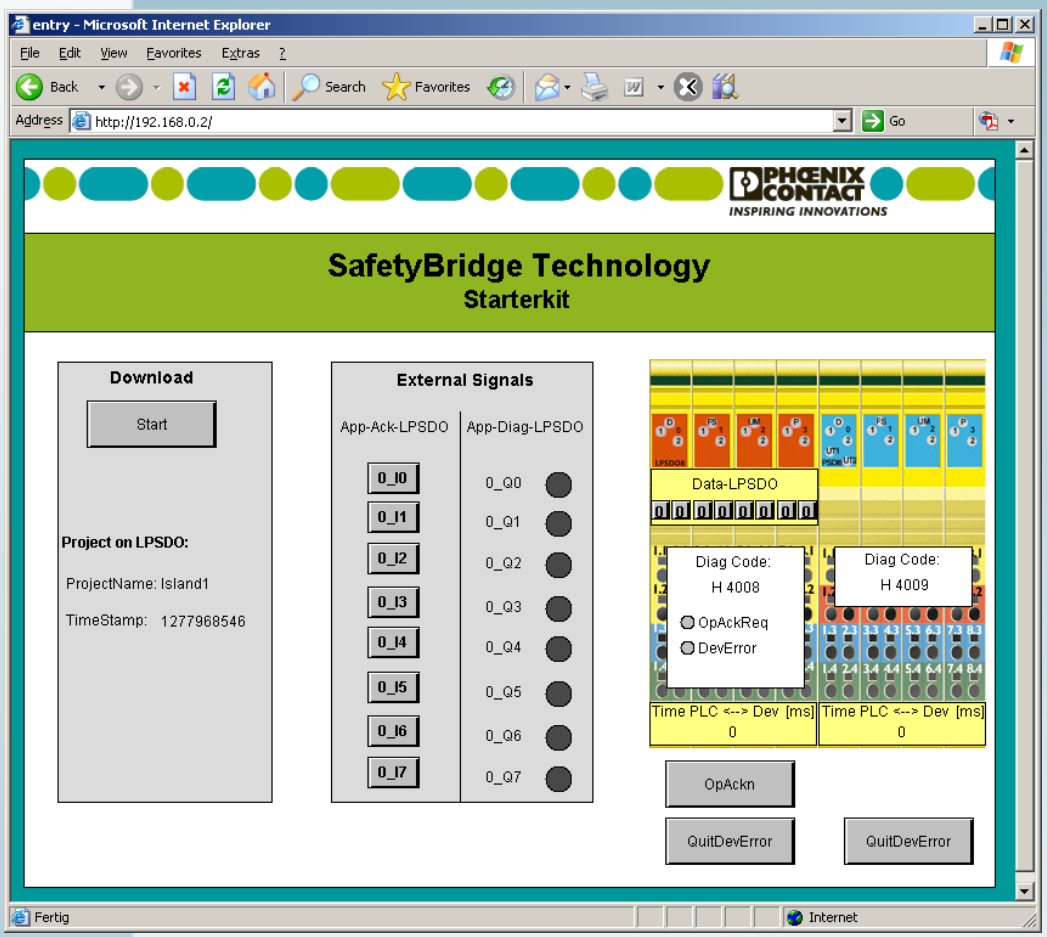
AUTOMATION



Application note

AH EN
ILC 130 SBT STARTERKIT

Revision: 01

Working with the ILC 130 SBT STARTERKIT

PHOENIX CONTACT
INSPIRING INNOVATIONS

This document is valid for:

Designation	Order No.
ILC 130 SBT STARTERKIT	2700529

Statement of legal authority

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Published by

PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstraße 8
32825 Blomberg
Germany
Phone +49 5235 3-00
Fax +49 5235 3-41200

PHOENIX CONTACT
P.O. Box 4100
Harrisburg, PA 17111-0100
USA
Phone +1-717-944-1300

Should you have any suggestions or recommendations for improving the contents and layout of our manuals, please send your comments to

tecdoc@phoenixcontact.com.

Table of Contents

1 Basics and example project

1.1 Information about this document

This document uses an example project to help you get started with a SafetyBridge system.

This document explains how the web server of the ILC 130 SBT STARTERKIT can be accessed via a web browser.

You can use the ILC 130 SBT STARTERKIT to test various functions and display the results in the form of a web visualization.

The example program and the visualization are stored on the starter kit's controller and can also be found on the CD provided.

1.2 Additional documentation

Components

For more detailed information about the hardware components, please refer to the documentation for the components.

