SIEMENS OPEN LIBRARY

5 – HMI Alarm Generation

JUNE 11, 2019

Contents

1. Purpose

This document walks through automatically generating HMI alarms for Siemens HMIs. This overview covers tools included in the Open Library. Note that these tools are designed for use with Open Library structures and architecture only. Specifically, these may only be used to generate alarms for bit-packed Data Blocks. Use with any other alarm setup may not work.

2. Intended Use

This document is intended to be used by anyone utilizing the Open Library for PLC and HMI Development after the PLC code has been complete and alarms are ready to be generated.

3. Revision History

Version	Date	Author	Comments
1.0	2016-05-23	DMC	Initial Release
1.1	2016-06-20	DMC	No Changes
1.2	2016-08-23	DMC	No Changes
1.3	2016-10-11	DMC	No Changes
2.0	2017-11-3	DMC	No Changes
3.0	2018-12-05	DMC	Transition from Excel macro to Window application
4.0	2019-2-15	DMC	No Changes

4. Open Library License

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5. General Overview

Siemens Comfort Panels and WinCC Advanced Runtime use bits out of words to trigger alarms, and there are no methods to configure Boolean alarms. This library, however, utilizes bits for all alarms on these platforms. WinCC Professional use either bits in words or Boolean alarms, both of which are compatible with the library. To automate this process the Siemens Open Library includes a Windows application that utilizes a data block of Booleans to generate alarms.

5.1. Windows Application

The Windows application uses the definition of Data Blocks to automatically generate alarms. The source code is not included in the library zip but is available via specific release by contacting Contribute@PlcOpenLibrary.com. The application will work with any non-optimized data block containing only Booleans. The Booleans can be placed directly in the Data Block, nested in User Defined Types, arrays, or structs.

5.2. Alarm Special Considerations

The included application has the following special considerations in order for the system to function:

1. The Data Block must be non-optimized (applies to 1200/1500 only and is accessible via the properties of the Data Block). See Section 7 of this document or '2- Siemens Open Library - Initial Setup' for details about how to set up a non-optimized data block.
2. The User Defined Type, Struct, and/or individual Boolean comments will be utilized for the alarm text, so it is important to put in meaningful comments on each alarm.

6. Verify Non-Optimized Data Blocks

To verify that a data block is non-optimized, right click on the data block and select 'Properties.' Under the 'Attribute' tab, verify the 'Optimized block access' is not checked. Choosing optimized block access permits the TIA Portal compiler to rearrange data to optimize space on the PLC. When using the alarm generator, however, the application utilizes data block position to determine address, so non-optimized blocks need to be used for correct functionality.
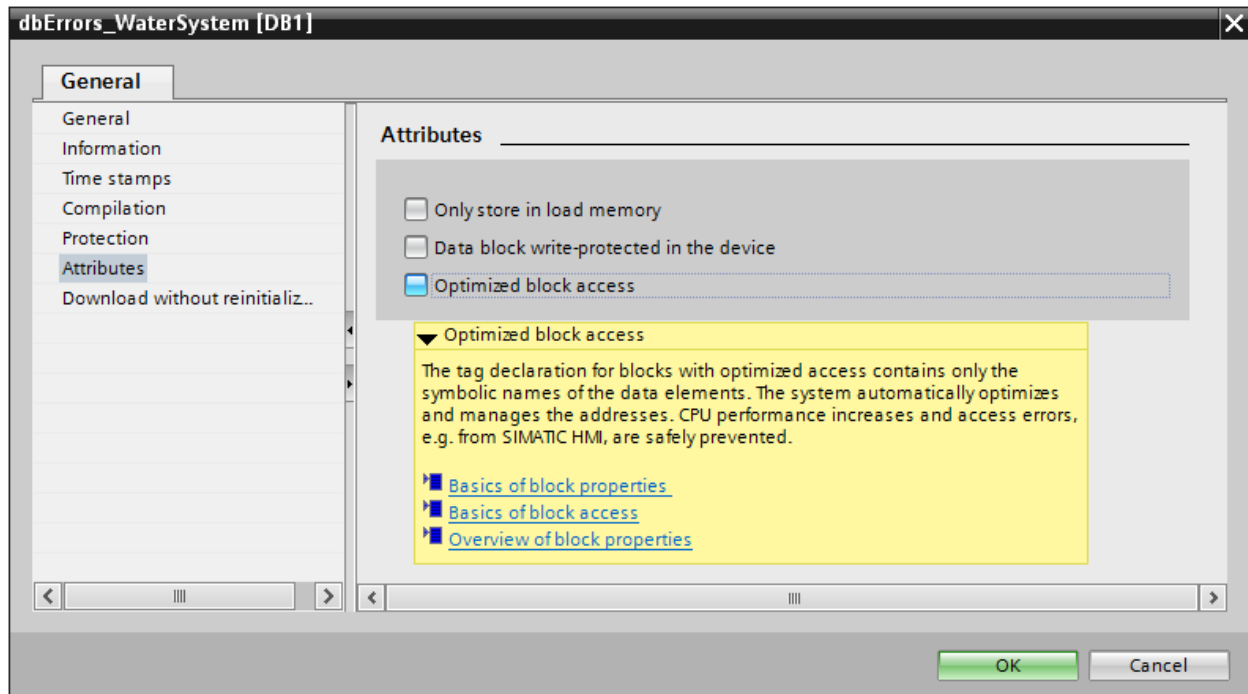
7. Alarm Naming Conventions

