that is utilized. The template will automatically display the GFX file name in the lower right corner. Typically, this graphic will contain necessary controls and indication for the operator to run the facility. Link each L2 Display to the appropriate L2 Navigation Button - see Global Objects for details on navigation configuration.
(raP-5-SE) Template Display L2 No L3		This template is used for simple L2 Displays that do not have L3 Displays associated (no L3 navigation bar). There will be one L2 display for every L2 Navigation button that is utilized. The template will automatically display the GFX file name in the lower right corner. Typically, this graphic will contain necessary controls and indication for the operator to run the facility. Link each L2 Display to the appropriate L2 Navigation Button - see Global Objects for details on navigation configuration. The parameter for the global object for L2 button indication will need to be configured. There is one parameter (#107) and is setup the same as with the L3 navigation bar. See Global Objects for details on this parameter.

Display	Graphic	Description
(raP-5-SE) Template Display L3		This template is used for each L3 Display. There will be one L3 display for every L3 Navigation button that is utilized. The template will automatically display the GFX file name in the lower right corner. Typically, this graphic will contain more detailed information on devices that are on associated L2 display. Link each L3 Display to the appropriate L3 Navigation Button - see Global Objects for details on navigation configuration.
(raP-5-SE) Template Toolbox		This display is used as a toolbox of objects that can be copied and places on other displays. This screen will not be used on any active clients. If the off-screen navigation objects are used, then the button action and text will need to be updated. • Same L1 1. Copy the objected onto the desired screen. 2. Update the text. 3. Update the button action – navigate direct to display. • Other L1 1. Copy the objected onto the desired screen. 2. Update the text object. 3. Update the button action – use macro to display other L1 header and L3/L2 display. If the system status breadcrumb is used, the animation will need to be updated. Replace "/Area1/DATA::[MyCLX]" with the shortcut defined for your application. If multiple processors are used, duplicated the function for each processor and use a logical OR statement to combine the expression.

Macros

Macros are an important component in the graphic framework. There are three macros that are provided as a template and their functions are very similar.

- Template_ClientStartup
- Template_Repaint
- Template_OffScreen

Template_ClientStartup

```
!===== Macro File created  07/22/2020 ================================
!
! Use this macro to Startup graphics windows for a 1920 x 1080 application
!
!=============================================================

Abort * /D

Define SW_ShortcutRedefine DefineShowTreeCmd 0
SW_ShortcutRedefine /Area1/DATA::[Hardware]

Define HW_ShortcutRedefine DefineShowHWTreeCmd 0
HW_ShortcutRedefine /Area1/DATA::[Hardware]

Display "(raP-5-SE) Template 1Mon Header"
Display "(raP-5-SE) Template Display L1"

Define GoHome Template_Repaint
```

```
!===== Macro File created  07/22/2020 ================================
!
! Use this macro to Startup graphics windows for a 1920 x 1080 application
!
!=============================================================

Abort * /D

Display "(raP-5-SE) Template 1Mon Header"
Display "(raP-5-SE) Template Display L1"

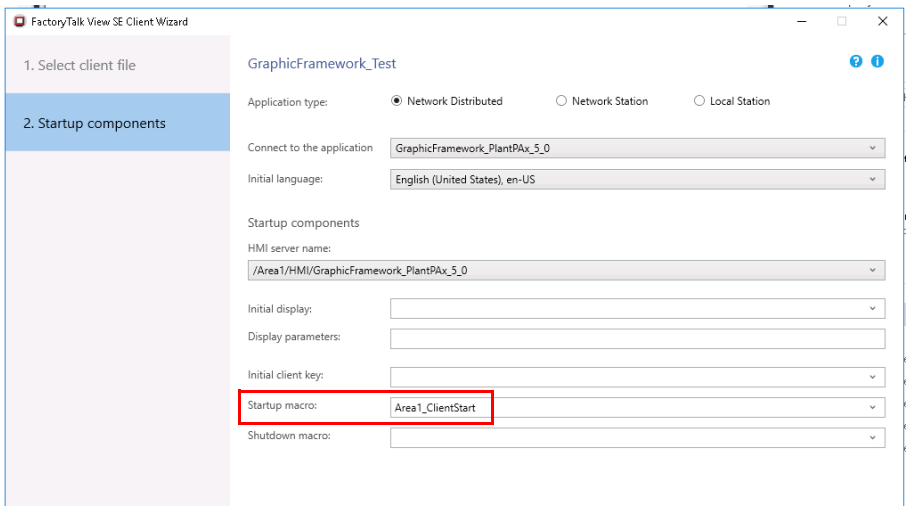
Define GoHome Template_Repaint
```

The Client Startup macro should be linked to the Startup Macro selected in the client file configuration. There should be one Client Startup macro for every L1 area.

```
Define SW_ShortcutRedefine DefineShowTreeCmd 0
SW_ShortcutRedefine /Area1/DATA::[Hardware]

Define HW_ShortcutRedefine DefineShowHWTreeCmd 0
HW_ShortcutRedefine /Area1/DATA::[Hardware]
```

The two “Define” functions shown above are used to setup up the Client Startup Macro for use with the Hardware and Software Tree Views. For each client used, the number at the end of these “Define” calls should increment by one (i.e. if you have five clients in a system, each client would be assigned a different number: 0, 1, 2, 3, 4, etc). The shortcut defined for each in the second line above should be a valid shortcut that is used for to initialize on. The shortcut should include the full area and short name.



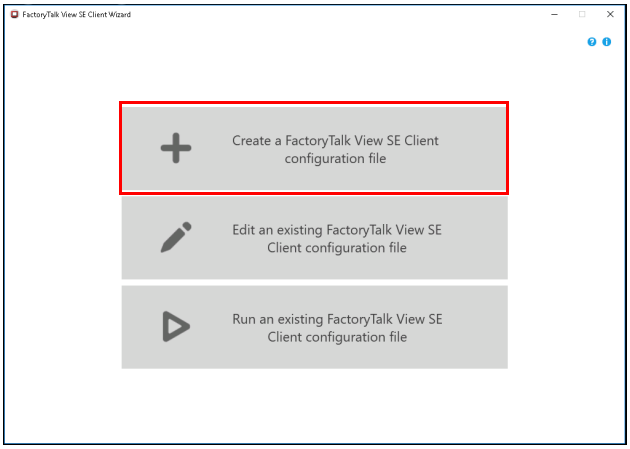
The main purpose of this macro is to open the header and the L1 overview display. The specific displays will need to be updated for each macro created to point to the Header and screen for that L1 area.

The macro is also used to define the GoHome command. This command is used for Home button on the Header. The definition of the GoHome will have to be updated to point to the specific L1 area repaint macro.

Client File Setup (.CLI)

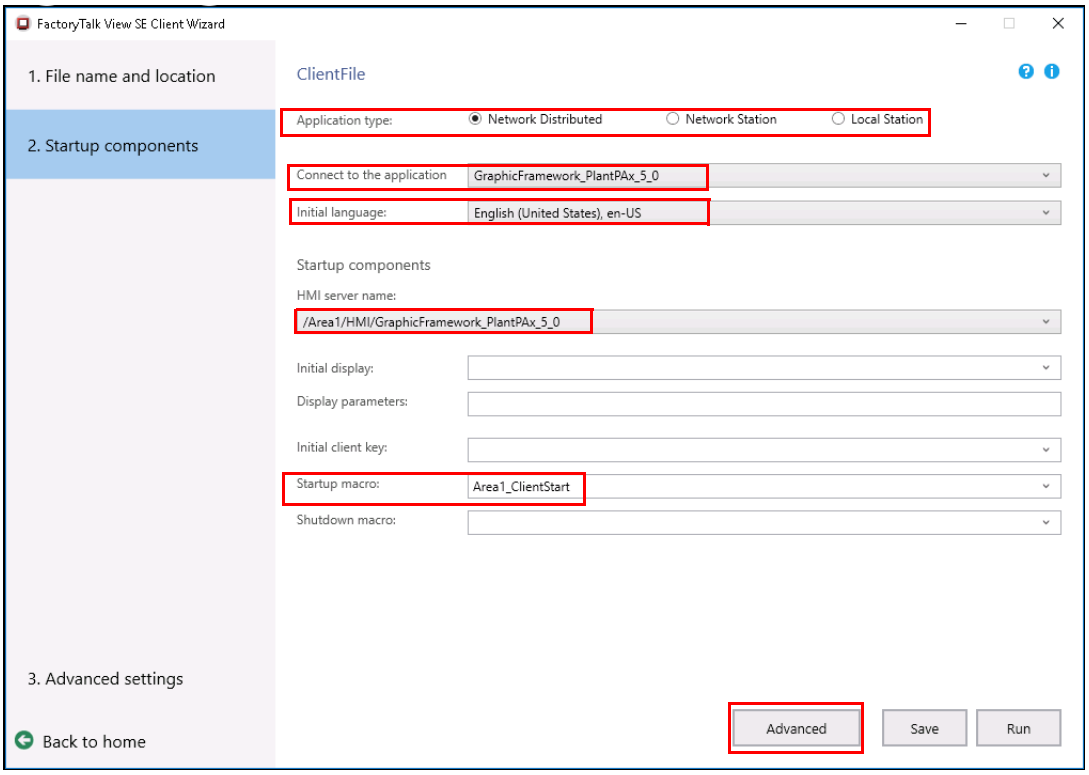
Setup a basic client file to use with the PlantPAx Graphic Framework.

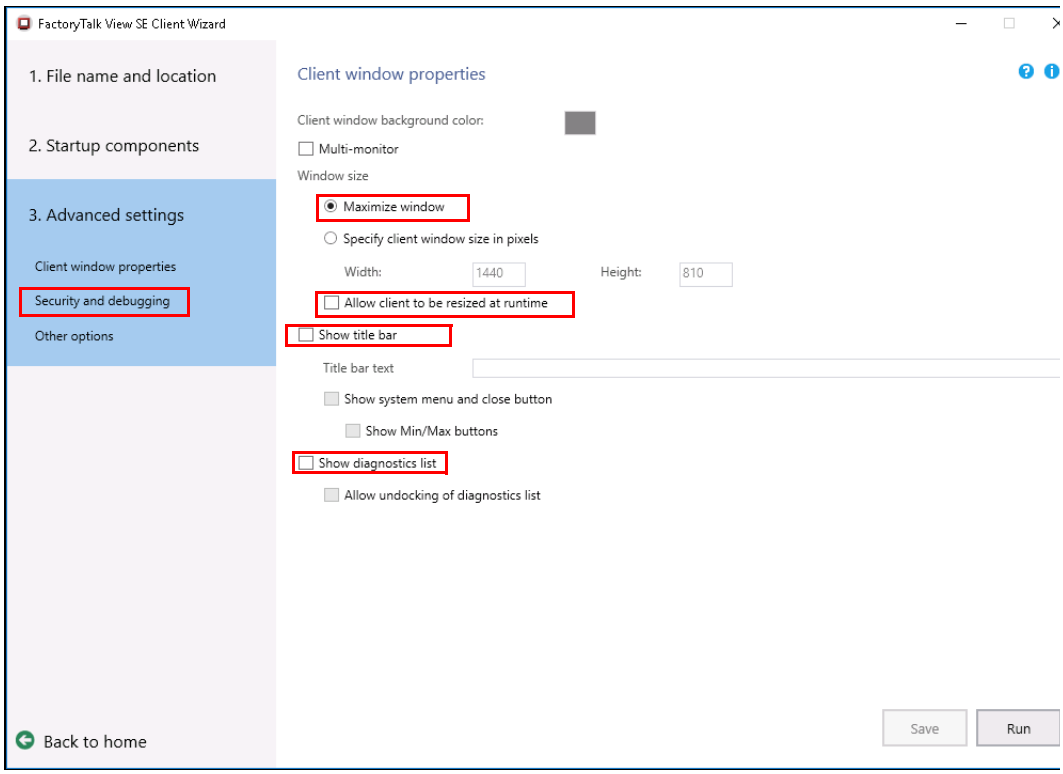
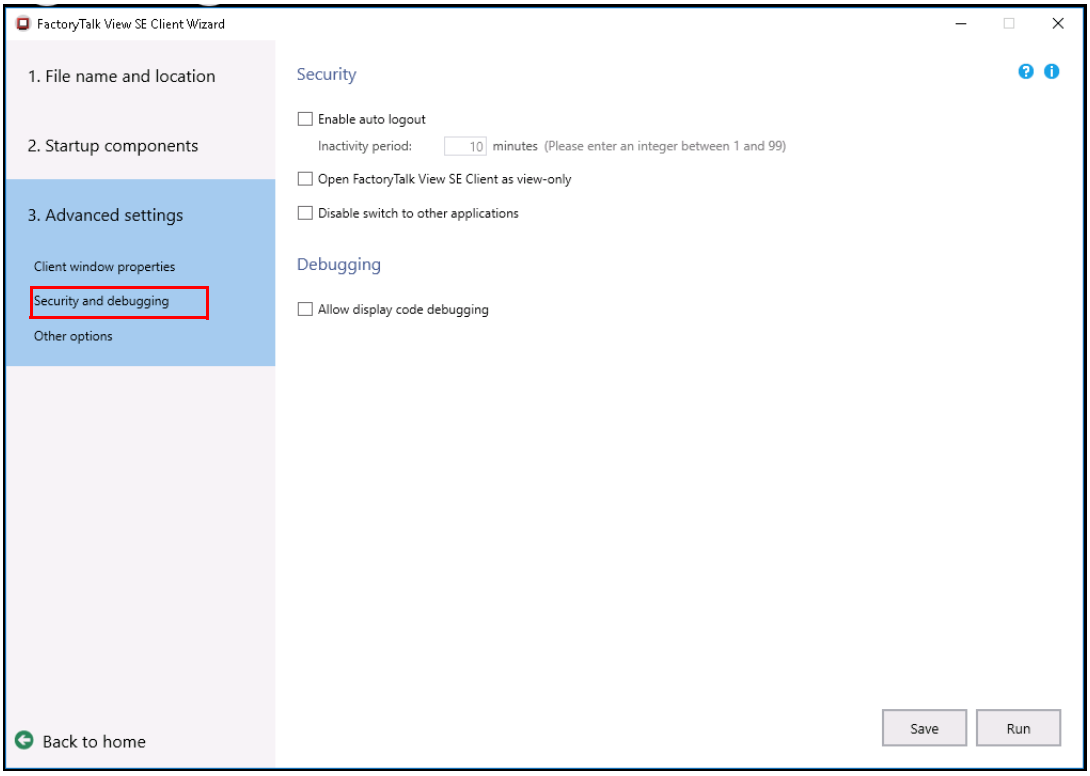
1. Go to FactoryTalk View SE Client Wizard and select Create a FactoryTalk View SE Client configuration file.

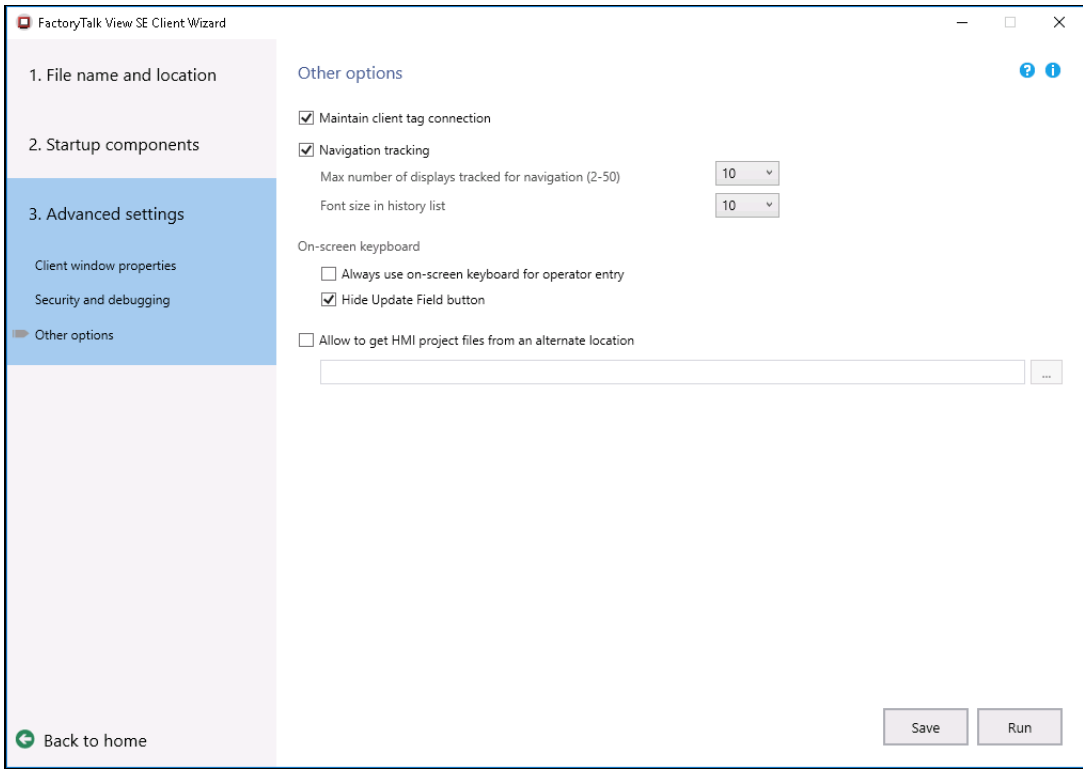


2. In the wizard, set the following:

On this Page	Action
File Name and Location	Name the client file and select the store location. In most cases, the store location should be the OWS desktop.
Startup Components	Select the appropriate application type. Connect to the correct application and select the initial language. Select the HMI server name within your application. Select the Startup Macro created in Macros. Select Advanced.



On this Page	Action
Advanced Settings	Select "Maximize Window" - Note: It is assumed that all the monitors in the system will have a resolution of 1920x1080. The PlantPAx Graphic Framework is designed to work with this resolution. Unselect “Allow Client to be resized at runtime”. Unselect “Show title bar” and unselect “Show diagnostic list”. Save and select the “Security and debugging”. 
Security and Debugging	Depending on application requirements, select or unselect the “Enable auto logout”, “Open FactoryTalk View SE Client as view-only”, or “Disable switch to other applications”. The Debugging feature is only used for troubleshooting. Select “Other Options” tab. 

On this Page	Action
Other Options	Review the options and modify if required. Leave at default if there are not application specific requirements. Save and close or Select Run to run the Client file. 

Logix Diagnostic Objects



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters and configuration parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

Logix Change Detector (raP_Dvc_LgxChangeDet)

The raP_Dvc_LgxChangeDet (Logix Change Detector) Add-On Instruction monitors another Logix controller on the network and checks for changes that impact operation. Changes that can be monitored include downloads, online edits, I/O forcing, and controller mode changes.

No visualization elements are supplied with the raP_Dvc_LgxChangeDet instruction.

Guidelines

Use this instruction if you want to monitor a Logix controller for changes, to be sure that the correct application is being run for regulatory, quality, or security reasons.

Do not use this instruction in these situations:

- You have only one Logix controller. The raP_Dvc_LgxChangeDet instruction is intended to be run in a controller other than the one being monitored. Although the raP_Dvc_LgxChangeDet instruction can be configured to monitor the controller in which it is running, because it runs in controller logic, it cannot detect when the controller in which it is running is placed in Program mode.
- You have software, such as FactoryTalk® AssetCentre that monitors controllers on a secured network. This software provides much more extensive change tracking and auditing than the raP_Dvc_LgxChangeDet Add-On Instruction.

Functional Description

The raP_Dvc_LgxChangeDet instruction includes a source protected Add-On Instruction for use with RSLogix 5000® software, version 33 or later, and Logix controllers. This instruction is intended to be used in one Logix controller to monitor another controller for changes.

Although this instruction must be executed in a Logix controller with firmware revision 33 or later, it can monitor controllers running firmware revision 12 or later.

The raP_Dvc_LgxChangeDet instruction monitors a Logix controller for the following types of changes:

- New entries being made in the change log, such as the following:
  - Modify, insert, or delete logic in Run or Program mode
  - Accept, assemble, or cancel edits
  - Enable, disable, or remove forces
  - Reconfigure a module
  - Change an output list
  - Send the 'Set Attribute' MSG or 'SSV' to a controller object class or instance
  - Send the 'Set Attribute List' MSG to a controller object class or instance
  - Send the 'Set Attribute All' MSG to a controller object class or instance
  - Apply attributes to a controller object class or instance
  - Create, delete, or reset a controller object instance
- Download of a different application
- Partially import into an application
- Download of an application without logic changes (but saved configuration data that has changed)
- Download of an application that contains offline edits
- Restore an application from an external drive source, such as a Secure Digital (SD) card

This instruction also reports the following:

- Controller/application 'check' value for change detection
- Date and time on the controller clock (YYYY-MM-DD hh:mm:ss)
- Day of the week based on the controller date
- Controller keyswitch position and mode
- Major and minor fault indications

The raP_Dvc_LgxChangeDet instruction is provided as a rung import for installation. Import this rung into your ladder diagram routine to:

- Import the Add-On Instruction definition.
- Create an instruction instance.
- Creates and completes all required tags and data structures for the instruction.

IMPORTANT Once the rung is imported, and before downloading and running the application, set the path in each of the referenced Message structures to point to the Logix controller to be monitored.

The interval at which this instruction checks for changes and updates its status is configurable, from 1…60 seconds.

Required Files

Controller Files

The raP_Dvc_LgxChangeDet_5.00.**00**_RUNG.L5X rung import file must be imported into the controller project for the controller that is performing the monitoring. It is not necessary to add any logic to the controller being monitored. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

There are no visualization files because the raP_Dvc_LgxChangeDet object does not use Graphic Symbols or Faceplates.

Operations

Command Sources

The raP_Dvc_LgxChangeDet instruction has no commands or outputs that are intended to control equipment and therefore does not have any command sources.

Alarms

The raP_Dvc_LgxChangeDet Add-On Instruction provides one alarm: Alm_ChangeDetected. This alarm is a Logix Tag Based Alarm.

Virtualization

The raP_Dvc_LgxChangeDet Add-On Instruction does not have a Virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	No EnableIn False logic is provided. The raP_Dvc_LgxChangeDet instruction must always be scanned true. In relay ladder logic, the raP_Dvc_LgxChangeDet instruction must be by itself on an unconditional rung. If the Rung Import provided with the Rockwell Automation® Library is used to install this instruction, the proper rung is created for you.
Powerup (prescan, first scan)	On Prescan, any commands that are received before First Scan are discarded. The update timer and internal polling status are reset. On first scan, the Change Detected internal status latch is cleared.
Postscan (SFC transition)	No SFC Postscan logic is provided.

See to the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010, for more information.

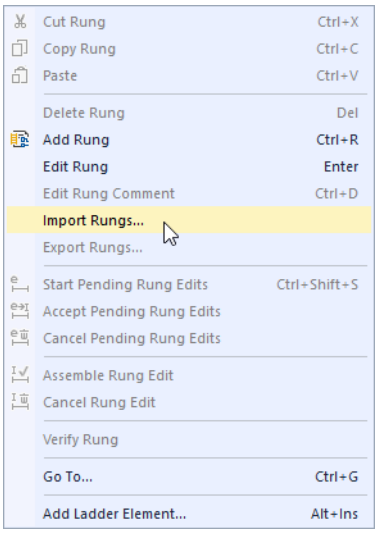
Programming Example

The raP_Dvc_LgxChangeDet instruction is provided fully configured as a rung import; so little programming is required for the instruction to be used. This programming example shows how the rung import is used to instantiate the raP_Dvc_LgxChangeDet instruction.

Since the raP_Dvc_LgxChangeDet instruction is a rung import, it must be created in a Ladder Diagram routine. By default, raP_Dvc_LgxChangeDet checks controllers for changes only every 5 seconds, so the ladder routine does not need to run in a fast periodic task.

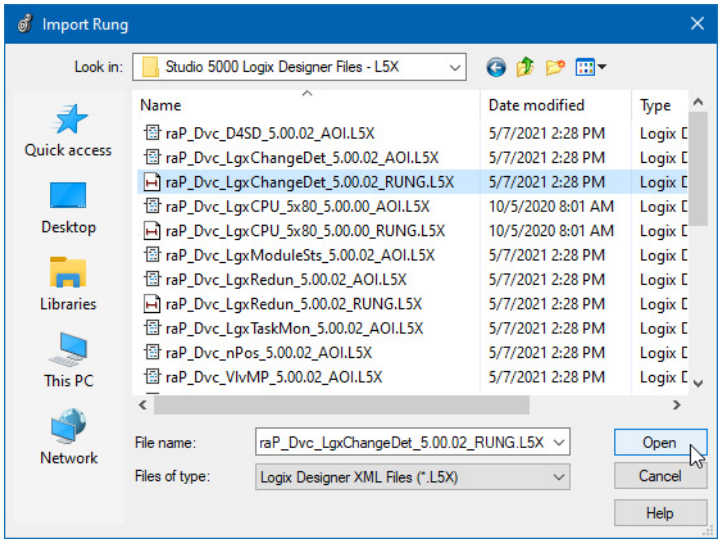
The following steps describe how you instantiate raP_Dvc_LgxChangeDet in your routine.

1. In your ladder routine, right-click where to insert the rungs and select Import Rungs.

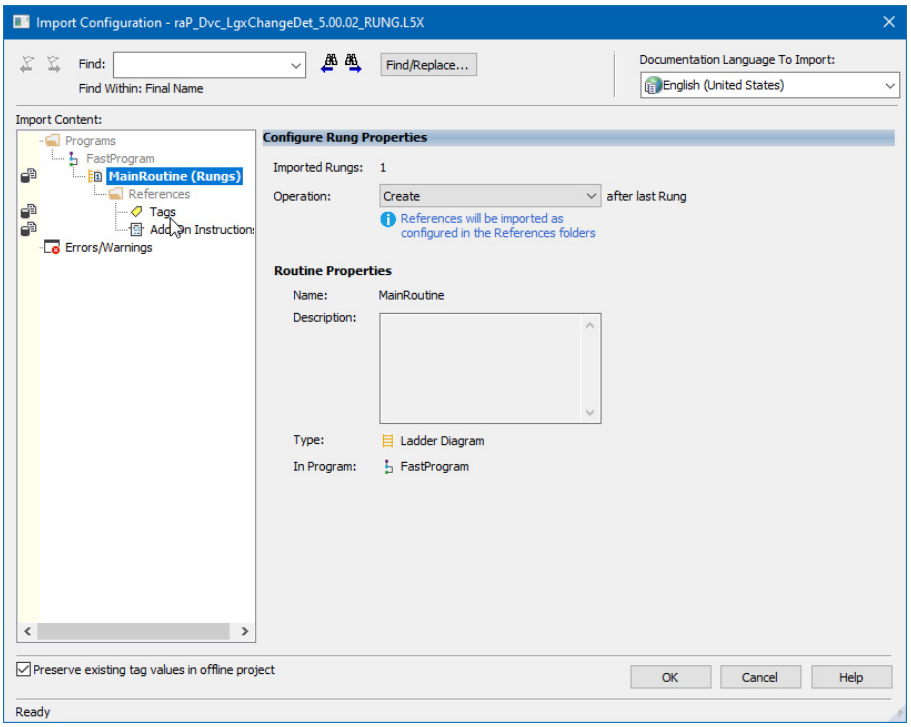


   The Import Rungs dialog box appears.

2. Select the raP_Dvc_LgxChangeDet rung import file that is named in Required Files on page 91.
3. Select Open.



The Import Configuration dialog box appears.

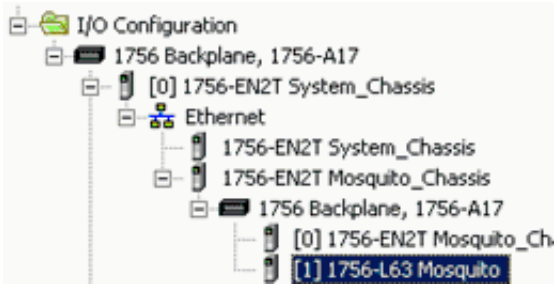


4. Rename the tags being imported to incorporate the name of the controller being monitored.

   One controller can monitor several others. Adding the controller name to the tag makes it easier to track the individual instances when monitoring multiple controllers.

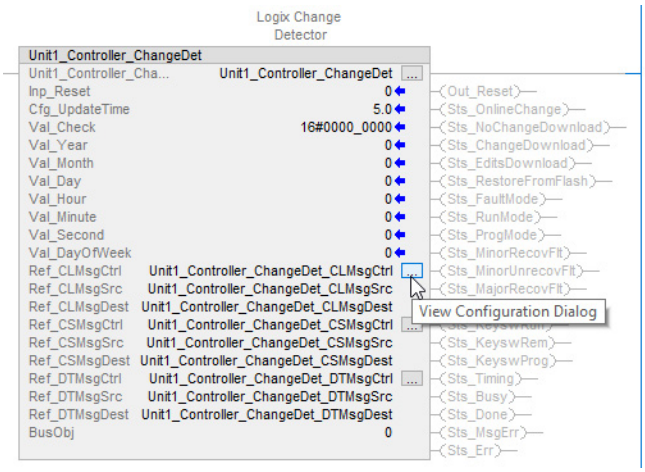
5. Select OK.
6. To point to the controller being monitored for changes, change the path in each of the MSG control tags.

   If you create a link to the controller in the I/O tree configuration, enter the name that is assigned to that controller.



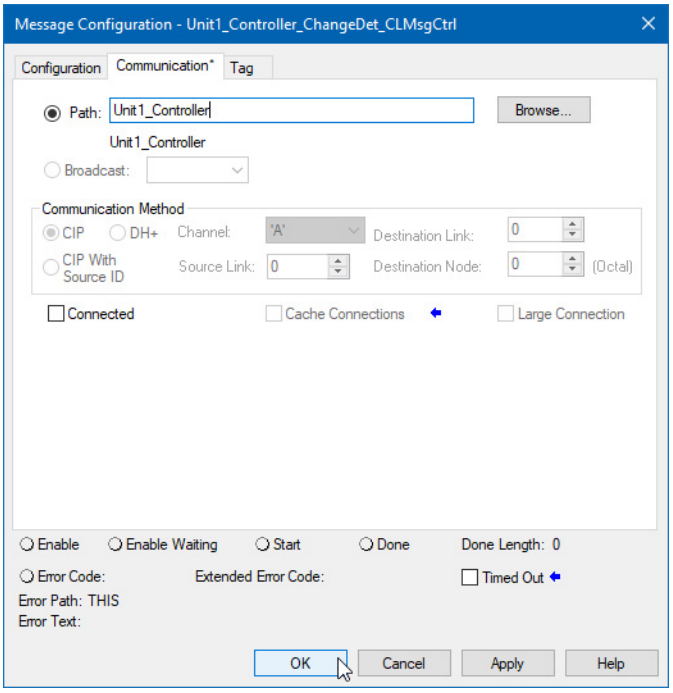
7. Complete the following steps for each of the three MSG control tags.

a. Select the ellipsis next to the MSG control tag.



The Message Configuration dialog box appears.

b. Select the Communication tab and change the path to the controller link created in the I/O tree.



c. Select OK.

8. Place the controller in RUN mode.

Status bits on the raP_Dvc_LgxChangeDet instruction indicate changes that are made to the monitored controller. Set Cmd_AckAll to 1 to clear the latched-in detections.

Logix Controller CPU Utilization (raP_Dvc_LgxCPU_5x80)

The raP_Dvc_LgxCPU_5x80 (Logix Controller CPU Utilization) Add-On Instruction monitors a Logix controller, and provides information on controller CPU utilization, communication usage, and other information. Data that is provided by the raP_Dvc_LgxCPU_5x80 instruction is useful to diagnose communication or control responsiveness issues and in tuning the performance of control tasks for optimum controller performance.

The raP_Dvc_LgxCPU_5x80 instruction can be loaded as part of a control application and disabled (default) until needed. The instruction can also be enabled at a slow update rate for general controller monitoring. The update rate can be increased, if necessary, as directed by a Rockwell Automation Technical Support representative to help diagnose controller performance issues.

The global object and faceplate in the following image are examples of the HMI that is provided with this library object.

Guidelines

Use this instruction in these situations:

- Monitor general controller resource utilization:
  - Processor utilization
  - Memory usage
  - Communication capacity
  - Networking performance and connection usage
- Gather data to help resolve a specific issue under the direction of a Rockwell Automation Technical Support representative
- Tune the periods or priorities of multiple tasks in a controller to optimize control and observe how changes in task configuration affect CPU and other resource usage in the controller

Do not use this instruction at a high update rate on a continuing basis. The raP_Dvc_LgxCPU_5x80 instruction increases the communication load on the controller when it is polling for performance data. At high update rates, the resource load that the raP_Dvc_LgxCPU_5x80 instruction polling generates can affect control performance, especially if you already have a fully loaded controller.

Functional Description

The raP_Dvc_LgxCPU_5x80 instruction collects and summarizes various data from the Logix controller that is being monitored. This information includes the following:

- Processor Identity information:
  - Catalog number and description
  - Major and minor firmware revision numbers
- Communication Responsiveness information:
  - CPU% used for responding to communication requests

  - Optimized Packets that are used for responding to communication requests

IMPORTANT The raP_Dvc_LgxCPU_5x80 instruction does not support SoftLogix™ 5800 or RSLogix™ Emulate 5000 controllers.

- CPU utilization (%):
  - Continuous task (or unused CPU, if no continuous task)
  - Periodic and Event tasks
  - Responding to communication requests (such as from HMI)
  - System (I/O scan, timer updates, everything else)
- Communication connection usage:
  - Total connections available
  - Connections that are used for each of several classes of communication
  - Unconnected buffers and cached messages
- I/O Forcing status
- Controller minor faults
- Communication timeslice setting

The items that are listed previously are displayed on several faceplate tabs, with summary information on the main (home) tab.

IMPORTANT We recommend that you access the raP_Dvc_LgxCPU_5x80 faceplate when you contact Rockwell Automation Technical Support. The information on the Operator (home) tab is often requested when you call. You also need your RSLogix 5000 software serial number or other license or support contract information. The Maintenance tab has a space for you to record this information for reference.

Required Files

Controller Files

For Logix 5x80 controllers, the following rung import must be imported into the controller for each instance of raP_Dvc_LgxCPU_5x80 in your project:

raP_Dvc_LgxCPU_5x80_5.0.**00**_RUNG.L5X

Visualization Files

See Visualization Files on page 26 for general information on visualization files.

Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

Operations

Command Sources

The raP_Dvc_LgxCPU_5x80 instruction has no commands or outputs that are intended to control equipment and therefore does not have any command sources.

Alarms

The raP_Dvc_LgxCPU_5x80 Add-On Instruction does not provide any alarms. If an alarm is required, define the output status to be alarmed as a Logix Tag Based Alarm.

Virtualization

The raP_Dvc_LgxCPU_5x80 Add-On Instruction does not have a Virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	The raP_Dvc_LgxCPU_5x80 instruction has no EnableInFalse logic and does nothing on a false rung. Data that are associated with the instruction are left in their last state.
Powerup (prescan, first scan)	Logic is sure that the window time is sent to the controller when it transitions to Run mode. Previously active polling (before power down or transition to Program mode) is canceled. High-water data that is stored in the instruction (not built in to the controller status registers) are cleared.
Postscan (SFC transition)	No SFC Postscan logic is provided.

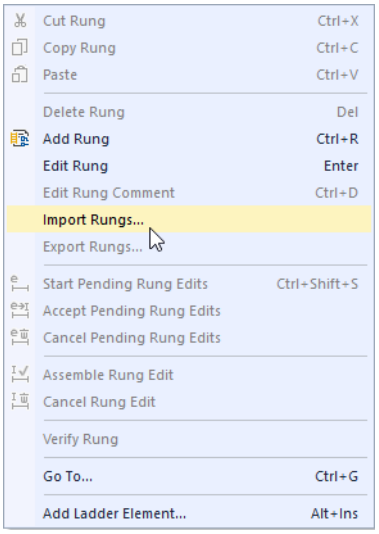
See to the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010, for more information.

Programming Example

The raP_Dvc_LgxCPU_5x80 instruction is provided fully configured as a rung import; therefore, little programming is required for the instruction to be used. This programming example shows how the rung import is used to instantiate the raP_Dvc_LgxCPU_5x80 instruction.

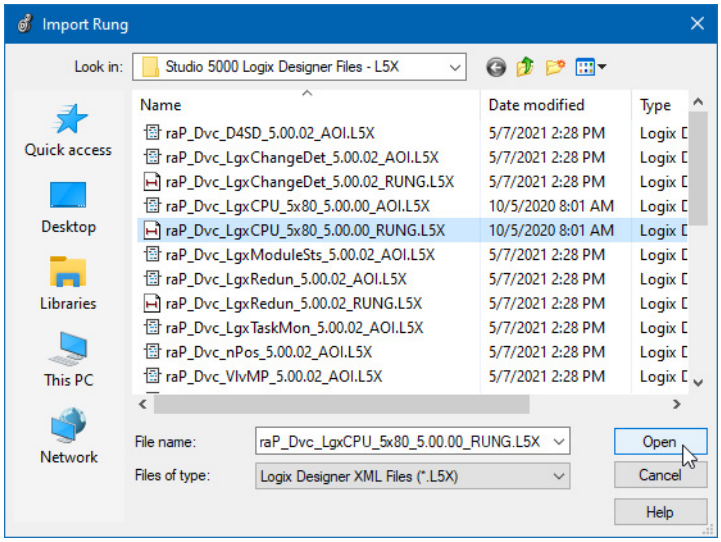
Because raP_Dvc_LgxCPU_5x80 is a rung import, it must be created in a ladder diagram routine. The following steps describe how to instantiate raP_Dvc_LgxCPU_5x80 in your routine.

1. In your ladder routine, right-click where to insert the rungs and select Import Rungs.



The Import Rungs dialog box appears.

2. Select the appropriate raP_Dvc_LgxCPU_5x80 rung import file that is named in Required Files on page 96.



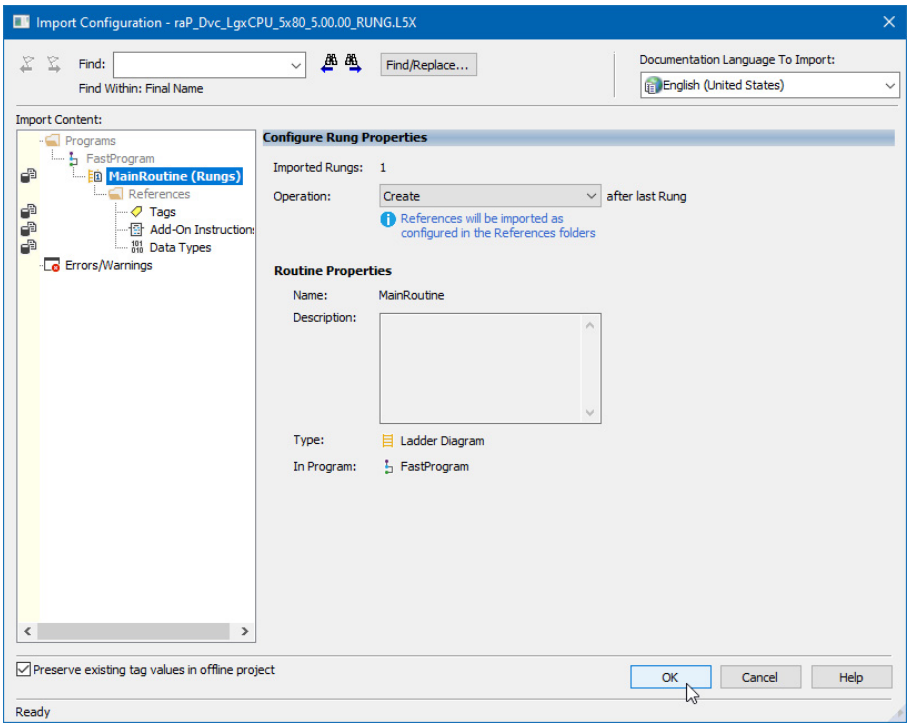
3. Select Open.

The Import Configuration dialog box appears.

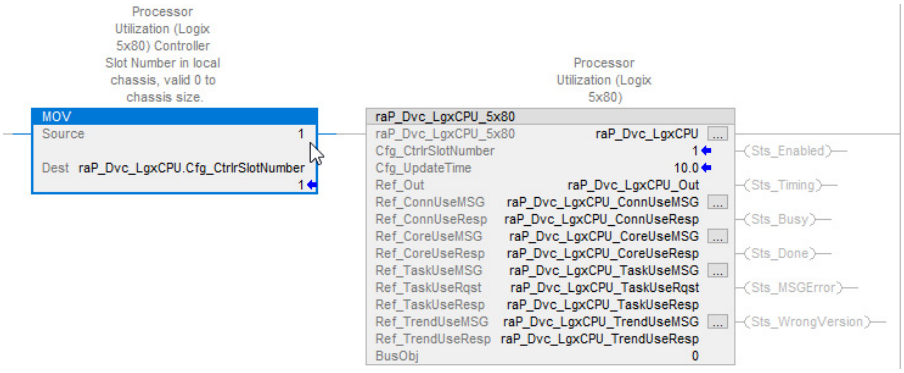
IMPORTANT Do not change tag names in the Import Configuration.

There must be one instance only of the raP_Dvc_LgxCPU_5x80 instruction in any controller project.

4. To create the instance of raP_Dvc_LgxCPU_5x80, select OK.



5. Set the controller slot number in the Source of the MOV.



   Set this value before putting the controller into Run mode. If the value is changed, it requires a transition from Program to Run on the controller for the new value to take effect.

6. Select the Finalize All Edits in Program icon.
7. To finalize all edits, Select Yes.

Graphic Symbols

A Graphic Symbol (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of graphic symbols, with tag structures in the ControlLogix® system, aid consistency and save engineering time.

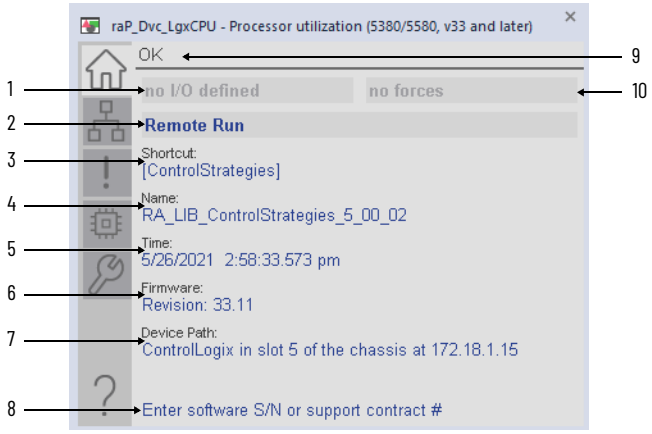
Graphic Symbol Name	Graphic Symbol	Description
GO_LgxCPU		

Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab

The Faceplate initially opens to the Operator (Home) tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator command source.

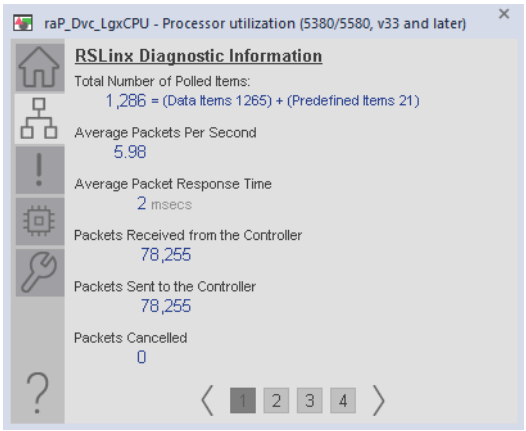


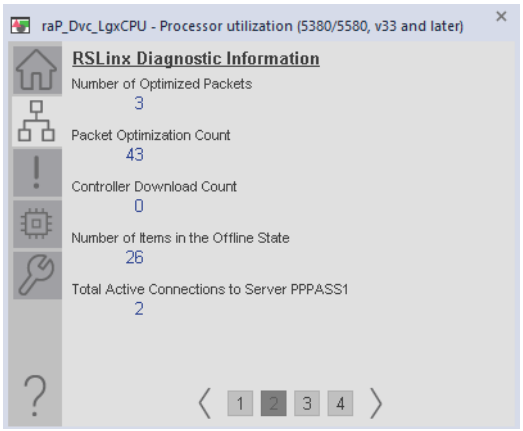
Item	Description
1	I/O communication status
2	Current controller mode
3	Device shortcut
4	Processor name defined in RSLogix 5000
5	Current date and time
6	Current firmware revision
7	Path from the HMI server to the device
8	Serial number or support agreement. This number is used when contacting Rockwell Automation technical support.
9	Controller OK indicator
10	I/O forcing status indicator

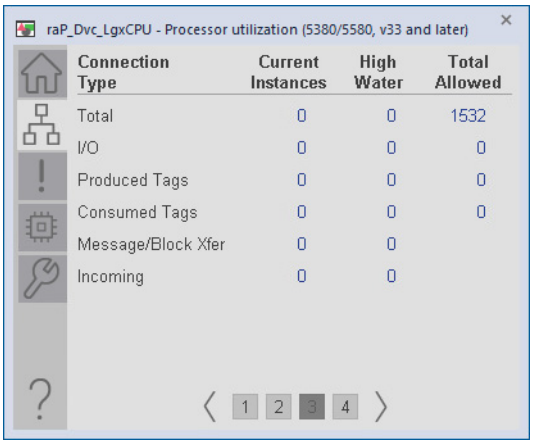
Communication Tab

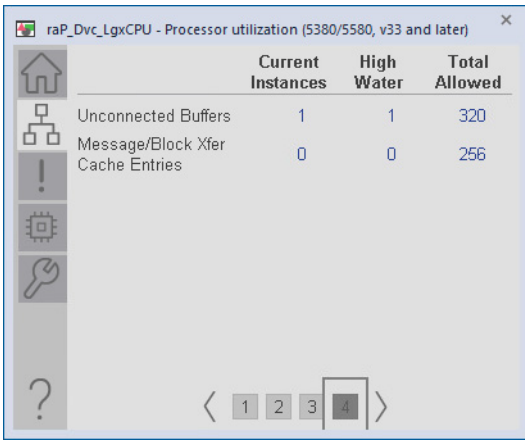
The pages in the Communication tab display the following information:

- Nested bar graph and numeric displays that show the approximate percent CPU available for responding to communication requests from the HMI (outer bar). The outer bar graph changes color from green to yellow when CPU availability for communication is low.
- The approximate percent CPU that is actually being used for responding to communication requests (inner bar). The inner bar graph changes color from blue to red when nearly all CPU availability for communication is being used.
- The count of RSLinx® optimized packets that are currently used.
- The high-water value of optimized packets that are used.
- The largest optimized packet instance number that is used in the controller.
- Diagnostic counters for the FactoryTalk® Linx software driver that is being used by the HMI to communicate with the controller.
- The number of connections that are being used, the highest number that is used, and the total available connections for several types of data transfers.
- Data also includes statistics for message instructions that are using unconnected buffers and message cache entries.



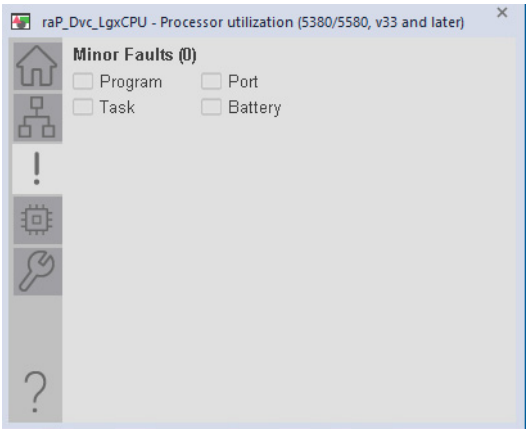






Faults Tab

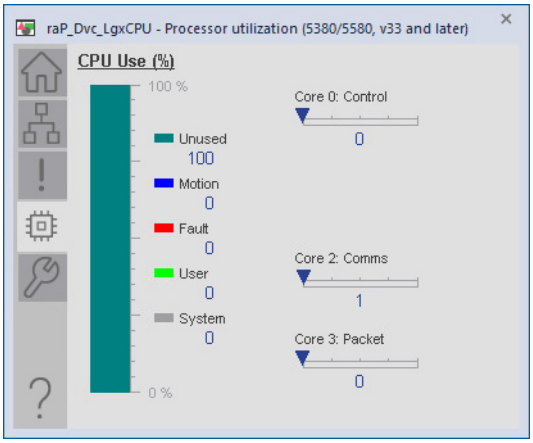
The Faults tab contains the list of minor faults and the fault count. There is an indicator to display the status of each fault. A blue indicator box shows that the fault is active.



Performance Tab

The Performance tab shows the approximate CPU percentage that is used by each of the major activities for the controller. If there is a continuous task running in the controller, the top segment of the bar graph shows the CPU used by the continuous task. If there is no continuous task, the top segment shows the percentage CPU free (unused). The CPU percentages do not necessarily add up to 100% because of the variability between execution cycles of the listed tasks and rounding errors.

The L_CPU_5x80 instruction is used with a multi-core controller. The bar graph on the left represents the CPU percentage that is used of the control core (Core 0).

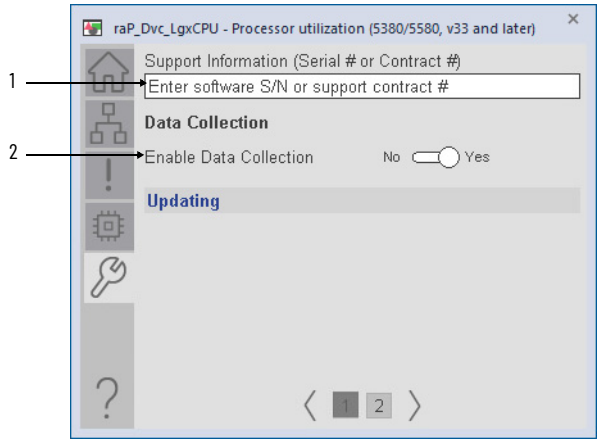


Maintenance Tab

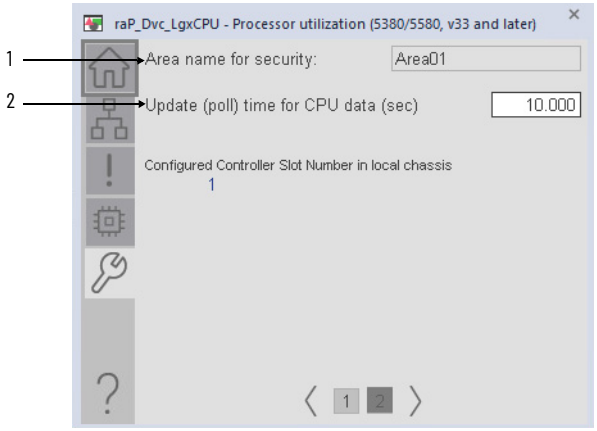
The Maintenance tab shows the following information:

- An indicator to show whether L_CPU data collection (polling) is enabled or disabled
- An indicator to show when the L_CPU instruction is waiting before the next data collection (poll) and when a poll is in progress

- An indicator to show when a poll is busy or the result of the last poll
- (Data Received or Error)
- Configuration values, some of which cannot be changed from the faceplate



Item	Description
1	Enter a serial number for your RSLogix 5000 software, the contract number for your TechConnect℠, or other technical support contract information. This information is then available for ready reference if you call Rockwell Automation Technical Support.
2	Enable / Disable Data Collection **IMPORTANT**: The L_CPU instruction accomplishes its data collection by using MSG instructions to the controller (MSG to self), which uses some controller communication resources. You can leave data collection disabled until it is needed. Some faceplate data is monitored without using the polling messages and is still displayed. When disabled, only data collection via MSG instructions is disabled. Other data can still be updated and displayed on the faceplate. Data not updated when collection is disabled is not displayed.



Item	Description
1	Area name for security
2	Enter the interval that is used to collect and update data that is displayed on the other faceplate tabs. **IMPORTANT**: If you set this parameter too low, it can result in a flood of messages to the controller and possibly affect control performance. Do not use a value less than 5 seconds unless instructed to do so by a Rockwell Automation Technical Support specialist.

Logix Redundant Controller Monitor (raP_Dvc_LgxRedun)

The raP_Dvc_LgxRedun (Logix Redundant Controller Monitor) Add-On Instruction monitors one redundant pair of Logix controllers. The instruction checks primary and secondary controller status that can affect the ability of the system to switch to the back-up controller on a failure of the primary.

Guidelines

Use this instruction in these situations:

- You are using Logix controllers in a redundant configuration.
- You want to monitor the status of the redundant controller pair.
- You want to display this status to operators, maintenance personnel, or engineers.

Do not use this instruction in these situations:

- You are using single Logix controllers, not in a redundant configuration. The raP_Dvc_LgxRedun instruction is designed around the ControlLogix Enhanced Redundancy System architecture, by using information from the 1756-RM2 Redundancy Modules. The raP_Dvc_LgxRedun Add-On

Instruction does not verify in a non-redundant system because the data items it monitors do not exist in a non-redundant configuration.

- Your controllers are in an accessible location and the indicators on the controllers, network modules, and redundancy modules provide sufficient information about redundancy status.

For more information, see the ControlLogix Enhanced Redundancy System User Manual, publication 1756-UM535.

Functional Description

The raP_Dvc_LgxRedun instruction is provided as a rung import for installation. The import of this rung into your ladder diagram routine:

- imports the Add-On Instruction definition
- creates an instruction instance
- creates and completes all required tags and data structures for the instruction

Once the rung is imported, and before you download and run the application, set the path in each Message tag that references the input/output parameters of the instruction to point to slot that contains the 1756-RM2 module in the local chassis ('1, <slot>').

Required Files

Controller Files

The raP_Dvc_LgxRedun_5.00.00_RUNG.L5X rung import file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

See Visualization Files on page 26 for general information on visualization files.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

Operations

The raP_Dvc_LgxRedun instruction monitors a redundant pair of Logix controllers and provides the following information and capabilities:

- Determines and displays whether the current primary controller is in Chassis ‘A’ or Chassis ‘B’ (as defined by user configuration)
- Displays the Chassis A and Chassis B Redundancy Module
- (1756-RM2) status
- Displays the Controller A and Controller B redundancy status
- Displays the Controller A and Controller B keyswitch positions
- Displays the overall compatibility between modules in Chassis A and modules in Chassis B
- Displays the synchronization progress in percent complete
- Displays the amount of data that is transferred from the Primary redundancy module to the Secondary in the most recent transfer, and the most sent in any transfer (high-water mark)

This instruction also supports the following commands, if enabled in the configuration:

- Initiate a switchover from Primary to Secondary
- Initiate a resynchronization of the system (if it does not take place automatically)

Command Sources

The raP_Dvc_LgxRedun instruction has no commands or outputs that are intended to control equipment and so does not have any command sources.

Alarms

The raP_Dvc_LgxRedun Instruction uses the following alarm, which is implemented by using Tag Based Alarms.

Alarm	Alarm Name	Description
Secondary not ready	Alm_SecNotRdy	Secondary controller not ready to take control.

Virtualization

The raP_Dvc_LgxRedun Add-On Instruction does not have a Virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	No EnableIn False logic is provided. The raP_Dvc_LgxRedun instruction must always be scanned true. In relay ladder logic, the raP_Dvc_LgxRedun instruction must be by itself on an unconditional rung. If the Rung Import provided with the Rockwell Automation is used to install this instruction, the proper rung is created for you.
Powerup (prescan, first scan)	On Pre-scan, any commands that are received before first scan are discarded.
Postscan (SFC transition)	No SFC Postscan logic is provided.

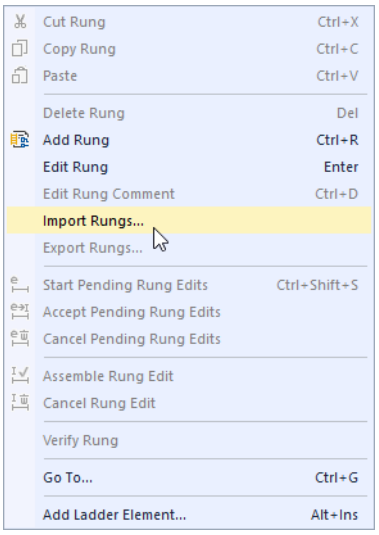
See to the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010, for more information.

Programming Example

The raP_Dvc_LgxRedun instruction is provided fully configured as a rung import, so little programming is required for the instruction to be used. This programming example shows how the rung import is used to instantiate the raP_Dvc_LgxRedun instruction.

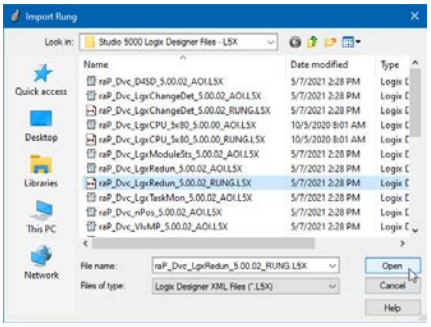
As raP_Dvc_LgxRedun is a rung import, it must be created in a Ladder Diagram routine. The following steps describe how you instantiate raP_Dvc_LgxRedun in your routine.

1. In your ladder routine, right-click where to insert the rungs and select Import Rungs.



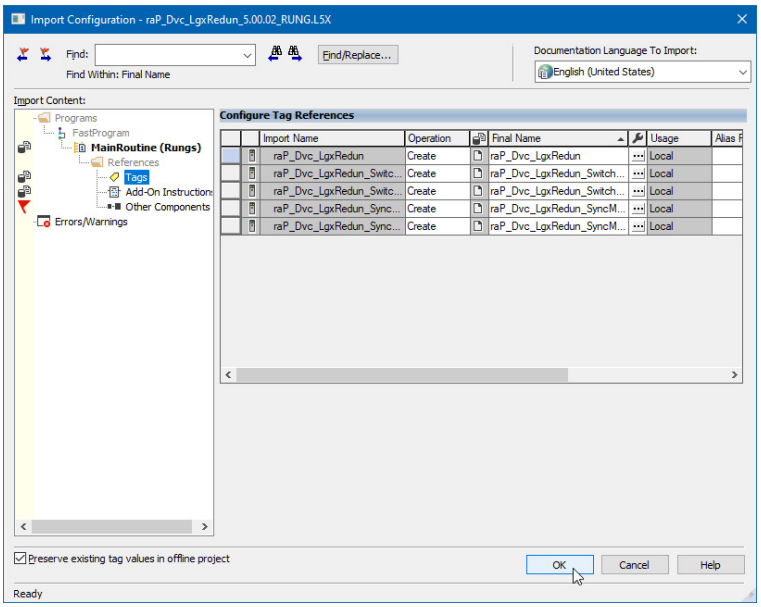
   The Import Rungs dialog box appears.

2. Select the appropriate raP_Dvc_LgxRedun rung import file that is named in Required Files on page 104.
3. Select Open.



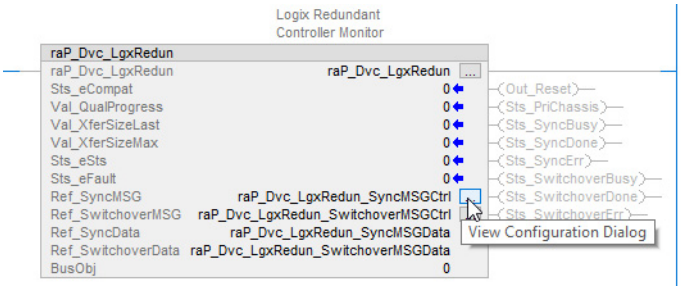
   The Import Configuration dialog box appears.

4. To create the instance of raP_Dvc_LgxRedun, select OK.



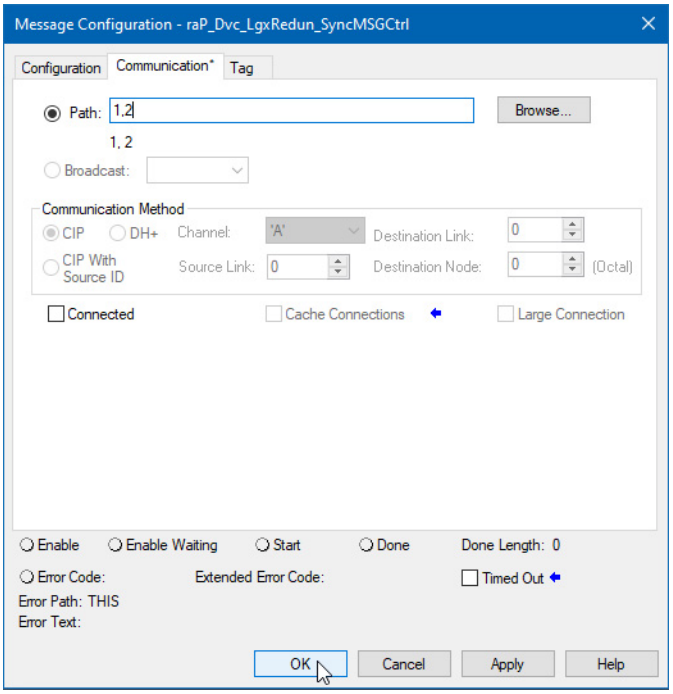
5. Complete the following steps for each of the two MSG controls to set the path to point to the 1756-RM2 module in the local chassis.

   a. Select the ellipsis next to the MSG control tag.



   The Message Configuration dialog box appears.

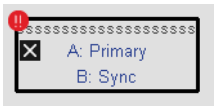
b. To set the second number in the path to the slot number of the 1756-RM2 module, Select the Communication tab.



c. Select OK.

Graphic Symbols

A Graphic Symbol (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of graphic symbols, with tag structures in the ControlLogix system, aid consistency and save engineering time.

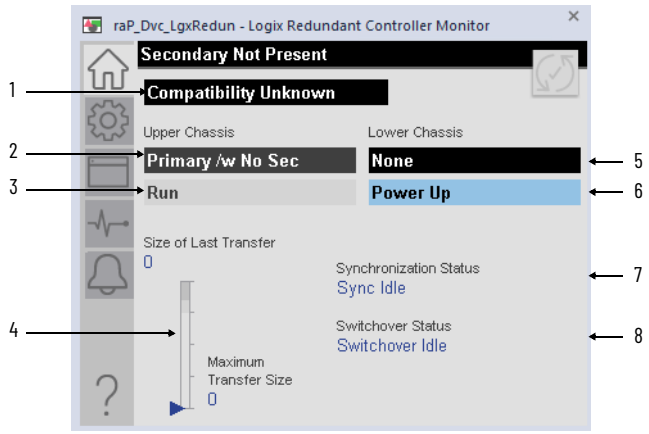
Graphic Symbol Name	Graphic Symbol	Description
GO_LgxRedun		This global object is used for redundancy modules.

Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab

The Operator tab provides status information on the primary and secondary controllers.

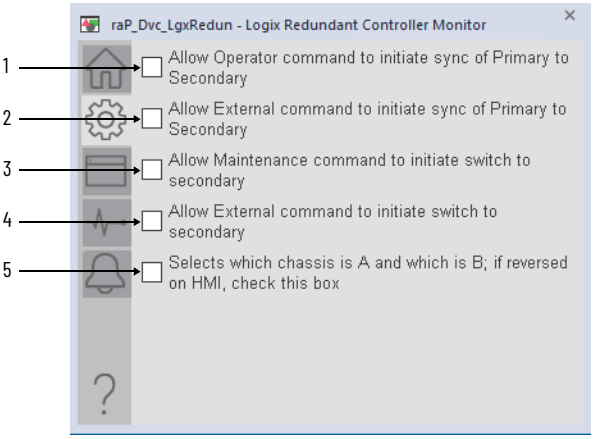


Item	Description
1	Compatibility status
2	Chassis A (upper chassis) status
3	Chassis A (upper chassis) controller mode
4	Transfer size and status
5	Chassis B (lower chassis) status
6	Chassis B (lower chassis) controller status
7	Synchronization status
8	Switchover status

Engineering Tab

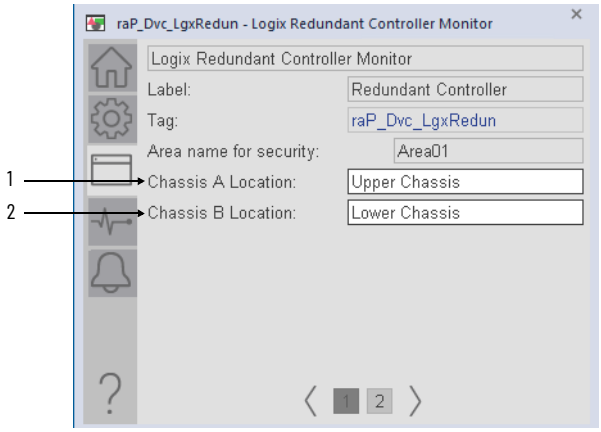
The Engineering tab provides access to device configuration parameters and ranges, options for device and I/O setup, security area, displayed text, and faceplate-to-faceplate navigation settings, for initial system commissioning or later system changes.

On the Engineering tab, you can identify and configure each chassis and configure display, switchover, and synchronization options.

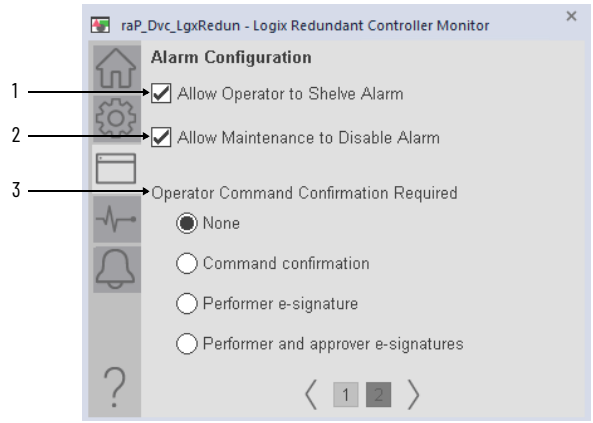


Item	Description
1	Select to enable the Operator command to initiate synchronization of the primary controller to the secondary controller.
2	Select to enable the External command to initiate synchronization of the primary controller to the secondary controller.
3	Select to enable the Maintenance command to switch to the secondary controller.
4	Select to enable the External command to switch to the secondary controller.
5	Select to designate chassis A and chassis B on the HMI.

HMI Configuration Tab



Item	Description
1	Enter a name for the location of Chassis A location.
2	Enter a name for the location of Chassis B location.



Item	Description
1	Select to allow Operator to shelve the alarm.
2	Select to allow Maintenance to disable the alarm.
3	Select the type of confirmation required for Operator commands.

Logix Module Status (raP_Dvc_LgxModuleSts)

The raP_Dvc_LgxModuleSts (Logix Module Status) Add-On Instruction monitors the connection status of one module or device in the I/O configuration tree of the Logix controller, and monitors it for any I/O channel faults on the module. The instruction provides an "I/O fault" status to dependent equipment, and provides a "Module Fault" status and alarm if the connection to the module is lost. It also provides an "Any Channel Fault" status and alarm if any I/O channel on the module reports a fault.

Guidelines

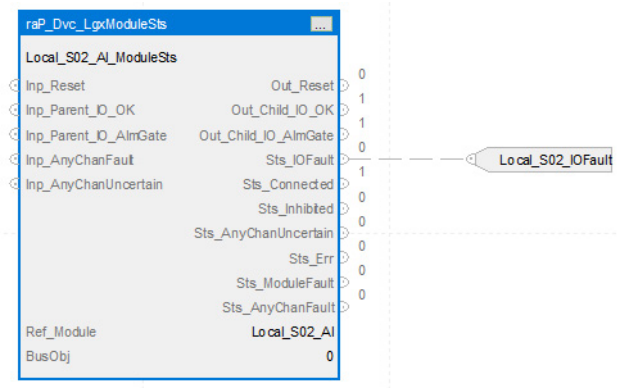
Use this instruction if you want to monitor the I/O connection status of a given module or device. This instruction is for use in Logix 5380 and Logix 5580 controllers using software / firmware revision 33 or later.

Functional Description

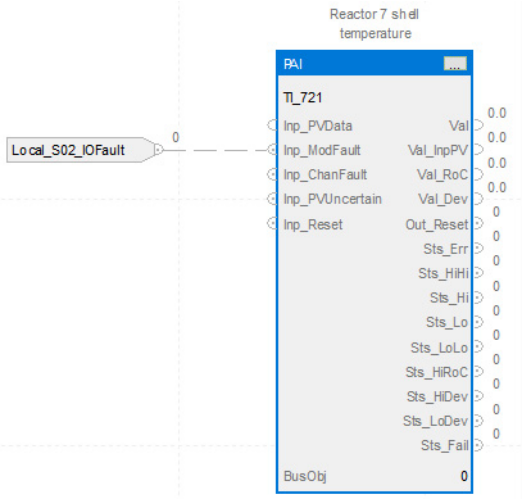
The raP_Dvc_LgxModuleSts Add-On Instruction is used to check the I/O connection status for the given module or device. The instruction provides an I/O Fault status output, which is 1 when the connection is lost, and 0 when the connection to the I/O module is OK and running normally. This status

available for use by other Add-On Instructions that use inputs or outputs of the given I/O module or device.

The following images show how the I/O Fault status output is connected to instructions that use the module being monitored. Here is the code showing the raP_Dvc_LgxModuleSts instruction getting the connection status for the module in Local chassis, Slot 2:



That status is passed along to the Analog Input instruction, which uses an input on that module:



The raP_Dvc_LgxModuleSts instruction can be used to provide the connection status for any connected device (anything with a Requested Packet Interval) in the I/O Configuration tree in Studio 5000 Logix Designer® application. These devices include I/O modules, network communication modules, motor drives, overload relays, flowmeters, analyzers, weigh scales and other devices on EtherNet/IP™ or another I/O network, or in the chassis containing the controller.

IMPORTANT	Entry of a name for an I/O module or other device in the I/O Configuration is optional. However, in order for the raP_Dvc_LgxModuleSts instruction to refer to the module or device, you MUST give the module or device a name.

Required Files

Controller Files

The raP_Dvc_LgxModuleSts_5.00.**00**_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

See Visualization Files on page 26 for general information on visualization files.

Operations

Command Sources

The raP_Dvc_LgxModuleSts instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command source.

Alarms

The raP_Dvc_LgxModuleSts Instruction uses the following alarms, which are implemented using Logix Tag Based Alarms:

Alarm	Alarm Name	Description
Module Fault	Alm_ModuleFault	The connection to the I/O module or device has been lost. This alarm can be inhibited by a higher-level module in the module hierarchy; see Programming Examples.
Any Channel Fault	Alm_AnyChannelFault	At least one I/O channel is reporting a channel fault.

Virtualization

Virtualization allows the raP_Dvc_LgxModuleSts instruction to report a virtual connection status for use in test, demonstration, or training systems. The raP_Dvc_LgxModuleSts Add-On Instruction can be selected to virtual or physical (normal) operation. When physical operation is selected, the actual module connection status is monitored, and an I/O Fault status and Module Fault alarm is reported if the connection is not running. When virtual operation is selected, the actual module connection status is ignored; the Set_VirtualConnectedSts input parameter determines the reported connection status.

Set_VirtualConnectedSts value	Description
1	Connected, the connection status is reported as OK
0	Faulted, the connection status is reported as faulted, the Sts_IOFault status is raised for dependent devices, and the Alm_ModuleFault alarm is raised.

Execution

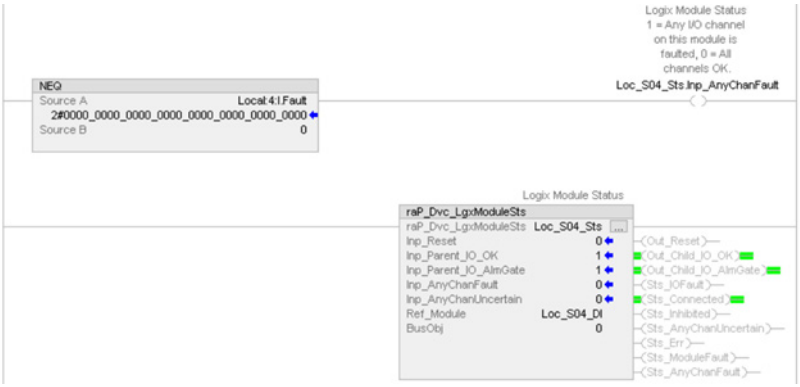
The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	No EnableIn False logic is provided. The raP_Dvc_LgxModuleSts instruction must always be scanned true. In relay ladder logic, the raP_Dvc_LgxModuleSts instruction must be by itself on an unconditional rung.
Powerup (prescan, first scan)	All commands, including alarm acknowledge and reset, virtual or physical selection, maintenance bypass and check, plus all latched internal fault status bits, are cleared on prescan.
Postscan (SFC transition)	No SFC Postscan logic is provided.

See to the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010, for more information.

Programming Examples

The example in the Function Description section shows the basic use of the raP_Dvc_LgxModuleSts Add-On Instruction for monitoring a module connection. The instruction can also monitor and alarm channel faults on the I/O module, using some simple external logic. For many discrete modules, the individual channel fault bits are collected into a single INT or DINT (16-bit or 32-bit integer), and if the value of this integer is not zero, there is at least one channel fault:

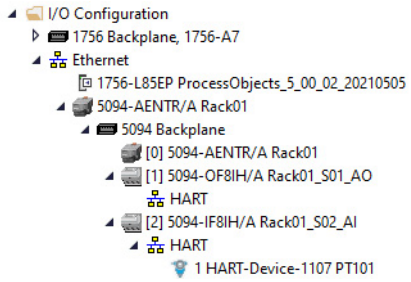


The "NEQ" instruction determines that there is at least one channel fault, and this status is forwarded to the raP_Dvc_LgxModuleSts instruction via the Inp_AnyChanFault input pin.

Some analog modules use a similar grouping of channel faults; others require the user to “OR” the individual channel faults in the external logic:

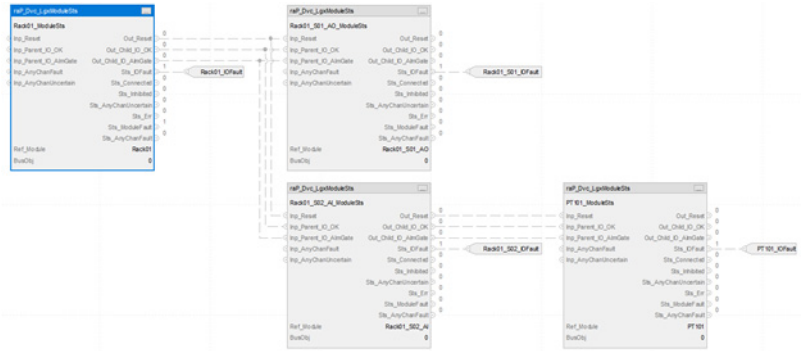


The raP_Dvc_LgxModuleSts also has the capability to be organized, via connecting pins or via the optional Bus, to match the I/O hierarchy. This organization can help prevent alarm floods by inhibiting the alarms from lower-level modules when a higher-level connection fault causes a cascading I/O failure. Suppose we have the following I/O configuration:



If the connection to the 5094-AENTR adapter fails, all devices under it will report I/O connection loss, and a flood of Module Fault alarms will occur. By wiring the raP_Dvc_LgxModuleSts instructions into a hierarchy, the fault detected for the 5094-AENTR can be cascaded to the I/O Fault inputs of all

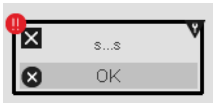
dependent devices, AND can be used to inhibit the Module Fault alarms at the lower-levels, reducing the number of alarms generated.



If the I/O adapter (5094-AENTR) connection fails, the HART analog input module (5094-IF8IH) and the PT101 device logic will be informed of the I/O fault condition (via the Rack01_S02IOFault and PT101_IOFault IREFs), but the analog input module and PT101 device Module Fault alarms are inhibited (via the child I/O alarm gate connections), so that only the root cause module fault alarm will be generated.

Graphic Symbols

A Graphic Symbol (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of graphic symbols, with tag structures in the ControlLogix system, aid consistency and save engineering time.

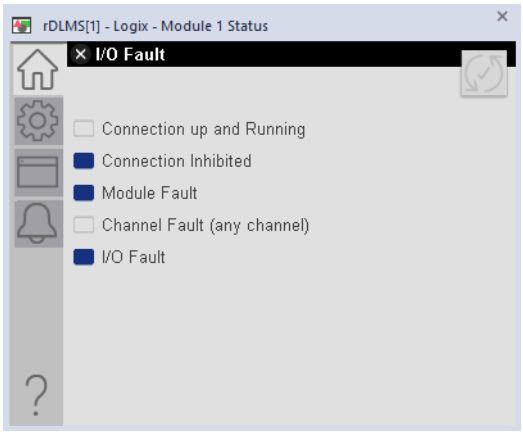
Graphic Symbol Name	Graphic Symbol	Description
GO_LgxModuleSts		This global object is used for module status.

Faceplates

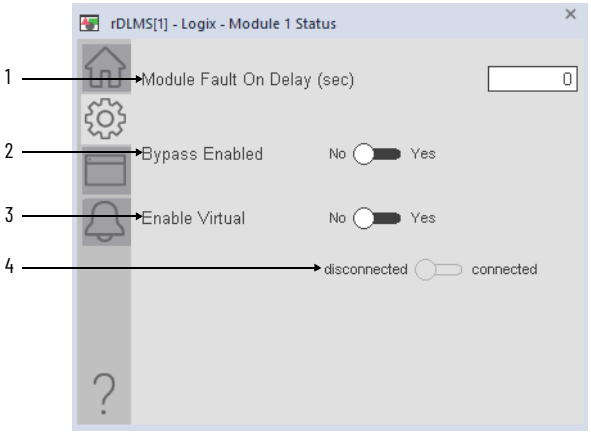
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab

The operator tab displays the status of the module.

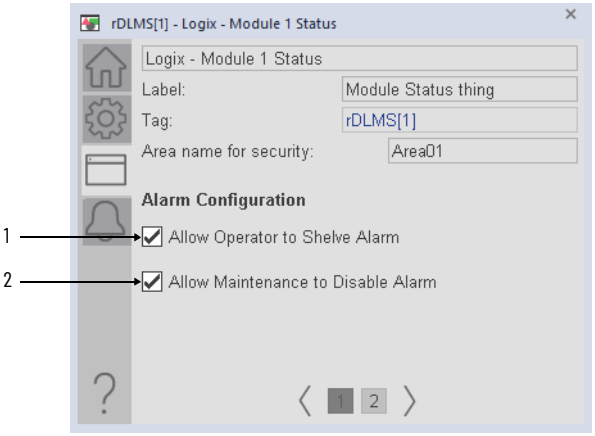


Engineering Tab

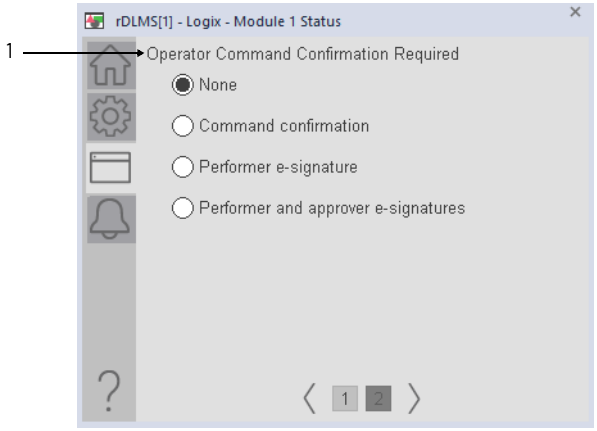


Item	Description
1	Enter the delay, in seconds, after an I/O communication fault is detected before raising the Alm_ModuleFault alarm. This delay may be needed to avoid an alarm flood when a network or I/O adapter fault cascades down to several modules. The delay allows time for the parent fault to inhibit the individual module fault alarms.
2	Select yes to bypass (block) the generation of the I/O Fault status (Sts_IOFault). Select no to enable I/O Fault status generation.
3	Select yes to enable virtual operation; the actual module connection status is ignored, and the virtual connection status setting (#4) is used instead. Select no to enable physical operation; the actual module connection is monitored.
4	When virtual operation is selected, use this selector to set the virtual connection status. When set to disconnected, an I/O Fault status is generated (if not bypassed).

HMI Configuration Tab



Item	Description
1	Select to allow Operator to shelve the alarm.
2	Select to allow Maintenance to disable the alarm.



Item	Description
1	Select the type of confirmation required for Operator commands.

Logix Event (raP_Tec_LgxEvent)

The raP_Tec_LgxEvent (Logix Event) Add-On Instruction captures any of 16 event bit rising edge transitions and records the lowest -order rising edge bit as the reason of the event. The instruction provides an “I/O fault” input to monitor parent IO conditions. It also provides a Reset to clear the event reason.

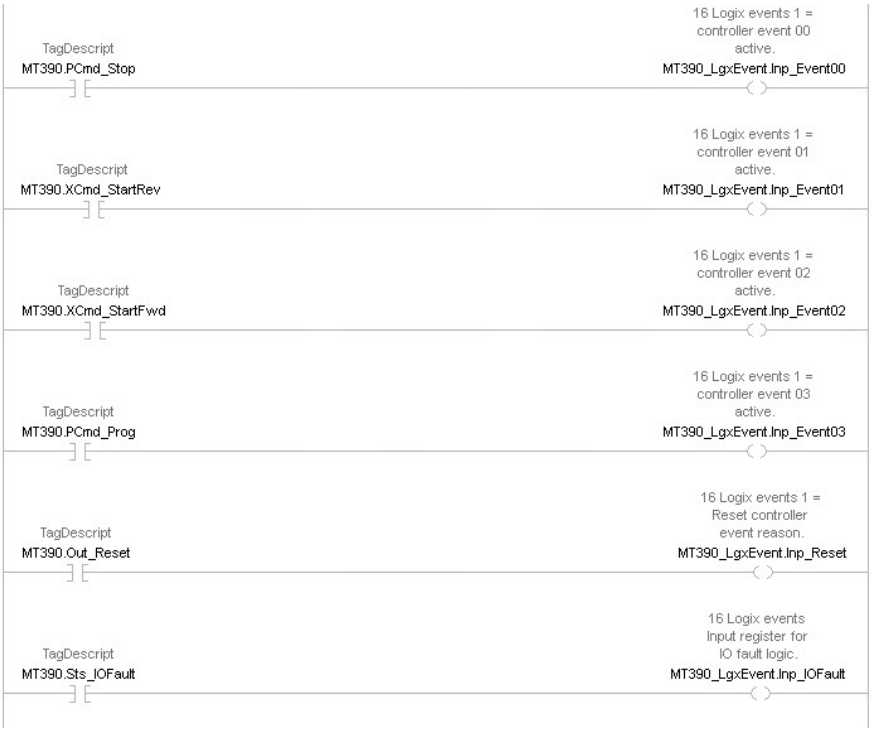
Guidelines

Use this instruction if you want to monitor up to 16 User-defined events, per object.

Functional Description

The raP_Tec_LgxEvent Add-On Instruction is used to capture any of 16 bit rising edge transitions and records the lowest order rising edge bit as the reason of the event. The events are published in the Sts_Reasons parameter. Reasons are only captured if the Inp_IOFault and the Inp_Reset parameters are low. (0) Event reasons are cleared by setting the Reset input parameter. (1) Event input conditions can be connected to any user-defined logic.

The following images show how the event inputs are mapped to the instruction. Ladder logic is typically used to allow for more complex trigger conditions. Here is the code showing the mapping of four event triggers, as well as the Reset and IOFault:



Those inputs are the source of the raP_Tec_LgxEvent instruction:



The following images show how the event Reasons are assigned a User description for the Event. Each individual event is allowed a unique description to be applied. The description needs to be changed/updated to what the you want to be displayed in the reports.

Name	Usage	Value	Force Mask	Style	Data Type	Description
raP_Tec_LgxEvent_01.Sts_Reason		2#0000_0000_0000_00...		Binary	INT	16 Logix events Reason of individual controller event.
raP_Tec_LgxEvent_01.Sts_Reason.0		0		Decimal	BOOL	16 Logix events Reason Zero
raP_Tec_LgxEvent_01.Sts_Reason.1		0		Decimal	BOOL	16 Logix events Reason One
raP_Tec_LgxEvent_01.Sts_Reason.2		0		Decimal	BOOL	16 Logix events Reason Two
raP_Tec_LgxEvent_01.Sts_Reason.3		0		Decimal	BOOL	16 Logix events Reason Three
raP_Tec_LgxEvent_01.Sts_Reason.4		0		Decimal	BOOL	16 Logix events Reason Four
raP_Tec_LgxEvent_01.Sts_Reason.5		0		Decimal	BOOL	16 Logix events Reason Five
raP_Tec_LgxEvent_01.Sts_Reason.6		0		Decimal	BOOL	16 Logix events Reason Six
raP_Tec_LgxEvent_01.Sts_Reason.7		0		Decimal	BOOL	16 Logix events Reason Seven
raP_Tec_LgxEvent_01.Sts_Reason.8		0		Decimal	BOOL	16 Logix events Reason Eight
raP_Tec_LgxEvent_01.Sts_Reason.9		0		Decimal	BOOL	16 Logix events Reason Nine
raP_Tec_LgxEvent_01.Sts_Reason.10		0		Decimal	BOOL	16 Logix events Reason Ten
raP_Tec_LgxEvent_01.Sts_Reason.11		0		Decimal	BOOL	16 Logix events Reason Eleven
raP_Tec_LgxEvent_01.Sts_Reason.12		0		Decimal	BOOL	16 Logix events Reason Twelve
raP_Tec_LgxEvent_01.Sts_Reason.13		0		Decimal	BOOL	16 Logix events Reason Thirteen
raP_Tec_LgxEvent_01.Sts_Reason.14		0		Decimal	BOOL	16 Logix events Reason Fourteen
raP_Tec_LgxEvent_01.Sts_Reason.15		0		Decimal	BOOL	16 Logix events Reason Fifteen

Required Files

Controller Files

The raP_Tec_LgxEvent_5.00.**00**_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

There are no visualization files because the raP_Tec_LgxEvent object does not use Graphic Symbols or Faceplates.

Operations

Command Sources

The raP_Tec_LgxEvent instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command source.

Alarms

The raP_Tec_LgxEvent Instruction has no Alarms.

Virtualization

The raP_Tec_LgxEvent Instruction has no Virtualization.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	No EnableIn False logic is provided. The raP_Tec_LgxEvent instruction must always be scanned true. In relay ladder logic, the raP_Tec_LgxEvent instruction must be by itself on an unconditional rung.
Powerup (prescan, first scan)	No SFC Prescan logic is provided.
Postscan (SFC transition)	No SFC Postscan logic is provided.

See to the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010, for more information.

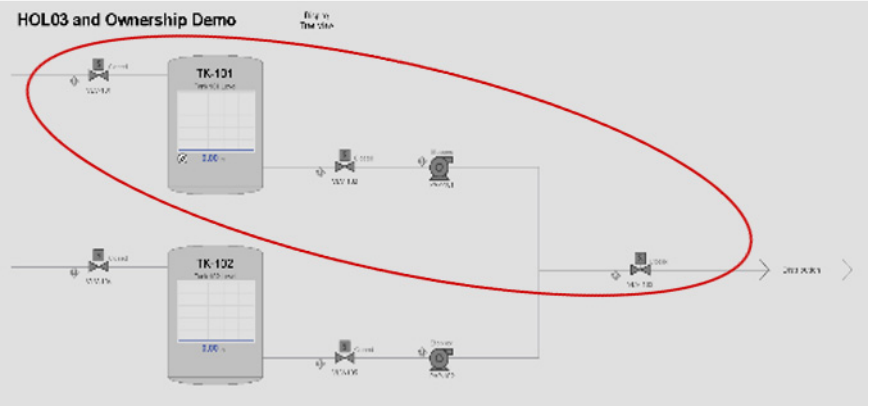
Programming Examples

The example in the Function Description section shows the basic use of the raP_Tec_LgxEvent Add-On Instruction for capturing events.

Organization and Propagation

Organization

Organization is a method by which parent / child relationships can be created and modified among control objects. Organization provides a method to propagate a selected subset of commands (related to command source, alarms, etc.) from the parent down to its children or propagate the aggregate of a selected subset of status (related to command source, alarms, etc.) from the children up to the parent(s).



Organizational views can be many nodes deep and wide, and numerous organizational views can reference the same devices to suit the needs of the user. The structure and view of these organizational trees can be modified online from the HMI. This provides the ability to coordinate commands of related equipment and view their related status (equipment modules or phase modules), or alternatively to monitor specific equipment or equipment types as a maintenance function.

Functional Description

Bus - An interface for use by Bus enabled PlantPAx® objects to convey specific status and commands through a user defined organizational structure.

Bus Status Elements - The status elements included in the Bus contain specific elements relative to alarms, Command Source and virtualization if the object has those elements or capabilities. The status is indicative of the object and propagated from its children.

Status Produced and Propagated	Description
Alarm(s) Active	At least one alarm is active for this object or its children
Alarm(s)/Object to be Reset	At least one alarm is ready for reset for this object or its children
Ready for Reset	At least one object or child is ready for reset
Alarm(s) Enabled	At least one alarm is enabled for this object or its children
Alarm(s) Disabled	At least one alarm is disabled for this object or its children

Status Produced and Propagated	Description
Alarm(s) Unsuppressed	At least one alarm is not suppressed for this object or its children
Alarm(s) Suppressed	At least one alarm is suppressed for this object or its children
Alarm(s) Shelved	At least one alarm is shelved for this object or its children
Object Not Ready	At least one object or child is not ready
Maint Bypass Active	At least one object or child has a Maint Bypass active
Object(s) in Physical	At least one object or child is in Physical
Object(s) in Virtual	At least one object or child is in Virtual
Ready for Oper Request	At least one object or child is ready for an Oper request
Ready for Prog Request	At least one object or child is ready for a Prog request
Ready for Ext Request	At least one object or child is ready for an Ext request
Ready for Ext Release	At least one object or child is ready for an Ext release request
Ready for Maint Request	At least one object or child is ready for a Maint request
Ready for Maint Release	At least one object or child is ready for a Maint release request
Object(s) in Hand	At least one object or child has an active prompt
Object(s) Out of Service (OoS)	At least one object or child is Out of Service
Object(s) in Oper or Prog Locked	At least one object or child is Oper or Prog Locked
Object(s) has Prog, is not in Prog	At least one object or child has Prog but is not in Prog
Prompt is active	At least one object or child has an active prompt

Bus command Elements - The command elements included in the Bus contain specific elements relative to alarms, Command Source and virtualization if the object has those elements or capabilities. The command will be issued to the object and propagated to its children.

Commands Issued and Propagated	Description
Reset/Ack All	Issue a Reset/Ack All to all objects
Reset	Issue a Reset to all objects
Disable alarms	Disable all alarms
Enable alarms	Enable all alarms
Suppress alarms	Suppress all alarms
Unsuppress alarms	Unsuppress all suppressed alarms
Unshelve alarms	Unshelve all shelved alarms
Request Virtual	Request all to be in Virtual
Request Physical	Request all to be in Physical
Request Oper	Request all to be in Oper
Request Prog	Request all to be in Prog
Request Ext	Request all to be in Ext
Release Ext	Release all from Ext
Request Maint	Request all to be in Maint
Release Maint	Release all from Maint

Node - An element which contains organizational information about a single point in a user defined organizational structure such as parent/child relationship and status/command propagation configuration.

Node Propagation Configuration - Each node can be individually configured to propagate status to its parent and accept propagated commands from its parent. By default all status is propagated to parents and no commands are accepted from the parent.

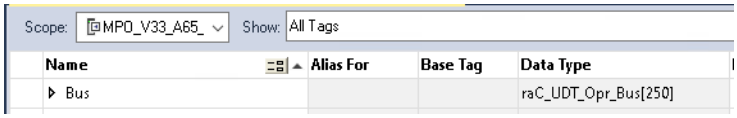
Required Files

File	Description
raP_Opr_OrgScan	Function to scan and update all Bus elements and tree nodes
raP_Opr_OrgView	Function to create a file tree view of the nodal organization in FTView
raP_Opr_Owner	Function to allow ownership of a Bus element
raP_UDT_Opr_Bus	Individual Bus element
raP_UDT_Opr_Bus_Node	Individual Node element
raP_UDT_Opr_Bus_View	Individual FTView client data

Operations

Programming - Controller Logic

1. Create a controller scoped array of type 'Bus'. The name of the array must be 'Bus'. The number of elements in the array should be enough to hold all elements in the project that will participate on the Bus.



2. Assign a unique Bus index to any project element in the controller that you wish to have participate on the Bus.

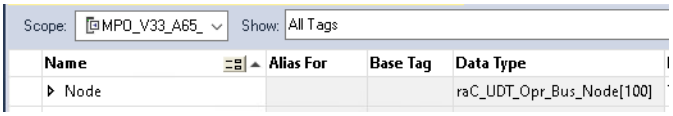


Right click to monitor this Bus element and type a name. This is the string that will appear in the HMI tree view. It also supplies a quick check as to whether this Bus element has already been assigned to something.

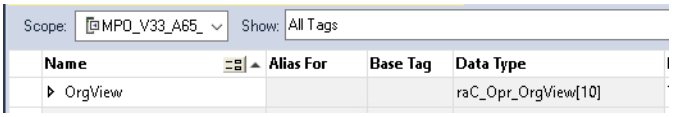


Assign any non-functional Bus elements to be used as organizational nodes. Participation on the Bus is not limited to functional objects (objects which have instruction instances.) These can be used as 'folders' in organizational trees to consolidate other functional and non-functional Bus elements.

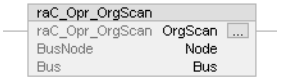
3. Create a controller scoped array of type 'Node'. The name of the array must be 'Node'. The number of elements in the array should be enough to hold all of the nodes in all of the organizational trees.



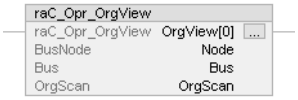
4. Create a controller scoped array of UDT type raP_Opr_OrgView. The name of the array must be 'OrgView'. The number of array elements should be greater than the number of FTView clients which will have a view into the organizational tree.



5. Create one instance of the OrgScan AOI in a routine in the one second 'System' task.

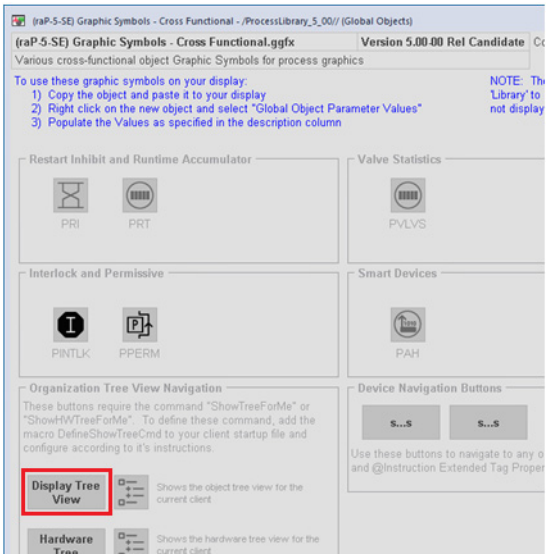


6. Create one instance of the OrgView AOI to immediately execute after the OrgScan AOI. One instance of the OrgView AOI will need to be created for each HMI client which will have access to the organizational tree view.



Programming - HMI

1. Select and copy the 'Display Tree View' button from the '(raP-5-SE) Graphic Symbols - Cross Functional.ggfx' global object file. Paste this button to the desired display.



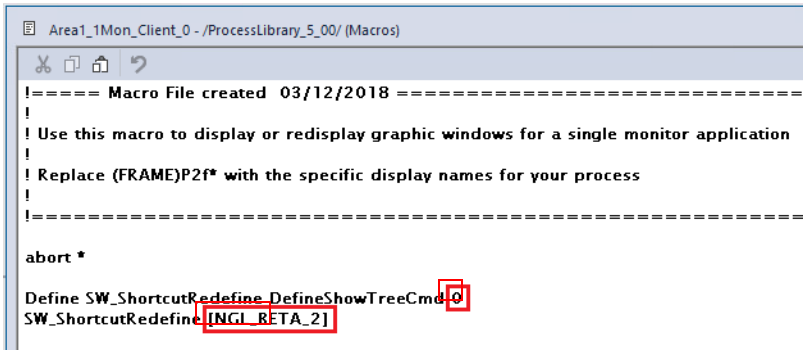
2. Add the following lines to the client startup macro:

'Define SW_ShortcutRedefine DefineShowTreeCmd 0'

'SW_ShortcutRedefine [TOPIC]'

*Where 'o' is the index of the OrgView array in the controller for this client.

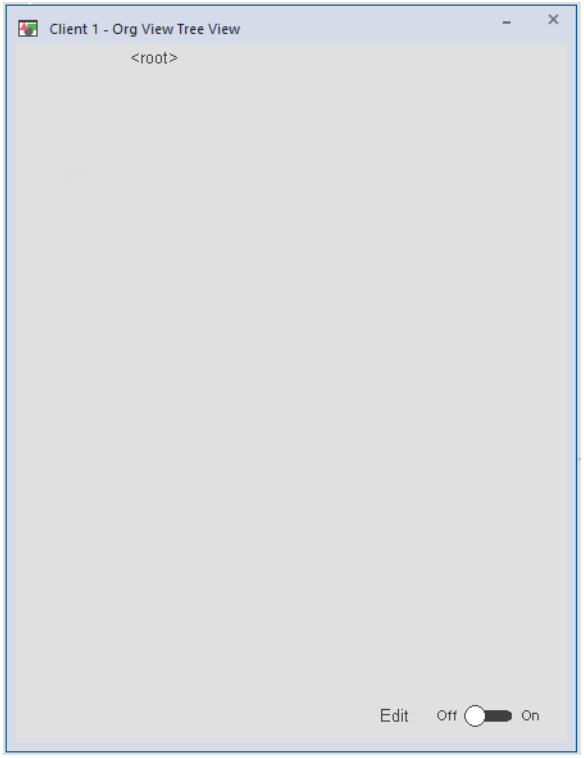
*And [TOPIC] is the linx shortcut to the controller.



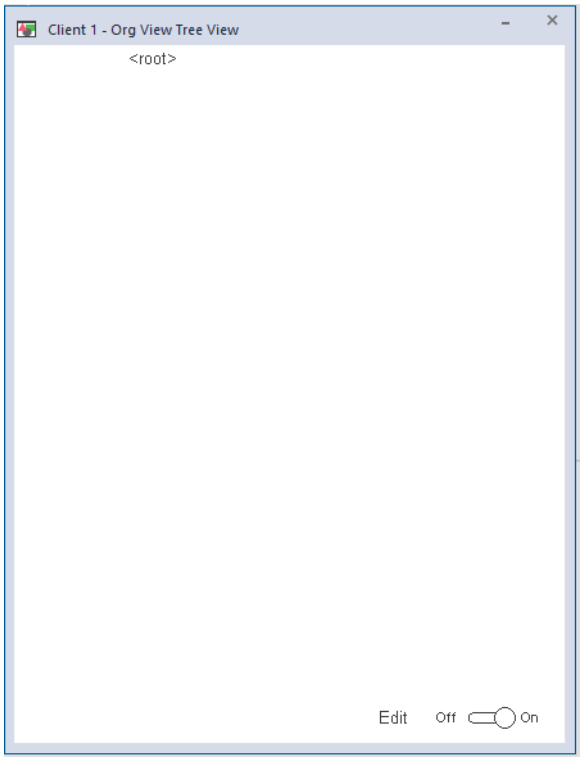
Configuring a Node

Constructing a Nodal Tree

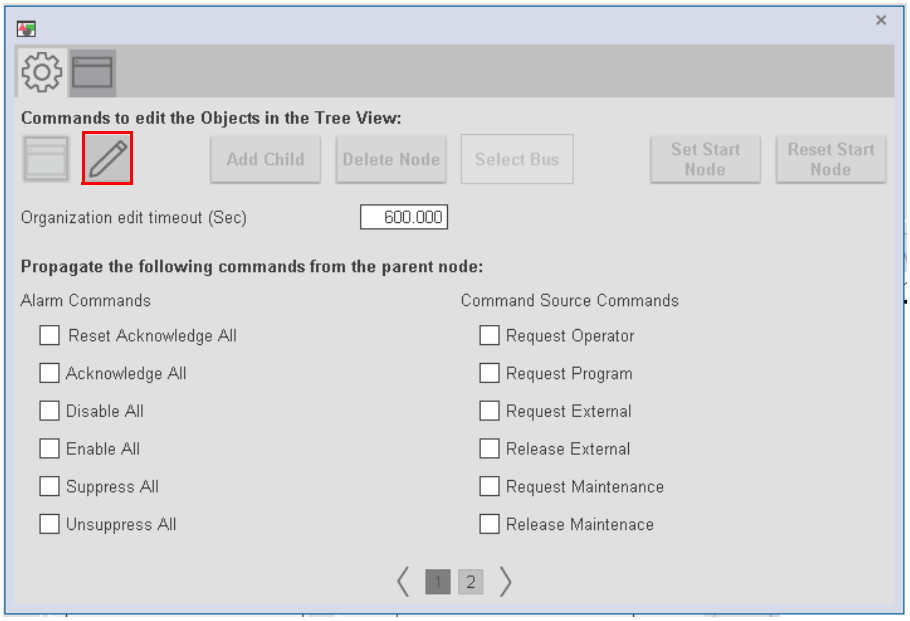
1. Open the organizational tree display by clicking on the Global Object in the display.



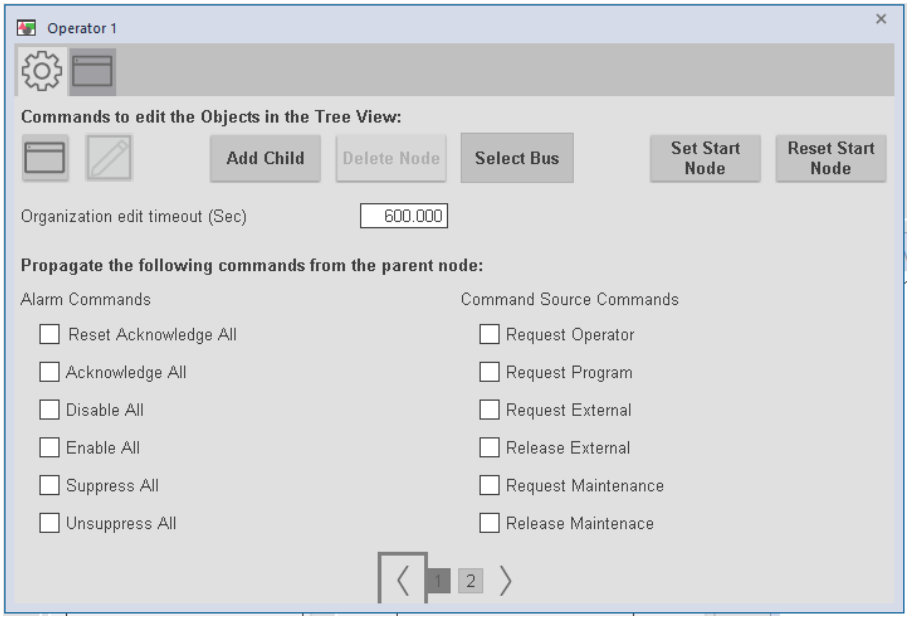
2. Select Tree Edit mode (by selecting Edit On). This mode causes the HMI to respond with tree edit displays.



3. Select the Node to edit. Click on the node in the tree to select it for edit. The edit display will then appear.
4. Acquire the Edit Privilege. Click on the 'Enter Edit Mode' button. This action causes this client to own the edit privilege. If no edit action is taken in the time specified by the 'Organization Edit Timeout' then the client will automatically release the edit privilege. This period can be shortened or extended by entering a different value into the 'Organization edit timeout' in seconds.

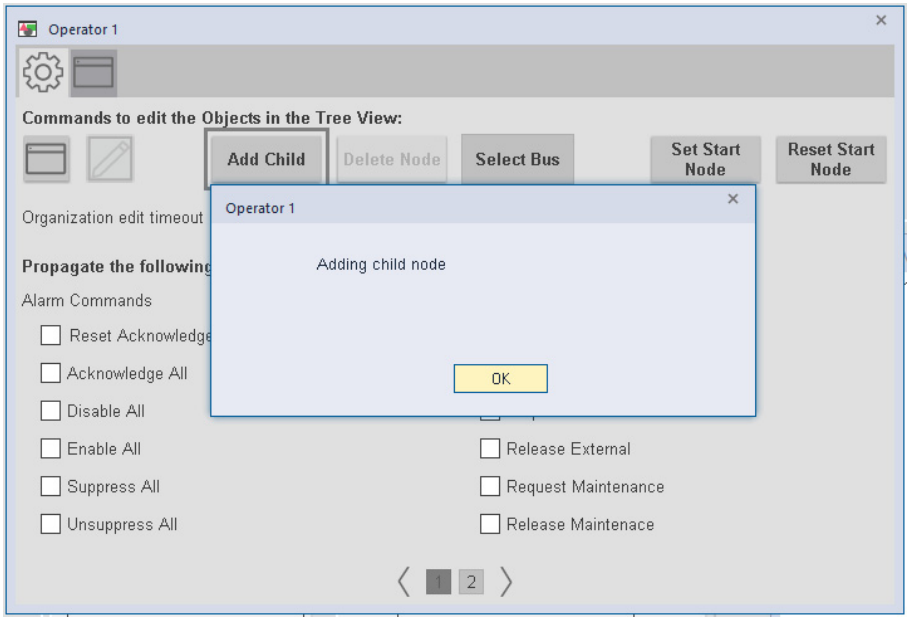


5. Several options are now available to the user.

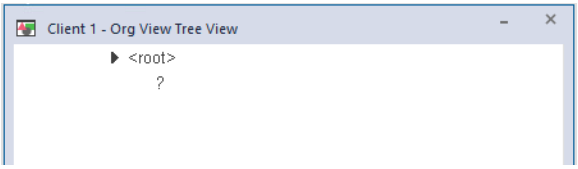


Option	Description
Add Child	Adds a child to the selected node. It will appear indented in the tree.
Delete Node	Deletes the selected node. Is available only if the selected node has no children.
Select Bus	Allows the assignment of any Bus element to this tree node.
Set Start Node	Pressing this will make the currently selected node the top most node in the visible tree.
Reset Start Node	Pressing this will reset the top most node to the 'root' of the organizational trees.

