LESSON 4

ALARMS AND
ALARM DISPLAYS

In order to use alarm display for your application, you need to set up alarm processing first, and then define an alarm block. This chapter describes how to set up alarm processing and the alarm block. It also describes how to configure the alarm display to show alarm history, alarm count, active alarm and alarm marquee.

11.1. Using Alarms

To use an alarm in your application, please follow the procedure as below:

1. Setting up alarm processing
    Described in Section 11.2

2. Creating and configuring discrete alarm blocks or analog alarm blocks
    Described in Section 11.4 and Section 11.5

3. Creating and configuring alarm displays
    Described in Section 11.6

You can use the command flag setting in the command block or function button to request the panel to clear the alarm history or clear the alarm count.

To know how to set up the command flag in the command block, please see Section 3.5.1 Command Block and Status Words. To know how to define a function button, please see Section 5.4.1 Basic Operations on function buttons.
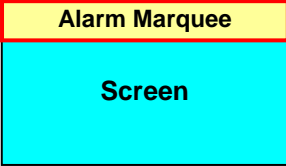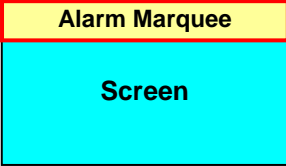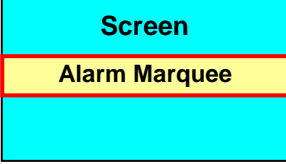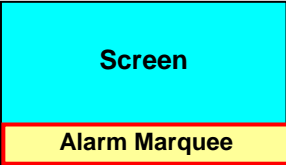
11.2. Setting Up Alarm Processing

You can set up the alarm processing with the Alarm Properties dialog box. In this dialog, you can determine the required memory for the alarm logging buffer, choose the default color and font for the alarm message, specify how to save the alarm history records to a text file and configure the global alarm marquee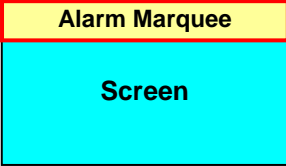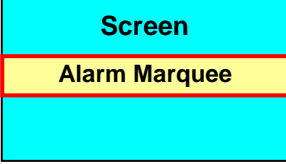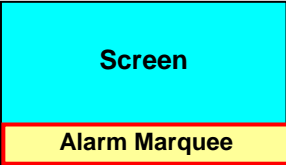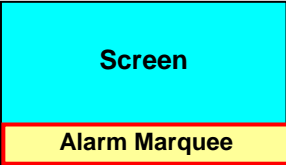 if you want to display it on the screen. To open the dialog box for alarm processing, please double click the node named Alarms in the Project Manager tool window. The following is an example of the Alarm Properties dialog box.
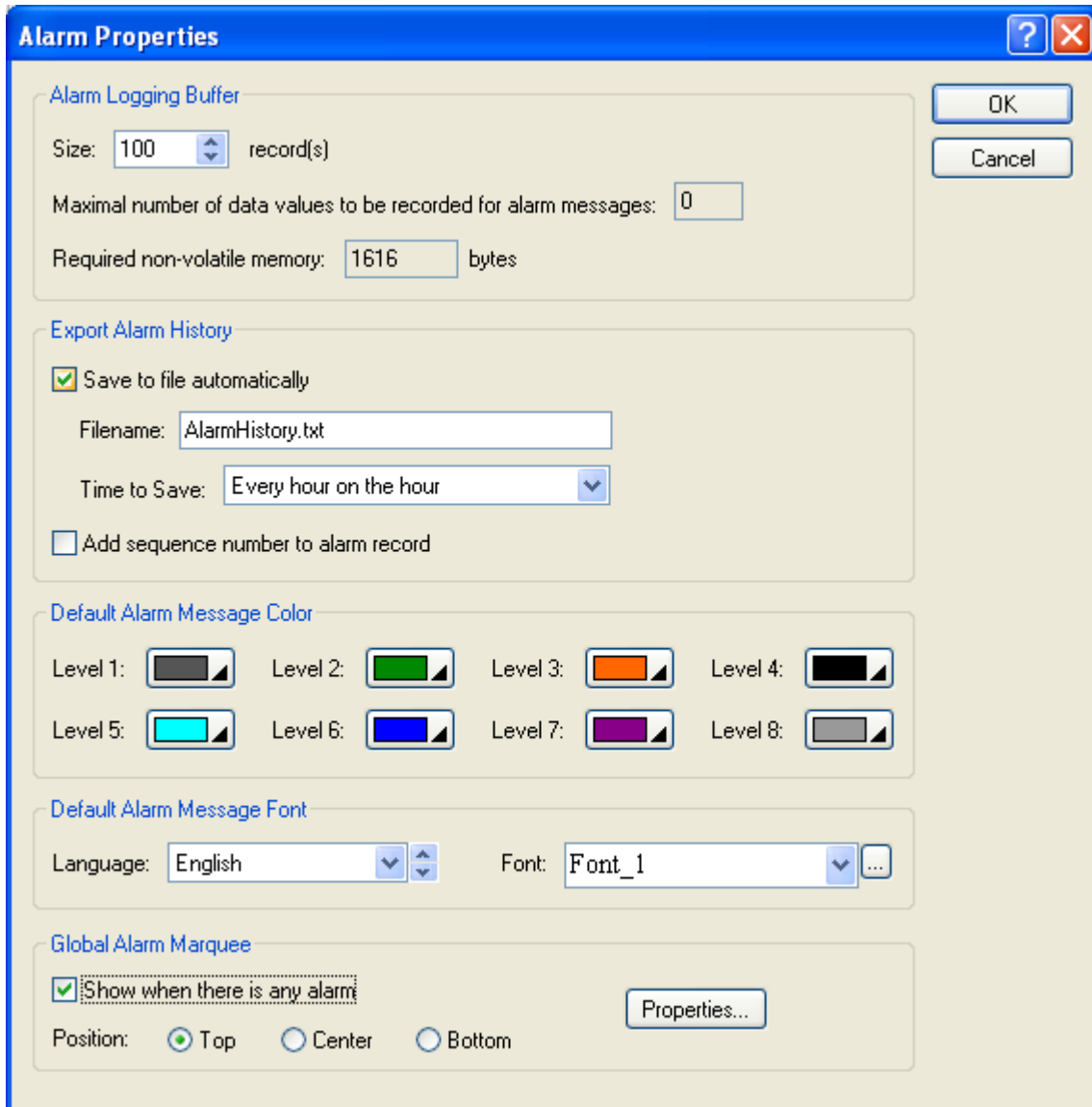
The table below describes each property in the Alarm Properties dialog.

