



# Process Expert - General Purpose Library Classic

## Diagnostic Supervision Services Reference Manual

EIO0000001528.17  
03/2023



# Legal Information

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this guide are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owners.

This guide and its content are protected under applicable copyright laws and furnished for informational use only. No part of this guide may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the guide or its content, except for a non-exclusive and personal license to consult it on an "as is" basis. Schneider Electric products and equipment should be installed, operated, serviced, and maintained only by qualified personnel.

As standards, specifications, and designs change from time to time, information contained in this guide may be subject to change without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this material or consequences arising out of or resulting from the use of the information contained herein.

As part of a group of responsible, inclusive companies, we are updating our communications that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

© 2023 – Schneider Electric. All rights reserved.

---

# Table of Contents

Safety Information .....	5
Qualification of Personnel .....	6
Proper Use.....	7
Before You Begin.....	8
Start-up and Test .....	9
Operation and Adjustments .....	10
About the Book.....	11
<b>Overview .....</b>	<b>15</b>
Supervision Services .....	16
Delivering Supervision Services .....	16
List of Supervision Functions .....	17
Genies and Faceplates .....	18
Using Genies.....	18
Information Tab.....	19
<b>Control System Diagnosis .....</b>	<b>20</b>
Libraries .....	21
Description of the Libraries .....	21
Control and Supervision Services Relationship .....	22
Control/Supervision Relationship .....	22
CPU Diagnostic Management.....	23
Supervision Functions .....	23
Tags.....	23
Genies .....	25
Faceplates .....	26
<b>Supervision System Diagnosis .....</b>	<b>32</b>
Libraries .....	33
Libraries .....	33
Configuring Microsoft® Windows® TCPIP Parameters .....	35
Configuring Microsoft® Windows® TCPIP Parameters .....	35
Initializing Components .....	36
Initializing Components .....	36
Server Component .....	38
Server Component Genies .....	38
Faceplates .....	39
Client Component.....	43
Client Component Genies.....	43
Faceplates .....	44
I/O Device Component.....	46
I/O Component Genies.....	46
Faceplates .....	48
<b>Index .....</b>	<b>49</b>



# 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.

# Qualification of Personnel

A qualified person is one who has the following qualifications:

- Skills and knowledge related to the construction and operation of electrical equipment and the installation.
- Knowledge and experience in industrial control programming.
- Received safety-related training to recognize and avoid the hazards involved.

The qualified person must be able to detect possible hazards that may arise from parameterization, modifying parameter values and generally from mechanical, electrical, or electronic equipment. The qualified person must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when designing and implementing the system.

## Proper Use

This product is a library to be used together with the automation control systems and is intended solely for the purposes described in the present documentation as applied in the industrial sector.

Always observe the applicable safety-related instructions, the specified conditions, and the technical data.


Perform a risk evaluation concerning the specific use before using the product. Take protective measures according to the result.

Since the product is used as a part of an overall system, you must ensure the safety of the personnel by means of the concept of this overall system (for example, machine concept).

Any other use is not intended and may be hazardous.

# 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:

(In case of divergence or contradiction between any translation and the English original, the original text in the English language will prevail.)

- 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 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 genies, faceplates, and other Supervision components that provide the Supervision services for diagnostic functions.

This document covers the functional aspects of Supervision services when engineering a system, using EcoStruxure Process Expert, and describes the dynamic objects visible from the runtime window. It does not cover any operational aspects, nor does it provide information on how to use Supervision services to monitor and operate control systems.

Users of Supervision services need to have a very good working knowledge of EcoStruxure Process Expert, and of the Supervision and Control Participants.

## Validity Note

This document has been updated for the release of EcoStruxure™ Process Expert 2023.

## Related Documents

The characteristics that are described in the present document, as well as those described in the documents included in the Related Documents section below, can be found online. To access the information online, go to the Schneider Electric home page [www.se.com/ww/en/download/](http://www.se.com/ww/en/download/).

The characteristics that are described in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Title of Documentation	Reference Number
EcoStruxure Process Expert User Guide	EIO0000001114
EcoStruxure™ Process Expert - General Purpose Library Classic Diagnostics Templates Reference Manual	EIO0000001526
EcoStruxure™ Process Expert - General Purpose Library Classic Diagnostics Control Services Reference Manual	EIO0000001527

## Technical Support

Visit <https://www.se.com/myschneider/> for support, software updates, and latest information.

## Product Related Information

### **⚠ WARNING**

#### **LOSS OF CONTROL**

- Perform a Failure Mode and Effects Analysis (FMEA), or equivalent risk analysis, 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 them.
- Review the implications of communication link interruptions and take actions to mitigate them.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and error conditions) according to your risk assessment, and applicable codes and regulations.
- Apply local accident prevention and safety regulations and guidelines.<sup>1</sup>
- Test each implementation of a system for proper operation before placing it into service.

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

<sup>1</sup> 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.

Examples described in this manual 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.**

## Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in this manual, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as safety, safety function, safe state, fault, fault reset, malfunction, failure, error, error message, dangerous, etc.

Among others, these standards include:

Standard	Description
IEC 61131-2:2007	Programmable controllers, part 2: Equipment requirements and tests.
ISO 13849-1:2015	Safety of machinery: Safety related parts of control systems. General principles for design.
EN 61496-1:2013	Safety of machinery: Electro-sensitive protective equipment.

Standard	Description
	Part 1: General requirements and tests.
ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction.
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
ISO 14119:2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection.
ISO 13850:2015	Safety of machinery - Emergency stop - Principles for design.
IEC 62061:2015	Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems.
IEC 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements.
IEC 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems.
IEC 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements.
IEC 61784-3:2016	Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions.
2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility Directive
2014/35/EU	Low Voltage Directive

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

Standard	Description
IEC 60034 series	Rotating electrical machines
IEC 61800 series	Adjustable speed electrical power drive systems
IEC 61158 series	Digital data communications for measurement and control – Fieldbus for use in industrial control systems

Finally, the term zone of operation may be used in conjunction with the description of specific hazards, and is defined as it is for a hazard zone or danger zone in the Machinery Directive (2006/42/EC) and ISO 12100:2010.

**NOTE:** The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.



---

# Overview

## What's in This Part

Supervision Services .....	16
Genies and Faceplates .....	18

# Supervision Services

## What's in This Chapter

Delivering Supervision Services .....	16
List of Supervision Functions .....	17

## Delivering Supervision Services

### Introduction

Inside diagnostic control module templates, the resources providing Supervision services to diagnose controllers are organized in composite and facet templates. They are called *references*.

Interfaces link these references within the control module and allow making links to instances of other templates.

