



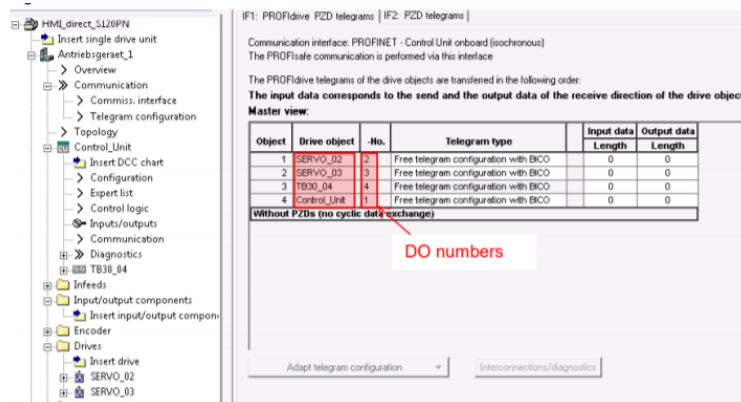
White Paper: How to Display S120 Drive Faults Directly on HMI with No PLC Programming

By Darren McCulley, PCC

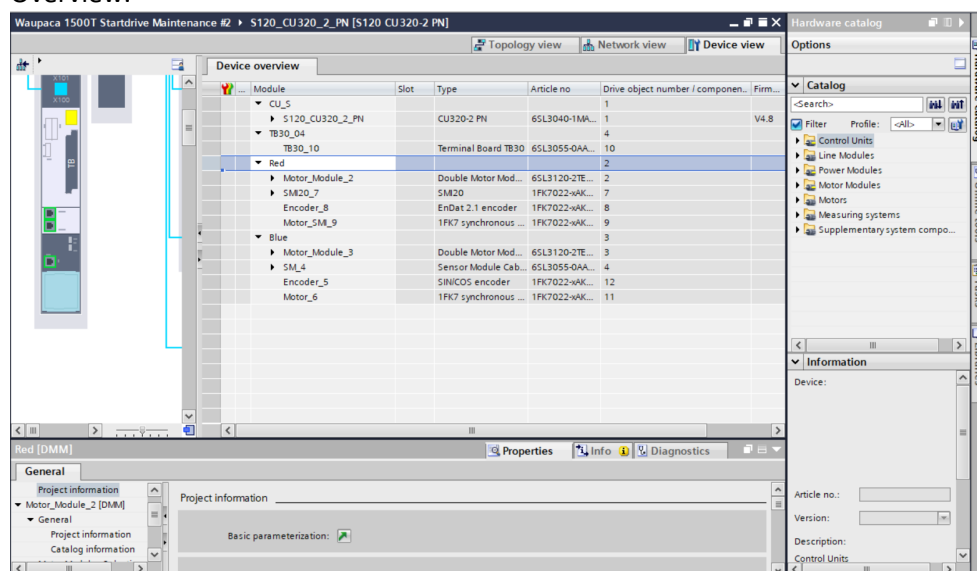
Whitepaper: How to Display S120 Drive Faults Directly on HMI with No PLC Programming

- You should have a project with an HMI, and drive setup.
- The parameters in a Sinamics drive is accessed using tags via S7 communication. Generally, all parameters can be accessed via the HMI. It depends if a parameter is a read (r) parameter or settable (p) parameter whether a parameter can be written to or observed from HMI direct access. The figure below shows how to access the converter parameters in the HMI. The Parameter Number corresponds to the Data block number, and the Parameter Index corresponds to the Drive Object Number + Data Block Offset. The G120 always has a Drive Object value of 1.

The Drive object for an S120 can be found under the telegram configuration in Starter

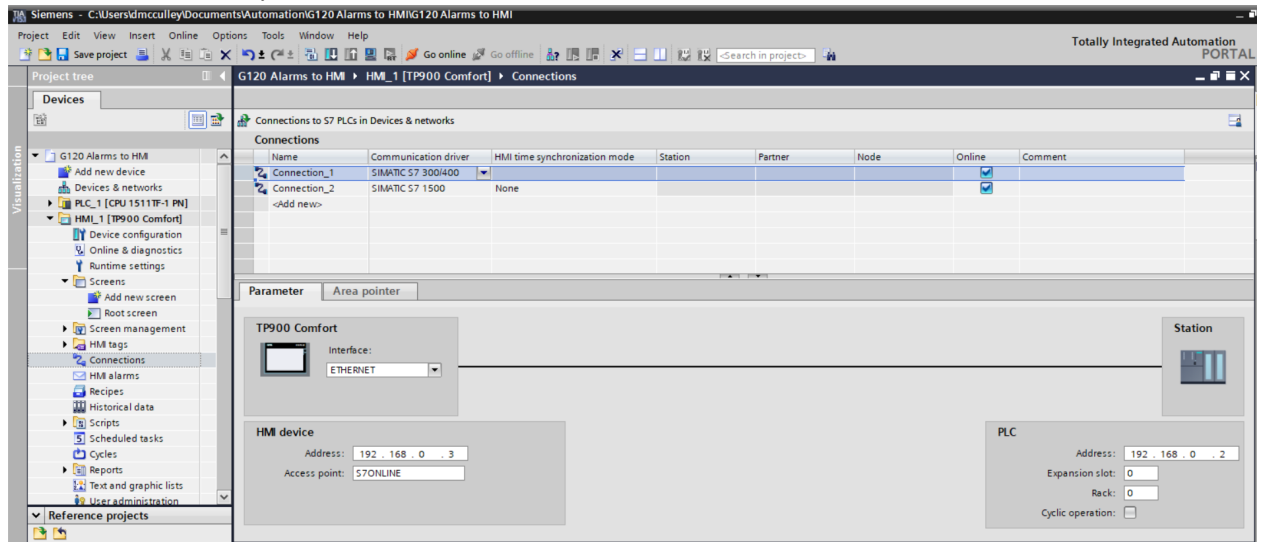


In TIA Portal the Drive Object Number can be seen in the Device View of the drive under Device Overview.