Property		Description
Alarm Logging Buffer	Size	The maximum number of records that the alarm logging buffer can hold. For example: 100 means that when the 101st alarm occurs, the 1st record will be overwritten.
	Required non-volatile memory	The size of the alarm logging buffer. The unit is byte. The formula to calculate the size is: Alarm Logging Buffer Size = Number of Records * 16 + Maximal Number of Data Values for Each Record * 4 + 16.

Continued

Property		Description
Export Alarm History	Save to file automatically	Check this option so the most current alarm history record will be written to a specified file periodically. Each time the operation is performed, the panel writes only the record that has not already been saved to the file.
	File Name	The filename or the prefix of the filename of the file to save the alarm record as. The alarm records are saved in text format and the file extension name must be ".txt". You can use any text editor or Microsoft Excel to view the alarm records directly. This item is available when the option Save alarm history to file is checked.
	Time to Save	Specifies the period to save the alarm history records. This item is available when the option Save alarm history to file is checked. There are nine periods available: Every hour on the hour ; Every 8 hours (00:00, 08:00, 16:00) ; Every 12 hours (00:00, 12:00) Every day at 00:00; Every day at 08:00; Every day at 12:00; Every Sunday at 00:00; Every Monday at 00:00; Every first day of the month at 00:00.
	Add sequence number to alarm record	Check this option so the exported alarm history can have the sequence numbers for the alarm records.
Default Alarm Message Color	Level 1, Level 2… Level 8	Select a default color for alarm levels 1, 2…8. The alarm display for each alarm level will show an alarm message with the selected color.
Default Alarm Message Font	Language	Select a default language so you can view and edit the language dependent settings in the Text group for that language. The language dependent properties in the Text group include Font and Alarm Status Abbreviation.
	Font	Select a default font for the text of the alarm message.
Global Alarm Marquee	Show when there is any alarm	Check this option if you want to show the global alarm marquee on the current screen when there is any alarm.
	Position	Select one of the following 3 positions for the global alarm marquee to be displayed.

Position	Description	
Top	The global alarm marquee shows up at the top of the screen.	**Alarm Marquee** / **Screen**
Center	The global alarm marquee shows up at the center of the screen.	**Screen** / **Alarm Marquee**
Bottom	The global alarm marquee shows up at the bottom of the screen.	**Screen** / **Alarm Marquee**

	Properties	Click the button to bring up the Alarm Display dialog box to set up the properties of the global alarm marquee. Please see for details.

11.3. Working with Alarm Blocks

11.3.1. Creating an Alarm Block

To create a discrete alarm block, you may do one of the following:

1) In the Project Manager tool window, right-click the Alarms node of the concerned panel application and select Add Discrete Alarm Block.
2) In the menu bar, click Panel to bring up the Panel sub-menu. Click Discrete Alarm Block in the Panel sub-menu to bring up the pop-up menu. Select Add in the pop-up menu.

To create an analog alarm block, you may do one of the following:

1) In the Project Manager tool window, right-click the Alarms node of the concerned panel application and select Add Analog Alarm Block.
2) In the menu bar, click Panel to bring up the Panel sub-menu. Click Analog Alarm Block in the Panel sub-menu to bring up the pop-up menu. Select Add in the pop-up menu.

11.3.2. Importing and Exporting an Alarm Block

To import an alarm block, right-click the Alarms node and then select Import Alarm Block… in the Project Manager window. Select *.alm file in the Open file dialog and then click Open.

