



Process Expert - General Purpose Library

Diagnostics Templates Reference Manual

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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.

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Table of Contents

Safety Information	5
Qualification of Personnel	5
Proper Use	6
Before You Begin	6
Start-up and Test	7
Operation and Adjustments	7
About the Book	9
Overview	13
List of Diagnostics Templates	14
List of Diagnostics templates	14
Glossary of Acronyms	15
Acronym	15
Template	16
Common Parameters	16
Control Module Template Interfaces	17
Hyperlink Services	17
Diagnostics Templates	18
Control	20
Diagnostic Control Composite and Facet Templates	20
Supervision	21
Supervision Services	21
Supervision Resource Structure	21
Access Control	21
Privilege Levels	21
Genies	24
Using Genies	24
Genie Icons	25
Displaying Genies	26
Faceplate	26
Tab Icons	26
Alarm Tab	27
Trend Tab	29
Measures Tab	30
IO Measures Tab	31
Color Codes	32
Dynamic Variable Status	32
CPU Diagnostics - M580 and M340	33
M580 and M340 CPU Diagnostics	34
Template	34
Description	34
Parameters	34
Interfaces	35
Control	36
DFB Representation	36
Inputs/Outputs	36
Supervision	37
Genies	37
Faceplate	38

Items	43
Computer and Floating Computer Diagnostics	48
Template	48
Description	48
Parameters.....	49
Interfaces	50
Supervision	50
Genies	51
Faceplate	51
Items.....	55
Cluster Diagnostics.....	57
Template	57
Description	57
Parameters.....	57
Interfaces	58
Supervision	58
Genies	58
Faceplate	58
Items.....	60
Index	61

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 functionality and features of the Control services, Supervision services of diagnostics templates.

This document covers the functional aspects of templates, Control, and 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 the Supervision services to monitor and operate control systems.

To use diagnostics templates, you need to have knowledge of EcoStruxure™ Process Expert, 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/.

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 - General Purpose Library User Guide	EIO0000004045

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.¹
- 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.

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.

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

List of Diagnostics Templates	14
Glossary of Acronyms.....	15
Template	16
Control	20
Supervision.....	21

Overview

This part gives an overview of EcoStruxure Process Expert diagnostics library and describes the concept that are implemented for controlling and monitoring diagnostics.

List of Diagnostics Templates

What's in This Chapter

List of Diagnostics templates 14

List of Diagnostics templates

The following table lists the diagnostics templates:

Diagnostics templates	Description
<code>\$M580DiagGP/M340DiagGP</code> , page 34	M580 and M340 CPU diagnostics
<code>\$ComputerGP/\$FloatingComputerGP</code> , page 48	Computer and floating computer diagnostics
<code>\$ClusterGP</code> , page 57	Cluster diagnostics

Glossary of Acronyms

What's in This Chapter

Acronym	15
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Acronym

Acronyms and Definitions

The following table lists the acronyms used in this manual:

Acronym	Definition
RTC	Real time clock
PAC	Process automation controller
DFB	Derived function block
FBD	Function block diagram
EFB	Elementary function block
SCADA	Supervisory control and data acquisition
HMI Human machine interface	Human machine interface

Template

What's in This Chapter

Common Parameters	16
Control Module Template Interfaces.....	17
Hyperlink Services.....	17
Diagnostics Templates.....	18

Overview

This chapter describes the basic concepts of the diagnostic template.

Common Parameters

Asset and Display

The following table describes the asset and display parameters of supervision:

Section	Parameter description	Data type	Default value	Additional remarks
Asset	Asset Priority	Enum	Normal (4)	Priority of the asset on a scale of 1 to 5 and 9 where 1 is the highest priority.
	Physical location	String	–	Asset location and properties have no specific impact on the library operation as delivered but are instead available for user or system data.
	Custom 1 (alarm filter)	String	–	User defined properties for the asset as well as each of its alarms. The asset filters allow the asset type to be used to enable rapid filtering of alarm and event data.
	Custom 2 (alarm filter)			
	Custom 3 (alarm filter)			
	Custom 4 (user defined)		–	User defined Properties for the asset.
	Custom 5 (user defined)			
	Custom 6 (user defined)			
Display	Process page name	String	–	Process graphic page name where equipment genie is available.
	Other page names (optional list)			Overview graphic page associated with the equipment.

Trend

The table describes the local panel that are applicable to the selected template:

Section	Parameter description	Data type	Default value	Additional remarks
Trend	Sample period	Duration	00:00:05	–
	History length (weeks)	Integer	5	–

Section	Parameter description	Data type	Default value	Additional remarks
	History rollover time	Dura-tion	12:00:00	–
	History rollover day	String	Tuesday	–
	Storage type	String	TRN_EVENT	–
	Data location (optional)	String	[Data]:	–

Control Module Template Interfaces

Common Interface Parameters

The table describes the control module template interfaces:

Interface identifier	Type/Role	Description	Example
Bool	<i>\$Bool</i>	An input interface of boolean type variable.	Different type of variable can be connected to different object.
INT	<i>\$Integer</i>	An input interface of integer type variable.	
Real	<i>\$Real</i>	An input interface of real type variable.	
Time	<i>\$Time</i>	An input interface of time type variable.	

Hyperlink Services

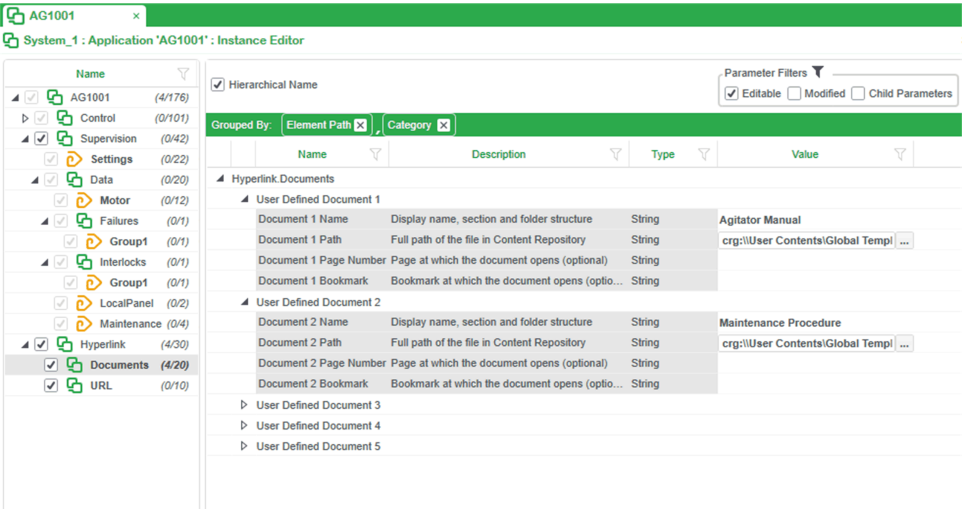
Hyperlink

EcoStruxure Process Expert provides the user links to access documents associated with an asset through the operations client (runtime navigation services). Hyperlinks are defined within the library to provide access to elements configured by the library.

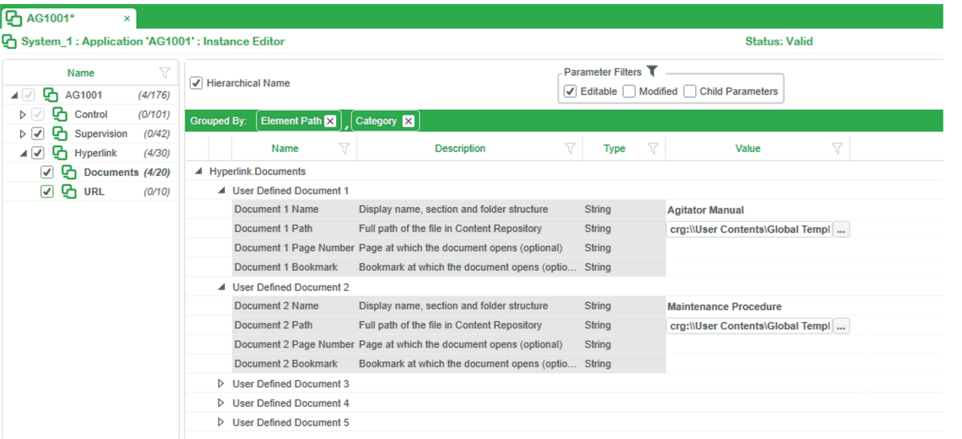
Hyperlinks are also available as a configurable parameters for the user to provide their own links to the documents and web pages such as:

- Equipment Manuals
- Process and Instrumentation Diagrams
- Maintenance Procedures
- Maintenance Requests
- Reports

The following figure depicts the HyperLink configuration to the documentation and web pages:

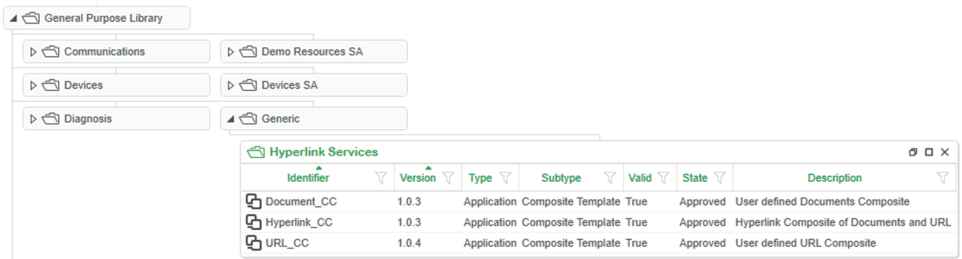


The following figure depicts the Runtime Navigation to the documentation and web pages:



Hyperlink composites are stored in *Hyperlink* Services folder under *Generic* folder:

The following figure depicts the Hyperlink services folder:



Diagnostics Templates

Description

The EcoStruxure Process Expert – General Purpose Library diagnostics templates provides resources that have been pre-configured and tested by Schneider Electric, and that are designed for automating a large variety of processes.

Diagnostics templates provides M580 and M340 controller-related information.

They are used to implement the Control and Supervision services that are provided by the software Participants, streamlining the engineering of systems.

The resources providing these services are encapsulated in dedicated facet references, which are then organized in composite references.

At the highest level, the diagnostics template represents the control module.

The diagnostics templates allow you to monitor Schneider Electric controllers - M340 and M580. You can instantiate these templates in EcoStruxure Process Expert to create instances, which model the components of the automation system.

Diagnostics Template Services

A facet template is a sub template which can consist of control, supervision, or genie components. It can be used to group properties and data that are related to the template. The facet editor allows you to view and/or edit the parameters, elements, or interfaces.

