Process Expert
General Purpose Library for AVEVA™ System Platform

Supervision Services

User Guide

EIO0000004241.06

03/2022

Legal Information

Table of Contents

Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER
DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING
WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION
CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE
NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

⚠WARNING

UNGUARDED EQUIPMENT

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check are made and that enough time is allowed to perform complete and satisfactory testing.

⚠WARNING

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove all temporary grounds from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

Operation and Adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer’s instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer’s instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

About the Book

Document Scope

This document describes the master templates of the EcoStruxure™ Process Expert - General Purpose Library for AVEVA™ System Platform.

It describes their default configuration, the dynamic objects that are included in these master templates, and other functional aspects managed from ArchestrA IDE. This document does not cover any operational aspects, nor does it provide information on how to use supervision services to monitor and operate control systems.

This document is written for users with experience in the engineering of control systems and with a working knowledge of ASP and Control Expert.

NOTE: The terms *circuit breaker* and *motor starter* that are used in this manual refer to specific Schneider Electric devices for which templates are provided in this library. Refer to the product documentation of these devices for information on the applicable standards, which define these terms.

NOTE:

- ASP is abbreviation for AVEVA™ System Platform.

Validity Note

This document is valid for EcoStruxure™ Process Expert for AVEVA System Platform 2021or later.

Related Documents

Title of documentation	Reference number
Modicon Libraries General Purpose Process Components User Guide	EIO0000002093 (eng)
Modicon Libraries General Purpose Devices Components User Guide	EIO0000002092 (eng)
Modicon Libraries General Purpose Diagnostics Components User Guide	EIO0000002090 (eng)
Modicon Libraries General Purpose for Wonderware System Platform Equipment Module Components User Guide	EIO0000003013 (eng)

Product Related Information

The application of this library, which is referred to as the *product*, requires expertise in the design and operation of control systems.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Allow only authorized personnel with expertise in the design and operation of control systems to program, install, alter, and apply this product.
- Follow local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Examples described in this manual and the demonstration project are provided for information only.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Adapt examples that are given in this manual to the specific functions and requirements of your industrial application before you implement them.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Getting Started

What's in This Part

Environment Preparation

What's in This Chapter

Library Installation

Software Compatibility

The EcoStruxure Process Expert General Purpose Library for AVEVA System Platform has been tested and validated with AVEVA System Platform 2020 R2.

The control resources that are mentioned in this manual are from the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Use OPC Factory Server 3.40.2808.0, 3.50.2908.0 (SP3), or later, page 25.

Installation Methods

You can install the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform in ArchestrA IDE in two different ways:

- Recommended way to use the library with existing Galaxies: By importing the library installation files, which consist of:
  - The Galaxy package file.
  - Script function libraries.
  - The Galaxy style library.
  - A text (.txt) file with spanish translation of alarm messages.

  The EcoStruxure Process Expert for AVEVA System Platform installer copies the installation files at the path *C:\ProgramData\Schneider Electric\GPL for Aveva System Platform\Galaxy Backup*.
- Recommended way to use the library with a new Galaxy: By creating a new Galaxy from the GPLBlank yymmdd.cab Galaxy backup that is copied by the EcoStruxure Process Expert for AVEVA System Platform installer at the path *C:\ProgramData\Schneider Electric\GPL for Aveva System Platform\Galaxy Backup*. The backup contains the necessary resources, page 26, including alarm messages in English and Spanish.

  NOTE: Use this method to install the demonstration project.

Installing the Library by Using Installation Files

The installation files are composed of:

- Three script function libraries:
  - *PSxLocalize.aaSLIB*
  - *ww.nasc.btl.modeling.aaSLIB*
  - *PSxMessaging.aaSLIB* (for attributes used by EcoStruxure Process Expert runtime navigation services)
  - *System.Windows.Forms.aaSLIB*
- A Galaxy style library:
  - *GalaxyStyles-yyyymmdd.xml*
- Two packages containing the objects:
  - *GPLMasterTemplates.aaPKG*
  - *GPLApplicationTemplates.aaPKG* (also contains master templates), page 26

- A file with spanish translation of alarm messages used in master templates:
  - *Galaxy_GPLDemoProcess yyyymmdd_3082_Alarm_Comments.txt*

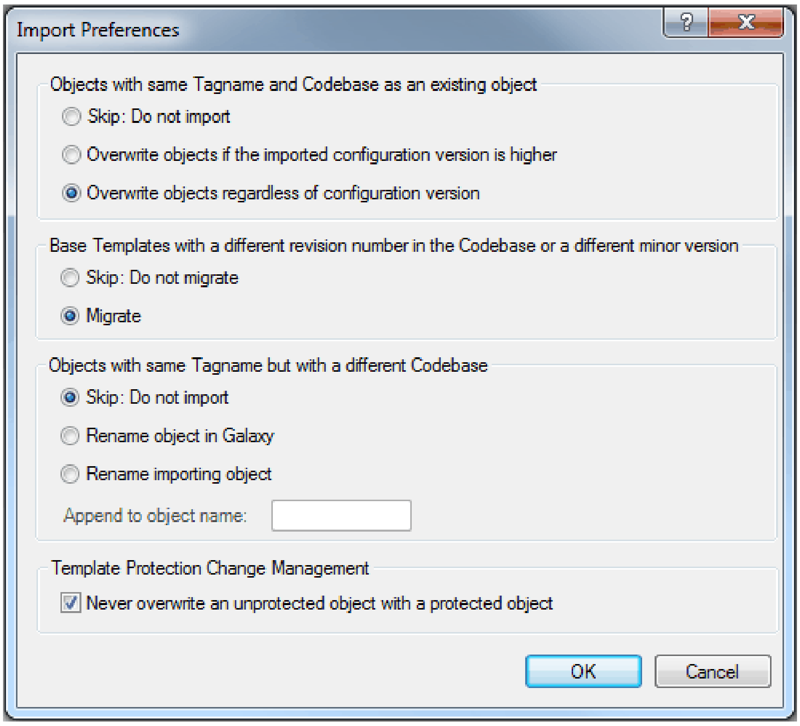
    NOTE: This file is for user reference for spanish translation.
- SQL database related files to manage parameter sets:
  - *ParameterSets.bak*, which is a backup file of the blank ParameterSets database. It contains the tables that are required to manage parameter sets by using the parameter set management template.

    NOTE: To use the backup file, Microsoft SQL Server, page 22 needs to be installed on the PC. Open Microsoft SQL Server Management Studio and select **Restore Database** from the context menu of the **Databases** folder. Select **Device** in the **Source** section of the **Restore Database** dialog box and browse to the backup file.
  - `GPL for WSP PS schema yymmdd.sql`, which is an SQL query file that creates a blank `ParameterSets` database without needing to restore the backup file provided in the setup.
  - `PS Schema Migration yyyymmdd.sql`, which is an SQL query file for existing users to migrate their `ParameterSets` database.

    NOTE: To use the SQL query file, Microsoft SQL Server, page 22 needs to be installed on the PC. Open Microsoft SQL Server Management Studio, select **File → Open → File**, browse to the required query and open it, then select **Query → Execute**.

Proceed as follows to install the library by using the installation files.

Step	Action
1	Open ArchestrA IDE.
2	Click **Galaxy > Import > Galaxy Style Library**.
3	Select the `GalaxyStyles-yyyymmdd.xml` file from the **Installation Files > Galaxy Styles** folder and then click **Open**.
4	Set the `GalaxyStyles-yyyymmdd` as the default style .
5	Click **Galaxy > Import > Script Function Library**.
6	Select the `PSxLocalize.aaSLIB` file from the **Installation Files > Script Function Libraries** folder and then click **Open**.
7	Click **Galaxy > Import > Script Function Library**.
8	Select the `PSxMessaging.aaSLIB` file from the **Installation Files > Script Function Libraries** folder and then click **Open**.
9	Click **Galaxy > Import > Script Function Library**.
10	Select the `ww.nasc.btl.modeling.aaSLIB` file from the **Installation Files > Script Function Libraries** folder and then click **Open**.
11	Click **Galaxy > Import > Script Function Library**.
12	Select the `System.Windows.Forms.aaSLIB` file from the **Installation Files > Script Function Libraries** folder and then click **Open**.
13	Click **Galaxy > Import > Object(s)**.
14	Select the `PSxTab.aaPKG` file from the **Installation Files > Graphic Objects** folder and then click **Open**.
15	Click **Galaxy > Import > Object(s)**.
16	Select the `LayoutGP.aaPKG` file from the **Installation Files > Graphic Objects** folder and then click **Open**.
17	Click **Galaxy > Import > Object(s)**.
18	Select the `$ViewAppGP.aaPKG` file from the **Installation Files > Graphic Objects** folder and then click **Open**.
19	Click **Galaxy > Import > Object(s)**.
20	Select the *GPLMasterTemplates.aaPKG* file from the **Installation Files > Master Templates** folder and then click **Open**.

Step	Action
21	Click **Galaxy > Import > Object(s)**.
22	Select the *GPLApplicationTemplates.aaPKG* file from the **Installation Files > Application Templates** folder and then click **Open**.
23	Select your import preferences according to your needs and click **OK**. **NOTE:** To update library objects that already exist in your Galaxy, select the following import preferences.  **Result:** The import of the library objects begins.
24	Wait until the import ends.
25	Verify the import log in the **Import Automation Object(s)** window.

Installing the Library by Using the Galaxy Backup

Proceed as follows to install the library by using the Galaxy backup of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Step	Action
1	Copy the Galaxy backup file (.cab) from the path *C:\ProgramData\Schneider Electric\GPL for Aveva System Platform\Galaxy Backup* to the BackupGalaxies folder at the path *C:\Program Files(x86)\ArchestrA\Framework\Bin\BackupGalaxies*.
2	Open ArchestrA IDE.
3	Click **New Galaxy**.
4	Select the Galaxy backup file from the **Galaxy type** list.
5	Enter your Galaxy name in the **Galaxy name** field.
6	Click **Create**. **Result:** Your Galaxy is created from the Galaxy backup of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Content of the GPL

What's in This Chapter

Overview

This chapter describes the contents and features of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Overview

Library Scope

The EcoStruxure Process Expert General Purpose Library for AVEVA System Platform provides a supervision function for each control functions in the EcoStruxure Process Expert for AVEVA System Platform - General Purpose Library templates.

Modularity is provided by the object-oriented design with ready-to-use templates, which reduces engineering time.

The EcoStruxure Process Expert General Purpose Library for AVEVA System Platform includes templates for the following categories of control modules:

- Process
- Devices
- Diagnosis
- Parameter Set

The library is engineered with ArchestrA IDE, page 22.

Key Features

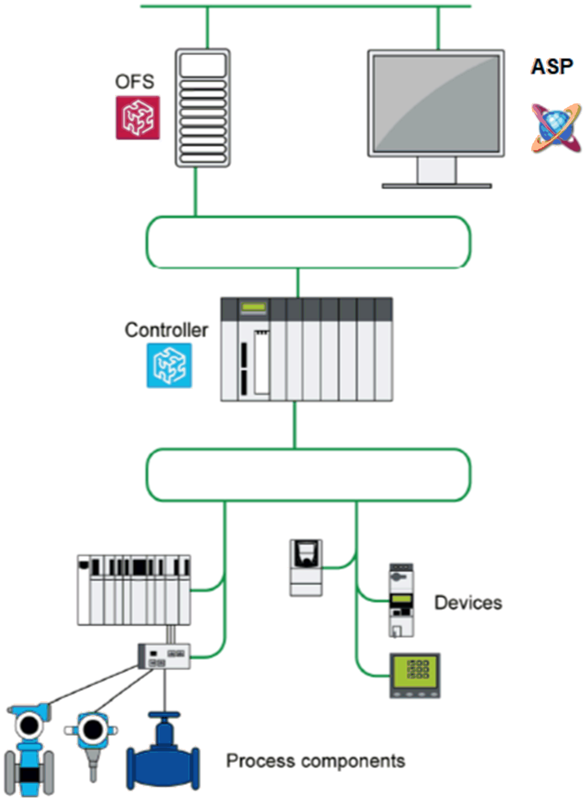
The EcoStruxure Process Expert General Purpose Library for AVEVA System Platform delivers the following features:

- Situational Awareness (SA): The library look and feel has been designed according to SA principles. You can quickly identify abnormal situations, which are deviations compared to what is expected and to what is considered to be the normal operating mode. (For example, level bars and trends allow you to compare current process values to the configured thresholds, or if the configuration of a function considers the normal operating mode to be *program*, setting it to *operator* is indicated as an abnormal situation.).
- AVEVA Situational Awareness Library (SAL) look and feel.
- Device diagnosis and status reporting according to Namur NE-107 recommendation.
- Communication between the control and supervision layers by using OPC Factory Server (OPC UA and OPC DA).
- Auto references to controller variables.
- Various process, device, and diagnostic master templates.
- Consistent look and feel.
- Static text of symbols and faceplates, as well as alarm descriptions available in English (default) and Spanish.

- Library style management, which allows you to change the appearance of the library components by modifying the global configuration.

Architecture

The figure illustrates a typical system architecture.



Resource Description

The EcoStruxure Process Expert General Purpose Library for AVEVA System Platform contains the following templates and resources:

Templates:	A template is an entity that represents a common functional requirement of a device, family of devices, or function. It only exists in the development environment. There are four types of templates: • Base templates. These are core objects used to create master templates. (For example, *$SPBoolCE*.) • Master templates. Their name starts with the sufixCE. (For example, *$MotorCE*). These control module templates are derived from base templates or other parent templates of the *Services* category. You can copy these templates if you want to modify the default configuration at the template level and then create instances. **NOTE:** Some attributes of these master templates may be locked at the template level and/or parent level. • Application templates. Each one is directly derived from a master template for your convenience. Their name starts with the prefix $a and sufixCE. (For example, *$AnalogInputCE*). You can modify these templates and/or create instances from them.
ArchestrA Symbols:	ArchestrA symbols are included with master and application templates. They contain graphic objects and faceplates used to visualize data in runtime. A graphic object includes multiple configurations in a single symbol wizard (for example, motor or pump symbols).

List of Master Templates

Overview

The master templates described in this document are grouped by category and family.

When the library is installed, templates are located at the following path in the **Template Toolbox**:

- Master templates: **EcoStruxure Plant\Master Templates**.
- Application templates: **EcoStruxure Plant\Application Templates**.

For example, the *$MotorCE* master template is located at the path **EcoStruxure Plant\Master Templates\GPL\Process\Control Modules\On/Off Device Control**.

For other master templates and base templates, their location in the **Template Toolbox** is indicated in the table listing them.

NOTE: For each category, the families are the same as those used to group the control resources that are referenced in this manual.

NOTE: Templates located in the **Services** folders in each category are intermediate derived templates, which are common to several master templates of a category. You can derive from these templates but Schneider Electric recommends using only master templates located under the **Control Modules** folders in the **Template Toolbox**.

Process Category

The table lists the master templates which belong to the **Process** category.

Family	Template name	Purpose
Signal processing	*$AnalogInputCE*	Analog inputs with configurable range, page 101
	$AnalogOutputCE	Analog outputs, page 106
	$DigitalInputCE	Digital inputs, page 112
	$DigitalOutputCE	Digital outputs, page 116
	$AnalogInMultiCE	Multiple analog inputs with configurable range, page 119
	$TotalCE	Totalizing function, page 124
	$LoadCellENOD4TCE	Scaime weighing module, page 129
	$LoadCellPMESWTCE	Scaime weighing module, page 136
On/Off device control	*$HandValveCE*	Hand valves, page 143
	$MotorCE	On/off motors, page 147
	$Motor2DirCE	2-speed/2-rotation-direction motors, page 153
	$MValveCE	Discrete motorized valves, page 158
	$DualOPValveCE	Dual Output Valve, page 163
	$ValveCE	On/off valves, page 169
Analog device control	*$ControlValveCE*	Control valves, page 175
	$MValvewithPosCE	Motorized valves with position feedback, page 181
	$MotorVSCE	Motors with variable speed drive, page 187
Process control	*$IMCTLCE*	Internal model controllers, page 195
	$LeadLagCE	Lead-Lag controllers, page 201
	$PIDCE	PID controllers, page 205
	$PWMCtlCE	Pulse-width modulation controllers, page 209

Family	Template name	Purpose
	$RampCE	Ramps, page 212
	$RatioCtrlCE	Ratio controllers, page 215
	$SplitRangeCE	Split-range controllers, page 220
	$Step3CtlCE	Three-step controllers, page 224
Sequential control	*$SequenceCE*	Sequential control, page 230
Batch Phase Manager	*$PhaseCE*	Batch phase functions, page 249
Equipment module	*$EMPatternCE*	Equipment module functions, page 275
Pump Set	`$PumpSetCtrlCE`	Pump Set functions, page 292
Flow Control	`$PumpFlowCtrlCE`	Flow Control functions, page 298
Auxiliary functions	*$AlarmSummaryCE*	Alarm summary, page 305
	$AnalogSelectCE	Analog signal selection, page 308
	$SPBoolCE	Discrete setpoints, page 314
	$SPRealCE	Real setpoints, page 316
	$SPIntCE	Integer setpoints, page 318
	$SPDurationCE	Duration setpoints, page 320
	$MessageBoxCE	Messages to the operator, page 311
	$SchedulerCE	Scheduler function, page 323

Devices Category

The table lists the master templates which belong to the **Devices** category.

Family	Template name	Purpose
Circuit breakers	*$CompactNSXMBUCE*	Compact NSX circuit breakers, page 328
	$MasterpactMTZCMBUCE	Masterpact MTZ Circuit Breakers with Drawout/Chasis, page 332
	$MasterpactMTZMBUCE	Masterpact MTZ Circuit Breakers without Drawout/Chasis, page 335
	$MasterpactNxMBUCE	Masterpact Nx Circuit Breakers without Drawout/Chasis, page 339
	$MasterpactNxCMBUCE	Masterpact Nx Circuit Breakers with Drawout/Chasis, page 342
	$MasterpactHWCE	Hardwired Circuit Breaker, page 345
	$CompactHWCE	Hardwired Compact Circuit Breaker, page 348
Digital protection relays	*$Sepam80ECE*	Sepam 80 protection relays, page 351
	$Sepam80MBCE	
Motor controllers and starters	*$TesysTAllDataCE*	TeSys T, page 361 communicating by using either: • Ethernet Modbus TCP implicit messaging (normal I/O scanning) • Ethernet Modbus TCP explicit messaging • Modbus serial
	$TesysTEFastCE	TeSys T, page 361 communicating by using either: • Ethernet Modbus TCP implicit messaging (fast I/O scanning) • CANopen (device connected to an STB island)
	$TesysTPBCE	TeSys T, page 361 communicating by using *Profibus*.
	$TesysUIOCE	TeSys U, page 365 communicating by using either of: • Modbus serial. • CANopen.
	$TesysUMainDataCE	TeSys U, page 365 communicating by using either of: • Modbus serial.

Family	Template name	Purpose
		• CANopen.
	$TesysUMECCE	TeSys U, page 365 communicating by using Modbus serial.
Power meters	*$PM5350MBCE*	PM5350 power meters, page 369
	$PM53xxEMCE	PM53xx power meters, page 369
	$PM82xxEMCE	PM82xx power meters, page 372
Soft starters	*$ATS22MBCE*	Altistart 22 soft starters, page 376
	$ATS48MBCE	Altistart 48 soft starters, page 379
	$ATS480MBTCPCE	Altistart 480 soft starters, page 383
	$ATS480EIPCE	
Speed drives	*$ATV6xxECE*	Altivar 6xx series variable speed drives, page 387
	$ATV9xxECE	Altivar 9xx series variable speed drives, page 390
	$ATV6xxxECE	Altivar 6xxx series variable speed drives, page 394
	$ATV320ECE	Altivar 320 series variable speed drives, page 398
	$ATV340CE	Altivar 340 series variable speed drives

Diagnosis Category

The table lists the master templates which belong to the **Diagnosis** category.

Template name	Purpose
$M340DiagCE	Modicon M340 diagnosis, page 408
$M580DiagCE	Modicon M580 diagnosis, page 408

Acronym

Acronyms and Definitions

The following table lists the acronyms used in this manual:

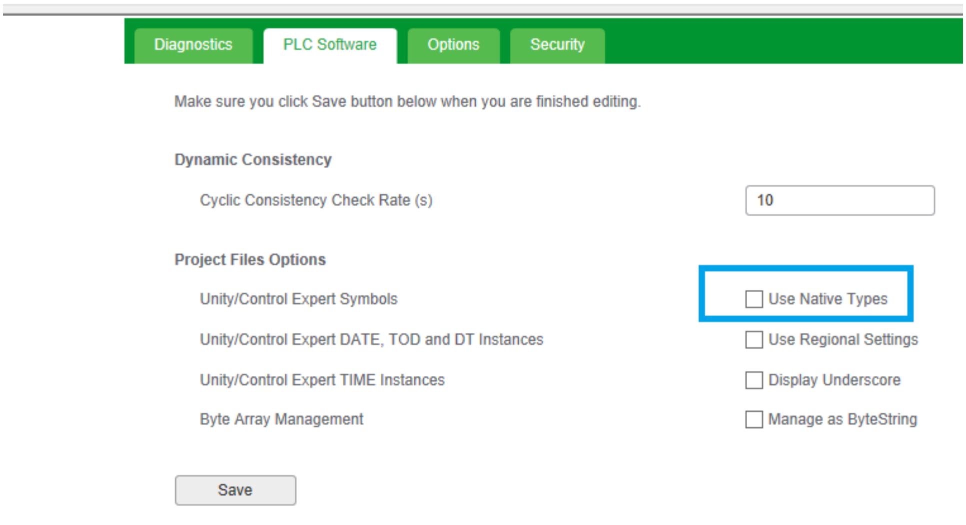
Acronym	Definition
ASP	AVEVA system platform
WSP	Wonderware system platform
IDE	–
OPC	–
OPS	–
SQL	–
IDE	–
PID	–
SA	Situational Awareness
OP	Output command
LOP	Local output command
PV	Present value
SP	Setpoint
LSP	Local setpoint
RSP	Remote setpoint

Acronym	Definition
NAN	–
DIO	–
ZSH	–
ZSL	–
PIDFF	–
PWM	–

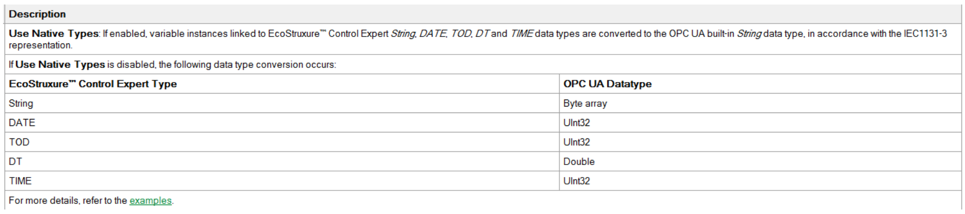
OFS Configuration and Datatypes

For users of Modicon Communication Server 2.01 and versions below

The OFS/ MCS has a setting to convert the datatypes to IEC61131-3 format/ Native OPC format. The figure below illustrates the native type setting in MCS.



The snapshot from the MCS help given below provides the details of the impacted datatypes.



Description

Use Native Types: If enabled, variable instances linked to EcoStruxure™ Control Expert *String*, *DATE*, *TOD*, *DT* and *TIME* data types are converted to the OPC UA built-in *String* data type, in accordance with the IEC1131-3 representation.

If **Use Native Types** is disabled, the following data type conversion occurs:

EcoStruxure™ Control Expert Type	OPC UA Datatype
String	Byte array
DATE	UInt32
TOD	UInt32
DT	Double
TIME	UInt32

For more details, refer to the examples.

NOTE:

1. This library is designed to work with the setting “Native Types” configured as disabled.
2. This setting is not available in BME NUA (the in rack OPC server module).

The behavior of the various datatypes with the Native Type setting enabled/ disabled in the OFS DA/OFS UA/ MCS and NUA are as shown in the below table.

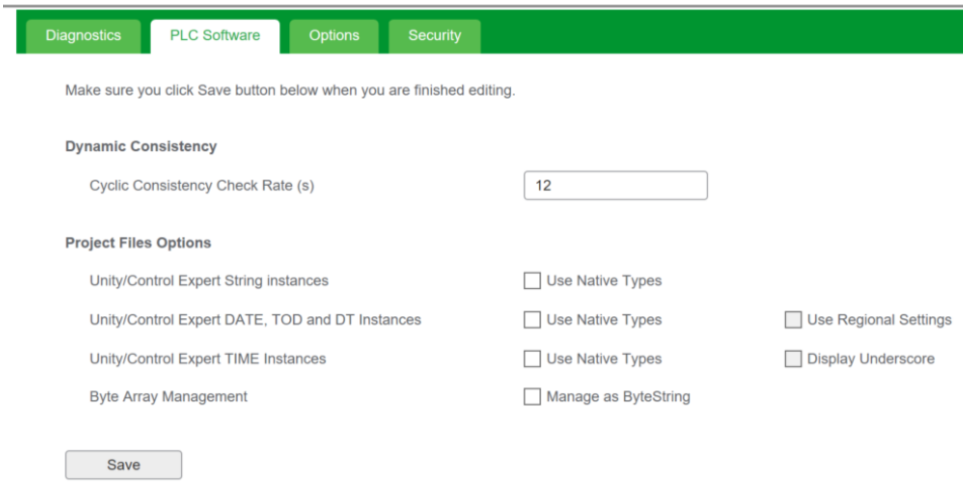
Control Expert Value	Control Expert Datatype	OFS UA/ OFS DA/ MCS				NUA	
		Native Type Enabled		Native Type Disabled			
		Value	Datatype	Value	Datatype	Value	Datatype
TestValue	`String`	TestValue	`String`	[84, 101, 115, 116, 86, 97, 108, 117, 101]	`Byte Array`	TestValue	`String`
T#1s100ms	`Time`	T#1s100ms	`String`	1100	`UInt32`	1100	`UInt32`
DT#2000-01-00:40:00	`DT`	DT#2000-01-00:40:00	`String`	1.49E-154	`Double`	230584417744-8990000	`UInt64`
D#2001-1-1	`DATE`	D#2001-1-1	`String`	536936705	`UInt32`	536936705	`UInt32`
TOD#5:01:01	`TOD`	TOD#5:01:01	`String`	83951872	`UInt32`	83951872	`UInt32`

There is an inconsistency observed in the BME NUA, as it is does not align with either of the Native type setting. The GPL objects are compatible with OFS DA/

OFS UA/ BME NUA. Users will have to take care of the inconsistency in their custom templates.

For users of Modicon Communication Server 2.01 SP1 and versions above

The OFS/ MCS has a setting to convert the datatypes to IEC61131-3 format/ Native OPC format.



The snapshot from the MCS help given below provides the details of the impacted datatypes.

Description	
Use Native Types: If enabled, variable instances linked to EcoStruxure™ Control Expert *String, DATE, TOD, DT* and *TIME* data types are converted to the OPC UA built-in *String* data type, in accordance with the IEC1131-3 representation.	
If **Use Native Types** is disabled, the following data type conversion occurs:	
EcoStruxure™ Control Expert Type	**OPC UA Datatype**
String	Byte array
DATE	UInt32
TOD	UInt32
DT	Double
TIME	UInt32
For more details, refer to the examples.	

NOTE:

1. This library is designed to work with the setting “Native Types” configured as disabled.
2. This setting is not available in BME NUA (the in rack OPC server module).

The behavior of the various datatypes with the Native Type setting enabled/ disabled in the OFS DA/OFS UA/ MCS and NUA are as shown in the below table.

Control Expert Value	Control Expert Datatype	OFS UA/ OFS DA/ MCS				NUA	
		Native Type Enabled		Native Type Disabled			
		Value	Datatype	Value	Datatype	Value	Datatype
TestValue	`String`	TestValue	`String`	[84, 101, 115, 116, 86, 97, 108, 117, 101]	`Byte Array`	TestValue	`String`
T#1s100ms	`Time`	T#1s100ms	`String`	1100	`UInt32`	1100	`UInt32`
DT#2000-01-00:40:00	`DT`	DT#2000-01-00:40:00	`String`	1.49E-154	`Double`	230584417744-8990000	`UInt64`
D#2001-1-1	`DATE`	D#2001-1-1	`String`	536936705	`UInt32`	536936705	`UInt32`
TOD#5:01:01	`TOD`	TOD#5:01:01	`String`	83951872	`UInt32`	83951872	`UInt32`

Supervision Features

What's in This Part

Overview

This part describes the supervision features that apply to the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Access Control

What's in This Chapter

Access Control

Overview

Attributes of master templates of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform use the object security classification of ArchestrA IDE for access control.

The settings are identical in the corresponding application templates, page 26 and are propagated to derived templates and instances.

You can modify the configuration of the security classification of attributes in application templates.

For information on the object security classification, refer to the ArchestrA IDE help.

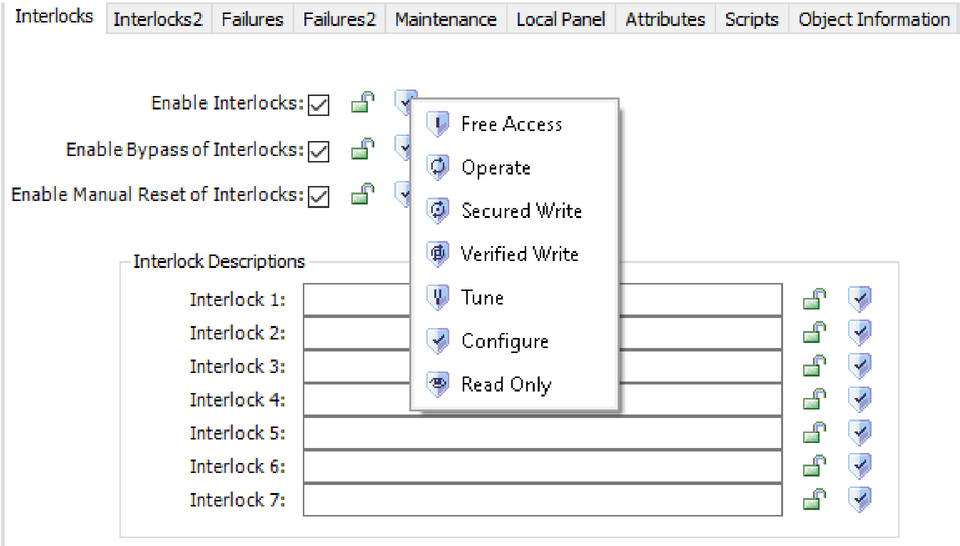
Default Object Security Classification of Attributes

This table describes the object security classification that is defined by default for attributes of master templates

Classification	Description
Operate	This level is used for regular operation activities (for example, setting of setpoints, operating modes, alarm setpoints) Manual reset of a specific abnormal condition is also available for users with operate rights
Secured write	This level is used for manual resetting of interlock conditions and global reset of the control module (for example, motor reset).
Verified write	This level is used for bypassing interlock conditions, global bypass of interlocks and bypass of an abnormal condition
Tune	This level is used for engineering parameters (for example, alarm priorities, PID sensitivity, ramp adjustments).
Configure	This level is used for UDAs configuration (for example, range, engineering units, format, normal operating modes). **NOTE:** This level is only used for attribute modification during engineering time.

Configuration of Object Security Classification

To configure the security classification of an attribute of an application template, click the shield icon next to the attribute in the configuration page and select a level.



NOTE: If the icon is shown in gray, the access control modification is locked in its parent object. For more information about attribute locking and unlocking, refer to the ArchestrA IDE help.

Security Group Configuration

When you create derived templates or instances, they are added to the **Default** security group.

For information on assigning them to a different security group, refer to the ArchestrA IDE help.

Alarm Functions

What's in This Chapter

Overview

This chapter describes alarm functions of master templates of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Alarm Priority

Overview

Default alarm priorities are configured in master templates for attributes to which an alarm is associated. The priorities are identical in the corresponding application templates, page 26. They are propagated to derived templates and instances that you create.

The security classification of alarm priorities for state alarms is *Tune*.

The priority value range is 0...999.

You can modify the configuration in the application templates.

NOTE: The alarm priority value associates an alarm severity, page 36 to the alarm.

Alarm Priority Configuration

Proceed as follows to configure or modify an alarm priority.

Step	Action
1	Double-click the object (application template, derived template, or instance).
2	Select the **Attributes** page.
3	Click the filter icon and select **State alarm** from the list of filters.
4	From the results, select an attribute (for example `DevCtl.St.Faild`).
5	The alarm configuration appears in the **State alarm** section of the features area.
6	Set the **Priority** value, page 36. **NOTE:** You can also modify the **Alarm message** and the alarm **Category**.
7	Check in the object.

SA Alarm Severity

Overview

Four Situational Awareness (SA) alarm severities are configured in the global configuration of the Galaxy.

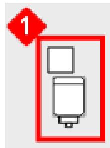
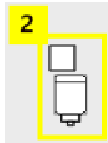
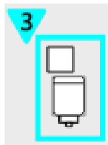
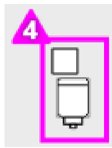
Each alarm signal is assigned an alarm severity, which is related to its alarm priority. For example, if an alarm has an alarm priority of 200, it is assigned an alarm severity of 1 by default.

You can change the priority range that is associated to each alarm severity to adapt the behavior to the specific requirements of your project.

To access the alarm configuration screen, click **Galaxy > Configure > Alarms and Events Configuration**.

Default Alarm Severity Configuration

The table describes the alarm severities and their default properties.

Alarm severity	Alarm historization	Priority range	Representation
1	Yes	1...250	
2	Yes	251...500	
3	Yes	501...750	
4	Yes	751...999	

Alarm Shelving

Alarm Shelving Configuration

When you install the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform by using the supplied Galaxy backup, alarm shelving is enabled for alarms of severity 3 and 4 by default.

You can modify the configuration in the alarm configuration screen if your role has the required permission.

Shelving Alarms

During operation, shelving or unshelving an alarm by using the **Shelve** check box in the alarms tab, page 64 of the faceplate of the instance sets the corresponding *<reference>.AlarmShelve** attributes.

An alarm does not need to be active to be shelved. The shelving period starts when you shelve the alarm.

To shelve an alarm during runtime, your role needs to have the required operational permission.

For more information, refer to the topic describing how to shelve alarms in the ArchestrA IDE help.

NOTE: Shelving an alarm is considered as an abnormal situation, page 43.

Representation of Shelved Alarms During Operation

At the faceplate level, the alarms tab allows you to view the shelved status of alarms by displaying a timer icon, page 45. If the alarm is disabled or silenced while shelved, the timer icon is hidden but the shelving period count-down continues.

At the symbol level, the timer icon is displayed to indicate that an alarm is shelved. However, if for an instance, an alarm is shelved and, at the same time, another alarm is active, the timer icon is not displayed. This is because active alarms are displayed over shelved alarms independently of their respective severity and priority.

Namur NE-107 Status Management

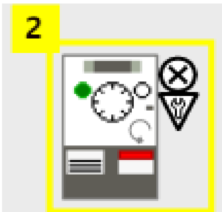
Overview

The Namur NE-107 recommendation defines that detailed device diagnostic information be summarized as four simple status signals. This allows the operator to view device statuses in a simple and uniform way regardless of the source device.

Device master templates of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform are preconfigured to manage Namur statuses.

Namur statuses are mapped to the device diagnostic bits of the Control resource, page 86 that is monitored by the template. These bits are associated to state alarms by using scripts so that the detection of a Namur status raises an alarm.

This illustration shows a device with two Namur icons displayed to the right.



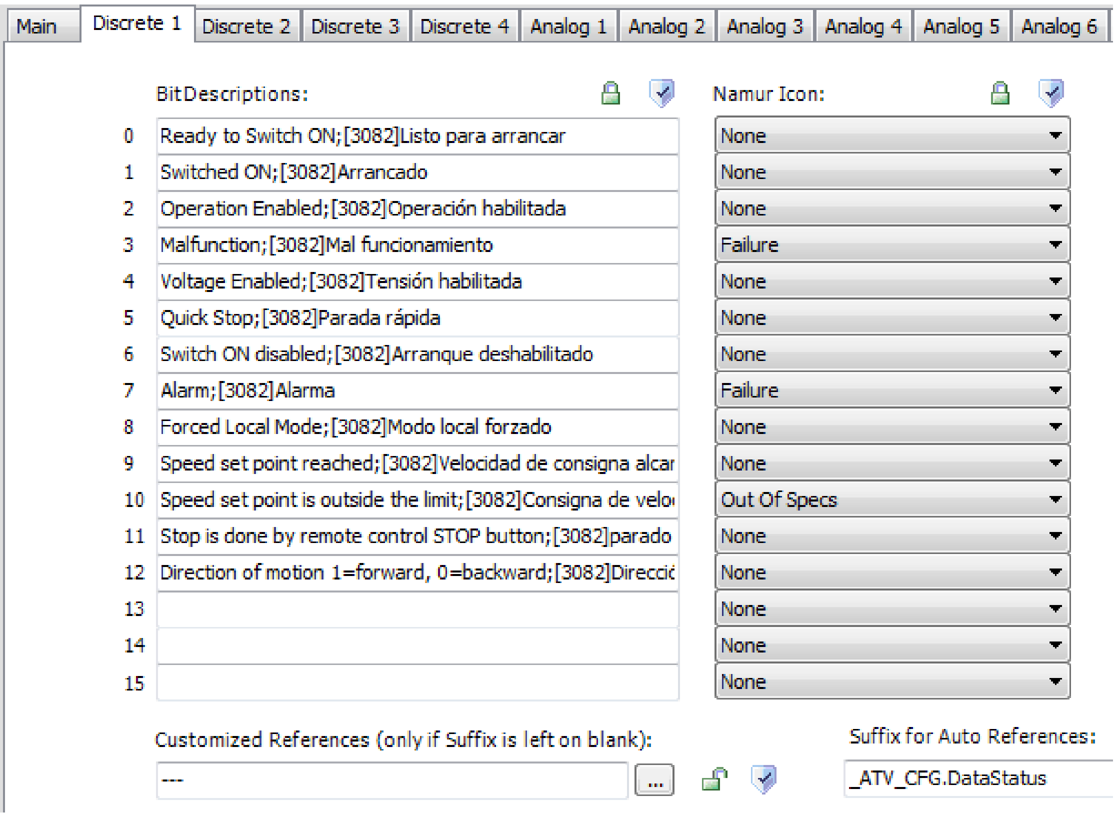
Description

The table describes the Namur statuses as defined in the Namur NE-107 recommendation and their default configuration

Namur status	Description	Alarm priority	Associ-ated alarm severity	Icon
Failure	Output signal invalid due to error detected in the field device or its peripherals.	500	2	
Function check	Output signal temporarily invalid (for example, frozen) due to ongoing work on the device.	750	3	
Out of specification	The device is operating outside its specified range (for example, measuring or temperature range). Internal diagnosis indicates deviations from measured or set values due to errors detected in the device or process characteristics.	999	4	
Maintenance required	Although the output signal is valid, the wear reserve is nearly exhausted or a function will soon be restricted due to operational conditions (for example, aging of a pH-electrode).	999	4	

Namur Status Mapping

The mapping of Namur statuses is accessible in the **Discrete 1** to **Discrete n** tabs of the device object. In this example, Namur statuses are mapped to bits 3, 7, and 10 of the ATV_CFG.DataStatus word, which is monitored by the template.



NOTE: Bit descriptions and Namur statuses are locked attributes.

Namur Alarm Priority Configuration

You can modify the alarm priority of the associated state alarm in the application template or its instance by configuring the corresponding attribute (for example, *AO.Namur.OutOfSpecs*).

For information on modifying state alarm priorities, refer to the topic describing alarm priority configuration, page 36.

Multilanguage Support

What's in This Chapter

Multilanguage Support

Overview

The engineering environment is in English.

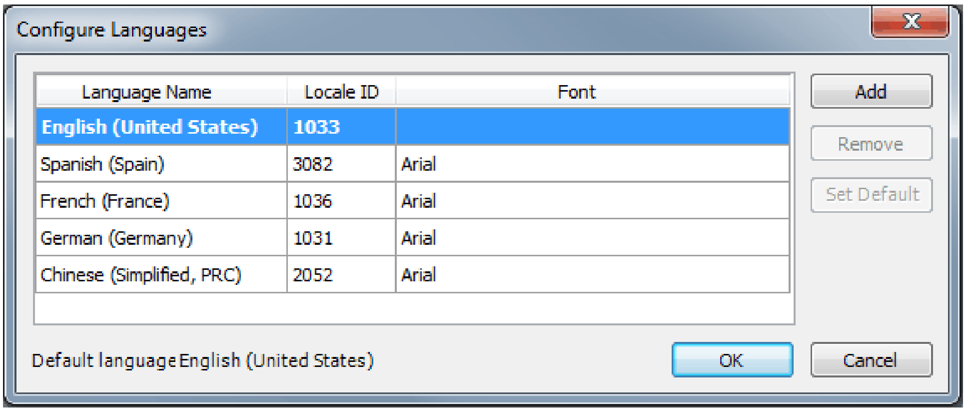
The operation environment supports the following languages:

- English
- Spanish

The default and native language is English.

You have the possibility to add other languages to your application.

Click **Galaxy > Configure > Languages** to access to the **Configure Languages** window:



You can add or remove language or change the default language.

For information on how to use other languages, refer to the ArchestrA IDE online help.

Alarm Description Localization

The alarm description can be localized with the export/import function of alarm messages.

Proceed as follows to localize alarm messages:

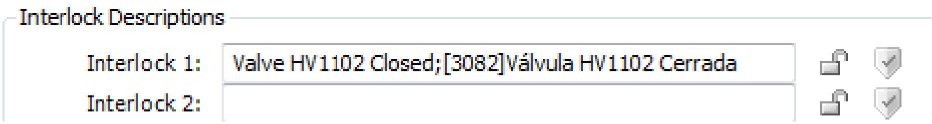
Step	Action
1	Click **Galaxy > Export > Localization > All Alarm Messages**. **Result:** The **Export Alarm Messages** window opens.
2	Select the language to export and click **Export**. **Result:** A text file is generated with all alarm messages.
3	Insert the translation of the alarm messages in this text file. (A file with spanish translation of alarm messages used in master templates are available in the installation files, page 22).
4	Click **Galaxy > Import > Localization > Alarm Message(s)**. **Result:** The **Import Alarm Messages** window opens.

Step	Action
5	Select the language and the text file to import and click **Import**. **Result:** The localizations of alarm messages are imported in the galaxy.
6	The text file has to be imported in the InTouch window maker also. Click **Special > Language > Import Alarm Fields**. **Result:** The localizations of alarm messages are imported in the InTouch window maker.

UDA Values Localization

The UDA values (for example interlock and detected failure condition descriptions) can be entered with a multilingual format.

This illustration presents an example of multilingual format:



Use the following syntax to enter the value:

<text in default language>;[Language ID]<localized text>;[Language ID]<localized text>...

This table presents the language ID:

Language	Language ID
English	1033
Spanish	3082
French	1036
German	1031
Chinese	2052

In this example the interlock description is localized in Spanish and French:

Valve HV1102 Closed;[3082]Válvula HV1102 Cerrada;[1036]Vanne HV1102 fermée

NOTE: If you operate with a non-listed language, the text in default language is used.

ArchestrA Symbol Localization

The static text of the library symbols can be localized with the export/import function of symbol localizations.

Proceed as follows to localize the static text of the library symbols:

Step	Action
1	Select the graphic toolset to export in the **Graphic Toolbox**.
2	Click **Galaxy > Export > Localization > Selected Symbol(s)**. **Result:** The **Export Locale Data** window opens.
3	Select the language to export and click **Export**. **Result:** An XML file is generated with all symbol texts of the toolset.
4	Edit the XML file and insert the text translation between the tags `<Translation>` and `</Translation>`.
5	Click **Galaxy > Import > Localization > Symbol(s)**. **Result:** The **Import Locale Data** window opens.

Step	Action
6	Select the language and the XML file to import and click **Import**. **Result:** The **Import Locale Preferences** window opens.
7	Select the import preferences and click **Import**. **Result:** The text localizations of the symbols are imported.

Representation of Supervision Data

What's in This Chapter

Overview

Graphic symbols and faceplates use icons, animations, and other graphic elements to convey information related to control modules, such as values, setpoints, statuses, or conditions. In particular, styles are used to distinguish between types of information or to highlight changes or situations that require action.

This chapter describes the icons used in supervision components and the styles that are used to represent supervision data. You can modify the definitions of the listed styles as needed, without having to redesign the ArchestrA symbols.

Situational Awareness (SA)

Overview

The EcoStruxure Process Expert General Purpose Library for AVEVA System Platform uses SA principles. These help you identify states that are different from the expected state and from the normal operating mode that is configured for an object. Such states are considered abnormal states.

Bars and trends allow you to compare current process values with expected thresholds.

Symbol Animation

An abnormal state is represented by an exclamation mark on orange background, which is displayed next to the symbol.

Icon	Description
 Static	The control module is in an abnormal configuration or operating mode, for example: • Simulation mode. • The current owner mode is different from the normal mode (as configured by default in the corresponding attribute) or the initial value is different from the possible values normally used for the attribute. In such case, the current owner mode is indicated on the symbol (for example, **O** for *operator*). • Bypassed interlocks or abnormal conditions. • Disabled, silenced, inhibited, or shelved alarm.
 Flashing	The control module is waiting for an operator action (for example, a motor needs to be reset manually to start again). **NOTE:** If at the same time an operator action is requested and an abnormal configuration is detected, which are represented by a flashing and a static icon respectively, the flashing icon prevails.

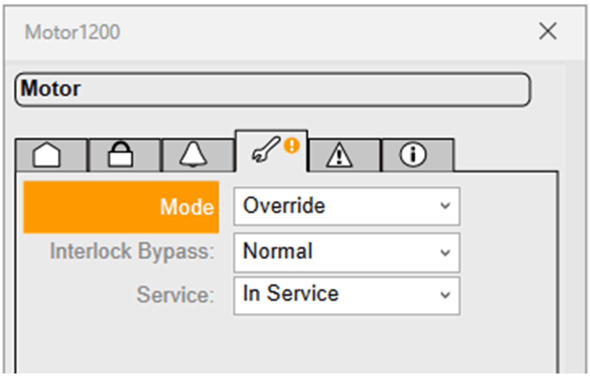
NOTE: The symbol uses the User_Defined_01 element style, page 44.

Faceplate Animation

An abnormal configuration is represented by an exclamation mark on orange background, which is displayed next to the icon of the faceplate tab.

NOTE: If the tab icon is flashing, an action is required from this tab.

In addition, the item that is in an abnormal configuration or that requires an operator action is displayed with an orange background. In this example, the simulation mode is enabled whereas the normal operating mode has simulation disabled.



Element Styles

Introduction

The **Element Styles** of the library are configured in the **Galaxy Style Library** (click **Galaxy > Configure > Galaxy Style Library**). You can change the look and feel of the entire library by modifying the global configuration for the Galaxy.

You can modify for each element style:

- Color and text font.
- Fill color override.
- Line style.
- Outline style.

Description

This table describes the default element styles that are used to represent supervision data.

Element	State	Galaxy style	Representation
Static legend	-	Label	Security Group:
Animated legend	Normal state	Label	Interlock Bypass:
	Abnormal state	User_Defined_01	Interlock Bypass:
Configurable legend	-	User_Defined_17	High Level SP
Present value	-	Actual_Value	30.0
Setpoint value	-	Setpoint	1000.0

Element	State	Galaxy style	Representation
Output value	-	User_Defined_13	1000.0
Other non-editable value	-	User_Defined_04	Security Group:
Editable value	-	User_Defined_05	1000.0
Button and drop-down list	-	User_Defined_08	Reset
Animated text in tables	Value OFF	User_Defined_07	LSL1001 D10 Low Level
	Value ON	User_Defined_06	LSL1001 D10 Low Level
	Value ON	User_Defined_02	data to the Oper
Non-animated text in tables	-	User_Defined_03	Average current
Dynamic value	Value OFF	Passive	
	Value ON	Active	
	Transitioning	Transitioning	Travelling
	Stopped state	Not_Running	
Line separator in faceplates	-	User_Defined_11	
Faceplate and selected tab background	-	User_Defined_09	
Unselected tab background	-	User_Defined_10	###
Over range (for example, open and closed at same time or in case of motorised valve, if valve positioner feedback crosses the threshold limit and is not matching with its limit switch indication.)	-	Over-range	
Outputs in trends	-	Control_line	
Bars representing signals not confirmed from field	-	Active_NotAvailable	

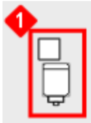
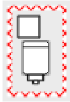
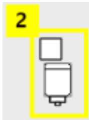
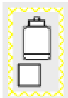
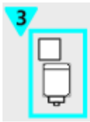
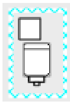
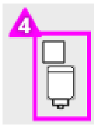
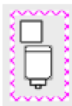
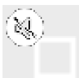
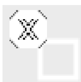
Icons

Description

The table describes the icons that may be displayed during operation.

Function	Icon	Meaning	Examples of use	Comment
Displaying owner selection	**O**	Operator	Valve in operator mode (the operator sets the setpoint).	The icon is displayed only if it is not the normal mode.
	P	Program	Valve in program mode (the program sets the setpoint).	

Function	Icon	Meaning	Examples of use	Comment
	C	Cascade	Closed-loop PID controller with an externally set setpoint	
Displaying operating mode	**A**	Auto	Closed-loop PID controller.	The icon is displayed only if it is not the normal mode.
	M	Manual		
Interlocking		Active	A motor is interlocked because of an interlock condition.	–
Displaying service information		Out of service	A motor is declared out of service in its faceplate.	–
Transitioning		Transitioning state	–	–
Informing of abnormal configuration		The control module is in abnormal configuration.	The control module is in simulation. Global bypass is activated. Partial bypass.	Represented on the element that is in abnormal configuration, page 43.
Requesting operator action	Flashing	The control module is waiting for an operator action.	A motor needs a reset to start again.	–
Resetting required		Awaiting a reset	Motor waiting to be reset after thermal trip.	Displayed if mandatory manual resetting is enabled in the resource controlling the device.
Displaying Namur statuses		Out of specification	Speed setpoint is outside the limit.	Namur NE-107 Management, page 38
		Maintenance required	Replace the pH electrode.	
		Failure detected	Inoperable device.	
		Check function	Substitute value entered.	
Displaying operator messages		Information	A message is shown to the operator.	See *$MessageBoxCE*
		Question	A value or confirmation is requested from the operator.	
		Exclamation	The operator is informed of an abnormal condition.	
		Stop	An abnormal condition that is equivalent to the Namur *Failure* status is shown to the operator.	

Function	Icon	Meaning	Examples of use	Comment
Displaying alarms		Alarm of severity 1	Very high temperature alarm.	Defined by the style *AlarmBorder_Critical_UNACK*
		Alarm of severity 1 returns to normal	–	Defined by the style *AlarmBorder_Critical_RTN*
		Alarm of severity 2	High temperature alarm.	Defined by the style *AlarmBorder_High_UNACK*
		Alarm of severity 2 returns to normal	–	Defined by the style *AlarmBorder_High_RTN*
		Alarm of severity 3	Function check (Namur status).	Defined by the style *AlarmBorder_Medium_UNACK*
		Alarm of severity 3 returns to normal	–	Defined by the style *AlarmBorder_Medium_RTN*
		Alarm of severity 4	–	Defined by the style *AlarmBorder_Low_UNACK*
		Alarm of severity 4 returns to normal	–	Defined by the style *AlarmBorder_Low_RTN*
Displaying alarms		Alarm silenced	–	–
		Alarm disabled or inhibited	–	–
		The alarm is shelved, page 37.	–	–
Indicating alarm level setpoints		Very high	Very high temperature.	–
		High	High temperature.	–
		Setpoint	Temperature outside of setpoint.	–
		Deviation	Temperature outside of deviation.	–
		Low	Low temperature.	–
		Very low	Very low temperature.	–
Indicating Setpoints (bars)		Setpoint	Position setpoint of a control valve.	–

Function	Icon	Meaning	Examples of use	Comment
Displaying trend pens		Present value	–	–
		Output value	–	–
		Very high limit	–	–
		High limit	–	–
		Setpoint	–	–
		Deviation	–	–
		Low limit	–	–
		Very low limit	–	–
Opening the trend faceplate		Click the icon to open the trend faceplate.	–	–
Displaying labels	FCV1004	Label of symbols	–	Only if labels are made visible.
Extended interlock/ Initial condition		Click to open extended interlock faceplate.	-	Displayed if the interlocks/initial conditions are extended using *$IlckCE* template.

NOTE: User has to use **PSxLabels** symbol to enable label on the graphic (click **Graphic Toolbox** → **PSx Symbol Library** → **Support** → **PSxLabels**).

Faceplate Tab Icons

Overview

You can access a faceplate, page 54 by clicking a symbol during operation.

Faceplates consist of tabs which group by category, the representation of functionalities that are provided by the associated control resource during operation.

Each category is represented by a tab icon.

Click a tab to access its functionalities.

To access the trend faceplate, click the wave icon that is displayed next to a symbol.

NOTE: Some tabs are optional or object-specific and are displayed only if the control module features the corresponding service and the service is enabled for the instance.

NOTE: If the tab icon is flashing, an action is required from this tab.

Description

The table describes the tabs and the functionalities they feature.

Tab/category	Icon	Functionalities	Examples of use
Operation		• Current status (present value, setpoint, output value) • Owner change • Operating mode change • Setpoint (`SP`) change • Resetting • Configuration of alarms at control level • Local panel monitoring	• Operator/ program • Manual/automatic • PID controller setpoint (`SP`) change in auto mode and output change in manual mode
Interlocks / initial conditions		• Interlock condition statuses • Bypassing and/or manual resetting of interlock conditions	Interlocks associated with an on-off valve
Failures		• Status of detected failure conditions • Bypassing of detected failure conditions • Manual resetting condition	Thermal overload of a motor
Maintenance		• Access to accumulated data regarding the control module operation • Counter resetting	• Hours of operation • Number of operations
Engineering		Changing settings or parameters	• Adjustment of PID control parameters • Activating the simulation mode
Warning		Status of detected warning conditions	To monitor the extended warning conditions from ATV6xx/ATV9xx device
Alarms		• Acknowledgment of alarms • Configuration of alarms at supervision level	• Disable alarm • Mute alarm
Analog data		• Analog data of a device • Input and output parameters of a sequence	Motor speed
Discrete data		Discrete data of a device	Information ready to switch on of an ATV61
RTNS		Provide a user interface that allows you to view system components during runtime (for example, controllers, process objects, process data, and so on) for monitoring and troubleshooting purposes.	For monitoring and troubleshooting purposes.

Optional Label Text

Description

Label of graphical symbols is optional for user to use as it can be show/hide in the runtime page.

The below table explains the steps to disable the label:

Step	Action
1	Open the Application Template derived from the `$MotorCE` master template, from which the application instances are created.
2	Add the new local graphic symbol (for example, **MyBlower_Left**).
3	Open the **Blower_Left** symbol and also open the **MyBlower_Left** symbol.
4	Open **Blower_Left** symbol, copy the entire content of this symbol and paste into **MyBlower_Left** symbol that is newly created.
5	Select the **MyBlower_Left** symbol and change the **LabelVisibility** custom property value to False.

Step	Action
6	**Save** and **Close MyBlower_Left** symbol.
7	Instantiate **MyBlower_Left** symbol on process page and check the runtime.

LabelVisibility custom property of **MyBlower_Left** symbol on process page can be disabled (double click on the **MyBlower_Left** symbol then edit symbol properties will appear, change **LabelVisibility** default value to false). The label custom property will appear in runtime window as per the modification.

Optional label text is available in graphical symbol of below templates:

Sl. No.	Template Name
1	`$DigitalInputCE`
2	`$AnalogInputCE`
3	`$AnalogInMultiCE`
4	`$DigitalOutputCE`
5	`$AnalogOutputCE`
6	`$TotalCE`
7	`$MotorCE`
8	`$Motor2DirCE`
9	`$ValveCE`
10	`$HandValveCE`
11	`$MValveCE`
12	`$ControlValveCE`
13	`$MValvewithPosCE`
14	`$MotorVSCE`
15	`$IMCTLCE`
16	`$LeadLagCE`
17	`$PIDCE`
19	`$PWMCtlCE`
20	`$RampCE`
21	`$RatioCtrlCE`
22	`$SplitRangeCE`
23	`$Step3CtlCE`

Screen Profile and Layout

What's in This Chapter

Screen Profile and Layout

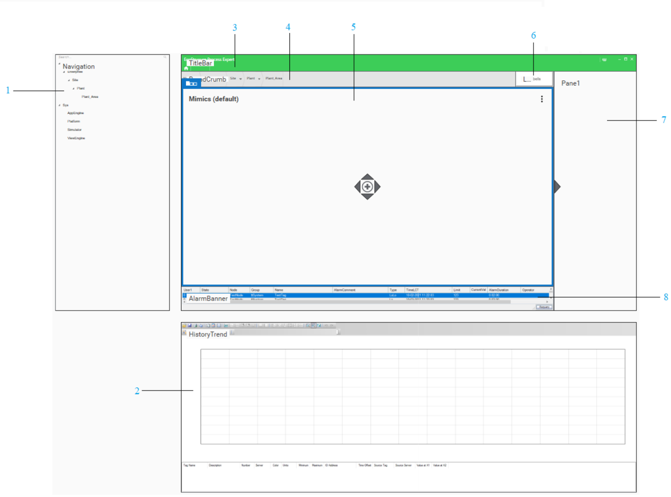
Screen Profile

A Screen Profile defines the display assigned to a client. Screen Profile definitions include all the aspects defined for a Screen (size, orientation, resolution, density, touch), but adds the ability to define how many screens are used for the display and how they fit together. For example, the Screen Profile for a control room might include the definitions for three screens, two in landscape orientation and one in portrait orientation, each with a different size and resolution. This library offers one sample screen (`$ScreenProfileGP`) profile for a single monitor with HD resolution.

Layout

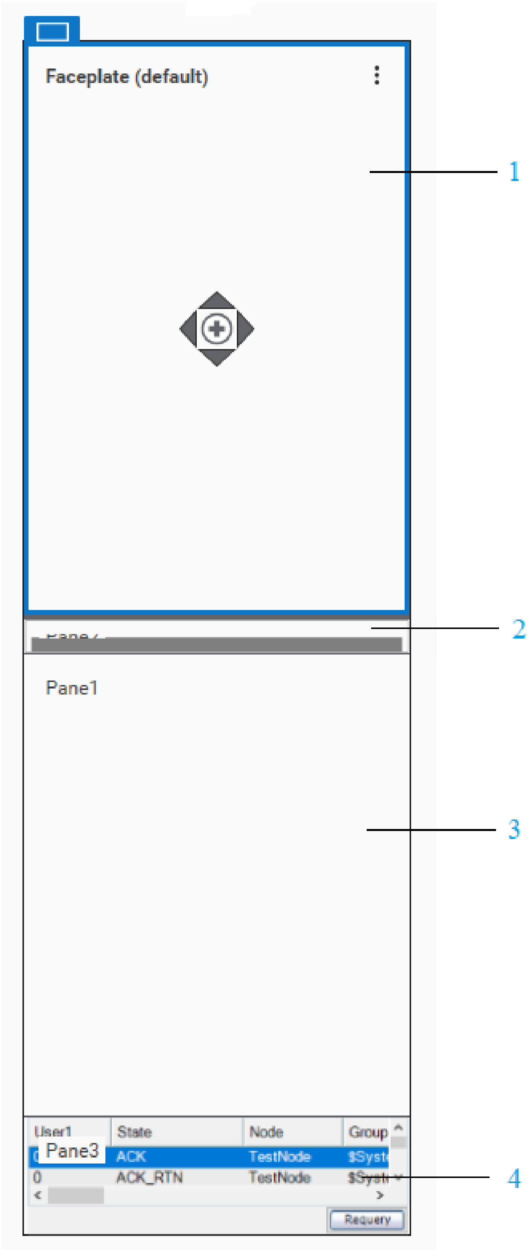
A Layout consists of one more rectangular areas of content (panes) for a screen and is used to define how run-time information is displayed. The Layout determines the type of content to be displayed in each pane, and how the panes are positioned on the screen. A pane can encompass the entire screen, or only a portion of it. This library provides a layout sample (`$LayoutGP`) for the user, the details of which are explained below.

1. LayoutGP



Item	Description
1	This slide-in pane is configured with the *Navigationtreecontrol* app provided by AVEVA system platform.
2	This slide-in pane is configured with the *Historicaltrendcontrol* app provided by AVEVA system platform.
3	This pane is configured with the *Titlebarcontrol* app provided by AVEVA system platform.
4	This pane is configured with the *Navigationbreadcrumbcontrol* app provided by AVEVA system platform.
5	This pane is configured to show level 3 symbols. The graphic must be configured with content type as L3, so that it appears in this pane.
6	This pane is configured to hold the label enable button for the L3 symbols.
7	This area in the layout is reserved to host the faceplate.
8	This pane is configured with the *Alarmcontrol* app provided by AVEVA system platform. This app helps to manage the alarms.

2. GPLLayout_Content:



Item	Description
1	This pane will host the operator tab/ information of the faceplate.
2	This pane will display the tab icons of the services that are configured.
3	This pane will host all the tab contents of the services that are configured.
4	This pane is configured with the Asset Specific Alarmcontrol app provided by AVEVA system platform. This app helps to manage the asset specific alarms.

Please refer to AVEVA help for more details on the apps which are used in the layout.

This Library also delivers a viewapp (`$viewappGP`), which uses the screenprofile and layout samples delivered in the library.

Faceplates

What's in This Part

Overview

This part describes the faceplates and faceplate tabs, page 48 that are common to various object categories of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Optional Faceplate Tabs for Process Objects

What's in This Chapter

Overview

This chapter describes the various optional faceplate tabs, page 48 that are common to objects of the process category.

Their use and functionalities are configured from the corresponding optional pages, page 78 of the master template.

NOTE: Template-specific faceplate tabs are described in the chapters documenting the master template.

Local Panel Section

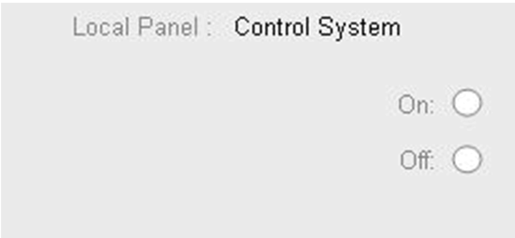
Overview

The operation tab may feature the optional local panel section.

The local panel is enabled from the **Local Panel** page of the process master template.

Local Panel Representation

The figure shows the local panel section only when *ModeSignalsEN* input signal is high.



The figure shows the local panel section only when *VirtualLPEN* input signal is high.

Function Description

The local panel section features a Local Panel mode indication, Local Panel mode selection from the Faceplate and status lights.

For a detailed description of the local panel function, refer to the corresponding control resource (see Modicon Libraries General Purpose, Process Components User Guide).

This table describes the different operating modes of the local panel when enabled:

Item	State	Description
Local Panel (Modes)	**Control System**	User have the choice to control the device through the **PROGRAM** or the **OPERATOR** (**OWNER** section of the operation tab).
	Zero	User cannot operate the device neither from the faceplate controls nor from the field (Local Panel).
	Local Panel	User can operate the control module from the field (Local Panel) only. The Local Panel provides status information of the device on the faceplate (status lights) that is operated from the field (Local Panel).
Status lights	Passive style, page 44	The status that is indicated by the label is not activated.
	Active style, page 44	The status that is indicated by the label is activated.
Local Panel	Local Panel mode operation can be enabled from the drop-down list on the faceplate. **NOTE:** • When *VirtualLPEN* input pin signal is high in DFB, Local Panel mode drop-down list appears on the faceplate for operation. • In runtime, when the user is not logged-in or if the Owner is in program mode, then the Local Panel mode drop-down list is disabled for operation.	
	Enable	*LPMode* operation is enabled in DFB, so the user can operate devices from the field (Local Panel).
	Disable	*LPMode* is disabled in DFB. Hence, user cannot operate the devices from the field (Local Panel).

Interlocks Tab

Overview

The optional interlocks tab is available on certain faceplates, allowing you to view and interact with conditions that are configured to interlock a control module.

Depending on the configuration of the corresponding control resource and the process object, the tab allows bypassing each condition. You can also make manual resetting of each input of the corresponding control resource mandatory after the interlock condition is cleared.

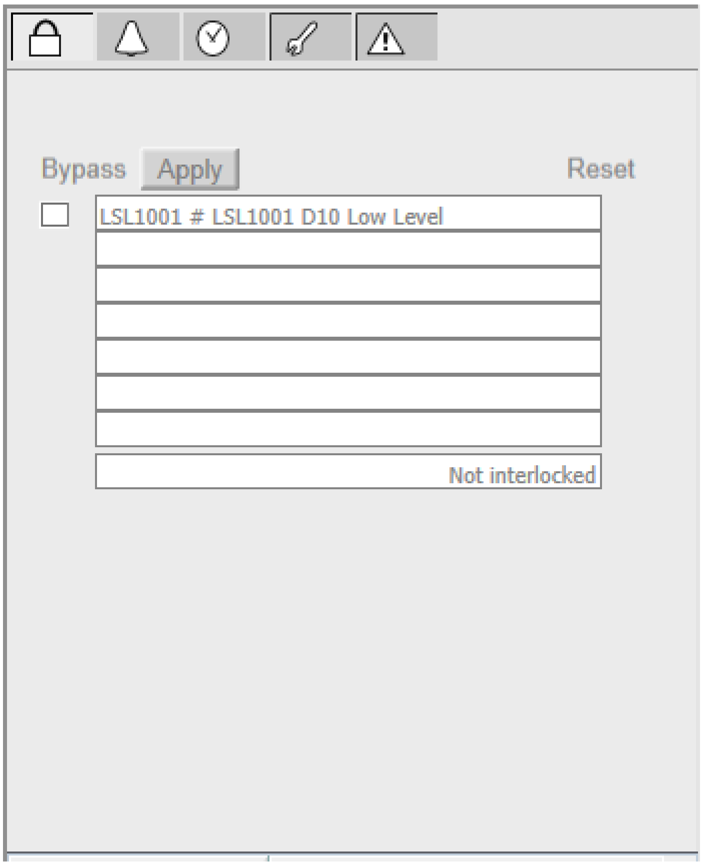
When configured, a dialog box is displayed when you click a reset button, which is used to confirm the reset.

The interlocks tab is enabled from the **Interlocks** page of the process master template.

NOTE: This tab is also used to display initial conditions for sequential control, page 242 and equipment module, page 288.

Interlocks Tab Representation

The figure shows an example of the interlocks tab.



NOTE: When no interlock conditions are present or when all present interlock conditions are bypassed, the message **Not Interlocked** is displayed at the bottom of the tab; otherwise, the message is **Interlocked**.

⚠ WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Do not manually bypass or reset an interlock condition without confirming the impact on subsequent process events.
- Provide separate or redundant control paths wherever required.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Interlock Condition Descriptions

The tab displays the interlock conditions configured in the **Interlocks** page, page 79 of the process object.

When a configured condition arises, its description is displayed in the tab.

Bypassing an Interlock Condition

After you have selected one or more interlock conditions in the tab, bypassing the selected conditions underlies a security classification, page 79 when you click **Apply**. The default configuration is *verified write*.

Bypassing an interlock condition is configured by default as an abnormal state and is indicated by an orange rectangle, page 43.

NOTE: For interlock conditions starting by an asterisk (*), the **Bypass** check box is not displayed because they are associated to control data that cannot be written to.

Manual Resetting of an Interlock Condition

When the reset is effective, the command that is shown in the **SetPoint** menu in the operation tab of the faceplate is initiated.

The reset button is available only if the interlock condition has disappeared and depending on the configuration made in the controller.

Resetting an interlock conditions underlies a security classification, page 79. The default configuration is *secured write*.

NOTE: When the tab is used as part of the *$SequenceCE* master template, after performing a reset, you need to restart the process sequence from the operation tab of the faceplate.

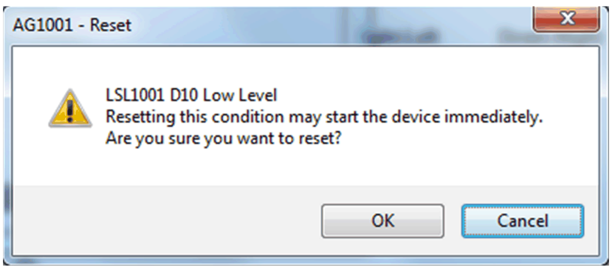
Reset Confirmation

For the following master templates of the process category, the *Param.InterlockRearmConfirmation* parameter allows you to display a dialog box that requires a confirmation for the reset of an interlock to take effect. The dialog box appears when you click **Apply**:

- *$MotorCE*
- *$MValvewithPosCE*
- *$MValveCE*
- *$MotorVSCE*
- *$Motor2DirCE*
- *$ValveCE*

Refer to *Parameters* in the chapter documenting each master template for a description of the *Param.InterlockRearmConfirmation* parameter.

The figure shows the confirmation dialog box which is model in nature.



Resetting an interlock condition by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

NOTE: When the reset confirmation is enabled, the security classification that normally applies when you click a reset button R is not effective.

Failures Tab

Overview

The optional failures tab is available on certain faceplates, allowing you to view and interact with abnormal conditions at the control module level.

Depending on the configuration of the monitored control logic and the process object, the tab allows bypassing each condition. You can also make manual resetting of each input of the corresponding control resource mandatory after the abnormal condition is cleared.

