

General Specifications

GS 36J31A11-01E

Model NTPV100
 AAASuite
 (Advanced Alarm Administrator)
 Alarm Rationalization Assistance
 Package Software



■ GENERAL

In recent years, plants have experienced increased alarm flooding, which leads to the oversight of important alarms, while at the same time significantly adding to the scope of operator tasks. It is becoming increasingly difficult to realize safer, more stable, and efficient plant operation with limited human resources. Therefore, the necessity of alarm management (alarm validation and optimization, etc.) as an effective countermeasure against this problem is widely recognized. However, implementing alarm management is not an easy task, because solving the root cause of nuisance alarms requires huge cost and huge manpower across the relevant departments. The solution is Alarm Rationalization Assistance Package Software, AAASuite (Advanced Alarm Administrator). AAASuite (Triple A Suite) is an innovative alarm management system that can automatically improve an alarm flooding just with simple initial settings. Alarm functions help improve the safety and stability of plant operations and substantially reduce instrumentation engineering manpower needed for alarm improvements.

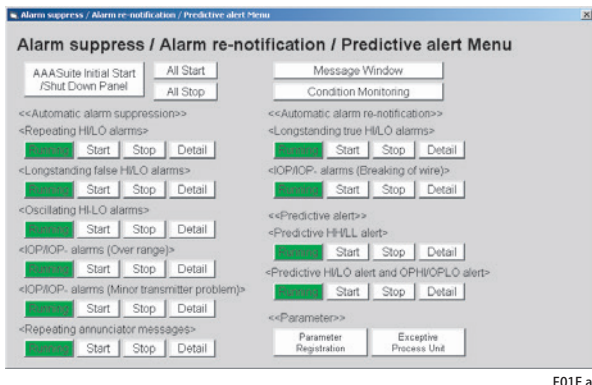


Figure AAASuite Menu Panel

■ FUNCTION SPECIFICATION

● Automatic Alarm Suppression

As a solution to alarm flooding, AAASuite suppresses the following kinds of repeating nuisance alarms automatically, and helps operators concentrate only on important alarms.

1. Suppressing Repeating HI/LO Alarms

AAASuite suppresses sporadically repeating HI/LO alarms (for example, those that occur three times in five minutes) caused by incorrect setting of the HI/LO alarm threshold.

Suppression judgement: AAASuite monitors an HI alarm tag and detects that an HI alarm repeats a specified number of times in a certain period of time.

Suppression processing: AAASuite performs calculation based on the moving average and standard deviation of PV and temporarily changes PH to an alarm set point that suppresses the repetition of the HI alarm (which indicates a safe level).

Turning off suppression: Based on the moving average and standard deviation of PV, AAASuite resets PH to the original setting to let NR or HI to continue.

Note: LO is suppressed in the same way.

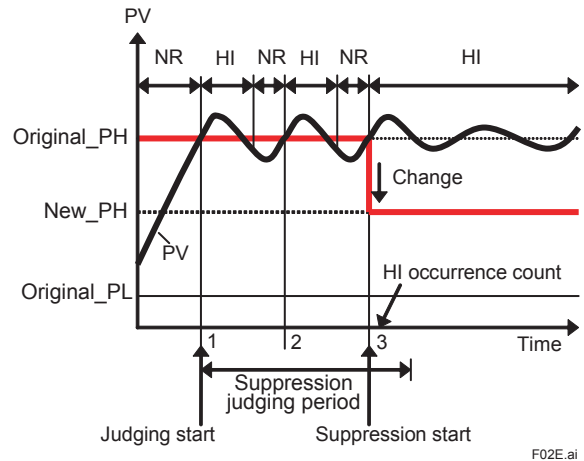


Figure Judging and Suppression of Repeating HI/LO Alarms

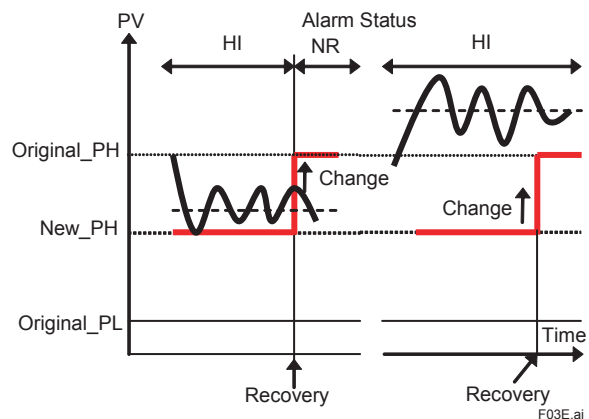


Figure Recovery of Repeating HI/LO Alarms

2. Suppressing Longstanding False HI/LO Alarms

AAASuite turns off repeating longstanding false alarms caused by incorrect setting of the HI/LO alarm threshold or hysteresis.