SafetyBridge in PC WORX

The safety logic configuration in SAFECONF and the configuration of a SafetyBridge system in PC WORX is described in the UM QS EN SAFETYBRIDGE - PC WORX Quick Start Guide.

Should you wish to extend/change the existing project beyond the details described in this document or alternatively wish to create your own project for the starter kit, proceed according to the UM QS EN SAFETYBRIDGE - PC WORX Quick Start Guide. In this case, please also observe the additional documentation specified in the guide.

Documentation available online

This documentation can be downloaded at www.phoenixcontact.net/catalog.

1.3 Requirements

Knowledge

It is assumed that the user has knowledge and experience in the operation of PCs and Windows operating systems.

Hardware

In order to start up the example system, the following hardware is required:

– Programming device/PC
– ILC 130 SBT STARTERKIT

The inline controller of the starter kit has the address 192.168.0.2.

Software

In order to start up the example system, the following software is required:

– Microsoft Windows
– Current Java version (from Version 6 update 20)
– SAFECONF from Phoenix Contact (software for configuration of the safety logic and for parameterization of the channels)
  This can be found on the Internet at www.phoenixcontact.net/catalog.

1.4 The ILC 130 SBT STARTERKIT

The ILC 130 SBT STARTERKIT is a combination of hardware and an example project. It contains all the components you need to simulate and visualize the functions of a SafetyBridge system in the case of an example project.

The starter kit hardware is provided fully assembled on a board. The starter kit comprises the components represented in Figure 1 and Table 1.

The assembly is supplied by a power supply unit mounted on the back of the board. To operate the assembly, simply connect the mains cable to the power supply unit and to the supply voltage (230 V AC socket).
In addition, connect the ILC 130 ETH to your PC via the Ethernet cable provided.

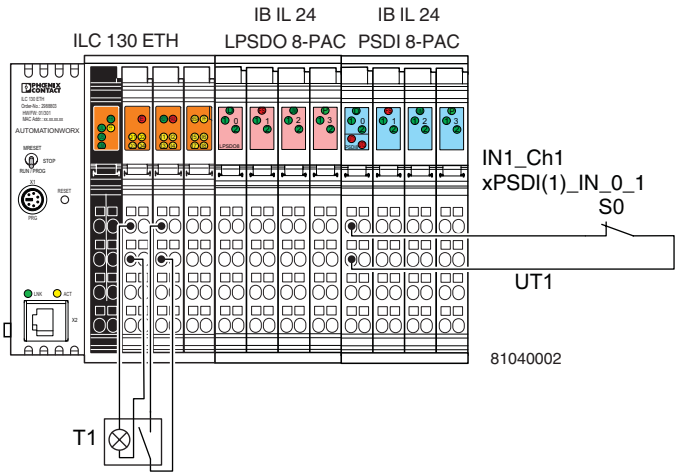

Figure 1 SafetyBridge example system

S0	Safety switch; emergency stop (EStop/button S0)
T1	Illuminated key Triggered when an error occurs. The error can be acknowledged using the illuminated key or the visualization.

The switching module and illuminated key components that are also wired on the board, as well as the wiring are not represented in Figure 1.

Table 1 Components of the ILC 130 SBT STARTERKIT

Description	Type	Order No.	Pcs./Pkt.
Hardware (modules)			
Inline controller	Inline controller	2988803	1
Inline module with integrated safety logic and safe digital outputs	IB IL 24 LPSDO 8-PAC	2916024	1
Inline module with safe digital inputs	IB IL 24 PSDI 8-PAC	2985688	1
Hardware (accessories, part of the starter kit)			
Ethernet patch cable, crossover, 2 m	FL CAT5 FLEX CONF/	2744843	1
Switch module	UM 45-IB-DI/SIM8	2962997	1
Standard end clamp, gray	CLIPFIX 35-5	3022276	1
Documentation/CD			
Quick Start Guide	AH EN ILC 130 SBT STARTERKIT	–	1
CD	CD ILC 130 SBT STARTERKIT	9052261	1

The following can be found on the CD:

- Projects for
  - PC WORX: SBT_Starterkit_EN.zwt
  - SAFECONF: Island1.zcp
  - WebVisit
- Documentation for the ILC 130 SBT STARTERKIT (current document)
- Libraries for PC WORX

The project provided on the CD as well as additional example projects can be downloaded at www.phoenixcontact.net/catalog.

Make sure you always use the latest files.

Should you work with PC WORX, it is essential to check whether new library files are available online. If this is the case, use the current libraries.

