Siemens Basic/Comfort Panel Alarm Messaging

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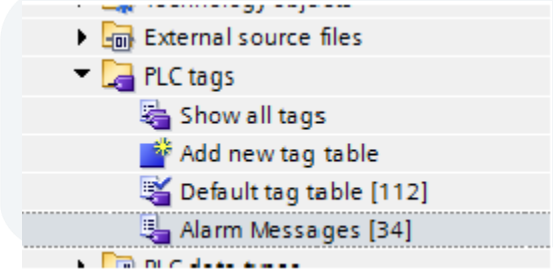
This document describes the basic setup of the alarm messaging function in the Siemens Basic and Comfort panel families of HMIs. Additional info on alarm messaging can be found in TIA Portal online help (expand Help menu and select Show Help) in the Content tab under Information System->Visualize Processes->Working with alarms.

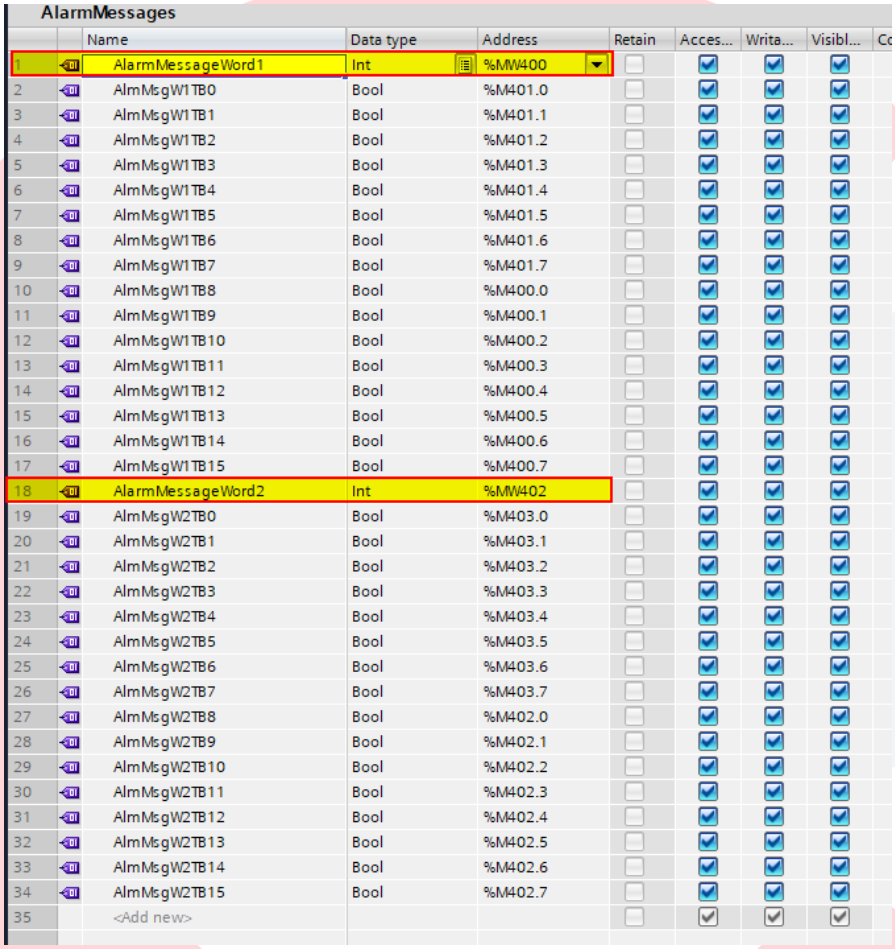
Alarm messaging using M memory

Alarm messages are transferred to the HMI in word sized registers. For every 16 messages, create an alarm message word in M memory. Also, create tags in the table for the individual bits in the word. The individual bits in that alarm word will trigger the messages.

Create a new tag table by expanding the PLC Tags folder under the PLC and clicking on 'Add new tag table'. Rename the tag table to (for example) 'Alarm Messages'



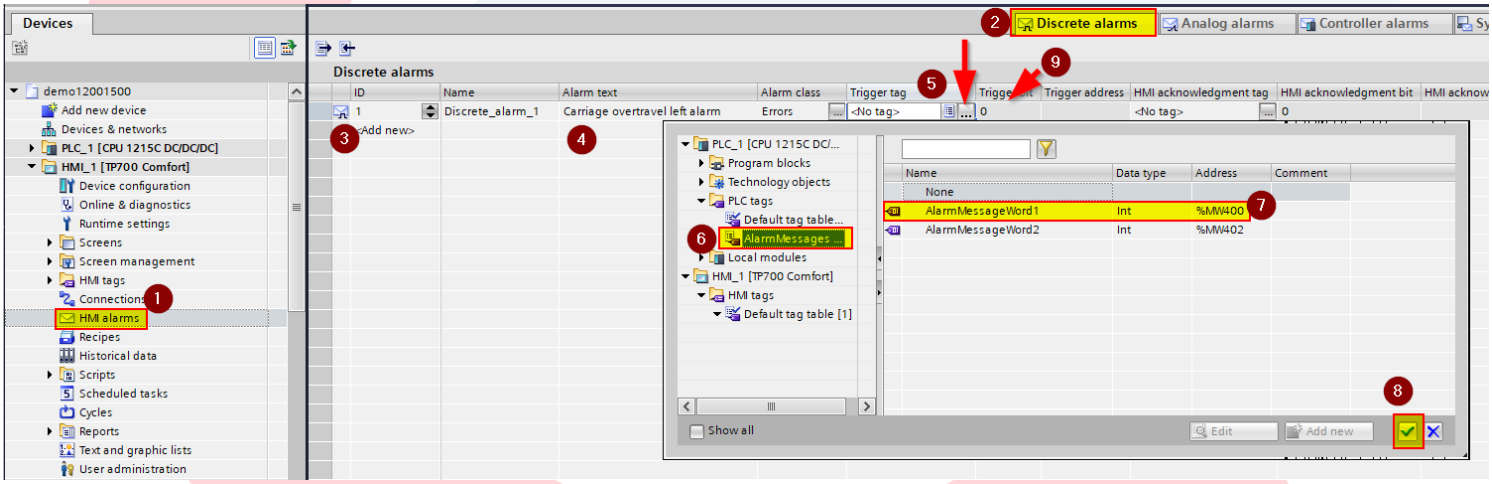
Add the alarm message word and bit tags in the table. In this case, the alarm words are MW400 and MW402. Each individual bit within the word can be added and documented and will be used to trigger the messages. It is not required but it is a suggested that contiguous M memory words be used for the alarm message words.



