



PARKER P33 SAFETY EXHAUST VALVE WITH SIEMENS FAIL SAFE PLC SYSTEM ET200 PRO (S7300)

QUICK START GUIDE

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PREFACE

This Quick Start Guide (QSG) is designed to help integrate Parker Hannifin's P33 safety exhaust valve into a safe-operating environment using Siemens fail safe PLC system ET200 Pro (S7300F).

Please be aware, that P33 are available with different pin assignments of solenoid and sensor connectors. For a convenient connection to the PLC' I/O module (6ES7 148-4FC00-0AB0) , only type **P33xxxxCCxx** is suitable to use because pin assignment fits 1:1.

With all other versions, pin assignment doesn't fit 1:1 and so, connection cables need to be adopted.

Due to wiring refer also to chapter 1.

The QSG assumes that you have already set up the ET200 Pro system with fail safe CPU and fail safe I/O module and that you are familiar with Siemens TIA-Portal. This version describes integration into **TIA-Portal V14 SP1 update 9**.

The guide will walk the user through integrating the **P33xxxxCCxx** into TIA-Portal (V14 SP1 update 9) and where to obtain necessary files.

You can download resources such as this QSG, a TIA function block (Library), a sample for TIA portal and an e-drawing:

QSG: "P33_S7300F_TIA_V14_R0_QSG.pdf"

TIA library: "P33_S7300F_TIA_V14_R0_Lib"

TIA project: "P33_S7300F_TIA_V14_ExampleCode_R0.zap14"

e-drawing: "P33_S7300F_TIA_ePLAN.pdf"

and the full P33 manual here:

https://ph.parker.com/de/de/safety-exhaust-valve-p33-series-pneumatic-division-europe/p33tb96cbeg-p33tb96cbeg/#product_support

1. WIRING / E-DRAWING

Make sure your system is connected as shown in e-drawing “P33_S7300F_TIA_ePLAN”.

All descriptions in this guide and the TIA-Portal sample project base on the wiring of this drawing.

You can use a different configuration of ports. But then you have to adjust the settings of this guide in an appropriate manner, off course.

2. ET200 PRO – SYSTEM PARTS

In this guide, the ET200 Pro system contains the following parts:

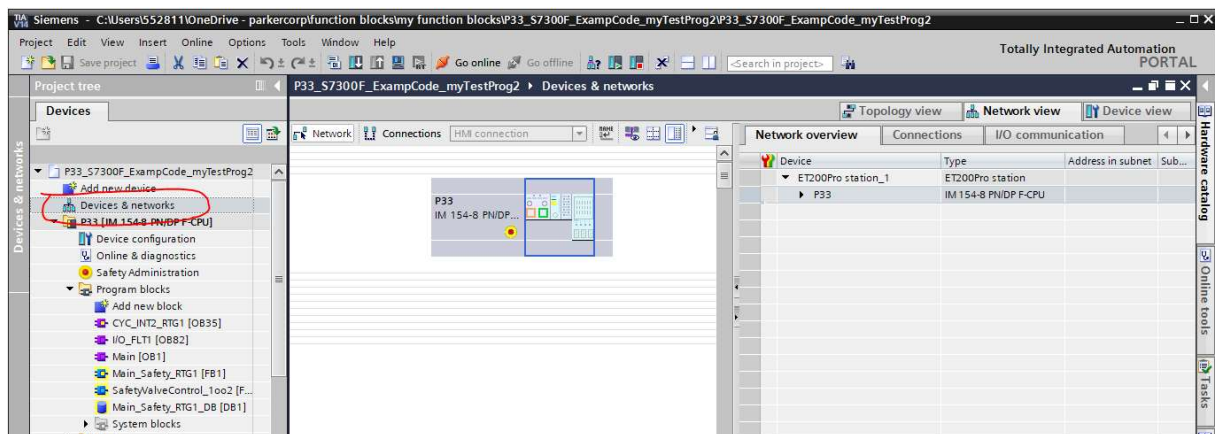
- 1 x CPU: 6ES7 154-8FB01-0AB0
- 1 x IO-Link Master module: 6ES7 147-4JD00-0AB0 (not used in this application)
- 1 x Fail safe digital I/O module: 6ES7 148-4FC00-0AB0

3. F-PARAMETER IN S7-ET200 PRO

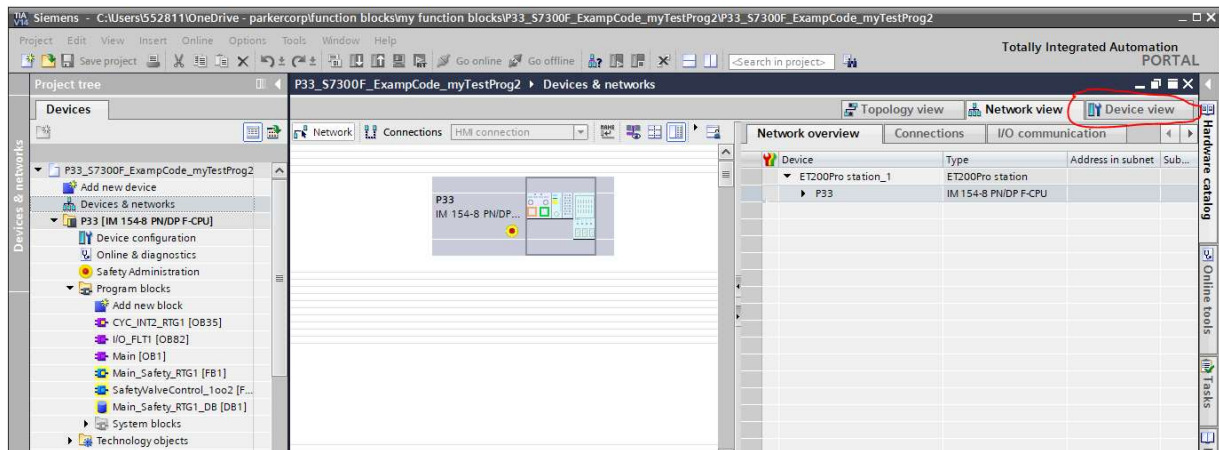
3.1 F-Address in ET200 Pro 4/8 F-DI/4 F-DO module

The F-Address needs to be set with the hardware DIP switches at the backside of the module. The value you find in TIA-Portal:

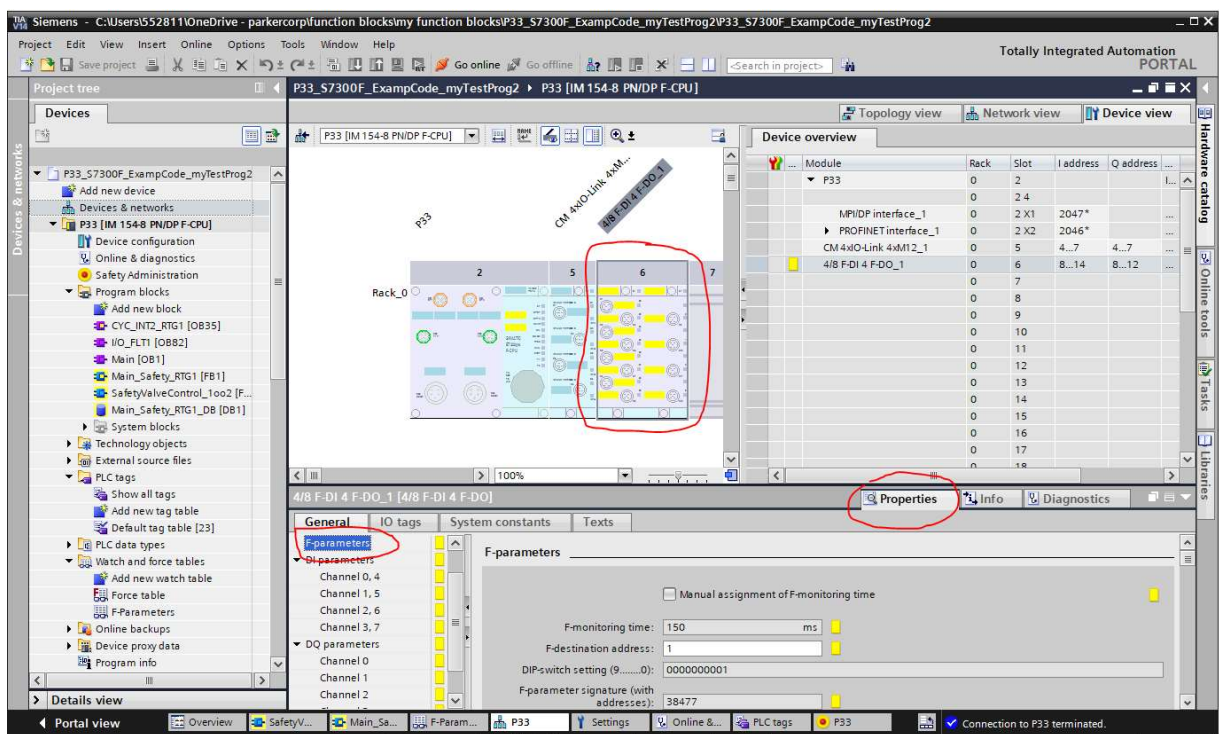
Double click on “Devices & networks” in the Project tree:



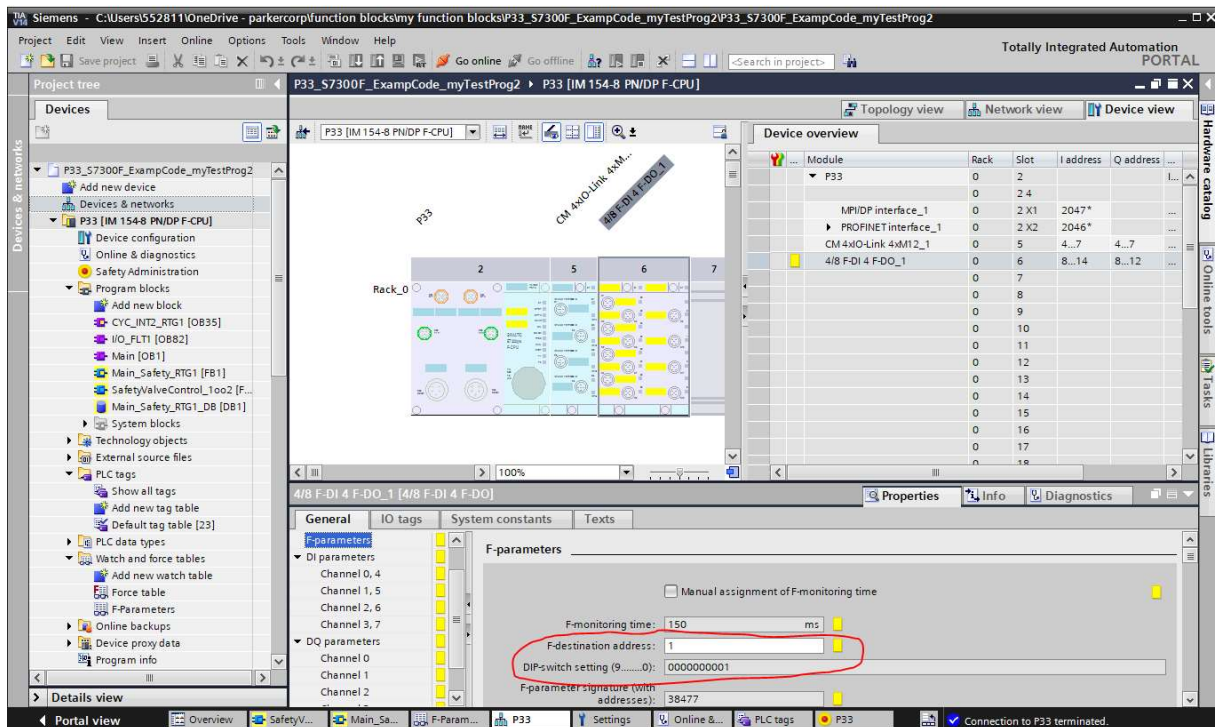
Click on the PLC Graphic (mark) and then click on “Device view”:



Mark the 4/8 F-DI/4 F-DO (device "6") click on "Properties" and mark "F-Parameters" in tab "General":



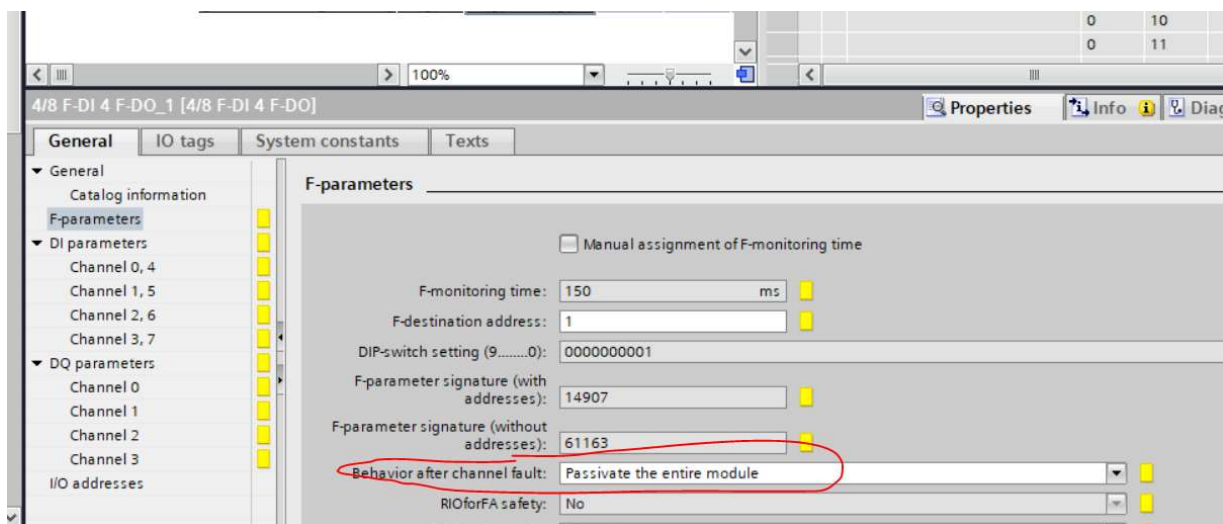
Here you find the F-Address of the 4/8 F-DI/4 F-DO module:



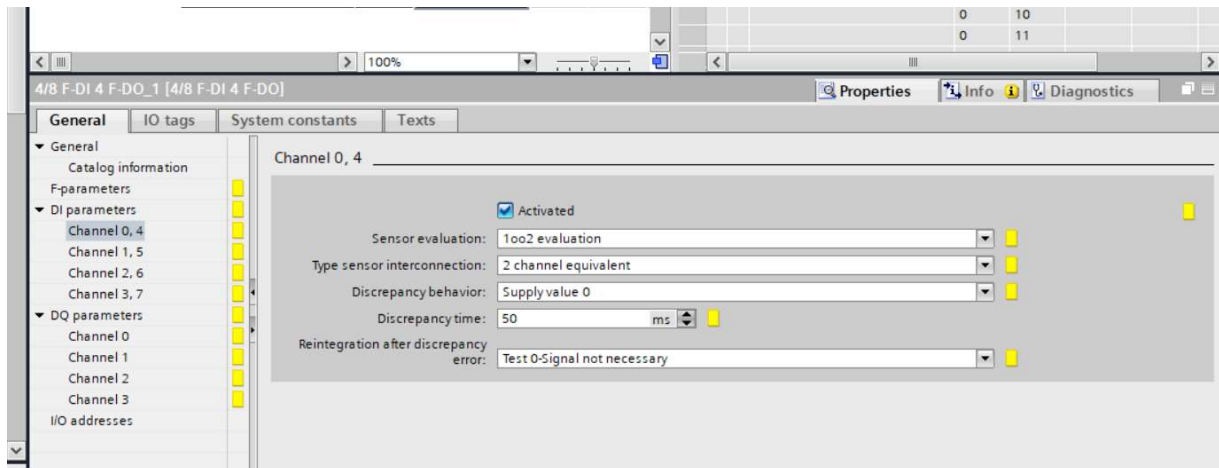
This address you have to set at the module with the DIP switches. Refer also to Siemens manuals.