Turning off judgement: AAASuite monitors an HI alarm tag and detects that the moving average (Mean) + 3* standard deviation (Dev) of PV stays within the PH hysteresis for a certain period of time.

Turning off processing: AAASuite turns off the HI alarm by changing PH to SH (the upper limit on the scale) for just three seconds.

Note: LO is turned off in the same way.

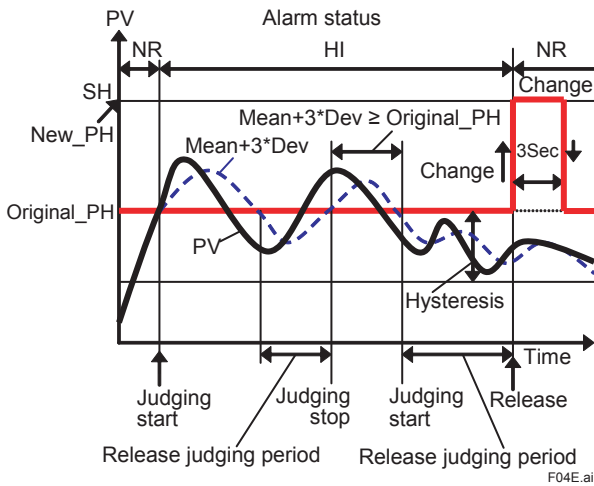


Figure Suppression of Longstanding False HI/LO Alarms

3. Suppressing Oscillating HI-LO Alarms

AAASuite suppresses repeating oscillating alarms caused by incorrect setting of the PID parameters and HL/LO alarm threshold.

Suppression judgement: AAASuite monitors an HI alarm tag and detects that HI and LO alarms repeat alternately a specified number of times in a certain period of time.

Suppression processing: AAASuite turns off only HI and LO alarms (AOF).

Turning off suppression: AAASuite turns HI and LO alarms back on (AON), when NR (PL<PV<PH) continues for a certain period of time.

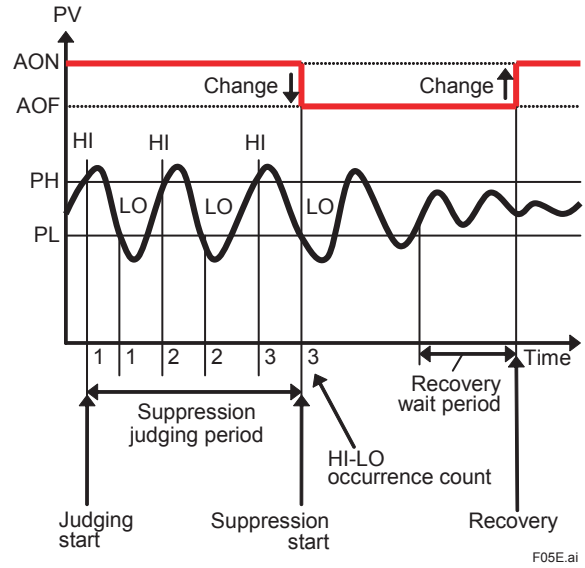


Figure Suppression of Oscillating HI-LO Alarms

4. Suppressing IOP (IOP-) Alarms (Over range)

AAASuite suppresses repeating IOP (IOP-) alarms caused by overrange.

Over range IOP (IOP-) judgement: A slow alternating sequence of occurrence and recovery of IOP is defined as an over range IOP. AAASuite monitors a tag that recovers in a certain period of time after IOP occurs. When IOP occurs after a certain period of time after PV of a monitored tag rises over SH and recovers in a certain period of time, that IOP is judged to be an over range IOP.

Note: IOP- is also judged in the same way.

Suppression processing: AAASuite turns only the IOP alarm off at the time when PV of a suppressed tag rises over SH, and turns the alarm back on (AON) at the time when PV falls below SH.

Note: IOP- is also suppressed in the same way.

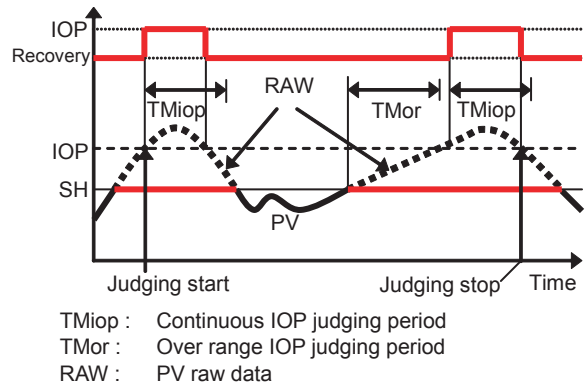


Figure Judging of IOP/IOP- Alarms (Over range)

