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Light control with LOGO! and HMI Panel

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LOGO!

Light control with LOGO! and HMI Panel

Application examples

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Task

The application should satisfy the following requirements:

- Implementation of a light control, i.e. switching on/off and dimming lamps and lamp groups with LOGO!

- Convenient setting, saving and re-opening various light scenarios using an HMI Panel

- Display of the current setting values on the display of the LOGO!

- Language switching of user interface between German / English

Figure 1-1   Light control with LOGO! 8 and HMI Panel

Solution

2

2.1   Overview

This application is implemented via a logic module LOGO! with expansion modules for analog outputs. Operation is via an HMI Panel which is connected to the LOGO!. The following figure shows a schematic system configuration.
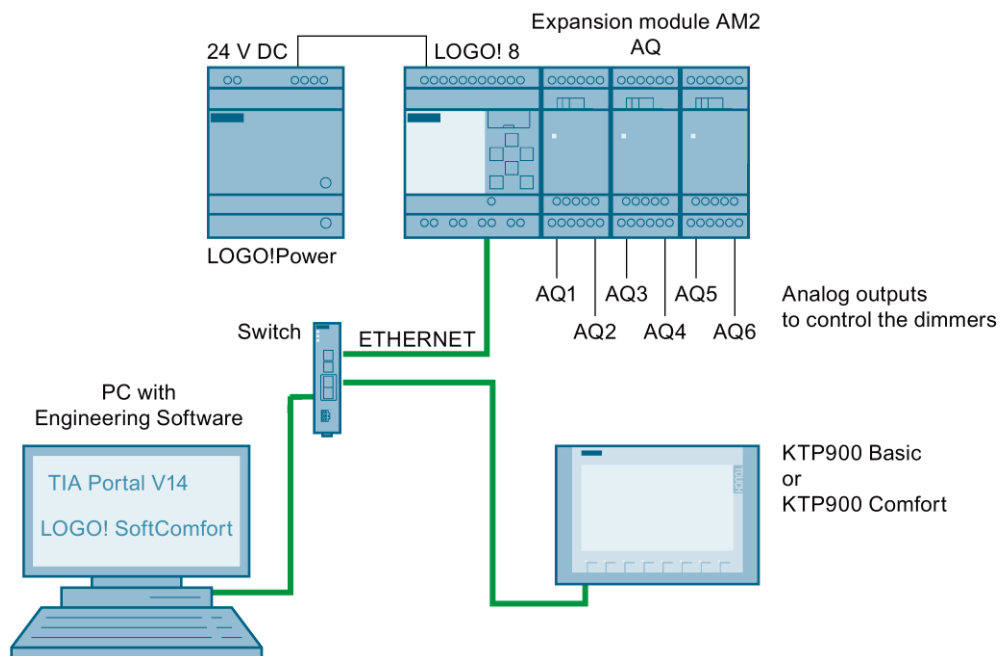

Figure 2-1   LOGO! 8 light control system configuration

Purpose and function of the system components

A LOGO! 8 logic module is the controller in this application. Three LOGO! AM2 AQ modules are used as expansion modules. Each of these modules has two analog outputs. In total, therefore, six analog outputs AQ1 to AQ6 are available in this configuration.

The analog outputs of the expansion module have a voltage range of 0 V DC to 10 V DC, which enable the direct control of suitable dimmers (for example, hall dimmers) for light control.

For additional information on controlling dimmers with LOGO!, see the application example which is available for download (see Internet links (Page 25)).

The HMI Panel (for example, KTP900 Basic) provides for a convenient and intuitively operable control.

The "Recipes" function of the HMI Panel provides a elegant option for defining associated lamp group and transferring the control values to LOGO!.

A corresponding control program in the LOGO! logic module processes the control values from the HMI Panel and controls the analog outputs accordingly.

Communication between LOGO! and HMI-Panel is via an Ethernet connection. A 24-V power supply unit LOGO!Power is used to supply power to the LOGO!, the expansion modules and the HMI module.

The LOGO! logic module and HMI Panel are configured using a PC connected via Ethernet. The LOGO! Soft Comfort program is used to configure LOGO! The HMI Panel is configured in the TIA Portal.

You can find detailed information on the used components under Hardware and software components (Page 12).