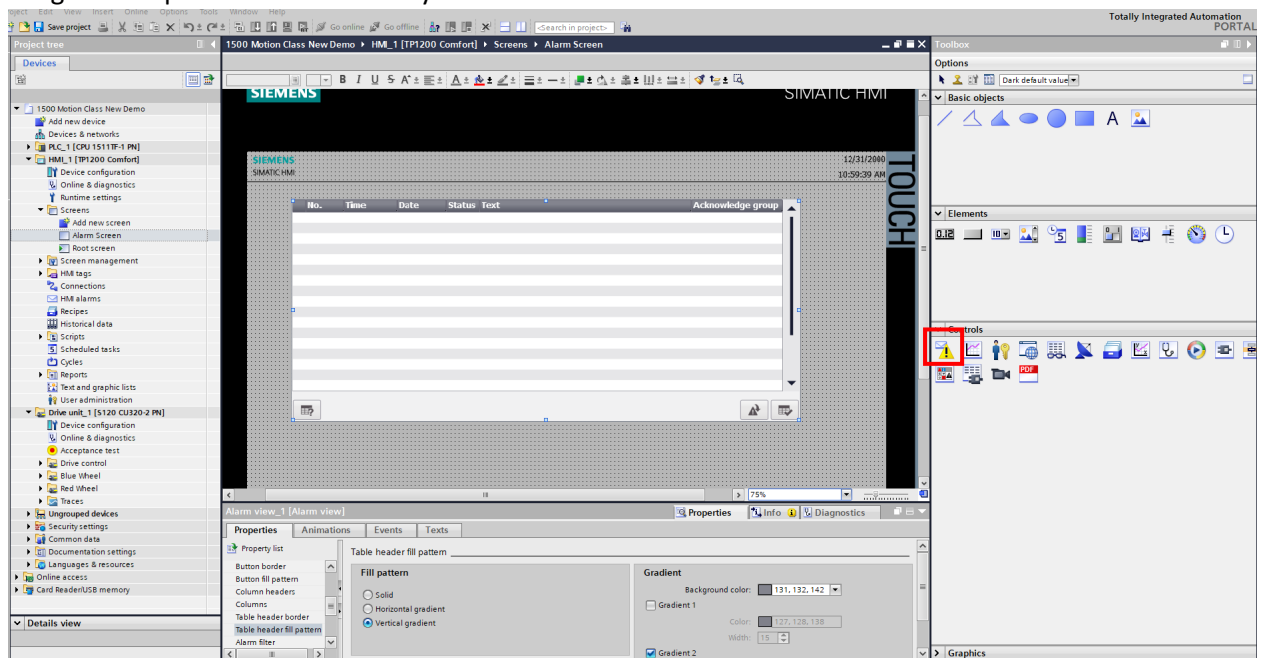


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- Under your HMI connections add a connection with the Simatic S7300/400 driver and the station IP address of your drive, mine is 192.168.0.2.



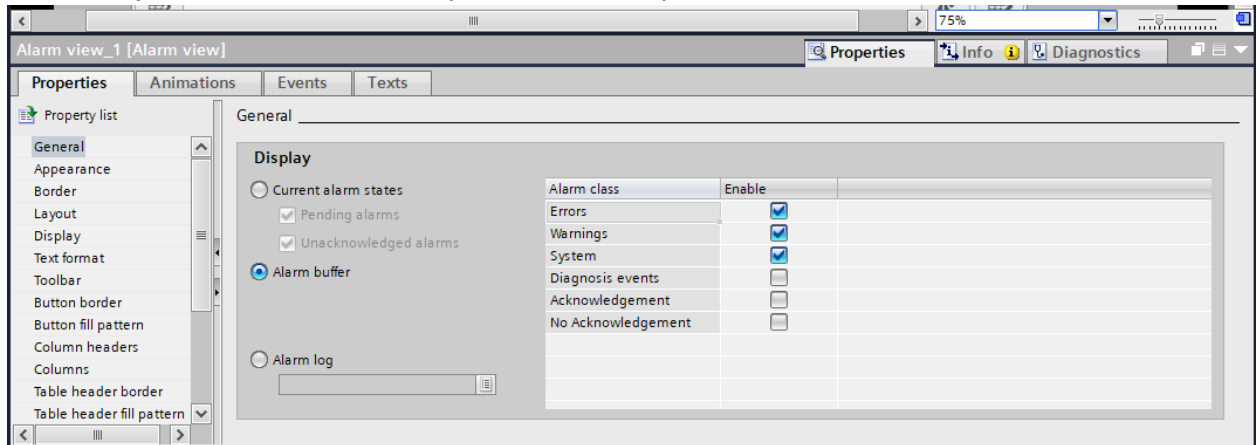
- Drag and drop an Alarm View into your alarm screen of the HMI.



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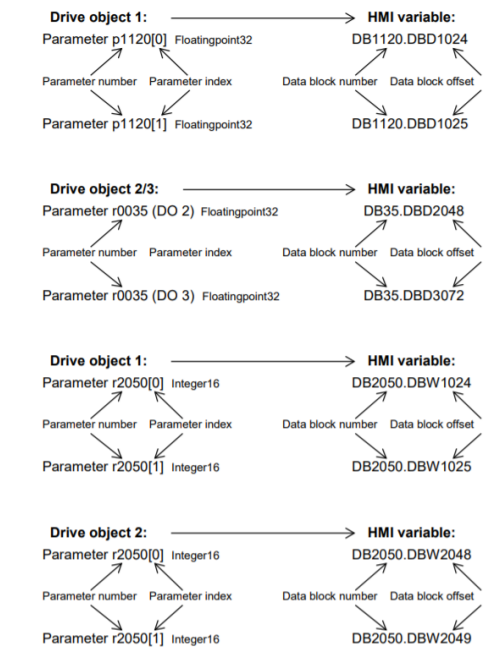
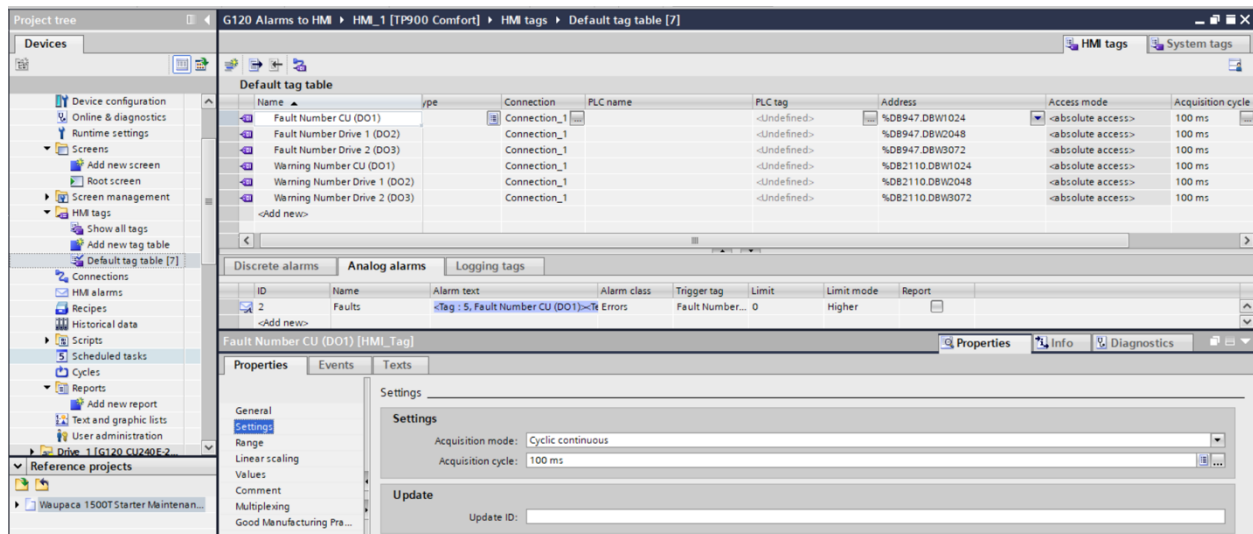
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3. You can adjust what alarms or faults you see in the Properties tab.