1.5 The SAFECONF safety function

The safety function provided in the project is highlighted in Figure 2. This includes an EStop block, which processes the following input signals:

– Safe signal from emergency stop switch at input 1_I0_1 (toggle switch 0)
– Activation signal (ACT) that is set to TRUE
– Standard signal 0_IO; 0_IO = 1 =>
  – Resetting error messages if the error is no longer present
  – Manual resetting of an active startup inhibit
    (specified by the S_RES and/or A_RES parameters)

The block provides the following results:

– Safe signal 0_O0_1
– Standard signal 0_Q0

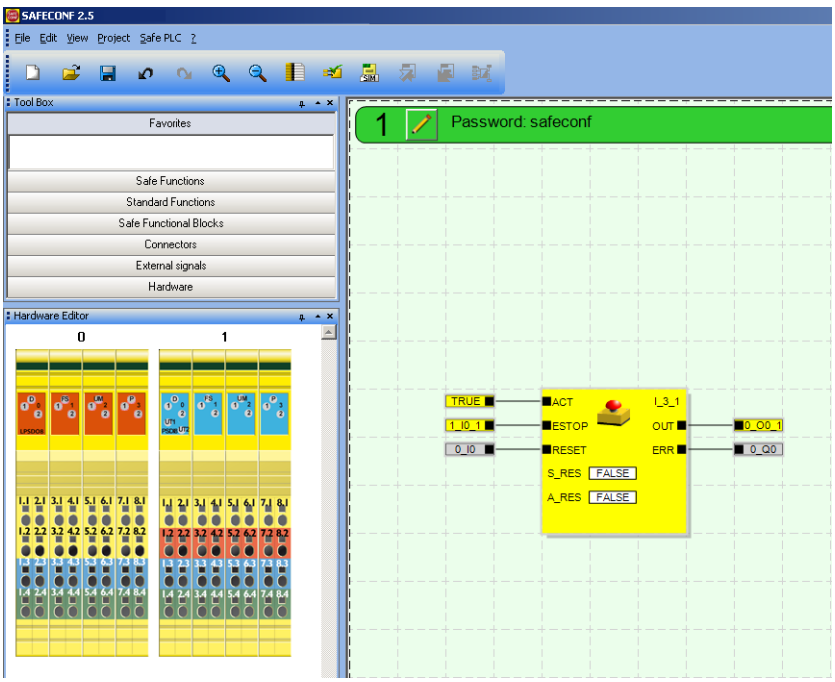

Figure 2 Safety function in SAFECONF

1.6 Integrating a SafetyBridge system into an existing system in three steps

A SafetyBridge system can be integrated into an existing system in three steps. The starter kit takes care of some of the tasks involved.

1. **Configuring the safety logic**
   The project is already stored on the starter kit's controller.
2. **Integrating SafetyBridge modules into the controller**
   The project is already stored on the starter kit's controller (on the inline controller).
3. **Installing SafetyBridge modules**
   The supply voltages and the inputs and outputs are already wired on the module.

   - Supply the starter kit with mains voltage.
   - Establish the Ethernet connection to the PC.
     The controller has the IP address 192.168.0.2. If this address is not suitable for the PC network, adjust the addresses accordingly. Change either the IP address of the PC or the IP address of the controller (e.g. via PC WORX).

2 Preparing the web browser for the visualization

- Switch to your web browser. Internet Explorer is used here as an example.
- Establish a connection to the inline controller. As the address, enter the IP address of the controller. The entry is: "http://192.168.0.2".

If you were not able to establish a connection, check your proxy settings.

- In Internet Explorer, select the "Tools, Internet Options..." menu item.
- Open the "Connections" tab.
- In the "LAN Settings" area, press the "Settings" button.
- Disable the "Use automatic configuration script" checkbox.
- Then close the window by pressing ok.
- Confirm the IP address for the controller once again.

The window with the visualization opens.