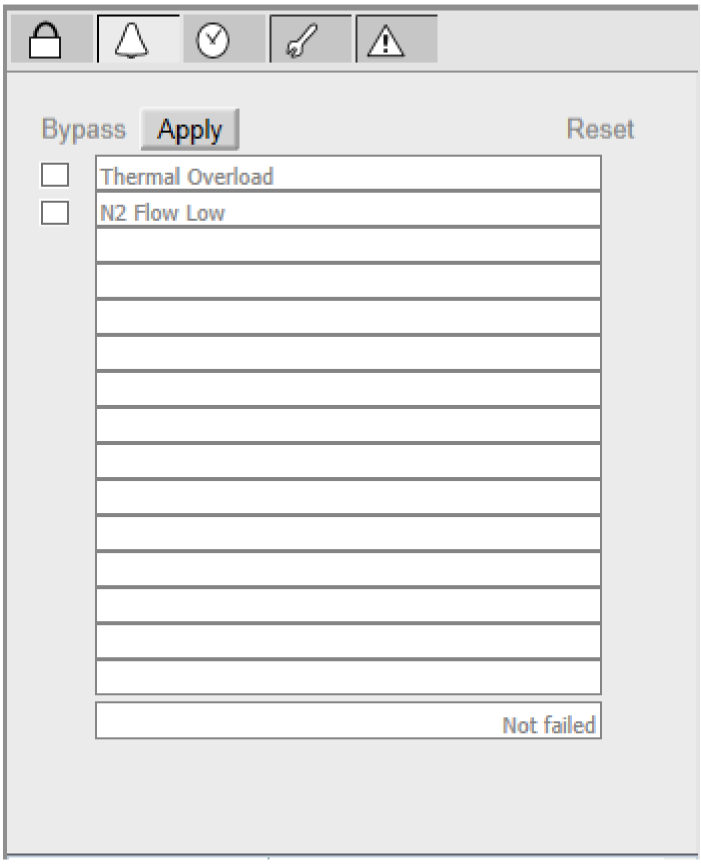
The tab is enabled from the **Failures** page, page 79 of the process master template.

NOTE: This tab is also used to display:

- Alarm conditions for alarm summary management, page 305.
- Detected failure conditions for sequential control, page 243 and equipment module, page 289.

Failures Tab Representation

The figure shows an example of the **Failures** tab.



NOTE: When no abnormal conditions are present or when all present abnormal conditions are bypassed, the message **Not Failed** is displayed at the bottom of the tab; otherwise, the message is **Failed**.

⚠ WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Do not manually bypass or reset a failure condition without confirming the impact on subsequent process events.
- Provide separate or redundant control paths wherever required.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Abnormal Condition Descriptions

The tab displays the abnormal conditions configured in the **Failures** and/or **Failures2** pages, page 79 of the process object.

When a configured condition arises, its description is displayed in the tab.

Bypassing an Abnormal Condition

After you have selected one or more abnormal conditions in the tab, bypassing the selected interlock conditions underlies a security classification, page 81 when you click **Apply**. The default configuration is *verified write*.

Bypassing an abnormal condition is configured by default as an abnormal state and is indicated by an orange rectangle, page 43.

NOTE: When the tab is used as part of the *$SequenceCE* master template, resetting a detected failure condition requires a *secured write*.

NOTE: For abnormal conditions starting by an asterisk (*), the **Bypass** check box is not displayed because they are associated to control data that cannot be written to.

Manual Resetting of Abnormal Conditions

The reset button is available only if the abnormal condition has disappeared and depending on the configuration made in the controller.

By default, resetting an abnormal condition underlies a *secured write* security classification, page 81.

Depending on the configuration of the monitored control logic, to reset the control module, you may need to click the **Reset** button on the operation faceplate. Refer to the description of the operation faceplate in the chapter describing the corresponding master template.

NOTE: When the tab is used as part of the *$AlarmSummaryCE* master template, to reset an abnormal condition, your role needs to have permission to modify attributes with *operate* security classification.

NOTE: When the tab is used as part of the *$SequenceCE* master template, after performing a reset, you need to restart the process sequence from the operation tab of the faceplate.

Maintenance Tab

Overview

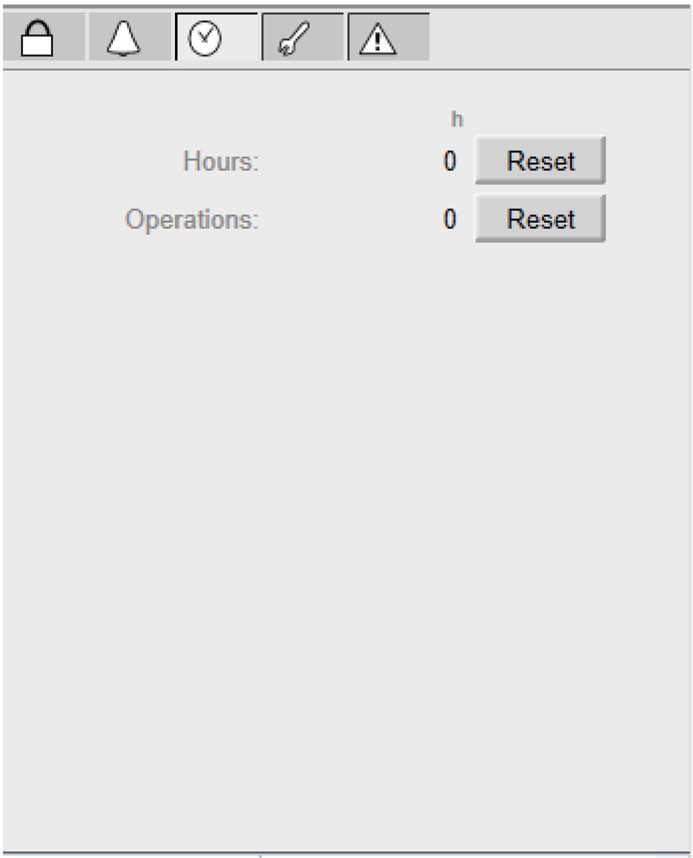
The maintenance tab is an optional tab that:

- Displays accumulated data related to the operation of the control module.
- Allows resetting the corresponding counters.

The tab is enabled and configured from the **Maintenance** page of the process master template.

Maintenance Tab Representation

The figure shows an example of the maintenance tab.



Resetting of Counters

Resetting a counter underlies a security classification, page 82.

Optional Faceplate Tabs for Smart Device Objects

What's in This Chapter

Overview

This chapter describes the various optional faceplate tabs, page 48 that are common to templates of the device category.

Their use and functionalities are configured from the corresponding optional pages, page 85 of the master template.

NOTE: Template-specific faceplate tabs are described in the chapters documenting the master template.

Analog Data Tab

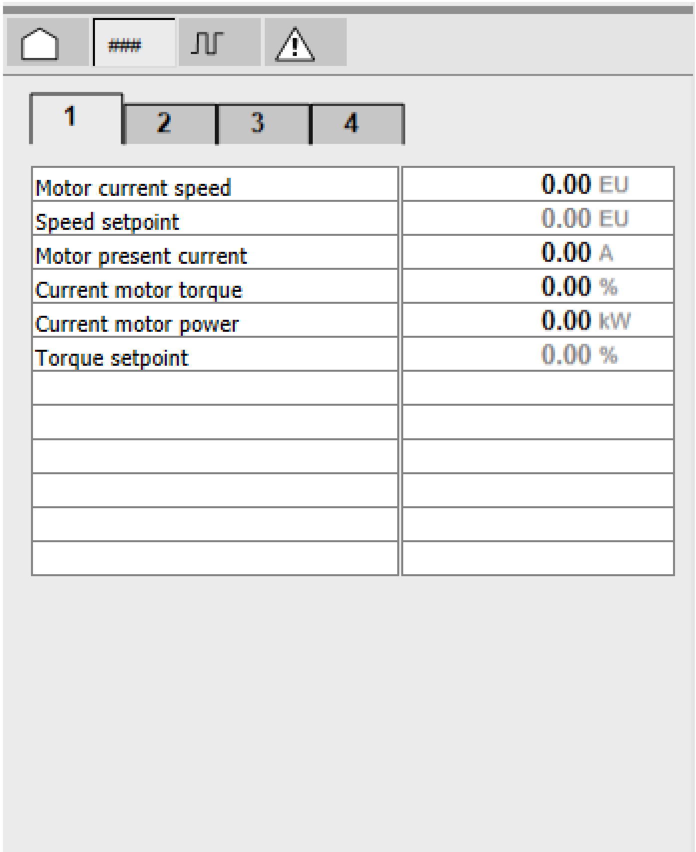
Overview

The analog data tab contains up to six subtabs displaying the analog data of the device. A subtab is displayed once the corresponding analog group is enabled from the **Main** page of the master template.

The analog data is configured in the **Analog 1**...**Analog 6** pages, page 87 of the device object .

Analog Data Tab Representation

The figure shows an example of the analog data tab.



NOTE:

- **Analog Data** tab - if the value from the Unity is **NAN** then the data displayed on the faceplate will be as per the OS language set on the local System.
- **Analog Data** tab **> Diagnostic codes** tab displays the information of diagnostic code of the device. The value displayed is in decimal, user has to manually convert this decimal value to hexadecimal value and refer (see Modicon Libraries General Purpose, Devices Components User Guide) for Diagnostic codes/ Failcode description.

Discrete Data Tab

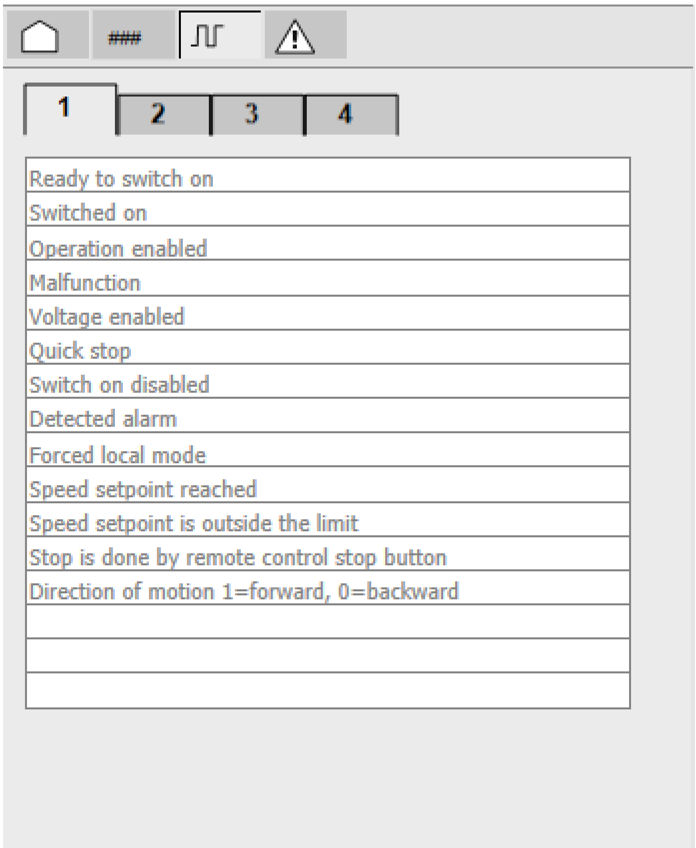
Overview

The discrete data tab contains up to four subtabs displaying the discrete data of the device. A subtab is displayed once the corresponding word is enabled from the **Main** page of the master template.

The discrete data is configured in the **Discrete 1**...**Discrete 4** pages, page 86 of the device object.

Discrete Data Tab Representation

The figure shows an example of the discrete data tab.



NOTE: Namur icons are displayed in the tab to the right of the description when configured, page 39.

Common Faceplate Tabs

What's in This Chapter

Overview

This chapter describes the various tabs that are common to the faceplates of master templates of the library.

Alarms Tab

Overview

The alarms tab is available in each faceplate. It allows you to acknowledge alarm notifications that are associated to the control module and to manage the way these notifications are reported at the supervision level.

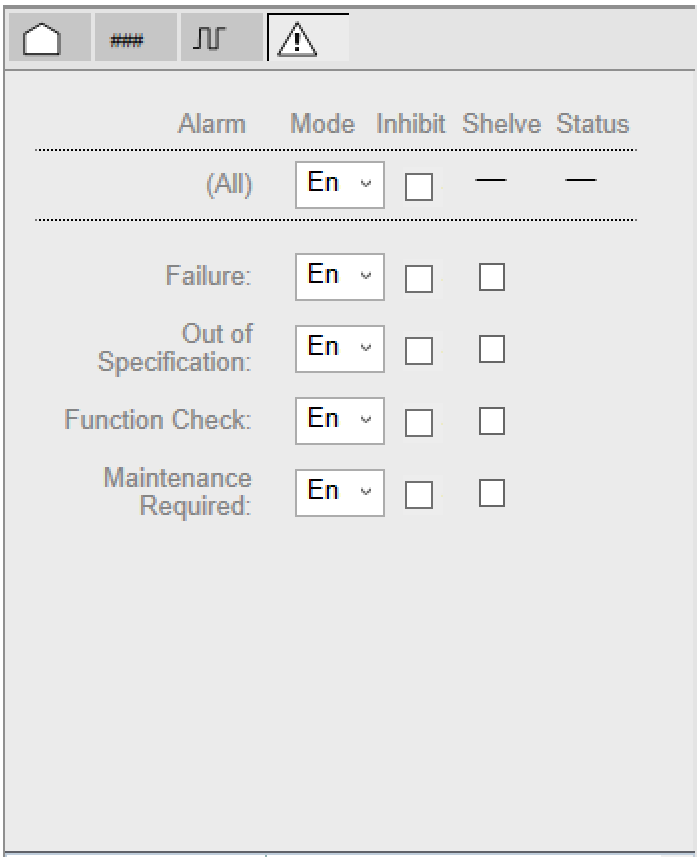
You can acknowledge and configure alarm notifications either:

- Globally for the alarms that are associated to the control module.
- Individually for each alarm.

NOTE: The evaluation of the corresponding signals at the control level is not impacted by the configuration of alarm notifications in this tab.

Alarms Tab Representation

The figure shows an example of the alarms tab.



Header	Description
Alarm	Displays the string that is configured in the **Alarm message** of the alarm feature of the attribute. The row **(All)** applies the configuration globally to alarms of the control module. **NOTE:** The state alarms that are configured by default are described in the chapter documenting each master template.
Mode	Available alarm modes: • **Enable** • **Disable** • **Silence**
Inhibit	When selected, the alarm is inhibited. **NOTE:** It also inhibits any alarm in contained instances of the object.
Shelve	When selected, the alarm is shelved, page 37. **NOTE:** It does not shelve alarms in contained instances of the object.
Status	Shows: • The status of the alarm by using the corresponding icon, page 45. • The Namur icon (when applicable). • The alarm severity, page 36. **NOTE:** The tab allows you to see the alarms that are active, whereas the symbol displays only the alarm with the highest priority out of the active alarms.

NOTE: Your role needs to have the required operational permission to modify alarm modes.

Faceplate Customization

With the Ecostruxure Process Expert – General Purpose for Aveva System Platform R2 release, the user will be able to modify the standard library tab faceplates and use custom faceplates instead of standard tabs. Also you will be able to extend the faceplate by adding new tabs.

Follow the below mentioned steps to add new tabs.

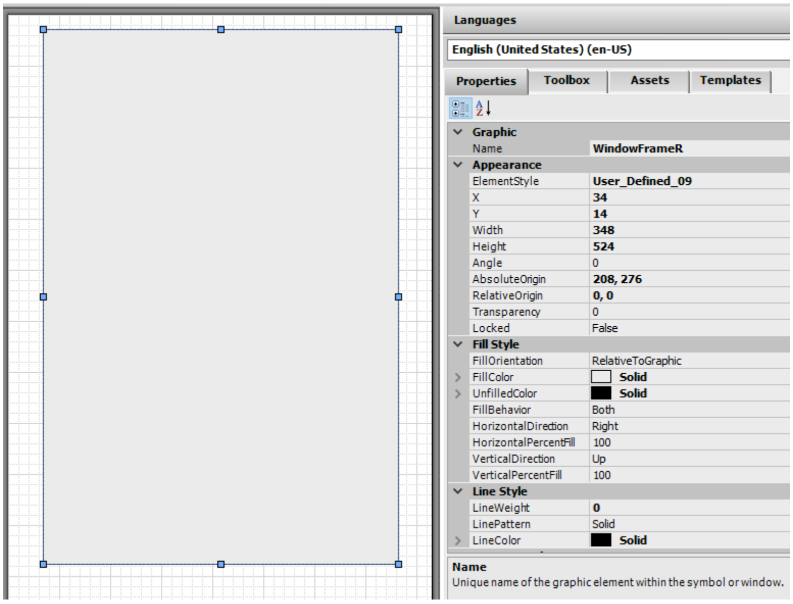
1. Creation of new tabs in L4 (Faceplates).

   There are two methods which can be followed to create new tabs for the existing templates.

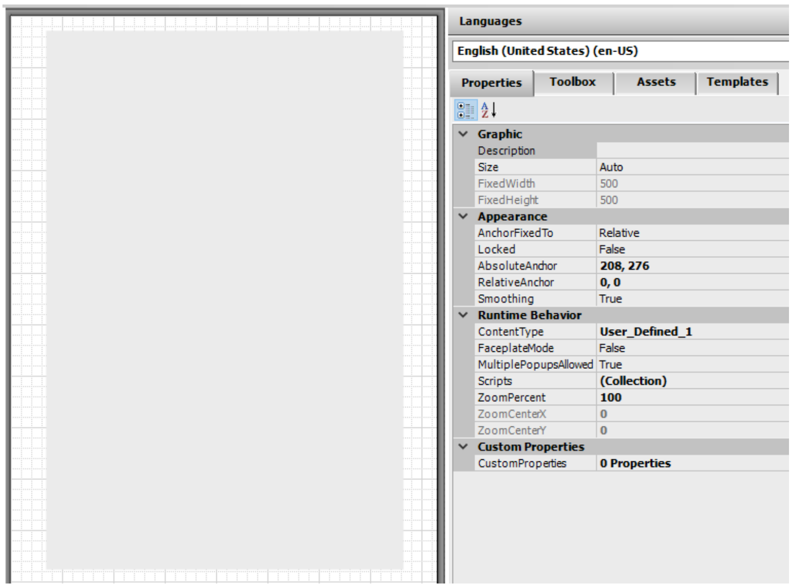
   a. Duplicate the existing faceplate and add the required objects.

   b. Create new content and set the following properties.

      (1) Create a frame of width: 348 and height: 524



      (2) Set the symbol (TabxxxxFP) ContentType : **User_Defined_1**

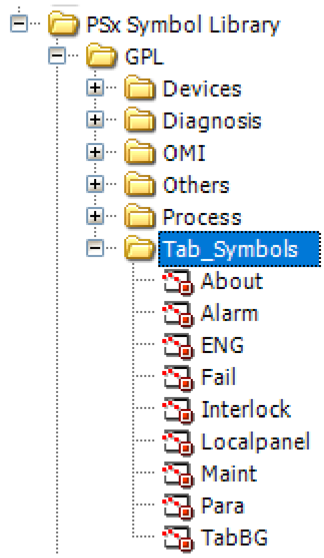


      (3) Add the required Objects / Scripts / Custom Properties are to the frame to complete the L4 symbol (Faceplate).

      (4) Then an attribute (parameter) is created in the Master template to store the name of the content that represents the new tab (Faceplate).

2. Creation of Tab Icon.

   a. You can either use the existing the Standard Tab Icons available in path shown below



   or can design/create new icon with abnormal if required in same location depending on the requirements.

   b. Create new content in Master Template with the below mentioned syntax:

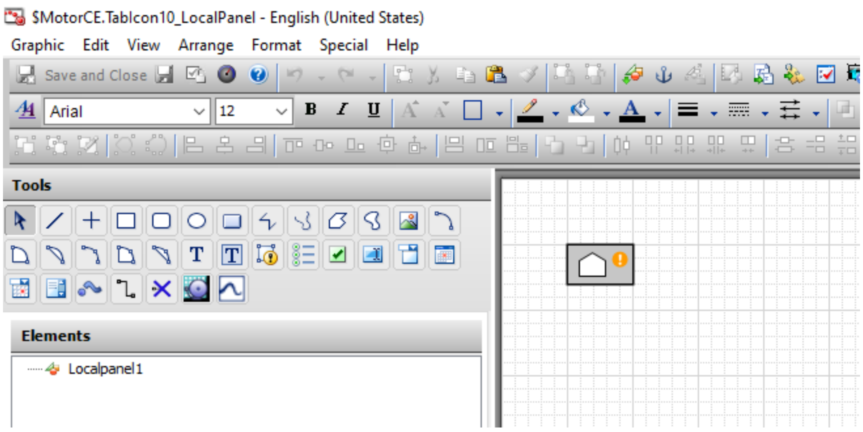
   “TabIconxx_yyyy”

   where “xx” is a numeric value defining the order where tab appears in runtime and “yyyy” is any suffix.

   Example: TabIcon10_LocalPanel where“10” in the name describes the order of the tab from left to right in the ascending order.

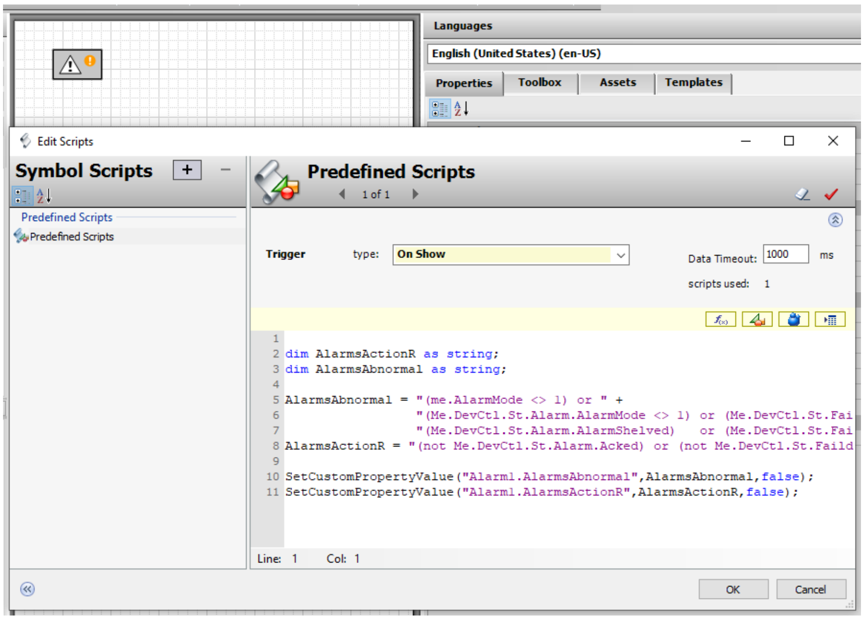
   c. Instantiate the Tab Symbol in the new content which is created.

   Example: In TabIcon10_LocalPanel, Tabsymbol “Localpanel” is instantiated

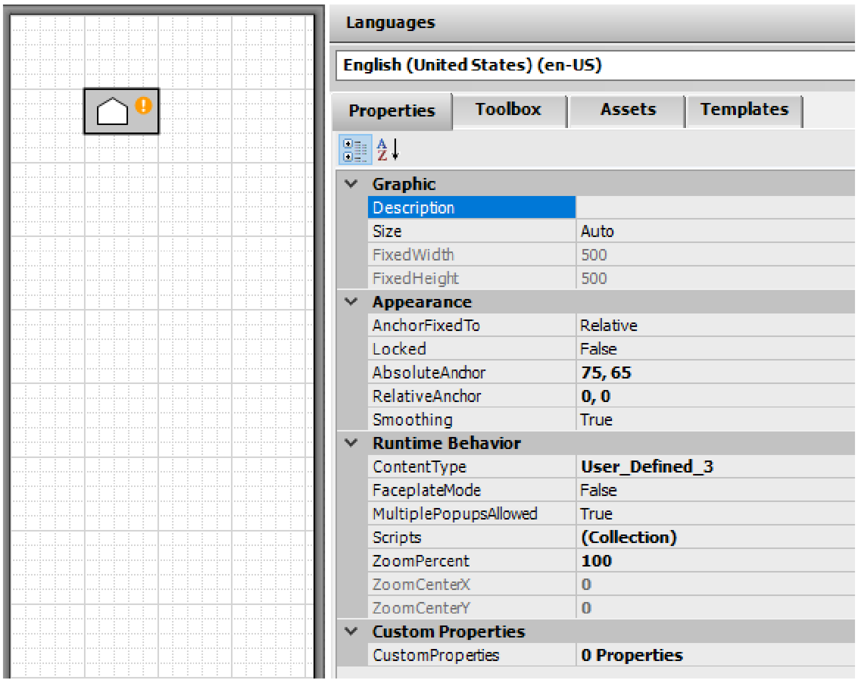


   d. Write the Abnormal animation conditions in the script (if any of them are applicable).

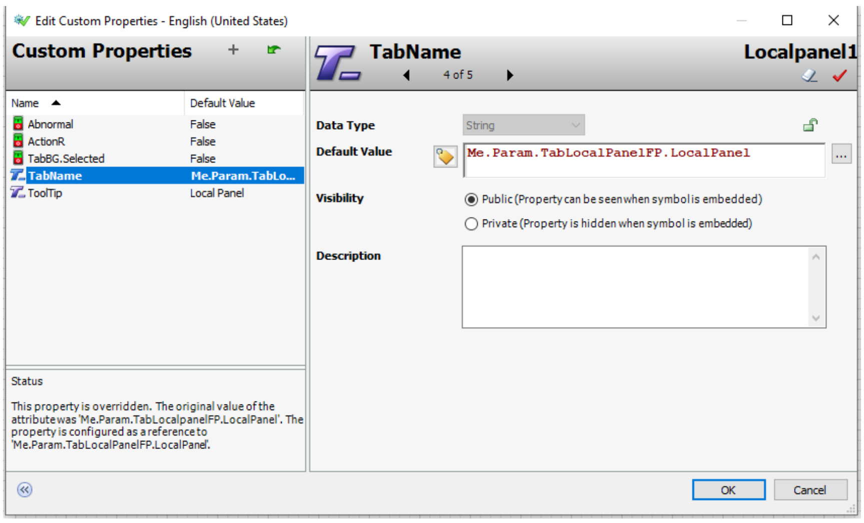
   The image below illustrates an example for Alarms Tab abnormal symbol.



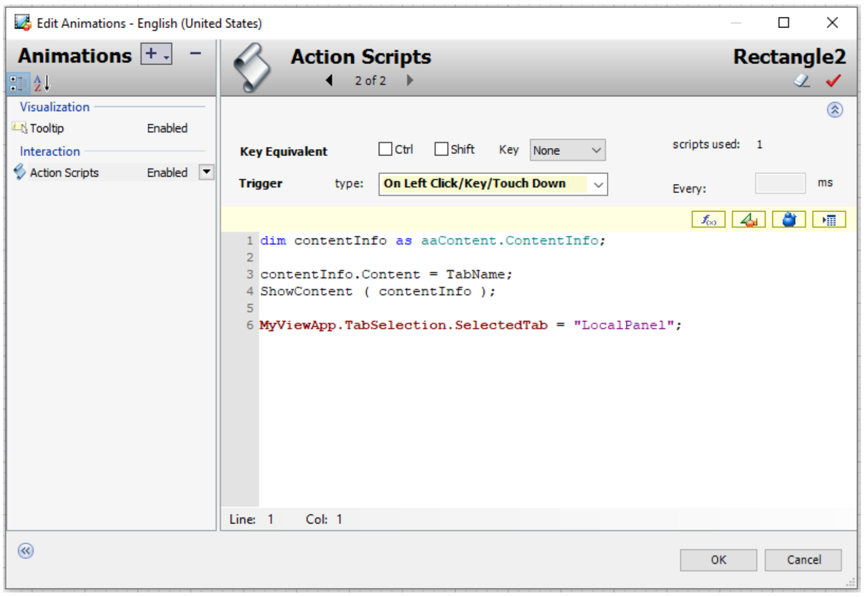
e. Set the Content Type of Tab symbol to **“User_Defined_3”** as illustrated below.



f. A custom property **TabName** is created to read the name of the faceplate through the attribute (parameter).



g. This custom property **TabName** will be referred in the action script shown below. This action script will set focus to the faceplate.



NOTE:

- The faceplate customization is applicable to tabs displayed below operator faceplate.
- The recommended number of tabs are 8, however you can add more tabs. Once the tab count exceeds 8, scroll bar will appear to navigate beyond 8 tabs.

Adding a Symbol to Open the Operation Client

Overview

This topic describes how to add a symbol to the faceplate or animated graphic (genie) of a user-created template and configure it to open the Operation Client to view asset-related information.

Working Principle

The following action script needs to be executed to open the Operation Client. You can insert it in any graphic and associate it to a trigger.

```
' Call Runtime Navigation Services
dim xref = new PsxMessaging.CrossReference;
xref.System = PESSystemID;
xref.ExecutionDomain = PESExecutionDomainID;
xref.Project = PESProjectID;
xref.Instance = Me.Tagname;

PsxMessaging.Messenger.SendFacet(xref);
```

To provide values to the variables used in this script, the symbol must contain the following custom properties.

Name	Data type	Default value
PESSystemID	*String*	*MyArea.Param.SystemID*
PESExecutionDomainID	*String*	*MyArea.Param.DomainID*

NOTE:

- PESProjectID is currently not used.
- Me.Tagname automatically takes as value the instance name of the object.
- For more information on the execution domain, refer to the topic describing executable properties (see EcoStruxure Process Expert for AVEVA System Platform, User Guide).

When you use AssetLink and the EcoStruxure Process Expert GPL for AVEVA System Platform, instances of the *$aAreaRootGP* template contain the following two attributes, which hold the values for the PESSystemID and PESExecutionDomainID variables respectively:

- *Param.SystemID*
- *Param.DomainID*

If you do not use the *AreaRoot* and *Area* templates, you need to add these attributes to your templates.

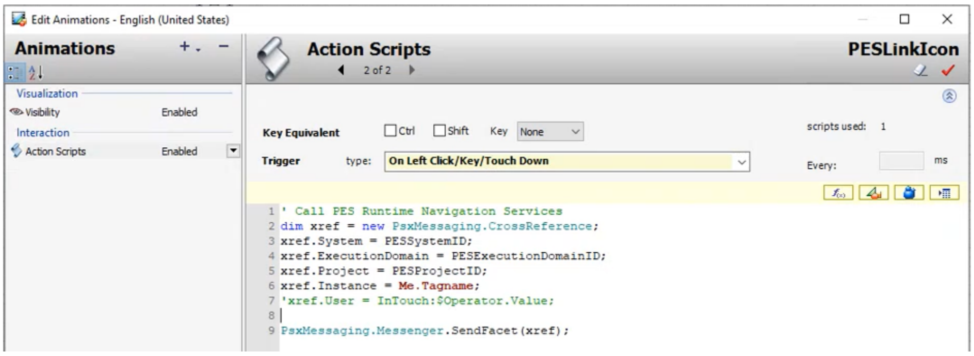
NOTE: *$aAreaRootGP* is selected by default for *Root Area* in the **Configuration** tab of the *$aEsxCEAssetLink* template. It represents the identifier of the EcoStruxure Process Expert system.

Child areas (instances of *$aAreaGP* that represent the folders of the application) use the same attributes and a corresponding script to acquire the value from their parent (an area or the root area):

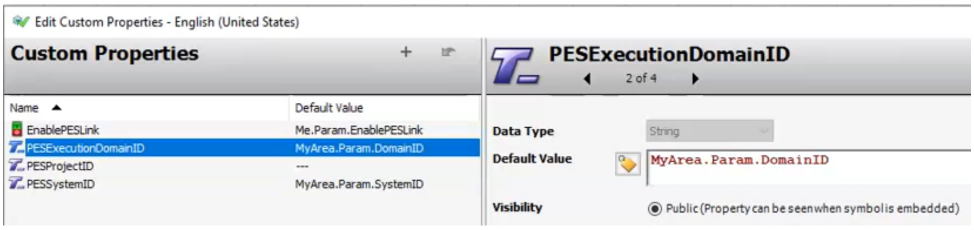
```
Me.Param.systemID = MyArea.Param.systemID
Me.Param.DomainID = MyArea.Param.DomainID
```

Examples

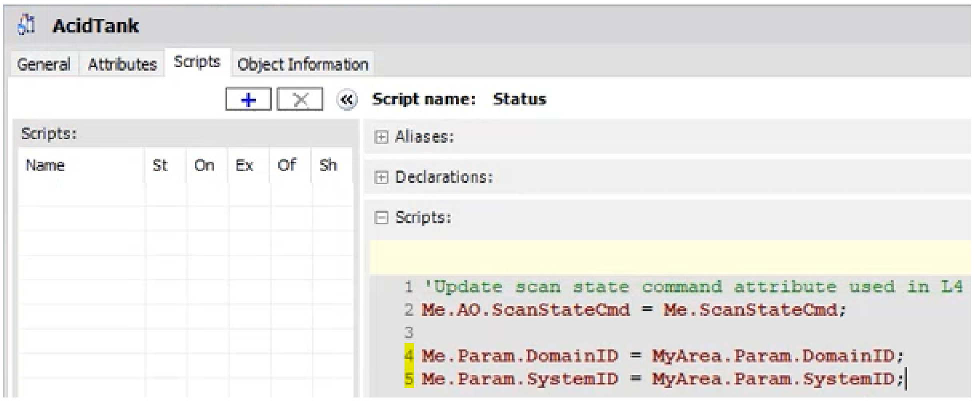
The following figure shows an example of the action script of a symbol that is executed on a mouse left-click.



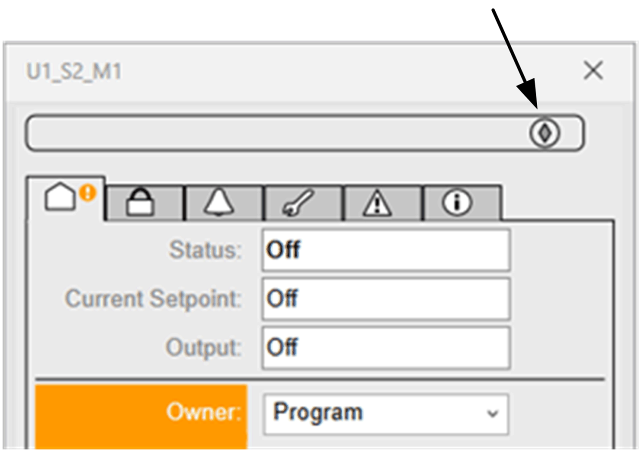
The following figure shows an example of the custom property of a symbol that allows variable `PESExecutionDomainID` to acquire the value from the *Param. DomainID* of its parent area.



The following figure shows an example of the script in an instance of a *$AreaGP* area template that allows assigning a value to its *Param.SystemID* and *Param. DomainID* attributes (rows 4 and 5).



The following figure shows an example of the faceplate of a template of the EcoStruxure Process Expert GPL for AVEVA System Platform that uses the *PSxPESLink* symbol to open the Operation Client. The symbol is pointed out by the arrow.



Implementing the Library

What's in This Part

Overview

This part describes how to implement the Modicon Libraries - General Purpose for Wonderware System Platform to create an application.

It does not describe how to deploy objects nor the Galaxy. Refer to the ArchestrA IDE help.

Implementing the Library

What's in This Chapter

Overview

This chapter describes how to implement the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform to create an application.

It does not describe how to deploy objects nor the Galaxy. Refer to the ArchestrA IDE help.

Implementation Overview

Quick Reference

The table indicates the steps to follow and the topic describing each step.

Step	Action	Refer to
1	Import library objects in your Galaxy.	Library Installation, page 22.
2	Create the **Model** view hierarchy.	Creating the Model View.
3	Create application object instances.	Instance Creation.
4	Configure application object instances.	Template or Instance Configuration, page 74.
5	Deploy the Galaxy.	ArchestrA IDE help.
6	Create your supervision application in ArchestrA Graphic Editor.	Graphic Symbol Integration, page 75.

Creating the Model View

Introduction

The **Model** view shows objects in terms of their physical or containment relationships and allows you to create your system architecture.

An area represents a physical section of a plant or automation process or a logical part of an automation application.

The area instances are created from the *$aAreaRootGP* and *$aAreaGP* application templates.

The *$aAreaRootGP* template is used to create the top-level areas of the **Model** view.

Model View Creation

This procedure describes the creation of a typical model view by using instances of application templates.

Step	Action
1	Select **Model** view.
2	Create instances of the *$aAreaRootGP* application template.
3	Create instances of the *$aAreaGP* application template.
4	Drag each area instance from the **UnassignedArea** folder to the required area instances to create your **Model** view hierarchy (up to 10 levels). **NOTE:** The *$aAreaGP* instances must not be placed at the top of the model view hierarchy. They need to have *$aAreaRootGP* instances as parent.
5	Configure each *$aAreaRootGP* and *$aAreaGP* instances.
6	Create system object instances by using the *$aWinplatformGP*, *$aAppEngineGP*, and *$aViewEngineGP* application templates.
7	Configure the system objects.
8	Create instances of the *$aOPCClientGP* application template.
9	Drag the *$aOPCClientGP* instance from the **UnassignedArea** folder to the *$aAreaRootGP* instance.
10	Configure the *aOPCClientGP* instance (refer to aOPCClient Configuration, page 74).
11	Create your application object instances by using the appropriate application templates.
12	Drag the application object instances from the **UnassignedArea** folder to the areas corresponding to your system architecture.

aOPCClientGP Configuration

Overview

OPC client instances are created from the *$aOPCClientGP* template.

They are used to communicate with Modicon controllers through OPC Factory Server (OFS).

Configuring *aOPCClientGP*

Proceed as follows to configure an OPC DA and OPC UA client instance.

Step	Action
1	Create an instance of the *$aOPCClientGP* template.
2	Double-click the instance to open it in the object editor
3	In the **General** page, configure the **Server node** with the name or IP address of the PC that hosts the OFS server.
4	To set the **Server name**, you can use the OFS server program ID (*Schneider-Aut.OFS*) or select the instance of the OFS server from the menu. **NOTE:** For OPC UA Configuration OFS Program ID is `OI.GATEWAY.3`.
5	In the **Scan Group** page, you need to configure at least one scan group. A scan group is a collection of OPC items with a common update interval. **NOTE:** By default, **Scan Mode** is set to *ActiveOnDemand*. In this mode, the items that are not actively being referenced by any client or object are not scanned. For more information about **Scan Mode**, refer to the ArchestrA IDE help.
6	Check in the object.

Template or Instance Configuration (Object Editor)

Overview

The object editor features native configuration pages but also pages that are specific to the objects of EcoStruxure Process Expert General Purpose Library for

AVEVA System Platform, page 77. Typically, the library-specific pages are used to configure optional supervision functions provided by templates.

Use the **Attributes** page to:

- List the attributes associated with the template or instance.
- Add attributes to a template or instance.
- Configure parameters of core supervision functions (attributes with the `Param.` prefix)
- Configure state alarms.
- Configure the aliases if needed (attributes with the `.Alias` suffix).

Diagnostic Messages When Saving Changes to Unassigned Instances

If you edit an instance that is not assigned to an area or host yet and save your changes, ArchestrA IDE may display a message about unresolved references in attributes.

Indeed, most templates of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform have attributes with references, which require that their instances be assigned to an area or host so that the reference can be resolved.

This is the case, for example, for instances that have attributes with references to *MyEngine*. The reference can be resolved only once the instance is assigned to a host, which is an instance of any template derived from the *$aAppEngineGP* template, page 92.

Similarly, instances of templates derived from *$aAreaGP* trigger a message about unresolved references to *MyArea*. These references are resolved when the instances are assigned to another area. This other area is an instance of any template derived from the *$aAreaGP* or *$aAreaRootGP* templates, page 94.

Edit instances after you have assigned them to the appropriate area or host to avoid these references from being reported as unresolved.

> **NOTE:** This type of message can also be triggered if ArchestrA IDE cannot resolve a reference as a result of an incorrect modification in a derived template or its instances. Verify that your configuration allows references in attributes to be resolved.

Graphic Symbol Integration

Introduction

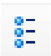
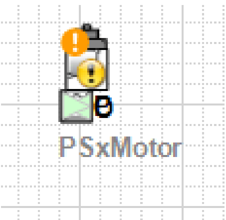
The graphic symbols are associated with the automation objects (object instances).

The ArchestrA Graphic Editor allows you to embed graphic symbols into another symbol.

You can create part of your supervision application in a symbol and integrate this symbol in an InTouch window and use it at runtime.

Integrating Graphic Symbols

Proceed as follows to insert a graphic symbol into another symbol.

Step	Action
1	In the **Graphic Toolbox** view, double-click the symbol in which you want to insert a symbol. **Result:** The ArchestrA Graphic Editor opens.
2	Click **Edit > Embed Graphic** or click the following icon in the toolbar.  Result: The **Galaxy Browser** opens.
3	Display the instances by clicking the following icon in the toolbar 
4	Select an instance from the list.
5	Select one of the graphic symbols associated with this instance. **NOTE:** Faceplate symbols also appear in the list but they do not open dynamically when you click them at runtime. You do not need to embed them. Faceplates open when you click a symbol at runtime.
6	Click **Ok**.
7	Click the area where you want to position the symbol. **Result:** The symbol is added. 

Object Configuration Pages (Object Editor)

What's in This Part

Overview

This part describes the configuration pages that are common to various object categories of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

Optional Process Object Configuration Pages

What's in This Chapter

Overview

This chapter describes the configuration pages that are common to master templates of the process category and specific to the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

They allow you to configure optional supervision functions of process application templates and their instances.

Data that you configure from these pages affects the corresponding optional tabs, page 55 and common tabs, page 64 of process object faceplates. If a page contains no data, the corresponding faceplate tab is not displayed.

The default security classification to modify references is *Configure*.

NOTE: Depending on the master template, some of these pages may not be available and/or not configured.

Interlocks Page Default Configuration

Overview

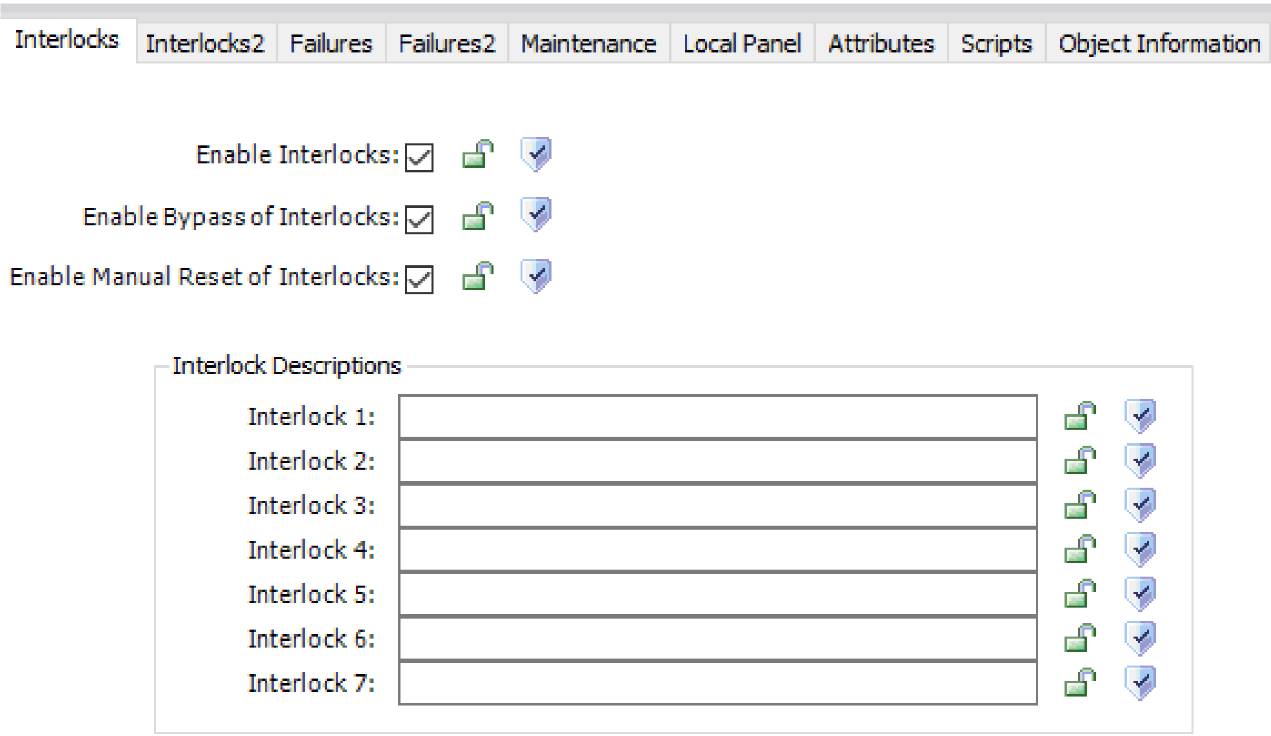
Depending on the configuration of the corresponding control resource, the **Interlocks** page is used to:

- Enable or disable monitoring of interlocks and define the interlock condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of interlocks.
  - Enable or disable the manual resetting of interlocks.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of interlocks management, refer to the chapter documenting each master template of the process category.

Interlocks Page Description



Element	Description
Enable Interlocks	Select this check box to enable monitoring of interlock conditions. The default security classification is *Configure*.
Enable Bypass of Interlocks	Select this check box to enable bypassing of interlock conditions. The default security classification is *Configure* to enable the bypassing function and *Verified Write* to bypass interlocks during operation.
Enable Manual Reset of Interlocks	Select this check box to enable manual resetting of interlocks. The default security classification is *Configure* to enable the reset function and *Secured Write* to reset interlocks during operation.
Interlock Descriptions	Enter the interlock condition descriptions (up to 7). Interlock descriptions starting with an asterisk (*) are associated to control data that cannot be written to; they cannot be bypassed. For these, the **Bypass** check box is therefore not displayed in the faceplate tab. The default security classification is *Configure*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Failures Page Default Configuration

Overview

Depending on the configuration of the corresponding control resource, the **Failures** page is used to:

- Enable or disable monitoring of abnormal conditions and define the descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of abnormal conditions.
  - Enable or disable the manual resetting of abnormal conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of abnormal condition management, refer to the chapter documenting each master template of the process category.

NOTE: Two identical pages are available to configure abnormal condition management, **Failures** and **Failures2**. Only the suffixes that are configured by default vary.

Management of Abnormal Conditions for Direction and Speed

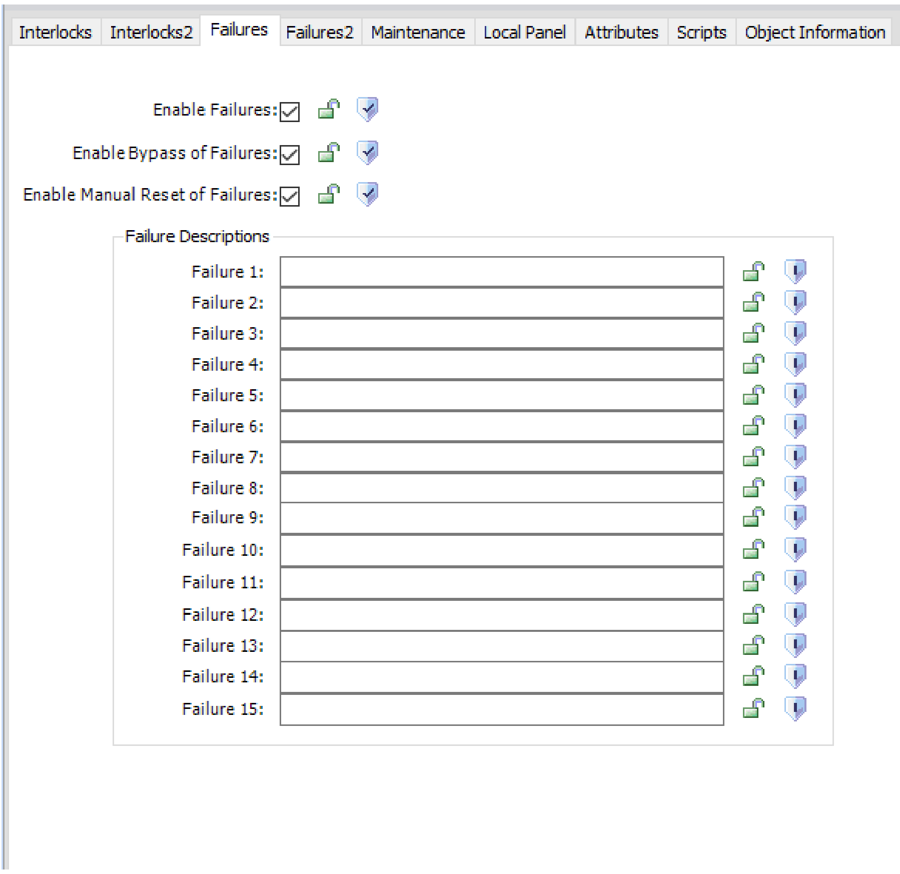
Two identical pages are available to configure abnormal condition management, **Failures** and **Failures2**. Only the suffixes that are configured by default vary:

- The **Failures** page references the CONDSUM_ST datatype.
- The **Failures2** page references the RC_CONDSUM_ST datatype.

The table describes the possible scenarios to manage abnormal conditions for control resources with two motor directions and two speeds that feature these functions by using either or both pages.

Monitoring of abnormal conditions for	Use Failures page	Use Failures2 page
None	No	No
Forward direction/speed 1 and reverse direction/speed 2	Yes	No
Forward direction/speed 1 and reverse direction/speed 2	Yes Forward direction/speed 1	Yes Reverse direction/speed 2

Failures and Failures2 Page Description



Element	Description
Enable Failures	Select this check box to enable monitoring of abnormal conditions. The default security classification is *Configure*.
Enable Bypass of Failures	Select this check box to enable bypassing of abnormal conditions. The default security classification is *Configure* to enable the bypassing function and *Verified Write* to bypass abnormal conditions during operation.
Enable Manual Reset of Failures	Select this check box to enable manual resetting of abnormal conditions. The default security classification is *Configure* to enable the reset function and *Secured Write* to reset abnormal conditions during operation.
Failure Descriptions	Enter the description of the detected failure conditions (up to 15). Descriptions starting with an asterisk (*) are associated to control data that cannot be written to; they cannot be bypassed. For these, the **Bypass** check box is therefore not displayed in the faceplate tab. The default security classification is *Configure*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Maintenance Page Default Configuration

Overview

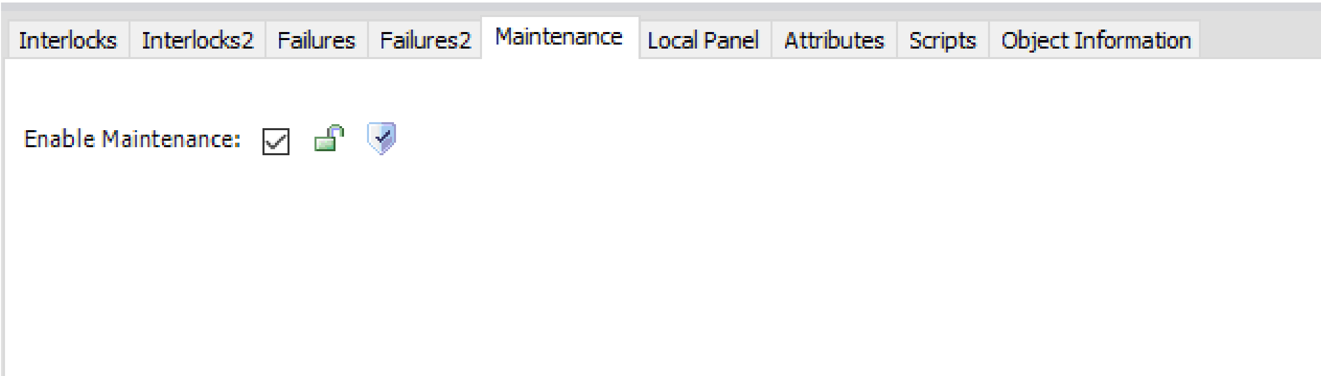
Depending on the configuration of the corresponding control resource, the **Maintenance** page is used to enable monitoring of maintenance data. When enabled, it allows you to count and reset:

- Operation hours.
- Number of switches.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of maintenance data management, refer to the chapter documenting each master template of the process category.

Maintenance Page Description



Element	Description
Enable Maintenance	Select this check box to enable supervision for maintenance data. The default security classification is *Configure*.
Status Word	Status word
Configuration Word	Configuration word The default security classification is *Verified Write* to reset counters during operation.
Running Hours	Counter of operation hours The default security classification is *Configure*.
Number of Operations	Counter of number of operations; by default the variable reference with suffix for auto-referencing is <Instance name>_DEVMNT_ST.MCNT. The default security classification is *Configure*.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Local Panel Page Default Configuration

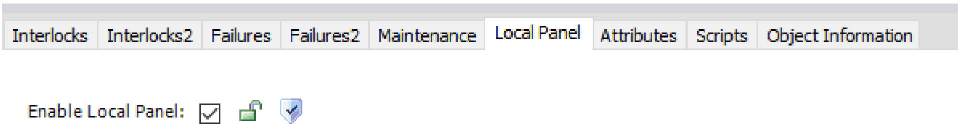
Overview

Depending on the configuration of the corresponding control resource, the **Local Panel** page is used to enable the local panel.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of the local panel function, refer to the chapter documenting each master template of the process category.

Local Panel Page Description



Element	Description
Enable Local Panel	Select this check box to enable the local panel function at the supervision level. The default security classification is *Configure*.
Status Word	Status word; the variable reference is specific to the type of control module associated with the local panel. The default security classification is *Configure*.
Configuration Word	Configuration Word; the variable reference is specific to the type of control module associated with the local panel. The default security classification is *Configure*.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

NOTE: User has to match **Suffix for Auto References** with the DDT structure of the control resource (DFB) of the instance.

Alarms Page Default Configuration

Overview

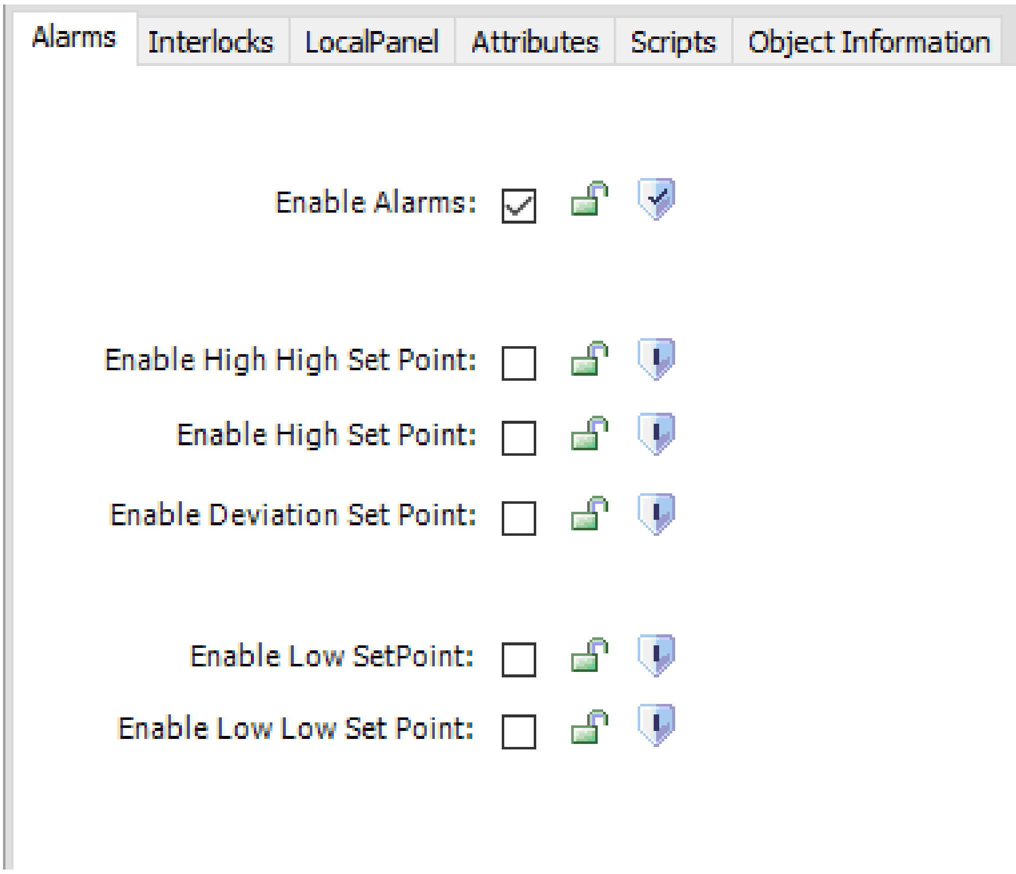
Depending on the configuration of the corresponding control resource, the **Alarms** page is used to enable level alarm functions for analog signals. When enabled, it allows you to manage individually the following alarm level signals:

- Very high level
- High level
- Deviation
- Low level
- Very low level

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of the level alarm function, refer to the chapter documenting each master template of the process category.

Alarms Page Description



Element	Description
Enable Alarms	Select this check box to enable supervision for analog alarms. The default security classification is *Configure* to enable the alarm function and *Tune* to during operation.
Enable High High Setpoint	Select this check box to enable supervision for very high-level alarms.
Enable High Setpoint	Select this check box to enable supervision for high-level alarms.
Enable Deviation Setpoint	Select this check box to enable supervision for deviation alarms.
Enable Low Setpoint	Select this check box to enable supervision for low-level alarms.
Enable Low Low Setpoint	Select this check box to enable supervision for very low-level alarms.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

NOTE: For setpoints, the default security classification is *Configure* to enable setpoint supervision and *Tune* to modify it during operation.

Optional Device Object Configuration Pages

What's in This Chapter

Overview

This chapter describes the configuration pages that are common to master templates of the device category and specific to the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

They are used to configure optional supervision functions of device application templates and their instances.

Data that you configure from these pages affects the corresponding optional tabs and subtabs, page 62 and common tabs, page 64 of device object faceplates. If a page contains no data, the corresponding faceplate tab is not displayed.

The default security classification to modify references is *Configure*.

NOTE: Depending on the master template, some of these pages may not be available and/or not configured.

Main Page Default Configuration

Overview

Depending on the configuration of the corresponding control resource, the **Main** page is used to:

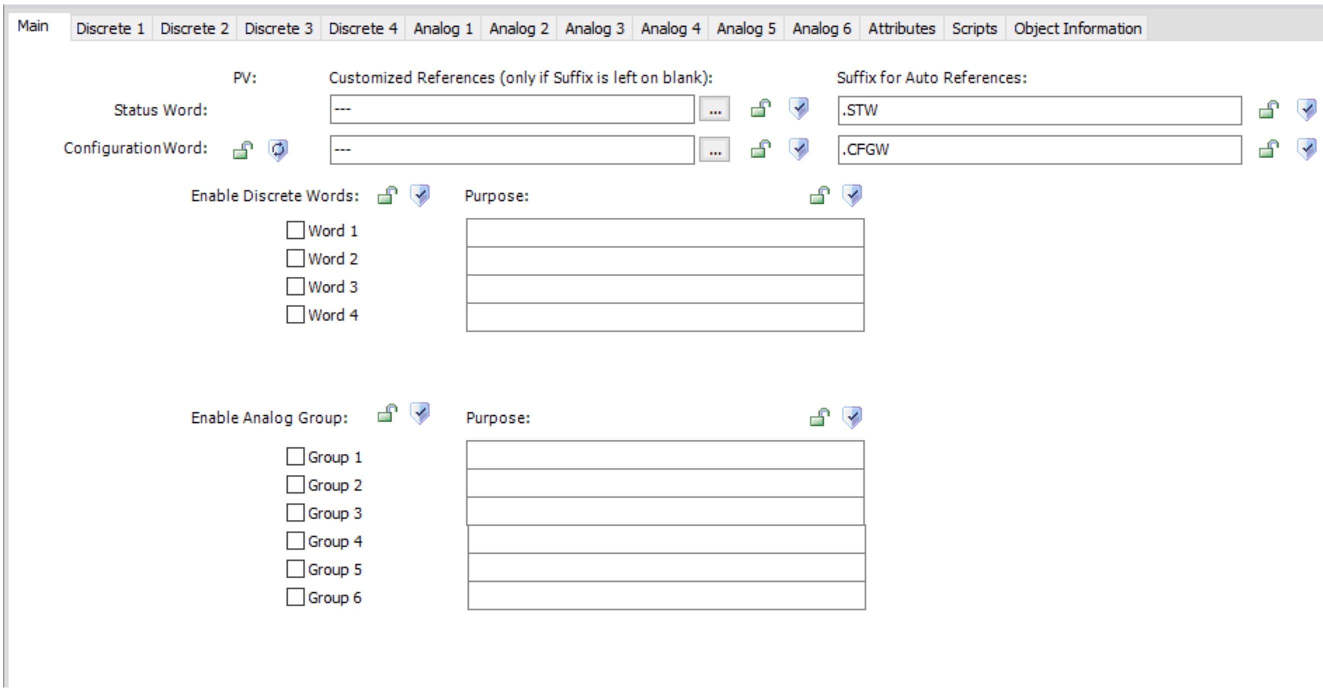
- Enable or disable discrete words related to the device (displayed in the discrete data tab of the device faceplate).
- Enable or disable analog groups related to the device (displayed in the analog data tab of the device faceplate).

When enabled, it allows you to configure the corresponding discrete and analog configuration pages.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of device data management, refer to the chapter documenting each master template of the process category.

Main Page Description



Element	Description
Status Word	Reference variable of the status word of the device.
Configuration Word	Reference variable of the configuration word of the device. The default security classification is *Operate*.
Enable Discrete Words	Select the check box to enable monitoring of the corresponding discrete word. Enabling **Word 1** to **Word 4** enables **Discrete 1** to **Discrete 4** pages, page 86 respectively. The text that you enter in the **Purpose** field is displayed in the tooltip of the corresponding subtabs (1 to 4) of the discrete data tab of faceplates, page 63. The default security classification is *Configure*. **NOTE:** Text can be entered in multiple languages, page 40.
Enable Discrete Group	Select the check box to enable monitoring of the analog group. Enabling **Group 1** to **Group 6** enables **Analog 1** to **Analog 6** pages, page 87 respectively. The text that you enter in the **Purpose** field is displayed in the tooltip of the corresponding subtabs (1 to 6) of the analog data tab of faceplates, page 62. **NOTE:** Text can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Discrete Page Default Configuration

Overview

The **Discrete 1** to **Discrete 4** pages are used to:

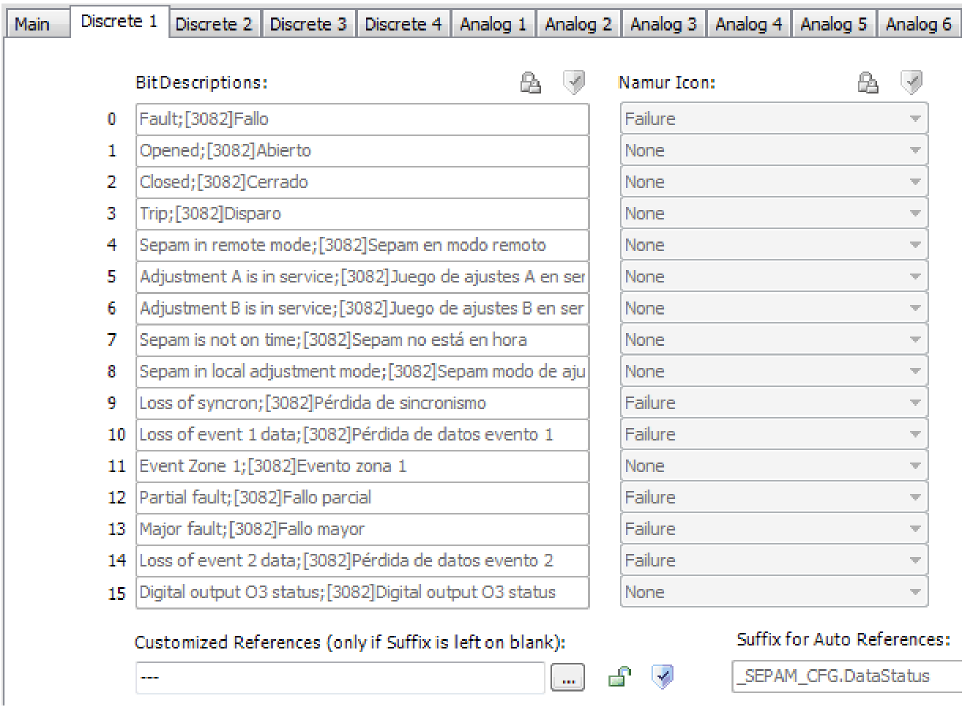
- Define the bit descriptions of the discrete words.
- Define the Namur status associated with each bit.
- Define the variable references associated with each discrete word.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of device data management, refer to the chapter documenting each master template of the process category.

NOTE: First, you need to enable the corresponding discrete word in the **Main** page, page 85.

Discrete 1 to Discrete 4 Page Description



Element	Description
Bit Descriptions	Description of the bits. The text is displayed in the subtabs (1 to 4) of the corresponding discrete data tab of device faceplates, page 63. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Namur Icon	Select a Namur, page 38 status from the menu: • None • Failure • Function check • Out of specs • Maintenance required
Suffix for Auto References	Variable reference of the configuration word of the control resource controlling the device. By default, the variable reference is `<Instance name>_<device-specifc DFB_DDT>.<Configuration word>`.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Analog Page Default Configuration

Overview

The **Analog 1** to **Analog 6** pages are used to:

- Define descriptions of data of the analog groups.

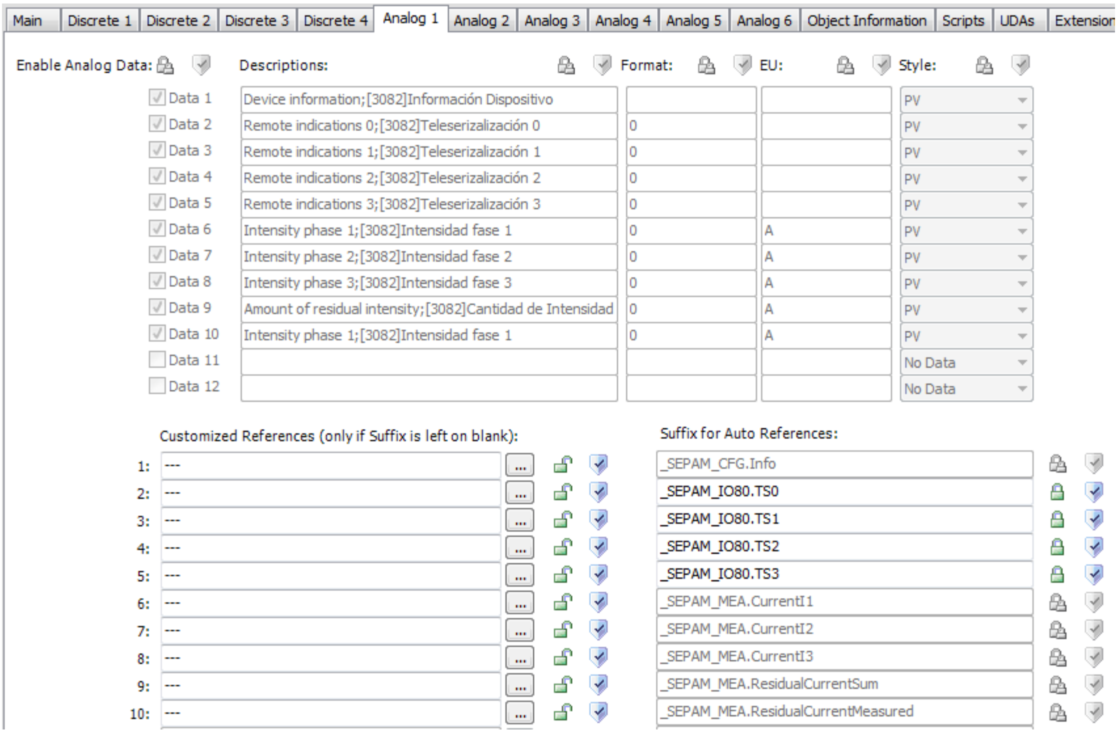
- Define the numerical format, engineering unit, and style, page 44 of the analog values that are displayed in the faceplate of devices.
- Define the variable references associated with each analog data.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

For a description of the default template-specific configuration of device data management, refer to the chapter documenting each master template of the process category.

> **NOTE:** First, you need to enable the corresponding analog group in the **Main** page, page 85.

Analog 1 to Analog 6 Page Description



Element	Description
Descriptions	Description of the analog data. The text is displayed in the subtabs (1 to 6) of the corresponding analog data tab of device faceplates, page 62. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Format	Specify the number format of analog data to be displayed in faceplate tabs. **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
EU	Specify the engineering unit of analog data to be displayed in faceplate tabs.
Format	Select the style from the menu: • **PV**: Present value style • **SP**: Setpoint style • **OP**: Output style • **Alarm Code**: Alarm style • **No Data**: The analog data is not displayed in the faceplate
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.
Suffix for Auto References	Variable reference of the control resource for each analog data.

Common Configuration Pages

What's in This Chapter

Overview

This chapter provides an overview of the standard ArchestrA IDE configuration pages that are common to master templates of the library.