3.2 F-Parameters of the 4/8 F-DI/4 F-DO module

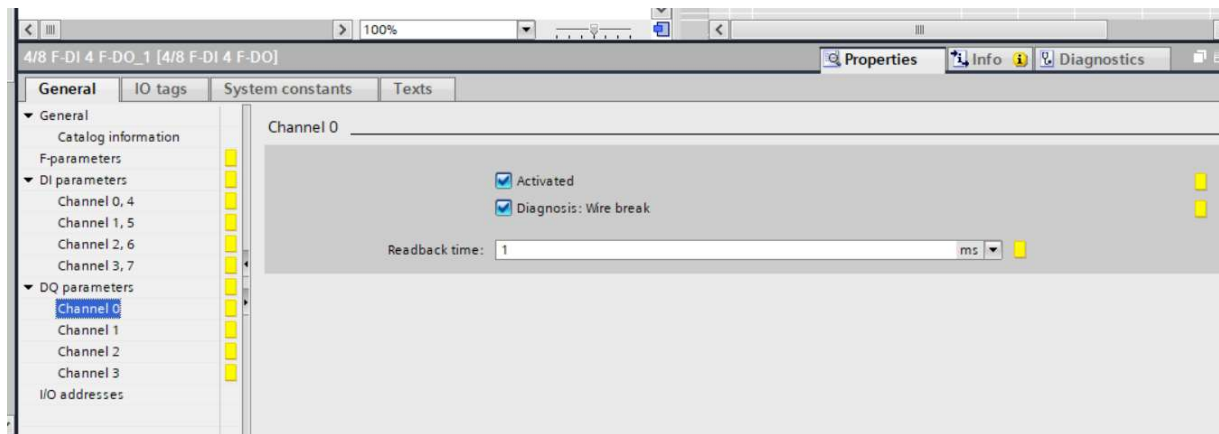
Click on “F-Parameters” and set “Behavior after channel fault” to “Passivate the entire module”:



Click on “DI parameters” → “Channel 0,4” and do the setting in your program:



Click on “DQ parameters” → “Channel 0” and do the setting in your program:

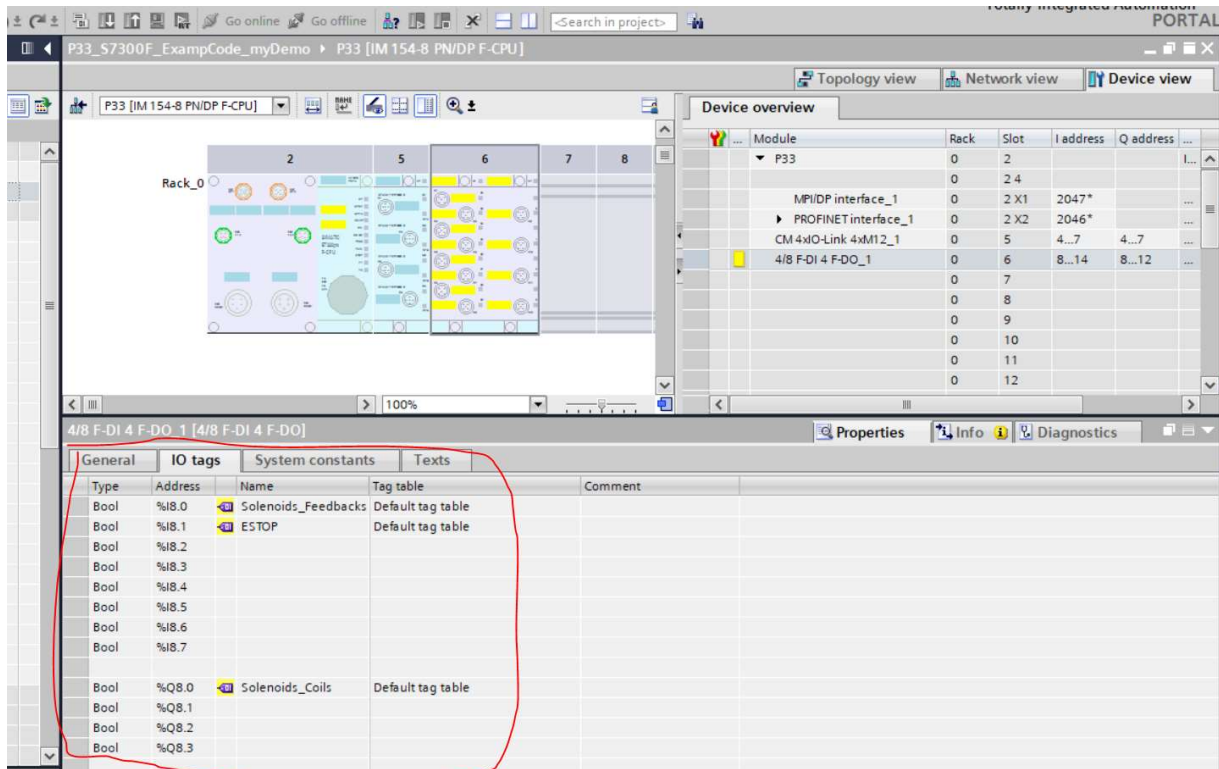


4. PROGRAM CODE

4.1 Create Tags

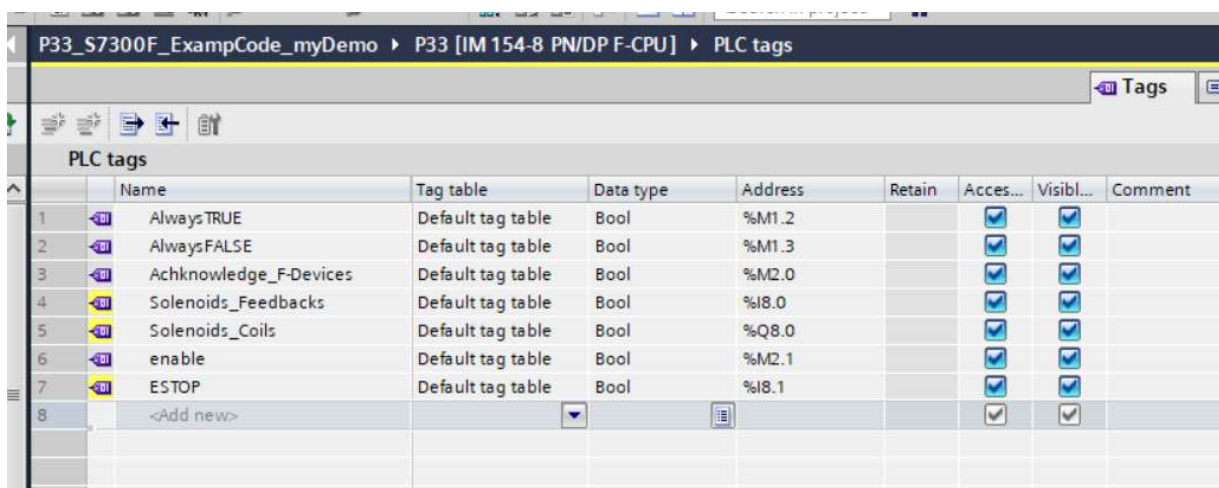
Safe digital in- and outputs:

Navigate to the “Device view” of the ET200 Pro 4/8 F-DI/4 F-DO module → “Properties” → I/O tags:



| Type | Address | Name | Tag table | Comment |
|------|---------|---------------------|-------------------|---------|
| Bool | %I8.0 | Solenoids_Feedbacks | Default tag table | |
| Bool | %I8.1 | ESTOP | Default tag table | |
| Bool | %I8.2 | | | |
| Bool | %I8.3 | | | |
| Bool | %I8.4 | | | |
| Bool | %I8.5 | | | |
| Bool | %I8.6 | | | |
| Bool | %I8.7 | | | |
| Bool | %Q8.0 | Solenoids_Coils | Default tag table | |
| Bool | %Q8.1 | | | |
| Bool | %Q8.2 | | | |
| Bool | %Q8.3 | | | |

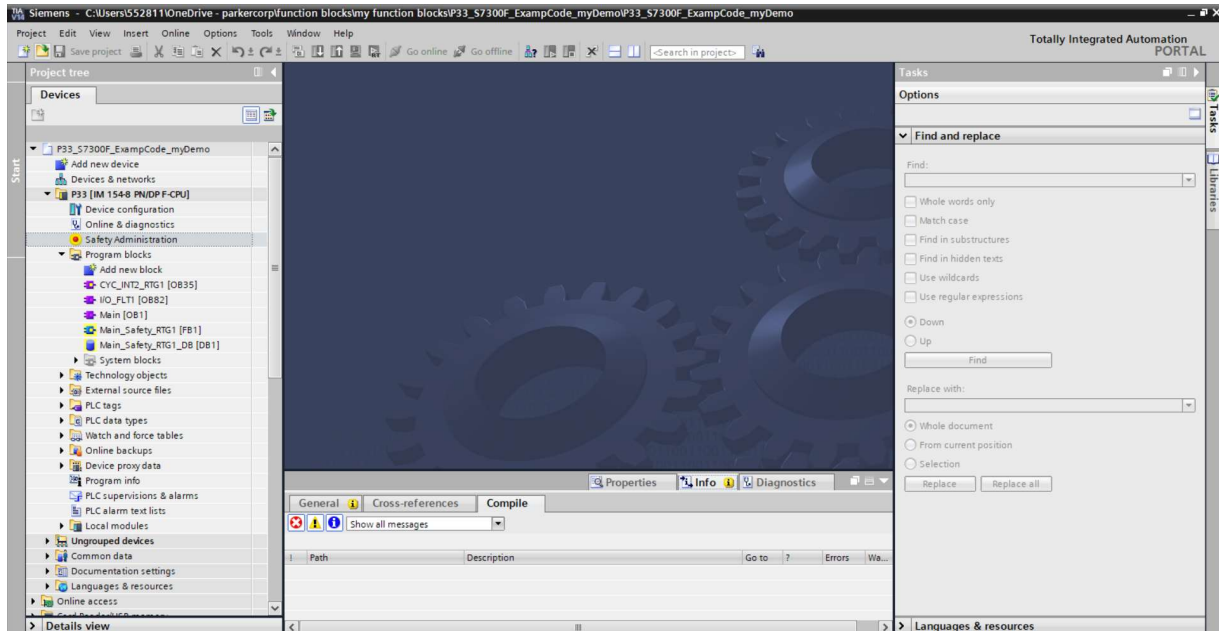
Create the 3 displayed tags due to your addressing for safe in and outputs. Create additional tags as shown in the screen:



| | Name | Tag table | Data type | Address | Retain | Access | Visible | Comment |
|---|-----------------------|-------------------|-----------|---------|--------|-------------------------------------|-------------------------------------|---------|
| 1 | Always TRUE | Default tag table | Bool | %M1.2 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 2 | Always FALSE | Default tag table | Bool | %M1.3 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3 | Acknowledge_F-Devices | Default tag table | Bool | %M2.0 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 4 | Solenoids_Feedbacks | Default tag table | Bool | %I8.0 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 5 | Solenoids_Coils | Default tag table | Bool | %Q8.0 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 6 | enable | Default tag table | Bool | %M2.1 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 7 | ESTOP | Default tag table | Bool | %I8.1 | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 8 | <Add new> | | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |

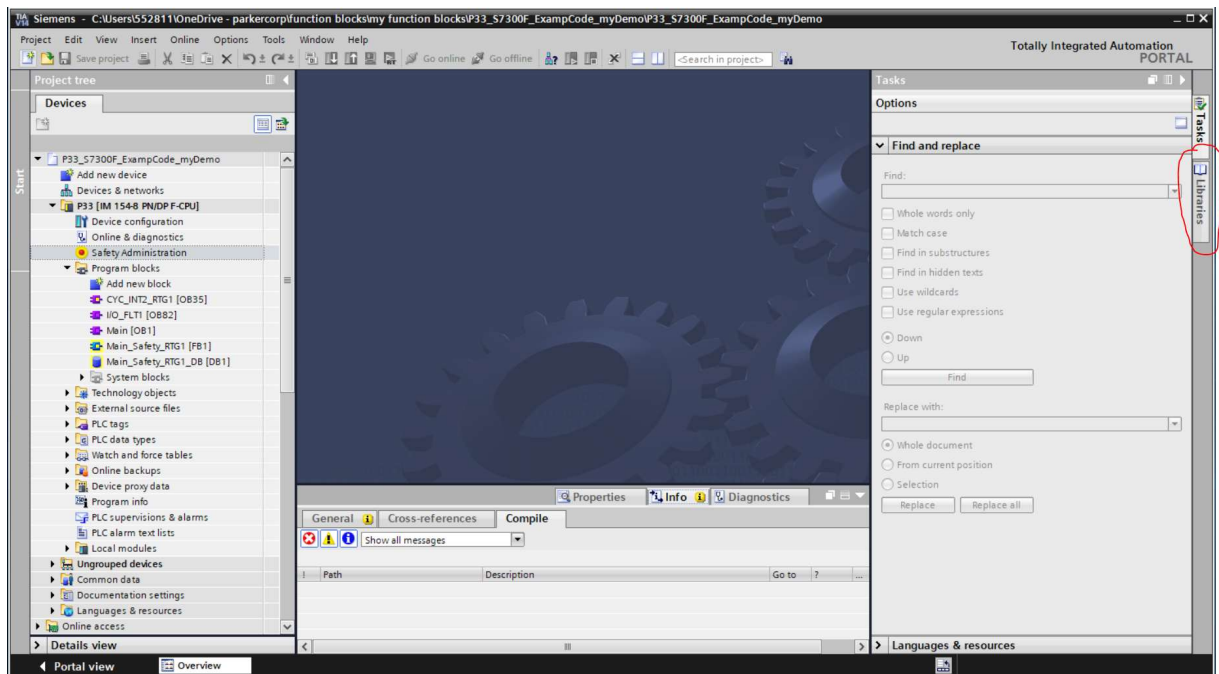
4.2 P33 safety control function block from library

This QSG starts now from standard settings after F-runtime group was installed:



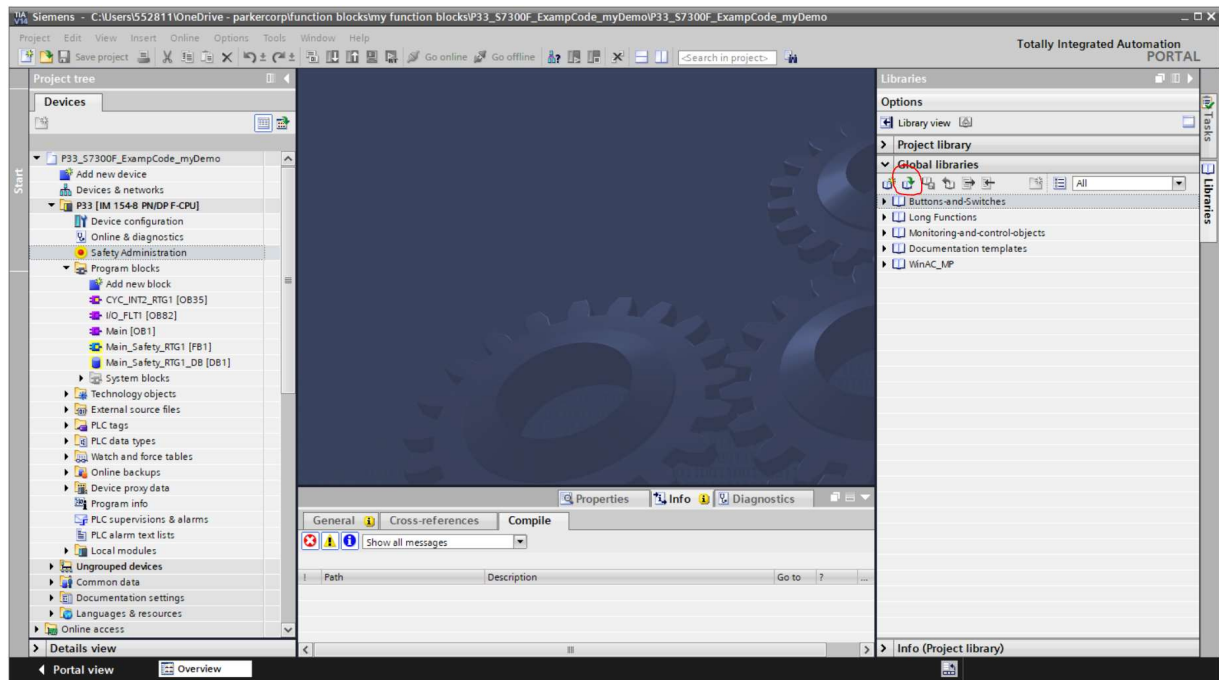
Install the P33 control function block now:

Click on the tab “libraries” at the right side of the screen:



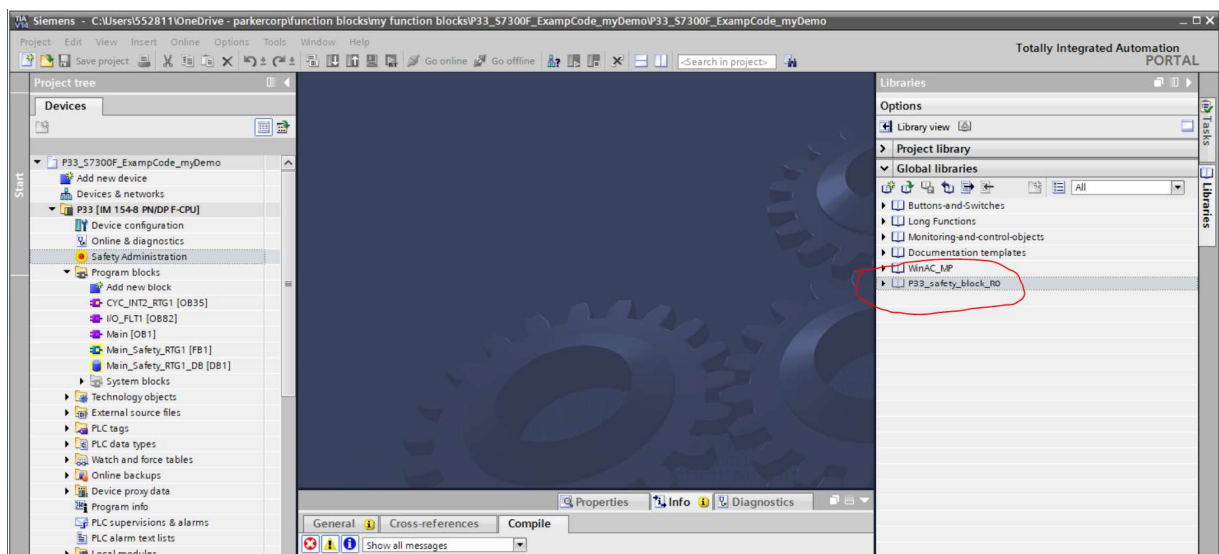
Confirm the pop-up message with “ok”.