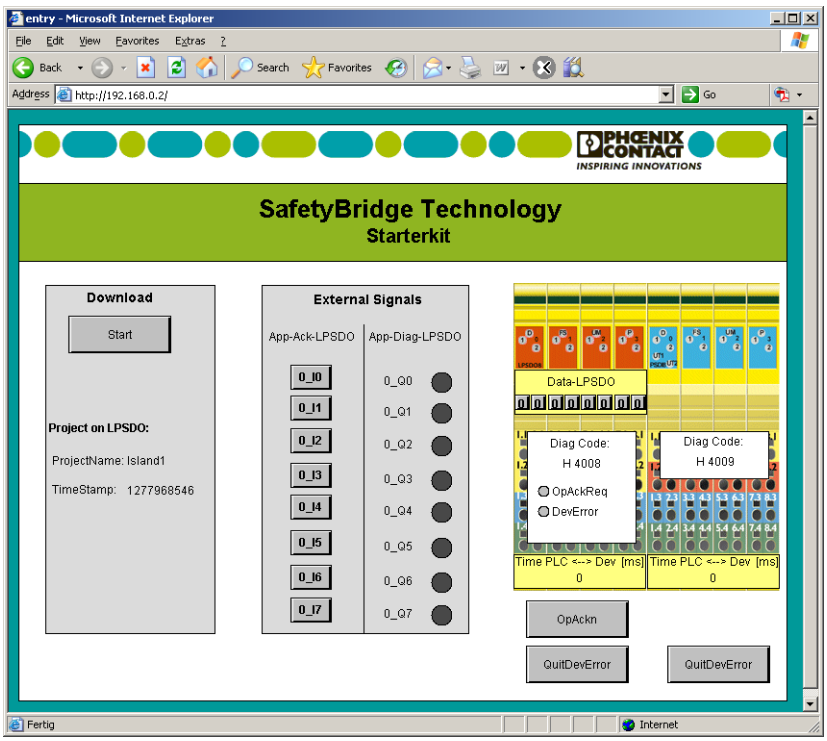

Figure 3 Window with the visualization

- To download the configuration and parameterization data record created in the SAFECONF to the IB IL 24 LPSDO 8-PAC, press the "Start" button in the Download area.

In the Download area, a progress indicator displays the download progress. The ProjectName and TimeStamp of the current project are also displayed.

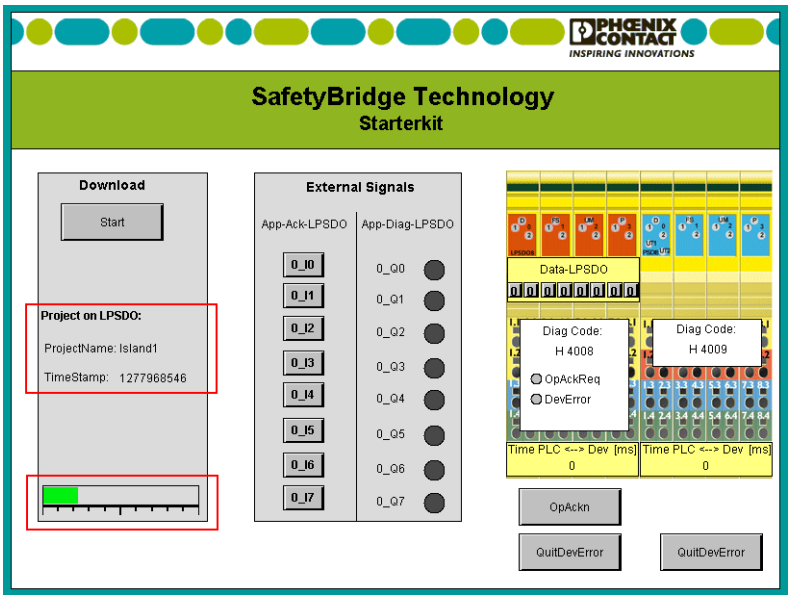

Figure 4 Downloading the configuration and parameterization data record

The download is completed successfully, once the diagnostic code (Diag Code) of the connected 8000_{hex} modules is displayed.
The red LED is no longer illuminated on the starter kit.