4. Open the HMI tag table and configure as below adding a tag for Fault Number and Warning number. Notice the addresses correspond to the parameter numbers for drive faults and alarms and the corresponding drive object number. I have alarms for the control unit and two drives setup. Add tags as needed for your drives. Make sure the connection is the one you setup in step 1. Also make sure the Acquisition Cycle is set for Cyclic Continuous. You can set the Acquisition cycle time as desired.
 - a. The address compromises the parameter number, index, and drive object number.
DB<parameter number>.DBW<data block offset>
 - b. The data block offset is formed from the drive object number and the parameter index.
Data block offset = $1024 * \text{drive object number} + \text{parameter index}$
For drive object 2 the data block offset = $1024 * 2 + \text{parameter index}$

Examples for various parameters

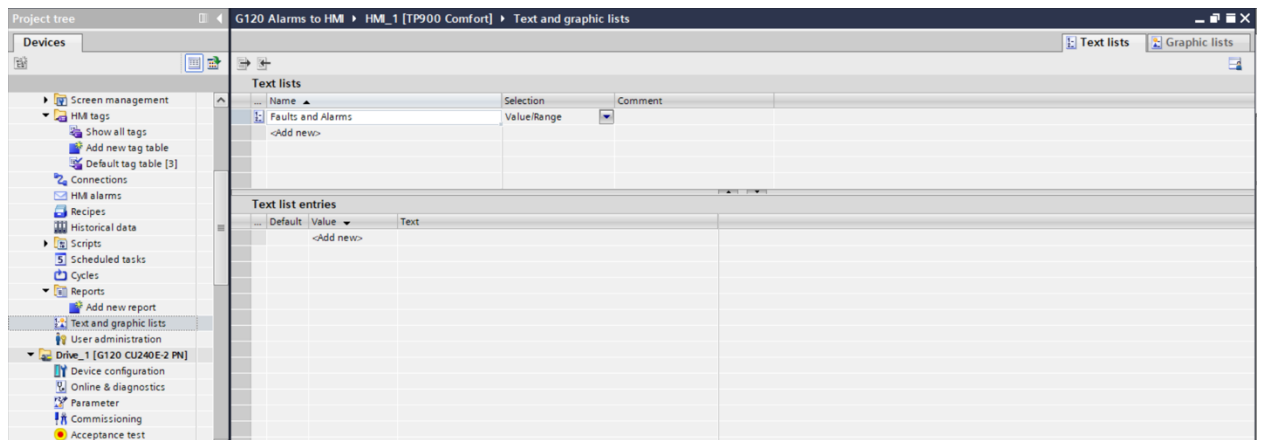
The screenshot shows the SIMATIC Manager interface for configuring HMI tags. The 'Default tag table' is displayed, showing a list of tags with their names, types, connections, PLC names, PLC tags, addresses, access modes, and acquisition cycles.

Name	Type	Connection	PLC name	PLC tag	Address	Access mode	Acquisition cycle
Fault Number CU (DO1)	Integer16	Connection_1		<Undefined>	%DB947.DBW1024	<absolute access>	100 ms
Fault Number Drive 1 (DO2)	Integer16	Connection_1		<Undefined>	%DB947.DBW2048	<absolute access>	100 ms
Fault Number Drive 2 (DO3)	Integer16	Connection_1		<Undefined>	%DB947.DBW3072	<absolute access>	100 ms
Warning Number CU (DO1)	Integer16	Connection_1		<Undefined>	%DB2110.DBW1024	<absolute access>	100 ms
Warning Number Drive 1 (DO2)	Integer16	Connection_1		<Undefined>	%DB2110.DBW2048	<absolute access>	100 ms
Warning Number Drive 2 (DO3)	Integer16	Connection_1		<Undefined>	%DB2110.DBW3072	<absolute access>	100 ms

The 'Properties' window for the 'Fault Number CU (DO1) [HMI_Tag]' is also shown, with the 'Settings' tab active. The 'Acquisition mode' is set to 'Cyclic continuous' and the 'Acquisition cycle' is set to '100 ms'.

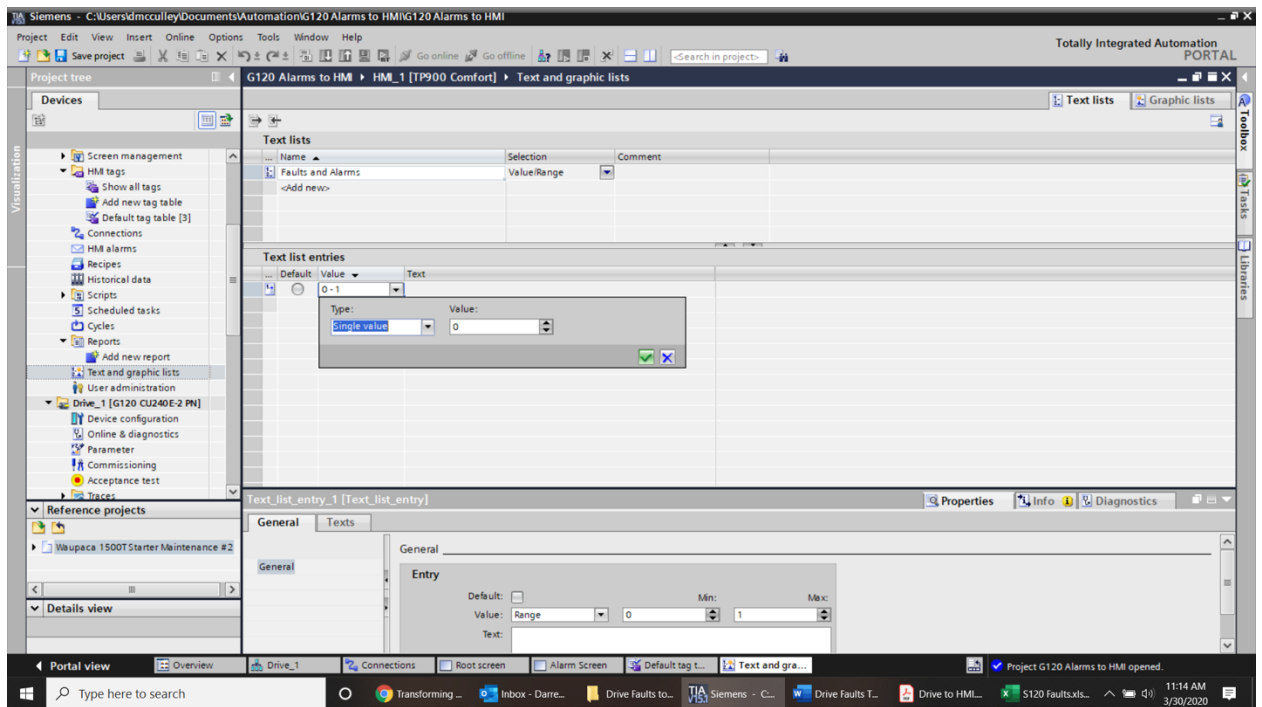
White Paper: Title How to Display S120 Drive Faults Directly on HMI with No PLC Programming

5. The fault and alarm list have to be converted in to Excel format using the XML parser. The current faults and alarms can be found at Siemens Industry Online Support: <https://support.industry.siemens.com/cs/products?mfn=ps&lc=en-WW>.
Information on how to use and download the XML Parser is at the following link: <https://support.industry.siemens.com/cs/document/77467239/transforming-warning-and-error-messages-of-a-sinamics-drive-with-the-aid-of-the-xml-parser-and-integrating-them-into-a-step-7-hmi-project?dti=0&lc=en-WW>
Download and install the XML parser or download the Excel formatted fault list here on the PCC website.
6. Under the Reports menu item, create a Text List for fault and warning messages of the drive called Faults and Alarms.