TMIop : Continuous IOP judging period
 TMor : Over range IOP judging period
 RAW : PV raw data

F06E.ai

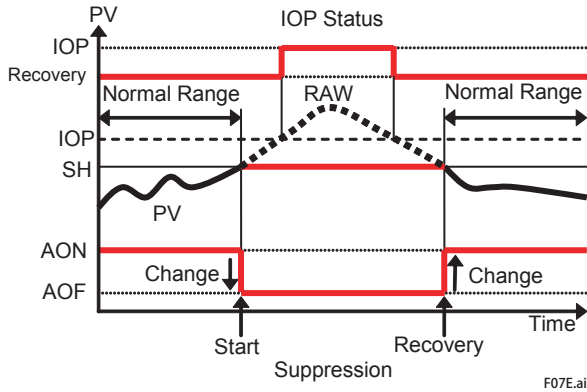


Figure Suppression of IOP/IOP- Alarms (Over range)

5. Suppressing IOP (IOP-) Alarms (Minor Transmitter Problem)

AAASuite suppresses repeating IOP (IOP-) alarms caused by field transmitter problems.

Field transmitter problem IOP (IOP-) judgement: A rapid alternating sequence of occurrence and recovery of IOP is defined as a field transmitter problem IOP. AAASuite monitors a tag that recovers in a certain period of time after IOP occurs. When IOP occurs three seconds or less after PV of a monitored tag rises over SH and recovers in a certain period of time, that IOP is judged to be a field transmitter problem IOP.

Note: IOP- is also judged in the same way.

Suppression judgement: AAASuite turns off only the IOP alarm with a suppressed tag (AOF). The advanced operation screen for each function allows for turning off suppression.

Note: IOP- is also suppressed in the same way.

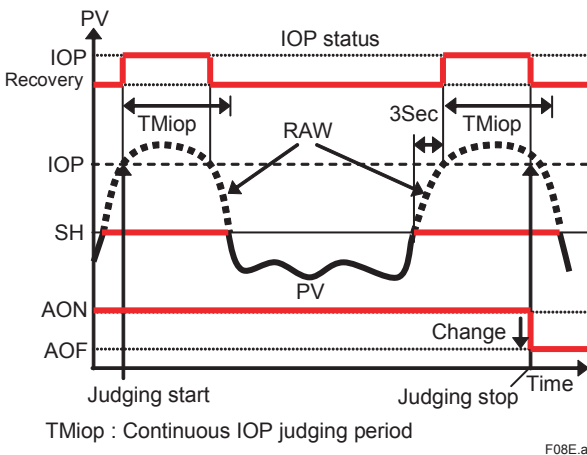


Figure Suppression of IOP/IOP- Alarms (Minor Transmitter Problem)

6. Suppressing Repeating Annunciator Messages
AAASuite suppresses repeating annunciator messages caused by an incomplete DCS sequence program.

First-time suppression judgement: AAASuite detects that an annunciator message repeats a specified number of times in a certain period of time.

First-time suppression processing: AAASuite turns off the alarm (AOF) for the relevant annunciator message.

First-time turning off suppression: AAASuite detects that the annunciator message does not occur in a certain period of time, and turns the alarm back on (AON).

Second and subsequent times: AAASuite detects the first occurrence of an annunciator message and turns off the alarm (AOF). The way of turning on the alarm is the same as that for the first time.

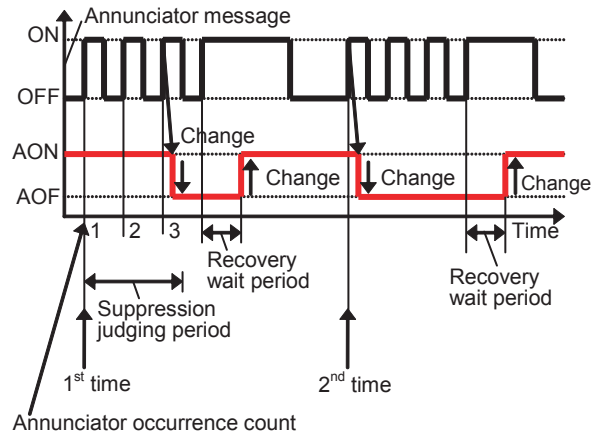


Figure Suppression of Repeating Annunciator Messages

● **Audit Trail**

The AAASuite Condition monitoring panel allows for viewing the tag state of suppressed alarms (suppression start date and time, tag number, suppression alarm, estimated causes, etc.). The event history view of Exapilot (standard function) allows for viewing the suppression history and outputting it to an CSV file.