This section discusses how automated alarms are generated and how text will be created for the HMI. Alarm text will be created using the comments contained in the Data Block.

7.1. Alarm String Creation

The applicaiton will generate the alarm based on the following parameters:

1. For alarms not in a User Defined Type or Struct, the alarm string will be the Boolean comment string.
2. For alarms in a single or nested User Defined Types and/or Structs, the comment for each User Defined Type and/or Struct will be a prefix for the alarm.

8. Windows Application

The application was built using .NET Framework version 4.7.1. The latest framework ships with Windows updates, but can be [downloaded separately here](#), if neccesary. The application does not need to be installed but does need to be unzipped prior to use.

1. Locate the 'Dmc.SiemensToolbox.exe' and double click to start the application.
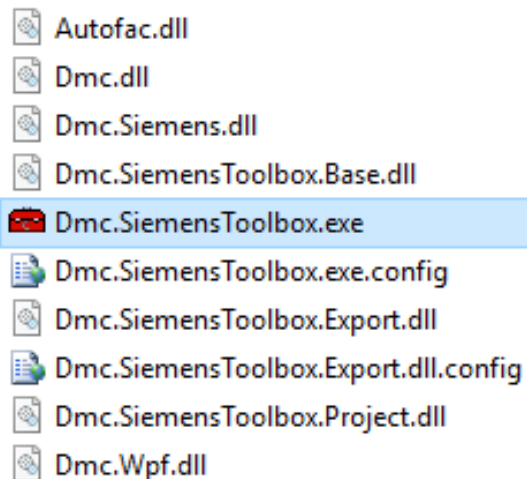
2. Open up the PLC project that contains the desired alarm data blocks.
3. Right click the Errors data block that contains the alarms and select "Generate source from blocks" then "Including all dependent blocks"
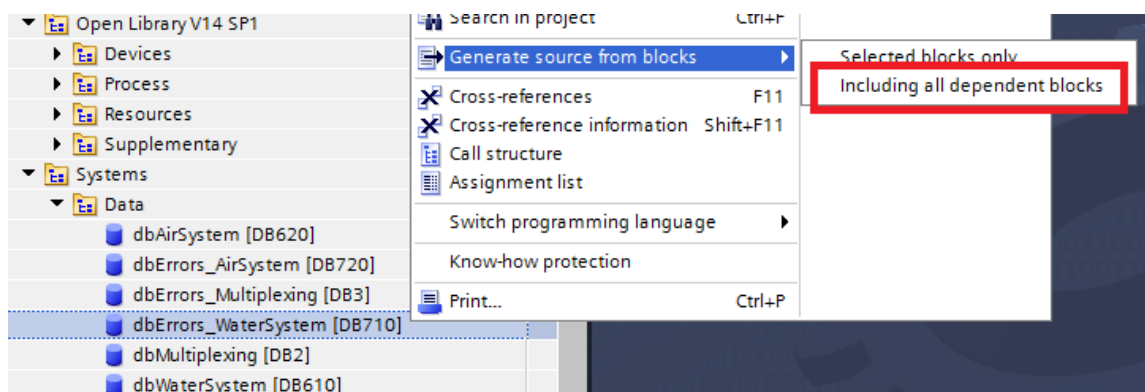
This will export this data block as well as any UDTs on which that data block depends. NOTE: You can export multiple data blocks at one time by selecting before generating.