To export a discrete alarm block, right-click the node of the desired discrete alarm block and then select Export Alarm Block…. in the Project Manager window.

To export an analog alarm block, right-click the node of the desired analog alarm block and then select Export Alarm Block…. in the Project Manager window.

11.3.3. Deleting an Alarm Block

To delete a discrete alarm block, you may do one of the following:

1) In the Project Manager window, right-click the node of the desired discrete alarm block and then select Delete.
2) In the menu bar, click Panel to bring up the Panel sub-menu. Click Discrete Alarm Block in the Panel sub-menu to bring up the Discrete Alarm Block pop-up menu. Select Delete in the pop-up menu to bring up the discrete alarm block list of the current panel application. Select the desired discrete alarm block in the list.

To delete an analog alarm block, you may do one of the following:

1) In the Project Manager window, right-click the node of the desired analog alarm block and then select Delete.
2) In the menu bar, click Panel to bring up the Panel sub-menu. Click Analog Alarm Block in the Panel sub-menu to bring up the Analog Alarm Block pop-up menu. Select Delete in the pop-up menu to bring up the analog alarm block list of the current panel application. Select the desired analog alarm block in the list.

11.3.4. Specifying To-be-recorded Data

You can record maximum 8 data values and display them in the alarm message. The data value will be appended to the alarm message with the following format:

(Name: Value of the address with the specified format)

For example, the recorded value #2 will display the **32-bit floating point number** stored in **W10** with the format of **4 total digits** and **1 fractional digit**.

If the value of W10 is 123.456 when the alarm occurs, the following text will be appended to its alarm message: (Temperature: 123.4)

To specify values, use the Specify To-be-recorded Data dialog. The following is an example of the dialog:

The Specify To-be-recorded Data dialog contains two parts. The left side lists the address and name of each value. The right side shows the properties of the selected value. To select a value, click the row of the value in the list. The following table describes each property of the value.

Property	Description
Name	Specifies the name of the data item for the language specified in the Language field.
Language	Select a language so you can view and edit the name of the value for that language.
Address	The read address of the value. The address can be any valid word address.
Data Type	The data type of the value. The supported data types include: 16-Bit Unsigned Integer, 32-Bit Unsigned Integer, 16-Bit Signed Integer, 32-Bit Signed Integer, 16-Bit BCD, 32-Bit BCD, 32-Bit Floating Point.

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Property	Description
Display Type	The display type for the value of the data item. The following table shows the available display types for each data type. 	Data Type	Available Display Types
16-Bit Unsigned Integer	16-Bit Unsigned Decimal, 16-Bit Hexadecimal, 16-Bit Octal
32-Bit Unsigned Integer	32-Bit Unsigned Decimal, 32-Bit Hexadecimal, 32-Bit Octal
16-Bit Signed Integer	16-Bit Signed Decimal
32-Bit Signed Integer	32-Bit Signed Decimal
16-Bit BCD	16-Bit Unsigned Decimal
32-Bit BCD	32-Bit Unsigned Decimal
32-Bit Floating Point	32-Bit Floating Point	
Total Digits	Specifies the number of digits to be displayed for the value of the item.
Fractional Digits	Specifies how to display the fractional part for the value of the item. When the Display Type is 32-bit Floating Point, this property specifies the number of fractional digits to be displayed. When the Display Type is not 32-bit Floating Point, this property specifies not only the number of fractional digits to be displayed, but also the number of least significant digits to be displayed as the fractional part. With this feature, an integer can be shown as a fixed point number. **Example:** | Display Type	Total Digits	Fractional Digits	Sampled Value	Displayed Value
---	---	---	---	---
32-bit Floating Point	4	2	12.34	12.34
32-bit Floating Point	4	2	123.4	23.40
16-bit Signed Decimal	5	2	12345	123.45
16-bit Signed Decimal	5	2	-5	-0.05	
Scaling	Check this option if you want the value of the data item to be displayed in a scaled manner. The following is the scaling formula: DisplayedValue = SampledValue * *Gain* + *Offset* **Note:** The *Gain* and *Offset* are 32-bit floating point numbers. They have, at most, 6 significant digits. Rounding and truncation errors may happen.
Gain	Available when the Scaling option is checked. Specifies the *Gain* used in the scaling formula.
Offset	Available when the Scaling option is checked. Specifies the *Offset* used in the scaling formula.

11.4. Discrete Alarm Blocks

You can set up a discrete alarm block with the Discrete Alarm Block dialog box. There are two ways to open the dialog box:

1) In the Project Manager window, move the mouse to the node of the desired discrete alarm block and double click the node or right-click the node and then select Properties.
2) In the menu bar, click Panel to bring up the Panel sub-menu. Click Discrete Alarm Block in the Panel sub-menu to bring up the Discrete Alarm Block pop-up menu. Select Properties in the pop-up menu to bring up the discrete alarm block list of the current panel application. Select the desired discrete alarm block in the list.

11.4.1. Settings

Use the dialog box to define all the settings for a discrete alarm block. The following is an example of the discrete alarm block dialog.

The table below describes some properties in the Discrete Alarm Block dialog.