2.2   Principle of operation

Using recipes for light control

The HMI Panel enables you to set and transfer the light values of individual lamps and the entire light scenarios to LOGO!. To do this, you combine associated pre-settings to a recipe in the HMI Panel.
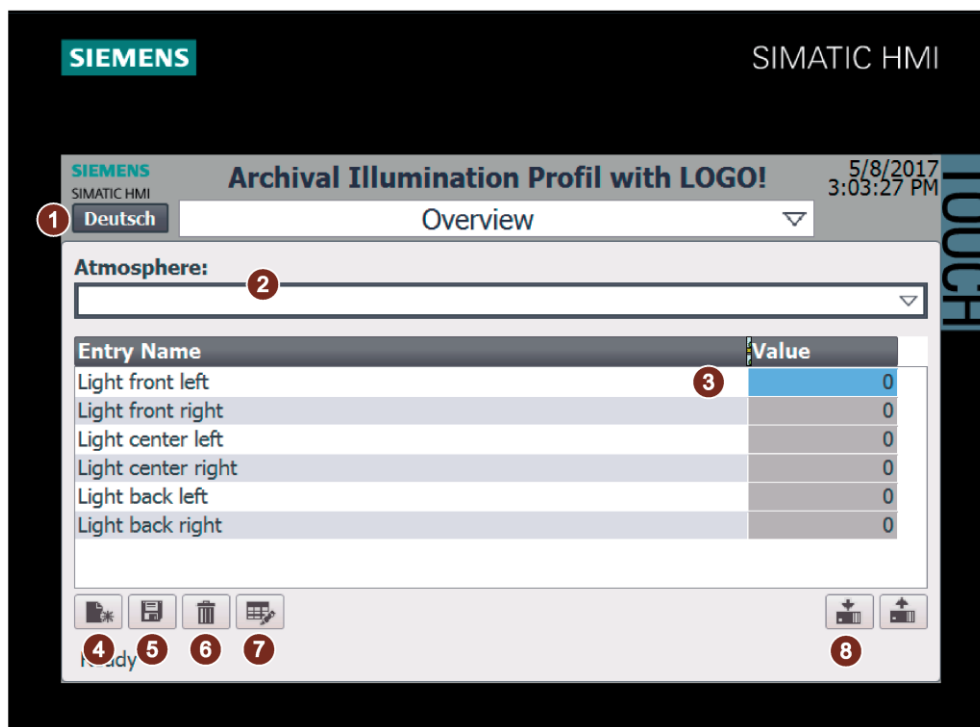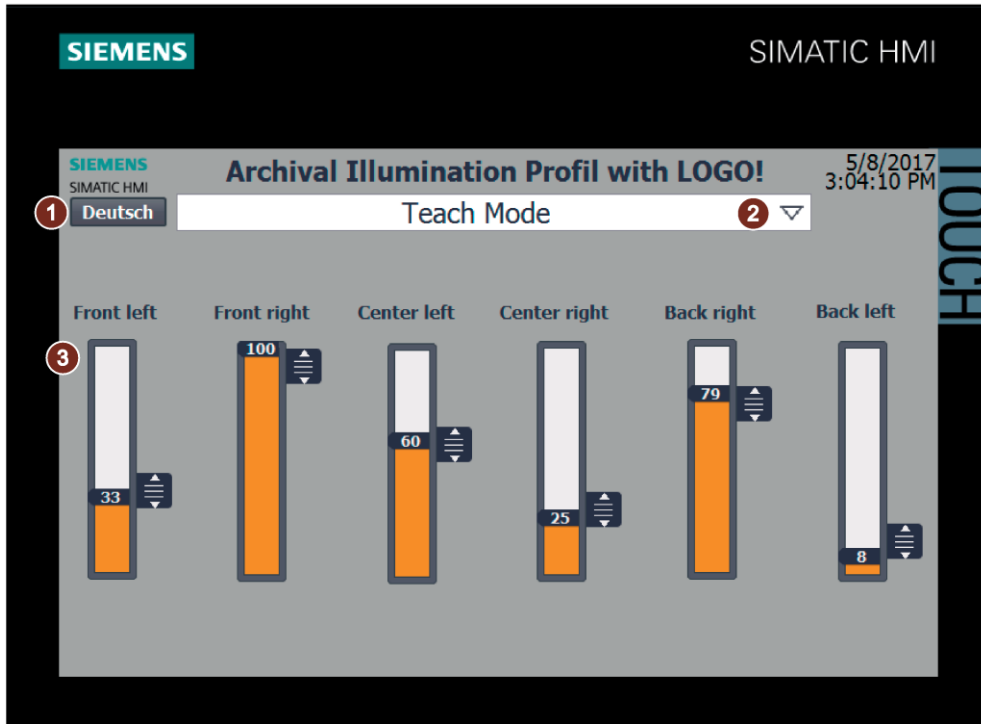

①   Language switch German / English
②   Recipe selection (Atmosphere)
③   Recipe element with entry field for individual brightness, value range: 0 to 100
④   Create a new recipe data record
⑤   Save recipe data record
⑥   Delete a recipe data record
⑦   Edit the recipe data record
⑧   Transfer recipe data record to LOGO!

Figure 2-2   Recipe for light control

Teach mode

When you use a Comfort Panel you have the option of setting the light situation and immediately checking their effect. If your settings are correct you can load them from LOGO! to the HMI Panel and save them as recipe data record under a name.