White Paper: Title How to Display S120 Drive Faults Directly on HMI with No PLC Programming

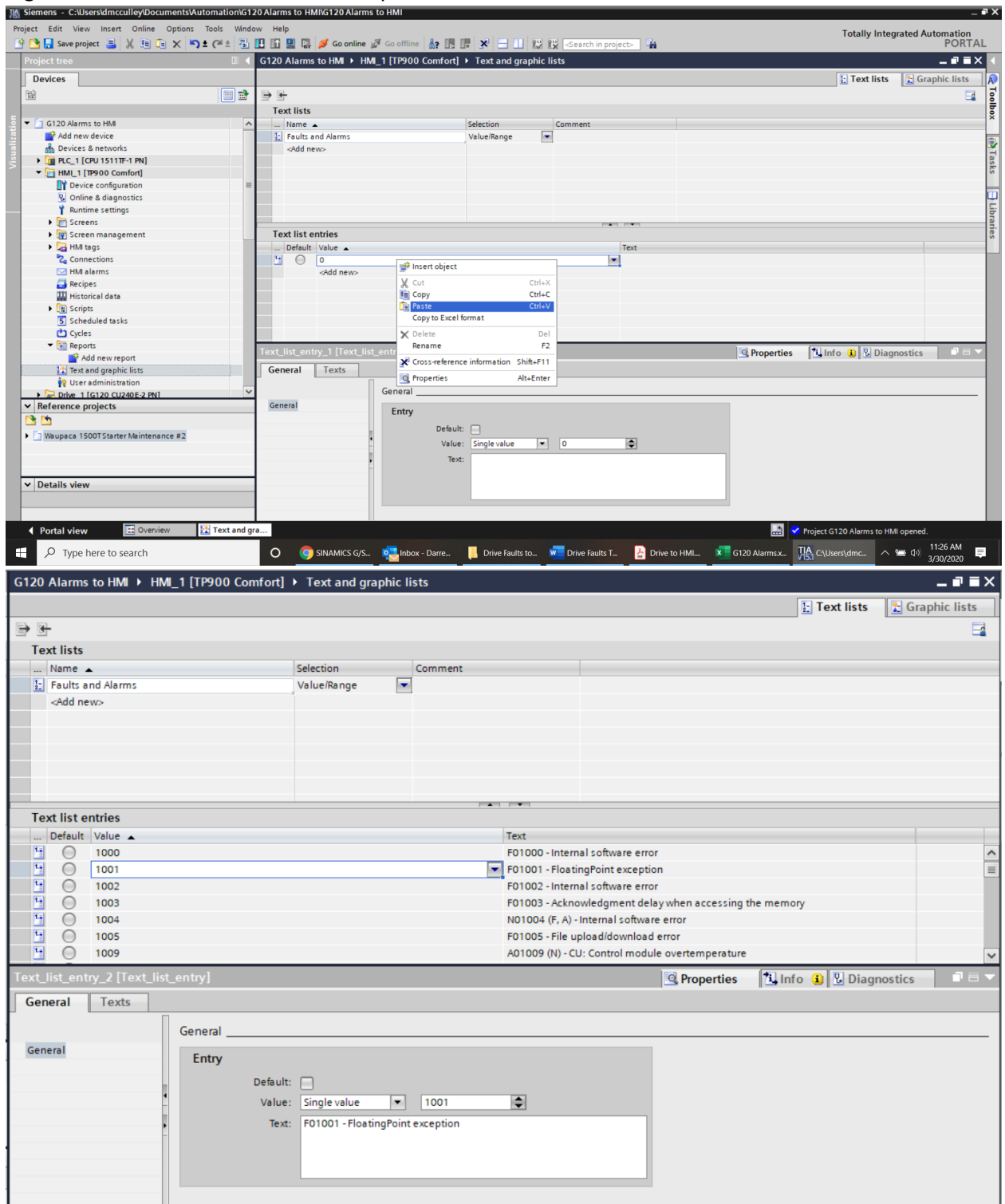
- Double click on <Add new> then click the drop down and change the type to Single value.



- Highlight all the faults and alarms in Excel and copy them.

	A	B	C	D	E
	Duplicates	Error Number decimal	Long Name	AddInfo	Cause
1					
2					
3		1000	F01000 - Internal software error	F01000 - Module: %1-/- line: %2	F01000 - An internal
4		1001	F01001 - FloatingPoint exception	F01001 - %1	F01001 - An excepti
5		1002	F01002 - Internal software error	F01002 - %1	F01002 - An internal
6		1003	F01003 - Acknowledgment delay when accessing the memory	F01003 - %1	F01003 - A memory
7		1004	N01004 (F, A) - Internal software error	N01004 (F, A) - %1	N01004 (F, A) - An i
8		1005	F01005 - Firmware download for DRIVE-CLIQ component unsuccessful	F01005 - Component number: %1-/- fault cause: %2	F01005 - It was not
9		1006	A01006 - Firmware update for DRIVE-CLIQ component required	A01006 - Component number: %1	A01006 - The firmw
10		1007	A01007 - POWER ON for DRIVE-CLIQ component required	A01007 - Component number: %1	A01007 - A DRIVE-C
11		1009	A01009 (N) - CU: Control module overtemperature	A01009 (N) -	A01009 (N) - The tei
12		1010	F01010 - Drive type unknown	F01010 - %1	F01010 - An unknow
13		1011	F01011 (N) - Download interrupted	F01011 (N) - %1	F01011 (N) - The prc
14		1012	F01012 (N) - Project conversion error	F01012 (N) - %1	F01012 (N) - When i
15		1013	A01013 - CU: Fan operating time reached or exceeded	A01013 - %1	A01013 - The maxin
16		1014	F01014 - Topology: DRIVE-CLIQ component property changed	F01014 - Component number: %1	F01014 - The proper
17		1015	F01015 - Internal software error	F01015 - %1	F01015 - An internal
18		1016	A01016 (F) - Firmware changed	A01016 (F) - %1	A01016 (F) - At least
19		1017	A01017 - Component lists changed	A01017 - %1	A01017 - On the me
20		1020	A01020 - Writing to RAM disk unsuccessful	A01020 -	A01020 - A write ac
21		1023	F01023 - Software timeout (internal)	F01023 - %1	F01023 - An internal
22		1030	F01030 - Sign-of-life failure for master control	F01030 -	F01030 - For active
23		1031	F01031 - Sign-of-life failure for OFF in REMOTE	F01031 -	F01031 - With the "t
24		1032	A01032 (F) - ACK: all parameters must be saved	A01032 (F) - %1	A01032 (F) - The par
25		1033	F01033 - Units changeover: Reference parameter value invalid	F01033 - Parameter: %1	F01033 - When char
26		1034	F01034 - Units changeover: Calculation parameter values after reference value change unsuccessful	F01034 - Parameter: %1	F01034 - The chang
27		1035	A01035 (F) - ACK: Parameter back-up file corrupted	A01035 (F) - %1	A01035 (F) - When t