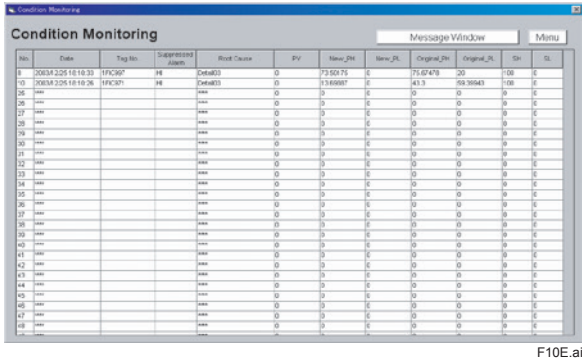


Figure AAASuite Condition Monitoring Panel

● **Automatic Alarm Re-notification**

1. **Re-notifying Longstanding True HI/LO Alarms**

AAASuite re-notifies longstanding true HI/LO alarms caused by incorrect setting of the HI/LO alarm threshold.

Alarm re-notification judgement: AAASuite monitors an HI alarm tag and detects that the moving average (Mean) + 3* standard deviation (Dev) of PV stays over PH for a certain period of time.

Alarm re-notification processing: AAASuite issues an alarm message to the AAASuite Message window panel and returns to the alarm re-notification judgement panel.

Note: Alarm for LO is also re-notified in the same way.

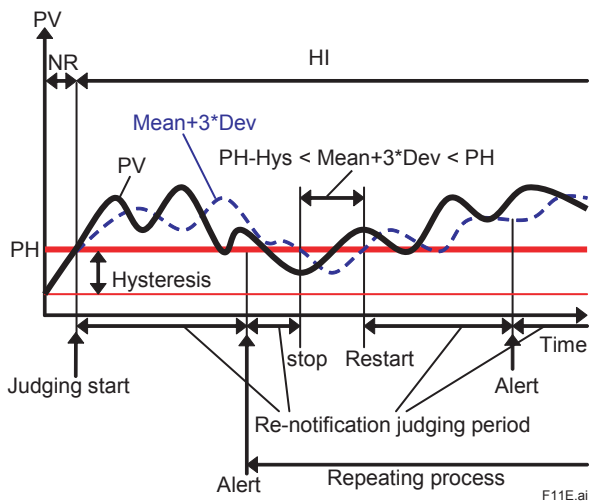


Figure Re-notification of Longstanding True HI/LO Alarms

2. **Re-notifying IOP (IOP-) Alarms (Broken Wire)**
AAASuite re-notifies longstanding IOP (IOP-) alarms caused by field transmitter problems.

Alarm re-notification judgement: AAASuite detects that IOP does not recover after a certain period of time after it occurs.

Alarm re-notification processing: AAASuite issues an alarm message to the AAASuite Message window panel.

Note: Alarm for IOP- is also re-notified in the same way.

● **Predictive Alert**

1. **Predictive HH/LL Alert**

AAASuite notifies a predictive alert prior to an HH/LL alarm.

Alert judgement: AAASuite monitors the rising trend of an HI alarm tag, and issues an alert when time to reach an HH alarm that is estimated based on the first-order regression line is within a certain period of time.

Alert processing: AAASuite issues an alert message to the AAASuite Message window panel and returns to the alert judgment panel.

Note: Predictive alert for LL is also issued in the same way.

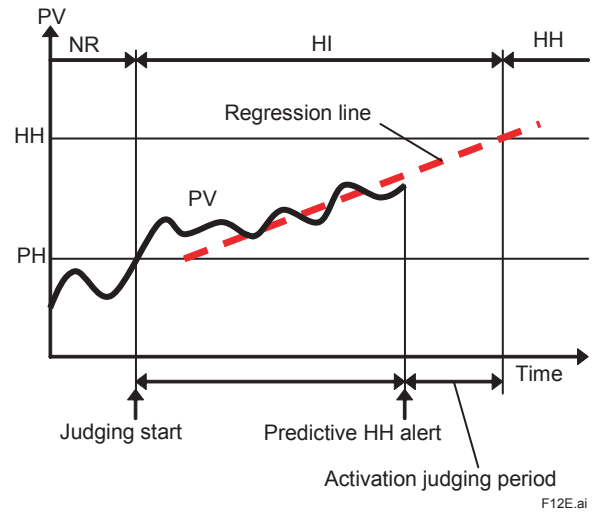


Figure Predictive HH/LL Alert

2. **Predictive HI/LO Alert**

AAASuite always monitors PV of a specific critical tag specified by AAASuite and issues a predictive alert prior to an HL/LO alarm in the same way as the predictive alert for HH/LL alarms.

● **OPHI/OPLO Alert**

HI/LO alert can be added to the target value of a specific critical tag specified by AAASuite. An Operational HI/Operational LO (OPHI/OPLO) can be used for the HI/LO threshold of the target value and set to the range inside of the HI/LO alarm threshold.