①	Language switching between German / English
②	Switching between teach mode and recipe
③	Slider for setting the brightness (value range 0 to 100)

Figure 2-3   Teach mode

Note

Requirements for using the teach mode:

You require TIA V14 Update 2 (or higher) with WinCC Advanced and a Comfort Panel (Page 12), as the slider is available as function in this combination.

2.3 Hardware and software components

This application example was created with the following components:

Hardware components

Component	Number	Article number	Comment
Power supply 24 V LOGO!Power	1	6EP1332-1SH43	Power supply for LOGO!, expansion module AM2 AQ, HMI Panel
LOGO! 12/24RCE	1	6ED1 052-1MD00-0BA8	LOGO! 8 logic module with display and Ethernet connection 12 V DC to 24 V DC supply voltage
LOGO! AM2 AQ	3	6ED1055-1MM00-0BA2	Expansion module with 2 analog outputs 0 to 10 V
SIMATIC HMI KTP900 Basic	1	6AV2123-2JB03-0AX0	For recipe
SIMATIC HMI TP900 Comfort	1	6AV2124-0JC01-0AX0	For recipe and teach mode

Software components

Component	Number	Article number	Comment
LOGO! Soft Comfort V8	1	6ED1058-0BA08-0YA1	Version V8.1.0 is used for this application example
TIA V14 with WinCC Basic/Advanced	1	--	--

Example files and projects

Component	Comment
109747758_LOGO_light_control.pdf	This document
109747758_LOGO_light_control.zip	This packed file contains the LOGO! Soft Comfort file and the TIA project of the application example.

Configuring / programming 3

3.1 Overview

This chapter describes the configuration of the LOGO! 8 system components and the HMI panel.

Note

The corresponding example programs are available for download for the configuration described below. See Hardware and software components (Page 12).

Knowledge required

- Knowledge in handling and programming the Siemens LOGO! 8 logic module
- Knowledge of the LOGO! Soft Comfort program
- Knowledge about using the TIA configuration environment and about SIMATIC WinCC
- General knowledge of network engineering (TCP/IP)

3.2 Configuring HMI Panels

3.2.1 Connecting HMI Panels with LOGO!

1. Assign an IP address for the HMI Panel in the "device configuration" ①.

2. Create an new connection, for example with the name "LOGO_Connection" under connections ②. Select "LOGO!" as communication driver ③.

3. Connect HMI Panel and LOGO! via an ETHERNET connection ④.

4. Assign the IP addresses ⑤ for the devices according to the system environment.

Note

Make sure that the specified IP address of the HMI Panel is identical with the IP address specified under "device configuration".
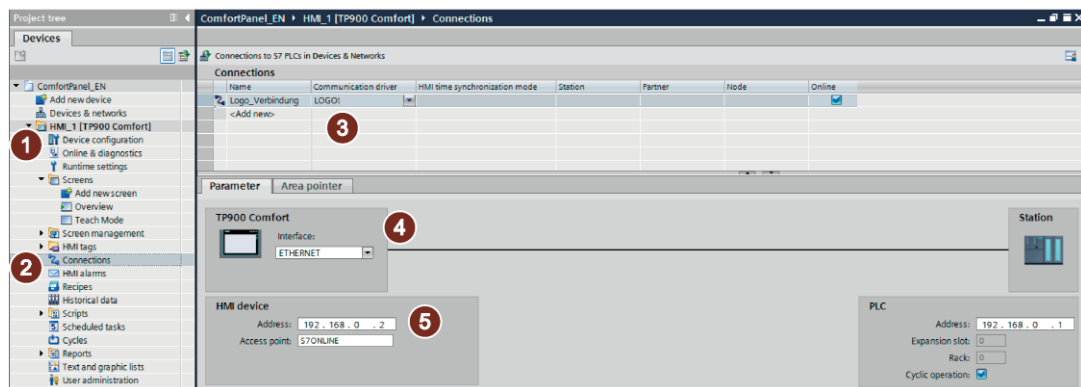
Figure 3-1   Creating an Ethernet connection

3.2.2 Creating a tag table

1. Under "Default tag table" ① create the tags that are to be linked to the LOGO!.

2. Make sure that the name of the LOGO! communication driver (Page 15) is set under connection ② to ensure a connection to the LOGO!.

3. Define the address ③ as VW (variable word memory) This address type can be read and described in the LOGO! as "Analog network input". When reading values from the VM (variable memory), the VW address range covers the values 0 to 849.