Attributes Page

Overview

Use the **Attributes** page to:

- List the attributes associated with a template or instance.
- Add attributes to a template or instance.
- Configure the parameters of core functions of the object (attributes with the `Param.` prefix). The object-specific parameters are described in the chapter documenting each master template.
- Configure the aliases, if needed (attributes with the `.Alias` suffix). The control/supervision relationship that is configured by default in master templates is described in the chapter documenting each master template.
- Configure extendable attributes.
- Configure features such as state alarms.

  NOTE: The necessary **I/O** features are already preconfigured in the master templates.

For more information about attribute configuration, refer to the ArchestrA IDE help.

Me Suffix of Attributes

The *Me* suffix in an attribute means that the attribute is owned by the object. That is, the attribute does not come from the field.

Such attributes may point to another attribute of the same object; otherwise, they are calculated based on various information coming from the field, operators, and so on.

AO Attributes

The *AO* element in the syntax of an attribute means that the attribute is calculated.

Such attributes may be calculated by using scripts or by pointing to another attribute of the same object for clarity and flexibility.

Scripts Page

Description

The **Scripts** page contains scripts associated with the object, for example:

- Script to summarize statuses.

- Script to calculate attributes.
- Script to evaluate abnormal conditions.
- Script to calculate references.

For more information about scripts, refer to the ArchestrA IDE help.

NOTE: This page does not require further configuration but you can add your own scripts.

Object Information Page

Overview

The **Object Information** page provides general information about an object, its configuration, and dependencies.

Object Description

The description that you enter in the **Description** field is displayed on the faceplate of the object.

NOTE: You can enter descriptions in multiple languages, page 40.

System and Device Integration Objects

What's in This Part

Overview

This part describes system and device integration objects, and the diagnostic functions that they provide.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

$aAppEngineGP: Application Engine

What's in This Chapter

Supervision Functions

Description

The *$aAppEngineGP* master template provides the following functions:

- Viewing and setting the scan state of the application engine.
- Viewing the application engine status.
- Viewing redundancy information and status.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The default values of parameters of the *$aAppEngineGP* master template are the same as those of the *$aAppEngineGP* template.

However, the *$aAppEngineGP* master template contains attributes and scripts, which are configured to allow monitoring data related to the application engine.

The configurable parameters associated to attributes are described in this topic.

Default State Alarms

State Alarms for Application Engines

The table indicates for which attributes a state alarm is configured in the *$aAppEngineGP* master template and provides the default values.

Attribute	Alarm message	Priority
Redundancy.AO.StandbyUnavailable.Condition	*Standby Unavailable*	250
Redundancy.AO.StandbyNotReady.Condition	*Standby Not Ready*	250

NOTE: You can modify the configuration from the **Attributes** page.

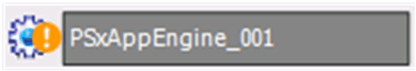
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$aAppEngineGP* master template to display data related to the application engine during operation.

Name	Graphic symbol	Description
`Symbol`		Displays the application engine icon and to the right, the instance name by using: • Element style *User_Defined_06* if **Scan State** is set to *On*. • Element style *User_Defined_07* if **Scan State** is set to *Off*.

$aAreaGP and *$aAreaRootGP*: Areas

What's in This Chapter

Supervision Functions

Description

The *$aAreaGP* and *$aAreaRootGP* master templates provide the following functions:

- Viewing and setting the scan state for instances assigned to the area.
- Viewing the status of alarms for instances assigned to the area.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The default values of parameters of the *$aAreaGP* and *$aAreaRootGP* master templates are the same as those of the *$aAreaGP* template.

However, the*$aAreaGP* and *$aAreaRootGP* master templates contain attributes and scripts, which are configured to allow monitoring data related to the area.

The configurable parameters associated to attributes are described in this topic.

You can modify the parameter values in the derived application template or in its instances.

Parameter Description

The table describes the parameters that are defined as part of the *$aAreaGP* and *$aAreaRootGP* master template attributes.

Name	Data type	Initial value	Description
`Param.EnablePESLink`	Boolean	False	**NOTE:** The feature that you can configure by using this parameter is not supported in this version of the library. This EcoStruxure Process Expert feature is only available when the object is used.

Default State Alarms

State Alarms for Areas

No state alarms are configured for attributes of the *$aAreaGP* and *$aAreaRootGP* master templates.

NOTE: You can modify the configuration from the **Attributes** page.

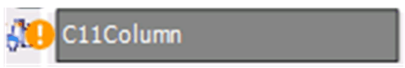
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$aAreaGP* and *$aAreaRootGP* master templates to display data related to areas during operation.

Name	Graphic symbol	Description
`Symbol`		Displays the area icon and to the right, the instance name by using: • Element style *User_Defined_06* if **Scan State** is set to *On*. • Element style *User_Defined_07* if **Scan State** is set to *Off*.

$aOPCClientGP: OPC Client

What's in This Chapter

Supervision Functions

Description

The *$aOPCClientGP* master template provides the following functions:

- Viewing and setting the scan state of the OPC client.
- Viewing the connection and related alarm status.
- Viewing scan group information.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The default values of parameters of the *$aOPCClientGP* master template are the same as those of the *$OPCClientGP* template.

However, the *$aOPCClientGP* master template contains attributes and scripts, which are configured to allow monitoring data related to the OPC client.

You can modify the configuration in the derived application template or in its instances.

NOTE: No configurable parameters (attributes with the *Param.* prefix) are associated to attributes of the *$aOPCClientGP* master template.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$aOPCClientGP* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain parameters of the **General** page are associated to alarms.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for OPC Clients

The table indicates for which attributes a state alarm is configured in the *$aOPCClientGP* master template and provides the default values.

Attribute	Alarm message	Priority
AO.ScanGroupAlarm	*Off Scan Alarm*	500

NOTE: You can modify the configuration from the **Attributes** page.

Additional Alarm Conditions for OPC Clients

The table indicates the parameters to which an alarm is associated by default in the *$aOPCClientGP* master template.

Parameter	Alarm message	Priority
Detect connection alarm	*OPC Server Connection*	250

NOTE: You can modify the configuration from the **General** page.

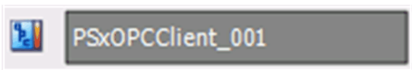
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$aOPCClientGP* master template to display data related to OPC clients during operation.

Name	Graphic symbol	Description
`aOPCClientGP`		Displays the OPC client icon and to the right, the instance name by using: • Element style *User_Defined_06* if **Scan State** is set to *On*. • Element style *User_Defined_07* if **Scan State** is set to *Off*.

$aRedundantDIObjectGP: Redundant Communication Object Diagnosis

What's in This Chapter

Supervision Functions

Description

The *$aRedundantDIObjectGP* master template provides the following functions:

- Viewing the status of redundant communication objects (sources).
- Switching between primary and backup communication objects.
- Viewing the connection and related alarm status.
- Viewing scan group information.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The default values of parameters of the *$aRedundantDIObjectGP* master template are the same as those of the *$aRedundantDIObjectGP* template.

However, the *$aRedundantDIObjectGP* master template contains attributes and scripts, which are configured to allow monitoring data related to redundant communication objects.

You can modify the configuration in the derived application template or in its instances.

NOTE: No configurable parameters (attributes with the *Param.* prefix) are associated to attributes of the *$aRedundantDIObjectGP* master template.

Default State Alarms and Additional Alarm Conditions

Overview

In the*$aRedundantDIObjectGP* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain parameters of the **General** page are associated to alarms.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Redundant Communication Object Diagnosis

The table indicates for which attributes a state alarm is configured in the *$aRedundantDIObjectGP* master template and provides the default values.

Attribute	Alarm message	Priority
AO.ConnectionAlarm	*OPC Server Connection*	250
AO.ScanGroupAlarm	*Off Scan Alarm*	500
AO.SwitchoverAlarm	*Switchover Alarm*	500

NOTE: You can modify the configuration from the **Attributes** page.

Additional Alarm Conditions

By default, no additional alarm conditions are configured for the *$aRedundantDIObjectGP* master template.

NOTE: You can modify the configuration from the **General** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$aRedundantDIObjectGP* master template to display data related to redundant communication objects during operation.

Name	Graphic symbol	Description
`symbol`		Displays the redundant communication icon and to the right, the name of the redundant communication object being monitored (active source) by using: • Element style *User_Defined_06* if **Scan State** is set to *On*. • Element style *User_Defined_07* if **Scan State** is set to *Off*.

Signal Processing

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for the signal processing family.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠ WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

$AnalogInputCE: Analog Inputs with Configurable Range

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of analog inputs with configurable range.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass input monitoring, Override, Maintenance mode, and the configuration of range-related parameters (in engineering units).
- Optional alarm function allows you to monitor level setpoints (very-high, high, low, and very-low) in engineering units, a setpoint used as a reference for deviation alarm evaluation, and a setpoint indicating the maximum deviation allowed (in engineering units).

  You can activate/deactivate the detection of each alarm during operation.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$AnalogInputCE* master template attributes.

Name	Type	Initial value	Description
`Param.ContainerDesc`	Bool	False	*True* = The description of the master template that contains a derivation of this template is used. **NOTE:** The parameter is only used when the template is contained in another template. For example, the *$MValvewithPosCE* master template contains a derivation of *$AnalogInputCE*.
`Param.EngUnits`	String	`%`	Unit of the output value.
`Param.NumFormat`	String	`0.00`	Specifies the display format of values. For example, enter `0.00` to display 2 decimals.
`Param.TrendPeriodMin`	Integer	15	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

NOTE: `Param.EngUnits` and `Param.NumFormat` will be generated by AssetIins.

Default State Alarms

State Alarms for Analog Inputs With Configurable Range

The table indicates for which attributes a state alarm is configured in the *$AnalogInputCE* master template and provides the default values.

Attribute	Alarm message	Priority
AInput1.St.AD	*Deviation*	500
AInput1.St.AHH	*High High*	250
AInput1.St.AH	*High*	500
AInput1.St.AL	*Low*	500
AInput1.St.ALL	*Low Low*	250
AInput1.St.BadSt	*Bad Quality*	250

NOTE: You can modify the configuration from the **Attributes** page.

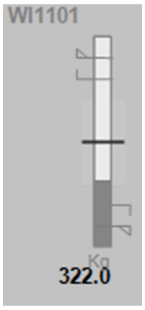
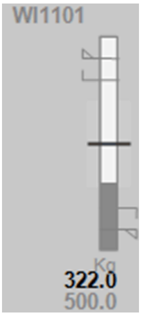
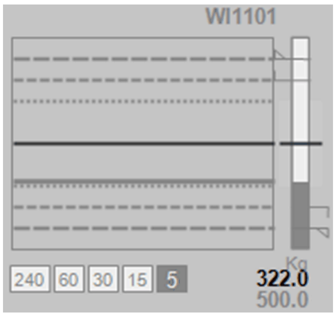
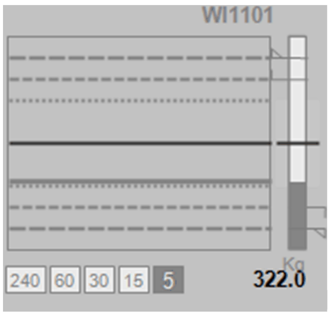
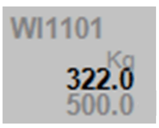
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$AnalogInputCE* master template to display data of analog inputs with configurable range during operation.

Name	Graphic symbol	Description
Bar_Horiz_PV		Displays the label, a horizontal bar with engineering units, and present value (`PV`).
Bar_Horiz_PV_SP		Displays the label, a horizontal bar with engineering units, present value (`PV`), and setpoint (`SP`).
Bar_Vert_PV		Displays the label, a vertical bar with engineering units, and present value (`PV`).
Bar_Vert_PV_SP		Displays the label, a vertical bar with engineering units, present value (`PV`), and setpoint (`SP`).
Bar_Vert_PV_SP_ Trend		Displays the label, a vertical bar with engineering units, present value (`PV`), and setpoint (`SP`). In addition, the symbol displays trends and allows you to select the trend period in minutes. Refer to the description of the *Param. TrendPeriodMin* parameter of the master template.
Bar_Vert_PV_Trend		Displays the label, a vertical bar with engineering units, and present value (`PV`). In addition, the symbol displays trends and allows you to select the trend period in minutes. Refer to the description of the *Param. TrendPeriodMin* parameter of the master template.
Indicator_PV		Displays the label, engineering units, and present value (`PV`).
Indicator_PV_SP		Displays the label, engineering units, present value (`PV`), and setpoint (`SP`).
Label		Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE: The optional alarm, setpoint, and deviation levels appear in bar graphs only when enabled in the operation tab of the faceplate. At the same time, the corresponding trends are also displayed in symbols, which feature a trend panel.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

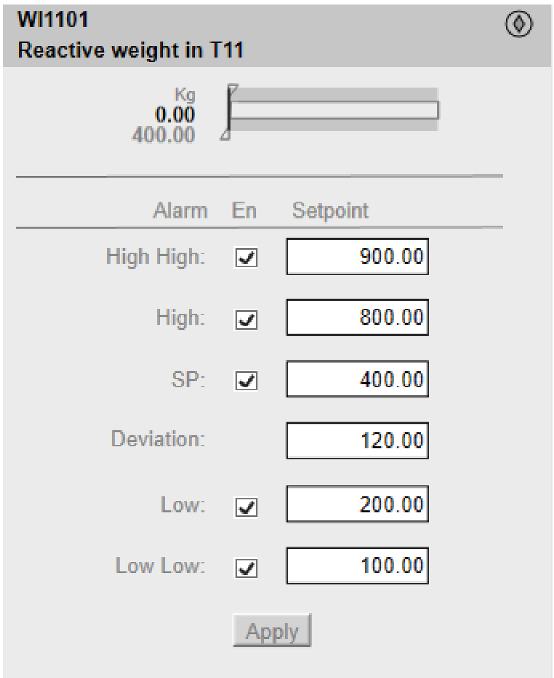
During operation, clicking an analog input symbol opens a faceplate with the following tabs:

- Operation with optional analog alarm management section.
- Engineering
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

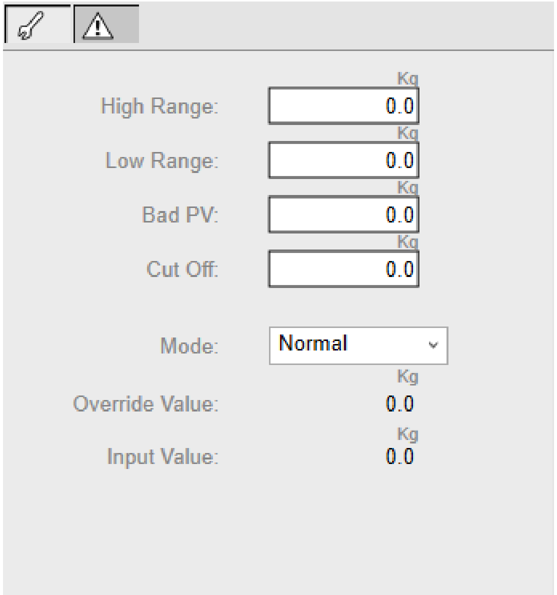
The figure shows an example of the **Operation** tab.



The **En** check boxes allow you to enable or disable the evaluation of level alarms at the controller level. Select or unselect the corresponding check box and click **Apply**.

Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: Input Value: If external `PV` is enable from the control, then input value is equal to external `PV`. If external `PV` is disable from the control, then input value is equal to channel value.

$AnalogOutputCE: Analog Outputs

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of analog outputs.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass setpoint management, owner selection, simulation mode, resetting, and global bypassing of interlock conditions.
- Optional functions encompass a local panel and individual interlock condition management.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$AnalogOutputCE* master template attributes.

Parameter	Type	Default	Description
`Param.EngUnits`	String	`%`	Engineering unit of attributes.
`Param.HiOP`	Float	100.0	High limit for the output value.
`Param.LoOP`	Float	0.0	Low limit for the output value.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Parameter	Type	Default	Description
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of values. For example, enter `0.00` for 2 decimals.
`Param.TrendPeriodMin`	Integer	0	Refer to the description of this parameter that is documented for *$AnalogOutputCE*.

Default State Alarms

State Alarms for Analog Outputs

The table indicates for which attributes a state alarm is configured in the *$AnalogOutputCE* master template and provides the default values.

Attribute	Alarm message	Priority
AOutput.St.BadSt	*Channel Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Three-Way Valve Symbol Naming Convention

For analog outputs represented as three-way valve symbols, the naming convention is as follows:

Valve type_Valve orientation_Inlet position_Port normally open.

For example, *V3V_Horiz_Down_Left* means:

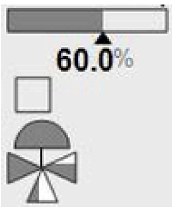
- Three-way valve.
- Shown horizontally.
- Inlet positioned downwards.
- The left-hand port is normally open.

Three-Way Valve Symbol Graphic Convention

For operator convenience, the graphic convention for analog outputs represented as three-way valve symbols is as follows:

- The inlet is shown fully filled independently of the position of the valve.
- The area of the outlets that is shown filled gives an indication of the position of the valve. The filled area shows approximately how much each port is open.

The example shows a *V3V_Horiz_Left_Down* symbol representing a three-way valve 60% open. The normally open *Down* port is shown 40% filled (40% open) and the normally closed *Right* port 60% filled (60% open).

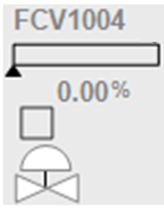
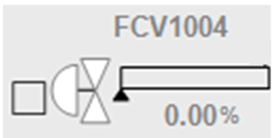
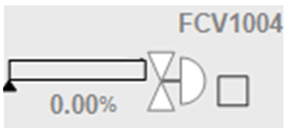


Representation

In addition to icons, the symbols display:

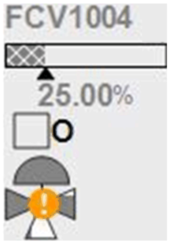
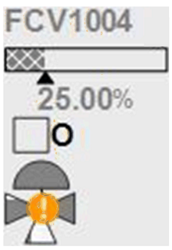
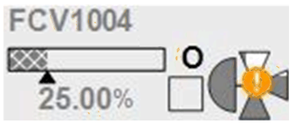
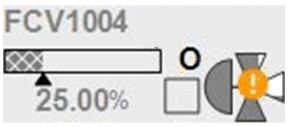
- The label.
- The trend client icon to open the trends faceplate.
- A bar graph showing the setpoint and the present valve position.
- The setpoint value with engineering units.
- States, shown in a square, page 45.
- The owner mode if it is detected as an abnormal situation, page 43.

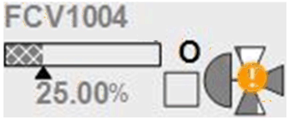
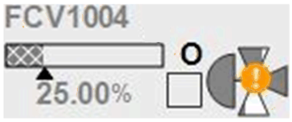
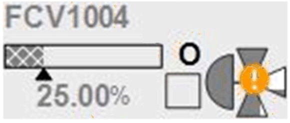
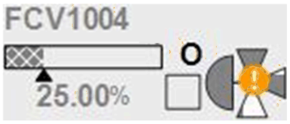
The table describes the symbols that are included in the *$AnalogOutputCE* master template to display data of analog outputs as two-way valves during operation.

Name	Graphic symbol	Description
V2V_Horiz		Two-way control valve shown horizontally
V2V_Vert_Left		Two-way control valve shown vertically
V2V_Vert_Right		Two-way control valve shown vertically
Label		Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE: For two-way valve symbols, both ports are shown fully filled as soon as the setpoint > 0.

The table describes the symbols that are included in the *$AnalogOutputCE* master template to display data of analog outputs as three-way valves during operation.

Name	Graphic symbol
V3V_Horiz_Down_Left	
V3V_Horiz_Down_Right	
V3V_Horiz_Left_Down	
V3V_Horiz_Left_Right	
V3V_Horiz_Right_Down	
V3V_Horiz_Right_Left	
V3V_Vert_Down_Right	
V3V_Vert_Down_Up	

Name	Graphic symbol
V3V_Vert_Right_Down	
V3V_Vert_Right_Up	
V3V_Vert_Up_Down	
V3V_Vert_Up_Right	

Faceplates

Overview

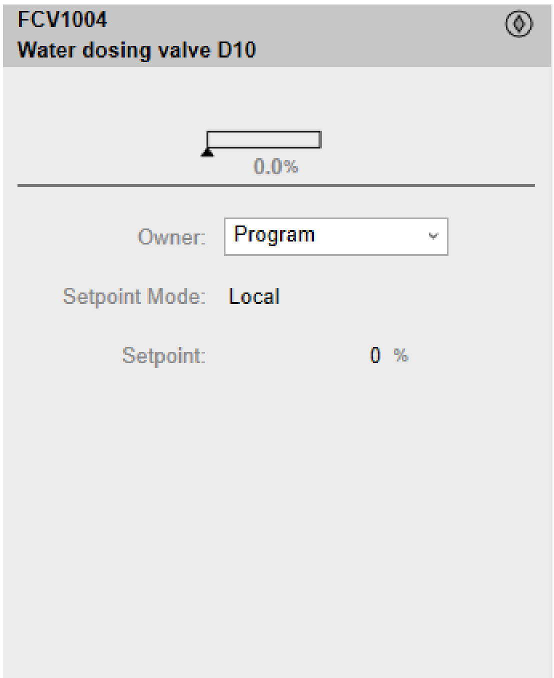
During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Optional tab:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

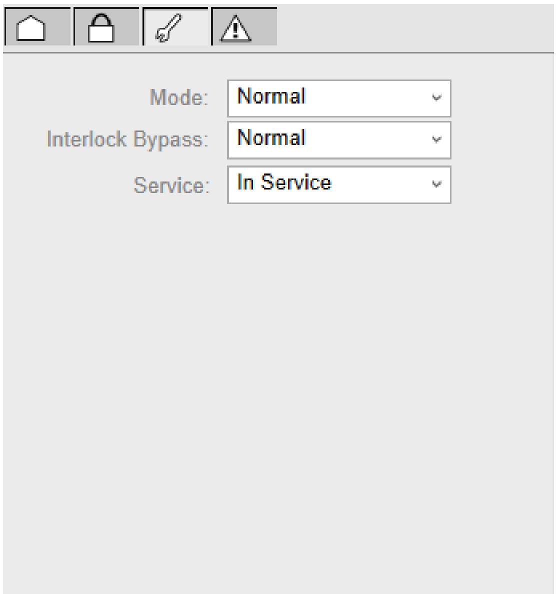
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$DigitalInputCE: Digital Inputs

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of digital inputs.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass setpoint management, alarm configuration, enabling/disabling of alarm, and simulation mode.
- Optional functions allow you to track operating hours and switching operations.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$DigitalInputCE* master template attributes.

Parameter	Type	Initial value	Description
`Param.AlarmEnable`	Bool	True	If true, the alarm evaluation at the supervision level is enabled. If false, the alarm evaluation at the supervision level is disabled. **NOTE:** The alarm signal is not interpreted as an alarm at the supervision level but it continues being evaluated at the controller level. It is useful for signals to be monitored but not associated to an alarm.
`Param.BadStEnable`	Bool	True	If true, the diagnostic status of the channel, indicated by the **Channel Failure** alarm, is enabled. If false, the diagnostic status of the channel is disabled.
`Param.ContainerDesc`	Bool	False	*True* = The description of the master template that contains a derivation of this template is used. **NOTE:** The parameter is only used when the template is contained in another template. For example, the *$MValveCE* master template contains a derivation of *$DigitalInputCE*.

Default State Alarms

State Alarms for Digital Inputs

The table indicates for which attributes a state alarm is configured in the *$DigitalInputCE* master template and provides the default values.

Attribute	Alarm message	Priority
AO.Alarm	*Digital Alarm*	999
AO.BadSt	*Channel Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

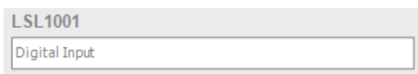
Graphic Representation

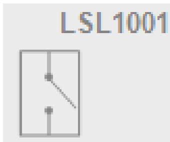
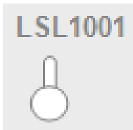
Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Description

This table describes the symbols available for representing the digital inputs:

Name	Graphic symbol	Description
AlarmText		Alarm text
Arrow_H		Arrow with the label above

Name	Graphic symbol	Description
Arrow_V		Arrow with the label on the right
Bullet_H		Bullet with the label above
Bullet_V		Bullet with the label on the right
EmergencyStop_H		Stop button with the label above
EmergencyStop_V		Stop button with the label on the right
PressureLimit		Pressure limit switch
ElectricalSwitch_H_Thin		Electrical switch represented horizontally
ElectricalSwitch_V_Thin		Electrical switch represented vertically
TemperatureLimit		Temperature limit switch
Label		Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Overview

During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64
- Optional tab:
  - Maintenance, page 61

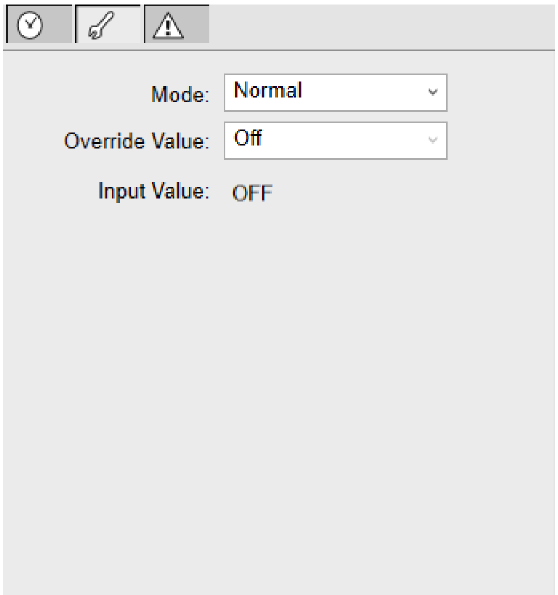
Operation Tab

The figure shows an example of the **Operation** tab.

The **En** check box allows you to enable/disabe the evaluation of the alarm at the controller level.

Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: Input Value: Indicates the channel value.

$DigitalOutputCE: Digital Outputs

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of digital outputs.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass owner selection, setpoint management, global bypassing of interlock conditions.
- Optional functions encompass individual interlock condition management, tracking of operating hours and switching operations.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Default State Alarms

State Alarms for Digital Outputs

The table indicates for which attributes a state alarm is configured in the *$DigitalOutputCE* master template and provides the default values.

Attribute	Alarm message	Priority
DOutput.St.BadSt	*Channel Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

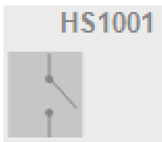
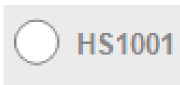
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Description

This table describes the symbols available for representing the digital outputs:

Name	Graphic symbol	Description
Electrical_Switch_H_Thin		Electrical switch represented horizontally
Electrical_Switch_V_Thin		Electrical switch represented vertically
StatusIndicator_H		Status indicator with the label above
StatusIndicator_V		Status indicator with the label on the right
Label	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Overview

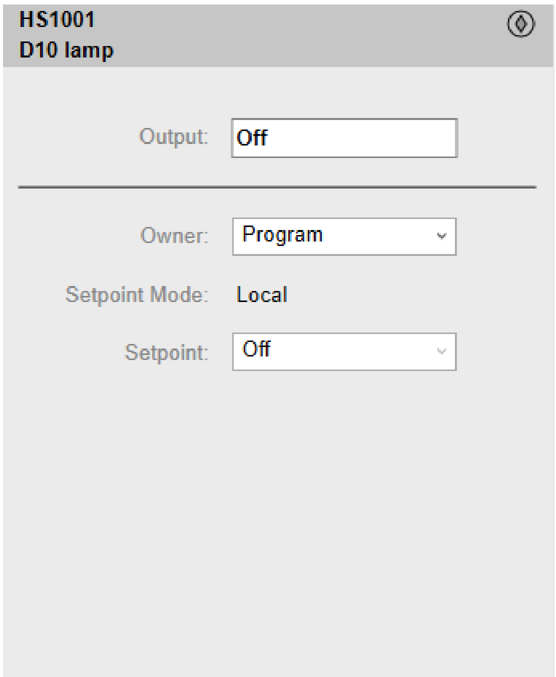
During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64

- Optional tab:
    - Interlocks, page 56
    - Maintenance, page 61

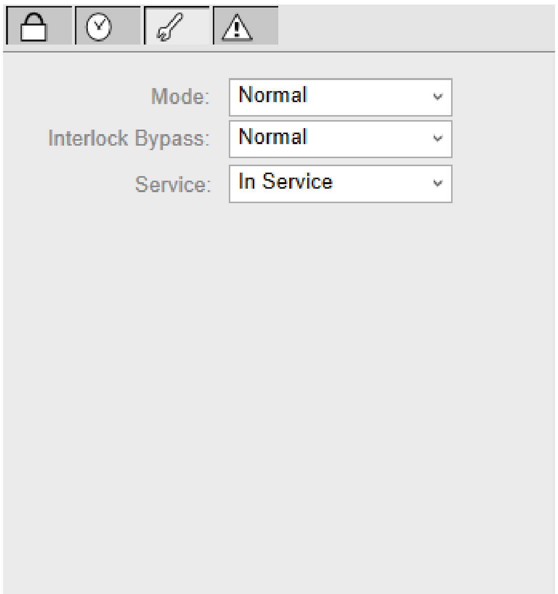
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$AnalogInMultiCE: Multiple Analog Inputs

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of multiple analog inputs (up to 4) with configurable range.

Supervision Functions

Description

Core resources provide the following monitoring and operation functions:

- Monitoring of up to four analog inputs
- Owner selection
- Simulation mode
- Configuration of parameters: *High/Low Range*, *Bad PV*, *Cut Off* values
- Selection of one input signal based on one of these predefined criteria:
  - First present value
  - Direct selection of input signal
  - Median
  - Average
  - Minimum
  - Maximum

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$AnalogInMultiCE* master template attributes.

Parameter	Type	Default	Description
`Param.EngUnits`	String	`%`	Defines the engineering unit of attributes.
`Param.ModeNormal`	String	`O,P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.00`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	15	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for Multiple Analog Inputs

The table indicates for which attributes a state alarm is configured in the *$AnalogInMultiCE* master template and provides the default values.

Attribute	Alarm message	Priority
MAInput1.Cfg.PV1Fail	*PV1 Channel Failure*	250
MAInput1.Cfg.PV2Fail	*PV2 Channel Failure*	250
MAInput1.Cfg.PV3Fail	*PV3 Channel Failure*	250
MAInput1.Cfg.PV4Fail	*PV4 Channel Failure*	250
MAInput1.St.BadSt	*Selected Channel Failure*	250
MAInput1.St.DevAlm	*Deviation Fail*	500

NOTE: You can modify the configuration from the **Attributes** page.

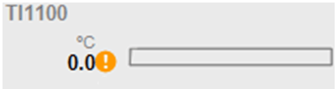
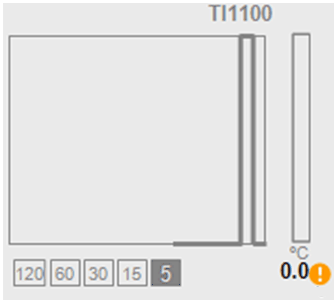
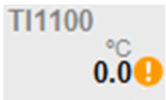
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

The table describes the symbols that are included in the *$AnalogInMultiCE* master template to display data of multiple analog inputs during operation.

Name	Graphic symbol	Description
`Bar_Horiz_PV`		Displays the label, a horizontal bar with engineering units, and present value (`PV`).
`Bar_Vert_PV`		Displays the label, a vertical bar with engineering units, and present value (`PV`).
`Bar_Vert_PV_Trend`		Displays the label, a vertical bar with engineering units, and present value (`PV`). In addition, the symbol displays trends and allows you to select the trend period in minutes. Refer to the description of the *Param. TrendPeriodMin* parameter of the master template.
`Indicator_PV`		Displays the label, engineering units, and present value (`PV`).
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

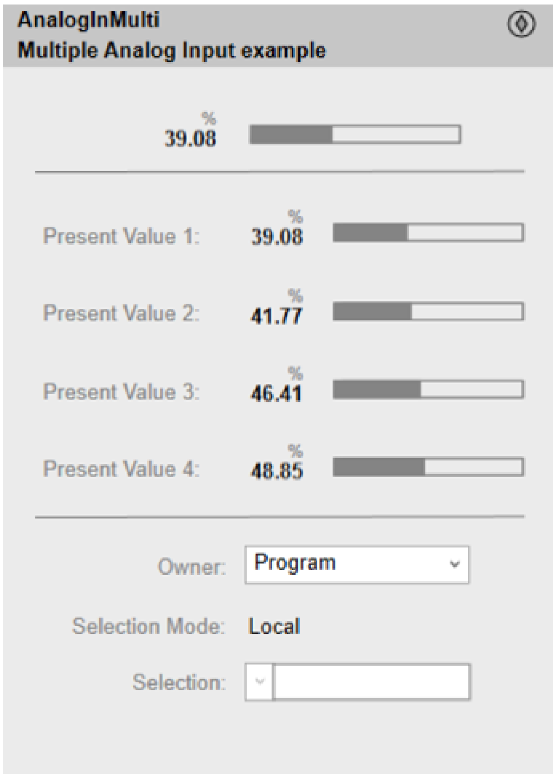
Overview

During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64

NOTE: The master template also features the trends faceplate.

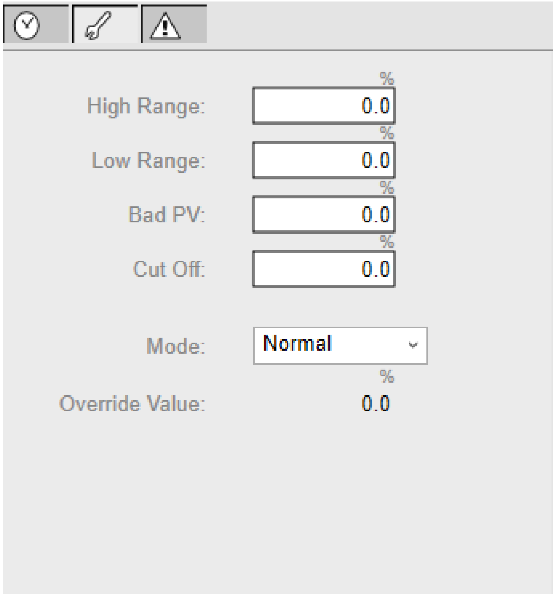
Operation Tab



The **Selection** drop-down list allows you to select the following input signal:

- First present value
- Present value 1
- Present value 2
- Present value 3
- Present value 4
- Median
- Average
- Minimum
- Maximum

Engineering Tab



NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$TotalCE: Totalizing Function

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of totalizing function.

Supervision Functions

Description

The *$TotalCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Command management.
  - Owner selection.
  - Totalizing.
  - Monitoring.
  - State Management
- Optional functions:
  - Viewing, bypassing, and resetting of abnormal conditions.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

> **NOTE:** You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$TotalCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`EU`	Defines the engineering unit of attributes.
`Param.HiPV`	Double	`999999-999.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.HideHoldButton`	Bool	False	If true, the **Hold** button is not displayed. If false, the **Hold** button is displayed.
`Param.HideResetButton`	Bool	False	If true, the **Reset** button is not displayed. If false, the **Reset** button is displayed.
`Param.HideRestartButton`	Bool	False	If true, the **Restart** button is not displayed. If false, the **Restart** button is displayed.
`Param.HideStartButton`	Bool	False	If true, the **Start** button is not displayed. If false, the **Start** button is displayed.
`Param.HideStopButton`	Bool	False	If true, the **Stop** button is not displayed. If false, the **Stop** button is displayed.
`Param.LoPV`	Double	`0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.TotalModeNormal`	String	`I,R,H,S`	Specifies the normal operating states (separated by a comma): • `I`: Idle • `R`: Running • `H`: Held • `S`: Stopped For example `I,R,S`.
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	15	The parameter has two functions: • It defines the trend period in minutes that is used by default. • When you enter a value that is different from one of the five predefined values (5, 15, 30, 60, 120, which are displayed below the trend graph), your value replaces the 120 value. For example, if you enter `45`, the values that are displayed below symbols featuring a trend panel, page 102 are (from left to right) 45, 60, 30, 15, and 5. Range: 1...10080. (10080 = 1 week) **NOTE:** If the initial value is 0, the trend period that is used becomes 15 minutes but the predefined values that are displayed are unchanged.
`Param.EnablePESLink`	Boolean	False	**NOTE:** The features that you can configure by using these parameters are not supported in this version of the library. These EcoStruxure Process Expert features are only available when the object is used.
`Param.PESExecutionDomainId`	String	Blank	
`Param.PESProjectId`	String	Blank	
`Param.PESSystemId`	String	Blank	

Default State Alarms

State Alarms for *TOTAL*

The table indicates an attribute for which a state alarm is configured in the *$TotalCE* master template and provides the default values.

Attribute	Alarm message	Priority
Total.St.Alarm	Failure detected while totalizing	999

NOTE: You can modify the configuration from the **Attributes** page.

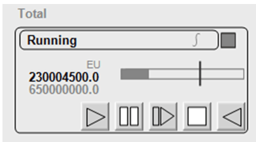
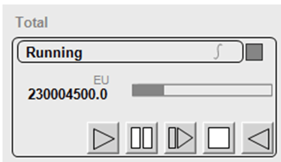
Graphic Representation

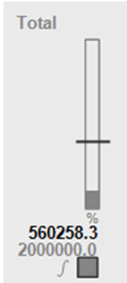
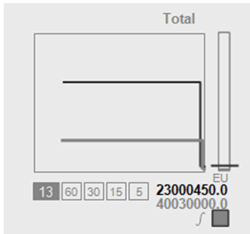
Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$TotalCE* master template to display data of analog inputs during operation.

Name	Graphic symbol	Description
PanelWithButtons_PV_SP		Graphic symbol displays(from top to bottom): • The label. • Engineering units. • To the right, a horizontal bar showing the present value and the setpoint. • The present value. • The setpoint value. • The current state of the totalizer. • Control buttons
PanelWithButtons_PV		Graphic symbol displays(from top to bottom): • The label. • Engineering units. • To the right, a horizontal bar showing the present value. • The present value. • The current state of the totalizer. • Control buttons
Numeric_PV_SP		Graphic symbol displays(from top to bottom): • The label. • Engineering units. • The present value. • The setpoint value.
Numeric_PV		Graphic symbol displays(from top to bottom): • The label. • Engineering units. • The present value.

Name	Graphic symbol	Description
Bar_Vert_PV_SP		Graphic symbol displays(from top to bottom): • The label. • Engineering units. • A vertical bar showing the setpoint and the present value. • The present value. • The setpoint value.
Bar_Vert_PV_SP_Trend		Displays in addition to data of *Bar_Vert_PV_SP*, a trend panel with configurable trend period in minutes. Refer to the description of the *Param. TrendPeriodMin* parameter.
Bar_Horz_PV_SP		Graphic symbol displays(from top to bottom): • The label. • Engineering units. • To the right, a horizontal bar showing the setpoint and the present value. • The present value. • The setpoint value.
Label	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE:

- The trends are displayed in the *Bar_Vert_PV_SP_Trend* symbol which feature a trend panel.
- When *AUTOSTART* input pin is high in unity, the start button disappears.This is applicable for Operator selection in faceplate also.
- When *AUTORESET* input pin is high in unity, the reset button disappears.This is applicable for Operator selection in faceplate also.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

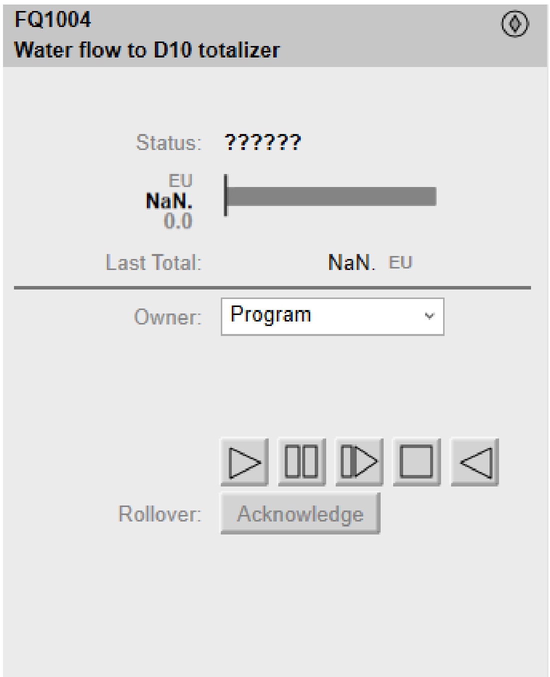
Available Tabs

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Tabs for core functions:
  - Operation
  - Alarms, page 64
- Tabs for optional functions, which appear only if configured:
  - Detected failures, page 59

Operator Tab

The figure shows an example of the **Operation** tab.



NOTE: The **Operator** tab features the control module **Acknowledge** button. This button is used to acknowledge the rollover indication (Rollover flag) in the control module.

$LoadCellENOD4TCE - Scaime Weighing Module

What’s in This Chapter

This chapter describes the supervision resources and runtime services that are available for the management of `$LoadCellENOD4TCE` - Scaime Weighing Module.

Supervision Function

Core resources provide monitoring and operation functions. Weighing functions like Zero, Tare, Preset tare, cancel tare, Device reset, Factory reset, diagnostic information management, resetting, owner selection.

These functions are implemented in runtime through a symbol and its associated faceplate.

Default State Alarms

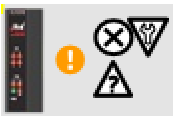
The table indicates for which attributes a state alarm is configured in the `$LoadCellENOD4TCE` template and provides the default values:

Attribute	Alarm message	Priority
AO.Namur.CheckFunction	Function check	750
AO.Namur.Failure	Failure	500
AO.Namur.MaintenanceR	Maintenance Required	999
AO.Namur.OutOfSpecs	Out Of Specs	999

Graphic Representation

Graphical Representation

The various types of symbols available in this template are illustrated in the table:

Sr No.	Name	Graphic Symbol	Description
1	Enod4T		Device Status: Namur Alarms

Faceplate

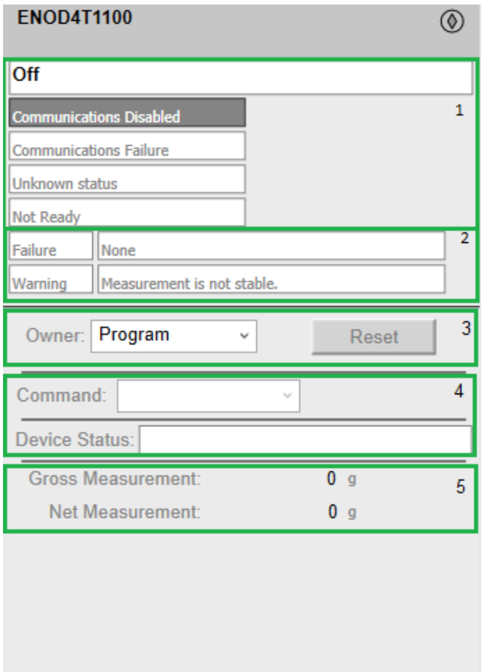
During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Operation
- Analog Data

- Discrete Data
- Alarms

Operator Tab

The figure shows the operator tab.



This tab provides information about the operator actions and the device information:

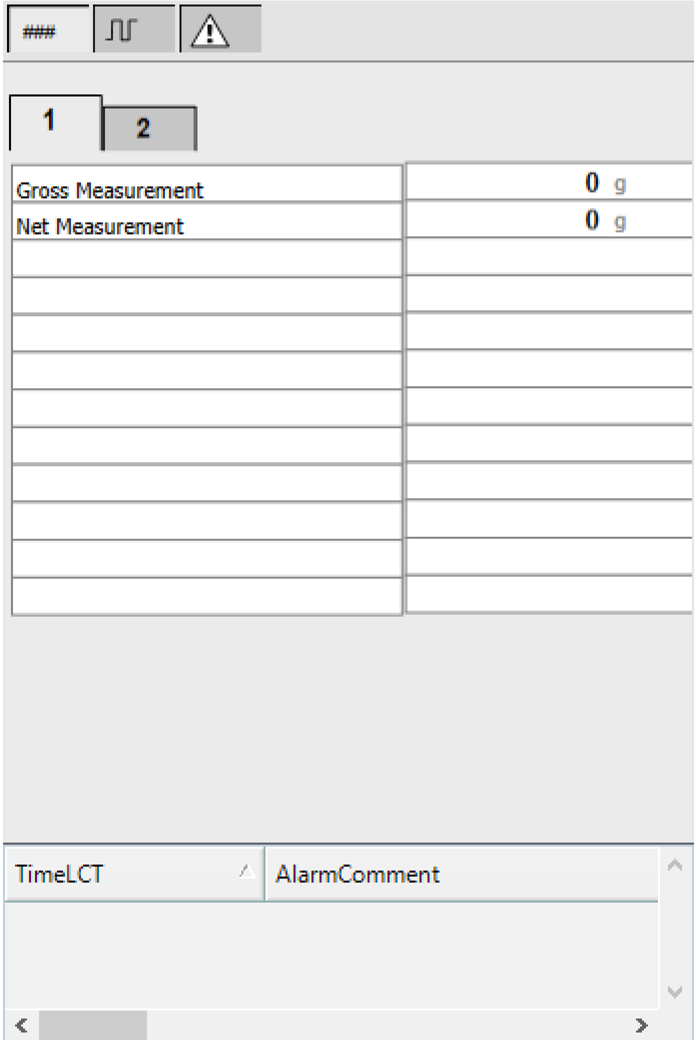
Item	Description
1	This section provides information about the device Communication and device status.
2	This section provides information about the latest alarms and alerts generated.
3	This section allows the operator to change the mode from Program mode to Operator mode or vice versa.
4	This section allows the operator to execute various weighing commands like Zero, Tare, Device Reset. This section also provides the current Device status. **NOTE:** Command combo becomes active only when it is in Operator mode.
5	This section displays the major weighing measurements like Gross, Net and Flow measurements.

NOTE: Command combo becomes active only when it is in Operator mode.

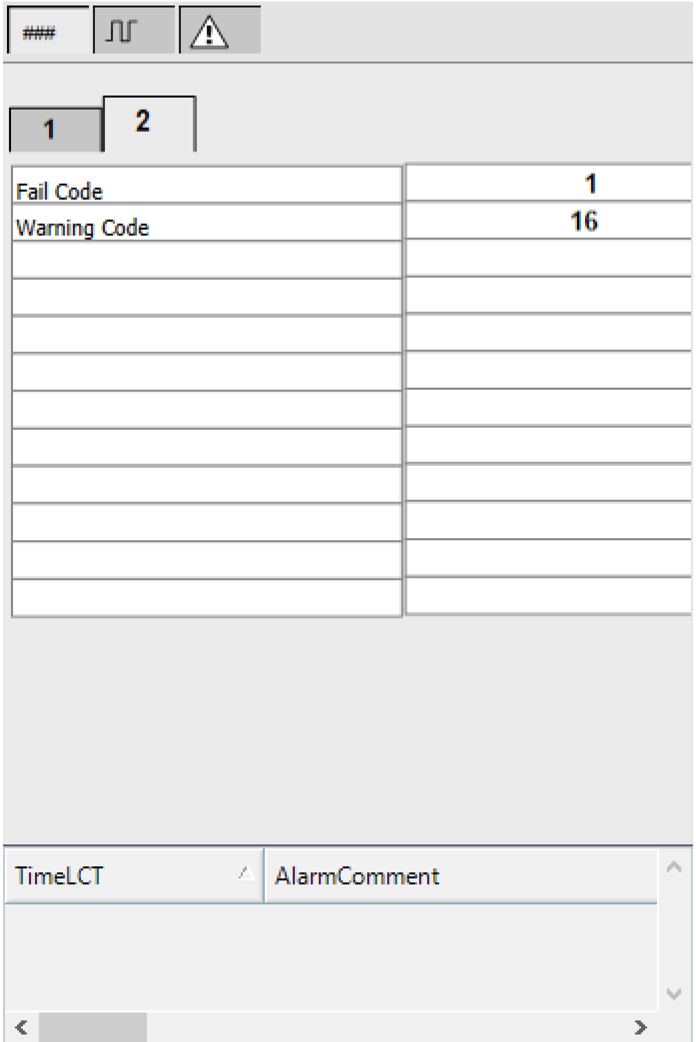
Analog Tab

This tab provides information about the analog data of the device:

Analog Tab 1: Provides information of Weighing measurements like Gross & Net measurements.



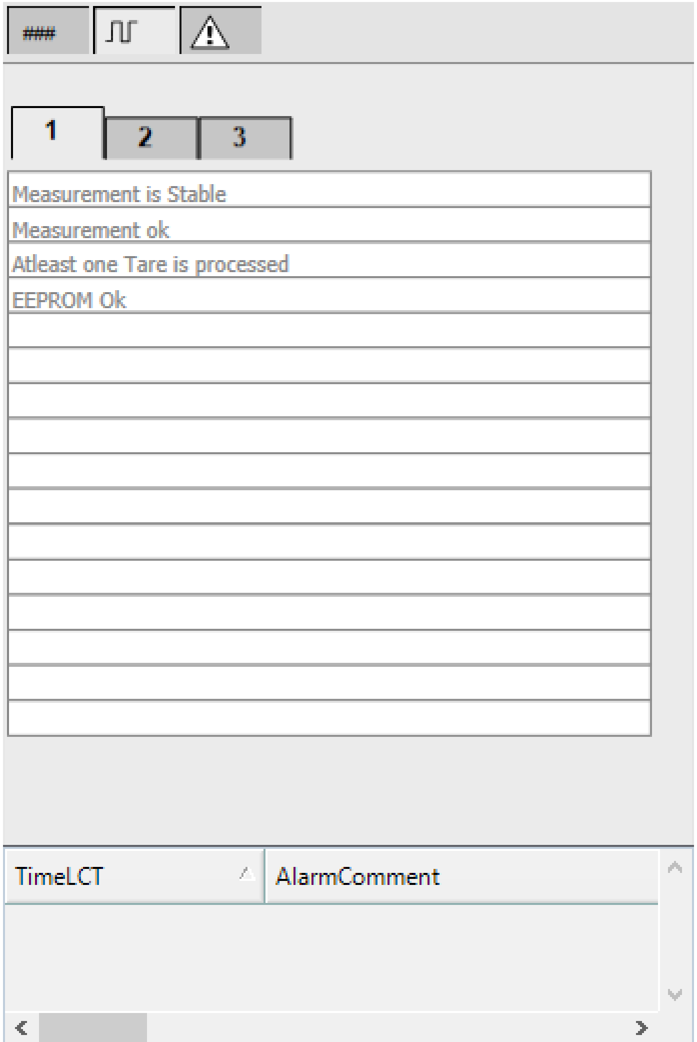
Analog Tab 2: Provides information of detected Failure and Alerts codes.



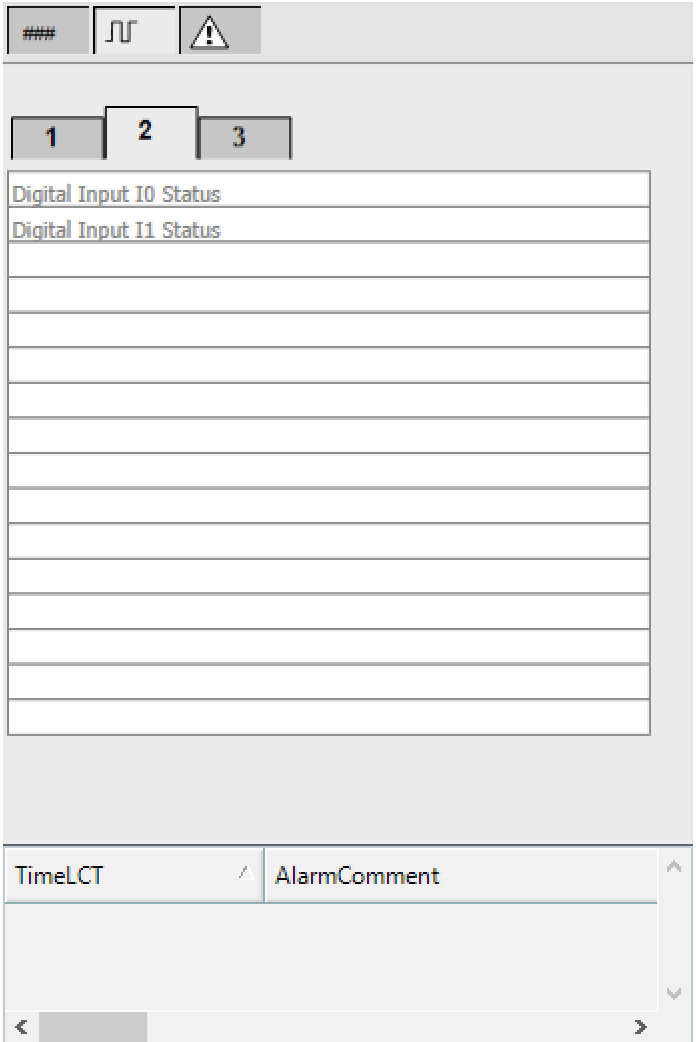
Discrete Tab

This tab provides information about the digital data of the device:

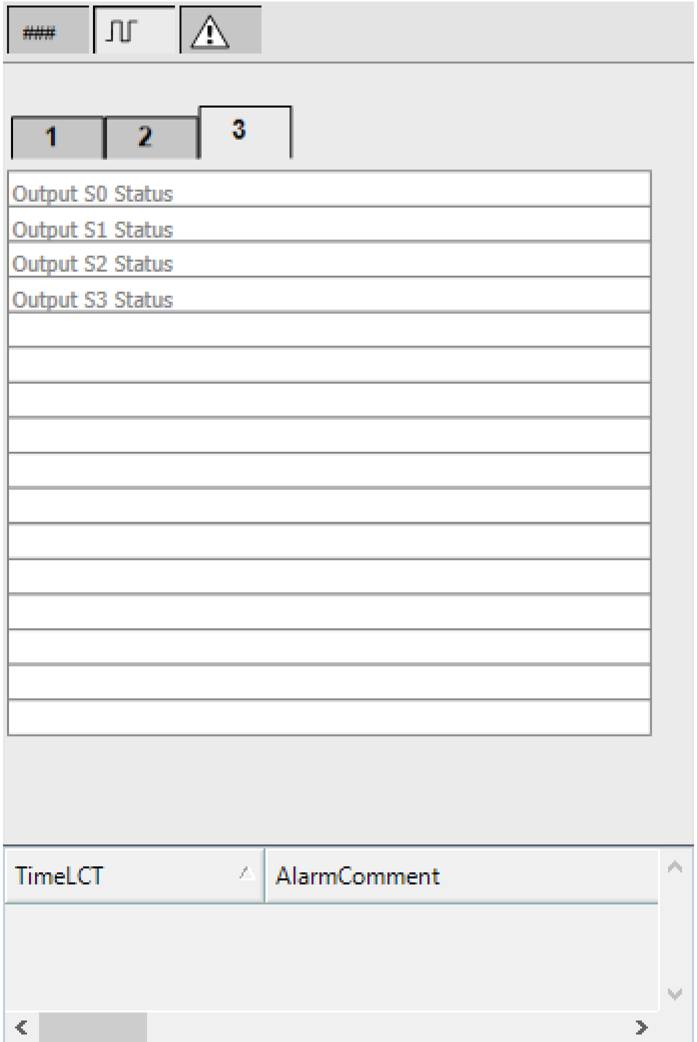
Digital Tab 1: Provides information about the current device status



Digital Tab 2: Provide the Input channel status of `eNod4T` Module



Digital Tab 3: Provide the Output channel status of `eNod4T` Module



Alarm Tab

Refer to Alarms Tab.

$LoadCellPMESWTCE - Scaime weighing module

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of `$LoadCellPMESWTCE` - Scaime Weighing Module.

Supervision Function

Core resources provide monitoring and operation functions. Weighing functions like Zero, Tare, Preset tare, cancel tare, Device reset, Factory reset, diagnostic information management, resetting, owner selection.

These functions are implemented in runtime through a symbol and its associated faceplate.

Default State Alarms

The table indicates for which attributes a state alarm is configured in the `$LoadCellPMESWTCE` template and provides the default values:

Attribute	Alarm message	Priority
AO.Namur.CheckFunction	Function check	750
AO.Namur.Failure	Failure	500
AO.Namur.MaintenanceR	Maintenance Required	999
AO.Namur.OutOfSpecs	Out Of Specs	999

Graphic Representation

Graphical Representation

The various types of symbols available in this template are illustrated in the table:

Sr No.	Name	Graphic Symbol	Description
1	**Genie**		Device Status: Namur Alarms

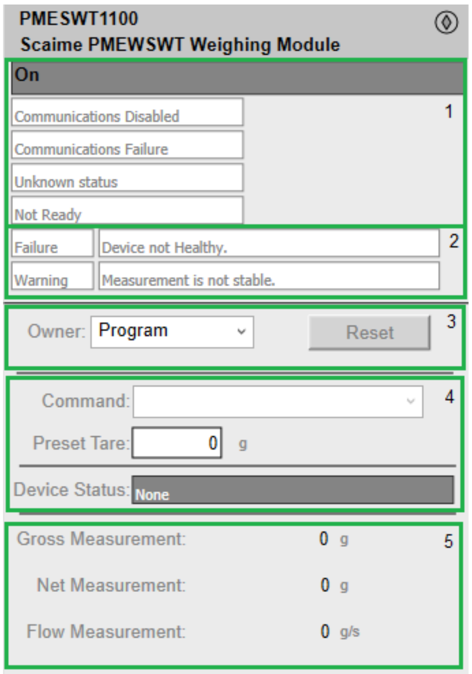
Faceplate

During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Operation
- Analog Data
- Discrete Data
- Alarms

Operator Tab

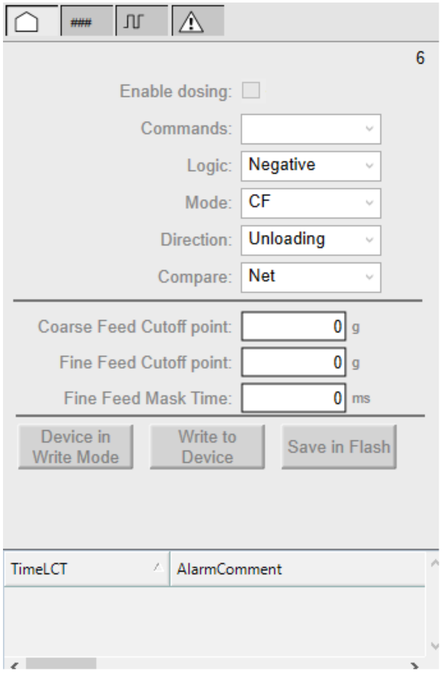
The figure shows the operator tab.



This tab provides information about the operator actions and the device information:

Item	Description
1	This section provides information about the device Communication and operation status.
2	This section provides information about the latest alarms and alerts generated.
3	This section allows the operator to change the mode from Program mode to Operator mode or vice versa.
4	This section allows the operator to execute various weighing commands like Zero, Tare, Preset Tare and also allows the operator to specify the Preset tare value in prior to executing Preset Tare command. This section also provides the current Device status
5	This section displays the major weighing measurements like Gross, Net and Flow measurements.

The figure shows the extended operator tab



Item	Description
6	This section allows the user to perform Dosing functions

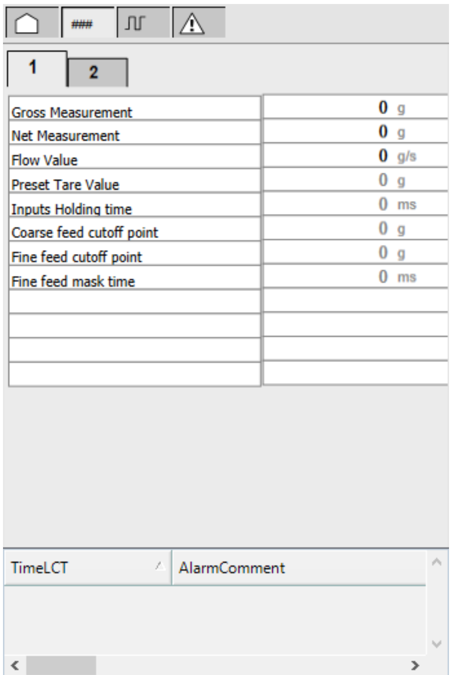
NOTE: Command combo becomes active only when it is in Operator mode.

Analog Tab

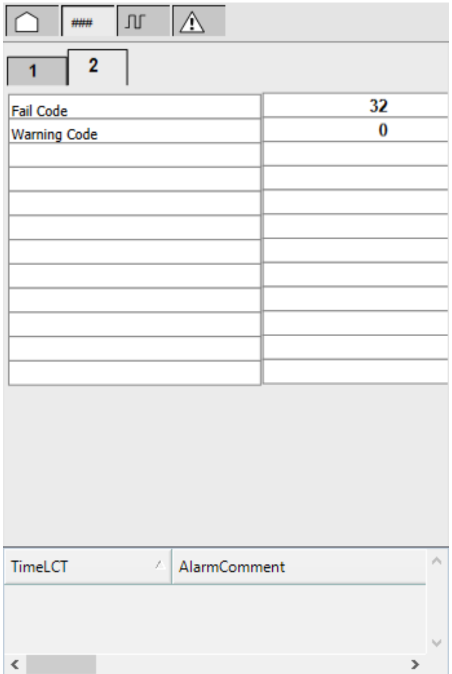
This tab provides information about the analog data of the device:

Analog Tab 1: Provides information about

- Weighing measurements like Gross, Net,Flow
- Set points of Preset Tare Value
- Dosing set points like Coarse feed cut-off point and Fine feed cut-off points and
- Few Monitoring timers.



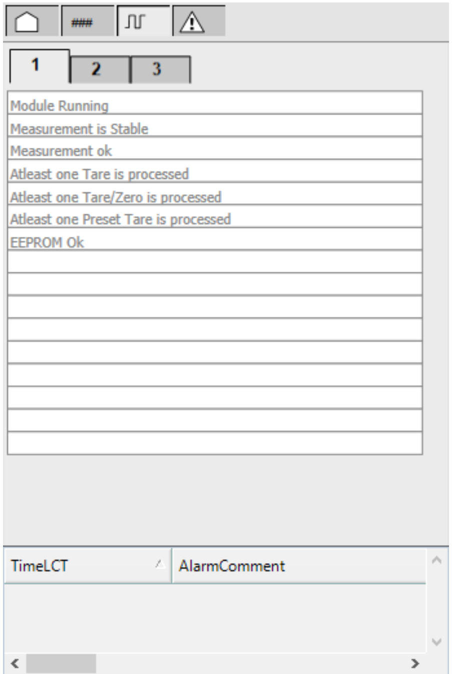
Analog Tab 2: Provides information of Detected Failure and Alerts codes.



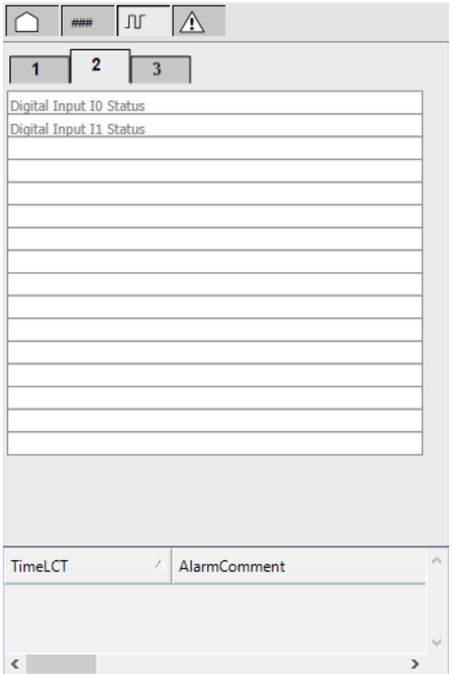
Discrete Tab

This tab provides information about the digital data of the device:

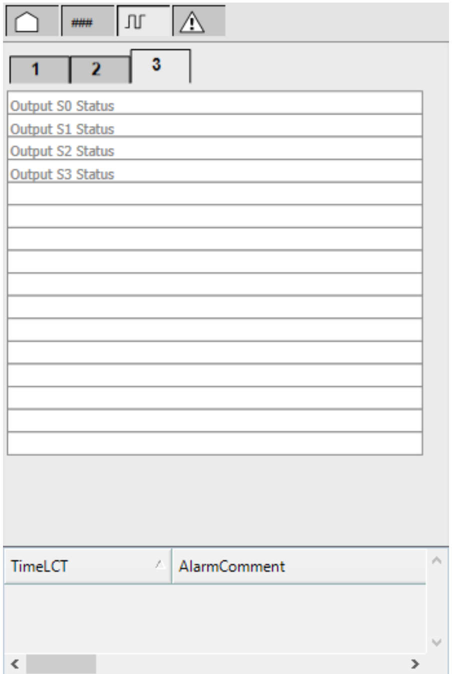
Digital Tab 1: Provides information about the current device status



Digital Tab 2: Provide the digital Input channel status of `PMESWT0100` Module



Digital Tab 3: Provide the digital Output channel status of `PMESWT0100` Module



Alarm Tab

Refer to Alarms Tab, page 64

On/Off Device Control

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for the on/off device control family.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

$HandValveCE: Hand Valves

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of hand valves.

Supervision Functions

Description

Core resources provide the following monitoring and operation functions: Simulation mode and setpoint management.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

There are no configurable parameters for hand valves.

Default State Alarms

State Alarms for Hand Valves

The table indicates for which attributes a state alarm is configured in the *$HandValveCE* master template and provides the default values.

Attribute	Alarm message	Priority
HValve.AO.PosFail	*Unknown Position*	750

NOTE: You can modify the configuration from the **Attributes** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the hand valve:

Name	Graphic symbol	Description
`V2V_Horiz`		Horizontal two-way valve
`V2V_Vert`		Vertical two-way valve
`V3V_Horiz_Down_Left`		Horizontal three-way valve (down to left way when closed, down to right way when open)
`V3V_Horiz_Down_Right`		Horizontal three-way valve (down to right way when closed, down to left way when open)
`V3V_Horiz_Left_Down`		Horizontal three-way valve (left to down way when closed, left to right way when open)
`V3V_Horiz_Left_Right`		Horizontal three-way valve (left to right way when closed, left to down way when open)
`V3V_Horiz_Right_Down`		Horizontal three-way valve (right to down way when closed, right to left way when open)
`V3V_Horiz_Right_Left`		Horizontal three-way valve (right to left way when closed, right to down way when open)
`V3V_Vert_Down_Right`		Vertical three-way valve (down to right way when closed, down to up way when open)
`V3V_Vert_Down_Up`		Vertical three-way valve (down to up way when closed, down to right way when open)
`V3V_Vert_Right_Down`		Vertical three-way valve (right to down way when closed, right to up way when open)
`V3V_Vert_Right_Up`		Vertical three-way valve (right to up way when closed, right to down way when open)
`V3V_Vert_Up_Down`		Vertical three-way valve (up to down way when closed, up to right way when open)
`V3V_Vert_Up_Right`		Vertical three-way valve (up to right way when closed, up to down way when open)
`Label`		Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

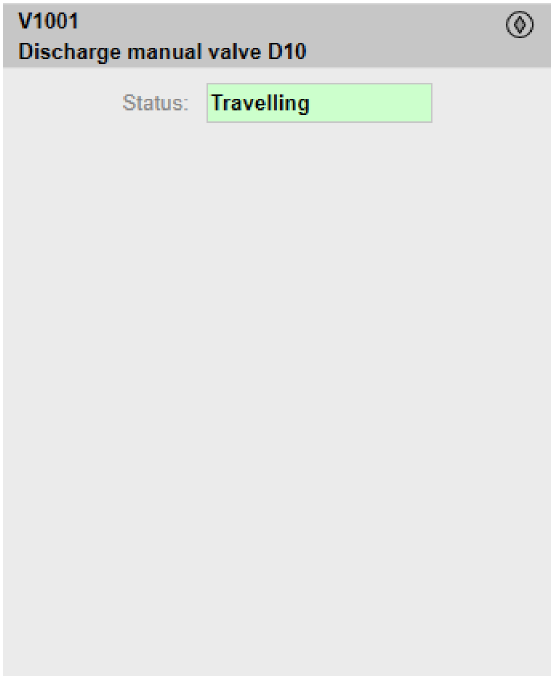
Overview

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64

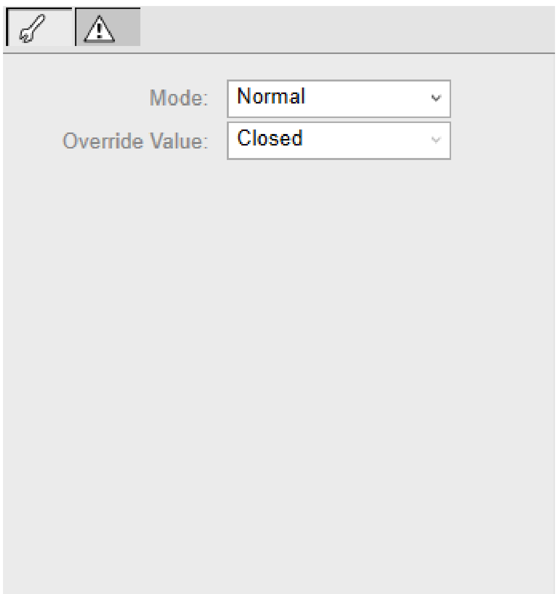
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$MotorCE: On/Off Motor

What's in This Chapter

Overview

This chapter describes the *$MotorCE* master template, which contains supervision resources to monitor and operate 1-speed/1-rotation-direction on/off motors.