● **Optional Functions**

1. Dynamic Alarm Threshold Setting Function

Depending on the operation state of the process, this function allows for setting all the optimum thresholds for the DCS controller at the same time.

The following modes can be used to set the operation state.

MAN mode: Allows the operator to set the operation state using his/her own judgment from the Dynamic Alarm Threshold Setting operation panel.

AUT mode: Allows for automatically setting the operation state using user-created Exapilot logics.

The following modes can be used to set alarm thresholds.

Read mode: Allows for reading the current thresholds as initial values for operation states.

Read and write mode: Allows for writing the threshold after changes made to the threshold by the operator are reflected when the operation state is changed.

Write mode: Allows for writing the threshold depending on the operation state.

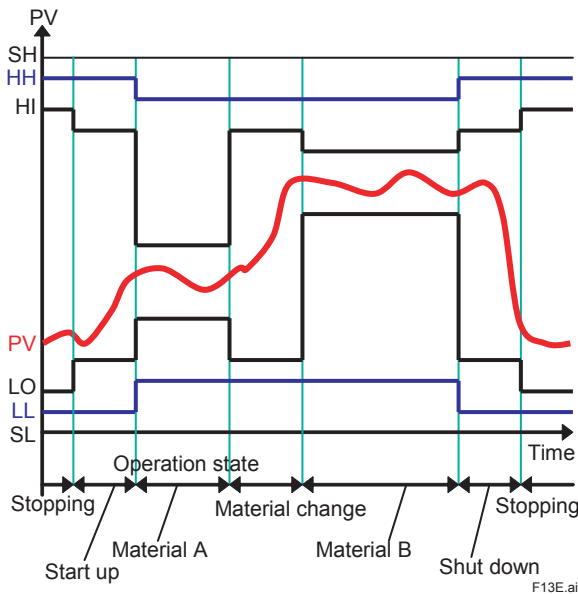


Figure Dynamic Alarm Threshold Setting Function

2. Static Alarm Suppression Function

Depending on the operation state of the process, this function allows for setting all optimum alarm suppression (AON/AOF) for the DCS controller at the same time.

The following modes can be used to set the operation state.

MAN mode: Allows the operator to set the operation state using his/her own judgment from the Static Alarm Suppression operation panel.

AUT mode: Allows for automatically setting the operation state using user-created Exapilot logics.

The following modes can be used to set alarm suppression.

Read mode: Allows for reading the current alarm suppression as initial values for operation states.

Read and write mode: Allows for writing alarm suppression for the operation state after changes to the alarm suppression by the operator being reflected when the operation state is changed.

Write mode: Allows for writing alarm suppression depending on the operation state.

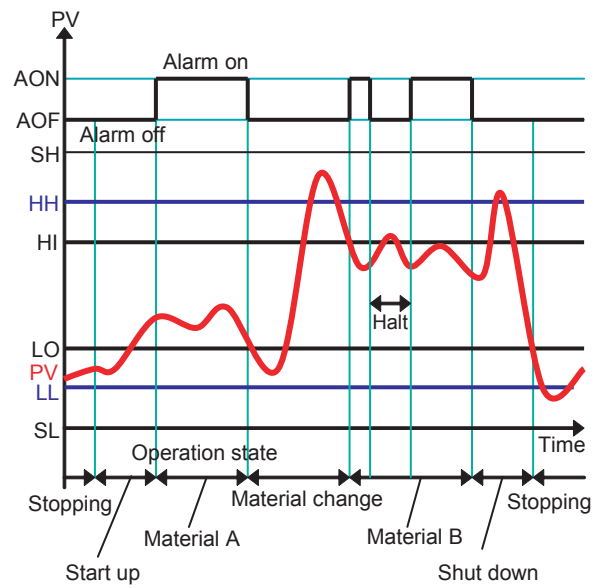


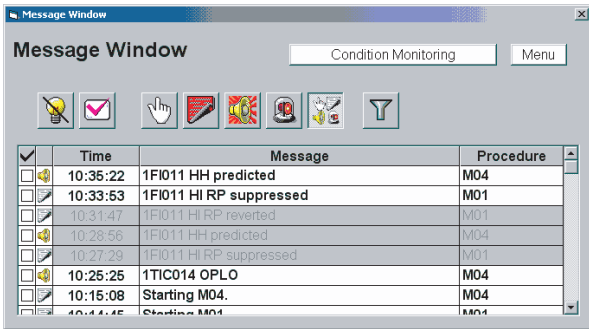
Figure Static Alarm Suppression Function

3. Recovery Function

When a master PC having an AAASuite server function fails due to unexpected problems, the recovery function implemented in a recovery PC can be used to reset alarm settings changed by the automatic alarm suppression function to the original settings.