Figure 3-2   Creating a tag table

3.2.3   Defining the "light control" recipe

Creating the "light control" recipe

1. Open the "Recipes" editor ① and create a new "light control" recipe.

2. Add the various lamps under "Elements" ②.

3. Link the created recipe elements with the tags ③ from the tag table (Page 16).
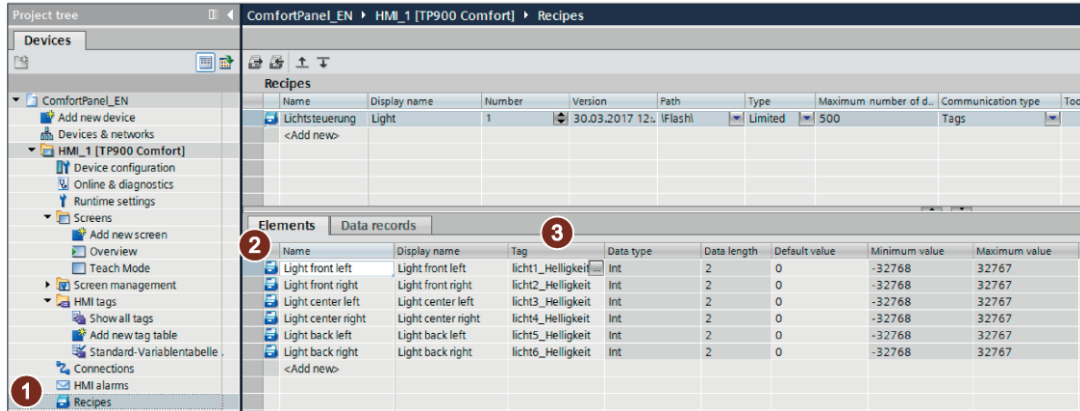

Figure 3-3   Creating the "light control" recipe

Inserting data records

1. Insert the data records ①, for example, Jazz, Rock, Classic. The recipe data record has a separate column ② for every recipe element (lamp) created in the recipe with the input field for the brightness value of the respective lamp.

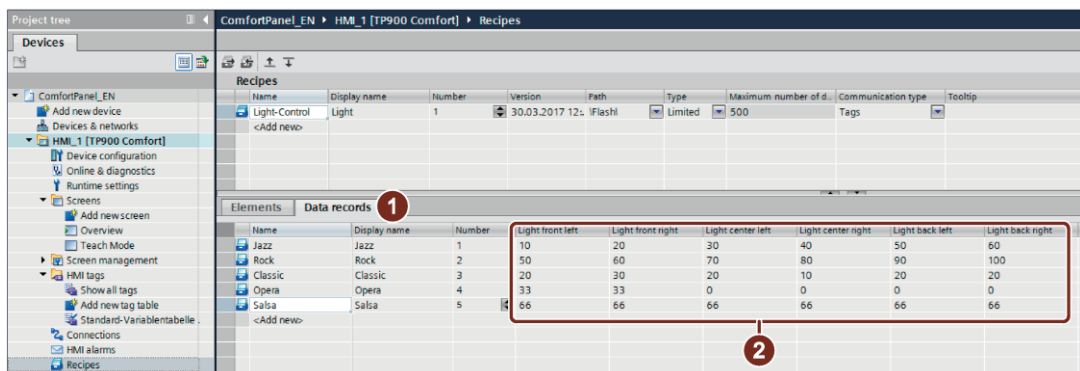   You can subsequently edit and adjust the created data records.

Figure 3-4   Inserting data records

Configuring a recipe view

A standard display and operating object, the "Recipe View", is used to display and manage recipes.

1. Open the "Screens" editor.

2. You will find the recipe view under "Controls" in the "Tools" task card ①. Insert the created recipe in the screen ②.

3. Select the previously created recipe under "Properties > General > Recipe". The inserted template is now linked to the existing recipe.
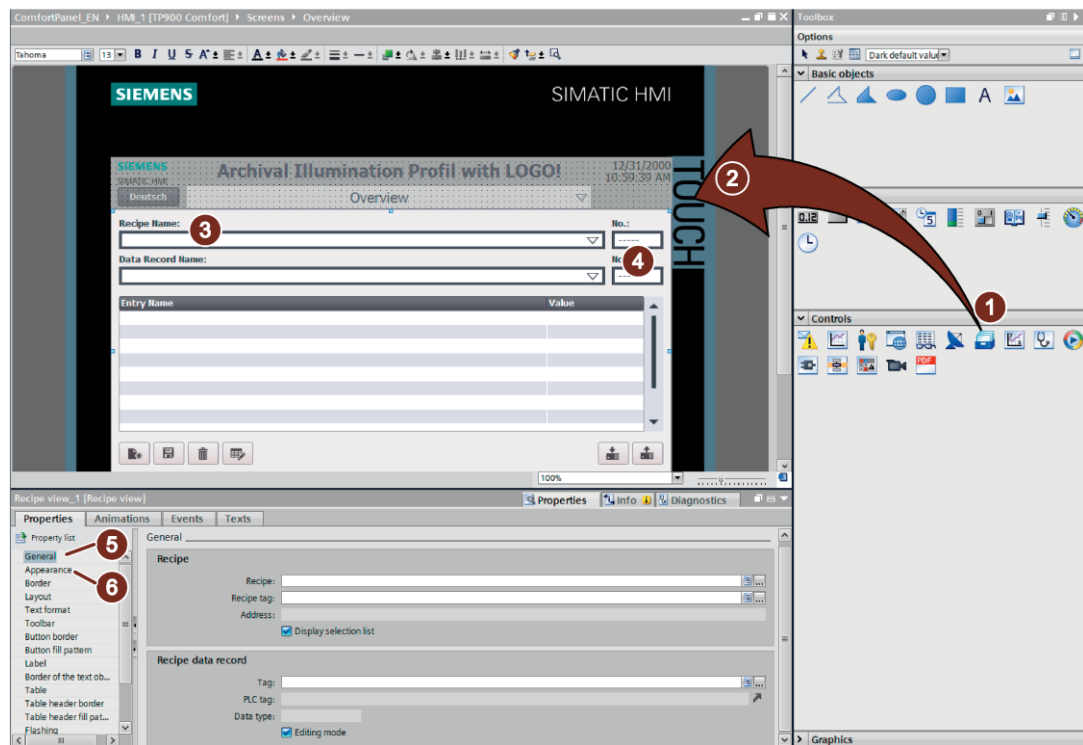
Figure 3-5   Configuring a recipe view