Supervision Functions

Description

The *$MotorCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Status monitoring.
  - Owner selection.
  - Simulation mode.
  - Resetting.
  - Global bypassing of interlock conditions.
- Optional functions:
  - Operation from a local panel.
  - Viewing, bypassing, and resetting of individual interlock conditions and abnormal conditions.
  - Tracking of operating hours and switching operations.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$MotorCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.
`Param.IlckRearmConfirmation`	Boolean	`False`	When manual resetting of interlock conditions is enabled: • *False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. • *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms

State Alarms for On/Off Motor

The table indicates for which attributes a state alarm is configured in the *$MotorCE* master template and provides the default values.

Attribute	Alarm message	Priority
Devctl.AO.Alarm	*Confirmation Failure*	999
Devctl.AO.PosFail	*Unknown Position*	750
Devctl.St.Faild	*Device Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

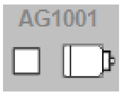
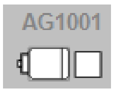
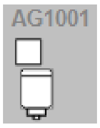
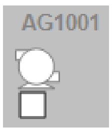
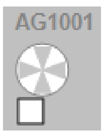
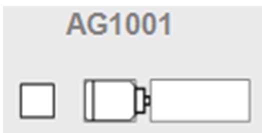
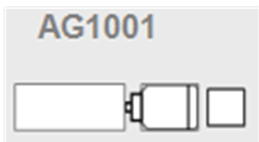
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MotorCE* master template to display data of 1-speed/1-rotation direction on/off motors during operation.

Name	Graphic symbol	Description
`Blower_Left`		Left blower
`Blower_Right`		Right blower
`Motor_Down`		Motor down
`Motor_Left`		Motor left
`Motor_Right`		Motor right
`Motor_Up`		Motor up
`Pump_Left`		Left pump
`Pump_Right`		Right pump
`RotaryValve`		Rotary valve
ScrewPump_Left		Screw pump left
ScrewPump_Right		Screw pump right
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

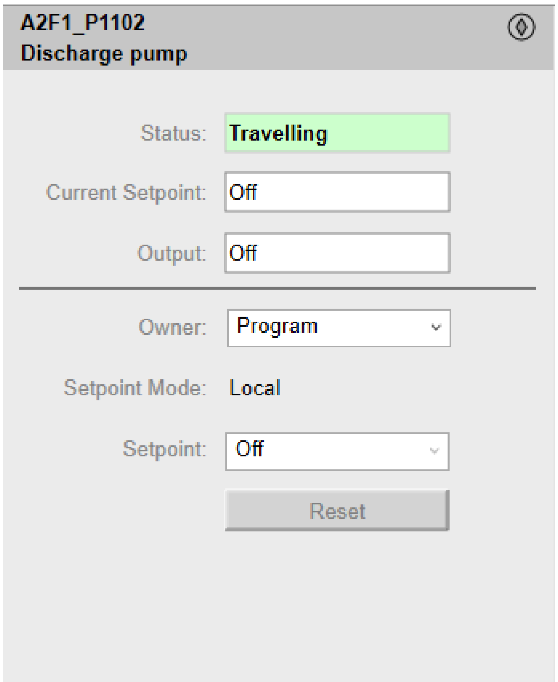
Available Tabs

During operation, clicking an on/off motor symbol opens a faceplate with the following tabs:

- Tabs for core functions:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Tabs for optional functions, which appear only if configured:
  - Interlocks, page 56
  - Failures, page 59
  - Maintenance, page 61

Operation Tab

The figure shows an example of the **Operation** tab.



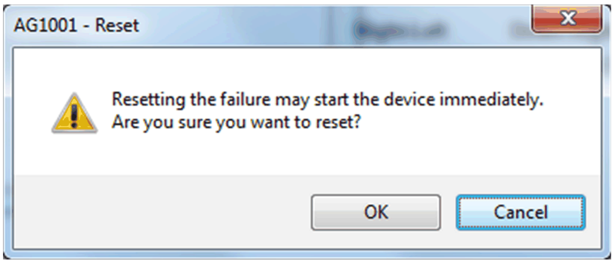
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.

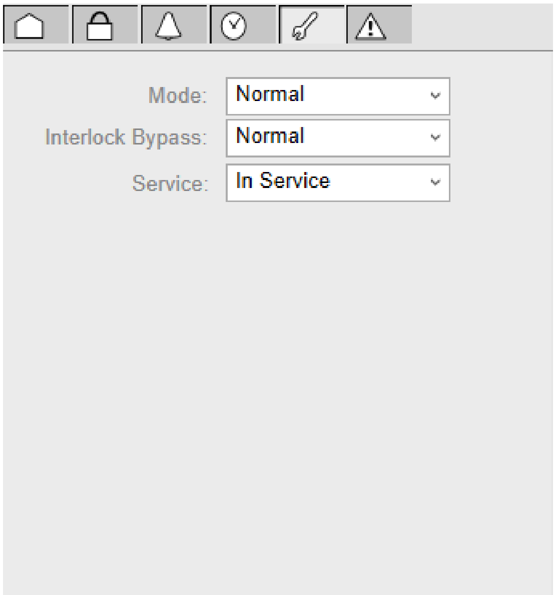


Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Engineering Tab

The figure shows an example of the **Engineering** tab.



⚠ WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

Before switching the monitored device back into service:

- Verify the current setpoint of the monitored device.
- Confirm the current status of the process.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Service** menu, which allows setting the control module out of service.

When the control menu is set back into service by selecting **In Service** in the **Service** menu, the current setpoint that is shown in the operation tab of the faceplate is effective.

Setting the control module out of service underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$Motor2DirCE: 2-Speed/2-Rotation-Direction Motors

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of 2-speed/2-rotation-direction motors.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, simulation mode, resetting, rotation direction, and global bypassing of interlock conditions.
- Optional functions encompass a local panel, individual interlock condition and diagnostic information management, tracking of operating hours and switching operations.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$Motor2DirCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.ContainerDesc`	Bool	False	If true, the container description is used. If false, the container description is not used. **NOTE:** This parameter is used for object contained by another object, for example *$MValveCE.M2*.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.
`Param.IlckRearmConfirmation`	Boolean	`False`	When manual resetting of interlock conditions is enabled: • *False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. • *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms

State Alarms for 2-Speed/2-Rotation-Direction Motors

The table indicates for which attributes a state alarm is configured in the *$Motor2DirCE* master template and provides the default values.

Attribute	Alarm message	Priority
Motor2.St.Alarm1	*Confirmation Failure 1*	999
Motor2.St.Alarm2	*Confirmation Failure 2*	999
Motor2.AO.PosFail	*Unknown Position*	750
Motor2.St.Faild1	*Device Failure 1*	500
Motor2.St.Faild2	*Device Failure 2*	500

NOTE: You can modify the configuration from the **Attributes** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the 2-speed/2-rotation direction motors:

Name	Graphic symbol	Description
`Motor_Direction_Down`		Down vertical motor with 2 rotation directions
`Motor_Direction_Left`		Left horizontal motor with 2 rotation directions
`Motor_Direction_Right`		Right horizontal motor with 2 rotation directions
`Motor_Direction_Up`		Up vertical motor with 2 rotation directions
`Motor_Speed_Down`		Down vertical motor with 2 speeds
`Motor_Speed_Left`		Left horizontal motor with 2 speeds
`Motor_Speed_Right`		Right horizontal motor with 2 speeds
`Motor_Speed_Up`		Up vertical motor with 2 speeds
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

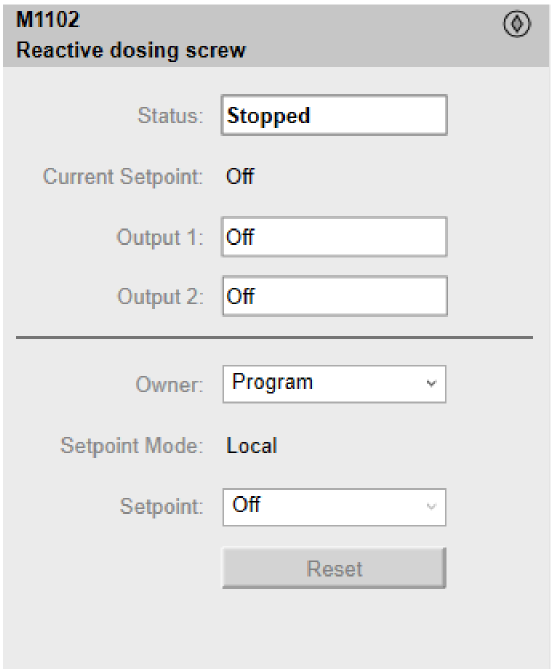
Overview

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56
  - Failures , page 59
  - Maintenance, page 61

Operation Tab

The figure shows an example of the **Operation** tab.



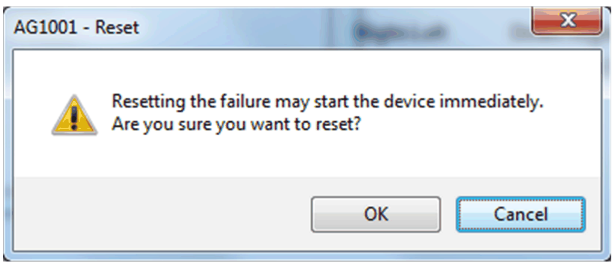
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.

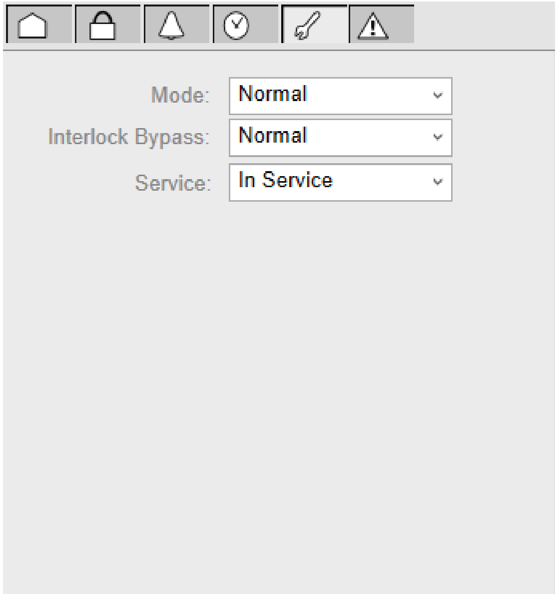


Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Engineering Tab

The figure shows an example of the **Engineering** tab.



⚠WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

Before switching the monitored device back into service:

- Verify the current setpoint of the monitored device.
- Confirm the current status of the process.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Service** menu, which allows setting the control module out of service.

When the control menu is set back into service by selecting **In Service** in the **Service** menu, the current setpoint that is shown in the operation tab of the faceplate is effective.

Setting the control module out of service underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$MValveCE: Discrete Motorized Valves

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of discrete motorized valves.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, resetting, setpoint management, and global bypassing of interlock conditions.
- Optional functions encompass a local panel, and individual interlock condition and diagnostic information management.

These functions are implemented in runtime through symbols and their associated faceplate.

NOTE: The discrete motorized valve template includes three contained objects:

- *$MValveCE.M2*: motor management (a derived template of $Motor2DirCE, page 153 with interlock and detected failure conditions enabled by default, and the parameter `Param.ContainerDesc` enabled)
- *$MValveCE.ZSH*: high limit switch management (a derived template of $DigitalInputCE, page 112 with the parameter `Param.ContainerDesc` enabled)
- *$MValveCE.ZSL*: low limit switch management (a derived template of $DigitalInputCE, page 112 with the parameter `Param.ContainerDesc` enabled)

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$MValveCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.
`Param.IlckRearmConfirmation`	Boolean	`False`	When manual resetting of interlock conditions is enabled: • *False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. • *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms

State Alarms for Discrete Motorized Valves

The table indicates for which attributes a state alarm is configured in the *$MValveCE* master template and provides the default values.

Attribute	Alarm message	Priority
MValveD.St.Alarm1	*Open Confirmation Fail*	999
MValveD.St.Alarm2	*Closed Confirmation Fail*	999
MValveD.AO.PosFail	*Unknown Position*	750
MValveD.St.Faild	*Device Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

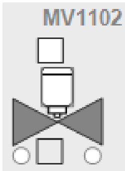
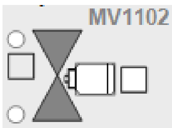
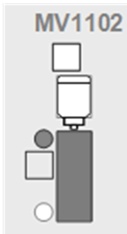
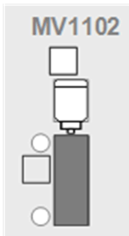
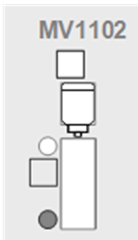
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the discrete motorized valves:

Name	Graphic symbol	Description
`V2V_Horiz`		Horizontal valve
`V2V_Vert`		Vertical valve
`PenStockV`		Penstock valve (Open position)
`PenStockV`		Penstock valve (Intermediate position)
`PenStockV`		Penstock valve (Closed position)
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE: The discrete motorized valve symbol is composed of four symbols:

- Valve
- Motor
- High limit switch
- Low limit switch

Navigation to display the related faceplate of contained objects motor and limit switches are provided on main faceplate of discrete motorised valves.

Faceplates

Overview

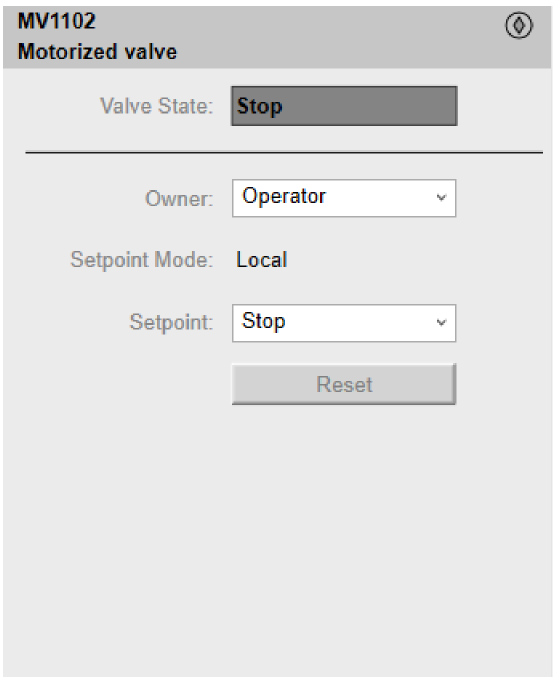
During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56

NOTE: Navigation to display the related faceplate of contained objects motor and limit switches are provided on main faceplate of discrete motorised valves.

Operation Tab

The figure shows an example of the **Operation** tab.



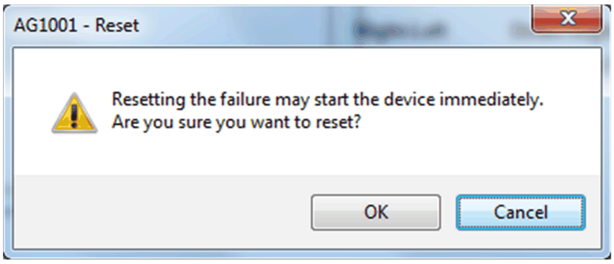
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param.FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.

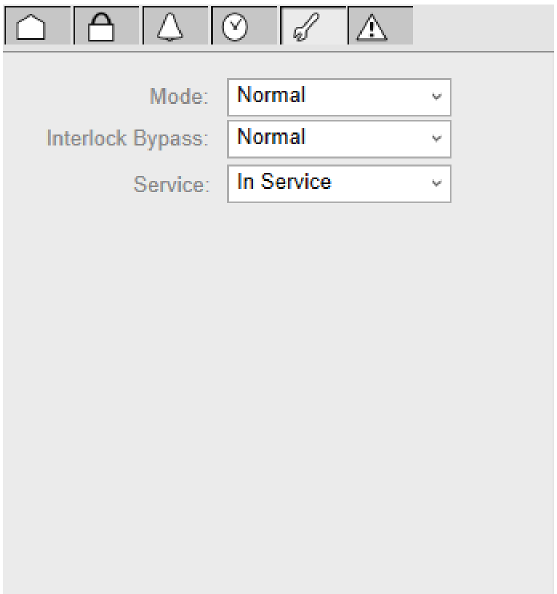


Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$DualOPValveCE: Dual Output Valves

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of dual output valves.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, resetting, setpoint management, simulation mode, and global bypassing of interlock conditions.
- Optional functions encompass tracking of operating hours and switching operations, individual interlock condition and diagnostic information management.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template prefix or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$DualOPValveCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Name	Data type	Initial value	Description
`Param. FailureRearmCon-firmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.
`Param. IlckRearmConfir-mation`	Boolean	`False`	When manual resetting of interlock conditions is enabled: • *False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. • *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms

State Alarms for Dual Output Valves

The table indicates for which attributes a state alarm is configured in the *$DualOPValveCE* master template and provides the default values.

Attribute	Alarm message	Priority
DVALVE.ST.AlarmH	*Open Confirmation Fail*	999
DVALVE.ST.AlarmL	*Close Confirmation Fail*	999
DVALVE.ST.FAILD	*Device failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

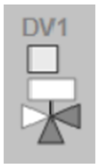
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the dual output valves:

Name	Graphic symbol	Description
`V2V_Horiz`		Horizontal two-way valve
`V2V_Vert`		Vertical two-way valve
`V2V_Butterfly_Vert_ Left`		Vertical butterfly with control on the left
`V2V_Butterfly_Vert_ Right`		Vertical butterfly with control on the right
`V3V_Horiz_Down_Left`		Horizontal three-way valve (down to left way when closed, down to right way when open)
`V3V_Horiz_Down_Right`		Horizontal three-way valve (down to right way when closed, down to left way when open)
`V3V_Horiz_Left_Down`		Horizontal three-way valve (left to down way when closed, left to right way when open)
`V3V_Horiz_Left_Right`		Horizontal three-way valve (left to right way when closed, left to down way when open)
`V3V_Horiz_Right_Down`		Horizontal three-way valve (right to down way when closed, right to left way when open)
`V3V_Horiz_Right_Left`		Horizontal three-way valve (right to left way when closed, right to down way when open)
`V3V_Vert_Down_Right`		Vertical three-way valve (down to right way when closed, down to up way when open)

Name	Graphic symbol	Description
`V3V_Vert_Down_Up`		Vertical three-way valve (down to up way when closed, down to right way when open)
`V3V_Vert_Right_Down`		Vertical three-way valve (right to down way when closed, right to up way when open)
`V3V_Vert_Right_Up`		Vertical three-way valve (right to up way when closed, right to down way when open)
`V3V_Vert_Up_Down`		Vertical three-way valve (up to down way when closed, up to right way when open)
`V3V_Vert_Up_Right`		Vertical three-way valve (up to right way when closed, up to down way when open)
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

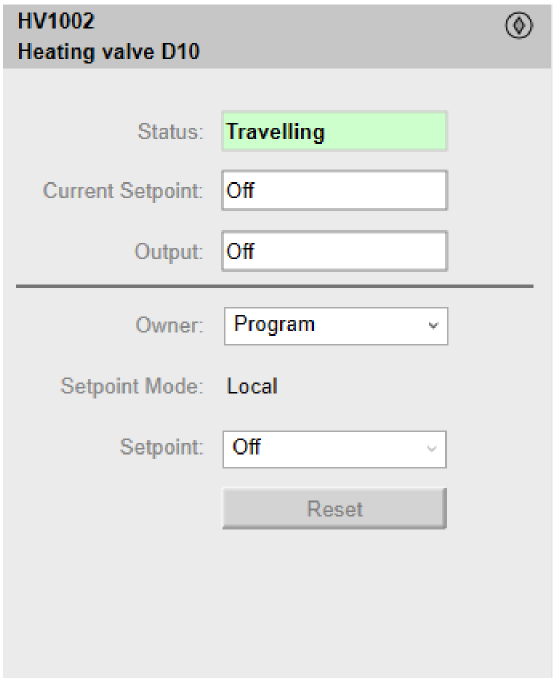
Overview

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56
  - Failures, page 59
  - Maintenance, page 61

Operation Tab

The figure shows an example of the **Operation** tab.



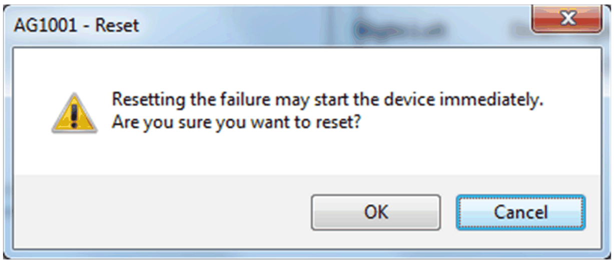
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param.FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.

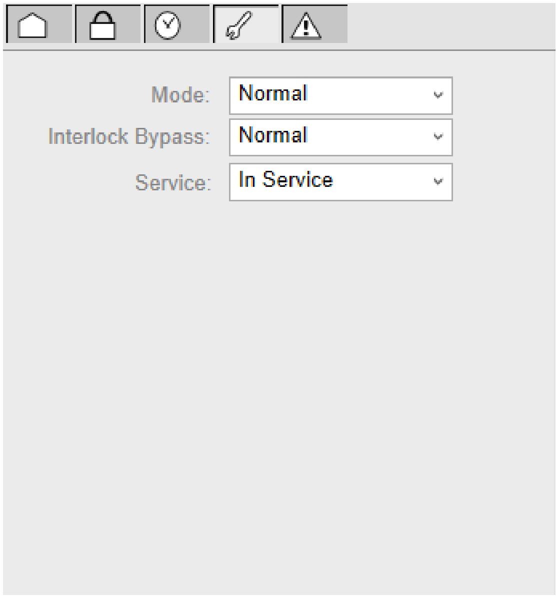


Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Engineering Tab

The figure shows an example of the **Engineering** tab.



⚠WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

Before switching the monitored device back into service:

- Verify the current setpoint of the monitored device.
- Confirm the current status of the process.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Service** menu, which allows setting the control module out of service.

When the control menu is set back into service by selecting **In Service** in the **Service** menu, the current setpoint that is shown in the operation tab of the faceplate is effective.

Setting the control module out of service underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$ValveCE: On/Off Valves

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of on/off valves.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, simulation mode, resetting, and global bypassing of interlock conditions.
- Optional functions encompass a local panel, individual interlock condition management, tracking of operating hours and switching operations.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Default State Alarms

State Alarms for On/Off Valves

The attributes for which a state alarm is configured in the *$ValveCE* master template are the same as for *$MotorCE*.

NOTE: You can modify the configuration from the **Attributes** page.

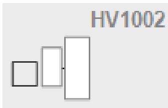
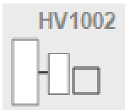
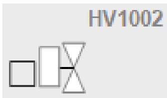
Graphic Representation

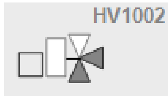
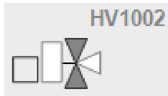
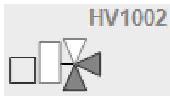
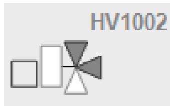
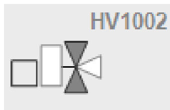
Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the on/off valves:

Name	Graphic symbol	Description
`V2V_Butterfly_Vert_Left`		Vertical butterfly with control on the left
`V2V_Butterfly_Vert_Right`		Vertical butterfly with control on the right
`V2V_Horiz`		Horizontal two-way valve
`V2V_Vert`		Vertical two-way valve
`V3V_Horiz_Down_Left`		Horizontal three-way valve (down to left way when closed, down to right way when open)
`V3V_Horiz_Down_Right`		Horizontal three-way valve (down to right way when closed, down to left way when open)
`V3V_Horiz_Left_Down`		Horizontal three-way valve (left to down way when closed, left to right way when open)
`V3V_Horiz_Left_Right`		Horizontal three-way valve (left to right way when closed, left to down way when open)

Name	Graphic symbol	Description
`V3V_Horiz_Right_Down`		Horizontal three-way valve (right to down way when closed, right to left way when open)
`V3V_Horiz_Right_Left`		Horizontal three-way valve (right to left way when closed, right to down way when open)
`V3V_Vert_Down_Right`		Vertical three-way valve (down to right way when closed, down to up way when open)
`V3V_Vert_Down_Up`		Vertical three-way valve (down to up way when closed, down to right way when open)
`V3V_Vert_Right_Down`		Vertical three-way valve (right to down way when closed, right to up way when open)
`V3V_Vert_Right_Up`		Vertical three-way valve (right to up way when closed, right to down way when open)
`V3V_Vert_Up_Down`		Vertical three-way valve (up to down way when closed, up to right way when open)
`V3V_Vert_Up_Right`		Vertical three-way valve (up to right way when closed, up to down way when open)
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Overview

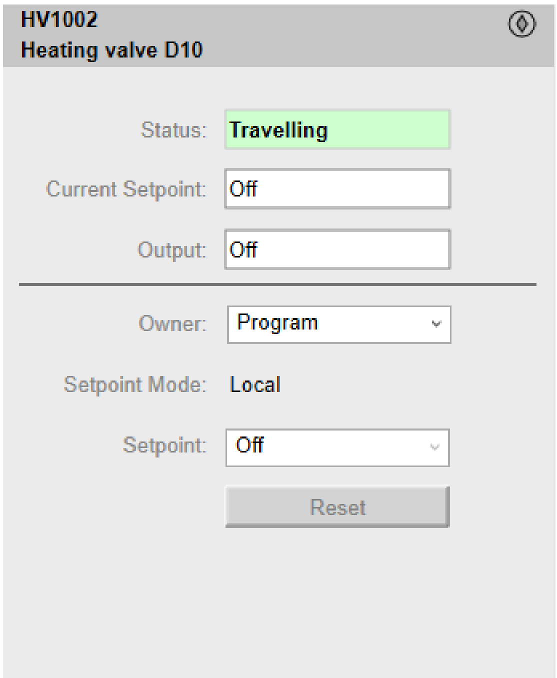
During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56
  - Failures, page 59
  - Maintenance, page 61

NOTE: The same faceplate is used for on/off motor and on/off valve.

Operation Tab

The figure shows an example of the **Operation** tab.



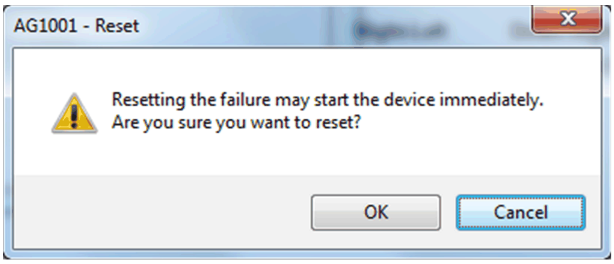
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.

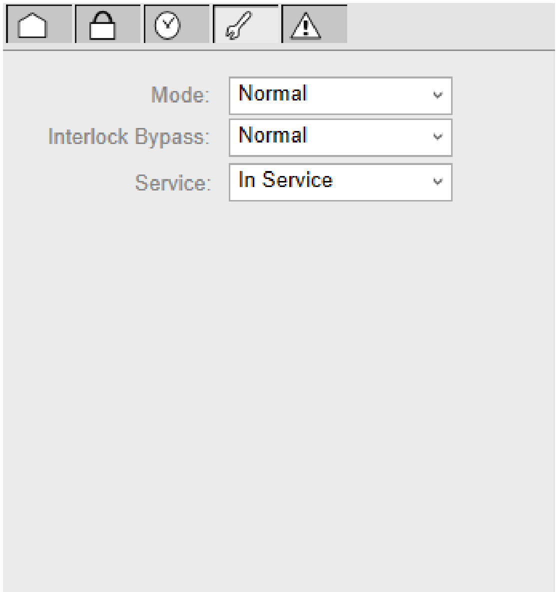


Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Engineering Tab

The figure shows an example of the **Engineering** tab.



⚠WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

Before switching the monitored device back into service:

- Verify the current setpoint of the monitored device.
- Confirm the current status of the process.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Service** menu, which allows setting the control module out of service.

When the control menu is set back into service by selecting **In Service** in the **Service** menu, the current setpoint that is shown in the operation tab of the faceplate is effective.

Setting the control module out of service underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

Analog Device Control

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for the analog device control family.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

$ControlValveCE: Control Valves

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of control valves.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, simulation mode, position indication (current setpoint, position output, current valve position, in engineering units), and global bypassing of interlock conditions.
- Optional functions encompass a local panel and individual interlock condition management.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template prefix or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.EngUnits`	String	%	Unit of the present value
`Param.HiPV`	Float	100.0	High limit for the present value
`Param.LoPV`	Float	0.0	Low limit for the present value
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.

Parameter	Type	Default	Description
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of setpoint. For example, enter `0.00` for 2 decimal.
`Param.TrendPeriodMin`	Integer	`0`	Specifies the default trend period in minutes.

Default State Alarms

State Alarms for Control Valves

The table indicates for which attributes a state alarm is configured in the *$ControlValveCE* master template and provides the default values.

Attribute	Alarm message	Priority
CValve.St.Alarm	*Position Failure*	500
CValve.St.ChinFailure	*Input Channel Failure*	500
CValve.St.ChoutFailure	*Output Channel Failure*	500
CValve.St.Fail	*Device Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Three-Way Valve Symbol Naming Convention

For three-way control valve symbols, the naming convention is as follows:

Valve type_Valve orientation_Inlet position_Port normally open.

For example, *V3V_Horiz_Left_Down* means:

- Three-way valve.
- Shown horizontally.
- Inlet positioned left-hand side.
- The down port is normally open.

Using Limit Switches with Control Valves

You can configure the control valve object to monitor limit switches. By default, bits 11 and 12 of the CVALVE_ST.STW status word are used. These are parameters *ZSLPOS* and *ZSHPOS* respectively.

In such case, the symbol:

- Uses the *over-range* element style to show both outlet ports fully filled (open) if both limit switch signals are true.
- Shows either outlet port fully filled (open) when the corresponding limit switch signal is true, independently of the actual valve position. For example, if *ZSLPOS* for a *V3V_Horiz_Left_Down* symbol is true, the down port (normally open) is shown fully filled (open) even if *PV* indicates 25%. In this case, the down port would normally be shown 75% filled.

Two-Way Valve Symbol Graphic Convention

For operator convenience, the graphic convention for two-way control valve symbols indicates the limit switch signals.

Both valve ports are filled depending on the signals transmitted by the limit switches:

- If *ZSLPOS* is true (closed state), the valve ports are shown not filled (white).
- If *ZSHPOS* is true (open state), both valve ports are shown fully filled.
- If there is no limit switch signal or if both signals are true, both valve ports are shown fully filled (open state).

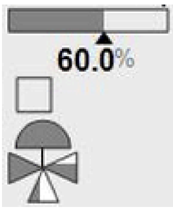
  NOTE: The valve position is indicated by the bar graph and the numerical value.

Three-Way Valve Symbol Graphic Convention

For operator convenience, the graphic convention for three-way control valve symbols is as follows:

- The inlet is shown fully filled independently of the position of the valve.
- The area of the outlets that is shown filled gives an indication of the position of the valve. The filled area shows approximately how much each port is open.

The example shows a *V3V_Horiz_Left_Down* symbol representing a three-way valve with a position 60% open. The normally open *Down* port is shown 40% filled (40% open) and the normally closed *Right* port 60% filled (60% open).

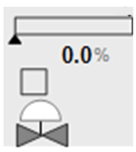
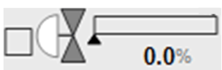


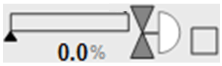
Representation

In addition to icons, symbols display:

- The label.
- The trend client icon to open the trends faceplate.
- A bar graph showing the present valve position.
- The value of the present valve position with engineering units.
- States, shown in a square, page 45.
- The owner mode if it is detected as an abnormal situation, page 43.

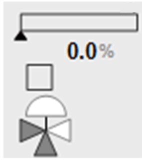
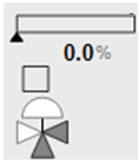
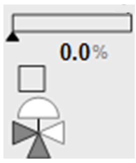
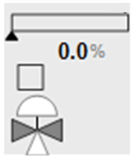
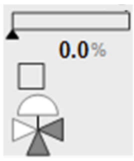
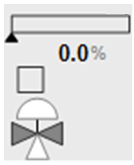
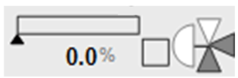
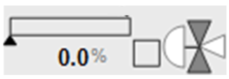
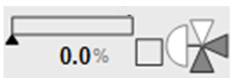
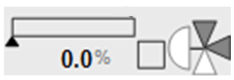
The table describes the symbols that are included in the *$ControlValveCE* master template to display data of two-way control valves during operation.

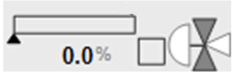
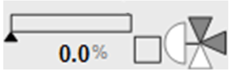
Name	Graphic symbol	Description
`V2V_Horiz`		Horizontal two-way valve
`V2V_Vert_Left`		Vertical two-way valve

Name	Graphic symbol	Description
`V2V_Vert_Right`		Vertical two-way valve
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE:

The table describes the symbols that are included in the *$ControlValveCE* master template to display data of three-way control valves during operation.

Name	Graphic symbol
`V3V_Horiz_Down_Left`	
`V3V_Horiz_Down_Right`	
`V3V_Horiz_Left_Down`	
`V3V_Horiz_Left_Right`	
`V3V_Horiz_Right_Down`	
`V3V_Horiz_Right_Left`	
`V3V_Vert_Down_Right`	
`V3V_Vert_Down_Up`	
`V3V_Vert_Right_Down`	
`V3V_Vert_Right_Up`	

Name	Graphic symbol
`V3V_Vert_Up_Down`	
`V3V_Vert_Up_Right`	

Faceplates

Overview

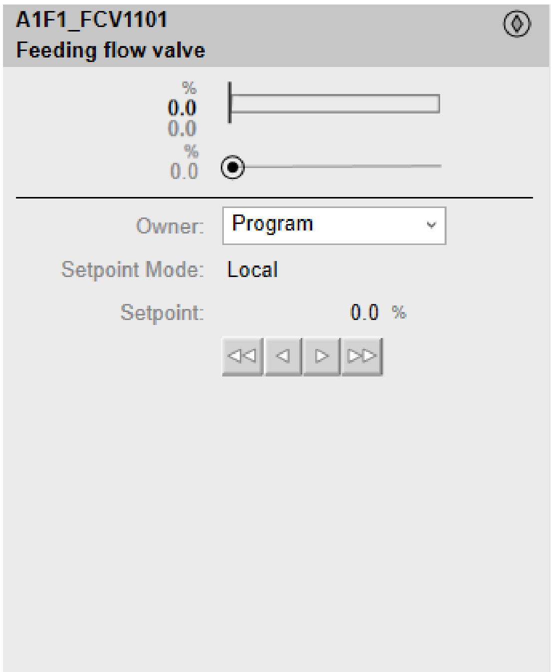
During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56
  - Failures, page 59
  - Maintenance, page 61

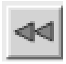
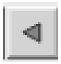
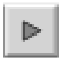
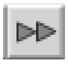
NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the **Operation** tab.

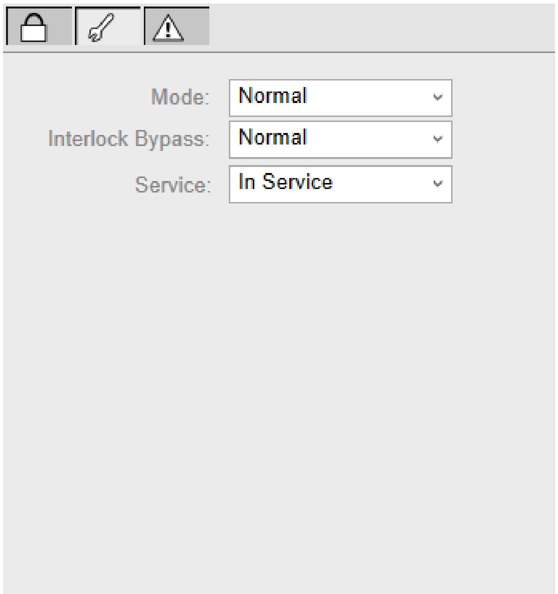


This table describes the **SetPoint** button functions in **Operator** owner mode:

Button	Description
	Large decrement of the setpoint value (-5)
	Small decrement of the setpoint value (-1)
	Small increment of the setpoint value (+1)
	Large increment of the setpoint value (+5)

Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$MValvewithPosCE: Motorized Valve With Feedback

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of motorized valves with feedback.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, three-step controller functions, resetting, and global bypassing of interlock conditions.
- Optional functions encompass a local panel, individual interlock condition and diagnostic information management, tracking of operating hours and switching operations.

These functions are implemented in runtime through symbols and their associated faceplate.

NOTE: The motorized valve template includes four contained objects:

- *$MValvewithPosCE.AI*: analog input management (a derived template of $AnalogInputCE, page 101 with alarms disabled and the parameter `Param.ContainerDesc` enabled)
- *$MValveCE.M2*: motor management (a derived template of $Motor2DirCE, page 153 with interlock and detected failure conditions enabled by default, and the parameter `Param.ContainerDesc` enabled)
- *$MValveCE.ZSH*: high limit switch management (a derived template of $DigitalInputCE, page 112 with the parameter `Param.ContainerDesc` enabled)
- *$MValveCE.ZSL*: low limit switch management (a derived template of $DigitalInputCE, page 112 with the parameter `Param.ContainerDesc` enabled)

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$MValvewithPosCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.EngUnits`	String	%	Unit of the present value
`Param.HiPV`	Float	100.0	High limit for the present value.
`Param.LoPV`	Float	0.0	Low limit for the present value.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of setpoint. For example, enter `0.00` for 2 decimal.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.
`Param.IlckRearmConfirmation`	Boolean	`False`	When manual resetting of interlock conditions is enabled: • *False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. • *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms

State Alarms for Motorized Valves

The table indicates for which attributes a state alarm is configured in the *$MValvewithPosCE* master template and provides the default values.

Attribute	Alarm message	Priority
MValve.St.Alarm	*Auxiliary Device Fail*	999
MValve.St.PMIS	*Position Mismatch*	999

Attribute	Alarm message	Priority
MValve.AO.PosFail	*Unknown Position*	750
MValve.St.Faild	*Switching Operation Fault*	500

NOTE: You can modify the configuration from the **Attributes** page.

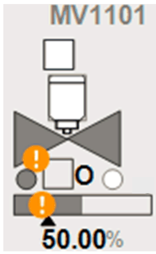
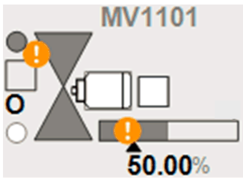
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the motorized valves with feedback

Name	Graphic symbol	Description
`V2V_Horiz`		Horizontal bar with current value of the valve position Horizontal two-way valve
`V2V_Vert`		Vertical bar with current value of the valve position Vertical two-way valve
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE: The motorized valve symbol is composed of five symbols:

- Valve
- Analog input
- Motor
- High limit switch
- Low limit switch

Navigation to display the related faceplate of contained objects analog input, motor and limit switches are provided on main faceplate of motorised valves with feedback.

Faceplates

Overview

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

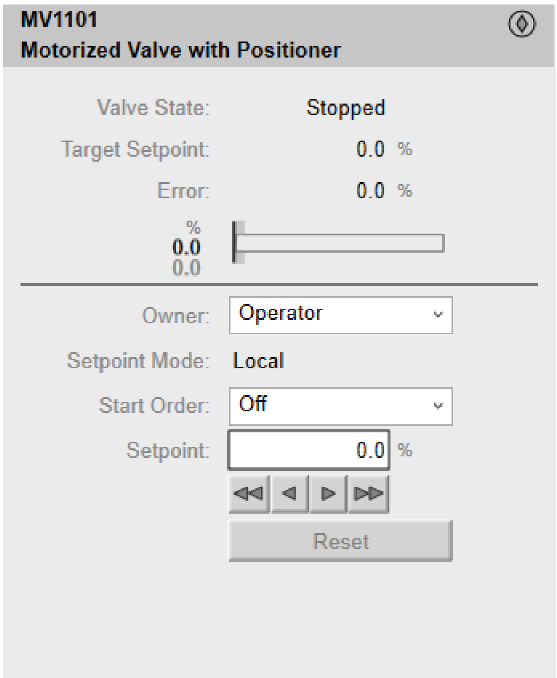
- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Failures, page 59
  - Maintenance, page 61

NOTE: Navigation to display the related faceplate of contained objects analog input, motor and limit switches are provided on main faceplate of motorised valves with feedback.

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the **Operation** tab.



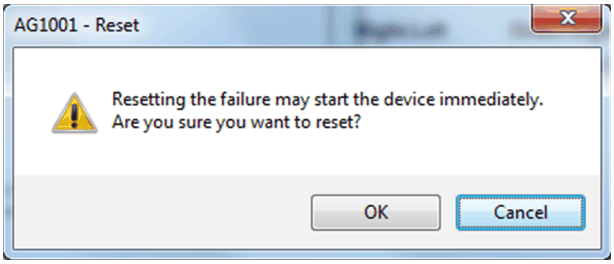
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

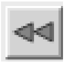
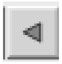
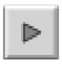
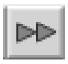
The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

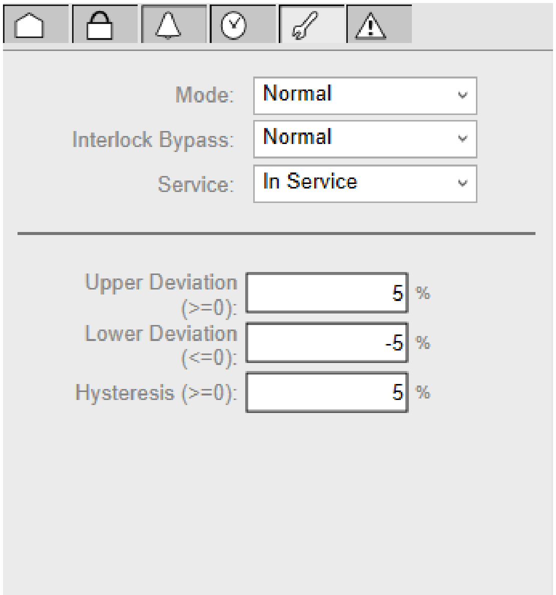
When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

This table describes the **SetPoint** button functions in **Operator** owner mode:

Button	Description
	Large decrement of the setpoint value (-5)
	Small decrement of the setpoint value (-1)
	Small increment of the setpoint value (+1)
	Large increment of the setpoint value (+5)

Engineering Tab

The figure shows an example of the **Ongineering** tab.



NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Service** menu, which allows setting the control module out of service.

When the control menu is set back into service by selecting **In Service** in the **Service** menu, the current setpoint that is shown in the operation tab of the faceplate is effective.

Setting the control module out of service underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$MotorVSCE: Devices with Variable Speed Drive

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of devices with variable speed drive.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, simulation mode, motor operation indication, multispeed setpoints, resetting, and global bypassing of interlock conditions.
- Optional functions encompass a local panel, individual interlock condition and diagnostic information management, tracking of operating hours, and switching operations.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$MotorVSCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Unit of present value (`PV`) and setpoint (`SP`)
`Param.EngUnitsOP`	String	`%`	Unit of output value (`OP`)
`Param.HiOP`	Float	`100.0`	High limit for output value (`OP`)
`Param.HiPV`	Float	`100.0`	High limit for present value (`PV`)
`Param.LoOP`	Float	`0.0`	Low limit for output value (`OP`)
`Param.LoPV`	Float	`0.0`	Low limit for present value (`PV`)

Parameter	Data type	Initial value	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of present value (`PV`). For example, enter `0.00` for 2 decimal.
`Param.NumFormatOP`	String	`0.0`	Specifies the displaying format of output value (`OP`). For example, enter `0.00` for 2 decimal.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.
`Param.IlckRearmConfirmation`	Boolean	`False`	When manual resetting of interlock conditions is enabled: • *False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. • *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms

State Alarms for Variable Speed Drives

The table indicates for which attributes a state alarm is configured in the *$MotorVSCE* master template and provides the default values.

Attribute	Alarm message	Priority
SDDevctl.St.Alarm	*Confirmation Failure*	500
SDDevctl.St.Faild	*Device Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

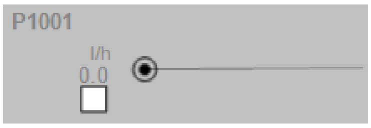
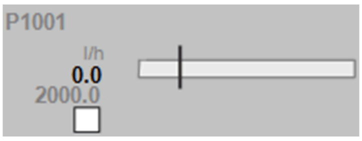
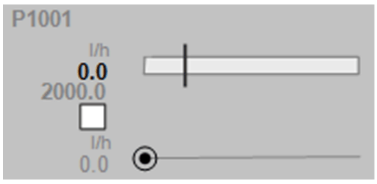
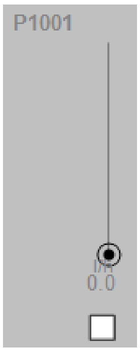
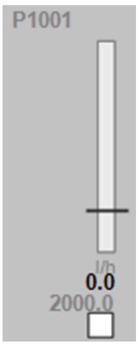
Graphic Representation

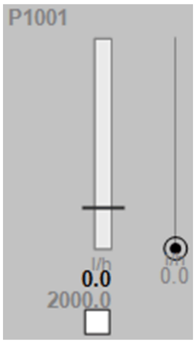
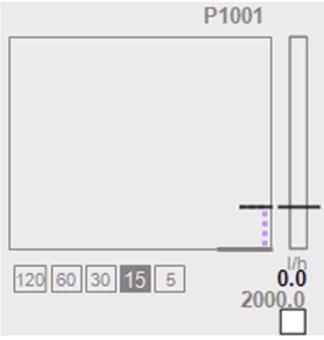
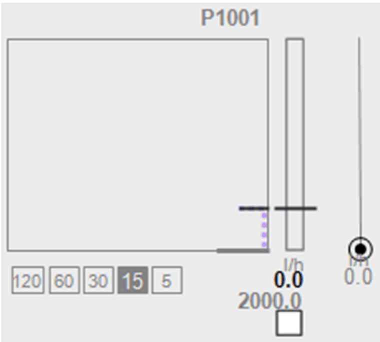
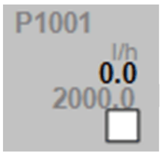
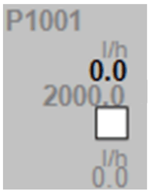
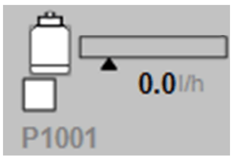
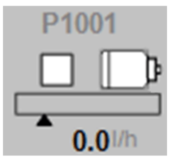
Representation of Supervision Data

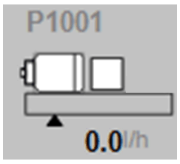
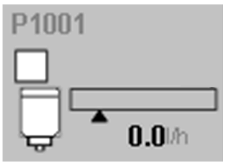
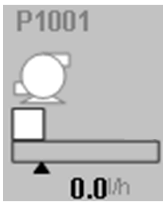
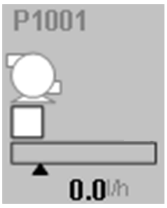
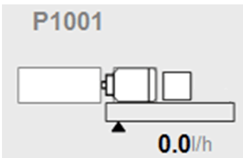
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the devices with variable speed drive:

Name	Graphic symbol	Description
`Bar_Horz_OP`		Horizontal bar with output (`OP`) of motor with speed driver
`Bar_Hor_PV_SP`		Horizontal bar with present value (`PV`) and setpoint (`SP`) of motor with speed driver
`Bar_Hor_PV_SP_OP`		Horizontal bar with present value (`PV`), setpoint (`SP`), and output (`OP`) of motor with speed driver
`Bar_Vert_OP`		Vertical bar with output (`OP`) of motor with speed driver
`Bar_Vert_PV_SP`		Vertical bar with present value (`PV`) and setpoint (`SP`) of motor with speed driver

Name	Graphic symbol	Description
`Bar_Vert_PV_SP_OP`		Vertical bar with present value (`PV`), setpoint (`SP`), and output (`OP`) of motor with speed driver
`Bar_Vert_PV_SP_Trend`		Vertical bar and trend with present value (`PV`) and setpoint (`SP`) of motor with speed driver
`Bar_Vert_PV_SP_OP_ Trend`		Vertical bar and trend with present value (`PV`), setpoint (`SP`), and output (`OP`) of motor with speed driver
`Display_PV_SP`		Display with present value (`PV`) and setpoint (`SP`) of motor with speed driver
`Display_PV_SP_OP`		Display with present value (`PV`), setpoint (`SP`), and output (`OP`) of motor with speed driver
`Motor_Down`		Down vertical motor and horizontal bar with present value (`PV`)
`Motor_Left`		Left horizontal motor and horizontal bar with present value (`PV`)

Name	Graphic symbol	Description
`Motor_Right`		Right horizontal motor and horizontal bar with present value (`PV`)
`Motor_Up`		Up vertical motor and horizontal bar with present value (`PV`)
`Pump_Left`		Left pump and horizontal bar with present value (`PV`)
`Pump_Right`		Right pump and horizontal bar with present value (`PV`)
ScrewPump_Left		Screw pump left
ScrewPump_Right		Screw pump right
Label	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

NOTE: Based on screw pump application, its symbol is available only for forward direction.

Faceplates

Overview

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

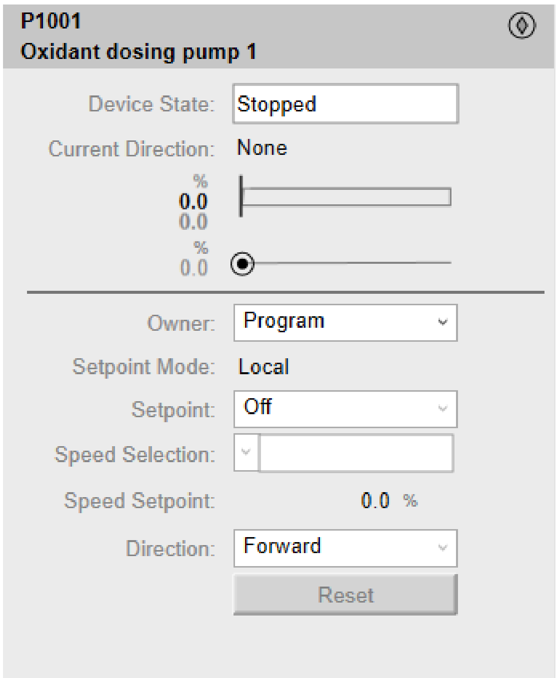
- Standard tabs:
  - Operation with optional local panel, page 55
  - Engineering
  - Alarms, page 64

- Optional tabs:
  - Interlocks, page 56
  - Failures, page 59
  - Maintenance, page 61

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the **Operation** tab.



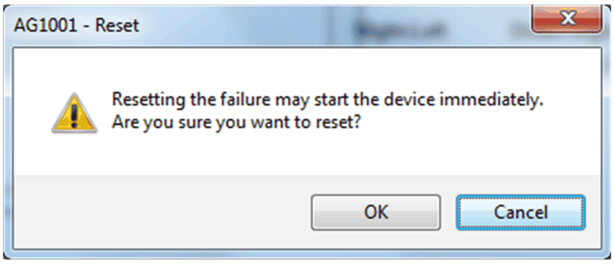
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.

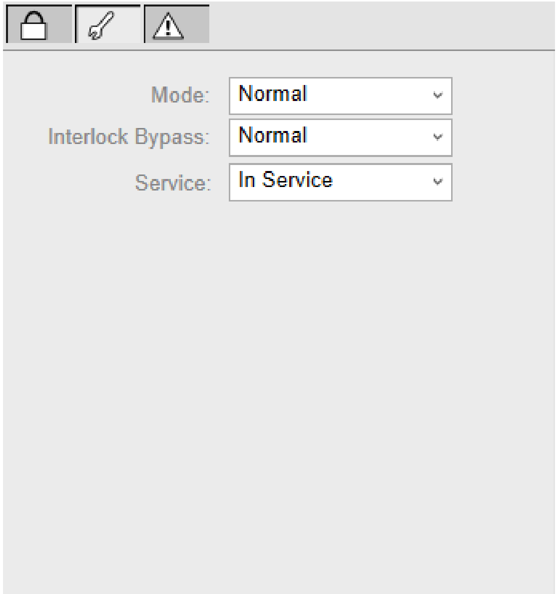


Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Engineering Tab

The figure shows an example of the **Engineering** tab.



⚠ WARNING

LOSS OF CONTROL AND UNINTENDED EQUIPMENT OPERATION

Before switching the monitored device back into service:

- Verify the current setpoint of the monitored device.
- Confirm the current status of the process.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

NOTE: This tab features the **Service** menu, which allows setting the control module out of service.

When the control menu is set back into service by selecting **In Service** in the **Service** menu, the current setpoint that is shown in the operation tab of the faceplate is effective.

Setting the control module out of service underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

Process Control

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for the process control family.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

$IMCTLCE: Internal Model Controllers

What's in This Chapter

Overview

This chapter describes the *$IMCTLCE* master template, which contains supervision resources to monitor and operate internal model controllers (IMCs).

Supervision Functions

Description

The *$IMCTLCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Status monitoring.
  - Owner selection.
  - Setpoint management: IMC tuning and action.
  - IMC operation indication.
  - Global bypassing of interlock conditions.
- Optional functions:
  - Viewing, bypassing, and resetting of individual interlock conditions.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$IMCTLCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Defines the unit of inputs and parameters.
`Param.EngUnitsOP`	String	`%`	Defines the unit of outputs.
`Param.HiOP`	Float	`100.0`	Highest value that the controller can output.
`Param.HiPV`	Float	`100.0`	Highest value that the controller accepts as setpoint.
`Param.LoOP`	Float	`0.0`	Lowest value that the controller can output.
`Param.LoPV`	Float	`0.0`	Lowest value that the controller accepts as setpoint.
`Param.LoopModeNormal`	String	`A,M`	Specifies the operating mode of the IMC (separated by a comma): • `A`: Automatic • `M`: Manual
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.NumFormatOP`	String	`0.0`	Specifies the display format of the *OP* variable. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	`0`	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for IMC

No state alarm is configured by default for the *$IMCTLCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

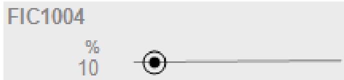
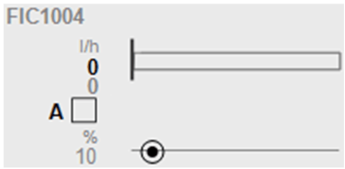
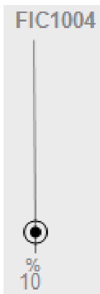
Graphic Representation

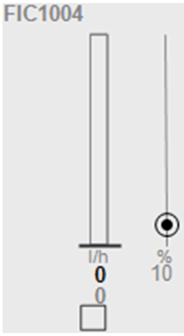
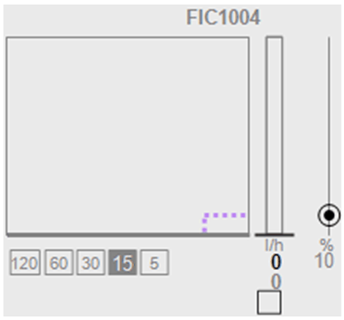
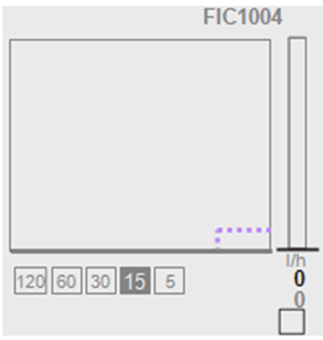
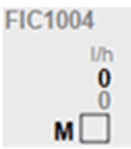
Representation of Supervision Data

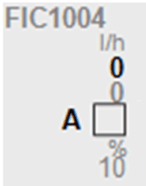
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

The table describes the symbols that are included in the *$IMCTLCE* master template to display data of IMCs during operation.

Name	Graphic symbol	Description
`Bar_Horz_OP`		In addition to icons, displays: • The label. • Engineering units. • The output value. • A horizontal line with configured high and low limits showing the relative position of the output.
`Bar_Hor_PV_SP`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The setpoint value. • States. • To the right, a horizontal bar showing the setpoint and the present value.
`Bar_Hor_PV_SP_OP`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The setpoint value. • States. • To the right, a horizontal bar showing the setpoint and the present value. • Below the bar, a horizontal line with configured high and low limits showing the relative position of the output. Engineering units and value of the output are displayed to the left of the line.
`Bar_Vert_OP`		In addition to icons, displays: • The label. • A vertical line with configured high and low limits showing the relative position of the output. • Engineering units. • The ouput value.

Name	Graphic symbol	Description
`Bar_Vert_PV_SP`		In addition to icons, displays (from top to bottom): • The label. • A vertical bar showing the setpoint and the present value. • Engineering units. • The present value. • The setpoint value.
`Bar_Vert_PV_SP_OP`		In addition to icons, displays (from top to bottom): • The label. • A vertical bar showing the setpoint and the present value. • Engineering units. • The present value. • The setpoint value. • States. • To the right of the bar, a vertical line with configured high and low limits showing the relative position of the output. Engineering units and value of the output are displayed below the line.
`Bar_Vert_PV_SP_OP_ Trend`		Displays in addition to data of *Bar_Vert_PV_SP_OP*, a trend panel with configurable trend period in minutes. Refer to the description of the *Param. TrendPeriodMin* parameter.
`Bar_Vert_PV_SP_Trend`		Displays in addition to data of *Bar_Vert_PV_SP*, a trend panel with configurable trend period in minutes. Refer to the description of the *Param. TrendPeriodMin* parameter.
`Display_PV_SP`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value.

Name	Graphic symbol	Description
`Display_PV_SP_OP`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The setpoint value. • States. • Engineering units and value of the output.
`Label`		Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

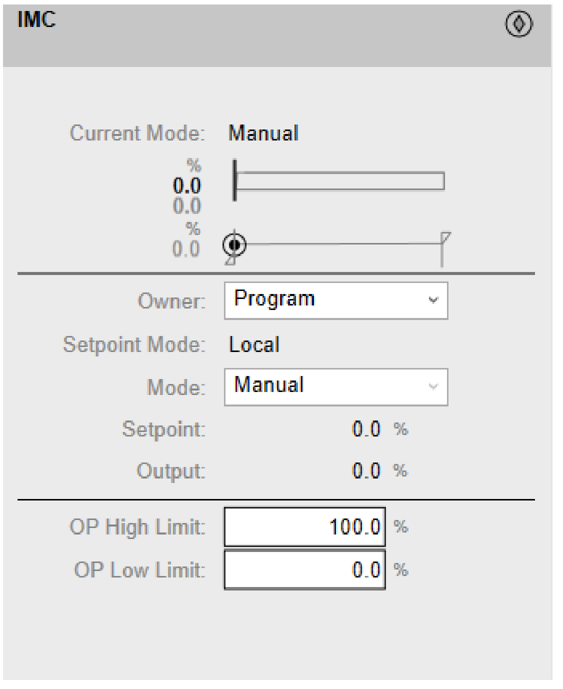
During operation, clicking an IMC symbol opens a faceplate with the following tabs:

- Tabs for core functions:
  - Operation
  - Engineering
  - Alarms, page 64
- Tabs for optional functions, which appear only if configured:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

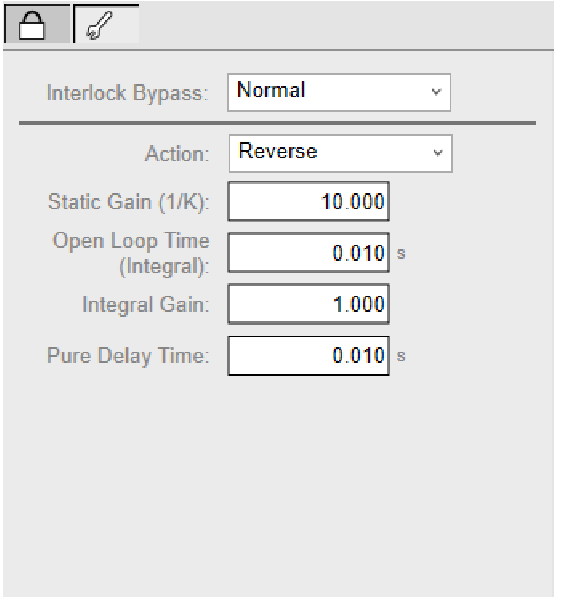
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$LeadLagCE: Lead Lag Controllers

What's in This Chapter

Overview

This chapter describes the *$LeadLagCE* master template, which contains supervision resources to monitor and operate lead lag controllers.

Supervision Functions

Description

The *$LeadLagCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Status monitoring.
  - Owner selection.
  - Operating mode.
  - Setpoint management: Lead-lag configuration tuning, lead-lag operation indication.
  - Global bypassing of interlock conditions.
- Optional functions:
  - Viewing, bypassing, and resetting of individual interlock conditions.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$LeadLagCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Indicates the unit of inputs and parameters.
`Param.EngUnitsOP`	String	`%`	Indicates the unit of outputs.
`Param.HiOP`	Float	`100.0`	Highest value that the controller can output.
`Param.HiSP`	Float	`100.0`	Highest value that the controller accepts as setpoint.
`Param.LoOP`	Float	`0.0`	Lowest value that the controller can output.
`Param.LoSP`	Float	`0.0`	Lowest value that the controller accepts as setpoint.
`Param.LoopModeNormal`	String	`A,M`	Specifies the normal loop operating mode of the lead lag controller (separated by a comma): • `A`: Automatic • `M`: Manual
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.NumFormatOP`	String	`0.0`	Specifies the display format of the *OP* variable. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	`0`	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for Split Range Controllers

No state alarm is configured by default for the *$LeadLagCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

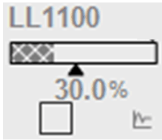
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$LeadLagCE* master template to display data of lead lag controllers during operation.

Name	Graphic symbol	Description
`Bar_Hor_SP_OP`		In addition to icons, displays (from top to bottom): • The label. • A horizontal bar graph showing the setpoint and the output. • The output value with engineering units.
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

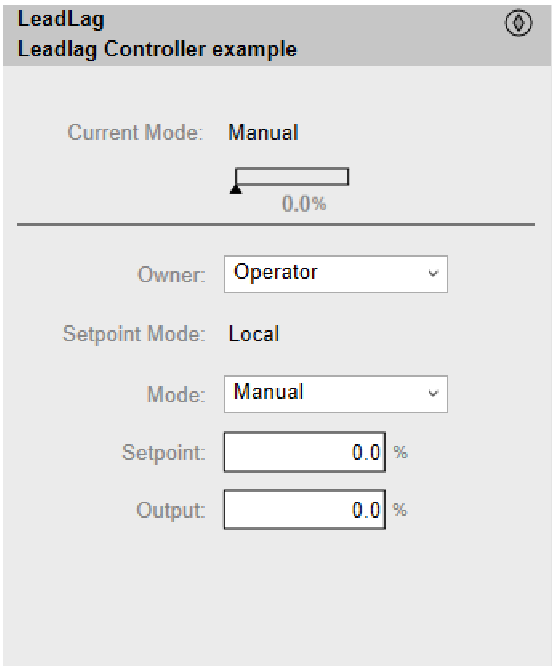
During operation, clicking a lead lag controller symbol opens a faceplate with the following tabs:

- Tabs for core functions:
  - Operation
  - Engineering
  - Alarms, page 64
- Tabs for optional functions, which appear only if configured:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

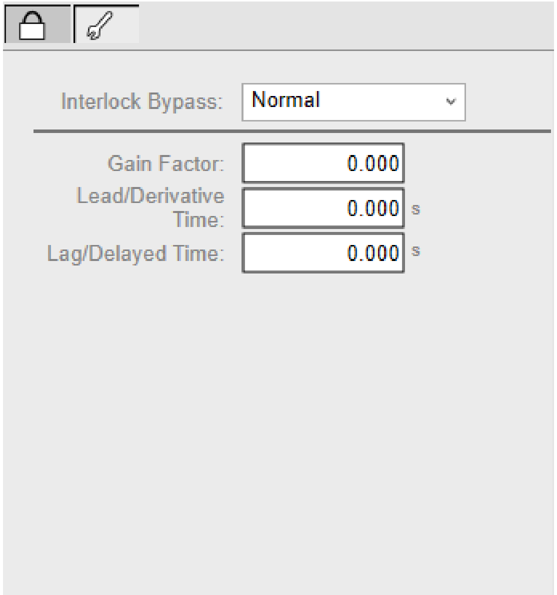
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$PIDCE: PID Controllers

What's in This Chapter

Overview

This chapter describes the *$PIDCE* master template, which contains supervision resources to monitor and operate PIDFF regulators with monitoring interface.

Supervision Functions

Description

The PID controller supervision functions help you to monitor and control a PIDFF-type controller by providing the operating modes used in the other resources for process control.

The *$PIDCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Owner selection
  - PID operation monitoring
  - PID mode selection
  - Tuning
  - Forward/reverse action
  - Formula management
  - Global bypassing of interlock conditions
- Optional functions:
  - Individual interlock condition management

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$PIDCE* master template attributes.

Parameter	Type	Initial value	Description
Param.EngUnits	String	%	Unit of present value (PV) and setpoint (SP)
Param.EngUnitsOP	String	%	Unit of output value (OP)
Param.HiOP	Float	100.0	High limit for output value (OP)
Param.HiPV	Float	100.0	High limit for present value (PV)
Param.LoOP	Float	0.0	Low limit for output value (OP)
Param.LoPV	Float	0.0	Low limit for present value (PV)
Param. LoopModeNormal	String	A,M	Specifies the loop normal modes (separated by a comma): • A: Auto, regardless it is in Override mode (external output) or not • M: Manual
Param.ModeNormal	String	O,P,C	Specifies the normal owner modes (separated by a comma): • O: Operator • P: Program • C: Cascade For example P,C.
Param.NumFormat	String	0.0	Specifies the displaying format of present value (PV). For example, enter 0.00 for 2 decimals.
Param. NumFormatOP	String	0.0	Specifies the displaying format of output value (OP). For example, enter 0.00 for 2 decimals.
Param. TrendPeriodMin	Integer	0	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for PIDs

No state alarm is configured by default for the *$PIDCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The symbols that are included in the *$PIDCE* master template to display data of PIDFF regulators with monitoring interface during operation are the same as those of the *$IMCTLCE* master template, page 196.

Faceplates

Overview

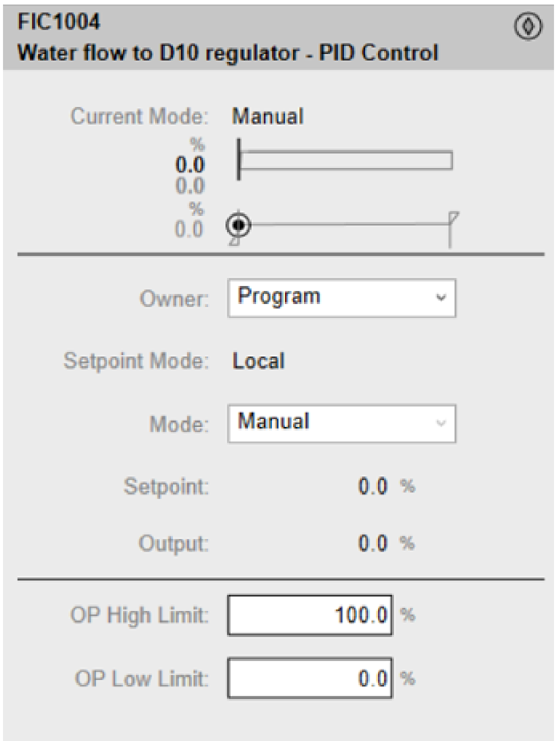
During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

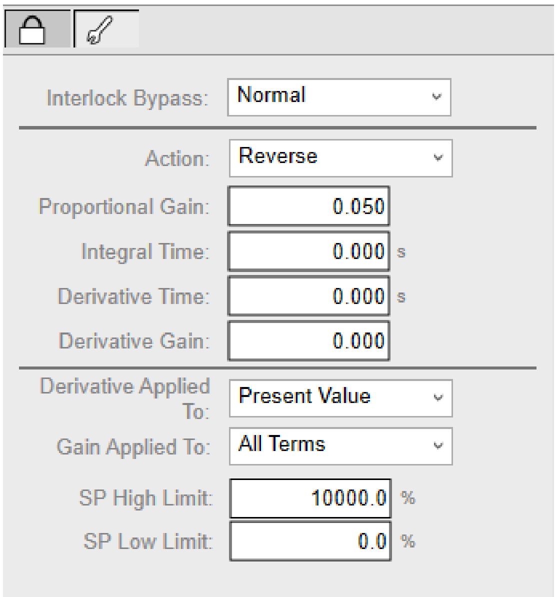
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$PWMCtlCE: Pulse-Width Modulation Controllers

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of pulse-width modulation controllers.

Supervision Functions

Description

Core and optional resources provide the following monitoring and operation functions:

- Main core functions encompass status monitoring, owner selection, PWM activation, setpoint management (PWM configuration), and global bypassing of interlock conditions.
- Optional functions encompass individual interlock condition management.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.EngUnits`	String	`%`	Unit of the setpoint value
`Param.HiSP`	Float	100.0	High limit for the setpoint value
`Param.LoSP`	Float	0.0	Low limit for the setpoint value

Parameter	Type	Default	Description
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of values. For example, enter `0.00` for 2 decimal.

Default State Alarms

State Alarms for Pulse-Width Modulation Controllers

No state alarm is configured by default for the *$PWMCtlCE*

NOTE: You can modify the configuration from the **Attributes** page.

