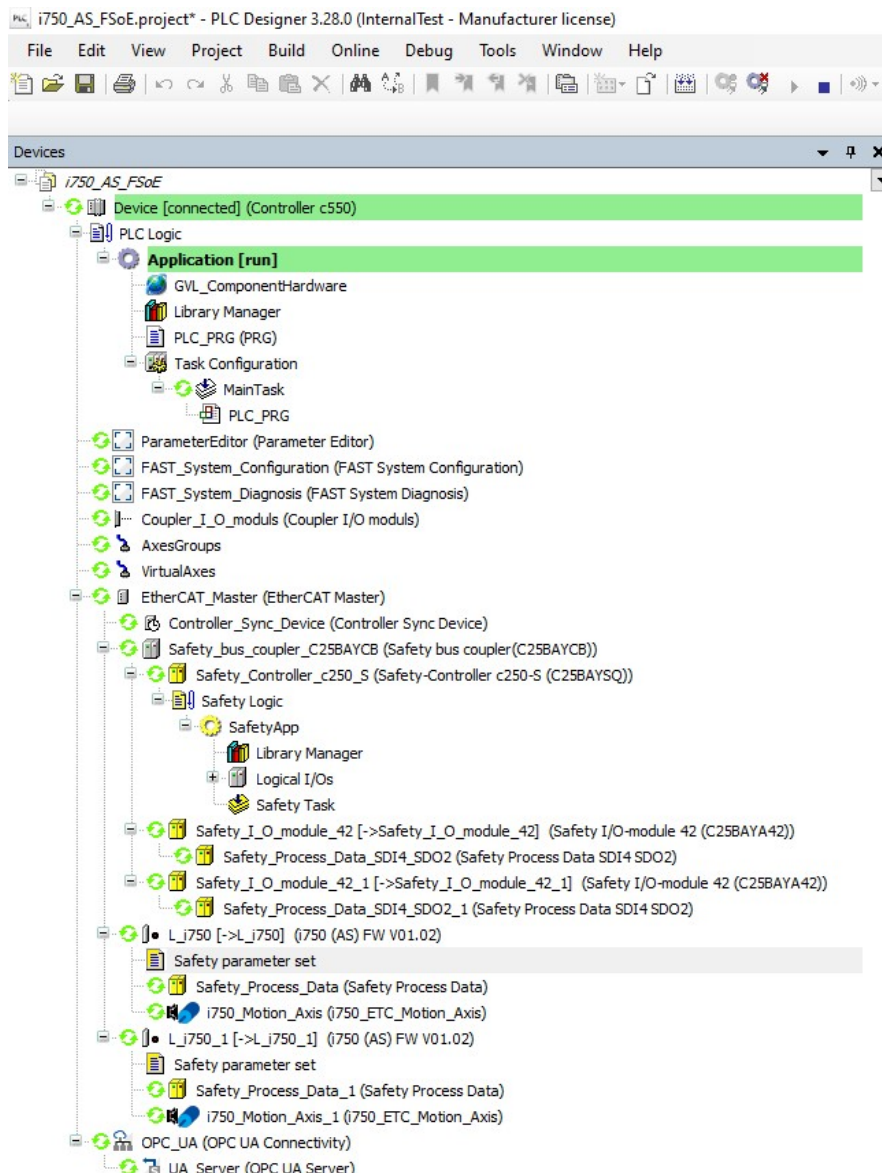


Commissioning manual for i750AS connected via FSoE to c250-S

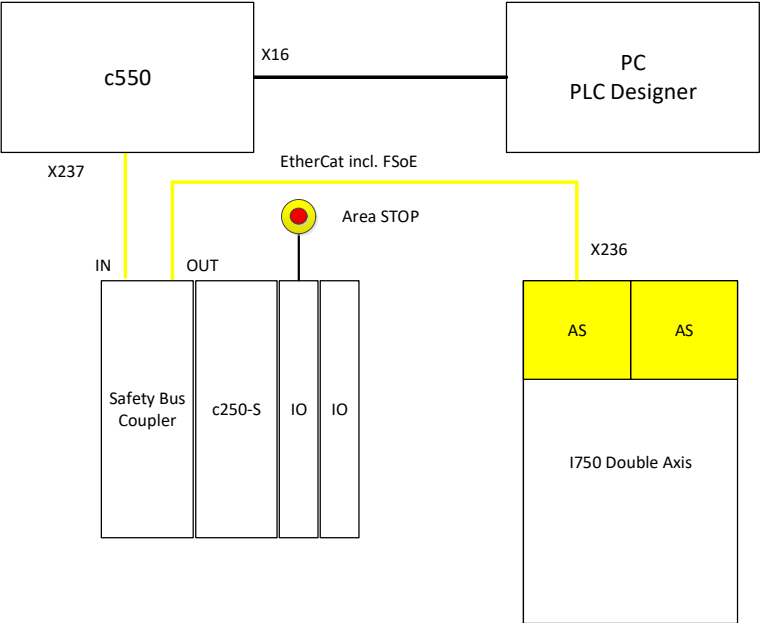
This document describes how the Lenze c250-S safety controller with an i750AS is commissioned. The standard controller is a Lenze c550. STO is activated via S-bus.

Used PC-Software: PLC Designer V3.28

Used Devices: c550 FW V1.11.0.3985, Device Description V1.11.0.17
 Safety Controller c250-s V1.2.0, Device Description V1.0.0.6
 Safety I/O module 42 V1.01, Device Description V1.0.0.7
 Double Axis i750 AS FW V1.2.0.714, Safety FW 1.3.06.10382



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1

PLC Designer:
Start Plc Designer V3.28 and create a new Standard Project with a c550 Controller.