4. Return to the toolbox application and click the "Settings" tab at the top.
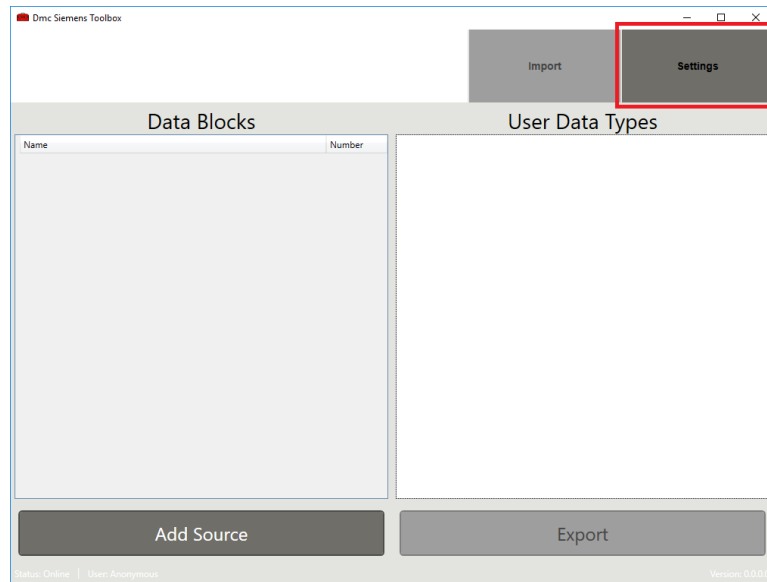
5. Select the applicable WinCC version as the "Export Type" (in this case, WinCC Comfort). Also select the version of TIA Portal being used.
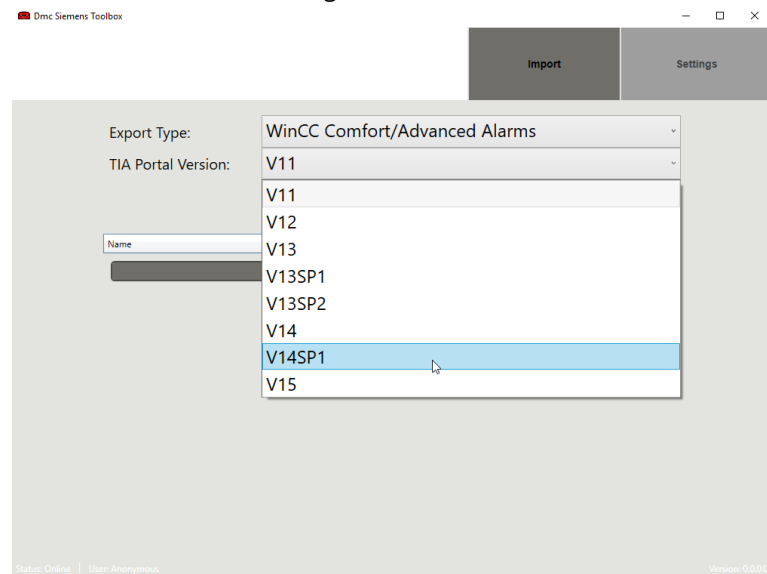
6. Navigate back to the "Import" screen and click "Add Source"
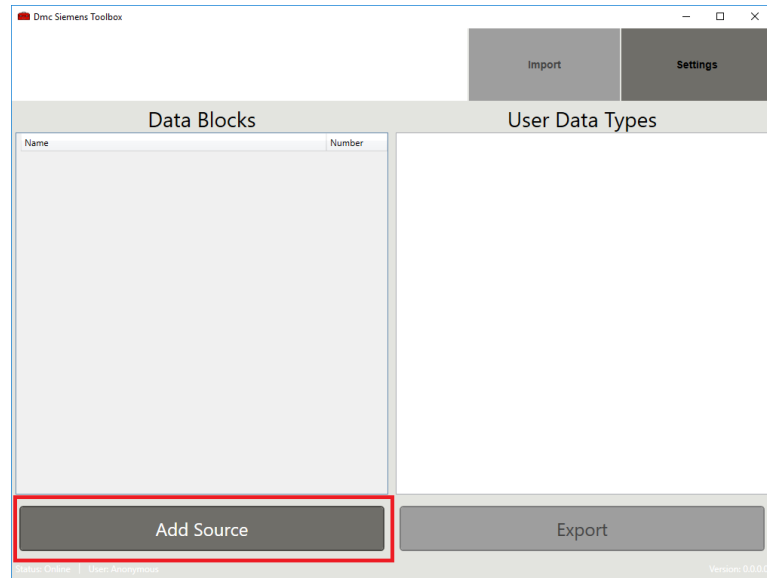