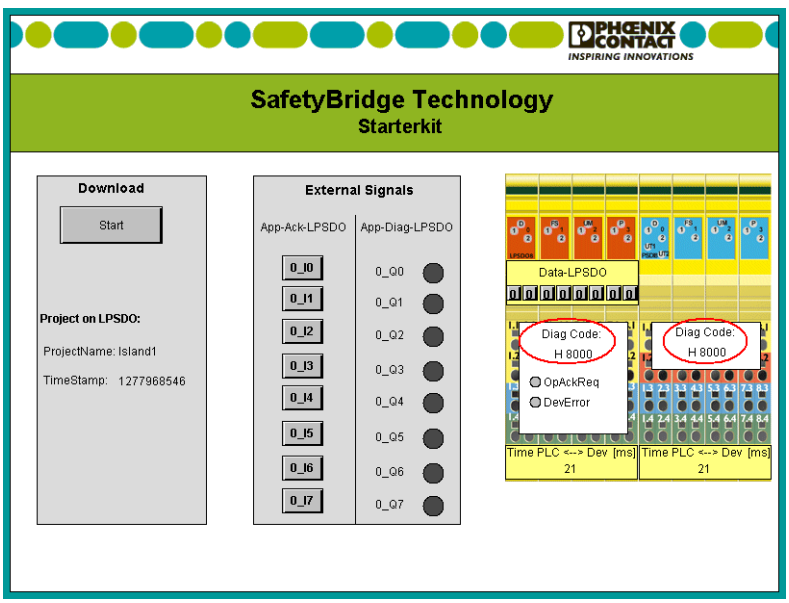

Figure 5 Downloading the configuration and parameterization data record

3 Visualizing behavior of inputs and outputs

- Set the toggle switch 0 to 1.
  This simulates the safe signal from the emergency stop switch at input 1_I0_1.
  The LED 01 of the IB IL 24 PSDI 8-PAC is illuminated.
- In the "External signals" area of the visualization, press the "0_I0" button. This simulates the standard signal 0_I0.
  The block is reset with the positive edge.

As a result of this, the safe signal is set to 0_O0_1.

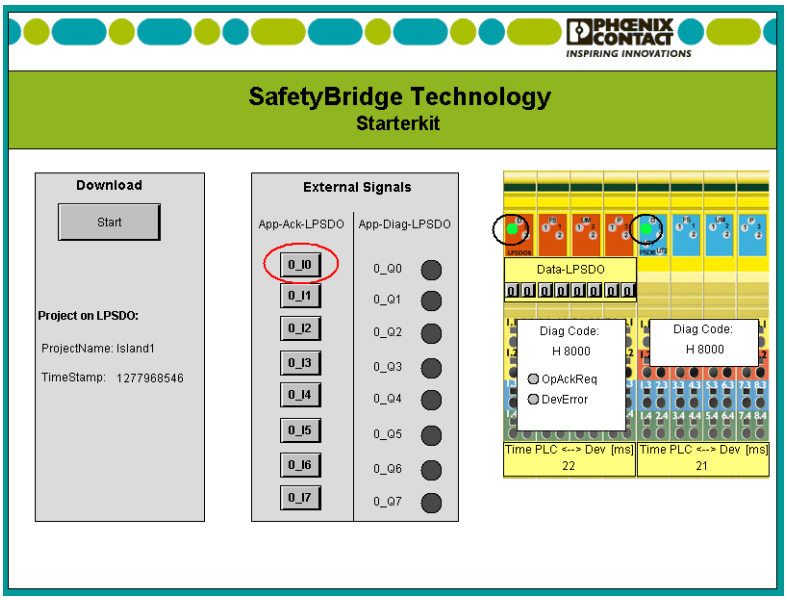

Figure 6 Visualizing behavior of inputs and outputs

4 Diagnosing and acknowledging errors

Errors are displayed in the visualization and at the illuminated key, which is connected to the starter kit's controller. As such, you are able to detect and reproduce the effect of errors and determine which steps are required to eradicate and acknowledge them.

Example 1: Interrupted communication

- Interrupt communication at the controller by setting the "MRESET/STOP/RUN/PROG" switch from "RUN/PROG" to "STOP".
- Eliminate the error cause by re-setting the switch to the "RUN/PROG" setting.

Effect:

– The illuminated key lights up.
– In the visualization, the "OpAckReq" display is illuminated in yellow.
– In the area of the IB IL 24 LPSDO 8-PAC, the error message 501_{hex} appears. The IB IL 24 LPSDO 8-PAC User Manual describes the error message in detail.
It means: Communication connection interrupted 0501_{hex}: First connection defective. Acknowledgment required.

- Acknowledge the error by either pressing the illuminated key or the "OpAckn" button below the module.

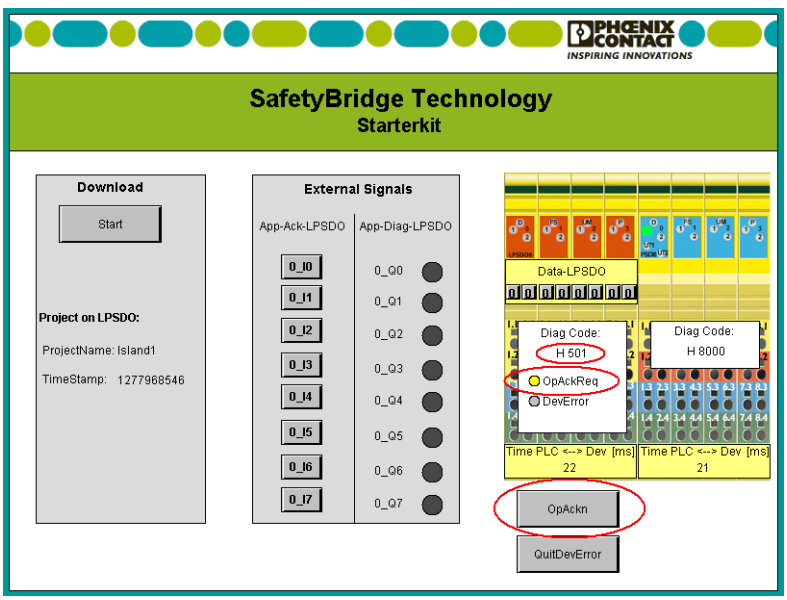

Figure 7 Visualizing an error

Example 2: Device error, e.g. a short circuit at an input or output (e. g., on the IB IL 24 LPSDO 8-PAC, jumper between the terminal points 1.1 and 1.3)