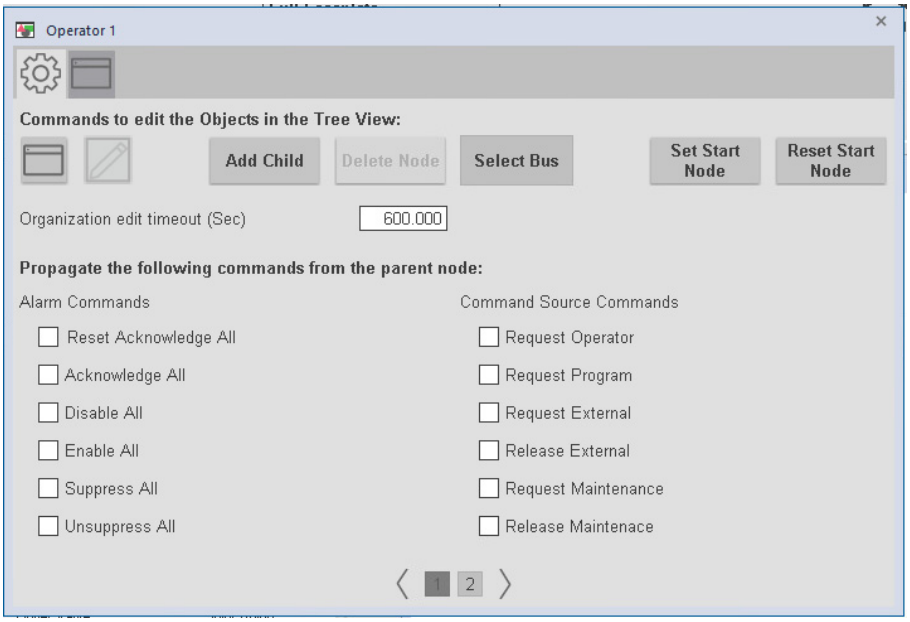
6. Add a child. This action adds a child node to the tree with no Bus element assigned.



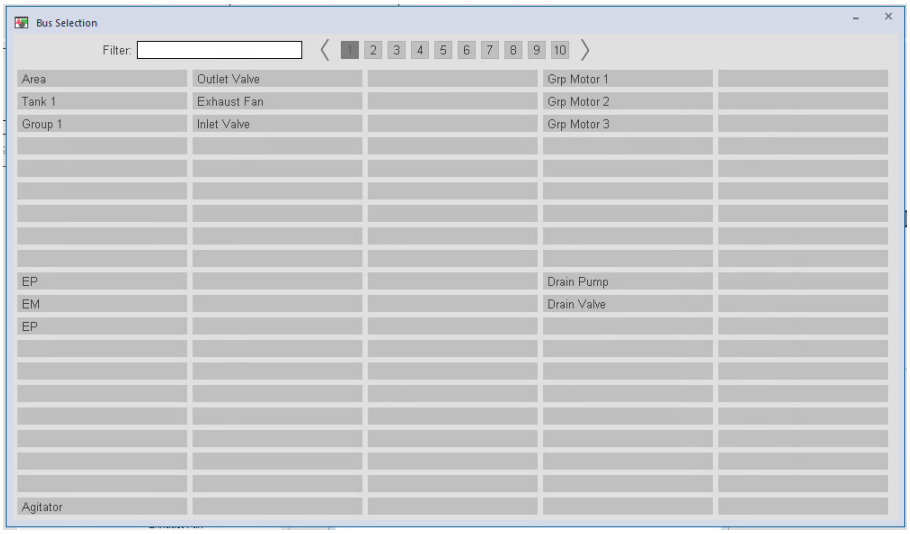
7. Close the edit display.



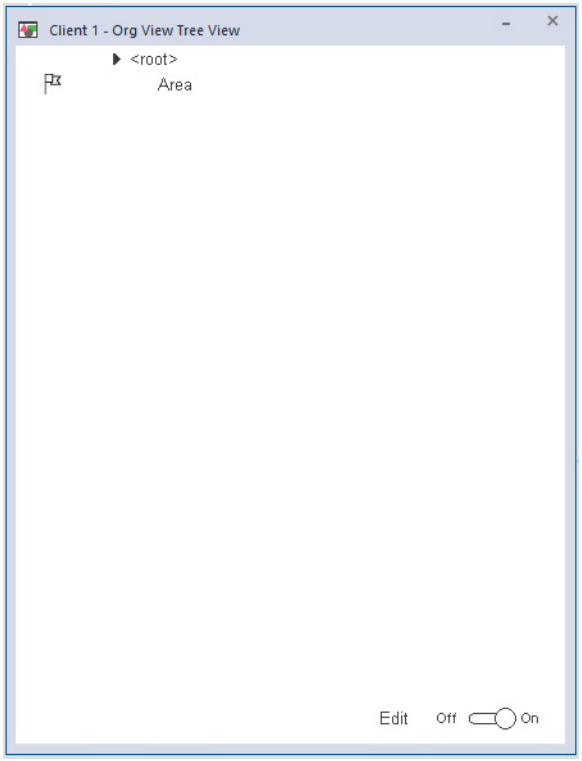
8. Select the new node to edit.



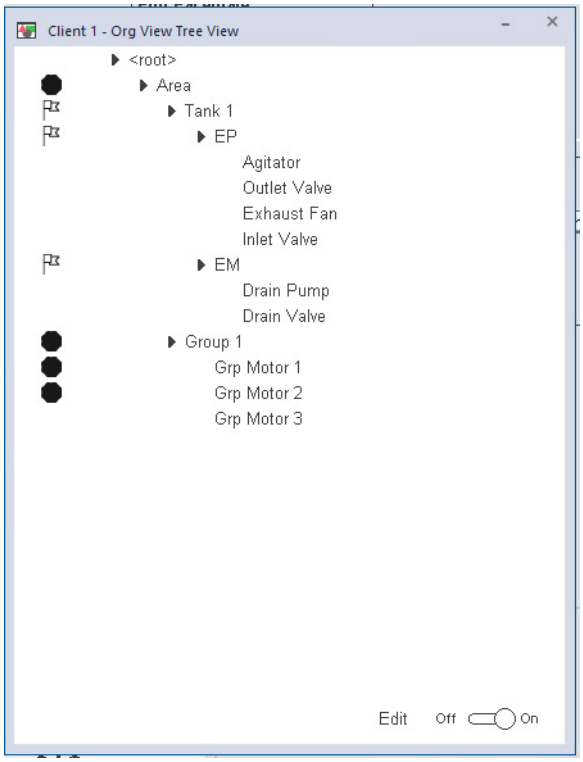
9. Select 'Select Bus' to select the Bus element for this Node.



10. Select the Bus element for this Node. This action will assign the Bus element selected to the node selected and close the Bus selection display.



11. Repeat this process to create the desired organizational tree(s) from the available Bus elements.

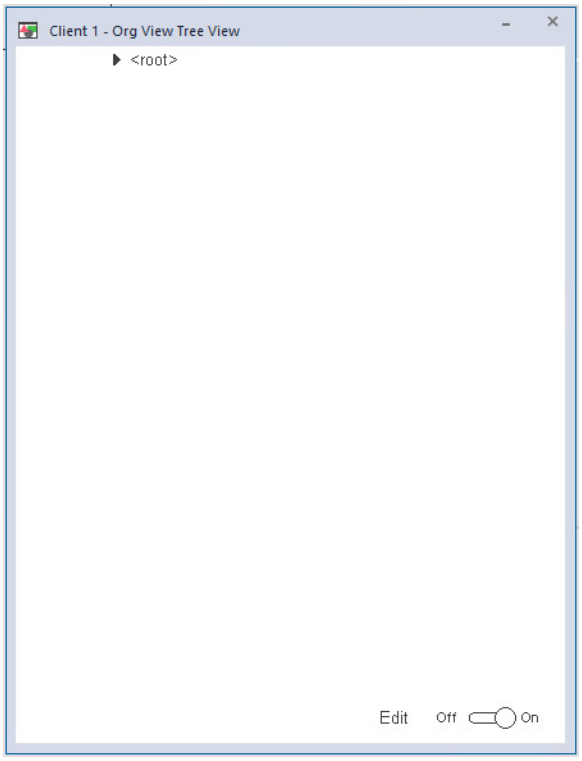


Configure the Tree Node at Which to Start this View

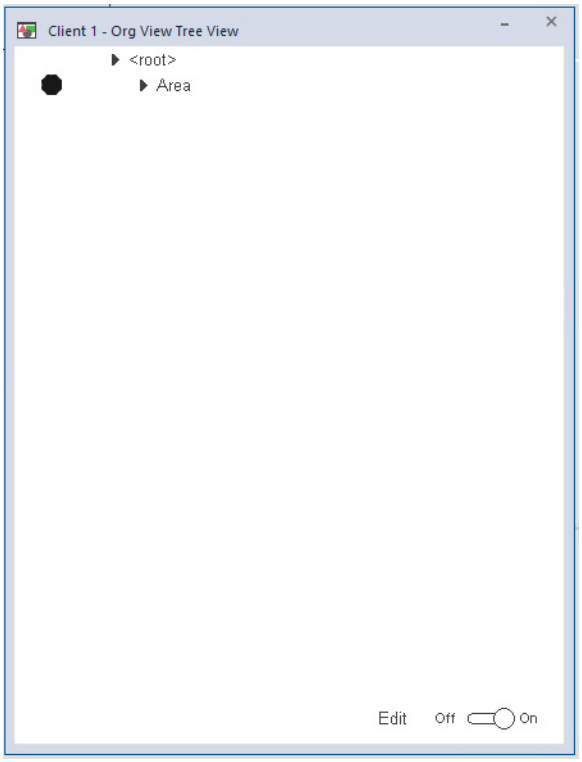
1. Open the organizational tree display.



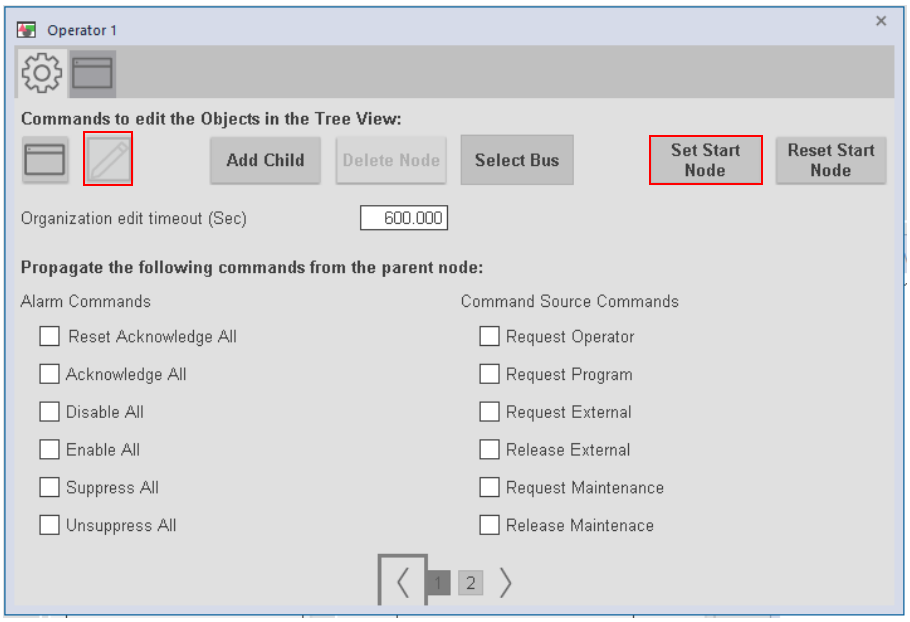
2. Select the tree edit mode (select Edit On).

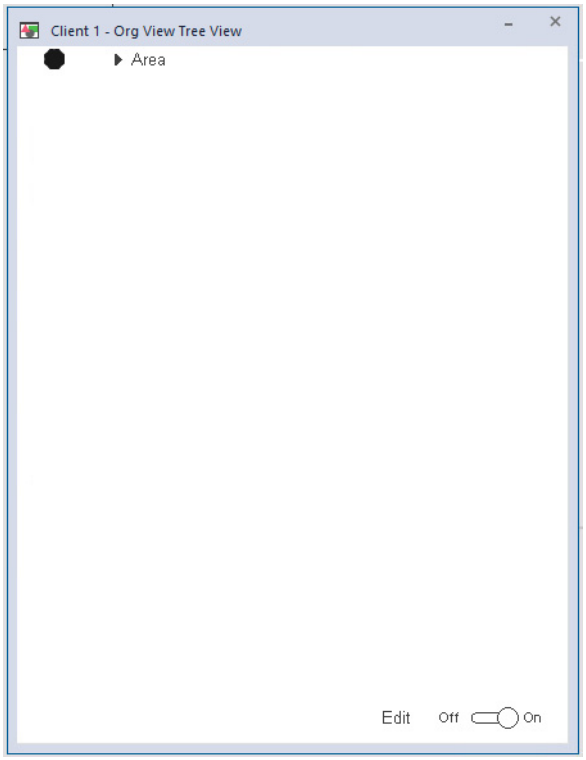


3. Expand the tree to view and select the Node to edit.



4. Acquire the edit privilege and select Set Start Node. The tree view will now have the selected node as its top most node.




Client 1 - Org View Tree View
Area
Edit
Off
On

Configuring Propagation and Navigation

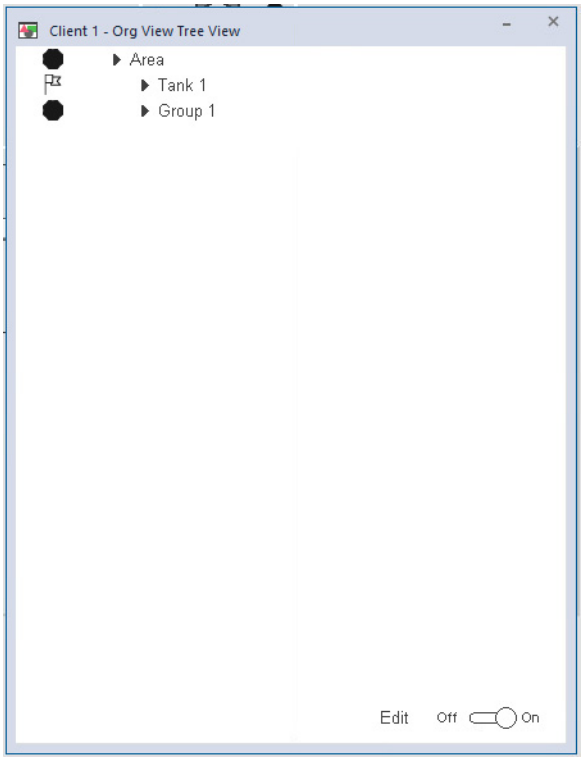
By default, all status items are propagated from child to parent. No commands are propagated from parent to child. The user can optionally enable or disable propagation of any status and command at any point in the organizational trees.

1. Open the organizational tree display.

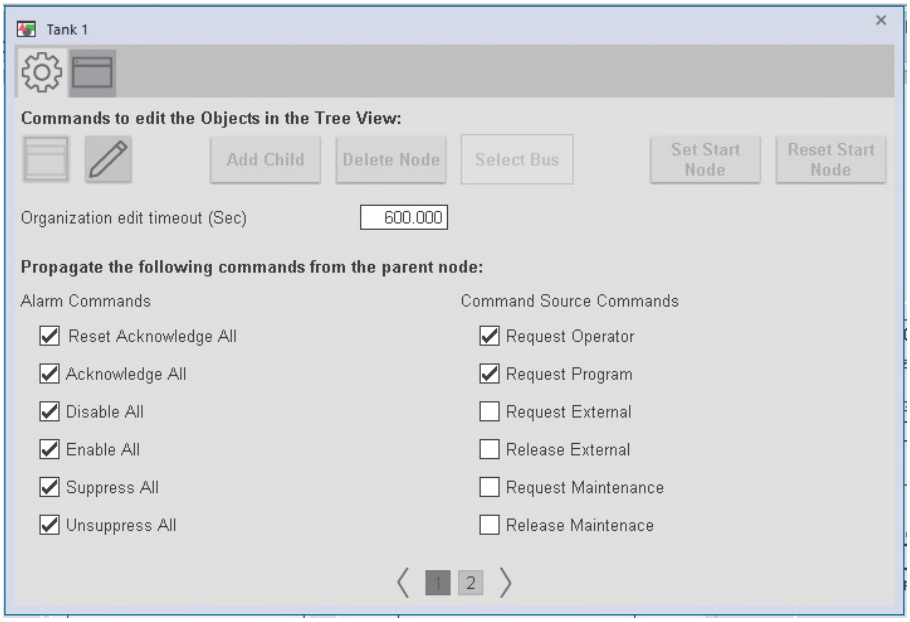


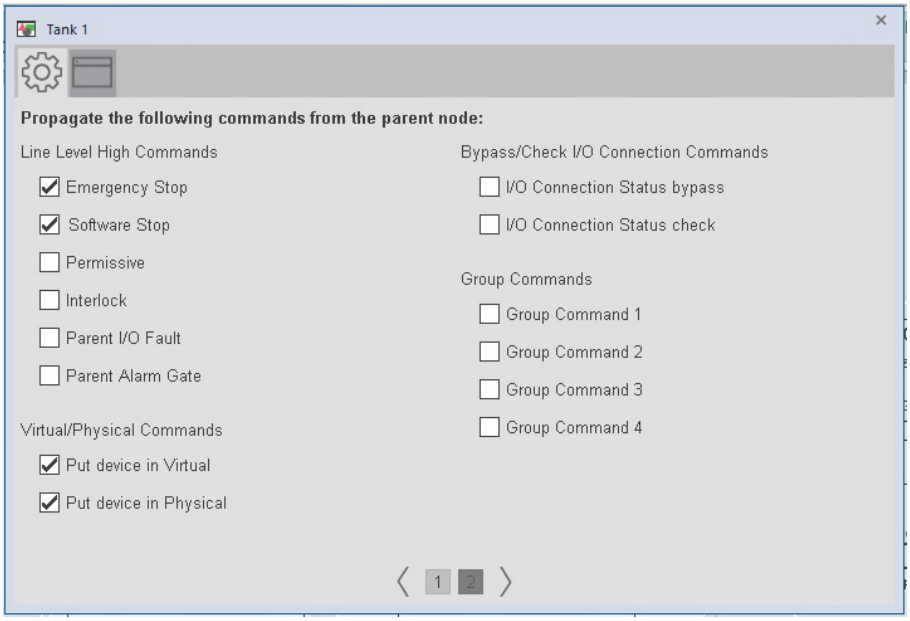
2. Select the Tree Edit Mode.

3. Select the Node to edit.

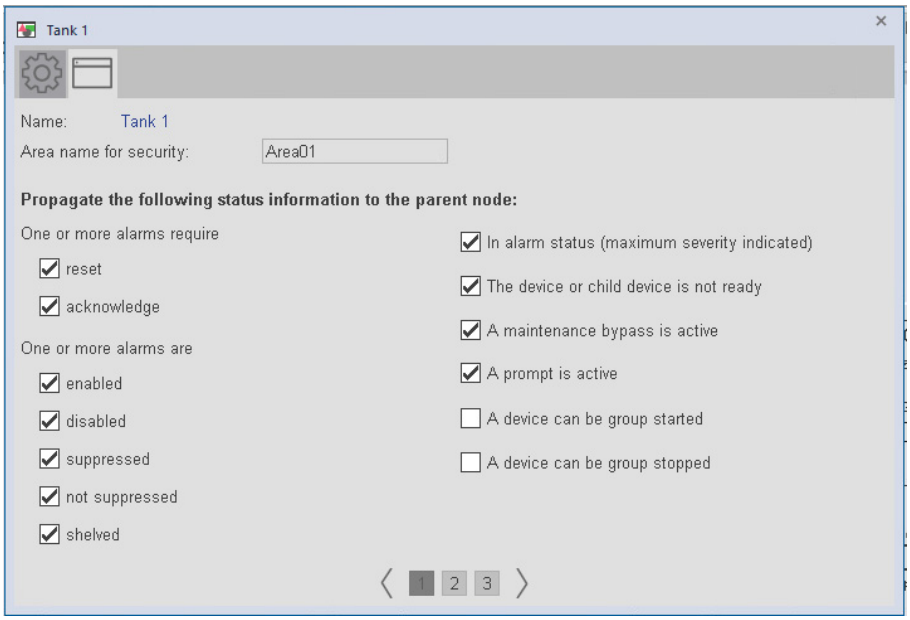


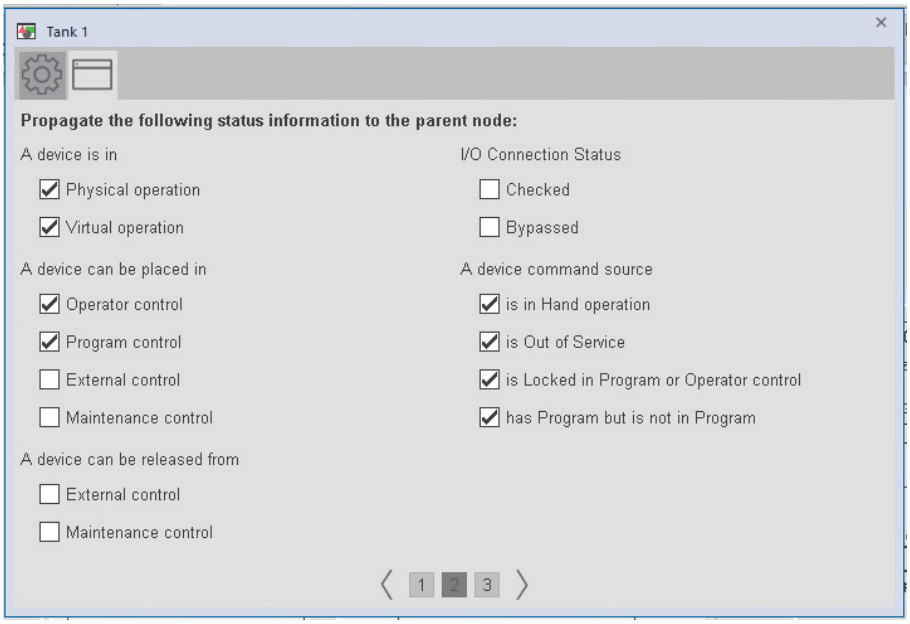
4. On the Engineering tabs, select all commands that should be propagated from the parent for this node. Selecting a command means that if a command is given to the parent it will be received and processed by this node as well.



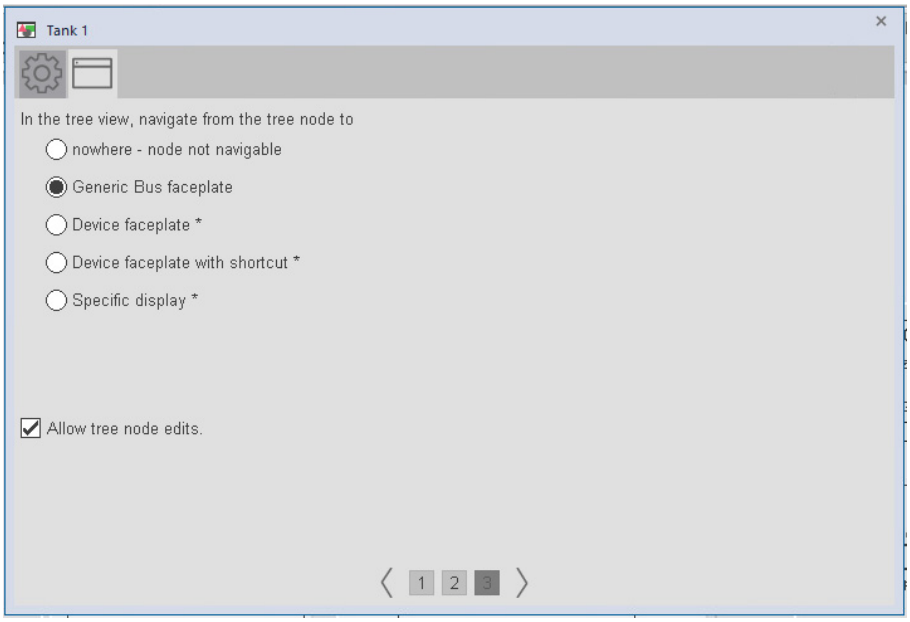


5. From the HMI Configuration tab, select all the status' that should be propagated to the parent for this node. Selecting a status means that if a status is asserted by this node or propagated from its children then it will be pushed to the parent node.





6. From page three of the HMI Configuration tab, specify what occurs when the node in the tree is selected in non-edit mode. Specify what action occurs when a user clicks on that node in the organizational tree.

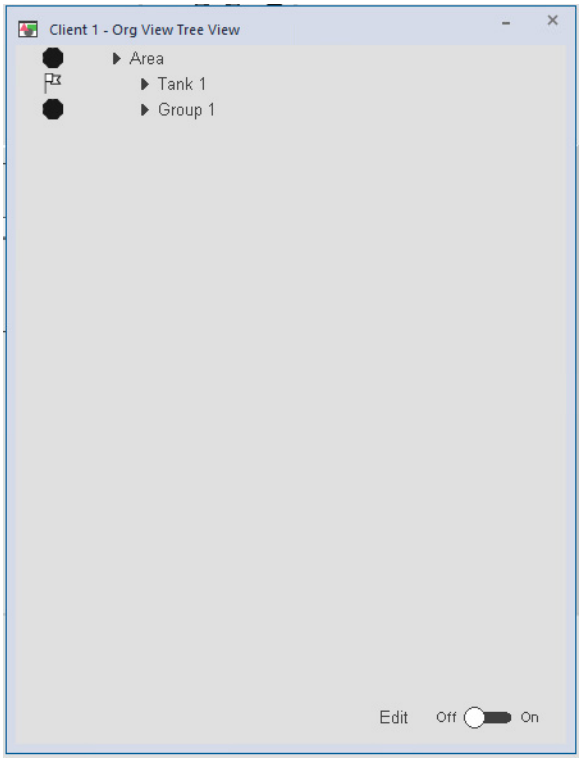


Action	Description
Nowhere	No action occurs
Generic Bus Faceplate	The Generic Bus Faceplate is displayed
Device Faceplate	Use when the node represents a device which has a faceplate that requires the instance backing tag as display parameter. To configure navigation path for a node go to Bus[x].@EngineeringUnit and populate the field with Tag. True for all instructions in the PlantPAx Pallet. Example Bus[2].@EngineeringUnit = [ControlStrategies]XV101 = XV101

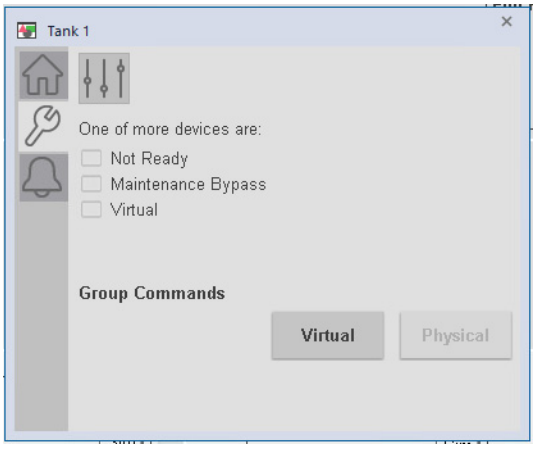
Action	Description
Device Faceplate with Shortcut	Use when the node represents a device which has a faceplate that requires the instance backing tag and shortcut as display parameters. True for raP_Opr_EMGen, raP_Opr_EPGen, raP_Dvc_LgxCPU_5x80 and raP_Opr_Unit instructions. To configure navigation path for the node go to Bus[x].@EngineeringUnit and populate the field with [TOPIC]Tag. Example Bus[2].@EngineeringUnit = [ControlStrategies]eTK101
Specify Display	Other user specified display
Allow tree node edits	This allows the engineer to disable the organizational tree edit capability for this client.

Configure Nodal HMI

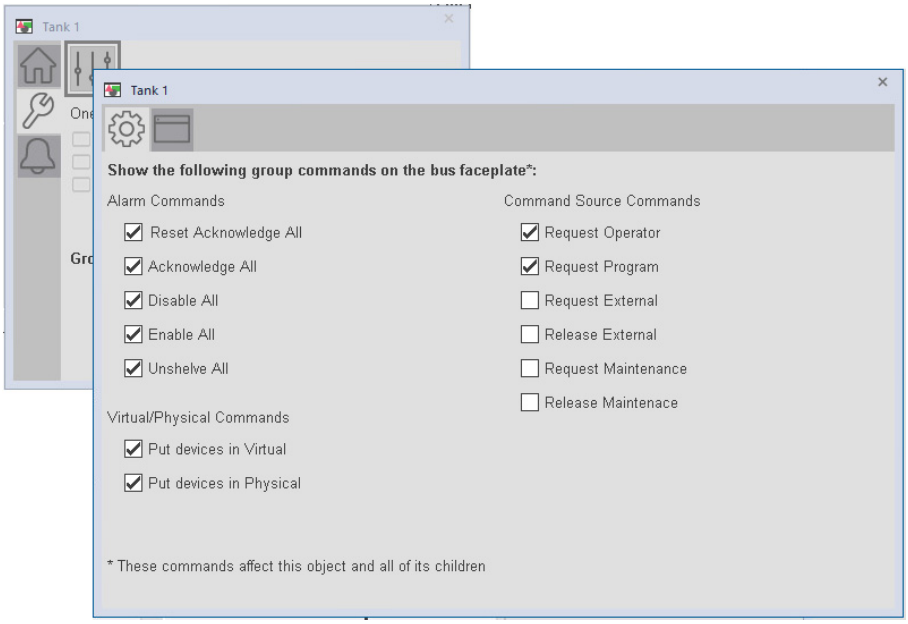
1. Open the organizational tree display and select the node to configure.



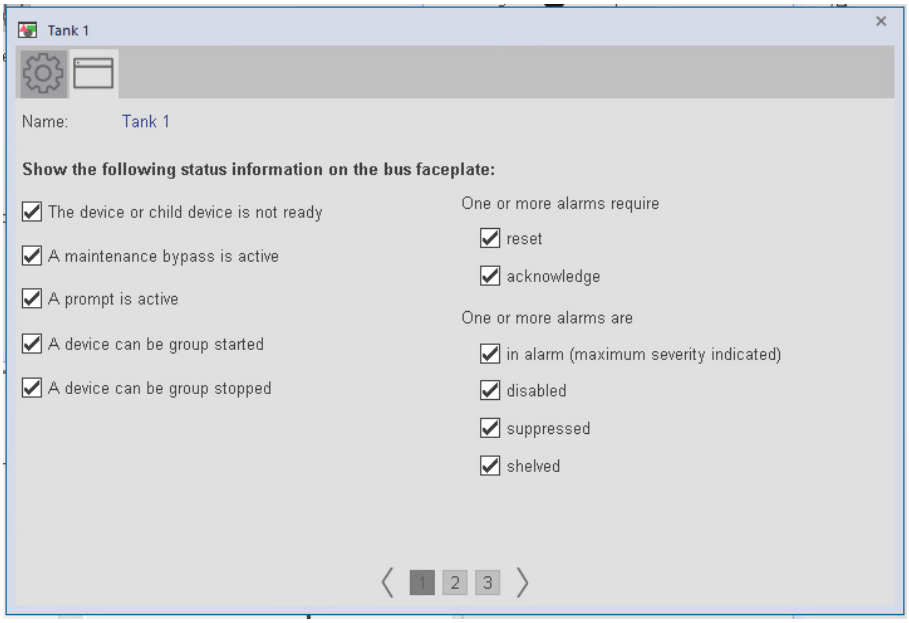
2. Select the maintenance tab.

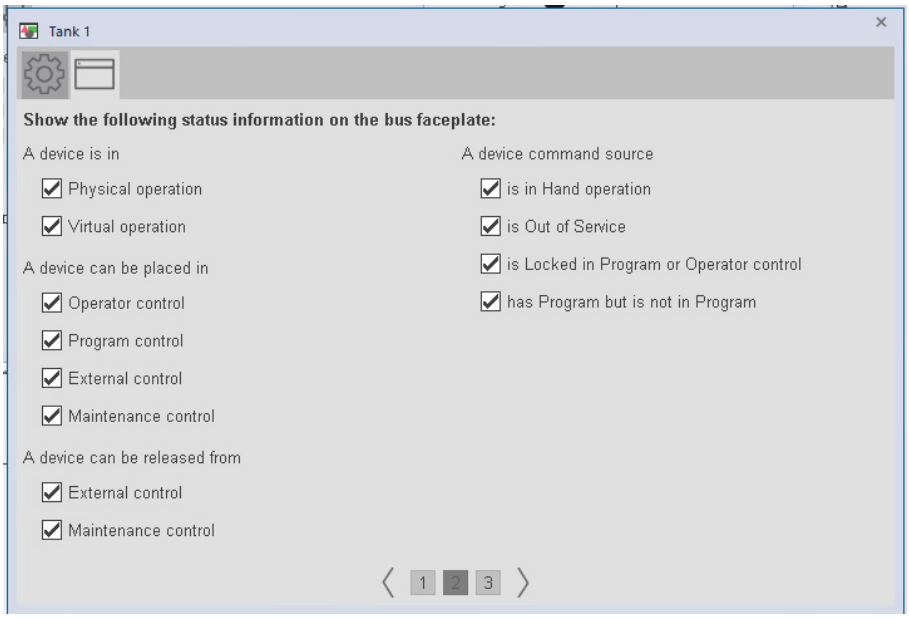


1. Select the Advanced Properties tab and set the commands that are available from the Bus Faceplate.

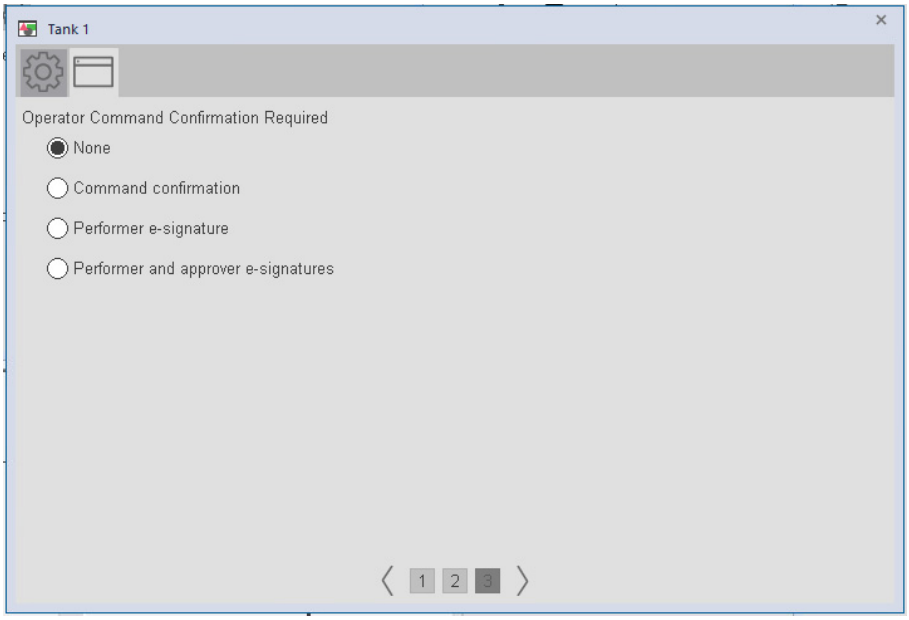


2. Select the HMI configuration tab and select the status items which are to be shown on the Bus faceplate.





3. On page three of the HMI Configuration tab, select the configuration of operator confirmation of commands.

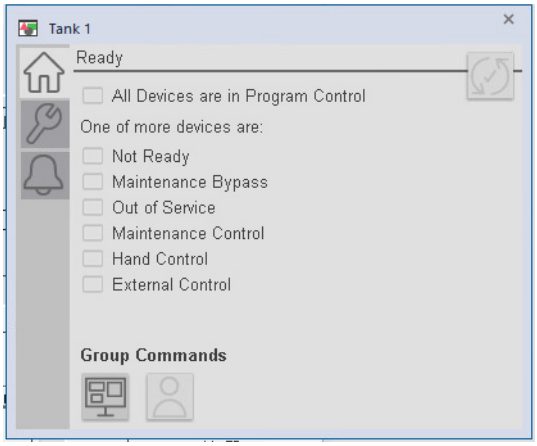


Issue Commands

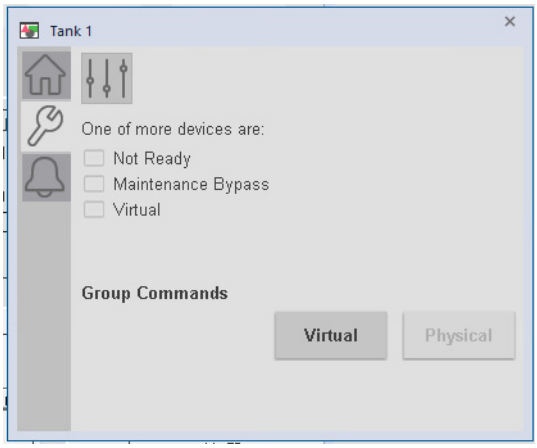
When configured to be available, specific commands can be issued from any node in an organizational tree via the Bus faceplate. Commands related to alarms, command source, and virtualization are supported. The commands available on the faceplate are determined by the configuration previously entered.

When commands are issued from this faceplate, those commands are issued to this object and all children of this object in the organizational tree that are configured to accept commands from the parent.

The Home tab shows the 'Program Request' and 'Operator Request' button available.



On the Maintenance tab, the 'Virtual' and 'Physical' commands are available.



On the Alarm tab the alarm commands to 'Disable All', 'Enable All', 'Unshelve All' and 'Acknowledge/Reset All' are available.



Status Indicators

When configured to be available, specific status' can be viewed from any node in an organizational tree via the Bus faceplate. Select status' are represented by breadcrumbs which appear in the organizational tree next to the nodes that are affected. Status' related to alarms, command source, and virtualization are supported. The status' available on the faceplate are determined by the configuration previously entered.

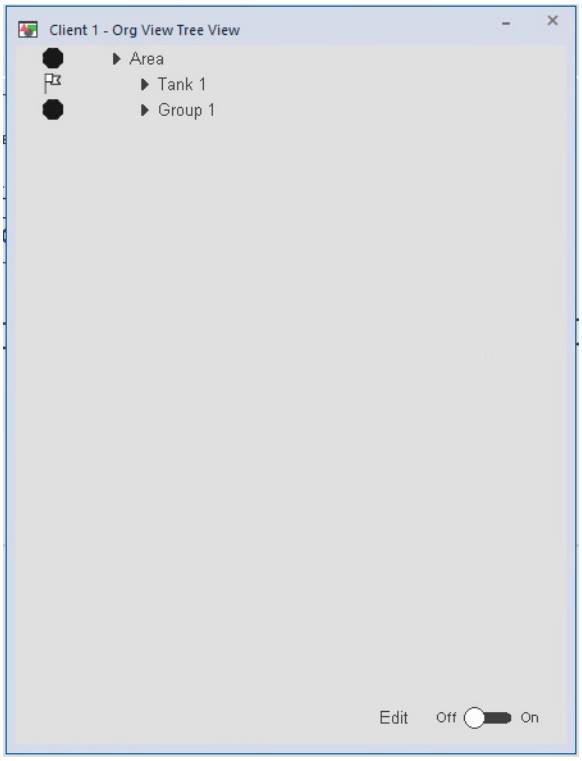
When a condition occurs which produces a status point, those status' may be relative to this object or any of its children.

Status Symbol	Description
	This object or one of its children is not ready. This indication will appear over the 'NIP.'
	This object or one of its children is not in Program.
	This object or one of its children is alerting the operator (Attention.)
	This object or one of its children is in Virtual. This indication will appear over the 'MP.'
	This object or one of its children has an active Maintenance Bypass.

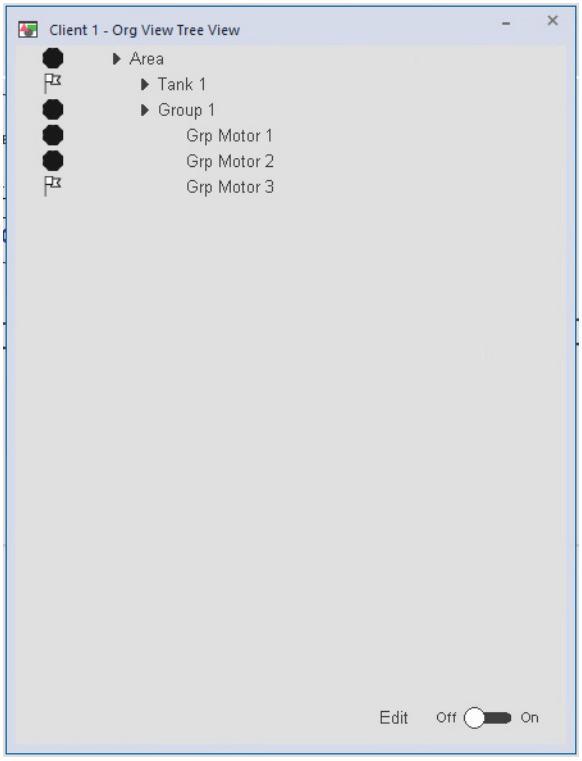
Example of the Not Ready symbol next to the Area node.



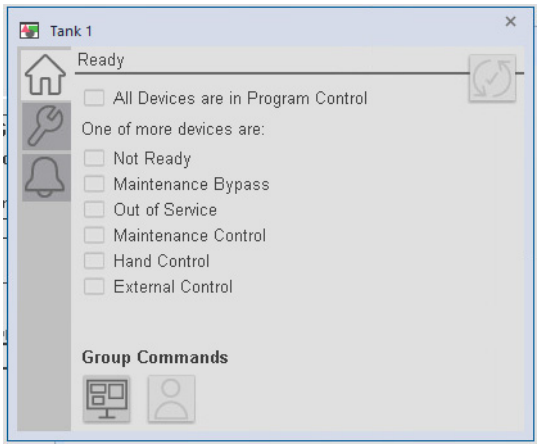
Expanding the 'Area' node shows that a child of the 'Group 1' node is 'Not Ready.'

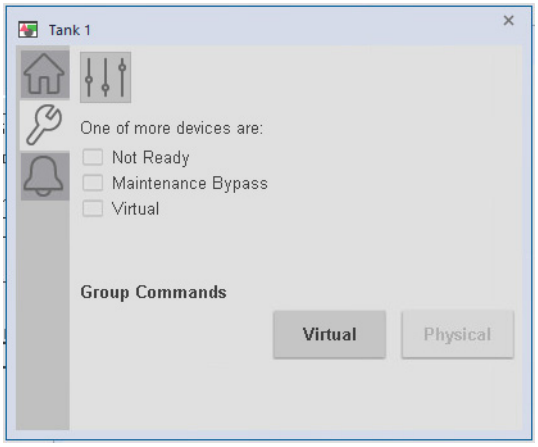


Expanding the 'Group 1' node shows that 'Group Motor 1' and 'Group Motor 2' are 'Not Ready.'



The Bus faceplate can indicate detailed status of each status used or propagated.



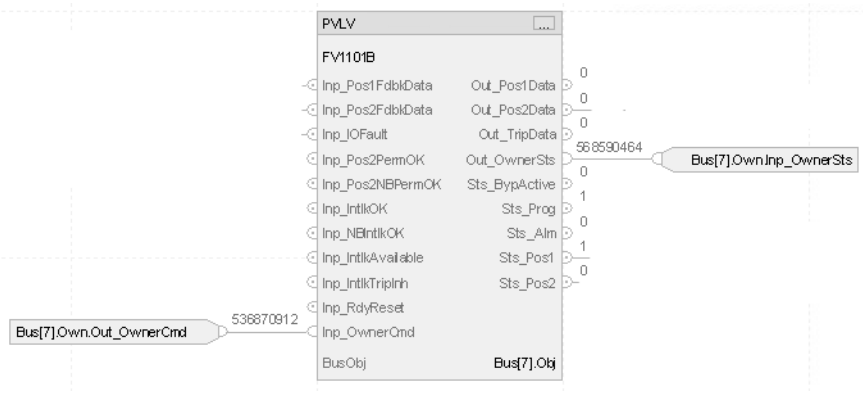




Adding ownership to devices if using the raP_Opr_EMGen

Add the ownership interface to any objects which will be used with an raP_Opr_EMGen object to group into equipment in the organizational tree. Placing these modules as children of the raP_Opr_EMGen object will enable the ownership functionality without further programming.

Using the same Bus element as is used for the object tie the Bus parameter 'Bus[x].Own.Out_OwnerCmd' to the object input 'Object.Inp_OwnerCmd.' Also connect the object output 'Object.Out_OwnerSts' to the Bus parameter 'Bus[x].Own.Inp_OwnerSts.



Note that the Bus element referenced for the ownership parameters is the same as that of the object.

If the object in question does not have these parameters then it cannot participate in formal ownership. But can and should still be used in the equipment organizational tree as a child.

Ownership (raP_Opr_Owner)

The raP_Opr_Owner (Ownership) Add-On Instruction extends the functionality of the PCMDSRC (Command Source) instruction to allow for ownership requests and owner ID book-keeping functionality.

Guidelines

Use this instruction when it is desirable to maintain ownership IDs and manage ownership arbitration between the ownership classes (Opr, Prog, Ext, and Maint).

The raP_Opr_Owner functionality is included in the Bus Organizational UDT (raP_UDT_Opr_Bus). It is not necessary to create a separate raP_Opr_Owner instance to obtain ownership functionality between parent child relationships that are configured in organizational trees that are processed by a raP_Opr_OrgScan instruction.

Functional Description

The raP_Opr_Owner Add-On Instruction is used to accept and process ownership requests by ID utilizing a PCMDSRC (Command Source) instruction for class arbitration rules. The basic class arbitration rules are implemented by the PCMDSRC instruction, which ownership requests are allowed, which ownership requests 'win' when multiple ownership requests are made by different classes of owners, and so on.

The raP_Opr_Owner instruction uses positive value DINTs as ownership IDs.

This instruction yields status as to the current owner IDs maintained if any. The ultimate 'winning' owner class and ID are also produced as status.

The state of 'Organization' is also indicated through status. This status will indicate if the device/object is in the correct PCMDSRC state for its ultimate owner and the status of any children if present and aggregated (that is, through the BUS organization). In this way you can determine if this device/object is in the proper condition for operation.



Required Files

Controller Files

The raP_Opr_Owner_5.00.**00**_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

The raP_Opr_Owner Instruction uses no visualization files or components.

Operations

Command Sources

The raP_Opr_Owner instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command source.

Alarms

The raP_Opr_Owner Instruction uses no alarms.

Virtualization

The raP_Opr_Owner Instruction has no Virtualization capability.

Execution

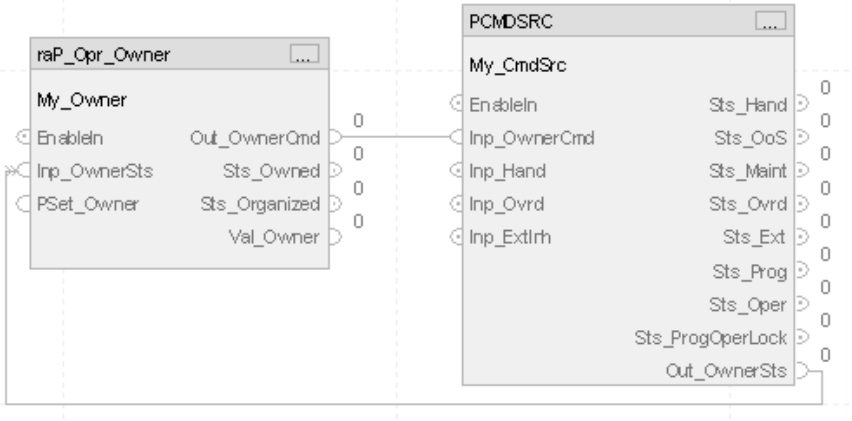
The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	The raP_Opr_Owner instruction clears all owner status and ID fields, and releases any ownership that is currently applied when scanned false or with the EnableIn=0.
Powerup (prescan, first scan)	The raP_Opr_Owner instruction clears all owner status and ID fields on PreScan/first scan.
Postscan	No SFC Postscan logic is provided.

For more information, see the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010.

Programming Examples

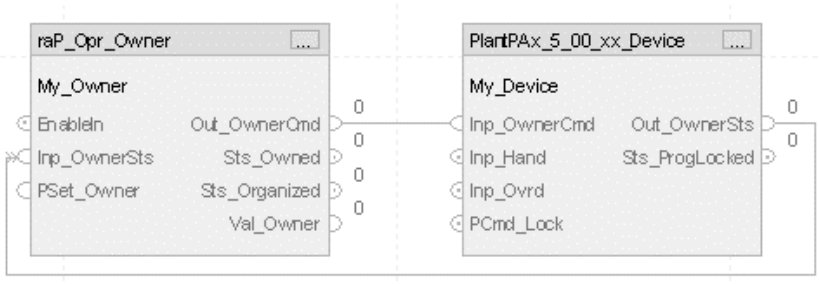
The raP_ Opr_Owner instruction must be coupled with a PCMDSRC instruction or a device/object that contains a PCMDSRC instruction. There are input and output parameters to accomplish the interface:



The 'Owner.Out_OwnerCmd' output parameter sends any pending ownership requests to the PCMDSRC owner interface parameter of the PCMDSRC (Inp_OwnerCmd).

The 'Owner.Inp_OwnerSts' input parameter receives existence, configuration, and current state information from the associated PCMDSRC (Out_OwnerSts).

When using a PlantPAx® 5.00.xx device/object these parameters are supplied on the object to interface the ownership instruction with the object's internal PCMDSRC:



When using a PlantPAx 5.00.xx device/object as a participant on the Bus, the Bus referenced ownership interface parameters are used as input and output to the device/object:



Graphic Symbols

There are no graphic symbols or HMI graphic support for the raP_Opr_Owner instruction.

Faceplates

There is no faceplate for the raP_Opr_Owner instruction.

Arbitration (raP_Opr_ArbitrationQ)

The raP_Opr_ArbitrationQ (Arbitration) Add-On Instruction extends the functionality of the raP_Opr_Owner (Ownership) instruction to allow for the queuing of ownership requests within an ownership class.

Guidelines

Use this instruction if you want to extend the functionality of the raP_Opr_Owner to include multiple ownership requests within the same ownership class. One raP_Opr_ArabitrationQ instruction can be associated to a single raP_Opr_Owner to perform optional queuing of any of the four ownership classes (Oper, Prog, Ext, Maint).

Functional Description

The raP_Opr_ArbitrationQ Add-On Instruction is used to manage arrays of owner IDs for each class of ownership. Ownership requests made of the associated raP_Opr_Owner are intercepted by the raP_Opr_ArbitrationQ instruction and placed into a queue (DINT array) in the order in which they are received. By default, the earliest entry is used by the raP_Opr_Owner for ownership evaluation. As ownership requests and releases are made of the raP_Opr_Owner, the raP_Opr_ArbitrationQ instruction manages the addition and deletion of these requests and releases in the respective queues.

Use of the raP_Opr_ArbitrationQ instruction is optional. It extends the functionality of the raP_Opr_Owner instruction. Use the raP_Opr_ArbitrationQ instruction when there are multiple entities that could simultaneously request owner ship of this entity AND you wish to maintain their order of request or manipulate the requests for prioritization.

Items in the queues can be reordered by user programming to accommodate prioritization schemes.

IMPORTANT	You should never add or delete IDs on the queue by user programming. Addition and deletion of IDs is done by the instruction itself based on the ownership requests made by the associated raP_Opr_Owner instruction.

The following image shows how a raP_Opr_ArbitrationQ instruction configured with the raP_Opr_Owner instruction 'My_Owner' as its associated owner instruction. Further, it is configured to have queues for Oper, Prog, and Maint owner classes. It does not use a queue for the External owner class:



Required Files

Controller Files

The raP_Opr_ArbitrationQ_5.00.**00**_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

The raP_Opr_ArbitrationQ Instruction uses no visualization files or components.

Operations

Command Sources

The raP_Opr_ArbitrationQ instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command source.

Alarms

The raP_Opr_ArbitrationQ Instruction uses no alarms.

Virtualization

The raP_Opr_Owner Instruction has no Virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	The raP_Opr_Arbitration instruction clears all queues and counters when scanned false or with the EnableIn=0.
Powerup (prescan, first scan)	The raP_Opr_Arbitration instruction clears all queues and counters on PreScan/first scan.
Postscan	No SFC Postscan logic is provided.

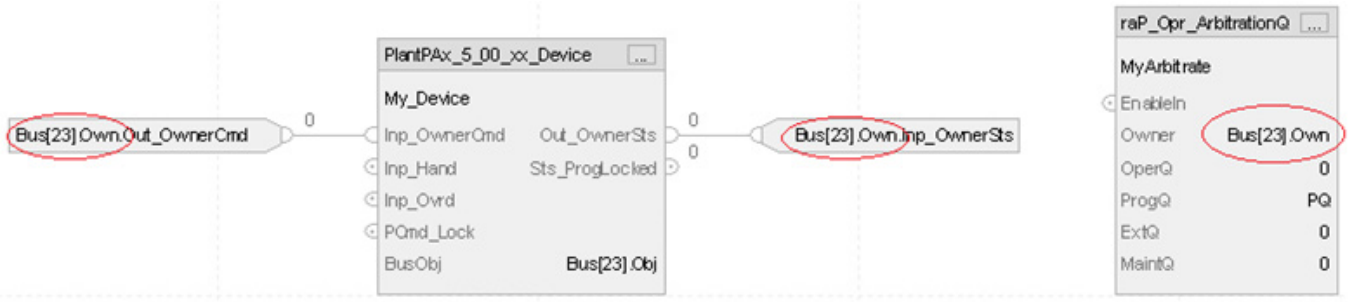
For more information, see the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010.

Programming Examples

The example in the Function Description section shows the basic use of the raP_Opr_ArbitrationQ Add-On Instruction for extending an ownership instruction. Typically, the raP_Opr_ArbitrationQ instruction is used in association with a Bus-resident entity. The following shows an arbitration instruction that is associated with a Bus referenced entity. The owner field is the '.Own' sub-element of the Bus structure:



A Bus enabled PlantPAx® device/object has its own Bus element. When extending the ownership functionality with the arbitration instruction, use the same Bus element reference that is used for that device/object:



Graphic Symbols

There are no graphic symbols or HMI graphic support for the raP_Opr_ArbitrationQ instruction.

Faceplates

There is no faceplate for the raP_Opr_ArbitrationQ instruction.

Notes:

Organizational Scan (raP_Opr_OrgScan)

The raP_Opr_OrgScan (Organizational Scan) Add-On Instruction processes user-defined organizational trees to propagate status information from child nodes to parent nodes, and to propagate commands from parent nodes to child nodes. Further ownership requests and status can be propagated between parent and child nodes. The functionality to edit any organizational trees is built into this Add-On Instruction and edit requests are executed synchronously with the organizational scan.

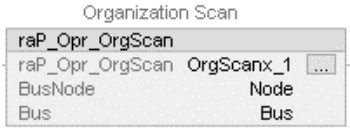
Guidelines

Use this instruction if you want to build parent child relationships between controller-resident entities and propagate status, command, and ownership functionality between them.

Functional Description

The raP_Opr_OrgScan Add-On Instruction is used to propagate the information between elements of organizational trees and allow ownership relationships between those elements. It also maintains the organizational tree editing functions and the edit token ownership.

A single raP_Opr_OrgScan instruction is to be used to scan all organizational trees in a controller. As such, a single instance of the Add-On Instruction is to be scanned unconditionally in a slow, low-priority task.



'Node' is an array that is comprised of elements of type 'raP_UDT_Opr_Bus_Node.' This array must be of sufficient length to accommodate the maximum possible number of organizational tree nodes. Typical systems can have 100...1000 nodes depending upon the complexity of the organizational trees. Significant scans can occur when Node arrays with greater than 500 elements are used.

'Bus' is an array that is comprised of elements 'raP_UDT_Opr_Bus.' This array must be of sufficient length to accommodate the maximum possible number of devices/objects that you wish to place on the Bus.

IMPORTANT The name of the Node array must be 'Node' and the name of the Bus array must be 'Bus' for raP_Opr_OrgView operation.

Edit functionality and Edit Token management is also maintained in the raP_Opr_OrgScan instruction. All editing of the nodal organizational trees occurs through this instruction instance.

Required Files

Controller Files

The raP_Opr_OrgScan_5.00.**00**_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

The raP_Opr_OrgScan Instruction uses no visualization files or components.

Operations

Command Sources

The raP_Opr_OrgScan instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command source. A raP_Opr_Owner and PCMDSRC instances are present in the Add-On Instruction to facilitate edit token ownership by an HMI client through a raP_Opr_OrgView instance.

Alarms

The raP_Opr_OrgScan Instruction uses no alarms.

Virtualization

The raP_Opr_OrgScan Instruction has no Virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	No EnableIn False logic is provided. The raP_Opr_OrgScan instruction must always be scanned true. In relay ladder logic, the raP_Opr_OrgScan instruction must be by itself on an unconditional rung.
Powerup (prescan, first scan)	All status and internal limits are cleared on prescan/first scan and array bounds and existing node configuration are checked.
Postscan	No SFC Postscan logic is provided.

For more information, see the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010.

Programming Examples

The example in the Function Description section shows the basic use of the raP_Opr_OrgScan Add-On Instruction. The raP_Opr_OrgScan can be executed from any controller language. But must be executed unconditionally. The scan update of all nodes in a system may require long scan times, therefore it is recommended to be executed from a slow, low-priority task. Further, the associated timeouts (Program, and so on) should be lengthened accordingly.

Graphic Symbols

There are no graphic symbols or HMI graphic support for the raP_Opr_OrgScan instruction.

Faceplates

There is no faceplate for the raP_Opr_OrgScan instruction.

Notes:

Organizational View (raP_Opr_OrgView)

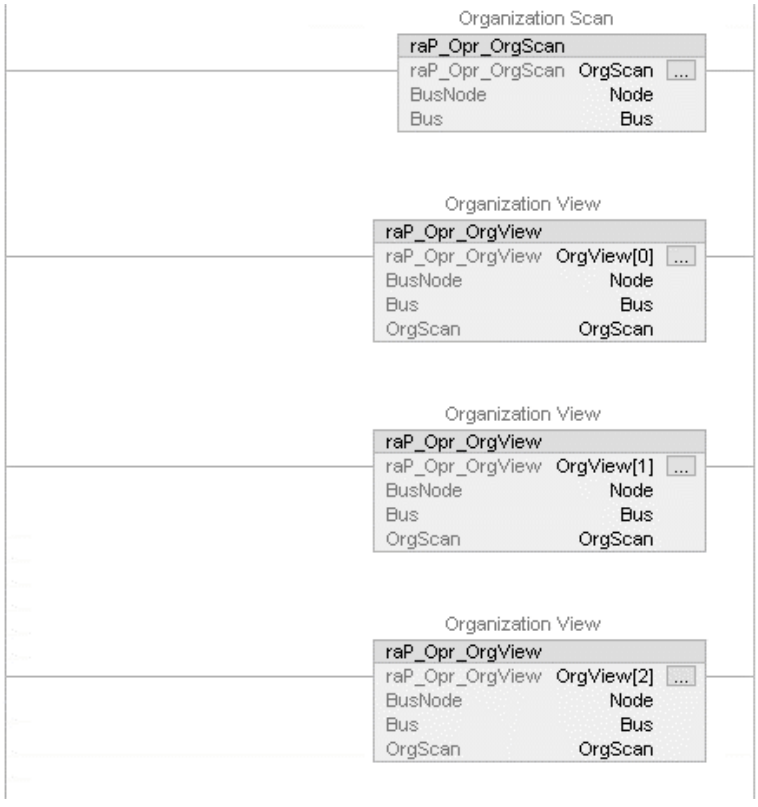
The raP_Opr_OrgView (Organizational View) Add-On Instruction continuously scans the organizational trees and queues the information into a standard hierarchical tree view for presentation on a single HMI (FactoryTalk® View SE) client.

Guidelines

Use this instruction if you want to display organizational tree information on an HMI client. Another instance of the raP_Opr_OrgView instruction needs to be instantiated and scanned within the user project for each intended HMI client.

Functional Description

The raP_Opr_OrgView Add-On Instruction is used to read and format organizational tree information into a standard tree view on the HMI. The Add-On Instruction automatically adjusts the tree view based on user edits of the organizational tree. It is intended to have one raP_Opr_OrgView instruction instance for each HMI client viewing the organizational trees in a controller. This is so each HMI client can have a tree view that is unaffected by the actions of another client (expand, collapse, edit, and so on).



Here there are three raP_Opr_OrgView instances that are associated with the primary raP_Opr_OrgScan instance to update three individual HMI clients.

IMPORTANT An array of raP_Opr_OrgView backing tags must be created at the controller scope of name 'OrgView.' Each element of the array is used as the backing tag for each instance servicing a single HMI client. See Organizational Scan (raP_Opr_OrgScan) on page 153 for other naming requirements.

Required Files

Controller Files

The raP_Opr_View_5.00.00_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

See Visualization Files on page 26 for general information on visualization files.

Operations

Command Sources

The raP_Opr_OrgView instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command source.

Alarms

The raP_Opr_OrgView Instruction uses no alarms.

Virtualization

The raP_Opr_OrgView Instruction has no Virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	No EnableIn False logic is provided. The raP_Opr_OrgView instruction must always be scanned true. In relay ladder logic, the raP_Opr_OrgView instruction must be by itself on an unconditional rung.

Condition	Description
Powerup (prescan, first scan)	All status, internal HMI buffers, and internal limits are cleared on prescan/first scan and array bounds and existing node configuration are checked.
Postscan	No SFC Postscan logic is provided.

For more information, see the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010.

Programming Examples

The example in the Function Description section shows the basic use of the raP_Opr_OrgView Add-On Instruction for three HMI clients to monitor of the organizational tree.

The raP_Opr_OrgView instances are to be executed immediately after the raP_Opr_OrgScan instance execution. And are to be scanned unconditionally (always enabled).

Graphic Symbols

A Graphic Symbol (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of graphic symbols, with tag structures in the ControlLogix® system, aid consistency and save engineering time.

Graphic Symbol Name	Graphic Symbol	Description
GO_nav_ShowTree		Show the object tree view for the current client
GO_nav_NavShowTreeView		Show the object tree view for the current client
GO_nav_ShowHWTree1		Show the hardware tree view for the current client
GO_nav_NavShowHWTreeView		Show the hardware tree view for the current client

Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Faceplates for this instruction are shown in Chapter 5 Organization and Propagation.

Notes:

n-Position Device (raP_Dvc_nPos)

The raP_Dvc_nPos (n-Position Device) Add-On Instruction controls a circular or linear discrete device. The device can have between 2 and 30 positions. The instruction provides outputs to select each individual position, and it provides outputs to drive the device toward increasing positions (“clockwise” for a circular device) or toward decreasing positions (“counterclockwise” for a circular device).

For linear devices, the raP_Dvc_nPos instruction can be configured to return to Position 1 on every move, approaching the target position from the ‘same side’ on each move to improve position repeatability, or move directly to the new position.

For circular devices, the raP_Dvc_nPos instruction can be configured to move only “clockwise” to increasing positions, or to move in whichever direction provides the shortest move. For example, with an 8-position device, a move from position 1 to position 6 could be clockwise only (from position 1 through positions 2, 3, 4, and 5 to position 6) or via the shortest path (from position 1 through positions 8 and 7 to position 6).

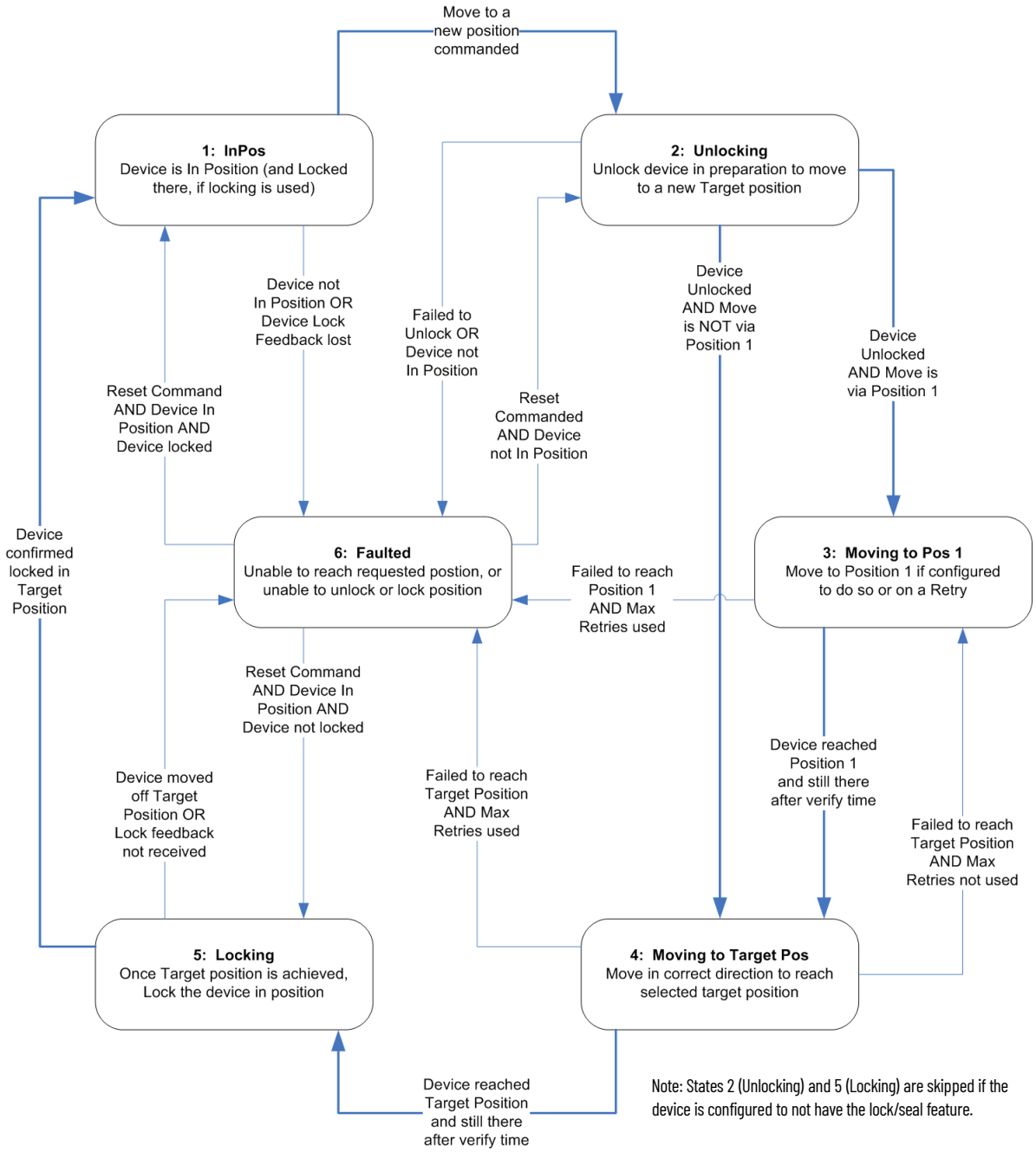


Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

The raP_Dvc_nPos instruction also supports devices that have a lock or seal which must be unsealed before moving the device and resealed after the motion is complete. The instruction supports devices such as rotary tube selector valves, which use indexing cylinders to accomplish motion from position to position, with outputs to cylinders which engage, shift clockwise, retract, and shift counterclockwise.

The diagram shows the functional characteristics of the raP_Dvc_nPos Add-On Instruction.



Functional Description

The n-Position Device instruction provides the following capabilities:

- Controls and monitors a multi-position device (up to 30 positions), such as rotary valves, and other devices with multiple fixed positions
- Monitors limit switches or other position feedback and displays actual device position
- Checks for failure to reach the requested position within a configured time. Provides Alarm on Position Failure
- Monitors Permissive conditions to allow moving to a new position

- Monitors Interlock conditions to de-energize the device, or to request the device to return to Position 1. Provides an Interlock Trip Alarm if an interlock condition causes the device to de-energize or return to Position 1
- Provides outputs to request each position, and provides outputs for increasing and decreasing position
- Provides outputs to sequence indexing cylinders for devices that use pneumatic or hydraulic devices to step through positions. The cylinders work in an Extend, Shift, Retract, Shift sequence to engage the device, and step it to the next position. The cylinder sequence reverses the Shift directions when driving circular devices 'counterclockwise' (for devices that support bidirectional operation)
- Optionally provides handling of a position lock or seal that must be driven to an unlocked or unsealed state before moving the device, and returned to a locked or sealed state after the move is completed
- Capability for maintenance personnel to take the device out of service.

IMPORTANT This capability is not a substitute for hard lockout/tagout (LOTO) procedures.

- If the optional lock or seal is used, provides position feedback for the lock or seal to verify the locked or unlocked state at appropriate times. Provides Alarm for Lock Failure
- Provides a virtual capability, responding as if a working device were present while keeping outputs de-energized. The virtual capability can be used for activities such as system testing, operator training, or as part of a full process virtualization
- Monitors for I/O communication faults and provides an I/O Fault Alarm
- Provides an 'Available' status for use by automation logic so the logic knows when it has control of the device
- Provides maintenance capabilities, such as the ability to bypass any bypassable interlocks or permissives or temporarily disable feedback checking

Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Dvc_nPos_5.00.**00**_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

This section describes the primary operations for this Add-On Instruction.

Alarms

Alarms are implemented using Logix Tag Based Alarms.

Access to alarms is via
<backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer® online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

Virtualization

Virtualization in raP_Dvc_nPos disables the normal outputs and provides feedback of a working device. This lets you operate the n_Postion Add-On Instruction as if it were a working device, even if no device is physically present.

Use Maintenance Commands or Program Commands to command the device to Virtual (simulated) or Physical (controlling real device). The Virtual or Loopback Test icon  is displayed at the top left of the Operator faceplate.

You can also set the following parameters in virtual:

- Cfg_VirtualPosTime - time to reach target position in virtual (seconds)
- Cfg_VirtualLockTime - time to lock or unlock in virtual (seconds)
- Cfg_VirtualCylTime - time to simulate index cylinder feedback in virtual (seconds)

When you have finished in virtual, use PCmd_Physical (from program logic) or MCmd_Physical (from the HMI faceplate) to return to normal operation.

Execution

The following table explains the handling of instruction execution conditions.

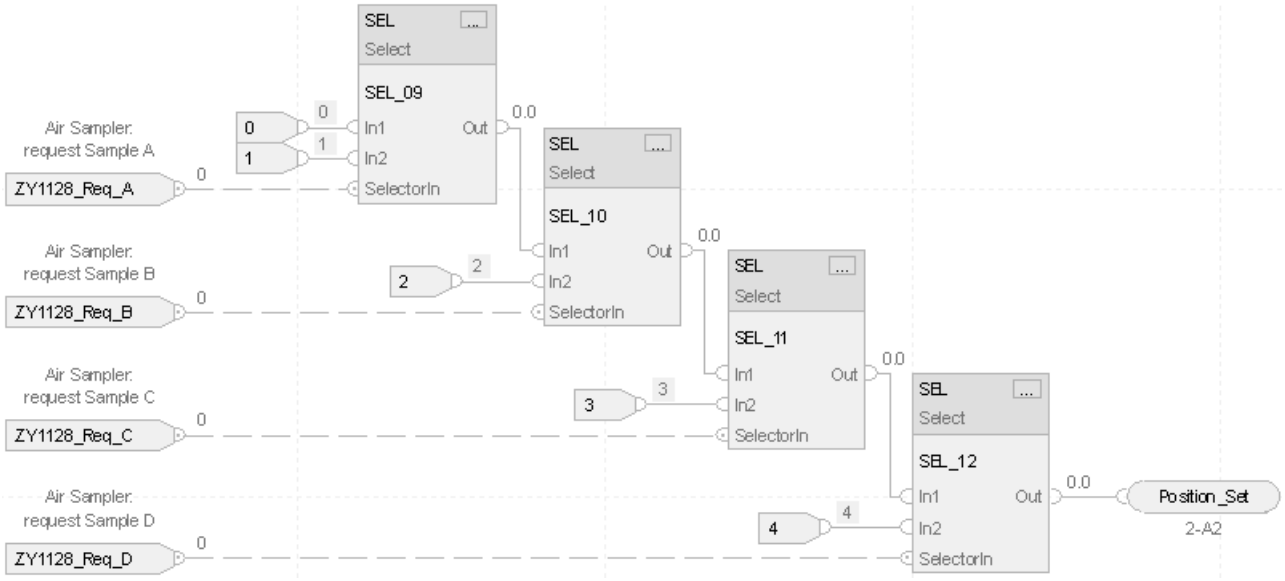
Condition	Description
EnableIn False (false rung)	Processing for EnableIn False (false rung) is handled the same as if the device were taken out of service by Command. The device outputs are de-energized and the device is shown as Program Out of Service on the HMI. All alarms are cleared.
Powerup (prescan, first scan)	On prescan, any commands that are received before first scan are discarded. The device is de-energized. On first scan, the device is treated as if it were returning from Hand command source: the instruction state is set based on the position feedback that is received from the device. If the feedback is valid for one position, the device is set to that position, and, if the device has the lock/seal capability enabled, the device is locked in that position. If the device does not have position feedback or the position feedback is invalid, the device is set to the 'unknown/powerup' state. The command source is set to its default, either Operator or Program (unlocked).
Postscan	No SFC Postscan logic is provided.

For more information, see the Logix 5000 Controllers Add-On Instructions Programming Manual, publication 1756-PM010.

Programming Example

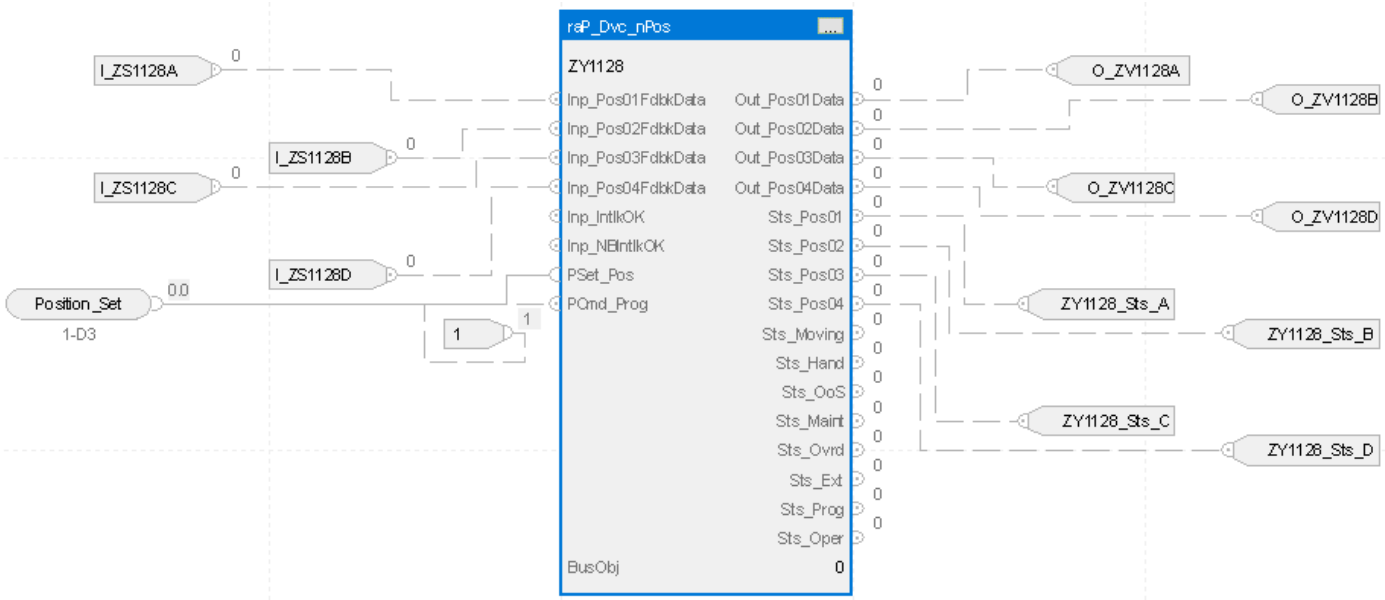
This example uses the raP_Dvc_nPos instruction to control a rotating selector valve with four fixed positions. Each position directs a sample air from one of four sampling locations to an air quality monitor. The rotating selector valve directs all non-selected streams to flow to a common outlet to vent. In this example, the device handles transitions from one position to another. The instruction does not have to enforce a progression of positions to get to the desired state.

First, some simple selector logic is used to turn the individual sampler position requests into a position selection number. The select blocks provide a value of 1, 2, 3, or 4 based on the requests, or 0 if no request is active.



The requested position is fed to the PSet_Pos program setting.

Next, the outputs of the instruction are connected to the selector valve. For this example, the parameter Cfg_NumPos is set to 4, indicating this is a four-position device. The parameter Cfg_HasPosFdbk and Cfg_UsePosFdbk are both set to 1 to indicate that the selector valve provides position feedback, and must be used. The input parameters for positions 1...4 (Inp_Pos01FdbkData, Inp_Pos02FdbkData, Inp_Pos03FdbkData, and Inp_Pos04FdbkData) are connected to the digital inputs representing the status of the selector valve.



Next, the instruction is configured to connect to the outputs of the instruction to the selector valve. The parameter Cfg_OutPosLatch is set to 1 to latch the output parameter until a new position is commanded. The output parameters for positions 1...4 (Out_Pos01Data, Out_Pos02Data, Out_Pos03Data, and Out_Pos04Data) are connected to the digital outputs that command the selector valve to the desired position.

Once the I/O have been configured, the instruction can be configured to recognize commands from the analyzer control sequence. In this example, the Program setting for target position (PSet_Pos set to 1, 2, 3 or 4) is connected to the commands from the analyzer control sequence to command the selector valve to the desired position in the sequence. The Command Source is configured to default to Program

The valve does not have a locking or sealing device, so Cfg_HasLock is set to 0.

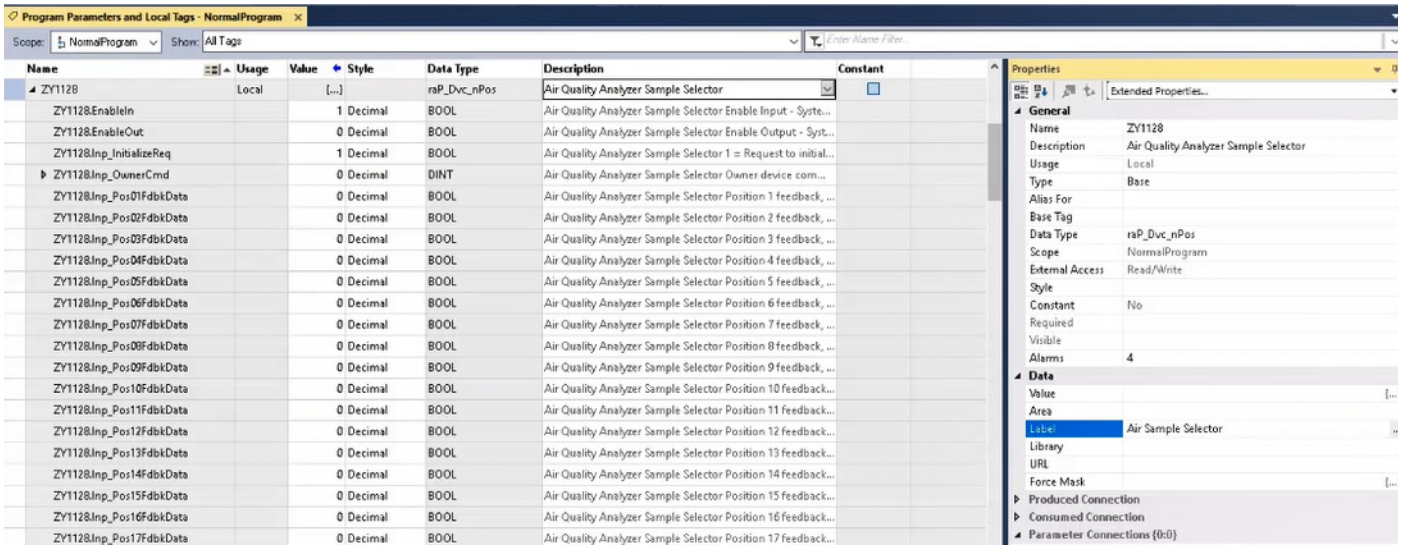
In the controller Alarm Manager, the object's Alm_PosFail alarm has its "Use" checkbox checked to enable the position fail alarm. The remaining alarms have their “Use” checkbox unchecked, as these alarms are not used in this application. The parameter Cfg_PosCheckTime is set to 30 seconds, to allow 30 seconds for the selector valve to achieve commanded position before a position failure alarm is issued.

The status output parameters (Sts_Pos01, Sts_Pos02, Sts_Pos03, and Sts_Pos04) can be connected to external tags to be used by the analyzer control sequence, if desired.

Lastly, the following tag extended properties must be configured to drive the text on the operations faceplate. See Logix 5000 Controllers I/O and Tag Data, publication 1756-PM004 for more information on extended tags.

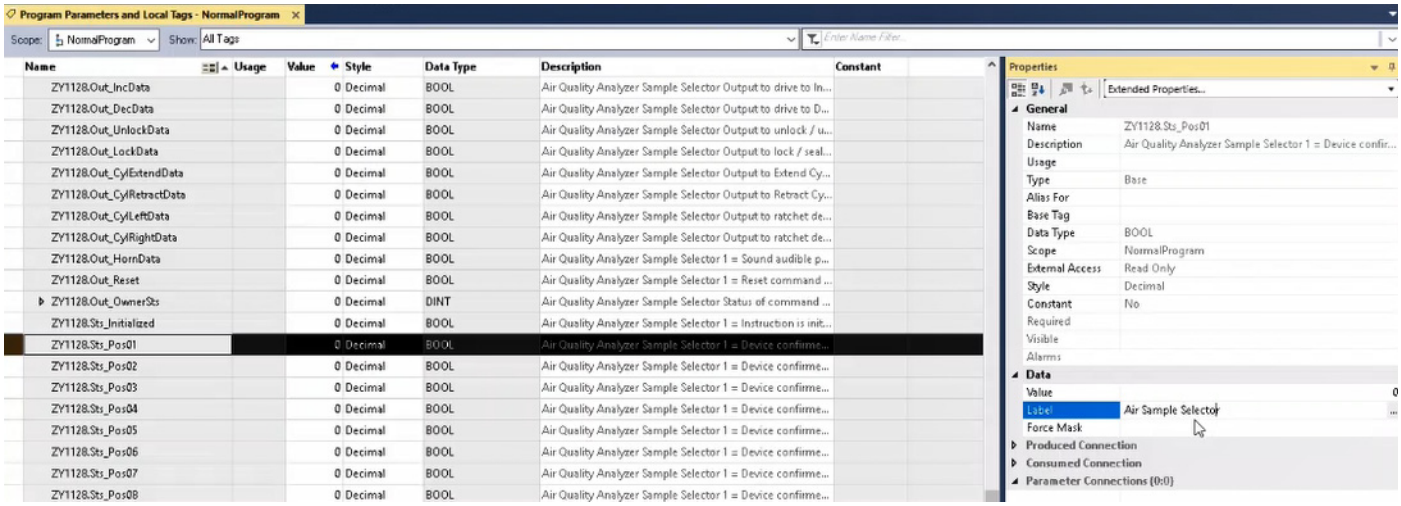
In this example, the selector valve P&ID tag is ZY1128. In this example, the strings are set as follows:

Extended Property	Value
Name	ZY1128
Label (ZY1128.@Label)	Air Sample Selector
Description (ZY1128.@Description)	Air Quality Analyzer Sample Selector
Library (ZY1128.@Library)	raP-5_00-SE
Area (ZY1128.@Area)	Area01

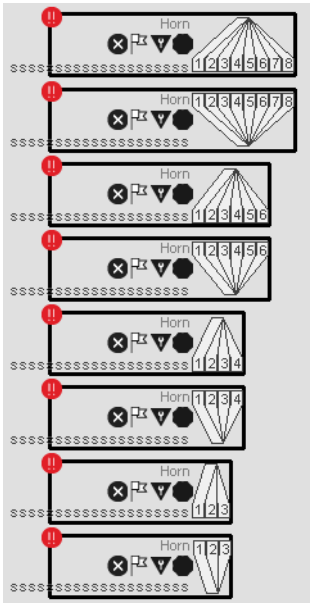
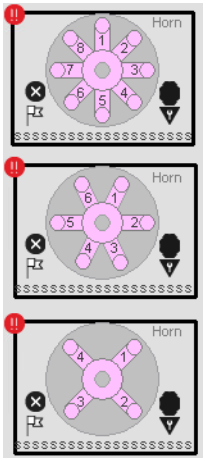


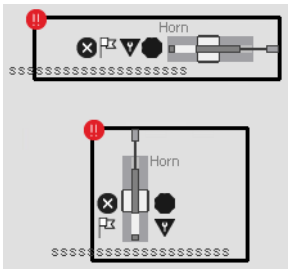
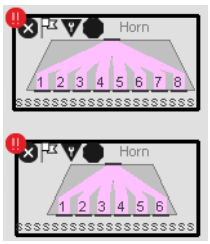
The label for the position name is set from the extended properties of the position. In this example, Position A would be set from the extended properties of ZY1128.Sts_Pos1. Repeat for each individual position.

Extended Property	Value
ZY1128.Sts_Pos1.@Label	Position A
ZY1128.Sts_Pos2.@Label	Position B
ZY1128.Sts_Pos3.@Label	Position C
ZY1128.Sts_Pos4.@Label	Position D


Program Parameters and Local Tags - NormalProgram
Scope: NormalProgram
Show: All Tags
Enter Name Filter...
Name | Usage | Value | Style | Data Type | Description | Constant
ZY1128.Out_IncData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to drive to In...
ZY1128.Out_DecData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to drive to D...
ZY1128.Out_UnlockData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to unlock / u...
ZY1128.Out_LockData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to lock / seal...
ZY1128.Out_CylExtendData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to Extend Cy...
ZY1128.Out_CylRetractData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to Retract Cy...
ZY1128.Out_CylLeftData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to ratchet de...
ZY1128.Out_CylRightData 0 Decimal BOOL Air Quality Analyzer Sample Selector Output to ratchet de...
ZY1128.Out_HornData 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Sound audible p...
ZY1128.Out_Reset 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Reset command ...
ZY1128.Out_OwnerSts 0 Decimal DINT Air Quality Analyzer Sample Selector Status of command ...
ZY1128.Sts_Initialized 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Instruction is init...
ZY1128.Sts_Pos01 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos02 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos03 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos04 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos05 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos06 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos07 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
ZY1128.Sts_Pos08 0 Decimal BOOL Air Quality Analyzer Sample Selector 1 = Device confirme...
Properties
Extended Properties...
General
Name ZY1128.Sts_Pos01
Description Air Quality Analyzer Sample Selector 1 = Device confir...
Usage
Type Base
Alias For
Base Tag
Data Type BOOL
Scope NormalProgram
External Access Read Only
Style Decimal
Constant No
Required
Visible
Alarms
Data
Value
Label Air Sample Selector
Force Mask
Produced Connection
Consumed Connection
Parameter Connections (0:0)

Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PnPos_8SelValve GO_PnPos_8SelValve1 GO_PnPos_6SelValve GO_PnPos_6SelValve1 GO_PnPos_4SelValve GO_PnPos_4SelValve1 GO_PnPos_3SelValve GO_PnPos_3SelValve1		These Graphic Symbols are used for routing one flow path to many vertically. These elements show all 3, 4, 6, or 8 ports and unused ports are not hidden.
GO_PnPOS_8PosRotary GO_PnPOS_6PosRotary GO_PnPOS_4PosRotary		These Graphic Symbols are used for rotary selection from one port to many ports. Only the ports that are enabled are displayed. For example, if you configure the PnPos instruction with five positions, ports 6, 7, and 8 are not displayed.

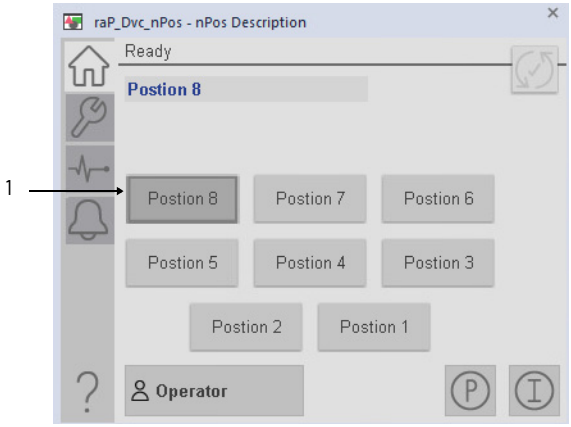
Graphic Symbol Name	Graphic Symbol	Description
GO_PnPOS_SlideGate GO_PnPOS_SlideGate1		These Graphic Symbols show a linear multi-position device. The symbol is animated to show the position that is based on the number of positions configured.
GO_PnPos GO_PnPos1		These Graphic Symbols are similar to those elements shown on the first page of this table, but ports that aren't configured are not displayed.

Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator

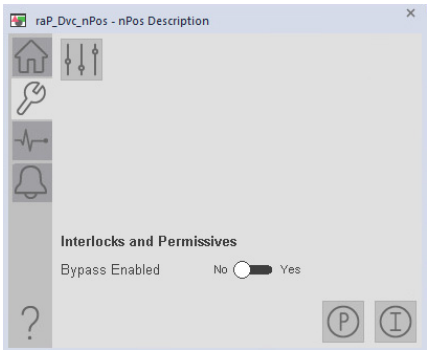
The Faceplate initially opens to the Operator (Home) tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator command source.



Item	Description
1	Current device position

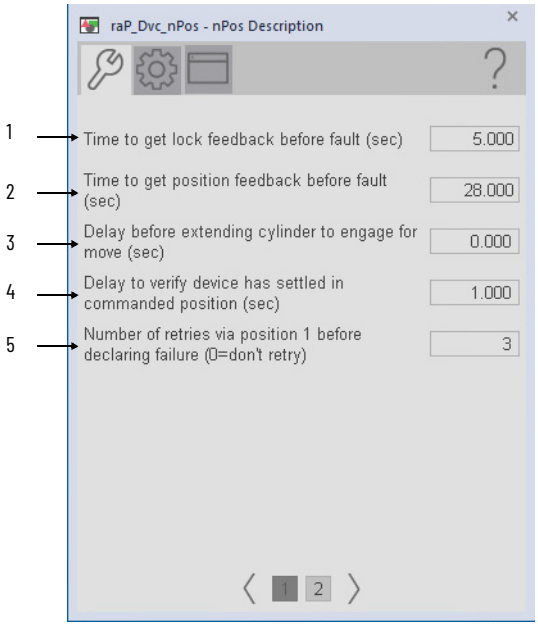
Maintenance

Maintenance personnel use the information and controls on the Maintenance tab to adjust device parameters, troubleshoot, temporarily work around device problems, and disable the device for routine maintenance.

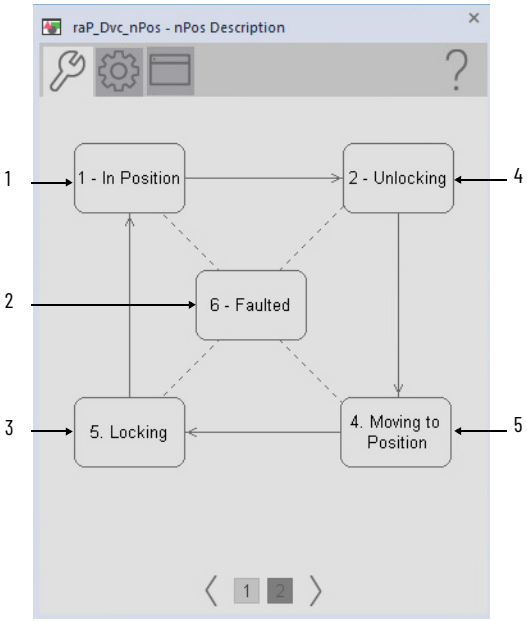


Advanced Maintenance Tab

The Advanced Properties Display opens to the advanced maintenance settings. The Advanced Properties Display provides access to device configuration parameters and ranges, and options for device and I/O setup. This tab is used for initial system commissioning or later system changes.

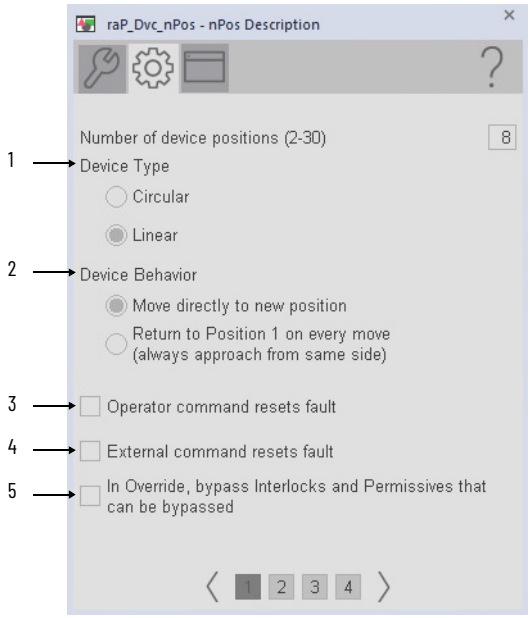


Item	Description
1	Enter a value (0...2,147,483) that indicates the maximum time that is allowed for lock feedback before a fault.
2	Enter a value (0...2,147,483) that indicates the maximum time that is allowed for the device to be in position before a fault.
3	Enter a value (0...2,147,483) that indicates the time delay before engaging a cylinder move.
4	Enter a value (0...2,147,483) that indicates the delay time to verify that a device is in a commanded position.
5	Enter a value (0...2,147,483) to indicate the number of retires for a device in Position 1 before a fault is set.

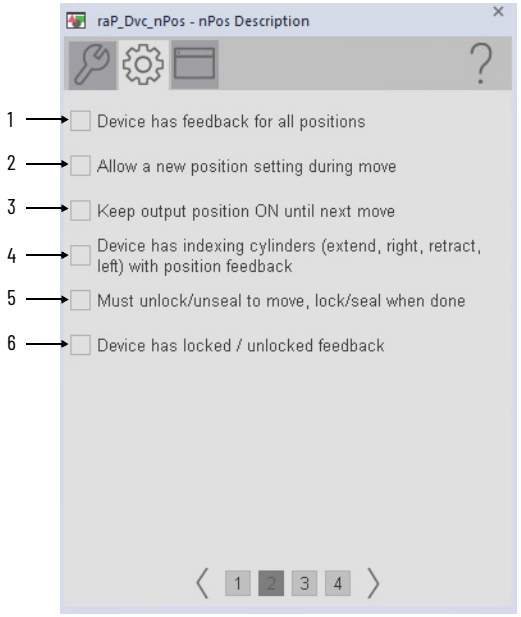


Item	Description
1	This state is highlighted whenever the device is in the position that it was last commanded.
2	This state is highlighted if the device feedback fails to confirm that the device is unlocked, moved to position, or locked as requested within the configured failure times.
3	This state is displayed only if the device is configured with a lock or seal that must be unlocked or unsealed to move. This state is highlighted when the device has reached its commanded position and has been commanded to lock, but locked feedback has not been received yet.
4	This state is displayed only if the device is configured with a lock or seal that must be unlocked or unsealed to move. This state is highlighted when the device has been commanded to unlock, but unlocked feedback has not been received yet.
5	This state is highlighted when the device is being moved to its commanded position, but that position feedback has not been received yet.

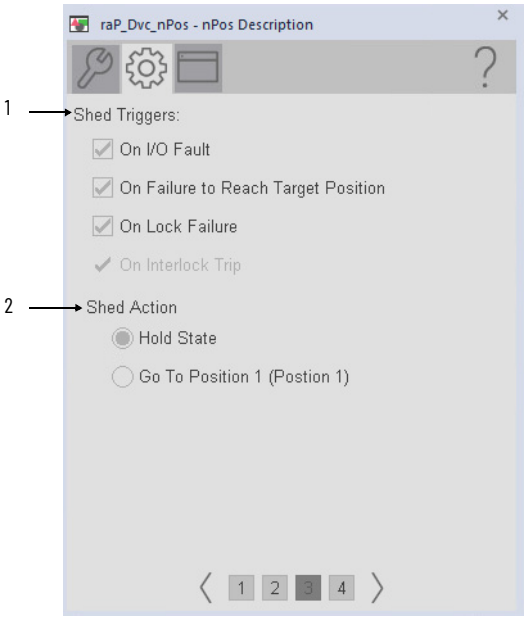
Engineering Tabs



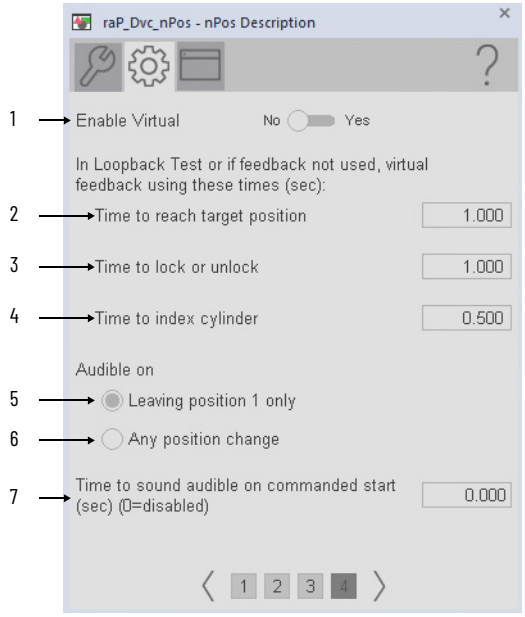
Item	Description
1	Select circular or linear for the device type
2	For Circular, select either clockwise only or clockwise or counterclockwise. For Linear, select whether the device returns to Position 1 for every move or moves directly to the target position.
3	Select to reset a fault on a new Operator command.
4	Select to reset a fault on a new External command.
5	Select to bypass permissives and interlocks in Override command source.



Item	Description
1	Select to enable device feedback for all positions.
2	Select to enable a new position command to be received and processed while a move is in progress.
3	Select to keep a position output On until the next move.
4	Select to enable indexing cylinders with position feedback.
5	Select if the device must be unlocked to move and locked when the move is complete.
6	Select if the device has feedback for locked/unlocked positions.



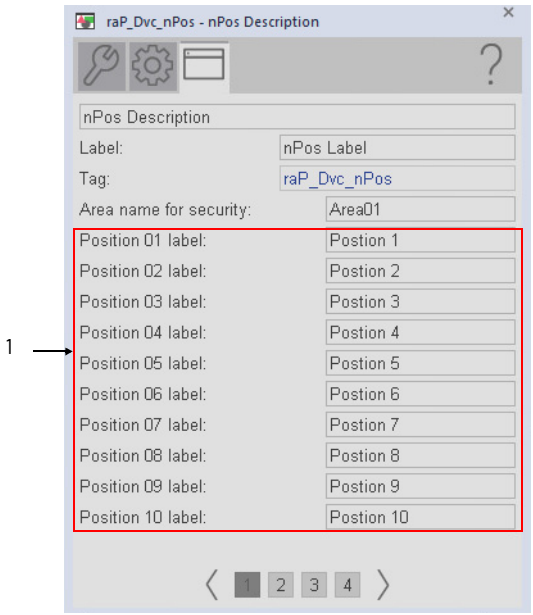
Item	Description
1	Select to enable whether an I/O Fault, Failure to Reach Position, or Lock Failure is considered a shed condition. The device always sheds on an Interlock Trip. This item cannot be unchecked. It is displayed as a reminder that the Interlock Trip function always triggers a shed. If a condition causes the device to shed, a reset is required to operate the device.
2	Select to determine whether the device holds the hold position or goes to position 1 upon a shed condition.



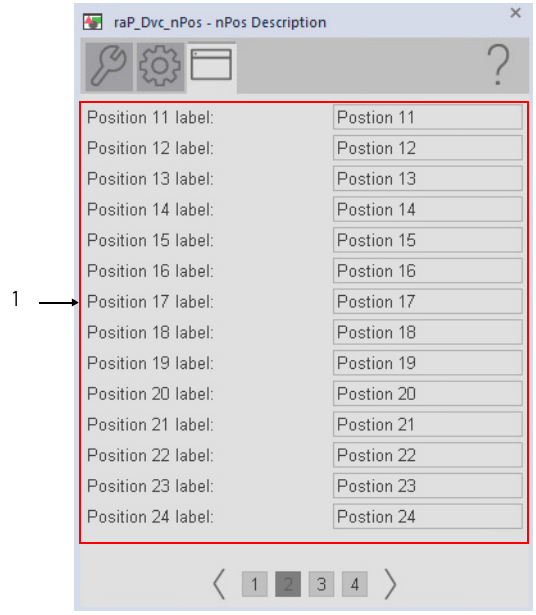
Item	Description
1	Select yes to enable virtual.
2	Enter the time (0...2,147,483) to reach a target position in virtual.
3	Enter the time (0...2,147,483) to lock/unlock with the device in virtual.
4	Enter the time (0...2,147,483) to simulate index cylinder feedback in virtual.
5	Select to sound an audible on a commanded stage from Position 1.
6	Select to sound an audible on a commanded stage from any State.
7	Enter the time (in seconds) that the audible sounds when there is a commanded State change.

HMI Configuration Tabs

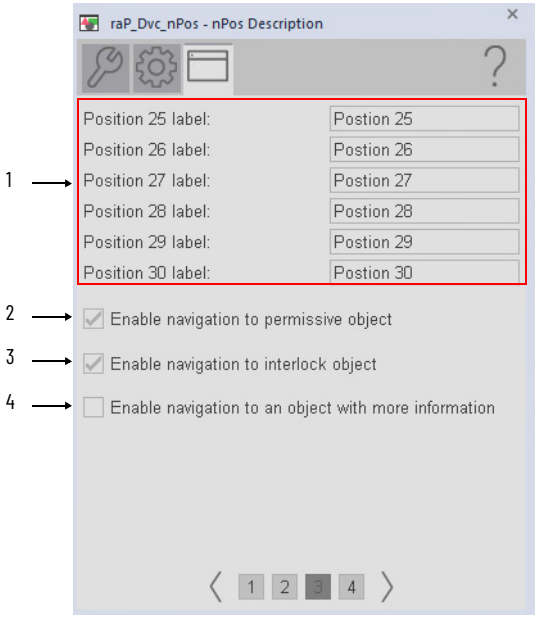
The HMI configuration tab provides access to displayed text, and faceplate-to-faceplate navigation settings. View the description, label, tag, and security area for the device. The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



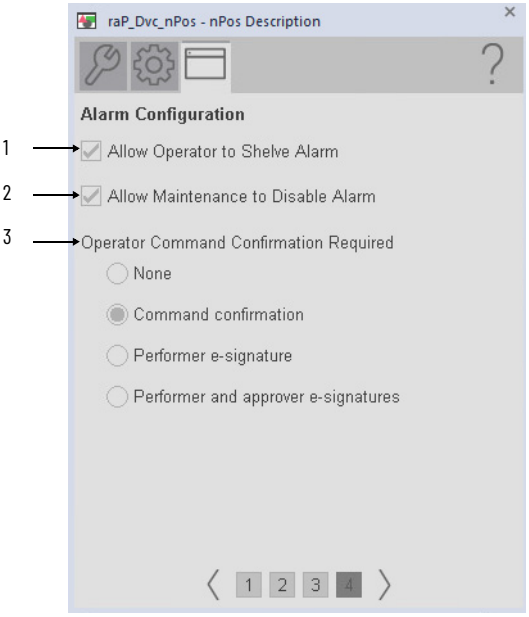
Item	Description
1	Name is displayed for each device position that is based on the number of positions.



Item	Description
1	Name is displayed for each device position that is based on the number of positions.



Item	Description
1	Name is displayed for each device position that is based on the number of positions.
2	Select to indicate that a permissive object is connected to the permissive inputs of this object. **IMPORTANT**: The name of the Permissives object in the controller must be the name of the object with the suffix '_Perm'. For example, if your raP_Dvc_nPos object has the name 'nPos123', then its Permissives object must be named 'nPos123_Perm'
3	Select to indicate that an interlock object is connected to the interlock inputs of this object. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_Intlk'. For example, if your raP_Dvc_nPos object has the name 'nPos123', then its Interlock object must be named 'nPos123_Intlk'.
4	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.



Item	Description
1	Select to allow Operator to shelve alarm.
2	Select to allow Maintenance to disable alarm.
3	Select to configure operator command confirmation. This action would take place after any operator command.

Diagnostics Tab

The Diagnostic tab provides indications that are helpful to diagnose or help prevent device problems. The device problems can include specific reasons a device is 'Not Ready', device warnings and faults, warning and fault history, and predictive/preventive maintenance data.

Alarms Tab

The Alarms tab displays each configured alarm. The icon on the tab for the alarms page changes color to show the current active alarm status. A blinking alarm icon indicates that one or more alarms must be acknowledged or the device must be reset.

Mix-proof Valve (raP_Dvc_VlvMP)

Overview

The Mix-proof Valve (raP_Dvc_VlvMP) Add-On Instruction controls one mix-proof valve in a variety of modes and states, and can check position feedback inputs to verify that the valve reached the commanded position. An alarm can be provided on failure to reach a target position. The graphic symbols and faceplate shown below are examples of the graphical interface tools for this Add-On Instruction.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

Functional Description

The raP_Dvc_VlvMP Add-On Instruction provides the following capabilities:

- Operates a mix-proof valve with the following positions:
  - Closed
  - Opened
  - Lift upper seat (optional)*
  - Lift lower seat (optional)*
  - CIP/SIP leakage cavity (optional)
  - CIP/SIP upper seat (optional)*
  - CIP/SIP lower seat (optional)*

  The asterisk (*) indicates that the position can pulse the seat being cleaned or lifted opened and closed to provide enhanced cleaning. (As the seat is popped open and closed, the flow velocity across the seat is increased compared to the fully open seat position.) Pulse times are configurable.
- Operated by using a state model that makes sure that valve seats are sequenced properly to avoid cross-contamination
- Provides six outputs and six inputs. The outputs in each valve state (including intermediate states) are configurable for on and off states. The inputs that verify each valve state are configurable for their required on, required off, and don't care states. Provides feedback checking to make sure that the valve reaches each position, including intermediate positions before moving to the next position. The time for which the feedback inputs must match the configured pattern to confirm each position is configurable.