9. Right click in the Value box and choose paste and overwrite the values.

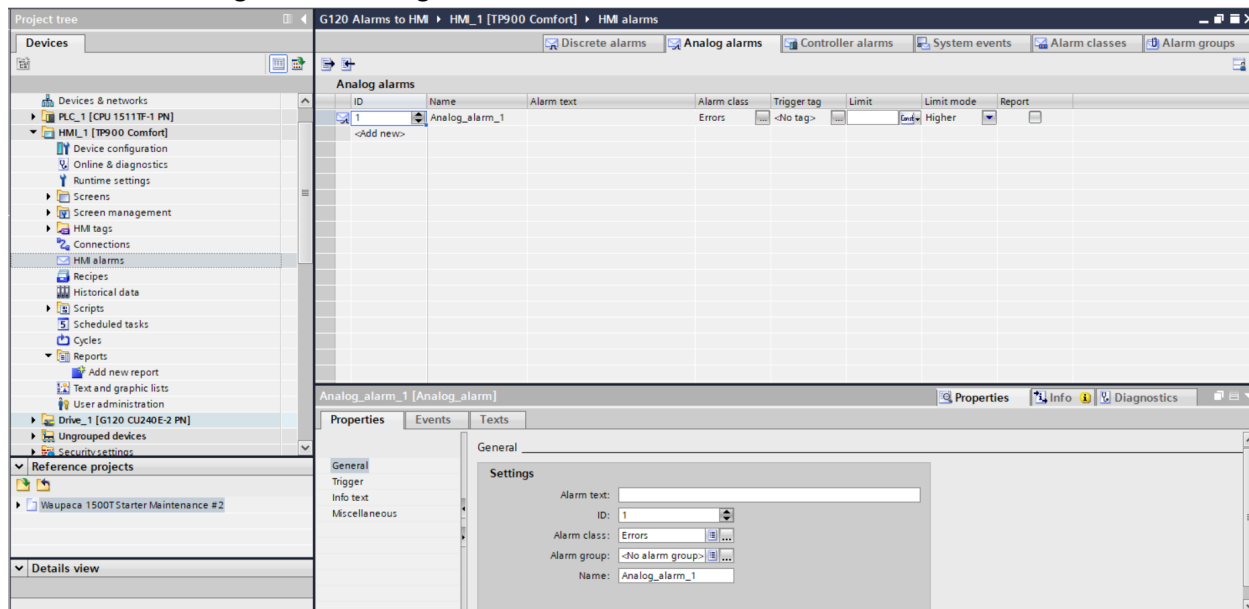


The screenshot displays the Siemens TIA Portal interface for configuring HMI alarms. The project tree on the left shows the hierarchy: G120 Alarms to HMI > HMI_1 [TP900 Comfort] > Text and graphic lists. The main window is divided into several panes:

- Text lists:** A table with columns 'Name', 'Selection', and 'Comment'. It contains one entry: 'Faults and Alarms' with a selection of 'Value/Range'.
- Text list entries:** A table with columns 'Default', 'Value', and 'Text'. It lists various fault codes and their descriptions:

Default	Value	Text
<input type="radio"/>	1000	F01000 - Internal software error
<input type="radio"/>	1001	F01001 - FloatingPoint exception
<input type="radio"/>	1002	F01002 - Internal software error
<input type="radio"/>	1003	F01003 - Acknowledgment delay when accessing the memory
<input type="radio"/>	1004	N01004 (F, A) - Internal software error
<input type="radio"/>	1005	F01005 - File upload/download error
<input type="radio"/>	1009	A01009 (N) - CU: Control module overtemperature
- Text list entry_2 [Text_list_entry]:** The 'General' tab is active, showing the 'Entry' configuration. The 'Value' field is set to 'Single value' and '1001'. The 'Text' field contains the description: 'F01001 - FloatingPoint exception'.

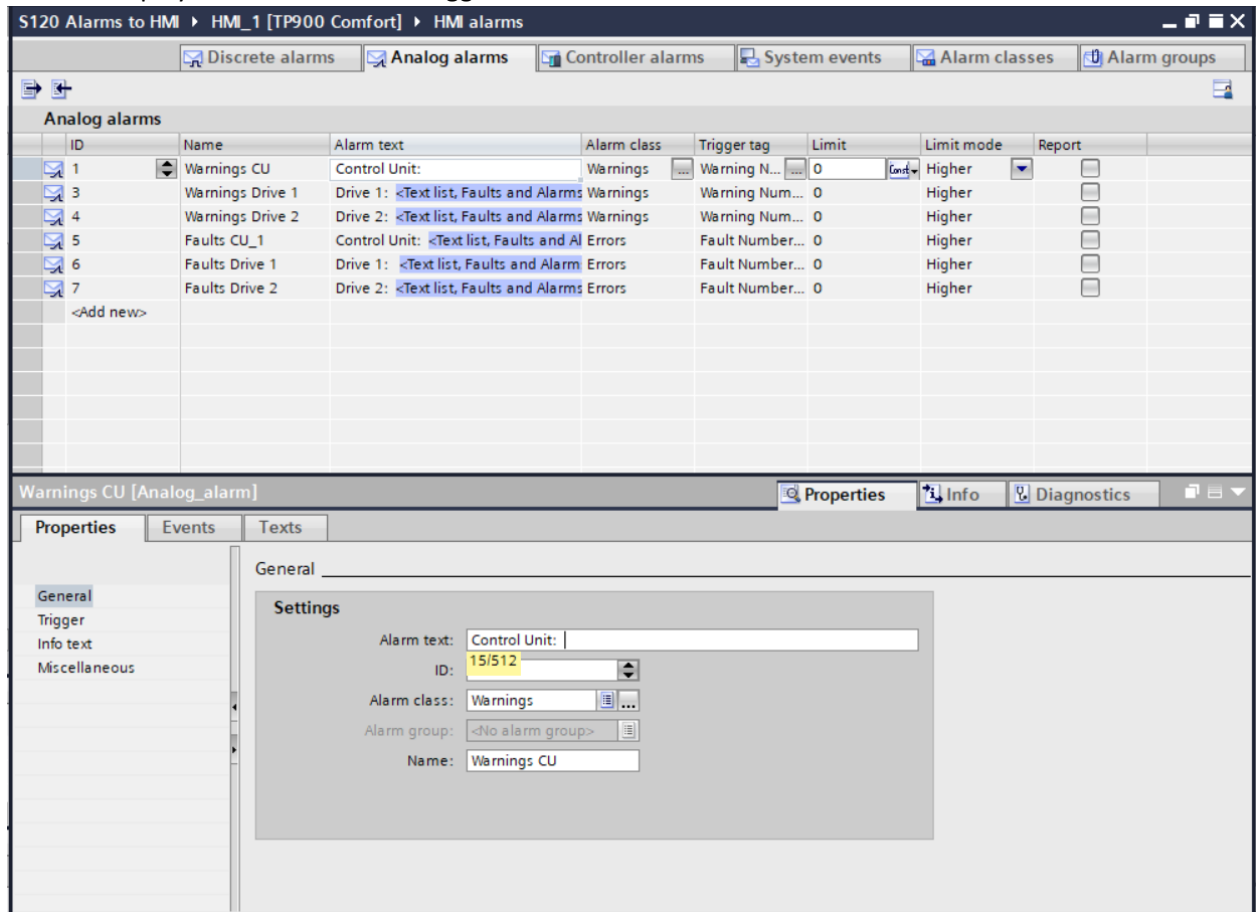
10. Under HMI alarms go to the Analog Alarms tab and add a new alarm.