4. Customize the display of the recipe.

   - Under "General" ⑤ you can removed the recipe name ③.
   - Under "Appearance" ⑥ you can remove the number ④.

3.2.4   Setting up teach mode

Requirements

To use teach mode, you need a Comfort Panel (Page 12).

Configuring teach mode

1. Insert a slider ①.

2. Format and label the slider under "Properties" ②.

3. Link the slider to the via the "Process tag" ③ to the corresponding tag from the tag table (Page 15).

4. Set the color of the bar under "Appearance" ④.

5. You can remove the marking and the scale under "Layout" ⑤.

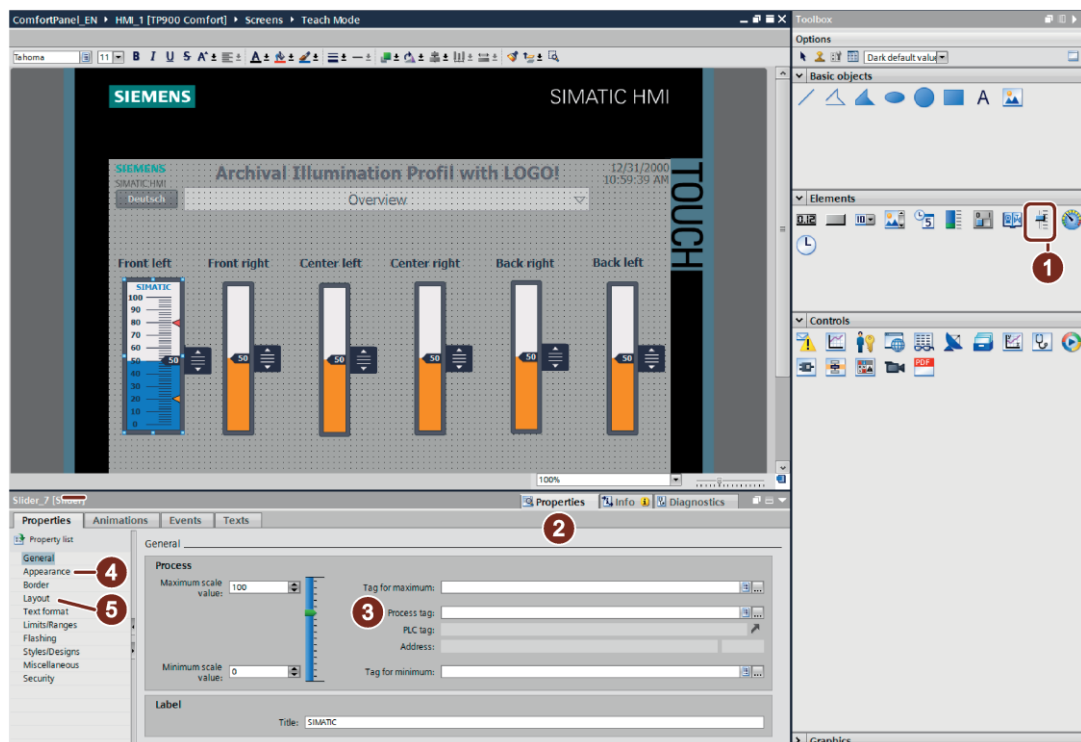6. You can adjust or remove the label "SIMATIC" under "General".