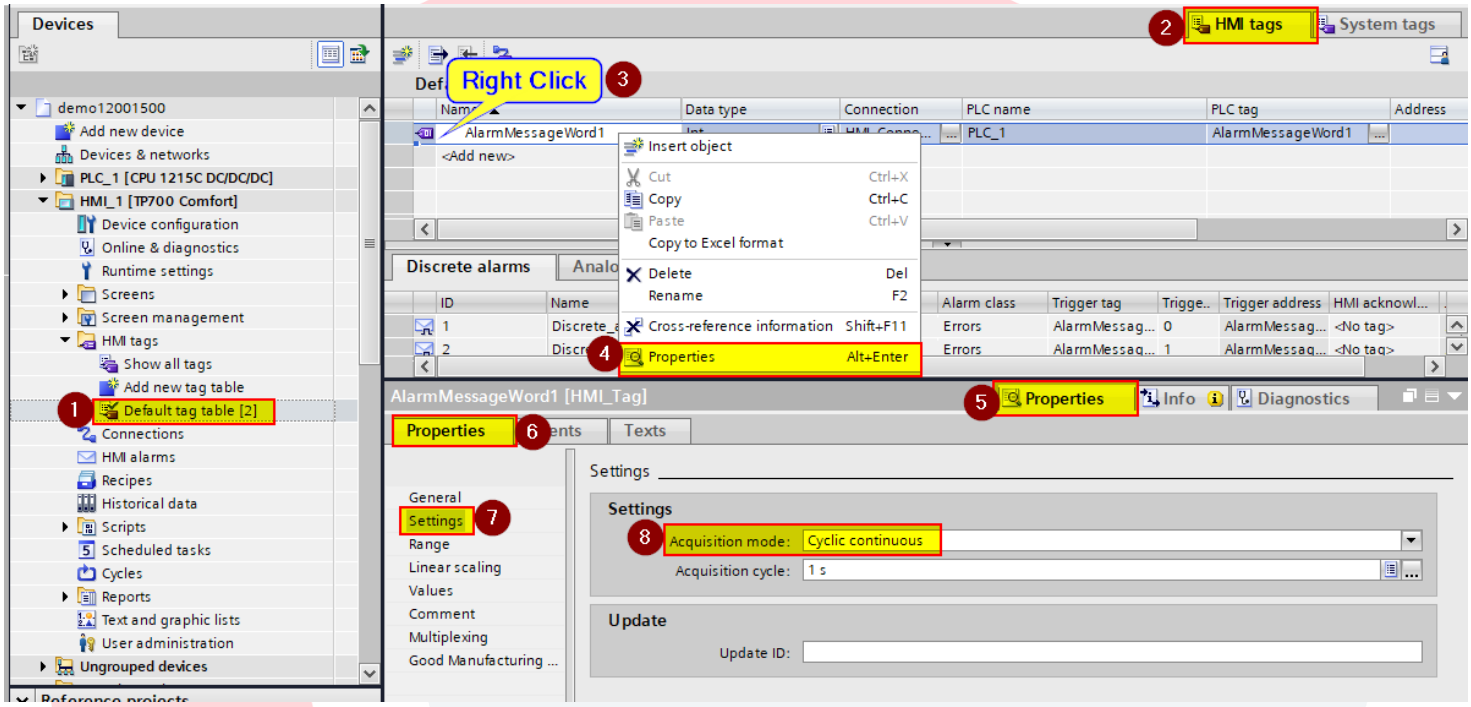
AlarmMessages

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...	Co
1	AlarmMessageWord1	Int	%MW400	☐	☑	☑	☑	
2	AlmMsgW1TB0	Bool	%M401.0	☐	☑	☑	☑	
3	AlmMsgW1TB1	Bool	%M401.1	☐	☑	☑	☑	
4	AlmMsgW1TB2	Bool	%M401.2	☐	☑	☑	☑	
5	AlmMsgW1TB3	Bool	%M401.3	☐	☑	☑	☑	
6	AlmMsgW1TB4	Bool	%M401.4	☐	☑	☑	☑	
7	AlmMsgW1TB5	Bool	%M401.5	☐	☑	☑	☑	
8	AlmMsgW1TB6	Bool	%M401.6	☐	☑	☑	☑	
9	AlmMsgW1TB7	Bool	%M401.7	☐	☑	☑	☑	
10	AlmMsgW1TB8	Bool	%M400.0	☐	☑	☑	☑	
11	AlmMsgW1TB9	Bool	%M400.1	☐	☑	☑	☑	
12	AlmMsgW1TB10	Bool	%M400.2	☐	☑	☑	☑	
13	AlmMsgW1TB11	Bool	%M400.3	☐	☑	☑	☑	
14	AlmMsgW1TB12	Bool	%M400.4	☐	☑	☑	☑	
15	AlmMsgW1TB13	Bool	%M400.5	☐	☑	☑	☑	
16	AlmMsgW1TB14	Bool	%M400.6	☐	☑	☑	☑	
17	AlmMsgW1TB15	Bool	%M400.7	☐	☑	☑	☑	
18	AlarmMessageWord2	Int	%MW402	☐	☑	☑	☑	
19	AlmMsgW2TB0	Bool	%M403.0	☐	☑	☑	☑	
20	AlmMsgW2TB1	Bool	%M403.1	☐	☑	☑	☑	
21	AlmMsgW2TB2	Bool	%M403.2	☐	☑	☑	☑	
22	AlmMsgW2TB3	Bool	%M403.3	☐	☑	☑	☑	
23	AlmMsgW2TB4	Bool	%M403.4	☐	☑	☑	☑	
24	AlmMsgW2TB5	Bool	%M403.5	☐	☑	☑	☑	
25	AlmMsgW2TB6	Bool	%M403.6	☐	☑	☑	☑	
26	AlmMsgW2TB7	Bool	%M403.7	☐	☑	☑	☑	
27	AlmMsgW2TB8	Bool	%M402.0	☐	☑	☑	☑	
28	AlmMsgW2TB9	Bool	%M402.1	☐	☑	☑	☑	
29	AlmMsgW2TB10	Bool	%M402.2	☐	☑	☑	☑	
30	AlmMsgW2TB11	Bool	%M402.3	☐	☑	☑	☑	
31	AlmMsgW2TB12	Bool	%M402.4	☐	☑	☑	☑	
32	AlmMsgW2TB13	Bool	%M402.5	☐	☑	☑	☑	
33	AlmMsgW2TB14	Bool	%M402.6	☐	☑	☑	☑	
34	AlmMsgW2TB15	Bool	%M402.7	☐	☑	☑	☑	
35	<Add new>			☐	☑	☑	☑	

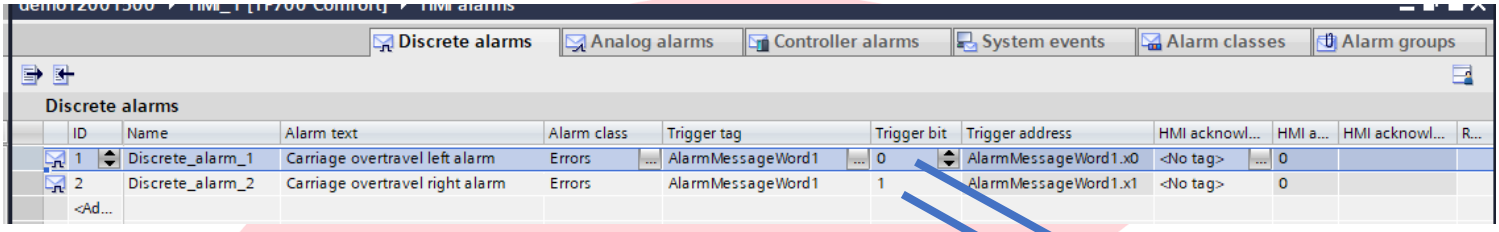
1. Expand the HMI folder in the project tree and double click on ‘HMI Alarms’.
2. Select the ‘Discrete Alarms’ tab.
3. Double click on the ‘<Add new>’ in the first row ID column to add an alarm message.
4. Type in the message in the ‘Alarm text’ column.
5. Click on the browse button in the ‘Trigger tag’ column to select the tag. The trigger tag must be an INT or Word data type.
6. If the tag has not been created in ‘HMI tags’, expand the PLC folder then expand ‘PLC tags’ and select the tag table containing the alarm message words. If the tag is already in ‘HMI tags’ expand the HMI folder and ‘HMI tags’.
7. Select the tag. The tag must be an Int or Word data type.
8. Click on the green check box in the lower right hand corner of the tag selection dialog when finished.
9. Select the bit in the alarm word tag (Trigger tag) being used to trigger the alarm message in the ‘Trigger bit’ column.