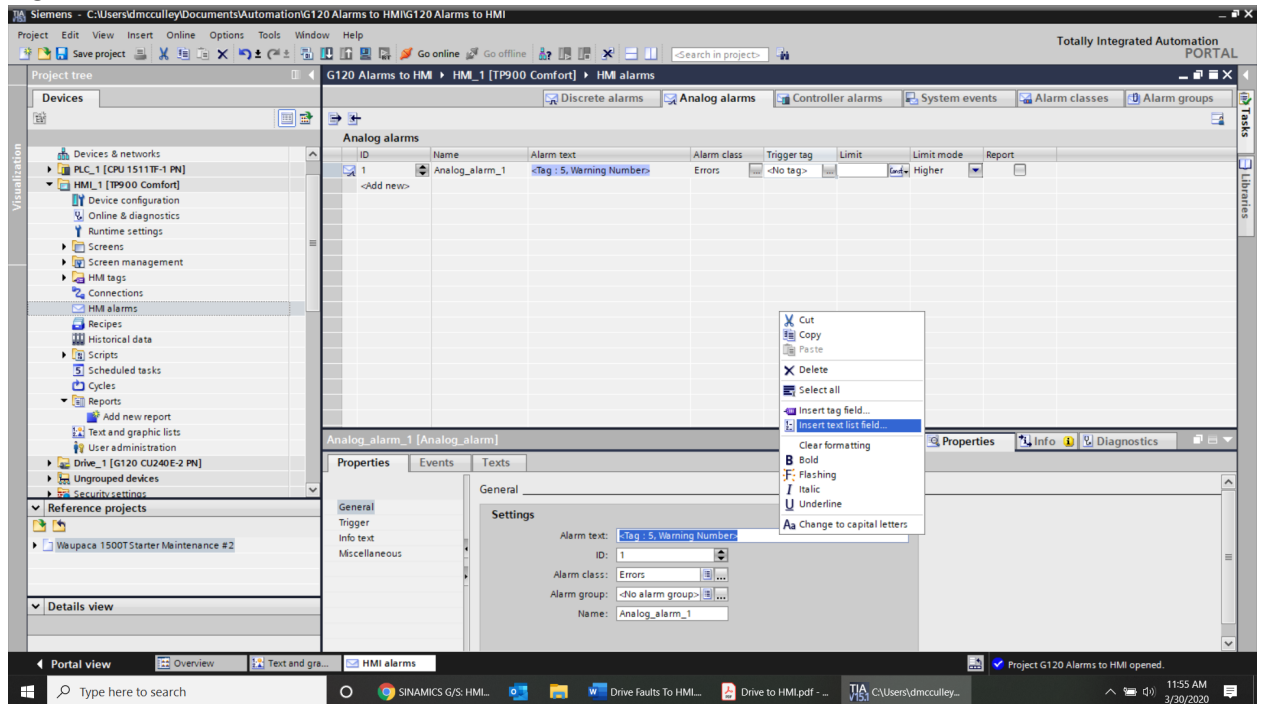
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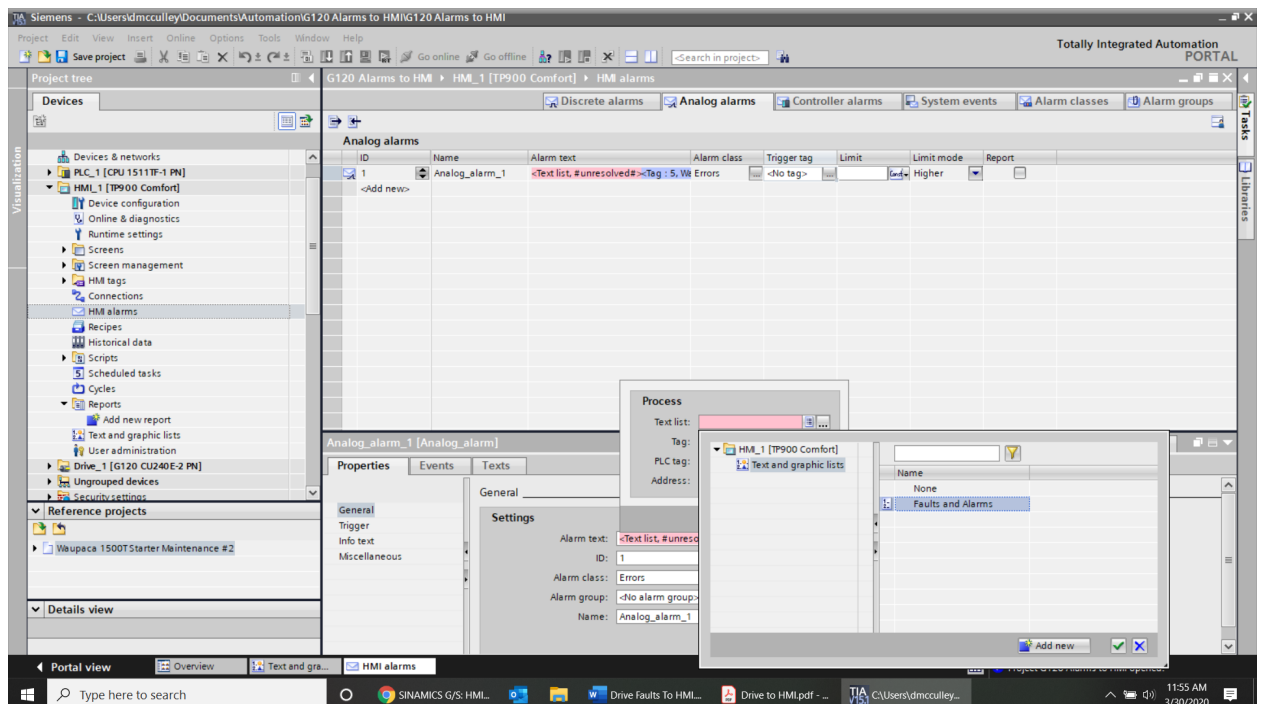
11. In the Inspector Window go to the Properties tab then General. Type in the name of the drive object that the alarm pertains to, my first one is for my control unit. You can add any text you want to display when this alarm is triggered.



12. Right click on the Alarm Text window and choose Insert text list field...



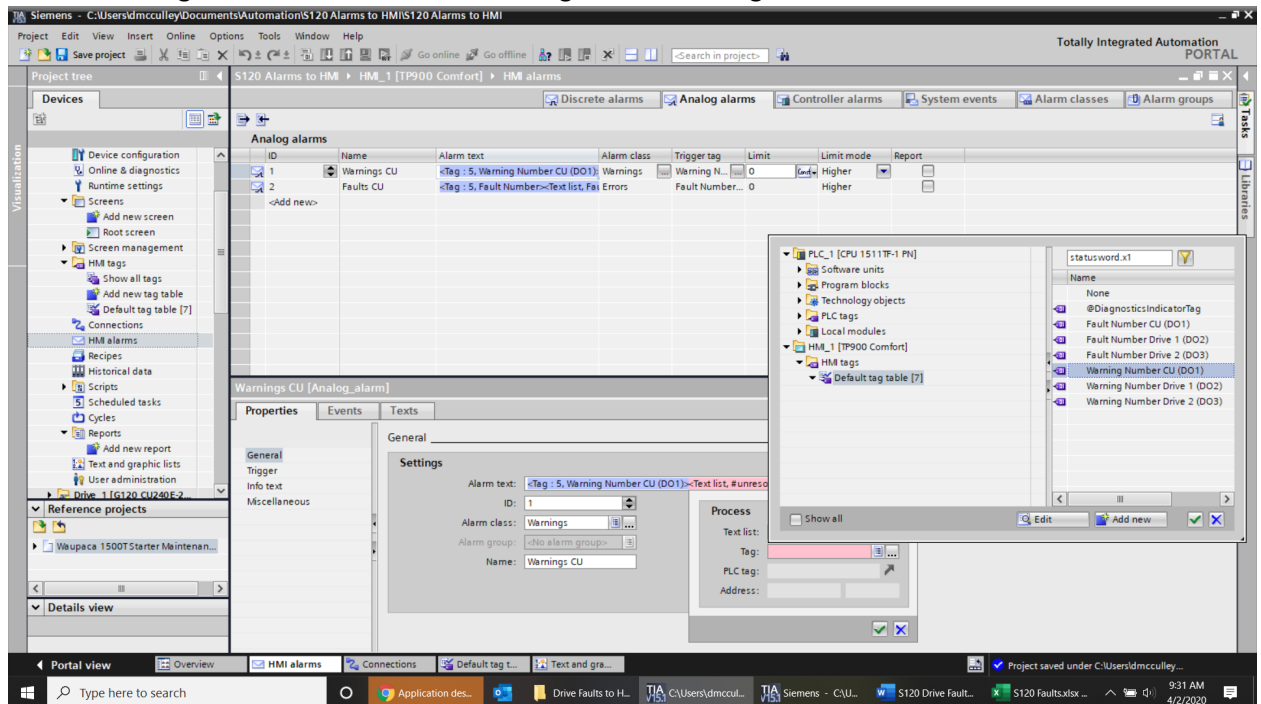
13. Click on the Text List icon and choose the Faults and Alarms text list.