Facet templates referenced by diagnostic control module templates provide the following services:

Control	Includes core services plus additional, optional services, which you can activate if needed. Function blocks and variables are the resources that are encapsulated in these facet templates to provide such services.
Supervision	Supervision services complement the Control services. Supervision services are optional and those corresponding to selected Control services are enabled by default. Tags, alarms, and genies are the resources that are encapsulated in these facet template to provide such services. Data is provided by the associated Control resources.

Also, for both Control and Supervision services, you can configure parameters during instantiation to meet the requirements of your application.

Control

What's in This Chapter

Diagnostic Control Composite and Facet Templates.....	20
-------------------------------------------------------	----

Overview

The EcoStruxure Hybrid DCS software provides the resources that have been pre-configured and tested by Schneider Electric and that were specifically designed for automating a large variety of processes.

The control resources for process control provide the common required functions, facilitating the development of control systems.

To automate and simplify the implementation process of control systems, you can use these resources together with tools for code generation and for the synchronization of control and monitoring subsystems.

This document describes the basic concepts and details behind each one of the function blocks (DFBs) for implementing the common cross-process and cross-market EcoStruxure control functions.

Diagnostic Control Composite and Facet Templates

Introduction

Within the Diagnostic control module templates (see EcoStruxure™ Process Expert, User Guide), the resources for Control are templized in Composite and Facet templates, which are referred to as references.

Control Composite References

A Control composite reference is composed of 1 or more other composite references and/or 1 or more facet references. Typically, a Control composite reference contains:

- core Control resources that provide the core functions of the process template
- optional Control resources. The EcoStruxure Process Expert software allows you to activate or deactivate these additional resources.

Control Facet References

The facet references are the smallest component of a diagnostic template, Control facet references encapsulate the constituent from the participant, which is embedded in the EcoStruxure Process Expert software.

During the Generation stage, these constituents, which are the function blocks and variables described in this document, create the logic of the control project that you have defined in EcoStruxure Process Expert.

You can configure the parameters of the Control services:

- at the Control facet template level during the Installation stage using the Process Expert software and/or,
- at the DFB level during the Refinement stage using the participant.

Supervision

What's in This Chapter

Supervision Services	21
Access Control	21
Genies	24
Faceplate	26
Color Codes	32

Overview

This part describes the overview of the diagnostics supervision services.

Supervision Services

Supervision Resource Structure

The GeneralPurposeLibrary project contains the following Supervision resources grouped in libraries:

Symbols	Static graphical elements are supplied as symbol libraries so that you can redefine the appearance of Supervision components.
Genies	Dynamic objects are supplied as Supervision genies (in turn, these can be made up of other genies) to represent the dynamic elements that are commonly used in monitoring flowcharts.
Faceplates	Genies are linked to faceplates that allow you to access parameters such as operation, configuration, or maintenance parameters, depending on the function. Faceplates are implemented by using Supervision pages featuring supergenie syntax (refer to the Supervision Participant help for details).
Templates	Template types with various resolutions featuring the standard EcoStruxure Process Expert format.
Cicode	The functions that allow genies and their faceplates to work properly are implemented by using the proprietary Supervision Participant programming language.

Deploying Supervision Resources

When you edit pages, EcoStruxure Process Expert adds the GeneralPurposeLibrary project to the Supervision Participant project so that the resources it contains are deployed with the master project.

Access Control

Privilege Levels

Overview

Supervision components feature access control so that only users having access to the configured area and the required privilege level execute actions on dynamic objects and/or faceplate during operation.

You need to assign privilege levels and areas to users to configure their access permissions depending on the specific requirements of each application.

An Area is configured for each instance. Based on the roles, privilege is assigned to the area. User assigned with the privilege to an area within a role has the view access to that area. However, the user can only operate the system elements in that area who has appropriate privilege. For more detail, refer to Plant SCADA 2018.

The privilege levels are mentioned in the custom 8 fields of the item. It is either a single digit or a two digit number. If it is a single digit number, then the privilege is equivalent to the Plant philosophy, refer to Plant SCADA 2018.

The double-digit privilege level is applicable for write command confirmation.

Default Privilege Levels

By default, the following general criteria are defined to assign privilege levels in Supervision components:

Privilege	Role
0	Everyone
1	Operator
2	Supervisor
3	Maintenance
4	Not used
5	Engineer
6	Not used
7	Administrator
8	Not used

Confirmation

Confirmation operation is applicable to write the command. Write operation is confirmed by adding the second digit to the privilege.

Following are two types of confirmation based on the privilege number:

- Single confirmation
- Double confirmation

Single Confirmation

Confirmation from the currently logged-in user is required. The user has to perform the confirmation operation if the second digit of privilege level is 0. For example, if the privilege level is set to 50 for the item, then the engineer confirmation (5 + 0) are required to perform an operation. This is termed as Engineer (Confirmed), Operator (Confirmed), and so on, based on the privilege level.

Example:

W1101-Silo Weight

Action: Deviation= 60.00
Current: Deviation= 50.00

Comment:

Name: Engineer

Password:

OK Cancel

In earlier example, a login user is `Engineer`. when the `Engineer` changes the deviation limit from `50` to `60` of silo weight, with a popup appears and the `Engineer` must have to enter the password again to confirm the operation.

Double Confirmation

Confirmation from currently logged-in user and verifier user who has privilege equal to the second digit is required. The user has to perform the confirmation and verify the operation if the second digit of privilege level is not `0`. If the privilege level is set to `15` for the item, then the `Operator` and `Engineer` (`1 + 5`) are required to perform operation. This is termed as `Operator + Engineer`, `Operator + Supervisor`, and so on, based on the privilege level.

Example:

PIDGP_1-

Action: Interlock 1 Condition 1 Bypass=Bypass
Current: Interlock 1 Condition 1 Bypass=Normal

Comment:

Operator

Name: a
Password:

Engineer

Name:
Password:

OK Cancel

In earlier example, a login user is `Operator`. When the `Operator` changes the deviation limit from `50` to `60` of silo weight, with a popup appears and the `Operator` enters the password again to confirm the operation and `Verifier` needs to enter the password to verify the operation.

Genies

Overview

This section provides general information about the representation of genies that are part of the GeneralPurposeLibrary project.

Using Genies

Genie Availability

The GeneralPurposeLibrary resource contains a number of genies grouped in libraries that correspond to Supervision functions. For example, the `gpl_diagnostics` library contains three genies for M580 and M340.

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

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

Assigning Genies

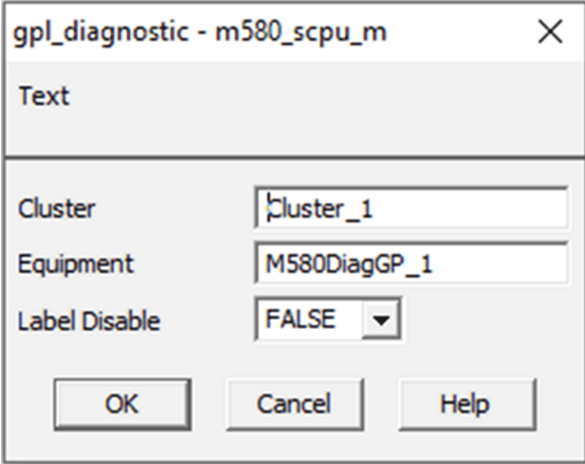
You can assign the genies that are referenced a template to a Supervision page by editing the page, using the **Edit** command.

Genie Properties

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

Genies of the GeneralPurposeLibrary project have the **Cluster** and **Equipment**, and **Label Disable** properties.

The figure shows an example of the properties dialog box of the `diagnostics` genie:




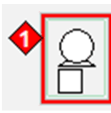

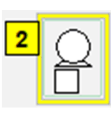



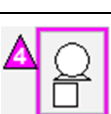






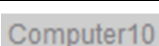
The table describes the properties of the `diagnostics` genie:

Genie properties	Description
Cluster	Cluster name of the equipment.
Equipment	Equipment name
Label Disable	By default, Label Disable is False, enter True if you need to hide the label of an object.

Genie Icons

Description

The following table describes the icons that are displayed during an operation:

Function	Icon	Meaning	Examples of use	Comment
Informing of abnormal configuration		The control module is in abnormal configuration.	Dataforce is active in the control module.	Represented on the element that is in abnormal configuration.
Displaying alarms		Alarm of priority 1	Very high temperature alarm.	<i>Critical alarm ON unacknowledge</i>
		Alarm of priority 1 returns to normal	–	<i>Critical alarm OFF unacknowledge</i>
		Alarm of priority 2	High temperature alarm	<i>AlarmBorder high unacknowledge</i>
		Alarm of priority 2 returns to normal	–	<i>AlarmBorder high unacknowledge</i>
		Alarm of priority 3	Function check (Namur status).	<i>AlarmBorder medium unacknowledge</i>
		Alarm of priority 3 returns to normal	–	<i>AlarmBorder medium unacknowledge</i>
		Alarm of priority 4	–	<i>AlarmBorder low unacknowledge</i>
		Alarm of priority 4 returns to normal	–	<i>AlarmBorder low unacknowledge</i>
Displaying trend pens		Present value	–	–
		Output value	–	–
		Setpoint	–	–
		Deviation	–	–
Displaying status		Status		Grey - Active White - Inactive
Displaying labels		Label of symbols	–	Only if labels are made visible.

Displaying Genies

Overview

The label that identifies each dynamic object inserted in a page can be shown or hidden during runtime.



NOTE: To hide or show the labels, click **Show/Hide Labels** option on the header of the runtime, when the **Label/Disable** is entered as `FALSE` in the property dialog box of the genie.

Faceplate

Overview

This section provides general information about the representation of faceplate linked to genies.

You can access a faceplate by clicking the genie during operation.

Faceplate allow viewing and controlling the corresponding Control block.

Tab Icons

Overview

Faceplate consists of tabs that are grouped according to their functionalities provided by the associated Control block during operation.






Each tab is represented by an icon that you can click to display the information related to it.

Certain tabs are and become available if the control module features the corresponding element and the element is selected.

NOTE: The order of the tabs in a faceplate can be adapted to suit the application without impact on functionality. The tabs order shown in documentation images may differ from that displayed at runtime to the operator.