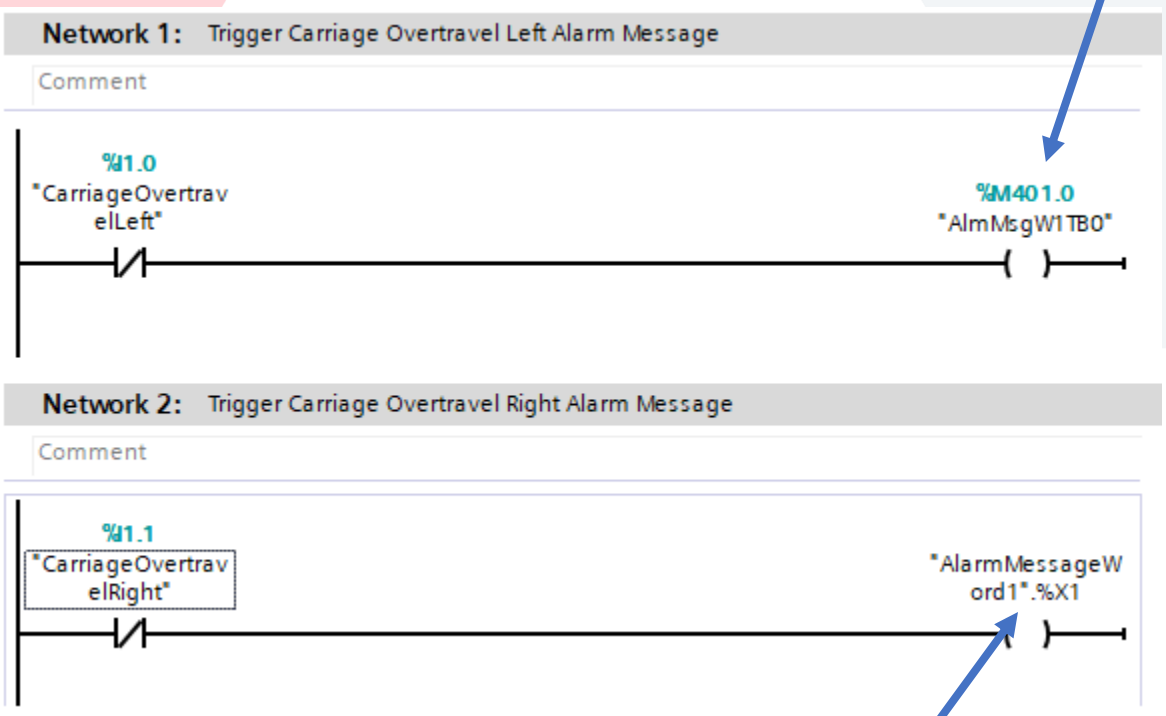
In the HMI tags folder right click on an alarm message word tag and select 'Properties' to display the tags properties. In the Settings section of the Properties, make sure the tag's 'Acquisition mode' is set to 'Cyclic continuous'. Cyclic continuous setting means the tag is always being updated in the background at the rate specified.



In the PLC program trigger logic, use the bit in the alarm word indicated in the Trigger bit column. Siemens byte orientation puts the least significant byte address on the left and the most significant on the right (Big-Endian byte ordering). In this case, trigger bit 0 of AlarmMessageWord1 would be M401.0.



	MW400															
	MB400								MB401							
	M400.7	M400.6	M400.5	M400.4	M400.3	M400.2	M400.1	M400.0	M401.7	M401.6	M401.5	M401.4	M401.3	M401.2	M401.1	M401.0
Trigger Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0



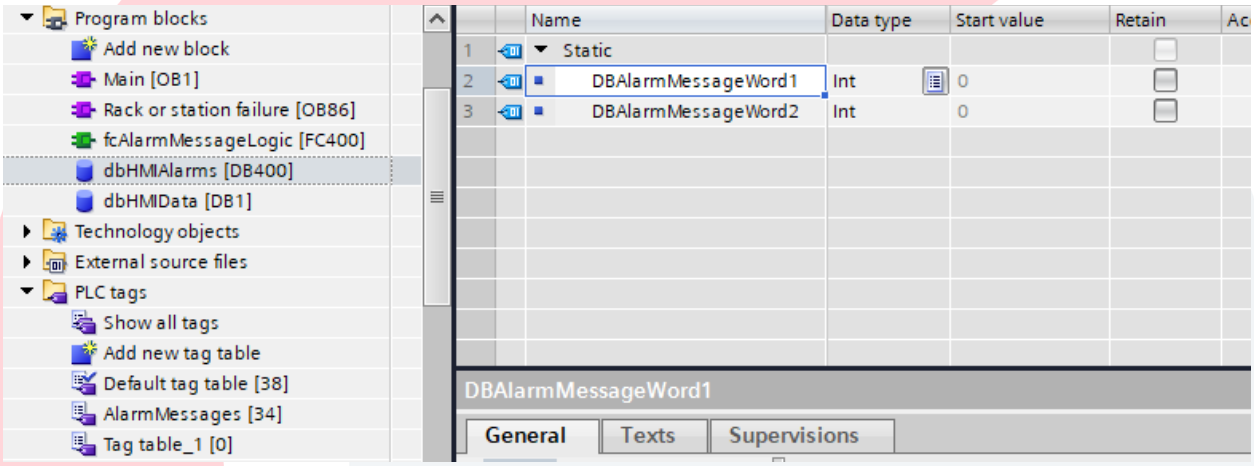
Slice addressing can also be used. In this case the alarm word tag is referenced followed by a .X then the bit. 'alarmwordtagname'.Xy where y is the bit address.