- Graphic symbols are provided for mix-proof valves in 2-D layouts and 3-D (isometric) layouts for ease in building valve array and routing manifold displays
- Capability for maintenance personnel to take the device out of service.

IMPORTANT	This capability is not a substitute for hard lockout/ tagout (LOTO) procedures.

- Provides inputs for Permissive conditions to enable moving the valve from the closed state
- Provides inputs for Interlock conditions to drive the valve to the closed state
- Monitors for I/O communication faults and closes the valve and alarms on a fault
- Provides an 'available' status for Program command source logic so automation code can know whether the valve can be controlled
- Provides a valve virtual capability. When the mix-proof valve is being simulated, outputs are left de-energized, and the instruction behaves as if a fully functioning valve were providing feedback

Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Dvc_VlvMP_5.00.**00**_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

This section describes the primary operations for this Add-On Instruction.

IMPORTANT	See Appendix B for Command Sources and Virtual types.

Alarms

Alarms are implemented using Logix Tag Based Alarms. P_Alarm and P_Gate are no longer used.

Access to alarms is via <backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer® online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

Virtualization

Virtualization in raP_Dvc_VlvMP disables the normal outputs and provides feedback of a working device. This lets you operate the n_Postion Add-On Instruction as if it were a working device, even if no device is physically present.

Use Maintenance Commands or Program Commands to command the device to Virtual (simulated) or Physical (controlling real device). The Virtual or Loopback Test icon is displayed at the top left of the Operator faceplate.

When you have finished in virtual, use PCmd_Physical (from program logic) or MCmd_Physical (from the HMI faceplate) to return to normal operation.

Execution

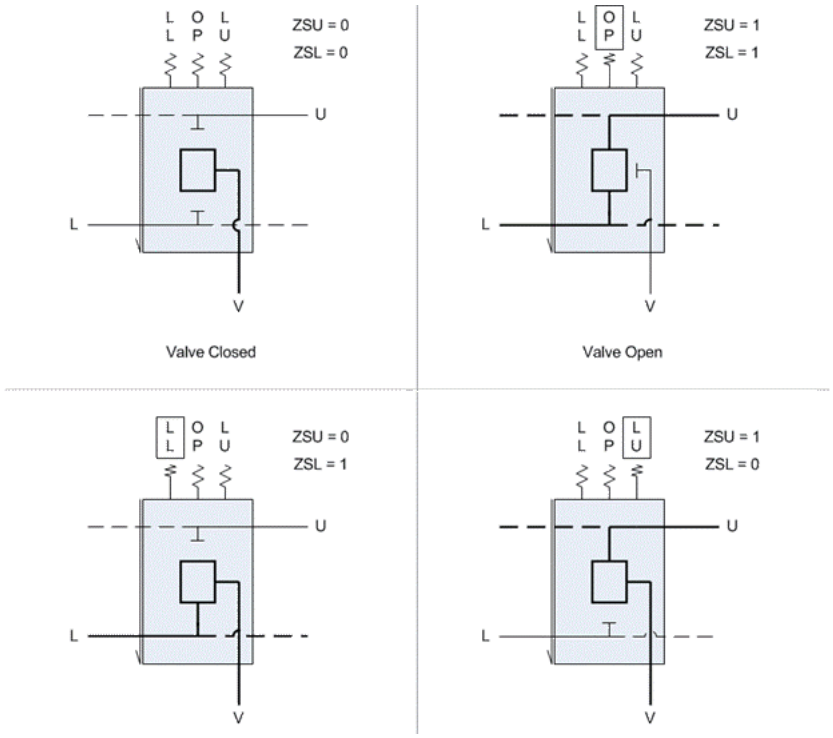
The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	Processing for EnableIn False (false rung) is handled the same as if the device were taken out of service by Command. The device outputs are de-energized and the device is shown as Program Out of Service on the HMI. All alarms are cleared.
Powerup (prescan, first scan)	On prescan, any commands that are received before first scan are discarded. The device is de-energized. On first scan, the device is treated as if it were returning from Hand command source: the instruction state is set based on the position feedback that is received from the device. If the feedback is valid for one position, the device is set to that position. If the device does not have position feedback or the position feedback is invalid, the device is set to the ‘unknown/ powerup’ state. The command source is set to its default, either Operator or Program (unlocked).
Postscan	No SFC Postscan logic is provided.

Programming Example

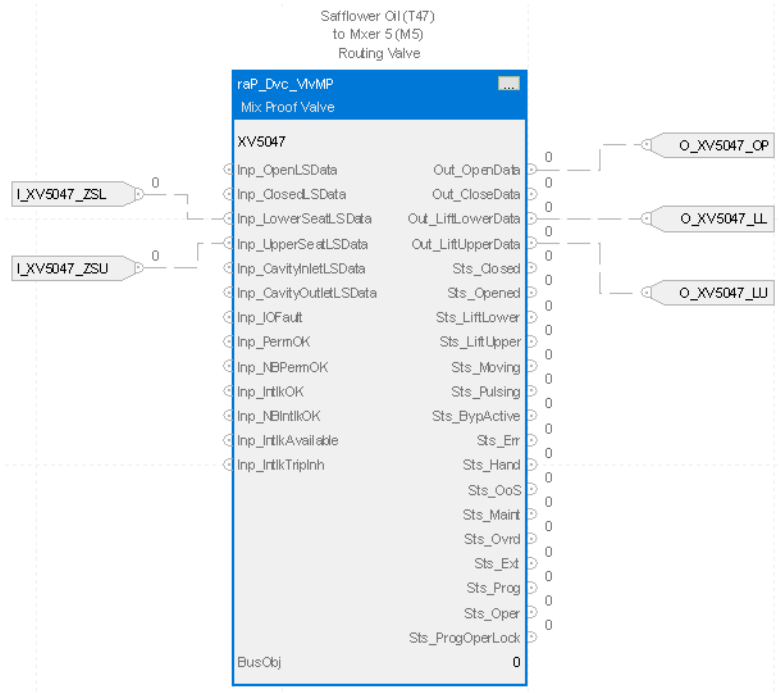
This example uses the raP_Dvc_VlvMP instruction to implement a mix-proof valve feeding bulk material (safflower oil) from a storage silo into a mixer.

For this example, the mix-proof valve connects to the control system by using two inputs and three outputs. The manufacturer's data sheet for the valve shows the following information.



In the closed position (all outputs off), flow is not directed anywhere and the valve cavity is vented to waste recovery. In the open state, flow is directed from the upper line to the lower line. In the Lower Lift position, flow is directed from the lower line through the valve cavity to waste recovery. In the Upper Lift position, flow is directed from the upper line through the valve cavity to waste recovery.

The raP_Dvc_VlvMP instruction for this valve is configured as shown in the following diagram.



The two limit switches from the field are connected into inputs Inp_LowerSeatLSData and Inp_UpperSeatLSData. The three outputs to the field are connected to Out_OpenData, Out_LiftLowerData and Out_LiftUpperData.

Lastly, the following tag extended properties must be configured to drive the text on the operations faceplate. See Logix 5000 Controllers I/O and Tag Data, publication 1756-PM004 for more information on extended tags.

The descriptive strings and supported states are configured.

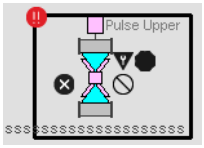
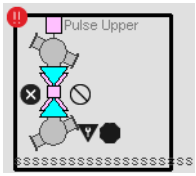
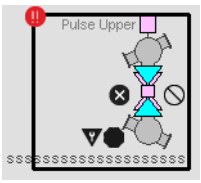
Extended Property	Value
Name	Safflower Oil T-47 to Mixer M-5
Label (ZY1128.@Label)	Safflower T-47 / M-5
Description (ZY1128.@Description)	XV-5047
Library (ZY1128.@Library)	raP-5_00-SE
Cfg_HasLiftLower, Cfg_HasLiftUpper	1 (checked)
Cfg_HasSIPCavity, Cfg_HasSIPLower, Cfg_HasSIPUpper	0 (unchecked)

The state configuration can be accessed and modified. For this example, we have to configure six states. There are three outputs only, so for each state, the outputs for Close, Cavity In, and Cavity Out can be ignored. We'll also ignore feedback states for feedback that is not required. The example uses parameters for all ignored values set to `0`.

The table shows the configuration for each valve state. These configuration items are Local Tags of the instruction.

State	Configuration
0 - De-energized	Cfg_OutStateTbl[0] = 2#0000_0000 (all outputs are 0) Cfg_FdbkReqdTbl[0] = 2#0000_1100 (Lift Lower and Lift Upper are required) Cfg_FdbkStateTbl[0] = 2#0000_0000 (Lift Lower and Lift Upper feedback state are 0)
1 - Close	Cfg_OutStateTbl[1] = 2#0000_0001 (Close output is 1 and all others are 0, Close output set for display purposes only) Cfg_FdbkReqdTbl[1] = 2#0000_1100 (Lift Lower and Lift Upper are required) Cfg_FdbkStateTbl[1] = 2#0000_0000 (Lift Lower and Lift Upper feedback state are 0)
3 - Open	Cfg_OutStateTbl[3] = 2#0000_0010 (Open output is 1 and all others are 0) Cfg_FdbkReqdTbl[3] = 2#0000_1100 (Lift Lower and Lift Upper are required) Cfg_FdbkStateTbl[3] = 2#0000_1100 (Lift Lower and Lift Upper feedback state are 1)
2 - Close Cavity Out	Cfg_OutStateTbl[3] = 2#0000_0010 (Open output is 1 and all others are 0) Cfg_FdbkReqdTbl[3] = 2#0000_1100 (Lift Lower and Lift Upper are required) Cfg_FdbkStateTbl[3] = 2#0000_1100 (Lift Lower and Lift Upper feedback state are 1)
4 - Lift Lower Seat	Cfg_OutStateTbl[4] = 2#0000_0100 (Lift Lower output is 1 and all others are 0) Cfg_FdbkReqdTbl[4] = 2#0000_1100 (Lift Lower and Lift Upper are required) Cfg_FdbkStateTbl[4] = 2#0000_0100 (Lift Lower feedback state is 1 and Lift Upper feedback state is 0)
5 - Lift Upper Seat	Cfg_OutStateTbl[5] = 2#0000_1000 (Lift Upper output is 1 and all others are 0) Cfg_FdbkReqdTbl[5] = 2#0000_1100 (Lift Lower and Lift Upper are required) Cfg_FdbkStateTbl[5] = 2#0000_1000 (Lift Lower feedback state is 0 and Lift Upper feedback state is 1)

Graphic Symbols

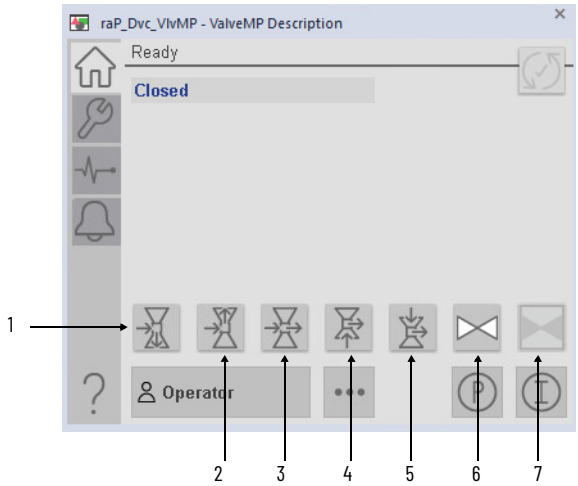
Graphic Symbol Name	Graphic Symbol	Description
GO_PValveMP2D		This Mix-proof Valve graphic object allows for numerous orientations on displays
GO_PValveMP_Orth		This 3-D orthogonal Mix-proof Valve graphic object provides different valve angle positions on displays.
GO_PValveMP_Orth1		This 3-D orthogonal Mix-proof Valve graphic object provides different valve angle positions on displays.

Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator

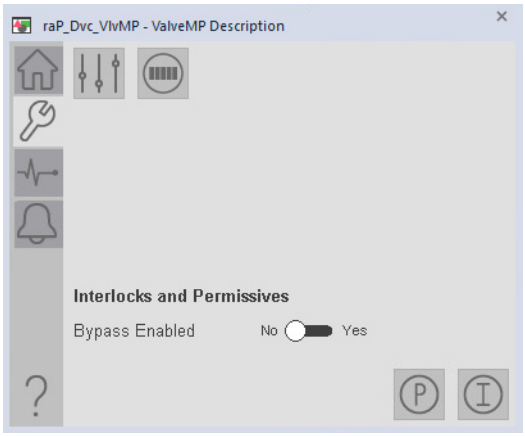
The Faceplate initially opens to the Operator (Home) tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator command source.



Item	Description
1	Select to go to the CIP/SIP Valve Lower Seat state.
2	Select to go to the CIP/SIP Valve Upper Seat state.
3	Select to go to the CIP/SIP Valve Cavity state.
4	Select to go to the Lift Valve Lower Seat state.
5	Select to go to the Lift Valve Upper Seat state.
6	Select to open valve.
7	Select to close valve.

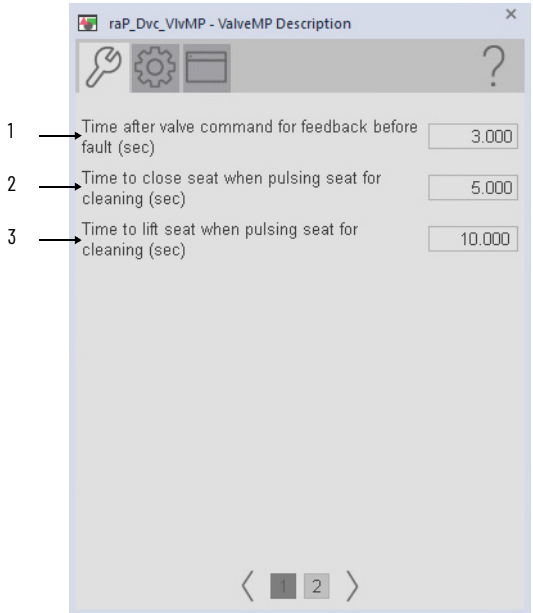
Maintenance

Maintenance personnel use the information and controls on the Maintenance tab to adjust device parameters, troubleshoot, temporarily work around device problems, and disable the device for routine maintenance.

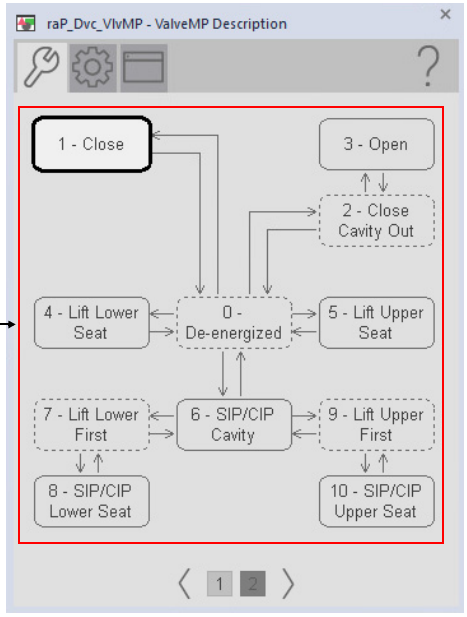


Advanced Maintenance Tab

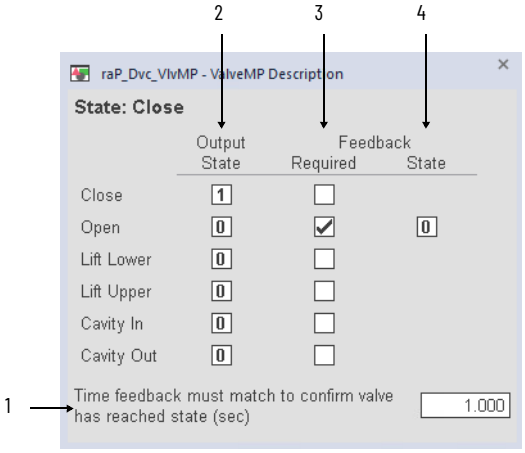
The Advanced Properties Display opens to the advanced maintenance settings. The Advanced Properties Display provides access to device configuration parameters and ranges, and options for device and I/O setup. This tab is used for initial system commissioning or later system changes.



Item	Description
1	Enter a value (seconds) that gives the valve time to achieve state before triggering a valve failure fault.
2	Enter a value (seconds) that the valve seat is held closed when pulsing for cleaning.
3	Enter a value (seconds) that the valve seat is held open when pulsing for cleaning.

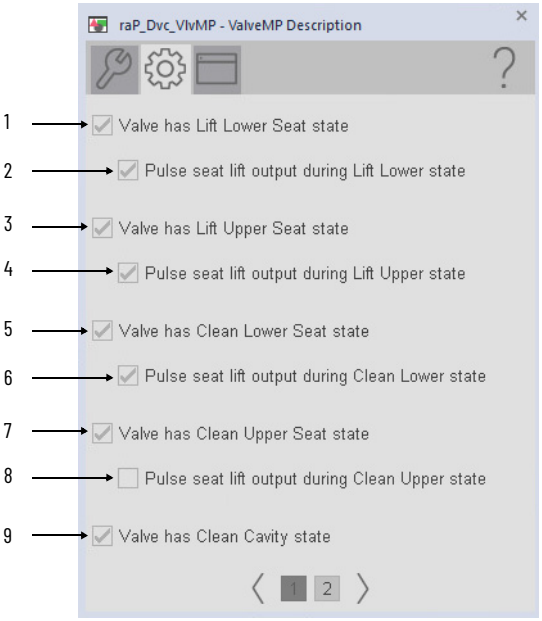


Item	Description
1	Select a state box to open the State Configuration display to access configuration parameters for the valve state

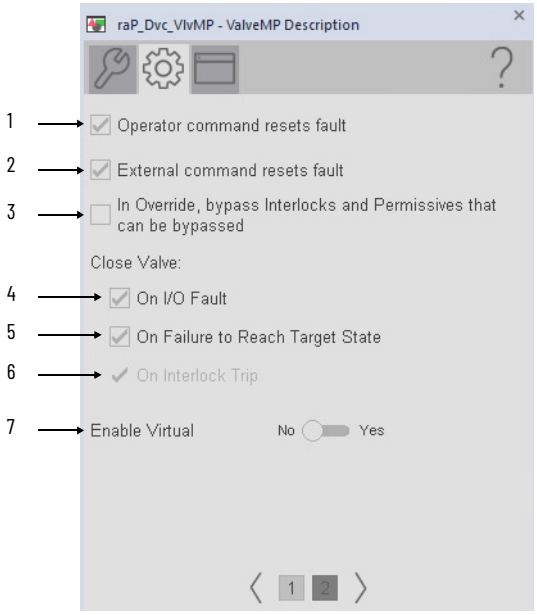


Item	Description
1	Enter a value (seconds) the feedback must match for the valve to achieve the selected state.
2	Set State of each Output in the selected valve state.
3	Select to require a feedback signal for the selected valve state.
4	Sets the desired value of the feedback signals for the selected valve state.

Engineering Tabs



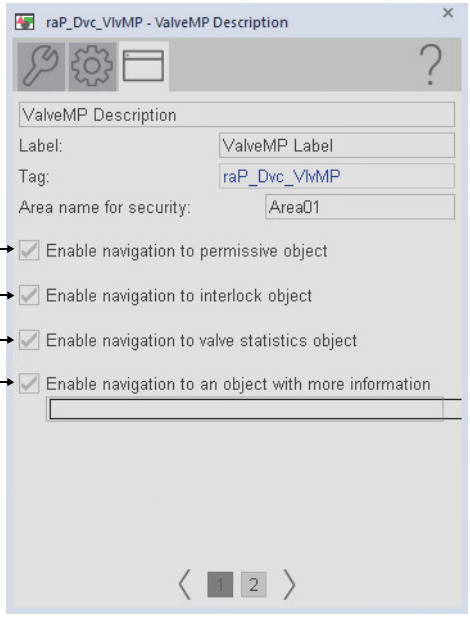
Item	Description
1	Select to enable the lift lower seat state for the valve.
2	Select to enable pulsing in the lift lower state.
3	Select to enable the lift upper seat state for the valve.
4	Select to enable pulsing in the lift upper state.
5	Select to enable the clean lower seat state.
6	Select to enable pulsing in the clean lower seat state
7	Select to enable the clean upper seat state.
8	Select to enable pulsing in the clean upper seat state.
9	Select to enable the clean cavity state.



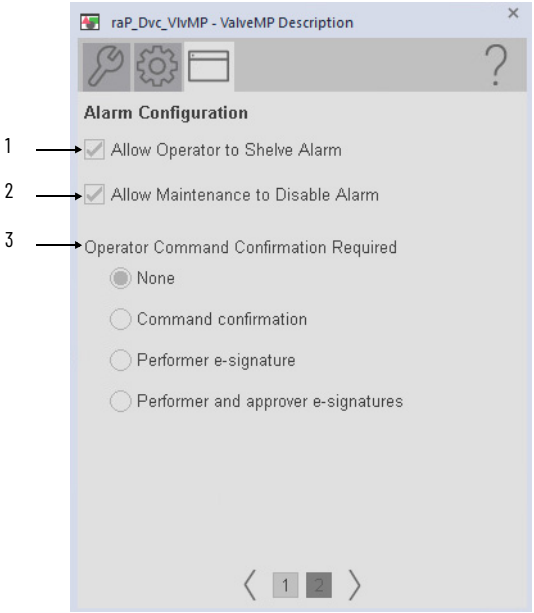
Item	Description
1	Select to reset a fault on a new Operator command.
2	Select to reset a fault on a new External command.
3	Select to bypass permissives and interlocks in Override command source.
4	Select to close the valve when an I/O Fault occurs. A reset is required to clear this latched shed condition. Clear this checkbox to show only the I/O fault status/alarm and not trip the valve if an I/O fault is detected.
5	Selcet to close the valve when a Position Fail occurs. A reset is required to clear this latched shed condition. Clear this checkbox to show only the Position Fail status/alarm and not trip the valve if a Position Fail is detected
6	The device always sheds (closes) on an interlock trip. This item cannot be unchecked. It is displayed as a reminder that the interlock trip function always triggers a shed.
7	Select yes to enable virtual.

HMI Configuration Tabs

The HMI configuration tab provides access to displayed text, and faceplate-to-faceplate navigation settings. Configure the description, label, tag, and security area for the device. The HMI configuration tab has settings that are common to the objects. See page 27 for descriptions of the common settings.



Item	Description
1	Select if a Permissive object is used with this valve. This check changes the Permissive indicator to a clickable button to open the Permissive faceplate. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_Perm'. For example, if your raP_Dvc_VlvMP object has the name 'ValveMP123', then its Permissive object must be named 'ValveMP123_Perm'.
2	Select if an Interlock object is used with this valve. This check changes the Interlock indicator to a clickable button to open the Interlock faceplate. **IMPORTANT**: The name of the interlock object in the controller must be the name of the object with the suffix '_Intlk'. For example, if your raP_Dvc_VlvMP object has the name 'ValveMP123', then its interlock object must be named 'ValveMP123_Intlk'.
3	Select if the Valve Stats instruction (for example, P_ValveStats) is used with this device. This check adds a button to the faceplate that opens the Valve Stats faceplate. **IMPORTANT**: The name of the Valve Statistics object in the controller must be the name of the object with the suffix '_ValveStats'. For example, if your raP_Dvc_VlvMP object has the name 'ValveMP123', then its Interlock object must be named 'ValveMP123_ValveStats'.
4	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.



Item	Description
1	Select to allow Operator to shelve alarm.
2	Select to allow Maintenance to disable alarm.
3	Select to configure operator command confirmation. This action would take place after any operator command.

Diagnostics Tab

The Diagnostic tab provides indications that are helpful to diagnose or help prevent device problems. The device problems can include specific reasons a device is 'Not Ready', device warnings and faults, warning and fault history, and predictive/preventive maintenance data.

Alarms Tab

The Alarms tab displays each configured alarm. The icon on the tab for the alarms page changes color to show the current active alarm status. A blinking alarm icon indicates that one or more alarms must be acknowledged or the device must be reset.

Discrete 2-, 3-, 4-state Device (raP_Dvc_D4SD)

The raP_Dvc_D4SD (Discrete 2-, 3-, 4-state Device) Add-On Instruction controls and monitors feedback from a discrete 2-state, 3-state, or 4-state device in a variety of modes, monitoring for fault conditions. These devices include multiple-speed motors or multiple-position valves. The graphic symbols and faceplate shown below are examples of the graphical interface tools that are used with this instruction.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

Functional Description

The Discrete 2-, 3-, or 4-state Device Add-On Instruction provides the following capabilities:

- Provides configuration to have two, three, or four selectable states for the device.
- Provides Operator and Program commands to select one of the two, three, or four states of the device.
- Controls four discrete outputs, with configurable states of each output in the various device states. Each output can be set, cleared, or left in last state in a given device state.
- Monitors four discrete feedback inputs, with configurable states (including 'must be on', 'must be off, and 'don't care') for each input in the various device states for monitoring the actual position of the device.
- Provides configurable text labels for each of the states.
- When feedback inputs are used, detects failure to reach the target state, after a configurable time, and alarms the failure. Optionally 'sheds' to the default state (state 0) on a feedback failure.
- Monitors Permissive conditions that allow commanding the device to each state.
- Monitors Interlock conditions that return the device to its default state (state 0).
- Provides virtualization of a normal working device, while holding the outputs to the real device de-energized, for use in testing or operator training.
- Monitors I/O communication status, providing an alarm on an I/O fault. Optionally 'sheds' to the default state on an I/O fault condition.

- Provides an 'Available' status when in Program command source and operating normally for use by automation logic to determine if the logic can manipulate the device.
- Operates from Hand, Maintenance, Override, External, Program, and Operator command sources.

Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Dvc_D4SD_5.00.**00**_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

This section describes the primary operations for this Add-On Instruction.

IMPORTANT See Appendix B for Command Sources and Virtual types.

Alarms

Alarms are implemented using Logix Tag Based Alarms. P_Alarm and P_Gate are no longer used.

Access to alarms is via <backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer® online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

Virtualization

Virtualization in raP_Dvc_D4SD disables the normal outputs and provides feedback of a working device. This lets you operate the n_Postion Add-On Instruction as if it were a working device, even if no device is physically present.

Use Maintenance Commands or Program Commands to command the device to Virtual (simulated) or Physical (controlling real device). The Virtual or Loopback Test icon  is displayed at the top left of the Operator faceplate.

You can also set the following parameter in virtual:

- Cfg_VirtualFdbkTime - time to reach target state in virtual (seconds) When you have finished in virtual, use PCmd_Physical (from program logic) or MCmd_Physical (from the HMI faceplate) to return to normal operation.

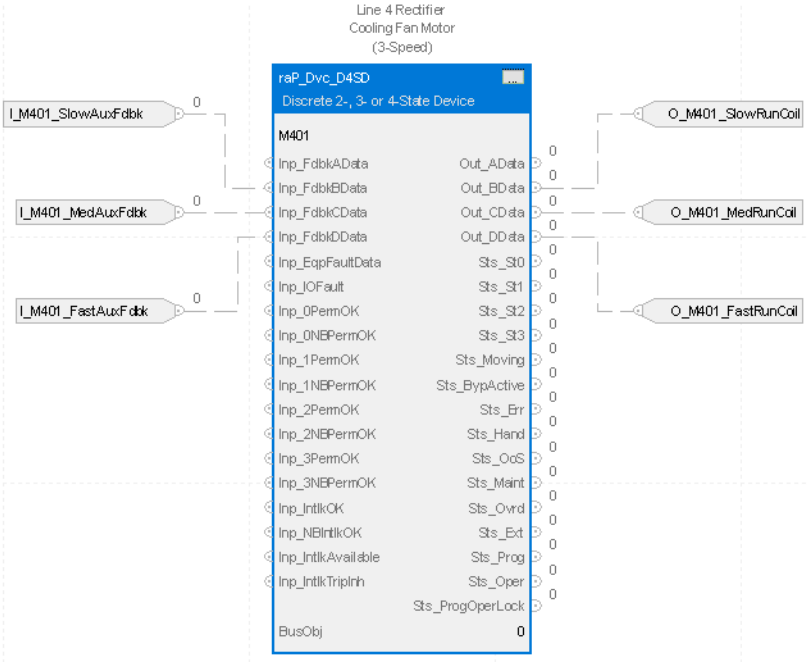
Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	Processing for EnableIn False (false rung) is handled the same as if the device were taken out of service by Command. The device outputs are de-energized and the device is shown as Program Out of Service on the HMI. All alarms are cleared.
Powerup (prescan, first scan)	On Prescan, any commands that are received before First Scan are discarded. The device outputs are de-energized. The device can then be commanded to any of its four states. The Command Source is set to its default, either Operator or Program (unlocked).
Postscan	No SFC Postscan logic is provided.

Programming Example

This example uses the raP_Dvc_D4SD Add-On Instruction to control a cooling fan that has three fixed speeds ('low', 'medium', 'high') and an 'off' state. This is considered a 4-state device. In this example, three digital outputs are used to set the speed setting (when all three are off, the fan is commanded off) and three digital inputs provide feedback of the actual fan state (when all three are off, the fan is off).



In this example, the four cooling fan states are being mapped to the device as follows:

- State 0 = Off
- State 1 = Low
- State 2 = Medium
- State 3 = High

Set the Cfg_NumStates parameter to 4 to indicate this is a four-state device. The input parameters for states 1...3 (Inp_FdbkBData, Inp_FdbkCData, and Inp_FdbkDData) are connected to the digital inputs, representing the status of the fan. The output parameters for states 1...3 (Out_BData, Out_CData, and Out_DData) are connected to the digital outputs that command the fan to the desired state.

Based on the wiring of the I/O, we can now configure the raP_Dvc_D4SD instruction how we want to process the outputs to get to the desired state. We can do this via the following table.

	Output A	Output B	Output C	Output D
State 0	1	0	0	0
State 1	0	1	0	0
State 2	0	0	1	0
State 3	0	0	0	1
1 = command output On, 0 = command output Off.				

We are setting Output A so it can be used for display purposes even though Output A is not used by the cooling fan device. The parameters Cfg_bStXOutWrite determine which outputs get written for each state, and the parameters Cfg_bStXOutState determine the states that get written. These parameters are short integers where the bits .0 through .3 correspond to outputs A through D respectively.

These parameters are displayed in binary format as indicated by the prefix 2#. By using the previous table, we can set the settings as follows:

Cfg_bSt0OutWrite: 2#0000_1111

Cfg_bSt0OutState: 2#0000_0001

Cfg_bSt1OutWrite: 2#0000_1111

Cfg_bSt1OutState: 2#0000_0010

Cfg_bSt2OutWrite: 2#0000_1111

Cfg_bSt2OutState: 2#0000_0100

Cfg_bSt3OutWrite: 2#0000_1111

Cfg_bSt3OutState: 2#0000_1000

We can now repeat this same effort to configure how the raP_Dvc_D4SD instruction determines actual state based on the field inputs via the following table.

State	Input A	Input B	Input C	Input D
State 0	x	0	0	0
State 1	x	1	0	0
State 2	x	0	1	0
State 3	x	0	0	1
x = status not checked, 1 = status checked on, 0 = status checked off				

The parameter Cfg_bStXFdbkCheck determines which feedback inputs to check for each state. The parameter Cfg_bStXFdbkState determines how the state is interpreted from the input values.

By using the previous table, we can set the settings as follows:

Cfg_bSt0FdbkCheck: 2#0000_1110

Cfg_bSt0FcbkState: 2#0000_0000

Cfg_bSt1FdbkCheck: 2#0000_1110

Cfg_bSt1FdbkState: 2#0000_0010

Cfg_bSt2FdbkCheck: 2#0000_1110

Cfg_bSt2FdbkState: 2#0000_0100

Cfg_bSt3FdbkCheck: 2#0000_1110

Cfg_bSt3FdbkState: 2#0000_1000

As this is a cooling fan, if there is a device mismatch or fault, we still want the logic to command to the desired state. Therefore, Cfg_ShedOnFail and Cfg_ShedOnDeviceFault are both set to 0.

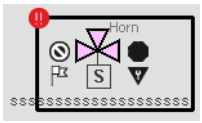
Lastly, configure the following tag extended properties to drive the text on the operations faceplate. See Logix 5000 Controllers I/O and Tag Data, publication 1756-PM004 for more information on extended tags.

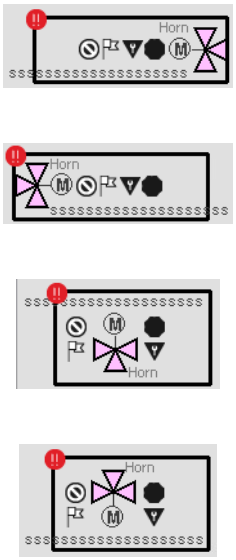
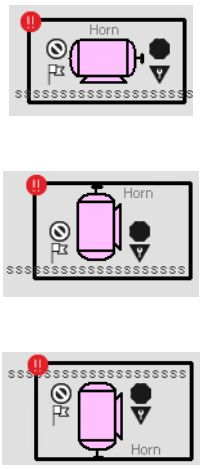
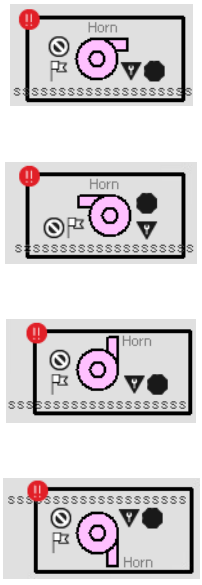
In this example, the cooling fan P&ID tag is M401. In this example, they are set as follows:

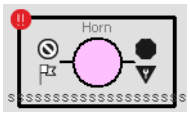
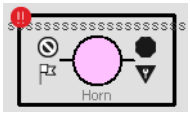
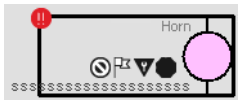
Extended Property	Value
Name	M401
Label (ZY1128.@Label)	Line 4 Rectifier Fan
Description (ZY1128.@Description)	Line 4 Rectifier Cooling Fan
Library (ZY1128.@Library)	raP-5_00-SE
Sts_St0.@Label	Stopped
Sts_St1.@Label	Slow
Sts_St2.@Label	Medium
Sts_St3.@Label	Fast
M401.@Area	Area01

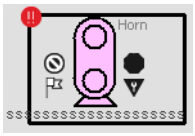
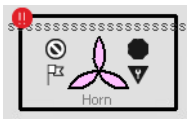
Graphic Symbols

A Graphic Symbol (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of graphic symbols, with tag structures in the ControlLogix system, aid consistency and save engineering time.

Graphic Symbol Name	Graphic Symbol	Description
GO_PD4SD_4Way		Three/Four-Way Valve. The Three/Four-way Valve parameters define the inlet and output ports of the valve: • No. 110 - Top port open state • No. 111 - Right port open state • No. 112 - Bottom port open state • No. 113 - Left port open state • 0 = Inlet (always shown as open) • 1 = Open when Val_Sts = 1 (state 0) • 2 = Open when Val_Sts = 2 (state 1) • 3 = Open when Val_Sts = 3 (state 2) • 4 = Open when Val_Sts = 4 (state 3)
GO_PD4SD_3Way_SORt GO_PD4SD_3Way_SOLt GO_PD4SD_3Way_SOBtm GO_PD4SD_3Way_SOTop	   	Two-Way Solenoid-operated Diverter Valve in different positions: right, left, bottom, and top. Parameters define the inlet and output ports of the Two-way Solenoid-operated Diverter Valve.
GO_PD4SD_Diverter GO_PD4SD_Diverter1	 	Two Way Diverter Valve in open top-left and open top-right positions. The Two-way Diverter Valve parameters define the state of the valve: • State 0: Open top-left • State 1: Open top-right • State 2: — • State 3: —

Graphic Symbol Name	Graphic Symbol	Description
GO_PD4SD_3WayMO_Rt GO_PD4SD_3WayMO_Lt GO_PD4SD_3WayMO_Btm GO_PD4SD_3WayMO_Top		Two-Way Motor-operated Diverter Valve in different positions: right, left, bottom, and top. Parameters define the inlet and output ports of the Two-way Motor-operated Diverter Valve.
GO_PD4SD_R GO_PD4SD_U GO_PD4SD_D		Motors in different positions: right, up, and down.
GO_PD4SD_Blower_R GO_PD4SD_Blower_L GO_PD4SD_Blower_U GO_PD4SD_Blower_D		Blowers in different positions: right, left, up, and down.

Graphic Symbol Name	Graphic Symbol	Description
GO_PD4SD_Conveyor_R		Conveyor
GO_PD4SD_Inline_U		Inline Motors in different positions: up, left, down, and right.
GO_PD4SD_Inline_L		
GO_PD4SD_Inline_D		
GO_PD4SD_Inline_R		
GO_PD4SD_Pump_R		Pumps in different positions: right, left, and up.
GO_PD4SD_Pump_L		
GO_PD4SD_Pump_U		
GO_PD4SD_Agitator_D		Agitator in down position.

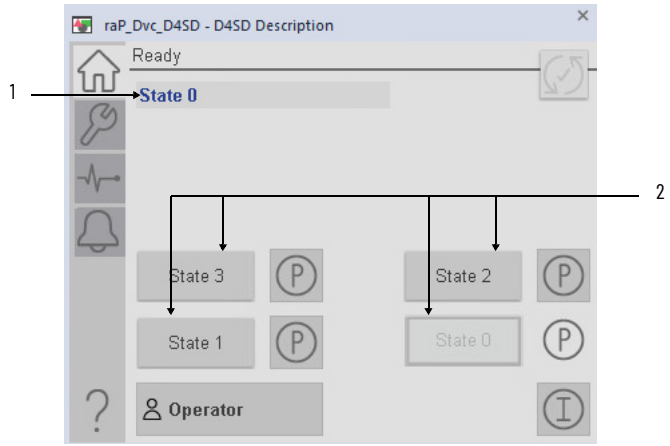
Graphic Symbol Name	Graphic Symbol	Description
GO_PD4SD_Mixer_U		Mixer in up position.
GO_PD4SD_RPump_U		Rotary Gear Pump in up position.
GO_PD4SD_Fan_D		Fan in down position.

Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab

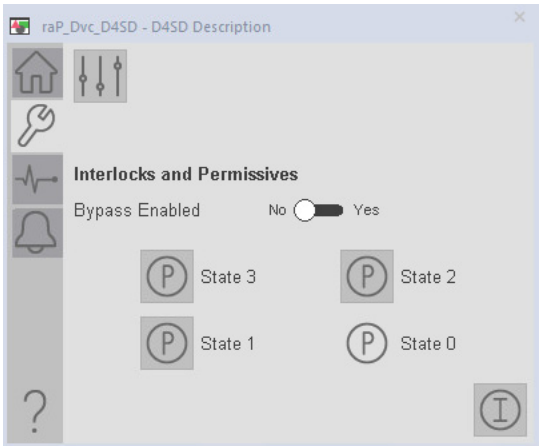
The Faceplate initially opens to the Operator (Home) tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator command source.



Item	Description
1	Device state indicator
2	Move to state command buttons

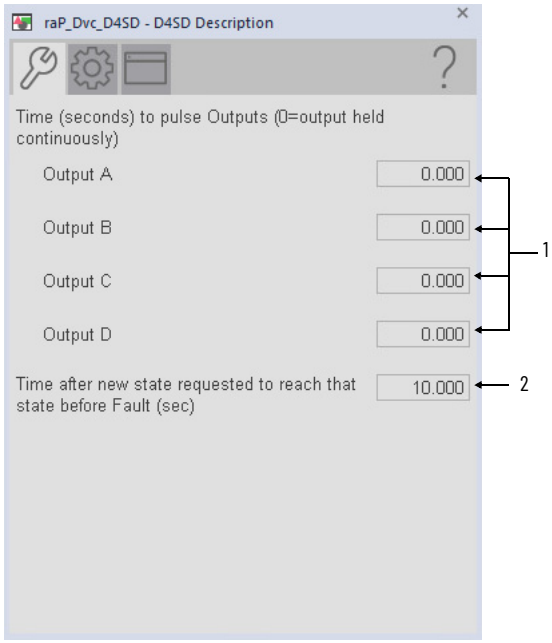
Maintenance Tab

Maintenance personnel use the information and controls on the Maintenance tab to adjust device parameters, troubleshoot, temporarily work around device problems, and disable the device for routine maintenance.



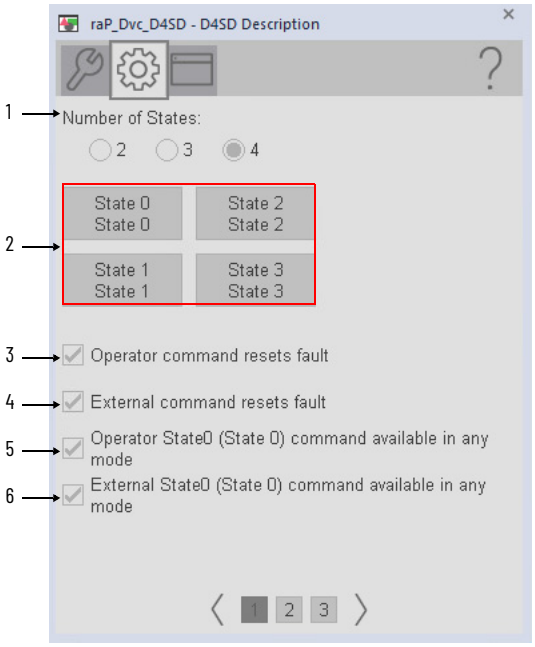
Advanced Maintenance Tab

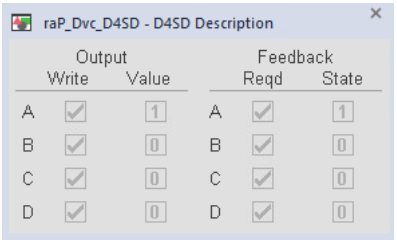
The Advanced Properties Display opens to the advanced maintenance settings. The Advanced Properties Display provides access to device configuration parameters and ranges, and options for device and I/O setup. This tab is used for initial system commissioning or later system changes.

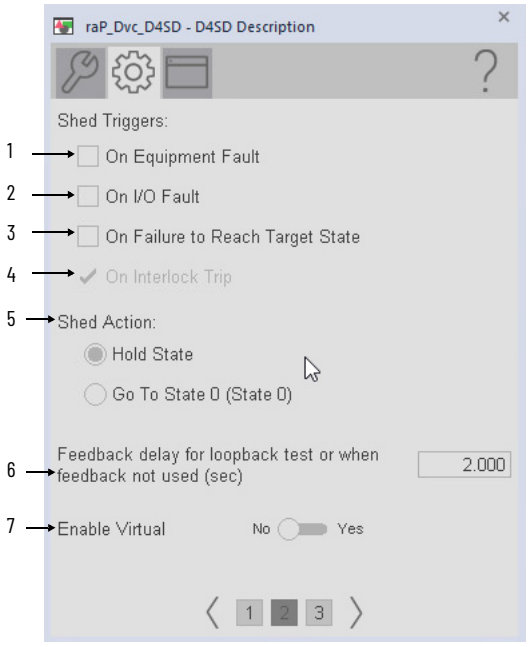


Item	Description
1	Enter a value (0...2,147,483.647) to indicate the time (seconds) to energize outputs to the device to be sure that they are latched in. (0 = output held continuously)
2	Enter a value (0...2,147,483.647) to indicate the time (seconds) to allow the device to reach the commanded state before issuing a fault.

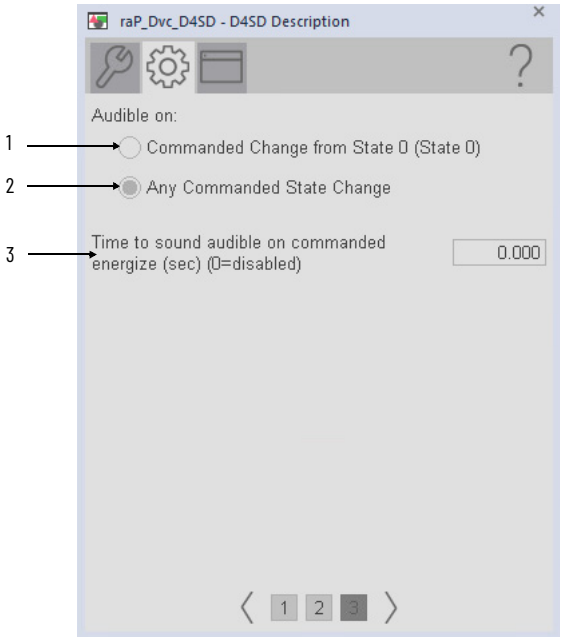
Engineering Tabs



Item	Description
1	Select the number of states.
2	Select a state to open the raP_Dvc_D4SD State Configuration display for that state.  This display directs how the raP_Dvc_D4SD instruction commands the device state via outputs and determines the actual device state via feedback inputs. The first two columns for output set parameters, Cfg_bSt[x]OutWrite, and Cfg_bSt[x]OutState, determine how outputs are written to command to a state. The second two columns for feedback set parameters, Cfg_bSt[x]FdbkCheck, and Cfg_bSt[x]FcbkState, determine how the state is interpreted from the input values.
3	Select to reset a fault upon a new operator command.
4	Select to reset a fault upon a new external command.
5	Select (= 1) to make Operator State 0 (OCmd_St0) available in any command source. Clear this checkbox (= 0) to make Operator State 0 (OCmd_St0) available only in Operator or Maintenance command source.
6	Select (= 1) to make External State 0 (XCmd_St0) available in any command source. Clear this checkbox (= 0) to make External State 0 (XCmd_St0) available only in External command source.



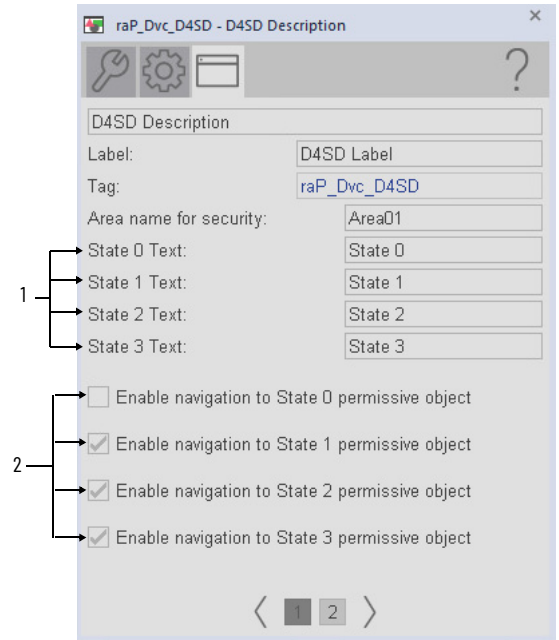
Item	Description
1	Select to shed if a Device Fault is detected.
2	Select to shed if an I/O Fault is detected.
3	Select to shed if target state is not reached.
4	The device always sheds an Interlock Trip. This item cannot be unchecked. It is displayed as a reminder that the Interlock Trip function always triggers a shed.
5	Select to determine whether you hold position or go to state 0 upon a shed condition.
6	Enter a value (seconds) to indicate the delay to echo back reaching the state when in virtual.
7	Select yes to enable virtual.



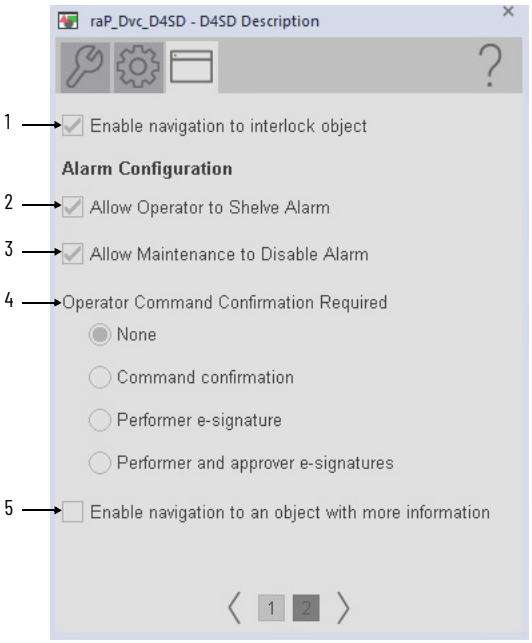
Item	Description
1	Select to sound an audible on a commanded stage from State 0.
2	Select to sound an audible on a commanded stage from any State.
3	Enter the time (in seconds) that the audible sounds when there is a commanded State change.

HMI Configuration Tabs

The HMI configuration tab provides access to displayed text, and faceplate-to-faceplate navigation settings. Configure the description, label, tag, and security area for the device. The HMI configuration tab has settings that are common to the objects. See page 27 for descriptions of the common settings.



Item	Description
1	Enter text to describe the state.
2	Check if the corresponding State object is used with this device. This check changes the Permissive Indicator to a button that accesses the Permissive faceplate. **IMPORTANT**: The name of the Permissives object in the controller must be the name of the object with the suffix '_Perm#', where '#' is the permissive number (0...3) For example, if your raP_Dvc_D4SD object has the name 'D4SD123', then its Permissives object must be named 'D4SD123_Perm0'.



Item	Description
1	Select if an interlock object is connected to Inp_Intlk. This check changes the interlock indicator on the Operator tab to a button that opens the interlocks faceplate. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_Intlk'. For example, if your raP_Dvc_D4SD object has the name'D4SD123', then its Interlock object must be named 'D4SD123_Intlk'.
2	Select to allow Operator to shelve alarm.
3	Select to allow Maintenance to disable alarm.
4	Select to configure operator command confirmation. This action would take place after any operator command.
5	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.

Diagnostics Tab

The Diagnostic tab provides indications that are helpful to diagnose or help prevent device problems. The device problems can include specific reasons a device is 'Not Ready', device warnings and faults, warning and fault history, and predictive/preventive maintenance data.

Alarms Tab

The Alarms tab displays each configured alarm. The icon on the tab for the alarms page changes color to show the current active alarm status. A blinking alarm icon indicates that one or more alarms must be acknowledged or the device must be reset.

Process Extended Alarms (raP_Opr_ExtddAlm)



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

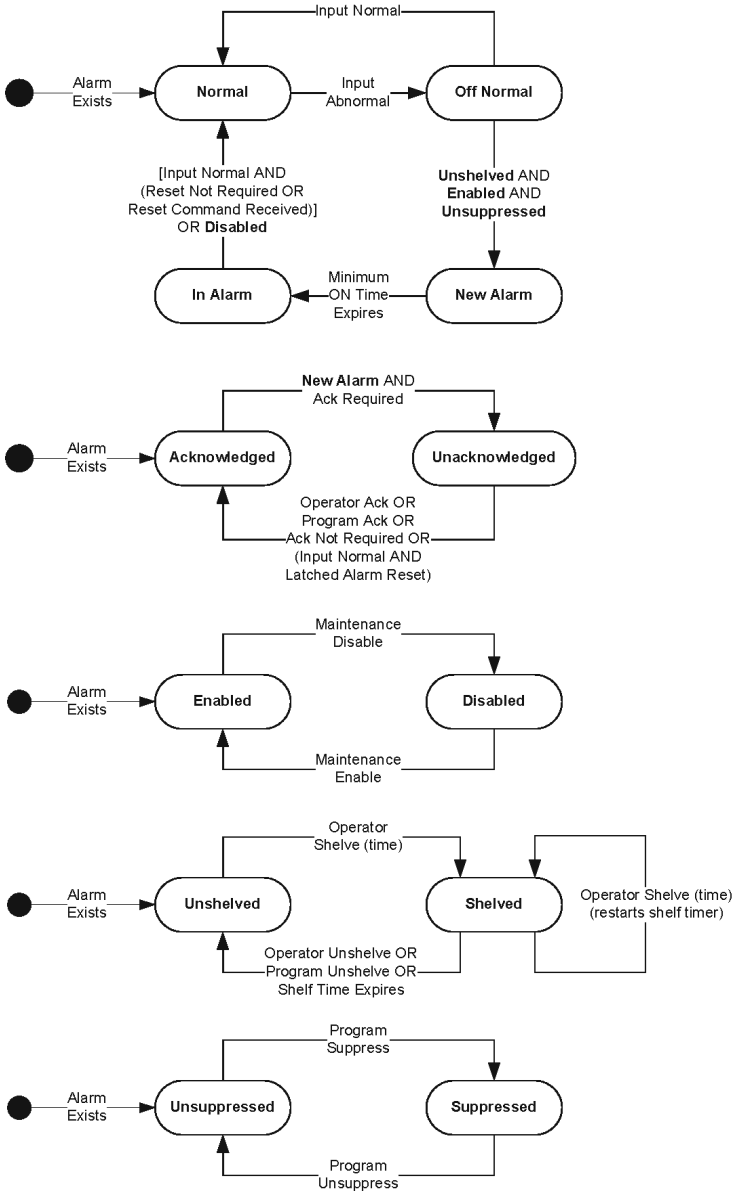
The raP_Opr_ExtddAlm (Extended Alarm Block) Add-On Instruction is used to provide notification to operators of abnormal conditions or events for up to 32 additional items external to a parent object. (raP_Opr_Area, raP_Opr_Unit, raP_Opr_EMGen, raP_Opr_EPGen) This instruction handles the connections of the commands from the parent object:

- Acknowledge
- Reset
- Enabling/Disabling
- Suppress/Unsuppress
- UnShelve

This instruction handles the connections of the status from the raP_Opr_ExtddAlm:

- Used
- Alarm
- Acknowledged
- Disabled
- Suppressed
- Shelved
- Alarm Fault
- Ready for Reset
- Notify value

The state diagram shows how a raP_Opr_ExtddAlm instruction instance behaves as an alarm occurs, is acknowledged, clears, and is reset, depending on the instruction configuration.



Functional Description

The primary operations of the raP_Opr_ExtddAlm instruction includes the following:

- Raise an alarm when the input is true.
- Handle Alarm Acknowledge commands from the HMI or from the parent object. The requirement for acknowledgement is configurable. If acknowledgement is required, a new alarm clears the acknowledged status and an Acknowledge command is required to set the status. If acknowledgement is not required, the alarm is automatically acknowledged.
- Handle Alarm Reset commands from the HMI or from the parent object. The requirement for reset is configurable. If reset is required, the alarm Input sets the Alarm condition, and it is latched in until the alarm Input is clear and a Reset command is received. If reset is not required, the

Alarm condition clears when the input clears and the minimum alarm on time expires.

- Handle Maintenance Disable and Enable commands, Program Suppress and Unsuppress commands, and Operator Shelve and Unshelve commands. Maintenance personnel can independently disable the alarm or the operator can temporarily shelve the alarm. When the operating sequence unsuppresses the alarm at the appropriate step, the Maintenance Disable or Operator Shelve is still in effect.

When an alarm is Disabled by Maintenance, the following occurs:

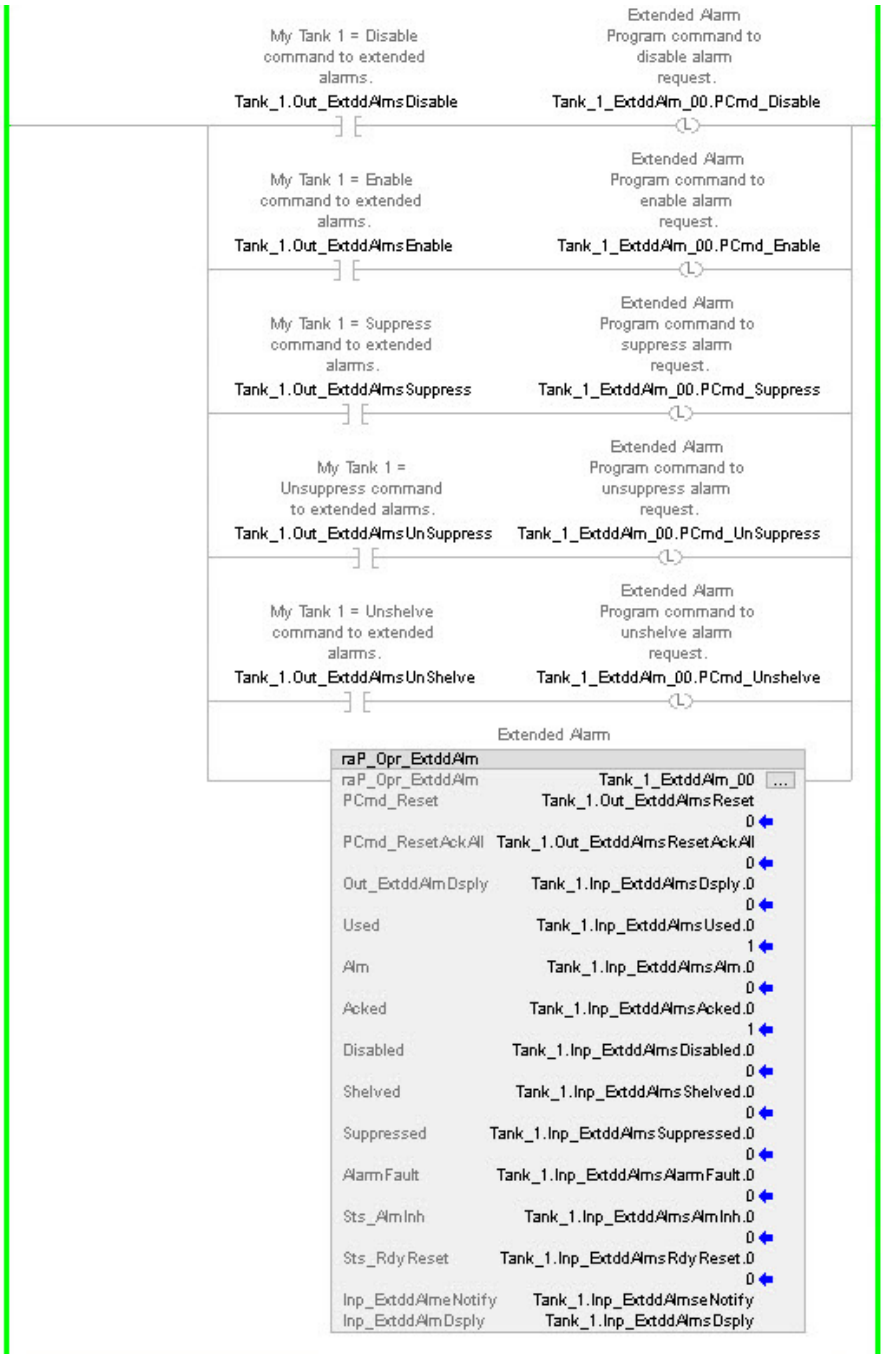
- The Alarm Status (Alm) clears immediately.
- If the alarm is unacknowledged, it must still be acknowledged.

When an alarm is Shelved by Operator or Suppressed by Program, the following occurs:

- The alarm is not cleared until the input condition clears.
- New alarms are not raised.
- If the alarm is latched, it must still be reset (after the input condition clears).
- If the alarm is unacknowledged, it must still be acknowledged.

The following images show how the raP_Opr_ExtddAlm is connected to the first allowable instance of a parent extended alarm. The first instance is mapped to the bit level of a DINT, the first is bit 0, the last, bit 31.




My Tank 1 = Disable command to extended alarms.
Tank_1.Out_ExtddAlmsDisable
Extended Alarm Program command to disable alarm request.
Tank_1_ExtddAlm_00.PCmd_Disable
My Tank 1 = Enable command to extended alarms.
Tank_1.Out_ExtddAlmsEnable
Extended Alarm Program command to enable alarm request.
Tank_1_ExtddAlm_00.PCmd_Enable
My Tank 1 = Suppress command to extended alarms.
Tank_1.Out_ExtddAlmsSuppress
Extended Alarm Program command to suppress alarm request.
Tank_1_ExtddAlm_00.PCmd_Suppress
My Tank 1 = Unsuppress command to extended alarms.
Tank_1.Out_ExtddAlmsUnSuppress
Extended Alarm Program command to unsuppress alarm request.
Tank_1_ExtddAlm_00.PCmd_UnSuppress
My Tank 1 = Unshelve command to extended alarms.
Tank_1.Out_ExtddAlmsUnShelve
Extended Alarm Program command to unshelve alarm request.
Tank_1_ExtddAlm_00.PCmd_Unshelve
Extended Alarm
raP_Opr_ExtddAlm
raP_Opr_ExtddAlm Tank_1_ExtddAlm_00
PCmd_Reset Tank_1.Out_ExtddAlmsReset
0
PCmd_ResetAckAll Tank_1.Out_ExtddAlmsResetAckAll
0
Out_ExtddAlmDsply Tank_1.Inp_ExtddAlmsDsply.0
0
Used Tank_1.Inp_ExtddAlmsUsed.0
1
Alm Tank_1.Inp_ExtddAlmsAlm.0
0
Acked Tank_1.Inp_ExtddAlmsAcked.0
1
Disabled Tank_1.Inp_ExtddAlmsDisabled.0
0
Shelved Tank_1.Inp_ExtddAlmsShelved.0
0
Suppressed Tank_1.Inp_ExtddAlmsSuppressed.0
0
AlarmFault Tank_1.Inp_ExtddAlmsAlarmFault.0
0
Sts_AlmInh Tank_1.Inp_ExtddAlmsAlmInh.0
0
Sts_RdyReset Tank_1.Inp_ExtddAlmsRdyReset.0
0
Inp_ExtddAlmeNotify Tank_1.Inp_ExtddAlmseNotify
Inp_ExtddAlmDsply Tank_1.Inp_ExtddAlmsDsply

Required Files

Controller File

The raP_Opr_ExtddAlm_5.00.**00**_AOI.L5X Add-On Instruction definition file must be imported into the controller project to be able to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Visualization Files

See Visualization Files on page 26 for general information on visualization files.

Operations

Command Sources

The raP_Opr_ExtddAlm instruction has no commands or outputs that are intended to control equipment and therefore does not have any selection of active command.

Alarms

The raP_Opr_ExtddAlm Instruction uses the following alarm, which are implemented using Logix Tag Based Alarms:

Alarm	Alarm Name	Description
ParentObject.External_Alarm_##	User Defined	User defined alarm description.

Virtualization

The raP_Opr_ExtddAlm Add-On Instruction does not have a virtualization capability.

Execution

The following table explains the handling of instruction execution conditions.

Condition	Description
EnableIn False (false rung)	Processing for EnableIn False (False Rung) is handled the same as the main Logic Routine except that the state of Inp (the Input) is inverted. This inversion lets the raP_Opr_ExtddAlm Add-On Instruction in a ladder diagram instance have its input mapped by using the rung condition instead of using a separate branch or rung. Set the input to 1 when using the on-rung mapping.
Powerup (prescan, first scan)	All commands, including alarm acknowledge and reset, are cleared on prescan.
Postscan	No SFC Postscan logic is provided.

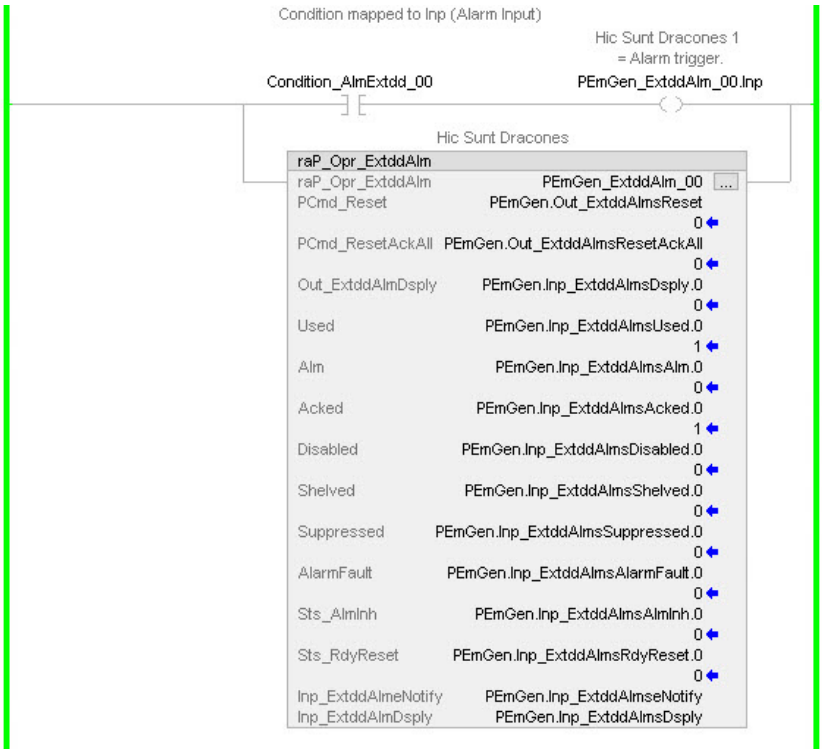
See to the Logix 5000™ Controllers Add-On Instructions Programming Manual, publication 1756-PM010, for more information.

Programming Examples

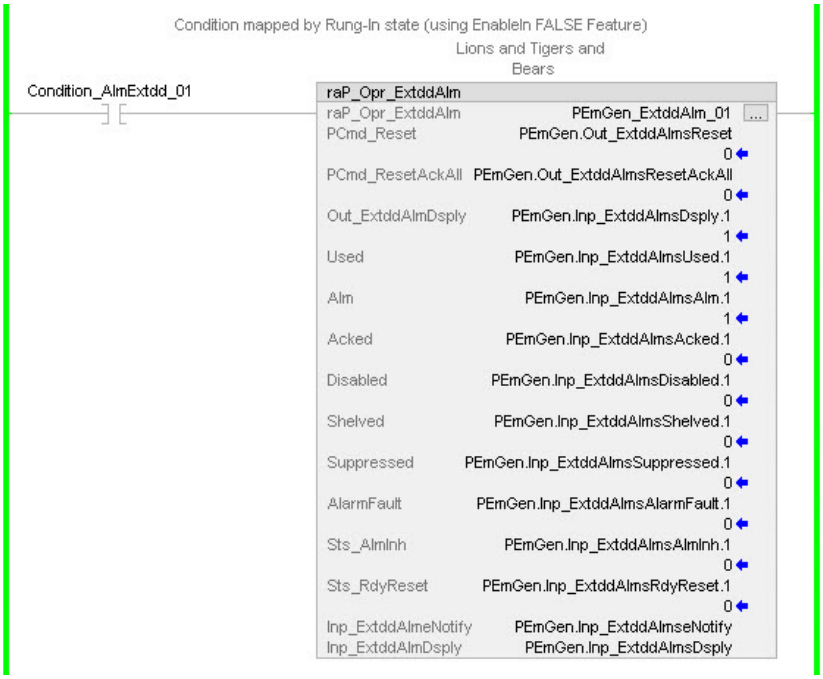
Implementation by Using the EnableIn False Feature

For the convenience of ladder diagram programmers, the raP_Opr_ExtddAlm instruction can be used in a ladder diagram routine with the input condition carried by the Rung-In condition instead of being mapped on a separate branch.

The following illustration shows normal implementation with the input condition mapped to Inp on a separate branch.



The following illustration shows the EnableIn False implementation with the input condition mapped to the raP_Opr_ExtddAlm instruction by using the Rung-In state.



The Rung-In condition determines whether the Add-On Instruction's normal code (Logic routine) is executed or its EnableIn False code (EnableInFalse routine) is executed. In the raP_Opr_ExtddAlm instruction, the EnableIn False code is identical to the Logic code, except it uses the inverse of the Inp signal for processing. To use the Rung-In mapping, method, set Inp to 1 (its default value). When the rung is True, Inp (= 1) is treated as True (not inverted, in alarm), and when the rung is False, Inp (=1) is treated as False (inverted, not in alarm).

Graphic Symbols

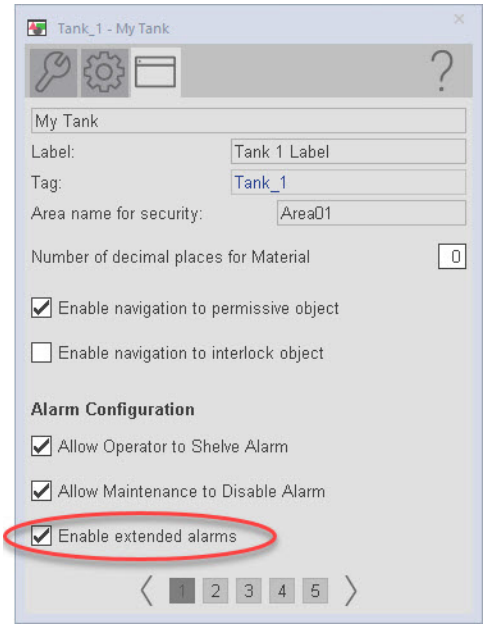
A Graphic Symbol (global object) is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of graphic symbols, with tag structures in the ControlLogix system, aid consistency and save engineering time.

Graphic Symbol Name	Graphic Symbol	Description
GO_ExtddAlmXXDisplay		This global object is used for Extended Alarms.

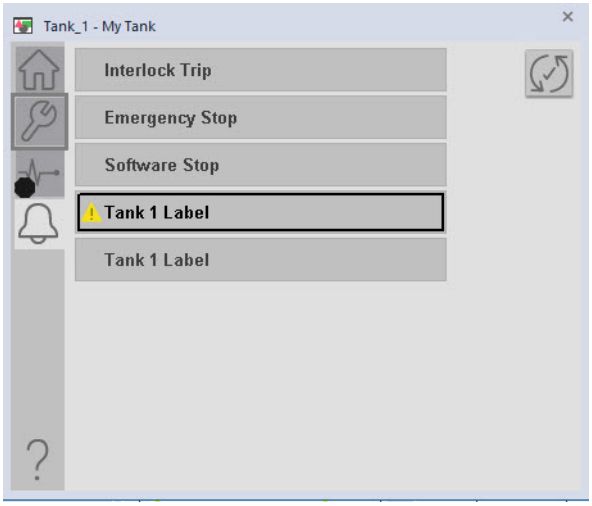
Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

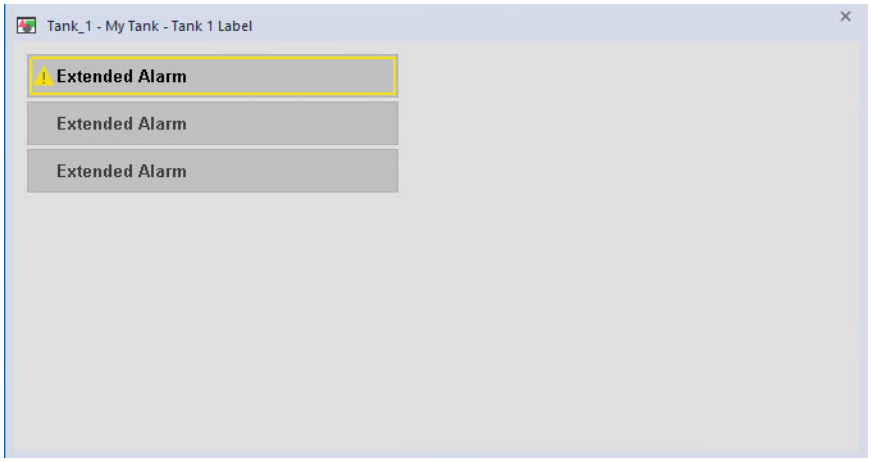
Extended alarms are enabled from the HMI Configuration tab of the parent device.

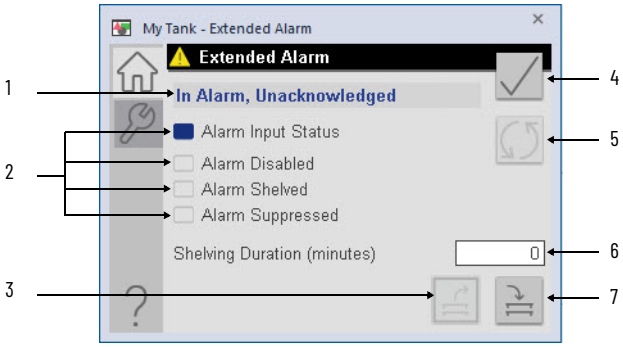


When the external alarm is activated there is a notification on the parent device faceplate.



Select the alarm to open the list of extended alarms.





Item	Description
1	Alarm status
2	Individual status information indicators
3	Unshelve alarm
4	Acknowledge Alarm. This command acknowledges an alarm that has been configured with “Ack Required”.
5	Reset Alarm
6	
7	Shelve alarm

Notes:

Process Area Module (raP_Opr_Area)

The raP_Opr_Area object groups Units together, and provides a propagation mechanism for aggregating status from Unit objects, and broadcasting commands to Unit objects.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

The Area group is based in a controller.

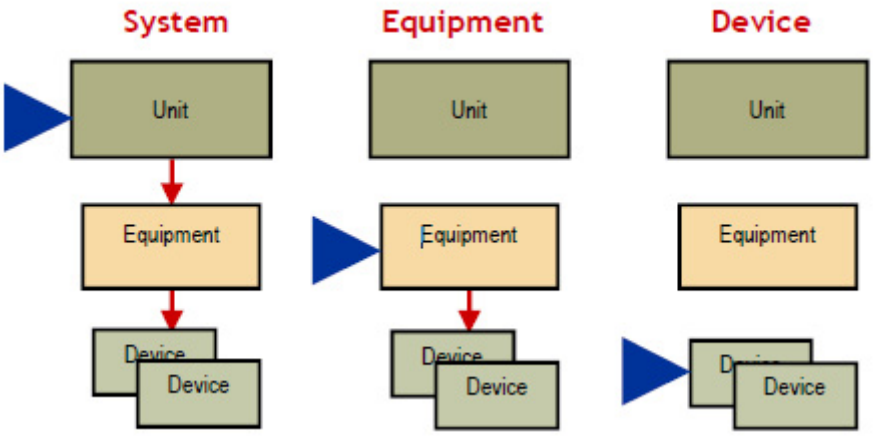
The Area is responsible for managing the equipment that is associated to that Area. These responsibilities include, but are not limited to, the following:

- Command Source management for a group of equipment.
- Alarm management for a group of equipment.
- Aggregate (propagation) status (for items such as: command source, alarm, configuration errors, etc.) and provided “bread crumbs” for navigation.
- Provide broadcast (propagation) command mechanism.
- Detects failure conditions, such as Emergency Stop and Software Stop.
- Provides mechanism for extended Alarms.
- Monitor various Area failure conditions, and produce alarms.
- Provide a propagation mechanism to allow the Area to receive status from and send commands to a group of equipment.
- Provides the ability to produces a Software Stop condition based on any of the following:
  - Alarm from any lower level object
  - Software Stop input
  - Area Alarm

Functional Description

Command Source Management

Allows the user to interact with the system at various levels.



Use the PCMDSRC PlantPAx® instruction to manage the command source (owner) of an instruction or control strategy. For more information, see Logix 5000 Advanced Process Control and Drives and Equipment Phase and Sequence Instructions Reference Manual, 1756-RM006

Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Opr_Area_5.00.00_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

Alarms

Alarms are implemented using Logix Tag Based Alarms.

Access to alarms is via <backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer® online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

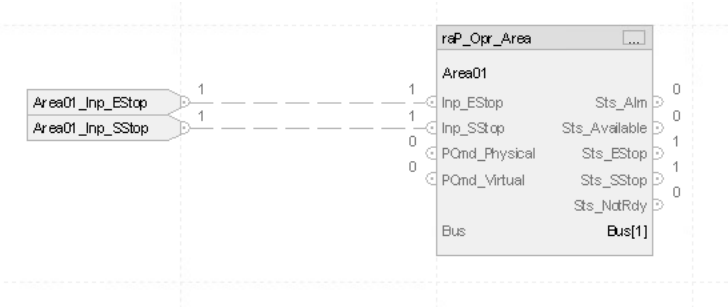
Execution

The handling of instruction execution conditions.

Condition	Description
EnableIn False (False Rung)	Handle processing for EnableIn False (False Rung) the same as if the Area were Disabled by Command. The Area outputs are deenergized and the Area is shown as Disabled on the HMI.
Powerup (Pre-scan, First Scan)	Handles processing of command source and alarms on Pre-scan and Powerup. On Powerup, the Area is treated as if it were Commanded to reset all the program and operator commands
Postscan (SFC Transition)	No SFC Postscan logic is provided.

Refer to Logix 5000 Controllers Add-On Instructions: Programming Manual, 1756-PM010 for more information.

Programming Example



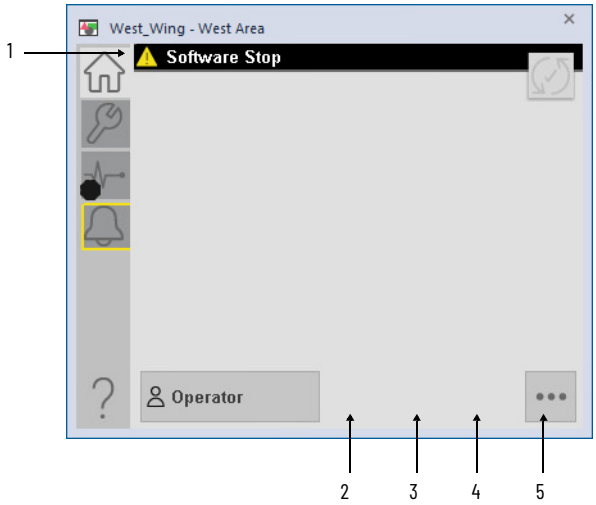
Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PAREA		The raP_Opr_Area object groups Units together, and provides a propagation mechanism for aggregating status from Unit objects, and broadcasting commands to Unit Objects.

Faceplates

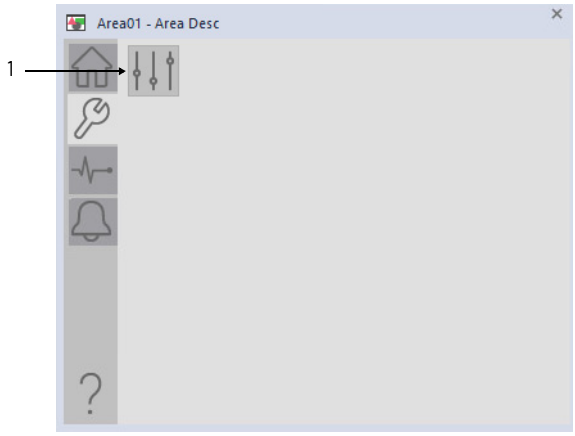
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab



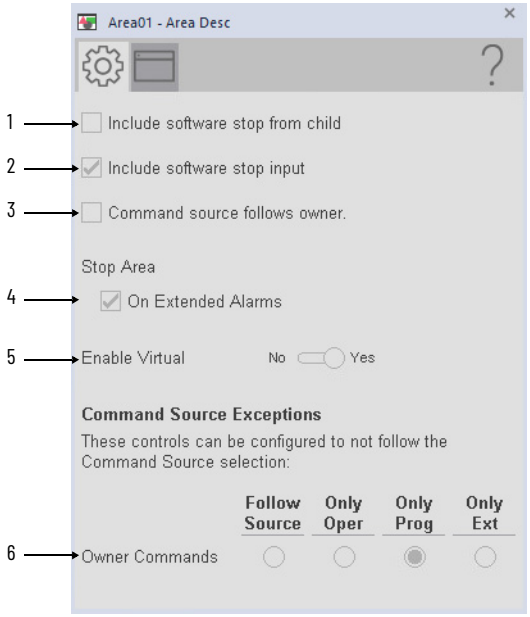
Item	Description
1	Displays the current state of the object
2	Acquire child command source
3	Release child command source
4	Display organizational tree view for this object
5	Display more information

Maintenance Tab



Item	Description
1	Display Advanced Properties

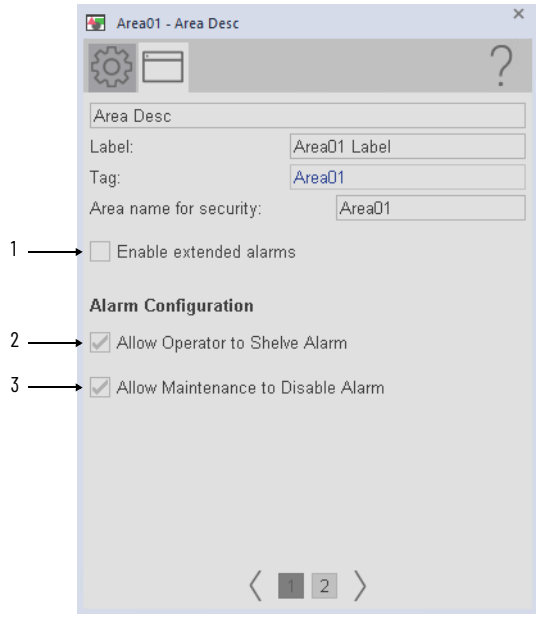
Engineering Tab



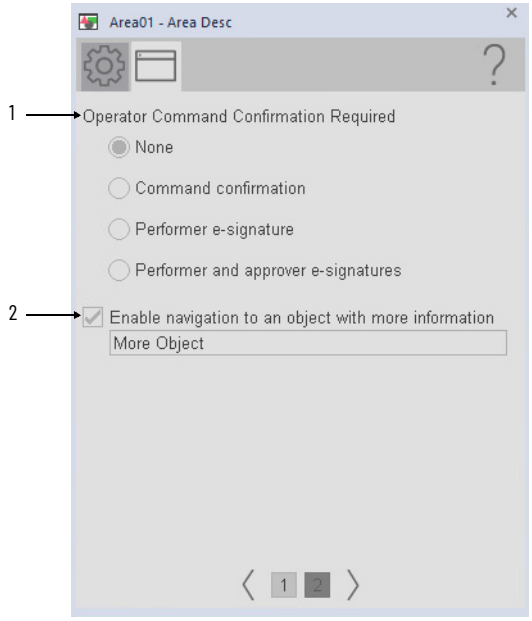
Item	Description
1	Select to include software stop from child
2	Select to include software stop input
3	Select to have the Command source follow the owner
4	Select to stop unit on extended alarms
5	Select yes to enable virtual mode
6	Use the radio buttons for the area owner commands to follow the overall command source of the instruction, or to "keep" particular source (operator, program or external).

HMI Configuration Tab

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Select to enable extended alarms
2	Select to allow Operator to shelve alarm
3	Select to allow Maintenance to disable alarm



Item	Description
1	Select an option for Operator Command Confirmation Requirements
2	Select to allow navigation to an object with more information. You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.

Process Unit (raP_Opr_Unit)

Overview

The raP_Opr_Unit object groups Equipment together, and provides a propagation mechanism for aggregating status from Equipment, and broadcasting commands to Equipment. As an example each vessel, tank, mixer, machine, etc… within the control system would be considered a Unit.

- Units are presumed to operate on only one batch at a time.
- Units operate relatively independently of one another.
- This term applies to both the physical equipment and the equipment entity.
- Examples of major processing activities are; react, crystallize, and make a solution.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

The UNIT object controls a Unit in a variety of command sources and monitors for fault conditions.

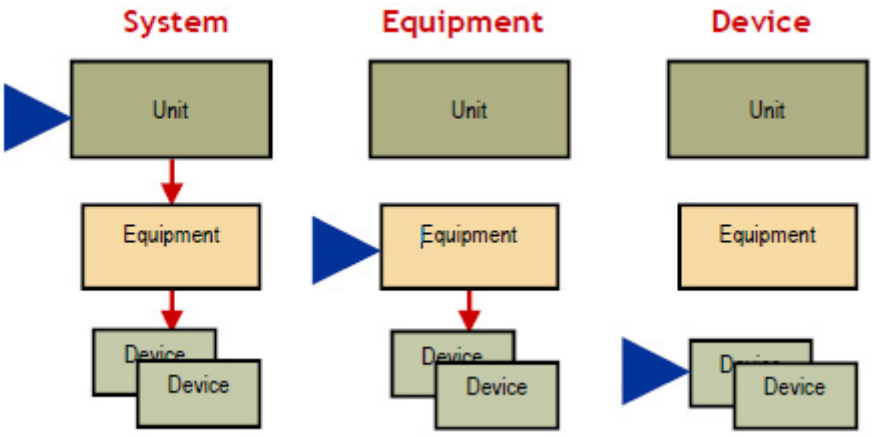
Use when:

- You want to consolidate status from groups of equipment. These status's include:
  - Alarm Status
  - Alarm Priority
  - Command Source
  - Configuration Errors
- You want to manage and to following functions for a group of equipment, with a "master" or "global" set of commands:
  - Command Source
  - Alarm Acknowledge
  - Alarm Reset
- You want to apply permissive conditions to a group of equipment.
- You want to shut down groups of equipment based on a single alarm which occurs in any related equipment.
- You want to issue user defined commands to equipment.

Functional Description

Command Source Management

Allows the user to interact with the system at various levels.



Use the PCMDSRC PlantPAx® instruction to manage the command source (owner) of an instruction or control strategy. For more information, see Logix 5000 Advanced Process Control and Drives and Equipment Phase and Sequence Instructions Reference Manual, 1756-RM006

Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File The raP_Opr_Unit_5.00.00_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

Alarms

Alarms are implemented using Logix Tag Based Alarms.

Access to alarms is via <backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer® online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

Execution

The handling of instruction execution conditions.

Condition	Description
EnableIn False (False Rung)	Handle processing for EnableIn False (False Rung) the same as if the Area were Disabled by Command. The Area outputs are deenergized and the Area is shown as Disabled on the HMI.
Powerup (Pre-scan, First Scan)	Handles processing of modes and alarms on Pre-scan and Powerup. On Powerup, the Area is treated as if it were Commanded to reset all the program and operator commands
Postscan (SFC Transition)	No SFC Postscan logic is provided.

Refer to Logix 5000 Controllers Add-On Instructions: Programming Manual, 1756-PM010 for more information.

Programming Example



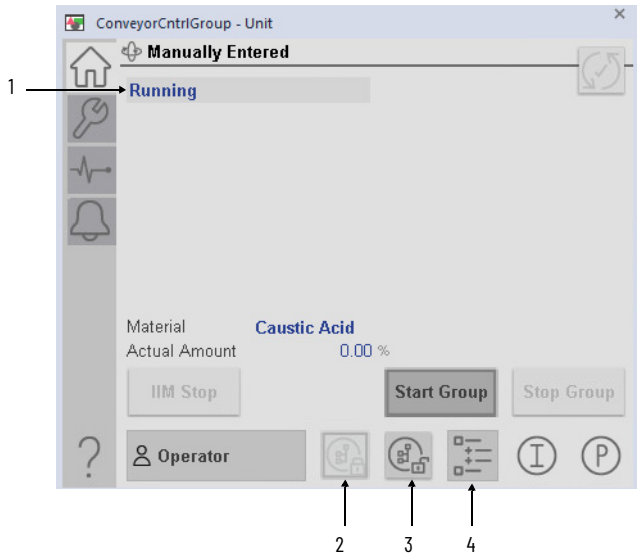
Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PUNIT		The raP_Opr_Unit object groups Equipment together, and provides a propagation mechanism for aggregating status from Equipment, and broadcasting commands to Equipment.

Faceplates

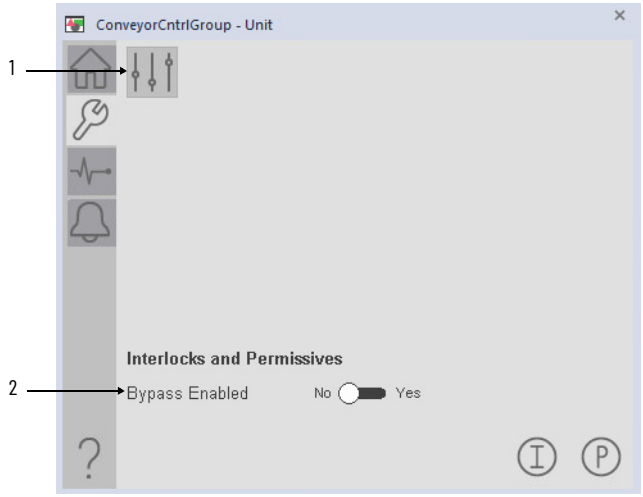
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab



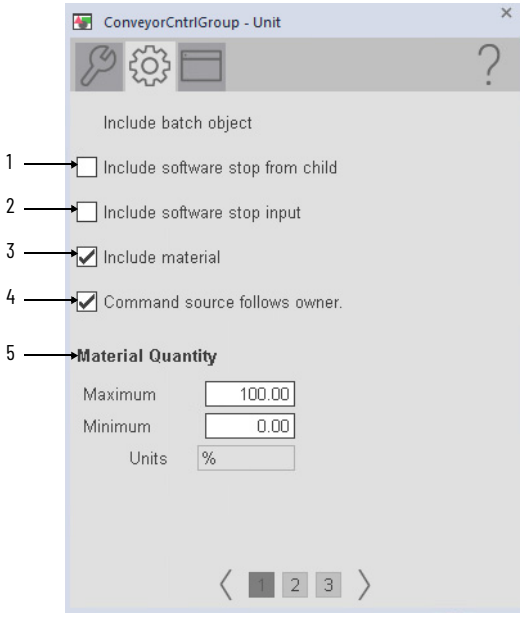
Item	Description
1	Displays the current state of the object
2	Acquire child command source
3	Release child command source
4	Display tre view for this object

Maintenance Tab

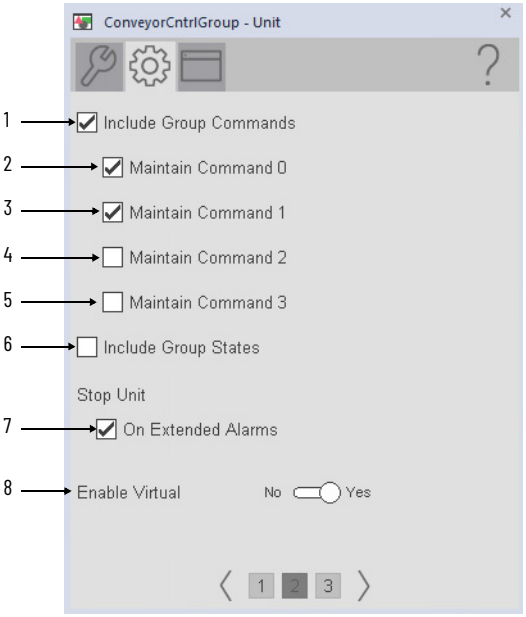


Item	Description
1	Display Advanced Properties
2	Select yes to enable bypass

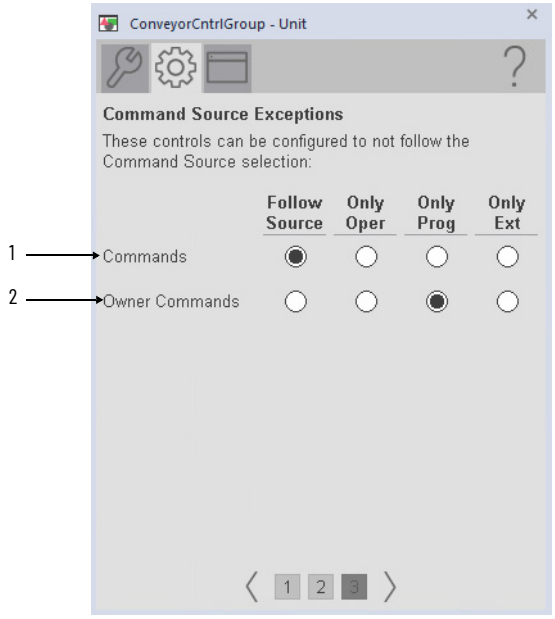
Engineering Tab



Item	Description
1	Select to include a software stop from child object
2	Select to include software stop input
3	Select to include material
4	Select to have the command source follow the owner.
5	Enter the material maximum and minimum quantities as well as the units.



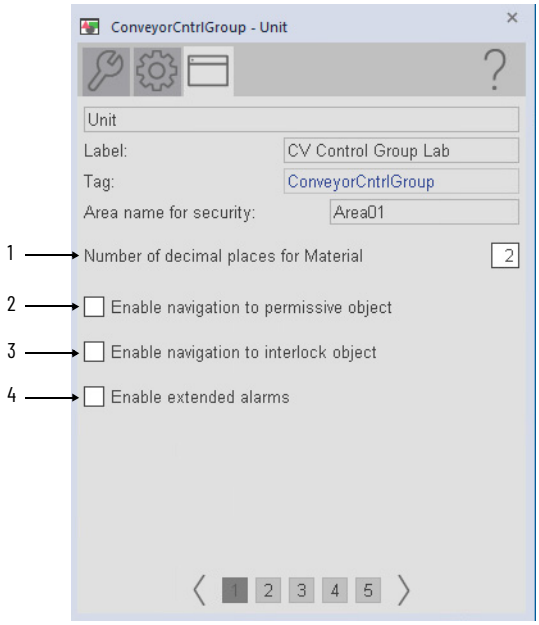
Item	Description
1	Enable User-Defined Group Commands.
2	Enable level command for Command 0
3	Enable level command for Command 1
4	Enable level command for Command 2
5	Enable level command for Command 3
6	Enable User-Defined Group States.
7	Select to stop unit on extended alarms
8	Select to enable virtual made



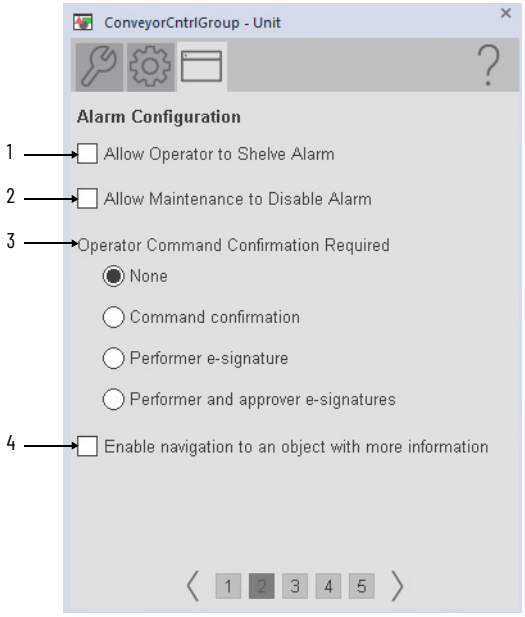
Item	Description
1	Use the radio buttons for the unit commands to follow the overall command source of the instruction, or to "keep" particular source (operator, program or external).
2	Use the radio buttons for the unit owner commands to follow the overall command source of the instruction, or to "keep" particular source (operator, program or external).

HMI Configuration Tab

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



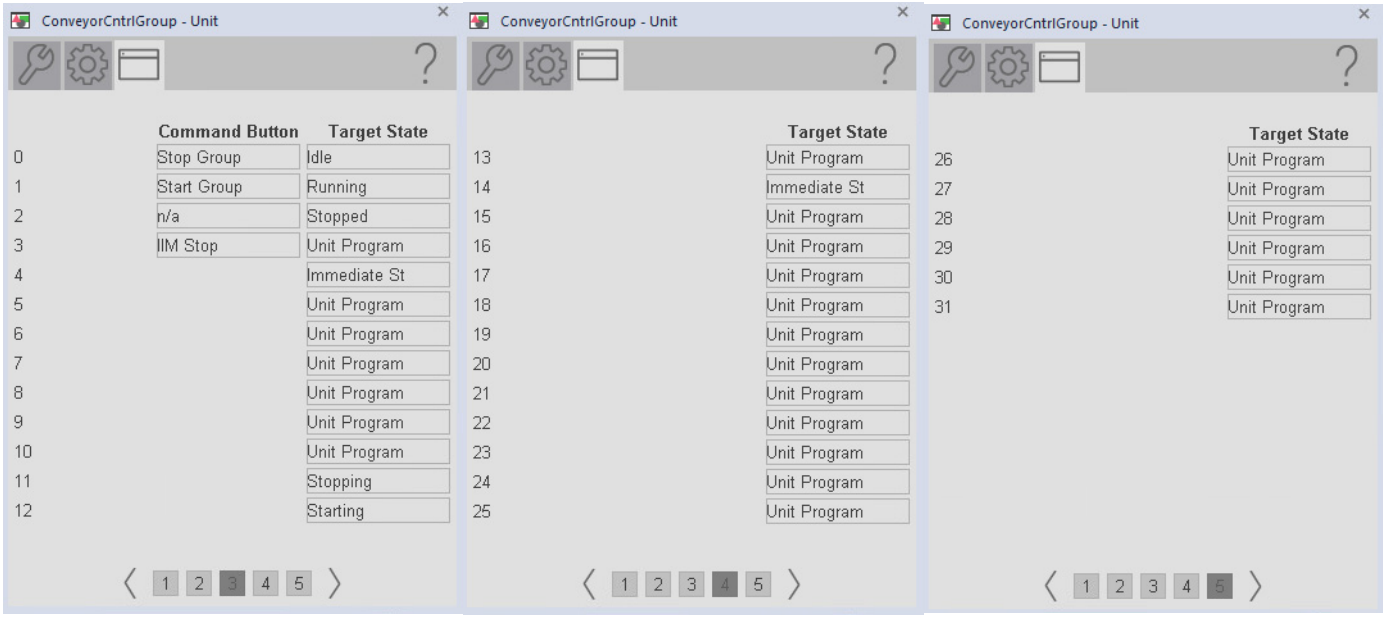
Item	Description
1	Enter the number of decimal places for the material
2	Select to enable navigation to the permissive object
3	Select to enable navigation to the interlock object
4	Select to enable extended alarms



Item	Description
1	Select to allow Operator to shelve alarm
2	Select to allow Maintenance to disable alarm
3	Select an option for Operator Command Confirmation Requirements
4	Select to enable navigation to an object with more information. You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.

The Configuration – HMI Interface Tab has the following purpose:

- Displays configuration of Command Buttons and Target State text (displayed on Operator Tab) for the Equipment Object.



Notes:

General Equipment Module (raP_Opr_EMGen)

Overview

An equipment module is a functional group of equipment that can carry out a finite number of specific minor processing activities. An equipment module is typically centered around a piece of process equipment (a weigh tank, a process heater, a scrubber, etc.). This term applies to both the physical equipment and the equipment entity.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

The raP_Opr_EMGen (Generic Equipment Module) object controls an Equipment Module in a variety of command sources and monitors for fault conditions.

Use when:

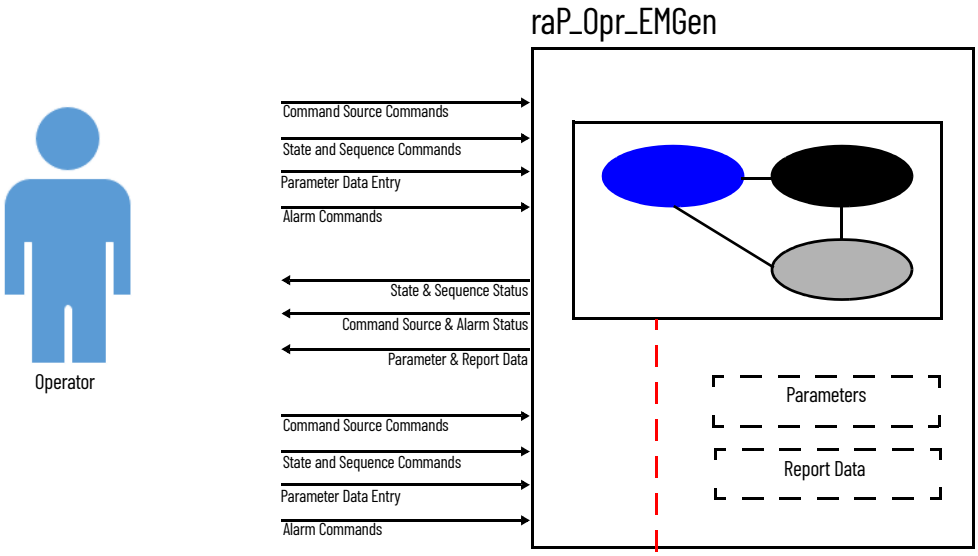
- You want to group equipment, and you want to apply a custom state model
- You want to provide the following for a group of equipment
  - Apply a mode model to the equipment group
  - Definable Commands and states
  - Apply interlocks and/or permissives to the group of equipment
  - Parameter which define the behavior of the group of equipment
  - Report / Resultant data from the group of equipment
  - A faceplate which allows monitoring / control of the equipment grouping
  - Alarm if any device fails
  - Monitor step (description), and allow forcing of steps in maintenance command source
  - Allow configurable alarms for certain process / equipment failure conditions

Functional Description

Program

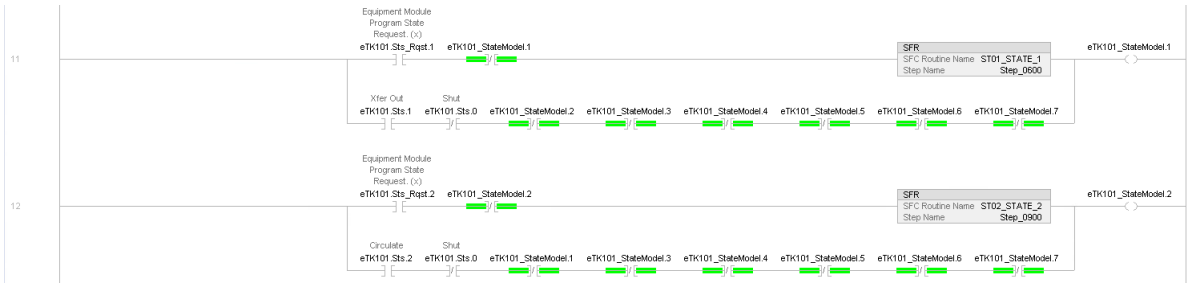
Dispatch

Contains raP_Opr_EMGen instruction and any external instructions required.



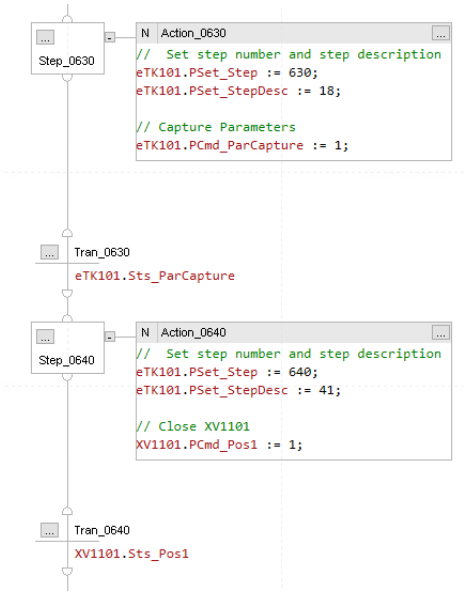
StateModel

Contains your state model (if state model is implemented external to raP_Opr_EMGen



STxx_<State> Routines

Contains your logic which sequences and coordinates devices (implement states as required)



Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Opr_EMGen_5.00.00_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

The primary operations of raP_Opr_EMGen (Generic Equipment Module) are to:

- Provides user defined states, and commands
- Allow monitoring of sequence Step, and display sequence Status.
- Monitor permissive conditions to prevent Equipment Module operation.
- Monitor interlock conditions to prevent Equipment Module operation or create failure condition.
- Provide the ability to force steps (maintenance)
- Monitor various Equipment Module failure conditions, and produce alarms.
- Operate in maintenance, program and operator command source.
- Provide an “available” status for use by automation logic, to indicate the Equipment Module is available for operation.
- Provide a propagation mechanism to allow the Equipment Module to publish status to and receive status from a group of equipment.
- Provides Interface to parameter display, data entry and configuration.
- Provides interface to resultant (report) data display and configuration.
- Allows configurable state effect of Alarm and Permissive

Command Source Operations

The raP_Opr_EMGen (Generic Equipment Module) uses the following standard command source operations implemented using an embedded PCMDSRC instruction.

Command Source	Description
Operator	The operator starts and stops the Equipment Module using the HMI faceplate.
Program	Logic outside the raP_Opr_EMGen starts and stops the Equipment Module using Program Commands (PCmd_Start, PCmd_Stop).
Maintenance	Maintenance personnel have control of the Equipment Module using the HMI faceplate and it is not available for normal operation by operators or program logic; by-passable interlocks, permissives and device alarms are bypassed, and fail-to-start and fail-to-stop checking is not performed

State Model

The raP_Opr_EMGen (Generic Equipment Module) allows the creation of a customized state model, for a particular instance.

Depending on your requirements, you may choose to modify the provided raP_Opr_EMGen with the logic required to implement the desired state model OR you may choose to implement the logic required for the state model external to raP_Opr_EMGen.

The raP_Opr_EMGen (Generic Equipment Module) provides up to 32 state commands (PCmd) and 32 state status's (Sts), which may be used when creating a custom state model.

Program Structure

The raP_Opr_EMGen (Generic Equipment Module) may be implemented using a program as a container (recommended). The following table outlies suggested program structure and routine naming:

Routine	Description
Dispatch	Contains raP_Opr_EMGen instance, external function instances (Interlock, Permissive, Associated Device), and routine calls.
AlarmsSuppress	Contains raP_Opr_EMGen alarm suppression logic.
Interlocks	Contains raP_Opr_EMGen interlock mapping from interlock conditions to _Intlk block.
Parameters	Contains raP_Opr_EMGen parameter mapping to and from Parameter blocks (I_Parameter(Enum,Integer,Real,Strin g) to raP_Opr_EMGen instance.
Permissives	Contains raP_Opr_EMGen permissive mapping from permissive conditions to _Perm block.
Reports	Contains raP_Opr_EMGen report mapping to and from Parameter blocks (I_Parameter(Enum,Integer,Real,Strin g) to raP_Opr_EMGen instance.
_StateModel	Contains raP_Opr_EMGen state module program logic.
ExtddAlarms	Contains raP_Opr_EMGen instances of external alarm instances and trigger logic.
St<xx>_<StateDesc>	Contains raP_Opr_EMGen state logic.