You can also use Supervision components (genies and faceplates) independently of diagnostic control module templates. For example, you have the possibility to use a given genie of the SGC\_Include2 project and its associated faceplate with your own control resources, which are controlling compatible devices.

Supervision services are optional.

### Supervision Facet References

A facet reference is the smallest component of a process template.

It encapsulates the constituents of the Supervision Participant, which are the tags or genies described in this document.

During generation (see EcoStruxure™ Process Expert, User Guide), these constituents become part of the Supervision (see EcoStruxure™ Process Expert, User Guide) Participant project that you have created in EcoStruxure Process Expert.

### Supervision Composite References

A Supervision composite reference is a container for Supervision facet references and/or other composite references.

Supervision composite reference helps organizing Supervision services inside the control module template.

### Configuring Supervision Services

Supervision resources that correspond to the selected Control services for the diagnosis of controllers are activated by default.

To customize the services provided by an instance that uses the control module template, the **Properties** window of the instance allows you to:

- Deactivate Supervision resources.
- Configure the parameters of selected Supervision resources.

In addition, you can modify the Supervision Participant project and its pages during refinement.



# List of Supervision Functions

## Supervision Functions for Controller Diagnosis

The following table lists the Supervision functions for controller and Supervision system diagnostic management:

Function
CPU diagnostic management, page 23
Supervision system diagnostic management, page 32

# Genies and Faceplates

## What's in This Chapter

Using Genies ..... 18

Information Tab ..... 19

## Using Genies

### Genie Availability

The SGC\_Include2 resource contains a number of genies grouped in libraries that correspond to Supervision functions. For example, the `sgc_devctl_motors` library contains six genies for on/off motor management.

These genies allow monitoring and interacting with control modules during operation.

Genies become visible in runtime window once you assign them to a Supervision page.

### Assigning Genies

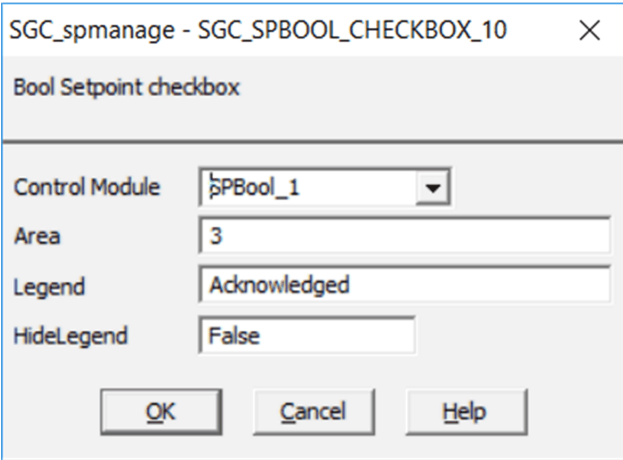
You can assign the genies that are referenced a template to a Supervision page by editing the page, using the **Edit** command.

### Genie Properties

Once you have assigned a genie to a page, double-click it to display its properties.

Genies of the SGC\_Include2 project have the **Control Module** and **Area** properties but may also feature additional properties.

The following figure depicts an example of the properties dialog box of the `SPBool_Checkbox_10` genie, featuring the additional **Legend** and **HideLegend** properties:



### Genie Control Module Name

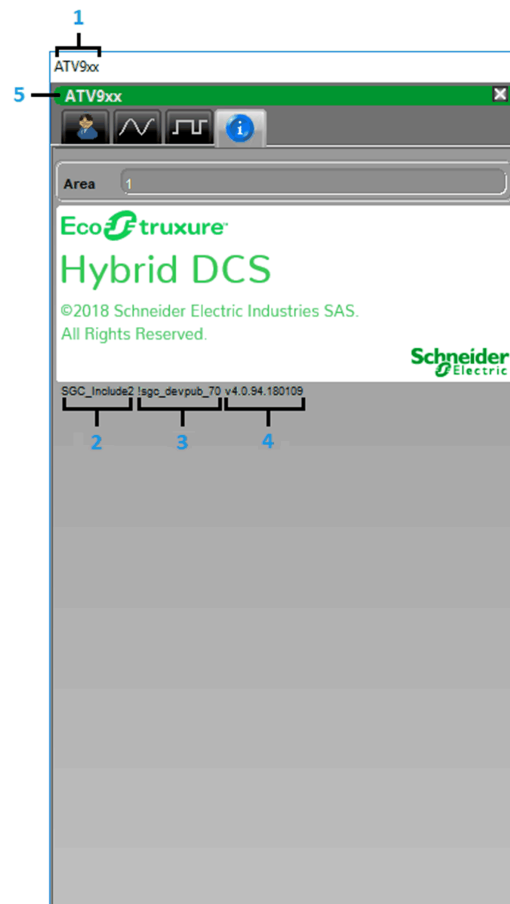
The name that appears in the **Control Module** field of the genie properties window is used to generate expressions referencing tags.

For example, a genie of the `sgc_devctl_motors` library (on/off motor management) with `Conveyor1` as a **Control Module** (CM) name generates connections with the following tags: `Conveyor1_DEVCTL_STW` and `Conveyor1_DEVCTL_CFGW`.

## Information Tab

## Representation

The following figure shows an example of the information tab that is available for each faceplate:



- 1 Default identifier of the instance using the faceplate
- 2 Name of the include project that contains the faceplate
- 3 Name of the faceplate file
- 4 Version of the include project that contains the faceplate
- 5 Description of the object

# Control System Diagnosis


## What's in This Part

Libraries .....	21
Control and Supervision Services Relationship .....	22
CPU Diagnostic Management .....	23

## Overview

This chapter describes the resources that allow you to diagnose the control system implemented with EcoStruxure Process Expert.

These function blocks do not reflect any specific installation.

 **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. <sup>1</sup>
- 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.**

<sup>1</sup> 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.

# Libraries

## What's in This Chapter

Description of the Libraries.....	21
-----------------------------------	----

## Description of the Libraries

### Description

The resources for the diagnosis of the Control system are included in libraries of the SGC\_Include2 project. The *xy* suffixes in the resource names indicate their version (*x*) and revision (*y*) respectively.

#### Symbol libraries:

- *sgc\_icons*: Basic icons used by multiple objects.
- *sgc\_citect*: Various icons for system diagnosis.

#### Dynamic object libraries (genies):

- *sgc\_citect*: Includes the following genies for control system diagnosis:
  - *sgc\_cpudiag\_m340\_xy*: Diagnosis of M340 platform CPUs.
  - *sgc\_cpudiag\_quantum\_xy*: Diagnosis of Quantum platform CPUs.
  - *sgc\_cpudiag\_m580\_xy*: Diagnosis of M580 platform CPUs.
- *sgc\_items*: Basic genies used by other genies.