The address can be copied directly from the Trigger Address column if needed

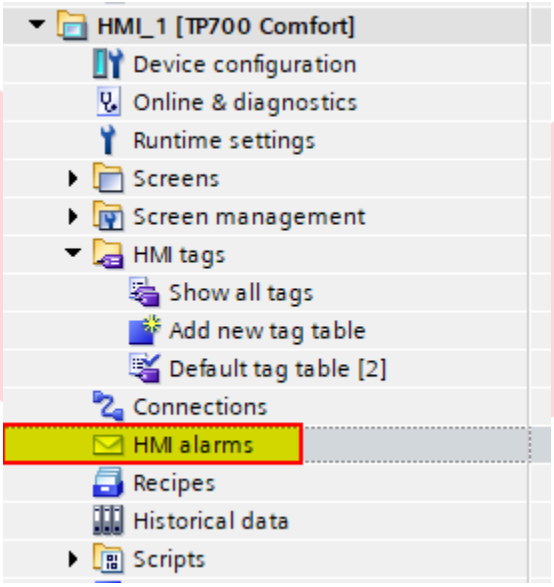
Alarm Messaging using Data Block (DB) memory

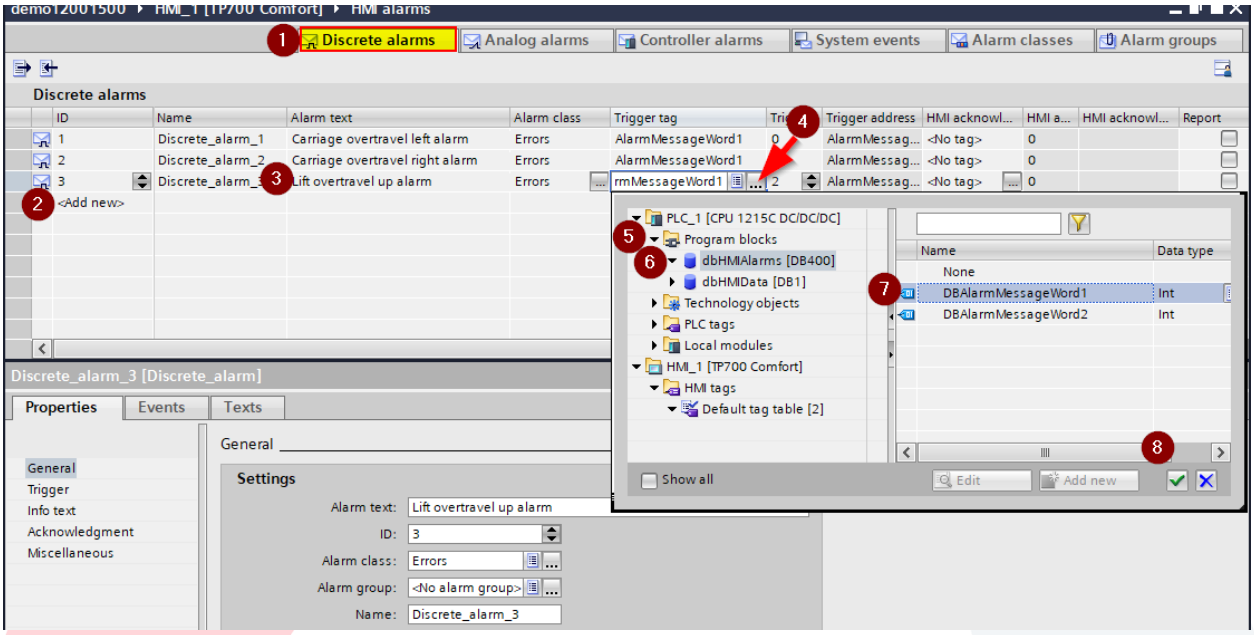
Alarm messaging using DB memory is similar to using M memory except with DB memory, you can't break the alarm message word into individual bits. You must use slice addressing to access the bit of the alarm word in logic.

Create a DB in the program blocks folder. Create a tag of the data type INT in the data block for the first alarm word. In the case below, DB400 was created and two alarm words were added (DBAlarmMessageWord1 and DBAlarmMessageWord2)

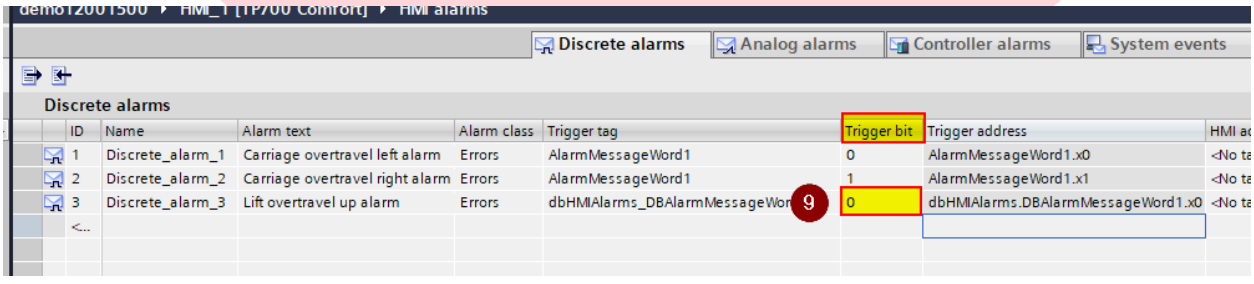


Expand the HMI folder in the project tree and double click on HMI Alarms.