Effect:

– In the visualization, the "DevError" display is illuminated in yellow.
– In the area of the module with the error, a corresponding error message is output.

• Eliminate the error cause.
• Acknowledge the error by either pressing the illuminated key or the "QuitDevError" button below the module.

5 Changing the project

Changing the project

If you would like to change the example project, proceed as follows:

- Save the file with the example project for SAFECONF *Island1.zcp* from the CD or Internet to your PC (see "The ILC 130 SBT STARTERKIT" on page 5).
- Open the SAFECONF software.
- Select the "File, Extract Project" command.
  The password to be used is "safeconf".
- Change the project in SAFECONF (e.g. drag the input to a different position).
- Check the project. To do so, select the "Project, Check Project" command.

A message window is opened that displays the progress of the check. Once the check is completed without errors, the configuration and parameterization data record is generated as a *BINFILE.BIN* file. This file is stored in the directory, in which you extracted the zcp file, in the FileOutput folder.

The *BINFILE.BIN* file must then be downloaded to the controller.

Downloading the BINFILE.BIN to the controller

Download the configuration and parameterization data record *BINFILE.BIN* to the controller. To do this, proceed as follows:

- Copy the *BINFILE.BIN* file.
- Establish a connection to the controller in Explorer via FTP. In the example this is: ftp://192.168.0.2.
- Copy the *BINFILE.BIN* file to the root directory of the controller.

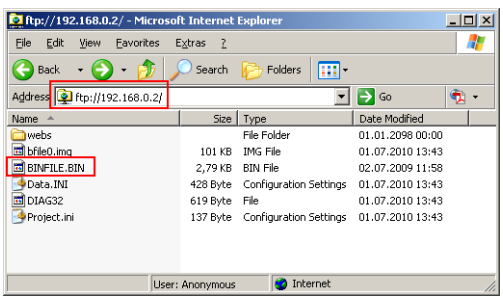

Figure 8 *BINFILE.BIN* copied to the controller via FTP

Ensure that the file is saved in the folder highlighted in Figure 8. If a different folder opens, repeat your selection.

New project in the visualization

- In the visualization, start the download by pressing the "Start" button in the Download area.

The Download area of the visualization indicates that both a new and old project are available. The name and time stamp of the old and new project are displayed.

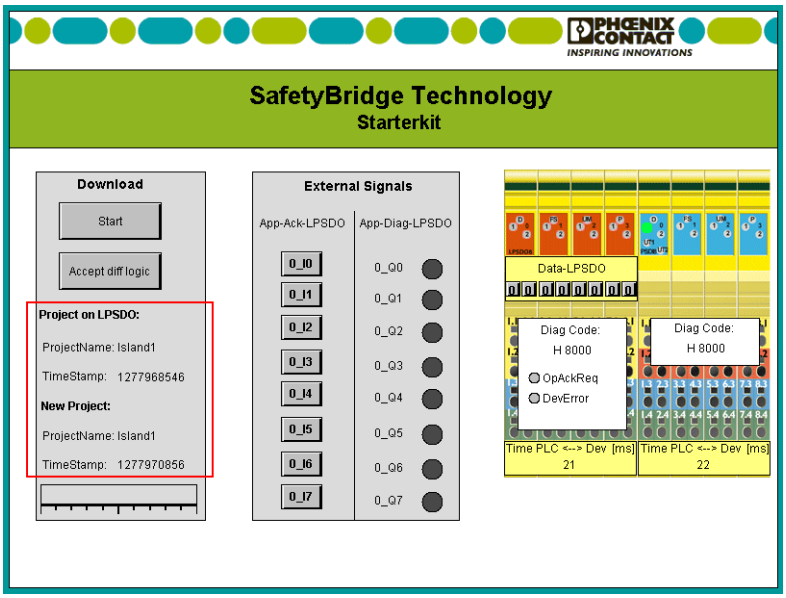

Figure 9 New project available

- Confirm that you accept the change made by pressing the "Accept diff logic" button.