Description

The table describes the functions that are available in each tab:

Tab	Icon	Functions	Examples of use
Operation		<ul style="list-style-type: none"> The current status of PAC PAC detected error information PAC overrun Scan time in millisecond PAC dataforce IO device status The I/O Server which the client is using to communicate to this device Average read time The current time of PAC The current time of PC Sync clock 	<ul style="list-style-type: none"> Update RTC of controller using sync clock command
Alarm		<ul style="list-style-type: none"> Acknowledgment of alarms Configuration of alarms at supervision level. Navigate to the equipment of the alarm condition. 	<ul style="list-style-type: none"> Acknowledge alarm
Measures		Monitors the current values of parameter groups.	Monitoring the communication status, last stop, operating status, mast task, fast task, aux 0 task and aux1 task
IO Measures		Monitors the current values of parameter groups.	Monitoring the input output status and rack status
Trend		Display the trend	Trend of mast execution time, fast execution time, Aux0 execution time, and Aux0 execution time

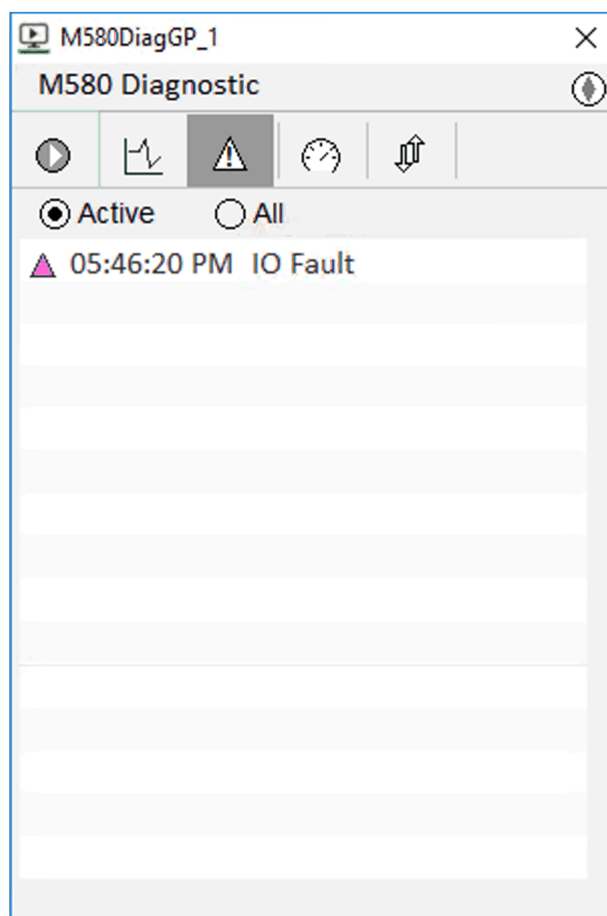
Alarm Tab

Overview

The alarm tab is available in each faceplate. It shows all the configured and active alarms that are associated with the control module and its children.

Alarm Tab Representation

The figure shows an example of an alarm tab:



Tab Icons

Shelved/Disabled Alarm

If any alarm of the control module is in an unacknowledged state, then action required condition is displayed on the alarm tab with flashing orange abnormal indication.

Unacknowledged Alarm

If any alarm of the control module is in an unacknowledged state, then action required condition is displayed on the alarm tab with flashing orange abnormal indication.

Alarm List

Display order

The alarms in the alarm tab are sorted based on the following order:

- Alarm Unacknowledged + Active
- Alarm Unacknowledged + Inactive
- Alarm Acknowledged + Active

NOTE:

- The order of displaying an alarm in each state is based on the priority (critical to low).
- The same priority and same state alarms are sorted based on the descending time order.

Display Format

User can manage the display format of an alarm list details by overwriting the **Value** field of `DefaultGPLEquipAllActiveAlarm_HD1080` and `DefaultGPLEquipActiveAlarm_HD1080` available in the **Parameter** tab (Setup > Parameters). Parameter can be overwritten by configuring the same parameter with required value in the Plant SCADA project. Refer to the figure.

Row	Section Name	Name	Value
1	FORMAT	EquipAllAlarm_HD1080	{PriorityandState,25}{Desc,260}
2	FORMAT	EquipActiveAlarm_HD1080	{PriorityandState,24}{OnTime,90}{Desc,150}

For example, if user wants to display the category of individual alarm in the third column of an alarm list shown on the faceplate, overwrite the value of the parameter by `{PriorityandState,25}{Desc,260}{category,20}`.

Selection

User can select one of the following alarm list display:

- **Active:** Alarm associated to control module.
- **All:** Configured alarms of the control module.

NOTE: When the *EnableChildSelection* parameter (Setup > Parameters) under section `GPL.Alarm` is configured as `TRUE`, user can select to display the alarms in the child equipment.

Action

Following are the possible actions:

- Acknowledge
- Shelf For
- Shelf Until
- Restore
- Navigate

NOTE: Navigation (sets the context to the selected child) is available for the associated child equipment alarms.

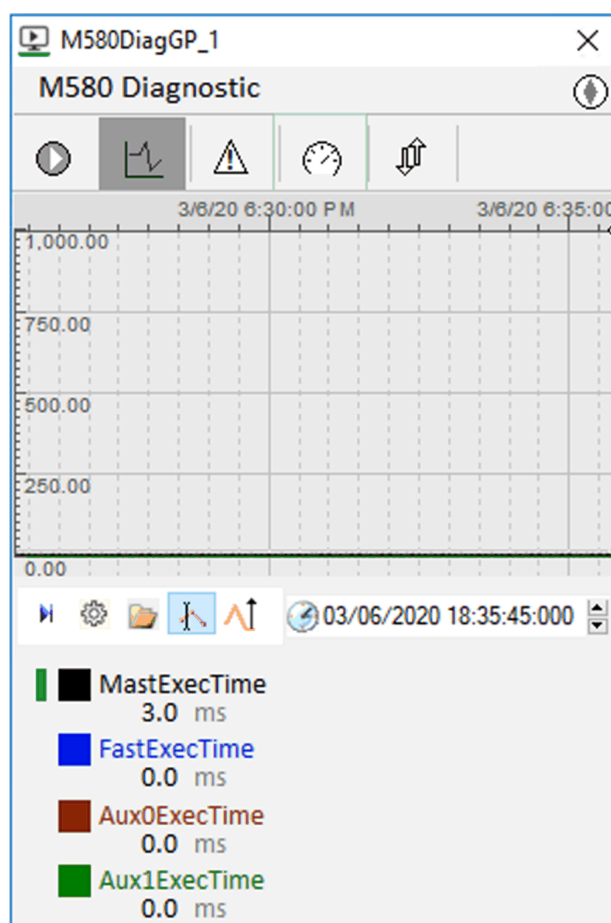
Trend Tab

Overview

The Trend tab is available in faceplate for diagnostics. It displays the logged data of parameters associated to the diagnostics family.

Trend Tab Representation

The figure shows an example of a trend tab:



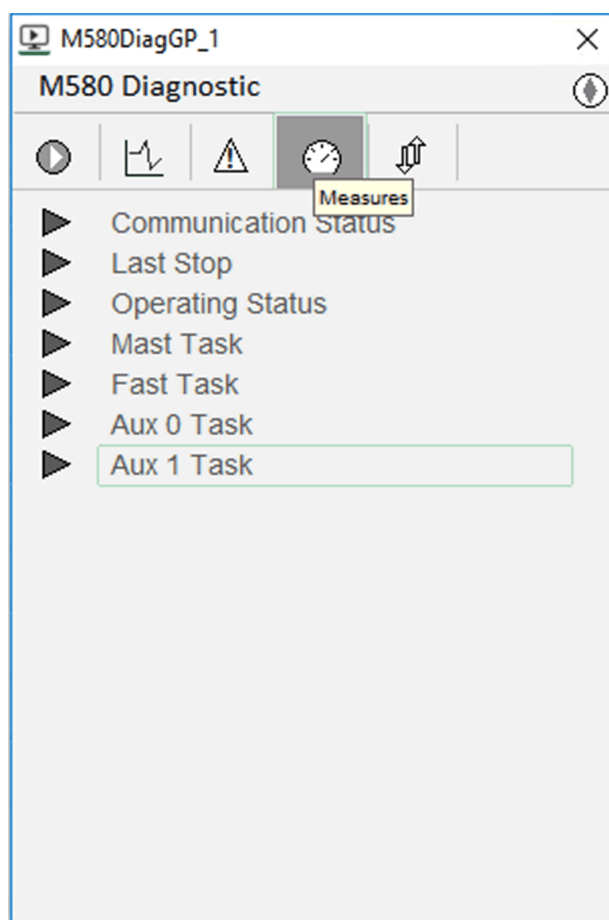
Measures Tab

Overview

The measures tab allows you to observe the status and monitor the current values of parameter groups (such as communication status, last stop, operating status, mast task, fast task, Aux 0 task, aux 1 task, etc) from the diagnostic templates.

Measures Tab Representation

The figure shows an example of a measures tab for M580 and M340:



For more details about parameter groups, refer to the **Measures Tab** section in respective supervision chapter.

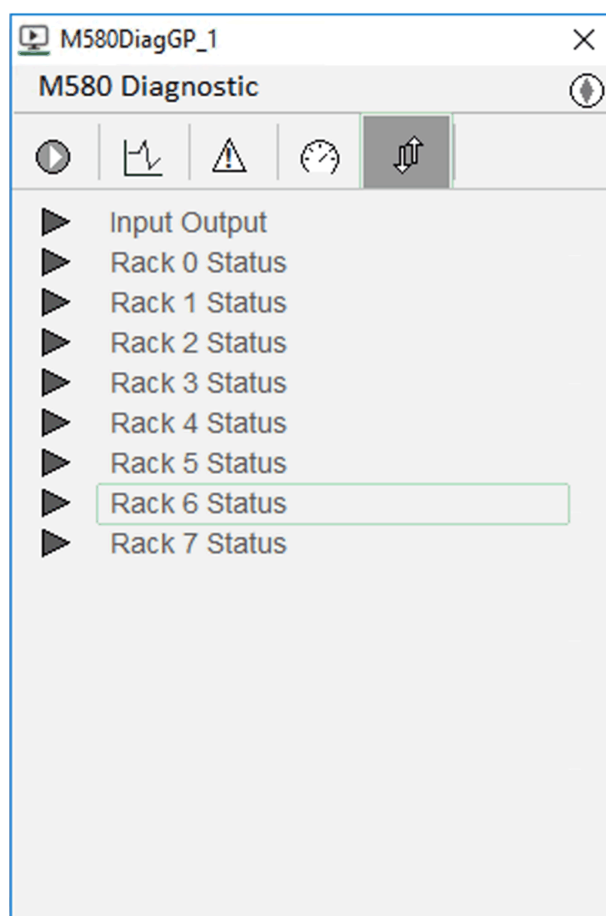
IO Measures Tab

Overview

The IO measures tab allows you to observe the Input output and rack status from the diagnostics templates.

IO Measures Tab Representation

The figure shows an example of an IO measures tab:





For more details about parameter groups, refer to the **IO Measures Tab** section in respective supervision chapter.