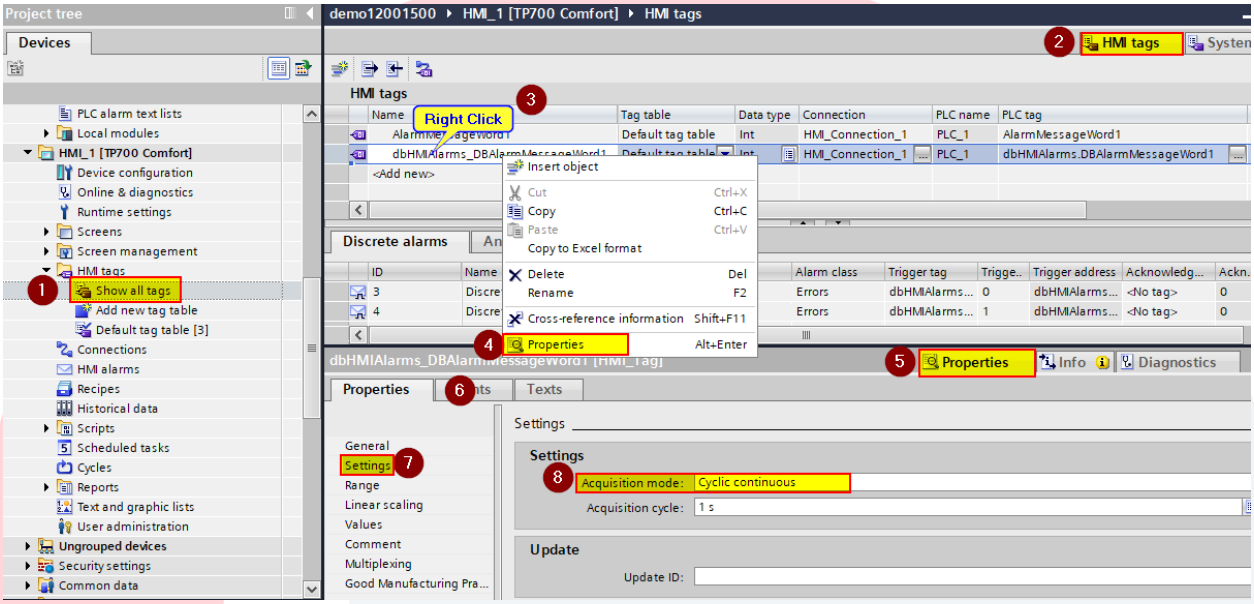




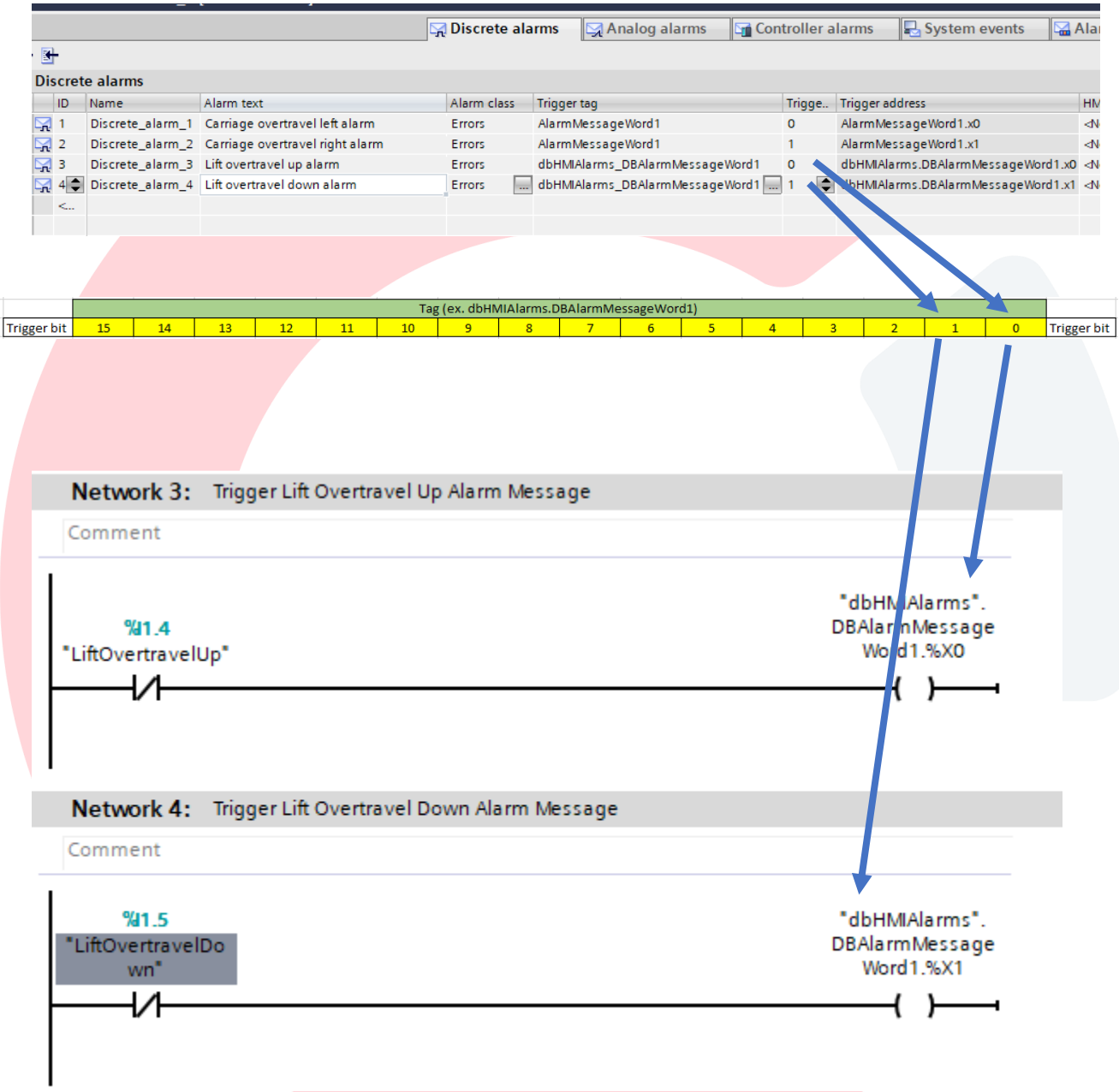
1. Select the Discrete Alarms tab
2. Click on <Add New> in the ID column to add a new message.
3. Type in the message in the ‘Alarm text’ column.
4. Click on the browse button in the ‘Trigger tag’ column to select the tag. The trigger tag must be an INT or Word data type.
5. If the tag has not been created in ‘HMI tags’, expand the PLC folder then expand ‘Program blocks’ and
6. select the data block (DB) containing the alarm message words. If the tag is already in ‘HMI tags’ expand the HMI folder and ‘HMI tags’.
7. Select the tag. The tag must be an Int or Word data type.
8. Click on the green check box in the lower right hand corner of the tag selection dialog when finished.
9. Select the bit in the alarm word tag (Trigger tag) being used to trigger the alarm message in the ‘Trigger bit’ column.



In the HMI tags folder, right click on an alarm message word tag and select ‘Properties’ to display the tags properties. In the Settings section of the Properties, make sure the tag’s ‘Acquisition mode’ is set to ‘Cyclic continuous’. Cyclic continuous setting means the tag is always being updated in the background at the rate specified.



In the PLC program trigger logic, use the address specified in the Trigger Address column. When using DB registers for alarm trigger bits, slice addressing must be used. You can copy and paste from the Trigger Address field if needed.



Slice addressing must be used. In this case the alarm word tag is referenced followed by a .X then the bit.

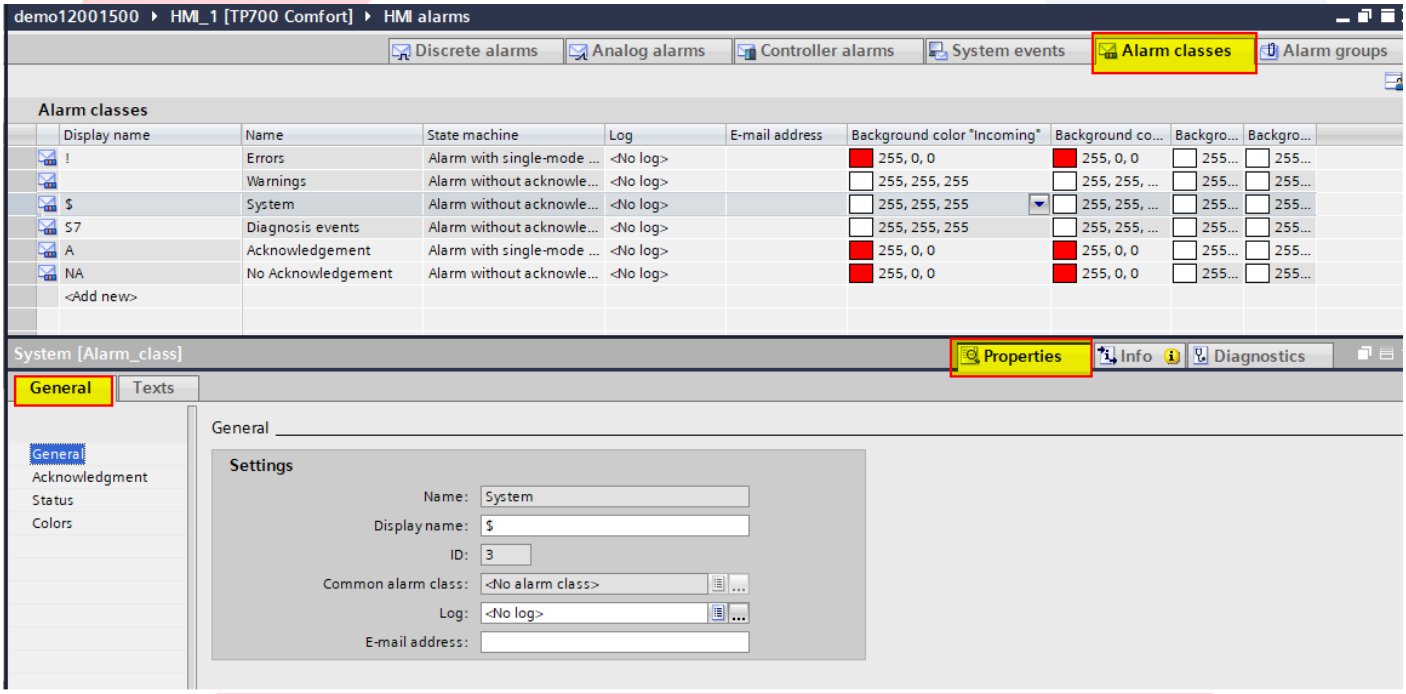
'alarmwordtagname'.Xy where y is the bit address.