● **Message Window Panel**

AAASuite provides a dedicated operation monitor screen for operators and advanced monitoring screen for engineers.



F15E.ai

Figure AAASuite Message Window Panel

■ **SETTLEMENT OF INTRODUCING AAASuite**

The following benefits can be expected from the introduction of AAASuite.

● **Reducing Engineering Manpower**

Manpower for gathering and analyzing data, making changes to the DCS sequence, tuning DCS parameters in order to increase alarm efficiency will be substantially reduced.

● **Reducing the Number of Operator Tasks**

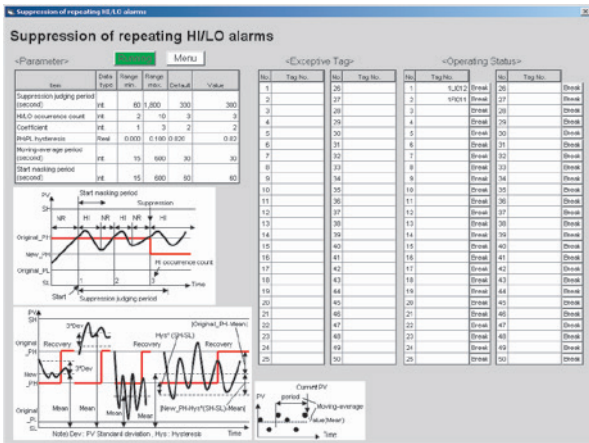
Number of unnecessary operator tasks will be substantially reduced.

● **Increasing Safety**

Decreased number of operator tasks will reduce the risk that operators overlook important alarms.

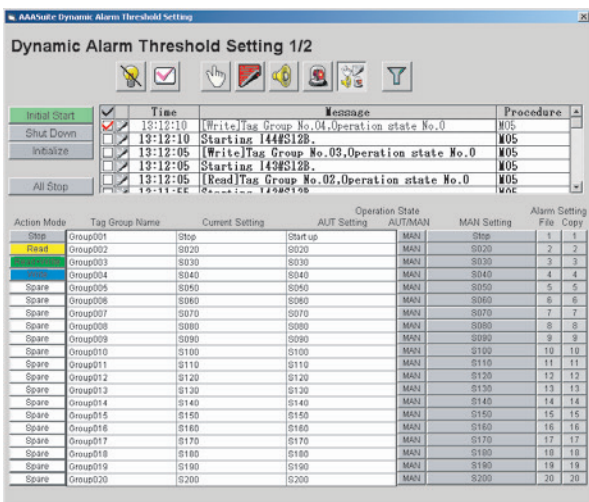
● **Increasing Process Stability**

Decreased number of operator tasks will enable operators to make timely interventions, and process stability will thereby increase.



F16E.ai

Figure AAASuite Detail Setting Panel



F17E.ai

Figure Dynamic Alarm Threshold Setting Operation Panel

■ OPERATING ENVIRONMENT

● Hardware Operating Environment

PC for installing AAASuite Master PC (*1), Recovery PC (*1) and Client PC functions

Specification Item	OS (Refer to software operating environment for more details.)		
	Windows 7	Windows Server 2008 R2	Windows 10
Machine	IBM PC/AT Compatible (DOS/V)		
CPU	Intel Core 2 Duo Processor 2.66 GHz or faster		
Main memory	Required	2 GB or more	1 GB or more
	Recommended		2 GB or more
Disk capacity	4 GB or more of disk space must be available		
Color	32768 colors or more		
Resolution	1024 × 768 or higher		
Sound	Recommended (For message output)		

*1: A control bus interface card (VF702 or VI702) and Exaopc OPC interface package (NTPF100) are required when connecting to CENTUM VP/CS 3000 using V net or Vnet I/P.

● Software Operating Environment

AAASuite Master PC / Recovery PC

Windows OS	Service Pack
Windows 7 Professional (64-bit)	1
Windows Server 2008 R2 Standard (64-bit)	1
Windows 10 Enterprise 2016 LTSB (64-bit)	—
Windows 10 IoT Enterprise 2016 LTSB (64-bit) (*1)	—

Note: Operating conditions of AAASuite are the same as those of Exapilot. For more information about the OS, see Exapilot GS (GS 36J06B10-01E).

*1: Please contact Yokogawa for the available PC Models.

AAASuite Client PC

Windows OS	Service Pack
Windows 7 Professional (32-bit)	1
Windows 7 Professional (64-bit)	1
Windows Server 2008 R2 Standard (64-bit)	1
Windows 10 Enterprise 2016 LTSB (64-bit)	—
Windows 10 IoT Enterprise 2016 LTSB (64-bit) (*1)	—

Note: Operating conditions of AAASuite are the same as those of Exapilot. For more information about the OS, see Exapilot GS (GS 36J06B10-01E).