6 Simulating an enable principle

The enable principle can be simulated in the visualization.

The enable principle is described in detail in the IB IL 24 LPSDO 8-PAC User Manual.

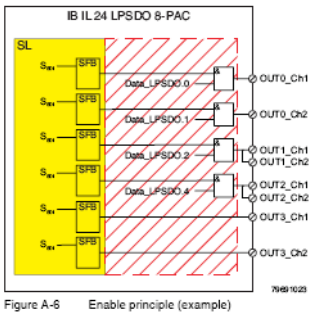

Figure A-6 Enable principle (example)

SL	Safety logic
SFB	Safe function block
&	Standard function block for ANDing
S_{SDI}	Signal from the IB IL 24 PSDI 8-PAC safe input module
Data-LPSDO.x	Standard data of the standard control system, which is to acknowledge the IB IL 24 LPSDO 8-PAC; bit x
OUTx_Chy	Output x, channel y
	Internal sequences

Figure 10 Enable principle (example) - taken from the IB IL 24 LPSDO 8-PAC User Manual

The enable function can be configured in SAFECONF. To do so, change the available project (see "Changing the project" on page 14).

- Double-click on the output you wish to activate for the enable function.
- Select the "active" value for the enable function.

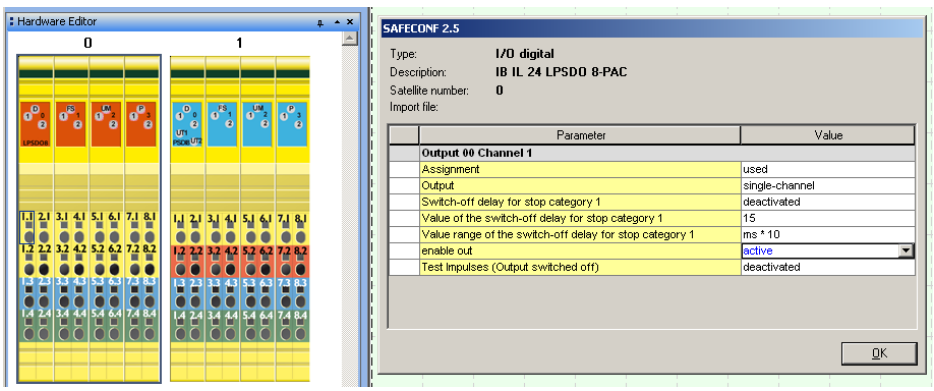

Figure 11 Activating the enable function in SAFECONF

- Download the SAFECONF project to the controller via the FTP (see "Downloading the BINFILE.BIN to the controller" on page 14).
- Press the "Start" button to download the project in the Download area to the IB IL 24 LPSDO 8-PAC (see "New project in the visualization" on page 15). Confirm the message regarding the change made to the previously available project (Accept diff Logic).

In the visualization, you can now enable or disable a signal.

The switches for the enable function can be found on the IB IL 24 LPSDO 8-PAC under "Data-LPSDO". Each checkbox enables the associated output.

In the case of a real project, the enable signal originates from the standard controller and not from the visualization.

When the (active) enable function is enabled, the relevant safe local output is ANDed bit-by-bit with the corresponding standard output of the standard controller (Data-LPSDO register). The safe output is then only set if the result of the safety function calculation permits this and the standard controller has set the corresponding output in the Data-LPSDO register (bit = 1 in the "Data-LPSDO" area).

If the corresponding bit in the "Data-LPSDO" area = 0, the safe output cannot be set.

- Activate or deactivate the enable function using the checkboxes for Data_LPSDO.

Regardless of the input, the enable function can only be activated if it is configured in SAFECONF and the corresponding configuration and parameter data records have been transferred to the controller and the IB IL 24 LPSDO 8-PAC.