Alarm Classes and Alarm Groups

Each alarm message can be assigned to an alarm class and an alarm group. An alarm class is used to indicate the importance or priority of an alarm message. An alarm group is used to organize the messages (for example, into sections of the machine or areas of a plant). The alarm class and group can be assigned in the properties of each message.

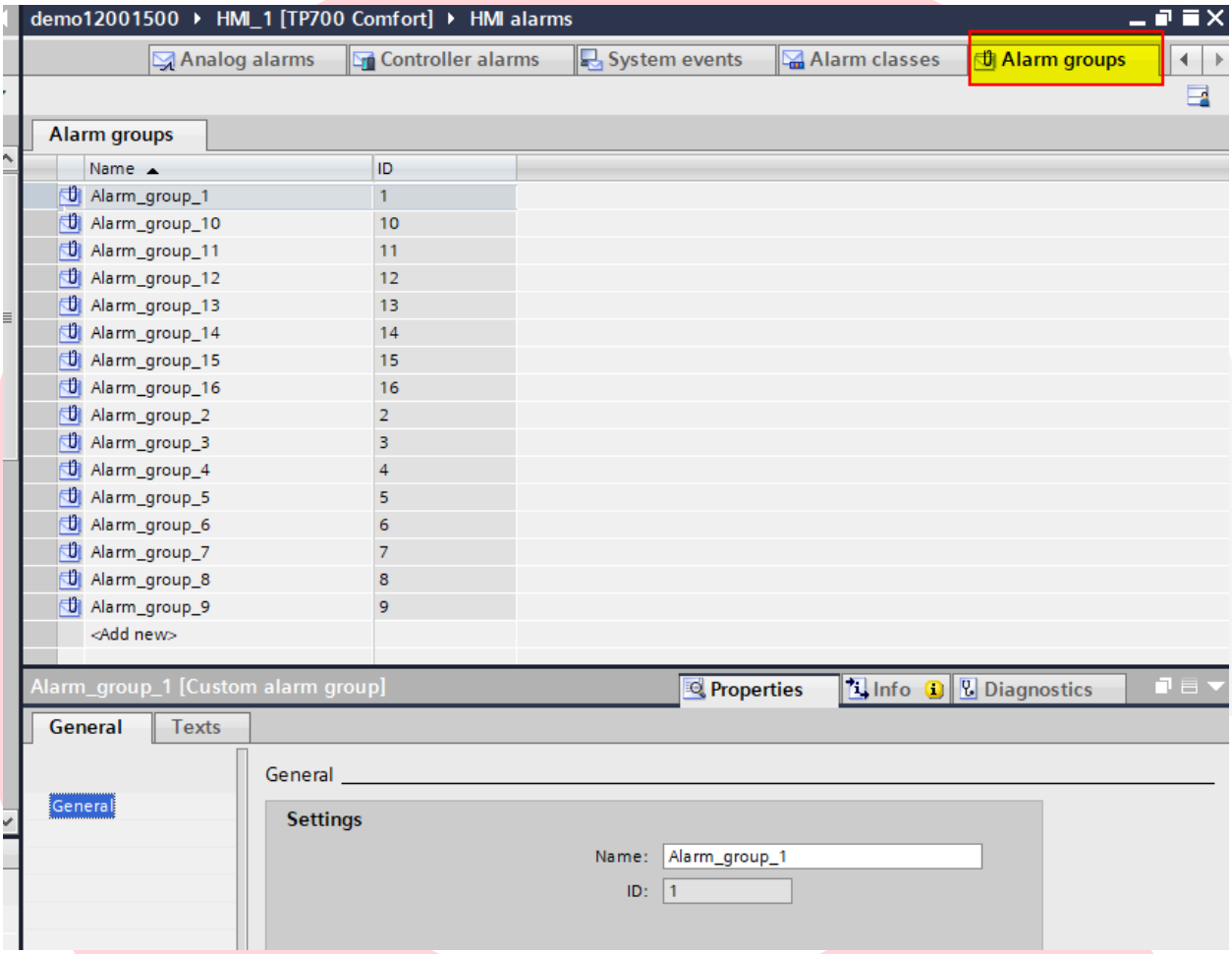
Alarm Classes

Alarm classes are defined in the Alarm classes tab in HMI Alarms section. Six default class are provided and the user can their own classes and modify background colors and parameters if needed



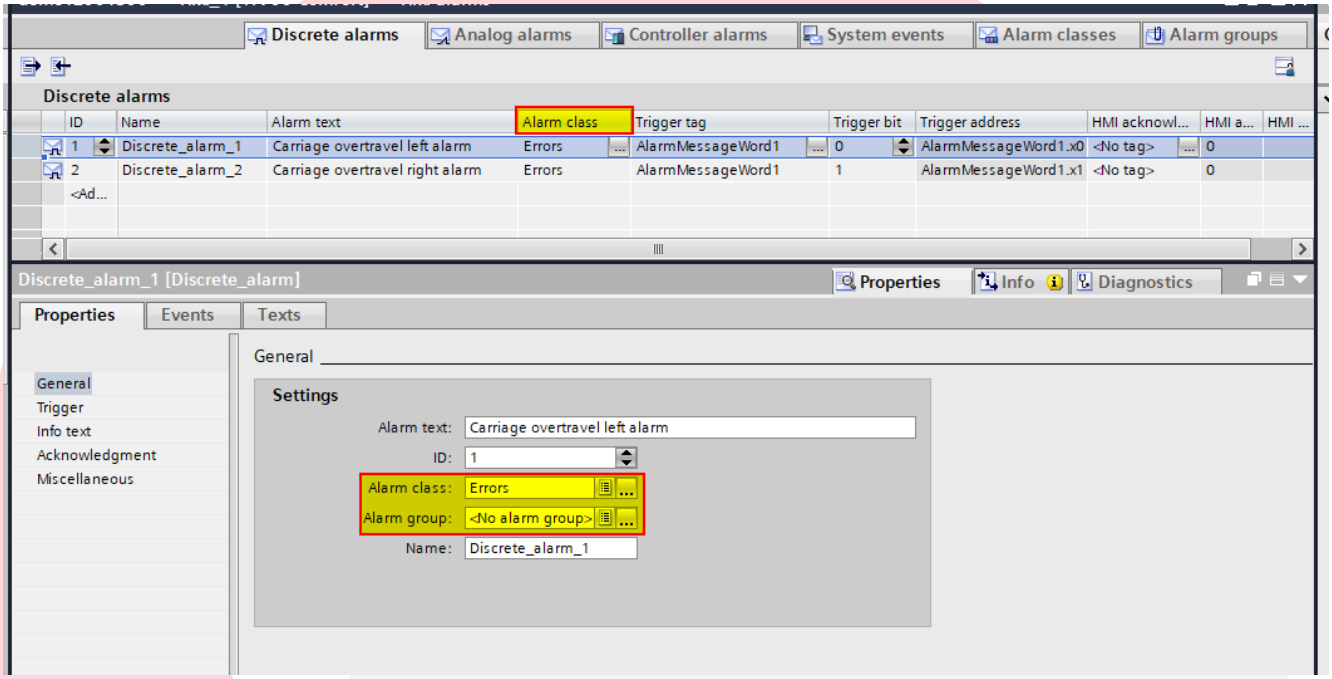
Alarm Groups

Alarm groups are defined in the Alarm groups tab in the HMI Alarms section. Sixteen alarm groups are set up by default and more can be added by the user. The user can change the name from the default 'Alarm_group_x' to a name of their choice.