In the tab “Global Libraries” click the “import”-button:

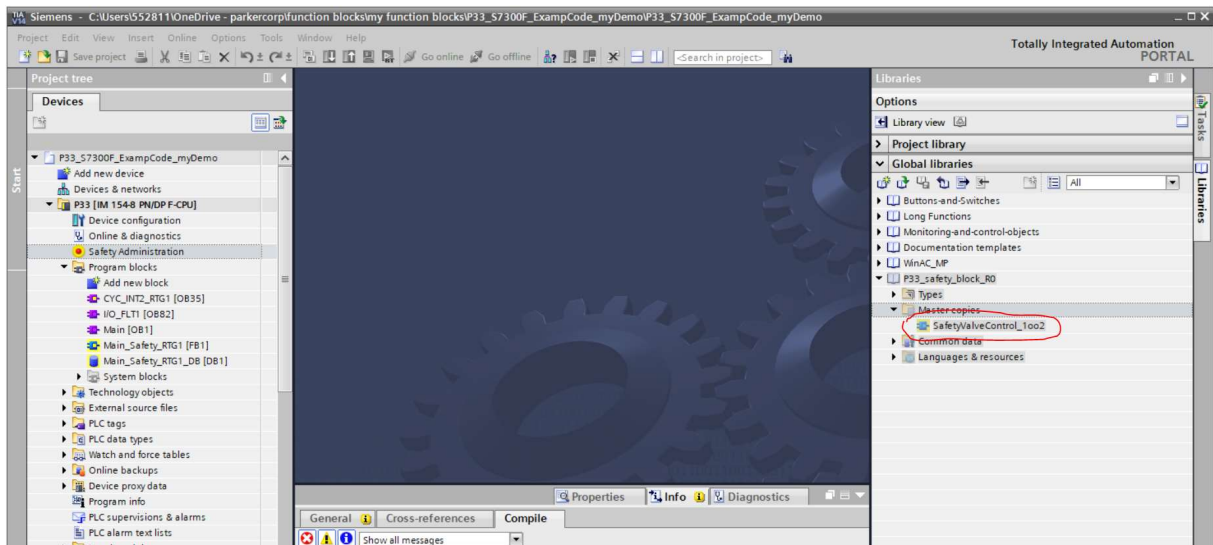


Navigate to the file “P33_safety_block_RO.al”, select it and click “open”:

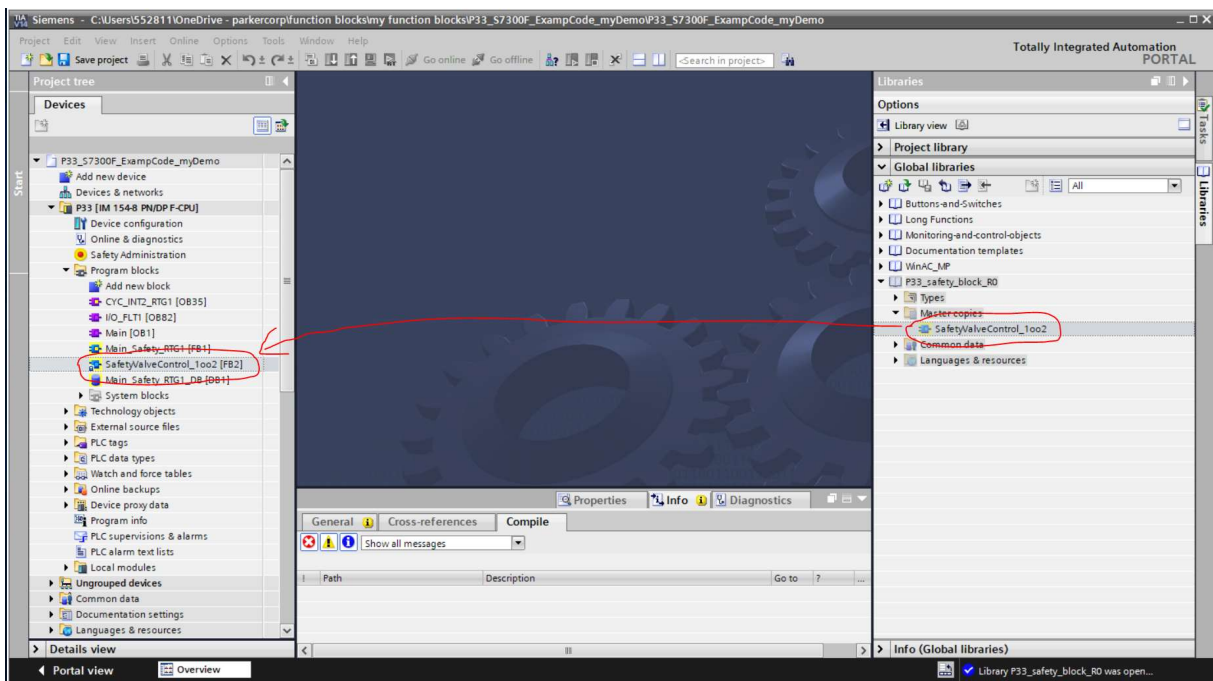
The library folder should appear in the folder “Global libraries”:



Open the library folder and then open folder “Master copies”. You should see now the function block “SafetyValveControl_1002”.



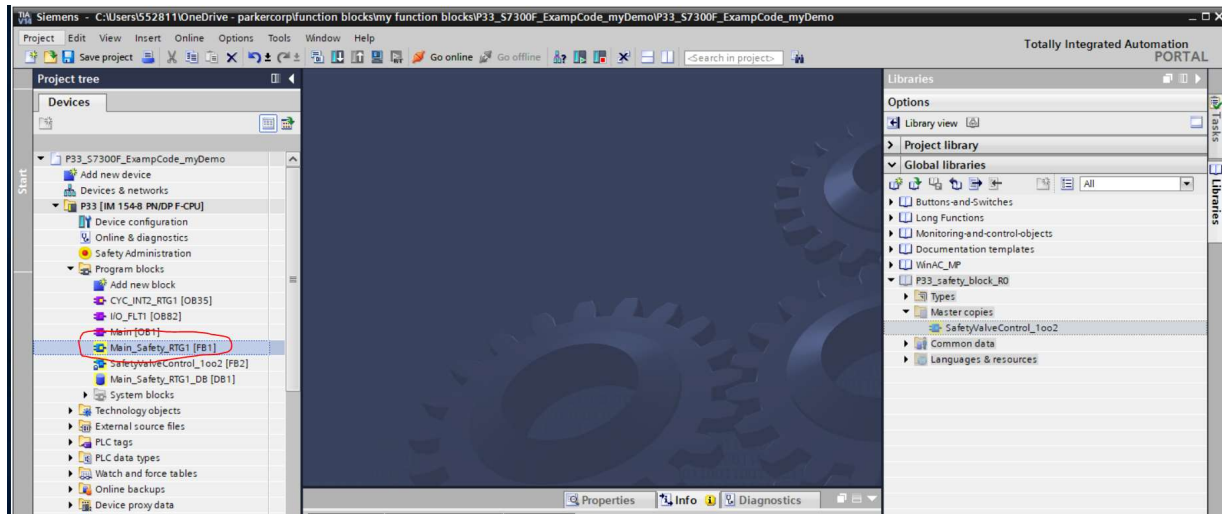
Move this FB via drag & drop into the folder “program blocks”:



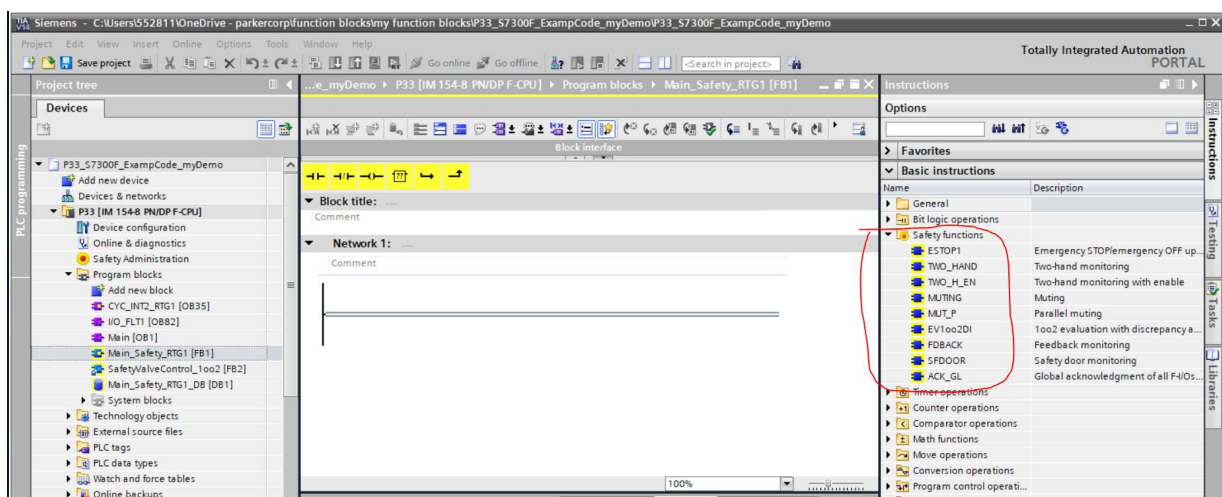
4.3 Program code for function “Main Safety RTG1 [FB1]”

Insert some code now in the Safety Main function block.