Figure 3-6   Configuring teach mode

3.2.5 Configuring language switching

Defining languages

1. Under "Project languages" ①, activate the languages that are to be displayed on the HMI Panel. In this example, these languages are "English" and "German".
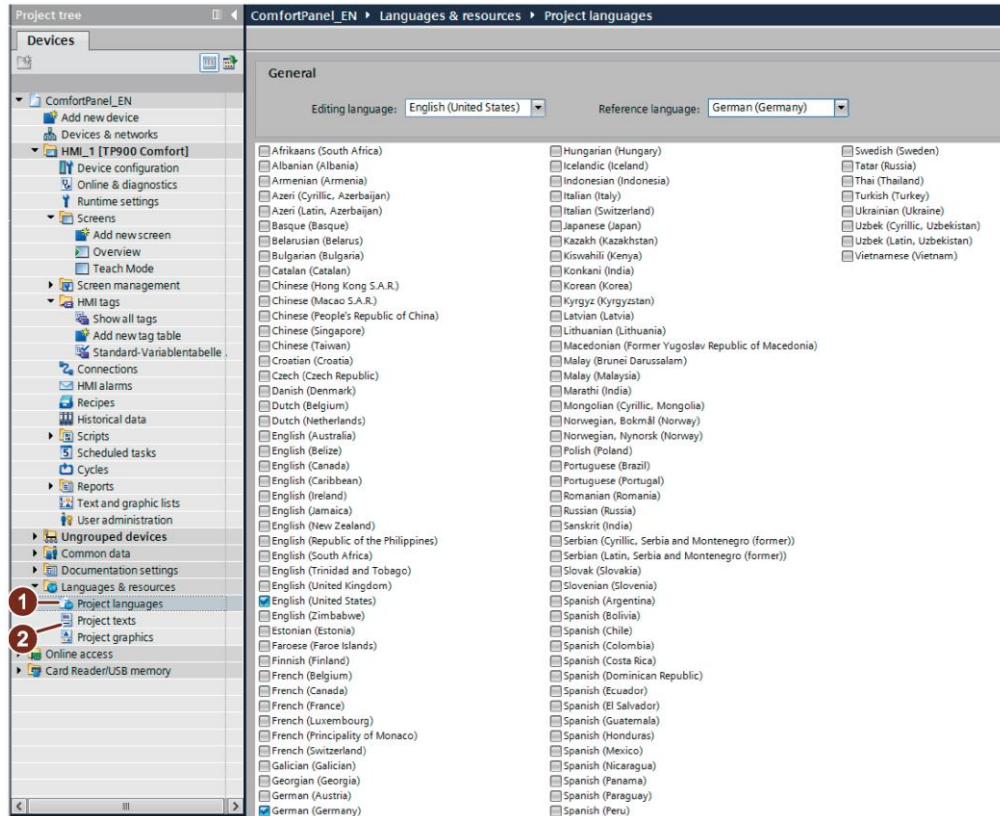

Figure 3-7   Setting project languages

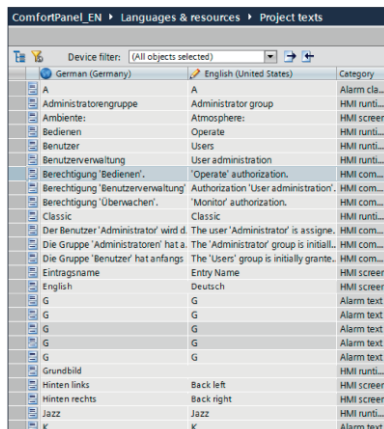2. Under "Project texts" ② define the German and English texts of the project.

Figure 3-8   Defining project texts

3. Set the check marks for the selected languages under "Runtime settings" ① with "Enable" ②.
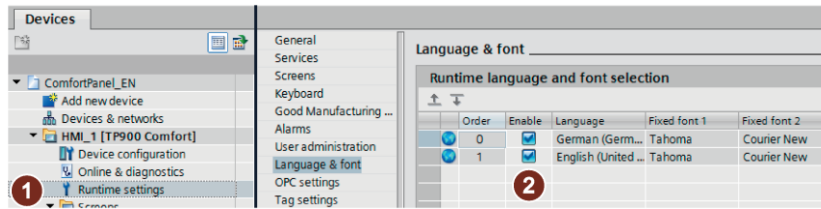

Figure 3-9   Runtime settings

Insert a button to toggle the display language

You require a corresponding button in order to be able to change the user interface language of the HMI Panel. When you press this button the language should toggle between German and English.