Property	Description
Block Name	The discrete alarm block's name. The maximum length of the name is 20 characters.
Block ID	The discrete alarm block's ID number. Select a number between 0 and 15. The number is unique among all discrete alarm blocks of the panel application.
Type	Specifies the memory type used to allocate the discrete alarm block. There are four types:

Type	Description
Bits	Select Bits to create a discrete alarm block starting from the bit device *M* with *N* continuous bits
Bits of Word Device	Select Bits of Word Device to create a discrete alarm block starting from the bit 0 of the word device *M* with *N* continuous bits of the word device.
Word Value	Select Word Value to create a discrete alarm block at word device *M*. An alarm will occur if the value of *M* is between 0 and *N*.
Random Bits	Select Random Bits to create a discrete alarm block with *N* specified random bits.

Legend: *M*: An address specified in Read Address field. ***N*:** A size specified in Block Size/Maximum field.

Property	Description
Read Address	Specifies the starting address of an alarm block to monitor the status of alarms. Click 🔲 to enter an address for this field. Click 🔳 to select a tag for this field.
Block Size / Maximum	Specifies the block size of an alarm block. The unit is bit. The maximum block size or maximum value you can specify depends on the type selected. The following table lists the limitation of each type:

Type	Maximum block size/value
Bits	256
Bits of Word Device	256
Word Value	0-511
Random Bits	64

Property		Description
Read Interval		Specifies a period between 1 to 3600 seconds that the panel reads the Alarm Block and checks the state of every bit in the block. The shorter the Read Interval is, the faster the alarm display object will be refreshed, but the refresh rate of other objects will be slower.
Record specified data values	<Check Box>	Check this option if you want to record the specified data values and display them in the alarm message.
	Number of data values	The number of data values you want to record. The maximum is 8.
	Specify…	Click the button to specify the recorded data values. For details, please see Section 11.3.4 Specifying To-be-recorded Data.

To specify all discrete alarms, you need to set the discrete alarm list and the discrete alarm properties field. The discrete alarm list is located at the bottom-left of the dialog, and shows all the discrete alarms in the alarm block. The discrete alarm properties field is located at the right of the alarm list, and shows all the properties of the selected discrete alarm.

The following table describes each column in the discrete alarm list.

Column	Description
No.	The number of the discrete alarm in the alarm block.
Address/Bit No./Value	If the type is Bits or Random Bits, the column shows the address of the discrete alarm. If the type is Bits of Word Device, the column shows the bit no of the discrete alarm. If the type is Word Value, the column shows the value of the discrete alarm.
Use	Check this option if you want to use discrete alarm #n.
Message	Displays a specified alarm message in the selected language.

You need to make a selection before editing the discrete alarm. To select a discrete alarm, click the row of that alarm in the list. To select multiple rows, click the row on its header column and use Ctrl + Click to add a row to the selection.

If multiple rows are selected, any modification on the common properties such as Level, Record alarm, Sound Buzzer, Display message, Display screen, Required Acknowledgement, Record ACK, Notification, Tip Screen…will apply to all selected discrete alarms

The following table describes each property of the selected discrete alarm.

Property		Description
Address/Bit No./Value		Indicates the status of its corresponding alarm. The meaning of the field depends on the selected type.
		<table><tr><th>Field Name</th><th>Type</th><th>Description</th></tr><tr><td>Address</td><td>Bits</td><td>Shows the address of the selected discrete alarm</td></tr><tr><td>Bit No.</td><td>Bits of Word Device</td><td>Shows the bit no. of the selected discrete alarm</td></tr><tr><td>Value</td><td>Word Value</td><td>Shows the value of the selected discrete alarm</td></tr><tr><td>Address</td><td>Random Bits</td><td>Specifies the bit variable of the selected discrete alarm. Click ▦ to enter an address. Click 🔳 to select a tag.</td></tr></table>
Alarm State		Specify the alarm state to indicate the corresponding alarm is active. If 1(On) is selected, a bit with high (on) state indicates that the corresponding alarm is active. And a bit with low (off) state indicates that the corresponding alarm is clear.
Level		Select a level for the alarm between 1 and 8.
ID		Specifies the alarm ID. The maximum length of the ID is 6 characters.
Message	Language	Select an existing language that you are setting the message to.
	Import All…	Click the button to import the texts of *.csv files, and save the texts as the alarm messages for the current language.
	Export All…	Click the button to export all the messages for the selected language to a *.csv file.
	Text	Specifies the text for the current language. The text will be shown when the alarm is active.
	Show Recorded Value	Check the specified value you want to record and display in the alarm message. Note that only the selected value will be recorded.
Record alarm		Check this option if you want to record the alarm to the alarm display object.
Sound Buzzer		Check this option if you want the panel to play the sound buzzer when the alarm is activated or cleared.