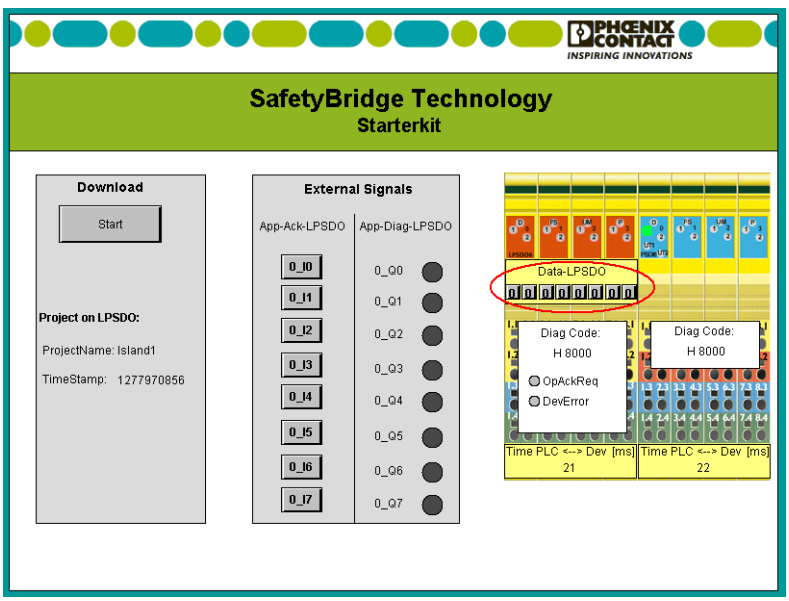

Figure 12 Enable function in the visualization

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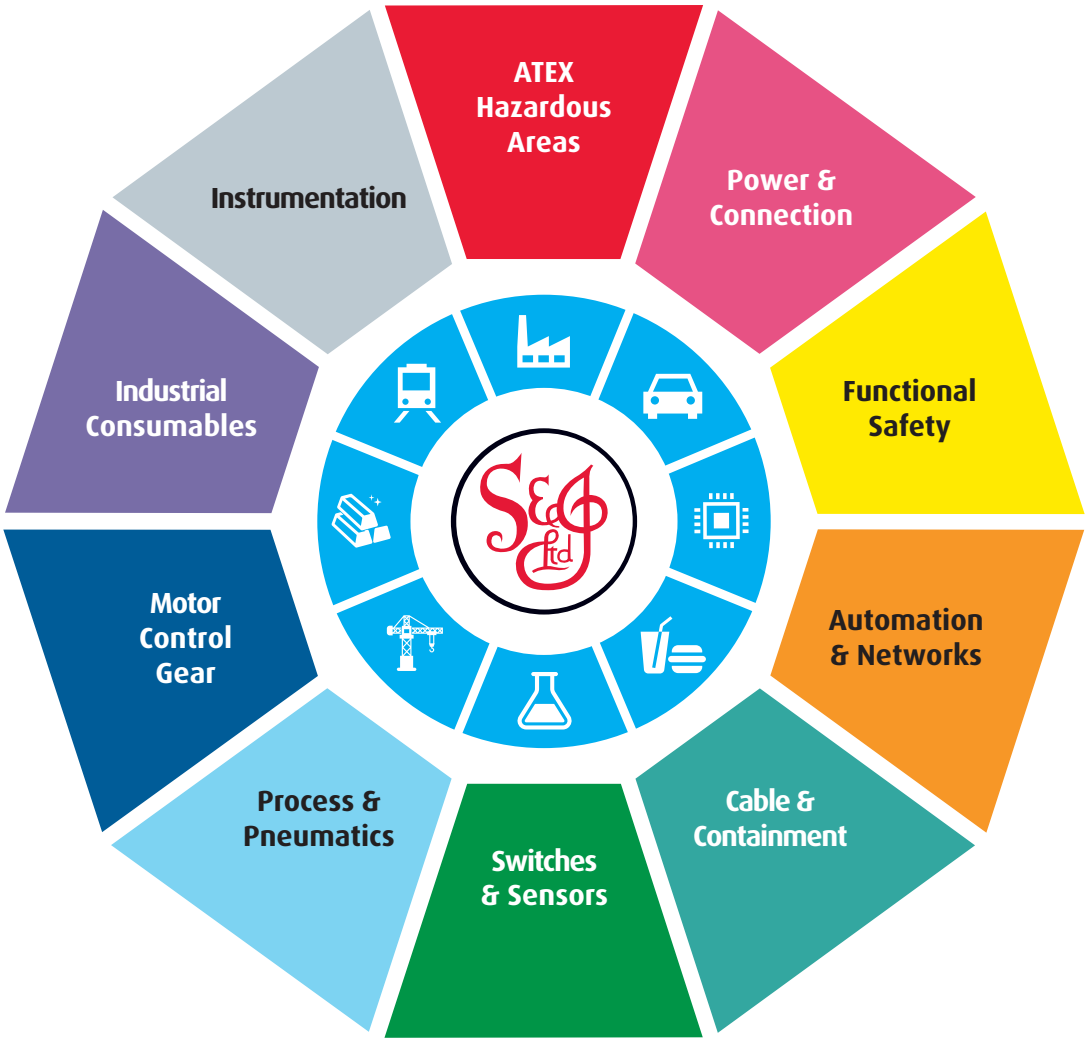

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