Double click on the function to open it:

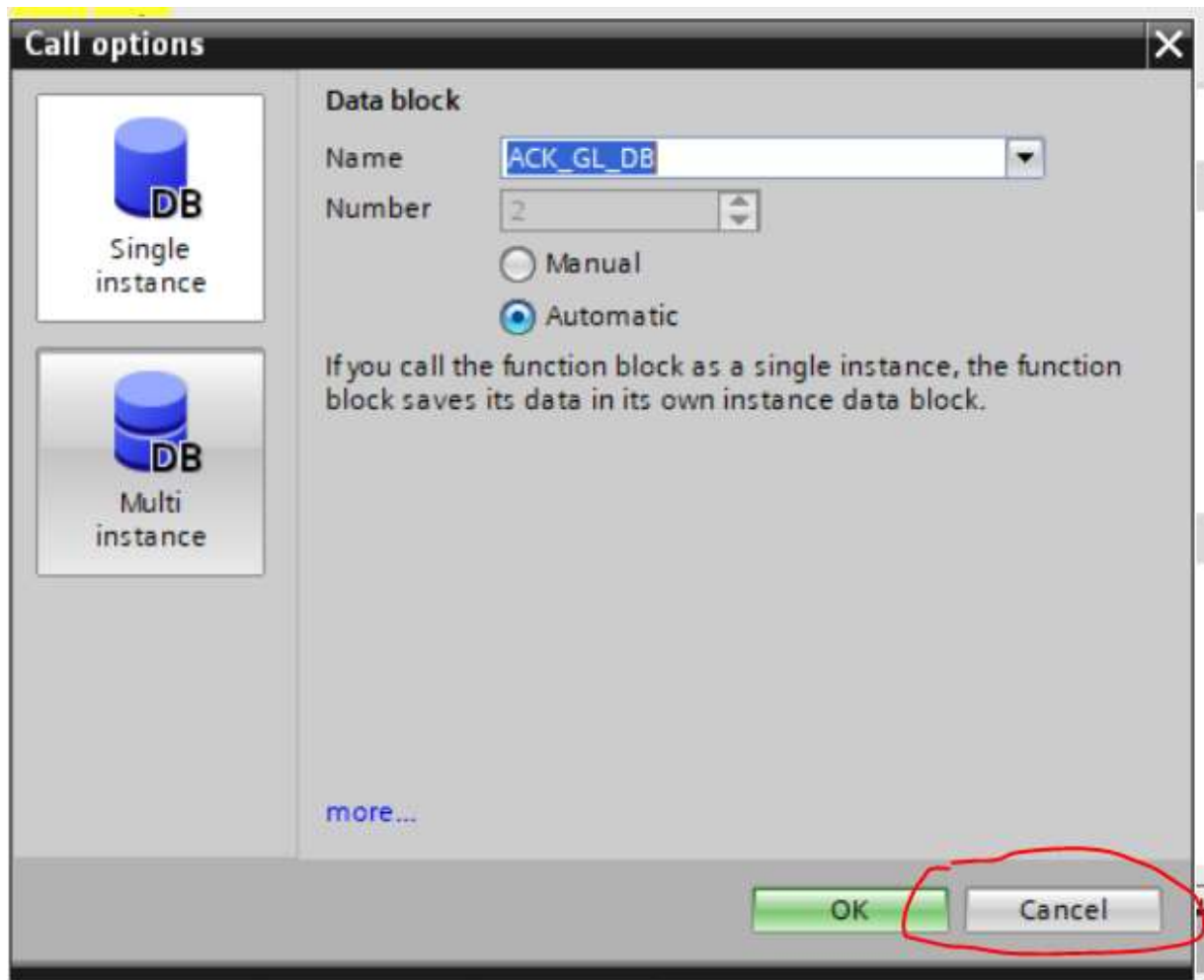


On the right side you can see the instruction catalog now. Open the folder “Safety functions”:

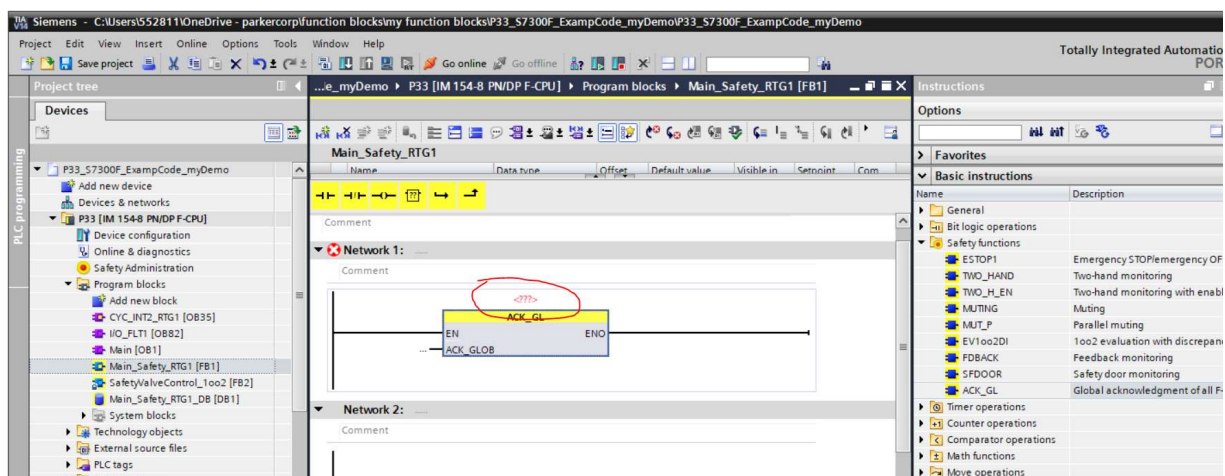


Insert function “ACK_GL” in the first network by drag & drop. →

NOTE: A window appears and ask you to create an instance data block. → Click “cancel” in first step because we will create a **local** instance data block in next step.



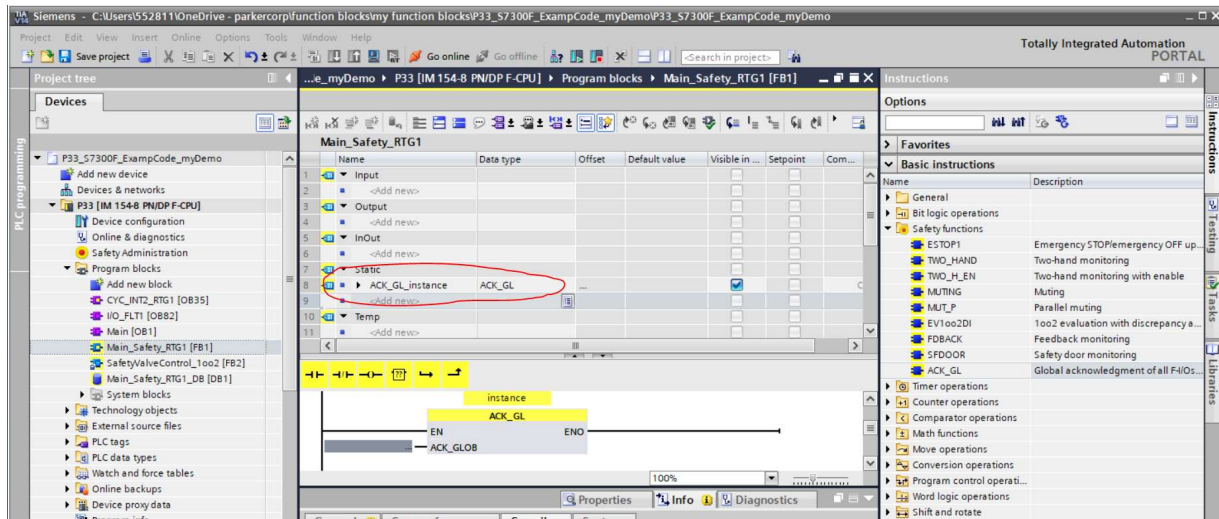
Your screen should look like this now:



Do a double Click on the 3 question marks and insert "#ACK_GL_instance" (don't forget the #), otherwise you'll get a global data block (you can also work with global ones).