#### Faceplates:

- *!sgc\_CPUDIAG\_M340*: Diagnosis for M340 platform CPUs.
- *!sgc\_CPUDIAG\_QP*: Diagnosis for Quantum platform CPU.
- *!sgc\_CPUDIAG\_M580*: Diagnosis for M580 platform CPU.

#### Cicode archives (Auxiliary code for managing animations):

- *sgc\_cpudiag*: Functions for opening the faceplate associated to the genies.
- *sgc\_general*: Common primitives used by multiple animation objects.

# Control and Supervision Services Relationship

## What's in This Chapter

Control/Supervision Relationship ..... 22

## Control/Supervision Relationship

### Overview

The table describes, which Control resources provide data to the Supervision components of the `sgc_citect` library when implemented through the corresponding diagnosis control module template:

Supervision service (component)	Supervision resources																	
	AUX0INFO	AUX1INFO	AUX2INFO	AUX3INFO	BATT	COMM	FASTINFO	GENSTS	LASTSTOP	MASTINFO	OSINFO	RTC						
M340 controller diagnosis (sgc_cpudiag_m340_xy)	-	-	-	-	-	O	O	X	O	O	O	O						
Quantum controller diagnosis <sup>(1)</sup> (sgc_cpudiag_quantum_xy)	O	O	O	O	O	O	O	X	O	O	O	O						
M580 controller diagnosis <sup>(1)</sup> (sgc_cpudiag_m580_xy)	O	O	-	-	-	O	O	X	O	O	O	O						
<table><tr><td>X</td><td>mandatory resource</td></tr><tr><td>O</td><td>optional resource</td></tr><tr><td>(1)</td><td>AUX tasks are only available in dual core CPUs.</td></tr></table>													X	mandatory resource	O	optional resource	(1)	AUX tasks are only available in dual core CPUs.
X	mandatory resource																	
O	optional resource																	
(1)	AUX tasks are only available in dual core CPUs.																	

# CPU Diagnostic Management

## What's in This Chapter

Supervision Functions .....	23
Tags .....	23
Genies .....	25
Faceplates .....	26

## Overview

This chapter describes the Supervision resources and runtime services for the diagnosis of controllers of the platforms (M340, M580, and Quantum).

## Supervision Functions

### Description

The diagnostic Supervision services are available for CPUs of the platforms (M340, M580, and Quantum).

## Tags

### Tag Syntax

Refer to Genie Control Module Name, page 18.

## Common Variable Tags

The table describes the common variable tags that are managed by Supervision components for all platforms:

Tag	Description
CM name_GENSTS_SYSBITW	Device status information
CM name_GENSTS_GENSTS_COUNTER	Activity counter
CM name_GENSTS_COMM_CURREQ	Current requests
CM name_GENSTS_COMM_MAXREQ	Maximum requests
CM name_GENSTS_COMM_USEDCOMM	Used communication
CM name_GENSTS_OSINFO_CPUFIRM	CPU firmware
CM name_GENSTS_OSINFO_CPUPATCH	CPU patch
CM name_GENSTS_OSINFO_CPUVER	CPU version
CM name_GENSTS_RTC_ACTDAYOFWEEK	Current day of week
CM name_GENSTS_RTC_ACTHOURMIN	Current hours and minutes
CM name_GENSTS_RTC_ACTMONTHDAY	Current month and day
CM name_GENSTS_RTC_ACTSEC	Current seconds
CM name_GENSTS_RTC_ACTYEAR	Current year
CM name_GENSTS_RTC_NEWDATE	Date setup

Tag	Description
CM name_GENSTS_RTC_NEWHOUR	Hour setup
CM name_GENSTS_RTC_NEWMINUTE	Minute setup
CM name_GENSTS_RTC_NEWMONTH	Month setup
CM name_GENSTS_RTC_NEWSEC	Second setup
CM name_GENSTS_RTC_NEWYEAR	Year setup
CM name_GENSTS_RTC_RTCWRITEW	Command
CM name_GENSTS_MASTINFO_CURRTIME	Current time
CM name_GENSTS_MASTINFO_MINTIME	Minimum time
CM name_GENSTS_MASTINFO_MAXTIME	Maximum time
CM name_GENSTS_MASTINFO_WDGVALUE	Watchdog
CM name_GENSTS_LASTSTOP_STOPDAY	Day
CM name_GENSTS_LASTSTOP_STOPMD	Month and day
CM name_GENSTS_LASTSTOP_STOPHM	Hours and minutes
CM name_GENSTS_LASTSTOP_STOPSEC	Seconds
CM name_GENSTS_LASTSTOP_STOPYEAR	Year
CM name_GENSTS_FASTINFO_CURRTIME	Current time
CM name_GENSTS_FASTINFO_MINTIME	Minimum time
CM name_GENSTS_FASTINFO_MAXTIME	Maximum time
CM name_GENSTS_FASTINFO_WDGVALUE	Watchdog

## M580 Variable Tags

The table describes the variable tags apart from the common variable tags that are managed by Supervision components for *M580* platform:

Tag	Description
CM name_GENSTS_AUXnINFO_CURRTIME	Current time
CM name_GENSTS_AUXnINFO_MINTIME	Minimum time
CM name_GENSTS_AUXnINFO_MAXTIME	Maximum time
CM name_GENSTS_AUXnINFO_WDGVALUE	Watchdog
n = 0 and 1.	

## Quantum Variable Tags

The table describes the variable tags apart from the common variable tags that are managed by Supervision components for *Quantum* platform:

Tag	Description
CM name_GENSTS_BATT_BATTW	Status word
CM name_GENSTS_AUXnINFO_CURRTIME	Current time
CM name_GENSTS_AUXnINFO_MINTIME	Minimum time
CM name_GENSTS_AUXnINFO_MAXTIME	Maximum time
CM name_GENSTS_AUXnINFO_WDGVALUE	Watchdog
n = 0, 1, 2 and 3.	



## Advanced Alarm Tags

The table describes the advanced alarm tags that are managed by Supervision components and the expression that is configured in the Supervision component to read or write the corresponding bit of the status or configuration word:

Name	Description	Expression	Process event
CM name_GENSTS_GENSTS_IOE	Detected error in I/O	CM name_GENSTS_SYSBITW BitAND 0x0004	No
CM name_GENSTS_GENSTS_WDO	Watchdog	CM name_GENSTS_SYSBITW BitAND 0x0008	

## Trend Tags

No trend tags are managed by Supervision components for diagnosis of controllers of the M340, M580, and Quantum platforms.