7. Using the navigator, browse to the source file generated from Portal and click "Ok"
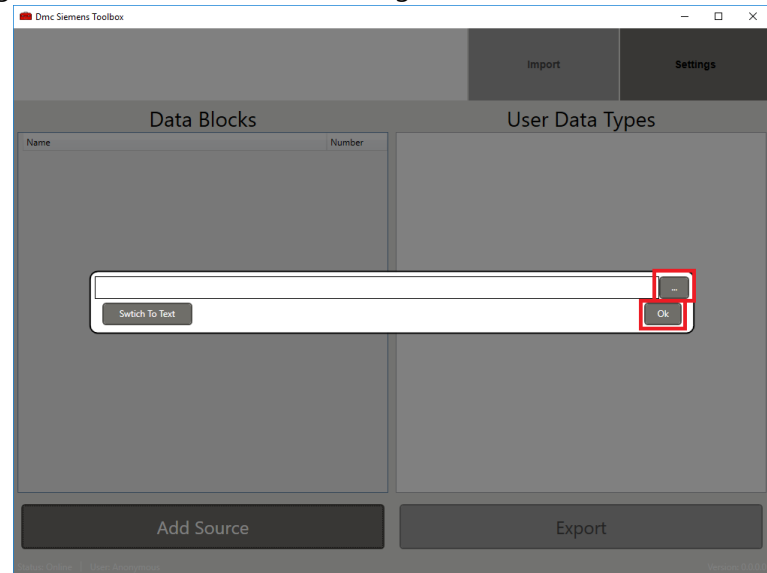
8. Fill in the data block number(s) corresponding to the block number in Portal.
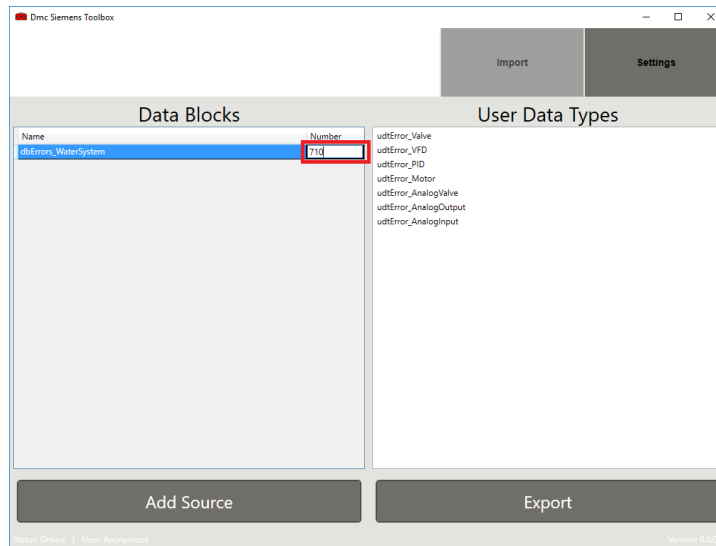
9. Click the "Export" button and save the generated xlsx file.
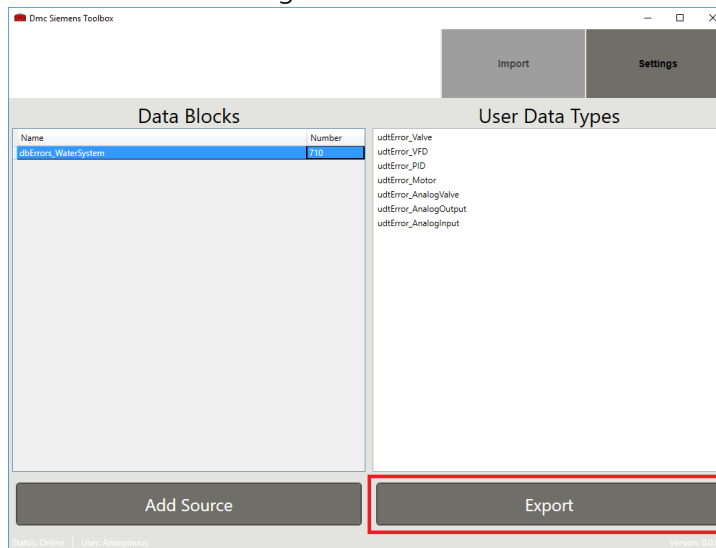
9. Importing Alarms to a Comfort Panel