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Property		Description
Display message		Check this option if you want the panel to automatically display a message when the alarm is activated or cleared. This field can be checked only when Display screen is unchecked.
Display screen	<Check Box>	Check this option if you want the panel to automatically display a window screen when the alarm is activated or cleared. This field can be checked only when Display message is unchecked.
		Select a window screen to display when the alarm is activated or cleared. The field is available when Display Screen is selected. Note that only Window Screens will be available to choose from.
Required Acknowledge-ment	<Check Box>	Check this option if you want the operator to acknowledge an alarm. When an alarm becomes active, the panel displays an alarm message or a screen with ACK button when the Required Acknowledgement option is selected. The operator should press the ACK button to acknowledge the alarm, and have the panel refresh the current screen. This field is available when either Display message or Display screen is selected.
	Record ACK	Check this option if you want to record ACK to the alarm display object
	Notification	Check this option if you want to notify the specified bit when the ACK button is clicked.
	Bit	Specifies the bit that receives the notification.
Tip Screen	<Check Box>	Check this option if you want to display a screen when you select the corresponding alarm on the alarm display object.
		Select a window screen as the tip screen.
Play Sound	<Check Box>	Check this option if you want the panel to play sound when the alarm is activated or cleared.
	Sound	Select a sound from sound table of the current panel application.
	Number of Plays	Specifies how many times you want to play the sound.
	Break Between Plays	Specifies an interval between two plays. You can select 0s, 0.2s, 0.4s, 0.6s, 0.8s, 1s, 2s, 3s, 4s, 5s.

11.5. Analog Alarm Blocks

You can set up an analog alarm block with the Analog Alarm Block dialog box. There are two ways to open the dialog box:

1) In the Project Manager window, move the mouse to the node of the desired analog alarm block and double click the node or right-click the node and then select Properties.
2) In the menu bar, click Panel to bring up the Panel sub-menu. Click Analog Alarm Block in the Panel sub-menu to bring up the Analog Alarm Block pop-up menu. Select Properties in the pop-up menu to bring up the analog alarm block list of the current panel application. Select the desired analog alarm block from the list.

11.5.1. Settings

Use the dialog box to define all the settings for an analog alarm block. The following is an example of the analog alarm block dialog box.

The table below describes each property in the Analog Alarm Block dialog box.

Property	Description
Block Name	The analog alarm block's name. The maximum length of the name is 20 characters.
Block ID	The analog alarm block's ID number. Select a number between 64 and 79. The number is unique among all analog alarm blocks of the panel application.
Type	Specifies the type of the analog alarm block. There are two types: <table><tr><th>Type</th><th>Description</th></tr><tr><td>Continuous Words</td><td>Select Continuous Words to create an analog alarm block starting from the word device *M* with *N* continuous words</td></tr><tr><td>Random Words</td><td>Select Random Words to create an analog alarm block with *N* specified random words.</td></tr></table> **Legend:** *M*: An address specified in Read Address field. *N*: A size specified in Block Size.
Read Address	Specifies the starting address of an alarm block to monitor the status of alarms. Click ▦ to enter an address for this field. Click ▥ to select a tag for this field.
Block Size	Specifies the block size of an alarm block. The unit is word. The maximum block size you can specify depends on the type you select. <table><tr><th>Type</th><th>Maximum block size</th></tr><tr><td>Continuous Words</td><td>16</td></tr><tr><td>Random Words</td><td>64</td></tr></table>
Read Interval	Specifies a period between 1 to 3600 seconds that the panel reads the Alarm Block and checks the state of every bit in the block. The shorter the Read Interval is, the faster the alarm display object will be refreshed, but the refresh rate of other objects will be slower.
Record specified data values	<Check Box> — Check this option if you want to record the specified data values and display them in the alarm message.
	Number of data values — The number of data values you want to record. The maximum is 8.
	Specify… — Click the button to specify the recorded data values. For details, please see Section 11.3.4 Specifying To-be-recorded Data.

To specify all analog alarms, you need to set the analog alarm list and the analog alarm properties field. The analog alarm list is located at the bottom-left of the dialog, and shows all the analog alarms in the alarm block. The analog alarm properties field is located to the right of the list, and shows all the properties of the selected analog alarm.

The following table describes each column of the analog alarm list.

Column	Description
No.	The number of the analog alarm in the alarm block.
Address	Shows the address of the analog alarm.
Use	Check this option if you want to use analog alarm #n.
Message	Displays a specified alarm message in the selected language.

You need to make a selection before editing the analog alarm. To select an analog alarm, click the row of that alarm in the list. To select multiple rows, click the row on its header column and use Ctrl + Click to add a row to the selection.

If multiple rows are selected, any modification to the common properties such as Level, Record alarm, Sound Buzzer, Display message, Display screen, Required Acknowledgement, Record ACK, Notification, Tip Screen…will apply to all selected analog alarms

The following table describes each column in the analog alarm list.