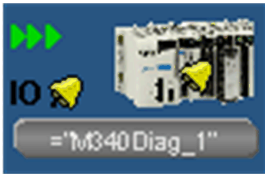


## Genies

### Genie Properties

Refer to Using Genies, page 18






## Representation

The table shows the genie of the `sgc_citect` library:

Graphic symbol	Platform	Genie name	Faceplate template identifier	Description
	M340	sgc_cpudiag_m340_10	\$M340Diag_CG	Genie to supervise a CPU of the platforms.  The label indicates the name of the entity that is being supervised.
	M580	sgc_cpudiag_m580_10	\$M580Diag_CG	
	Quantum	sgc_cpudiag_quantum_10	\$QuantumDiag_CG	

## Description

The table describes the icons that appear on the genie during operation:

Icon	Platform	Description
	M340 M580 Quantum	The arrows are animated when the controller is online and running.
	M340 M580 Quantum	Indicates a non-operational I/O. The icon corresponds to the I/O LED that is located on the CPU itself.
	M340	Indicates a non-operational I/O.
	Quantum	
	M580	Indicates overflow of watchdog timer.

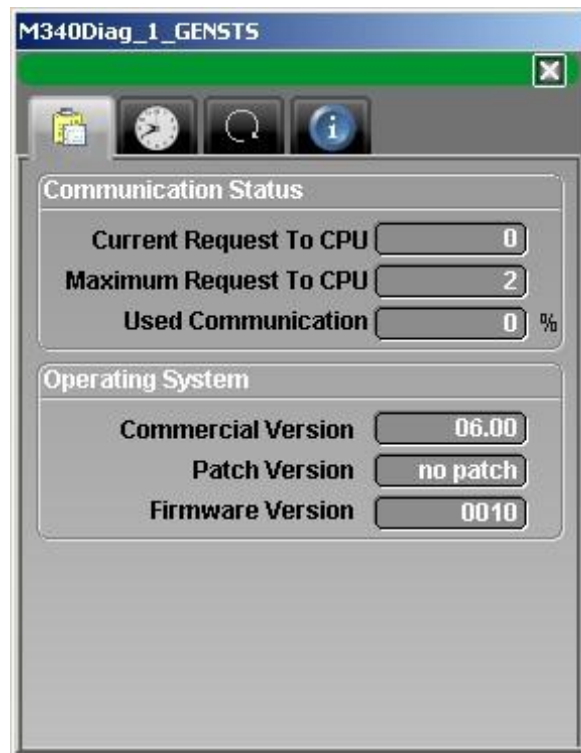
## Faceplates

### Overview

During operation, click the genie to display a faceplate with various tabs that provide diagnostic information on the controller being supervised.

## Communication Tab

The following figure displays the Communication tab faceplate for M340 and M580 platforms:

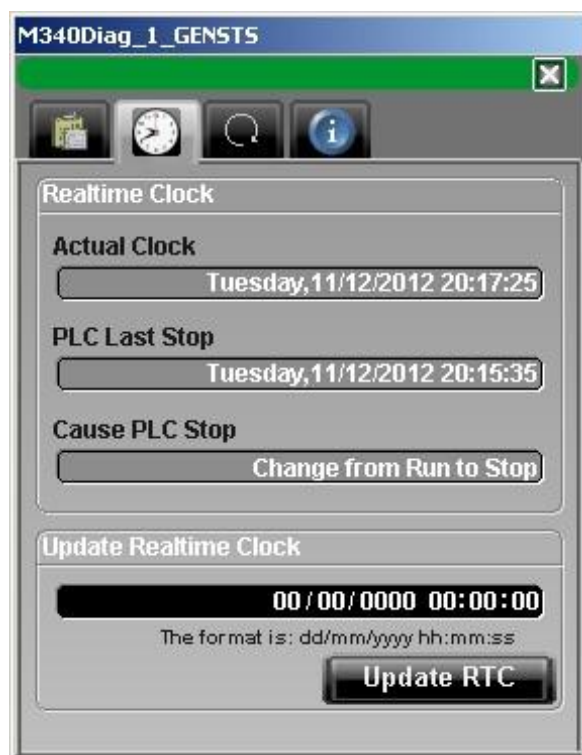


The following figure displays the Communication tab faceplate for Quantum platform:

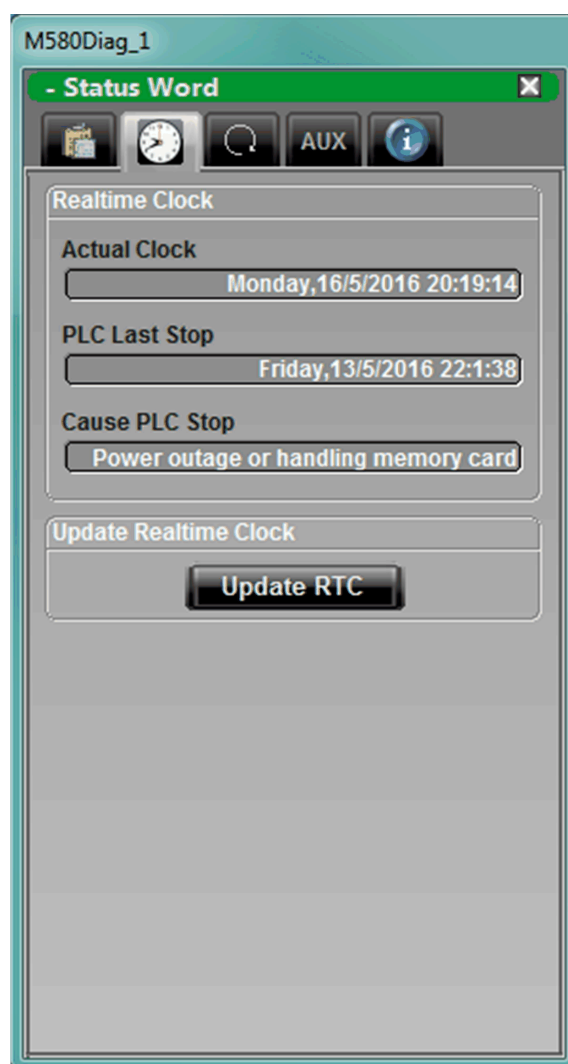


## RTC Tab

The following figure displays the RTC tab faceplate for M340 and Quantum platforms:



The following figure displays the RTC tab faceplate for M580.