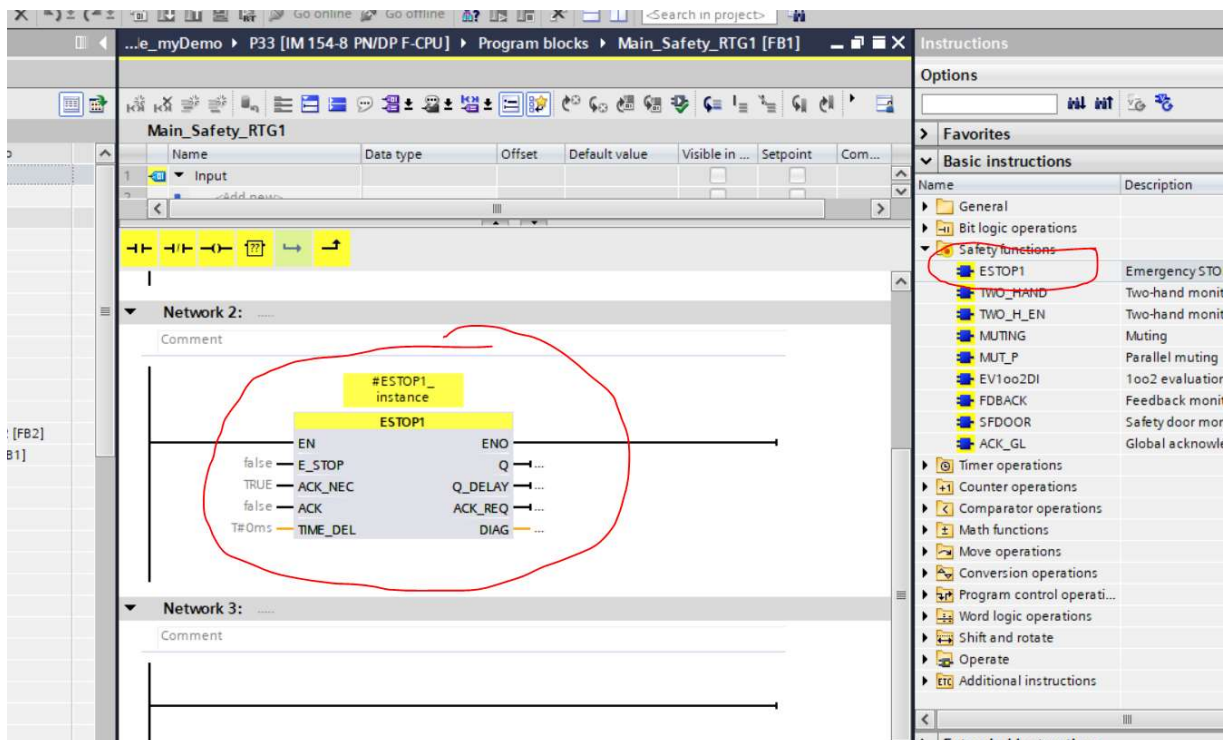
Confirm next window with “ok”.

For cross check open the area for local tags above the middle screen: You should see the local instance data block:



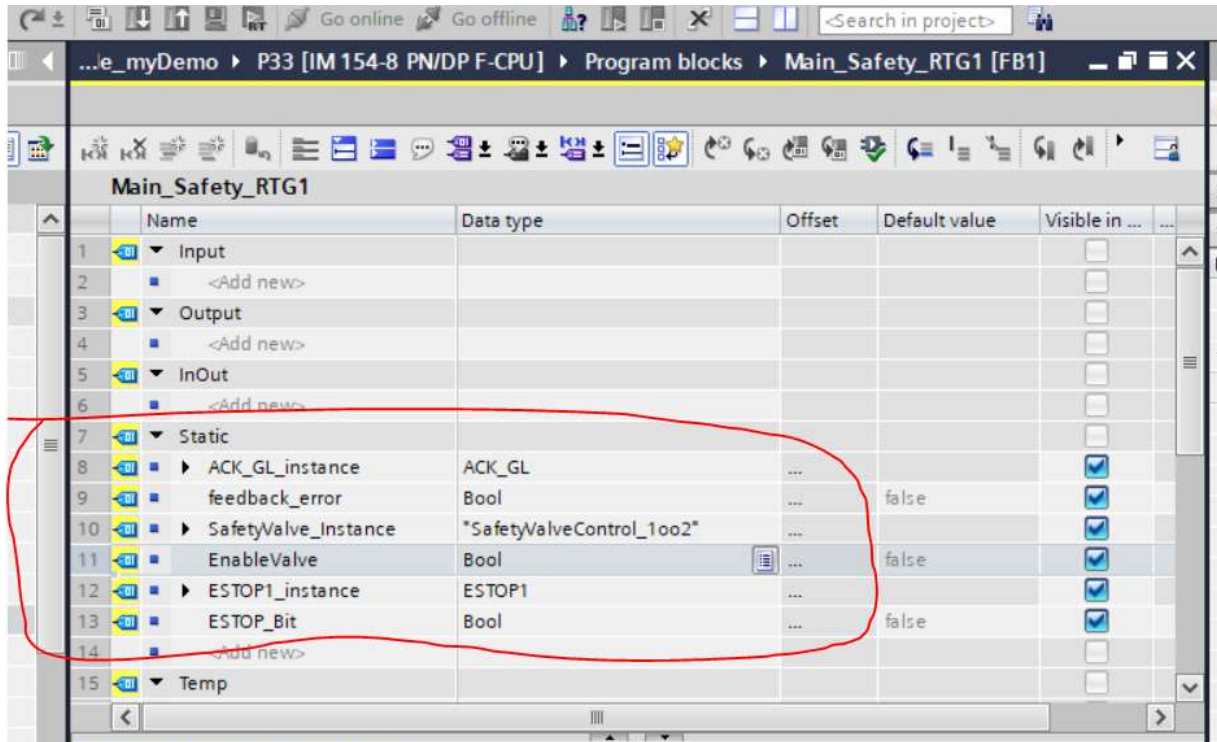
Hide the local tag area.

In the same way, add function “ESTOP1” in network 2 with local instance data block “#ESTOP1_instance”