Once an ".xlsx" alarm file has been created, it may be imported directly to TIA Portal. It is important to note that the file format created is compatible with WinCC Comfort panels and WinCC Advanced.

1. Open the "Show all tags" section of the Comfort Panel
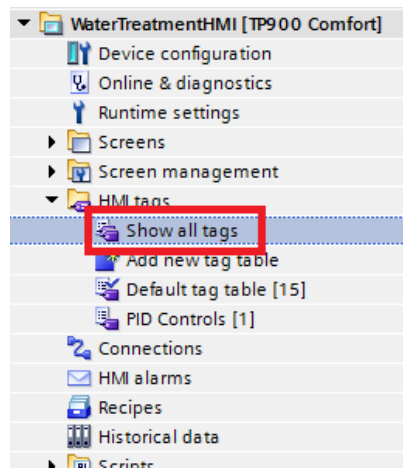
2. Press the Import button in the top left corner
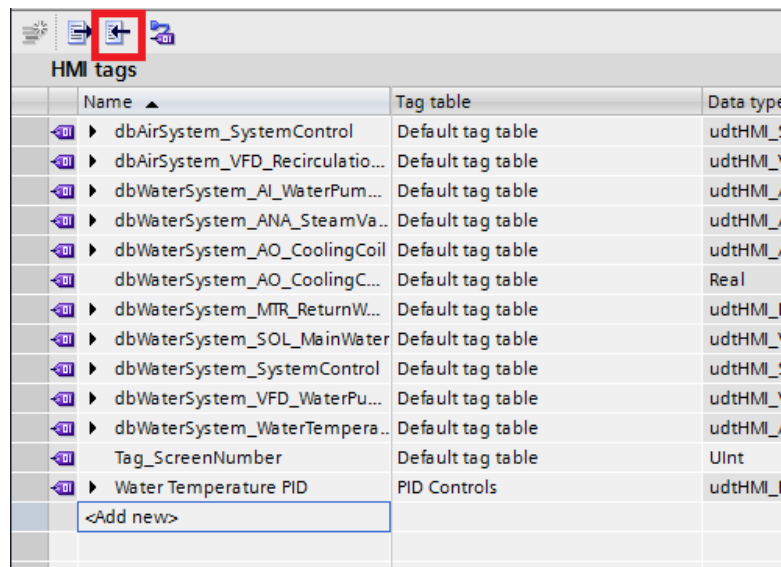
3. Browse for the generated ".xlsx" file and press the Import button
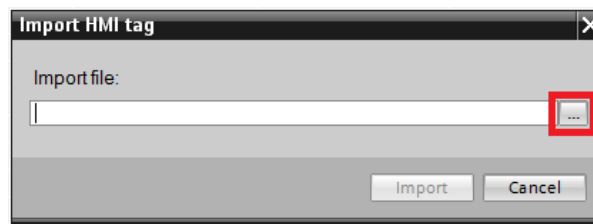
4. Once completed, you will get prompted with a success dialog
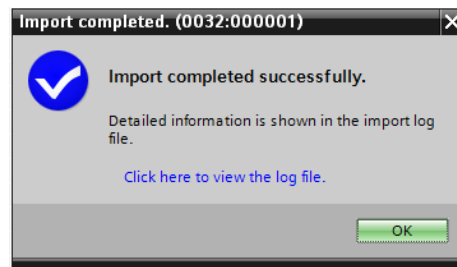
5. Press Ok and check to make sure that all tags were imported correctly