Color Codes

Dynamic Variable Status

Description

The table describes the possible statuses of dynamic variables and the colors that are used to represent them in elements of Supervision components:

Function	Color	Status	Example of use
Diagnostic module	Grey 	Active	Active running order Active running confirmation
	White 	Passive	Stopped running order Stopped running confirmation

CPU Diagnostics - M580 and M340

What's in This Part

M580 and M340 CPU Diagnostics	34
Computer and Floating Computer Diagnostics.....	48
Cluster Diagnostics	57

Overview

This part provides the functionality of the templates, a detailed description of the control (functions, pins, pin layout, and variables of the function blocks), and the supervision functions of M580 and M340DiagGP template.

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.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.

M580 and M340 CPU Diagnostics

What's in This Chapter

Template	34
Control	36
Supervision.....	37

Overview

This chapter describes the functionality of template, control services, and Supervision functions of the M580 and M340.

Template

Overview

This section describes the functionality, parameters, and interfaces of the \$M580DiagGP and \$M340DiagGP template.

Description

General

The \$M580DiagGP and \$M340DiagGP diagnostics template represents M580 and M340 CPU family.

This template provides CPU-related information such as communications diagnostics, AUX status, scan time, and so on.

Each of these information consists of control service component.

NOTE: This template does not support OPC UA communication protocol.

Parameters

Parameters

The \$M580DiagGP and \$M340DiagGP template provides different control and supervision parameters to the user to control the functions as per the requirement.

Supervision

The table describes the supervision parameters:

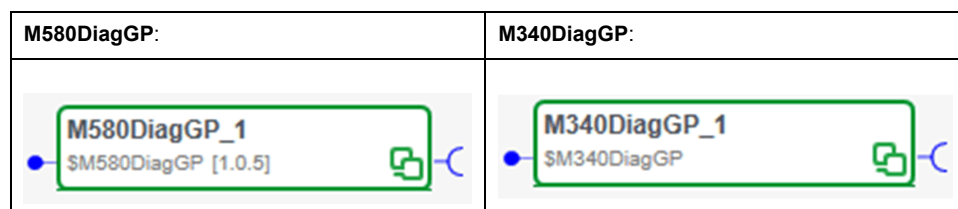
Section	Parameter description	Data type	Default value	Additional remarks
Security	Set alarm acknowledge	Enum	Operator (1)	Privilege to acknowledge alarm. This parameter is used in Alarm Tab, page 27.
Asset and Display	For more details, refer to the topic describing the parameters of asset and display, page 16.			
Trend	For more details, refer to the topic describing the parameters of trend, page 16.			

Section	Parameter description	Data type	Default value	Additional remarks
Controller				
Alarm	Watchdog overrun description	String	@(Software watchdog overrun).	A detail description for alarms.
	Watchdog overrun group and Input/output fault group		Failure	Group name for rapid alarm filtering.
	Watchdog overrun severity and input/output fault severity	Enum	Low (4000)	It allows to set the criticality (Critical (1000), High (2000), Medium (3000) and Low (4000)) of alarm.
	Input/output fault description	String	@(IO Fault)	A detail description for input/output detected error.
Trend	Disable trend	Boolean	FALSE	It disables trend tag.
Configuration	Controller part number	String	–	Part number of controller selected.
	Enable auxiliary 0 task status	Boolean	FALSE	It enables the auxiliary 0 task status.
	Enable auxiliary 1 task status			It enables the auxiliary 0 task status.
Configuration	Number of slots	Enum	8 (2)	Number of slots available in the mounted rack.
Historize NOT-E: This parameter is also applicable for rack status from 0 to 7.	Status	Boolean	False	It allows to historize the change in status.

Interfaces

Interfaces

The following figure depicts the \$M580DiagGP and \$M340DiagGP (also applicable for \$M580DiagCE and \$M340DiagCE) template as it appears in Links Editor:



Control

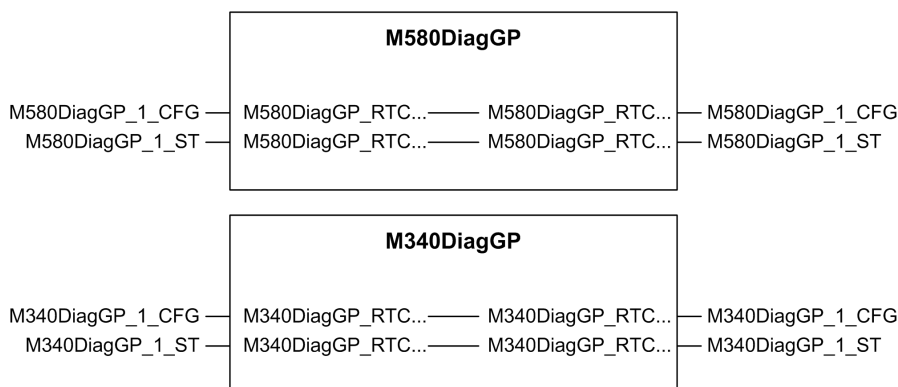
Overview

This chapter describes the M580DiagGP and M340DiagGP DFB.

DFB Representation

Representation

The M580DiagGP and M340DiagGP DFB has been specifically designed for use with the FBD language of the controller:



Inputs/Outputs

Input/Output Parameter Description

The table describes the input/output parameters for M580 and M340:

Parameter	Type	Description
M580DiagGP_RTC_CFG	M580DiagGP_RTCC_CFG	Provides the data needed to configure the DFB usually from the monitoring subsystem.
Parameter	Type	Description
M580DiagGP_RTC_ST	M580DiagGP_RTCC_ST	Provides the status information from the controllers.

NOTE: Parameter are same for M580 and M340. Hence, M580 is documented and same can be refer for M340.

M580DiagGP/M340DiagGP_CFG_DDT Type

Name	Type	Description
NewSec	INT	New second in system word.
NewMin	INT	New minute in system word.
NewHour	INT	New hour in system word.
NewDate	INT	New date in system word.
NewMonth	INT	New month in system word.
NewYear	INT	New year in system word.
RTCUpdate	INT	Bit to update RTC command.

M580DiagGP/M340DiagGP_ST_DDT Type

Name	Type	Description
ActDayOfWeek	INT	Actual Day of week of RTC.
ActHourMin	INT	Actual hour and minute of RTC.
ActSec	INT	Actual second of RTC.
ActMonthDay	INT	Actual month and day of RTC.
ActYear	INT	Actual year of RTC.

Supervision

Overview

This section describes the Supervision resources and runtime services that are available for the management of M580 and M340.

Genies

Genie Properties


Refer to Genie Properties, page 24.

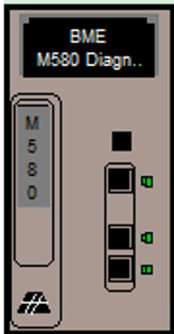
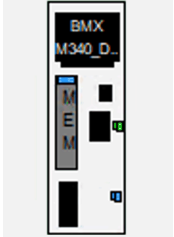
Genie Icons

Refer to Genie Icons, page 25.

Representation

The table describes the genies of the `gpl_diagnostics` library:

Graphic symbol	Genie name	Description
	<i>M580_CPU</i>	Genie to supervise a CPU of the platforms. The label indicates the name of the entity that is being supervised.

Graphic symbol	Genie name	Description
	<i>M580_SCPU</i>	
	<i>M340_CPU</i>	

Faceplate

Representation of Supervision Data

At the beginning of this document, you can find a of the graphic elements that are used in the faceplate.

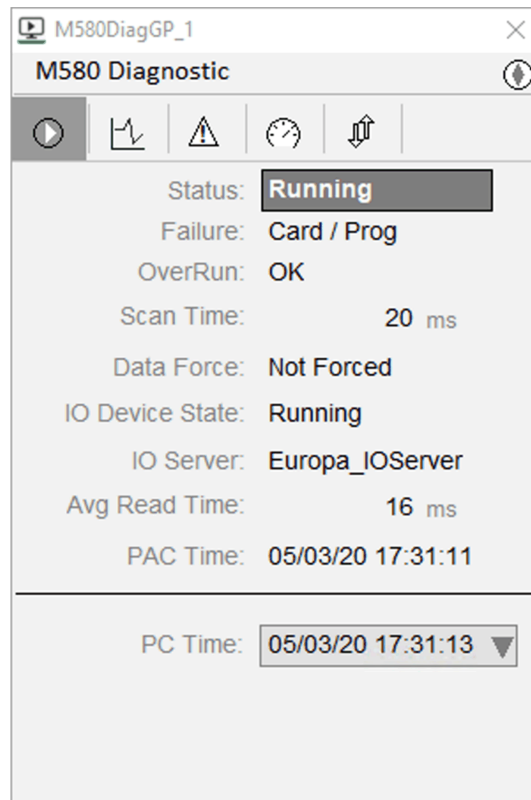
Available Tabs

During operation, clicking a diagnostics genie opens a faceplate with the following tabs of M580 and M340:

- Tabs for core functions:
 - Operation
 - Alarm, page 27
 - Measures, page 30
 - IO Measures, page 31
 - Trend, page 29

Operator Tab

The figure shows an operator tab:



The table describes the control function of an operator tab:

Label	Item name	Description
Status	EquipStatus	The current status of PAC
Failure	PACFailure	PAC detected error information
OverRun	OverRun	PAC overrun
Scan Time	ScanTime	Scan Time in millisecond
Data Force	DataForce	PAC data force
IO Device State	IODState	IO device state
IO Server	IOServer	The I/O Server which the client is using to communicate to this device
Average Read Time	AvrTime	Average read time
PAC Time	CPUTime	The current time of PAC
PC time	ActualTime	The current time of PC

Measures Tab

The figure shows an Measures tab:

The image displays six screenshots of the M580 Diagnostic tool, arranged in a 3x2 grid. Each screenshot shows a different section of the diagnostic interface.