PLC Designer 3.25.0 (InternalTest - Manufacturer license)

File Edit View Project Build Online Debug Tools Window Help

Devices

New Project

Categories: (General), CoDeSys Automation Alliance, Libraries, Projects

Templates: Standard project

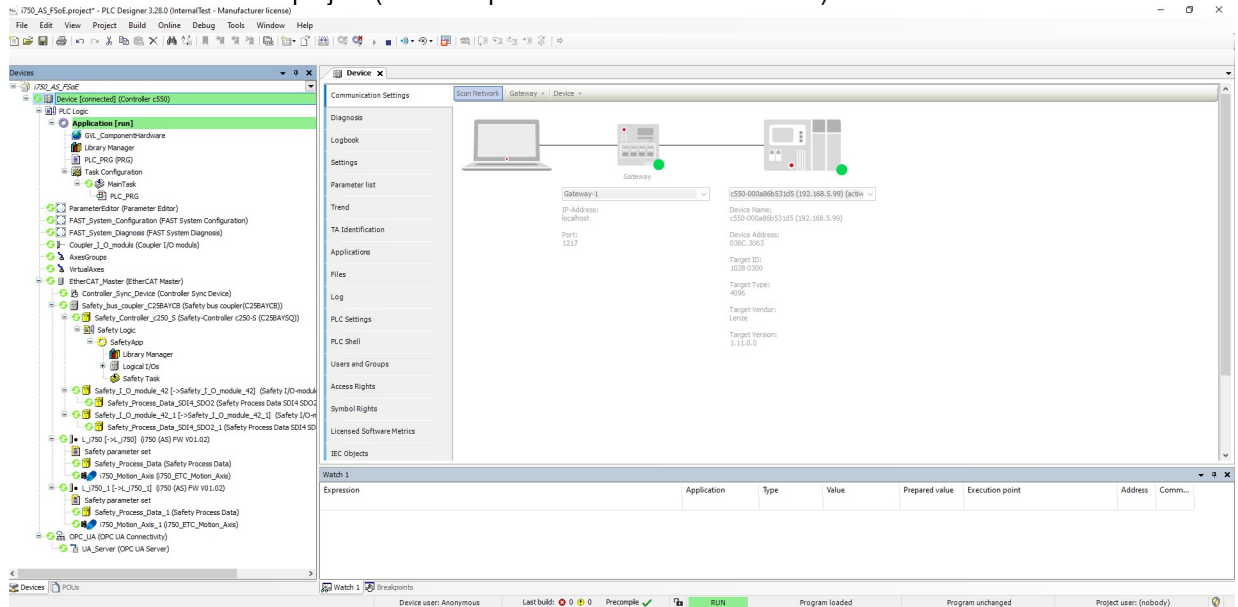
A project containing one device, one application, and an empty implementation for PLC_PRG

Name: Untitled4

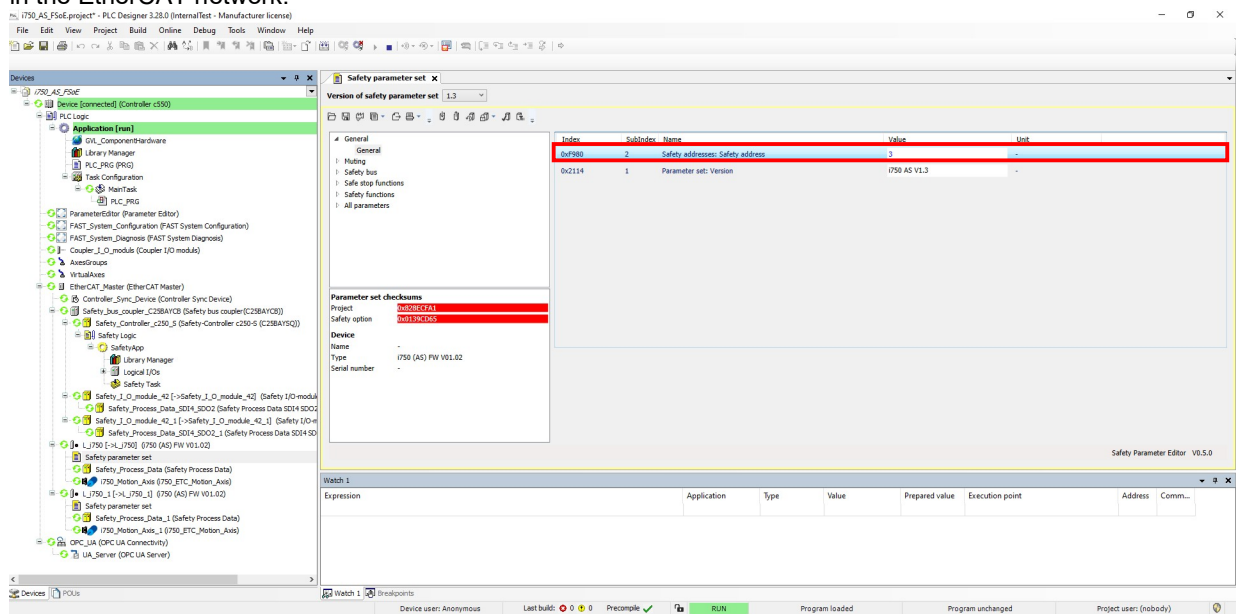
Location: C:\Users\admin\Documents

OK Cancel

2 EtherCAT: Insert all devices into the project (For example with “Scan For Devices...”).



3 i750 AS Safety Settings: Set the Safety Address. The Safety Address is the FSoE Address as well. The FSoE Address must be unique in the EtherCAT network.



Safety Bus Configuration => FSoE / EtherCAT onboard is default.

Version of safety parameter set 1.3

Index	Subindex	Name	Value	Unit
0x2128	0	S-Bus configuration	FSoE / EtherCAT onboard	-

Parameter set checksums

Project	0x70011006
Safety option	0x0130C005

Device

Name	L1750
Type	(750 (AS) FW V01.02)
Serial number	-

Watch 1

Expression	Application	Type	Value	Prepared value	Execution point	Address	Comm...

Change the source of STO to S-bus and Automatic restart.

Version of safety parameter set 1.3

Index	Subindex	Name	Value	Unit
0x2891	0	STO Source S-Bus	Activated	-
0x2892	1	STO: Restart	Automatic restart	-

Parameter set checksums

Project	0x711900CA
Safety option	0x0130C005

Device

Name	L1750
Type	(750 (AS) FW V01.02)
Serial number	9000002168
Axis type	Axis A of double axis

STO

0x2891:000 Activation / deactivation of the STO control bit via the safety bus.
Default value: Deactivated

Watch 1

Expression	Application	Type	Value	Prepared value	Execution point	Address	Comm...