Property		Description	
Alarm Type		There are four types of analog alarms:	
		Type	**Description**
		Low Low	An alarm will occur if the value of the destination variable is lower than or equal to the Low Low Limit.
		Low	An alarm will occur if the value of the destination variable is equal to the Low Limit or between the Low Limit and the Low Low Limit.
		High	An alarm will occur if the value of the destination variable is equal to the High Limit or between the High Limit and the High High Limit.
		High High	An alarm will occur if the value of the destination variable is higher than or equal to the High High Limit.
Data Type		The data type of the destination variable. The supported data types include: 16-Bit Unsigned Integer, 32-Bit Unsigned Integer, 16-Bit Signed Integer, 32-Bit Signed Integer, 16-Bit BCD, 32-Bit BCD, 32-Bit Floating Point.	
Address		Indicates the status of its corresponding alarm.	
		Type	**Description**
		Continuous Words	Shows the address of the selected analog alarm.
		Random Words	Specifies the word variable of the selected analog alarm. Click 🖩 to enter an address. Click 🏷 to select a tag.
Limit		Set a limit for the alarm. The value range of the limit depends on the specified data type.	
Hysteresis		Set a range for the limit values for an alarm to turn OFF after it has been turned ON. If the alarm type is Low Low or Low, the range is between the Limit and Limit + Limit * Hysteresis/100. If the alarm type is High High or High, the range is between the Limit and Limit - Limit * Hysteresis/100.	
Level		Select a level for the alarm between 1 and 8.	
ID		Specifies the alarm ID. The maximum length of the ID is 6 characters.	
Message	Language	Select an existing language that you are setting the message for.	
	Import All…	Click the button to import the texts of *.csv files and saves the texts as the alarm messages for the current language.	
	Export All…	Click the button to export all the messages for the selected language to a *.csv file.	
	Text	Specifies the text for the current language. The text will be shown when the alarm is active.	
	Show Recorded Value	Check the specified value you want to record and display in the alarm message. Note that only the selected value will be recorded.	
Record alarm		Check this option if you want to record the alarm in the alarm display object.	
Sound Buzzer		Check this option if you want the panel to play a sound buzzer when the alarm is activated or cleared.	
Display alarm message		Check this option if you want the panel to display a message automatically when the alarm is activated or cleared. This field can be checked only when Display screen is unchecked.	

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Property		Description
Display screen	<Check Box>	Check this option if you want the panel to display a window screen automatically when the alarm is activated or cleared. This field can be checked only when Display message is unchecked.
		Select a window screen to display when the alarm is activated or cleared. The field is available when Display Screen is selected. Note that only Window Screens will be available to choose from.
Required Acknowledge-ment	<Check Box>	Check this option if you want the operator to acknowledge an alarm. When an alarm becomes active, the panel displays an alarm message or a screen with ACK button when Required Acknowledgement is selected. The operator should press the ACK button to acknowledge the alarm and to have the panel refresh the current screen. This field is available when either Display message or Display screen is selected.
	Record ACK	Check this option if you want to record ACK in the alarm display object
	Notification	Check this option if you want to notify the specified bit when the ACK button is clicked.
	Bit	Specifies the bit that receives the notification.
Tip Screen	<Check Box>	Check this option if you want to display a screen when you select the corresponding alarm on the alarm display object.
		Select a window screen as the tip screen
Play Sound	<Check Box>	Check this option if you want the panel to play sound when the alarm is activated or cleared.
	Sound	Select a sound from sound table of the current panel application.
	Number of Plays	Specifies how many times you want to play the sound.
	Break Between Plays	Specifies an interval between two plays. You can select 0s, 0.2s, 0.4s, 0.6s, 0.8s, 1s, 2s, 3s, 4s, 5s.

11.6. Alarm Displays

11.6.1. Basic Operations

There are four types of alarm displays.

Type	Description
Alarm History	You can display a list of alarm records by using an alarm history display. **[Alarm history display example]** | Date	Time	Blk Id	Level	Id	Status	Message
---	---	---	---	---	---	---
03-04-09	08:53:50	0	4	L002	C	Tank #1 level too high
03-04-09	08:53:44	0	4	L002	A	Tank #1 level too high
03-04-09	08:53:39	0	3	T001	C	Tank #1 temperature too high
03-04-09	08:53:35	0	3	T001	ACK	Tank #1 temperature too high
03-04-09	08:53:34	0	3	T001	A	Tank #1 temperature too high | The above is an example of the alarm history display. The first row is the title row. It displays the title of each column. The other rows display one alarm record per row. You can create scroll button groups or scroll bars to scroll the contents. An alarm history display can have seven columns. The following table describes the content of each column of an alarm record. | Column	Description
Date	The date when the record is created. This column is optional.
Time	The time when the record is created. This column is optional.
Alarm Block ID	The ID of the alarm block in which the associated alarm is defined. This column is optional.
Alarm Level	The level of the associated alarm. This column is optional.
Alarm ID	The ID of the associated alarm. This column is optional.
Alarm Status	The type of the alarm record. There are three types of alarm records. 	Type	Description
Active	An Active record is created when an alarm is activated.
ACK	An ACK record is created when an alarm is acknowledged.
CLR	A CLR record is created when an alarm is cleared.	
Alarm Message	The message of the associated alarm. This column is optional. | The text color of a row is determined by the type of the alarm record.

Continued

Type	Description
Alarm Count	You can display a list of the number of occurrences for each alarm by using an alarm count display. The above is an example of an alarm count display. The first row is the title row. It displays the title of each column. The other rows display one alarm per row. You can create scroll button groups or scroll bars to scroll the contents. An alarm count display can have five columns. The following table describes the content of each column of an alarm.