Screenshot 1 (Top Left): Measures

- Navigation icons: Play, Stop, Warning, Measures (selected), Up/Down arrows.
- Tree view:
 - Communication Status
 - Last Stop
 - Operating Status
 - Mast Task
 - Fast Task
 - Aux 0 Task
 - Aux 1 Task

Screenshot 2 (Top Right): Last Stop

- Navigation icons: Play, Stop, Warning, Measures (selected), Up/Down arrows.
- Section: **Last Stop**
 - Date : 05/03/20
 - Time : 17:40:42
 - Cause : User

Screenshot 3 (Middle Left): Communication Status

- Navigation icons: Play, Stop, Warning, Measures (selected), Up/Down arrows.
- Section: **Communication Status**
 - Current Request : 0
 - Maximum Request : 24
 - Used Communication : 0 %
 - Server Request / Sec : 9
 - Diag Buffer Configured : OFF
 - Diag Buffer Full : OK

Screenshot 4 (Middle Right): Operating Status

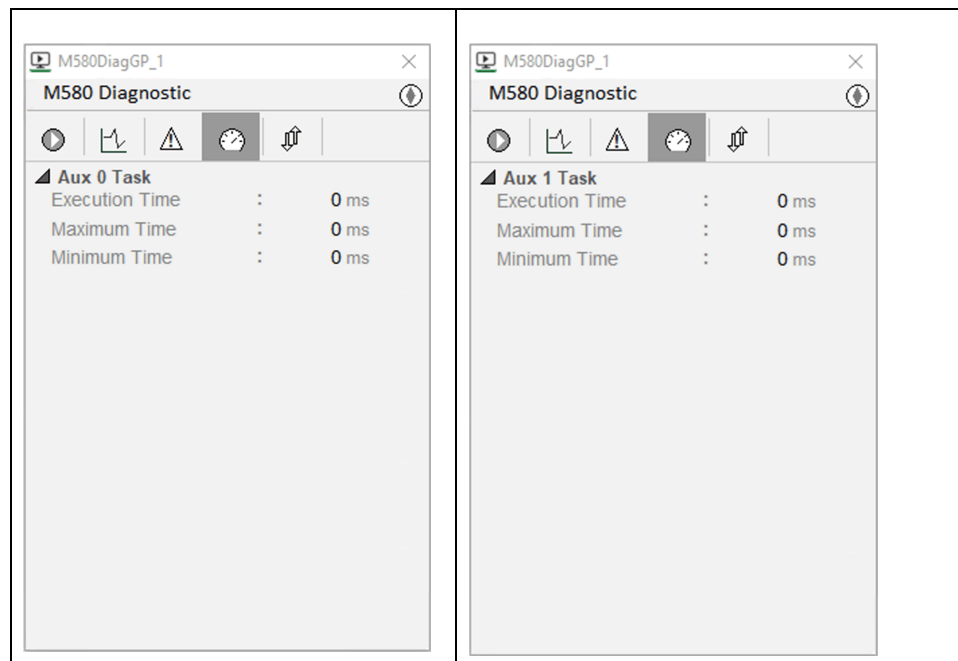
- Navigation icons: Play, Stop, Warning, Measures (selected), Up/Down arrows.
- Section: **Operating Status**
 - Commercial Version : 02.80
 - Patch Version : None
 - Firmware Version : 0011

Screenshot 5 (Bottom Left): Mast Task

- Navigation icons: Play, Stop, Warning, Measures (selected), Up/Down arrows.
- Section: **Mast Task**
 - Execution Time : 2 ms
 - Maximum Time : 6 ms
 - Minimum Time : 2 ms
 - WatchDog : 250 ms

Screenshot 6 (Bottom Right): Fast Task

- Navigation icons: Play, Stop, Warning, Measures (selected), Up/Down arrows.
- Section: **Fast Task**
 - Execution Time : 0 ms
 - Maximum Time : 0 ms
 - Minimum Time : 0 ms

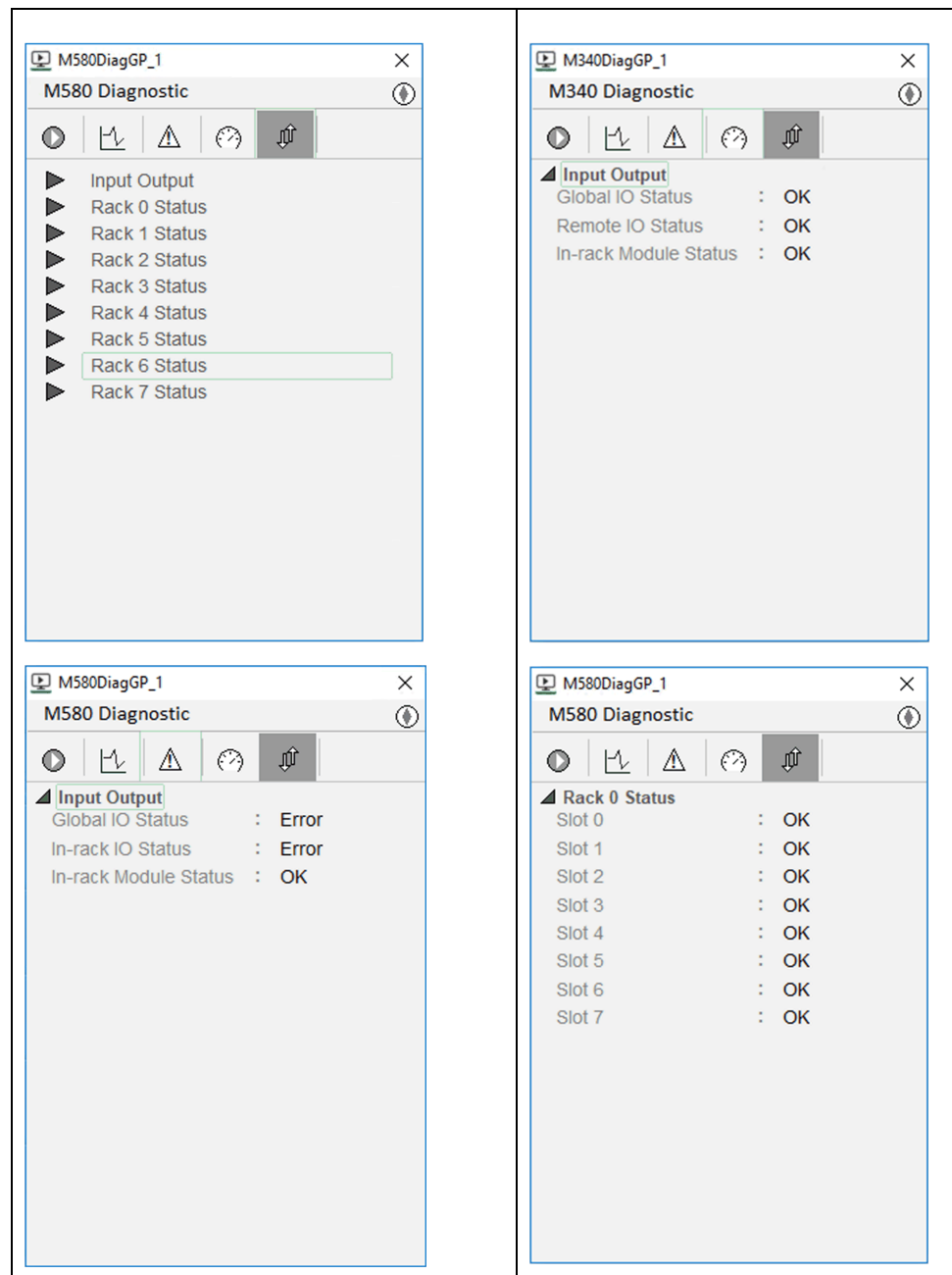


The table describes the control function of an Measures tab:

Label	Item name	Description
Communication Status		
Current Request	CurrReq-Counter	Requests handled by PAC in the last scan.
Maximum Request	MaxReqNb	Maximum number of requests managed by the MAST server.
Used Communication	UsedComm	Used Communication
Server Request/Sec	MastReqNb	PAC server requests processed per second.
Diag Buffer Configured	DiagBuff-Conf	Diag buffer configured.
Diag Buffer Full	DiagBuff-Full	Diag buffer full
Last Stop		
Date	LastStop-Date	PAC last stop date
Time	LastStop-Time	PAC last Stop time
Cause	PACStop-Cause	PAC last stop cause
Operating Status		
Commercial Version	CommVer	PAC OS version - commercial version
Patch Version	PatchVer	PAC OS version - patch version
Firmware Version	FirmwareVer	PAC OS version - firmware version
Mast Task and Fast Task		
Execution Time ¹	MastExec-Time	Execution time of last MAST task in millisecond.
Maximum Time ¹	MastMax-Time	Maximum execution time of MAST task in millisecond.
Minimum Time ¹	MastMin-Times	Minimum execution time of MAST task in millisecond.
WatchDog	WatchDog	Software watchdog overrun status.
NOTE: ¹ It is also applicable for Aux 0 Task and Aux 1 Task. Aux 0 Task and Aux 1 Task is not applicable for M340.		

IO Measures Tab Representation

The figure shows a measures tab:



The table describes the The table lists the items of each groups of IO measures tab:

Label	Item name	Description
Input Output		
Global IO Status	IOStatus	Global IO status
In-rack IO Status NOTE: This label is only applicable for M580.	IntIOStatus	In-rack IO status
Remote IO Status NOTE: This label is only applicable for M340.	REMIOStatus	Remote IO status
In-Rack Module Status	LocIOStatus	In-rack module status
Rack 0 Status		
Rack 0...7	Rack0-Slot0...7	Rack0 slot0...7 status

Items

Overview

This section describes the variables IO, alarm items, events, and trends item of M580 and M340.

Variables

The table describes the variable IO items that are used by Supervision components:

Item name	Description	Address
IO Items		
Aux0ExecTime ¹	The execution time of last AUX0 task in millisecond %SW36.	#Aux0-Times[0]
Aux0MaxTime ¹	The maximum execution time of AUX0 task in millisecond %SW37.	#Aux0-Times[1]
Aux0MinTime ¹	The minimum execution time of last AUX0 task in millisecond %SW38.	#Aux0-Times[2]
Aux1ExecTime ¹	The execution time of last AUX1 task in millisecond %SW39.	#Aux1-Times[0]
Aux1MaxTime ¹	The maximum execution time of AUX1 task in millisecond %SW40.	#Aux1-Times[1]
Aux1MinTime ¹	The minimum execution time of last AUX1 task in millisecond %SW41.	#Aux1-Times[2]
AuxPeriod0 ¹	The AUX0 task period in units of 10 millisecond %SW2.	#AuxPeriod[0]
AuxPeriod1 ¹	The AUX1 task period in units of 10 millisecond %SW3.	#AuxPeriod[1]
BackupProgOK	Memory card present/consistent with internal RAM %SW96.	#Backup- ProgOK
CardStatus	Card status indication %SW97.	#CardSta- tus
CPUErr	Last system inoperable %SW124.	#CPUErr
CPUErrType	Last system inoperable.	#CPUErr- Type
CPUStopTime0	Time of last power detected error/PAC stoppage - seconds and day of the week %SW54.	#CPUStop- Time[0]
CPUStopTime1	Time of last power detected error/PAC stoppage - hour and minutes %SW55.	#CPUStop- Time[1]
CPUStopTime2	Time of last power detected error/PAC stoppage - month and day %SW56.	#CPUStop- Time[2]
CPUStopTime3	Time of last power detected error/PAC stoppage - century and year %SW57.	#CPUStop- Time[3]
CPUStopTime4	Time of last power detected error/PAC stoppage - day of the week and stop code %SW58.	#CPUStop- Time[4]
DiagBuffConf	Diagnosis buffer configured %SW76.	#DiagBuff- Conf
DiagBuffFull	Diagnosis buffer full %SW77.	#DiagBuff- Full
FastPeriod	FAST task period in millisecond %SW1.	#FastPer- iod
FastExecTime	The execution time of last FAST task in millisecond %SW33.	#Fast- Times[0]
FastMaxTime	The maximum execution time of FAST task in millisecond %SW34.	#Fast- Times[1]