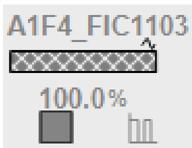
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the pulse-width modulation controllers:

Name	Graphic symbol	Description
`Bar_Horiz_SP`		Horizontal bar with setpoint value (`SP`)
`Label`	PSxLabel	Displays the **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Overview

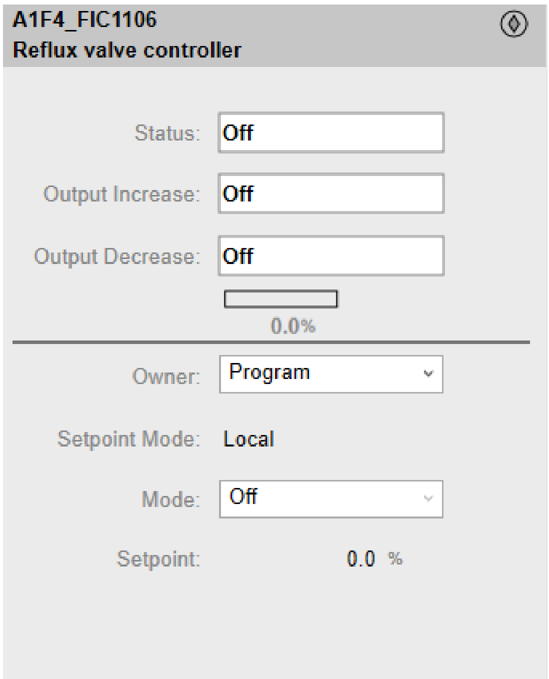
During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

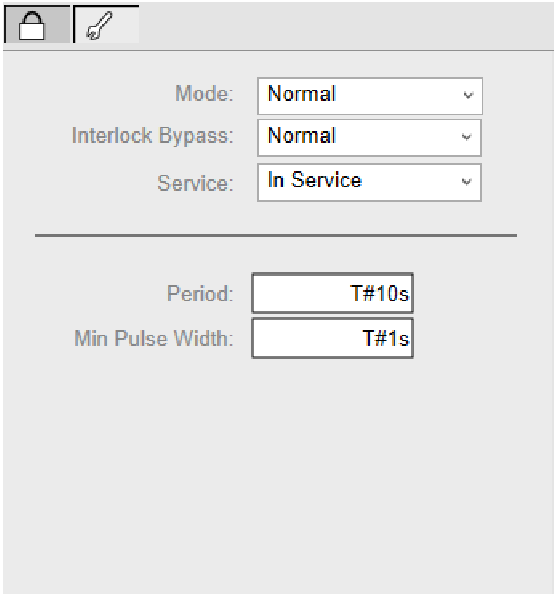
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the PWM configuration data:

- Period in seconds.
- Minimum pulse width in seconds.

$RampCE: Ramps

What’s in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of ramps.

Supervision Functions

Description

Core resources provide the following monitoring and operation functions: Status monitoring, owner selection, and setpoint management (ramp activation and configuration).

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.EngUnits`	String	`%`	Unit of the setpoint value
`Param.HiSP`	Float	100.0	High limit for the setpoint value
`Param.LoSP`	Float	0.0	Low limit for the setpoint value
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of values. For example, enter `0.00` for 2 decimal.

Default State Alarms

State Alarms for Ramp Management

No state alarm is configured by default for the *$RampCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

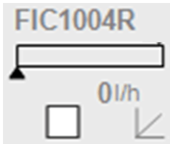
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the ramps:

Name	Graphic symbol	Description
`Bar_Horiz_SP_Target`		Horizontal bar with setpoint (`SP`)
`Label`	PSxLabel	Displays **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

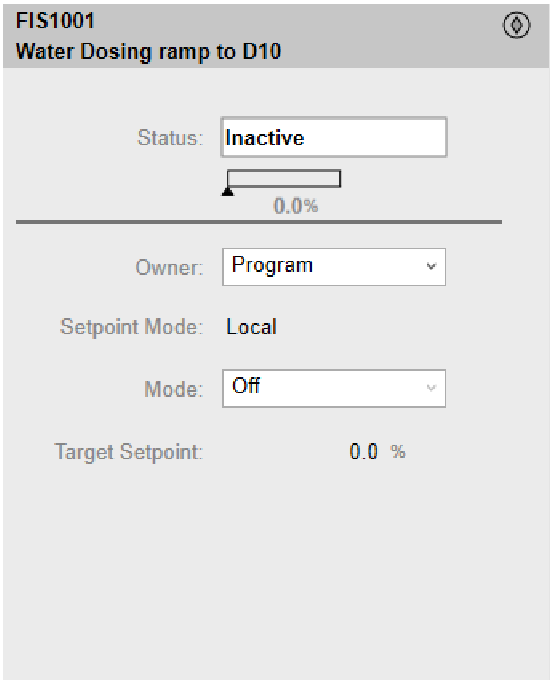
Overview

During operation, clicking the graphic symbol allows you to display a faceplate with the following tabs:

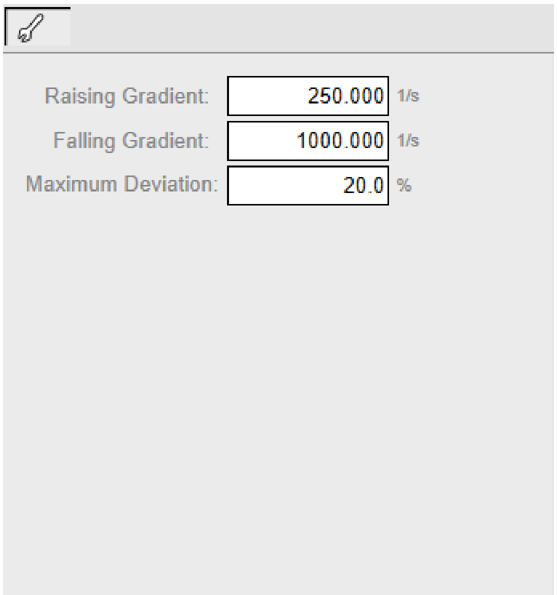
- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab



Engineering Tab



$RatioCtrlCE: Ratio Controllers

What's in This Chapter

Overview

This chapter describes the *$RatioCtrlCE* master template, which contains supervision resources to monitor and operate ratio controllers.

Supervision Functions

Description

The *$RatioCtrlCE* master template provides the following monitoring and operation core functions:

- Status monitoring.
- Owner selection.
- Setpoint management: Ratio configuration.
- Ratio operation indication.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$RatioCtrlCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Defines the unit of attributes.
`Param.HiPV`	Float	`100.0`	Highest value that the controller accepts as setpoint.
`Param.LoPV`	Float	`0.0`	Lowest value that the controller accepts as setpoint.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma):

Name	Data type	Initial value	Description
			• `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.00`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	`0`	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for Ratio Controller

No state alarm is configured by default for the *$RatioCtrlCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

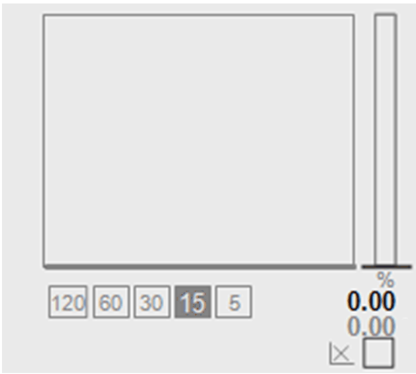
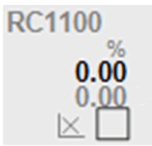
Present and Output Value Description

Ratio controller symbols display the following values:

- Present value: Current value of the variable that is controlled by the ration controller.
- Output value: Output *OP* generated by the controller based on the measurement and the configured ratio, page 218. *OP = (K) * PV_TRACK + BIAS* where *(K)* is the local ratio.

Symbol Description

The table describes the symbols that are included in the *$RatioCtrlCE* master template to display data of ratio controllers during operation.

Name	Graphic symbol	Description
`Bar_Hor_PV_SP`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The output value. • The trend client icon. • States, shown in a square, page 45. • To the right, a horizontal bar showing the setpoint and the present value.
`Bar_Vert_PV_SP`		In addition to icons, displays (from top to bottom): • The label. • A vertical bar showing the setpoint and the present value. • Engineering units. • The present value. • The output value. • The trend client icon. • States, shown in a square, page 45.
`Bar_Vert_PV_SP_Trend`		Displays in addition to data of *Bar_Vert_PV_SP*, a trend panel with configurable trend period in minutes. Refer to the description of the *Param.TrendPeriodMin* parameter.
`Display_PV_SP`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The output value. • The trend client icon. • States, shown in a square, page 45.
`Label`	PSxLabel	Displays **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

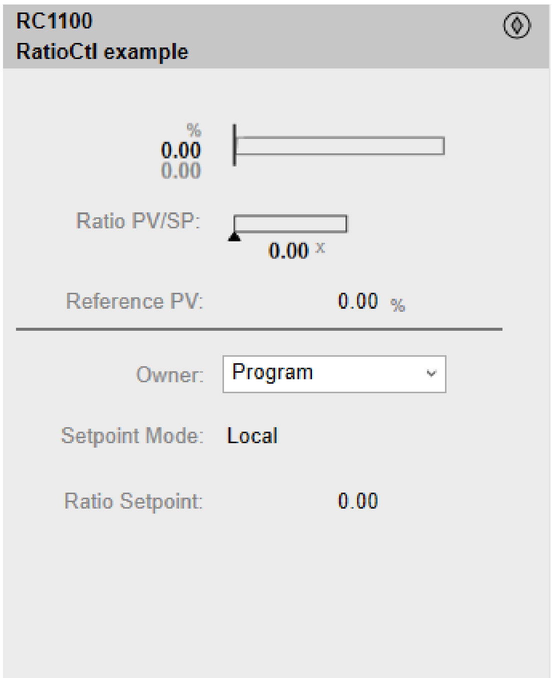
During operation, clicking a ratio controller symbol opens a faceplate with the following tabs:

- Operation
- Engineering
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the **Operation** tab.

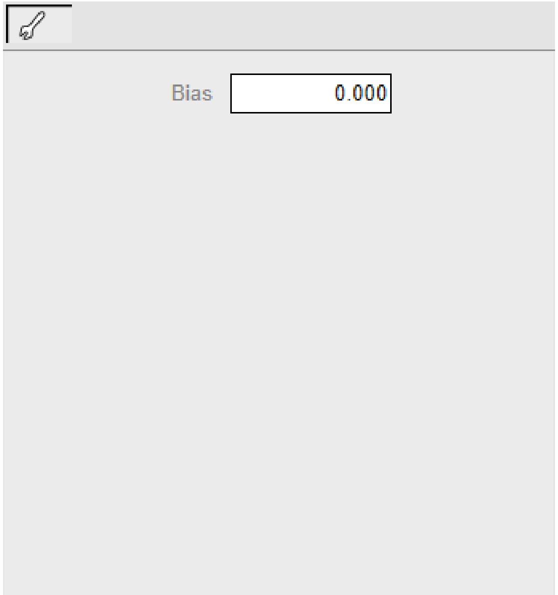


Ratio setpoint value: Ratio coefficient for the ration between the generated output and the measurement that is being applied according to the current operating mode.

Present value ratio: Actual ration coefficient generated by the ratio controller. Actual ratio *KAct = (PV - BIAS)/PV_TRACK*.

Engineering Tab

The figure shows an example of the **Engineering** tab.



$SplitRangeCE: Split Range Controllers

What's in This Chapter

Overview

This chapter describes the *$SplitRangeCE* master template, which contains supervision resources to monitor and operate split range controllers.

Supervision Functions

Description

The *$SplitRangeCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Status monitoring.
  - Owner selection.
  - Operating mode.
  - Setpoint management: Split range configuration.
  - Global bypassing of interlock conditions.
- Optional functions:
  - Viewing, bypassing, and resetting of individual interlock conditions.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$SplitRangeCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Defines the unit of inputs and parameters.
`Param.HiOP`	Float	`100.0`	Highest value that the controller can output.
`Param.HiSP`	Float	`100.0`	Highest value that the controller accepts as setpoint.
`Param.LoOP`	Float	`0.0`	Lowest value that the controller can output.
`Param.LoSP`	Float	`0.0`	Lowest value that the controller accepts as setpoint.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	`0`	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for Split Range Controllers

No state alarm is configured by default for the *$SplitRangeCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

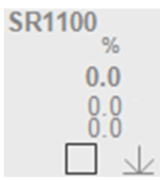
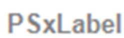
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$SplitRangeCE* master template to display data of split range controllers during operation.

Name	Graphic symbol	Description
`Numeric_SP_OP1_OP2_Sates`		The symbol displays (from top to bottom): • The label. • Engineering units. • The setpoint. • Output 1. • Output 2. • States.
`Label`		Displays **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

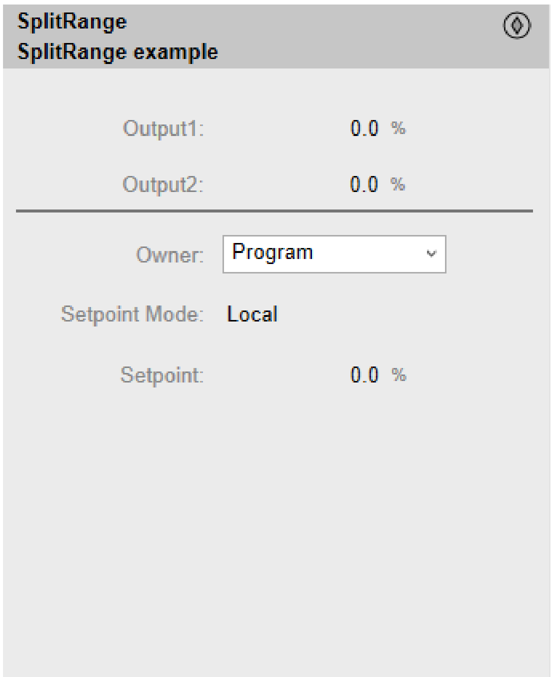
During operation, clicking a split range controller symbol opens a faceplate with the following tabs:

- Tabs for core functions:
  - Operation
  - Engineering
  - Alarms, page 64
- Tabs for optional functions, which appear only if configured:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

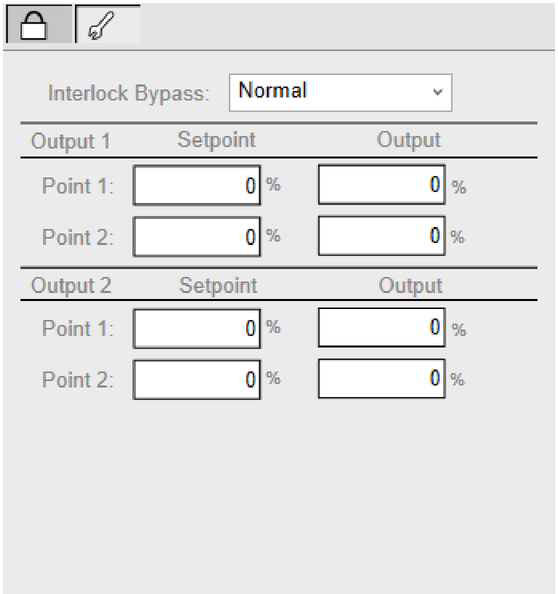
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$Step3CtlCE: Three-Step Controllers/Positioners

What's in This Chapter

Overview

This chapter describes the *$Step3CtlCE* master template, which contains supervision resources to monitor and operate three-step controllers/positioners.

Supervision Functions

Description

The *$Step3CtlCE* master template provides the following monitoring and operation functions:

- Core functions:
  - Status monitoring.
  - Owner selection.
  - Setpoint mode selection.
  - Controller operation indication.
  - Global bypassing of interlock conditions.
- Optional functions:
  - Viewing, bypassing, and resetting of individual interlock conditions.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$Step3CtlCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Indicates the unit of attributes
`Param.HiPV`	Float	`100.0`	Highest value that the controller accepts as setpoint.
`Param.LoPV`	Float	`0.0`	Lowest value that the controller accepts as setpoint.
`Param.ModeNormal`	String	`O,P,C`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program • `C`: Cascade For example `P,C`.
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.TrendPeriodMin`	Integer	`0`	Refer to the description of this parameter that is documented for *$AnalogInputCE*.

Default State Alarms

State Alarms for Three-Step Controller

No state alarm is configured by default for the *$Step3CtlCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

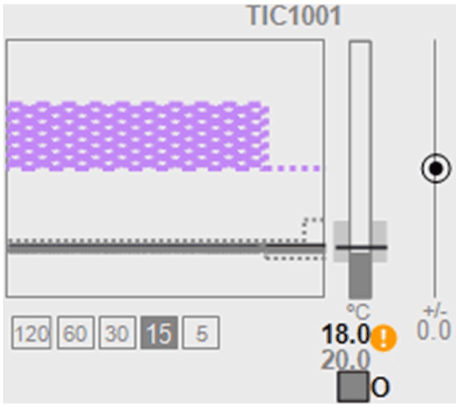
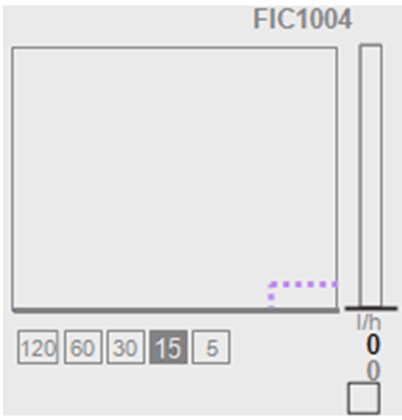
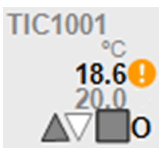
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$Step3CtlCE* master template to display data of three-step controllers/positioners during operation.

Name	Graphic symbol	Description
`Bar_Horiz_PV_SP_States`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The setpoint value. • States. • To the right, a horizontal bar showing the setpoint and the present value.
`Bar_Vert_PV_SP_OP_States_Trend`		Displays in addition to data of `Bar_Vert_PV_SP_States_Trend`, a vertical line showing the output.
`Bar_Vert_PV_SP_States`		In addition to icons, displays (from top to bottom): • The label. • A vertical bar showing the setpoint and the present value. • Engineering units. • The present value. • The setpoint value. • States.
`Bar_Vert_PV_SP_States_Trend`		Displays in addition to data of *Bar_Vert_PV_SP_States*, a trend panel with configurable trend period in minutes. Refer to the description of the *Param.TrendPeriodMin* parameter.
`Numeric_PV_SP_States`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • The setpoint value. • States.

Name	Graphic symbol	Description
`Numeric_PV_States`		In addition to icons, displays (from top to bottom): • The label. • Engineering units. • The present value. • States.
`Label`		Displays **ObjectTagName**, **StaticText** and **CustomPropertyLabel**.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

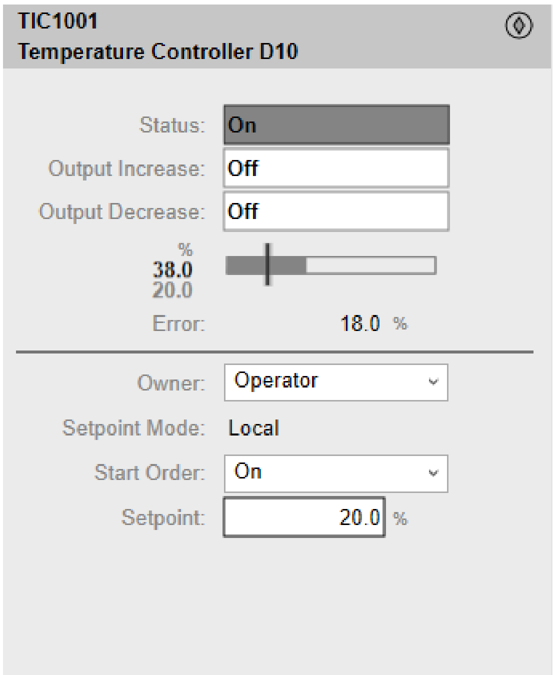
During operation, clicking a three-step controller/positioner symbol opens a faceplate with the following tabs:

- Tabs for core functions:
  - Operation
  - Engineering
  - Alarms, page 64
- Tabs for optional functions, which appear only if configured:
  - Interlocks, page 56

NOTE: The master template also features the trends faceplate.

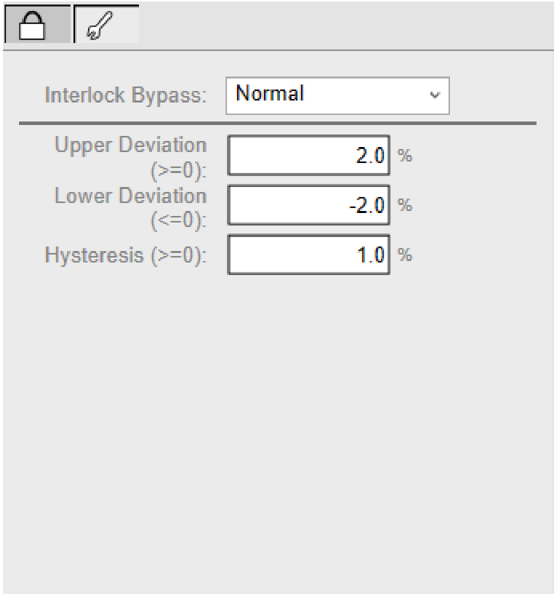
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Interlock Bypass** menu, which allows bypassing interlocks globally.

When the control module is reset, the current setpoint that is shown in the operation tab of the faceplate is effective.

Bypassing interlocks by selecting **Bypass** underlies a security classification, page 79. The default configuration is *verified write*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

Sequential Control

What’s in This Part

Overview

This part describes the master templates that provide the supervision functions for sequential control. It also describes the template-specific configuration pages of the ArchestrA IDE object editor.

$SequenceCE: Sequential Control Functions

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for Sequential Control.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Description

Introduction

This object is used for monitoring sequences based on the ISA-S88.01-1995 standard for batch control.

Supervision Functions

The table describes the main functions for sequential control management:

Function	Description
State management	Shows the status of the sequence.
Owner selection	Allows you to configure whether the sequence commands come from the program or the operator.
Operating mode	Allows you to operate the sequence in automatic/semi-automatic or manual mode.
Command management	Allows you to send commands (such as *Start* and *Stop*) to the sequence.
Parameter management	Allows you to select a strategy, enter input parameter values, and monitor output values.
Initial condition management	Optional function that allows you to manage initial conditions that are not satisfied and that block the start of the sequence.
Diagnostic information management	Optional function that allows you to manage abnormal conditions detected by the sequence.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. User can modify the values in the derived application template or in its instances. User can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allows user to configure core functions.

NOTE: You can configure optional functions from the template-specific configuration pages, page 241.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.Data1.Desc`	String		`Data1` description (only displayed in the `PanelAll` symbol).
`Param.Data1.Format`	String	`0.00`	Specifies the displaying format of the `Data1` value. For example, enter `0.00` for 2 decimal **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data1.PV`	Float	0.0	`Data1` value attribute. **NOTE:** To display the `Data1` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data1.PV` (for example `Me.SeqPar.OP01.OP.PV` for displaying the output parameter 1).
`Param.Data2.Desc`	String		`Data2` description (only displayed in the `PanelAll` symbol).

Parameter	Type	Default	Description
`Param.Data2.Format`	String	`0.00`	Specifies the displaying format of the `Data2` value. For example, enter `0.00` for 2 decimal **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data2.PV`	Float	0.0	`Data2` value attribute. **NOTE:** To display the `Data2` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data2.PV` (for example `Me.SeqPar.OP02.OP.PV` for displaying the output parameter 2).
`Param.HideAbortButton`	Bool	False	If true, the **Abort** button is not displayed. If false, the **Abort** button is displayed.
`Param.HideHoldButton`	Bool	False	If true, the **Hold** button is not displayed. If false, the **Hold** button is displayed.
`Param.HidePauseButton`	Bool	False	If true, the **Pause** button is not displayed. If false, the **Pause** button is displayed.
`Param.HideResetButton`	Bool	False	If true, the **Reset** button is not displayed. If false, the **Reset** button is displayed.
`Param.HideRestartButton`	Bool	False	If true, the **Restart** button is not displayed. If false, the **Restart** button is displayed.
`Param.HideStartButton`	Bool	False	If true, the **Start** button is not displayed. If false, the **Start** button is displayed.
`Param.HideStopButton`	Bool	False	If true, the **Stop** button is not displayed. If false, the **Stop** button is displayed.
`Param.ModeNormal`	String	`O,P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program

Default State Alarms

State Alarms for Sequential Control

The table indicates for which attributes a state alarm is configured in the *$SequenceCE* master template and provides the default values.

Attribute	Alarm message	Priority
AO.Failure	*Failure condition triggered during execution*	999

NOTE: You can modify the configuration from the **Attributes** page.

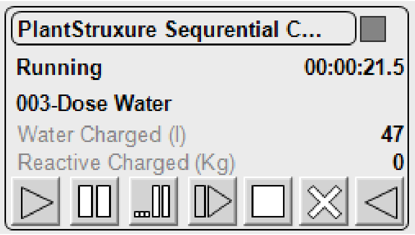
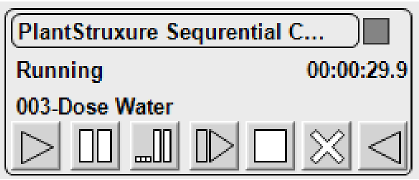
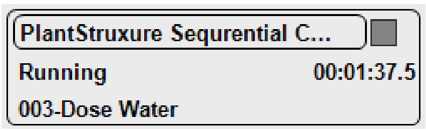
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the sequential control:

Name	Graphic symbol	Description
`PanelAll`		The symbol displays: • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons. • Two configurable data (*Data1* and *Data2*).
`PanelWithButtons`		The symbol displays: • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons
`PanelState`		The symbol displays: • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step.

Faceplates

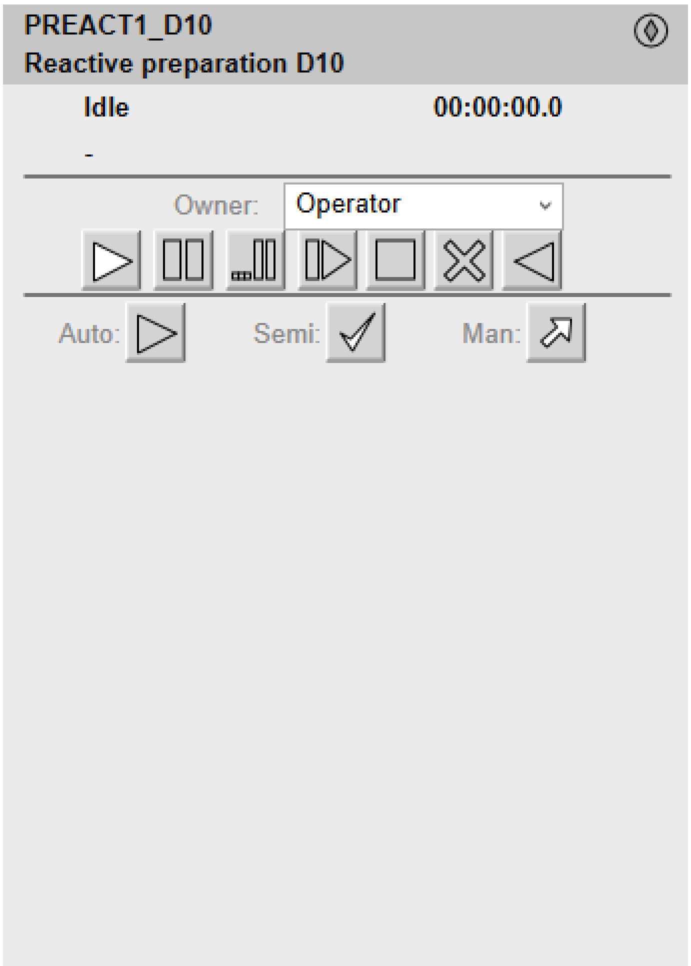
Overview

During operation, clicking a sequential control graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Parameters (input and output parameters)
  - State machine
  - Alarms, page 64
- Optional tabs:
  - Initial Conditions, page 56
  - Failures, page 59

Operation Tab in Automatic Mode

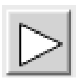
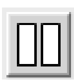
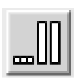
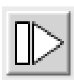
This figure shows the **Operation** tab when **Operator** and the **Auto** mode are selected.

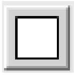
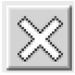
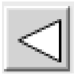


The sequence runs in automatic mode after clicking the **Start** button, and the bottom section of the faceplate displays:

- The step that is being executed and its number.
- The transition to the next step:
  - *Passive* Galaxy style, page 44: The condition is not yet fulfilled.
  - *Active* Galaxy style: The condition is true.
- The next step to be executed when the current step is completed and the transition is true.

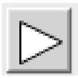
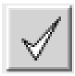
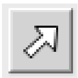
This table describes the command that corresponds to each button on the **Operation** tab.

Button	Command
	Start
	Hold
	Pause
	Restart/resume

Button	Command
	Stop
	Abort
	Reset

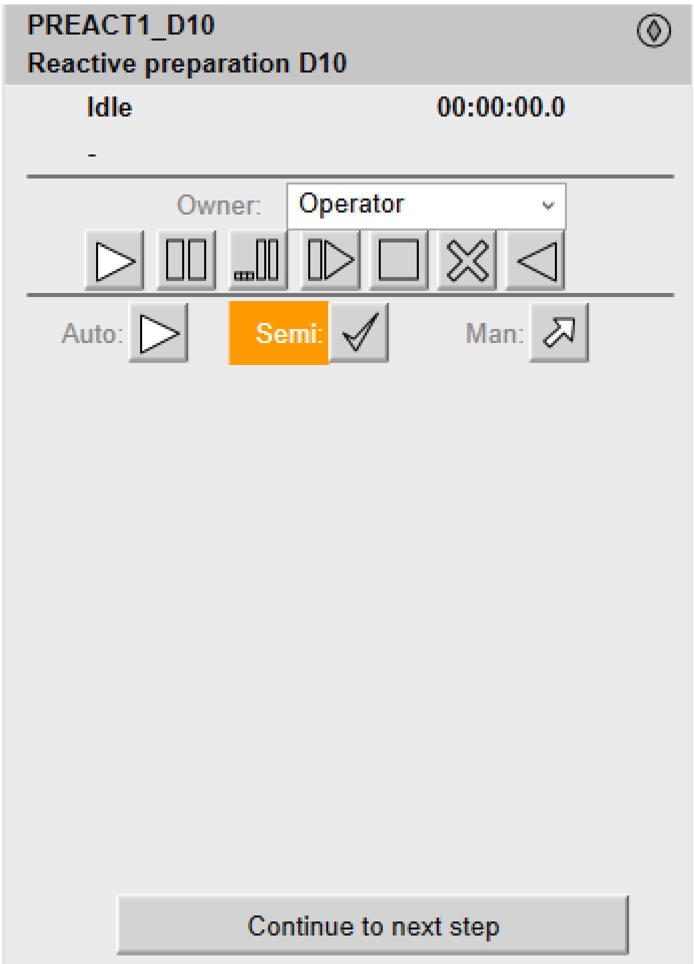
NOTE: Only buttons that correspond to available commands are active (*Active* Galaxy style, page 44). Unavailable commands are displayed with the *Passive* Galaxy style.

This table describes the mode that corresponds to each button on the **Operation** tab.

Button	Mode	Description
	Auto	Normal execution
	Semi	Asks for confirmation before transitioning
	Man	Allows you to select the step to execute

Operation Tab in Semi-Automatic Mode

This figure shows the **Operation** tab when **Operator** and the **Semi** mode are selected.

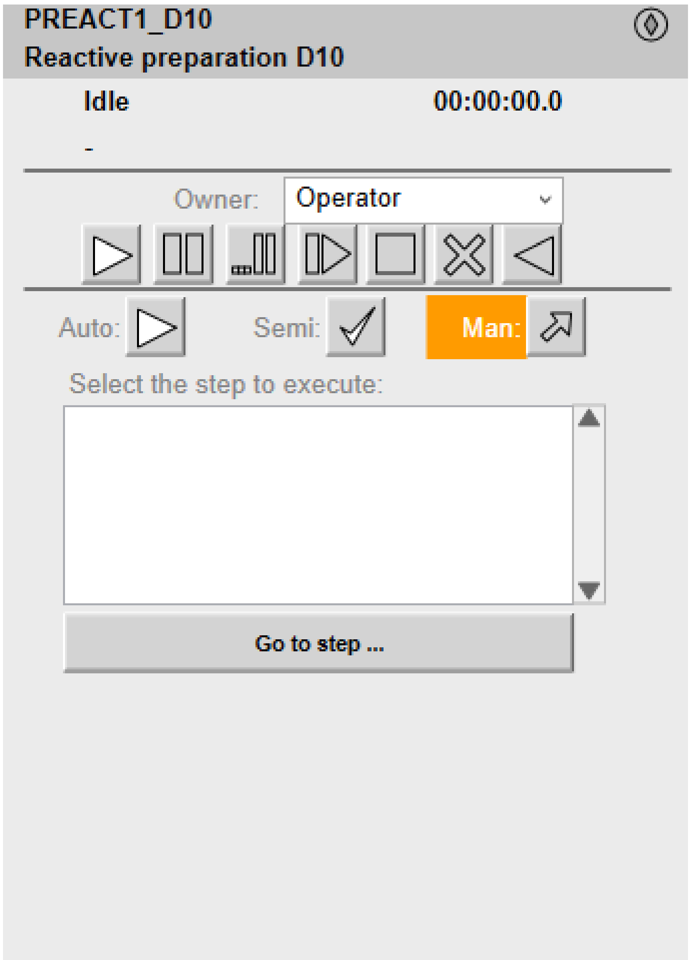


The sequence starts in semi-automatic mode after clicking the **Start** button, and the bottom section of the faceplate displays:

- The step that is being executed and its number.
- The transition to the next step:
  - Passive style: The condition is not yet fulfilled
  - Active style: The condition is true.
- The next step to be executed.
- A **Continue to Next Step** button requiring the operator to confirm the execution of the next step when the transition is true.

Operation Tab in Manual Mode

This figure shows the **Operation** tab when **Operator** and the **Man** mode are selected.



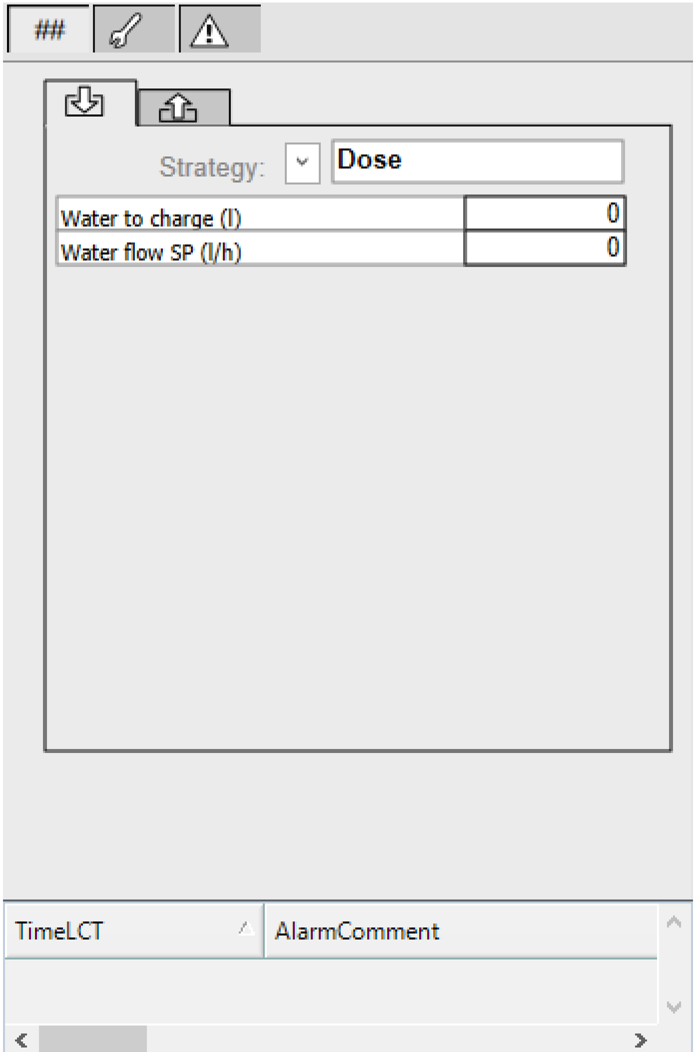
The sequence starts in manual mode after clicking the **Start** button. The bottom section of the faceplate displays:

- The steps of the sequence that are programmed in the **Running** state.
- A **Go To Step** button allowing to execute the step selected in the **Select the Step to execute** list.

You can scroll up and down (in six-step increments) through the list of steps by using the two arrow buttons.

Input/Ouput Parameters Tab

This figure shows the **Parameters** tab when the **Input Parameters** subtab is selected

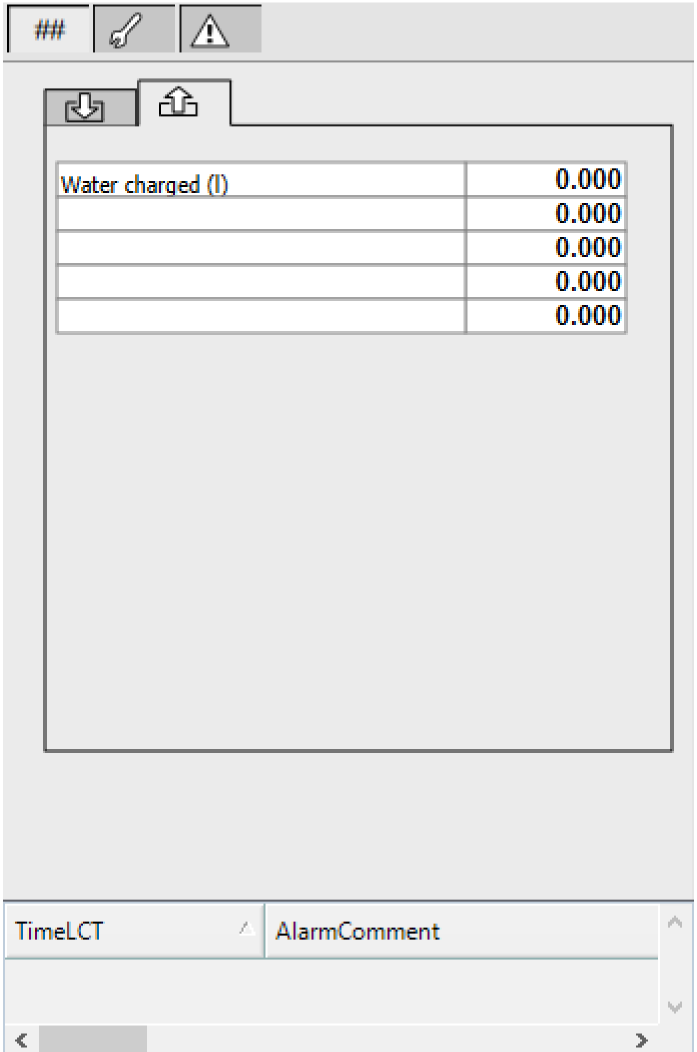


You can select a strategy from the ones that have been defined and enter the corresponding values for enabled parameters.

Parameters that do not pertain to the selected strategy are disabled.

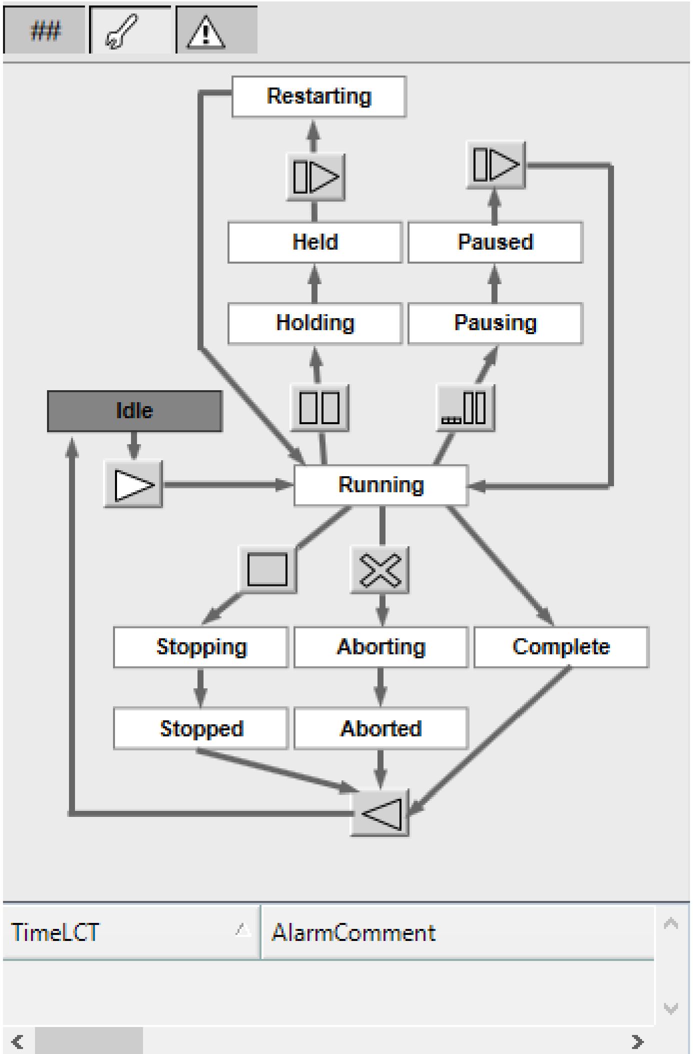
NOTE: The parameters can be only modified when the sequence is in **Idle** state.

This figure shows the **Parameters** tab when the **Output Parameters** subtab is selected.



Displays the values of output parameters, which are calculated while the sequence is executed.

State Machine Tab



The state diagram allows the operator to execute available commands by using the buttons.

Names of states appear in *Passive* style while the current state appears in *Active* style.

> **NOTE:** Only buttons that correspond to available commands are active (*Active* style). Unavailable commands are displayed with the *Passive* style.

Sequential Control Object Configuration Pages

What's in This Chapter

Overview

This chapter describes the default configuration of pages for sequential control objects.

They allow you to configure optional supervision functions of process application templates and their instances.

The default security classification to modify references is *Configure*.

Main Page Default Configuration

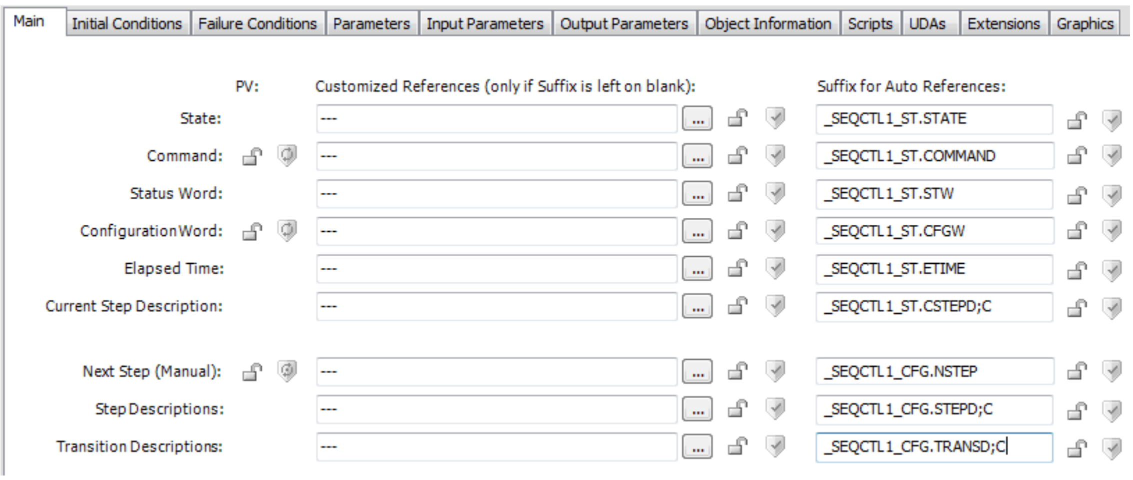
Overview

The **Main** page is used to modify the variable references used by the sequential control object.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of sequential control management, refer to the chapter documenting master template of the sequential control.

Main Page Description



Element	Default variable reference with suffix for auto-referencing
State	`<Instance name>_SEQCTL1_ST.STATE`.
Command	`<Instance name>_SEQCTL1_ST.COMMAND`. The default security classification is *Operate*.
Status Word	`<Instance name>_SEQCTL1_ST.STW`.

Element	Default variable reference with suffix for auto-referencing
Configuration Word	`<Instance name>_SEQCTL1_ST.CFGW`. The default security classification is *Operate*.
Elapsed Time	`<Instance name>_SEQCTL1_ST.ETIME`.
Current Step Description	`<Instance name>_SEQCTL1_ST.CSTEPD;C`.
Next Step (Manual)	`<Instance name>_SEQCTL1_CFG.NSTEP`. The default security classification is *Secured Write*.
Step Descriptions	`<Instance name>_SEQCTL1_CFG.STEPD;C`.
Transition Descriptions	`<Instance name>_SEQCTL1_CFG.TRANSD;C`.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Initial Conditions Page Default Configuration

Overview

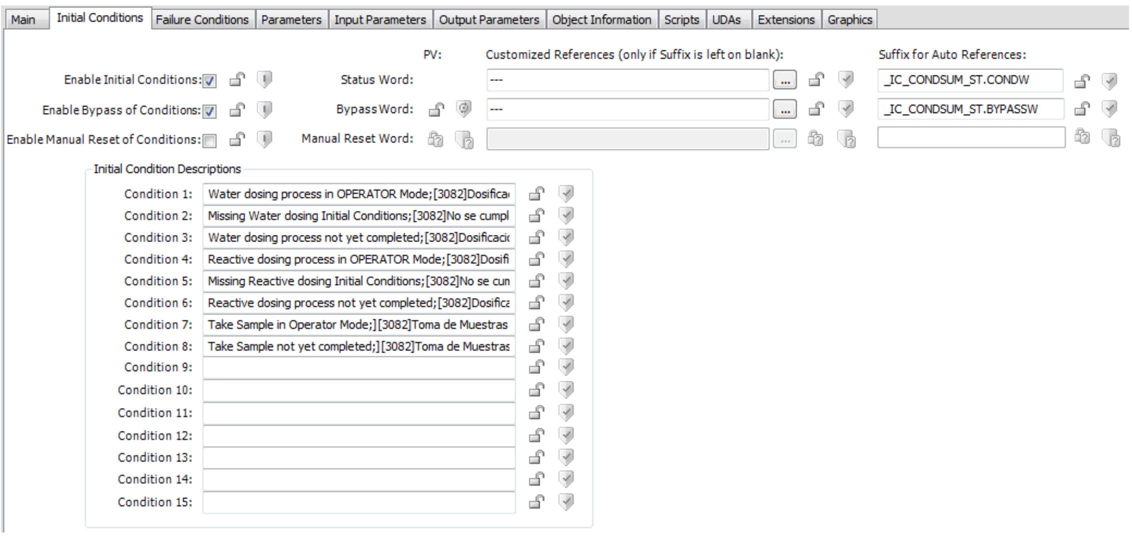
Depending on the configuration of the corresponding control resource, the **Initial Conditions** page is used to:

- Enable or disable initial conditions and define the initial condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of initial conditions.
  - Enable or disable the manual resetting of initial conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of initial conditions, refer to the chapter documenting master template of the Sequential control.

Initial Conditions Page Description



Element	Description
Enable Initial Conditions	Select this check box to enable initial condition management. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.CONDW`. The default security classification is *Free Access*.
Enable Bypass of Conditions	Select this check box to enable bypass of conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.BYPASSW`. The default security classification is *Free Access* to enable the bypassing function and *Secured Write* to bypass conditions during operation.
Enable Manual Reset of Conditions	Select this check box to enable the manual resetting of conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.REARMREQW`. The default security classification is *Free Access* to enable the manual reset function and *Secured Write* to reset conditions during operation.
Initial Condition Description	Enter the initial condition descriptions (up to 15). The default security classification is *Configure*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Failure Conditions Page Default Configuration

Overview

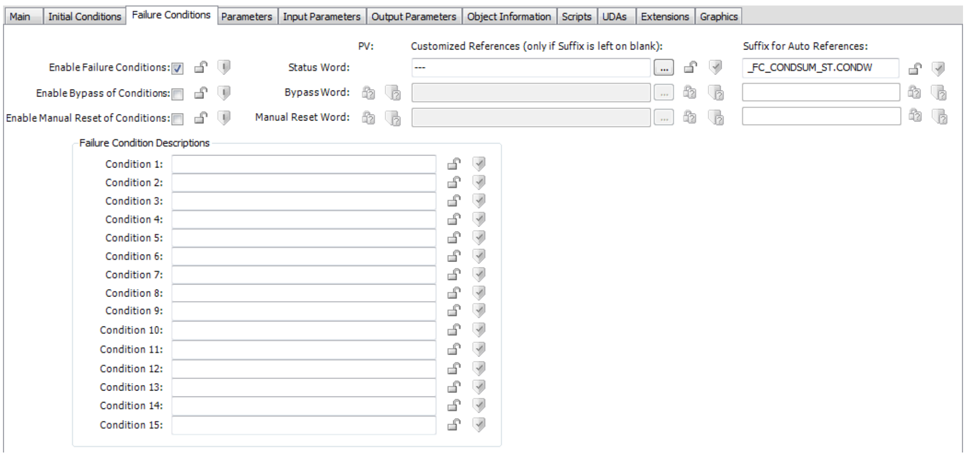
Depending on the configuration of the corresponding control resource, the **Failure Conditions** page is used to:

- Enable or disable monitoring of detected failure conditions and define the detected failure condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of detected failure conditions.
  - Enable or disable the manual resetting of detected failure conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of detected failure condition management, refer to the chapter documenting master template of the sequential control.

Failure Conditions Page Description



Element	Description
Enable Failure Conditions	Select this check box to enable the management of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.CONDW`. The default security classification is *Free Access*.
Enable Bypass of Conditions	Select this check box to enable bypass of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.BYPASSW`. The default security classification is *Free Access* to enable the bypassing function and *Secured Write* to bypass conditions during operation.
Enable Manual Reset of Conditions	Select this check box to enable the manual resetting of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.REARMREQW`. The default security classification is *Free Access* to enable the manual reset function and *Secured Write* to reset conditions during operation.
Failure Condition Descriptions	Enter the condition descriptions (up to 15). The default security classification is *Free Access*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Parameters Page Default Configuration

Overview

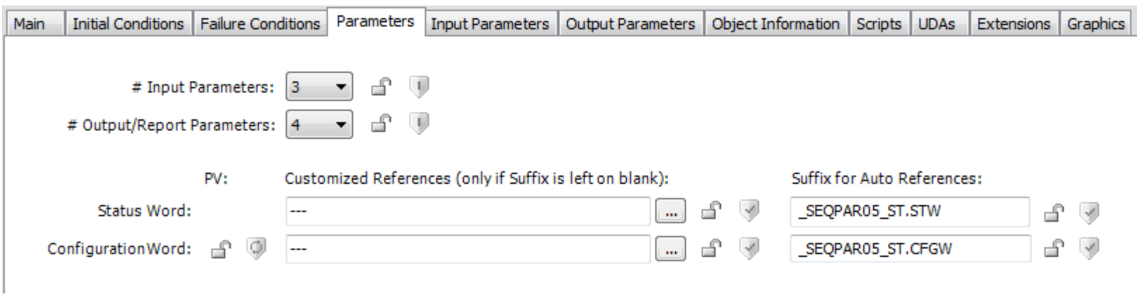
Depending on the configuration of the corresponding control resource, the **Parameters** page is used to:

- Define the number of input parameters.
- Define the number of output parameters.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of parameters for sequential control, refer to the chapter documenting master template of the sequential control.

Parameters Page Description



Element	Description
# Input Parameters	Select the number of input parameters from the drop-down list (up to 16). The default security classification is *Free Access*.
# Output/Report Parameters	Select the number of output and report parameters from the drop-down list (up to 16). The default security classification is *Free Access*.
Status Word	Status word; by default the variable reference with suffix for auto-referencing is <Instance name>_SEQPARxx_ST.STW(1)).
Configuration Word	Status word; by default the variable reference with suffix for auto-referencing is <Instance name>_SEQPARxx_ST.CFGW(1)). The default security classification is *Operate*.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.
(1) xx = 05, 10, or 16 according to the number of parameters.	

By combining the number of input and output parameters (the higher one), the object automatically selects the control block for the parameters being used at the control level (no parameters, *SEQPAR05*, *SEQPAR10*, or *SEQPAR16*).

Input Parameters Page Default Configuration

Overview

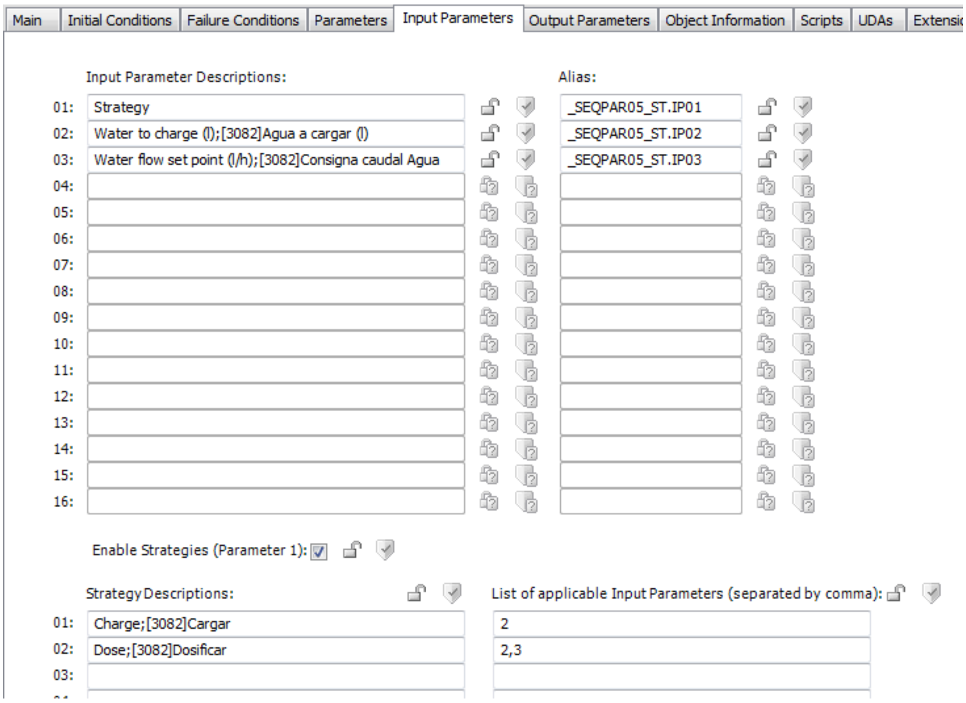
Depending on the configuration of the corresponding control resource, the **Input Parameters** page is used to:

- Define input parameter descriptions.
- Enable or disable strategies for the input parameters.
- Configure the strategies when enabled.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of input parameters for sequential control, refer to the chapter documenting master template of the sequential control.

Input Parameters Page Description



Element	Description
Input Parameter Descriptions	Enter the input parameter descriptions. The number of parameters depends of the configuration made in the parameter tab, page 244. The default variable reference (**Alias**) is `<Instance name>_SEQPAR16_ST.IP01`...`<Instance name>_SEQPAR16_ST.IP16`. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Enable Strategies (Parameter 1)	Select this check box to enable strategy management. **NOTE:** If the strategies are enabled, the parameter 1 is reserved for strategy management.
Strategy Descriptions	Enter the description of strategies (up to 8). **NOTE:** Descriptions can be entered in multiple languages, page 40.
List of applicable Input Parameters	Enter the input parameters applicable in each strategy separated by a comma. For example, if parameters 02 and 03 are applicable for the strategy, enter `2,3`.

NOTE: The default security classification of attributes of this page is *Operate*.

Output Parameters Page Default Configuration

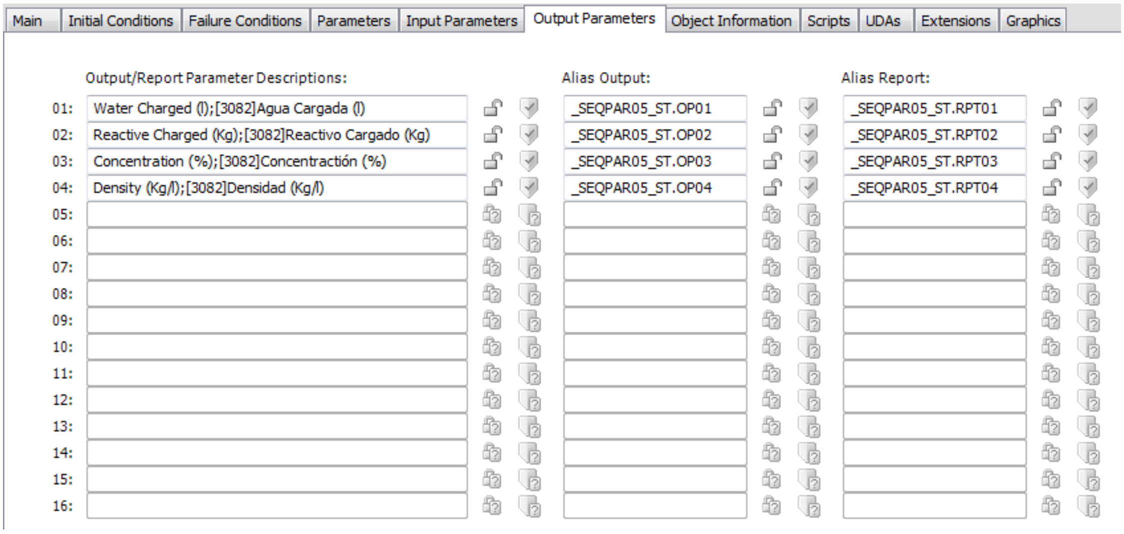
Overview

Depending on the configuration of the corresponding control resource, the **Output Parameters** page is used to define output and report parameter descriptions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of parameters for sequential control, refer to the chapter documenting master template of the sequential control.

Output Parameters Page Description



Element	Description
Output/Report Parameter Descriptions	Enter the output/report parameter descriptions. The number of parameters depends of the configuration made in the parameter tab, page 244. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Alias Output	The default variable reference is `<Instance name>_SEQPAR16_ST.OP01`...`<Instance name>_SEQPAR16_ST.OP16`.
Alias Report	The default variable reference is `<Instance name>_SEQPAR16_ST.RPT01`...`<Instance name>_SEQPAR16_ST.RPT16`.

NOTE: The default security classification of attributes of this page is *Operate*.

Batch Phase Manager

What’s in This Part

Overview

This part describes the master templates that provide the supervision functions for Batch phase manager. It also describes the template-specific configuration pages of the ArchestrA IDE object editor.

$PhaseCE: Batch Phase Functions

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for Batch phase.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠ WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Description

Introduction

This object is used for monitoring phases based on the ISA-S88.01-1995 standard for batch control.

Supervision Functions

The table describes the main functions for Batch phase management:

Function	Description
State management	Shows the status of the phase.
Owner selection	Allows user to configure whether the phase commands come from the program or the operator.
Operating mode	Allows user to operate the phase in automatic/semi-automatic or manual mode.
Command management	Allows user to send commands (such as *Start* and *Stop*) to the phase.
Parameter management	Allows user to select a strategy, enter input parameter values, and monitor output values.
Initial condition management	Optional function that allows user to manage initial conditions that are not satisfied and that block the start of the phase.
Diagnostic information management	Optional function that allows user to manage abnormal conditions detected by the phase.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. User can modify the values in the derived application template or in its instances. User can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allows user to configure core functions.

NOTE: User can configure optional functions from the template-specific configuration pages, page 241.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.Data1.Desc`	String		`Data1` description (only displayed in the `PanelAll` symbol).
`Param.Data1.Format`	String	`0.00`	Specifies the displaying format of the `Data1` value. For example, enter `0.00` for 2 decimal **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data1.PV`	Float	0.0	`Data1` value attribute. **NOTE:** To display the `Data1` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data1.PV` (for example `Me.IBPar.OP01.OP.PV` for displaying the output parameter 1).
`Param.Data2.Desc`	String		`Data2` description (only displayed in the `PanelAll` symbol).

Parameter	Type	Default	Description
`Param.Data2.Format`	String	`0.00`	Specifies the displaying format of the `Data2` value. For example, enter `0.00` for 2 decimal **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data2.PV`	Float	0.0	`Data2` value attribute. **NOTE:** To display the `Data2` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data2.PV` (for example `Me.IBPar.OP02.OP.PV` for displaying the output parameter 2).
`Param.HideAbortButton`	Bool	False	If true, the **Abort** button is not displayed. If false, the **Abort** button is displayed.
`Param.HideHoldButton`	Bool	False	If true, the **Hold** button is not displayed. If false, the **Hold** button is displayed.
`Param.HidePauseButton`	Bool	False	If true, the **Pause** button is not displayed. If false, the **Pause** button is displayed.
`Param.HideResetButton`	Bool	False	If true, the **Reset** button is not displayed. If false, the **Reset** button is displayed.
`Param.HideRestartButton`	Bool	False	If true, the **Restart** button is not displayed. If false, the **Restart** button is displayed.
`Param.HideStartButton`	Bool	False	If true, the **Start** button is not displayed. If false, the **Start** button is displayed.
`Param.HideStopButton`	Bool	False	If true, the **Stop** button is not displayed. If false, the **Stop** button is displayed.
`Param.ModeNormal`	String	`O,P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program

Default State Alarms

State Alarms for Batch Phase

The table indicates for which attributes a state alarm is configured in the *$PhaseCE* master template and provides the default values.

Attribute	Alarm message	Priority
AO.Failure	*Failure condition triggered during execution*	999

NOTE: User can modify the configuration from the **Attributes** page.

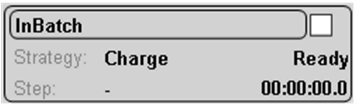
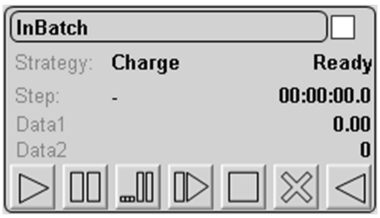
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the InBatch:

Name	Graphic symbol	Description
`PanelState`		The symbol displays: • The current state of the phase. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step.
`PanelWithButtons`		The symbol displays: • The current state of the phase. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons
`PanelAll`		The symbol displays: • The current state of the phase. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons. • Two configurable data (*Data1* and *Data2*).
`ControlButtons`		User configurable control buttons. **NOTE:** Control buttons will be enabled only if the phase is started in operator owner (during program owner operation, control buttons are disabled). Control buttons will be disabled if phase state is *READY* or *INTERLOCKED*.

NOTE:

- The display area for the descriptions of State, Strategy and Step is limited, however, since they are user configurable, tooltips are available for these descriptions in the graphical symbols as well as in the **Operator** tab of the faceplate.
- Current state will be shown as: State related to InBatch (Intermediate state of phase). For example, *RUN*(*HOLDING*)

Faceplates

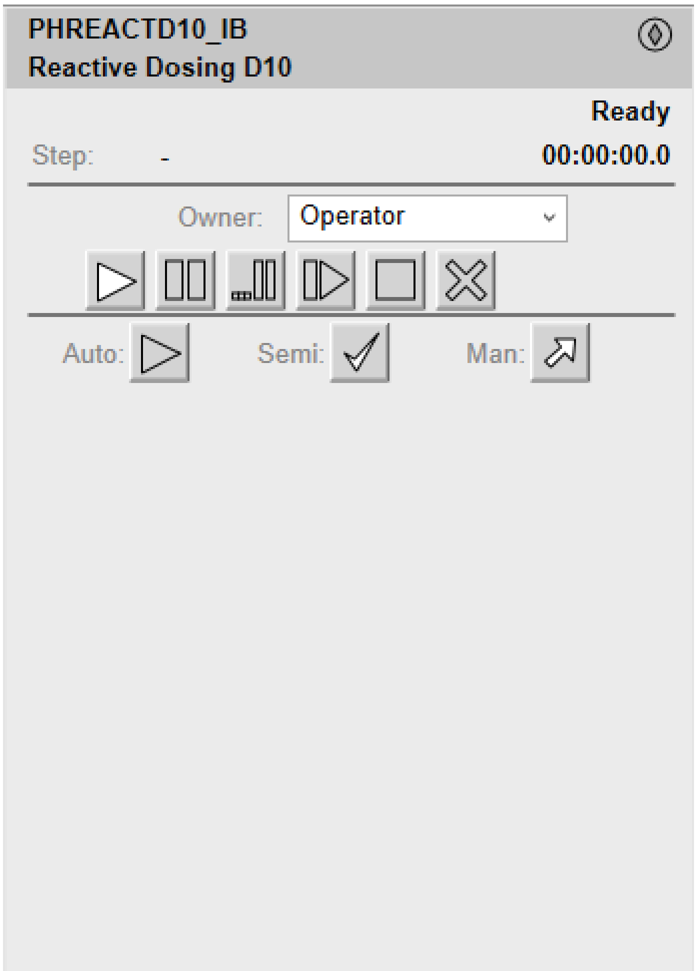
Overview

During operation, clicking a Batch phase graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Parameters (input and output parameters)
  - State machine
  - Alarms, page 64
- Optional tabs:
  - Initial Conditions, page 56
  - Detected Failures, page 59

Operation Tab in Automatic Mode

This figure shows the Operation tab when Operator and the Auto mode are selected.

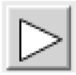
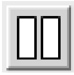
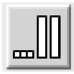
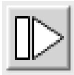
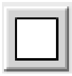
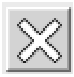
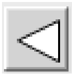


NOTE: Control buttons will be enabled only if the phase is started in operator owner (during program owner operation, control buttons are disabled). Control buttons will be disabled if phase state is *READY* or *INTERLOCKED*.

The phase runs in automatic mode after clicking the **Start** button, and the bottom section of the faceplate displays:

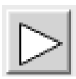
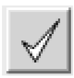
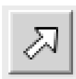
- The step that is being executed and its number.
- The transition to the next step:
  - `Passive` Galaxy style, page 44: The condition is not yet fulfilled.
  - `Active` Galaxy style, page 44: The condition is true.
- The next step to be executed when the current step is completed and the transition is true.

This table describes the command that corresponds to each button on the **Operation** tab.

Button	Command
	Start
	Hold
	Pause
	Restart/resume
	Stop
	Abort
	Reset

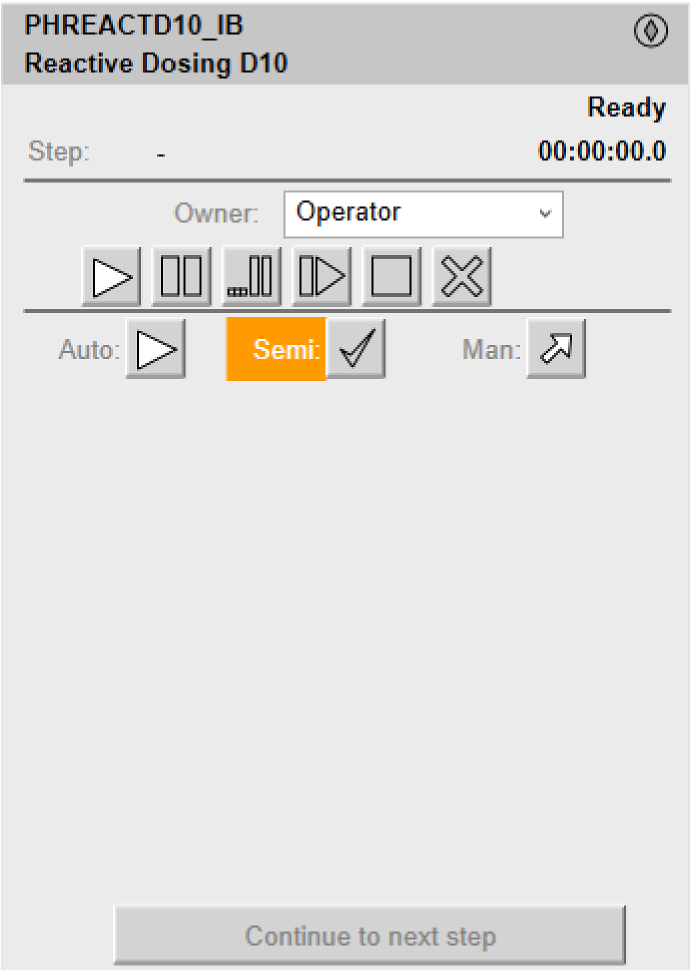
NOTE: Only buttons that correspond to available commands are active (*Active* Galaxy style, page 44). Unavailable commands are displayed with the *Passive* Galaxy style.

This table describes the mode that corresponds to each button on the **Operation** tab.

Button	Mode	Description
	Auto	Normal execution
	Semi	Asks for confirmation before transitioning
	Man	Allows you to select the step to execute

Operation Tab in Semi-Automatic Mode

This figure shows the **Operation** tab when **Operator** and the **Semi** mode are selected.