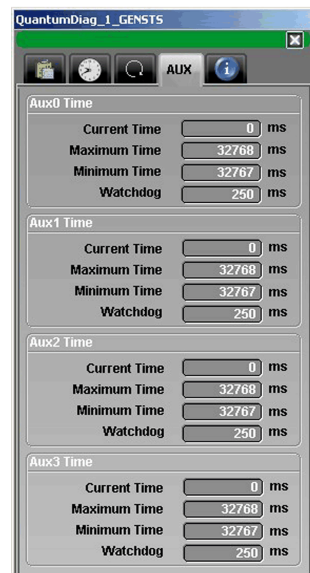
## Status Tab

The following figure displays the Status tab faceplate for M340, M580, and Quantum platforms:

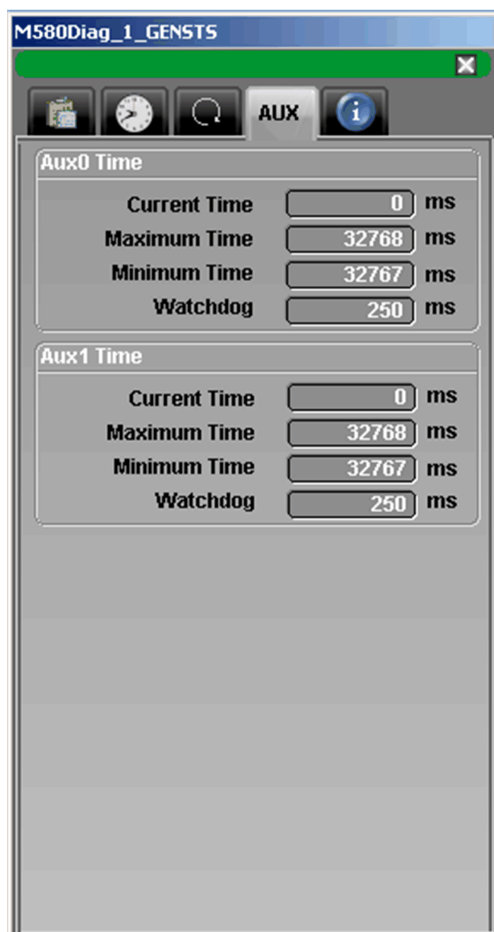


## Auxiliary Tab

The following figure displays the Auxiliary tab faceplate for Quantum platform:



The following figure displays the Auxiliary tab faceplate for M580 platform:



---

# Supervision System Diagnosis

## What's in This Part

Libraries .....	33
Configuring Microsoft® Windows® TCPIP Parameters .....	35
Initializing Components.....	36
Server Component .....	38
Client Component .....	43
I/O Device Component .....	46

## Overview

This part describes the resources that allow you to diagnose the Supervision system implemented with EcoStruxure Process Expert, using graphic elements that represent the architecture of the system.

**NOTE:** Components for the diagnosis of the Supervision system are not encapsulated in templates but are contained in the SGC\_Include2 project. Use these components through refinement of the Supervision project.



# Libraries

## What's in This Chapter

Libraries .....	33
-----------------	----

## Libraries

## Working Principle

The working principle of these resources is based on the Supervision node checking the status of the entities represented in the architecture and creating local data tables in the node itself. These local data tables are based on the information that you provide when you create the diagnosis screen of the system.

The genies used for system diagnosis access this data through primitives, which are included in the SGC\_Include2 project. The information that is displayed represents a snapshot of the current status of the devices and nodes that are comprised in the architecture of the system.

The different types of nodes are:

- *Server Node*: Represented by a server component.
- *Client Node*: Represented by a client component.
- *Controller*: Represented by an I/O device component.

You can combine genies to monitor the various functions that each node of the system carries out based on its configuration.

**NOTE:** To obtain information on client nodes or I/O devices, the server nodes of the system have to be inserted in the diagnostic screen.

For example, if your system consists of 4 servers (one each for the alarm, trend, report, and communication services), you need to assign 4 server genies in the screen, each genie representing 1 server. This way, the genies that represent client nodes or I/O devices are able to show their information correctly.

## Using Diagnostic Supervision Functions

To use the diagnostic functionalities of Supervision nodes, start a session with a user account that exists in the nodes that you want to diagnose.

## Required Software Components

Genies and faceplates implemented for the Supervision diagnosis use Microsoft® Forms 2.0 ActiveX® controls and/or the corresponding resources.

Verify that the corresponding Microsoft® ActiveX® control resources are installed on PCs on which you want to use the library components during operation.

## Contents

The resources for the diagnosis of Supervision nodes and processes are included in libraries of the SGC\_Include2 project. The *xy* suffixes in the resource names indicate their version (*x*) and revision (*y*) respectively.

### Symbol libraries

- *sgc\_icons*: Basic icons used from multiple objects.
- *sgc\_citect*: Various icons for system diagnosis.

#### Dynamic object libraries (genies):

- *sgc\_citect*: Includes the following genies for monitoring subsystem diagnoses:
  - *sgc\_client\_xy*: Monitors the status of the Supervision client. It displays information on the server about the services and functions to perform a restart of the node or the monitoring Supervision software used by the client.
  - *sgc\_iodev\_xy*: Summarizes the status of the I/O devices that work together to provide communication with one single device (those I/O devices that have the same device number are associated to them in the system configuration to provide communication redundancy).
  - *sgc\_m340\_iodev*: Combines the diagnosis of a controller of the M340 platform and the associated I/O device.
  - *sgc\_m580\_iodev*: Combines the diagnosis of a controller of the M580 platform and the associated I/O device.
  - *sgc\_quantum\_iodev*: Combines the diagnosis of a controller of the Quantum platform and the associated I/O device.
  - *sgc\_refresh\_xy*: Button that includes the calls to code that is necessary to refresh the diagnostic information on screen. (To refresh the information when you open the screen requires a specific configuration, page 37).
  - *sgc\_server\_xy*: Monitors the services (alarms, trend logs, and/or reports) and communications services (I/O server) provided by the server of the system.
- *sgc\_items*: Basic genies used by other genies.

#### Faceplates:

- *!sgc\_client\_xy*: Diagnosis of a Supervision client process.
- *!sgc\_IODevice\_xy*: Diagnosis of a Supervision I/O device.
- *!sgc\_server\_xy*: Diagnosis of the Supervision server processes.

#### Cicode archives (auxiliary code to manage animations):

- *sgc\_citect*: Functions that allow you to determine the status of the Plant SCADA processes.
- *sgc\_cpudiag*: Functions for opening the faceplates (pages) associated to the dynamic objects (genies).
- *sgc\_general*: Common primitives used from multiple animation objects.