Go online with c550. Download the program and load Safety parameter set into the i750AS.

The screenshot shows the 'Safety parameter set' window in the PLC Designer software. The window is divided into several sections:

- General:** Contains a table of safety addresses.

Index	Subindex	Name	Value	Unit
0x980	2	Safety addresses: Safety address	3	-
0x2114	1	Parameter set: Version	i750 AS V1.3	-
- Parameter set checks:** Contains a list of parameters.

Project	Safety option	Device
0x2114	0x2114	0x2114
- Device:** Contains a list of device parameters.

Name	Type	Serial number	Axis type
L_750	i750 (AS) FW V01.02	9000003168	Axis A of double axis

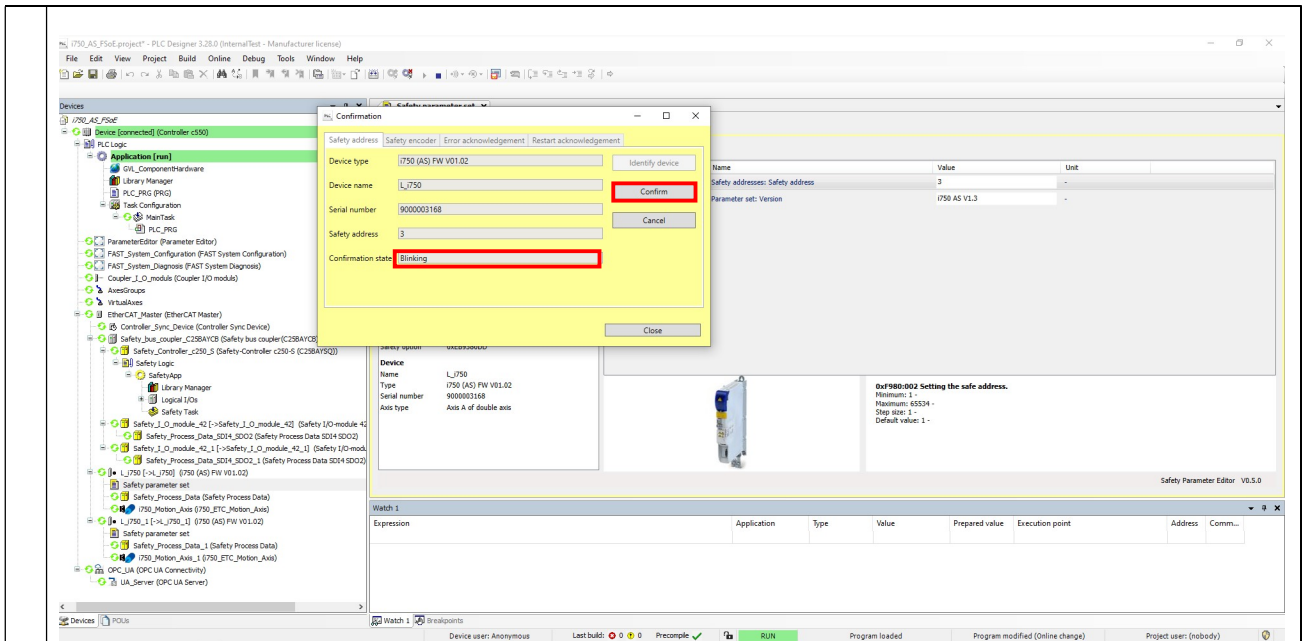
The 'Identify device' button is highlighted in red. The bottom status bar shows 'Device user: Anonymous', 'Last built: 0 0 0', 'Precompile', 'RUN', 'Program loaded', 'Program unchanged', and 'Project user: (nobody)'.

Do not forget to confirm the Safety address after the download.

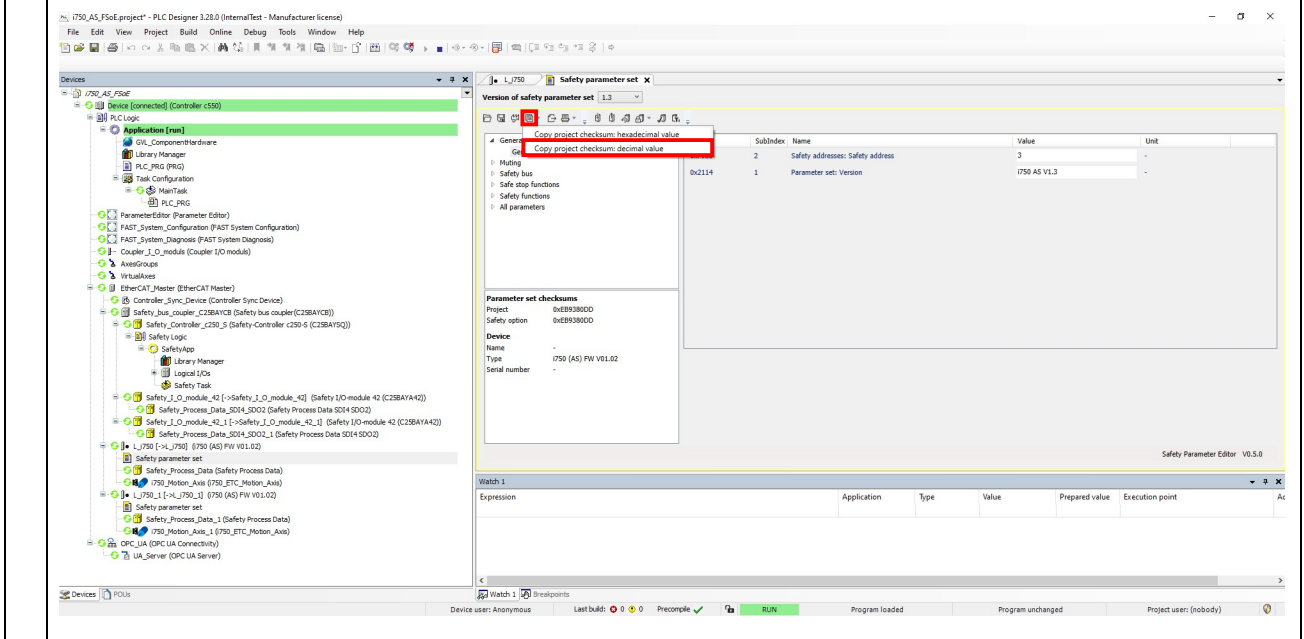
The screenshot shows the 'Confirmation' dialog box in the PLC Designer software. The dialog box is titled 'Confirmation' and contains the following fields:

- Safety address:** 3
- Device type:** i750 (AS) FW V01.02
- Device name:** L_750
- Serial number:** 9000003168
- Safety address:** 3
- Confirmation state:** (empty)

The 'Identify device' button is highlighted in red. The bottom status bar shows 'Device user: Anonymous', 'Last built: 0 0 0', 'Precompile', 'RUN', 'Program loaded', 'Program unchanged', and 'Project user: (nobody)'.

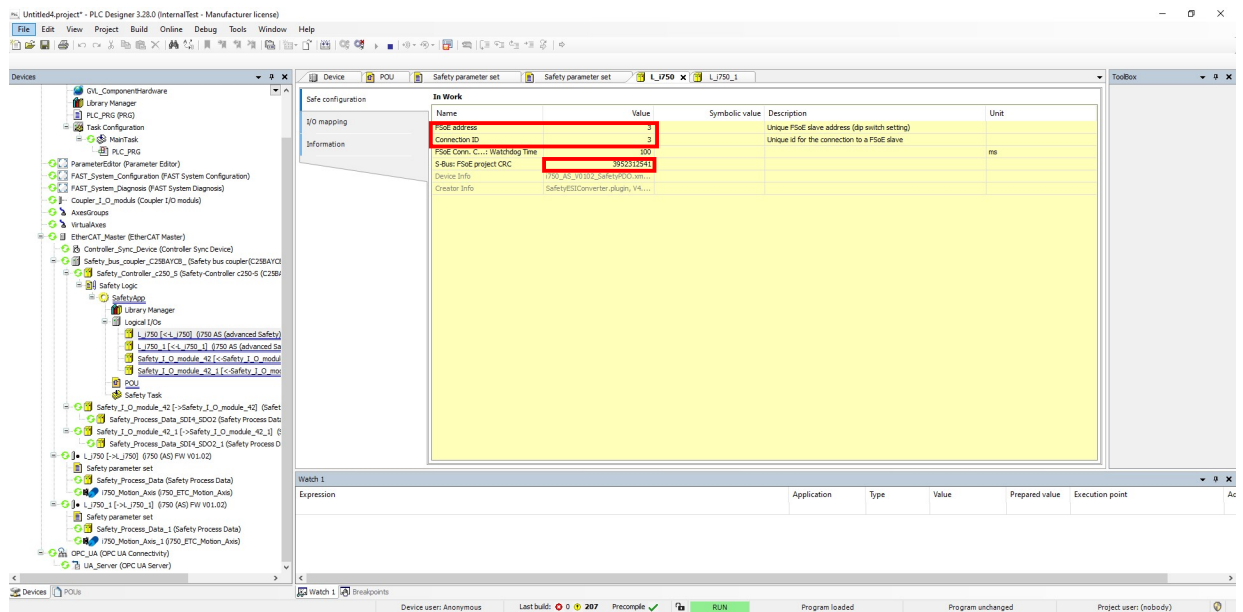


- 4 **FSOE:**
 Insert in the Safety Plc the FSoE functionality.
 The CRC (dec) of the i750 Safety parameter set is needed.
 L_i950 => Diagnosis => Safety

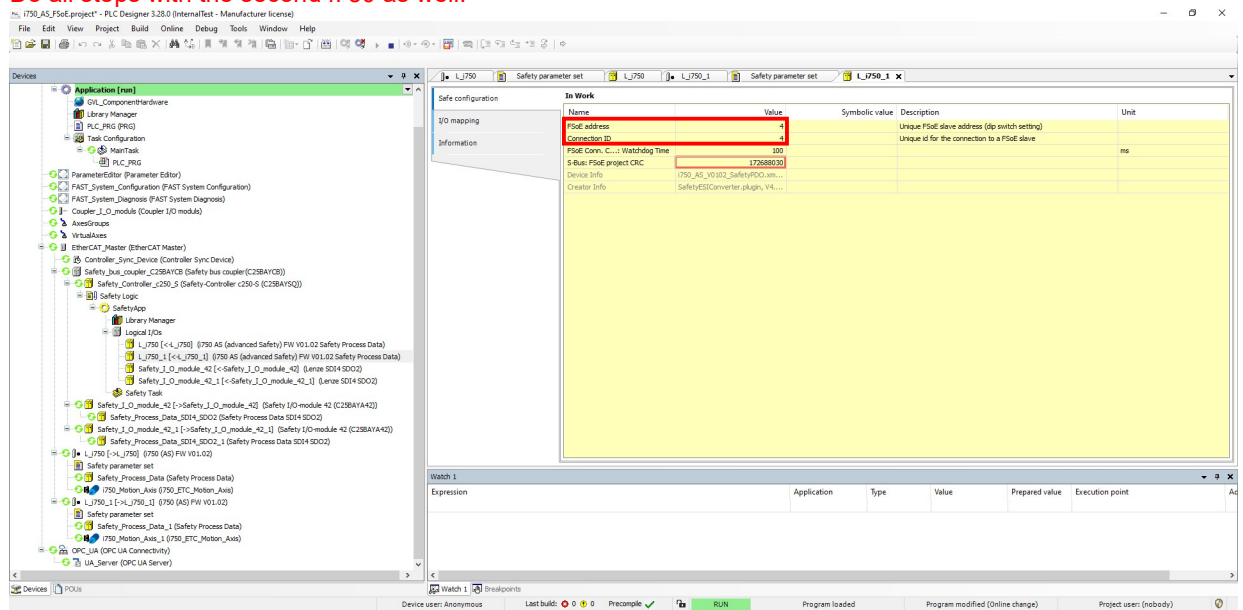


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Change over to the Safety controller and open the Logical I/O of the i750. Copy the CRC of the i750 to Safe configuration. Insert the FSoE Address and the Connection ID to the same value, as the Safety Address of i750.