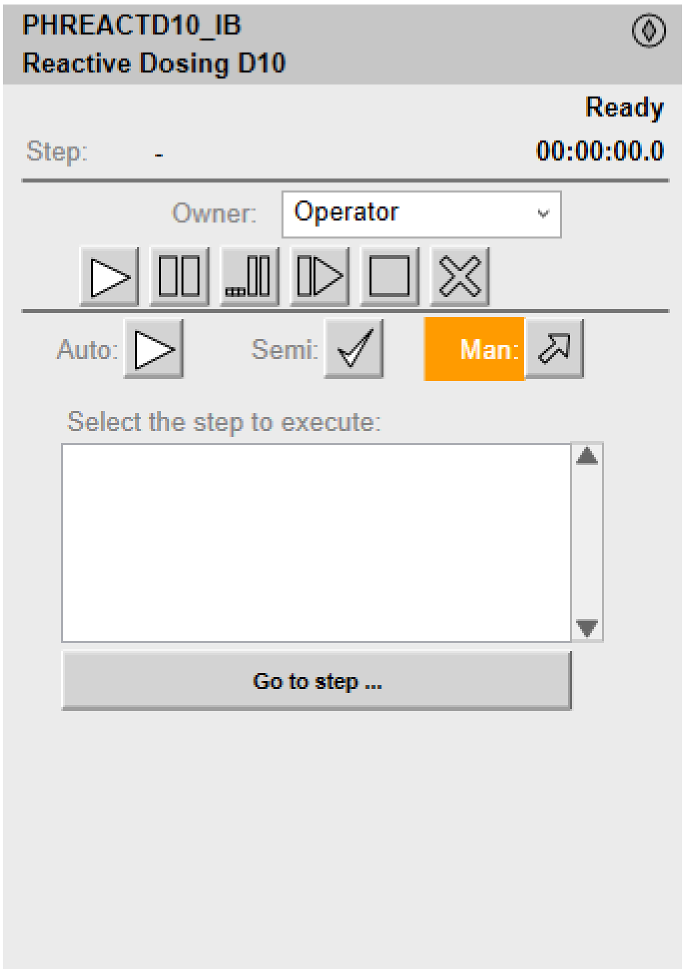


The phase starts in semi-automatic mode after clicking the **Start** button, and the bottom section of the faceplate displays:

- The step that is being executed and its number.
- The transition to the next step:
  - Passive style: The condition is not yet fulfilled
  - Active style: The condition is true.
- The next step to be executed.
- A **Continue to Next Step** button requiring the operator to confirm the execution of the next step when the transition is true.

Operation Tab in Manual Mode

This figure shows the **Operation** tab when **Operator** and the **Man** mode are selected.



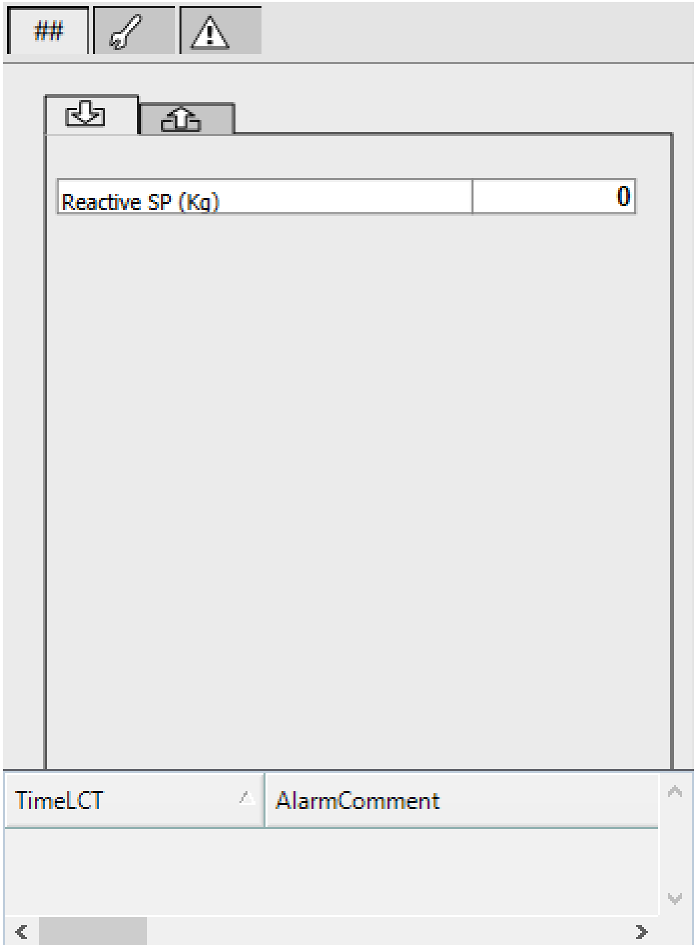
The phase starts in manual mode after clicking the **Start** button. The bottom section of the faceplate displays:

- The steps of the sequence that are programmed in the **Running** state.
- A **Go To Step** button allowing to execute the step selected in the **Select the Step to execute** list.

User can scroll up and down (in six-step increments) through the list of steps by using the two arrow buttons.

Input/Ouput Parameters Tab

This figure shows the **Parameters** tab when the **Input Parameters** subtab is selected

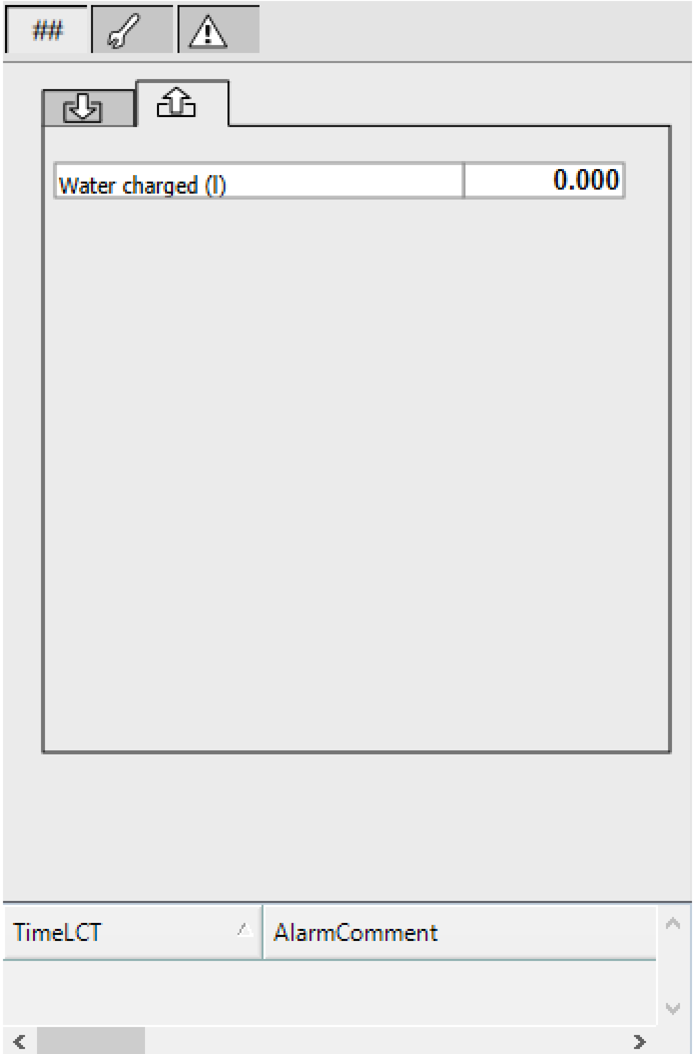


User can select a strategy from the ones that have been defined and enter the corresponding values for enabled parameters.

Parameters that do not pertain to the selected strategy are disabled.

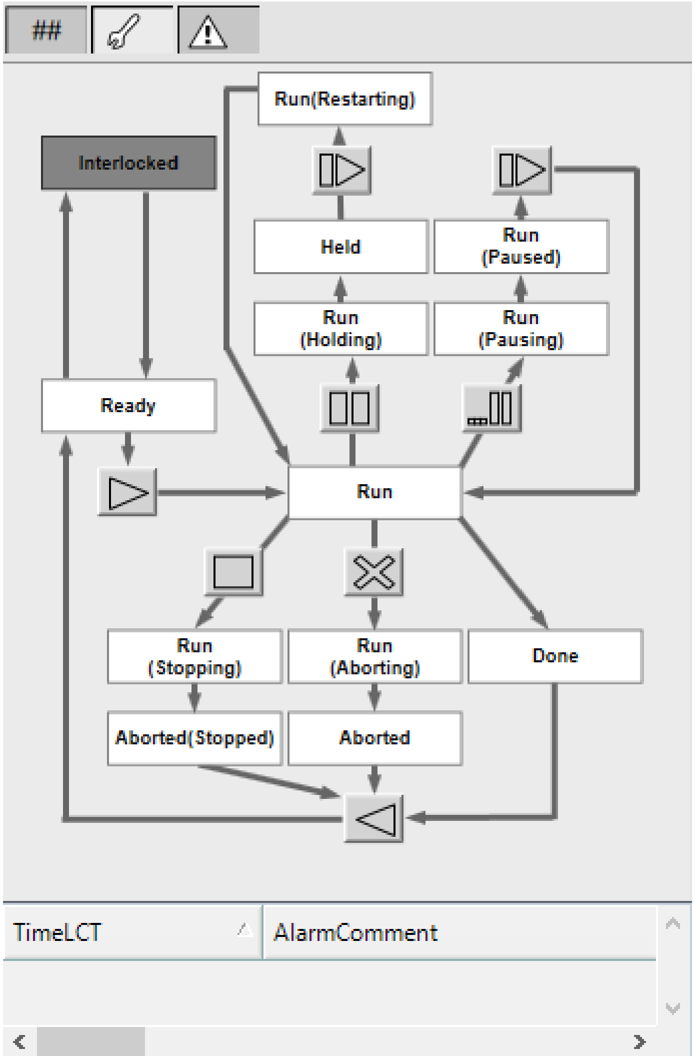
> **NOTE:** The parameters can be only modified when the sequence is in **READY** state.

This figure shows the **Parameters** tab when the **Output Parameters** subtab is selected.



Displays the values of output parameters, which are calculated while the phase is executed.

State Machine Tab



The state diagram allows the operator to execute available commands by using the buttons.

Names of states appear in *Passive* style while the current state appears in *Active* style.

> **NOTE:** Only buttons that correspond to available commands are active (*Active* style). Unavailable commands are displayed with the *Passive* style.

Batch Phase Object Configuration Pages

What's in This Chapter

Overview

This chapter describes the default configuration of pages for Batch phase objects.

They allow you to configure optional supervision functions of process application templates and their instances.

The default security classification to modify references is *Configure*.

Main Page Default Configuration

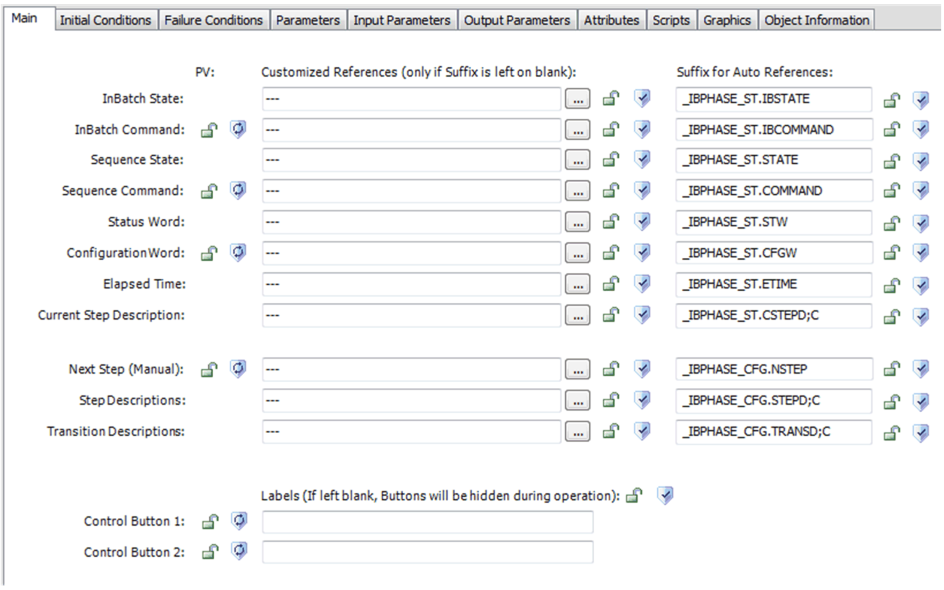
Overview

The **Main** page is used to modify the variable references used by the InBatch object.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of Batch phase management, refer to the chapter documenting each master template of the Batch phase.

Main Page Description



Element	Default variable reference with suffix for auto-referencing
InBatch State	`<Instance name>_IBPHASE_ST.IBSTATE.`
InBatch Command	`<Instance name>_IBPHASE_ST.IBCOMMAND.`
Sequence State	`<Instance name>_IBPHASE_ST.STATE.`

Element	Default variable reference with suffix for auto-referencing
Sequence Command	`<Instance name>_IBPHASE_ST.COMMAND`. The default security classification is *Operate*.
Status Word	`<Instance name>_IBPHASE_ST.STW`.
Configuration Word	`<Instance name>_IBPHASE_ST.CFGW`. The default security classification is *Operate*.
Elapsed Time	`<Instance name>_IBPHASE_ST.ETIME`.
Current Step Description	`<Instance name>_IBPHASE_ST.CSTEPD;C`.
Next Step (Manual)	`<Instance name>_IBPHASE_CFG.NSTEP`. The default security classification is *Secured Write*.
Step Descriptions	`<Instance name>_IBPHASE_CFG.STEPD;C`.
Transition Descriptions	`<Instance name>_IBPHASE_CFG.TRANSD;C`.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.
Control Button 1	Label for Control button 1. Control Button will be available only if the label is defined.
Control Button 2	Label for Control button 2. Control Button will be available only if the label is defined.

NOTE: For control button commands, access control is provided on **Main** tab with labels.

Initial Conditions Page Default Configuration

Overview

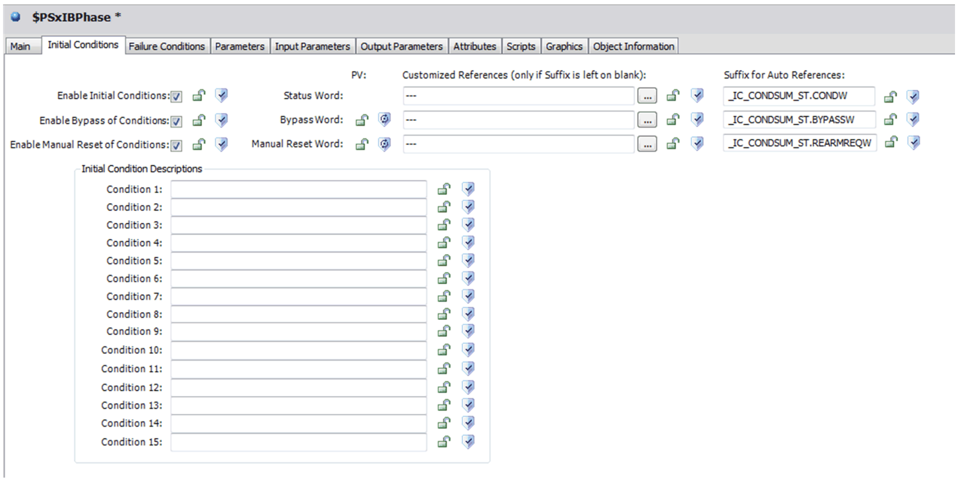
Depending on the configuration of the corresponding control resource, the **Initial Conditions** page is used to:

- Enable or disable initial conditions and define the initial condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of initial conditions.
  - Enable or disable the manual resetting of initial conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of initial conditions, refer to the chapter documenting each master template of the Batch phase.

Initial Conditions Page Description



Element	Description
Enable Initial Conditions	Select this check box to enable initial condition management. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.CONDW`. The default security classification is *Free Access*.
Enable Bypass of Conditions	Select this check box to enable bypass of conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.BYPASSW`. The default security classification is *Free Access* to enable the bypassing function and *Secured Write* to bypass conditions during operation.
Enable Manual Reset of Conditions	Select this check box to enable the manual resetting of conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.REARMREQW`. The default security classification is *Free Access* to enable the manual reset function and *Secured Write* to reset conditions during operation.
Initial Condition Description	Enter the initial condition descriptions (up to 15). The default security classification is *Configure*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Failure Conditions Page Default Configuration

Overview

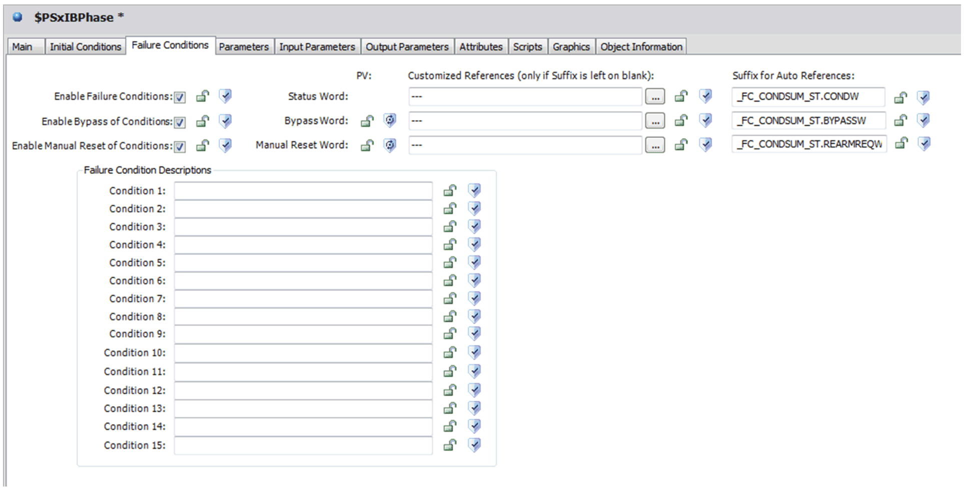
Depending on the configuration of the corresponding control resource, the **Failure Conditions** page is used to:

- Enable or disable monitoring of detected failure conditions and define the detected failure condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of detected failure conditions.
  - Enable or disable the manual resetting of detected failure conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of detected failure condition management, refer to the chapter documenting each master template of the InBatch.

Failure Conditions Page Description



Element	Description
Enable Failure Conditions	Select this check box to enable the management of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.CONDW`. The default security classification is *Free Access*.
Enable Bypass of Conditions	Select this check box to enable bypass of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.BYPASSW`. The default security classification is *Free Access* to enable the bypassing function and *Secured Write* to bypass conditions during operation.
Enable Manual Reset of Conditions	Select this check box to enable the manual resetting of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.REARMREQW`. The default security classification is *Free Access* to enable the manual reset function and *Secured Write* to reset conditions during operation.
Failure Condition Descriptions	Enter the condition descriptions (up to 15). The default security classification is *Free Access*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Parameters Page Default Configuration

Overview

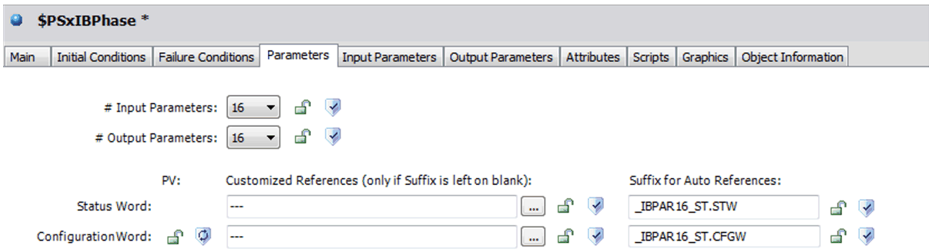
Depending on the configuration of the corresponding control resource, the **Parameters** page is used to:

- Define the number of input parameters.
- Define the number of output parameters.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of parameters for sequential control, refer to the chapter documenting each master template of the Batch phase.

Parameters Page Description



Element	Description
# Input Parameters	Select the number of input parameters from the drop-down list (up to 16). The default security classification is *Free Access*.
# Output Parameters	Select the number of output parameters from the drop-down list (up to 16). The default security classification is *Free Access*.
Status Word	Status word; by default the variable reference with suffix for auto-referencing is `<Instance name>_IBPARxx_ST.STW`[1].
Configuration Word	Status word; by default the variable reference with suffix for auto-referencing is `<Instance name>_IBPARxx_ST.CFGW`[1]. The default security classification is *Operate*.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.
[1] `xx` = 05, 10, or 16 according to the number of parameters.	

By combining the number of input and output parameters (the higher one), the object automatically selects the control block for the parameters being used at the control level (no parameters, *IBPAR05*, *IBPAR10*, or *IBPAR16*).

Input Parameters Page Default Configuration

Overview

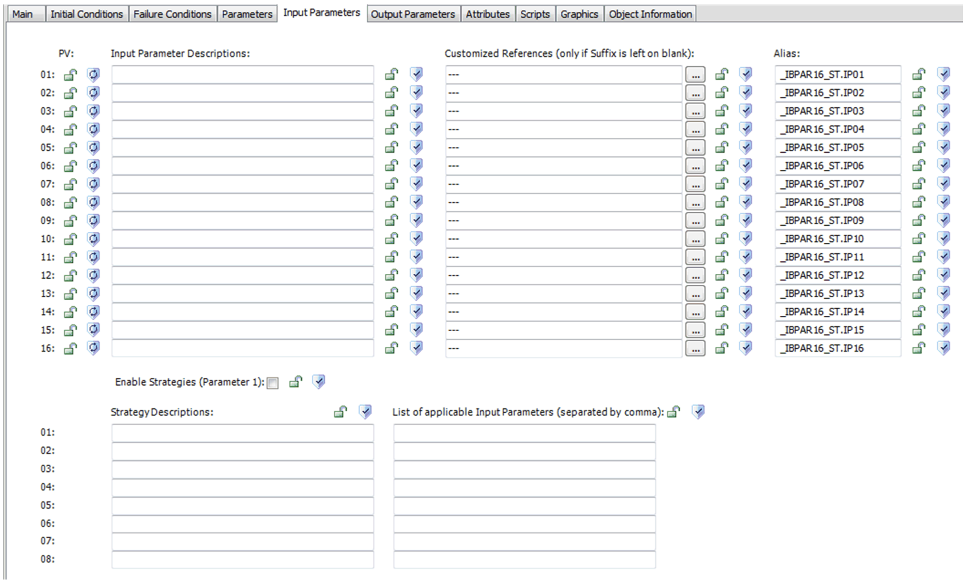
Depending on the configuration of the corresponding control resource, the **Input Parameters** page is used to:

- Define input parameter descriptions.
- Enable or disable strategies for the input parameters.
- Configure the strategies when enabled.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of input parameters for InBatch to the chapter documenting each master template of the Batch phase.

Input Parameters Page Description



Element	Description
Input Parameter Descriptions	Enter the input parameter descriptions. The number of parameters depends of the configuration made in the parameter tab, page 244. The default variable reference (**Alias**) is `<Instance name>_IBPAR16_ST.IP01`...`<Instance name>_IBPAR16_ST.IP16`. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Enable Strategies (Parameter 1)	Select this check box to enable strategy management. **NOTE:** If the strategies are enabled, the parameter 1 is reserved for strategy management.
Strategy Descriptions	Enter the description of strategies (up to 8). **NOTE:** Descriptions can be entered in multiple languages, page 40.
List of applicable Input Parameters	Enter the input parameters applicable in each strategy separated by a comma. For example, if parameters 02 and 03 are applicable for the strategy, enter `2,3`.

NOTE: The default security classification of attributes of this page is *Operate*.

Output Parameters Page Default Configuration

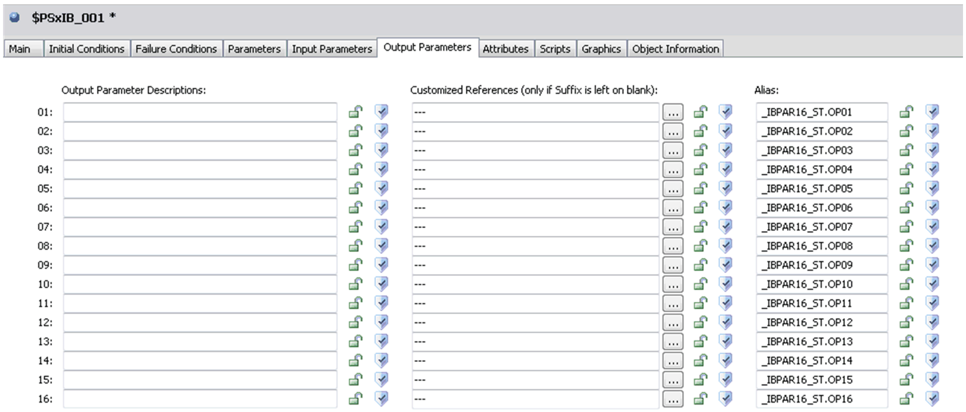
Overview

Depending on the configuration of the corresponding control resource, the **Output Parameters** page is used to define output parameter descriptions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of parameters for InBatch, refer to the chapter documenting each master template of the Batch phase.

Output Parameters Page Description



Element	Description
Output Parameter Descriptions	Enter the output parameter descriptions. The number of parameters depends of the configuration made in the parameter tab, page 244. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Alias Output	The default variable reference is `<Instance name>_IBPAR16_ST.OP01`...`<Instance name>_IBPAR16_ST.OP16`.

NOTE: The default security classification of attributes of this page is *Operate*.

Communication Configuration in InBatch Tool

What's in This Chapter

Overview

This chapter describes the configuration examples that can be implemented to establish the communication between InBatch tool and Batch Phase Manager.

Description

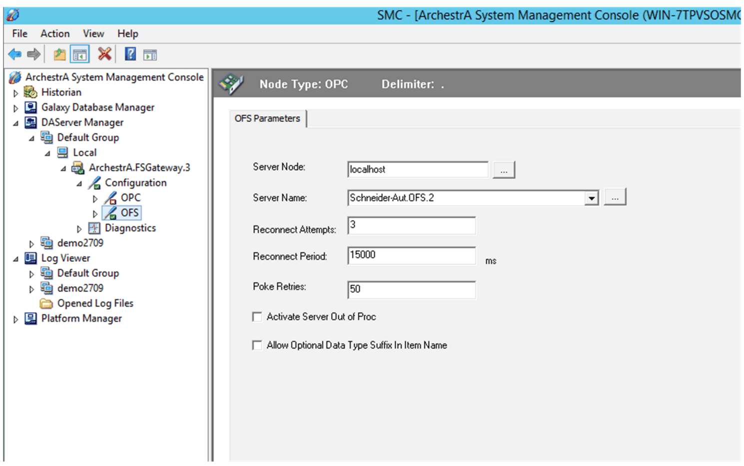
InBatch tool can be configured to communicate with Batch Phase Manager by two approaches:

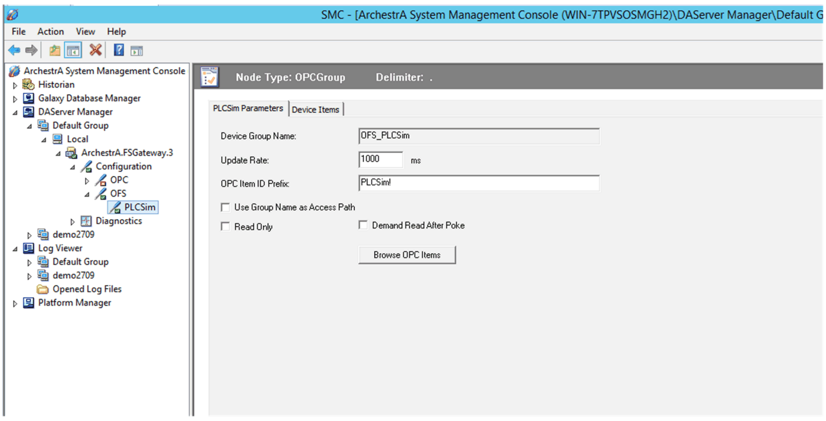
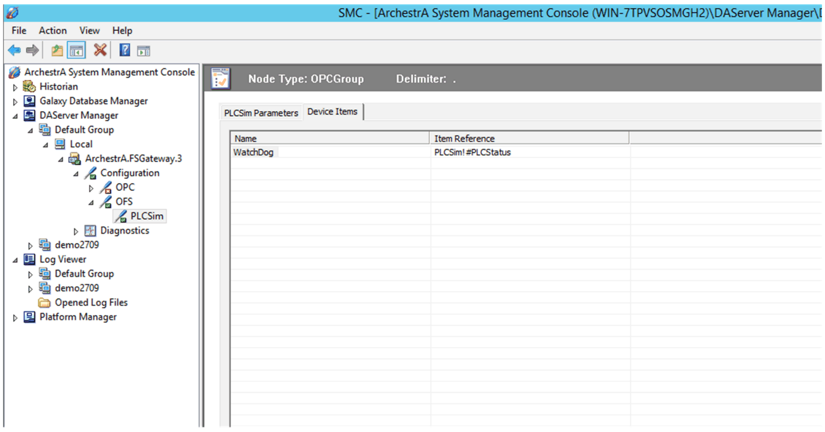
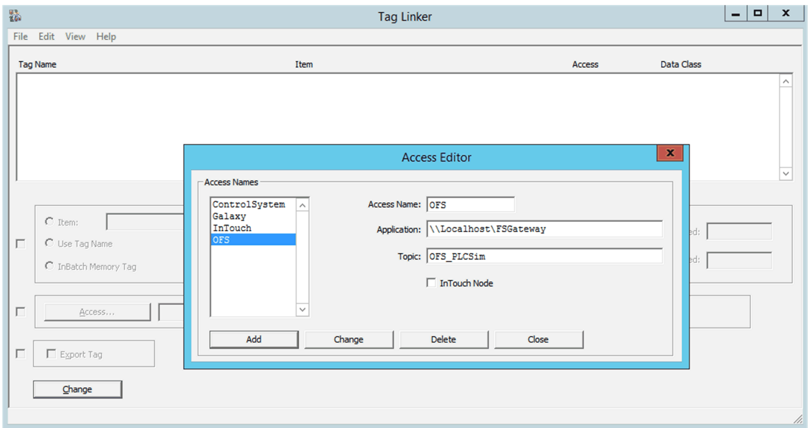
- InBatch tool on top of the OFS layer - InBatch tool will communicate with OFS directly in parallel with Supervisory layer (ASP) and OFS is communicating with Batch Phase Manager.
- InBatch tool on top of the Supervisory layer (ASP) - In this approach InBatch tool will communicate with ASP and ASP is communicating with OFS.

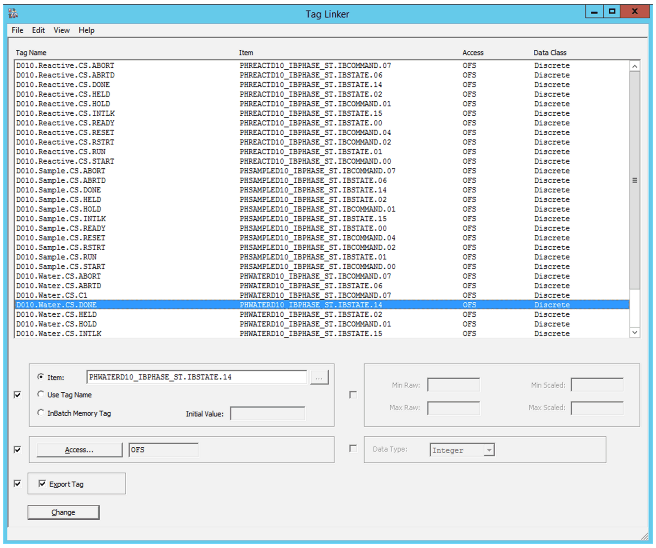
InBatch Tool on Top of the OFS Layer

To configure the InBatch tool to communicate with OFS user has to verify that *IBCli* service is added in the runtime services and all the runtime services are stopped.

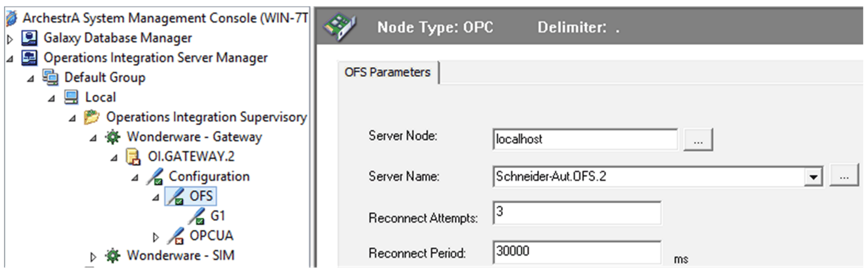
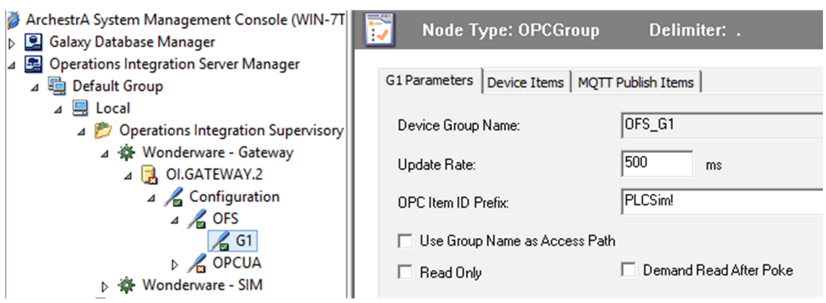
The below table shows the steps to configure InBatch tool to communicate with OFS layer for the AVEVA™ System Platform 2014 R2 SP1.

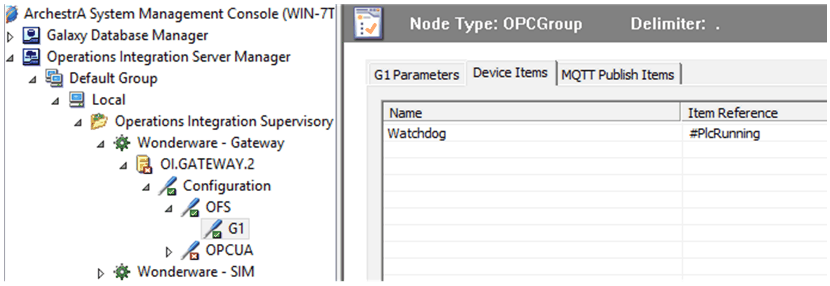
Step	Action
1	Go to the **ArchestrA System Management Console**.
2	Go to the **DAServer Manager** in the left side navigation hierarchy.
3	Create and configure the **OPC** object as shown in the figure (for example, **OFS**). 
4	Add and configure **OPC** group object as shown in the figure (for example, **PLCSim**).

Step	Action
	 
5	Go to the InBatch tool, **Environment Display**. Open the **TagLinker**. Create a new access name. Provide the computer path location where the **FSGateway** is configured. In this case **FSGateway** is on the local host. Provide the topic name same as **Device Group Name** mentioned in the **FSGateway** server. 
6	Now Go to **View** in **TagLinker**, click on **Filter**, select the Units and Tag type to create the link. In the below figure, **Tag Name** column shows the tags created by the InBatch and items are *IBCommand* and *IBState* variables from Batch Phase Manager. User will have to configure every tag with the respective bit in the *IBCommand* and *IBState* as shown in the below figure. User will have to change the access to the **OFS** which is created in step 5.

Step	Action
	
7	After linking all the required tags, update the **Environment**, **Runtime** and **Configuration** in **Environment Display**.
8	Now activate the **FSGateway** server in **ArchestrA System Management Console**.
9	Start all the services from **Runtime** in **Environment Display**. Now the user will be able to communicate InBatch tool with Batch Phase Manager.

The below table shows the steps to configure InBatch tool to communicate with OFS layer for the AVEVA™ System Platform 2017 Update 2.

Step	Action
1	Go to the **ArchestrA System Management Console**.
2	Go to the **OI.GATEWAY.2** in the left side navigation hierarchy.
3	Create and configure the **OPC** object as shown in the figure (for example, **OFS**). 
4	Add and configure **OFS** group object as shown in the figure (for example, **G1**). 

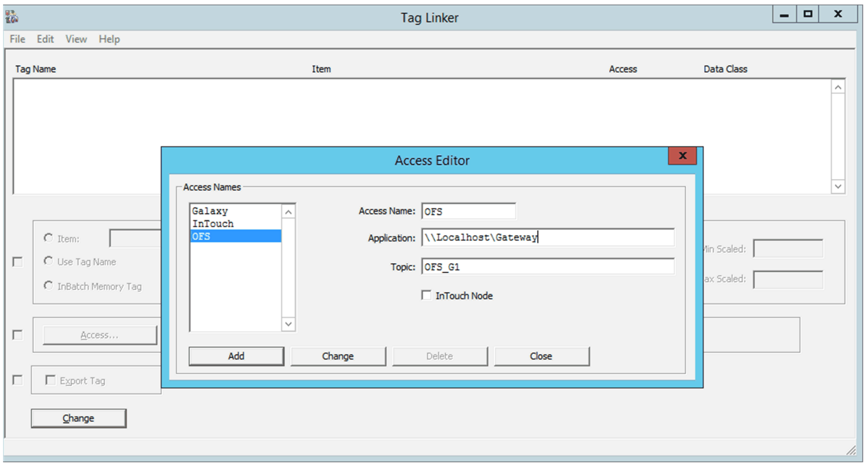
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td></td><td>


</td></tr>
<tr><td>5</td><td>
Go to the InBatch tool, **Environment Display**.

Open the **TagLinker**. Create a new access name.

Provide the computer path location where the **OI.GATEWAY.2** is configured. The service name for the **OI.GATEWAY.2** is **GATEWAY**. In this case **Gateway** is on the local host.

Provide the topic name same as **Device Group Name** mentioned in the **OI.GATEWAY.2** server.

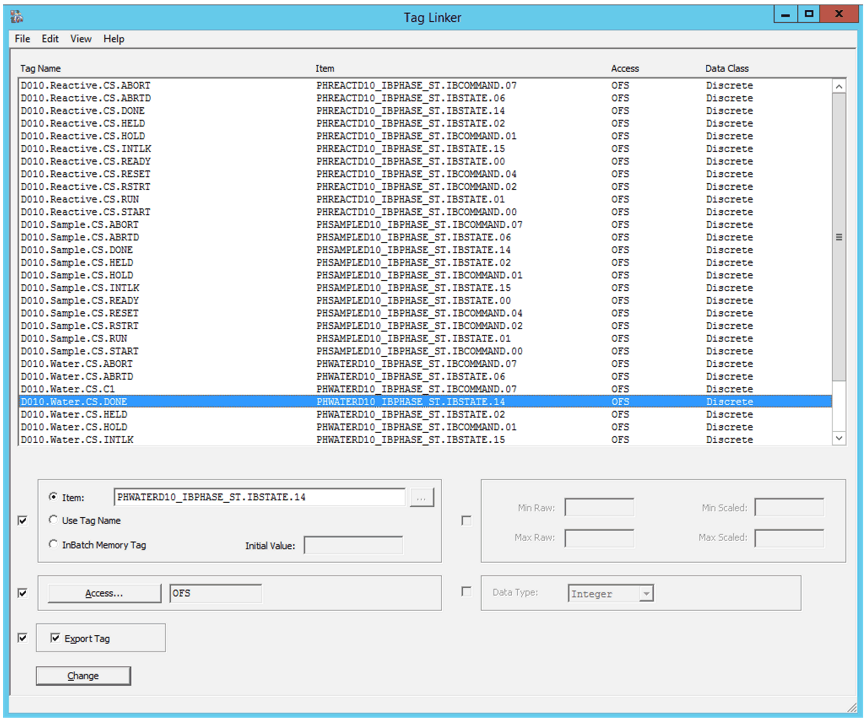


</td></tr>
<tr><td>6</td><td>
Now Go to **View** in **TagLinker**, click on **Filter**, select the Units and Tag type to create the link.

In the below figure, **Tag Name** column shows the tags created by the InBatch and items are *IBCommand* and *IBState* variables from Batch Phase Manager.

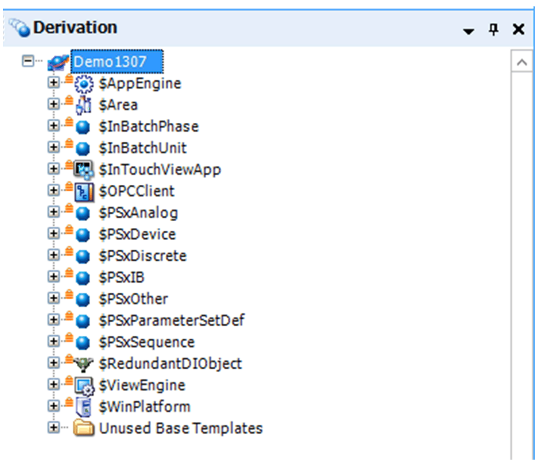
User will have to configure every tag with the respective bit in the *IBCommand* and *IBState* as shown in the below figure.

User will have to change the access to the **OFS** which is created in step 5.
</td></tr>
</table>

Step	Action
	
7	After linking all the required tags, update the **Environment**, **Runtime** and **Configuration** in **Environment Display**.
8	Now activate the **OI.GATEWAY.2** server in **ArchestrA System Management Console**.
9	Start all the services from **Runtime** in **Environment Display**. Now the user will be able to communicate InBatch tool with Batch Phase Manager.

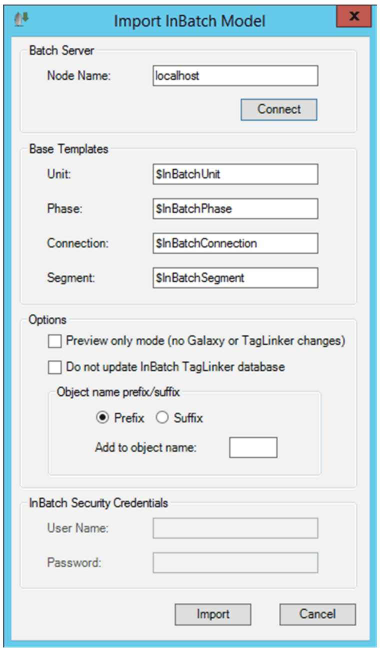
InBatch tool on Top of the Supervisory Layer (ASP)

To configure the InBatch tool to communicate with the Batch Phase Manager through the ASP user has to verify that *IBMX* service is added in the runtime services and all the runtime services are stopped. The below table shows the steps to configure InBatch tool to communicate with Batch Phase Manager through the ASP.

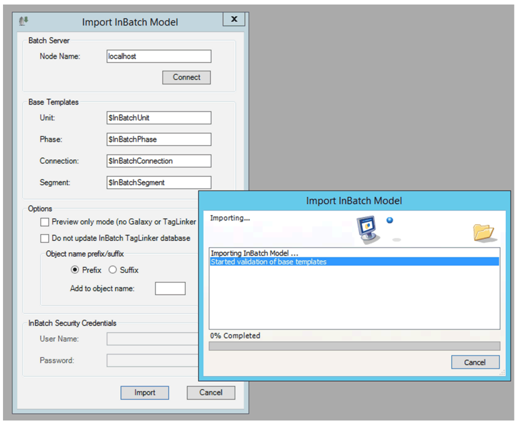
Step	Action
1	Go to the ArchestrA IDE plateform, import the InBatch base templates from the below path C:\Program Files (x86)\Wonderware\InBatch\AppObjects. Here the drive C is the root drive for the installables.  Galaxy will have *$InBatchPhase* and *$BatchUnit* base templates.
2	Go to the ArchestrA IDE Platform, click **InBatch** tab →**Import InBatch Model**.

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td></td><td>

A dialog box will appear select the **Node Name**, click on **Connect** and after successful connection click on **Import**.



The import operation will start importing InBatch application phase as an instance in ASP.

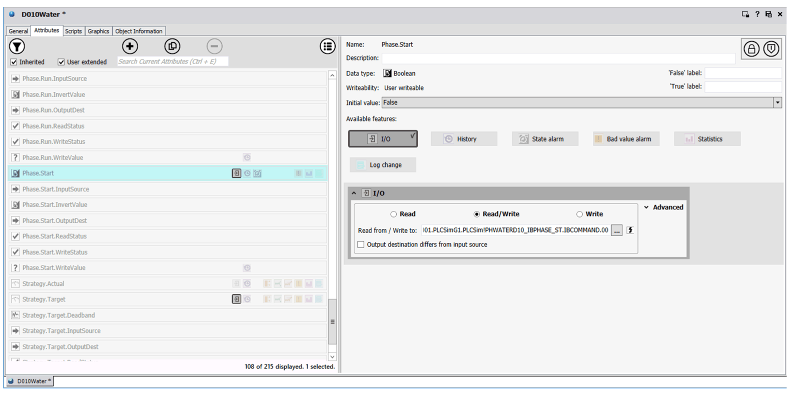


</td></tr>
<tr><td>3</td><td>

Now open the InBatch phase instance under $InBatchPhase template. The instance will have phase commands and phase states from InBatch.

Enable the IO type of the phase commands and phase states. Connect the respective *IBCommand* and *IBState* variable from Batch Phase Manager as shown in figure.

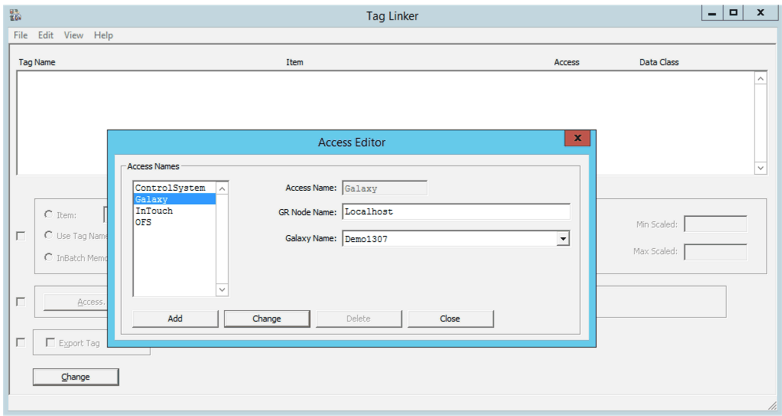
For example, **Phase.Start** - `EPEASP.OPCUA_DeviceGroup.OPCUA.DeviceGroup./DA/0:PLCSim!PHASE1100_Phase_ST.PhState`



</td></tr>
<tr><td>4</td><td>Go to the InBatch tool, Environment Display.</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td></td><td>

Open the **TagLinker** → **Access Editor**, click Galaxy → enter **GR Node Name** and then select the **Galaxy Name** from the drop-down list and click on **Change** button.

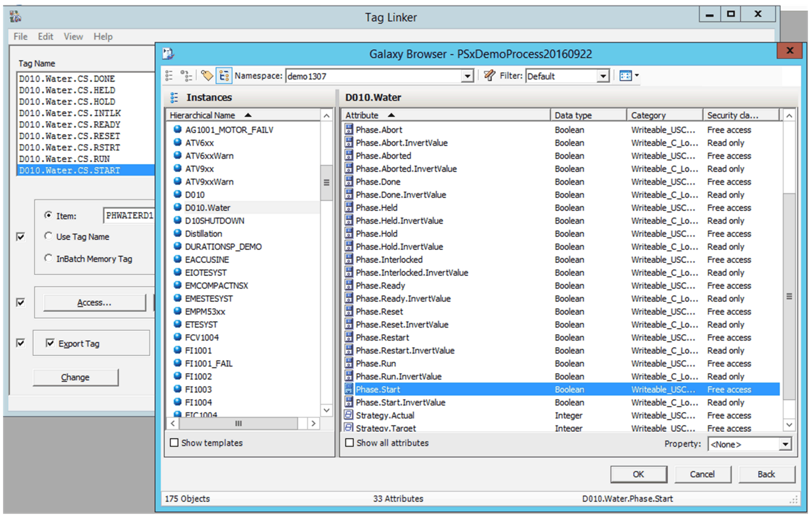


</td></tr>
<tr><td>5</td><td>

Now Go to **View** in **TagLinker**, click on **Filter**, select the Units and Tag type to create the link.

Select the tag name, click on **Access**, select the **Galaxy** as Access Name and click on *Change* button.

A dialog box appears when user clicks the browse button of **Item** and select the attribute from corresponding phase instance and click **OK** as shown in the below figure.



Link all the required attributes of the phase instance.

</td></tr>
<tr><td>6</td><td>Update the Environment, Runtime and Configuration in Environment Display.</td></tr>
<tr><td>7</td><td>Start all the services from Runtime in Environment Display. Now the user will be able to communicate InBatch tool with Batch Phase Manager through ASP.</td></tr>
</table>

Equipment Module

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for equipment module. It also describes the template-specific configuration pages of the ArchestrA IDE object editor.

$EMPatternCE: Equipment Module Functions

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for equipment module.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠ WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Description

Introduction

This object is used for monitoring sequences based on the ISA-NS88 standard for continuous control.

Supervision Functions

The table describes the main functions for equipment module management:

Function	Description
Equipment state management	Shows the state of the sequence.
Owner selection	Allows you to configure whether the sequence commands come from the program or the operator.
Operating mode	Allows you to operate the sequence in automatic/semi-automatic or manual mode.
Command management	Allows you to send commands (such as *Start* and *Stop*) to the sequence.
Parameter management	Allows you to select a strategy, enter input parameter values, and monitor output values.
Initial condition management	Optional function that allows you to manage initial conditions that are not satisfied and that block the start of the sequence.
Diagnostic information management	Optional function that allows you to manage abnormal conditions detected by the sequence.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

NOTE: You can configure optional functions from the template-specific configuration pages, page 241.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Initial Value	Description
`Param.Data1.Desc`	String		`Data1` description (only displayed in the `PanelWithButtons_2Data` and `PanelWithButtons_4Data` symbols).
`Param.Data1.Format`	String	`0.00`	Specifies the displaying format of the `Data1` value. The valid format entries are D (Duration), T (Date Time) and numeric formats (for example: 0, 0.0, 00000) **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data1.PV`	Double	0.0	`Data1` value attribute. **NOTE:** To display the `Data1` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data1.PV` (for

Parameter	Type	Initial Value	Description
			example `Me.EMPar.OP01.OP.PV` for displaying the output parameter 1).
`Param.Data1.EU`	String		Engineering unit for Data1.
`Param.Data2.Desc`	String		`Data2` description (only displayed in the `PanelWithButtons_2Data` and `PanelWithButtons_4Data` symbols).
`Param.Data2.Format`	String	`0.00`	Specifies the displaying format of the `Data2` value. The valid format entries are D (Duration), T (Date Time) and numeric formats (for example: 0, 0.0, 00000) **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data2.PV`	Double	0.0	`Data2` value attribute. **NOTE:** To display the `Data2` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data2.PV` (for example `Me.EMPar.OP02.OP.PV` for displaying the output parameter 2).
`Param.Data2.EU`	String		Engineering unit for Data2.
`Param.HideAbortButton`	Bool	False	If true, the **Abort** button is not displayed. If false, the **Abort** button is displayed.
`Param.HideHoldButton`	Bool	False	If true, the **Hold** button is not displayed. If false, the **Hold** button is displayed.
`Param.HidePauseButton`	Bool	False	If true, the **Pause** button is not displayed. If false, the **Pause** button is displayed.
`Param.HideResetButton`	Bool	False	If true, the **Reset** button is not displayed. If false, the **Reset** button is displayed.
`Param.HideRestartButton`	Bool	False	If true, the **Restart** button is not displayed. If false, the **Restart** button is displayed.
`Param.HideStartButton`	Bool	False	If true, the **Start** button is not displayed. If false, the **Start** button is displayed.
`Param.HideStopButton`	Bool	False	If true, the **Stop** button is not displayed. If false, the **Stop** button is displayed.
`Param.ModeNormal`	String	`O,P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program
`Param.Data3.Desc`	String		`Data3` description (only displayed in the `PanelWithButtons_4Data` symbol).
`Param.Data3.Format`	String	`0.00`	Specifies the displaying format of the `Data3` value. The valid format entries are D (Duration), T (Date Time) and numeric formats (for example: 0, 0.0, 00000) **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.

Parameter	Type	Initial Value	Description
`Param.Data3.PV`	Double	0.0	`Data3` value attribute. **NOTE:** To display the `Data3` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data3.PV` (for example `Me.EMPar.OP01.OP.PV` for displaying the output parameter 1).
`Param.Data3.EU`	String		Engineering unit for Data3.
`Param.Data4.Desc`	String		`Data4` description (only displayed in the `PanelWithButtons_4Data` symbol).
`Param.Data4.Format`	String	`0.00`	Specifies the displaying format of the `Data4` value. The valid format entries are D (Duration), T (Date Time) and numeric formats (for example: 0, 0.0, 00000) **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
`Param.Data4.PV`	Double	0.0	`Data4` value attribute. **NOTE:** To display the `Data4` variable, you need to define it in the **Extensions** tab as an input extension of the attribute `Param.Data4.PV` (for example `Me.EMPar.OP01.OP.PV` for displaying the output parameter 1).
`Param.Data4.EU`	String		Engineering units for Data4.

Default State Alarms

State Alarms for Equipment Module

The table indicates for which attributes a state alarm is configured in the *$EMPatternCE* master template and provides the default values.

Attribute	Alarm message	Priority
AO.Failure	*Failure condition triggered during execution*	999

NOTE: You can modify the configuration from the **Attributes** page.

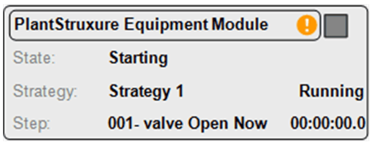
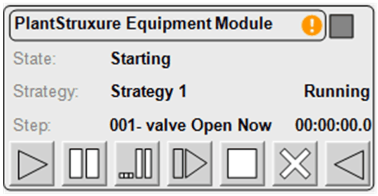
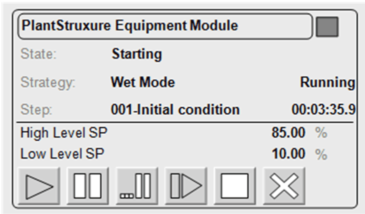
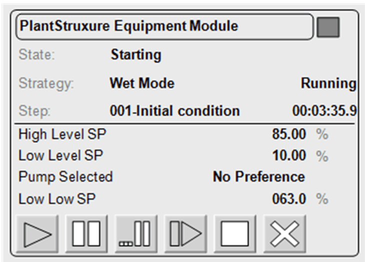
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the equipment module:

Name	Graphic symbol	Description
`PanelState`		The symbol displays: • The current equipment state. • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step.
`PanelWithButtons`		The symbol displays: • The current equipment state. • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons
`PanelWithButton_ 2Data`		The symbol displays: • The current equipment state. • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons. • Two configurable data (*Data1* and *Data2*).
`PanelWithButton_ 4Data`		The symbol displays: • The current equipment state. • The current state of the sequence. • The step being executed. • The strategy that is applied (if configured and selected). • The time elapsed for the current step. • Control buttons. • Four configurable data (*Data1*, *Data2*, *Data3* and *Data4*).

NOTE: The display area for the descriptions of State, Strategy, Strategy State and Step is limited, however, since they are user configurable, tooltips are available for these descriptions in the graphical symbols as well as in the **Operator** tab of the faceplate.

Faceplates

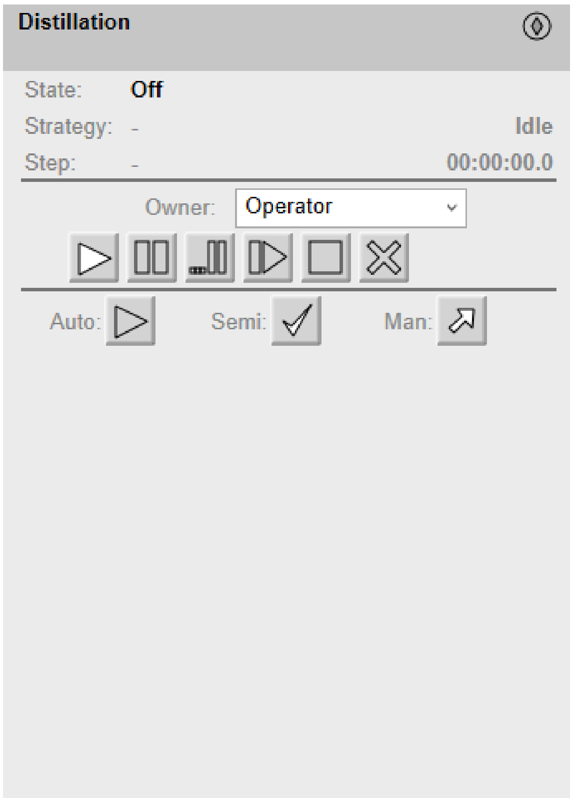
Overview

During operation, clicking a equipment module graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Parameters (input and output parameters)
  - State machine
  - Alarms, page 64
- Optional tabs:
  - Initial Conditions, page 56
  - Failures , page 59

Operation Tab in Automatic Mode

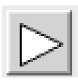
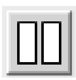
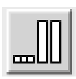
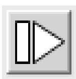
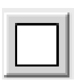
This figure shows the **Operation** tab when **Operator** and the **Auto** mode are selected.

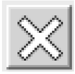
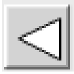


The sequence runs in automatic mode. Once user clicks on **Start** button when Owner is Operator, it is navigated to **Parameter** → **Input Parameter** tab, and from **Input Parameter** tab user can select **Strategy** and start the sequence. After clicking the **Start** button, that is placed at the bottom of **Input Parameter** tab, and bottom section of the operator tab on faceplate displays:

- The step that is being executed and its number.
- The transition to the next step:
  - *Passive* Galaxy style, page 44: The condition is not yet fulfilled.
  - *Active* Galaxy style: The condition is true.
- The next step to be executed when the current step is completed and the transition is true.

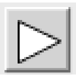
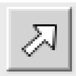
This table describes the command that corresponds to each button on the **Operation** tab.

Button	Command
	Start
	Hold
	Pause
	Restart/resume
	Stop

Button	Command
	Abort
	Reset

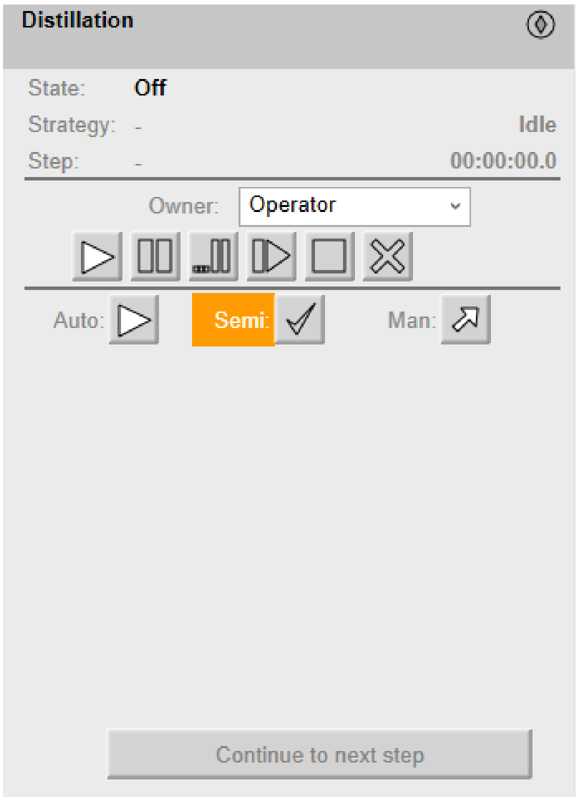
NOTE: Only buttons that correspond to available commands are active (*Active* Galaxy style, page 44). Unavailable commands are displayed with the *Passive* Galaxy style.

This table describes the mode that corresponds to each button on the **Operation** tab.

Button	Mode	Description
	Auto	Normal execution
	Semi	Asks for confirmation before transitioning
	Man	Allows you to select the step to execute

Operation Tab in Semi-Automatic Mode

This figure shows the **Operation** tab when **Operator** and the **Semi** mode are selected.



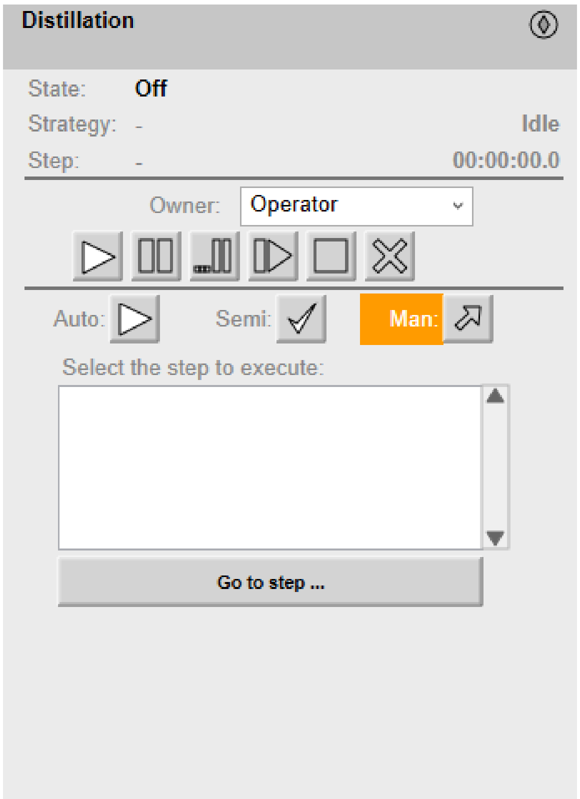
The sequence starts in semi-automatic mode after clicking the **Start** button, that is placed at the bottom of **Input Parameter** tab, and bottom section of the **Operator** tab faceplate displays:

- The step that is being executed and its number.

- The transition to the next step:
    - Passive style: The condition is not yet fulfilled
    - Active style: The condition is true.
- The next step to be executed.
- A **Continue to Next Step** button requiring the operator to confirm the execution of the next step when the transition is true.

Operation Tab in Manual Mode

This figure shows the **Operation** tab when **Operator** and the **Man** mode are selected.



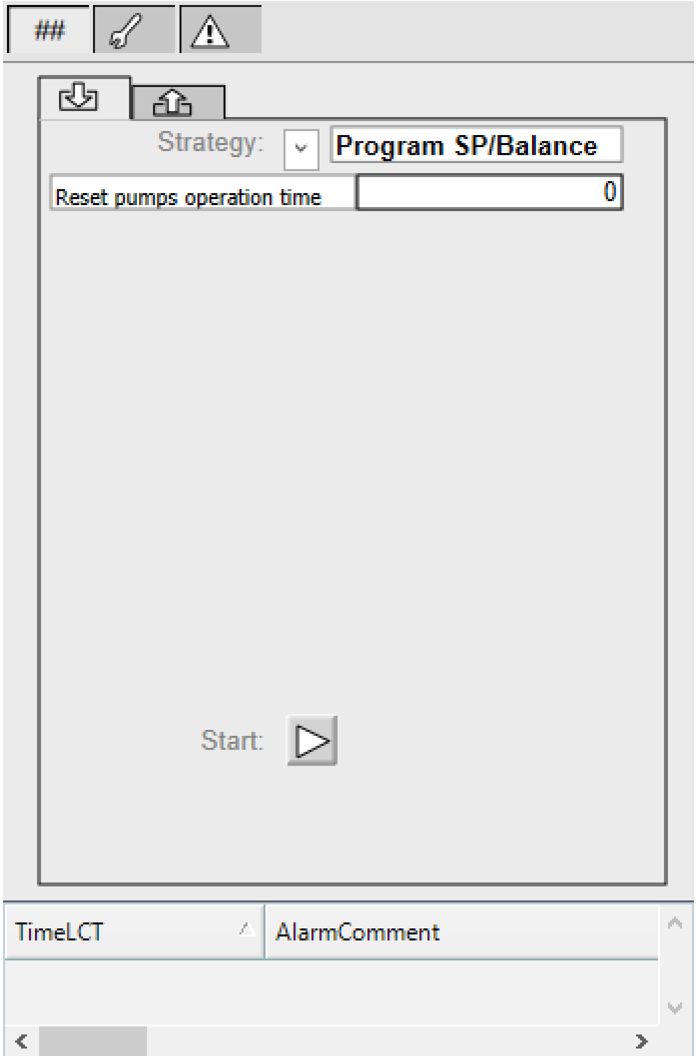
The sequence starts in manual mode after clicking the **Start** button placed at bottom of the **Input Parameter** tab, and the bottom section of the **Operator** tab faceplate displays:

- The steps of the sequence that are programmed in the **Running** state.
- A **Go To Step** button allowing to execute the step selected in the **Select the Step to execute** list.

You can scroll up and down (in six-step increments) through the list of steps by using the two arrow buttons.

Input/Ouput Parameters Tab

This figure shows the **Parameters** tab when the **Input Parameters** subtab is selected.



You can select a strategy from the ones that have been defined and enter the corresponding values for enabled parameters.

- Filter the Strategies shown from the drop-down list based on the currently disabled strategies as determined from the logics in the controller. The drop-down list is only editable while the Strategy status is **Idle** and Owner is in Operator mode.

The **Input Parameter** tab consists of three columns:

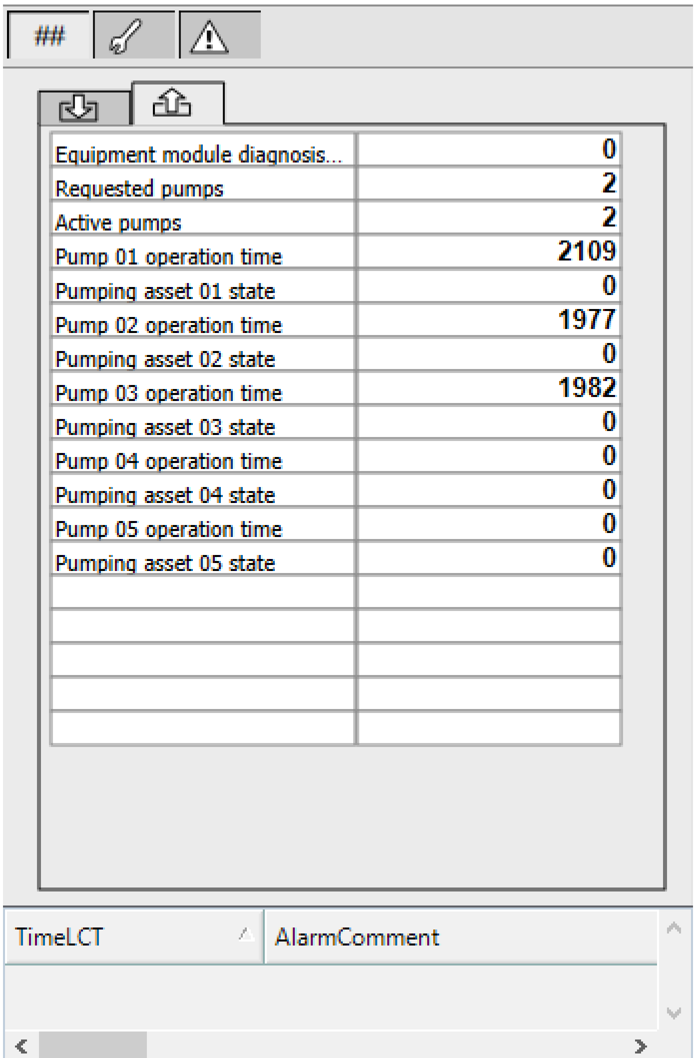
- **Description** (read only): Description of input parameter.
- **Value** (read/write): The value is to be formatted as configured. Only editable while the Strategy Status is `Idle`. Formatted as:
  - Duration: Format of duration is `dd.hh:mm:ss.mss`
  - Date/Time: Date/Time as per regional settings.
  - Numeric: Numeric value formatted as per the configured **Format** (for example, 0, 0.0, 00000).
- **EU** (read only): EU is configured for the following specific data types:
  - Duration, Date/Time: NA
  - Numeric: Localized text as per the configured **EU**.

Sequence **Start** button is located at the bottom of the **Input Parameter** tab, that is to be enabled only in case of the current equipment module Strategy that is in `Idle` state and Owner is in Operator mode.

Parameters that do not pertain to the selected strategy are disabled.

> **NOTE:** The parameters can be only modified when the sequence is in **Idle** state.

This figure shows the **Parameters** tab when the **Output Parameters** subtab is selected.

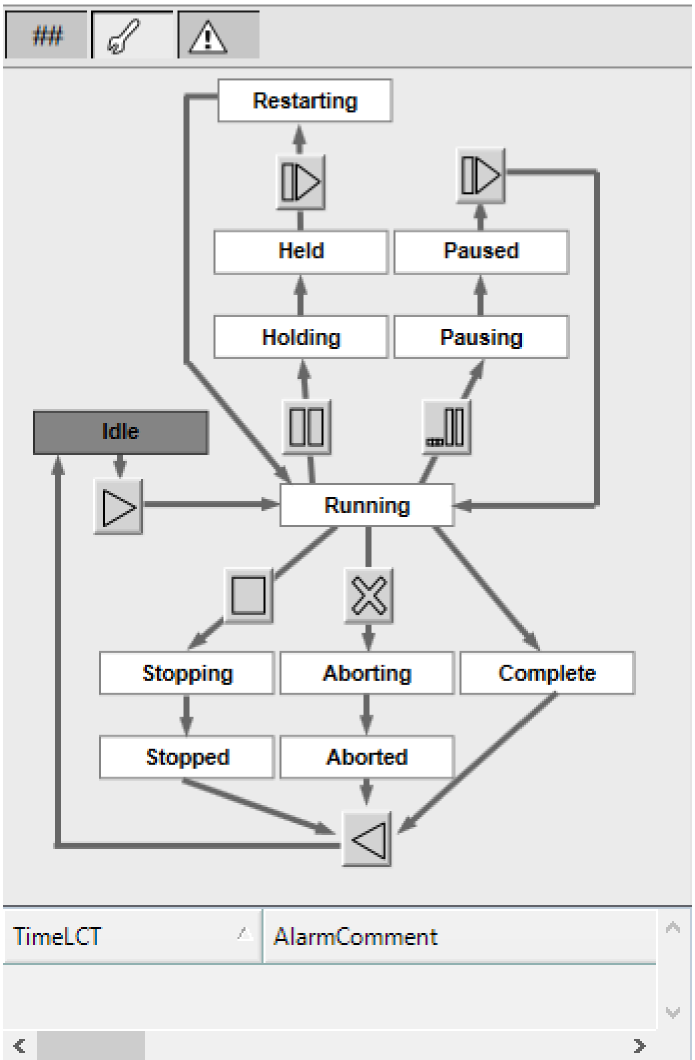


Displays the values of output parameters, which are calculated while the sequence is executed.