Specifying Alarm Class and Alarm Group in a message

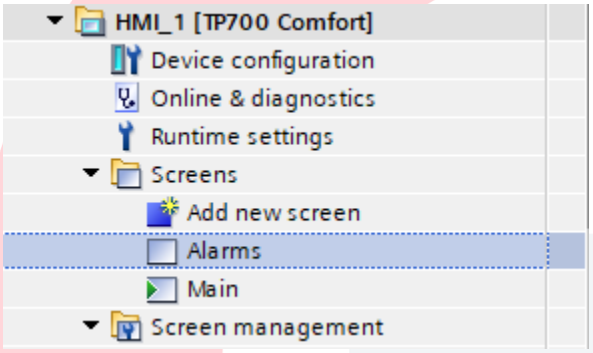
For discrete alarms select the message and open its properties. In the General section, select the Alarm class and Alarm group (if needed).



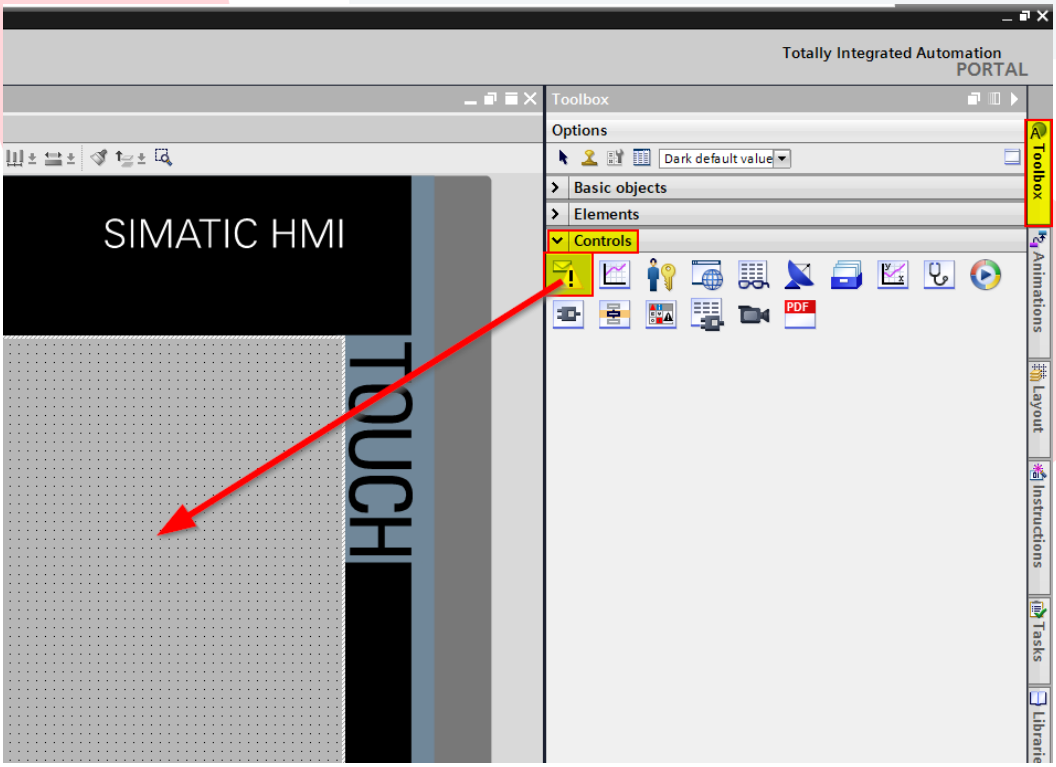
Adding the Alarm View object to a screen

The Alarm View object is located in the Toolbox->Controls section. Open the screen where the Alarm View object is to be located. On the right hand side click on the Toolbox tab to make the Toolbox appear. Expand the Controls section and left mouse click and hold on the Alarm View object. Drag it over to the screen. Adjust the size and location.

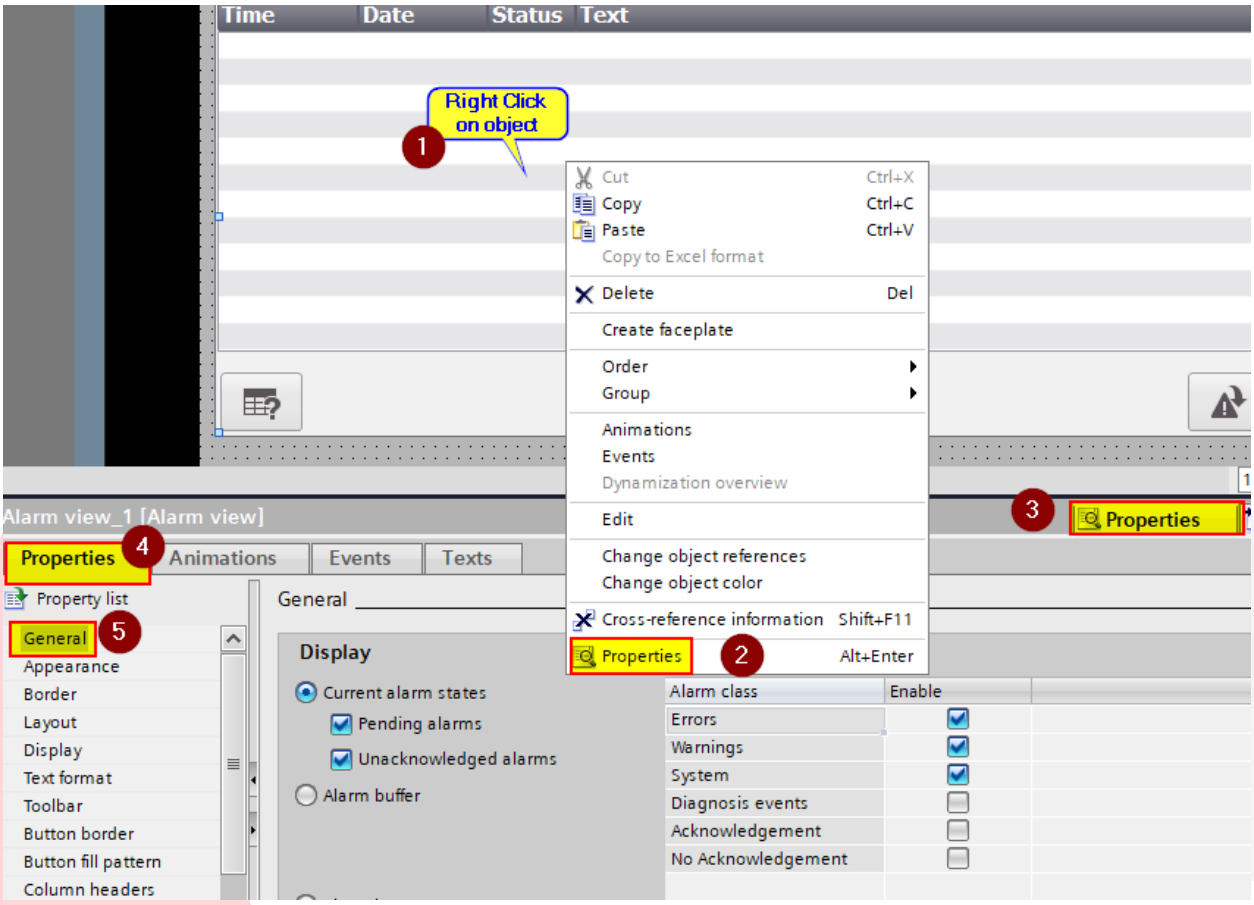
In the example below, a screen called Alarms was created.