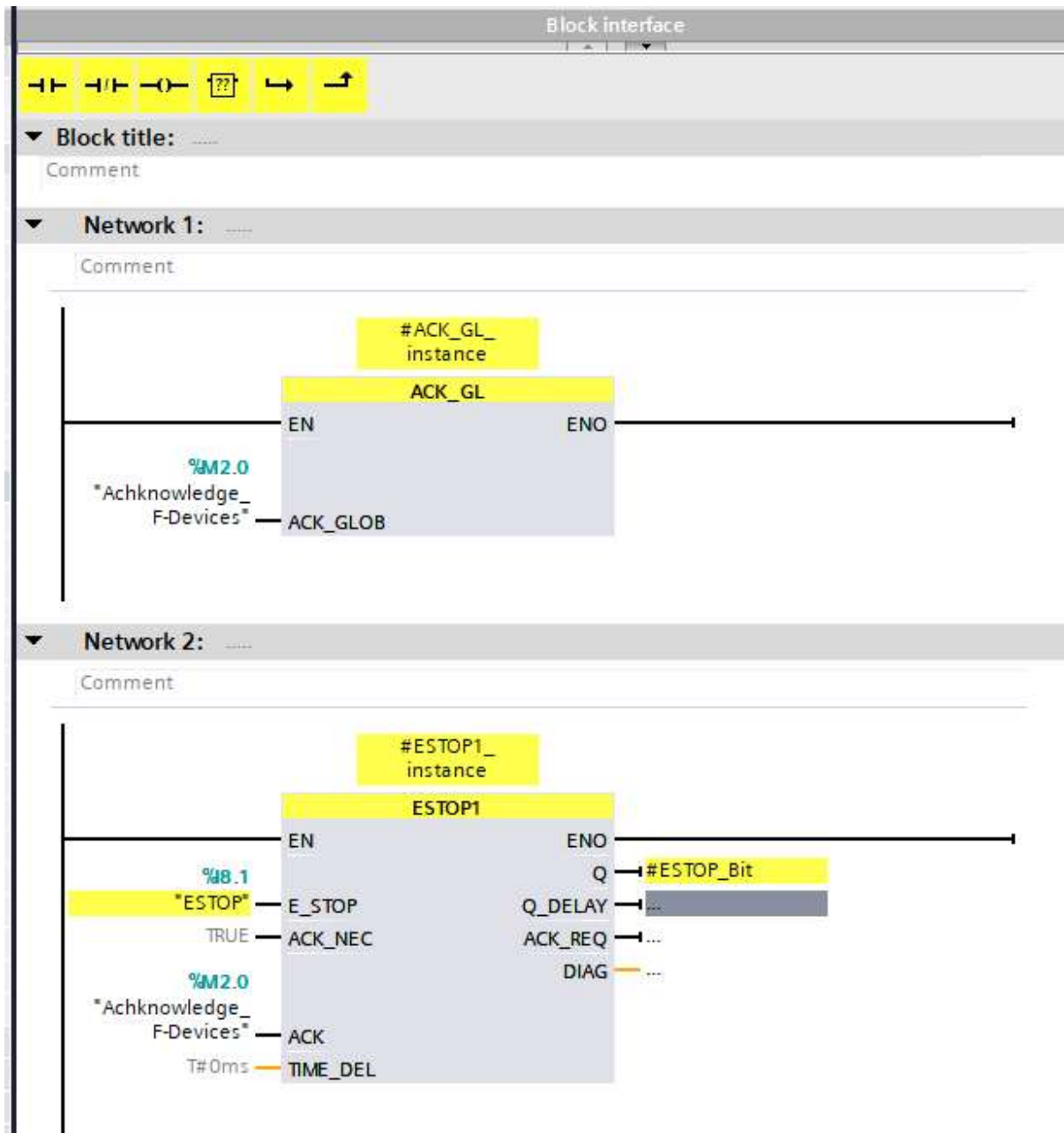


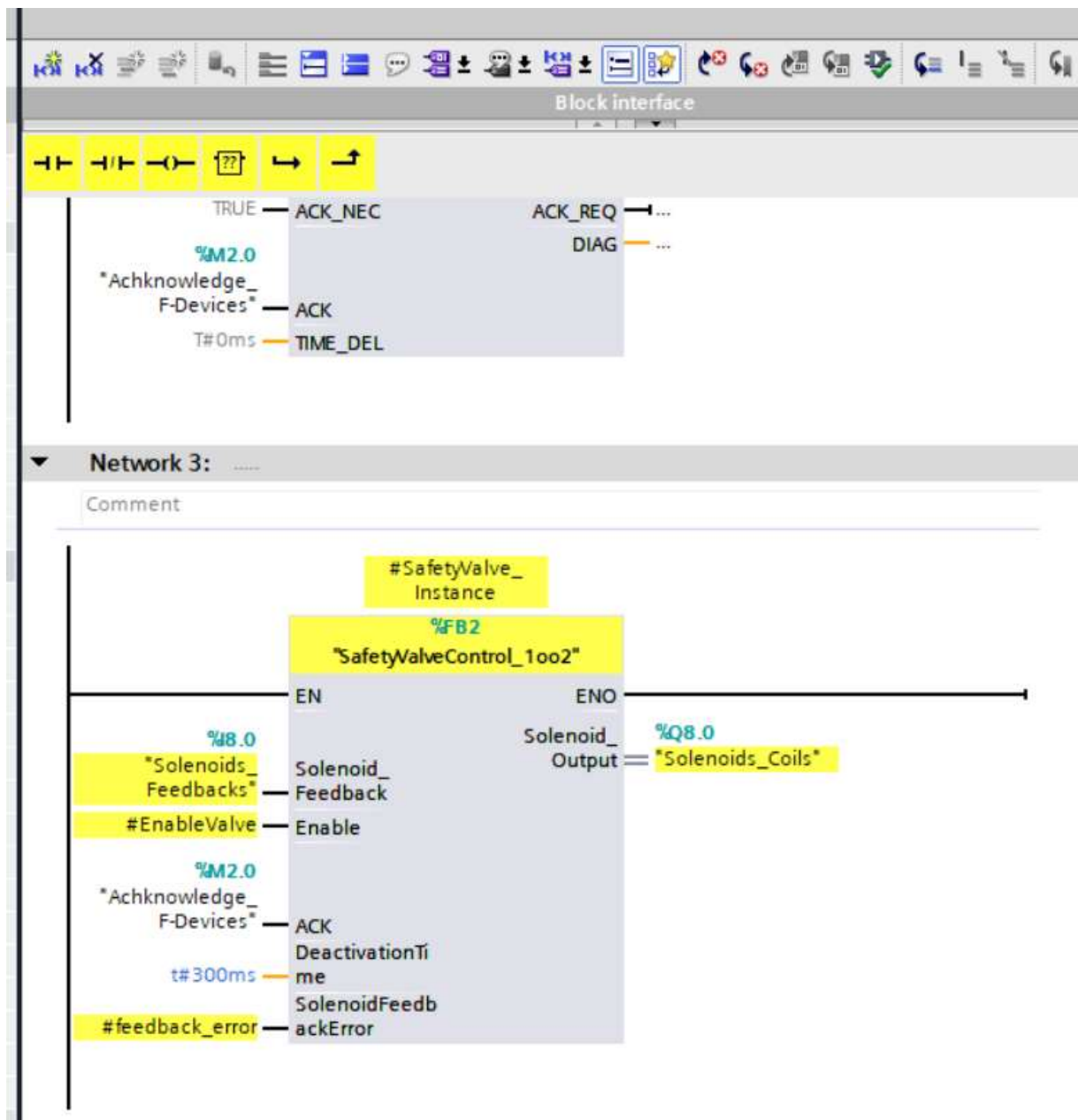
In the same way, add function “SafetyValveControl_1oo2” in network 3 with local instance data block “#SafetyValve_Instance”

Now, complete the local tags of “Main_Safety_RTG1 [FB1]” by the template screen:

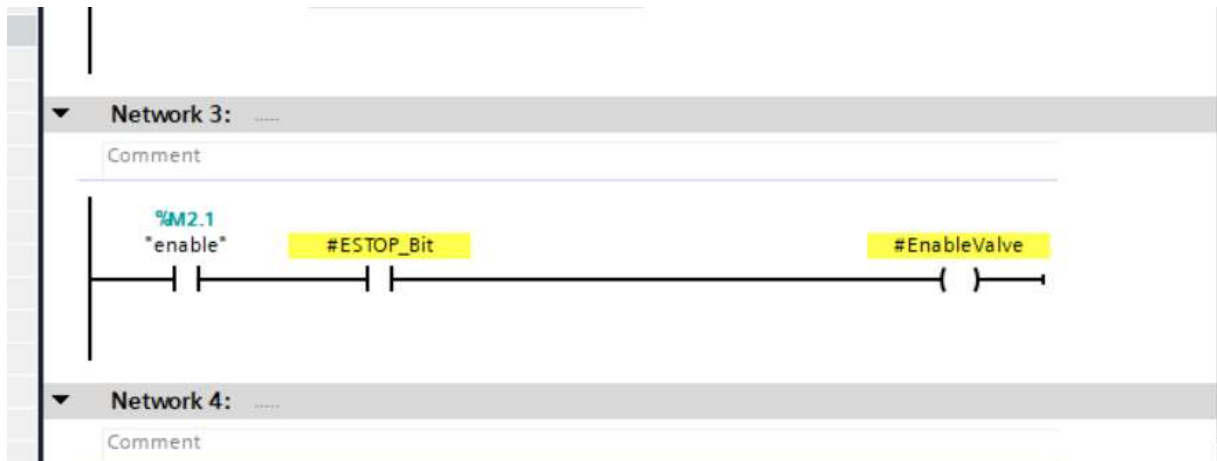


Connect your function blocks as shows in screens below:





Insert a network now after NW2 and enter the following code:



➔ Compile your program and load it down into PLC

5 Operation / functionality

- Make sure, that there is air pressure on input of P33
- Release your emergency stop button, if not done yet
- Now, acknowledge the F-devices: Set the bit "Acknowledge_F-Devices" (M2.0). (Don't forget to reset). You have to do this two times if emerg. Stop was activated
- Activate the P33 by setting bit "enable" (M2.1). The P33 should switch to "ON" now and remains ON.
- To switch off, reset bit "enable" (M2.1) or press emerg. Stop button.
- In case of discrepancy of P33 feedback signals or emerg. Stop signals, P33 will turned off. You can edit the discrepancy time in the hardware settings of ET200 Pro 4/8 F-DI/4 F-DO module. Default value is 300ms
- Switch-Off time delay: you can enter this in the program at function block "SafetyValveControl_1002" at input "DeactivationTime". Default value is 300ms

6 Important Safety Notes

6.1 The "SafetyValveControl_1002" works internally with the Siemens safety function block "FDBACK". Please be aware, that in "SafetyValveControl_1002", the "FDBACK" doesn't operate with the signal "QBAD".

6.2 This is only a sample program. Parker doesn't take any responsibility for safe operation in a modified application. It's up to user responsibility to create his program in a way to fulfill the safety requirements for his machine.