Do all steps with the second i750 as well!



The FSoE Address and the Connection ID of I/O modules must fit to dip switches of the I/O modules.

PLC Designer 3.20.0 (InternalTest - Manufacturer license)

File Edit View Project Build Online Debug Tools Window Help

Devices

Application [run]

Library Manager

PLC_PRG

Task Configuration

ParameterEditor (Parameter Editor)

FAST_System_Configuration (FAST System Configuration)

FAST_System_Diagnosis (FAST System Diagnosis)

Coupler_I_O_module (Coupler I/O module)

VirtualAxes

EtherCAT_Master (EtherCAT Master)

Controller_Sync_Device (Controller Sync Device)

Safety_bus_coupler_C25A1CB (Safety bus coupler C25A1CB)

Safety_Controller_c250_S (Safety-Controller c250-S (C25A1SQ))

SafetyApp

Library Manager

Logical I/Os

L_750_1 [-> L_750_1] (750 AS (advanced Safety) FW V0.02 Safety Process Data)

Safety_I_O_module_42 [-> Safety_I_O_module_42] (Lenze S04 SDO2)

Safety_I_O_module_42_1 [-> Safety_I_O_module_42_1] (Lenze S04 SDO2)

Safety Task

Safety_Process_Data_S04_SDO2 (Safety Process Data S04 SDO2)

Safety_I_O_module_42_1 [-> Safety_I_O_module_42_1] (Safety I/O module 42 (C25A1A42))

Safety_Process_Data_S04_SDO2_1 (Safety Process Data S04 SDO2)

L_750 [-> L_750] (750 AS FW V0.02)

Safety parameter set

Safety_Process_Data (Safety Process Data)

L_750_1 [-> L_750_1] (750 AS FW V0.02)

Safety parameter set

Safety_Process_Data_1 (Safety Process Data)

L_750_Motion_Axis_1 (750_ETC_Motion_Axis)

OPC-UA (OPC UA Connectivity)

UA_Server (OPC UA Server)

Safe configuration

In Work

Name	Value	Symbolic value	Description	Unit
FSoE address	1		Unique FSoE slave address (dip switch setting)	
Connection ID	1		Unique id for the connection to a FSoE slave	
Watchdogtime	100			ms
Used Inputs	15		Input 0, 1, 2, 3 used	
External Inputs	0			
Used Outputs	3		Output 0, 1 used	
extGroundOutputs	0		No Outputs external ground	
Test pulse duration input 0	500			
Test pulse duration input 1	500			
Test pulse duration input 2	500			
Test pulse duration input 3	500			
Test pulse duration output0	800			
Test pulse duration output1	800			
Test frequency input 0	1			
Test frequency input 1	1			
Test frequency input 2	1			
Test frequency input 3	1			
Test frequency output 0	10			
Test frequency output 1	10			
Device Info	Lenze S04S014S04S014 R...			
Creator Info	SafetyESDConverter.plugin, V4...			

Watch 1

Expression	Application	Type	Value	Prepared value	Execution point
------------	-------------	------	-------	----------------	-----------------

Device user: Anonymous Last build: 0 0 Precompile RUN Program loaded Program modified (Online change) Project user: (nobody)

PLC Designer 3.20.0 (InternalTest - Manufacturer license)

File Edit View Project Build Online Debug Tools Window Help

Devices

Application [run]

Library Manager

PLC_PRG

Task Configuration

ParameterEditor (Parameter Editor)

FAST_System_Configuration (FAST System Configuration)

FAST_System_Diagnosis (FAST System Diagnosis)

Coupler_I_O_module (Coupler I/O module)

VirtualAxes

EtherCAT_Master (EtherCAT Master)

Controller_Sync_Device (Controller Sync Device)

Safety_bus_coupler_C25A1CB (Safety bus coupler C25A1CB)

Safety_Controller_c250_S (Safety-Controller c250-S (C25A1SQ))

SafetyApp

Library Manager

Logical I/Os

L_750 [-> L_750] (750 AS (advanced Safety) FW V0.02 Safety Process Data)

Safety_I_O_module_42 [-> Safety_I_O_module_42] (Lenze S04 SDO2)

Safety_I_O_module_42_1 [-> Safety_I_O_module_42_1] (Lenze S04 SDO2)

Safety Task

Safety_Process_Data_S04_SDO2 (Safety Process Data S04 SDO2)

Safety_I_O_module_42_1 [-> Safety_I_O_module_42_1] (Safety I/O module 42 (C25A1A42))

Safety_Process_Data_S04_SDO2_1 (Safety Process Data S04 SDO2)

L_750 [-> L_750] (750 AS FW V0.02)

Safety parameter set

Safety_Process_Data (Safety Process Data)

L_750_1 [-> L_750_1] (750 AS FW V0.02)

Safety parameter set

Safety_Process_Data_1 (Safety Process Data)

L_750_Motion_Axis_1 (750_ETC_Motion_Axis)

OPC-UA (OPC UA Connectivity)

UA_Server (OPC UA Server)

Safe configuration

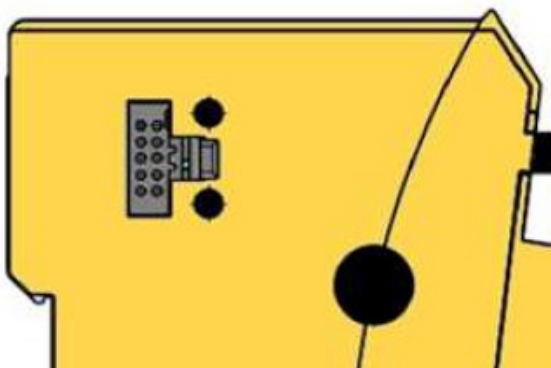
In Work

Name	Value	Symbolic value	Description	Unit
FSoE address	1		Unique FSoE slave address (dip switch setting)	
Connection ID	2		Unique id for the connection to a FSoE slave	
Watchdogtime	100			ms
Used Inputs	15		Input 0, 1, 2, 3 used	
External Inputs	0			
Used Outputs	3		Output 0, 1 used	
extGroundOutputs	0		No Outputs external ground	
Test pulse duration input 0	500			
Test pulse duration input 1	500			
Test pulse duration input 2	500			
Test pulse duration input 3	500			
Test pulse duration output0	800			
Test pulse duration output1	800			
Test frequency input 0	1			
Test frequency input 1	1			
Test frequency input 2	1			
Test frequency input 3	1			
Test frequency output 0	10			
Test frequency output 1	10			
Device Info	Lenze S04S014S04S014 R...			
Creator Info	SafetyESDConverter.plugin, V4...			