▶ dbErrors_AirSystem	Default tag table	Array [0..1] of Word	HMI_Connection_1	WaterTreatmentPLC	\<Undefined>	%DB720.DBX0.0
▶ dbErrors_WaterSystem	Default tag table	Array [0..8] of Word	HMI_Connection_1	WaterTreatmentPLC	\<Undefined>	%DB710.DBX0.0
\<Add new>						

6. Open the HMI Alarms section

7. Press the Import button in the top left corner

8. Again, browse for the generated ".xlsx" file and press the Import button

9. Once completed, you will get prompted with another success dialog

10. Press Ok and check to make sure that all alarms were imported correctly

Discrete alarms | Analog alarms | Controller alarms | System events

Discrete alarms

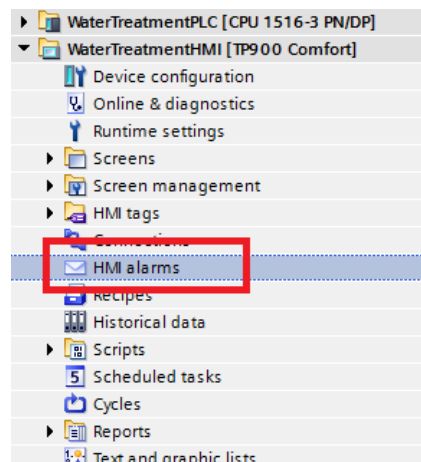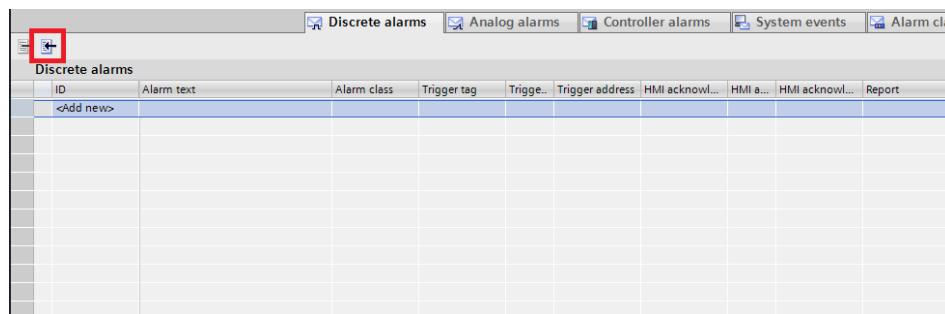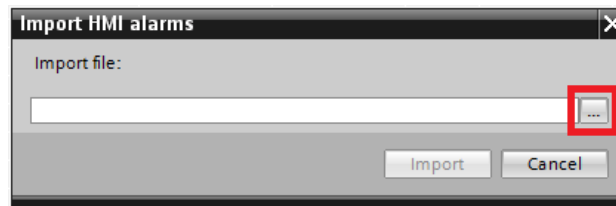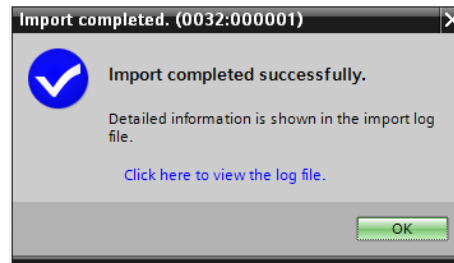| ID	Alarm text	Alarm class	Trigger tag	Trigge..	Trigger address	HMI acknowl...	HMI a...	HMI acknowl...	Rep...
1	Main Water Valve - Home position fe	Errors	dbErrors_Wat...	8	%DB310.DBX...	<No tag>	0		
2	Main Water Valve - Work position fee	Errors	dbErrors_Wat...	9	%DB310.DBX...	<No tag>	0		
3	Main Water Valve - Home position fe	Errors	dbErrors_Wat...	10	%DB310.DBX...	<No tag>	0		
4	Main Water Valve - Work position fee	Errors	dbErrors_Wat...	11	%DB310.DBX...	<No tag>	0		
5	Main Water Pump - Motor protector tr	Errors	dbErrors_Wat...	24	%DB310.DBX...	<No tag>	0		
6	Main Water Pump - Motor disconnect	Errors	dbErrors_Wat...	25	%DB310.DBX...	<No tag>	0		
7	Main Water Pump - Clutch tripped	Errors	dbErrors_Wat...	26	%DB310.DBX...	<No tag>	0		
8	Main Water Pump - No feedback from	Errors	dbErrors_Wat...	27	%DB310.DBX...	<No tag>	0		
9	Main Water Pump - Contactor still on	Errors	dbErrors_Wat...	28	%DB310.DBX...	<No tag>	0		
10	Main Water Pump - No signal forward	Errors	dbErrors_Wat...	29	%DB310.DBX...	<No tag>	0		
11	Main Water Pump - No signal reverse	Errors	dbErrors_Wat...	30	%DB310.DBX...	<No tag>	0		
12	Main Water Pump - Motor doesn't sto	Errors	dbErrors_Wat...	31	%DB310.DBX...	<No tag>	0		