The Alarm View object was placed on the Alarms screen and resized

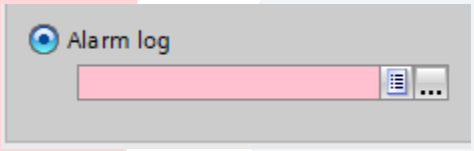


Right click on the Alarm object and select Properties from the pop-up menu to view and parameterize the properties of the Alarm object.

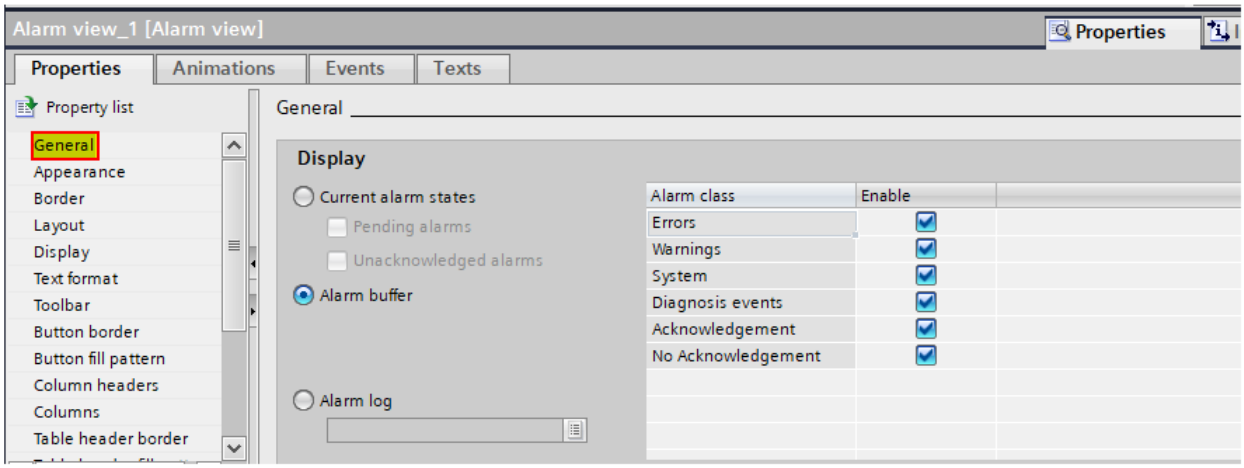


There are three ways to display the alarms

- Current Alarm States (active alarms) –
  - Pending/Unacknowledged checked – messages are displayed until outgoing and acknowledged
  - Only Pending checked – only incoming alarms will be displayed. No acknowledgement
  - Only Unacknowledged checked- message will be displayed until acknowledged
- Alarm buffer (alarm history) – all alarm states (incoming/outgoing/acknowledged) are displayed. The alarm buffer uses panel memory to store the messages. The number of messages stored depends on the panel.
- Alarm log – All alarm states are displayed from a log file. The log file is stored either on a SD memory card (max 2Gb) in the Data Card slot or on a USB drive (max 2GB). An alarm log must be created in Historical Data and selected in the field.

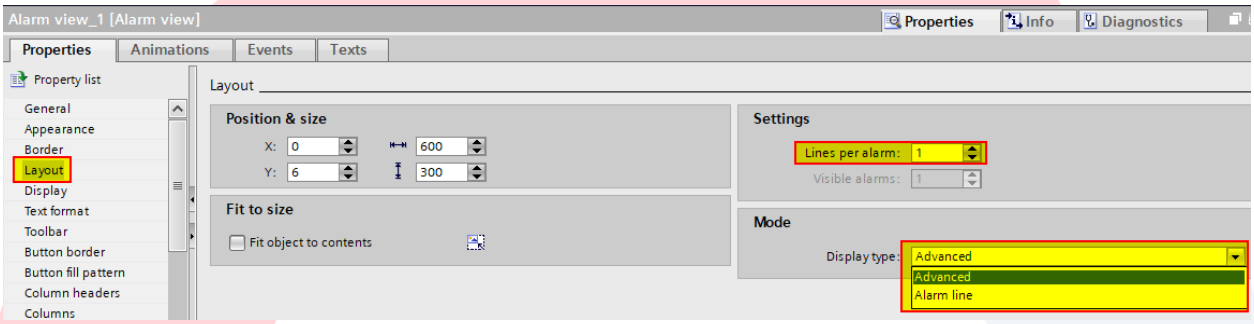


Some users have only one Alarm View set up to display alarm history ('Alarm buffer' selected). Some users create two separate alarm screens, one showing the current alarm states and the other showing alarm history.

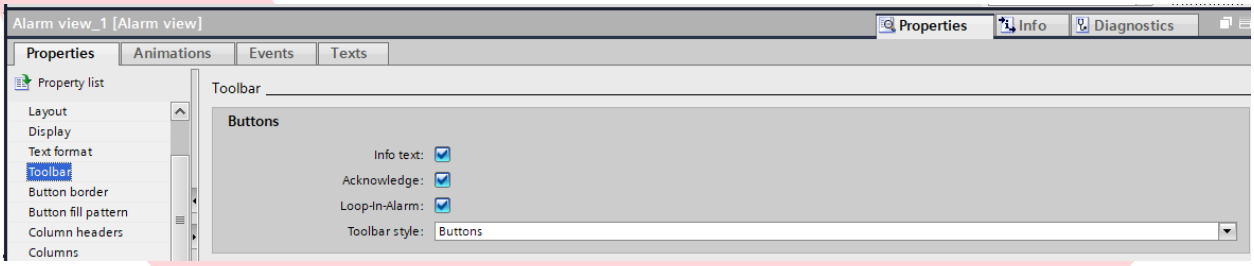


Below are some of the more common properties to be set in the Alarm view.

In the Layout property, you can adjust the number of lines to display in the Advanced mode or you can select Alarm Line mode for use as an alarm banner at the top of the screen. If you want the single line banner to be displayed on all of the screens, put it on a template screen.



In the Toolbar property, you can select which buttons to display. 'Info text' can be used to display additional information when the alarm is selected and the 'Info text' button is pressed. The 'Acknowledge' button acknowledges alarms. The 'Loop-in-Alarm' can be used to jump to a screen that displays information relevant to the alarm message selected.



In the Columns property, the columns to displayed can be selected.