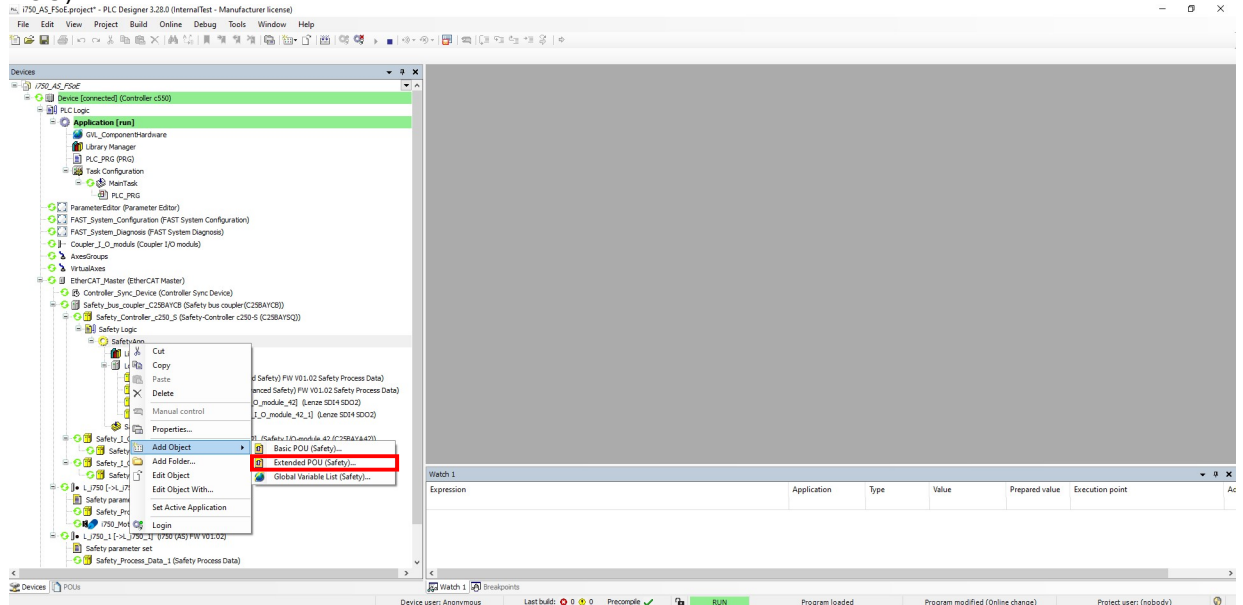
Watch 1

Expression	Application	Type	Value	Prepared value	Execution point
------------	-------------	------	-------	----------------	-----------------

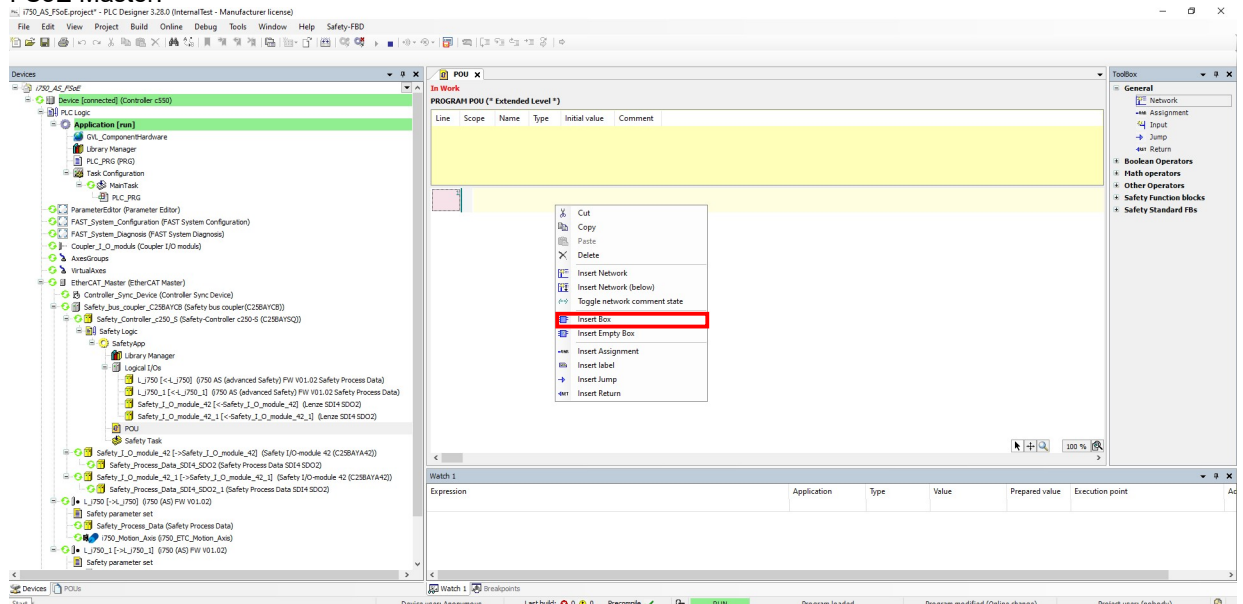
Device user: Anonymous Last build: 0 0 Precompile RUN Program loaded Program modified (Online change) Project user: (nobody)



Insert a new POU into the Safety controller. Right mouse click on SafetyApp=> Add Object => Extended (POU).



Insert in the POU a new box with Right-mouse-click. Choose from the library SIODRVFSOE the function block FSoE Master.