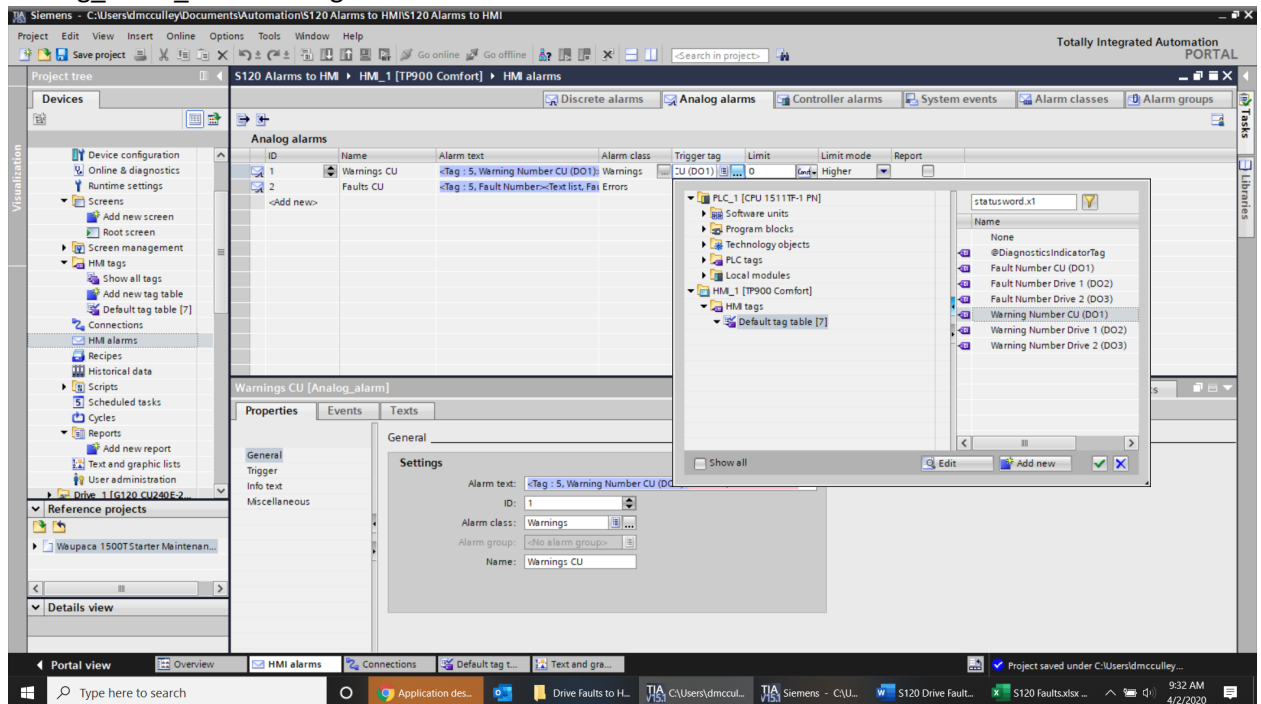
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14. Click on the tag choice and choose the Warning Number CU tag.



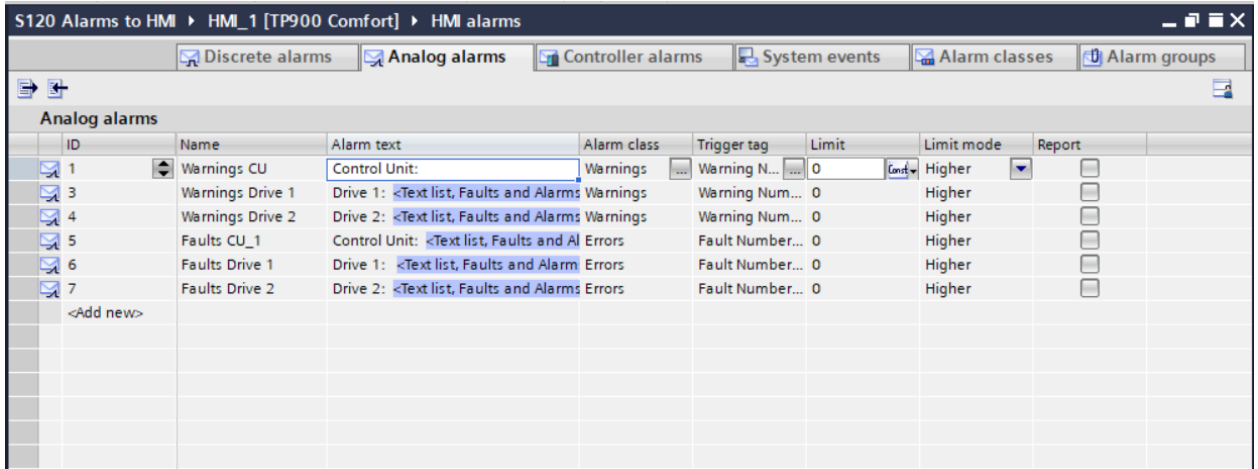
15. In the Analog Alarms tab choose the Trigger Tag as Warning Number CU. Rename the Analog_alarm_1 to Warnings CU. Set the Limit to Constant and enter a value of 0.