1. Insert a button ①.

2. Set the behavior of the button:
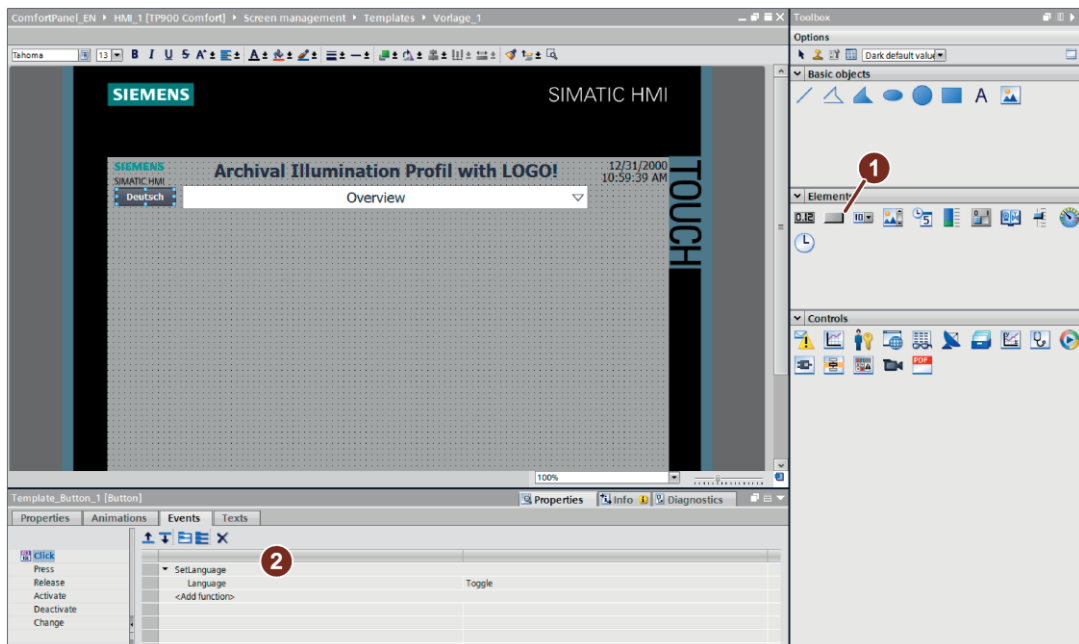"Properties > Events > Click > Set Language > Toggle"

Figure 3-10   Configuring a button to toggle languages

3.2.6 Check and test the configuration

You do not have to be load the interface on the hardware in order to check the configuration functionality for the HMI Panel. During compilation, WinCC checks the consistency of the configuration. In addition, you can test your configuration and, if necessary, find logical configuration errors using the WinCC simulator.

3.3 Configuring LOGO!

3.3.1 LOGO! control program

Overview

The following figure shows a section of the control program created in LOGO! Soft Comfort. This control program is designed for six analog outputs for controlling the dimming. This program is available to Download (Page 25).
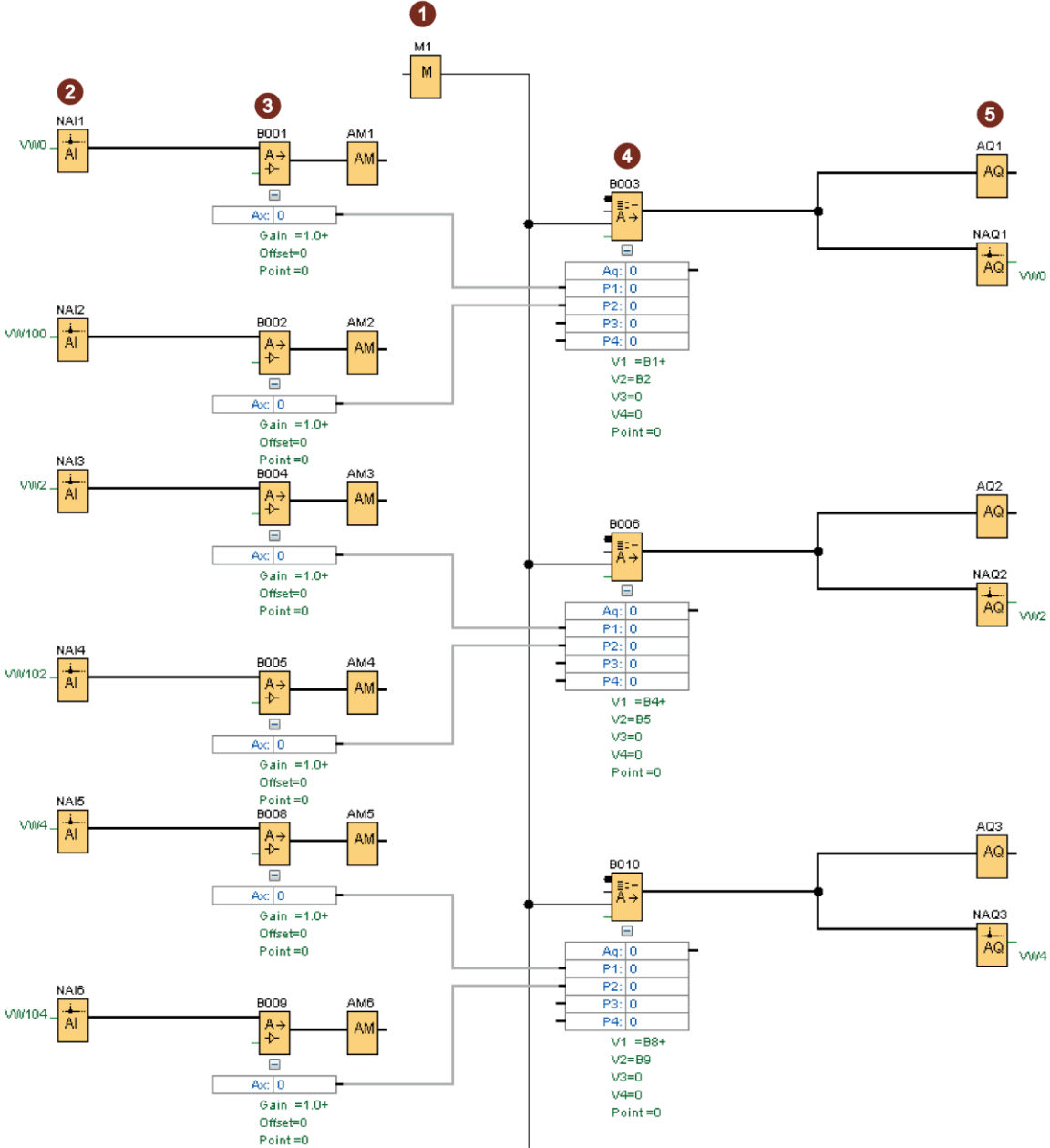