# Configuring Microsoft® Windows® TCPIP Parameters

## What's in This Chapter

Configuring Microsoft® Windows® TCPIP Parameters .....	35
--	----

## Configuring Microsoft® Windows® TCPIP Parameters

### Overview

The Microsoft® Windows® operating system has certain configuration parameters by default that affect TCPIP communication. They are not entirely suited to the accurate execution of functions related to the diagnosis of communications.

You need to change some Microsoft® Windows® registry keys so that the Supervision software kernel can provide accurate data about the status of its TCPIP communication.

If the default parameters are kept and, for example, a cable breaks, Microsoft® Windows® does not consider that the connection is interrupted unless the source of data is the node itself. This may result in a server genie continuing to show on screen that it has  $n$  connected clients because the connection is still established in the Microsoft® Windows® TCP stack although communication with 1 or more of them is actually interrupted.

### New TCPIP Parameters

These are the new parameters to be configured and the corresponding keys:

- *KeepAliveTime* = 1000 ms
- *TcpMaxDataRetransmissions* = 3
- *TcpTimeWaitDelay* = 30

The keys are located at the following path: *HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters*.

### Benefits of the New Parameters

With these parameters in effect, the operating system checks the status of the connection with a device every 1,000 ms and makes 3 additional attempts. After that, once a 4-second delay has elapsed without a connection being established, the operating system considers that the connection is interrupted.

# Initializing Components

## What's in This Chapter

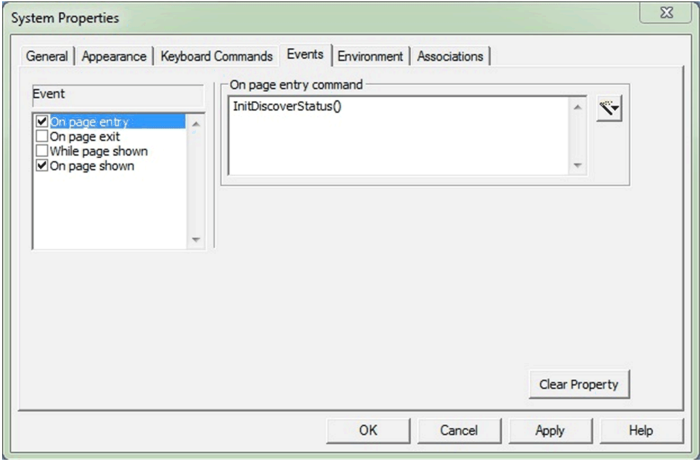
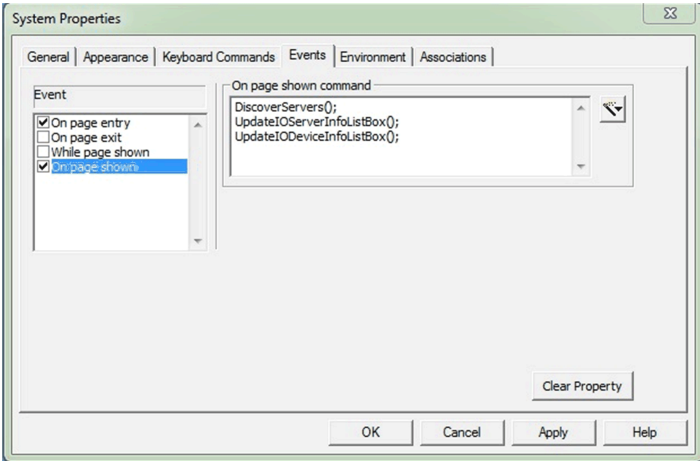
Initializing Components..... 36

# Initializing Components

## Description

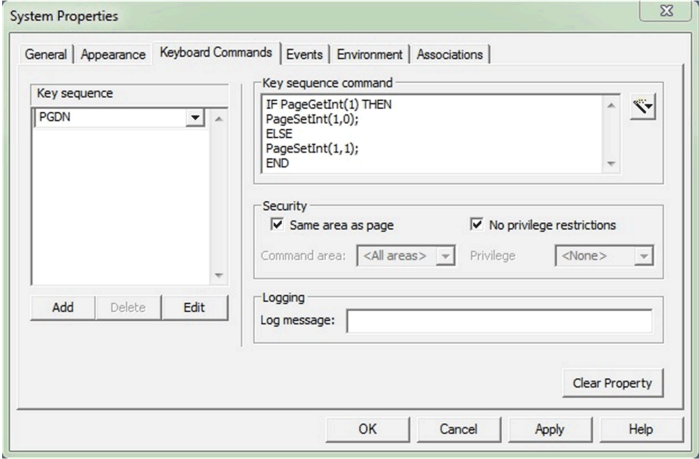
Diagnostic components have to be initialized and their initial refresh process forced so that the status of the entities that make up the system (servers, clients, and/or controllers) is displayed when the diagnosis page opens.

To initialize diagnostic components and force their initial refresh, the configuration described in this procedure needs to be applied to the properties of the page that is used as the diagnostics screen:

Step	Action
1	<p>Select <b>On page entry</b> in the <b>Events</b> tab and enter the commands in the <b>On page entry command</b> field as shown in the figure.</p> 
2	<p>Select <b>On page shown</b> in the <b>Events</b> tab and enter the commands in the <b>On page shown command</b> field as shown in the figure.</p> 

## Displaying and Hiding Component Names

You can define a key stroke sequence that allows you to control the display of the name of each component in real time:

Step	Action
1	<div><p>In this example, the component names are shown when you press the PAGE DOWN key.</p></div>

**NOTE:** You can enter the code shown in the figure for any other event.

# Server Component

## What's in This Chapter

Server Component Genies .....	38
Faceplates .....	39

## Overview

This chapter describes the server component.

## Server Component Genies

### Server Component Description

This genie represents a node that has been configured as an alarm, trend, report, or I/O server, either as an all-in-one station or as a server, which provides these services to other client nodes.

Based on the name of the node, the genie determines which services it provides, to whom it provides them, and how many clients for each service are being served.

## Assigning Genies

In the **Paste Genie** dialog box of the Supervision Participant, select the `sgc_citect` library, then the genie, page 33, and click **OK**.

## Genie Properties

Double-click a genie that you have assigned to a page to access its properties window:



You need to provide data for the following properties:

**Server Node:** Name of the node, which runs the Supervision services. The name of the node is the one that corresponds to the `citect.ini [LAN]Node` parameter.

**NOTE:** For single node systems, leave the field blank.

**Description:** Free text field to describe the node. The text is displayed in the title bar of the faceplate associated to the genie.

**Area:** Access control area to which the component is associated. Not used in the current component version. Included for compatibility with other components.

