

Duplicating tags and code with Step7 TIA Portal

Note: for version 18+

Preliminaries:

1. Retrieve the "EricksonPLC" library from [...]Chem Process\S7 TIA\Library\EricksonPLC.zal18 file by
 - a. Open the Global Library pane
 - b. Right-click in the blank area below the installed libraries
 - c. Select "Retrieve Library"
 - d. Select files of type: "Compressed libraries"
 - e. Browse to the "EricksonPLC.zal18" file and click on "Open."
 - f. The destination directory should be the place where the other libraries are stored.
The Step7 default is C:\Users\[username]\Documents\Automation\

This library contains the following FB's:

Motor_Std
Motor_Conv
Valve_Disc
Gate_Slide
Gate_Flop

The following user-defined data types are also contained in this library:

Unit_Type	Unit global data
Seq_Type	Step sequence data
PIDData_Type	Sequence interaction with PID loop
Motor_Std_Type	Motor device data
Motor_Conv_Type	Conveyor motor device data
Valve_Disc_Type	Discrete valve device data
Gate_Slide_Type	Slide gate device data
Gate_Flop_Type	Flop gate device data

2. Unarchive the "Samp_Seq.zap18" program from [...]S7 TIA\Progs S7-1500\ folder. The destination directory should be the place where your other programs are stored.
3. Set up the memory map for the devices (pumps, conveyors, valves, etc.) and the information to be communicated with the HMI. See the "SodaAsh Memory and IO Layout S7.xls" file for an example. Make a file like "SodaAsh Memory and IO Layout S7.xls" to organize the layout.

Steps:

1. Set up xlsx files to define the tags and descriptions for the locations in your internal IO Layout.xls file. Use "Soda_Ash.xlsx" and/or "Samp_Seq_PLCTags.xlsx" as examples. There are also sample separate xlsx's for devices (C6100, G6000, G6200, L6100, XV1001, FIC1000). The files whose names end in "_Sim" define simulated I/O tags.
2. Open the Samp_Seq project and save it as another name
3. Change the "Unit1" program group to the name of the unit
4. Change "Unit1" in the names of the FB100 to FB124 blocks to the name of the unit.

5. Change "Unit1" in the names of the DB100 to DB106 blocks to the name of the unit.
The "Unit1" unit in the Samp_Seq project contains the following sequences:

- Sample (40-steps)
- Hold
- Shutdown (20 steps)
- E-Shutdown (10 steps)

The auto-starts are cross-linked. Every unit has at least 4 sequences.

6. In DB102, Change the name of the first sequence, "Sample" to the name of the first sequence for the unit. Add any other sequence names after the first one. All sequences will have "Hold", "Shutdown", and "EShutdown" sequences.

If the unit has more sequences:

- Copy/paste the first sequence. Change its FB number to be between 102 and 111 and its name to match the name in the code guidelines.
- In the FB for the new sequence, do a search/replace of the tags for the sequence tags. For example, if the name of the unit is "Unit1" and the name of new sequence is "Package" and the name of the first sequence is "Sample", the search text is ["Unit1S".Sample.] and the replace text is ["Unit1S".Package.]. The text to place in the Find and Replace window is within the square brackets.
- On the first network of each sequence, check and modify the following as appropriate:
 - Normally-closed contacts in series.
 - Move of zero to the .Step_Num of other sequences in group.
 - Constant offset for ADD that generates message number for unit.
- On the second network of each sequence, add the NC contact referring to the Auto_Start of the new sequence.

Add a "call" to the new sequence function block to the "Unit_000Main" FB.

7. Add device tags to the Unit G, M, P, and V data blocks for the unit.
8. Add device control FB's to the _Gates, _Motors, _PIDLoops, and _Valves function blocks for the unit.
9. Program the sequences for the unit.
10. You will need to add your own networks for the abnormal conditions, modify the network that handle maintenance mode, and un-disable and fix appropriate auto-starts.
11. If communicating with other processors, program the Comms (FB30) as appropriate. Define xxx_Export_Data and xxx_Import_Data data blocks as needed.
12. Check that all data blocks referenced by HMIs, especially non-Siemens HMIs, must have "Optimized block access" disabled.
13. Fix OB1 as necessary for calls to the unit "xxx_000Main" function blocks.
14. Save your project.

Duplicate Blocks for Second Unit

The following directions assume the name of the first unit is "Unit1" and the name of the second unit is "Unit2".

Duplicate program group “Unit1” and name it as a new group, “Unit2”:

Right-click on the program group “Unit1”

Select **Copy**

Right-click on the “Program Blocks” in the project tree.

Select **Paste**

A new group named “Unit1_1” is created, located beneath “Unit1”

Rename this group as “Unit2”

Rename the FB’s and DB’s in this group, replacing the “Unit1” in the names with “Unit2” and removing the “_1”.

Change the FB and DB block numbers by adding 100 to the number. For example, FB100 now becomes FB200. Right-click on the block and select **Properties** and **General**.

The DB references in the Unit2_000Main function block may be red. Do not panic.

Compile the software changes. The red should change to black.