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Do that for the I/O slices and the second i750 also.
Insert "True" on Input AutoReset.

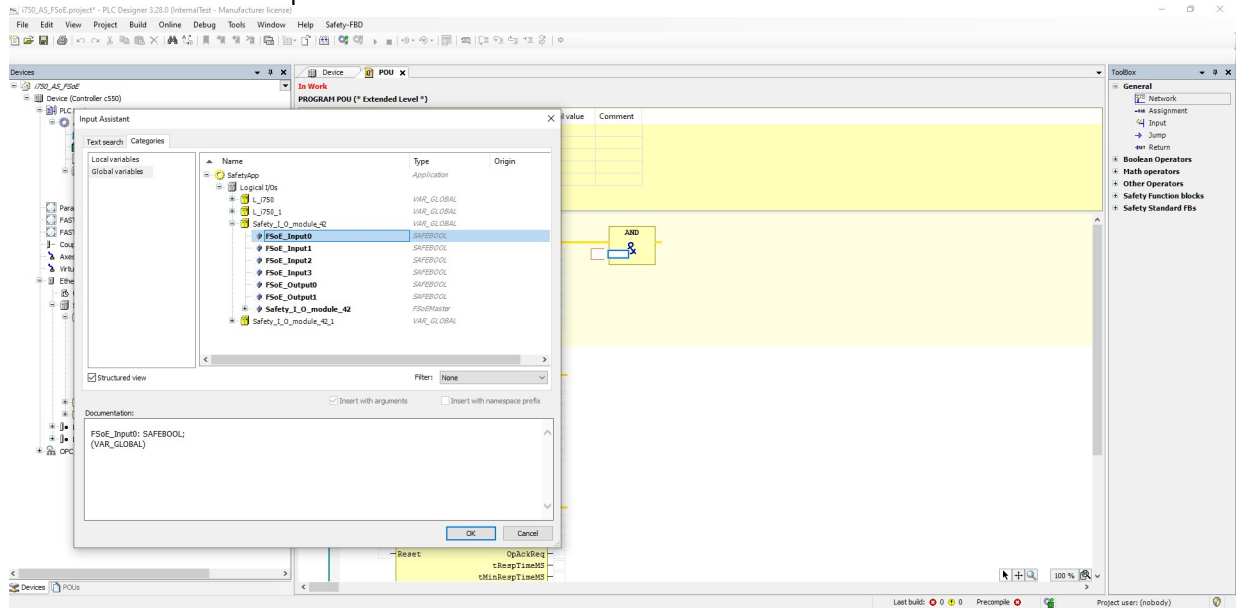
The screenshot displays the PLC Designer 3.28.0 interface. The left pane shows the project tree with 'Safety_Controller_c250-S' selected. The main workspace shows the 'PROGRAM POU (* Extended Level *)' for 'I_1750'. Two 'FSolMaster' blocks are visible, each with an 'AutoReset' input set to 'True' (highlighted with a red box). The bottom status bar shows 'RUN' mode.

Download program to the Safety Controller.
FSOE is running now:

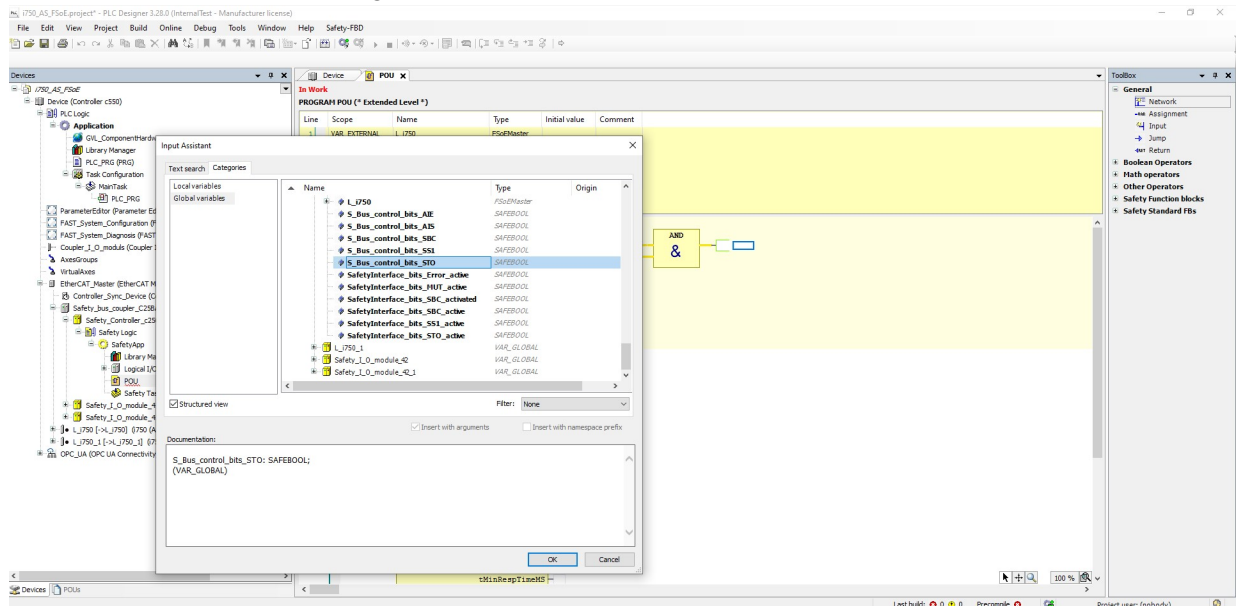
The screenshot displays the PLC Designer 3.28.0 interface. The left pane shows the project tree with 'Safety_Controller_c250-S' selected. The main workspace shows the 'PROGRAM POU (* Extended Level *)' for 'I_1750'. Two 'FSolMaster' blocks are visible, each with an 'AutoReset' input set to 'True' (highlighted with a red box). The bottom status bar shows 'RUN' mode.