NOTE:

- Display cell area for column **Value** and **EU** of Input/Output parameter is limited. However, if **Value** or **EU** is exceeding the optimal space available, then it can be seen in tool tip.
- In Input/Output parameters, **Value** column will display **NaN** in case of non-numeric variable or if the variable is not available in the controller.

State Machine Tab



The above faceplate shows a simplified diagram of state machine.

Names of states appear in *Passive* style while the current state appears in *Active* style.

> **NOTE:** All the buttons are displayed with *Passive* style and cannot be used for sending commands.

Equipment Module Object Configuration Pages

What's in This Chapter

Overview

This chapter describes the default configuration of pages for equipment module objects.

They allow you to configure optional supervision functions of process application templates and their instances.

The default security classification to modify references is *Configure*.

Main Page Default Configuration

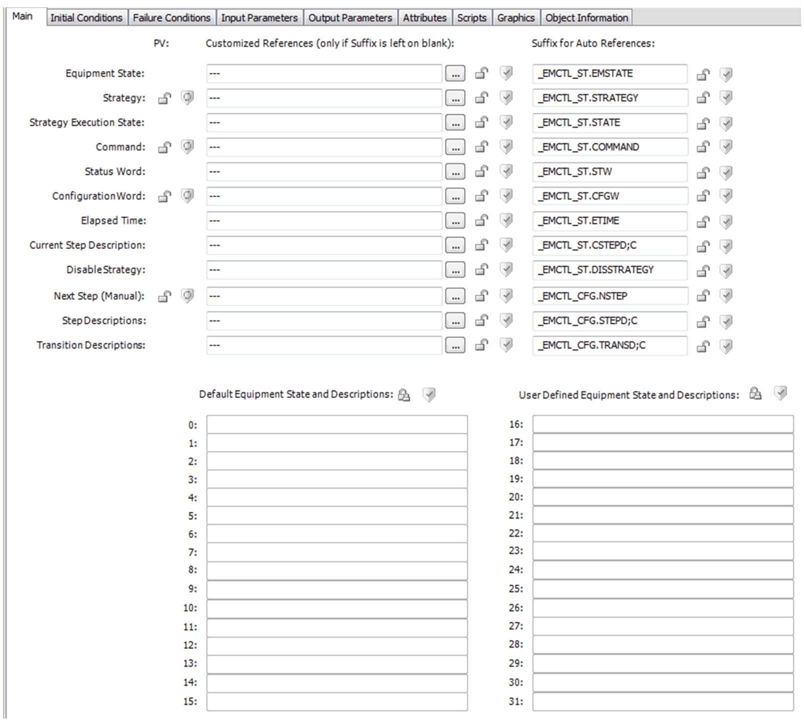
Overview

The **Main** page is used to modify the variable references used by the equipment module object.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of sequential control management, refer to chapter documenting the master template of the equipment module.

Main Page Description



Element	Default variable reference with suffix for auto-referencing
Equipment State	*<Instance name>_EMCTL_ST.EMSTATE*
Strategy	*<Instance name>_EMCTL_ST.STRATEGY*
Strategy Execution State	*<Instance name>_EMCTL_ST.STATE*
Command	`<Instance name>_EMCTL1_ST.COMMAND`. The default security classification is *Operate*.
Status Word	`<Instance name>_EMCTL1_ST.STW`.
Configuration Word	`<Instance name>_EMCTL1_ST.CFGW`. The default security classification is *Operate*.
Elapsed Time	`<Instance name>_EMCTL1_ST.ETIME`.
Current Step Description	`<Instance name>_EMCTL1_ST.CSTEPD;C`.
Disable Strategy	`<Instance name>_ EMCTL _ST.DISSTRATEGY.`
Next Step (Manual)	`<Instance name>_EMCTL1_CFG.NSTEP`. The default security classification is *Secured Write*.
Step Descriptions	`<Instance name>_EMCTL1_CFG.STEPD;C`.
Transition Descriptions	`<Instance name>_EMCTL1_CFG.TRANSD;C`.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

There are sixteen default equipment states (0 to 15) available, and user can add sixteen more equipment states (17 to 31) as per requirement.

EMSTATE	Equipment Module Default State Description
0	Off
1	Stopped
2	Starting
3	Ready
4	Standby
5	Producing
6	Switching
7	Clearing
8	Holding
9	Held
10	Stopping
11	Aborting
12	Aborted
13	Reserved
14	Reserved
15	Reserved

Initial Conditions Page Default Configuration

Overview

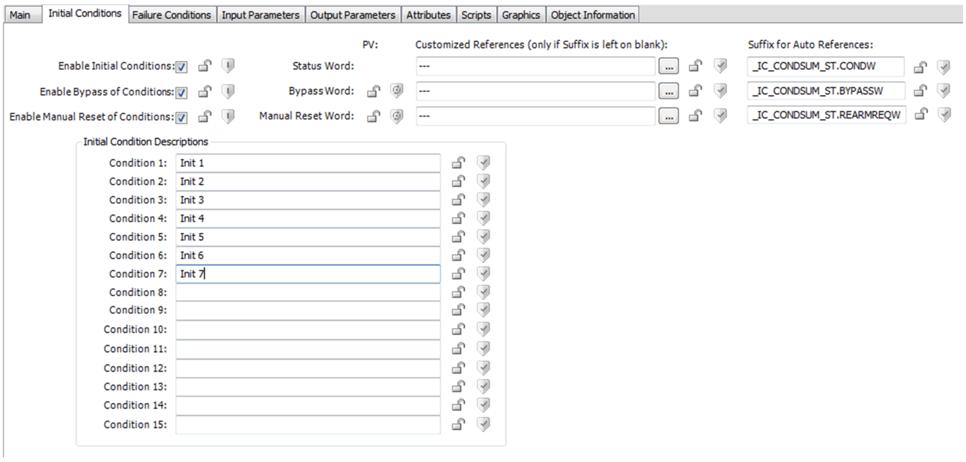
Depending on the configuration of the corresponding control resource, the **Initial Conditions** page is used to:

- Enable or disable initial conditions and define the initial condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of initial conditions.
  - Enable or disable the manual resetting of initial conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of initial conditions, refer to chapter documenting the master template of the equipment module.

Initial Conditions Page Description



Element	Description
Enable Initial Conditions	Select this check box to enable initial condition management. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.CONDW`. The default security classification is *Free Access*.
Enable Bypass of Conditions	Select this check box to enable bypass of conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.BYPASSW`. The default security classification is *Free Access* to enable the bypassing function and *Secured Write* to bypass conditions during operation.
Enable Manual Reset of Conditions	Select this check box to enable the manual resetting of conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_IC_CONDSUM_ST.REARMREQW`. The default security classification is *Free Access* to enable the manual reset function and *Secured Write* to reset conditions during operation.
Initial Condition Description	Enter the initial condition descriptions (up to 15). The default security classification is *Configure*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Failure Conditions Page Default Configuration

Overview

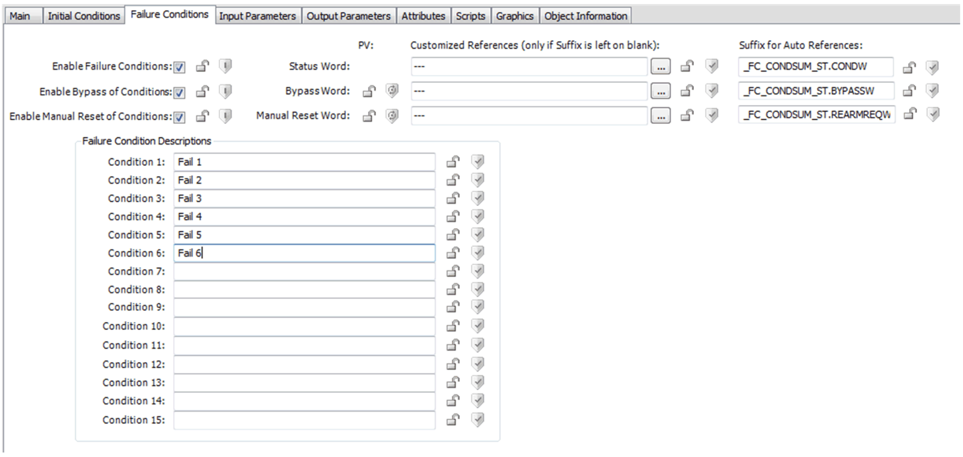
Depending on the configuration of the corresponding control resource, the **Failure Conditions** page is used to:

- Enable or disable monitoring of detected failure conditions and define the detected failure condition descriptions. When enabled, it allows you to:
  - Enable or disable the bypass of detected failure conditions.
  - Enable or disable the manual resetting of detected failure conditions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of detected failure condition management, refer to chapter documenting the master template of the equipment module.

Failure Conditions Page Description



Element	Description
Enable Failure Conditions	Select this check box to enable the management of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.CONDW`. The default security classification is *Free Access*.
Enable Bypass of Conditions	Select this check box to enable bypass of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.BYPASSW`. The default security classification is *Free Access* to enable the bypassing function and *Secured Write* to bypass conditions during operation.
Enable Manual Reset of Conditions	Select this check box to enable the manual resetting of detected failure conditions. By default the variable reference with suffix for auto-referencing is `<Instance name>_FC_CONDSUM_ST.REARMREQW`. The default security classification is *Free Access* to enable the manual reset function and *Secured Write* to reset conditions during operation.
Failure Condition Descriptions	Enter the condition descriptions (up to 15). The default security classification is *Free Access*. **NOTE:** The descriptions can be entered in multiple languages, page 40.
Customized References	Specify a variable reference if the automatic referencing mechanism is not used.

Input Parameters Page Default Configuration

Overview

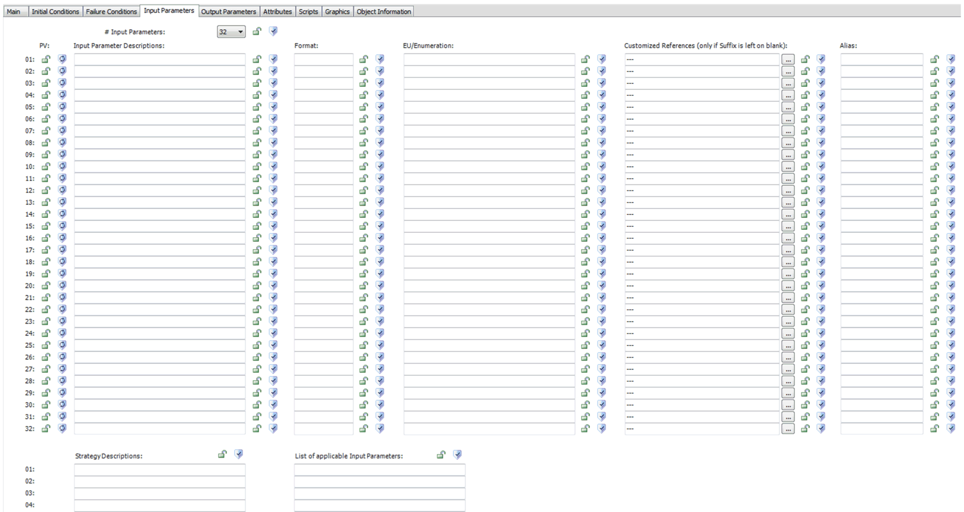
Depending on the configuration of the corresponding control resource, the **Input Parameters** page is used to:

- Define input parameter descriptions.
- Configure the strategies.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of input parameters for sequential control, refer to chapter documenting the master template of the equipment module.

Input Parameters Page Description



Element	Description
Input Parameter Descriptions	Enter the input parameter descriptions. The number of parameters depends of the configuration made. Customized (**Alias**) reference for input parameters. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Format	The valid format entries are D (Duration), T (Date Time) and numeric formats (for example: 0, 0.0, 0000). **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
Engineering Unit	EU is configured for the following specific data types: • Duration, Date/Time: NA • Numeric: Localized text as per the configured **EU**.
Customized reference	Customized reference for the input parameters.
Alias	Alias for the input parameters.
Strategy Descriptions	Enter the description of strategies (up to 16). **NOTE:** Descriptions can be entered in multiple languages, page 40.
List of applicable Input Parameters	Enter the input parameters applicable in each strategy separated by a comma. For example, if parameters 02 and 03 are applicable for the strategy, enter `2,3`.

NOTE: The default security classification of attributes of this page is *Operate*.

Output Parameters Page Default Configuration

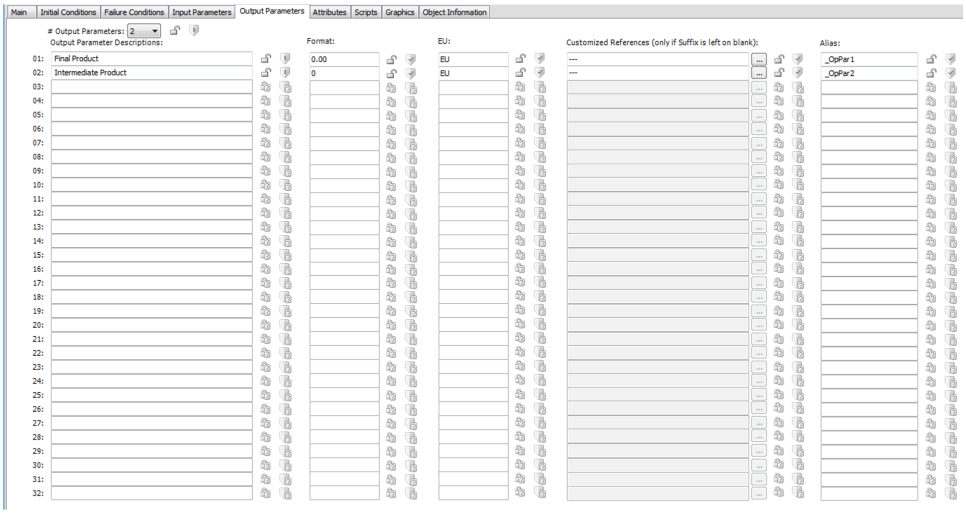
Overview

Depending on the configuration of the corresponding control resource, the **Output Parameters** page is used to define output parameter descriptions.

The references to control resources that are described use specific control resources of the EcoStruxure Process Expert - General Purpose Library.

For a description of the default template-specific configuration of parameters for sequential control, refer to chapter documenting the master template of the equipment module.

Output Parameters Page Description



Element	Description
Output Parameter Descriptions	Enter the output parameter descriptions. The number of parameters depends of the configuration made. **NOTE:** Descriptions can be entered in multiple languages, page 40.
Format	The valid format entries are D (Duration), T (Date Time) and numeric formats (for example: 0, 0.0, 0000). **NOTE:** For configuration purposes, the decimal separator must be **Dot** (.) and not any other type of separator, for example, **Comma** (,). The run-time will use the configured language settings of the local system.
Engineering Unit	EU is configured for the following specific data types: • Duration, Date/Time: NA • Numeric: Localized text as per the configured **EU**.
Customized reference	Customized reference for the output parameters.
Alias	Alias for the output parameters.

NOTE: The default security classification of attributes of this page is *Operate*.

Pump Set

What's in This Part

$PumpSetCtrlCE: Pump Set Pattern Functions

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for Pump Set.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Description

Introduction

This object is used for controlling 10 pumping assets. A pump, an inlet valve, an outlet valve, and a drain valve are collectively referred to as a pumping asset.

Supervision Functions

For details about the main functions for Pump Set Equipment module management,, page 276.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

> **NOTE:** You can configure optional functions from the template-specific configuration pages, page 297.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Initial Value	Description
`Param.Data1.Desc`	String	Pump Set Diagnosis State	Refer to Equipment module,, page 276.
`Param.Data1.Format`	String	`E`	
`Param.Data1.PV`	Double	`Me.EMPar.OP01.OP.PV`	
`Param.Data1.EU`	String	`Normal,0:Warning,1:Failure,2`	
`Param.Data2.Desc`	String	Requested Pumps	
`Param.Data2.Format`	String	`0`	
`Param.Data2.PV`	Double	`Me.EMPar.OP02.OP.PV`	
`Param.Data2.EU`	String		
`Param.Data3.Desc`	String	Active Pumps	
`Param.Data3.Format`	String	`0`	
`Param.Data3.PV`	Double	`Me.EMPar.OP03.OP.PV`	
`Param.Data3.EU`	String		
`Param.Data4.Desc`	String	Pump 01 Operation Time	
`Param.Data4.Format`	String	`D`	
`Param.Data4.PV`	Double	`Me.EMPar.OP04.OP.PV`	
`Param.Data4.EU`	String		
`Param.HideAbortButton`	Bool	False	Refer to Equipment module,, page 276.
`Param.HideHoldButton`	Bool	False	
`Param.HidePauseButton`	Bool	False	
`Param.HideResetButton`	Bool	False	
`Param.HideRestartButton`	Bool	False	
`Param.HideStartButton`	Bool	False	
`Param.HideStopButton`	Bool	False	
`Param.ModeNormal`	String	`O,P`	
`Param.NumInputParam`		`0`	Number of input parameters.
`Param.NumOutputParam`		`0`	Number of output parameters.

Parameter	Type	Initial Value	Description
`Param.DisplaySelection`	Integer	0	0: Pump Operation time, 1: Pump Operation Count, 2: Pump Idle time, 3: Pump Run Time
`Param.NumberofAssets`	Integer	2	Number of assets connected.

Default State Alarms

State Alarms for Pump Set Module

The table indicates for which attributes a state alarm is configured in the `$PumpSetCtrlCE` master template and provides the default values.

Attribute	Alarm message	Priority
AO.Failure	*Failure condition triggered during execution*	999
AO.Diagnosis.PumpSet.Alarm [1]	*At least one Pumping Asset is in failure*	999
AO.Diagnosis.PumpSet.Fail [1]	*Unable to run requested pumps*	500
AO.Diagnosis.PumpingAsset{x}.Alarm[1]	*Asset {y} alarm description*	999
AO.Diagnosis.PumpingAsset{x}.Fail[1]	*Asset {y} failure description*	500
[1] indicates that the User should acknowledge these alarms from the alarm banner.		
NOTE: {x} represents from 01 to 10 and {y} represents from 1 to 10.		

NOTE: You can modify the configuration from the Attributes page.

For details about the default `Strategy` and its applicable input parameters, EMState configured for `$PumpSetCtrlCE` template refer to, (see Modicon Libraries General Purpose, Equipment Module Components User Guide) .

For details about the default configuration for DATA1 to DATA4,, page 294.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

The symbols available for representing the Pump Set equipment module, refer, page 278.

Faceplates

Overview

During operation, clicking a equipment module graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation, page 280
  - Parameters (input and output parameters), page 283
  - State machine, page 285
  - Alarms, page 64
- Optional tabs:
  - Initial Conditions, page 56
  - Failures , page 59

Pump Set Pattern Object Configuration pages

What's in This Chapter

Default Configuration Pages

The Object configuration pages for pump set pattern are as follows:

- Main Page Default Configuration, page 286
- Initial Conditions Page Default Configuration, page 288
- Failure Conditions Page Default Configuration, page 289
- Input Parameters Page Default Configuration, page 290
- Output Parameters Page Default Configuration, page 291

Flow Control

What's in This Part

$PumpFlowCtrlCE: Flow Control Pattern Functions

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for Flow Control.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Description

Introduction

This object is used for controlling 10 pumping assets. A variable speed pump, an inlet valve, an outlet valve, and a drain valve are collectively referred to as a pumping asset.

Supervision Functions

For details about the Supervision functions for Flow Control Equipment Module, page 276.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

NOTE: You can configure optional functions from the template-specific configuration pages, page 297.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Initial Value	Description
Param.Data1.Desc	String	Equipment module diagnosis state	Refer to Equipment module,, page 276.
Param.Data1.Format	String	E	
Param.Data1.PV	Double	Me.EMPar.OP01.OP.PV	
Param.Data1.EU	String	Normal,0:Warning,1:Failure,2	
Param.Data2.Desc	String	Current Flow SP	
Param.Data2.Format	REAL	0.0	
Param.Data2.PV	Double	Me.EMPar.OP02.OP.PV	
Param.Data2.EU	String	-	
Param.Data3.Desc	String	Flow PV	
Param.Data3.Format	REAL	0.0	
Param.Data3.PV	Double	Me.EMPar.OP03.OP.PV	
Param.Data3.EU	String	-	
Param.Data4.Desc	String	Pumps required to achieve Flow SP	
Param.Data4.Format	String	0	
Param.Data4.PV	Double	Me.EMPar.OP04.OP.PV	
Param.Data4.EU	String	-	
Param.HideAbortButton	Bool	False	Refer to Equipment module,, page 276.
Param.HideHoldButton	Bool	False	
Param.HidePauseButton	Bool	False	
Param.HideResetButton	Bool	False	
Param.HideRestartButton	Bool	False	
Param.HideStartButton	Bool	False	
Param.HideStopButton	Bool	False	
Param.ModeNormal	String	O,P	
Param.NumInputParam		0	Number of input parameters.

Parameter	Type	Initial Value	Description
`Param.NumOutputParam`		`0`	Number of output parameters.
`Param.DisplaySelection`	Integer	`0`	0: Pump Operation time, 1: Pump Operation Count, 2: Pump Idle time, 3: Pump Run Time
`Param.NumberofAssets`	Integer	`2`	Number of assets connected.

Default State Alarms

State Alarms for Flow Control Equipment Module

The table indicates for which attributes a state alarm is configured in the `$PumpFlowCtrlCE` master template and provides the default values.

Attribute	Alarm message	Priority
AO.Failure	*Failure condition triggered during execution*	999
AO.Diagnosis.FlowCtl.Alarm [1]	*At least one Pumping Asset is in failure*	999
AO.Diagnosis.FlowCtl.Fail [1]	*Unable to run requested pumps*	500
AO.Diagnosis.PumpingAsset{x}.Alarm[1]	*Asset {y} alarm description*	999
AO.Diagnosis.PumpingAsset{x}.Fail[1]	*Asset {y} failure description*	500
[1] indicates that the User should acknowledge these alarms from the alarm banner.		
NOTE: {x} represents from 01 to 15 and {y} represents from 1 to 15		

NOTE: You can modify the configuration from the Attributes page.

For details about the applicable input parameters, `EMState` configured for `$PumpFlowCtrlCE` template refer to, (see Modicon Libraries General Purpose, Equipment Module Components User Guide).

For details about the default configuration for DATA1 to DATA4,, page 294.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

The symbols available for representing the Flow Control Equipment Module, refer, page 278.

Faceplates

Overview

During operation, clicking a equipment module graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation, page 280
  - Parameters (input and output parameters), page 283
  - State machine, page 285
  - Alarms, page 64
- Optional tabs:
  - Initial Conditions, page 56
  - Failures , page 59

Flow Control Pattern Object Configuration pages

What's in This Chapter

Default Configuration Pages

The Object configuration pages for Flow Control Equipment Module pattern are as follows:

- Main Page Default Configuration, page 286
- Initial Conditions Page Default Configuration, page 288
- Failure Conditions Page Default Configuration, page 289
- Input Parameters Page Default Configuration, page 290
- Output Parameters Page Default Configuration, page 291

Auxiliary Functions

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for the auxiliary function family.

You can use these templates with those of other families to provide additional services, data, symbols, and/or faceplates.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

$AlarmSummaryCE: Alarm Summary

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of alarms based on up to 15 conditions.

Supervision Functions

Description

Core resources provide the following monitoring and operation functions: Alarm configuration, enabling/disabling of alarms, simulation mode, management of individual alarm conditions.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.AlarmEnable`	Bool	True	If true, the alarm evaluation at the supervision level is enabled. If false, the alarm evaluation at the supervision level is disabled. **NOTE:** The alarm signal is not interpreted as an alarm at the supervision level but it continues being evaluated at the controller level. It is useful for signals to be monitored but not associated to an alarm.

Default State Alarms

State Alarms for Alarm Summary

The table indicates for which attributes a state alarm is configured in the *$AlarmSummaryCE* master template and provides the default values.

Attribute	Alarm message	Priority
AO.Alarm	*Digital Alarm*	500

NOTE: You can modify the configuration from the **Attributes** page.

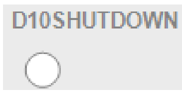
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available for representing the alarm summary:

Name	Graphic symbol	Description
AlarmText		Alarm text
StatusIndicator_H		Bullet with the label above
StatusIndicator_V		Bullet with the label on the right

Faceplates

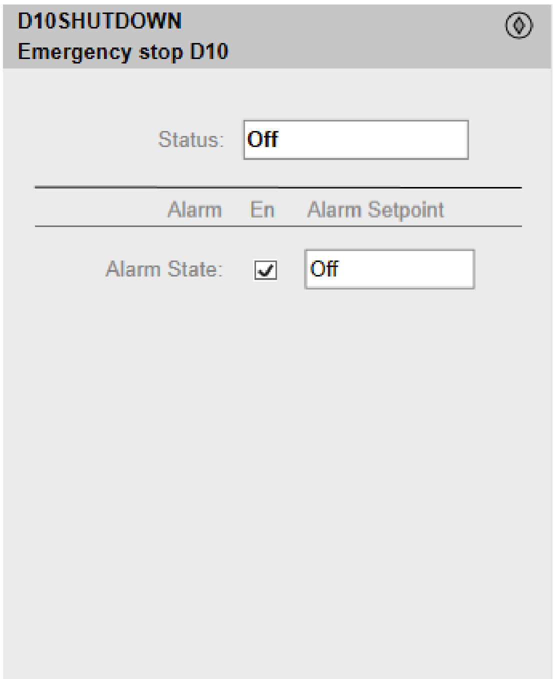
Overview

During operation, clicking the graphic symbol opens a faceplate with the following tabs:

- Standard tabs:
  - Operation
  - Engineering
  - Alarms, page 64
- Optional tabs:
  - Failures, page 59

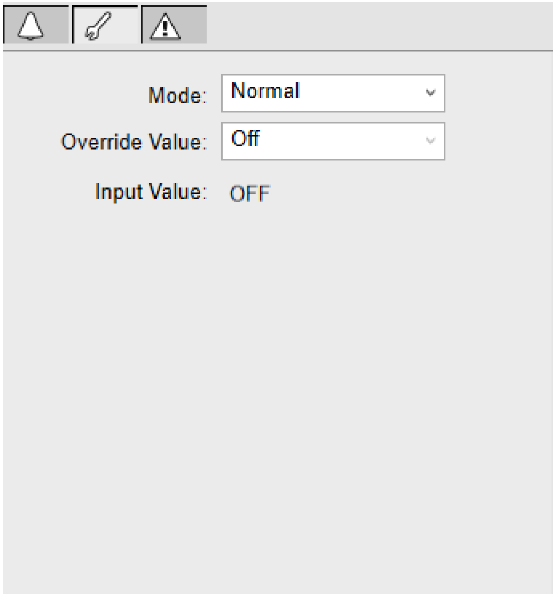
Operation Tab

The figure shows an example of the **Operation** tab.



Engineering Tab

The figure shows an example of the **Engineering** tab.



NOTE: This tab features the **Simulation** menu, which allows setting the control module to simulation mode.

In addition, the tab may feature another menu or text field, which allows you to configure the state or value to be simulated.

Enabling the simulation mode underlies a security classification, page 79. The default configuration is *tune*. It also triggers the display of an abnormal state, page 43 on the tab and on the symbol.

$AnalogSelectCE: Analog Signal Selection

What's in This Chapter

Overview

This chapter describes the *$AnalogSelectCE* master template, which contains supervision resources to monitor and select analog signals.

Supervision Functions

Description

The *$AnalogSelectCE* master template provides the following core monitoring and operation functions:

- Monitoring of values of up to four analog signals.
- Selecting one signal out of the monitored signals, either directly or by selecting the one with the highest or lowest value.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$AnalogSelectCE* master template attributes.

Name	Data type	Initial value	Description
`Param.EngUnits`	String	`%`	Indicates the unit of attributes.
`Param.HiSP`	Integer	`100`	High limit for the setpoint.
`Param.LoSP`	Integer	`0`	Low limit for the setpoint.
`Param.ModeNormal`	String	`O,P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program

Name	Data type	Initial value	Description
			For example, `O`, `P`.
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.
`Param.ShortDescSP1…` `Param.ShortDescSP4`	String	`SetPoint x` where *x* corresponds to the number of the parameter.	4 parameters, each one describing an analog signal, which is monitored. **NOTE:** The initial value is also available in Spanish.

Default State Alarms

State Alarms for Analog Signal Selection

The table indicates for which attributes a state alarm is configured in the *$AnalogSelectCE* master template and provides the default values.

Attribute	Description	Priority
ASelect11.St.Error	*Signal Error*	500

NOTE: You can modify the configuration from the **Attributes** page.

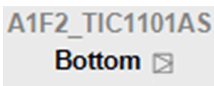
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$AnalogSelectCE* master template to display data for monitoring and selecting analog signals during operation.

Name	Graphic symbol	Description
`Desc_SP`		In addition to icons, the symbol displays (from top to bottom): • The label. • The short description of the selected signal.
`Indicator_SP`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • The value of the selected signal. • The short description of the selected signal.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

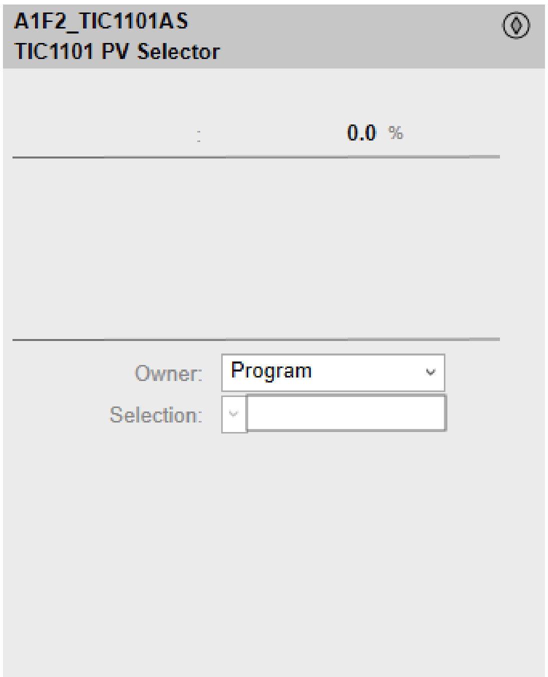
During operation, clicking an analog signal selection symbol opens a faceplate with the following tabs:

- Operation
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab. The description and value of the selected signal is shown at the top of the tab. The 2 available signals and their value are shown below.



$MessageBoxCE: Operator Messages

What's in This Chapter

Overview

This chapter describes the *$MessageBoxCE* master template, which contains supervision resources to manage messages to operators.

Supervision Functions

Description

The *$MessageBoxCE* master template provides the following core functions:

- Display of 1 message in the symbol and, in addition, in the faceplate:
  - Display and capture of up to 2 data items, which are associated with the message.
  - For each data item, display of up to 1 additional message.
- Configuration of the message mode with 4 different icons, which are displayed next to the symbol.
- Message treatment.
- Alarm management associated to the icons, which are displayed.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$MessageBoxCE* master template attributes.

Name	Data type	Initial value	Description
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.

Default State Alarms

State Alarms for Operator Messages

The table indicates for which attributes a state alarm is configured in the *$MessageBoxCE* master template and provides the default values.

Attribute	Description	Priority
MsgBox.AO.Stop	*MsgBox Error*	999
MsgBox.AO.Exclamation	*MsgBox Warning*	750

NOTE: You can modify the configuration from the **Attributes** page.

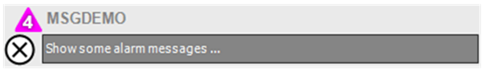
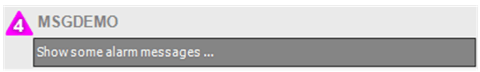
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MessageBoxCE* master template to display messages to the operator during operation.

Name	Graphic symbol	Description
`MsgBoxTypeNormal-WithIcon`		Displays the message by using element style *User_Defined_06*. It also displays the following icons, page 45 on the left-hand side of the message box: • Stop • Exclamation mark • Question mark • Information The icons blink when the **OK** or **OK** and **Cancel** buttons are enabled.
`MsgBoxTypeNormal-WithoutIcon`		Displays the message by using element style *User_Defined_07*, no icons.
`MsgBoxTypelargeWi-thIcon`		Displays icons in the same position and with the same behavior as symbol `MsgBoxTypeNormalWithIcon` but uses element style *User_Defined_02*, which has large-size text to display the message.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking an operator message box symbol opens a faceplate with the following tabs:

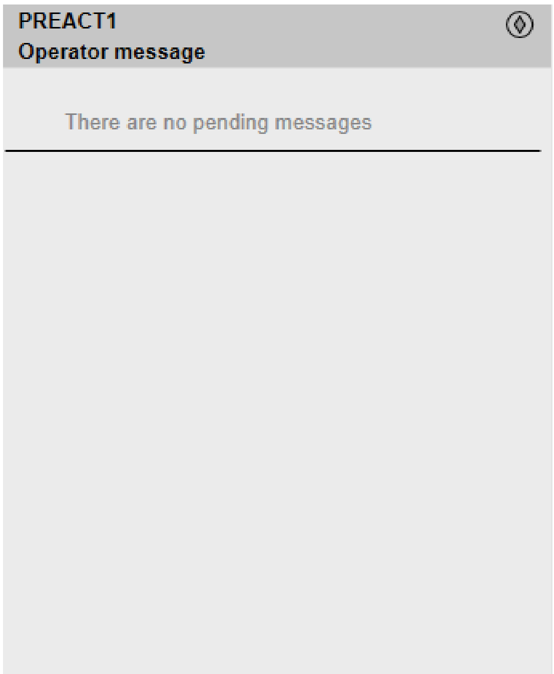
- Operation
- Alarms

Operation Tab

The items that are displayed depend on the configuration of the *sc* public variable (MSGBOX_SC_DDT) of the associated control resource:

- Icon and message.
- Up to 2 additional messages.
- A data item associated to each message. Entering data underlies the *Operate* security classification, page 34.
- **OK** or **OK** and **Cancel** buttons. Using these buttons underlies the *Operate* security classification, page 34

The figure shows an example of the operation tab featuring the icon, the message, as well as 2 additional messages with their associated data item. It also shows a button.



Alarms Tab

The *$MessageBoxCE* master template allows managing two alarms, page 36, which are associated to message modes that display the following icons:

- Exclamation mark icon: Alarm severity 3 (attribute *MsgBox.AO.Exclamation*).
- Stop icon: Alarm severity 4 (attribute *MsgBox.AO.Stop*).

For a description of the tab, refer to the topic documenting the alarms tab, page 64.

$SPBoolCE: Discrete Setpoints

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of setpoints of discrete data type.

Supervision Functions

Description

The *$SPBoolCE* template is used to enter a boolean setpoint/value from the supervision runtime. The value can be set by using various types of symbols that are referenced by the template.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.HideLegend`	Bool	False	If true, the legend (object description) is not displayed. If false, the legend is displayed.
`Param.PulseDuration`	Elapsed Time	00:00:0-5.0000-000	Period during which the output remains true when the button is clicked. Only applicable if the symbol is pushbutton, page 315 style.

Default State Alarms

State Alarms for Discrete Setpoints

No state alarm is configured by default for the *$SPBoolCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

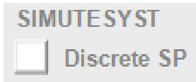
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available to represent discrete setpoints:

Name	Graphic symbol	Description
LatchButton		The output is set (1) when the symbol is latched and remains 1, until unlatched.
CheckBox		The output is set (1) when the check box is selected and remains 1, until unselected.
PulseButton		When clicked, the output is set (1) for a period that you can configure. Refer to Parameters, page 314

Faceplate

No faceplate is available.

$SPRealCE: Real Setpoints

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of setpoints of REAL data type.

Supervision Functions

Description

The *$SPRealCE* template is used to enter a real setpoint/value from the supervision runtime.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.EngUnits`	String	–	Unit of the setpoint (`SP`)
`Param.HideLegend`	Bool	False	If true, the legend (object description) is not displayed. If false, the legend is displayed.
`Param.HiPV`	Float	`100.0`	High limit for the setpoint value
`Param.LoPV`	Float	`0.0`	Low limit for the setpoint value
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of the setpoint. For example, enter `0.00` for 2 decimal.

Default State Alarms

State Alarms for Setpoints of Real Data Type

No state alarm is configured by default for the *$SPRealCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

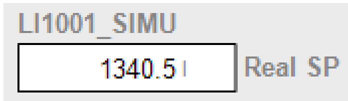
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available to represent REAL setpoints:

Name	Graphic symbol	Description
RealSetPoint		Setpoint value

Faceplate

No faceplate is available.

$SPIntCE: Integer Setpoints

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of setpoints of INT data type.

Supervision Functions

Description

The *$SPIntCE* template is used to enter an integer setpoint/value from the supervision runtime.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.EngUnits`	String	`%`	Unit of the setpoint
`Param.HideLegend`	Bool	False	If true, the legend (object description) is not displayed. If false, the legend is displayed.
`Param.HiPV`	Integer	`100`	High limit for the setpoint (`SP`)
`Param.LoPV`	Integer	`0`	Low limit for the setpoint
`Param.NumFormat`	String	`0.0`	Specifies the displaying format of setpoint. For example, enter `0.00` for 2 decimal.

Default State Alarms

State Alarms for Setpoints of Integer Data Type

No state alarm is configured by default for the *$SPIntCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

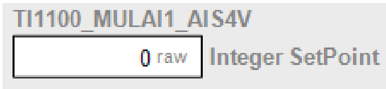
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available to represent integer setpoints:

Name	Graphic symbol	Description
IntegerSetPoint		Setpoint value

Faceplates

No faceplate is available.

$SPDurationCE: Duration Setpoints

What's in This Chapter

Overview

This chapter describes the supervision resources and runtime services that are available for the management of setpoints of Duration data type.

Supervision Functions

Description

The *SPDurationCE* template allows you to set a Control Expert variable of type TIME (or DINT) representing a time duration in milliseconds.

During operation, the symbol allows you to enter a duration in various ways, based on the format *DD.HH:MM:SS.MSS*.

The duration is displayed by using 5 time components:

Time component	Description		Maximum value(1)
DD	Days component		24
HH	Hours component		99(2)
MM	Minutes component		59
SS	Seconds component		59
MSS	Milliseconds component		999
(1) You need to configure the high end of the setpoint range accordingly.			
(2) Values equal to or higher than 24 are converted to days and hours.			

Rules Applicable to Durations

The table describes the rules that apply when you enter durations in the symbol during operation:

Object of the rule	Description	Example
Conversion of entries	The symbol converts hour values that you enter and that are equal to or higher than 24 to days and hours.	Entering `50:20:10` displays `2.02:20:10.000`
Durations starting with minutes components	To enter a duration in minutes and seconds or milliseconds, enter the value in the format `MM:SS` or `MM:SS.MSS`.	Entering `20:10` or `20:10.000` displays `20:10.000`
Durations expressed in seconds	The symbol accepts the entry of durations expressed in seconds in the format ###### and converts the value to the *DD.HH:MM:SS.MS* format. You cannot enter more than 6 digits; otherwise your entry is not accepted and the current value that is configured remains. **NOTE:** You can enter 999999 seconds maximum.	Entering `119` displays `1:59.000` Entering `3` displays `3.000`

Object of the rule	Description	Example
Durations expressed in milliseconds	The symbol accepts the entry of durations expressed in milliseconds in the format `0.###`.	Entering `0.200` displays `0.200`
Maximum duration	You cannot enter a value that is outside of the range configured in the parameters, page 321; otherwise your entry is not accepted and the current value that is configured remains.	-

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

This table describes the parameters of the automation object:

Parameter	Type	Default	Description
`Param.HideLegend`	Bool	False	If true, the legend (object description) is not displayed. If false, the legend is displayed.
`Param.HiPV`	Double	`1000.0`	High limit for the setpoint value
`Param.LoPV`	Double	`0.0`	Low limit for the setpoint value

Default State Alarms

State Alarms for Setpoints of Duration Data Type

No state alarm is configured by default for the *$SPDurationCE* master template.

NOTE: You can modify the configuration from the **Attributes** page.

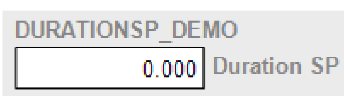
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

This table describes the symbols available to represent duration setpoints:

Name	Graphic symbol	Description
DurationSetPoint		Shows the time value and legend. Default display: `0.000`

Display Format

The table describes the rules that apply to display the duration values that you enter:

<table>
<tr><th>Description</th><th>Data entry example</th><th>Display</th></tr>
<tr><td rowspan="4">The symbol displays only the time components that you enter (or that is the result of the conversion), if different from 0, in the format DD.HH:MM:SS.MS.
NOTE:
• The leading 0 of the highest time component is not displayed.
• The millisecond component is displayed with 3 digits.
• The day component is displayed only if you enter a value for this component.</td><td><code>0.320</code></td><td><code>0.320</code></td></tr>
<tr><td><code>3.5</code></td><td><code>3.500</code></td></tr>
<tr><td><code>2:10:5</code></td><td><code>2:10:05.000</code></td></tr>
<tr><td><code>50:20:10</code></td><td><code>2.02:20:10.000</code></td></tr>
</table>

Faceplates

No faceplate is available.

$SchedulerCE: Scheduler function

What's in This Chapter

Overview

This chapter describes the *$SchedulerCE* master template, which contains supervision resources to schedules based on events or time driven schedules.

Supervision Functions

General Description

The `$SchedulerCE` template is used to schedules based on events or time driven schedules. The template allows user to select up to 10 different schedules which can be configured either event or time schedule

Functional Description

The main functions of motor template are described in the following table:

Function	Description
Time scheduling	The template compares the current PLC time with configured event times in the Schedule data. After comparison, the function block releases the outputs.
Event scheduling	The template compares the status of the event as per the event configured in template and if the event is active, then function block releases the outputs.
Scheduler status	Active or Inactive The scheduler module is in operation when scheduler status is set to active on faceplate.
Mode selection	The object can be switched to different modes of operation like On, Off, and Pulse.
Pulse timing	If user selects the mode as Pulse, then user can select the Pulse On time and Off time either in seconds, minutes, or hours based on the selection in Pulse Time In on the faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$SchedulerCE* master template attributes.

Name	Data type	Initial value	Description
`Param.NumFormat`	String	`0.0`	Specifies the display format of values. For example, enter *0.00* to display 2 decimals.

Default State Alarms

State Alarms for Scheduler function

No state alarms are configured for attributes of the $SchedulerCE master templates.

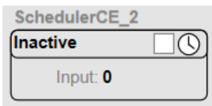
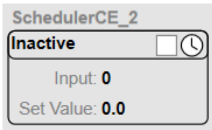
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$SchedulerCE* master template to display data for monitoring and selecting analog signals during operation.

Name	Graphic symbol	Description
Scheduler		Active scheduler with input value
Scheduler_SV		Inactive scheduler with input value

Faceplates

Representation of Supervision Data

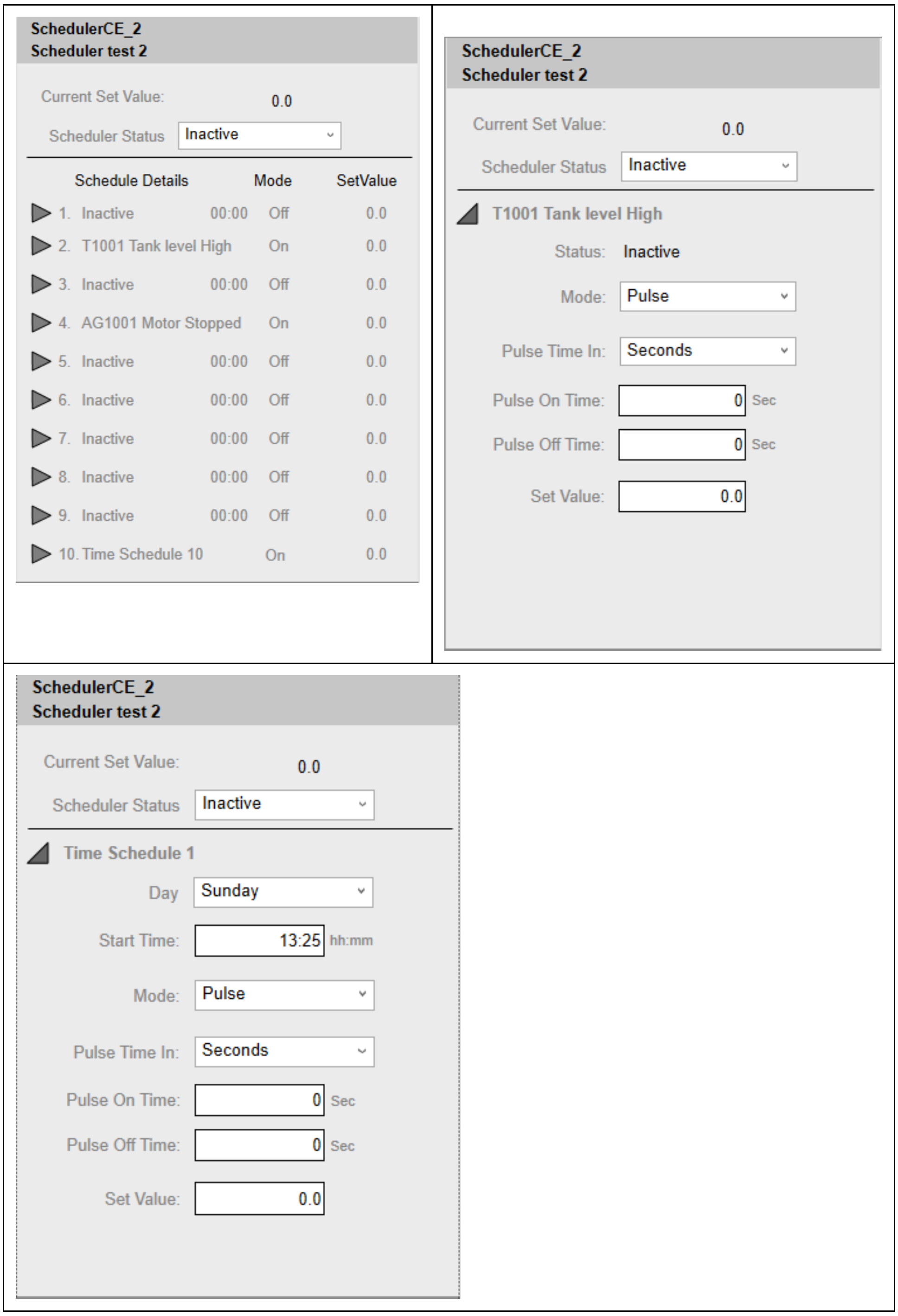
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking an analog signal selection symbol opens a faceplate with the following tabs:

- Operation

Operation Tab



Smart Device Control

What's in This Part

Overview

This part describes the master templates that provide the supervision functions for families of the device category.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Default State Alarms for Devices

What's in This Chapter

Default State Alarms for Devices

Description

The table indicates for which attributes a state alarm is configured in master templates of the device category, page 27 and provides the default values.

Attribute	Alarm message	Priority
AO.Namur.OutOfSpecs	*Out of Specs*	999
AO.Namur.MaintenanceR	*Maintenance Required*	999
AO.Namur.CheckFunction	*Check Function*	750
AO.Namur.Failure	*Failure*	500

NOTE: You can modify the configuration from the **Attributes** page.

Circuit Breakers

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for the circuit breaker family.

$CompactNSXMBUCE: Compact NSX Circuit Breakers

Overview

This section describes the *$CompactNSXMBUCE* master template, which contains supervision resources to monitor and operate Compact NSX circuit breakers.

Supervision Functions

Description

The *$CompactNSXMBUCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$CompactNSXMBUCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$CompactNSXMBUCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Compact NSX Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Compact NSX Circuit Breakers

The table indicates for which bits an alarm is configured in the *$CompactNSXMBUCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
COMPACT_CFG.DataStatus	2	*SD electrical trip*	*Failure*
	3	*SDE electrical trip*	*Failure*
	4	*Status Not available*	*Failure*
COMPACT_CFG.WarningCode	0	*User defined flag 201*	*Failure*

Word structure	Bit	Description	Namur status
	1	*User defined flag 202*	*Failure*
	2	*User defined flag 203*	*Failure*
	3	*User defined flag 204*	*Failure*
	4	*User defined flag 205*	*Failure*
	5	*User defined flag 206*	*Failure*
	6	*User defined flag 207*	*Failure*
	7	*User defined flag 208*	*Failure*
	8	*User defined flag 209*	*Failure*
	9	*User defined flag 210*	*Failure*
	10	*Long time protection*	*Failure*
	11	*Earth leakage*	*Failure*
	12	*Ground fault*	*Failure*
	13	*Long time pickup*	*Failure*
COMPACT_CFG.WarningOrderCode	1	*Wrong password*	*Check Function*
	2	*Modbus pad locked*	*Check Function*
	3	*Detected internal alarm*	*Failure*
	4	*Out of order*	*Check Function*
	5	*Need reset*	*Check Function*
	10	*Not present*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1**, **Discrete 2**, and **Discrete 3** pages.

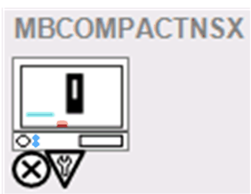
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$CompactNSXMBUCE* master template to display data of Compact NSX circuit breakers during operation.

Name	Graphic symbol	Description
`CompactNSX`		Compact NSX circuit breaker symbol and icons.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

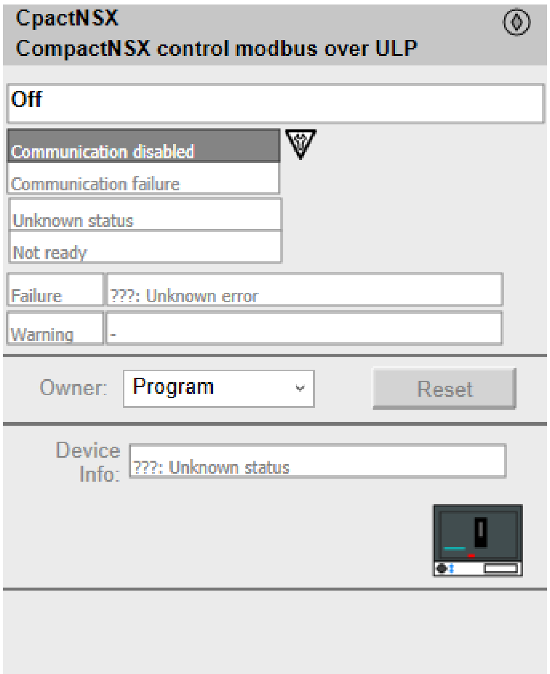
Available Tabs

During operation, clicking a Compact NSX circuit breaker symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

Operation Tab

The figure shows an example of the operation tab.



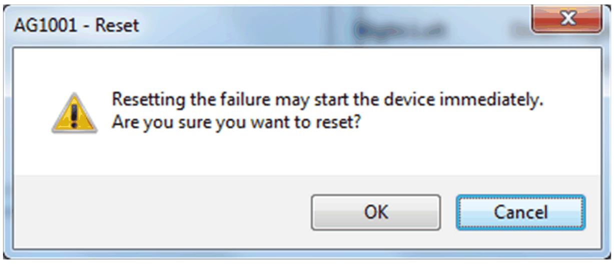
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param.FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$MasterpactMTZCMBUCE: Masterpact MTZ Circuit Breakers with Chassis

Overview

This section describes the *$MasterpactMTZCMBUCE* master template, which contains supervision resources to monitor and operate Masterpact MTZ circuit breakers.

Supervision Functions

Description

The *$MasterpactMTZCMBUCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$MasterpactMTZCMBUCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param. FailureRearmCon-firmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$MasterpactMTZCMBUCE* master template, alarms related to supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Masterpact Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Masterpact Circuit Breakers

The table indicates for which bits an alarm is configured in the *$MasterpactMTZCMBUCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
Masterpact_CFG.DataStatus	2	*SD Electrical trip*	*Failure*
	3	*SDE Electrical trip*	*Failure*
	4	*Discharged*	*Check function*
	6	*Not ready to close*	*Check function*
	10	*Chassis disconnected position*	*Check function*
	11	*Chassis test position*	*Check function*
Masterpact_CFG.WarningCodeExt	0	*Ground fault*	*Failure*
	1	*Earth leakage*	*Failure*
	2	*Chassis status discordance*	*Check function*
	3	*Unknown IO configuration*	*Check function*
Masterpact_CFG.WarningOrderCode	1	*Wrong password*	*Check function*

Word structure	Bit	Description	Namur status
	2	*IFE locking pad/EIFE intrusive command is locked*	*Check function*
	3	*IFM locking pad locked*	*Check function*
	4	*Resource/Module does not exist*	*Check function*
	5	*Timeout during command*	*Failure*
	6	*Circuit breaker tripped, reset before commands*	*Failure*
	7	*Circuit breaker already closed*	*Check function*
	8	*Circuit breaker already open*	*Check function*
	9	*Circuit breaker already reset*	*Check function*
	10	*Actuator in manual mode*	*Check function*
	11	*Actuator not present*	*Check function*
	12	*Inhibit mode on*	*Check function*

NOTE: You can modify the configuration from the **Discrete 1**, **Discrete 3** and **Discrete 4** application template tabs.

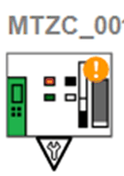
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MasterpactMTZCMBUCE* master template to display data of Masterpact circuit breakers during operation.

Name	Graphic symbol	Description
`MasterpactMTZC`		Symbol and icons for Masterpact MTZ circuit breakers with chassis.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

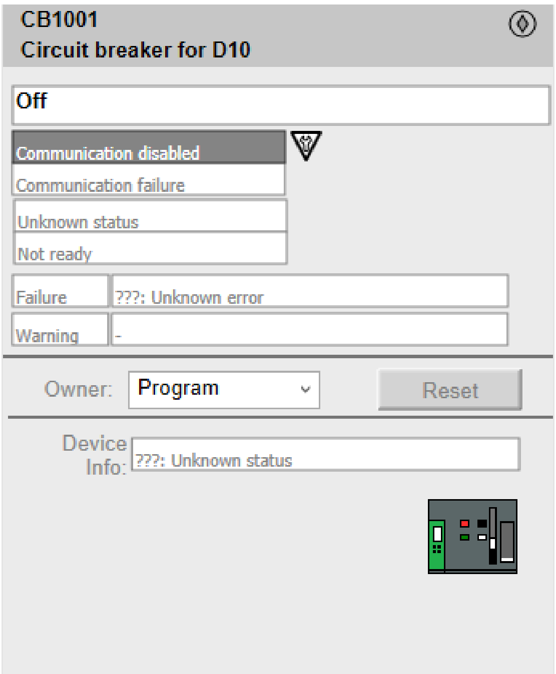
Available Tabs

During operation, clicking a Masterpact circuit breaker symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

Operation Tab

The figure shows an example of the operation tab.



NOTE: This tab features the control module **Reset** button. By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect. Refer to Parameters, page 332 in this chapter for description of the `Param.FailureRearmConfirmation` parameter, which allows you to configure the reset confirmation. For Reset Confirmation refer, page 58.

$MasterpactMTZMBUCE: Masterpact MTZ Circuit Breaker without Chassis

Overview

This section describes the *$MasterpactMTZMBUCE* master template, which contains supervision resources to monitor and operate Masterpact MTZ circuit breakers.

Supervision Functions

Description

The *$MasterpactMTZMBUCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$MasterpactMTZMBUCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$MasterpactMTZMBUCE* master template, alarms related to supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Masterpact Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Masterpact Circuit Breakers

The table indicates for which bits an alarm is configured in the *$MasterpactMTZMBUCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
Masterpact_CFG.DataStatus	2	*SD Electrical trip*	*Failure*
	3	*SDE Electrical trip*	*Failure*
	4	*Discharged*	*Check function*
	6	*Not ready to close*	*Check function*
Masterpact_CFG.WarningCodeExt	0	*Ground fault*	*Failure*
	1	*Earth leakage*	*Failure*
Masterpact_CFG.WarningOrderCode	1	*Wrong password*	*Check function*
	2	*IFE locking pad/EIFE intrusive command is locked*	*Check function*
	3	*IFM locking pad locked*	*Check function*
	4	*Resource/Module does not exist*	*Check function*
	5	*Timeout during command*	*Failure*
	6	*Circuit breaker tripped, reset before commands*	*Failure*
	7	*Circuit breaker already closed*	*Check function*
	8	*Circuit breaker already open*	*Check function*
	9	*Circuit breaker already reset*	*Check function*
	10	*Actuator in manual mode*	*Check function*
	11	*Actuator not present*	*Check function*
	12	*Inhibit mode on*	*Check function*

NOTE: You can modify the configuration from the **Discrete 1**, **Discrete 3** and **Discrete 4** application template tabs.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MasterpactMTZMBUCE* master template to display data of Masterpact circuit breakers during operation.

Name	Graphic symbol	Description
`MasterpactMTZwoC`		Symbol and icons for Masterpact MTZ circuit breakers without chassis.

Faceplates

Representation of Supervision Data

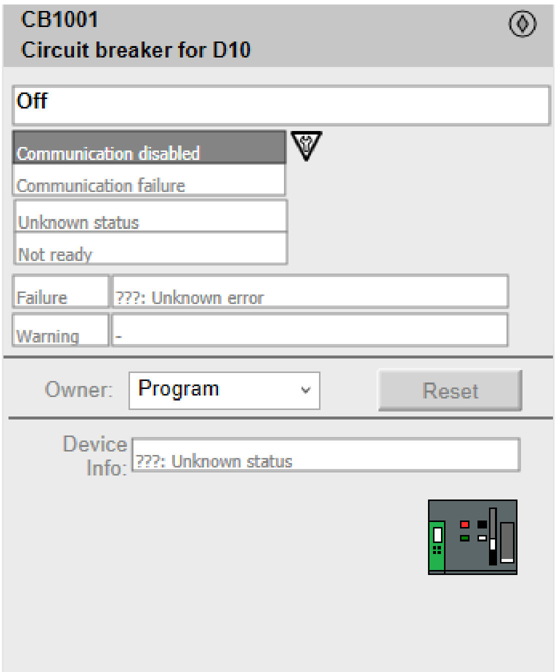
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking a Masterpact circuit breaker symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

Operation Tab



NOTE: This tab features the control module **Reset** button. By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect. Refer to Parameters, page 332 in this chapter for description of the `Param.FailureRearmConfirmation` parameter, which allows you to configure the reset confirmation. For Reset Confirmation refer, page 58.

$MasterpactNxMBUCE: Masterpact Nx Circuit Breaker without Chassis (x= T/W)

Overview

This section describes the *$MasterpactNxMBUCE* master template, which contains supervision resources to monitor and operate Nx circuit breakers.

Supervision Functions

Description

The *$MasterpactNxMBUCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$MasterpactNxMBUCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$MasterpactNxMBUCE* master template, alarms related to supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Masterpact Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Masterpact Circuit Breakers

The table indicates for which bits an alarm is configured in the *$MasterpactNxMBUCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
Masterpact_CFG.DataStatus	2	*SD Electrical trip*	*Failure*
	3	*SDE Electrical trip*	*Failure*
	4	*Discharged*	*Check function*
	6	*Not ready to close*	*Check function*
Masterpact_CFG.WarningCodeExt	0	*Ground fault*	*Failure*
	1	*Differential detected alarm (Vigi)*	*Failure*
Masterpact_CFG.WarningOrderCode	1	*Wrong password*	*Check function*
	2	*IFE locking pad/EIFE intrusive command is locked*	*Check function*
	3	*IFM locking pad locked*	*Check function*
	4	*Resource/Module does not exist*	*Check function*
	5	*Timeout during command*	*Failure*

Word structure	Bit	Description	Namur status
	6	*Circuit breaker tripped, reset before commands*	*Failure*
	7	*Circuit breaker already closed*	*Check function*
	8	*Circuit breaker already open*	*Check function*
	9	*Circuit breaker already reset*	*Check function*
	10	*Actuator in manual mode*	*Check function*
	11	*Actuator not present*	*Check function*
	12	*Inhibit mode on*	*Check function*

NOTE: You can modify the configuration from the **Discrete 1**, **Discrete 3** and **Discrete 4** application template tabs.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MasterpactNxMBUCE* master template to display data of Masterpact circuit breakers during operation.

Name	Graphic symbol	Description
`MasterpactNxwoC`		Symbol and icons for Masterpact Nx circuit breakers without chassis.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking a Masterpact circuit breaker symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: This tab features the control module **Reset** button. By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect. Refer to Parameters, page 332 in this chapter for description of the `Param.FailureRearmConfirmation` parameter, which allows you to configure the reset confirmation. For Reset Confirmation refer, page 58.

$MasterpactNxCMBUCE: Masterpact Nx Circuit Breakers with Chassis (x= T/W)

Overview

This section describes the *$MasterpactNxCMBUCE* master template, which contains supervision resources to monitor and operate Masterpact Nx circuit breakers.

Supervision Functions

Description

The *$MasterpactNxCMBUCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$MasterpactNxCMBUCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param. FailureRearmCon-firmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$MasterpactNxCMBUCE* master template, alarms related to supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Masterpact Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Masterpact Circuit Breakers

The table indicates for which bits an alarm is configured in the *$MasterpactNxCMBUCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
Masterpact_CFG.DataStatus	2	*SD Electrical trip*	*Failure*
	3	*SDE Electrical trip*	*Failure*
	4	*Discharged*	*Check function*
	6	*Not ready to close*	*Check function*
	10	*Chassis disconnected position*	*Check function*
	11	*Chassis test position*	*Check function*
Masterpact_CFG.WarningCodeExt	0	`Ground fault`	*Failure*
	1	`Earth leakage`	*Failure*
	2	`Chassis status discordance`	*Check Function*
	3	`Unknown IO configuration`	*Check Function*
Masterpact_CFG.WarningOrderCode	1	`Wrong password`	*Check Function*
	2	`IFE locking pad`	*Check Function*

Word structure	Bit	Description	Namur status
	3	IFM locking pad locked	*Check Function*
	4	Resource/Module does not exist	*Check Function*
	5	Timeout during command	*Failure*
	6	Circuit breaker tripped, reset before commands	*Failure*
	7	Circuit breaker already closed	*Check Function*
	8	Circuit breaker already open	*Check Function*
	9	Circuit breaker already reset	*Check Function*
	10	Actuator in manual mode	*Check Function*
	11	Actuator not present	*Check Function*
	12	Inhibit mode on	*Check Function*

NOTE: You can modify the configuration from the **Discrete 1**, **Discrete 3** and **Discrete 4** application template tabs.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MasterpactNxCMBUCE* master template to display data of Masterpact circuit breakers during operation.

Name	Graphic symbol	Description
MasterpactNxC		Symbol and icons for Masterpact Nx circuit breakers with chassis.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking a Masterpact circuit breaker symbol opens a faceplate with the following tabs:

- Operation

- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: This tab features the control module **Reset** button. By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect. Refer to Parameters, page 332 in this chapter for description of the `Param.FailureRearmConfirmation` parameter, which allows you to configure the reset confirmation. For Reset Confirmation refer, page 58.

$MasterpactHWCE: Hardwired Circuit Breaker

Overview

This section describes the *$MasterpactHWCE* master template, which contains supervision resources to monitor and operate Hardwired circuit breaker.

Supervision Functions

Description

The *$MasterpactHWCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$MasterpactHWCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$MasterpactHWCE* master template, alarms related to supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Masterpact Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Masterpact Circuit Breakers

The table indicates for which bits an alarm is configured in the *$MasterpactHWCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
HWCB_CFG.DataStatus	2	*SD Electrical trip*	*Failure*
	3	*SDE Electrical trip*	*Failure*
	7	*Chassis disconnected position*	*Check function*
	8	*Chassis test position*	*Check function*

NOTE: You can modify the configuration from the **Discrete 1** application template tab.

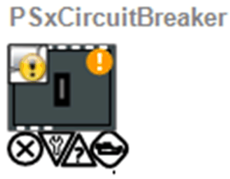
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$MasterpactHWCE* master template to display data of Hardwired circuit breakers during operation.

Name	Graphic symbol	Description
`Circuitbreaker`		Symbol and icons for Hardwired circuit breaker.

Faceplates

Representation of Supervision Data

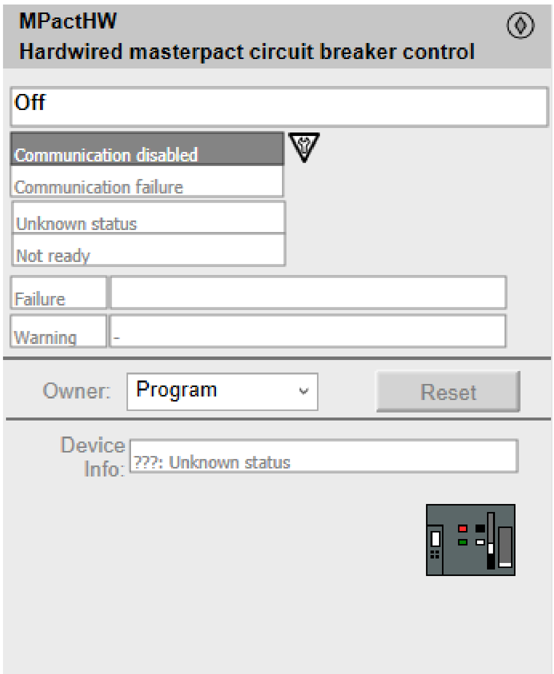
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking a Masterpact circuit breaker symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

Operation Tab



NOTE: This tab features the control module **Reset** button. By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect. Refer to Parameters, page 345 in this chapter for description of the `Param.FailureRearmConfirmation` parameter, which allows you to configure the reset confirmation. For Reset Confirmation refer, page 58.

$CompactHWCE: Hardwired Compact Circuit Breaker

Overview

This section describes the *$CompactHWCE* master template, which contains supervision resources to monitor and operate Hardwired Compact Circuit Breaker.

Supervision Functions

Description

The *$CompactHWCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$CompactHWCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$CompactHWCE* master template, alarms related to supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Compact Circuit Breakers

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Compact Circuit Breakers

The table indicates for which bits an alarm is configured in the *$CompactHWCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
HWCB_CFG.DataStatus	2	*SD Electrical trip*	*Failure*
	3	*SDE Electrical trip*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** application template tab.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$CompactHWCE* master template to display data of Hardwired circuit breakers during operation.

Name	Graphic symbol	Description
`hwcompact`		Symbol and icons for Hardwired Compact Circuit Breaker.

Faceplates

Representation of Supervision Data

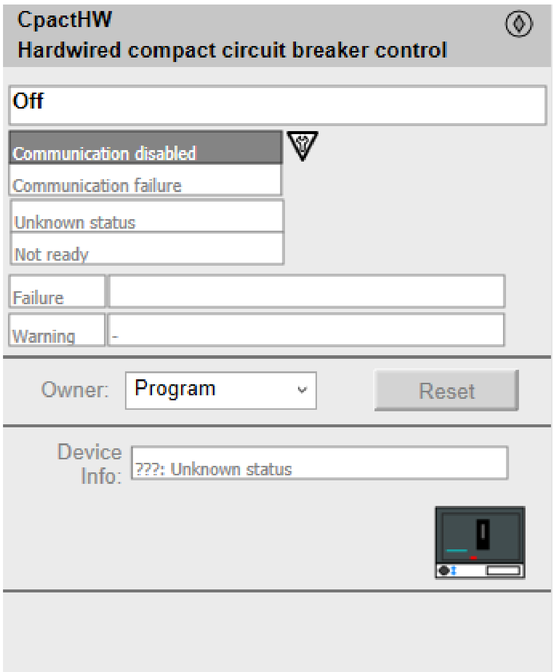
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

During operation, clicking a Compact circuit breaker symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

Operation Tab



NOTE: This tab features the control module **Reset** button. By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect. Refer to Parameters, page 345 in this chapter for description of the `Param.FailureRearmConfirmation` parameter, which allows you to configure the reset confirmation. For Reset Confirmation refer, page 58.

Digital Protection Relays

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for the digital protection relay family.

$Sepam80ECE and $Sepam80MBCE: *Sepam80* Digital Protection Relays

Overview

This section describes the supervision resources and runtime services that are available for the management of the $Sepam80ECE and $Sepam80MBCE protection relay.