IMPORTANT The raP_Opr_EMGen (Generic Equipment Module) may be implemented without the program structure defined above; this is provided as an example.

Alarms

Alarms are implemented using Logix Tag Based Alarms.

Access to alarms is via <backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer® online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

Execution

Condition	Description
EnableIn False (False Rung)	Handle processing for EnableIn False (False Rung) the same as if the Equipment Module were Disabled by Command. The Equipment Module outputs are de-energized and the Equipment Module is shown as Disabled on the HMI.
Powerup (Pre-scan, First Scan)	Handles processing of command sources and alarms on Pre-scan and Powerup. On Powerup, the Equipment Module is treated as if it were Commanded to Reset all the Program and Operator command.
Postscan (SFC Transition)	No SFC Postscan logic is provided.

Refer to Logix 5000 Controllers Add-On Instructions: Programming Manual, 1756-PM010 for more information.

ATTENTION: Disabling the raP_Opr_EMGen Add-On instruction causes Equipment Module outputs to become de-energized.

Programming Example



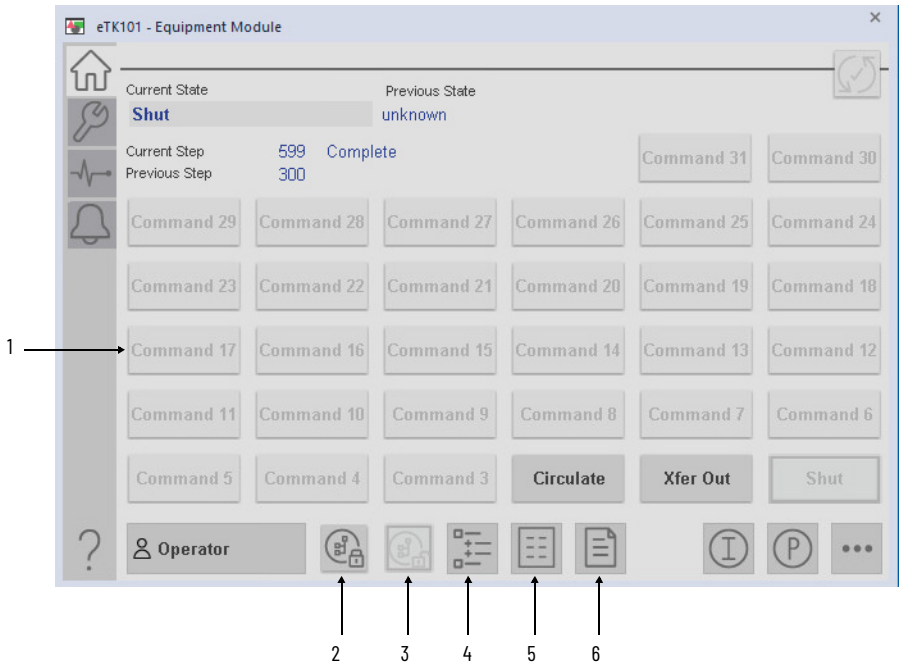
Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PEMGEN		The raP_Opr_EMGen (Generic Equipment Module) object controls an Equipment Module in a variety of command sources and monitors for fault conditions.

Faceplates

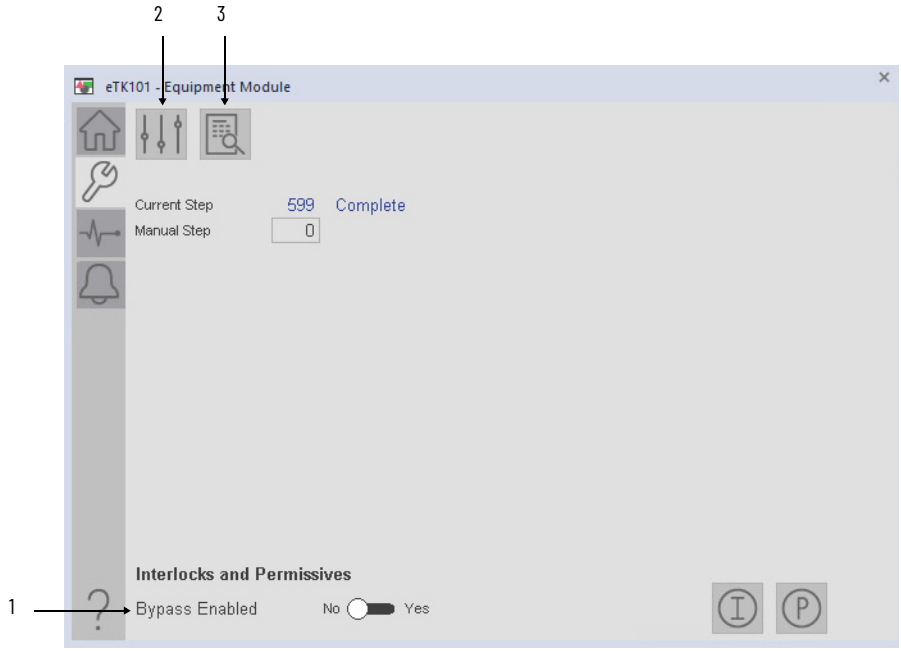
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab



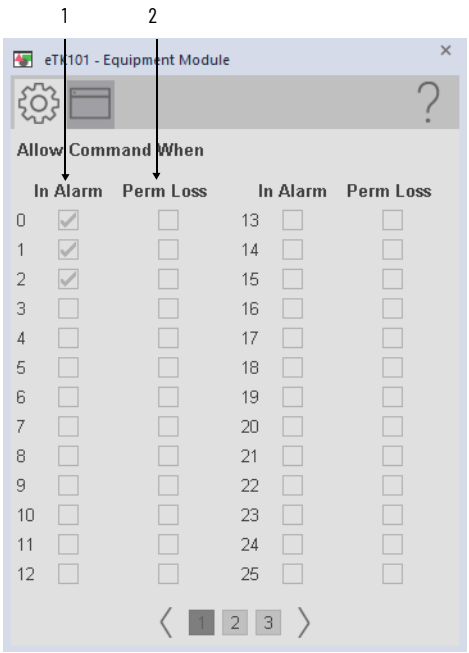
Item	Description
1	Command buttons with command text
2	Acquire child command source
3	Release child command source
4	Display tree view for this object
5	Show parameter display
6	Show report display

Maintenance Tab

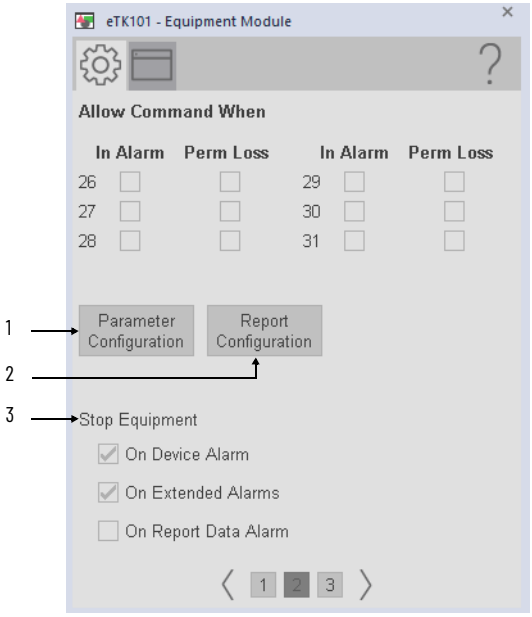


Item	Description
1	Select yes to enable bypass
2	Display advanced properties
3	Navigation to detail display

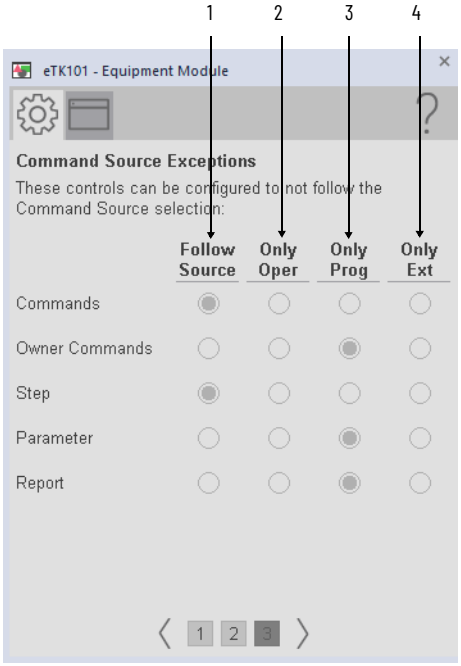
Engineering Tab



Item	Description
1	Select to allow Operator command execution with active alarm condition
2	Select to allow Operator command execution with loss of permissive



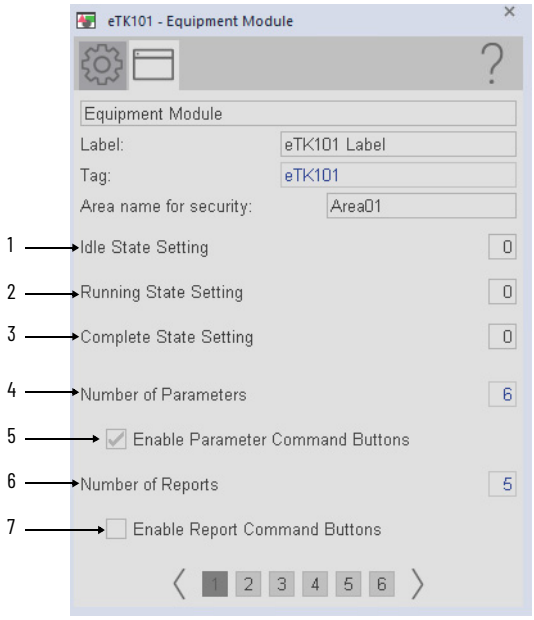
Item	Description
1	Show parameter configuration display
2	Show report configuration display
3	Select conditions to stop equipment



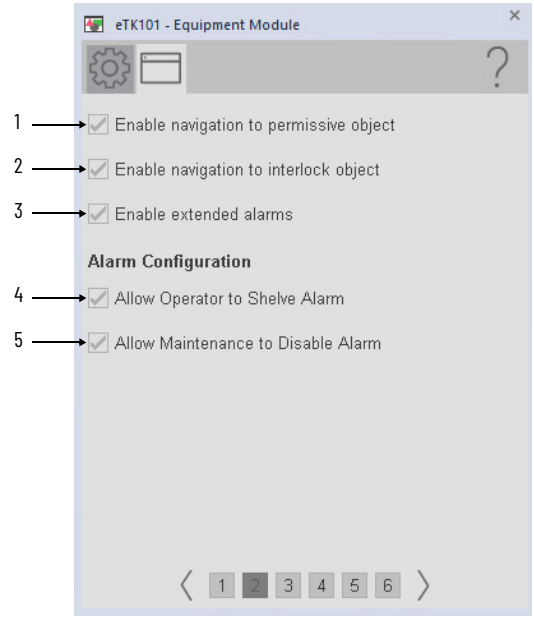
Item	Description
1	Control of this feature will be determined by the current command source
2	This feature will always be commanded by the Operator
3	This feature will always be commanded by the Program Logic
4	This feature will always be commanded by the External Source

HMI Configuration Tab

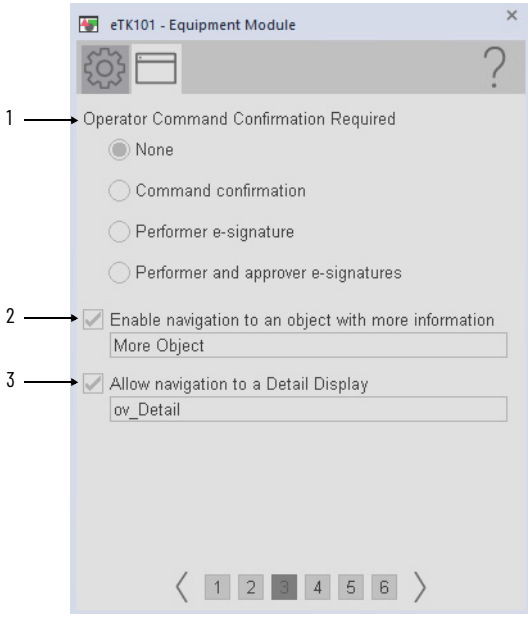
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Define the Idle State for Status indication.
2	Define the Running State for Status indication.
3	Define the Complete State for Status indication.
4	Define the number of Parameters.
5	Select to enable parameter command buttons
6	Define the number of Reports.
7	Select to enable report command buttons

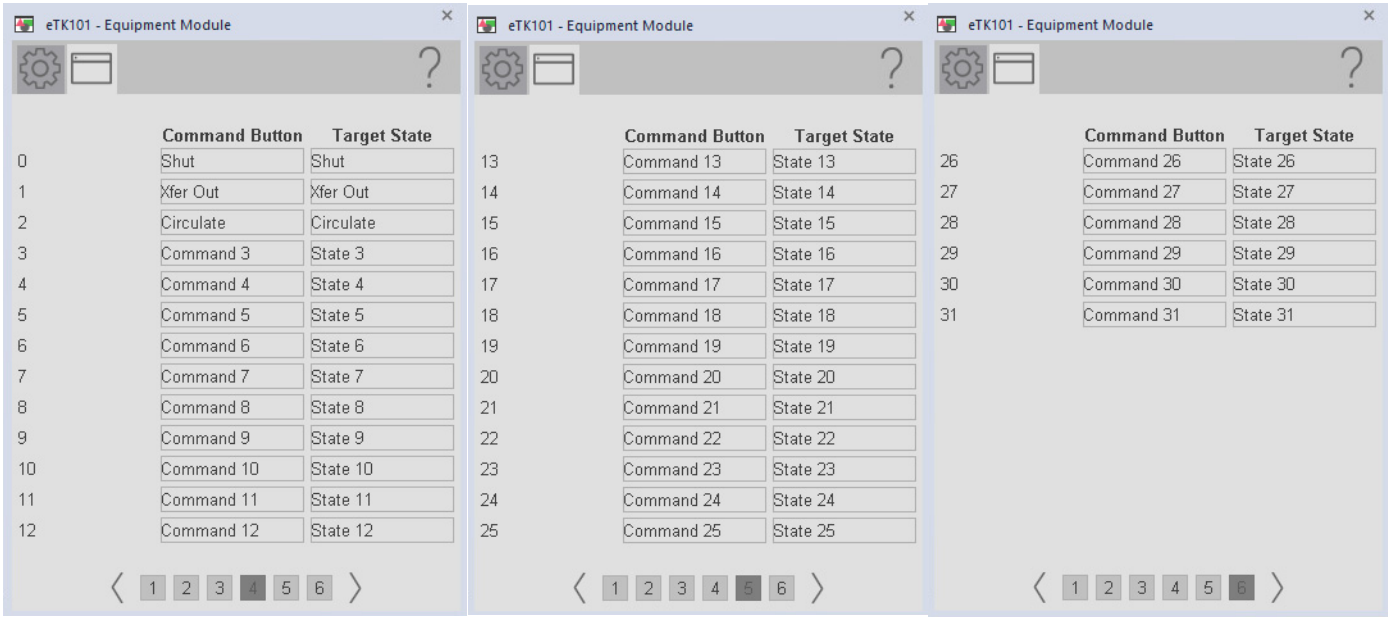


Item	Description
1	Select to enable navigation to permissive object
2	Select to enable navigation to interlock object
3	Select to enable extended alarms
4	Select to allow Operator to shelve alarm
5	Select to allow Maintenance to disable alarm



Item	Description
1	Select an option for Operator Command Confirmation Requirements
2	Select to enable navigation to an object with more information. You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.
3	Select to allow navigation to detail display

Define the Command Button and Target Stages on pages four, five and six.



General Equipment Phase (raP_Opr_EPGen)

Overview

An equipment phase is a functional group of equipment that can carry out a finite number of specific minor processing activities when directed by a (recipe) phase.



Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

The raP_Opr_EPGen (Generic Equipment Phase Module) object controls a Equipment Phase in a variety of command sources and monitors for fault conditions.

Use when:

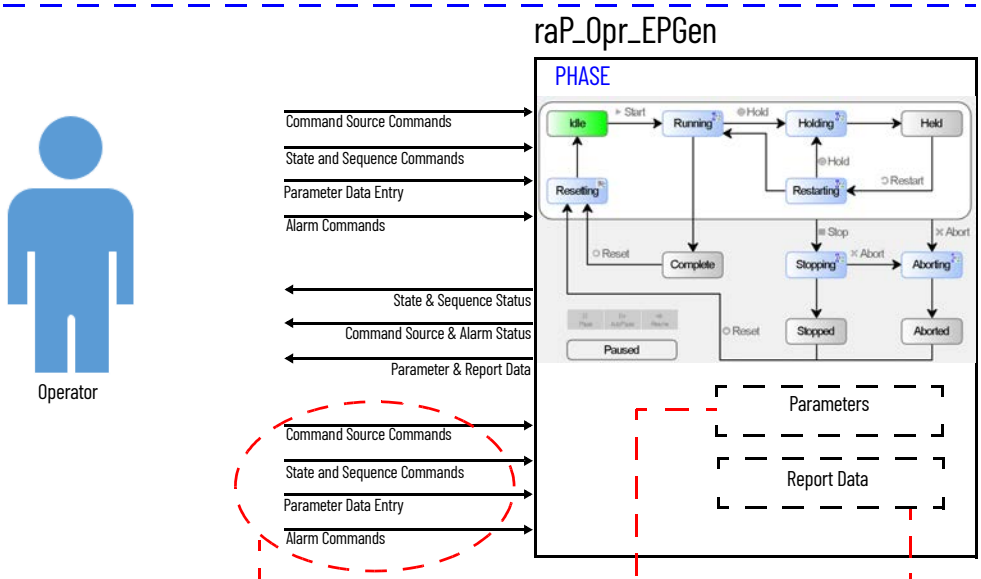
- You want to group equipment, and you want to apply the ISA 88.01 state model using PhaseManager™
- You want to provide the following for a group of equipment
  - Apply a mode model to the equipment group
  - Apply interlocks and/or permissives to the group of equipment
  - Parameters which define the behavior of the group of equipment
  - Report / Resultant data from the group of equipment
  - A faceplate which allows monitoring / control of the equipment grouping
  - Monitor step (description), and allow forcing of steps in maintenance command source
  - Allow alarms to be defined for certain process / equipment failure conditions
  - Alarming function, including alarms based on device failure.

Functional Description

Phase Manager Program

Dispatch

Contains raP_Opr_EPGen instruction and any external instructions required.



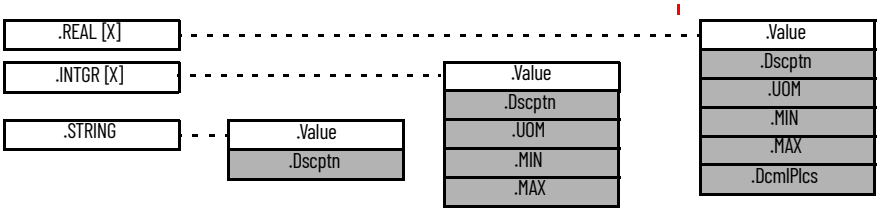
PHASECommands

Contains commands from your logic to raP_Opr_EPGen (as required)
Note: FactoryTalk® Batch issues commands directly to raP_Opr_EPGen via Phase Manager - no logic is requried.



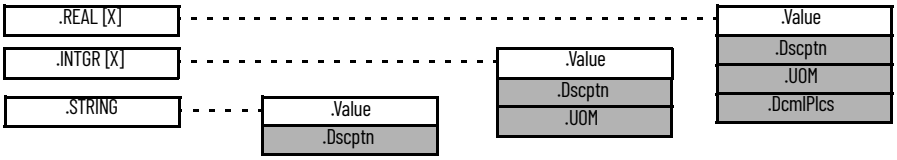
Parameters

Contains logic which maps parameters to raP_Opr_EPGen to Phase Manager tags (Input)



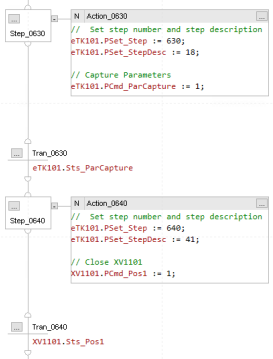
Reports

Contains logic which maps report data from raP_Opr_EPGen to Phase Manager tags (Output)



Phase State Routines

Contains your logic which sequences and coordinates devices (implement states as required)



Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Opr_EPGen_5.00.00_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

The primary operations of the raP_Opr_EPGen (Generic Equipment Phase Module) are to:

- Provides ISA 88 states, and associated commands
- Provides program structure as a container for coordination and sequencing logic.
- Provides Parameter display, and data entry (operator command source).
- Provides resultant (report) data display.
- Allow monitoring of process Step, and display Equipment Phase status.
- Monitor permissives, preventing Equipment Phase operation.
- Monitor interlock conditions to prevent Equipment Phase operation or create failure condition.
- Provide a stepping mechanism, including the ability to force steps (maintenance)
- Monitor various Equipment Phase failure conditions, and produce alarms.
- Operate in maintenance, program and operator command sources.
- Provide an “available” status for use by automation logic, to indicate the Equipment Phase is available for operation.
- Provide a propagation mechanism to allow the Equipment Phase to publish status to and receive status from a group of equipment.

Command Source Operations

The raP_Opr_EPGen (Generic Equipment Phase Module) uses the following standard command sources implemented using an embedded PCMDSRC instruction.

Command Source	Description
Operator	The operator starts and stops the Equipment Module using the HMI faceplate.
Program	Logic outside the EM_GEN starts and stops the Equipment Module using Program Commands (PCmd_Start, PCmd_Stop).
Maintenance	Maintenance personnel have control of the Equipment Module using the HMI faceplate and it is not available for normal operation by operators or program logic; by-passable interlocks, permissives and device alarms are bypassed, and fail-to-start and fail-to-stop checking is not performed

Phase Manager

The raP_Opr_EPGen (Generic Equipment Phase Module) is designed to operate with PhaseManager.

PhaseManager provides the following:

- ISA 88 state model, which can be executed by FTBatch, Studio 5000 Logix Designer®, or program logic.
- Program Structure, which contains phase state routines
- Program scoped tags, which allow individual tags to be configured as Input (parameters from FTBatch) or Output (resultant data, or report data, to FTBatch) for a particular PhaseManager phase.
- Phase data structure, which allows interface to the PhaseManager phase
- An instruction set for issuing commands, and controlling the execution of the PhaseManager phase.

The raP_Opr_EPGen (Generic Equipment Phase Module) provides an embedded reference to an associated PhaseManager Phase. The raP_Opr_EPGen (Generic Equipment Phase Module):

- Provides an HMI interface (faceplate), which allows control and monitoring of the PhaseManager phase.
- Provides a predefined HMI interface (faceplate), which allows input & monitoring of parameters (linked to program tags) and monitoring of resultant/report data (linked to program tags)
- Provides a normalized logic command interface, which utilizes the PhaseManager instruction set.

Program Structure

The raP_Opr_EPGen (Generic Equipment Phase Module) utilizes the PhaseManager program structure, as follows:

Routine	Description
Dispatch	Contains raP_Opr_EPGen instance, external function instances (Interlock, Permissive, Associated Device), and Phase State routinecalls. Phase state routines are a component of a PhaseManager Phase. • One or all of the available Phase state routines may be implemented. • The logic within a particular Phase state routine is executed when the Phase is in the corresponding state. • Any implemented Phase state routine requies a Phase State Complete instruction (which the state engine uses to determine the state is complete).
Aborting	Generally used for shutting down equipment in an emergency situation. If you have implemented Stopping, you would at a minimum duplicate the stopping logic within Aborting. In some cases the sequence in an emergency situation (Aborting) differs from the orderly shutdown of equipment (Stopping).
Holding	Used if equipment or a sub-set of equipment needs to be shut down when the phase enters the hold state. It may also be advantageous to release owned equipment if maintaining ownership while held constrains production by maintaining ownership of shared equipment.
Resetting	Generally used to perform “clean-up” activities such as release owned equipment, etc.
Restarting	Generally implemented if Holding is implemented. Used to bring equipment from the state it is in at the end of the Holding state back to the state it was in prior Holding. Usually used in conjunction with PSet_HoldIndx and Val_LastRunningStep to return execution to the proper sequence step.
Running	Use to start-up equipment, and aquire ownership of equipment (if required).
Stopping	Use if equipment needs to be shut down in a given sequence.

Routine	Description
AlarmsSuppress	Contains EP_GEN alarm suppression logic.
Interlocks	Contains EP_GEN interlock mapping from interlock conditions to <EP_GEN>_Intlk block.
Parameter	Contains EP_GEN parameter mapping to and from Parameter blocks (I_Parameter(Enum,Integer,Real,String) to EP_GEN instance.
Permissives	Contains EP_GEN permissive mapping from permissive conditions to <EP_GEN>_Perm block.
<EP_GEN>_PhaseCommands	Maps commands from EP_GEN to PhaseManager commands
<EP_GEN>_PXRQ	PXRQ Routine container. Use the PRXQ instruction to initiate communication with FTBatch software.
Reports	Contains EP_GEN report mapping to and from Parameter blocks (I_Parameter(Enum,Integer,Real,String) to EP_GEN instance.
ExtddAlarms	Contains EP_GEN instances of external alarm instances and trigger logic.

IMPORTANT Routines listed in the table above, are located within the PhaseManager program. This represents an example for implementing PhaseManager with the raP_Opr_EPGen (Generic Equipment Phase Module).

PhaseManager may be implemented without the raP_Opr_EPGen (Generic Equipment Phase Module), in which case the PhaseManager program may be structured as desired. See the PhaseManager User Manual, Publication LOGIX-UM001.

Alarms

Alarms are implemented using Logix Tag Based Alarms.

Access to alarms is via <backing_tag>.@Alarms.<alarm_name>.<alarm_parameter>.

For more information, see the Studio 5000 Logix Designer online help topic: "Logix Designer > Alarms > Tag-based alarms > Access tag-based alarms in logic" and related subtopics.

Execution

The following table explains the handling of instruction execution conditions.

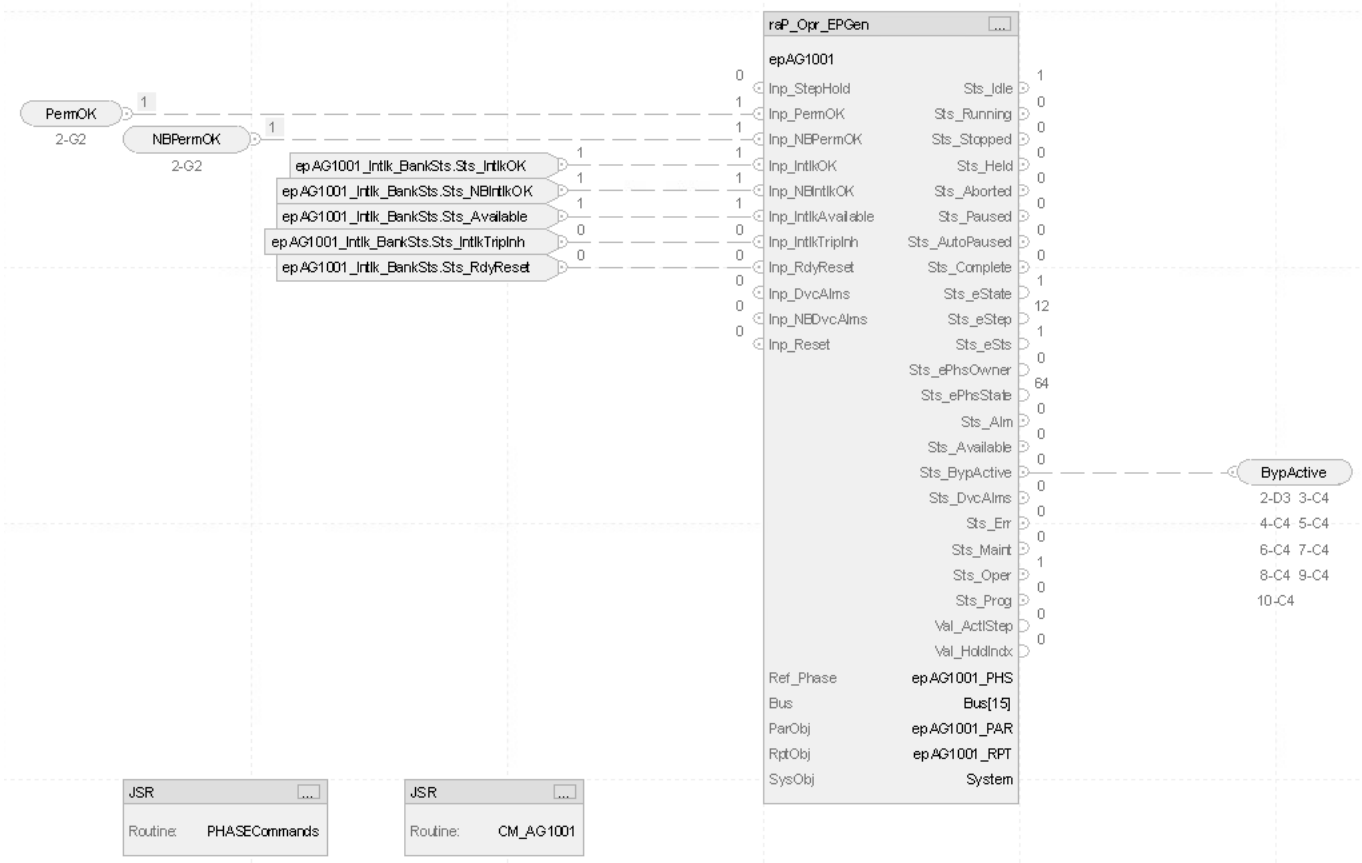
Condition	Description
EnableIn False (False Rung)	Handle processing for EnableIn False (False Rung) the same as if the Equipment Module were Disabled by Command. The Equipment Module outputs are de-energized and the Equipment Module is shown as Disabled on the HMI.
Powerup (Pre-scan, First Scan)	Handles processing of command sources and alarms on Pre-scan and Powerup. On Powerup, the Equipment Module is treated as if it were Commanded to Reset all the Program and Operator command.
Postscan (SFC Transition)	No SFC Postscan logic is provided.

Refer to Logix 5000 Controllers Add-On Instructions: Programming Manual, 1756-PM010 for more information.

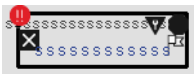


ATTENTION: Disabling the raP_Opr_EPGen Add-On instruction causes Equipment Phase outputs to become de-energized.

Programming Example



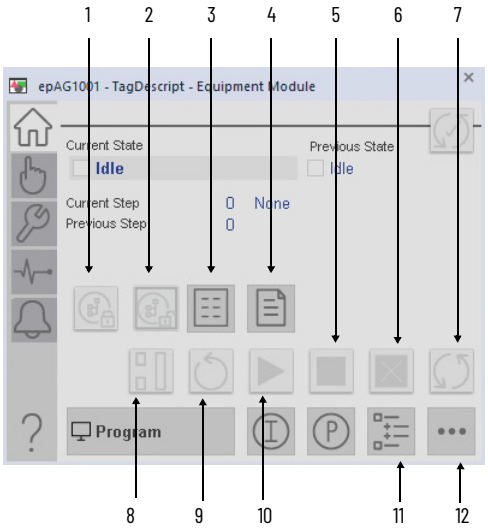
Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PEPGEN		The raP_Opr_EMGen (Generic Equipment Module) object controls an Equipment Module in a variety of command sources and monitors for fault conditions.

Faceplates

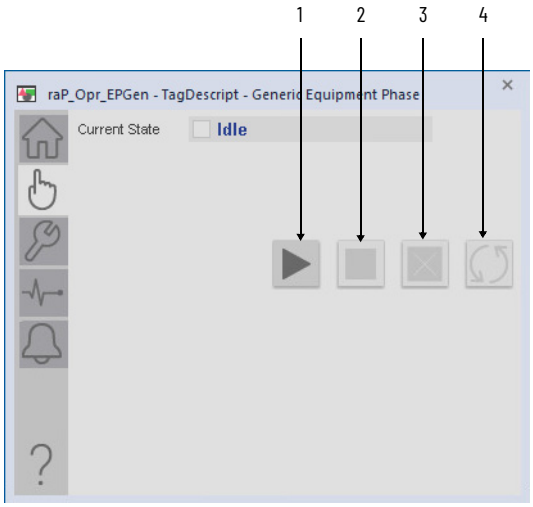
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab



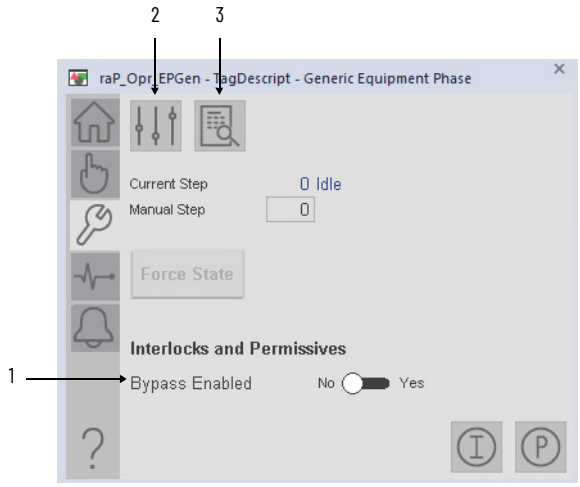
Item	Description
1	Acquire child command source
2	Release child command source
3	Show parameter display
4	Show report display
5	Stop phase
6	Abort phase
7	Reset phase
8	Hold phase
9	Restart phase
10	Start phase
11	Display Tree View for this object
12	Display an object with more information

Manual Control



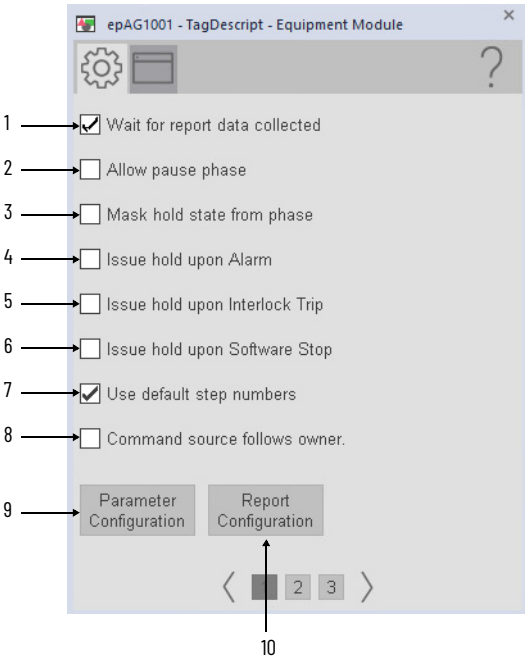
Item	Description
1	Start phase
2	Stop phase
3	Abort phase
4	Reset phase

Maintenance Tab

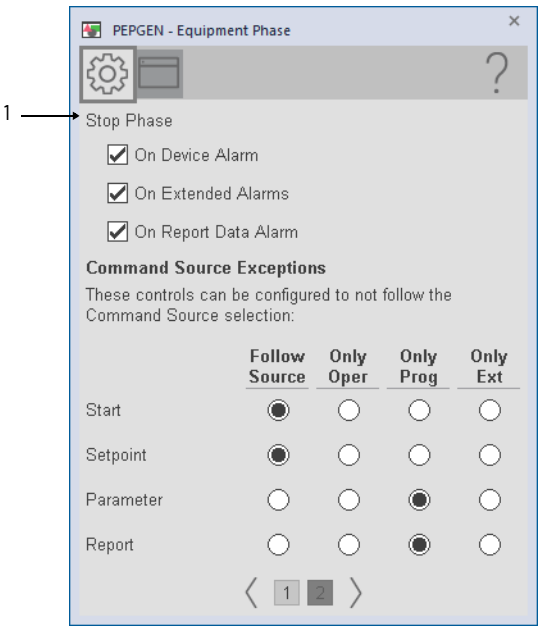


Item	Description
1	Select Yes to enable bypass
2	Display Advanced Properties
3	Navigate to detail display

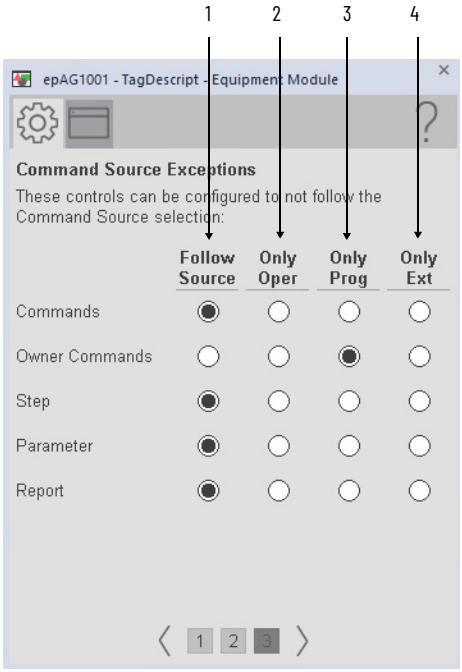
Engineering Tab



Item	Description
1	Select to wait for report data collected before alarming.
2	Select to allow a pause phase
3	Select to mask hold state from phase
4	Select to issue hold upon alarm
5	Select to issue hold upon interlock trip
6	Select to issue hold upon software stop
7	Select to use default step numbers
8	Select to have the command source follow the owner
9	Show parameter configuration display
10	Show report configuration display



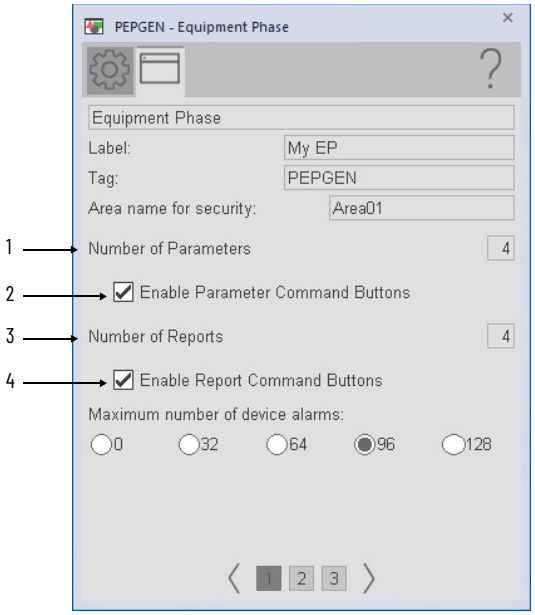
Item	Description
1	Select conditions to stop phase



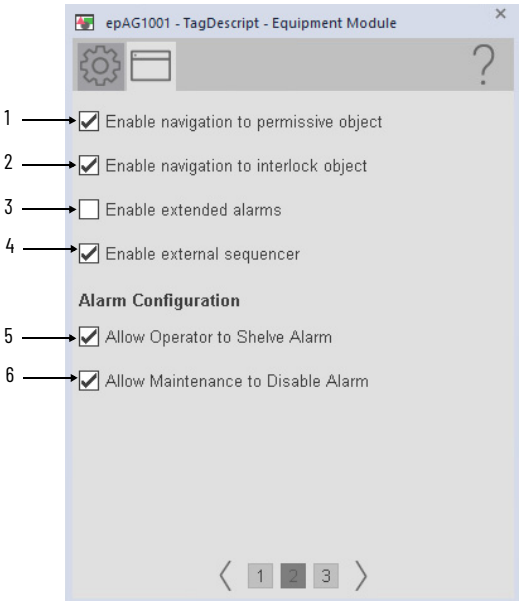
Item	Description
1	Control of this feature will be determined by the current command source
2	This feature will always be commanded by the Operator
3	This feature will always be commanded by the Program Logic
4	This feature will always be commanded by the External Source

HMI Configuration Tab

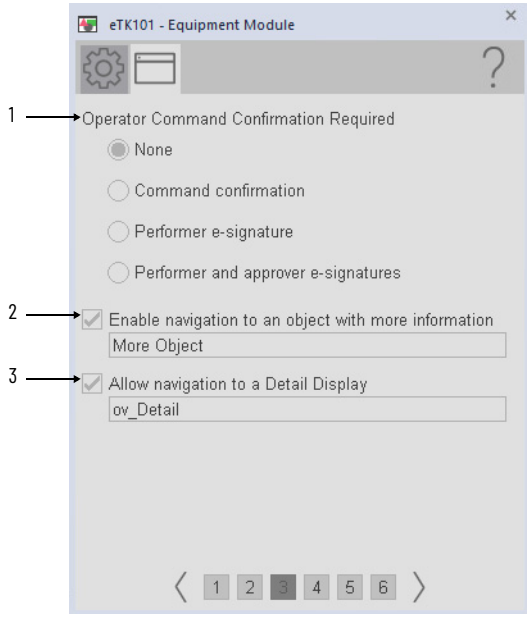
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Define the number of Parameters.
2	Select to enable parameter command buttons
3	Define the number of Reports.
4	Select to enable report command buttons



Item	Description
1	Select to enable navigation to permissive object
2	Select to enable navigation to interlock object
3	Select to enable extended alarms
4	Select to enable external sequencer
5	Select to allow Operator to shelve alarm
6	Select to allow Maintenance to disable alarm



Item	Description
1	Select an option for Operator Command Confirmation Requirements
2	Select to enable navigation to an object with more information. You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.
3	Select to allow navigation to detail display

Notes:

Parameter and Reports (raP_Tec_ParRpt)

Overview

The raP_Tec_ParRpt Add-On Instruction is used to implement parameter data items. The raP_Tec_ParRpt instruction may be used as follows:

- For a read only parameter
- For a read/write parameter
- For a parameter of type Integer, Real, String or Enumeration
- Equipment Module (raP_Opr_EMGen) and Equipment Phase (raP_Opr_EPGen) are designed to work with the raP_Tec_ParRpt instruction



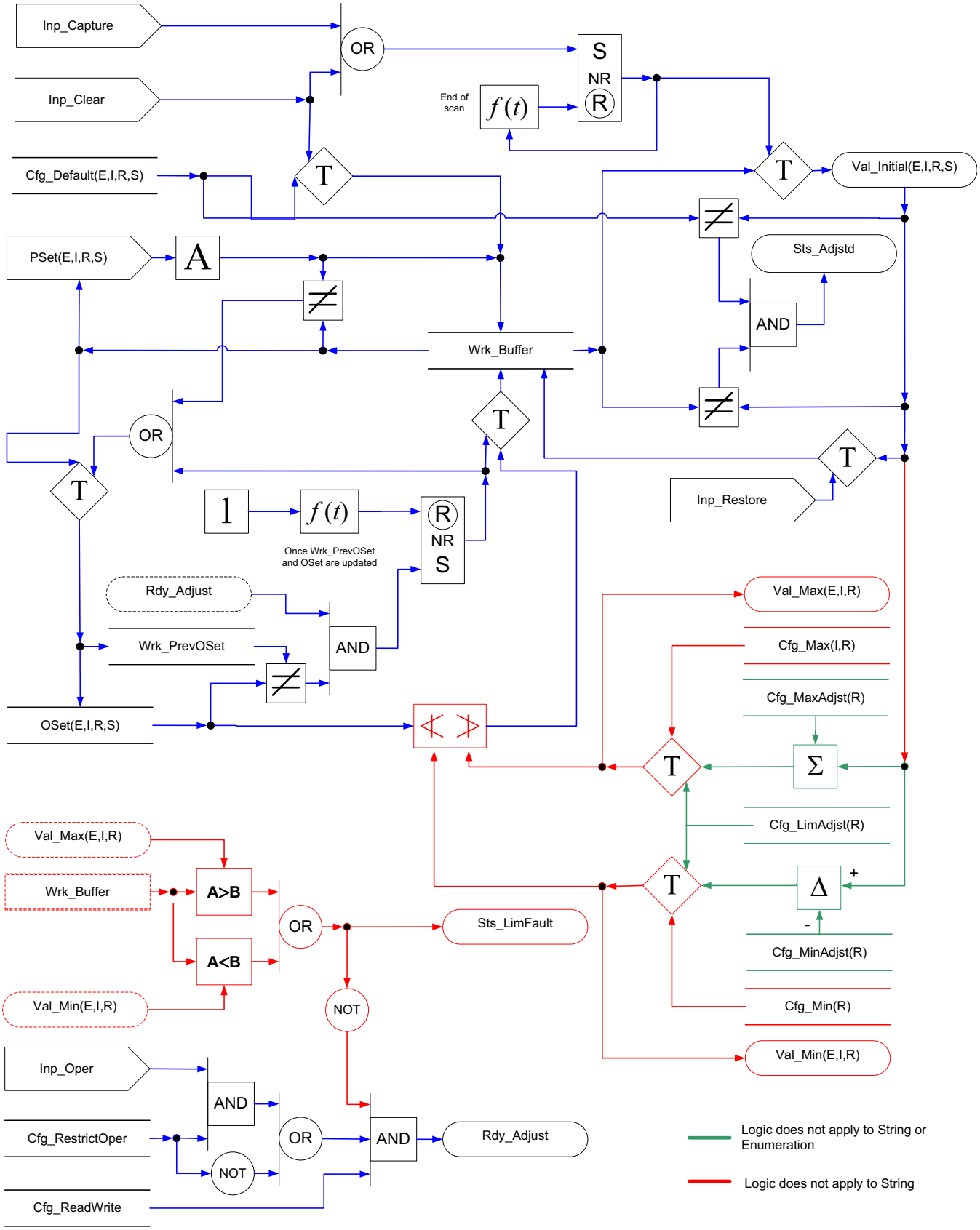
Knowledgebase Technote, PlantPAx System Release 5.0 Configuration and Implementation Tools, contains the object and visualization parameters. Download the spreadsheet from this public article.

You may be asked to log in to your Rockwell Automation web account or create an account if you do not have one. You do not need a support contract to access the article.

Use when:

- You need the ability to view or modify a parameter from either the HMI or from logic
- You need to arbitrate parameter input based on mode
- You need the ability to limit the value of a parameter, from either the HMI or logic
- You need the ability to capture an initial parameter value (based on a trigger), and provide an indication if the parameter was adjusted from the initial value
- You need to limit the adjustment of a parameter within a deadband relative to an initial value
- You need to apply command confirmation (i.e. Electronic Signature) to parameter entry from the HMI.
- Your parameter is read only or read/write
- Your need a Parameter (recipe) or Report (resultant) parameter
- Your parameter is of data type: Integer, Real, String, or is an Enumeration

Functional Description



Required Files

Add-On Instructions are reusable code objects that contain encapsulated logic that can streamline implementing your system. This lets 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.

Controller File

The raP_Tec_ParRpt_5.00.00_AOI.L5X Add-On Instruction must be imported into the controller project to be used in the controller configuration. The service release number (boldfaced) can change as service revisions are created.

Operations

The primary operations of the raP_Tec_ParRpt (Parameter Instruction) are:

- Captures the initial value of the parameter (snap shot) when the Trigger goes TRUE. Maintains the initial value until the Clear input goes TRUE.
- Permits or denies Operator adjustment of the parameter value. When permitted, allows the adjustment of the parameter value within a deadband of the initial parameter value based on configured limits.
- Compares the initial parameter value to the present parameter value and produces an “Adjusted” status.
- Allows initial parameter values to be restored, when the Reset to Initial input goes TRUE.
- Limits the value of the parameter based on configured Minimum and Maximum limits, and produces a status when the parameter value is beyond limits.
- Allows parameter to be configured as Read, or Read/Write
- Allows a default parameter value to be configured, restores defaults when Clear input goes TRUE.
- Allows the configuration of a text description, and units of measure (engineering units) for the parameter.
- When configured to allow Operator entry and Read/Write, and “Operator” mode input is true; produces “Ready to Adjust” status, and allows the parameter value to be entered from the HMI.
- Allows command confirmation to be applied to parameter entry from the HMI: No Signature, Performer Signature only, or Performer and Approvers Signatures.

Modes of Operation

The raP_Tec_ParRpt instruction does not have modes. However, the raP_Tec_ParRpt provides an input to monitor for Operator mode, and uses this to arbitrate request to modify the parameter value.

Alarms

The raP_Tec_ParRpt instruction does not generate any alarms.

Execution

The following table explains the handling of instruction execution conditions.

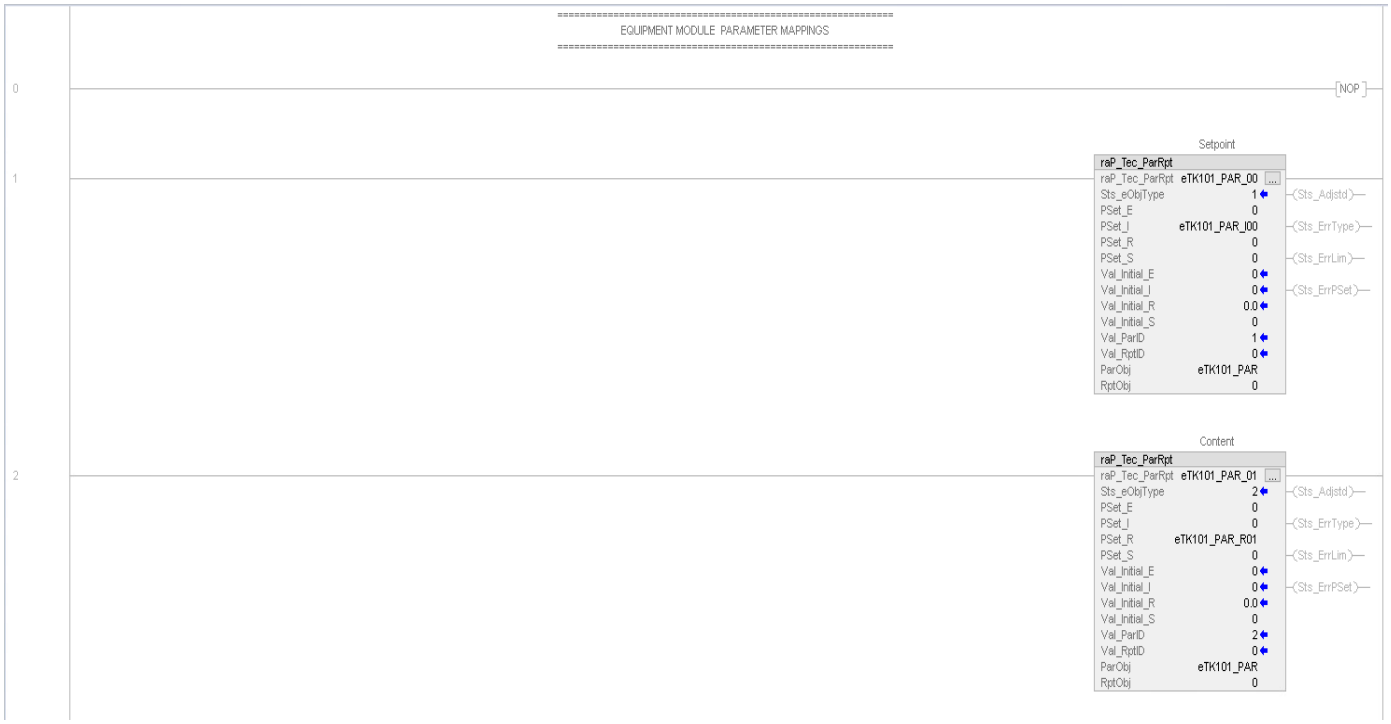
Condition	Description
EnableIn False (False Rung)	Handle processing for EnableIn False (False Rung) the same as if the Equipment Module were Disabled by Command. The Equipment Module outputs are de-energized and the Equipment Module is shown as Disabled on the HMI.
Powerup (Pre-scan, First Scan)	Handles processing of modes and alarms on Pre-scan and Powerup. On Powerup, the Equipment Module is treated as if it were Commanded to Reset all the Program and Operator command.
Postscan (SFC Transition)	No SFC Postscan logic is provided.

Refer to Logix 5000 Controllers Add-On Instructions: Programming Manual, 1756-PM010 for more information.

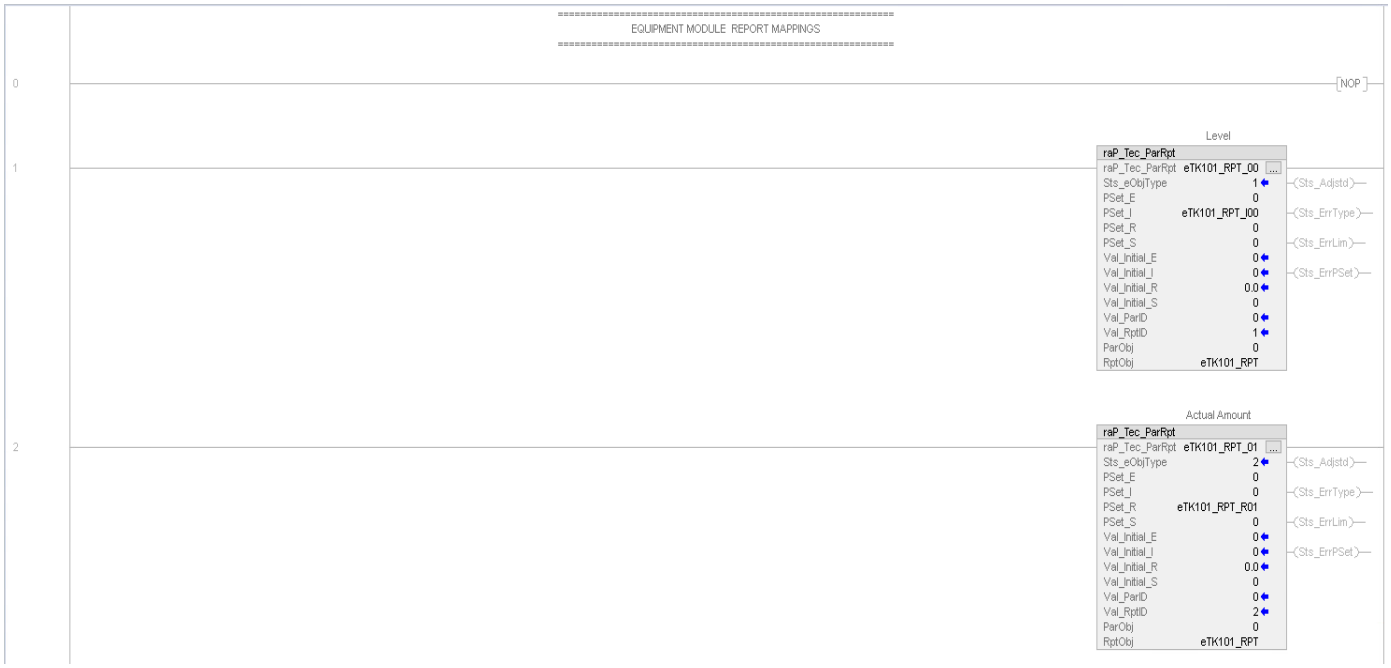
ATTENTION: Disabling the raP_Tec_ParRpt Add-On instruction causes Equipment Phase outputs to become de-energized.

Programming Example

Parameter Program Example

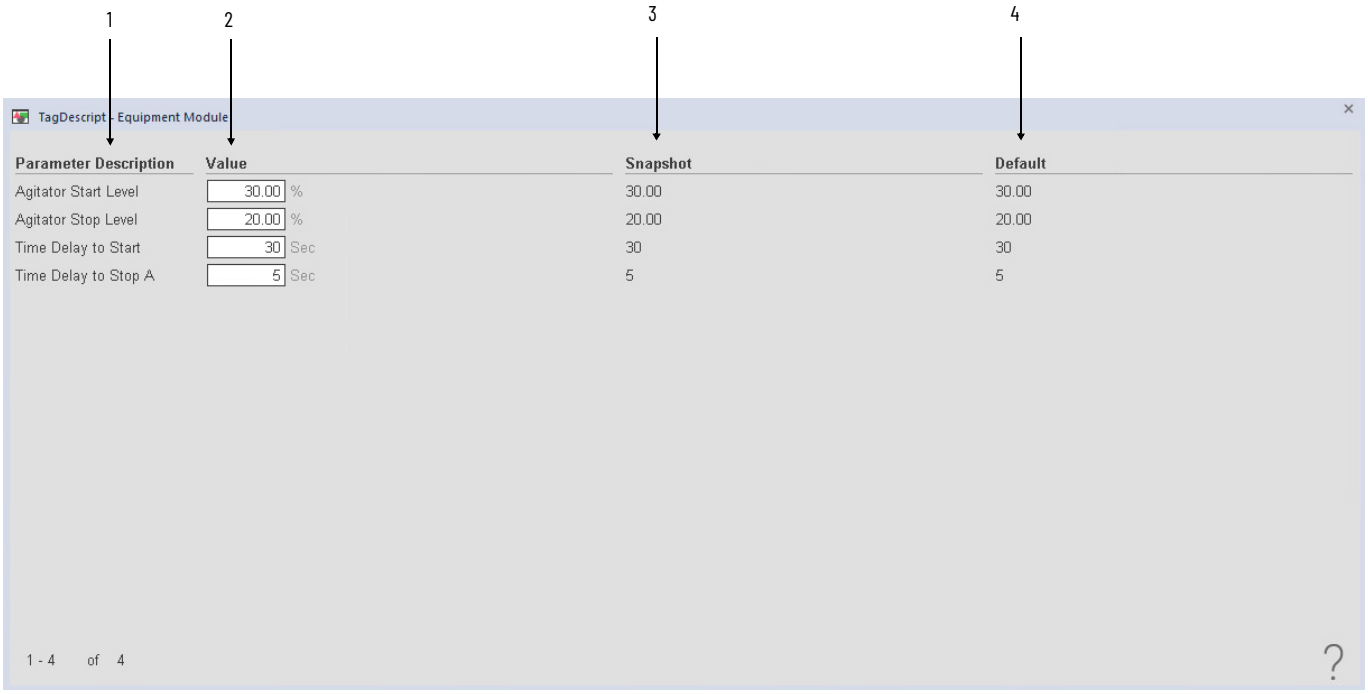


Reports Program Example



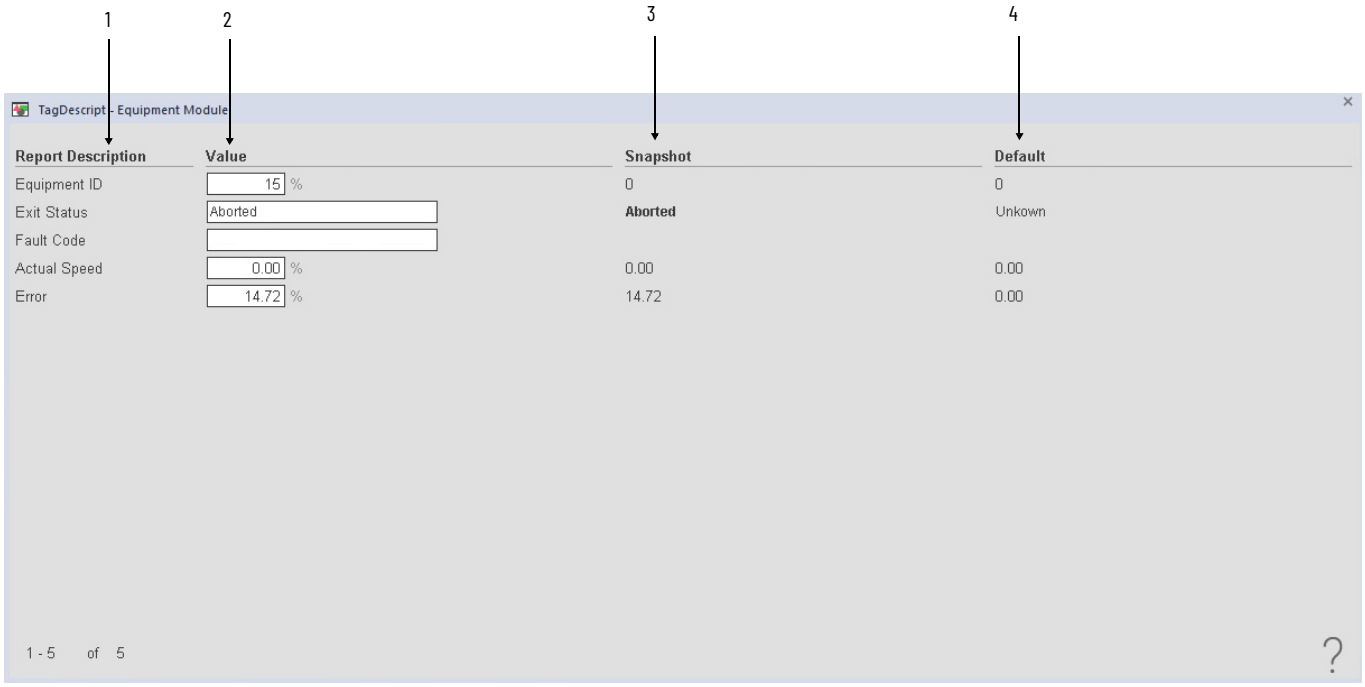
Faceplates

Parameter Display



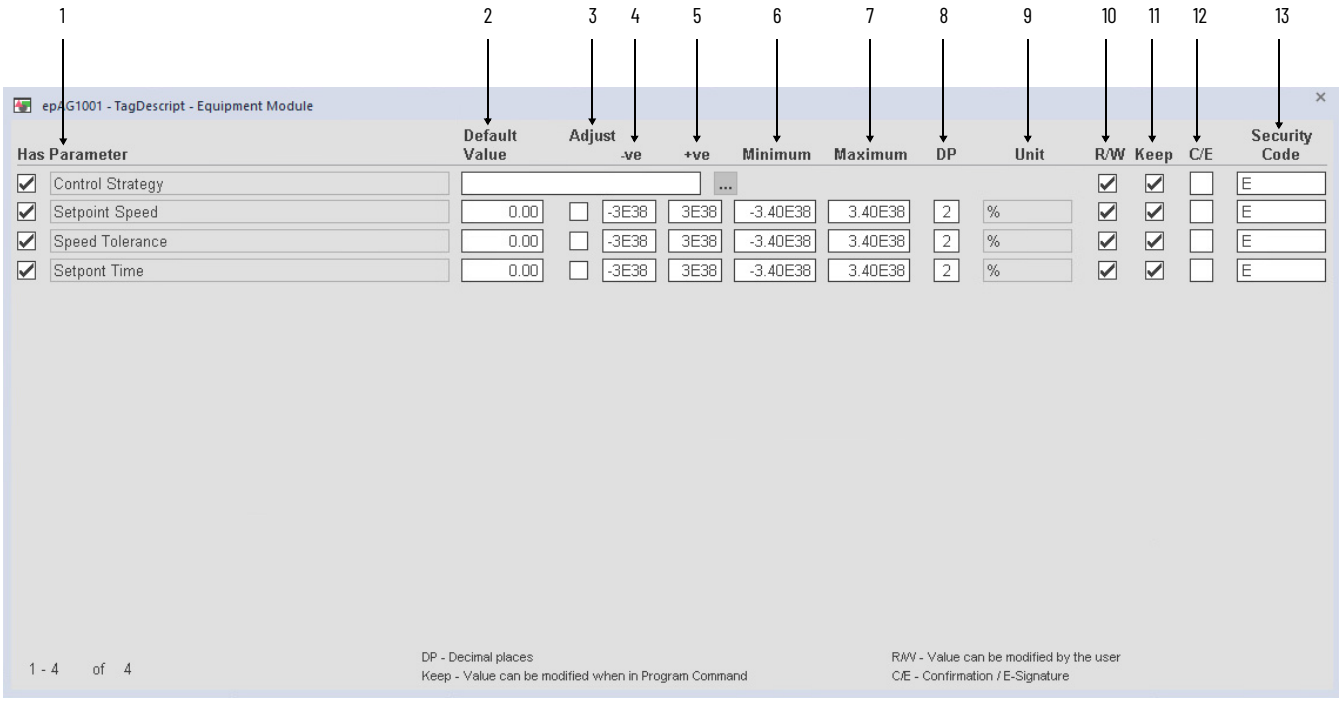
Item	Description
1	Parameter descriptions
2	Value of Parameter
3	Snapshot value
4	Default value of Parameter

Report Display



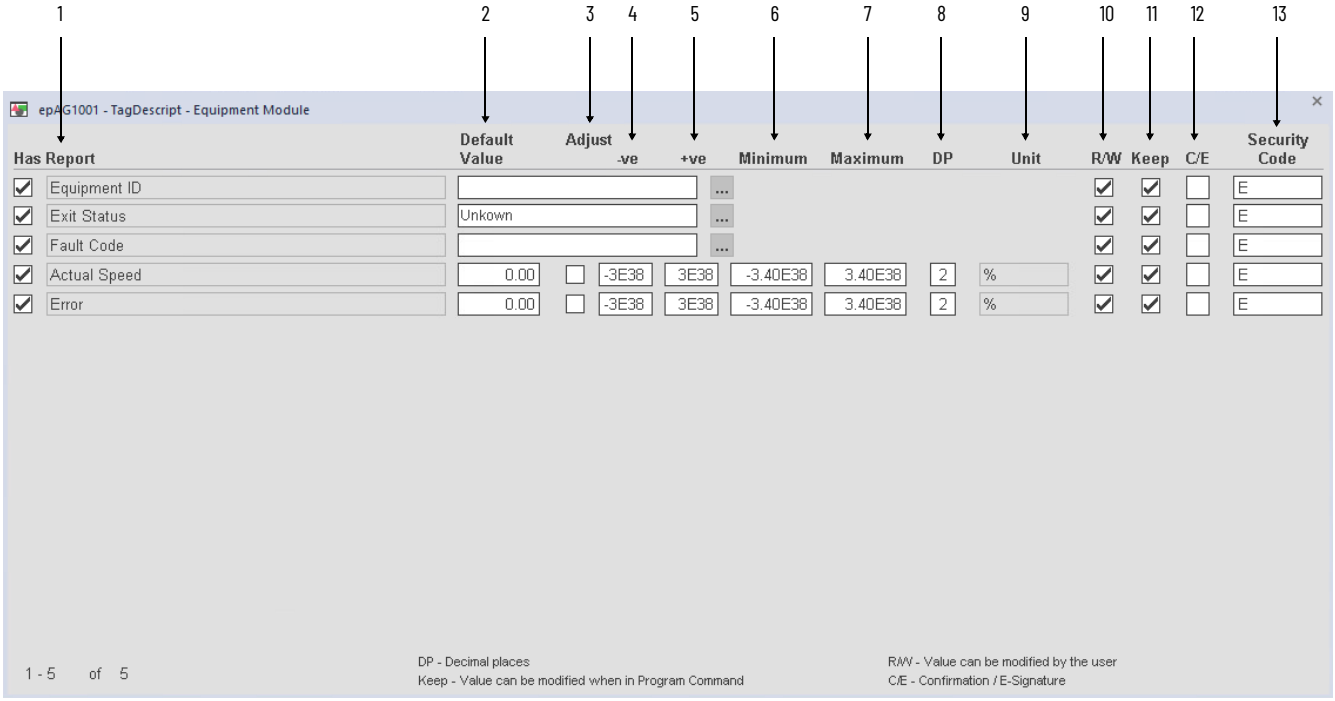
Item	Description
1	Report descriptions
2	Value of Report
3	Snapshot value
4	Default value of Report

Parameter Configuration



Item	Description
1	Parameter Description
2	Default value of Parameter
3	Allow limit adjust
4	Integer minimum adjust value of parameter.
5	Integer maximum adjust value of parameter.
6	Minimum value of Parameter
7	Maximum value of Parameter
8	Enter the decimal places to display.
9	Engineering Unit of Parameter.
10	Parameter value can be modified by the operator when enabled.
11	Parameter value can be modified when in Program Command.
12	Enable Confirmation / E-Signature of Parameter.
13	Assign User Roles Security Level of Parameter.

Report Configuration



Item	Description
1	Report Description
2	Default value of Report
3	Allow limit adjust
4	Integer minimum adjust value of parameter.
5	Integer maximum adjust value of parameter.
6	Minimum value of Report
7	Maximum value of Report
8	Enter the decimal places to display.
9	Engineering Unit of Report.
10	Report value can be modified by the operator when enabled.
11	Report value can be modified when in Program Command.
12	Enable Confirmation / E-Signature of Report.
13	Assign User Roles Security Level of Report.

Notes:

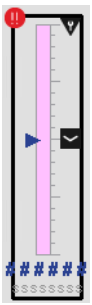
Graphic Symbols and Faceplates for PlantPAx Instructions

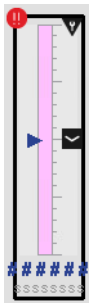
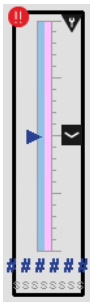
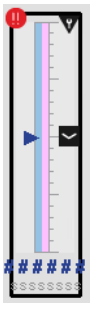
In PlantPAx® 5.0, Rockwell Automation offers device control strategies embedded into the process controller. These PlantPAx strategies use Graphic Symbols and Faceplates for the HMI interface. The instructions in this chapter are only available on the process controller.

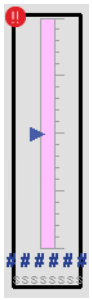
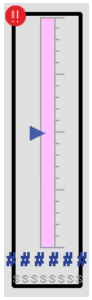
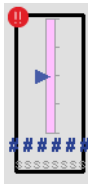
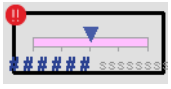
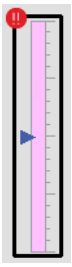
A Graphic Symbol is a global object that is created once and can be referenced multiple times on multiple displays in an application. When changes are made to the original (base) object, the instantiated copies (reference objects) are automatically updated. Use of global objects, with tag structures in the ControlLogix® system, aid consistency and save engineering time.

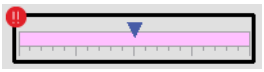
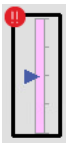
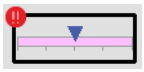
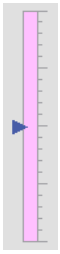
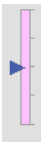
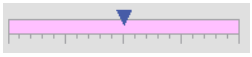
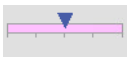
All of the objects with "_L1" are for Level 1 or Level 2 displays. These objects do not launch faceplates.

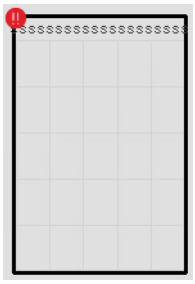
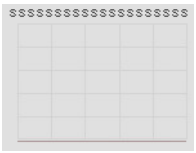
Process Analog Input (PAI) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PAI		Standard analog-input graphic symbol
GO_PAI_Trend		Analog input with a trend of the Process Variable and limits (highhigh, high, low, and low-low).
GO_PAI_Indicator		Process Variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bars.

Graphic Symbol Name	Graphic Symbol	Description
GO_PAI_IndicatorWCapture		This object is the same as GO_PAI_Indicator plus a light gray minimum/maximum capture area.
GO_PAI_TrendWCapture		Analog Input with Trend of Process Variable and limits (high-high, high, low, and low-low) plus a light gray capture area.
GO_PAI_Adv_Trend		This graphic symbol includes a trend with target lines and is intended to be used for the Advanced Analog Input Add-On Instruction.
GO_PAI_AdvIndicator		A moving triangle indicates the process variable. The graphic display includes limits that are displayed with filled bars plus a cyan target range (for deviations).
GO_PAI_AdvIndicatorWCapture		A moving triangle indicates the process variable. The graphic display includes limits that are displayed with filled bars plus a cyan target range (for deviations) and a light gray minimum/ maximum capture area.
GO_PAI_L1_		Displays the process variable value with alarm indication.

Graphic Symbol Name	Graphic Symbol	Description
GO_PAI_L1_PV	####### sssssssss	Displays the process variable value.
GO_PAI_L1_PV1	####### sssssssss	Displays the process variable value.
GO_PAI_L1_Label	ssssssssssssssssssss	Label only. This does not include the process variable value.
GO_PAI_L1_Indicator		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. Includes alarm indication.
GO_PAI_L1_HIndicator		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. Includes alarm indication.
GO_PAI_L1_IndicatorS		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. Includes alarm indication.
GO_PAI_L1_HIndicatorS		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. Includes alarm indication.
GO_PAI_L1_BarWAlm		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip. Includes alarm indication.

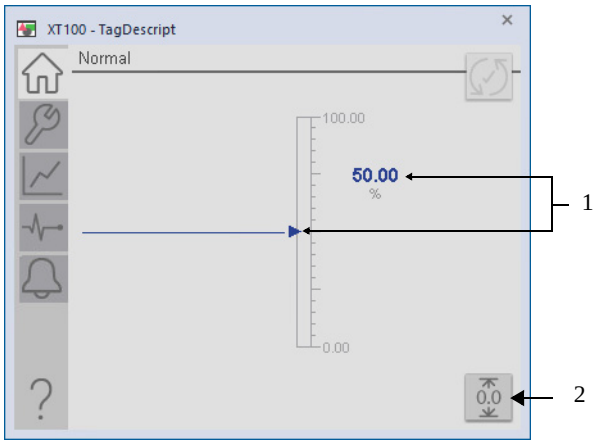
Graphic Symbol Name	Graphic Symbol	Description
GO_PAI_L1_HBarWAlm		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip. Includes alarm indication.
GO_PAI_L1_BarWAlmS		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip. Includes alarm indication.
GO_PAI_L1_HBarWAlmS		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip. Includes alarm indication.
GO_PAI_L1_Bar		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip.
GO_PAI_L1_BarS		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip.
GO_PAI_L1_HBar		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip.
GO_PAI_L1_HBarS		Process variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bar. The process variable value or EU are not displayed, but can be found in the tooltip.

Graphic Symbol Name	Graphic Symbol	Description
GO_PAI_Trend1		Trend of process variable that includes limits (high-high, high, low, and low-low) plus a light gray capture area. Includes alarm indication.
GO_PAI_HistTrend		Trend of historical process variable values. Analog limits are not included.
GO_PAI_HistTrend1		Trend of historical process variable values. Analog limits are not included.

Process Analog Input (PAI) Faceplates

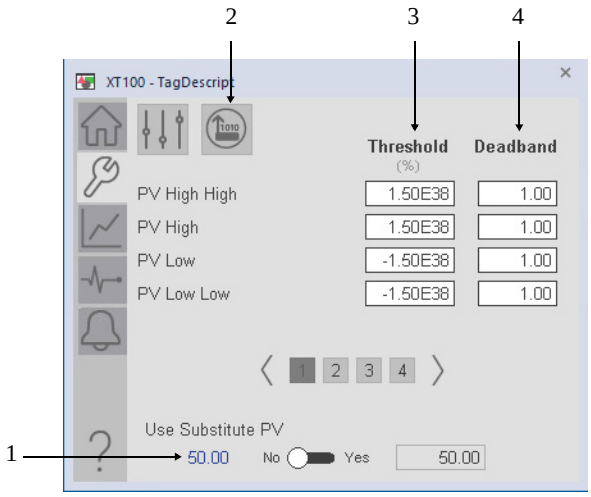
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator Tab

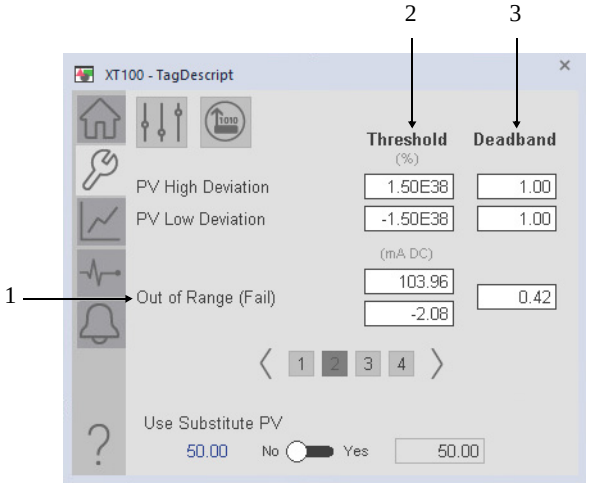


Item	Description
1	Current Process Variable that is shown as an arrow on the graph and numerically.
2	Clear capture minimum / maximum extents

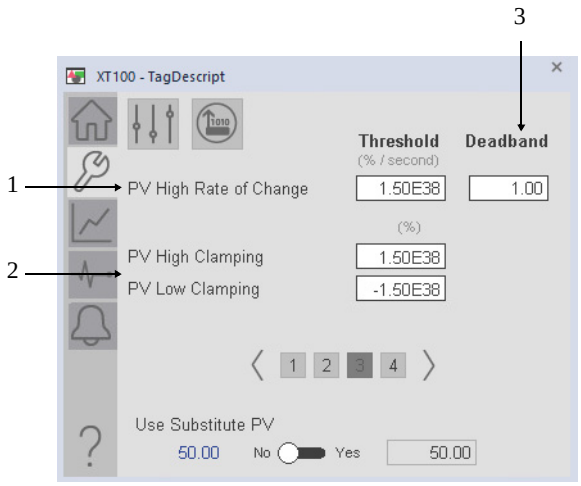
Maintenance Tabs



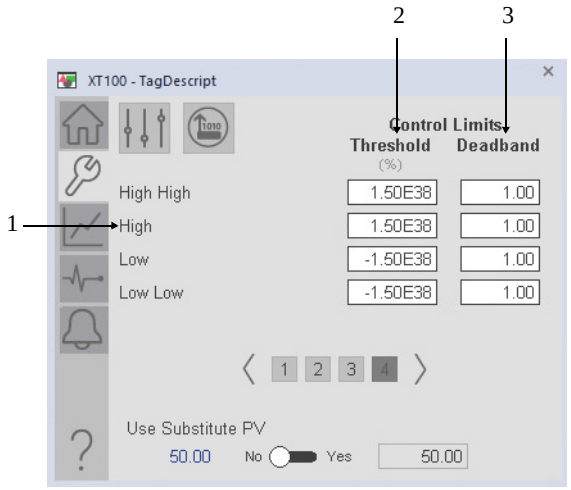
Item	Description
1	Use Substitute PV: Select to input a substitute process variable.
2	Select to display smart device object. See Process Analog HART (PAH) Faceplates.
3	Enter the threshold (trip point) for analog input alarms.
4	Enter the deadband (hysteresis) that applies to each alarm limit. Deadband helps prevent a noisy signal from generating numerous spurious alarms. Example: If the High alarm limit is 90.0 and the High alarm deadband is 5, once the signal rises above 90.0 and generates a High alarm. The signal must fall below 85.0 (90.0 minus 5.0) for the alarm to clear.



Item	Description
1	Out of Range (Fail) low and high threshold values.
2	Process variable deviation low and high threshold values.
3	Deadband associated with each threshold. Enter the deadband (hysteresis) that is applied to each limit.

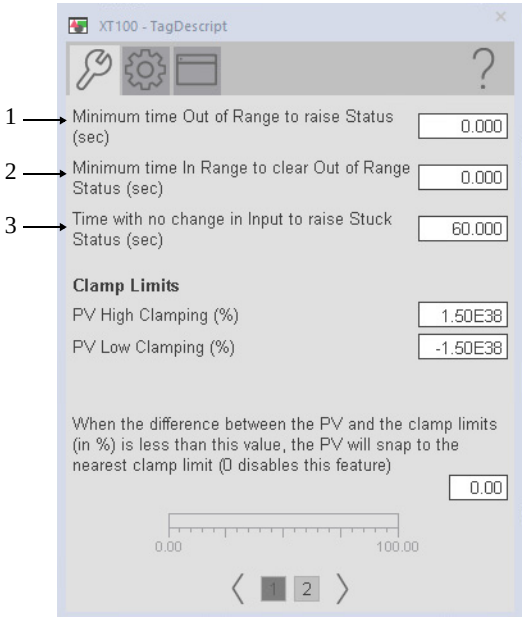


Item	Description
1	Process variable high rate of change threshold value. There is an alarm associated with this configuration. The deadband can be configured in the advanced maintenance settings.
2	Process variable clamping low and high threshold values. Any process variable below the low value or above the high value will be held at the low or high value respectively.
3	Deadband associated with each threshold. Enter the deadband (hysteresis) that is applied to each limit.

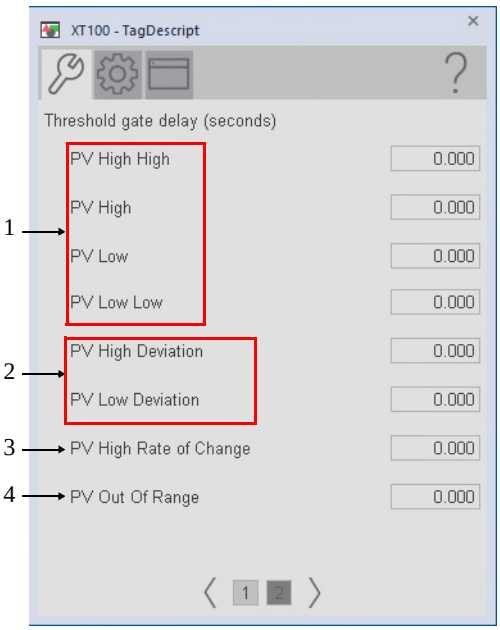


Item	Description
1	Process variable control condition high high, high, low, and low low threshold values.
2	Process variable deviation low and high threshold values.
3	Deadband associated with each threshold. Enter the deadband (hysteresis) that is applied to each limit.

Advanced Maintenance

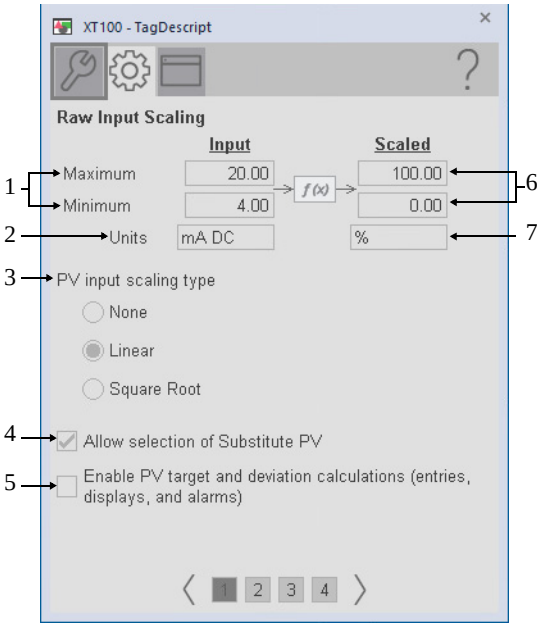


Item	Description
1	Enter the amount of time the input must stay within the range thresholds (with deadband) to clear the Out of Range (fail) condition. The off-delay time is used to help prevent a chattering fail detection on a noisy signal near a range threshold.
2	Enter the amount of time the input must stay beyond a range threshold to cause an Out of Range (fail) condition. The on-delay time is used to avoid an unnecessary fail detection when the input only momentarily exceeds the threshold.
3	Enter the amount of time the input must remain unchanged to trigger a stuck input condition. A value of zero means the input must change every instruction scan to avoid a stuck input condition. Enter a large value to disable stuck input detection.
4	Process variable clamping configuration. This includes the clamping low and high threshold values and the clamping deadband.

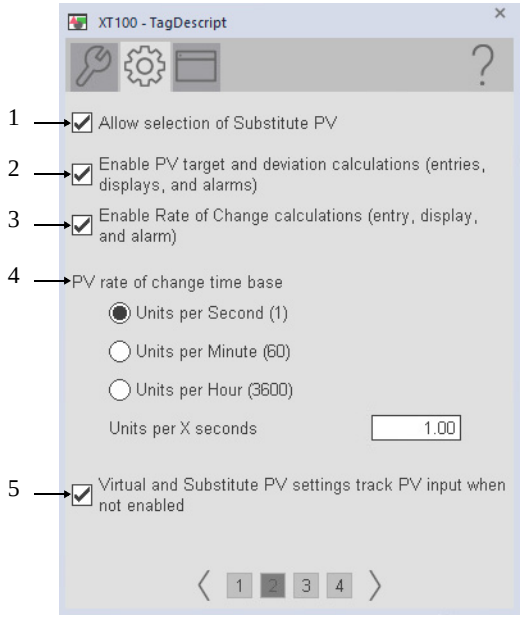


Item	Description
1	Process variable high high, high, low, and low low threshold gate delay (seconds).
2	Process variable high and low deviation threshold gate delay (seconds).
3	Process variable high rate of change threshold gate delay (seconds).
4	Process variable out of range threshold gate delay (seconds).

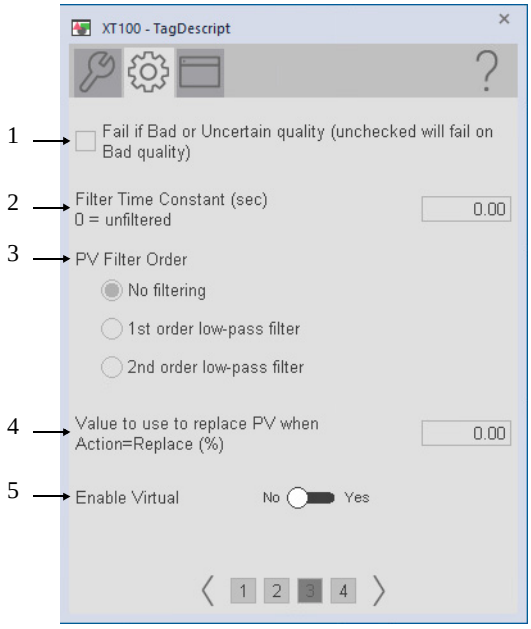
Engineering Tabs



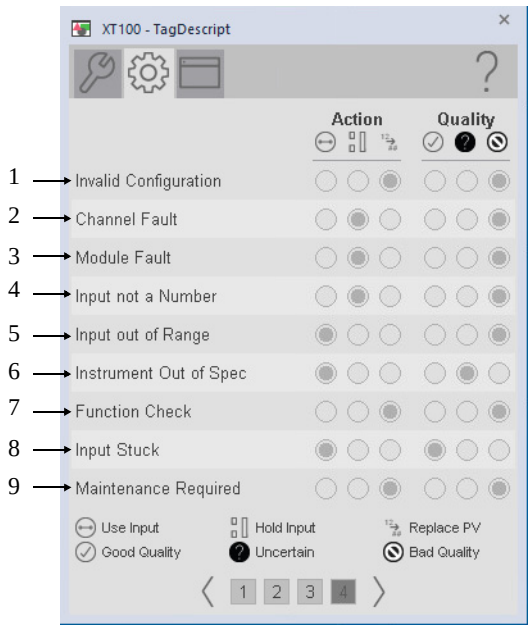
Item	Description
1	Input (unscaled) minimum and maximum These parameters must be set to the range of the signal that is connected to the Inp_Process Variable Input. The raw minimum default is 0.0 and the raw maximum default is 100.0. **Example**: If your input card provides a signal from 4.0...20.0mA, set Cfg_InpRawMin to 4.0 and Cfg_InpRawMax to 20.0. The raw minimum/maximum and engineering units minimum/maximum are used for scaling to engineering units.
2	Enter the Raw Input units to display on the HMI.
3	PV scaling type selection. Square root can be configured for differential pressure applications.
4	Select to allow the Substitute Process Variable Maintenance function. Clear this checkbox to disallow the Substitute Process Variable Maintenance function (default).
5	Select to enable target entry, deviation calculations, display, and alarms.
6	EU minimum and maximum for scaling These parameters must be set to match the Process Variable range of the input signal that is connected to Inp_PV. The Process Variable engineering units minimum default is 0.0 and the Process Variable engineering units maximum is 100.0. **Example**: If your input card provides a signal from 4...20 mA that represents -50...+250 °C, set Cfg_PVEUMIN to -50.0 and Cfg_PVEU maximum to 250.0. The raw minimum/maximum and Process Variable engineering units minimum/maximum are used for scaling to engineering units.
7	Enter engineering units for display on the HMI. Percent (%) is the default.



Item	Description
1	Process variable substitution is allowed or not allowed. The substitute PV allows for an entry of the PV from the HMI, which overrides the read PV.
2	Select to enable process variable target calculations, display, and alarms.
3	Select to enable Rate of Change target calculations, display, and alarms.
4	Process variable rate of change configuration.
5	Configure if the virtual and substitute process variables will track the active process variable.



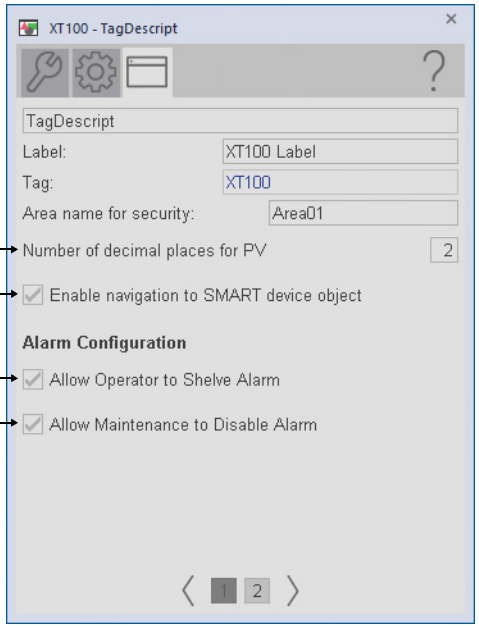
Item	Description
1	Configure if object will fail on uncertain signal quality.
2	Enter the Process Variable filter time constant. If the time constant is 0, the Process Variable is unfiltered.
3	Filter configuration: no filter, 1st order, 2nd order.
4	Process variable replacement value for when the action is "Replace". There are multiple action configurations. For example, if the Channel Fault action is configured to “Replace”, this replace value will be used in the event of a channel fault.
5	Enable or disable virtual mode.



Item	Description	Item	Description
1	Action: When the P_AInChan configuration is not valid: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When the P_ configuration is not valid: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad	5	Action: When the input is out of range: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When the input is out of range: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad
2	Action: When there is a channel fault: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When there is a channel fault: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad	6	Action: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When the input is out of spec: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad
3	Action: When there is a module fault: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When there is a module fault: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad	7	Action: When Inp_FuncCheck is set: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When Inp_FuncCheck is set: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad
4	Action: When the input is not a number: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When the input is not a number: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad	8	Action: When the input is stuck (no change): Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When the input is stuck (no change): Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad

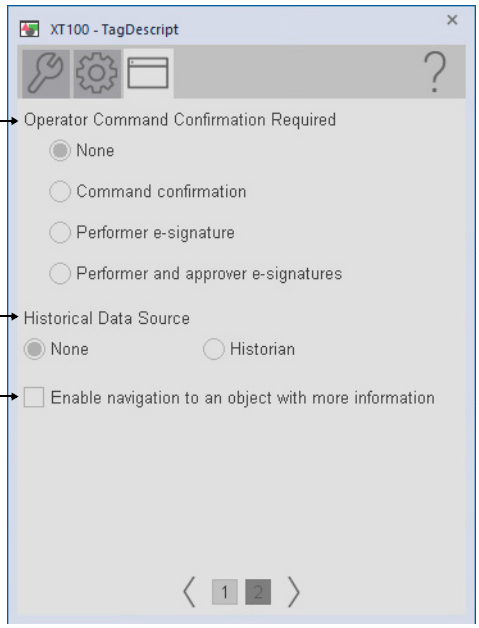
Item	Description	Item	Description
9	Action: When Inp_MaintReqd is set: Use the input to determine value Hold value at its last good value Set value by using Cfg_PVReplaceVal Quality: When Inp_MaintReqd is set: Set Sts_PVGood Set Sts_PVUncertain Set Sts_PVBad	N/A	N/A

HMI Configuration



The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

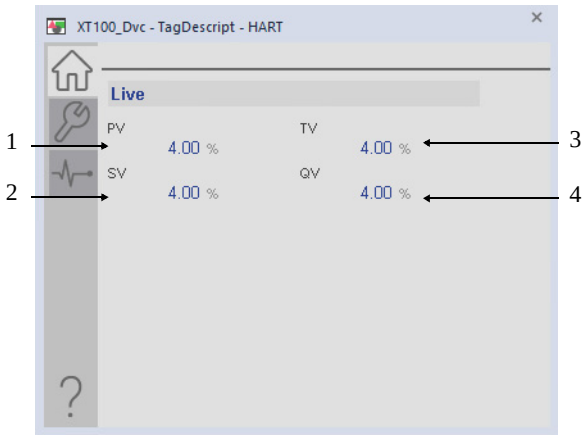
Item	Description
1	Set the number of decimal places for the Process Variable.
2	Select to allow navigation to SMART device object.
3	Select to allow Operator to shelve alarm.
4	Select to allow Maintenance to disable alarm.



Item	Description
1	Select to configure operator command confirmation. This action would take place after an operator resets the captured minimum and maximum values.
2	Select to configure if a Historical data source will be used or not.
3	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.

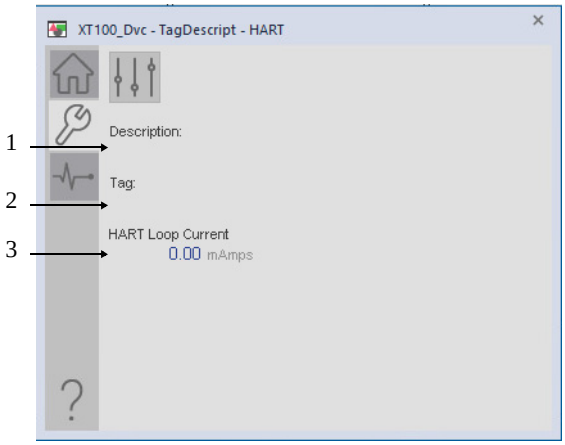
Process Analog HART (PAH) Faceplates

Smart Device Operator



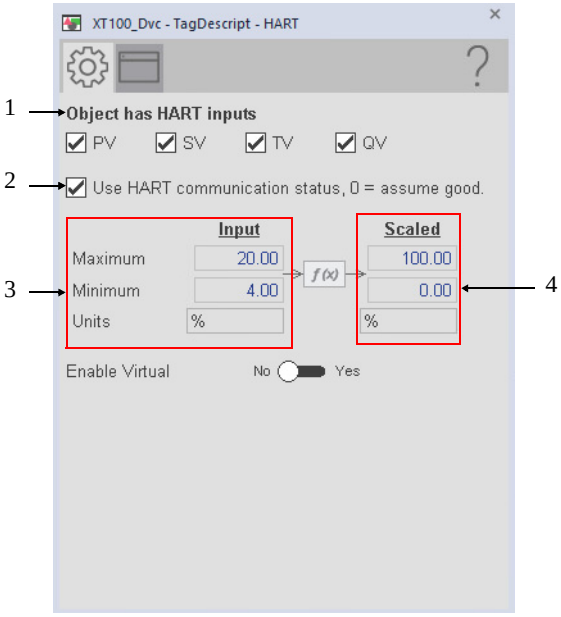
Item	Description
1	Show Process Variable for the HART PV.
2	Show Process Variable for the HART SV
3	Show Process Variable for the HART TV.
4	Show Process Variable for the HART QV.

Smart Device Maintenance



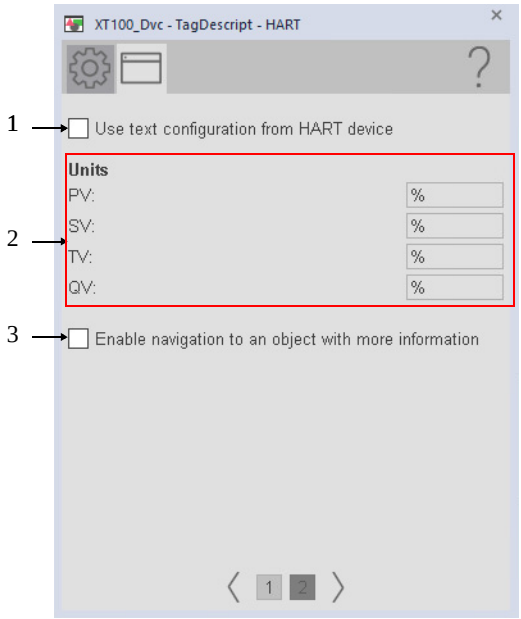
Item	Description
1	Display the description for the device.
2	Display the tag name for the device.
3	Display digital HART value for loop current in milliamps.

Smart Device Engineering



Item	Description
1	Select to display the digital variables' (PV, SV, TV, FV) status as received via HART. Clear this checkbox to disable automatic updating of HART device information.
2	Select to use HART communication status to generate SrcQ, 0 - assume good.
3	Display analog input unscaled signal maximum, minimum, and units from HART module (in module units).
4	Display analog input scaled signal maximum, minimum, and units from HART module (in module units).

Smart Device HMI Configuration



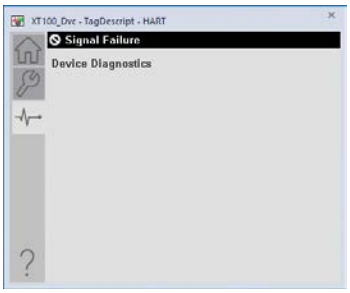
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

Item	Description
1	Select to display text received from HART device, 0 = use extended properties for text.
2	Display the text to display the units of measure for variable HART PV, SV, TV, and QV.
3	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.

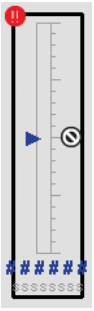
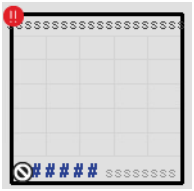
Smart Device Diagnostics

The Diagnostic tab provides indications that are helpful to diagnose or help prevent device problems. These problems can include specific reasons a device is 'Not Ready', device warnings and faults, warning and fault history, and predictive/preventive maintenance data.

The Diagnostics tab displays possible reasons for the device not being ready.



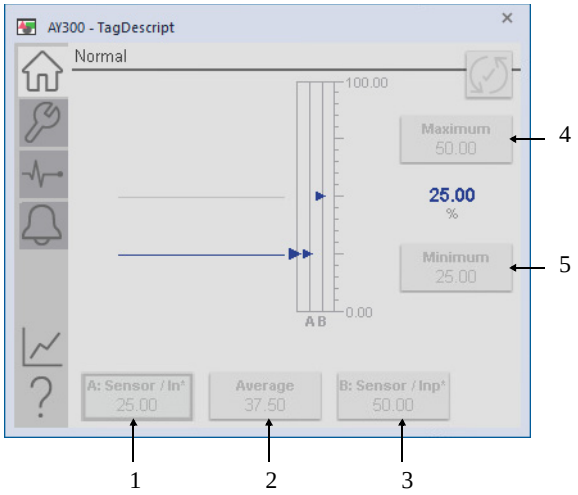
Process Dual Sensor Analog Input (PAID) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PAID		Standard analog-input graphic symbol
GO_PAID_Indicator		Process Variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bars.
GO_PAID_Trend		Analog input with a trend of the Process Variable and limits (highhigh, high, low, and low-low).

Process Dual Sensor Analog Input (PAID) Faceplates

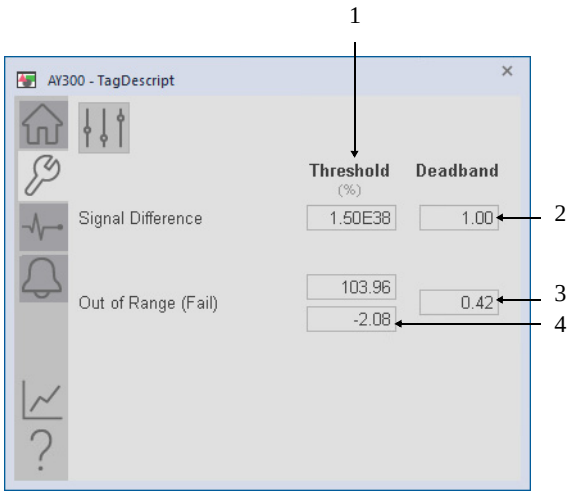
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



Item	Description
1	Select Sensor A Input Process Variable.
2	Select the average of Sensor A and Sensor B input Process Variables.
3	Select Sensor B Input Process Variable.
4	Select the maximum of Sensor A and Sensor B Input Process Variable.
5	Select the minimum of Sensor A and Sensor B Input Process Variable.

Maintenance



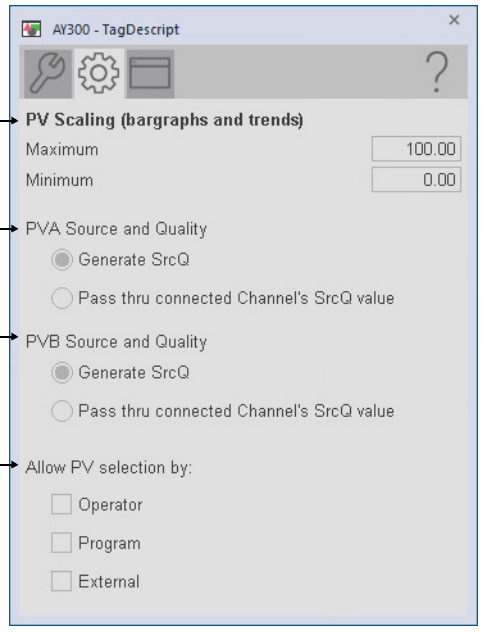
Item	Description
1	Process variable high/low signal difference threshold. Enter the threshold (trip point) for analog input alarms.
2	Process variable deadband. Enter the deadband (hysteresis) that is applied to the alarm limit. Deadband helps prevent a noisy signal from generating numerous spurious alarms. **Example**: If the High alarm limit is 90.0 and the High alarm deadband is 5, once the signal rises above 90.0 and generates a High alarm. The signal must fall below 85.0 (90.0 minus 5.0) for the alarm to clear.
3	Process variable fail deadband. Enter the deadband (hysteresis) that is applied to each alarm limit. Deadband helps prevent a noisy signal from generating numerous spurious alarms. **Example**: If the High alarm limit is 90.0 and the High alarm deadband is 5, once the signal rises above 90.0 and generates a High alarm. The signal must fall below 85.0 (90.0 minus 5.0) for the alarm to clear.
4	Process variable fail threshold in raw units.

Advanced Maintenance



Item	Description
1	Configure the signal difference gate delay (seconds), which is the time after the gate input activates before the threshold detection is enabled

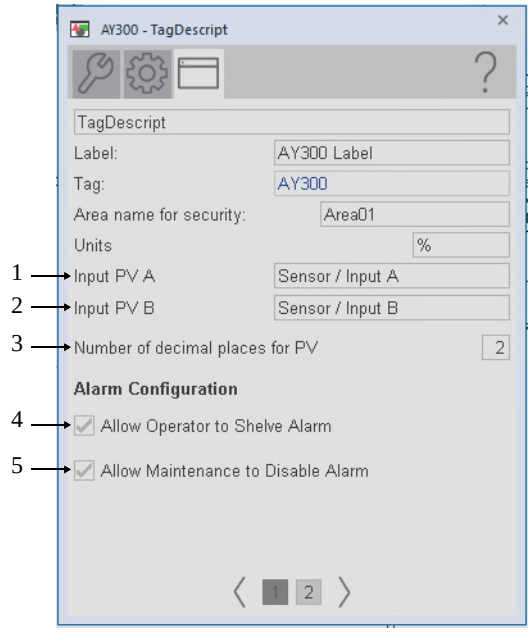
Engineering



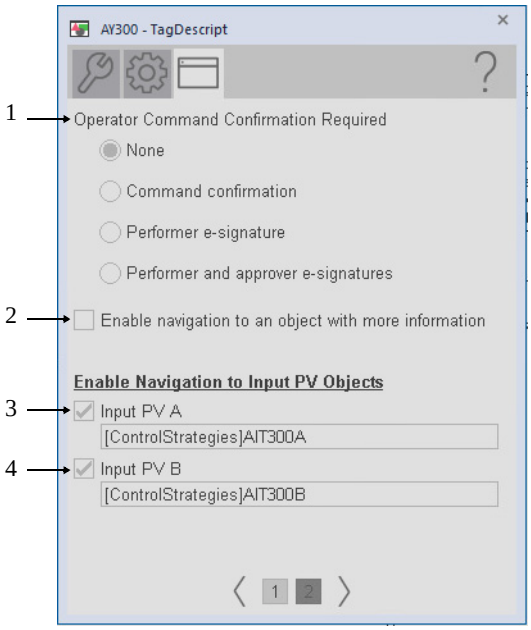
Item	Description
1	Minimum and maximum scale for the process variable on the trend.
2	PV Source and Quality Input A **Generate SrcQ:** This instruction determines the Process Variable quality using Inp_PVBad, Inp_PVUncertain, and the PV value (out of range, infinite or not a number) **Pass thru connected Channel's SrcQ value**: This instruction uses the Source and Quality (SrcQ) value that is provided by an upstream object (such as P_AIChan) via Inp_PVSrcQ to determine the PV source and quality.
3	PV Source and Quality Input B **Generate SrcQ**: This instruction determines the Process Variable quality using Inp_PVBad, Inp_PVUncertain, and the PV value (out of range, infinite or not a number) **Pass thru connected Channel's SrcQ value**: This instruction uses the Source and Quality (SrcQ) value that is provided by an upstream object (such as P_AIChan) via Inp_PVSrcQ to determine the PV source and quality.
4	Allows any combination of the operator, program, or external sources to select the active process variable.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

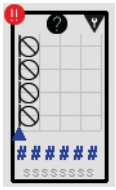
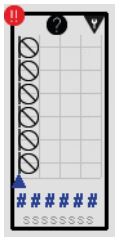
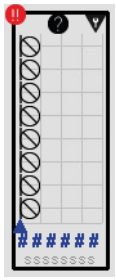


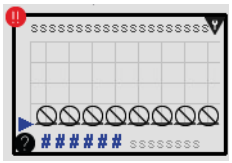
Item	Description
1	Enter the name for Input Tag A to show on the faceplate and Tooltip. IMPORTANT: Hover the pointing device over the field to display a tool tip with the configured Logix tag/path.
2	Enter the name for Input Tag B to show on the faceplate and Tooltip. IMPORTANT: Hover the pointing device over the field to display a tool tip with the configured Logix tag/path.
3	Set the number of decimal places for the Process Variable.
4	Select to allow Operator to shelve alarm.
5	Select to allow Maintenance to disable alarm.



Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.
3	Select to enable navigation to an upstream analog input object. The tagname to navigate to is shown in the box under the checkbox label.
4	Select to enable navigation to an upstream analog input object. The tagname to navigate to is shown in the box under the checkbox label.

Process Multi Sensor Analog Input (PAIM) Graphic Symbols

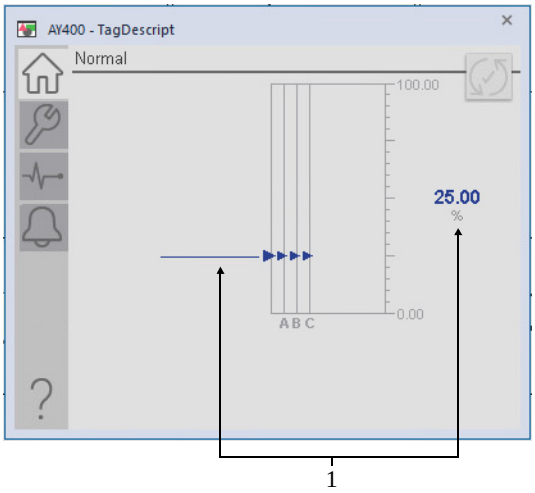
Graphic Symbol Name	Graphic Symbol	Description
GO_PAIM		Standard analog-input graphic symbol.
GO_PAIM_4V		The object displays four inputs (A-D), with each input a moving line on a horizontal axis. The graphic display includes indicators for disabled and rejected inputs.
GO_PAIM_6V		The object displays six inputs (A-F), with each input a moving line on a horizontal axis. The graphic display includes indicators for disabled and rejected inputs.
GO_PAIM_8V		The object displays eight inputs (A-H), with each input a moving line on a horizontal axis. The graphic display includes indicators for disabled and rejected inputs.

Graphic Symbol Name	Graphic Symbol	Description
GO_PAIM_8H		The object displays eight inputs (A-H), with each input a moving line on a vertical axis. The graphic display includes indicators for disabled and rejected inputs.
GO_PAIM_Indicator		Process Variable indicated by a moving triangle. The graphic display includes limits that are displayed with filled bars.
GO_PAIM_Trend		Analog input with a trend of the Process Variable and limits (highhigh, high, low, and low-low).

Process Multi Sensor Analog Input (PAIM) Faceplates

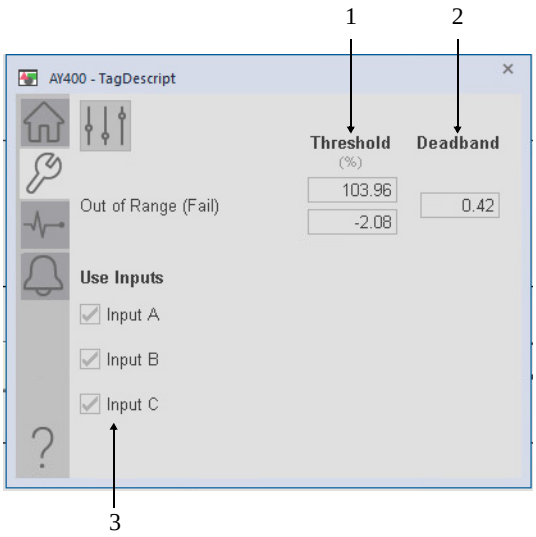
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



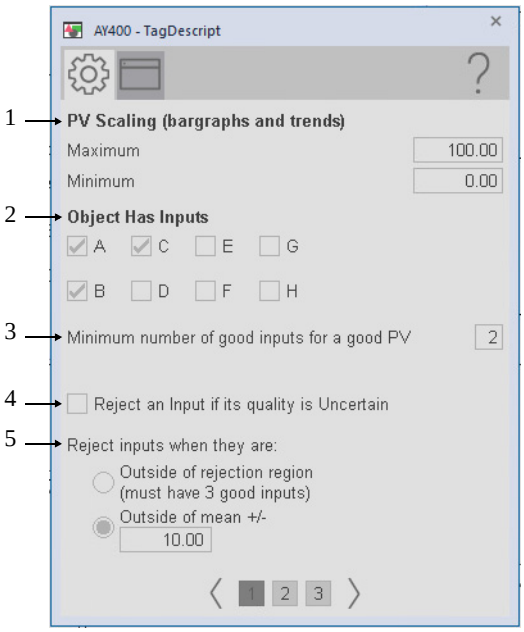
Item	Description
1	Process Variable

Maintenance

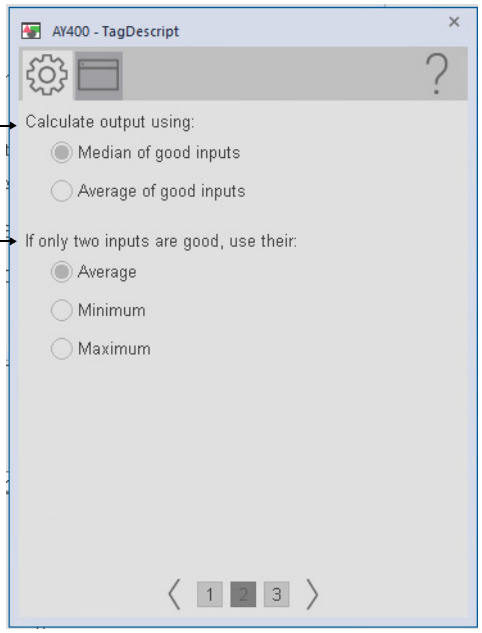


Item	Description
1	Failure status high/low threshold.
2	Failure status high/low threshold.
3	Sensor Inputs. Select: • ON if the corresponding input is to be used to calculate the final Process Variable (average or median). • OFF to exclude the corresponding input from the Process Variable calculation. This configuration is typically used to exclude a particular input when it is taken out of service for maintenance. If the P_AInMulti instruction has a Process Variable but is not using it, the Maintenance Bypass Indicator is displayed.

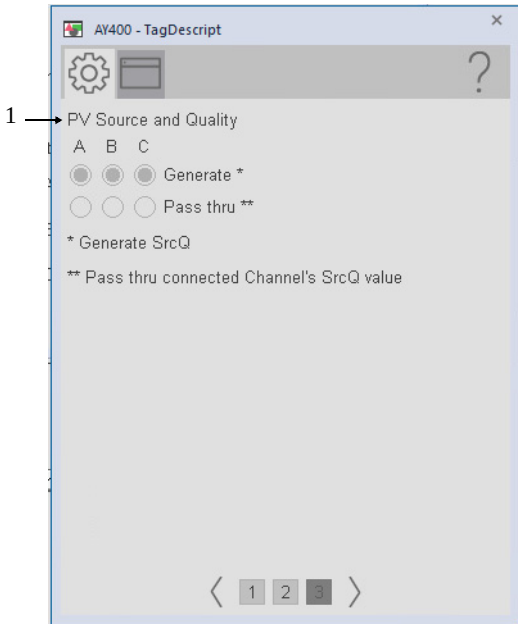
Engineering



Item	Description
1	Minimum and maximum scale for the process variable on the trend.
2	Select to set this parameter: • ON, if the corresponding Process Variable Input is to be used to calculate final Process Variable (average or median) • OFF, to exclude the corresponding Process Variable Input from the Process Variable calculation TIP: This configuration determines whether a particular input is intended to be wired and used. See the Maintenance tab for functions to take an input out of service for maintenance temporarily.
3	Enter the number of selected inputs that must have a good source quality to result in a good Process Variable.
4	Select to set this parameter to one of the following: • ON, an input that is flagged as uncertain is rejected and not used to calculate the final Process Variable. • OFF, an input that is flagged as uncertain is not rejected and is still used to calculate the final Process Variable. The flag causes the final Process Variable to be flagged as uncertain (default).
5	Select: • 'Outside of rejection region' to reject an input that is more than two standard deviations from the mean. • 'Outside of mean +/-' to reject an input that deviates from the mean by more than the value entered. Value is in PV engineering units. **IMPORTANT**: At least four inputs must be used for the 'Outside of rejection region' selection to be meaningful.



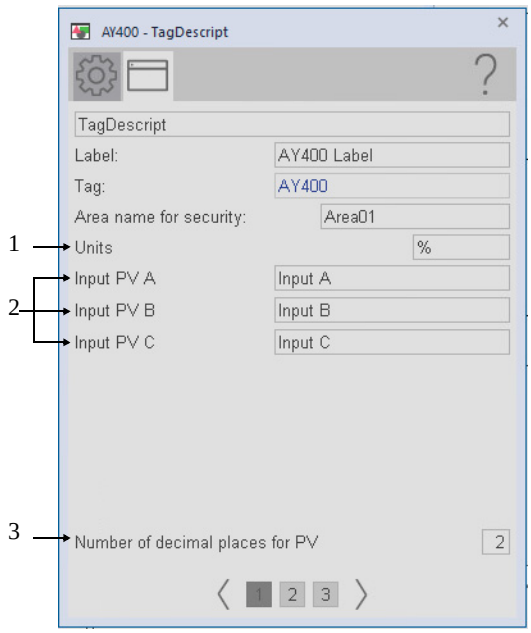
Item	Description
1	Select: • 'Average of good inputs' - the calculated final Process Variable is the average (arithmetic mean) of the good (non-rejected) Process Variable inputs. • 'Median of good inputs' - the calculated final Process Variable is the median (central value) of the good (non-rejected) Process Variable inputs (default). The average is the sum of values that are divided by the number of values. The median is the value of the item in the middle. If there are an even number of items, the median is the average of the two central values.
2	Select one of the options to determine the output calculation when there are only two unrejected inputs.



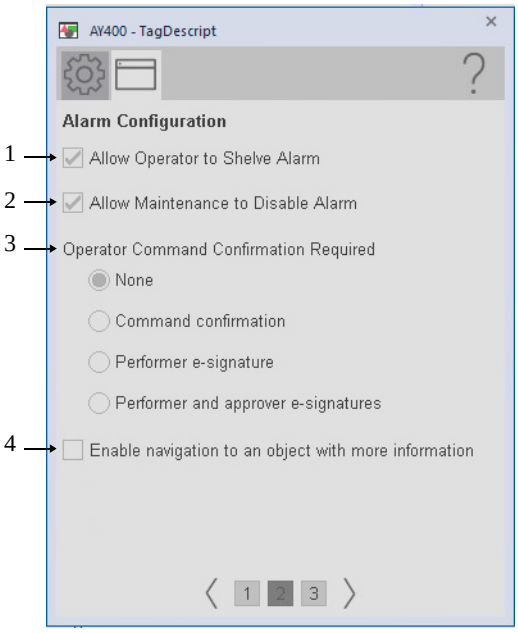
Item	Description
1	Select either generate or pass thru source quality for each channel. If the channel is configured to pass thru, the PV source quality will not be impacted by that channel source quality.

HMI Configuration

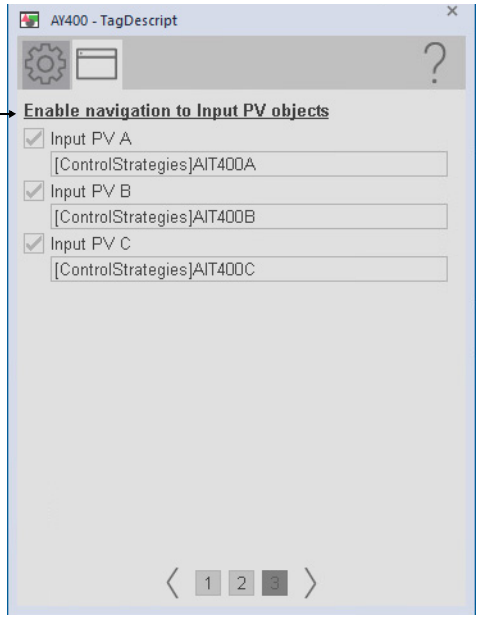
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the unit measurements.
2	Enter the Input tag names.
3	Enter the number of decimal places for the Process Variable.

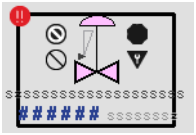


Item	Description
1	Select to allow Operator to shelve alarm.
2	Select to allow Maintenance to disable alarm.
3	Select to configure operator command confirmation. This action would take place after any operator command.
4	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.



Item	Description
1	Enter the object to navigate to for each input.

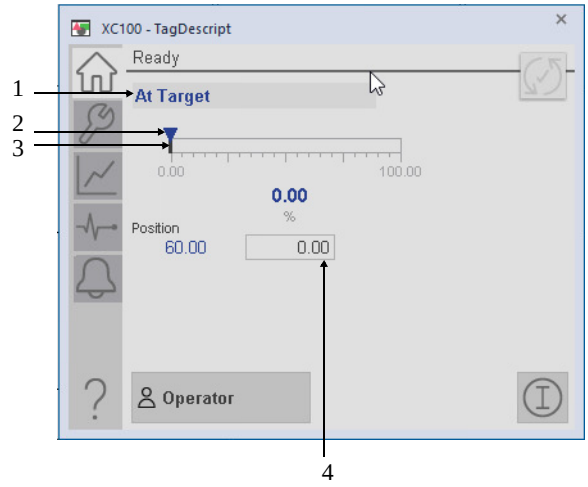
Process Analog Output (PAO) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PAO		Standard analog-output graphic symbol.
GO_PAO_ControlValve		Normal controlled valve symbol for horizontal pipe.
GO_PAO_ControlValve1		Inverted controlled valve symbol for horizontal pipe.
GO_PAO_ControlValve2		Controlled valve symbol for vertical pipe (pipe to the left.)
GO_PAO_ControlValve3		Controlled valve symbol for vertical pipe (pipe to the right).

Process Analog Output (PAO) Faceplates

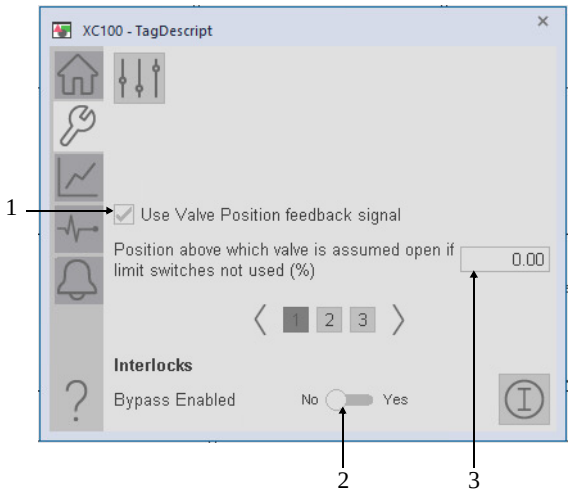
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



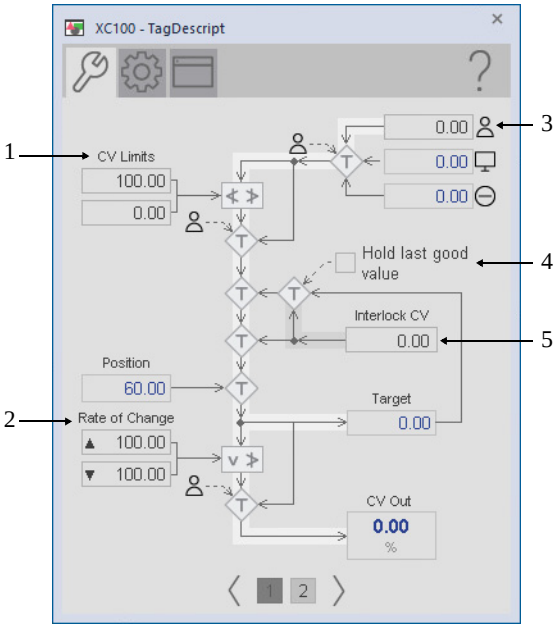
Item	Description
1	Analog Output State (At Target, Ramping Down, Ramping Up, Clamped at Min, Clamped at Max, or Disabled).
2	Control Variable.
3	Control Variable target.
4	Enter to change the Controlled Variable output value.

Maintenance

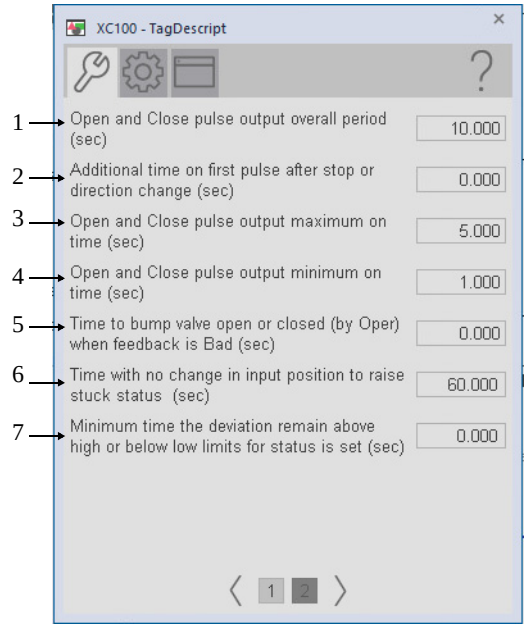


Item	Description
1	Select box to indicate there is a feedback reference. Uncheck if a reference does not exist.
2	Select YES to bypass checking of bypassable interlocks and permissives.
3	Select Yes to bypass checking of bypassable interlocks and permissives. Select No to enable checking of all interlocks and permissives.

Advanced Maintenance

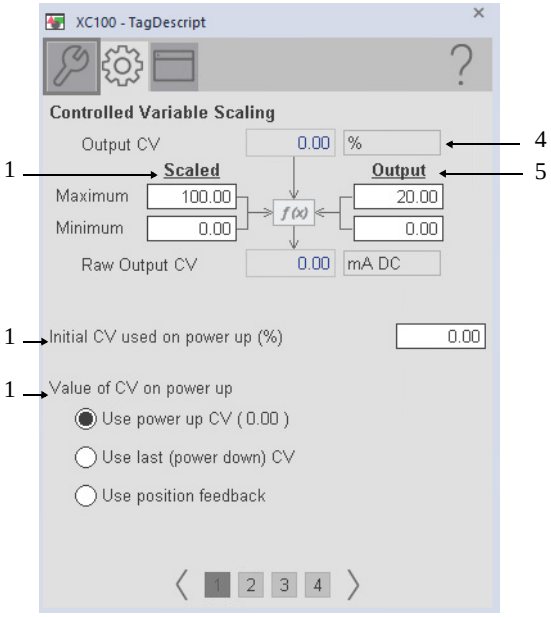


Item	Description
1	Controlled Variable clamp limits. Enter the clamping limits for the Controlled Variable in engineering units. Clamp limits are enforced in Operator and Program command sources only.
2	Enter the maximum allowed value for the Rate of Change Limit in engineering units per second. A value of zero allows any rate of change to be input by the Program or Operator.
3	Enter the Operator command source Controlled Variable Target in engineering units. This entry is available in Operator command source and Maintenance command source.
4	Select and the Controlled Variable holds at the last good value when an Interlock trips or an I/O Fault occurs. Clear this checkbox and the Controlled Variable goes to the Interlock Controlled Variable value when an Interlock trips or an I/O Fault occurs.
5	Enter the interlock target Controlled Variable in engineering units. This value is used for the Controlled Variable when interlocked or on an I/O Fault, but only if Hold Last Good Value is not selected.

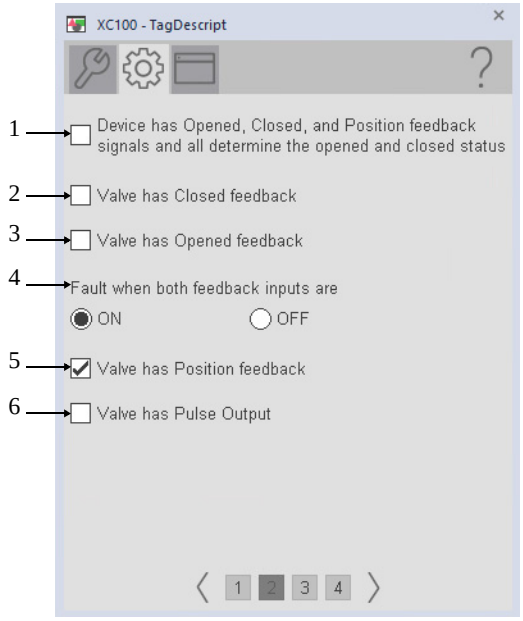


Item	Description
1	Enter the overall period for the open and close cycles. The open and close cycles consist of a pulsed output and an idle time. If the total cycle time is 10 seconds and the maximum output time is 5 seconds, the cycle will be 5 seconds of pulsed output and 5 seconds of idle. The pulse cycles are only used if pulse outputs are enabled.
2	Enter the additional time to be added to the first pulse of an open or close action.
3	Maximum time the open or close pulse output will be enabled during each cycle.
4	Minimum time the open or close pulse output will be enabled during each cycle.
5	Enter value for time the output is bumped for open or closed bump command by the operator. When enabled, this is a one-time bump of the requested output.
6	Enter value for the stuck alarm. When this time is reached without position change, the status will change to stuck.
7	Enter value for the gate of the deviation alarm. If deviation is above the high limit or below the low limit for this time, the deviation status will be raised.

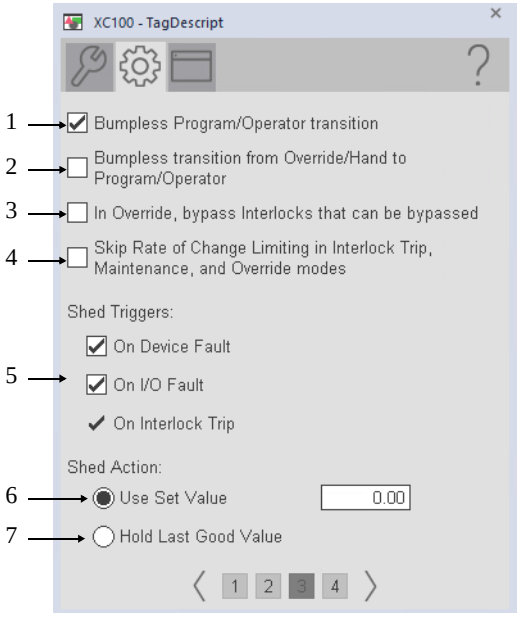
Engineering



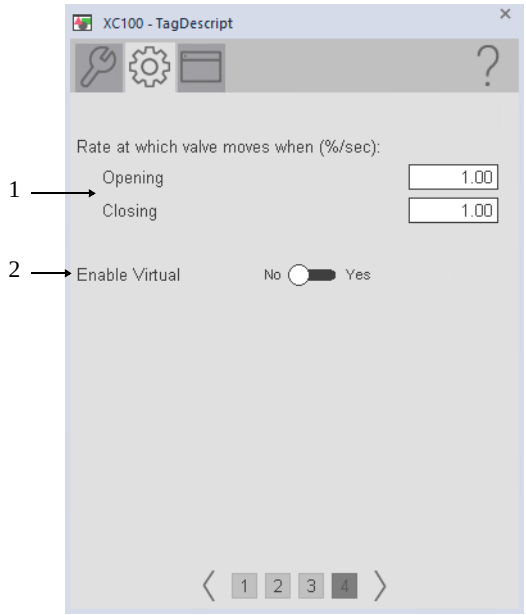
Item	Description
1	Enter values for the maximum and minimum scaled (engineering units) scaling ranges.
2	Enter the value for the initial CV used on power up.
3	Select what method will be used to determine the CV on power up. Position feedback must be enabled to use the position feedback power up method.
4	Engineering Units label.
5	Enter values for the maximum and minimum output (Raw) scaling ranges.



Item	Description
1	Select whether this method will be used for opened and closed status. This is a cross check between the position and the opened/closed feedback.
2	Select whether the valve has closed feedback or not.
3	Select whether the valve has opened feedback or not.
4	Select whether the valve will fault when the opened and closed feedbacks are both ON or when they are both off.
5	Select whether the valve has position feedback (%) or not.
6	Select whether the valve will have a pulsed output for opening and closing.



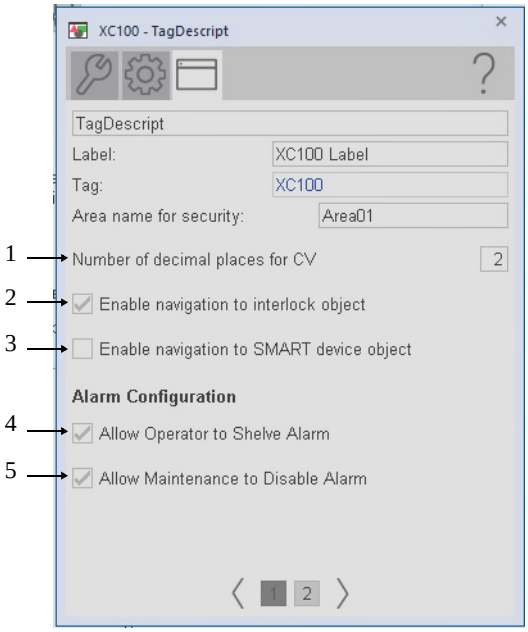
Item	Description
1	When selected, the operator settings track the program settings when the command source is Program, and program settings track the operator settings when the command source is Operator. Transition between command sources is bumpless. When not selected, the operator settings and program settings retain their values regardless of command source. When the command source is changed, the value of a limit can change, such as from the Program-set value to the Operator-set value.
2	When selected, the Program and Operator Settings of the CV track the output CV when the command source is Hand or Override.
3	Select while in Override command source to bypass Interlocks that can be bypassed.
4	Select to have the CV immediately go to its target value or configured Interlock CV value when an Interlock trips or the instruction is placed in Maintenance or Override command source. Clear this checkbox to have the CV always use rate of change limiting (ramping) of the CV output.
5	Select so that an I/O Fault triggers a shed of the output, to the configured shed set value or to hold last good output. The shed condition is latched internal to the Add-On Instruction. When the I/O Fault condition clears, a Reset command is required to return to normal operation. Clear this checkbox so that the I/O Fault condition does not affect operation (but can still generate an alarm). The configured shed action always takes place on an interlock trip. This selection cannot be changed.
6	Select this option to set the analog output to the configured shed set value when a condition configured as a shed trigger occurs.
7	Select this option to hold the analog output at its last good value when a condition configured as a shed trigger occurs.



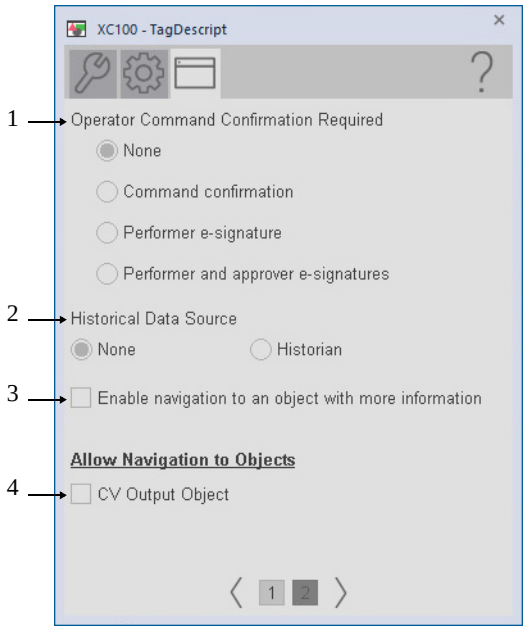
Item	Description
1	Enter the rate (%/sec) at which the the valve moves during opening and closing.
2	Select yes to enable Virtual.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Set the number of decimal places for the Control Variable.
2	Select if an interlock object is connected to Inp_IntlkOK. The Interlock indicator becomes a button that opens the P_Intlk faceplate. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_Intlk_0. For example, if your P_AOut object has the name 'AOut123', then its Interlock object must be named 'AOut123_Intlk_0'.
3	Select to enable navigation to a SMART device object.
4	Select to allow Operator to shelve the alarm.
5	Select to allow Maintenance to disable the alarm.



Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to configure if a Historical data source will be used or not.
3	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.
4	Select to enable navigation to the faceplate for the PlantPAx object that is providing the CV for this object (PSet_CV).

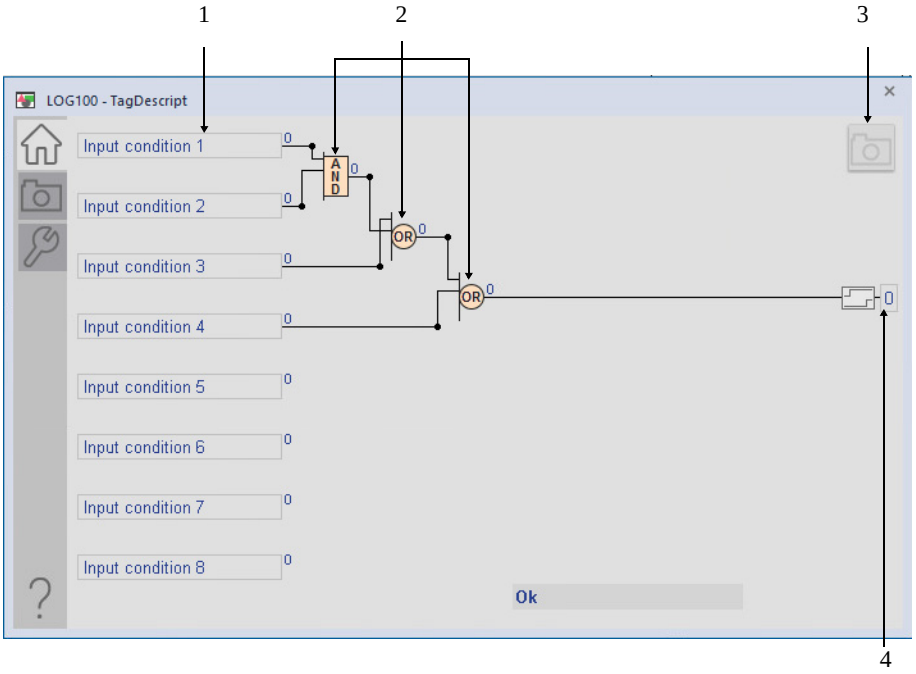
Process Boolean Logic (PBL) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PBL		Standard PBL object. Displays boolean output status and alarming. Opens faceplate.
GO_PBL1		Standard PBL object. Displays boolean output status and alarming.

Process Boolean Logic (PBL) Faceplates

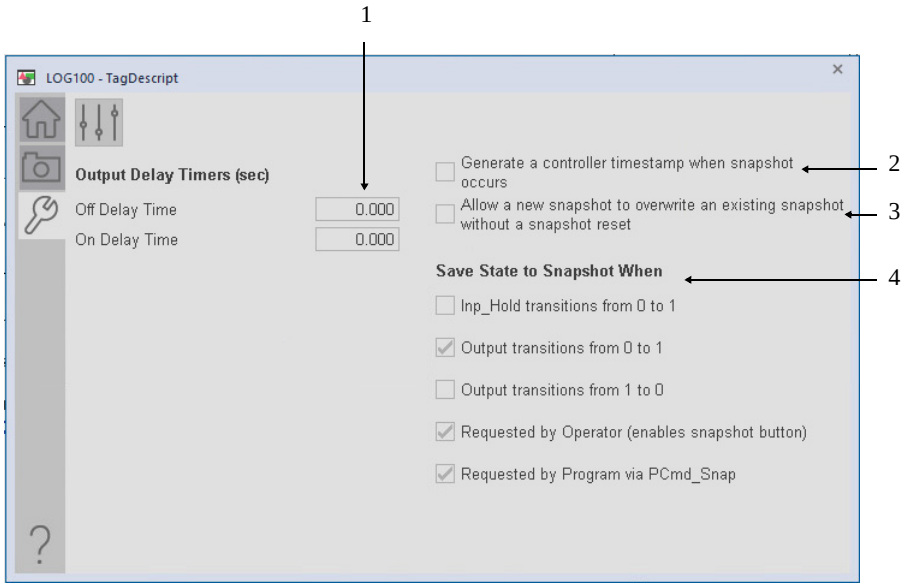
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



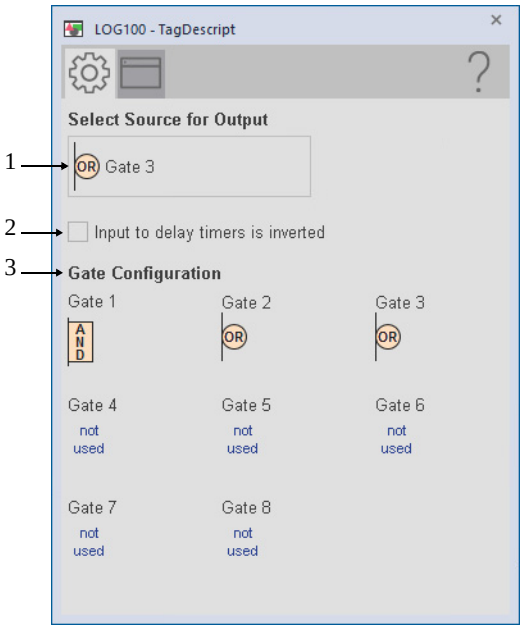
Item	Description
1	Input Name: Select to navigate to the Input object faceplate.
2	Gates: Select one of the gates to access the Gate Configuration display for that gate.
3	Select to take a snapshot of the current state. **IMPORTANT**: When you take a snapshot, the View Snapshot tab is automatically displayed.
4	Boolean value that displays the final output of the PBL object.

Maintenance



Item	Description
1	Enter a value for the off-delay time and the on-delay time.
2	Select to generate a time stamp whenever a snapshot triggers.
3	Select to allow a new snapshot to be triggered without a reset of the previous snapshot.
4	Select to trigger a snapshot when the designated condition is met.

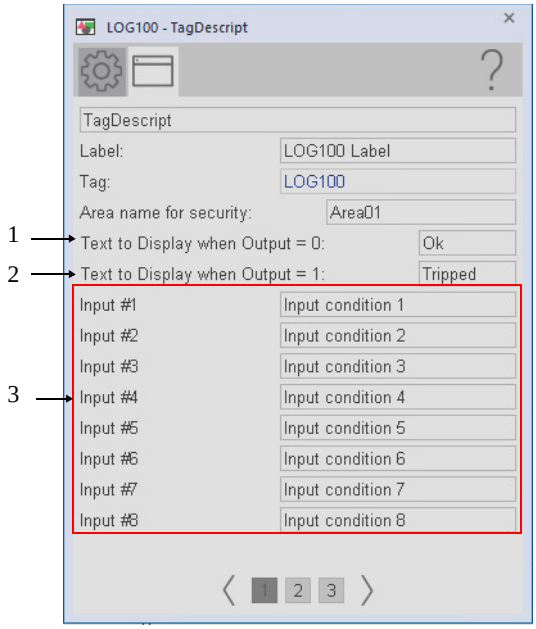
Engineering



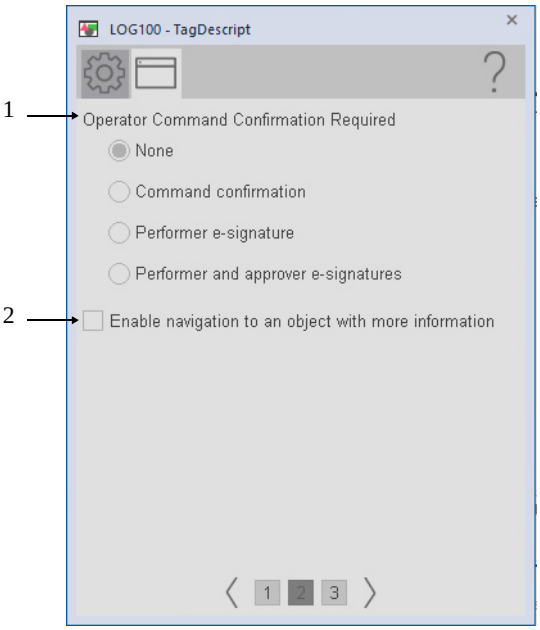
Item	Description
1	Select to open the faceplate to select the output source.
2	Select to invert the selected output before it is passed to the output delay timers
3	Select to open the Gate Configuration faceplate.

HMI Configuration

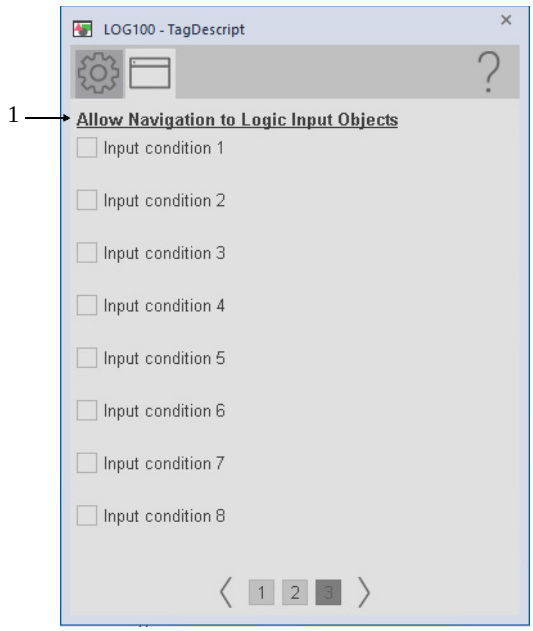
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the text to display on the faceplate when output = 0
2	Enter the text to display on the faceplate when output = 1
3	Enter a description for each input.

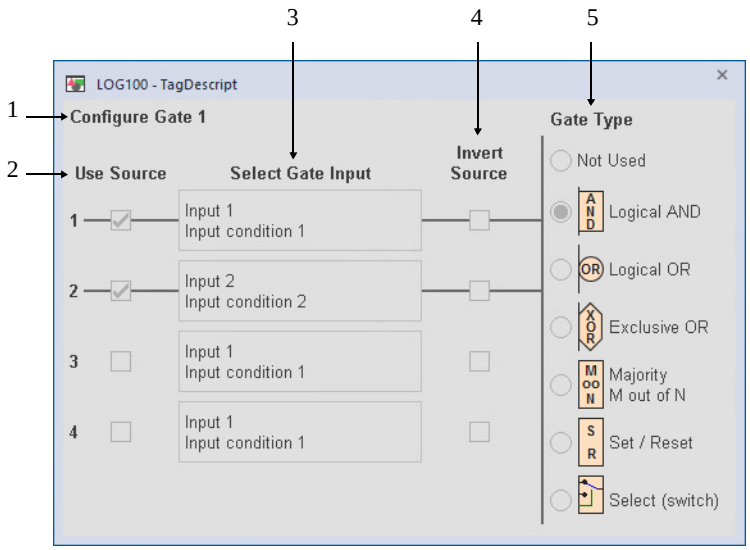


Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable nivigation to an object with more information.



Item	Description
1	Select to enable navigation to input object.

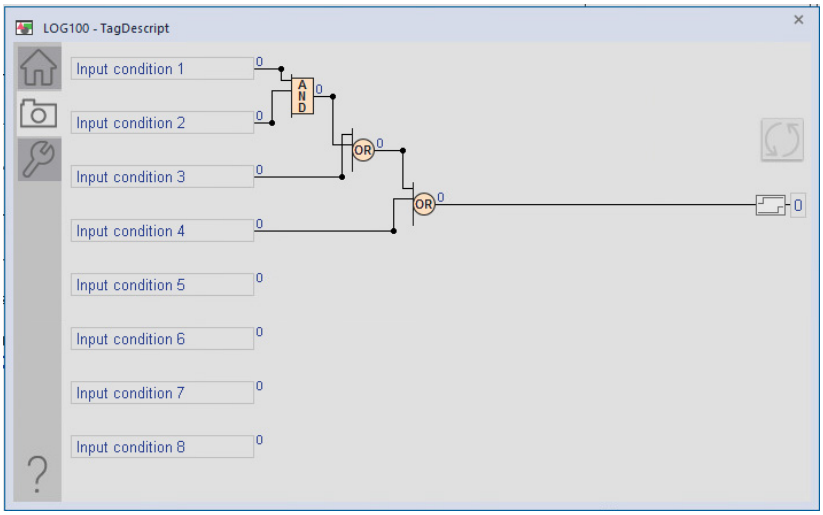
Logic Gate Configuration



Item	Description
1	Displays the gate being configured.
2	Select to select which inputs of the gate are enabled (1...4).
3	Select the inputs for the gate.
4	Select to invert the source that enters the gate.
5	Select to select a gate type.

View Snapshot

The View Snapshot tab shows an image of the Operator faceplate when the snapshot was taken. The background of the display turns from gray to white to indicate capture. The View Snapshot has the same functionality as the operator faceplate plus a Reset button.



Process Command Source (PCMDSRC)

The PCMDSRC (Command Source) Add-On Instruction is used to provide selection of the command source (owner) of an instruction or control strategy. This instruction excludes Graphic Symbols.

The command source indicator displays by exception only. For example, if the device is operating normally, there is not an indicator. If the device is out of service (OoS), then the OoS indicator is displayed.

Command source indicators are not used for analog inputs.

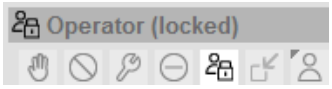
Image	Description
	Device is out of service
	Device is not in normal command source operation
	Device is in program command source operation
	Device is in maintenance command source operation
	Device is in operator command source operation

Image	Description
	Device is in override command source operation
	Device is in local command source operation
	Device is in external command source operation

Command Source Totem Pole

The Command Source Totem Pole shows the sources that have been requested. These sources have a white background color. The leftmost source that is highlighted is the active command source.

In the example that follows, the current command source is Operator Locked. When Operator Locked is released, the default command source is Operator. The small black triangle, in the upper left corner of the operator indicator indicates the normal command source.



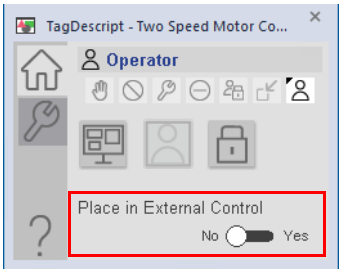
Operator Buttons

The Operator Lock buttons on device faceplates are used to lock and unlock Operator command source. The buttons also show the current command source status.

Image	Description
	Select to request Operator command source.
	Select to lock in Operator command source. The program cannot take control.
	Select to request Program command source.

External Control

There is a slider on the operator page that allows the operator to place the device in External Control



Maintenance Buttons

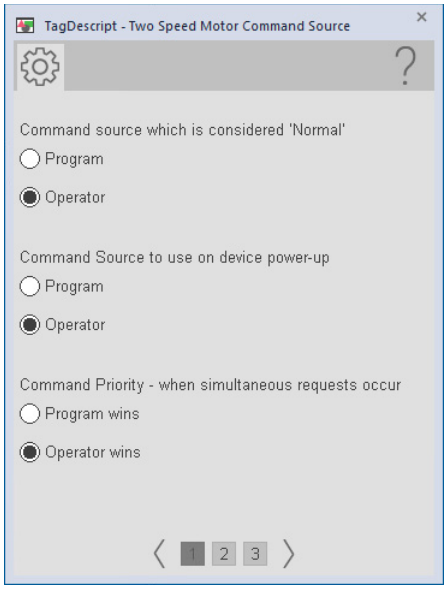
The maintenance buttons on device faceplates are used to request and release Maintenance command source.

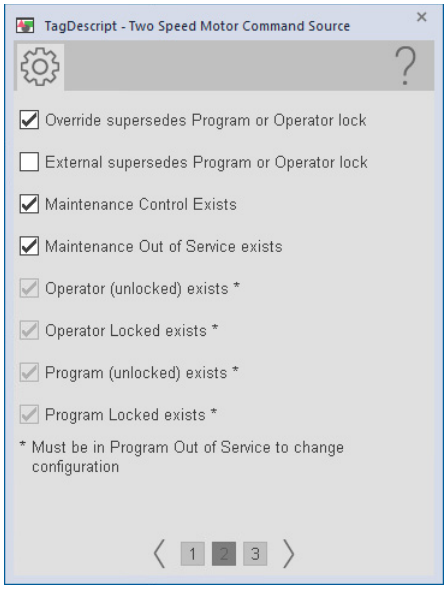
Image	Description
	Select to acquire Maintenance command source.
	Select to release Maintenance command source.
	Select to display Advanced Properties command source.

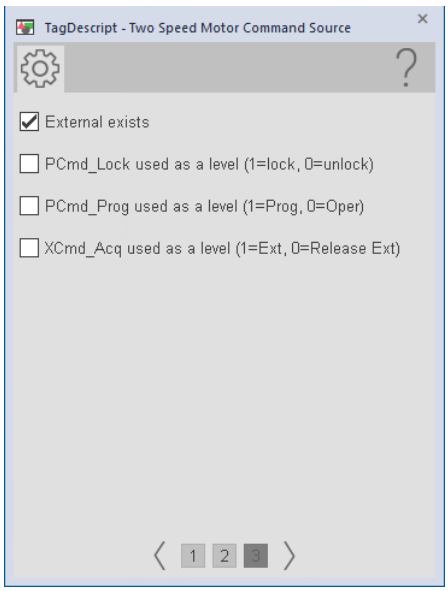
Advanced Properties

Select the Advanced Properties button from the maintenance page to access the engineering tabs. There are three engineering tabs. The first page is the configuration for the Cfg_ProgDefault parameter for the object, which sets the default command source when no command source is being requested.

From the other pages, you can configure the settings for additional command sources.







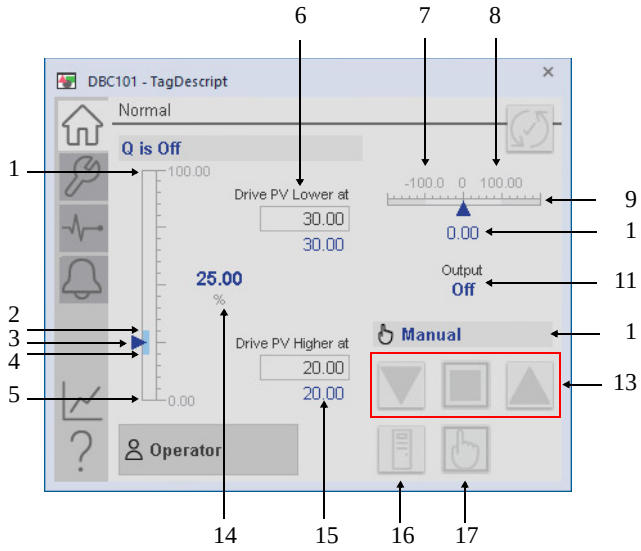
Process Deadband Controller (PDBC) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PDBC		Standard deadband controller graphic symbol.

Process Deadband Controller (PDBC) Faceplates

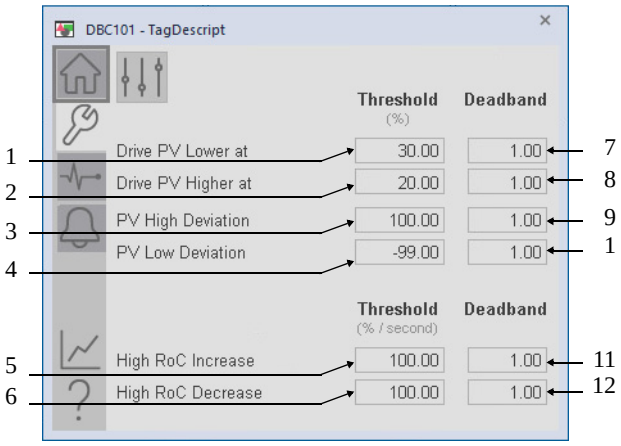
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



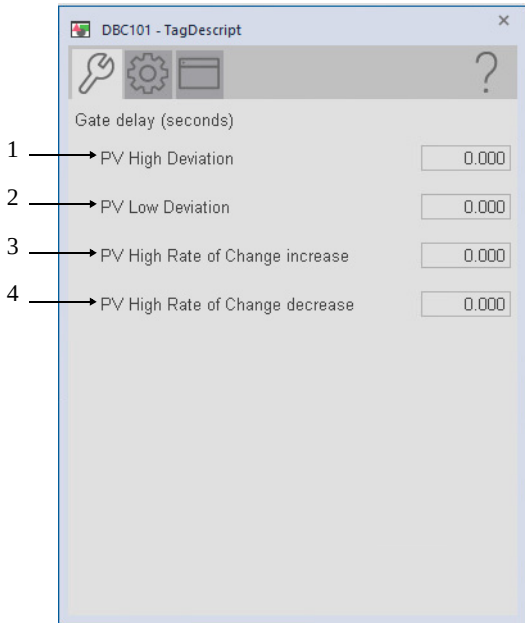
Item	Description
1	PV EU maximum
2	Drive PV Lower Value
3	Current PV Value
4	Drive PV Higher Value
5	PV EU minimum
6	Drive PV Lower Limit
7	High Rate of Change Decreasing Limit
8	High Rate of Change Increasing Limit
9	Rate of Change Indicator
10	Current Rate of Change
11	Controlled Variable Indicator
12	Auto/Manual Mode Indicator
13	Drive PV buttons. From left to right: drive PV lower, don't drive PV, drive PV higher
14	Current PV Value
15	Drive PV Higher Limit
16	Auto Mode Command Button
17	Manual Mode Command Button

Maintenance



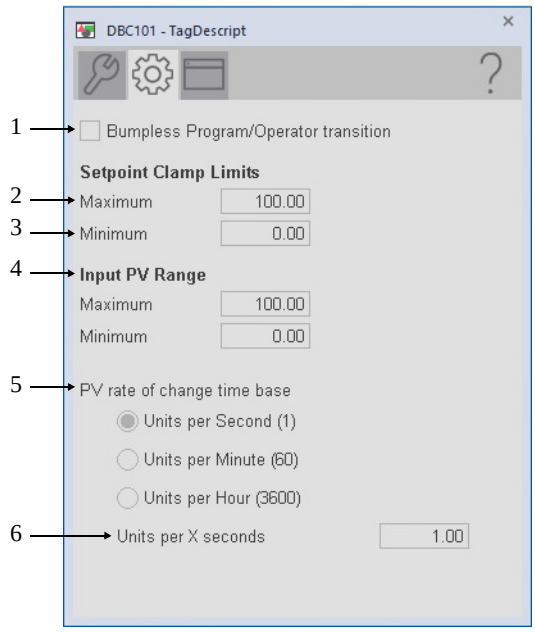
Item	Description
1	Enter the value of the PV at which the output turns off and PV starts to decrease.
2	Enter the value of the PV at which the output turns on and PV starts to increase.
3	Enter the number that is used to establish the high deviation limit. When the PV reaches this limit, a High Deviation alarm is generated. **EXAMPLE**: In the examples, the Lower setpoint is 67 and the PV Hi Dev Status is 5. We add 67 and 5 to get the high deviation limit of 72.
4	Enter the number that is used to establish the low deviation limit. When the PV reaches this limit, a Low Deviation alarm is generated. **EXAMPLE**: In the examples, the Raise setpoint is 30 and the PV Lo Dev Status is -5. We add 30 and -5 to get the low deviation limit of 25.
5	Enter the number to set the high Rate of Change (decrease) limit (83 in the example). When the Rate of Change reaches this level, a Hi Rate of Decrease alarm is generated.
6	Enter the number to set the high Rate of Change (increase) limit (17 in the example). When the Rate of Change reaches this level, a Hi Rate of Increase alarm is generated.
7	Enter a number that is the size of the deadband for the Lower output (below Lower limit)
8	Enter a number that is the size of the deadband for the Raise output (above Raise limit)
9	Enter the number that PV must decrease to reset a High Deviation alarm. **EXAMPLE**: The high deviation limit is 72 and the deadband is 1. The PV must decrease 1 unit to 71 to reset the High Deviation alarm. **IMPORTANT**: The deadband can be set so that the PV must decrease below the Lower setpoint before the High Deviation alarm is reset. For example, the deadband can be set to 10 so that the PV must decrease to 62 to reset the alarm.
10	Enter the number that PV must increase to reset a Low Deviation alarm. **EXAMPLE**: The low deviation limit is 30 and the deadband is 1. The PV must increase 1 unit to 26 to reset the Low Deviation alarm. **IMPORTANT**: The deadband can be set so that the PV must increase above the Raise setpoint before the Low Deviation alarm is reset. For example, the deadband can be set to 10 so that the PV must decrease to 35 to reset the alarm.
11	Enter the number that the Rate of Change must decrease to reset a Hi Rate of Decrease alarm.
12	Enter the number that the Rate of Change must increase to reset a Hi Rate of Increase alarm.

Advanced Maintenance



Item	Description
1	Enter the Process Variable high deviation gate delay (seconds).
2	Enter the Process Variable low deviation gate delay (seconds).
3	Enter the Process Variable high rate of change increase gate delays (seconds).
4	Enter the Process Variable high rate of change decrease gate delays (seconds).

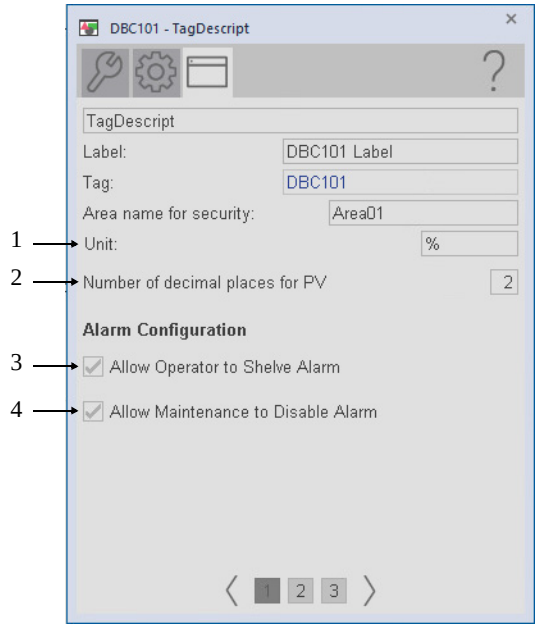
Engineering



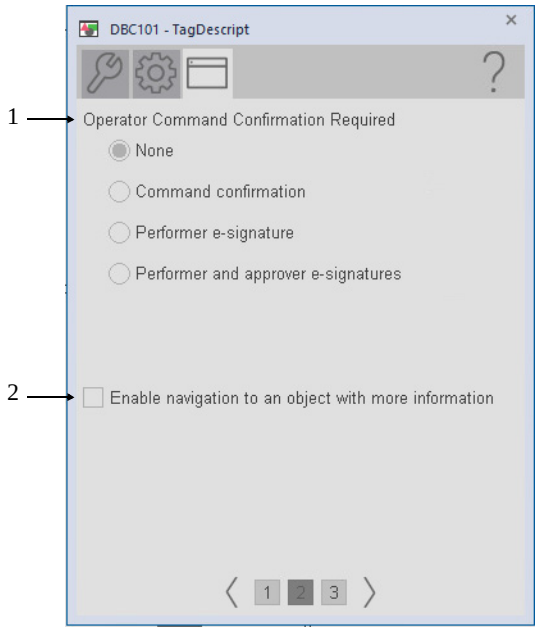
Item	Description
1	Select, the operator settings track the program settings when mode is Program, and program settings track the operator settings when the mode is Operator. Transition between modes is bumpless. Clear the checkbox, this instruction does not modify the operator settings and program settings. The operator settings and program settings retain their values regardless of mode. When the mode is changed, the value of a limit can change, such as from the Program-set value to the Operator-set value.
2	Enter the lower limit for the Loop PV Higher point.
3	Enter the upper limit for the loop PV Lower point.
4	Minimum and maximum values for PV input. These values are reflected on the PV bar graph on the Operator tab and the graph on the Trends tab.
5	Select the PV rate of change time base used.
6	Enter the number of units per x seconds, where x equals the number of seconds selected for the PV rate of change time base.

HMI Configuration

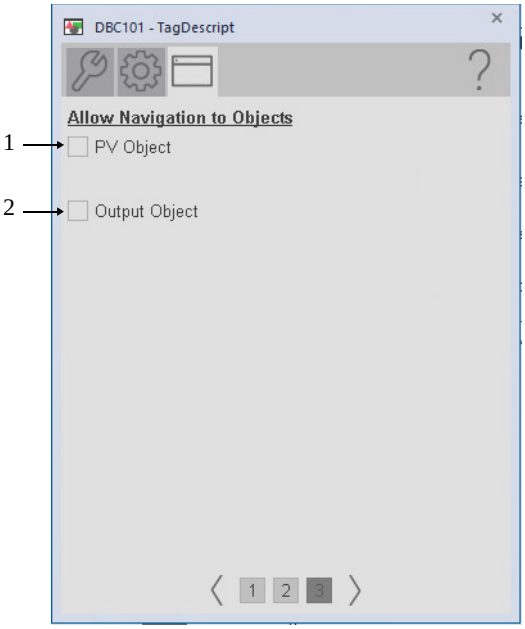
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the text of the engineering units for the PV.
2	Enter the number of decimal places that are used for the PV.
3	Select to allow Operator to shelve alarm.
4	Select to allow Maintenance to disable alarm.

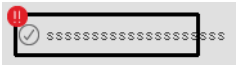
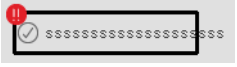


Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.



Item	Description
1	Select to enable navigation to the PV object.
2	Select to enable navigation to the output object.

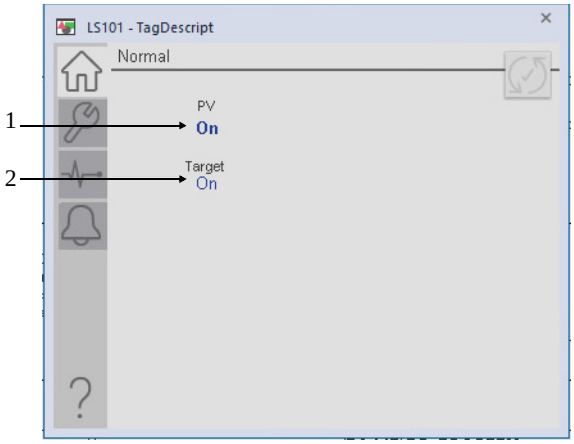
Process Discrete Input (PDI) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PDI		Global object with label.
GO_PDI1		Global object without label.
GO_PDI_Circle		Global object with only indicator.
GO_PDI_CircleWLabel		Global object with indicator and label.
GO_PDI_L1_		Displays object status with label.
GO_PDI1_L1_		Displays object status without label.
GO_PDI_L1_Circle		Displays object indicator.
GO_PDI_L1_CircleWLabel		Displays object indicator with label.

Process Discrete Input (PDI) Faceplates

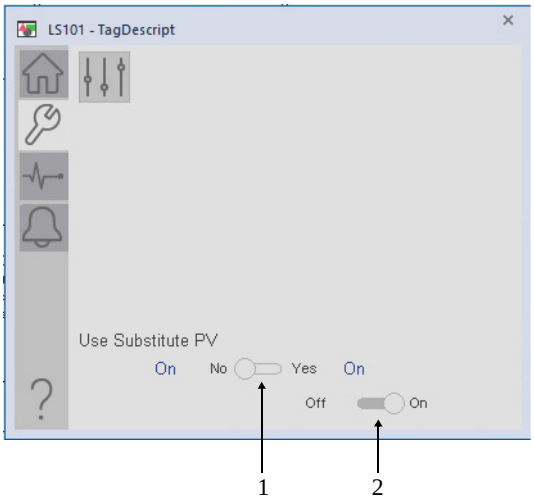
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



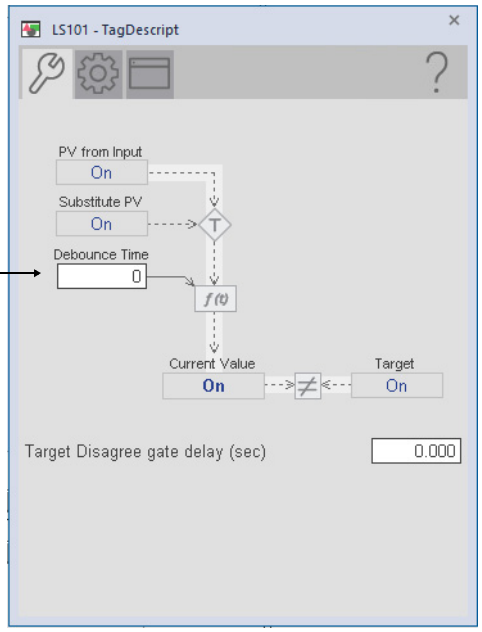
Item	Description
1	Current Process Variable
2	Target Process Variable

Maintenance



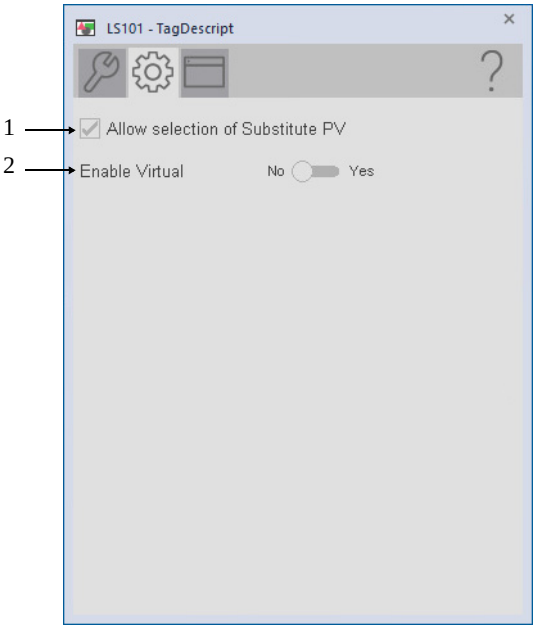
Item	Description
1	Select to enable the use of the Substitute Process Variable.
2	Select to choose Process Variable to be used.

Advanced Maintenance



Item	Description
1	Minimum time the Process Variable must maintain the state, in seconds.

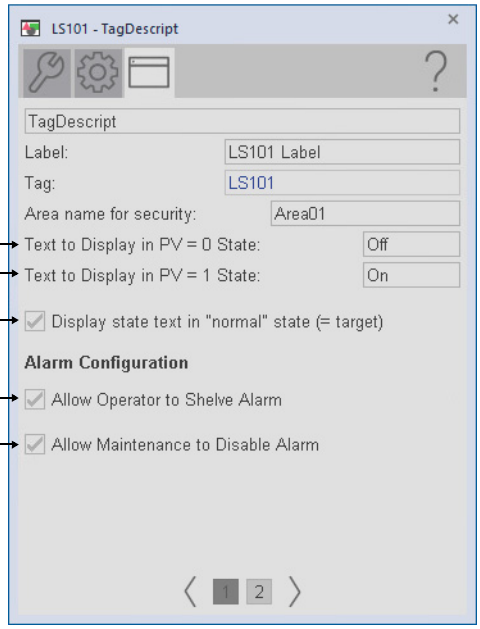
Engineering



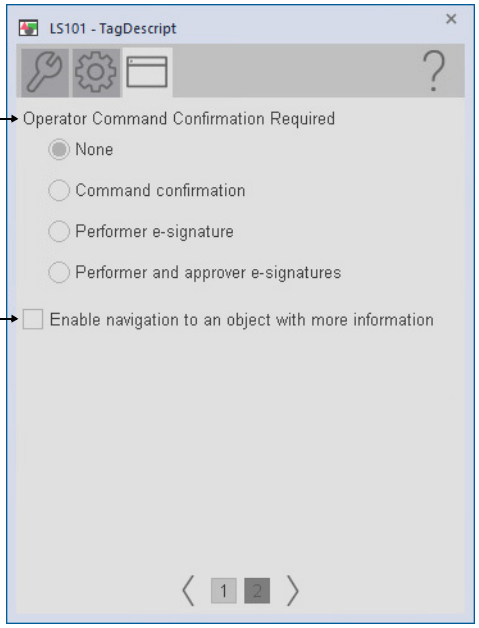
Item	Description
1	Select to enable the substitute Process Variable feature.
2	Select yes to enable Virtual.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

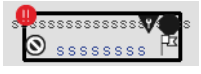


Item	Description
1	Enter text to display in PV 0 State.
2	Enter text to display in PV 1 State.
3	Select to display state text in normal state
4	Select to allow Operator to shelve the alarm.
5	Select to allow Maintenance to disable the alarm.



Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.

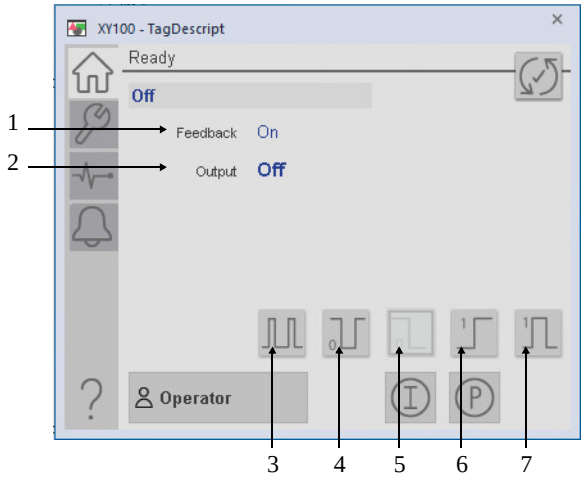
Process Discrete Output (PDO) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PDO		Digital (2-state) device Graphic Symbol for use on overview and detail displays.

Process Discrete Output (PDO) Faceplates

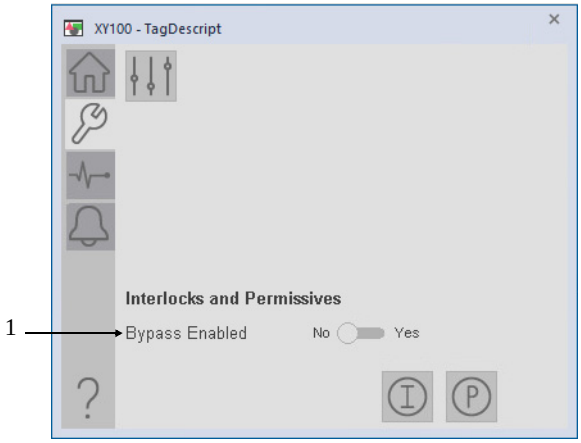
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



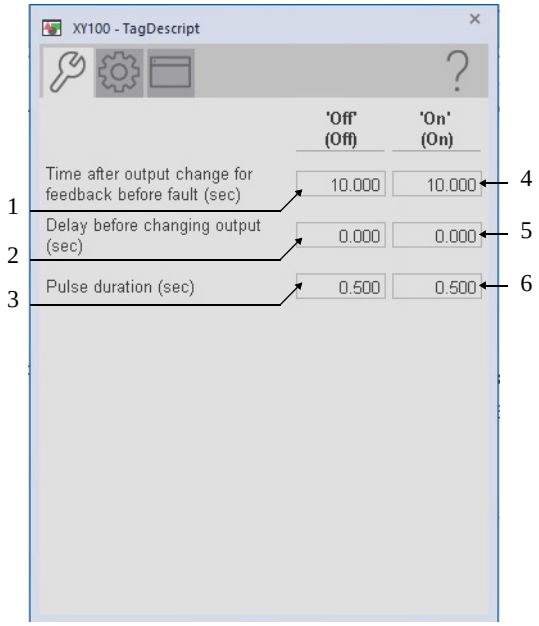
Item	Description
1	Feedback indicator
2	Discrete output indicator
3	Continuous Pulse Button
4	Single Pulse 'Off' Button
5	Output 'Off' Button
6	Output 'On' Button
7	Single Pulse 'On' Button

Maintenance



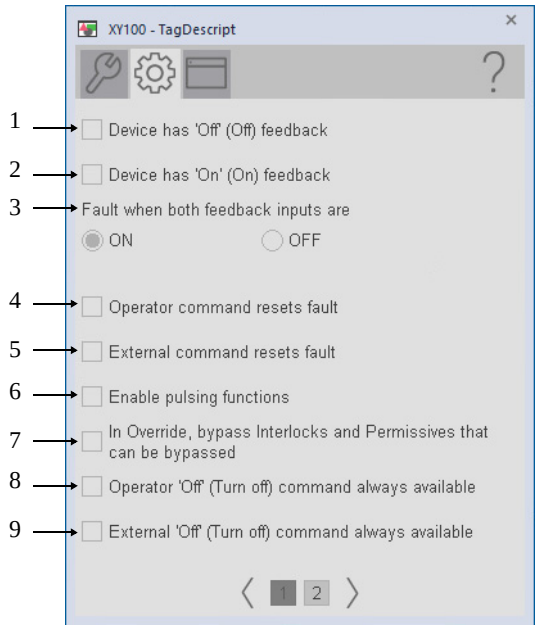
Item	Description
1	Select if bypassable interlocks and permissives are bypassed.

Advanced Maintenance

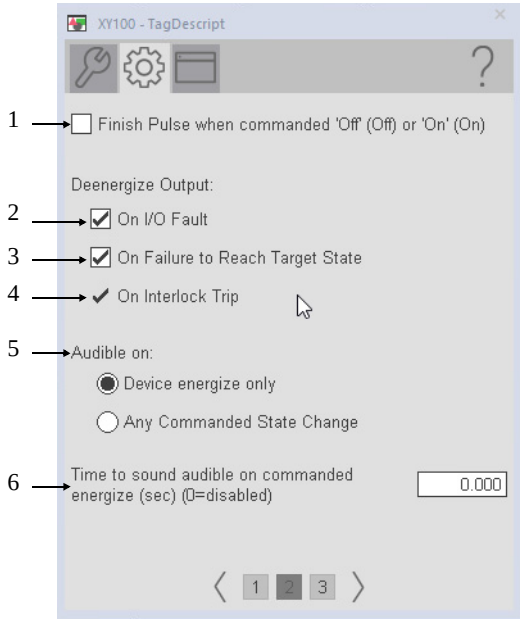


Item	Description
1	Enter the amount of time to allow for the device to get feedback for the Off setting before setting a fault.
2	Enter the amount of time before the output deactivates.
3	Enter the amount of time to trigger a pulse when the device deactivates.
4	Enter the amount of time to allow for the device to get feedback for the On setting before setting a fault.
5	Enter the amount of time before the output activates.
6	Enter the amount of time to trigger a pulse when the device deactivates.

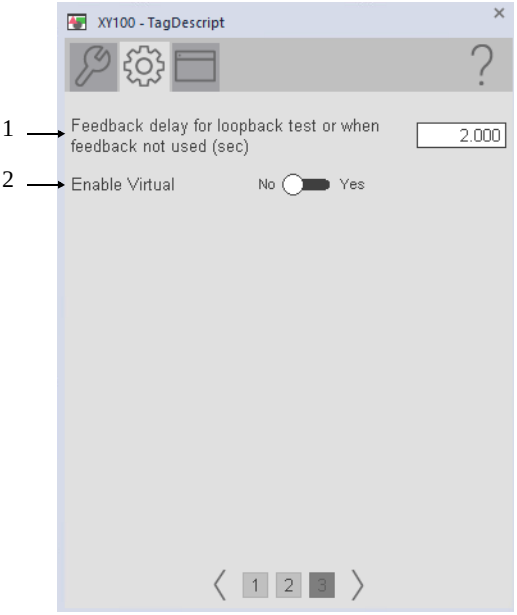
Engineering



Item	Description
1	Select to configure the instruction to use Off feedback signals from the device.
2	Select to configure the instruction to use On feedback signals from the device.
3	Select to Enable fault when both feedback inputs are either ON or OFF.
4	Select to reset a fault upon an operator command. Clear this checkbox to reset faults by using only the reset code.
5	Select to reset a fault upon an external command. Clear this checkbox to reset faults by using only the reset code.
6	Select to enable the pulsing functions.
7	Select if bypassable interlocks and permissives are bypassed in override command source.
8	Select to make the Operator Off command available in any command source. Clear this checkbox to make the Operator Off command available only in Operator or Maintenance command source.
9	Select to make the External Off command available in any command source. Clear this checkbox to make the External Off command available only in Operator or Maintenance command source.



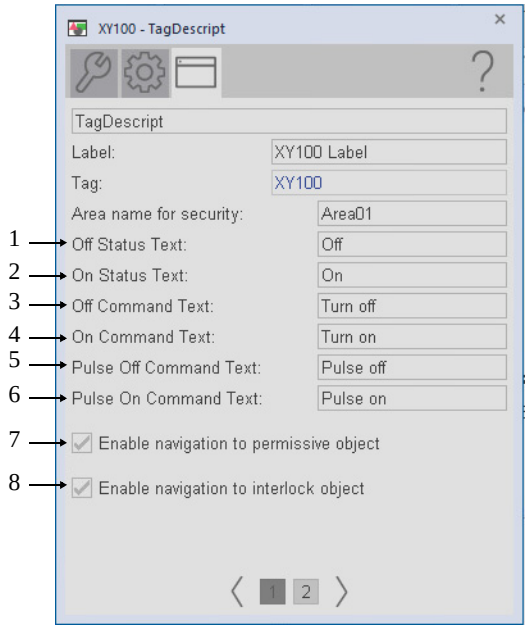
Item	Description
1	Select to finish pulse when commanded ON or OFF.
2	Select to de-energize the output to the device and return the device to its fail position, when an I/O Fault condition occurs. Clear this checkbox to keep the output to the device in its current stat on an I/O Fault condition. **IMPORTANT**: If a condition is configured to shed the device to the Off state on a fault, a reset is required to clear the shed fault. This reset commands the device to a state other than Off.
3	Select to de-energize the output to the device, return it to its fail position, when a Position Fail condition occurs. Clear this checkbox to keep the output to the device in its current state (keep trying) on a Position Fail condition. **IMPORTANT**: If a condition is configured to shed the device to the Off state on a fault, a reset is required to clear the shed fault. This reset commands the device to a state other than Off.
4	The device outputs are always de-energized on an Interlock Trip. This item cannot be unchecked. It is displayed as a reminder that the Interlock Trip function always de-energizes the device.
5	Select the setting for when the audible output of the object is on.
6	Enter the amount of time the audible output will be held on when enabled.
7	
5	Sets the time delay (in seconds) for the On or Off status to be echoed back when Virtual is enabled or when On and Off feedbacks are not used.
6	Select yes to enable Virtual.



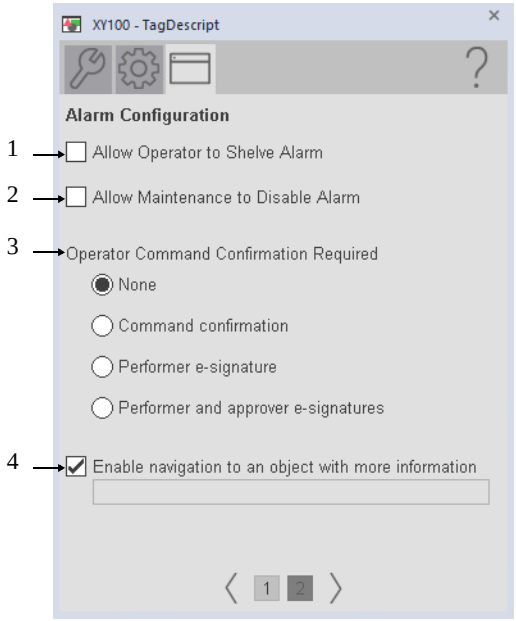
Item	Description
1	Sets the time delay (in seconds) for the On or Off status to be echoed back when Virtual is enabled or when On and Off feedbacks are not used.
2	Select yes to enable Virtual.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

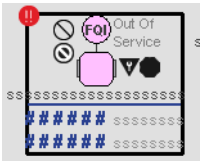
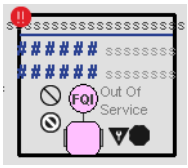
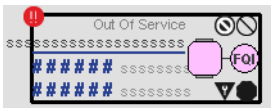
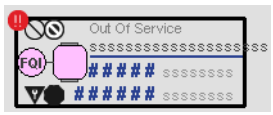
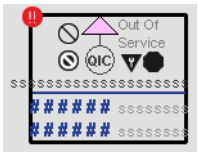
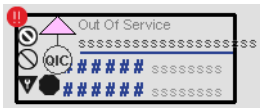


Item	Description
1	Enter text to display when device is in Off (0) state.
2	Enter text to display when device is in On (1) state.
3	Enter text to display for the off command.
4	Enter text to display for the on command.
5	Enter text to display for the pulse off command.
6	Enter text to display for the pulse on command.
7	Select to enable navigation to the permissive object
8	Select to enable navigation to the interlock object



Item	Description
1	Select to allow Operator to shelve the alarm.
2	Select to allow Maintenance to disable the alarm.
3	Select to configure operator command confirmation. This action would take place after any operator command.
4	Select whether there is navigation to an additional object or not. If selected, enter the object name in the value.

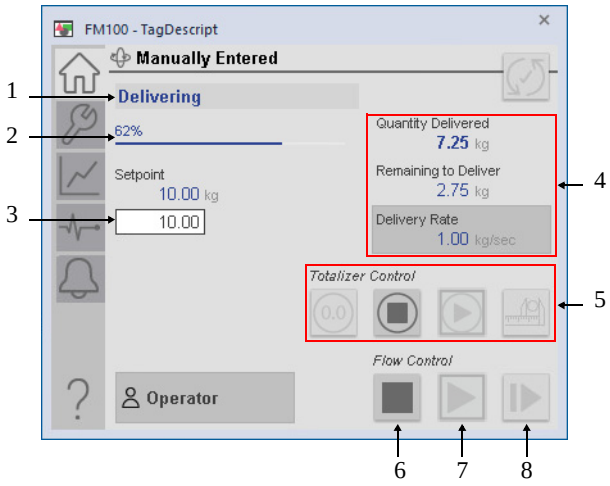
Process Dosing (PDOSE) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PDOSE_FM		Vertical Orientation Top
GO_PDOSE_FM1		Vertical Orientation Bottom
GO_PDOSE_FM2		Horizontal Orientation Right
GO_PDOSE_FM3		Horizontal Orientation Left
GO_PDOSE_WS		Vertical orientation up.
GO_PDOSE_WS1		Horizontal orientation right.
GO_PDOSE_WS2		Horizontal orientation left.

Process Dosing (PDOSE) Faceplates

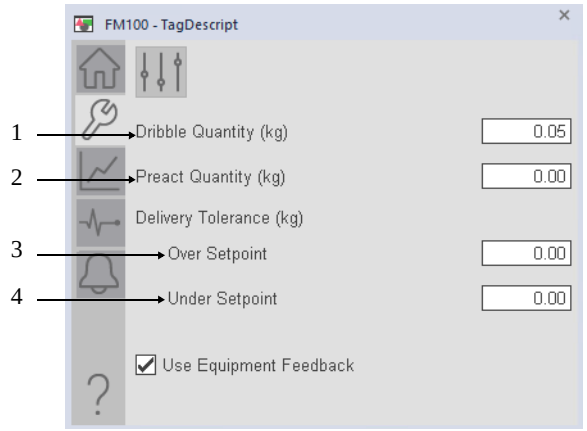
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



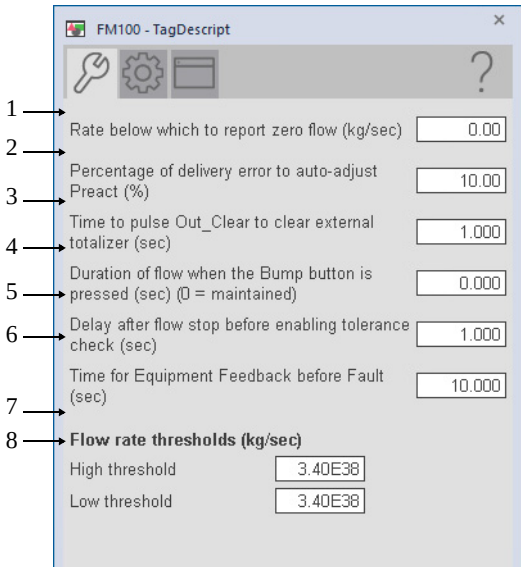
Item	Description
1	Dosing Equipment Commanded State.
2	Delivery Progress Bar.
3	Configure the quantity to deliver.
4	Delivery progress.
5	Totalizer Control (from left to right) • Select to clear the totalized quantity. • Select to stop the Totalizer. • Select to start the Totalizer. • Select to check tolerances.
6	Select to stop the Totalizer flow.
7	Select to start the Totalizer flow.
8	Select to bump the Totalizer flow.

Maintenance



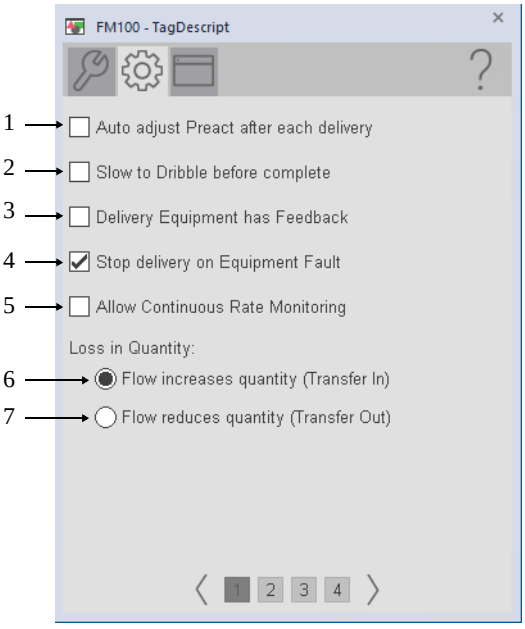
Item	Description
1	Configure the quantity before the end of delivery, when a switch to a reduced flow rate (dribble) for finer control of the final quantity is made.
2	Configure the quantity before reaching the Setpoint Quantity when a command the delivery equipment to stop to allow equipment to react. The preact quantity helps prevent overshooting the delivery Setpoint.
3	Enter the quantity by which delivery can exceed the setpoint. If the delivered quantity is more than the setpoint plus this value, a tolerance check shows over tolerance.
4	Enter the quantity by which delivery can fall short of the setpoint. If the delivered quantity is less than the setpoint minus this value, a tolerance check shows under tolerance.
5	Select whether there is equipment feedback or not. The equipment provides run (dribble if used) and stop feedback.

Advanced Maintenance

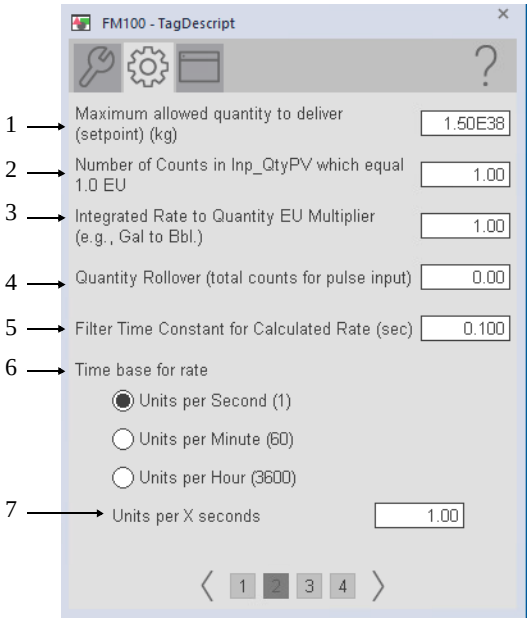


Item	Description
1	Enter a value so that when the flow rate is less than this value, it is treated as zero. This value helps prevent totalizing the transmitter error when flow is stopped.
2	Enter the percentage of delivery error. When the delivery tolerance is checked, if no bump has occurred and if the delivery is in tolerance, the error (difference between delivery setpoint and actual delivery) is multiplied by this percentage and applied to the preact. The preact self tunes and learns the correct value of the preact over time.
3	Configure the Time (in seconds) to Pulse the Clear Output to clear an external totalizer, such as one in an intelligent flowmeter.
4	Enter the amount of time to command the controlled equipment to run flow when the bump command button is pressed. If this value is set to zero, Bump is treated like a Jog: flow starts when the button is pressed and stops when the button is released. If this value is greater than zero, flow is bumped for the configured time.
5	Enter the amount of time in seconds after flow is stopped for the scale reading to settle before a tolerance check can be commanded.
6	Enter the maximum allowed feedback time. If equipment feedback is being used, the instruction allows this much time after commanding the equipment for feedback to show the equipment in the commanded state before raising a fault status.
7	Enter the flow high threshold. This is the limit for flow alarming.
8	Enter the flow low threshold. This is the limit for flow alarming.

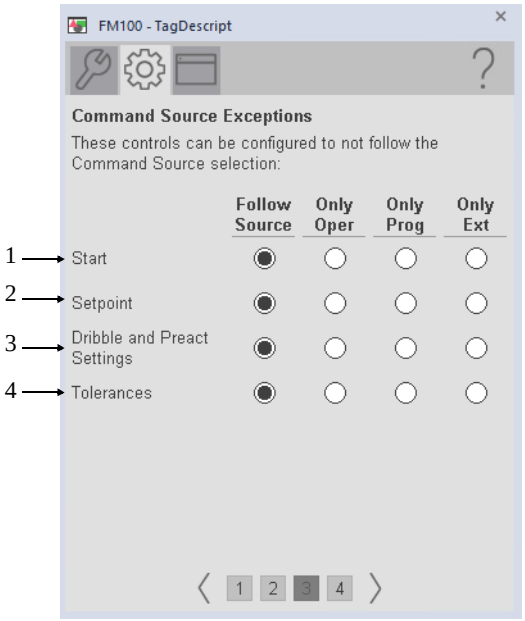
Engineering



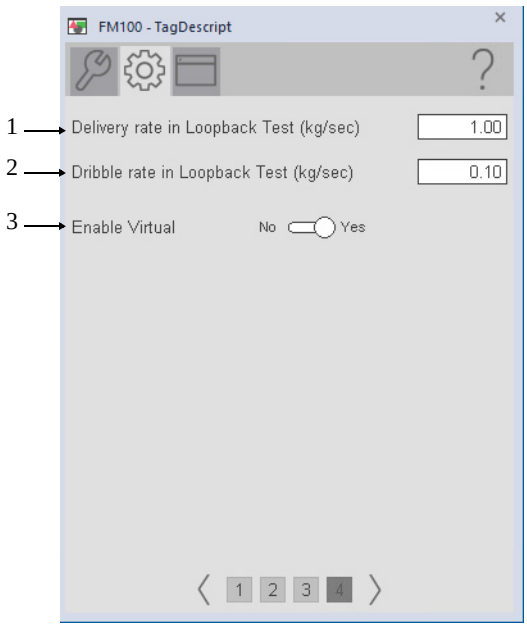
Item	Description
1	Select to adjust the Preact automatically based on the actual versus setpoint Quantity after each successful delivery. Clear this checkbox to leave the Preact as entered.
2	Select to command the equipment to a slower Dribble rate as delivery nears completion to improve the accuracy of Quantity delivered.
3	Select if the controlled equipment provides feedback of its running, dribbling, and stopped status to this instruction. This instruction checks that the equipment is performing the commanded function and provides a status (and optional alarm) if the equipment fails to respond as commanded within a configurable time. **IMPORTANT**: The feedback fault time is configured on the Advanced Maintenance tab. Clear this checkbox if the controlled equipment does not provide feedback of its status. The instruction assumes that the equipment is performing the commanded function and no equipment failure-to-respond checks occur.
4	Select if you want the dosing instruction to attempt to stop the controlled equipment if an equipment fault is reported (Inp_CtrldEqupFault) or detected (via feedbacks). Clear this checkbox if you want the dosing instruction to keep performing its current function, even if an equipment fault occurs.
5	Select to allow continuous rate monitoring.
6	Select to designate as a Transfer In instance.
7	Select to designate as a Transfer Out instance.



Item	Description
1	Enter the maximum allowed quantity to deliver. The quantity setpoint is clamped not to exceed this value.
2	Enter the number of counts in Inp_QtyPV that equal one engineering unit of quantity delivered. This value is used with pulse output flowmeters and a pulse input I/O card.
3	Enter the rate to quantity engineering units multiplier. This value is used if the input is in one unit of measure, such as gallons per minute, and the total is in another that requires conversion above and beyond time units, such as barrels.
4	Enter the quantity rollover. This value is used when a quantity or pulse count input rolls over to zero at some value, such as 999,999 counts.
5	Enter the filter time constant for calculated rate.
6	Select the time base for rate.
7	Enter the number of units per x seconds, where x equals the number of seconds selected for the time base for rate.



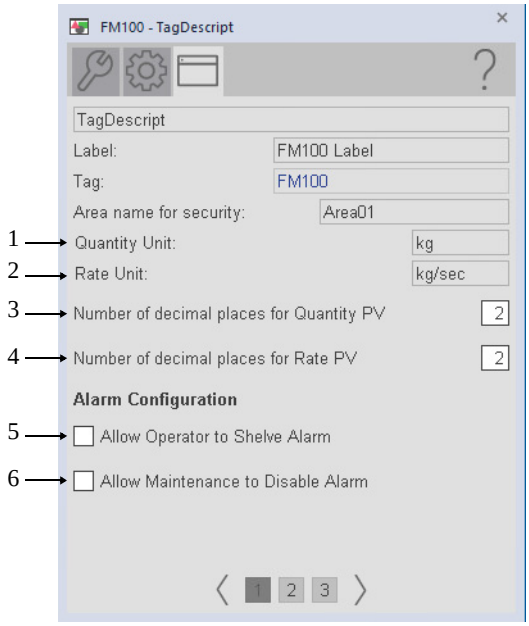
Item	Description
1	Select to keep control of dosing Start and Stop commands with the Operator, Program, External, or Follow the Source even if the instruction is in Program command source.
2	Select to keep control of the Setpoint quantity setting with the Operator, Program, External, or Follow the Source even if the instruction is in Program command source.
3	Select to keep control of the Dribble and Preact quantity settings with the Operator, Program, External, or Follow the Source even if the instruction is in Program command source.
4	Select to keep control of the high and low Tolerance settings with the Operator, Program, External, or Follow the Source even if the instruction is in Program command source.



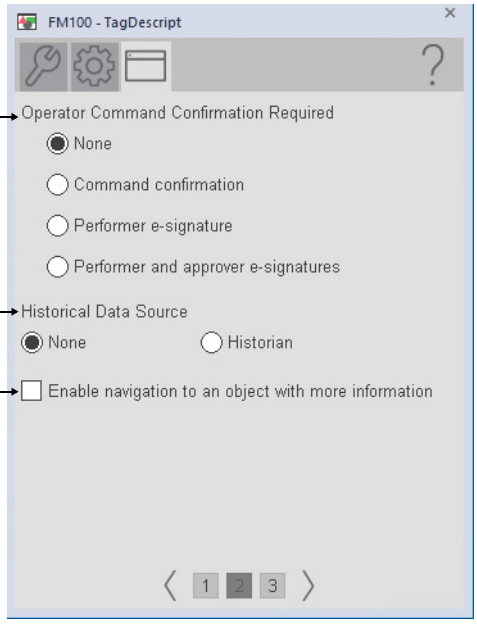
Item	Description
1	Enter the normal running delivery rate that is used when the P_Dose instruction is in virtual (Inp_Sim = 1).
2	Enter the dribble (slow) delivery rate that is used when the P_Dose instruction is in virtual (Inp_Sim = 1).
3	Select yes to enable virtual.

HMI Configuration

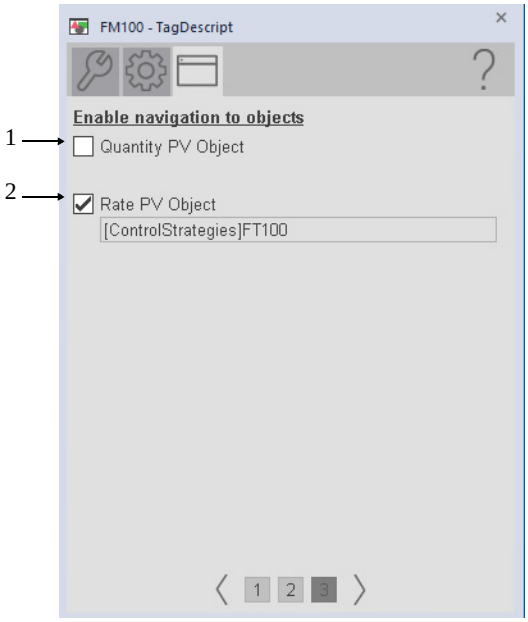
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the units of measure descriptor for the Quantity delivered.
2	Enter the units of measure descriptor for the Rate of delivery.
3	Enter in the number of decimal places that are displayed for the Quantity Process Variable
4	Enter in the number of decimal places that are displayed for the Rate Process Variable
5	Select to allow Operator to shelve the alarm.
6	Select to allow Maintenance to disable the alarm.

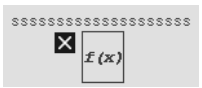


Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to configure if a Historical data source will be used or not.
3	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.



Item	Description
1	Select to enable navigation to a Quantity PV object
2	Select to enable navigation to a Rate PV object

Process Analog Fanout (PFO) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PFO		P_Fanout graphic symbol (horizontal layout).
GO_PFO1		P_Fanout graphic symbol (vertical layout).

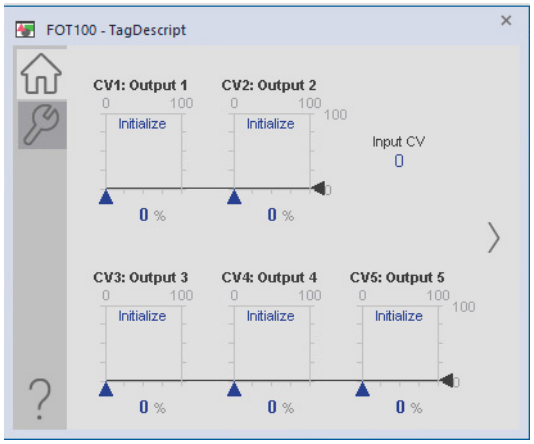
Process Analog Fanout (PFO) Faceplates

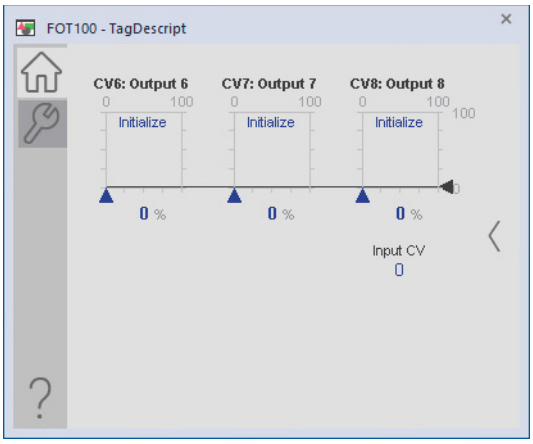
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator

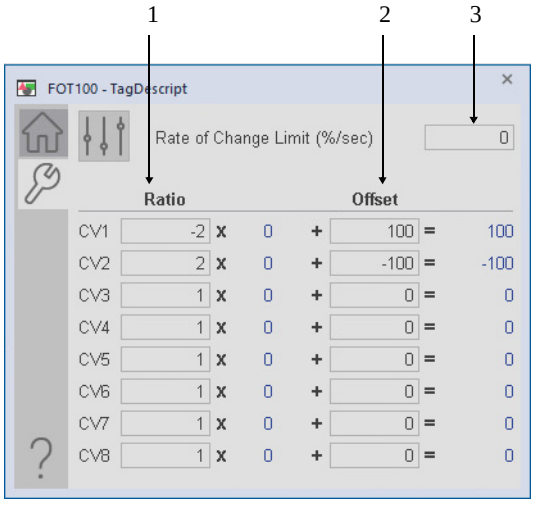
The Faceplate initially opens to the Operator (Home) tab. From here, an operator can monitor the device status and manually operate the device when it is in Operator mode.

If outputs 6, 7, and 8 are used by the instruction (in other words, if Cfg_HasCV6... Cfg_HasCV8 are 1), the Home tab has a second page that displays the information.



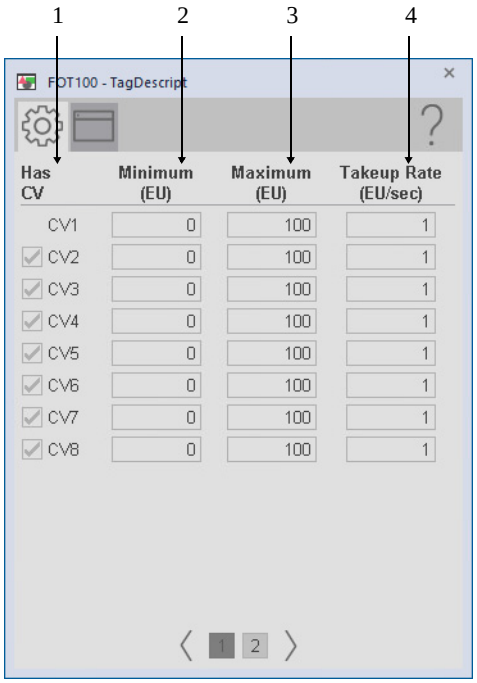


Maintenance

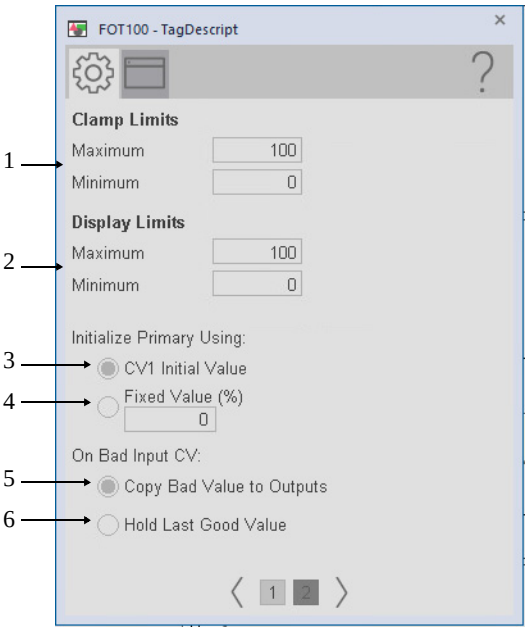


Item	Description
1	Enter a value that sets the ratio to calculate each individual output. This value either sets the operator ratio (for example, OSet_CV1Ratio) or the configuration ratio (for example, Cfg_CV1Ratio) depending on the ratio source selection.
2	Operator setting for the Input CV rate of change limit (increasing or decreasing). If Cfg_MaxCVRoC = 0.0, then this parameter can be set to zero, which means the rate of change is not limited.
3	Enter a value that sets the offset to calculate each individual output. This value either sets the operator offset (for example, OSet_CV1Offset) or the configuration offset (for example, Cfg_CV1Offset) depending on the ratio source selection.

Engineering



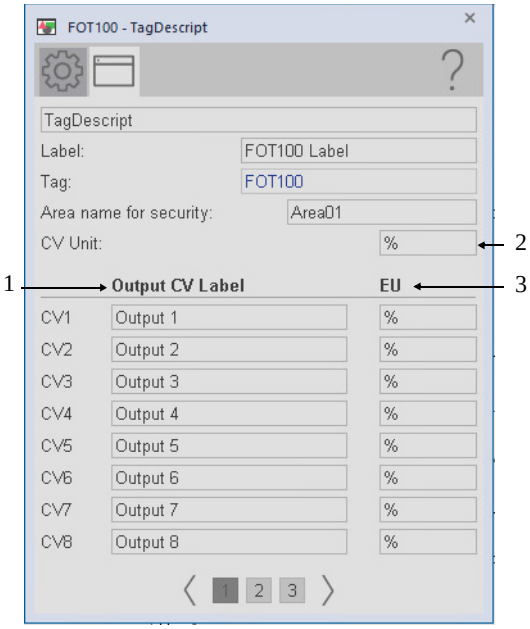
Item	Description
1	Select to enable use of the corresponding output.
2	Enter a value for the minimum value to be used to clamp CV (in engineering units).
3	Enter a value for the maximum value to be used to clamp CV (in engineering units).
4	Enter a rate the CV is to change to a calculated value after initialization to provide bumpless transfer from initialization.



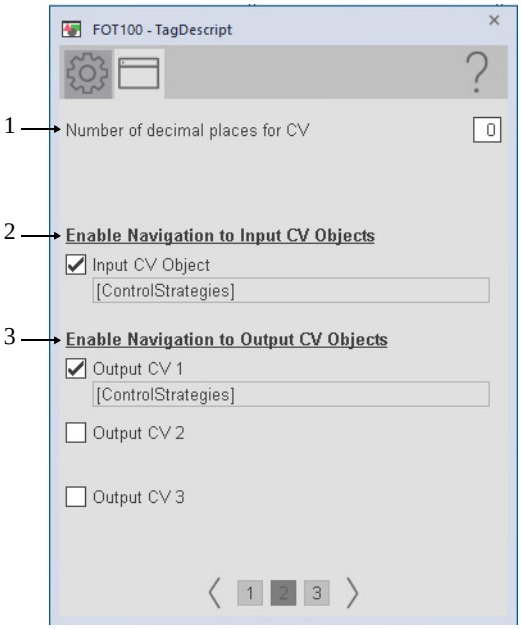
Item	Description
1	Enter values to set the limits to use to clamp the CV.
2	Enter values to set the limits to display for the CV.
3	Select to use the CV1 initialization value (Inp_CV1InitVal) to set the initialization output (Out_CV_InitVal) when initialization is requested.
4	Select to use a fixed value (Cfg_FixedInitVal) to set the initialization output (Out_CV_InitVal) when initialization is requested. Enter a value to set the initialization value (Out_CVInitVal) if initialization is requested and a fixed value option is selected.
5	Select to pass through the bad value.
6	Select to hold last good value.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the description of the output name.
2	Enter the units that are used with the CV.
3	Sets the CV engineering units to use for display.



Item	Description
1	Enter the number of decimal places to be shown for CV.
2	Select to permit navigation to an input CV object faceplate for which you typed a tag name.
3	Select to permit navigation to an output CV object faceplate for which you typed a tag name.

Process High or Low Selector (PHLS) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PHLS		Standard High or Low Selector graphic symbol.

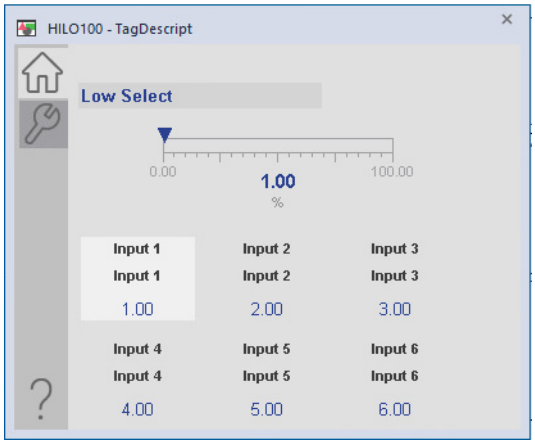
Process High or Low Selector (PHLS) Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

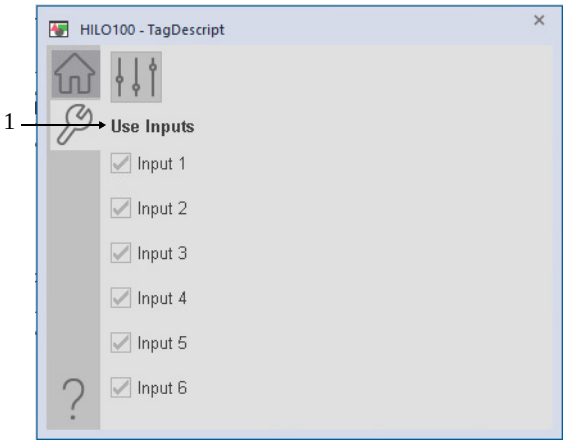
Operator

The Operator tab shows the following information:

- Current operation (High or Low Select)
- Currently selected input (white highlight)
- Bar graph for clamp limits from minimum to maximum plus Output CV indicator
- Input CV values and Output CV value

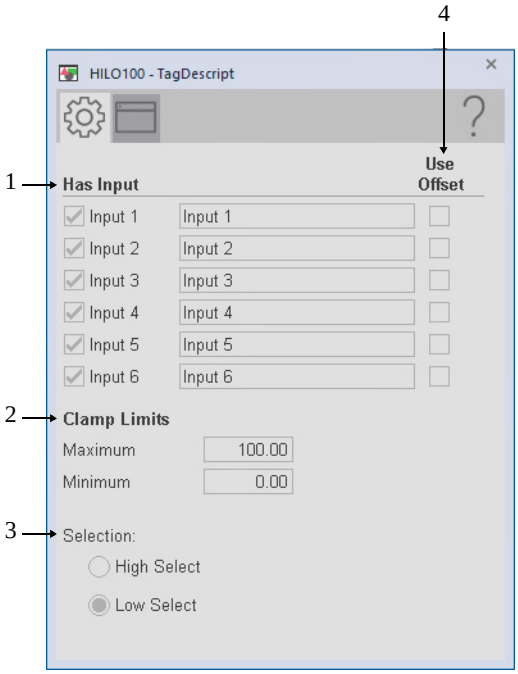


Maintenance



Item	Description
1	Select to use a CV input. Clear a checkbox not to use the input and put the instruction in Maintenance Bypass.