Figure 3-11   LOGO! control program section 1

Functionality of the LOGO! control program

The function of the individual blocks in the control program are described in detail below.

No.	Description
①	Bit memory 1 (M1) is linked to the HMI Panel and is used as "Switch" between teach mode and recipe. Note: Teach mode is only possible when using Comfort Panels (Page 12).
②	The value is transferred from the HMI Panel to the LOGO! via the "analog network input" (see also section Creating a tag table (Page 16)) • NAI1 (VW0) is used to input via the recipe • NAI2 (VW100) is used to input via the teach mode
③	The values are subsequently link to an "analog amplifier" (for example, B001).
④	This link enables the output to be set at an "analog multiplexer" (for example, B003). The multiplexer then switches the teach value or the recipe value at the output.
⑤	The values are then transferred to an "analog output" (for example, AQ1). The values are then transferred to an "analog network output" (for example, NAQ1). The values are stored in the tags linked to the network output (for example, VW0).

To display the data on the display of the LOGO!, a "high signal" is inserted which is linked to the "alarm text" (for example, B007). The white background on the display is set via the bit memory M25 LOGO! display.
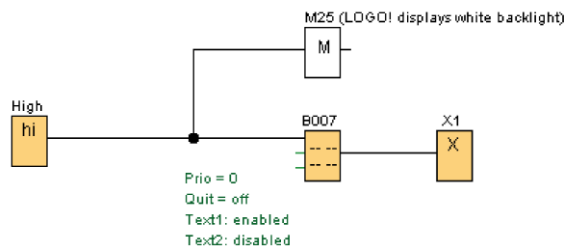

Figure 3-12   LOGO! control program section 2

Further information

For additional information on controlling dimmers with LOGO!, see the application example which is available at Internet links (Page 25)

Appendix A

A.1 Literature references

No.	Title
1	LOGO! Lehr – und Arbeitsbuch zur Kleinsteuerung Autor: Herbert Tapken Verlag: Europa Lehrmittel ISBN: 978-3-8085-3446-5
2	Praxisbezogenes Steuern und Regeln mit der LOGO! 8 Autor: Jürgen Kaftan Verlag: KAFTAN media ISBN: 978-3-943211-57-3
3	LOGO! 8 A Practical Introduction, with Circuit Solutions and Example Programs Author: Stefan Kruse Published by: Publicis ISBN: 978-3-89578-439-2
4	LOGO!8 - MiniTrainerSchule Author: Klaus Machalek Art. no.: LOGO! MTS

A.2 Internet links

No.	Topic
1	Download page of the entry (https://support.industry.siemens.com/cs/ww/en/view/109747758)
2	Siemens Industry Online Support (http://support.industry.siemens.com)
3	LOGO! 8 manual (https://support.industry.siemens.com/cs/de/en/view/100761780/67518106635)
4	SIMATIC HMI Basic Panels Manual (https://support.industry.siemens.com/cs/ww/en/view/90114350)
5	SIMATIC HMI Comfort Panels manual (https://support.industry.siemens.com/cs/ww/en/view/49313233)
6	LOGO! application examples (http://w3.siemens.com/mcms/programmable-logic-controller/en/logic-module-logo/application-examples/Pages/Default.aspx)
7	Application example "Dimming with LOGO! 8" (https://support.industry.siemens.com/cs/ww/en/view/109739085)

A.3 History

Edition	Comment
05/2017	First edition