Supervision Functions

Description

The supervision resources provide device status monitoring, communication status, owner selection, resetting, current commands, and device data.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$Sepam80ECE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param. FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$Sepam80ECE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Sepam 80

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Sepam 80

The table indicates for which bits an alarm is configured in the *$Sepam80ECE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
SEPAM_CFG.DataStatus	0	*Detected fault*	*Failure*
	3	*Trip*	*Failure*
	9	*Loss of synchronization*	*Failure*
	10	*Loss of event 1 data*	*Failure*
	12	*Detected partial fault*	*Failure*
	13	*Detected major fault*	*Failure*
	14	*Loss of event 2 data*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation

The table describes the symbols that are included in the *$Sepam80ECE* master template to display data of Sepam 80 digital protection relays during operation

Name	Graphic symbol	Description
`Sepam80C`		Sepam 80C symbol

Faceplates

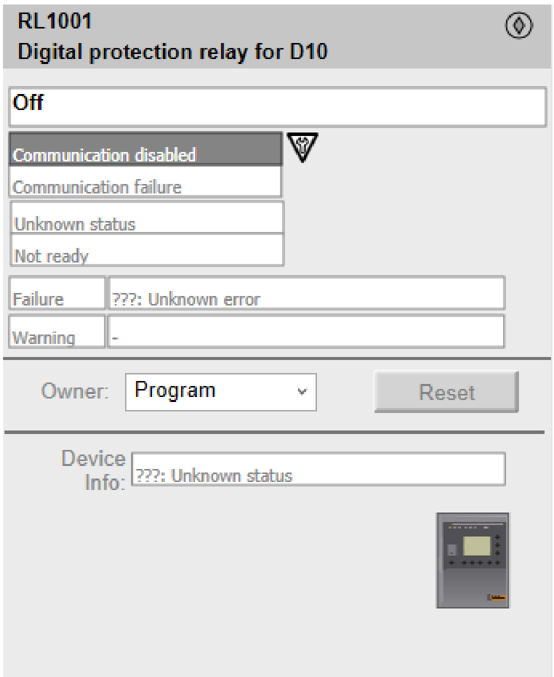
Overview

During operation, clicking a Sepam 80 graphic symbol opens a faceplate with the following tabs:

- Operation
- Analog Data, page 62
- Discrete Data, page 63
- Alarms, page 64

Operation Tab

The figure shows an example of the operation tab.



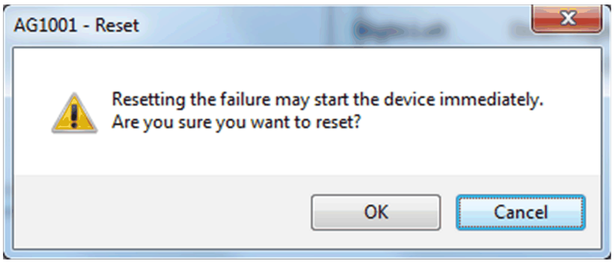
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$EasergyP3EMCE: Digital Protection Relays

Overview

This section describes the Supervision resources and runtime services that are available for the management of `$EasergyP3EMCE`

Supervision Functions

Description

The supervision resources provide device status monitoring, communication status, owner selection, resetting, current commands, and device data.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$EasergyP3EMCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param. FailureRearmCon-firmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$EasergyP3MCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for EasergyP3

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for EasergyP3

The table indicates for which bits an alarm is configured in the *$EasergyP3MCE* master template and provides the associated Namur status.

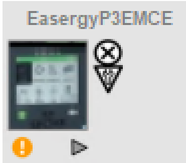
Word structure	Bit	Description	Namur status
EasergyP3_CFG.DataStatus	0	*Detected fault*	*Failure*
	3	*Trip*	*Failure*
	9	*Loss of synchronization*	*Failure*
	10	*Loss of event 1 data*	*Failure*
	12	*Detected partial fault*	*Failure*
	13	*Detected major fault*	*Failure*
	14	*Loss of event 2 data*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation

The table describes the symbols that are included in the *$EasergyP3MCE* master template to display data of EasergyP3 digital protection relays during operation

Name	Graphic symbol	Description
`EasergyP3EMCE`		EasergyP3 symbol.

Faceplates

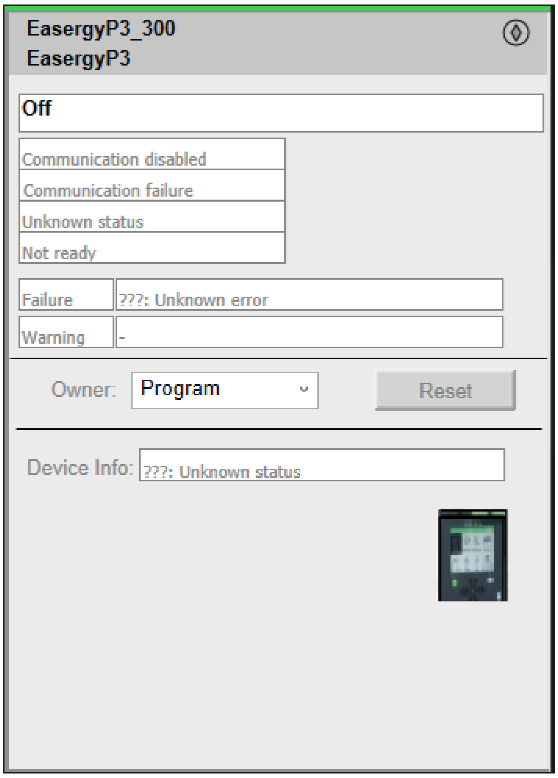
Overview

During operation, clicking a *EasergyP3* graphic symbol opens a faceplate with the following tabs:

- Operation
- Analog Data, page 62
- Discrete Data, page 63
- Alarms, page 64

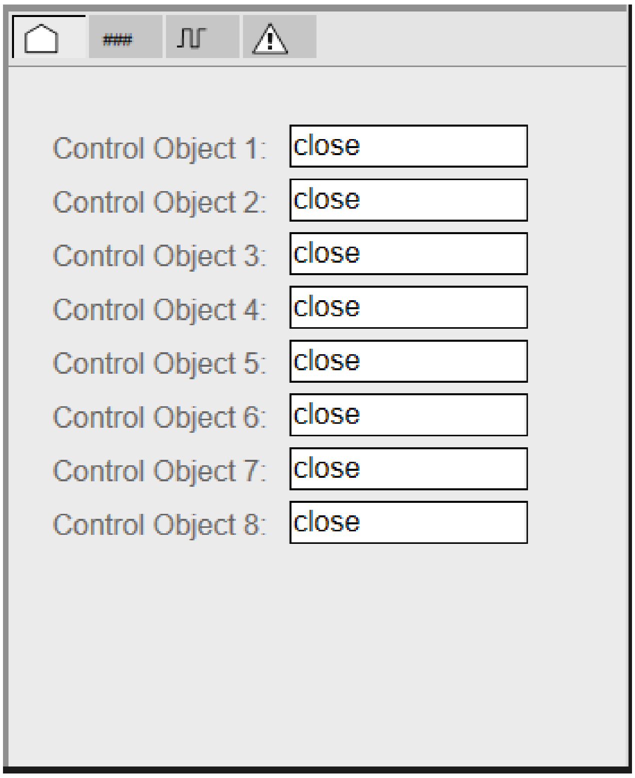
Operation Tab

The figure shows an example of the operation tab.



Extended Operator Tab

The figure shows an example of the extended operator tab.



$EasergyP5EMCE: Digital Protection Relays

Overview

This section describes the Supervision resources and runtime services that are available for the management of `$EasergyP5EMCE`

Supervision Functions

Description

The supervision resources provide device status monitoring, communication status, owner selection, resetting, current commands, and device data.

These functions are implemented in runtime through symbols and their associated faceplate.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$EasergyP5EMCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$EasergyP5EMCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for EasergyP5

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for EasergyP5

The table indicates for which bits an alarm is configured in the *$EasergyP5EMCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
EasergyP5_CFG.DataStatus	0	*Detected fault*	*Failure*
	3	*Trip*	*Failure*
	9	*Loss of synchronization*	*Failure*
	10	*Loss of event 1 data*	*Failure*
	12	*Detected partial fault*	*Failure*
	13	*Detected major fault*	*Failure*
	14	*Loss of event 2 data*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation

The table describes the symbols that are included in the *$EasergyP5EMCE* master template to display data of EasergyP5 digital protection relays during operation

Name	Graphic symbol	Description
`EasergyP5`		EasergyP5 symbol.

Faceplates

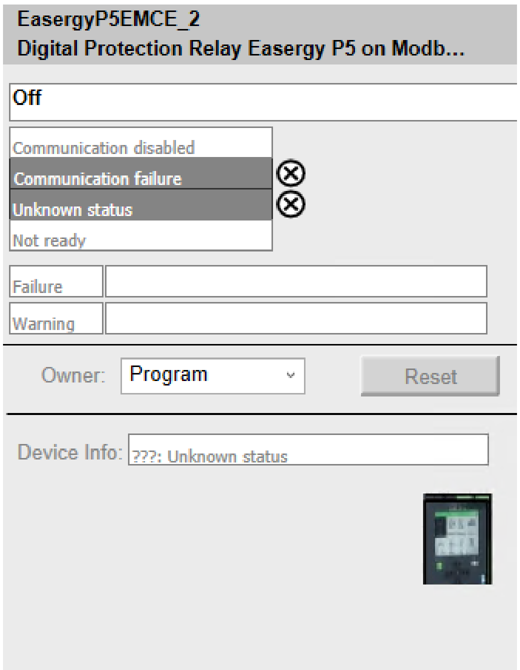
Overview

During operation, clicking a *EasergyP5* graphic symbol opens a faceplate with the following tabs:

- Operation
- Analog Data, page 62
- Discrete Data, page 63
- Alarms, page 64

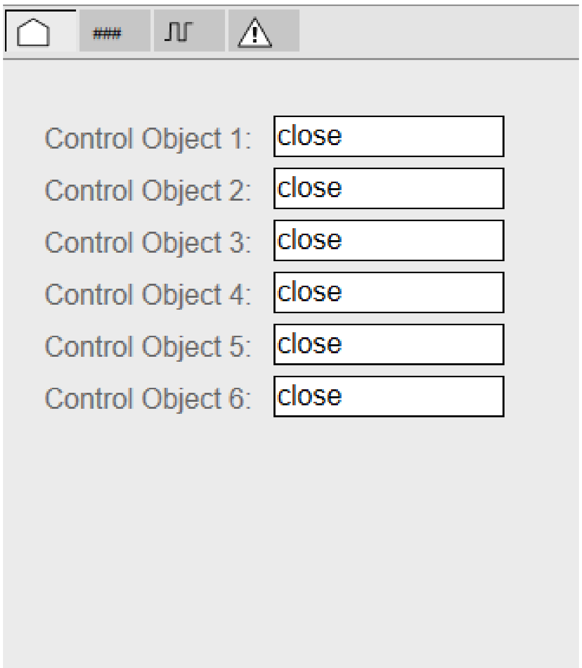
Operation Tab

The figure shows an example of the operation tab.



Extended Operator Tab

The figure shows an example of the extended operator tab.


###
Control Object 1: close
Control Object 2: close
Control Object 3: close
Control Object 4: close
Control Object 5: close
Control Object 6: close

Motor Controllers and Starters

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for the motor controller and starter family.

$TesysT: TeSys T Motor Controllers and Starters

Overview

This section describes the master templates that contain supervision resources to monitor and operate TeSys T motor controllers and starters.

The table indicates the relationship between master templates and TeSys T devices.

Master template	TeSys T device
$TesysTAllDataCE	Communicating by using either: • Ethernet Modbus TCP implicit messaging (normal I/O scanning) • Ethernet Modbus TCP explicit messaging • Modbus serial
$TesysTEFastCE	Communicating by using either: • Ethernet Modbus TCP implicit messaging (fast I/O scanning) • CANopen (device connected to an STB island)
$TesysTPBCE	Communicating by using Profibus network.

Supervision Functions

Description

The *$TesysTAllDataCE*, *$TesysTEFastCE* and *$TesysTPBCE* master templates provide the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$TesysTAllDataCE*, *$TesysTEFastCE* and *$TesysTPBCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.HiAvgCurrent`	Float	`100.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.LoAvgCurrent`	Float	`0.0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.
`AO.ResetFaultVisibility`	BOOL	False	Visible reset fault auth on *$TesysTPBCE*.
		True	Visible reset fault auth on *$TesysTAllDataCE* and *$TesysTEFastCE*.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$TesysTAllDataCE*, *$TesysTEFastCE* and *$TesysTPBCE* master templates, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for TeSys T Motor Controllers and Starters

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for TeSys T Motor Controllers and Starters

The table indicates for which bits an alarm is configured in the *$TesysTAllDataCE*, *$TesysTEFastCE* and *$TesysTPBCE* master templates and provides the associated Namur status.

Word structure	Bit	Description	Namur status
TESYST_CFG.DataStatus	2	*Device fault state*	*Failure*
	3	*Detected alarm*	*Failure*
	4	*Trip*	*Failure*
	11	*Detected fault*	*Function Check*
	14	*HMI communication lost*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

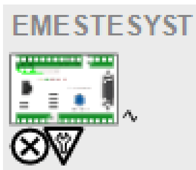
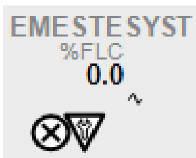
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

The table describes the symbols that are included in the *$TesysTAllDataCE*, *$TesysTEFastCE* and *$TesysTPBCE* master templates to display data of TeSys T motor controllers and starters during operation.

Name	Graphic symbol	Description
TesysT		TeSys T device symbol and icons.
TesysT_Amp		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • The average current value in engineering units.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

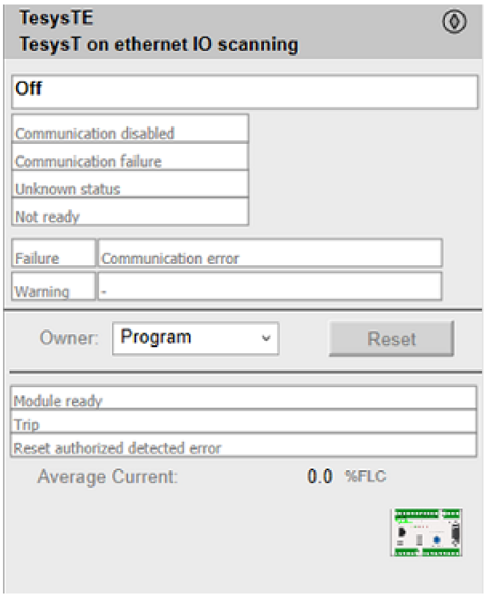
Available Tabs

During operation, clicking a TeSys T motor controller and starter symbol opens a faceplate with the following tabs:

- Operation
- Analog Data, page 62
- Discrete Data, page 63
- Alarms, page 64

Operation Tab

The figure shows an example of the operation tab.



NOTE: *FaultResetAuth* is not available for *$TesysTPBCE*.

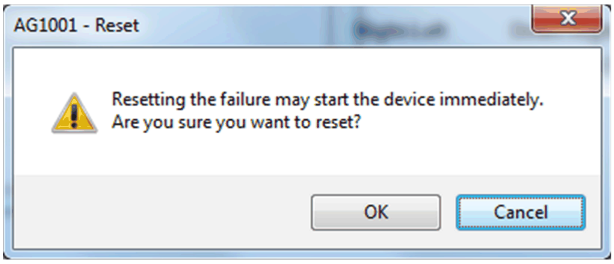
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$TesysU: TeSys U Motor Controllers and Starters

Overview

This section describes the following master templates that contain supervision resources to monitor and operate TeSys U motor controllers and starters, which use various protocols for communication..

Template	Communication protocol used by the device
$TesysUIOCE	Either of: • Modbus serial. • CANopen.
$TesysUMainDataCE	Either of: • Modbus serial. • CANopen.
$TesysUMECCE	Modbus serial.

Supervision Functions

Description

The *$TesysUIOCE*, *$TesysUMainDataCE*, and *$TesysUMECCE* master templates provide the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions such as communication interruption.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$TesysUIOCE*, *$TesysUMainDataCE*, and *$TesysUMECCE* master template attributes.

Parameter	Data type	Initial value	Description
`Param.HiAvgCurrent`	Float	`100.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.LoAvgCurrent`	Float	`0.0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$TesysUIOCE*, *$TesysUMainDataCE*, and *$TesysUMECCE* master templates, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for TeSys U Motor Controllers and Starters

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for TeSys U Motor Controllers and Starters

The table indicates for which bits an alarm is configured in the *$TesysUIOCE*, *$TesysUMainDataCE*, and *$TesysUMECCE* master templates and provides the associated Namur status.

Word structure	Bit	Description	Namur status
TESYSU_CFG.DataStatus	2	*Device in fault state*	*Failure*
	3	*Detected alarm*	*Failure*
	4	*Trip*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

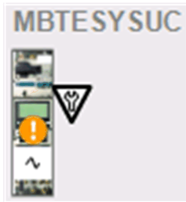
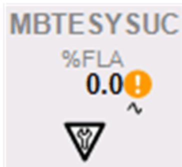
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Representation

The table describes the symbols that are included in the *$TesysUIOCE*, *$TesysUMainDataCE*, and *$TesysUMECCE* master templates to display data of TeSys U motor controllers and starters during operation.

Name	Graphic symbol	Description
TesysU		TeSys U device symbol and icons.
TesysU_Amp		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • The average current value in engineering units.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

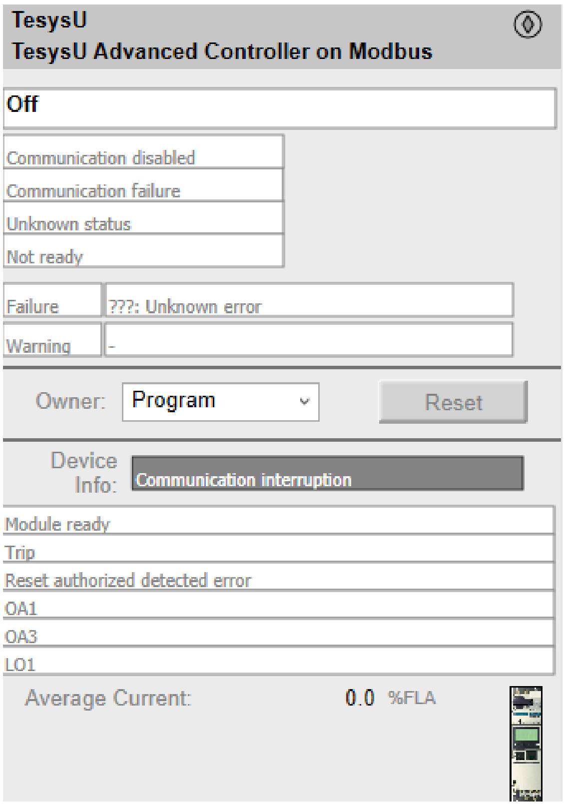
Available Tabs

During operation, clicking a TeSys U motor controller and starter symbol opens a faceplate with the following tabs:

- Operation
- Analog Data, page 62
- Discrete Data, page 63
- Alarms, page 64

Operation Tab

The figure shows an example of the operation tab.



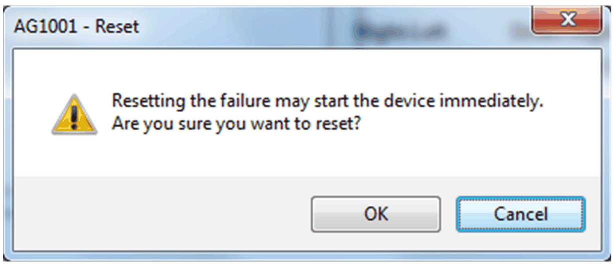
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Power Measurement

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for the power meter family.

$PM5350MBCE and *$PM53xxEMCE* : PM5350 and PM53xx Power Meters

Overview

This section describes the *$PM5350MBCE* and *$PM53xxEMCE* master templates, which contains supervision resources to monitor and operate PM5350 power meter by using Modbus serial communication and PM53xx power meter by using Ethernet explicit communication.

Supervision Functions

Description

The *$PM5350MBCE* and *$PM53xxEMCE* master templates provide the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions such as communication interruption.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$PM5350MBCE* and *$PM53xxEMCE* master templates attributes.

Name	Data type	Initial value	Description
Param.HiEnergy	Float	*10000000.0*	Defines the high limit of the present value to scale the Y axis for trending.
Param.LoEnergy	Float	*0.0*	Defines the low limit of the present value to scale the Y axis for trending.
Param.HiPower	Float	*100.0*	Defines the high limit of the present value to scale the Y axis for trending.
Param.LoPower	Float	*0.0*	Defines the low limit of the present value to scale the Y axis for trending.
Param.ModeNormal	String	*P*	Specifies the normal owner modes (separated by a comma): • *O*: Operator • *P*: Program For example *P,O*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$PM5350MBCE* and *$PM53xxEMCE* master templates, alarms related to core supervision functions are managed through attributes, which have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for PM5350 and PM53xx Power Meters

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for PM5350 and PM53xx Power Meters

In the *$PM5350MBCE* and *$PM53xxEMCE* master templates, there are no bits for which additional alarm conditions are configured.

NOTE: You can modify the configuration from the **Main** page.

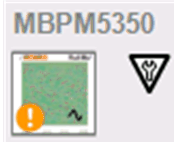
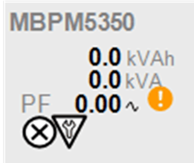
Graphic Representation

Representation of Supervision Data

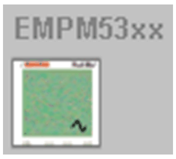
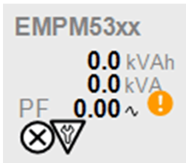
At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$PM5350MBCE* master template to display data of PM5350 power meters during operation.

Name	Graphic symbol	Description
`PM5350`		PM5350 power meter symbol and icons.
`PM5350_Power`		In addition to icons, the symbol displays (from top to bottom): • The label. • Apparent energy consumption with engineering units. • Total apparent power with engineering units. • Total power factor.

The table describes the symbols that are included in the *$PM53xxEMCE* master template to display data of PM53xx power meters during operation.

Name	Graphic symbol	Description
`PM53xx`		PM53xx power meter symbol and icons.
`PM53xx_Power`		In addition to icons, the symbol displays (from top to bottom): • The label. • Apparent energy consumption with engineering units. • Total apparent power with engineering units. • Total power factor.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

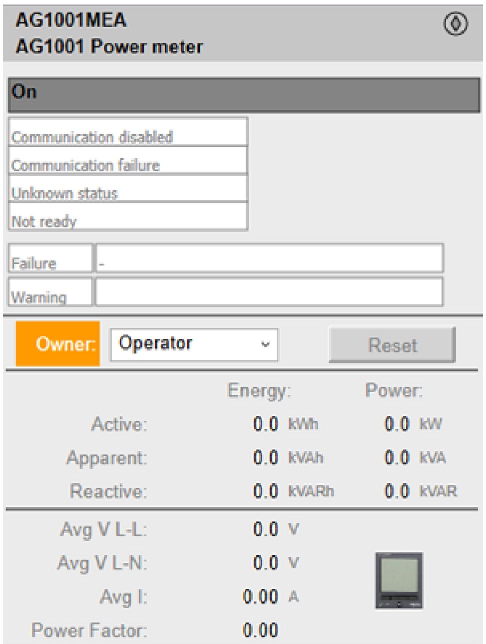
During operation, clicking a PM5350/PM53xx power meter symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Alarms, page 64

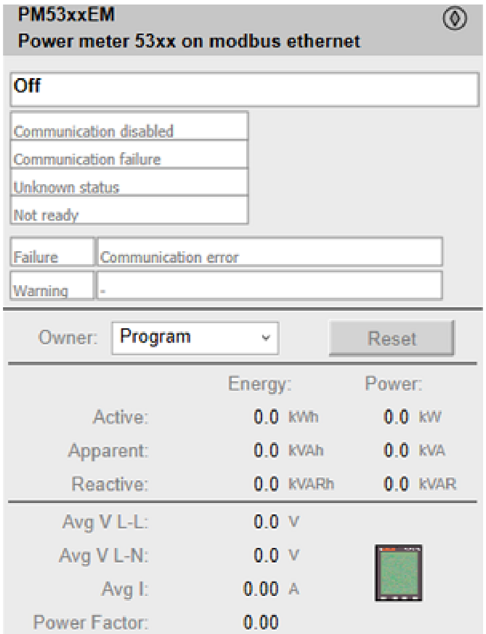
NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows the operation tab of `MBPM5350`.



The figure shows the operation tab of `EMPM53xx`.



NOTE: This tab features the control module **Reset** button.

$PM82xxEMCE: PM82xx Power Meter

Overview

This section describes the *$PM82xxEMCE* master template, which contains supervision resources to monitor and operate PM82xx power meter by using Ethernet explicit communication.

Supervision Functions

Description

The *$PM82xxEMCE* master template provide the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions such as communication interruption.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

> **NOTE:** You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The table describes the parameters that are defined as part of the *$PM82xxEMCE* master templates attributes.

Name	Data type	Initial value	Description
Param.HiEnergy	Float	*10000000.0*	Defines the high limit of the present value to scale the Y axis for trending.
Param.LoEnergy	Float	*0.0*	Defines the low limit of the present value to scale the Y axis for trending.
Param.HiPower	Float	*100.0*	Defines the high limit of the present value to scale the Y axis for trending.
Param.LoPower	Float	*0.0*	Defines the low limit of the present value to scale the Y axis for trending.
Param.ModeNormal	String	*P*	Specifies the normal owner modes (separated by a comma): • *O*: Operator • *P*: Program For example *P,O*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$PM82xxEMCE* master template, alarms related to core supervision functions are managed through attributes, which have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for PM82xx Power Meters

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for PM82xx Power Meters

In the *$PM82xxEMCE* master template, there are no bits for which additional alarm conditions are configured.

NOTE: You can modify the configuration from the **Main** page.

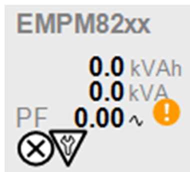
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$PM82xxEMCE* master template to display data of PM82xx power meters during operation.

Name	Graphic symbol	Description
`PM82xx`		PM82xx power meter symbol and icons.
`PM82xx_Power`		In addition to icons, the symbol displays (from top to bottom): • The label. • Apparent energy consumption with engineering units. • Total apparent power with engineering units. • Total power factor.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

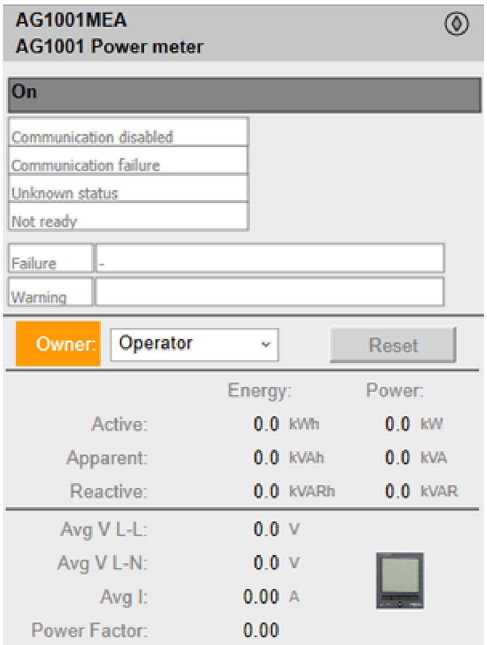
During operation, clicking a PM82xx power meter symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows the operation tab of `EMPM82xx`.



NOTE: This tab features the control module **Reset** button.

Soft Starters

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for the soft starter family.

$ATS22MBCE: Altistart 22 Soft Starters

Overview

This section describes the *$ATS22MBCE* master template, which contains supervision resources to monitor and operate Altistart 22 soft starters.

Supervision Functions

Description

The *$ATS22MBCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

> **NOTE:** You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATS22MBCE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiCurrent`	Float	`100.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.LoCurrent`	Float	`0.0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATS22MBCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altistart 22

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altistart 22

The table indicates for which bits an alarm is configured in the *$ATS22MBCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATS22_CFG.DataStatus	2	*Trip*	*Failure*
	3	*Detected alarm*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATS22MBCE* master template to display data of Altistart 22 soft starters during operation.

Name	Graphic symbol	Description
`ATS22`		Altistart 22 symbol and icons.
`ATS22_Amp`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Current on starter line 1 in Amperes. • Current on starter line 2 in Amperes. • Current on starter line 3 in Amperes.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

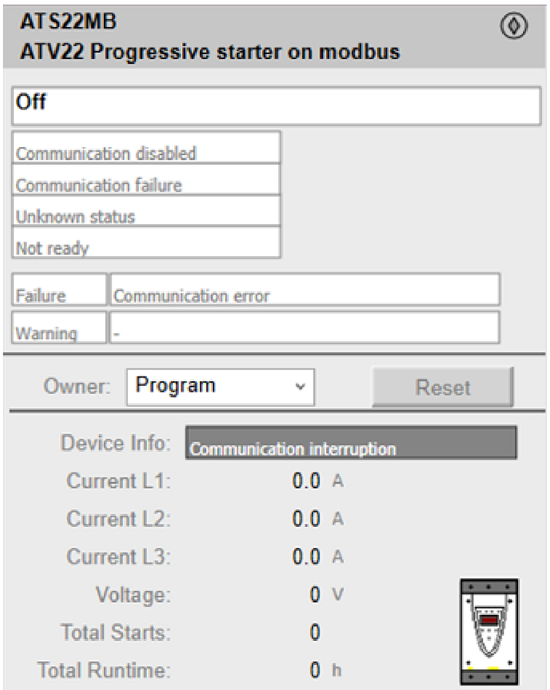
During operation, clicking an Altistart 22 soft starter symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



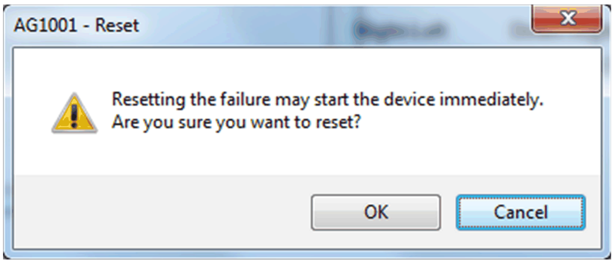
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$ATS48MBCE: Altistart 48 Soft Starters

Overview

This section describes the *$ATS48MBCE* master template, which contains supervision resources to monitor and operate Altistart 48 soft starters.

Supervision Functions

Description

The *$ATS48MBCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATS48MBCE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiCurrent`	Float	`100.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.LoCurrent`	Float	`0.0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATS48MBCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altistart 48

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altistart 48

The table indicates for which bits an alarm is configured in the *$ATS48MBCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATS_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

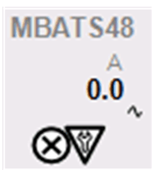
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATS48MBCE* master template to display data of Altistart 48 soft starters during operation.

Name	Graphic symbol	Description
`ATS48`		Altistart 48 symbol and icons.
`ATS48_Amp`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Current on starter line in Amperes.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

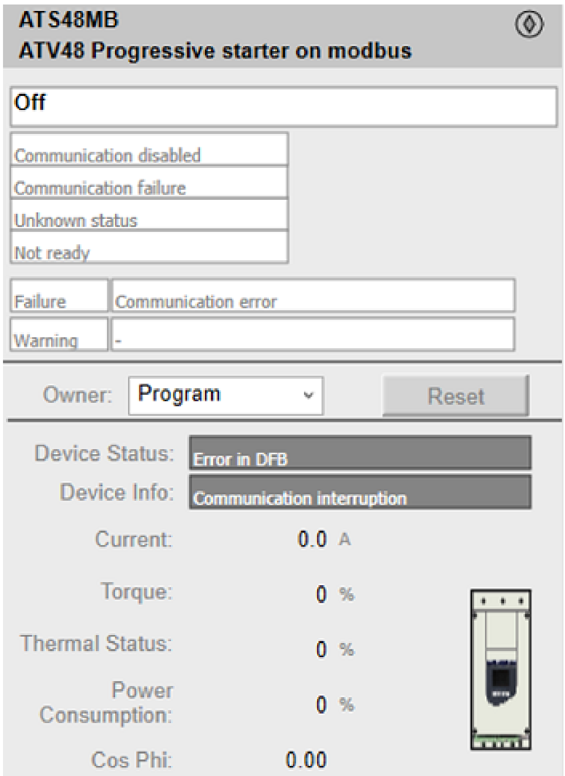
During operation, clicking an Altistart 48 soft starter symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



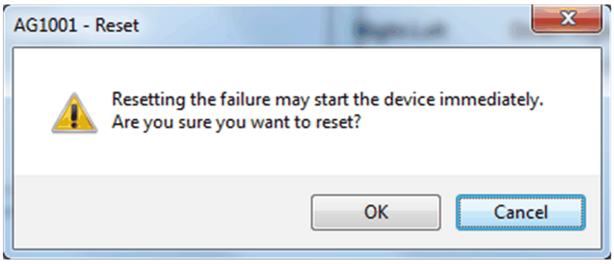
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

MBTCPATS480 - ATS480 (Modbus TCP/IP) and *EIPATS480 - ATS480 (Ethernet IP)*: Progressive Starters

Overview

This section describes the *$ATS480MBTCPCE* and *$ATS480EIPCE* master template, which contains supervision resources to monitor and operate Altistart 480 soft starters.

Supervision Functions

Description

The *$ATS480MBTCPCE* and *$ATS480EIPCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATS480MBTCPCE* and *$ATS480EIPCE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiCurrent`	Float	`1000.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.LoCurrent`	Float	`0.0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATS480MBTCPCE* and *$ATS480EIPCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altistart 480

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altistart 480

The table indicates for which bits an alarm is configured in the *$ATS480MBTCPCE* and *$ATS480EIPCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATS_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** page.

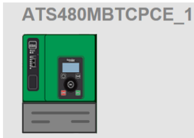
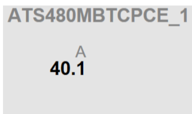
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATS480MBTCPCE* and *$ATS480EIPCE* master template to display data of Altistart 480 soft starters during operation.

Name	Graphic symbol	Description
`ATS480`		Altistart 480 symbol and icons.
`ATS48_Amp`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Current on starter line in Amperes.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

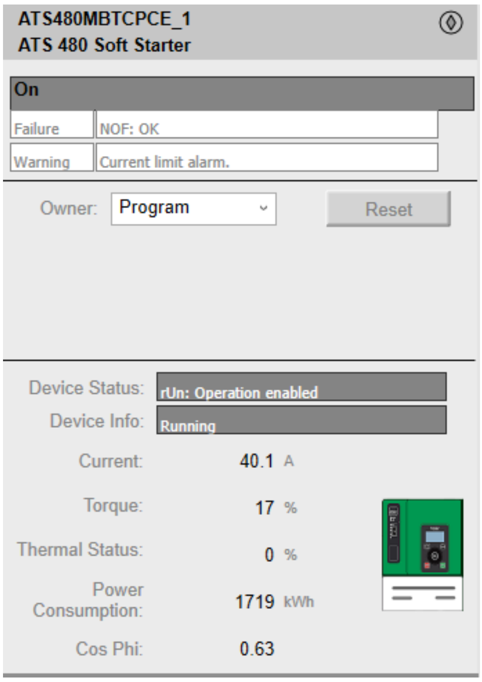
During operation, clicking an Altistart 480 soft starter symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



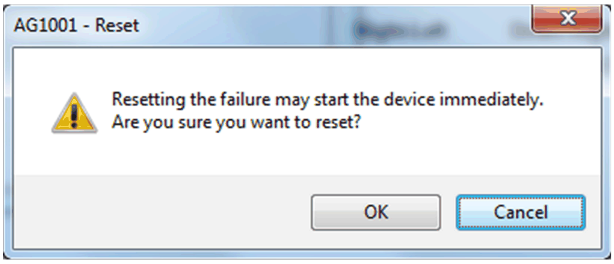
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param.FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Speed Drives

What's in This Chapter

Overview

This chapter describes the master templates that provide the supervision functions for the speed drive family.

$ATV6xxECE: Altivar 6xx Series Variable Speed Drives

Overview

This section describes the *$ATV6xxECE* master template, which contains supervision resources to monitor and operate Altivar 6xx series variable speed drives (*6xx* represents the device model number).

Supervision Functions

Description

The *$ATV6xxECE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Setting of speed setpoint and direction of rotation.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATV6xxECE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiPV`	Float	`100.0`	Defines the high limit of the present value to scale the Y axis for trending.
`Param.LoPV`	Float	`0.0`	Defines the low limit of the present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Defines the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmCon-firmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATV6xxECE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altivar 6xx Series Speed Drives

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altivar 6xx Series Speed Drives

The table indicates for which bits an alarm is configured in the *$ATV6xxECE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATV_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*
	10	*Speed setpoint outside of limit*	*Out Of Specs*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATV6xxECE* master template to display data of Altivar 6xx series variable speed drives during operation.

Name	Graphic symbol	Description
`ATV6xx`		Altivar 600 symbol and icons.
`ATV6xx_PV`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed.
`ATV6xx_PVSP`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed. • Direction of rotation setpoint. • Motor speed setpoint.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

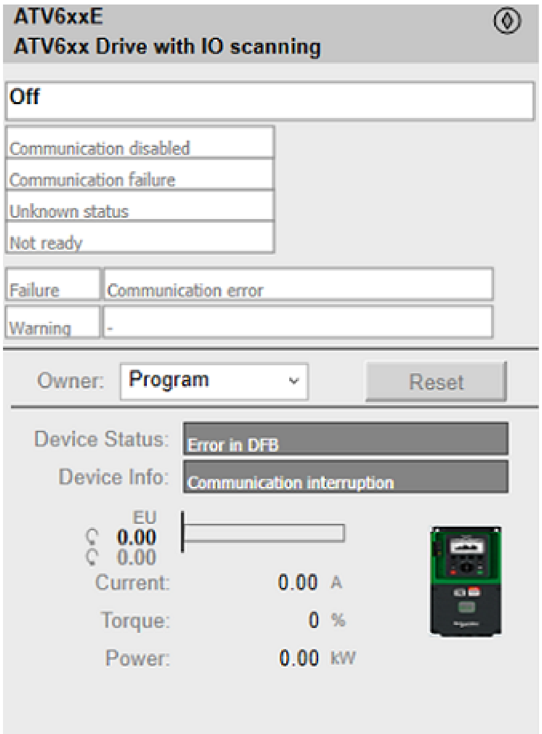
During operation, clicking an Altivar 6xx series variable speed drive symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



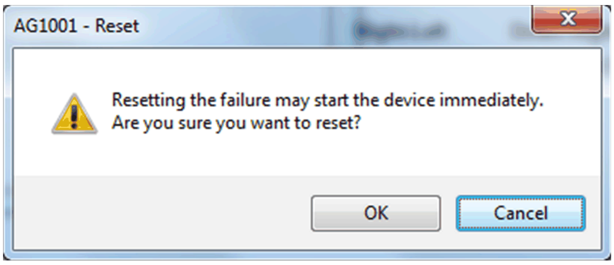
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$ATV9xxECE: Altivar 9xx Series Variable Speed Drives

Overview

This section describes the *$ATV9xxECE* master template, which contains supervision resources to monitor and operate Altivar 9xx series variable speed drives (*9xx* represents the device model number).

Supervision Functions

Description

The *$ATV9xxECE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Setting of speed setpoint and direction of rotation.
- Setting of torque setpoint.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATV9xxECE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiPV`	Float	`100.0`	Defines the high limit of the speed present value to scale the Y axis for trending.
`Param.LoPV`	Float	`0.0`	Defines the low limit of the speed present value to scale the Y axis for trending.
`Param.TorqueHiPV`	Float	`100.0`	Defines the high limit of the torque present value to scale the Y axis for trending.
`Param.TorqueLoPV`	Float	`0.0`	Defines the low limit of the torque present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Defines the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATV9xxECE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altivar 9xx Series Speed Drives

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altivar 9xx Series Speed Drives

The table indicates for which bits an alarm is configured in the *$ATV9xxECE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATV_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*
	10	*Speed setpoint outside of limit*	*Out Of Specs*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATV9xxECE* master template to display data of Altivar 9xx series variable speed drives during operation.

Name	Graphic symbol	Description
`ATV9xx`		Altivar 900 symbol and icons.
`ATV9xx_PV`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed.
`ATV9xx_PVSP`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed. • Direction of rotation setpoint. • Motor speed setpoint.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

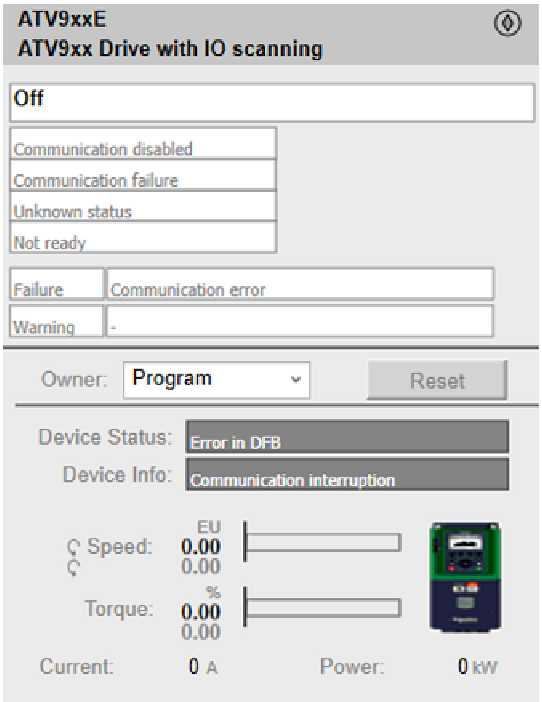
During operation, clicking an Altivar 9xx series variable speed drive symbol opens a faceplate with the following tabs:

- Operation, page 394
- Analog data, page 62
- Discrete data, page 63

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



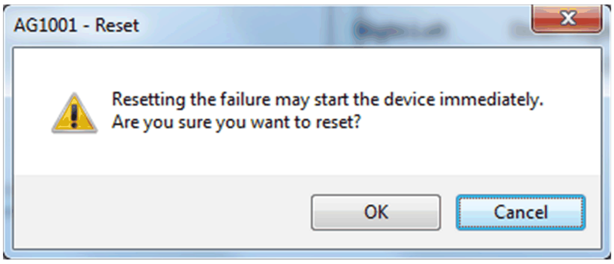
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$ATV6xxxECE: Altivar 6xxx Series Variable Speed Drives

Overview

This section describes the *$ATV6xxxECE* master template, which contains supervision resources to monitor and operate Altivar 6xxx series variable speed drives (*6xxx* represents the device model number).

Supervision Functions

Description

The *$ATV6xxxECE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Setting of speed setpoint and direction of rotation.
- Setting of torque setpoint.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATV6xxxECE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiPV`	Float	`100.0`	Defines the high limit of the speed present value to scale the Y axis for trending.
`Param.LoPV`	Float	`0.0`	Defines the low limit of the speed present value to scale the Y axis for trending.
`Param.TorqueHiPV`	Float	`100.0`	Defines the high limit of the torque present value to scale the Y axis for trending.
`Param.TorqueLoPV`	Float	`0.0`	Defines the low limit of the torque present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Defines the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATV6xxxECE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altivar 6xxx Series Speed Drives

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altivar 6xxx Series Speed Drives

The table indicates for which bits an alarm is configured in the *$ATV6xxxECE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATV_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*
	10	*Speed setpoint outside of limit*	*Out Of Specs*

NOTE: You can modify the configuration from the **Discrete 1** page.

Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATV6xxxECE* master template to display data of Altivar 6xxx series variable speed drives during operation.

Name	Graphic symbol	Description
`ATV6xxx`		Altivar 900 symbol and icons.
`ATV6xxx_PV`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed.
`ATV6xxx_PVSP`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed. • Direction of rotation setpoint. • Motor speed setpoint.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

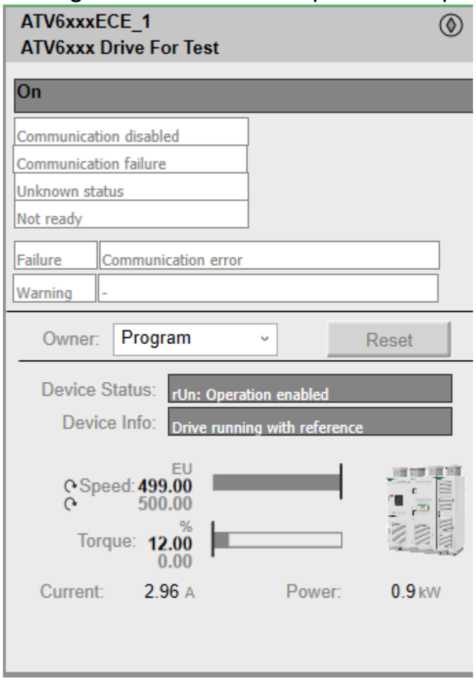
During operation, clicking an Altivar 6xxx series variable speed drive symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



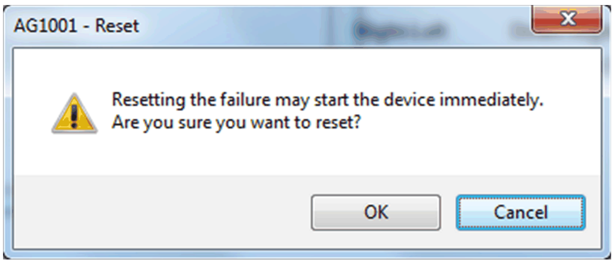
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$ATV320EMCE: Altivar 320 Series Variable Speed Drives

Overview

This section describes the *$ATV320EMCE* master template, which contains supervision resources to monitor and operate Altivar 320 series variable speed drives (*320* represents the device model number).

Supervision Functions

Description

The *$ATV320EMCE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Setting of speed setpoint and direction of rotation.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATV320EMCE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiPV`	Float	`100.0`	Defines the high limit of the speed present value to scale the Y axis for trending.
`Param.LoPV`	Float	`0.0`	Defines the low limit of the speed present value to scale the Y axis for trending.
`Param.TorqueHiPV`	Float	`100.0`	Defines the high limit of the torque present value to scale the Y axis for trending.
`Param.TorqueLoPV`	Float	`0.0`	Defines the low limit of the torque present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Defines the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATV320EMCE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altivar 320 Series Speed Drives

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altivar 320 Series Speed Drives

The table indicates for which bits an alarm is configured in the *$ATV320EMCE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATV_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*
	10	*Speed setpoint outside of limit*	*Out Of Specs*

NOTE: You can modify the configuration from the **Discrete 1** page.

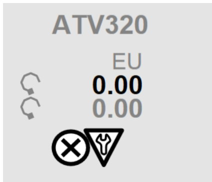
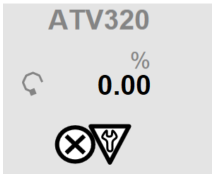
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATV320EMCE* master template to display data of Altivar 320 series variable speed drives during operation.

Name	Graphic symbol	Description
`ATV320`		Altivar 320 symbol and icons.
`ATV320_PV`		In addition to icons, the symbol displays (from top to bottom): • The label • Engineering units. • Direction of rotation. • Present motor speed.
`ATV320_PVSP`		In addition to icons, the symbol displays (from top to bottom): • The label • Engineering units. • Direction of rotation. • Present motor speed. • Direction of rotation setpoint. • Motor speed setpoint.
`ATV320_Item_PV`		In addition to icons, the symbol displays (from top to bottom): • The label • Engineering units of the item selected. • Direction of rotation. • Value of the item selected.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

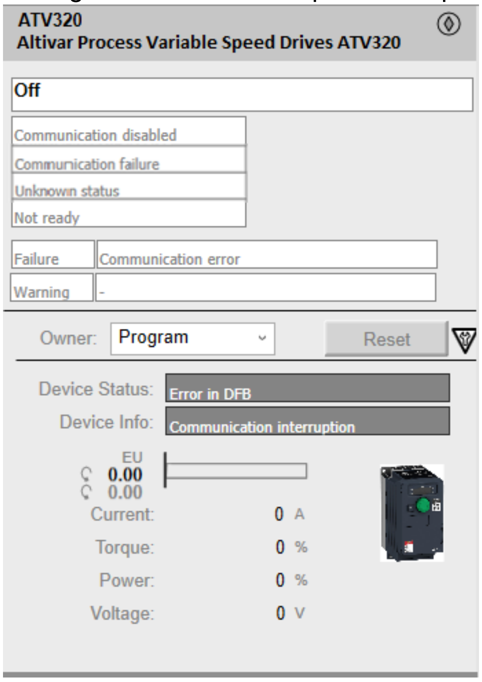
During operation, clicking an Altivar 320 series variable speed drive symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



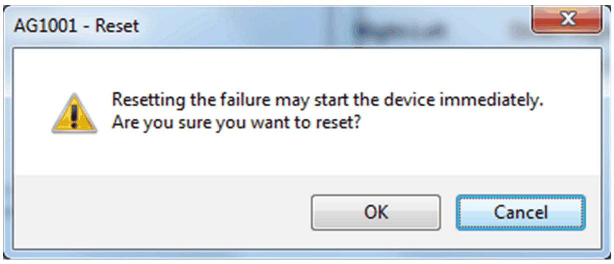
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

$ATV340CE: Altivar 340 Series Variable Speed Drives

Overview

This section describes the *$ATV340CE* master template, which contains supervision resources to monitor and operate Altivar 340 series variable speed drives (*340* represents the device model number).

Supervision Functions

Description

The *$ATV340CE* master template provides the following monitoring and operation functions:

- Device status and data monitoring.
- Setting of speed setpoint and direction of rotation.
- Setting of torque setpoint.
- Monitoring of abnormal conditions.
- Device logic resetting.
- Owner selection.
- Alarm signal management.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

NOTE: You can modify the default configuration in the corresponding configuration pages, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$ATV340CE* master template attributes.

Name	Data type	Initial value	Description
`Param.HiPV`	Float	`100.0`	Defines the high limit of the speed present value to scale the Y axis for trending.
`Param.LoPV`	Float	`0.0`	Defines the low limit of the speed present value to scale the Y axis for trending.
`Param.TorqueHiPV`	Float	`100.0`	Defines the high limit of the torque present value to scale the Y axis for trending.
`Param.TorqueLoPV`	Float	`0.0`	Defines the low limit of the torque present value to scale the Y axis for trending.
`Param.ModeNormal`	String	`P`	Defines the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example, `P,O`.

Name	Data type	Initial value	Description
`Param.FailureRearmConfirmation`	Boolean	`True`	*False* = After you click the **Reset** button on the faceplate during operation and have successfully validated the command according to the configured security classification, resets the control logic with no additional confirmation being required. *True* = After you click the **Reset** button on the faceplate during operation, displays a dialog box, which requires that you confirm the reset command. The control logic is reset only by clicking **OK** and validating the command according to the configured security classification. By default, the security classification is *secured write*.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$ATV340CE* master template, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Altivar 340 Series Speed Drives

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Altivar 340 Series Speed Drives

The table indicates for which bits an alarm is configured in the *$ATV340CE* master template and provides the associated Namur status.

Word structure	Bit	Description	Namur status
ATV_CFG.DataStatus	3	*Malfunction*	*Failure*
	7	*Detected alarm*	*Failure*
	10	*Speed setpoint outside of limit*	*Out Of Specs*

NOTE: You can modify the configuration from the **Discrete 1** page.

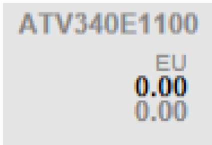
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the *$ATV340CE* master template to display data of Altivar 340 series variable speed drives during operation.

Name	Graphic symbol	Description
`ATV340`		Altivar 900 symbol and icons.
`ATV340_PV`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed.
`ATV340_PVSP`		In addition to icons, the symbol displays (from top to bottom): • The label. • Engineering units. • Direction of rotation. • Present motor speed. • Direction of rotation setpoint. • Motor speed setpoint.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

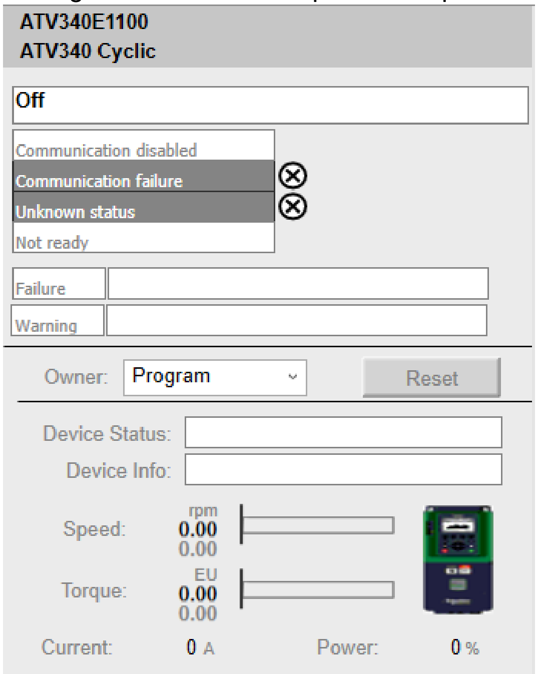
During operation, clicking an Altivar 340 series variable speed drive symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: The master template also features the trends faceplate.

Operation Tab

The figure shows an example of the operation tab.



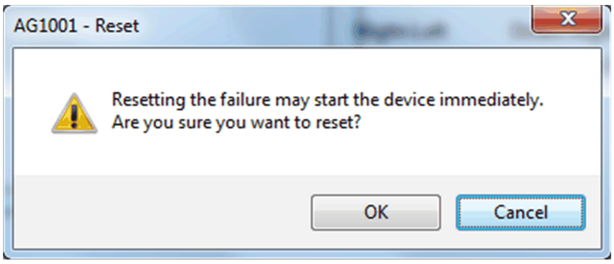
NOTE: This tab features the control module **Reset** button.

When the control module is reset, the current setpoint that is shown in this tab is effective.

By default, when you click **Reset**, a dialog box opens, which requires that you confirm the command for the reset of the control module to take effect.

Refer to *Parameters* in this chapter for a description of the *Param. FailureRearmConfirmation* parameter, which allows you to configure the reset confirmation.

The figure shows the confirmation dialog box which is model in nature.



Resetting the control module by clicking **OK** underlies a security classification, page 79. The default configuration is *secured write*.

When the reset confirmation dialog box is enabled, the security classification that normally applies when you click **Reset** is not effective.

Diagnosis

What's in This Part

Overview

This section describes the master templates that provide the supervision functions for the diagnosis category.

Schneider Electric provides the templates described in this document. These templates can be used in various applications to minimize engineering efforts but the use, integration, configuration, and validation of the system is the sole responsibility of the user. Said user must ensure the safety of the system as a whole by performing a safety analysis, including the resources provided by Schneider Electric through procedures that the user deems appropriate.

⚠WARNING

LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate.
- Review the implications of communication link interruptions and take actions to mitigate.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations.
- Apply local accident prevention and safety regulations and guidelines. [1]
- Test each implementation of this library for proper operation before placing it into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Controller Diagnosis

What's in This Chapter

Overview

This section describes the master templates that provides the supervision functions for the controller diagnosis.

$M340DiagCE and $M580DiagCE: Modicon Controller Diagnosis

Overview

This section describes the *$M340DiagCE* and *$M580DiagCE* master templates, which contain supervision resources to monitor and update real time clock in the controller.

Supervision Functions

Description

Use the master templates for the following controllers:

- *$M340DiagCE* for Modicon M340.
- *$M580DiagCE* for Modicon M580.

These master templates provide the following monitoring and operation functions:

- Viewing CPU-related information.
- Viewing controller status.
- Viewing communication status information.
- Monitoring of abnormal conditions.
- Updating the real-time clock (RTC).
- Alarm signal management.

  NOTE:

  - AUX task information is not available for CPUs of the M340 platforms.
  - Battery status information is not available for CPUs of the M340 and M580 platforms.

During operation, these functions are implemented by instances through symbols and their associated faceplate.

> **NOTE:** You can modify the default configuration in the corresponding configuration pages as applicable, page 77.

Parameters

Parameter Configuration

The initial value of the parameters described in this topic corresponds to what is considered the normal operating mode. You can modify the values in the derived application template or in its instances. You can access the parameters from the **Attributes** page of the object editor, page 89.

These parameters allow you to configure core functions.

Parameter Description

The tables describe the parameters that are defined as part of the *$M340DiagCE* and *$M580DiagCE* master template attributes.

Name	Data type	Initial value	Description
`Param.ModeNormal`	String	`P`	Specifies the normal owner modes (separated by a comma): • `O`: Operator • `P`: Program For example `P,O`.

Default State Alarms and Additional Alarm Conditions

Overview

In the *$M340DiagCE* and *$M580DiagCE* master templates, alarms related to core supervision functions are managed in the following ways:

- Certain attributes have associated state alarms. When the condition that is defined in the script, page 89 is satisfied, the alarm becomes active.
- Certain bits of the word structure that the master template manages have associated Namur statuses, page 38. When the bit is set, an alarm with the default priority that is associated to the status becomes active.

You can manage the alarms from the alarms tab of the faceplate during operation.

State Alarms for Modicon Controller Diagnostic

For a description of the attributes for which a state alarm is configured by default, refer to the topic describing default state alarms for devices, page 327.

Additional Namur Alarm Conditions for Modicon Controller Diagnostic

The table indicates for which bits an alarm is configured in the *$M340DiagCE* and *$M580DiagCE* master templates and provides the associated Namur status.

Customized reference	Bit	Description	Namur status
Me.Diagnostic.AO.DataStatus	0	*Controller Stopped*	*Function Check*
	3	*Detected Error in I/O*	*Failure*
	4	*Watchdog Overflow*	*Failure*

NOTE: You can modify the configuration from the **Discrete 1** and/or **Discrete 2** pages of the parent template *$PSxPACModicon*.

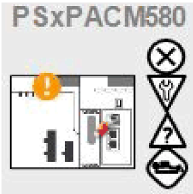
Graphic Representation

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in symbols.

Symbol Description

The table describes the symbols that are included in the master templates to display data of Modicon controllers during operation.

Master template	Symbol name	Graphic symbol	Description
$M340DiagCE	`PACM340`		M340 controller symbol and icons.
$M580DiagCE	`PACM580`		M580 controller symbol and icons.

Faceplates

Representation of Supervision Data

At the beginning of this document, you can find a general description, page 43 of the graphic elements and element styles that are used in faceplates.

Available Tabs

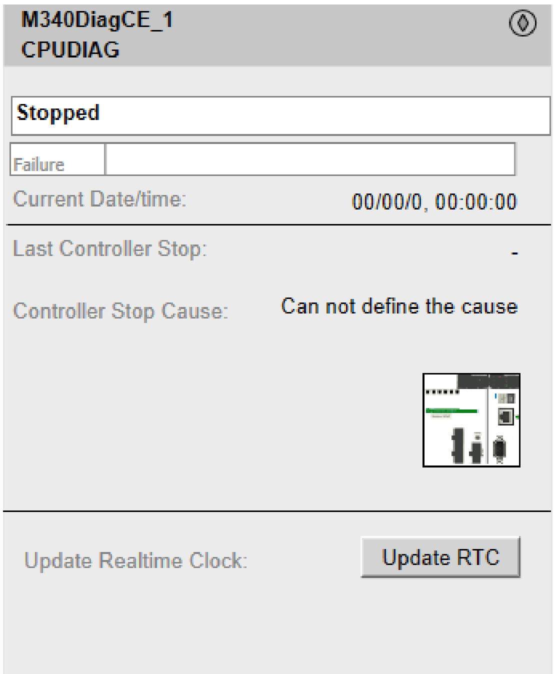
During operation, clicking a Modicon controller diagnostic symbol opens a faceplate with the following tabs:

- Operation
- Analog data, page 62
- Discrete data, page 63
- Alarms, page 64

NOTE: Analog Data tab **> Operating System and Comm Information** tab displays the information of processor patch version and firmware version. The value displayed is in decimal, user has to manually convert this decimal value to hexadecimal value to get the correct processor patch version and firmware version of the controller.

Operation Tab

The figure shows an example of the operation tab for a M340 controller, which opens when you click a `PACM340` symbol.



NOTE: The tab for M340 and M580 controllers is identical except for the controller graphic, which shows a controller-specific rack.

NOTE: In faceplate, **Analog** tab shows controller OS, patch and firmware information. The value displayed on the faceplate will be in decimal value when communicated with PLC simulator.

NOTICE

ERRONEOUS DATA LOGGING

Confirm the input date and time before setting the date and time in the controller.

Failure to follow these instructions can result in data loss.

The table indicates which attribute corresponds to the field or menu that appears on the tab.

Item	Attribute
Controller status	Statuses are indicated by using the following attributes: • Controller status: ◦ *Me.Diagnostic.AO.STW.10*. When true, **Booting** is displayed. ◦ *Me.Diagnostic.AO.STW.11*. When true, **Running** is displayed; when false, **Stopped**. • Abnormal conditions: ◦ *Me.Diagnostic.AO.STW.03*. When true, **Failure** is displayed and next to it the description from *Me.AO.Lastfailure* **NOTE:** These fields use the *active* and *passive* element styles, page 44.
Current Date/Time	*Me.Diagnostic.AO.ActualClock* RTC data. Format: *dd/mm/yyyy, hh:mm:ss*

Item	Attribute
Last Controller Stop	*Me.Diagnostic.AO.ActualClock* and *Me.Diagnostic.AO.CausePLCStop* RTC data and reason of last controller stop. RTC data format: *dd/mm/yyyy, hh:mm:ss*
Update Real-Time Clock (RTC)	Allows user to update Real-Time Clock on **Update RTC** button action from the faceplate, Current system date and time are passed to the following attributes individually: • *Me.Diagnostic.AO.RTC.Cfg.NEWDAY* • *Me.Diagnostic.AO.RTC.Cfg.NEWMONTH* • *Me.Diagnostic.AO.RTC.Cfg.NEWYEAR* • *Me.Diagnostic.AO.RTC.Cfg.NEWHOUR* • *Me.Diagnostic.AO.RTC.Cfg.NEWMIN* • *Me.Diagnostic.AO.RTC.Cfg.NEWSEC* The display format is: *dd/mm/yyyy hh:mm:ss* **NOTE:** For the M580 controller current UTC date and time are passed to the above mentioned attributes, however for M340 controllers current system date and time are passed.

Control/Supervision Relationship

What's in This Part

Control/Supervision Relationship

What's in This Chapter

Control Resources

In order to provide core and optional supervisory functions, ASP templates are configured to exchange data with the following control resources of the EcoStruxure Process Expert General Purpose Library for AVEVA System Platform.

NOTE: The ASP templates mentioned in the table are the application templates, hence prefixed with `a`.

Family	ASP template	Control Resource name	Pattern name
Signal processing	*$aAnalogInputCE*	AINPUTGP	*$aAnalogInputCE*
	$aAnalogOutputCE	AOUTPUTGP	*$aAnalogOutputCE*
	$aDigitalInputCE	DINPUTGP	*$aDigitalInputCE*
	$aDigitalOutputCE	DOUTPUTGP	*$aDigitalOutputCE*
	$aAnalogInMultiCE	MAInputGP	*$aAnalogInMultiCE*
	$aTotalCE	TotalGP	*$aTotalCE*
On/Off device control	*$aHandValveCE*	HVALVEGP	*$aHandValveCE*
	$aMotorCE	MOTORGP	*$aMotorCE*
	$aMotor2DirCE	MOTOR2GP	*$aMotor2DirCE*
	$aMValveCE	MVALVEDGP	*$aMValveCE*
	$aDualOPValveCE	DVALVEGP	*$aDualOPValveCE*
	$aValveCE	VALVEGP	*$aValveCE*
Analog device control	*$aControlValveCE*	CVALVEGP	*$aControlValveCE*
	$aMValvewithPosCE	MVALVEGP	*$aMValvewithPosCE*
	$aMotorVSCE	MOTORVSGP	*$aMotorVSCE*
Process control	*$aIMCTLCE*	IMCTLGP	*$aIMCTLCE*
	$aLeadLagCE	LDLGCTLGP	*$aLeadLagCE*
	$aPIDCE	PIDCTLGP	*$aPIDCE*
	$aPWMCtlCE	PWMCTL	*$aPWMCtlCE*
	$aRampCE	ARampGP	*$aRampCE*
	$aRatioCtrlCE	RATIOCTLGP	*$aRatioCtrlCE*
	$aSplitRangeCE	SPLRGCTLGP	*$aSplitRangeCE*
	$aStep3CtlCE	STEP3CTLGP	*$aStep3CtlCE*
Sequential control	*$aSequenceCE*	SEQCTLGP	*$aSequenceCE*
Batch Phase Manager	*$aPhaseCE*	PHASEGP	*$aPhaseCE*
Equipment module	*$aEMPatternCE*	EMCTLGP	*$aEMPatternCE*
Pump set	`$aPumpSetCtrlCE`	PUMPSETPATTERNGP	`$aPumpSetCtrlCE`
Flow control	`$aPumpFlowCtrlCE`	FLOWCTLPATTERNGP	`$aPumpFlowCtrlCE`
Auxiliary functions	*$aAlarmSummaryCE*	–	*$aAlarmSummaryCE*

Family	ASP template	Control Resource name	Pattern name
	$aAnalogSelectCE	ASELECTGP	*$aAnalogSelectCE*
	$aSPBoolCE	–	*$aSPBoolCE*
	$aSPRealCE	–	*$aSPRealCE*
	$aSPIntCE	–	*$aSPIntCE*
	$aSPDurationCE	–	*$aSPDurationCE*
	$aMessageBoxCE	MSGBOXGP	*$aMessageBoxCE*
	$aSchedulerCE	SCHEDULERGP	*$aSchedulerCE*
Circuit breakers	*$aCompactHWCE*	HWCIRCUITBREAKER	*$aCompactHWCE*
	$aCompactNSXMBUCE	MBUCOMPACTNSX	*$aCompactNSXMBUCE*
	$aMasterpactHWCE	HWCIRCUITBREAKER	*$aMasterpactHWCE*
	$aMasterpactMTZCMBUCE	MBUMASTERPACTMTZC	*$aMasterpactMTZCMBUCE*
	$aMasterpactMTZMBUCE	MBUMASTERPACTMTZ	*$aMasterpactMTZMBUCE*
	$aMasterpactNxCMBUCE	MBUMASTERPACTNxC	*$aMasterpactNxCMBUCE*
	`$aMasterpactNxMBUCE`	MBUMASTERPACTNx	`$aMasterpactNxMBUCE`
Digital protection relays	`$aSepam80ECE`	MBSEPAM80C	`$aSepam80ECE`
	`$aSepam80MBCE`	ESEPAM80C	`$aSepam80MBCE`
	`$aEassergyP3EMCE`	EMEassergyP3	`$aEassergyP3EMCE`
	`$aEassergyP5EMCE`	EMEassergyP5	`$aEassergyP5EMCE`
Motor controllers and starters	*$aTesysTAllDataCE*	EIOSTESYST	*$aTesysTAllDataCE*
		EMESTESYST	
		MBTESYST	
	$aTesysTEFastCE	ETESYST	*$aTesysTEFastCE*
	$aTesysTPBCE	PBTESYST	*$aTesysTPBCE*
	$aTesysUIOCE	MBTESYSUC	*$aTesysUIOCE*
		TESYSUC	
	$aTesysUMainDataCE	TESYSUCTL	*$aTesysUMainDataCE*
		MBTESYSUSCST	
		TESYSUSCST	
	$aTesysUMECCE	MBTESYSUSC	*$aTesysUMECCE*
		TESYSUSC	
Power meters	*$aPM5350MBCE*	MBPM5350	*$aPM5350MBCE*
	`$aPM53xxEMCE`	EMPM53xx	`$aPM53xxEMCE`
	`$aPM82xxEMCE`	EMPM82xx	`$aPM82xxEMCE`
Soft starters	*$aATS22MBCE*	MBATS22	*$aATS22MBCE*
	$aATS48MBCE	MBATS48	*$aATS48MBCE*
	$aMBTCPATS480	MBATS480	*$aMBTCPATS480*
Speed drives	*$aATV6xxECE*	ATV6xx	*$aATV6xxECE*
	$aATV9xxECE	ATV9xx	*$aATV9xxECE*
	$aATV6xxxCE	ATV6xxx	*$aATV6xxxCE*
	$aATV320CE	ATV320	*$aATV320CE*
	$aATV340CE	EMESATV340, EIOSATV340	*$aATV340CE*
Modicon controllers	*$aM340DiagCE*	GENSTS	*$aM340DiagCE*
		COMM	
		OSINFO	

Family	ASP template	Control Resource name	Pattern name
		RTC	
		MASTINFO	
		LASTSTOP	
		FASTINFO	
	$aM580DiagCE	GENSTS	*$aM580DiagCE*
		COMM	
		OSINFO	
		RTC	
		MASTINFO	
		LASTSTOP	
		FASTINFO	
		AUX1INFO	
		AUX0INFO	

Optional services	Control resource name	Pattern name
Interlock	ILCKOnGP ILCKOffGP	$iOpenILockCE $iCloseILockCE $iILCKCE $iILockOnCE $iILockOn1CE $iInitCondCE $iForwardILockCE $iReverseILockCE
Failures	CondSumGP	$iCondsumCE $iCondsum2CE $iCondsum3CE $iCondsum4CE $iFCCondsumCE $iSeqCondsumCE $iSeqInitCondCE
Maintenance	DevMNTGP MotorMNTGP ValveMNTGP	$iMNTCE $iDevmntCE $iDValveDevmntCE $iValveDevmntCE
Local Panel	MotorLPGP Motor2LPGP ValveLPGP MValveLPGP DValveLPGP MValveDLPGP CValveLPGP AOutputLPGP	$iDevlpCE $iMotor2DevlpCE $iValveDevlpCE $iDValveDevlpCE $iMValveDLPCE $iAoutputLPCE

Index

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

V

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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