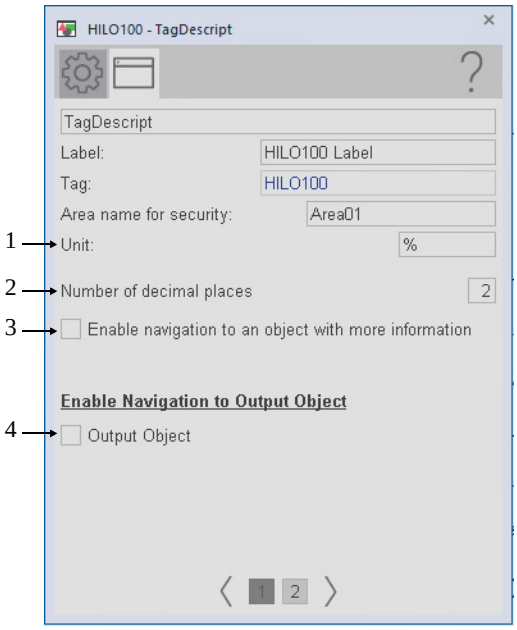
Engineering



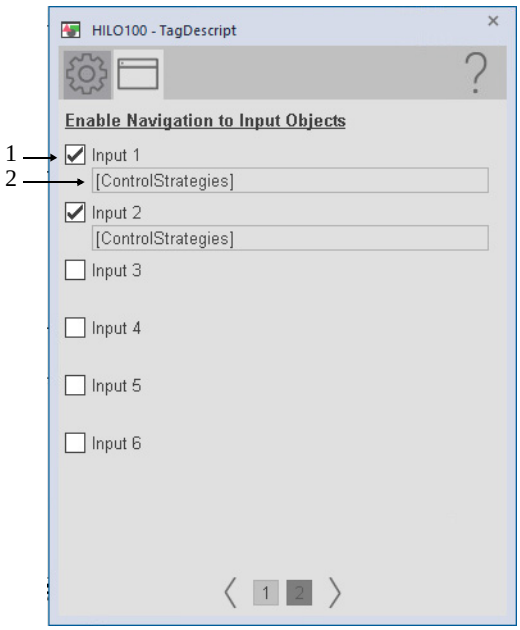
Item	Description
1	Select 'Has Input' (CV1...CV6) where an input is connected.
2	Enter in the minimum and maximum to set the range for the selected input CV. If the selected input CV is below the minimum, it is clamped to the minimum value. If the selected input CV is above the maximum, it is clamped to the maximum value.
3	Select High Select to select the highest input CV value to pass to the output. Select Low Select to select the lowest input CV value to pass to the output.
4	Select a 'Use Offset' (CV1...CV6) to include the Kp*E offset in initialization calculation.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the engineering units for display on the HMI. Percent (%) is the default.
2	Enter in the number of decimal places that are displayed for the CV.
3	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.
4	Select to enable navigation to an output object.



Item	Description
1	Select an input (CV1...CV6) or the Output CV to allow navigation to a specified object.
2	Enter the tag name for the corresponding input (CV1...CV6) or Output CV.

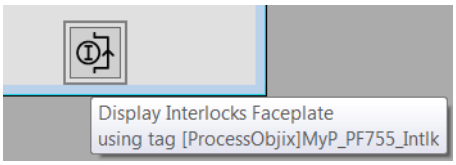
Process Interlock (PINTLK) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_Interlock		Standard Interlock Graphic Symbol.
GO_CfgHasType		Used to configure the type of interlock.
GO_Interlock_MSet_Bypass		Used to select maintenance bypass of the interlock.
GO_InterlockBank0		Used for navigation to a specific bank of interlocks.
GO_InterlockCfg		Used to configure OK state, bypass, reset, and stop only settings of interlocks.
GO_rb_Cfg_eTypeX		Used to configure the types.

Interlock States

Item	Description
	Not ready to run or energize. One or more interlock conditions are not OK.
	Ready to run or energize. One or more conditions that can be bypassed are not OK, but these conditions are bypassed. All conditions that cannot be bypassed are OK.
	Ready to run or energize. All interlock conditions are OK.
	Ready to run or energize, and all interlock conditions are OK, conditions that can be bypassed are being bypassed and the equipment is not shut down.

The overall graphic symbol includes a touch field that opens the faceplate. Hover the pointing device over the graphic symbol to display a tooltip that describes the function of the symbol.



Process Interlock (PINTLK) Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator

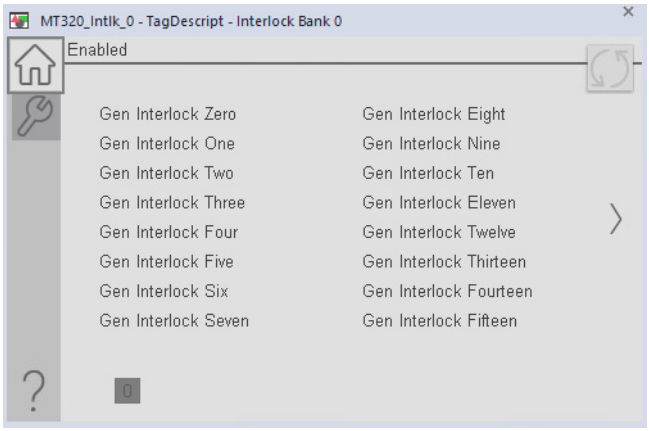
The Faceplate initially opens to the Operator (Home) Tab. From here, an operator can monitor the device status.

The Operator tab shows the following information:

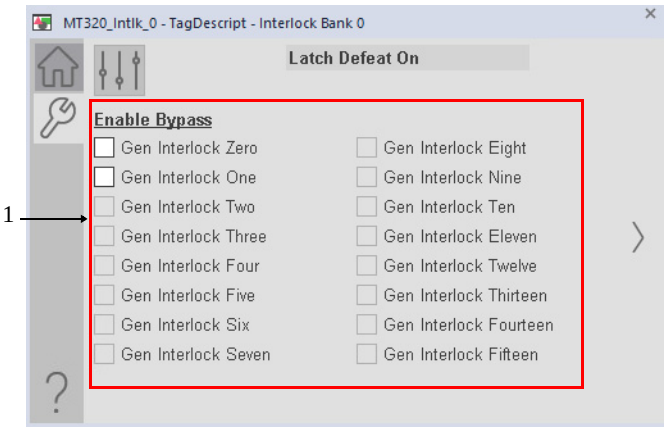
- Interlock bypass status indicator (Enabled, Bypassed)
- Each configured interlock along with the current state of the interlock

If navigation is enabled, Select a condition to open the faceplate of the object that is associated with the condition.

The following figure shows the Operator tab in a non-bypassed condition with no faults.

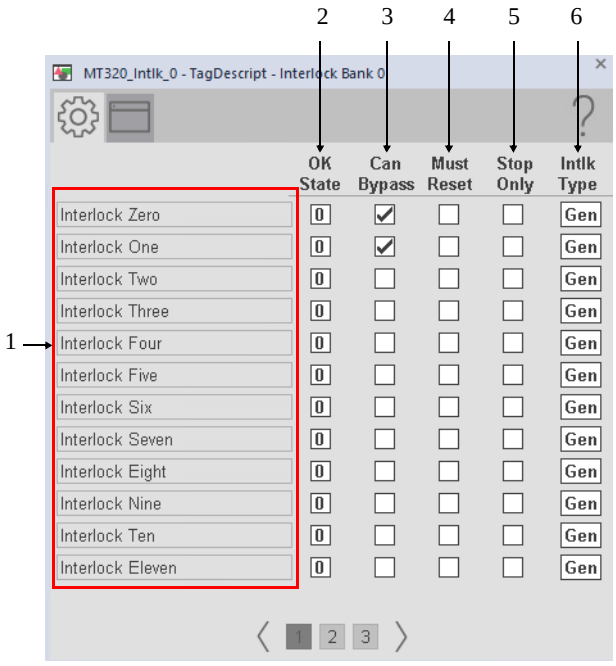


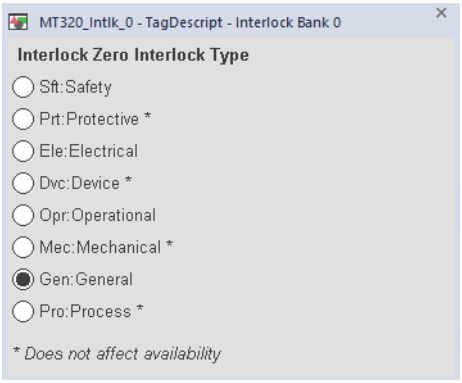
Maintenance



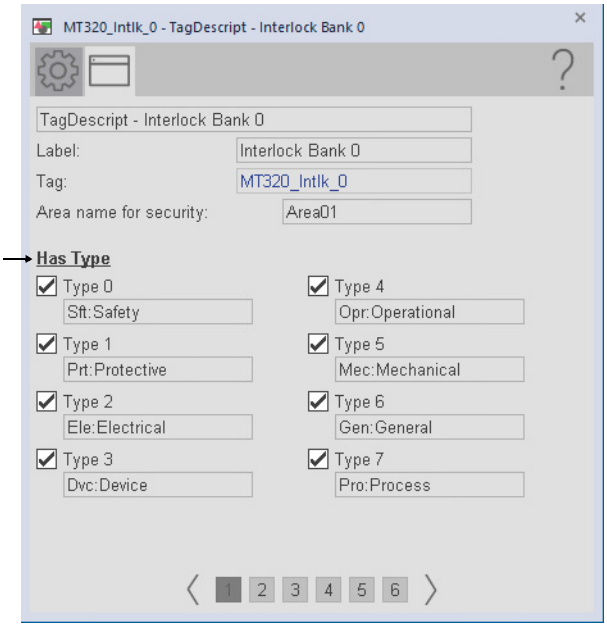
Item	Description
1	Select an interlock condition that can be bypassed, one that has a white checkbox, to enable bypass of that individual interlock.

Engineering

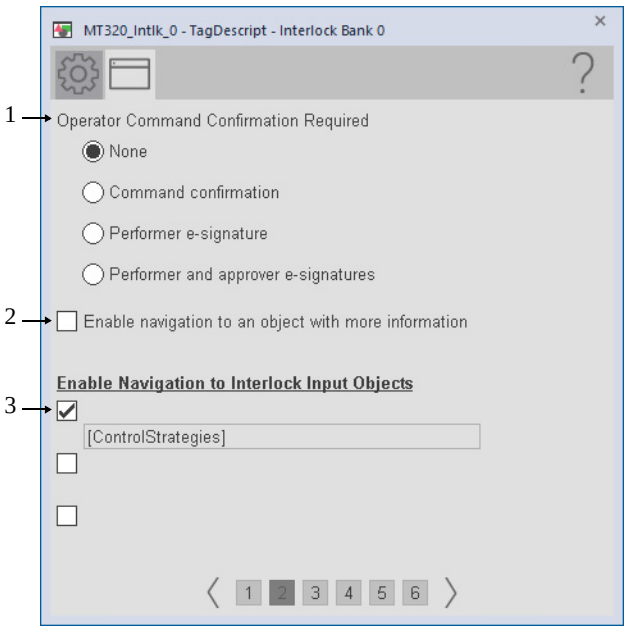


Item	Description
1	Enter the text description of each interlock condition used. Only the interlocks with text entered appear on the Operator tab of the faceplate.
2	Selects the state of the corresponding interlock that is the OK to Run state.
3	Select to indicate that the corresponding interlock can be bypassed.
4	Select to indicate that the corresponding interlock is latched and must be reset.
5	Select to configure the interlock for stop only. The object (motor) the interlock object is associated will trip when if this specific interlock is not OK, but it will not alarm.
6	Select to define the interlock type. The display opens to select an available interlock type that was defined in the HMI Configuration. 

HMI Configuration

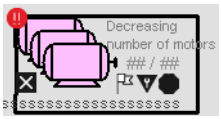
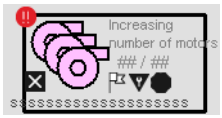
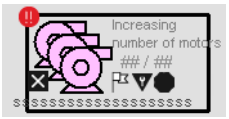


Item	Description
1	Select to enable the interlock type that can be defined in the Engineering tab. There are eight types that are configurable. The first three letters define the short name type followed by ':' and then the full type description.



Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.
3	Select to allow navigation to interlock input objects.

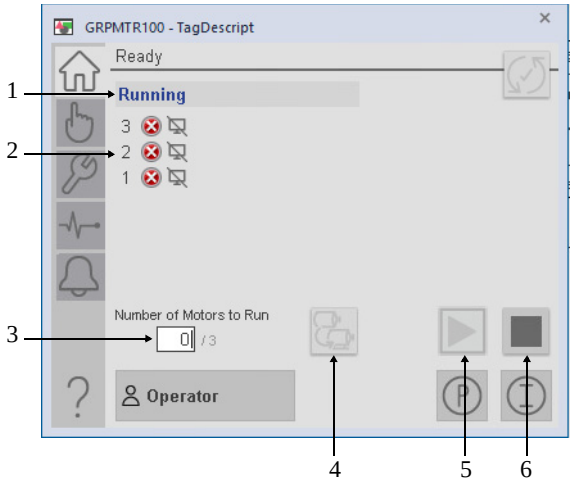
Process Lead/Lag/Standby Motor Group (PLLS) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PLLS_Motors		A group of motors.
GO_PLLS_Blowers		A group of blowers.
GO_PLLS_Pumps		A group of pumps

Process Lead/Lag/Standby Motor Group (PLLS) Faceplates

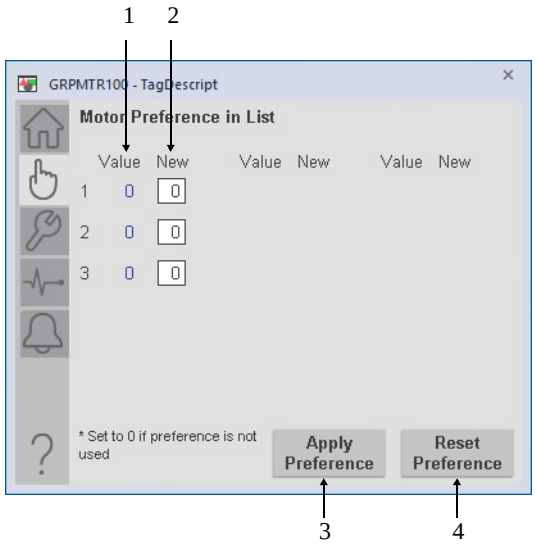
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



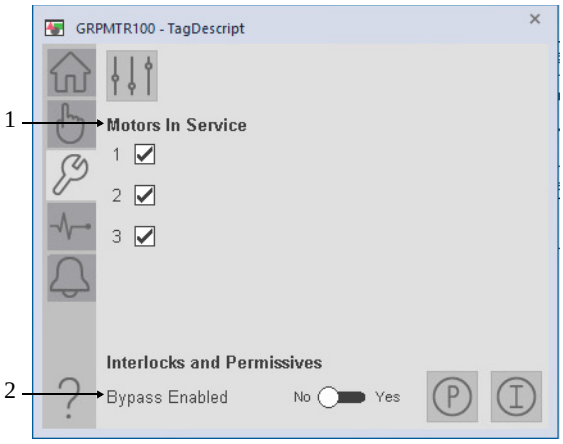
Item	Description
1	Motor state indicator.
2	Individual motor state indicators.
3	Enter a number between 0 and the maximum demand to indicate the number of motors to run.
4	Select to rotate motor assignments. The lead motor is demoted to the end of the list. Motors are started or stopped to satisfy Number of Motors to Run.
5	Select to start group.
6	Select to stop group. **IMPORTANT**: Motors stop in reverse order of starting unless First Started is First Stopped on the engineering tab is checked.

Manual Mode



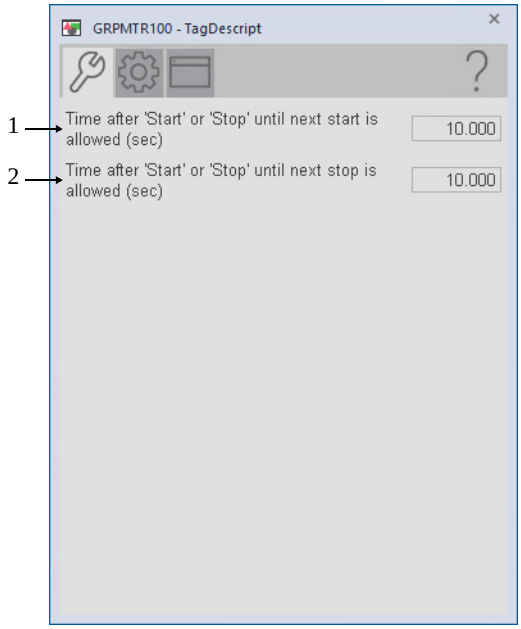
Item	Description
1	Displays the current preference for a motor.
2	Enter new preference value. The preference value determines the precedence when starting motors.
3	Apply the values in the new column to the preference values.
4	Reset preferences to previous.

Maintenance



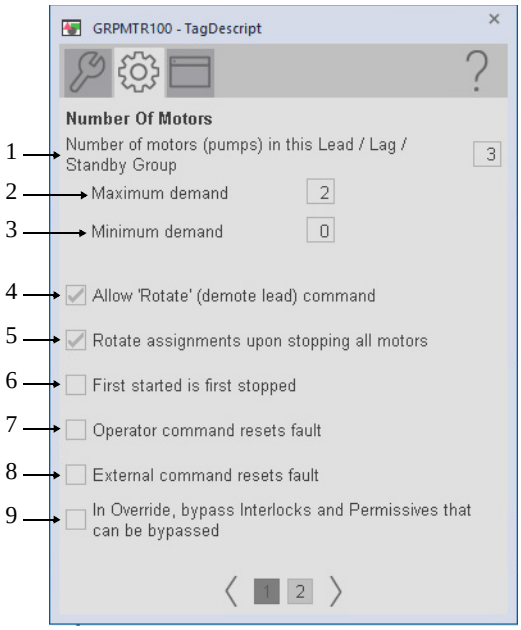
Item	Description
1	Select to place a motor in service (not in maintenance bypass). Clear the checkbox to place a motor out of service (maintenance bypass)
2	Select Yes to bypass checking of bypassable interlocks and permissives. Select No to enable checking of all interlocks and permissives.

Advanced Maintenance

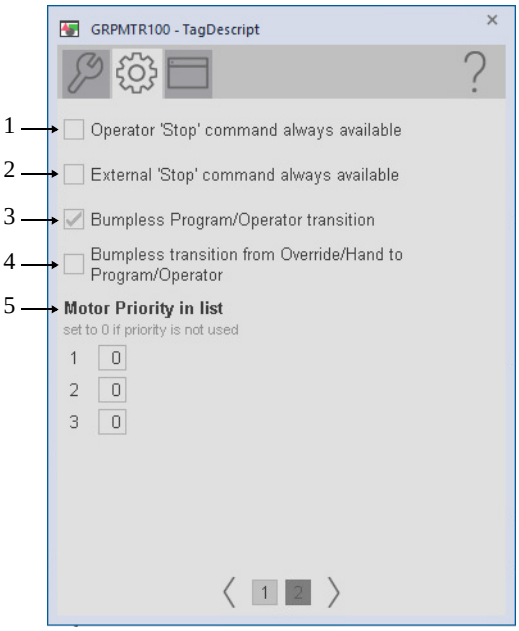


Item	Description
1	Enter the number of seconds after a start or stop that the next start is allowed.
2	Enter the number of seconds after a start or stop that the next stop is allowed.

Engineering



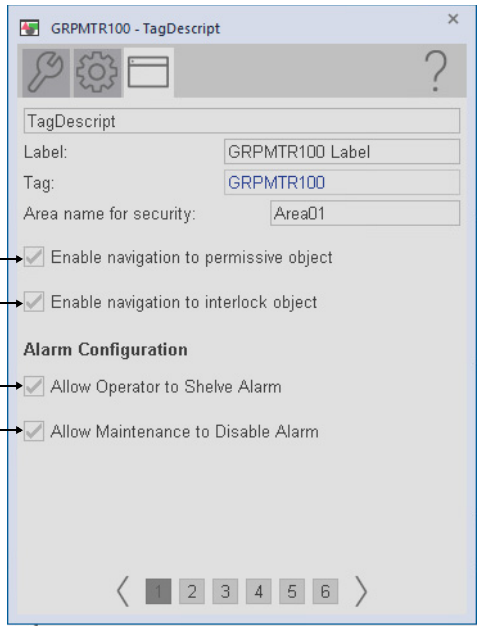
Item	Description
1	Enter the number of motors (2...30) in the group.
2	Enter the highest number of motors that can be running.
3	Enter the lowest number of motors that can be running.
4	Select to allow the Rotate command to rotate motor assignments.
5	Select to rotate the lead motor to the end of list upon stopping all motors.
6	Select so that the first motor that is started is the first motor that is stopped.
7	Select to allow the Operator Start or Stop command to reset any previous faults (Interlock Trip), then start or stop the group. Clear this checkbox to reset faults by using only the reset commands.
8	Select to allow the External Start or Stop command to reset any previous faults (Interlock Trip), then start or stop the group. Clear this checkbox to reset faults by using only the reset commands.
9	Select to bypass interlocks and permissives that are bypassable when in Override command source.



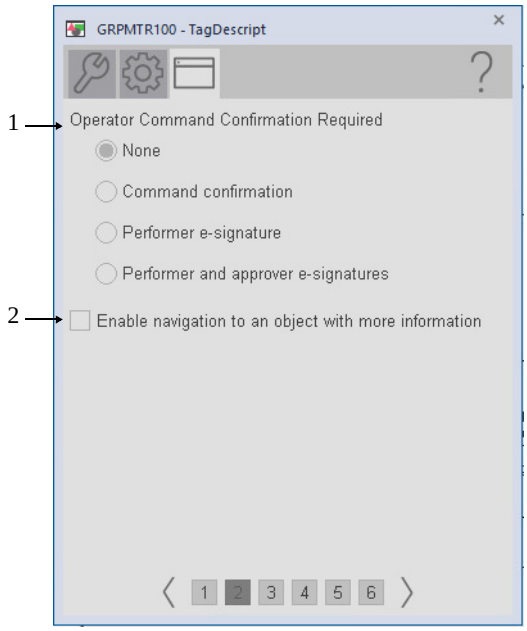
Item	Description
1	Select (= 1) so that the OCmd_Stop has priority and is accepted at any time. If the Command Source is not Operator or Maintenance, the motor or drive requires a reset. Clear this checkbox (= 0) so that the OCmd_Stop works only in Operator or Maintenance command source.
2	Select (= 1) so that the XCmd_Stop has priority and is accepted at any time. If the Command Source is not External, the motor or drive requires a reset. Clear this checkbox (= 0) so that the XCmd_Stop only works when the command source is External.
3	Select to have Program settings (such as Speed Reference) track Operator settings in Operator command source, and have Operator settings track Program settings in Program command source.
4	Select to have Program and Operator Speed Reference track the Override Speed Reference in Override command source or the actual speed in Hand command source.
5	Enter the start priority within the list of the motors selected. Motors start in order of priority (0...31) and the higher numbers start first.

HMI Configuration

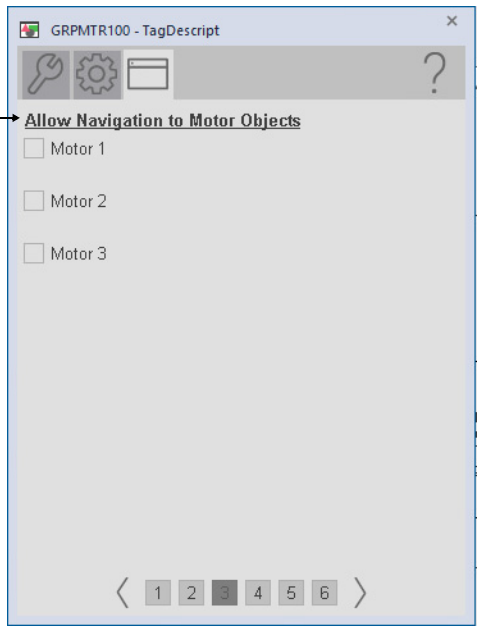
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Select if a Permissive object is used with this motor. This check changes the Permissive indicator to a clickable button to open the Permissive faceplate. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_Perm'. For example, if your P_LLS object has the name 'LLS123', then its Permissive object must be named 'LLS123_Perm'.
2	Select if an Interlock object is used with this group. Checking this box changes the Interlock indicator to a clickable button to open the Interlock faceplate. **IMPORTANT**: The name of the Interlock object in the controller must be the object name with the suffix '_Intlk'. For example, if your P_LLS object has the name'LLS123', then its Interlock object must be named 'LLS123_Intlk'.
3	Select to allow Operator to shelve the alarm.
4	Select to allow Maintenance to disable the alarm.

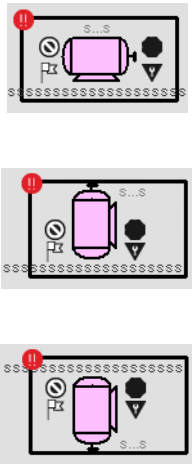
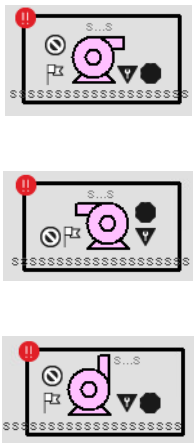
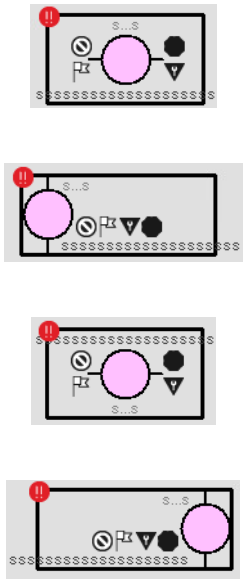


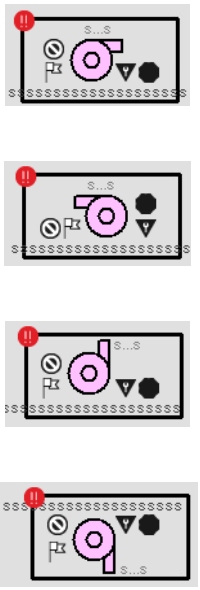
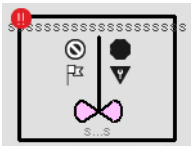
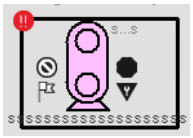
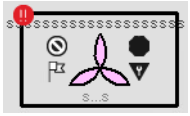
Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.



Item	Description
1	Select to allow navigation to motor objects. Additional pages are available if configured for more than 8 motors.

Process Motor (Power Discrete) (PMTR) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PMTR_R GO_PMTR_U GO_PMTR_D		Motors operate in different positions: right, up, and down.
GO_PMTR_Pump_R GO_PMTR_Pump_L GO_PMTR_Pump_U		Pumps operate in several positions: right, left, and up
GO_PMTR_Inline_U GO_PMTR_Inline_L GO_PMTR_Inline_D GO_PMTR_Inline_R		Inline motors operate in several positions: up, left, down, and right.

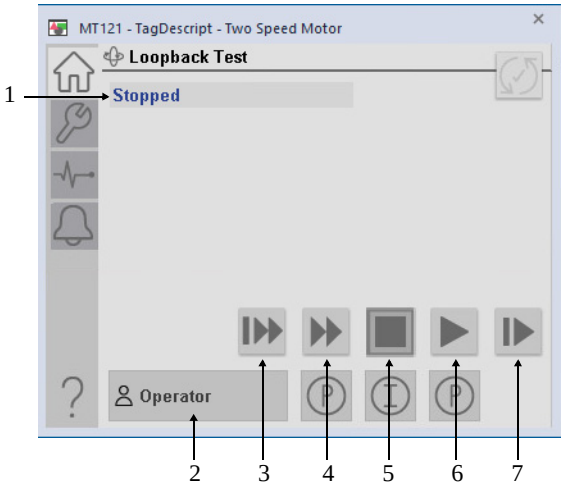
Graphic Symbol Name	Graphic Symbol	Description
GO_PMTR_Blower_R GO_PMTR_Blower_L GO_PMTR_Blower_U GO_PMTR_Blower_D		Blowers operate in different positions: right, left, up, and down.
GO_PMTR_Conveyor_R		Conveyor that is shown as a Graphic Symbol.
GO_PMTR_Agitator_D		Agitator that is shown as a Graphic Symbol
GO_PMTR_Mixer_U		Mixer that is shown as a Graphic Symbol.
GO_PMTR_RPump_U		Rotary gear pump that is shown as a Graphic Symbol.
GO_PMTR_Fan_D		Fan that is shown as a Graphic Symbol.
GO_PMTR_L1_		Indicator with label.

Graphic Symbol Name	Graphic Symbol	Description
GO_PMTR_L1_Motor		Motor indicator
GO_PMTR_L1_Pump		Pump indicator
GO_PMTR_L1_Blower		Blower indicator

Process Motor (Power Discrete) (PMTR) Faceplates

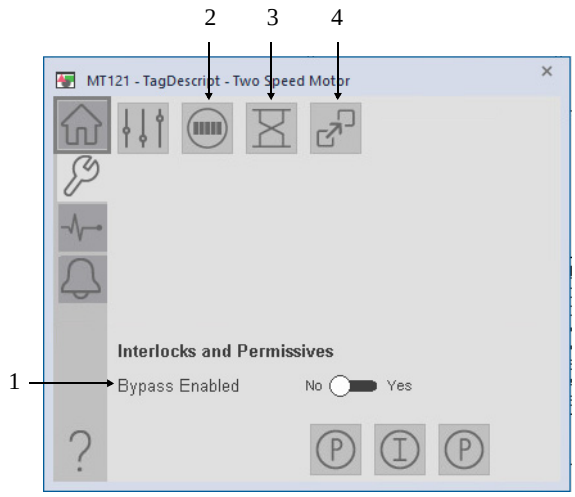
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



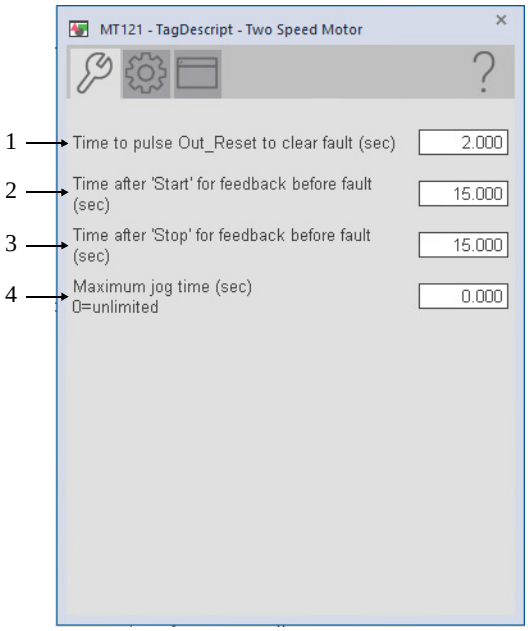
Item	Description
1	Motor state (stopping, stopped, starting, or running)
2	Current command source (Program, Operator, Override, Maintenance, or Hand)
3	Select to jog motor at speed 2 (Fast for 2 speed motors, Reverse for reversing motors)
4	Select to start motor at speed 2 (Fast for 2 speed motors, Reverse for reversing motors)
5	Motor stop
6	Select to start motor at speed 1 (Slow for 2 speed motors, Forward for reversing motors)
7	Select to jog Motor at speed 1 (Slow for 2 speed motors, Forward for reversing motors)

Maintenance



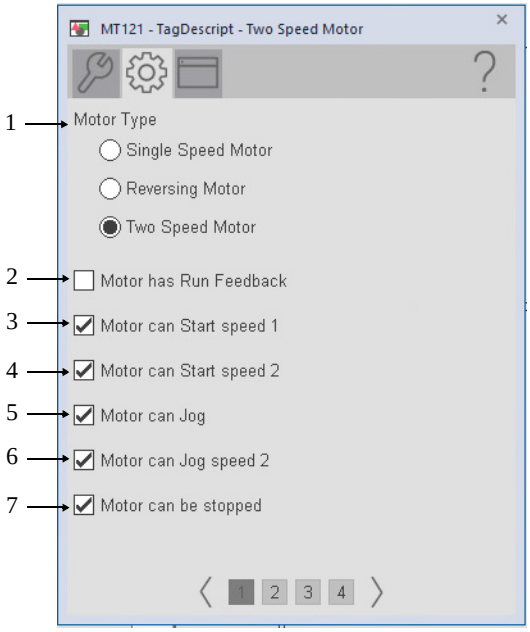
Item	Description
1	Select Yes to bypass checking of bypassable interlocks and permissives. Select No to enable checking of all interlocks and permissives.
2	Select to open the runtime faceplate. **IMPORTANT**: This option is only available if 'Enable navigation to run time object' on the HMI Configuration tab is checked.
3	Select to open the Restart Inhibit faceplate. **IMPORTANT**: This option is only available if 'Enable navigation to restart inhibit object' on the HMI Configuration tab is checked.
4	Select to open the device object faceplate. **IMPORTANT**: This option is only available if 'Enable navigation to device object' on the HMI Configuration tab is checked.

Advanced Maintenance

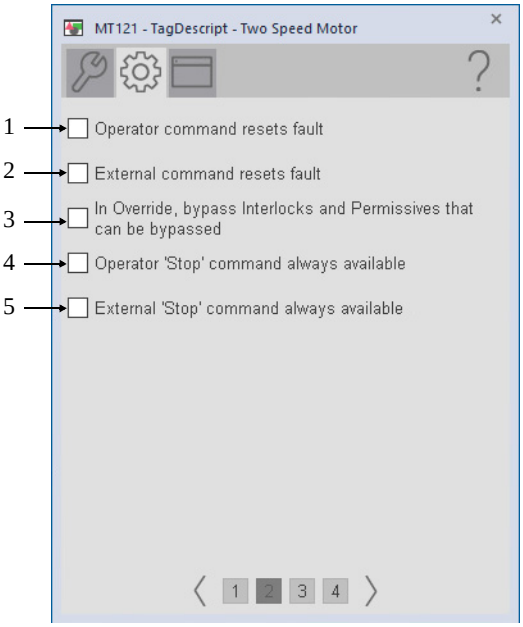


Item	Description
1	Enter the time for the reset output to be pulsed.
2	Enter the time to allow the run feedback to show that the motor has started before raising a fail to start alarm.
3	Enter the time to allow the run feedback to show that the motor has stopped before raising a Fail to Stop alarm.
4	Enter the maximum time to allow the motor to jog. Enter zero to allow unlimited jog time.

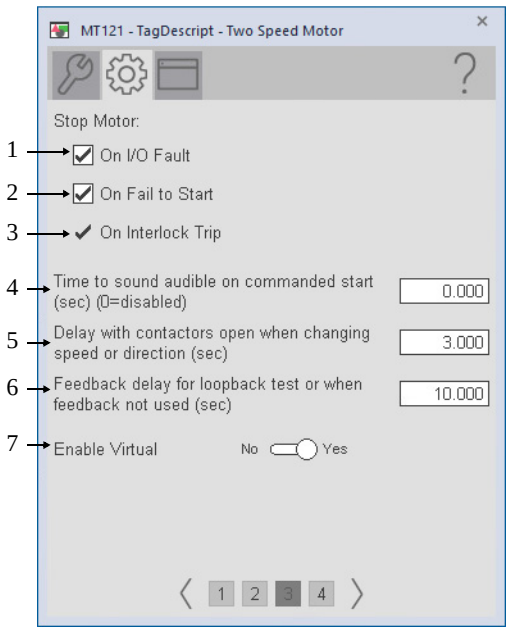
Engineering



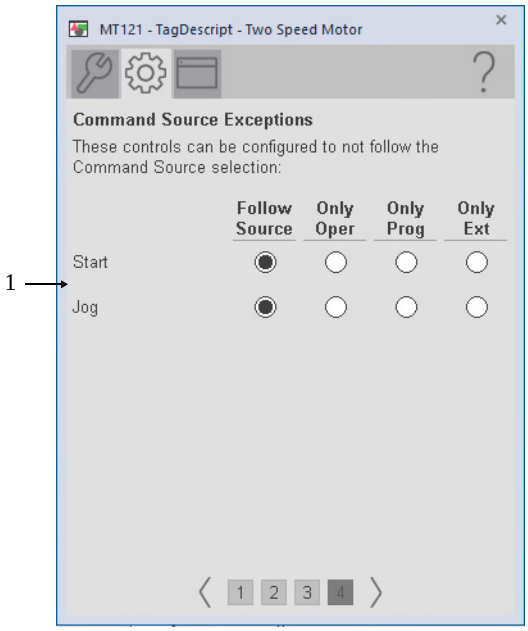
Item	Description
1	Select the motor type.
2	Select if the motor provides run feedback to Inp_SlowRunFdbk and Inp_FastRunFdbk. Clear this checkbox if there is no run feedback. **IMPORTANT**: This check places the device in Maintenance Bypass unless 'Use Run Feedback' on the Maintenance tab is checked.
3	Select to allow the motor to start at speed 1.
4	Select to allow the motor to start at speed 2.
5	Select to allow the motor to be jogged.
6	Select to allow the motor to jog at speed 2.
7	Select to allow the motor to be stopped.



Item	Description
1	Select to allow the Operator commands for Start Slow, Start Fast, or Stop to reset any previous faults (I/O fault, Fail to Start, Fail to Stop, Interlock Trip). Then start or stop motor. Clear this checkbox to reset faults only using the reset commands.
2	Select to allow the External commands for Start Slow, Start Fast, or Stop to reset any previous faults (I/O fault, Fail to Start, Fail to Stop, Interlock Trip). Then start or stop motor. Clear this checkbox to reset faults only using the reset commands.
3	Select to bypass bypassable interlocks and permissives in Override command source.
4	Select to have the Operator Stop command available in any command source. Clear this checkbox to have the Operator Stop command available only in the Operator and Maintenance command sources.
5	Select to have the External Stop command available in any command source. Clear this checkbox to have the External Stop command available only in the Operator and Maintenance command sources.



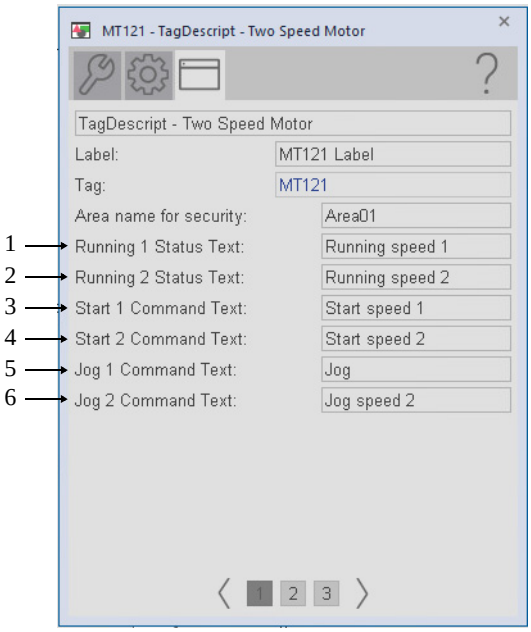
Item	Description
1	Select to stop the motor if an I/O fault is detected. Clear this checkbox to show only the I/O fault status/alarm and not stop the motor if an I/O fault is detected.
2	Select to stop the motor if a fail to Start fault is detected. Clear this checkbox to show only the Fail to Start status/alarm and not stop the motor if a fail to Start fault is detected.
3	The motor always stops on an interlock trip. This item cannot be cleared. It is displayed as a reminder that the Interlock Trip function always trips the motor.
4	Enter the amount of time to sound the audible alarm when the motor starts.
5	Enter the time delay between when the run output has turned off for one speed and when it is turned on for the other speed.
6	Enter the time delay (in seconds) for the running or stopped status to be echoed back when the virtual is enabled or when run feedback is not used.
7	Select yes to enable virtual.



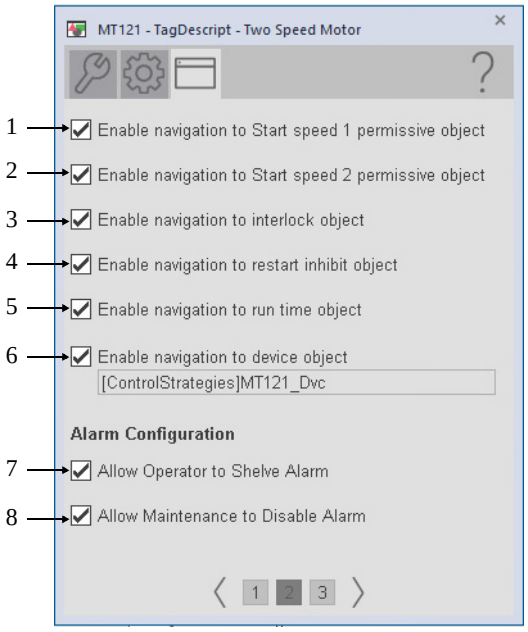
Item	Description
1	Select one of the four options to determine the source of each command (start and jog). If any option but “Follow Source” is selected, then that source will be the only source allowed for that command.

HMI Configuration

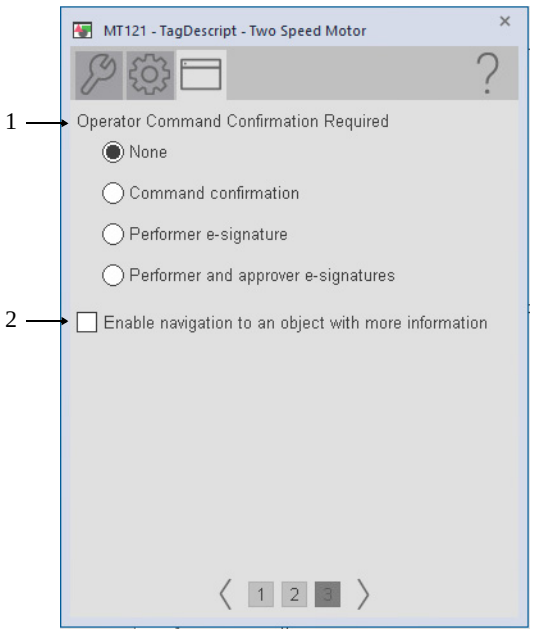
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the text to display when the motor is running at speed 1.
2	Enter the text to display when the motor is running at speed 2.
3	Enter the text to display when the motor is starting at speed 1.
4	Enter the text to display when the motor is starting at speed 2.
5	Enter the text to display when the motor is jogging at speed 1.
6	Enter the text to display when the motor is jogging at speed 2.

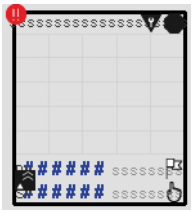


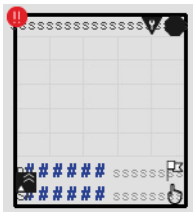
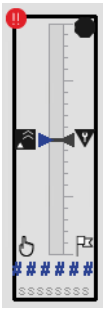
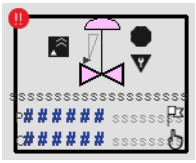
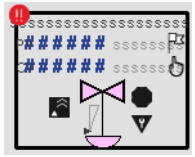
Item	Description
1	Select if Start Speed 1 permissive object is used with this motor. • For 2 Speed Motors, speed 1 is Slow and Speed 2 is Fast. • For Reversing Motors, speed 1 is Forward and Speed 2 is Reverse. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_1Perm'. For example, if your PMTR object has the name 'Motor123', then its Start Speed 1 object must be named 'Motor123_1Perm'.
2	Select if Start Speed 2 permissive object is used with this motor. • For 2 Speed Motors, speed 1 is Slow and Speed 2 is Fast. • For Reversing Motors, speed 1 is Forward and Speed 2 is Reverse. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_2Perm'. For example, if your PMTR object has the name 'Motor123', then its Permissive object must be named 'Motor123_2Perm'.
3	Select if an interlock object is used with this motor. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_Intlk_0'. For example, if your PMTR object has the name 'Motor123', then its Interlock object must be named 'Motor123_Intlk_0'.
4	Select if a restart inhibit object is used with this motor. **IMPORTANT**: The name of the Restart Inhibit object in the controller must be the name of the object with the suffix '_ResInh'. For example, if your PMTR object has the name 'Motor123', then its Restart Inhibit object must be named 'Motor123_ResInh'.
5	Select if a run time object is used with this motor. **IMPORTANT**: The name of the Run Time object in the controller must be the name of the object with the suffix '_RunTime'. For example, if your PMTR object has the name 'Motor123', then its Run Time object must be named 'Motor123_RunTime'.
6	Select to allow navigation to the device object.
7	Select to allow Operator to shelve the alarm.
8	Select to allow Maintenance to disable the alarm.

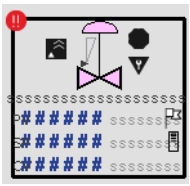
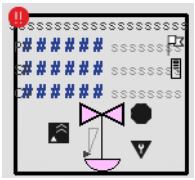
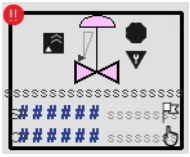
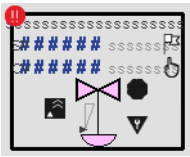
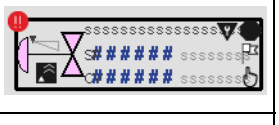


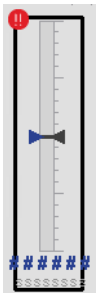
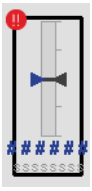
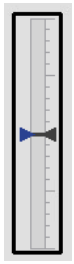
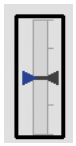
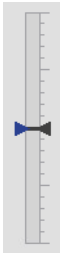
Item	Description
1	Select to configure operator command confirmation. This action would take place after any operator command.
2	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.

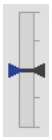
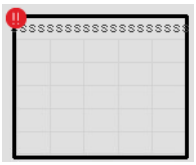
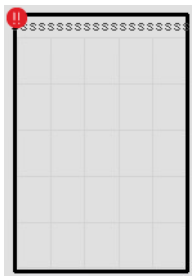
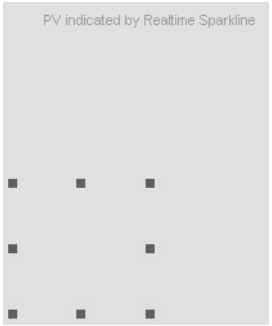
PPID Graphic Symbols

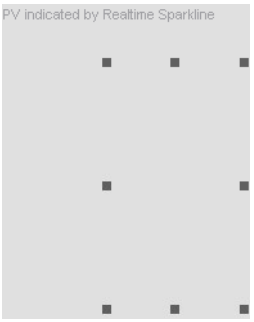
Graphic Symbol Name	Graphic Symbol	Description
GO_PPID		Graphic Symbol with PV and CV numeric displays.
GO_PPID1		Graphic Symbol with PV, SP, and CV numeric displays.
GO_PPID2		Graphic Symbol with SP and CV numeric displays
GO_PPID_Trend		Graphic Symbol with PV and CV numeric displays and a trend display that plots SP, PV, High, and Low Deviations. The trend is scaled to PV EU Min and Max.
GO_PPID_Trend1		Graphic Symbol with PV, SP, and CV numeric displays and a trend display that plots SP, PV, High, and Low Deviations. The trend is scaled to PV EU Min and Max.

Graphic Symbol Name	Graphic Symbol	Description
GO_PPID_TrendWTarget		Graphic Symbol with PV and CV numeric displays and a trend display that plots SP, PV, High, and Low Deviations. The trend is scaled by using the High and Low Deviations.
GO_PPID_TrendWTarget1		Graphic Symbol with PV, SP, and CV numeric displays and a trend display that plots SP, PV, High, and Low Deviations. The trend is scaled by using the High and Low Deviations.
GO_PPID_Indicator		Bar graph with SP on the left and PV on the right that is scaled by PV EU minimum and maximum.
GO_PPID_Valve		Proportional Valve Graphic Symbol with PV and CV numeric displays.
GO_PPID_Valve1		
GO_PPID_Valve2		
GO_PPID_Valve3		

Graphic Symbol Name	Graphic Symbol	Description
GO_PPID_Valve4		Proportional Valve Graphic Symbol with PV, CV, and Setpoint numeric displays.
GO_PPID_Valve5		
GO_PPID_Valve6		
GO_PPID_Valve7		
GO_PPID_Valve8		Proportional Valve Graphic Symbol with SP, CV, and Setpoint numeric displays.
GO_PPID_Valve9		
GO_PPID_Valve10		
GO_PPID_Valve11		
GO_PPID_Val_PV		PV indicator with label.
GO_PPID_PV1		PV indicator with label.

Graphic Symbol Name	Graphic Symbol	Description
GO_PPID_PVSP	P###### ssssssss S###### ssssssss	Indicator with PV and SP.
GO_PPID_Label	ssssssssssssssssss	Label only
GO_PPID_Indicator		Bar indicator with PV and SP moving triangles. Includes displayed limits. Alarm indication.
GO_PPID_Indicator1		Bar indicator with PV and SP moving triangles. Includes displayed limits. Alarm indication.
GO_PPID_Indicator2		Bar indicator with PV and SP moving triangles. Includes displayed limits. Alarm indication and PV value in tooltip.
GO_PPID_Indicator3		Bar indicator with PV and SP moving triangles. Includes displayed limits. Alarm indication and PV value in tooltip.
GO_PPID_Indicator4		Bar indicator with PV and SP moving triangles. Includes displayed limits. PV value in tooltip.

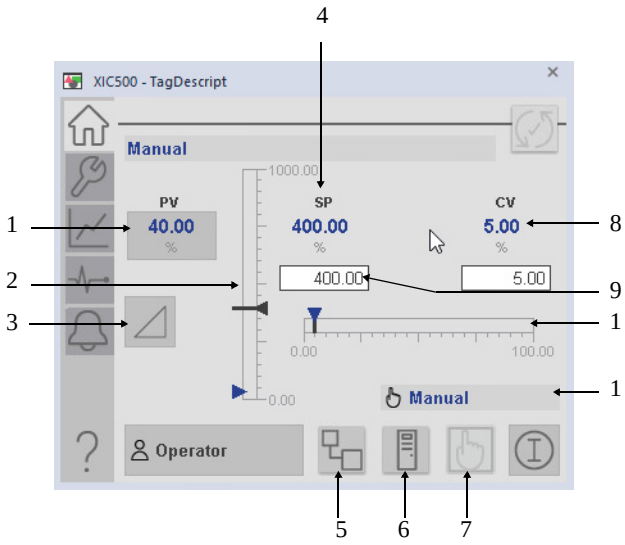
Graphic Symbol Name	Graphic Symbol	Description
GO_PPID_Indicator5		Bar indicator with PV and SP moving triangles. Includes displayed limits. PV value in tooltip.
GO_PPID_Trend_L1		Trend with PV and SP values.
GO_PPID_Trend1_L1		Trend with PV and SP values.
GO_PPID_HistTrend1		Trend with PV and SP historical values.
GO_PPID_HistTrend2		Trend with PV and SP historical values.
GO_PPID_Sparkline		PV indicated by Realtime Sparkline

Graphic Symbol Name	Graphic Symbol	Description
GO_PPID_Sparkline1		PV indicated by Realtime Sparkline
GO_PPID_HistTrend3		PV indicated by Historical Sparkline
GO_PPID_HistTrend4		PV indicated by Historical Sparkline

PPID Faceplates

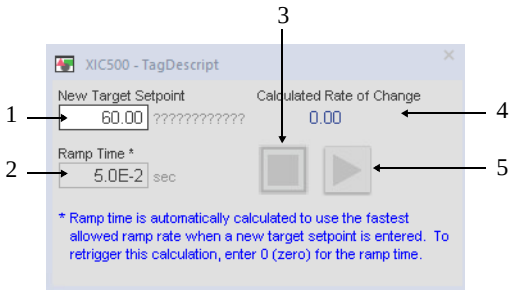
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



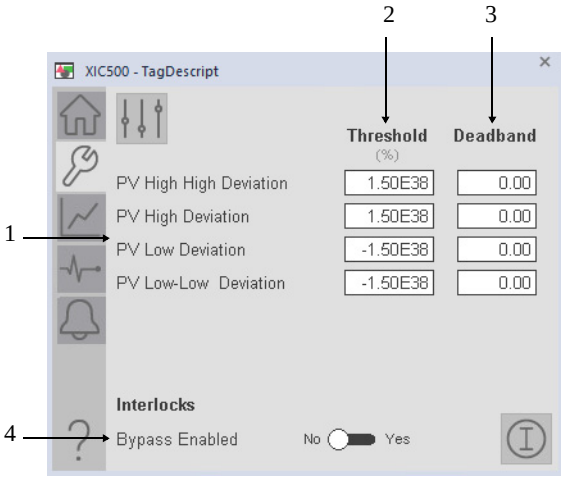
Item	Description
1	Current Process Variable (PV).
2	Bar graph for the current Process Variable.
3	Select to open the ramp wizard display.
4	Current Setpoint (SP).
5	Cascade loop mode.
6	Auto loop mode.
7	Manual loop mode
8	Current Control Variable (CV).
9	Enter a value for the loop setpoint. **IMPORTANT**: This value can be entered only when the instruction command source is Operator and the Loop mode is Automatic or Manual.
10	Bar graph for the current Control Variable.
11	Loop mode indicator.

Ramp Wizard Display



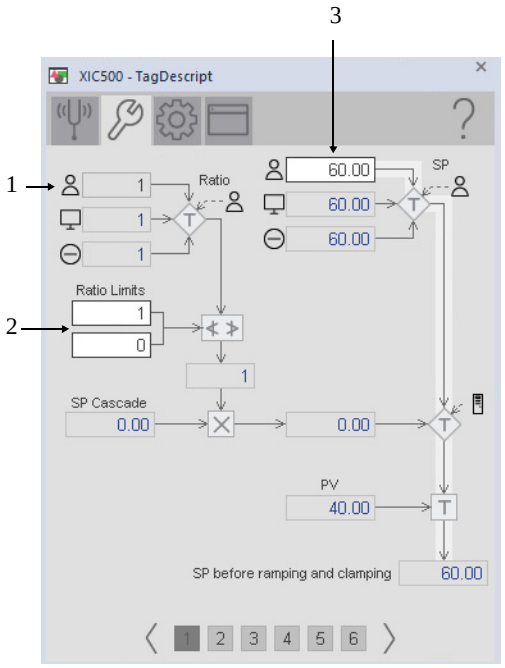
Item	Description
1	Enter new target setpoint.
2	Ramp Time
3	Stop setpoint ramping.
4	Calculated rate of change.
5	Start setpoint ramping.

Maintenance

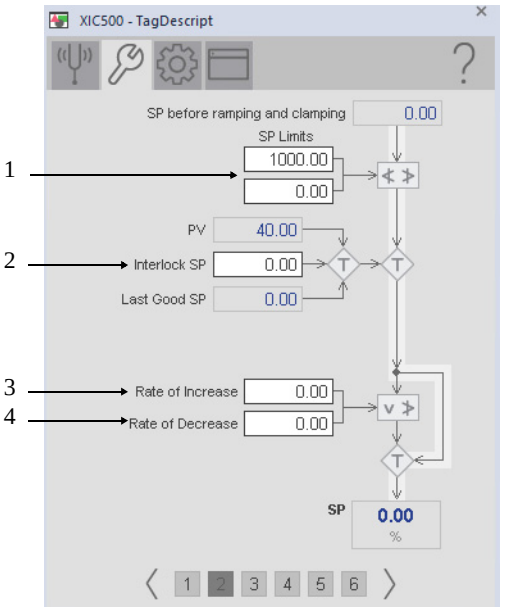


Item	Description
1	Threshold Name
2	Enter the threshold (trip point) for analog input alarms.
3	Enter the deadband (hysteresis) that applies to each alarm limit. Deadband helps prevent a noisy signal from generating numerous spurious alarms. **Example**: If the High alarm limit is 90.0 and the High alarm deadband is 5, once the signal rises above 90.0 and generates a High alarm. The signal must fall below 85.0 (90.0 minus 5.0) for the alarm to clear.
4	Select Yes to bypass checking of bypassable interlocks and permissives. Select No to enable checking of all interlocks and permissives.

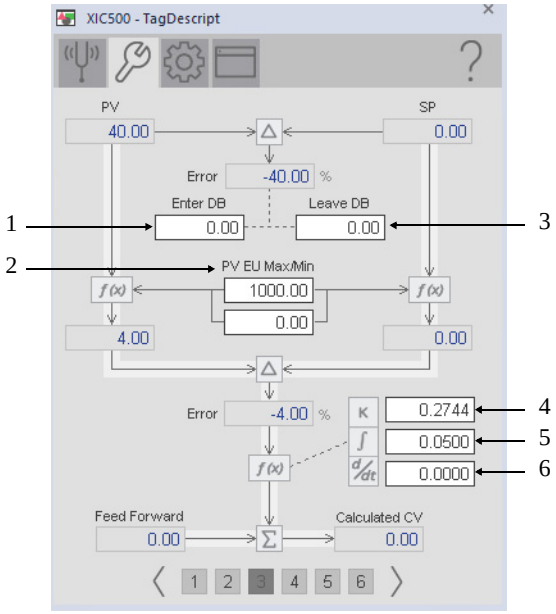
Advanced Maintenance



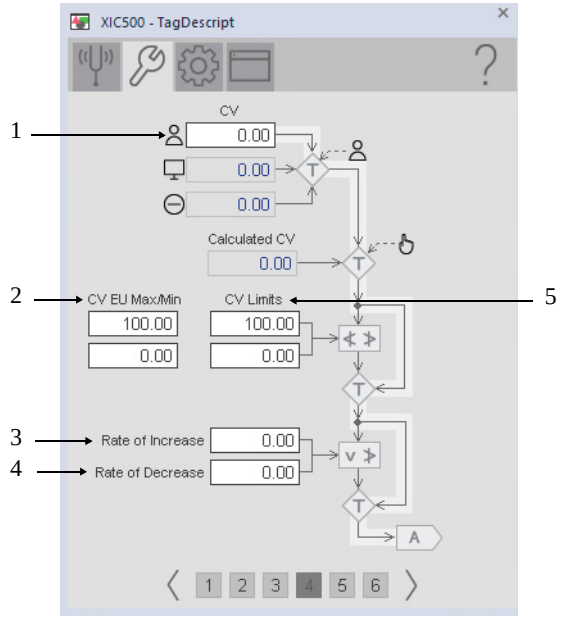
Item	Description
1	Enter the Operator ratio.
2	Enter the maximum and minimum limits for the ratio.
3	Enter the Operator Setpoint for the Operator Loop mode.



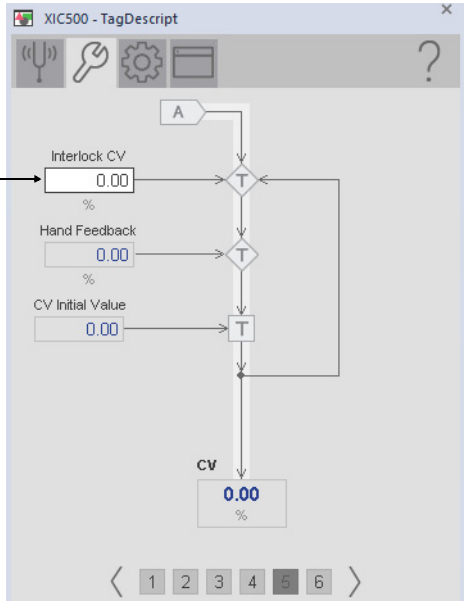
Item	Description
1	Enter the minimum and maximum limits for the setpoint
2	Enter the interlock setpoint.
3	Enter the setpoint rate of increase.
4	Enter the setpoint rate of decrease.



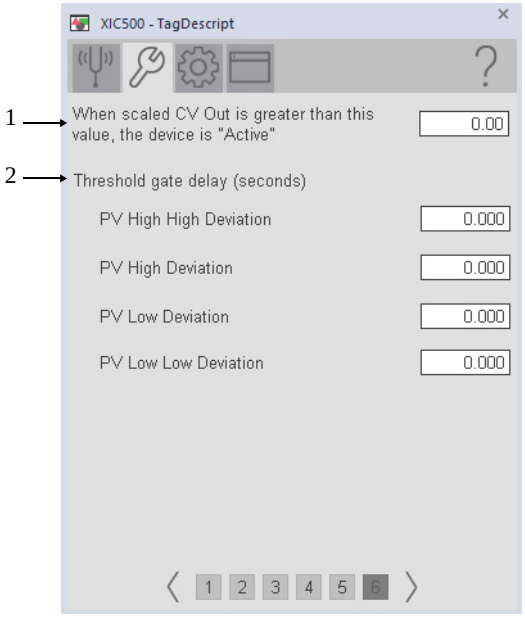
Item	Description
1	Enter the value for the zero-crossing deadband (in PV engineering units). When the loop error is less than the zero-crossing deadband, the loop output does not change.
2	Enter the maximum and minimum values of the PV range (span) (in PV engineering units). The maximum value must be greater than the minimum.
3	
4	Gains: Proportional This value depends on the setting of Cfg_Depend. If Cfg_Depend = 1 (dependent gains, the default), Enter the Controller Gain (unitless). This gain is applied to the Proportional, Integral, and Derivative terms. If Cfg_Depend = 0 (independent gains), Enter the Proportional Gain (unitless). This gain is applied to the Proportional term only. A value of zero in either case disables the Proportional term of the controller. Negative values are not valid.
5	Gains: Integral This value depends on the setting of Cfg_Depend. If Cfg_Depend = 1 (dependent gains, the default), Enter the Integral Time Constant (minutes pre-repeat). If Cfg_Depend = 0 (independent gains), Enter the Integral Gain (1/minutes). A value of zero in either case disables the Integral term of the controller. Negative values are not valid.
6	Gains: Derivative This value depends on the setting of Cfg_Depend. If Cfg_Depend = 1 (dependent gains, the default), Enter the Derivative Time Constant (minutes). If Cfg_Depend = 0 (independent gains), Enter the Derivative Gain (minutes). A value of zero in either case disables the Derivative term of the controller. Negative values are not valid.



Item	Description
1	Enter the operator CV (when the PID is in manual mode).
2	Enter the minimum and maximum CV engineering units. These are used for scaling the output.
3	Enter the values for the maximum rate of change for increasing CV.
4	Enter the values for the maximum rate of change for decreasing CV.
5	Enter the maximum allowed value of the CV in percent. The CV output is clamped not to exceed the entered value. This value must be less than or equal to 100.0 and greater than the CV Low Limit. Enter the minimum allowed value of the CV in percent. The CV output is clamped not to go below the entered value. This value must be greater than or equal to 0.0 and less than the CV High Limit.

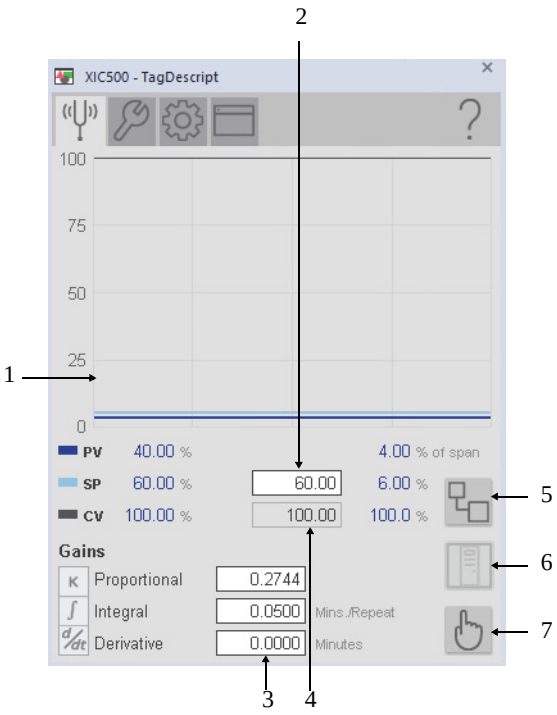


Item	Description
1	Enter the value in percent to output as the CV when an Interlock input is not OK. The CV is held at this value until the interlock inputs are OK (subject to interlock bypassing).



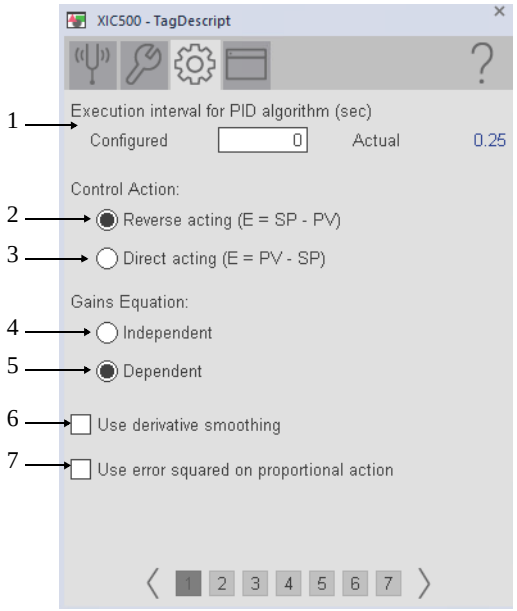
Item	Description
1	Enter the CV active threshold.
2	Process variable high high, high, low, and low low deviation threshold gate delay (seconds).

Tuning

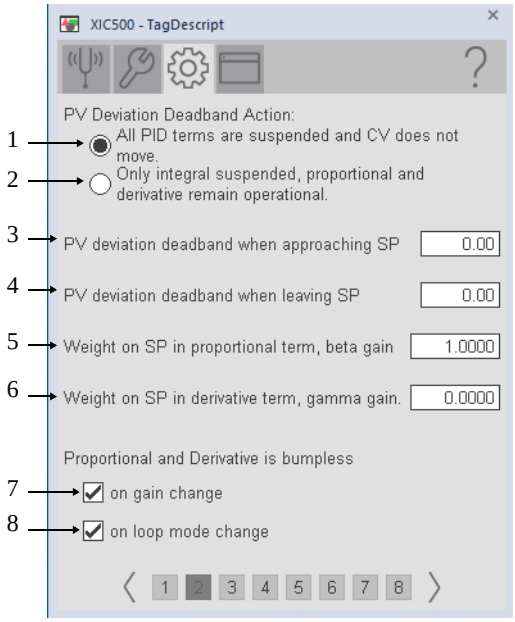


Item	Description
1	Trend display for Process Variable, Setpoint, and Controlled Variable.
2	Setpoint data entry.
3	Tuning constant entries.
4	Process variable data entry
5	Cascade loop mode.
6	Auto loop mode.
7	Manual loop mode.

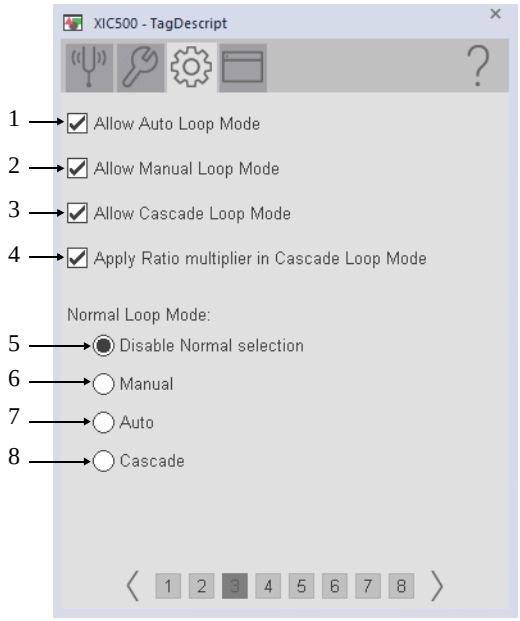
Engineering



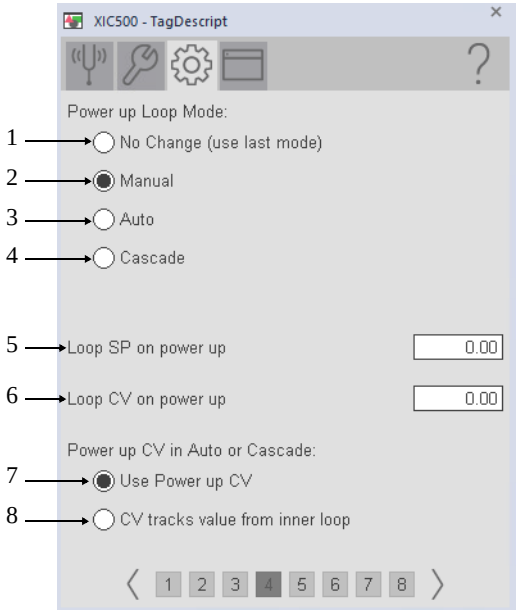
Item	Description
1	Enter the interval (in seconds) to execute the PID algorithm.
2	Select for reverse-acting loop response (default). When the PV increases, the CV (output) decreases.
3	Select for direct-acting loop response. When the PV increases, the CV (output) increases.
4	Select to use the Independent Gains form of the PID algorithm. Changes to the proportional gain do not affect integral or derivative response.
5	Select to use the Dependent Gains form of the PID algorithm (default). Changes to Cfg_PGain are applied as loop gain changes and affect proportional, integral, and derivative responses.
6	Select to enable derivative smoothing. Derivative smoothing can help reduce output jitter due to noise on the PV signal. Clear this checkbox to disable derivative smoothing. When derivative smoothing is disabled, it can result in quicker loop response at high derivative gain.
7	Select whether the error is squared on proportional action or not. Squaring the error minimizes the effect of a small error on the output.



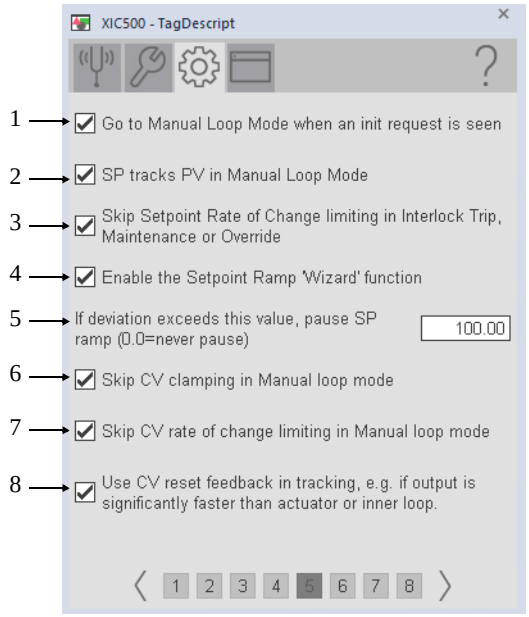
Item	Description
1	If the PV derivative deadband is exceeded, PID will stop processing the error calculation and the CV will freeze.
2	If the PV derivative deadband is exceeded, the integral portion of the error calculation will be suspended. The error calculation will continue and the CV will be updated.
3	Enter the value for PV deviation when the CV is approaching SP. A lower deadband will allow for less deviation in the PV. If the deviation deadband is reached, action will be taken according to items #1 or #2.
4	Enter the value for PV deviation when the CV is leaving the SP. A lower deadband will allow for less deviation in the PV. If the deviation deadband is reached, action will be taken according to items #1 or #2.
5	Enter value for beta gain. This is the weight (multiplier) of the proportional gain. If beta is set to 0.0, the proportional gain has value. If beta is set to 1.0, the proportional gain has full effect. This is configurable from 0.0 to 1.5.
6	Enter value for gamma gain. This is the weight (multiplier) of the derivative gain. If gamma is set to 0.0, the derivative gain has value. If beta is set to 1.0, the derivative gain has full effect. This is configurable from 0.0 to 1.5.
7	Select whether the CV response to the proportional and derivative gains is bumpless or not.
8	Select if the proportional and derivative is bumpless during a loop mode change. This is only enabled when the integral gain is set to 0



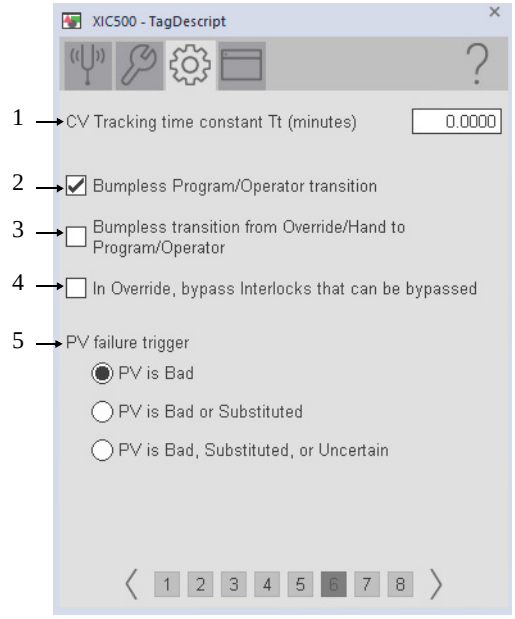
Item	Description
1	Select to enable Auto Loop mode.
2	Select to enable Manual Loop mode.
3	Select to enable Cascade Loop mode.
4	Select to enable ratio multiplier in Cascade mode.
5	Select to disable normal loop made selection
6	Select to choose manual as the normal loop mode
7	Select to choose auto as the normal loop mode
8	Select to choose cascade as the normal loop mode.



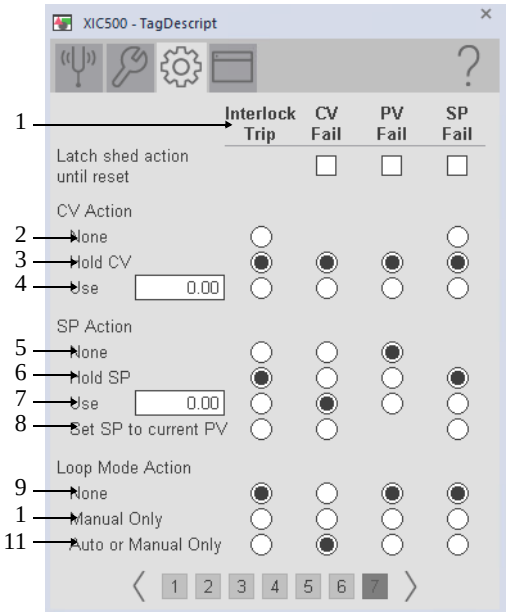
Item	Description
1	Select to keep the Loop mode what it was at powerdown.
2	Select to set the Loop mode to Manual on powerup.
3	Select to set the Loop mode to Auto on powerup.
4	Select to set the loop mode to Cascade on powerup.
5	Enter a value to apply to the loop CV (in percent) on controller powerup. The CV is set to this value on controller powerup in Run mode and on controller transition from Program mode to Run mode.
6	Enter a value to apply to the loop setpoint (in PV engineering units) on controller powerup. The setpoint is set to this value on controller powerup in Run mode and on controller transition from Program mode to Run mode.
7	Select to set the loop mode to the Normal loop mode on powerup.



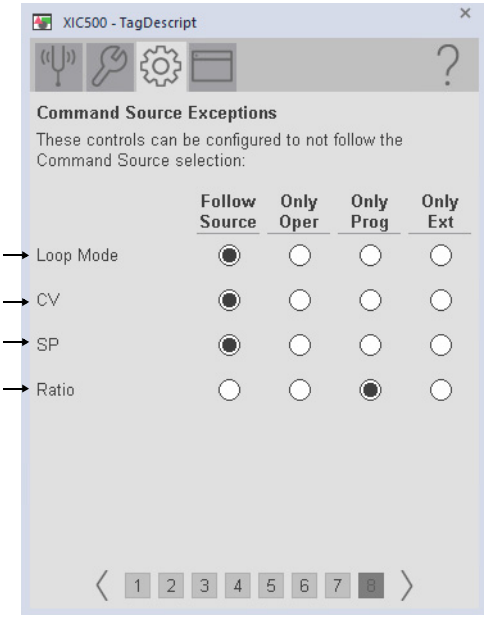
Item	Description
1	Select to set the Loop mode to Manual when the Use CVInit Value input is true. The loop is left in manual with the CV at the initialization value when the initialization request clears. Clear this checkbox to leave the loop in its current mode on an initialization request. When the initialization request clears, the loop resumes controlling in its previous mode.
2	Select to have the current PV copied to the SP (track) whenever the loop is in Manual mode.
3	Select to skip the setpoint rate of change limiting in Interlock Trip, Maintenance, or Override.
4	Select to allow navigation to the setpoint Ramp Wizard Display from the Operator tab.
5	Enter a value for maximum deviation between SP and PV. If the deviation exceeds this value, the SP ramp pauses until the PV returns to a value within the set deviation.
6	Select to disable CV clamping during Manual mode.
7	Select to disable CV rate of change during Manual mode.
8	Select to enable CV reset feedback tracking. This keeps the CV from ramping if the output device or inner loop is significantly slower.



Item	Description
1	Enter gain for CV tracking.
2	Select so that when this parameter is: • On, the operator settings track the program settings when command source is Program, and program settings track the operator settings when the command source is Operator. Transition between command sources is bumpless. • Off, the operator settings and program settings retain their values regardless of command source. When the command source is changed, the value of a limit can change, such as from the Programset value to the Operator-set value.
3	Select so that Program and operator settings track when the command source is Hand or Override.
4	Select to bypass Interlocks that can be bypassed while in Override command source.
5	Select the PV failure trigger.



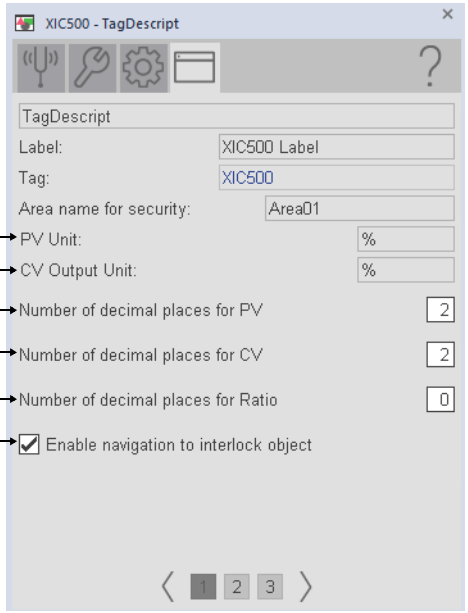
Item	Description
1	Possible Failures
2	For the given failure, do not change the CV operation, keep controlling.
3	For the given failure, hold the CV at the current value.
4	For the given failure, set the CV to the configured value.
5	For the given failure, do not change the SP operation.
6	For the given failure, hold the SP at the current value.
7	For the given failure, set the SP to the configured value.
8	For the given failure, have SP track the current PV value.
9	For the given failure, keep current loop mode.
10	For the given failure, set the loop mode to manual.
11	For the given failure, If loop made is cascade set to auto.



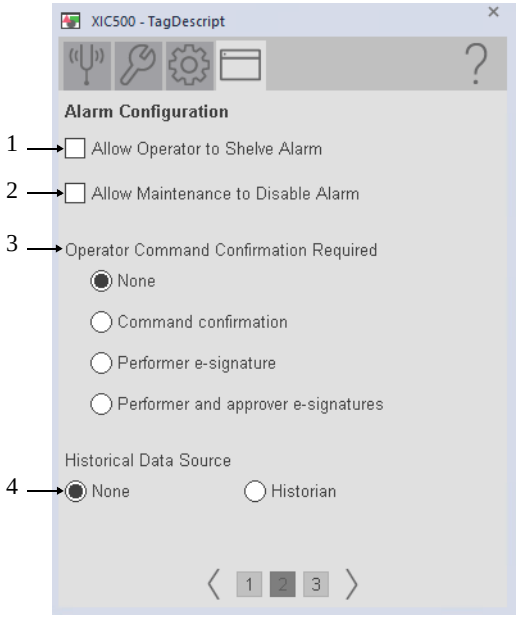
Item	Description
1	Select to keep control of loop mode commands with the Operator, Program, External, or Follow the Source even if the instruction is in Program mode.
2	Select to keep control of the controlled variable quantity setting with the Operator, Program, External, or Follow the Source even if the instruction is in Program mode.
3	Select to keep control of the setpoint settings with the Operator, Program, External, or Follow the Source even if the instruction is in Program mode.
4	Select to keep control of the ratio settings with the Operator, Program, External, or Follow the Source even if the instruction is in Program mode.

HMI Configuration

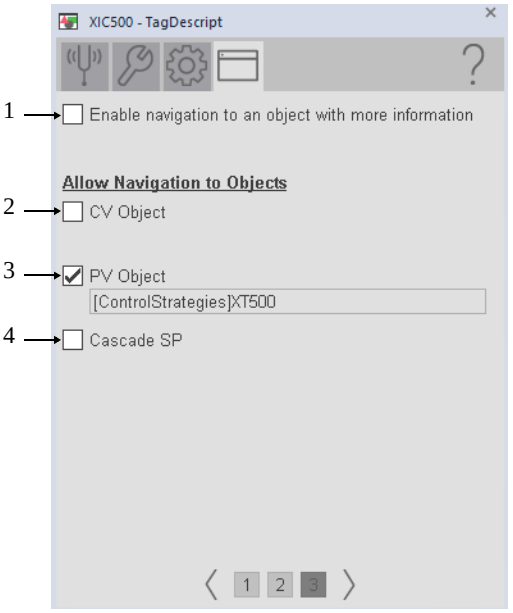
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Enter the PV engineering units for display on the HMI.
2	Enter the CV engineering units for display on the HMI. Percent (%) is the default
3	Enter in the number of decimal places that are displayed for the Process Variable
4	Enter in the number of decimal places that are displayed for the Control Variable
5	Enter the number of decimal places that are displayed for the ratio (cascade)
6	Select to enable navigation to the Interlock object.



Item	Description
1	Select to allow Operator to shelve alarm.
2	Select to allow Maintenance to disable alarm.
3	Select to configure operator command confirmation. This action would take place after any operator command.
4	Select to configure if a Historical data source will be used or not.



Item	Description
1	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.
2	Select to enable navigation to the CV object.
3	Select to enable navigation to the PV object.
4	Select to enable navigation to Cascade SP object.

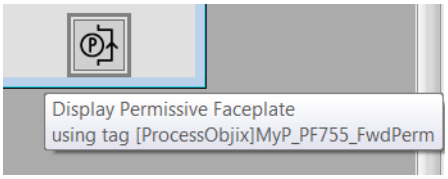
Process Permissive (PPERM) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PPERM		Standard Permissive Global Object.

Permissive States

Image	Description
	Not ready to run or energize. One or more permissive conditions are not OK.
	Ready to run or energize. One or more conditions that can be bypassed are not OK, but these conditions are bypassed. All conditions that cannot be bypassed are OK.
	Ready to run or energize. All permissive conditions are OK.
	Ready to run or energize, and all permissive conditions are OK, conditions that can be bypassed are being bypassed and the equipment is not shut down.

The overall graphic symbol includes a touch field over it that opens the faceplate. Hover the pointing device over the graphic symbol to display a tooltip that describes the function of the symbol.



Process Permissive (PPERM) Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator

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

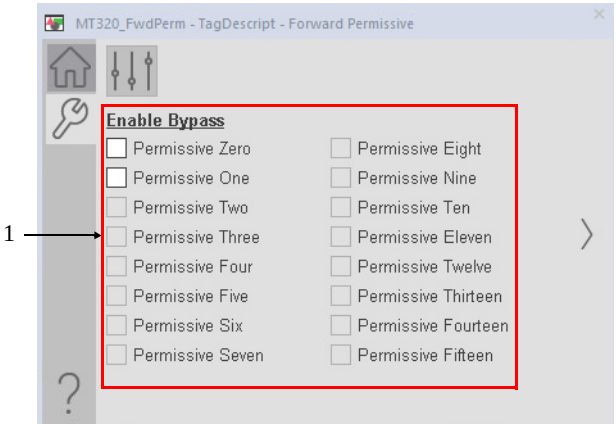
- The Operator tab shows the following information:
- Permissive bypass status indicator (Enabled, Bypassed)

Each configured permissive along with the current state of the permissive

If navigation is enabled, Select the condition to open the faceplate of the object that is associated with the condition.

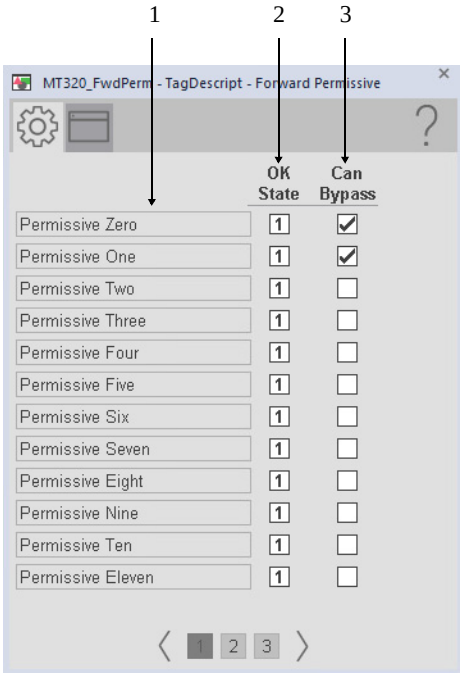


Maintenance



Item	Description
1	Select an active permissive, one that has a white checkbox, to enable bypass of that individual permissive.

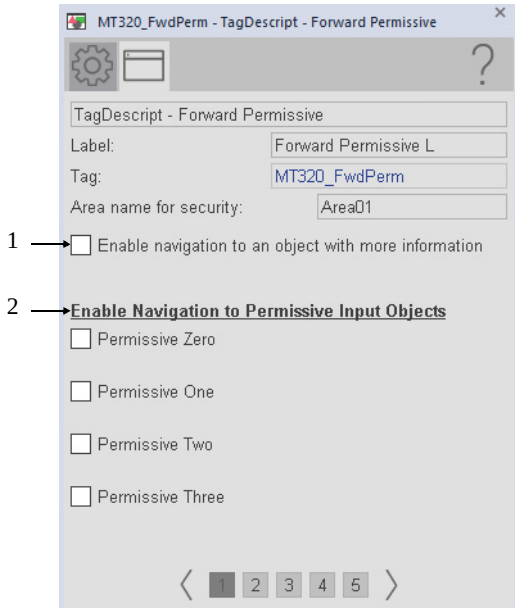
Engineering



Item	Description
1	Enter the text description of each permissive condition used. Only the permissives with text entered appear on the Operator tab of the faceplate.
2	Selects the state of the corresponding permissive that is the OK to Run state.
3	Select to indicate that the corresponding permissive can be bypassed.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an object backing tag or a UDT tag that has Instruction and Library defined.
2	Select to allow navigation to Permissive Input objects.

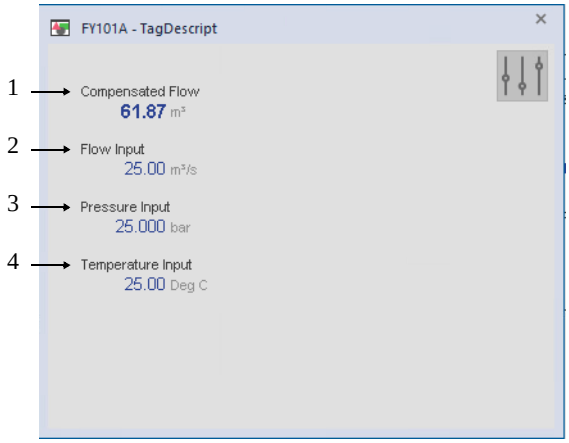
Process Pressure/ Temperature Compensated Flow (PPTC) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PPTC		Standard pressure / temperature compensated flow graphic symbol

Process Pressure/ Temperature Compensated Flow (PPTC) Faceplates

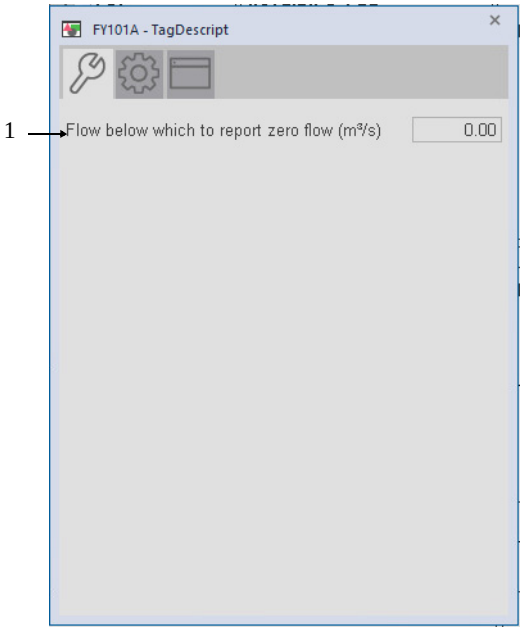
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



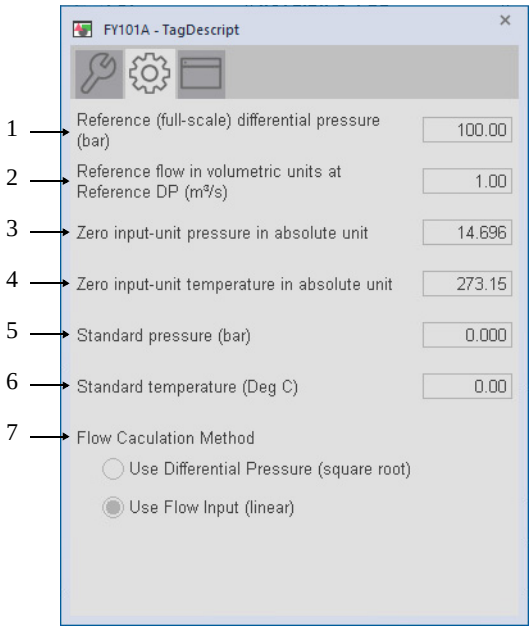
Item	Description
1	The compensated flow (at standard temperature and pressure).
2	Actual (measured) uncompensated flow in volumetric units.
3	The actual (measured) pressure. Can be absolute or common units.
4	The actual (measured) temperature.

Advanced Maintenance



Item	Description
1	Enter the flow value. Any flow below this value will be reported as 0.

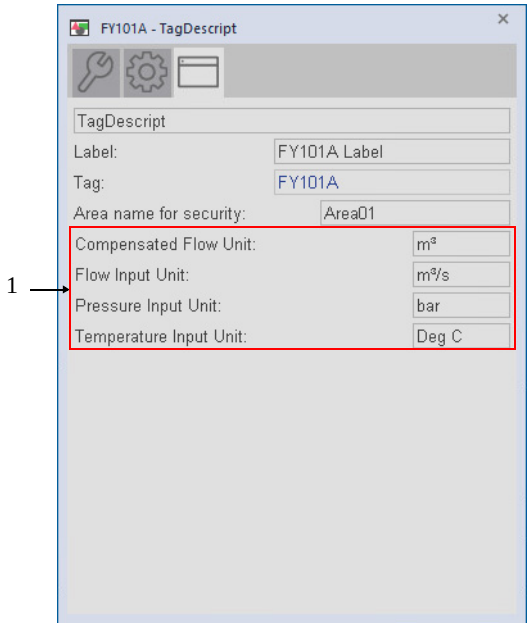
Engineering



Item	Description
1	Enter the full-scale differential pressure reference.
2	Enter the flow at the reference differential pressure.
3	Enter the zero input-unit pressure. This is the pressure offset (usually 14.696 PSIA).
4	Enter the zero input-unit temperature. This is the temperature offset (usually 273.15 K or 459.67 Rankine).
5	Enter the standard pressure value.
6	Enter the standard temperature value.
7	Select the flow calculation method.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Displays units

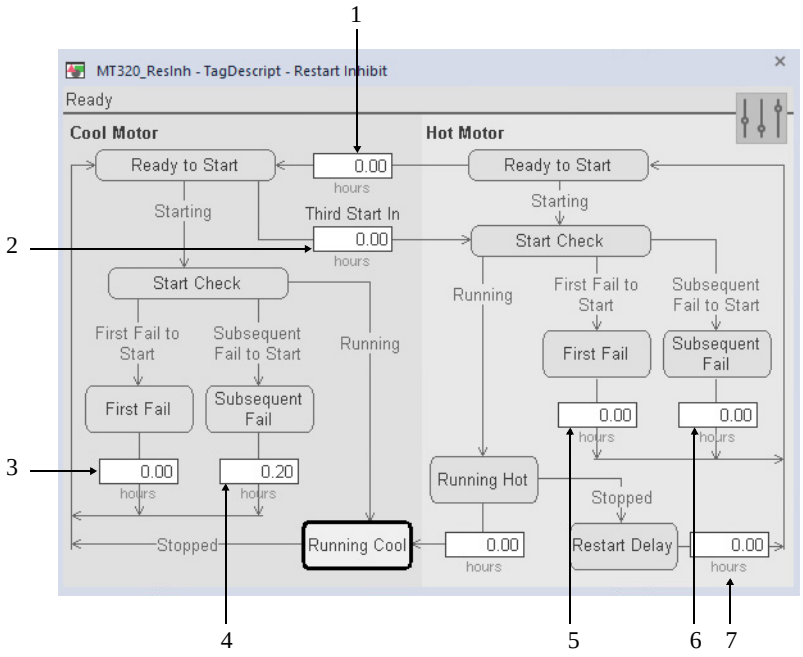
Process Restart Inhibit (PRI) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PRI		Standard Restart Inhibit Graphic Symbol.

Process Restart Inhibit (PRI) Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



Item	Description
1	Enter the time, in hours, for a stopped hot motor to cool.
2	Enter the time, in hours, during which three motor starts turn a cold motor to hot.
3	Enter the time, in hours, to wait after failing to start a cold motor the first time.
4	Enter the time, in hours, to wait after failing to start a cold motor two or more times.
5	Enter the time, in hours, to wait after failing to start a hot motor the first time.
6	Enter the time, in hours, to wait after failing to start a hot motor two or more times.
7	Enter the time, in hours, to wait after stopping a running hot motor.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



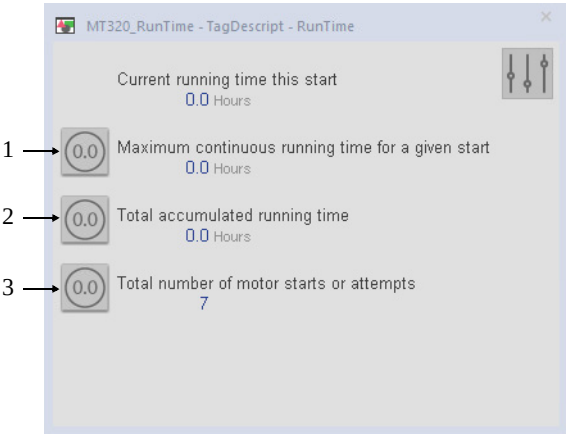
Process Run Time (PRT) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PRT		Standard Run Time Graphic Symbol.

Process Run Time (PRT) Faceplates

There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

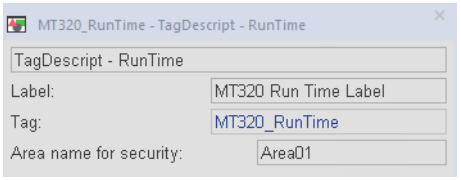
Operator



Item	Description
1	Select to clear maximum continuous running time for any given start.
2	Select to clear total running time.
3	Select to clear total number of motor starts or start attempts.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



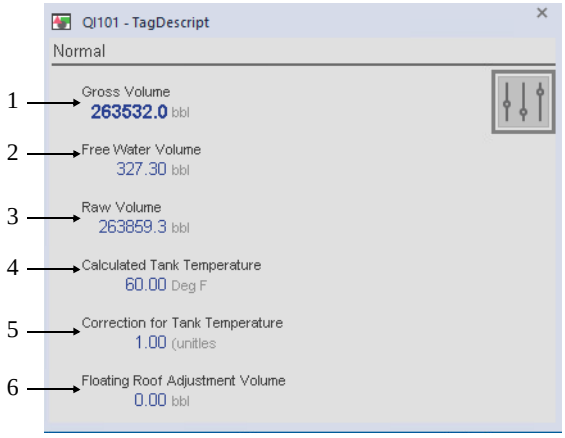
Process Tank Strapping Table (PTST) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PTST	sssssssssssssssssss ###### ssssssss	Standard tank strapping table graphic symbol

Process Tank Strapping Table (PTST) Faceplates

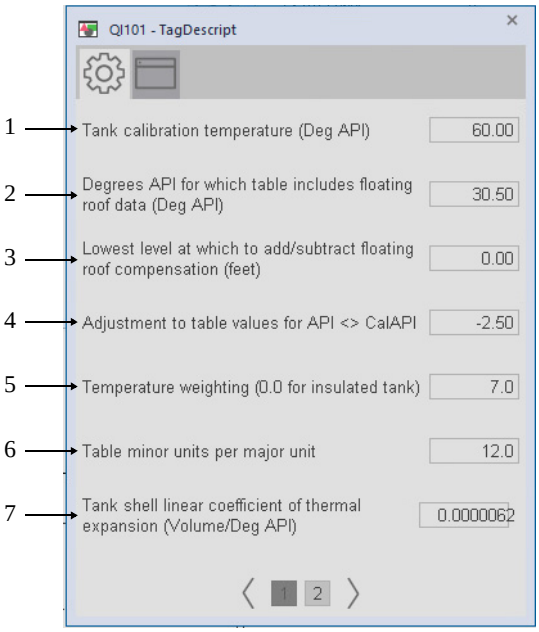
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator

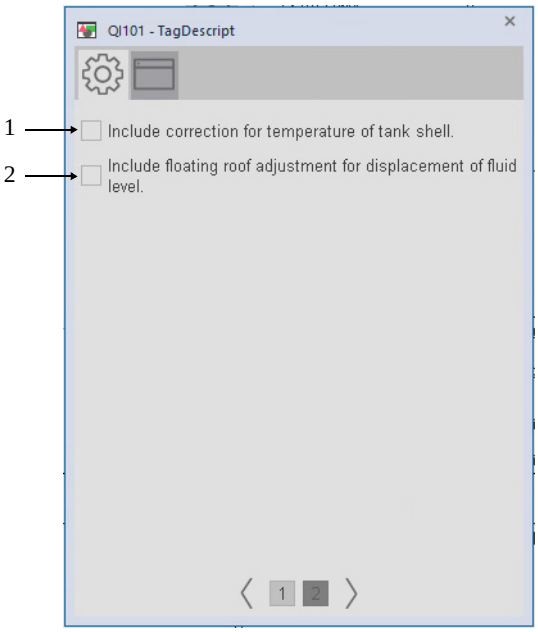


Item	Description
1	Displays gross tank volume.
2	Displays free water volume.
3	Displays raw (observed) volume.
4	Displays calculated tank temperature.
5	Displays correction for tank temperature
6	Displays floating roof adjustment volume

Engineering



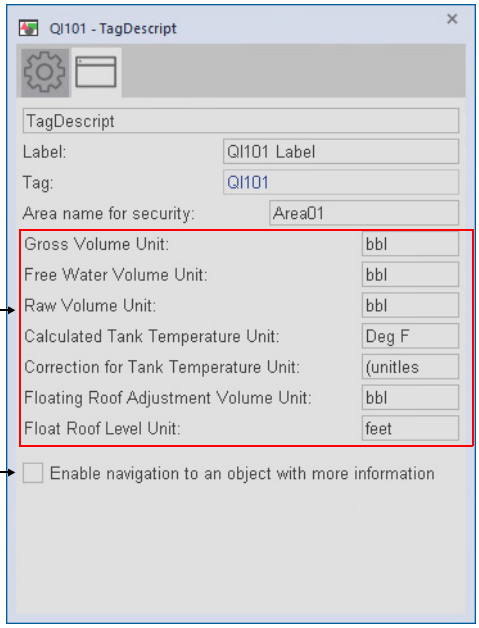
Item	Description
1	Enter temperature of tank calibration (typically 60 F or 15 C)
2	Enter degrees API for which the table includes floating roof data.
3	Enter the lowest level at which to add or subtract floating roof compensation.
4	Enter adjustment to table values for API <> CalAPI (volume/degress API, typically a negative number).
5	Enter temperature weighting (0.0 for insulated tank). See API MPMS 2.2A Appendix D.
6	Enter table minor units in inches, cm, mm, per major unit (feet or meters). Enter 0.0 if minor units are not used.
7	Enter tank shell linear coefficient of thermal expansion (1 per degree Fahrenheit or 1 per Celsius).



Item	Description
1	Select to include the tank shell temperature correction.
2	Select to include the floating roof adjustment for calculating fluid level.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Display units
2	Select to enable navigation to another object as a reference.

Process Valve (PVLV)

The PVLV Add-On Instruction can be configured to be a Hand Operated, Motor Operated, or Solenoid Operated valve.

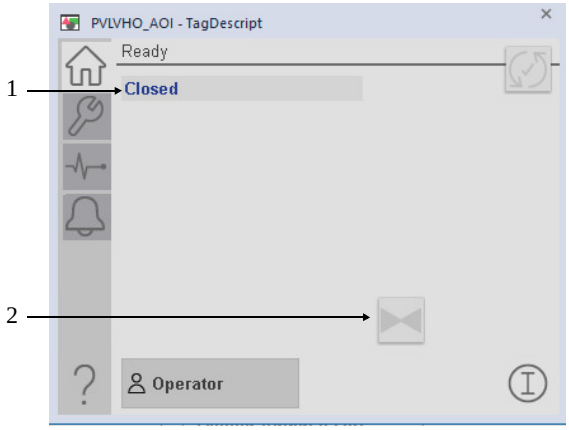
Process Valve (PVLV) Graphic Symbols (Configured as Hand Operated Valve)

Graphic Symbol Name	Graphic Symbol	Description
GO_PVLV_H0 GO_PVLV_H01 GO_PVLV_H02 GO_PVLV_H03	   	Hand-operated Valves that are shown in various orientations.

Process Valve (PVLV) Faceplates (Configured as Hand Operated Valve)

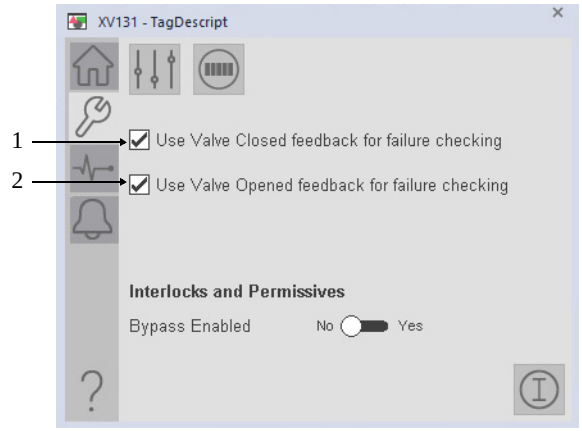
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



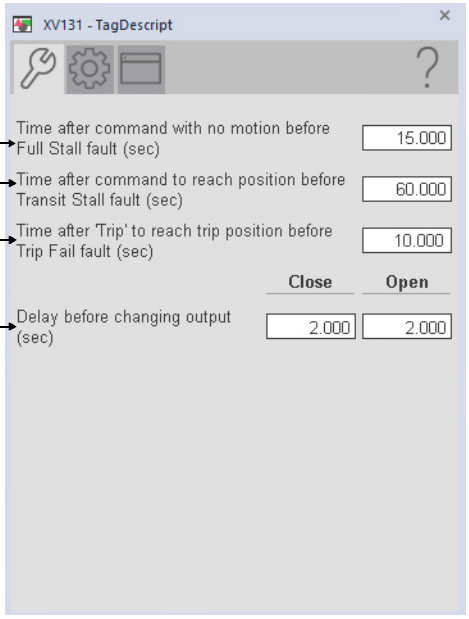
Item	Description
1	Valve state indicator.
2	Select to trip the valve "Open" or "Closed" depending on the valve configuration.

Maintenance



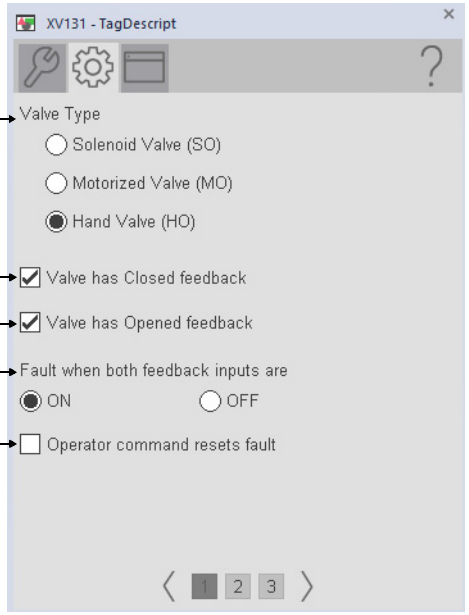
Item	Description
1	Select to configure the valve to use the closed limit switch. Clear the checkbox to bypass the closed limit switch temporarily.
2	Select to configure the valve to use the open limit switch. Clear the checkbox to bypass the closed limit switch temporarily.

Advanced Maintenance

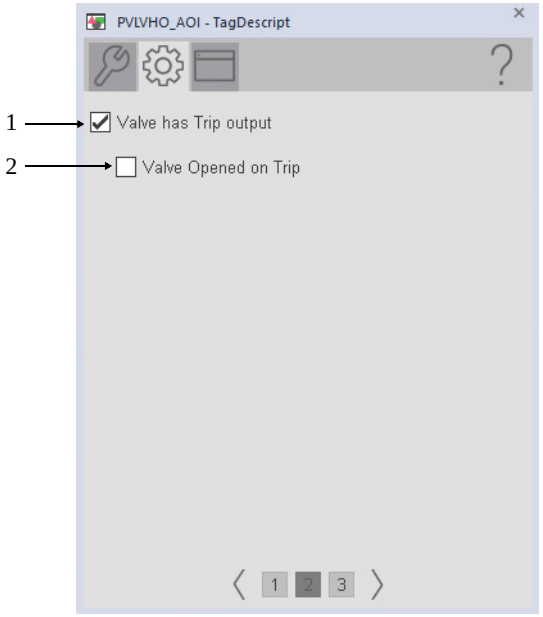


Item	Description
1	Enter the amount of time with no motion after a command for an alarm to occur.
2	Enter the amount of time that the valve is not confirmed open or closed before a Transit Stall.
3	Enter the amount of time to allow the valve to reach its trip position after a trip command is received before raising a trip fail alarm.
4	Enter the amount of time after receiving a command to open or close the valve before changing the outputs to actually move the valve (command delay).

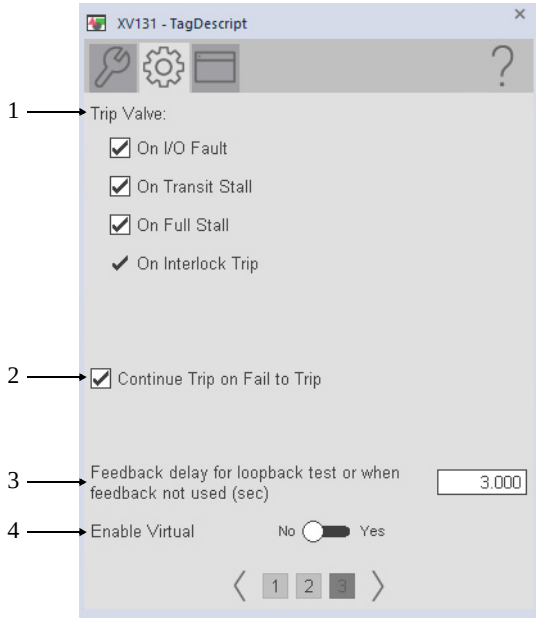
Engineering



Item	Description
1	Select the Valve type.
2	Select if the valve has Closed feedback.
3	Select if the valve has Open feedback.
4	Select 'ON' if both limit switches are OFF when the valve is moving in normal operation. Select 'OFF' if both limit switches are ON when the valve is moving in normal operation. This selection determines which limit switch combination indicates abnormal operation.
5	Select to allow the operator trip command to reset any previous faults (I/O fault, fail to trip, interlock trip), then trip the valve. Clear this checkbox to reset faults with only the reset command.