Item name	Description	Address
FastMinTimes	The minimum execution time of FAST task in millisecond %SW35.	#Fast-Times[2]
ForcedDigital	Number of forced discrete bits %SW108.	#Force-dObjects [0]
ForcedAnalog	Number of forced analog channels %SW109.	#Force-dObjects [1]
IntIOStatus	In-rack IO status %S117.	#IntIOSta-tus
IOStatus	Global IO status %S10.	#IOStatus
LocIOStatus	In-rack module status %S119.	#LocIOSta-tus
ScanTime	MAST task period in millisecond %SW0.	#MastPer-iod
MastReqNb	PAC server requests processed per second %SW26	#Mas-tReqNb
MastExecTime	The execution time of last MAST task in millisecond %SW30.	#Mast-Times[0]
MastMaxTime	The maximum execution time of MAST task in millisecond %SW31.	#Mast-Times[1]
MastMinTimes	The minimum execution time of MAST task in millisecond %SW32.	#Mast-Times[2]
OSCommVer	PAC OS version - commercial version %SW14.	#OSVer-sion[0]
OSPatchVer	PAC OS version - patch number %SW15.	#OSVer-sion[1]
OSFirmVer	PAC OS version - firmware internal revision %SW16.	#OSVer-sion[2]
OverRun	PAC overrun %S19	#OverRun
PLCRunning	The current state of PAC %S12	#PLCRun-ning
CurrReqCounter	Requests handled by PAC in the last scan %SW87.	#Re-qCounters [0]
MaxReqNb	The maximum number of requests managed by the MAST server %SW90.	#Max-ReqNb
WatchDog	Software watchdog overrun status %S11	#Watch-Dog
WatchDogValue	MAST task watchdog value in millisecond %SW11.	#Watch-dogValue
ActDayOfWeek	Hot standby status	ActDayOf-Week
ActHourMin	The current status of PAC	ActHour-Min
ActSec	PAC inoperable information	ActSec
ActMonthDay	PAC inoperable information	ActMonth-Day
ActYear	Sync RTC clock	ActYear
RackIOStatus {x}	Rack {x} IO status	#RackIOStatus {x}
NOTE: {x} represents the rack number, range from 0 to 7.		
RackStatus {x}	Rack {x} device status	#RackSta-tus {x}
NOTE: {x} represents the rack number, range from 0 to 7.		

Item name	Description	Address
Rack {x} Slot {y}	Rack {x} Slot {y} Status	Refer to 3rd bulleted point of the below note for the address.
NOTE: <ul style="list-style-type: none"> • {x} represents the rack, range from 0 to 7 • {y} represents the slot number, range from 0 to 11. • Following are the address for slot, range from 0 to 11: <ul style="list-style-type: none"> ◦ RackStatus{x} BITAND 0x0001 ◦ RackStatus{x} BITAND 0x0002 ◦ RackStatus{x} BITAND 0x0004 ◦ RackStatus{x} BITAND 0x0008 ◦ RackStatus{x} BITAND 0x0010 ◦ RackStatus{x} BITAND 0x0020 ◦ RackStatus{x} BITAND 0x0040 ◦ RackStatus{x} BITAND 0x0080 ◦ RackStatus{x} BITAND 0x0100 ◦ RackStatus{x} BITAND 0x0200 ◦ RackStatus{x} BITAND 0x0400 ◦ RackStatus{x} BITAND 0x0800 		
Calculated Items		
PACFailure	Shows pack detected error information of the M580 and M340	GPL_PACFailure
DataForce	Shows abnormal condition of the M580 and M340	GPL_DataForce
SyncClock	Shows synchronize RTC clock of the M580 and M340	GPL_SyncClock
PACStopCause	Shows pack stop cause of the M580 and M340	GPL_PACStopCause
UsedComm	Shows used communication of the M580 and M340	GPL_UsedComm
LastStop	Shows last stop of the M580 and M340	GPL_PACLastStop
ActualTime	Shows actual time of the M580 and M340	GPL_ActualTime
CommVer	PAC OS version - commercial version	GPL_CommVersion
PatchVer	PAC OS version - Patch version	GPL_PatchVersion
FirmwareVer	PAC OS version - Firmware version	GPL_FirmwareVersion
CPUTime	The current time of PAC	GPL_PACCurrentTime NOT-E: The address for M340 is GPL_

Item name	Description	Address
		P AC- Cur- ren- tTi- me_340
LastStopTime	PAC last stop time.	GPL_ PACLast- StopTime
IODState	IO device State	GPL_ IODevi- ceState
IOServer	IO Server	GPL_ IOSer- verInfo
AvrTime	Average read time	GPL_ Avera- geRead- Time
Abnormal	Shows abnormal condition of the M580 and M340. Refer to Abnormal Conditions, page 46.	GPL_ Abnormal
NOTE: 1 This item is not applicable for M340.		

PACCurrStatus Calculated Variable

The table describes the *PACCurrStatus* calculated variable:

Equipment State	Conditions	Enumeration
Active	Not [PLCRunning]	Stopped
Active	$PLCRunning \times CPUError = 0$	Running
Active	$PLCRunning \times CPUError <> 0$	Error

Abnormal Conditions

The table describes the abnormal conditions:

Item name	Description	Address
Bit items derived from Abnormal variable word.		
AbnormalDataForce	Abnormal status of data force.	Bit0
AbnormalOperatorTab	Abnormal status of operator tab.	Bit8

Alarms

Event conditions are conditions for M580 and M340 which are detected during the operation of control module or the logging of operator actions:

Item name	Description	Expression
WatchDogOverrun	Software WatchDog Overrun	M580DiagGP_WatchDog
IOFault	input/output inoperable	M580DiagGP_IOStatus

Trends

The table describes the trend items for the M580 and M340 except ¹ that are used by Supervision components:

Item name	Description	Expression
MastTaskExecTime	Mast task execution time trend in millisecond.	M580DiagGP_MastExecTime
FastTaskExecTime	Fast task execution time trend millisecond.	M580DiagGP_FastExecTime
Aux0TaskExecTime ¹	Auxiliary 0 task execution time trend millisecond.	M580DiagGP_Aux0ExecTime
Aux1TaskExecTime ¹	Auxiliary 1 task execution time trend millisecond.	M580DiagGP_Aux1ExecTime
NOTE: ¹ This Item is not applicable for M340.		

Computer and Floating Computer Diagnostics

What's in This Chapter

Template 48
Supervision..... 50

Overview

This chapter describes the functionality of template and Supervision functions of the computer and floating computer.

Template

Overview

This section describes the functionality, parameters, and interfaces of the `$ComputerGP` and `$FloatingComputerGP` template.

Description

General

The `$ComputerGP` and `$FloatingComputerGP` diagnostics template represents Planr SCADA Client.

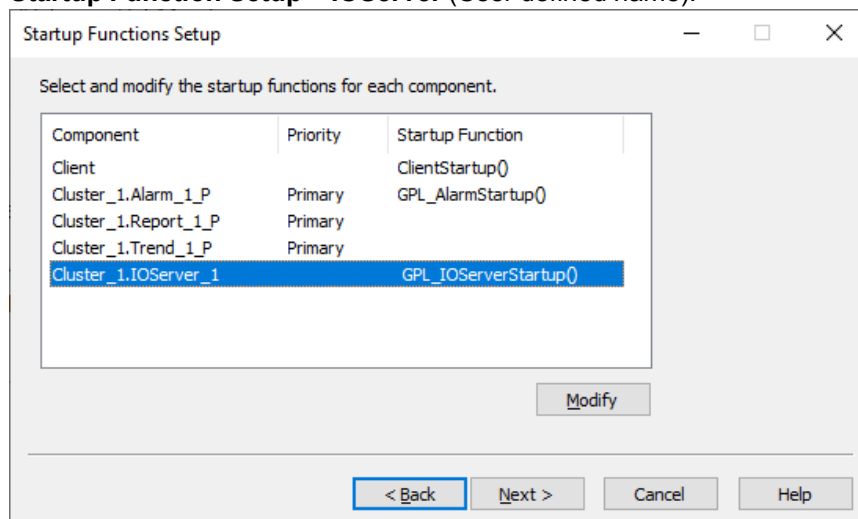
This template provides client-related information such as active status, user, login time, start-up time, client CPU load.

Additionally `$ComputerGP` also provides the servers informations (Alarm, IO, Trend and Report):

Each of these information consists of supervision service component.

NOTE:

- \$FloatingComputerGP template supports three computer.
- The general property AllowRPC and AllowExec of the role should be set to true in Plant SCADA supervision (Security > Roles).
- The general property AllowRPC of all servers (IO, Alarm, Trend, Report) should be set to true in Pant SCADA supervision (Topology > Edit).
- The password must same for all the systems (computers and floating computers) that are on the same network in Plant SCADA supervision (Setup Wizard > Server Authentication).
- Add start up function **GPL_IOServerStartup()** in **Setup Wizard > Startup Function Setup > IOServer** (User defined name).



Parameters

Parameters

The \$ComputerGP and \$FloatingComputerGP template provides supervision parameters to the user to supervise the functions as per the requirement.

Supervision

Settings

The table describes the settings parameters:

Section	Parameter description	Data type	Default value	Additional remarks
Security	Set alarm acknowledge	Enum	Operator (1)	Privilege to acknowledge alarm. This parameter is used in alarm page.
Asset and Display	For more details, refer to the topic describing the parameters of asset and display, page 16.			
Trend	For more details, refer to the topic describing the parameters of trend, page 16.			

Data

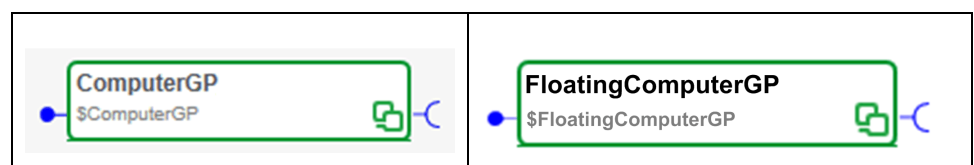
The table describes the data parameters:

Section	Parameter description	Data type	Default value	Additional remarks
Configuration NOTE: This parameter group is only applicable for \$ComputerGP.	Display name	String	–	User configurable name for the computer.
	Network address		127.0.0.1	Computer network address.
Security	Client restart	Enum	Administrator (7)	Restarts the client.
	Server and client restart			Restarts the client and servers.
	WorkStation restart			Restarts the computer system.
Alarm	High client CPU load limit in %	Float	70.0	Allows to set the high client CPU load alarm limit.
	High client CPU load delay	Duration	00:00:05	Allows to set the high client CPU load alarm generation time delay.
	High client CPU load description	String	@(High client CPU load)	A detail description for alarms.
	High client CPU load severity	Enum	High (2000)	It allows to set the criticality (Critical (1000), High (2000), Medium (3000) and Low (4000)) of alarm.
	High client CPU load group	String	High client CPU overload	Group name for rapid alarm filtering.