*1: Please contact Yokogawa for the available PC Models.

Software Specification

Software	Functional Specifications
Standard commercial software	Microsoft Office 2010 (SP2) (32-bit) Microsoft Office 2013 (SP1) (Volume License Editions) (32-bit) Microsoft Office 2016 (Volume License Editions) (32-bit) Adobe Reader 11.0 or later Adobe Acrobat Reader DC 2015 or later
Yokogawa basic software	Exapilot R3.97.00 (*1) Exaopc R3.10 or later (*2)
Yokogawa optional software	AAASuite Dynamic alarm threshold setting function AAASuite Static alarm suppression function AAASuite Recovery function

*1: Exapilot is bundled with AAASuite as only for AAASuite. Exapilot's IT Security works either on the "Legacy model" or "Standard model."

*2: Exaopc is dedicated with AAASuite.

■ CONNECTED SYSTEM

- CENTUM CS (R2.10 or later) + Exaopc (NTPF100-S3x/Y-PLT)
- CENTUM CS 3000 (R3.10 or later) + Exaopc (NTPF100-S1x/Y-PLT)
- CENTUM VP (R4.02 or later) + Exaopc (NTPF100-S1x/Y-PLT)
- CENTUM VP (R5.03.20 or later) + Exaopc (NTPF100-S6x/Y-PLT supporting CAMS for HIS)

■ SOFTWARE STRUCTURE

● AAASuite master PC

- Solution package for AAASuite master PC
- Screen for AAASuite master PC
- Exaopc
- Microsoft Excel

● AAASuite client PC

- Screens (up to 7) for AAASuite client PC

● AAASuite recovery PC

- Solution package for AAASuite recovery PC
- Screen for AAASuite recovery PC
- Exaopc
- Microsoft Excel

Table: List of AAASuite Function Categories, Capacity, and Constraints

Functions	Number of Functions	Functional Constraints		
		CS System	XL System	V System
		FCS	EFCx EFMS EFGW	CFCx CFSx
Basic functions				
Suppressing Repeating HI/LO alarms	50 (*1)	Supported	Supported	Supported
Suppressing Longstanding false HI/LO alarms	10 (*1)	Supported	Supported	Supported
Suppressing IOP (IOP-) alarms (Overrange)	50 (*1)	Supported	-	-
Suppressing Oscillating HI-LO alarms	10 (*1)	Supported	-	-
Suppressing IOP (IOP-) alarms (Minor transmitter problem)	50 (*1)	Supported	-	-
Suppressing Repeating annunciator messages	10 (*1)	Supported	-	-
Re-notifying of longstanding true HI/LO alarms	10 (*1)	Supported	Supported	Supported
Re-notifying of IOP (IOP-) alarms (Broken wire)	20 (*1)	Supported	-	-
Predictive HH/LL alert	50 (*1)	Supported	Supported	-
Predictive HI/LO alert OPHI/OPLO alert	20 (*2)	Supported	Supported	-
Optional functions				
Dynamic alarm threshold setting (M05-S12)	40 (*3)	Supported	Supported	Supported
Static alarm suppression (M06-S13)	40 (*4)	Supported	Supported	Supported
Recovery	1	Supported	Supported	-

*1: Monitoring tags do not need to be specified because they are identified based on an event that fits conditions. The number of functions means that of tags that can be monitored simultaneously. Up to 50 monitoring tags can be specified (wild cards can be also used when specifying).

*2: This function allows for specifying monitoring tags.

*3: Up to 40 tag groups can be set. Up to 500 thresholds can be set to a single tag group. Up to 10 operational states can be set for a single tag group. (Total number of data pieces = 40*500*10 = 200,000)

*4: Up to 40 tag groups can be set. Up to 500 alarm suppressions can be set to a single tag group. Up to 10 operational states can be set for a single tag group. (Total number of data pieces = 40*500*10 = 200,000)

■ MODELS AND SUFFIX CODES

AAASuite

		Description
Model	NTPV100	AAASuite Advanced Alarm Administrator
Suffix Codes	-S	Basic Software License (with Media)
	1	For AAASuite
	1	English version

AAASuite with Optional Functions

		Description
Model	NTPV101	AAASuite Advanced Alarm Administrator with Option Function
Suffix Codes	-S	Basic Software License (with Media)
	1	For AAASuite with Option Function
	1	English version
Option Codes	/A10	Dynamic alarm threshold setting function
	/A20	Static alarm suppression function