13	Main Water Pump - Max frequency rea	Errors	dbErrors_Wat...	16	%DB310.DBX...	<No tag>	0		
14	Main Water Pump - VFD overcurrent	Errors	dbErrors_Wat...	17	%DB310.DBX...	<No tag>	0		
15	Main Water Pump - Motor overload	Errors	dbErrors_Wat...	18	%DB310.DBX...	<No tag>	0		
16	Main Water Pump - VFD overload	Errors	dbErrors_Wat...	19	%DB310.DBX...	<No tag>	0		
17	Main Water Pump - VFD fault	Errors	dbErrors_Wat...	20	%DB310.DBX...	<No tag>	0		
18	Main Water Pump - No feedback from	Errors	dbErrors_Wat...	21	%DB310.DBX...	<No tag>	0		
19	Analog Steam Valve - Valve feedbac	Errors	dbErrors_Wat...	40	%DB310.DBX...	<No tag>	0		
20	Water Temperature PID - Input value	Errors	dbErrors_Wat...	56	%DB310.DBX...	<No tag>	0		
21	Water Temperature PID - InputPER va	Errors	dbErrors_Wat...	57	%DB310.DBX...	<No tag>	0		
22	Water Temperature PID - Fine tuning	Errors	dbErrors_Wat...	58	%DB310.DBX...	<No tag>	0		
23	Water Temperature PID - Pre-tuning -	Errors	dbErrors_Wat...	59	%DB310.DBX...	<No tag>	0		
24	Water Temperature PID - PID set poin	Errors	dbErrors_Wat...	60	%DB310.DBX...	<No tag>	0		
25	Water Temperature PID - Pre-tuning r	Errors	dbErrors_Wat...	61	%DB310.DBX...	<No tag>	0		
26	Water Temperature PID - Pre-tuning -	Errors	dbErrors_Wat...	62	%DB310.DBX...	<No tag>	0		
27	Water Temperature PID - Fine tuning	Errors	dbErrors_Wat...	63	%DB310.DBX...	<No tag>	0		
28	Water Temperature PID - Input value	Errors	dbErrors_Wat...	48	%DB310.DBX...	<No tag>	0		
29	Water Temperature PID - Output valu	Errors	dbErrors_Wat...	49	%DB310.DBX...	<No tag>	0		
30	Water Temperature PID - PID_Compa	Errors	dbErrors_Wat...	50	%DB310.DBX...	<No tag>	0		
31	Water Temperature PID - Set point va	Errors	dbErrors_Wat...	51	%DB310.DBX...	<No tag>	0		
32	Water Temperature PID - Manual valu	Errors	dbErrors_Wat...	52	%DB310.DBX...	<No tag>	0		
33	Water Temperature PID - Substitute c	Errors	dbErrors_Wat...	53	%DB310.DBX...	<No tag>	0		
34	Water Temperature PID - Disturbance	Errors	dbErrors_Wat...	54	%DB310.DBX...	<No tag>	0		
<Add new>									