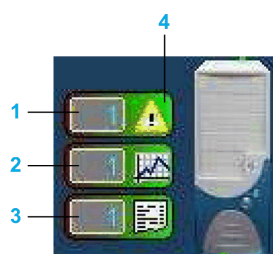
## Representation in Engineering Time

The figure shows the genie in engineering time:



## Representation During Operation

The figure shows the genie during operation:



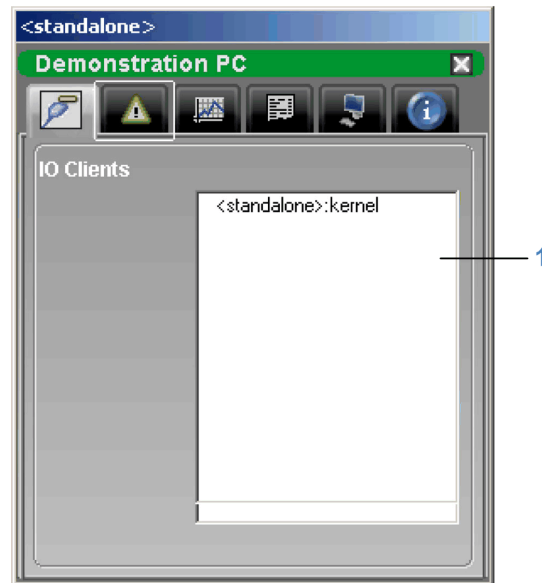
- 1 Number of clients connected to the alarm service
- 2 Number of clients connected to the trend log service
- 3 Number of clients connected to the report service
- 4 Services are shown with a green rectangle when the service is active and with a red rectangle when it is inactive. The rectangle is gray when the server does not provide the corresponding service.

## Faceplates

### Overview

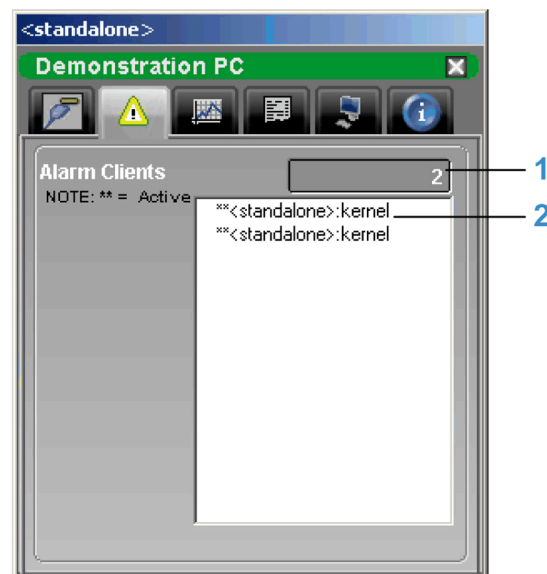
During operation, click the genie to display a faceplate with various tabs that provide diagnostic information on the server component.

## Communications Service Tab



1 List of clients (and user) connected to the service

## Alarm Service Tab

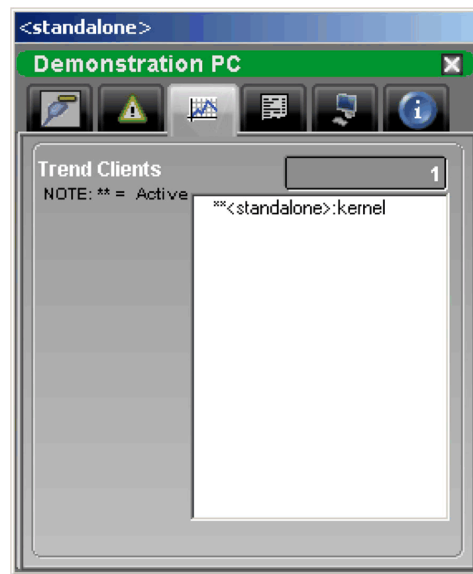


1 Number of clients connected to the service

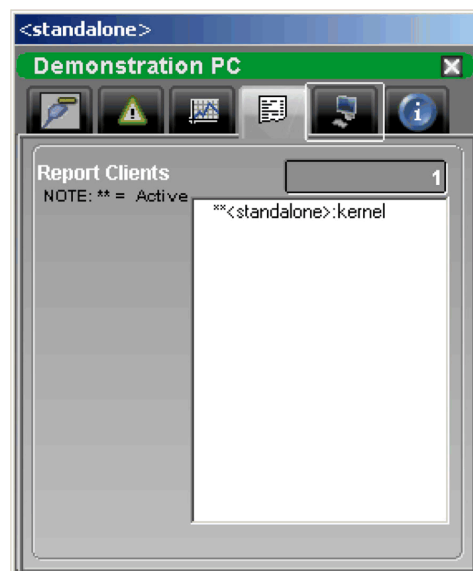
2 List of clients (and user) connected to the service



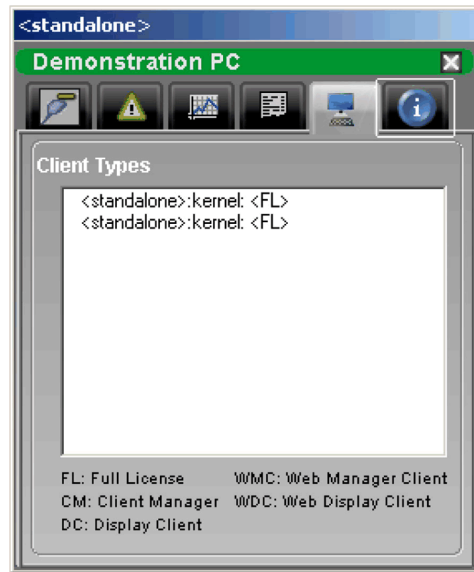
## Trend Service Tab



## Report Service Tab



## Client Nodes Tab



# Client Component

## What's in This Chapter

Client Component Genies .....	43
Faceplates .....	44

## Overview

This chapter describes the client component.

## Client Component Genies

## Client Component Description

This genie represents a client node of the system architecture and is used to determine, which server nodes provide the different services such as alarms, trends, reports, and communication.

## Genie Properties

Double-click a genie that you have assigned to a Supervision page to access its properties window:

You need to provide data for the following properties:

**Client Node:** Name of the client node. The name of the node is the one that corresponds to the *citect.ini* [LAN]Node parameter.

**NOTE:** For single node systems, leave the field blank.

**Description:** Free text field to describe the node. The text is displayed in the title bar of the faceplate associated to the genie.

**Area:** Access control area to which the component is associated to control the functions that you can carry out (restart of the node or of the Supervision software).