Column	Description
Alarm Block ID	The ID of the alarm block in which the alarm is defined. This column is optional.
Alarm Level	The level of the alarm. This column is optional.
Alarm ID	The ID of the alarm. This column is optional.
Alarm Count	The number of occurrences of the alarm.
Alarm Message	The message of the alarm. This column is optional.

The text color of a row is determined by the level of the alarm.

Type	Description
Active Alarm	You can display a list of active alarms by using an active alarm display. The above is an example of an active alarm display. The first row is the title row. It displays the title of each column. The other rows display one active alarm per row. You can create scroll button groups or scroll bars to scroll the contents. An active alarm display can have six columns. The following table describes the content of each column for an active alarm.

Column	Description
Date	The date when the alarm is activated.
Time	The time when the alarm is activated.
Alarm Block ID	The ID of the alarm block in which the alarm is defined. This column is optional.
Alarm Level	The level of the alarm. This column is optional.
Alarm ID	The ID of the alarm. This column is optional.
Alarm Message	The message of the alarm. This column is optional.

The text color of a row is determined by the level of the alarm.

Type	Description
Alarm Marquee	You can display and scroll the messages of the active alarms by using an alarm marquee. 4 L002 Tank #1 level too high 3 T001 Tank #1 temperature too high The above is an example of an alarm marquee. You can place the following texts in front of the alarm messages. <table><tr><th>Text</th><th>Description</th></tr><tr><td>Alarm Block ID</td><td>The ID of the alarm block in which the alarm is defined.</td></tr><tr><td>Alarm Level</td><td>The level of the alarm.</td></tr><tr><td>Alarm ID</td><td>The ID of the alarm.</td></tr></table> The text color for an alarm is determined by the level of that alarm.

Note: You can sort the list of an alarm display at runtime by touching the title of the column that you want to be the sort field. Touching the same title again changes the sort order from ascending to descending, or vice versa. The columns that can be a sort field include: Date, Time, Alarm Block ID, Alarm Level, Alarm ID, Alarm Status, and Alarm Count.

11.6.2. Operation Options

The following operation options can be added to an alarm display. Select and set the option in the Alarm Display dialog box.

Options	Description
Visibility Control	You can show and hide an alarm display with a specified bit or the current user level. Select and set this option in the Visibility page.

11.6.3. Settings

You can complete all the settings of an alarm display in the Alarm Display dialog box. This dialog box contains the following two pages.

■ **General**
Described in Section 11.6.4.

■ **Query**
Described in Section 11.6.5.

■ **Visibility**
Described in Section 4.4.6.

11.6.4. General Settings

This section describes how to define the general settings for an alarm display. The following is an example of the General page of the Alarm Display dialog box.

The following table describes each property in the General page of the Alarm Display dialog box.

Property	Description
ID	The object's identifier. It is generated when the object is created. The identifier is unique within the screen where the object is located and is unchangeable. The format of the IDs for the alarm displays is ADnnnn.
Note	You can type a note for the object.
Shape settings	For details about the following properties, see Section 4.3.4 Setting up the Shape of an Object.. Shape... , Border Color, BG Color

Property		Description
Type		Specifies the type of the alarm display. There are four types:

Type	Description
Alarm History	The alarm history display lists the alarm records.
Alarm Count	The alarm count display lists the number of occurrences of each alarm.
Active Alarm	The active alarm display lists the active alarms.
Alarm Marquee	The alarm marquee scrolls the messages of the active alarms horizontally.

Property		Description
Scrolling Speed		Select a speed for the alarm display when the Type is Alarm Marquee.
Direction		Select Leftward or Rightward for the alarm display when the Type is Alarm Marquee.
Grid	Vertical	Select this option if you want the alarm display to have vertical grids.
	Horizontal	Select this option if you want the alarm display to have horizontal grids.
	Color	Select a color for the grids.
Alarm Block		Select an alarm block so that the alarm display will show the alarms defined in that alarm block only. Select All if you want the alarm display to show all the alarms.
Title	<Check Box>	Select this option if you want the alarm display to have a title row to show the title for each column of the displayed list when the Type is Alarm History, Alarm Count, or Current Alarm.
	Language	Select a language so you can view and edit the settings of the title row for that language.
	Font	Select a font for the title text.
	Color	Select a color for the text.
	BG Color	Select a color for the title row.
	Date	Specifies the title for the Date column. This field is available when the Type is Alarm History or Current Alarm.
	Time	Specifies the title for the Time column. This field is available when the Type is Alarm History or Current Alarm.
	Alarm Block ID	Specifies the title for the Alarm Block ID column.
	Alarm Level	Specifies the title for the Alarm Level column.
	Alarm ID	Specifies the title for the Alarm ID column.
	Alarm Status	Specifies the title for the Alarm Status column. This field is available when the Type is Alarm History.
	Alarm Count	Specifies the title for the Alarm Count column. This field is available when the Type is Alarm Count.
	Alarm Message	Specifies the title for the Alarm Message column.