AAASuite with Advanced Optional Functions

		Description
Model	NTPV101	AAASuite Advanced Alarm Administrator with Option Function
Suffix Codes	-S	Basic Software License (with Media)
	A	After upgrading from the model "NTPV100" to "NTPV101" add optional functions
	B	Add optional functions to the model "NTPV101"
	1	English version
Option Codes	/A10	Dynamic alarm threshold setting function
	/A20	Static alarm suppression function

AAASuite Recovery Functions

		Description
Model	NTPV102	AAASuite Advanced Alarm Administrator Recovery Function
Suffix Codes	-S	Basic Software License (with Media)
	1	For AAASuite Recovery Function
	1	English version

Maintenance Service for AAASuite

		Description
Model	NTMV100	Maintenance Service for AAASuite
Suffix Codes	-S	Annual Contract
	1	For AAASuite
	1	English version

Maintenance Service for AAASuite with Optional Functions

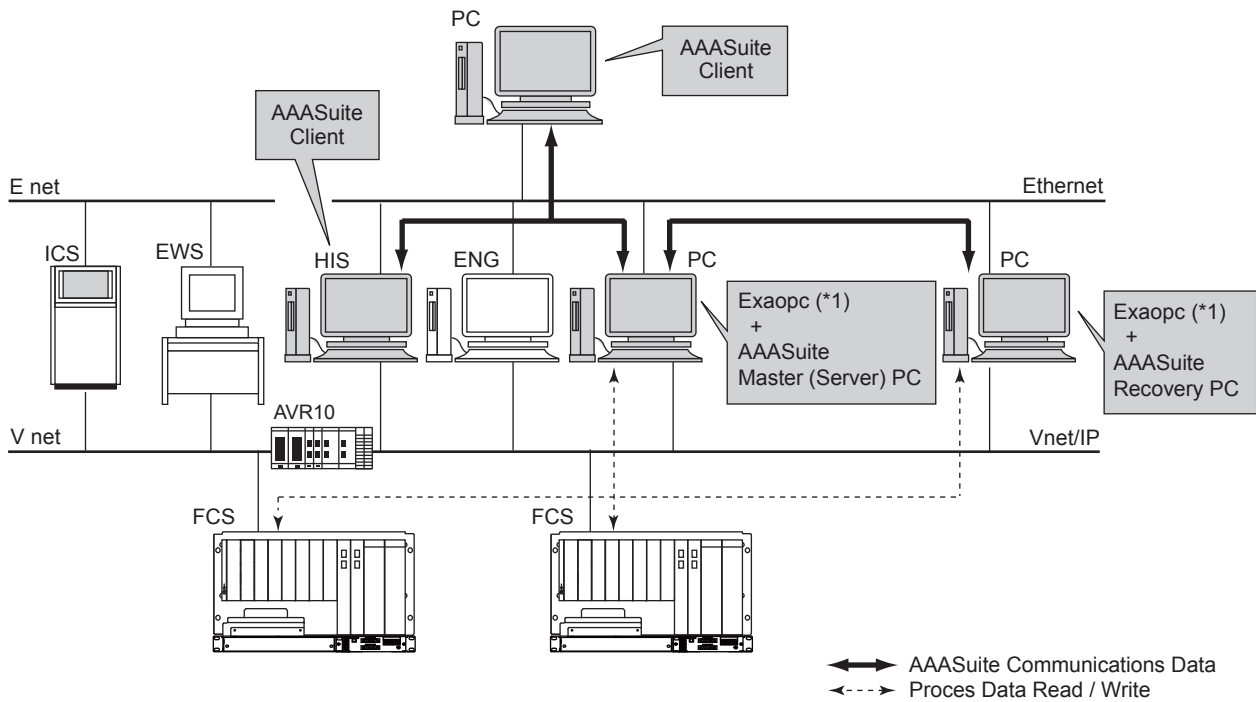
		Description
Model	NTMV101	Maintenance Service for AAASuite with Option function
Suffix Codes	-S	Annual Contract
	1	For AAASuite
	1	English version

Maintenance Service for AAASuite Recovery Functions

		Description
Model	NTMV102	Maintenance Service for AAASuite Recovery function
Suffix Codes	-S	Annual Contract
	1	For AAASuite
	1	English version

■ SYSTEM CONFIGURATION

The system configuration which AAASuite is connected to CENTUM Integrated System is as below.



*1: Refer to Exaopc OPC interface package general specifications (GS 36J02A10-01E) during the system configuration (engineering).

Figure Introduction Example of AAASuite to CENTUM Integrated System

■ ANNUAL MAINTENANCE CONTRACT

An annual maintenance contract is required for this product.

■ TRADEMARKS

- AAASuite, Exaopc, Exapilot and CENTUM are registered trademarks of Yokogawa Electric Corporation.
- Other company and product names appearing in this document are trademarks or registered trademarks of their respective holders.