White Paper: Title How to Display S120 Drive Faults Directly on HMI with No PLC Programming

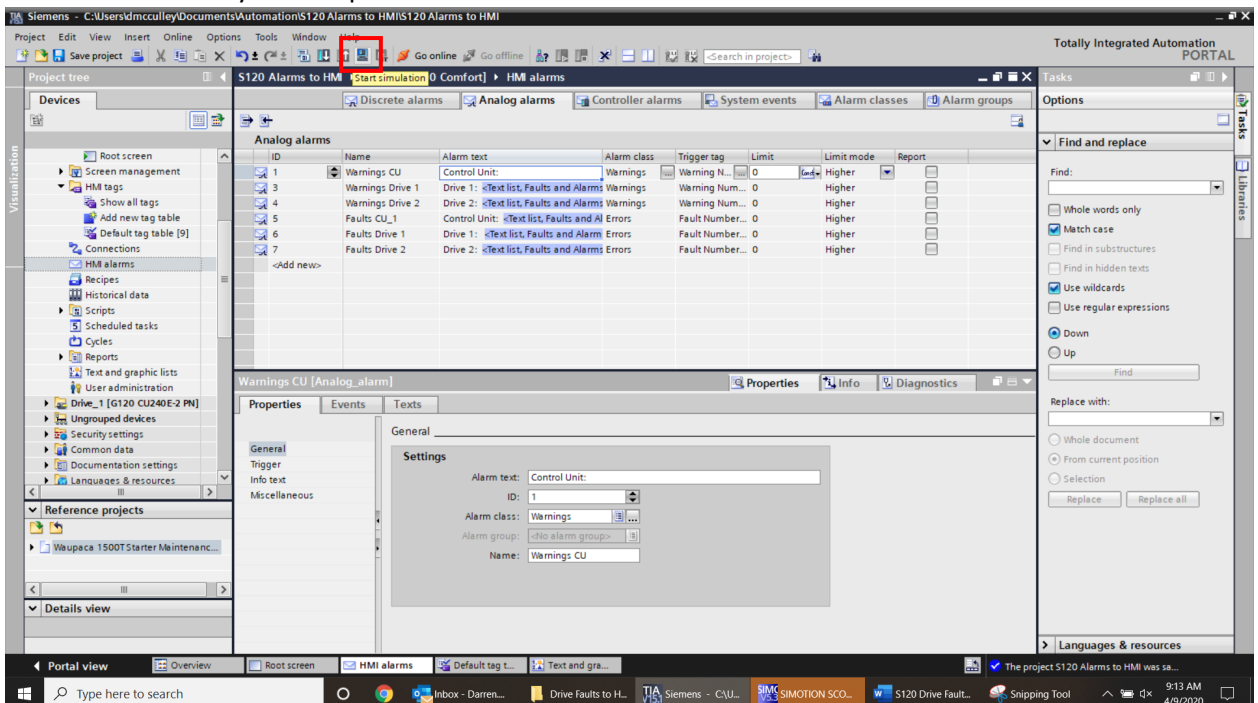
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16. Repeat the same steps for all the drive objects and make sure to add Fault information for the faults and warning information for warnings as below using the Fault Number tag instead of the Warning Number tag:



ID	Name	Alarm text	Alarm class	Trigger tag	Limit	Limit mode	Report
1	Warnings CU	Control Unit:	Warnings	Warning N...	0	Higher	<input type="checkbox"/>
3	Warnings Drive 1	Drive 1: <Text list, Faults and Alarms	Warnings	Warning Num...	0	Higher	<input type="checkbox"/>
4	Warnings Drive 2	Drive 2: <Text list, Faults and Alarms	Warnings	Warning Num...	0	Higher	<input type="checkbox"/>
5	Faults CU_1	Control Unit: <Text list, Faults and Al	Errors	Fault Number...	0	Higher	<input type="checkbox"/>
6	Faults Drive 1	Drive 1: <Text list, Faults and Alarms	Errors	Fault Number...	0	Higher	<input type="checkbox"/>
7	Faults Drive 2	Drive 2: <Text list, Faults and Alarms	Errors	Fault Number...	0	Higher	<input type="checkbox"/>
<Add new>							

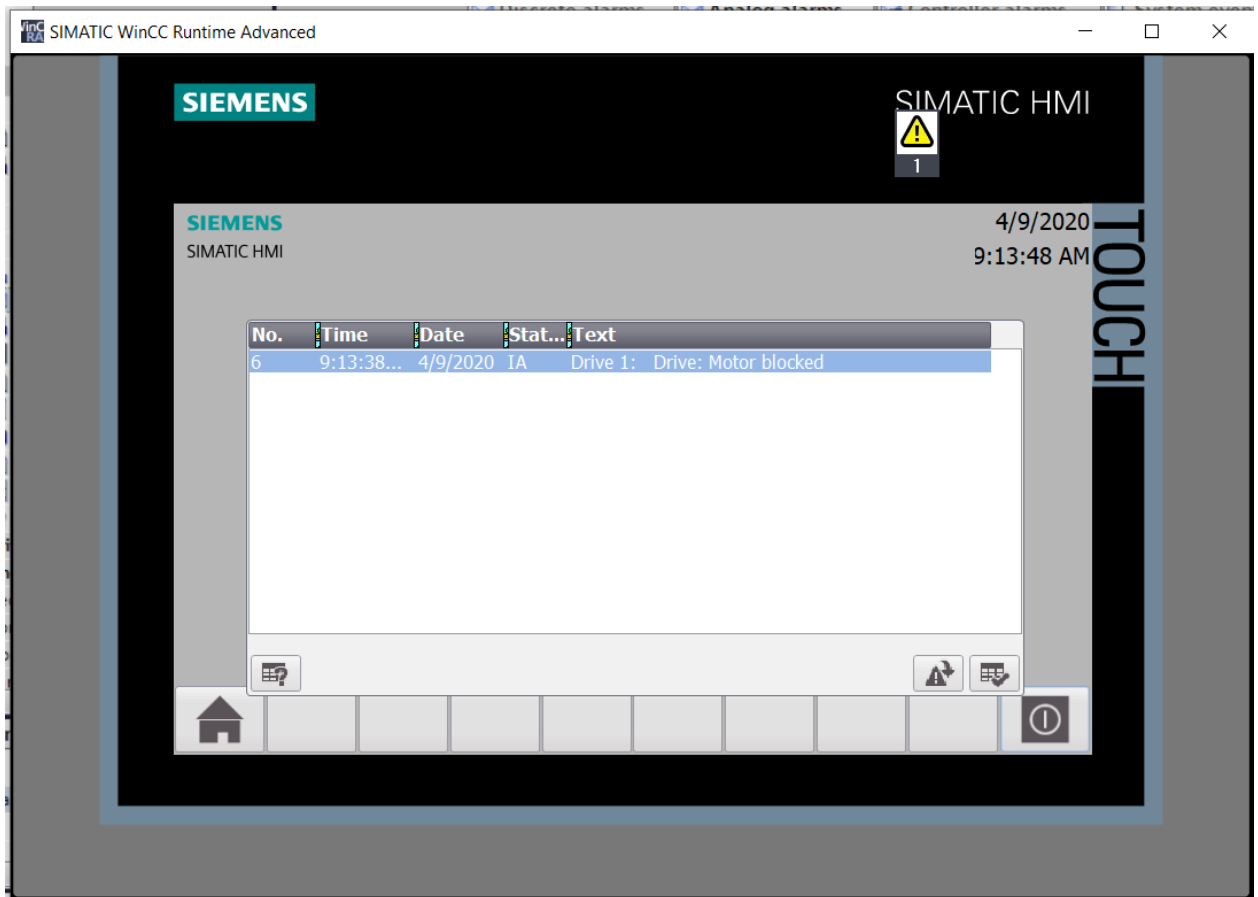
17. Save and compile your HMI. You can use HMI Simulation to test the application if you have your drive connected to your computer.



The screenshot shows the Siemens SIMATIC Manager interface. The 'S120 Alarms to HMI' project is open. The 'Analog alarms' table is displayed, and the 'Warnings CU' alarm is selected. The 'Properties' window is open, showing the 'General' tab with the following settings:

- Alarm text: Control Unit:
- ID: 1
- Alarm class: Warnings
- Alarm group: <No alarm group>
- Name: Warnings CU

18. I created a Drive Blocked fault on my drive and you can see the alarm display on my simulated HMI.



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