Interfaces

Interfaces

The following figure depicts the \$ComputerGP \$Floating ComputerGP and template as it appears in Links Editor:



Supervision

Overview

This section describes the Supervision resources and runtime services that are available for the management of computer and floating computer.

Genies

Genie Properties



Refer to Genie Properties, page 24.

Genie Icons

Refer to Genie Icons, page 25.

Representation

The table describes the genies of the `gpl_diagnostics` library:

Graphic symbol	Genie name	Description
	<i>Desktop</i>	Genie to supervise the client and server information.
	<i>Laptop</i>	

Faceplate

Representation of Supervision Data

At the beginning of this document, you can find a of the graphic elements that are used in the faceplate.

Available Tabs

During operation, clicking a diagnostics genie opens a faceplate with the following tabs of computer and floating computer:

- Tabs for core functions:
 - Operation
 - Service

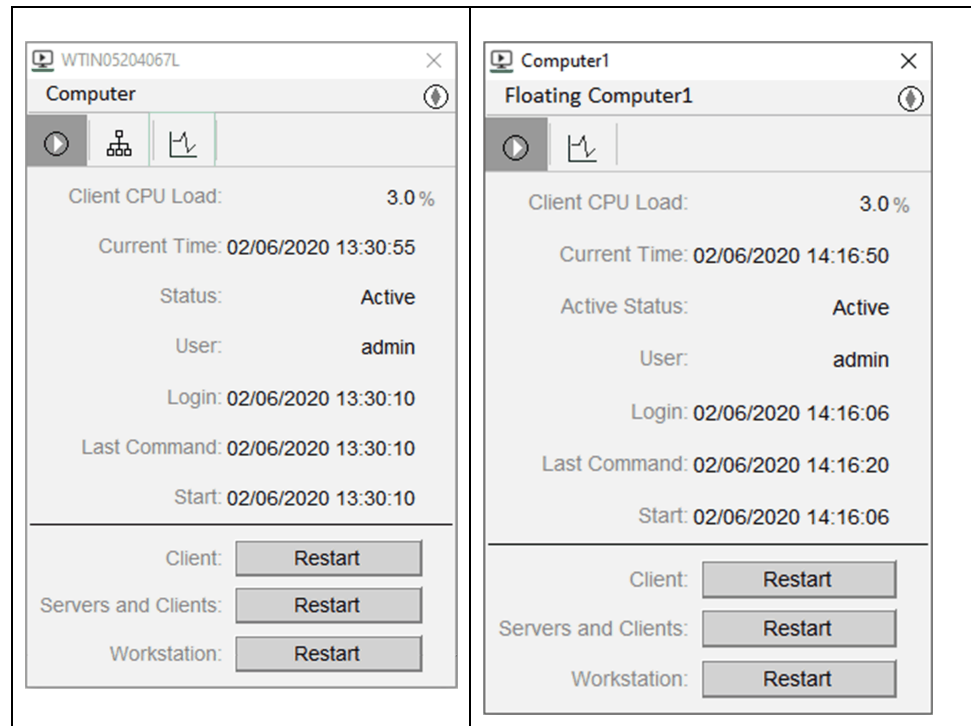
NOTE: Service tab is not applicable for the floating computer.

- Trend

NOTE: Alarm and Event tabs are user configurable, it appears when user configure it.

Operator Tab

The figure shows an operator tab:

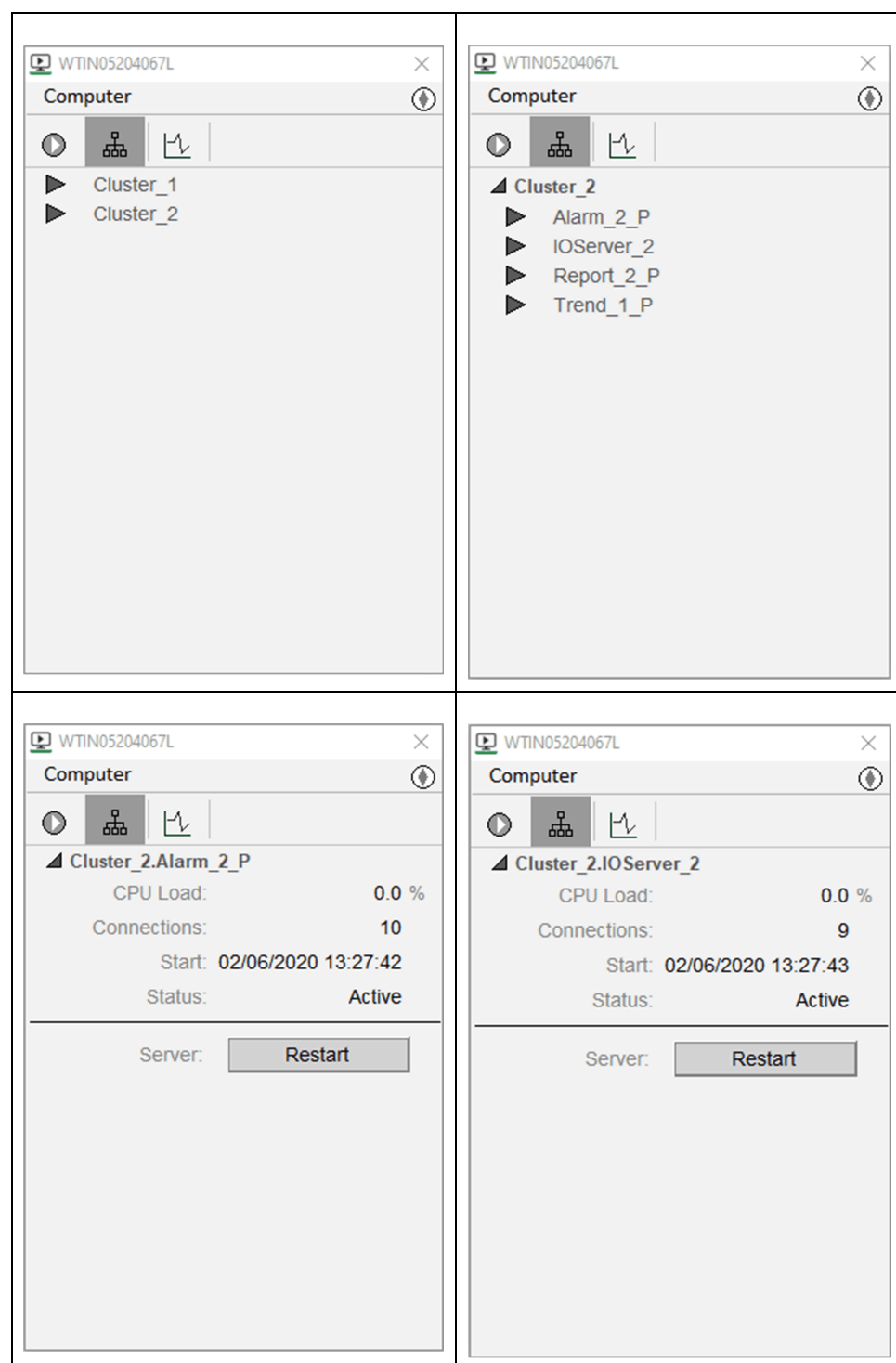


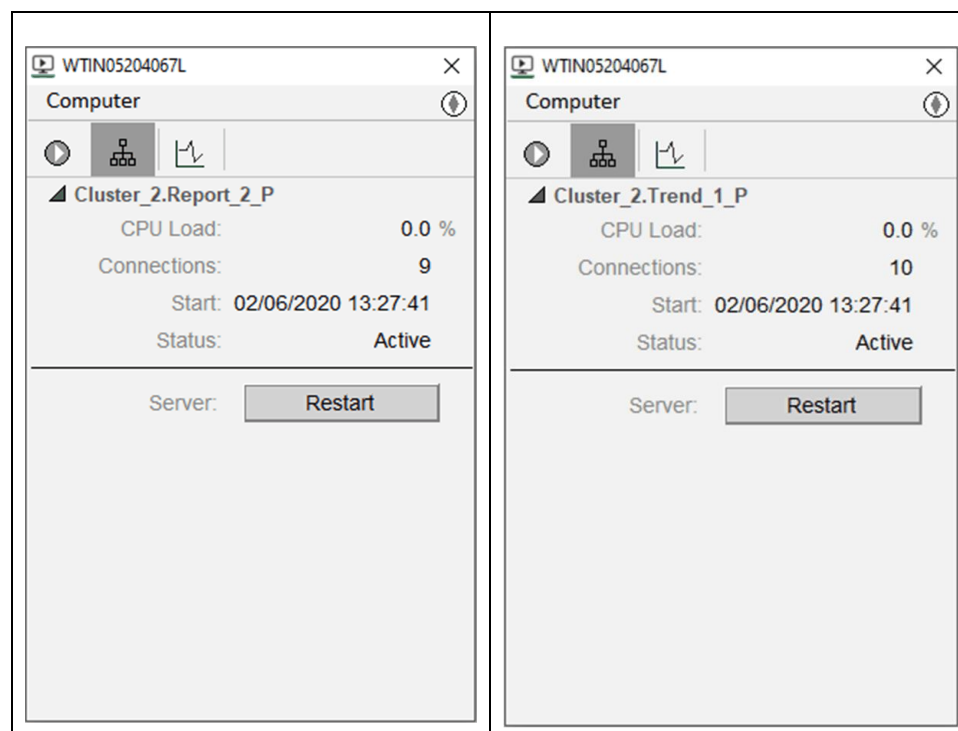
The table describes the control function of an operator tab:

Label	Item name	Description
Client CPU Load	CPUload	Client CPU Load
Current Time	CurrentTime	Current time
Status	ActiveStatus	Shows the status of client
User	User	Client current user
Login	LoginTime	Login time
Last Command	LastCommandTime	Last command time
Start	SupervisionStartTime	Supervision start time
Client	RestartClient	Restart client
Servers and Clients	RestartSupervision	Restart client and servers
Workstation	RestartWorkStation	Restart workstation

Service Tab

The figure shows a Service tab:

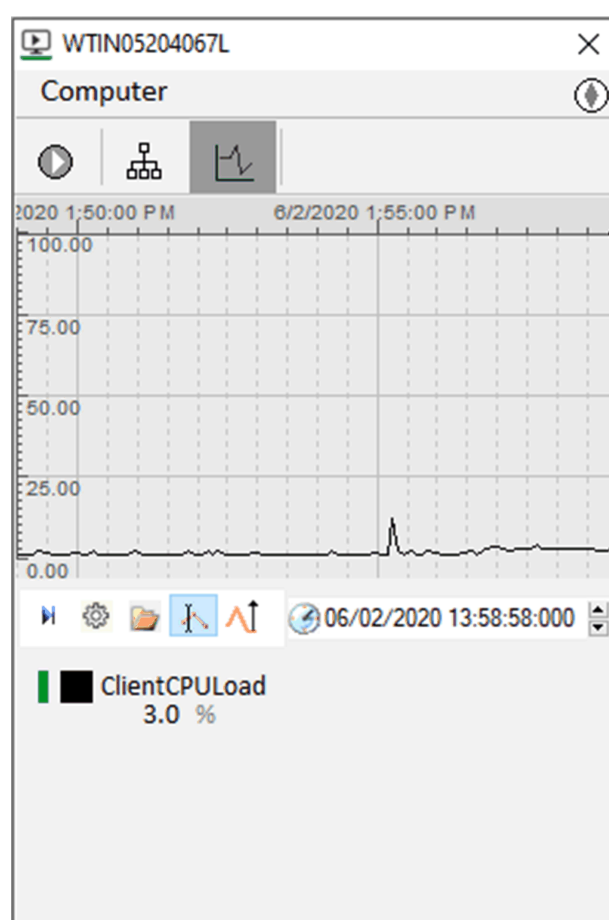




NOTE: Service tab is applicable for computer only.

Trend Tab

The figure shows an trend tab:



Items

Overview

This section describes the Disk IO, alarm items, events, and trends item of Computer and Floating Computer

Variables

The table describes the disk IO items that are used by Supervision components:

Item name	Description	Address
ActiveStatus Items		
ActiveStatus	Status	{xyz}_ActiveStatus
CPUload	Client CPU Load	{xyz}_CPUload
CurrentTime	Current time	{xyz}_CurrentTime
User	User	{xyz}_User
LoginTime	Login time	{xyz}_LoginTime
LastCommand-Time	Last command time	{xyz}_LastCommandTime
Supervision-StartTime	Supervision start time	{xyz}_SupervisionStartTime
RestartClient	Restart client	{xyz}_RestartClient
RestartSuper-vision	Restart client and servers	{xyz}_RestartSupervision
RestartWork-Station	Restart workstation	{xyz}_RestartWorkStation
Name NOTE: This Item is only applicable for floating computer.	Represents the computer name	{xyz}_Name
NOTE: {xyz} represents the computer or floating computer.		

Alarms

The table describes the advanced alarm items that are used by Supervision components. It also indicates the address that is configured in the Supervision components:

Item name	Description	Expression
HighClientCPUload	High client CPU Load	CPUload >= 70.0

NOTE: Default alarm is visible in active Alarms page. if required to display on faceplate, alarm tab has to be configured.

Events

Event conditions are conditions for computer which are detected during the operation of control module or the logging of operator actions:

Item name	Description
ActionAlarm	All actions by the operator.

NOTE: Default events are visible in active Alarms page. if required to display on faceplate, events tab has to be configured.

Trends

The table describes the trend items that are used by Supervision components:

Item name	Description	Expression
ClientCPULoad	Client CPU load	Computer_CPULoad

Cluster Diagnostics

What's in This Chapter

Template	57
Supervision.....	58

Overview

This chapter describes the functionality of template, control services, and Supervision functions of the cluster.

Template

Overview

This section describes the functionality, parameters, and interfaces of the `$ClusterGP` template.

Description

General

The `$ClusterGP` diagnostics template represents clusters and servers.

This template provides topology-related information such as active number of clusters, servers, and server information (status, start time, number of connections, and CPU load).

Each of these information consists of supervision service component.

Parameters

Parameters

The `$ClusterGP` template provides supervision parameters to the user to control the functions as per the requirement.

Supervision

Data

The table describes the data parameters:

Section	Parameter description	Data type	Default value	Additional remarks
Security	Server restart	Enum	<i>Administrator (7)</i>	Privilege to restart the servers.

Interfaces

Interfaces

The following figure depicts the `$ClusterGP` template as it appears in Links Editor:



Supervision

Overview

This section describes the Supervision resources and runtime services that are available for the management of cluster.

Genies

There is no genies for cluster.

Faceplate

Representation of Supervision Data

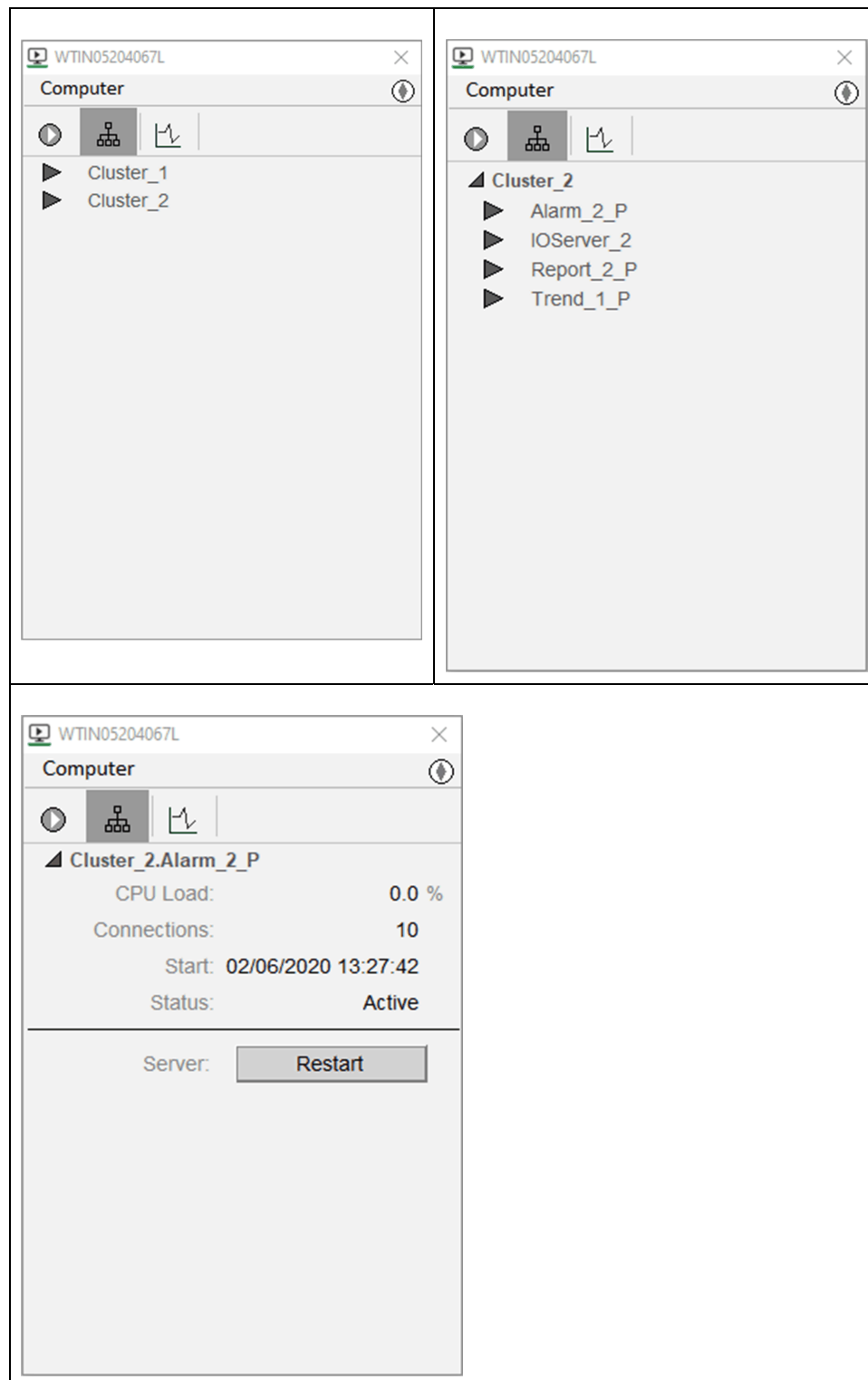
At the beginning of this document, you can find a of the graphic elements that are used in the faceplate.

Available Tabs

There is no faceplate for cluster but information is available in the service tab of computer faceplate.

Service Tab

The figure shows an service tab:



The table describes the control function of **Service** tab of computer template:

Label	Item name	Description
CPU load	Server{x}CPULoad	Server CPU Load
Connections	Server{x} NumberOfClient	Number of server connections
Start	Server{x}StartupTime	Server startup time
Status	Server{x}ActiveStatus	Server status
Server	Server{x}Restart	Restarts the server
NOTE: {x} represents server, range from 1 to 10.		

Items

Overview

This section describes the variables IO, events, item of `Cluster`.

Variables

The table describes the Disc IO items that are used by Supervision components:

Item name	Description	Address
Disk IO Items		
Server{x} CPULoad	Server CPU Load	Cluster_Server{x}_CPULoad
Server{x} NumberOfClient	Number of connections	Cluster_Server{x} _NumberOfClient
Server{x} StartupTime	Server startup time	Cluster_Server{x}_StartupTime
Server{x} ActiveStatus	Server status	Cluster_Server{x} _ActiveStatus
Server{x} Restart	Restarts the server	Cluster_Server{x}_Restart
Name	Represents the server name	Cluster_Server{x}_Name
NOTE: {x} represents server, range from 1 to 10.		

Events

Event conditions are conditions for computer which are detected during the operation of control module or the logging of operator actions:

Item name	Description
ActionAlarm	All actions by the operator.

Index

A

access control	
privilege levels	21
Alarm tab	
Faceplate Tabs	27

C

Cluster	
supervision services	58
Computer	
supervision services	50

F

faceplate	
description	26
faceplate tab	
icons	26
faceplate tabs	
IO Measures tab	31
Measures tab	30
Faceplate Tabs	
Alarm Tab	27
Trend Tab	29

H

hyperlink services	
Hyperlink services	17

I

IO Measures tab	
faceplate tabs	31

M

M580	
supervision services	37
Measures tab	
faceplate tabs	30

P

privileges	
privilege levels for supervision actions	21
process templates	
list of templates	14

S

supervision services	
Cluster management	58
Computer management	50
M580 management	37

T

tabs	
Alarm Tab	27

Trend Tab	29
templates	
list of Diagnostics templates	14
Trend tab	
Faceplate Tabs	29

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