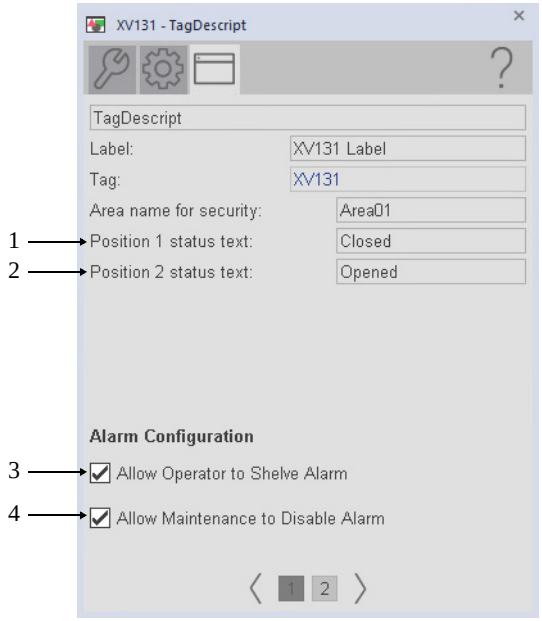
Item	Description
1	Select if a trip output is connected to the PVLV instruction to trip the valve on an interlock or trip command. This selection makes the trip command button visible on the operator tab.
2	Select if triggering the trip output causes the valve to open. Clear the checkbox (default) if triggering the trip output causes the valve to close. **Note**: This generally corresponds to the "fail" or "spring return**"** position of the valve. selected for a "fail open" valve or cleared for a "fail closed" valve.



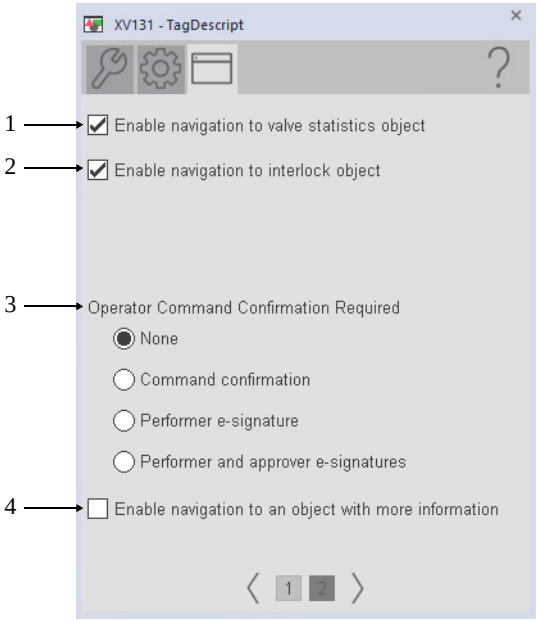
Item	Description
1	Select the options for when to send the trip output to the valve if a fault is detected. Clear this checkbox to show only the fault status/alarm and not trip the valve if a fault is detected. The valve always trips on an interlock trip. This item cannot be cleared. It is displayed as a reminder that the interlock trip function always trips the valve.
2	Select to keep sending the trip output to the valve on a trip, even if position feedback does not confirm the valve reached the trip position. Clear this checkbox to stop sending the trip output to the valve when the valve trip times out and the fail to trip status is set.
3	Configure the amount of time the valve status shows 'tripping' before showing an opened or closed status when the valve is tripped and I/O are being simulated.
4	Enable or disable virtual mode.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

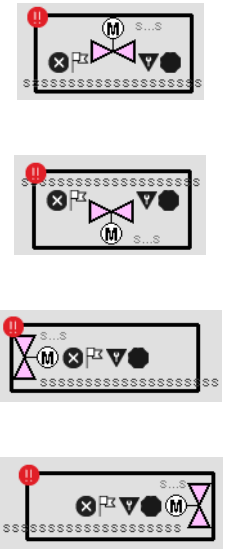


Item	Description
1	Displays the text for Position 1.
2	Displays the text for Position 2.
3	Select to allow Operator to shelve alarm.
4	Select to allow Maintenance to disable alarm.



Item	Description
1	Select if the Valve Stats instruction. For example, PVLVS is used with this device. This check adds a button to the faceplate that opens the Valve Stats faceplate. **IMPORTANT**: The name of the Valve Statistics object in the controller must be the name of the object with the suffix '_ValveStats'. For example, if your PVLV object has the name 'ValveH0123', then its valve statistics object must be named 'ValveH0123_ValveStats'.
2	Select if an Interlock object is used with this valve. This check changes the Interlock indicator to a clickable button to open the Interlock faceplate. **IMPORTANT**: The name of the interlock object in the controller must be the name of the object with the suffix '_Intlk'. For example, if your PVLV object has the name 'ValveH0123', then its interlock object must be named 'ValveH0123_Intlk'.
3	Select to configure operator command confirmation. This action would take place after any operator command.
4	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.

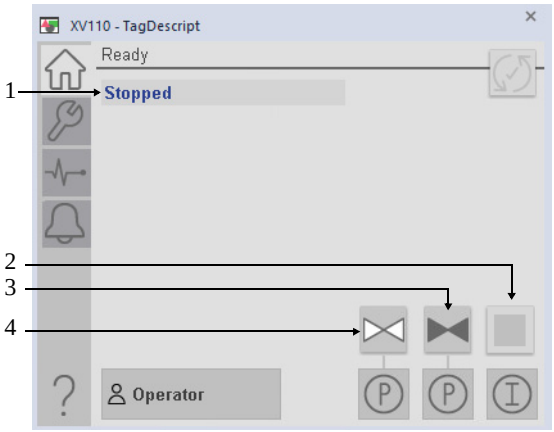
Process Valve (PVLV) Graphic Symbols (Configured as Motorized Valve)

Graphic Symbol Name	Graphic Symbol	Description
GO_PVLV_M0 GO_PVLV_M01 GO_PVLV_M02 GO_PVLV_M03		Standard motor-operated valves that are shown in various orientations.

Process Valve (PVLV) Faceplates (Configured as Motorized Valve)

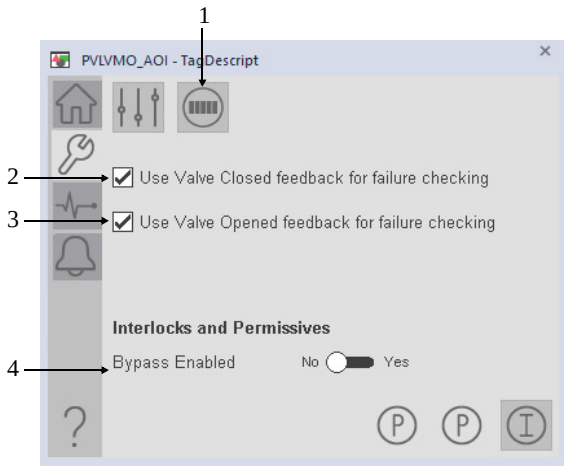
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



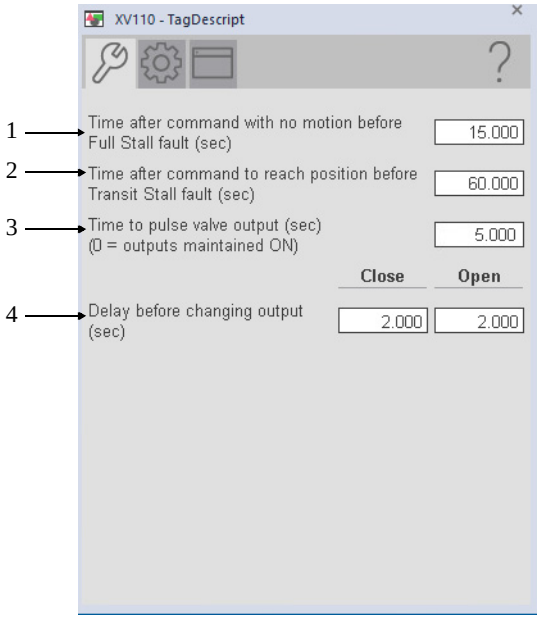
Item	Description
1	Valve state indicator.
2	Select to issue the valve Stop command.
3	Select to open valve.
4	Select to close valve.

Maintenance



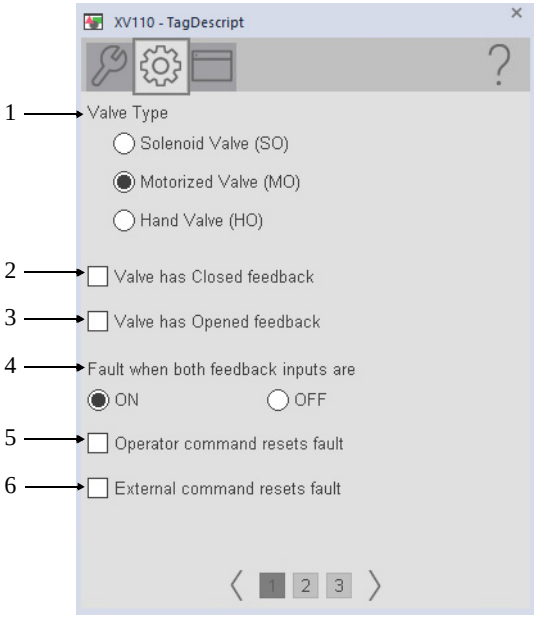
Item	Description
1	Select to open the Valve Statistics faceplate.
2	Select to use Valve Closed feedback for failure checking.
3	Select to use Valve Opened feedback for failure checking.
4	Select yes to bypass checking of interlocks and permissives that can be bypassed.

Advanced Maintenance

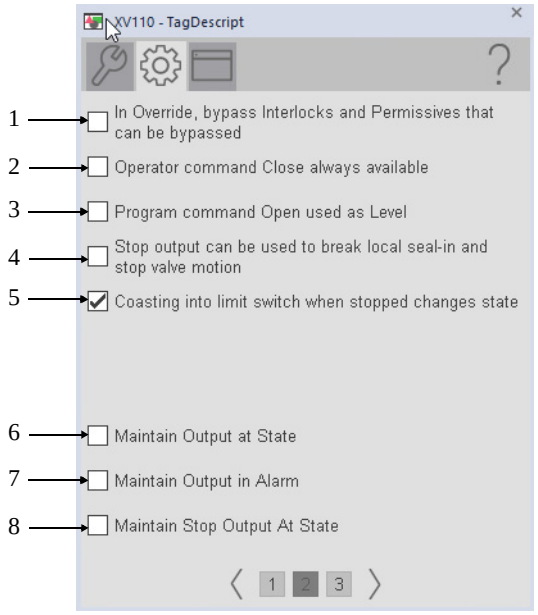


Item	Description
1	Enter the amount of time with no motion after a command for an alarm to occur.
2	Enter the amount of time (in seconds) that the valve is not confirmed open or closed before a Transit Stall.
3	Enter the amount of time to pulse outputs to the valve (in seconds). Enter 0 if outputs to the valve should be maintained on indefinitely once energized.
4	Enter the amount of time after receiving a command to open or close the valve before changing the outputs to actually move the valve (command delay).

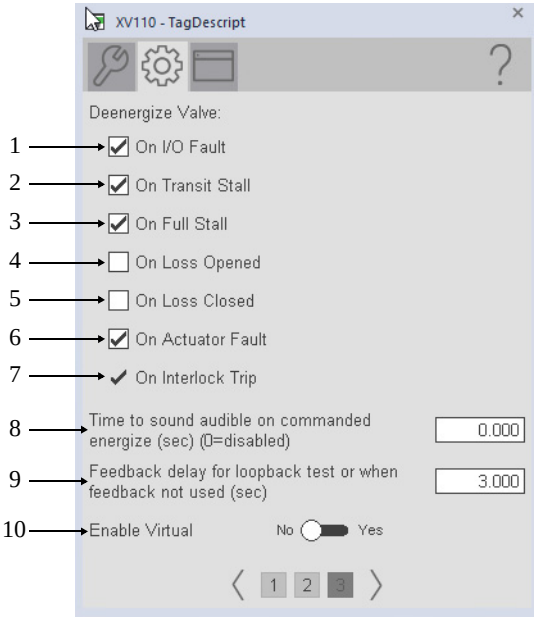
Engineering



Item	Description
1	Select the Valve type.
2	Select if the valve has Closed feedback.
3	Select if the valve has Opened feedback.
4	Select 'ON' if both limit switches are OFF when the valve is moving in normal operation. Select 'OFF' if both limit switches are ON when the valve is moving in normal operation. This selection determines which limit switch combination indicates abnormal operation.
5	Select to allow operator commands to reset any previous faults (I/O fault, fail to trip, interlock trip), then move the valve. Clear this checkbox to reset faults with only the reset command.
6	Select to allow External commands to reset any previous faults (I/O fault, transit stall, full stall, interlock trip), then move the valve. Clear this checkbox to reset faults by using only the reset command



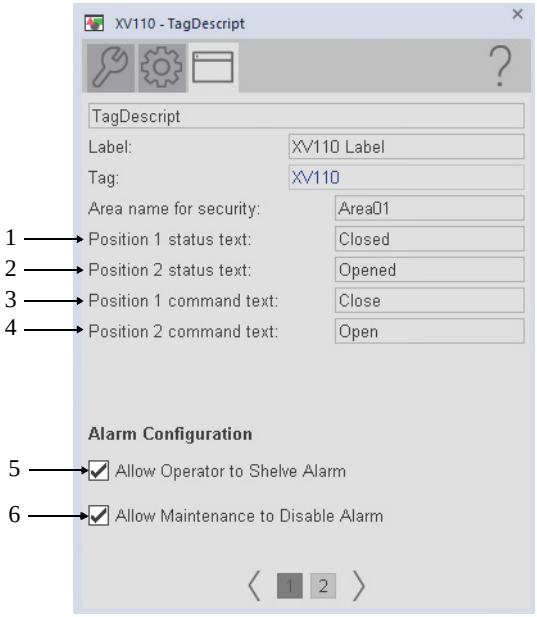
Item	Description
1	When selected, the bypassable interlocks and permissives are bypassed when Override command source is selected. When the checkbox is cleared, the bypassable interlocks and permissives are enforced in Override.
2	When selected, the Operator command button to close the valve is available even when a command source other than Operator or Maintenance is selected. When the checkbox is cleared, the Operator close command button is only enabled in Operator or Maintenance command source.
3	When selected, the Program open command pin is treated as a level input: when 1, the valve is commanded to open, and when 0 the valve is commanded to close. When the checkbox is cleared, the Program commands follow the normal command convention: write a 1 to the Program open command to open the valve, and write a 1 to the Program close command to close the valve
4	When selected, the valve Stop command is enabled and commanding the valve in the opposite direction while moving is permitted. When the checkbox is cleared, the valve Stop command is hidden, and a valve command to the opposite direction is not accepted while the initial move is in progress.
5	When selected, if the valve is stopped and limit switches subsequently indicate the valve has reached the opened or closed position, the valve state changes to opened or closed, as appropriate. When the checkbox is cleared, if the valve is stopped, the state shows stopped until the valve is commanded to a position, even if limit switch inputs change state.
6	When selected, outputs are maintained on, even when the valve reaches the target position. When the checkbox is cleared, outputs are turned off once the valve reaches the target position.
7	When selected, outputs are maintained on when a valve has a full stall (failed to move) or transit stall (failed to reach target position). When the checkbox is cleared, outputs are turned off when a valve stall occurs.
8	When selected, the stop output is maintained, even if the valve coasts into the opened or closed position. When the checkbox is cleared, the stop output is cleared if the valve coasts into the opened or closed position after a stop is commanded.



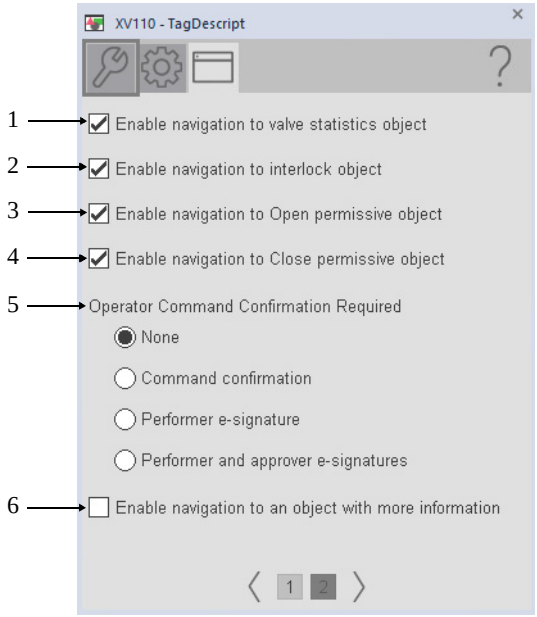
Item	Description
1	Select to send a stop output to the valve and clear the Open and Close outputs when an I/O Fault condition occurs. Clear this checkbox to keep the outputs to the valve in their current state on an I/O Fault condition. **IMPORTANT**: When this checkbox is selected and an I/O Fault condition occurs, a reset is required before the valve can be energized.
2	Select to send a stop output to the valve and clear the Open and Close outputs when a Transit Stall condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Transit Stall condition. (A Transit Stall means the valve, when commanded to move, moved off its original position, but did not reach its commanded position before the Transit Stall time expired.) **IMPORTANT**: When this checkbox is selected and a Transit Stall condition occurs, a reset is required before the valve can be energized.
3	Select to send a stop output to the valve and clear the Open and Close outputs when a Full Stall condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Full Stall condition. (A Full Stall means the valve, when commanded to move, did not move off its original position before the Full Stall time expired.) **IMPORTANT**: When this checkbox is selected and a Full Stall condition occurs, a reset is required before the valve can be energized.
4	Select to send a stop output to the valve and clear the Open and Close outputs when a Loss of Open Position condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Loss of Open Position condition. (A Loss of Open Position means the valve was commanded to open, reached the open position as confirmed by the limit switches, and subsequently moved off the open position.) **IMPORTANT**: When this checkbox is selected and a Loss of Open Position condition occurs, a reset is required before the valve can be energized.
5	Select to send a stop output to the valve and clear the Open and Close outputs when a Loss of Closed Position condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Loss of Closed Position condition. (A Loss of Closed Position means the valve was commanded to close, reached the closed position as confirmed by the limit switches, and subsequently moved off the closed position.) **IMPORTANT**: When this checkbox is selected and a Loss of Closed Position condition occurs, a reset is required before the valve can be energized.
6	Check to send a stop output to the valve and clear the Open and Close outputs when an Actuator Fault condition occurs. Clear this checkbox to keep the outputs to the valve in their current state on an Actuator Fault condition. **IMPORTANT**: When this checkbox is selected and an Actuator Fault condition occurs, a reset is required before the valve can be energized.
7	The device always de-energizes on an interlock trip. This item cannot be unchecked. It is displayed as a reminder that the interlock trip function always causes the valve to de-energize.
8	Enter the seconds to sound an audible alarm when the valve energizes.
9	Enter the time delay (in seconds) for the opened or closed status to be echoed back when Simulation is enabled or when limit switch feedback is not used.
10	Enable or disable virtual mode.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

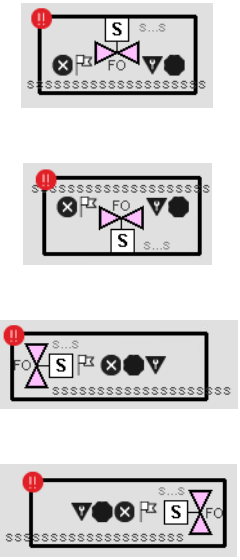


Item	Description
1	Displays the text for Position 1.
2	Displays the text for Position 2.
3	Displays the command text for Position 1.
4	Displays the command text for Position 2.
5	Select to allow Operator to shelve alarm.
6	Select to allow Maintenance to disable alarm.



Item	Description
1	Check if a Valve Stats object is used with this valve. This action makes the Valve Statistics button visible on the Maintenance faceplate; Select this button to open the Valve Statistics faceplate for this valve. **IMPORTANT**: The name of the ValveStats object in the controller must be the name of the object with the suffix '_ValveStats'. For example, if your PVLV object has the name 'ValveM0123', then its Valve Stats object must be named 'ValveM0123_ValveStats'.
2	Select if an interlock instruction is used with this output. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_IntlK'. For example, if your PVLV object has the name 'ValveM0123', then its Interlock object must be named 'ValveM0123_IntlK'
3	Select if you have a PPERM instruction that is used with this valve for Open Permissives. This action changes the Permissive indicator to a clickable button to open the Permissive faceplate. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_OpenPerm'. For example, if your PVLV object has the name 'ValveM0123', then its Permissive object must be named 'ValveM0123_OpenPerm'.
4	Select if you have a PPERM instruction that is used with this valve for Close Permissives. This action changes the Permissive indicator to a clickable button to open the Permissive faceplate. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_ClosePerm'. For example, if your PVLV object has the name 'ValveM0123', then its Permissive object must be named 'ValveM0123_ClosePerm'.
5	Select to configure operator command confirmation. This action would take place after any operator command.
6	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.

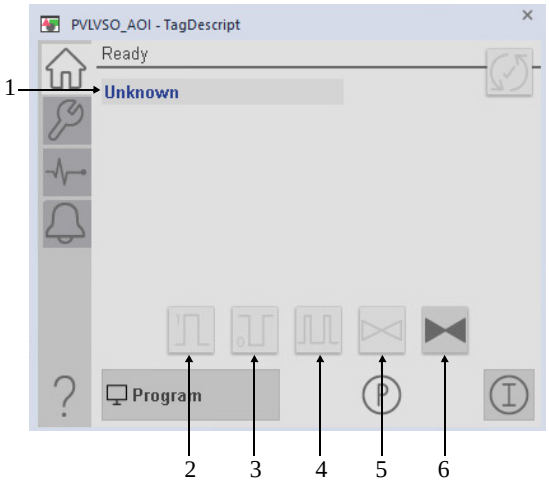
Process Valve (PVLV) Graphic Symbols (Configured as Solenoid Operated Valve)

Graphic Symbol Name	Graphic Symbol	Description
GO_PVLV_S0 GO_PVLV_S01 GO_PVLV_S02 GO_PVLV_S03		Standard solenoid-operated valves that are shown in various orientations.

Process Valve (PVLV) Faceplates (Configured as Solenoid Operated Valve)

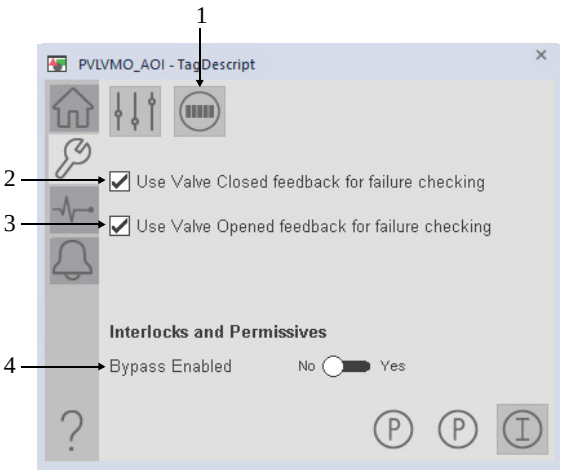
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



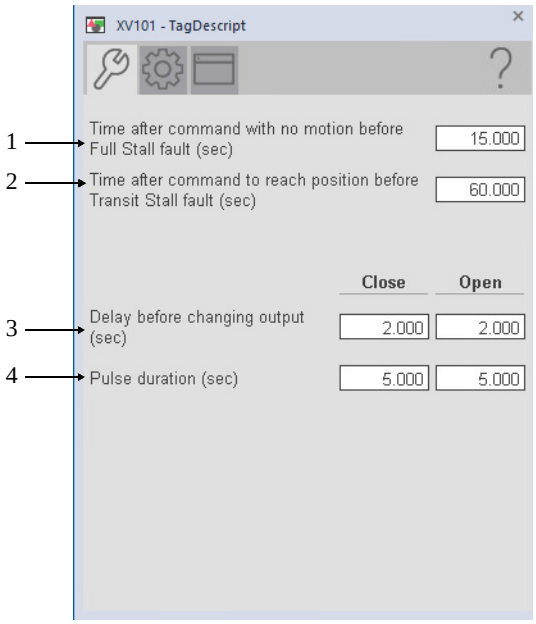
Item	Description
1	Valve state indicator.
2	Select to have the valve pulse open.
3	Select to have the valve pulse closed.
4	Select to have the valve pulse continuously.
5	Select to open valve.
6	Select to close valve.

Maintenance



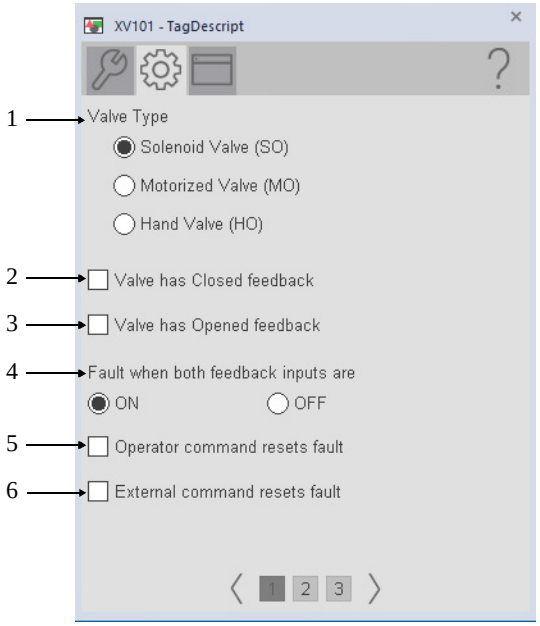
Item	Description
1	Select to open the Valve Statistics faceplate.
2	Select to use Valve Closed feedback for failure checking.
3	Select to use Valve Opened feedback for failure checking.
4	Select yes to bypass checking of interlocks and permissives that can be bypassed.

Advanced Maintenance

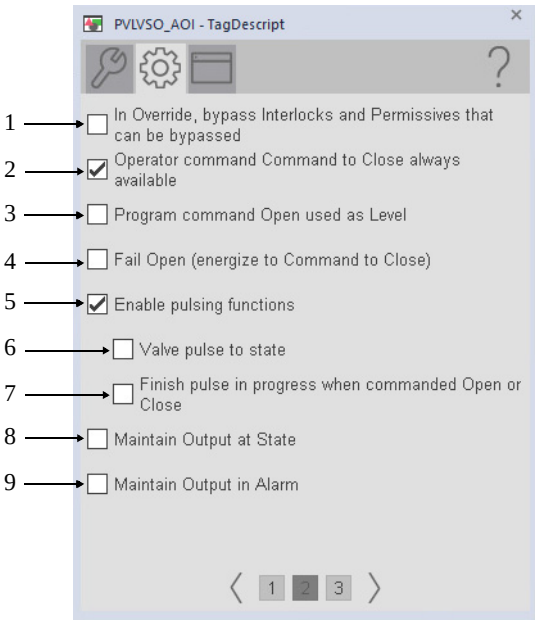


Item	Description
1	Enter the amount of time with no motion after a command for an alarm to occur.
2	Enter the amount of time (in seconds) that the valve is not confirmed open or closed before a Transit Stall.
3	Enter the amount of time after receiving a command to open or close the valve before changing the outputs to actually move the valve (command delay).
4	Enter the amount of time to pulse the open and close outputs when commanding the valve. Enter zero if the outputs are to be maintained until the valve reaches the target position.

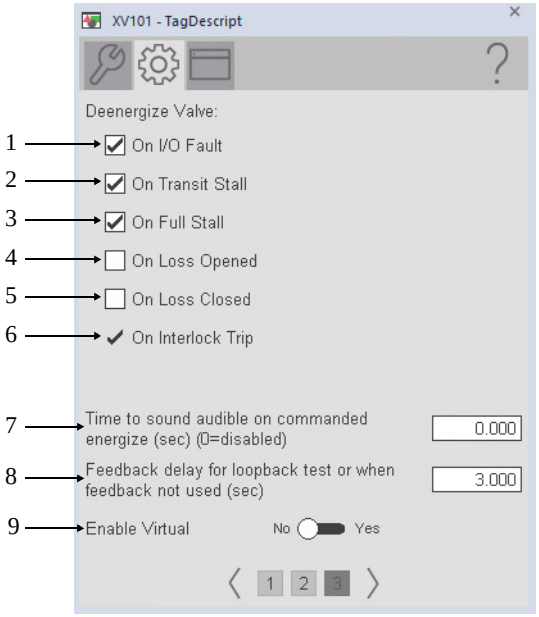
Engineering



Item	Description
1	Select the Valve type.
2	Select if the valve has Closed feedback.
3	Select if the valve has Opened feedback.
4	Select 'ON' if both limit switches are OFF when the valve is moving in normal operation. Select 'OFF' if both limit switches are ON when the valve is moving in normal operation. This selection determines which limit switch combination indicates abnormal operation.
5	Select to allow operator commands to reset any previous faults (I/O fault, fail to trip, interlock trip), then move the valve. Clear this checkbox to reset faults with only the reset command.
6	Select to allow External commands to reset any previous faults (I/O fault, transit stall, full stall, interlock trip), then move the valve. Clear this checkbox to reset faults by using only the reset command



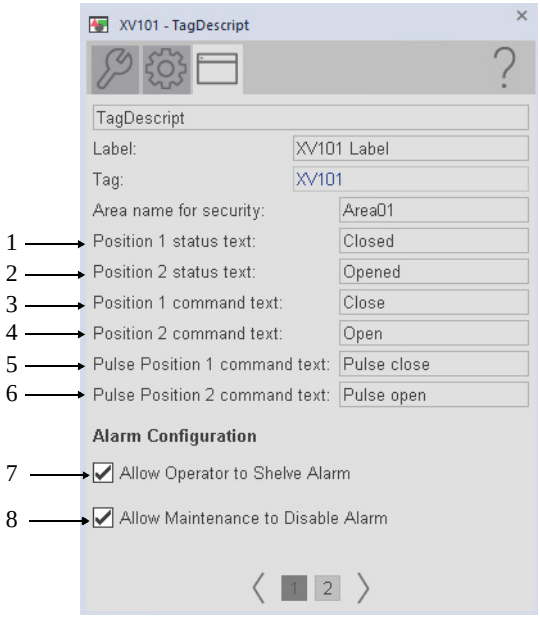
Item	Description
1	When selected, the bypassable interlocks and permissives are bypassed when Override command source is selected. When the checkbox is cleared, the bypassable interlocks and permissives are enforced in Override.
2	When selected, the Operator command button to close the valve is available even when a command source other than Operator or Maintenance is selected. When the checkbox is cleared, the Operator close command button is only enabled in Operator or Maintenance command source.
3	When selected, the Program open command is pin is treated as a level input: when 1, the valve is commanded to open, and when 0 the valve is commanded to close. When the checkbox is cleared, the Program commands follow the normal command convention: write a 1 to the Program open command to open the valve, and write a 1 to the Program close command to close the valve
4	When selected, the valve is spring-return (fail) to the open position (energize to close). Leave the box unchecked if the valve is spring-return (fail) to the closed position (energize to open).
5	Select to enable pulsing functions.
6	
7	
8	When selected, outputs are maintained on, even when the valve reaches the target position. When the checkbox is cleared, outputs are turned off once the valve reaches the target position.
9	When selected, outputs are maintained on when a valve has a full stall (failed to move) or transit stall (failed to reach target position). When the checkbox is cleared, outputs are turned off when a valve stall occurs.



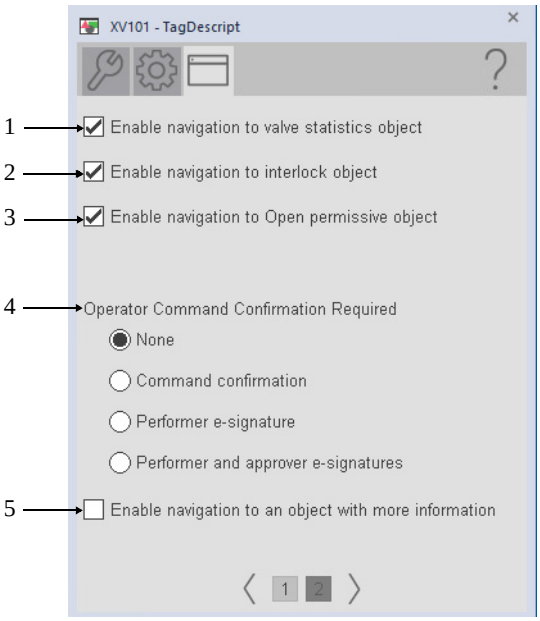
Item	Description
1	Select to send a stop output to the valve and clear the Open and Close outputs when an I/O Fault condition occurs. Clear this checkbox to keep the outputs to the valve in their current state on an I/O Fault condition. **IMPORTANT**: When this checkbox is checked and an I/O Fault condition occurs, a reset is required before the valve can be energized.
2	Select to send a stop output to the valve and clear the Open and Close outputs when a Transit Stall condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Transit Stall condition. (A Transit Stall means the valve, when commanded to move, moved off its original position, but did not reach its commanded position before the Transit Stall time expired.) **IMPORTANT**: When this checkbox is checked and a Transit Stall condition occurs, a reset is required before the valve can be energized.
3	Select to send a stop output to the valve and clear the Open and Close outputs when a Full Stall condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Full Stall condition. (A Full Stall means the valve, when commanded to move, did not move off its original position before the Full Stall time expired.) **IMPORTANT**: When this checkbox is checked and a Full Stall condition occurs, a reset is required before the valve can be energized.
4	Select to send a stop output to the valve and clear the Open and Close outputs when a Loss of Open Position condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Loss of Open Position condition. (A Loss of Open Position means the valve was commanded to open, reached the open position as confirmed by the limit switches, and subsequently moved off the open position.) **IMPORTANT**: When this checkbox is selected and a Loss of Open Position condition occurs, a reset is required before the valve can be energized.
5	Select to send a stop output to the valve and clear the Open and Close outputs when a Loss of Closed Position condition occurs. Clear this checkbox to keep the outputs to the valve in their current state (keep trying) on a Loss of Closed Position condition. (A Loss of Closed Position means the valve was commanded to close, reached the closed position as confirmed by the limit switches, and subsequently moved off the closed position.) **IMPORTANT**: When this checkbox is selected and a Loss of Closed Position condition occurs, a reset is required before the valve can be energized.
6	The device always de-energizes on an interlock trip. This item cannot be unchecked. It is displayed as a reminder that the interlock trip function always causes the valve to de-energize.
7	Enter the seconds to sound an audible alarm when the valve energizes.
8	Enter the time delay (in seconds) for the opened or closed status to be echoed back when Simulation is enabled or when limit switch feedback is not used.
9	Enable or disable virtual mode.

HMI Configuration

The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.

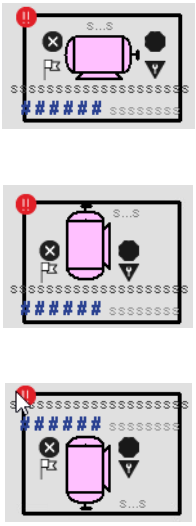
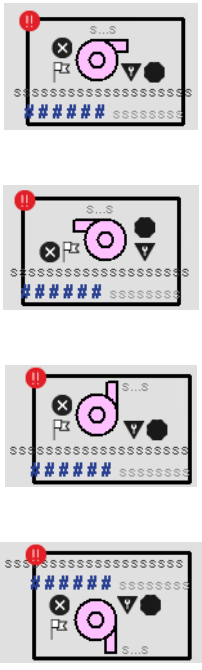


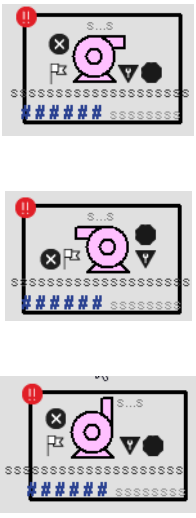
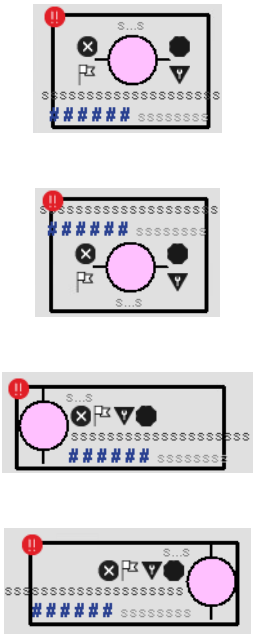
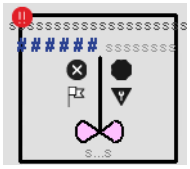
Item	Description
1	Displays the text for Position 1.
2	Displays the text for Position 2.
3	Displays the command text for Position 1.
4	Displays the command text for Position 2.
5	Displays the command text for Pulse Position 1.
6	Displays the command text for Pulse Position 2.
7	Select to allow Operator to shelve alarm.
8	Select to allow Maintenance to disable alarm.

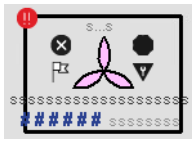
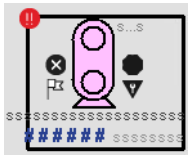


Item	Description
1	Check if a Valve Stats object is used with this valve. This action makes the Valve Statistics button visible on the Maintenance faceplate; Select this button to open the Valve Statistics faceplate for this valve. **IMPORTANT**: The name of the ValveStats object in the controller must be the name of the object with the suffix '_ValveStats'. For example, if your PVLV object has the name 'ValveM0123', then its Valve Stats object must be named 'ValveM0123_ValveStats'.
2	Select if an interlock instruction is used with this output. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_Intlk'. For example, if your PVLV object has the name 'ValveM0123', then its Interlock object must be named 'ValveM0123_Intlk'
3	Select if you have a PPERM instruction that is used with this valve for Open Permissives. This action changes the Permissive indicator to a clickable button to open the Permissive faceplate. **IMPORTANT**: The name of the Permissive object in the controller must be the name of the object with the suffix '_OpenPerm'. For example, if your PVLV object has the name 'ValveM0123', then its Permissive object must be named 'ValveM0123_OpenPerm'.
4	Select to configure operator command confirmation. This action would take place after any operator command.
5	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) You configure the tagname of the object you want to navigate to in the extended tag property "Cfg_HasMoreObj.@Navigation". It uses the <backing tag>.@Library and <backing tag>.@Instruction extended tag properties to display the objects faceplate.

Process Variable Speed Drive (PVSD) Graphic Symbols

Graphic Symbol Name	Graphic Symbol	Description
GO_PVSD GO_PVSD1 GO_PVSD4		Motors operate in different positions: right, up, and down.
GO_PVSD_Blower1 GO_PVSD_Blower2 GO_PVSD_Blower3 GO_PVSD_Blower4		Blowers operate in different positions: right, left, up, and down.

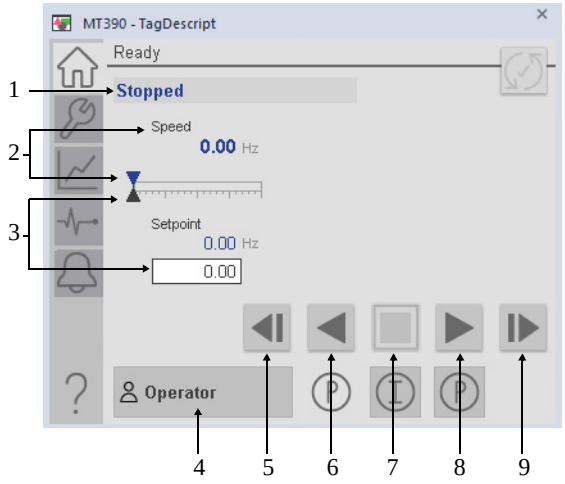
Graphic Symbol Name	Graphic Symbol	Description
GO_PVSD_Pump1 GO_PVSD_Pump2 GO_PVSD_Pump3		Pumps operate in several positions: right, left, and up
GO_PVSD_Inline1 GO_PVSD_Inline2 GO_PVSD_Inline3 GO_PVSD_Inline4		Inline motors operate in several positions: up, left, down, and right.
GO_PVSD_Agitator		Agitator that is shown as a Graphic Symbol.
GO_PVSD_Conveyor		Conveyor that is shown as a Graphic Symbol.

Graphic Symbol Name	Graphic Symbol	Description
GO_PVSD_Fan		Fan that is shown as a Graphic Symbol.
GO_PVSD_Mixer		Mixer that is shown as a Graphic Symbol
GO_PVSD_RotaryPump		Rotary Pump that is shown as a Graphic Symbol
GO_PVSD_L1_		Indicator with label.
GO_PVSD_L1_Blower		Blower indicator
GO_PVSD_L1_Motor		Motor indicator
GO_PVSD_L1_Pump		Pump indicator

Process Variable Speed Drive (PVSD) Faceplates

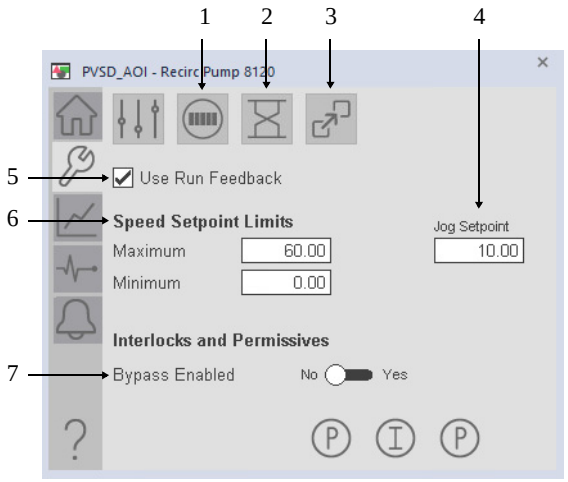
There are basic faceplate attributes that are common across all instructions. See Basic Faceplate Attributes on page 31.

Operator



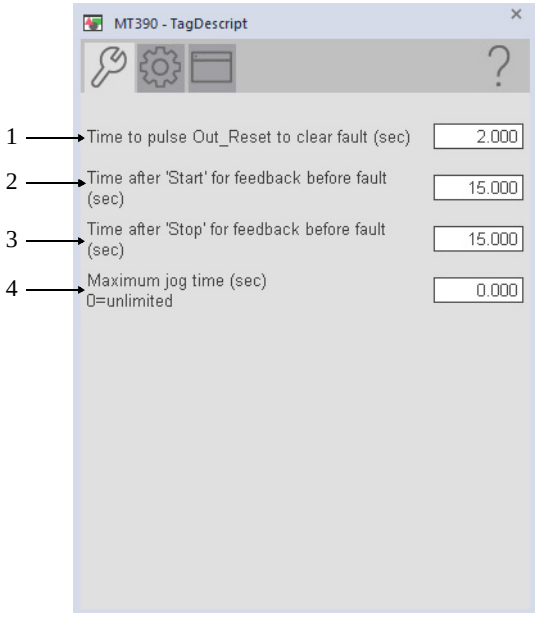
Item	Description
1	Drive state indicator.
2	Current speed of the drive.
3	Setpoint for the speed of the drive.
4	Current command source (Program, Operator, Override, Maintenance, or Hand)
5	Jog drive in reverse.
6	Start drive in reverse.
7	Stop drive.
8	Start drive forward.
9	Jog drive forward.

Maintenance



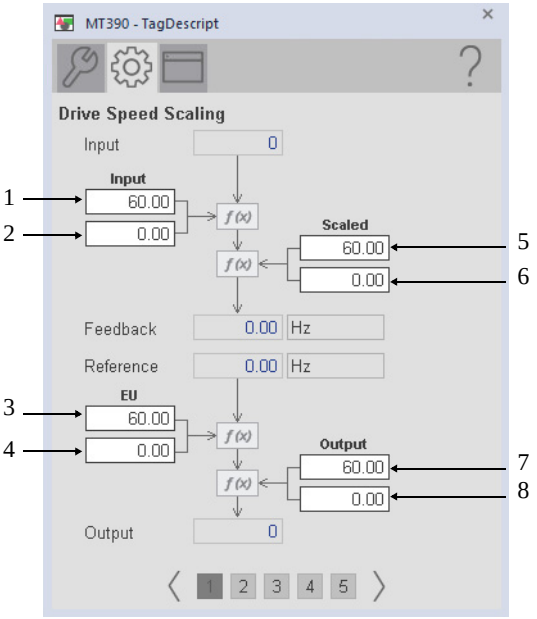
Item	Description
1	Display Runtime Accumulator Faceplate.
2	Display Restart Inhibit Faceplate.
3	Display Device Faceplate.
4	Enter the Jog Setpoint.
5	Select to use Run Feedback.
6	Enter the clamping limits for the speed setpoint. If a speed setpoint outside this range is entered, the speed is clamped at these limits and Sts_SpeedLimited is asserted.
7	Select yes to bypass checking of interlocks and permissives that can be bypassed.

Advanced Maintenance

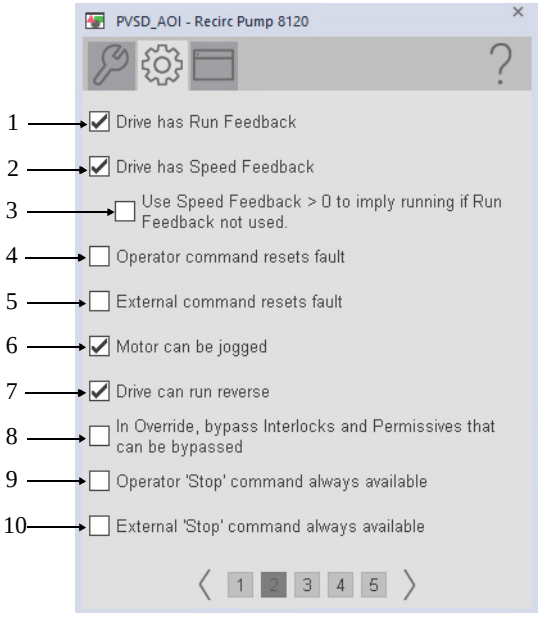


Item	Description
1	Enter the amount of time to hold Out_Reset true to reset a drive fault when a reset command is received.
2	Enter the amount of time to allow for the run feedback on the drive to confirm that the drive has started before raising a Fail to Start alarm.
3	Enter the amount of time to allow for the run feedback on the drive to confirm that the drive has stopped before raising a Fail to Stop alarm. **TIP**: Allow extra time for the drive to decelerate or coast to zero speed before it returns a confirmed Stopped status.
4	Enter the maximum amount of time allowed to jog the motor.

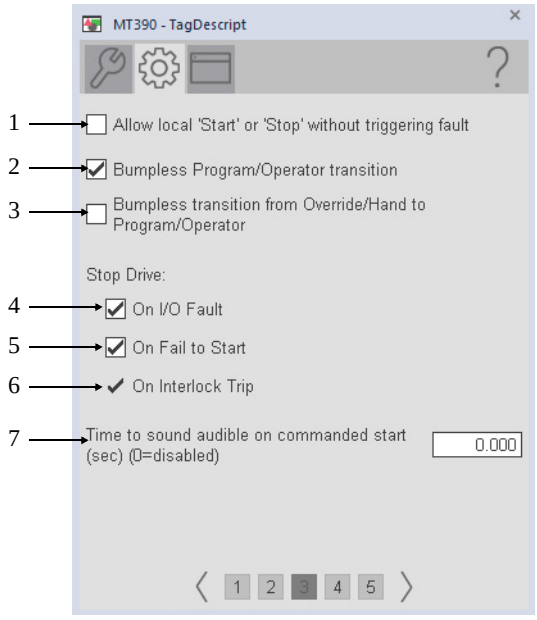
Engineering



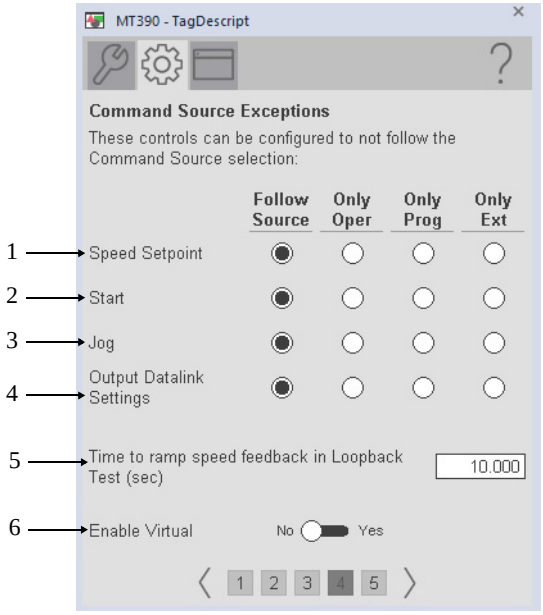
Item	Description
1	Enter the raw input count that corresponds to the maximum speed feedback from the drive.
2	Enter the raw input count that corresponds to the minimum speed feedback from the drive. (This value is usually zero.)
3	Enter the engineering unit value for the maximum speed reference sent to the drive.
4	Enter the engineering unit value for the minimum speed reference sent to the drive. (This value is usually zero. Do not enter a negative value for reversing drives. Reversing is handled separately.)
5	Enter the engineering unit value for the maximum speed feedback from the drive.
6	Enter the engineering unit value for the minimum speed feedback from the drive. (This value is usually zero. Do not enter a negative value for reversing drives. Reversing is handled separately.
7	Enter the raw output count that corresponds to the maximum speed reference sent to the drive.
8	Enter the raw output count that corresponds to the minimum speed reference sent to the drive. (This value is usually zero.)



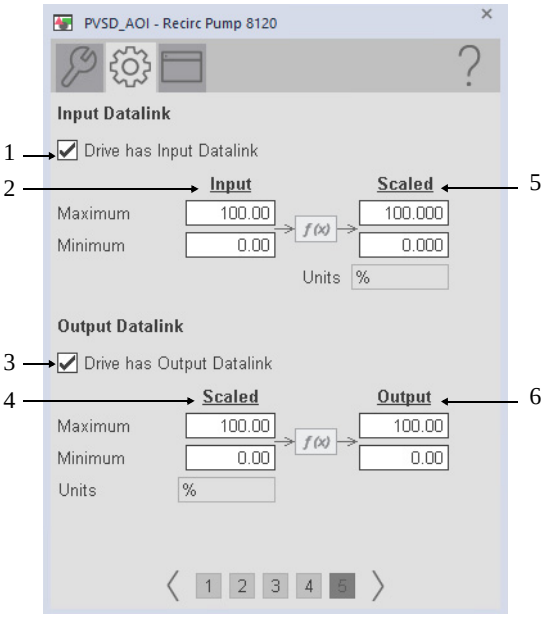
Item	Description
1	Select if the drive provides a run feedback signal. This check enables feedback checking for Fail to Start and Fail to Stop. Clear this checkbox if here is no run feedback.
2	Select if the drive provides a speed feedback signal. Clear this checkbox if there is no speed feedback.
3	Select if Speed feedback greater than zero is used to signify the drive is running. **IMPORTANT**: This configuration setting is available only if the previous configuration setting is checked.
4	Select to reset faults when a new operator drive command, such as start or stop, is issued. Clear this checkbox to require an explicit reset command to clear faults.
5	Select to reset faults when a new external drive command, such as start or stop, is issued. Clear this checkbox to require an explicit reset command to clear faults.
6	Select to make the Jog command button visible on the Operator tab and enable the drive to be jogged from the faceplate.
7	Select to make the forward and reverse direction command buttons visible on the Operator tab and enable the drive to run forward or reverse.
8	Select to have the interlocks and permissives that can be bypassed, bypassed in Override command source.
9	Select (= 1) so that the OCmd_Stop has priority and is accepted at any time. If the Command Source is not Operator or Maintenance, the motor or drive requires a reset. Clear this checkbox (= 0) so that the OCmd_Stop works only in Operator or Maintenance command source.
10	Select (= 1) so that the XCmd_Stop has priority and is accepted at any time. If the Command Source is not External, the motor or drive requires a reset. Clear this checkbox (= 0) so that the XCmd_Stop only works when the command source is External.



Item	Description
1	Select to allow for local command source start and stop without triggering a fault.
2	Select to have Program settings, such as Speed Reference, track Operator settings in Operator command source, and have Operator settings track Program settings in Program command source.
3	Select to have Program and Operator Speed Reference track the Override Speed Reference in Override command source or the actual speed in Hand command source.
4	Select to stop the drive if an I/O Fault is detected. Clear this checkbox show the I/O Fault Status/Alarm only and not stop the drive if an I/O Fault is detected.
5	When the bit is **on** and a motor Fail to Start is detected, the drive is stopped. A reset is required before another start can be attempted. If the bit is **off** and a drive Fail to Start is detected, the instruction sets only the Sts_FailToStart status (and the Alm_FailToStart alarm, if so configured). The outputs are not changed, so the instruction continues to start the drive.
6	The drive always stops on an Interlock trip. This item cannot be unchecked. It is displayed as a reminder that the Interlock Trip function always stops the drive.
7	Enter the time (in seconds) that the audible sounds when there is a commanded State change.



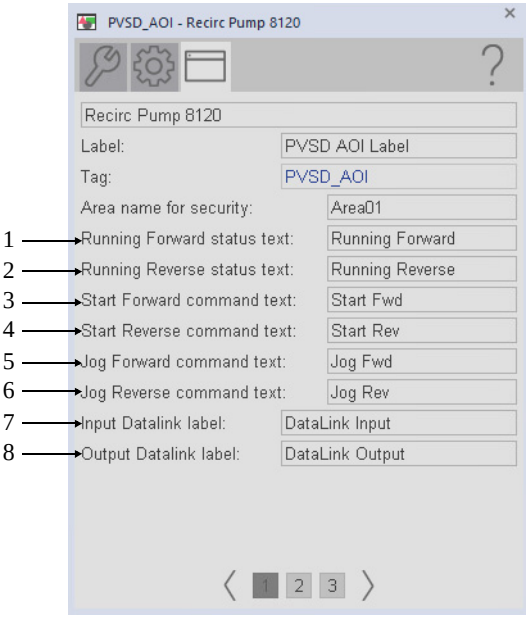
Item	Description
1	This selection determines whether control of the drive speed reference follows the command source selected for the instruction, stays with the operator, stays with the program, or stays with the external command source.
2	This selection determines whether control of the drive starting and stopping follows the command source selected for the instruction, stays with the operator, stays with the program, or stays with the external command source.
3	This selection determines whether control of the drive jogging follows the command source selected for the instruction, stays with the operator, stays with the program, or stays with the external command source.
4	This selection determines whether control of the output datalink value follows the command source selected for the instruction, stays with the operator, stays with the program, or stays with the external command source.
5	Enter the time, in seconds, to ramp speed feedback when in Virtual.
6	Enable or disable virtual mode.



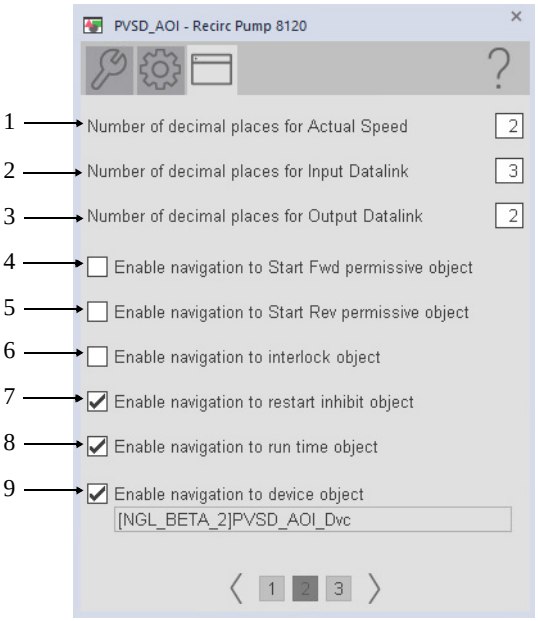
Item	Description
1	Select to make the Input Datalink configuration and operation functions visible.
2	Enter the minimum and maximum raw (from the drive) units for the Input Datalink.
3	Select to makethe Output Datalink configuration and operation functions visible.
4	Enter the minimum and maximum scaled values for the Output Datalink in Engineering Units.
5	Enter the minimum and maximum scaled values for the Input Datalink in Engineering Units.
6	Enter the minimum and maximum scaled values for the Output Datalink in Raw (to the drive) Units. Enter the text to display for the label and units of measure of the Output Datalink.

HMI Configuration

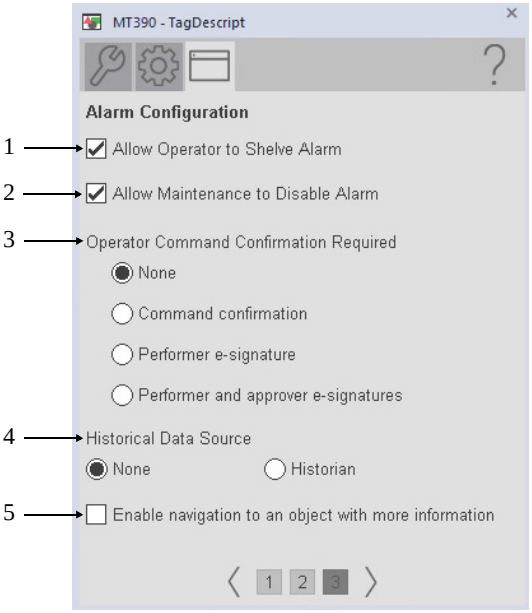
The HMI configuration tab has settings that are common to the objects. See page 33 for descriptions of the common settings.



Item	Description
1	Display name for running forward direction.
2	Display name for running reverse direction.
3	Display name for start forward direction.
4	Display name for start reverse direction.
5	Display name for jog forward direction.
6	Display name for jog reverse direction.
7	Display name for input Datalink.
8	Display name for output Datalink.



Item	Description
1	Enter the decimal places to display for actual speed.
2	Enter the decimal places to display for Input Datalink.
3	Enter the decimal places to display for Output Datalink.
4	Select if a permissive object is connected to Inp_FwdPermOK. The permissive indicator becomes a button that opens the permissive faceplate. **IMPORTANT**: The name of the permissive object in the controller must be the name of the object with the suffix "_FwdPerm".
5	Select if a permissive object is connected to Inp_RevPermOK. The permissive indicator becomes a button that opens the permissive faceplate. **IMPORTANT**: The name of the permissive object in the controller must be the name of the object with the suffix "_RevPerm".
6	Select if an interlock object is connected to Inp_IntlkOK. The Interlock indicator becomes a button that opens the interlock faceplate. **IMPORTANT**: The name of the Interlock object in the controller must be the name of the object with the suffix '_Intlk_0'. For example, if your PVSD object has the name 'Drive123', then its Interlock object must be named 'Drive123_Intlk'
7	Select if a restart inhibit object is connected. The button that opens the Restart Inhibit faceplate appears. **IMPORTANT**: The name of the Restart Inhibit object in the controller must be the name of the object with the suffix '_ResInh'. For example, if your PVSD object has the name 'Drive123', then its Restart Inhibit object must be named 'Drive123_ResInh'
8	Select if a runtime object is connected. The button that opens the runtime faceplate appears. **IMPORTANT**: The name of the runtime object in the controller must be the name of the object with the suffix '_RunTime'. For example, if your PVSD object has the name 'Drive123', then its runtime object must be named 'Drive123_RunTime'.
9	Select to allow navigation to the device object.



Item	Description
1	Select to allow Operator to shelve alarm.
2	Select to allow Maintenance to disable alarm.
3	Select to configure operator command confirmation. This action would take place after any operator command.
4	Select where to capture historical data.
5	Select to enable navigation to an object with more information (Cfg_HasMoreObj is set to true.) This can be configured to navigate to an AOI backing tag or a UDT tag that has HMI_Type and HMI_Lib defined. For example, there is a motor with the tag name P_101 and there is a need to have the more information button navigate to the parent P_LLS object. A tag is created for the P_LLS object that is given the alias P101_More. When the more information button is pressed on the motor, it links to P101_More. This will open the faceplate for the LLS object.

Notes:

FactoryTalk View Customization Tool

Overview

This customization tool lets you create a color palette to change the colors for global objects and displays.

The Color Change tool uses three types of files:

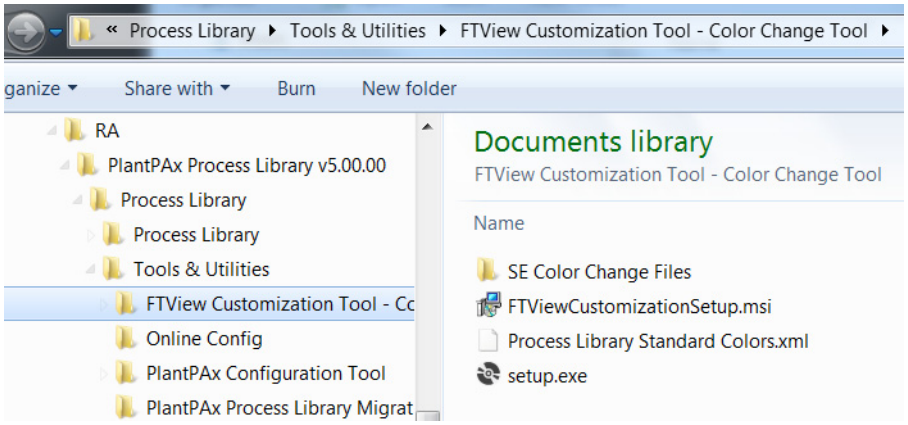
- **FactoryTalk® View Graphics .xml file:** This file is exported from the FactoryTalk View graphic (display or global object) in the View Studio software program. Once changes are made, it is imported into the View Studio software program to change the colors in the display or global object.
- **Color Association File:** This .xml file matches a color instance in the FactoryTalk View Graphics .xml file to the color palette entry. There is one Color Association File (CAXML) for each FactoryTalk View Graphics .xml file. The tool creates and maintains the CAXML file.
- **Color Palette:** This .xml file defines the colors for an application. The tool creates and maintains the .xml file. There is one color palette file for all FactoryTalk View Graphics .xml files that are being customized. If you want to change the color, it is done in the color palette.

TIP We suggest that you make a copy of the color palette .xml file if you plan to use the color tool.

Install Tool File

Obtain the Color Change tool as part of the Library of Process Objects download from the Product Compatibility and Download Center at http://www.rockwellautomation.com/rockwellautomation/support/downloads.page.

Access the tool from the Process Library download. Choose RA>Process Library v*X.X*>Tools & Utilities>FTView Customization Tool - Color Change Tool and double-click FTViewCustomizationSetup.msi.



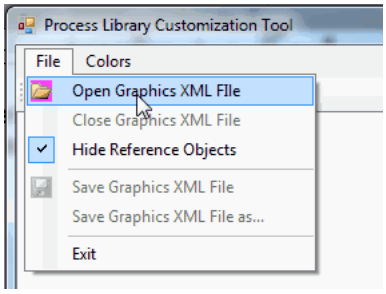
This file installs the program and adds a shortcut to the Start menu under 'PlantPAx®.'

Use the Tool with Library Objects

The download includes .xml exports for all global objects and display files in the library (for FactoryTalk View SE software). Make sure that you also download the CAXML and Process Library Standard Colors .xml files.

Follow these steps to change colors in the process library.

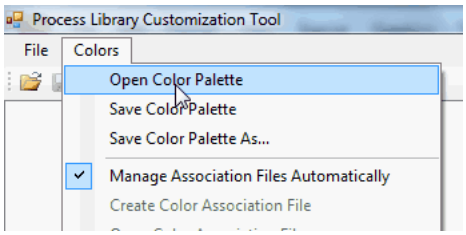
1. From the Process Library Customization Tool File menu, Select Open Graphic XML File.



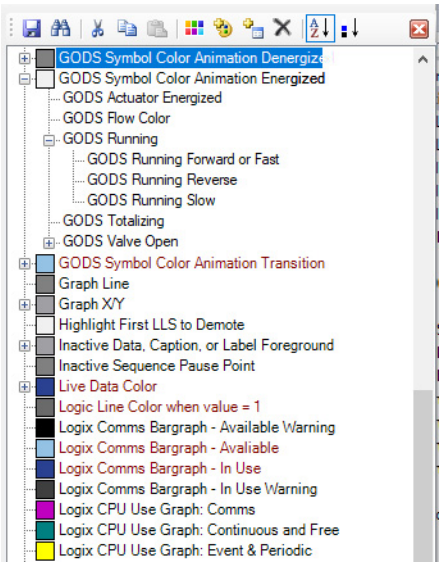
   The Open Graphics XML Files dialog box appears.

   Multiple global object and display files can be opened simultaneously from the file open dialog box.

2. Select the Colors tab and choose Open Color Palette.



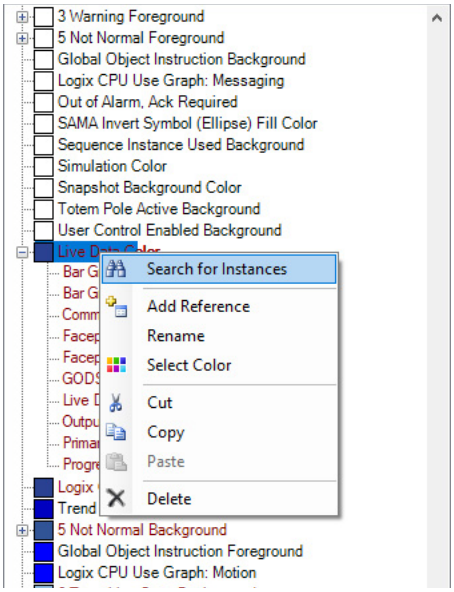
3. Select the colors that you want to change in the palette.



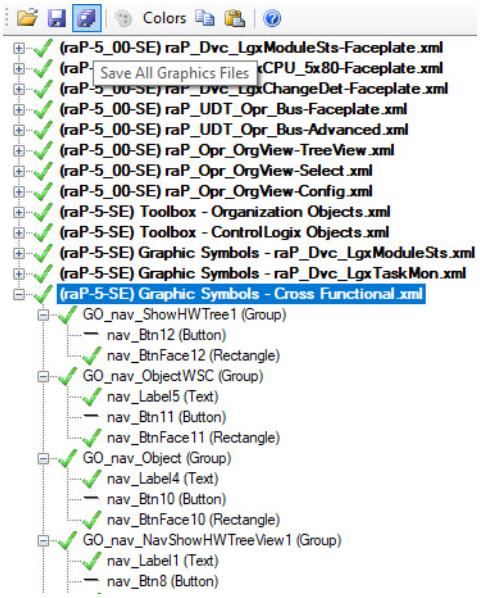
4. To select a new color, Select the Choose Color  icon.

5. Repeat step 4 to change each color.

6. To see where a color is used, right-click a color and choose Search for Instances.



7. To save all graphic files (along with their association files) and the color palette file, Select Save All  .



8. Import the files into the FactoryTalk View software program.

   There are bulk import files for the displays (BatchImport_Displays_PlantPAx)Library.xml) and global objects (BatchImport_Global_PlantPAx)Library.xml).

Modifying the Color Palette

The color palette appears in a tree format that shows a parent-child relationship between colors. 'Base Colors' are shown with a color box next to them. 'Reference Colors' reference either a Base Color or another Reference Color.

By changing a Base Color, all Reference Colors under it change. For example, you can create a generic Base Color, called 'Energized', and then reference it with the Reference Color, called 'Running'.

Do not delete Color palette entries unless they are known to be unused. To see if a color palette entry is being used, right-click the color and choose 'Find Color Instances'.

Any color palette entry (Reference or Base Color) can be moved to reference another color. This action is done by simply dragging the color to be moved and dropping it on the new color to reference. When a color that has references is moved, all of its references move as well.

To make a Reference Color a Base Color, right-click the Reference Color and select 'Make Base Color' from the context menu.

Color palette entries are stored with an integer code. That integer code is used in the association file. Renaming a color palette entry does not break any existing associations. Multiple color palette entries can have the same name, but this practice is not recommended.

Follow these color palette considerations:

- Once a color palette entry is deleted and the palette is saved, the only way to restore associations is to recreate them manually.
- Object names in FactoryTalk View software usually have a number on the end. Names are considered to be similar if they are the same after the ending number is removed.

Use the Tool with Other FactoryTalk View Software Files

The color palette must be applied to FactoryTalk View software files that are not part of the Rockwell Automation® Library. Graphic elements in the file must be associated to the color palette. You must create associations and save them in a color association file. When opening an .xml graphics file, if the file already has an association file (CAXML), it is automatically opened as well. If an association file does not exist, it is created.

Follow these steps to create associations.

1. From the Process Library Customization Tool File menu, Select Open Graphic XML File.

   The Open Graphics XML Files dialog box appears.

2. Select an object from the tree on the left, and its colors appear in the center of the screen.

3. To associate a color from the palette, select the palette color and drag it to the text box next to the color display box.

   Once all colors for an object are associated with the color palette, a check appears next to the object in the tree.

   Colors that are used for the object only are displayed. For example, if an object is configured as 'Transparent', its background color does not show up in the tool. Also, instances of global objects from display files do not appear in the object tree. The tree can be configured to show instances of global objects. These objects do not have any color instances because their parent global objects control their colors.

4. Copy and paste functions have been included to allow quick creation of color associations. To use these functions, right-click the graphic object in the tree on the left and a menu appears.
   - **Copy Color Associations:** Use this function to copy the color associations for the object. If the object is a group, the color configuration for all group members is copied.
   - **Paste Color Associations (this Object only):** Use this function to paste the previously copied color associations to the selected object. This option is not available if the selected object is a group that has members with color associations.
   - **Paste Color Associations (to all group members):** Use this function to paste the previously copied color associations to the new object and all of its members. This option is available only if the source and destination objects are groups with members that have similar names and object types.
   - **Copy and Paste Color Associations to Similar Objects with Names like 'Xxxx#'**: This option copies the selected object and searches objects with a similar name and object type. Color associations are copied to all objects with similar names and types in any of the currently open graphics files. If the objects are groups, then the group members must have similar names and object types. Be careful when you use this feature to help prevent unwanted changes.

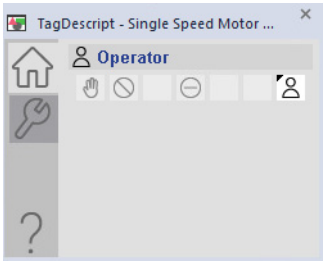
Command Sources and Device Virtualization

Command Sources

The Command Source selection determines the source of Commands and Settings for the object. For example, when the Command Source is Operator, the object processes Commands and Settings from the Operator.

Highlighted indicators on the object faceplate display show which sources have requested control. If more than one source is requesting control, multiple indicators are highlighted. The sources are shown in priority order, and the highlighted source furthest to the left has control. If that source relinquishes control, the next source in priority order assumes control of the object.

A triangle in the upper left corner (as seen in the following screen capture on the icon in the far right) indicates the “Normal” command source.



Command Source	Description
Operator	The Operator controls the object. Operator Commands, such as OCmd_Start and OCmd_Stop, and Operator Settings, such as OSet_SP and OSet_CV, from the HMI are accepted.
Program	Program logic controls the object. Program Commands, such as PCmd_Start and PCmd_Stop, and Program Settings, such as PSet_SP and PSet_CV, are accepted.
External	An external system or other external devices control the object via logic. External Commands, such as XCmd_Start and XCmd_Stop, and External Settings, such as XSet_SP, XSet_CV, from Logic are accepted. Examples of external devices and systems that may control an object include a SCADA master system or local pilot devices (push buttons, switches, pilot lights).
Override	Priority logic controls the object and supersedes Operator, Program, and External control. The Override Command Input (Inp_OvrdCmd) and other Override settings are accepted. If so configured (for example, Cfg_OvrdPermIntlk=1), bypassable interlocks and permissives are bypassed.

Command Source	Description
Maintenance 	Maintenance controls the object and supersedes Operator, Program, External, and Override control. Operator Commands and Settings from the HMI are accepted. Bypassable interlocks and permissives are bypassed, and feedback timeout checks are not processed.
Out of Service 	The object may be placed Out of Service by Maintenance from the HMI (Maintenance Out of Service). The object may also be placed Out of Service by scanning the instruction false (in a ladder diagram implementation) or by exposing and wiring the EnableIn input pin and setting it false (in a Function Block Diagram implementation). When the object is Out of Service, outputs are held de-energized / at zero, and alarms are inhibited.
Hand 	Hardwired circuits or other logic outside the instruction controls the object, ignoring outputs of the instruction. The instruction tracks the state of the object via inputs for bumpless transfer back to another command source.

Not all Command Sources are used in every object.

P_CmdSrc	Operator	Program	External	Override	Maintenance	Out of Service	Hand
raP_Dvc_D4SD	x	x	x	x	x	x	x
raP_Dvc_nPos	x	x	x	x	x	x	x
raP_Dvc_VlvMP	x	x	x	x	x	x	x
raP_Opr_Area	x	x	x		x	x	
raP_Opr_Unit	x	x	x		x	x	
raP_Opr_EMGen	x	x	x		x	x	
raP_Opr_EPGen	x	x	x		x	x	

Virtualization

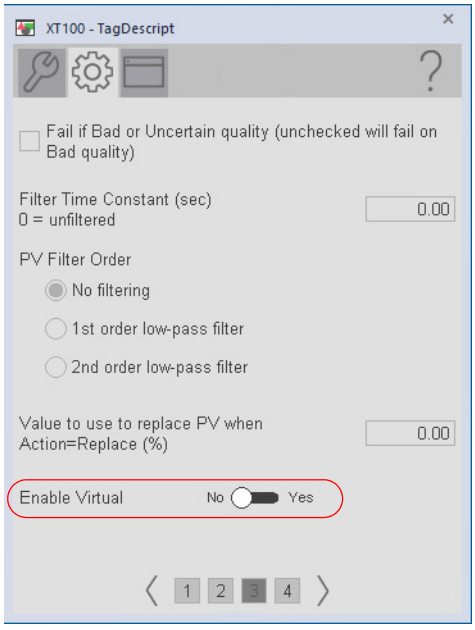
Virtualization is used with device objects to simulate operation of a device instead of controlling the actual device. Virtualization is used for such activities as system testing or operator training, where the process is shut down or not connected to the controller.

When a device is set to Physical operation, the actual field device I/O are monitored or controlled, and the field device operates normally, on-process.

When a device object is set to Virtual operation, the I/O for the field device are ignored, and the device operates in one of these manners:

- For monitored devices, such as analog and discrete inputs, a virtual process variable (PV) is provided, either by simulation logic or by entry form the HMI faceplate.
- For controlled devices, such as valves, motors and drives, the outputs are held de-energized (at zero) and the object responds in a "loopback" manner, as if an actual device were connected. So a valve object, while keeping outputs de-energized, reports valve status to the operator and to program logic as if the valve were opening and closing normally.

To select Virtual or Physical operation, go to the Advanced faceplate for the device and toggle the Virtual / Physical selector.

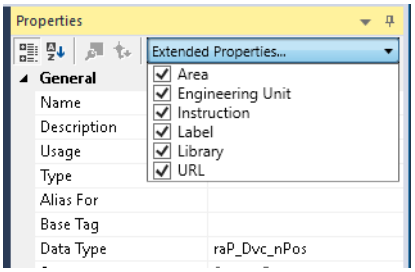


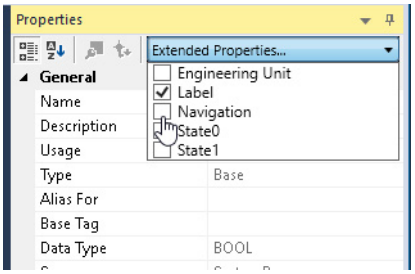
Notes:

Tag Extended Properties and Default Alarm Settings

Tag extended properties must be configured to drive the text on the operations faceplate. See Logix 5000 Controllers I/O and Tag Data, publication 1756-PM004 for more information on extended tags.

You need to select the extended properties to populate for each tag and then enter the values.





raP_Opr_Area

Common	
raP_Opr_Area.@Description	"Area"
raP_Opr_Area.@Area	"Area01"
raP_Opr_Area.@Instruction	"raP_Opr_Area"
raP_Opr_Area.@Label	"Area"
raP_Opr_Area.@Library	"raP-5_00"
raP_Opr_Area.@URL	" "
raP_Opr_Area.Cfg_HasMoreObj.@Navigation	" "

General	
raP_Opr_Area.Sts_ExtddAlms.@Label	"Extended alarm"

Alarms		Alarm Default Message	Severity
raP_Opr_Area.Sts_EStopTrip.@Label	“Emergency stop”	"/*S:0 %.@Description*/: Emergency stop	750
raP_Opr_Area.Sts_SStopTrip.@Label	“Software stop”	"/*S:0 %.@Description*/: Software stop	750

raP_Opr_Unit

Common	
raP_Opr_Unit.@Description	"Unit"
raP_Opr_Unit.@Area	"Area01"
raP_Opr_Unit.@Instruction	"raP_Opr_Unit"
raP_Opr_Unit.@Label	"Unit"
raP_Opr_Unit.@Library	"raP-5_00"
raP_Opr_Unit.@URL	" "
raP_Opr_Unit.Cfg_HasMoreObj.@Navigation	" "

General	
raP_Opr_Unit.Sts.0.@Description	"State 0"
raP_Opr_Unit.Sts.1.@Description	"State 1"
raP_Opr_Unit.Sts.2.@Description	"State 2"
raP_Opr_Unit.Sts.3.@Description	"State 3"
raP_Opr_Unit.Sts_ExtddAlms.@Label	"Extended alarm"
raP_Opr_Unit.XCmd.0.@Description	"Group Command 0"
raP_Opr_Unit.XCmd.1.@Description	" "
raP_Opr_Unit.XCmd.2.@Description	" "
raP_Opr_Unit.XCmd.3.@Description	" "
raP_Opr_Unit.Val_Actl.@EngineeringUnit	"Kg"

Alarms		Alarm Default Message	Severity
raP_Opr_Unit.Sts_EStopTrip.@Label	"Emergency stop”	"/*S:0 %.@Description*/: Emergency stop	750
raP_Opr_Unit.Sts_GroupCmd1Fail.@Label	"Group Command 1 Failed”	"/*S:0 %.@Description*/: Group Command 1 Failed	500
raP_Opr_Unit.Sts_GroupCmd2Fail.@Label	"Group Command 2 Failed”	"/*S:0 %.@Description*/: Group Command 2 Failed	500
raP_Opr_Unit.Sts_GroupCmd3Fail.@Label	"Group Command 3 Failed”	"/*S:0 %.@Description*/: Group Command 3 Failed	500
raP_Opr_Unit.Sts_GroupCmd4Fail.@Label	"Group Command 4 Failed”	"/*S:0 %.@Description*/: Group Command 4 Failed	500
raP_Opr_Unit.Sts_IntlkTrip.@Label	"Interlock trip”	"/*S:0 %.@Description*/: Interlock trip	500
raP_Opr_Unit.Sts_SStopTrip.@Label	"Software stop”	"/*S:0 %.@Description*/: Software stop	750

raP_Opr_EMGen

Common	
raP_Opr_EMGen.@Description	"Generic Equipment Module"
raP_Opr_EMGen.@Area	"Area01"
raP_Opr_EMGen.@Instruction	"raP_Opr_EMGen"
raP_Opr_EMGen.@Label	"Equipment Module"
raP_Opr_EMGen.@Library	"raP-5_00"
raP_Opr_EMGen.@URL	" "
raP_Opr_EMGen.Cfg_HasMoreObj.@Navigation	" "

General	
raP_Opr_EMGen.Cfg_HasDetailDisplay.@Navigation	" "
raP_Opr_EMGen.Sts.0.@Description	"State 1"
raP_Opr_EMGen.Sts.1.@Description	"State 2"
raP_Opr_EMGen.Sts.2.@Description	"State 3"
raP_Opr_EMGen.Sts.3.@Description	"State 4"
raP_Opr_EMGen.Sts.4.@Description	"State 5"
raP_Opr_EMGen.Sts.5.@Description	"State 6"
raP_Opr_EMGen.Sts.6.@Description	"State 7"
raP_Opr_EMGen.Sts.7.@Description	"State 8"
raP_Opr_EMGen.Sts.8.@Description	"State 9"
raP_Opr_EMGen.Sts.9.@Description	"State 10"
raP_Opr_EMGen.Sts.10.@Description	"State 11"
raP_Opr_EMGen.Sts.11.@Description	"State 12"
raP_Opr_EMGen.Sts.12.@Description	"State 13"
raP_Opr_EMGen.Sts.13.@Description	"State 14"
raP_Opr_EMGen.Sts.14.@Description	"State 15"
raP_Opr_EMGen.Sts.15.@Description	"State 16"
raP_Opr_EMGen.Sts.16.@Description	"State 17"
raP_Opr_EMGen.Sts.17.@Description	"State 18"
raP_Opr_EMGen.Sts.18.@Description	"State 19"
raP_Opr_EMGen.Sts.19.@Description	"State 20"
raP_Opr_EMGen.Sts.20.@Description	"State 21"
raP_Opr_EMGen.Sts.21.@Description	"State 22"
raP_Opr_EMGen.Sts.22.@Description	"State 23"
raP_Opr_EMGen.Sts.23.@Description	"State 24"
raP_Opr_EMGen.Sts.24.@Description	"State 25"
raP_Opr_EMGen.Sts.25.@Description	"State 26"
raP_Opr_EMGen.Sts.26.@Description	"State 27"
raP_Opr_EMGen.Sts.27.@Description	"State 28"
raP_Opr_EMGen.Sts.28.@Description	"State 29"
raP_Opr_EMGen.Sts.29.@Description	"State 30"
raP_Opr_EMGen.Sts.30.@Description	"State 31"
raP_Opr_EMGen.Sts.31.@Description	"State 32"
raP_Opr_EMGen.Sts_ExtddAlms.@Label	"Extended alarm"
raP_Opr_EMGen.XCmd.0.@Description	"Command 1"
raP_Opr_EMGen.XCmd.1.@Description	" "
raP_Opr_EMGen.XCmd.2.@Description	" "
raP_Opr_EMGen.XCmd.3.@Description	" "
raP_Opr_EMGen.XCmd.4.@Description	" "
raP_Opr_EMGen.XCmd.5.@Description	" "
raP_Opr_EMGen.XCmd.6.@Description	" "
raP_Opr_EMGen.XCmd.7.@Description	" "

General	
raP_Opr_EMGen.XCmd.8.@Description	" "
raP_Opr_EMGen.XCmd.9.@Description	" "
raP_Opr_EMGen.XCmd.10.@Description	" "
raP_Opr_EMGen.XCmd.11.@Description	" "
raP_Opr_EMGen.XCmd.12.@Description	" "
raP_Opr_EMGen.XCmd.13.@Description	" "
raP_Opr_EMGen.XCmd.14.@Description	" "
raP_Opr_EMGen.XCmd.15.@Description	" "
raP_Opr_EMGen.XCmd.16.@Description	" "
raP_Opr_EMGen.XCmd.17.@Description	" "
raP_Opr_EMGen.XCmd.18.@Description	" "
raP_Opr_EMGen.XCmd.19.@Description	" "
raP_Opr_EMGen.XCmd.20.@Description	" "
raP_Opr_EMGen.XCmd.21.@Description	" "
raP_Opr_EMGen.XCmd.22.@Description	" "
raP_Opr_EMGen.XCmd.23.@Description	" "
raP_Opr_EMGen.XCmd.24.@Description	" "
raP_Opr_EMGen.XCmd.25.@Description	" "
raP_Opr_EMGen.XCmd.26.@Description	" "
raP_Opr_EMGen.XCmd.27.@Description	" "
raP_Opr_EMGen.XCmd.28.@Description	" "
raP_Opr_EMGen.XCmd.29.@Description	" "
raP_Opr_EMGen.XCmd.30.@Description	" "
raP_Opr_EMGen.XCmd.31.@Description	" "

Alarms		Alarm Default Message	Severity
raP_Opr_EMGen.Sts_DvcAlms.@Label	"Device alarm"	"/*S:0 %.@Description*/: Device alarm	500
raP_Opr_EMGen.Sts_IntlkTrip.@Label	"Interlock trip"	"/*S:0 %.@Description*/: Interlock trip	500
raP_Opr_EMGen.Sts_RptData.@Label	"Report data not collected"	"/*S:0 %.@Description*/: Report data	500

raP_Opr_EPGen

Common	
raP_Opr_EPGen.@Description	"Generic Equipment Phase"
raP_Opr_EPGen.@Area	"Area01"
raP_Opr_EPGen.@Instruction	"raP_Opr_EPGen"
raP_Opr_EPGen.@Label	"Equipment Phase"
raP_Opr_EPGen.@Library	"raP-5_00"
raP_Opr_EPGen.@URL	" "
raP_Opr_EPGen.Cfg_HasMoreObj.@Navigation	" "

General	
#2.Cfg_HasDetailDisplay.@Navigation	" "
#2.Sts_ExtddAlms.@Label	"Extended alarm"

Alarms		Alarm Default Message	Severity
raP_Opr_EPGen.Sts_DvcAlms.@Label	"Device alarm"	"/*S:0 %.@Description*/: Device alarm	500
raP_Opr_EPGen.Sts_IntlkTrip.@Label	"Interlock trip"	"/*S:0 %.@Description*/: Interlock trip	500
raP_Opr_EPGen.Sts_RptData.@Label	"Report data not collected"	"/*S:0 %.@Description*/: Report data	500

raP_Dvc_D4SD

Common	
raP_Dvc_D4SD.@Description	"Discrete 2-, 3- or 4- State Device"
raP_Dvc_D4SD.@Area	"Area01"
raP_Dvc_D4SD.@Instruction	"raP_Dvc_D4SD"
raP_Dvc_D4SD.@Label	"Discrete Device"
raP_Dvc_D4SD.@Library	"raP-5_00"
raP_Dvc_D4SD.@URL	" "
raP_Dvc_D4SD.Cfg_HasMoreObj.@Navigation	" "

General	
raP_Dvc_D4SD.Sts_St0.@Label	"State 0"
raP_Dvc_D4SD.Sts_St1.@Label	"State 1"
raP_Dvc_D4SD.Sts_St2.@Label	"State 2"
raP_Dvc_D4SD.Sts_St3.@Label	"State 3"

Alarms		Alarm Default Message	Severity
raP_Dvc_D4SD.Sts_Sts_EqpFault.@Label	"Equipment fault"	"/*S:0 %.@Description*/: Device-reported Equipment Fault	1000
raP_Dvc_D4SD.Sts_Sts_Fail.@Label	"Position fail"	"/*S:0 %.@Description*/: Fail to Achieve State	1000
raP_Dvc_D4SD.Sts_Sts_IntlkTrip.@Label	"Interlock trip"	"/*S:0 %.@Description*/: Interlock trip	500
raP_Dvc_D4SD.Sts_Sts_Sts_IOFault.@Label	"IO fault"	"/*S:0 %.@Description*/: I/O Fault	1000

raP_Dvc_VlvMP

Common	
raP_Dvc_VlvMP.@Description	"Mix Proof Valve"
raP_Dvc_VlvMP.@Area	"Area01"
raP_Dvc_VlvMP.@Instruction	"raP_Dvc_VlvMP"
raP_Dvc_VlvMP.@Label	"Valve Control"
raP_Dvc_VlvMP.@Library	"raP-5_00"
raP_Dvc_VlvMP.@URL	" "
raP_Dvc_VlvMP.Cfg_HasMoreObj.@Navigation	" "

Alarms		Alarm Default Message	Severity
raP_Dvc_VlvMP.Sts_Sts_Fail.@Label	"Position fail"	"/*S:0 %.@Description*/: Fail to achieve position	1000
raP_Dvc_VlvMP.Sts_Sts_IOFault.@Label	"IO fault"	"/*S:0 %.@Description*/: I/O Fault	1000
raP_Dvc_VlvMP.Sts_Sts_IntlkTrip.@Label	"Interlock trip"	"/*S:0 %.@Description*/: Interlock trip	500

raP_Dvc_nPos

Common	
raP_Dvc_nPos.@Description	"n-Position Device"
raP_Dvc_nPos.@Area	"Area01"
raP_Dvc_nPos.@Instruction	"raP_Dvc_nPos"
raP_Dvc_nPos.@Label	"n-Position Device"
raP_Dvc_nPos.@Library	"raP-5_00"
raP_Dvc_nPos.@URL	" "
raP_Dvc_nPos.Cfg_HasMoreObj.@Navigation	" "

General	
raP_Dvc_nPos.Sts_Pos01.@Label	"Postion 1"
raP_Dvc_nPos.Sts_Pos02.@Label	"Postion 2"
raP_Dvc_nPos.Sts_Pos03.@Label	"Postion 3"
raP_Dvc_nPos.Sts_Pos04.@Label	"Postion 4"
raP_Dvc_nPos.Sts_Pos05.@Label	"Postion 5"
raP_Dvc_nPos.Sts_Pos06.@Label	"Postion 6"
raP_Dvc_nPos.Sts_Pos07.@Label	"Postion 7"
raP_Dvc_nPos.Sts_Pos08.@Label	"Postion 8"
raP_Dvc_nPos.Sts_Pos09.@Label	"Postion 9"
raP_Dvc_nPos.Sts_Pos10.@Label	"Postion 10"
raP_Dvc_nPos.Sts_Pos11.@Label	"Postion 11"
raP_Dvc_nPos.Sts_Pos12.@Label	"Postion 12"
raP_Dvc_nPos.Sts_Pos13.@Label	"Postion 13"
raP_Dvc_nPos.Sts_Pos14.@Label	"Postion 14"
raP_Dvc_nPos.Sts_Pos15.@Label	"Postion 15"
raP_Dvc_nPos.Sts_Pos16.@Label	"Postion 16"
raP_Dvc_nPos.Sts_Pos17.@Label	"Postion 17"
raP_Dvc_nPos.Sts_Pos18.@Label	"Postion 18"
raP_Dvc_nPos.Sts_Pos19.@Label	"Postion 19"
raP_Dvc_nPos.Sts_Pos20.@Label	"Postion 20"
raP_Dvc_nPos.Sts_Pos21.@Label	"Postion 21"
raP_Dvc_nPos.Sts_Pos22.@Label	"Postion 22"
raP_Dvc_nPos.Sts_Pos23.@Label	"Postion 23"
raP_Dvc_nPos.Sts_Pos24.@Label	"Postion 24"
raP_Dvc_nPos.Sts_Pos25.@Label	"Postion 25"
raP_Dvc_nPos.Sts_Pos26.@Label	"Postion 26"
raP_Dvc_nPos.Sts_Pos27.@Label	"Postion 27"
raP_Dvc_nPos.Sts_Pos28.@Label	"Postion 28"
raP_Dvc_nPos.Sts_Pos29.@Label	"Postion 29"
raP_Dvc_nPos.Sts_Pos30.@Label	"Postion 30"

Alarms		Alarm Default Message	Severity
raP_Dvc_nPos.Sts_Sts_IOFault.@Label	"IO fault"	"/*S:0 %.@Description*/: I/O Fault	1000
raP_Dvc_nPos.Sts_Sts_IntlkTrip.@Label	"Interlock trip"	"/*S:0 %.@Description*/: Interlock trip	500
raP_Dvc_nPos.Sts_Sts_LockFail.@Label	"Lock / Unlock failure"	"/*S:0 %.@Description*/: Device lock or seal failure	1000
raP_Dvc_nPos.Sts_Sts_PosFail.@Label	"Position fail"	"/*S:0 %.@Description*/: Device failed to reach commanded position	1000

raP_Opr_ExtddAlm

Common	
raP_Opr_ExtddAlm.@Description	"Extended alarm"
raP_Opr_ExtddAlm.@Area	"Area01"
raP_Opr_ExtddAlm.@Instruction	"raP_Opr_ExtddAlm"
raP_Opr_ExtddAlm.@Label	"Alarm"
raP_Opr_ExtddAlm.@Library	"raP-5_00"
raP_Opr_ExtddAlm.@URL	" "

raP_Tec_ParRpt

Common	
raP_Tec_ParRpt_PAR_XX.@Description	"Parameter"
raP_Tec_ParRpt_PAR_XX.@Area	"Area01"
raP_Tec_ParRpt_PAR_XX.@Instruction	"raP_Tec_ParRpt"
raP_Tec_ParRpt_PAR_XX.@Label	"Parameter Label"
raP_Tec_ParRpt_PAR_XX.@Library	"raP-5_00"
raP_Tec_ParRpt_PAR_XX.@URL	" "
raP_Tec_ParRpt_PAR_XX.@EngineeringUnit	"%"
raP_Tec_ParRpt_RPT_XX.@Description	"Report"
raP_Tec_ParRpt_RPT_XX.@Area	"Area01"
raP_Tec_ParRpt_RPT_XX.@Instruction	"raP_Tec_ParRpt"
raP_Tec_ParRpt_RPT_XX.@Label	Report Label"
raP_Tec_ParRpt_RPT_XX.@Library	"raP-5_00"
raP_Tec_ParRpt_RPT_XX.@URL	" "
raP_Tec_ParRpt_RPT_XX.@EngineeringUnit	"%"

raP_Opr_Prompt

Common	
raP_Opr_Prompt.@Description	"Operator Prompt"
raP_Opr_Prompt.@Area	"Area01"
raP_Opr_Prompt.@Instruction	"raP_Opr_Prompt"
raP_Opr_Prompt.@Label	"Prompt"
raP_Opr_Prompt.@Library	"raP-5_00"
raP_Opr_Prompt.@URL	" "
raP_Opr_Prompt.Cfg_HasMoreObj.@Navigation	" "

raP_Opr_Prompt_Core

Common	
raP_Opr_Prompt.@Description	"Operator Prompt"
raP_Opr_Prompt.@Area	"Area01"
raP_Opr_Prompt.@Instruction	"raP_Opr_Prompt"
raP_Opr_Prompt.@Label	"Prompt"
raP_Opr_Prompt.@Library	"raP-5_00"
raP_Opr_Prompt.@URL	" "
raP_Opr_Prompt.Cfg_HasMoreObj.@Navigation	" "

raP_Dvc_LgxTaskMon

Common	
raP_Dvc_LgxTaskMon.@Description	"Logix Task Monitor"
raP_Dvc_LgxTaskMon.@Area	"Area01"
raP_Dvc_LgxTaskMon.@Instruction	"raP_Dvc_LgxTaskMon"
raP_Dvc_LgxTaskMon.@Label	"Logix Task Monitor"
raP_Dvc_LgxTaskMon.@Library	"raP-5_00"
raP_Dvc_LgxTaskMon.@URL	" "

raP_Dvc_LgxChangeDet

Common	
raP_Dvc_LgxChangeDet.@Description	"Logix Change Detector"
raP_Dvc_LgxChangeDet.@Area	"Area01"
raP_Dvc_LgxChangeDet.@Instruction	"raP_Dvc_LgxChangeDet"
raP_Dvc_LgxChangeDet.@Label	"Controller Name"
raP_Dvc_LgxChangeDet.@Library	"raP-5_00"
raP_Dvc_LgxChangeDet.@URL	" "
raP_Dvc_LgxChangeDet.Cfg_HasMoreObj.@Navigation	" "

raP_Dvc_LgxRedun

Common	
raP_Dvc_LgxRedun.@Description	"Logix Redundant Controller Monitor"
raP_Dvc_LgxRedun.@Area	"Area01"
raP_Dvc_LgxRedun.@Instruction	"raP_Dvc_LgxRedun"
raP_Dvc_LgxRedun.@Label	"Redundant Controller"
raP_Dvc_LgxRedun.@Library	"raP-5_00"
raP_Dvc_LgxRedun.@URL	" "

raP_Dvc_LgxModuleSts

Common	
raP_Dvc_LgxModuleSts.@Description	"Logix - Module Status"
raP_Dvc_LgxModuleSts.@Area	"Area01"
raP_Dvc_LgxModuleSts.@Instruction	"raP_Dvc_LgxModuleSts"

Common	
raP_Dvc_LgxModuleSts.@Label	"Module Name"
raP_Dvc_LgxModuleSts.@Library	"raP-5_00"
raP_Dvc_LgxModuleSts.@URL	" "

raP_Dvc_LgxCPU_5x80

Common	
raP_Dvc_LgxCPU_5x80.@Description	"Processor utilization (5380/5580, v33 and later)"
raP_Dvc_LgxCPU_5x80.@Area	"Area01"
raP_Dvc_LgxCPU_5x80.@Instruction	"raP_Dvc_LgxCPU_5x80"
raP_Dvc_LgxCPU_5x80.@Label	" "
raP_Dvc_LgxCPU_5x80.@Library	"raP-5_00"
raP_Dvc_LgxCPU_5x80.@URL	" "
raP_Dvc_LgxCPU_5x80.Cfg_HasMoreObj.@Navigation	" "

raP_Opr_ArbitrationQ

Common	
raP_Opr_ArbitrationQ.@Description	" "
raP_Opr_ArbitrationQ.@Area	"Area01"
raP_Opr_ArbitrationQ.@Instruction	" "
raP_Opr_ArbitrationQ.@Label	" "
raP_Opr_ArbitrationQ.@Library	"raP-5_00"
raP_Opr_ArbitrationQ.@URL	" "

raP_Opr_OrgScan

Common	
raP_Opr_OrgScan.@Description	" "
raP_Opr_OrgScan.@Area	"Area01"
raP_Opr_OrgScan.@Instruction	" "
raP_Opr_OrgScan.@Label	" "
raP_Opr_OrgScan.@Library	"raP-5_00"
raP_Opr_OrgScan.@URL	" "

raP_Opr_OrgView

Common	
raP_Opr_OrgView.@Description	" "
raP_Opr_OrgView.@Area	"Area01"
raP_Opr_OrgView.@Instruction	" "
raP_Opr_OrgView.@Label	" "
raP_Opr_OrgView.@Library	"raP-5_00"
raP_Opr_OrgView.@URL	" "

HMI Navigation

Tag Naming Conventions

The following table describes the tag naming conventions and syntax to follow when programming to achieve navigation between HMI Faceplate objects.

Instruction Tag Reference/ Navigation Syntax			
Instruction	**Navigation / References**	**Navigation / Reference Tag Name Syntax**	**Navigation / Reference Tag Name Example**
PAH	–	–	–
PAI	Nav to HART Device	PAH : _Dvc	If PAI Tag Name = XT100 PAH tag name = XT100_Dvc
PAID	–	–	–
PAIM	–	–	–
PAO			If PAO Tag Name = XC100
	Nav to HART Device	PAH : _Dvc	PAH tag name = XC100_Dvc
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = XC100_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank0 tag name = XC100_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank0 tag name = XC100_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank0 tag name = XC100_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank0 tag name = XC100_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank0 tag name = XC100_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank0 tag name = XC100_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank0 tag name = XC100_Intlk_7
PBL	–	–	–
PDBC	–	–	–
PDI	–	–	–
PDO			If PDO Tag Name = XY100
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = XY100_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = XY100_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = XY100_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = XY100_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = XY100_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = XY100_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = XY100_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = XY100_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = XY100_Perm
PDOSE	–	–	–
PFO	–	–	–
PHLS	–	–	–

Instruction Tag Reference/ Navigation Syntax			
Instruction	**Navigation / References**	**Navigation / Reference Tag Name Syntax**	**Navigation / Reference Tag Name Example**
PLLS			If PLLS Tag Name = GRPMTR100
	PLLS Ref_Tag(InOut)	PLLS Ref_Motors (InOut) : _Motors	PLLS Ref_Motors (InOut) = GRPMTR100_Motors
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = GRPMTR100_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = GRPMTR100_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = GRPMTR100_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = GRPMTR100_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = GRPMTR100_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = GRPMTR100_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = GRPMTR100_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = GRPMTR100_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = GRPMTR100_Perm
PINTLK			If PDO Tag Name = XY100
	PINTLK (InOut)_Intlk_BankSts	PINTLK Ref_IntlkBankSts (InOut) : _Intlk_BankSts	PINTLK (InOut) - XY100_Intlk_BankSts
PMTR			If PMTR = MT321
	Device Reference Control Set	PMTR Ref_Ctrl_Set (InOut) : _CtrlSet	PMTR Ref_Ctrl_Set (InOut) = MT321_CtrlSet
	Device Reference Control Commands	PMTR Ref_Ctrl_Cmd (InOut) : _CtrlCmd	PMTR Ref_Ctrl_Cmd (InOut) = MT321_CtrlCmd
	Device Reference Control Commands Status	PMTR Ref_Ctrl_Sts (InOut) : _CtrlSts	PMTR Ref_Ctrl_Sts (InOut) = MT321_CtrlSts
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = MT321_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = MT321_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = MT321_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = MT321_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = MT321_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = MT321_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = MT321_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = MT321_Intlk_7
	Nav to Permissive 1	PPERM : _1Perm	PPERM 1 tag name = MT321_1Perm
	Nav to Permissive 2	PPERM : _2Perm	PPERM 2 tag name = MT321_2Perm
	Nav to RunTime	PRT : _RunTime	PRT tag name = MT321_RunTime
	Nav to Restart Inhibit	PRI : _ResInh	PRI tag name = MT321_ResInh
	Nav to Device Object	Device Object : _Dvc	Device Object tag name = MT321_Dvc
PPERM	—	—	—
PPID			If PPID Tag Name = XIC700:
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = XIC700_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = XIC700_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = XIC700_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = XIC700_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = XIC700_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = XIC700_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = XIC700_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = XIC700_Intlk_7
PPTC	—	—	—
PRI	—	—	—
PRT	—	—	—
PTST			If PTST Tag Name = QI102
	Calibration Table Reference	PTST Cfg_CalTbl (InOut) : _CalTable	PTST Cfg_CalTable (InOut) tag name = QI102_CalTable

Instruction Tag Reference/ Navigation Syntax			
Instruction	**Navigation / References**	**Navigation / Reference Tag Name Syntax**	**Navigation / Reference Tag Name Example**
PVLV			If PVLV : XV110
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = XV110_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = XV110_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = XV110_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = XV110_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = XV110_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = XV110_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = XV110_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = XV110_Intlk_7
	Nav to Permissive 1 (Motorized Valve)	PPERM : _Pos1Perm (Motorized Valve)	PPERM 1 tag name = XV110_Pos1Perm (Motorized Valve)
	Nav to Permissive 2 (Solenoid and Motorized Valve)	PPERM : _Pos2Perm (Solenoid and Motorized Valve)	PPERM 2 tag name = XV110_Pos2Perm (Solenoid and Motorized Valve)
	Nav to Valve Statistics	PVLVS : _ValveStats	PVLVS tag name = XV110_ValveStats
PVLVS	—	—	—
PVSD			If PVSD : MT390
	Device Reference Control Set	PVSD Ref_Ctrl_Set (InOut) : _CtrlSet	PVSD Ref_Ctrl_Set (InOut) = MT390_CtrlSet
	Device Reference Control Commands	PVSD Ref_Ctrl_Cmd (InOut) : _CtrlCmd	PVSD Ref_Ctrl_Cmd (InOut) = MT390_CtrlCmd
	Device Reference Control Commands Status	PVSD Ref_Ctrl_Sts (InOut) : _CtrlSts	PVSD Ref_Ctrl_Sts (InOut) = MT390_CtrlSts
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = MT390_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = MT390_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = MT390_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = MT390_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = MT390_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = MT390_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = MT390_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = MT390_Intlk_7
	Nav to Forward Permissive	PPERM : _FwdPerm	PPERM Forward tag name = MT390_FwdPerm
	Nav to Reverse Permissive	PPERM : _RevPerm	PPERM Reverse tag name = MT390_RevPerm
	Nav to RunTime	PRT : _RunTime	PRT tag name = MT390_RunTime
	Nav to Restart Inhibit	PRI : _ResInh	PRI tag name = MT390_ResInh
	Nav to Device Object	Device Object : _Dvc	Device Object tag name = MT390_Dvc
raP_Dvc_nPos			If raP_Dvc_nPos Tag Name = NP0100
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = NP0100_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = NP0100_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = NP0100_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = NP0100_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = NP0100_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = NP0100_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = NP0100_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = NP0100_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = NP0100_Perm

Instruction Tag Reference/ Navigation Syntax			
Instruction	**Navigation / References**	**Navigation / Reference Tag Name Syntax**	**Navigation / Reference Tag Name Example**
raP_Dvc_VlvMP			If raP_Dvc_VlvMP = XV120
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = XV120_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = XV120_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = XV120_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = XV120_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = XV120_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = XV120_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = XV120_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = XV120_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = XV120_Perm
	Nav to Valve Statistics	raP_Dvc_VlvMPS : _ValveStats	PVLVS tag name = XV120_ValveStats
raP_Dvc_D4SD			If raP_Dvc_D4SD : D4SD100
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = D4SD100_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = D4SD100_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = D4SD100_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = D4SD100_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = D4SD100_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = D4SD100_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = D4SD100_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = D4SD100_Intlk_7
	Nav to Permissive 0	PPERM : _0Perm	PPERM 0 tag name = D4SD100_Perm
	Nav to Permissive 1	PPERM : _1Perm	PPERM 1 tag name = D4SD100_Perm
	Nav to Permissive 2	PPERM : _2Perm	PPERM 2 tag name = D4SD100_Perm
	Nav to Permissive 3	PPERM : _3Perm	PPERM 3 tag name = D4SD100_Perm
	Nav to Valve Statistics	raP_Dvc_D4SDS : _ValveStats	PVLVS tag name : D4SD100_ValveStats
raP_Opr_Area			If raP_Opr_Area = Area01
	Nav to Extended Alarms	raP_Opr_ExtddAlm: _ExtddAlm_00 ... _ExtddAlm_32	raP_Opr_ExtddAlm: Area01_ExtddAlm_00 ... _ExtddAlm_32
raP_Opr_EMGen			If raP_Opr_EMGen Tag Name = eTK101
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = eTK101_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = eTK101_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = eTK101_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = eTK101_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = eTK101_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = eTK101_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = eTK101_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = eTK101_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = eTK101_Perm
	Nav to Extended Alarms	raP_Opr_ExtddAlm: _ExtddAlm_00 ... _ExtddAlm_32	raP_Opr_ExtddAlm tag name = eTK101_ExtddAlm_00 ... _ExtddAlm_32
	Nav Parameters	raP_Tec_ParRpt: _PAR_00 ... _PAR_48	raP_Tec_ParRpt tag name = eTK101_PAR_00 ... _PAR_48
	Nav Reports	raP_Tec_ParRpt: _RPT_00 ... _RPT_48	raP_Tec_ParRpt tag name = eTK101_RPT_00 ... _RPT_48

Instruction Tag Reference/ Navigation Syntax			
Instruction	**Navigation / References**	**Navigation / Reference Tag Name Syntax**	**Navigation / Reference Tag Name Example**
raP_Opr_EPGen			If raP_Opr_EPGen Tag Name = epAG1001
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = epAG1001_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = epAG1001_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = epAG1001_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = epAG1001_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = epAG1001_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = epAG1001_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = epAG1001_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = epAG1001_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = eTK101_Perm
	Nav to Extended Alarms	raP_Opr_ExtddAlm: _ExtddAlm_00 ... _ExtddAlm_32	raP_Opr_ExtddAlm tag name = epAG1001_ExtddAlm_00 ... _ExtddAlm_32
	Nav Parameters	raP_Tec_ParRpt: _PAR_00 ... _PAR_48	raP_Tec_ParRpt tag name = epAG1001_PAR_00 ... _PAR_48
	Nav Reports	raP_Tec_ParRpt: _RPT_00 ... _RPT_48	raP_Tec_ParRpt tag name = epAG1001_RPT_00 ... _RPT_48
raP_Opr_ExtddAlm	Extended Alarms	—	—
raP_Opr_Unit			If raP_Opr_Unit Tag Name = GroupControl
	Nav to Interlock Bank 0	PINTLK : _Intlk_0	PINTLK Bank0 tag name = GroupControl_Intlk_0
	Nav to Interlock Bank 1	: _Intlk_1	PINTLK Bank1 tag name = GroupControl_Intlk_1
	Nav to Interlock Bank 2	: _Intlk_2	PINTLK Bank2 tag name = GroupControl_Intlk_2
	Nav to Interlock Bank 3	: _Intlk_3	PINTLK Bank3 tag name = GroupControl_Intlk_3
	Nav to Interlock Bank 4	: _Intlk_4	PINTLK Bank4 tag name = GroupControl_Intlk_4
	Nav to Interlock Bank 5	: _Intlk_5	PINTLK Bank5 tag name = GroupControl_Intlk_5
	Nav to Interlock Bank 6	: _Intlk_6	PINTLK Bank6 tag name = GroupControl_Intlk_6
	Nav to Interlock Bank 7	: _Intlk_7	PINTLK Bank7 tag name = GroupControl_Intlk_7
	Nav to Permissive	PPERM : _Perm	PPERM tag name = GroupControl_Perm
	Nav to Extended Alarms	raP_Opr_ExtddAlm: _ExtddAlm_00 ... _ExtddAlm_32	raP_Opr_ExtddAlm tag name = GroupControl_ExtddAlm_00 ... _ExtddAlm_32
raP_Tec_ParRpt	Parameters and Reports	—	—

Notes:

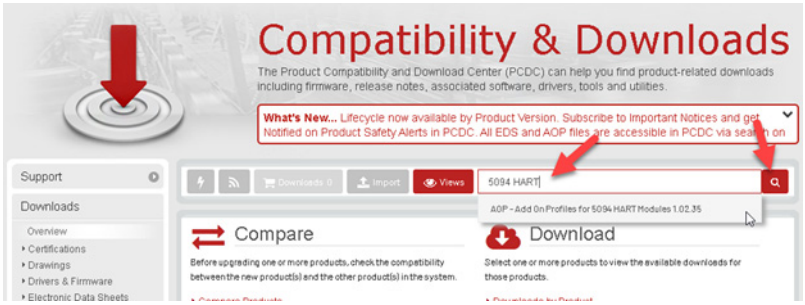
5094-IF8IH to PAH Configuration Example

This appendix describes how to configure a HART device using a newer HART I/O module, such as the 5094-IF8IH, and the PAH instruction, in a PlantPAx® 5.0 system. This example requires a system that meets PlantPAx 5.0 system requirements, including using Version 33 or later of Studio 5000 Logix Designer® software.