Continued

	Property		Description
Text	Sort Type		Specifies how the alarm display initially sorts its list. This field is available when the Type is not Alarm Marquee. **Note:** When you want an alarm display to sort its list by the contents of a column at runtime, simply touch the title of that column and the alarm display will sort its list right away.
	Language		Select a language so you can view and edit the language dependent settings in the Text group for that language. The language dependent properties in the Text group include Font and Alarm Status Abbreviation.
	Font		Select a font for the text.
	Date	\<Check Box\>	Check this option if you want the alarm display to have the Date column. This field is available when the Type is Alarm History.
		\<Drop-down List\>	Select a format for displaying the date
	Time	\<Check Box\>	Check this option if you want the alarm display to have the Time column. This field is available when the Type is Alarm History.
		\<Drop-down List\>	Select a format for displaying the time
	Alarm Block ID		Check this option if you want the alarm display to have the Alarm Block ID column.
	Alarm Level		Check this option if you want the alarm display to have the Alarm Level column.
	Alarm ID		Check this option if you want the alarm display to have the Alarm ID column.
	Alarm Message		Check this option if you want the alarm display to have the Alarm Message column.
	Cleared Alarms		Check this option so the alarm display will show the records of cleared alarms. This field is available when the Type is Alarm History.
	Alarm ACK		Check this option so the alarm display will show the records of acknowledged alarms. This field is available when the Type is Alarm History.
	Sequence Number		Check this option so the alarm display will show the sequence numbers of the alarm records. This field is available when the Type is Alarm History.
	Alarm Status Abbreviation	Active	Enter up to 3 characters that will be shown in the Alarm Status column for the alarm records that record when an alarm occurs. This field is available when the Type is Alarm History.
		Cleared	Enter up to 3 characters that will be shown in the Alarm Status column for the alarm records that record when an alarm is cleared. This field is available when the Type is Alarm History.
		ACK	Enter up to 3 characters that will be shown in the Alarm Status column for the alarm records that record when an alarm is acknowledged. This field is available when the Type is Alarm History.
	Line Spacing		Specifies the extra space in pixels for two adjacent rows of the alarm display. This field is available when the Type is not Alarm Marquee.
	Item Spacing		Specifies the extra space for every column of the alarm display. This field is available when the Type is not Alarm Marquee.
Alarm Message Color	Set to default colors		Click the button to replace the selections of the L1 to L8 fields by the default alarm message colors defined in the Alarm Properties dialog box. This button is available when the Type is not Alarm History.
	L1,L2 … L8		Select a color for alarm level 1, 2…8. The alarm display will show an alarm message with this color if that alarm is defined as a level 1, 2…8 alarm. This field is available when the Type is not Alarm History.
	Active		Select a color for displaying the alarm records that record when an alarm occurs. This field is available when the Type is Alarm History.
	Cleared		Select a color for displaying the alarm records that record when an alarm is cleared. This field is available when the Type is Alarm History.
	ACK		Select a color for displaying the alarm records that record when an alarm is acknowledged. This field is available when the Type is Alarm History.

11.6.5. Query Settings

This section describes how to query alarms. The following is an example of the Query page of the Alarm Display dialog box.

The following table describes each property in the Query page of the Alarm Display dialog box.

Property	Description
Support Dynamic Query	When this option is selected, the object can display the alarm records to answer the query specified in the Query Parameter Block.
Query Trigger Bit	Specifies the bit that will trigger the query operation at runtime. The HMI reads the Query Parameter Block and refreshes the object according to the current query whenever the Query Trigger Bit changes from Off to On. Click ▦ to enter the bit address. Click 🔖 to enter the bit tag.
Query Parameter Block	Specifies the location that stores the query parameters. Click ▦ to enter an address for this field. Click 🔖 to select a tag for this field. The following table shows the data arrangement of the parameter block.

Word	Description
0	The query flags.

Bit	Description
0	Query the alarm records of the specified alarm number when the bit is on. The alarm number is specified in word 1 of the Query Parameter Block.
1	Query the alarm records that occurred within the specified duration when the bit is on. The date range is specified in word 2-7 of the Query Parameter Block. The time range is specified in word 8-13 of the Query Parameter Block.

Note: When both query flags are on, the answer will fulfill both query conditions.

Word	Description
1	The alarm number.
2,3,4	The start date of the date range. Year(word 2): 1~99; Month(word 3): 1~12; Day(word 4): 1~31
5,6,7	The end date of the date range. Year(word 5): 1~99; Month(word 6): 1~12; Day(word 7): 1~31
8,9,10	The start time of the time range. Hour(word 8): 0~23; Minute(word 9): 0~59; Second(word 10): 0~59
11,12,13	The end time of the time range. Hour(word 11): 0~23; Minute(word 12): 0~59; Second(word 13): 0~59

Property	Description
Block Size (Words)	The size in word of query parameter block.
Date Range	Check this option if you want the object to display the alarms that occur in the specified date range.
Time Range	Check this option if you want the object to display the alarms that occur in the specified time range.