## Representation In Engineering Time

The figure shows the genie in engineering time:



## Representation During Operation

The figure displays the services of the client node during operation:



- 1 Shown only on the node from which the diagnosis screen is being accessed.
- 2 Name of the server providing the alarm service.
- 3 Name of the server providing the trend log service.
- 4 Name of the server providing the report service.
- 5 User on the node.
- 6 List of I/O servers that the node accesses.

## Faceplates

### Overview

During operation, click the genie to display a faceplate featuring the **Restart** tab that allows you to restart the node that this genie represents or the Supervision application running on this node.

**NOTE:** The operator needs to have a privilege level greater than 2 to use the buttons.

## Restart Tab



1 Shows the status of the restart process.

## Restarting Nodes

The Plant SCADA services are not available when **Shutdown and Restart Plant SCADA** and **Shutdown Plant SCADA and Restart Node** buttons are clicked and as a result data acquisition from field does not happen.

**NOTE:** There is no double confirmation when **Shutdown and Restart Plant SCADA** and **Shutdown Plant SCADA and Restart Node** buttons on the faceplate are clicked.

### Shutdown and Restart Plant SCADA

You can use this command to shut down the Plant SCADA services of the node represented in the client genie and restart that node on the network remotely by configuring the following parameter in its Citect.ini configuration file in the path (<installed directory>\Citect SCADA 2016\User\<Project Name>):

Parameter	Description
[ShutDown]NetworkStart	1 = The node can send restart commands to other nodes on the network. Default value is set to 0.

**NOTE:** Nodes to be restarted remotely need to be configured to accept shutdown calls through the network.

### Shutdown Plant SCADA and Restart Node

You can use the **Shutdown Plant SCADA and Restart Node** button on the faceplate to quit the Supervision application that is running on the client node configured in the genie and restart the PC by configuring the [ShutDown] NetworkIgnore parameter.

Parameter	Description
[ShutDown]NetworkIgnore	0 = The node can be restarted by another node through the network. Default value is set to 1.

**NOTE:** Configure the parameter in the Citect.ini configuration file in the path (<installed directory>\Citect SCADA 2016\User\<Project Name>) of the node to be restarted.

# I/O Device Component

## What's in This Chapter

I/O Component Genies .....	46
Faceplates .....	48

## Overview

This chapter describes the I/O device component.

## I/O Component Genies

## I/O Device Component Description

Genie that is used to monitor the I/O device.

In addition to the main genie, two additional genies exist that consist of the combination of a control system diagnosis genie, page 21 and the I/O device genie.

## Assigning Genies

In the **Paste Genie** dialog box of the Supervision Participant, select the `sgc_citect` library, then the genie, page 33, and click **OK**.

## Genie Properties

Double-click a genie that you have assigned to a Supervision page to access its properties window:



You need to provide data for the following parameters:

**I/O Device Number:** Number associated to the I/O device for device configuration, as shown in the next figure.

**Area:** Access control area to which the component is associated. Not used in the current component version. Included for compatibility with other components.

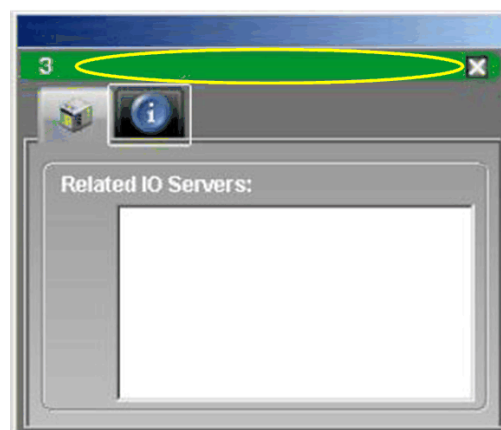
Citect Studio - Supervision\_FAT 20180216 [Active Project]

Topology Computers Edit Profiles I/O Devices Components & Mapping

Save Discard Copy Paste Delete Row(s) Export All Import All Export Tags Import

Row	Server Name	Name	Number	Address	Protocol	Port Name	Comment
1	IOServer_1	IODevice_1	1	PLCSim	OFSOPC	Port_1	

In the **Comment** field of the **I/O device** window, you can enter a description that is displayed in the title bar of the faceplate of the I/O server, as shown in the following figure:



## Representation in Engineering Time



**1** The bell icon is displayed only during operation if there is a detected problem regarding communication with this device. It appears in yellow when a related I/O device is disabled or in standby write status, and in red when a related I/O device is in an offline, starting and offline, or undefined status mode. The icon also appears in red if communication cannot be established with an I/O server or if there is no I/O device in a running status.




## Representation During Operation



**1** List of related I/O servers and current status of the I/O device being monitored

## Genies Combining Controller and I/O Device

To facilitate diagnostics of a controller and the associated I/O device, the following 2 preconfigured genies exist:

Graphic symbol	Description
	Genie combining an I/O device genie with a Quantum controller diagnostic genie, page 25.
	Genie combining an I/O device genie with an M340 controller diagnostic genie, page 25.
	Genie combining an I/O device genie with an M580 controller diagnostic genie, page 25.

**NOTE:** The controller diagnostic faceplate is displayed when you click the controller icon (M340, page 26, Quantum, page 26 or M580, page 26).

## Faceplates

### Overview

During operation, click the I/O device icon of the I/O device genie (located on top of the white rectangle) to display a faceplate with various tabs providing diagnostic information on the I/O device component.

### I/O Device Tab

The I/O device tab shows the I/O devices that are active:





## C

client component	
supervision system diagnosis.....	43
component names	
displaying and hiding.....	37
CPU	
diagnostic supervision functions.....	23

## D

diagnostic monitoring	
control and supervision services relationship.....	22
libraries .....	21
diagnostic supervision services	
supervision functions.....	17
diagnostic supervision templates	
description.....	16

## F

faceplate tabs	
information tab.....	19

## G

genies	
control module name.....	18
properties.....	18
using genies .....	18

## I

information tab	
faceplate tabs .....	19
initializing components	
monitoring subsystem diagnosis .....	36
I/O device component	
monitoring subsystem diagnosis .....	46

## L

libraries	
monitoring subsystem diagnosis .....	33

## N

names	
displaying and hiding diagnostic component	
names .....	37

## S

server component	
monitoring subsystem diagnosis .....	38
supervision diagnosis components	
configuring TCPIP parameters .....	35

## T

TCPIP parameters	
------------------	--

Schneider Electric  
35 rue Joseph Monier  
92500 Rueil Malmaison  
France

+ 33 (0) 1 41 29 70 00

[www.se.com](http://www.se.com)

As standards, specifications, and design change from time to time,  
please ask for confirmation of the information given in this publication.

© 2023 Schneider Electric. All rights reserved.

EIO0000001528.17