5 S-bus:

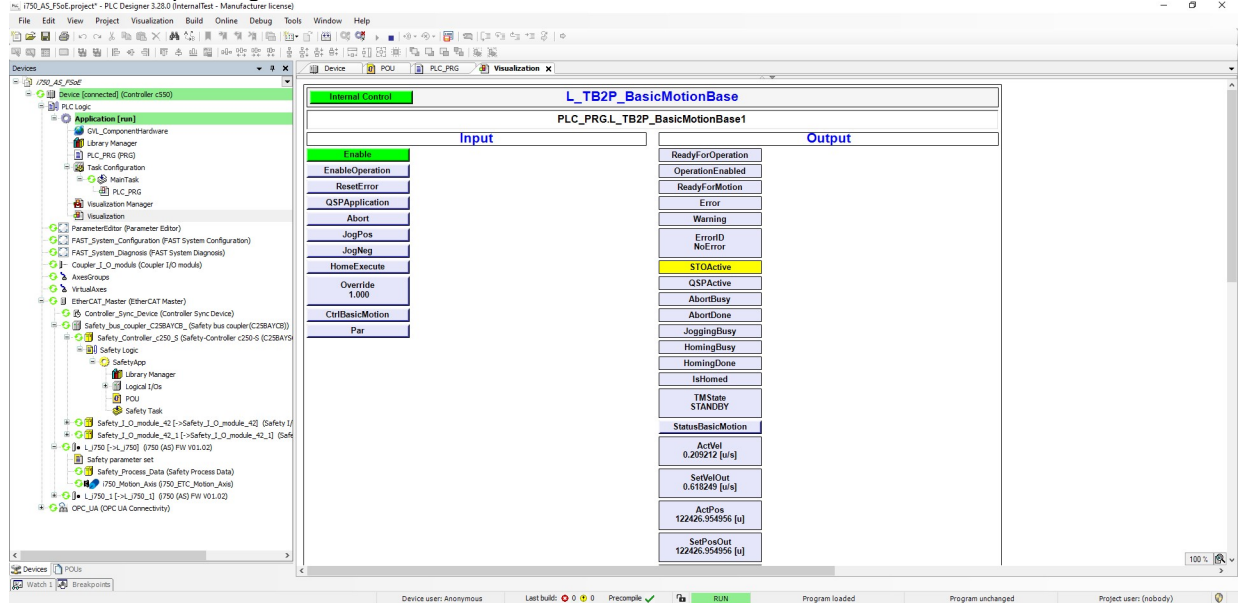
For using STO via S-bus the logical I/O's have to be added in the application. First add an AND block at the S_OutReady Output of the FSoE Master Block. Then put an Input for the STO button onto the second input of the AND block.



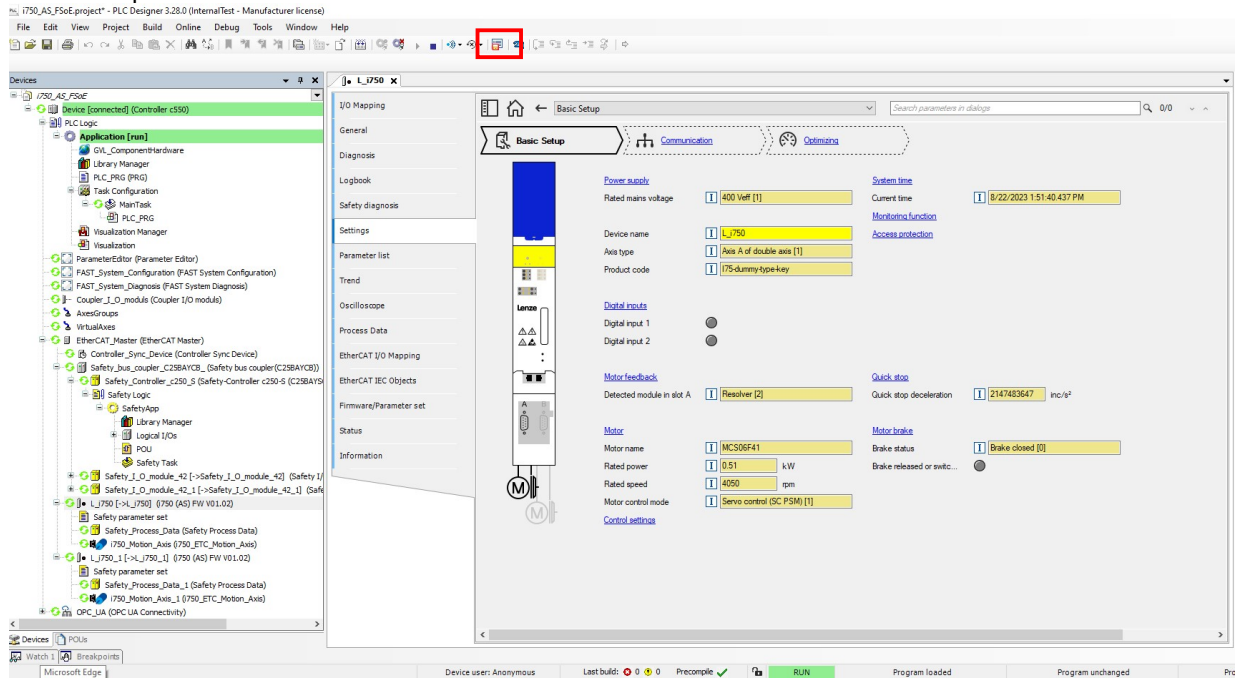
Then insert the control bit for STO.



Add the corresponding visualisation.



Do not forget to choose the motor, brake, etc.! Check the Soft motion parameter (mechanical data) also.
At least all parameter sets must be saved on the controller.



Do all steps with the second i750 as well!

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Safety information / disclaimer:



The safety application and parameterization notes are examples of possible subfunctions in machines.

The T_{10D} value according to DIN EN ISO 13849-1, Annex C.4.2 is only indicated if a B_{10D} value is available and the operating time is less than 20 years.

Commissioning is prohibited until the machine has been checked in accordance with the regulations set out in the relevant EU directives / national laws.

The safety instructions contained in the technical documentation must be observed.

Using the examples does not exempt the user from careful project planning. For possible damages and consequential damages Lenze assumes no liability to the extent permitted by law.

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