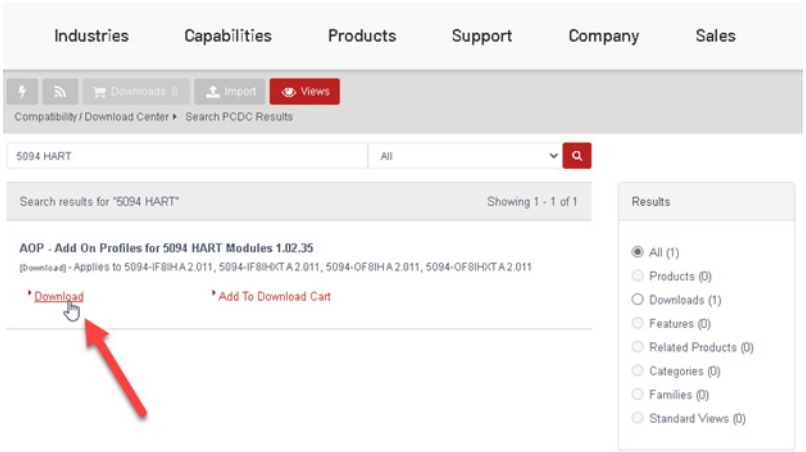
Download and install the 5094 HART Analog Add-On Profile

The Add-on Profile can be accessed from the Product Compatibility and Download Center.

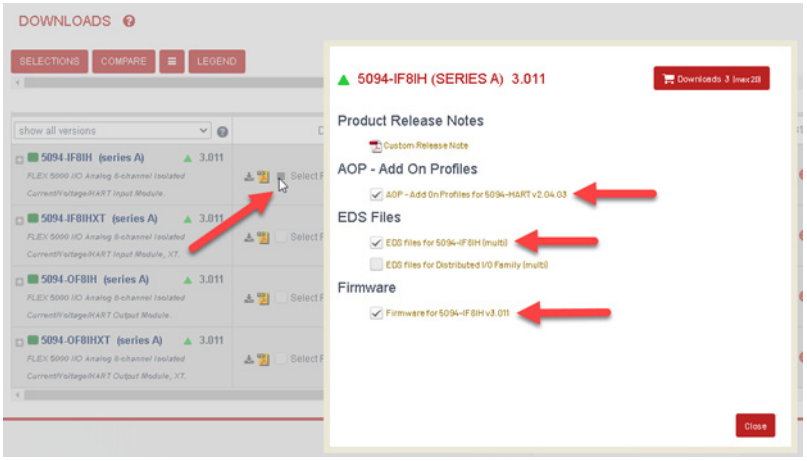
1. Search for "5094-HART".



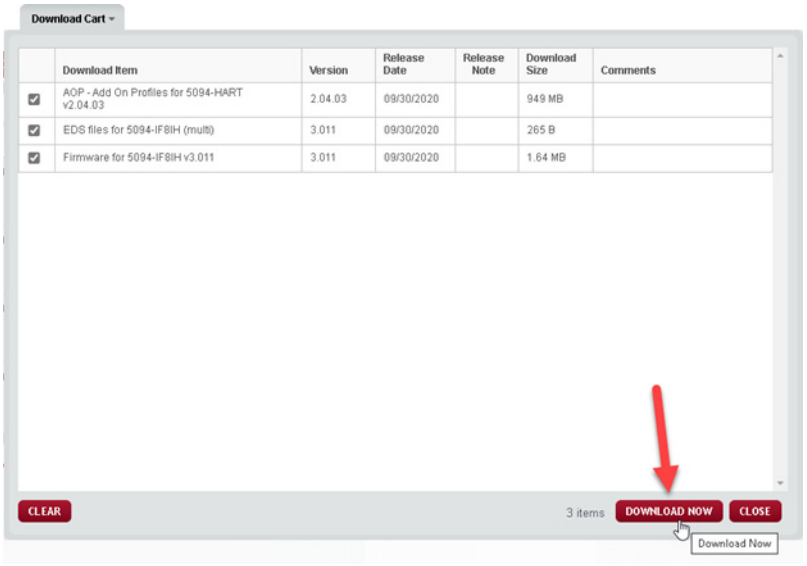
2. Select Download.



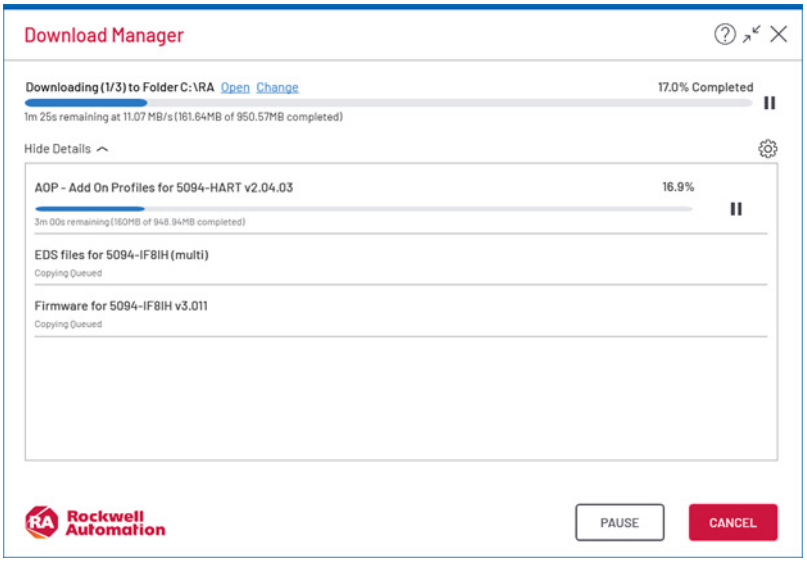
3. Select Files, then select the Add-on Profiles, EDS Files, and Firmware.



4. Select Download Now.



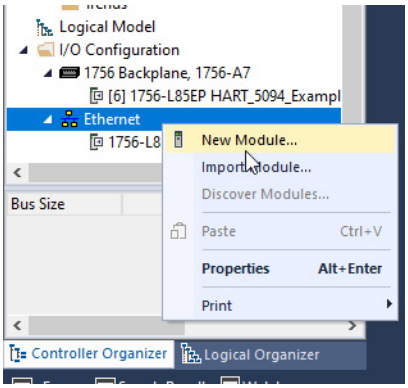
The files are downloaded into a zip file using the download manager.



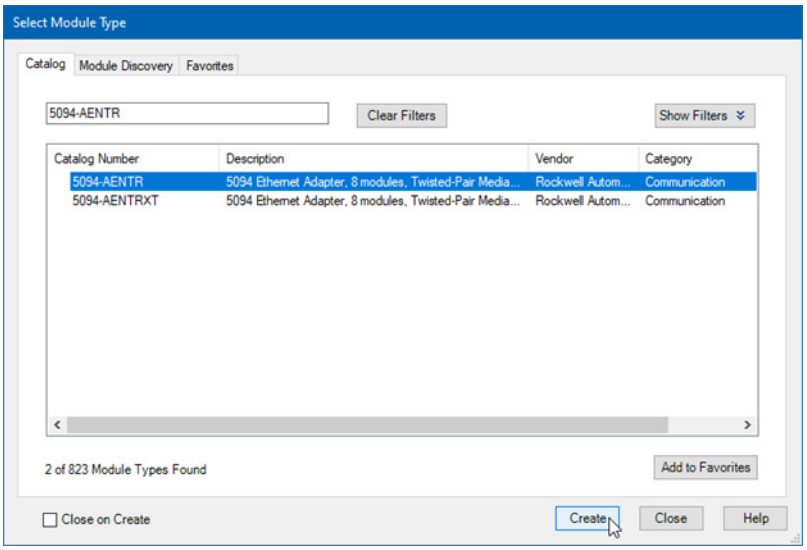
5. Extract the files from the ZIP folder.
6. Run mpsetup.exe as Administrator.

Add the 5094 Adapter Module to the Project I/O Configuration

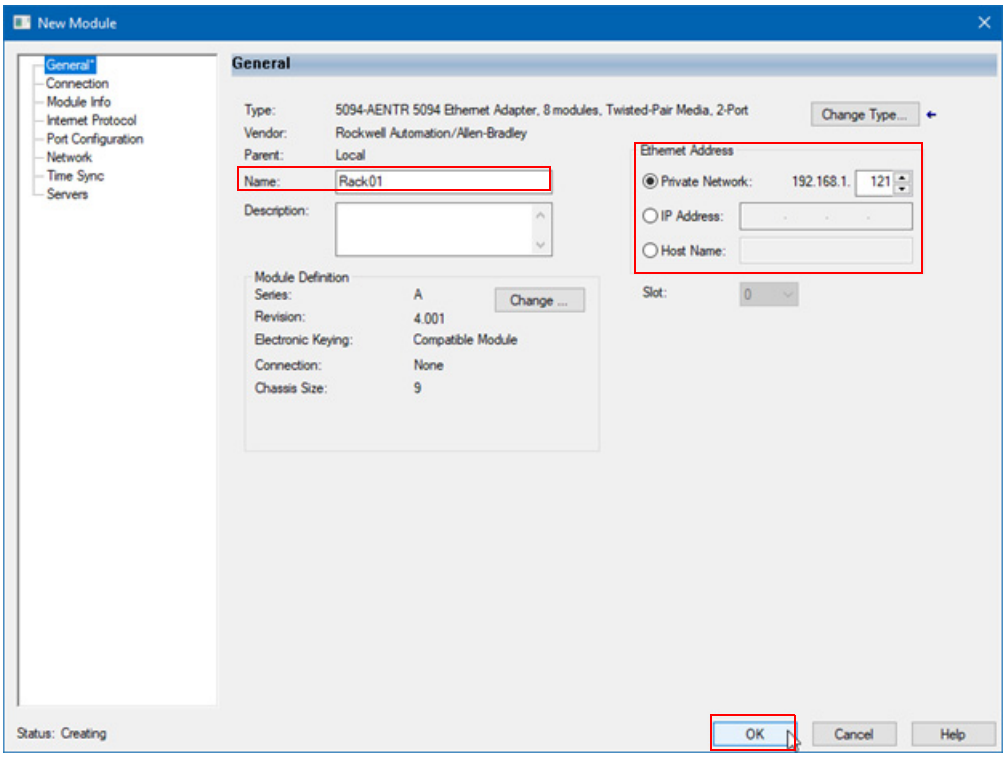
1. In the controller Organizer for your project, select the Ethernet network to be used to communicate with the 5094 I/O. Right-click and select "New Module..."



2. Select the catalog number of the 5094 adapter you are using and Create.

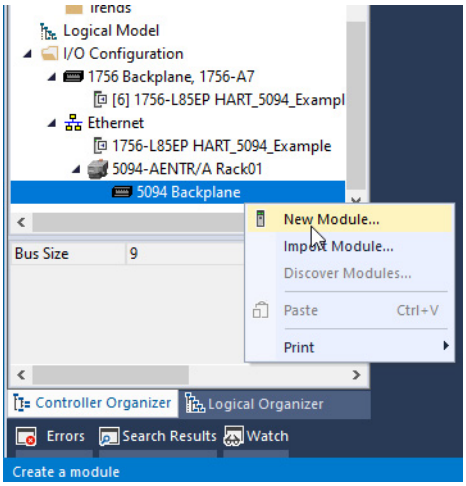


3. Enter the name and IP address for the adapter.

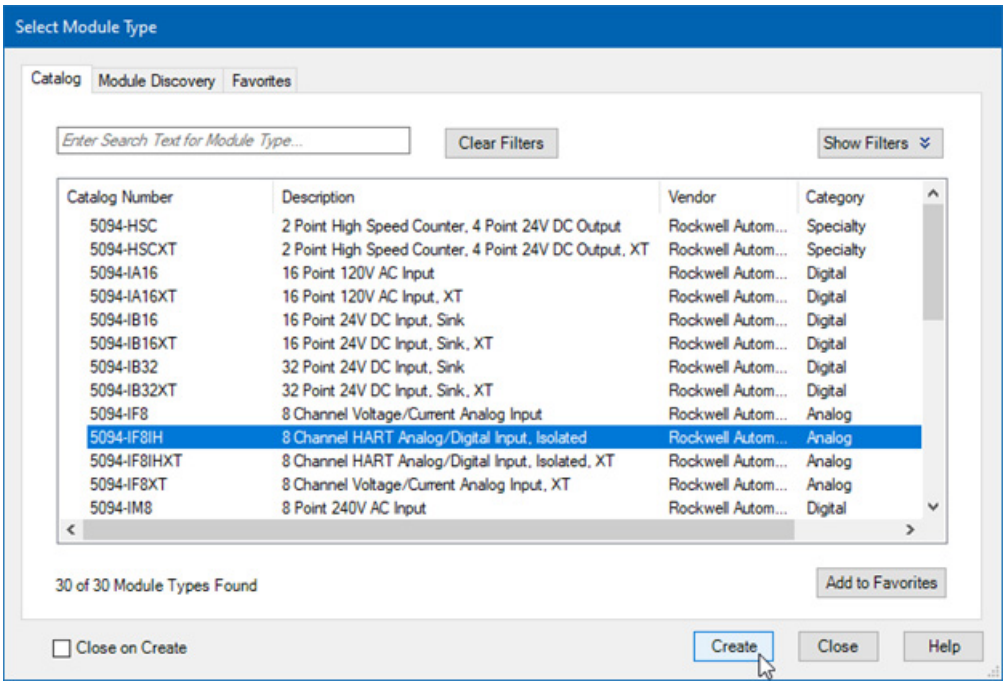


Add the 5094-IF8IH Module to the Project I/O Configuration

1. In the controller Organizer for your project, select the 5094 Backplane. Right-click and select "New Module..."



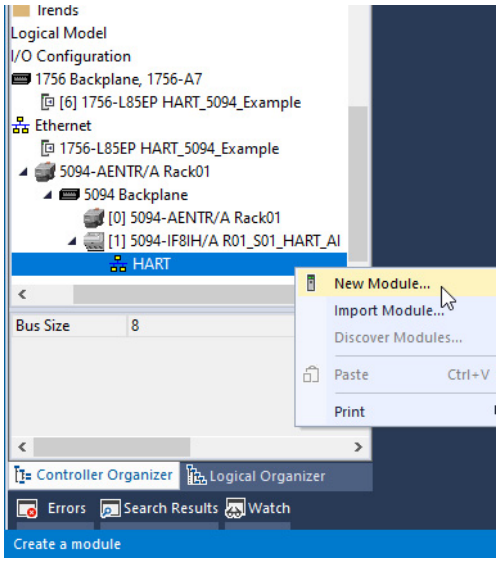
2. Select the 5094-IF8IH module and “Create”.



3. To accept the module defaults, Select OK.

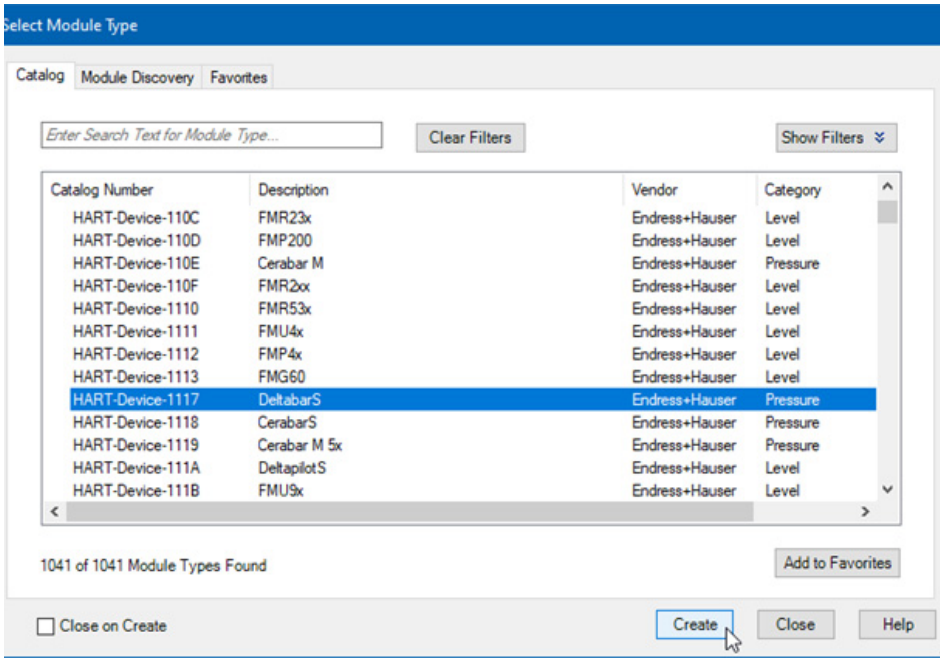
Add the HART Device to the Project I/O Configuration

1. In the controller Organizer for your project, select the HART network. Right-click and select “New Module...”.

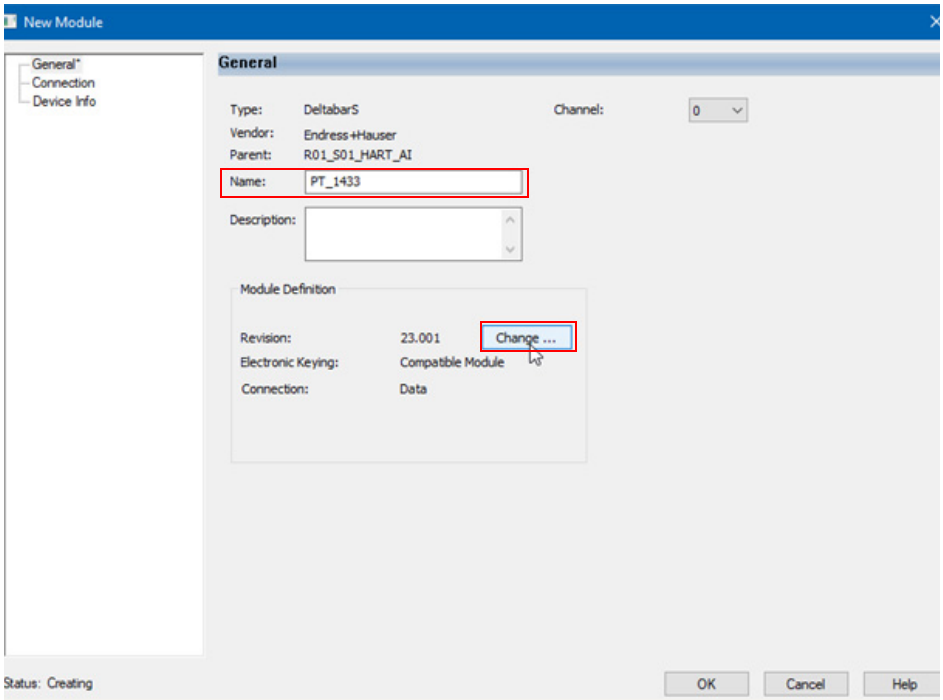


2. Select the type of HART transmitter and “Create”.

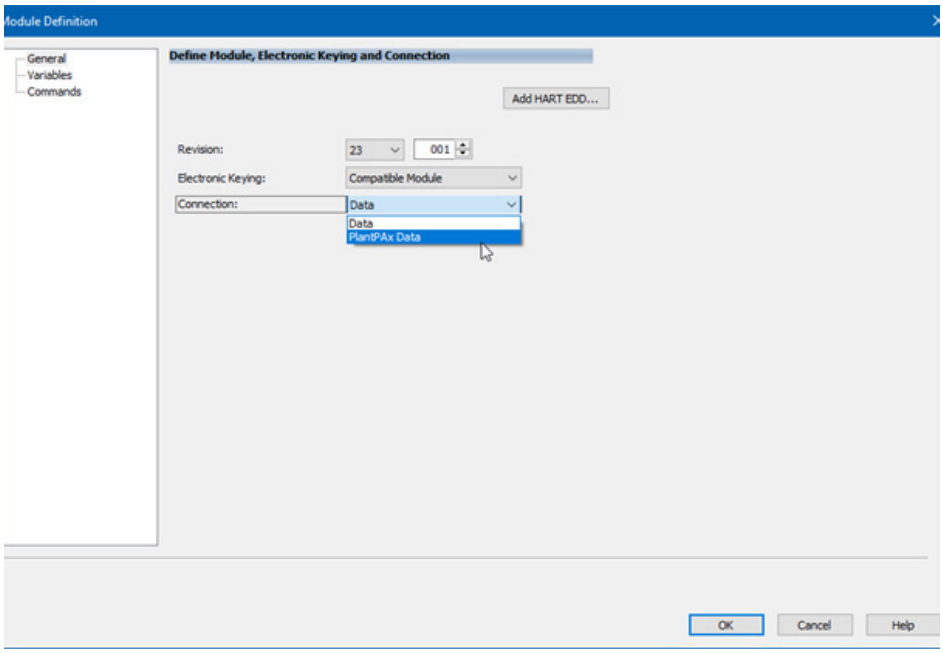
   In this example, we are using an Endress+Hauser Deltabar-S device.



3. In the New Module dialog box, enter a name for the transmitter then select Change in the Module Definition section.

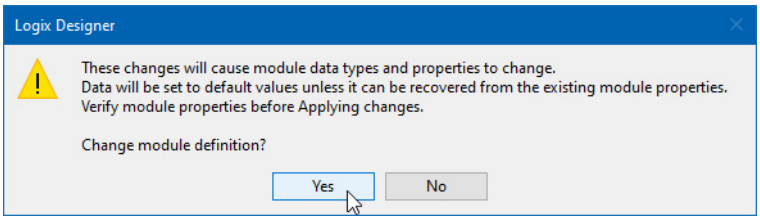


4. Change the Connection type to PlantPAx Data.

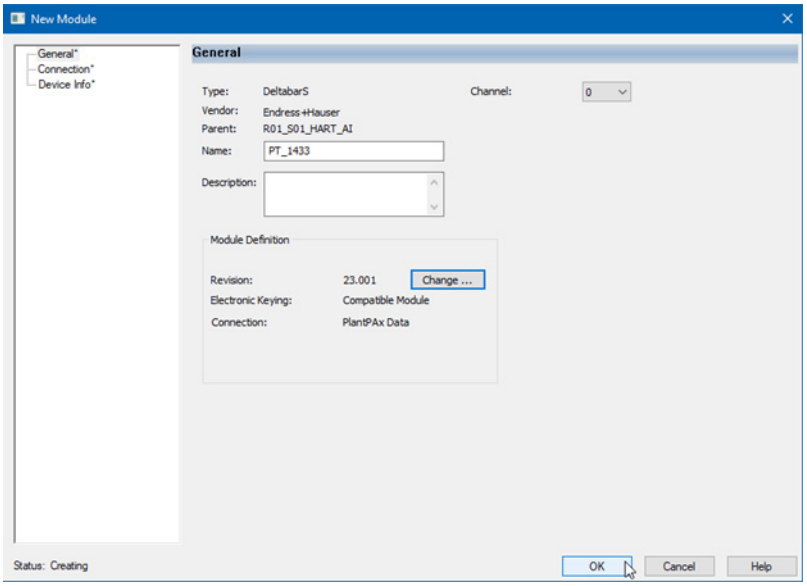


5. Changing the connection type causes a change in data types for the input and output data.

   Select Yes to change the module definition.

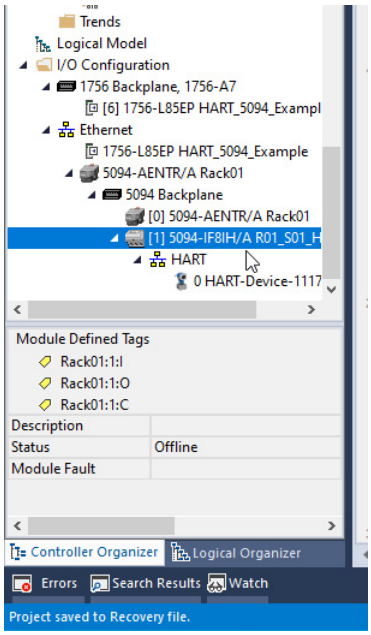


6. Verify the information and Select OK.

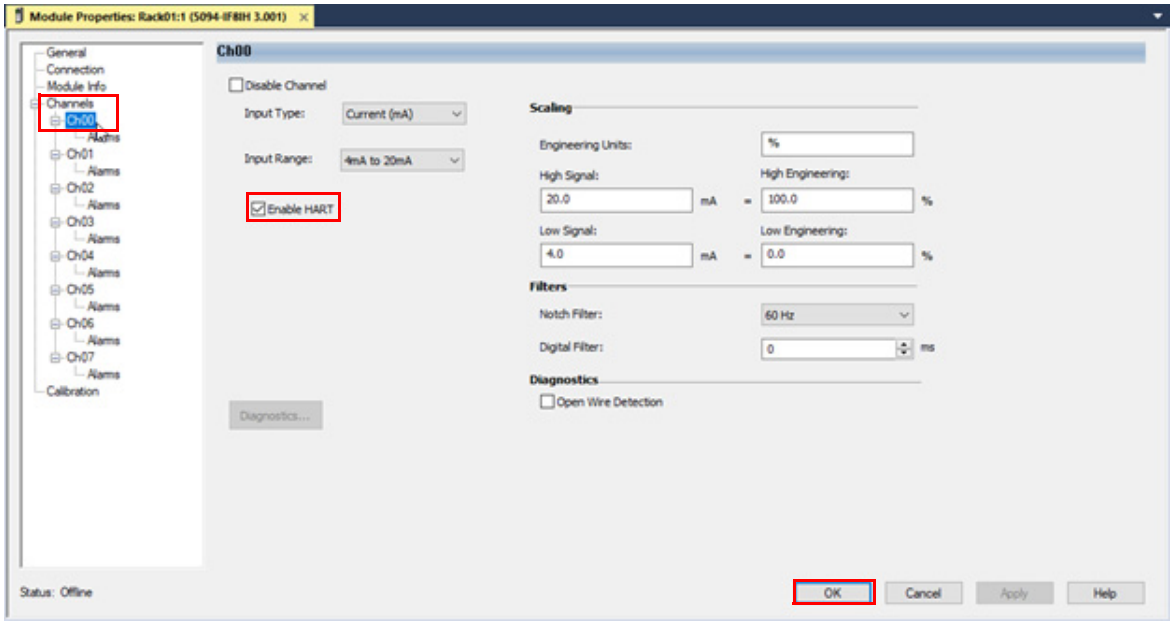


Configure the Analog Input Channel

1. In the controller Organizer for your project, select the 5094-IF8IH module created. Double-click to open the Properties dialog.



2. Select the channel where the transmitter is connected. In this example, it is Channel 00. Select the box to Enable HART communication on this channel.

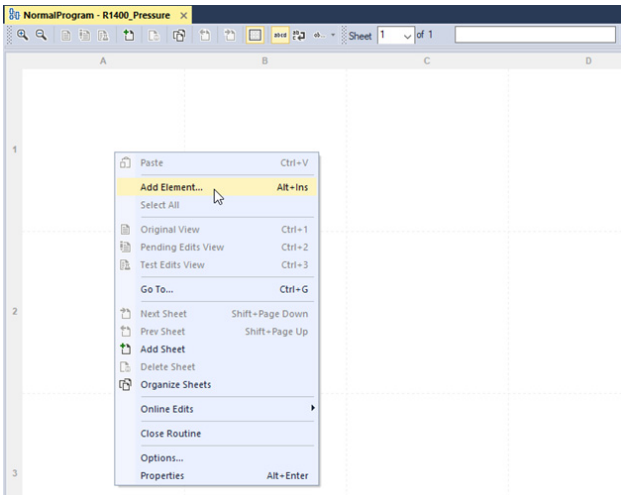


Add the PAH (Process Analog HART) and PAI (Process Analog Input) Instruction Instances to the Project

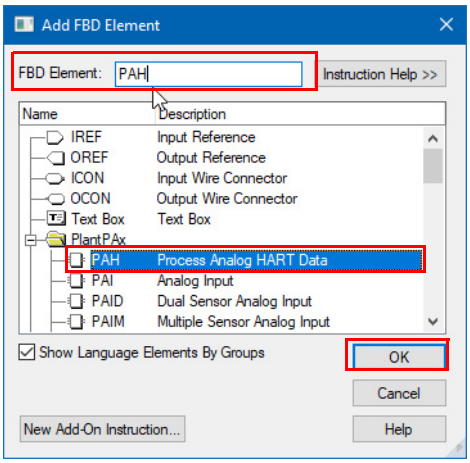
In this example, we are using a Function Block routine. Ladder Diagram or Structured Text could be used.

Add the PAH Instruction Instance

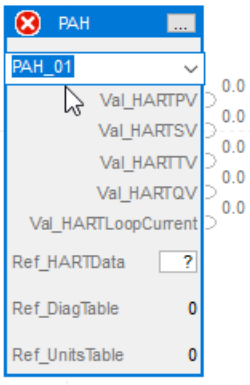
1. Right-click a blank area on the sheet and select “Add Element...”.



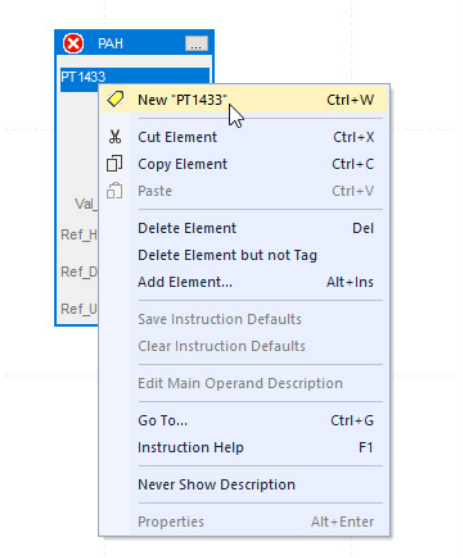
2. Enter PAH for the FBD Element.



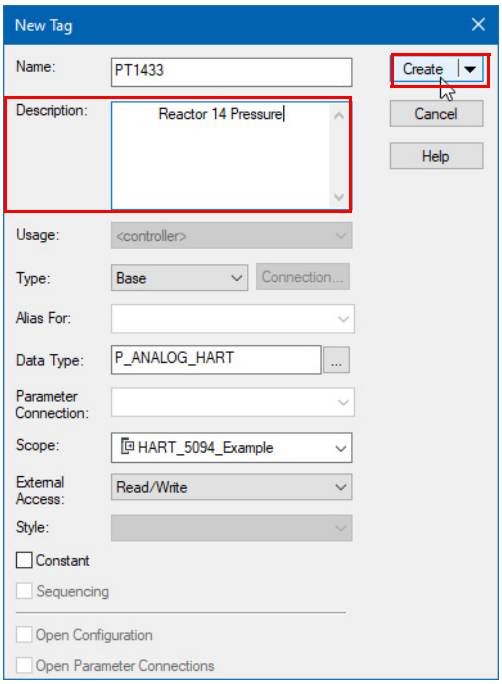
3. Enter the desired tag name of the backing tag for the PAH block.



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



5. In the New Tag dialog, enter a tag description. The required data type is automatically selected for you.

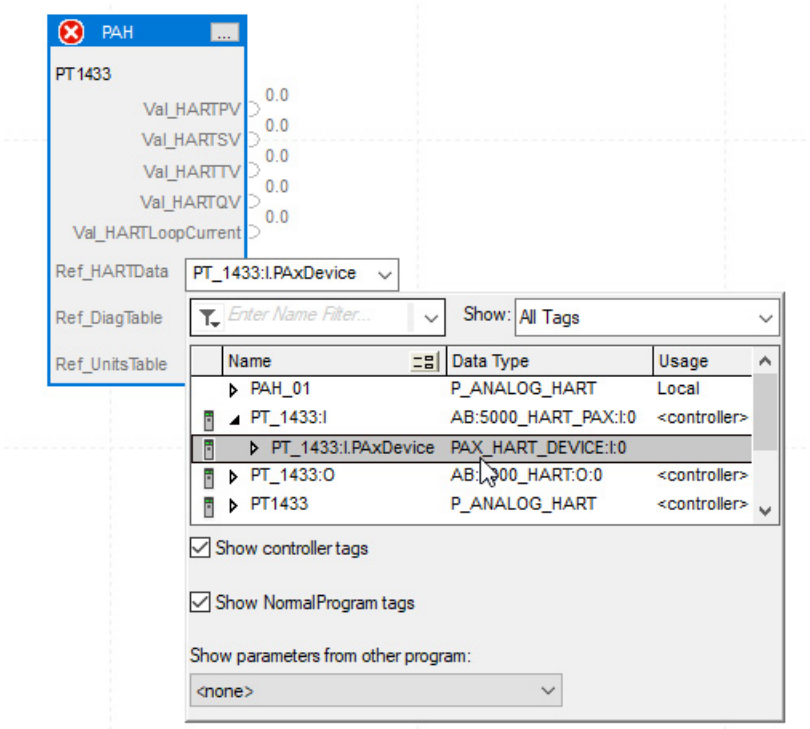


The tag can be created at Controller scope, or in the Program containing this routine. For this example, we use a Controller-scope tag.

Connect PAX_HART_DEVICE:I:0 Member from Input Assembly to Ref_HARTData InOut Parameter.

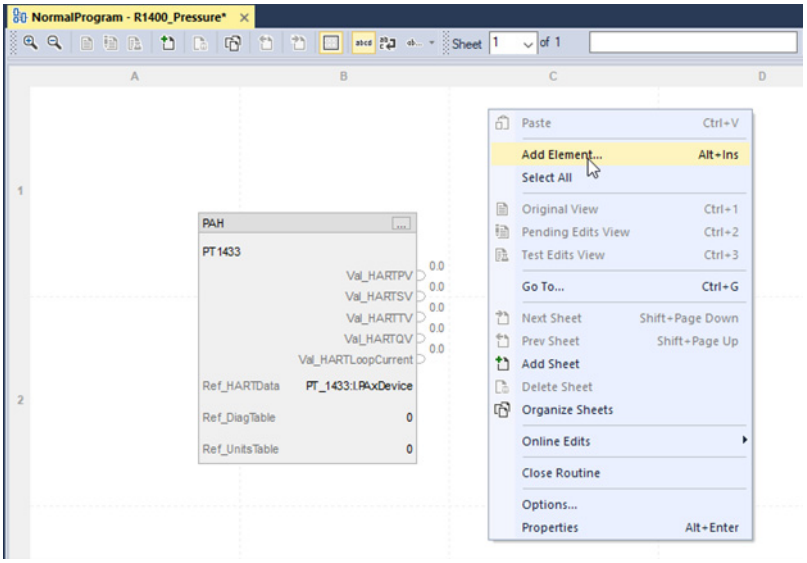
1. Select the pull-down for the Ref_HARTData InOut Parameter.
2. Navigate to the input assembly tag for the HART device, expand, and select the “PAxDevice” member.

   The data type must be “PAX_HART_DEVICE:I:0”.

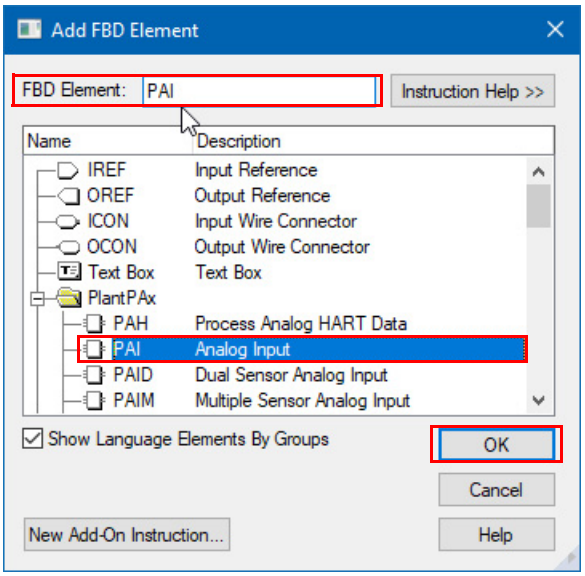


Add the PAI Instruction Instance

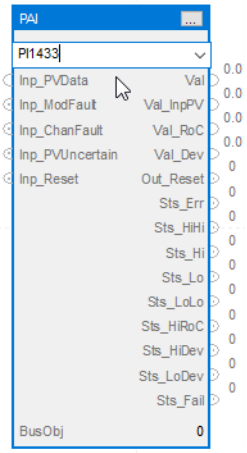
1. Right-click a blank area of the Function Block routine sheet and select “Add Element...”.



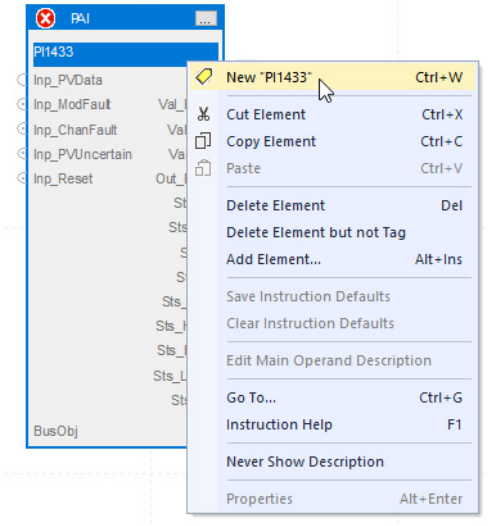
2. Enter PAI for the FBD Element.



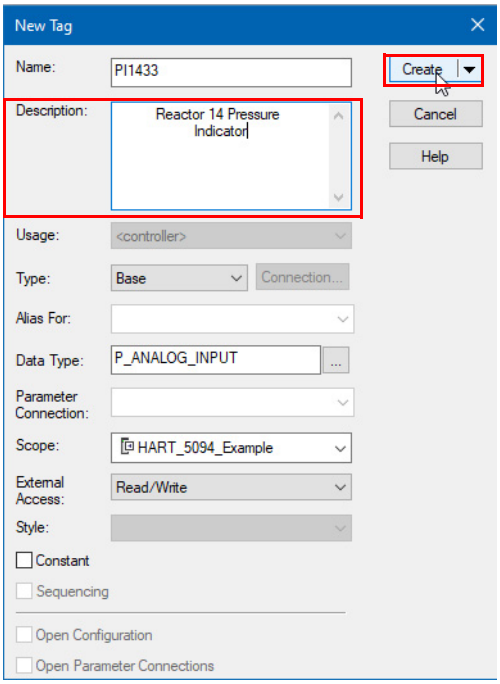
3. Enter the desired tag name of the backing tag for the PAI block. In this example, we used “PI1433” (for Pressure Indicator).



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

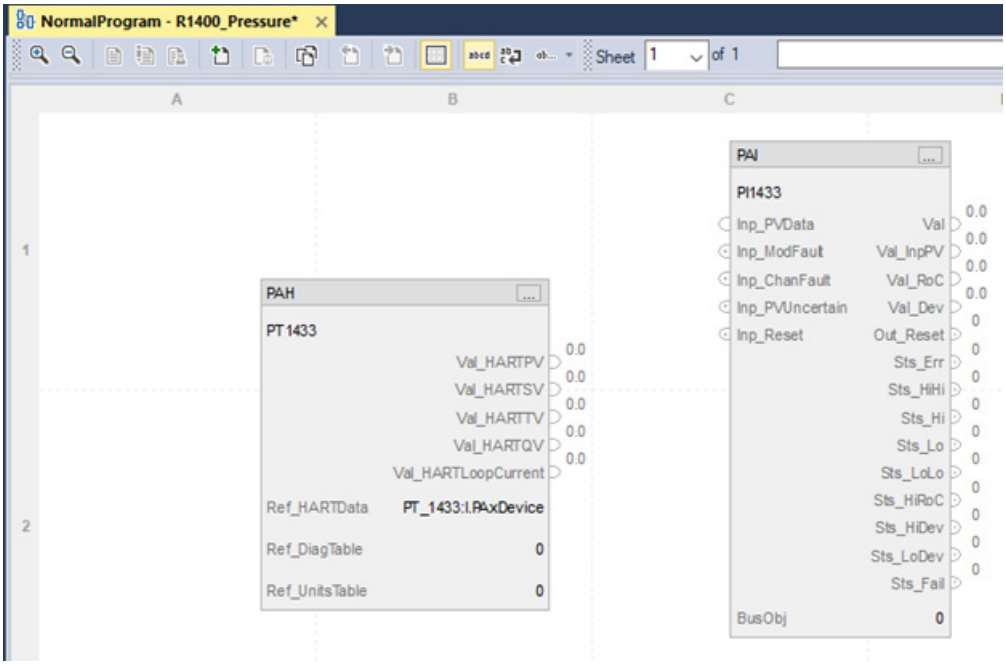


5. In the New Tag dialog, enter a tag description. The required data type is automatically selected for you.



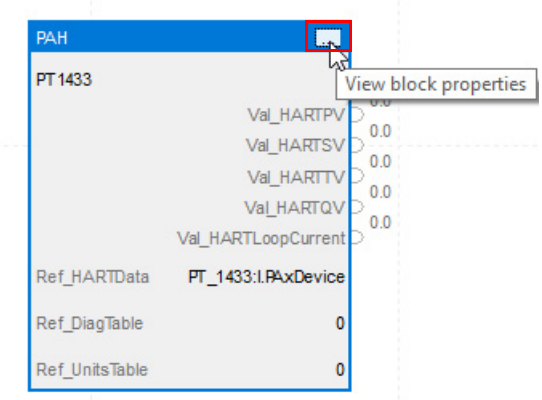
The tag can be created at Controller scope, or in the Program containing this routine. For this example, we use a Controller-scope tag. For HMI navigation to work properly, the PAH and PAI instance tags must be at the same scope.

The tag is created and the routine contains no errors.

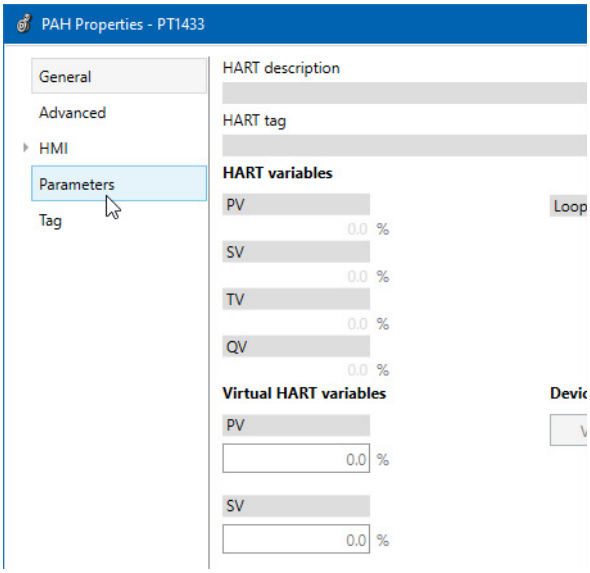


Connect the PAH Instance to the PAI Instance

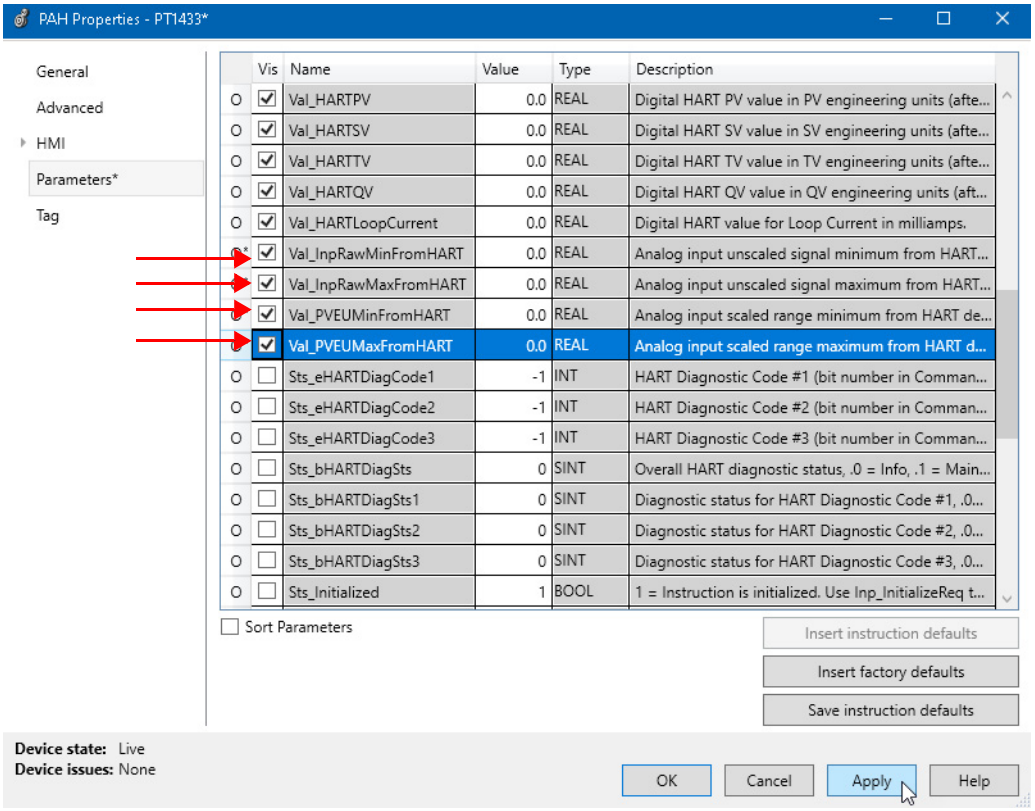
1. Select the properties of the PAH instruction.



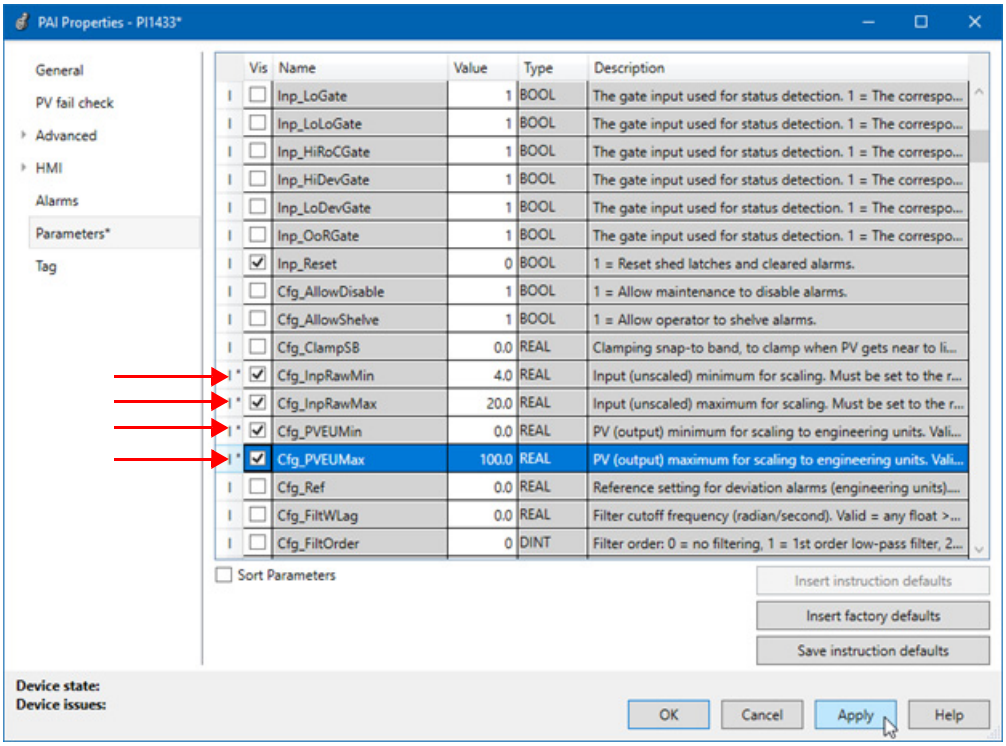
2. Select the Parameters tab.



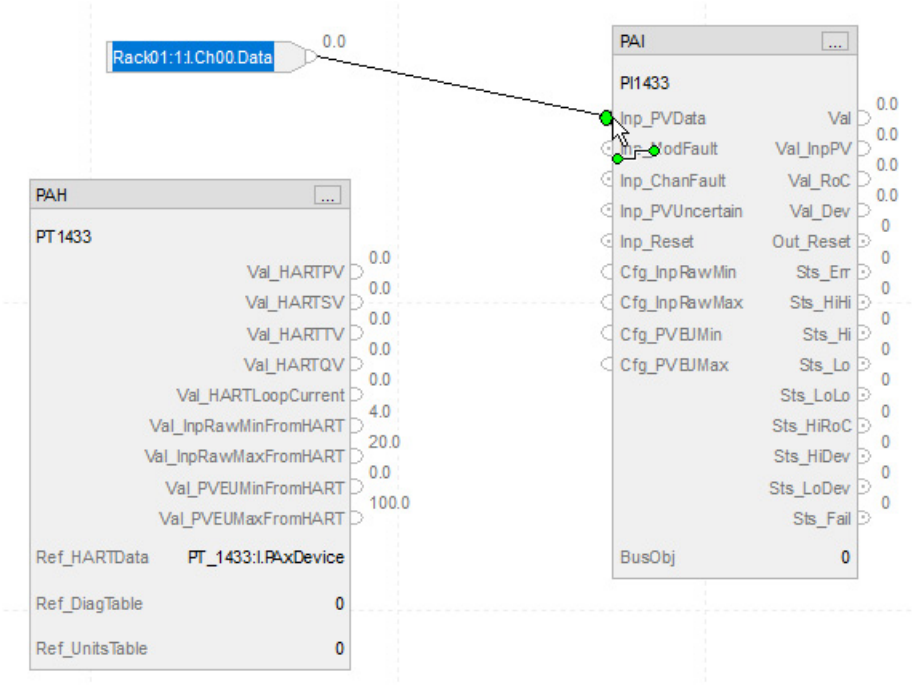
3. Select the boxes in the "Vis" column to make the Raw and EU scaling Values visible as output pins.



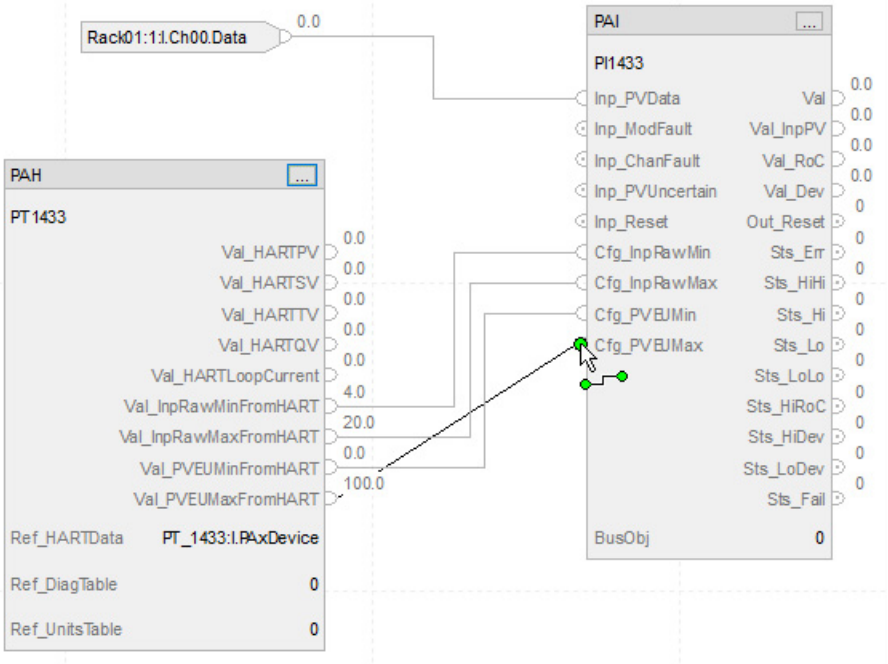
4. From the Parameters tab of the **PAI instruction** properties, Select the boxes in the "Vis" column to make the Raw and EU **configuration input** pins visible.



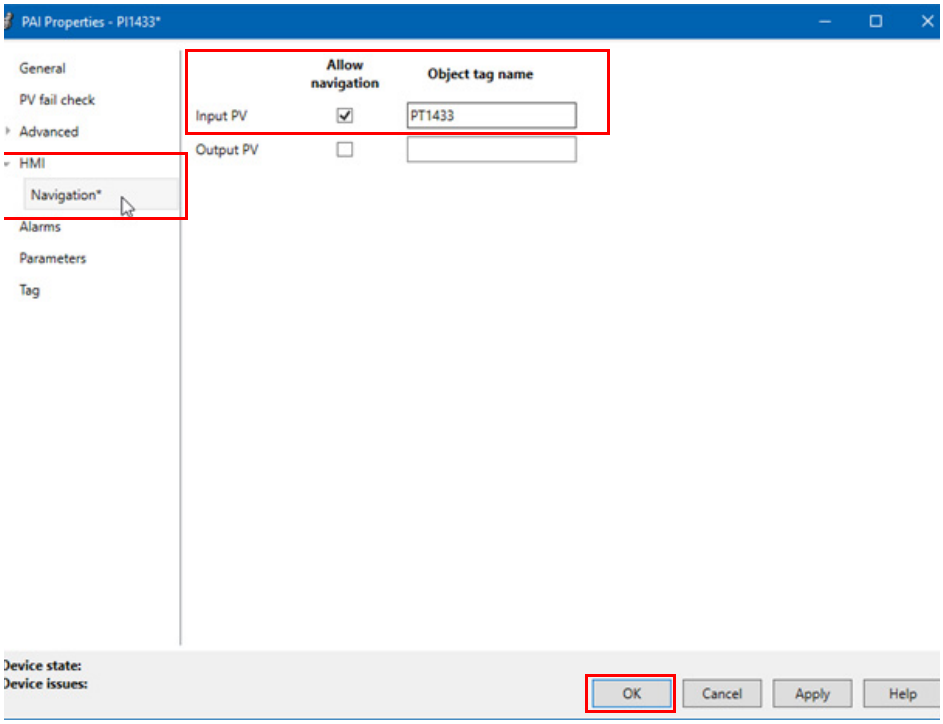
5. Wire the analog input signal to the PAI block.



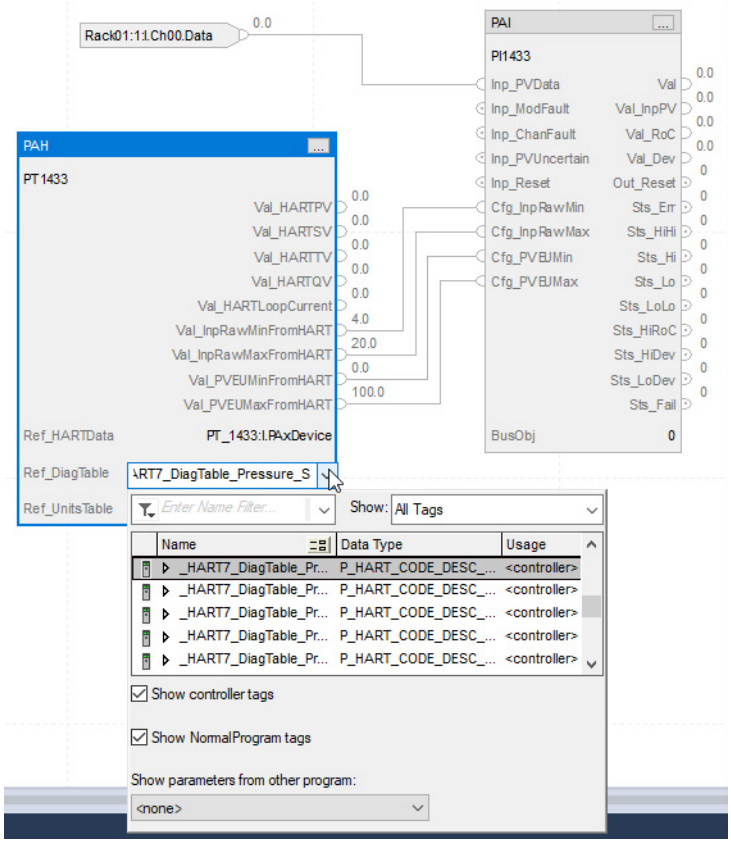
6. Wire the HART scaling data from the PAH block to the PAI block.



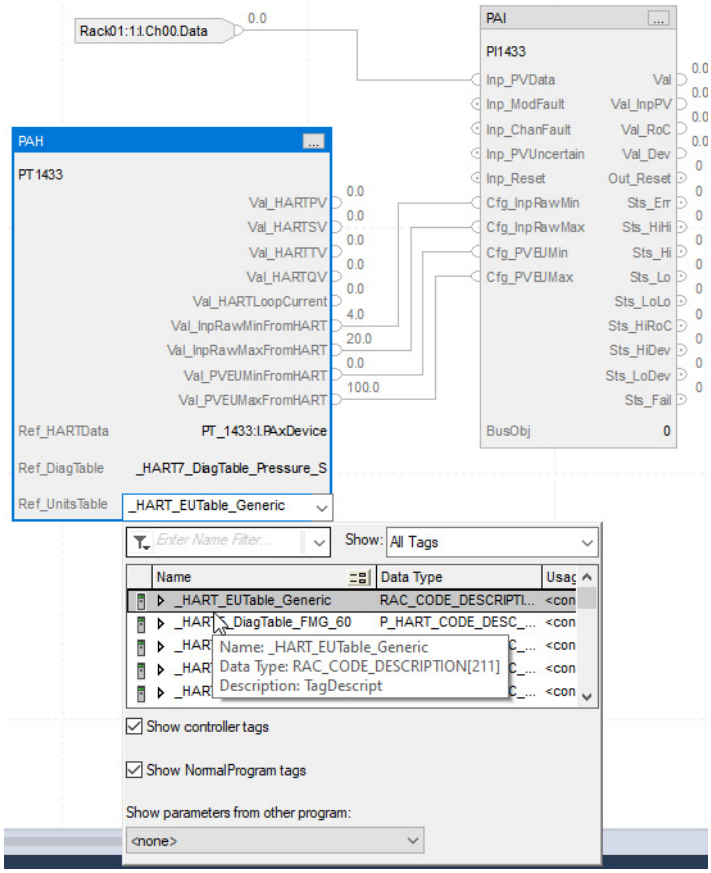
7. From the PAI Properties, navigate to the HMI>Navigation tab. Link the PAI Input PV navigation to the PAH instance.



8. On the PAH instance, link the HART Diagnostic Lookup Table for the pressure transmitter InOut parameter.



9. Link the HART engineering units lookup table to the units InOut parameter.

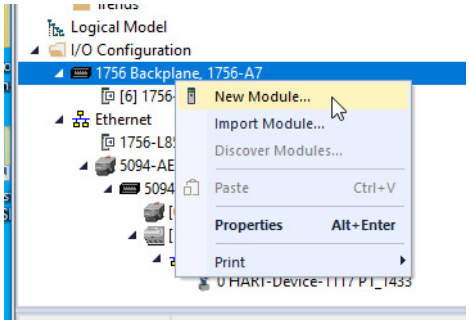


1756-IF8IH with raP_Tec_HARTChanData_to_PAH Add-On Instruction Configuration Example

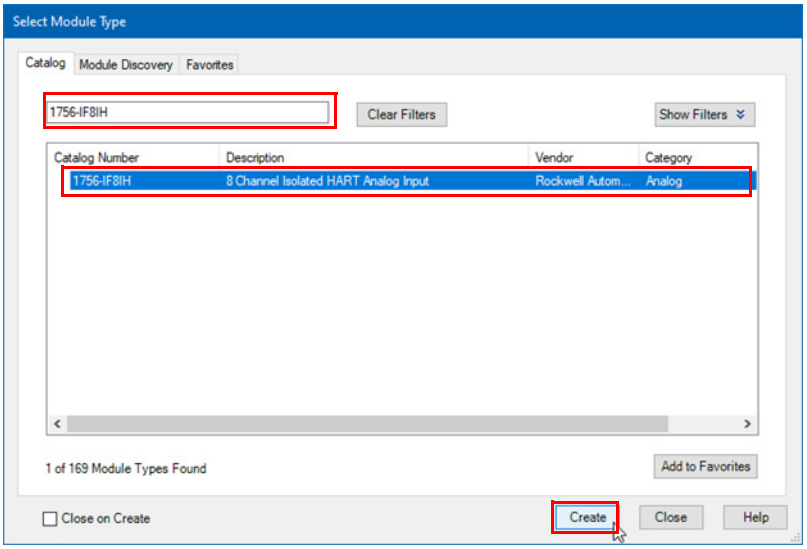
This appendix shows an example of using a 1756-IF8IH (using I_1756IF8IH 4.10) with the raP_Tec_HARTChanData_to_PAH Add-On Instruction from the 5.00 Library download to feed PAH and PAI instructions (5.00 system on L85EP).

Add the 1756-IF8IH Module to the Project I/O Configuration

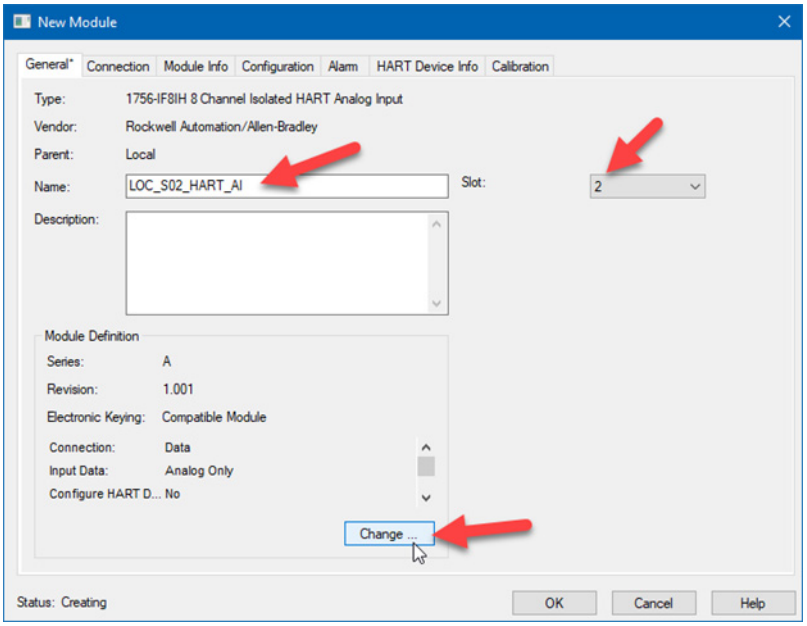
1. In the controller Organizer for your project, select the 1756 Backplane. Right-click and select "New Module...".



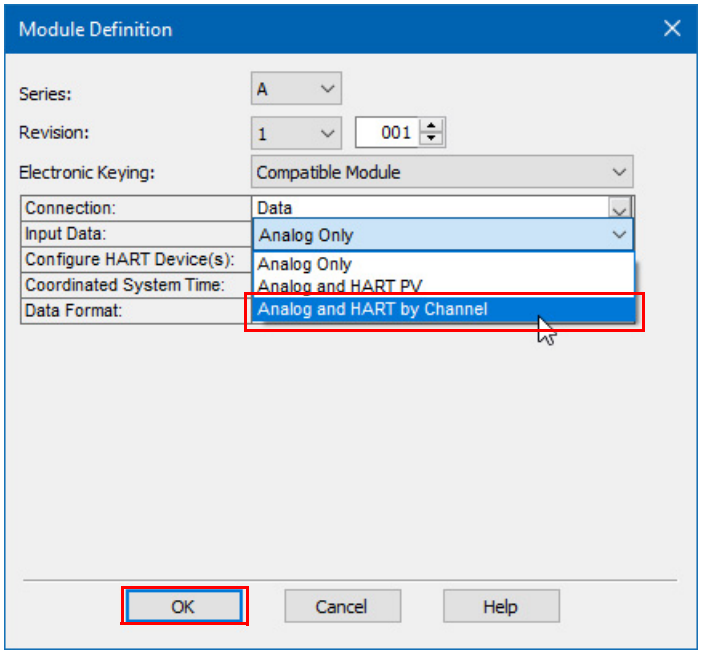
2. Select 1756-IF8IH.



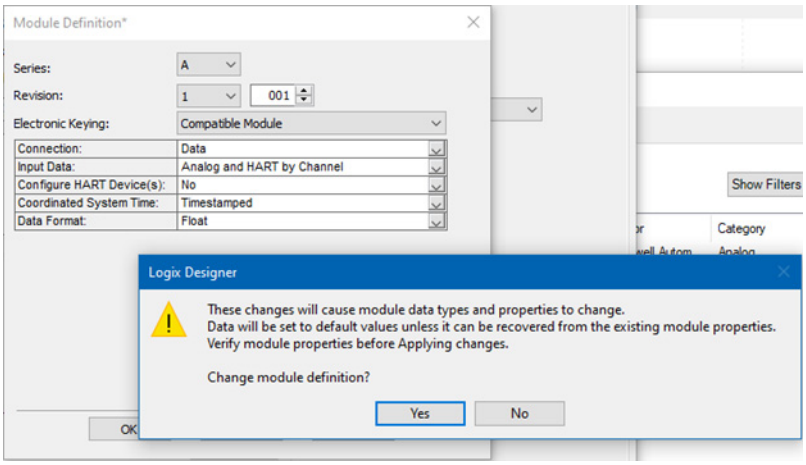
3. Enter a name for the module, Select the slot number where the module is installed, and select Change in the Module Definition.



4. In the Module Definition dialog, change the Input Data selection to "Analog and HART by Channel".

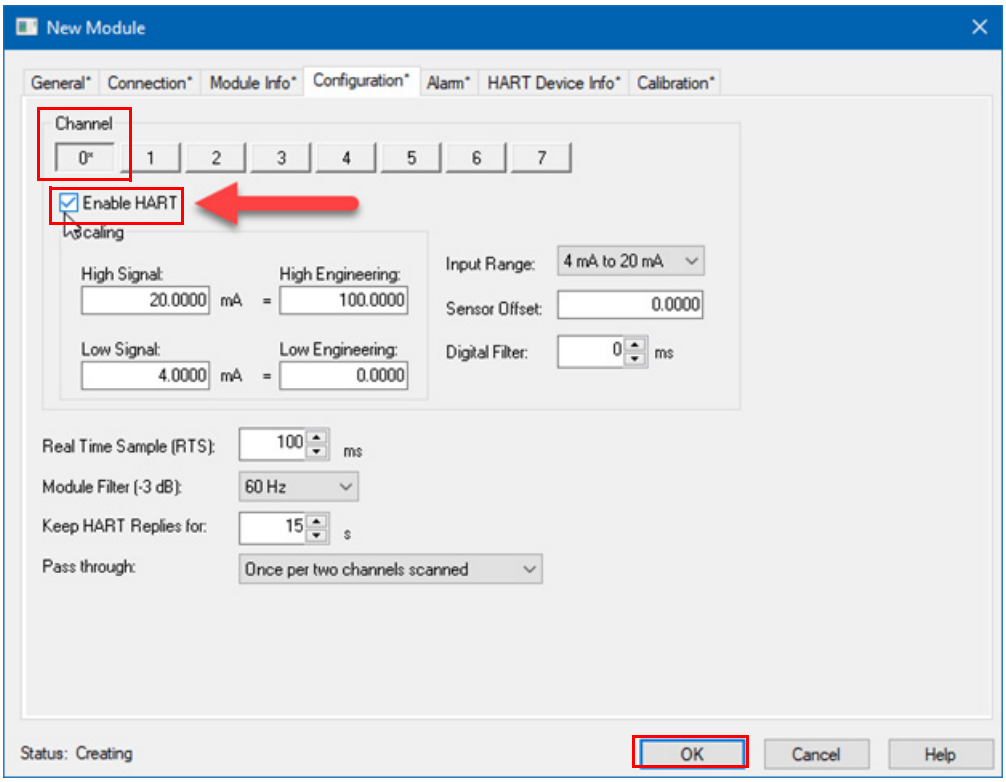


5. Select YES to change the module definition.



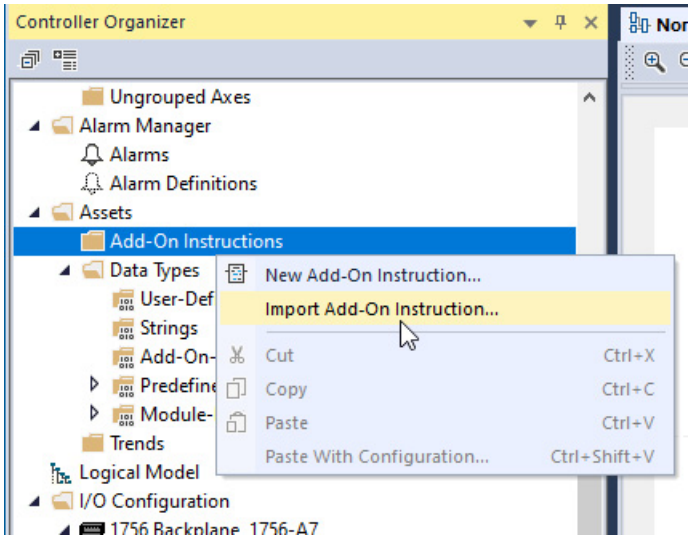
Configure the Channel for the HART Device

1. From the New Module dialog box, Select the configuration tab.
2. Select the Channel where the transmitter is installed and Enable HART on the channel.

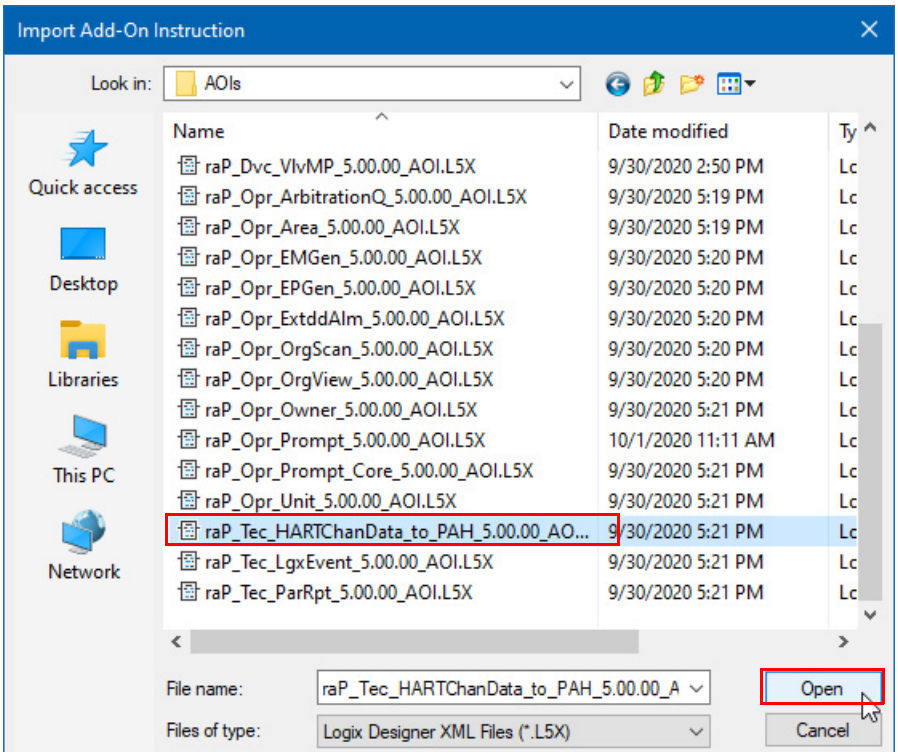


Import the raP_Tec_HARTChanData_to_PAH Add-On Instruction

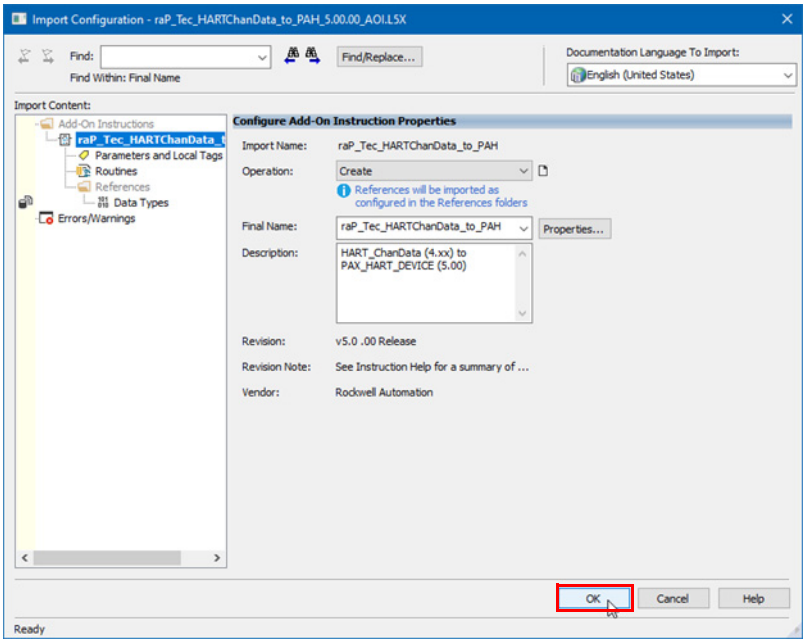
1. In the Controller Organizer, expand “Assets” to show the “Add-On Instructions” folder.
2. Right-click the Add-On Instructions folder and select “Import Add-On Instruction...”.



3. Navigate to the location where you downloaded the Library of Process Objects version 5.00.
4. Navigate to the Logix Add-On Instructions. Select the “raP_Tec_HARTChanData_to_PAH” Add-On Instruction import L5X file.

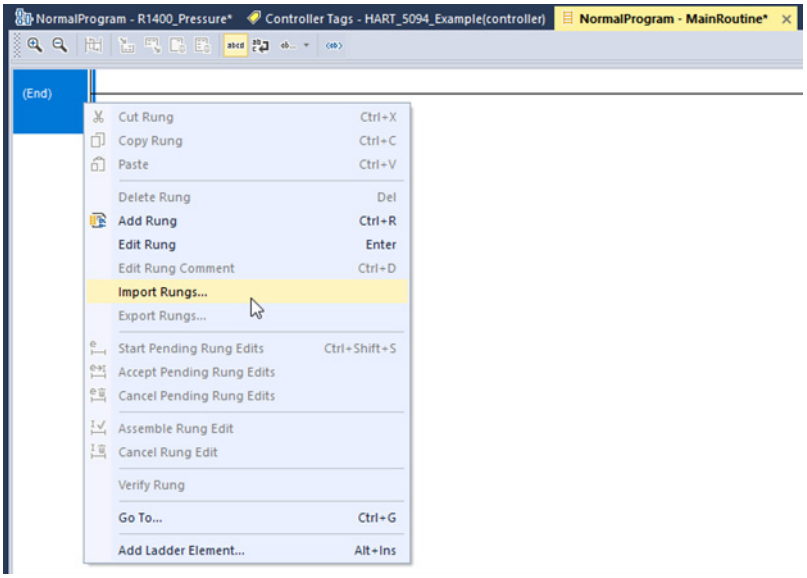


5. Select OK in the Import Configuration dialog box to accept the default values.



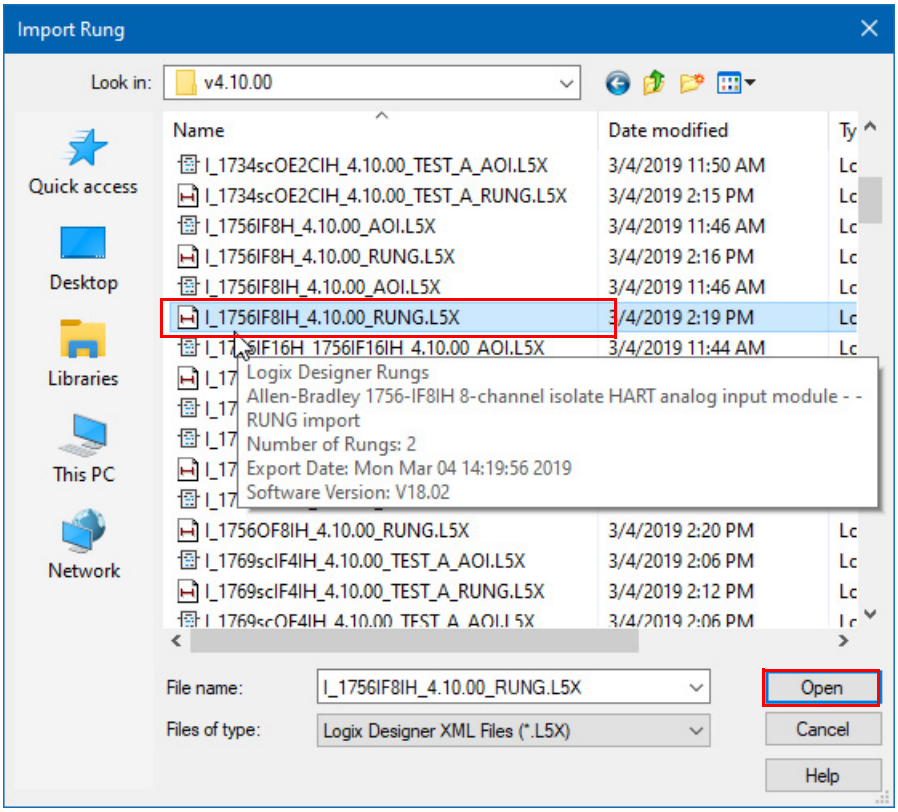
Import the I_1756IF8IH Rung into the Project

1. Open a Ladder Diagram routine in your project.
2. Click in the left margin where you want to insert the rung for the 1756-IF8IH module. Right-click and select “Import Rungs...”.

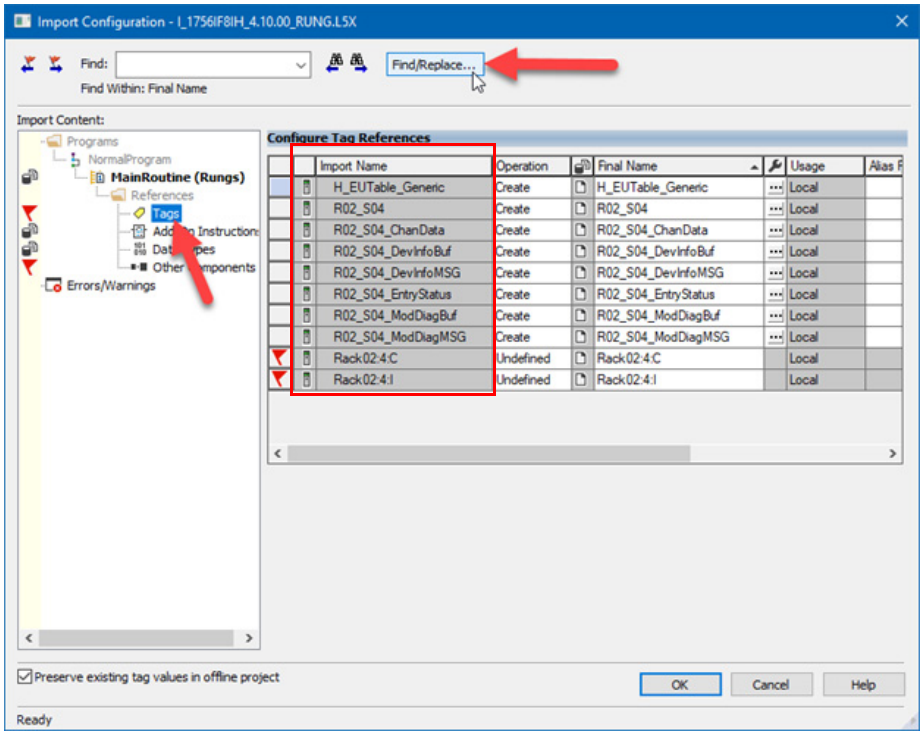


3. Navigate to the location where you downloaded the Library of Process Objects version 4.10.xx.

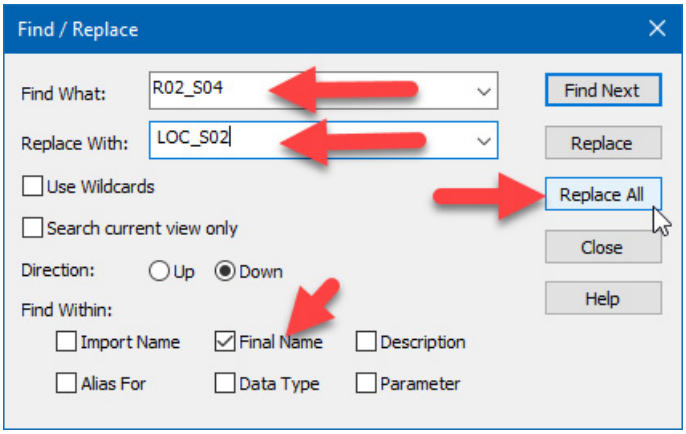
4. Navigate to the Logix Add-On Instructions. Select the I_1756IF8IH_4.10.00_RUNG.L5X file.



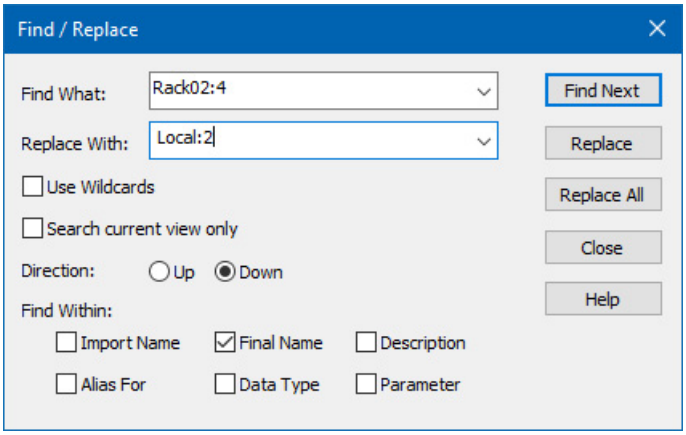
5. In the Import Configuration window, select the “Tags” item in the “Import Content” tree on the left. Note the names of tags in the import file. Select “Find/Replace...”.



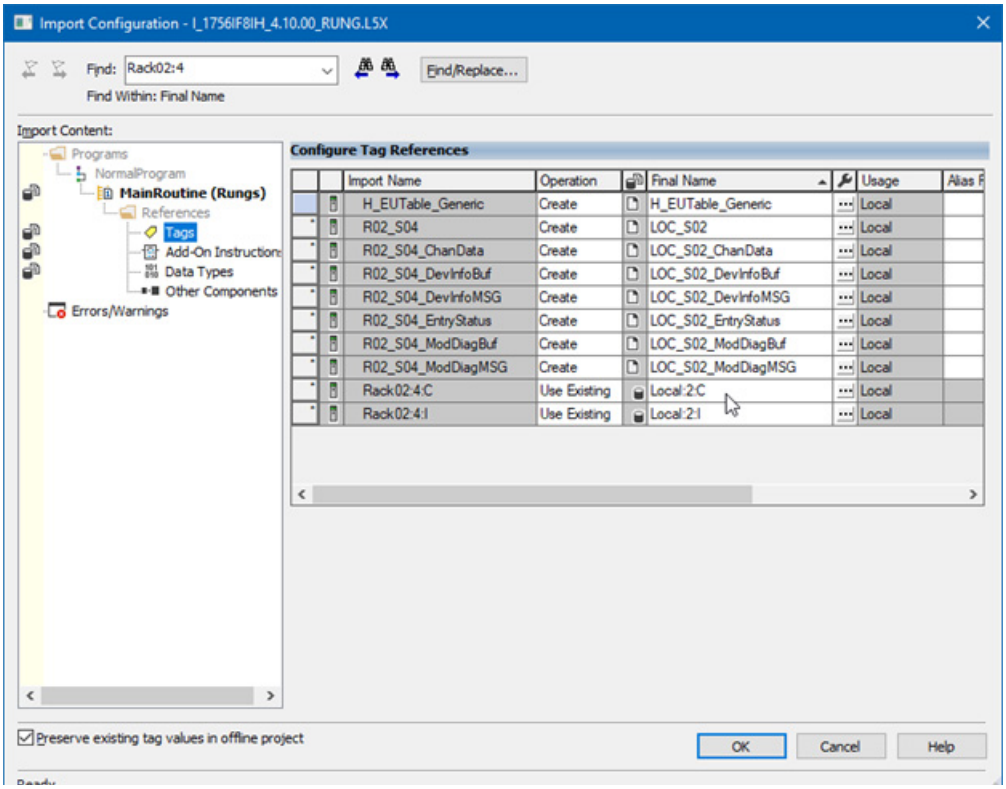
6. Change the base that you want to use for the tag names.
   - In the "Find What" box, enter "R02_S04", which is the base name for the tags in the import file.
   - In the "Replace With" box, enter the base that you want to use for tag names for this rung. Since we created the module in local chassis slot 2, for this example we use "LOC_S02".
   - Select "Replace All"



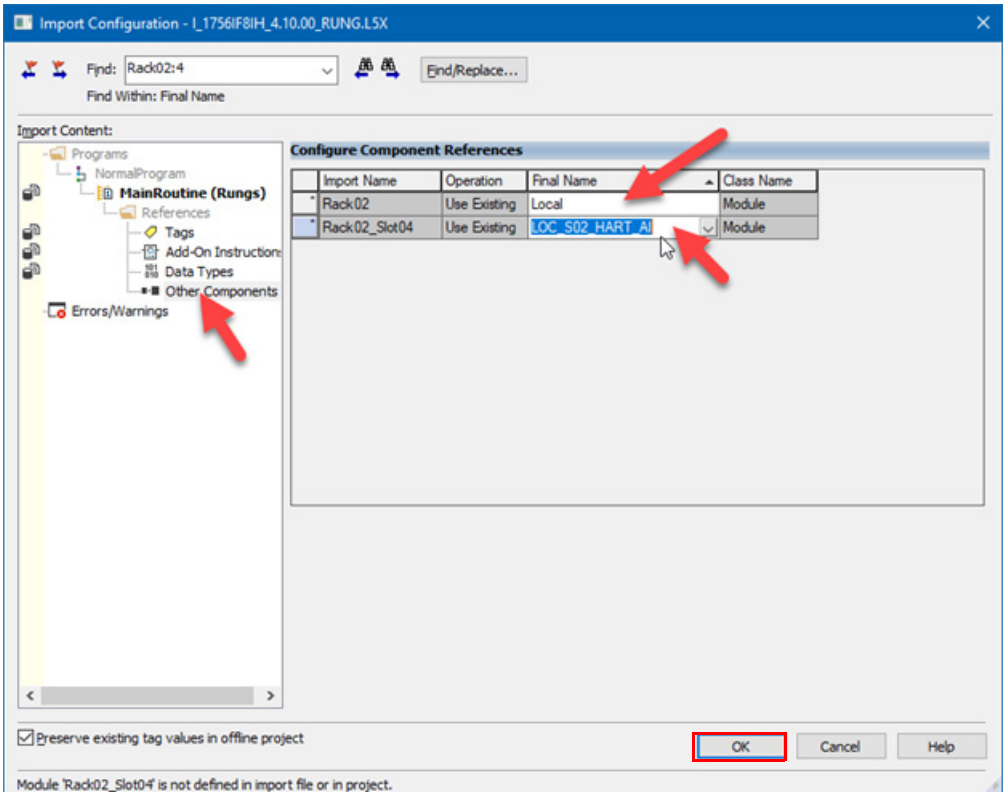
7. Use the same process to replace the text "Rack02:4" in the import with "Local:2", for the tag names assigned to the module I/O data.



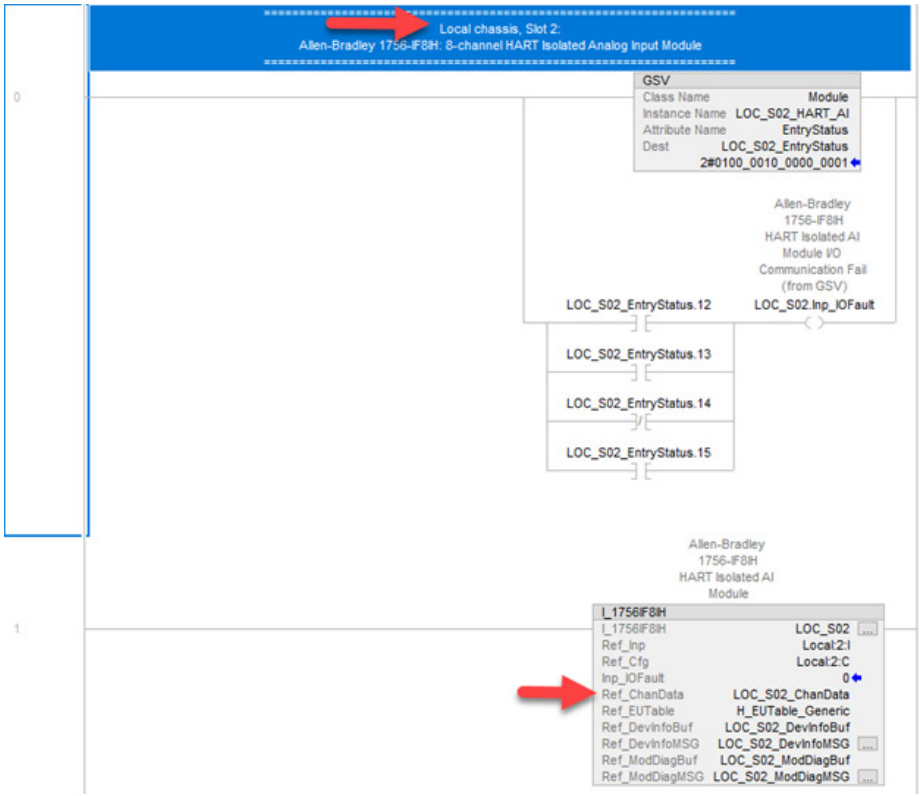
The Final Name column shows the tags to be created or used.



8. Select the Other Components item in the Import Contents tree.
9. Change the Final Name items to align with the Rack name and the Module name you gave the 1756-IF8IH module when you created it. Select OK to import the rung.



10. Two rugs are imported. On the first rung, change the Rung Comment to reflect the location of the module created. Note the tag of the Ref_ChanData InOut parameter in the second rung. This tag name is used in the following steps.

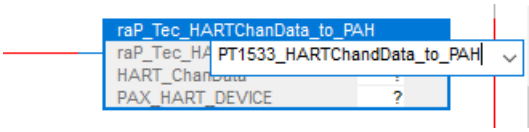


Add the raP_Tec_HARTChanData_to_PAH Instance to the Project

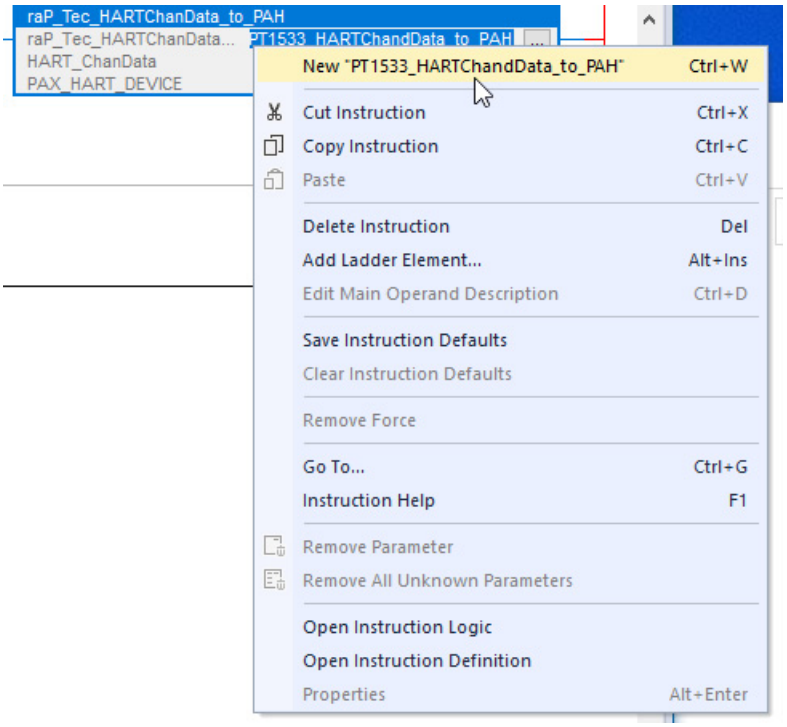
1. Add a rung after the I_1756IF8IH rung. On that rung, place an instance of the raP_Tec_HARTChanData_to_PAH instruction.



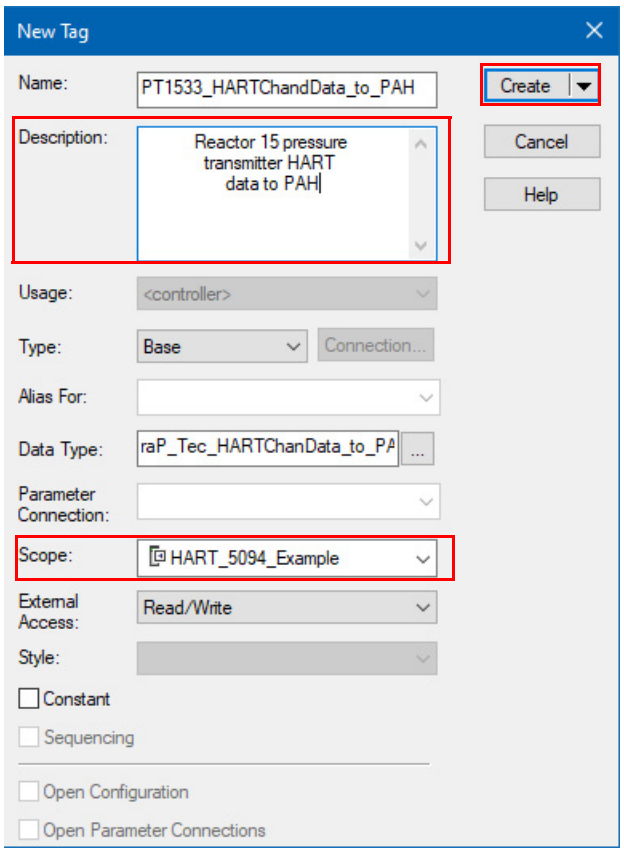
2. The first operand is the backing tag for the instruction. Enter a suitable name.



3. Right-click and select “New (tag name)”.



4. Enter a description and select the tag scope. The tag Data Type is set for you automatically.

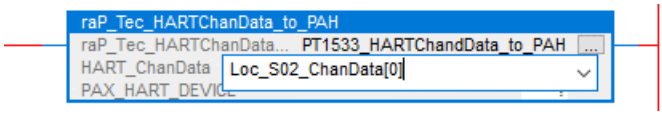


5. The second operand is a HART Channel Data member from the I_1756IF8IH instruction.



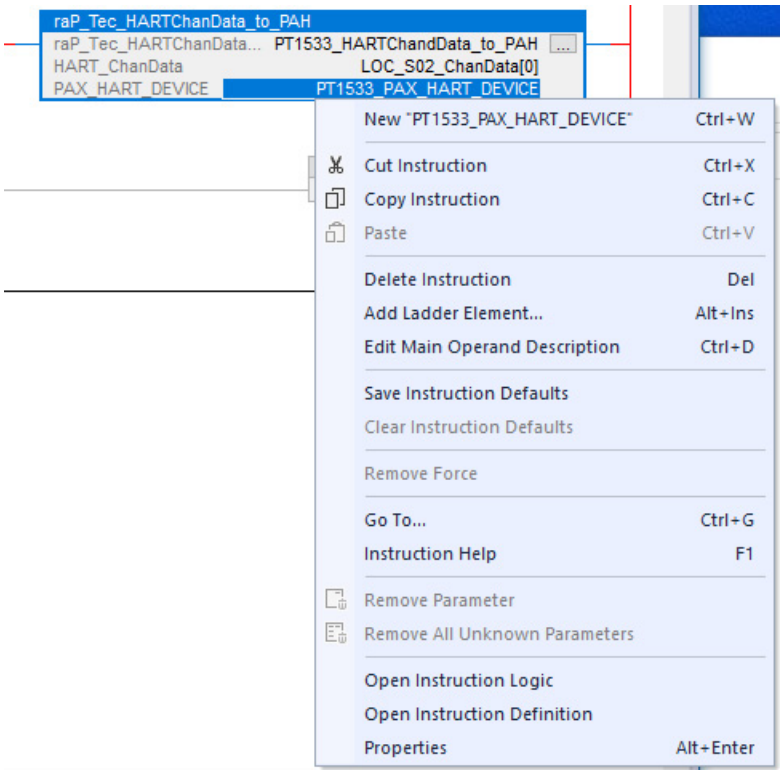
The I_1756IF8IH instruction creates an array of 8 channels' data. Previously we configured Channel 0 on the 1756-IF8IH for this device.

Select element [0] of that array for this operand.

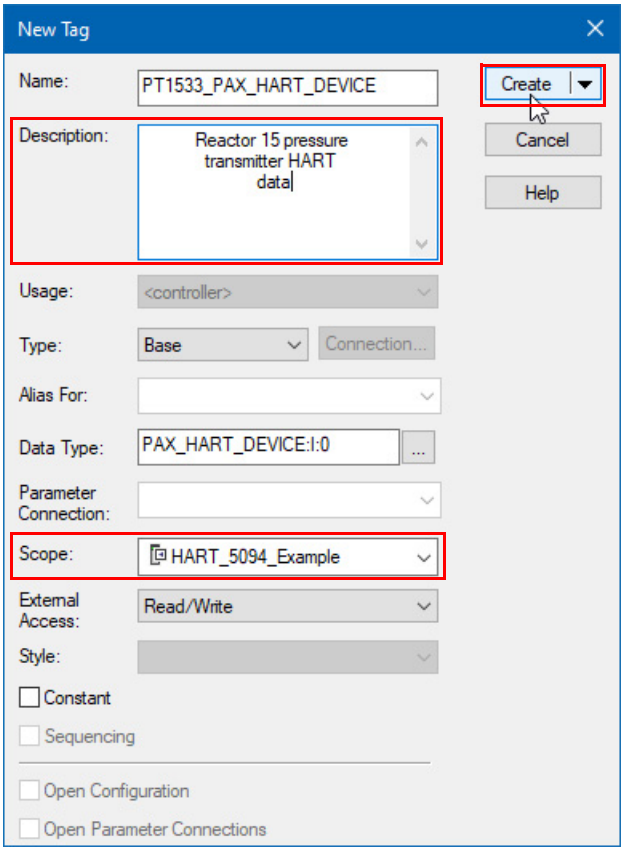


6. The third operand is a tag that you create that is the same data type as used by newer HART I/O modules, such as the 5094-IF8IH. This tag contains the HART data coming out of the raP_Tec_HARTChandData_to_PAH instruction and going to the PAH instruction.

Enter a suitable tag name, then right-click and select "New (tag name)".



7. Enter a description and select the tag scope. The tag Data Type is set for you automatically.

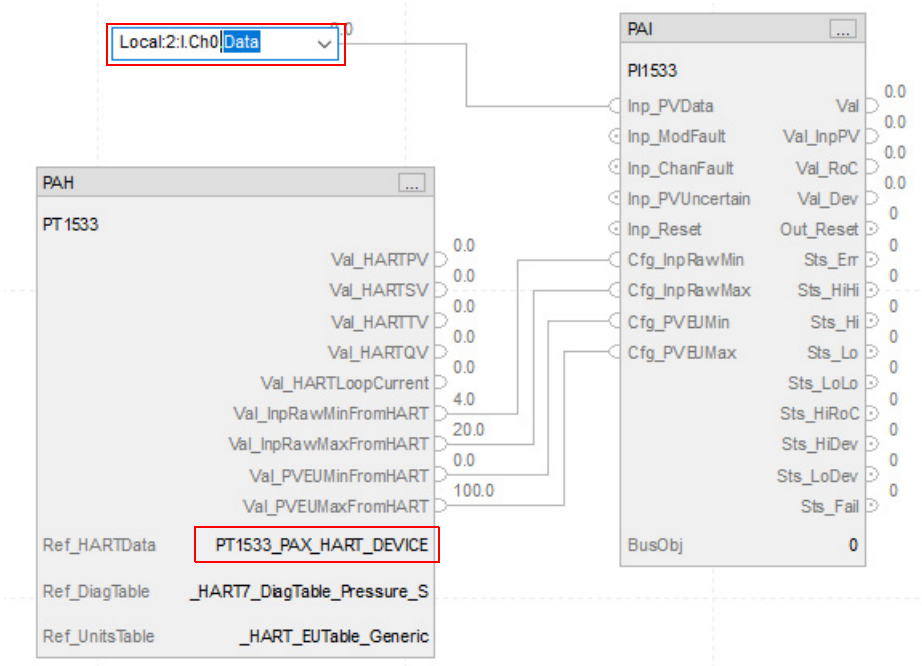


Add the PAH and PAI Instances to the Project and Connect PAH and PAI Instances

Continue as in the example documented in Appendix E, Add the PAH (Process Analog HART) and PAI (Process Analog Input) Instruction Instances to the Project, creating the PAH and PAI instances and linking them together.

The "Ref_HARTData" operand on the PAH instruction is the tag that you just created above, PT1533_PAX_HART_DEVICE. The analog input to the PAI instruction comes from the input data value from Channel 0 of the 1756-IF8IH, which is in the Local chassis, slot 2. In this example, the tag is Local:2:I.Ch0.Data.

The following diagram shows the final configuration for this example.



Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	rok.auto/pcdc

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.

Allen-Bradley, ArmorStart, CompactLogix, ControlLogix, FactoryTalk, Integrated Architecture, iTRAK, Kinetix, Logix 5000, MagneMotion, PlantPAx, PowerFlex, RSLinx, RSLogix, RSLogix 5000, SoftLogix, Stratix, Studio 5000, Studio 5000 Logix Designer, TechConnect, Rockwell Automation, and Rockwell Software are trademarks of Rockwell Automation, Inc.

EtherNet/IP is a trademark of ODVA, Inc.

Microsoft and Windows are trademarks of Microsoft.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752, İçerenköy, İstanbul, Tel: +90 (216) 5698400 EEE YÖnetmeliğine Uygundur

Connect with us.

rockwellautomation.com — expanding **human possibility**™

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Publication PROCES-RM200B-EN-P - June 2021
Supersedes Publication PROCES-RM200A-EN-P - October 2020

Copyright © 2021 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A